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**RADIO REPORT FOR CERTIFICATION
to
47 CFR Part 15 Subpart C (Section 15.247)**

Test Report Number: S190733-2 v3

FCC ID: PN2-BZT1

Report Number: S190733-2 v3

Tested For: Adherium (NZ) Ltd
Device under Test : Hailie Sensor (for Breztri Aersphere)
Model Number : NF0103
Serial Numbers: 000001, 000002, 000003 and 000005

Issue Date: 16th July 2020

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.

REVISION TABLE

Version	Sec/Para Changed	Change Made	Date
1		Initial issue of document	26/09/2019
2	All	Inclusion of FCC ID: PN2-BZT1	08/07/2020
	1.1	KDB Reference version updated	
	2.5	Equipment Table updated	
	Page 4	Update address	
3	3	Updated Contents Page	16/07/2020
	All	Amend to version 3 and update of Issue Date of Report	16/07/2020

RADIO REPORT FOR CERTIFICATION

47 CFR Part 15 Subpart C (Section 15.247)

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RADIO REPORT **FOR CERTIFICATION**

Test Report No: S190733-2 v3

Product : Hailie Sensor (for Breztri Aerosphere)

Model Number: NF0103
Serial Numbers: 000001, 000002, 000003 and 000005

Manufacturer: Adherium (NZ) Ltd

Tested for: Adherium (NZ) Ltd
Address: Level 11, 16 Kingston Street,
Auckland, 1010, New Zealand

Phone: +64 9 307 2771

Contact: Mr Chris Mander

FCC ID: PN2-BZT1

Standards: **47 CFR Part 15** – Radio Frequency Devices
Subpart C – Intentional Radiators
Section 15.247 – Operation within the bands 902-928 MHz,
2400-2483.5 MHz, and 5725-5850 MHz

Test Dates: 15th August 2019 to 12th September 2019

Issue Date: 16th July 2020

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.

Test Engineer:

Dong Feng

Quinn Wu

**Authorised
Signatory:**

Robert Middleton
Sydney Branch Manager
EMC Technologies Pty Ltd.

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RADIO REPORT FOR CERTIFICATION to 47 CFR Part 15 Subpart C (section 15.247)

1.0 INTRODUCTION

Radio tests were performed on Hailie Sensor (for Breztri Aerosphere) with Model Number: NF0103, in accordance with the applicable requirements of 47 CFR, Part 15 Subpart C – Section 15.247 operating within the band: 2400 MHz to 2483.5 MHz.

1.1 Test Procedure

Radio measurements were performed in accordance with the appropriate procedures of ANSI C63.10: 2013 and KDB 558074 v05r02 - Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247.

The measurement instrumentation conformed to the requirements of ANSI C63.2: 2016.

1.2 Summary of 47 CFR Part 15 Subpart C Results

FCC Part 15 Subpart C	Test Performed	Results
15.203	Antenna requirement	Complied
15.204	Antenna information	Complied
15.205	Restricted bands of operation	Complied
15.207	Disturbance voltage on AC Mains	Not Applicable EUT is DC powered
15.247(c)	Spurious radiated emission 15.209 limit applied	Complied
15.247 (a2)	6 dB Bandwidth	Complied
15.247 (e)	3 kHz Peak Power Density	Complied
15.247 (b)	Peak Output Power	Complied
15.247 (c)	Antenna Gain > 6 dBi	Not Applicable
15.247 (d)	Out of Band Emissions	Complied
15.247 (f)	Hybrid Systems	Not Applicable
15.247 (i)	99% Occupied bandwidth	Complied

1.3 Modifications by EMC Technologies

No modifications were performed on the EUT in order to achieve compliance.

2.0 GENERAL INFORMATION

2.1 EUT (Transmitter) Details

The Equipment Under Test (EUT) was identified as follows:

FCC ID:	PN2-BZT1
Manufacturer:	Adherium (NZ) Ltd
Product :	Hailie Sensor (for Breztri Aerosphere)
Model Number:	NF0103
Serial Number:	000001, 000002, 000003 and 000005
Operating Band:	2.40 – 2.48GHz
Modulation:	GFSK (1Mb/s)
Antenna type and gain:	Integral Omni directional 1dBi
Nominal Power:	2.5nW
Channels:	40
Data Cable:	RG-316 coaxial cable for the antenna extension for test samples with antenna
Classification Type:	Transceiver Bluetooth
Support Equipment:	Empty Breztri Aerosphere Inhaler Docking cradle with USB Lead

2.2 Test Sample Description

The EUT is a hand-held battery operated electronic medical device that clips onto a metered dose inhaler (MDI) to log when medication is used and remind when medication is due.

2.3 Test Configuration

The Test Model firmware for operating mode selected from PC software, and RF modes selected from device control button.

2.4 Test Facility

2.4.1 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 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 – **Designation number AU0002.**

Measurements in this report were performed at EMC Technologies' laboratory in Seven Hills, New South Wales Australia.

2.4.2 NATA Accreditation

NATA is the Australian National laboratory accreditation body and has accredited EMC Technologies to operate to the IEC/ISO17025 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

2.5 Test Equipment Calibration

Measurement instrumentation and transducers were calibrated in accordance with the applicable standards by an independent NATA registered laboratory. All equipment calibration is traceable to Australian national standards at the National Measurements Institute.

Equipment Type	Make/Model Serial Number	Asset No:	Due Date DD/MM/YY
EMI Receivers	Model: ESCI S/N: 100012 9Hz – 3GHz	R-029	27/04/21
	Rohde & Schwarz, 20Hz -40GHz Model: EU40I, S/N: 100138	R-038	27/03/21
Antenna	Double Ridged Horn Antenna 1-18GHz Model: EMCO 3115 S/N: 3823	A-324	29/01/21
	Sunar RF Motion Model: JB1 S/N: A021318	A-430	08/03/21
	ETS Horn Antenna S/N: 00066033	A-305	12/06/21
	EMCO 6502 ELECTRIC ANTENNA S/N: 9108-2660	A-008	12/12/21
Cables	13m RG214 N-Type, 0.1- 6000MHz	SC-028	16/07/20
Preamplifier	HP 8449B Preamplifier Model: HP 8449B S/N: 3008A01113	A-138	07/08/20

TEST SITES

Equipment Type	Make/Model Serial Number	Due Date DD/MM/YY
Shielded Room/ Test Laboratory	7.23m × 4.83m × 2.45m	N/A
Indoor Open Area Test Site (iOATS)	RFI Industries S800 Serial Number: 876, 3 metre site iOATS situated at Seven Hills, NSW	20/04/21

3.0 TEST RESULTS

3.1 §15.203 Antenna Requirement

Requirement:

No antenna other than that furnished by the responsible party shall be used with the device.

Results:

The antenna was integral to the device ensuring that it could not be replaced.
EUT was fully enclosed.

Conclusion: Complied

3.2 §15.204 Antenna Information

Requirement:

Provide information for every antenna proposed for the use with the EUT.

Results:

- | | |
|--|--------------------------|
| a) Antenna type: | Integral omnidirectional |
| b) Manufacture and model No.: | NA |
| c) Gain with reference to an isotropic radiator: | 1 dBi |

Conclusion: Complied

3.3 §15.207 Conducted Limits

Testing on AC mains not applicable as the EUT is DC battery powered.

3.4 §15.247(a2) 6 dB Bandwidth

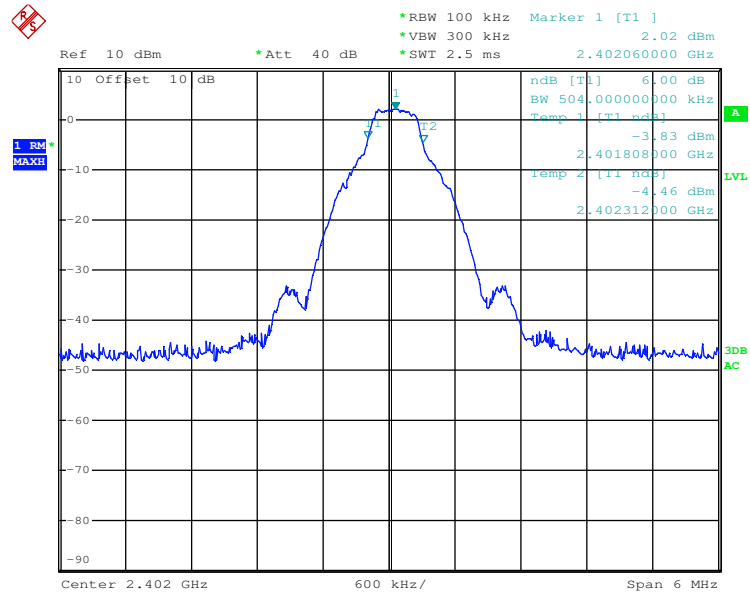
Requirement:

Systems using digital modulation techniques may operate in the 902-928MHz, 2400- 2483.5MHz, and 5725-5850MHz bands. The minimum 6dB bandwidth shall be at least 500kHz.

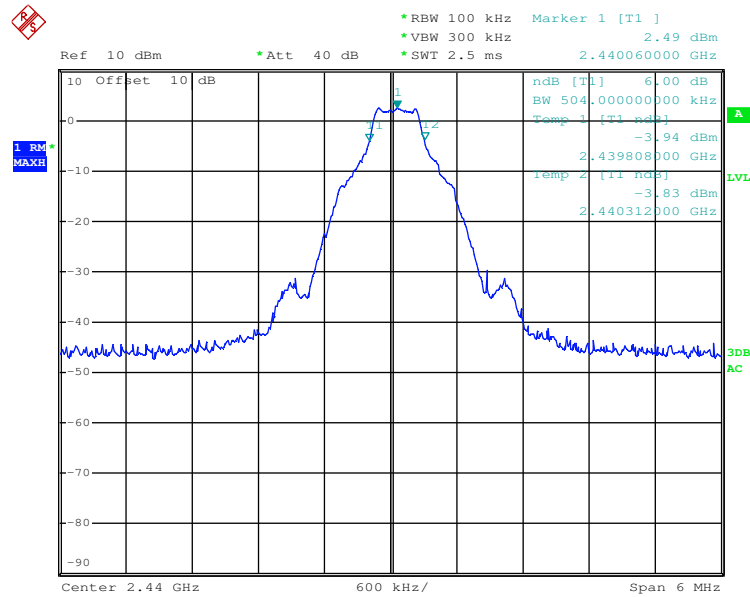
Results:

6 dB Emission Bandwidth:

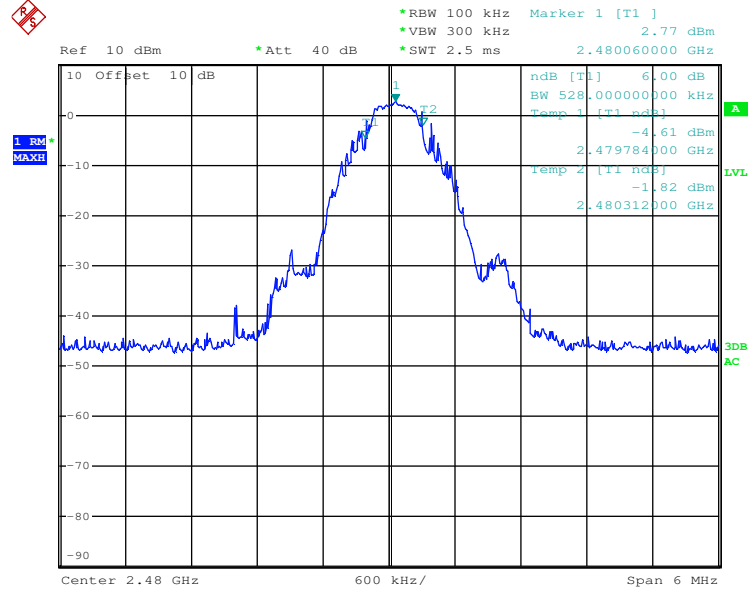
Centre Frequency [MHz]	6 dB Bandwidth [kHz]
2402	504
2440	504
2480	528

Channel 2402 MHz

Date: 15.AUG.2019 14:16:34

Channel 2440 MHz

Date: 15.AUG.2019 14:03:02

Channel 2480 MHz

Date: 15.AUG.2019 14:10:54

Conclusion: Complied

3.5 §15.247(e) 3 kHz Peak Power Density

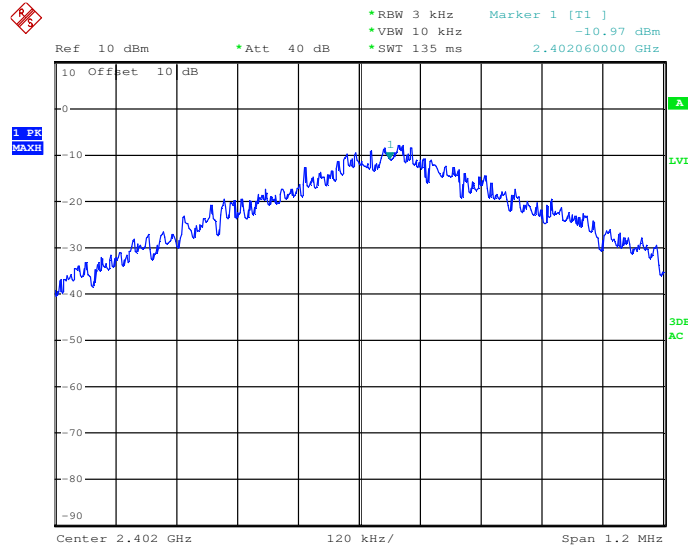
Requirement:

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Results:

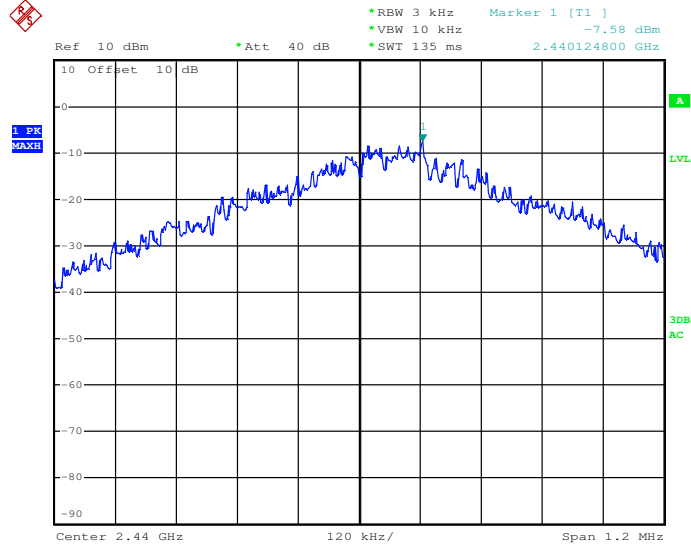
Centre Frequency [MHz]	3 kHz Peak Power density [dBm]
2402	-10.97
2440	-7.58
2480	-8.45

Channel 2402 MHz



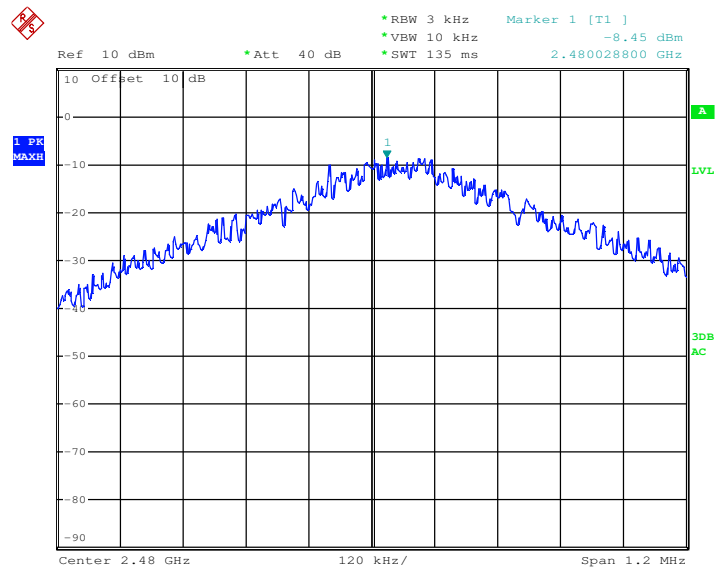
Date: 15.AUG.2019 14:23:31

Channel 2440 MHz



Date: 15.AUG.2019 14:24:15

Channel 2480 MHz



Date: 15.AUG.2019 14:24:41

3.6 §15.247(b) Peak Output power

For system using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz Bands: 1 Watt.

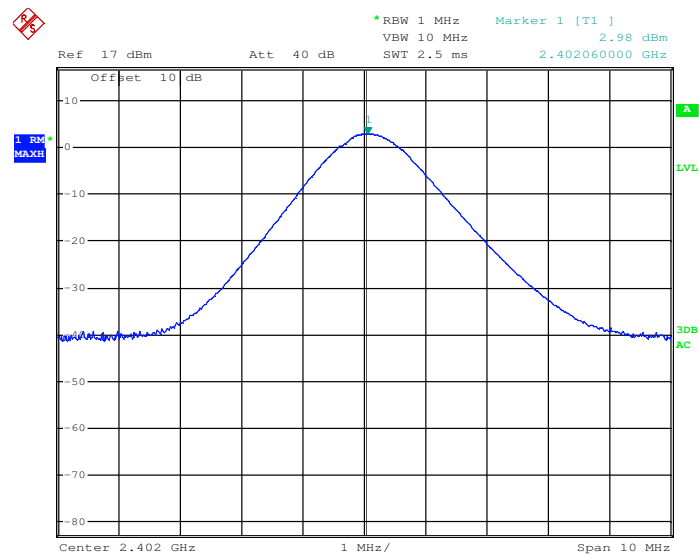
1W=30dBm.

The antenna gain of integral antenna is 1 dBi.

