

EMC & RF Test Report

As per

RSS-247 Issue 2:2017 & FCC Part 15 Subpart 15.247

Unlicensed Intentional Radiators

on the

WMODLP

Issued by:

Prepared by:

Reviewed by:

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Testing produced for

See Appendix A for full client & EUT details.







Report File #: 7169006356RB-000

THE FC COMMISSION

Registration # CA6844

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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Report Scope

This report addresses the EMC verification testing and test results of the **Innovere Medical WMODLP**, and is herein referred to as EUT (Equipment Under Test). The EUT was tested for compliance against the following standards:

RSS-247 Issue 2:2017 FCC Part 15 Subpart C 15.247:2018

Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.

The results contained in this report relate only to the item(s) tested.

This report does not imply product endorsement by any government, accreditation agency, or TÜV SÜD Canada Inc.

Opinions or interpretations expressed in this report, if any, are outside the scope of TÜV SÜD Canada Inc. accreditations. Any opinions expressed do not necessarily reflect the opinions of TÜV SÜD Canada Inc., unless otherwise stated.

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Client	Innovere Medical Inc.	
Product	WMODLP	SUD
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Summary

The results contained in this report relate only to the item(s) tested.

EUT:	WMODLP		
FCC Certification #, FCC ID:	25063-WMODLP6		
Industry Canada Certification #, IC:	2ATDA-WMODLP6		
EUT passed all tests performed	Yes		
Tests conducted by	Min Xie		

For testing dates, see "Testing Environmental Conditions and Dates".

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Client	Innovere Medical Inc.	
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Test Results Summary

Standard/Method	Description	Class/Limit	Result
FCC 15.203	Antenna Requirement	Unique	Pass See Justification
FCC 15.205 RSS-GEN (Table 6)	Restricted Bands for Intentional Operation	QuasiPeak Average	Pass
FCC 15.207 RSS-GEN (Table 3)	Power Line Conducted Emissions	QuasiPeak Average	Pass
FCC 15.209 RSS-GEN (Table 4)	Spurious Radiated Emissions	QuasiPeak Average	Pass
FCC 15.247(a)2 RSS-247 5.2(a)	6 dB Bandwidth	> 500 kHz	Pass
FCC 15.247(b)2 RSS-247 5.4(d)	Max Output Power	< 1 Watt	Pass
FCC 15.247(b)4 RSS-247 5.4(d)	Antenna Gain	< 6 dBi	Pass See Justifications
FCC 15.247(d) RSS-247 5.5	Antenna Conducted Spurious	< 20 dBc	Pass
FCC 15.247(e) RSS-247 5.2(b)	Spectral Density	< 8 dBm (3 kHz BW)	Pass
	Pass		

If the product as tested or otherwise complies with the specification, the EUT is deemed to comply with the requirement and is deemed a 'PASS' grade. If not 'FAIL' grade will be issued. Note that 'PASS' / 'FAIL' grade is independent of any measurement uncertainties. A 'PASS' / 'FAIL' grade within measurement uncertainty is marked with a '*'.

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Notes, Justifications, or Deviations

The following notes, justifications for tests not performed or deviations from the above listed specifications apply:

For the Antenna requirement specified in FCC 15.203 (RSS-247 section 5.5), the unit uses the following antennas:

- 1. Taoglas FXP70 1.1 dBi Patch Antenna
- 2. PCB inverted F-Antenna 3.3 dBi

Note: Antenna gains were declared by the manufactured based on the latest data sheet.

For the Restricted Bands of operation, the EUT is designed to only operate between 2400 – 2483.5 MHz band.

The EUT is not a hybrid system and FCC 15.247 (f) does not apply to it.

The EUT is a FHSS transmitter. However, it meets all the requirement of DTS and is therefore tested as a DTS transmitter.

The EUT was mounted in three orthogonal axis for spurious radiated emissions.

SAR assessment is applicable to the EUT. Please see RF Exposure exhibits for details.

Sample Calculation(s)

Radiated Emission Test

$$\begin{split} Margin &= Limit - (Received Signal + Antenna Factor + Cable Loss - Pre-Amp Gain) \\ Margin &= 50.5 dB \mu V/m - (50 dB \mu V + 10 dB + 2.5 dB - 20 dB) \\ Margin &= 8.0 \ dB \ (pass) \end{split}$$

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Client	Innovere Medical Inc.	
Product	WMODLP	TÜV
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Applicable Standards, Specifications and Methods

ANSI C63.4:2014	Methods of Measurement of Radio-Noise Emissions from Low- Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10:2013	American National Standard For Testing Unlicensed Wireless Devices
CFR 47 FCC 15 Subpart C:2017	Code of Federal Regulations – Radio Frequency Devices, Intentional Radiators
CISPR 32:2012	Electromagnetic Compatibility of Multimedia Equipment – Emission Requirements
FCC KDB 558074: 2017	FCC KDB 558074 Digital Transmission Systems, measurements and procedures
FCC KDB 447498: 2015	RF exposure procedures and equipment authorization policies for mobile and portable devices
ICES-003 Issue 6 2017	Digital Apparatus - Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard
RSS-GEN Issue 5 2018	General Requirements and Information for the Certification of Radio Apparatus
RSS-247 Issue 2:2017	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE- LAN) Devices
ISO 17025:2005	General Requirements for the Competence of Testing and Calibration Laboratories

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Client	Innovere Medical Inc.	
Product	WMODLP	TÜV
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Document Revision Status

Revision	Date	Description
000	Jun 4, 2020	Initial Release
-	-	-

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Client	Innovere Medical Inc.	
Product	WMODLP	
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Definitions and Acronyms

The following definitions and acronyms are applicable in this report. See also ANSI C63.14.

AE – Auxiliary Equipment. A digital accessory that feeds data into or receives data from another device (host) that in turn, controls its operation.

BW – Bandwidth. Unless otherwise stated, this is refers to the 6 dB bandwidth.

EMC – Electro-Magnetic Compatibility. The ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

EMI – Electro-Magnetic Immunity. The ability to maintain a specified performance when the equipment is subjected to disturbance (unwanted) signals of specified levels.

EUT – Equipment Under Test. A device or system being evaluated for compliance that is representative of a product to be marketed.

ITE – Information Technology Equipment with a primary function(s) of entry, storage, display, retrieval, transmission, processing, switching, or control, of data.

LISN – Line Impedance Stabilization Network

NCR – No Calibration Required

RF – Radio Frequency

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Testing Facility

Testing for EMC on the EUT was carried out at TÜV SÜD Canada testing lab near Toronto, Ontario. The testing lab has calibrated 3m semi-anechoic chambers which allow measurements on a EUT that has a maximum width or length of up to 2m and a height of up to 3m. The testing lab also has a calibrated 10m Open Area Test Site (OATS). The chambers are equipped with a turntable that is capable of testing devices up to 5000lb in weight and are equipped with a mast that controls the polarization and height of the antenna. Control of the mast occurs in the control room adjoining the shielded chamber. This facility is capable of testing products that are rated for single phase or 3-phase AC input and DC capability is also available. Radiated emission measurements are performed using a BiLog antenna and a Horn antenna where applicable. Conducted emissions, unless otherwise stated, are performed using a LISN and using the vertical ground plane if applicable.

