



LoRaWAN® End-Device and Network Server Interoperability Test Report Template

Project Information

Batch End Device: **Volley Boast LLC, VoBo**

Date of Report: **May 20, 2026**

Test Engineer: **Milan S Vujovic**

Organization: **Volley Boast LLC**

Interoperability Test Plan Version: **v1.1.1**

LoRaWAN Version Tested (e.g. 1.0.2, 1.0.4): **1.0.4**

Frequency Plan ID (e.g. EU868, US915, AS923, etc.) : **US915**

Network Server Make/Model: **Actility, ThingPark**

Gateway Make/Model: **MultiTech Conduit 300 (US915) 8 channels**

Application Server Make/Model: **Actility, ThingPark X IoT Flow**

Join Server Make/Model: **Actility, ThingPark**

Device Under Test (DUT) Summary

DUT ID	DUT Make/Model	Act Modes (OTAA/ABP)	DUT Configuration Notes	Comments
1	VoBo GP-1 US915	OTAA	Preconfigured to transmit every 1 minute	Device debugger connected
2	VoBo HL-1 US915	OTAA	Preconfigured to transmit every 1 minute	Device debugger connected
3	VoBo TC US915	OTAA	Preconfigured to transmit every 1 minute	Device debugger connected
4	VoBo XP-GP US915	OTAA	Preconfigured to transmit every 1 minute	Device debugger connected
5	VoBo XP-HL US915	OTAA	Preconfigured to transmit every 1 minute	Device debugger connected

Summary of Test Results

DUT ID	Test Case	Test Description	Result (Pass/Fail/Partial)	Observed Events	Comments
DUT-1	3.2.1	Activation by Personalization (ABP) Test	N/A	N/A	DUT ships OTAA-only
DUT-1	3.2.2	Over The Air Activation - Join/Rejoin Process	Pass	JoinRequest (EVT 1.4) JoinRequest received by NS (EVT 2.1.1) JoinRequest received by JS (EVT 2.3.1) JoinAccept sent by JS (EVT 2.3.2) JoinAccept sent by NS (EVT 2.1.2) JoinAccept received by DEV (EVT 1.5) OTAA keys configured (EVT 1.1) DevAddr set (EVT 1.3) UnconfirmedDataUp (EVT 1.4) Uplink received by NS (EVT 2.1.1) Uplink received by AS (EVT 2.2.1)	Verified via LNS trace and device debugger
DUT-1	3.2.3	Uplink Transmission	Pass	ConfirmedDataUp (EVT 1.4) Uplink received by NS (EVT 2.1.1) ACK downlink sent by NS (EVT 2.1.2)	Verified via LNS trace and device debugger



DUT-1	3.2.4	Downlink Transmission	Pass	Downlink received by DEV (EVT 1.5) ConfirmedDataUp, FCntUp+1 (EVT 1.4) ConfirmedDataUp (EVT 1.4) ConfirmedDataDown sent by AS (EVT 2.2.2) ConfirmedDataDown sent by NS (EVT 2.1.2) Downlink received by DEV (EVT 1.5) Ack-bearing Uplink (EVT 1.4) Uplink received by NS (EVT 2.1.1)	Verified via LNS trace and device debugger
DUT-1	3.2.5	Class B Tests	N/A	N/A	DUT is Class A only
DUT-1	3.2.6	Class C Tests	N/A	N/A	DUT is Class A only

DUT ID	Test Case	Test Description	Result (Pass/Fail/Partial)	Observed Events	Comments
DUT-2	3.2.1	Activation by Personalization (ABP) Test	N/A	N/A	DUT ships OTAA-only
DUT-2	3.2.2	Over The Air Activation - Join/Rejoin Process	Pass	JoinRequest (EVT 1.4) JoinRequest received by NS (EVT 2.1.1) JoinRequest received by JS (EVT 2.3.1) JoinAccept sent by JS (EVT 2.3.2) JoinAccept sent by NS (EVT 2.1.2) JoinAccept received by DEV (EVT 1.5) OTAA keys configured (EVT 1.1) DevAddr set (EVT 1.3) UnconfirmedDataUp (EVT 1.4) Uplink received by NS (EVT 2.1.1) Uplink received by AS (EVT 2.2.1)	Verified via LNS trace and device debugger
DUT-2	3.2.3	Uplink Transmission	Pass	ConfirmedDataUp (EVT 1.4) Uplink received by NS (EVT 2.1.1) ACK downlink sent by NS (EVT 2.1.2) Downlink received by DEV (EVT 1.5) ConfirmedDataUp, FCntUp+1 (EVT 1.4)	Verified via LNS trace and device debugger
DUT-2	3.2.4	Downlink Transmission	Pass	ConfirmedDataUp (EVT 1.4) ConfirmedDataDown sent by AS (EVT 2.2.2) ConfirmedDataDown sent by NS (EVT 2.1.2) Downlink received by DEV (EVT 1.5) Ack-bearing Uplink (EVT 1.4) Uplink received by NS (EVT 2.1.1)	Verified via LNS trace and device debugger
DUT-2	3.2.5	Class B Tests	N/A	N/A	DUT is Class A only
DUT-2	3.2.6	Class C Tests	N/A	N/A	DUT is Class A only



