



Global Product Certification
EMC-EMF Safety Approvals

EMC Technologies Pty Ltd

ABN 82 057 105 549
176 Harrick Road, Keilor Park
Victoria 3042, Australia

Ph: +61 (0)3 9365 1000
Fax: +61 (0)3 9331 7455
E-mail: sales@emctech.com.au

RADIO REPORT FOR CERTIFICATION

FCC Part 15 Subpart C Section 15.225

**RSS-210 Issue 9, August 2016
Annex B.6 Band 13.110-14.010 MHz**

Client: Nanosonics Ltd.

Test Sample: Ultrasound probe disinfection device

Product Marketing Name: trophon®2

Model: N05000-1

FCC ID: 2AM5R-TROPHON2

IC: 22999-TROPHON2

Report Number: M170526-3R1

(replacing Report Number M170526-3)

Issue Date: 18 September 2017

EMC Technologies Pty Ltd reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. EMC Technologies Pty Ltd shall have no liability for any deductions, inferences or generalisations drawn by the client or others from EMC Technologies Pty Ltd issued reports. This report shall not be used to claim, constitute or imply product endorsement by EMC Technologies Pty Ltd.



Accredited for compliance with ISO/IEC 17025 - Testing.

The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

RADIO REPORT FOR CERTIFICATION

FCC Part 15 Subpart C (Section 15.225) RSS-210 Issue 9, August 2016

CONTENTS

- 1.0 INTRODUCTION
- 2.0 GENERAL INFORMATION
- 3.0 TEST RESULTS
 - 3.1 §15.203 / RSS-Gen 8.3 Antenna Requirement
 - 3.2 §15.207 / RSS-Gen 8.8 Conducted Limits
 - 3.3 §15.225(a) / RSS-210 B.6(a) Fundamental Field Strength
 - 3.4 §15.225(b,c) / RSS-210 B.6(b,c) Transmission Mask 13.110-14-010 MHz
 - 3.5 §15.209 / RSS-Gen 8.9 Radiated emission limits; general requirements
 - 3.6 §15.225(d) / RSS-210 B.6(d) Spurious Emissions
 - 3.7 §15.225(e) / RSS-210 B.6(e) Frequency Tolerance
 - 3.8 §2.1049 / RSS-Gen 6.6 Occupied bandwidth – 99% power
- 4.0 COMPLIANCE STATEMENT
- 5.0 MEASUREMENT UNCERTAINTY



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

RADIO REPORT FOR CERTIFICATION

Issued by: EMC Technologies Pty. Ltd.,
176 Harrick Road, Keilor Park, VIC 3042, Australia.

Phone: +61 3 9365 1000, **E-mail:** sales@emctech.com.au, **Web:** www.emctech.com.au
FCC registration number: 494713 and ISED Canada iOATS number: IC 3569B

Sample: Ultrasound probe disinfection device
Product Marketing Name: trophon®2

Model: N05000-1

Manufacturer: Nanosonics Ltd.

FCC ID: 2AM5R-TROPHON2

IC: 22999-TROPHON2

Equipment Type: Intentional Radiator (13.56 MHz Transceiver)

Tested for: Nanosonics Ltd.

Address: 14 Mars Road, Lane Cove
New South Wales 2066, AUSTRALIA

Phone: +61 (0)2 8063 1654

Contact: Forough Khandan

Email: f.khandan@nanosonics.com.au

Standard: CFR FCC Part 15 – Radio Frequency Devices

Subpart C – Intentional Radiators

Section 15.225 – Operation within the band 13.110-14.010 MHz

RSS-210 Issue 9, August 2016 – License-Exempt Radio Apparatus:

Category I Equipment

**RSS-Gen Issue 4, November 2014 – General Requirements for
Compliance of Radio Apparatus**

Result: The Trophon2 Ultrasound probe disinfection device complied with the applicable FCC Part 15C and RSS-210 requirements. Refer to Report M170526-3R1 for full details.

Test Dates: 6 to 17 March 2017

Issue Date: 18 September 2017

Test Engineer:


William Alam, EMC Test Engineer

Authorised Signatory:


Rob Weir, Wireless Certification Manager

Attestation:

I hereby certify that the device(s) described herein were tested as described in this report and that the data included is that which was obtained during such testing.



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

**RADIO REPORT FOR CERTIFICATION
FCC PART 15 SUBPART C (SECTION 15.225)
RSS-210 ISSUE 9, AUGUST 2016**

1.0 INTRODUCTION

Test results and procedures were performed in accordance with applicable Federal Communications Commission (FCC) and Innovation, Science and Economic Development (ISED) Canadian standards/regulations for a transmitter operating in the 13.56 MHz band.

1.1 Test Procedure

The measurement procedure used was in accordance with ANSI C63.10: 2013. The instrumentation conformed to the requirements of ANSI C63.2: 2009.

1.2 Summary of Results

FCC Part 15C	Test Performed	Results
15.203	Antenna Requirement	Complied
15.207	Conducted Limits	Complied
15.209	Radiated Emissions Limits; General Requirements	Complied
15.225(a)	Fundamental Field Strength	Complied
15.225(b and c)	Transmission Mask 13.110-14.010 MHz	Complied
15.225(d)	Spurious Emissions	Complied
15.225(e)	Frequency Tolerance	Complied
2.1049	Occupied Bandwidth	141 kHz

ISED Part	Test Performed	Results
RSS-Gen (8.3)	Antenna requirement	Complied
RSS-Gen (8.8)	Conducted emissions limits	Complied
RSS-Gen (8.9)	Radiated Emission Limits (General requirements)	Complied
RSS-210 B.6(a)	Fundamental Field Strength	Complied
RSS-210 B.6(b and c)	Transmission Mask 13.110-14.010 MHz	Complied
RSS-210 B.6(d)	Spurious Emissions	Complied
RSS-210 B.6	Frequency Tolerance	Complied
RSS-Gen 6.6	Occupied Bandwidth	141 kHz

1.3 Modifications by EMC Technologies

No modifications were performed.



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

2.0 GENERAL INFORMATION

2.1 EUT (Transmitter) Details

Wireless Radio:	RFID
Operating band:	13.110 MHz to 14.010 MHz
Modulation type:	ASK
Antenna type:	Integral, inductive loop

2.2 EUT (Host) Details

Test Sample:	Ultrasound probe disinfection device
Model Number:	N05000-1
Product Marketing Name:	trophon®2
Manufacturer:	Nanosonics Ltd.
Supply Rating:	100 – 120V AC, 5A, 50-60 Hz
Highest Frequency:	528 MHz

The trophon®2 is designed to provide High-Level Disinfection of validated medical instruments. Disinfection is achieved by surface exposure to a controlled dose of hydrogen peroxide mist delivered to a disinfection chamber containing the medical instrument.

The trophon®2 is suitable for use in general hospital and health care facilities by clinical personnel only. The trophon®2 has no direct patient-contacting components. Users must be trained in correct use prior to disinfecting any medical instrument.

2.3 Test Configuration

The sample was programmed to transmit a modulated RFID signal continuously.

2.4 Modifications

No modifications were required to achieve compliance.



