

FCC Connectivity TAS Evaluation Report

**FCC ID: BCG-E8950A
Model: A3257**

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Revision History

Rev.	Date	Revisions	Revised By
V1	2025/8/8	Initial Issue	--
V2	2025/8/11	Changed formatting of variables, subscripts, and removed superscripts Removed DRAFT watermark	Kanaad Sovani
V3	2025/8/12	Modified plots and measurement/validation values; updated appendices.	Prem Dhar

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1. Test Specifications, Methods/Procedures, and Facilities

The tests documented in this report were performed following the OEM's pre-approval, RSS102.SAR.MEAS Annex G, and cSAR3D V5.8 Manual §4.2.2.4.

The test sites and measurement facilities used to collect data are located at:

5440 Patrick Henry Drive
SAR/Conducted Labs PHD

Note: This is an unaccredited report.

2. Introduction

This DUT supports time-averaged SAR (TAS) technology for the connectivity transmitters (i.e. WLAN, BT, 802.15.4, NB UNII). A central manager, referenced as the RF Exposure manager, is responsible for maintaining the rolling time-averaged RF exposure over the applicable regulatory compliance window. This manager allocates a total RF exposure budget and specifies the RF exposure compliance limit to the connectivity radios. The radio controllers manage their transmissions to always maintain their consumption below the regulatory RF exposure limit. They report their consumed RF exposure back to the RF exposure manager. The RF exposure manager uses this feedback to allocate updated budget information throughout the regulatory averaging window. This implementation uses a 30-second time-averaging window.

3. Key TAS Parameters

This section defines the relevant power and RF Exposure parameters related to the unlicensed TAS mechanism for this DUT.

3.1. On-Body Detection (OBD)/Operating State Summary (OPS)

The table below summarizes the operating states supported by the DUT:

Table 3-1: DUT Supported OBD/OPS

OBD/OPS	Description
0	Head
1	Body/Extremity

3.2. Wi-Fi Power State Descriptions

Table 3-2: Power States and Descriptions

Power State*	Description
1	Cell Off 802.15.4ab Off
2	Cell Off 802.15.4ab On
3	Cell On (Power State 2) 802.15.4ab Off
4	Cell On (Power State 2) 802.15.4ab On
5	Cell On (Power State 1) 802.15.4ab Off
6	Cell On (Power State 1) 802.15.4ab On

*: Power State will be abbreviated to PS in this report

3.3. TAS Parameter Definitions

P_{Max} :	The maximum possible instantaneous power
P_{Limit} :	The maximum possible time-averaged power
SAR_{Target} :	The maximum spatial peak averaged SAR value inclusive of the total device uncertainty
$P_{Avg}(n)$:	The normalized time-averaged conducted power, which should be less than 1 for a passing scenario.
TER_{limit} :	The limit for the normalized time-averaged conducted power.

P_{Limit} and P_{Max} values are defined for all antennas, technologies, bands, and OBD/OPS combinations supporting TAS on the DUT. Instantaneous power for the specified antenna/technology/band/OBD/OPS combinations is capped at P_{Max} .

Transmitter	Technology	Protocol	Bandwidth (MHz)	1-g Averaging Volume																							
				Cell Off + Connectivity PS 1			Cell Off + Connectivity PS 2 + 802.15.4ab			Cell On PS 2 + Connectivity PS 3			Cell On PS 3 + Connectivity PS 4 + 802.15.4ab			Cell On PS 1 + Connectivity PS 5			Cell On PS 1 + Connectivity PS 6 + 802.15.4ab								
				P _{Loss} (dBm)	P _{Max} (dBm)	SAR _{Design Limit} (W/kg)	P _{Loss} (dBm)	P _{Max} (dBm)	SAR _{Design Limit} (W/kg)	P _{Loss} (dBm)	P _{Max} (dBm)	SAR _{Design Limit} (W/kg)	P _{Loss} (dBm)	P _{Max} (dBm)	SAR _{Design Limit} (W/kg)	P _{Loss} (dBm)	P _{Max} (dBm)	SAR _{Design Limit} (W/kg)	P _{Loss} (dBm)	P _{Max} (dBm)	SAR _{Design Limit} (W/kg)						
ANT 1	Wi-Fi 2.4 GHz	802.11b	20	23.0	21.2	1.190	22.5	21.2	1.190	20.0	21.2	0.600	19.2	21.2	0.500	18.3	21.2	0.400	17.0	21.2	0.300						
ANT 1	Bluetooth 2.4 GHz	EDR	1	23.0	20.0	1.190	23.0	20.0	1.190	20.0	20.0	0.600	19.2	20.0	0.500	18.3	20.0	0.400	17.0	20.0	0.300						
ANT 1	Bluetooth 2.4 GHz	EDR2	1	23.0	16.5	1.190	23.0	16.5	1.190	20.0	16.5	0.600	19.2	16.5	0.500	18.3	16.5	0.400	17.0	16.5	0.300						
ANT 1	Bluetooth 2.4 GHz	EDR3	1	23.0	16.5	1.190	23.0	16.5	1.190	20.0	16.5	0.600	19.2	16.5	0.500	18.3	16.5	0.400	17.0	16.5	0.300						
ANT 1	Bluetooth 2.4 GHz	LE Adv	1	23.0	20.8	1.190	23.0	20.8	1.190	20.0	20.8	0.600	19.2	20.8	0.500	18.3	20.8	0.400	17.0	20.8	0.300						
ANT 1	Bluetooth 2.4 GHz	LE 1M	1	23.0	20.8	1.190	23.0	20.8	1.190	20.0	20.8	0.600	19.2	20.8	0.500	18.3	20.8	0.400	17.0	20.8	0.300						
ANT 1	Bluetooth 2.4 GHz	LE 2M	2	23.0	20.8	1.190	23.0	20.8	1.190	20.0	20.8	0.600	19.2	20.8	0.500	18.3	20.8	0.400	17.0	20.8	0.300						
ANT 1	Bluetooth 2.4 GHz	LE LR 2	1	23.0	12.8	1.190	23.0	12.8	1.190	20.0	12.8	0.600	19.2	12.8	0.500	18.3	12.8	0.400	17.0	12.8	0.300						
ANT 1	Bluetooth 2.4 GHz	LE LR 4	1	23.0	12.8	1.190	23.0	12.8	1.190	20.0	12.8	0.600	19.2	12.8	0.500	18.3	12.8	0.400	17.0	12.8	0.300						
ANT 1	Bluetooth 2.4 GHz	HDR 4	2	23.0	13.8	1.190	23.0	13.8	1.190	20.0	13.8	0.600	19.2	13.8	0.500	18.3	13.8	0.400	17.0	13.8	0.300						
ANT 1	Bluetooth 2.4 GHz	HDR 8	4	23.0	13.8	1.190	23.0	13.8	1.190	20.0	13.8	0.600	19.2	13.8	0.500	18.3	13.8	0.400	17.0	13.8	0.300						
ANT 1	Bluetooth 2.4 GHz	HDRPS 2	2	23.0	13.8	1.190	23.0	13.8	1.190	20.0	13.8	0.600	19.2	13.8	0.500	18.3	13.8	0.400	17.0	13.8	0.300						
ANT 1	Bluetooth 2.4 GHz	HDRPS 4	4	23.0	13.8	1.190	23.0	13.8	1.190	20.0	13.8	0.600	19.2	13.8	0.500	18.3	13.8	0.400	17.0	13.8	0.300						
ANT 1	Bluetooth 2.4 GHz	HDRPS 6	6	23.0	13.8	1.190	23.0	13.8	1.190	20.0	13.8	0.600	19.2	13.8	0.500	18.3	13.8	0.400	17.0	13.8	0.300						
ANT 1	Bluetooth 2.4 GHz	HDRPS 8	8	23.0	13.8	1.190	23.0	13.8	1.190	20.0	13.8	0.600	19.2	13.8	0.500	18.3	13.8	0.400	17.0	13.8	0.300						
ANT 1	Bluetooth 2.4 GHz	HDRPS 12	12	23.0	13.8	1.190	23.0	13.8	1.190	20.0	13.8	0.600	19.2	13.8	0.500	18.3	13.8	0.400	17.0	13.8	0.300						
ANT 1	Bluetooth 2.4 GHz	XHDRPS 2	2	23.0	13.8	1.190	23.0	13.8	1.190	20.0	13.8	0.600	19.2	13.8	0.500	18.3	13.8	0.400	17.0	13.8	0.300						
ANT 1	Bluetooth 2.4 GHz	XHDRPS 4	4	23.0	13.8	1.190	23.0	13.8	1.190	20.0	13.8</																

