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RADIO COMPLIANCE REPORT

Certification Test Report

In accordance with:
CFR47 FCC Part 15, Subpart C, 15.225

Tait International Limited

TAHP2A

TCH8 Control Head

FCC ID: CASTAHP2A

REPORT: E2510-1902-3
DATE: November, 2025



Accreditation Number: 18553
Accredited for compliance with ISO/IEC 17025 - Testing

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Certificate of Compliance

EMC Bayswater Test Report: E2510-1902-3
Issue Date: November, 2025

Test Sample(s): TCH8 Control Head
Model No: TAHP2A
Serial No: 21771802 (Sample 1), 21771803 (Sample 2)
FCC ID: CASTAHP2A

Customer Details: Ms. Rayna Zhang
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Test Specification: CFR47 FCC Part 15, Subpart C, 15.225

Results Summary:	15.203 – Antenna Requirement	Complied
	15.225 (a) - Field Strength within the band 13.553 - 13.567MHz	Complied
	15.225 (b) - Field Strength within the bands 13.410-13.553 MHz and 13.567-13.710 MHz	Complied
	15.225 (c) - Field Strength within the bands 13.110-13.410 MHz and 13.710-14.010 MHz	Complied
	15.225 (d) - Field Strength outside the band 13.110-14.010 MHz	Complied
	15.225 (e) - Frequency tolerance of the carrier signal	Complied
	15.215 (c) - 20dB Emission Bandwidth	Complied

Test Date(s): 1st to 20th October, 2025

Test House (Issued By): EMC Bayswater Pty Ltd
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Croydon South
Victoria, 3136
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FCC Accredited Test Firm Registration number: 527798

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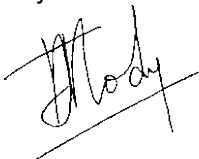
This is to certify that the necessary measurements were made by EMC Bayswater Pty Ltd, and that the Tait International Limited, TAHP2A, TCH8 Control Head (Serial No: 21771802 (Sample 1), 21771803 (Sample 2)), has been tested in accordance with requirements contained in the appropriate commission regulations.

Tested and prepared by: Tested by:

Approved by:



Adnan Zaman
(EMC Test Engineer)



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(EMC Test Engineer)



Neville Liyanapatabendige
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10/11/2025 12:23

Date

Radio Compliance Report for Tait International Limited

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1. Introduction

Radio tests were performed on a Tait International Limited, TAHP2A, TCH8 Control Head in accordance with the requirements of Title 47 of the standard CFR47 FCC Part 15, Subpart C, 15.225.

2. Test Report Revision History

None

3. Report Information

EMC Bayswater Pty Ltd reports apply only to the specific samples tested under the stated test conditions. All samples tested were in good operating condition throughout the entire test program unless otherwise stated. EMC Bayswater Pty Ltd does not in any way guarantee the later performance of the product/equipment. It is the manufacturer's responsibility to ensure that additional production units of the tested model are manufactured with identical electrical and mechanical components. EMC Bayswater Pty Ltd shall have no liability for any deductions, inference or generalisations drawn by the clients or others from EMC Bayswater Pty Ltd issued reports. This report shall not be used to claim, constitute or imply product endorsement by EMC Bayswater Pty Ltd. This report shall not be reproduced except in full (with the exception of the certificate on page 2) without the written approval of EMC Bayswater Pty Ltd. This document may be altered or revised by EMC Bayswater Pty Ltd personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by EMC Bayswater Pty Ltd will nullify the document.

4. Summary of Results

The EUT complied with applicable requirements of CFR47 FCC Part 15, Subpart C, 15.225. Worst-case results are tabled as follows:

FCC Part 15C sections	Test	Result
15.203	Antenna Requirement	Complied ^{#1}
15.225 (a)	Field Strength within the band 13.553 - 13.567MHz	Complied by 64.2dB
15.225 (b)	Field Strength within the bands 13.410-13.553 MHz and 13.567-13.710 MHz	Complied by 43.6dB
15.225 (c)	15.225 (c) - Field Strength within the bands 13.110-13.410 MHz and 13.710-14.010 MHz	Complied by 60.0dB
15.225 (d), 15.209	Field Strength outside the band 13.110-14.010 MHz	Complied by 8.9dB
15.225 (e)	Frequency tolerance of the carrier signal	Complied
15.215 (c)	20dB Emission Bandwidth	Complied

^{#1}The Antenna is permanently attached, internal to the device

Table 1: Summary of test results

5. Product Sample, Configuration & Modifications

5.1. EUT Description

The EUT (Equipment Under Test), as supplied by the client, is described as follows:

Product:	TCH8 Control Head	
Model No:	TAHP2A	
Serial No:	21771802 (Sample 1), 21771803 (Sample 2)	
Firmware:	QIDMR_FC_TCH8BTCompl.0004	
Software:	N/A	
Power Specifications 1:	Remote: 10.8V -16V dc, maximum current 2 Amps	
Power Specifications 2:	Local: Radio powered	
Transmitter 1 details:	Description:	Bluetooth Classic
	Type:	Murata 2DL (NXP IW611)
	Modulation:	GFSK, $\pi/4$ -DQPSK, 8-DPSK
	Channels:	79 channels spanning from 2.402GHz to 2.48GHz
	Max power:	BR: +16dBm EDR: +8dBm
	Antenna:	AANI-NI-0013
	Antenna Gain:	+3.2 dBi
Transmitter 2 details:	Description:	Bluetooth Low Energy
	Type:	Murata 2DL (NXP IW611)
	Modulation:	GFSK
	Channels:	40 channels spanning from 2.402GHz to 2.48GHz (Spacing 2MHz)
	Max power:	+16dBm
	Antenna:	AANI-NI-0013
	Antenna Gain:	+3.2 dBi
Transmitter 3 details:	Description:	13.56MHz NFC
	Type:	STM ST25R3916B
	Modulation:	Not supplied
	Channels:	N/A
	Max power:	1.6W
	Antenna:	Tait PN 220-01998
	Antenna Gain:	Not supplied
Dimensions:	178x62x52mm (Length x Width x Height)	
Weight:	Local Head = 236g, Remote Head = 292g	
EUT Type:	Tested as tabletop.	

(Customer supplied product information)

(Refer to photographs in Annex A & B for views of the EUT)

5.2. Product description

The EUT (Equipment Under Test) has been described by the customer as follows:

“TCH8 is a control head for Tait TM9000 series mobile radio. It features two rotary controls (volume/channel) and Bluetooth connectivity for wireless PTT and audio accessories. TCH8 is available in local or remote mount configurations. The remote configuration includes an audio PA which is powered by a dedicated DC power connector on the rear of the control head.”

(Customer supplied product description information)

5.3. Support Equipment

Support Equipment 1:	Description:	Laptop
	Manufacturer:	Toshiba
	Model:	PORTÉGÉ
	Serial number:	WS3958
Support Equipment 2:	Description:	Mobile Body
	Manufacturer:	Tait International
	Model:	Demo Model
	Serial number:	21730970

5.4. Product operating modes

The customer described the products normal operation modes as the following:

“3 Modes – Idle, Receive and Transmit.”

(Customer supplied product operating mode information)

5.5. Product operating mode for testing

“NFC: CCTM mode.”

(Customer supplied product operating mode for testing information)

5.6. Configuration

The EUT was either configured by the customer or configured using the customer's instructions:

The device was connected and powered by the Mobile Body. The device was also connected to a 12V battery/13.8VDC laboratory power supply.

Customer supplied a sample (SN: 21771803) with a temporary SMA connector for the conducted method testing.