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

2.5 Test Facility

2.5.1 General

EMC Technologies Pty Ltd is listed by the FCC as a test laboratory able to perform compliance testing for the public. EMC Technologies is listed as an FCC part 47CFR2.948 test lab and may perform the testing required under Parts 15 and 18 – **FCC Registration Number 90560**

EMC Technologies Pty Ltd has also been accredited as a Conformity Assessment Body (CAB) by Australian Communications and Media Authority (ACMA) under the APECTEL MRA and is designated to perform compliance testing on equipment subject to Declaration of Conformity (DoC) and Certification under Parts 15 and 18 of the FCC Commission's rules – **Registration Number 494713 & Designation number AU0001**.

EMC Technologies indoor open air test site (iOATS) have been accepted by Industry Canada for the performance of radiated measurements in accordance with RSS-Gen, Issue 8 - **Industry Canada iOATS number - IC 3569B**

Measurements in this report were performed at EMC Technologies' laboratory in Keilor Park, Victoria Australia.

2.5.2 NATA Accreditation

NATA is the Australian National laboratory accreditation body and has accredited EMC Technologies to operate to the IEC/ISO 17025 requirements. A major requirement for accreditation is the assessment of the company and its personnel as being technically competent in testing to the standards. This requires fully documented test procedures, continued calibration of all equipment to the National Standard at the National Measurements Institute (NMI) and an internal quality system to ISO 9002. NATA has mutual recognition agreements with the National Voluntary Laboratory Accreditation Program (NVLAP) and the American Association for Laboratory Accreditation (A²LA).

EMC Technologies is accredited in Australia by the National Association of Testing Authorities (NATA). All testing in this report has been conducted in accordance with EMC Technologies' scope of NATA accreditation.

The current full scope of accreditation can be found on the NATA website: www.nata.asn.au



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

2.6 Test Equipment Calibration

Measurement instrumentation and transducers were calibrated in accordance with the applicable standards by an independent NATA registered laboratory such as Agilent Technologies (Australia) Pty Ltd or the National Measurement Institute (NMI) or in-house. All equipment calibration is traceable to Australian national standards at the National Measurements Institute.

Equipment Type	Make/Model/Serial Number	Calibration Period dd/mm/yy	Cal. Interval
Chamber	Frankonia SAC-10-2 (R-139)	22/03/2016 - 22/03/2017	1 Year, *1
	Weiss Environmental Chamber (E-010)	15/05/2016 - 15/05/2017	1 Year, *1
Receiver	Rohde & Schwarz ESW26 2 Hz – 26.5 GHz Sn: 101306 (R-143)	31/03/2016 - 31/03/2017	1 Year, *2
	Rohde & Schwarz ESCI 9 kHz - 3 GHz Sn: 100011 (R-028)	13/06/2016 - 13/06/2017	1 Year, *2
Antennas	EMCO 6502 Active Loop 9kHz – 30MHz Sn. 9311-2801 (A-231)	20/07/2015 - 20/07/2018	3 Year, *2
	SUNOL JB6 BICONILOG 30 – 6000 MHz Sn. A012312 (A-363)	26/05/2016 - 26/05/2018	2 Year, *2
Cables	Room 12 inbuilt cable Panel 1 to 10m (C-422)	31/05/2016 - 31/05/2017	1 Year, *1
	Room 12 Antenna cable (C-437)	31/05/2016 - 31/05/2017	1 Year, *1
LISN	EMCO 3825/2 LISN Sn: 9607-2567 (L-022)	20/09/2016 - 20/09/2018	2 Year, *1

Note *1. Internal NATA calibration.

Note *2. External NATA / A2LA calibration



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

3.0 TEST RESULTS

3.1 §15.203 / RSS-Gen 8.3 Antenna Requirement

An internal, permanently attached antenna was incorporated within the device ensuring that it could not be replaced.



3.2 §15.207 / RSS-Gen 8.8 Conducted Limits

3.2.1 Test Procedure

The arrangement specified in ANSI C63.10: 2013 was adhered to for the conducted EMI measurements. The EUT was placed in the RF screened enclosure and a CISPR EMI Receiver as defined in ANSI C63.2: 2009 was used to perform the measurements.

The EMI Receiver was operated under program control, using the Max-Hold function and automatic frequency scanning, measurement and data logging techniques. The specified 0.15 MHz to 30 MHz frequency range was sub-divided into sub-ranges to ensure that all short duration peaks were captured.

3.2.2 Peak Maximising Procedure

For each of the sub-ranges, the EMI receiver was set to continuous scan with the Peak detector set to Max-Hold mode. The Quasi-Peak detector and the Average detector were then used to measure the actual Quasi-Peak and Average level of the most significant peaks detected.

3.2.3 Calculation of Voltage Levels

The voltage levels were automatically measured in software and compared to the test limit. The method of calculation was as follows:

$$V_{EMI} = V_{Rx} + L_{BPF}$$

Where: V_{EMI} = the Measured EMI voltage in dB μ V to be compared to the limit.

V_{Rx} = the Voltage in dB μ V read directly at the EMI receiver.

L_{BPF} = the insertion loss in dB of the LISN, cables and limiter.



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

3.2.4 Plotting of Conducted Emission Measurement Data

The measurement data pertaining to each frequency sub-range were concatenated to form a single graph of (peak) amplitude versus frequency. This was performed for both Active and Neutral lines and the composite graph was subsequently plotted. A list of the highest relevant peaks and the respective Quasi-Peak and Average values were also plotted on the graph.

3.2.5 Results of Conducted Emission Measurement

Shielded Room Temperature: 22°C
Relative Humidity: 50%

As the host device was considered a Class A unintentional radiator and these limits are higher than §15.207 and RSS-Gen 8.3 they were applied to the conducted emission measurements.

