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TEST REPORT

**Windcave CHU200TP Rel C
Desktop Payment Terminal**

tested to the

**47 Code of Federal Regulations
Part 15 - Radio Frequency Devices
Subpart C – Intentional Radiators**

Section 15.225

Operation within the band 13.110 -14.010 MHz

for

Windcave Ltd

A handwritten signature in black ink, appearing to read "Andrew Cutler".

This test report is issued with the authority of:

Andrew Cutler - General Manager



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1. STATEMENT OF COMPLIANCE

The **Windcave CHU200TP Release C Desktop Payment Terminal** complies with FCC Part 15 Subpart C Section 15.225 as an Intentional Radiator when the methods as described in ANSI C63.10 –2013 are applied.

2. RESULTS SUMMARY

The results from testing carried out between June 11th, 2025 and August 6th, 2025 are detailed in the following table:

Clause	Parameter	Result
15.201	Equipment authorisation requirement	Certification required
15.203	Antenna requirement	Complies. Antenna internal to the device
15.204	External PA and antenna modifications	Not applicable. No external devices
15.205	Restricted bands of operation	Complies. Device transmits on 13.560 MHz
15.207	Conducted limits	Complies
15.209	Radiated emission limits - Emissions < 30 MHz	Complies
15.209	Radiated emission limits – Emissions > 30 MHz	Complies
15.225	Radiated emission limits - Fundamental	Complies
15.225	Frequency stability	Complies

3. INTRODUCTION

This report describes the tests and measurements performed for the purpose of determining compliance with the specification.

The client selected the test sample.

This report relates only to the sample tested.

Any corrections or erasures in this report are detailed in the revision table below.

Measurement uncertainties with statistical confidence intervals of 95% are shown below test results. Both Class A and Class B uncertainties have been accounted for, as well as influence uncertainties where appropriate.

All compliance statements have been made with respect of the specification limit with no reference to the measurement uncertainty.

All testing was carried out as per the standard in the worst-case configuration with no deviations being applied.

Report Revision Table

Version	Change Made	Date
250507.1	Initial Issue	17 th August 2025
250507.1A	Accreditation number added along with ILAC sticker	9 th December 2025
250507.1B	Interface Board Photo on Page 22 Removed. Module FCC ID's added	10 th December 2025

4. CLIENT INFORMATION

Company Name	Windcave Ltd
Address	33 Wilkinson Rd, Ellerslie
State	Auckland 1060
Country	New Zealand
Contact	Mark England

5. DESCRIPTION OF TEST SAMPLE

Brand Name	Windcave
Product	Desktop Payment Terminal
Model Number	CHU200TP Release C
Manufacturer	Windcave Limited
Country of Origin	New Zealand
Serial Number(s)	3425230068
Firmware version	v3.0.0.6-E
Antenna type and gain	The NFC antenna is a 2-turn loop antenna around the perimeter of the LCD with gain of zero.
Rated supply voltage	12 Vdc representative power supply powered at 120 Vac
Modulation description	ASK
Highest clock frequency	12 MHz crystal CPU with 168 MHz internal PLL 500 MHz MIPI DSI
Modules installed	4G Cat M1 Cellular Module FCC ID: N7NHL78A 2.4 GHz WiFi Module FCC ID: XPYNINAW15
NFC Frequency	13.560 MHz
FCC ID	2AC2O-CHU200TPRC

Product Description:

The device tested is a desktop payment terminal for fixed and mobile retail environments.

The device was operated using a Notebook computer that was running supplied software that continuously operated the payment terminal.

6. SETUPS AND PROCEDURES

Standard

The sample was tested in accordance with 47 CFR Part 15 Subpart C.

Methods and Procedures

The measurement methods and procedures as described in ANSI C63.10 - 2013 were used.

Section 15.201: Equipment authorisation requirement

Certification as detailed in Subpart J of Part 2 is required for the NFC device.

The following modules have been installed with FCC ID's listed:

FCC ID: N7NHL78A 4G Cat M1 Cellular Module

FCC ID: XPYNINAW15 2.4 GHz WiFi Module

Section 15.203: Antenna requirement:

The device has a permanently attached internal 13.560 MHz antenna

Result: Complies

Section 15.204: External radio frequency power amplifiers and antenna modifications

It is NOT possible to attach an external power amplifier to this transmitter.

Result: Complies.

Section 15.205: Restricted bands of operation.