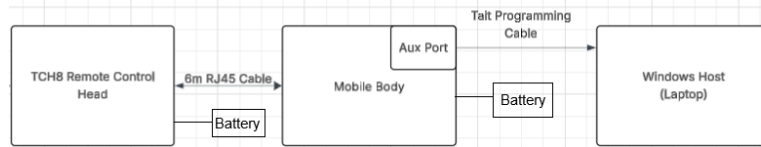


Figure 1: Block diagram of EUT test configuration – Radiated Method

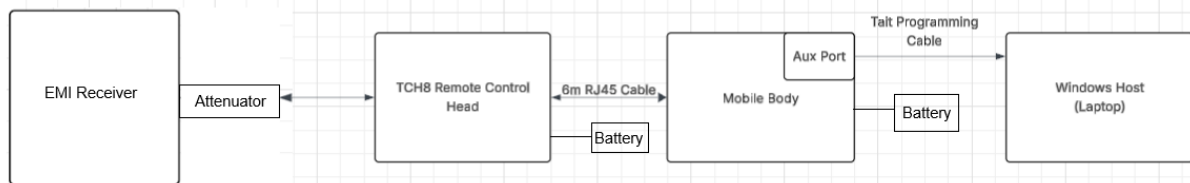


Figure 2: Block diagram of EUT test configuration – Conducted Method

Port	Cable type	Shielded cable	Cable Brand	Cable Model	Length (m)	Termination
Interface	RJ45	Yes	Chuanlian	CL0E1289	6m	Mobile body
Remote Control head Power Supply	Twin Flex Auto cable 14 AWG	No	DSQ	Not stated	5m	12V Battery/Laboratory PSU
Front Mic Port	Unterminated					

Table 2: List of ports, loads and cable lengths used for testing

5.7. Modifications

EMC Bayswater Pty Ltd did not modify the EUT.

6. Test Facility & Equipment

6.1. Test Facility

Radiated Field Strength emissions and 20dB Emission Bandwidth measurements were taken in the indoor Open Area Test Site (iOATS) facility at EMC Bayswater Pty Ltd, located at 18/88 Merrindale Drive, Croydon South, Victoria, 3136, Australia.

Frequency tolerance of the carrier signal measurements were performed in an environmental chamber at EMC Bayswater Pty Ltd, located at 18/88 Merrindale Drive, Croydon South, Victoria, 3136, Australia.

EMC Bayswater Pty Ltd's FCC Accredited Test Firm Registration number: 527798.

6.2. Test Equipment

Refer to Appendix A for the measurement instrument list.

7. Referenced Standards

CFR47 FCC Part 15, Subpart C

CFR47 FCC Part 15, Subpart B

ANSI C63.10 - 2020

American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

ANSI C63.4 - 2014

American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

8. Referenced Documents

Test Plan

None supplied

9. Antenna Requirement – FCC Part 15.203

9.1. Requirements

As per section 15.203 of CFR47 FCC Part 15, Subpart C:

- An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

9.2. Result

The EUT uses permanent, internally attached antenna which is etched into the PCB. Therefore the EUT complied with the antenna requirements of CFR47 FCC Part 15, Subpart C, Section 15.203.

10. Field Strength within the 13.110MHz to 14.010MHz bands - FCC Part 15.225 (a), (b) and (c)

10.1. Test Procedure

The field strength of any emissions within the band 13.110MHz to 14.110MHz was measured 3 metres away from the EUT in the iOATS (indoor Open Area Test Site) facility, which is an ANSI C63.4 compliant semi-anechoic chamber with ground plane.

The field strength measurements (Radiated Emissions) were performed in accordance with the ANSI C63.10 - 2020.

The EUT was placed on a polystyrene support at a height of 0.8m above the ground reference plane. The measuring antenna was located at a distance of 3m from the EUT. The spectrum analyser peak detector was set to MAX-HOLD and the range selected continuously scanned with 10kHz RBW and 30kHz VBW. The antenna height was fixed at 1 meter and the turntable slowly rotated. The EUT was also orientated in each of the X and Y-axis, in-turn in order to find the worst-case emission arrangement.

Plots of the accumulated measurement data for X (Parallel), Y (Perpendicular) and Z (Ground-Parallel) antenna orientations, including all transducer correction factors and other measuring system correction factors were produced using commercially available compliant software (as listed in the test equipment list of this report).

(Refer to photographs in Annex C for views of the test configuration)

10.2. Requirements

The EUT must comply with field strength limits defined in section 15.225 (a), (b) and (c) of CFR47 FCC Part 15, Subpart C:

Frequency Band (MHz)	Limit at 30m (dB μ V/m)	Limit at 3m ^{Note 1} (dB μ V/m)
13.110 to 13.410	40.5	80.5
13.410 to 13.553	50.5	90.5
13.553 to 13.567	84.0	124.0
13.567 to 13.710	50.5	90.5
13.710 to 14.010	40.5	80.5

Note 1: The measurements were performed at 3m distance therefore the square of an inverse linear distance extrapolation factor (40 dB/decade) was applied to 30m limits.

Table 3: Limits for Field Strength within the 13.110MHz to 14.010MHz bands – FCC Part 15.225 (a), (b) and (c)

10.3. Test Results

Worst-case Field Strength measurements are tabulated below.

(Refer to graphs in Appendix C.1)

FCC Par 15 Section	Frequency Band (MHz)	Frequency (MHz)	Measured Field Strength at 3m Peak (dB μ V/m)	Limit at 3m (dB μ V/m)	Delta limit (dB)
15.225 (a)	13.553 to 13.567	13.560	59.8	124.0	-64.2
15.225 (b)	13.410 to 13.553	13.552	44.6	90.5	-45.9
	13.567 to 13.710	13.567	46.9	90.5	-43.6*
15.225 (c)	13.110 to 13.410	13.363	19.6	80.5	-60.9
	13.710 to 14.010	13.718	20.5	80.5	-60.0

**Worst-case emissions*

Table 4: Field Strength within the 13.110MHz to 14.010MHz bands

The measurement uncertainty was calculated as follows:

Measurement frequency range	Calculated measurement uncertainty
9kHz to 30MHz	± 4.33 dB

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of $k=2$ which gives a level of confidence of approximately 95%. The referenced uncertainty standard specifies that determination of compliance shall be based on measurements without taking into account measurement uncertainty. However, the measurement uncertainty shall appear in the test report.

Climatic Conditions	
Temperature:	16.7 to 17°C
Humidity:	47 to 48%
Atmospheric pressure:	1004.0 to 1005.0hPa

Table 5: Climatic Conditions

Notes: The Field Strength of any emissions within the band 13.110MHz to 14.010 MHz were below the applicable limits.

Assessment: The EUT complied with the Field Strength requirements of CFR47 FCC Part 15, Subpart C, 15.225 (a), (b) and (c).

11. Field Strength outside the band 13.110-14.010 MHz – FCC Part 15.225 (d), FCC 15.209

11.1. Test Procedure

The Radiated Emissions were performed in accordance with the ANSI C63.10 - 2020.

Radiated Emissions were measured 3 metres (from 9kHz to 1GHz) away from the EUT in the iOATS (indoor Open Area Test Site) facility, which is an ANSI C63.4 compliant semi-anechoic chamber with ground plane. The EUT was placed on a non-conductive support at a height of 0.8m above the ground plane.