Results:

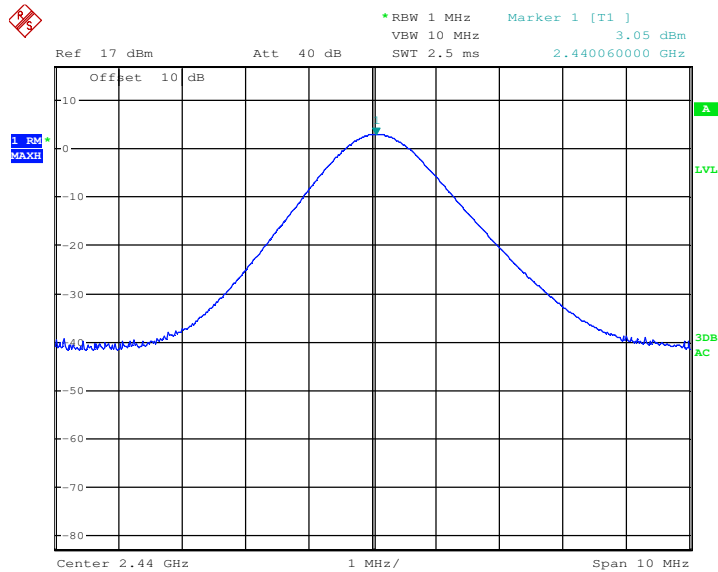
Frequency (MHz)	Conducted Power Measured (dBm)
2402	2.98
2440	3.05
2480	3.11

Channel 2402 MHz



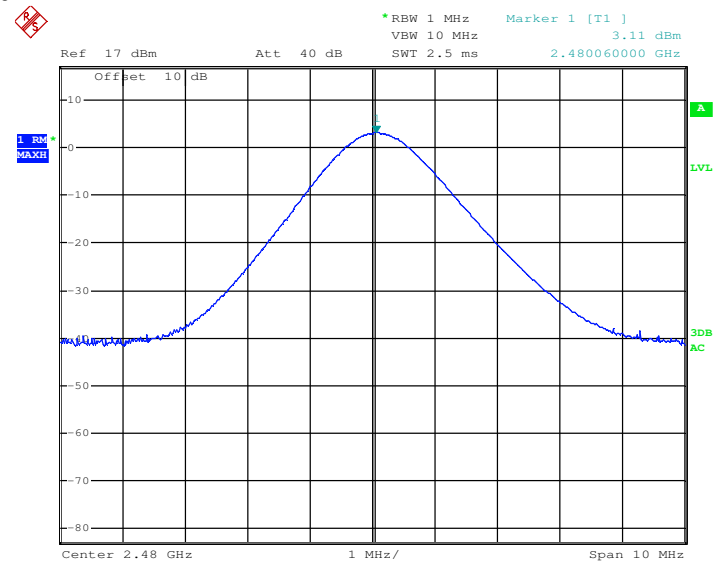
Date: 15.AUG.2019 09:14:38

Channel 2440 MHz



Date: 15.AUG.2019 09:16:07

Channel 2480 MHz



Date: 15.AUG.2019 09:17:16

Conclusion: Complied

3.7 §15.205 Restricted Bands of Operation

Requirement:

Radiated emissions which fall in the restricted bands, as defined in 15.205(a), Must also comply with the radiated emission limits specified in 15.209(a).

Results:

The 15.209 limit was applied across the applicable spectrum and therefore complied with the restricted band requirements. Refer to result plots in 3.8 of this report. Two restricted bands are located either side of operating band: 2310-2390MHz, 2483.5-2500MHz. 2390MHz was checked as band edge of bottom channel and 2483.5MHz was checked as band edge of top channel. Refer to result plots in 3.9 of this report.

Conclusion: Complied

3.8 §15.247(d) Spurious Radiated Emission

Requirement:

In any 100KHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a)

Limits of 15.209(a) was applied across the applicable spectrum as that is the most stringent requirement.

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 30	9	3	Active loop antenna
30 to 1000	120	3	Biconilog antenna
1000 to 18 000	1000	3	Broad band horn
18 000 to 25 000	1000	1	Broad band horn

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 prescanned in three orthogonal orientations to decide maximum emission direction.

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 software using pre-stored calibration data. The method of calculation is shown below:

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

Where:

- E** = Radiated Field Strength in dBμV/m.
- V** = EMI Receiver Voltage in dBμV. (measured value)
- 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)

3.8.1 Frequency Band: 0.009 - 30 MHz

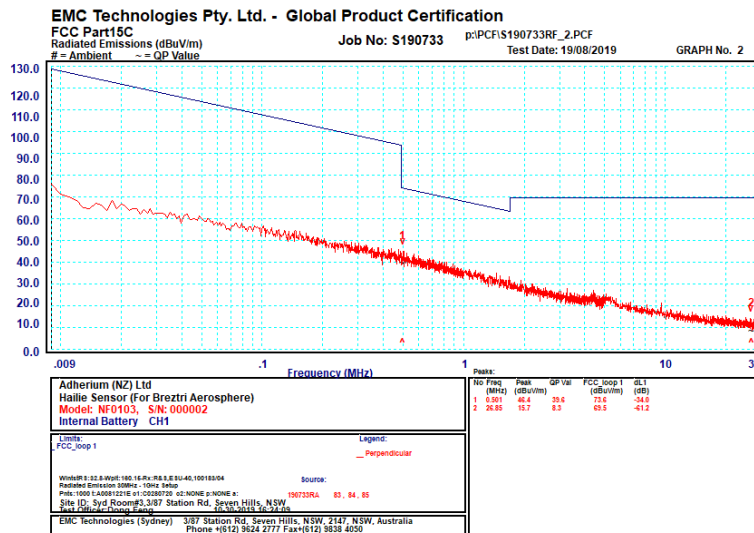
Measurements were made at a distance of 3 metres. The measurement of emissions between 0.009 - 30 MHz were made with a resolution bandwidth (RBW) of 9 kHz and the video bandwidth (VBW) of 30 kHz.

The §15.209 limit applied

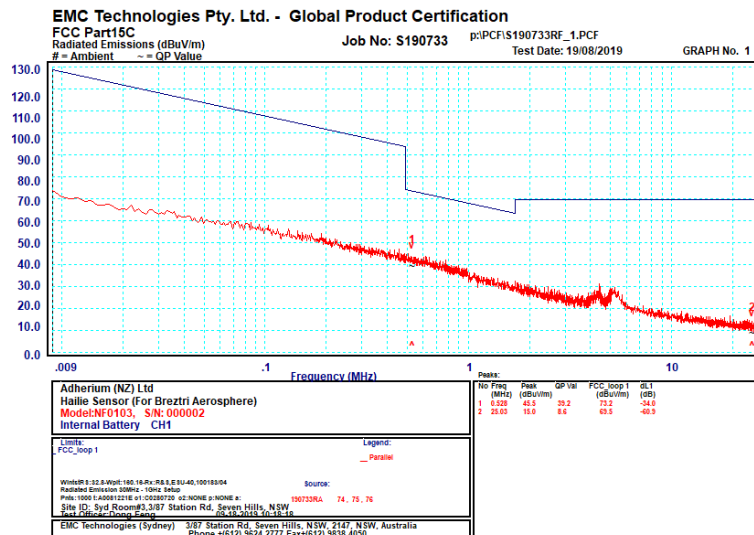
Test Result:

All measured frequencies complied with the Limit by a margin of greater than 10dB.

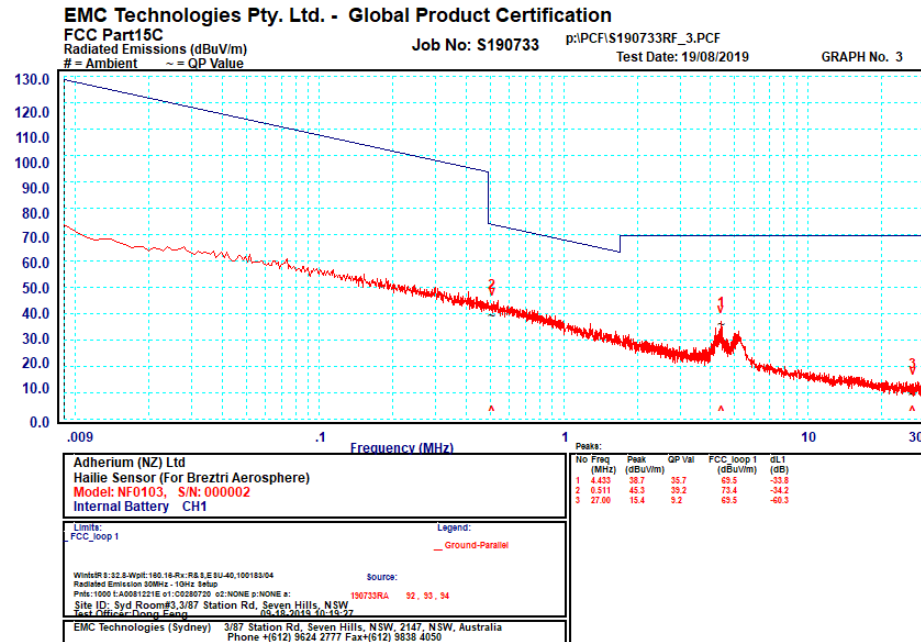
Channel 2402, Perpendicular Polarisation



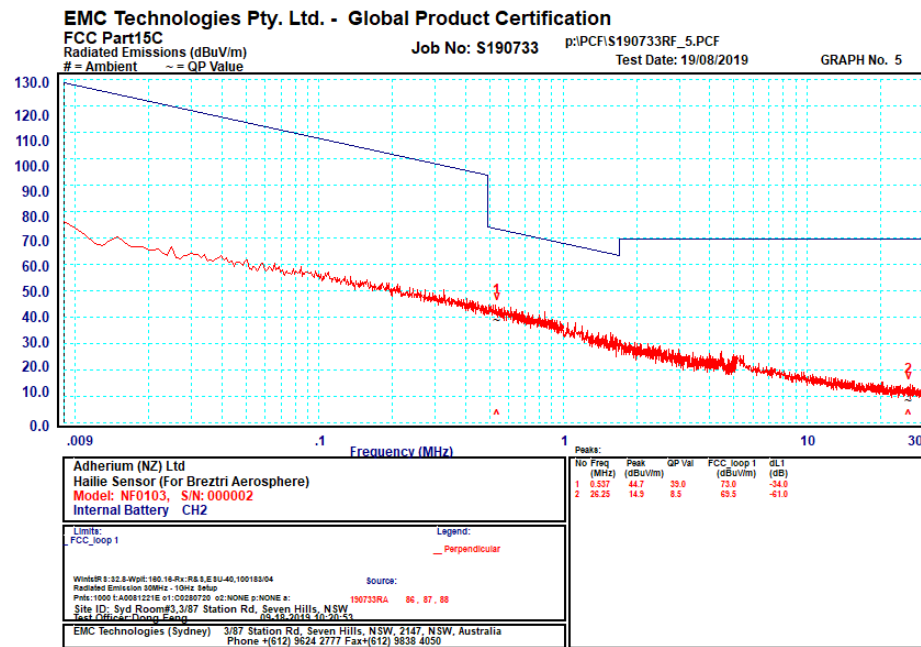
Channel 2402, Parallel Polarisation



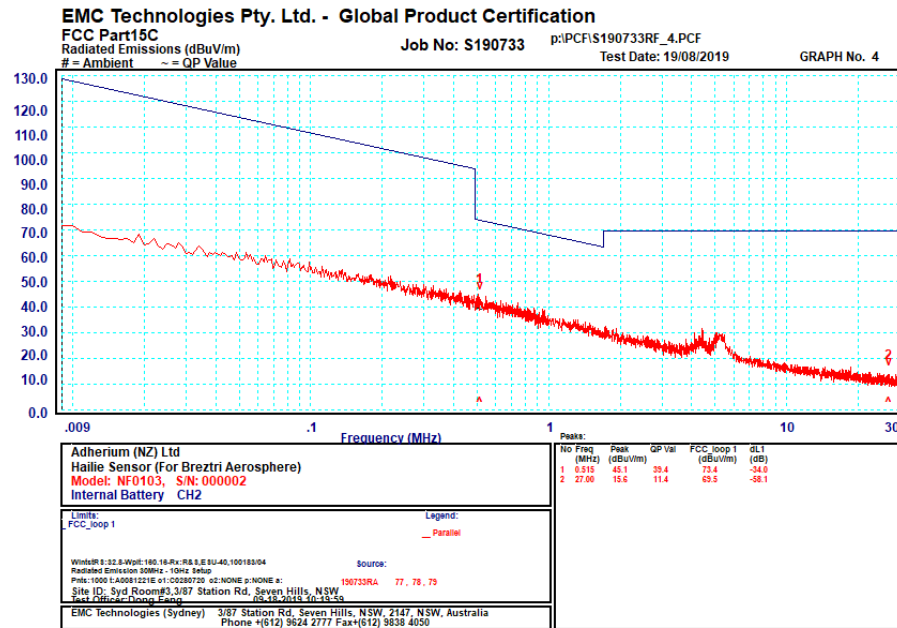
Channel 2402, Ground-Parallel Polarisation



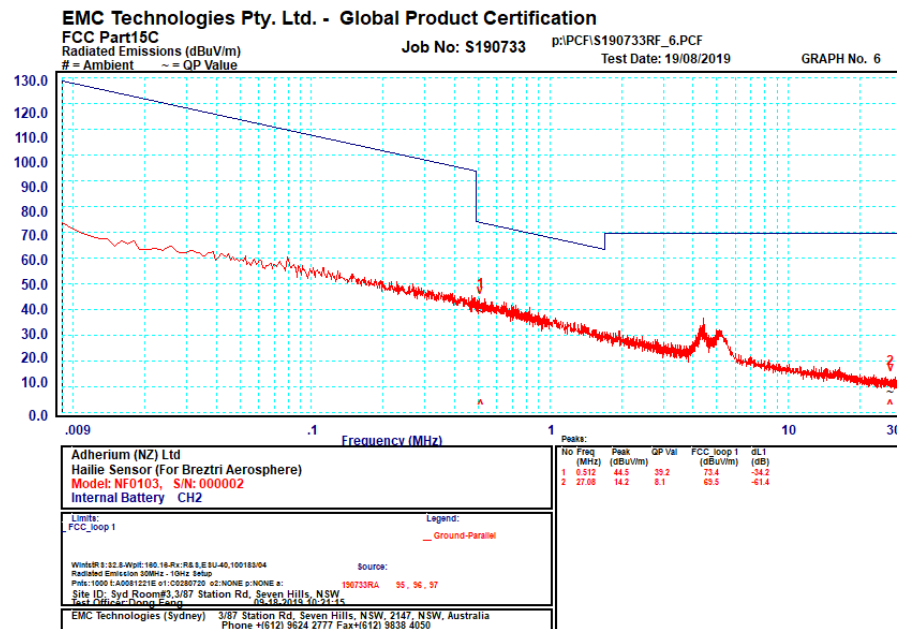
Channel 2440, Perpendicular Polarisation



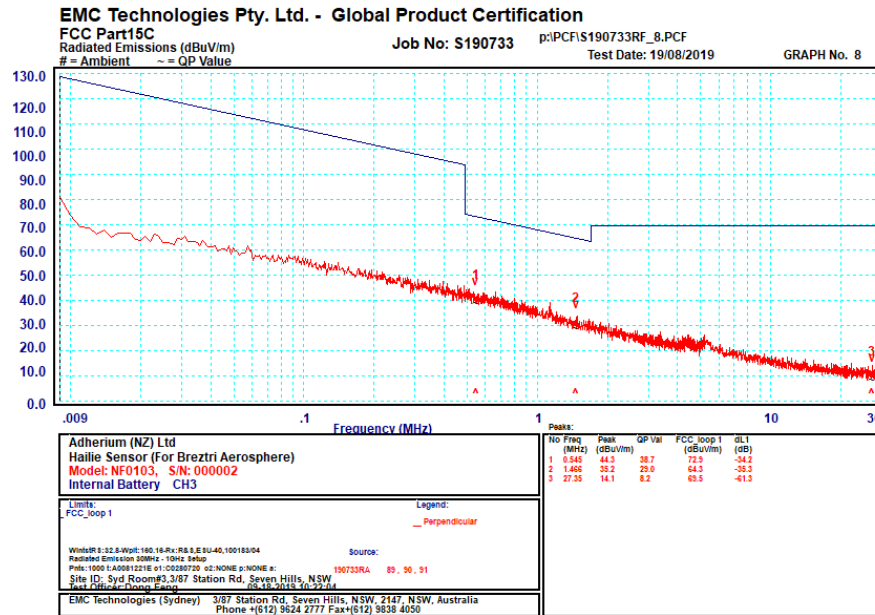
Channel 2440, Parallel Polarisation



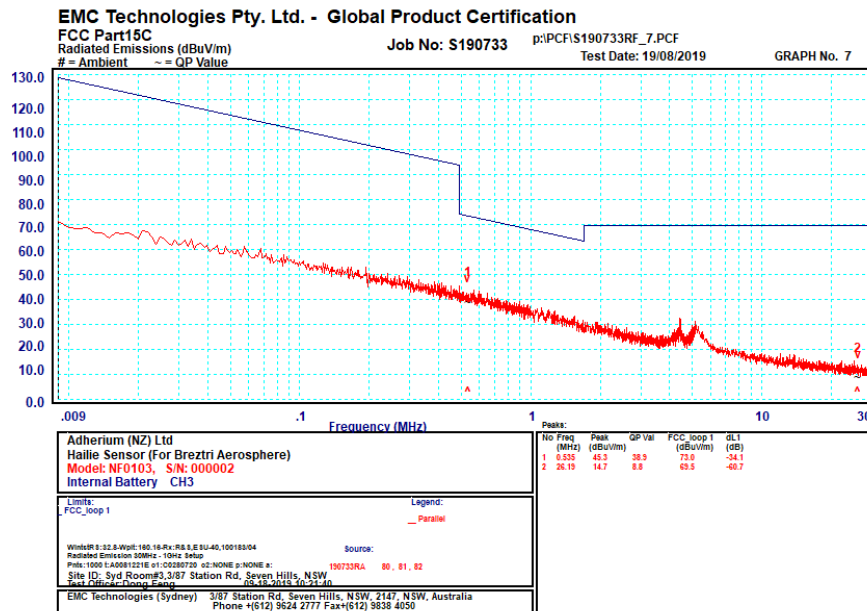
Channel 2440, Ground-Parallel Polarisation



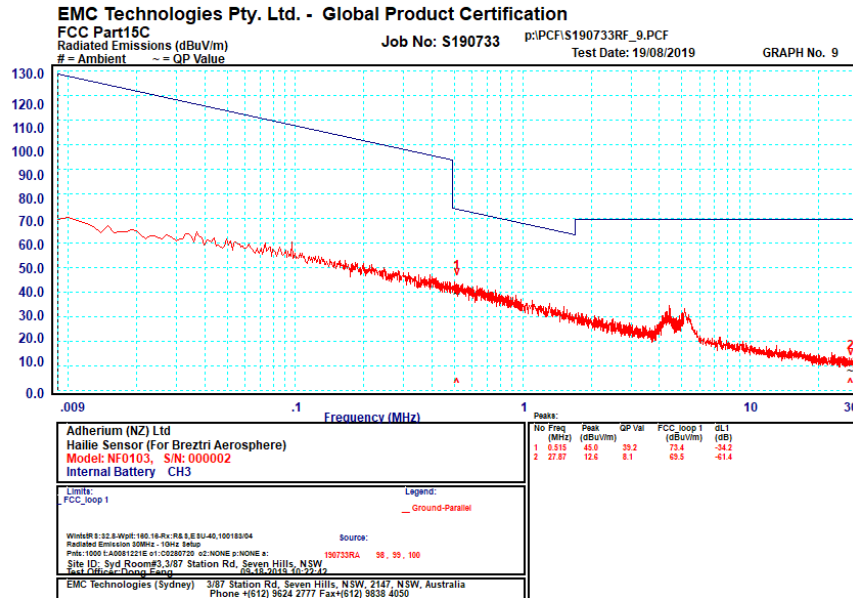
Channel 2480, Perpendicular Polarisation



Channel 2480, Parallel Polarisation



Channel 2480, Ground-Parallel Polarisation



3.8.2 Frequency Band: 30 - 1000 MHz

Measurements were made at a distance of 3 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.