Calibrations and Accreditations

The 3m semi-anechoic chamber is registered with Federal Communications Commission (FCC, CA6844), Innovation, Science and Economic Development Canada (ISED, 6844A-3) and Voluntary Control Council for Interference (VCCI, R-4023, G-506, C-4498, and T-1246). This chamber was calibrated for Normalized Site Attenuation (NSA) using test procedures outlined in ANSI C63.4 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The chamber is lined with ferrite tiles and absorption cones to minimize any undesired reflections. The NSA data is kept on file at TÜV SÜD Canada. For radiated susceptibility testing, a 16 point field calibration has been performed on the chamber. The field uniformity data is kept on file at TÜV SÜD Canada. TÜV SÜD Canada Inc. is accredited to ISO 17025 by A2LA with Testing Certificate #2955.02. The laboratory's current scope of accreditation listing can be found as listed on the A2LA website. All measuring equipment is calibrated on an annual or biennial basis as listed for each respective test.

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Testing Environmental Conditions and Dates

Following environmental conditions were recorded in the facility during time of testing

Date	Test	Initials	Temperature (ºC)	Humidity (%)	Pressure (kPa)
2020 Jun 1-2	Radiated Emissions	MX	22.2 – 23.5	27.9 – 39.7	101.5- 102.1
2019 Jul 26	Antenna Conducted Emissions	MX	23.9	48.2	100.4

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Detailed Test Results Section

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6dB Bandwidth of Digitally Modulated Systems

Purpose

The purpose of this test is to ensure that the bandwidth occupied exceeds a stated minimum. This helps ensure the utilization of the frequency allocation is sufficiently wide. This also helps prevent corruption of data by ensuring adequate data separation to distinguish the reception of the intended information.

Limits and Methods

The Limit is as specified in FCC Part 15.247 and RSS 247.

Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz. This should be measured with a 100 kHz RBW and a 300 kHz VBW.

The method is given in ANSI C63.10 Clause 11.8 DTS bandwidth.

Results

The EUT passed. The minimum measured 6 dB BW was of all modulations were greater than 500 kHz.

Additional 99% bandwidth were measured for information purpose. There is no requirement on 99% bandwidth.

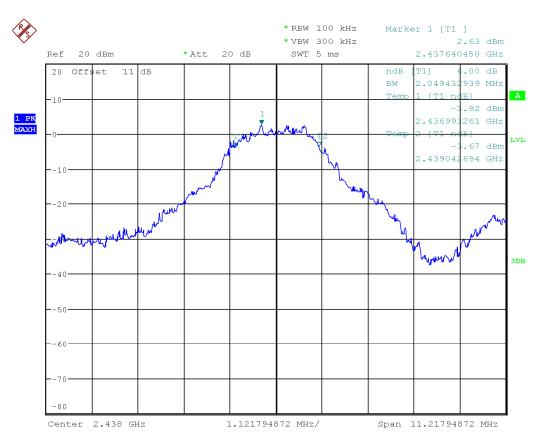
Three Channels were measured. The following table show the 6 dB and 99% bandwidth: The external attenuator and cable loss were accounted for as reference offset in the spectrum analyzer.

Bandwidth						
	Frequency	6 dB BW	99% BW	6 dB BW Limit		
Channel	(MHz)	(MHz)	(MHz)	(MHz)	Pass/Fail	
Low	2406	2.03	4.29	0.5	Pass	
Mid	2438	2.05	4.19	0.5	Pass	
High	2474	2.12	3.85	0.5	Pass	

Client	Innovere Medical Inc.	
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Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Graph(s)

The graphs shown below show the OBW during the operation of the device. This is measured by a max hold on the spectrum analyzer and the highest resolution bandwidth that is sufficiently low to exhibit the 6 dB bandwidth of a channel during operation of the EUT. This measurement is a peak measurement. Max hold is performed for a duration of not less than 1 minute.



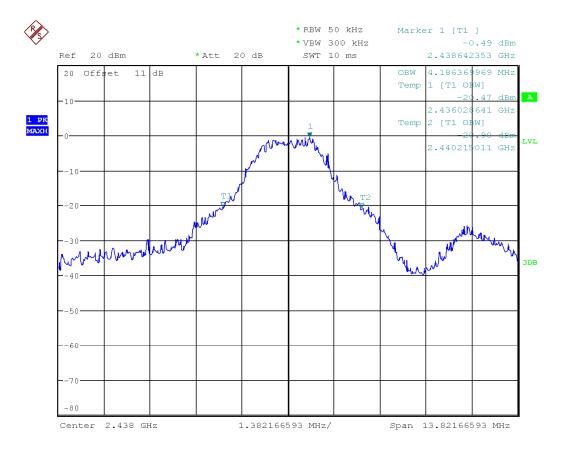
6 dB Bandwidth Mid Channel

Date: 26.JUL.2019 15:33:40

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99%Bandwidth Mid Channel



Date: 26.JUL.2019 15:37:01

Note: See 'Appendix B – EUT & Test Setup Photographs' for photos showing the test setup.

Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Test Equipment List

Equipment	Model No.	Manufacturer	Last calibration / Verification date	Next calibration/ Verification due date	Asset #
26.5GHz Spectrum Analyzer	FSQ26	Rohde & Schwarz	Mar-1,2019	Mar-1,2021	GEMC 234
Attenuator 10 dB	3M-10	Weinshel	NCR	NCR	GEMC 279

This report module is based on GEMC template "FCC - Power Line Conducted Emissions Class B_Rev1"

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Maximum Peak Envelope Conducted Power

Purpose

The purpose of this test is to ensure that the maximum power conducted to the radiating element does not exceed the limits specified. This ensures that if the end-user replaces the antenna, that the maximum power does not exceed an amount which may create an excessive power level.

Limits and Methods

The limits are defined in FCC Part 15.247(b) and RSS 247. For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands, the peak limit is 1 watt.

The method is given in ANSI C63.10 Clause 11.9.1.2 Integrated band power method.

Results

The EUT passed. The EUT was set to transmit at maximum power. Three Channels were measured. The following table shows the peak power: The external attenuator and cable loss were accounted for as reference offset in the spectrum analyzer.

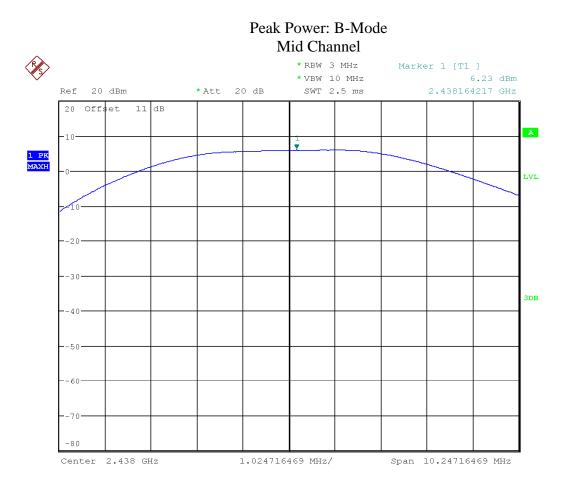
Power					
		_	_		
	Frequency	Power	Power	Limit	
Channel	(MHz)	(dBm)	(mW)	(mW)	Pass/Fail
Low	2406	6.21	4.18	1000	Pass
Mid	2438	6.23	4.20	1000	Pass
High	2474	4.91	3.10	1000	Pass

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Client	Innovere Medical Inc.	
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Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Readings

The graphs shown below show the peak power output of the device. This is measured by a max hold on the spectrum analyzer using a RBW of 3 MHz. This measurement is a peak measurement. Max hold is performed for a duration of not less than 1 minute.



Date: 26.JUL.2019 15:38:00

Note: See 'Appendix B – EUT & Test Setup Photographs' for photos showing the test setup.

