



REGULATORY COMPLIANCE TEST REPORT

FCC CFR 47 Part 15 SubPart B & ICES-003

Report No.: ITRO42-U2 Rev A

Company: Itron Networked Solutions, Inc.

Model: OWS-NIC511-LTE

REGULATORY COMPLIANCE TEST REPORT

Company Name: Itron Networked Solutions, Inc.

Model Name: OWS-NIC511-LTE

To: FCC CFR 47 Part 15 Subpart B & ICES-003

Test Report Serial No.: ITRO42-U2 Rev A

This report supersedes: NONE

Applicant: Itron Networked Solutions, Inc.
230 W Tasman Dr.
San Jose, California 95134
USA

Issue Date: 16th June 2021

This Test Report is Issued Under the Authority of:

MiCOM Labs, Inc.
575 Boulder Court
Pleasanton California 94566
USA
Phone: +1 (925) 462-0304
Fax: +1 (925) 462-0306
www.micomlabs.com



MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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1. ACCREDITATION, LISTINGS & RECOGNITION

1.1. TESTING ACCREDITATION

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard ISO/IEC 17025:2017. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-01.pdf>



Accredited Laboratory

A2LA has accredited

MICOM LABS

Pleasanton, CA


for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. 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).



Presented this 24th day of February 2020.



Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2021

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

1.2. RECOGNITION

MiCOM Labs, Inc is widely recognized for its wireless testing and certification capabilities. In addition to being recognized for Testing and Certification under Phase 2 Mutual Recognition Agreements (MRA) with Canada, Europe, United Kingdom and Japan, our international recognition includes Conformity Assessment Body (CAB) designation status under agreements with Asia Pacific (APEC) MRA Phase 1 countries giving acceptance of MiCOM Labs test reports. MiCOM Labs test reports are accepted globally.

Country	Recognition Body	Status	MRA Phase	Identification No.
USA	Federal Communications Commission (FCC)	TCB	-	US0159 Test Firm Designation#: US1084
Canada	Industry Canada (ISED)	FCB	APEC MRA 2	US0159 ISED#: 4143A
Japan	MIC (Ministry of Internal Affairs and Communication)	CAB	Japan MRA 2	RCB 210
	Japan Approvals Institute for Telecommunication Equipment (JATE)			
	VCCI			
Europe	European Commission	NB	EU MRA 2	A-0012 NB 2280
United Kingdom	Department for Business, Energy & Industrial Strategy (BEIS)	AB	UK MRA 2	AB 2280
Mexico	Instituto Federal de Telecomunicaciones (IFT)	CAB	Mexico MRA 1	US0159
Australia	Australian Communications and Media Authority (ACMA)	CAB	APEC MRA 1	US0159
Hong Kong	Office of the Telecommunication Authority (OFTA)			
Korea	Ministry of Information and Communication Radio Research Laboratory (RRL)			
Singapore	Infocomm Development Authority (IDA)			
Taiwan	National Communications Commission (NCC)			
	Bureau of Standards, Metrology and Inspection (BSMI)			
Vietnam	Ministry of Communication (MIC)			

TCB – Telecommunications Certification Bodies (TCB)

FCB – Foreign Certification Body

CAB – Conformity Assessment Body

NB – Notified Body

AB – Approved Body

MRA – Mutual Recognition Agreement

MRA Phase I - recognition for product testing

Phase II – recognition for both product testing and certification

1.3. PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard ISO/IEC 17065:2012. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-02.pdf>



United States of America – Telecommunication Certification Body (TCB)
Industry Canada – Certification Body, CAB Identifier – US0159
Europe – Notified Body (NB), NB Identifier - 2280
Japan – Recognized Certification Body (RCB), RCB Identifier - 210

2. DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft	12 th May 2021	Draft for Review Additional verification testing required due to a passive RF Switch change FCC Part 15B & ISSED ICES-003
Rev A	16 th June 2021	Initial Release
Original test program: SSNT135-U3_Master Rev A (1 st February 2017)		

In the above table the latest report revision will replace all earlier versions.

