# TEST REPORT

## Test Report No. : UL-RPT-RP12761350-116C

| | | |
|---|---|---|
| **Customer** | : | Remote Diagnostic Technologies Ltd |
| **Model No. / HVIN** | : | 00-1026-R |
| **PMN** | : | Tempus Pro |
| **FCC ID** | : | Contains FCC ID: NCMOMO6012 & PV7-WIBEAR11N-DF2 |
| **ISED Certification No.** | : | Contains IC: 2734A-M06012 & 7738A-WB11NDF2 |
| **Technology** | : | WLAN |
| **Test Standard(s)** | : | FCC Parts 15.209(a) & 15.247(d)<br>Innovation, Science and Economic Development Canada<br>RSS-247 Issue 2 February 2017 Section 5.5 &<br>RSS-Gen Issue 5 April 2018 Section 6.13 |

1. This test report shall not be reproduced except in full, without the written approval of UL VS LTD.
2. The results in this report apply only to the sample(s) tested.
3. The 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. Version 1.0

**Date of Issue:** 02 May 2019

**Checked by:**

Ben Mercer
Senior Test Engineer, Radio Laboratory

**Company Signatory:**

Sarah Williams
Senior Test Engineer, Radio Laboratory
UL VS LTD

ilac-MRA UKAS TESTING 0644

This laboratory is accredited by UKAS. The tests reported herein have been performed in accordance with its' terms of accreditation.

**UL VS LTD**
**Unit 1-3 Horizon, Kingsland Business Park, Wade Road, Basingstoke, Hampshire, RG24 8AH, UK**
**Telephone: +44 (0)1256 312000**
**Facsimile: +44 (0)1256 312001**

## Customer Information

| | |
|---|---|
| **Company Name:** | Remote Diagnostic Technology Ltd |
| **Address:** | Pavilion C2<br>Ashwood Park<br>Ashwood way<br>Basingstoke<br>RG23 8BG<br>United Kingdom |

## Report Revision History

| Version Number | Issue Date | Revision Details | Revised By |
|---|---|---|---|
| 1.0 | 02/05/2019 | Initial Version | Ben Mercer |

## Table of Contents

# 1. Attestation of Test Results

## 1.1. Description of EUT

The equipment under test was a medical vital signs monitor that contains FCC / ISED Canada certified GSM/UMTS, *Bluetooth* and 2.4 GHz WLAN radio modules (FCC ID: NCMOMO6012 & PV7-WIBEAR11N-DF2, ISED Certification No. IC: 2734A-M06012 & 7738-WB11NDF2).

## 1.2. General Information

| | |
|---|---|
| **Specification Reference:** | 47CFR15.247 |
| **Specification Title:** | Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.247 |
| **Specification Reference:** | 47CFR15.209 |
| **Specification Title:** | Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Sections 15.209 |
| **Specification Reference:** | RSS-Gen Issue 5 April 2018 |
| **Specification Title:** | General Requirements for Compliance of Radio Apparatus |
| **Specification Reference:** | RSS-247 Issue 2 February 2017 |
| **Specification Title:** | Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices |
| **FCC Test Firm Registration No.:** | 621311 |
| **ISED#:** | 20903 |
| **CAB Identifier:** | UK0001 |
| **Location of Testing:** | UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom |
| **Test Dates:** | 16 March 2019 to 22 March 2019 |

## 1.3. Summary of Test Results

| FCC Reference (47CFR) | ISED Canada Reference | Measurement | Result |
|---|---|---|---|
| 15.247(d) & 15.209(a) | RSS-Gen 6.13 & RSS-247 5.5 | 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 Unit 3 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 | X |

UL VS LTD is accredited by UKAS. The tests reported herein have been performed in accordance with its terms of accreditation.