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Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Test Equipment List

Equipment	Model No.	Manufacturer	Last calibration / Verification date	Next calibration/ Verification due date	Asset #
26.5GHz Spectrum Analyzer	FSQ26	Rohde & Schwarz	Mar-1,2019	Mar-1,2021	GEMC 234
Attenuator 10 dB	3M-10	Weinshel	NCR	NCR	GEMC 279

This report module is based on GEMC template "FCC – Power Line Conducted Emissions Class B_Rev1"

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Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Antenna Spurious Conducted Emissions (-20 dBc Requirement)

Purpose

The purpose of this test is to ensure that the maximum power conducted to the radiating element at frequencies outside of the authorized spectrum does not exceed the limits specified. This ensures that the only the intended signal is delivered to the radiating element.

Limits and Methods

The limits are defined in 15.247(d). In any 100 kHz band, the peak spurious harmonics emissions must be at least 20 dB below the fundamental. Spurious Conducted emissions are to be evaluated up to the 10th harmonic. This -20 dBc requirement also applies at the 'band edge' or 2.4 GHz and 2.4835 GHz.

The method is given in ANSI C63.10 Clause 11.11 Emissions in nonrestricted frequency bands

Results

The EUT passed.

The EUT was set to transmit at maximum power. Three Channels were measured.

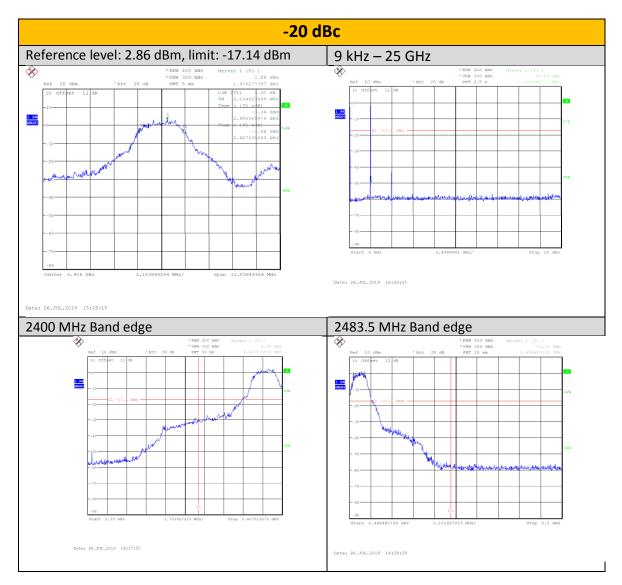
Low, middle and high channels were measured. The worst case was presented as a graph for the spectrum. The -20 dBc requirement is shown for the lower band edge at 2.4 GHz in the low band. The -20 dBc requirement is also shown for the higher band edge at 2.4835 GHz in the high band.

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Client	Innovere Medical Inc.	
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Graph(s)

The graphs shown below shows the peak power spectral density of the device. This is measured by a max hold on the spectrum analyzer using a RBW of 100 kHz. This measurement is a peak measurement. Max hold is performed for a duration of not less than 1 minute.



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Client	Innovere Medical Inc.	
Product	WMODLP	SUD
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Note: See 'Appendix B – EUT & Test Setup Photographs' for photos showing the test setup.

Test Equipment List

Equipment	Model No.	Manufacturer	Last calibration / Verification date	Next calibration/ Verification due date	Asset #
26.5GHz Spectrum Analyzer	FSQ26	Rohde & Schwarz	Mar-1,2019	Mar-1,2021	GEMC 234
Attenuator 10 dB	3M-10	Weinshel	NCR	NCR	GEMC 279

This report module is based on GEMC template "FCC - Power Line Conducted Emissions Class B_Rev1"

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Product	WMODLP	
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Radiated Emissions in Restricted Band

Purpose

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT does not exceed the limits listed below as defined in the applicable test standard, as measured from a receiving antenna. This helps protect broadcast radio services such as television, FM radio, pagers, cellular telephones, emergency services, and so on, from unwanted interference.

Limit and Method

The method is given in ANSI C 63.10 The limits are as defined in FCC Part 15, Section 15.209 and RSS GEN:

The limits, as defined in 15.247(d) for unintentional radiated emissions apply for those emissions that fall in the restricted bands, as defined in Section 15.205(a). These emissions must comply with the radiated emission limits specified in Section 15.209(a).

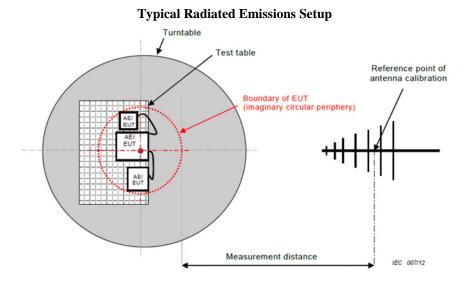
All unintentional emissions must also meet the 'Spurious Conducted Emissions' requirements of -20 dBc or greater. See also 'Spurious Conducted Emissions' for further details.

0.009 MHz - 0.490 MHz, 2400/F (kHz) uV/m at 300 m¹ 0.490 MHz - 1.705 MHz, 24000/F (kHz) uV/m at 30 m¹ 1.705 MHz - 30 MHz, 30 uV/m at 30 m¹ 30 MHz - 88 MHz, 100 uV/m (40.0 dBuV/m¹) at 3 m 88 MHz - 216 MHz, 150 uV/m (43.5 dBuV/m¹) at 3 m 216 MHz - 960 MHz, 200 uV/m (46.0 dBuV/m¹) at 3 m Above 960 MHz, 500 uV/m (54.0 dBuV/m¹) at 3 m Above 1000 MHz, 500 uV/m (54 dBuV/m²) at 3m Above 1000 MHz, 500 uV/m (74 dBuV/m³) at 3m

¹Limit is with Quasi Peak detector with bandwidths as defined in CISPR-16-1-1 ²Limit is with 1 MHz measurement bandwidth and using an Average detector ³Limit is with 1 MHz measurement bandwidth and using a Peak detector

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Measurement Uncertainty

The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is ± 5.67 dB for 30MHz – 1GHz and ± 4.58 dB for 1GHz – 18GHz with a 'k=2' coverage factor and a 95% confidence level.

Preliminary Graphs

Note the graphs shown below are for graphical illustration only. For final measurements with the appropriate detector, please refer to the final measurement table where applicable. The graph shown below is a maximized peak measurement graph, measured with a resolution bandwidth greater than the final required detector and over a full 0-360 rotation. This peaking process is done as a worst case measurement. This process enables the detection of frequencies of concern for final measurement, and provides considerable time savings.

In accordance with FCC Part 15, Subpart A, Section 15.33, the device was scanned to the 10th harmonic (a minimum of a 24.835 GHz).

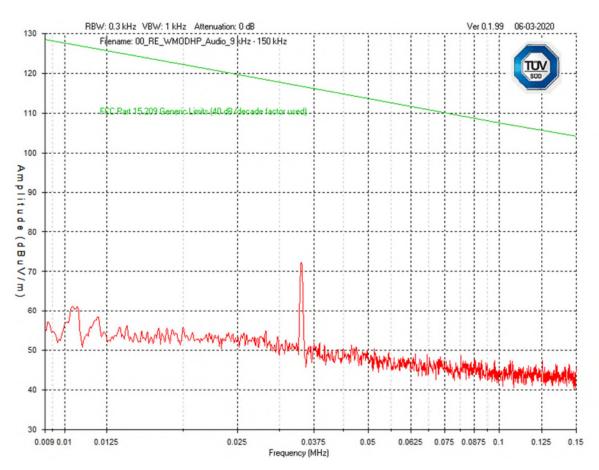
Devices scanned may be scanned at alternate test distances, and in accordance with FCC Part 15, Subpart A, Section 15.31, an extrapolation factor of 20 dB/decade was used above 30 MHz and 40 dB/decade below 30 MHz. For example for 1 meter measurements, an extrapolation factor 9.5 dB from 20 Log (1m / 3m) is applied.

