

Test Report # 317347 F

Equipment Under Test:	PHC-11AC1-A
Requirement:	FCC 1.1037, 2.1091, 2.1093, ISED Canada RSS-102 for a module
Test Date(s):	1/15/2020
Prepared for:	Mark Nolin Philips Healthcare 3000 Minuteman Road Andover, MA 1810

Report Issued by: Shane Dock, EMC Engineer

Signature:



Date: 7/2/2020

Report Reviewed by: Adam Alger, Quality Manager

Signature:



Date: 7/2/2020

Report Constructed by: Shane Dock, EMC Engineer

Signature:



Date: 1/15/2020

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Company: Philips Healthcare	Page 1 of 19	Name: PHC-11AC1-A
Report: 317347 F		Model: PHC-11AC1-A
Job: C-3013		Serial: Engineering Samples

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Laird Connectivity Test Services in Review

The Laird Connectivity laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:



A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025:2017 with Electrical (EMC) Scope

A2LA Certificate Number: 1255.01

Scope of accreditation includes all test methods listed herein unless otherwise noted



Federal Communications Commission (FCC) – USA

Accredited Test Firm Registration Number: 953492

Recognition of two 3 meter Semi-Anechoic Chambers



Innovation, Science and Economic Development Canada

Accredited U.S. Identification Number: US0218

Recognition of two 3 meter Semi-Anechoic Chambers

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Job: C-3013		Serial: Engineering Samples

1 TEST REPORT SUMMARY

During **1/15/2020** the Equipment Under Test (EUT), **PHC-11AC1-A**, as provided by **Philips Healthcare**, was tested to the following requirements:

Requirement	Description	Specification	Method	Result
FCC Part 1.1307, 2.1091, 2.1093	RF Exposure and equipment authorization requirements	Reported	FCC KDB 447498	Reported
ISED Canada RSS-102	Radio Frequency Radiation Exposure Evaluation	Reported	RSS-102 Section 2.5.2	Reported

Notice:

The results relate only to the item tested and described in this report. Any modifications made to the equipment under test after the specified test date(s) may invalidate the data herein.

If the resulting measurement margin is seen to be within the uncertainty value, as listed in this report, the possibility exists that this unit may not meet the required limit specification if subsequently tested.

2 CLIENT INFORMATION

Company Name	Philips Healthcare
Contact Person	Mark Nolin
Address	3000 Minuteman Road Andover, MA 1810

2.1 Equipment Under Test (EUT) Information

The following information has been supplied by the client

Product Name	PHC-11AC1-A
Model Number	PHC-11AC1-A
Serial Number	Engineering Samples
Additional Information	FCC ID: 2ATC9-PHC-11AC1 IC ID: 25528- PHC11AC1

2.2 Product Description

Combined 802.11 a/b/g/n/ac WLAN and Bluetooth module.

2.3 Modifications Incorporated for Compliance

None noted at time of test

2.4 Deviations and Exclusions from Test Specifications

None noted at time of test

2.5 Additional Information

EUT is a module provided with 3.3 VDC and was tested on a Host board with an antenna port termination for radiated emissions testing (Conducted Testing assumes a 5.5 dBi antenna gain). The EUT was programmed via the serial connection through a devkit facilitated through a terminal connection program (via TeraTerm v4.99). The hcitool command set was used to program the EUT for the BT radio, and the wl command set was used to program the WLAN radio. WLAN firmware version is 7.45.151. BT firmware version is 003.001.025.0111.0000. The USI part number for this module is 8501-601900-01.

2.6 Evaluation Information

Power Data taken from other Tx Reports for the purposes of this evaluation (Reported in Section 5). Worst case antenna gains and tune-up tolerances used to calculate test separation distances.

3 REFERENCES

Publication	Edition	Date
CFR 47 Part 15	-	2020
ANSI C63.10	-	2013
RSS-247	2	2017
RSS GEN	5	2014
RSS-102	5	2015
CFR 47 Part 1 and 2	-	2020

4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of $k = 2$.

