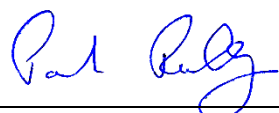


Test Report Number	25E11547-1b
Quotation	Q25-0205-1
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FCC Test Firm Registration	IE0002
Date	16 th Jan 2026
EUT Description	Approve 2 additional antennas for C2PC
FCC ID	2BQMY-M010
Authorised by	Paul Reilly
Authorised Signature:	

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TEST SUMMARY

The equipment complies with the requirements according to the following standards.

FCC 15.247 Section	TEST PARAMETERS	Test Result
15.247 (b)3	Output power Conducted	Pass
15.205 15.209 15.247	Radiated Spurious Emissions/band edge	Pass

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Exhibit A – Technical Report

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Ref report titled Movetru 25E11547-1b Appendices A-F for Appendices A-F

1.0 EUT Description

FCC ID	2BQMY-M010
Type of radio:	Stand-alone
Transmitter Type:	BLE
Operating Frequency Range(s):	2.402 GHz - 2.480GHz
Power configuration:	3.7v Battery.
Node Antenna Type :	Printed antenna
Node Antenna Gain Max:	-1.6 dBi
Node Antenna Impedance:	50 ohms
Hub Antenna Type :	Printed antenna
Hub Antenna Gain Max:	2.5 dBi
Hub Antenna Impedance:	50 ohms
Test Standards:	15.247
Test Methodology:	Measurements performed according to the procedures in ANSI C63.10-2020

This report details tests carried out to approve 2 antennas (Node antenna and Hub Antenna) for BLE module FCCID 2BMY-M010.

The worst case results are reported here.

1.1 EUT Operation

Operating Conditions during Test:

Node Antenna tests

The BLE module was fitted to a host pcb (Node) which contained a printed antenna (Node antenna).

Conducted measurements were carried out on a host pcb (Sample #004) where the antenna was replaced by cable and SMA. The EUT was powered from its internal battery which was fully charged prior to testing.

The EUT was operated in test mode where the channel and modulation was set via USB connection from the EUT to a laptop.

Radiated measurements were performed on a sample (Sample #001 Low , #002 Mid , #003 High channels) with standard internal antenna and powered from its internal battery which was fully charged prior to testing.

The firmware setting for output power was setting 0 dBm (BLE GFSK 1MB/s) for all tests.

Hub Antenna tests

The BLE module was fitted to a host pcb (Hub) which contained a printed antenna (Hub antenna).

Conducted measurements were carried out on a sample (Sample #002) where the antenna was replaced by cable and SMA. The EUT was powered from its internal battery

The EUT was operated in test mode where the channel and modulation was set via USB connection from the EUT to a laptop.

Radiated measurements were performed on a sample (Sample #001) with standard internal antenna and powered from its internal battery which was fully charged prior to testing.

The firmware setting for output power was setting 0 dBm (BLE GFSK 1MB/s) for all tests.

Environmental conditions

	Temperature	Relative Humidity
Test	°C	%
Conducted Emissions	21	48
Radiated Emissions <1GHz	18	42
Radiated Emissions >1GHz	22	53

1.2 Modifications

No modifications were required in order to pass the test specifications.

1.3 Date of Test

The tests were carried out on 5th, 6th, 7th, 8th of Aug and 8th Sept 2025.

1.4 Description of Test modes

Channel List

Channel	Channel	Freq MHz
Low	1	2402
Mid	19	2440
High	39	2480

All tests were performed with the EUT on the low mid and high channels.

The samples were tested with BLE GFSK 1MB/s and this will be the only mode used with the Hub and Node antennas. Note the power setting was based on the original approval of BLE 4.8mW.

2 Emissions Measurements

2.1 Conducted Emissions Measurements

Radio Conducted measurements were carried out on the EUT as per section 1.1 above.

All results were measured as conducted on the antenna except radiated spurious emissions.

2.2 Radiated Emissions Measurements

Radiated Power measurements were made at the Compliance Engineering Ireland Ltd anechoic chamber located in Dunshaughlin, Co. Meath, Ireland to determine the radio noise radiated from the EUT. A "Description of Measurement Facilities" has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules.

The EUT was centred on a motorized turntable, which allows 360 degree rotation.

Emissions below 1GHz were measured using a test antenna positioned at a distance of 3 metres from the EUT (as measured from the closest point of the EUT). The radiated emissions were maximised by configuring the EUT, by rotating the EUT, and by raising and lowering the antenna from 1 to 4 metres. In this case the resolution bandwidth was 100kHz.

Emissions in the 1GHz-18GHz range were measured using a horn antenna located at 3 metres distance from the EUT in a fully anechoic chamber.

The radiated emissions were maximised by configuring the EUT and by rotating the EUT, and by raising and lowering the test antenna from 1 to 4 metres.

Emissions above 18GHz were measured using a horn antenna located at 1 metre distance from the EUT in a fully anechoic chamber. The radiated emissions peaks where detected were maximised by configuring the EUT and by rotating the EUT and raising the test and antenna from 1 to 4 metres.

In this case the resolution bandwidth was 1MHz and video bandwidth was 3 MHz.

A pre-scan was performed to determine the worst case EUT orientation for the radiated measurements.

All radiated tests were performed with the EUT in orientation O2 for Horizontal polarization measurements and with the EUT in orientation O2 for Vertical polarisation measurements.

Ref Appendix E for orientations.

