



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)
Innovation, Science and Economic Development Canada
RSS-247 Issue 2 February 2017 Section 5.5 &
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



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

UL VS LTD

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Customer Information

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Report Revision History

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

Table of Contents

Customer Information.....	2
Report Revision History	2
1. Attestation of Test Results.....	4
1.1. Description of EUT	4
1.2. General Information	4
1.3. Summary of Test Results	4
1.4. Deviations from the Test Specification	4
2. Summary of Testing.....	5
2.1. Facilities and Accreditation	5
2.2. Methods and Procedures	5
2.3. Calibration and Uncertainty	6
2.4. Test and Measurement Equipment	7
3. Equipment Under Test (EUT)	8
3.1. Identification of Equipment Under Test (EUT)	8
3.2. Modifications Incorporated in the EUT	8
3.3. Additional Information Related to Testing	9
3.4. Description of Available Antennas	9
3.5. Description of Test Setup	10
4. Radiated Test Results.....	16
4.1. Transmitter Radiated Emissions <1 GHz	16
4.2. Transmitter Radiated Emissions >1 GHz	18

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 CO2 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

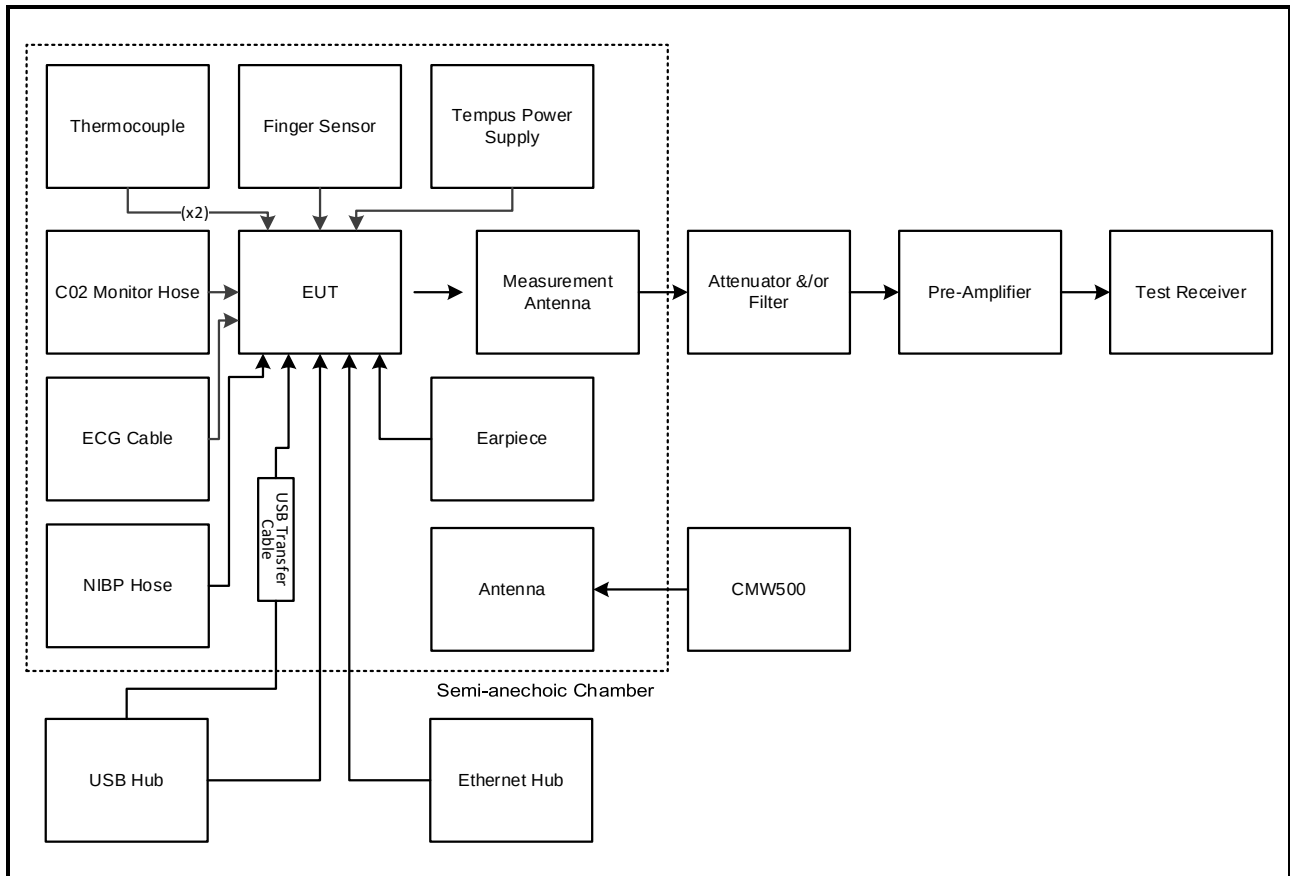
The EUT was tested in the following configuration(s):