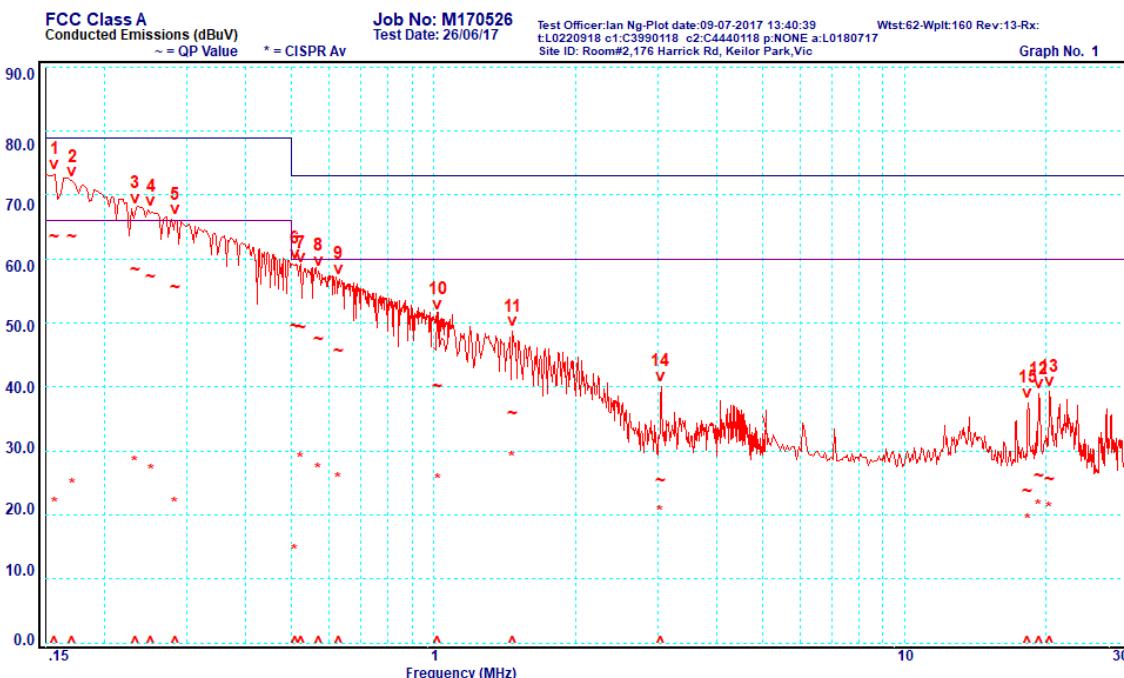
Active Line

Nanosonics Limited
TROPHON2 Ultrasound probe disinfection device

Limit1: FCC_AQPN FCC Part 15.107 Class A - Quasi-Peak Limit (Conducted)

Limit2: FCC_AAVN FCC Part 15.107 Class A - Average Limit (Conducted)

Trace 2: Active Line



Point	Frequency [MHz]	Line	Quasi-Peak			Average		
			Level [dB μ V]	Limit [dB μ V]	Margin [\pm dB]	Level [dB μ V]	Limit [dB μ V]	Margin [\pm dB]
1	0.157	Active	63.5	79.0	-15.5	21.6	66.0	-44.4
2	0.171	Active	63.4	79.0	-15.6	24.6	66.0	-41.4
3	0.233	Active	58.3	79.0	-20.7	28.0	66.0	-38.0
4	0.252	Active	57.2	79.0	-21.8	26.8	66.0	-39.2
5	0.283	Active	55.5	79.0	-23.5	21.6	66.0	-44.4
6	0.509	Active	49.4	73.0	-23.6	14.2	60.0	-45.8
7	0.523	Active	49.3	73.0	-23.7	28.7	60.0	-31.3
8	0.570	Active	47.5	73.0	-25.5	26.9	60.0	-33.1
9	0.630	Active	45.5	73.0	-27.5	25.6	60.0	-34.4
10	1.021	Active	40.1	73.0	-32.9	25.3	60.0	-34.7
11	1.472	Active	35.8	73.0	-37.2	28.9	60.0	-31.1
12	19.28	Active	26.1	73.0	-46.9	21.3	60.0	-38.7
13	20.30	Active	25.4	73.0	-47.6	20.9	60.0	-39.1
14	3.040	Active	25.2	73.0	-47.8	20.4	60.0	-39.6
15	18.26	Active	23.7	73.0	-49.3	19.1	60.0	-40.9



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

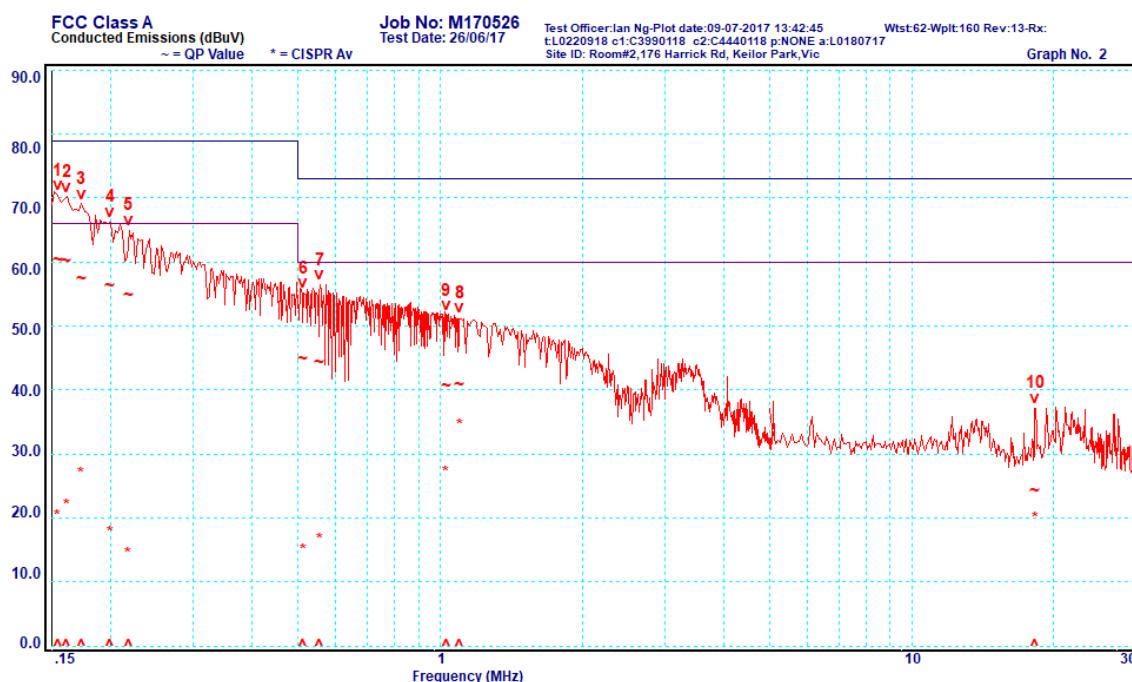
This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

Neutral Line

Nanosonics Limited
TROPHON2 Ultrasound probe disinfection device

Limit1: FCC_AQPN FCC Part 15.107 Class A - Quasi-Peak Limit (Conducted)
Limit2: FCC_AAVN FCC Part 15.107 Class A - Average Limit (Conducted)

Trace 2: Neutral Line



Point	Frequency [MHz]	Line	Quasi-Peak			Average		
			Level [dB μ V]	Limit [dB μ V]	Margin [\pm dB]	Level [dB μ V]	Limit [dB μ V]	Margin [\pm dB]
1	0.155	Neutral	60.3	79.0	-18.7	20.2	66.0	-45.8
2	0.162	Neutral	60.0	79.0	-19.0	21.9	66.0	-44.1
3	0.174	Neutral	57.3	79.0	-21.7	26.8	66.0	-39.2
4	0.200	Neutral	56.2	79.0	-22.8	17.5	66.0	-48.5
5	0.219	Neutral	54.9	79.0	-24.1	14.2	66.0	-51.8
6	0.513	Neutral	44.8	73.0	-28.2	14.8	60.0	-45.2
7	0.556	Neutral	44.3	73.0	-28.7	16.5	60.0	-43.5
8	1.103	Neutral	40.8	73.0	-32.2	34.4	60.0	-25.6
9	1.031	Neutral	40.6	73.0	-32.4	26.9	60.0	-33.1
10	18.26	Neutral	24.2	73.0	-48.8	19.8	60.0	-40.2

3.2.6 Conclusion

The conducted emissions complied with the average and quasi-peak limits of §15.207 and RSS-Gen 8.8 by a margin of 18.7 dB.



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

3.3 §15.225(a) / RSS-210 B.6(a) Fundamental Field Strength

The field strength of the fundamental transmitted frequency was measured inside a compliant ANSI C63.4: 2014 semi-anechoic chamber. The EUT was positioned on a test turn-table and rotated through 360° to determine the highest emissions.