## 2.2. Methods and Procedures

| | |
|---|---|
| **Reference:** | ANSI C63.10-2013 |
| **Title:** | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices |

## 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

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 measured (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.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

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 |
|---|---|---|---|
| Radiated Spurious Emissions | 30 MHz to 1 GHz | 95% | ±4.65 dB |
| Radiated Spurious Emissions | 1 GHz to 25 GHz | 95% | ±2.94 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 Radiated Emissions

| Asset No. | Instrument | Manufacturer | Type No. | Serial No. | Date Calibration Due | Cal. Interval (Months) |
|---|---|---|---|---|---|---|
| M2003 | Thermoygrometer | Testo | 608-H1 | 45046641 | 06 Jan 2020 | 12 |
| K0017 | 3m RSE Chamber | Rainford | N/A | N/A | 16 Feb 2020 | 12 |
| M1995 | Test Receiver | Rohde & Schwarz | ESU40 | 100428 | 10 Aug 2019 | 12 |
| A3167 | Pre-Amplifier | Com-Power | PAM-103 | 18020010 | 11 Feb 2020 | 12 |
| A2948 | Pre-Amplifier | Com-Power | PAM-118A | 551087 | 12 Feb 2020 | 12 |
| A3142 | Pre-Amplifier | Schwarzbeck | BBV 9718 B | 00020 | 12 Feb 2020 | 12 |
| A2893 | Pre-Amplifier | Schwarzbeck | BBV 9721 | 9721-021 | 15 Feb 2020 | 12 |
| A3161 | Antenna | Teseq | CBL611D | 50859 | 17 Dec 2019 | 12 |
| A2889 | Antenna | Schwarzbeck | BBHA 9120 B | BBHA 9120 B 563 | 12 Feb 2020 | 12 |
| A2890 | Antenna | Schwarzbeck | HWRD 750 | 014 | 12 Feb 2020 | 12 |
| A2892 | Antenna | Schwarzbeck | BBHA 9170 | 9170-727 | 16 Feb 2020 | 12 |
| A3113 | Attenuator | AtlanTecRF | AN18-06 | 219706#3 | 17 Dec 2019 | 12 |
| A2916 | Attenuator | AltalTecRF | AN18W5-10 | 832827#1 | 20 Feb 2020 | 12 |
| A2131 | Low Pass Filter | AtlanTecRF | AFL-02000 | JFB1004-002 | 20 Feb 2020 | 12 |
| A2914 | High Pass Filter | AltalTecRF | AFH-03000 | 2155 | 20 Feb 2020 | 12 |
| A2947 | High Pass Filter | AltalTecRF | AFH-07000 | 1601900001 | 20 Feb 2020 | 12 |

# 3. Equipment Under Test (EUT)

## 3.1. Identification of Equipment Under Test (EUT)

| | |
|---|---|
| **Brand Name:** | Remote Diagnostic Technology Ltd |
| **Model No. / HVIN:** | 00-1026-R |
| **PMN:** | Tempus Pro |
| **Test Sample Serial Number:** | 602429 |
| **Hardware Version:** | Trizeps VII |
| **Software Version:** | V7.01 |
| **FCC ID:** | Contains FCC ID: NCMOMO6012 & PV7-WIBEAR11N-DF2 |
| **ISED Certification Number:** | Contains IC: 2734A-M06012 & 7738A-WB11NDF2 |

## 3.2. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

## 3.3. Additional Information Related to Testing

| | | | |
|---|---|---|---|
| **Technology Tested:** | WLAN (IEEE 802.11b,g,n) / Digital Transmission System | | |
| **Type of Unit:** | Transceiver | | |
| **Modulation Type:** | DQPSK | | |
| **Data Rates:** | 802.11b | 11 Mbps | |
| **Power Supply Requirement(s):** | Nominal | 12.0 VDC via 120 VAC 60 Hz | |
| **Channel Spacing:** | 20 MHz | | |
| **Transmit Frequency Range:** | 2412 MHz to 2472 MHz | | |
| **Transmit Channels Tested:** | **Channel ID** | **Channel Number** | **Channel Frequency (MHz)** |
| | Bottom | 1 | 2412 |
| | Middle | 6 | 2437 |
| | Top | 11 | 2462 |

## 3.4. Description of Available Antennas

The radio utilises an integrated antenna with the following maximum gain:

| Manufacturer | Model | Type | Frequency Range (MHz) | Antenna Gain (dBi) |
|---|---|---|---|---|
| Antenova | A10470-BLADE | Monopole | 2400 to 2500 | Not specified |

