



**COMPLIANCE
ENGINEERING**

EMC Product Safety Environmental Shielding

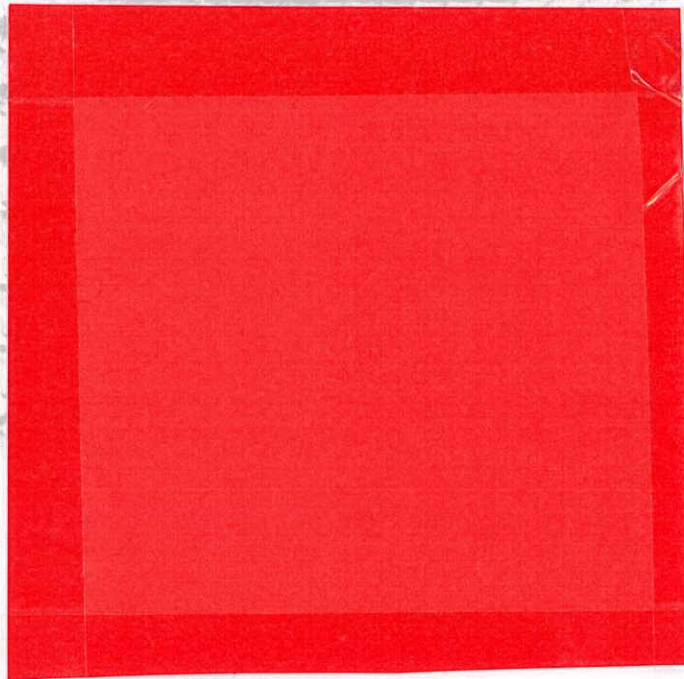
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EMC Compliance Test Report

CFR 47, Chapter 1, Subchapter A,
Part 15, Subpart B and ICES - 003

Report Number: CE3667Rev4

February 2023



NeoProducts Pty Ltd
Betline TOT Kiosk
Model No: 15501-GA0xx

The results detailed in this test report relate only to the specific sample/s tested. It is the Manufacturer's responsibility to ensure that all production units are manufactured with equivalent EMC characteristics. This report is not to be reproduced except in full, without written approval from Compliance Engineering Pty Ltd.



COMPLIANCE CERTIFICATE

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Device: Betline TOT Kiosk

Model No: 15501-GA0xx

Serial No: 15501-GA002-0006

FCC ID: 2A3TL-15501

Reference Standard: CFR 47 - Telecommunication, Chapter 1 - Federal Communications Commission, Subchapter A – General, Part 15 - Radio Frequency Devices Subpart B Unintentional Radiators.

Test Method: 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.

Test Date: 1st & 2nd February 2023

Tests Performed by: Abdirahman Dacar
Compliance Engineering Pty Ltd
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The **Betline TOT Kiosk (Model No: 15501-GA0xx)** Complied with the radiated RF emission requirements detailed in CFR 47, Chapter 1, Subchapter A, Part 15, Subpart B and ICES - 003 and ICES - 003 (Class A limits).

		28 th February 2023
Prepared By: Abdirahman Dacar Test Engineer Compliance Engineering Pty Ltd	Approved By: Andrew Burden Technical Manager Compliance Engineering Pty Ltd	Date

Revision History			
Revision	Issue Date	Remarks	Revised by
0	07-02-2023	Initial release	-
01	14-02-2023	Model changed as per the client's request	Dacar
02	16-02-2023	AE & Product details changed as per the client's request	Dacar
03	16-02-2023	FCC ID updated as per the client's request	Dacar
04	28-02-2023	NFC FCC ID was edited as per the client	Dacar

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EMC Compliance Test Report

1. INTRODUCTION

Electromagnetic compatibility (EMC) measurements were performed on the Betline TOT Kiosk (Model No: 15501-GA0xx) in accordance with the requirements detailed in CFR 47, Chapter 1, Subchapter A, Part 15, Subpart B and ICES - 003 (Class A limits).

2. RESULTS SUMMARY

CFR 47, Chapter 1, Subchapter A, Part 15, Subpart B and ICES - 003 (class A limits)

Description	Rule / Clause	Limit	Result
Radiated RF emissions	FCC 15.109 & ICES - 003 (3.2.2)	Class A	Complied
Mains Terminal emissions	FCC 15.107 & ICES - 003 (3.2.1)	Class A	Complied

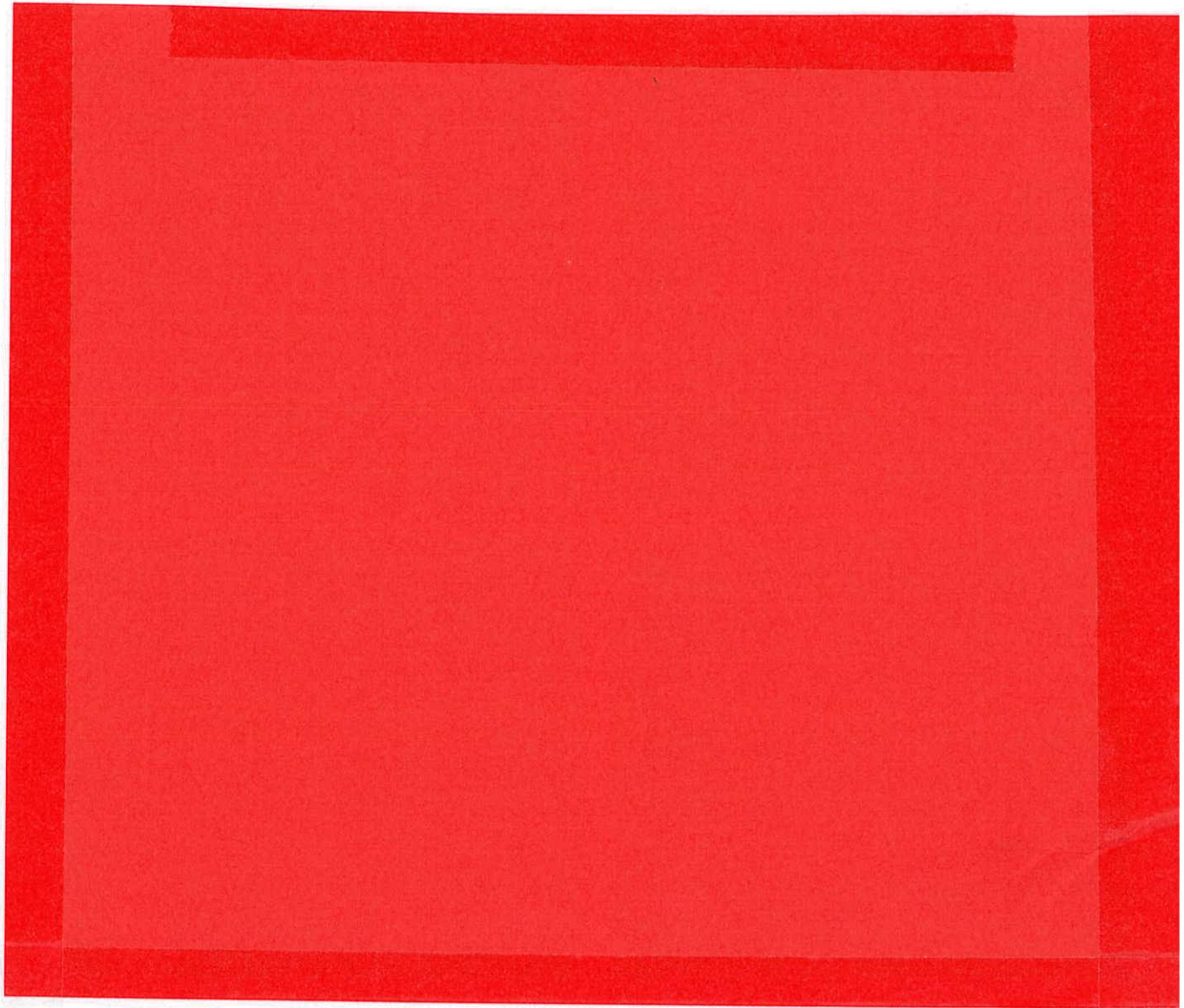
3. TEST SAMPLE

The equipment under test (EUT) is described as follows:

Equipment Under Test (<i>Information supplied by client</i>):	
Product Name	Betline TOT Kiosk
Model Number:	15501-GA0xx
Serial Number:	15501-GA002-0006
NUC FCC ID:	PD9AX201D2
NFC FCC ID:	V5MACM1252U-Z2
Power Supply:	100 to 240 VAC, 50/60Hz
Highest operating frequency:	5.8 GHz
Equipment type:	The BetMakers Teller Terminal is a multifunction. wagering teller terminal designed to provide people with the ability to place wagers at sporting facilities.

AE: Auxiliary/Associated Equipment				
Device	Manufacturer	Model No:	Serial No:	Comments
Printer	SEIKO	CAPM347H-E.	N/A	Continuously printing

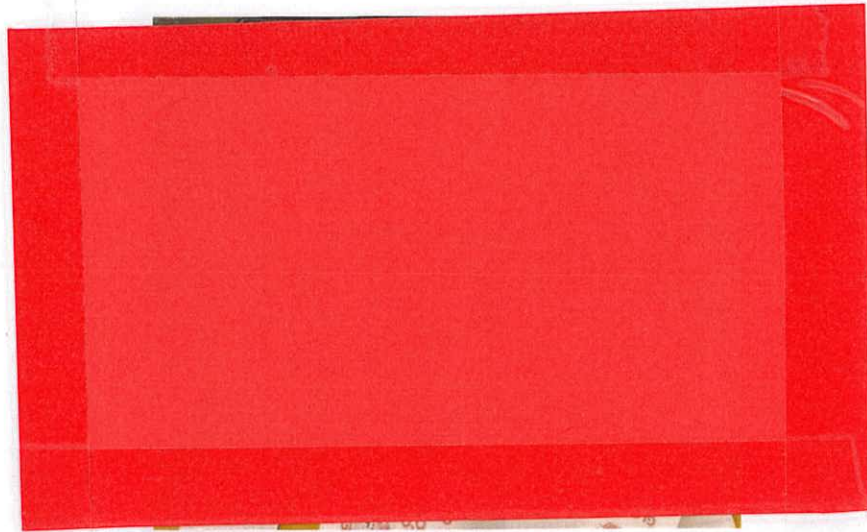
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4. CONFIGURATION

