

## ⚠ WARNING



### RISK OF COLLISION!

If the Local Object (LO) is in a congested area, the CxS Application may not detect or position correctly Remote Objects and the Collision Avoidance System (CAS) will not send the right instructions to the Vehicle Intervention Controller (VIC) which could lead to a collision that could result in death or severe injury.

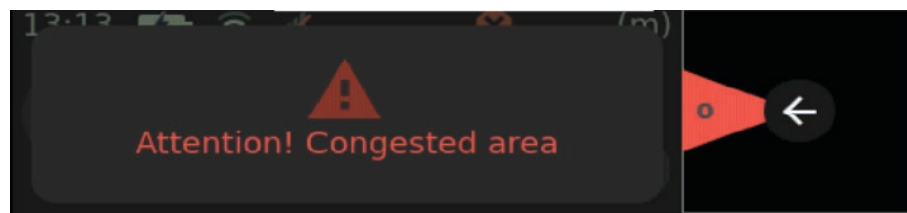
**The operator must slow down or stop and must not rely on the system for vehicle intervention. Mine safety working procedures must be followed.**

The Congested Area alarm notifies the operator that the number of Remote Objects (RO) may either overload the capacity of the CxS application to efficiently position Remote Objects (RO) within a specific sector or zone.

By default, this alarm cannot be acknowledged and is triggered only when more than 15 nodes (PRS and/or NPD-L1x) are detected. For example, this can be triggered when the CxS application detects 2 heavy vehicles (6x PRS each) and 3 pedestrians (1 NPD-L1x each), for a total of 15 nodes, in the bullseye area.




On the NVD, there will be an overlay in front of the MineProx® RO screen, and a repeated audio alert will be played.




5.5 Available Menus

5.5.1 Main Menu Icon (MFD only)



**WARNING**



**RISK OF COLLISION!**

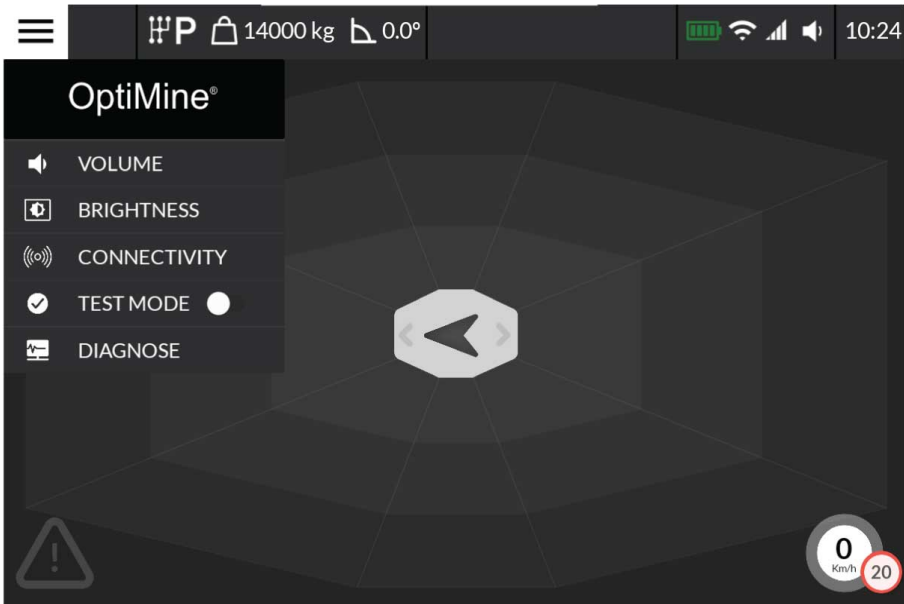
Operating the vehicle while using the Multi-Function Display (MFD) for other purposes than proximity detection may lead to a collision that could result in death or severe injury. If you touch the Main menu icon to change the volume, brightness, and connectivity while operating the vehicle, this can lead to the malfunction of the system or missed notifications.

**Do not touch the Main menu icon to change the volume, brightness, and connectivity while operating the vehicle.**

Touch the **Main menu** icon to open the options to change the volume, brightness, and connectivity. The last two menus, reserved for Newtrax certified personnel, allow them to launch the PRS coverage test and check key information when troubleshooting is necessary.

**Note!**

*The Main menu icon can only be opened when the vehicle is immobilized. If there are no telemetry inputs, the system cannot know if the vehicle is moving, hence the menu is always unlocked.*



5.5.1.1 Adjust Volume

**Note!**

**Adjust the volume only when the vehicle is not in operation.**

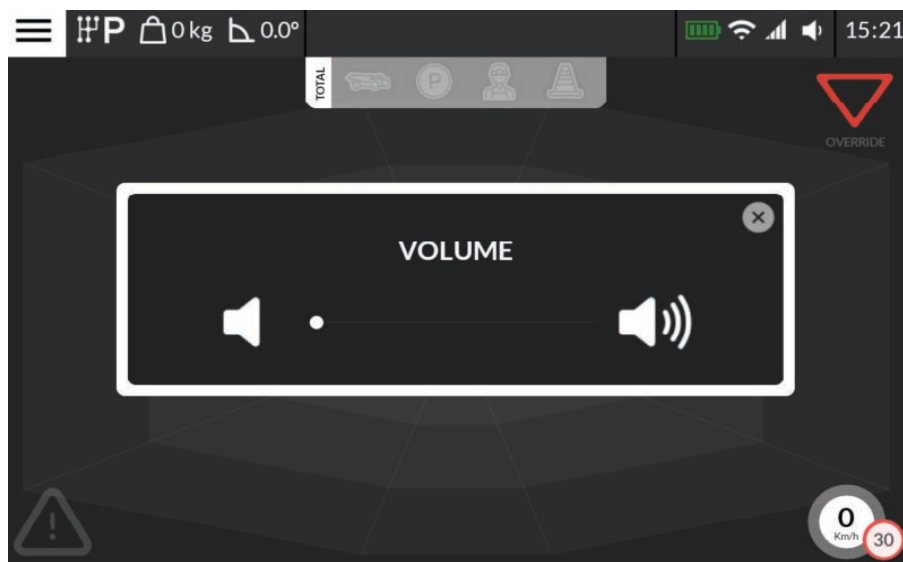
Swipe along the bar to increase or decrease the volume of the Multi-Function Display (MFD). You can also turn off the volume.

