

TEST REPORT

Test Report No. : UL-RPT-RP15910797-216A

Customer* : FIRE1

Model No. / HVIN* : PN1100-1-X

PMN* : NORM

FCC ID* : 2BQVN-NORMHF01

Test Standard(s) : FCC Parts 15.205, 15.209 & 15.223

Test Laboratory : UL International (UK) Ltd, Basingstoke, Hampshire, RG24 8AH,
United Kingdom

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2. The results in this report apply only to the sample(s) tested.
3. This sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. All information marked with (*) was provided by the Customer, Applicant or Authorised representative
6. Version 3.0 supersedes all previous versions.

Date of Issue: 18 February 2026

Checked by:



Ben Mercer
Lead Test Engineer, Radio Laboratory

Company Signatory:



Sarah Williams
Staff Engineer, Radio Laboratory



5772

Customer Information

Company Name*:	FIRE1
Address*:	DCU Alpha, Old Finglas Road, Glasnevin, Dublin 11, Ireland

Report Revision History

Version Number	Issue Date	Revision Details	Revised By
1.0	19/08/2025	Initial Version	Ben Mercer
2.0	19/08/2025	Model number corrected	Ben Mercer
3.0	18/02/2026	Updated to ANSI C63.10-2020+Cor.1-2023	Ben Mercer

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1 Attestation of Test Results

1.1 Description of EUT

The equipment under test (EUT) was a body worn device to measure a patient's inferior vena cava (IVC) area remotely with a low frequency transmitter operating in the 1.7 to 10 MHz band. The EUT also incorporates a *Bluetooth* Low Energy module.*

1.2 General Information

Specification Reference:	47CFR15.223
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Radio Frequency Devices) - Section 15.223
Specification Reference:	47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.209
Specification Reference:	47CFR15.205
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.205
Site Registration:	685609
FCC Lab. Designation No.:	UK2011
Location of Testing:	Units 3 & 4 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	28 July 2025 & 29 July 2025

1.3 Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
15.223(a)	Transmitter 6 dB Bandwidth	
15.223(a)	Transmitter Fundamental Field Strength	
15.205(a) / 15.209(a) / 15.223(b)	Transmitter Band Edge	
15.205(a) / 15.209(a) / 15.223(b)	Transmitter Radiated Emissions	
Key to Results  = Complied  = Did not comply		

1.4 Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

2 Summary of Testing

2.1 Facilities and Accreditation

The test site and measurement facilities used to collect data are located at Units 3 & 4 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom. The following table identifies which facilities were utilised for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

Site 1	-
Site 2	-
Site 17	-
Site 32	-
Site 33	X

UL International (UK) Ltd is accredited by the United Kingdom Accreditation Service (UKAS). UKAS is one of the signatories to the International Laboratory Accreditation Co-operation (ILAC) Arrangement for the mutual recognition of test reports. The tests reported herein have been performed in accordance with its terms of accreditation.

2.2 Methods and Procedures

Reference:	ANSI C63.10-2020+Cor.1-2023
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Reference:	Notice 2020 – DRS0023, December 18, 2020
Title:	Guidance on magnetic field strength radiated emission measurements (9 kHz – 30 MHz)

2.3 Calibration and Uncertainty

Measuring Instrument Calibration

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

Measurement Uncertainty & Decision Rule

Overview

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

Decision Rule

Measurement system instrumentation shall be used with an accuracy specification meeting the accuracy specification limits according to IEC/IECEE OD-5014.

As applicable, unless specified otherwise in this quotation, the compliance "Decision Rule" is based on Simple Acceptance. If the measured value is on the limit, the result is defined as a pass. In this case the risk of a false positive is 50%. For further information regarding risk assessment refer to ILAC G8:09/2019.

Measurement Uncertainty

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
6dB Bandwidth	1.9 MHz to 2.6 MHz	95%	±3.27 %
Fundamental Field Strength	1.9 MHz to 2.6 MHz	95%	±5.44 dB
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	±5.44 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±4.66 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

2.4 Test and Measurement Equipment

Test Equipment Used for Transmitter 6 dB Bandwidth / Band Edge / Field Strength Tests

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
K226203	3m RSE Chamber	Albatross Projects	N/A	N/A	29 Apr 2026	12
M2040	Thermohygrometer	Testo	608-H1	45124934	20 Dec 2025	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	19 Mar 2026	12
A231567	Pre Amplifier	RF Bay Inc.	LNA-1070	2	28 Apr 2026	12
A225134	Antenna	Teseq, Inc	CBL6111D	62222	13 Mar 2026	12
A3198	Magnetic Loop Antenna	ETS-Lindgren	6502	00221887	05 Nov 2025	12