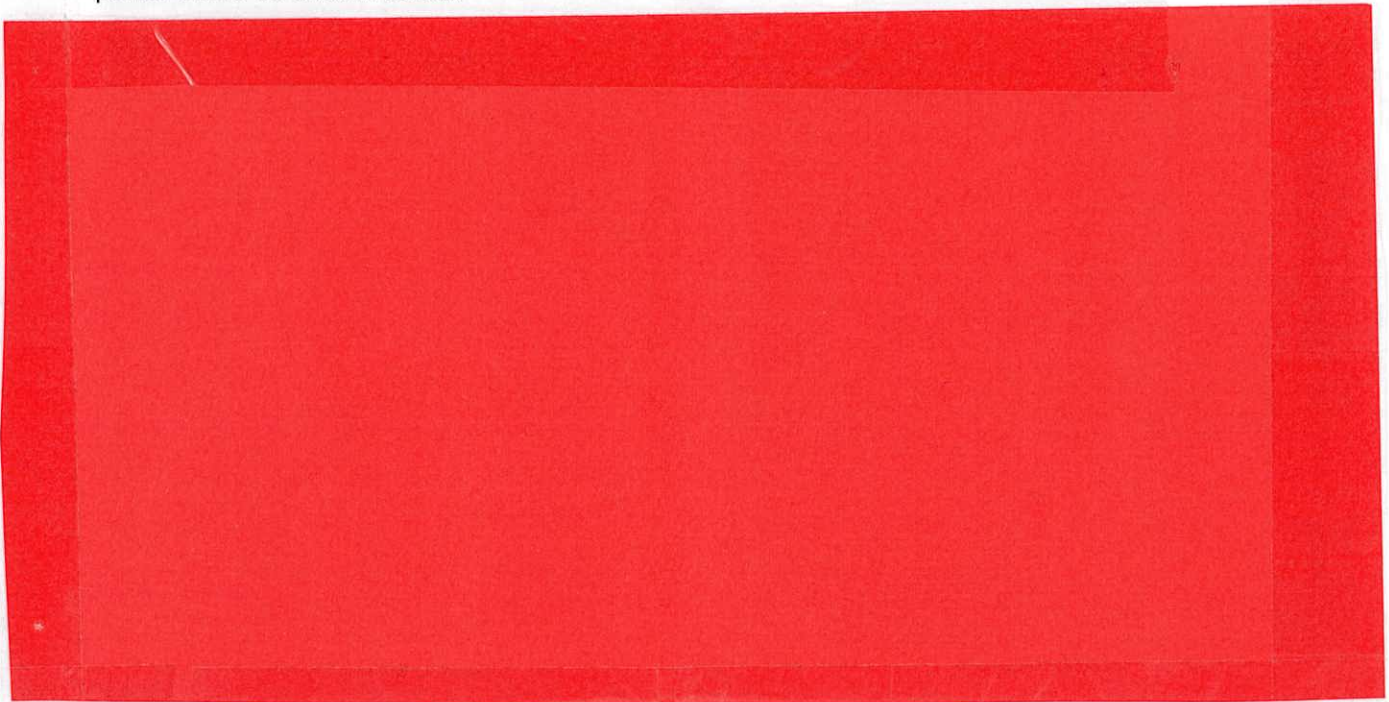
The Betline TOT Kiosk (Model No: 15501-GA0xx) was powered from 115 VAC, 60 Hz.

During all measurements, the printer was continuously printing, and the Ethernet port was exercised with a Video from YouTube, as shown below:



5. MODIFICATIONS

In order for the Betline TOT Kiosk pass radiated RF emissions requirements, three ferrite beads were required to be installed. Two (Würth Part No: 742 716 33) were fitted to each end of the HDMI cable and one (Würth Part No: 742 711 11) fitted to the 7-Inch LCD screen power cable as shown below.



6. STANDARD DEVIATIONS

No deviation from the standard were performed.

7. TEST FACILITY

All measurements were performed inside Compliance Engineering's, 3m Semi-Anechoic (iOATS) and/or shielded enclosures located at 90 Indian Drive, Keysborough, Victoria, Australia.

A2LA (ISO 17025-2017) – Certificate No: 2829.01

Compliance Engineering Pty Ltd, is accredited to ISO 17025-2017 by American Association for Laboratory Accreditation (A2LA) which is an ILAC member and has mutual recognition agreements with the National Voluntary Laboratory Accreditation Program (NVLAP)

All tests within this report have been conducted in accordance with Compliance Engineering's scope of A2LA accreditation.

The current full scope of accreditation can be found on the A2LA website: www.a2la.org

FCC – Registration No: 982700

Compliance Engineering Pty Ltd, has been recognized and is listed as an FCC part 47 CFR 2.948 measurement facility to perform compliance testing on equipment under Parts 15 and 18. The Designation Number is AU0006 and the Test Firm Registration Number is 982700.

Innovation, Science & Economic Development Canada (ISED) - Registration No: 27266

Compliance Engineering's 3m indoor semi-anechoic chamber (iOATS) has been accepted by Innovation, Science & Economic Development Canada (ISED) for performing radiated measurements in accordance with RSS-102, RSS-GEN, RSS-210, RSS-247, RSS-248 – ISED Canada Registration No: 27266

8. FIELD STRENGTH CALCULATION

All emission measurements are automatically calculated via the dedicated EMC software using the pre-stored calibration factors. The following equation simplifies the actual calculation performed;

$$\text{Corr.Ampl} = V_{\text{RAW}} + \text{AF} - \text{G} + \text{L}$$

Where:

Corr.Ampl = Corrected amplitude in dBμV/m (for radiated) & dBμV (for conducted)
V_{RAW} = Raw voltage receiver/analyser reading in dBμV
AF = Antenna Factor in dB (stored as a data array of factor vs frequency)
G = Preamplifier Factor in dB (stored as a data array of gain vs frequency)
L = Cable Loss Factor in dB (stored as a data array of insertion loss vs frequency)

Limit:

The FCC limits are given in units of μV/m. The following formula is used to convert the units of μV/m to dBμV/m.

$$\text{Limit (dBμV/m)} = 20 \cdot \log(\mu\text{V/m})$$

Margin:

This is the margin of compliance below the limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example Calculation:

A peak emission is observed at 100 MHz at 21.5 dBμV. An antenna factor for that frequency is 10 dB. The preamplifier gain factor is 30 dB and the cable loss at that same frequency 1.5 dB. Hence the overall Correction Amplitude is as follows;

$$V_{RAW} + AF - G + L : \text{Corr.Amp} - \text{Limit} = \text{Margin}$$

$$31.5 + 10 - 20 + 1.5 : 23 \text{ dB}\mu\text{V/m} - 57.0 \text{ dB}\mu\text{V/m} = - 34 \text{ dB}$$

9. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

Measurement	Frequency / Range	Uncertainty (k=2)
Temperature (ANSI C63.4-2014)	10°C to 40°C	0.5°C
Humidity (ANSI C63.4-2014)	5% to 90%	2%
Conducted Emissions (using a 50Ω/50μH + 5μH LISN)	0.09 MHz to 30 MHz	± 4.79
Conducted Emissions (using a Voltage Probe)	0.15 MHz to 30 MHz	± 5.07
Conducted Emissions (using a 50Ω/50μH LISN)	0.15 MHz to 30 MHz	± 4.35
Radiated Emissions (Horizontal Polarisation)	30 MHz to 200 MHz	± 4.98
Radiated Emissions (Vertical Polarisation)	30 MHz to 200 MHz	± 5.23
Radiated Emissions (Horizontal Polarisation)	200 MHz to 1000 MHz	± 5.24
Radiated Emissions (Vertical Polarisation)	200 MHz to 1000 MHz	± 5.92
Radiated Emissions (STLP)	1 GHz to 6 GHz	± 5.14
Radiated Emissions (STLP)	6 GHz to 18 GHz	± 6.11
Radiated Emissions (SGH)	18 GHz to 26 GHz	± 6.11
Radiated Emissions (SGH)	26 GHz to 40 GHz	± 6.11

These uncertainties represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

The reference uncertainty standard specifies that although the measurement uncertainty shall be documented within the test report, the actual determination of compliance shall be based on measurements without taking into account the measurement uncertainty.

10. RADIATED RF EMISSION MEASUREMENTS

10.1 REQUIREMENTS

AC Mains:	115 VAC, 60 Hz
Frequency Range:	30 MHz to the 5 th harmonic of the highest fundamental frequency, or to 40 GHz, whichever is lower.
Highest Operating frequency:	5,800 MHz
Measurement Distance:	3 metres
Limit:	Class A

10.2 TEST EQUIPMENT

Asset	Equipment	Model No	Serial No	Cal Due
644	EMI Receiver	ESIB7	100338	Jul 24
091	Spectrum Analyzer	HP8593EM	3710A00205	Jul 23
796	Spectrum Analyser	8564EC	4439A00960	Dec 23
731	Biconical Antenna	VHBB 9124+BBA 9106	9124-1461	Aug 24
733	Log Periodic Antenna	USLP 9143 B	USLP 9143B 136	Aug 24
52	Preamplifier	UTC10-212-1	9232SN02	Apr 23
278	Preamplifier	LA1018N4009	J1012090727001	Mar 24
853	Preamplifier	ALN3325-41-4320	44398	Mar 24
779	Preamplifier	ALN2225-38-4025	41502	Mar 24
734	Stacked Log Periodic	STLP 9148	176	Aug 24
364	Horn Antenna	JXTXLB-42-20-C-SF	J2021090616013	NR
799	26.5GHz-40GHz Antenna	LB-28-20-C-KF	2020056001026	NR
760	iOATS (11m x 7m x 6m)	CE-iOATS	2021	Oct 23
TER-S004	Measurement Software	Radimation	Rev: 2022.1.3	-

10.3 ENVIRONMENTAL CONDITIONS

Environment	Range	Actual
Temperature	15.5°C to 24°C	22°C
Humidity	15% to 60%	49%

10.4 PROCEDURE

Measurements were performed inside a semi-anechoic chamber at a distance of 3 m from the EUT. The EUT was supported 0.8 metres above the ground reference plane on a large polystyrene block, which in turn rested on top of a turntable.

The EUT was rotated 360° and the antenna height varied between 1 m and 4 m. The measuring antenna polarisation was rotated and measurements performed for horizontal and vertical antenna polarisations.

The receiver/spectrum analyser was configured to capture the highest peak emissions. Quasi-peak and or average detector measurements were performed at frequencies where peak emissions are close to or exceed the applicable limit.

Plots of the accumulated measurement data, including all transducer correction factors were produced and stored to file.

Note: The EUT has RF transmitters installed, operating at either 2.4 GHz or 5.8 GHz. During these measurements the 2.4 GHz transmitter was operating. A Notch filter was connected to the measuring antenna output to reduce the transmitter signal, which would typically saturate the measurement system. The emission with correction for the notch filter will appear on the graph of results and is not subject to the limit.

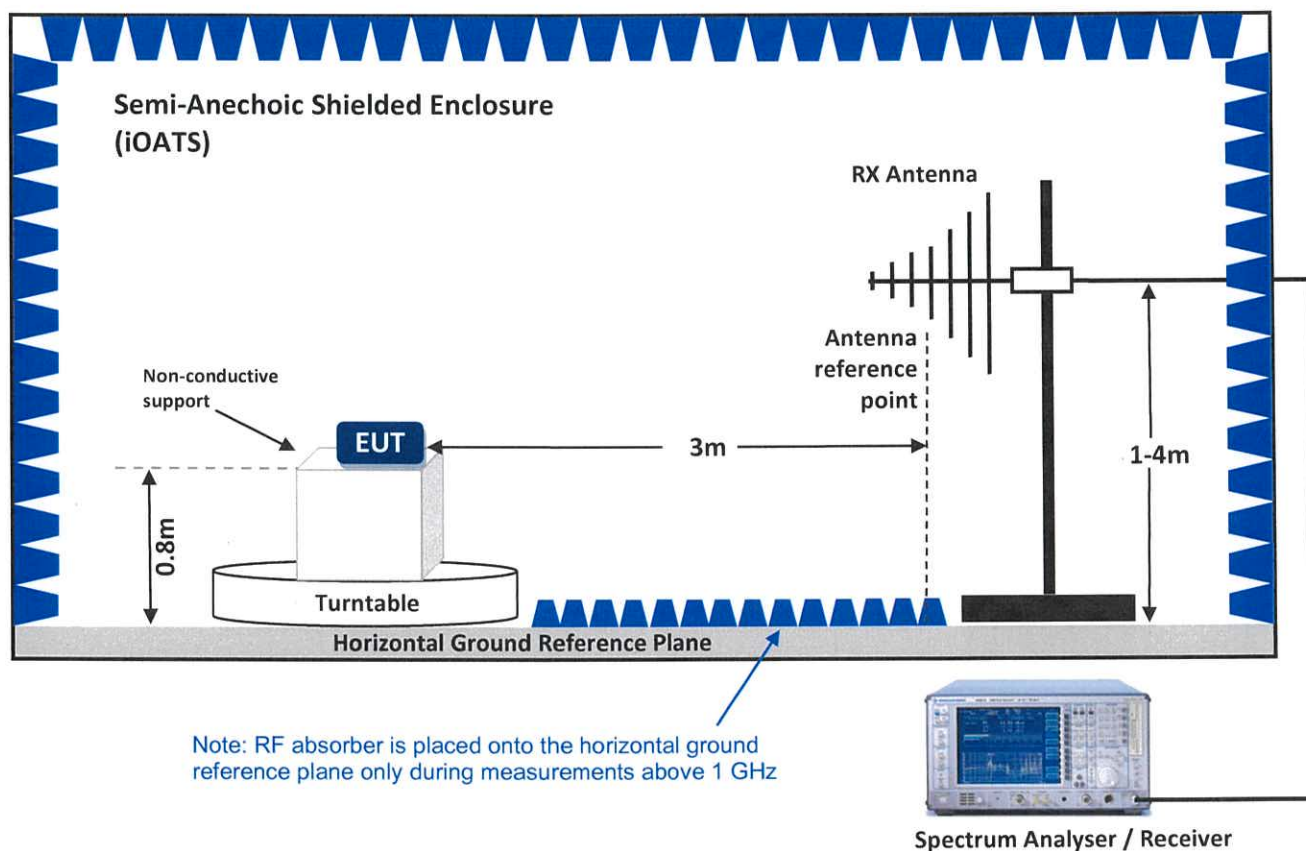
Measurements below 1 GHz:

