

**Test Report for the
FCC and ISSED Testing of an
HID ATOM 3K
to FCC Rules 47CFR 15.225 and
RSS-210
for
Access Ltd**

Test Report number: C16161TR4

Project number: C9618v3

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Issue	Description						Issue by	Date
4	Copy 1		Copy 2		PDF	√	JB	6 th January 2026

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The results contained in this report are only applicable to the apparatus tested.

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Test Report Change History

Issue	Date	Modification Details
1	4 th November 2025	First Issue
2	28 th November 2025	FCC ID added
3	18 th December 2025	Header updated
4	6 th January 2026	EUT dimensions amended
5		
6		
7		
8		
9		
10		

Section 1 Test Location

All testing was performed at;

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

1.1 UKAS Accreditation

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

Eurofins E&E UK 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.

Eurofins E&E UK Castleford Laboratory is recognised by ISED for certification testing.

ISED Assigned Code: 22959

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

Section 3 Equipment Details

3.1 Equipment Under Test (EUT)

Date received:	22 nd October 2025		
EUT name:	ATOM 3K		
PMN:	ATOM 3K		
HVIN:	00A		
FVIN:	Access-IS-Reader_CX3_3.3.387.10		
FCC ID:	ZERATOM3K		
Serial nos:	1010202503 & 1010202510		
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.		
Antenna:	Integral Antenna		
Transmission:	13.56MHz RFID		
Modulation schemes:	ASK		
Operating frequency band:	13.11 to 14.01MHz		
No of units tested:	Two		
EUT power:	Nominal 12Vdc via customer supplied 120Vac PSU		
Highest internal frequency:	13.56MHz		
Size of EUT (mm):	Length: 186	Width: 143	Height: 93
Mode/s of operation:	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.		
Test software:	None		
Modifications incorporated during testing:	None		

Ports and Cables	Cable Length	Screened/ unscreened	Connected to
DC Power	1.8m	Unscreened	Representative 12Vdc PSU
USB	1.0m	Screened	Dell Laptop

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 Photographs

Photographs are supplied separately.

3.3 Configuration of EUT

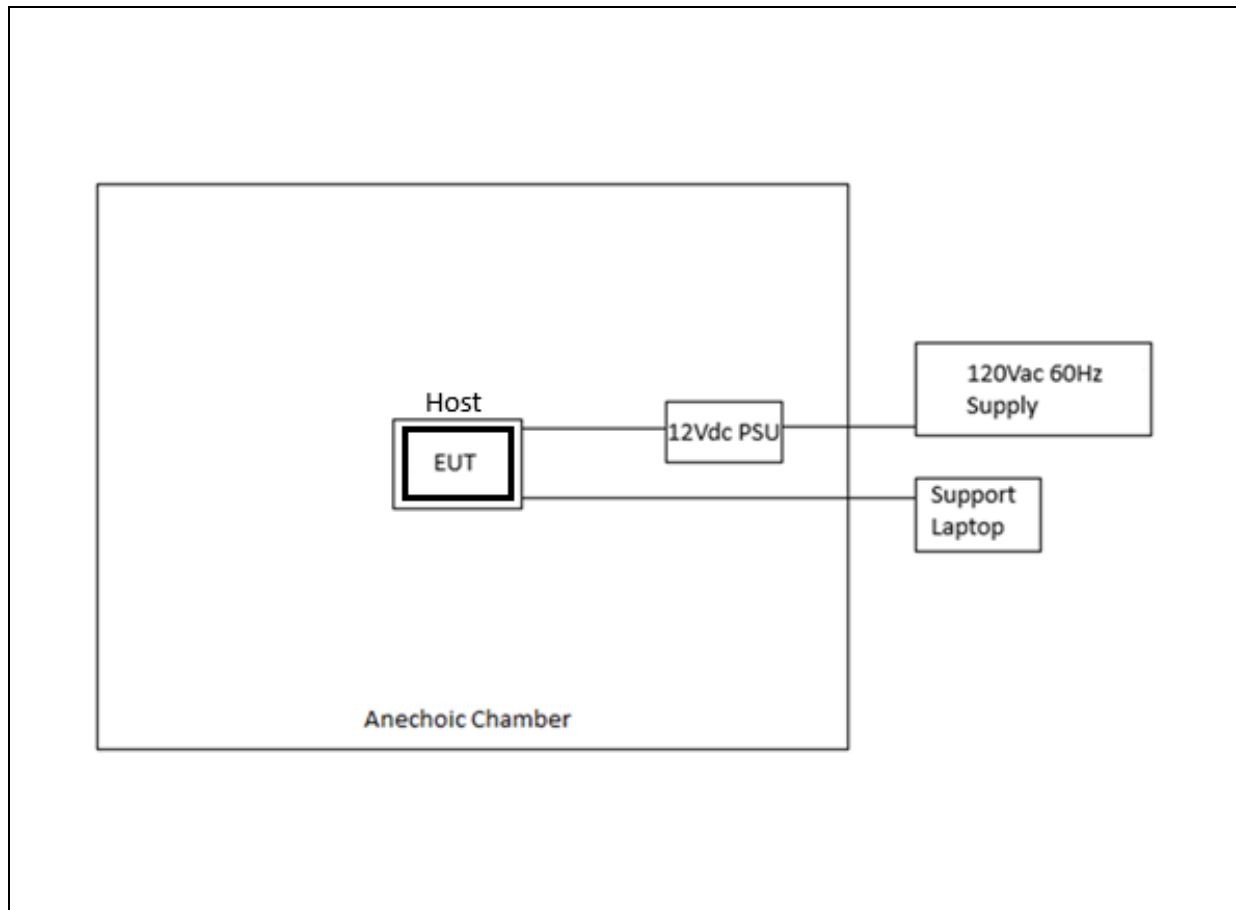


Figure 1 Diagram of EUT.

3.4 EUT Monitoring/Auxiliary Equipment

Equipment name	Type no.	Serial no
Dell Laptop	Precision 7720	11906711606

3.5 Monitoring Software

None.

Section 4 Test Specifications

The tests were performed in accordance with Eurofins E&E UK Quotation C9608v3

For USA:

Test Standard	Relevant Section	Class/limit	Status
CFR 47 Part 15C & ANSIC63.10-2020/Cor1-2023	Section 15.225(a) Field strength within the band 13.553MHz-13.567MHz	As specified in Section 15.225(a)	Pass
	Section 15.225(a) Field strength within the bands 13.410MHz-13.552MHz and 13.567MHz to 13.710MHz	As specified in Section 15.225(b)	Pass
	15.225(b) Field strength within the bands 13.110MHz-13.410MHz and 13.710MHz to 14.010MHz	As specified in Section 15.225(c)	Pass
	Section 15.225(d) Field Strength outside the band 13.110MHz-14.010MHz	As specified in Section 15.209	Pass
	Section 15.225(e) Frequency tolerance of the carrier signal	As specified in Section 15.225(e)	Pass
	Section 15.31(e) Field strength variation with operating voltage	As specified in Section 15.31(e)	Pass
	15.215 (c) 20dB bandwidth	As specified in Section 15.215 (c)	Pass
	Section 15.207 Mains conducted emissions	As specified in Section 15.207(a) Test not applicable	Pass

Note 1 :All testing was carried out at a test distance of 3m and the limits adjusted accordingly.

Note 2 : Applies to carrier current systems see reference 47CFR Part 15Clause 15.109(e).

For Canada:

Regulation / Test Standard	RSS-210 Licence-Exempt Radio Apparatus: Category I Equipment Issue 11 June 2024 And, RSS-Gen — General Requirements for Compliance of Radio Apparatus Issue 5 April 2018 +A1 March 2019 +A2 February 2021
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Requirement	ISED Regulation	Comments	Results Summary
Radiated Emissions Magnetic Field Measurements (Expressed as electric field) (9kHz to 30MHz) And Electric Field Measurements (30MHz – 1000MHz)	ISED RSS-210 § B.6 Referencing ISED RSS-Gen	Applies	Pass
Frequency tolerance of the carrier signal	ISED RSS-210 § B.6 (b)	Applies	Pass
AC Power-line conducted emissions	ISED RSS-Gen 8.8	Applies	Pass

4.1 Knowledge Database References

The following KDBs were referenced during the testing.

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

<https://apps.fcc.gov/kdb>

4.1.1 Conducted Emissions

Publication Number	Keyword	Publication Date
174176	Section 15.107, 15.207,18.307, C63.4, C63.10, Suitable Dummy Load, AC Power Line Conducted Measurement	03/06/2015

4.1.2 Radiated Emissions (9kHz to 30MHz)

Publication Number	Keyword	Publication Date
937606	Test Site Requirements for Part 15 and 18 Devices Operating Below 30 MHz	10/10/2014
460108	Radiated emission measurements below 30 MHz	06/15/2015

4.1.3 Radiated Emissions (30MHz to 1000MHz)

913591	Measurement of radiated emissions at the band-edge for a Part 15 RF Device	04/05/2017
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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

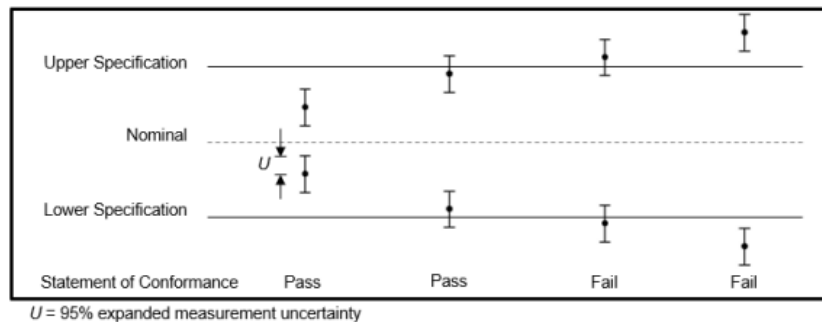
Where a result is considered marginal in respect of its proximity to the limit line, for example, the customer would be made aware of situation so that they can make an informed decision on how to proceed.

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, $AL = TL$



Section 5 Radiated Emission Results

5.1 Test Specification

FCC Rule Part	47CFR 15.225 Operation in the band 13.110-14.010MHz
RSS Rule Part	ISED RSS-210 § B.6 Referencing ISED RSS-Gen
Standard	ANSI C63.10-2020/Cor1-2023
Measurement Uncertainty Radiated tests	The reported uncertainty of measurement $y \pm U$, 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

5.2 Procedure and Test Software Version

Radiated tests:- 47CFR15.205 and 47CFR15.209

Eurofins E&E UK Test procedure (9kHz to 30MHz)	CEP22 Issue 9
Eurofins E&E UK test procedure (30MHz to 1GHz)	CEP23 Issue 12
Test software	RadiMation Version 2023.1.6

5.3 Magnetic Field 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 = $40\log(\text{test distance} / \text{specific distance})$.

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 Date of Test

23rd & 27th October 2025

5.3.4 Test Area

LAB 5 (FAR)

5.3.5 Tested by

L Trickett

5.3.6 SAC 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, perpendicular to the EUT and then parallel to the ground plane.

The results are maximised in orientation 0-360 degrees.

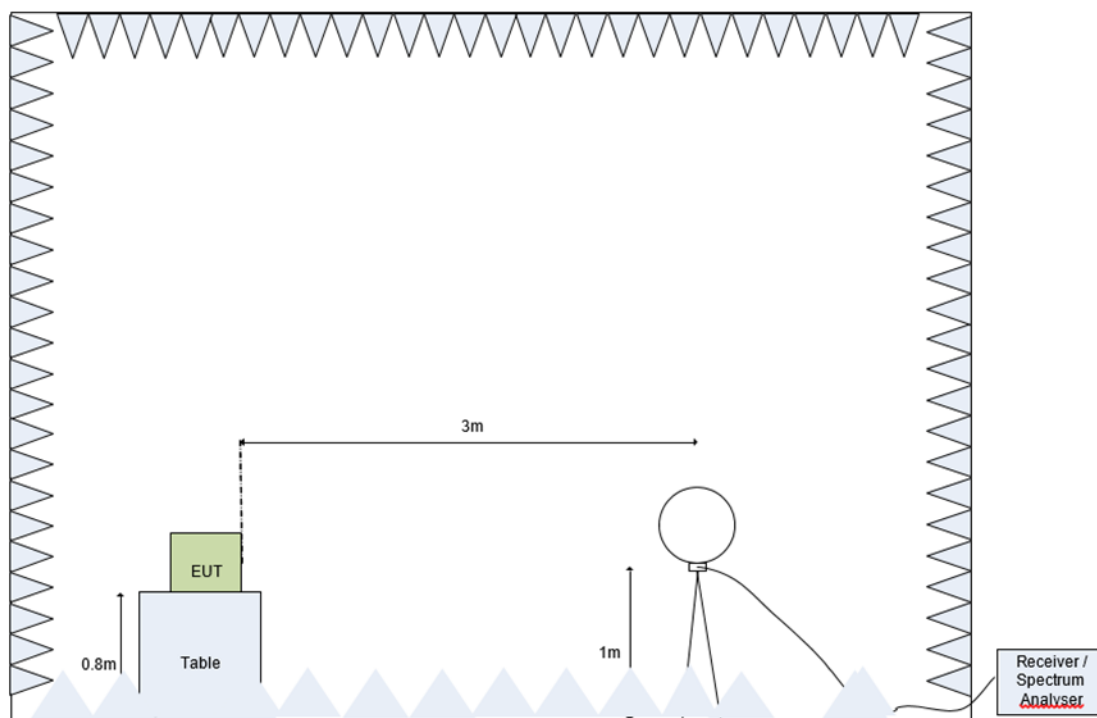


Figure 2: Test Setup for H-Field Measurements from 9kHz to 30MHz

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.