The §15.209 limit applied

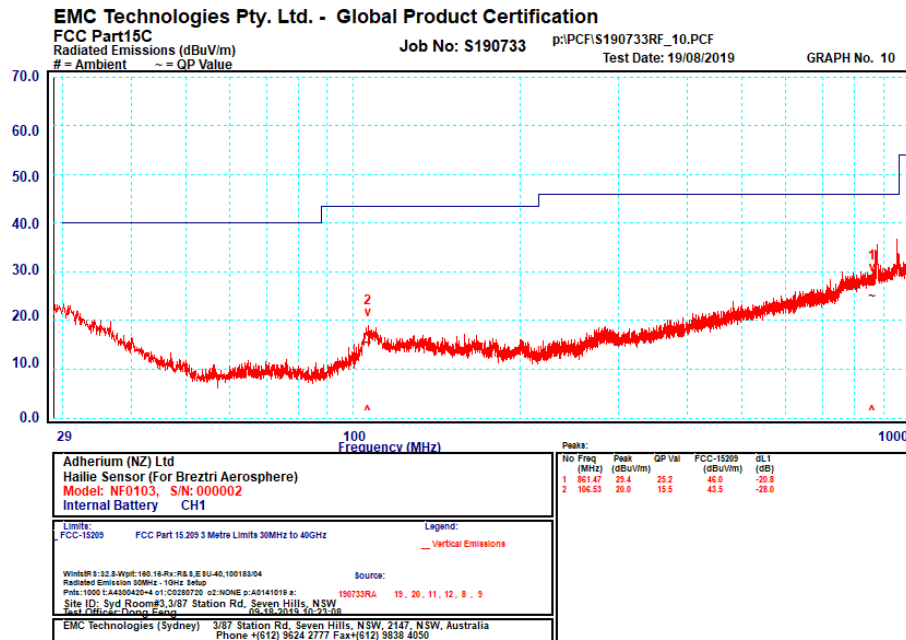
Test Result: All measured frequencies complied with the Limit by a margin of greater than 10dB.

Channel 1

Graph 10:

Vertical Polarisation

29 to 1000MHz

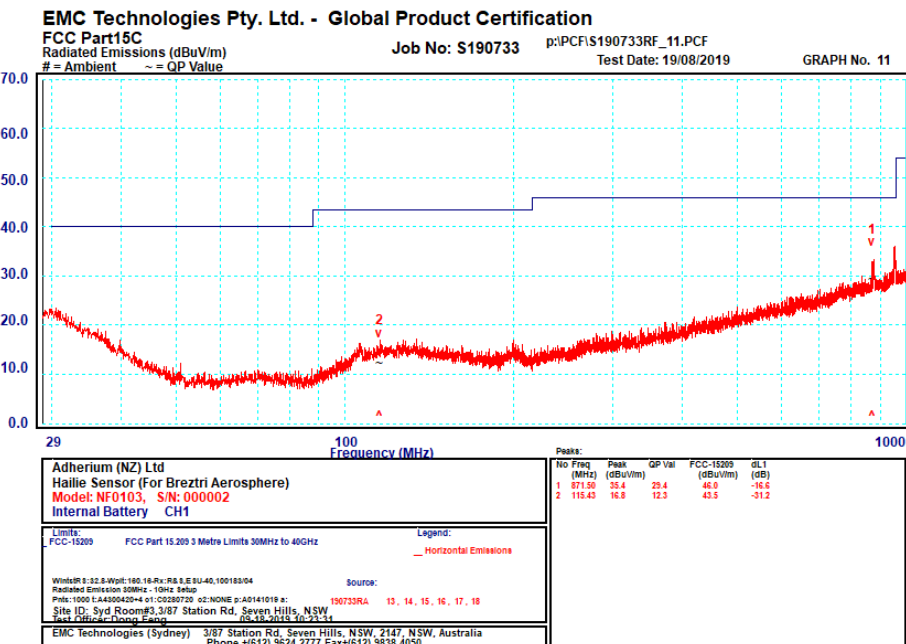


All measured frequencies complied with the Limit by a margin of greater than 10dB.

Graph 11

Horizontal Polarisation

29 to 1000MHz



All measured frequencies complied with the limit by a margin of greater than 10dB.

Channel 2

Graph 12 Vertical Polarisation 29 to 1000MHz

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FCC Part15C

Radiated Emissions (dBuV/m)

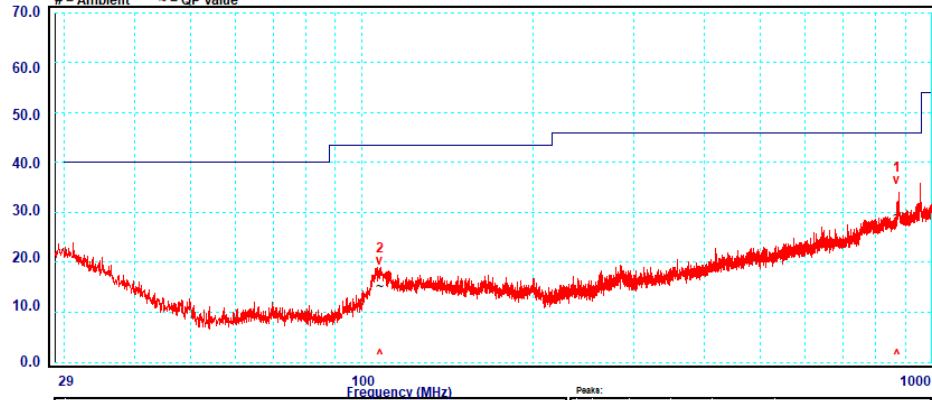
Job No: S190733

p:\PCF\S190733RF_12.PCF

Test Date: 19/08/2019

GRAPH No. 12

= Ambient ~ = QP Value



No	Freq (MHz)	Peak (dBuV/m)	QP Val (dBuV/m)	FCC-15205 (dBuV/m)	dL1 (dB)
1	871.81	34.9	25.4	46.0	-16.6
2	107.86	18.8	16.4	43.5	-28.1

Adherium (NZ) Ltd Hallie Sensor (For Breztri Aerosphere) Model: NF0103, S/N: 000002 Internal Battery CH2	Source: 190733RA 21, 22, 23, 24, 25, 26 190733RA 21, 22, 23, 24, 25, 26
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Limits: FCC-15205 FCC Part 15.205 3 Metre Limits 30MHz to 40GHz	Legend: — Vertical Emissions
--	---------------------------------

WinSR8: 32.8-Wpt8: 180.18-Rx: R&S EBU-40, 100183/04 Radiated Emission 30MHz - 10Hz Setup Pnts: 1000 L: AA000420+4 01: C0280720 02: NONE p: A0141019 a: Site ID: Syd_Room#3, 3/87 Station Rd, Seven Hills, NSW, Australia Test Office: Chong Gang	Source: 190733RA 21, 22, 23, 24, 25, 26 190733RA 21, 22, 23, 24, 25, 26
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All measured frequencies complied with the limit by a margin of greater than 10dB.

Graph 13 Horizontal Polarisation 29 to 1000MHz

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FCC Part15C

Radiated Emissions (dBuV/m)

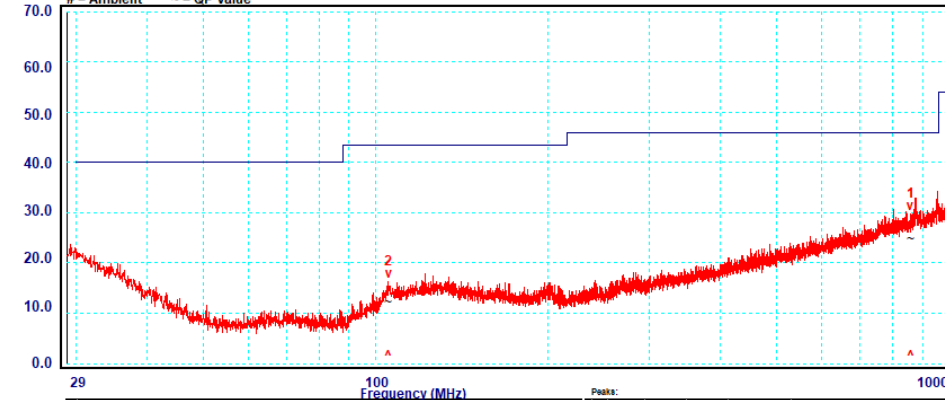
Job No: S190733

p:\PCF\S190733RF_13.PCF

Test Date: 19/08/2019

GRAPH No. 13

= Ambient ~ = QP Value



No	Freq (MHz)	Peak (dBuV/m)	QP Val (dBuV/m)	FCC-15205 (dBuV/m)	dL1 (dB)
1	860.04	25.7	25.0	46.0	-21.0
2	105.49	16.2	12.3	43.5	-31.2

Adherium (NZ) Ltd Hallie Sensor (For Breztri Aerosphere) Model: NF0103, S/N: 000002 Internal Battery CH2	Source: 190733RA 32, 31, 30, 29, 28, 27 190733RA 32, 31, 30, 29, 28, 27
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Limits: FCC-15205 FCC Part 15.205 3 Metre Limits 30MHz to 40GHz	Legend: — Horizontal Emissions
--	-----------------------------------

WinSR8: 32.8-Wpt8: 180.18-Rx: R&S EBU-40, 100183/04 Radiated Emission 30MHz - 10Hz Setup Pnts: 1000 L: AA000420+4 01: C0280720 02: NONE p: A0141019 a: Site ID: Syd_Room#3, 3/87 Station Rd, Seven Hills, NSW, Australia Test Office: Chong Gang	Source: 190733RA 32, 31, 30, 29, 28, 27 190733RA 32, 31, 30, 29, 28, 27
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EMC Technologies (Sydney) 3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia Phone +61(2) 9624 2777 Fax +61(2) 9838 4050	
--	--

All measured frequencies complied with the limit by a margin of greater than 10dB.

Channel 3

Graph 14 Vertical Polarisation 29 to 1000MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

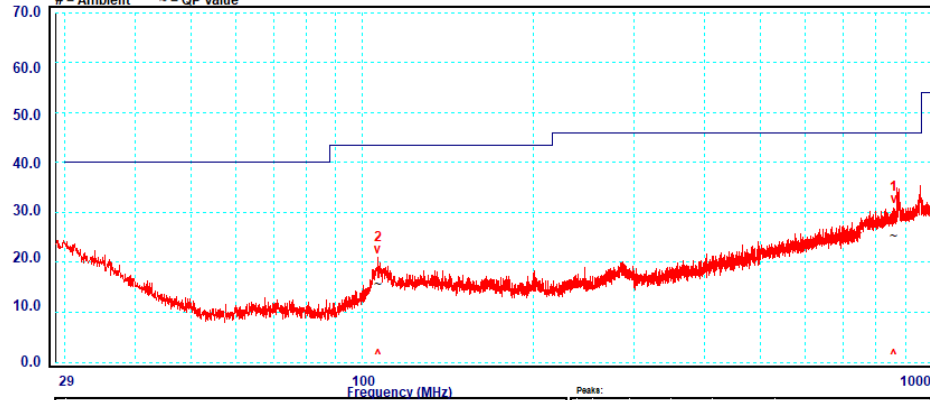
Job No: S190733

p:\PCF\S190733RF_14.PCF

Test Date: 19/08/2019

GRAPH No. 14

= Ambient ~ = QP Value



Adherium (NZ) Ltd				
Hallie Sensor (For Breztri Aerosphere)				
Model: NF0103, S/N: 000002				
Internal Battery CH3				
Limits: FCC-15209 FCC Part 15.209 3 Metre Limits 30MHz to 40GHz				
Legend: Vertical Emissions				
Window: 9 32.8-Wpt: 180 18-Rx: RA 3.8 BU-40, 100183/04				
Radiated Emission 30MHz - 100MHz Setup				
Pnts: 1000 LA400420-4 e1: C0280720 e2: NONE p: A0141018 a:				
Site ID: Syd Room#3, 3/87 Station Rd, Seven Hills, NSW				
Test Office: Dong Fang				
EMC Technologies (Sydney) 3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia				
Phone +61(2) 9624 2777 Fax +61(2) 9638 4050				

All measured frequencies complied with the limit by a margin of greater than 10dB.

Graph 15 Horizontal Polarisation 29 to 1000MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

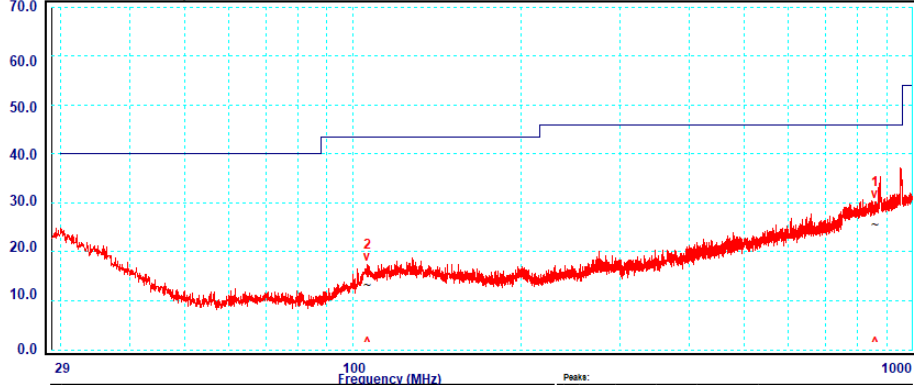
Job No: S190733

p:\PCF\S190733RF_15.PCF

Test Date: 19/08/2019

GRAPH No. 15

= Ambient ~ = QP Value



Adherium (NZ) Ltd				
Hallie Sensor (For Breztri Aerosphere)				
Model: NF0103, S/N: 000002				
Internal Battery CH3				
Limits: FCC-15209 FCC Part 15.209 3 Metre Limits 30MHz to 40GHz				
Legend: Horizontal Emissions				
Window: 9 32.8-Wpt: 180 18-Rx: RA 3.8 BU-40, 100183/04				
Radiated Emission 30MHz - 100MHz Setup				
Pnts: 1000 LA400420-4 e1: C0280720 e2: NONE p: A0141018 a:				
Site ID: Syd Room#3, 3/87 Station Rd, Seven Hills, NSW				
Test Office: Dong Fang				
EMC Technologies (Sydney) 3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia				
Phone +61(2) 9624 2777 Fax +61(2) 9638 4050				

All measured frequencies complied with the limit by a margin of greater than 10dB.

Channel 1 – Peak Measurements

Graph 18: Vertical Polarisation 1000 to 18000 MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

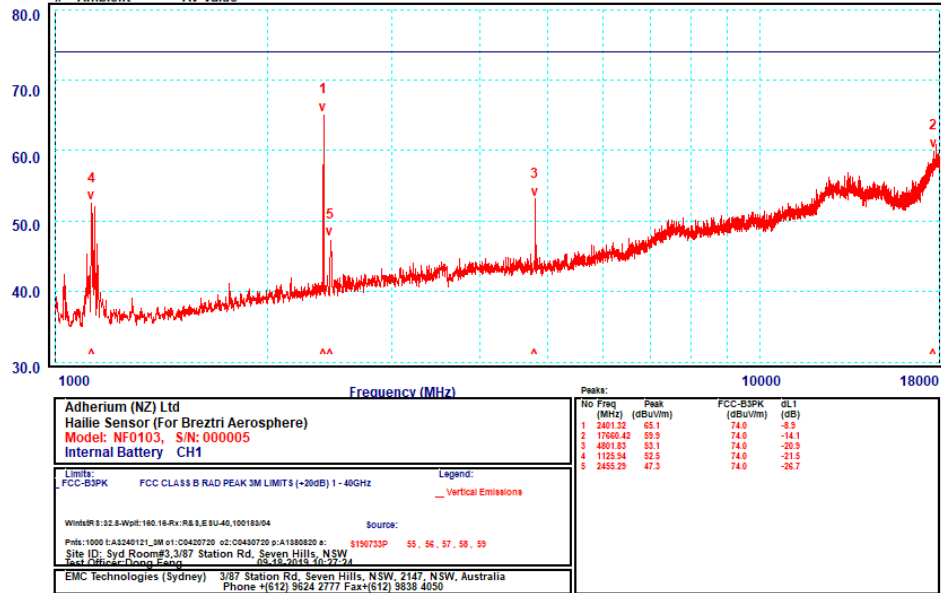
= Ambient ~ = AV Value

Job No: S190733

p:\PCF\S190733RF_18.PCF

Test Date: 12/09/2019

GRAPH No. 18



All measured frequencies complied with the peak limit by a margin of at least 8.9dB.