DUT ID	Test Case	Test Description	Result (Pass/Fail/Partial)	Observed Events	Comments
DUT-3	3.2.1	Activation by Personalization (ABP) Test	N/A	N/A	DUT ships OTAA-only
DUT-3	3.2.2	Over The Air Activation - Join/Rejoin Process	Pass	JoinRequest (EVT 1.4) JoinRequest received by NS (EVT 2.1.1) JoinRequest received by JS (EVT 2.3.1) JoinAccept sent by JS (EVT 2.3.2) JoinAccept sent by NS (EVT 2.1.2) JoinAccept received by DEV (EVT 1.5) OTAA keys configured (EVT 1.1) DevAddr set (EVT 1.3) UnconfirmedDataUp (EVT 1.4) Uplink received by NS (EVT 2.1.1) Uplink received by AS (EVT 2.2.1)	Verified via LNS trace and device debugger
DUT-3	3.2.3	Uplink Transmission	Pass	ConfirmedDataUp (EVT 1.4) Uplink received by NS (EVT 2.1.1) ACK downlink sent by NS (EVT 2.1.2) Downlink received by DEV (EVT 1.5) ConfirmedDataUp, FCntUp+1 (EVT 1.4)	Verified via LNS trace and device debugger
DUT-3	3.2.4	Downlink Transmission	Pass	ConfirmedDataUp (EVT 1.4) ConfirmedDataDown sent by AS (EVT 2.2.2) ConfirmedDataDown sent by NS (EVT 2.1.2) Downlink received by DEV (EVT 1.5) Ack-bearing Uplink (EVT 1.4) Uplink received by NS (EVT 2.1.1)	Verified via LNS trace and device debugger
DUT-3	3.2.5	Class B Tests	N/A	N/A	DUT is Class A only
DUT-3	3.2.6	Class C Tests	N/A	N/A	DUT is Class A only

DUT ID	Test Case	Test Description	Result (Pass/Fail/Partial)	Observed Events	Comments
DUT-4	3.2.1	Activation by Personalization (ABP) Test	N/A	N/A	DUT ships OTAA-only
DUT-4	3.2.2	Over The Air Activation - Join/Rejoin Process	Pass	JoinRequest (EVT 1.4) JoinRequest received by NS (EVT 2.1.1) JoinRequest received by JS (EVT 2.3.1) JoinAccept sent by JS (EVT 2.3.2) JoinAccept sent by NS (EVT 2.1.2) JoinAccept received by DEV (EVT 1.5) OTAA keys configured (EVT 1.1) DevAddr set (EVT 1.3) UnconfirmedDataUp (EVT 1.4) Uplink received by NS (EVT 2.1.1) Uplink received by AS (EVT 2.2.1)	Verified via LNS trace and device debugger
DUT-4	3.2.3	Uplink Transmission	Pass	ConfirmedDataUp (EVT 1.4) Uplink received by NS (EVT 2.1.1) ACK downlink sent by NS (EVT 2.1.2) Downlink received by DEV (EVT 1.5) ConfirmedDataUp, FCntUp+1 (EVT 1.4)	Verified via LNS trace and device debugger
DUT-4	3.2.4	Downlink Transmission	Pass	ConfirmedDataUp (EVT 1.4) ConfirmedDataDown sent by AS (EVT 2.2.2) ConfirmedDataDown sent by NS (EVT 2.1.2) Downlink received by DEV (EVT 1.5) Ack-bearing Uplink (EVT 1.4) Uplink received by NS (EVT 2.1.1)	Verified via LNS trace and device debugger
DUT-4	3.2.5	Class B Tests	N/A	N/A	DUT is Class A only
DUT-4	3.2.6	Class C Tests	Pass	JoinRequest (EVT 1.4) JoinRequest received by NS (EVT 2.1.1) JoinRequest received by JS (EVT 2.3.1) JoinAccept sent by JS (EVT 2.3.2) JoinAccept sent by NS (EVT 2.1.2) JoinAccept received by DEV (EVT 1.5) OTAA keys configured (EVT 1.1) DevAddr set (EVT 1.3) ConfirmedDataUp (EVT 1.4) Uplink received by NS (EVT 2.1.1) Uplink received by AS (EVT 2.2.1) UnconfirmedDataDown sent randomly by AS (EVT 2.2.2) Class-C Downlink sent by NS (EVT 2.1.2) Downlink received by DEV (EVT 1.5)	DUT is Class A/C only
DUT ID	Test Case	Test Description	Result (Pass/Fail/Partial)	Observed Events	Comments