RWB = 120 kHz, VBW = 3 x RBW

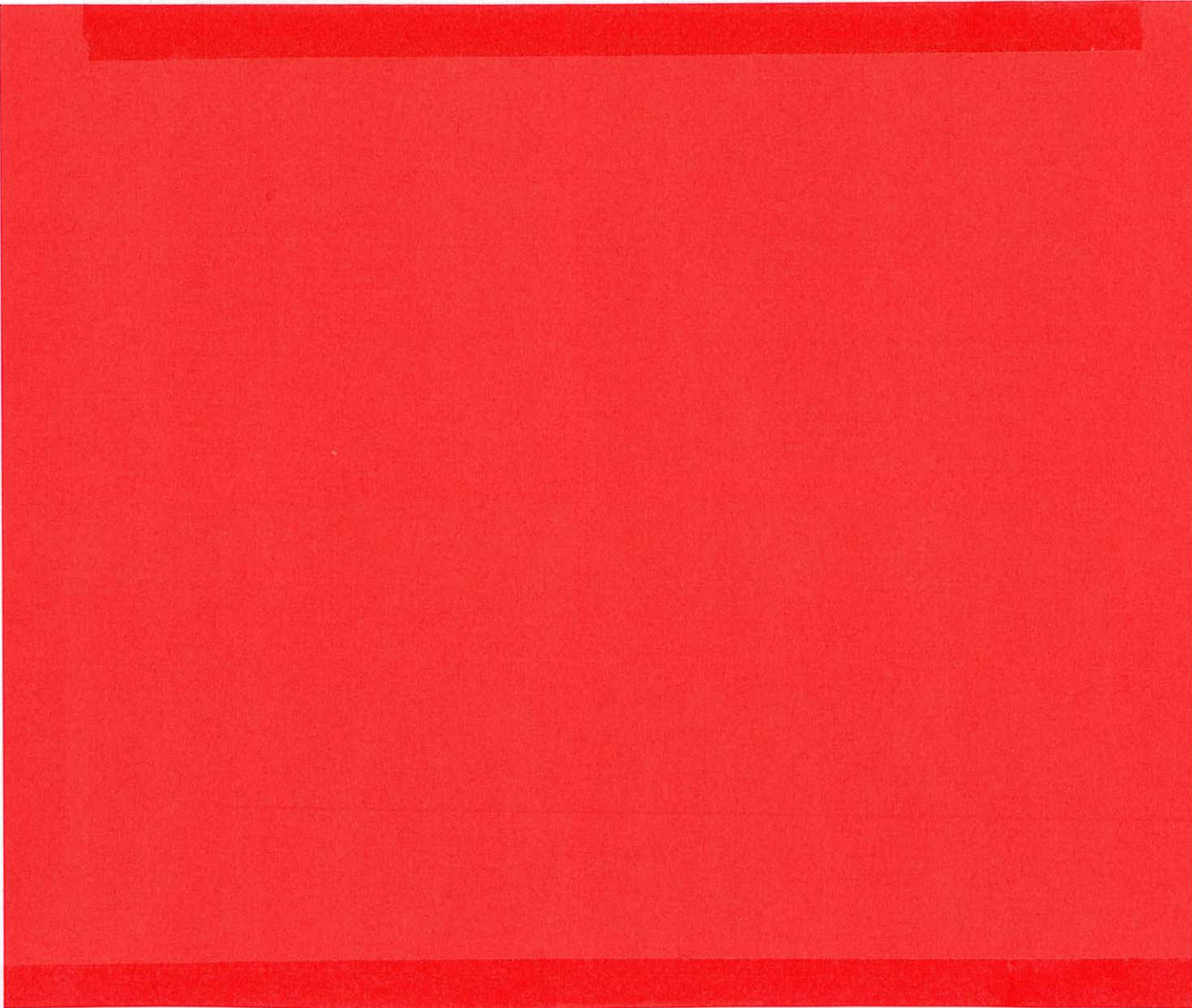
Measurements above 1 GHz:

RF absorber is placed on the ground reference plane between the EUT and the measuring antenna and its location size should allow the test site area comply with the CISPR 16-1-4 requirements.

RWB = 1 MHz (minimum), VBW = 3 x RBW



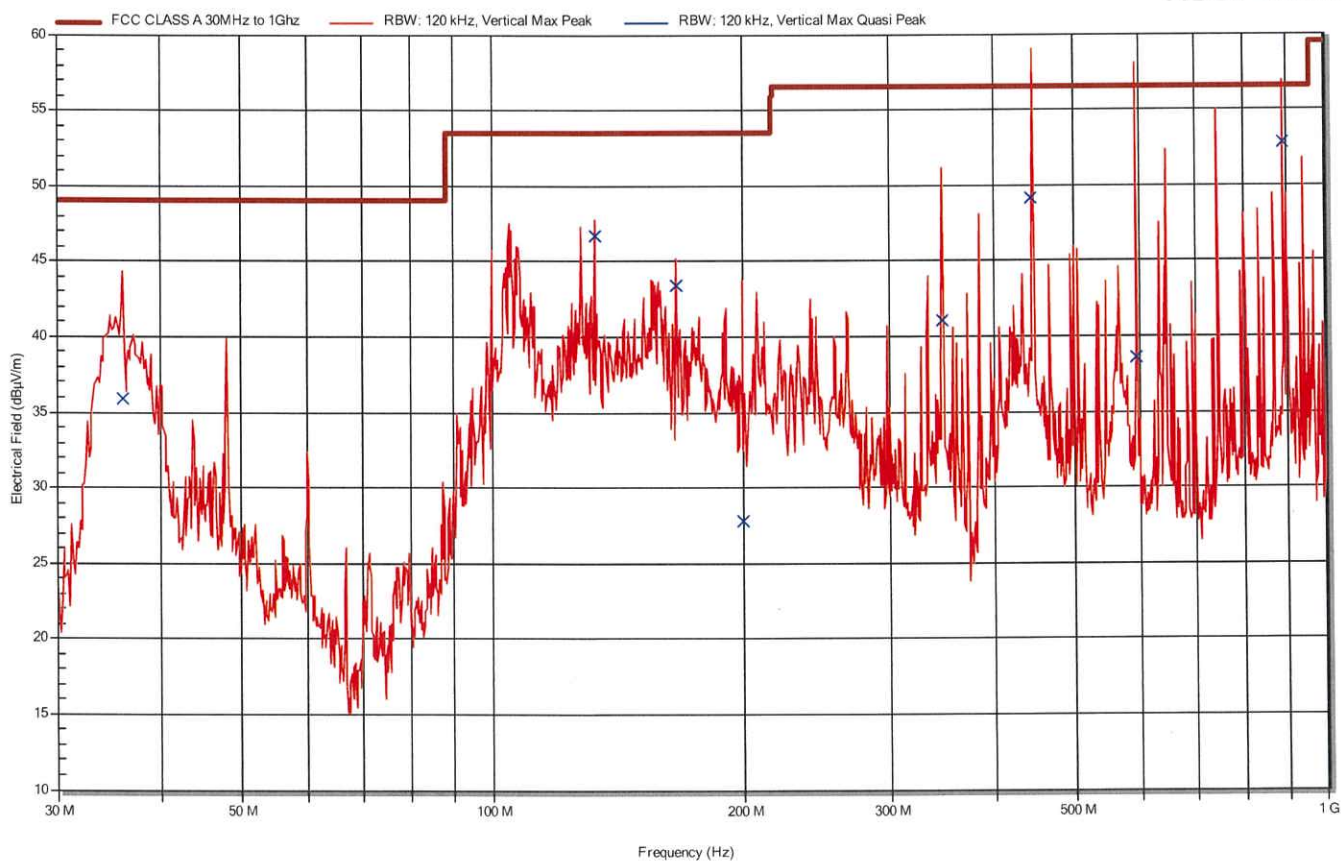
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10.5 RESULTS