References	Version / Date
CISPR 16-4-1	Ed. 2 (2009-02)
CISPR 16-4-2	Ed. 2 (2011-06)
CISPR 32	Ed. 1 (2012-01)
ANSI C63.23	2012
A2LA P103	February 4, 2016
A2LA P103c	August 10, 2015
ETSI TR 100-028	V1.3.1 (2001-03)

Measurement Type	Configuration	Uncertainty $\pm$
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	Absorbing Clamp	4.1 dB
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

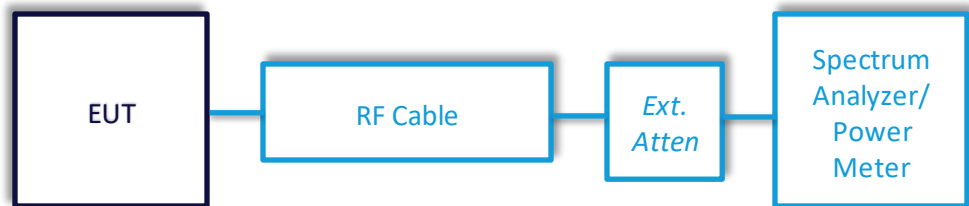
Parameter	ETSI U.C. $\pm$	U.C. $\pm$
Radio Frequency, from F0	1×10^{-7}	0.55×10^{-7}
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %

5 TEST DATA

5.1 Antenna Port Conducted Emissions

Description of Measurement	The direct measurement of emissions at the antenna port of the EUT is achieved by use of a RF connection to a spectrum analyzer or power meter. The cable and attenuator factors are loaded into the analyzer or power meter allowing for direct measurement readings without the need for further corrections.
Example Calculations	Measurement (dBm) + Cable factor (dB) + External Attenuator (dB) = Corrected Reading (dBm) Margin (dB) = Limit (dBm) – Corrected Reading (dBm)

Block Diagram



5.1.1 Antenna Port Conducted Emissions

Data – 5 GHz WLAN UNII 1

Mode	Rate	Channel	Frequency (MHz)	Output Power (dBm)	Duty Cycle Correction (dB)	Corrected Pout (dBm)	Limit (dBm)	Margin (dB)
802.11a	6 Mbps	36	5180	11.5	0.3	11.8	24.0	12.2
802.11a	6 Mbps	40	5200	11.6	0.3	11.9	24.0	12.1
802.11a	6 Mbps	48	5240	11.7	0.3	12.0	24.0	12.0
802.11a	54 Mbps	36	5180	9.8	1.9	11.7	24.0	12.3
802.11a	54 Mbps	40	5200	9.8	1.9	11.7	24.0	12.3
802.11a	54 Mbps	48	5240	9.7	1.9	11.6	24.0	12.4
802.11n	MCS0 - 20 MHz	36	5180	11.6	0.3	11.9	24.0	12.1
802.11n	MCS0 - 20 MHz	40	5200	11.6	0.3	11.9	24.0	12.1
802.11n	MCS0 - 20 MHz	48	5240	11.5	0.3	11.8	24.0	12.2
802.11n	MCS7 - 20 MHz	36	5180	9.0	2.1	11.1	24.0	12.9
802.11n	MCS7 - 20 MHz	40	5200	8.9	2.1	11.0	24.0	13.0
802.11n	MCS7 - 20 MHz	48	5240	9.0	2.1	11.1	24.0	12.9
802.11ac	MCS8 - 20 MHz	36	5180	9.0	2.2	11.2	24.0	12.8
802.11ac	MCS8 - 20 MHz	40	5200	9.1	2.2	11.3	24.0	12.7
802.11ac	MCS8 - 20 MHz	48	5240	8.9	2.2	11.1	24.0	12.9
802.11ac	MCS0 - 40 MHz	38	5190	9.1	0.6	9.7	24.0	14.3
802.11ac	MCS0 - 40 MHz	46	5230	8.9	0.6	9.5	24.0	14.5
802.11n	MCS7 - 40 MHz	38	5230	6.6	3.0	9.6	24.0	14.4
802.11n	MCS7 - 40 MHz	46	5230	6.4	3.0	9.4	24.0	14.6
802.11ac	MCS9 - 40 MHz	38	5230	6.6	3.3	9.9	24.0	14.1
802.11ac	MCS9 - 40 MHz	46	5230	6.5	3.3	9.8	24.0	14.2
802.11ac	MCS0 - 80 MHz	42	5210	7.1	1.2	8.3	24.0	15.7
802.11ac	MCS9 - 80 MHz	42	5210	4.0	4.0	8.0	24.0	16.0

