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Test Report for the FCC and ISED Intermodulation Radio Testing of a HID ATOM 3K for Access Ltd

Test Report number: C16162TR2
Project number: C9618v3

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Issue	Description						Issue by	Date
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Test Report Change History

Issue	Date	Modification Details
1	4th November 2025	Original issue of test report
2	28th November 2025	FCC ID added
3		
4		
5		
6		
7		
8		
9		
10		

Section 1 Test Location

All testing was performed at;

Eurofins E&E UK Ltd	Unit 5
	Speedwell Road
	Castleford
	WF10 5PY
Tel:	01977 731173
Website	https://www.yorkemc.com
UKAS Testing No.	1574

1.1 UKAS Accreditation

Tests marked "Not UKAS Accredited" in this report are not included in the UKAS Accreditation Schedule for our laboratory.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Eurofins E&E UK, Castleford latest accreditation schedule can be found at:

UKAS Scope of accreditation

Eurofins E&E UK Castleford Laboratory, is an Accredited facility recognised by the Federal Communications Commission (FCC) for certification testing. The appropriate FCC Designation Number is UK2013, dated 1st March 2021.

Section 2 Customer Information

Company name	Access Ltd
Address	18 – 19 Suttons Business Park
	Reading
	RG6 1AZ
	United Kingdom
Contact	Tanya Newell
Email	Tanya.newell@hidglobal.com
Customer Representative(s) present during testing	None

Section 3Equipment Details

3.1 Equipment Under Test (EUT)

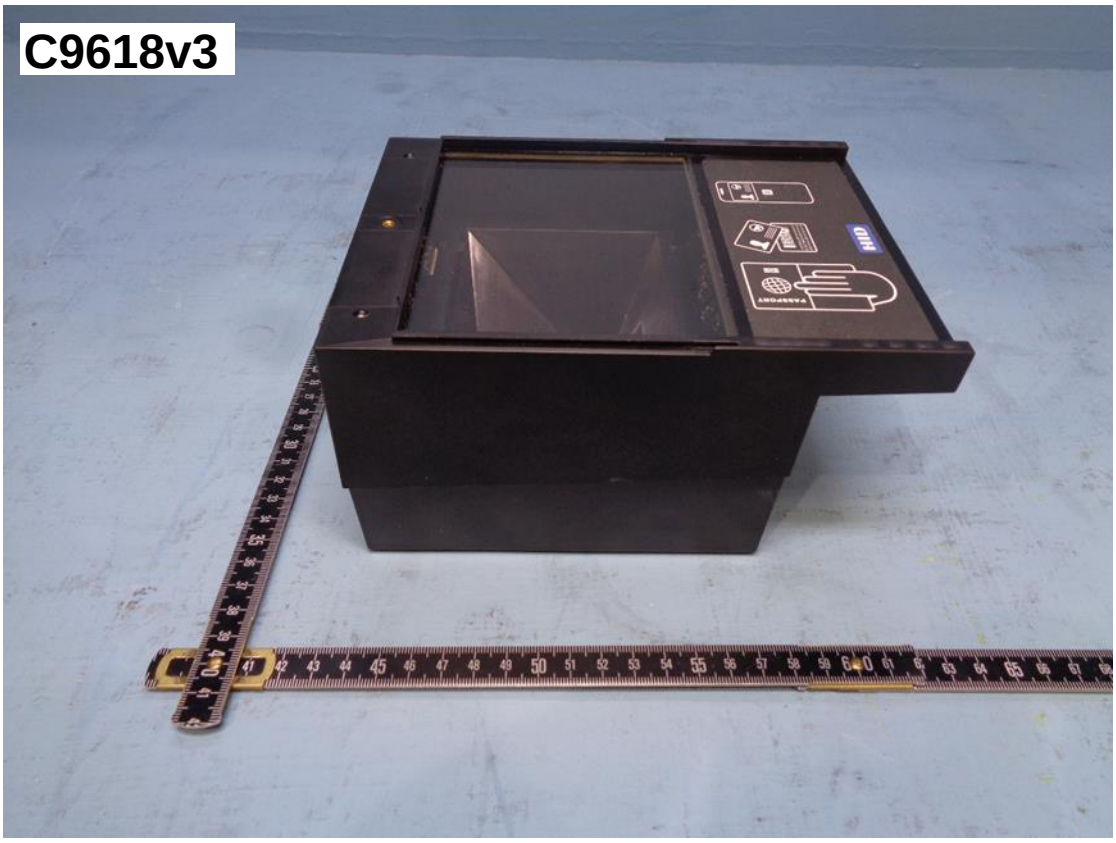
Date received:	22nd October 2025					
EUT name:	ATOM 3K					
Serial no/s:	1010202503 & 1010202510					
FCC ID:	ZERATOM3K					
HVIN:	00A					
FVIN:	Access-IS-Reader_CX3_3.3.387.10					
PMN:	ATOM 3K					
EUT description:	The EUT reads QR and barcodes, NFC and RFID cards, text from travel documents and contact smart cards. For use with applications that require ID document data capture, including passports, driver licenses and visas.					
Details of radio technology (type, frequency, RF Module, FCC ID):	• Bluetooth Low Energy, 2.4GHz, Module: Sunrich BLE Adaptor, FCC ID: QIJ-B190 • RFID, 13.56MHz, bespoke design					
No of units tested:	Two					
EUT power:	12	Vdc	Via customer suppled 120Vac 60Hz PSU			
Highest internal frequency:	2.4GHz					
Cables: (see section 3.3 for configuration):	DC Power	1.8	m	Unscreened	Terminated	
	USB	1.0	m	Screened	Terminated	
Tested as:	Table top					
Mode/s of operation:	**Mode 1**: Simultaneous transmission of the BLE, 2.4GHz and RFID 13.56MHz outputs: BLE: Normal operation. Communications established with a BLE speaker companion device. RFID: Continuous transmission of a modulated signal. EUT serial number 101020510 was modified by the customer for conducted emissions testing, with the module antenna connections terminated with a 50Ω load.					
Client modification statement:	None					
Modifications incorporated during testing:	None					

EUT Monitoring/Auxiliary Equipment

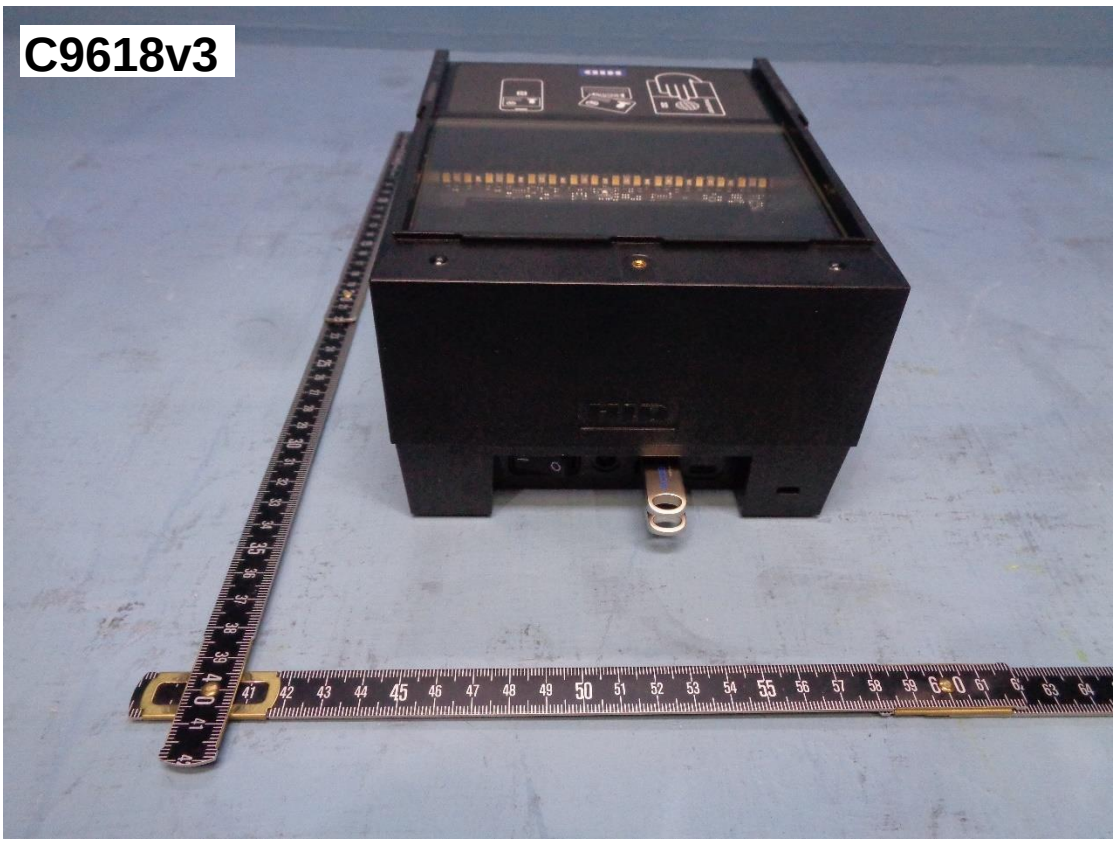
Equipment name	Type no.	Serial no
Dell Laptop	Precision 7720	11906711606
JBL Bluetooth Speaker	GO4	2023DJ21006

Note: The EUT was investigated in the laid flat & upright positions. It was determined that the upright position yielded worse-case results. Therefore, all tests were performed with the EUT in the upright position.

3.2 EUT Photos



Front View



Rear View

3.3 Configuration of EUT

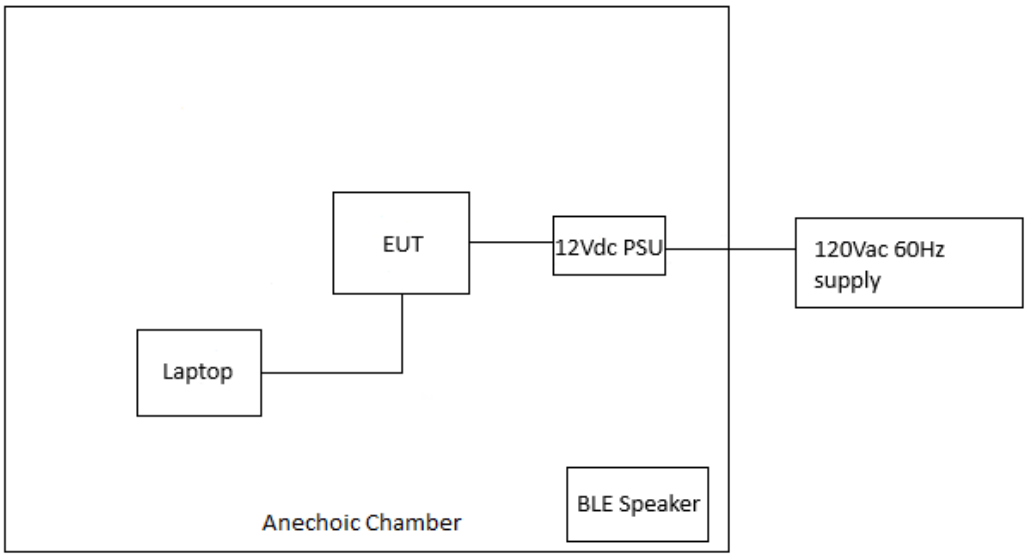


Figure 1: Diagram of EUT set-up

Section 4 Test Specifications

The tests were performed in accordance with Eurofins E&E UK Ltd Quotation C9618v3.

Based on 47CFR Part 15, Sub Part C Intentional Radiators referencing KDB 996369 D04 Module Integration Guide **And:** **RSS-GEN General Requirements for Compliance of Radio Apparatus Issue 5 April 2018**			
Which references the following specification: -			
ANSIC63.10-2020/Cor1-2023			
Test	**Method**	**Levels**	**Result**
Radiated Emissions Electric Field Measurements (30MHz to 12.5GHz) See Note 1	ANSIC63.10-2020/Cor1-2023 Clause 6.3	47CFR Part 15 Section 15.209 And ISED RSS-Gen	Pass
AC power line conducted emissions	ANSIC63.10-2020/Cor1-2023 Clause 6.2	47CFR Part 15 Clause 15.207 RSS-247 Section 3.1	Pass

Note 1: The spectrum was investigated up to 5 times the highest frequency in accordance with FCC rule part 15.33(b).

47CFR Part 15, Sub Part B Unintentional Radiators			
Which references the following specification: -			
ANSI C63-4: 2014 Methods of Measurements of Radio Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range 9kHz to 40GHz.			
Test	**Method**	**Levels**	**Result**
Conducted Emissions (0.15 – 30MHz)	ANSI C63.4: 2014 Section 7	Part 15 Clause 15.107 Class A	Pass
Radiated Emissions Electric Field Measurements (30MHz – 12.5GHz)	ANSI C63.4: 2014 Section 8	Part 15 Clause 15.109 Part 15 Class A	Pass (See Note 1)

Note: 1 All testing was carried out at a test distance of 3m and the limits adjusted accordingly. This is a deviation from the standard as Class A limits are specified at 10m test distance.

The Decision Rule is applied on the basis of the following:

Wireless testing - ETSI TR 102 273 and ETSI TR 100 028

These standards provide guidance on how to calculate and apply measurement uncertainty whilst providing maximum uncertainties allowance. In all cases due consideration will be given to JCGM 106:2012, ILAC-G8:09/2019 and LAB 48.