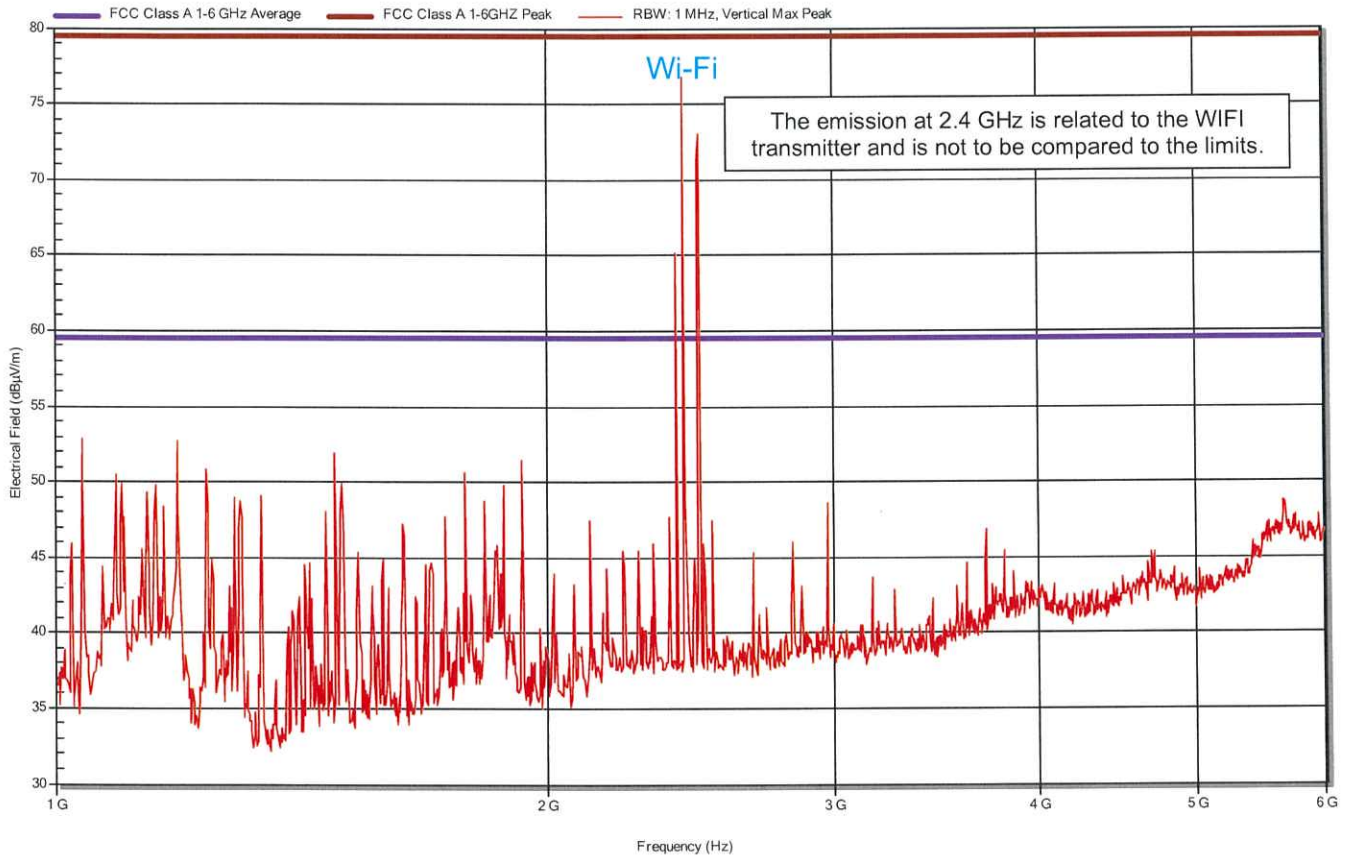
Radiated RF Emission Measurements – Vertical Polarisation – 30 MHz to 1 GHz				
Frequency (MHz)	Quasi-Peak (dB μ V/m)	Quasi-Peak Limit (dB μ V/m)	Delta Limit (dB)	Result
36.032	35.9	49	-13.1	Pass
133.066	46.7	53.5	-6.8	Pass
166.333	43.4	53.5	-10.1	Pass
199.8	27.7	53.5	-25.8	Pass
445.291	49.1	56.5	-7.4	Pass
594.389	38.6	56.5	-17.9	Pass
890.982	52.7	56.5	-3.8	Pass
346.693	41	56.5	-15.5	Pass

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Radiated RF Emission Measurements – Vertical Polarisation - 1 to 6 GHz							
Frequency (GHz)	Peak (dBµV/m)	Peak Limit (dBµV/m)	Average (dBµV/m)	Average Limit (dBµV/m)	Pk Delta Limit (dB)	AV Delta Limit (dB)	Result
Peak and Average emissions were below the applicable limits							Pass

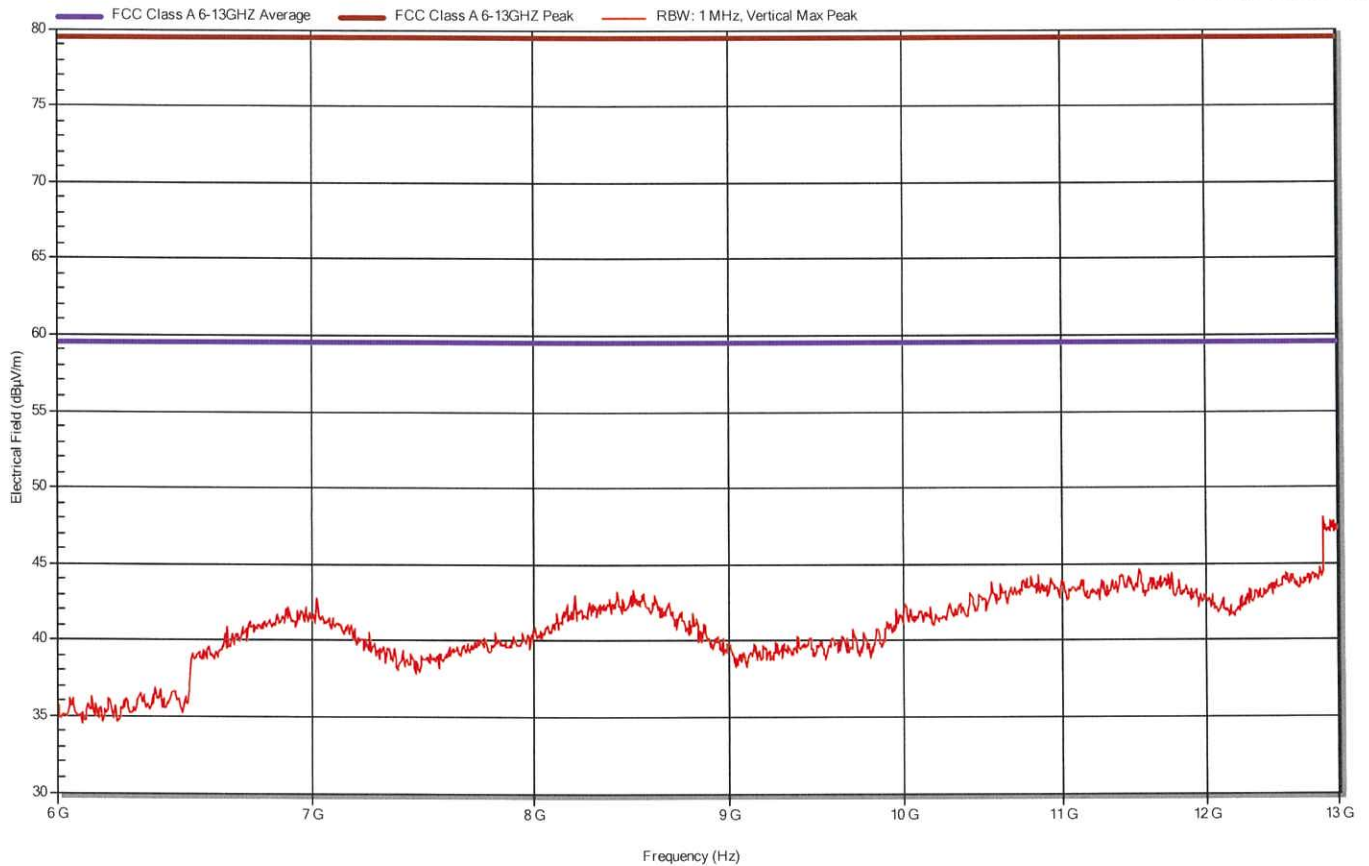
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Radiated RF Emission Measurements – Vertical Polarization - 6 to 13 GHz							Result
Frequency (GHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Average (dBμV/m)	Average Limit (dBμV/m)	Pk Delta Limit (dB)	AV Delta Limit (dB)	
Peak and Average emissions were below the applicable limits							Pass

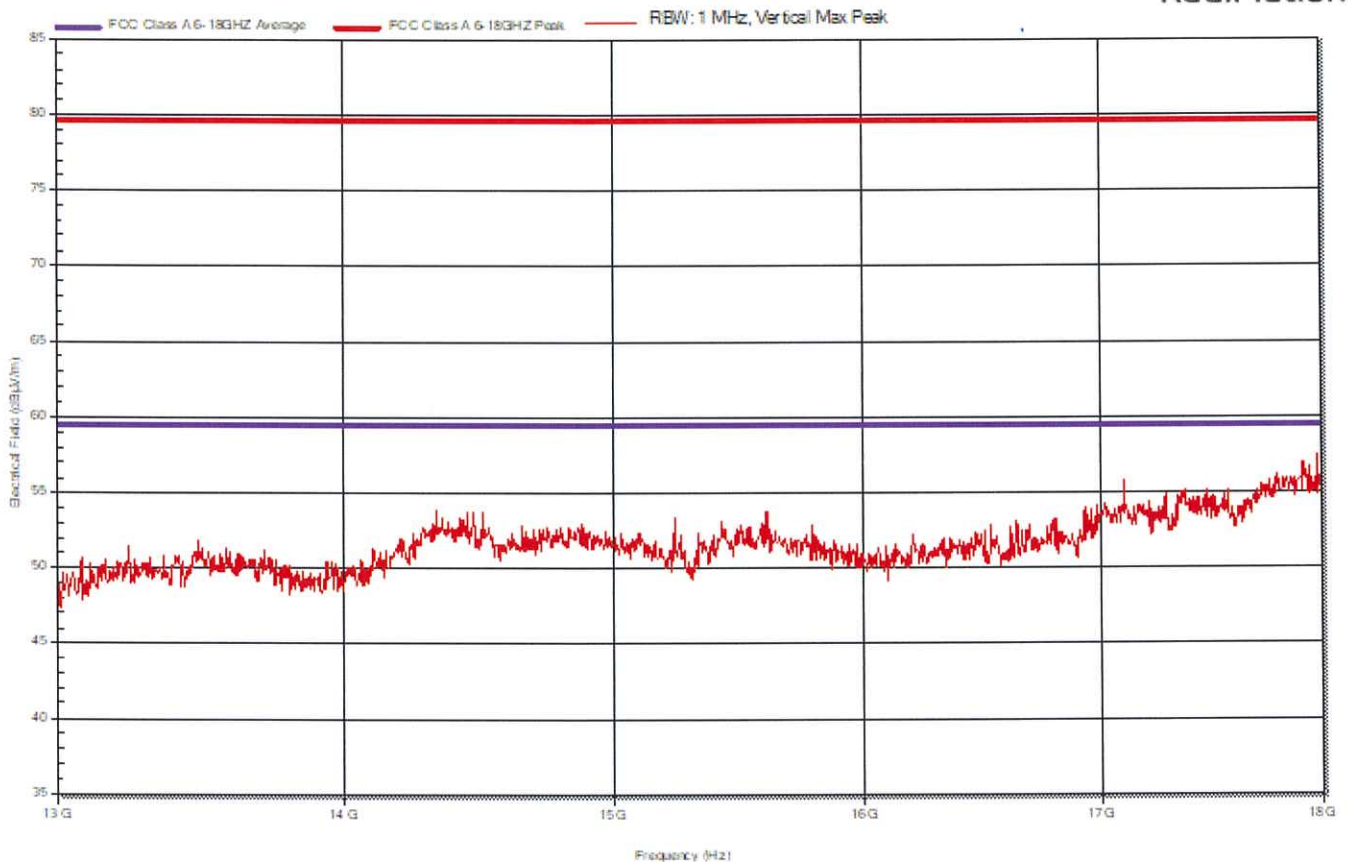
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Radiated RF Emission Measurements – Vertical Polarization - 13 to 18 GHz							
Frequency (GHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Average (dBμV/m)	Average Limit (dBμV/m)	Pk Delta Limit (dB)	AV Delta Limit (dB)	Result
Peak and Average emissions were below the applicable limits							Pass