ANT 5	Bluetooth NB U-NII 1	BDR	1	19.5	10.0	1.190	19.5	10.0	1.190	16.5	10.0	0.600	15.7	10.0	0.500	14.8	10.0	0.400	13.5	10.0	0.300
ANT 5	Bluetooth NB U-NII 1	LE Adv	1	19.5	10.3	1.190	19.5	10.3	1.190	16.5	10.3	0.600	15.7	10.3	0.500	14.8	10.3	0.400	13.5	10.3	0.300
ANT 5	Bluetooth NB U-NII 1	LE 1M	1	19.5	10.3	1.190	19.5	10.3	1.190	16.5	10.3	0.600	15.7	10.3	0.500	14.8	10.3	0.400	13.5	10.3	0.300
ANT 5	Bluetooth NB U-NII 1	LE 2M	2	19.5	11.0	1.190	19.5	11.0	1.190	16.5	11.0	0.600	15.7	11.0	0.500	14.8	11.0	0.400	13.5	11.0	0.300
ANT 5	Bluetooth NB U-NII 1	HDR 4	2	19.5	12.3	1.190	19.5	12.3	1.190	16.5	12.3	0.600	15.7	12.3	0.500	14.8	12.3	0.400	13.5	12.3	0.300
ANT 5	Bluetooth NB U-NII 1	HDR 8	4	19.5	14.5	1.190	19.5	14.5	1.190	16.5	14.5	0.600	15.7	14.5	0.500	14.8	14.5	0.400	13.5	14.5	0.300
ANT 5	Bluetooth NB U-NII 1	HRPS 2	2	19.5	12.3	1.190	19.5	12.3	1.190	16.5	12.3	0.600	15.7	12.3	0.500	14.8	12.3	0.400	13.5	12.3	0.300
ANT 5	Bluetooth NB U-NII 1	HRPM 4	4	19.5	14.5	1.190	19.5	14.5	1.190	16.5	14.5	0.600	15.7	14.5	0.500	14.8	14.5	0.400	13.5	14.5	0.300
ANT 5	Bluetooth NB U-NII 1	HRPM 6	4	19.5	14.5	1.190	19.5	14.5	1.190	16.5	14.5	0.600	15.7	14.5	0.500	14.8	14.5	0.400	13.5	14.5	0.300
ANT 5	Bluetooth NB U-NII 1	HRPM 12	8	19.5	14.5	1.190	19.5	14.5	1.190	16.5	14.5	0.600	15.7	14.5	0.500	14.8	14.5	0.400	13.5	14.5	0.300
ANT 5	Bluetooth NB U-NII 1	HRPL 8	8	19.5	14.5	1.190	19.5	14.5	1.190	16.5	14.5	0.600	15.7	14.5	0.500	14.8	14.5	0.400	13.5	14.5	0.300
ANT 5	Bluetooth NB U-NII 1	HRPL 12	8	19.5	14.5	1.190	19.5	14.5	1.190	16.5	14.5	0.600	15.7	14.5	0.500	14.8	14.5	0.400	13.5	14.5	0.300
ANT 5	Bluetooth NB U-NII 1	HRPL 24	8	19.5	11.5	1.190	19.5	11.5	1.190	16.5	11.5	0.600	15.7	11.5	0.500	14.8	11.5	0.400	13.5	11.5	0.300
ANT 5	Bluetooth NB U-NII 1	XHRPS 2	2	19.5	12.3	1.190	19.5	12.3	1.190	16.5	12.3	0.600	15.7	12.3	0.500	14.8	12.3	0.400	13.5	12.3	0.300
ANT 5	Bluetooth NB U-NII 1	XHRPM 4	4	19.5	14.5	1.190	19.5	14.5	1.190	16.5	14.5	0.600	15.7	14.5	0.500	14.8	14.5	0.400	13.5	14.5	0.300
ANT 5	Bluetooth NB U-NII 1	XHRPM 6	4	19.5	14.5	1.190	19.5	14.5	1.190	16.5	14.5	0.600	15.7	14.5	0.500	14.8	14.5	0.400	13.5	14.5	0.300
ANT 5	Bluetooth NB U-NII 1	XHRPM 12	8	19.5	11.5	1.190	19.5	11.5	1.190	16.5	11.5	0.600	15.7	11.5	0.500	14.8	11.5	0.400	13.5	11.5	0.300
ANT 5	Bluetooth NB U-NII 1	XHRPL 8	8	19.5	14.5	1.190	19.5	14.5	1.190	16.5	14.5	0.600	15.7	14.5	0.500	14.8	14.5	0.400	13.5	14.5	0.300
ANT 5	Bluetooth NB U-NII 1	XHRPL 12	8	19.5	14.5	1.190	19.5	14.5	1.190	16.5	14.5	0.600	15.7	14.5	0.500	14.8	14.5	0.400	13.5	14.5	0.300
ANT 5	Bluetooth NB U-NII 1	XHRPL 16	8	19.5	14.5	1.190	19.5	14.5	1.190	16.5	14.5	0.600	15.7	14.5	0.500	14.8	14.5	0.400	13.5	14.5	0.300
ANT 5	Bluetooth NB U-NII 1	XHRPL 24	8	19.5	11.5	1.190	19.5	11.5	1.190	16.5	11.5	0.600	15.7	11.5	0.500	14.8	11.5	0.400	13.5	11.5	0.300
ANT 5	Bluetooth NB U-NII 1	XHRPL 32	8	19.5	11.5	1.190	19.5	11.5	1.190	16.5	11.5	0.600	15.7	11.5	0.500	14.8	11.5	0.400	13.5	11.5	0.300
ANT 5	Bluetooth NB U-NII 1	HDT 2	2	19.5	12.5	1.190	19.5	12.5	1.190	16.5	12.5	0.600	15.7	12.5	0.500	14.8	12.5	0.400	13.5	12.5	0.300
ANT 5	Bluetooth NB U-NII 1	HDT 3	2	19.5	12.5	1.190	19.5	12.5	1.190	16.5	12.5	0.600	15.7	12.5	0.500	14.8	12.5	0.400	13.5	12.5	0.300
ANT 5	Bluetooth NB U-NII 1	HDT 4	2	19.5	12.5	1.190	19.5	12.5	1.190	16.5	12.5	0.600	15.7	12.5	0.500	14.8	12.5	0.400	13.5	12.5	0.300
ANT 5	Bluetooth NB U-NII 1	HDT 5/8	2	19.5	11.5	1.190	19.5	11.5	1.190	16.5	11.5	0.600	15.7	11.5	0.500	14.8	11.5	0.400	13.5	11.5	0.300
ANT 5	Bluetooth NB U-NII 3	BDR	1	18.0	19.5	1.190	18.0	19.5	1.190	15.0	19.5	0.600	14.2	19.5	0.500	13.3	19.5	0.400	12.0	19.5	0.300
ANT 5	Bluetooth NB U-NII 3	LE Adv	1	18.0	19.5	1.190	18.0	19.5	1.190	15.0	19.5	0.600	14.2	19.5	0.500	13.3	19.5	0.400	12.0	19.5	0.300
ANT 5	Bluetooth NB U-NII 3	LE 1M	1	18.0	19.5	1.190	18.0	19.5	1.190	15.0	19.5	0.600	14.2	19.5	0.500	13.3	19.5	0.400	12.0	19.5	0.300
ANT 5	Bluetooth NB U-NII 3	LE 2M	2	18.0	20.5	1.190	18.0	20.5	1.190	15.0	20.5	0.600	14.2	20.5	0.500	13.3	20.5	0.400	12.0	20.5	0.300
ANT 5	Bluetooth NB U-NII 3	HDR 4	2	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	HDR 8	4	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	HRPS 2	2	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	HRPM 4	4	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	HRPM 6	4	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	HRPM 12	8	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	HRPL 8	8	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	HRPL 12	8	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	HRPL 16	8	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	HRPL 24	8	18.0	11.5	1.190	18.0	11.5	1.190	15.0	11.5	0.600	14.2	11.5	0.500	13.3	11.5	0.400	12.0	11.5	0.300
ANT 5	Bluetooth NB U-NII 3	HRPL 32	8	18.0	11.5	1.190	18.0	11.5	1.190	15.0	11.5	0.600	14.2	11.5	0.500	13.3	11.5	0.400	12.0	11.5	0.300
ANT 5	Bluetooth NB U-NII 3	XHRPS 2	2	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	XHRPM 4	4	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	XHRPM 6	4	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	XHRPM 12	8	18.0	11.5	1.190	18.0	11.5	1.190	15.0	11.5	0.600	14.2	11.5	0.500	13.3	11.5	0.400	12.0	11.5	0.300
ANT 5	Bluetooth NB U-NII 3	XHRPL 8	8	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	XHRPL 12	8	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	XHRPL 16	8	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	XHRPL 24	8	18.0	11.5	1.190	18.0	11.5	1.190	15.0	11.5	0.600	14.2	11.5	0.500	13.3	11.5	0.400	12.0	11.5	0.300
ANT 5	Bluetooth NB U-NII 3	XHRPL 32	8	18.0	11.5	1.190	18.0	11.5	1.190	15.0	11.5	0.600	14.2	11.5	0.500	13.3	11.5	0.400	12.0	11.5	0.300
ANT 5	Bluetooth NB U-NII 3	HDT 2	2	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	HDT 3	2	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	HDT 4	2	18.0	14.5	1.190	18.0	14.5	1.190	15.0	14.5	0.600	14.2	14.5	0.500	13.3	14.5	0.400	12.0	14.5	0.300
ANT 5	Bluetooth NB U-NII 3	HDT 6	2	18.0	11.5	1.190	18.0	11.5	1.190	15.0	11.5	0.600	14.2	11.5	0.500	13.3	11.5	0.400	12.0	11.5	0.300
ANT 5	Bluetooth NB U-NII 3	HDT 7.5/8	2	18.0	11.5	1.190	18.0	11.5	1.190	15.0	11.5	0.600	14.2	11.5	0.500	13.3	11.5	0.400	12.0	11.5	0.300
ANT 5	Bluetooth NB U-NII 5	BDR	1	14.8	-0.8	1.190	14.8	-0.8	1.190	11.8	-0.8	0.600	11.0	-0.8	0.500	10.0	-0.8	0.400	8.8	-0.8	0.300
ANT 5	Bluetooth NB U-NII 5	LE Adv	1	14.8	-0.8	1.190	14.8	-0.8	1.190	11.8	-0.8	0.600	11.0	-0.8	0.500	10.0	-0.8	0.400	8.8	-0.8	0.300
ANT 5	Bluetooth NB U-NII 5	LE 1M	1	14.8	-0.3	1.190	14.8	-0.3	1.190	11.8	-0.3	0.600	11.0	-0.3	0.500	10.0	-0.3	0.400	8.8	-0.3	0.300
ANT 5	Bluetooth NB U-NII 5	LE 2M	2	14.8	0.5	1.190	14.8	0.5	1.190	11.8	0.5	0.600	11.0	0.5	0.500	10.0	0.5	0.400	8.8	0.5	0.300
ANT 5	Bluetooth NB U-NII 5	HDR 4	2	14.8	1.5	1.190	14.8	1.5	1.190	11.8	1.5	0.600	11.0	1.5	0.500	10.0	1.5	0.400	8.8	1.5	0.300

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4. TAS Validation

4.1. Conducted

4.1.1. Test Sequences

The TAS algorithm shall be validated with different expected power levels to manage the link budget.

Conducted power measurements will be used to validate the test cases. Configurations where P_{Limit} is 2-4dB below P_{Max} will be selected for assessment. Configurations where P_{Limit} is greater than P_{Max} will be excluded from testing as there will be no TAS activity in this condition.

4.1.2. Technology Switch

Requested power measurements shall be performed to validate the TAS algorithm when the DUT switches between technologies with different P_{Limit} values. Maximum power for the specific technology shall be requested from the DUT throughout the test. The change in technology shall occur once the TAS algorithm has reached steady state for the first band/technology, then the test transitions to transmitting on both technologies simultaneously once the TAS algorithm has reached steady state for the second technology. This test may be referenced for validation of simultaneous compliance.

4.1.3. Change in Device State

Requested power measurements shall be performed to validate the TAS algorithm when the DUT changes between operating states with different P_{Limit} values, e.g., when sensors or other mechanisms are used to change operating states. Maximum power shall be requested from the DUT throughout the test. The change in operating state shall occur once the TAS algorithm has reached steady state for the first operating state, and the test shall conclude once the algorithm has reached steady state for the second operating state.

4.1.4. Change in Antenna / Band

Requested power measurements shall be performed to validate the TAS algorithm when the DUT switches between different antennas and/or bands with differing P_{Limit} values, e.g., when sensors, DUT commands, and other mechanisms are used to switch between the DUT's different transmitting antennas or bands. Maximum power shall be requested from the device from the DUT throughout the test. The DUT's change in antenna or band shall take place once the TAS algorithm has reached a steady state under the first transmitting antenna/band; then, after the switch, the test will conclude once the TAS algorithm has reached a steady state under the second transmitting antenna/band.

4.1.5. Test Case Validation

4.1.5.1. Conducted Validation

Validation plots are included for the applicable test cases for this DUT. These plots serve to validate the operation of this unlicensed TAS algorithm by ensuring that the rolling time-averaged conducted power at the n th time step, $P_{Avg}(n)$, is always maintained below the defined P_{Limit} .

Power measurements, P_{Meas} , are used to validate all TAS test cases. In test cases where P_{Limit} remains constant, the equation, *Equation 1*, below is used to calculate the rolling time-averaged power for the n th time step, $P_{Avg}(n)$.

Equation 1: Rolling Time-averaged Power (Constant P_{Limit})

$$P_{Avg}(n) = \frac{1}{M} \sum_{m=0}^{M-1} P_{Measured}[n - m]$$

Where M is the total number of reporting periods per time-averaging window and m is the index of the time-averaging window. The TAS algorithm is validated when $P_{Avg}(n)$ is maintained less than or equal to P_{Limit} .

In test cases where P_{Limit} is not constant, the equation, *Equation 2*, below is used to calculate the normalized rolling time-averaged power, $P_{Avg}(n)$.

Equation 2: Rolling Time-averaged Power (P_{Limit} not Constant)

$$P_{Avg}(n) = \frac{1}{M} \sum_{m=0}^{M-1} \frac{P_{Measured}[n - m]}{P_{Limit}[n - m]}$$

Where M is the total number of reporting periods per time-averaging window and m is the index of the time-averaging window. The TAS algorithm is validated when $P_{Avg}(n)$ is maintained less than or equal to 1.

The test cases are summarized in the table below.

Table 4-1 Applicable Test Cases for FCC TAS Validation

Test Case	Sequence	Tech	Band	Antenna	OBD/OPS	Details
1 – Technology Switch	Cell Off Wi-Fi PS1 -> Cell Off BT PS1 -> Cell Off Wi-Fi PS1	Wi-Fi	5GHz	6	1 - Body	802.11a PRV
		Bluetooth	2.4GHz	2	1 - Body	HDR4
2 – Change in Device State	Power State 3 -> Power State 1	Wi-Fi	5GHz	6	1 - Body	802.11a
	Power State 3 -> Power State 4	Wi-Fi	2.4GHz	2	1 - Body	802.11b PRV
	Power State 5 -> Power State 6	Bluetooth	2.4GHz	2	1 - Body	HDR4 PRV
3 – Change in Antenna / Band	Wi-Fi 2.4GHz -> Wi-Fi 6GHz	Wi-Fi	2.4GHz	2	1 - Body	802.11b
			6GHz	6	1 - Body	802.11ax
	Wi-Fi 2.4GHz -> Wi-Fi 2.4GHz + 6 GHz	Wi-Fi	2.4GHz	2	1 - Body	802.11b
			6GHz	6	1 - Body	802.11a
	NB UNII 3 -> NB UNII 1	Figaro 5G	NB UNII 3	6	1 - Body	BDR
			NB UNII 1	5	1 - Body	BDR
	802.15.4 Core 0 -> Core 1	802.15.4	2.4 GHz	2	0 - Head	Thread
				1	0 - Head	Thread

*: These technologies do not have supported configurations where P_{Limit} is lower than P_{Max} , hence standalone cases were not tested

NOTE: Testing was performed using a Preliminary Power Table to demonstrate TAS functionality

The following figures outline the test setup for the applicable test cases:

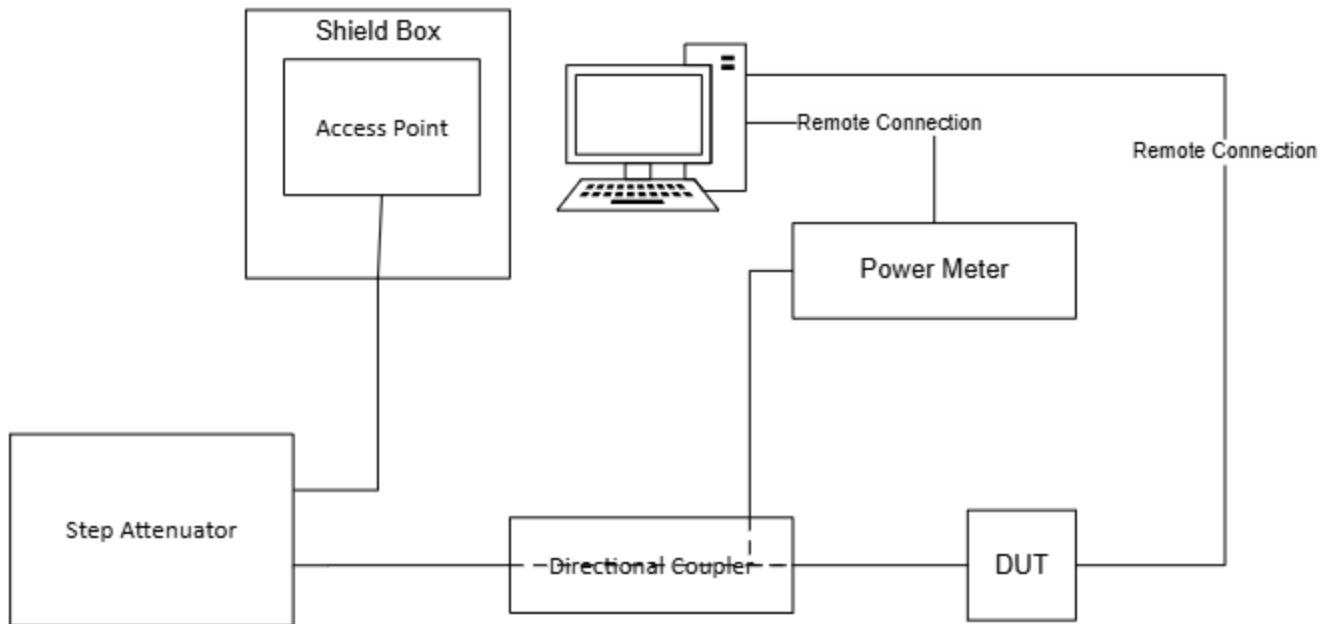


Figure 4-1: Mode Switch

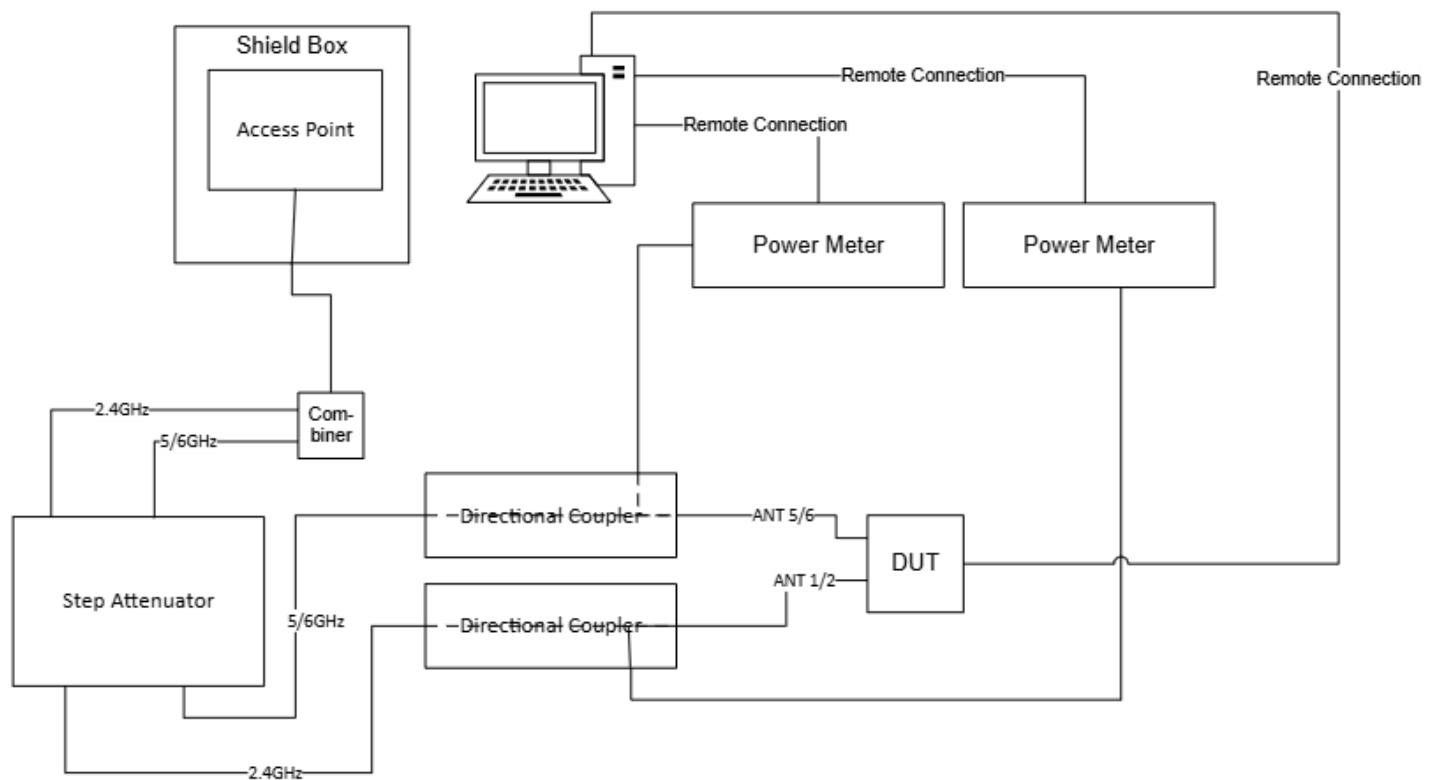


Figure 4-2: Antenna and Band Switching

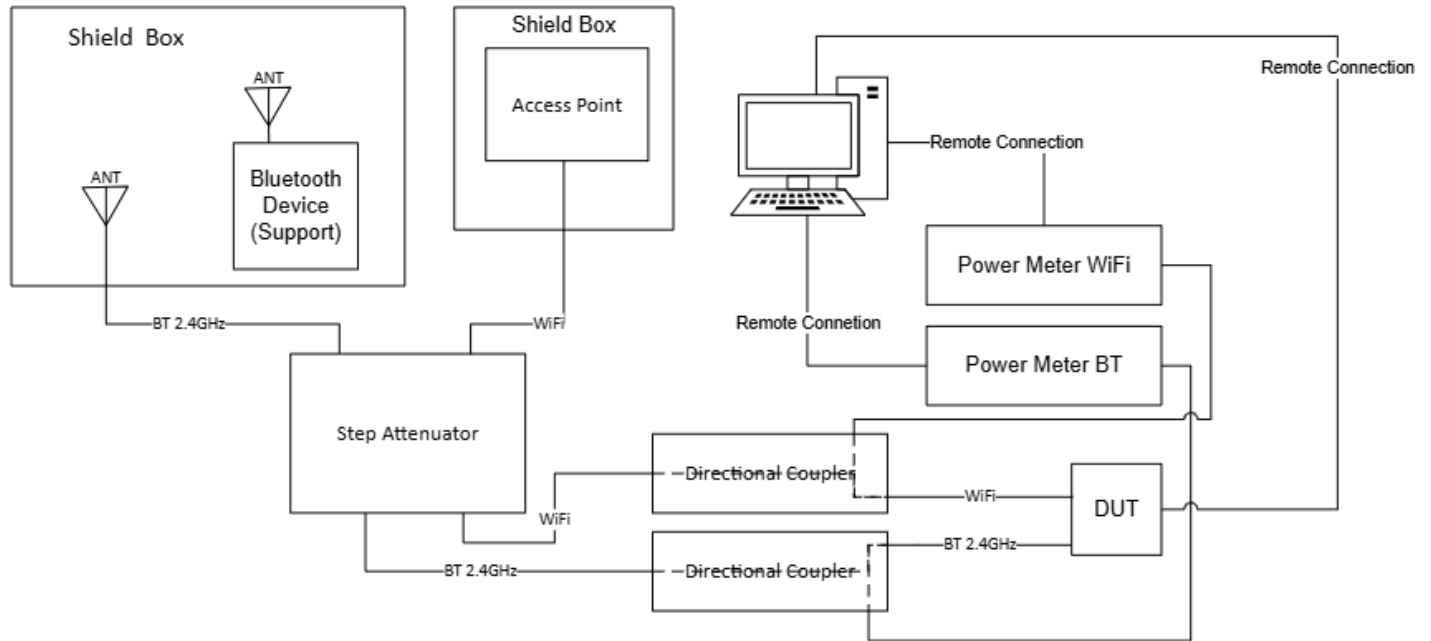


Figure 4-3: Tech Switch

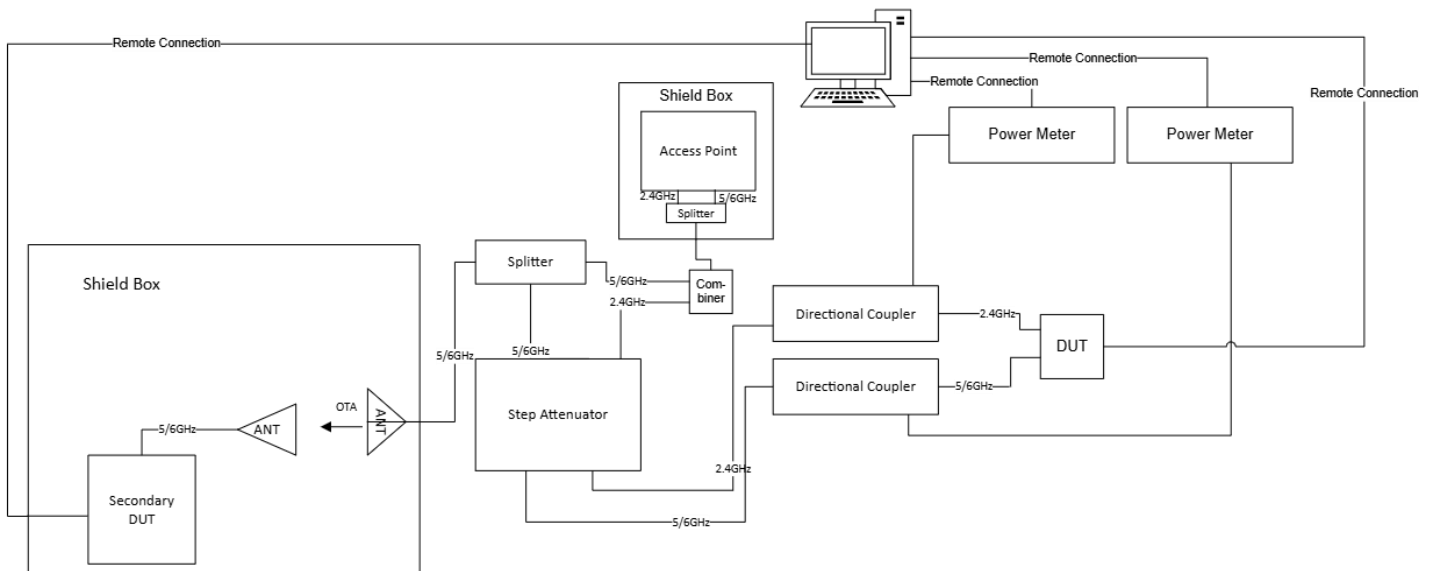


Figure 4-4: 2.4GHz Switch

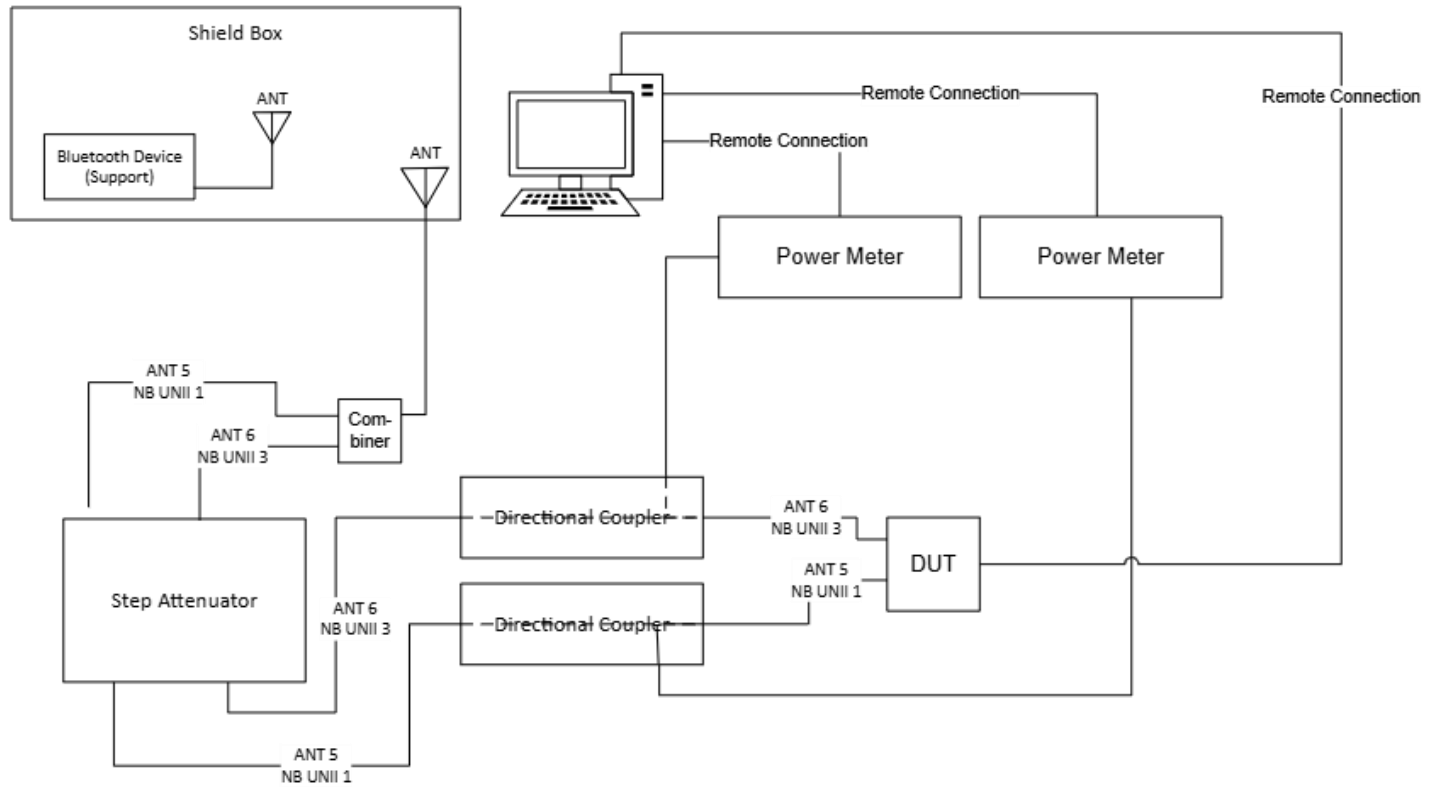


Figure 4-5: Change in Figaro 5G Antenna and Band

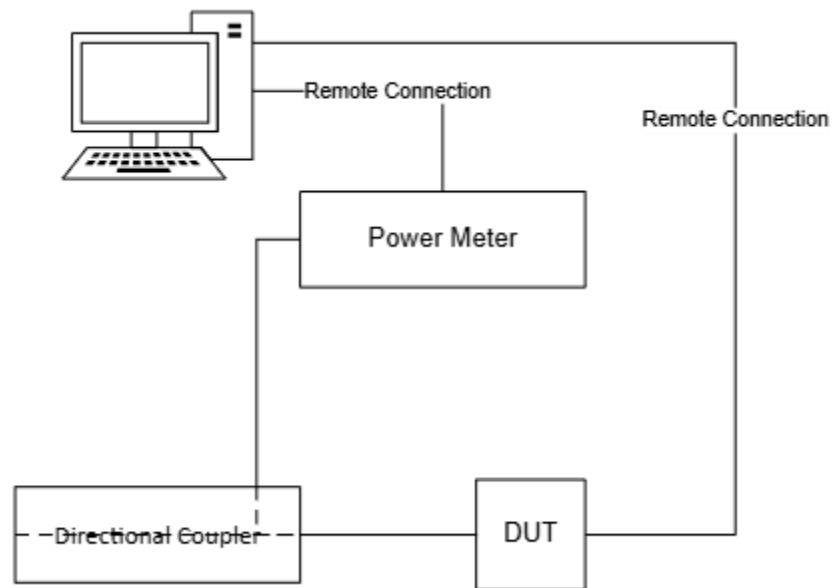


Figure 4-6: Change in Thread Antenna Setup

4.1.6. Technology Switch

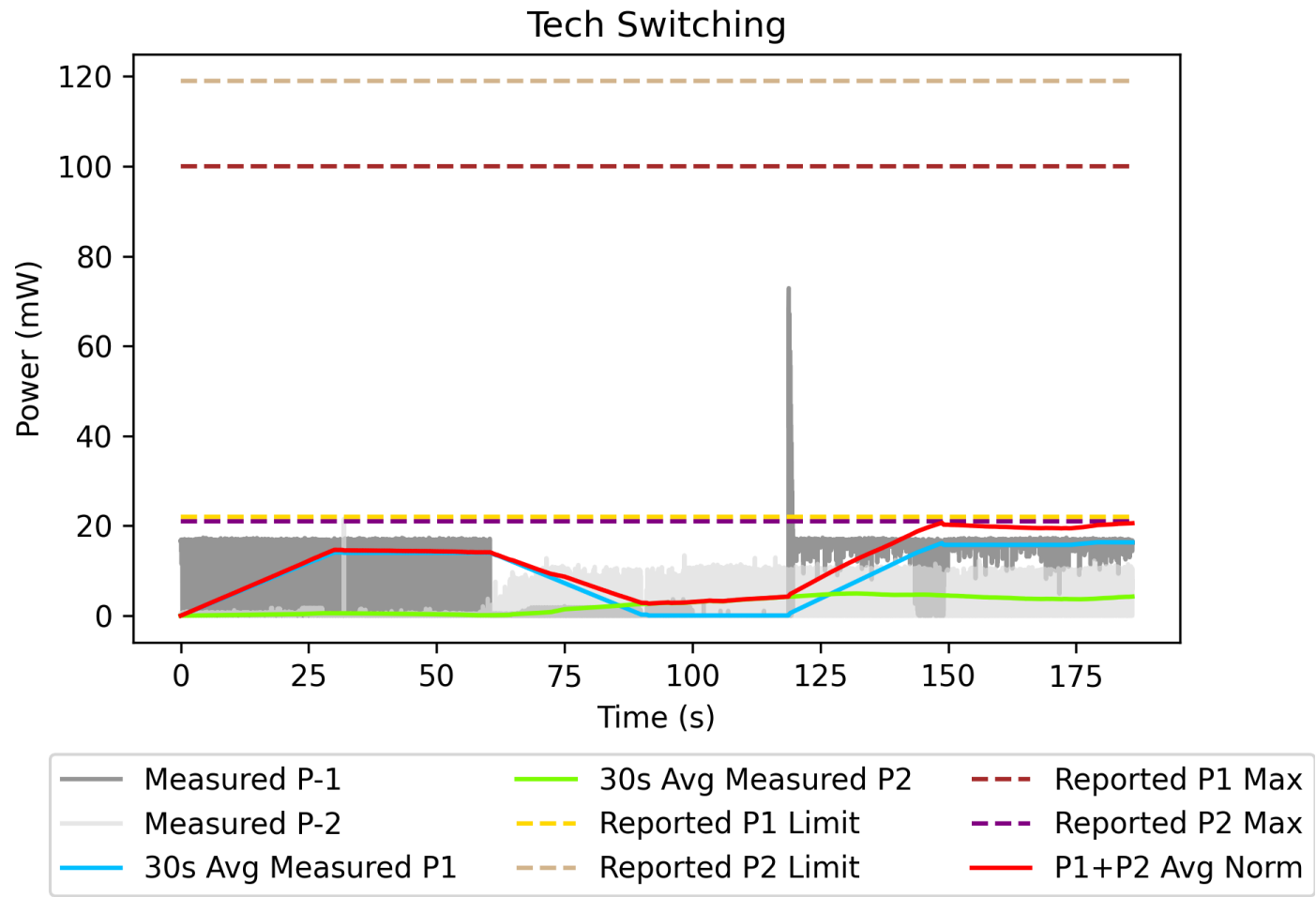


Figure 4-7: Change in Technology and Band Plot

