



REGULATORY COMPLIANCE TEST REPORT

ETSI EN 301 489-1/17
ETSI EN 61326-1
FCC Part 15B, ICES-003

Report No.: NTAL21-E2 Rev A

Company: NETALLY, LLC

Model: EtherScope EXG-300, EXG-300E, EXG-300C

REGULATORY COMPLIANCE TEST REPORT

Company: NETALLY, LLC

Model Name: EtherScope EXG-300, EXG-300E, EXG-300C

To: ETSI EN 301 489-1 v2.2.3 (2019-11) / -17 v3.2.4 (2020-09), EN 61326-1 (2013), FCC Part 15B, ICES-003

Test Report Serial No.: NTAL21-E2 Rev A

This report supersedes: None

Applicant: NETALLY, LLC
2075 Research Parkway, Suite 190
Colorado Springs, CO 80920
USA

Product Function: 802.11 a/b/g/n/ac/ax Wireless Tester

Issue Date: 11th March 2022

This Test Report is Issued Under the Authority of:

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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

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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 14th day of January 2022.



Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2023

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

1.2. RECOGNITION

MiCOM Labs, Inc has widely recognized wireless testing and certification capabilities. In addition to being recognized for Testing and Certification under Phase 2 agreements with Canada, Europe, United Kingdom and Japan, our international recognition includes Conformity Assessment Body designation under Phase 1 agreements with APEC MRA countries. MiCOM Labs test reports are accepted globally.

Country	Recognition Body	Status	MRA Phase	Identification No.
USA	Federal Communications Commission (FCC)	TCB	-	US0159 Test Site Designation #: US1084
Canada	Canada ISED	FCB	APEC MRA 2	US0159 Test Company #: 4143A
Japan	MIC (Ministry of Internal Affairs and Communication)	CAB	Japan MRA 2	RCB 210
	Japan Approvals Institute for Telecommunication Equipment (JATE)			
	VCCI	--	--	A-0012
Europe	European Commission	NB	EU MRA 2	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 Phases

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>



Accredited Product Certification Body

A2LA has accredited

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This product certification body is accredited in accordance with the recognized International Standard ISO/IEC 17065:2012 Requirements for bodies certifying products, processes and services. This product certification body also meets the A2LA R322 - Specific Requirements - Notified Body Accreditation Requirements and A2LA R308 - Specific Requirements - ISO-IEC 17065 - Telecommunication Certification Body Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a management system.



Presented this 14th day of January 2022



Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2023

For the product certification schemes to which this accreditation applies, please refer to the organization's Product Certification Scope of Accreditation.

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

2. DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft	9th March 2022	Draft report for client review.
Rev A	11th March 2022	Initial release.

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

3. TEST RESULT CERTIFICATE

Manufacturer: NETALLY, LLC 2075 Research Parkway, Suite 190 Colorado Springs, Colorado 80920, USA	Tested By: MiCOM Labs, Inc. 575 Boulder Court Pleasanton, California 94566, USA
Model: EtherScope EXG-300, EXG-300E, EXG-300C	Telephone: +1 925 462 0304
Equipment Type: 802.11 a/b/g/n/ac/ax Wireless Tester	Fax: +1 925 462 0306
S/N's: 2111004ESNXG, 2027443	
Test Date(s): 7 th -14 th February 2022	Website: www.micomlabs.com

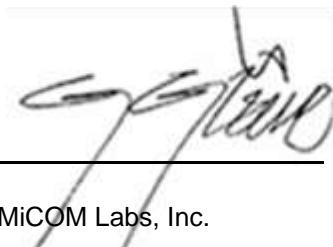
STANDARD(S)	TEST RESULTS
FCC Part 15B; ICES-003; EN 301 489-1 V2.2.3, EN 301 489-17 V3.2.4; EN 61326-1:2013	EQUIPMENT COMPLIES

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

Normative References

Ref.	Publication	Year	Title
(i)	ETSI EN 301 489-1 V2.2.3	2019-11	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility
(ii)	ETSI EN 301 489-17 V3.2.4	2020-09	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility
(iii)	FCC CFR 47 Part 15 Subpart B	2020	Title 47 CFR Part 15, Subpart B; Unintentional Radiators
(iv)	ICES-003, Issue 7	October 2020	Information Technology Equipment (including Digital Apparatus)
(v)	EN 61326-1	2013	Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements
(vi)	EN 55011	2009 A1:2010	Industrial, scientific and medical equipment — Radio-frequency disturbance characteristics — Limits and methods of measurement
(vii)	EN 55032	2015 + A11:2020	Electromagnetic compatibility of multimedia equipment - Emission requirements
(vi)	EN 55035	2017 + A11: 2020,	Electromagnetic compatibility of multimedia equipment – Immunity requirements
(vii)	EN 61000-3-2	2014	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
(viii)	EN 61000-3-11	2000	CENELEC EN 61000-3-11: "Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection".
(ix)	EN 61000-3-3	2013	CENELEC EN 61000-3-3: "Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection".

(ix)	EN 61000-3-12	2011	CENELEC EN 61000-3-12: "Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase".
(x)	EN 61000-4-2	2009	CENELEC EN 61000-4-2: "Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test".
(xi)	EN 61000-4-3	2010	CENELEC EN 61000-4-3: "Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test".
(xii)	EN 61000-4-4	2012	CENELEC EN 61000-4-4: "Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test".
(xiii)	EN 61000-4-5	2014	CENELEC EN 61000-4-5: "Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test".
(xiv)	EN 61000-4-6	2014	CENELEC EN 61000-4-6: "Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields".
(xv)	EN 61000-4-8	2010	Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test
(xvii)	EN 61000-4-11	2004	CENELEC EN 61000-4-11: "Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests".
(xviii)	ANSI C63.4	2014	American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
(xix)	EN 55016-2-3	2010	CENELEC EN 55016-2-3: "Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurements of disturbances and immunity - Radiated disturbance measurements".
(xx)	M 3003	Edition 3 Nov. 2012	Expression of Uncertainty and Confidence in Measurements
(xxi)	LAB34	Edition 1 August 2002	The expression of uncertainty in EMC Testing
(xxii)	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
(xxiii)	A2LA	October 2020	Reference to A2LA Accreditation Status – A2LA Advertising Policy

5. TEST SUMMARY

List of Measurements

The following table represents the list of measurements required per the EN 301 489-17 V3.2.4 standard.

TABLE OF REQUIRED TESTS – Emissions

Test Standard	Description	Limits	Compliance
FCC Part 15 B ICES-003 EN 55032/EN 55011	Radiated Emissions	Class A	Complies
EN 55032; CISPR32	Conducted Emissions - dc power I/O port	N/A	Not Applicable NOTE 1
FCC Part 15 B ICES-003 EN 55032; EN 55011	Conducted Emissions - ac power I/O port	Class A	Complies
EN 55032; CISPR32	Conducted Emission – Telecommunication Port	Class A	Complies
EN 61000-3-2	Harmonic Current Emissions (AC Mains Input Port)	Class A	Complies
EN 61000-3-3	Voltage Fluctuations and Flicker (AC Mains Input Port)	N/A	Complies

NOTE 1: Power delivered to the EUT is via AC/DC power adapter.

NOTE 2: Test results reported in this document relate only to the items tested.

NOTE 3: The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria.

TABLE OF REQUIRED TESTS – Immunity

Test Standard	Description	Section	EUT Performance Criterion	Compliance
EN 61000-4-2	Electrostatic Discharge	7.2.2	Criteria B	Complies
EN 61000-4-3	RF Electromagnetic Field (80 MHz-6000 MHz)	7.2.3	Criteria A	Complies
EN 61000-4-4	Fast Transients, Common Mode	7.2.4	Criteria B	Complies
EN 61000-4-5	Surges, Line to Line, and Line to Ground – AC Mains	7.2.5	Criteria B	Complies
EN 61000-4-5	Surges, Line to Ground – Telecommunications Ports	7.2.6	Criteria B	Complies
EN 61000-4-6	Radio Frequency Common Mode 0.15 MHz-80 MHz	7.2.7	Criteria A	Complies
EN 61000-4-11	Voltage Dips and Interruptions	7.2.8	B/C/C	Complies

NOTE 1: Test results reported in this document relate only to the items tested.

NOTE 2: The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria.

6. PRODUCT DETAILS AND TEST CONFIGURATIONS

6.1. Test Program Scope

NETALLY, LLC, EtherScope EXG-300, EXG-300E, EXG-300C

The scope of this program was to test the NETALLY, LLC, EtherScope EXG-300, EXG-300E, EXG-300C to the following test standards;-

ETSI EN 301 489-1 V2.2.3 ; ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility

ETSI EN 301 489-17 V 3.2.4 ; ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

FCC CFR 47 Part 15, Subpart B - Title 47 CFR Part 15, SubPart B; Unintentional Radiators.

ICES-003, - Information Technology Equipment (ITE) – Limits and methods of measurement.

EN 61326:2013 - Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements

The NETALLY EtherScope EXG-300 is available as three different models.

The following product description was supplied by the manufacturer;

The 3 different models (SKUs) are the same radio hardware and same capabilities, configured by firmware (EEPROM) during manufacturing to restrict what the radio can transmit on in the 6GHz band due to differences in country allowed spectrum for 6GHz:

EXG-300 – FCC/ISED full 6 GHz band UNii5-8 enabled
EXG-300E – EU + other countries that only allow lower 6 GHz band UNii5,6
EXG-300C – will be for countries that don't allow 6GHz at all like China.

This test report covers the 3 different model variants.

6.2. Product Technical Details

Detail	Description
Purpose:	Test of the NETALLY, LLC EtherScope EXG-300, EXG-300E, EXG-300C for compliance to FCC Part 15B; ICES-003; ETSI EN 301 489-1 v2.2.3 & ETSI EN 301 489-17 v3.2.4; EN 61326-1:2013
Applicant:	NETALLY, LLC 2075 Research Parkway Suite 190 Colorado Springs, CO 80920 USA
Manufacturer:	NETALLY, LLC 2075 Research Parkway Suite 190 Colorado Springs, CO 80920 USA
Test Laboratory:	MiCOM Labs, Inc. 575 Boulder Court, Pleasanton, California 94566, USA
Test report reference number:	NTAL21-E2
Date EUT received:	7 th February 2022
Dates of test (from - to):	7 th – 14 th February 2022
No of Units Tested:	2
Manufacturers Trade Name:	NETALLY, LLC
Model No.:	EtherScope EXG-300, EXG-300E, EXG-300C
Equipment Primary Function:	Wi-Fi Tester
Type of Technology:	802.11a/b/g/n/ac/ax
Installation type:	Portable
Construction/Location for Use:	Indoor only
Hardware Rev:	2.0
Software Rev:	2.0.0
Rated Input Voltage and Current:	AC/DC Adapter 100-240V, 1.2A, DC Output 15V, 3A Battery 2.5 - 4.2V
Operating Temperature Range	Declared Range 0 to +45°C
Equipment Dimensions:	4.05 in x 7.67 in x 2.16 in (10.5 x 19.5 x 5.7 cm)
Weight:	0.8 kg
Primary Function:	Networking testing tool
Equipment Secondary Function(s):	None

6.3. External A.C. / D.C. Power Adaptor

The NETALLY, LLC EtherScope EXG-300, EXG-300E, EXG-300C is powered by the AC/DC adaptor listed below;-

AC/DC power adaptor via 15 Vdc input DC cable length less than 3 meters;

FSP group
 Model: FSP045-A1BR
 100 – 240 Vac, 50-60 Hz, 1.2A max.
 +15 Vdc 3.0A

6.4. Cabling and I/O Ports

The following is a description of the cable and input, output ports available on the EUT.

TYPE OF I/O PORTS	DESCRIPTION	SHIELDED (Y/N)	LENGTH	QTY	TESTED (Y/N)
10M-10G Ethernet	Data	N	> 10 meters	1	Y
10/100/1000 Ethernet	Data	N	> 10 meters	1	Y
15V USB C DC Input	DC Volts	Y	1 meters	1	Y
FSP	Data	Y	> 10 meters	1	N
MicroSD	Data	Y	NA	1	N
USB Port	Data	Y	1 meters	1	N*

*used for configuration of EUT only (maintenance port)

6.5. Equipment Details

The following is a description of supporting equipment used during the test program.

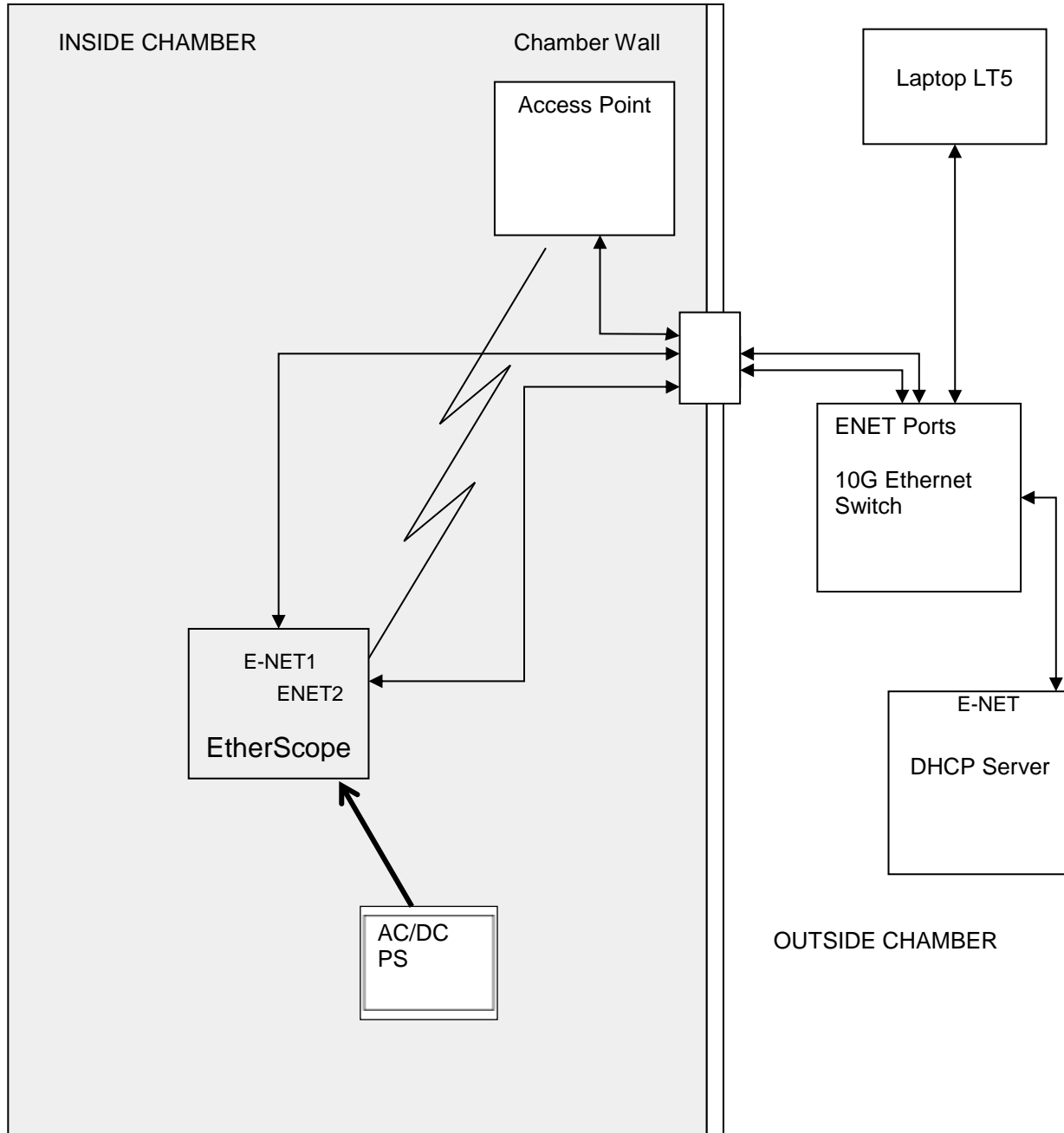
Type (EUT/Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT	802.11 a/b/g/n/ac/ax Wireless Tester	NETALLY, LLC	EtherScope EXG-300	2111004ESNXG, 2027443
EUT	AC/DC PS	FSP group	FSP045-A1BR	None
Support	Laptop PC	HP		None
Support	10G Switch	NetGear	XS708E	
Support	Tri Band Router	ASUS	AXE6600	

6.6. EUT Configurations

6.6.1. EUT Configuration - Radiated Emissions:

The EUT setup consists of two different test configurations where the EUT is powered either by Battery, or AC/DC power adapter. Within the two configurations, the EUT was exercised by performing tests over the Ethernet test port, and data transfer over management Ethernet port along with data transfer over WiFi.

Diagram of EUT Configuration for Emissions Measurements

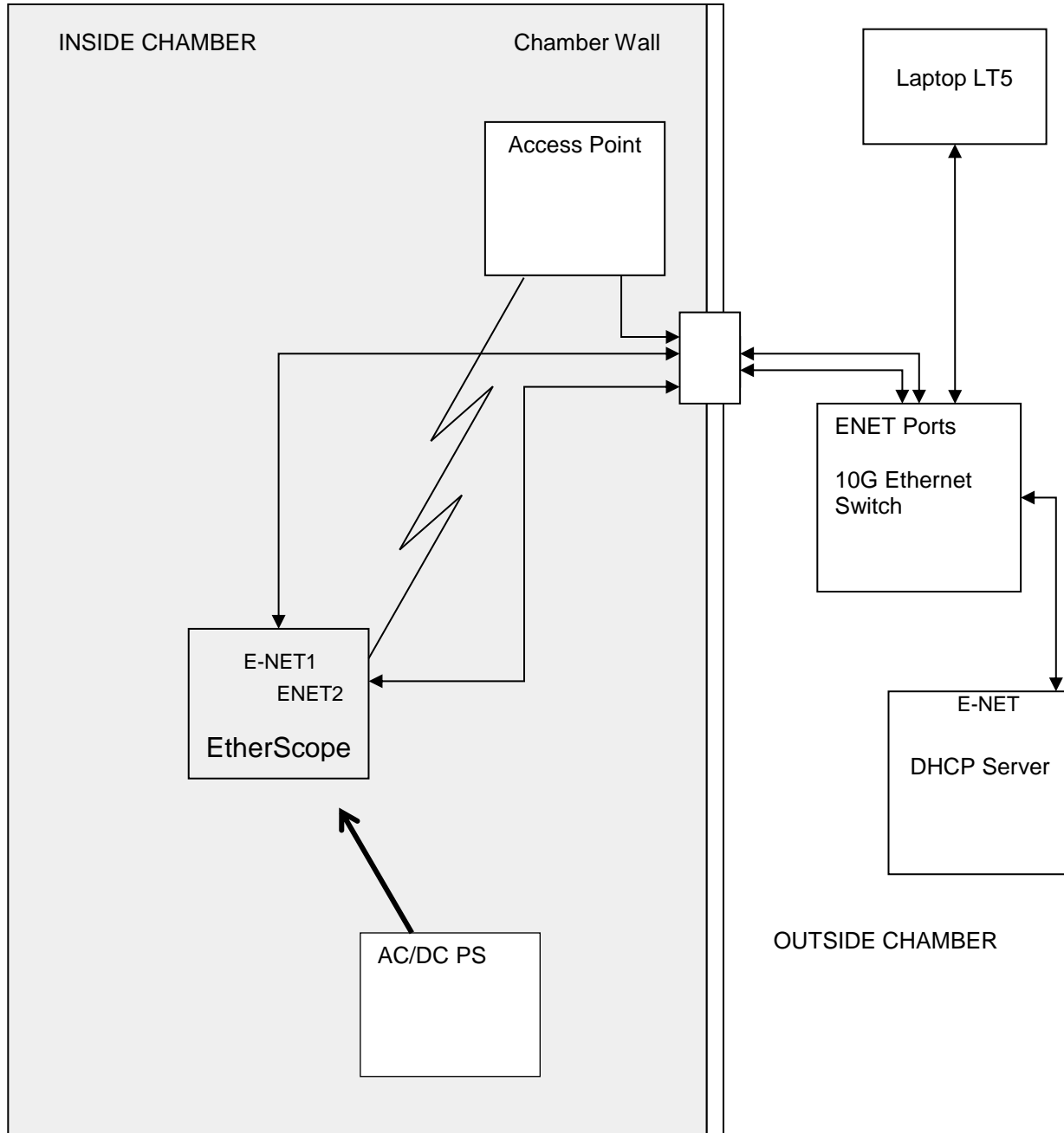


6.6.2. EUT Configuration – Immunity:

The tests were made in the mode(s) of operation specified in accordance with the relevant part of CISPR 24; EN 61326; EN 301 489-17 standards as specified for the type of equipment.

The EUT setup consists of two different test configurations where the EUT is powered either by Battery, or AC/DC power adapter. Within the two configurations, the EUT was exercised by performing tests over the Ethernet test port, and data transfer over management Ethernet port. A wireless connection was made from the EUT to an access point and data was transferred and monitored over the wireless link during testing.

Diagram of EUT Configuration for Immunity Measurements



Note 1: Shielded chamber is only applicable for Radiated Immunity. All other immunity tests allowed EUT and Auxiliary equipment to be operated within line-of-site communications.

6.7. Equipment Modifications

None.

6.8. Deviations from the Test Standard

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

None.

7. TEST RESULTS

7.1. EMC EMISSIONS TEST RESULTS

7.1.1. Radiated Emissions

Test Procedure

Testing 30 – 6,000 MHz was performed in an 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.

$$FS = R + AF + CORR - FO$$

FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor
FO = Distance Falloff Factor

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

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:

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

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

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

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

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

Limits

The equipment under test (EUT) shall meet the class B limits given in CISPR 32, and the limits above 1 GHz shown below.

CISPR 11/32: Spurious Emissions Limits

Class B limits:

Frequency range MHz	Quasi-peak limits dB(μ V/m) @ 10m	Quasi-peak limits dB(μ V/m) @ 3m
30 to 230	30	40.5
230 to 1 000	37	47.5
NOTE 1	The lower limit shall apply at the transition frequency.	

Class A limits:

Frequency range (MHz)	Quasi-peak limits dB(μ V/m) @ 10m	Quasi-peak limits dB(μ V/m) @ 3m
30 to 230	40	50.5
230 to 1 000	47	57.5
NOTE 1	The lower limit shall apply at the transition frequency.	

Frequency(MHz)	Average Limit (dB μ V/m)	Peak Limit (dB μ V/m)	Measurement Distance (meters)	Class (A/B)
1000 to 3000	50	70	3	Class B
3000 to 6000	54	74	3	Class B

Alternatively, for ancillary equipment intended to be used in telecommunication centres only, the class A limits given in EN 55032 and the limits above 1 GHz shown below apply.

Frequency(MHz)	Average Limit (dB μ V/m)	Peak Limit (dB μ V/m)	Measurement Distance (meters)	Class (A/B)
1000 to 3000	56	76	3	Class A
3000 to 6000	60	80	3	Class A

Note: The lower limit applies at the transition frequency.

FCC/ Canada ISED Limits

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:

The FCC limits are slightly lower in some sub bands and represent the more stringent requirements.

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)
	ISED	FCC		ISED	FCC	
30 to 88	40.0	39.0	10	50.0	49.5	3
88 - 216	43.5	43.5	10	54.0	54.0	3
216 - 230	46.4	46.4	10	56.9	56.9	3
230 - 960	47.0		10	57.0		3
960 - 1000	49.5	49.5	10	60.0	60.0	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)
	ISED	FCC		ISED	FCC	
30 to 88	30.0	29.5	10	40.0	40.0	3
88 - 216	33.1	33.0	10	43.5	43.5	3
216 - 230	35.6	35.6	10	46.0	46.0	3
230 - 960	37.0		10	47.0		3
960 - 1000	43.5	43.5	10	54.0	54.0	3

Manufacturer states No Clock sources > 108 MHz. No testing above 1 GHz required.

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
Measurements were made per work instruction Work Instruction WI-07 Radiated Emissions Test

Test Summary

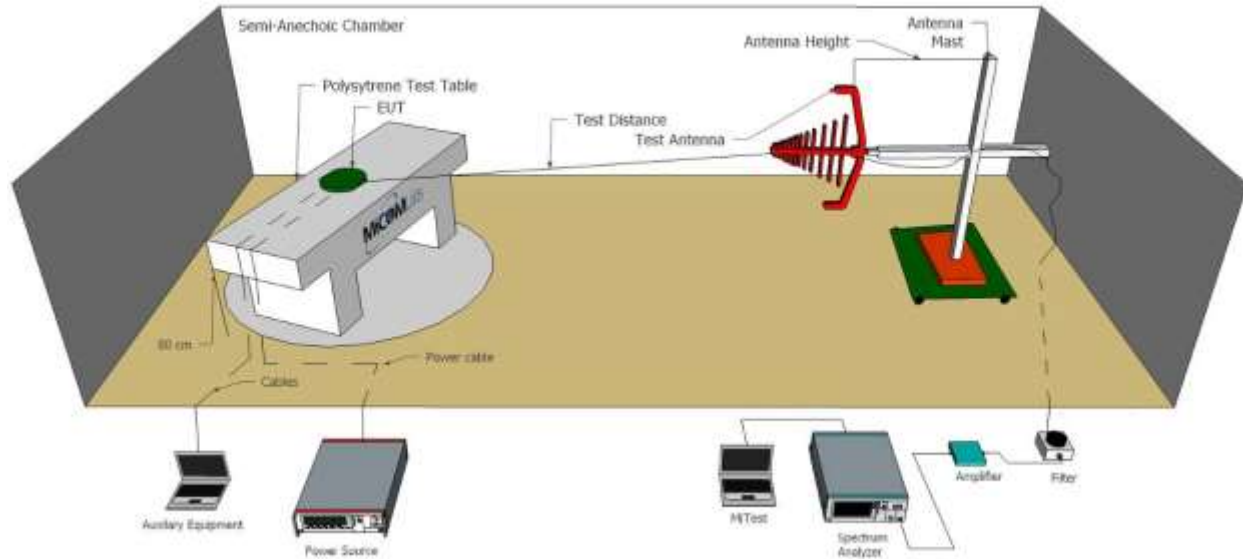
- EUT performed in Compliance with EN 55032, FCC Part 15, ICES-003 and EN 61326 emission limits.

Test Equipment Utilized

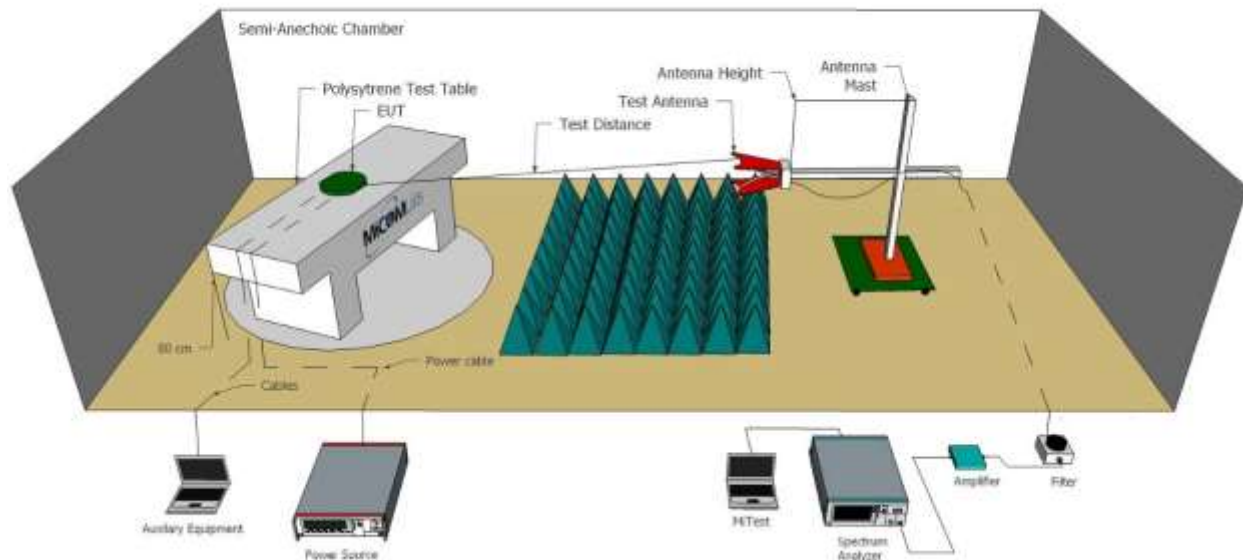
Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CU101	04R08507	Not Required
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	8 Oct 2022
298	3M Radiated Emissions Chamber Maintenance Check	MiCOM	3M Chamber	298	24 Mar 2022
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	29 Sep 2023
377	Band Rejection Filter 5150 to 5880MHz	Microtronics	BRM50716	034	6 Oct 2022
396	2.4 GHz Notch Filter	Microtronics	BRM50701	001	6 Oct 2022
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	27 Oct 2022
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	30 Sep 2023
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	2 Nov 2022
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
415	Turntable Controller	Sunol Sciences	Turntable Controller	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	27 Oct 2022
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	27 Oct 2022
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	27 Oct 2022
466	Low Pass Filter DC-1500 MHz	Mini-Circuits	NLP-1750+	VUU10401438	6 Oct 2022
476	Low Pass dc-2200MHz filter	Mini Circuits	15542 NLP-2400+	VUU13801345	6 Oct 2022
480	Cable - Bulkhead to Amp	SRC Haverhill	157-3050360	480	23 Jun 2022
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-3050787	481	23 Jun 2022
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023
554	Precision SMA Cable	Fairview Microwave	SCE18060101-400CM	554	23 Jun 2022
CC05	Confidence Check	MiCOM	CC05	None	24 Mar 2022

Test Setup for Radiated Emissions for above and below 1 GHz

Radiated Emissions Below 1GHz Test Setup



Radiated Emissions Above 1GHz Test Setup



A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

7.1.1.1. Measurement Results: 30-1000MHz

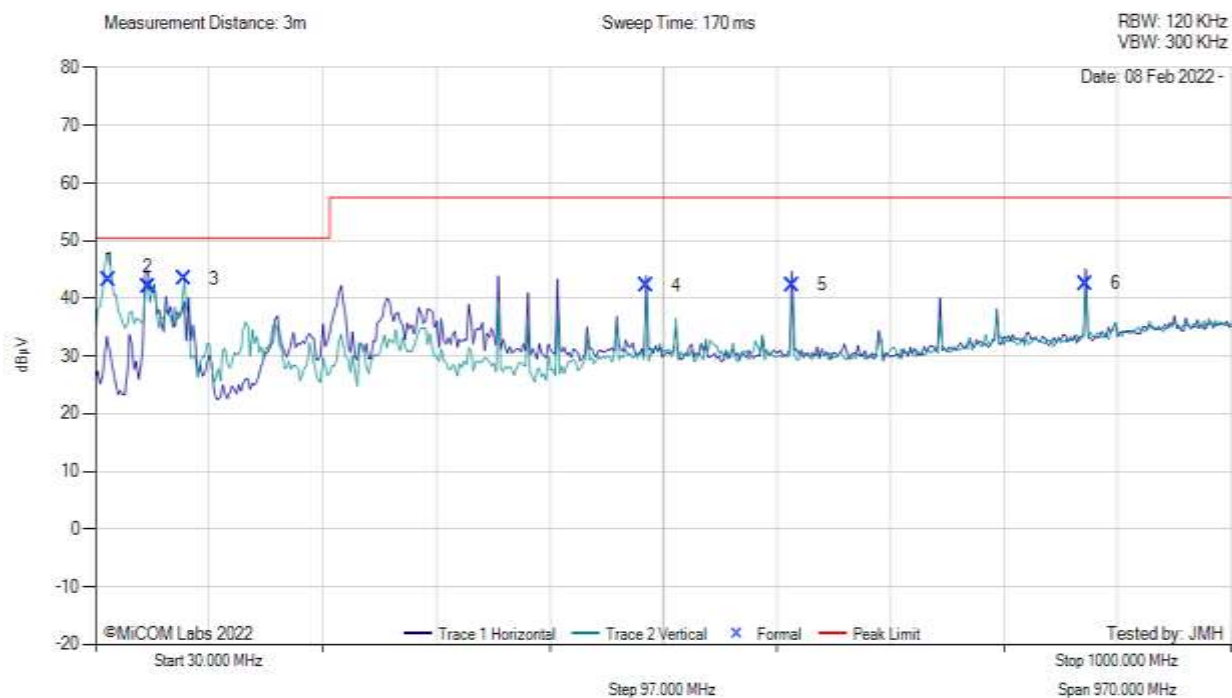
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	Battery
Input power:	NA	Standard:	CISPR A



30.00 - 1000.00 MHz												
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB/m	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	41.02	60.35	3.64	-18.48	45.51	MaxQP	Vertical	107	27	50.5	-5.0	Pass
2	74.85	59.77	3.93	-23.32	40.38	MaxQP	Horizontal	177	136	50.5	-10.1	Pass
3	80.66	57.02	3.98	-23.58	37.42	MaxQP	Vertical	141	154	50.5	-13.1	Pass
4	106.23	57.02	4.13	-19.44	41.71	MaxQP	Vertical	105	266	50.5	-9.8	Pass
5	500.04	49.29	5.70	-13.18	41.80	MaxQP	Horizontal	198	127	57.5	-15.7	Pass
6	625.03	51.29	6.09	-11.25	46.13	MaxQP	Horizontal	117	168	57.5	-11.4	Pass
7	875.00	43.86	6.85	-8.80	41.91	MaxQP	Horizontal	101	44	57.5	-15.6	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C powered by Battery. Connected to 10G hub outside chamber. ENET port tests running