3. TEST RESULT CERTIFICATE

Manufacturer: Itron Networked Solutions, Inc. 230 W Tasman Dr. San Jose California 95134 USA	Tested By: MiCOM Labs, Inc. 575 Boulder Court Pleasanton, California 94566 USA
Model: OWS-NIC511-LTE	Telephone: +1 925 462 0304
Equipment Type: Network Interface Card	Fax: +1 925 462 0306
S/N's: 00135005015AA2CD	
Test Date(s): 12 th May 2021	Website: www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC CFR 47 Part 15 Subpart B FCC & ICES-003	EQUIPMENT COMPLIES


MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Notes:

1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

Approved & Released for MiCOM Labs, Inc. by:

Graeme Grieve
Quality Manager MiCOM Labs, Inc.



Gordon Hurst
President & CEO MiCOM Labs, Inc.



4. REFERENCES AND MEASUREMENT UNCERTAINTY

4.1. Normative References

REF.	PUBLICATION	YEAR	TITLE
I	A2LA	October 2020	R105 - Requirement's When Making Reference to A2LA Accreditation Status
II	ETSI TR 100 028	2001-12	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
III	M 3003	Edition 3 Nov.2012	Expression of Uncertainty and Confidence in Measurements
IV	ICES-003	October 2020	Information Technology Equipment (including Digital Apparatus)
V	RSS-Gen Issue 5	March 2019 Amendment 1	General Requirements for Compliance of Radio Apparatus
VI	FCC CFR 47 Part 15 Subpart B	2020	Title 47 CFR Part 15, Sub Part B; Unintentional Radiators

4.2. Test and Uncertainty Procedure

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

5. PRODUCT DETAILS AND TEST CONFIGURATIONS

5.1. Technical Details

Details	Description
Purpose:	Test of the Itron Networked Solutions, Inc OWS-NIC511-LTE FCC Part 15B & ICES-003
Applicant:	Itron Networked Solutions, Inc. 230 W Tasman Dr. San Jose California 95134 USA
Manufacturer:	Itron Networked Solutions, Inc.
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
Test report reference number:	ITRO42-U2
Date EUT received:	6 th May 2021
Standard(s) applied:	FCC Part 15B & ICES-003
Dates of test (from - to):	12 th May 2021
No of Units Tested:	1
Type of Equipment:	Plug in Radio Device
Product Family Name:	MicroAP5
Model(s):	NIC 511-NA1-0313, NIC 511-NA1-0312 NIC 511-SV1-0313, NIC 511-SV1-0312
Location for use:	Indoor/Outdoor
Declared Frequency Range(s):	902 - 928 MHz; 2400 - 2483.5 MHz;
Primary function of equipment:	Plug in Radio Device
Secondary function of equipment:	Not Provided
Type of Modulation:	FHSS
EUT Modes of Operation:	GFSK, OFDM, OQPSK, 2FSK
Declared Nominal Output Power (Ave):	+30 dBm
Transmit/Receive Operation:	Transceiver - Full Duplex
Rated Input Voltage and Current:	4Vdc
Operating Temperature Range:	Declared Range -30°C to +70°C
ITU Emission Designator:	FHSS 2FSK 85K0F1D GFSK 330KF1D OFDM 317KG1D OQPSK 126KF1D
Equipment Dimensions:	62.0 mm (W) x 22.8 mm (H) x 110.0 mm (L)
Weight:	0.05 Kg
Hardware Rev:	170-0763-00
Software Rev:	4.2.0

5.2. Scope Of Test Program

Itron Networked Solutions, Inc OWS-NIC511-LTE

The scope of the test program was to test the Itron Networked Solutions, Inc OWS-NIC511-LTE, Plug in Radio Device configurations in the frequency ranges 2400 - 2483.5 MHz; for compliance against the following specification:

Title 47 CFR Part 15, Sub Part B; Unintentional Radiators

ICES-003 — Information Technology Equipment (including Digital Apparatus)

For additional tests and information refer to the MICOM Labs Report # SSNT135-U3_Master Rev A

5.3. Equipment Model(s) and Serial Number(s)

Type (EUT/Support)	Equipment Description (Including Brand Name)	Mfr.	Model No.	Serial No.
EUT	NIC 511-NA1-0312	Itron Networked Solutions, Inc.	NIC 511-NA1-0312	00135005015AA2CD