Test Configuration	Technology/Band	P_{Limit} (mW)	P_{Max} (mW)
P1	Wi-Fi 5.6 GHz	22.38	100
P2	Bluetooth 2.4 GHz	118.85	21.13
P1 + P2	Bluetooth 2.4 GHz + WiFi 5 GHz	141.23	121.13

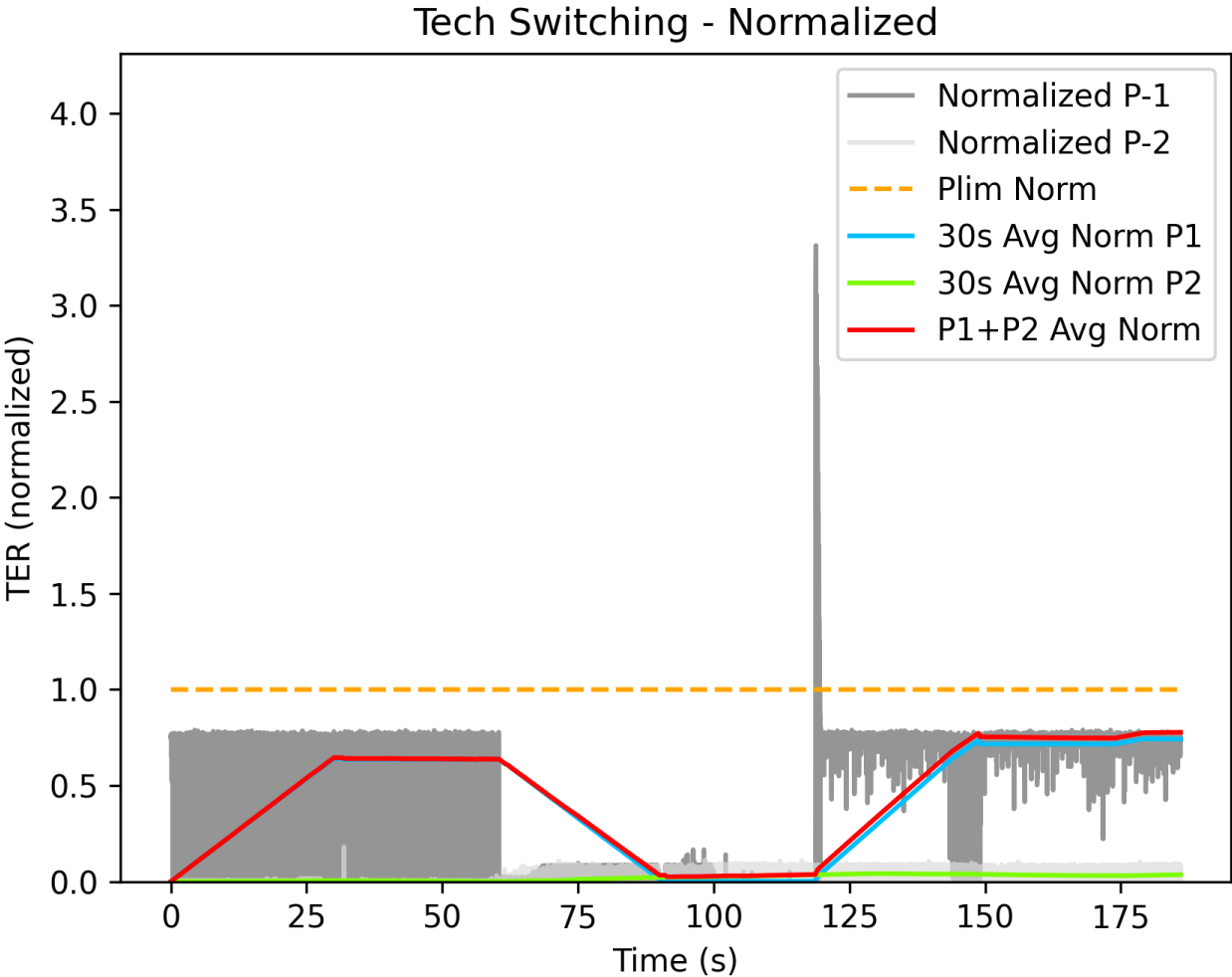


Figure 4-8: Change in Technology and Band Validation

	Validation
$P_{Avg}(n) \leq 1$	$0.76 \leq 1$

4.1.7. Change In Device State

4.1.7.1. Power State 3 to Power State 1

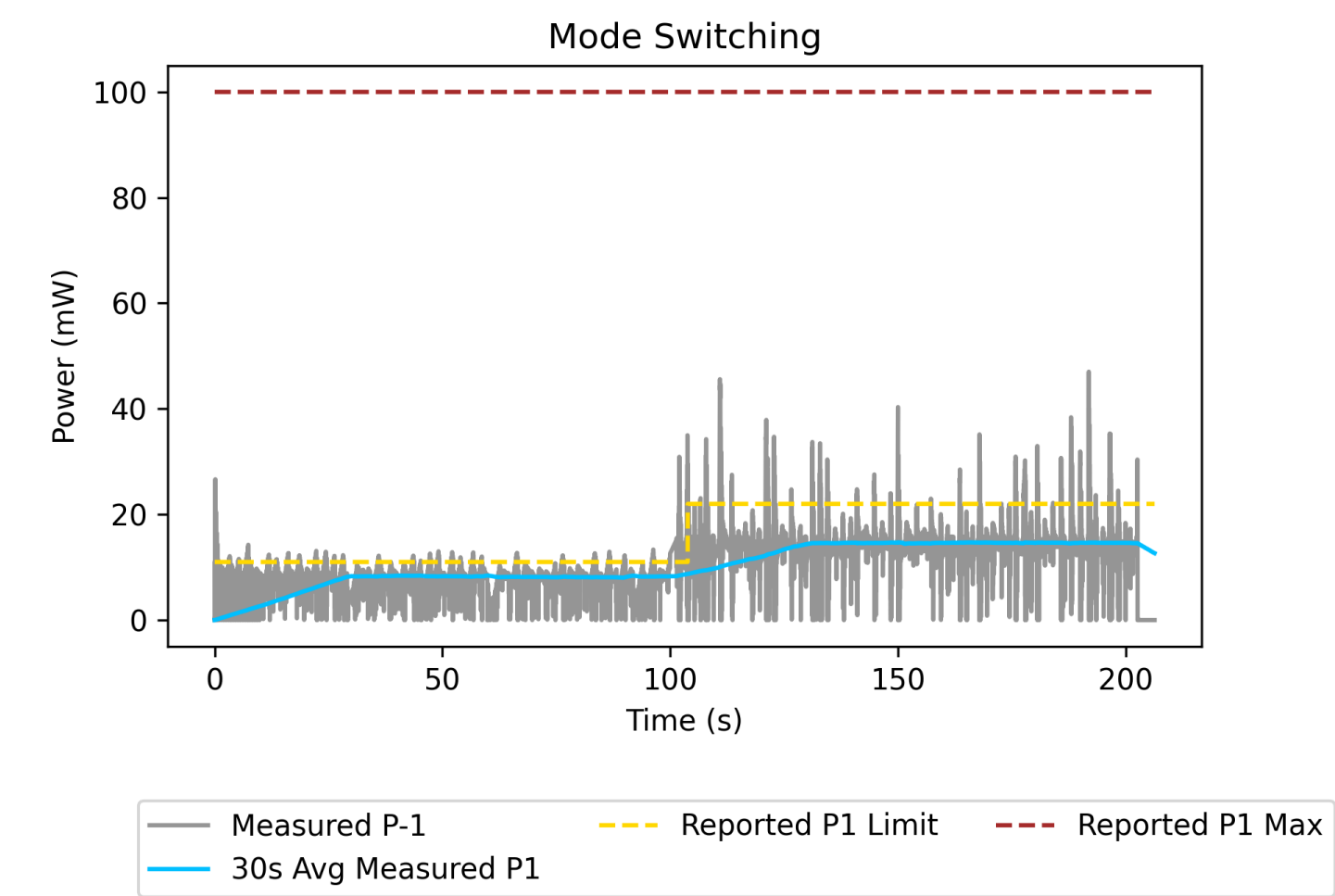


Figure 4-9: Power State 3 to Power State 1 Sequence

Test Configuration	Technology/Band	P_{Limit} (mW)	P_{Max} (mW)
P1 – Power State 3	Wi-Fi 5.6 GHz	11.19	100
P1 – Power State 1		22.38	100