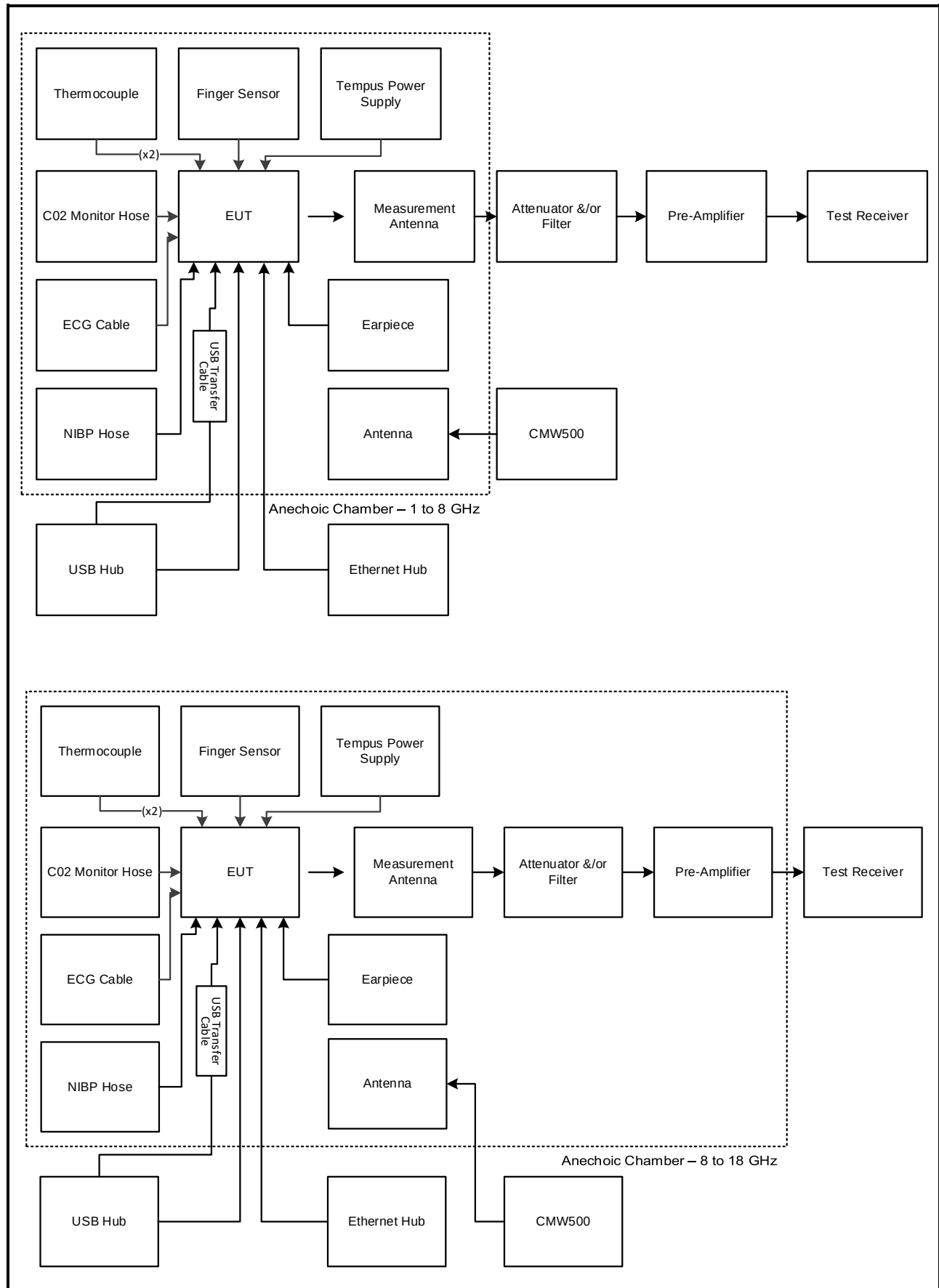
- WLAN was configured using a command prompt application installed on the laptop PC supplied by the customer. The application was used to enable continuous transmission and to select the test channels as required.
- Transmitter radiated spurious emissions were performed with the EUT transmitting with 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