5.3.7 Magnetic field emissions

The field strength is split into sub-bands as defined below in Section 47CFR 15.225:

- a) Section 15.225(a) Field strength within the band 13.553MHz-13.567MHz

Limit: $15848\mu\text{V/m}$ at 30m = $84\text{dB}\mu\text{V/m}$ at 30m

- b) Section 15.225(b) Field strength within the bands 13.410MHz-13.552MHz and 13.567MHz to 13.710MHz

Limit: $3348\mu\text{V/m}$ at 30m = $50.5\text{dB}\mu\text{V/m}$ at 3m

- c) Section 15.225(c) Field strength within the bands 13.110MHz-13.410MHz and 13.710MHz to 14.010MHz

Limit: $106\mu\text{V/m}$ at 30m = $40.5\text{dB}\mu\text{V/m}$ at 3m

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

$$\text{Correction} = 40 \cdot \log(3/300) = -80\text{dB}$$

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

$$\text{Correction} = 40 \cdot \log(3/30) = -40\text{dB}$$

5.3.8 Magnetic field emissions,9kHz to 30MHz and outside the band 13.110MHz to 14.010MHz

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

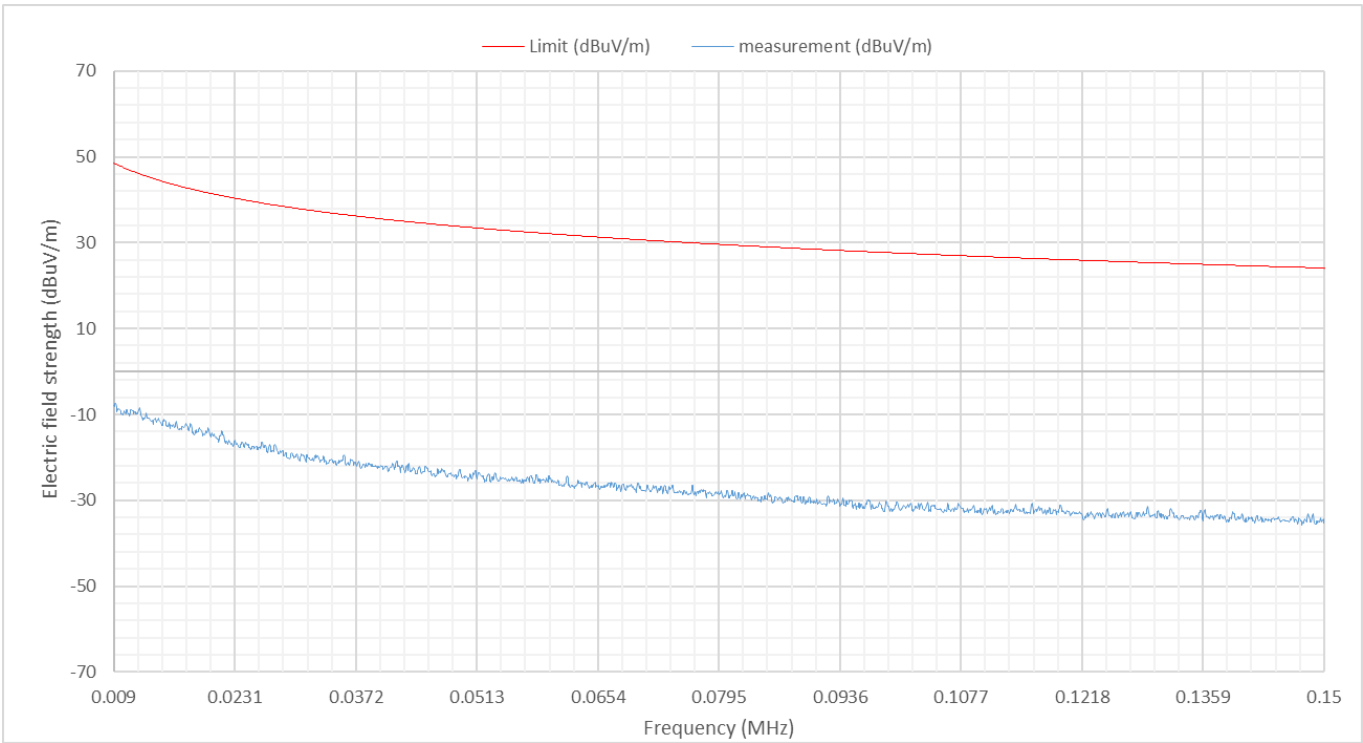


Figure 3 Magnetic field emissions Plot, 9kHz to 150kHz. Parallel to EUT

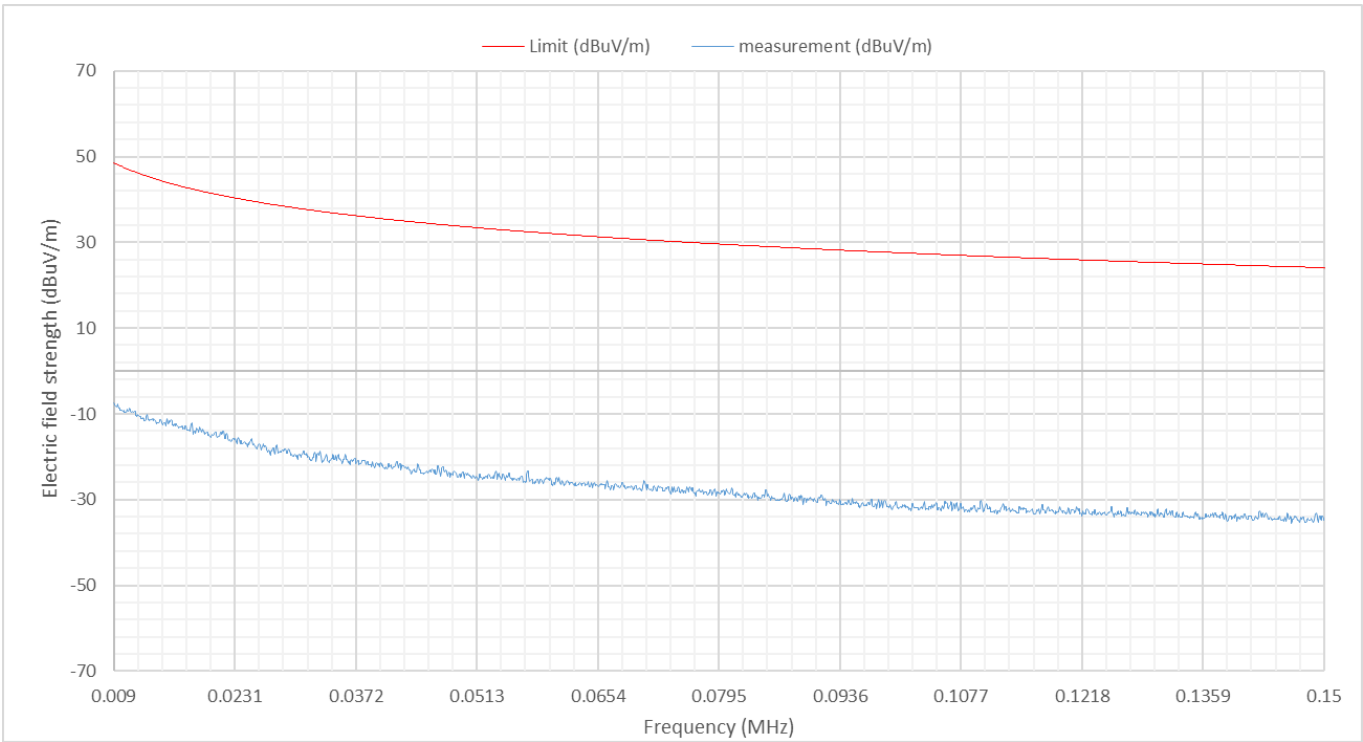


Figure 4 Magnetic field emissions Plot, 9kHz to 150kHz. Perpendicular to EUT

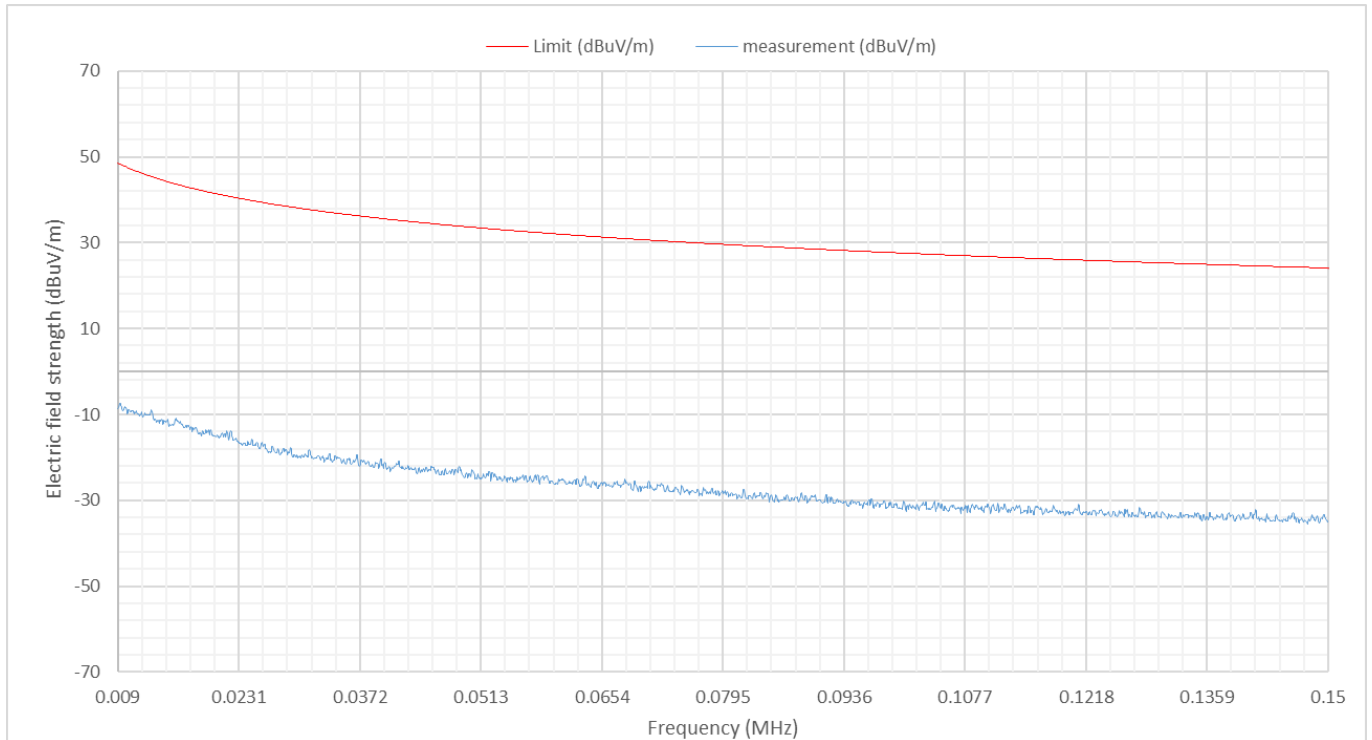


Figure 5 Magnetic field emissions Plot, 9kHz to 150kHz. Parallel to ground plane

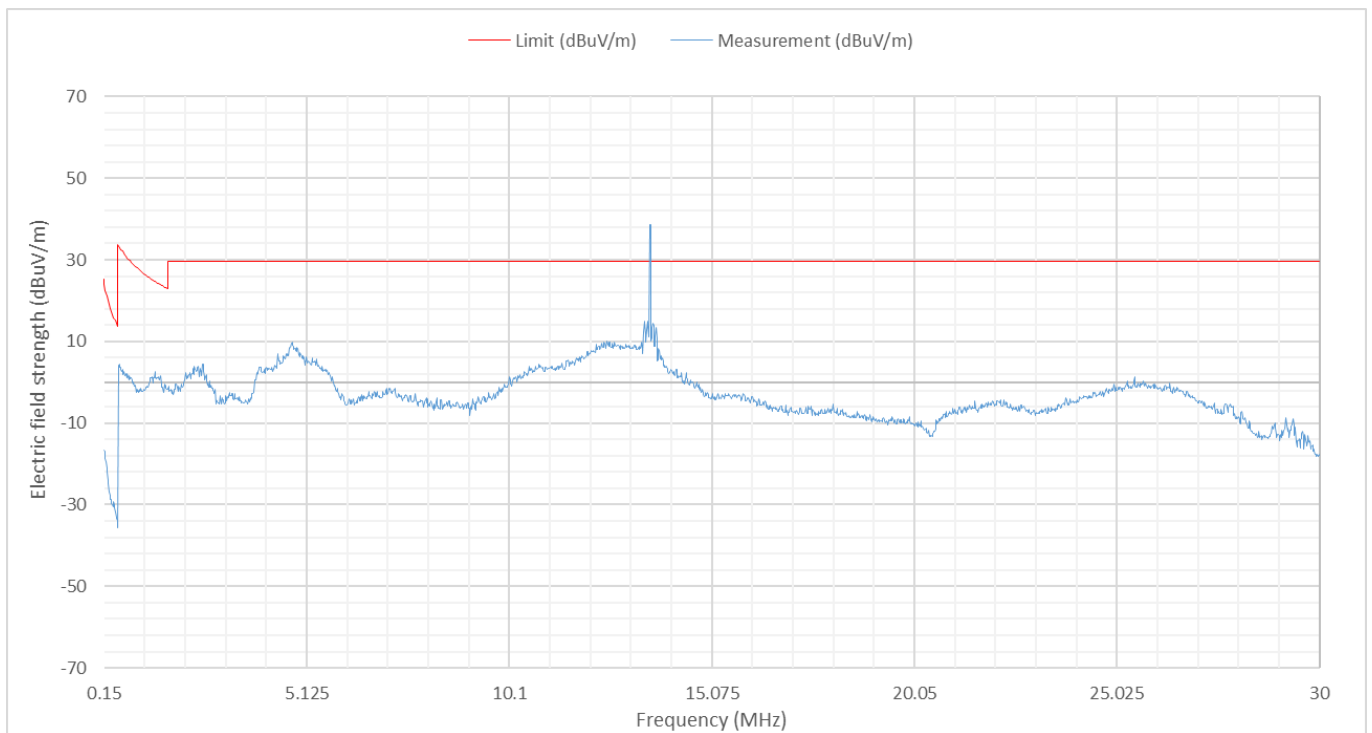


Figure 6 Magnetic field emissions Plot, 150kHz to 30MHz. Parallel to EUT

Note: The emission present at 13.56MHz is the intentional transmission and not subject to the spurious emissions limits.