This laboratory has demonstrated by calibrating its equipment and facilities, and calculating its own uncertainties, that it complies with the above requirements and therefore no allowance of uncertainties has been given to the tolerances.

Where a result is considered marginal in respect of its proximity to the limit line, for example, the customer would be made aware of situation so that they can make an informed decision on how to proceed.

4.1 Knowledge Database References

The following KDBs were referenced during the testing of the HID ATOM 3K:

The latest knowledge database references are available via the FCC KDB website at:

https://apps.fcc.gov/kdb

Radiated Emissions (9kHz to 30MHz)

Publication Number	Keyword	Publication Date
414788	Test Site Requirements for Part 15 and 18 devices below 30Mhz	07/12/2018
460108	Radiated emission measurements below 30 MHz	07/12/2018

Radiated Emissions (30MHz to 1000MHz)

Publication Number	Keyword	Publication Date
746324	CE Mark and use of CISPR 22 limits	07/09/2018
913591	Measurement of radiated emissions at the band-edge for a Part 15 RF Device	04/05/2017

Radiated Emissions (1GHz to 13GHz)

Publication Number	Keyword	Publication Date
714737	15B, Average Detector for Unintentional Radiator	30/11/2010
414788	Test Site Validation Requirements above 1 GHz.	07/12/2018
414788	Comparison Noise Emitter (CNE), reference noise source, .pdf	07/12/2018

Radiated Emissions - Apparatus Containing a Modular Transmitter

Publication Number	Keyword	Publication Date
996369	Modular Transmitter Integration Guide – Guidance for Host Product Manufacturers, Frequency Spectrum to be Investigated	04/16/2024

4.2 Compliance Statement

The ATOM 3K, as tested, was shown to meet requirements of the standards listed in Section 4 of this report.

4.3 Decision Rule Statement

The Decision Rule is applied on the basis of the ILAC-G8:09/2019

This guidance document has been prepared to assist laboratories in the use of decision rules when declaring statements of conformity to a specification or standard as required by ISO/IEC 17025:2017

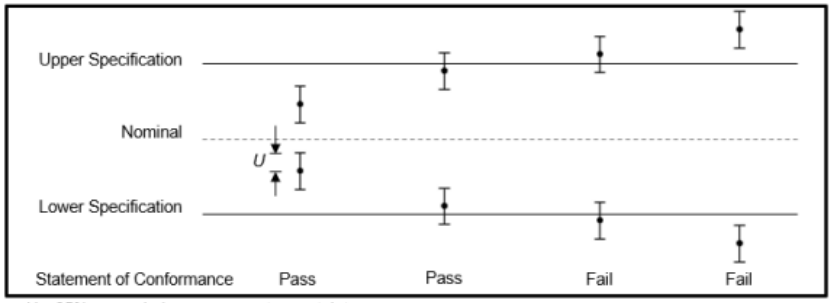
Where a result is considered marginal in respect of its proximity to the limit line, for example, the customer would be made aware of situation so that they can make an informed decision on how to proceed.

A binary decision rule exists when the result is limited to two choices (pass or fail). A non-binary decision rule exists when multiple terms may express the result (pass, conditional pass, conditional fail, fail). These are further explained below.

The laboratory recommends to use Binary Statement for Simple Acceptance Rule (w = 0)

Statements of conformity are reported as:

- Pass - the measured value is below the acceptance limit, AL = TL.
- Fail - the measured value is above the acceptance limit, $AL = TL$



U = 95% expanded measurement uncertainty

Section 5 Radiated Emission Results

5.1 Test Specification

Standard	ANSI C63.10-2020/Cor1-2023
Measurement Uncertainty	The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95% is +/- 4.94dB for the frequency range from 9kHz to 30MHz +/- 6.26dB for the frequency range 30MHz to 1GHz +/- 5.14dB for the frequency range from 1GHz to 6GHz +/- 5.45dB for the frequency range from 6GHz to 18GHz

5.2 Procedure and Test Software Version

Eurofins E&E UK test procedure (9MHz to 30MHz)	CEP 514 Issue 7
Eurofins E&E UK test procedure (30MHz to 1GHz)	CEP 22 Issue 9
Eurofins E&E UK test procedure (1GHz to 40GHz)	CEP 23 Issue 12
Test software	RadiMation Version 2023.1.6

5.3 Radiated Emissions (9kHz to 30MHz)

5.3.1 Limits

Frequency	Limits (dBµV/m)
9kHz to 490kHz	2400/F(kHz) at 300m
490kHz to 1.705MHz	24000/F(kHz) at 30m
1,705MHz to 30MHz	30 at 30m

Note 1: FCC 47 CFR Part 15 Section 15.209 has different test limits from 300m to 30m depending upon the measurement frequency range. The measured was adjusted for a measurement distance of 3m.
Distance Correction Factor = 40log (test distance /specific distance).

5.3.2 Receiver Settings

Receiver Parameters	Setting
Detector Function	Peak
Start Frequency	9kHz
Stop Frequency	150kHz
Resolution Bandwidth	200Hz
Video Bandwidth	Auto

Receiver Parameters	Setting
Detector Function	Peak
Start Frequency	150kHz
Stop Frequency	30MHz
Resolution Bandwidth	10kHz
Video Bandwidth	Auto

5.3.3 Emissions measurements

5.3.4 Date of Test

23rd & 27th October 2024

5.3.5 Test Area

LAB 5 FAR

5.3.6 Tested by

L Trickett

5.3.7 FAR Test Setup

The EUT was configured in the FAR on an 80cm high table.

The measurement was then performed with an antenna to EUT separation distance of 3m within the semi-anechoic chamber based upon the highest emissions results recorded on the outside test site.

The centre of the loop antenna was 1m above the ground and results were obtained with it parallel to the EUT and then perpendicular to the EUT.

The results are maximised in orientation 0-360 degrees.

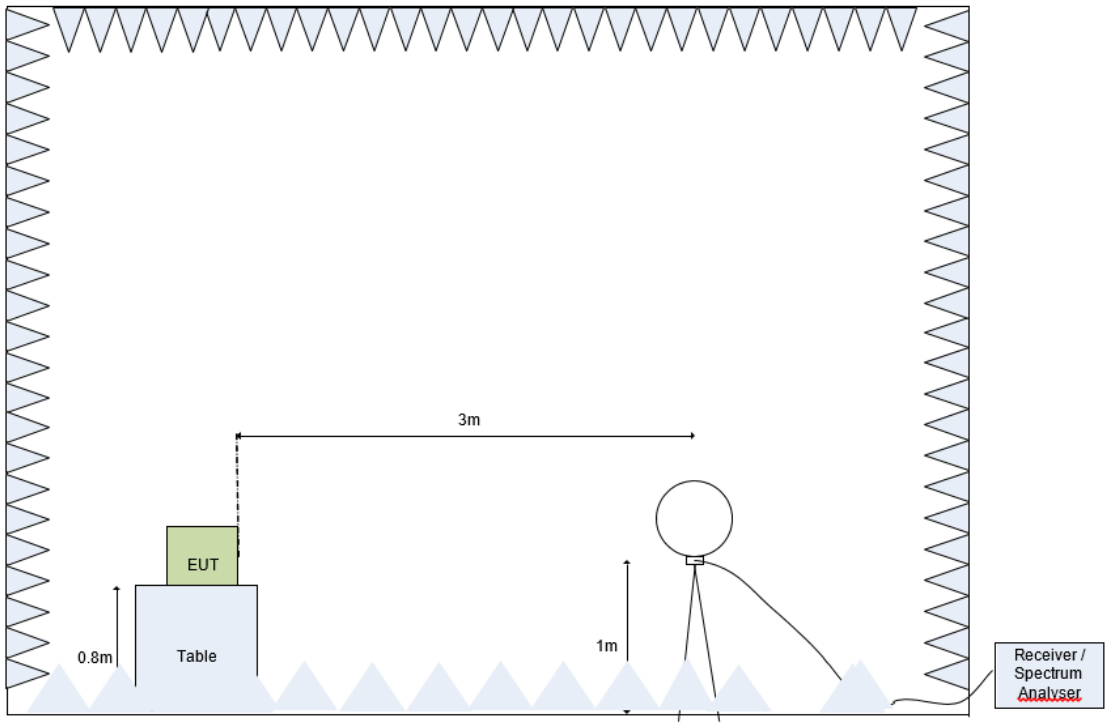


Figure 2: Test Setup for H-Field Measurements from 9kHz to 30MHz

Note 1: With the EUT de-energized the ambient radio noise and signals met the 6dB peak detection requirement of ANSI C63.4-2014 Clause 5.1.3.

Note 2: There were no significant environmental temperature changes during the test duration and hence it was not considered necessary to consider any variation in cable loss.

The results of peak detector max-hold emission measurements are presented below. The measurements were taken using a FAR as initial measurements.

Measurements were performed at a 3m measurement distance.

The detector used was a peak detector.

For measurements in the band 0.009MHz to 0.490MHz the specified measurement distance is 300m. The distance correction will be:

Correction = 40*log (3/300) = -80dB

For measurements in the band 0.490MHz to 30MHz the specified measurement distance is 30m. The distance correction will be:

Correction = 40*log (3/30) = -40dB

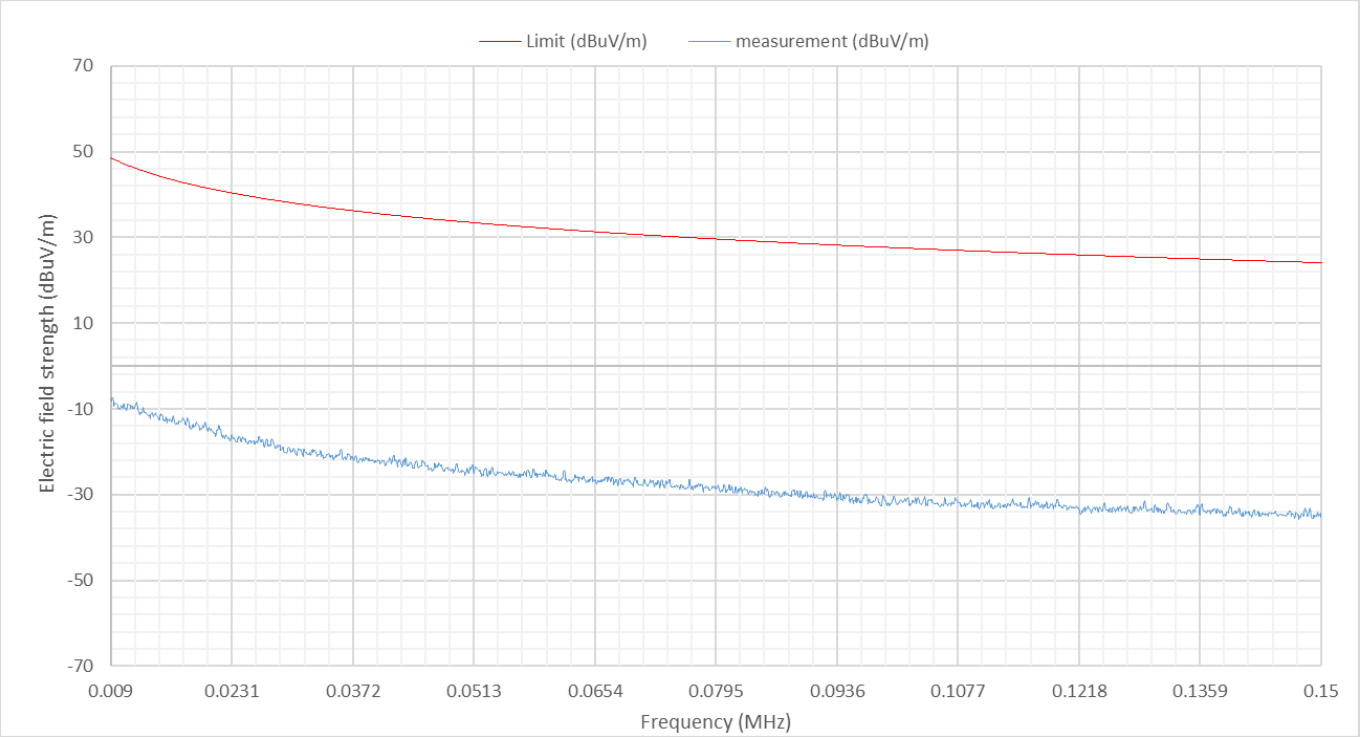


Figure 3 Magnetic field emissions Plot, 9kHz-150kHz, Parallel

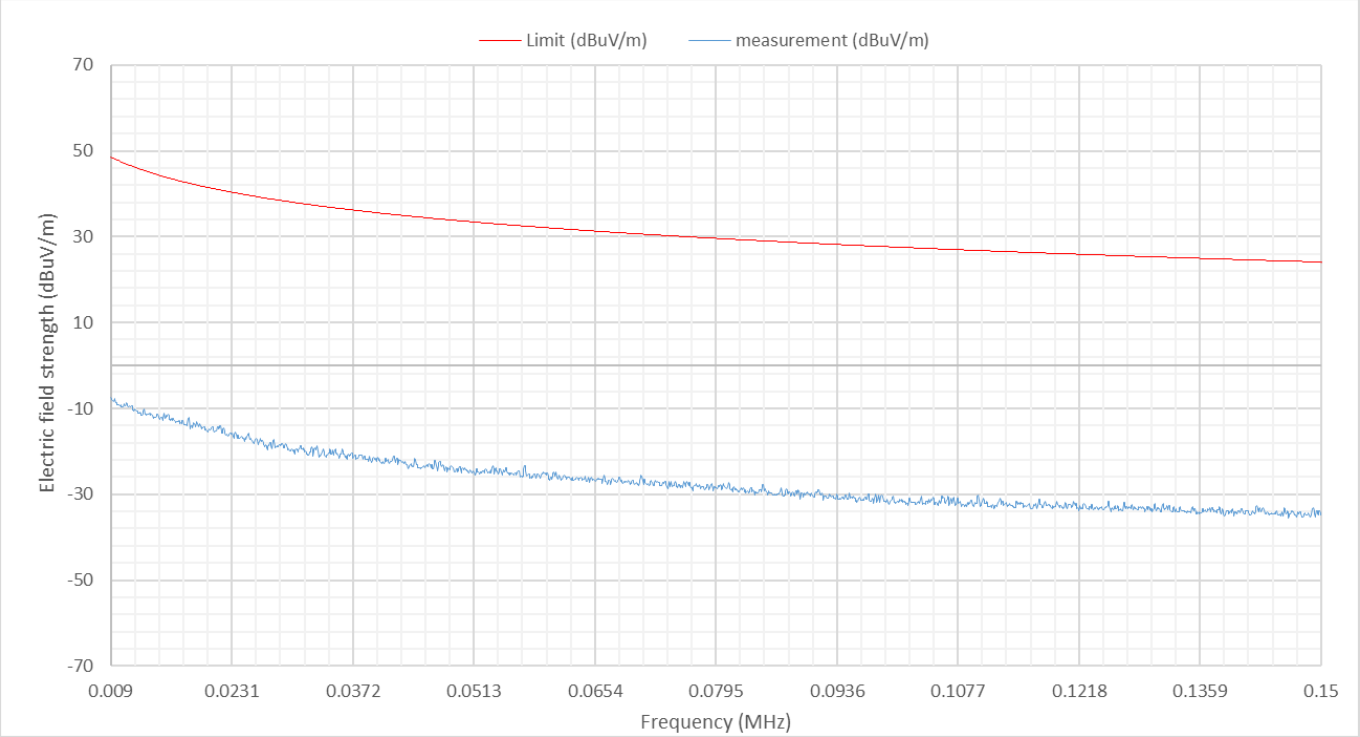


Figure 4 Magnetic field emissions Plot, 9kHz-150kHz, Perpendicular

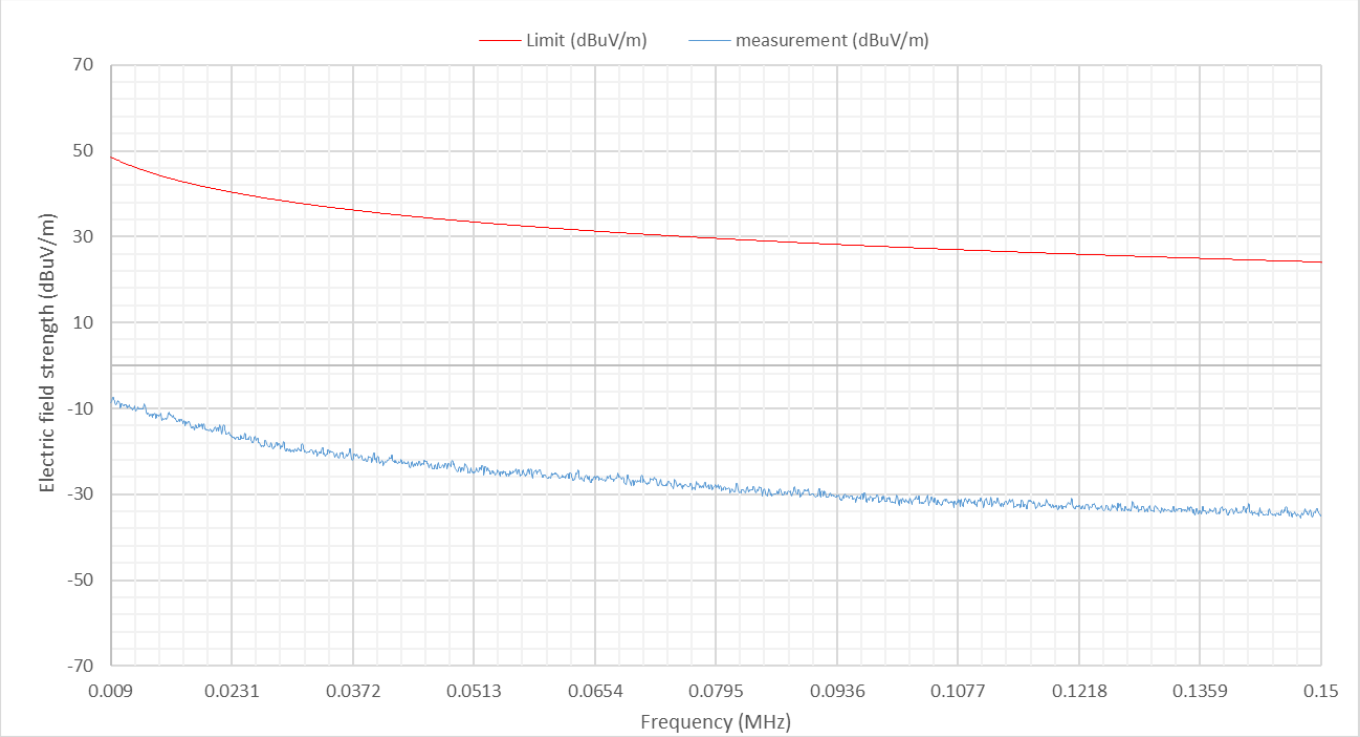


Figure 5 Magnetic field emissions Plot, 9kHz-150kHz, Ground Parallel

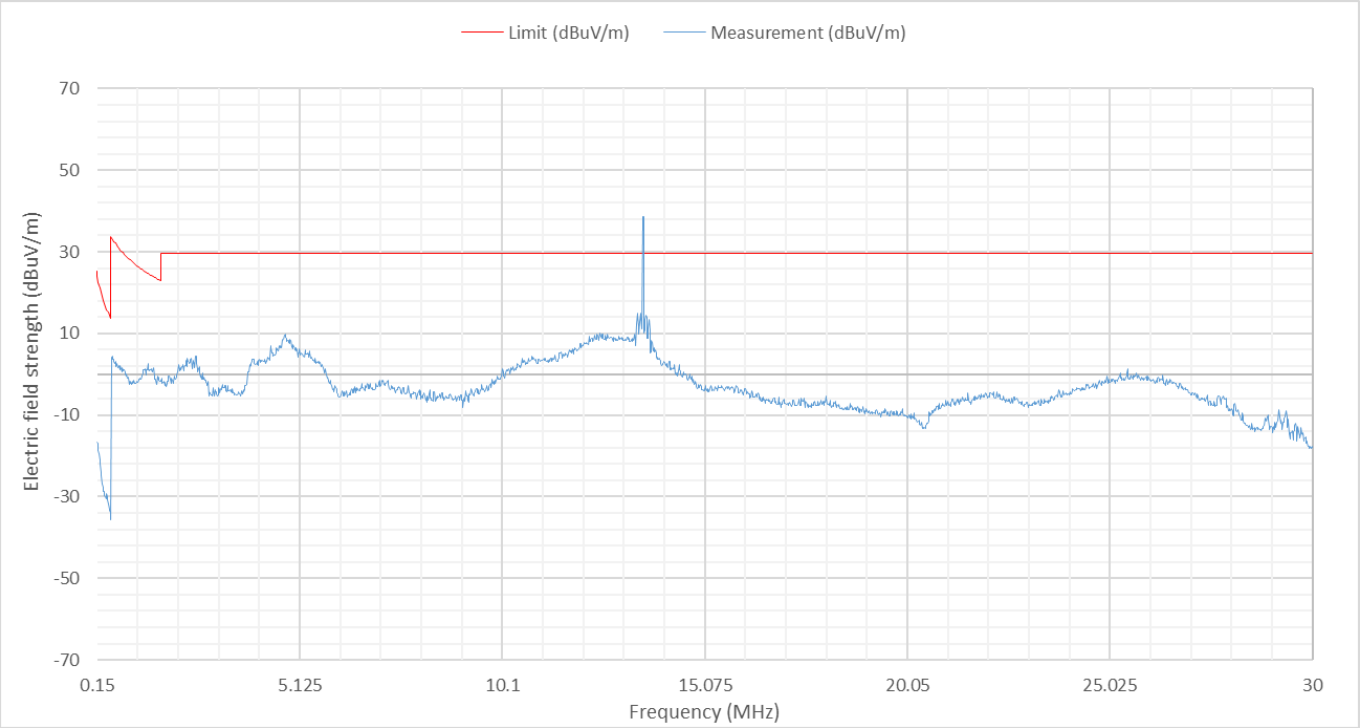


Figure 6 Magnetic field emissions Plot, 150kHz-30MHz, Parallel

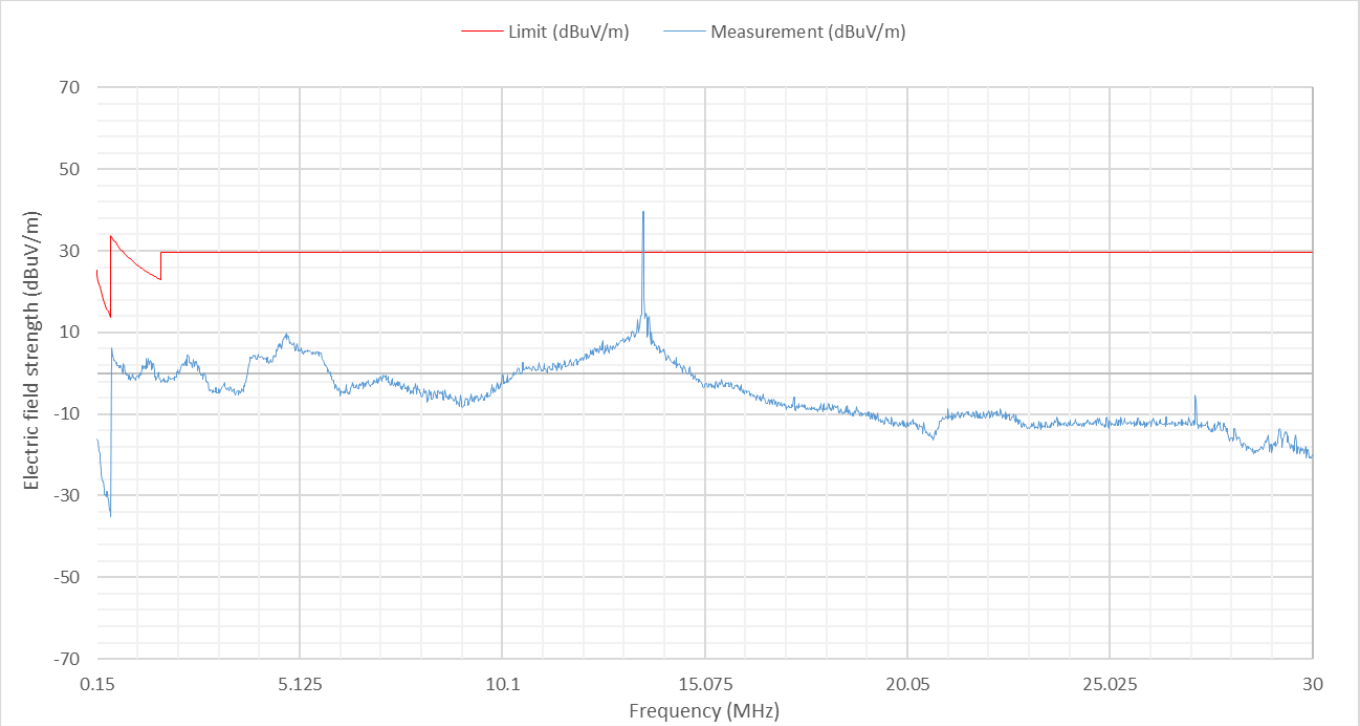


Figure 7 Magnetic field emissions Plot, 9kHz-150kHz, Perpendicular

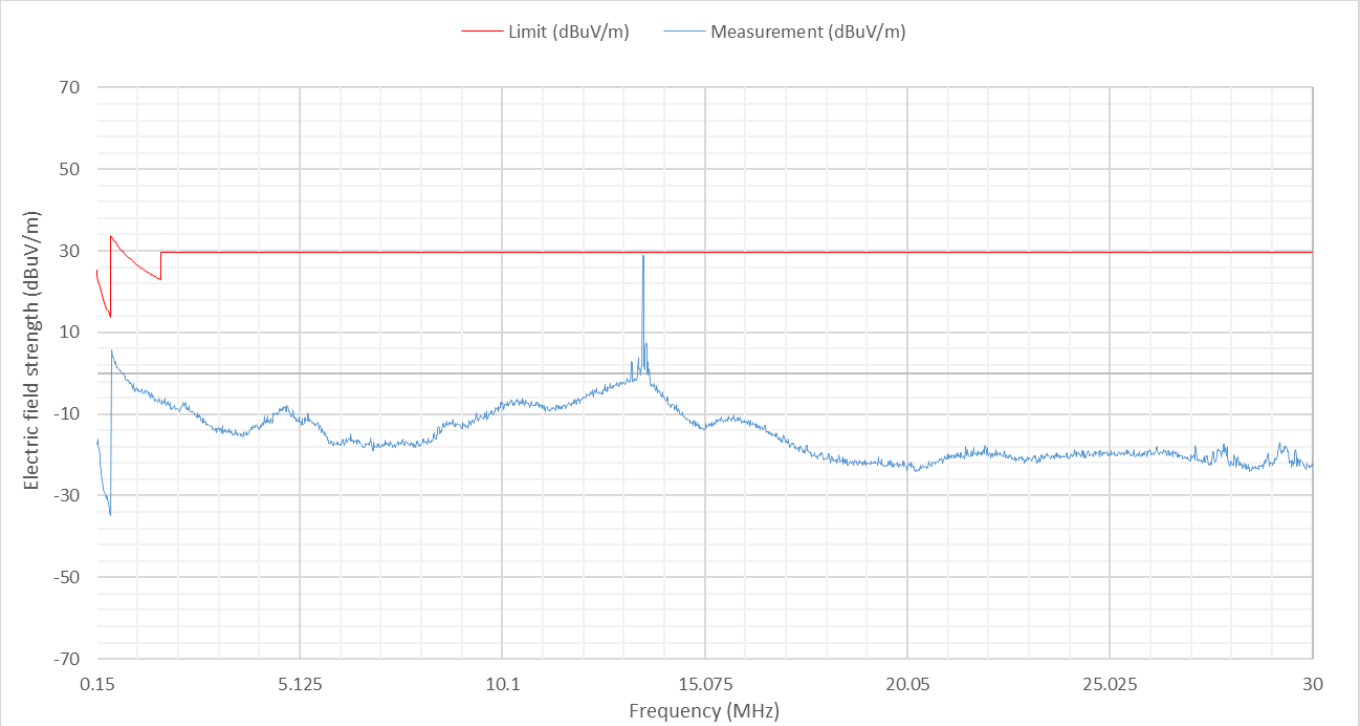


Figure 8 Magnetic field emissions Plot, 9kHz-150kHz, Ground Parallel

5.4 Radiated Emissions (30MHz to 1GHz)

5.4.1 Limits at 3m

Frequency (MHz)	Electric Field Strength Limit Limit (dBµV/m)
	Quasi Peak
30 - 88	40.0
88 -216	43.5
216 - 960	46.0
960- 1000	54.0

5.4.2 Receiver Settings

Receiver Parameters	Setting
Detector Function	Quasi Peak
Start Frequency	30MHz
Stop Frequency	1000MHz
Resolution Bandwidth	120kHz
Video Bandwidth	Auto

5.4.3 Emissions measurements

5.4.4 Date of Test

29th October 2025

5.4.5 Test Area

LAB 1 (Semi Anechoic Chamber)

5.4.6 Tested by

L Trickett

5.4.7 Test Setup

The EUT was configured in the SAC on an 80cm high table.

The measurement was performed with an antenna to EUT separation distance of 3m. The Quasi peak limits are therefore increased by 10dB (from the 10m values), to allow for the reduction in the measurement distance.

The results were maximised in orientation 0-360 degrees and height 1-4m.

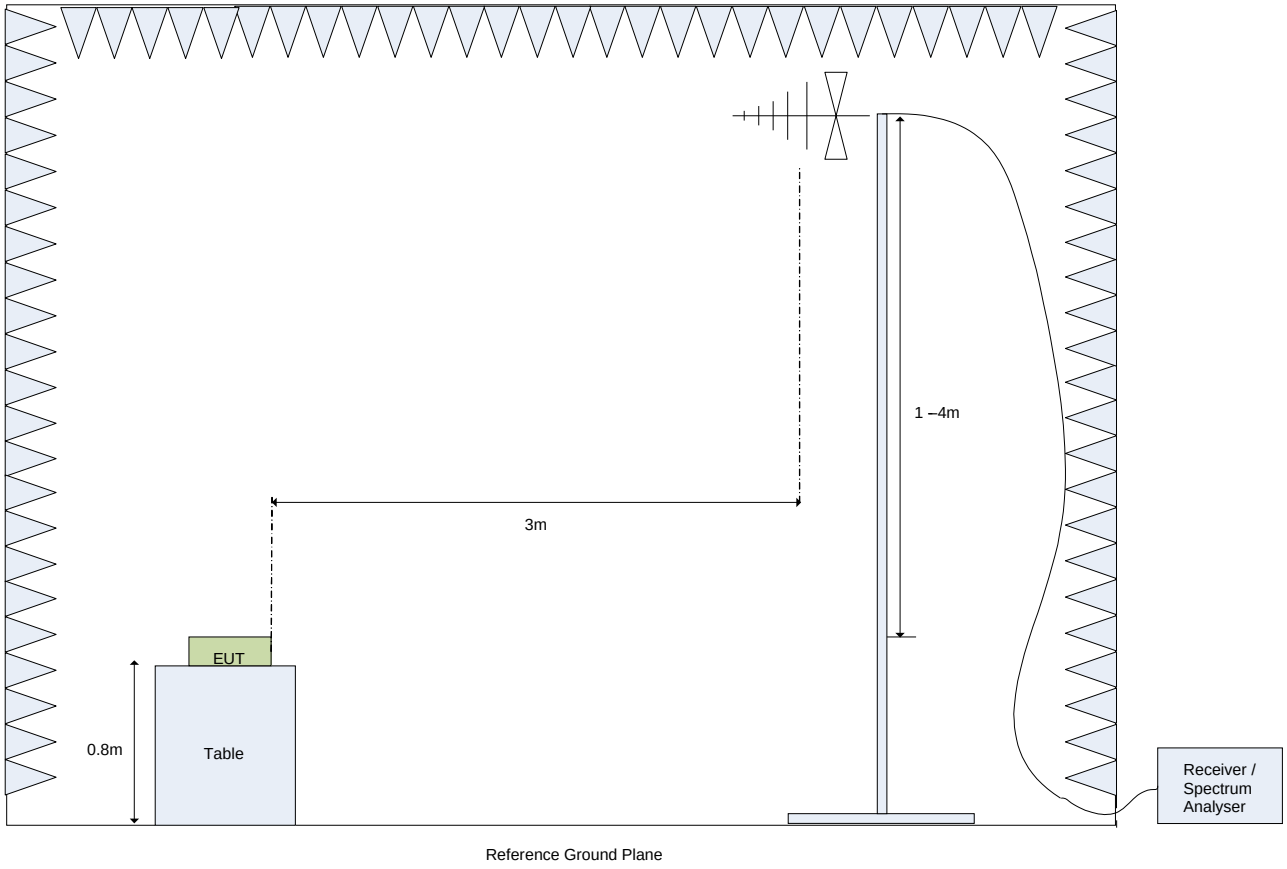


Figure 9: Test Setup for E-Field Measurements from 30MHz to 1GHz

Note 1 : With the EUT de-energized the ambient radio noise and signals met the 6dB peak detection requirement of ANSI C63.4-2014 Clause 5.1.3.

Note 2 : There were no significant environmental temperature changes during the test duration and hence it was not considered necessary to consider any variation in cable loss.