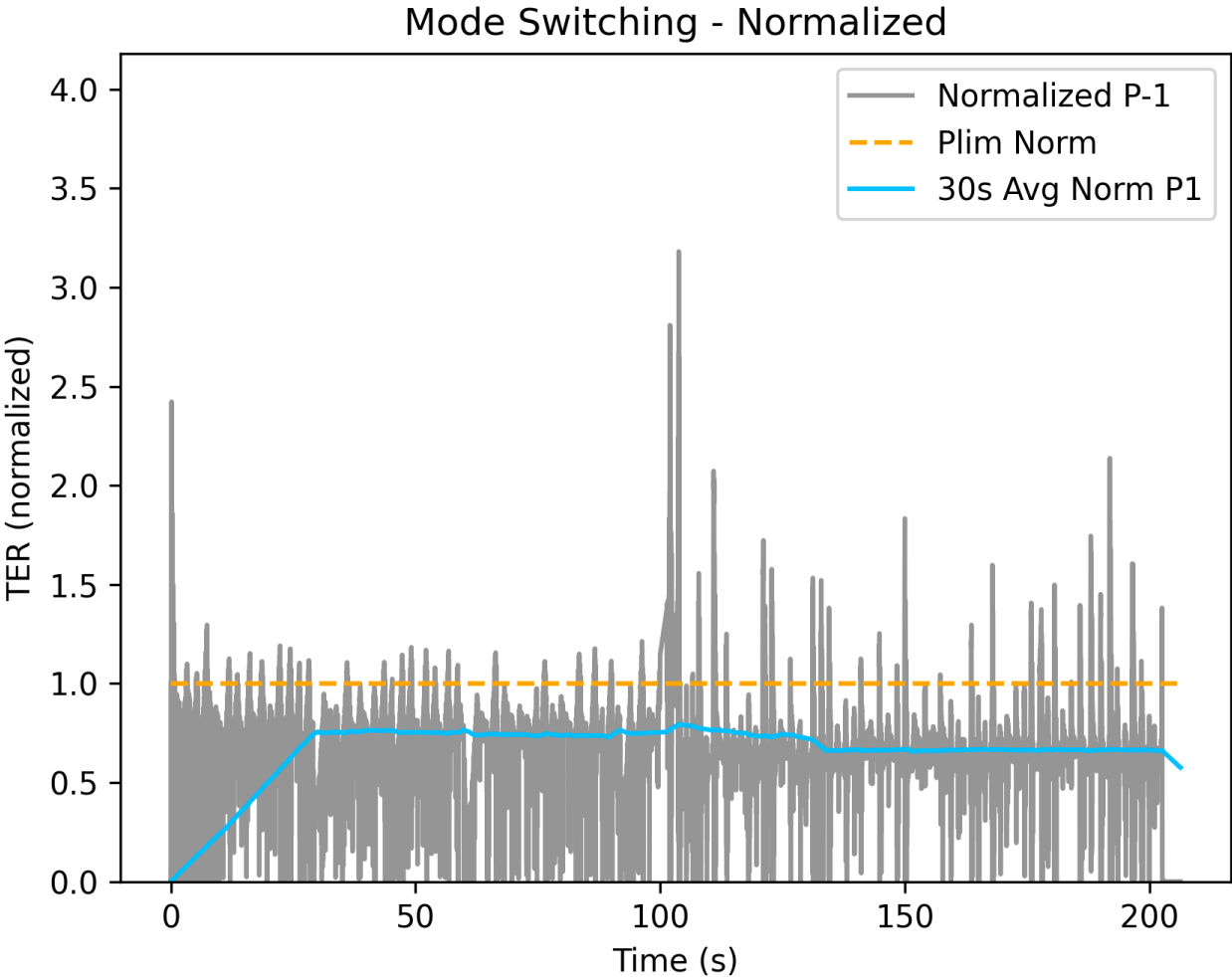


Figure 4-10: Wi-Fi Power State 3 to Power State 1 Validation

	Validation
$P_{Avg}(n) \leq 1$	$0.8 \leq 1$

4.1.7.2. Power State 3 to Power State 4

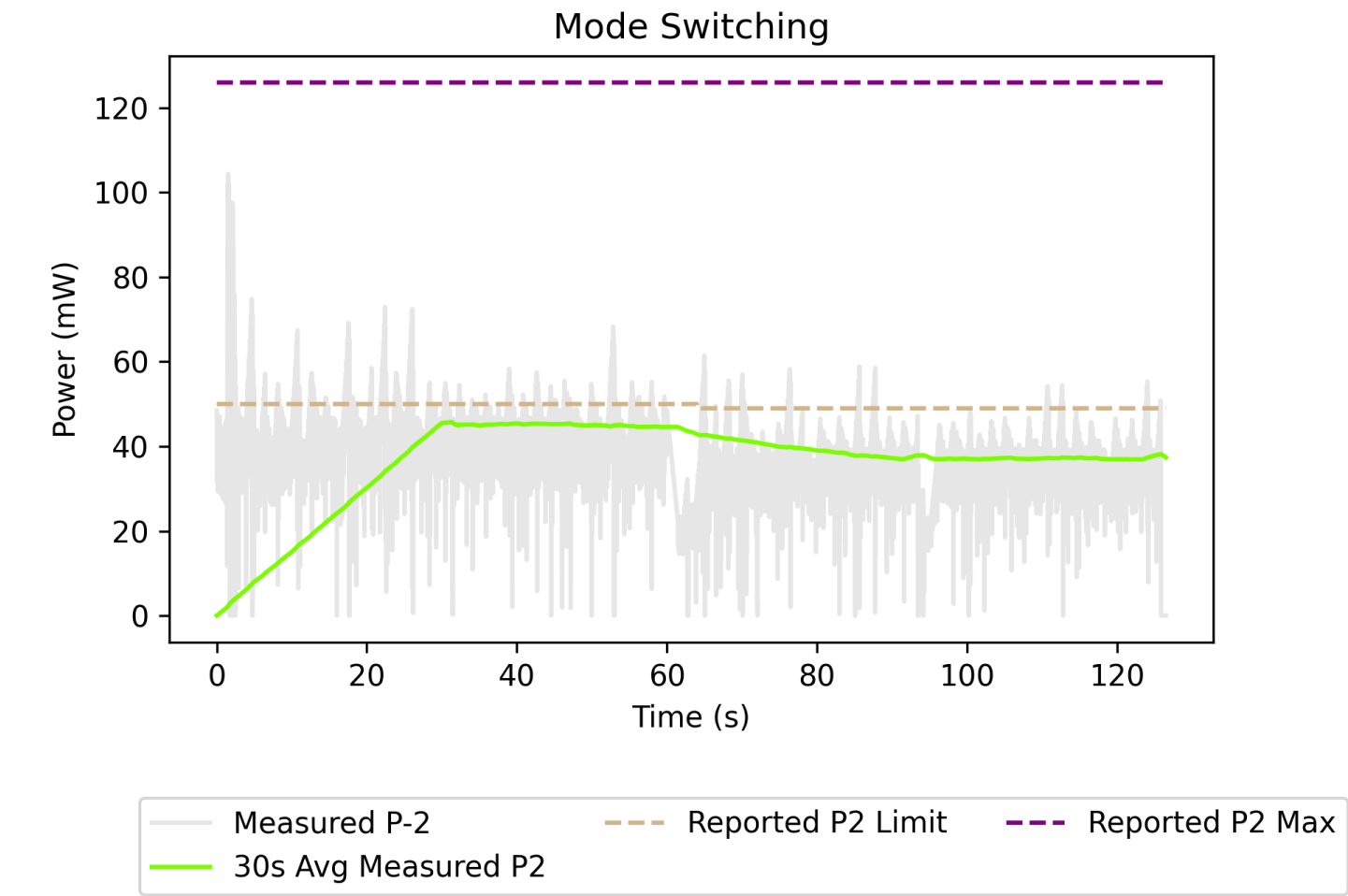


Figure 4-11: Wi-Fi Power State 3 to Power State 4 Plot

Test Configuration	Technology/Band	P_{Limit} (mW)	P_{Max} (mW)
P2 – Power State 3	Wi-Fi 2.4 GHz -	59.92	125.89
P2 – Power State 4		49.94	125.89