If the vehicle is not installed with an MFD, the volume can be configured on the Newtrax Vehicle Device (NVD) only if it is equipped with an external speaker (NTX-NVD-BUZZ-00x). Unlike the MFD, the volume can be

configured through internal configuration and cannot be configured through the UI.

**Note!** *The settings of the NVD can only be modified by certified Newtrax personnel.*

**Note!** *If the external speaker is not installed, the NVD has an internal buzzer that produces audio alerts at 70 dB.*



#### 5.5.1.2 Adjust Brightness

Swipe along the bar to increase or decrease the brightness of the Multi-Function Display (MFD).




**Note!** *Adjust the brightness only when the vehicle is not in operation.*


#### 5.5.1.3 Connectivity

**Note!** *Only Newtrax approved personnel must use this menu.*

5.5.1.4 Test Mode



## WARNING



**RISK OF COLLISION!**

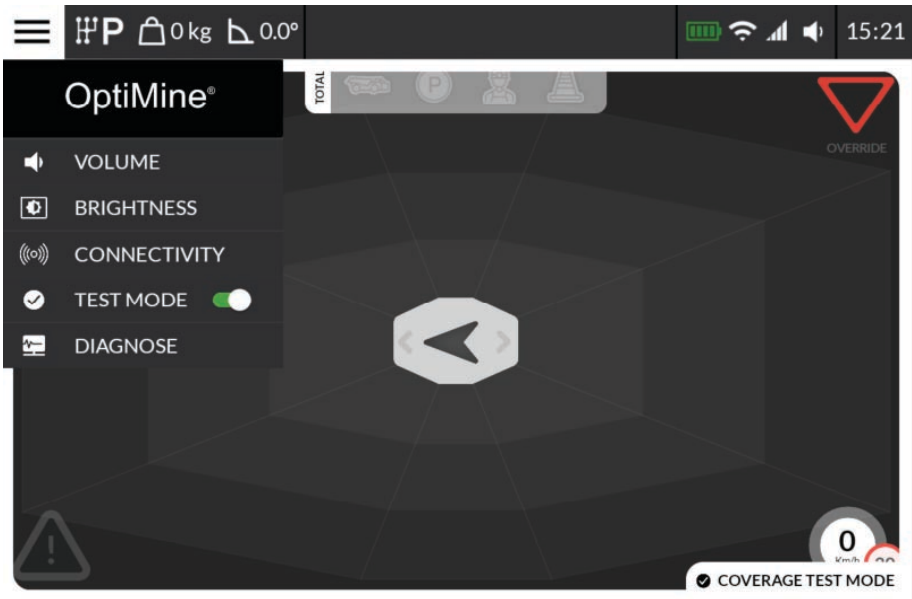
Operating the vehicle while using the Multi-Function Display (MFD) for other purposes than proximity detection may lead to a collision that could result in death or severe injury. Do not start the Test mode while driving, as it will turn off the detection of remote objects, the advisory notifications (Slow, Stop) when an RO is too close, and any appropriate vehicle-controlled intervention (Collision Avoidance System (CAS) only).

Use the Test Mode only when the vehicle is not in operation and there are no risks of collisions with other vehicles.

**Note!**

**Only Newtrax approved personnel must use this menu.**

This tool starts the PRS Coverage test, which is a test executed during the commissioning process to validate the sensors coverage and their location on the vehicle. Speak to Newtrax certified personnel for more details.



5.5.1.5 Diagnose

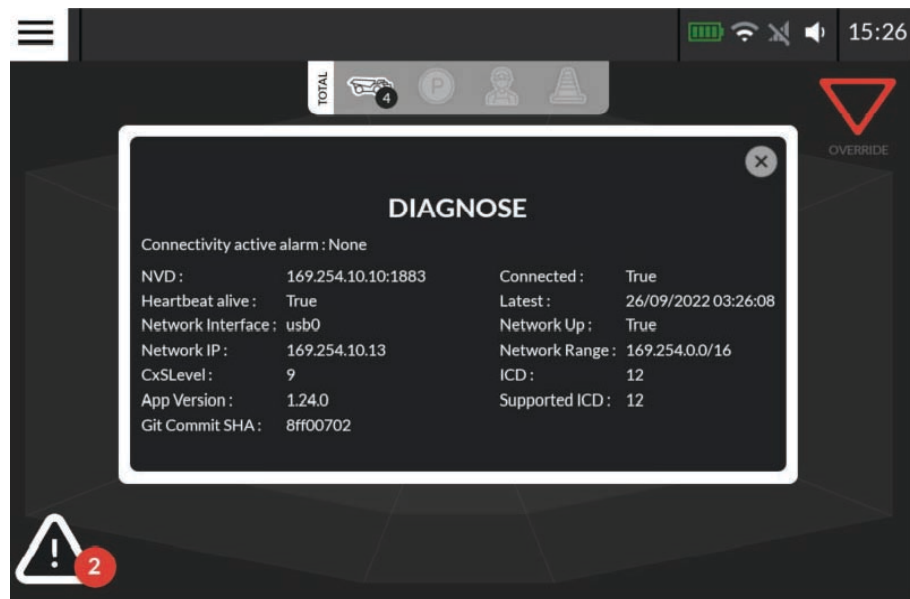
**Note!**

**Diagnose information must be consulted only when the vehicle is not in operation.**

- This submenu provides information that is useful for troubleshooting purposes. See the Terminology section for more details on each.