## 3.5. Description of Test Setup

### EUT Accessories

The following accessories were used to exercise the EUT during testing:

| | |
|---|---|
| **Description:** | Power Supply |
| **Brand Name:** | ASTEC |
| **Model Name or Number:** | DPS53-M / RDT Tempus PSU 01-2049 |
| **Serial Number:** | Not marked or stated |

| | |
|---|---|
| **Description:** | Earpiece. Quantity 1 |
| **Brand Name:** | Not marked or stated |
| **Model Name or Number:** | Not marked or stated |
| **Serial Number:** | Not marked or stated |

| | |
|---|---|
| **Description:** | Pulse Oximeter (Masimo rainbow finger sensor). Quantity 1 |
| **Brand Name:** | Not marked or stated |
| **Model Name or Number:** | Not marked or stated |
| **Serial Number:** | Not marked or stated |

| | |
|---|---|
| **Description:** | End Tidal C02 Monitor (plastic hose). Quantity 1 |
| **Brand Name:** | Not marked or stated |
| **Model Name or Number:** | Not marked or stated |
| **Serial Number:** | Not marked or stated |

| | |
|---|---|
| **Description:** | ECG (RDT 12-lead cable 01-2073). Quantity 1 |
| **Brand Name:** | Not marked or stated |
| **Model Name or Number:** | Not marked or stated |
| **Serial Number:** | Not marked or stated |

| | |
|---|---|
| **Description:** | Non-invasive blood pressure monitor (plastic hose). Quantity 1 |
| **Brand Name:** | Not marked or stated |
| **Model Name or Number:** | Not marked or stated |
| **Serial Number:** | Not marked or stated |

| | |
|---|---|
| **Description:** | Contact temperature thermocouple. Quantity 2 |
| **Brand Name:** | Not marked or stated |
| **Model Name or Number:** | Not marked or stated |
| **Serial Number:** | Not marked or stated |

## EUT Accessories (continued)

| | |
|---|---|
| **Description:** | USB Cable (RDT data transfer cable 01-2243). Quantity 1 |
| **Brand Name:** | Not marked or stated |
| **Model Name or Number:** | Not marked or stated |
| **Serial Number:** | Not marked or stated |

| | |
|---|---|
| **Description:** | Invasive blood pressure; internal (RDT 2-channel cable 01-2108 & 01-2113 with transducers) |
| **Brand Name:** | Not marked or stated |
| **Model Name or Number:** | Not marked or stated |
| **Serial Number:** | Not marked or stated |

## Support Equipment

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

| | |
|---|---|
| **Description:** | Laptop PC |
| **Brand Name:** | Lenovo |
| **Model Name or Number:** | L430 |
| **Serial Number:** | R9-Z2L03 13/06 |

| | |
|---|---|
| **Description:** | USB Cable. Length 2 metres. Quantity 1. |
| **Brand Name:** | Not marked or stated |
| **Model Name or Number:** | Not marked or stated |
| **Serial Number:** | Not marked or stated |

| | |
|---|---|
| **Description:** | Ethernet Cable. Length 2 metres. Quantity 1. |
| **Brand Name:** | Not marked or stated |
| **Model Name or Number:** | Not marked or stated |
| **Serial Number:** | Not marked or stated |

| | |
|---|---|
| **Description:** | USB Hub |
| **Brand Name:** | HAMA |
| **Model Name or Number:** | 00078498 |
| **Serial Number:** | Not marked or stated |

| | |
|---|---|
| **Description:** | Ethernet Hub |
| **Brand Name:** | Netgear |
| **Model Name or Number:** | DG834G |
| **Serial Number:** | 1JX167B008C4A |

## Support Equipment (continued)

| | |
|---|---|
| **Description:** | Wideband Radio Comms Tester |
| **Brand Name:** | Rohde & Schwarz |
| **Model Name or Number:** | CMW 500 |
| **Serial Number:** | 145923 |

## Operating Modes

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

- Continuously transmitting with a modulated carrier at maximum power on the relevant channels as required using the supported data rates/modulation types.