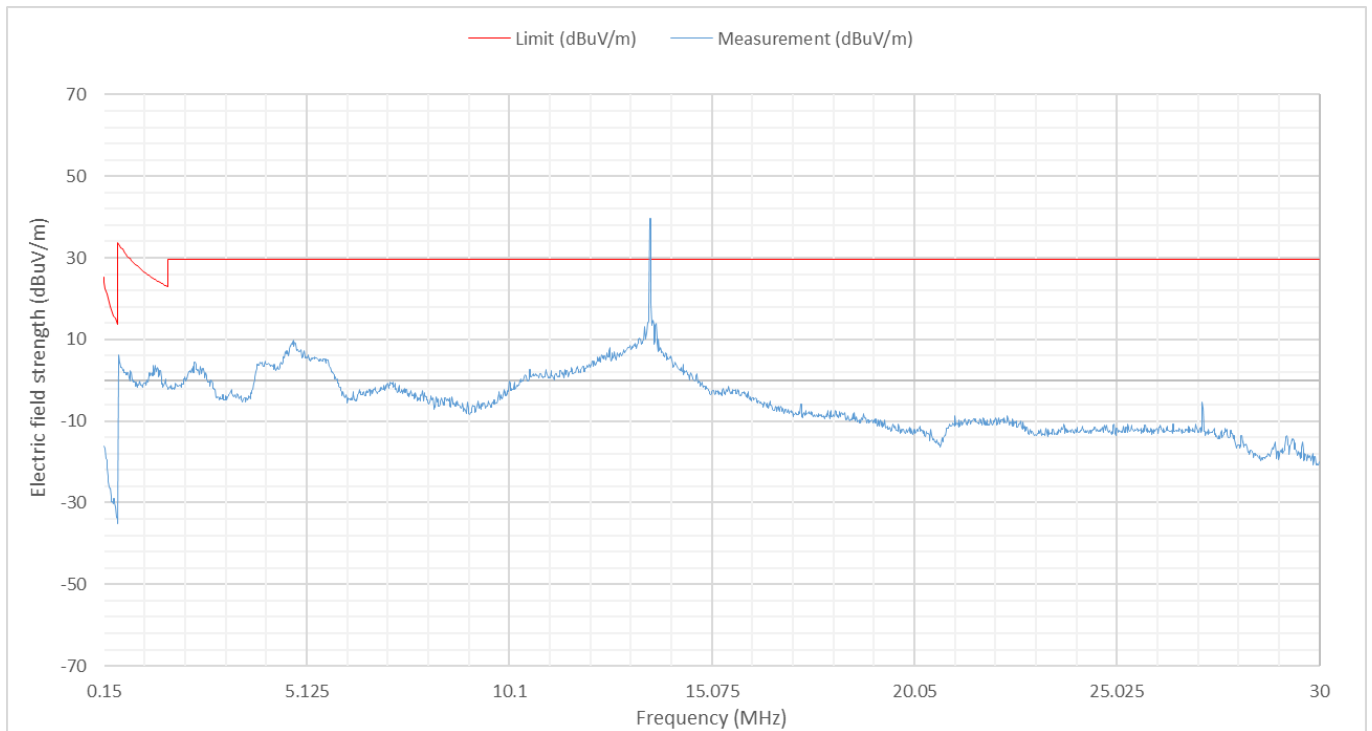


Figure 7 Magnetic field emissions Plot, 150kHz to 30MHz. Perpendicular to EUT

Note: The emission present at 13.56MHz is the intentional transmission and not subject to the spurious emissions limits.

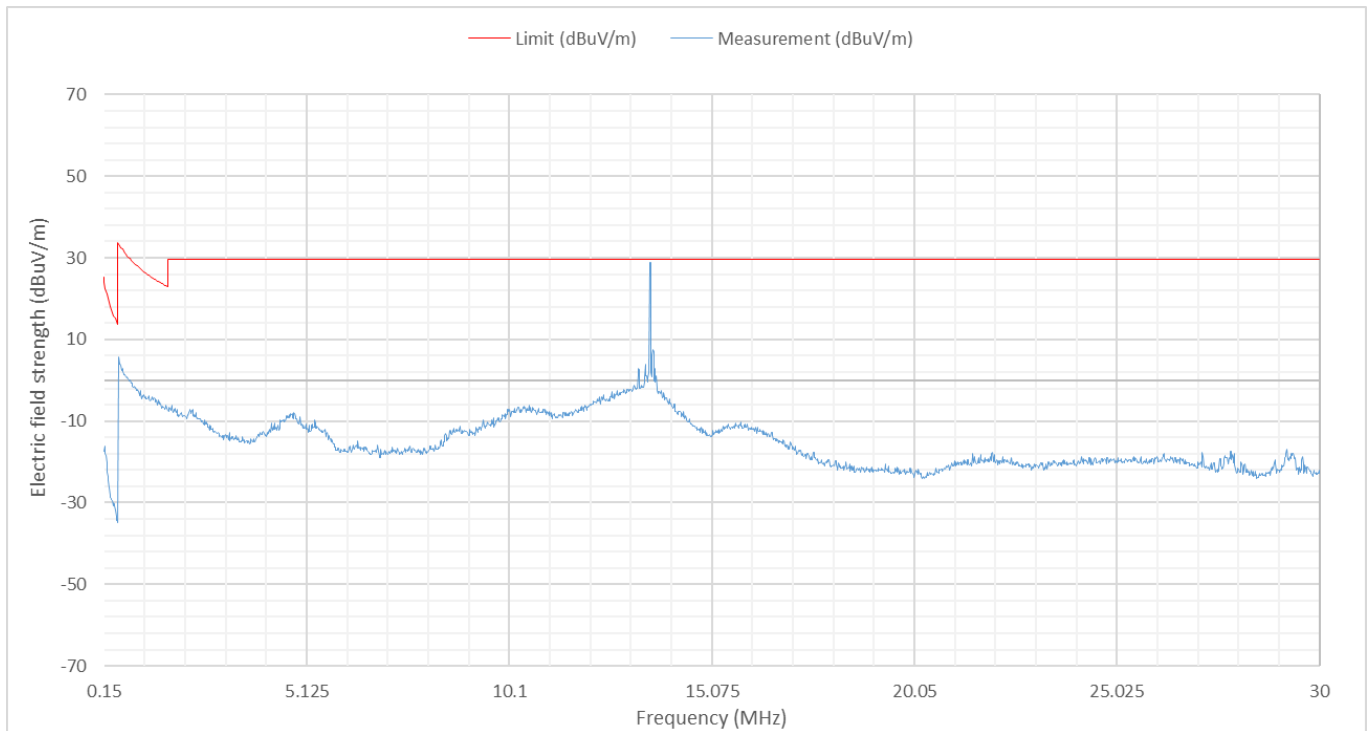


Figure 8 Magnetic field emissions Plot, 150kHz to 30MHz. Parallel to ground plane

Note: The emission present at 13.56MHz is the intentional transmission and not subject to the spurious emissions limits.

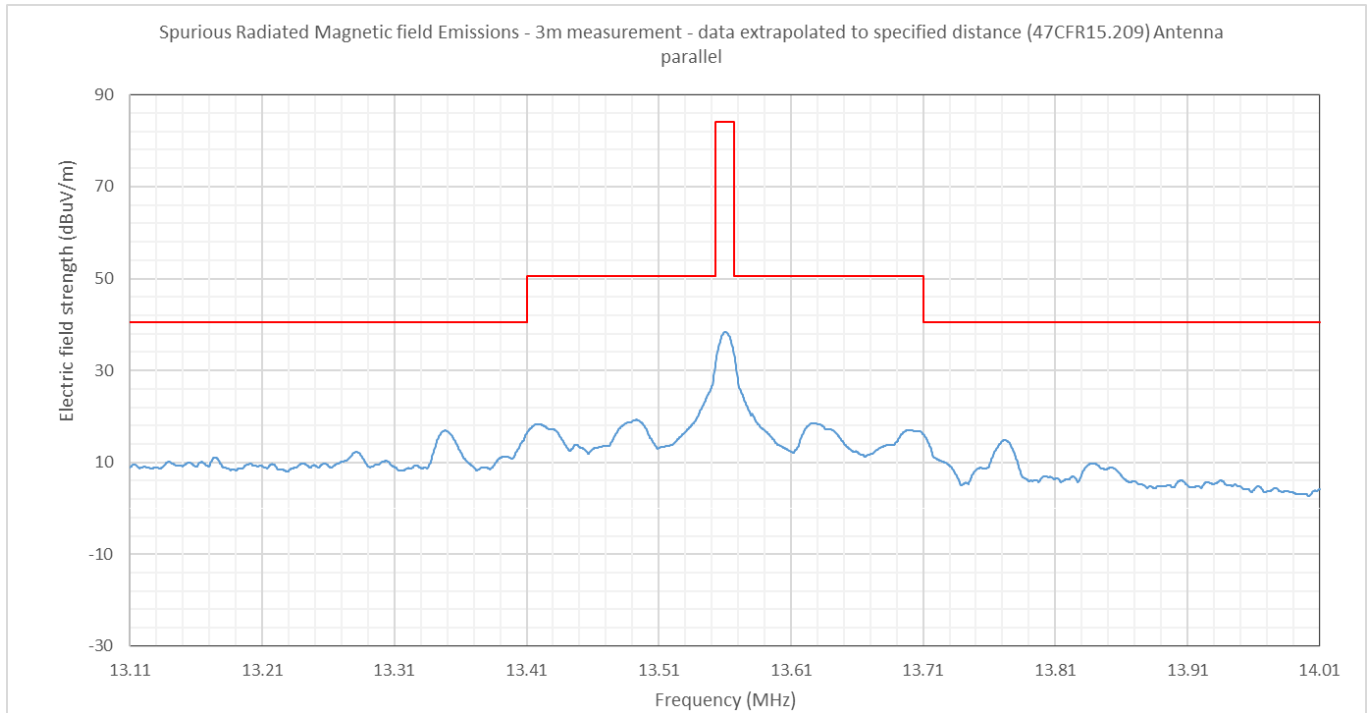
5.3.9 Field strength inside the band 13.110MHz to 14.010MHz

Figure 9 Magnetic field emissions Plot, 13.11MHz to 14.01MHz – Spectrum Mask – Parallel to EUT – 102V

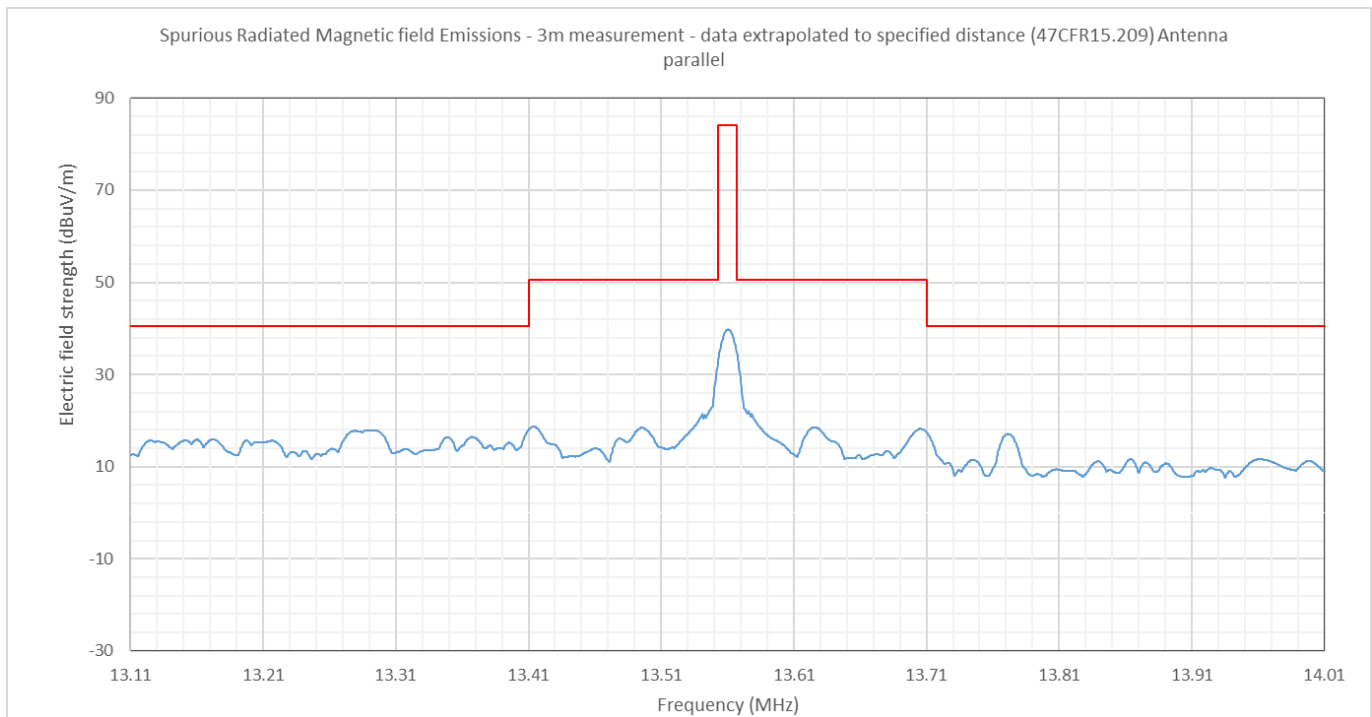


Figure 10 Magnetic field emissions Plot, 13.11MHz to 14.01MHz – Spectrum Mask – Perpendicular to EUT – 102V