In the frequency range of 9kHz to 30MHz, an Active loop antenna was used. For X (Parallel), Y (Perpendicular) and Z (Ground-Parallel) antenna polarizations, the peak detector was set to MAX-HOLD and the range selected continuously scanned. The measuring antenna was positioned at 1m fixed height and the turntable slowly rotated. The peak preview measurements were performed with a resolution bandwidth of 200Hz (9kHz to 150kHz), 9kHz (150kHz to 30MHz) and a video bandwidth of 30kHz. Peak emissions that exceeded the limit or were close to the applicable limit were investigated further. The frequency of each emissions was then accurately determined. Each emission of interest was then in-turn maximised by using the turntable to rotate the EUT through 360 degrees to find the worst-case emission arrangement. Quasi peak or CISPR Average measurements were then performed using a measuring time of no less than 15 seconds. The final quasi-peak or CISPR Average measurements were performed using a receiver bandwidth of 6dB and a resolution bandwidth of 200 Hz (9kHz to 150kHz) and 9kHz (150kHz to 30MHz).

In the frequency range of 30MHz to 1GHz, a Biconilog antenna was used. For both horizontal and vertical antenna polarizations, the peak detector was set to MAX-HOLD and the range selected continuously scanned. The measuring antenna was positioned at 4 different fixed height positions and the turntable slowly rotated. The peak preview measurements were performed with a resolution bandwidth of 120kHz and a video bandwidth of 300kHz. Peak emissions that exceeded the limit or were close to the applicable limit were investigated further. The frequency of each emissions was then accurately determined. Each emission of interest was then in-turn maximised by using the turntable to rotate the EUT through 360 degrees and varying the height of the antenna between 1 and 4 metres to find the worst-case emission arrangement. Quasi peak measurements were then performed using a measuring time of no less than 15 seconds. The final quasi-peak measurements were performed using a receiver bandwidth of 6dB and a resolution bandwidth of 120kHz.

Plots of the accumulated measurement data for both horizontal and vertical antenna polarizations, including all transducer and other measuring system correction factors were produced using commercially available compliant software (as listed in the test equipment list of this report).

(Refer to photographs in Annex C for views of the test configuration)

11.2. Requirements

As per section 15.225 (d) of CFR47 FCC Part 15, Subpart C:

- The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in 15.209 of CFR47 FCC Part 15, Subpart C

As per section 15.209 of CFR47 FCC Part 15, Subpart C, (Radiated emissions, general requirements) the EUT is required to meet the limits specified in the following table:

Frequency Range (MHz)	Limits at 3m (dB μ V/m)
0.009 to 0.490	128.5 to 93.8
0.490 to 1.705	73.8 to 62.9
1.705 to 30.0	69.5
30.0 to 88	40.0
88.0 to 216.0	43.5
216.0 to 960.0	46.0
Above 960	54.0
NOTE: The lower limit shall apply at the transition frequency.	

Note 1: as per CFR FCC Part 15 section 15.209 (d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector

Note 2: as per CFR FCC Part 15.35 (b) Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz. When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, e.g., see §§15.250, 15.252, 15.253(d), 15.255, 15.256, and 15.509 through 15.519 of this part, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device, e.g., the total peak power level. Note that the use of a pulse desensitization correction factor may be needed to determine the total peak emission level. The instruction manual or application note for the measurement instrument should be consulted for determining pulse desensitization factors, as necessary.

Table 6: Limits for Radiated Spurious Emissions at distance of 3m

11.3. Test Results

Radiated Emissions measurements are tabulated below. For below 1GHz measurements, Quasi-peak measurements were performed at spot frequencies where the peak emission was close to, or exceeded the applicable limit line. For above 1GHz measurements, Peak or CISPR Average measurements were performed at spot frequencies where the peak or average emission was close to, or exceeded the applicable limit line.

(Refer to graphs in Appendix C.2)

Antenna Orientation	Frequency (MHz)	Result Quai peak/ Average (dB μ V/m)	Limit Quasi-peak/ Average (dB μ V/m)	Delta limit (dB)
X	Peak emissions were not above the measurements system noise floor or at least 20dB below the limit outside the band 13.110 to 14.010MHz			
Y				
Z				

Table 7: Radiated Spurious Emissions – 9kHz to 30MHz

Antenna polarisation	Frequency (MHz)	Result Quasi-peak (dB μ V/m)	Limit Quasi-peak (dB μ V/m)	Delta limit (dB)
Horizontal	30.631	25.9	40.0	-14.1
	420.377	33.5	46.0	-12.5
	876.616	31.6	46.0	-14.4
Vertical	31.601	31.1	40.0	-8.9*
	74.329	25.1	40.0	-14.9
	154.209	27.5	43.5	-16.0
	949.560	32.8	46.0	-13.2

**Worst-case emissions*

Table 8: Radiated Spurious Emissions – 30MHz to 1GHz

The measurement uncertainty was calculated as follows:

Measurement frequency range	Calculated measurement uncertainty
0.009MHz to 30MHz	± 4.33 dB
30MHz to 1GHz	± 4.65 dB
1GHz to 6GHz	± 4.83 dB

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of $k=2$ which gives a level of confidence of approximately 95%. The referenced uncertainty standard specifies that determination of compliance shall be based on measurements without taking into account measurement uncertainty. However, the measurement uncertainty shall appear in the test report.

Climatic Conditions	
Temperature:	16.7 to 17°C
Humidity:	47 to 48%
Atmospheric pressure:	1004.0 to 1005.0hPa

Table 9: Climatic conditions

Calculation: The above results are based upon the following calculation:

$$E = V_{QP/PK/AV} + AF - G_{Amp} + L_C$$

Where:

E = E-field in dB μ V/m
 $V_{QP/PK/A}$ = Measured Voltage (Quasi Peak, Peak or Average) in dB μ V
 AF = Antenna Factor in dB(/m)
 L_C = Cable and attenuator Loss in dB
 G_{Amp} = Pre Amplifier Voltage Gain in dB

Example calculation:

$$\begin{aligned} E &= V_{PK} + AF - G_{Amp} + L_C \\ E &= 30\text{dB}\mu\text{V} + 12\text{dB/m} - 0\text{dB} + 2.3\text{dB} \\ E &= 44.3 \text{ dB}\mu\text{V/m} \end{aligned}$$

Notes: The field strength of any emissions appearing outside of the 13.110-14.010 MHz band measurements were below the specified CFR47 FCC Part 15, Subpart C, 15.209 limits.

Assessment: The EUT complied with the field strength of any emissions appearing outside of the 13.110-14.010 MHz band requirements of CFR47 FCC Part 15, Subpart C, 15.225 (d).

12. Frequency tolerance of the carrier signal - FCC Part 15.225 (e)

12.1. Test Procedure

The Frequency tolerance of the carrier signal (Frequency Stability) measurements were performed as per section 6.8 of ANSI C63.10 - 2020.

The EUT was placed inside the environmental chamber and the antenna port was connected to an external spectrum analyser. The spectrum analyser was tuned to the fundamental (transmit frequency) of the transmitter. While maintaining a constant temperature inside the environmental chamber the operating frequency measurements were performed at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total were made at each temperature.

The frequency stability measurements were performed over the +50°C to -20°C with 10°C temperature steps at nominal 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°C.

Voltage Specification	Voltage
Nominal	13.8VDC
85% of nominal	11.73VDC
115% of nominal	15.87VDC

Table 10: Frequency tolerance of the carrier signal – Voltage variation

(Refer to photographs in Annex C for views of the test configuration)

12.2. Requirements

As per section 15.225 (e) of CFR47 FCC Part 15, Subpart C:

- The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to + 50 degrees 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 degrees C.