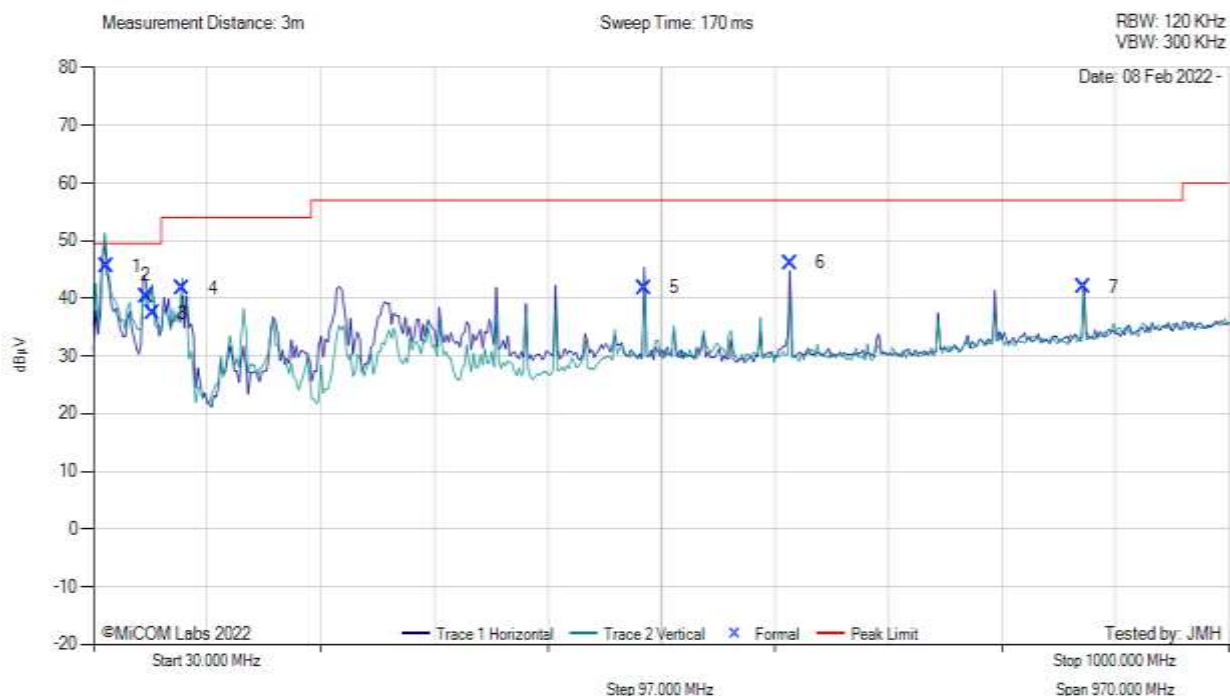
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Input power:	230V _{AC} /50Hz	Standard:	CISPR A



30.00 - 1000.00 MHz												
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB/m	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	41.23	58.06	3.64	-18.48	43.22	MaxQP	Vertical	99	86	50.5	-7.3	Pass
2	75.00	61.42	3.94	-23.36	42.00	MaxQP	Horizontal	196	327	50.5	-8.5	Pass
3	106.22	58.66	4.13	-19.44	43.35	MaxQP	Vertical	106	255	50.5	-7.2	Pass
4	500.03	49.68	5.70	-13.18	42.19	MaxQP	Horizontal	171	215	57.5	-15.3	Pass
5	625.06	47.46	6.09	-11.25	42.30	MaxQP	Horizontal	117	165	57.5	-15.2	Pass
6	875.02	44.47	6.85	-8.80	42.52	MaxQP	Horizontal	101	193	57.5	-15.0	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C powered by AC/DC PS. Connected to 10G hub outside chamber. ENET port tests running

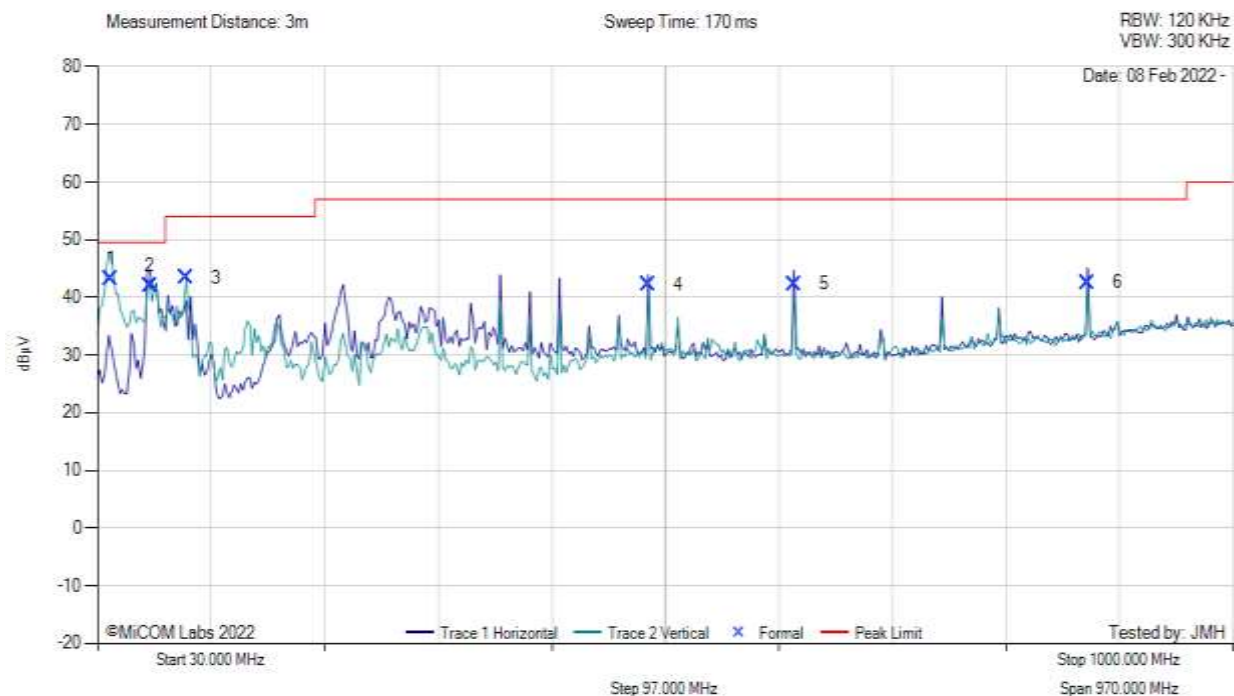
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	Battery
Input power:	NA	Standard:	FCC A, ICES-003



30.00 - 1000.00 MHz												
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB/m	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	41.02	60.35	3.64	-18.48	45.51	MaxQP	Vertical	107	27	49.5	-4.0	Pass
2	74.85	59.77	3.93	-23.32	40.38	MaxQP	Horizontal	177	136	49.5	-9.1	Pass
3	80.66	57.02	3.98	-23.58	37.42	MaxQP	Vertical	141	154	49.5	-12.1	Pass
4	106.23	57.02	4.13	-19.44	41.71	MaxQP	Vertical	105	266	54.0	-12.3	Pass
5	500.04	49.29	5.70	-13.18	41.80	MaxQP	Horizontal	198	127	57.0	-15.2	Pass
6	625.03	51.29	6.09	-11.25	46.13	MaxQP	Horizontal	117	168	57.0	-10.9	Pass
7	875.00	43.86	6.85	-8.80	41.91	MaxQP	Horizontal	101	44	57.0	-15.1	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C powered by Battery. Connected to 10G hub outside chamber. ENET port tests running

Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Input power:	120V _{AC} /60Hz	Standard:	FCC, ICES-003

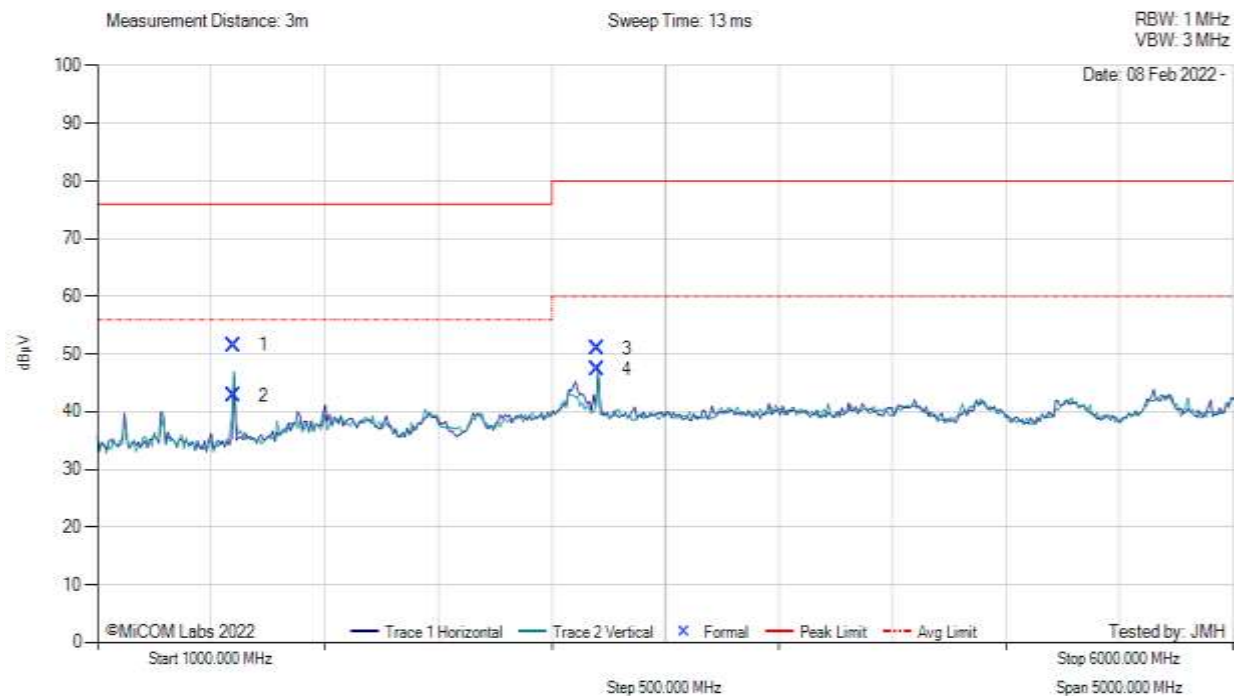


30.00 - 1000.00 MHz												
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB/m	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	41.23	58.06	3.64	-18.48	43.22	MaxQP	Vertical	99	86	49.5	-6.3	Pass
2	75.00	61.42	3.94	-23.36	42.00	MaxQP	Horizontal	196	327	49.5	-7.5	Pass
3	106.22	58.66	4.13	-19.44	43.35	MaxQP	Vertical	106	255	54.0	-10.7	Pass
4	500.03	49.68	5.70	-13.18	42.19	MaxQP	Horizontal	171	215	57.0	-14.8	Pass
5	625.06	47.46	6.09	-11.25	42.30	MaxQP	Horizontal	117	165	57.0	-14.7	Pass
6	875.02	44.47	6.85	-8.80	42.52	MaxQP	Horizontal	101	193	57.0	-14.5	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C powered by AC/DC PS. Connected to 10G hub outside chamber. ENET port tests running

7.1.1.2. Measurement Results: 1000-6000 MHz,

Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	Battery
Input power:		Standard:	CISPR A

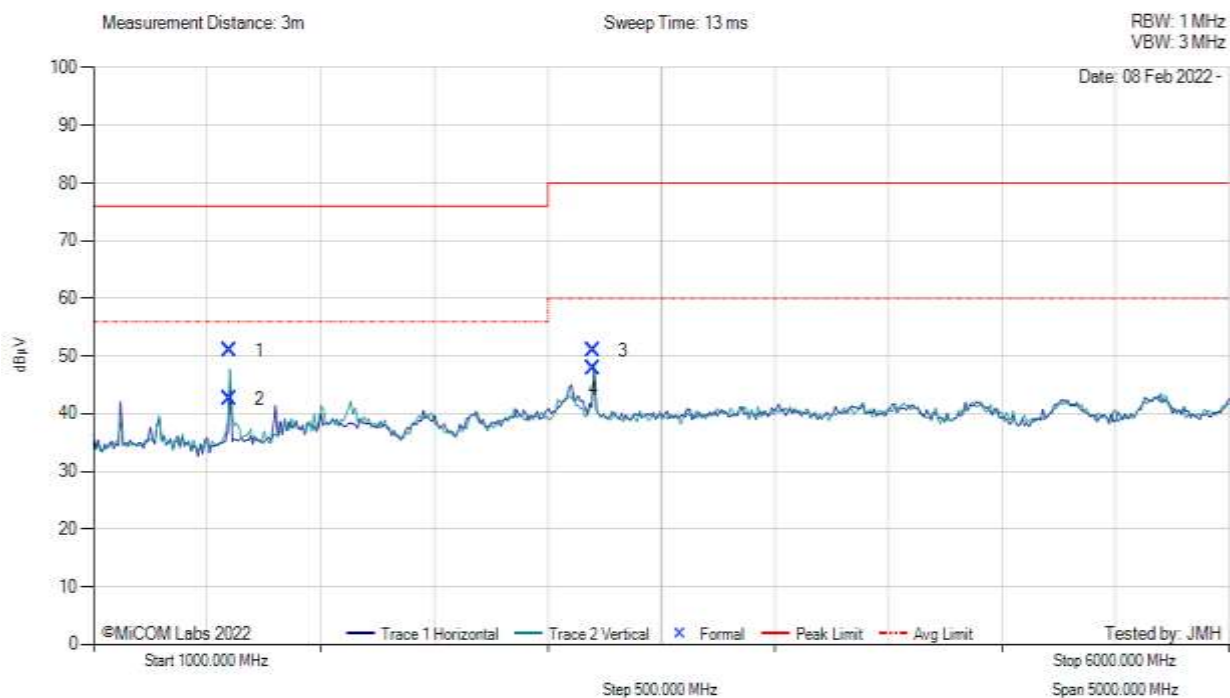


1000.00 - 6000.00 MHz												
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB/m	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	1599.98	66.64	1.62	-16.72	51.54	Max Peak	Vertical	110	193	76.0	-24.5	Pass
2	1599.98	57.87	1.62	-16.72	42.77	Max Avg	Vertical	110	193	56.0	-13.2	Pass
3	3200.00	60.13	2.25	-11.44	50.94	Max Peak	Vertical	101	334	80.0	-29.1	Pass
4	3200.00	56.49	2.25	-11.44	47.30	Max Avg	Vertical	101	334	60.0	-12.7	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C powered by Battery. Connected to 10G hub outside chamber. ENET port tests running. 2.4 and 5G notch in front of amp to prevent overloads.

Note: A notch filter was placed in front of preamplifier to prevent clipping and overload of equipment from the Transmitter fundamental. Device was placed in transmit mode to represent worst case operating mode conditions.

Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Input power:	230V _{AC} /50Hz	Standard:	CISPR A

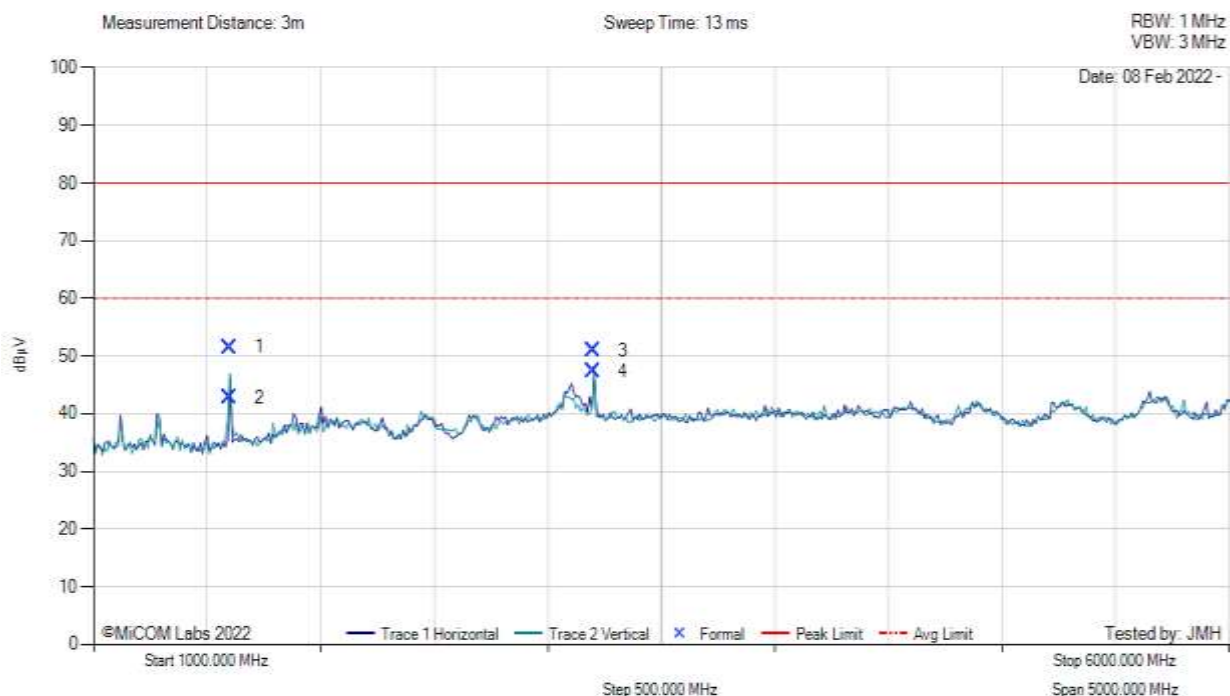


1000.00 - 6000.00 MHz												
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB/m	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	1599.87	66.01	1.62	-16.72	50.91	Max Peak	Vertical	166	197	76.0	-25.1	Pass
2	1599.87	57.72	1.62	-16.72	42.62	Max Avg	Vertical	166	197	56.0	-13.4	Pass
3	3199.99	60.14	2.25	-11.45	50.94	Max Peak	Vertical	120	65	80.0	-29.1	Pass
4	3199.99	57.02	2.25	-11.45	47.82	Max Avg	Vertical	120	65	60.0	-12.2	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C powered by AC/DC PS. Connected to 10G hub outside chamber. ENET port tests running. 2.4 and 5G notch in front of amp to prevent overloads.

Note: A notch filter was placed in front of preamplifier to prevent clipping and overload of equipment from the Transmitter fundamental. Device was placed in transmit mode to represent worst case operating mode conditions.

Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	Battery
Input power:	120V _{AC} /60Hz	Standard:	FCC A, ICES-003

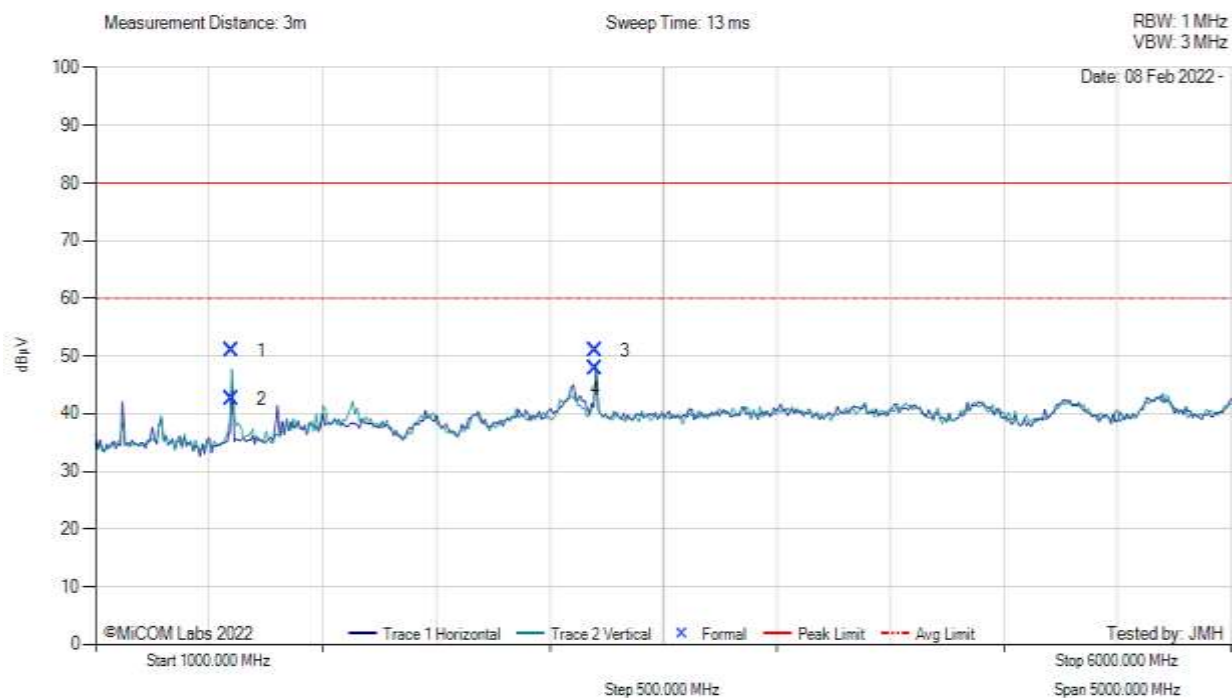


1000.00 - 6000.00 MHz												
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB/m	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	1599.98	66.64	1.62	-16.72	51.54	Max Peak	Vertical	110	193	80.0	-28.5	Pass
2	1599.98	57.87	1.62	-16.72	42.77	Max Avg	Vertical	110	193	60.0	-17.2	Pass
3	3200.00	60.13	2.25	-11.44	50.94	Max Peak	Vertical	101	334	80.0	-29.1	Pass
4	3200.00	56.49	2.25	-11.44	47.30	Max Avg	Vertical	101	334	60.0	-12.7	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C powered by Battery. Connected to 10G hub outside chamber. ENET port tests running. 2.4 and 5G notch in front of amp to prevent overloads.

Note: A notch filter was placed in front of preamplifier to prevent clipping and overload of equipment from the Transmitter fundamental. Device was placed in transmit mode to represent worst case operating mode conditions.

Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Input power:	120V _{AC} /60Hz	Standard:	FCC A, ICES-003



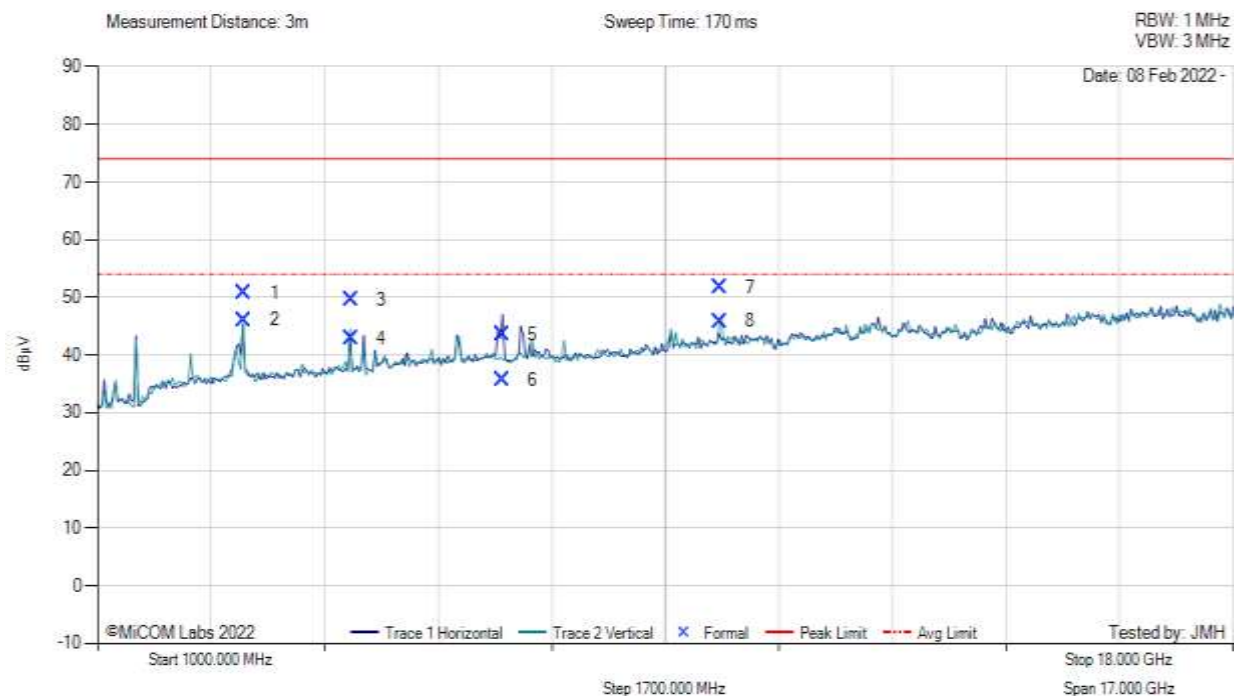
1000.00 - 6000.00 MHz												
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB/m	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	1599.87	66.01	1.62	-16.72	50.91	Max Peak	Vertical	166	197	80.0	-29.1	Pass
2	1599.87	57.72	1.62	-16.72	42.62	Max Avg	Vertical	166	197	60.0	-17.4	Pass
3	3199.99	60.14	2.25	-11.45	50.94	Max Peak	Vertical	120	65	80.0	-29.1	Pass
4	3199.99	57.02	2.25	-11.45	47.82	Max Avg	Vertical	120	65	60.0	-12.2	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C powered by AC/DC PS. Connected to 10G hub outside chamber. ENET port tests running. 2.4 and 5G notch in front of amp to prevent overloads.

Note: A notch filter was placed in front of preamplifier to prevent clipping and overload of equipment from the Transmitter fundamental. Device was placed in transmit mode to represent worst case operating mode conditions.

7.1.1.3. Measurement Results: 1000-18000 MHz, ISED Receiver

Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Input power:	120V _{AC} /60Hz	Standard:	ICES-003



1000.00 - 18000.00 MHz												
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB/m	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	3199.95	60.01	2.25	-11.45	50.81	Max Peak	Horizontal	101	127	74.0	-23.2	Pass
2	3199.95	55.26	2.25	-11.45	46.06	Max Avg	Horizontal	101	127	54.0	-7.9	Pass
3	4799.63	59.15	2.84	-12.42	49.57	Max Peak	Vertical	100	245	74.0	-24.4	Pass
4	4799.63	52.47	2.84	-12.42	42.89	Max Avg	Vertical	100	245	54.0	-11.1	Pass
5	7066.83	47.91	3.58	-7.92	43.57	Max Peak	Horizontal	186	181	74.0	-30.4	Pass
6	7066.83	39.94	3.58	-7.92	35.60	Max Avg	Horizontal	186	181	54.0	-18.4	Pass
7	10312.40	52.60	4.52	-5.45	51.67	Max Peak	Vertical	100	328	74.0	-22.3	Pass
8	10312.40	46.78	4.52	-5.45	45.85	Max Avg	Vertical	100	328	54.0	-8.2	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C . Connected to 10G hub outside chamber. ENET port tests running. WiFi in RCV mode

7.1.2. AC Mains Power Input/Output Ports

Scope

This test assesses the ability of the EUT to limit its internal noise from being present on the AC mains power input/output ports.

Test Method

The test method shall be in accordance with EN 55032 and the Artificial Mains Networks (AMNs) shall be connected to the AC mains power source.

The measurement frequency range extends from 150 kHz to 30 MHz. When the EUT is a transmitter operating at frequencies below 30 MHz, then the exclusion band for transmitters applies for measurements in the transmit mode of operation.

Test Procedure

The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

Limits

The equipment shall meet the class B limits given in EN 55032. Alternatively, for equipment intended to be used in telecommunication centres only, the class A limits given in EN 55032 may be used.

Class B Emissions

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency

Class A Emissions

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	79	66
0.5-30	73	60

Traceability

All conducted emission measurements are traceable to national standards. The uncertainty of measurement at a confidence level of not less than 95 %, with a coverage factor of k=2, in the range 9 kHz – 30 MHz (Average & Quasi-peak) is ± 2.64 dB.

Laboratory Measurement Uncertainty	
Measurement uncertainty	± 2.64 dB

Method
Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions'

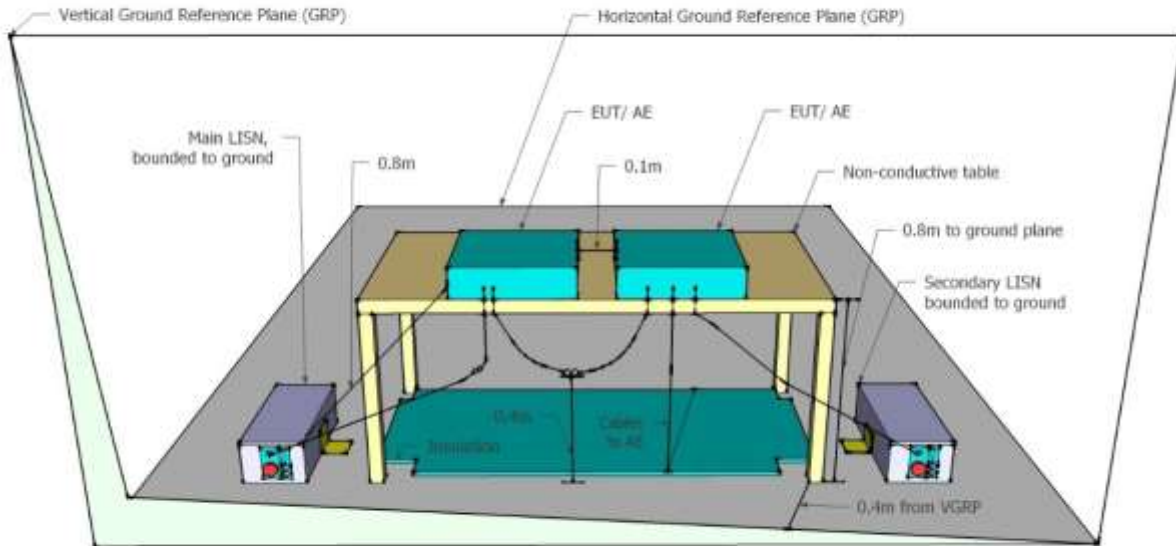
Test Summary

EUT performed in Compliance with EN 55032, EN 61326, ICES-003 and FCC Part 15B emission limits.