Data – 5 GHz WLAN UNII 2A

Mode	Rate	Channel	Frequency (MHz)	Output Power (dBm)	Duty Cycle Correction (dB)	Corrected Pout (dBm)	Limit (dBm)	Margin (dB)
802.11a	6 Mbps	52	5260	12.1	0.3	12.4	24.0	11.6
802.11a	6 Mbps	56	5280	12.0	0.3	12.3	24.0	11.7
802.11a	6 Mbps	60	5300	11.7	0.3	12.0	24.0	12.0
802.11a	6 Mbps	64	5320	13.0	0.3	13.3	24.0	10.7
802.11a	54 Mbps	52	5260	10.4	1.9	12.3	24.0	11.7
802.11a	54 Mbps	56	5280	10.3	1.9	12.2	24.0	11.8
802.11a	54 Mbps	60	5300	10.2	1.9	12.1	24.0	11.9
802.11a	54 Mbps	64	5320	11.0	1.9	12.9	24.0	11.1
802.11n	MCS0 - 20 MHz	52	5260	11.6	0.3	11.9	24.0	12.1
802.11n	MCS0 - 20 MHz	56	5280	11.5	0.3	11.8	24.0	12.2
802.11n	MCS0 - 20 MHz	60	5300	11.5	0.3	11.8	24.0	12.2
802.11n	MCS0 - 20 MHz	64	5320	9.5	0.3	9.8	24.0	14.2
802.11n	MCS7 - 20 MHz	52	5260	10.0	2.1	12.1	24.0	11.9
802.11n	MCS7 - 20 MHz	56	5280	9.9	2.1	12.0	24.0	12.0
802.11n	MCS7 - 20 MHz	60	5300	9.8	2.1	11.9	24.0	12.1
802.11n	MCS7 - 20 MHz	64	5320	7.9	2.1	10.0	24.0	14.0
802.11ac	MCS8 - 20 MHz	52	5260	9.7	2.2	11.9	24.0	12.1
802.11ac	MCS8 - 20 MHz	56	5280	9.7	2.2	11.9	24.0	12.1
802.11ac	MCS8 - 20 MHz	60	5300	9.6	2.2	11.8	24.0	12.2
802.11ac	MCS8 - 20 MHz	64	5320	7.8	2.2	10.0	24.0	14.0
802.11ac	MCS0 - 40 MHz	54	5270	10.7	0.6	11.3	24.0	12.7
802.11ac	MCS0 - 40 MHz	62	5310	8.8	0.6	9.4	24.0	14.6
802.11n	MCS7 - 40 MHz	54	5270	8.2	3.0	11.2	24.0	12.8
802.11n	MCS7 - 40 MHz	62	5310	6.2	3.0	9.2	24.0	14.8
802.11ac	MCS9 - 40 MHz	54	5270	7.9	3.3	11.2	24.0	12.8
802.11ac	MCS9 - 40 MHz	62	5310	5.9	3.3	9.2	24.0	14.8
802.11ac	MCS0 - 80 MHz	58	5290	8.2	1.2	9.4	24.0	14.6
802.11ac	MCS9 - 80 MHz	58	5290	5.3	2.1	7.4	24.0	16.6