3.3.1 Result

All measurements were made at a distance of 10 metres, the limit extrapolated by 20 dB/decade calculated according to ANSI C63.10 Clause 6.4.4. The fundamental emissions were measured using a quasi-peak detector.

Frequency [MHz]	10 m E-Field (quasi-peak) [dB μ V/m]		30 m E-Field (quasi-peak) [dB μ V/m]		Result
	Measured	Limit	Calculated	Limit	
13.56	61.0	93.5	51.5	84.0	Complied

3.3.2 Conclusion

The field strength of the fundamental transmitted signal complied with the limit of §15.225(a) and RSS-10 B.6(a).



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

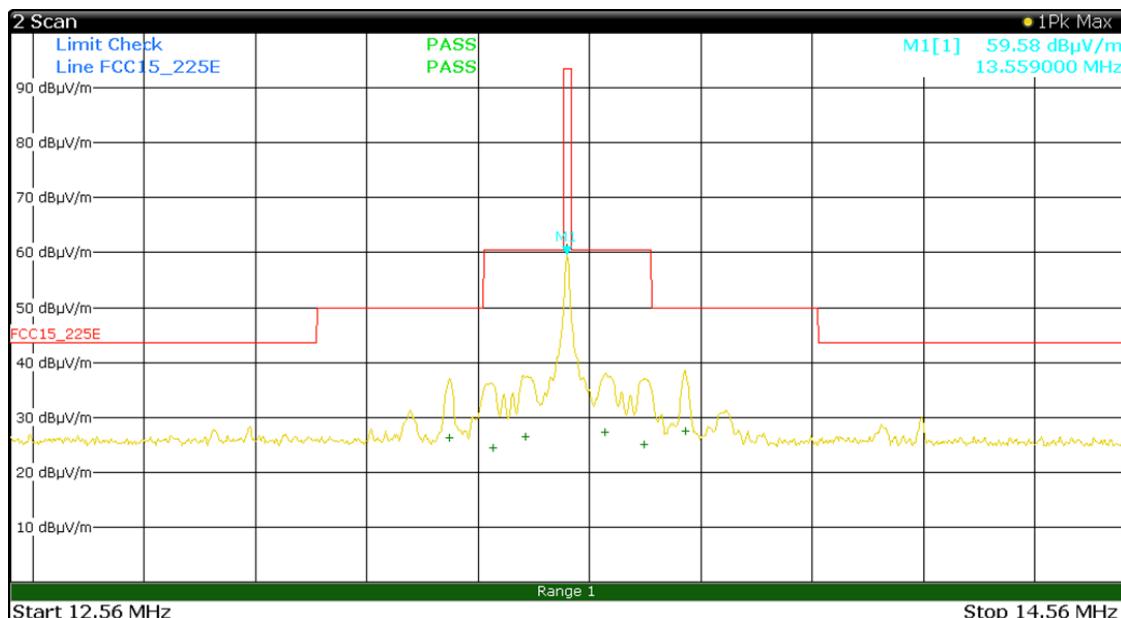
3.4 §15.225(b,c) / RSS-210 B.6(b,c) Transmission Mask 13.110-14-010 MHz

Measurements were made at 10 metres using a 0.6 metre loop antenna, the limit extrapolated by 20 dB/decade calculated according to ANSI C63.10 Clause 6.4.4. Initial investigations were made to find the EUT and measuring antenna orientations that produce the highest reading on the EMI receiver/spectrum analyser. These measurements were made at the transmit frequency, 13.56 MHz.

With the EUT and measuring antenna orientated in the position giving maximum emission measurements with a bandwidth of 9 kHz were made between 13.110 MHz and 14.010 MHz. The following limit mask applied:

Frequency band [MHz]	Field strength limit at 30 m [μ V/m]	Equivalent field strength at 10 m [dB μ V/m]
13.110 to 13.410	106	50.0
13.410 to 13.553	334	60.5
13.553 to 13.567	15,848	93.5
13.567 to 13.710	334	60.5
13.710 to 14.010	106	50.0

3.4.1 Result



Frequency [MHz]	QP level [dB μ V/m]	QP Limit [dB μ V/m]	Margin [dB]
13.35	26.4	50.0	-23.6
13.43	24.5	60.5	-36.0
13.48	26.5	60.5	-34.0
13.56	61.0	93.5	-32.5
13.63	27.3	60.5	-33.2
13.70	25.1	60.5	-35.4
13.77	27.4	50.0	-22.6

3.4.2 Conclusion

The transmitted signal complied with the limit mask of §15.225(b and c) and RSS-210 B.6(b and c).



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

3.5 §15.209 / RSS-Gen 8.9 Radiated emission limits; general requirements

The general requirement limits were applied to the following spurious emission measurements.

3.6 §15.225(d) / RSS-210 B.6(d) Spurious Emissions

Radiated spurious emission measurements were performed in a semi-anechoic chamber compliant with ANSI C63.4: 2014.

The test frequency range was sub-divided into smaller bands with sufficient frequency resolution to permit reliable display and identification of emissions.

Frequency range [MHz]	Measurement Bandwidth [kHz]	Measurement Distance [m]	Antenna
0.009 to 0.150	0.2	10	
0.150 to 30	9	10	0.6 metre loop antenna
30 to 1000	120	10	Biconilog hybrid
1000 to 18 000	1000	3	Standard gain or broad band horns
18 000 to 40 000	1000	1	

The sample was slowly rotated with the spectrum analyser set to Max-Hold. This was performed for at least two antenna heights. When an emission was located, it was positively identified and its maximum level found by rotating the automated turntable and by varying the antenna height. Devices design for a fixed position were tested in that position, portable devices were tested in three orthogonal orientations.

The measurement data for each frequency range was corrected for cable losses, antenna factors and preamplifier gain. This process was performed for both horizontal and vertical antenna polarisations.

Calculation of field strength

The field strength was calculated automatically by the software using the pre-stored calibration data. The method of calculation is shown below:

$$E = V + AF - G + L$$

Where: E = Radiated Field Strength in dB μ V/m.

V = EMI Receiver Voltage in dB μ V/m.

AF = Antenna Factor in dB. (stored as a data array)

G = Preamplifier Gain in dB. (stored as a data array)

L = Cable loss in dB. (stored as a data array of Insertion Loss versus frequency)

Field strength conversion over distance

To convert the limit given at a certain distance to a limit at the measurement distance or vice-versa the following equation was applied:

$$E_x = 20 \times \log \left(\frac{d_y \times 10^{E_y/20}}{d_x} \right)$$

Where: E_x = Electric field at x metres (dB μ V/m)

E_y = Electric field at y metres (dB μ V/m)

d_x = Measurement distance of x metres

d_y = Measurement distance of y metres

Limits:

As the host device was considered a Class A unintentional radiator and these limits are higher than §15.209 and RSS -Gen 8.8 they were applied to the radiated emission measurements.



Accredited for compliance with ISO/IEC 17025 - Testing.