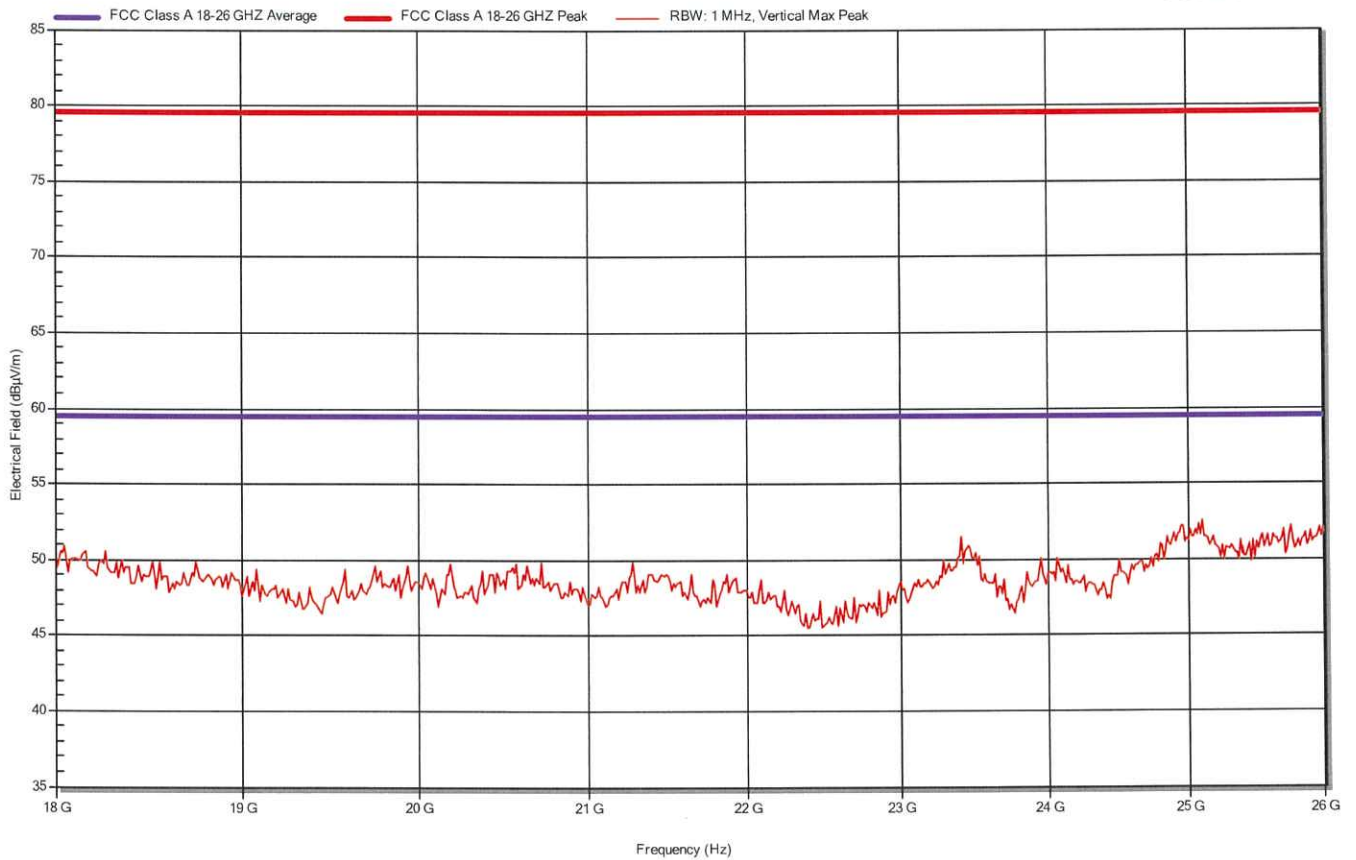
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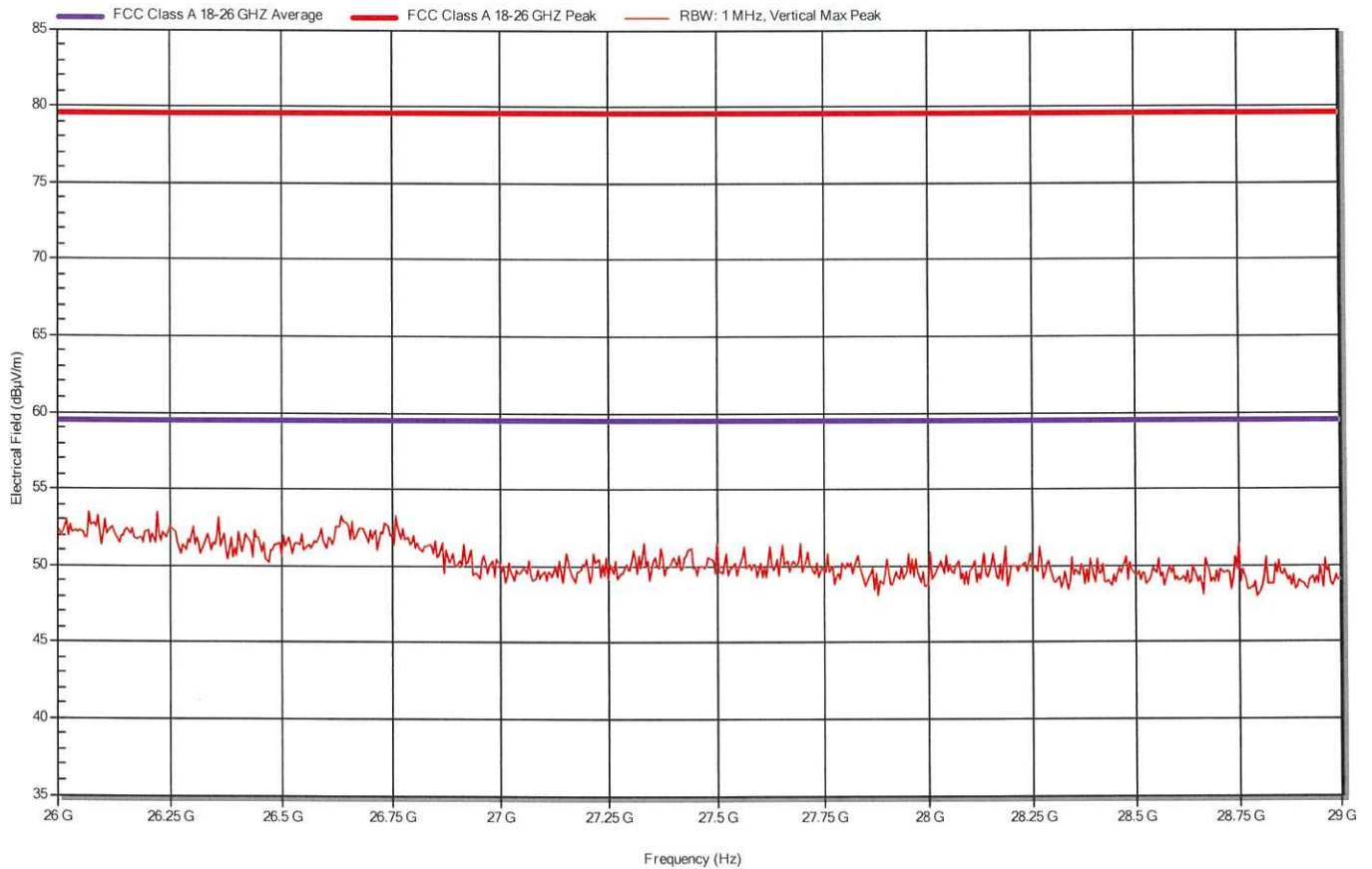
Radiated RF Emission Measurements – Vertical Polarization - 18 to 26 GHz							
Frequency (GHz)	Peak (dB μ V/m)	Peak Limit (dB μ V/m)	Average (dB μ V/m)	Average Limit (dB μ V/m)	Pk Delta Limit (dB)	AV Delta Limit (dB)	Result
Peak and Average emissions were below the applicable limits							Pass

RadiMation



Radiated RF Emission Measurements – Vertical Polarization - 26 to 29 GHz							
Frequency (GHz)	Peak (dB μ V/m)	Peak Limit (dB μ V/m)	Average (dB μ V/m)	Average Limit (dB μ V/m)	Pk Delta Limit (dB)	AV Delta Limit (dB)	Result
Peak and Average emissions were below the applicable limits							Pass

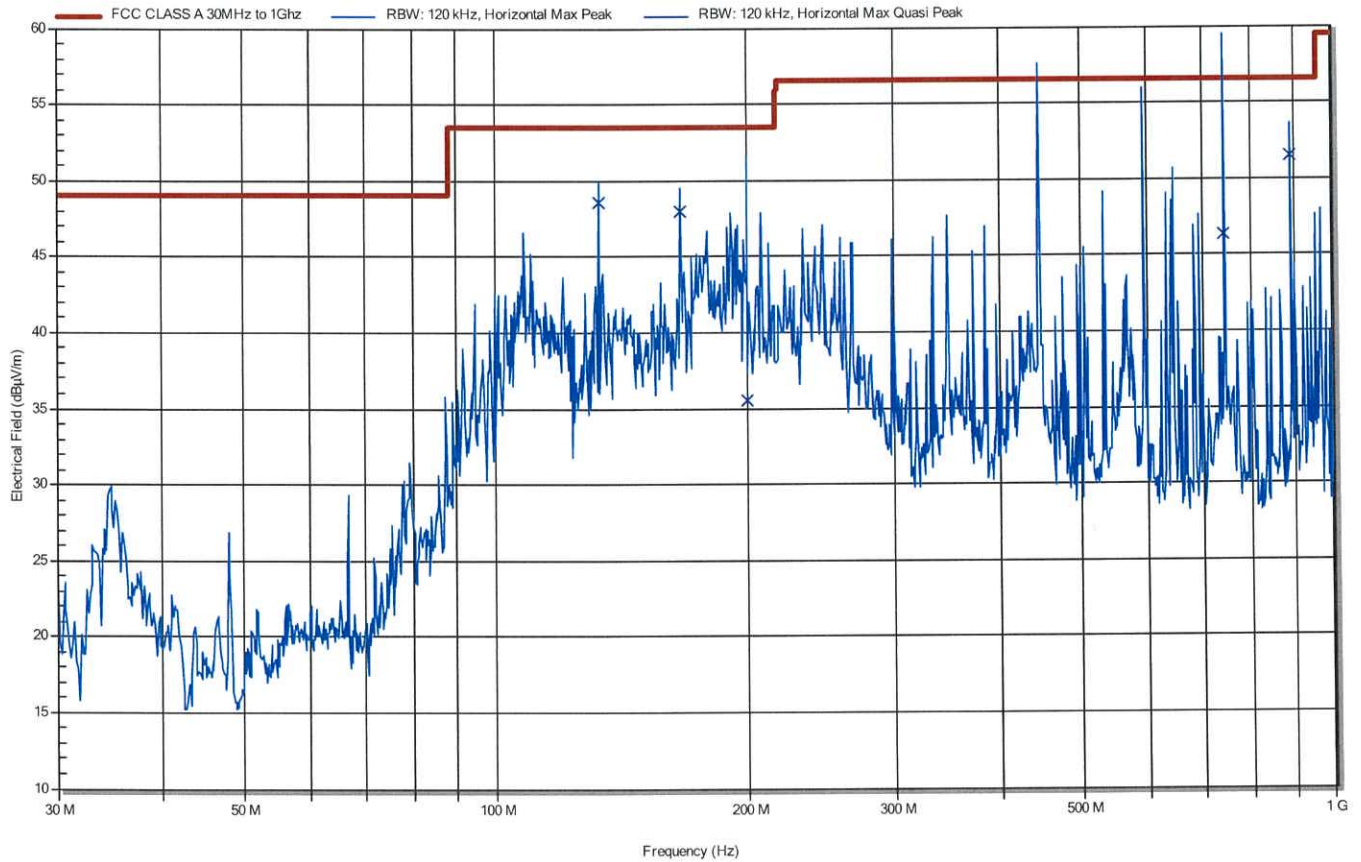
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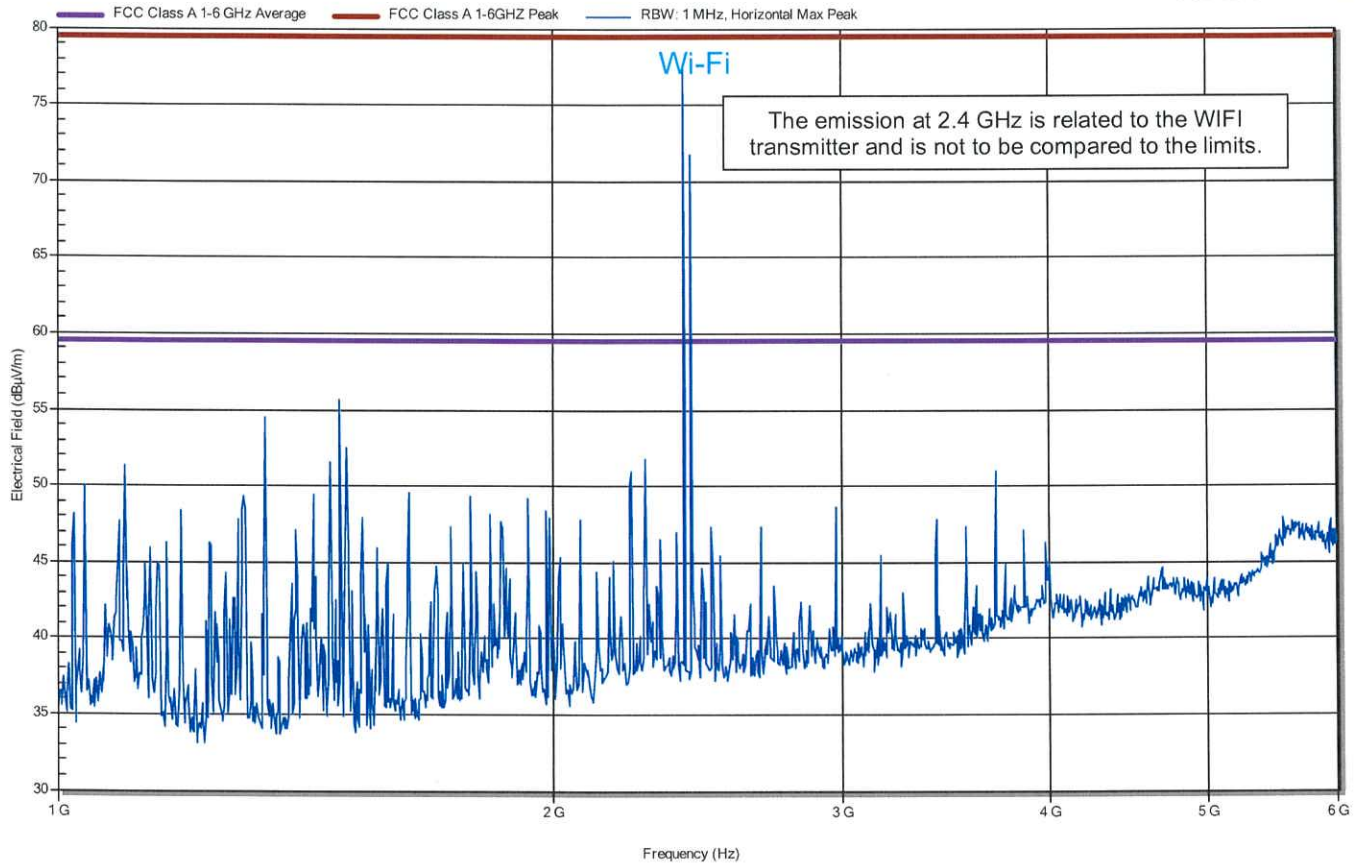
Radiated RF Emission Measurements – Horizontal Polarisation – 30 MHz to 1 GHz				
Frequency (MHz)	Quasi-Peak (dB μ V/m)	Quasi-Peak Limit (dB μ V/m)	Delta Limit (dB)	Result
166.3	48	53.5	-5.5	Pass
199.8	35.5	53.5	-18.0	Pass
742.69	46.3	56.5	-10.2	Pass
890.98	51.5	56.5	-5.0	Pass