Reference operating frequency at ambient (+20°C): 13.560260 MHz

Reference Frequency (MHz)	0.01% Bandwidth (MHz)	Lower Frequency Limit (MHz)	Upper Frequency Limit (MHz)
13.560260	0.001356	13.558904	13.561616

Table 11: Frequency tolerance of the carrier signal - Limits

12.3. Test Results

The Frequency tolerance of the carrier signal (Frequency Stability) are tabulated below:

Reference Frequency: 13.560260MHz, Limit: 0.01%									
Temperature (°C)	Measured Frequency (MHz)				Frequency Tolerance (%)				Result
	At startup	After 2 min	After 5 min	After 10 min	At startup	After 2 min	After 5 min	After 10 min	
+50	13.560240	13.560180	13.560140	13.560120	-0.0001	-0.0006	-0.0009	-0.0010	Complied
+40	13.560100	13.560100	13.560120	13.560120	-0.0012	-0.0012	-0.0010	-0.0010	Complied
+30	13.560140	13.560140	13.560160	13.560160	-0.0009	-0.0009	-0.0007	-0.0007	Complied
+20	13.560280	13.560280	13.560260	13.560260	0.0001	0.0001	0.0000	0.0000	Complied
+10	13.560440	13.560420	13.560380	13.560360	0.0013	0.0012	0.0009	0.0007	Complied
0	13.560380	13.560380	13.560380	13.560400	0.0009	0.0009	0.0009	0.0010	Complied
-10	13.560440	13.560440	13.560460	13.560480	0.0013	0.0013	0.0015	0.0016	Complied
-20	13.560500	13.560500	13.560519	13.560519	0.0018	0.0018	0.0019	0.0019	Complied

Table 12: Frequency tolerance of the carrier signal – Temperature variation at nominal voltage

Reference Frequency: 13.560260MHz, Limit: 0.01%									
Supply Voltage	Measured Frequency (MHz)				Frequency Tolerance (%)				Result
	At startup	After 2 min	After 5 min	After 10 min	At startup	After 2 min	After 5 min	After 10 min	
13.8 VDC (Nominal)	13.560280	13.560260	13.560260	13.560260	Reference				
11.73 VDC	13.560280	13.560260	13.560260	13.560260	0.0001	0.0000	0.0000	0.0000	Complied
15.87 VDC	13.560280	13.560260	13.560260	13.560240	0.0001	0.0000	0.0000	-0.0001	Complied

Table 13: Frequency tolerance of the carrier signal – Voltage variation at +20°C

The measurement uncertainty was calculated as follows:

Measurement Parameter	Calculated measurement uncertainty
Operating Frequency	±10.5kHz

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of $k=2$ which gives a level of confidence of approximately 95%. The referenced uncertainty standard specifies that determination of compliance shall be based on measurements without taking into account measurement uncertainty. However, the measurement uncertainty shall appear in the test report.

Climatic Conditions	
Temperature:	-20 to 50°C
Humidity:	49 to 50%
Atmospheric pressure:	1009.5 to 1011.4hPa

Table 14: Climatic conditions

Calculations: Frequency Tolerance (%) = $((F_{\text{measured}} - F_{\text{reference}}) / F_{\text{reference}}) \times 100$

F_{measured} = Measured Frequency

$F_{\text{reference}}$ = Reference Frequency

Notes: The Frequency tolerance of the carrier signal was maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20°C to $+50^{\circ}\text{C}$ at normal supply voltage (13.8VDC), and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of $+20^{\circ}\text{C}$.

Assessment: The EUT complied with the Frequency tolerance of the carrier signal requirements of CFR47 FCC Part 15, Subpart C, 15.225 (e).

13.20dB Emission Bandwidth - FCC Part 15.215 (c)

13.1.Test Procedure

The 20dB Bandwidth was performed in accordance with the section 6.9 of ANSI C63.10 - 2020.

The EUT was placed on a polystyrene support at a height of 0.8m above the ground reference plane. The measuring antenna was located at a distance of 3m from the EUT. The worst-case transmitter orientation, measurement antenna polarization were used for each measurement. The spectrum analyzer centre frequency was tuned to the fundamental (transmit frequency) of the transmitter with span range between two times and five times the OBW (-20dB bandwidth). The nominal IF filter bandwidth (RBW) was set to 1% to 5% of the OBW and video bandwidth (VBW) was set to three times the RBW. The peak detector was used with trace mode to max hold. The resultant bandwidth measurement was recorded.

(Refer to photographs in Annex C for views of the test configuration)

13.2.Requirements

As per section 15.215 (c) of CFR47 FCC Part 15, Subpart C:

- Intentional radiators operating under the alternative provisions to the general emission limits, as contained in 15.217 through 15.257 of CFR47 FCC Part 15, Subpart C and in subpart E of CFR47 FCC Part 15, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated.

Designated Operating Frequency Band: 13.110MHz to 14.010MHz

13.3.Test Results

20dB Bandwidth measurements are tabulated below:

(Refer to graph in Appendix C.3)

Transmit operating frequency (MHz)	Measured 20dB Bandwidth Lower Frequency (MHz)	Measured 20dB Bandwidth Upper Frequency (MHz)	Designated Operating Band (MHz)	Comment
13.560	13.560108	13.560370	13.110 to 14.010	Complied

Table 15: Results for 20dB Bandwidth

The measurement uncertainty was calculated as follows:

Measurement Parameter	Calculated measurement uncertainty
Operating Frequency	±10.5kHz
Bandwidth	±14.96kHz

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of $k=2$ which gives a level of confidence of approximately 95%. The referenced uncertainty standard specifies that determination of compliance shall be based on measurements without taking into account measurement uncertainty. However, the measurement uncertainty shall appear in the test report.

Climatic Conditions	
Temperature:	16.7 to 17°C
Humidity:	47 to 48%
Atmospheric pressure:	1004.0 to 1005.0hPa

Table 16: Climatic conditions

Notes: The 20 dB bandwidth of the emission was contained within the designated operating frequency band (13.110 MHz to 14.010 MHz).

Assessment: The EUT complied with the 20dB Emission Bandwidth requirements of CFR47 FCC Part 15, Subpart C, section 15.215 (c).

14. Conclusion

The Tait International Limited, TAHP2A, TCH8 Control Head complied with the applicable requirements of CFR47 FCC Part 15, Subpart C, 15.225, 15.209, 15.203 and 15.215.