5.4. Antenna Details

Type	Manufacturer	Model	Family	Gain (dBi)	BF Gain	Dir BW	X-Pol	Frequency Band (MHz)
external	Laird	TRAB9023NP	10	3.0	-	360	-	902 - 928
external	Laird	TRAB9023NP	10	3.0	-	360	-	2400 - 2483.5
external	Mobile Mark	MGRM-UMB-1C-BLK-120	10	3.0	-	360	-	902 - 928
external	Mobile Mark	MGRM-UMB-1C-BLK-120	10	3.0	-	360	-	2400 - 2483.5
integral	Tai Sheng Chen	155-0010-00	2	2.0	-	360	-	902 - 928
integral	Tai Sheng Chen	155-0010-00	2	5.0	-	360	-	2400 - 2483.5
external	Taoglas	G.30.B108111	10	1.0	-	360	-	902 - 928
external	Taoglas	G.30.B108111	10	3.0	-	360	-	2400 - 2483.5
external	Taoglas	GA.107.201111	10	0.0	-	360	-	902 - 928
external	Taoglas	GA.107.201111	10	0.0	-	360	-	2400 - 2483.5
external	WP	WPANT30017-CA	10	3.0	-	360	-	902 - 928
external	WP	WPANT30017-CA	10	4.5	-	360	-	2400 - 2483.5
external	WP	WPANT30104-S1C	10	6.0	-	360	-	902 - 928
external	WP	WPANT30104-S1C	10	0.0	-	360	-	2400 - 2483.5
external	WP	WPANT40010-C	2	1.0	-	360	-	902 - 928
external	WP	WPANT40010-C	2	3.5	-	360	-	2400 - 2483.5

BF Gain - Beamforming Gain
Dir BW - Directional BeamWidth
X-Pol - Cross Polarization

5.5. Cabling and I/O Ports

1. NONE

5.6. Test Configurations

Results for the following configurations are provided in this report:

Channel Spacing (kHz)	Operational Mode(s)	Data Rate with Highest Power (Kbps)	Channel Frequency (MHz)		
			Low	Mid	High
			902.0 – 928.0 MHz		
300	FSK	100.00	902.3	915.2	926.9

5.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

1. NONE

5.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. NONE

6. TEST SUMMARY

The following table represent the list of measurements required under the FCC CFR 47 Part 15B and ICES-003 standards;

TABLE OF REQUIRED TESTS – Class A Emissions

Test Standard	Description	Limits	Compliance
FCC Part 15B / ICES-003	Radiated Emissions	Class B	Complies*

*For any additional results refer to MICOM LABS SSNT135-U3_Master Rev A report for a complete list of tests.

7. TEST RESULTS

7.1. EMC EMISSIONS TEST RESULTS

7.1.1 Radiated Emissions

FCC, Part 15 Subpart B §15.109

Test Procedure

Testing 30 – 18,000 MHz was performed in a anechoic chamber using a CISPR compliant receiver. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. To further maximize emissions the receive antenna was varied between 1 and 4 meters. The emissions are recorded with receiver in peak hold mode.

Emissions nearest the limits were chosen for maximization and formal measurement using a CISPR Compliant receiver. Emissions from 30 MHz – 1000 MHz are measured utilizing a CISPR compliant quasi-peak detector with a tuned receiver, using a bandwidth of 120 kHz. Emissions above 1000 MHz are measured utilizing a CISPR compliant average detector with a tuned receiver, using a bandwidth of 1 MHz. Only the highest emissions relative to the limit are listed.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

$$\text{FS} = \text{R} + \text{AF} + \text{CORR} - \text{FO}$$

FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

FO = Distance Falloff Factor

$$\text{CORR} = \text{Correction Factor} = \text{CL} - \text{AG} + \text{NFL}$$

CL = Cable Loss

AG = Amplifier Gain

NFL = Notch Filter Loss or Waveguide Loss

Field Strength Calculation Example:

Given receiver input reading of 51.5 dB μ V; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength of the measured emission is:

$$\text{FS} = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 \text{ dB}\mu\text{V/m}$$