5.4.8 Electric field emissions, 30MHz to 1GHz

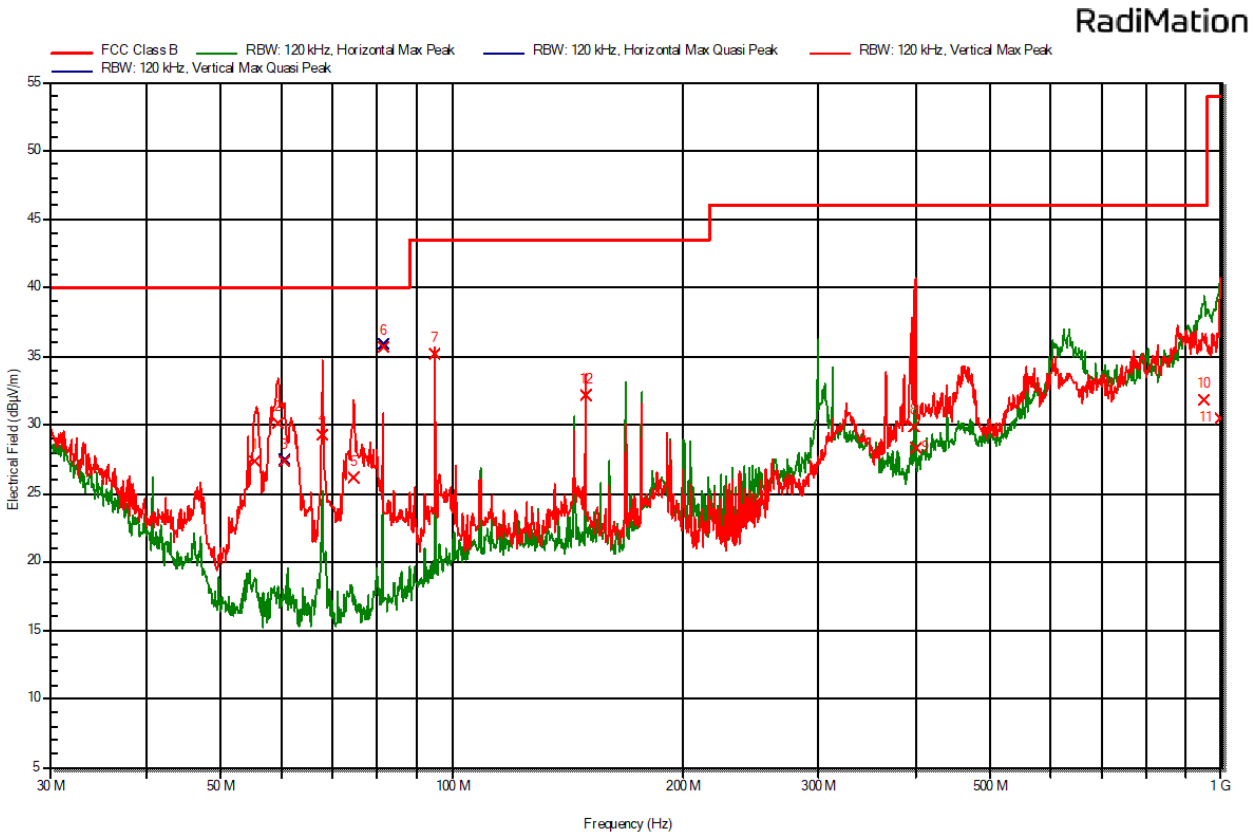


Figure 10: Electric field emissions Plot, 30MHz to 1GHz – Mode 1

Frequency MHz	Quasi-Peak dBµV/m	Quasi Peak Limit dBµV/m	Quasi-Peak Difference dB	Quasi-Peak Status	Angle degrees	Height m	Polarization
55.560	27.4	40.0	-12.6	Pass	290	1	Vertical
59.340	30.1	40.0	-9.9	Pass	300	1	Vertical
60.660	27.3	40.0	-12.7	Pass	75	1	Vertical
67.860	29.3	40.0	-10.7	Pass	175	1.7	Vertical
74.400	26.2	40.0	-13.8	Pass	165	1	Vertical
81.360	35.7	40.0	-4.3	Pass	315	1.3	Vertical
94.920	35.2	43.5	-8.3	Pass	45	1	Vertical
398.328	29.8	46.0	-16.2	Pass	205	1.3	Vertical
399.780	28.3	46.0	-17.7	Pass	195	1.2	Vertical
949.020	31.8	46.0	-14.2	Pass	50	1.6	Horizontal
995.580	30.5	54.0	-23.5	Pass	200	1.6	Vertical
149.160	32.1	43.5	-11.4	Pass	275	1	Vertical

Table 1: Electric Field Emissions Peaks, 30MHz to 1GHz – Mode 1

5.4.9 Quasi Peak correction factors

The quasi peak correction is shown in the above table. This correction figure consists of Antenna factor (AF); and Cable loss (CL).

Field strength (FS) is calculated as follows:

FS (dBµV/m) = Indicated Signal Level (dBµV) + AF (dB) + CL (dB)

5.4.10 Sample Data

The Quasi-Peak level at 55.56MHz

FS (dBµV/m) = 27.4dB = 14.5dBµV + 12.5dB + 0.4dB

5.5 Radiated Emissions (1GHz to 12.5GHz)

5.5.1 Limits

Frequency (GHz)	Electric Field Strength Limit (dBµV/m)
	Average
1-18	54.0

5.5.2 Receiver Settings

Receiver Parameters	Setting
Detector Function	Average
Start Frequency	1GHz
Stop Frequency	12.5GHz
Resolution Bandwidth	1MHz
Video Bandwidth	Auto

5.5.3 Emissions measurements

5.5.4 Date of Test

30th October 2025

5.5.5 Test Area

LAB 1 (SAC)

5.5.6 Tested by

L Trickett

5.5.7 Test Setup

The EUT was configured in the SAC on an 80cm high table.

Exploratory measurements on the EUT were carried out to identify suspect frequencies and worst case orientations, see Section 5.5.8.