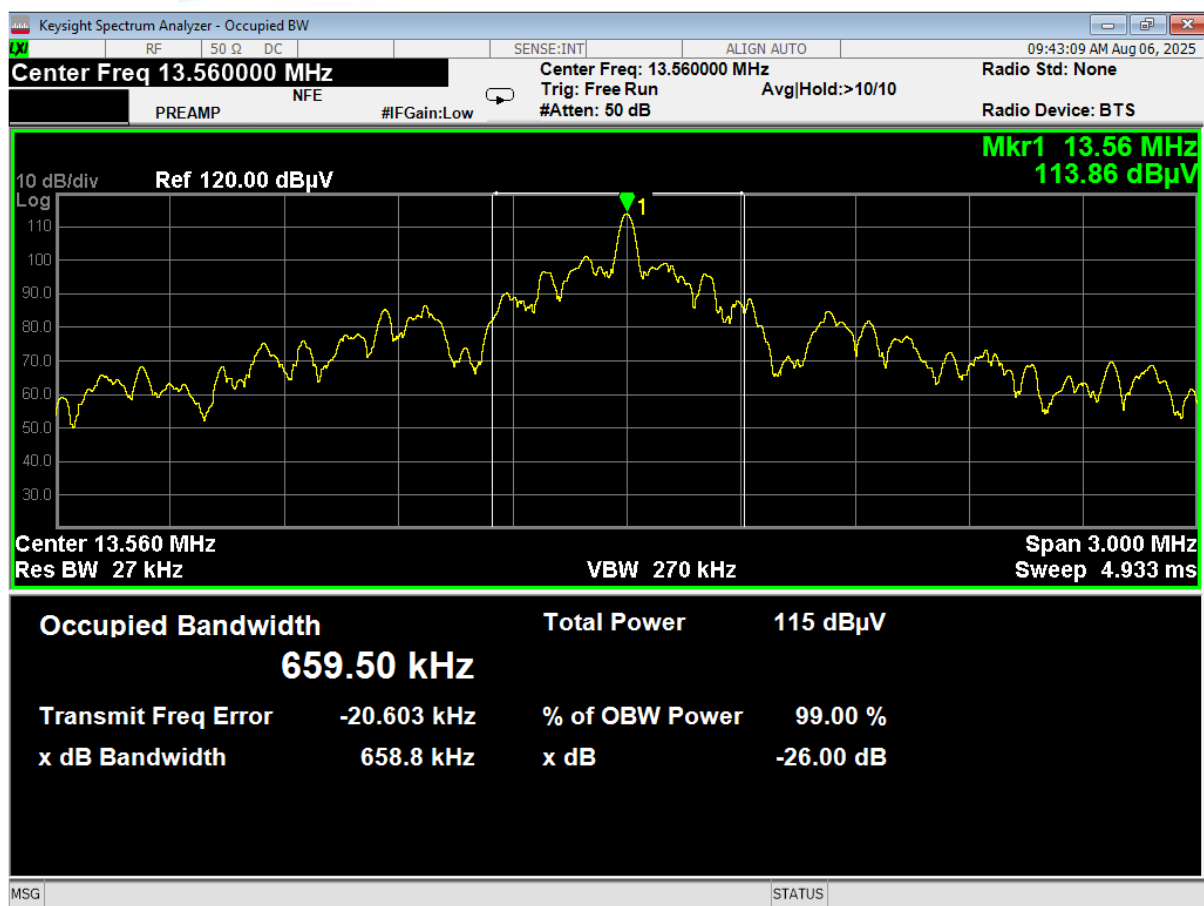
The 13.560 MHz device will fall into the band of 13.110 – 14.010 MHz that is covered by Section 15.225.

Measurements were made using a spectrum analyser with the 99% power points being determined.

Measurements were made using a span of 3 MHz with a resolution bandwidth of 27 kHz and a video bandwidth of 270 kHz.

A relative measurement was made in the laboratory when the device was being operated in immunity mode.

A worst case modulation bandwidth of 659.500 kHz was measured.



Result: Complies.

Section 15.207: Conducted emissions testing

Conducted Emissions testing was carried out over the frequency range of 150 kHz to 30 MHz which was carried out at the laboratory's MacKelvie Street premises in a 2.4 m x 2.4 m x 2.4 m screened room.

As it is possible for this device to be directly or indirectly connected to the Public AC mains supply testing was carried out using a representative AC power supply system that was powered at 120 Vac 60 Hz which powered the device under test via the USB to UART interface device.

The NFC Card Reader operates at 13.560 MHz.

Initially testing was carried out when the NFC Card Reader was operating normally with the internal antenna connected while continuously reading a card was that placed close to the reader.

As the device did not comply at 13.560 MHz an additional test was carried out with a Resistive Dummy load replacing the NFC antenna.

The device is deemed to comply when the emissions from the NFC device are observed to be less than the appropriate limits when the dummy load is attached.

The device was placed on top of the emissions table, which is 0.8 m x 0.8 m, 80 cm above the screened room floor which acts as the horizontal ground plane.

In addition, the device was positioned 40 cm away from the screened room wall which acts as the vertical ground plane.

The artificial mains network was bonded to the screened room floor.

At all times the device was kept more than 80 cm from the artificial mains network.

Initially a conducted emissions pre scan is carried out using a Peak detector (red trace) and an Average detector (green trace).

Worst case measurements are then made on the highest pre-scan emission levels on a limited number of frequencies using a Quasi Peak detector and an Average detector with the results of both the phase and neutral lines being recorded in the results table.

When either the Peak or Average detector pre scan emissions appear to be over the Quasi Peak or Average limit line each peak is individually checked and confirmed to be below the applicable limit.

The supplied plot is combined plot showing the worst case quasi peak and average results of both the phase and neutral lines to the representative AC power supply.

Quasi peak and average detectors have been used with resolution bandwidths of 9 kHz.