The EUT was set to transmit at maximum power. Low, middle and high channels in each mode were measured; however the worst case graphs are presented.

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Band edge measure graphs were shown for illustrations purpose. See final measurement section for all measurements.

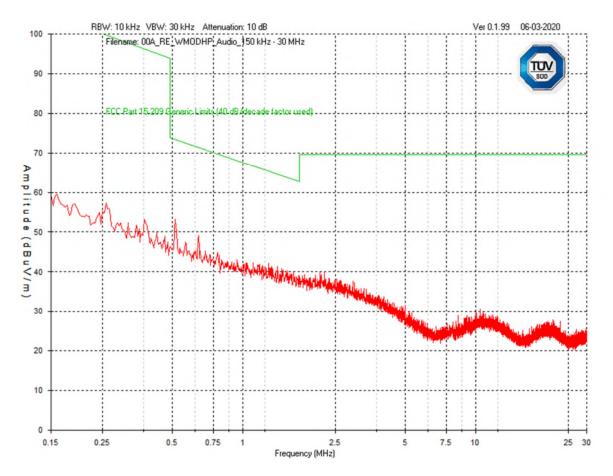


$9 \ kHz - 150 \ kHz$

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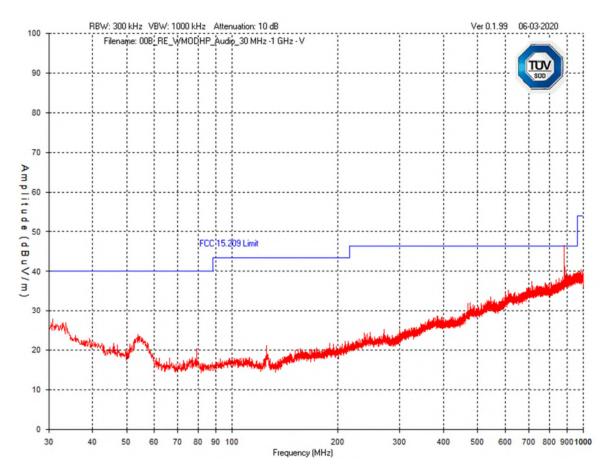
150 kHz - 30 MHz



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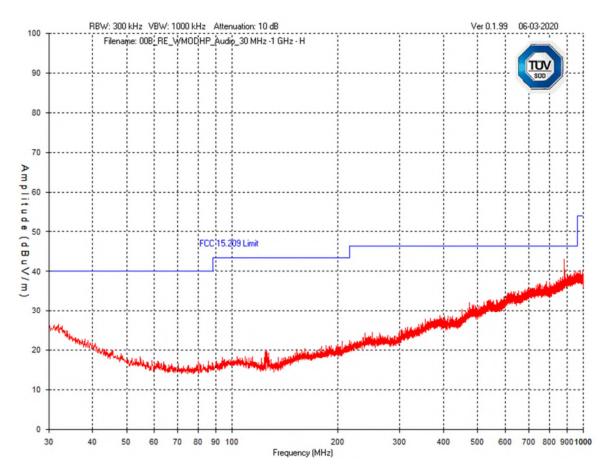
Mid Channel - 30 MHz – 1 GHz Vertical – Peak Emission Graph



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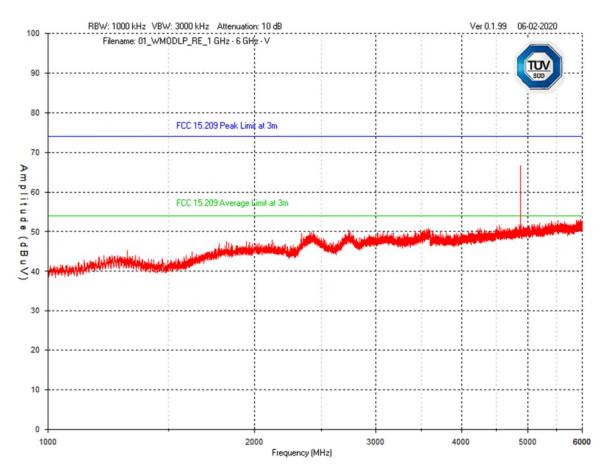
Mid Channel – 30 MHz – 1 GHz Horizontal - Peak Emission Graph



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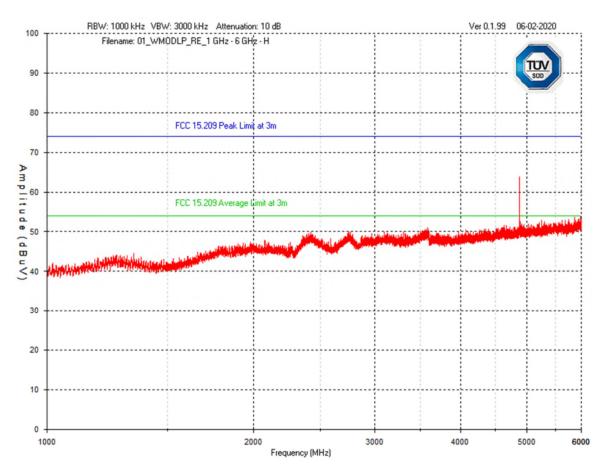
Mid Channel – 1 GHz – 6 GHz Vertical - Peak Emission Graph



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Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

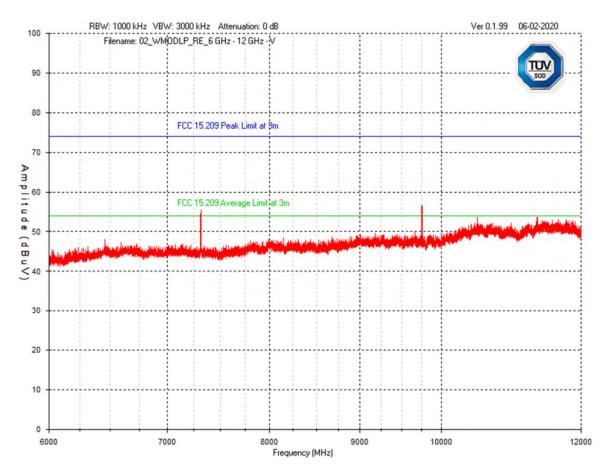
Mid Channel – 1 GHz – 6 GHz Horizontal - Peak Emission Graph



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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

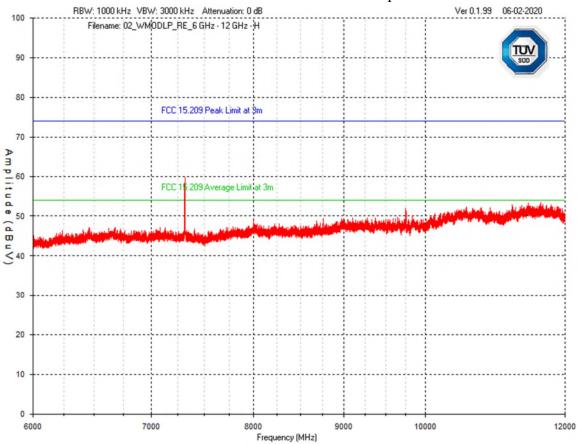
Mid Channel – 6 GHz – 12 GHz Vertical - Peak Emission Graph



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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