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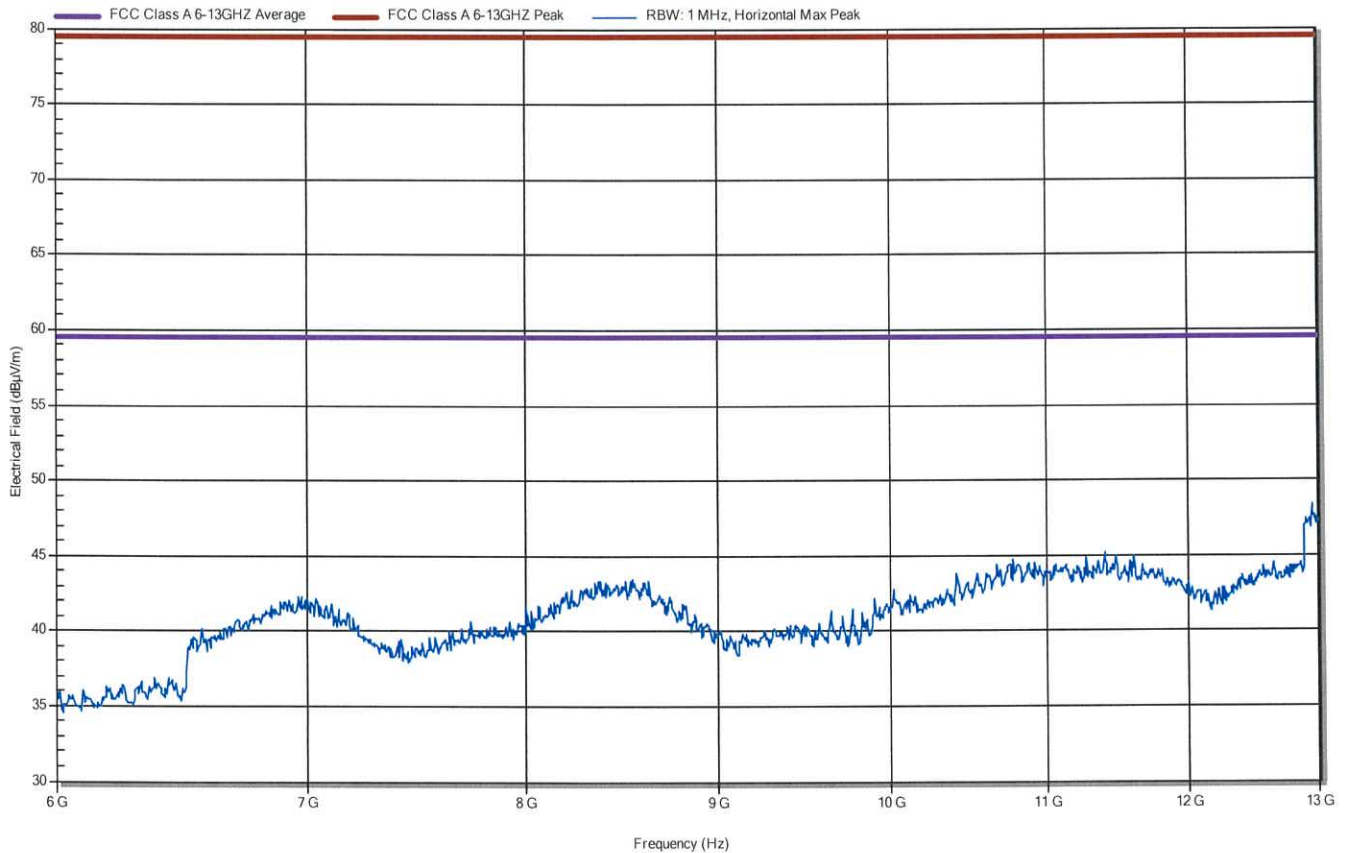
Radiated RF Emission Measurements – Horizontal Polarisation - 1 to 6 GHz							
Frequency (GHz)	Peak (dBµV/m)	Peak Limit (dBµV/m)	Average (dBµV/m)	Average Limit (dBµV/m)	Pk Delta Limit (dB)	AV Delta Limit (dB)	Result
Peak and Average emissions were below the applicable limits							Pass

RadiMation



Radiated RF Emission Measurements – Horizontal Polarisation - 6 to 13 GHz							
Frequency (GHz)	Peak (dBµV/m)	Peak Limit (dBµV/m)	Average (dBµV/m)	Average Limit (dBµV/m)	Pk Delta Limit (dB)	AV Delta Limit (dB)	Result
Peak and Average emissions were below the applicable limits							Pass