Test Equipment Used for Transmitter Radiated Emissions Tests

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
K226203	3m RSE Chamber	Albatross Projects	N/A	N/A	29 Apr 2026	12
M2040	Thermohygrometer	Testo	608-H1	45124934	20 Dec 2025	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	19 Mar 2026	12
A231567	Pre Amplifier	RF Bay Inc.	LNA-1070	2	28 Apr 2026	12
A225134	Antenna	Teseq, Inc	CBL6111D	62222	13 Mar 2026	12
A227145	Low Pass Filter	Micro-Tronics	LPM21015	001	06 May 2026	12
A3198	Magnetic Loop Antenna	ETS-Lindgren	6502	00221887	05 Nov 2025	12

3 Equipment Under Test (EUT)

3.1 Identification of Equipment Under Test (EUT)

Brand Name*:	NORM
Model Name or Number*:	PN1100-1-X
Test Sample Serial Number*:	TL965-04-e1a
Hardware Version*:	Not marked or stated
Software Version*:	Not marked or stated
Firmware Version*:	TPN1901-G4 rev01
FCC ID*:	2BQVN-NORMHF01
Date of Receipt:	24 July 2025

3.2 Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.3 Additional Information Related to Testing

Tested Technology:	Low Frequency 1.705-10 MHz
Category of Equipment	Transceiver
Channel Spacing	N/A
Power Supply Requirement*:	4.2V Max Rechargeable Battery
Transmit Frequency Range:	1.9 – 2.6 MHz (Continuously Variable)
Modulation	OOK

3.3.1 Description of Test Setup

Support Equipment

The following support equipment was used to exercise the EUT during testing:

Customer Supplied*:

Description	Brand Name	Model Name or Number	Serial Number
Belt Power Supply	Mean Well	GEM12I05-USBC	EJ4933920
Mobile Phone	Samsung	XCover7	R5CXB21LD3P (Tag ID: D00093)
Mobile Application	FIRE1	NORM	Revision: 05 Version: 4.0.0-182
Sensor	FIRE1	PN740	L0397-01
Plastic Fixture for Belt	Not Marked or Stated	EQ517-LM.5	Not Marked or Stated
Sensor Crimping Tool	Not Marked or Stated	EQ137	Not Marked or Stated

Operating Modes

The EUT was tested in the following operating mode(s):

- Continuous transmitting a low frequency modulated carrier at maximum power, whilst transmitting data to a mobile phone over *Bluetooth* Low Energy.

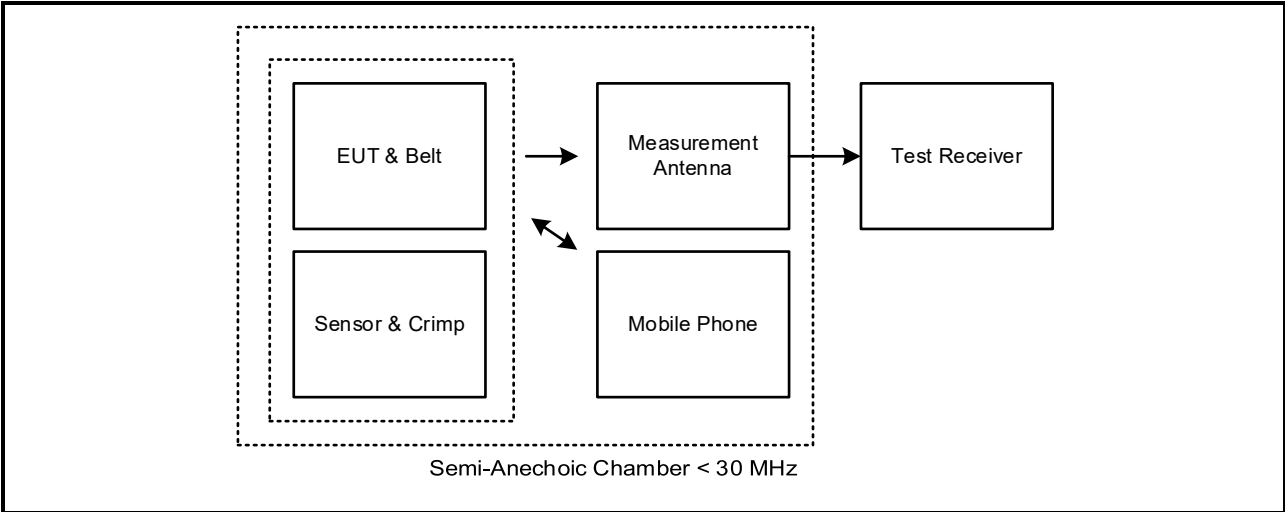
Configuration and Peripherals

The EUT was tested in the following configuration(s):