## Configuration and Peripherals

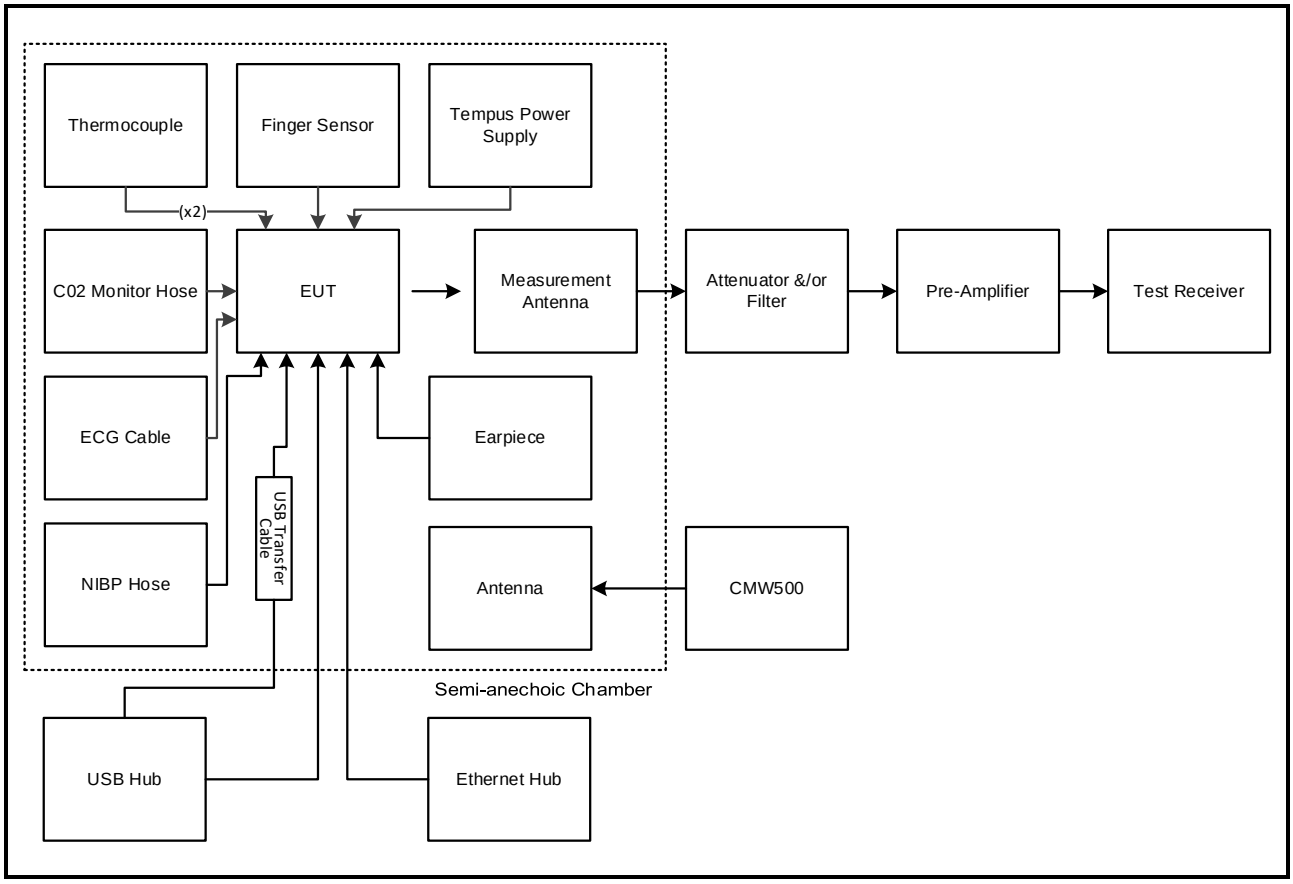
The EUT was tested in the following configuration(s):

- WLAN was configured using a command prompt application installed on the laptopc PC supplied by the customer. The application was used to enable continuous transmission and to select the test channels as required.
- Transmitter radiated spurious emissions were performed with the EUT transmitting with a worst case data rate of 11 Mbps as declared by the client.
- The EUT was powered from a 120 VAC 60 Hz single phase supply via a 12V power adaptor.
- All ports were terminated with typical end-user hardware.