Appendix A – Test Equipment

Inv.	Equipment	Make	Model No.	Serial No.	Calibration		
					Interval	Due	Type
	15.225 (a), (b), (c) and (d) Field strength (Radiated Emissions) - 9kHz to 30MHz and 20dB Bandwidth						
1217	ANALYSER, EMI Receiver	Rohde & Schwarz	ESU40	100182	1 year	Aug-26	E
0932	CONTROLLER, Position	Sunol Sciences	SC104V-3	081006-1	N/A	N/A	V
0933	TURNTABLE	Sunol Sciences	SM46C	081006-2	N/A	N/A	V
0024	ANTENNA, Active Loop	EMCO	6502	2620	2 years	Feb-26	I
0989	CABLE, Coax, Sucoflex 104A	Huber+Suhner	44454/4A	C357	1 year	Jan-26	I
1145	CABLE, Coax, Sucoflex 104PA	Huber + Suhner	84279564	SN MY056/4PA	1 year	Jan-26	I
1155	HYGROMETER, Temp, Humidity	DigiTech	QM7312	-	2 years	Jul-27	I
0666	Enclosure, Semi-Anechoic, No 1	RFI Industries	S800 iOATS	1229	3 years	Jul-28	I
SW007	EMC Measurement Software	Rohde & Schwarz	EMC 32	Version 8.53.0	N/A	N/A	N/A
	15.225 (d) Field strength (Radiated Emissions) 30MHz to 1GHz						
1217	ANALYSER, EMI Receiver	Rohde & Schwarz	ESU40	100182	1 year	Aug-26	E
0932	CONTROLLER, Position	Sunol Sciences	SC104V-3	081006-1	N/A	N/A	V
0933	TURNTABLE	Sunol Sciences	SM46C	081006-2	N/A	N/A	V
0934	MAST, Antenna	Sunol Sciences	TLT2	081006-5	N/A	N/A	V
0935	ANTENNA, Biconilog	Sunol Sciences	JB5	A071106	2 years	Jun-27	E
0718	ATTENUATOR, 6dB	JFW	50FPE-006	N/A	1 year	Jan-26	I
0989	CABLE, Coax, Sucoflex 104A	Huber+Suhner	44454/4A	C357	1 year	Jan-26	I
1145	CABLE, Coax, Sucoflex 104PA	Huber + Suhner	84279564	SN MY056/4PA	1 year	Jan-26	I
1155	Hygrometer, Temp, Humidity	DigiTech	QM7312	-	2 years	Jul-27	I
0666	Enclosure, Semi-Anechoic, No 1	RFI Industries	S800 iOATS	1229	3 years	Jul-28	I
SW007	EMC Measurement Software	Rohde & Schwarz	EMC 32	Version 8.53.0	N/A	N/A	N/A
	Frequency tolerance of the carrier signal (Frequency Stability)						
1330	ANALYSER, EMI Receiver	Rohde & Schwarz	ESR7	101804	1 year	Jun-26	E
0715	ATTENUATOR, 20dB	JFW	50HF-020N	N/A	3 years	Dec-27	I
1288	CABLE, Coax, Sucoflex 126 E	Huber+Suhner	SF126EA/11 N/11N/3000	519773/126EA	1 year	Jan-26	V
0950	CHAMBER, Environmental	Thermal Product Solutions - Tenney	TJR	0702000083	2 years	Dec-25	I
1181	Programmable DC Power supply	BK Precision	9115-AT	6021860107177 10003	N/A	N/A	V
1154	HYGROMETER, Temp, Humidity	DigiTech	QM7312	-	2 years	Jul-27	I

V: Verification of operation against an internal reference

I: Internal calibration against a traceable standard

E: External calibration by a NATA or MRA equivalent endorsed facility

N/A: Not Applicable

Appendix B – Photographs

Annex	Number	Photograph Description
A	1 to 8	EUT (sample 1) – External views
	9 to 16	EUT (sample 2) – External views – Sample with temporary external antenna connection for testing
B	1 to 52	EUT (sample 1) – Internal views
	53 to 65	EUT (sample 2) – View of the sample with temporary SMA antenna port connector for Conducted method testing
C	1	Radiated measurements – EUT X Orientation
	2	Radiated measurements – EUT Y Orientation
	3	Radiated measurements – 9kHz to 30MHz – X Antenna orientation
	4	Radiated measurements – 9kHz to 30MHz – Y Antenna orientation
	5	Radiated measurements – 9kHz to 30MHz – Z Antenna orientation
	6	Radiated measurements – 30MHz to 1GHz
	7	
	8	Conducted measurements – Temperature Chamber
	9	Support Equipment - Laptop
	10	
	11	
	12	Support Equipment – Mobile Body
	13	
	14	

EUT External Photographs	-	EMC Bayswater Test Report E2510-1902-3 Annex A
EUT Internal Photographs	-	EMC Bayswater Test Report E2510-1902-3 Annex B
EUT Orientations & Test Configurations Photographs	-	EMC Bayswater Test Report E2510-1902-3 Annex C

Appendix C – Measurement Graphs

Appendix C.1 – 15.225 (a), (b) and (c) Field Strength

No.	Test	Graph Description
1	Field Strength	X measurement antenna polarisation
2		Y measurement antenna polarisation
3		Z measurement antenna polarisation

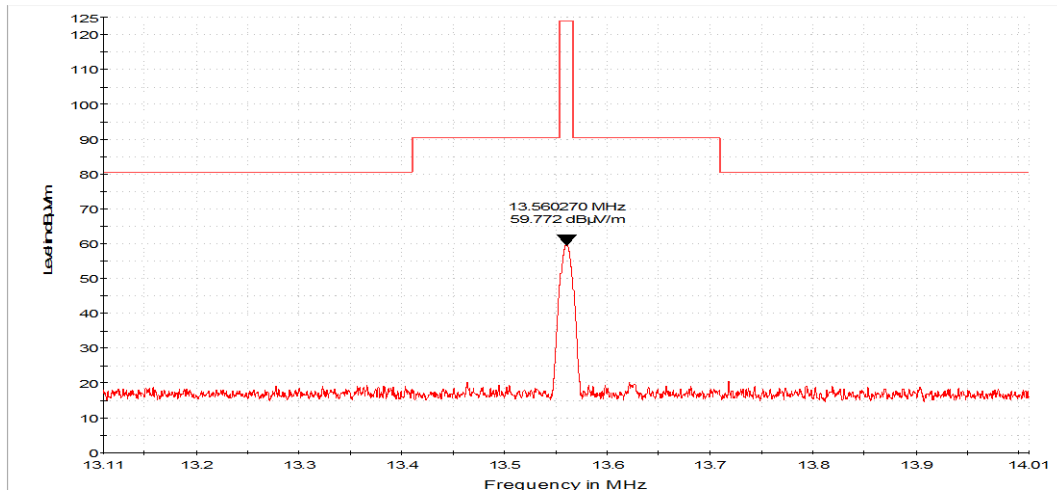


EMC Bayswater Pty. Ltd.

Field Strength - FCC Part 15.225 (a), (b) and (c)
Tait International Limited - TAHP2A - TCH8 Control
Head
EUT Y - X measurement antenna polarisation

Job Number: E2510-1902-3

Test Engineer: AZ



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Graph 1

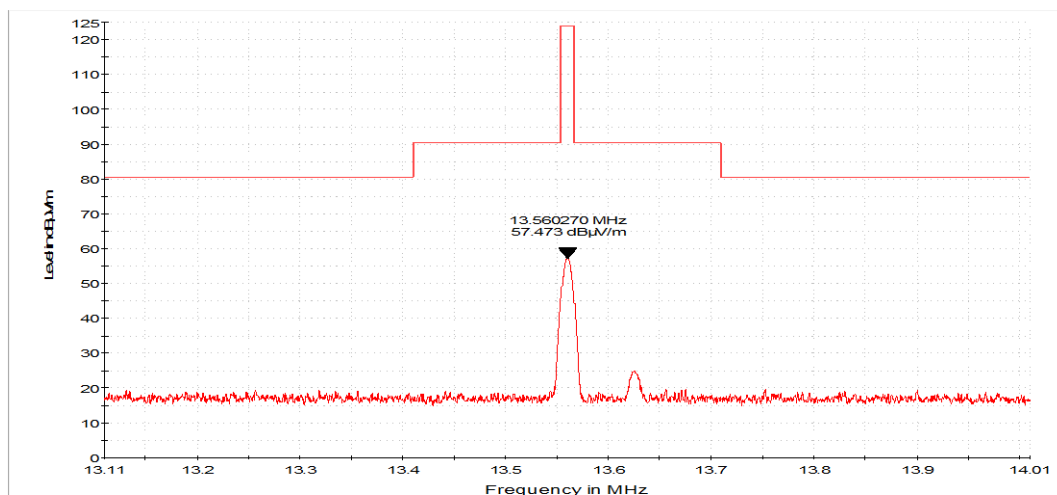


EMC Bayswater Pty. Ltd.