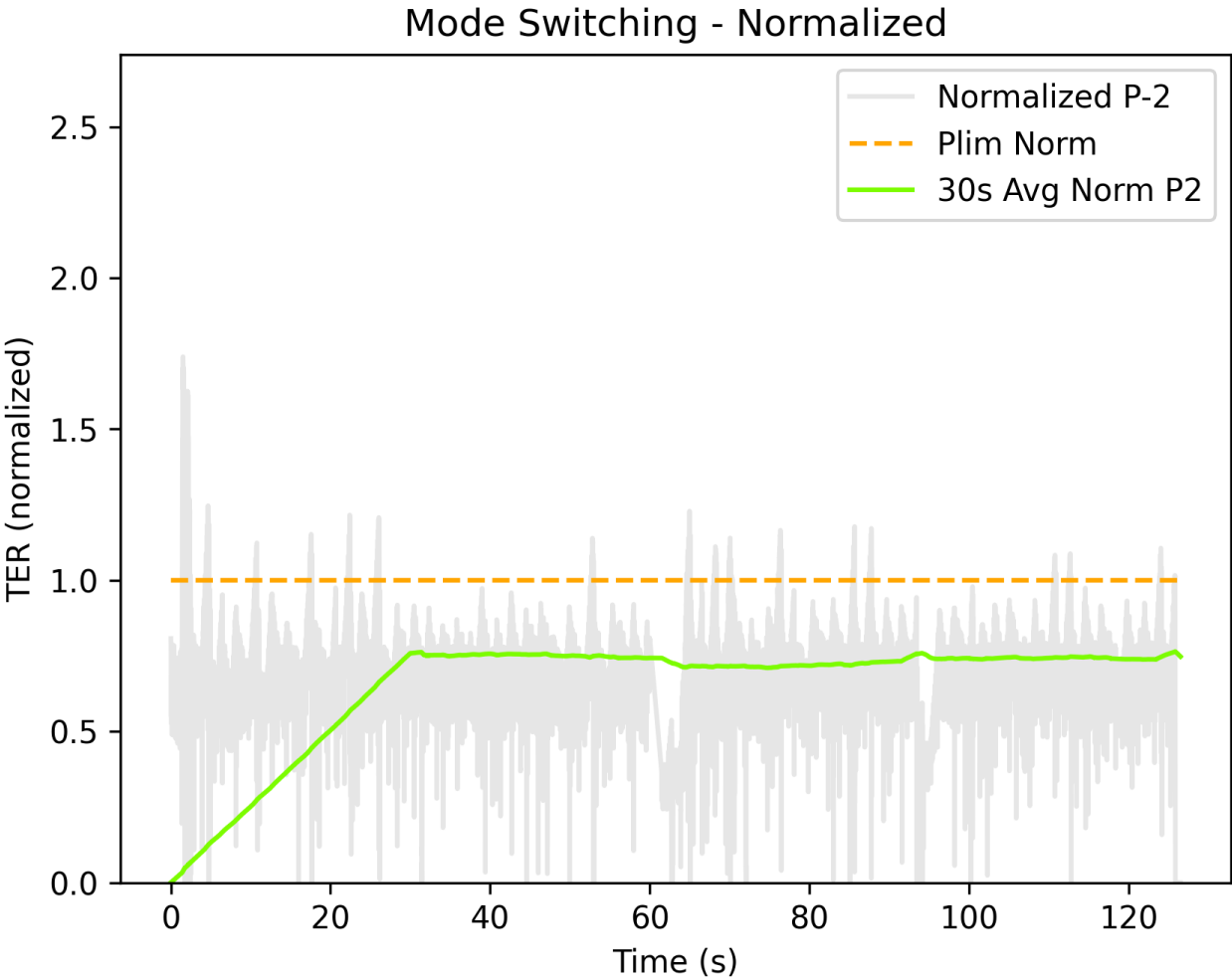


Figure 4-12: Wi-Fi Power State 3 to Power State 4 Validation

	Validation
$P_{Avg}(n) \leq 1$	$0.78 \leq 1$

4.1.7.3. Power State 5 to Power State 6

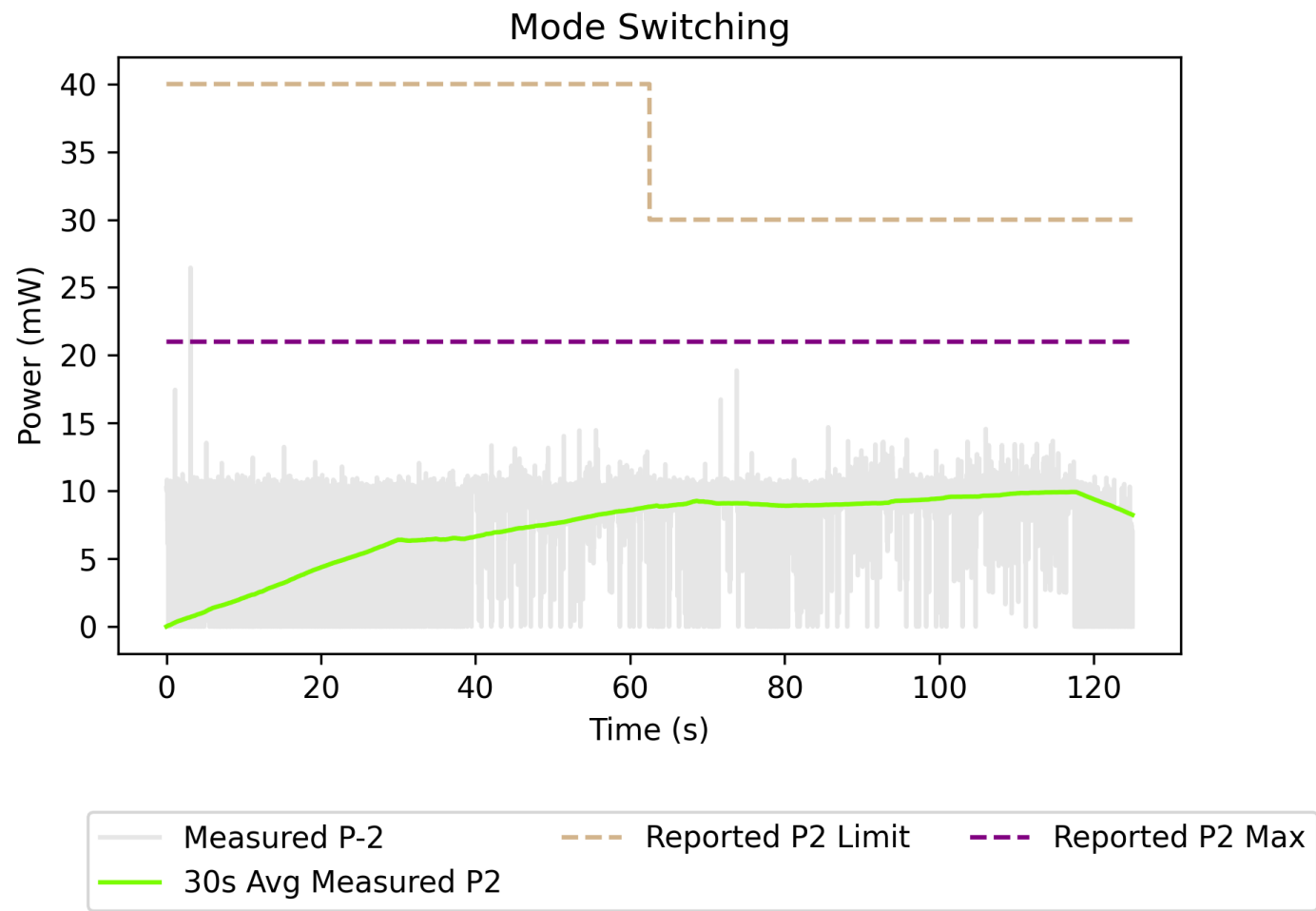


Figure 4-13: BT Power State 5 to Power State 6 Plot

Test Configuration	Technology/Band	P_{Limit} (mW)	P_{Max} (mW)
P2 – Power State 5	Bluetooth 2.4 GHz	39.95	31.23
P2 – Power State 6		29.96	31.23

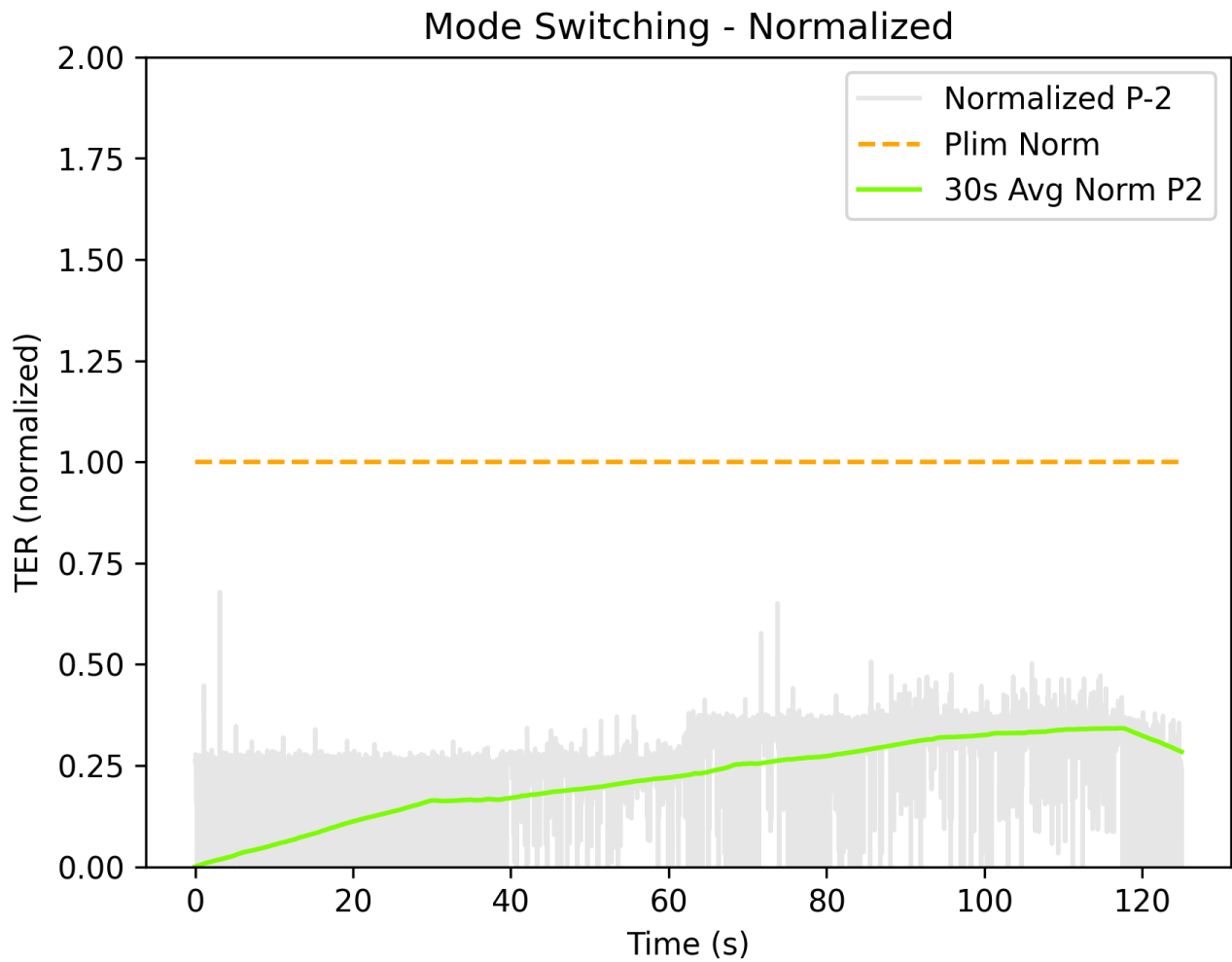
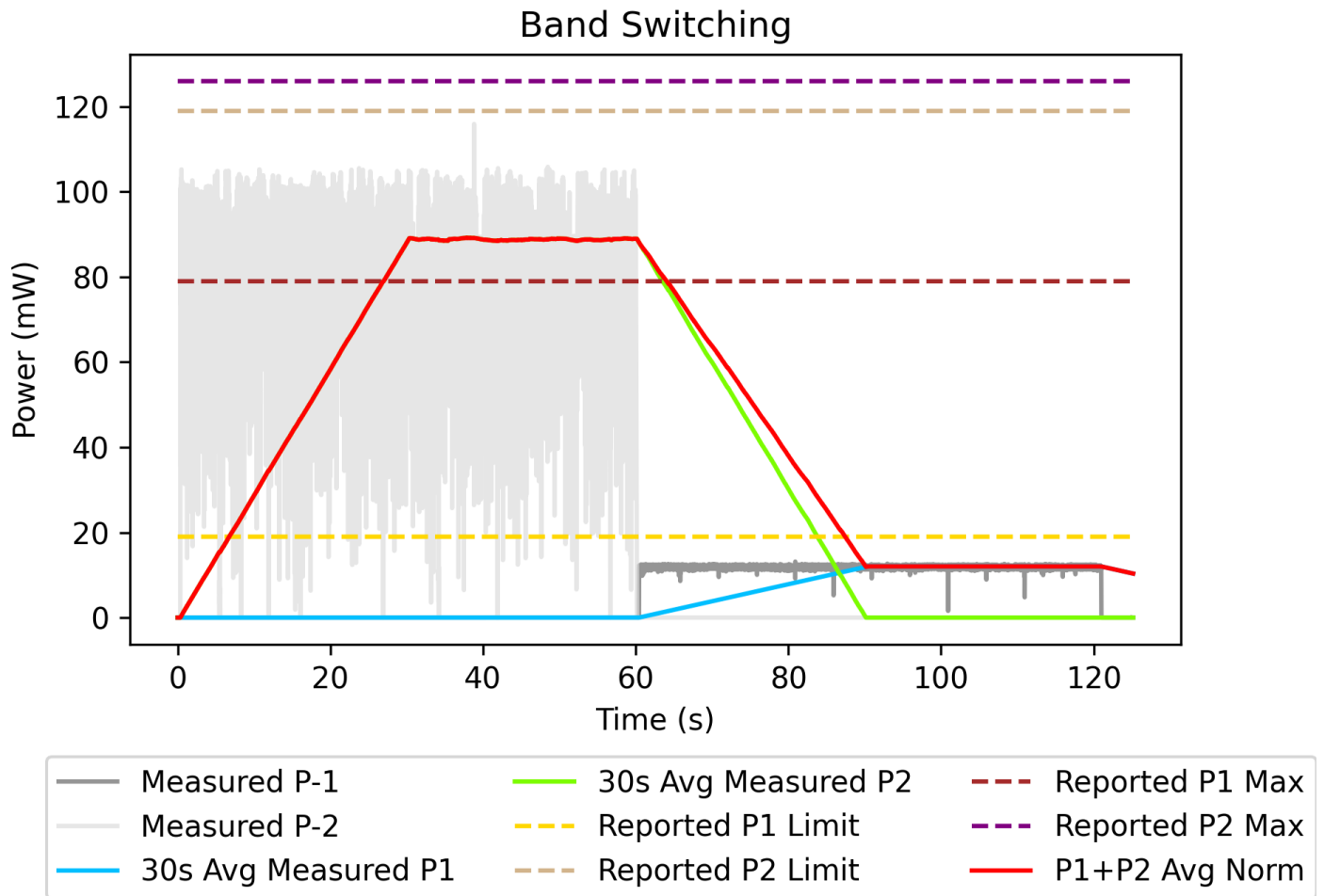


Figure 4-14: BT Power State 5 to Power State 6 Validation

	Validation
$P_{Avg}(n) \leq 1$	$0.36 \leq 1$

4.1.8. Change in Antenna/Band**4.1.8.1. Wi-Fi 2.4 GHz to Wi-Fi 6 GHz****Figure 4-15: Wi-Fi 2.4GHz to 6GHz Plot**

Test Configuration	Technology/Band	P_{Limit} (mW)	P_{Max} (mW)
P2	Wi-Fi 2.4 GHz	118.85	125.89
P1	Wi-Fi 6GHz	19.95	79.43