  - Information and status of the communication between the NVD and the MFD.
  - PDS/CWS/CAS selection on NVD.
  - MFD Application version.

- ICD: Version of the ICD the NVD utilizes.
- Supported ICD: Version of the ICD the MFD supports. This needs to match with the ICD value described above.





If the MFDs supported ICD and the NVDs ICD are different, the following warning will be displayed:



Touch the Diagnose to show the discrepancy:



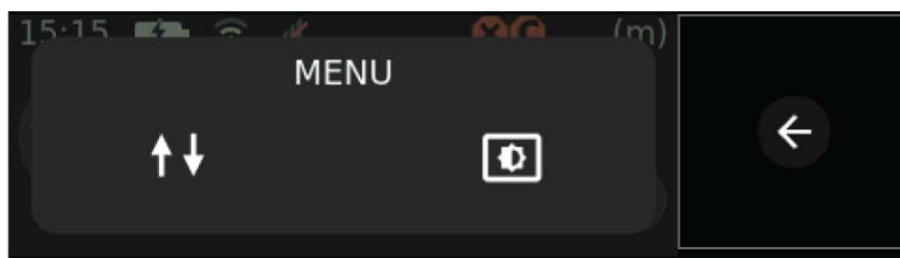
5.5.2 Submenu (NVD Only)

<div> <b>WARNING</b></div>	
	<b>RISK OF COLLISION!</b>
	Operating the vehicle while using the NVD GUI for other purposes than proximity detection may lead to a collision that could result in death or severe injury. If you use the Submenu on the NVD to change settings while operating the vehicle, this can lead to the malfunction of the system or missed notifications.
	Do not use the Submenu on the NVD to change settings while operating the vehicle.

**Note!** Do not open the submenu and do not adjust the brightness while driving.

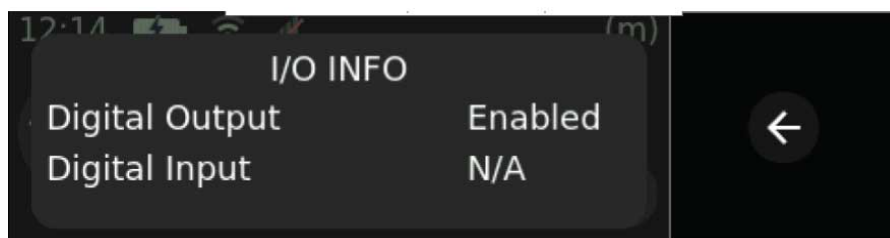
On the NVD, press the check mark button to access the submenu. The two available options are:

- Current Isolated I/O settings
- Brightness adjustment



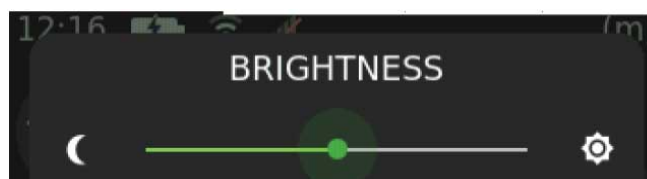
#### 5.5.2.1 *Input/Output (I/O) Settings Information*

From the MineProx® screen, press the check mark button to select and access the **Input/Output (I/O)** settings information screen. This section of the submenu allows the user to access the Input and Output settings related to the Isolated I/O port if any.



#### 5.5.2.2 *Brightness*

From the MineProx® screen, press the check mark button to select and access the **Brightness** screen. This section can adjust the brightness of the screen with the up/down arrow buttons on the NVD. Press the check mark button to save the changes.



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## **6      System Verification and Maintenance**

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## 6.1 System Verification and Maintenance

### **WARNING**



#### **DEGRADED MODE HAZARD!**

Using the system while it is compromised or degraded may lead to an accident that could result in death or severe injury. If the system or any of its components are disabled for a brief period or permanently, proper procedures must be implemented to inform all personnel that can be affected by this change.

Always follow the safety procedures related to the operation of the NVD.

### **WARNING**



#### **DEGRADED MODE HAZARD!**

Using the system while it is compromised or degraded may lead to an accident that could result in death or severe injury. Be careful when servicing the vehicle or performing maintenance, as these actions could inadvertently disable the system or part of the system. This could lead to malfunction.

System verifications and tests must always take place after you service the vehicle or perform maintenance.

The different verifications to be done are divided into two categories:

- Shift-wise verifications: The shift-wise verifications must be done at least at the beginning of every shift.
- Maintenance/Installation verifications: Maintenance/Installation verifications must be done after the installation or after any vehicle or system maintenance that would affect the system.