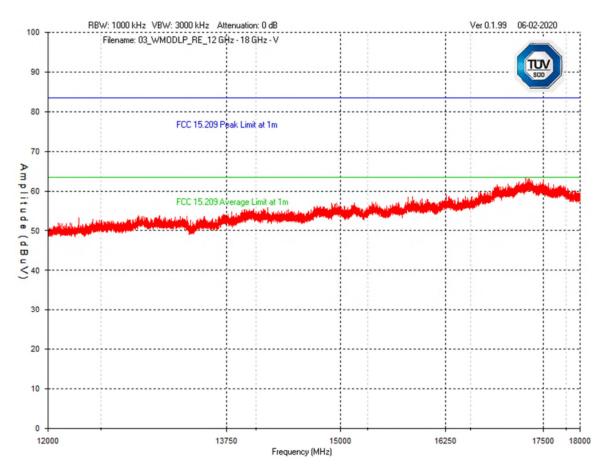
Mid Channel – 6 GHz – 12 GHz Horizontal - Peak Emission Graph



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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

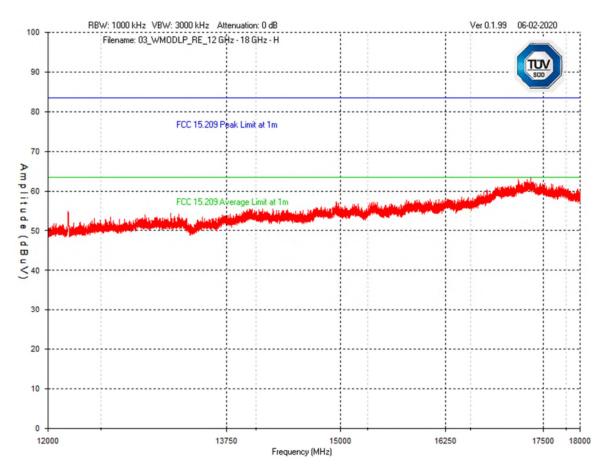
Mid Channel – 12 GHz – 18 GHz Vertical - Peak Emission Graph



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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

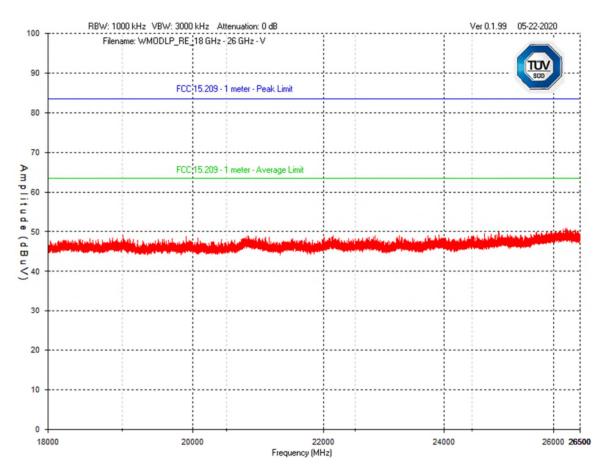
Mid Channel – 12 GHz – 18 GHz Horizontal - Peak Emission Graph



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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

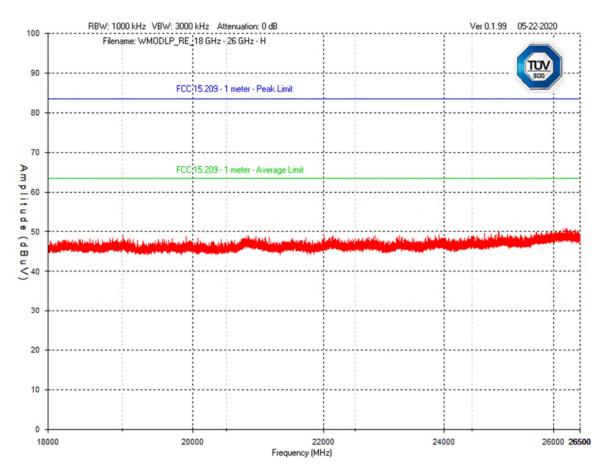
Mid Channel – 18 GHz – 25 GHz Vertical - Peak Emission Graph



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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

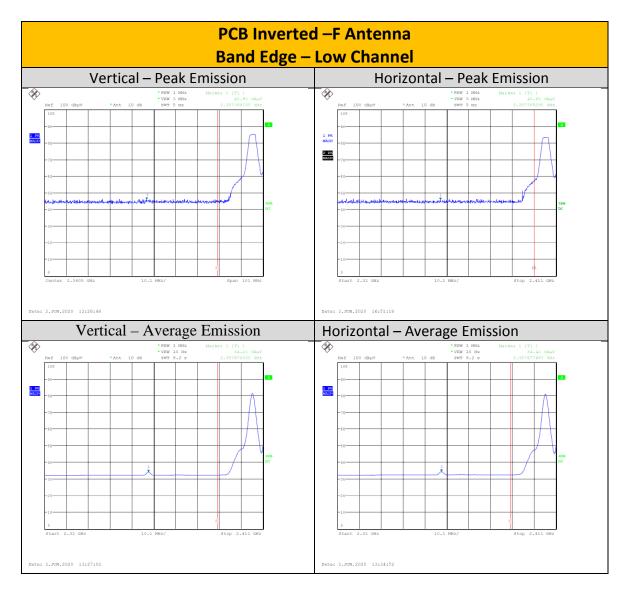
Mid Channel – 18 GHz – 25 GHz Horizontal - Peak Emission Graph



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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

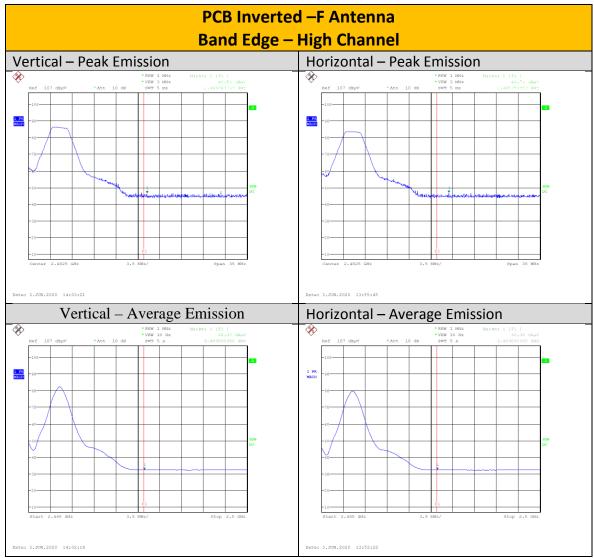
Band edge measurements



Note: Band edge plots were taken with 3 m measurements distance. The marker shows the raw value; see Final Measurements and Results section starting on page 41 for corrected values.

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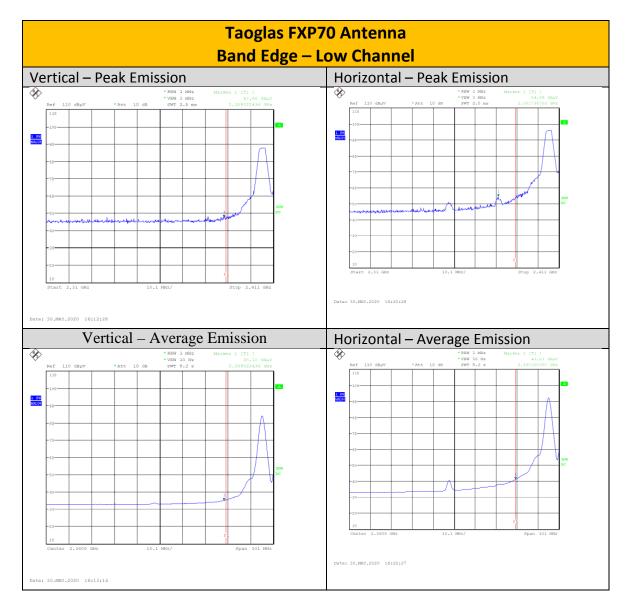
Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada



Note: Band edge plots were taken with 3 m measurements distance. The marker shows the raw value; see Final Measurements and Results section starting on page 41 for corrected values.