Result: Complies

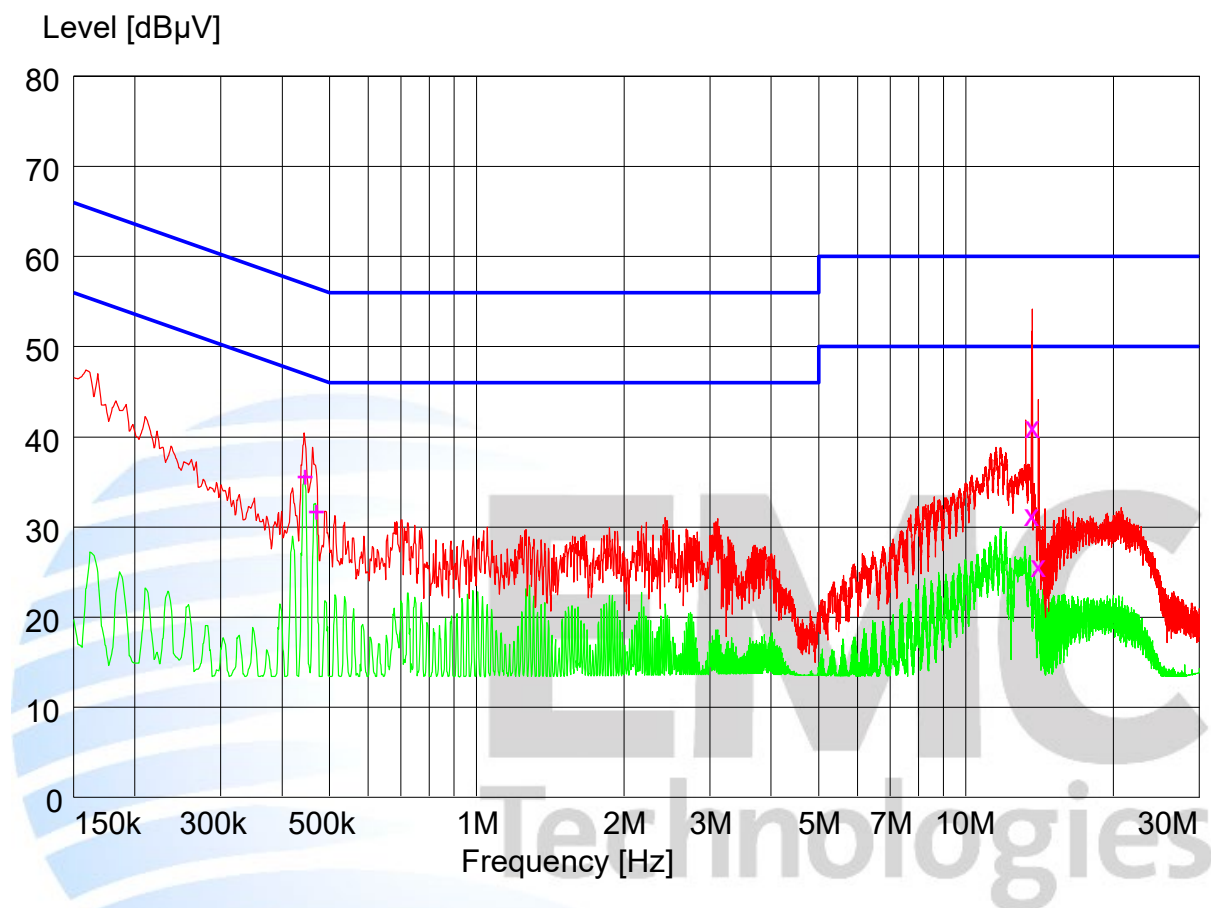
Measurement uncertainty with a confidence interval of 95% is:

- AC Mains port (0.15-30 MHz) ± 2.8 dB

Conducted Emissions – AC Input Power Port – Normal Operating

Setup: Device tested when powered at 120 Vac 60 Hz when operating in “Emissions” mode.

Peak --- Average -- Quasi Peak X Average +



Final Quasi-Peak Measurements

Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Phase	Rechecks (dBμV)
13.560000	-71.00	60.0	-11.0	L1	Fundamental
13.619000	31.70	60.0	28.3	N	30.1
13.691000	41.50	60.0	18.5	L1	41.4
14.069000	26.00	60.0	34.0	L1	-