#### **Note!**

***Maintenance of the system must be done monthly; this can be adjusted depending on the site and the use of the vehicle. All physical components must be inspected and replaced if necessary. The maintenance checks can be done after the inspection of a component or if it is replaced.***

<b>Description</b>	<b>Verification</b>	<b>Shift-wise checks</b>	<b>Maintenance/Installation checks</b>
<b>Physical Inspection of PRS</b>	<i>Make sure that all the PRS are in good condition, firmly fastened, and pointing in the right direction.</i>	<b>x</b>	<b>x</b>
<b>PRS Protectors</b>	<i>Make sure that the PRS Protectors are in good condition.</i>	<b>x</b>	<b>x</b>
<b>PRS Communication</b>	<i>Make sure that all the PRS are connected to an M12 cable, and the latter is not damaged. If possible, start the Test Mode from the tablet and make sure that all the PRS illuminate, which indicates active CAN communication.</i>	<b>x</b>	<b>x</b>
<b>Alarms</b>	<i>Make sure that the MFD or NVD LCD is free of any active alarms. Refer to <a href="#">Alarms (Page 64)</a>.</i>	<b>x</b>	<b>x</b>
<b>Wi-Fi and LTE</b>	<i>Check the icon on either the NVD LCD or the MFD.</i>	<b>x</b>	<b>x</b>
<b>MineProx®</b>	<i>Use a cap lamp to start a Distress signal and check the NVDs reception of the Distress signal over MineProx® technology. Make sure that a visual notification is triggered, and a periodic audio alert is played from either the NVD or the MFD.</i>	<b>x</b>	<b>x</b>
<b>PRS Coverage</b>	<i>Start the PRS Coverage test and walk around the vehicle.</i>		<b>x</b>
<b>CAN Isolator LEDs</b>	<i>Make sure that the LEDs of port 1 are on and the LEDs of ports 4, 5, 6, 7, and 8 are blinking.</i>		<b>x</b>
<b>CAN Isolator Ports</b>	<i>Make sure that the unused ports are still capped.</i>		<b>x</b>
<b>Power</b>	<i>Make sure that the NVD battery is charging when the vehicle is powered. Only necessary for NVD-CORE-00x.</i>		<b>x</b>

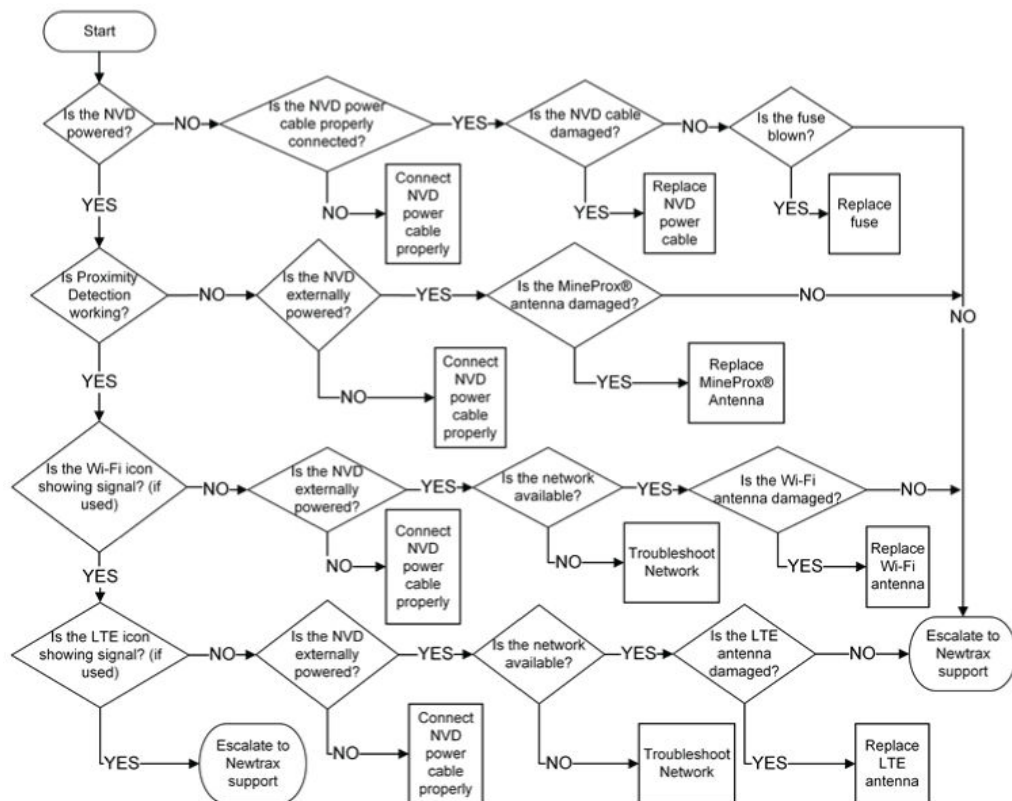
<b>Description</b>	<b>Verification</b>	<b>Shift-wise checks</b>	<b>Maintenance/Installation checks</b>
<b>MineProx® Antenna</b>	<b>Visually inspect the antenna and the exposed wiring of the antenna.</b>		<b>x</b>
<b>Multiband/Wi-Fi Antenna</b>	<b>Visually inspect the antenna and the exposed wiring of the antenna.</b>		<b>x</b>
<b>ICD Version (MFD only)</b>	<b>In the Diagnosis submenu, make sure that the ICD and Supported ICD show the same version.</b>	<b>x</b>	<b>x</b>

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## **7     System Troubleshooting**