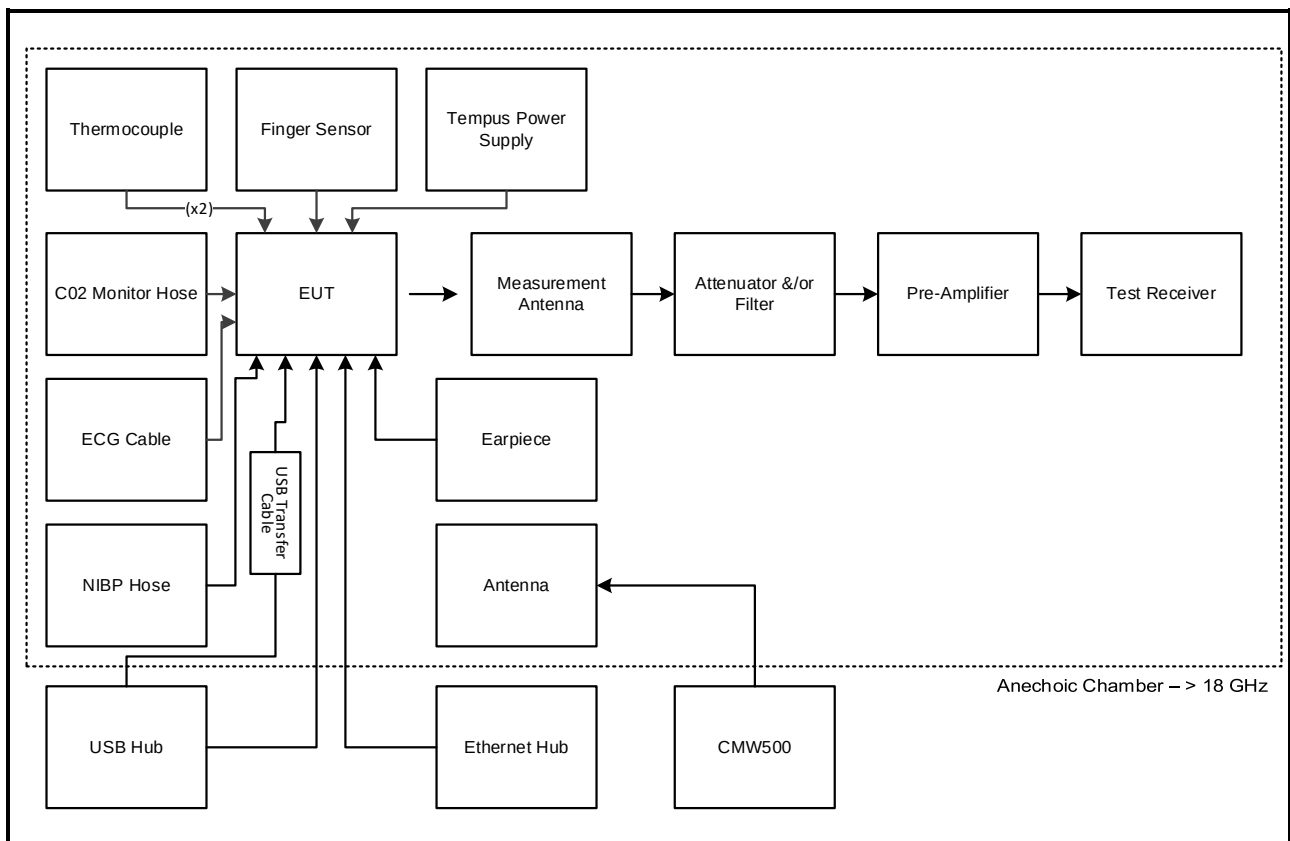
Radiated Tests:

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:

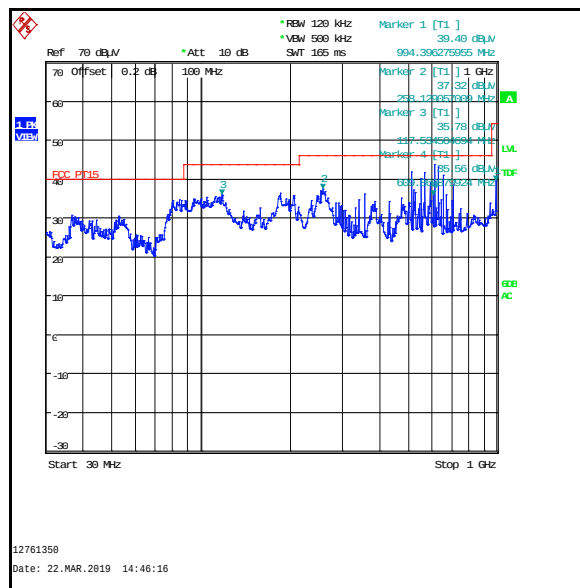
Temperature (°C):	21 to 24
Relative Humidity (%):	37 to 51

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 (dB μ V/m)	Limit (dB μ V/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.