Test Equipment Utilized

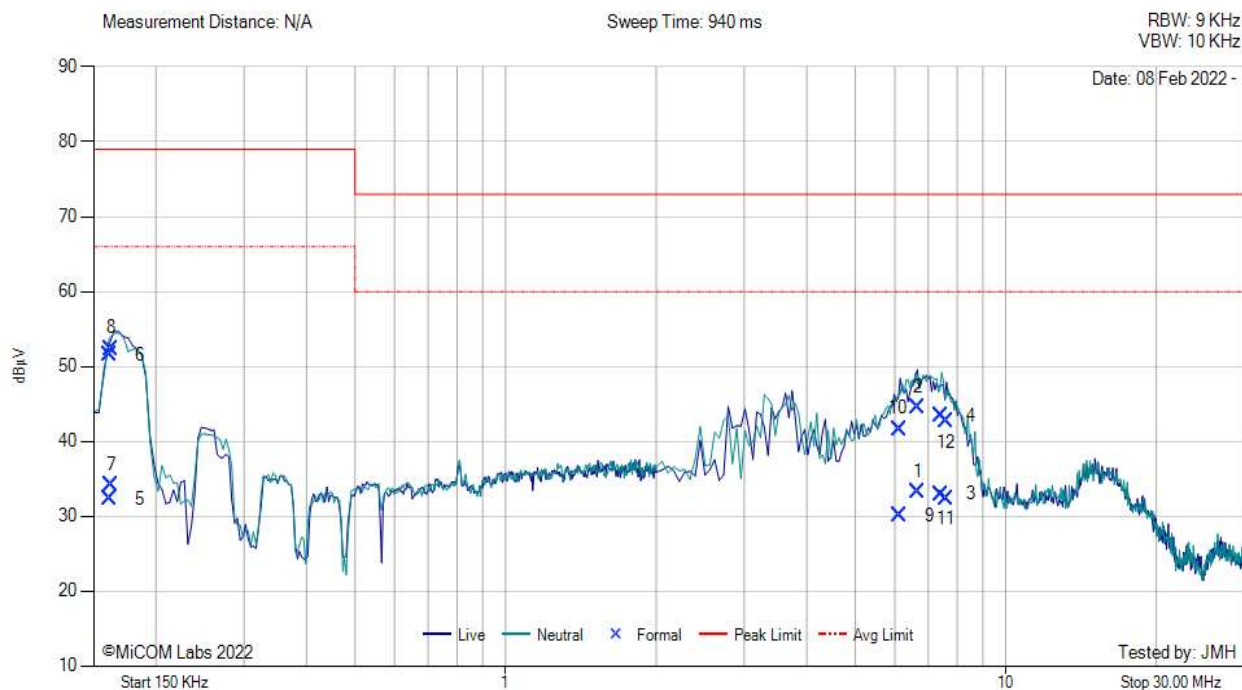
Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
184	Pulse Limiter	Rhode & Schwarz	ESH3Z2	357.8810.52	22 Oct 2022
190	LISN (two-line V-network)	Rhode & Schwarz	ESH3Z5	836679/006	11 Oct 2022
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	8 Oct 2022
295	Conducted Emissions Chamber Maintenance Check	MiCOM	Conducted Emissions Chamber	295	24 Mar 2022
307	BNC-CABLE	Megaphase	1689 1GVT4	15F50B002	22 Oct 2022
316	Dell desktop computer workstation	Dell	Desktop	WS04	Not Required
372	AC Variable PS	California Instruments	1251P	L06951	Cal when used
389	LISN (3 Phase) 9kHz - 30 MHz for support equipment	Rohde & Schwarz	ESH2-Z5	881493/013	Not Required
496	MiTest Conducted Emissions test software.	MiCOM	Conducted Emissions Test Software Version 1.0	496	Not Required
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023
555	Rhode & Schwarz Receiver (Firmware Version : 2.00 SP1)	Rhode & Schwarz	ESW 44	101893	28 Jun 2023
CCEMC01	Confidence Check.	MiCOM	CCEMC01	None	24 Mar 2022

Test Setup – Power Input / Output Port



7.1.2.1. Measurement Results

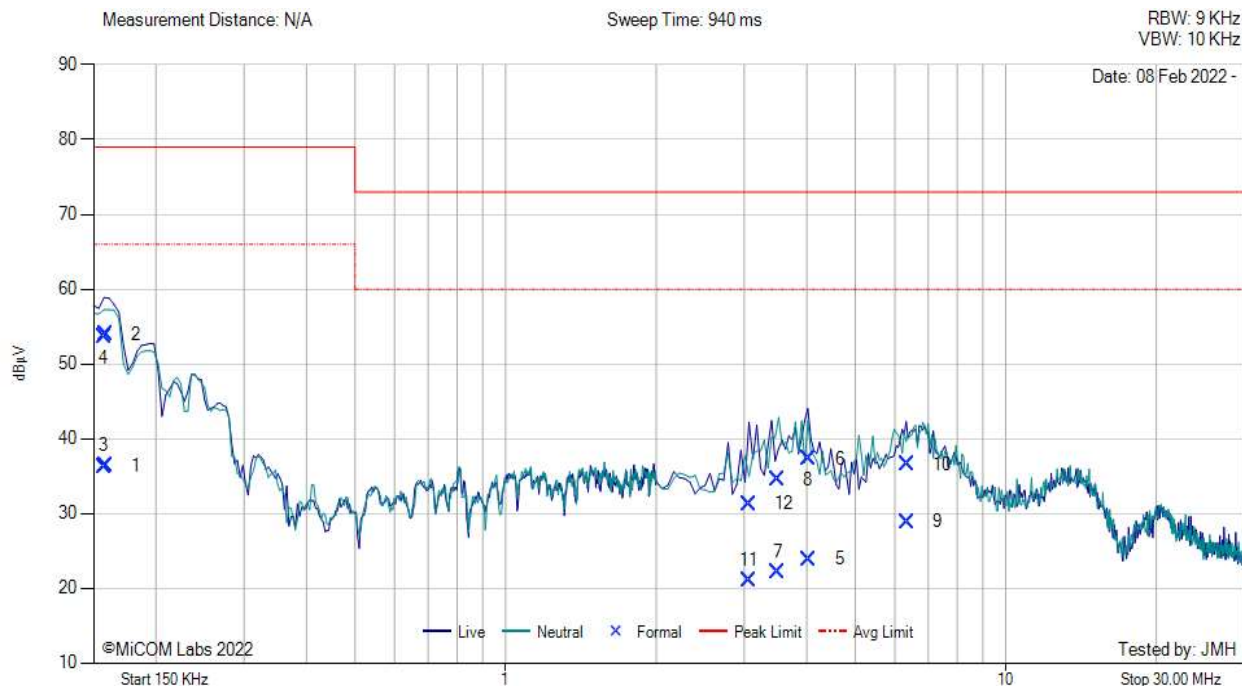
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Input power:	120V _{AC} /60Hz	Standard:	FCC, ICES-003, A



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	6.667	23.08	-0.18	10.29	10.11	33.19	Max Avg	Live	60.0	-26.8	Pass
2	6.667	34.39	-0.18	10.29	10.11	44.50	Max Qp	Live	73.0	-28.5	Pass
3	7.416	22.86	-0.19	10.30	10.11	32.97	Max Avg	Neutral	60.0	-27.0	Pass
4	7.416	33.28	-0.19	10.30	10.11	43.39	Max Qp	Neutral	73.0	-29.6	Pass
5	0.161	22.42	-0.04	9.99	9.95	32.37	Max Avg	Live	66.0	-33.6	Pass
6	0.161	41.62	-0.04	9.99	9.95	51.57	Max Qp	Live	79.0	-27.4	Pass
7	0.162	24.16	-0.04	9.99	9.95	34.11	Max Avg	Neutral	66.0	-31.9	Pass
8	0.162	42.43	-0.04	9.99	9.95	52.38	Max Qp	Neutral	79.0	-26.6	Pass
9	6.113	20.01	-0.18	10.29	10.11	30.12	Max Avg	Live	60.0	-29.9	Pass
10	6.113	31.56	-0.18	10.29	10.11	41.67	Max Qp	Live	73.0	-31.3	Pass
11	7.617	22.32	-0.19	10.30	10.11	32.43	Max Avg	Live	60.0	-27.6	Pass
12	7.617	32.57	-0.19	10.30	10.11	42.68	Max Qp	Live	73.0	-30.3	Pass

Test Notes: EXG300 AC Mains 120V

Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Input power:	230V _{AC} /50Hz	Standard:	CISPR A



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	0.158	26.45	-0.04	9.99	9.95	36.40	Max Avg	Live	66.0	-29.6	Pass
2	0.158	43.97	-0.04	9.99	9.95	53.92	Max Qp	Live	79.0	-25.1	Pass
3	0.157	26.36	-0.04	9.99	9.95	36.31	Max Avg	Neutral	66.0	-29.7	Pass
4	0.157	43.67	-0.04	9.99	9.95	53.62	Max Qp	Neutral	79.0	-25.4	Pass
5	4.044	13.87	-0.15	10.15	10.00	23.87	Max Avg	Live	60.0	-36.1	Pass
6	4.044	27.33	-0.15	10.15	10.00	37.33	Max Qp	Live	73.0	-35.7	Pass
7	3.501	12.16	-0.15	10.08	9.93	22.09	Max Avg	Neutral	60.0	-37.9	Pass
8	3.501	24.65	-0.15	10.08	9.93	34.58	Max Qp	Neutral	73.0	-38.4	Pass
9	6.359	18.77	-0.18	10.29	10.11	28.88	Max Avg	Live	60.0	-31.1	Pass
10	6.359	26.50	-0.18	10.29	10.11	36.61	Max Qp	Live	73.0	-36.4	Pass
11	3.065	11.05	-0.15	10.08	9.93	20.98	Max Avg	Live	60.0	-39.0	Pass
12	3.065	21.38	-0.15	10.08	9.93	31.31	Max Qp	Live	73.0	-41.7	Pass

Test Notes: EXG300 AC Mains 230V

7.1.3. Conducted Emission - Telecommunication Ports

Scope

This test assesses the EUT unwanted emission present at the telecommunication ports.

Test Method

The test method shall be in accordance with CISPR 32.

The measurement frequency range extends from 150 kHz to 30 MHz. When the EUT is a transmitter operating at frequencies below 30 MHz, then the exclusion band for transmitters applies for measurements in the transmit mode of operation.

Limits:

The telecommunication ports shall meet the class B limits given in CISPR 32. Alternatively, for equipment intended to be used in telecommunication centers only, the class A limits given in EN 55032 may be used.

Class B Emissions

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	84 - 74	74 - 64
0.5-30	74	64

Class A Emissions

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	97 - 87	84 - 74
0.5-30	87	74

Traceability

All conducted emission measurements are traceable to national standards. The uncertainty of measurement at a confidence level of not less than 95 %, with a coverage factor of k=2, in the range 9 kHz – 30 MHz (Average & Quasi-peak) is ± 2.64 dB.

Laboratory Measurement Uncertainty	
Measurement uncertainty	± 2.64 dB

Method
Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions'

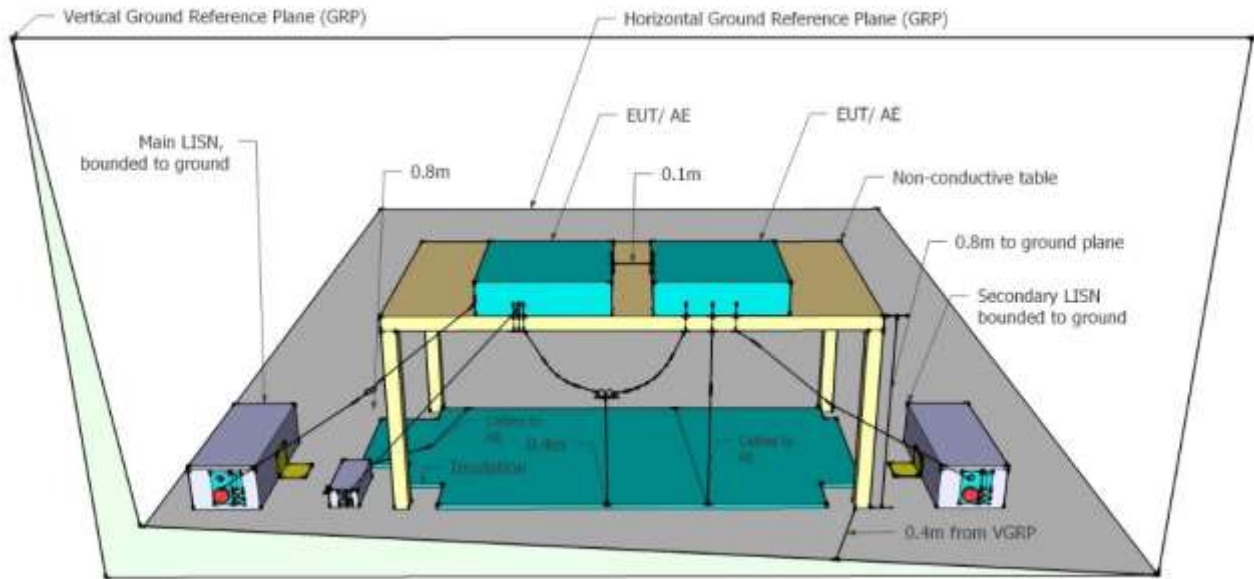
Test Summary

EUT performed in Compliance with EN 55032 emission limits.

Test Equipment Utilized

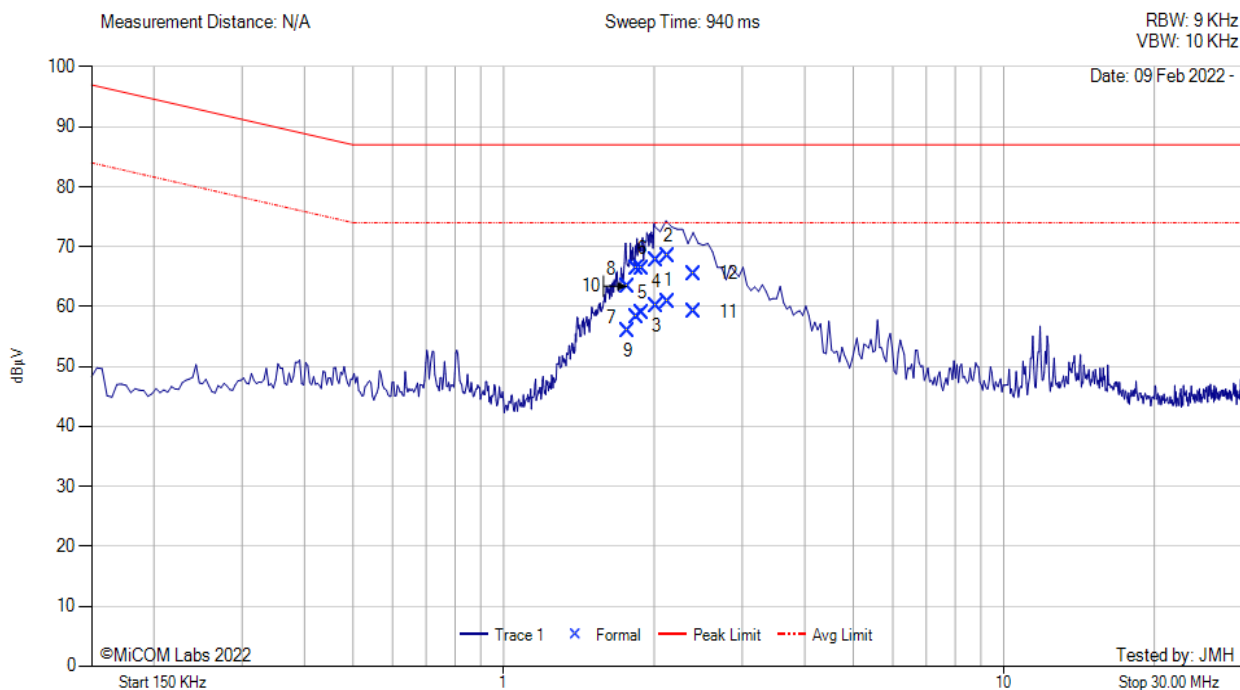
Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	8 Oct 2022
289	Impedance Stabilization Network (ISN)	Teseq	ISN T8-Cat6	60351	17 Dec 2022
295	Conducted Emissions Chamber Maintenance Check	MiCOM	Conducted Emissions Chamber	295	24 Mar 2022
307	BNC-CABLE	Megaphase	1689 1GVT4	15F50B002	22 Oct 2022
316	Dell desktop computer workstation	Dell	Desktop	WS04	Not Required
372	AC Variable PS	California Instruments	1251P	L06951	Cal when used
389	LISN (3 Phase) 9kHz - 30 MHz for support equipment	Rohde & Schwarz	ESH2-Z5	881493/013	Not Required
496	MiTest Conducted Emissions test software.	MiCOM	Conducted Emissions Test Software Version 1.0	496	Not Required
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023

Test Setup – Power Input / Output Port



7.1.3.1. Measurement Results AC/DC Power Supply

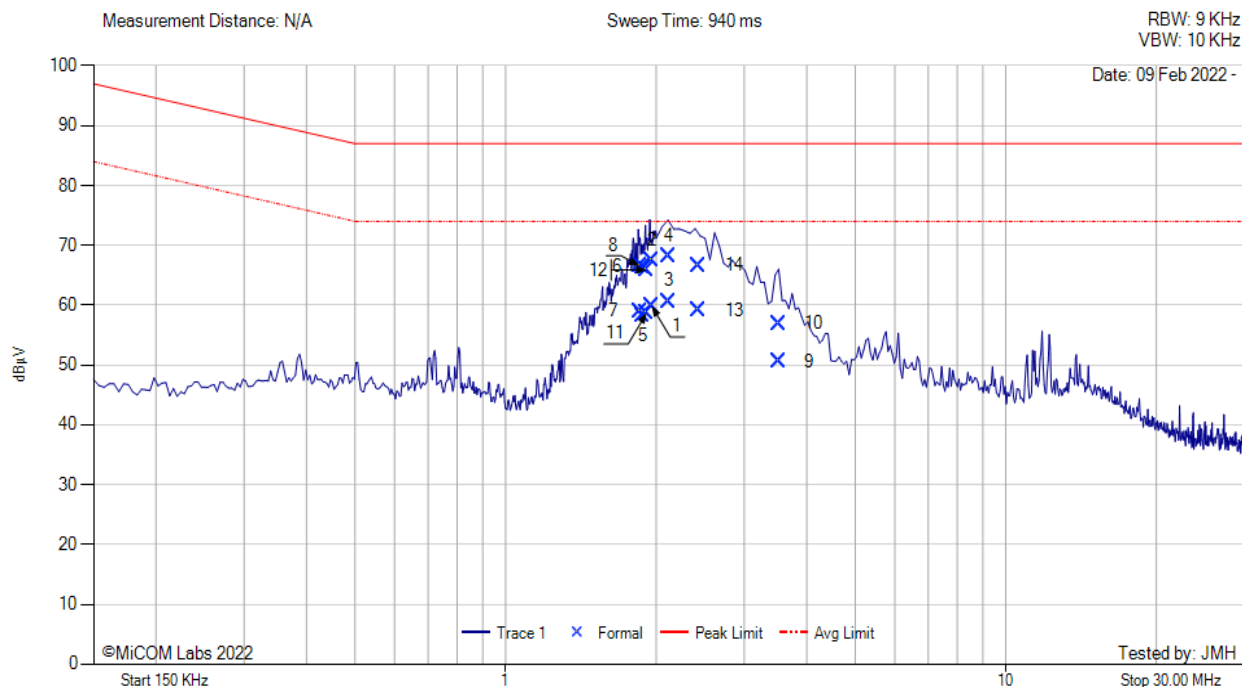
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Variant	Telecom Cond 10GB. 230V _{AC} , 50Hz	Port:	Network Test Port



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	2.137	51.10	-0.11	9.88	9.77	60.87	Max Avg	Telecom	74.0	-13.1	Pass
2	2.137	58.60	-0.11	9.88	9.77	68.37	Max Qp	Telecom	87.0	-18.6	Pass
3	2.025	50.33	-0.11	9.89	9.78	60.11	Max Avg	Telecom	74.0	-13.9	Pass
4	2.025	57.83	-0.11	9.89	9.78	67.61	Max Qp	Telecom	87.0	-19.4	Pass
5	1.892	49.15	-0.09	9.90	9.81	58.96	Max Avg	Telecom	74.0	-15.0	Pass
6	1.892	56.52	-0.09	9.90	9.81	66.33	Max Qp	Telecom	87.0	-20.7	Pass
7	1.848	48.37	-0.09	9.90	9.81	58.18	Max Avg	Telecom	74.0	-15.8	Pass
8	1.848	56.45	-0.09	9.90	9.81	66.26	Max Qp	Telecom	87.0	-20.7	Pass
9	1.771	46.15	-0.09	9.91	9.82	55.97	Max Avg	Telecom	74.0	-18.0	Pass
10	1.771	53.57	-0.09	9.91	9.82	63.39	Max Qp	Telecom	87.0	-23.6	Pass
11	2.398	49.42	-0.11	9.87	9.76	59.18	Max Avg	Telecom	74.0	-14.8	Pass
12	2.398	55.72	-0.11	9.87	9.76	65.48	Max Qp	Telecom	87.0	-21.5	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Test Port 10G connection.

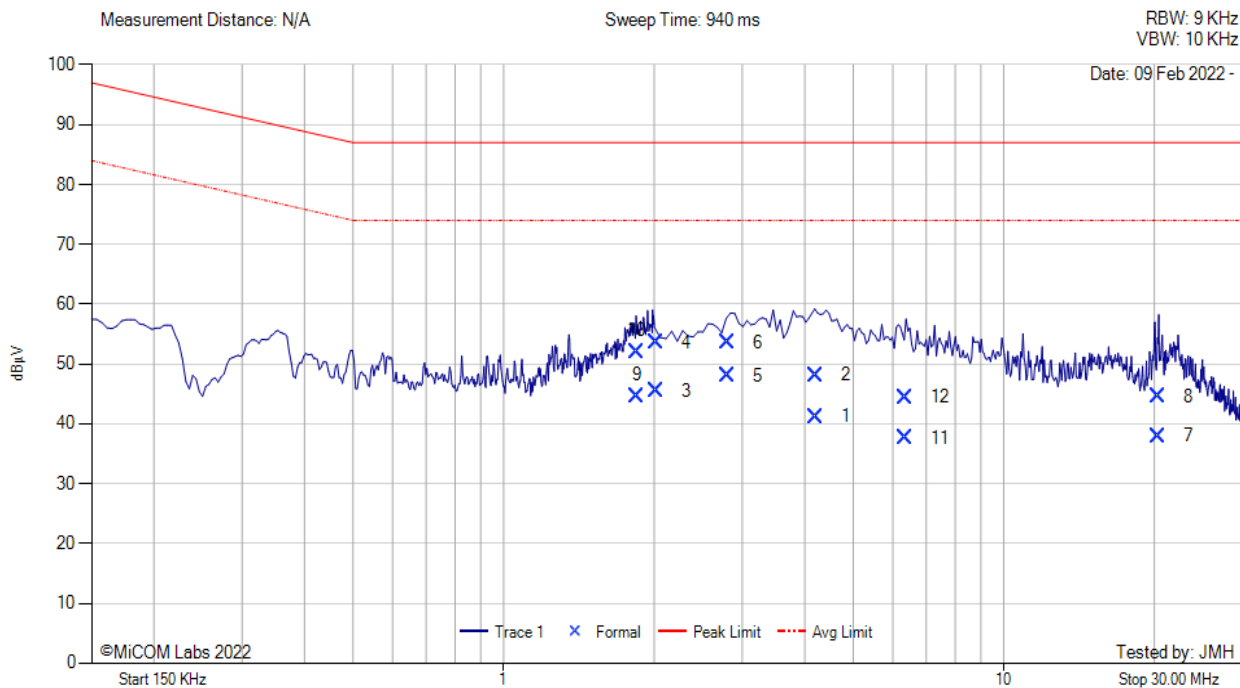
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Variant	Telecom Cond 1000T. 230V _{AC} , 50Hz	Port:	Network Test Port



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	1.958	50.09	-0.09	9.90	9.81	59.90	Max Avg	Telecom	74.0	-14.1	Pass
2	1.958	57.65	-0.09	9.90	9.81	67.46	Max Qp	Telecom	87.0	-19.5	Pass
3	2.120	50.88	-0.11	9.89	9.78	60.66	Max Avg	Telecom	74.0	-13.3	Pass
4	2.120	58.34	-0.11	9.89	9.78	68.12	Max Qp	Telecom	87.0	-18.9	Pass
5	1.879	48.46	-0.09	9.90	9.81	58.27	Max Avg	Telecom	74.0	-15.7	Pass
6	1.879	56.58	-0.09	9.90	9.81	66.39	Max Qp	Telecom	87.0	-20.6	Pass
7	1.852	49.15	-0.09	9.90	9.81	58.96	Max Avg	Telecom	74.0	-15.0	Pass
8	1.852	56.75	-0.09	9.90	9.81	66.56	Max Qp	Telecom	87.0	-20.4	Pass
9	3.518	40.87	-0.15	9.80	9.65	50.52	Max Avg	Telecom	74.0	-23.5	Pass
10	3.518	47.30	-0.15	9.80	9.65	56.95	Max Qp	Telecom	87.0	-30.1	Pass
11	1.915	48.92	-0.09	9.90	9.81	58.73	Max Avg	Telecom	74.0	-15.3	Pass
12	1.915	56.08	-0.09	9.90	9.81	65.89	Max Qp	Telecom	87.0	-21.1	Pass
13	2.436	49.31	-0.11	9.87	9.76	59.07	Max Avg	Telecom	74.0	-14.9	Pass
14	2.436	56.86	-0.11	9.87	9.76	66.62	Max Qp	Telecom	87.0	-20.4	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Test Port 1000T connection.

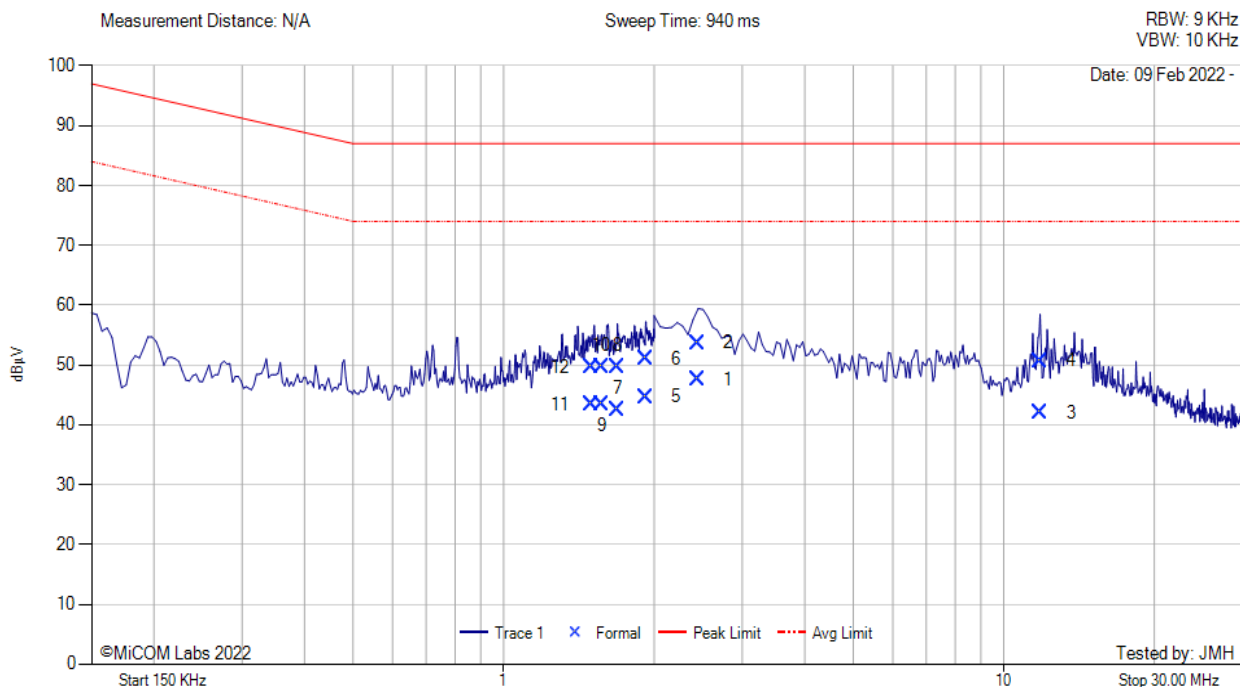
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Variant	Telecom Cond 100T. 230V _{AC} , 50Hz	Port:	Network Test Port



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	4.204	31.56	-0.15	9.77	9.62	41.18	Max Avg	Telecom	74.0	-32.8	Pass
2	4.204	38.49	-0.15	9.77	9.62	48.11	Max Qp	Telecom	87.0	-38.9	Pass
3	2.020	35.74	-0.11	9.89	9.78	45.52	Max Avg	Telecom	74.0	-28.5	Pass
4	2.020	43.73	-0.11	9.89	9.78	53.51	Max Qp	Telecom	87.0	-33.5	Pass
5	2.799	38.25	-0.11	9.85	9.74	47.99	Max Avg	Telecom	74.0	-26.0	Pass
6	2.799	43.84	-0.11	9.85	9.74	53.58	Max Qp	Telecom	87.0	-33.4	Pass
7	20.383	28.53	-0.30	9.73	9.43	37.96	Max Avg	Telecom	74.0	-36.0	Pass
8	20.383	35.09	-0.30	9.73	9.43	44.52	Max Qp	Telecom	87.0	-42.5	Pass
9	1.846	34.83	-0.09	9.90	9.81	44.64	Max Avg	Telecom	74.0	-29.4	Pass
10	1.846	42.28	-0.09	9.90	9.81	52.09	Max Qp	Telecom	87.0	-34.9	Pass
11	6.347	28.15	-0.18	9.64	9.46	37.61	Max Avg	Telecom	74.0	-36.4	Pass
12	6.347	34.94	-0.18	9.64	9.46	44.40	Max Qp	Telecom	87.0	-42.6	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Test Port 100T connection. AC-DC PS

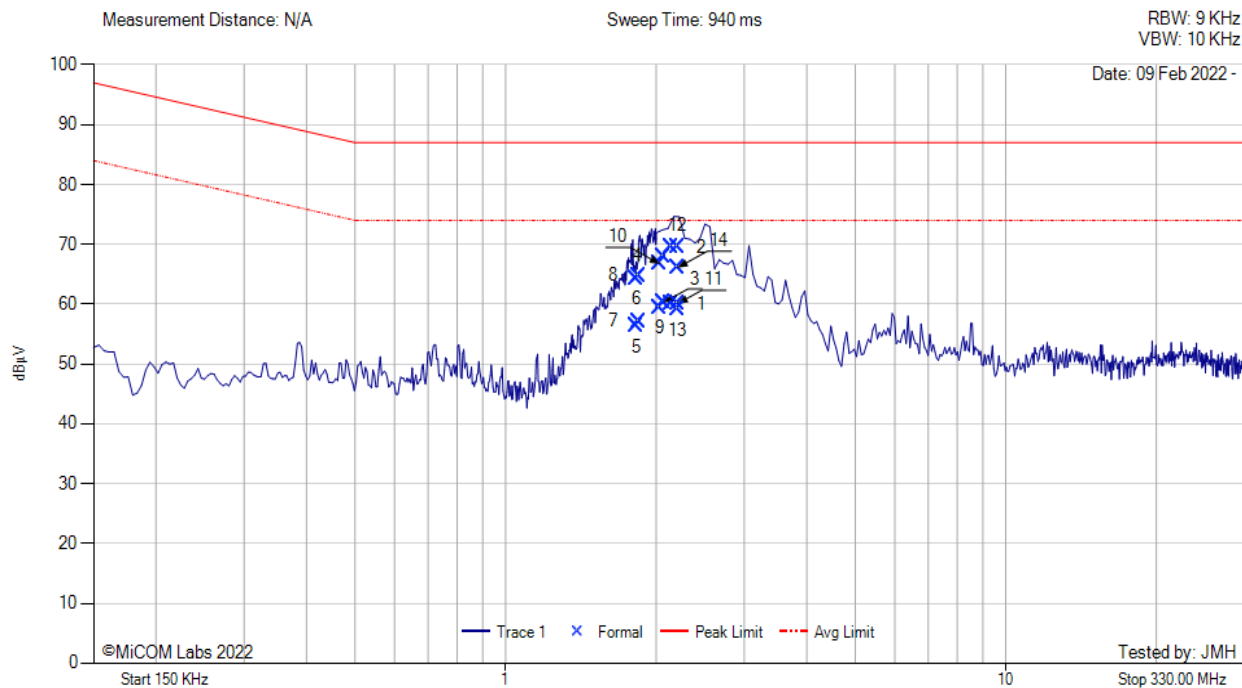
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Variant	Telecom Cond 10T. 230V _{AC} , 50Hz	Port:	Network Test Port



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	2.447	37.77	-0.11	9.87	9.76	47.53	Max Avg	Telecom	74.0	-26.5	Pass
2	2.447	43.90	-0.11	9.87	9.76	53.66	Max Qp	Telecom	87.0	-33.3	Pass
3	11.849	32.68	-0.22	9.48	9.26	41.94	Max Avg	Telecom	74.0	-32.1	Pass
4	11.849	41.38	-0.22	9.48	9.26	50.64	Max Qp	Telecom	87.0	-36.4	Pass
5	1.923	34.82	-0.09	9.90	9.81	44.63	Max Avg	Telecom	74.0	-29.4	Pass
6	1.923	41.28	-0.09	9.90	9.81	51.09	Max Qp	Telecom	87.0	-35.9	Pass
7	1.693	32.80	-0.09	9.91	9.82	42.62	Max Avg	Telecom	74.0	-31.4	Pass
8	1.693	39.92	-0.09	9.91	9.82	49.74	Max Qp	Telecom	87.0	-37.3	Pass
9	1.574	33.49	-0.09	9.92	9.83	43.32	Max Avg	Telecom	74.0	-30.7	Pass
10	1.574	39.92	-0.09	9.92	9.83	49.75	Max Qp	Telecom	87.0	-37.3	Pass
11	1.497	33.60	-0.09	9.92	9.83	43.43	Max Avg	Telecom	74.0	-30.6	Pass
12	1.497	39.84	-0.09	9.92	9.83	49.67	Max Qp	Telecom	87.0	-37.3	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Test Port 10T connection. AC-DC PS

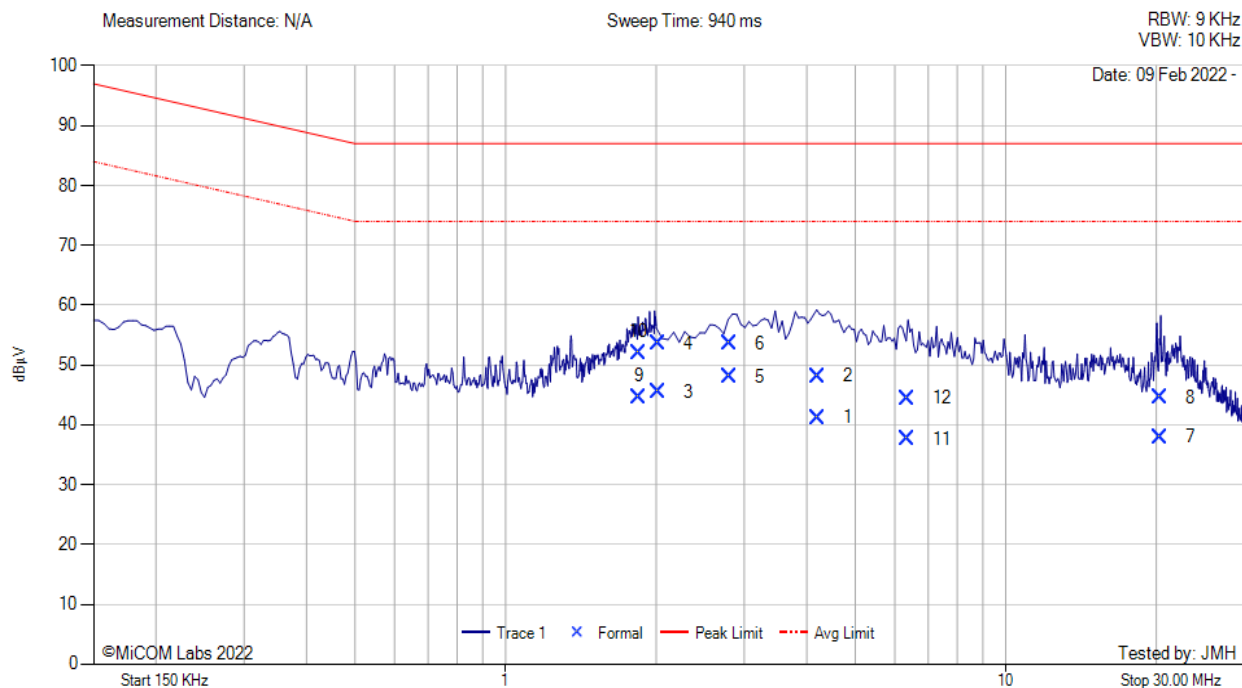
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Variant	Telecom Cond 1000T. 230V _{AC} , 50Hz	Port:	Management Port



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	2.147	50.32	-0.11	9.88	9.77	60.09	Max Avg	Telecom	74.0	-13.9	Pass
2	2.147	59.76	-0.11	9.88	9.77	69.53	Max Qp	Telecom	87.0	-17.5	Pass
3	2.068	50.50	-0.11	9.89	9.78	60.28	Max Avg	Telecom	74.0	-13.7	Pass
4	2.068	58.24	-0.11	9.89	9.78	68.02	Max Qp	Telecom	87.0	-19.0	Pass
5	1.828	46.52	-0.09	9.90	9.81	56.33	Max Avg	Telecom	74.0	-17.7	Pass
6	1.828	54.55	-0.09	9.90	9.81	64.36	Max Qp	Telecom	87.0	-22.6	Pass
7	1.845	47.38	-0.09	9.90	9.81	57.19	Max Avg	Telecom	74.0	-16.8	Pass
8	1.845	54.93	-0.09	9.90	9.81	64.74	Max Qp	Telecom	87.0	-22.3	Pass
9	2.036	49.67	-0.11	9.89	9.78	59.45	Max Avg	Telecom	74.0	-14.6	Pass
10	2.036	56.92	-0.11	9.89	9.78	66.70	Max Qp	Telecom	87.0	-20.3	Pass
11	2.206	50.30	-0.11	9.88	9.77	60.07	Max Avg	Telecom	74.0	-13.9	Pass
12	2.206	59.84	-0.11	9.88	9.77	69.61	Max Qp	Telecom	87.0	-17.4	Pass
13	2.204	49.36	-0.11	9.88	9.77	59.13	Max Avg	Telecom	74.0	-14.9	Pass
14	2.204	56.31	-0.11	9.88	9.77	66.08	Max Qp	Telecom	87.0	-20.9	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Admin Port 1000T connection.