DUT-5	3.2.1	Activation by Personalization (ABP) Test	N/A	N/A	DUT ships OTAA-only
DUT-5	3.2.2	Over The Air Activation - Join/Rejoin Process	Pass	<p>JoinRequest (EVT 1.4) JoinRequest received by NS (EVT 2.1.1) JoinRequest received by JS (EVT 2.3.1) JoinAccept sent by JS (EVT 2.3.2) JoinAccept sent by NS (EVT 2.1.2) JoinAccept received by DEV (EVT 1.5) OTAA keys configured (EVT 1.1) DevAddr set (EVT 1.3) UnconfirmedDataUp (EVT 1.4) Uplink received by NS (EVT 2.1.1) Uplink received by AS (EVT 2.2.1)</p>	Verified via LNS trace and device debugger
DUT-5	3.2.3	Uplink Transmission	Pass	<p>ConfirmedDataUp (EVT 1.4) Uplink received by NS (EVT 2.1.1) ACK downlink sent by NS (EVT 2.1.2) Downlink received by DEV (EVT 1.5) ConfirmedDataUp, FCntUp+1 (EVT 1.4)</p>	Verified via LNS trace and device debugger
DUT-5	3.2.4	Downlink Transmission	Pass	<p>ConfirmedDataUp (EVT 1.4) ConfirmedDataDown sent by AS (EVT 2.2.2) ConfirmedDataDown sent by NS (EVT 2.1.2) Downlink received by DEV (EVT 1.5) Ack-bearing Uplink (EVT 1.4) Uplink received by NS (EVT 2.1.1)</p>	Verified via LNS trace and device debugger
DUT-5	3.2.5	Class B Tests	N/A	N/A	DUT is Class A only
DUT-5	3.2.6	Class C Tests	Pass	<p>JoinRequest (EVT 1.4) JoinRequest received by NS (EVT 2.1.1) JoinRequest received by JS (EVT 2.3.1) JoinAccept sent by JS (EVT 2.3.2) JoinAccept sent by NS (EVT 2.1.2) JoinAccept received by DEV (EVT 1.5) OTAA keys configured (EVT 1.1) DevAddr set (EVT 1.3) ConfirmedDataUp (EVT 1.4) Uplink received by NS (EVT 2.1.1) Uplink received by AS (EVT 2.2.1) UnconfirmedDataDown sent randomly by AS (EVT 2.2.2) Class-C Downlink sent by NS (EVT 2.1.2) Downlink received by DEV (EVT 1.5)</p>	DUT is Class A/C only



Test Engineer Summary and Notes (Batch Level)

Overall Interoperability Evaluation:

All DUTs completed the OTAA join process and established stable network sessions. Uplink and downlink communication worked reliably, including confirmed messages and acknowledgments, with behavior verified through network traces and device debugging. DUTs operated as expected in Class A. Class B was not applicable. DUTs supporting Class C also successfully handled downlink communication.

Any Issues Encountered Across DUTs:

No issues or unexpected behavior were observed during testing.

General Recommendations:

No specific recommendation

Additional Comments:

Test Sign-Off

Test Engineer Name: **Milan S Vujovic**

Signature: *Milan Vujovic*

Date: May 20, 2026