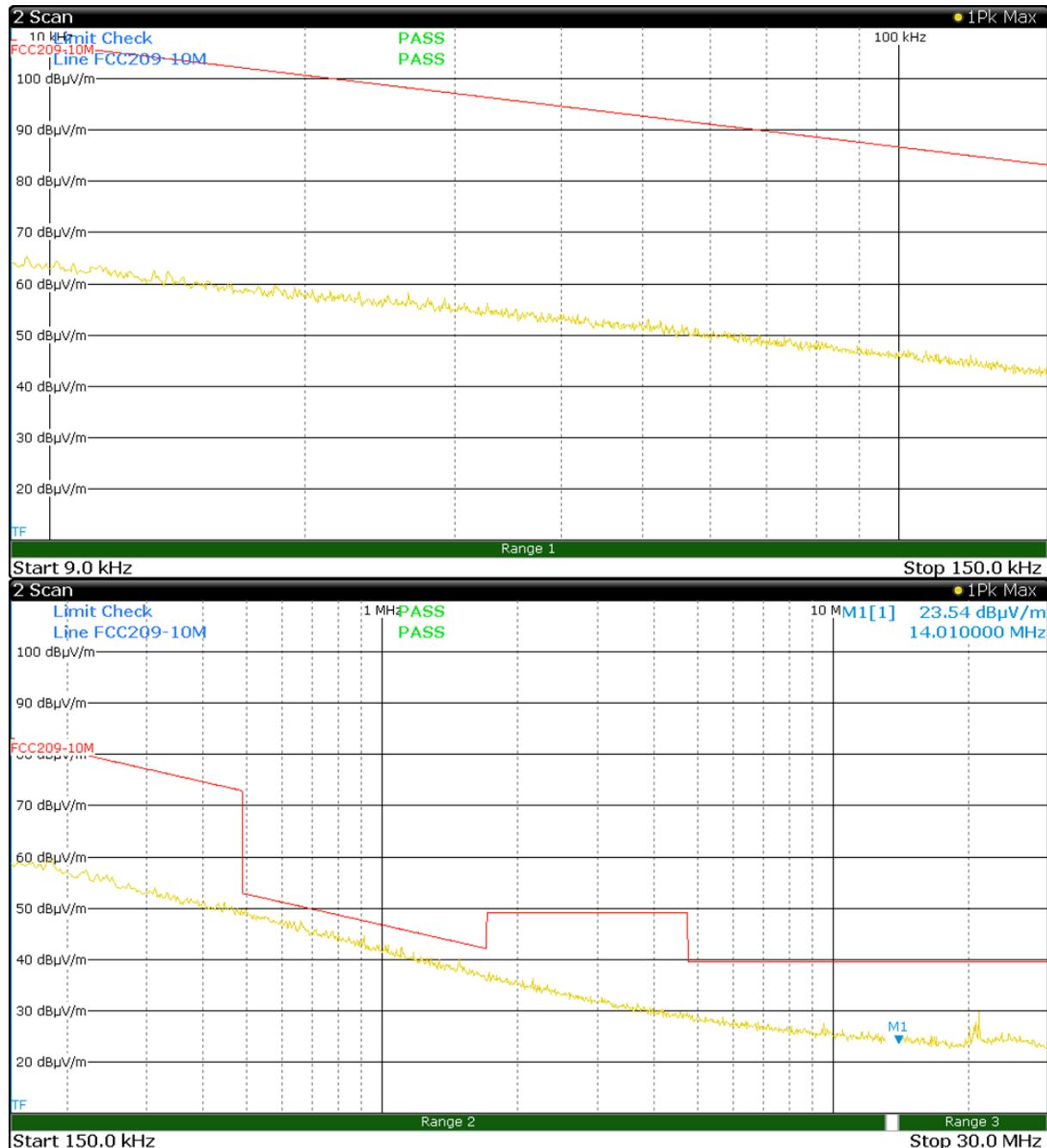
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

3.6.1 Frequency Band: 9 kHz - 30 MHz

Measurements were made at a distance of 10 metres, the limit was extrapolated by 40 dB/decade below 4.76 MHz and 20 dB/decade above 4.76 MHz calculated according to ANSI C63.10 Clause 6.4.4.

Results – Loop antenna parallel



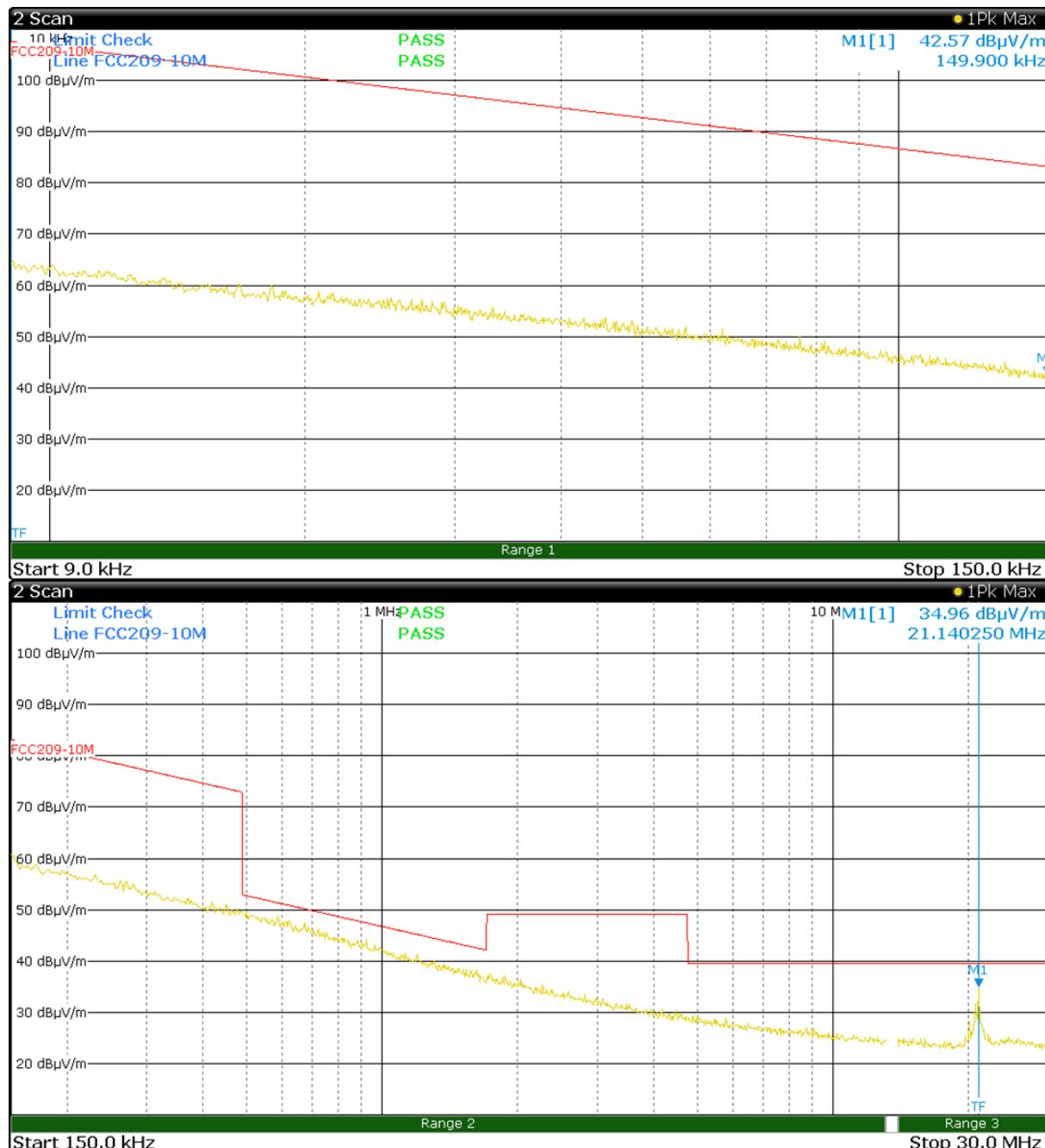
No emissions measured above the noise floor and near the limit.