3. Conducted Measurements on Node

3.1 Output power Conducted

4.4.1 Test Method

As per Ansi 63.10 Section 11.9..1.1

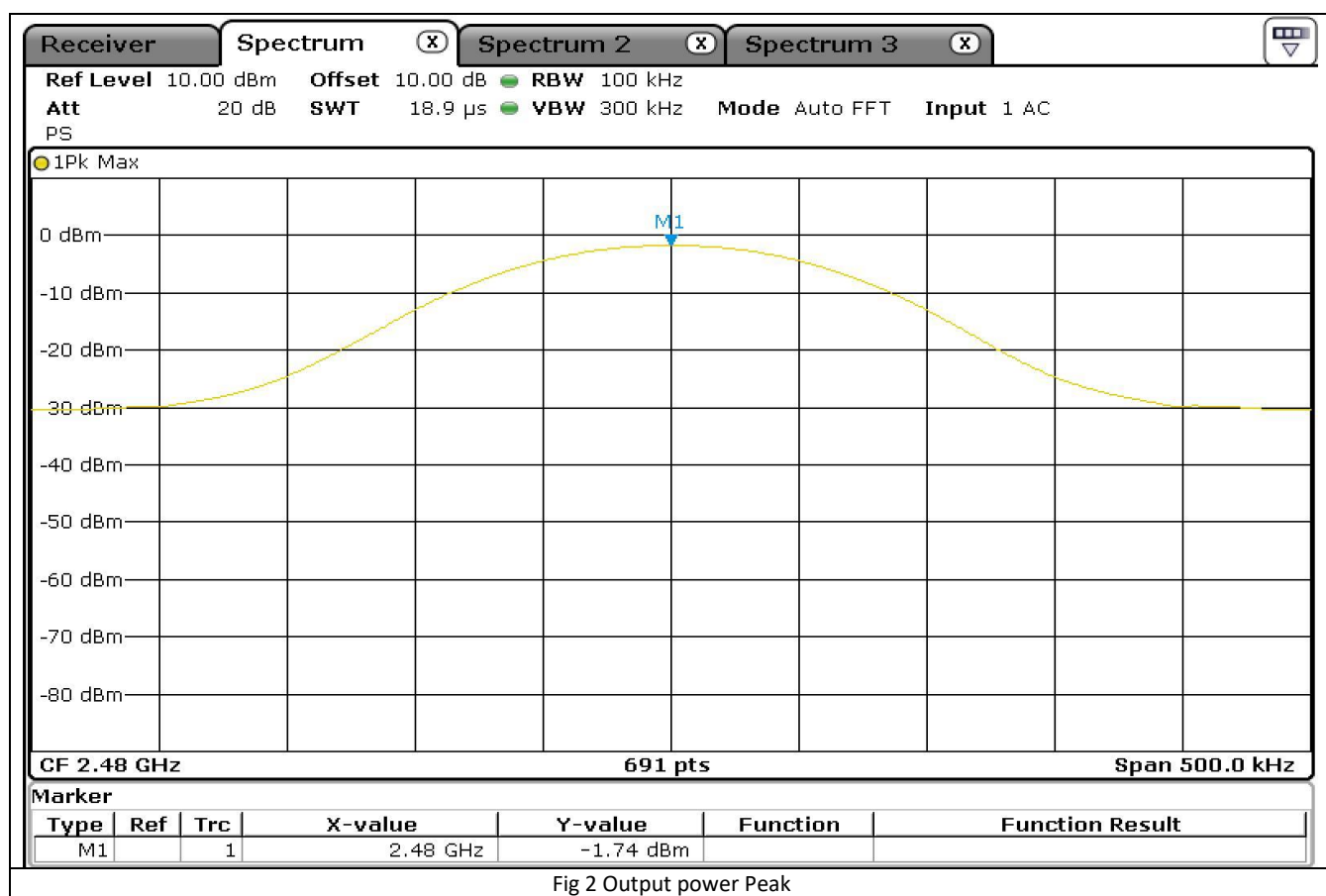
Ansi63.10 Section 11.9.1.1 RBW $\geq$ DTS bandwidth

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

- Set the RBW $\geq$ DTS bandwidth.
- Set VBW $\geq [3 \times \text{RBW}]$.
- Set span $\geq [3 \times \text{RBW}]$.
- Sweep time = auto couple.
- Detector = peak.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use peak marker function to determine the peak amplitude level.

Test performed in CW mode

4.4.2 Results



Frequency	Measurement Conducted Peak	Limit	Margin
MHz	dBm	dBm	dB
2402	-1.69	30	31.69
2440	-1.67	30	31.67
2480	-1.74	30	31.74

Test Result :- Pass

4. Spurious Emissions Measurements Node Antenna

4.1 Radiated Spurious Emissions in Restricted bands

4.1.1 Test Method

As per Ansi63.10 Section 11.12.1 and 6.10.5

Ansi63.10 Section 11.12.1 Radiated emission measurements

Because the typical emission requirements are specified in terms of radiated field strength levels, measurements performed to determine compliance have traditionally relied on a radiated test configuration.⁹² Radiated measurements remain the principal method for determining compliance to the specified requirements; however antenna-port conducted measurements are also now acceptable to determine compliance (see 11.12.2 for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in 6.3, 6.5, and 6.6 shall be followed

6.10.5 Restricted-band band-edge measurements

These procedures are applicable for determining compliance at band edges of restricted bands.

6.10.5.1 Test setup

Restricted-band band-edge tests shall be performed as radiated measurements, on a test site meeting the specifications in 5.2 at the measurement distances specified in 5.3.⁵⁷

The instrumentation shall meet the requirements in 4.1.1 using the bandwidths and detectors specified in 4.1.4.2. Considering the requirements of 5.8, the antenna(s) shall be connected to the antenna ports. When performing radiated measurements, the measurement antenna(s) shall meet the specifications in 4.3. The EUT shall be connected to an antenna and operated at the highest power settings following procedures in 6.3, and the relevant procedure in 6.4, 6.5, or 6.6

As per Ansi 63.10 Section 11.12.2.5.2

The test was performed in CW mode.