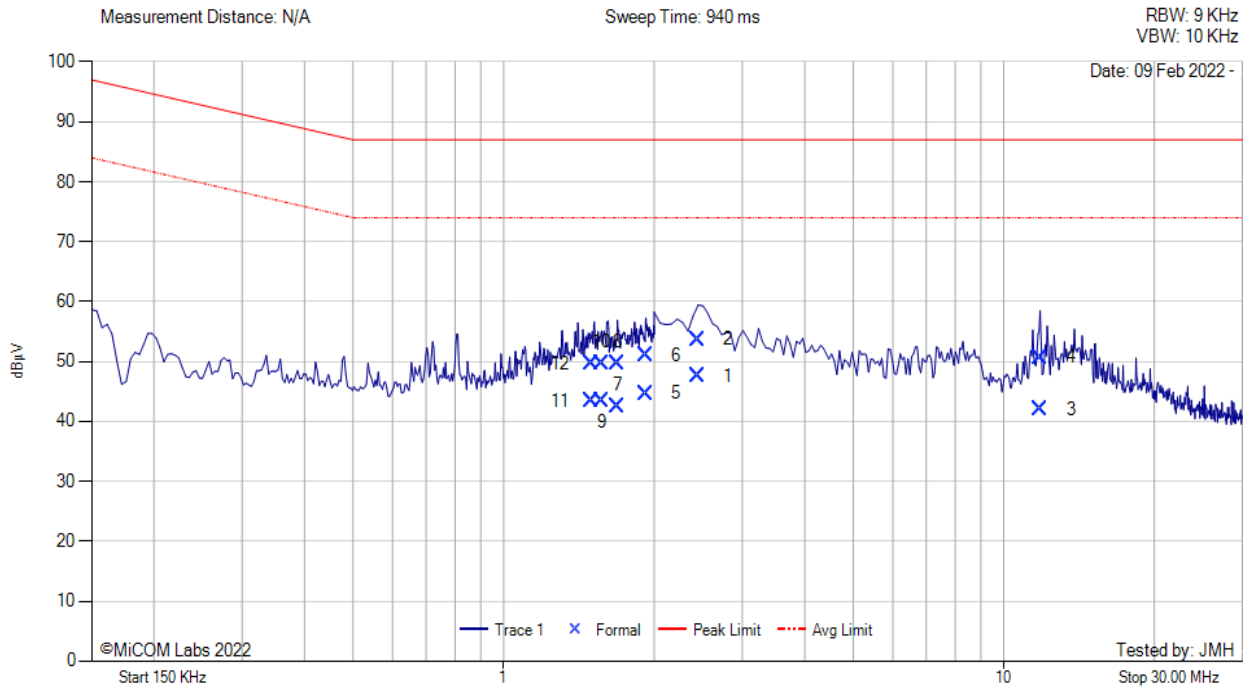
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Variant	Telecom Cond 100T. 230V _{AC} , 50Hz	Port:	Management Port



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	4.204	31.56	-0.15	9.77	9.62	41.18	Max Avg	Telecom	74.0	-32.8	Pass
2	4.204	38.49	-0.15	9.77	9.62	48.11	Max Qp	Telecom	87.0	-38.9	Pass
3	2.020	35.74	-0.11	9.89	9.78	45.52	Max Avg	Telecom	74.0	-28.5	Pass
4	2.020	43.73	-0.11	9.89	9.78	53.51	Max Qp	Telecom	87.0	-33.5	Pass
5	2.799	38.25	-0.11	9.85	9.74	47.99	Max Avg	Telecom	74.0	-26.0	Pass
6	2.799	43.84	-0.11	9.85	9.74	53.58	Max Qp	Telecom	87.0	-33.4	Pass
7	20.383	28.53	-0.30	9.73	9.43	37.96	Max Avg	Telecom	74.0	-36.0	Pass
8	20.383	35.09	-0.30	9.73	9.43	44.52	Max Qp	Telecom	87.0	-42.5	Pass
9	1.846	34.83	-0.09	9.90	9.81	44.64	Max Avg	Telecom	74.0	-29.4	Pass
10	1.846	42.28	-0.09	9.90	9.81	52.09	Max Qp	Telecom	87.0	-34.9	Pass
11	6.347	28.15	-0.18	9.64	9.46	37.61	Max Avg	Telecom	74.0	-36.4	Pass
12	6.347	34.94	-0.18	9.64	9.46	44.40	Max Qp	Telecom	87.0	-42.6	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Test Port 100T connection. AC-DC PS

Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	AC/DC PS
Variant	Telecom Cond 10T. 230V _{AC} , 50Hz	Port:	Management Port

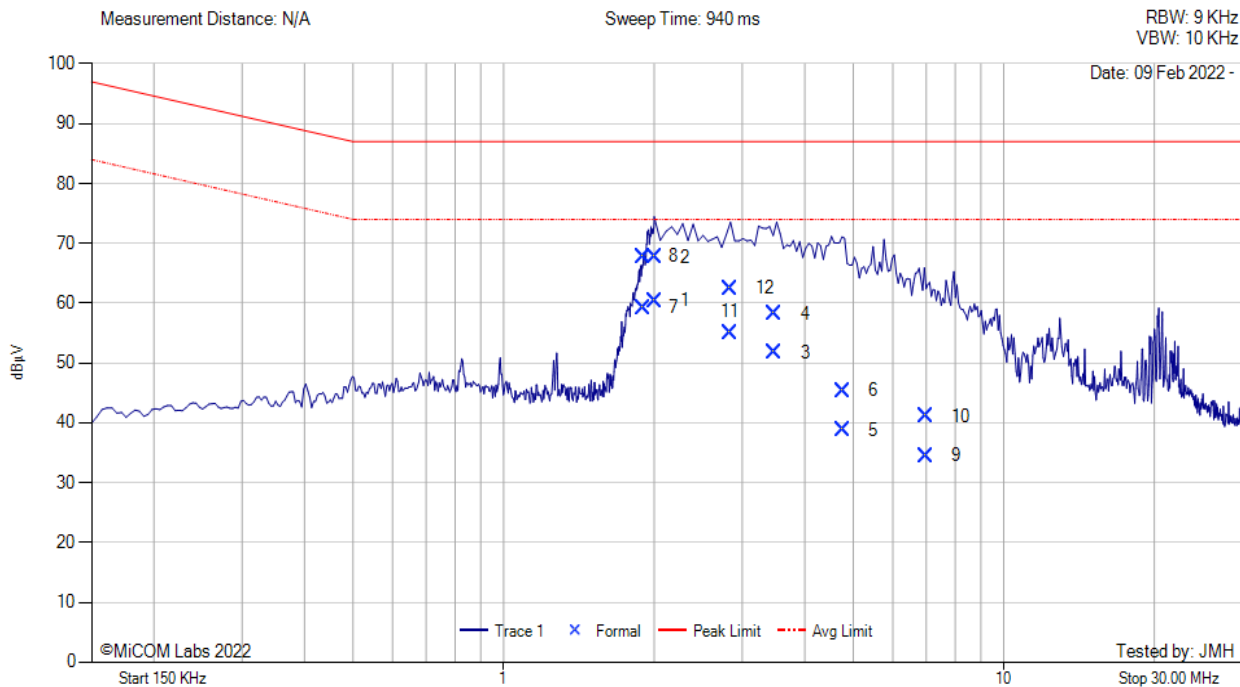


Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	2.447	37.77	-0.11	9.87	9.76	47.53	Max Avg	Telecom	74.0	-26.5	Pass
2	2.447	43.90	-0.11	9.87	9.76	53.66	Max Qp	Telecom	87.0	-33.3	Pass
3	11.849	32.68	-0.22	9.48	9.26	41.94	Max Avg	Telecom	74.0	-32.1	Pass
4	11.849	41.38	-0.22	9.48	9.26	50.64	Max Qp	Telecom	87.0	-36.4	Pass
5	1.923	34.82	-0.09	9.90	9.81	44.63	Max Avg	Telecom	74.0	-29.4	Pass
6	1.923	41.28	-0.09	9.90	9.81	51.09	Max Qp	Telecom	87.0	-35.9	Pass
7	1.693	32.80	-0.09	9.91	9.82	42.62	Max Avg	Telecom	74.0	-31.4	Pass
8	1.693	39.92	-0.09	9.91	9.82	49.74	Max Qp	Telecom	87.0	-37.3	Pass
9	1.574	33.49	-0.09	9.92	9.83	43.32	Max Avg	Telecom	74.0	-30.7	Pass
10	1.574	39.92	-0.09	9.92	9.83	49.75	Max Qp	Telecom	87.0	-37.3	Pass
11	1.497	33.60	-0.09	9.92	9.83	43.43	Max Avg	Telecom	74.0	-30.6	Pass
12	1.497	39.84	-0.09	9.92	9.83	49.67	Max Qp	Telecom	87.0	-37.3	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Test Port 10T connection. AC-DC PS

7.1.3.2. Measurement Results Battery Powered

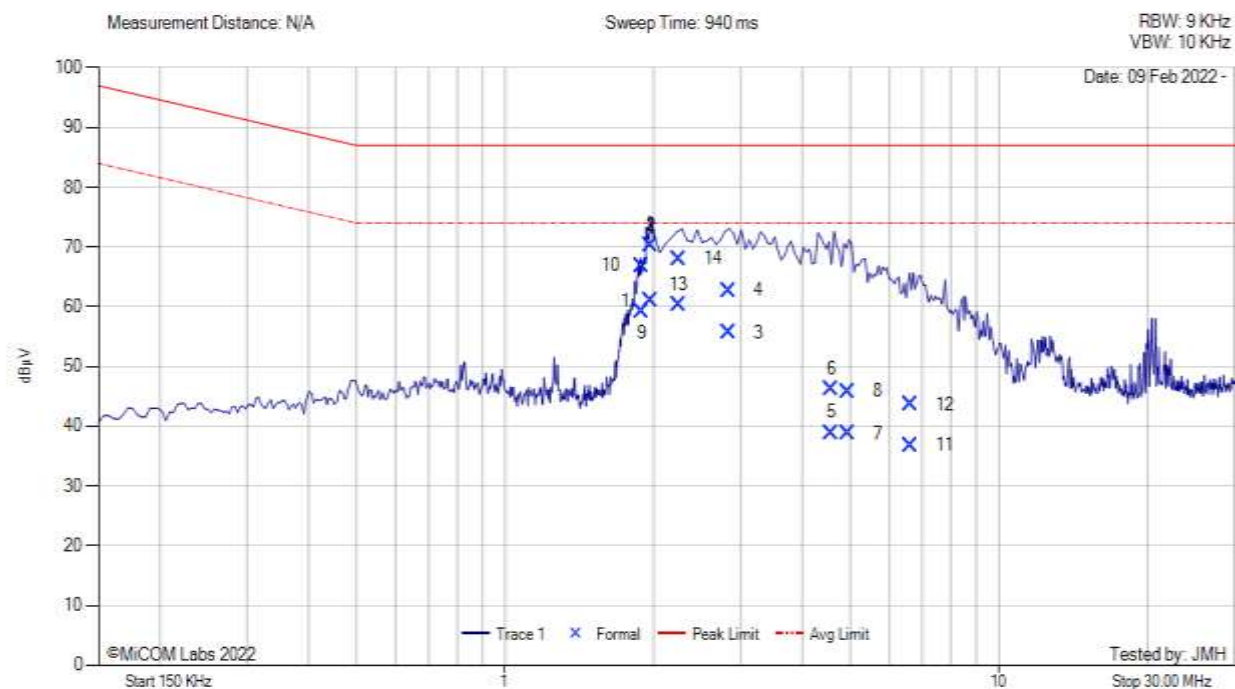
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	Battery
Variant	Telecom Cond 10GB	Port:	Network Test Port



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	2.002	50.57	-0.09	9.89	9.80	60.37	Max Avg	Telecom	74.0	-13.6	Pass
2	2.002	57.84	-0.09	9.89	9.80	67.64	Max Qp	Telecom	87.0	-19.4	Pass
3	3.486	42.06	-0.15	9.81	9.66	51.72	Max Avg	Telecom	74.0	-22.3	Pass
4	3.486	48.54	-0.15	9.81	9.66	58.20	Max Qp	Telecom	87.0	-28.8	Pass
5	4.769	29.13	-0.15	9.73	9.58	38.71	Max Avg	Telecom	74.0	-35.3	Pass
6	4.769	35.79	-0.15	9.73	9.58	45.37	Max Qp	Telecom	87.0	-41.6	Pass
7	1.901	49.40	-0.09	9.90	9.81	59.21	Max Avg	Telecom	74.0	-14.8	Pass
8	1.901	58.02	-0.09	9.90	9.81	67.83	Max Qp	Telecom	87.0	-19.2	Pass
9	6.983	25.08	-0.18	9.60	9.42	34.50	Max Avg	Telecom	74.0	-39.5	Pass
10	6.983	31.62	-0.18	9.60	9.42	41.04	Max Qp	Telecom	87.0	-46.0	Pass
11	2.833	45.35	-0.11	9.84	9.73	55.08	Max Avg	Telecom	74.0	-18.9	Pass
12	2.833	52.70	-0.11	9.84	9.73	62.43	Max Qp	Telecom	87.0	-24.6	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Test Port 10G connection. Battery Powered

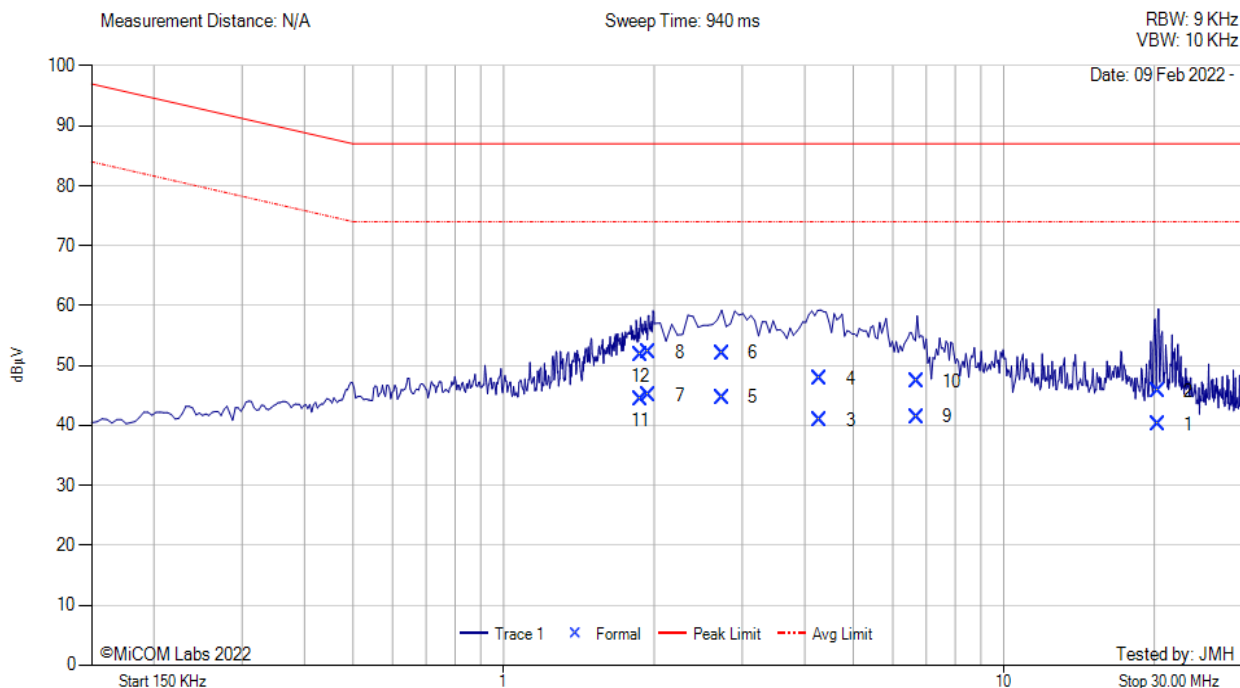
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	Battery
Variant	Telecom Cond 1000T	Port:	Network Test Port



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	1.974	51.13	-0.09	9.89	9.80	60.93	Max Avg	Telecom	74.0	-13.1	Pass
2	1.974	60.42	-0.09	9.89	9.80	70.22	Max Qp	Telecom	87.0	-16.8	Pass
3	2.833	45.90	-0.11	9.84	9.73	55.63	Max Avg	Telecom	74.0	-18.4	Pass
4	2.833	52.93	-0.11	9.84	9.73	62.66	Max Qp	Telecom	87.0	-24.3	Pass
5	4.586	29.27	-0.15	9.74	9.59	38.86	Max Avg	Telecom	74.0	-35.1	Pass
6	4.586	36.62	-0.15	9.74	9.59	46.21	Max Qp	Telecom	87.0	-40.8	Pass
7	4.939	29.15	-0.15	9.72	9.57	38.72	Max Avg	Telecom	74.0	-35.3	Pass
8	4.939	36.23	-0.15	9.72	9.57	45.80	Max Qp	Telecom	87.0	-41.2	Pass
9	1.892	49.30	-0.09	9.90	9.81	59.11	Max Avg	Telecom	74.0	-14.9	Pass
10	1.892	57.03	-0.09	9.90	9.81	66.84	Max Qp	Telecom	87.0	-20.2	Pass
11	6.626	27.32	-0.18	9.63	9.45	36.77	Max Avg	Telecom	74.0	-37.2	Pass
12	6.626	34.13	-0.18	9.63	9.45	43.58	Max Qp	Telecom	87.0	-43.4	Pass
13	2.247	50.55	-0.11	9.88	9.77	60.32	Max Avg	Telecom	74.0	-13.7	Pass
14	2.247	58.27	-0.11	9.88	9.77	68.04	Max Qp	Telecom	87.0	-19.0	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Test Port 1000T connection. Battery Powered

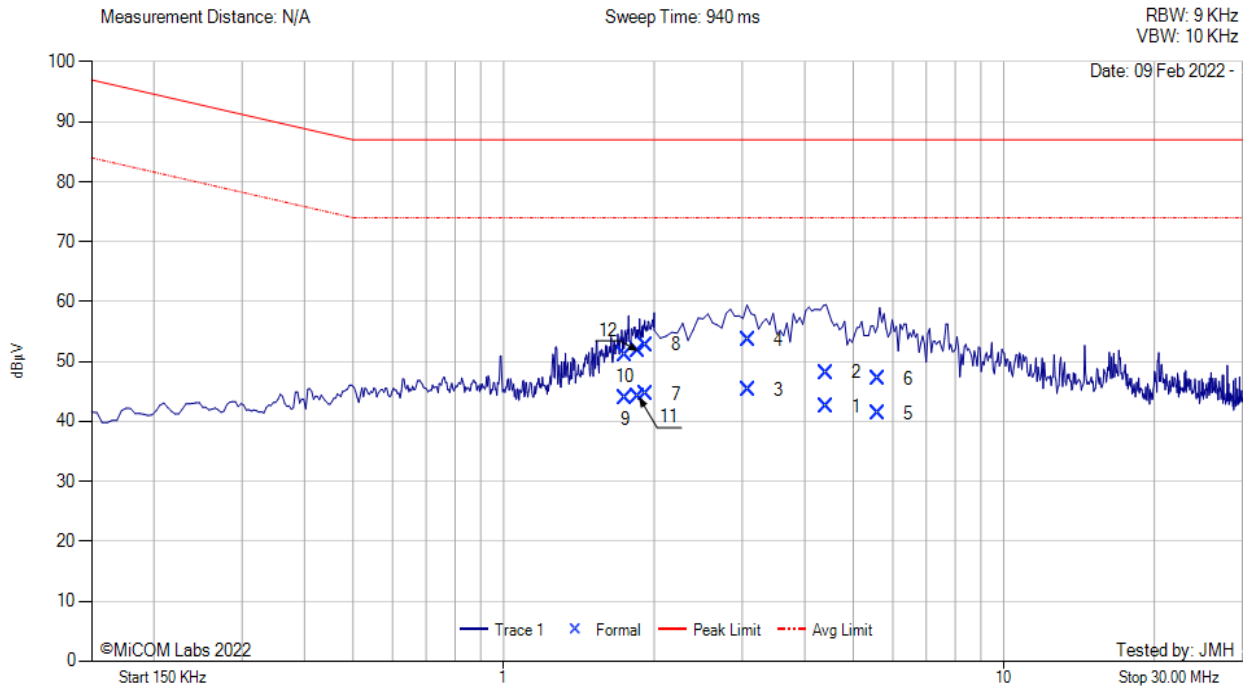
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	Battery
Variant	Telecom Cond 100T	Port:	Network Test Port



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	20.322	30.75	-0.30	9.73	9.43	40.18	Max Avg	Telecom	74.0	-33.8	Pass
2	20.322	36.24	-0.30	9.73	9.43	45.67	Max Qp	Telecom	87.0	-41.3	Pass
3	4.293	31.19	-0.15	9.76	9.61	40.80	Max Avg	Telecom	74.0	-33.2	Pass
4	4.293	38.18	-0.15	9.76	9.61	47.79	Max Qp	Telecom	87.0	-39.2	Pass
5	2.742	34.96	-0.11	9.85	9.74	44.70	Max Avg	Telecom	74.0	-29.3	Pass
6	2.742	42.30	-0.11	9.85	9.74	52.04	Max Qp	Telecom	87.0	-35.0	Pass
7	1.952	35.16	-0.09	9.90	9.81	44.97	Max Avg	Telecom	74.0	-29.0	Pass
8	1.952	42.41	-0.09	9.90	9.81	52.22	Max Qp	Telecom	87.0	-34.8	Pass
9	6.702	31.97	-0.18	9.62	9.44	41.41	Max Avg	Telecom	74.0	-32.6	Pass
10	6.702	37.94	-0.18	9.62	9.44	47.38	Max Qp	Telecom	87.0	-39.6	Pass
11	1.876	34.48	-0.09	9.90	9.81	44.29	Max Avg	Telecom	74.0	-29.7	Pass
12	1.876	41.91	-0.09	9.90	9.81	51.72	Max Qp	Telecom	87.0	-35.3	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Test Port 100T connection. Battery

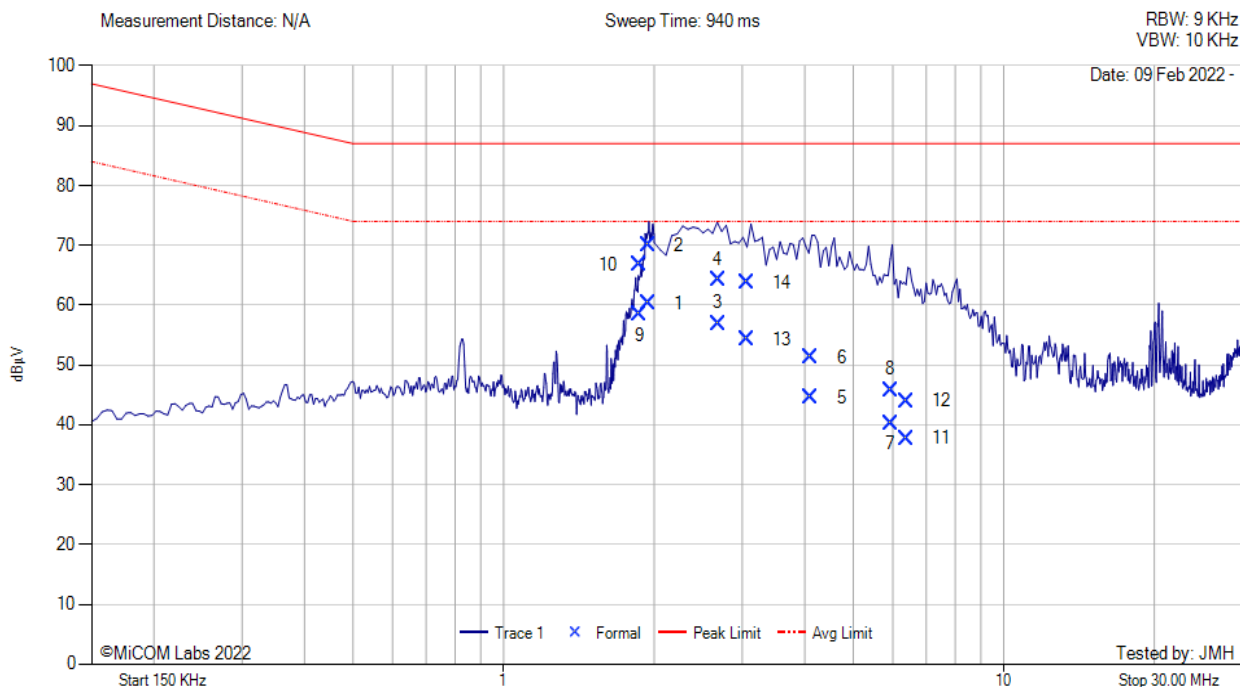
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	Battery
Variant	Telecom Cond 10T	Port:	Network Test Port



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	4.420	32.83	-0.15	9.75	9.60	42.43	Max Avg	Telecom	74.0	-31.6	Pass
2	4.420	38.56	-0.15	9.75	9.60	48.16	Max Qp	Telecom	87.0	-38.8	Pass
3	3.078	35.59	-0.15	9.83	9.68	45.27	Max Avg	Telecom	74.0	-28.7	Pass
4	3.078	43.83	-0.15	9.83	9.68	53.51	Max Qp	Telecom	87.0	-33.5	Pass
5	5.603	31.78	-0.17	9.68	9.51	41.29	Max Avg	Telecom	74.0	-32.7	Pass
6	5.603	37.62	-0.17	9.68	9.51	47.13	Max Qp	Telecom	87.0	-39.9	Pass
7	1.927	34.68	-0.09	9.90	9.81	44.49	Max Avg	Telecom	74.0	-29.5	Pass
8	1.927	42.98	-0.09	9.90	9.81	52.79	Max Qp	Telecom	87.0	-34.2	Pass
9	1.754	34.07	-0.09	9.91	9.82	43.89	Max Avg	Telecom	74.0	-30.1	Pass
10	1.754	41.26	-0.09	9.91	9.82	51.08	Max Qp	Telecom	87.0	-35.9	Pass
11	1.862	34.35	-0.09	9.90	9.81	44.16	Max Avg	Telecom	74.0	-29.8	Pass
12	1.862	41.91	-0.09	9.90	9.81	51.72	Max Qp	Telecom	87.0	-35.3	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Test Port 10T connection. Battery

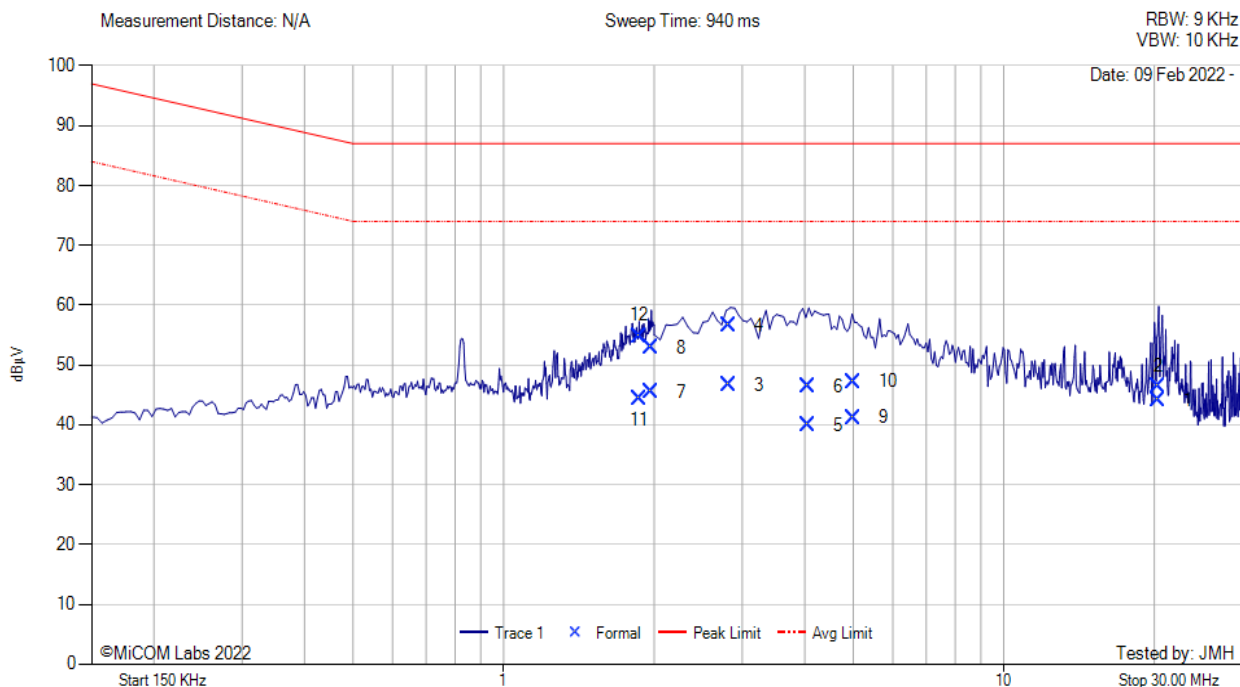
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	Battery
Variant	Telecom Cond 1000T	Port:	Management Port



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	1.950	50.52	-0.09	9.90	9.81	60.33	Max Avg	Telecom	74.0	-13.7	Pass
2	1.950	60.13	-0.09	9.90	9.81	69.94	Max Qp	Telecom	87.0	-17.1	Pass
3	2.683	47.17	-0.11	9.85	9.74	56.91	Max Avg	Telecom	74.0	-17.1	Pass
4	2.683	54.44	-0.11	9.85	9.74	64.18	Max Qp	Telecom	87.0	-22.8	Pass
5	4.120	34.94	-0.15	9.77	9.62	44.56	Max Avg	Telecom	74.0	-29.4	Pass
6	4.120	41.66	-0.15	9.77	9.62	51.28	Max Qp	Telecom	87.0	-35.7	Pass
7	5.933	30.79	-0.17	9.67	9.50	40.29	Max Avg	Telecom	74.0	-33.7	Pass
8	5.933	36.35	-0.17	9.67	9.50	45.85	Max Qp	Telecom	87.0	-41.2	Pass
9	1.867	48.65	-0.09	9.90	9.81	58.46	Max Avg	Telecom	74.0	-15.5	Pass
10	1.867	56.90	-0.09	9.90	9.81	66.71	Max Qp	Telecom	87.0	-20.3	Pass
11	6.399	28.25	-0.18	9.64	9.46	37.71	Max Avg	Telecom	74.0	-36.3	Pass
12	6.399	34.53	-0.18	9.64	9.46	43.99	Max Qp	Telecom	87.0	-43.0	Pass
13	3.059	44.55	-0.15	9.83	9.68	54.23	Max Avg	Telecom	74.0	-19.8	Pass
14	3.059	54.03	-0.15	9.83	9.68	63.71	Max Qp	Telecom	87.0	-23.3	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Man Port 1000T connection. Battery Powered