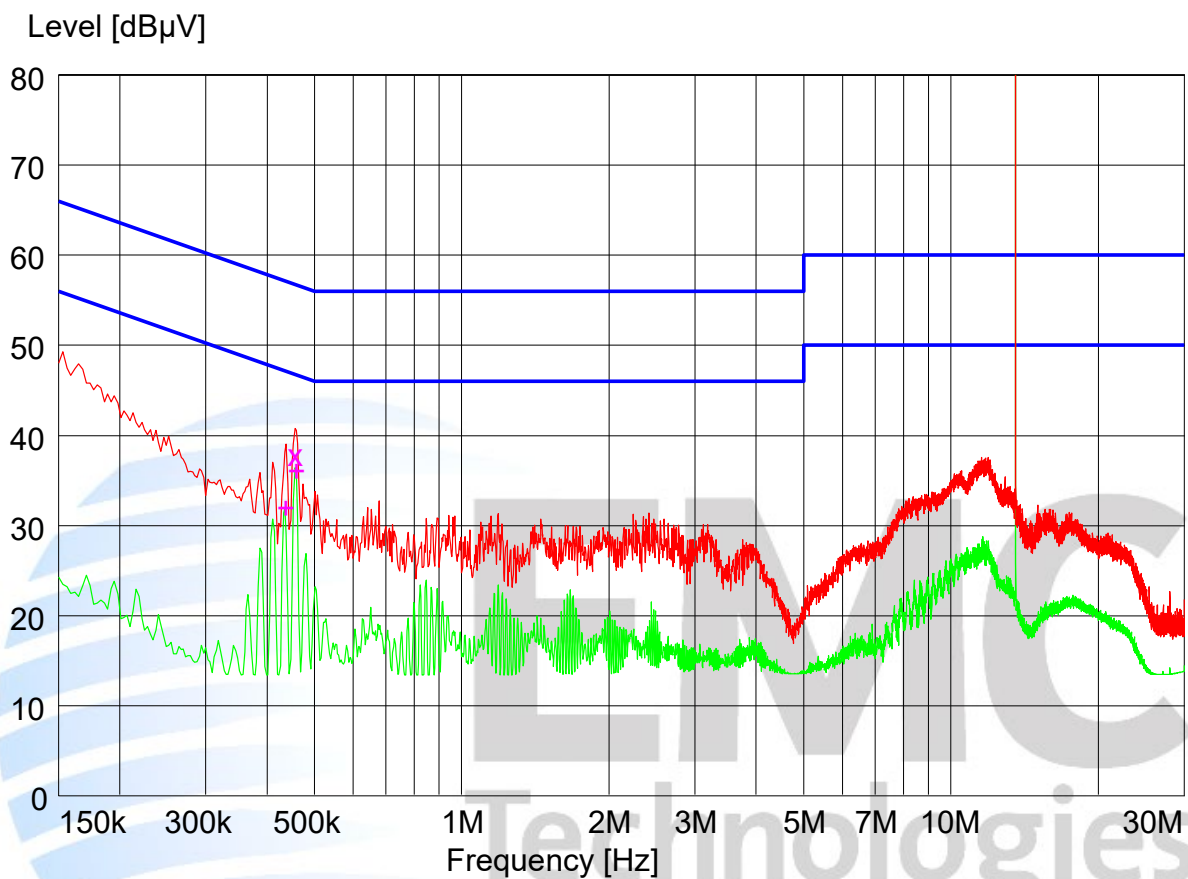
Final Average Measurements

Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Phase	Rechecks (dBμV)
0.444000	35.90	46.9	11.0	L1	-
0.468000	32.00	46.5	14.5	N	-
13.619000	23.50	50.0	26.5	L1	23.5
13.560000	33.20	50.0	16.8	L1	Fundamental

Conducted Emissions – AC Input Power Port – Normal Operating

Setup: Device tested when powered at 120 Vac 60 Hz when operating in “NFC” mode.

Peak --- Average -- Quasi Peak X Average +



Final Quasi-Peak Measurements

Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Phase	Rechecks (dBμV)
0.456000	38.20	56.8	18.6	L1	Fundamental
13.560500	81.00	60.0	-21.0	L1	

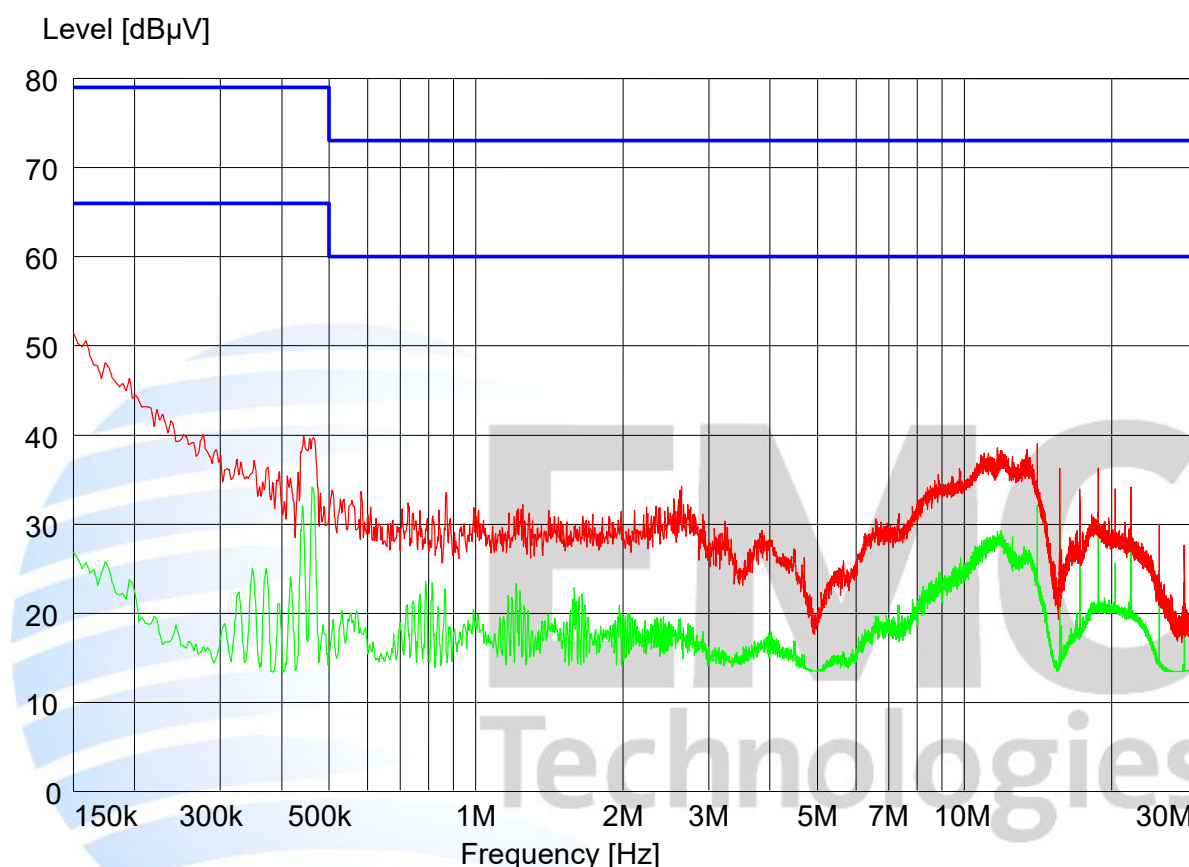
Final Average Measurements

Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Phase	Rechecks (dBμV)
0.435000	32.30	47.2	14.9	L1	Fundamental
0.456000	36.50	46.8	10.3	N	
13.560500	81.10	50.0	-31.1	L1	

Conducted Emissions – AC Input Power Port – Dummy Load Attached

Setup:	Device tested when powered at 120 Vac 60 Hz when operating in “NFC” mode with a Dummy Load installed on NFC antenna.
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Peak ---	Average --	Quasi Peak X	Average +
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Final Quasi-Peak Measurements

Frequency (MHz)	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Phase	Rechecks (dB μ V)
	No emissions detected within 15 dB of the limit.				

Final Average Measurements

Frequency (MHz)	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Phase	Rechecks (dB μ V)
	No emissions detected within 15 dB of the limit.				