The measurement was then performed with an antenna to EUT separation distance of 3m.

The antenna was kept in the “cone of radiation” from the EUT and pointed at the area both in azimuth and elevation using the tilt mechanism on the antenna mast.

The results were maximised in orientation 0-360 degrees and height 1-4m.

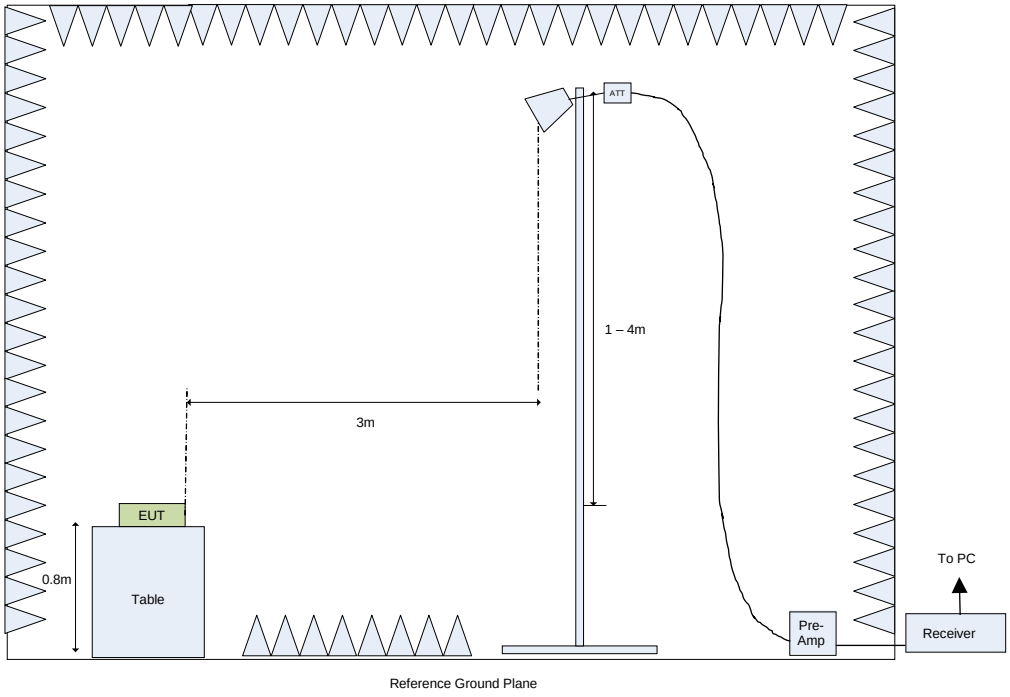


Figure 11: Test Setup for Final E-Field Measurements from 1GHz to 12.5GHz

Note 1: With the EUT de-energized the ambient radio noise and signals met the 6dB peak detection requirement of ANSI C63.4-2014 Clause 5.1.3.

Note 2: There were no significant environmental temperature changes during the test duration and hence it was not considered necessary to consider any variation in cable loss.

Note 3: A Micro-Tronics 2.4GHz band reject filter, was used to prevent harmonics being generated in the receive chain amplifier.

5.5.8 Exploratory Radiated Emission Maximization

During exploratory testing, suspect emissions from the EUT were identified both in terms of the frequency and directionality. This was achieved by manually positioning the antenna close to the EUT and also by scanning it over all sides of the EUT whilst observing a spectral display. The typical distance between the surface of the EUT and the scanning antenna was circa 30cm.

Frequency (GHz)	Mode of operation	EUT face	Emissions Angle (w.r.t. turntable)	Height (m)	Polarization
1.104	Mode 1	Rear	180	0.8	Horizontal
1.198	Mode 1	Rear	180	0.8	Horizontal
1.290	Mode 1	Rear	180	0.8	Horizontal
1.358	Mode 1	Rear	180	0.8	Horizontal
1.577	Mode 1	Rear	180	0.8	Horizontal
1.658	Mode 1	Rear	180	0.8	Horizontal
1.760	Mode 1	Rear	180	0.8	Horizontal
1.795	Mode 1	Rear	180	0.8	Horizontal
2.122	Mode 1	Rear	180	0.8	Horizontal
2.192	Mode 1	Rear	180	0.8	Horizontal
2.995	Mode 1	Rear	180	0.8	Horizontal
4.393	Mode 1	Rear	180	0.8	Horizontal
4.993	Mode 1	Rear	180	0.8	Horizontal
7.479	Mode 1	Rear	180	0.8	Horizontal
9.977	Mode 1	Rear	180	0.8	Horizontal

Table 2: Frequencies identified during Exploratory Radiated Emission maximization

Note 1: The front face of the EUT is deemed to be 0°, which is then turned in a clockwise direction through 360°.

Note 2: The method for the exploratory radiated emission maximisation is as detailed in Annex E of ANSI C63.4-2014 and ANSIC63.10-2020/Cor1-2023.

Note 3: As no emissions were detected above 9.977GHz, final measurements were limited to 10GHz.

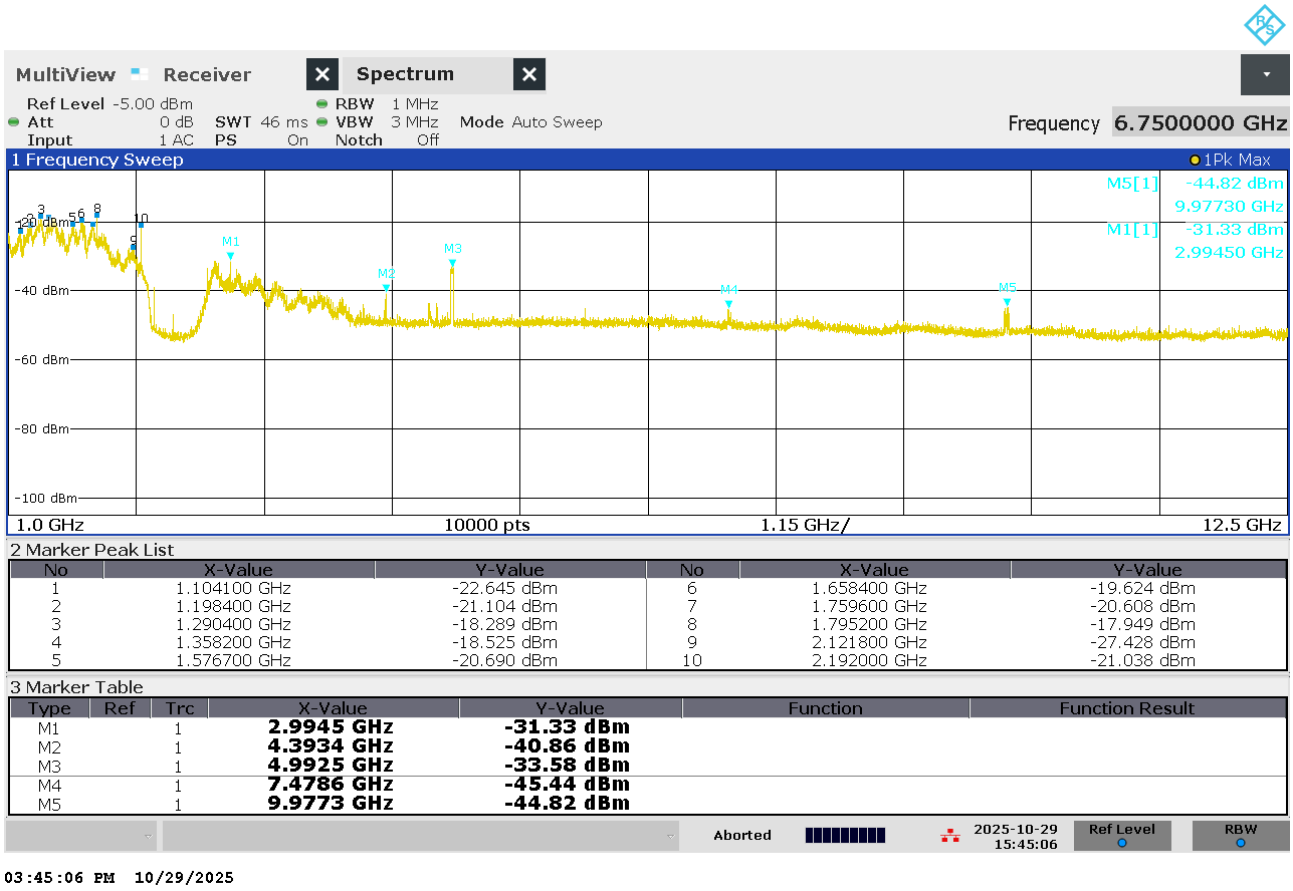


Figure 12: Exploratory radiated emissions Plot, 1GHz to 12.5GHz – Mode 1

5.5.9 Electric field emissions, 1GHz to 12.5GHz

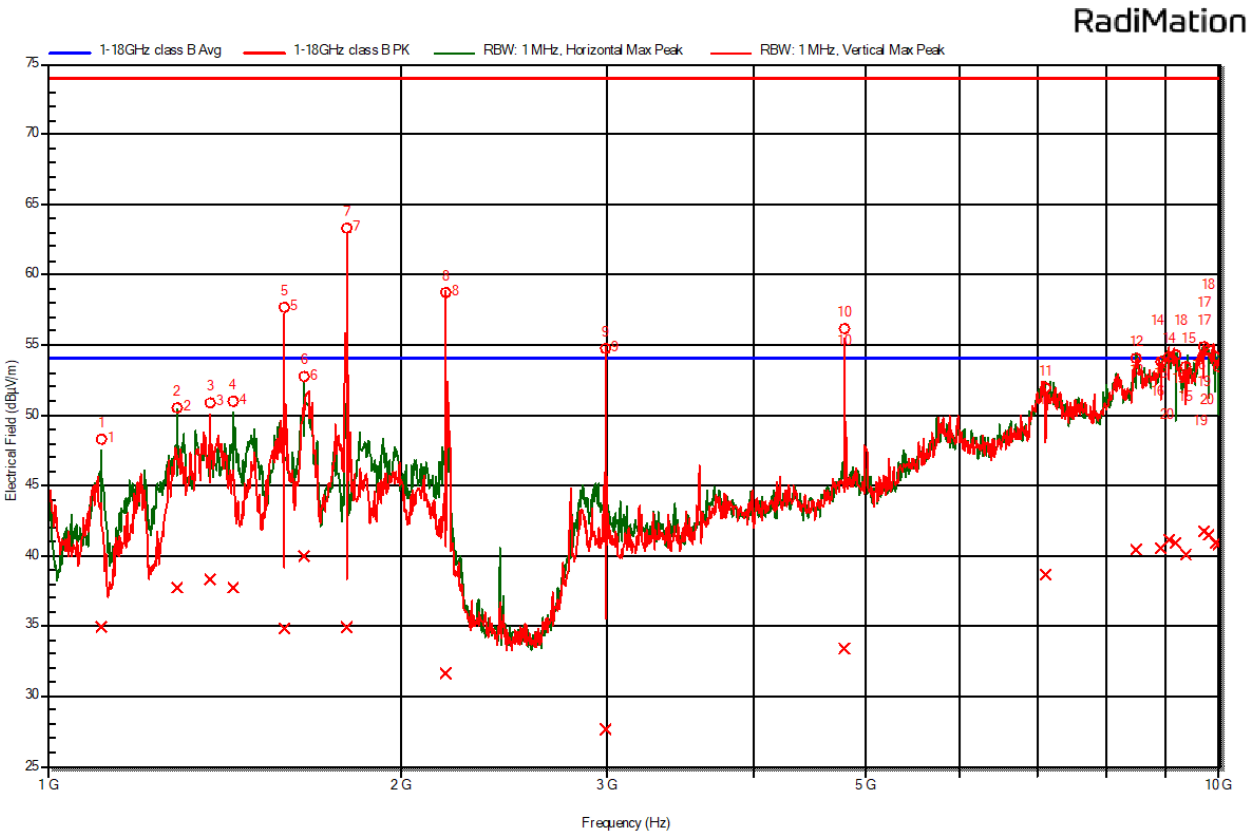


Figure 13: Electric field emissions Plot, 1GHz to 10GHz – Mode 1

Frequency GHz	Average dBµV/m	Average Limit dBµV/m	Average Difference dB	Average Status	Angle degrees	Height m	Polarization
1.112	34.9	54.0	-19.1	Pass	250	1.3	Horizontal
1.288	37.8	54.0	-16.2	Pass	230	1.9	Horizontal
1.375	38.4	54.0	-15.7	Pass	195	1.1	Vertical
1.438	37.8	54.0	-16.2	Pass	5	1.8	Horizontal
1.593	34.8	54.0	-19.2	Pass	240	1.3	Vertical
1.654	40.0	54.0	-14.0	Pass	220	1.0	Horizontal
1.799	35.0	54.0	-19.1	Pass	240	3.0	Vertical
2.188	31.6	54.0	-22.4	Pass	220	1.2	Vertical
2.997	27.7	54.0	-26.3	Pass	160	2.3	Vertical
4.783	33.4	54.0	-20.6	Pass	200	1.8	Vertical
7.117	38.7	54.0	-15.3	Pass	215	1.3	Vertical
8.482	40.5	54.0	-13.5	Pass	25	2.3	Horizontal
8.921	40.6	54.0	-13.4	Pass	155	3.7	Vertical
9.050	41.1	54.0	-12.9	Pass	150	2.4	Vertical
9.180	40.9	54.0	-13.1	Pass	195	1.4	Horizontal
9.360	40.1	54.0	-13.9	Pass	40	1.8	Vertical
9.684	41.7	54.0	-12.3	Pass	125	2.3	Vertical
9.796	41.5	54.0	-12.5	Pass	160	1.0	Horizontal
9.908	40.9	54.0	-13.1	Pass	255	4.0	Horizontal
9.990	40.8	54.0	-13.2	Pass	45	1.9	Horizontal

Table 3: Electric Field Emissions Peaks, 1GHz to 10GHz – Mode 1

5.5.10 Average correction factors

The total average corrections are shown in the above table. This correction figure consists of Preamplifier gain (PG), Antenna factor (AF); Attenuator loss (AL) and Cable loss (CL).