Field Strength - FCC Part 15.225 (a), (b) and (c)
Tait International Limited - TAHP2A - TCH8 Control
Head
EUT Y - Y measurement antenna polarisation

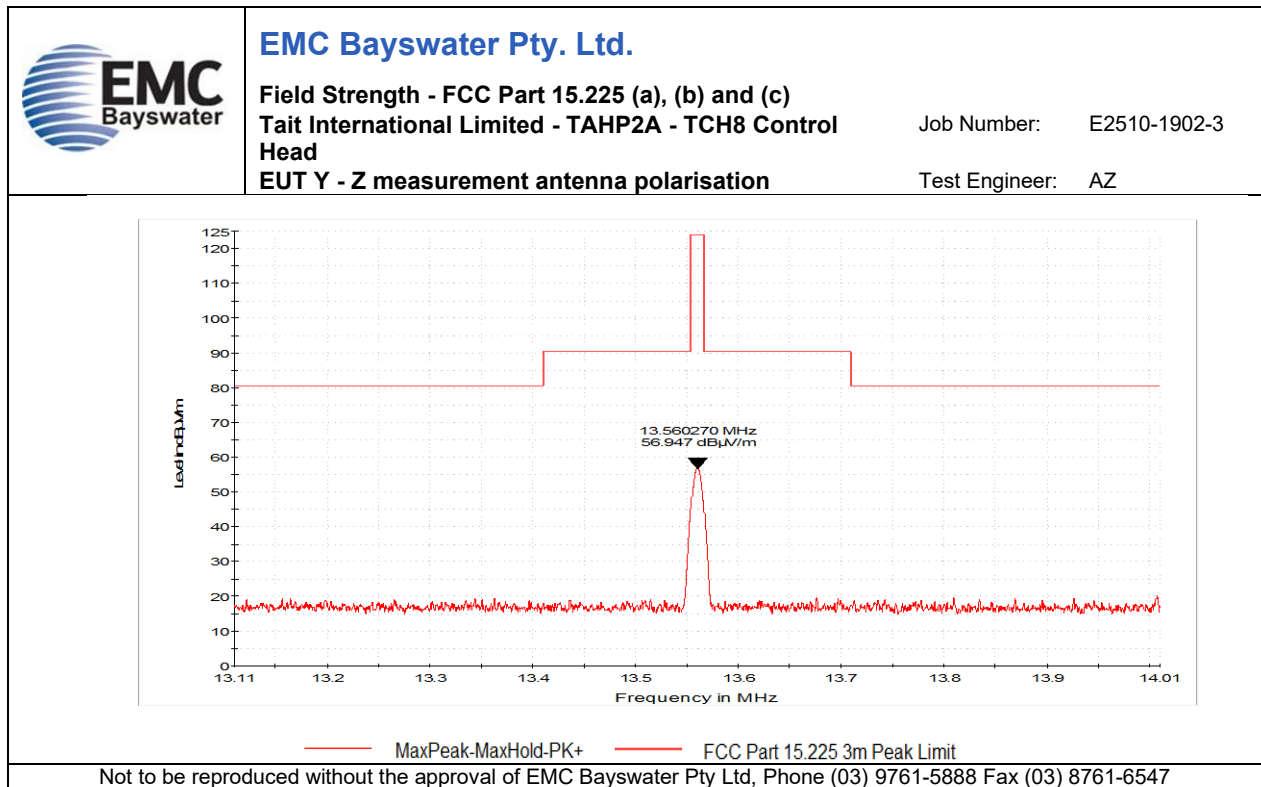
Job Number: E2510-1902-3

Test Engineer: AZ



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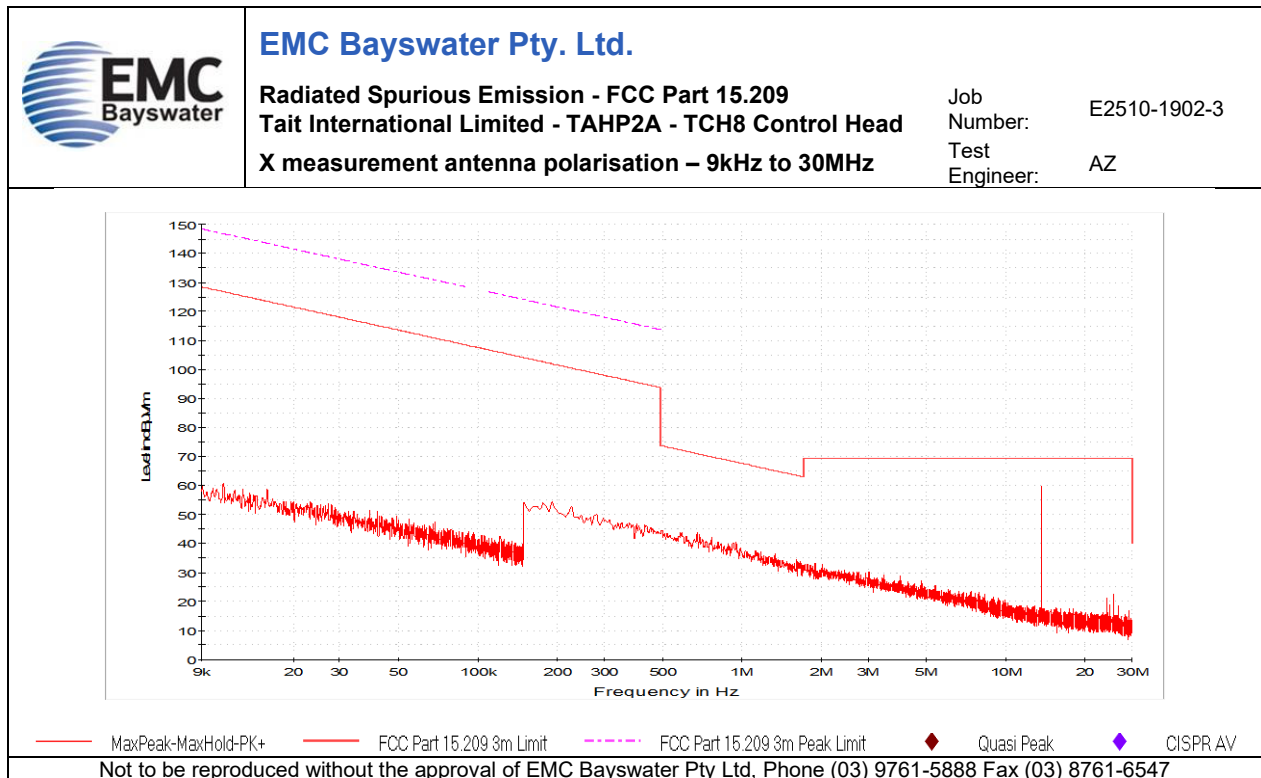
Graph 2