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

Results – Loop antenna ground-parallel



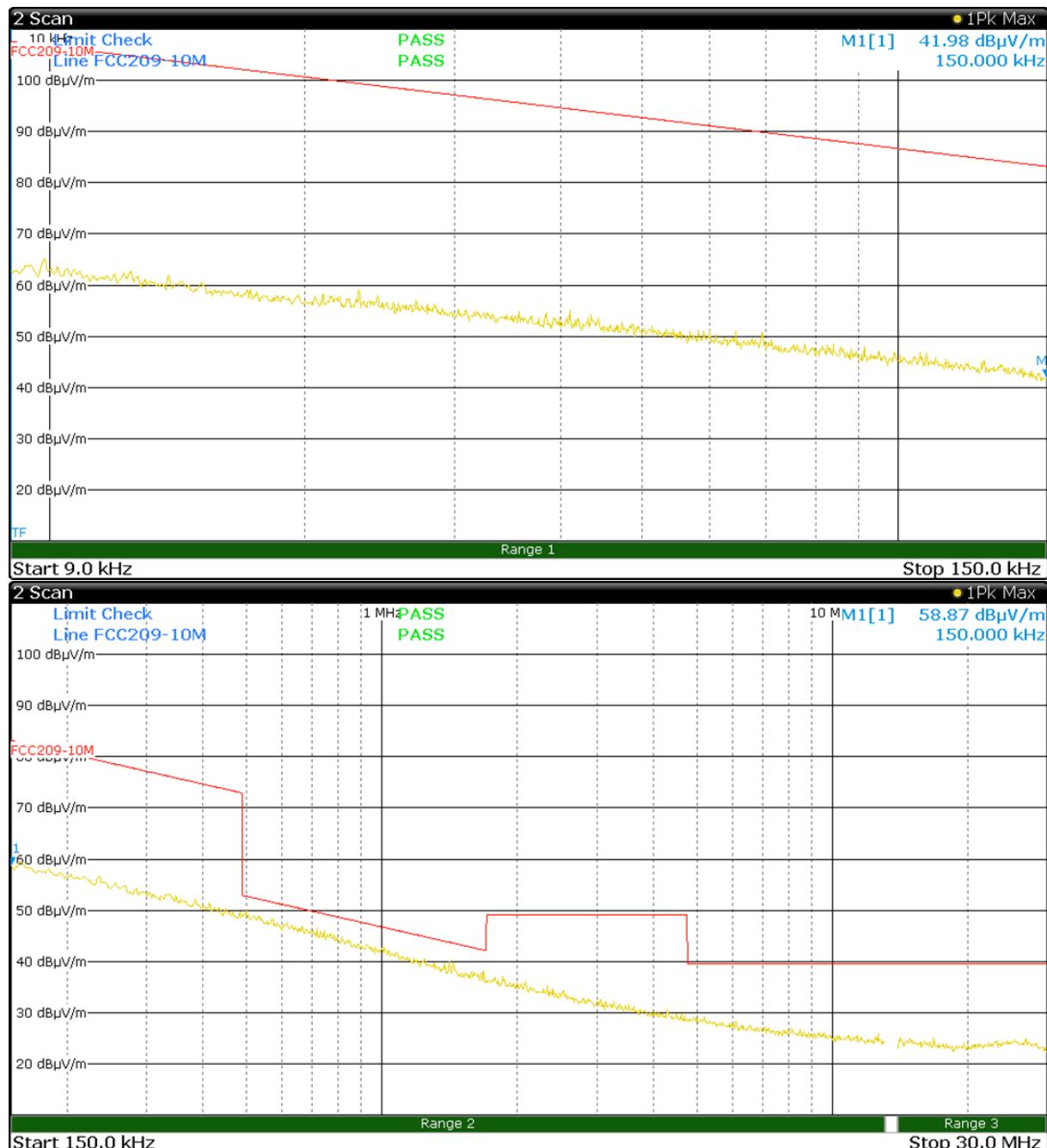
Frequency [MHz]	10 m E-Field (quasi-peak) [dB μ V/m]		30 m E-Field (quasi-peak) [dB μ V/m]		Result
	Measured	Limit	Calculated	Limit	
21.142	30.2	39.0	20.7	29.5	Complied



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

Results – Loop antenna perpendicular



No emissions measured above the noise floor and near the limit.

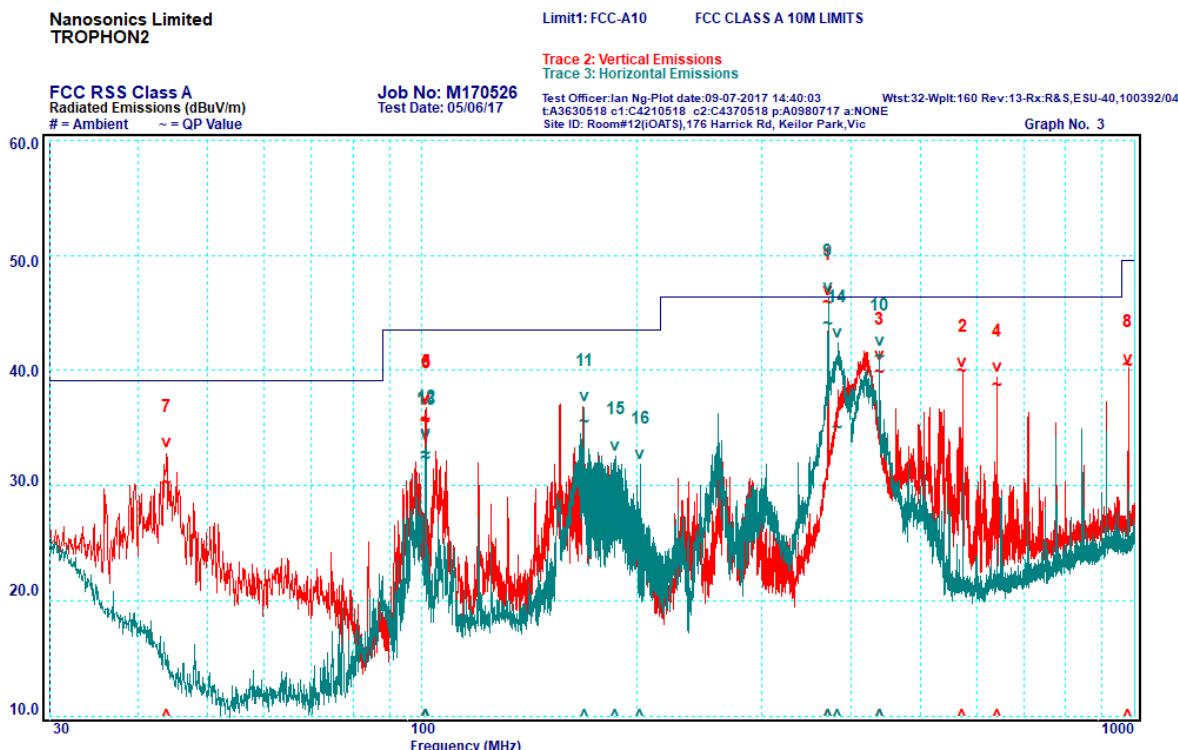


Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

3.6.2 Frequency Band: 30 - 1000 MHz

Measurements were made at a distance of 10 metres. The measurement of emissions between 30 - 1000 MHz were made with a resolution bandwidth (RBW) of 120 kHz and the video bandwidth (VBW) of 300 kHz.