Data – 5 GHz WLAN UNII 2C

Mode	Rate	Channel	Frequency (MHz)	Output Power (dBm)	Duty Cycle Correction (dB)	Corrected Pout (dBm)	Limit (dBm)	Margin (dB)
802.11a	6 Mbps	100	5500	10.6	0.3	10.9	24.0	13.1
802.11a	6 Mbps	116	5580	9.7	0.3	10.0	24.0	14.0
802.11a	6 Mbps	140	5700	9.6	0.3	9.9	24.0	14.1
802.11a	54 Mbps	100	5500	8.9	1.9	10.8	24.0	13.2
802.11a	54 Mbps	116	5580	8.2	1.9	10.1	24.0	13.9
802.11a	54 Mbps	140	5700	8.0	1.9	9.9	24.0	14.1
802.11n	MCS0 - 20 MHz	100	5500	10.3	0.3	10.6	24.0	13.4
802.11n	MCS0 - 20 MHz	116	5580	9.3	0.3	9.6	24.0	14.4
802.11n	MCS0 - 20 MHz	140	5700	9.4	0.3	9.7	24.0	14.3
802.11n	MCS7 - 20 MHz	100	5500	8.7	2.1	10.8	24.0	13.2
802.11n	MCS7 - 20 MHz	116	5580	7.7	2.1	9.8	24.0	14.2
802.11n	MCS7 - 20 MHz	140	5700	7.6	2.1	9.7	24.0	14.3
802.11ac	MCS8 - 20 MHz	100	5500	8.3	2.2	10.5	24.0	13.5
802.11ac	MCS8 - 20 MHz	116	5580	7.6	2.2	9.8	24.0	14.2
802.11ac	MCS8 - 20 MHz	140	5700	7.6	2.2	9.8	24.0	14.2
802.11ac	MCS0 - 40 MHz	102	5510	8.2	0.6	8.8	24.0	15.2
802.11ac	MCS0 - 40 MHz	110	5550	8.7	0.6	9.3	24.0	14.7
802.11ac	MCS0 - 40 MHz	134	5670	8.7	0.6	9.3	24.0	14.7
802.11n	MCS7 - 40 MHz	102	5510	5.8	3.0	8.8	24.0	15.2
802.11n	MCS7 - 40 MHz	110	5550	6.4	3.0	9.4	24.0	14.6
802.11n	MCS7 - 40 MHz	134	5670	6.2	3.0	9.2	24.0	14.8
802.11ac	MCS9 - 40 MHz	102	5510	5.4	3.3	8.7	24.0	15.3
802.11ac	MCS9 - 40 MHz	110	5550	6.0	3.3	9.3	24.0	14.7
802.11ac	MCS9 - 40 MHz	134	5670	5.9	3.3	9.2	24.0	14.8
802.11ac	MCS0 - 80 MHz	106	5530	5.8	1.2	7.0	24.0	16.0
802.11ac	MCS9 - 80 MHz	106	5530	2.8	2.1	4.9	24.0	19.1

Data – 5 GHz WLAN UNII 3

Mode	Rate	Channel	Frequency (MHz)	Output Power (dBm)	Duty Cycle Correction (dB)	Corrected Pout (dBm)	Limit (dBm)	Margin (dB)
802.11a	6 Mbps	149	5745	10.4	0.3	10.7	30.0	19.3
802.11a	6 Mbps	157	5785	10.1	0.3	10.4	30.0	19.6
802.11a	6 Mbps	165	5825	10.4	0.3	10.7	30.0	19.3
802.11a	54 Mbps	149	5745	8.6	1.9	10.5	30.0	19.5
802.11a	54 Mbps	157	5785	8.5	1.9	10.4	30.0	19.6
802.11a	54 Mbps	165	5825	8.6	1.9	10.5	30.0	19.5
802.11n	MCS0	149	5745	9.9	0.3	10.2	30.0	19.8
802.11n	MCS0	157	5785	9.3	0.3	9.6	30.0	20.4
802.11n	MCS0	165	5825	9.9	0.3	10.2	30.0	19.8
802.11n	MCS7	149	5745	8.3	2.1	10.4	30.0	19.6
802.11n	MCS7	157	5785	8.0	2.1	10.1	30.0	19.9
802.11n	MCS7	165	5825	8.3	2.1	10.4	30.0	19.6
802.11ac	MCS8	149	5745	8.1	2.2	10.3	30.0	19.7
802.11ac	MCS8	157	5785	7.7	2.2	9.9	30.0	20.1
802.11ac	MCS8	165	5825	8.0	2.2	10.2	30.0	19.8
802.11ac	MCS0 - 40 MHz	151	5755	7.9	0.6	8.5	30.0	21.5
802.11ac	MCS0 - 40 MHz	159	5795	8.0	0.6	8.6	30.0	21.4
802.11n	MCS7 - 40 MHz	151	5755	5.6	3.0	8.6	30.0	22.4
802.11n	MCS7 - 40 MHz	159	5795	5.5	3.0	8.5	30.0	22.5
802.11ac	MCS9 - 40 MHz	151	5755	5.3	3.3	8.6	30.0	21.4
802.11ac	MCS9 - 40 MHz	159	5795	5.2	3.3	8.5	30.0	21.5
802.11ac	MCS0 - 80 MHz	155	5775	7.4	1.2	8.6	30.0	21.4
802.11ac	MCS9 - 80 MHz	155	5775	4.3	2.1	6.4	30.0	23.6