Conversion between dB μ V/m (or dB μ V) and μ V/m (or μ V) are done as:

$$\text{Level (dB}\mu\text{V/m)} = 20 * \text{Log (level (}\mu\text{V/m))}$$

$$40 \text{ dB}\mu\text{V/m} = 100 \mu\text{V/m}$$

$$48 \text{ dB}\mu\text{V/m} = 250 \mu\text{V/m}$$

FCC and IC Spurious Emissions Limits

FCC, Part 15 Subpart B §15.109
 Industry Canada ICES-003 Section 3.2.2

Except for Class A digital device, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values.

Limits below 1 GHz:

Class A limits

Frequency(MHz)	Quasi-peak Limit (dB μ V/m)	Measurement Distance (meters)	Quasi-peak Limit (dB μ V/m)	Measurement Distance (meters)
30 to 88	39.0	10	49.5	3
88-216	43.5	10	54	3
216-960	46.4	10	56.5	3
960-1000	49.5	10	60	3

Class B limits

Frequency(MHz)	Quasi-peak Limit (dB μ V/m)	Measurement Distance (meters)	Quasi-peak Limit (dB μ V/m)	Measurement Distance (meters)
30 to 88	29.5	10	40	3
88-216	33	10	43.5	3
216-960	35.6	10	46	3
960-1000	43.5	10	54	3

Limits above 1GHz:

Frequency(MHz)	Average Limit (dB μ V/m)	Peak Limit (dB μ V/m)	Measurement Distance (meters)	Class (A/B)
1 000 to 6000	54	74	3	Class B

Frequency(MHz)	Average Limit (dB μ V/m)	Peak Limit (dB μ V/m)	Measurement Distance (meters)	Class (A/B)
1 000 to 6000	60	80	3	Class A