4.1.2 Results Low Channel

Frequency	Reading Peak	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Final Field Strength Peak	Average Limit	Margin for Peak v Average Limit +20dB	Result
GHz	dBµV/m		V/H	dB	dB	dB	dBµV/m	dBµV/m	dB	P/F
4.804	43.6	O2	Vertical	33.1	39.3	7.8	45.2	54.0	28.8	Pass
12.010	42.4	O2	Vertical	39.2	37.3	10.9	55.2	54.0	18.8	Pass
4.804	44.3	O2	Horizontal	33.1	39.3	7.8	45.9	54.0	28.1	Pass
12.010	43.0	O2	Horizontal	39.2	37.3	10.9	55.8	54.0	18.2	Pass

Final Field Strength Peak (dBµV/m) = Reading Peak (dBµV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB)

Calculation Example $45.2 = 43.6 + 33.1 - 39.3 + 7.8$

Frequency	Reading Average	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Duty Cycle correction	Final Field Strength Average	Average Limit	Margin	Result
GHz	dBµV/m		V/H	dB	dB	dB	dB	dBµV/m	dBµV/m	dB	P/F
12.010	32.3	O2	Vertical	39.2	37.3	10.9	0.00	45.1	54.0	8.9	Pass
12.010	32.4	O2	Horizontal	39.2	37.3	10.9	0.00	45.2	54.0	8.8	Pass

Final Field Strength Average (dBµV/m) = Reading Average (dBµV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB) + Duty Cycle correction (dB)

Calculation Example $45.1 = 32.3 + 39.2 - 37.3 + 10.9 + 0$

Test Result Pass

4.1.3 Results Mid Channel

Frequency	Reading Peak	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Final Field Strength Peak	Average Limit	Margin for Peak v Average Limit +20dB	Result
GHz	dBµV/m		V/H	dB	dB	dB	dBµV/m	dBµV/m	dB	P/F
4.880	43.9	O2	Vertical	33.2	39	7.8	45.9	54.0	28.1	Pass
7.320	46.4	O2	Vertical	36.4	40.6	10.1	52.3	54.0	21.7	Pass
12.200	41.5	O2	Vertical	39	36.8	10.8	54.5	54.0	19.5	Pass
4.880	44.6	O2	Horizontal	33.2	39	7.8	46.6	54.0	27.4	Pass
7.320	46.8	O2	Horizontal	36.4	40.6	10.1	52.7	54.0	21.3	Pass
12.200	41.8	O2	Horizontal	39	36.8	10.8	54.8	54.0	19.2	Pass

Final Field Strength Peak (dBµV/m) = Reading Peak (dBµV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB)

Calculation Example $45.9 = 43.9 + 33.2 - 39 + 7.8$

Frequency	Reading Average	EUT Orientation	Antenna Polarity	Antenna Factor	Preamplifier Gain	Cable loss	Duty Cycle correction	Final Field Strength Average	Average Limit	Margin	Result
GHz	dBµV/m		V/H	dB	dB	dB	dB	dBµV/m	dBµV/m	dB	P/F
12.200	31.0	O2	Vertical	39	36.8	10.8	0.00	44.0	54.0	10.0	Pass
12.200	31.1	O2	Horizontal	39	36.8	10.8	0.00	44.1	54.0	9.8	Pass

Final Field Strength Average (dBµV/m) = Reading Average (dBµV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB) + Duty Cycle correction (dB)

Calculation Example $44 = 31 + 39 - 36.8 + 10.8 + 0$

Test Result Pass

4.1.4 Results High Channel

Frequency	Reading Peak	EUT Orientation	Antenna Polarity	Antenna Factor	Preamplifier Gain	Cable loss	Final Field Strength Peak	Average Limit	Margin for Peak v Average Limit +20dB	Result
GHz	dBµV/m		V/H	dB	dB	dB	dBµV/m	dBµV/m	dB	P/F
4.960	43.9	O2	Vertical	33.5	39.2	8	46.2	54.0	27.8	Pass
7.440	46.3	O2	Vertical	36.6	40.8	10.4	52.5	54.0	21.5	Pass
12.400	40.8	O2	Vertical	39	37.1	11.3	54.0	54.0	20.0	Pass
4.960	43.6	O2	Horizontal	33.5	39.2	8	45.9	54.0	28.1	Pass
7.440	46.0	O2	Horizontal	36.6	40.8	10.4	52.2	54.0	21.8	Pass
12.400	41.3	O2	Horizontal	39	37.1	11.3	54.5	54.0	19.5	Pass

Final Field Strength Peak (dBµV/m) = Reading Peak (dBµV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB)

Calculation Example $46.2 = 43.9 + 33.5 - 39.2 + 8$

Frequency	Reading Average	EUT Orientation	Antenna Polarity	Antenna Factor	Preamplifier Gain	Cable loss	Duty Cycle correction	Final Field Strength Average	Average Limit	Margin	Result
GHz	dBµV/m		V/H	dB	dB	dB	dB	dBµV/m	dBµV/m	dB	P/F
12.400	31.3	O2	Vertical	39	37.1	11.3	0.00	44.5	54.0	9.4	Pass
12.400	31.5	O2	Horizontal	39	37.1	11.3	0.00	44.7	54.0	9.3	Pass

Final Field Strength Average (dBµV/m) = Reading Average (dBµV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB) + Duty Cycle correction (dB)

Calculation Example $44.5 = 31.3 + 39 - 37.1 + 11.3 + 0$

Test Result Pass

4.2 Radiated Band Edge / Restricted band Measurements

4.2.1 Test Method

11.13.3.2 Peak detection

When using a peak detector to measure unwanted emissions at or near the band edge (within 2 MHz of the authorized band), the following integration procedure can be used:

- a) Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).
- b) Set span to 2 MHz.
- c) RBW = 100 kHz.
- d) VBW $\geq [3 \times \text{RBW}]$.
- e) Detector = peak.
- f) Sweep time = auto.
- g) Trace mode = max hold.
- h) Allow sweep to continue until the trace stabilizes (required measurement time may increase for low-duty-cycle applications).
- i) Compute the power by integrating the spectrum over 1 MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency ($f_{\text{emission}} \pm 0.5 \text{ MHz}$). If the instrument does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by $f_{\text{emission}} \pm 0.5 \text{ MHz}$.