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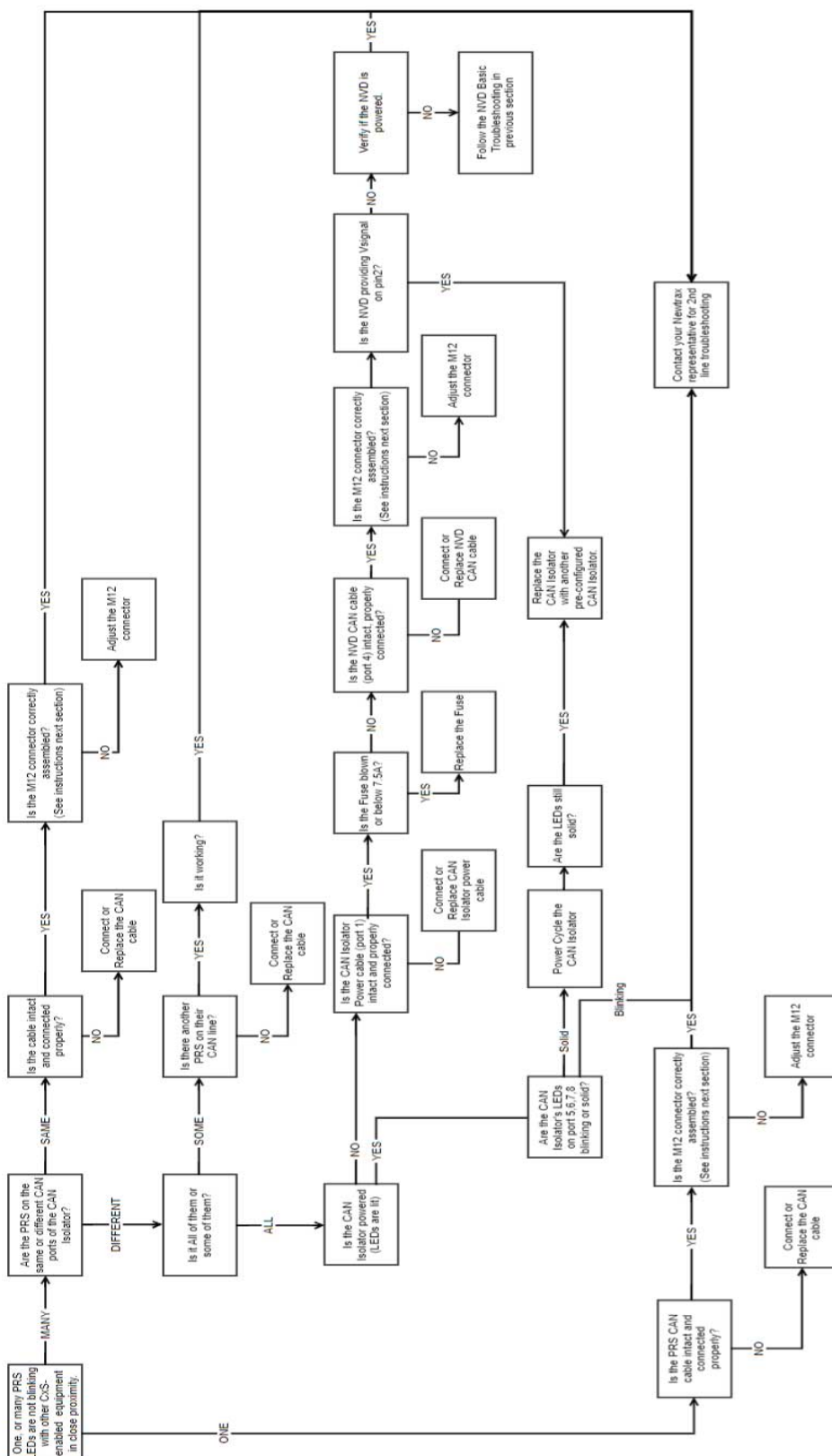
## 7.1 Troubleshooting Flowchart - NVD



## 7.2 CxS Troubleshooting

**Note!** *A PRS coverage test must be successfully executed after each repair to check the integrity of the system.*

Refer to the below flowchart for more information on how to troubleshoot the Collision Warning/Avoidance System (CxS).



## 7.3 Verify M12 Connector Assembly

1. Make sure that you torque the connector assembly.
2. Make sure that the wires are intact:
  - a. M12 Push Lock: Pull the wires gently to make sure that the contact still exists.
  - b. M12 IDC: Make sure that the wires are coming out.
3. Open the connector and make sure that the colors of the wire match with the M12 color as described in the table below:

Pheonix Con- tact 1413991 M12 pin	Pheonix Con- tact 1413991 M12 color	70-01082-00 Wire color	Description
4	Black	White	CAN-Hi
5	Grey	Black	CAN-Lo
3	Blue	Green	GND
1	Brown	Drain	Shield
2	White	Red	V+

4. Install the connector back by applying torque.

## 7.4 PRS Wired link Lost

PRS Wired Link lost occurs in the following conditions:

- With the MFD in installed condition: Launch the PRS coverage test using the Test Mode toggle on the MFD without the dedicated test PRS powered. The PRS or the PRSs that are not lit up are the ones that trigger the alarm. For more information on verifying the problem, refer to [CxS Troubleshooting \(Page 90\)](#) to assess the problem.
- When there is no MFD installed
  - Single PRS setup: Refer to the single PRS section of [CxS Troubleshooting \(Page 90\)](#).
  - Multiple ProxRS Setup
    - Acknowledge the alarm on the NVD
    - Remove any one of the PRS
    - If the PRS which was removed is not the one that triggered the alarm, it will re-trigger the PRS Wired Link Lost on the NVD
    - Insert the PRS, which was unplugged
    - Repeat until all the PRS are tested. It can be with more than one PRS, which can cause the PRS Wired Link Lost condition.
  - After you identify the number of PRSs, refer to [CxS Troubleshooting \(Page 90\)](#).

## 7.5 VIC Wired Link Lost

For support on the VIC wired link lost, speak with Newtrax support.