Traceability

Laboratory Measurement Uncertainty	
Measurement uncertainty	+5.6/ -4.5 dB

Method
Work instruction WI-EMC-07: Radiated Emissions Test

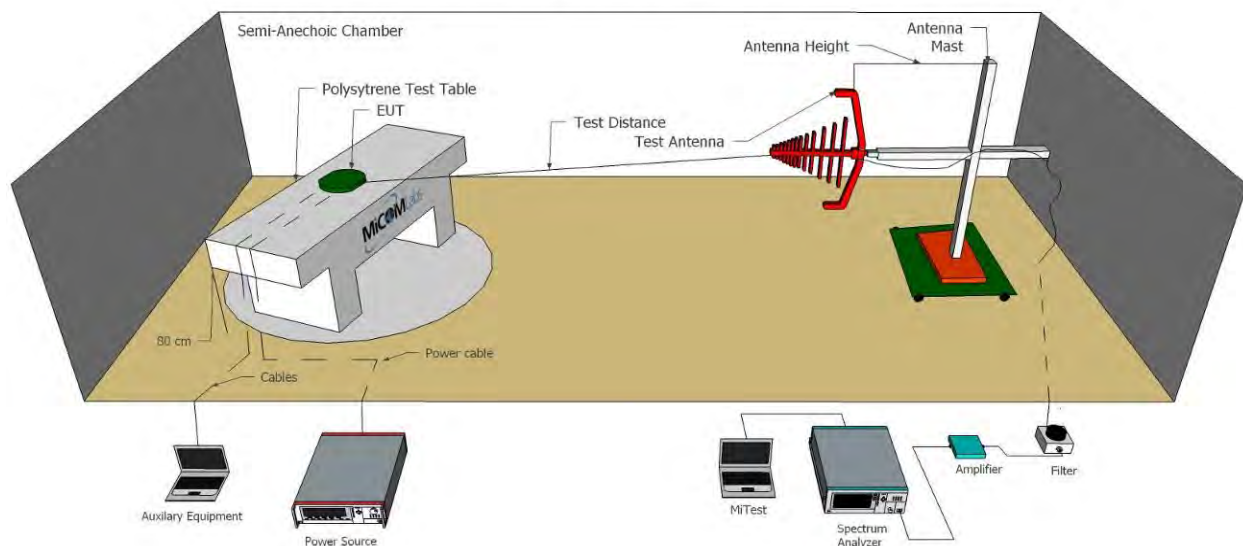
Test Equipment Utilized

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CU101	04R08507	Not Required
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	8 Oct 2021
298	3M Radiated Emissions Chamber Maintenance Check	MiCOM	3M Chamber	298	26 Sep 2021
301	5470 to 5725 MHz Notch Filter	Microtronics	RBC50704	001	4 Sep 2021
302	5150 to 5350 MHz Notch Filter	Microtronics	BRC50703	002	4 Sep 2021
303	5725 to 5875 MHz Notch filter	Microtronics	BRC50705	003	4 Sep 2021
330	Variac 0-280 Vac	Staco Energy Co	3PN1020B	0546	Cal when used
336	Active loop Ant 10kHz to 30 MHz	EMCO	EMCO 6502	00060498	29 Nov 2021
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	4 Oct 2021
341	900MHz Notch Filter	EWT	EWT-14-0199	H1	4 Sep 2021
342	2.4 GHz Notch Filter	EWT	EWT-14-0203	H1	4 Sep 2021
346	1.6 TO 10GHz High Pass Filter	EWT	EWT-57-0112	H1	4 Sep 2021
373	26III RMS Multimeter	Fluke	Fluke 26 series III	76080720	21 Jun 2021
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	12 Jun 2021
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	9 Sep 2021
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	12 Sep 2021
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	9 Sep 2021
410	Desktop Computer	Dell	Inspiron 620	WS38	Not Required