Field strength (FS) is calculated as follows:

FS (dBµV/m) = Indicated Signal Level (dBµV) - PG (dB) + AF (dB) + CL (dB)

5.5.11 Sample Data

The Average level at 1.112GHz

FS (dBµV/m) = 34.9dBµV/m = 63.2dBµV – 54.0dB + 23.2dB + 2.5dB

Section 6 AC Mains Conducted Emissions

6.1 Test Specification

Standard	ANSIC63.10-2020/Cor1-2023
Measurement Uncertainty	The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 % is +/- 3.45dB

6.2 Power Line Emission Limits

Frequency (MHz)	Limits (dBµV)	
	Quasi Peak	Average
0.15 – 0.5	66 – 56*	56 – 46*
0.5 – 5.0	56.0	46.0
5.0 - 30	60.0	50.0

Note: * The limit decreases linearly with the logarithm of the frequency in the range

6.3 Receiver Settings

Receiver Parameters	Setting
Detector Function	Quasi Peak and Average
Start Frequency	150kHz
Stop Frequency	30MHz
Resolution Bandwidth	10kHz
Video Bandwidth	Auto

6.4 Procedure and Test Software Version

Eurofins E&E UK test procedure	CEP19 Issue 10
Test software	RadiMation Version 2023.1.6

6.4.1 Date of Test

31st October 2025

6.4.2 Test Area

LAB 2

6.4.3 Tested by

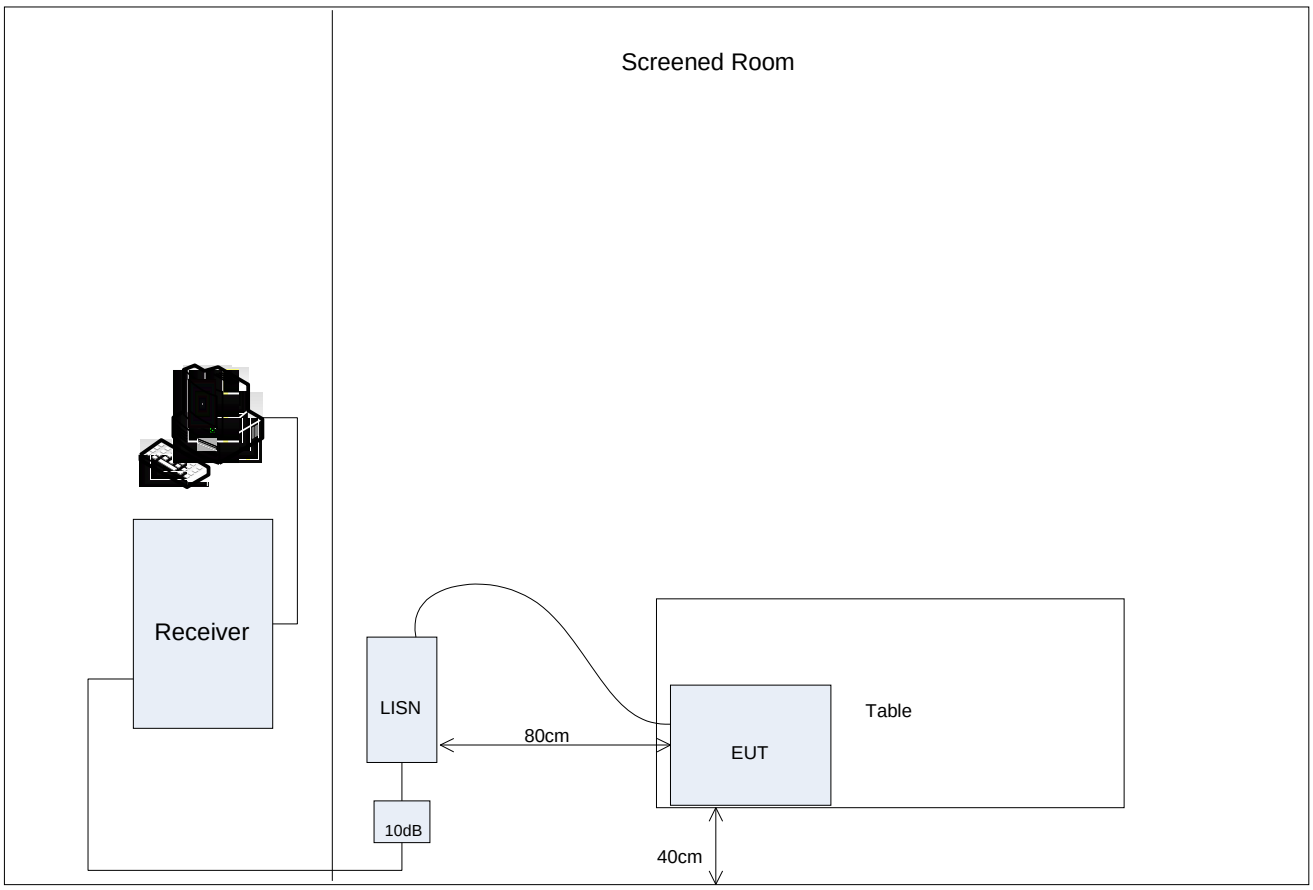
L Trickett

6.4.4 Test Setup

This test was applied to the EUT's Live and Neutral lines. The EUT was configured in the screened room on an 80cm high table was positioned 40cm from the room wall.

A calibrated mains extension lead was used to ensure a known impedance was presented to the EUT

The EUT was then powered from the mains supply via a Line Impedance Stabilisation Network (LISN).



6.5 Test Results

This section contains graphical and tabulated data. The following data is presented

Mode of Operation	Conductor	Result summary
RFID & BLE active	Live	Pass*
RFID & BLE active	Neutral	Pass*
RFID with dummy load & BLE active	Live	Pass*
RFID with dummy load & BLE active	Neutral	Pass*

*Note: FCC KDB publication number 174176 states:

"Devices Operating Below 30 MHz

For a device with a permanent or detachable antenna operating at or below 30 MHz, the FCC will accept measurements performed with a suitable dummy load in lieu of the antenna under the following conditions: (1) perform the AC power-line conducted tests with the antenna connected to determine compliance with Section 15.207 limits outside the transmitter's fundamental emission band; (2) retest with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network which simulates the antenna in the fundamental frequency band."

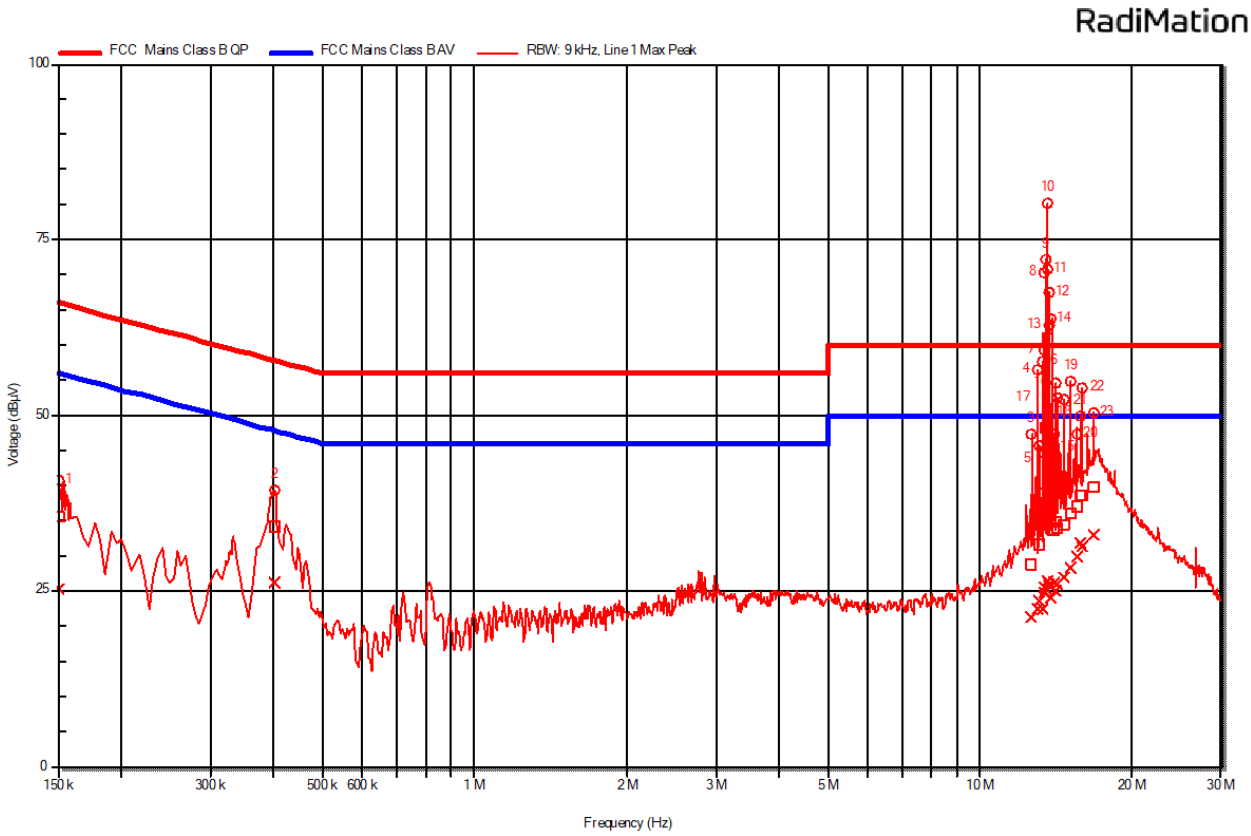


Figure 14: AC mains conducted emissions. RFID & BLE active – Live

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average Difference (dB)	Average Status	Quasi-Peak (dBµV)	Quasi-Peak Limit (dBµV)	Quasi-Peak Difference (dB)	Quasi-Peak Status
0.150	25.2	56.0	-30.8	Pass	35.5	66.0	-30.5	Pass
0.402	26.2	47.8	-21.6	Pass	34.2	57.8	-23.7	Pass
12.644	21.2	50.0	-28.8	Pass	28.8	60.0	-31.3	Pass
13.003	22.4	50.0	-27.6	Pass	32.9	60.0	-27.1	Pass
14.100	25.1	50.0	-24.9	Pass	34.8	60.0	-25.2	Pass
14.207	26.0	50.0	-24.0	Pass	33.9	60.0	-26.1	Pass
14.688	26.9	50.0	-23.1	Pass	34.4	60.0	-25.6	Pass
15.048	28.4	50.0	-21.6	Pass	36.1	60.0	-24.0	Pass
15.544	29.9	50.0	-20.1	Pass	37.1	60.0	-22.9	Pass
15.776	31.7	50.0	-18.3	Pass	38.7	60.0	-21.3	Pass
15.896	31.3	50.0	-18.7	Pass	38.5	60.0	-21.5	Pass
16.742	33.0	50.0	-17.0	Pass	39.7	60.0	-20.3	Pass

Table 4: Electric Field Emissions Peaks, 150kHz to 30MHz – RFID & BLE active - Live