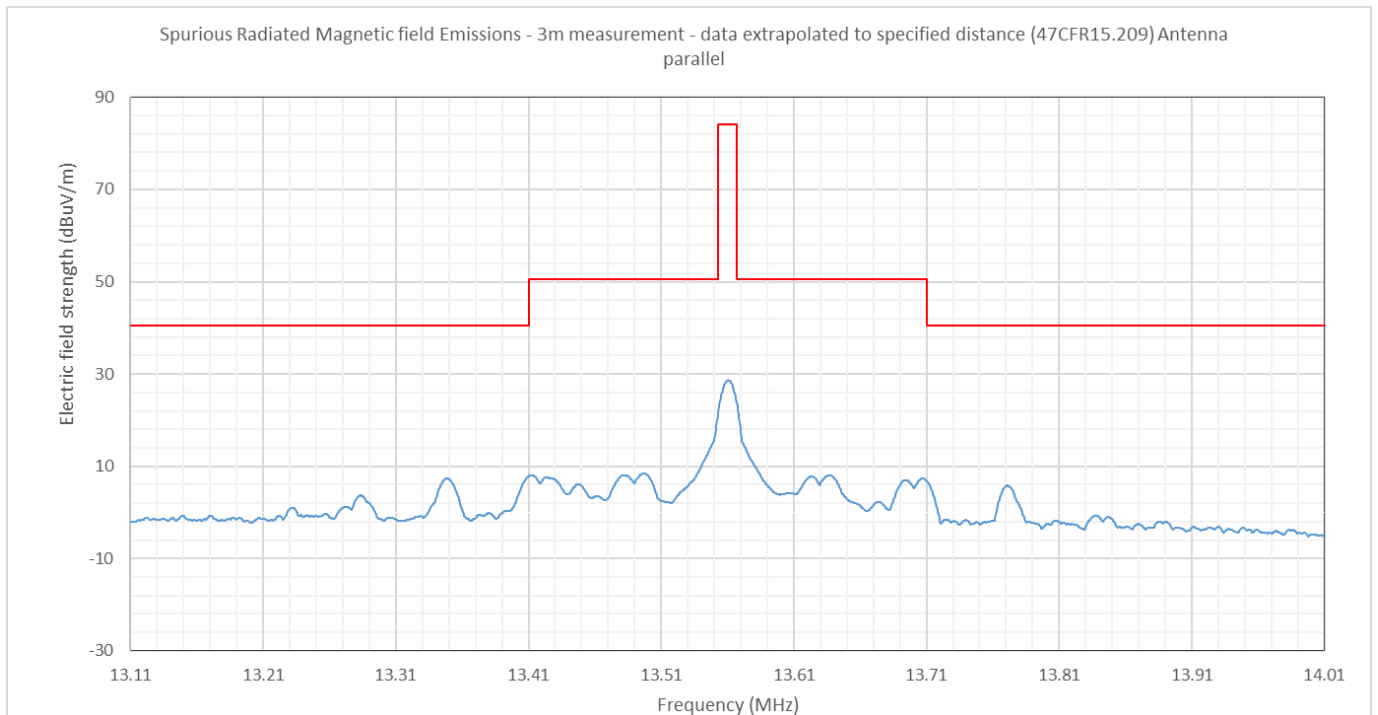


Figure 11 Magnetic field emissions Plot, 13.11MHz to 14.01MHz – Spectrum Mask – Parallel to ground plane – 102V

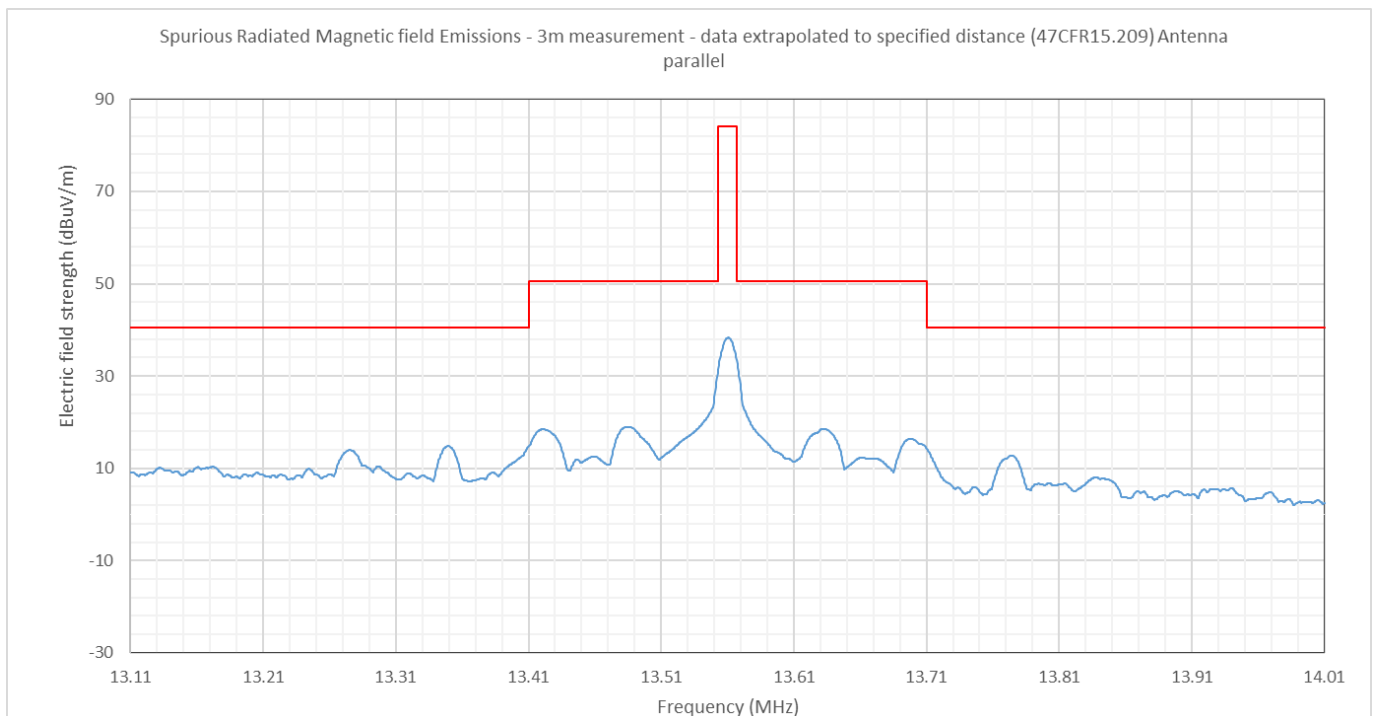


Figure 12 Magnetic field emissions Plot, 13.11MHz to 14.01MHz – Spectrum Mask – Parallel to EUT – 138V

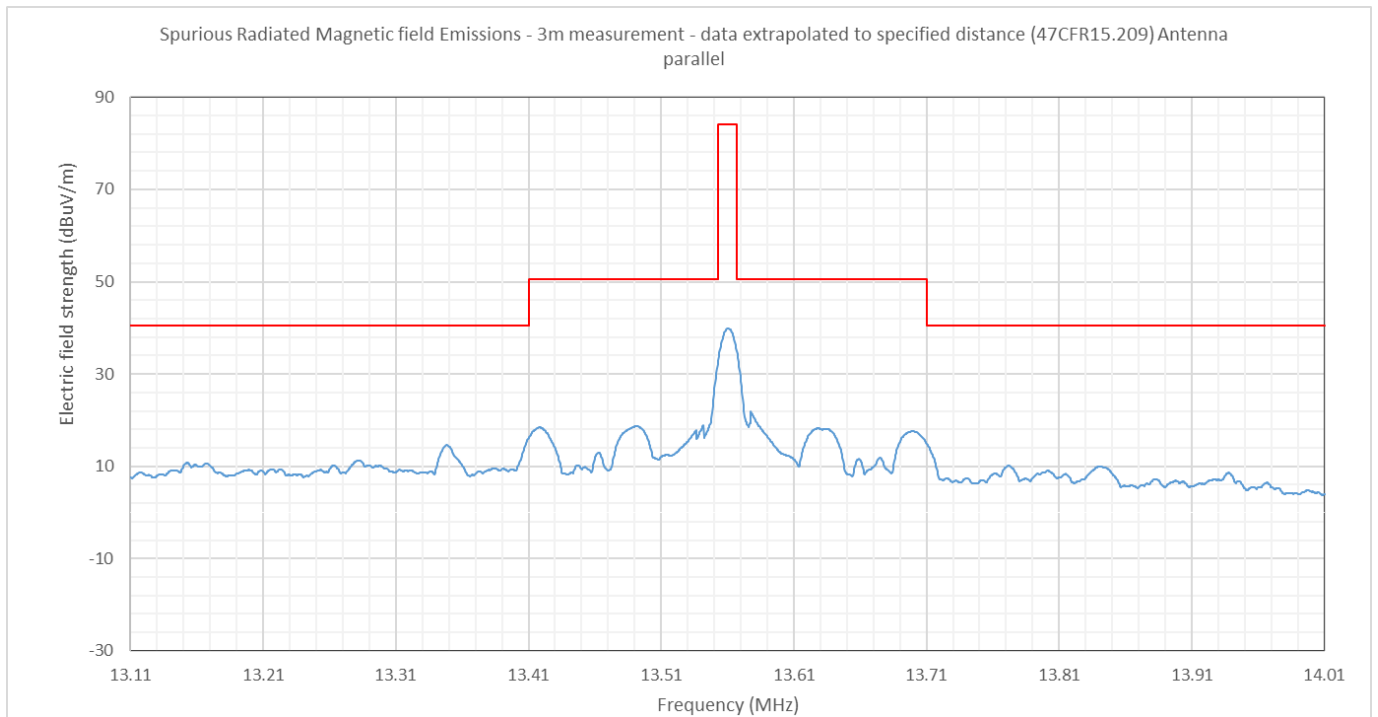


Figure 13 Magnetic field emissions Plot, 13.11MHz to 14.01MHz – Spectrum Mask – Perpendicular to EUT – 138V

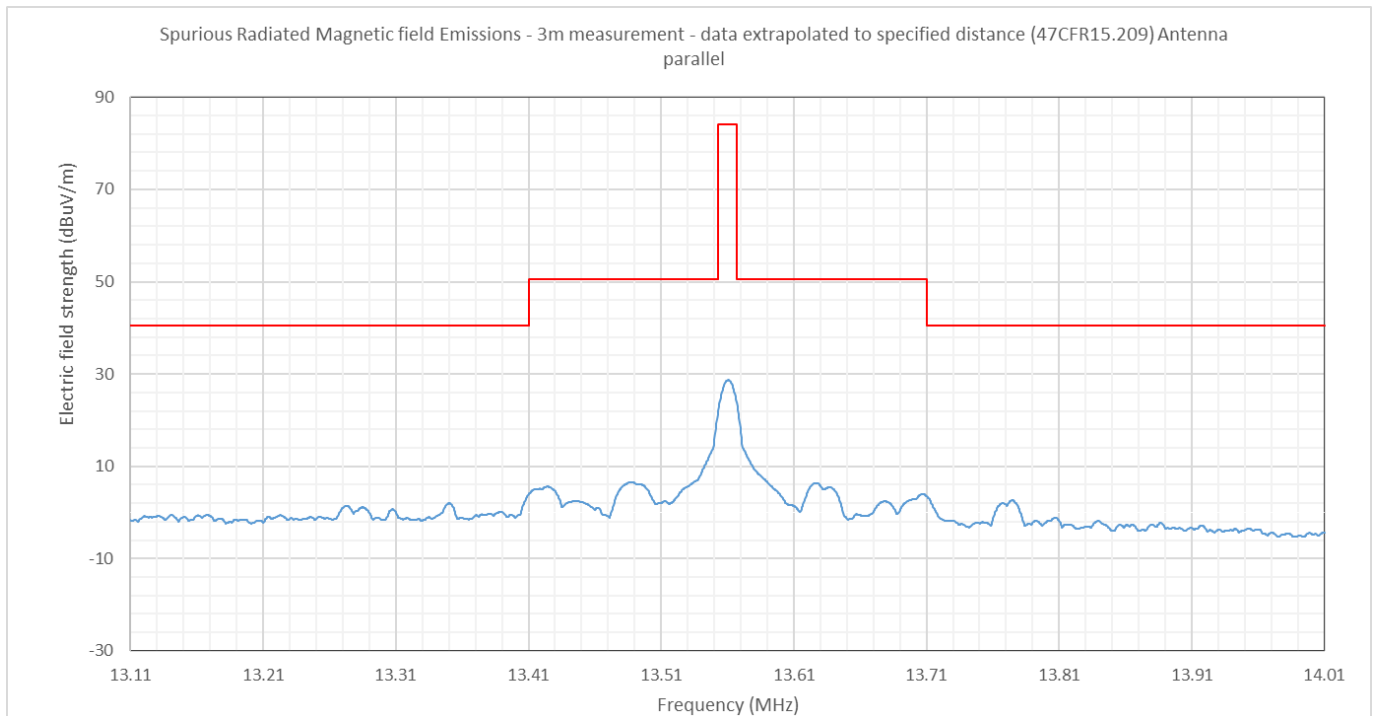


Figure 14 Magnetic field emissions Plot, 13.11MHz to 14.01MHz – Spectrum Mask – Parallel to ground plane – 138V

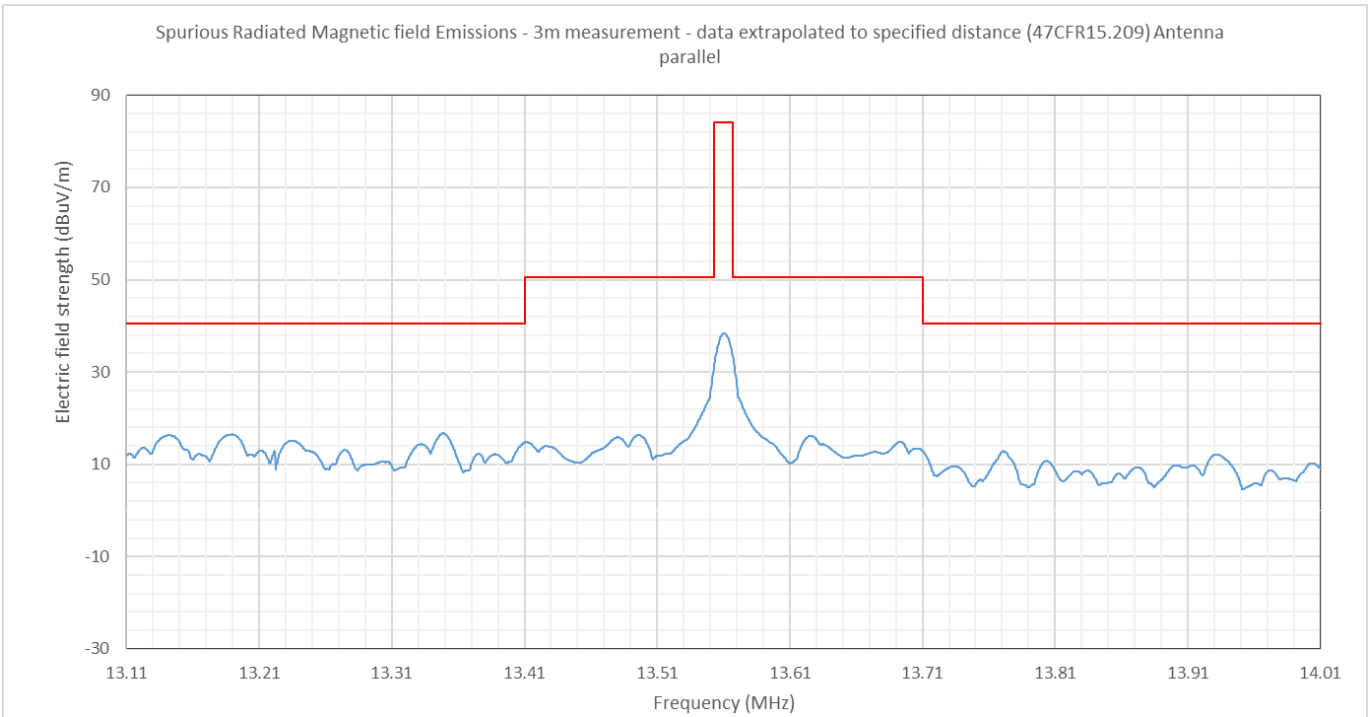


Figure 15 Magnetic field emissions Plot, 13.11MHz to 14.01MHz – Spectrum Mask – Parallel to EUT – 120V