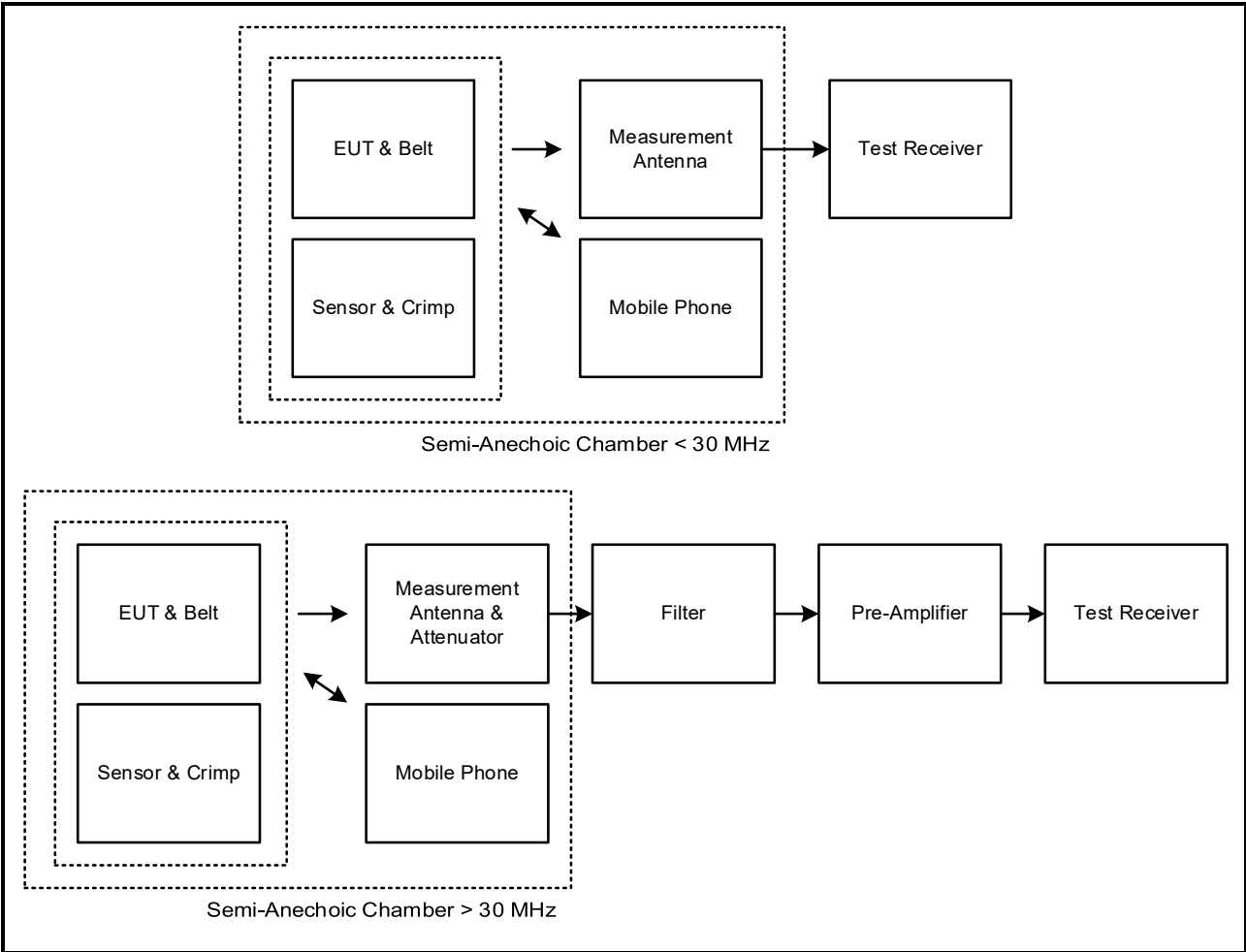
- The EUT was paired with a mobile phone with Norm App. The low frequency transmitter was configured to acquire readings from sensor for 30 minutes.
- The EUT was powered by internal battery. The low frequency transmitter is not active when the device is charging.
- Radiated spurious emission measurements were performed in the worst case orientation determined during previous pre-compliance measurements.
- The sensor was fitted inside a crimping tool that is used to vary the sensor diameter (corresponding to smallest and largest specified IVC diameter for the Norm System). This allows the transmitter frequency to be tuned over the test frequency range.
- Preliminary measurements were performed varying the sensor diameter to determine the maximum emission level. This frequency (2.324 MHz) was used as the middle channel frequency during subsequent tests.

Test Setup Diagrams

Test Setup for Transmitter 6 dB Bandwidth / 99% Emission Bandwidth / Band Edge / Field Strength



Test Setup for Transmitter Radiated Emissions



4. Radiated Test Results

4.1. Transmitter 6 dB Bandwidth

Test Summary:

Test Engineer:	John Ferdinand	Test Date:	28 July 2025
Test Sample Serial Numbers:	TL965-04-e1a		

FCC Reference:	Part 15.223(a)
Test Method Used:	ANSI C63.10 Section 6.9.2

Environmental Conditions:

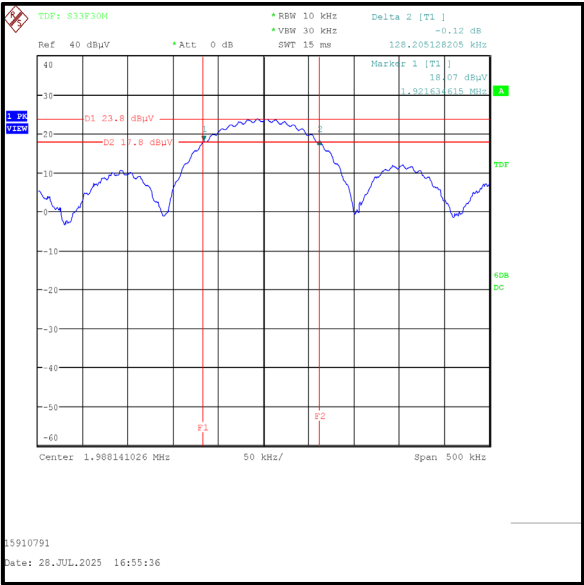
Temperature (°C):	23
Relative Humidity (%):	46

Note(s):

- 1. It was not possible to set the test receiver bandwidth between 1 and 5% of the measured 6 dB bandwidth due to test receiver limitations. The resolution bandwidth was set to the closest value of 10 kHz and the video bandwidth to 30 kHz. A peak detector was used, sweep time was set to auto and the trace mode was Max Hold. The span was set to 500 kHz. Normal and delta markers were placed 6 dB down from the peak of the carrier. The delta value was recorded in the table below.
- 2. The EUT incorporates a non-transmit band from 2.080 MHz to 2.280 MHz to avoid operation within the restricted band of 2.1735 MHz to 2.1905 MHz, as specified in Part 15.205. Measurements were performed at the band edges to verify compliance with Part 15.205 requirements.

Results: Bottom Channel

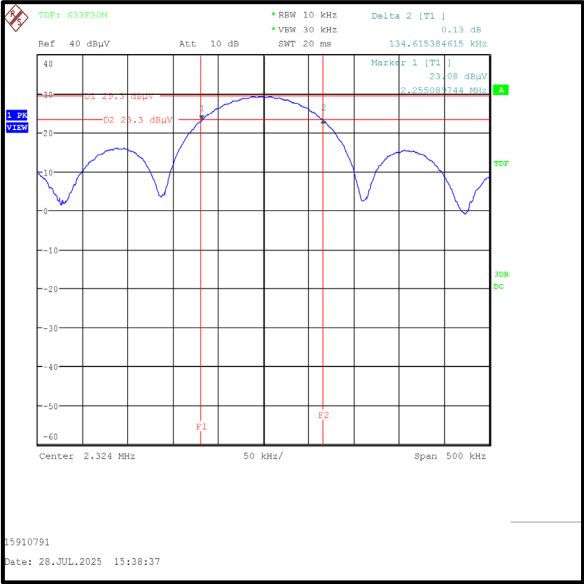
6 dB Bandwidth (kHz)
128.205



Transmitter 6 dB Bandwidth (continued)

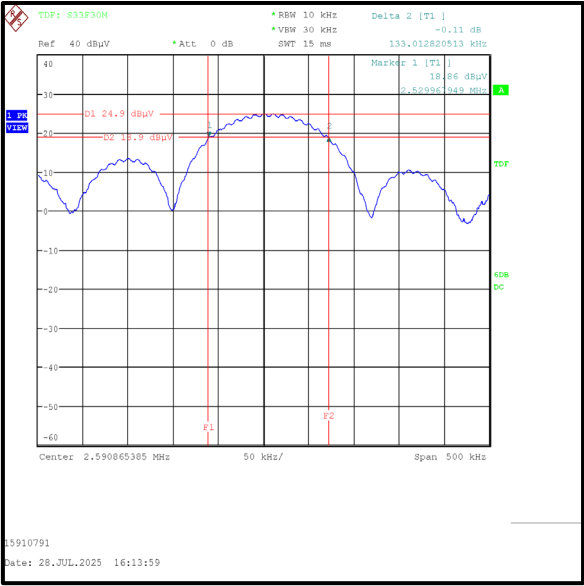
Results: Middle Channel

6 dB Bandwidth (kHz)
134.615



Results: Top Channel

6 dB Bandwidth (kHz)
133.013

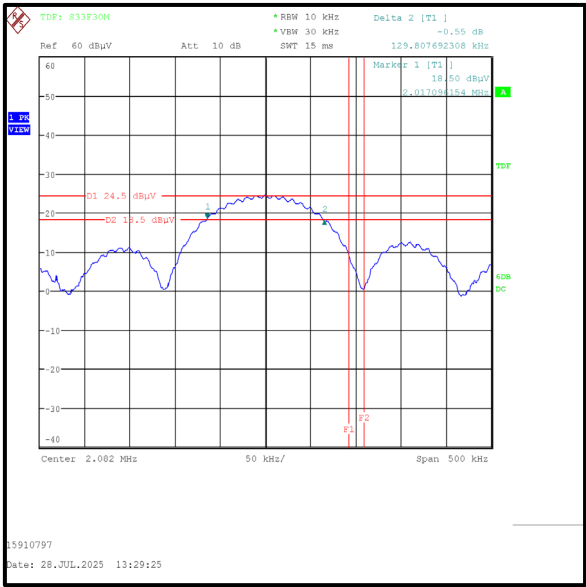


Transmitter 6 dB Bandwidth (continued)