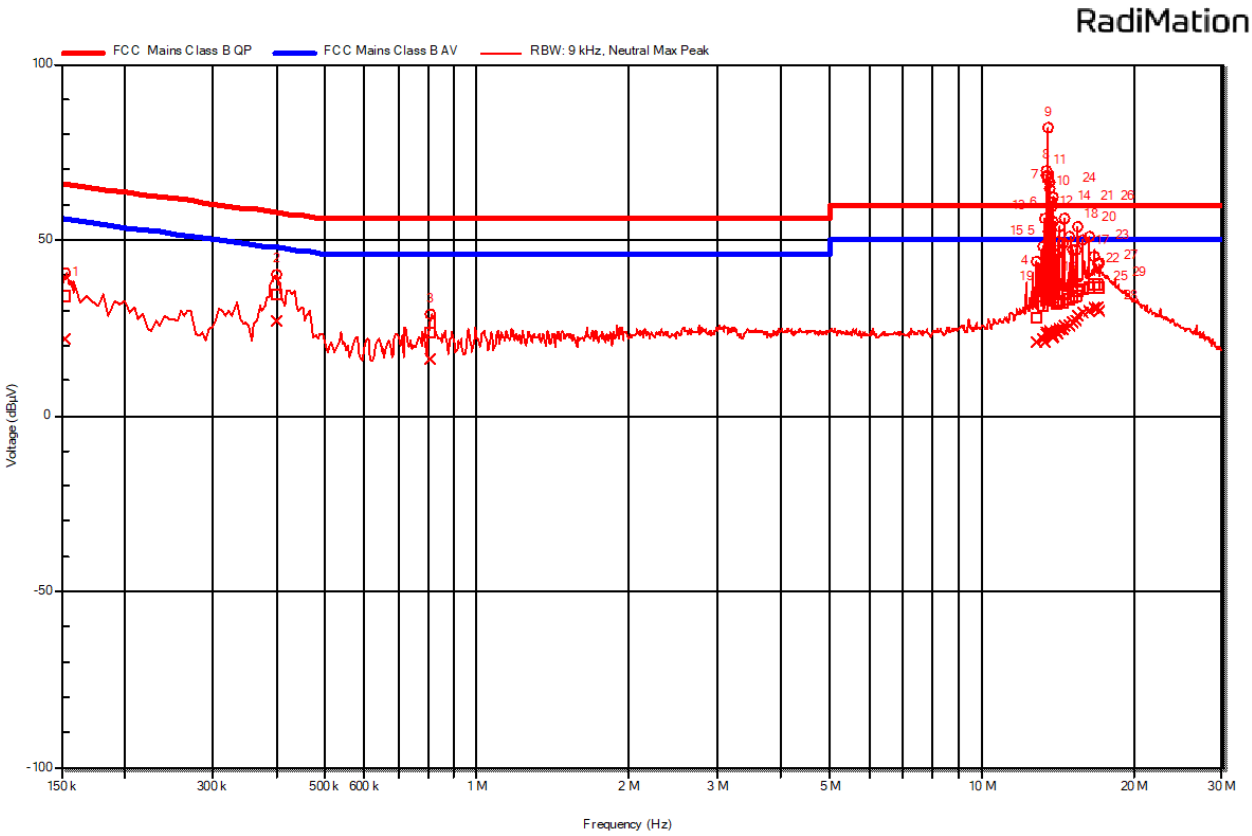


Figure 15: AC mains conducted emissions. – RFID & BLE active – Neutral

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average Difference (dB)	Average Status	Quasi-Peak (dBµV)	Quasi-Peak Limit (dBµV)	Quasi-Peak Difference (dB)	Quasi-Peak Status
0.153	21.9	55.8	-33.9	Pass	34.0	65.8	-31.8	Pass
0.401	27.2	47.8	-20.6	Pass	34.7	57.8	-23.1	Pass
0.811	16.2	46.0	-29.8	Pass	23.7	56.0	-32.3	Pass
12.827	21.0	50.0	-29.0	Pass	28.0	60.0	-32.0	Pass
14.035	24.4	50.0	-25.6	Pass	31.9	60.0	-28.1	Pass
14.152	23.0	50.0	-27.0	Pass	32.0	60.0	-28.0	Pass
14.264	24.5	50.0	-25.5	Pass	32.7	60.0	-27.3	Pass
14.505	24.7	50.0	-25.3	Pass	32.0	60.0	-28.0	Pass
14.622	25.5	50.0	-24.5	Pass	34.4	60.0	-25.6	Pass
14.984	25.7	50.0	-24.3	Pass	33.2	60.0	-26.8	Pass
15.117	26.7	50.0	-23.3	Pass	33.5	60.0	-26.5	Pass
15.355	27.1	50.0	-22.9	Pass	33.8	60.0	-26.2	Pass
15.468	28.2	50.0	-21.8	Pass	35.4	60.0	-24.6	Pass
15.830	29.1	50.0	-20.9	Pass	35.9	60.0	-24.1	Pass
16.314	30.0	50.0	-20.0	Pass	36.4	60.0	-23.6	Pass
16.679	30.9	50.0	-19.1	Pass	37.3	60.0	-22.7	Pass
17.039	30.5	50.0	-19.5	Pass	37.5	60.0	-22.5	Pass
17.160	30.0	50.0	-20.0	Pass	36.3	60.0	-23.7	Pass

Table 5: Electric Field Emissions Peaks, 150kHz to 30MHz – mode 1 - Neutral

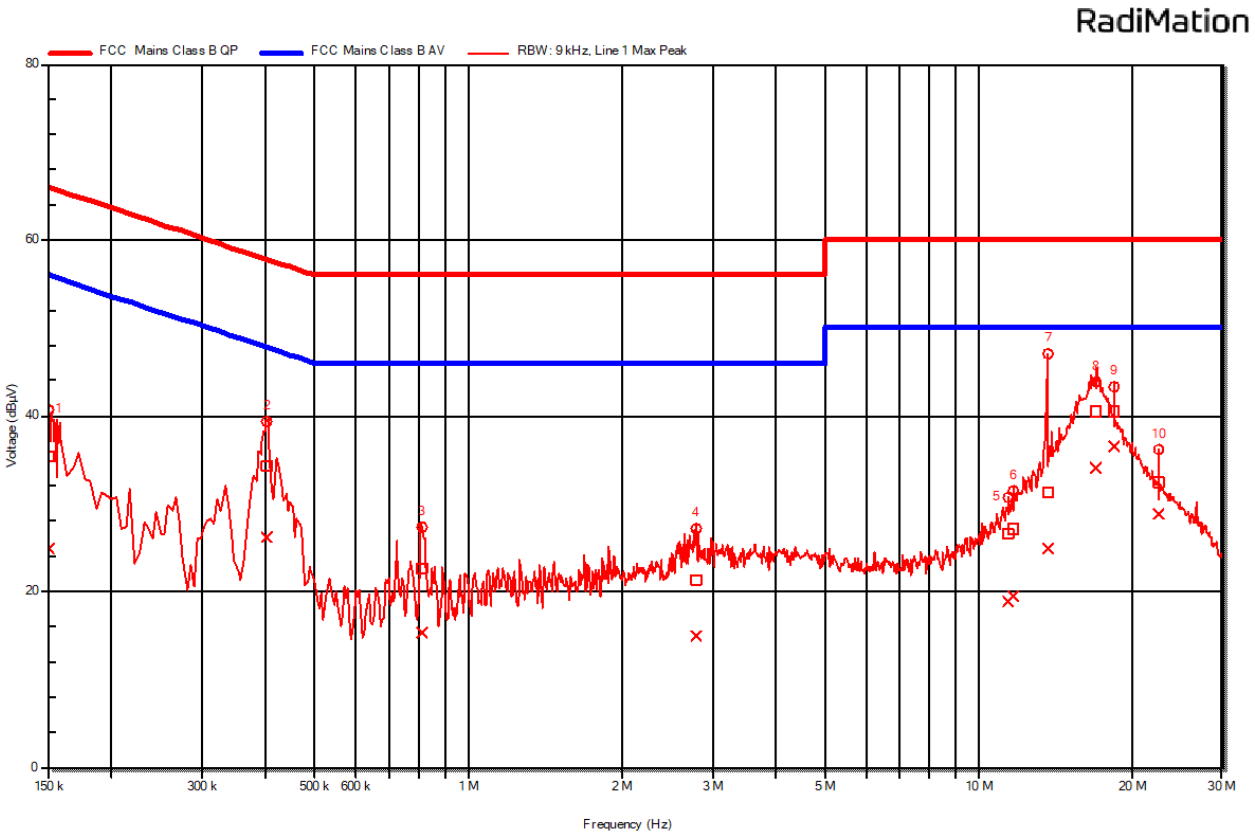


Figure 16: AC mains conducted emissions. – RFID with dummy load & BLE active – Live

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average Difference (dB)	Average Status	Quasi-Peak (dBµV)	Quasi-Peak Limit (dBµV)	Quasi-Peak Difference (dB)	Quasi-Peak Status
13.627	24.9	50.0	-25.2	Pass	31.3	60.0	-28.7	Pass

Table 6: Electric Field Emissions Peaks, 150kHz to 30MHz – RFID with dummy load & BLE active - Live

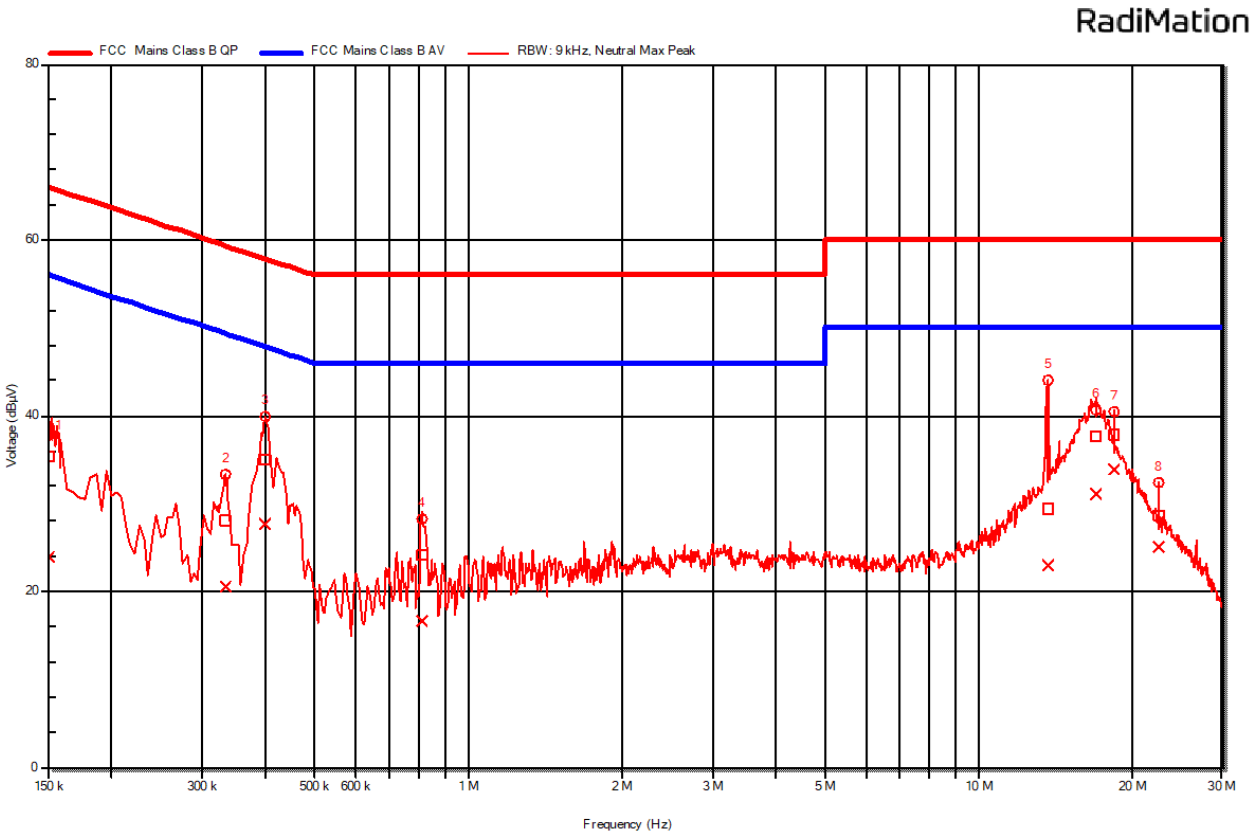


Figure 17: AC mains conducted emissions. – RFID with dummy load & BLE active – Neutral

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average Difference (dB)	Average Status	Quasi-Peak (dBµV)	Quasi-Peak Limit (dBµV)	Quasi-Peak Difference (dB)	Quasi-Peak Status
13.703	23.00	50.00	-27.02	Pass	29.4	60.0	-30.6	Pass

Table 7: Electric Field Emissions Peaks, 150kHz to 30MHz – RFID with dummy load & BLE active - Neutral

6.5.1 Example calculation

This correction factors required consists of LISN Insertion loss (IL) and Cable loss (CL)

The Actual Signal Level (ASL) is calculated as follows:

ASL (dBµV) = Indicated Signal Level (dBµV) + IL (dB) + CL (dB)