## 7.6 NVD Signal Loss

### Error Code: Network

1. Disconnect and reconnect the USB cable to make sure that the USB connections are intact on the cradle of the MFD and on the NVDs micro-USB.
2. Use a new USB cable if it is found loose.
3. If steps 1 and 2 do not work, speak with Newtrax representative.

### Error Code: Heartbeat

Speak with Newtrax support if you notice an **error code: Heartbeat**.

## 7.7 Stock Recommendations

Spare Part Number	Description	Part of Assembly	Maintenance Rate	Recommended per veh. per yr.
NTX-NVD-CORE-001	NVD N.A.	NTX-NVD-CORE-001	6 months	1 per 20 veh. per year (5%/yr)
NTX-NVD-CORE-002	NVD Wi-Fi	NTX-NVD-CORE-002	6 months	1 per 20 veh. per year (5%/yr)
NTX-NVD-CORE-003	NVD Global	NTX-NVD-CORE-003	6 months	1 per 20 veh. per year (5%/yr)
NTX-NVD-CORE-101	NVD N.A. no battery	NTX-NVD-CORE-101	6 months	1 per 20 veh. per year (5%/yr)
NTX-NVD-CORE-102	NVD Wi-Fi no battery	NTX-NVD-CORE-102	6 months	1 per 20 veh. per year (5%/yr)
NTX-NVD-CORE-103	NVD Global no battery	NTX-NVD-CORE-103	6 months	1 per 20 veh. per year (5%/yr)
NTX-NVD-PWR	DC-DC Convertor	NTX-NVD-CORE-xxx	6 months	1 per 20 veh. per year (5%/yr)
NTX-PRS-001-000	PRS	NTX-PRS-001-xxx	30 days	1 per 10 units per year (10%/yr)



Spare Part Number	Description	Part of Assembly	Maintenance Rate	Recommended per veh. per yr.
NTX-CAN-ISO-005	CAN Isolator	NTX-PRS-001-004 NTX-PRS-001-006	6 months	1 per 20 veh. per year (5%/yr)
NTX-DIS-PLAY-011	Tablet and cradle	NTX-DIS-PLAY-011	6 months	1 per 20 veh. per year (5%/yr)
	Cables		30 days	1 per 10 units per year (10%/yr)

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## **8      Technical Specifications**

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## 8.1 NVD Electrical Specifications

### NOTICE

- *MineProx® signal characterization is still pending.*
- *BLE signal characterization is still pending.*
- *Wi-Fi signal characterization is still pending.*
- *LTE signal characterization is still pending.*

Description	Min	Typical	Max	Unit
<b>Electrical Specifications</b>				
Input voltage from DC/DC converter	9	12	14	V
Input voltage to DC/DC converter	9	24	32	V
<b>Input Current @ 12V with DC/DC Converter</b>				
Cold start	150	205	481	mA
LTE/Wi-Fi/MineProx® connected	175	240	442	mA
Wi-Fi/MineProx® connected	159	197	383.5	mA
LTE/MineProx® connected	174	235	435.5	mA
Looking for signal on LTE/MineProx® (Wi-Fi disabled)	174	235	600.6	mA
Looking for signal on Wi-Fi/MineProx® (LTE disabled)	166	190	422.5	mA
Restart system configuration	174	235	590.2	mA
MineProx® only (LTE/Wi-Fi disabled)	166	180	373.1	mA
LTE/Wi-Fi/MineProx® with external buzzer (active default power)	170	225	435.5	mA
LTE/Wi-Fi/MineProx® with external buzzer (active max power)	174	230	455	mA
LTE/Wi-Fi/MineProx®/external buzzer and charging battery	1600	1650	2210	mA
Looking for MineProx® (LTE/Wi-Fi disabled)	151	189	579.8	mA
LTE/Wi-Fi/MineProx® with brightness at 100%	175	240	442	mA
LTE/Wi-Fi/MineProx® with brightness at 50%	128	196	422.5	mA
LTE/Wi-Fi/MineProx® with brightness at 0%	121	189	383.5	mA
<b>Input Current @ 24V with DC/DC Converter</b>				
Cold start	125	250	422.5	mA
LTE/Wi-Fi/MineProx® connected	225	275	422.5	mA

Description	Min	Typical	Max	Unit
Wi-Fi/MineProx® connected	225	250	390	mA
LTE/MineProx® connected	225	275	520	mA
Looking for signal on LTE/MineProx® (Wi-Fi disabled)	275	325	520	mA
Looking for signal on Wi-Fi/MineProx® (LTE disabled)	225	250	390	mA
Restart system configuration	225	275	422.5	mA
MineProx® only (LTE/Wi-Fi disabled)	225	250	487.5	mA
LTE/Wi-Fi/MineProx® with external buzzer (active default power)	225	275	487.5	mA
LTE/Wi-Fi/MineProx® with external buzzer (active max power)	225	275	520	mA
LTE/Wi-Fi/MineProx®/external buzzer and charging battery	950	975	1397.5	mA
Looking for MineProx® (LTE/Wi-Fi disabled)	225	250	390	mA
LTE/Wi-Fi/MineProx® with brightness at 100%	225	275	422.5	mA
LTE/Wi-Fi/MineProx® with brightness at 50%	200	250	409.5	mA
LTE/Wi-Fi/MineProx® with brightness at 0%	200	225	390	mA
<b>Isolated IO</b>				
Isolated input voltage	3		40	V
Isolated input current			32	mA
Isolated output configuration	Normally Open (NO)			
Isolated output current			140	mA
<b>IDN (Newtrax Device Network)</b>				
Output voltage	Vin-0.5		Vin	V
Total output current			500	mA
<b>Environmental Specifications</b>				
Operating temperature without battery	-30		60	°C
Operating temperature with battery	-20		40	°C
Storage temperature without battery	-30		60	°C
Storage temperature with battery	-20		50	°C

Refer to Newtrax Vehicle Device (NVD) data sheet for more information.