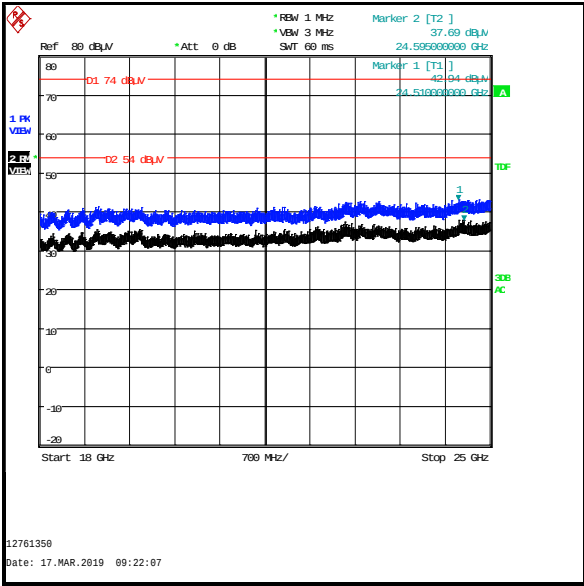
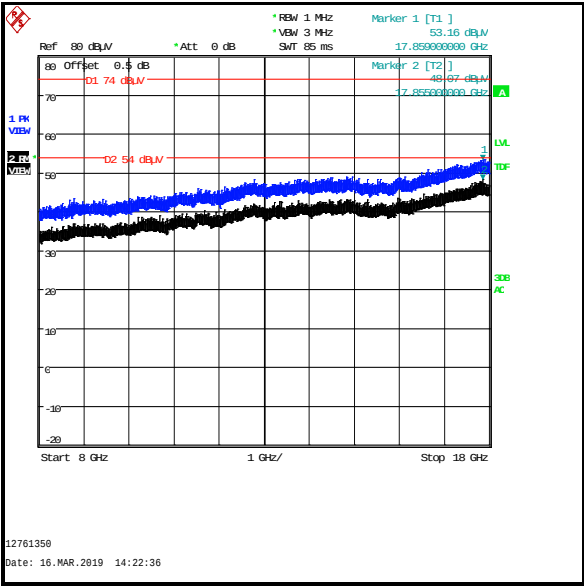
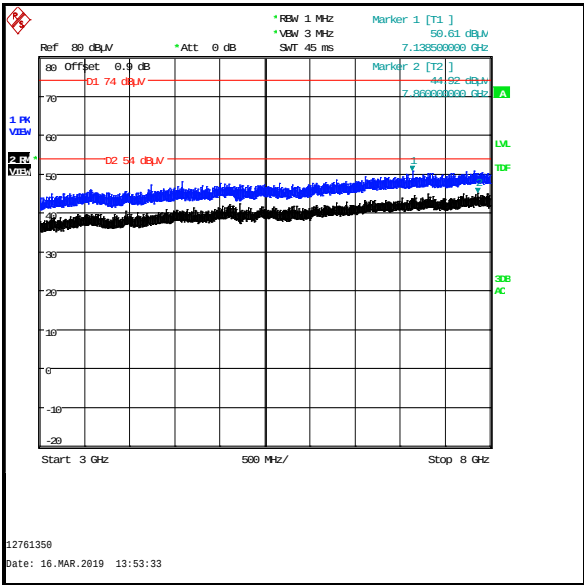
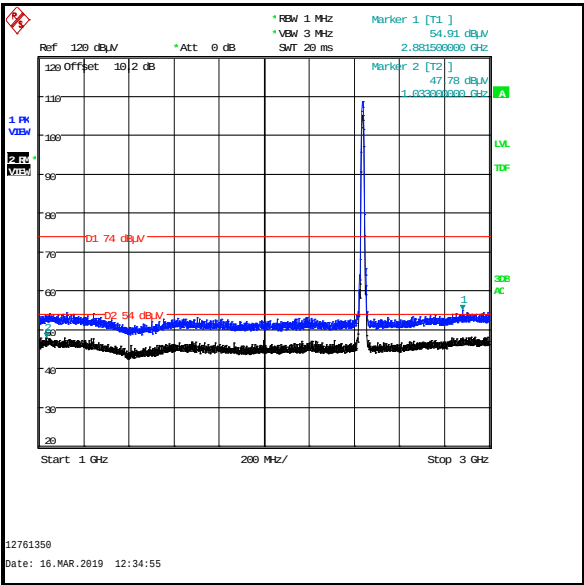
Results: Peak

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

Results: Average

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

Transmitter Radiated Emissions (continued)



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