Graph 19: Horizontal Polarisation 1000 to 18000 MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

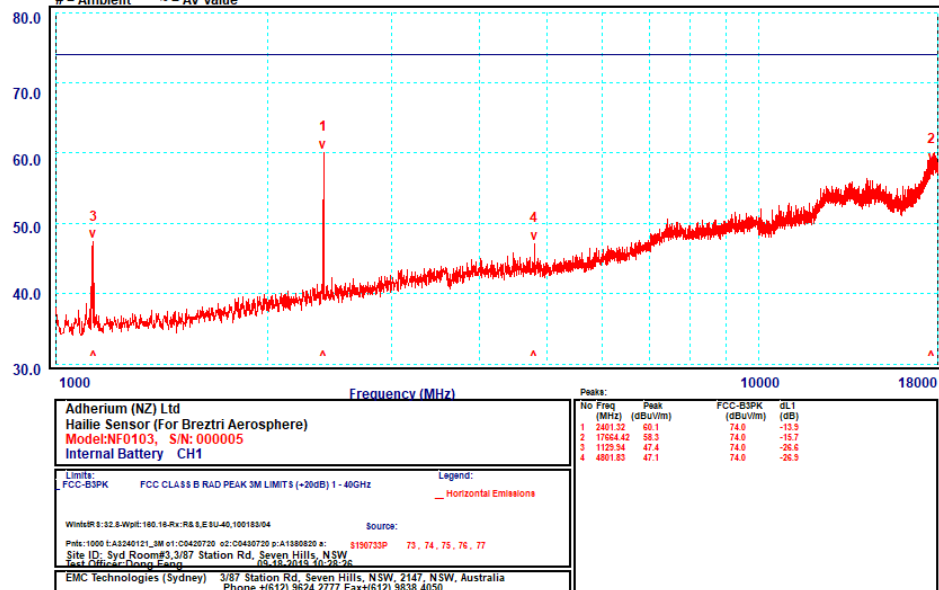
= Ambient ~ = AV Value

Job No: S190733

p:\PCF\S190733RF_19.PCF

Test Date: 12/09/2019

GRAPH No. 19



All measured frequencies complied with the peak limit by a margin of greater than 10dB.

Channel 2 – Average Measurements

Graph 20

Vertical Polarisation

1000 to 18000 MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

Job No: S190733

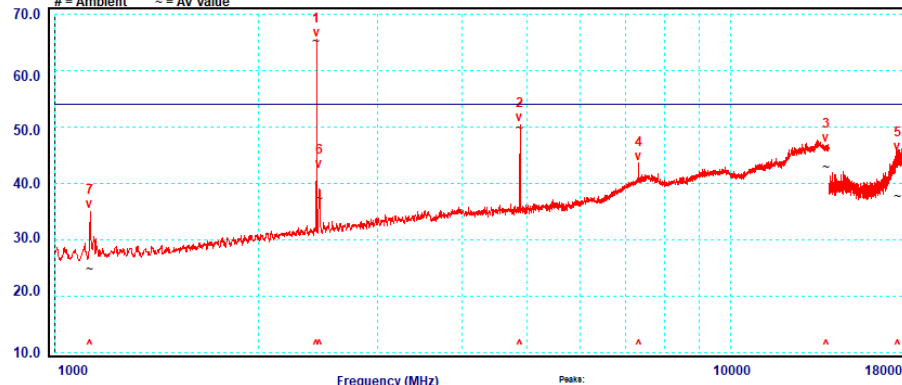
p:\PCF\S190733RF_20.PCF

Test Date: 12/09/2019

GRAPH No. 20

= Ambient

~ = AV Value



Limits		Legend:	
FCC-15209	FCC Part 15.209 3 Metre Limits 30MHz to 40GHz	—	Vertical Emissions
Writerr: S:32.8-Wpfr:180.16-Rx:RS&E-BU-40,100183-04 Pfr: 1000 1A3240121_UM v1:0420720 v2:0420720 p:A180020 s: Site ID: Syd Room#3,3/87 Station Rd, Seven Hills, NSW Test Officer: Dong Fang EMC Technologies (Sydney) 3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia Phone +(612) 3624 2777 Fax+(612) 3638 4050			

No	Freq (MHz)	Peak (dBuV/m)	Av Val (dBuV/m)	FCC-15209 (dBuV/m)	dL1 (dB)
1	2440.04	65.4	65.2	54.0	11.2
2	4890.05	50.3	49.9	54.0	-4.2
3	13867.19	46.6	42.9	54.0	-11.1
4	17320.51	43.5	40.2	54.0	-13.8
5	17715.08	45.1	37.7	54.0	-16.3
6	2463.11	41.9	37.4	54.0	-16.6
7	1127.06	39.0	34.8	54.0	-23.2

All measured frequencies complied with the average limits by a margin of at least 4.2dB*.

* This measurement falls within the laboratory's measurement uncertainty.

Graph 21

Horizontal Polarisation

1000 to 18000 MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

Job No: S190733

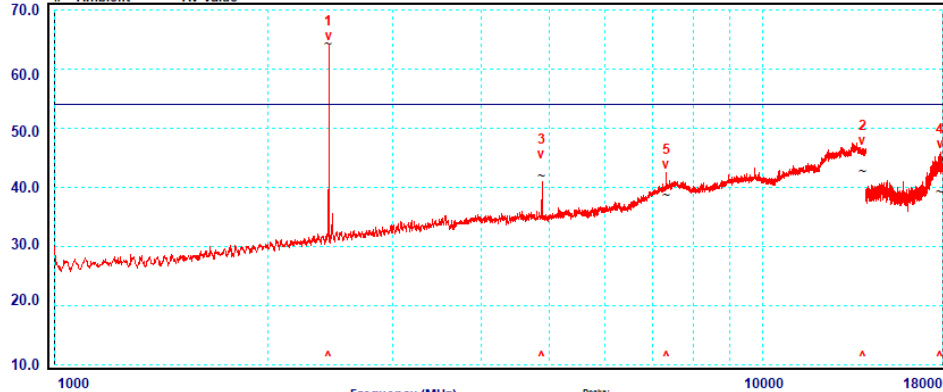
p:\PCF\S190733RF_21.PCF

Test Date: 12/09/2019

GRAPH No. 21

= Ambient

~ = AV Value



Limits		Legend:	
FCC-15209	FCC Part 15.209 3 Metre Limits 30MHz to 40GHz	—	Horizontal Emissions
Writerr: S:32.8-Wpfr:180.16-Rx:RS&E-BU-40,100183-04 Pfr: 1000 1A3240121_UM v1:0420720 v2:0420720 p:A180020 s: Site ID: Syd Room#3,3/87 Station Rd, Seven Hills, NSW Test Officer: Dong Fang EMC Technologies (Sydney) 3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia Phone +(612) 3624 2777 Fax+(612) 3638 4050			

No	Freq (MHz)	Peak (dBuV/m)	Av Val (dBuV/m)	FCC-15209 (dBuV/m)	dL1 (dB)
1	3435.57	64.2	64.3	54.0	10.5
2	13879.26	46.4	42.7	54.0	-11.3
3	4879.89	44.1	42.0	54.0	-12.0
4	17047.06	45.9	39.3	54.0	-14.7
5	7315.70	42.4	38.6	54.0	-15.4

All measured frequencies complied with the average limit by a margin of greater than 10dB.

Channel 2 – Peak Measurements

Graph 22 Vertical Polarisation 1000 to 18000 MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

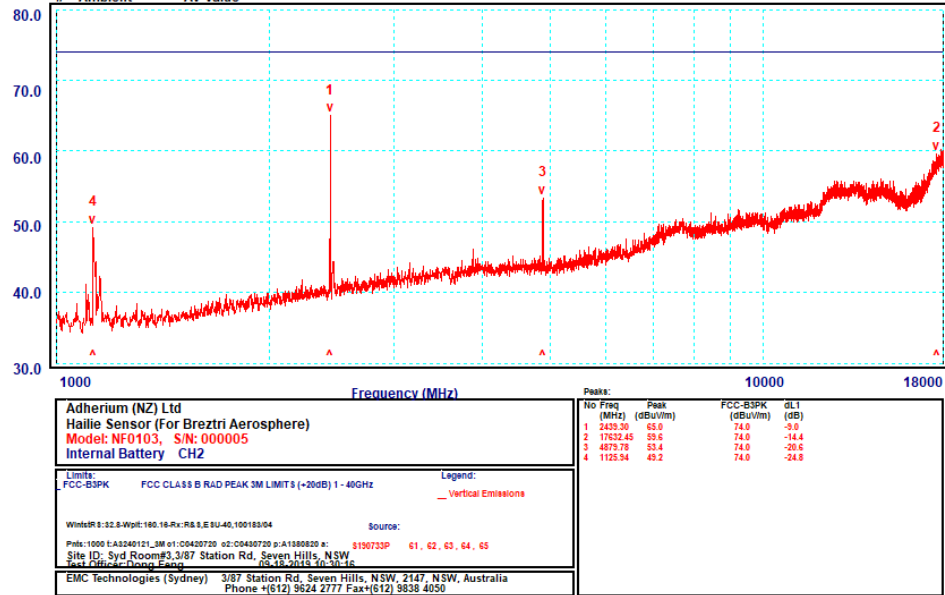
Job No: S190733

p:\PCF\S190733RF_22.PCF

Test Date: 12/09/2019

GRAPH No. 22

= Ambient ~ = AV Value



All measured frequencies complied with the peak limit by a margin of greater than 10dB.

Graph 23: Peak Measurements Horizontal Polarisation 1000 to 18000 MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

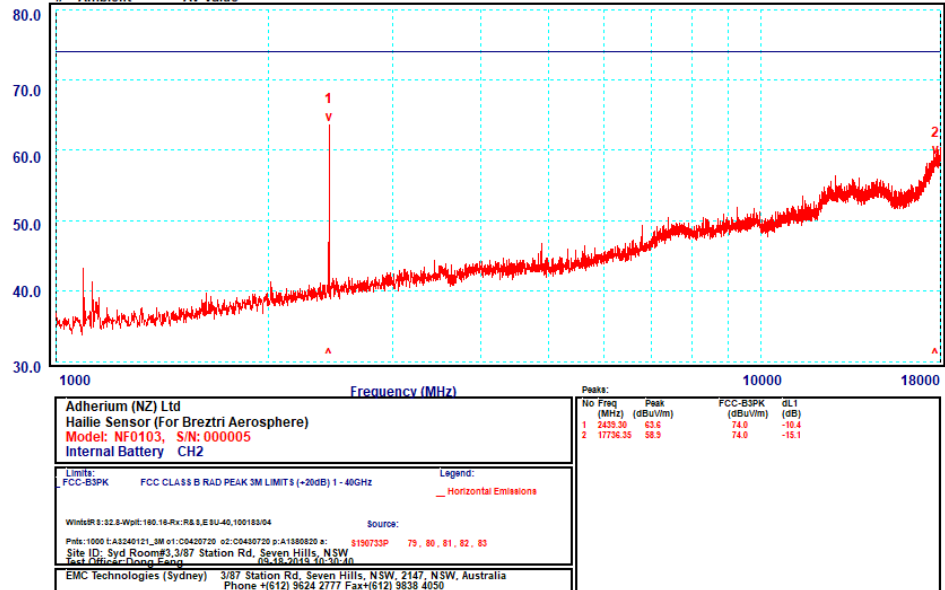
Job No: S190733

p:\PCF\S190733RF_23.PCF

Test Date: 12/09/2019

GRAPH No. 23

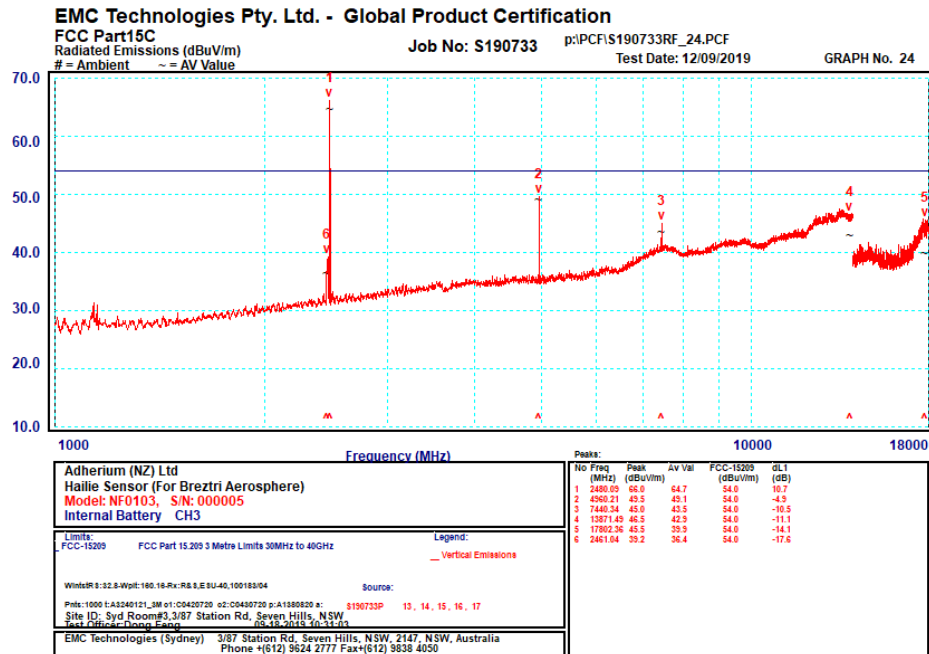
= Ambient ~ = AV Value



All measured frequencies complied with the peak limit by a margin of greater than 10dB.

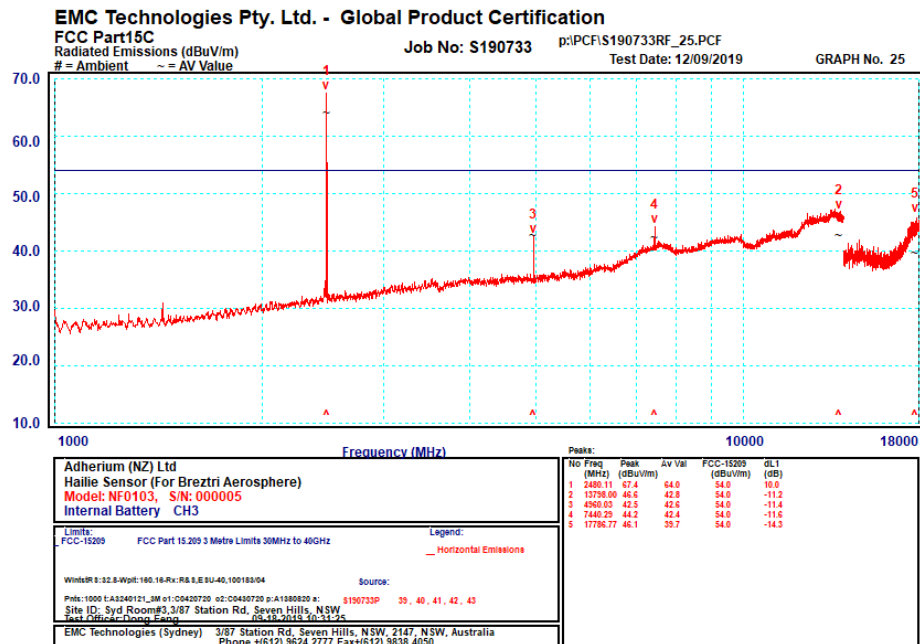
Channel 3

Graph 24 Average Measurements Vertical Polarisation 1000 to 18000 MHz



All measured frequencies complied with the average limit by a margin of at least 4.9dB.

Graph 25 Average Measurements Horizontal Polarisation 1000 to 18000 MHz



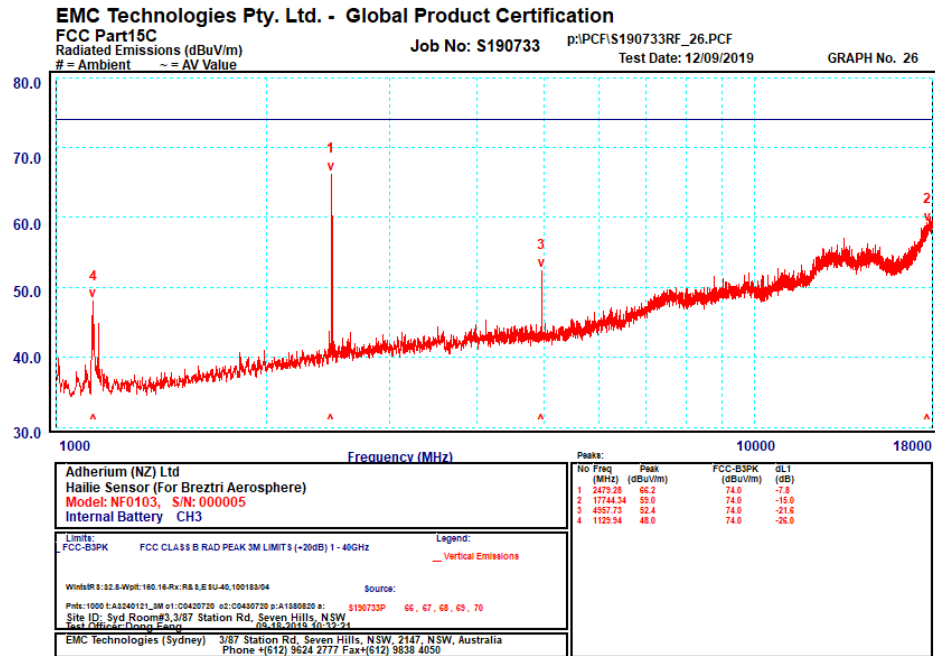
All measured frequencies complied with the average limit by a margin of greater than 10dB

Channel 3 – Peak Measurements

Graph 26

Vertical Polarisation

1000 to 18000 MHz

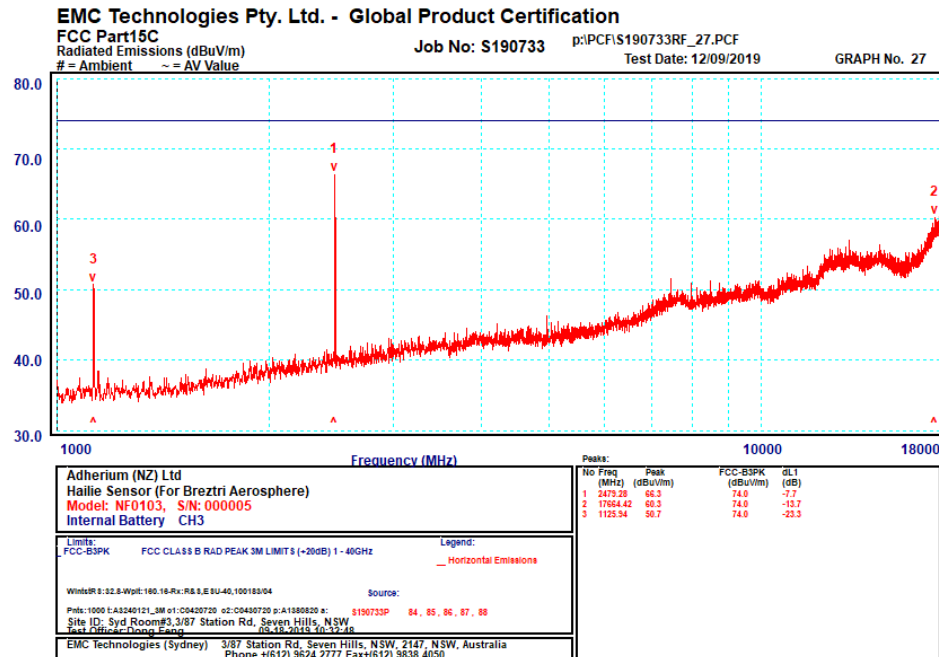


All measured frequencies complied with the peak limit by a margin of at least 7.8dB.