Peak	Frequency [MHz]	Polarisation	10 m Quasi-Peak [dB μ V/m]		3 m Quasi-Peak [dB μ V/m]		Margin [\pm dB]
			Measured	Limit	Calculated	Limit	
1	371.25	Vertical	45.8	46.4	56.3	56.9	-0.6
2	573.74	Vertical	39.9	46.4	50.4	56.9	-6.5
3	438.75	Vertical	39.8	46.4	50.3	56.9	-6.6
4	641.25	Vertical	38.7	46.4	49.2	56.9	-7.7
5	101.25	Vertical	35.7	43.5	46.2	54.0	-7.8
6	101.25	Vertical	35.5	43.5	46.0	54.0	-8.0
7	43.81	Vertical	30.2	39.1	40.7	49.6	-8.9
8	978.75	Vertical	40.4	49.5	50.9	60.0	-9.1
9	371.24	Horizontal	44.0	46.4	54.5	56.9	-2.4
10	438.74	Horizontal	41.1	46.4	51.6	56.9	-5.3
11	168.76	Horizontal	35.6	43.5	46.1	54.0	-7.9
12	101.25	Horizontal	32.7	43.5	43.2	54.0	-10.8
13	101.25	Horizontal	32.4	43.5	42.9	54.0	-11.1
14	382.81	Horizontal	35.0	46.4	45.5	56.9	-11.4
15	186.92	Horizontal	29.0	43.5	39.5	54.0	-14.5
16	202.47	Horizontal	26.5	43.5	37.0	54.0	-17.0



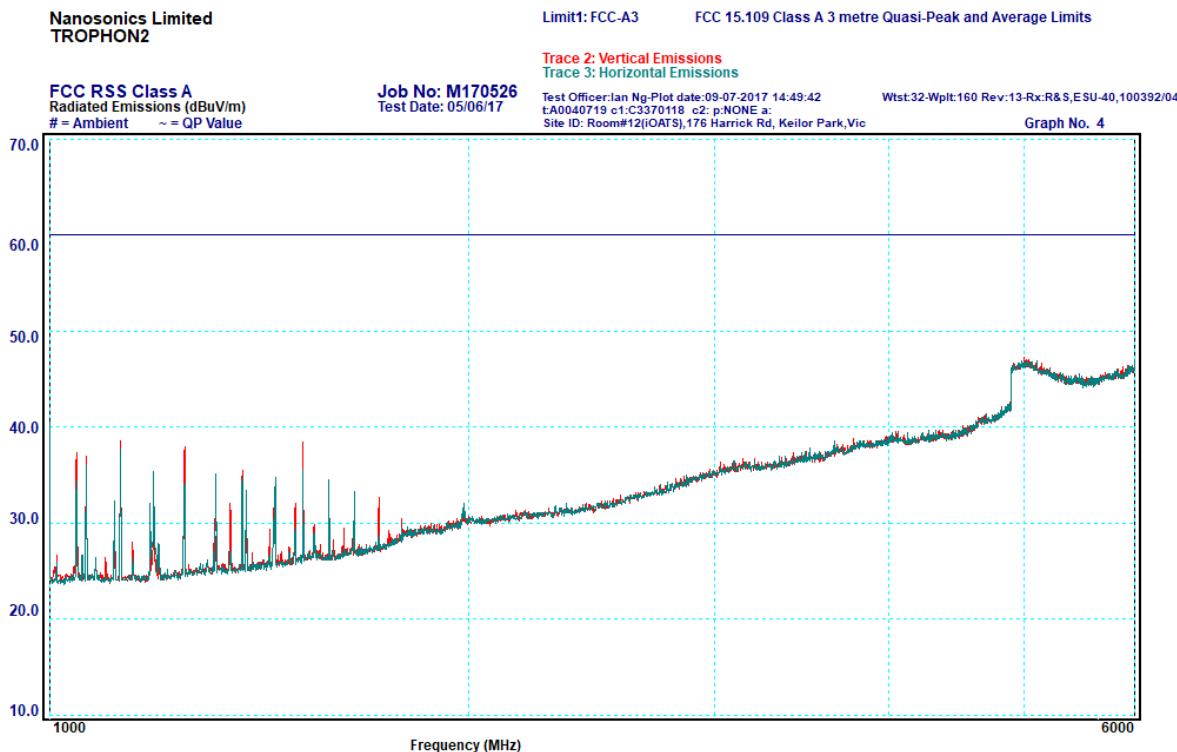
Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

3.6.3 Frequency Band: 1 000 – 6 000 MHz

Measurements up to 18 GHz are made at a distance of 3 metres and 18 to 25 GHz at 1 metre. The measurements were made with a resolution bandwidth (RBW) of 1000 kHz and the video bandwidth (VBW) of 1000 kHz.

Average detector results:



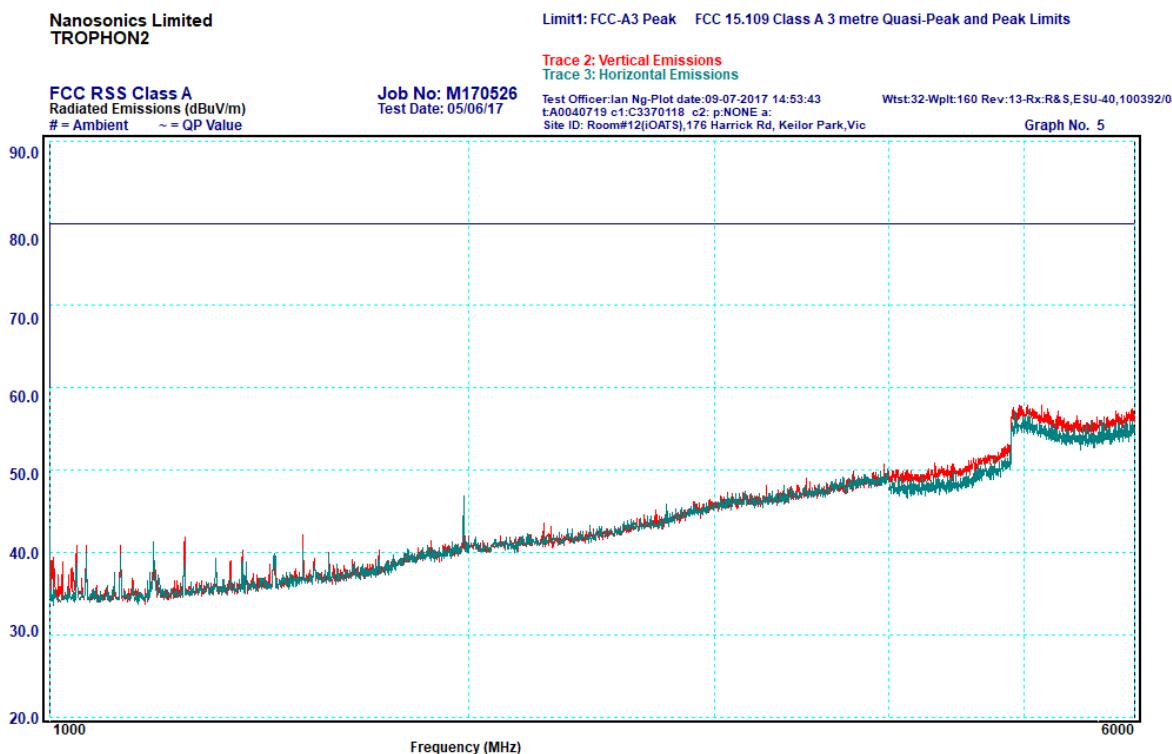
No emissions detected within 10 dB of the limit.