## 8.2 Newtrax Multi-Function Display - Technical Specifications

Features	Description
Mobile Computing Platform	Qualcomm Octa-core processor, 1.8GHz
Operating System	Android 9.0
RAM	3GB LPDDR3
Storage	32GB eMMC
Storage Expansion	Maximum Support Micro SD 512GB
LCD	7-inch HD (1280 x 800), 800cd/m2 Sunlight readable.
Touch Screen	10-point multi touch capacitive touchscreen
Digital Camera	Front 5 MP and Rear 16 MP
Bluetooth	BLE 4.2
Wi-Fi	IEEE 802.11 a/b/g/n/ac; 2.4GHz/5GHz
2G/3G/4G	LTE, HSPA+, UMTS, EDGE, GPRS, GSM (Data and Voice)
GNSS	GPS/GLONASS
NFC	<ul style="list-style-type: none"> <li>Read/Write Mode: ISO/IEC 14443 A&amp;B up to 848kbit/s, FeliCa at 212 and 424 kbit/s.</li> <li>MIFARE 1 K, 4K, NFC Forum type 1, 2, 3, 4, 5 tags ISO/IEC 15693 all peer-to-peer modes.</li> <li>Card Emulation Mode (from host): NFC Forum T4T (ISO/IEC 14443 A&amp;B) at 106 kbit/s; T3T FeliCa</li> </ul>
Video Format	TS/MP4
<b>Interface</b>	
<ul style="list-style-type: none"> <li>Type-C: Compliant with USB 3.0 (for charging and data transfer; support OTG)</li> </ul>	
<ul style="list-style-type: none"> <li>Docking Connector: POGO PIN x 24</li> </ul>	
<ul style="list-style-type: none"> <li>Headphone and Microphones: x 1</li> </ul>	
Sound	Built-in 2W 85dB speaker and internal microphone.
Sensor	Gyroscope, Accelerometer, Light sensor, Compass
DC Input	DC9-36V (ISO 7637-II compliant)

Features	Description
Battery	3.7V, 5000mAh Li-ion (Replaceable/Removable)
Weight of the Tablet	815g
Weight of the Cradle	550g
Dimension of the Tablet	200 x 130 x 28.5 mm
<b>Environment of the Tablet</b>	
• Drop Test: 120 cm	
• Vibration Test: MIL-STD-810G	
• Dustproof and Waterproof: IP67	
• External Power: -20 °C - 65 °C / 0 °C - 55 °C (charging)	
• Battery Power: -10 °C - 65 °C	
Storage Temperature: -20 °C - 70 °C	
<b>Environment of the Cradle</b>	
• Vibration Test: MIL-STD-810G	
• Operating Temperature: -20 °C - 65 °C (-4 °F - 149 °F)	
• Storage Temperature: -20 °C - 70 °C (-4 °F - 158 °F), 0 - 95% (humidity)	

Power Consumption Test														
Test Condition	Voltage (V)	Power Consumption	Maximum Power Consumption			Standby (Backlight On)			Standby (Sleep Mode)			Power Off (Charging)	Remark	
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	Current (A)		
Stand-by current: <ul style="list-style-type: none"><li>Backlight: 100% Maximum current</li><li>Volume: 100%</li><li>Memory: 90%~100%</li><li>Bluetooth: Send</li><li>Wi-Fi: Open not connected</li><li>3G/4G: Download</li></ul>	9	Current (A)	1.892	1.908	1.93	1.201	1.26	1.268	0.604	0.617	0.627	0.551	Battery is charging	
		Power consumption (W)	17.028	17.172	17.37	10.809	11.34	11.412	5.436	5.553	5.643	4.971		
		Current (A)	1.309	1.315	1.325	0.891	0.893	0.913	0.439	0.444	0.455	0.403		
	12	Power consumption (W)	15.708	15.78	15.9	10.692	10.716	10.956	5.268	5.328	5.46	4.845		
		Current (A)	0.418	0.422	0.425	0.28	0.283	0.294		0.163	0.166	0.138		
		Power consumption (W)	15.048	15.192	15.3	10.08	10.188	10.584	0	5.868	5.976	4.99		
	36	Current (A)												
		Power consumption (W)												
		Current (A)												
		Power consumption (W)												
Power Consumption Test														

Power Consumption Test														
Test Condition	Volt-age (V)	Power Con-sump-tion	Maximum Power Con-sumption			Standby (Backlight On)			Standby (Sleep Mode)			Power Off (Charg-ing)	Remark	
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	Current (A)		
Stand-by current: <ul style="list-style-type: none"><li>Backlight: 100%</li><li>Maximum current</li><li>Volume: 100%</li><li>Memory: 90%~100%</li><li>Bluetooth: Send</li><li>Wi-Fi: Open not con-nected</li><li>3G/4G: Download</li></ul>	9	Current (A)	1.027	1.054	1.093	0.435	0.439	0.459	0.081	0.092	0.103	0	No bat-tery	
		Power con-sump-tion (W)	9.243	9.486	9.837	3.915	3.951	4.131	0.729	0.828	0.927			
		Current (A)	0.756	0.768	0.777	0.321	0.322	0.351	0.062	0.072	0.1	0		
	12	Power con-sump-tion (W)	9.072	9.216	9.324	3.852	3.864	4.212	0.744	0.864	1.2			
		Current (A)	0.243	0.247	0.255	0.101	0.105	0.115	0.022	0.023	0.027	0		
		Power con-sump-tion (W)	8.748	8.892	9.18	3.636	3.78	4.14	0.792	0.828	0.972			
	36													



Refer to Newtrax Multi-Function Display (MFD) data sheet for more information.