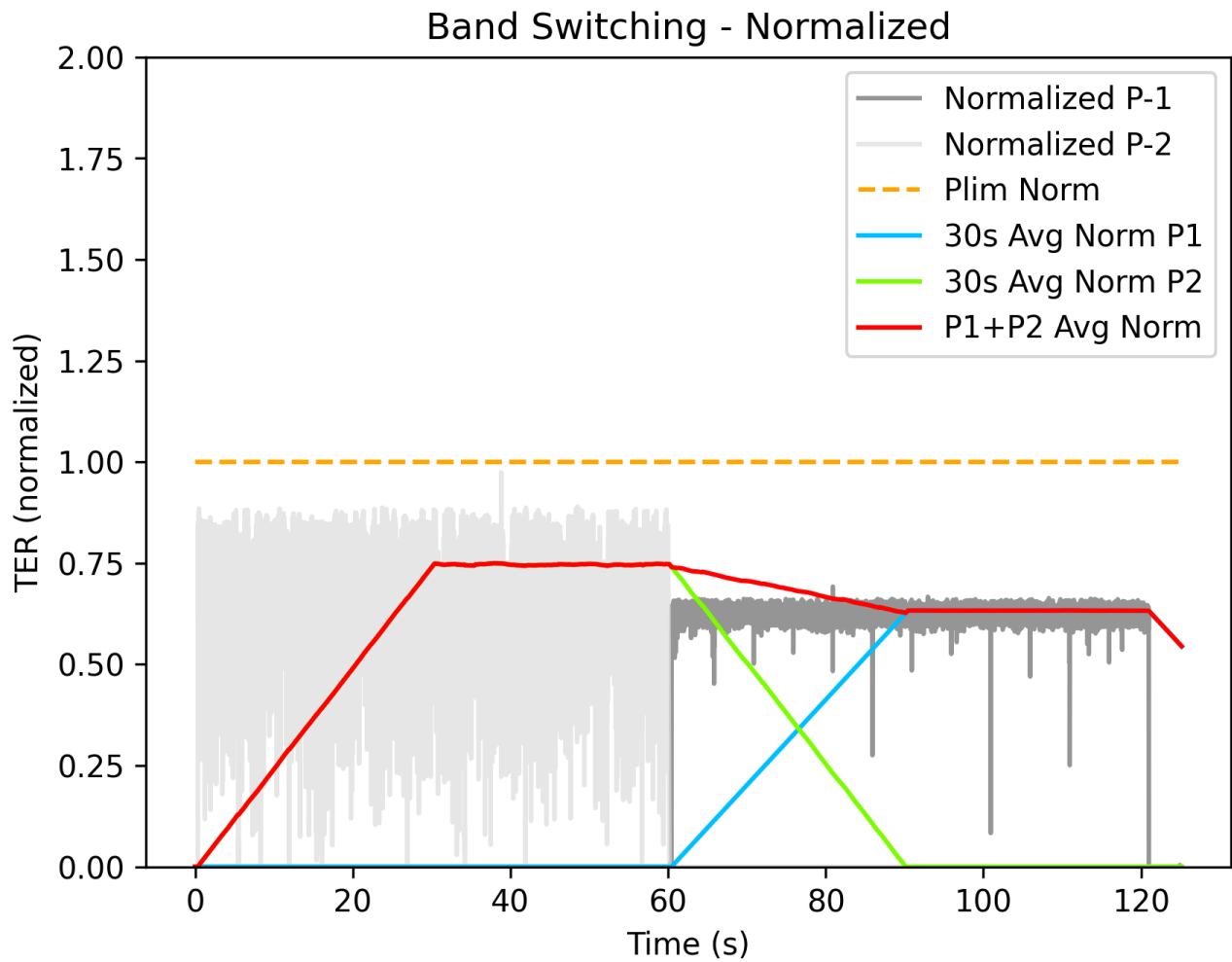
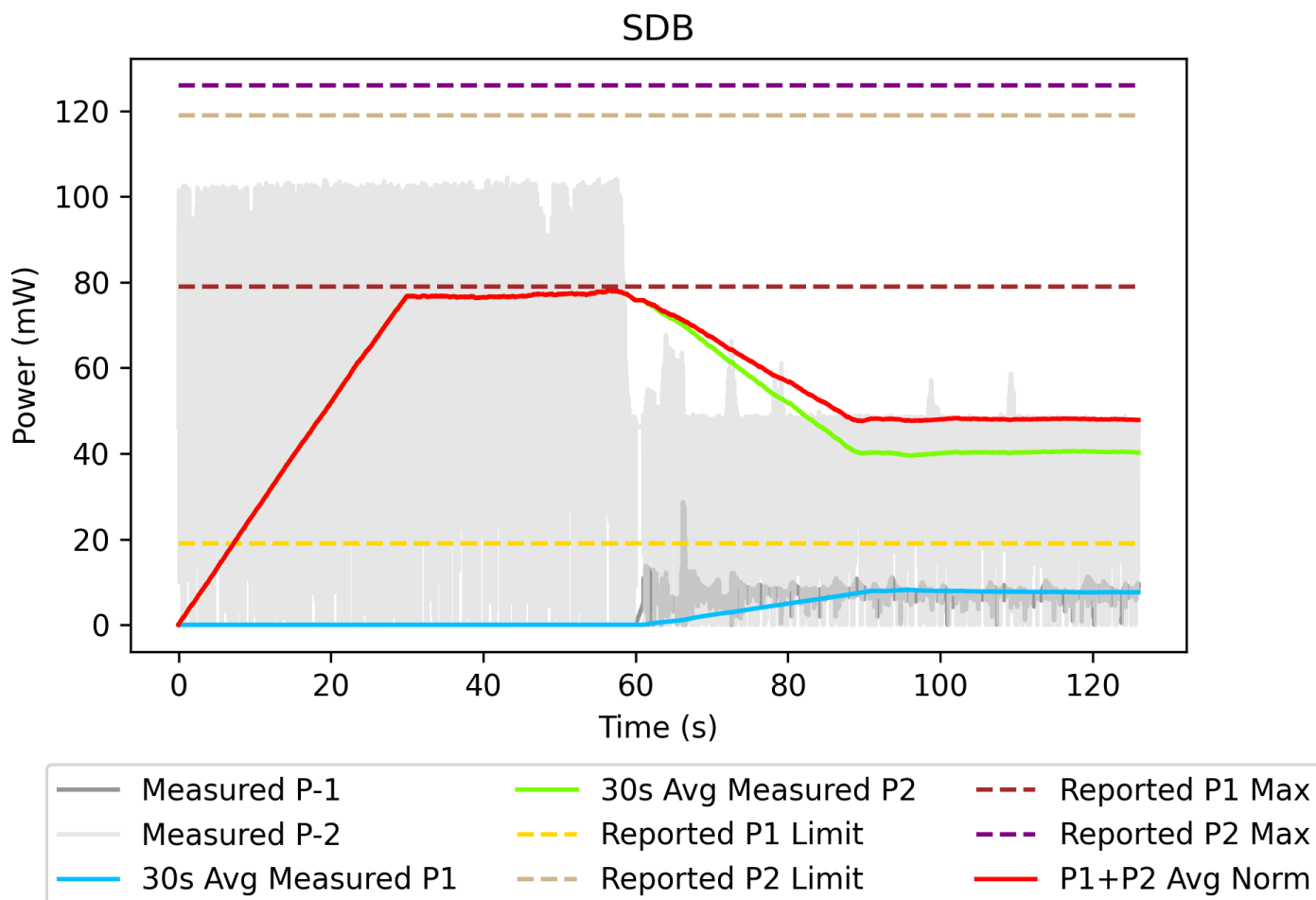


Figure 4-16: Band Switch Validation

	Validation
$P_{Avg}(n) \leq 1$	$0.80 \leq 1$

4.1.8.2. Wi-Fi 2.4GHz to Wi-Fi 2.4GHz + 6 GHz**Figure 4-17: Wi-Fi 2.4 GHz to Wi-Fi 2.4 GHz + 6 GHz Plot**

Test Configuration	Technology/Band	P_{Limit} (mW)	P_{Max} (mW)
P2	Wi-Fi 2.4 GHz -	118.85	125.89
P1	Wi-Fi 6 GHz	19.95	79.43
P1 + P2	Wi-Fi 2.4 GHz + Wi-Fi 6 GHz	138.8	205.32

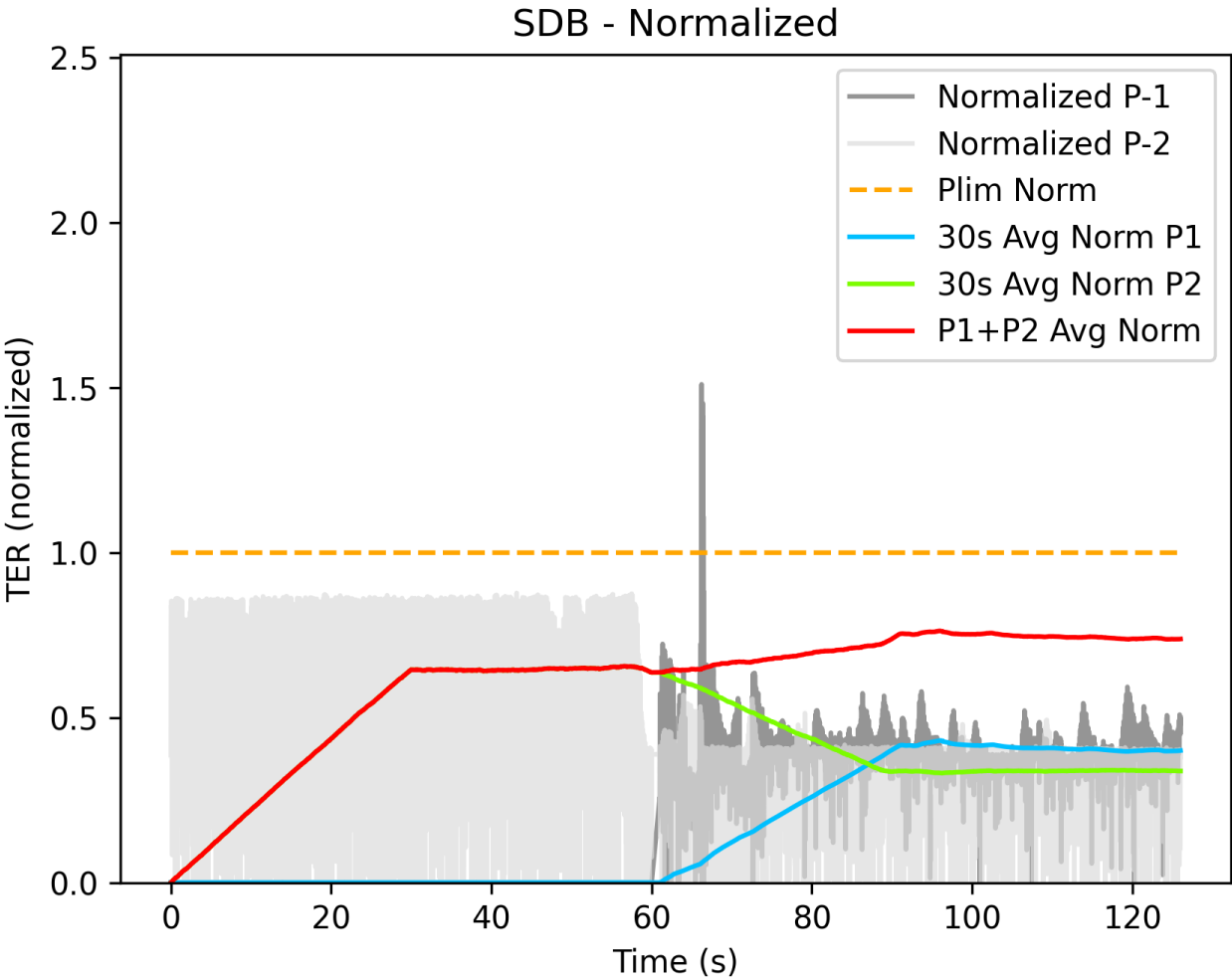


Figure 4-18: Wi-Fi 2.4 GHz to Wi-Fi 2.4 GHz + 6 GHz Validation

	Validation
$P_{Avg}(n) \leq 1$	$0.74 \leq 1$

4.1.8.3. Figaro 5G Antenna & Band Switch

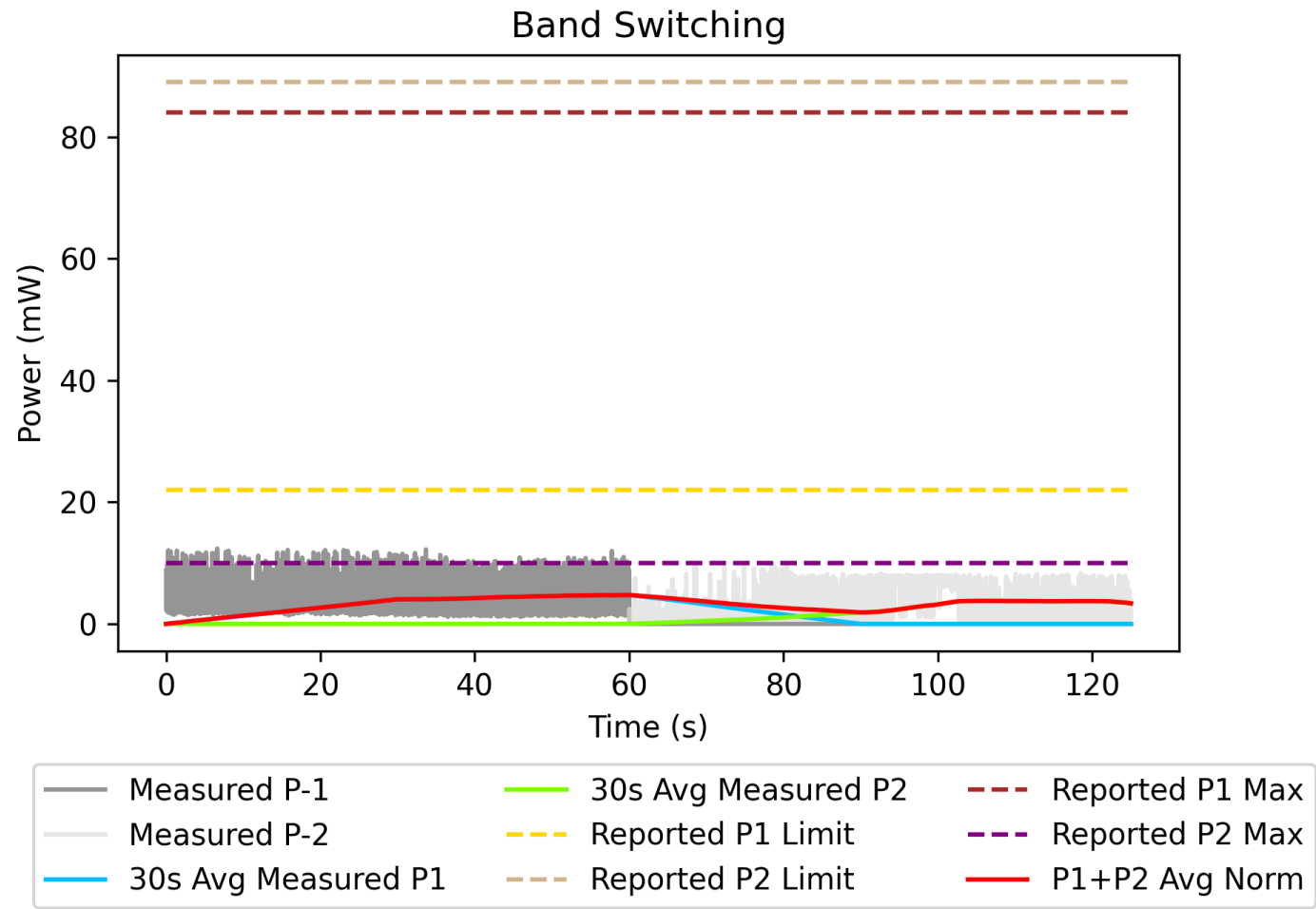


Figure 4-19: Figaro 5G Antenna/Band Switch Plot

Test Configuration	Technology/Band/Antenna	P_{Limit} (mW)	P_{Max} (mW)
P1	BDR NB UNII 3 ANT 6	22.38	84.14
P2	BDR NB UNII 1 ANT 5	89.13	10