11.12.2.5.2 Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT ($D \geq 98\%$) cannot be achieved and the duty cycle is constant (duty cycle variations are less than $\pm 2\%$), then the following procedure shall be used:

- a) The EUT shall be configured to operate at the maximum achievable duty cycle.
- b) Measure the duty cycle D of the transmitter output signal as described in 11.6.
- c) RBW = 1 MHz (unless otherwise specified).
- d) VBW $\geq [3 \times \text{RBW}]$.
- e) Detector = RMS (power averaging), if $[\text{span} / (\# \text{ of points in sweep})] \leq (\text{RBW} / 2)$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
- f) Averaging type = power (i.e., rms):
 - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
 - 2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.
- g) Sweep time = auto.
- h) Perform a trace average of at least 100 traces.
- i) A correction factor shall be added to the measurement results prior to comparing with the emission limit to compute the emission level that would have been measured had the test been performed at 100% duty cycle.

The correction factor is computed as follows:

- 1) If power averaging (rms) mode was used in step f), then the applicable correction factor is $[10 \log (1 / D)]$, where D is the duty cycle.
- 2) If linear voltage averaging mode was used in step f), then the applicable correction factor is $[20 \log (1 / D)]$, where D is the duty cycle.
- 3) If a specific emission is demonstrated to be continuous ($D \geq 98\%$) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

4.2.3 Result Radiated Restricted Band and band edge near 2.4 GHz band

The test was performed in modulated mode 1MHz channel 500kb/s.

Duty cycle (d) = Ton/Tperiod = 840uS/1mS = 84%

Power averaging method used => Duty cycle correction factor = $10 \cdot \log(1/d) = 0.76$ dB

Ref Appendix B for scans

Calculation for average results to include duty cycle factor

Frequency	Reading Peak	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Final Field Strength Peak	Average Limit	Margin for Peak v Average Limit +20dB	Result
GHz	dBμV/m		V/H	dB	dB	dB	dBμV/m	dBμV/m	dB	P/F
2.400	30.0	O2	Vertical	28.6	0	4.8	63.4	54.0	10.6	Pass
2.400	28.8	O2	Horizontal	28.6	0	4.8	62.2	54.0	11.8	Pass
2.484	24.3	O2	Vertical	28.6	0	4.9	57.8	54.0	16.2	Pass
2.500	24.6	O2	Vertical	28.8	0	4.9	58.3	54.0	15.7	Pass
2.484	24.6	O2	Horizontal	28.6	0	4.9	58.1	54.0	15.9	Pass
2.500	25.2	O2	Horizontal	28.8	0	4.9	58.9	54.0	15.1	Pass

Final Field Strength Peak (dBμV/m) = Reading Peak (dBμV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB)
Calculation Example $63.4 = 30 + 28.6 - 0 + 4.8$

Frequency	Reading Average	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Duty Cycle correction	Final Field Strength Average	Average Limit	Margin	Result
GHz	dBμV/m		V/H	dB	dB	dB	dB	dBμV/m	dBμV/m	dB	P/F
2.390	14.2	O2	Vertical	28.4	0	4.8	0.76	48.2	54.0	5.8	Pass
2.390	14.1	O2	Horizontal	28.4	0	4.8	0.76	47.3	54.0	6.7	Pass
2.4835	14.6	O2	Vertical	28.6	0	4.9	0.76	48.1	54.0	5.9	Pass
2.4835	14.1	O2	Horizontal	28.6	0	4.9	0.76	47.6	54.0	6.3	Pass
2.500	14.0	O2	Horizontal	28.8	0	4.9	0.76	47.7	54.0	6.3	Pass
2.500	14.0	O2	Horizontal	28.8	0	4.9	0.76	47.7	54.0	6.3	Pass

Final Field Strength Average (dBμV/m) = Reading Average (dBμV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB) + Duty Cycle correction (dB)
Calculation Example $48.2 = 14.2 + 28.4 - 0 + 4.8 + 0.76$

Test Result: - Pass

4.3 Radiated Power at fundamental

The test was performed in CW mode

Frequency	Reading Peak	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Final Field Strength Peak	Transmitted Power	Limit	Margin	Result
GHz	dBµV/m		V/H	dB	dB	dB	dBµV/m	dBm	dBm	dB	P/F
2.402	55.8	O2	Vertical	28.6	0	4.8	89.2	-6.0	36.0	42	Pass
2.402	55.3	O2	Horizontal	28.6	0	4.8	88.7	-6.5	36.0	42.5	Pass
2.440	56.7	O2	Vertical	28.6	0	4.8	90.1	-5.1	36.0	41.1	Pass
2.440	56.4	O2	Horizontal	28.6	0	4.8	89.8	-5.4	36.0	41.4	Pass
2.480	58.4	O2	Vertical	28.6	0	4.9	91.9	-3.3	36.0	39.3	Pass
2.480	56.2	O2	Horizontal	28.6	0	4.9	89.7	-5.5	36.0	41.5	Pass

Final Field Strength Peak (dBµV/m) = Reading Peak (dBµV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB)
Calculation Example $89.7 = 56.2 + 28.6 - 0 + 4.9$

Transmitted power (dBm) = Final Field Strength Peak (dBµV/m) - 95.2 dB
Calculation Example $-6 = 89.2 - 95.2$