Graph 27

Horizontal Polarisation

1000 to 18000 MHz



All measured frequencies complied with the peak limit by a margin of at least 7.7dB.

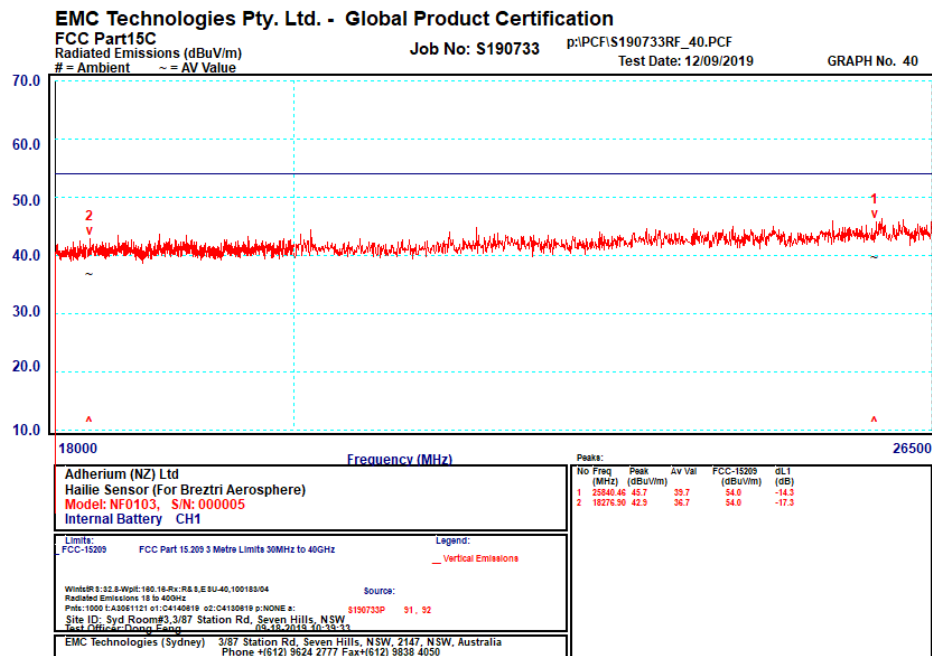
Conclusion: The EUT complied with the limits of FCC Rule Part 15 Subpart C, 15.209.

3.8.3 Frequency Band: 18000 - 26500 MHz

Measurements from 18 to 26.5GHz were made at a distance of 1 metres. The average measurements were made with a resolution bandwidth (RBW) of 1000 kHz and the video bandwidth (VBW) of 10kHz. The §15.209(a) limits applied.

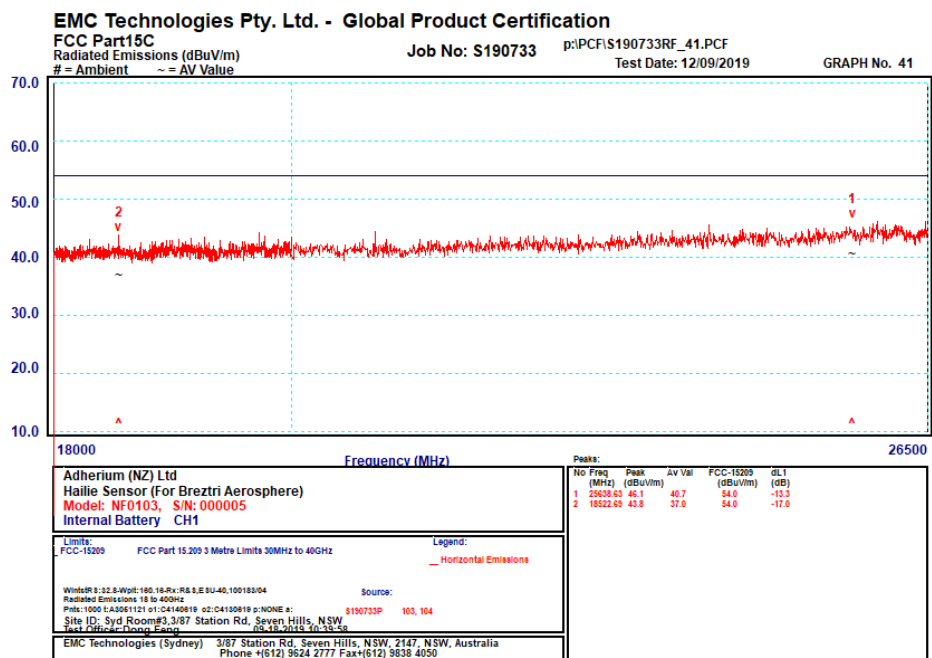
Channel 1 – Average Measurements

Graph 40 Vertical Polarisation 18 to 26.5GHz



All measured frequencies complied with the average limit by a margin of greater than 10dB.

Graph 41 Horizontal Polarisation 18 to 26.5GHz



All measured frequencies complied with average limit by a margin of greater than 10dB.

Channel 1 – Peak Measurements

Graph 42 Vertical Polarisation 18 to 26.5GHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

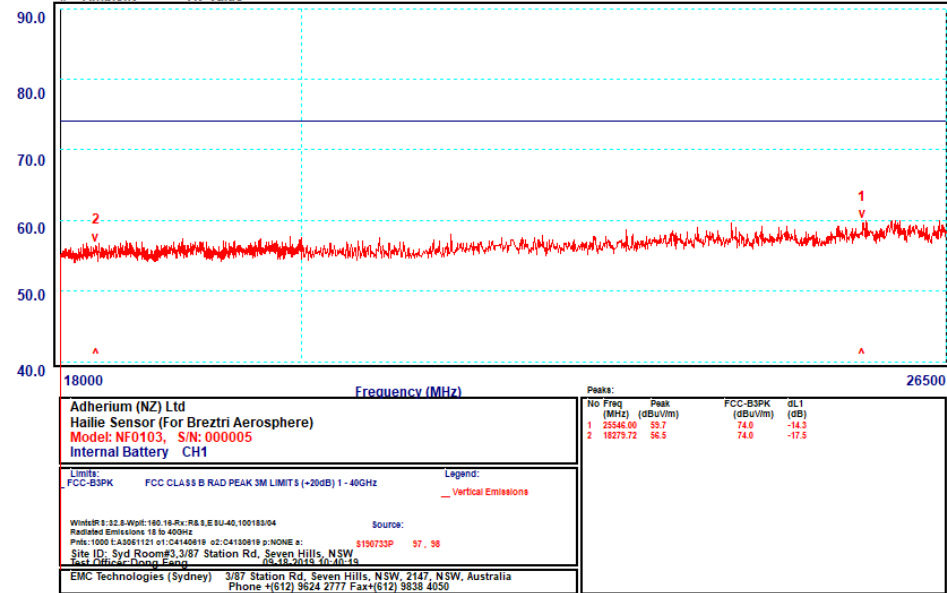
Job No: S190733

p:\PCF\S190733RF_42.PCF

Test Date: 12/09/2019

GRAPH No. 42

= Ambient ~ = AV Value



All measured frequencies complied with the peak limit by a margin of greater than 10dB.

Graph 43 Horizontal Polarisation 18 to 26.5GHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

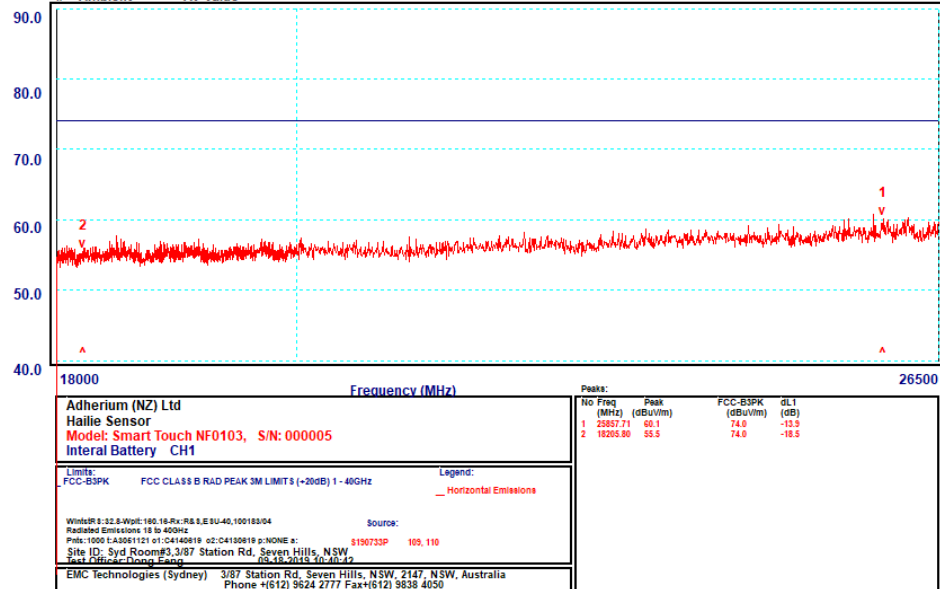
Job No: S190733

p:\PCF\S190733RF_43.PCF

Test Date: 12/09/2019

GRAPH No. 43

= Ambient ~ = AV Value



All measured frequencies complied with the peak limit by a margin of greater than 10dB.

Channel 2 – Average Measurements

Graph 44

Vertical Polarisation

18 to 26.5GHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

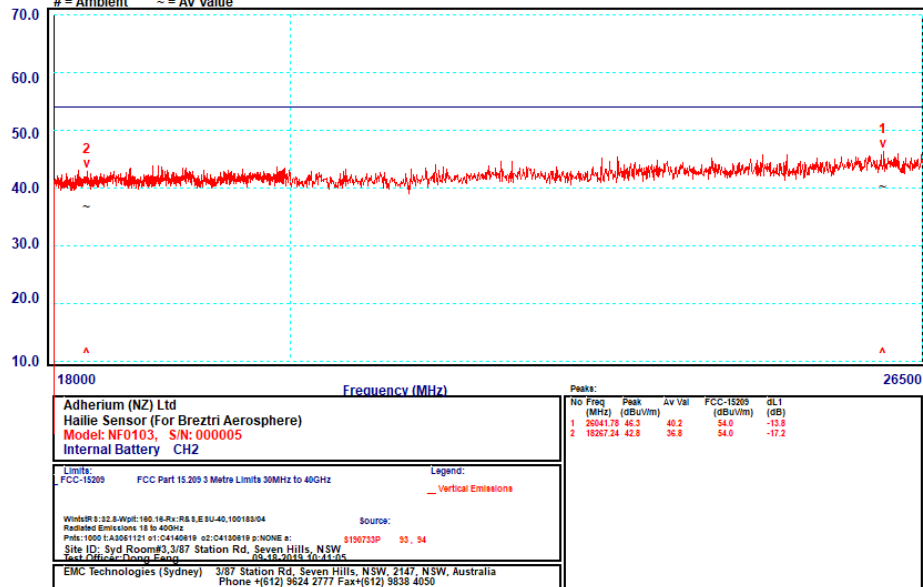
Job No: S190733

p:\PCF\S190733RF_44.PCF

Test Date: 12/09/2019

GRAPH No. 44

= Ambient ~ = AV Value



All measured frequencies complied with the average limit by a margin of greater than 10dB.

Graph 45

Horizontal Polarisation

18 to 26.5GHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

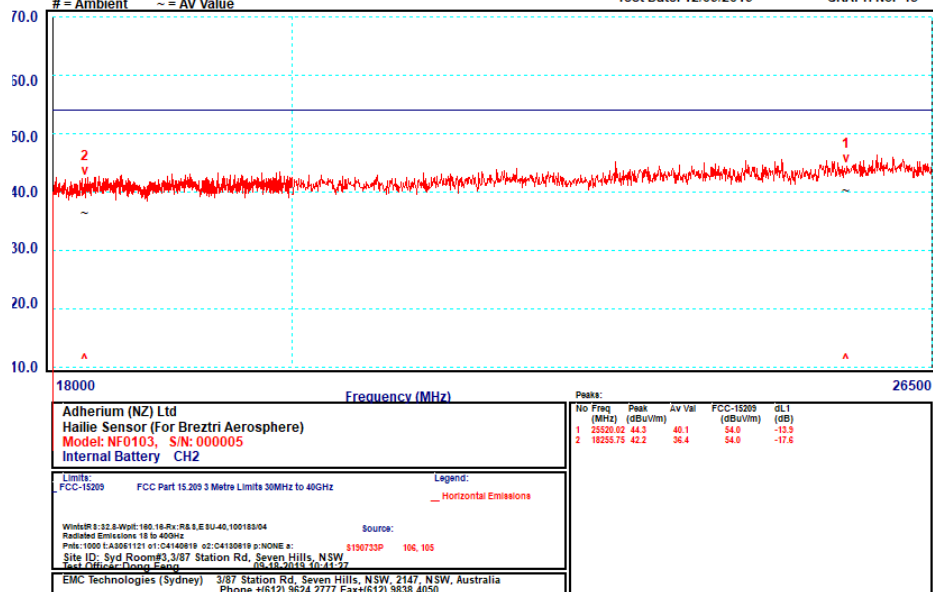
Job No: S190733

p:\PCF\S190733RF_45.PCF

Test Date: 12/09/2019

GRAPH No. 45

= Ambient ~ = AV Value



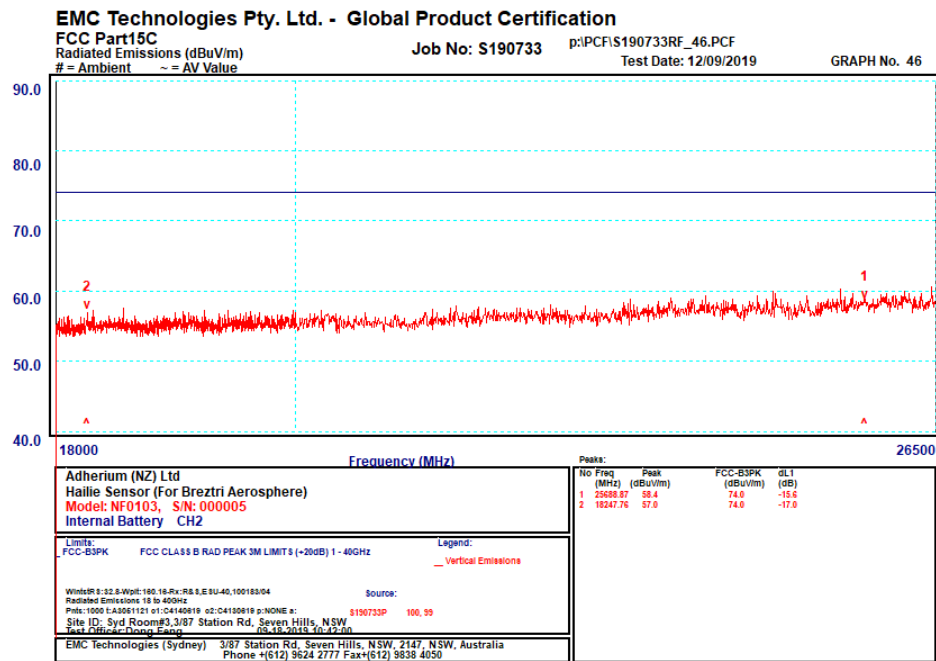
All measured frequencies complied with the average limit by a margin of greater than 10dB.