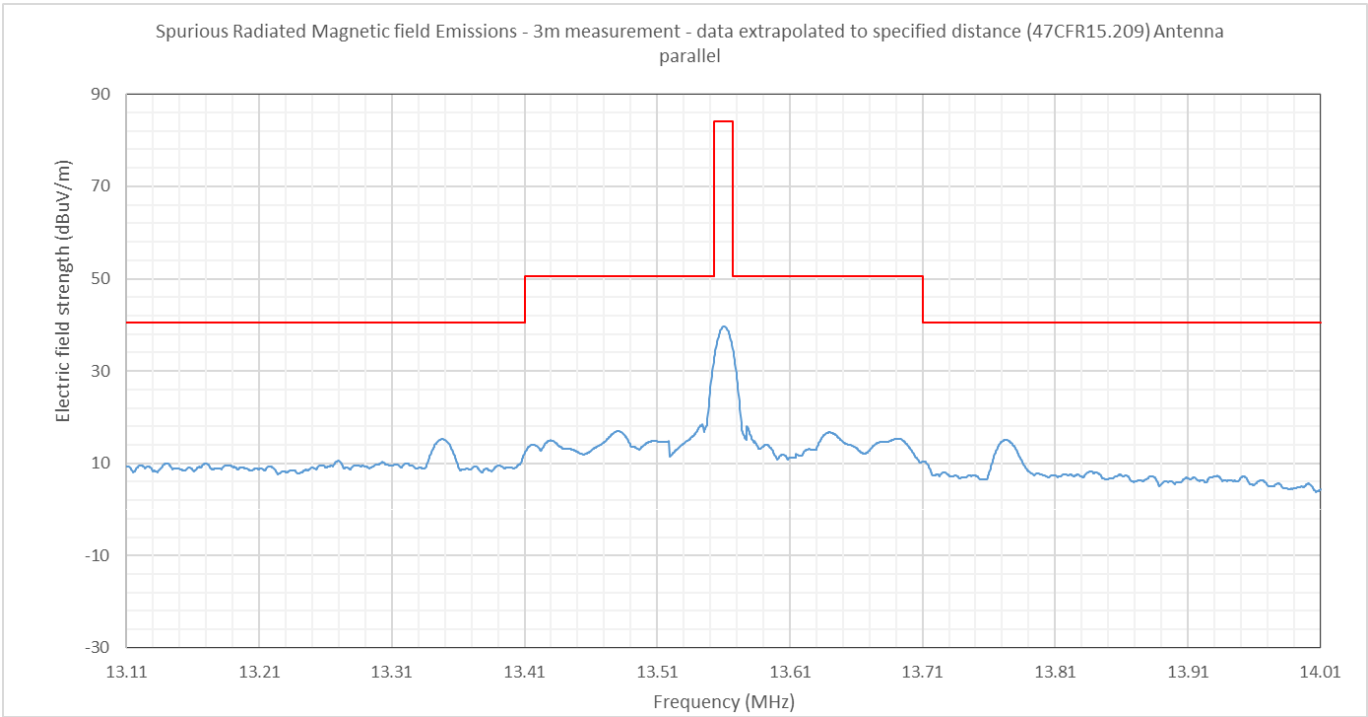


Figure 16 Magnetic field emissions Plot, 13.11MHz to 14.01MHz – Spectrum Mask – Perpendicular to EUT – 120V

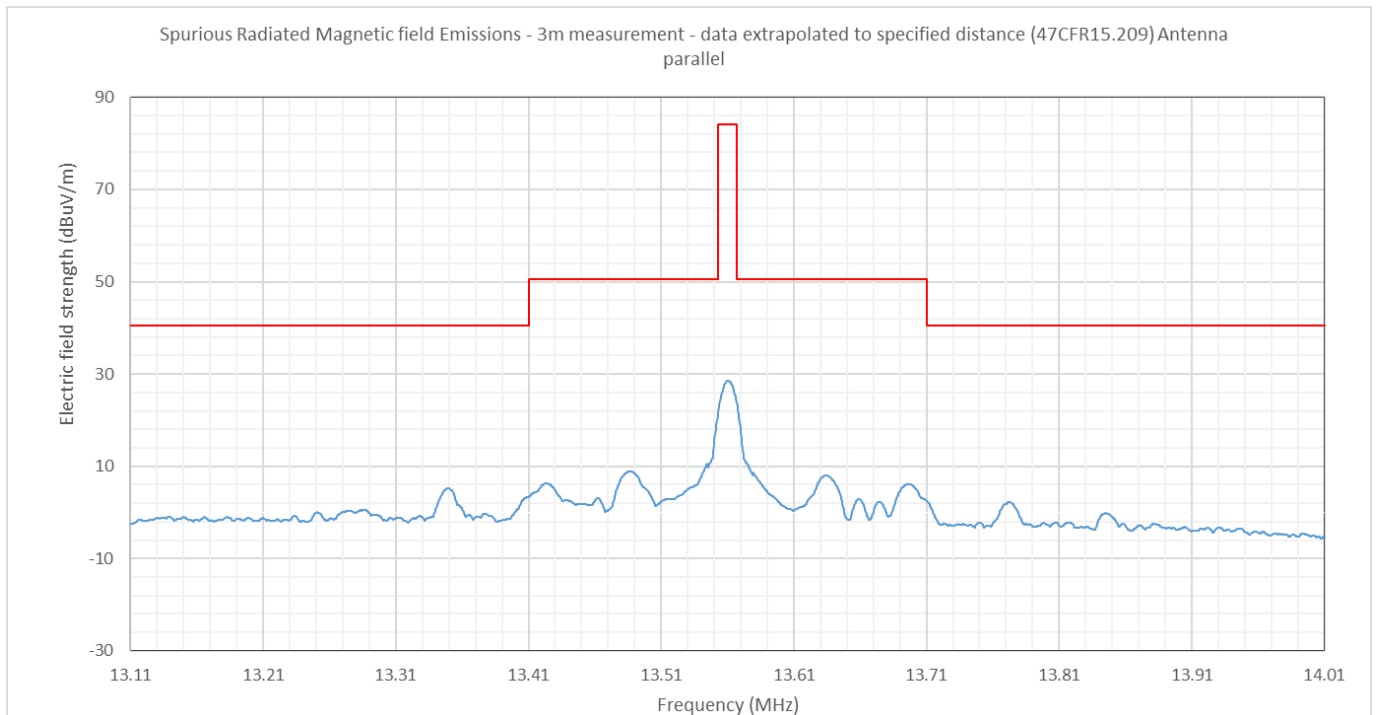


Figure 17 Magnetic field emissions Plot, 13.11MHz to 14.01MHz – Spectrum Mask – Parallel to ground plane – 120V

5.3.10 Calculation of result

Field strength (FS) is calculated as follows from the receiver reading, Antenna factor (AF) in dB/m; Cable loss (CL) and pre-amplifier gain (G).

$$FS \text{ (dB}\mu\text{V/m)} = \text{Indicated Signal Level (dB}\mu\text{V)} + AF(\text{dB/m}) - G(\text{dB}) + CL \text{ (dB)}$$

Cable loss was considered to have no influence on the measurement result in this case.

Freq (MHz)	Rx (dB μ V)	Preamp gain G (dB)	Antenna factor (dB/m)	Result at 3m (dB μ V/m)	Distance correction factor (40dB/decade)	Result at 30m (dB μ V/m)	Limit At 30m (dB μ V/m)	Margin (dB)	Result
13.56	75.8	30.9	33.5	78.4	-40	38.4	84.0	45.6	Below limit

13.56MHz result calculation – measurement antenna parallel

Freq (MHz)	Rx (dB μ V)	Preamp gain G (dB)	Antenna factor (dB/m)	Result at 3m (dB μ V/m)	Distance correction factor (40dB/decade)	Result at 30m (dB μ V/m)	Limit At 30m (dB μ V/m)	Margin (dB)	Result
13.56	77.0	30.9	33.5	79.6	-40	39.6	84.0	44.4	Below limit

13.56MHz result calculation – measurement antenna perpendicular

Freq (MHz)	Rx (dB μ V)	Preamp gain G (dB)	Antenna factor (dB/m)	Result at 3m (dB μ V/m)	Distance correction factor (40dB/decade)	Result at 30m (dB μ V/m)	Limit At 30m (dB μ V/m)	Margin (dB)	Result
13.56	65.9	30.9	33.5	68.5	-40	28.5	84.0	55.5	Below limit

13.56MHz result calculation – measurement antenna parallel to ground**5.3.11 Data Extrapolation**

Measurements were made at a 3m measurement distance since the NFC 13.56MHz signal was not detected at 10m. The data was extrapolated to the required specified distance as follows:

Between 9kHz and 490kHz the measurement distance according to 47CFR15.209 (a) is 300m:

$$\text{measurement at 300m} = \text{measurement at 3m} + 40\log\left(\frac{3}{300}\right)$$

$$\text{measurement at 300m} = \text{measurement at 3m} - 80\text{dB}$$

Between 490kHz and 30MHz the measurement distance according to 47CFR15.209 (a) is 30m:

$$\text{measurement at 30m} = \text{measurement at 3m} + 40\log\left(\frac{3}{30}\right)$$

$$\text{measurement at 30m} = \text{measurement at 3m} - 40\text{dB}$$

5.3.12 Measurement Summary

No further emissions were identified as being within 20dB of the specification limit using a peak detector. No further measurements were taken.

5.4 Radiated Emissions (30MHz to 1GHz)

Radiated electric field emission measurements are applied as defined in 47CFR15.205 and 47CFR15.209.

5.4.1 Limits at 3m

Frequency (MHz)	Electric Field Strength Limit (dBµV/m) at 3m measurement distance
	Quasi Peak
30 - 88	40.0
88 -216	43.5
216 - 960	46.0
960- 1000	54.0

Note: FCC 47 CFR Part 15 Section 15.209 and 15.205 specifies test limits at 3m

Receiver Settings

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

5.4.2 Date of Test

29th October 2025

5.4.3 Test Area

LAB 1 (SAC)

5.4.4 Tested by

L Trickett

5.4.5 Test Setup

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

The measurement was performed with an antenna to EUT separation distance of 3m. The results were maximised in orientation 0-360 degrees and height 1-4m.

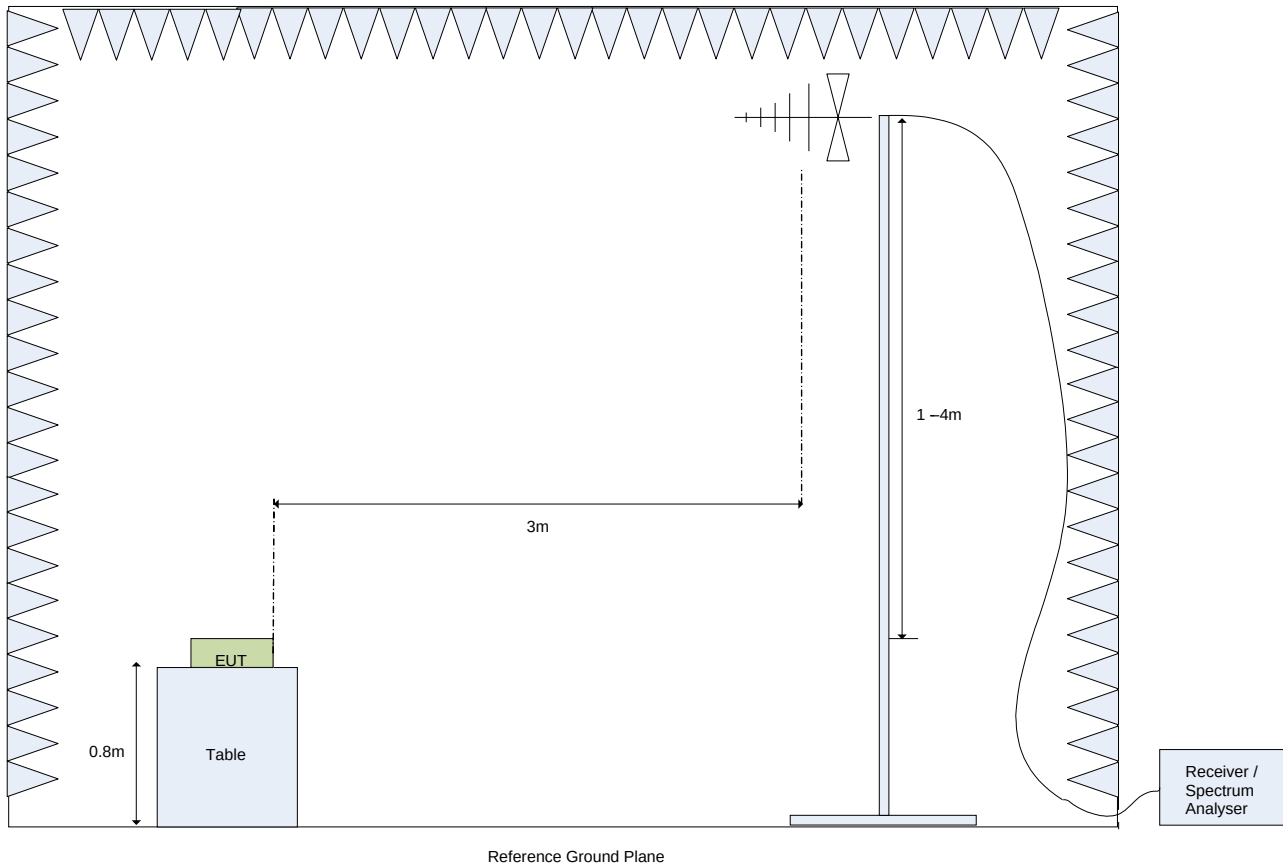


Figure 18 Test Setup for E-Field Measurements from 30MHz to 1GHz

Note 1 : With the EUT de-energized the ambient radio noise and signals met the 6dB peak detection requirement of ANSIC63.10-2020/Cor1-2023.