6.5.2 Sample Data

The Quasi-Peak level at 13.703MHz

ASL (dBµV) = 29.4dBµV = 19.6dBµV + 9.7dB + 0.1dB

Appendix A EUT Test Photos

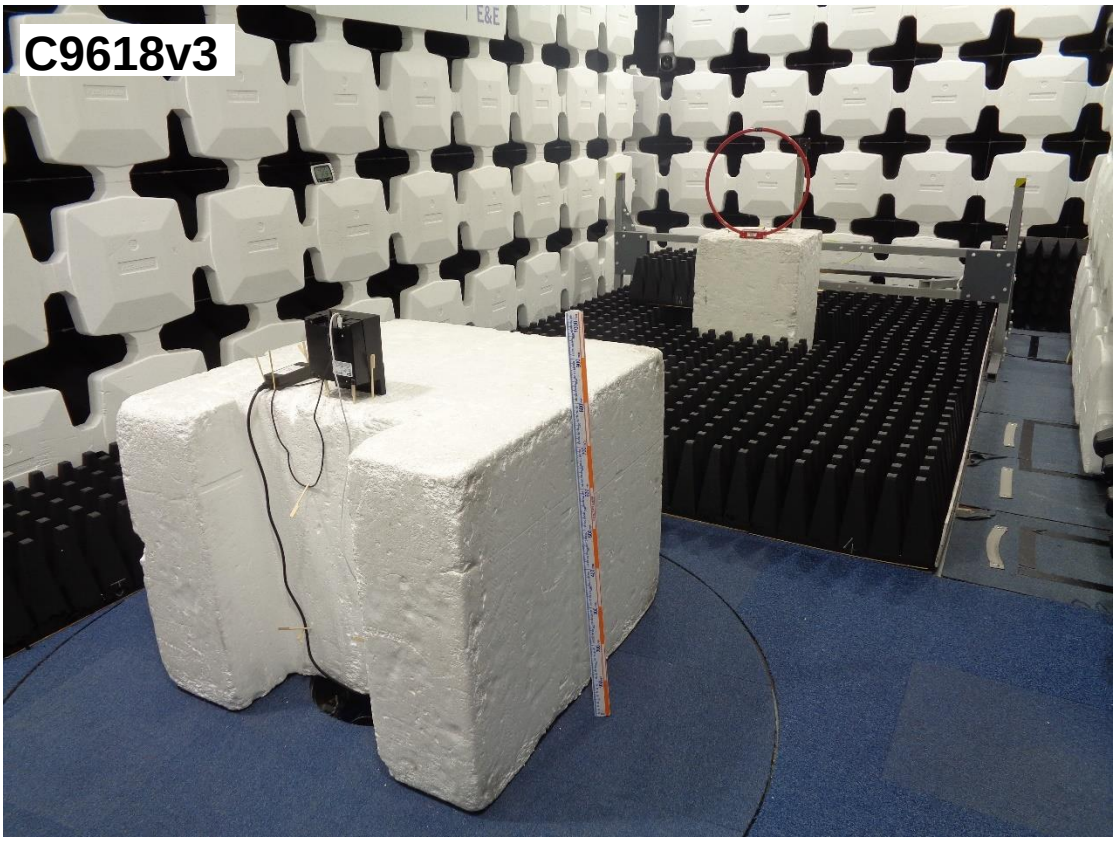


Photo 1: Radiated Emissions, 9kHz to 30MHz

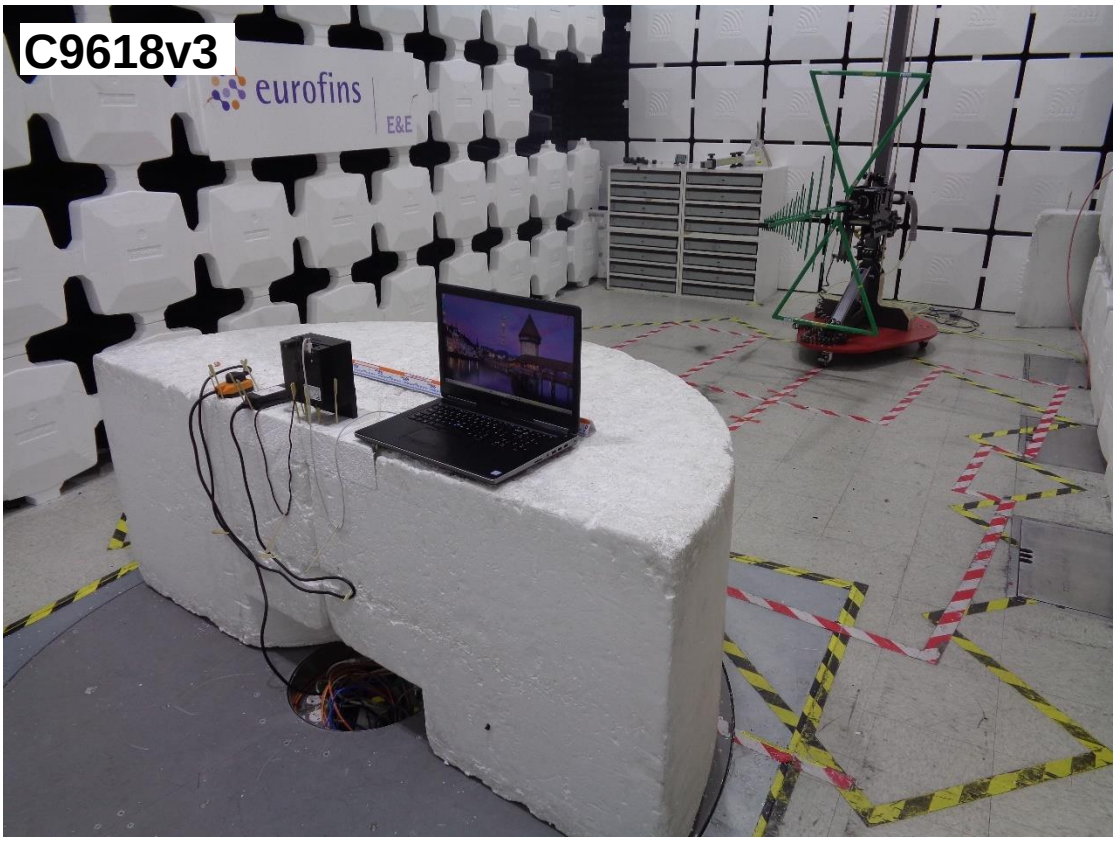


Photo 2: Radiated Emissions, 30MHz to 1GHz

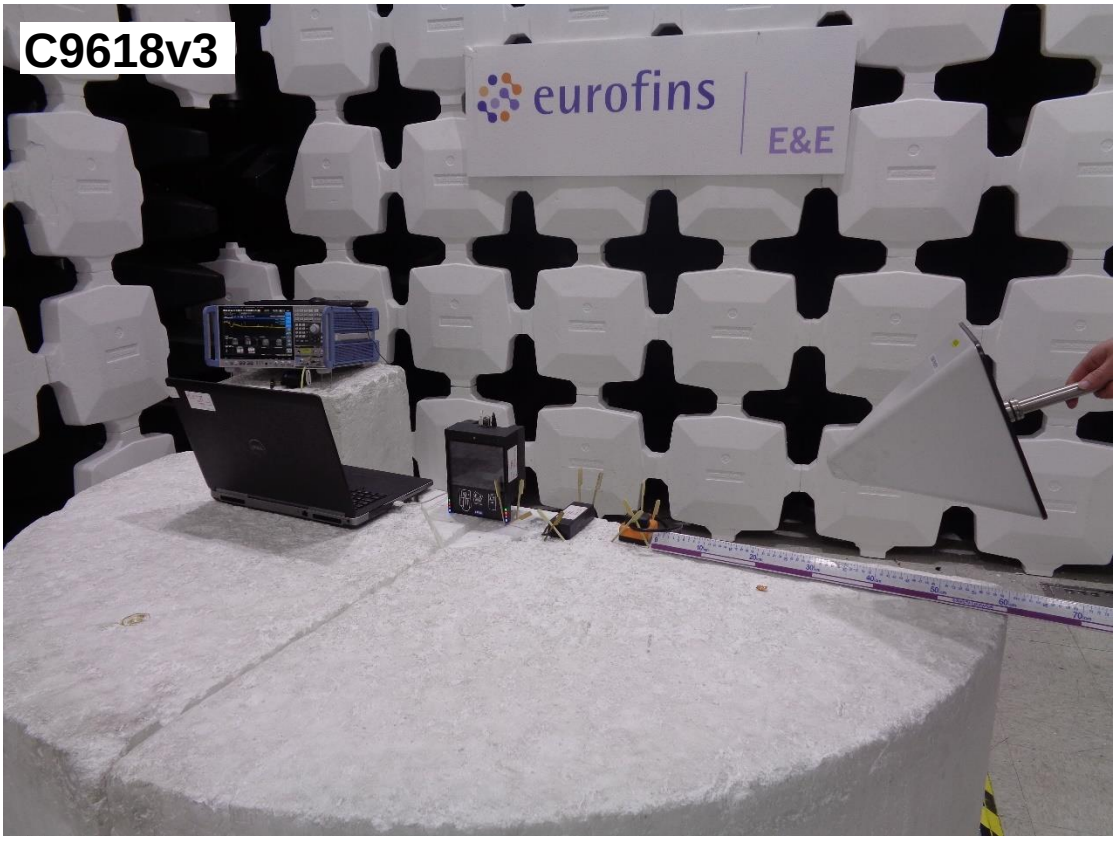


Photo 3: Exploratory Radiated Emissions Maximization, 1GHz to 12.5GHz

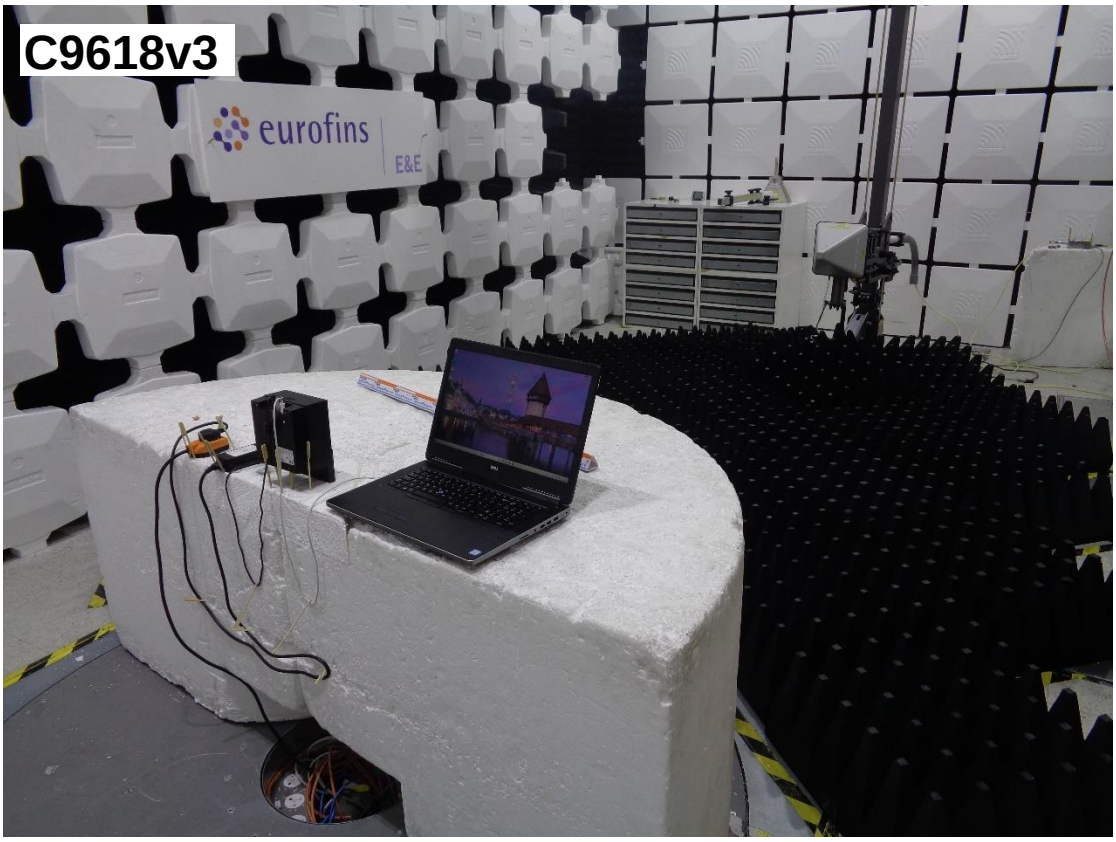


Photo 4: Radiated Emissions, 1GHz to 18GHz

Photo 5: AC Mains Conducted Emissions, 150kHz to 30MHz

Appendix B Test Equipment List

Radiated Emissions Equipment 9kHz to 30MHz

Item	Serial No.	Last Calibration Date	Calibration Interval
Lab 5 Fully Anechoic Room	C0578	10th July 2024	36 Months
R&S ESW 44 EMI Test Receiver	C0658	6th May 2025	12 Months
ETS Lindgren 6512 Passive Loop Antenna 9kHz – 30MHz	C0753	21st August 2023	36 Months
RF Cable 18	20748.04.14.002	6th October 2025	12 Months
RF Cable HF10	HF10	7th October 2025	12 Months
Kikasui PCR2000M AC Power Supply	C0198	-	-

Radiated Emissions Equipment 30MHz to 1GHz

Item	Serial No.	Last Calibration Date	Calibration Interval
Laboratory 1 Semi-Anechoic Chamber	C0471	6th December 2022	36 Months
ETS Lindgren 2017B Mast (1 – 4m) with tilting mechanism	--	N/A	N/A
R&S ESW44 EMI Receiver	C0751	14th October 2025	12 Months
Teseq CBL6112D Bilog Antenna	C0506	22nd August 2024	36 Months
RF Cable HF32	19149.01.09.003	7th October 2025	12 Months
RF Cable HF52	22293.01.30.002	9th October 2025	12 Months
RF Cable HF47	E44808	9th October 2025	12 Months
Kikasui PCR2000M AC Power Supply	C0198	-	-

AC Mains conducted emissions equipment

Item	Serial No.	Last Calibration Date	Calibration Interval
Rohde & Schwarz ESR7 Test receiver	C0502	4th March 2025	12 Months
RF Cable J7A	J7A	7th October 2025	12 Months
RF Cable J9A	J9A	7th October 2025	12 Months
RF Cable LF3	LF3	7th October 2025	12 Months
Rohde & Schwarz ENV216 LISN	C0592	11th November 2024	12 Months
Kikusui PCR2000M power supply	C0198	-	-

----------END OF REPORT----------