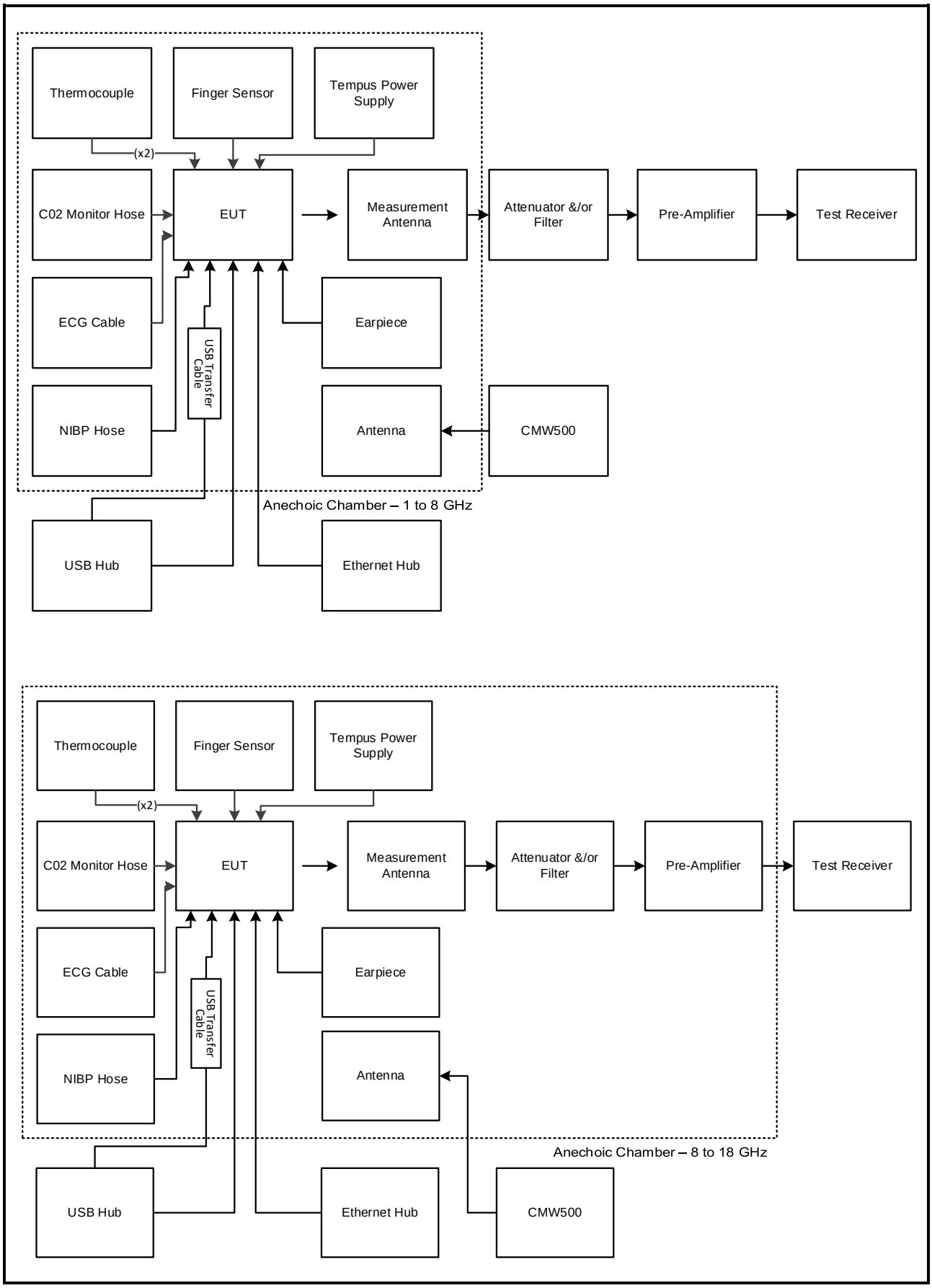
## Test Setup Diagrams

## Radiated Tests:

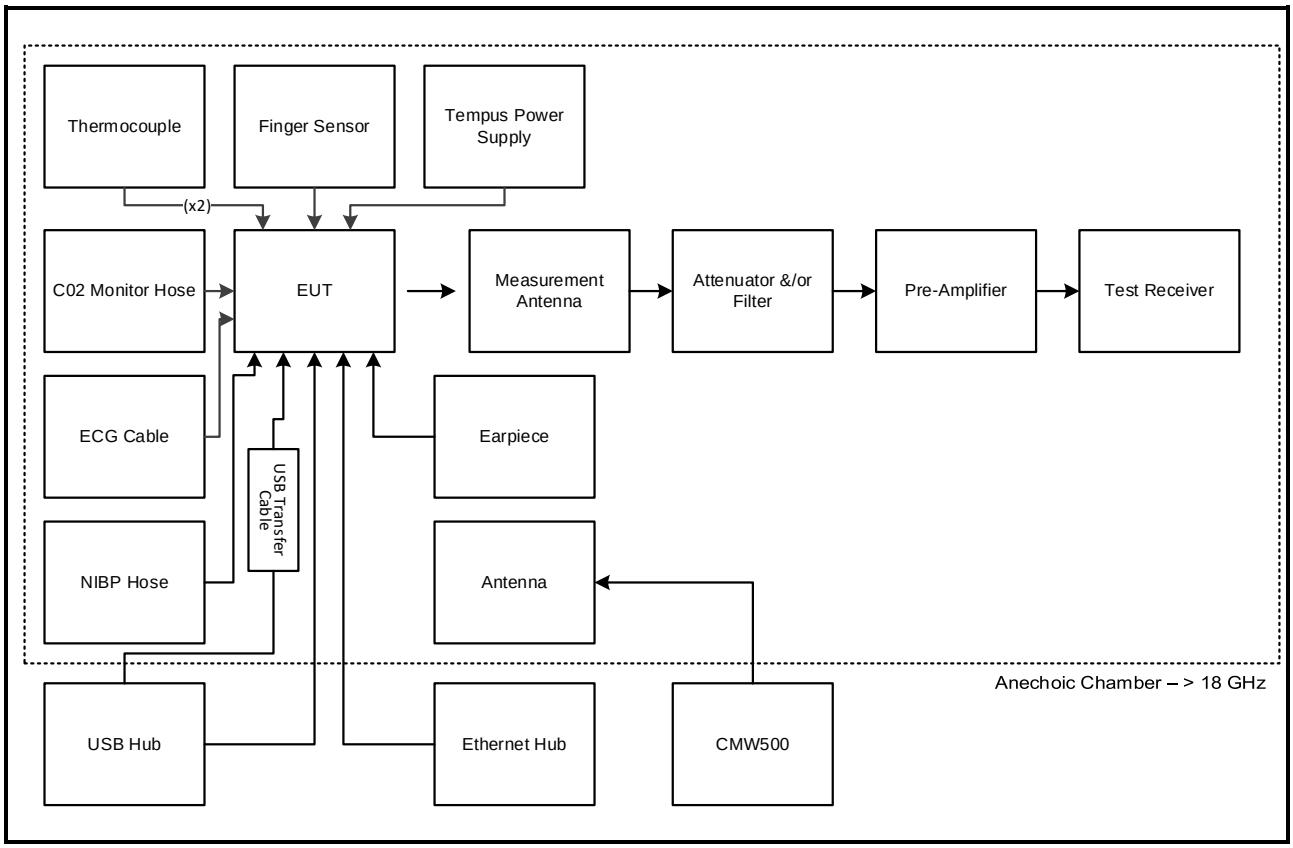
## Test Setup for Transmitter Radiated Emissions



## Test Setup for Transmitter Radiated Emission (continued)



## Test Setup for Transmitter Radiated Emission (continued)



# 4. Radiated Test Results

## 4.1. Transmitter Radiated Emissions <1 GHz

### Test Summary:

| | | | |
|---|---|---|---|
| **Test Engineer:** | Mark Perry | **Test Date:** | 22 March 2019 |
| **Test Sample Serial Number:** | 602429 | | |

| | |
|---|---|
| **FCC Reference:** | Parts 15.247(d) & 15.209(a) |
| **ISED Canada Reference:** | RSS-Gen 6.13 & RSS-247 5.5 |
| **Test Method Used:** | ANSI C63.10 Sections 6.3 and 6.5 |
| **Frequency Range** | 30 MHz to 1000 MHz |

### Environmental Conditions:

| | |
|---|---|
| **Temperature (°C):** | 21 to 24 |
| **Relative Humidity (%):** | 37 to 51 |