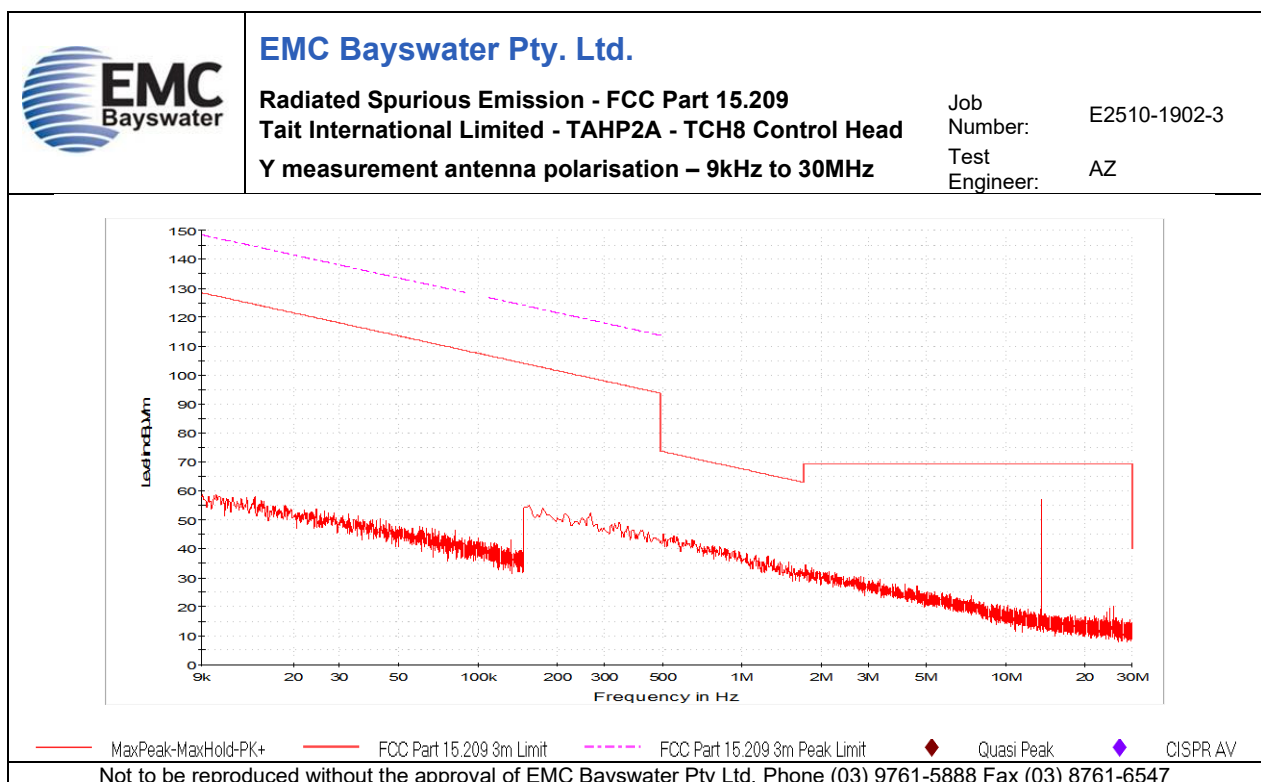
Graph 3

Appendix C.2 – Field Strength outside the band 13.110-14.010 MHz (Spurious Emissions)

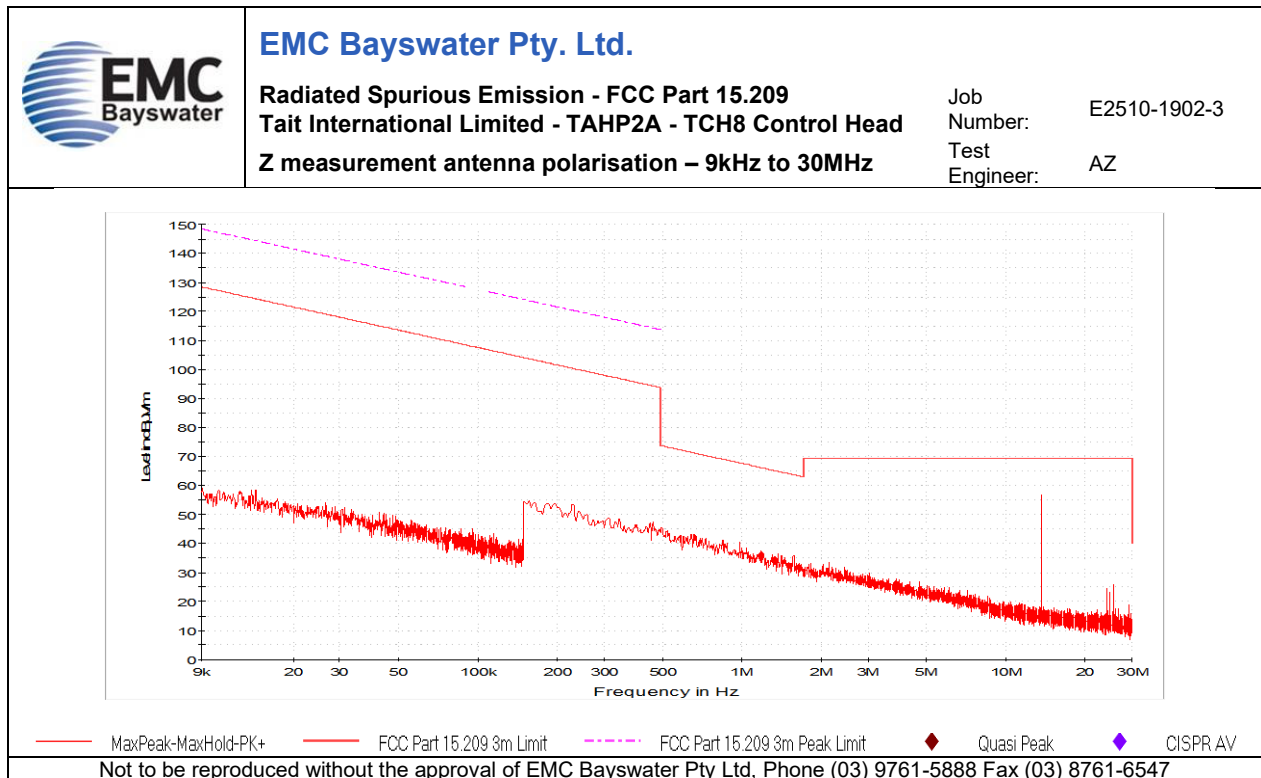
No.	Test	Graph Description
4	Radiated Spurious Emissions	X measurement antenna polarisation – 9kHz to 30MHz
5		Y measurement antenna polarisation – 9kHz to 30MHz
6		Z measurement antenna polarisation – 9kHz to 30MHz
7		Horizontal measurement antenna polarisation – 30MHz to 1GHz
8		Vertical measurement antenna polarisation – 30MHz to 1GHz