Restricted Band : 2.1735 MHz to 2.1905 MHz

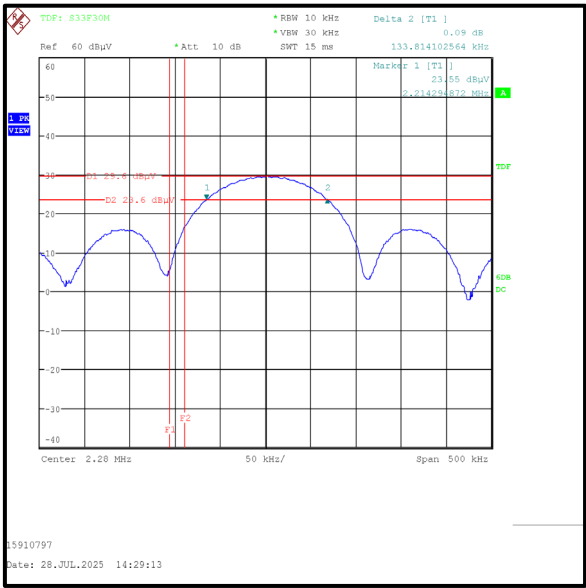
Results: 2.082 MHz

6 dB Bandwidth (kHz)
129.808



Results: 2.280 MHz

6 dB Bandwidth (kHz)
133.814



4.2. Transmitter Fundamental Field Strength

Test Summary:

Test Engineer:	John Ferdinand	Test Date:	28 July 2025
Test Sample Serial Number:	TL965-04-e1a		

FCC Reference:	Parts 15.223(a)
Test Method Used:	ANSI C63.10 Section 6.4

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	46

Note(s):

1. The limit is specified at a test distance of 30 metres. However, as permitted by Part 15.31 (f)(2) / RSS-Gen clause 6.5, measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40dB/decade).
2. Measurements were performed in a semi-anechoic chamber (Asset Number K226203) at 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. As allowed by ANSI C63.10 clause 5.2, an alternative test site that can demonstrate equivalent to an open area test site may be used for measurements below 30 MHz. Therefore, measurements were performed in a semi-anechoic chamber. The correlation data between semi-anechoic chamber and an open field test site is available upon request.
3. Pre-scan measurements were performed using a test receiver with a peak detector and measurement bandwidth of 120 kHz. The fundamental field strength was maximised by rotating the measurement antenna and EUT. The spectrum analyser was then switched to test receiver mode and the final measurement on the maximized level was performed with Peak and Average detector at 120kHz detector.
4. If the 6 dB bandwidth of the emission is less than 10% of the center frequency, the field strength shall not exceed 15 microvolts/meter or (the bandwidth of the device in kHz) divided by (the center frequency of the device in MHz) microvolts/meter at a distance of 30 meters.
5. As per 15.35 b), average radiated emission measurements was performed, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

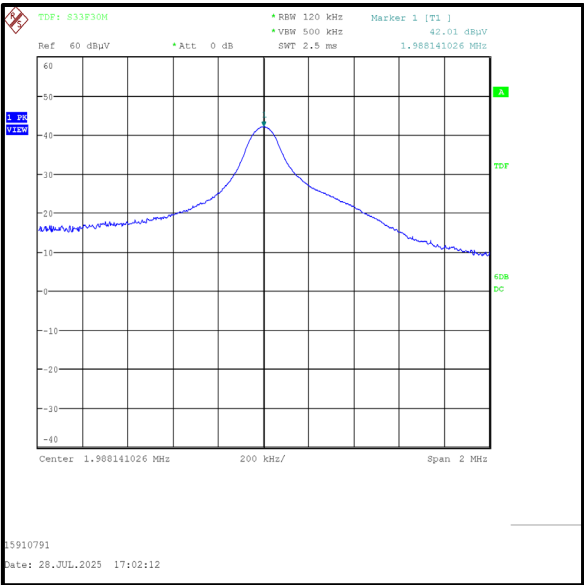
Transmitter Radiated Emissions (Fundamental) (continued)

Results: Bottom Channel / Peak

Antenna Orientation	Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)	Result
0° to EUT	42.0	56.2	14.2	Complied

Results: Bottom Channel / Average

Antenna Orientation	Average Level (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Result
0° to EUT	19.5	36.2	16.7	Complied



Note: This plot is a pre-scan for indication purposes only. For final measurements, see accompanying table.