Note the Radiated field strength was measured at 3 metres and the conversion formula below was used to determine the EIRP in dBm

$$EIRP (dBm) = E_{3m} (dBuV/m) - 95.2$$

Test Result Pass

5. Conducted measurements Hub

5.1 Output power Conducted

5.2.1 Test Method

As per Ansi 63.10 Section 11.9..1.1

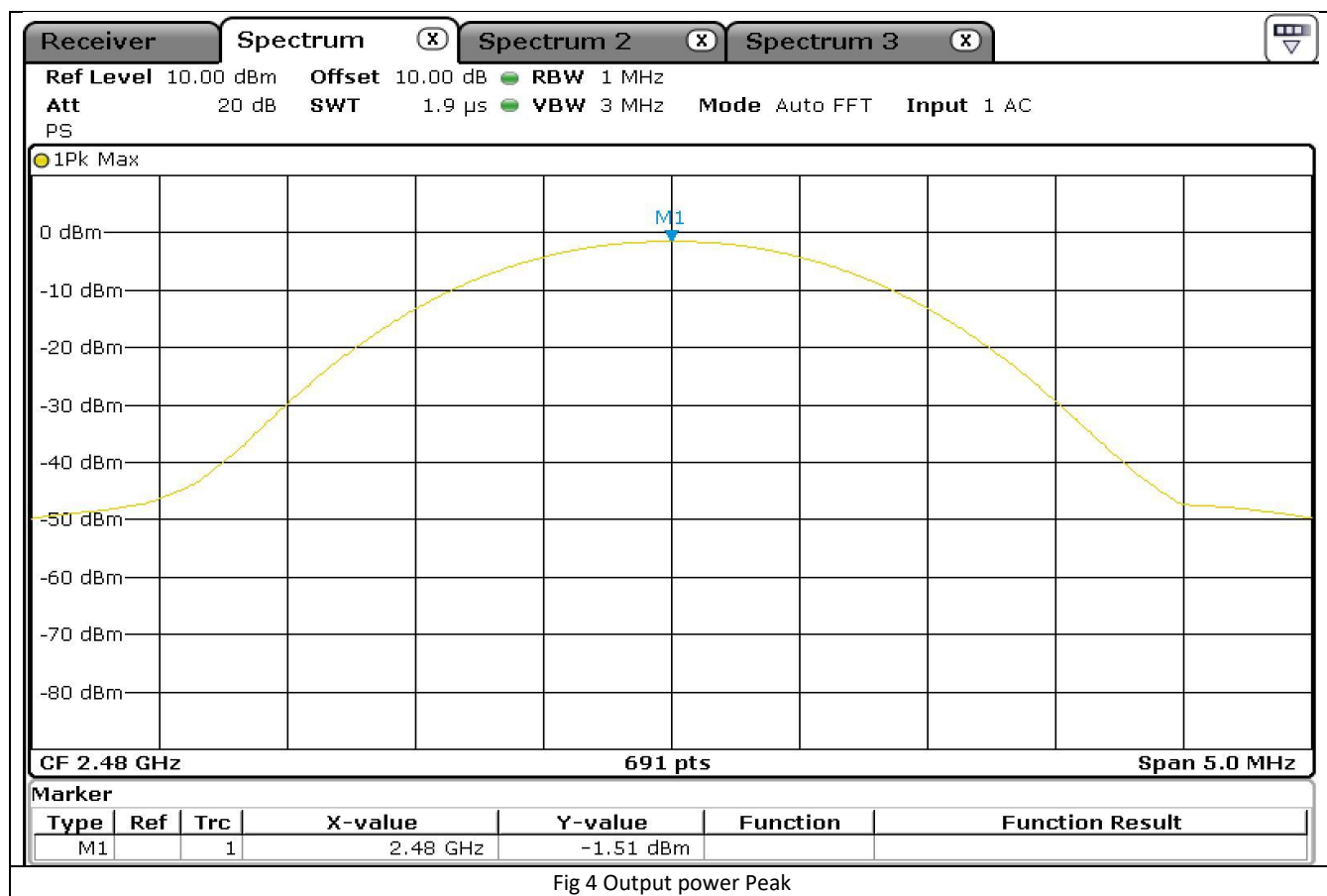
Ansi63.10 Section 11.9.1.1 RBW $\geq$ DTS bandwidth

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

- Set the RBW $\geq$ DTS bandwidth.
- Set VBW $\geq [3 \times \text{RBW}]$.
- Set span $\geq [3 \times \text{RBW}]$.
- Sweep time = auto couple.
- Detector = peak.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use peak marker function to determine the peak amplitude level.

The test was performed in CW Mode

5.2.2 Results



Frequency	Measurement	Limit	Margin
MHz	Conducted Peak	dBm	dB
2402	-1.37	30	31.37
2440	-1.44	30	31.44
2480	-1.51	30	31.51

Test Result :- Pass

6. Spurious Emissions Measurements Hub Antenna

6.1 Radiated Spurious Emissions in Restricted bands

6.1.1 Test Method

As per Ansi63.10 Section 11.12.1 and 6.10.5

Ansi63.10 Section 11.12.1 Radiated emission measurements

Because the typical emission requirements are specified in terms of radiated field strength levels, measurements performed to determine compliance have traditionally relied on a radiated test configuration.⁹² Radiated measurements remain the principal method for determining compliance to the specified requirements; however antenna-port conducted measurements are also now acceptable to determine compliance (see 11.12.2 for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in 6.3, 6.5, and 6.6 shall be followed

6.10.5 Restricted-band band-edge measurements

These procedures are applicable for determining compliance at band edges of restricted bands.

6.10.5.1 Test setup

Restricted-band band-edge tests shall be performed as radiated measurements, on a test site meeting the specifications in 5.2 at the measurement distances specified in 5.3.⁵⁷

The instrumentation shall meet the requirements in 4.1.1 using the bandwidths and detectors specified in 4.1.4.2. Considering the requirements of 5.8, the antenna(s) shall be connected to the antenna ports. When performing radiated measurements, the measurement antenna(s) shall meet the specifications in 4.3. The EUT shall be connected to an antenna and operated at the highest power settings following procedures in 6.3, and the relevant procedure in 6.4, 6.5, or 6.6

As per Ansi 63.10 Section 11.12.2.5.2

The test was performed in CW mode

6.1.2 Results Low Channel

Frequency	Reading Peak	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Final Field Strength Peak	Average Limit	Margin for Peak v Average Limit +20dB	Result
GHz	dBµV/m		V/H	dB	dB	dB	dBµV/m	dBµV/m	dB	P/F
4.804	43.6	O2	Vertical	33.1	39.3	7.8	45.2	54.0	28.8	Pass
12.010	42.4	O2	Vertical	39.2	37.3	10.9	55.2	54.0	18.8	Pass
4.804	44.3	O2	Horizontal	33.1	39.3	7.8	45.9	54.0	28.1	Pass
12.010	43.0	O2	Horizontal	39.2	37.3	10.9	55.8	54.0	18.2	Pass

