Calibration Certificate

ISO/IEC 17025:2017 and ANSI/NCSL Z540.1-1994
Certificate Number: CMT-19092364-4038-0009

ACM2520 Serial Number: **19092364** Date: **30 July 2020**

Description:	Automatic Calibration Module	**Customer:**
Model:	ACM2520	Copper Mountain Technologies 631 E. New York Street Indianapolis, IN 46202 USA
Serial Number:	19092364	
Manufacturer:	Copper Mountain Technologies	
Date of Receipt:	30 July 2020	**Location of Calibration:**
Date of Calibration:	30 July 2020	Copper Mountain Technologies 631 East New York Street Indianapolis, IN 46202 USA
Procedure:	QMS.CAL.01	
Temperature:	25.6 °C	
Humidity:	52.7 %	

This calibration certificate documents that the instrument has been calibrated using applicable procedures and in compliance with ISO/IEC 17025:2017 and ANSI/NCSL Z540.1-1994 (R2002).

As Received Condition:
The measured values of the instrument were observed IN SPECIFICATION at the points tested.

Action Taken:
No corrective actions were necessary to ensure the perfomance to published operating specifications.

As Shipped Condition:
At the completion of the calibration, measured values were IN SPECIFICATION at the points tested.

No sampling plan or other process was used for this calibration, the results reported herein apply only to the calibration of the instrument describe above. All calibrations are performed to manufacturer's specifications, unless otherwise noted. This certificate may contain data that is not covered by the ANAB scope of accreditation. The unaccredited material, where applicable, is indicated by an asterisk (*) or confined to clearly marked sections. This certificate shall not be reproduced except in full, without written approval of Copper Mountain Technologies.

Autorized by: _____

Kevin Crowe,
Senior Technician

Compliance with Specification

Reported uncertainties (where applicable) represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of 2 (k=2). EURAMET Calibration Guide No. 12 prescribes decision rule and way of uncertainty accounting for S-parameters in accordance with scalar case of quantitative verification criteria. For other parameters the decision rule is “simple acceptance” described into the ISO/IEC Guide 98-4.

Traceability Information

Measurements are traceable to the International System of Units (SI) via national metrology institutes (i.e. NIST, NPL, PTB, SNIIM, etc.) that are signatories to the CIPM Mutual Recognition Arrangement.

Calibration Equipment Used:

Type	Model	Description	Serial Number	Certificate Number	Cal Due	Trace Value
W	03CK010-150	Reference Calibration Kit	EB006	4-496	5 May 2021	Reflection, Transmission
W	C1220ET	S-parameter measurement system	001	CMT-C1220ET001-0004	4 Feb 2021	Reflection, Transmission

W - Working Standard: measurement standard that is used routinely to calibrate or verify measuring instruments or measuring systems (JCGM 200:2012 VIM3).

R - Reference Standard: measurement standard designated for the calibration of other measurement standards for quantities of a given kind in a given organization or at a given location (JCGM 200:2012 VIM3).

Test Summary

Environmental Conditions			
Temperature:	25.6 °C	Humidity:	52.7 %

Description	Lower limit	Measured value	Upper limit	MU	Result
Visual Inspection	—	—	—	—	PASS
Gaging Connectors *					
PORT A, 3.5 mm, female	-0.08 mm	-0.02 mm	0.00 mm	—	PASS
PORT B, 3.5 mm, female	-0.08 mm	-0.03 mm	0.00 mm	—	PASS
Parameters stability **					
Directivity	—	-56.4 dB	-55.0 dB	—	PASS
Reflection tracking	-0.030 dB	-0.027 dB	0.030 dB	—	PASS
Transmission tracking	-0.030 dB	-0.025 dB	0.030 dB	—	PASS
Effective parameters					
Directivity	—	0.0150	0.0158		PASS
Source match	—	0.0254	0.0282		PASS
Reflection tracking	-0.150 dB	0.139 dB	0.150 dB	±0.100 dB	PASS
Transmission tracking	-0.100 dB	0.131 dB	0.200 dB	±0.050 dB	PASS

** - This is not a warranted specification. The limits have been set to ensure that the hardware is functional and is not defective.