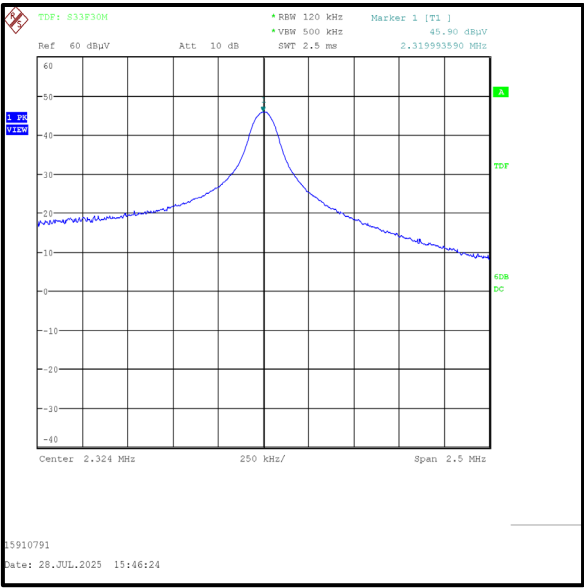
Transmitter Radiated Emissions (Fundamental) (continued)

Results: Middle Channel / Peak

Antenna Orientation	Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)	Result
0° to EUT	45.9	55.3	9.4	Complied

Results: Middle Channel / Average

Antenna Orientation	Average Level (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Result
0° to EUT	23.2	35.3	12.1	Complied



Note: This plot is a pre-scan for indication purposes only. For final measurements, see accompanying table.

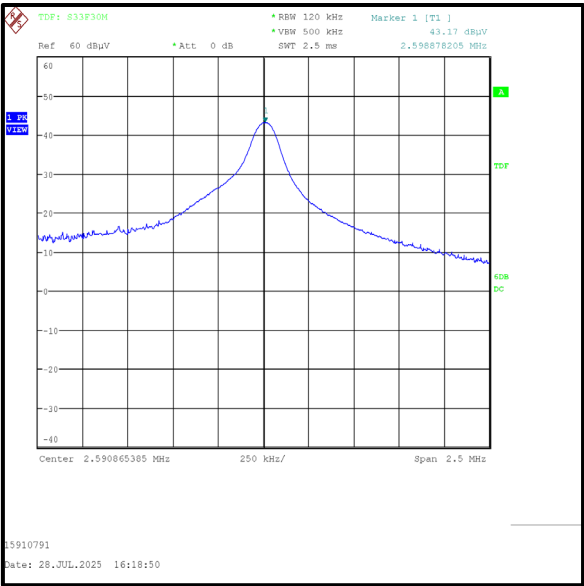
Transmitter Radiated Emissions (Fundamental) (continued)

Results: Top Channel / Peak

Antenna Orientation	Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)	Result
0° to EUT	43.2	54.2	11.0	Complied

Results: Top Channel / Average

Antenna Orientation	Average Level (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Result
0° to EUT	20.6	34.2	13.6	Complied



Note: This plot is a pre-scan for indication purposes only. For final measurements, see accompanying table.

4.3. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	John Ferdinand	Test Date:	28 July 2025
Test Sample Serial Number:	TL965-04-e1a		

FCC Reference:	Parts 15.223(b) / 15.209(a)
Test Method Used:	ANSI C63.10 Section 6.10.5.2 and Notes below

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	46

Note(s):

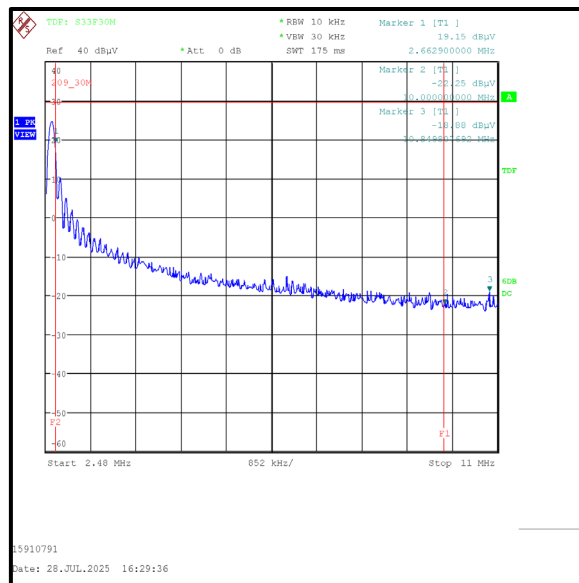
1. The limit is specified at a test distance of 30 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40dB/decade).
2. Measurements were performed in a semi-anechoic chamber (Asset Number K226203) at 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. As allowed by ANSI C63.10 clause 5.2, an alternative test site that can demonstrate equivalent to an open area test site may be used for measurements below 30 MHz. Therefore, measurements were performed in a semi-anechoic chamber. The correlation data between semi-anechoic chamber and an open field test site is available upon request.
3. The test receiver resolution bandwidth was set to 10 kHz and video bandwidth 30 kHz. A peak detector was used, sweep time was set to auto trace and trace mode was Max Hold. The span was set to 1 MHz, with frequency lines placed on the lower and upper band edges. A marker was placed on the band edge spot frequencies.
4. The EUT incorporates a non-transmit band from 2.080 MHz to 2.280 MHz to avoid operation within the restricted band of 2.1735 MHz to 2.1905 MHz, as specified in Part 15.205. Measurements were performed at the band edges to verify compliance with Part 15.205 requirements.