411	Mast/Turntable Controller	Sunol Sciences	SC98V	060199-1D	Not Required
412	USB to GPIB Interface	National Instruments	GPIB-USB HS	11B8DC2	Not Required
413	Mast Controller	Sunol Science	TWR95-4	030801-3	Not Required
414	DC Power Supply 0-60V	HP	6274	1029A01285	Cal when used
415	Turntable Controller	Sunol Sciences	Turntable Controller	None	Not Required
416	Gigabit ethernet filter	ETS-Lingren	Gigafoil 260366	None	Not Required

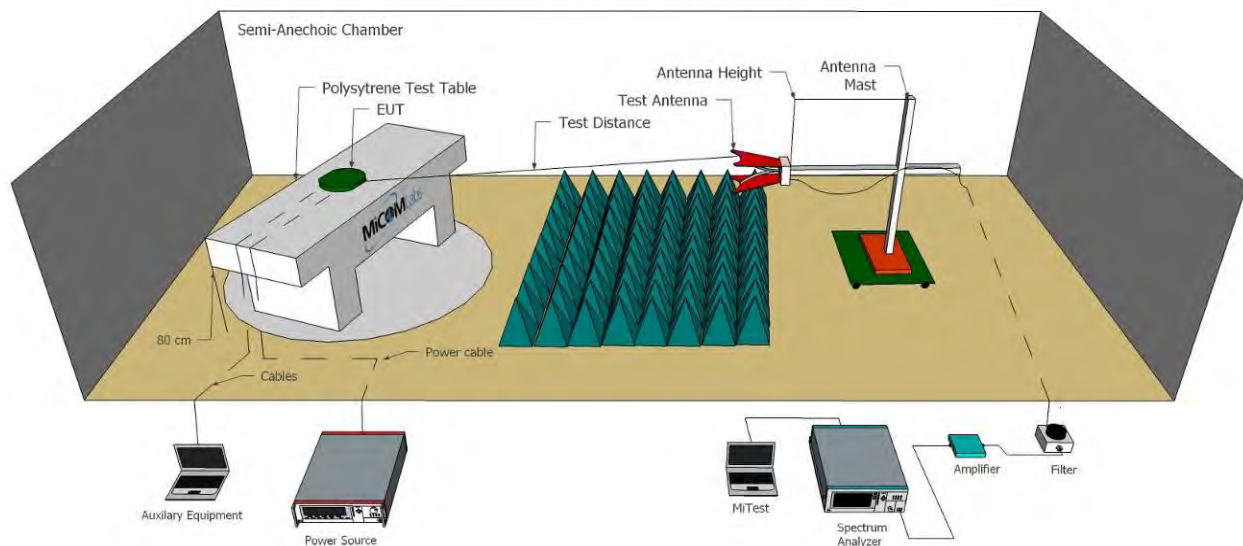
447	MiTest Rad Emissions Test Software	MiCOM	Rad Emissions Test Software Version 1.0	447	Not Required
462	Schwarzbeck cable from Antenna to Amplifier.	Schwarzbeck	AK 9513	462	4 Sep 2021
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	4 Sep 2021
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	4 Sep 2021
465	Low Pass Filter DC-1000 MHz	Mini-Circuits	NLP-1200+	VUU01901402	4 Sep 2021
467	2495 to 2650 MHz notch filter	MicroTronics	BRM50709	011	4 Sep 2021
469	Low pass filter	Mini Circuit	SLP-1000	None	4 Sep 2021
470	High Pass filter	Mini Circuits	SHP-700	None	4 Sep 2021
480	Cable - Bulkhead to Amp	SRC Haverhill	157-3050360	480	4 Sep 2021
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-3050787	481	4 Sep 2021
510	Barometer/Thermometer	Control Company	68000-49	170871375	20 Dec 2021
518	Cable - Amp to Antenna	SRC Haverhill	157-3051574	518	4 Sep 2021
87	Uninterruptible Power Supply	Falcon Electric	ED2000-1/2LC	F3471 02/01	Cal when used