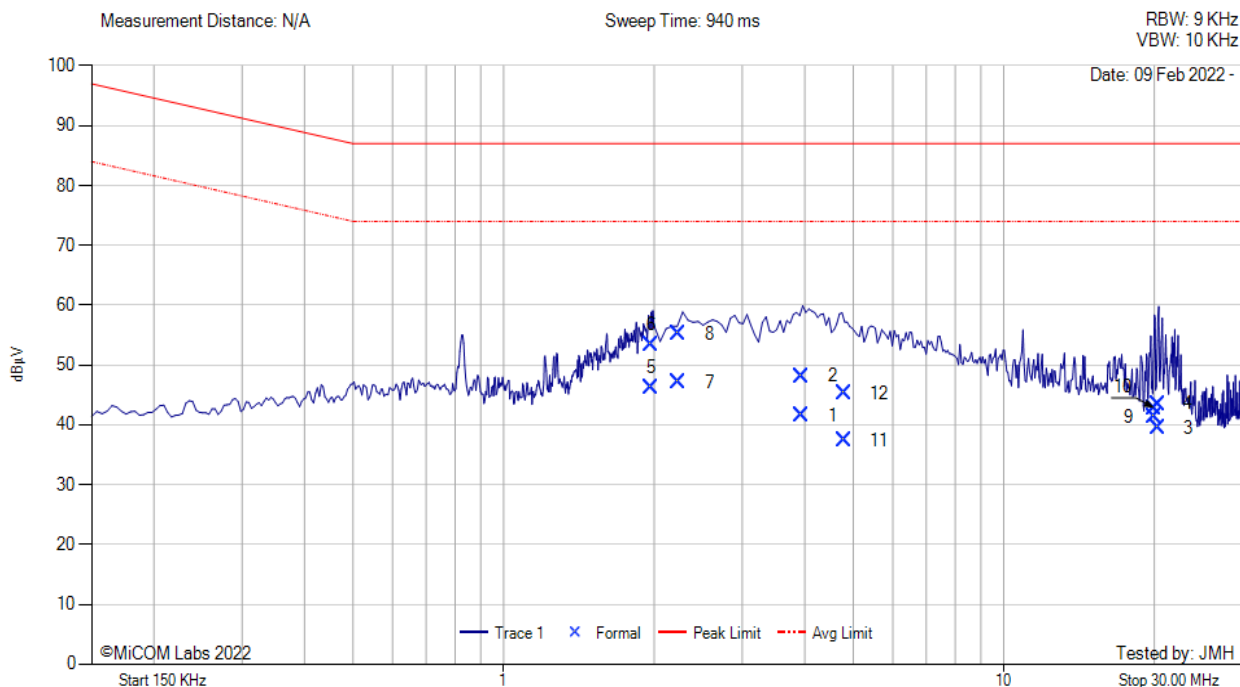
Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	Battery
Variant	Telecom Cond 100T	Port:	Management Port



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	20.381	34.60	-0.30	9.73	9.43	44.03	Max Avg	Telecom	74.0	-30.0	Pass
2	20.381	36.90	-0.30	9.73	9.43	46.33	Max Qp	Telecom	87.0	-40.7	Pass
3	2.813	36.95	-0.11	9.85	9.74	46.69	Max Avg	Telecom	74.0	-27.3	Pass
4	2.813	46.86	-0.11	9.85	9.74	56.60	Max Qp	Telecom	87.0	-30.4	Pass
5	4.053	30.26	-0.15	9.77	9.62	39.88	Max Avg	Telecom	74.0	-34.1	Pass
6	4.053	36.71	-0.15	9.77	9.62	46.33	Max Qp	Telecom	87.0	-40.7	Pass
7	1.969	35.63	-0.09	9.89	9.80	45.43	Max Avg	Telecom	74.0	-28.6	Pass
8	1.969	43.11	-0.09	9.89	9.80	52.91	Max Qp	Telecom	87.0	-34.1	Pass
9	4.994	31.58	-0.15	9.72	9.57	41.15	Max Avg	Telecom	74.0	-32.9	Pass
10	4.994	37.61	-0.15	9.72	9.57	47.18	Max Qp	Telecom	87.0	-39.8	Pass
11	1.873	34.48	-0.09	9.90	9.81	44.29	Max Avg	Telecom	74.0	-29.7	Pass
12	1.873	45.01	-0.09	9.90	9.81	54.82	Max Qp	Telecom	87.0	-32.2	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Man Port 100T connection. Battery Powered

Model:	EXG-300, EXG-300E, EXG-300C	Configuration tested:	Battery
Variant	Telecom Cond 10T	Port:	Management Port



Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	3.952	31.90	-0.15	9.78	9.63	41.53	Max Avg	Telecom	74.0	-32.5	Pass
2	3.952	38.52	-0.15	9.78	9.63	48.15	Max Qp	Telecom	87.0	-38.9	Pass
3	20.382	30.10	-0.30	9.73	9.43	39.53	Max Avg	Telecom	74.0	-34.5	Pass
4	20.382	34.09	-0.30	9.73	9.43	43.52	Max Qp	Telecom	87.0	-43.5	Pass
5	1.976	36.34	-0.09	9.89	9.80	46.14	Max Avg	Telecom	74.0	-27.9	Pass
6	1.976	43.54	-0.09	9.89	9.80	53.34	Max Qp	Telecom	87.0	-33.7	Pass
7	2.240	37.34	-0.11	9.88	9.77	47.11	Max Avg	Telecom	74.0	-26.9	Pass
8	2.240	45.40	-0.11	9.88	9.77	55.17	Max Qp	Telecom	87.0	-31.8	Pass
9	19.999	31.83	-0.29	9.72	9.43	41.26	Max Avg	Telecom	74.0	-32.7	Pass
10	19.999	33.38	-0.29	9.72	9.43	42.81	Max Qp	Telecom	87.0	-44.2	Pass
11	4.803	27.84	-0.15	9.73	9.58	37.42	Max Avg	Telecom	74.0	-36.6	Pass
12	4.803	35.61	-0.15	9.73	9.58	45.19	Max Qp	Telecom	87.0	-41.8	Pass

Test Notes: EXG-300, EXG-300E, EXG-300C Man Port 10T connection. Battery Powered

7.1.4. Harmonic Current Emissions (AC Mains Input Port)

Scope

This test deals with the limitation of harmonic currents injected into the public supply system.

Test Method

The appropriate requirements of EN 61000-3-2 for harmonic current emission apply for equipment with an input current up to and including 16A per phase.

Limits

Harmonics and Class A limit line: European Limits.

Traceability

Method
Measurements were made per work instruction WI-EMC-01 Conducted Emission Test

Test Summary

- EUT performed in Compliance with EN 61000-3-2 performance limits for Harmonic Current Emissions (AC Mains Input Port)

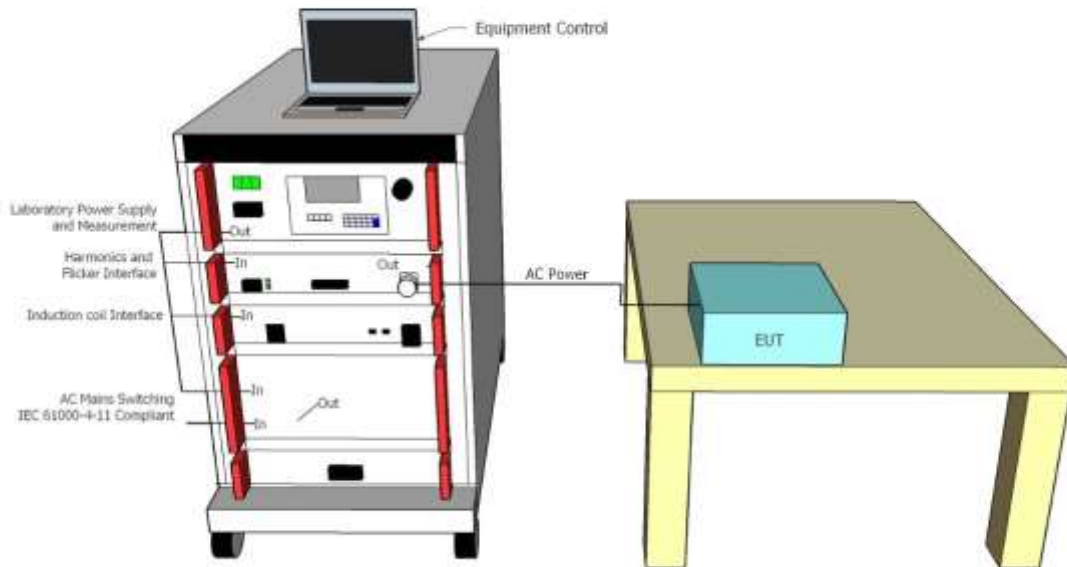
A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
355	AC Switching Unit	Schaffner	NSG 2200	200610-003EK	15 Oct 2022
356	Power Conditioning Unit (Software version Win 2100V3 Version 3.2.0.16)	Teseq	CCN 1000-1	72636	15 Oct 2022
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023
CC-EMC-Harmonics	Confidence Check	MiCOM	CC-EMC-Harmonics	None	16 Jun 2022

Test Setup – Harmonic Current Emissions (AC Mains Input Port)

IEC/EN 61000-3-2

Harmonic Current Emissions Test Setup



Harmonics, AC/DC PS

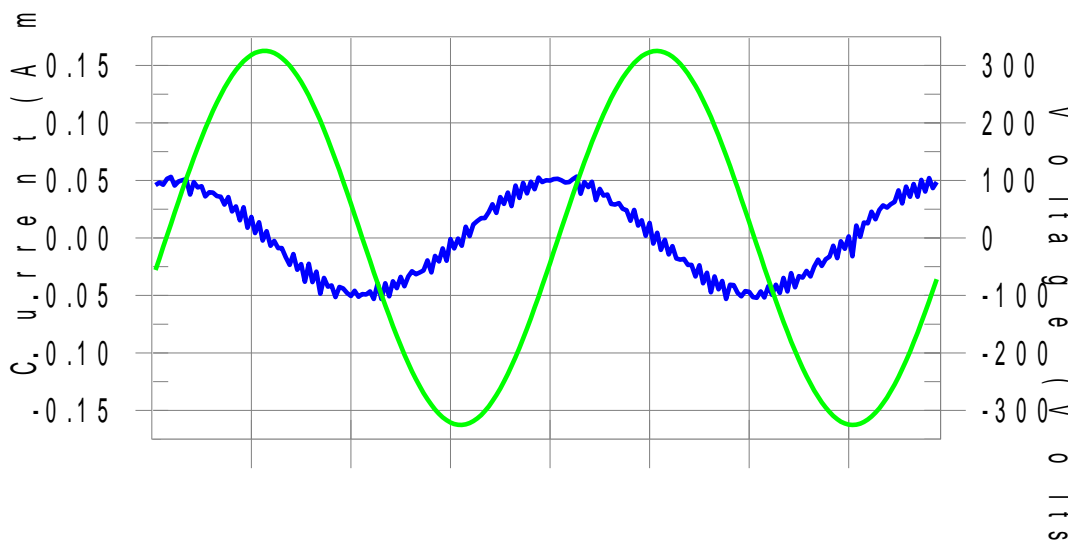
General Conditions					
Ambient Temperature:	17°C	Humidity:	45%	Pressure :1008	mbars
Tested by:	JMH				

Harmonics – Class-A per Ed. 2014

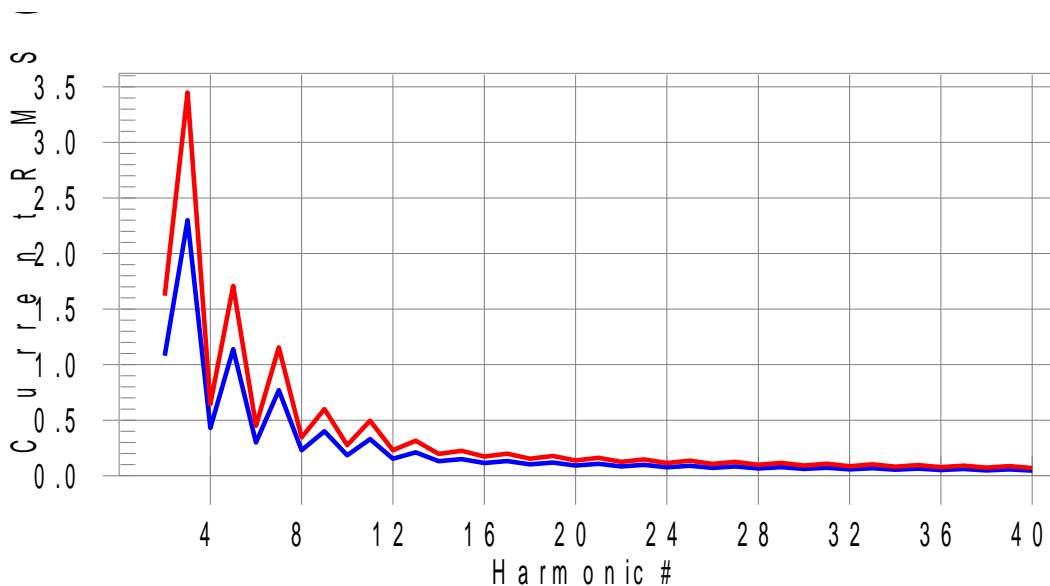
EUT: EXG-300, EXG-300E, EXG-300C AC/DC PS Tested by: JMH
 Test category: Class-A per Ed. 2014 (European limits) Test Margin: 100
 Test date: 2/11/2022 Start time: 7:37:56 AM End time: 7:40:47 AM
 Test duration (min): 2.5 Data file name: H-000952.cts_data
 Customer: NETALLY, LLC

Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line European Limits



Test result: Pass Worst harmonic was #32 with 1.52% of the limit.



Current Test Result Summary (Run time)

EUT: EXG-300, EXG-300E, EXG-300C Tested by: Tested by JMH
 Test category: Class-A per Ed. 2014 (European limits) Test Margin: 100
 Test date: 2/11/2022 Start time: 7:37:56 AM End time: 7:40:47 AM
 Test duration (min): 2.5 Data file name: H-000952.cts_data
 Customer: NTAL21

Test Result: Pass Source qualification: Normal
 THC(A): 0.00 I-THD(%): 6.77 POHC(A): 0.001 POHC Limit(A): 0.251

Highest parameter values under test:

V_RMS (Volts): 230.17 Frequency(Hz): 50.00
 I_Peak (Amps): 0.061 I_RMS (Amps): 0.034
 I_Fund (Amps): 0.034 Crest Factor: 1.768
 Power (Watts): 0.1 Power Factor: 0.011

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.000	1.080	0.0	0.000	1.620	0.02	Pass
3	0.000	2.300	0.0	0.000	3.450	0.01	Pass
4	0.000	0.430	0.0	0.000	0.645	0.03	Pass
5	0.000	1.140	0.0	0.000	1.710	0.02	Pass
6	0.000	0.300	0.1	0.000	0.450	0.07	Pass
7	0.000	0.770	0.0	0.000	1.155	0.02	Pass
8	0.000	0.230	0.2	0.000	0.345	0.14	Pass
9	0.000	0.400	0.1	0.000	0.600	0.04	Pass
10	0.000	0.184	0.1	0.000	0.276	0.08	Pass
11	0.000	0.330	0.1	0.000	0.495	0.04	Pass
12	0.000	0.153	0.2	0.000	0.230	0.11	Pass
13	0.000	0.210	0.1	0.000	0.315	0.09	Pass
14	0.000	0.131	0.2	0.000	0.197	0.12	Pass
15	0.000	0.150	0.1	0.000	0.225	0.10	Pass
16	0.000	0.115	0.2	0.000	0.173	0.14	Pass
17	0.000	0.132	0.2	0.000	0.199	0.12	Pass
18	0.000	0.102	0.2	0.000	0.153	0.15	Pass
19	0.000	0.118	0.2	0.000	0.178	0.13	Pass
20	0.000	0.092	0.2	0.000	0.138	0.17	Pass
21	0.000	0.107	0.2	0.000	0.161	0.14	Pass
22	0.000	0.084	0.2	0.000	0.125	0.18	Pass
23	0.000	0.098	0.2	0.000	0.147	0.16	Pass
24	0.000	0.077	0.3	0.000	0.115	0.20	Pass
25	0.000	0.090	0.3	0.000	0.135	0.23	Pass
26	0.000	0.071	0.6	0.000	0.106	0.43	Pass
27	0.001	0.083	0.8	0.001	0.125	0.54	Pass
28	0.001	0.066	1.4	0.001	0.099	0.97	Pass
29	0.001	0.078	0.8	0.001	0.116	0.54	Pass
30	0.000	0.061	0.8	0.001	0.092	0.56	Pass
31	0.001	0.073	0.8	0.001	0.109	0.54	Pass
32	0.001	0.058	1.5	0.001	0.086	1.05	Pass
33	0.001	0.068	0.8	0.001	0.102	0.54	Pass
34	0.000	0.054	0.8	0.000	0.081	0.54	Pass
35	0.000	0.064	0.4	0.000	0.096	0.29	Pass
36	0.000	0.051	0.4	0.000	0.077	0.29	Pass
37	0.000	0.061	0.3	0.000	0.091	0.24	Pass
38	0.000	0.048	0.4	0.000	0.073	0.30	Pass
39	0.000	0.058	0.3	0.000	0.087	0.26	Pass
40	0.000	0.046	0.4	0.000	0.069	0.34	Pass



Title: NetAlly EtherScope EXG-300, EXG-300E, EXG-300C
To: EN 301-489-1,17, EN 61326-1, FCC Part 15B, ICES-003
Serial #: NTAL21-E2 Rev A

Voltage Source Verification Data

EUT: EXG-300, EXG-300E, EXG-300C Tested by: JMH
Test category: Class-A per Ed. 2014 (European limits) Test Margin: 100
Test date: 2/11/2022 Start time: 7:37:56 AM End time: 7:40:47 AM
Test duration (min): 2.5 Data file name: H-000952.cts_data
Customer: NTAL21

Test Result: Pass Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms): 230.17 Frequency(Hz): 50.00
I_Peak (Amps): 0.061 I_RMS (Amps): 0.034
I_Fund (Amps): 0.034 Crest Factor: 1.768
Power (Watts): 0.1 Power Factor: 0.011

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.039	0.460	8.44	OK
3	0.401	2.071	19.38	OK
4	0.020	0.460	4.39	OK
5	0.046	0.921	4.98	OK
6	0.022	0.460	4.75	OK
7	0.029	0.690	4.26	OK
8	0.010	0.460	2.17	OK
9	0.011	0.460	2.31	OK
10	0.007	0.460	1.42	OK
11	0.009	0.230	4.06	OK
12	0.006	0.230	2.68	OK
13	0.005	0.230	2.17	OK
14	0.005	0.230	2.06	OK
15	0.008	0.230	3.53	OK
16	0.007	0.230	2.91	OK
17	0.004	0.230	1.91	OK
18	0.008	0.230	3.49	OK
19	0.006	0.230	2.50	OK
20	0.012	0.230	5.04	OK
21	0.007	0.230	3.22	OK
22	0.003	0.230	1.19	OK
23	0.003	0.230	1.32	OK
24	0.002	0.230	0.94	OK
25	0.002	0.230	0.84	OK
26	0.002	0.230	1.02	OK
27	0.005	0.230	2.12	OK
28	0.002	0.230	0.86	OK
29	0.006	0.230	2.52	OK
30	0.002	0.230	0.92	OK
31	0.002	0.230	0.76	OK
32	0.002	0.230	0.92	OK
33	0.002	0.230	0.97	OK
34	0.002	0.230	0.86	OK
35	0.002	0.230	0.97	OK
36	0.002	0.230	0.73	OK
37	0.003	0.230	1.37	OK
38	0.002	0.230	0.74	OK
39	0.004	0.230	1.91	OK
40	0.006	0.230	2.67	OK

7.1.5. Voltage Fluctuations and Flicker (AC Mains Input Port)

Scope

This test is concerned with the limitation of voltage fluctuations and flicker impressed on the public low-voltage system.

Test Method

The appropriate requirements of EN 61000-3-3 for voltage fluctuations and flicker apply for equipment with an input current up to and including 16A per phase.

Limits

European Limits – All Parameters.

Traceability

Method
Measurements were made per work instruction WI-EMC-01 Conducted Emission Test

Test Summary

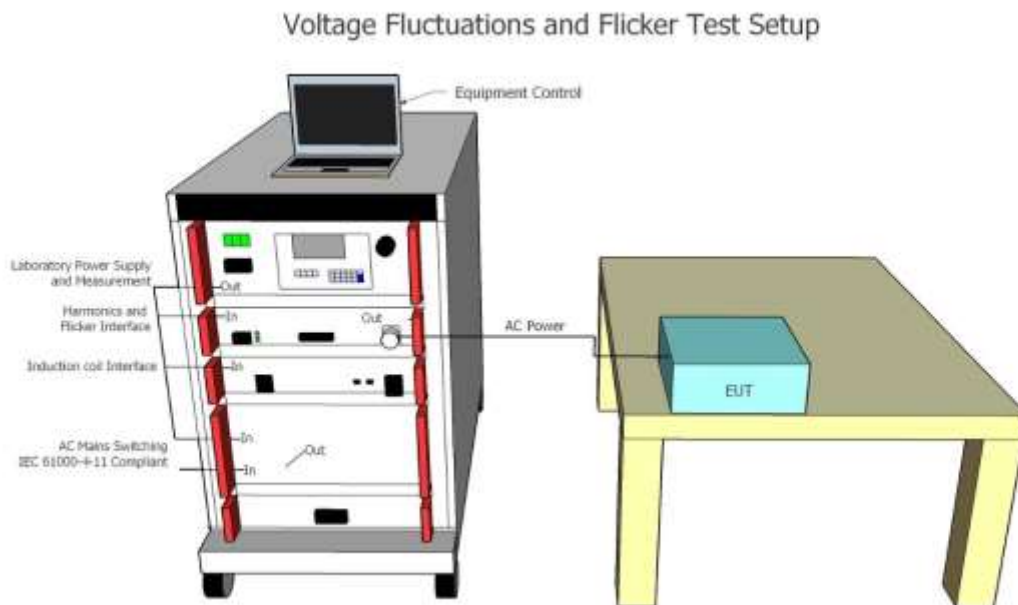
- EUT performed in Compliance with EN 61000-3-3 performance limits for Voltage Fluctuations (AC Mains Input / Output Port)

Test Equipment Utilized

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
354	5KVA AC Power Source	Teseq	NSG1007	58574	15 Oct 2022
355	AC Switching Unit	Schaffner	NSG 2200	200610-003EK	15 Oct 2022
356	Power Conditioning Unit (Software version Win 2100V3 Version 3.2.0.16)	Teseq	CCN 1000-1	72636	15 Oct 2022
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023
CC-EMC-Flicker	Confidence Check	MiCOM	CC-EMC-Flicker	None	16 Jun 2022

Test Setup – Voltage Fluctuations and Flicker

IEC/EN 61000-3-3 FLICKER TEST SETUP



Flicker, AC/DC PS

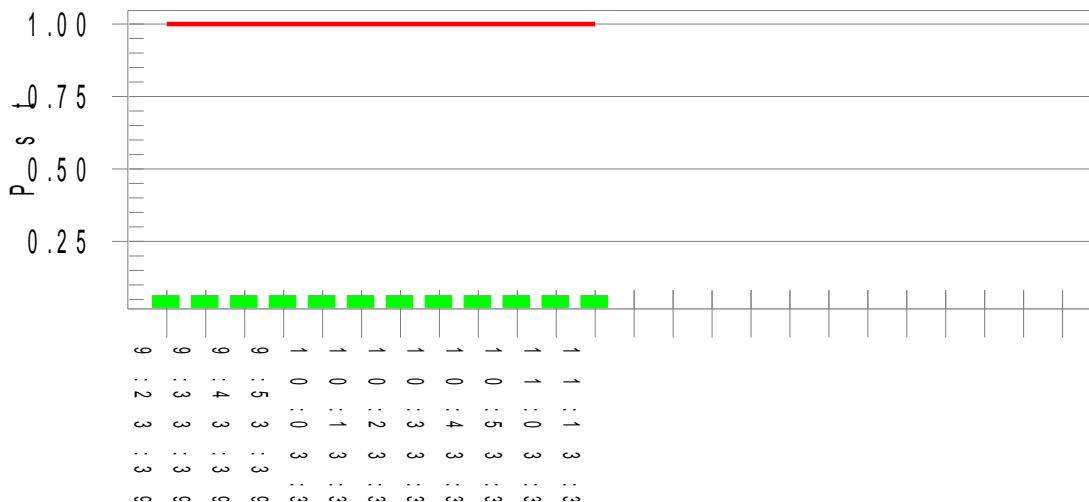
General Conditions					
Ambient Temperature:	18°C	Humidity:	44%	Pressure :	1008 mbars
Tested by:	JMH				

Flicker Test Summary per EN/IEC61000-3-3

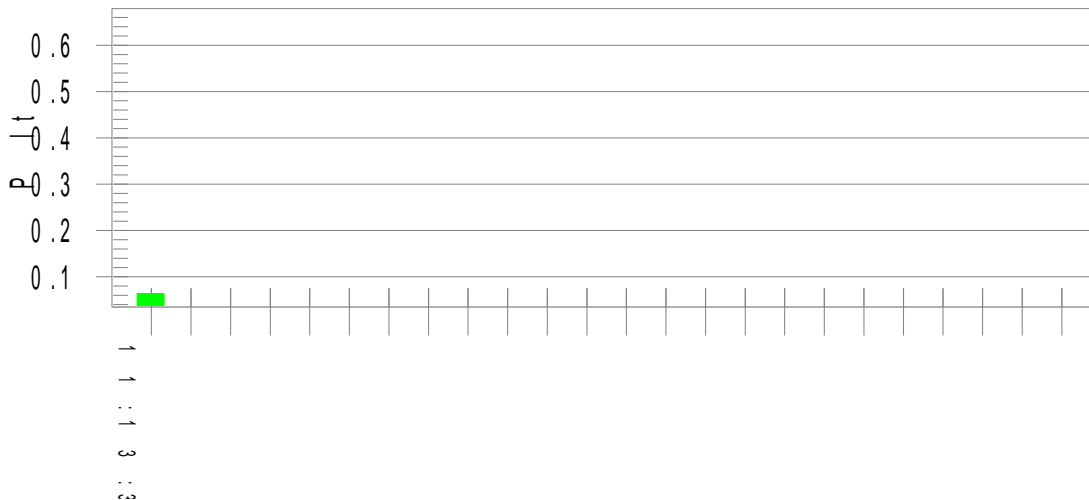
EUT: EXG-300, EXG-300E, EXG-300C Tested by: JMH
 Test category: All parameters (European limits) Test Margin: 100
 Test date: 2/11/2022 Start time: 9:13:19 AM End time: 11:13:40 AM
 Test duration (min): 120 Data file name: F-000955.cts_data
 Comment: Comments
 Customer: NTAL21

Test Result: Pass Status: Test Completed

Psti and limit line European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	230.06		
Highest dt (%):	-0.14	Test limit (%):	3.30 Pass
Time(mS) > dt:	0.0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	-0.15	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000 Pass
Highest Plt (2 hr. period):	0.064	Test limit:	0.650 Pass

7.2. EMC IMMUNITY TEST RESULTS

7.2.1. Performance Criteria

For compliance to the immunity requirements of the Directive, the EUT must comply with the Performance Criteria stipulated in the relevant standards, ETSI EN 301 489-17, EN 61326-1, CISPR 24.

ETSI 301-489-17 Performance Criteria		
Criteria	During Test	After Test
A	Shall operate as intended. (See note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (See note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (See note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (See note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (See note 3).

NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably

EN 61326 Performance Criteria		
Criteria	During Test	After Test
A	<ul style="list-style-type: none"> – Error rate beyond the figure defined by the manufacturer; – requests for retry beyond the figure defined by the manufacturer; – speed of data transmission rate beyond the figure defined by the manufacturer; – protocol failure; – loss of link. 	<ul style="list-style-type: none"> – Error rate beyond the figure defined by the manufacturer; – requests for retry beyond the figure defined by the manufacturer; – speed of data transmission rate beyond the figure defined by the manufacturer; – protocol failure; – loss of link.
B	Error rate, request for retry and speed of data transmission rate may be degraded during the application of the test.	After testing the normal operation of the EUT is self-recoverable to the condition immediately before the application of the test. In these cases, operator response is permitted to re-initiate an operation.
C	Degradation of the performance as described in criteria A and B is permitted	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance after the test

7.2.1.1. Customer Declarations

No customer declarations. Performance criteria as defined in the test standard was used.

7.2.2. Electrostatic Discharge

Scope

This test assesses the ability of the EUT to operate as intended in the event of an electrostatic discharge.

Test Method

The test method shall be in accordance with IEC 61000-4-2.

Human Body Model:

Storage Capacitor 150pF

Discharge Resistor 330 Ω

For radio equipment and ancillary equipment, the following requirements and evaluation of test results shall apply.

- The test severity level for contact discharge shall be 4 kV and for air discharge 8 kV.
- Electrostatic discharges shall be applied to all exposed surfaces of the EUT except where the user documentation specifically indicates a requirement for appropriate protective measures.
- As the EUT has no ground strap a cable with 470 kohm resistor was used between ESD test pulses to remove any build-up of charge from the point where the ESD pulse is to be applied.

Performance Criteria

For Electrostatic Discharge, the following performance criteria apply:

- For transmitters the performance criteria for transient phenomena for transmitters shall apply
- For receivers the performance criteria for transient phenomena for receivers shall apply
- For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

Traceability

All ESD measurements performed are traceable to national standards. The uncertainty of measurement at a confidence level of not less than 95 %, with a coverage factor of k=2, in the range $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 6\text{kV}$, $\pm 8\text{kV}$, is $\pm 7.12\%$.

Laboratory Measurement Uncertainty	
Measurement uncertainty	$\pm 7.12\%$.

Test Methodology
Measurements were made per work instruction WI-EMC-02 "Electrostatic Discharge"

Test Summary

EUT performed in Compliance with EN 301-489-1,17/EN 61326 performance criteria

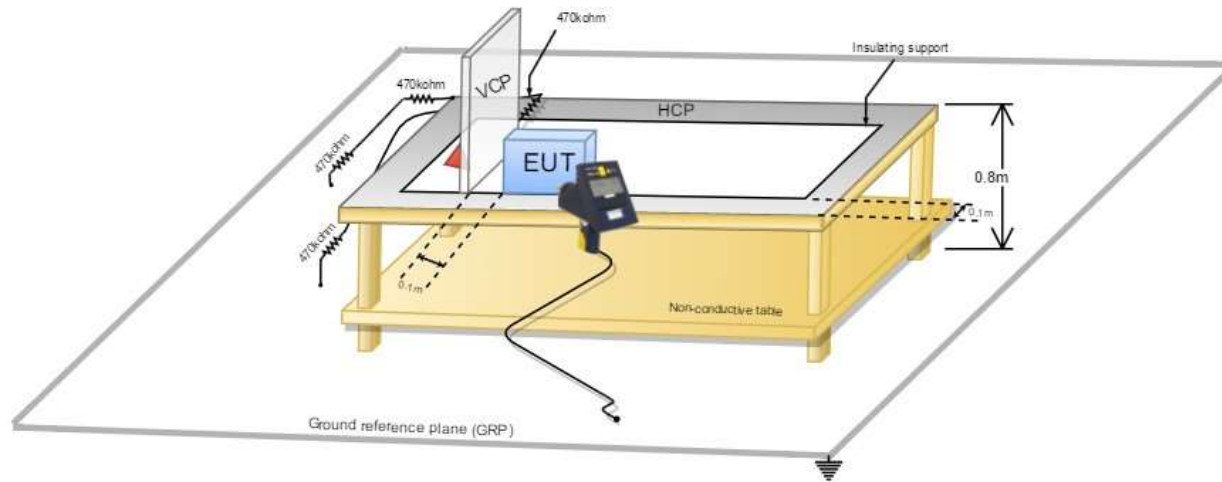
Test Equipment Utilized

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
199	ESD simulator	Schaffner	NSG 435	3150	21 Sep 2022
428	ESD Table	MiCOM Labs	ESD Table	N/A	Cal when used
429	ESD Vertical Coupling Plane	MiCOM Labs	ESD Vertical Coupling Plane	N/A	Cal when used
434	Bonaire Humidifier	Bonaire	BUL2612	None	Not Required
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023
CCEMC02	Confidence Check	MiCOM	CCEMC02	None	17 Jun 2022
ESD COAX#1	ESD Table to RB#1 Coax	MiCOM	ESD COAX#1	None	Cal when used
ESD COAX#2	Vertical Coupling Plane to RB#2 Coax	MiCOM	ESD COAX#2	None	Cal when used
ESD RB#1	Resistor Block #1	MiCOM	ESD RB#1	None	Cal when used
ESD RB#2	Resistor Block #2	MiCOM	ESD RB#2	None	Cal when used

Test Setup - ESD

Please refer to section 6.6.2 EUT Configuration - Immunity for EUT Setup and Monitoring Configurations.