Transmitter Band Edge Radiated Emissions (continued)**Results: Peak / Lower Band Edge**

Frequency (MHz)	Antenna Orientation	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
1.702	0° to EUT	5.4	23.0	17.6	Complied
1.705	0° to EUT	4.8	23.0	18.2	Complied

**Results: Peak / Upper Band Edge**

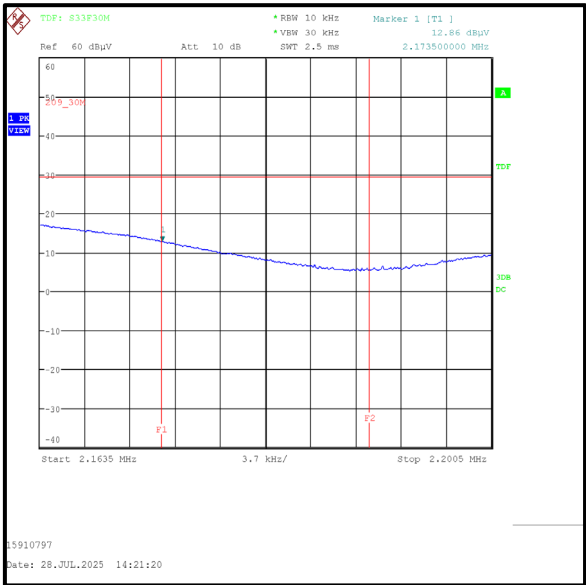
Frequency (MHz)	Antenna Orientation	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
10.000	0° to EUT	-22.3	29.5	51.8	Complied
10.850	0° to EUT	-18.9	29.5	48.4	Complied



Transmitter Band Edge Radiated Emissions (continued)

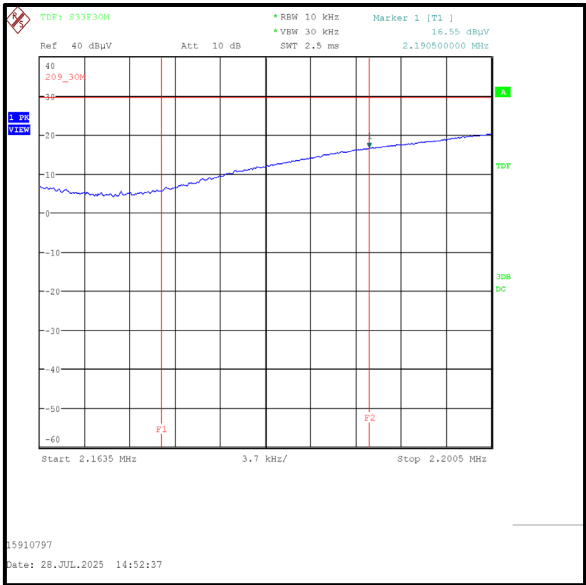
Results: Restricted Band / Peak / 2.082 MHz

Frequency (MHz)	Antenna Orientation	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2.1735	0° to EUT	12.9	29.5	16.6	Complied



Results: Restricted Band / Peak / 2.280 MHz

Frequency (MHz)	Antenna Orientation	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2.1905	0° to EUT	16.55	29.5	13.0	Complied



4.4. Transmitter Radiated Emissions <1GHz

Test Summary:

Test Engineer:	John Ferdinand	Test Dates:	28 July 2025 & 29 July 2025
Test Sample Serial Numbers:	TL965-04-e1a		

FCC Reference:	Parts 15.223(b) & 15.209(a)
Test Method Used:	ANSI C63.10:2013 Sections 6.3 and 6.4
Frequency Range:	9 kHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	46 to 47

