



# CERTIFICATE OF ACCREDITATION

## The ANSI National Accreditation Board

Hereby attests that

**Copper Mountain Technologies**  
631 East New York Street  
Indianapolis, IN 46202  
(and the satellite location listed on the scope)

Fulfills the requirements of

**ISO/IEC 17025:2017**

and national standard

**ANSI/NCSL Z540-1-1994 (R2002)**

In the field of

**CALIBRATION**

This certificate is valid only when accompanied by a current scope of accreditation document.  
The current scope of accreditation can be verified at [www.anab.org](http://www.anab.org).

A handwritten signature in black ink, appearing to be 'Jason Stine', is positioned above a horizontal line.

Jason Stine, Vice President

Expiry Date: 01 July 2024

Certificate Number: AC-2060



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory  
quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017**

**AND**

**ANSI/NCSL Z540-1-1994 (R2002)**

**Copper Mountain Technologies**

631 East New York Street

Indianapolis, IN 46202

Joshua Arvin 317-222-5400

[joshua.a@coppermountaintech.com](mailto:joshua.a@coppermountaintech.com)

**CALIBRATION**

Valid to: **July 1, 2024**

Certificate Number: **AC-2060**

**Electrical - RF/Microwave**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
RF Absolute Power – Measure <sup>2</sup>	0 dBm		Thermal Power Sensors R&S NRP-Z51 R&S NRP-Z52 R&S NRP110T
	DC to 33 GHz	0.10 dB + M	
	(33 to 54) GHz	0.25 dB + M	
	(-20 to +20) dBm		
	DC to 33 GHz	0.15 dB + M	
	(33 to 54) GHz	0.30 dB + M	

**Electrical – RF/Microwave**

Parameter/ Equipment	Reflection Magnitude <sup>1</sup>			
Reference Standard, Method, and/or Equipment	Vector Network Analyzers: C1220ET, S5243ET, FET1854ET Calibration Kits: 03CK010-150, 05CK010-150, 08CK010-150, 09CK010-150			
Range	Expanded Uncertainty of Measurement (+/-)			
Frequency	Measured VRC Magnitude (Linear)			
	0.0 to ≤ 0.4	> 0.4 to ≤ 0.6	> 0.6 to ≤ 0.8	> 0.8 to ≤ 1.0
(DC to 10) GHz	0.004	0.005	0.006	0.008
(10 to 33) GHz	0.006	0.007	0.009	0.012
(33 to 50) GHz	0.009	0.011	0.014	0.019
(50 to 54) GHz	0.016	0.018	0.022	0.027



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**Electrical – RF/Microwave**

Parameter/ Equipment	Reflection Phase				
Reference Standard, Method, and/or Equipment	Vector Network Analyzers: C1220ET, S5243ET, FET1854ET Calibration Kits: 03CK010-150, 05CK010-150, 08CK010-150, 09CK010-150				
Range	Expanded Uncertainty of Measurement (+/-)				
Frequency	Measured VRC Magnitude (Degrees)				
	(0.01 to 0.02)	(0.02 to 0.05)	(0.05 to 0.10)	(0.10 to 0.20)	(0.20 to 1.00)
(DC to 10) GHz	10 °	4 °	2 °	1 °	0.5 °
(10 to 33) GHz	15 °	6 °	3 °	2 °	1 °
(33 to 50) GHz	26 °	10 °	5 °	2.5 °	1.5 °
(50 to 54) GHz	–	19 °	10 °	5 °	2 °

**Electrical – RF/Microwave**

Parameter/ Equipment	Transmission Magnitude						
Reference Standard, Method, and/or Equipment	Vector Network Analyzers: C1220ET, S5243ET, FET1854ET Calibration Kits: 03CK010-150, 05CK010-150, 08CK010-150, 09CK010-150						
Range	Expanded Uncertainty of Measurement (+/-)						
Frequency	Measured VRC Magnitude (dB)						
	0	10	20	30	40	50	60
(DC to 20) GHz	0.05 dB	0.05 dB	0.05 dB	0.05 dB	0.05 dB	0.05 dB	0.05 dB
(20 to 44) GHz	0.10 dB	0.10 dB	0.10 dB	0.10 dB	0.10 dB	0.10 dB	0.10 dB
(44 to 50) GHz	0.11 dB	0.11 dB	0.11 dB	0.11 dB	0.11 dB	0.11 dB	0.15 dB
(50 to 54) GHz	0.15 dB	0.15 dB	0.15 dB	0.15 dB	0.15 dB	0.15 dB	0.17 dB



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**Electrical – RF/Microwave**