Test Setup



Results	Pass	Date	2-14-2022
Standard	EN 61000-4-2:2009		
Product Model	EXG-300, EXG-300E, EXG-300C	Serial#	2027443
Configuration	See test plan for details		
EUT Powered by	AC/DC PS	Temp	19° C
		Humidity	48%
		Pressure	1006 mbar
Air Discharges	±8 kV	Contact Discharges	±4 kV
HCP Discharges	±4 kV	VCP Discharges	±4 kV
Perf. Criteria	Criteria B	Perf. Verification	See test plan
Mod to EUT	None	Test Performed by	JMH

EUT Test Points Definitions

Test point locations are identified below:

- ● CD# indicates Contact Discharge Point
- ■ AD# indicates where Air Discharge was attempted

ESD Test Locations 1, AC/DC PS powered



Measurement Results:

DIRECT CONTACT DISCHARGE RESULTS									
Location	+2 kV	-2kV	+4kV	-4kV	+6kV	-6kV	+8kV	-8kV	Comments
CD1	C*	C*	C*	C*					

AIR DISCHARGE RESULTS									
Location	+2 kV	-2kV	+4kV	-4kV	+6kV	-6kV	+8kV	-8kV	Comments
AD1	ND	ND	ND	ND			ND	ND	
AD2	ND	ND	ND	ND			ND	ND	
AD3	ND	ND	ND	ND			ND	ND	
AD4	ND	ND	ND	ND			ND	ND	
AD5	ND	ND	ND	ND			ND	ND	
AD6	ND	ND	ND	ND			C*	C*	
AD7	ND	ND	ND	ND			ND	ND	
AD8	ND	ND	ND	ND			ND	ND	

C = Compliant: No Change in operating state.

C* = Compliant: product resets

ND = No discharge.

NC = Non-Compliant: Does not meet performance criteria defined in governing standard.

*During testing management and test port resets – EUT restarts to reset port and comes back to original state, iPerf has to be restarted – normal operation of program..

ESD Test Locations 2, AC/DC PS powered



Measurement Results:

DIRECT CONTACT DISCHARGE RESULTS									
Location	+2 kV	-2kV	+4kV	-4kV	+6kV	-6kV	+8kV	-8kV	Comments
CD1	C*	C*	C*	C*					
CD2	C	C	C	C					

AIR DISCHARGE RESULTS									
Location	+2 kV	-2kV	+4kV	-4kV	+6kV	-6kV	+8kV	-8kV	Comments
AD1	ND	ND	C*	C*			C*	C*	
AD2	ND	ND	ND	ND			ND	ND	
AD3	ND	ND	ND	ND			ND	ND	
AD4	ND	ND	ND	ND			ND	ND	
AD5	ND	ND	ND	ND			ND	ND	
AD6	ND	ND	ND	ND			ND	ND	
AD7	ND	ND	ND	ND			ND	ND	
AD8	ND	ND	ND	ND			ND	ND	
AD9	ND	ND	ND	ND			ND	ND	

C = Compliant: No Change in operating state.

C* = Compliant: product resets

ND = No discharge.

NC = Non-Compliant: Does not meet performance criteria defined in governing standard.

*During testing management port resets – EUT restarts to reset port and comes back to original state, iPerf has to be restarted – normal operation of program..

Measurement Results: Electrostatic Discharge

HORIZONTAL COUPLING PLANE (HCP) CONTACT DISCHARGE									
Location	+2 kV	-2kV	+4kV	-4kV	+6kV	-6kV	+8kV	-8kV	Comments
HCP	C	C	C	C	C	C			
Result: C = Compliant: No Change in operating state ND = No Discharge NC = Non-Compliant: Does not meet performance criteria defined in governing standard.									

VERTICAL COUPLING PLANE (VCP) CONTACT DISCHARGE									
Location	+2 kV	-2kV	+4kV	-4kV	+6kV	-6kV	+8kV	-8kV	Comments
Front	C	C	C	C	C	C			
Left	C	C	C	C	C	C			
Right	C	C	C	C	C	C			
Back	C	C	C	C	C	C			
Result: C = Compliant: No Change in operating state ND = No Discharge NC = Non-Compliant: Does not meet performance criteria defined in governing standard.									

Results	Pass			Date	2-14-2022		
Standard	EN 61000-4-2:2009						
Product Model	EXG-300, EXG-300E, EXG-300C		Serial#	2027443			
Configuration	See test plan for details						
EUT Powered by	Battery	Temp	19° C	Humidity	48%	Pressure	1006mbar
Air Discharges	±8 kV		Contact Discharges	±4 kV			
HCP Discharges	±4 kV		VCP Discharges	±4 kV			
Perf. Criteria	Criteria B		Perf. Verification	See test plan			
Mod to EUT	None		Test Performed by	JMH			

EUT Test Points Definitions

Test point locations are identified below:

- ● CD# indicates Contact Discharge Point
- ■ AD# indicates where Air Discharge was attempted

ESD Test Locations 1, Battery powered



Measurement Results:

DIRECT CONTACT DISCHARGE RESULTS									
Location	+2 kV	-2kV	+4kV	-4kV	+6kV	-6kV	+8kV	-8kV	Comments
CD1	C	C	C	C					
CD2	C	C	C	C					

AIR DISCHARGE RESULTS									
Location	+2 kV	-2kV	+4kV	-4kV	+6kV	-6kV	+8kV	-8kV	Comments
AD1	ND	ND	ND	ND			ND	ND	
AD2	ND	ND	ND	ND			ND	ND	
AD3	ND	ND	ND	ND			ND	ND	
AD4	ND	ND	ND	ND			ND	ND	
AD5	ND	ND	ND	ND			ND	ND	
AD6	ND	ND	ND	ND			ND	ND	
AD7	ND	ND	ND	ND			ND	ND	

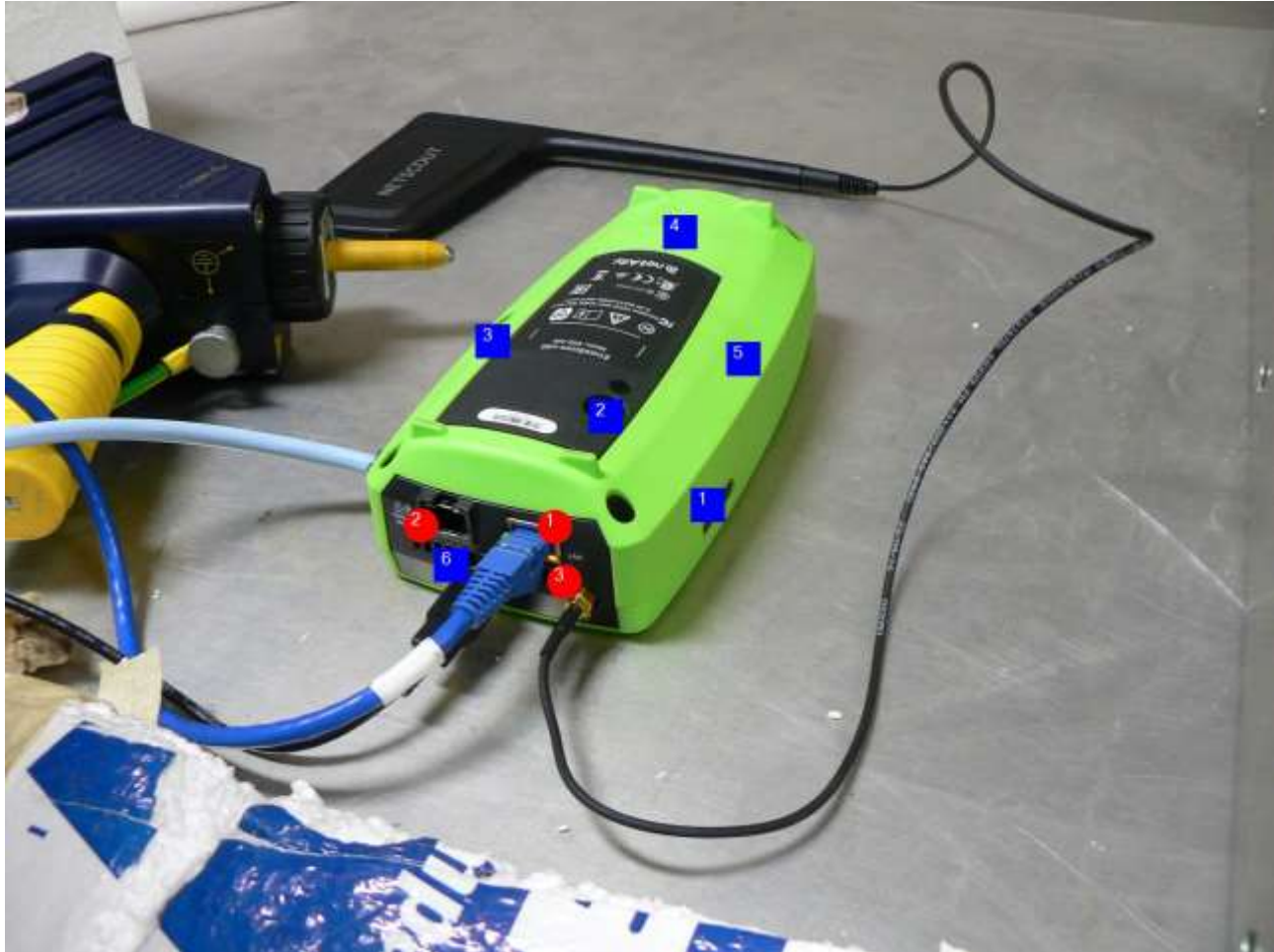
C = Compliant: No Change in operating state.

ND = No discharge.

NC = Non-Compliant: Does not meet performance criteria defined in governing standard.

*During testing management port resets – EUT restarts to reset port and comes back to original state, iPerf has to be restarted – normal operation of program..

ESD Test Locations 2, Battery powered



Measurement Results:

DIRECT CONTACT DISCHARGE RESULTS									
Location	+2 kV	-2kV	+4kV	-4kV	+6kV	-6kV	+8kV	-8kV	Comments
CD1	C*	C*	C*	C*					
CD2	C	C	C	C					
CD3	C*	C*	C*	C*					

AIR DISCHARGE RESULTS									
Location	+2 kV	-2kV	+4kV	-4kV	+6kV	-6kV	+8kV	-8kV	Comments
AD1	ND	ND	ND	ND			C*	C*	
AD2	ND	ND	ND	ND			ND	ND	
AD3	ND	ND	ND	ND			ND	ND	
AD4	ND	ND	ND	ND			ND	ND	
AD5	ND	ND	ND	ND			ND	ND	
AD6	ND	ND	ND	ND			ND	ND	

C = Compliant: No Change in operating state.

C* = Compliant: product resets

ND = No discharge.

NC = Non-Compliant: Does not meet performance criteria defined in governing standard.

*During testing management port resets – EUT restarts to reset port and comes back to original state, iPerf has to be restarted – normal operation of program..

Measurement Results: Electrostatic Discharge

HORIZONTAL COUPLING PLANE (HCP) CONTACT DISCHARGE									
Location	+2 kV	-2kV	+4kV	-4kV	+6kV	-6kV	+8kV	-8kV	Comments
HCP	C	C	C	C	C	C			
Result: C = Compliant: No Change in operating state ND = No Discharge NC = Non-Compliant: Does not meet performance criteria defined in governing standard.									

VERTICAL COUPLING PLANE (VCP) CONTACT DISCHARGE									
Location	+2 kV	-2kV	+4kV	-4kV	+6kV	-6kV	+8kV	-8kV	Comments
Front	C	C	C	C	C	C			
Left	C	C	C	C	C	C			
Right	C	C	C	C	C	C			
Back	C	C	C	C	C	C			
Result: C = Compliant: No Change in operating state ND = No Discharge NC = Non-Compliant: Does not meet performance criteria defined in governing standard.									

Conclusion:

EUT performed in Compliance with EN 301-489-1,17/EN 61326 performance criteria

7.2.3. RF Electromagnetic Field (80 MHz - 6,000 MHz)

Scope

This test assesses the ability of the EUT to operate as intended in the presence of a radio frequency electromagnetic field disturbance.

Test Method

The test method used was in accordance with EN 61000-4-3.

The following requirements and evaluation of test results shall apply:

- The test level shall be 3 V/m** (measured un-modulated). The test signal was amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1 000 Hz. If the wanted signal is modulated at 1 000 Hz, then an audio signal of 400 Hz shall be used;
- The test shall be performed over the frequency range 80 MHz to 6000 MHz with the exception of the exclusion band for transmitters, receivers and duplex transceivers, as appropriate;
- For receivers and transmitters, the stepped frequency increments shall be 1 % frequency increment of the momentary used frequency.
- Further product related spot frequency tests may be specified in the relevant part of EN 301 489 series dealing with the particular type of radio equipment;

Performance Criteria

- For transmitters the performance criteria for continuous phenomena for transmitter shall apply
- For receivers the performance criteria for continuous phenomena for receivers shall apply
- For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with receivers or transmitters in which case the corresponding performance criteria above shall apply.

EUT Monitoring

Please refer to section 6.6.2 EUT Configuration - Immunity for EUT Setup and Monitoring Configurations.

Traceability

All radiated immunity measurements performed are traceable to national standards. The uncertainty of measurement at a confidence level of not less than 95 %, with a coverage factor of $k=2$, in the range 80 MHz - 6 GHz (test level range 3V/m), is $\pm 0.84\text{V/m}$

Laboratory Measurement Uncertainty	
Measurement uncertainty	$\pm 0.84\text{V/m}$

Test Methodology
Measurements were made per work instruction WI-EMC-03 "Radiated Immunity"

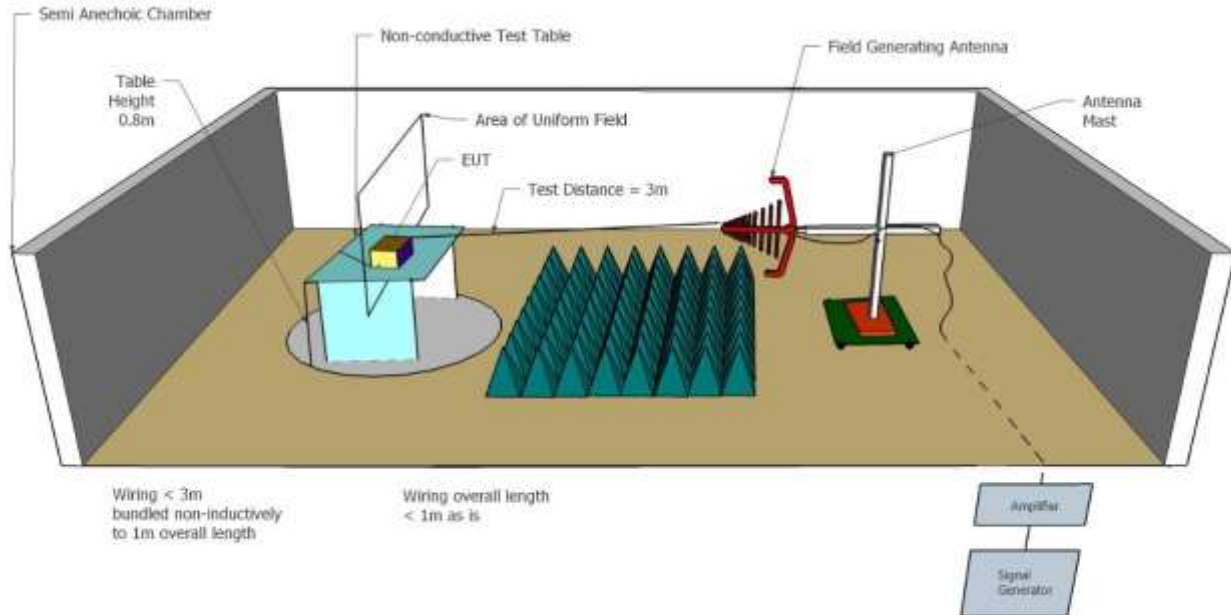
Test Summary

EUT performed in Compliance with EN ETSI 301 489-1/17 / EN 61326 performance criteria

Test Equipment Utilized

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
104	Antenna Horn 1-18GHz	Electro-Mechanics	3115	9205-3882	30 Dec 2022
169	Power Meter	Boonton	4231A	53201	2 Oct 2022
177	Amplifier 80-1000MHz	Amplifier Research	150W1000	29274	30 Dec 2022
191	Multi-device controller	ETS EMCO	2090	1537	Not Required
204	Mismatch Tolerant Directional Coupler	Werlatine	C5725	8755	30 Dec 2022
207	Radiated Immunity Chamber Maintenance Check	MiCOM	Rad Imm Chamber	207	27 Mar 2022
246	Power Sensor	Boonton	51011-EMC	31916	2 Oct 2022
319	Dell Desktop for Radiated Immunity	Dell	GX270	WS01	Not Required
333	30MHz to 3GHz Antenna	Sunol	JB3	A041006	28 Dec 2022
364	System Controller	Sunol Sciences	System Controller	None	Not Required
373	26III RMS Multimeter	Fluke	Fluke 26 series III	76080720	29 Sep 2022
430	Mast/Controller for RI	Sunol	Mast/Controller	None	Not Required
431	Turntable/Controller	ETS	Turntable/Controller	None	Not Required
432	Coupler for HF Amp	ARRA	N5164-10	4263	30 Dec 2022
487	100 KHz to 6 GHz High Performance Signal Generator	Agilent	8665B	3546A00797	12 Oct 2023
491	Electric Field Probe	Narda	EF1891 Electric Field Probe	G-0146	12 Sep 2022
492	Electric Field Meter	Narda	NBM-520	D-1381	12 Sep 2022
505	0.7 to 6GHz 50 Watt Amplifier	OPHIR RF Inc	5293FE	1052	30 Dec 2022
508	Test Software	ETS-Lingren	TILE4 Ver 4.2A	508	Not Required
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023
511	HF Directional Coupler 0.9 to 9 GHz	RF Lambda	RFDC9M9G35	1505050176	30 Dec 2022
CCEMC03	Confidence Check	MiCOM	CCEMC03	None	30 Dec 2022
RI Amp Blkhd	Cable Amplifier to bulkhead.	Schwarzbeck	AK 9515G 11	RI Amp Blkhd	30 Dec 2022
RI Blkhd Antenna	Cable bulkhead to antenna	Schwarzbeck	AK 9515G 12	RI Blkhd Antenna	30 Dec 2022
RI Sig Amp	Cable Signal Generator to Amp	Schwarzbeck	AK 9515G 2	RI Sig Amp	30 Dec 2022

Test Setup - Radiated Immunity



test distance = 3m

A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

Measurement Results

General Conditions					
Ambient Temperature:	18°C	Humidity:	45%	Pressure:	1005
Tested by:	JMH	Date:	10 th February 2022		

AC/DC Power Supply:

Sides Tested	Frequency Range	Test Severity Level	Pol	Result	Criteria
FRONT	80 - 1000 MHz	3V/m, 80% AM (1kHz)	H	Compliant	A
FRONT	80 - 1000 MHz	3V/m, 80% AM (1kHz)	V	Compliant	A
BACK	80 - 1000 MHz	3V/m, 80% AM (1kHz)	H	Compliant	A
BACK	80 - 1000 MHz	3V/m, 80% AM (1kHz)	V	Compliant	A
LEFT	80 - 1000 MHz	3V/m, 80% AM (1kHz)	H	Compliant	A
LEFT	80 - 1000 MHz	3V/m, 80% AM (1kHz)	V	Compliant	A
RIGHT	80 - 1000 MHz	3V/m, 80% AM (1kHz)	H	Compliant	A
RIGHT	80 - 1000 MHz	3V/m, 80% AM (1kHz)	V	Compliant	A
FRONT	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	H	Compliant	A
FRONT	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	V	Compliant	A
BACK	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	H	Compliant	A
BACK	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	V	Compliant	A
LEFT	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	H	Compliant	A
LEFT	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	V	Compliant	A
RIGHT	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	H	Compliant	A
RIGHT	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	V	Compliant	A

Dwell time for interfering signal was set to 2 seconds.

A log of the communication between EUT and computer was generated during testing.

Frequency of operation during testing 5150 – 5850 MHz

Radiated Immunity Test Frequencies 80 – 1000 MHz (1% step size)

MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz
80.00	103.60	134.20	173.80	225.10	291.60	377.70	489.30	633.70	820.90
80.80	104.60	135.50	175.50	227.40	294.50	381.50	494.10	640.10	829.10
81.60	105.70	136.90	177.30	229.60	297.50	385.30	499.10	646.50	837.40
82.42	106.70	138.20	179.10	231.90	300.40	389.20	504.10	652.90	845.70
83.24	107.80	139.60	180.90	234.30	303.40	393.10	509.10	659.50	854.20
84.08	108.90	141.00	182.70	236.60	306.50	397.00	514.20	666.10	862.70
84.92	109.90	142.40	184.50	239.00	309.50	401.00	519.40	672.70	871.40
85.77	111.00	143.80	186.30	241.40	312.60	405.00	524.60	679.40	880.10
86.62	112.20	145.30	188.20	243.80	315.80	409.00	529.80	686.20	888.90
87.49	113.30	146.70	190.10	246.20	318.90	413.10	535.10	693.10	897.80
88.37	114.40	148.20	192.00	248.70	322.10	417.20	540.40	700.00	906.70
89.25	115.60	149.70	193.90	251.20	325.30	421.40	545.90	707.00	915.80
90.14	116.70	151.20	195.80	253.70	328.60	425.60	551.30	714.10	925.00
91.04	117.90	152.70	197.80	256.20	331.90	429.90	556.80	721.20	934.20
91.95	119.10	154.20	199.80	258.80	335.20	434.20	562.40	728.50	943.60
92.87	120.30	155.80	201.80	261.40	338.60	438.50	568.00	735.70	953.00
93.80	121.50	157.30	203.80	264.00	341.90	442.90	573.70	743.10	962.50
94.74	122.70	158.90	205.80	266.60	345.40	447.30	579.40	750.50	972.10
95.69	123.90	160.50	207.90	269.30	348.80	451.80	585.20	758.00	981.90
96.64	125.10	162.10	210.00	272.00	352.30	456.30	591.10	765.60	991.70
97.61	126.40	163.70	212.10	274.70	355.80	460.90	597.00	773.30	1000.00
98.59	127.70	165.40	214.20	277.40	359.40	465.50	603.00	781.00	
99.57	128.90	167.00	216.30	280.20	363.00	470.20	609.00	788.80	
100.50	130.20	168.70	218.50	283.00	366.60	474.90	615.10	796.70	
101.50	131.50	170.40	220.70	285.90	370.30	479.60	621.20	804.70	
102.50	132.80	172.10	222.90	288.70	374.00	484.40	627.40	812.70	

Operation within 5 GHz Wi-Fi Band

Lowest allocated band edge frequency -270 MHz, i.e. 4 880 MHz

Highest allocated band edge frequency +270 MHz, i.e. 5 995 MHz

Exclusion band frequencies 4,880.0 to 5,995.0 MHz

MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz
1000.0	1184.3	1402.6	1661.1	1967.2	2329.8	2759.2	3267.7	3870.0	4583.2
1010.0	1196.1	1416.6	1677.7	1986.9	2353.1	2786.8	3300.4	3908.7	4629.0
1020.1	1208.1	1430.8	1694.5	2006.8	2376.6	2814.6	3333.4	3947.7	4675.3
1030.3	1220.2	1445.1	1711.4	2026.8	2400.4	2842.8	3366.7	3987.2	4722.1
1040.6	1232.4	1459.5	1728.5	2047.1	2424.4	2871.2	3400.4	4027.1	4769.3
1051.0	1244.7	1474.1	1745.8	2067.6	2448.6	2899.9	3434.4	4067.4	4817.0
1061.5	1257.2	1488.9	1763.3	2088.2	2473.1	2928.9	3468.7	4108.0	4865.2
1072.1	1269.7	1503.8	1780.9	2109.1	2497.9	2958.2	3503.4	4149.1	4880.0
1082.9	1282.4	1518.8	1798.7	2130.2	2522.8	2987.8	3538.5	4190.6	5995.0
1093.7	1295.3	1534.0	1816.7	2151.5	2548.1	3017.7	3573.8	4232.5	6000.0
1104.6	1308.2	1549.3	1834.9	2173.0	2573.5	3047.9	3609.6	4274.8	
1115.7	1321.3	1564.8	1853.2	2194.8	2599.3	3078.3	3645.7	4317.6	
1126.8	1334.5	1580.5	1871.7	2216.7	2625.3	3109.1	3682.1	4360.8	
1138.1	1347.8	1596.3	1890.5	2238.9	2651.5	3140.2	3719.0	4404.4	
1149.5	1361.3	1612.2	1909.4	2261.3	2678.0	3171.6	3756.1	4448.4	
1161.0	1374.9	1628.3	1928.5	2283.9	2704.8	3203.3	3793.7	4492.9	

Battery:

Sides Tested	Frequency Range	Test Severity Level	Pol	Result	Criteria
FRONT	80 - 1000 MHz	3V/m, 80% AM (1kHz)	H	Compliant	A
FRONT	80 - 1000 MHz	3V/m, 80% AM (1kHz)	V	Compliant	A
BACK	80 - 1000 MHz	3V/m, 80% AM (1kHz)	H	Compliant	A
BACK	80 - 1000 MHz	3V/m, 80% AM (1kHz)	V	Compliant	A
LEFT	80 - 1000 MHz	3V/m, 80% AM (1kHz)	H	Compliant	A
LEFT	80 - 1000 MHz	3V/m, 80% AM (1kHz)	V	Compliant	A
RIGHT	80 - 1000 MHz	3V/m, 80% AM (1kHz)	H	Compliant	A
RIGHT	80 - 1000 MHz	3V/m, 80% AM (1kHz)	V	Compliant	A
FRONT	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	H	Compliant	A
FRONT	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	V	Compliant	A
BACK	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	H	Compliant	A
BACK	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	V	Compliant	A
LEFT	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	H	Compliant	A
LEFT	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	V	Compliant	A
RIGHT	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	H	Compliant	A
RIGHT	1.0 - 6.0 GHz	3V/m, 80% AM (1kHz)	V	Compliant	A

Dwell time for interfering signal was set to 2 seconds.

A log of the communication between EUT and computer was generated during testing.

Frequency of operation during testing 5150 – 5850 MHz

Radiated Immunity Test Frequencies 80 – 1000 MHz (1% step size)

MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz
80.00	103.60	134.20	173.80	225.10	291.60	377.70	489.30	633.70	820.90
80.80	104.60	135.50	175.50	227.40	294.50	381.50	494.10	640.10	829.10
81.60	105.70	136.90	177.30	229.60	297.50	385.30	499.10	646.50	837.40
82.42	106.70	138.20	179.10	231.90	300.40	389.20	504.10	652.90	845.70
83.24	107.80	139.60	180.90	234.30	303.40	393.10	509.10	659.50	854.20
84.08	108.90	141.00	182.70	236.60	306.50	397.00	514.20	666.10	862.70
84.92	109.90	142.40	184.50	239.00	309.50	401.00	519.40	672.70	871.40
85.77	111.00	143.80	186.30	241.40	312.60	405.00	524.60	679.40	880.10
86.62	112.20	145.30	188.20	243.80	315.80	409.00	529.80	686.20	888.90
87.49	113.30	146.70	190.10	246.20	318.90	413.10	535.10	693.10	897.80
88.37	114.40	148.20	192.00	248.70	322.10	417.20	540.40	700.00	906.70
89.25	115.60	149.70	193.90	251.20	325.30	421.40	545.90	707.00	915.80
90.14	116.70	151.20	195.80	253.70	328.60	425.60	551.30	714.10	925.00
91.04	117.90	152.70	197.80	256.20	331.90	429.90	556.80	721.20	934.20
91.95	119.10	154.20	199.80	258.80	335.20	434.20	562.40	728.50	943.60
92.87	120.30	155.80	201.80	261.40	338.60	438.50	568.00	735.70	953.00
93.80	121.50	157.30	203.80	264.00	341.90	442.90	573.70	743.10	962.50
94.74	122.70	158.90	205.80	266.60	345.40	447.30	579.40	750.50	972.10
95.69	123.90	160.50	207.90	269.30	348.80	451.80	585.20	758.00	981.90
96.64	125.10	162.10	210.00	272.00	352.30	456.30	591.10	765.60	991.70
97.61	126.40	163.70	212.10	274.70	355.80	460.90	597.00	773.30	1000.00
98.59	127.70	165.40	214.20	277.40	359.40	465.50	603.00	781.00	
99.57	128.90	167.00	216.30	280.20	363.00	470.20	609.00	788.80	
100.50	130.20	168.70	218.50	283.00	366.60	474.90	615.10	796.70	
101.50	131.50	170.40	220.70	285.90	370.30	479.60	621.20	804.70	
102.50	132.80	172.10	222.90	288.70	374.00	484.40	627.40	812.70	

Operation within 5 GHz Wi-Fi Band

Lowest allocated band edge frequency -270 MHz, i.e. 4 880 MHz

Highest allocated band edge frequency +270 MHz, i.e. 5 995 MHz

Exclusion band frequencies 4,880.0 to 5,995.0 MHz

MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz
1000.0	1184.3	1402.6	1661.1	1967.2	2329.8	2759.2	3267.7	3870.0	4583.2
1010.0	1196.1	1416.6	1677.7	1986.9	2353.1	2786.8	3300.4	3908.7	4629.0
1020.1	1208.1	1430.8	1694.5	2006.8	2376.6	2814.6	3333.4	3947.7	4675.3
1030.3	1220.2	1445.1	1711.4	2026.8	2400.4	2842.8	3366.7	3987.2	4722.1
1040.6	1232.4	1459.5	1728.5	2047.1	2424.4	2871.2	3400.4	4027.1	4769.3
1051.0	1244.7	1474.1	1745.8	2067.6	2448.6	2899.9	3434.4	4067.4	4817.0
1061.5	1257.2	1488.9	1763.3	2088.2	2473.1	2928.9	3468.7	4108.0	4865.2
1072.1	1269.7	1503.8	1780.9	2109.1	2497.9	2958.2	3503.4	4149.1	4880.0
1082.9	1282.4	1518.8	1798.7	2130.2	2522.8	2987.8	3538.5	4190.6	5995.0
1093.7	1295.3	1534.0	1816.7	2151.5	2548.1	3017.7	3573.8	4232.5	6000.0
1104.6	1308.2	1549.3	1834.9	2173.0	2573.5	3047.9	3609.6	4274.8	
1115.7	1321.3	1564.8	1853.2	2194.8	2599.3	3078.3	3645.7	4317.6	
1126.8	1334.5	1580.5	1871.7	2216.7	2625.3	3109.1	3682.1	4360.8	
1138.1	1347.8	1596.3	1890.5	2238.9	2651.5	3140.2	3719.0	4404.4	
1149.5	1361.3	1612.2	1909.4	2261.3	2678.0	3171.6	3756.1	4448.4	
1161.0	1374.9	1628.3	1928.5	2283.9	2704.8	3203.3	3793.7	4492.9	

EUT performed in Compliance with EN ETSI 301 489-1/17 EN 61326 performance criteria

7.2.4. Fast Transients - Common Mode

Scope

This test assesses the ability of the EUT to operate as intended in the event of fast transients present on one of the input/output ports.

Test Method

The test method is in accordance with IEC 61000-4-4.

The following requirements and evaluation of test results shall apply:

- The test level for signal ports, telecommunication ports, and control ports shall be 0.5 kV open circuit voltage at a repetition rate of 5 kHz as given in IEC 61000-4-4;
- The test level for DC power input ports shall be 0.5 kV open circuit voltage as given IEC 61000-4-4;
- The test level for AC mains power input ports shall be 1 kV open circuit voltage as given IEC 61000-4-4.

Performance Criteria

For Fast Transients - Common Mode, the following performance criteria apply:

- For transmitters the performance criteria for transient phenomena for transmitters shall apply
- For receivers the performance criteria for transient phenomena for receivers shall apply
- For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

EUT Setup and Monitoring

Please refer to section 6.6.2 EUT Configuration - Immunity for EUT Setup and Monitoring Configurations.

Traceability

All Electrical Fast Transient/Burst Immunity measurements performed are traceable to national standards. The uncertainty of measurement at a confidence level of not less than 95 %, with a coverage factor of $k=2$, in the range up to and including $\pm 4.5\text{kV}$, is $\pm 1.2\%$.

Laboratory Measurement Uncertainty	
Measurement uncertainty	$\pm 1.2\%$.

Method
Measurements were made per work instruction WI-EMC-04 "Electrical Fast Transient, Burst (EFT, B)"

Test Summary

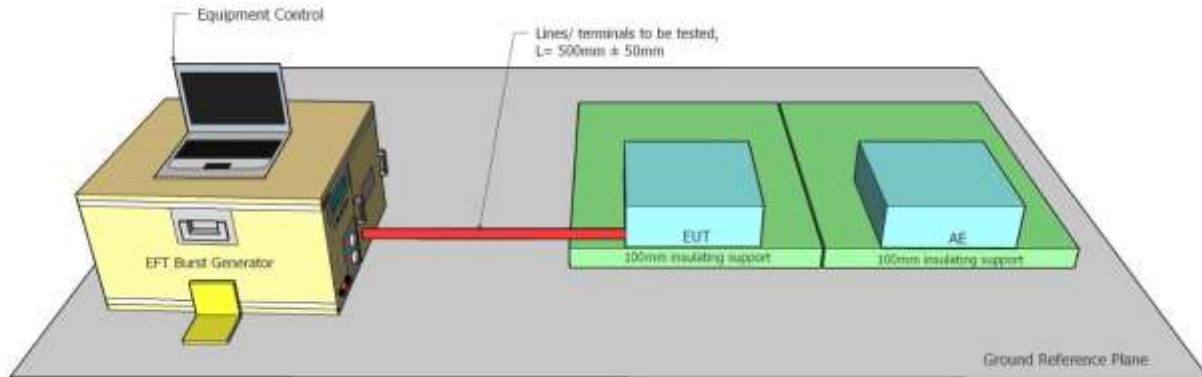
EUT performed in Compliance with EN 301-489-1,17/EN 61326 performance criteria.