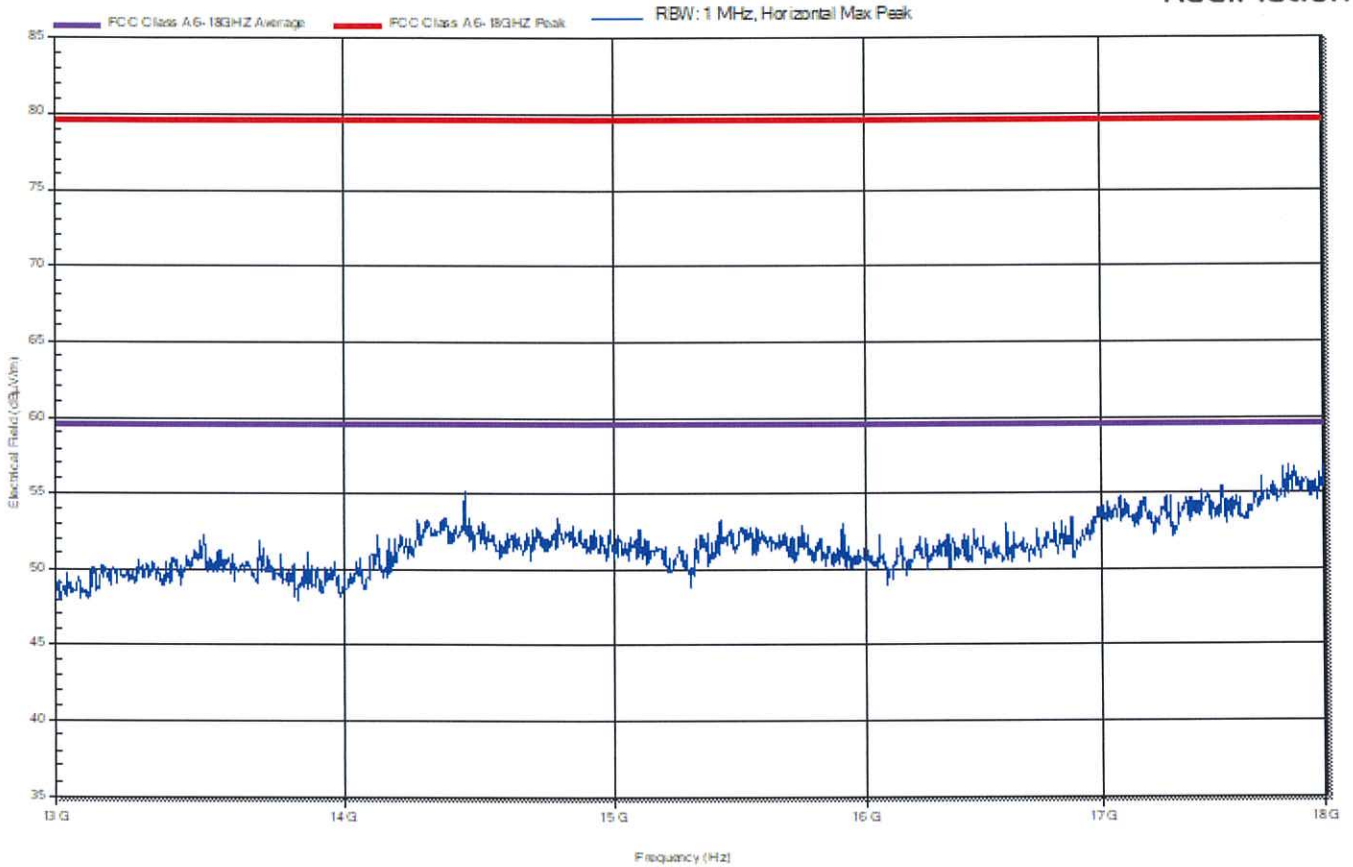
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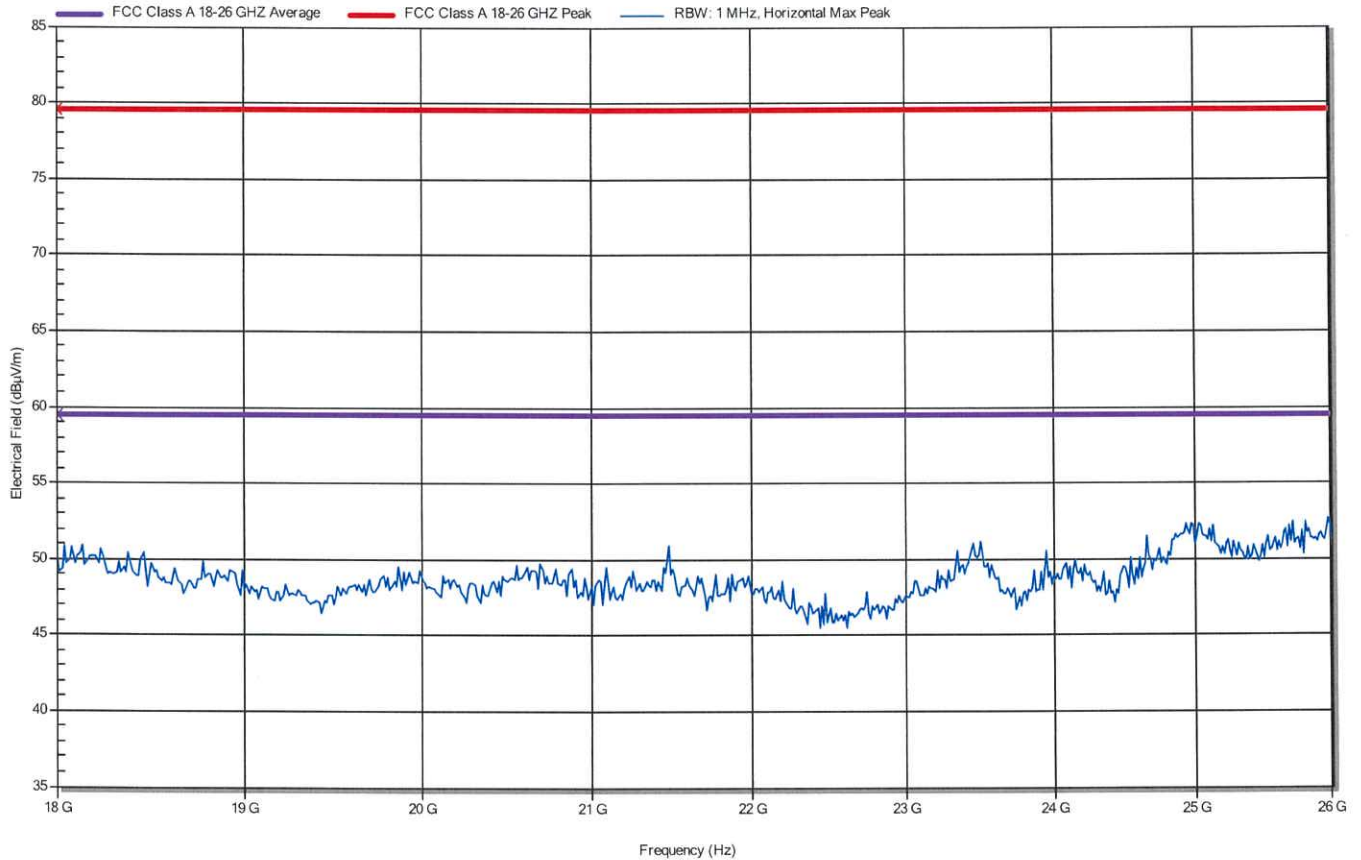
Radiated RF Emission Measurements – Horizontal Polarisation - 13 to 18 GHz							
Frequency (GHz)	Peak (dBµV/m)	Peak Limit (dBµV/m)	Average (dBµV/m)	Average Limit (dBµV/m)	Pk Delta Limit (dB)	AV Delta Limit (dB)	Result
Peak and Average emissions were below the applicable limits							Pass

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Radiated RF Emission Measurements – Horizontal Polarisation - 18 to 26 GHz							
Frequency (GHz)	Peak (dBµV/m)	Peak Limit (dBµV/m)	Average (dBµV/m)	Average Limit (dBµV/m)	Pk Delta Limit (dB)	AV Delta Limit (dB)	Result
Peak and Average emissions were below the applicable limits							Pass

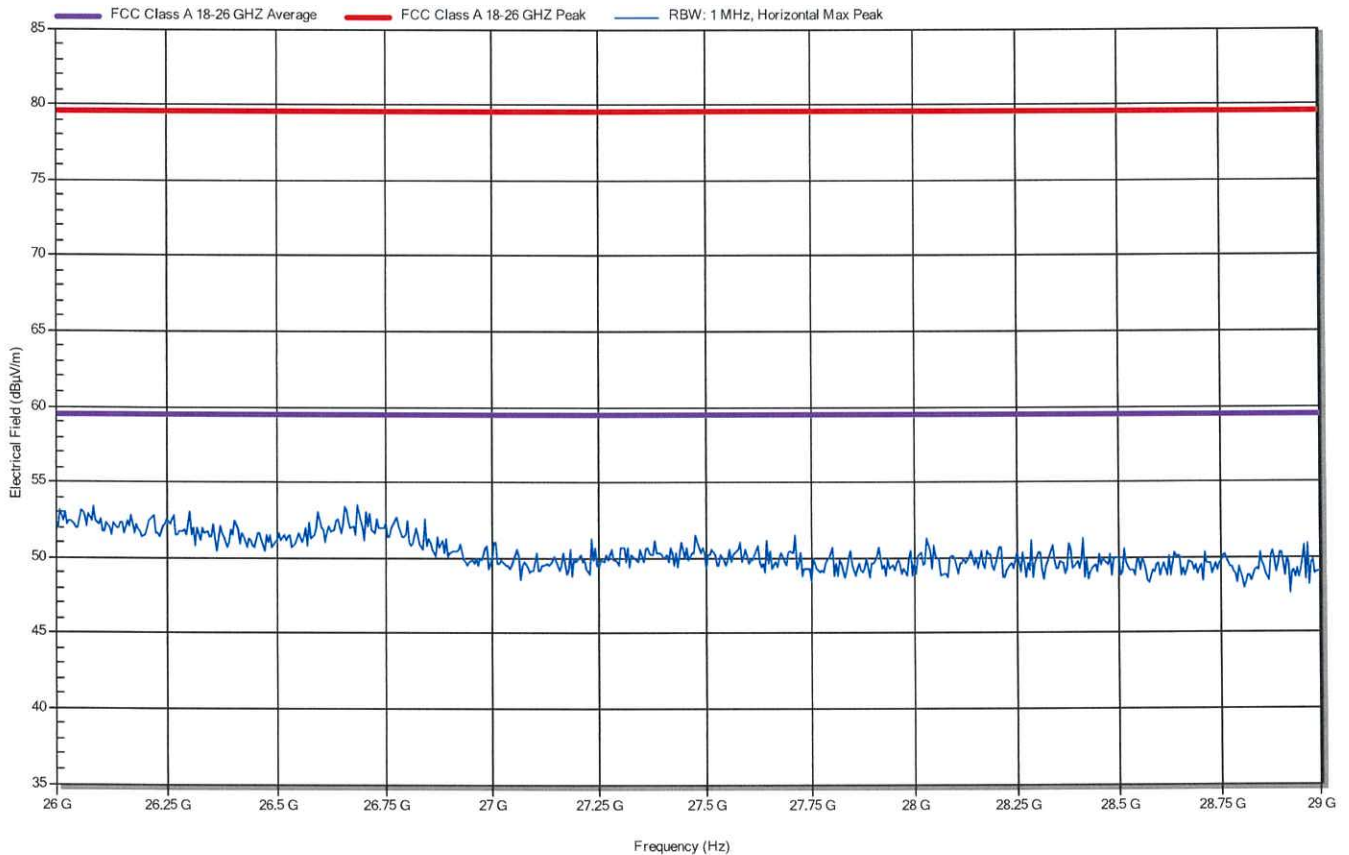
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Radiated RF Emission Measurements – Horizontal Polarisation - 26 to 29 GHz							
Frequency (GHz)	Peak (dBµV/m)	Peak Limit (dBµV/m)	Average (dBµV/m)	Average Limit (dBµV/m)	Pk Delta Limit (dB)	AV Delta Limit (dB)	Result
Peak and Average emissions were below the applicable limits							Pass

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10.6 ASSESSMENT

The Betline TOT Kiosk (Model No: 15501-GA0xx) complies with the radiated RF emission requirements detailed in CFR 47, Chapter 1, Subpart A, Part 15, Subpart B and ICES - 003 (Class A limits).

11. MAINS TERMINAL DISTURBANCE VOLTAGE EMISSION MEASUREMENTS

11.1 REQUIREMENTS

AC Mains: 115 VAC, 60 Hz
 Frequency Range: 0.15 MHz to 30 MHz
 Measurement Distance: 3 meters
 Limit: (Class A)

11.2 TEST EQUIPMENT

Asset	Equipment	Model No	Serial No	Cal Due
644	EMI Receiver 7 GHz	ESIB7	100338	Jul 24
34	LISN	3816/2AS	9605-1047	Dec 24
229	High Pass Filter	FEH0.15B	1247	Feb 23
230	Transient Limiter	TL250-10B	383	Feb 23
TER-S004	Measurement Software	Radimation	Rev: 2022.1.3	-

11.3 ENVIRONMENTAL CONDITIONS

Environment	Range	Actual
Temperature	15.5°C to 24°C	22°C
Humidity	15% to 60%	55%

11.4 PROCEDURE

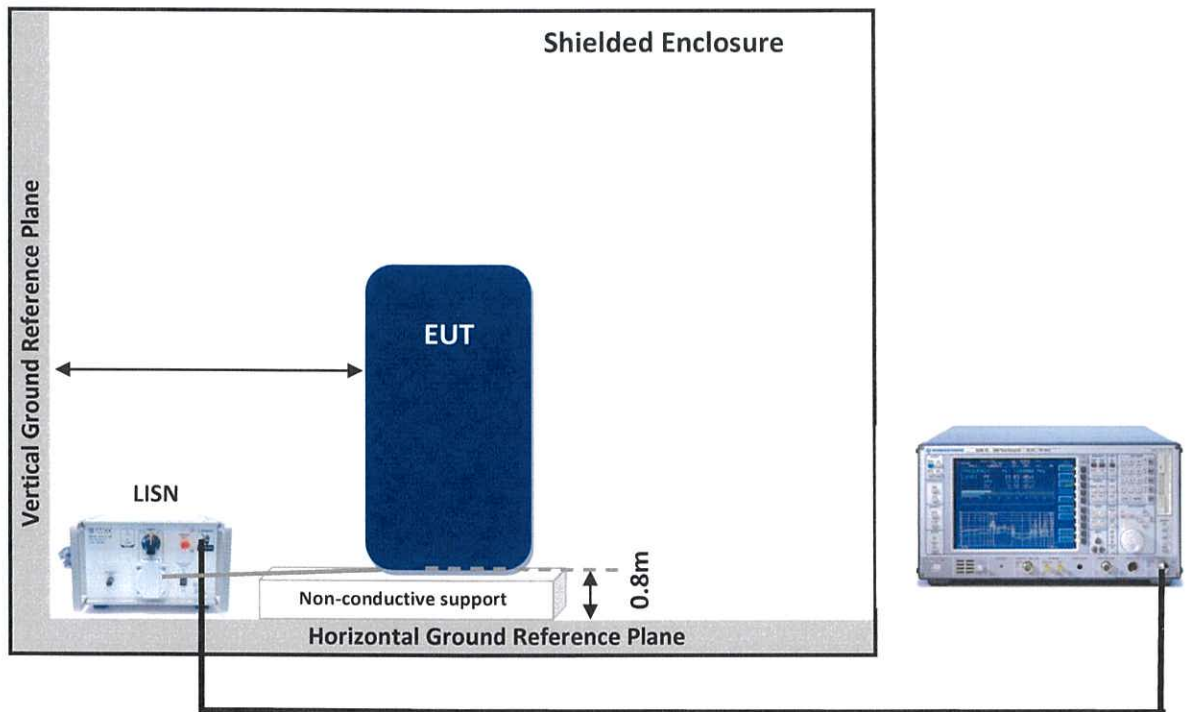
Mains terminal disturbance voltage emission measurements were performed inside a semi-anechoic enclosure.