Section 15.209: Radiated emission limits, general requirements

Radiated emission testing was carried out over the frequency range of 10 kHz to 21000 MHz as the device contains a 2.4 GHz WiFi module.

Testing was carried out at the laboratory's open area test site - located at Driving Creek, Orere Point, Auckland, New Zealand.

The device was tested when placed in the centre of the test table 0.8 m above the test site ground plane.

The device was powered using a representative AC power supply that was powered at 120 Vac.

The tablet and USB to serial adaptor were placed to the right of the device.

The serial adaptor was attached via a 1 m Ethernet type cable that was inserted in the serial and charging port of the device.

The device was activated and it operated continuously using the Windcave exercise program.

A payment card was placed in the card slot and a NFC card placed on the device screen.

When an emission is located, it is positively identified and its maximum level is found by rotating the automated turntable, and by varying the antenna height with an automated antenna tower.

Below 30 MHz a magnetic loop is used with the centre of the loop being 1 metre above the ground with measurements being made using a quasi peak detector at a distance of 10 metres.

Between 30 and 12500 MHz measurements were made at a distance of 3 metres in both vertical and horizontal antenna polarisations.

A Quasi Peak detector with a 120 kHz bandwidth was used between 30 and 1000 MHz.

A Peak detector and an Average detector, with a bandwidth of 1 MHz, were used between 1000 – 12000 MHz.

During the test a number of ambient emissions were identified a list of which can be provided upon request.

The emission level is determined in field strength by taking the following into consideration:
Level (dB μ V/m) = Receiver Reading (dB μ V) + Antenna Factor (dB/m) + Coax Loss (dB)

For example, if an emission of 30 dB μ V was observed at 30 MHz:
45.5 dB μ V/m = 30.0 dB μ V + 14 dB/m + 1.5 dB

Section 15.209: Below 30 MHz spurious emission measurements

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
27.120	9.1	48.6	39.5	Pass

The NFC device was transmitting continuously on 13.560 MHz

Magnetic loop measurements were made at a distance of 10 metres.

Measurement receiver with a quasi-peak detector with a 9 kHz bandwidth was used.

The 30 metre limit has been scaled by a factor of 40 dB per decade, as per section 15.31 (f) (2).

The limit at 27.120 MHz when measured at 30 metres is 30 uV/m or 29.54 dBuV/m.

The scaled limit at 10 metres will be 48.6 dBuV/m.

The spurious emission observed does not exceed the level of the fundamental emission.

No other low frequency spurious emissions were detected from the device when measurements were attempted from 10 kHz - 30.0 MHz

Result: Complies.

Measurement uncertainty with a confidence interval of 95% is:

- Free radiation tests (10 kHz – 30 MHz) $\pm$ 4.8 dB

Section 15.209: Spurious Emissions (above 30 MHz)

Measurements between 30 – 12000 MHz have been made at a distance of 3 metres as the device contains a 2.4 GHz WiFi module.

The limits as described in Section 15.209 have been applied.

Frequency (MHz)	Vertical (dB μ V/m)	Horizontal (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result	Antenna Polarisation
34.000	19.2	-	40.0	20.8	Pass	Vertical
35.280	19.2	-	40.0	20.8	Pass	Vertical
43.800	18.6	-	40.0	21.4	Pass	Vertical
46.320	19.6	-	40.0	20.4	Pass	Vertical
55.200	25.8	--	40.0	14.2	Pass	Vertical
58.200	21.8		40.0	18.2	Pass	Vertical
60.400	22.9	-	40.0	17.1	Pass	Vertical
61.840	32.6	-	40.0	7.4	Pass	Vertical
63.560	33.6	-	40.0	6.4	Pass	Vertical
65.240	20.8	-	40.0	19.2	Pass	Vertical
67.440	19.8	-	40.0	20.2	Pass	Vertical
78.960	20.9	-	40.0	19.1	Pass	Vertical
81.360	22.6	-	40.0	17.4	Pass	Vertical
83.320	32.6	-	40.0	7.4	Pass	Vertical
85.080	24.6	-	40.0	15.4	Pass	Vertical
87.920	21.1	-	40.0	18.9	Pass	Vertical
92.400	20.6	-	43.5	22.9	Pass	Vertical
145.120	-	21.9	43.5	21.6	Pass	Horizontal
271.000	-	27.6	46.0	18.4	Pass	Vertical
314.600	23.8	-	46.0	22.2	Pass	Vertical
320.280	22.6	-	46.0	23.4	Pass	Vertical
323.760	22.9	-	46.0	23.1	Pass	Vertical
332.160	-	21.8	46.0	24.2	Pass	Horizontal

No spurious emissions were detected from the NFC device that was operating on 13.560 MHz.

No spurious emissions were detected from the WiFi module or the Cellular Modem module when operating in various modes simultaneously.

All other emissions observed had a margin to the limit that exceed at least 15 dB when measurements were made between 30 – 12000 MHz using both vertical and horizontal polarisations.

Result: Complies.

Measurement uncertainty with a confidence interval of 95% is:

Free radiation tests (30 – 12000 MHz) $\pm$ 4.1 dB

Section 15.225: Fundamental emission:

Measurements were made using a magnetic loop antenna and a receiver with a Quasi Peak detector using a 9 kHz bandwidth.

Measurements were made at a distance of 10 metres with the limit being determined by using the extrapolation factor of 40 dB per decade limit, as detailed in section 15.31 f (2).