Data – 2.4 GHz WLAN

Mode	Data Rate	Channel	Frequency (MHz)	Power Setting	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11b	1 Mbps	1	2412	16.0	17.4	30.0	12.6
802.11b	1 Mbps	6	2437	16.0	17.5	30.0	12.5
802.11b	1 Mbps	11	2462	16.0	17.1	30.0	12.9
802.11b	11 Mbps	1	2412	16.0	18.1	30.0	11.9
802.11b	11 Mbps	6	2437	16.0	18.1	30.0	11.9
802.11b	11 Mbps	11	2462	16.0	17.7	30.0	12.3
802.11g	6 Mbps	1	2412	11.0	19.4	30.0	10.6
802.11g	6 Mbps	6	2437	15.0	22.5	30.0	7.5
802.11g	6 Mbps	11	2462	10.5	17.9	30.0	12.1
802.11g	54 Mbps	1	2412	11.0	17.4	30.0	12.6
802.11g	54 Mbps	6	2437	15.0	20.2	30.0	9.8
802.11g	54 Mbps	11	2462	10.5	16.1	30.0	13.9
802.11n HT20	HT20 MCS0	1	2412	9.5	16.7	30.0	13.3
802.11n HT20	HT20 MCS0	6	2437	16.0	21.9	30.0	8.1
802.11n HT20	HT20 MCS0	11	2462	10.5	16.9	30.0	13.1
802.11n HT20	HT20 MCS7	1	2412	9.5	16.1	30.0	13.9
802.11n HT20	HT20 MCS7	6	2437	16.0	21.2	30.0	8.8
802.11n HT20	HT20 MCS7	11	2462	10.5	16.6	30.0	13.4

Mode	Data Rate	Channel	Frequency (MHz)	Pout (dBm)	Duty Cycle Correction (dB)	Average Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11n HT40	MCS0	3	2422	8.3	0.6	8.9	30.0	21.1
802.11n HT40	MCS0	6	2437	10.2	0.6	10.8	30.0	19.2
802.11n HT40	MCS0	9	2452	9.1	0.6	9.7	30.0	20.3
802.11n HT40	MCS7	3	2422	5.8	3.0	8.8	30.0	21.2
802.11n HT40	MCS7	6	2437	7.7	3.0	10.7	30.0	19.3
802.11n HT40	MCS7	9	2452	6.7	3.0	9.7	30.0	20.3

Data – Bluetooth

Frequency (MHz)	Mode	Modulation	Output Power Measurement (dBm)	Output Power Limit (dBm)	Margin (dB)
2402	Bluetooth Classic	GFSK	8.4	30.0	21.6
2402	Bluetooth Classic	EDR2	7.3	30.0	22.7
2402	Bluetooth Classic	EDR3	7.1	30.0	22.9
2440	Bluetooth Classic	GFSK	8.7	30.0	21.3
2440	Bluetooth Classic	EDR2	6.2	30.0	23.8
2440	Bluetooth Classic	EDR3	6.4	30.0	23.6
2480	Bluetooth Classic	GFSK	8.9	30.0	21.1
2480	Bluetooth Classic	EDR2	5.3	30.0	24.7
2480	Bluetooth Classic	EDR3	5.5	30.0	24.5