Channel 2 – Peak Measurements

Graph 46

Vertical Polarisation

18 to 26.5GHz

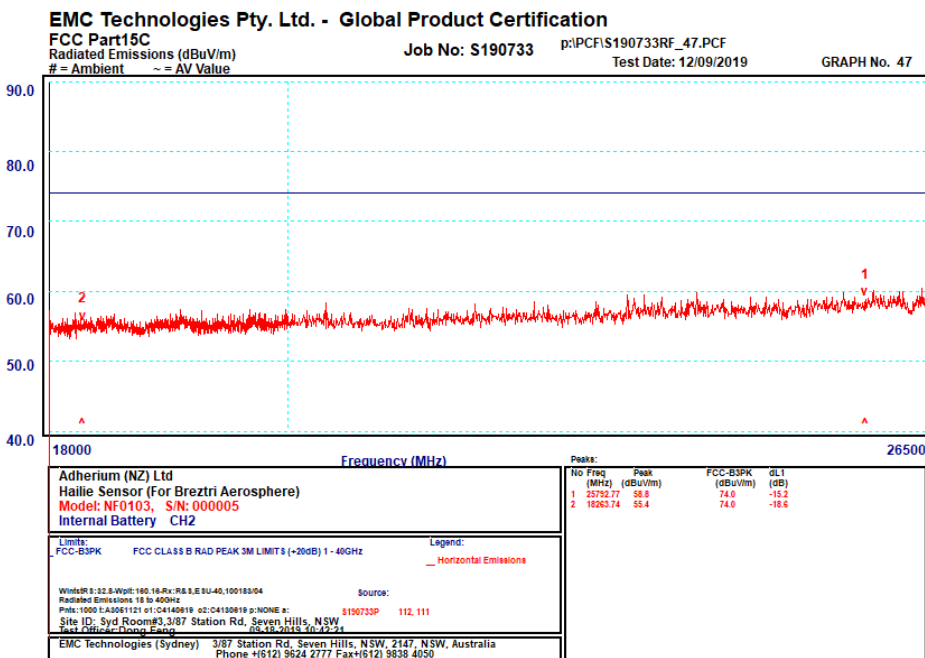


All measured frequencies complied with the peak limit by a margin of greater than 10dB.

Graph 47

Horizontal Polarisation

18 to 26.5GHz



All measured frequencies complied with the peak limit by a margin of greater than 10dB.

Channel 3 – Average Measurements

Graph 48

Vertical Polarisation

18 to 26.5GHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

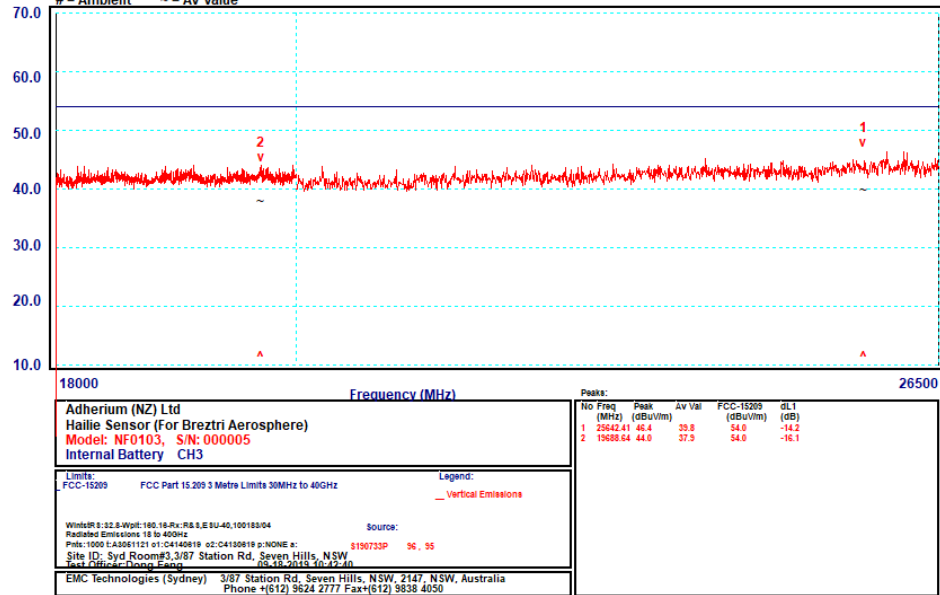
Job No: S190733

p:\PCF\S190733RF_48.PCF

Test Date: 12/09/2019

GRAPH No. 48

= Ambient ~ = AV Value



All measured frequencies complied with average limit by a margin of greater than 10dB.

Graph 49

Horizontal Polarisation

18 to 26.5GHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

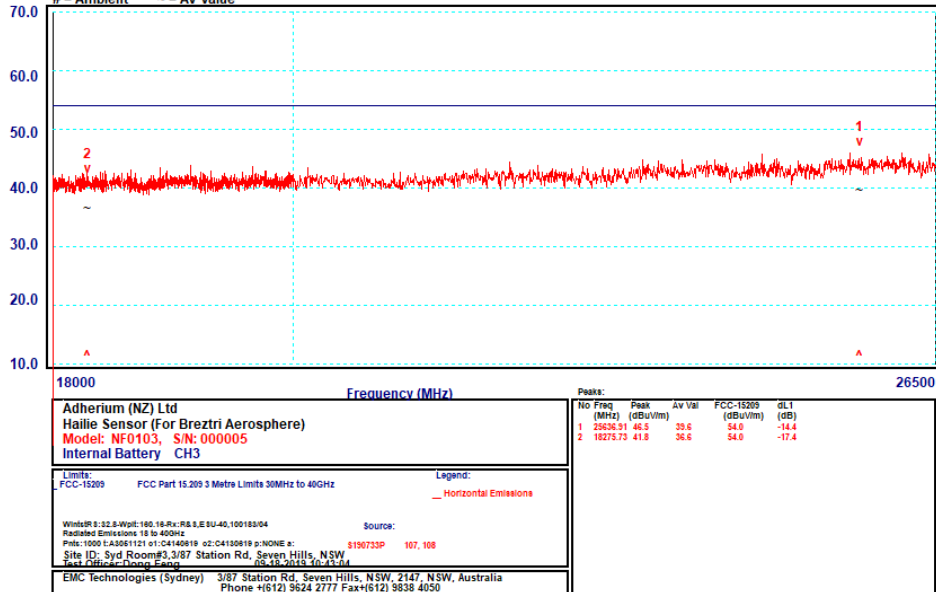
Job No: S190733

p:\PCF\S190733RF_49.PCF

Test Date: 12/09/2019

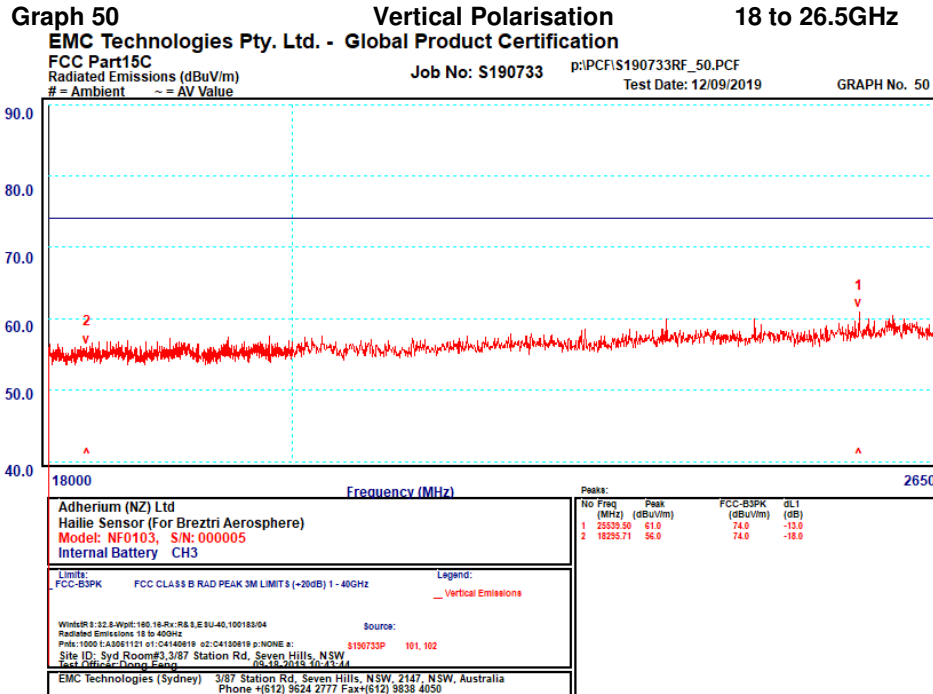
GRAPH No. 49

= Ambient ~ = AV Value

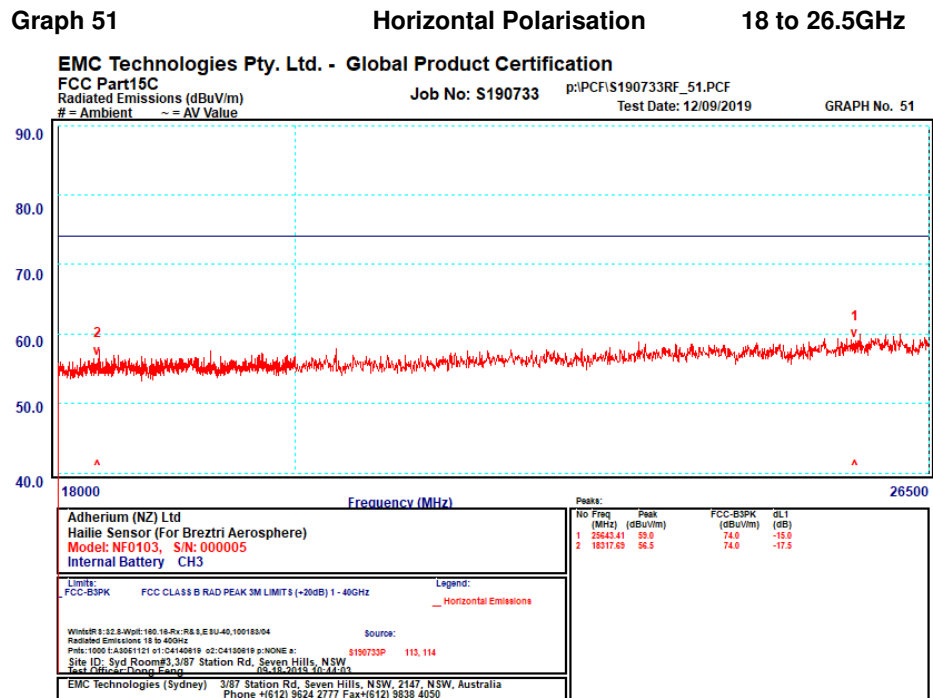


All measured frequencies complied with the average limit by a margin of greater than 10dB.

Channel 2 – Peak Measurements



All measured frequencies complied with the peak limit by a margin of greater than 10dB.



All measured frequencies complied with the peak limit by a margin of greater than 10dB.

Conclusion: The EUT complied with the limits of FCC Rule Part 15 Subpart C, 15.209.

3.9 15.247(d) Out of Band Emissions

Requirement:

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

The §15.209(a) limits are for reference only.

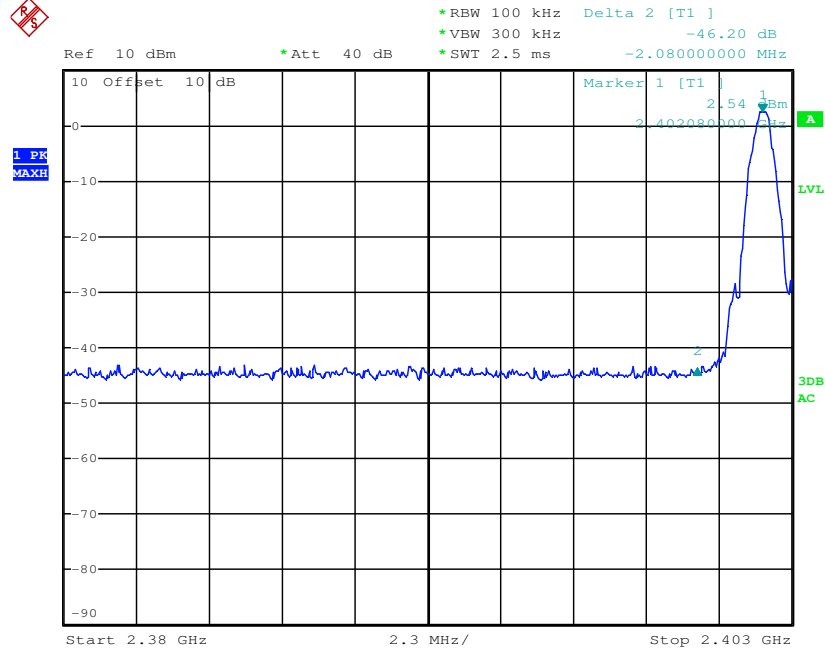
3.9.1 Authorized-band band-edge

Test was done by conducted measurement according to C63.10 Clause 6.10.4

Results:

Channel 2402 MHz, Bottom Band Edge:

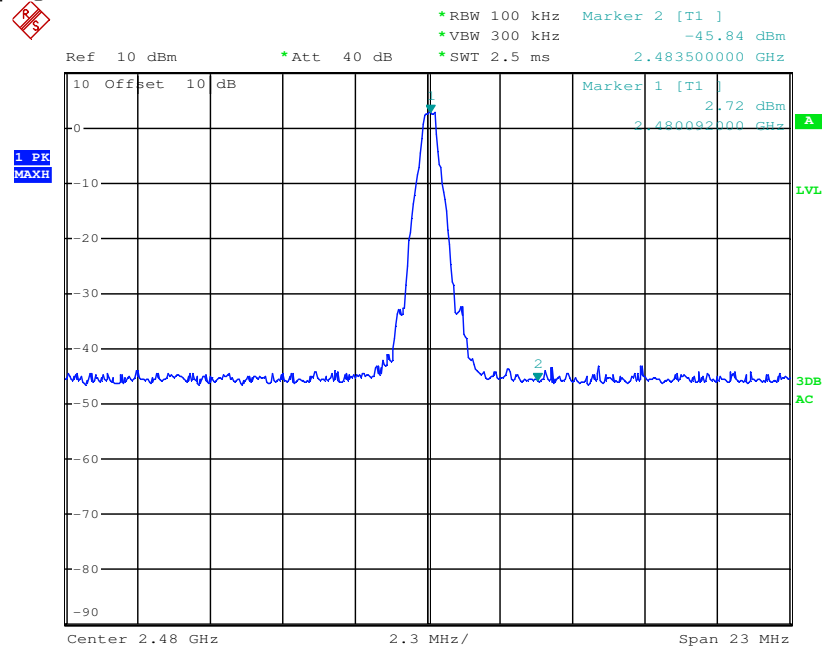
Hopping off, Marker 2 was 46.28dB down at 2400 MHz.



Date: 15.AUG.2019 14:43:53

Channel 2480 MHz, Top Band Edge:

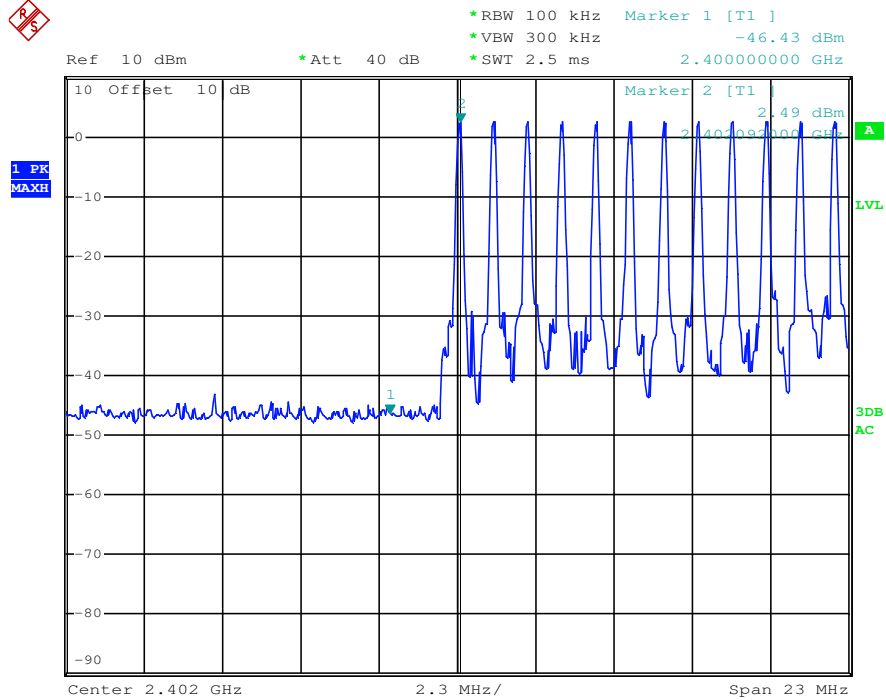
Hopping off, Marker 2 was 48.53dB down at 2480MHz.



Date: 15.AUG.2019 14:50:44

Bottom Band Edge:

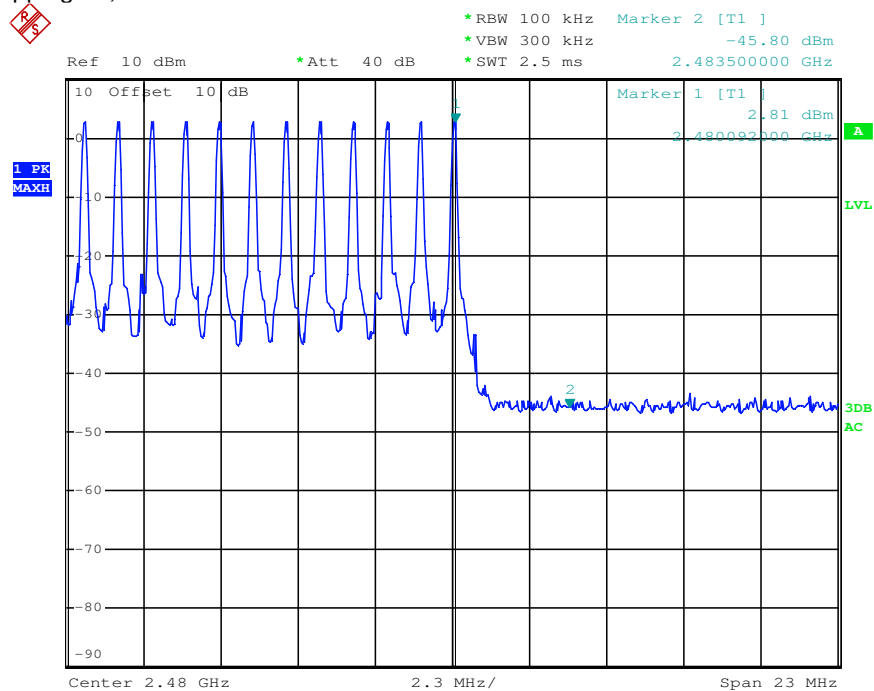
Hopping on, Marker 2 was 48.92dB down at 2400 MHz.