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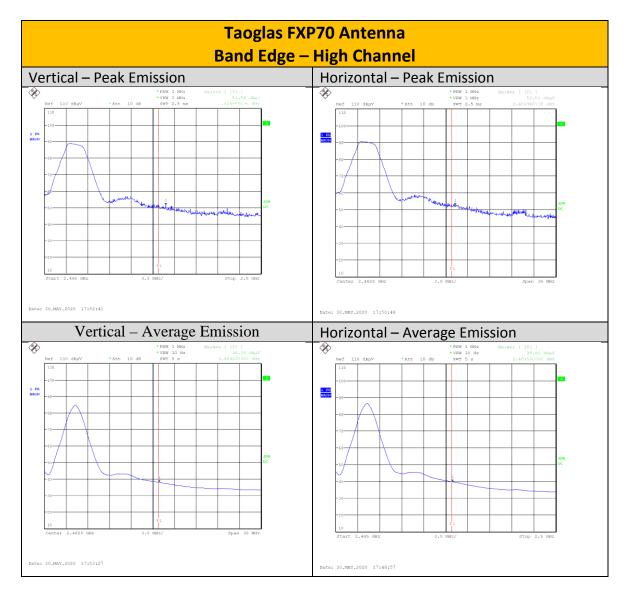
Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada



Note: Band edge plots were taken with 3 m measurements distance. The marker shows the raw value; see Final Measurements and Results section starting on page 41 for corrected values.

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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada



Note: Band edge plots were taken with 3 m measurements distance. The marker shows the raw value; see Final Measurements and Results section starting on page 41for corrected values.

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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Final Measurements and Results

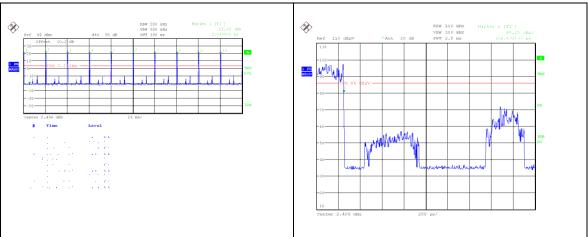
The EUT passed the limits. Low, middle and high bands were measured.

In accordance with 15.247(d), only frequencies exceeding the 15.209 limit that occur within the bands listed in 15.205, need to be verified with a final detector. Emission outside the restricted bands were measured for information purpose.

The measurements were maximized by rotating the turn table over a full 0-360 rotation and the antenna height was varied from 1 m to 4 m.

All emissions above 18 GHz were instrument noise floor of measurement instrument. No emissions were found in this frequency range.

The EUT have a duty cycle of 3.08% (10 pulse in 100 ms where each pulse is 0.308 ms). A Duty Cycle Correction factor of -30.2 dB was applied to peak harmonic to get the average emission.



Note: See Operation Description for more details on the spectrum access technique of the transmitter.

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Client	Innovere Medical Inc.	
Product	WMODLP	SUD
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

PCB Inverted-F Antenna

Test Frequency (MHz)	Detection Mode	Antenna Polarity (Horz/Vert)	Received Signal (dBµV)	Antenna Factor (dB/m)	Cable Factor (dB)	Atten uator (dB)	Pre-Amp Gain (dB)	Level (dBµV/m)	Emission Limit (dBµV/m)	Margin (dB)	Result
	Low Channel - X axis										
2406	Peak	Horz	84.7	32.0	4.7	10.0	-34.2	97.1			PASS
2406	Avg	Horz	80.8	32.0	4.7	10.0	-34.2	93.3			PASS
2406	Peak	Vert	85.3	32.0	4.7	10.0	-34.2	97.8			PASS
2406	Avg	Vert	81.4	32.0	4.7	10.0	-34.2	93.9			PASS
2357	Peak	Horz	45.7	31.9	4.7	10.0	-34.1	58.1	74.0	15.9	PASS
2357	Avg	Horz	34.4	31.9	4.7	10.0	-34.1	46.8	54.0	7.2	PASS
2357	Peak	Vert	45.9	31.9	4.7	10.0	-34.1	58.3	74.0	15.7	PASS
2357	Avg	Vert	34.2	31.9	4.7	10.0	-34.1	46.6	54.0	7.4	PASS
				High	Channel	- X axis					
2470	Peak	Horz	83.6	32.3	4.7	10.0	-34.2	96.4			PASS
2470	Avg	Horz	79.8	32.3	4.7	10.0	-34.2	92.6			PASS
2470	Peak	Vert	86.3	32.3	4.7	10.0	-34.2	99.1			PASS
2470	Avg	Vert	82.4	32.3	4.7	10.0	-34.2	95.2			PASS
2483.5	Peak	Horz	46.7	32.3	4.7	10.0	-34.2	59.5	74.0	14.5	PASS
2483.5	Avg	Horz	32.3	32.3	4.7	10.0	-34.2	45.1	54.0	8.9	PASS
2483.5	Peak	Vert	46.5	32.3	4.7	10.0	-34.2	59.3	74.0	14.7	PASS
2483.5	Avg	Vert	32.4	32.3	4.7	10.0	-34.2	45.2	54.0	8.8	PASS
4940	Peak	Horz	56.1	34.1	7.2	1.0	-31.5	66.9	74.0	7.1	PASS
4940	Avg	Horz	25.9	34.1	7.2	1.0	-31.5	36.7	54.0	17.3	PASS
4940	Peak	Vert	53.7	34.1	7.2	1.0	-31.5	64.5	74.0	9.5	PASS
4940	Avg	Vert	23.5	34.1	7.2	1.0	-31.5	34.3	54.0	19.7	PASS
7410	Peak	Horz	55.1	29.3	8.9	1.0	-33.0	61.2	74.0	12.8	PASS
7410	Avg	Horz	24.8	29.3	8.9	1.0	-33.0	31.0	54.0	23.0	PASS
7410	Peak	Vert	56.4	29.3	8.9	1.0	-33.0	62.5	74.0	11.5	PASS
7410	Avg	Vert	26.2	29.3	8.9	1.0	-33.0	32.3	54.0	21.7	PASS

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Client

Innovere Medical Inc.