Visual Inspection

Test standards and required equipment				
Model	Description	Serial number	Certificate Number	Cal due
No traceable test standards or equipment are required for this test				

Description	Statement of compliance	Result
The Module has all accessories listed in the operation manual	YES	PASS
The connectors do not have any mechanical damage	YES	PASS
There are no deep scratches or dents in the Module housing	YES	PASS
There is no sound in the housing due to loose components	YES	PASS
There is no evidence of metal corrosion	YES	PASS
The coatings are not damaged	YES	PASS
The label markings are legible	YES	PASS
The USB cable is not damaged	YES	PASS

Gaging Connectors

Test standards and required equipment				
Model	Description	Serial number	Certificate Number	Cal due
No traceable test standards or equipment are required for this test				

Port	Connector type	Lower limit [mm]	Measured value [mm]	Upper limit [mm]	Result
PORT A	3.5 mm, female	-0.08	-0.02	0	PASS
PORT B	3.5 mm, female	-0.08	-0.03	0	PASS

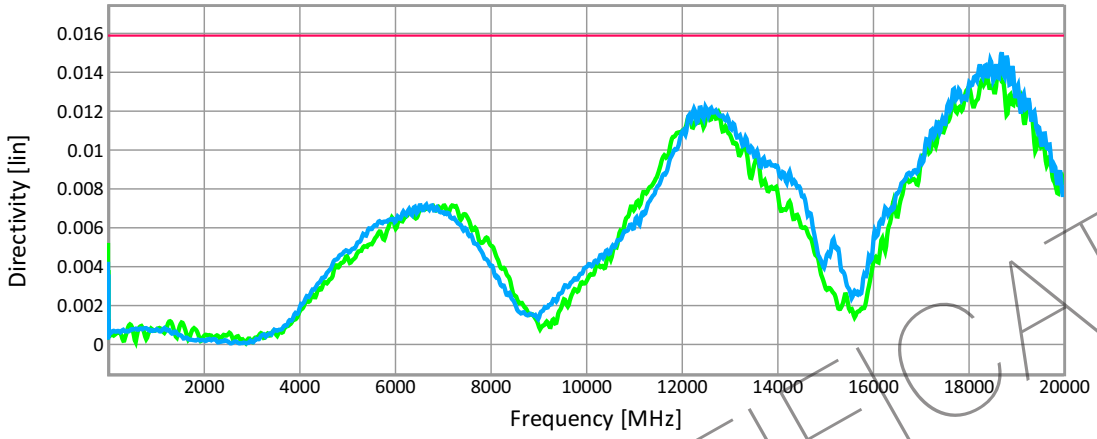
Accuracy Measurement

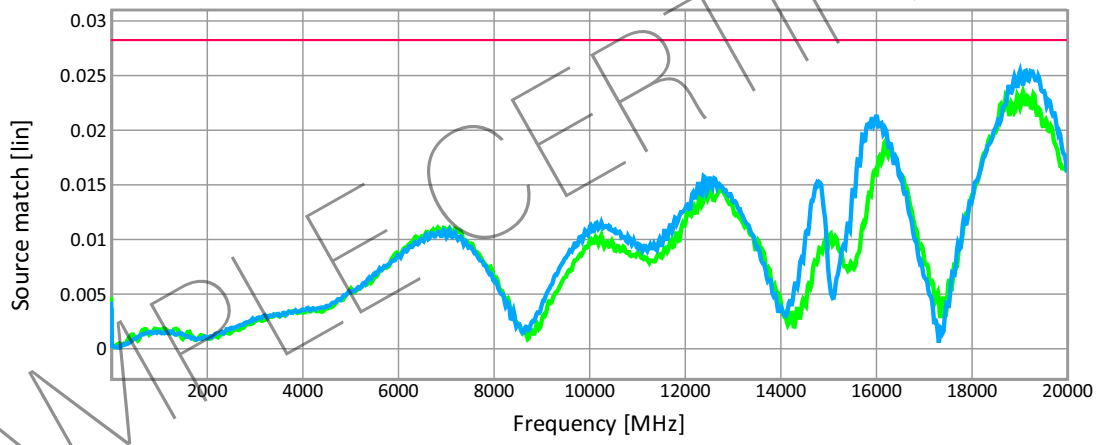
Test standards and required equipment				
Model	Description	Serial number	Certificate Number	Cal due
03CK010-150	Reference Calibration Kit	EB006	4-496	5 May 2021
C1220ET	S-parameter measurement system	001	CMT-C1220ET001-0004	4 Feb 2021