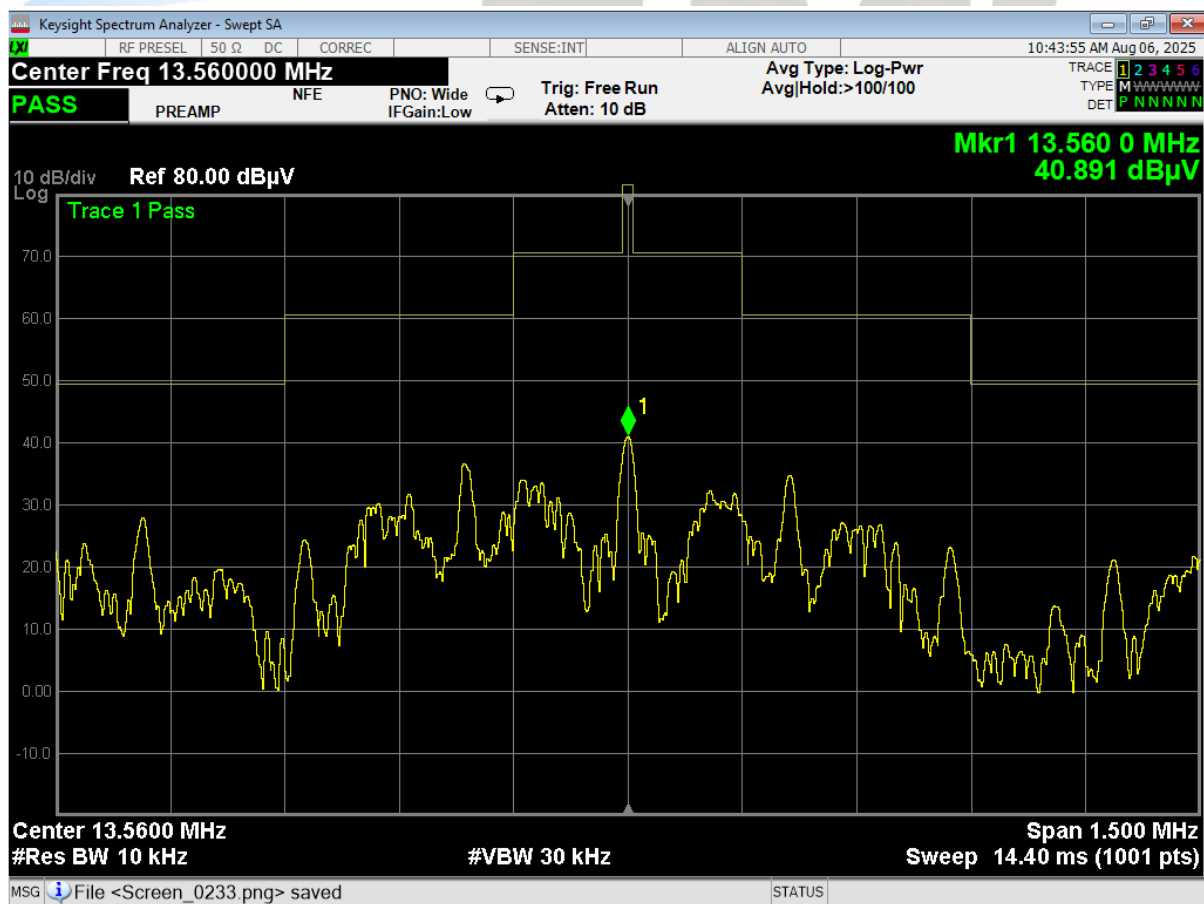
The limit at 30 m at 13.560 MHz is 15,848 uV/m or 84.0 dBuV/m.

Applying the extrapolation factor of 40 dB/ per decade, the limit at 10 m is 103.1 dBuV/m.

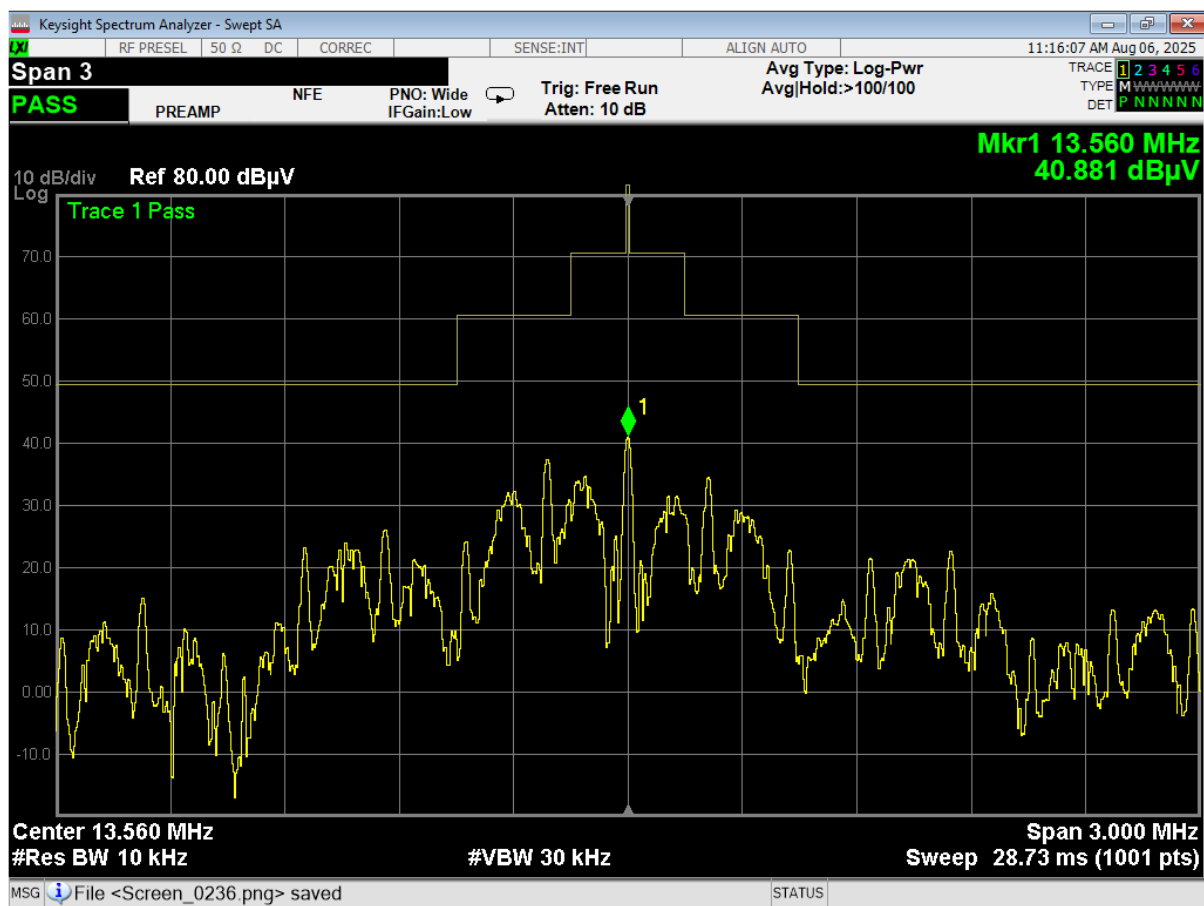
The 12 Vdc supply to the device was varied by +/- 15% to determine whether a change in field strength would occur.