Parameter/ Equipment	Transmission Phase						
Reference Standard, Method, and/or Equipment	Vector Network Analyzers: C1220ET, S5243ET, FET1854ET Calibration Kits: 03CK010-150, 05CK010-150, 08CK010-150, 09CK010-150						
Range	Expanded Uncertainty of Measurement (+/-)						
Frequency	Measured VRC Magnitude (Degrees)						
	0	10	20	30	40	50	60
(DC to 20) GHz	0.5 °	0.5 °	0.5 °	0.5 °	0.5 °	0.5 °	0.5 °
(20 to 44) GHz	1 °	1 °	1 °	1 °	1 °	1 °	1 °
(44 to 50) GHz	1.1 °	1.1 °	1.1 °	1.1 °	1.1 °	1.1 °	1.5 °
(50 to 54) GHz	1.5 °	1.5 °	1.5 °	1.5 °	1.5 °	1.5 °	1.7 °

**Time and Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Frequency - Source	10 MHz	130 nHz/Hz	Agilent 53181A, opt. 010 Counter
Frequency - Measure	1 Hz to 60 GHz	100 nHz/Hz	Frequency counter: 53181A, opt. 010, Spectrum Analyzer: E4407B, Harmonic Mixers: 11970A, 11970U



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**Services performed at satellite location  
Copper Mountain Technologies EMEA**

Eleftheriou Venizelou 48

Paphos 8021 Cyprus

**Electrical - RF/Microwave**

<b>Parameter/ Equipment</b>	Reflection Magnitude <sup>1</sup>			
<b>Reference Standard, Method, and/or Equipment</b>	Vector Network Analyzers: C1220 Calibration Kits: 03CK010-150, 05CK010-150			
<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>			
<b>Frequency</b>	Measured VRC Magnitude (Linear)			
	0.0 to ≤ 0.4	> 0.4 to ≤ 0.6	> 0.6 to ≤ 0.8	> 0.8 to ≤ 1.0
(DC to 10) GHz	0.004	0.005	0.006	0.008
(10 to 20) GHz	0.006	0.007	0.009	0.012

**Electrical - RF/Microwave**

<b>Parameter/ Equipment</b>	Reflection Phase				
<b>Reference Standard, Method, and/or Equipment</b>	Vector Network Analyzers: C1220 Calibration Kits: 03CK010-150, 05CK010-150				
<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>				
<b>Frequency</b>	Measured VRC Magnitude (Degrees)				
	(0.01 to 0.02)	(0.02 to 0.05)	(0.05 to 0.10)	(0.10 to 0.20)	(0.20 to 1.00)
(DC to 10) GHz	10 °	4 °	2 °	1 °	0.5 °
(10 to 20) GHz	15 °	6 °	3 °	2 °	1 °

**Electrical - RF/Microwave**

Parameter/ Equipment	Transmission Magnitude						
Reference Standard, Method, and/or Equipment	Vector Network Analyzers: C1220 Calibration Kits: 03CK010-150, 05CK010-150						
Range	Expanded Uncertainty of Measurement (+/-)						
Frequency	Measured VRC Magnitude (dB)						
	0	10	20	30	40	50	60
(DC to 10) GHz	0.05 dB	0.05 dB	0.05 dB	0.05 dB	0.05 dB	0.05 dB	0.05 dB
(10 to 20) GHz	0.05 dB	0.05 dB	0.05 dB	0.05 dB	0.05 dB	0.05 dB	0.05 dB

**Electrical - RF/Microwave**

Parameter/ Equipment	Transmission Phase						
Reference Standard, Method, and/or Equipment	Vector Network Analyzers: C1220 Calibration Kits: 03CK010-150, 05CK010-150						
Range	Expanded Uncertainty of Measurement (+/-)						
Frequency	Measured VRC Magnitude (dB)						
	0	10	20	30	40	50	60
(DC to 10) GHz	0.5 °	0.5 °	0.5 °	0.5 °	0.5 °	0.5 °	0.5 °
(10 to 20) GHz	0.5 °	0.5 °	0.5 °	0.5 °	0.5 °	0.5 °	0.5 °

**Electrical - RF/Microwave**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
RF Absolute Power – Measure <sup>2</sup>	0 dBm DC to 33 GHz	0.10 dB + M	Thermal Power Sensors: R&S NRP33T
	(-20 to +20) dBm DC to 33 GHz	0.15 dB + M	

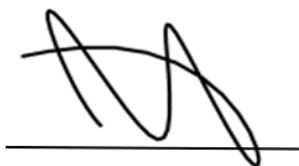
**Time and Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Frequency - Source	10 MHz	100 nHz/Hz	Frequency counter: 53181A, opt. 010
Frequency - Measure	1 Hz to 26.5 GHz	100 nHz/Hz	Frequency counter: 53181A, opt. 010  Spectrum Analyzer: E4407B

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 ( $k=2$ ), corresponding to a confidence level of approximately 95%.

Notes:

1. Unitless linear measure.
2. M – Match between Standard and UUT.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-2060.



Jason Stine, Vice President