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.

5.4.6 Electric field emissions, 30MHz to 1GHz

RadiMation

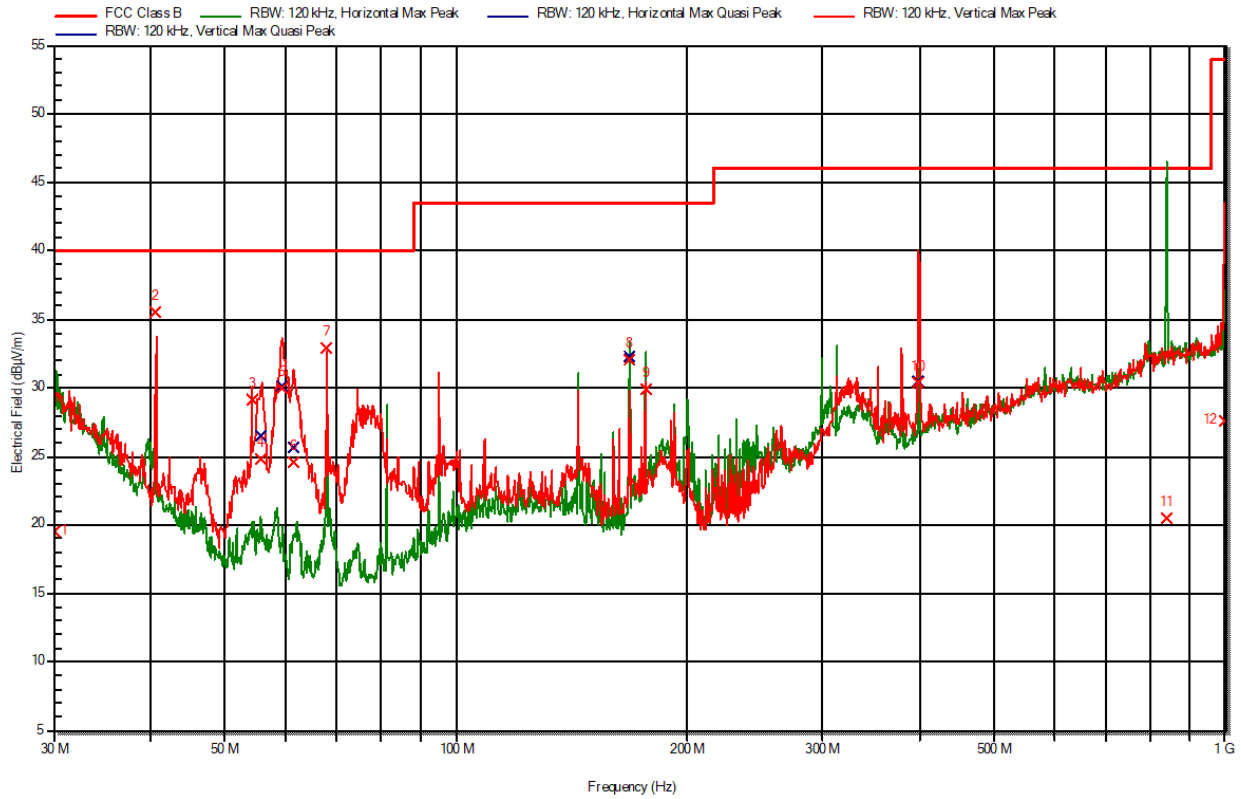


Figure 19 Electric field emissions Plot, 30MHz to 1GHz

Frequency MHz	Quasi- Peak dBµV/m	Quasi Peak Limit dBµV/m	Quasi- Peak Difference dB	Quasi- Peak Status	Angle degrees	Height m	Polarization
30.00	19.5	40.0	-20.5	Pass	75	1	Vertical
40.68	35.5	40.0	-4.5	Pass	275	1	Vertical
54.24	29.1	40.0	-10.9	Pass	220	1	Vertical
55.74	24.8	40.0	-15.2	Pass	230	1	Vertical
59.34	30.0	40.0	-10.0	Pass	300	1	Vertical
61.50	24.5	40.0	-15.5	Pass	235	1.5	Vertical
67.80	32.9	40.0	-7.1	Pass	175	1.6	Vertical
168.00	32.1	43.5	-11.4	Pass	255	2	Horizontal
176.28	29.9	43.5	-13.6	Pass	240	1.9	Horizontal
398.34	30.4	46.0	-15.6	Pass	205	1.3	Vertical
837.66	20.5	46.0	-25.5	Pass	25	3.2	Horizontal
995.76	27.5	54.0	-26.5	Pass	195	1.6	Vertical

Table 1 Electric Field Emissions Peaks, 30MHz to 1GHz.

5.4.7 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:

$$\text{FS (dB}\mu\text{V/m)} = \text{Indicated Signal Level (dB}\mu\text{V)} + \text{AF (dB)} + \text{CL (dB)}$$

5.4.8 Sample Data

The Quasi-Peak level at 30.0MHz

$$\text{FS (dB}\mu\text{V/m)} = -6.0 \text{ (dB}\mu\text{V)} + 24.9 \text{ (dB/m)} + 0.6 \text{ (dB)} = 19.5 \text{ (dB}\mu\text{V/m)}$$

Section 6 Frequency Stability

6.1 Test Specification

FCC Rule	47CFR 15.225 (e) – Frequency tolerance with temperature and supply voltage variation
ISED Rule Part	ISED RSS-210 § B.6
Standard	ANSI C63.10-2020/Cor1-2023
Measurement Uncertainty	The reported uncertainty of measurement $y \pm U$, 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 $\pm 1 \times 10^{-8}$

6.1.1 Date of Test

24th October 2025

6.1.2 Test Area

LAB 7 (Environmental chamber)

6.1.3 Tested by

L Trickett

6.1.4 Procedure

For frequency stability with respect to supply voltage the procedures of ANSIC63.10 Section 6.8.2 were followed. The measurements were performed at ambient room temperature.

For frequency stability with respect to ambient temperature the procedure of ANSI C63.10 Section 6.8.1 was followed.

6.1.5 Test Setup

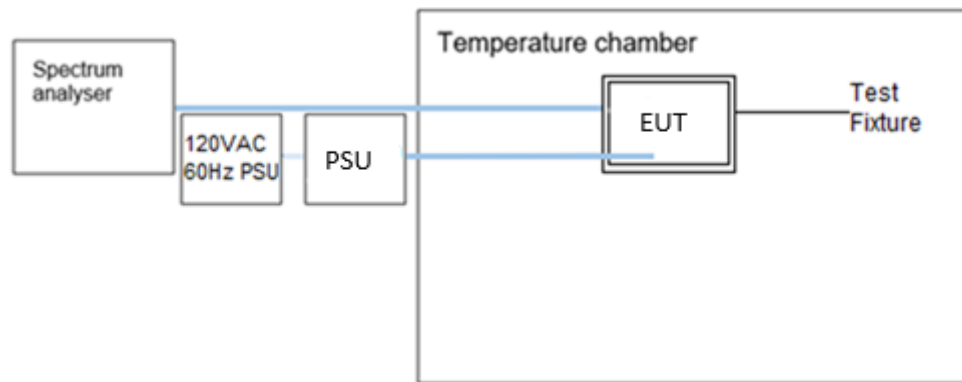


Figure 20 Test arrangement for frequency stability testing

6.2 Test Results. Frequency tolerance with temperature variation

Temperature (°C)	Time	Frequency (MHz)	Nominal	Deviation (%)	Limit 47CFR15.225 (%)	Result
50	Startup	13.5598854	13.56	-0.0008451	0.01	Within Limit
	2min	13.5601309	13.56	0.0009653	0.01	Within Limit
	5min	13.5601651	13.56	0.0012175	0.01	Within Limit
	10min	13.5601646	13.56	0.0012138	0.01	Within Limit
40	Startup	13.5598992	13.56	-0.0007434	0.01	Within Limit
	2min	13.5598992	13.56	-0.0007434	0.01	Within Limit
	5min	13.5603284	13.56	0.0024218	0.01	Within Limit
	10min	13.5597925	13.56	-0.0015303	0.01	Within Limit
30	Startup	13.5601792	13.56	0.0013215	0.01	Within Limit
	2min	13.5602962	13.56	0.0021843	0.01	Within Limit
	5min	13.5601705	13.56	0.0012574	0.01	Within Limit
	10min	13.5604532	13.56	0.0033421	0.01	Within Limit
20	Startup	13.5600678	13.56	0.0005000	0.01	Within Limit
	2min	13.5602967	13.56	0.0021880	0.01	Within Limit
	5min	13.5601164	13.56	0.0008584	0.01	Within Limit
	10min	13.5601083	13.56	0.0007987	0.01	Within Limit
10	Startup	13.5603831	13.56	0.0028251	0.01	Within Limit
	2min	13.5600750	13.56	0.0005531	0.01	Within Limit
	5min	13.5600846	13.56	0.0006239	0.01	Within Limit
	10min	13.5598703	13.56	-0.0009565	0.01	Within Limit
0	Startup	13.5603316	13.56	0.0024454	0.01	Within Limit
	2min	13.5600427	13.56	0.0003149	0.01	Within Limit
	5min	13.5605057	13.56	0.0037292	0.01	Within Limit
	10min	13.5601685	13.56	0.0012426	0.01	Within Limit
-10	Startup	13.5603082	13.56	0.0022728	0.01	Within Limit
	2min	13.5606477	13.56	0.0047763	0.01	Within Limit
	5min	13.5601101	13.56	0.0008119	0.01	Within Limit
	10min	13.5598442	13.56	-0.0011490	0.01	Within Limit
-20	Startup	13.5599980	13.56	-0.0000147	0.01	Within Limit
	2min	13.5599246	13.56	-0.0005561	0.01	Within Limit
	5min	13.5599667	13.56	-0.0002456	0.01	Within Limit
	10min	13.5606626	13.56	0.0048862	0.01	Within Limit

Table 2 Frequency stability with temperature Results

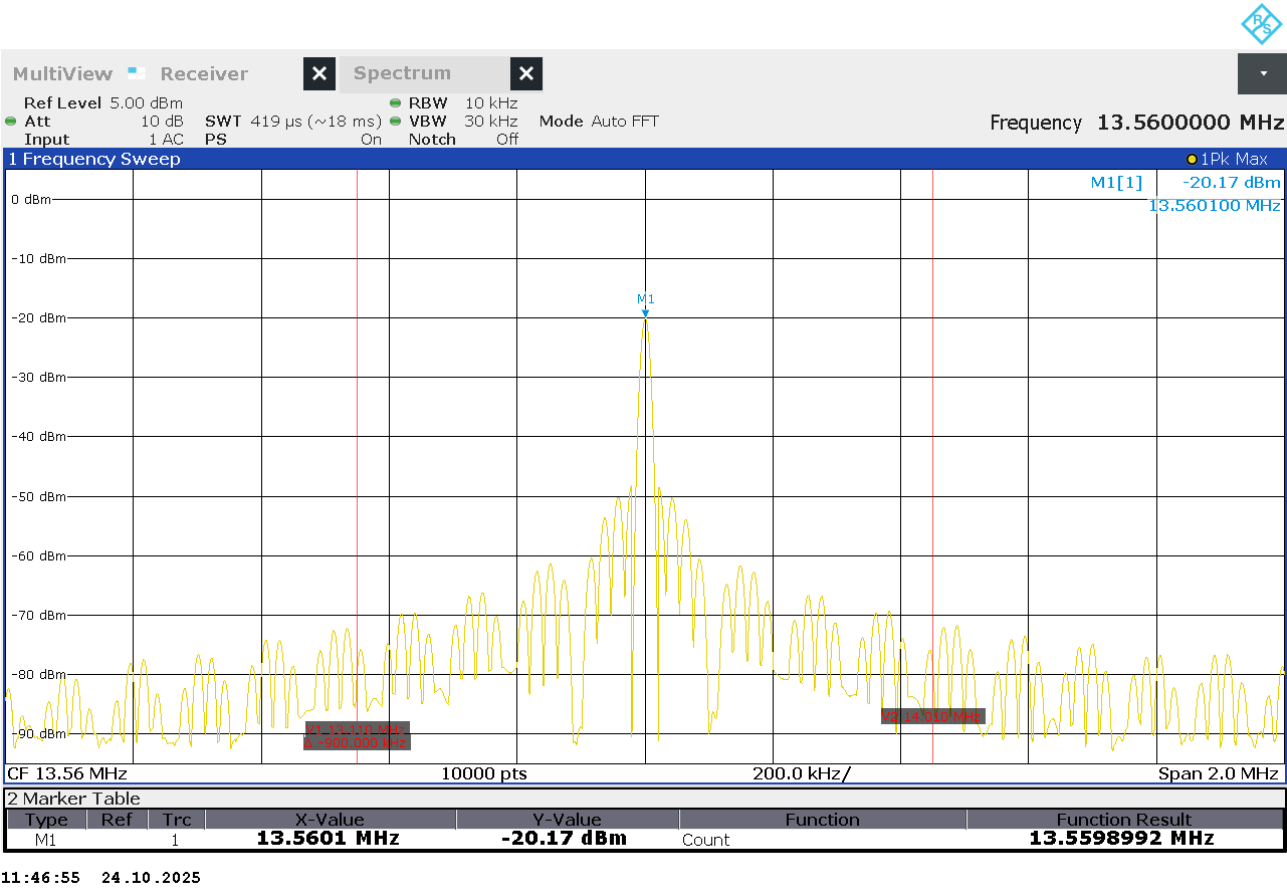


Figure 21 Example measurement of frequency stability at 40°C after 2 minutes

6.3 Test Results. Frequency tolerance with voltage variation

Temperature (°C)	Voltage (VAC)	Frequency (MHz)	Nominal	Deviation (%)	Limit 47CFR15.225 (%)	Result
20	102	13.5601114	13.56	0.0008215	0.01	Within Limit
	120	13.5601083	13.56	0.0007987	0.01	Within Limit
	138	13.5598229	13.56	-0.0013061	0.01	Within Limit