Date: 15.AUG.2019 15:05:08

Top Band Edge:

Hopping on, Marker 2 was 48.62dB down at 2483.5MHz.



Date: 15.AUG.2019 15:10:50

Conclusion: Complied.

3.9.2 Restricted-band band-edge

This was done by radiated measurement according to C63.10 Clause 6.10.5

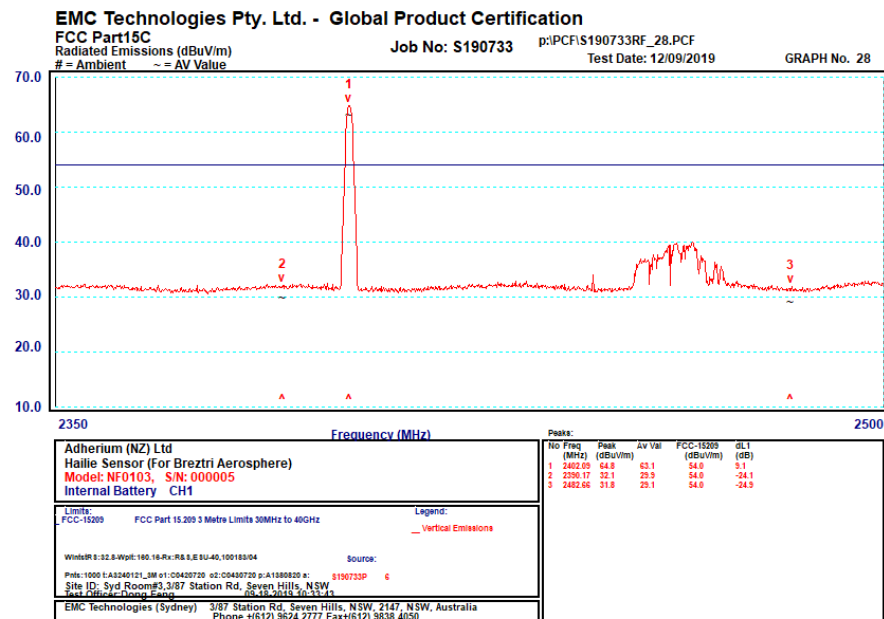
The peak measurements were made with a resolution bandwidth (RBW) of 1000 kHz and the video bandwidth (VBW) of 1000 kHz, The average measurement were made with a resolution bandwidth(RBW) of 1000kHz and the video bandwidth(VBW) of 10kHz.

Results:

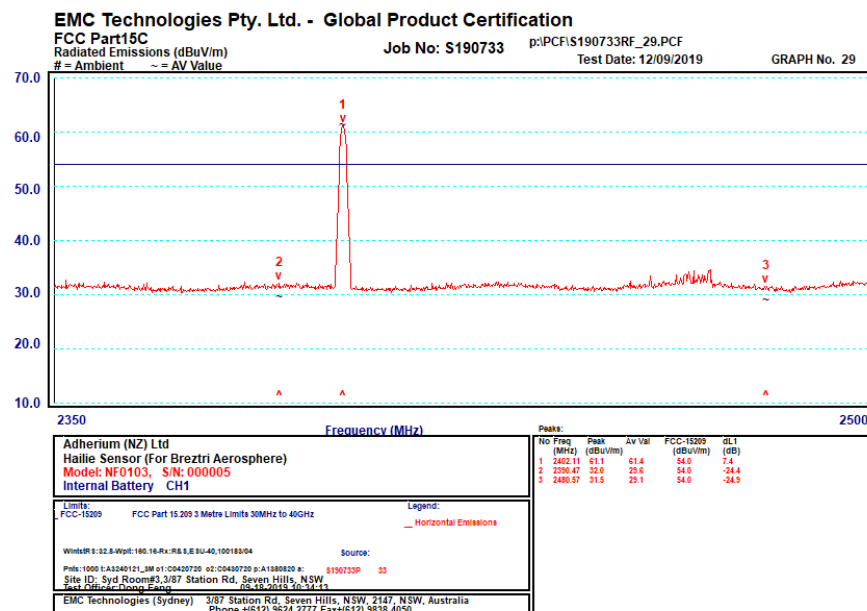
Mark1 and Mark2 being set to around 2390MHz and 2483.5MHz

Channel 2402 – Average Measurements

Graph 28 Vertical Polarization 2350 to 2500MHz



Graph 29 Horizontal Polarization 2350 to 2500MHz



Channel 2402 – Peak Measurements

Graph 30

Vertical Polarization

2350 to 2500MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

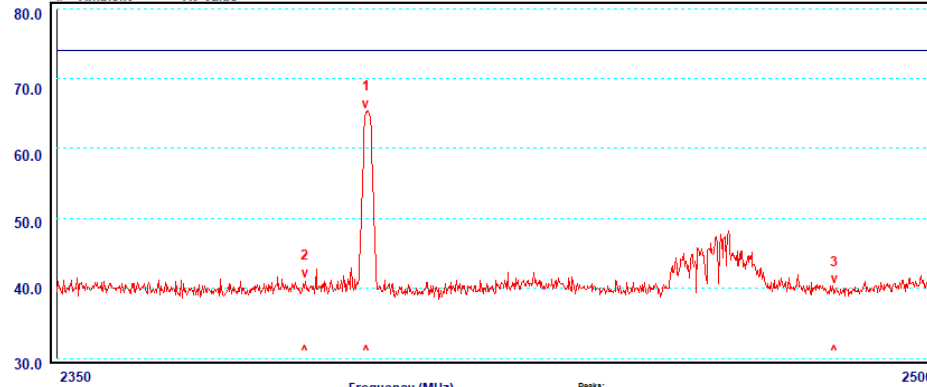
Job No: S190733

p:\PCF\S190733RF_30.PCF

Test Date: 12/09/2019

GRAPH No. 30

= Ambient ~ = AV Value



Adherium (NZ) Ltd		Limits:		Legend:	
Hallie Sensor (For Breztri Aerosphere)		FCC CLASS B RAD PEAK 3M LIMITS (-20dB) 1 - 40GHz		Vertical Emissions	
Model: NF0103, S/N: 000005		Limits: 1000 L:A3240121, SM o1:00420720 o2:00430720 p:A1380820 s:		Source:	
Internal Battery CH1		Site ID: Syd_Room#3, 3/87 Station Rd, Seven Hills, NSW		S190733P 60	
EMC Technologies (Sydney)		3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia		Phone +(612) 9624 2777 Fax+(612) 9838 4050	

No	Freq (MHz)	Peak (dBuV/m)	FCC-BSPK (dBuV/m)	dL1 (dB)
1	2401.87	65.3	74.0	-8.7
2	2391.52	41.0	74.0	-33.0
3	2482.66	40.1	74.0	-33.9

Graph 31

Horizontal Polarization

2350 to 2500MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

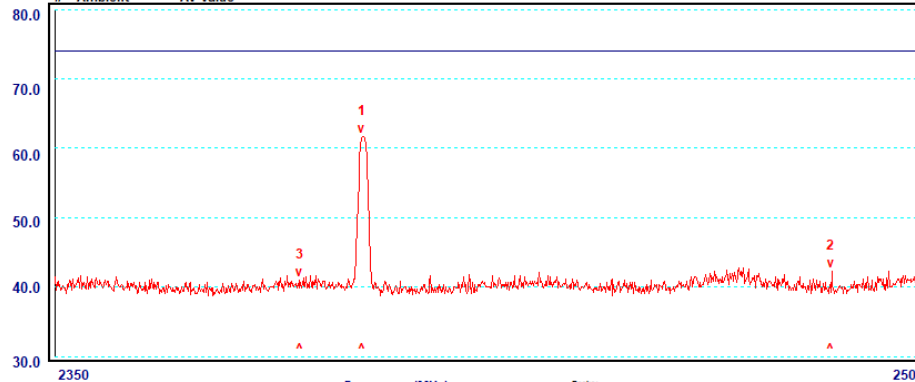
Job No: S190733

p:\PCF\S190733RF_31.PCF

Test Date: 12/09/2019

GRAPH No. 31

= Ambient ~ = AV Value



Adherium (NZ) Ltd		Limits:		Legend:	
Hallie Sensor (For Breztri Aerosphere)		FCC CLASS B RAD PEAK 3M LIMITS (-20dB) 1 - 40GHz		Horizontal Emissions	
Model: NF0103, S/N: 000005		Limits: 1000 L:A3240121, SM o1:00420720 o2:00430720 p:A1380820 s:		Source:	
Internal Battery CH1		Site ID: Syd_Room#3, 3/87 Station Rd, Seven Hills, NSW		S190733P 70	
EMC Technologies (Sydney)		3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia		Phone +(612) 9624 2777 Fax+(612) 9838 4050	

No	Freq (MHz)	Peak (dBuV/m)	FCC-BSPK (dBuV/m)	dL1 (dB)
1	2401.87	61.7	74.0	-12.3
2	2483.41	42.3	74.0	-31.7
3	2391.22	41.0	74.0	-33.0

Channel 2480 – Average Measurements

Graph 32 Vertical Polarization 2350 to 2500MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

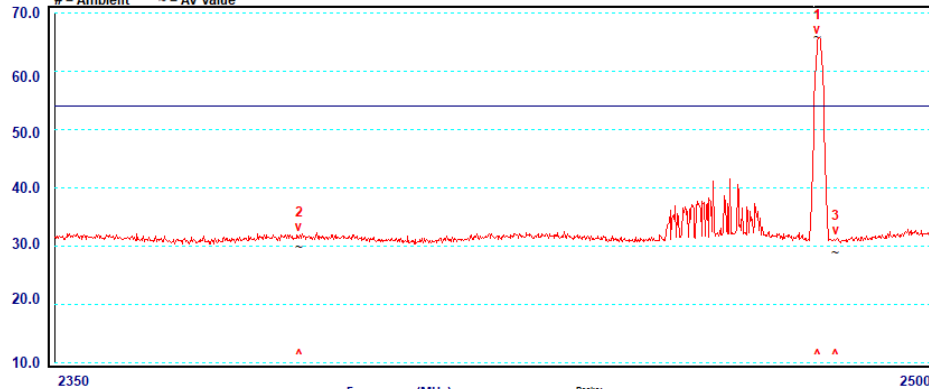
Job No: S190733

p:\PCF\S190733RF_32.PCF

Test Date: 12/09/2019

GRAPH No. 32

= Ambient ~ = AV Value



Frequency (MHz)		No Freq (MHz)	Peak (dBuV/m)	Av Val (dBuV/m)	FCC-15209 (dB)	SL1 (dB)	
Adherium (NZ) Ltd		1	2480.04	63.7	65.8	54.0	11.8
Hallie Sensor (For Breztri Aerosphere)		2	2390.92	31.5	29.8	54.0	-24.2
Model: NF0103, S/N: 000005		3	2483.26	31.2	29.8	54.0	-25.1
Internal Battery CH3							
Limits:		Legend:					
FCC-15209 FCC Part 15.209 3 Metre Limits 30MHz to 40GHz		— Vertical Emissions					
WinSR 8: 32.8-Wpt: 180.18-Rx: RB 3.8E BU-40, 100183/04		Source:					
Pnts: 1000 EA3240121_3M o1: C0430720 o2: C0430720 p: A1808020 s: S190733P 18							
Site ID: Syd Room#3, 3/87 Station Rd, Seven Hills, NSW 2147, Australia							
Test Office: Hong Kong 05-22-2019 10-36-52							
EMC Technologies (Sydney) 3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia							
Phone +61(2) 9624 2777 Fax +61(2) 9638 4050							

No	Freq (MHz)	Peak (dBuV/m)	Av Val (dBuV/m)	FCC-15209 (dBuV/m)	DL1 (dB)
1	2480.04	65.7	65.8	54.0	11.8
2	2389.57	32.1	29.6	54.0	-24.4
3	2483.26	31.2	28.9	54.0	-25.1

Graph 33 Horizontal Polarization 2350 to 2500MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

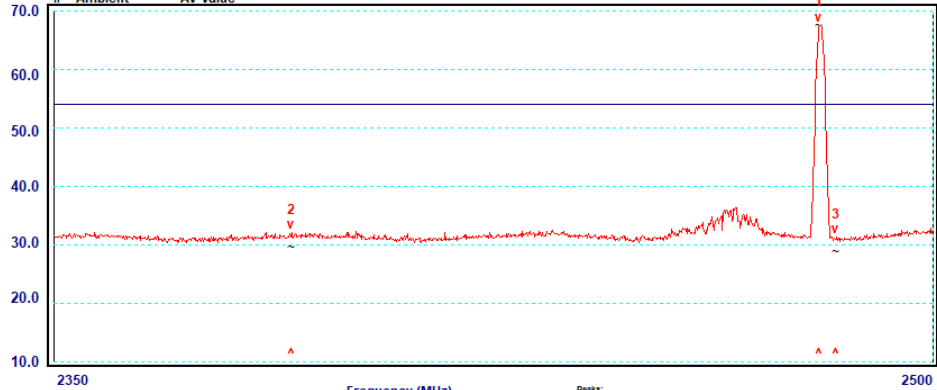
Job No: S190733

p:\PCF\S190733RF_33.PCF

Test Date: 12/09/2019

GRAPH No. 33

= Ambient ~ = AV Value



Frequency (MHz)		No Freq	Peak	Avg Val	FCC-15209	dL1	
		(MHz)	(dBuV/m)		(dB)	(dB)	
Adherium (NZ) Ltd		1	2480.04	67.5	67.4	54.0	13.4
Hailie Sensor (For Breztri Aerosphere)		2	2180.57	32.1	29.6	54.0	-28.4
Model: NF0103, S/N: 000005		3	2492.36	31.3	28.9	54.0	-25.1
Internal Battery, CH3							
Limits		Legend:					
FCC-15209		FCC Part 15.209 3 Metre Limits 30MHz to 40GHz		Horizontal Emissions			
WinSR 8: 32.8-Wpt: 180.18-Rx: RB 3.8E BU-40, 100183/04		Source:					
Pnts: 1000 EA3240121_3M o1: C0430720 o2: C0430720 p: A1808020 s:		S190733P 44					
Site ID: Syd Room#3, 3/87 Station Rd, Seven Hills, NSW		03-48-2019, 10:36:27					
Test Office: Dong Feng							
EMC Technologies (Sydney)		3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia					
		Phone +61(2) 9624 2777 Fax +61(2) 9638 4050					

No	Freq (MHz)	Peak (dBuV/m)	Av Val (dBuV/m)	FCC-15209 (dBuV/m)	DL1 (dB)
1	2480.04	67.5	67.4	54.0	13.4
2	2389.57	32.1	29.6	54.0	-24.4
3	2483.26	31.3	28.9	54.0	-25.1

Channel 2480 – Peak Measurements

Graph 34 Vertical Polarization 2350 to 2500MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

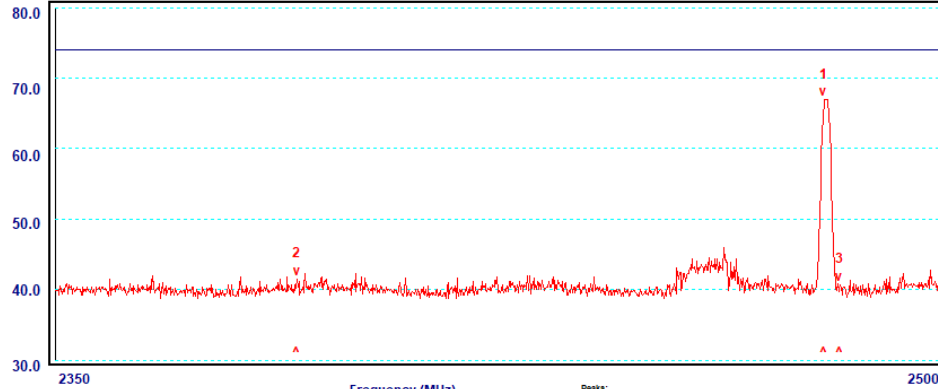
Job No: S190733

p:\PCF\S190733RF_34.PCF

Test Date: 12/09/2019

GRAPH No. 34

= Ambient ~ = AV Value



Limits		Legend:	
FCC-B3PK	FCC CLASS B RAD PEAK 3M LIMITS (+20dB) 1 - 40GHz	—	Vertical Emissions
WinSR3: 32.8-WpP: 180.18-Rx: RS 3, E: EU-40, 100183/04			
Pnts: 1000 L:A3240121_3M 01:00420720 02:00430720 p:A1800820 s: S190733P 71			
Site ID: Syd Room#3, 3/87 Station Rd, Seven Hills, NSW 1618-2018, 1618-2018			
EMC Technologies (Sydney) 3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia			
Phone +61(2) 9624 2777 Fax +61(2) 9638 4050			

Graph 35 Horizontal Polarization 2350 to 2500MHz

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Part15C

Radiated Emissions (dBuV/m)