Client	mnovere Medical Inc.	
Product	WMODLP	TÜV
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Test Frequency (MHz)	Detection Mode	Antenna Polarity (Horz/Vert)	Received Signal (dBµV)	Antenna Factor (dB/m)	Cable Factor (dB)	Atten uator (dB)	Pre-Amp Gain (dB)	Level (dBµV/m)	Emission Limit (dBµV/m)	Margin (dB)	Result
	•	•		Mid C	Channel -	Zaxis	•				
2438	Peak	Horz	83.8	32.1	4.7	10.0	-34.2	96.4			PASS
2438	Avg	Horz	80.0	32.1	4.7	10.0	-34.2	92.6			PASS
2438	Peak	Vert	81.6	32.1	4.7	10.0	-34.2	94.2			PASS
2438	Avg	Vert	77.7	32.1	4.7	10.0	-34.2	90.3			PASS
				Mid (Channel -	- X axis					
2438	Peak	Horz	82.2	32.1	4.7	10.0	-34.2	94.8			PASS
2438	Avg	Horz	78.1	32.1	4.7	10.0	-34.2	90.7			PASS
2438	Peak	Vert	84.6	32.1	4.7	10.0	-34.2	97.2			PASS
2438	Avg	Vert	80.6	32.1	4.7	10.0	-34.2	93.2			PASS
2388	Peak	Horz	44.9	31.9	4.7	10.0	-34.2	57.3	74.0	16.7	PASS
2388	Avg	Horz	33.1	31.9	4.7	10.0	-34.2	45.5	54.0	8.5	PASS
2388	Peak	Vert	45.8	31.9	4.7	10.0	-34.2	58.2	74.0	15.8	PASS
2388	Avg	Vert	33.4	31.9	4.7	10.0	-34.2	45.8	54.0	8.2	PASS
4876	Peak	Horz	60.3	34.2	7.0	1.0	-31.7	70.8	74.0	3.2	PASS
4876	Avg	Horz	30.1	34.2	7.0	1.0	-31.7	40.6	54.0	13.4	PASS
4876	Peak	Vert	56.9	34.2	7.0	1.0	-31.7	67.4	74.0	6.6	PASS
4876	Avg	Vert	26.6	34.2	7.0	1.0	-31.7	37.1	54.0	16.9	PASS
7314	Peak	Horz	62.1	29.1	8.8	1.0	-33.0	67.9	74.0	6.1	PASS
7314	Avg	Horz	31.8	29.1	8.8	1.0	-33.0	37.7	54.0	16.3	PASS
7314	Peak	Vert	61.1	29.1	8.8	1.0	-33.0	67.0	74.0	7.0	PASS
7314	Avg	Vert	30.9	29.1	8.8	1.0	-33.0	36.8	54.0	17.2	PASS
9752	Peak	Horz	49.2	31.3	9.9	1.0	-32.3	59.1	74.0	14.9	PASS
9752	Avg	Horz	18.9	31.3	9.9	1.0	-32.3	28.9	54.0	25.1	PASS
9752	Peak	Vert	46.1	31.3	9.9	1.0	-32.3	56.0	74.0	18.0	PASS
9752	Avg	Vert	15.9	31.3	9.9	1.0	-32.3	25.8	54.0	28.2	PASS
12190	Peak	Horz	44.1	31.8	11.3	1.0	-31.5	56.7	83.5	26.8	PASS
12190	Avg	Horz	13.9	31.8	11.3	1.0	-31.5	26.5	63.5	37.0	PASS
12190	Peak	Vert	43.0	31.8	11.3	1.0	-31.5	55.6	83.5	27.9	PASS
12190	Avg	Vert	12.8	31.8	11.3	1.0	-31.5	25.4	63.5	38.1	PASS
	Mid Channel - Y axis										
2438	Peak	Horz	85.2	32.1	4.7	10.0	-34.2	97.8			PASS
2438	Avg	Horz	81.4	32.1	4.7	10.0	-34.2	93.9			PASS
2438	Peak	Vert	83.2	32.1	4.7	10.0	-34.2	95.7			PASS
2438	Avg	Vert	79.3	32.1	4.7	10.0	-34.2	91.9			PASS

Client	Innovere Medical Inc.	
Product	WMODLP	SUD
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Taoglas FXP70 Antenna

Test Frequency (MHz)	Detection Mode	Antenna Polarity (Horz/Vert)	Received Signal (dBµV)	Antenna Factor (dB/m)	Cable Factor (dB)	Atten uator (dB)	Pre-Amp Gain (dB)	Level (dBµV/m)	Emission Limit (dBµV/m)	Margin (dB)	Result
				Low (Channel	- X axis					
2406	Peak	Horz	95.9	32.0	4.7	10.0	-34.2	108.3			PASS
2406	Avg	Horz	92.1	32.0	4.7	10.0	-34.2	104.6			PASS
2406	Peak	Vert	87.6	32.0	4.7	10.0	-34.2	100.1			PASS
2406	Avg	Vert	83.9	32.0	4.7	10.0	-34.2	96.3			PASS
2381	Peak	Horz	54.7	31.9	4.7	10.0	-34.2	67.1	74.0	6.9	PASS
2381	Avg	Horz	41.2	31.9	4.7	10.0	-34.2	53.6	54.0	0.4	PASS
2381	Peak	Vert	47.7	31.9	4.7	10.0	-34.2	60.1	74.0	13.9	PASS
2381	Avg	Vert	35.1	31.9	4.7	10.0	-34.2	47.5	54.0	6.5	PASS
	High Channel - X axis										
2470	Peak	Horz	90.4	32.3	4.7	10.0	-34.2	103.1			PASS
2470	Avg	Horz	86.1	32.3	4.7	10.0	-34.2	98.9			PASS
2470	Peak	Vert	88.7	32.3	4.7	10.0	-34.2	101.4			PASS
2470	Avg	Vert	84.4	32.3	4.7	10.0	-34.2	97.2			PASS
2483.5	Peak	Horz	52.6	32.3	4.7	10.0	-34.2	65.3	74.0	8.7	PASS
2483.5	Avg	Horz	39.8	32.3	4.7	10.0	-34.2	52.5	54.0	1.5	PASS
2483.5	Peak	Vert	51.5	32.3	4.7	10.0	-34.2	64.3	74.0	9.7	PASS
2483.5	Avg	Vert	38.1	32.3	4.7	10.0	-34.2	50.8	54.0	3.2	PASS

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Client

Innovere Medical Inc.

Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Test Frequency (MHz)	Detection Mode	Antenna Polarity (Horz/Vert)	Received Signal (dBµV)	Antenna Factor (dB/m)	Cable Factor (dB)	Atten uator (dB)	Pre-Amp Gain (dB)	Level (dBµV/m)	Emission Limit (dBµV/m)	Margin (dB)	Result
	•	•		Mid C	Channel -	Zaxis	•				
2438	Peak	Horz	89.6	32.1	4.7	10.0	-34.2	102.2			PASS
2438	Avg	Horz	86.0	32.1	4.7	10.0	-34.2	98.6			PASS
2438	Peak	Vert	84.7	32.1	4.7	10.0	-34.2	97.3			PASS
2438	Avg	Vert	81.1	32.1	4.7	10.0	-34.2	93.7			PASS
Mid Channel - X axis											
2438	Peak	Horz	95.8	32.1	4.7	10.0	-34.2	108.3			PASS
2438	Avg	Horz	91.8	32.1	4.7	10.0	-34.2	104.3			PASS
2438	Peak	Vert	88.4	32.1	4.7	10.0	-34.2	101.0			PASS
2438	Avg	Vert	84.8	32.1	4.7	10.0	-34.2	97.4			PASS
2388	Peak	Horz	50.6	31.9	4.7	10.0	-34.2	63.0	74.0	11.0	PASS
2388	Avg	Horz	39.7	31.9	4.7	10.0	-34.2	52.1	54.0	1.9	PASS
2388	Peak	Vert	46.3	31.9	4.7	10.0	-34.2	58.6	74.0	15.4	PASS
2388	Avg	Vert	34.4	31.9	4.7	10.0	-34.2	46.8	54.0	7.2	PASS
4876	Peak	Horz	54.6	34.2	7.0	1.0	-31.7	65.1	74.0	8.9	PASS
4876	Avg	Horz	24.4	34.2	7.0	1.0	-31.7	34.9	54.0	19.1	PASS
4876	Peak	Vert	57.8	34.2	7.0	1.0	-31.7	68.3	74.0	5.7	PASS
4876	Avg	Vert	27.6	34.2	7.0	1.0	-31.7	38.0	54.0	16.0	PASS
7314	Peak	Horz	55.3	29.1	8.8	1.0	-33.0	61.1	74.0	12.9	PASS
7314	Avg	Horz	25.0	29.1	8.8	1.0	-33.0	30.9	54.0	23.1	PASS
7314	Peak	Vert	54.5	29.1	8.8	1.0	-33.0	60.3	74.0	13.7	PASS
7314	Avg	Vert	24.2	29.1	8.8	1.0	-33.0	30.1	54.0	23.9	PASS
9752	Peak	Horz	49.4	31.3	9.9	1.0	-32.3	59.3	74.0	14.7	PASS
9752	Avg	Horz	19.2	31.3	9.9	1.0	-32.3	29.1	54.0	24.9	PASS
9752	Peak	Vert	49.9	31.3	9.9	1.0	-32.3	59.8	74.0	14.2	PASS
9752	Avg	Vert	19.6	31.3	9.9	1.0	-32.3	29.6	54.0	24.4	PASS
12190	Peak	Horz	45.8	31.8	11.3	1.0	-31.5	58.4	83.5	25.1	PASS
12190	Avg	Horz	30.5	31.8	11.3	1.0	-31.5	43.1	63.5	20.4	PASS
12190	Peak	Vert	43.7	31.8	11.3	1.0	-31.5	56.3	83.5	27.2	PASS
12190	Avg	Vert	28.1	31.8	11.3	1.0	-31.5	40.8	63.5	22.7	PASS
	Mid Channel - Y axis										
2438	Peak	Horz	86.2	32.1	4.7	10.0	-34.2	98.7			PASS
2438	Avg	Horz	82.5	32.1	4.7	10.0	-34.2	95.0			PASS
2438	Peak	Vert	94.1	32.1	4.7	10.0	-34.2	106.7			PASS
2438	Avg	Vert	90.3	32.1	4.7	10.0	-34.2	102.9			PASS