Test Equipment Utilized

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
181	Fast Transient/Burst Generator	Schaffner	PNW 2225	MICOM 2225	15 Oct 2022
194	Impulse Network Module 1.2/50 - 8/20 Combination Wave	Schaffner	PNW 2050	200112-021SC	15 Oct 2022
276	Coupling Clamp	Schaffner	8014	15518	15 Oct 2022
277	System Main Frame	Schaffner	NSG 2050	200111-264AR	15 Oct 2022
354	5KVA AC Power Source	Teseq	NSG1007	58574	15 Oct 2022
355	AC Switching Unit	Schaffner	NSG 2200	200610-003EK	15 Oct 2022
356	Power Conditioning Unit (Software version Win 2100V3 Version 3.2.0.16)	Teseq	CCN 1000-1	72636	15 Oct 2022
427	Dell Desktop computer for EFT/S w/TESEQ Software	Dell	Inspiron 530	N/A	Not Required
509	Test Software WIN 2145, WIN 2110, WIN 2130.	Schaffner	NSG 1007 Rev D	None	Not Required
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023
CCEMC04	EFT Confidence Check	MiCOM	CCEMC04	None	15 Oct 2022
EFT/S DB37#1	DB37 Interface cable from NSG2050 to CDN131	Schaffner	EFT/S DB37#1	None	Not Required
EFT/S DB9#1	DB9 Interface cable from PC to RS232	Schaffner	EFT/S DB9#1	None	Not Required
EFT/S PCI	PCI from PC to Schaffner 2200 AC	Schaffner	EFT/S PCI	None	Not Required
EFT/S RS232#1	RS232 Interface cable from DB9 to NSG2050	Schaffner	EFT/S RS232#1	None	Not Required
EFT/S USB#1	USB to Serial Interface from PC to Schaffner 2200 AC	Dynex	EFT/S USB#1	None	Not Required
EFT/S USB#2	USB to Serial Interface from PC to Schaffner 2200 AC	Dynex	EFT/S USB#2	None	Not Required

Test Setup - Fast Transients, Common Mode Test Setup

Electrical Fast Transients Power Line Immunity Test Setup



7.2.4.1. Measurement Results

Testing was performed on the Ethernet ports and AC power input port of the EUT. The cable to the ENET input port was further exercised

- 1). ENET Ethernet Network Test port (Port 1), clamp, AC/DC PS
- 2). ENET Management port (Port 2), clamp , AC/DC PS
- 3). EFT – AC/DC adaptor, direct discharge
- 4). ENET Ethernet Network Test port (Port 1), clamp, Battery
- 5). ENET Management port (Port 2), clamp , Battery

EUT communication was relied upon to make connection to auxiliary equipment for performance monitoring.

Description	Type	Length	Method	Result
Ethernet (ENET)	Ethernet Network Test Port	Greater than 3 meters	Clamp	PASS
Ethernet (ENET)	Management Port	Greater than 3 meters	Clamp	PASS
AC/DC adaptor	AC/DC adaptor	Not Applicable	Direct	PASS

Company Name	NETALLY, LLC
Equipment Tested:	EXG-300, EXG-300E, EXG-300C
Serial Number:	2111004ESNXG
Test Equipment used:	Teseq 2050
Test Procedure Used:	WI-EMC-04



Title: NetAlly EtherScope EXG-300, EXG-300E, EXG-300C
To: EN 301-489-1,17, EN 61326-1, FCC Part 15B, ICES-003
Serial #: NTAL21-E2 Rev A

General Conditions					
Ambient Temperature:	19°C	Humidity:	44%	Pressure:	1008
Tested by:	JMH	Date:	2/11/2022		

Test Case #1 ENET Ethernet port 1, clamp, AC/DC PS

Test Number 1			
Test Name	C:\PSUITE\WIN2050\EFT\INTERNAL\E2IO-EX.PLS		
Pulse Type	PNW2225 BURST INT CDN OUT		
Test Status	PASS		
Time Elapsed	0000:02:27	Packets Fired :	420

Parameter	Operation	From	To	Step Size	Fail Value
Polarity	POSITIVE, NEGATIVE				---
Spikes	Static	75count	---	---	---
Voltage	Static	500Volts	---	---	---
Angle	Static	1°	---	---	---
Burst Frequency	Static	5kHz	---	---	---
Repetition Rate	Static	300ms	---	---	---
Coupler	OUT				---

Parameter	Value
Sync	ASYNCHRONOUS

Comments
Traffic over Wifi and Enet continued throughout testing.



Test Case #2 ENET Ethernet port 2, clamp, AC/DC PS

Test Number 1			
Test Name	C:\PSUITE\WIN2050\EFT\INTERNAL\E2IO-EX.PLS		
Pulse Type	PNW2225 BURST INT CDN OUT		
Test Status	PASS		
Time Elapsed	0000:02:27	Packets Fired :	420

Parameter	Operation	From	To	Step Size	Fail Value
Polarity	POSITIVE, NEGATIVE				---
Spikes	Static	75count	---	---	---
Voltage	Static	500Volts	---	---	---
Angle	Static	1°	---	---	---
Burst Frequency	Static	5kHz	---	---	---
Repetition Rate	Static	300ms	---	---	---
Coupler	OUT				---

Parameter	Value
Sync	ASYNCHRONOUS

Comments
Traffic over Wifi and Enet continued throughout testing.

Test Case #3 EFT - AC/DC adaptor (230 V_{AC} 50 Hz), direct discharge

Test Number 2			
Test Name	C:\PSUITE\WIN2050\EFT\INTERNAL\E2IP-DX.PLS		
Pulse Type	PNW2225 BURST INT CDN L1 N		
Test Status	PASS		
Time Elapsed	0000:04:38	Packets Fired :	420

Parameter	Operation	From	To	Step Size	Fail Value
Polarity	POSITIVE, NEGATIVE				---
Voltage	Static	1000Volts	---	---	---
Angle	Static	1°	---	---	---
Spikes	Static	75count	---	---	---
Burst Frequency	Static	5kHz	---	---	---
Repetition Rate	Static	300ms	---	---	---
Coupler	L1 N				---

Parameter	Value
Sync	ASYNCHRONOUS

Comments
Traffic over Wifi and Enet continued throughout testing.

Test Case #4 ENET Ethernet port 1, clamp, Battery Powered

Test Number 1			
Test Name	C:\PSUITE\WIN2050\EFT\INTERNAL\E2IO-EX.PLS		
Pulse Type	PNW2225 BURST INT CDN OUT		
Test Status	PASS		
Time Elapsed	0000:02:27	Packets Fired :	420

Parameter	Operation	From	To	Step Size	Fail Value
Polarity	POSITIVE, NEGATIVE				---
Spikes	Static	75count	---	---	---
Voltage	Static	500Volts	---	---	---
Angle	Static	1°	---	---	---
Burst Frequency	Static	5kHz	---	---	---
Repetition Rate	Static	300ms	---	---	---
Coupler	OUT				---

Parameter	Value
Sync	ASYNCHRONOUS

Comments
Traffic over Wifi and Enet continued throughout testing.

Test Case #5 ENET Ethernet port 2, clamp, Battery Powered

Test Number 1			
Test Name	C:\PSUITE\WIN2050\EFT\INTERNAL\E2IO-EX.PLS		
Pulse Type	PNW2225 BURST INT CDN OUT		
Test Status	PASS		
Time Elapsed	0000:02:27	Packets Fired :	420

Parameter	Operation	From	To	Step Size	Fail Value
Polarity	POSITIVE, NEGATIVE				---
Spikes	Static	75count	---	---	---
Voltage	Static	500Volts	---	---	---
Angle	Static	1°	---	---	---
Burst Frequency	Static	5kHz	---	---	---
Repetition Rate	Static	300ms	---	---	---
Coupler	OUT				---

Parameter	Value
Sync	ASYNCHRONOUS

Comments
Traffic over Wifi and Enet continued throughout testing.

7.2.5. Surges, Line to Line, and Line to Ground – AC Mains

Scope:

These tests assess the ability of the EUT to operate as intended in the event of surges present on the AC mains power input ports and telecommunication ports.

Test Method:

The test method is in accordance with IEC 61000-4-5.

AC Mains:

This test shall be performed on the AC mains power input port ITE equipment.

The test level for ac mains power input ports shall be 2 kV line to ground, and 1 kV line to line, with the output impedance of the surge generator as given in IEC 61000-4-5. In telecom centres 1 kV line to ground and 0,5 kV line to line shall be used. The test generator provides a 1,2/50 μ s pulse as defined in IEC 61000-4-5.

Telecom Ports

This test shall be additionally performed on telecommunication ports, if any. These tests shall be performed on a representative configuration of the radio equipment, the associated ancillary equipment, or a representative configuration of the combination of radio and ancillary equipment.

The test level for telecommunication ports, intended to be connected to indoor cables (longer than 10 m) shall be 0,5 kV line to ground. In this case the total output impedance of the surge generator shall be in accordance with the basic standard IEC 61000-4-5. The test generator provides a 1,2/50 μ s pulse as defined in IEC 61000-4-5.

Performance Criteria:

- For transmitters the performance criteria for transient phenomena for transmitters shall apply
- For receivers the performance criteria for transient phenomena for receivers shall apply
- For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

Traceability

All test measurements carried out are traceable to national standards. The uncertainty of measurement at a confidence level of not less than 95 %, with a coverage factor of k=2, in the range up to and including $\pm 6\text{kV}$, is $\pm 1.2\%$.

Laboratory Measurement Uncertainty	
Measurement uncertainty	$\pm 1.2\%$.

Method
Measurements were made per work instruction WI-EMC-05 "Surge Immunity"

Test Summary

EUT performed in Compliance with EN 301-489-1,17/EN 61326 performance criteria.

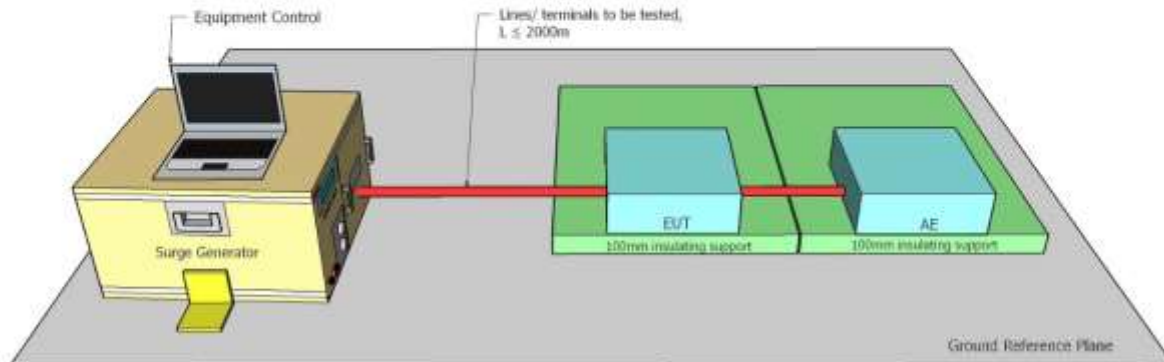
Test Equipment Utilized – Surges Line to Line and Line to Ground

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
180	Pulse Coupling Network	Schaffner	CDN 131	200131-001SC	15 Oct 2022
194	Impulse Network Module 1.2/50 - 8/20 Combination Wave	Schaffner	PNW 2050	200112-021SC	15 Oct 2022
277	System Main Frame	Schaffner	NSG 2050	200111-264AR	15 Oct 2022
354	5KVA AC Power Source	Teseq	NSG1007	58574	15 Oct 2022
355	AC Switching Unit	Schaffner	NSG 2200	200610-003EK	15 Oct 2022
356	Power Conditioning Unit (Software version Win 2100V3 Version 3.2.0.16)	Teseq	CCN 1000-1	72636	15 Oct 2022
427	Dell Desktop computer for EFT/S w/TESEQ Software	Dell	Inspiron 530	N/A	Not Required
509	Test Software WIN 2145, WIN 2110, WIN 2130.	Schaffner	NSG 1007 Rev D	None	Not Required
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023
CCEMC05 Mains	Surge Confidence Check AC Mains	MiCOM	CCEMC05 Mains	CCEMC05 Mains	15 Oct 2022
EFT/S DB9#1	DB9 Interface cable from PC to RS232	Schaffner	EFT/S DB9#1	None	Not Required
EFT/S PCI	PCI from PC to Schaffner 2200 AC	Schaffner	EFT/S PCI	None	Not Required
EFT/S RS232#1	RS232 Interface cable from DB9 to NSG2050	Schaffner	EFT/S RS232#1	None	Not Required
EFT/S USB#1	USB to Serial Interface from PC to Schaffner	Dynex	EFT/S USB#1	None	Not Required

	2200 AC				
EFT/S USB#2	USB to Serial Interface from PC to Schaffner 2200 AC	Dynex	EFT/S USB#2	None	Not Required

Test Setup – Surge, Line to Line and Line to Ground

Surge Immunity Test Setup



AC Mains Surge - EUT Setup and Monitoring:

Please refer to section 6.7 Test Configurations for EUT Setup and Monitoring Configurations.

Testing was performed on the AC port of the AC/DC adaptor and PoE injector.

- 1) Surge – AC/DC adaptor, direct discharge.

AC Mains - Test Results:

General Conditions					
Ambient Temperature:	19°C	Humidity:	44%	Pressure:	1005
Tested by:	JMH				
Date:	2/11/2022				

Injection Point	Line	Test Voltage Level(s)	Results	Performance Criteria
AC/DC adaptor	Line to Line	±0.500, ±1kV	Compliant	A
	Line to GND	±0.500, ±1kV, ±2kV	Compliant	A

Company Name	NETALLY, LLC
Equipment Tested:	EXG-300, EXG-300E, EXG-300C
Serial Number:	2111004ESNXG
Test Equipment used:	NSG2050; PNW2055
Test Procedure Used:	WI-EMC-05

Test Number 1			
Test Name	C:\PSUITE\WIN2050\SURGE\S1IP-C2.PLS		
Pulse Type	PNW2055 2 OHMS INTERNAL L N		
Test Status	PASS		
Time Elapsed	0000:14:12	Pulses Fired :	40

Parameter	Operation	From	To	Step Size	Fail Value
Angle	Linear	0°	270°	90°	---
Polarity	POSITIVE, NEGATIVE				---
Voltage	Static	500Volts	---	---	---
Coupler	INTERNAL L N				---

Parameter	Value
Sync	SYNCHRONOUS
Repetition Rate	10seconds

Comments
Traffic over Wifi and Enet continued throughout testing.

Test Number 2			
Test Name	C:\PSUITE\WIN2050\SURGE\S2IP-C2.PLS		
Pulse Type	PNW2055 2 OHMS INTERNAL L N		
Test Status	PASS		
Time Elapsed	0000:14:06	Pulses Fired :	40

Parameter	Operation	From	To	Step Size	Fail Value
Angle	Linear	0°	270°	90°	---
Polarity	POSITIVE, NEGATIVE				---
Voltage	Static	1000Volts	---	---	---
Coupler	INTERNAL L N				---

Parameter	Value
Sync	SYNCHRONOUS
Repetition Rate	10seconds

Comments
Traffic over Wifi and Enet continued throughout testing.

Test Number 3			
Test Name	C:\PSUITE\WIN2050\SURGE\S1IP-A9.PLS		
Pulse Type	PNW2055 12 OHMS INTERNAL N PE		
Test Status	PASS		
Time Elapsed	0000:14:13	Pulses Fired :	40

Parameter	Operation	From	To	Step Size	Fail Value
Polarity	POSITIVE, NEGATIVE				---
Angle	Linear	0°	270°	90°	---
Voltage	Static	500Volts	---	---	---
Coupler	INTERNAL N PE				---

Parameter	Value
Sync	SYNCHRONOUS
Repetition Rate	10seconds

Comments
EUT Continued to transfer data during and after test with lperf

Test Number 4			
Test Name	C:\PSUITE\WIN2050\SURGE\S2IP-A9.PLS		
Pulse Type	PNW2055 12 OHMS INTERNAL N PE		
Test Status	PASS		
Time Elapsed	0000:14:08	Pulses Fired :	40

Parameter	Operation	From	To	Step Size	Fail Value
Angle	Linear	0°	270°	90°	---
Polarity	POSITIVE, NEGATIVE				---
Voltage	Static	1000Volts	---	---	---
Coupler	INTERNAL N PE				---

Parameter	Value
Sync	SYNCHRONOUS
Repetition Rate	10seconds

Comments
Traffic over Wifi and Enet continued throughout testing.

Test Number 5			
Test Name	C:\PSUITE\WIN2050\SURGE\S3IP-A9.PLS		
Pulse Type	PNW2055 12 OHMS INTERNAL N PE		
Test Status	PASS		
Time Elapsed	0000:19:21	Pulses Fired :	40

Parameter	Operation	From	To	Step Size	Fail Value
Angle	Linear	0°	270°	90°	---
Polarity	POSITIVE, NEGATIVE				---
Voltage	Static	2000Volts	---	---	---
Coupler	INTERNAL N PE				---

Parameter	Value
Sync	SYNCHRONOUS
Repetition Rate	20seconds

Comments
Traffic over Wifi and Enet continued throughout testing.

Test Number 6			
Test Name	C:\PSUITE\WIN2050\SURGE\S1IP-B9.PLS		
Pulse Type	PNW2055 12 OHMS INTERNAL L PE		
Test Status	PASS		
Time Elapsed	0000:14:22	Pulses Fired :	40

Parameter	Operation	From	To	Step Size	Fail Value
Angle	Linear	0°	270°	90°	---
Polarity	POSITIVE, NEGATIVE				---
Voltage	Static	500Volts	---	---	---
Coupler	INTERNAL L PE				---

Parameter	Value
Sync	SYNCHRONOUS
Repetition Rate	10seconds

Comments
Traffic over Wifi and Enet continued throughout testing.

Test Number 7			
Test Name	C:\PSUITE\WIN2050\SURGE\S2IP-B9.PLS		
Pulse Type	PNW2055 12 OHMS INTERNAL L PE		
Test Status	PASS		
Time Elapsed	0000:14:17	Pulses Fired :	40

Parameter	Operation	From	To	Step Size	Fail Value
Angle	Linear	0°	270°	90°	---
Polarity	POSITIVE, NEGATIVE				---
Voltage	Static	1000Volts	---	---	---
Coupler	INTERNAL L PE				---

Parameter	Value
Sync	SYNCHRONOUS
Repetition Rate	10seconds

Comments
Traffic over Wifi and Enet continued throughout testing.

Test Number 8			
Test Name	C:\PSUITE\WIN2050\SURGE\S3IP-B9.PLS		
Pulse Type	PNW2055 12 OHMS INTERNAL L PE		
Test Status	PASS		
Time Elapsed	0000:19:21	Pulses Fired :	40

Parameter	Operation	From	To	Step Size	Fail Value
Angle	Linear	0°	270°	90°	---
Polarity	POSITIVE, NEGATIVE				---
Voltage	Static	2000Volts	---	---	---
Coupler	INTERNAL L PE				---

Parameter	Value
Sync	SYNCHRONOUS
Repetition Rate	20seconds

Comments
Traffic over Wifi and Enet continued throughout testing.

7.2.6. Surges, Line to Ground – Telecommunications Ports

Scope

These tests assess the ability of the EUT to operate as intended in the event of surges present on the telecommunication ports.

Performance Criteria

- For transmitters the performance criteria for transient phenomena for transmitters shall apply
- For receivers the performance criteria for transient phenomena for receivers shall apply
- For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

Test Method – Telecommunication Ports

This test shall be additionally performed on telecommunication ports, if any. These tests shall be performed on a representative configuration of the radio equipment, the associated ancillary equipment, or a representative configuration of the combination of radio and ancillary equipment.

The test level for telecommunication ports, intended to be connected to indoor cables (longer than 10 m) shall be 0,5 kV line to ground. In this case the total output impedance of the surge generator shall be in accordance with the basic standard EN 61000-4-5. The test generator provides a 1,2/50 μ s pulse as defined in EN 61000-4-5.

EUT Setup and Monitoring

Please refer to section 6.6.2 EUT Configuration - Immunity for EUT Setup and Monitoring Configurations.

Traceability

All test measurements carried out are traceable to national standards. The uncertainty of measurement at a confidence level of not less than 95 %, with a coverage factor of k=2, in the range up to and including $\pm 6\text{kV}$, is $\pm 1.2\%$.

Laboratory Measurement Uncertainty	
Measurement uncertainty	$\pm 1.2\%$.

Method
Measurements were made per work instruction WI-EMC-05 "Surge Immunity"

Test Summary

EUT performed in Compliance with EN 301-489-1,17/CISPR 24/EN 61326 performance criteria.

Test Equipment Utilized – Surges Telecom ports

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
180	Pulse Coupling Network	Schaffner	CDN 131	200131-001SC	15 Oct 2022
205	Coupling Network	Schaffner	CDN 117	17358	15 Oct 2022
277	System Main Frame	Schaffner	NSG 2050	200111-264AR	15 Oct 2022
291	Impulse Network 1.2/50 - 8/20 CDN 16A	Schaffner	PNW 2055	117	15 Oct 2022
354	5KVA AC Power Source	Teseq	NSG1007	58574	15 Oct 2022
355	AC Switching Unit	Schaffner	NSG 2200	200610-003EK	15 Oct 2022
356	Power Conditioning Unit (Software version Win 2100V3 Version 3.2.0.16)	Teseq	CCN 1000-1	72636	15 Oct 2022
427	Dell Desktop computer for EFT/S w/TESEQ Software	Dell	Inspiron 530	N/A	Not Required
433	Gas Arrestor for Telecom Surge	Schaffner	INA170	None	Not Required
509	Test Software WIN 2145, WIN 2110, WIN 2130.	Schaffner	NSG 1007 Rev D	None	Not Required
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023
CCEMC05 Telecom	Surge Confidence Check Telecom	MiCOM	CCEMC05 Telecom	CCEMC05 Telecom	15 Oct 2022
EFT/S DB9#1	DB9 Interface cable from PC to RS232	Schaffner	EFT/S DB9#1	None	Not Required
EFT/S ENET#1	Ethernet connection to CDN117	MiCOM	EFT/S ENET#1	None	Not Required
EFT/S HVOUT#1	High Volt Out cable from NSG2050 to CDN117	Schaffner	INA371	EFT/S HVOUT#1	15 Oct 2022

EFT/S HVOUT#2	High Volt Out cable from NSG2050 to CDN117	Schaffner	INA371	EFT/S HVOUT#2	15 Oct 2022
EFT/S PCI	PCI from PC to Schaffner 2200 AC	Schaffner	EFT/S PCI	None	Not Required
EFT/S RS232#1	RS232 Interface cable from DB9 to NSG2050	Schaffner	EFT/S RS232#1	None	Not Required
EFT/S USB#1	USB to Serial Interface from PC to Schaffner 2200 AC	Dynex	EFT/S USB#1	None	Not Required
EFT/S USB#2	USB to Serial Interface from PC to Schaffner 2200 AC	Dynex	EFT/S USB#2	None	Not Required

7.2.6.1. Measurement Results

General Conditions					
Ambient Temperature:	20°C	Humidity :	44%	Pressure :	1007
Tested by :	JMH				
Date:	2/11/2022				

Company Name	NETALLY, LLC
Equipment Tested :	EXG-300, EXG-300E, EXG-300C
Serial Number :	2111004ESNXG
Test Equipment used :	Teseq2050
Test Procedure Used :	WI-EMC-05

Cable	Line	Test Voltage Level(s)	Results	Performance Criteria
Ethernet Net Test – AC	LINE to GND	±0.500	Compliant	A
Ethernet Management-AC	LINE to GND	±0.500	Compliant	A
Ethernet Net Test – Battery	LINE to GND	±0.500	Compliant	A
Ethernet Management-Battery	LINE to GND	±0.500	Compliant	A

Ethernet Test Port: AC/DC PS

Test Number 1			
Test Name	C:\PSUITE\WIN2050\SURGE\S1EO-E2.PLS		
Pulse Type	PNW2050 2 OHMS		
Test Status	PASS		
Time Elapsed	0000:07:21	Pulses Fired :	10

Parameter	Operation	From	To	Step Size	Fail Value
Polarity	POSITIVE, NEGATIVE				---
Angle	ASYNCR	---	---	---	---
Voltage	Static	500Volts	---	---	---
Coupler	NONE				---

Parameter	Value
Sync	SYNCHRONOUS
Repetition Rate	30seconds
MaxIPeak	2000Amps

Comments
Traffic over Wifi and Enet continued after testing.

Ethernet Management Port: AC/DC PS

Test Number 1			
Test Name	C:\PSUITE\WIN2050\SURGE\S1EO-E2.PLS		
Pulse Type	PNW2050 2 OHMS		
Test Status	PASS		
Time Elapsed	0000:07:21	Pulses Fired :	10

Parameter	Operation	From	To	Step Size	Fail Value
Polarity	POSITIVE, NEGATIVE				---
Angle	ASYNCR	---	---	---	---
Voltage	Static	500Volts	---	---	---
Coupler	NONE				---

Parameter	Value
Sync	SYNCHRONOUS
Repetition Rate	30seconds
MaxIPeak	2000Amps

Comments
Traffic over Wifi and Enet continued after testing.

Ethernet Test Port: Battery

Test Number 1			
Test Name	C:\PSUITE\WIN2050\SURGE\S1EO-E2.PLS		
Pulse Type	PNW2050 2 OHMS		
Test Status	PASS		
Time Elapsed	0000:07:21	Pulses Fired :	10

Parameter	Operation	From	To	Step Size	Fail Value
Polarity	POSITIVE, NEGATIVE				---
Angle	ASYNC	---	---	---	---
Voltage	Static	500Volts	---	---	---
Coupler	NONE				---

Parameter	Value
Sync	SYNCHRONOUS
Repetition Rate	30seconds
MaxIPeak	2000Amps

Comments
Traffic over Wifi and Enet continued after testing.



Ethernet Management Port: Battery

Test Number 1			
Test Name	C:\PSUITE\WIN2050\SURGE\S1EO-E2.PLS		
Pulse Type	PNW2050 2 OHMS		
Test Status	PASS		
Time Elapsed	0000:07:21	Pulses Fired :	10

Parameter	Operation	From	To	Step Size	Fail Value
Polarity	POSITIVE, NEGATIVE				---
Angle	ASYNCR	---	---	---	---
Voltage	Static	500Volts	---	---	---
Coupler	NONE				---

Parameter	Value
Sync	SYNCHRONOUS
Repetition Rate	30seconds
MaxIPeak	2000Amps

Comments
Traffic over Wifi and Enet continued after testing.

7.2.7. Radio Frequency Common Mode 0.15 MHz – 80 MHz

Scope

This test assesses the ability of the EUT to operate as intended in the presence of a radio frequency electromagnetic disturbance on the input/output ports.

Test Method

The test method shall be in accordance with IEC 61000-4-6.

- The test level shall be severity level 2 as given in IEC 61000-4-6 corresponding to 3 V rms unmodulated. The test signal shall then be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1000 Hz. If the wanted signal is modulated at 1000 Hz, then the test signal of 400 Hz shall be used;
- The test shall be performed over the frequency range 150 kHz to 80 MHz with the exception of an exclusion band for transmitters, and for receivers and duplex transceivers;
- For ITE equipment the stepped frequency increments shall be 1 % frequency increment of the momentary frequency in the frequency range 150 kHz to 80 MHz. The injection method to be used shall be selected according to the basic standard EN 61000-4-6;

Performance Criteria

- For ITE equipment the performance criteria for continuous phenomena for transmitter shall apply

EUT Monitoring

Please refer to section 6.6.2 EUT Configuration - Immunity for EUT Setup and Monitoring Configurations.

Traceability

All test measurements carried out are traceable to national standards. The uncertainty of measurement at a confidence level of not less than 95 %, with a coverage factor of $k=2$, up to and including $3V_{rms}$ within the frequency range 150 kHz to 80 MHz, is ± 0.93 dB.

Laboratory Measurement Uncertainty	
Measurement uncertainty	± 0.93 dB.

Method
Measurements were made per work instruction WI-EMC-06 "Conducted Immunity"

Test Summary

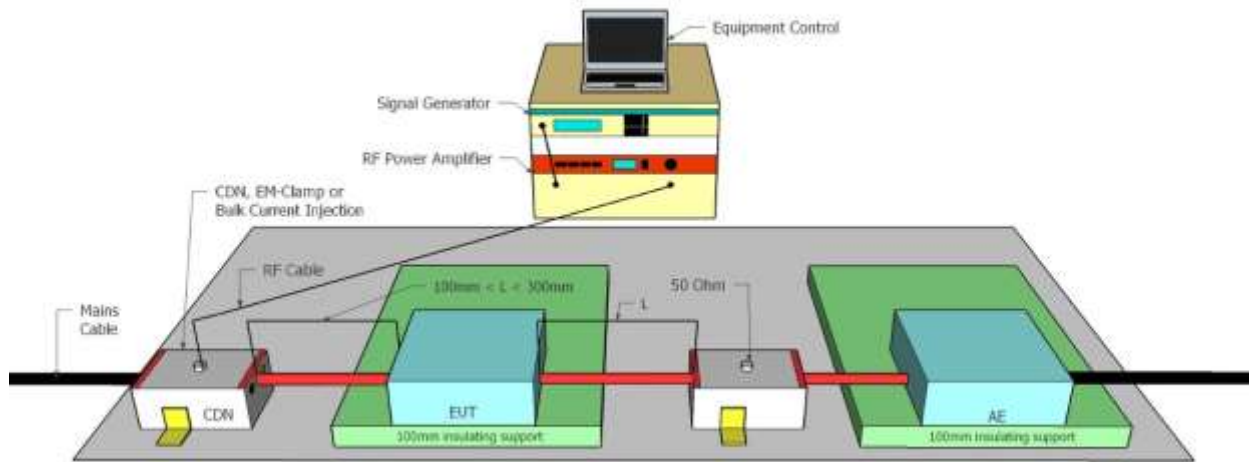
EUT performed in Compliance with EN 301-489-1,17/EN 61326 performance criteria.

Test Equipment Utilized – Radio Frequency Common Mode 0.15 – 80 MHz

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
144	JFW 10dB 100W Attenuator	Werlatone	50FHA0-10-100	N/A	21 Oct 2022
171	Synthesized Sweeper 9kHz-2.05GHz EMC	IFR	2023B	202302/566	20 Oct 2022
178	Amplifier 10kHz-100MHz	Amplifier Research	500A100A	29226	20 Oct 2022
202	BCI Clamp	Amplifier Research	BCI Clamp	28896	20 Oct 2022
209	Current Monitor Probe Bandwidth 1kHz-250MHz	FCC Inc	F-33-2	267	20 Oct 2022
210	AR coupling and de-coupling network for 3 line mains (M3)	EM Test	CDN-M3	0006223C	20 Oct 2022
425	Dell Laptop with Tile Software for CI	Dell	Inspiron 9400	15512213233	Not Required
426	USB to GPIB Interface	National Instruments	GPIB-USB HS	10D6F94	Not Required
508	Test Software	ETS-Lingren	TILE4 Ver 4.2A	508	Not Required
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023
88	Spectrum Analyser 9KHz-40GHz	HP	8564E	3410A00141	Not Required
CC-EMC-06	Confidence Check	MiCOM	CC-EMC-06	None	20 Oct 2022
CI COAX#1	MC-N2N-LMR400-0.8X Coax cable 1 for CI	MARS	CI COAX#1	None	20 Oct 2022
CI COAX#2	Coax cable 2 for CI	HP	CI COAX#2	None	20 Oct 2022
CI COAX#3	Coax cable 3 for CI	HP	CI COAX#3	None	20 Oct 2022
CI COAX#4	Coax cable 4 for CI	HP	CI COAX#4	None	20 Oct 2022
CI GPIB#1	GPIB cable 1 for CI	HP	CI GPIB#1	None	Not Required
CI GPIB#2	GPIB cable 2 for CI	HP	CI GPIB#2	None	Not Required
CI GPIB#3	GPIB cable 3 for CI	HP	CI GPIB#3	None	Not Required
CI GPIB#4	GPIB cable 4 for CI	HP	CI GPIB#4	None	Not Required

Test Setup - Radio Frequency Common Mode 0.15 – 80 MHz

Conductive Immunity Power Line Test Setup



Test Results:

General Conditions					
Ambient Temperature:	18°C	Humidity:	44%	Pressure:	1005
Tested by:	JMH				
Date:	2/14/2022				

Description	Type	Length	Method	Result
ENET (AC/DC PS)	Test Port	3Vrms, 80% AM (1 kHz)	Clamp	PASS
ENET (AC/DC PS)	Management Port	3Vrms, 80% AM (1 kHz)	Clamp	PASS
AC/DC adaptor	AC Mains	3Vrms, 80% AM (1 kHz)	CDN	PASS
ENET (Battery)	Test Port	3Vrms, 80% AM (1 kHz)	Clamp	PASS
ENET (Battery)	Management Port	3Vrms, 80% AM (1 kHz)	Clamp	PASS

7.2.8. Voltage Dips and Interruptions

Scope

These tests assess the ability of the EUT to operate as intended in the event of voltage dips and interruptions present on the AC mains power input ports powered by 230V.