Voltage (Vdc)	Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10.8	13.560	40.6	103.1	62.5
12.0	13.560	40.6	103.1	62.5
13.8	13.560	40.6	103.1	62.5

Spectrum analyser plot showing the carrier and modulation peaks within +/- 1500 kHz



Spectrum analyser plot showing the carrier and modulation peaks within +/- 3000 kHz



Relative measurements were made in the laboratory using the field strength measured at the test site as a reference level.

Result: Complies.

Measurement uncertainty with a confidence interval of 95% is:

- Free radiation tests (100 kHz – 30 MHz) ± 4.8 dB

Section 15.225: Frequency tolerance:

The frequency tolerance of the carrier is required to be +/- 0.01% of operating frequency when the temperature is varied between -20 degrees C and +50 degrees C.

The device operates nominally on 13.560 MHz which gives a frequency tolerance of +/- 1356 Hz.

Temperature (°C)	Frequency (MHz)	Difference (Hz)
50.0	13.559 921	-79
40.0	13.559 938	-62
30.0	13.559 969	-31
20.0	13.559 979	-21
10.0	13.560 436	+436
0.0	13.560 078	+78
-10.0	13.560 461	+461
-20.0	13.559 988	-12

As a worst case scenario the 12 Vdc supply to the device was varied by +/- 15% at 20 degrees C (ambient).

Voltage (Vdc)	Frequency (MHz)	Difference (Hz)
10.2	13.559 979	-21
12.0	13.559 979	-21
13.8	13.559 979	-21

The frequency tolerance above has been calculated by subtracting the Measured Frequency from the Nominal Frequency (13.560 MHz).

Result: Complies.

Measurement uncertainty with a confidence interval of 95% is:
Frequency tolerance $\pm$ 50 Hz

7. TEST EQUIPMENT USED

Instrument	Manufacturer	Model	Serial No	Asset Ref	Cal Due	Period
Aerial Controller	EMCO	1090	9112-1062	RFS 3710	N/A	N/A
Aerial Mast	EMCO	1070-1	9203-1661	RFS 3708	N/A	N/A
Biconical Antenna	Schwarzbeck	BBA 9106	9124-420 + 04272023E	3802	02 May 2026	3 years
Heliac cable	Andrews	L6PNM-RPD	22869	Oats Cable	22 Oct 2025	1 year
Horn Antenna	EMCO	3115	9511-4629	E1526	24 Jun 2030	5 years
Log Periodic	Schwarzbeck	VUSLP 9111	9111-113 + 04272023D	EMC4026	02 May 2026	3 years
Loop Antenna	EMCO	6502	9003-2485	3798	24 Jun 2028	3 years
Mains Network	Rohde & Schwarz	ESH2-Z5	881362/034	3628	09 Jul 2027	3 years
Power Supply	Hewlett Packard	6654A	3236A-00874	EMC4041	N/A	N/A
Receiver	R & S	ESIB-40	100295	EMC4030	30 May 2026	2 years
Receiver	ESHS 10	828404/005	828404/005	3728	03 Dec 2026	2 years
Software	R & S	ESK 1 - 140	-	-	N/A	N/A
Spectrum Analyzer	Keysight	N9038A	MY57290153	EMC4033	20 Nov 2026	3 year
Thermal Chamber	Contherm	M180F	86025	3626	18 Oct 2027	3 year
Thermometer	DSIR	RT200	35	EMC4029	20 Apr 2027	5 years
Turntable	EMCO	1080-1-2.1	9109-1578	RFS 3709	N/A	N/A
VHF Balun	Schwarzbeck	VHBB9124	9124-420 + 04272023E	3801	02 May 2026	3 years
Voltage Variac	Powerdeck	SRV-5	RFS3800	-	N/A	N/A

All test equipment was within calibration at the time of testing.

8. ACCREDITATIONS

Testing was carried out in accordance with EMC Technologies NZ Ltd designation as a FCC Accredited Laboratory by International Accreditation New Zealand, designation number: NZ0002 under the APEC TEL MRA.

All testing was carried out in accordance with the terms of EMC Technologies (NZ) Ltd International Accreditation New Zealand (IANZ) Accreditation to NZS/ISO/IEC 17025, Accreditation Number 424 dated 26th June 1991.