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

Peak detector results



No emissions detected within 20 dB of the limit.

3.6.4 Conclusion

The spurious emissions complied with the general limits of §15.209 and RSS-Gen 8.8 by a margin of 0.6 dB.



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

3.7 §15.225(e) / RSS-210 B.6(e) Frequency Tolerance

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of $-20\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$ at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of $20\text{ }^{\circ}\text{C}$. For battery operated equipment, the equipment tests shall be performed using a new battery. After the sample stabilised at each temperature the transmitter was turned on and the fundamental frequency was measured at regular intervals.

Limit (MHz) = $13.558644 < f < 13.561356$

Temperature ($^{\circ}\text{C}$)	Time after start-up (minute)	Frequency (MHz)	Result
50	0	13.5594	Complied
	2	13.5595	
	5	13.5595	
	10	13.5595	
40	0	13.5594	Complied
	2	13.5595	
	5	13.5595	
	10	13.5595	
30	0	13.5595	Complied
	2	13.5595	
	5	13.5595	
	10	13.5595	
20	0	13.5595	Complied
	2	13.5595	
	5	13.5595	
	10	13.5595	
10	0	13.5595	Complied
	2	13.5595	
	5	13.5595	
	10	13.5595	
0	0	13.5595	Complied
	2	13.5595	
	5	13.5595	
	10	13.5595	
-10	0	13.5595	Complied
	2	13.5595	
	5	13.5595	
	10	13.5595	
-20	0	13.5595	Complied
	2	13.5595	
	5	13.5595	
	10	13.5595	

Temperature ($^{\circ}\text{C}$)	Supply voltage (V)	Frequency (MHz)	Result
20	93.5	13.5595	Complied
	110.0	13.5595	Complied
	126.5	13.5595	Complied



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

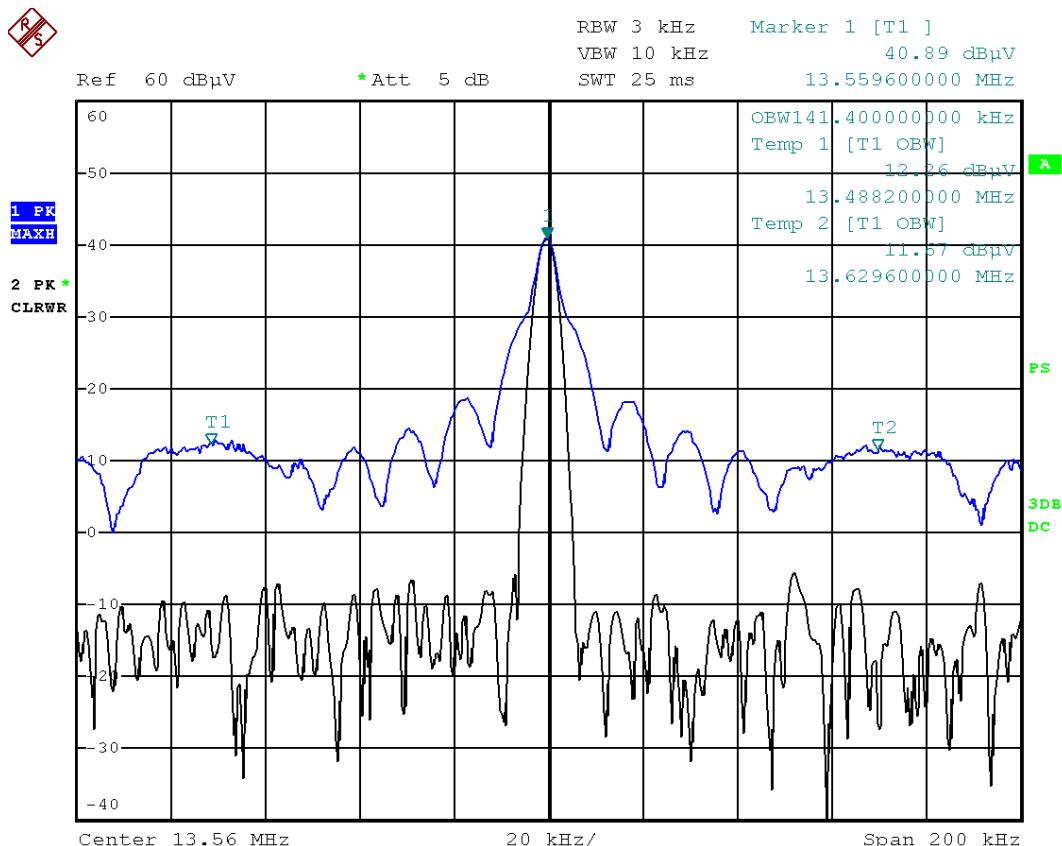
This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

3.8 §2.1049 / RSS-Gen 6.6 Occupied bandwidth – 99% power

The bandwidth containing 99% power of the transmitted signal was measured using the procedure from ANSI C63.10 section 6.9.

Result:

The 99% power bandwidth was **141 kHz**.



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3

4.0 COMPLIANCE STATEMENT

The trophon®2 Ultrasound probe disinfection device tested on behalf of Nanosonics Ltd. **complied** with the requirements of 47 CFR, Part 15 Subpart C - Rules for Radio Frequency Devices (intentional radiators), Section 15.225 - Operation within the band 13.110-14.010 MHz and RSS-210 Annex B.6.

5.0 MEASUREMENT UNCERTAINTY

EMC Technologies has evaluated the equipment and the methods used to perform the emissions testing. The estimated measurement uncertainties for emissions tests shown within this report are as follows:

Conducted Emissions:	9 kHz to 30 MHz	±3.2 dB
Radiated Emissions:	9 kHz to 30 MHz	±4.1 dB
	30 MHz to 300 MHz	±5.1 dB
	300 MHz to 1000 MHz	±4.7 dB
	1 GHz to 18 GHz	±4.6 dB
Peak Output Power:		±1.5 dB

The above expanded uncertainties are based on standard uncertainties multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3