The EUT was positioned on a non-conductive support 0.8 metres above the ground reference plane.

Measurements were performed on both the active and neutral lines in turn with the Line Impedance Stabilization Network (LISN) located 0.8 metres away from the test sample (When applicable, other accessories are connected to a separate LISN).

The receiver/spectrum analyser was configured to capture the highest peak emissions. Quasi-peak and or average detector measurements were performed at frequencies where peak emissions are close to or exceed the applicable limit.

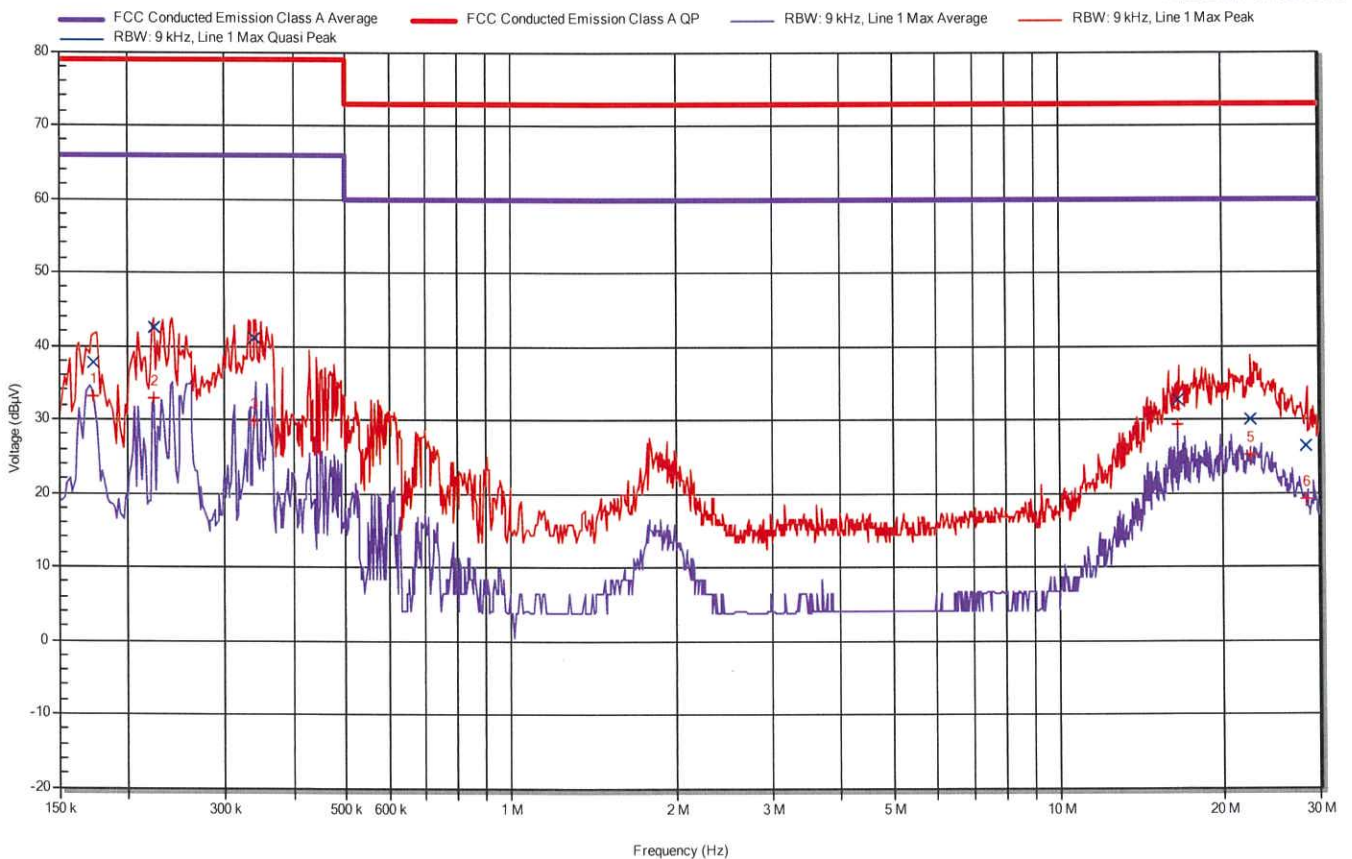
Plots of the accumulated measurement data, including all transducer correction factors were then produced and stored on file.



11.5 RESULTS

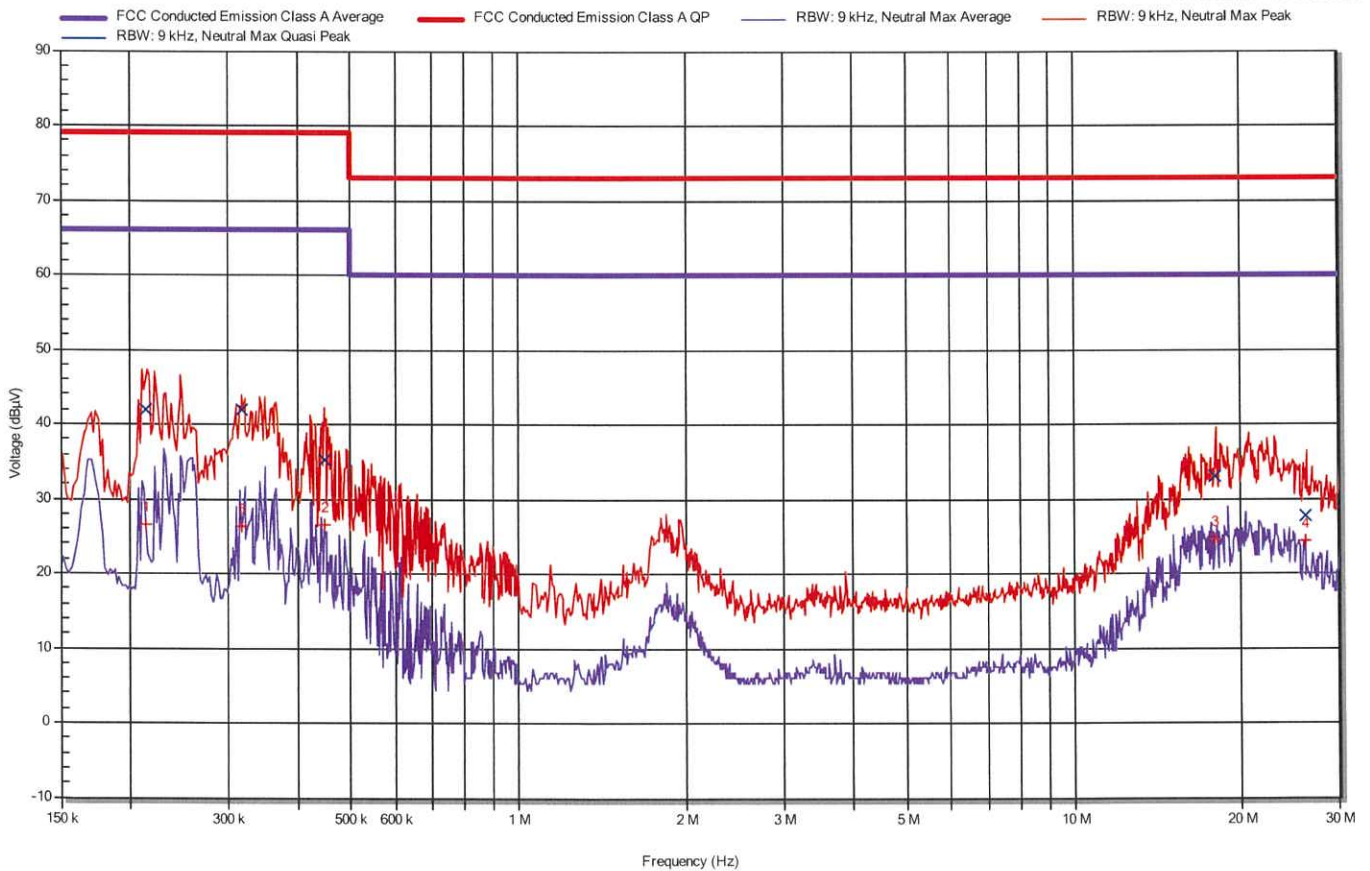
Mains Terminal Emission Measurements – Active Line							
Frequency (kHz)	Quasi-peak (dBμV)	Quasi-peak Limit (dBμV)	Delta QP Limit (dB)	Average (dBμV)	Average Limit (dBμV)	Delta AVG Limit (dB)	Result
0.173848	37.7	79	-41.3	33.2	66	-32.8	Pass
0.223246	42.4	79	-36.6	32.9	66	-33.1	Pass
0.340782	41	79	-38.0	29.8	66	-36.2	Pass
16.593	32.5	73	-40.5	29.3	60	-30.7	Pass
22.505	29.9	73	-43.1	25.3	60	-34.7	Pass
28.467	26.3	73	-46.7	19.1	60	-40.9	Pass

RadiMation



Mains Terminal Emission Measurements – Neutral Line							
Frequency (kHz)	Quasi-peak (dBμV)	Quasi-peak Limit (dBμV)	Delta QP Limit (dB)	Average (dBμV)	Average Limit (dBμV)	Delta AVG Limit (dB)	Result
0.214729	41.9	79	-37.1	26.6	66	-39.4	Pass
0.448096	35.1	79	-43.9	26.5	66	-39.5	Pass
18.006	33	73	-40.0	24.5	60	-35.5	Pass
26.172	27.8	73	-45.2	24.2	60	-35.8	Pass
0.318637	41.9	79	-37.1	26.2	66	-39.8	Pass

RadiMation



11.6 ASSESSMENT

The Betline TOT Kiosk (Model No: 15501-GA0xx) complied with the CFR 47, Chapter 1, Subpart A, Part 15, Subpart B and ICES – 003 (Class A limits) conducted RF emission requirements.

12. CONCLUSION

The **Betline TOT Kiosk (Model No: 15501-GA0xx)** Complies with the conducted and radiated RF emission requirements detailed in CFR 47, Chapter 1, Subpart A, Part 15, Subpart B and ICES - 003 (Class A limits).