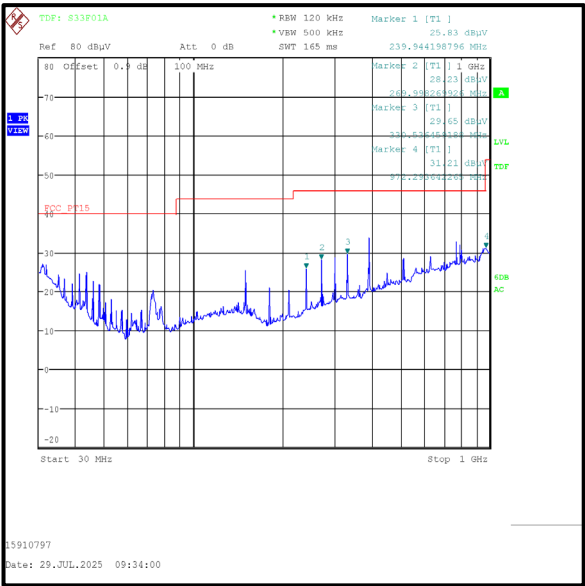
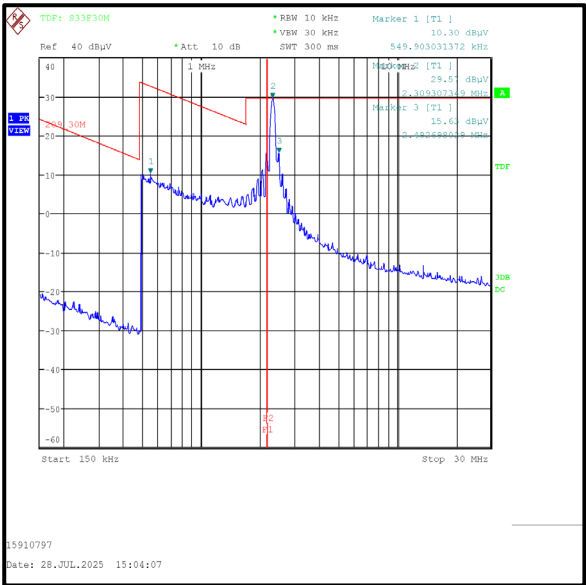
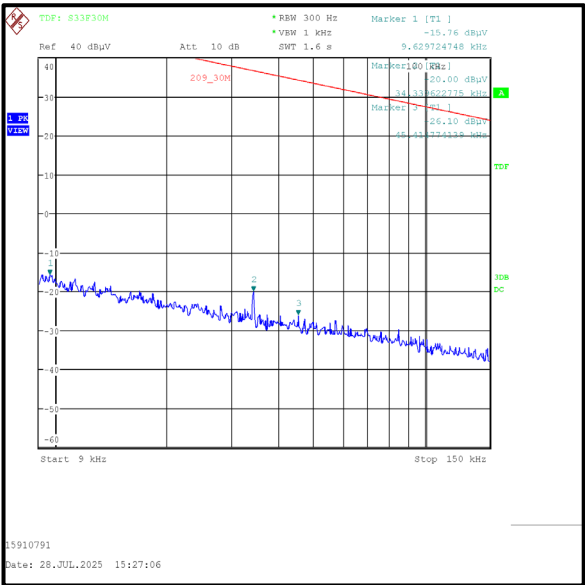
Transmitter Radiated Emissions <1 GHz (continued)**Note(s):**

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. All other emissions were investigated and found to be at least 20 dB below the appropriate limit or below the noise floor of the measurement system.
3. The emission shown at approximately 2.3 MHz is the fundamental emission frequency.
4. Measurements below 30 MHz were performed in a semi-anechoic chamber (Asset Number K226203) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. As allowed by ANSI C63.10 clause 5.2; an alternative test site that can demonstrate equivalence to an open area test site may be used for measurements below 30 MHz. Therefore, measurements were performed in a semi-anechoic chamber. The correlation data between semi-anechoic chamber and an open field test site is available upon request.
5. Measurements below 30 MHz, the measured values at 3 metres were extrapolated to the required measurement distances of 300 metres and 30 metres and compared to the specified limits at those distances:
 - 9 kHz to 490 kHz: measured value extrapolated from 3 metres to 300 metres by subtracting 80 dB at 40 dB / decade
 - 490 kHz to 30 MHz: measured value extrapolated from 3 metres to 30 metres by subtracting 40 dB at 40 dB / decade
6. Measurements from 30 MHz to 1 GHz were performed in a semi-anechoic chamber (Asset Number K226203) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
7. Pre-scans were performed, and markers placed on the highest measured levels. The test receiver was configured as follows: For 9 kHz to 150 kHz, the resolution bandwidth was set to 300 Hz and video bandwidth 1 kHz. A peak detector was used, and trace mode was Max Hold. For 150 kHz to 30 MHz, the resolution bandwidth was set to 10 kHz and video bandwidth 30 kHz, trace mode was Max Hold. For 30 MHz to 1 GHz, the resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
8. Final measurements were performed on the marker frequencies and the results entered into the tables below. The test receiver resolution bandwidth was set to the following bandwidths: 150 kHz to 30 MHz, the measured bandwidth was set to 9 kHz, and 30 MHz to 1 GHz, the measured bandwidth was set to 120 kHz, using a CISPR quasi-peak detector with a measurement time of 15 seconds.

Transmitter Radiated Emissions <1 GHz (continued)

Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
149.996	Vertical	24.1	44.0	19.9	Complied
240.008	Vertical	24.6	46.0	21.4	Complied
270.014	Vertical	27.5	46.0	18.5	Complied
330.008	Vertical	28.6	46.0	17.4	Complied



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

--- END OF REPORT ---