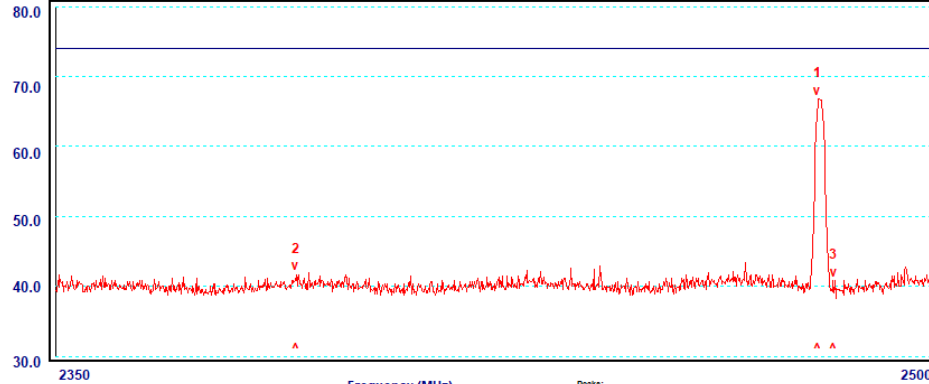
Job No: S190733

p:\PCF\S190733RF_35.PCF

Test Date: 12/09/2019

GRAPH No. 35

= Ambient ~ = AV Value



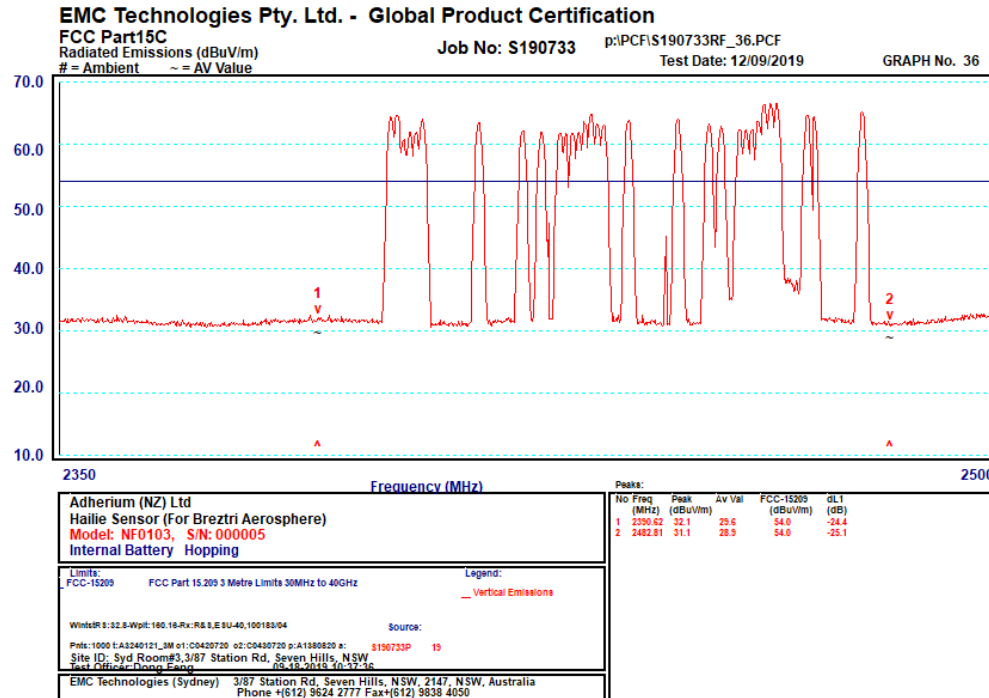
Limits		Legend:	
FCC-B3PK	FCC CLASS B RAD PEAK 3M LIMITS (+20dB) 1 - 40GHz	—	Horizontal Emissions
WinSR3: 32.8-WpP: 180.18-Rx: RS 3, E: EU-40, 100183/04			
Pnts: 1000 L:A3240121_3M 01:00420720 02:00430720 p:A1800820 s: S190733P 85			
Site ID: Syd Room#3, 3/87 Station Rd, Seven Hills, NSW 1618-2018, 1618-2018			
EMC Technologies (Sydney) 3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia			
Phone +61(2) 9624 2777 Fax +61(2) 9638 4050			

Hopping on – Average Measurements

Graph 36

Vertical Polarization

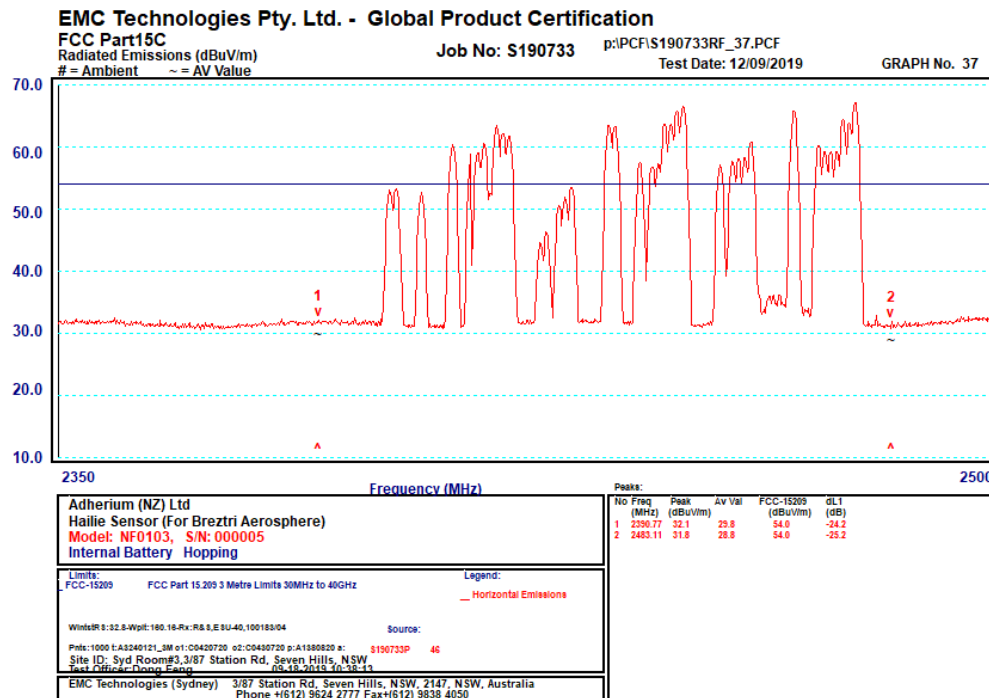
2350 to 2500MHz



Graph 37

Horizontal Polarization

2350 to 2500MHz

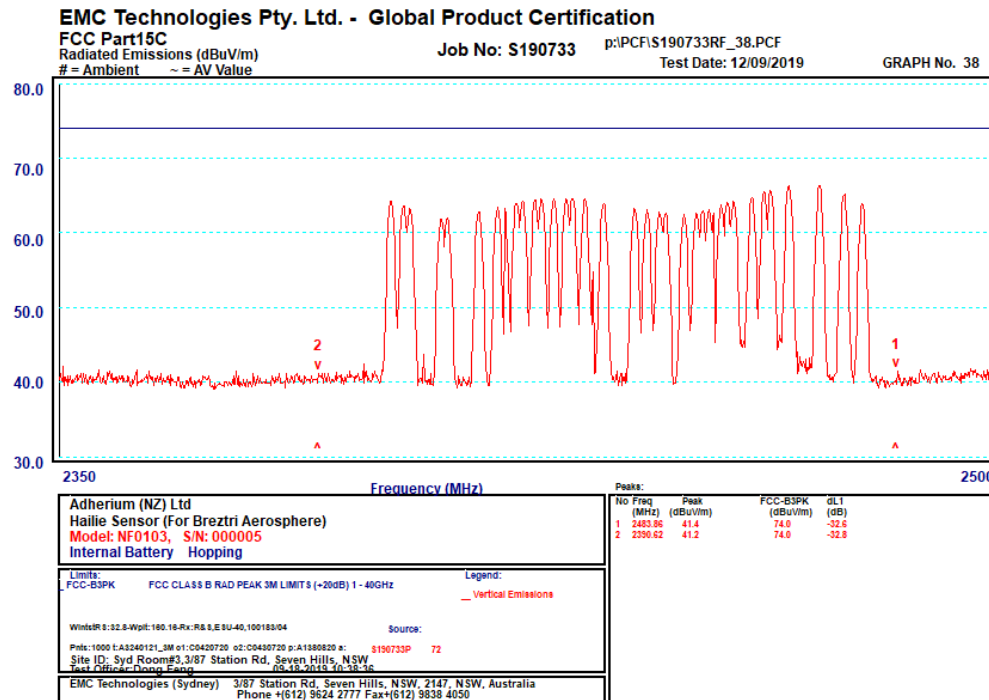


Hopping on – Peak Measurements

Graph 38

Vertical Polarization

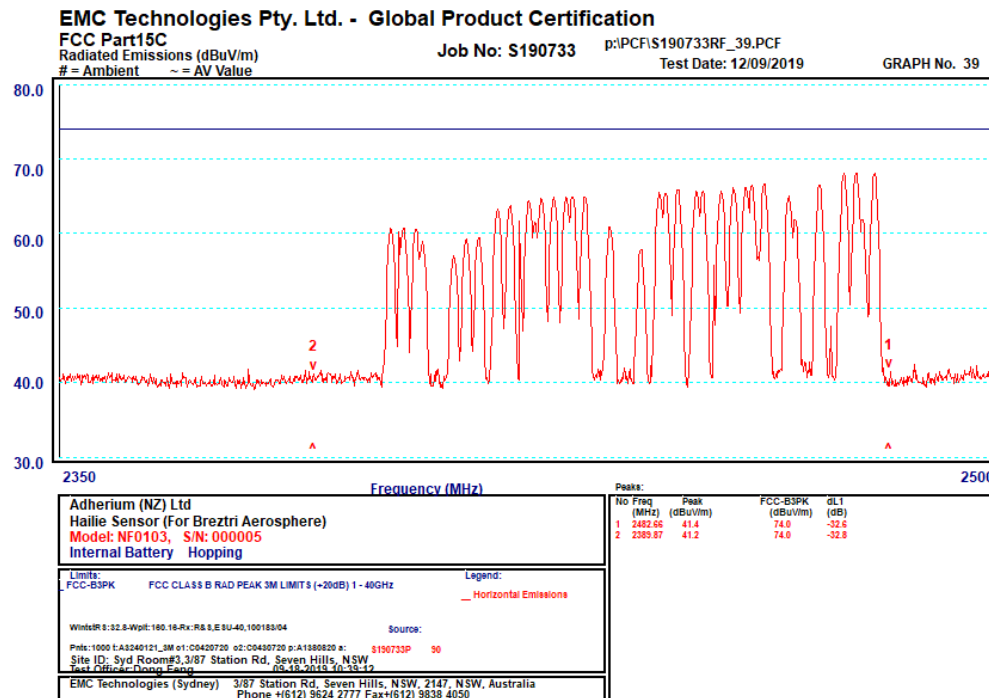
2350 to 2500MHz



Graph 39

Horizontal Polarization

2350 to 2500MHz



3.10 §15.247(i) Maximum Permissible Exposure

Table 1—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

Requirement:

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the commission's guidelines. See §1.1307(b)(1) of this chapter.

Due to the nature of EUT, Calculations were performed according to devices used within 20 cm of person (FCC2.1093) - < 50mm test separation.

KDB 447498 D01 v06 was used to calculate the minimum separation distance allowed before SAR measurements were required.

1-g Head or Body SAR:

$$\left(\frac{\text{max.channel power,mW}}{\text{min.separation distance,mm}} \right) \times \sqrt{f(\text{GHz})} \leq 3.0$$

10-g Extremity SAR:

$$\left(\frac{\text{max.channel power,mW}}{\text{min.separation distance,mm}} \right) \times \sqrt{f(\text{GHz})} \leq 7.5$$

Result:

Maximum measured power, E.I.R.P. = 3.11dBm + 1dBi = 4.11dBm = 2.57mW

Minimum separation distance = 5mm

Highest frequency = 2.48 GHz

$$(2.57\text{mW} / 5 \text{ mm}) \times \sqrt{2.48 \text{ GHz}} = 0.82 < 3.0 \text{ and } 7.5$$

Conclusion: Complied.

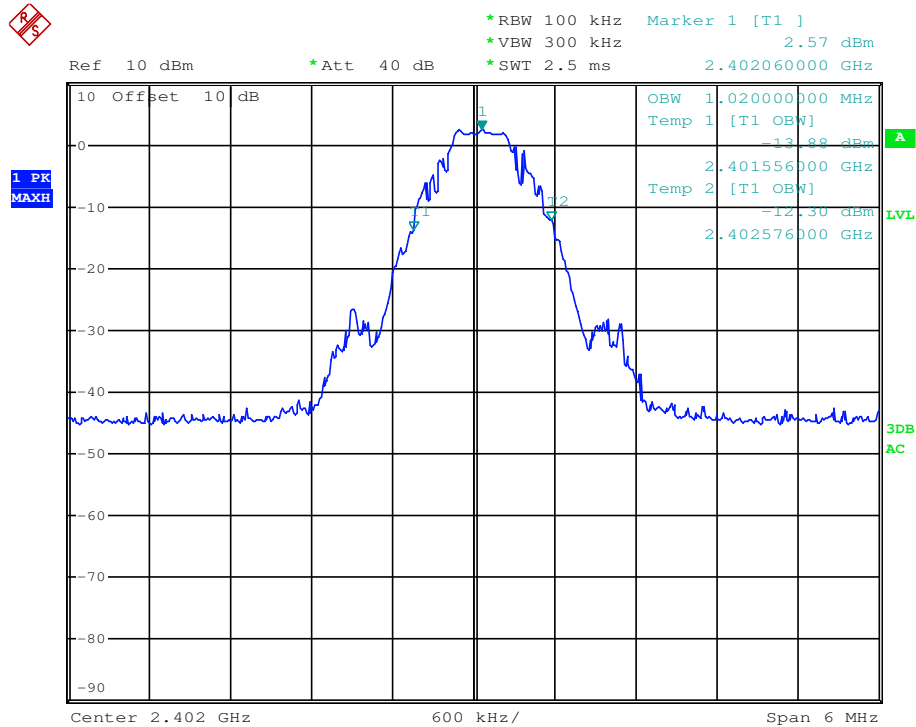
3.11 §2.1049 Occupied bandwidth – 99% power

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

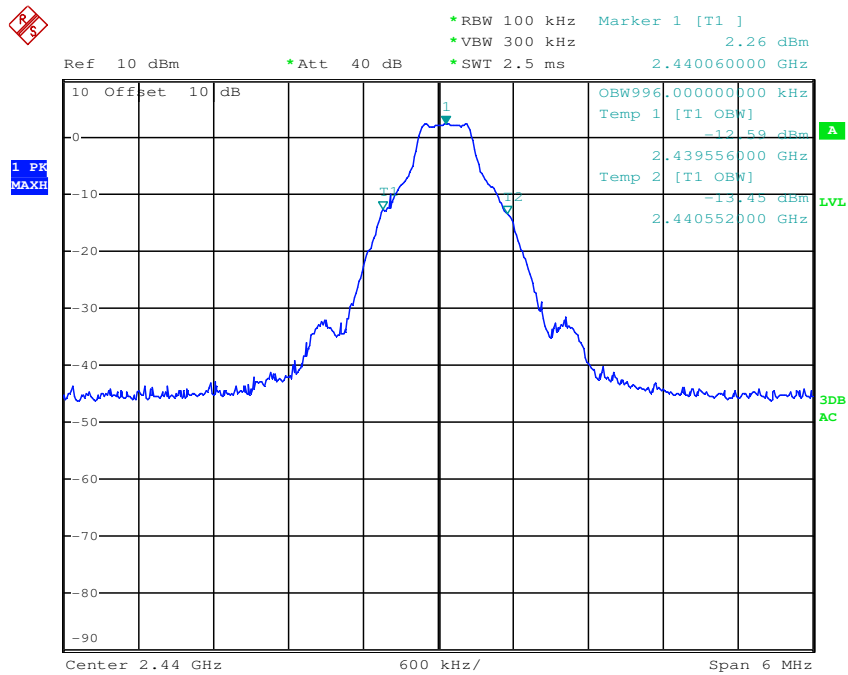
Channel [kHz]	99% Bandwidth [MHz]	Low Frequency [GHz]	High Frequency [GHz]
2402	1.02	2.401556	2.402576
2402	0.996	2.439556	2.440552
2480	1.008	2.479556	2.480564

99% Occupied Bandwidth

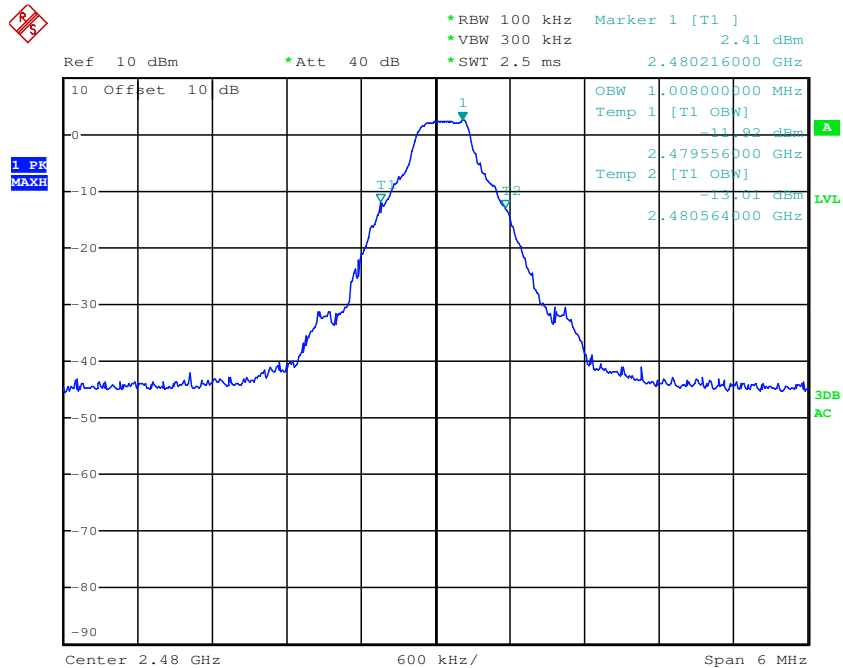
Channel 1



Date: 15.AUG.2019 11:26:03

99% Occupied Bandwidth**Channel 2**

Date: 15.AUG.2019 12:31:05

99% Occupied Bandwidth**Channel 3**

Date: 15.AUG.2019 11:30:47

4.0 COMPLIANCE STATEMENT

The Hailie Sensor (for Breztri Aersphere) with Model Number: NF0103 tested on behalf of Adherium (NZ) Ltd, complied with the requirements of 47 CFR, Part 15 Subpart C - Rules for Radio Frequency Devices (intentional radiators) operating within the band: 2400 MHz to 2483.5 MHz.

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:

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
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Peak Power Spectral Density:	±1.5 dB
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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%.