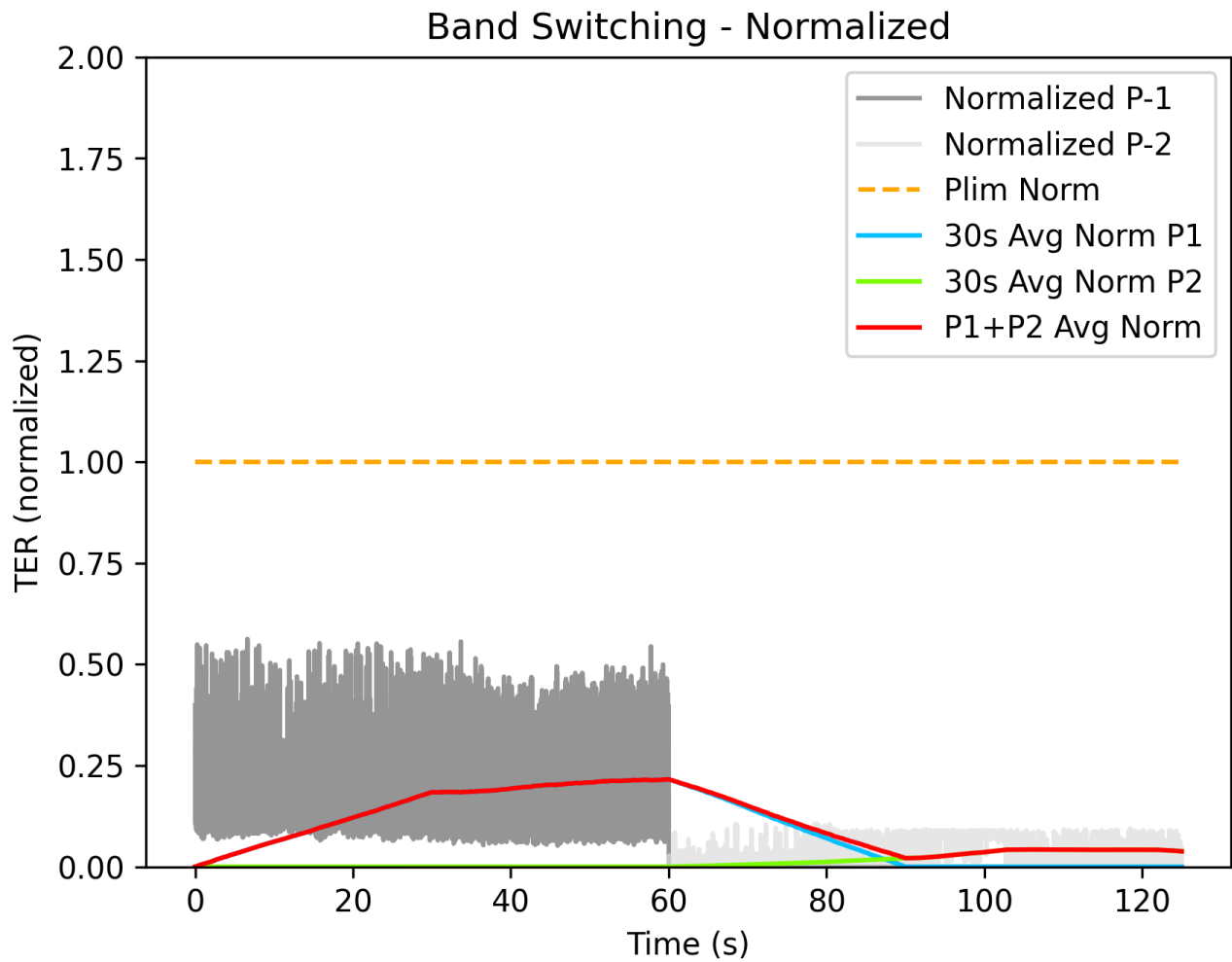


Figure 4-20: Figaro 5G Antenna and Band Switch Validation

	Validation
$P_{Avg}(n) \leq 1$	$0.22 \leq 1$

4.1.8.4. 802.15.4 Antenna & Band Switch

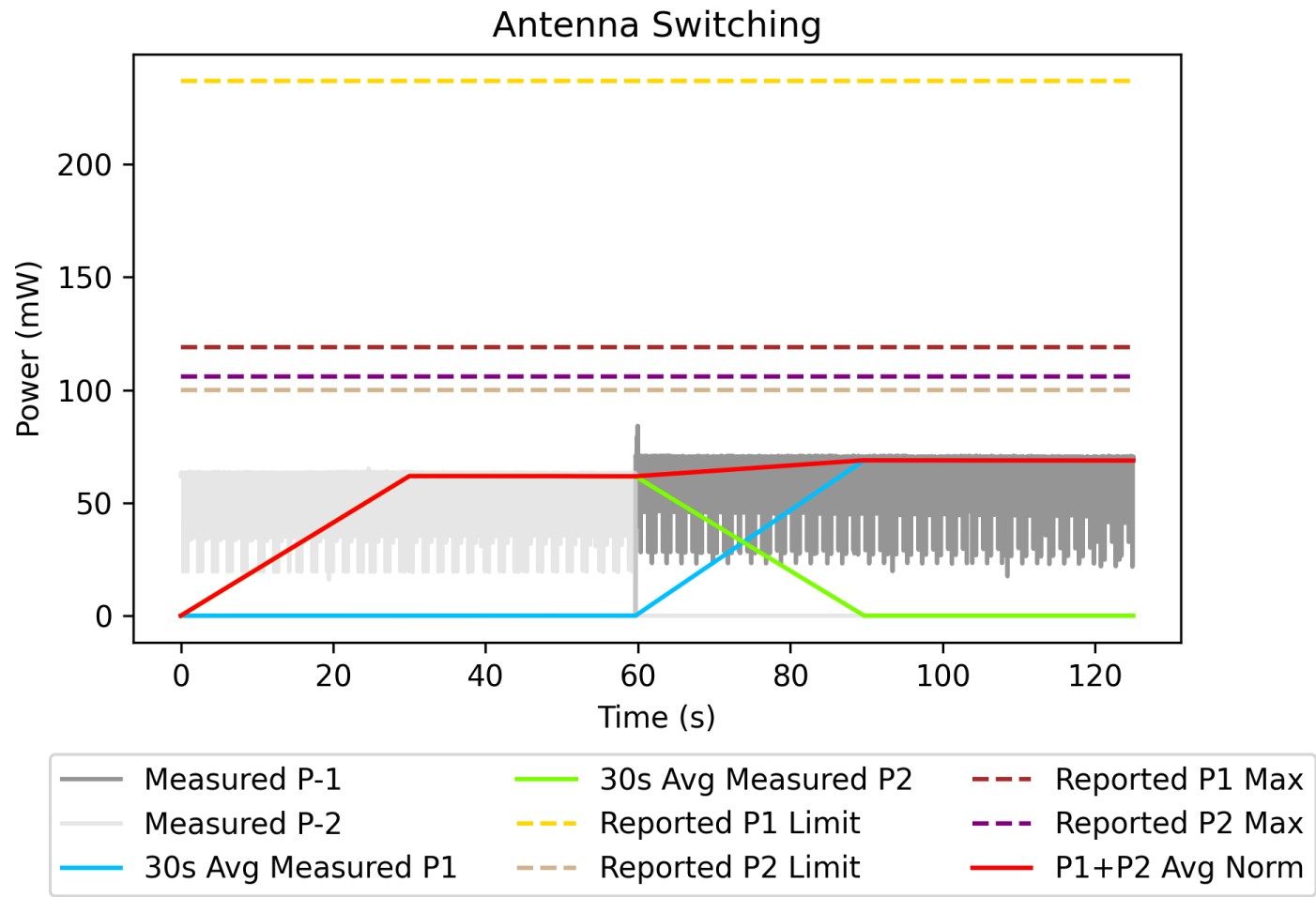


Figure 4-21: 802.15.4 Antenna Switch Plot

Test Configuration	Technology/Antenna	P_{Limit} (mW)	P_{Max} (mW)
P1	802.15.4 ANT 1	237.14	118.85
P2	802.15.4 ANT 2	100	105.93

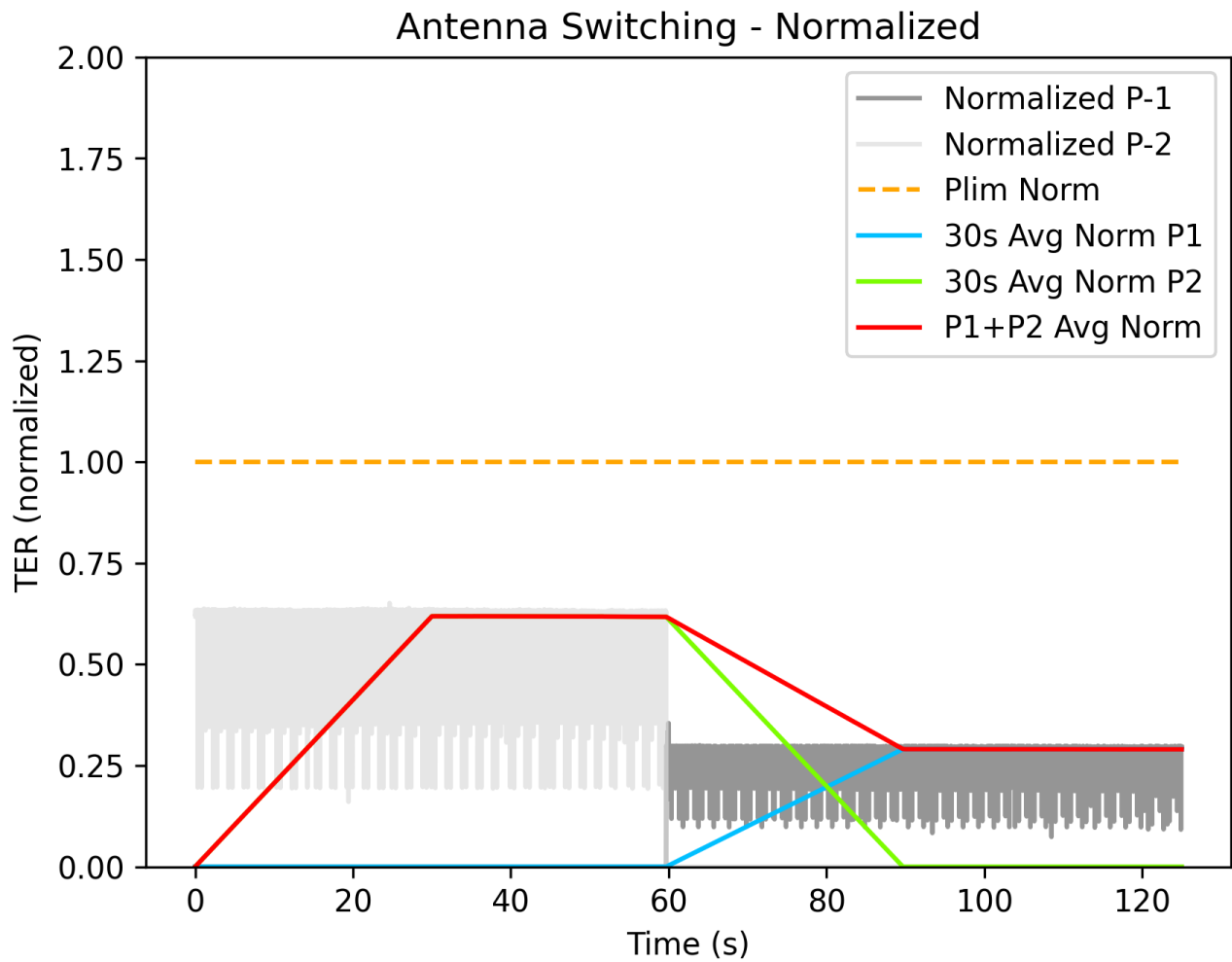


Figure 4-22: 802.15.4 Antenna Switch Validation

	Validation
$P_{Avg}(n) \leq 1$	$0.62 \leq 1$

5. Conclusion

The data presented in this report serves to validate this TAS algorithm for the connectivity transmitters. As demonstrated, the power limiting enforcement is effective and the total normalized time-averaged requested power/RF exposure does not exceed 1 nor does $P_{\text{Avg}}(n)$ exceed P_{Limit} .

Appendices

Appendix A: Test Setup Photos

Appendix B: SAR Measurement System & Test Equipment

B.1. Test Equipment

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations and is traceable to recognized national standards.

Test Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Sensor	R&S	NRP8S	107587	5/5/2027
Power Sensor	R&S	NRP8S	108121	5/5/2027
Power Sensor	R&S	NRP8S	109115	2/28/2026
Power Sensor	R&S	NRP8S	105244	5/5/2027
Vector Network Analyzer	R&S	ZNLE6	171920	2/28/2026
OSM Calibration Kit	R&S	ZN-Z151	101507	2/21/2026
Bi-Directional Coupler	Mini-Circuits	ZUDC10-83-S+	N/A	N/A
Bi-Directional Coupler	Mini-Circuits	ZUDC10-83-S+	N/A	N/A
Programmable Step Attenuator	API Technologies - Weinschel	8321 Series	11548001	N/A
Power Splitter	Mini-Circuits	ZFSC-2-10G	SF191300443	N/A
Power Splitter	Mini-Circuits	ZN2PD-9G-S	SF689400614	N/A
Access Point – Wi-Fi Router	TP-Link	Archer BE800	Y24B045000598	N/A

Appendix C: Measurement Uncertainties

C.1. Conducted

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	U _{Lab}
RF Power Measurement Direct Method Using Power Meter	1.300 dB Peak 0.450 dB Avg

Uncertainty figures are valid to a confidence level of 95%.

END OF REPORT