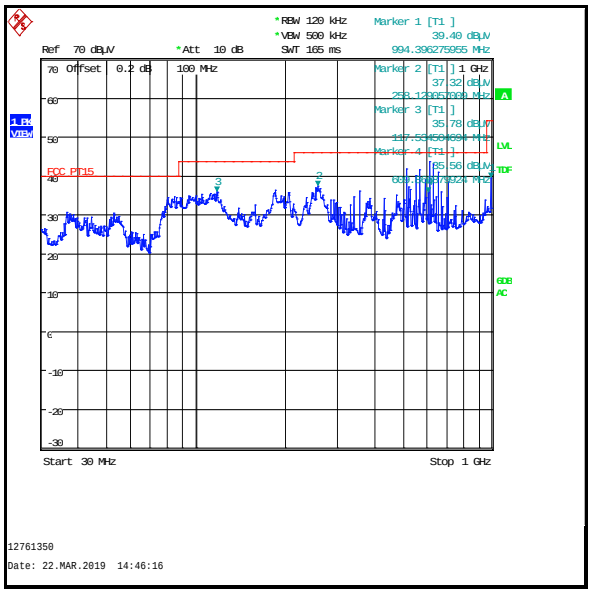
### Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the middle channel only.
3. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0017) 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.
4. Pre-scans were performed with the EUT transmitting on middle channel with a data rate of 802.11b 11 Mbit/s and markers placed on the highest measured levels. The test receiver 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.
5. Final measurements were performed on the marker frequencies and the results entered into the table below. The test receiver resolution bandwidth was set to 120 kHz, using a CISPR quasi-peak detector and span wide enough to see the whole emission.

## Transmitter Radiated Emissions (continued)

## Results: Middle Channel / 802.11b / 11Mbps

| Frequency (MHz) | Antenna Polarity | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Result |
|---|---|---|---|---|---|
| 112.840 | Vertical | 30.3 | 43.5 | 13.2 | Complied |
| 250.119 | Horizontal | 30.1 | 46.0 | 15.9 | Complied |
| 331.780 | Vertical | 30.6 | 46.0 | 15.4 | Complied |
| 609.043 | Horizontal | 31.1 | 46.0 | 14.9 | Complied |
| 613.903 | Horizontal | 36.4 | 46.0 | 9.6 | Complied |
| 990.024 | Vertical | 37.2 | 54.0 | 16.8 | Complied |




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

## 4.2. Transmitter Radiated Emissions >1 GHz

### Test Summary:

| | | | |
|---|---|---|---|
| **Test Engineer:** | Mark Perry | **Test Dates:** | 16 March 2019 & 17 March 2019 |
| **Test Sample Serial Number:** | 602429 | | |

| | |
|---|---|
| **FCC Reference:** | Parts 15.247(d) & 15.209(a) |
| **ISED Canada Reference:** | RSS-Gen 6.13 & RSS-247 5.5 |
| **Test Method Used:** | ANSI C63.10 Sections 6.3, 6.6, 11.11 & 11.12 |
| **Frequency Range** | 1 GHz to 25 GHz |

### Environmental Conditions:

| | |
|---|---|
| **Temperature (°C):** | 21 to 24 |
| **Relative Humidity (%):** | 37 to 43 |

### Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. The emission shown on the 1 GHz to 3 GHz plot is the EUT fundamental.
3. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak and average noise floor readings of the measuring receiver were recorded as shown in the tables below.
4. Pre-scans were performed in a fully anechoic chamber (Asset Number K0017) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT.
5. Pre-scans were performed with the EUT transmitting on middle channel with a data rate of 802.11b 11 Mbit/s and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto.