Test Setup for Radiated Emissions for above and below 1 GHz

Radiated Emissions Below 1GHz Test Setup



Radiated Emissions Above 1GHz Test Setup

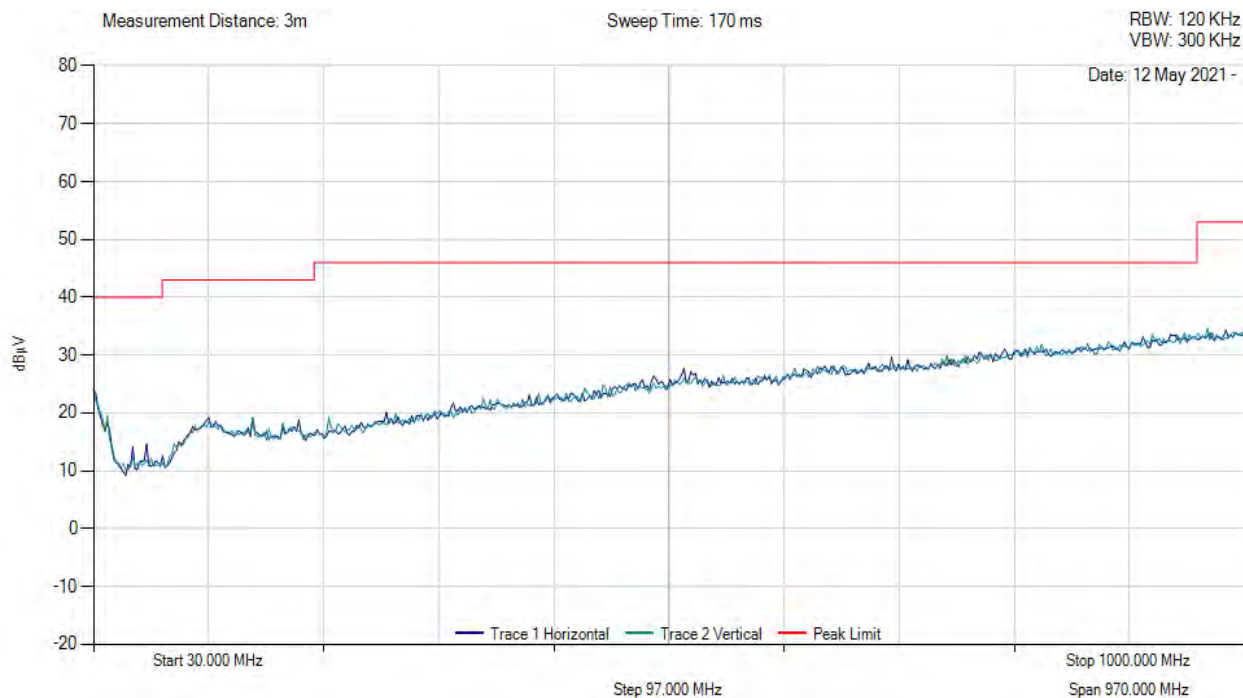


30-1000 MHz

Equipment Configuration for Radiated Digital Emissions

Antenna:	Not Applicable	Variant:	NIC511
Antenna Gain (dBi):	Not Applicable	Modulation:	Not Applicable
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	Not Applicable
Channel Frequency (MHz):	Not Applicable	Data Rate:	Not Applicable
Power Setting:	Max	Tested By:	SB

Test Measurement Results

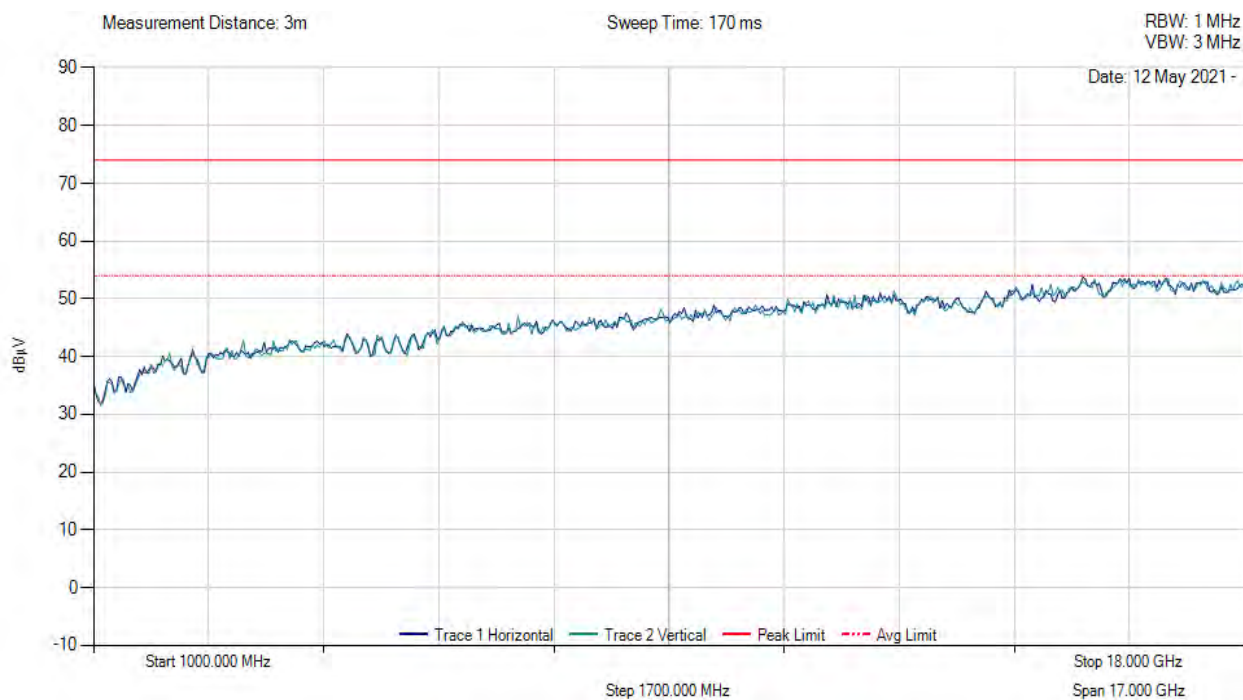


There are no emissions found within 6dB of the limit line.

Equipment Configuration for Restricted Band Spurious Emissions

Antenna:	Not Applicable	Variant:	NIC511
Antenna Gain (dBi):	Not Applicable	Modulation:	Not Applicable
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	Not Applicable
Channel Frequency (MHz):	Not Applicable	Data Rate:	Not Applicable
Power Setting:	Max	Tested By:	SB

Test Measurement Results



There are no emissions found within 6dB of the limit line.



575 Boulder Court
Pleasanton, California 94566, USA
Tel: +1 (925) 462 0304
Fax: +1 (925) 462 0306
www.micomlabs.com