Final Field Strength Peak (dBµV/m) = Reading Peak (dBµV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB)
 Calculation Example $45.2 = 43.6 + 33.1 - 39.3 + 7.8$

Frequency	Reading Average	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Duty Cycle correction	Final Field Strength Average	Average Limit	Margin	Result
GHz	dBµV/m		V/H	dB	dB	dB	dB	dBµV/m	dBµV/m	dB	P/F
12.010	32.5	O2	Vertical	39.2	37.3	10.9	0.00	45.3	54.0	8.6	Pass
12.010	32.5	O2	Horizontal	39.2	37.3	10.9	0.00	45.3	54.0	8.7	Pass

Final Field Strength Average (dBµV/m) = Reading Average (dBµV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB) + Duty Cycle correction (dB)
 Calculation Example $45.3 = 32.5 + 39.2 - 37.3 + 10.9 + 0$

Test Result Pass**6.1.3 Results Mid Channel**

Frequency	Reading Peak	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Final Field Strength Peak	Average Limit	Margin for Peak v Average Limit +20dB	Result
GHz	dBµV/m		V/H	dB	dB	dB	dBµV/m	dBµV/m	dB	P/F
4.880	43.9	O2	Vertical	33.2	39	7.8	45.9	54.0	28.1	Pass
7.320	46.4	O2	Vertical	36.4	40.6	10.1	52.3	54.0	21.7	Pass
12.200	41.5	O2	Vertical	39	36.8	10.8	54.5	54.0	19.5	Pass
4.880	44.6	O2	Horizontal	33.2	39	7.8	46.6	54.0	27.4	Pass
7.320	46.8	O2	Horizontal	36.4	40.6	10.1	52.7	54.0	21.3	Pass
12.200	41.8	O2	Horizontal	39	36.8	10.8	54.8	54.0	19.2	Pass

Final Field Strength Peak (dBµV/m) = Reading Peak (dBµV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB)
 Calculation Example $45.9 = 43.9 + 33.2 - 39 + 7.8$

Frequency	Reading Average	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Duty Cycle correction	Final Field Strength Average	Average Limit	Margin	Result
GHz	dBµV/m		V/H	dB	dB	dB	dB	dBµV/m	dBµV/m	dB	P/F
12.200	31.5	O2	Vertical	39	36.8	10.8	0.00	44.5	54.0	9.5	Pass
12.200	31.1	O2	Horizontal	39	36.8	10.8	0.00	44.1	54.0	9.9	Pass

Final Field Strength Average (dBµV/m) = Reading Average (dBµV/m) + Antenna Factor (dB)- Pre-amp Gain (dB) +Cable Loss (dB) +Duty Cycle correction (dB)

Calculation Example **44.5 = 31.5 + 39 - 36.8 + 10.8 + 0**

Test Result Pass

6.1.4 Results High Channel

Frequency	Reading Peak	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Final Field Strength Peak	Average Limit	Margin for Peak v Average Limit +20dB	Result
GHz	dBµV/m		V/H	dB	dB	dB	dBµV/m	dBµV/m	dB	P/F
4.960	43.9	O2	Vertical	33.5	39.2	8	46.2	54.0	27.8	Pass
7.440	46.3	O2	Vertical	36.6	40.8	10.4	52.5	54.0	21.5	Pass
12.400	40.8	O2	Vertical	39	37.1	11.3	54.0	54.0	20.0	Pass
4.960	43.6	O2	Horizontal	33.5	39.2	8	45.9	54.0	28.1	Pass
7.440	46.0	O2	Horizontal	36.6	40.8	10.4	52.2	54.0	21.8	Pass
12.400	41.3	O2	Horizontal	39	37.1	11.3	54.5	54.0	19.5	Pass

Final Field Strength Peak (dBµV/m) =Reading Peak (dBµV/m) + Antenna Factor (dB)- Pre-amp Gain (dB) +Cable Loss (dB)

Calculation Example **46.2 = 43.9 + 33.5 - 39.2 + 8**

Frequency	Reading Average	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Duty Cycle correction	Final Field Strength Average	Average Limit	Margin	Result
GHz	dBµV/m		V/H	dB	dB	dB	dB	dBµV/m	dBµV/m	dB	P/F
12.400	31.4	O2	Vertical	39	37.1	11.3	0.00	44.6	54.0	9.4	Pass
12.400	31.3	O2	Horizontal	39	37.1	11.3	0.00	44.5	54.0	9.5	Pass

Final Field Strength Average (dBµV/m) = Reading Average (dBµV/m) + Antenna Factor (dB)- Pre-amp Gain (dB) +Cable Loss (dB) +Duty Cycle correction (dB)

Calculation Example **44.6 = 31.4 + 39 - 37.1 + 11.3 + 0**

Test Result Pass

6.2 Radiated Band Edge / Restricted band Measurements

6.2.1 Test Method

11.13.3.2 Peak detection

When using a peak detector to measure unwanted emissions at or near the band edge (within 2 MHz of the authorized band), the following integration procedure can be used:

- a) Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).
- b) Set span to 2 MHz.
- c) RBW = 100 kHz.
- d) VBW $\geq [3 \times \text{RBW}]$.
- e) Detector = peak.
- f) Sweep time = auto.
- g) Trace mode = max hold.
- h) Allow sweep to continue until the trace stabilizes (required measurement time may increase for low-duty-cycle applications).
- i) Compute the power by integrating the spectrum over 1 MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency ($f_{\text{emission}} \pm 0.5 \text{ MHz}$). If the instrument does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by $f_{\text{emission}} \pm 0.5 \text{ MHz}$.