Test Method

The test method shall be in accordance with IEC 61000-4-11. The test levels shall be:

- voltage dip: 0 % residual voltage for 0,5 cycle;
- voltage dip: 0 % residual voltage for 1 cycle
- voltage dip: 70 % residual voltage for 25 cycles
- voltage interruption: 0 % residual voltage for 250 cycles

Performance Criteria

For a voltage dips the following performance criteria apply:

- For transmitters the performance criteria for transient phenomena for transmitters shall apply
- For receivers the performance criteria for transient phenomena for receivers shall apply
- For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

For a voltage interruptions the following performance criteria apply:

- No unintentional responses shall occur at the end of the test;
- In the event of loss of function(s) or in the event of loss of user stored data, this fact shall be recorded in the test report;
- For ancillary equipment the pass/failure criteria supplied by the manufacturer (see Section 7.2.1.2 Customer Declarations) shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

EUT Setup and Monitoring

Please refer to section 6.6.2 EUT Configuration - Immunity for EUT Setup and Monitoring Configurations.

Traceability

All test measurements carried out are traceable to national standards. The uncertainty of measurement at a confidence level of not less than 95 %, with a coverage factor of k=2, in the range up to and including $\pm 230V_{AC}$, 50Hz is ± 0.75 %.

Laboratory Measurement Uncertainty	
Measurement uncertainty	± 0.75 %.

Method
Measurements were made per work instruction WI-EMC-08

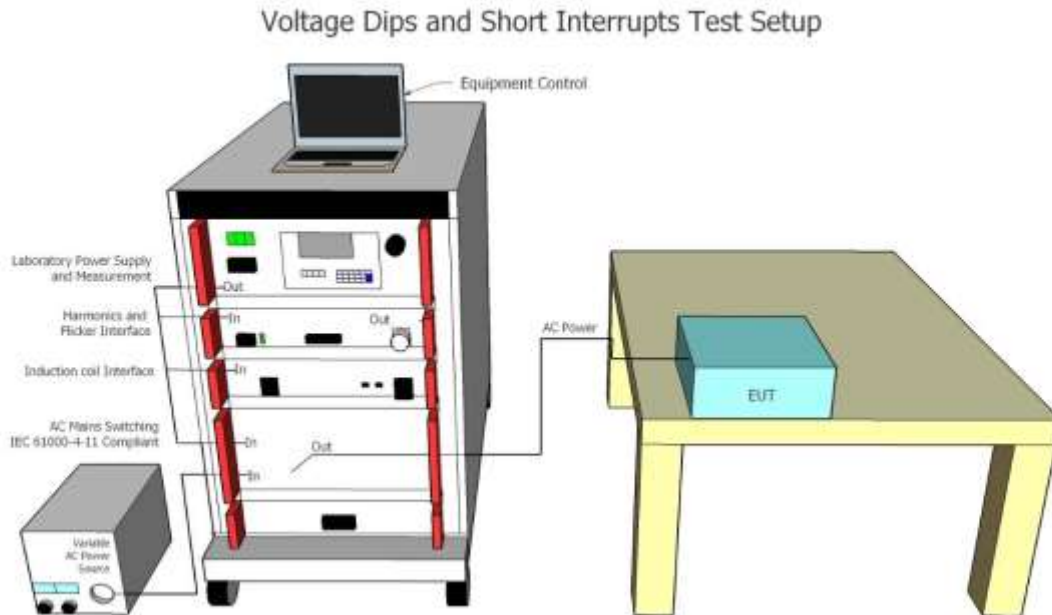
Test Summary

EUT performed in Compliance with EN 301-489-1,17/CISPR 24/EN 61326 performance criteria.

Equipment Utilized – Voltage Dips and Interruptions

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
290	1250VA Power Supply	California Instruments	1215WP	L04664	Not Required
354	5KVA AC Power Source	Teseq	NSG1007	58574	15 Oct 2022
355	AC Switching Unit	Schaffner	NSG 2200	200610-003EK	15 Oct 2022
356	Power Conditioning Unit (Software version Win 2100V3 Version 3.2.0.16)	Teseq	CCN 1000-1	72636	15 Oct 2022
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023
CC-EMC-VDI	Confidence Check	MiCOM	CC-EMC-VDI	None	16 Jun 2022

Test Setup – Voltage Dips and Interruptions



7.2.8.1. Measurement Results

Testing was performed on the power adaptors at 230 V_{AC} 50 Hz. Communication between the EUT and client device was relied upon for performance monitoring, see Section 6.6.2 EUT Configuration - Immunity.

General Conditions					
Ambient Temperature:	17°C	Humidity:	45%	Pressure:	1006
Tested by:	JMH				
Date:	2/11/2022				

Test Results:

AC/DC PS

Test Level (%)	Voltage	Duration (cycles)	Tests	Delay (Secs)	Result (Compliant/ Non Compliant)	Performance Criteria
0 %	0 V _{AC}	0.5	3	10	Compliant	A
0 %	0 V _{AC}	1	3	10	Compliant	A
70 %	161 V _{AC}	25	3	10	Compliant	A
0 %	0 V _{AC}	250	3	10	Compliant	A*

*EUT runs on Battery simultaneously

8. PHOTOGRAPHS

8.1. Radio Emissions < 1 GHz

AC/DC Adapter

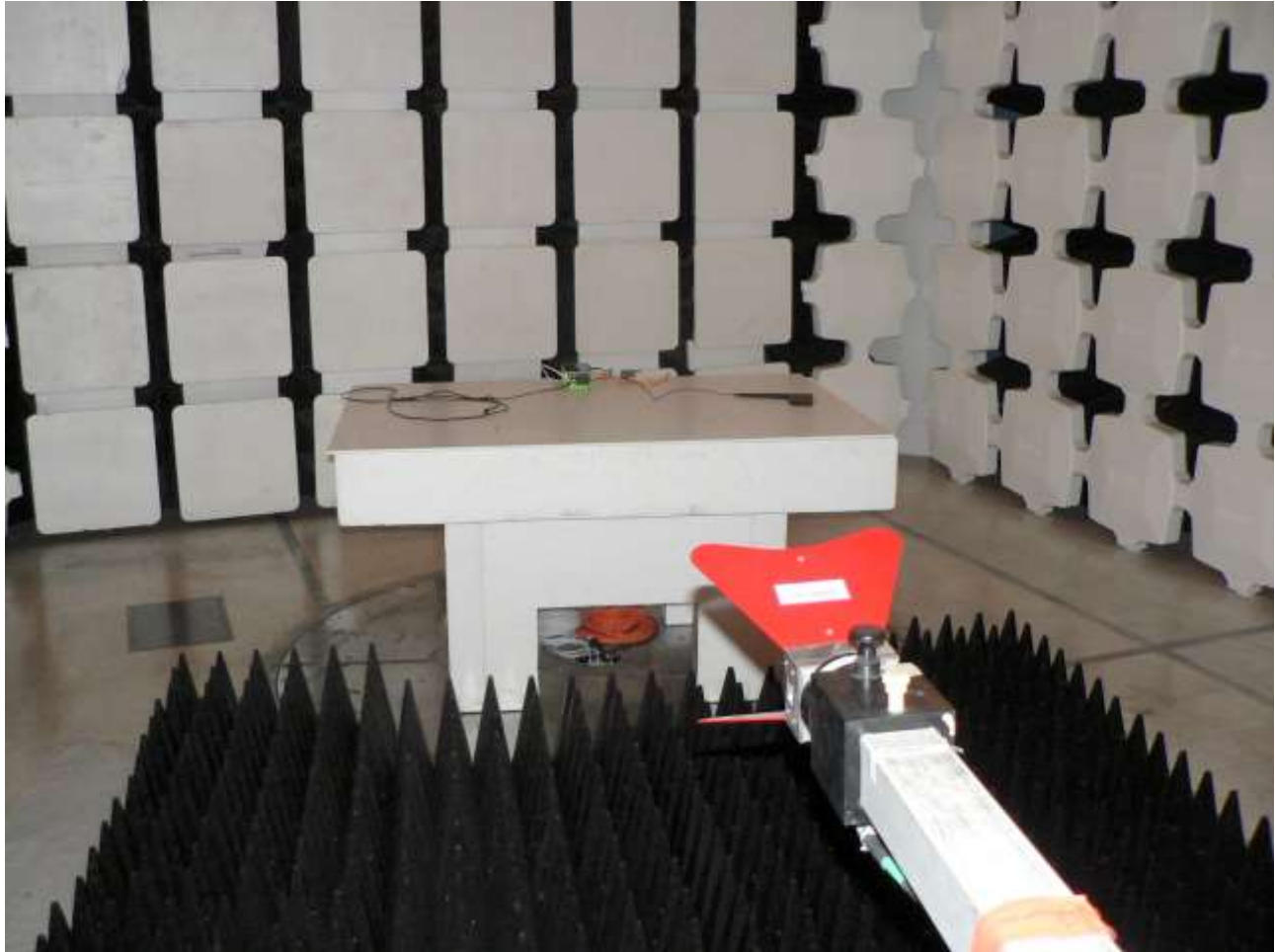


Battery Powered

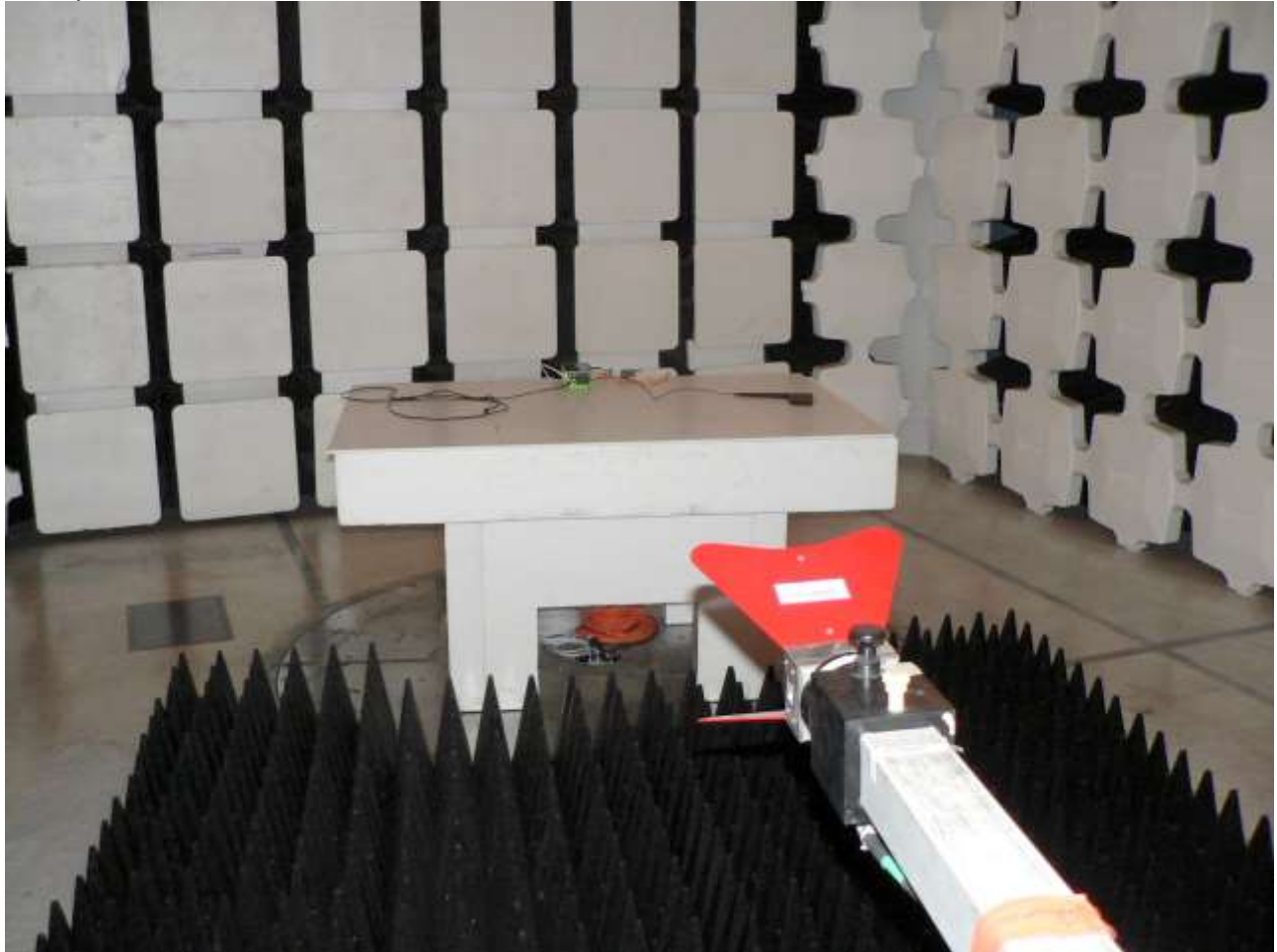


8.2. Radiated Emissions 1 - 6 GHz

AC/DC Adapter



Battery Powered

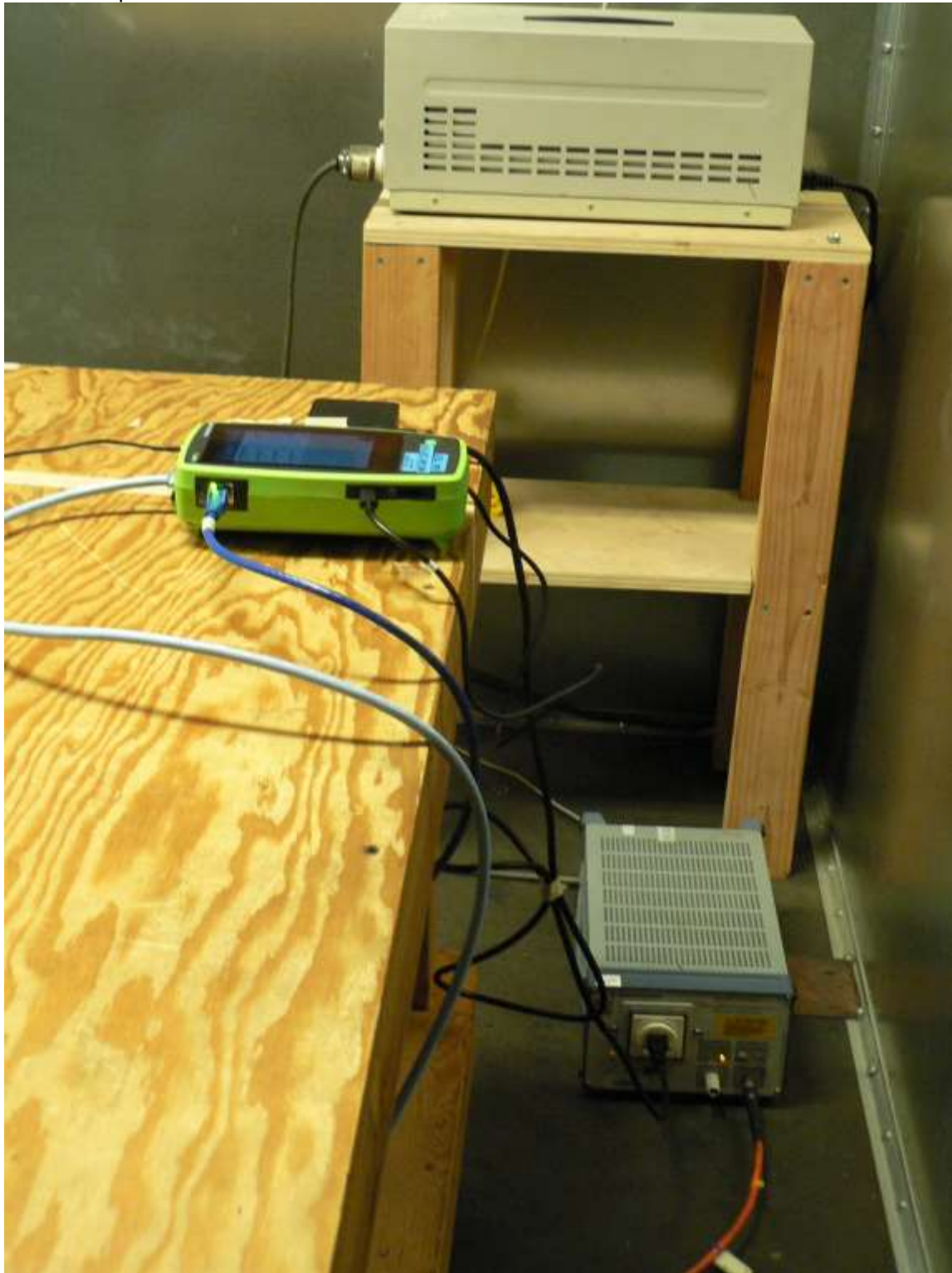


8.3. AC Wireline Emissions

AC/DC Adapter



AC/DC Adapter Side View



8.4. Telecom Emissions

AC/DC Adapter



Battery Powered



8.5. Harmonics and Flicker



8.6. Electro-Static Discharge (ESD)

AC/DC Adapter



Battery Powered



8.7. Radio frequency electromagnetic field 80 MHz – 1,000 MHz

AC/DC PS



Battery Powered;



8.8. Radio frequency electromagnetic field 1 – 6 GHz

AC/DC PS:



Battery Powered:



8.9. Fast Transients Mains

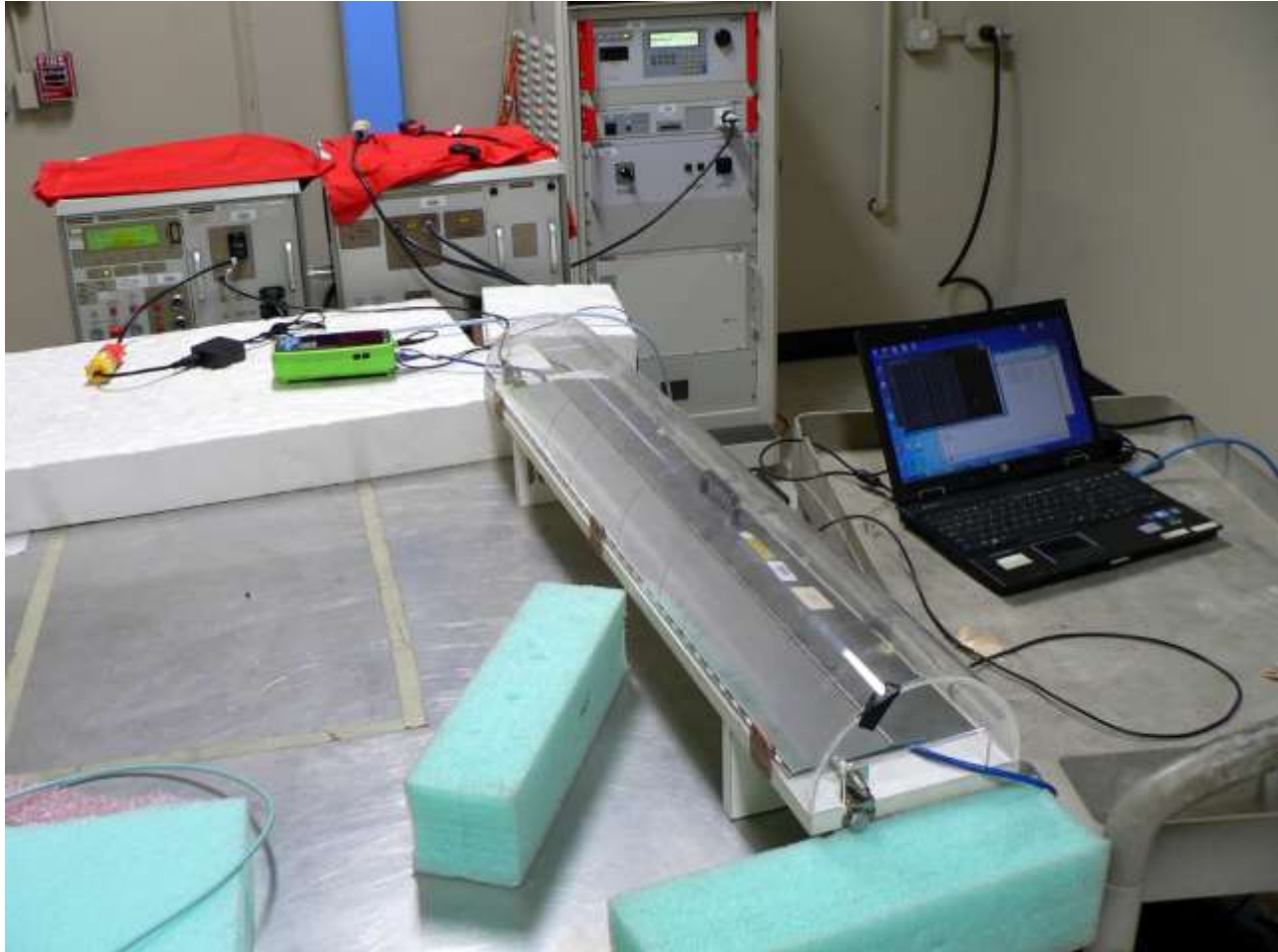


8.10. Fast Transients I/O Lines

AC/DC PS Management Port:



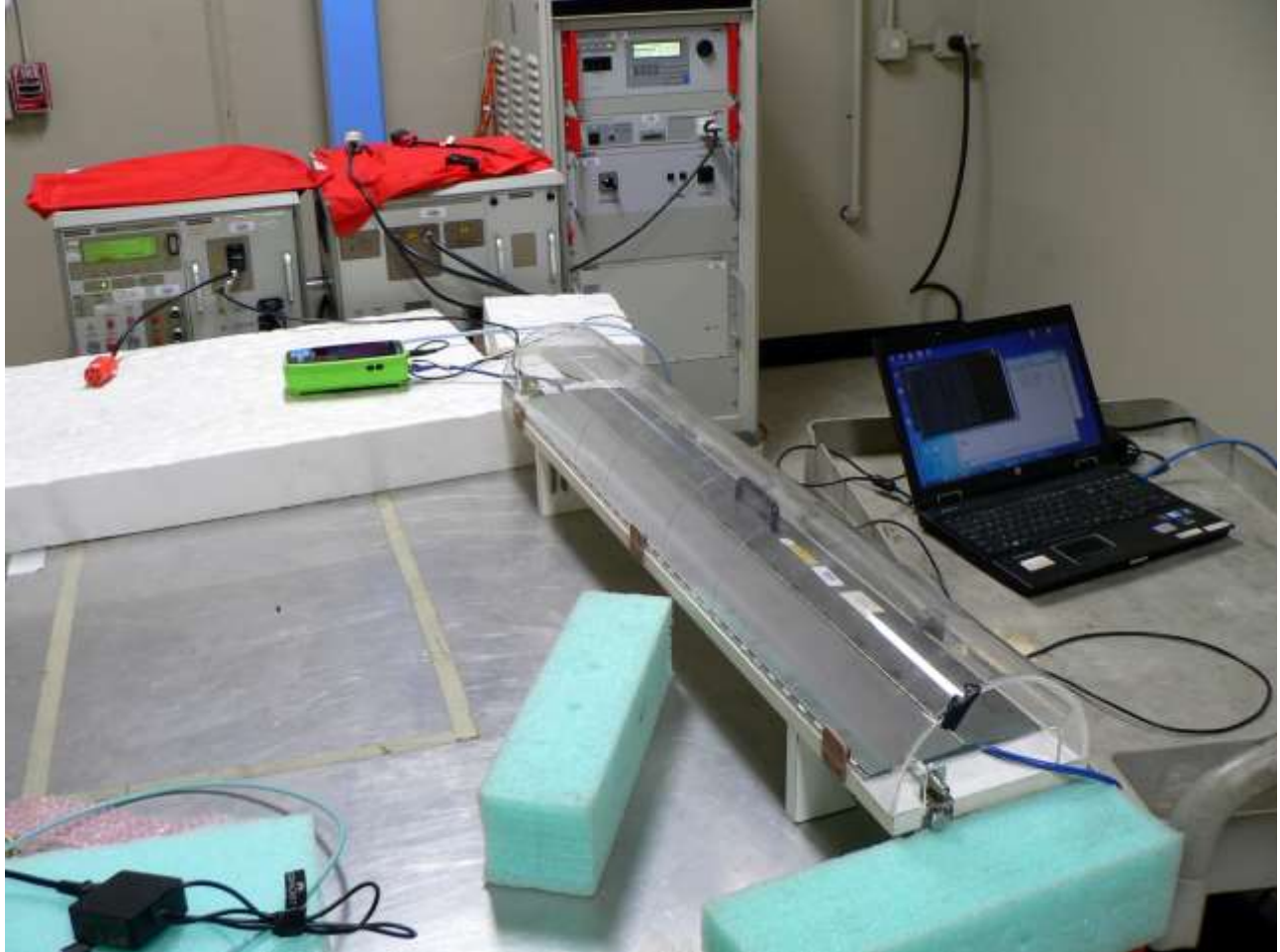
AC/DC PS Test Port:



Battery Management Port:



Battery Test Port:



8.11. Surge Mains



8.12. Surge - Telecommunication Ports

AC/DC PS Management Port:



AC/DC PS Test Port:



Battery Management Port:



Battery Test Port:

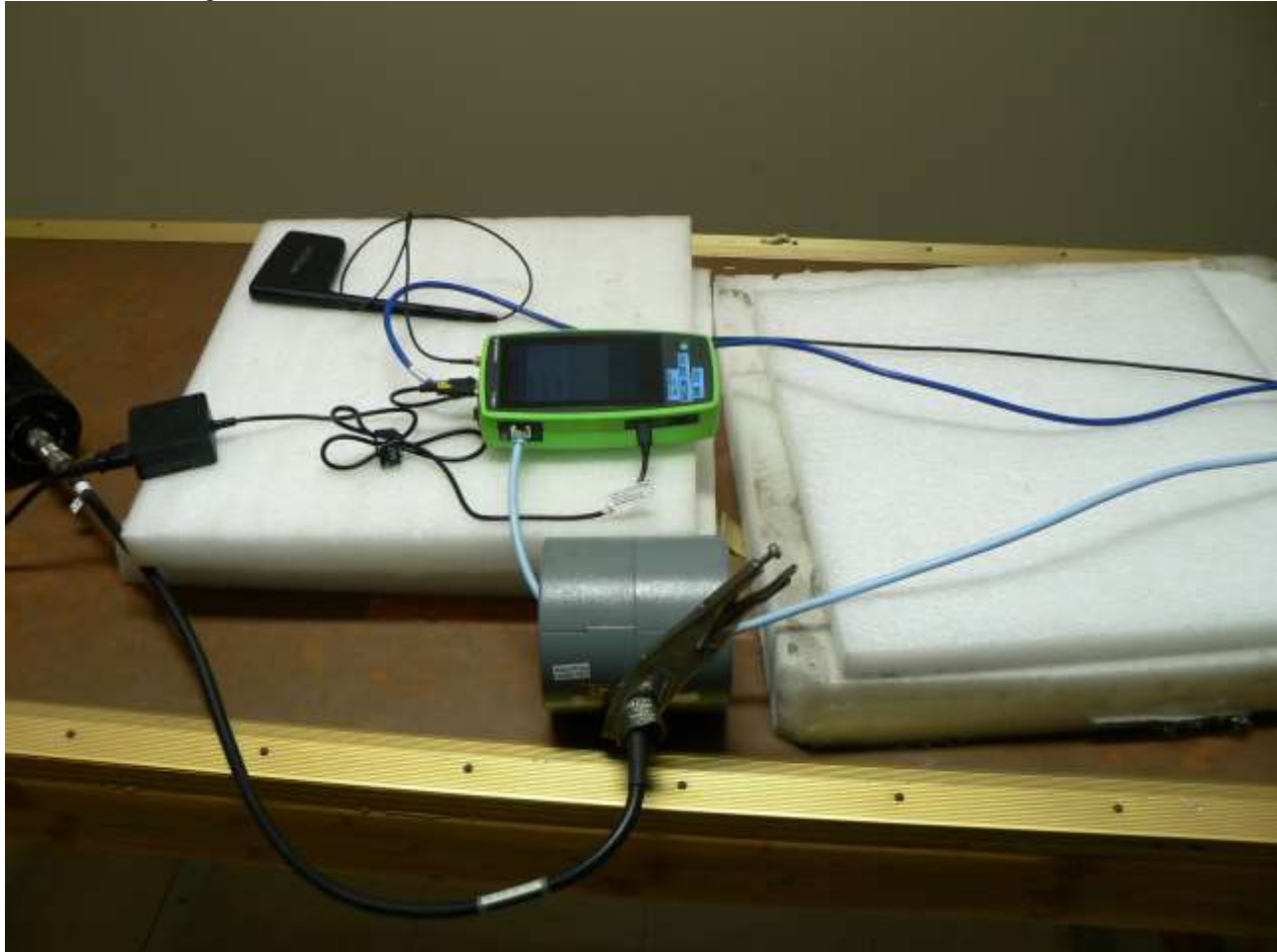


8.13. Radio frequency Common Mode 0.15 MHz – 80 MHz

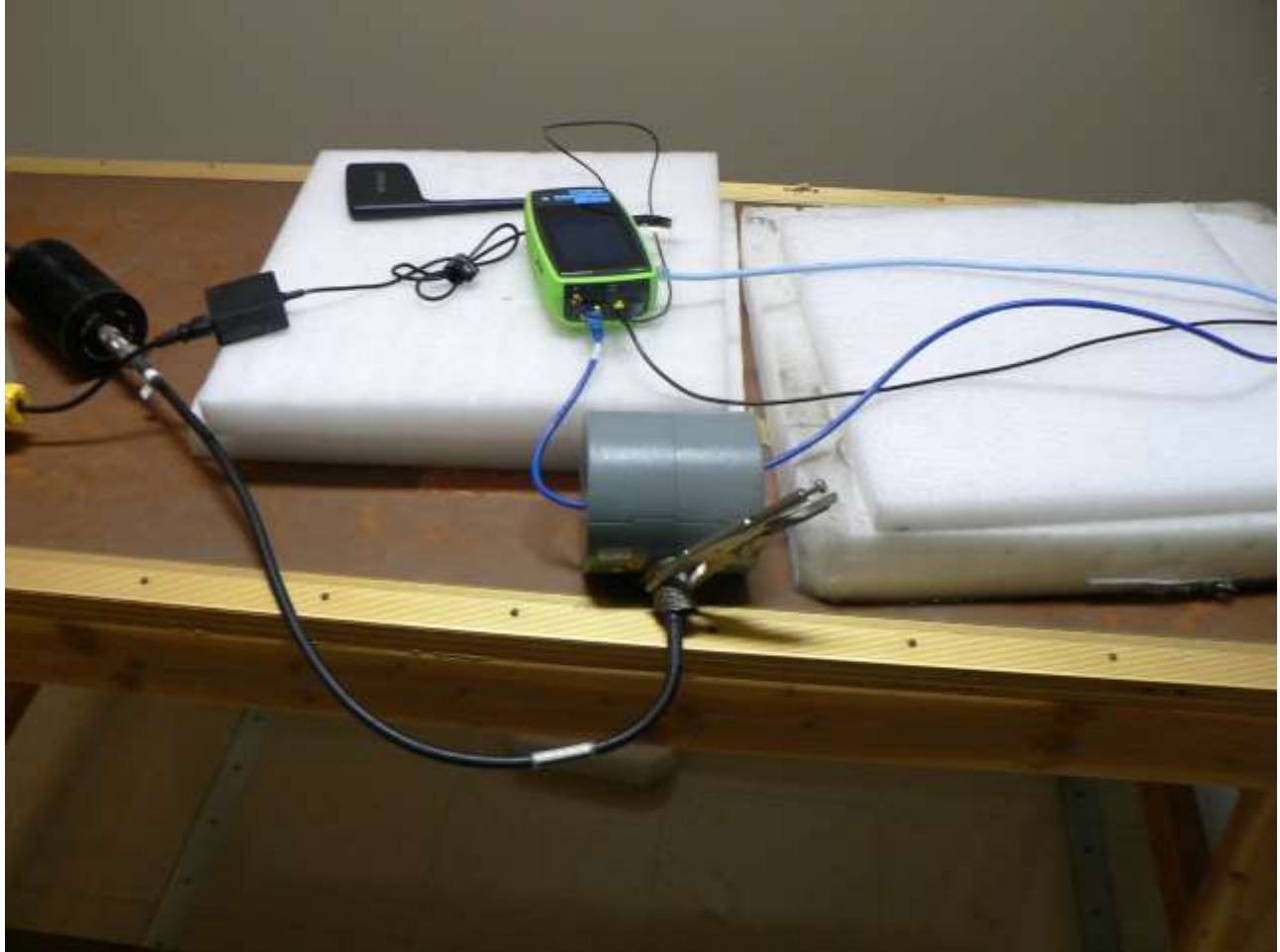


8.14. Radio frequency Common Mode 0.15 MHz – 80 MHz – I/O Lines

AC/DC PS Management Port:



AC/DC PS Test Port:



Battery Management Port:



Battery Test Port:



8.15. Voltage Dips and Interruptions





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