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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration Date	Next Calibration Date	Asset #
Spectrum Analyzer	ESU 40	Rohde & Schwarz	Jan. 15, 2020	Jan. 15, 2022	GEMC 233
Loop Antenna	EM 6871	Electro-Metrics	Feb 15, 2019	Feb 15, 2021	GEMC 70
Loop Antenna	EM 6872	Electro-Metrics	Feb 15, 2019	Feb 15, 2021	GEMC 71
BiLog Antenna	3142-C	ETS	Oct 18, 2018	Oct 18, 2020	GEMC 8
Horn Antenna 1 – 18 GHz	3117	ETS-Lindgren	Feb. 17, 2020	Feb. 17, 2022	GEMC 340
Horn Antenna 2 – 18 GHz	WBH218HN	Q-par	Apr. 1, 2020	Apr. 1, 2022	GEMC 6375
Horn Antenna 18 GHz - 26.5 GHz	SAS-572	A.H. Systems	Oct 23, 2018	Oct 23, 2020	GEMC 6371
Pre-Amp 9 kHz – 1 GHz	LNA 6901	Teseq	Feb. 25, 2019	Feb. 25, 2021	GEMC 168
2.4GHz-2.5GHz Notch Filter	BRM50702	Micro-Tronics	NCR	NCR	GEMC 230
Pre-Amp 1 – 26.5 GHz	HP 8449B	HP	Dec. 20, 2019	Dec. 20, 2021	GEMC 189
Attenuator 10 dB	612-10-1	Meca Electronics, Inc	NCR	NCR	GEMC 224
RF Cable 10m	LMR-400-10M- 50Ω-MN-MN	LexTec	NCR	NCR	GEMC 274
RF Cable HF	HP305S	Semflex Inc.	NCR	NCR	GEMC 330
RF Cable 2m	Sucoflex 104A	Huber+Suhner	NCR	NCR	GEMC 271
Emissions Software	0.1.98	TUV SUD Canada, Inc.	NCR	NCR	GEMC 58

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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Power Spectral Density

Purpose

The purpose of this test is to ensure that the maximum power spectral density to the radiating element does not exceed the limits specified. This ensures that the modulation is significantly wide enough, or low enough in power that it will allow for co-operation of other wireless devices operating within this frequency allocation.

Limits and Methods

The limits are defined in 15.247(e).

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

The method is given in ANSI 63.10 11.10.2 Method PKPSD.

Results

The EUT passed. The EUT was set to transmit at maximum power. Three Channels were measured. The following tables show the peak power spectral density: External attenuator and cable loss were accounted for as reference offset in the spectrum analyzer.

PSD				
Channel	Frequency (MHz)	PSD/3kHz (dBm)	Limit (dBm/3kHz)	Pass/Fail
1	2406	-11.17	8	Pass
6	2438	-11.74	8	Pass
11	2474	-13.45	8	Pass

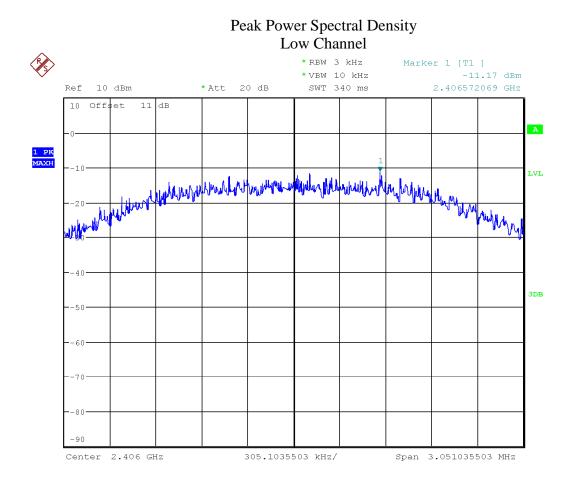
Graph(s)

The graphs shown below show the power spectral density of the device. This is measured by a max hold on the spectrum analyzer using a RBW of 3 kHz. This measurement is a peak measurement. Max hold is performed for a duration of not less than 1 minute.

Low, middle, and high channel for each mode was investigated in each mode, with the worst case being presented.

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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada



Date: 26.JUL.2019 15:29:40

Note: See 'Appendix B – EUT & Test Setup Photographs' for photos showing the test setup.

Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Test Equipment List

Equipment	Model No.	Manufacturer	Last calibration / Verification date	Next calibration/ Verification due date	Asset #
26.5GHz Spectrum Analyzer	FSQ26	Rohde & Schwarz	Mar-1,2019	Mar-1,2021	GEMC 234
Attenuator 10 dB	3M-10	Weinshel	NCR	NCR	GEMC 279

This report module is based on GEMC template "FCC - Power Line Conducted Emissions Class B_Rev1"

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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Appendix A – EUT Summary

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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

For further details for filing purposes, refer to filing package.

General EUT Description

Client		
Organization / Address	Innovere Medical Inc.	
	250 Shields Court Unit 6	
	Markham ON L3R 9W7	
	Canada	
Contact	Lynsie Thomason	
Phone	1-888-262-0408 x104	
Email	lynsie.thomason@innoveremedical.com	
	EUT Details	
EUT Name	EMODLP	
FCC ID	25063-WMODLP6	
Industry Canada #	2ATDA-WMODLP6	
Equipment Category	Low power wireless transceiver	
Basic EUT Functionality	EUT is a 2.4 GHz wireless module	
Peripherals Required for	None	
Test		
Release type	Final	
Intentional Radiator	2400 – 2483.5 MHz FHSS	
Frequency		
EUT Configuration	Wireless configured to transmit continuously at	
	100% duty cycle	

Note the EUT is considered to have been received the date of the commencement of the first test, unless otherwise stated. For a close-up picture of the EUT, see 'Appendix B – EUT and Test Setup Photos'.

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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

EUT Configuration

Please see Appendix B for a picture of the unit running in normal conditions.

- Wireless were configured to transmit at maximum possible duty cycle
- Hoping was disable for all test. The EUT is tested as a DTS transmitter.
- A power setting of 2 dBm.

Operational Setup

These devices are required to be attached to the EUT for its normal operation.

- A debug board was connected to the EUT to issue test commands and to power it.
- Radiated emissions were tested in a representative host.

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Client	Innovere Medical Inc.	
Product	WMODLP	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247:2018	Canada

Appendix B – EUT and Test Setup Photos

Refer to the files separate from this test report

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