11.12.2.5.2 Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT ($D \geq 98\%$) cannot be achieved and the duty cycle is constant (duty cycle variations are less than $\pm 2\%$), then the following procedure shall be used:

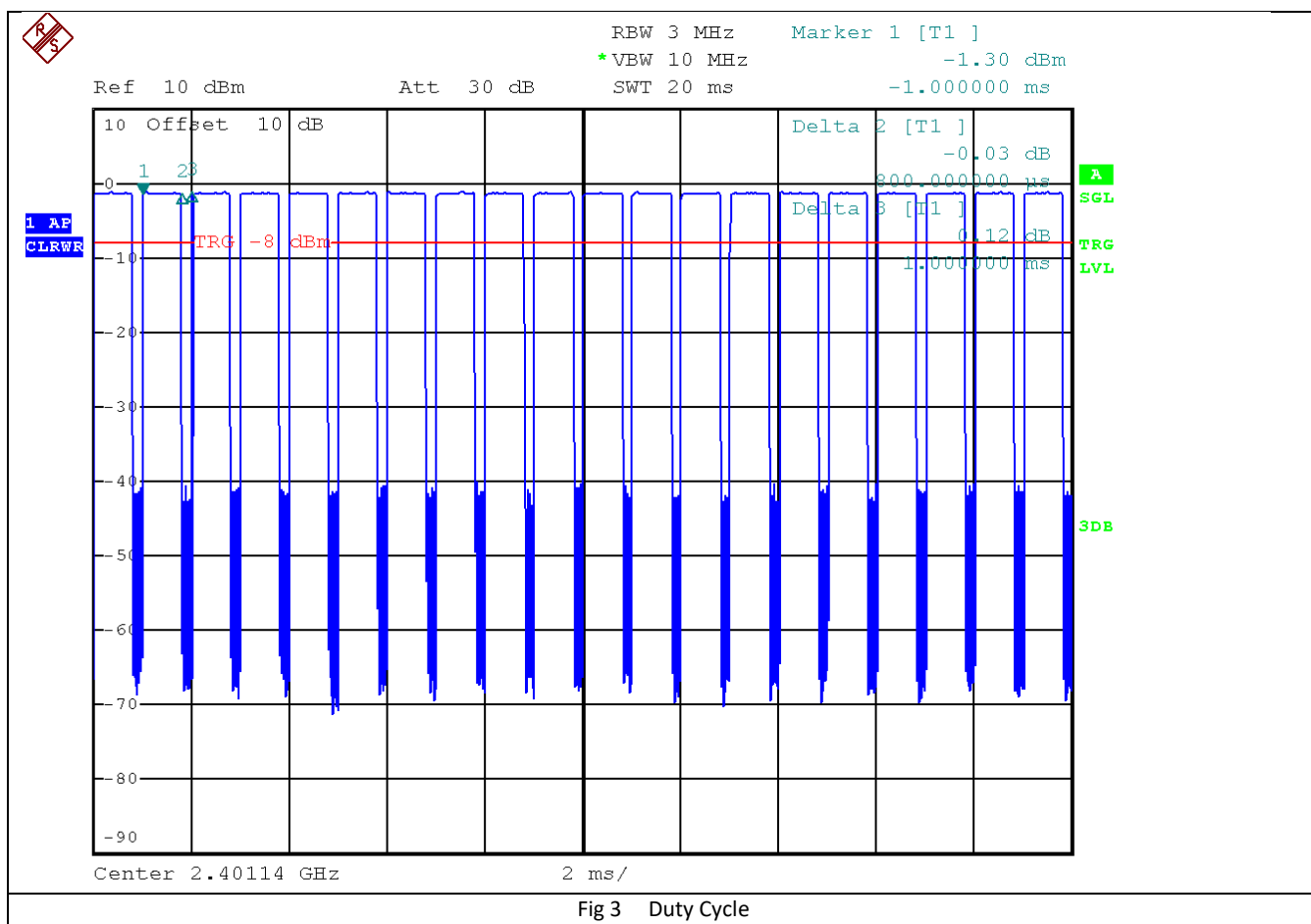
- a) The EUT shall be configured to operate at the maximum achievable duty cycle.
- b) Measure the duty cycle D of the transmitter output signal as described in 11.6.
- c) RBW = 1 MHz (unless otherwise specified).
- d) VBW $\geq [3 \times \text{RBW}]$.
- e) Detector = RMS (power averaging), if $[\text{span} / (\# \text{ of points in sweep})] \leq (\text{RBW} / 2)$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
- f) Averaging type = power (i.e., rms):
 - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
 - 2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.
- g) Sweep time = auto.
- h) Perform a trace average of at least 100 traces.
- i) A correction factor shall be added to the measurement results prior to comparing with the emission limit to compute the emission level that would have been measured had the test been performed at 100% duty cycle.

The correction factor is computed as follows:

- 1) If power averaging (rms) mode was used in step f), then the applicable correction factor is $[10 \log (1 / D)]$, where D is the duty cycle.
- 2) If linear voltage averaging mode was used in step f), then the applicable correction factor is $[20 \log (1 / D)]$, where D is the duty cycle.
- 3) If a specific emission is demonstrated to be continuous ($D \geq 98\%$) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

As per Ansi 63.10 Section 11.6 zero span measurement method

Ansi63.10 Section **11.6 Duty cycle (D), transmission duration (T), and maximum power control level**
 Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%). When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be used to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration (T) over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed T at any time that data are being acquired (i.e., no transmitter OFF-time is to be considered).


$$\text{Duty cycle (d)} = T_{\text{on}}/T_{\text{period}} = 800\mu\text{S}/1\text{mS} = 80\%$$

6.2.3 Result Radiated Restricted Band and band edge near 2.4 GHz band

The test was performed in modulated mode (1MHz channel 500kb/s).