### 8.3 Proximity Ranging Sensor - Technical Specifications

Description	Min	Typical	Max	Unit
<b>Electrical Specifications</b>				
Input Voltage	9	12	36	V
<b>Input Current @ 24V</b>				
Cold start	9	96	242	mA
CSS Active (No UWB, No LEDs)		36		mA
UWB Active (No CSS, No LEDs)		22		mA
CSS and UWB Active (Single Color LEDs active, 100% duty cycle)			192	mA
CSS and UWB Active (Dual Color LEDs active, 100% duty cycle)			325	mA
CSS and UWB Active (White Tri-Color LEDs active, 100% duty cycle)			458	mA
<b>Input Current @ 12V</b>				
Cold Start	18	192	484	mA
CSS Active (No UWB, No LEDs)		73		mA
UWB Active (No CSS, No LEDs)		44		mA
CSS and UWB Active (Single Color LEDs active, 100% duty cycle)			384	mA
CSS and UWB Active (Dual Color LEDs active, 100% duty cycle)			650	mA
CSS and UWB Active (White Tri-Color LEDs active, 100% duty cycle)			917	mA
<b>Environmental Specifications</b>				
Operating temperature	-20		60	°C
Storage temperature	-20		60	°C
<b>Dimensions with mounting hardware</b>				
Height		50		mm
Radius		100		mm
<b>RF Emissions</b>				
Chirp Spread Spectrum (CSS) 2.4GHz			+7	dBm
Ultra-Wide Band (UWB) 3.5GHz or 5GHZ			-41.3	dBm

Refer to Proximity Ranging Sensor (PRS) data sheet for more information.

## 8.4 CAN Isolator Technical Specifications

<b>Power</b>	
Power Supply Input - Nominal	12 V or 24 Vdc nominal; 9...36 Vdc
Under-voltage Protection	Hardware shuts down at 6.5 Vdc
Surge Protection	55 Vdc
Over-voltage Protection	Hardware shuts down at 45Vdc
Reverse Polarity Protection	Provided up to -80V
Over-current Protection	Maximum 5.5A
Conversion Platform	The CAN Isolator/Router comes per-programmed with standard protocol conversion logic for bidirectional data exchange between six CAN buses (CAN 2.0B). It recognizes the higher-level CAN protocol, such as SAE J1939 or CAN open. The Ethernet port has a web server running for configuration purposes.
CAN	CAN 2.0B ports Baud rate: Each port can be configured for 125, 250, 500, or 1,000 kbps over CAN. Default baud rate: 500 kbps
	5 CAN Ports Five (5) CAN In ports with power supply and resettable fuse, the fuse trips at 1A. Fuse status is reported over the CAN network. The fuse remains tripped until the short is removed. Each port includes a 120 Ohm termination. It can be configured over CAN.
	1 CAN Port One (1) CAN port with module activation sensing One digital input shuts down power to the router and power to all CAN input ports. Amplitude up to +Vps.
Ethernet	Single 10/100 Mbit Ethernet compliant port 10BASE-T, 100BASE-Tx (auto-negotiation and full-duplex supported) Auto-MDIX
Operating System	Free RTOS
<b>General Specifications</b>	
Memory	32-bit, 2Mbyte Flash Program Memory
Quiescent Current Draw	170 mA @12 V; 100 mA @24 V

Isolation	3-way isolation Isolation is between power supply, micro controller, and each CAN port. 300 Vrms.
LED Indicator	POWER LED RED = Power OFF (Fuse Open) Port Activity is shown using the RED/GREEN LED ON.
	GREEN= Power ON
	(Fuse Closed) = Power OFF (Fuse Open)
	Port Activity is shown using the RED/GREEN LED ON.
Operating Conditions	-40 to 70°C (-40 to 158°F)
Installation	Suits three (3) M5 or #10 mounting bolts.
Weight	1.036 lb. (0.475 kg)

Refer to CAN Isolator data sheet for more information.

## 8.5 Vehicle Intervention Controller (VIC) - Technical Specifications

**Note!** *VIC is not released, following values are projections.*

Type	Description
Controller	
Input Voltage	9-36VDC Input Voltage Range, Nominal 12/24VDC
Operating Temperature	-40C to 85C
Supported values for high speed	10km/h, up to 30km/h
Compliance	MIL-STD-810G
Certification standards	FCC, UL, IC, and CE

## 9.0 Regulatory Statements

### ISED non-interference disclaimer

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

This device complies with the Canadian ICES-003 Class A specifications. CAN ICES-003(A) / NMB-003 (A).

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempt de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) L'appareil ne doit pas produire de brouillage;
- (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Cet appareil numérique de la Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

### ISED RF Exposure statement

This equipment complies with ISED RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm (7.9 inches) between the radiator and any part of your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux radiations ISED CNR-102 établies pour un environnement non contrôlé. Une distance de séparation d'au moins 20 cm doivent être maintenue entre l'antenne de cet appareil et toutes les personnes. Lanceurs ou ne peuvent pas coexister cette antenne ou capteurs avec d'autres.

### FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation. Please note that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### FCC RF Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, this equipment should be installed and operated with minimum distance 20 cm (7.9 inches) between the antenna and your body during normal operation. Users must follow the specific operating instructions for satisfying RF exposure compliance.