All measurement equipment has been calibrated in accordance with the terms of the EMC Technologies (NZ) Ltd International Accreditation New Zealand (IANZ) Accreditation to NZS/ISO/IEC 17025.

International Accreditation New Zealand has International Laboratory Accreditation Council (ILAC) Mutual Recognition Arrangements for testing and calibration with various accreditation bodies in a number of economies.

This includes NATA (Australia), UKAS (UK), SANAS (South Africa), NVLAP (USA), A2LA (USA), SWEDAC (Sweden).

Further details can be supplied on request

9. PHOTOGRAPHS

CHU200TP Release C with Cards



CHU200TP Release C Top & Bottom Orientation



CHU200TP Release C Front Orientation



CHU200TP Release C Rear Orientation



CHU200TP Release C Right Orientation



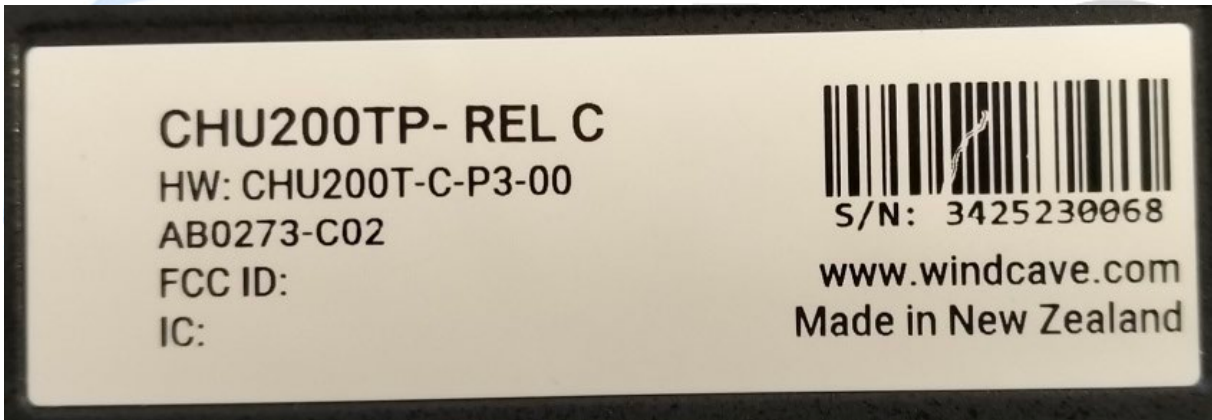
CHU200TP Release C Left Orientation



CHU200TP Release C Power Adaptor



CHU200TP Release C Label



Conducted Emissions Test Setup



Radiated Emissions Test Setup



Radiated Emissions Test Setup



Radiated Emissions Test Site



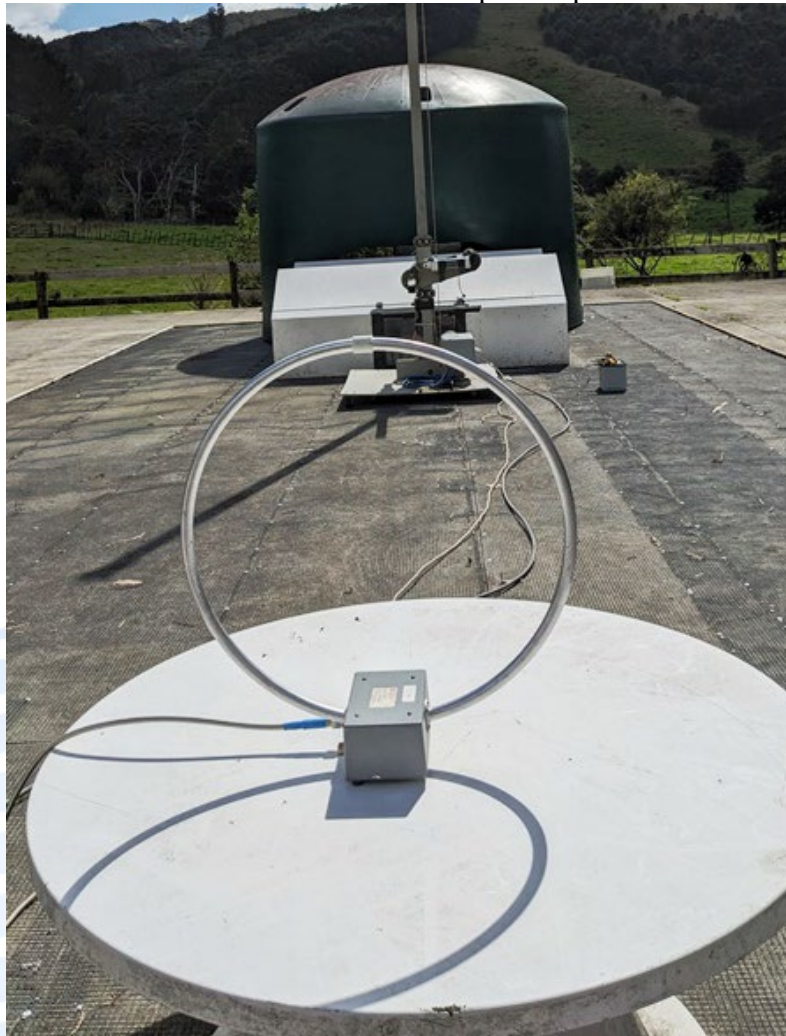
Radiated Emissions Test Setup



Radiated Emissions Test Setup



Radiated Emissions Test Setup - Loop Antenna



Radiated Emissions Test Setup - Biconical Antenna



Radiated Emissions Test Setup - Log Periodic Antenna



Radiated Emissions Test Setup - Horn Antenna