Duty cycle (d) = Ton/Tperiod = 800uS/1mS = 80%

Power averaging method used => Duty cycle correction factor = $10 \cdot \log(1/d) = 0.97$ dB

Calculation for average results to include duty cycle factor

Ref Appendix C for scans

Frequency	Reading Peak	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Final Field Strength Peak	Average Limit	Margin for Peak v Average Limit +20dB	Result
GHz	dBμV/m		V/H	dB	dB	dB	dBμV/m	dBμV/m	dB	P/F
2.400	34.6	O2	Vertical	28.6	0	4.8	68.0	54.0	6.0	Pass
2.400	35.6	O2	Horizontal	28.6	0	4.8	69.0	54.0	5.0	Pass
2.484	12.4	O2	Vertical	28.6	0	4.9	45.9	54.0	28.1	Pass
2.500	32.3	O2	Vertical	28.8	0	4.9	66.0	54.0	8.0	Pass
2.484	30.4	O2	Horizontal	28.6	0	4.9	63.9	54.0	10.1	Pass
2.500	29.0	O2	Horizontal	28.8	0	4.9	62.7	54.0	11.3	Pass

Final Field Strength Peak (dBμV/m) = Reading Peak (dBμV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB)

Calculation Example $68 = 34.6 + 28.6 - 0 + 4.8$

Frequency	Reading Average	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Duty Cycle correction	Final Field Strength Average	Average Limit	Margin	Result
GHz	dBμV/m		V/H	dB	dB	dB	dB	dBμV/m	dBμV/m	dB	P/F
2.390	14.4	O2	Vertical	28.4	0	4.8	0.97	48.6	54.0	5.4	Pass
2.390	14.7	O2	Horizontal	28.4	0	4.8	0.97	47.9	54.0	6.1	Pass
2.4835	14.3	O2	Vertical	28.6	0	4.9	0.97	47.8	54.0	6.2	Pass
2.4835	14.2	O2	Horizontal	28.6	0	4.9	0.97	47.7	54.0	6.3	Pass
2.500	13.7	O2	Horizontal	28.8	0	4.9	0.97	47.4	54.0	6.6	Pass
2.500	13.7	O2	Horizontal	28.8	0	4.9	0.97	47.4	54.0	6.6	Pass

Final Field Strength Average (dBμV/m) = Reading Average (dBμV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB) + Duty Cycle correction (dB)

Calculation Example $48.6 = 14.4 + 28.4 - 0 + 4.8 + 0.97$

Test Result: - Pass

6.3 Radiated Power at fundamental Hub Antenna

Tested in CW mode

Frequency	Reading Peak	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Final Field Strength Peak	Transmitted Power	Limit	Margin	Result
GHz	dBµV/m		V/H	dB	dB	dB	dBµV/m	dBm	dBm	dB	P/F
2.402	62.9	O2	Vertical	28.6	0	4.8	96.3	1.1	36.0	34.9	Pass
2.402	62.4	O2	Horizontal	28.6	0	4.8	95.8	0.6	36.0	35.4	Pass
2.440	62.9	O2	Vertical	28.6	0	4.8	96.3	1.1	36.0	34.9	Pass
2.440	61.1	O2	Horizontal	28.6	0	4.8	94.5	-0.7	36.0	36.7	Pass
2.480	61.2	O2	Vertical	28.6	0	4.9	94.7	-0.5	36.0	36.5	Pass
2.480	59.5	O2	Horizontal	28.6	0	4.9	93.0	-2.2	36.0	38.2	Pass

Final Field Strength Peak (dBµV/m) = Reading Peak (dBµV/m) + Antenna Factor (dB) - Pre-amp Gain (dB) + Cable Loss (dB)
Calculation Example $93 = 59.5 + 28.6 - 0 + 4.9$

Transmitted power (dBm) = Final Field Strength Peak (dBµV/m) - 95.2 dB
Calculation Example $-2.2 = 93 - 95.2$

Note the Radiated field strength was measured at 3 metres and the conversion formula below was used to determine the EIRP in dBm
$$EIRP (dBm) = E_{3m} (dBuV/m) - 95.2$$

Test Result Pass

7 List of Test Equipment

Instrument	Manufacturer	Model	Serial Num	CEI Ref	Cal Date	Cal Interval Months
Microwave Preamplifier	Hewlett Packard	83017A	3123A00175	805	29-Jul-25	12
Spectrum Analyser 30Hz-40GHz	Rohde & Schwarz	FSP40	100053	850	09-Jan-25	36
Test Receiver 3.6GHz	Rohde & Schwarz	ESR	1316.3003k03-101625-s	869	23-May-23	36
Antenna Horn	EMCO	3115	2363	1100	21-Feb-23	36
Fully Anechoic Chamber	CEI	FAR 3M	906	906	12-Aug-25	36
Anechoic Chamber	CEI	SAR 10M	845	845	12-Sept-22	36
Antenna Biconical	EMCO		3110B	847	30-Oct-24	36
Antenna Log Periodic	Chase	UPA6108	1072	609	05-Nov-24	36
Antenna Horn Standard Gain 18-26.5GHz	A-Info	LB-42-25-C-KF	J2021091103028	877	02-Aug-25	12
Cable 20m				1213	29-Jul-25	12
Cable purple Ktype 1.8m				917	29-Jul-25	12
Cable HF Ktype 1.5m				705	29-Jul-25	12
Cable SMA 10m				914	29-Jul-25	12

8 Measurement Uncertainties

Measurement	Uncertainty
Radio Frequency	+/- 5×10^{-7}
Maximum Frequency Deviation	+/- 1.7 %
Conducted Emissions	+/- 1 dB
Radiated Emission 30MHz-300MHz	+/- 5.3 dB
Radiated Emission 300MHz-1GHz	+/- 4.9 dB
Radiated Emission 1GHz-40GHz	+/- 5.4 dB
Modulation bandwidth	+/- 5×10^{-7}
Duty Cycle	+/- 5 %
Power supply	± 0.1 VDC
Temperature	± 0.2 °C
Frequency	± 0.01 ppm

The measurement uncertainties stated were calculated with a k=2 for a confidence level of over 95% as per ETS TR100 028.

The test data can be compared directly to the specification limit to determine compliance, as the calculated measurement uncertainty meets the requirements of the applicable specification.

Ref report titled Movetru 25E11547-1b Appendices A-F