Table 3 Frequency stability with voltage Results

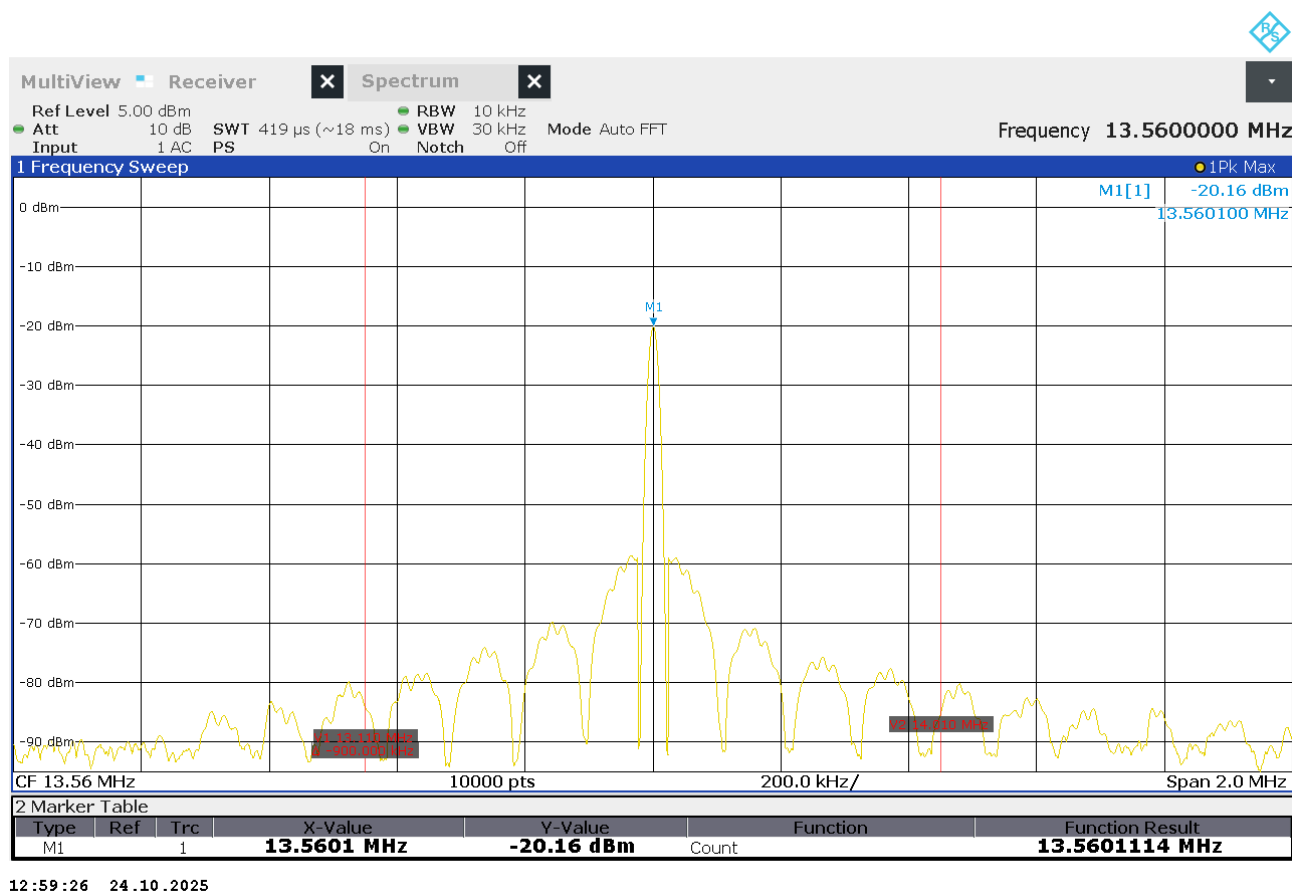


Figure 22 Example measurement of frequency stability at 102VAC

Section 7 20dB Bandwidth

7.1 Test Specification

FCC Rule	47CFR 15.215 (c) – 20dB Bandwidth
Standard	ANSIC63.10-2020/Cor1-2023
ISED Rule Part	ISED RSS-Gen section 6.7
Measurement Uncertainty	The reported uncertainty of measurement $y \pm U$, 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 $\pm 1 \times 10^{-8}$

7.1.1 Date of Test

28th October 2025

7.1.2 Test Area

LAB 5

7.1.3 Tested by

L Trickett

7.2 Procedure

For 20dB bandwidth the procedures of ANSIC63.10 Section 6.9.2 were followed.

Receiver Parameters	Setting
Detector Function	Peak
Span	2MHz
Resolution Bandwidth	10kHz
Video Bandwidth	30kHz
Sweep rate	Auto couple
Trace mode	Max hold

7.3 Test Results.

The 20dB bandwidth was measured using the bandwidth function of the signal analyser and the procedures of Clause 6.9.2 of ANSIC63.10-2020/Cor1-2023.

The measured 20dB bandwidth was 150.4kHz which was contained within the operating band 13.110 to 14.01MHz.



16:12:12 28.10.2025

Figure 23 Bandwidth at 20dB Point.

Section 8 AC Mains Conducted Emissions

8.1 Test Specification

Regulation (USA)	47CFR15.207
Standard	ANSIC63.10-2020/Cor1-2023
Measurement Uncertainty	The reported uncertainty of measurement $y \pm U$, 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 $\pm 3.44\text{dB}$

8.2 Power Line Emission Limits

Frequency (MHz)	Limits (dB μ V)	
	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

8.3 Receiver Settings

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

8.4 Procedure and Test Software Version

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

8.4.1 Date of Test28th October 2025**8.4.2 Test Area**

LAB 2

8.4.3 Tested by

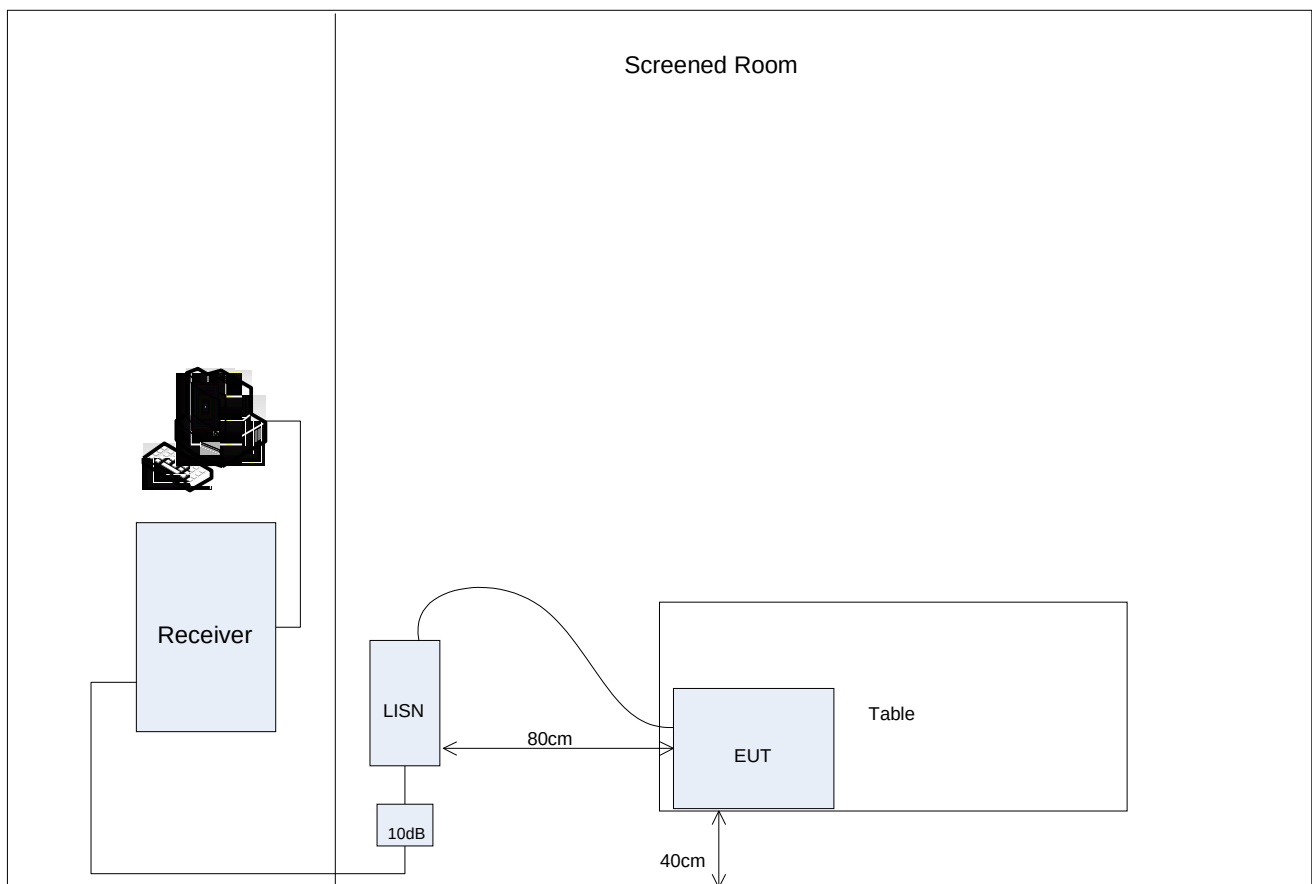
L Trickett

8.4.4 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).



8.5 Test Results

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

Mode of Operation	Conductor	Result summary
RFID active operating at 13.56MHz	Live	Pass*
RFID active operating at 13.56MHz	Neutral	Pass*
RFID active operating at 13.56MHz with dummy load	Live	Pass*
RFID active operating at 13.56MHz with dummy load	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.”

RadiMation

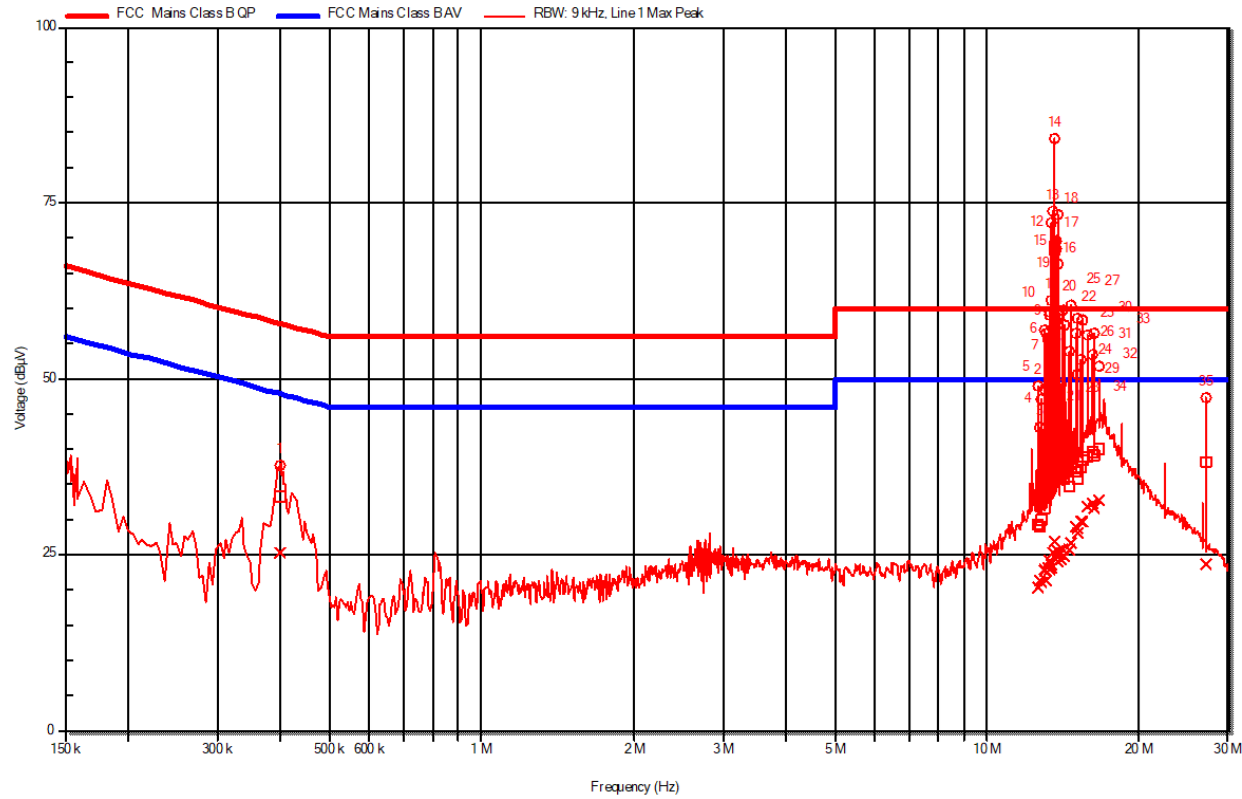


Figure 24: AC mains conducted emissions – RFID active – Live

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
0.400	25.3	47.8	-22.5	Pass	33.1	57.8	-24.7	Pass
12.582	20.2	50.0	-29.8	Pass	29.2	60.0	-30.8	Pass
12.713	21.1	50.0	-28.9	Pass	29.0	60.0	-31.0	Pass
12.825	20.9	50.0	-29.1	Pass	29.9	60.0	-30.1	Pass
12.955	22.6	50.0	-27.4	Pass	31.5	60.0	-28.5	Pass
13.008	22.9	50.0	-27.1	Pass	34.4	60.0	-25.6	Pass
13.062	21.2	50.0	-28.8	Pass	33.4	60.0	-26.6	Pass
14.026	24.3	50.0	-25.7	Pass	35.9	60.0	-24.1	Pass
14.137	25.7	50.0	-24.3	Pass	36.6	60.0	-23.4	Pass
14.267	24.7	50.0	-25.3	Pass	35.7	60.0	-24.3	Pass
14.507	25.6	50.0	-24.4	Pass	34.7	60.0	-25.3	Pass
14.622	26.6	50.0	-23.4	Pass	37.8	60.0	-22.2	Pass
14.975	28.9	50.0	-21.1	Pass	36.8	60.0	-23.2	Pass
15.047	28.8	50.0	-21.2	Pass	37.5	60.0	-22.5	Pass
15.108	28.1	50.0	-21.9	Pass	35.7	60.0	-24.3	Pass
15.340	29.7	50.0	-20.3	Pass	37.4	60.0	-22.6	Pass
15.465	29.6	50.0	-20.4	Pass	38.3	60.0	-21.7	Pass
15.819	31.7	50.0	-18.3	Pass	38.8	60.0	-21.2	Pass
16.181	32.4	50.0	-17.6	Pass	39.6	60.0	-20.4	Pass
16.317	31.5	50.0	-18.5	Pass	39.1	60.0	-20.9	Pass
16.670	32.7	50.0	-17.3	Pass	40.1	60.0	-19.9	Pass
27.121	23.6	50.0	-26.4	Pass	38.1	60.0	-21.9	Pass