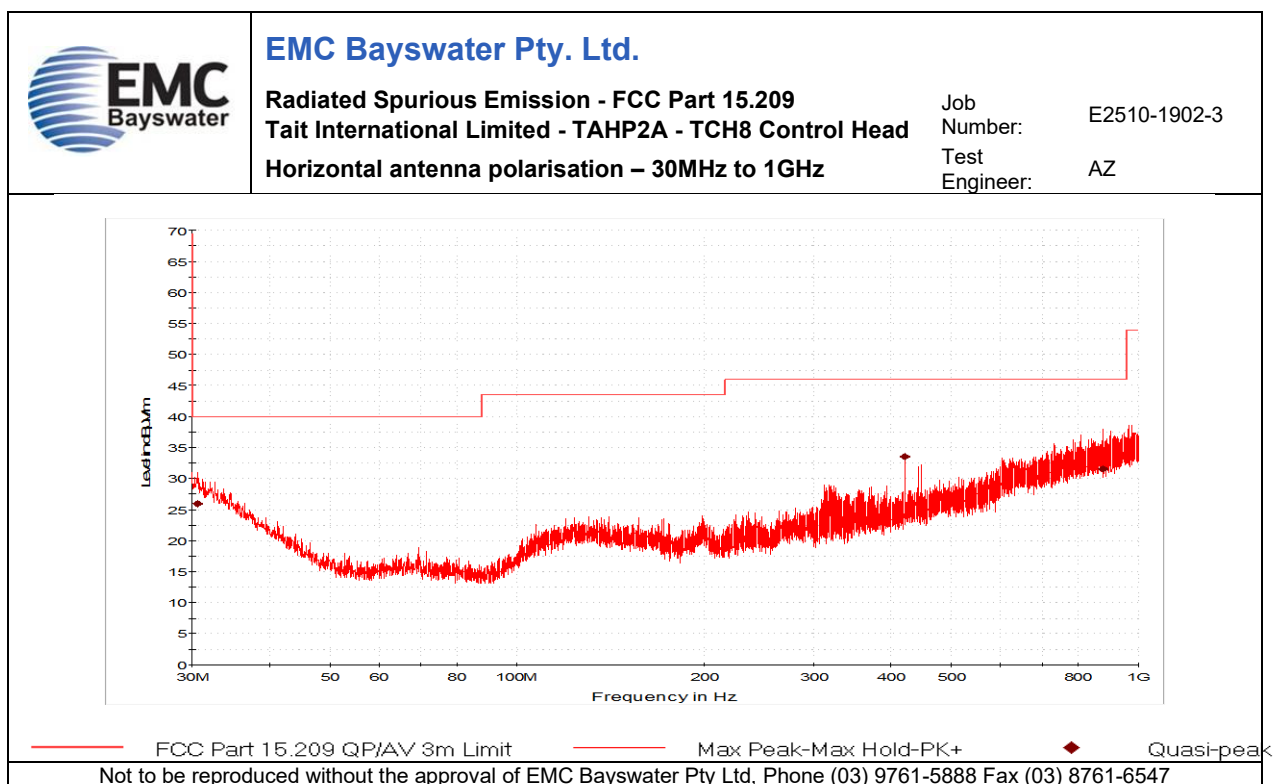
Graph 4



Graph 5



Graph 6



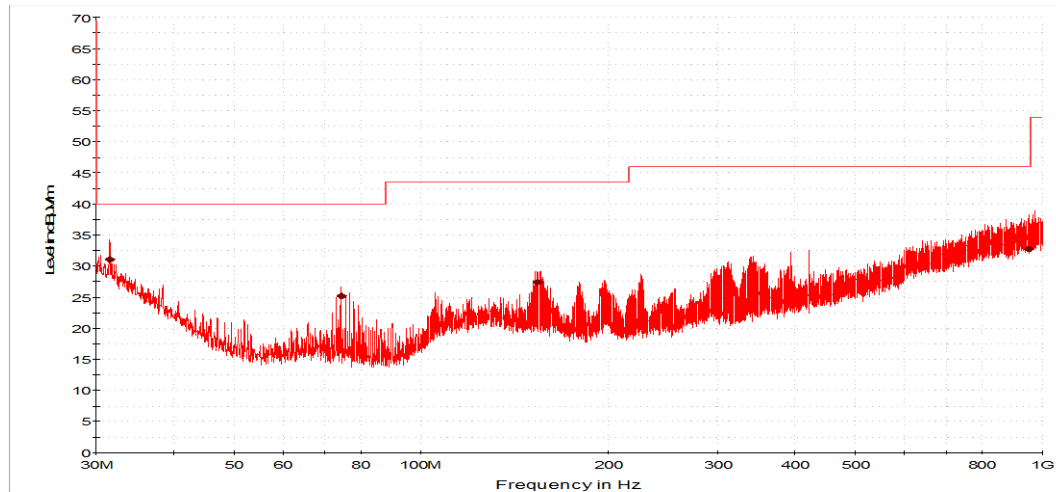
Graph 7



EMC Bayswater Pty. Ltd.

Radiated Spurious Emission - FCC Part 15.209
Tait International Limited - TAHP2A - TCH8 Control Head
Vertical antenna polarisation – 30MHz to 1GHz

Job Number: E2510-1902-3
Test Engineer: AZ



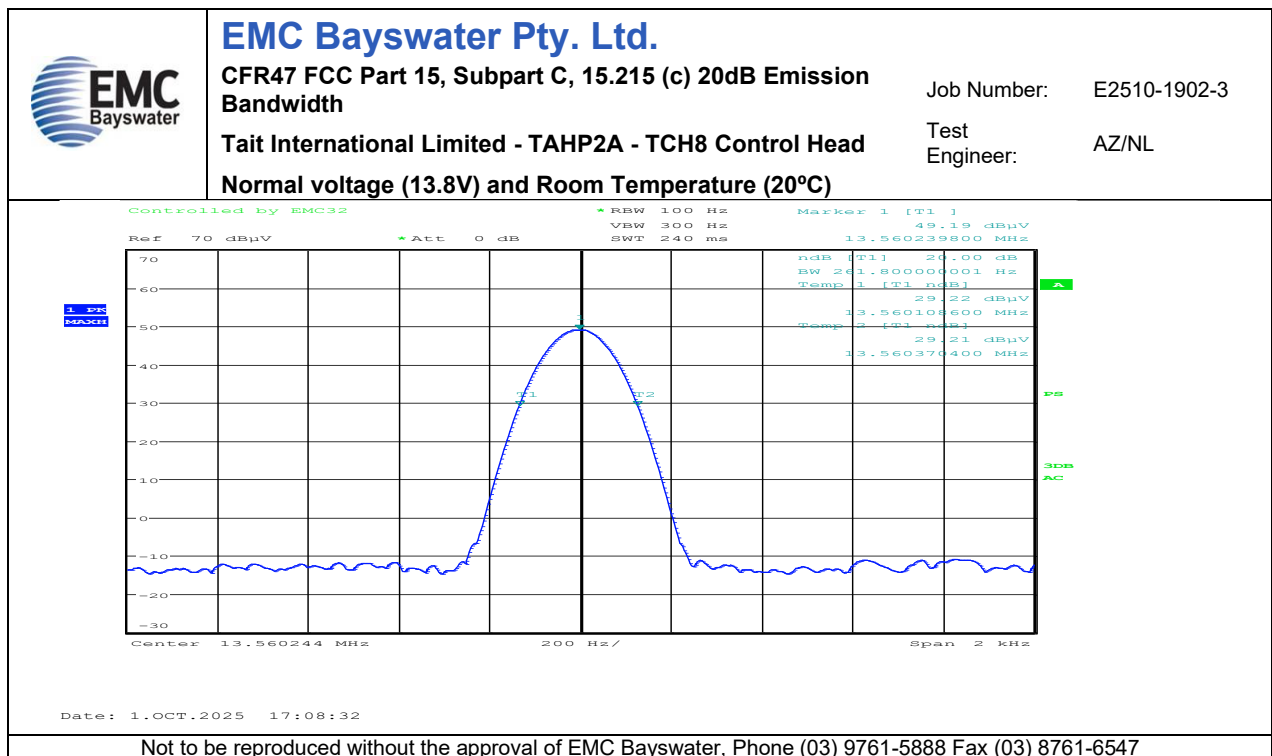
— FCC Part 15.209 QP/AV 3m Limit — Max Peak-Max Hold-PK+ ◆ Quasi-peak

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Graph 8

Appendix C.3 – 20dB Emission Bandwidth

No.	Test	Graph Description
9	20dB Emission Bandwidth	Normal test conditions



Graph 9