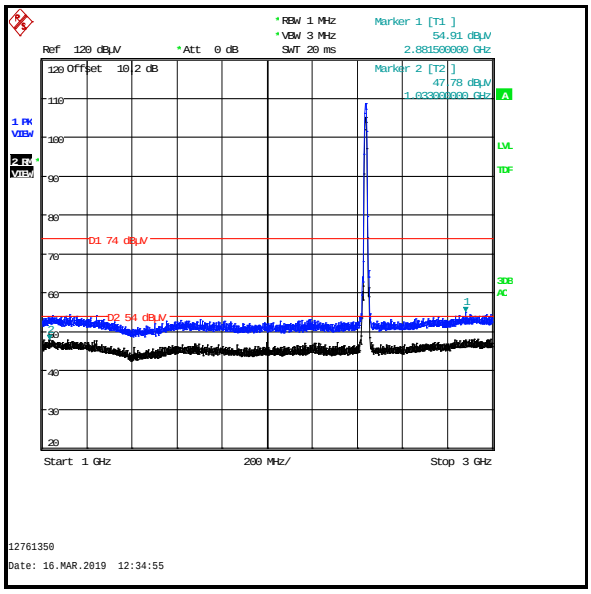
### Results: Peak

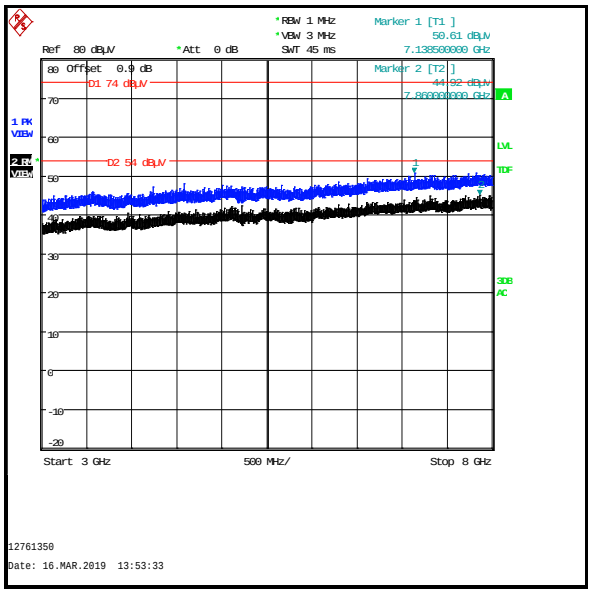
| Frequency (MHz) | Antenna Polarity | Peak Level (dBµV/m) | Peak Limit (dBµV/m) | Margin (dB) | Result |
|---|---|---|---|---|---|
| 2881.500 | Vertical | 54.9 | 74.0 | 19.1 | Complied |

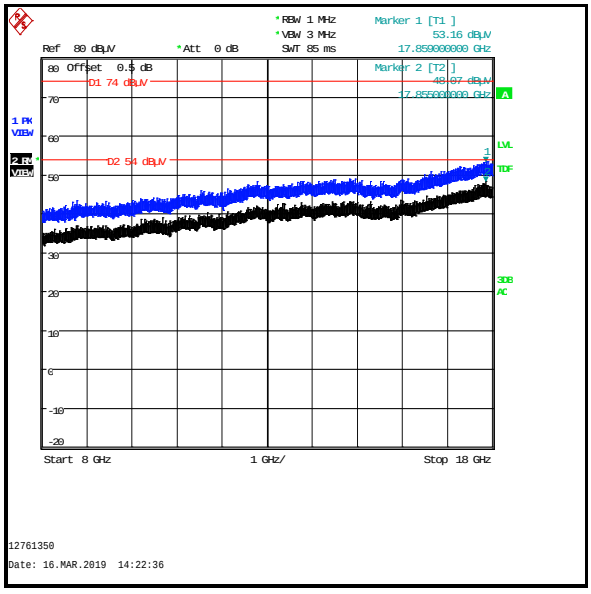
### Results: Average

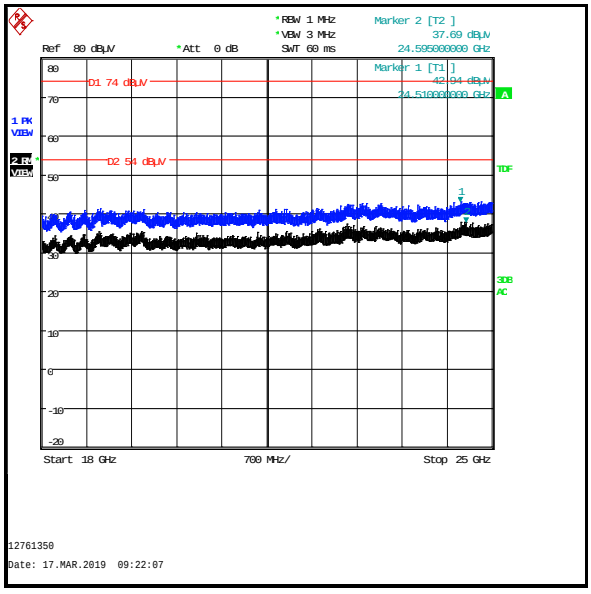
| Frequency (MHz) | Antenna Polarity | Average Level (dBµV/m) | Average Limit (dBµV/m) | Margin (dB) | Result |
|---|---|---|---|---|---|
| 1033.000 | Vertical | 47.8 | 54.0 | 6.2 | Complied |

## Transmitter Radiated Emissions (continued)

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