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

RadiMation

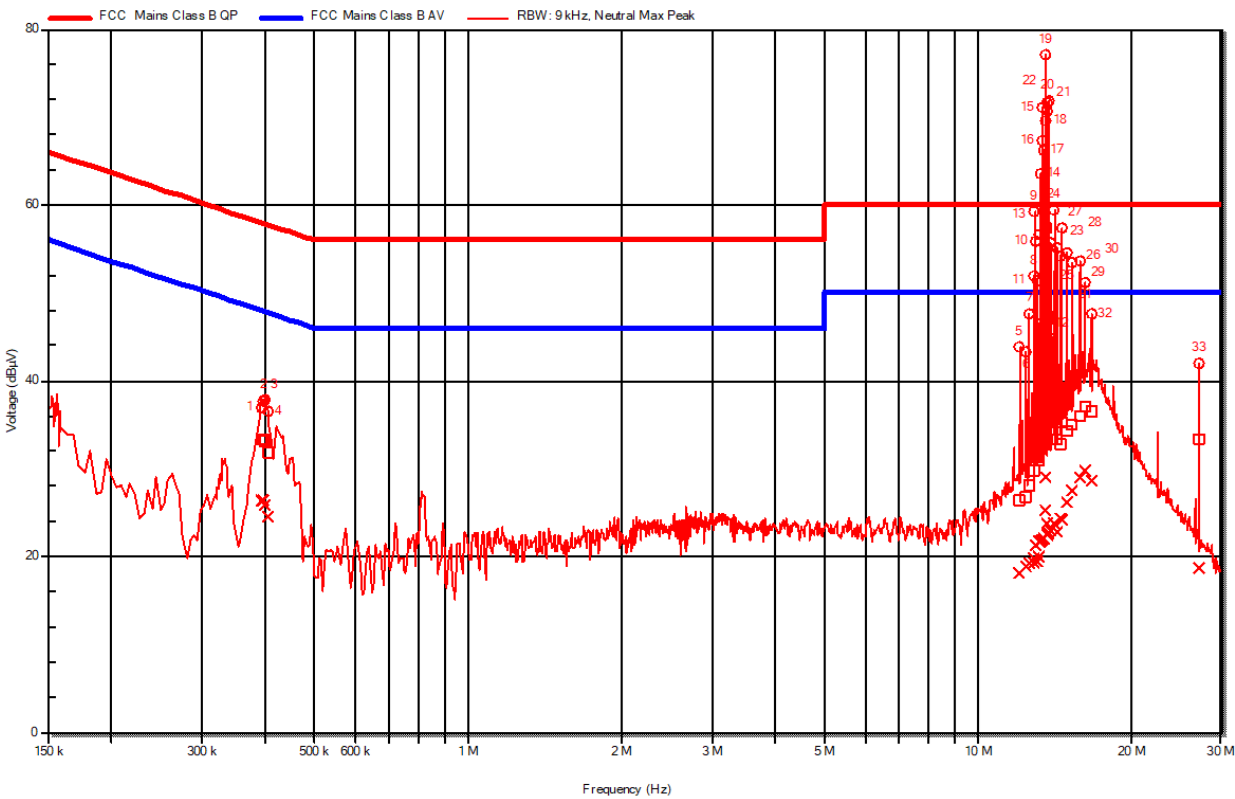


Figure 25: AC mains conducted emissions – RFID active – Neutral

Frequency (MHz)	Average (dB μ V)	Average Limit (dB μ V)	Average Difference (dB)	Average Status	Quasi-Peak (dB μ V)	Quasi-Peak Limit (dB μ V)	Quasi-Peak Difference (dB)	Quasi-Peak Status
0.393	26.5	48.0	-21.5	Pass	33.3	58.0	-24.7	Pass
0.396	26.5	47.9	-21.5	Pass	33.3	57.9	-24.7	Pass
0.400	25.9	47.9	-22.0	Pass	33.1	57.9	-24.8	Pass
0.405	24.4	47.8	-23.3	Pass	31.9	57.8	-25.8	Pass
12.079	18.1	50.0	-31.9	Pass	26.4	60.0	-33.6	Pass
12.435	18.9	50.0	-31.1	Pass	26.8	60.0	-33.2	Pass
12.568	19.3	50.0	-30.7	Pass	28.0	60.0	-32.0	Pass
12.857	19.2	50.0	-30.8	Pass	29.7	60.0	-30.3	Pass
12.923	19.8	50.0	-30.2	Pass	34.4	60.0	-25.6	Pass
12.988	21.4	50.0	-28.6	Pass	32.4	60.0	-27.6	Pass
13.036	19.5	50.0	-30.5	Pass	31.3	60.0	-28.7	Pass
14.127	23.8	50.0	-26.2	Pass	35.6	60.0	-24.4	Pass
14.257	22.7	50.0	-27.3	Pass	33.3	60.0	-26.7	Pass
14.483	24.4	50.0	-25.6	Pass	32.8	60.0	-27.2	Pass
14.616	24.2	50.0	-25.8	Pass	35.3	60.0	-24.7	Pass
14.965	26.1	50.0	-23.9	Pass	34.3	60.0	-25.7	Pass
15.327	27.4	50.0	-22.6	Pass	35.0	60.0	-25.0	Pass
15.817	29.1	50.0	-20.9	Pass	36.0	60.0	-24.0	Pass
16.177	29.8	50.0	-20.2	Pass	37.2	60.0	-22.9	Pass
16.662	28.6	50.0	-21.4	Pass	36.5	60.0	-23.5	Pass
27.122	18.7	50.0	-31.3	Pass	33.3	60.0	-26.7	Pass

Table 5: Electric Field Emissions Peaks, 150kHz to 30MHz – RFID active – Neutral

RadiMation

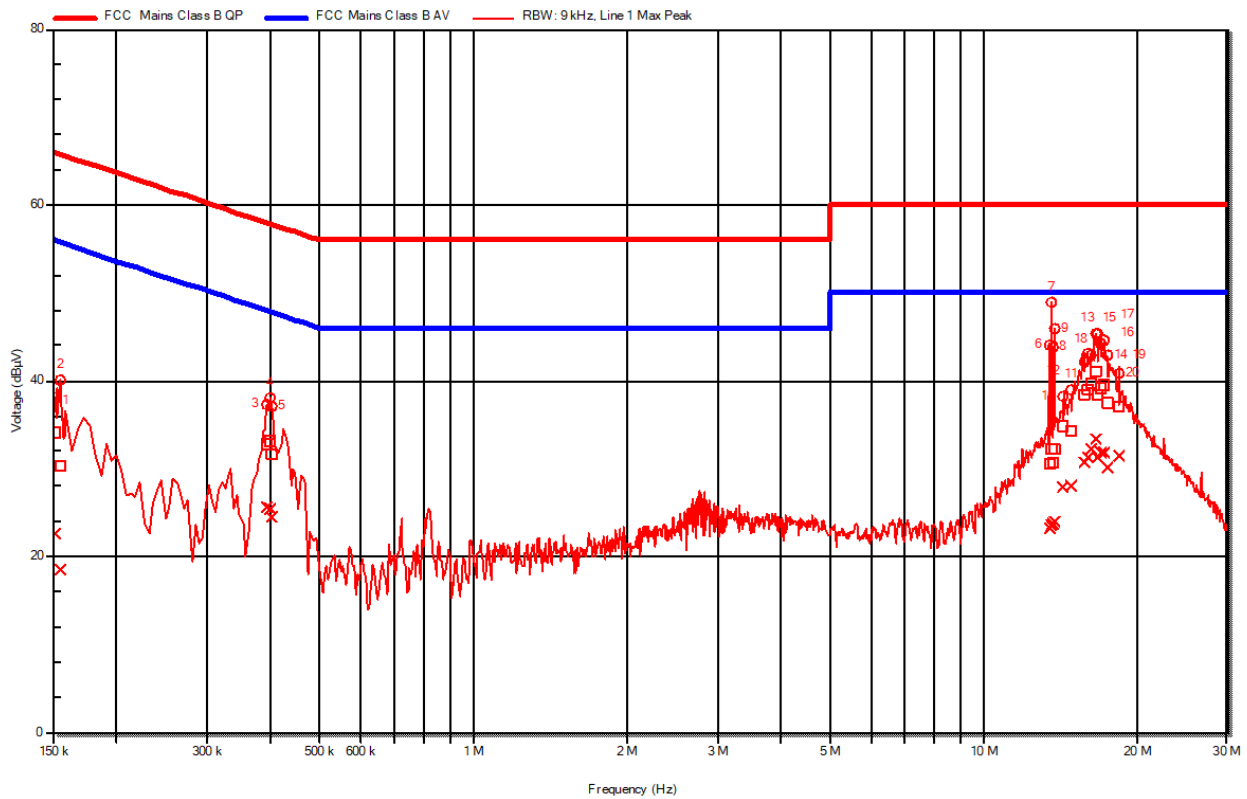


Figure 26: AC mains conducted emissions – RFID active with dummy load – Live

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
13.425	23.2	50.0	-26.8	Pass	30.5	60.0	-29.5	Pass
13.543	23.5	50.0	-26.5	Pass	32.2	60.0	-27.9	Pass
13.644	23.8	50.0	-26.2	Pass	30.7	60.0	-29.3	Pass
13.775	24.0	50.0	-26.0	Pass	32.2	60.0	-27.8	Pass

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

RadiMation

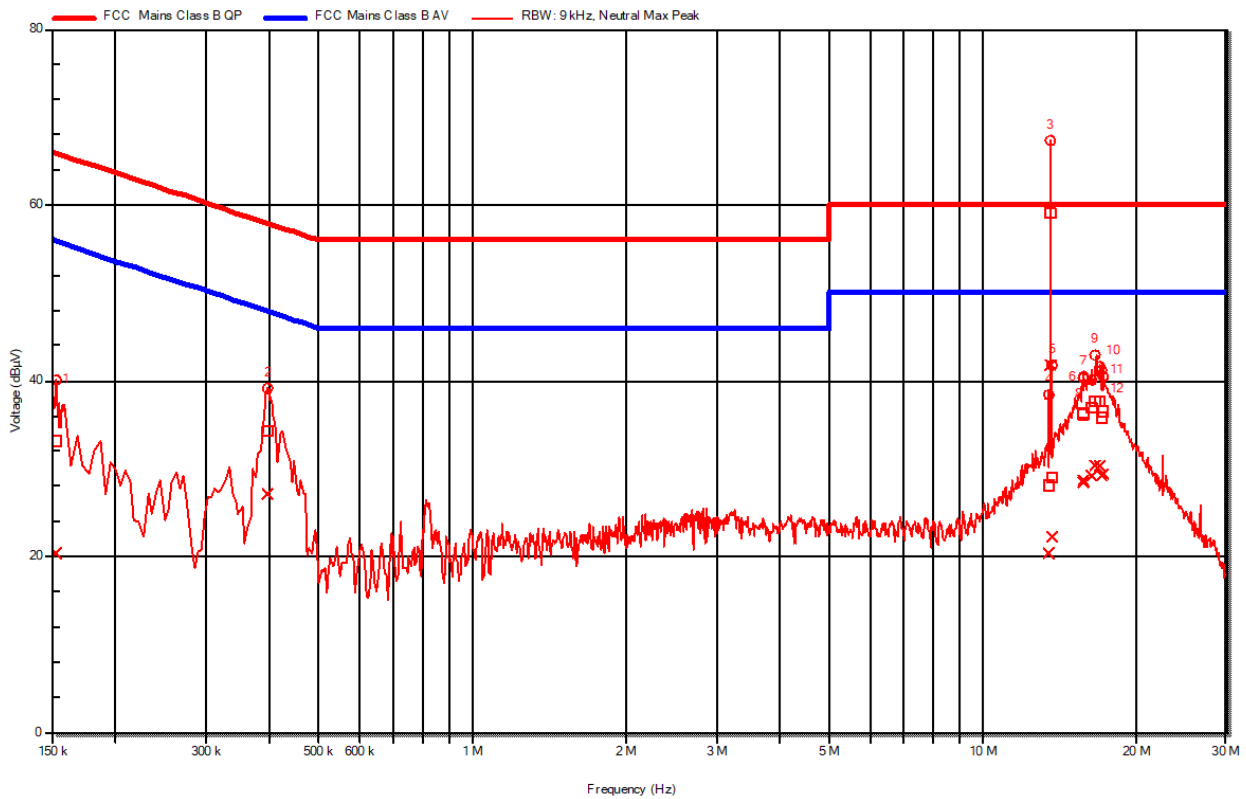


Figure 27: AC mains conducted emissions – RFID active with dummy load – Neutral

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
13.560	41.9	50.0	-8.1	Pass	59.1	60.0	-1.0	Pass
13.448	20.4	50.0	-29.7	Pass	28.1	60.0	-31.9	Pass
13.674	22.3	50.0	-27.7	Pass	29.0	60.0	-31.0	Pass

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

8.5.1 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:

$$\text{ASL (dB}\mu\text{V)} = \text{Indicated Signal Level (dB}\mu\text{V)} + \text{IL (dB)} + \text{CL (dB)}$$

8.5.2 Sample Data

The Quasi-Peak level at 13.56MHz

$$\text{ASL (dB}\mu\text{V)} = 59.1\text{dB}\mu\text{V} = 49.3\text{dB}\mu\text{V} + 9.7\text{dB} + 0.1\text{dB}$$

Appendix A EUT Test Photos

Test set up photographs are supplied separately.

Appendix B Test Equipment List

Radiated Emissions 30MHz to 1GHz Equipment

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

Radiated Emissions 9kHz to 30MHz Equipment

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

Frequency stability measurement equipment

Item	Serial No.	Last Calibration Date	Calibration Interval
R&S ESW 44 EMI Test Receiver	C0658	6 th May 2025	12 Months
ETS Lindgren Loop Antenna 7604	79206	-	-
Chroma Programmable AC Source 61602	C0341	-	-
JTS Environmental Chamber	C0108	26 th November 2024	12 Months
RS Pro 1319A K-Type Thermometer	C0487	8 th August 2025	12 Months
RF Cable 24	20748.03.14.002	6 th October 2025	12 Months

AC Mains conducted emissions equipment

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

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