Parameters Stability

Description	Lower limit [dB]	Measured value [dB]	Upper limit [dB]	Measurement Uncertainty [dB]	Result
Directivity	—	-56.4	-55.0	—	PASS
Reflection tracking	-0.030	-0.027	0.030	—	PASS
Transmission tracking	-0.030	-0.025	0.030	—	PASS

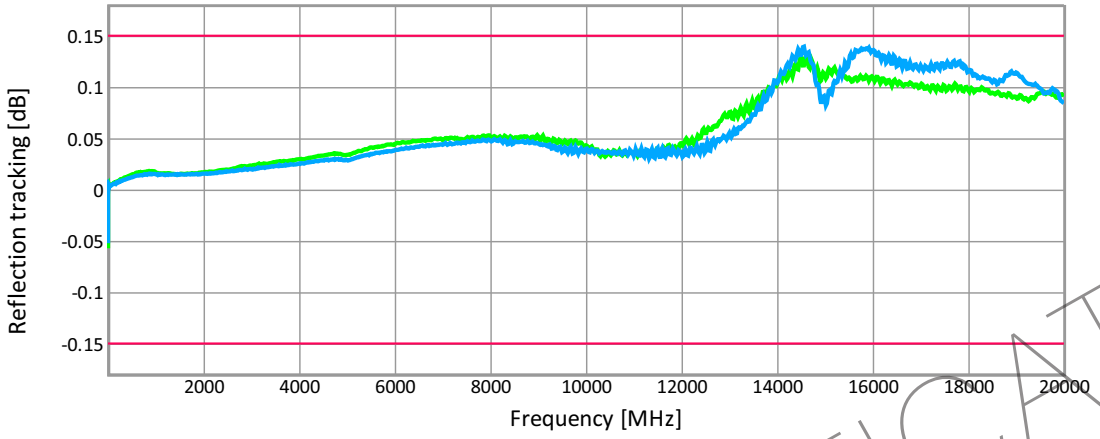
Effective Parameters

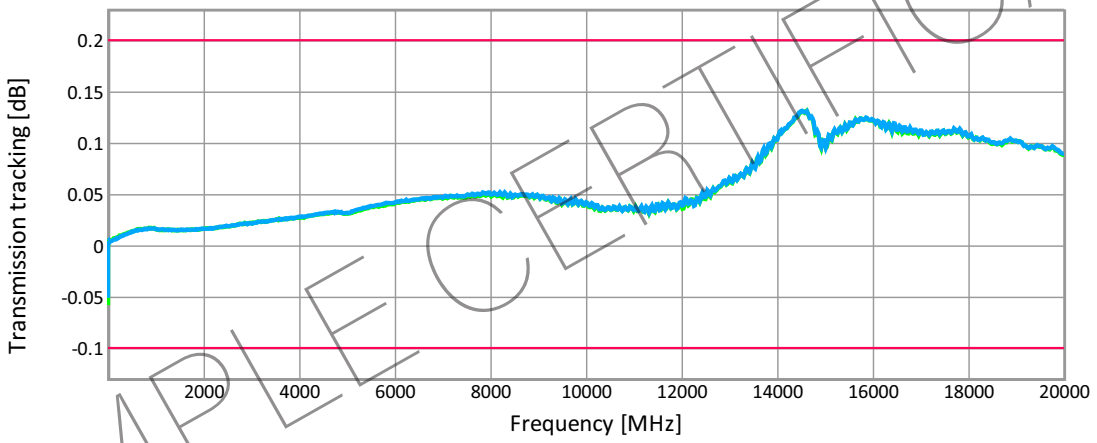




Description	Lower limit [lin]	Measured value [lin]	Upper limit [lin]	Measurement Uncertainty [lin]	Result
Directivity	—	0.0150	0.0158		PASS
Source match	—	0.0254	0.0282		PASS

ACM2520 Serial Number: **19092364** Date: **30 July 2020** **PASS**





Description	Lower limit [dB]	Measured value [dB]	Upper limit [dB]	Measurement Uncertainty [dB]	Result
Reflection tracking	-0.150	0.139	0.150	±0.100	PASS
Transmission tracking	-0.100	0.131	0.200	±0.050	PASS