Data – BLE

Frequency (MHz)	Peak Pout (dBm)	Peak Pout Limit (dBm)	Margin (dB)
2402	5.3	30.0	24.7
2440	4.6	30.0	25.4
2480	5.3	30.0	24.7

6 EXCLUSION CALCULATION

6.1 Test Cases

5 GHz WLAN: 13.3 dBm at 5320 MHz (Tune up Tolerance = +/- 2 dB)

2.4 GHz WLAN: 22.5 dBm at 2412 MHz (Tune up Tolerance = +/- 2 dB)

BT: 8.9 dBm at 2480 MHz (Tune up Tolerance = +/- 4 dB)

BLE: 5.3 dBm at 2480 MHz (Tune up Tolerance = +/- 4 dB)

Antenna Gain: 5.5 dBi @ 2.4 GHz

5.0 dBi @ 5 GHz

No Simultaneous Tx test case.

6.2 FCC – 5 GHz WLAN

Worst Case Scenario: 13.3 dBm at 5320 MHz

Tune-Up Tolerance: 2.0 dB

Total Power: 15.3 dBm = 33.9 mW

Peak Antenna Gain: 5.0 dBi

MPE Calculation

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: 15.30 (dBm)

Maximum peak output power at antenna input terminal: 33.884 (mW)

Antenna gain(peak): 5 (dBi)

Maximum antenna gain: 5.000 (numeric)

Prediction distance: 20 (cm)

Prediction frequency: 5320 (MHz)

MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm²)

Power density at prediction frequency: 0.033705 (mW/cm²)

The EUT is exempt from routine evaluation, as the power density is lower than the MPE limit.

6.3 ISED Canada – 5 GHz WLAN

Per Section 2.5.2:

Maximum EIRP = $(f(\text{MHz})^{0.6834}) * 1.31 * 10^{-2} \text{ W} = 4.6 \text{ W}$

The EUT is exempted from routine evaluation at 20 cm as the maximum 33.9 mW EIRP is less than 4.6 W.

6.4 FCC – 2.4 GHz WLAN

Worst Case Scenario: 22.5 dBm at 2412 MHz

Tune-Up Tolerance: 2.0 dB

Total Power: 24.5 dBm = 281.8 mW

Peak Antenna Gain: 5.5 dBi

Minimum test separation distance: To be calculated (EUT is a module).

MPE Calculation

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: 24.50 (dBm)

Maximum peak output power at antenna input terminal: 281.838 (mW)

Antenna gain(peak): 5.5 (dBi)

Maximum antenna gain: 5.500 (numeric)

Prediction distance: 20 (cm)

Prediction frequency: 2412 (MHz)

MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm²)

Power density at prediction frequency: 0.308385 (mW/cm²)

The EUT is exempt from routine evaluation, as the power density is lower than the MPE limit.

6.5 ISED Canada - 2.4 GHz WLAN

Per Section 2.5.2:

Maximum EIRP = $(f(\text{MHz})^{0.6834}) * 1.31 * 10^{-2} \text{ W} = 2.7 \text{ W}$

The EUT is exempted from routine evaluation at 20 cm as the maximum 281.8 mW EIRP is less than 2.7 W.

6.6 FCC – Bluetooth

Worst Case Scenario: 8.9 dBm at 2480 MHz

Tune-Up Tolerance: 4.0 dB

Total Power: 12.9 dBm = 19.5 mW

Peak Antenna Gain: 5.5 dBi

Minimum test separation distance: To be calculated (EUT is a module).

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: 12.90 (dBm)

Maximum peak output power at antenna input terminal: 19.498 (mW)

Antenna gain(peak): 5.5 (dBi)

Maximum antenna gain: 5.500 (numeric)

Prediction distance: 20 (cm)

Prediction frequency: 2480 (MHz)

MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm²)

Power density at prediction frequency: 0.021335 (mW/cm²)

The EUT is exempt from routine evaluation, as the power density is lower than the MPE limit.

6.7 ISED Canada – Bluetooth

Per Section 2.5.2:

Maximum EIRP = $(f(\text{MHz})^{0.6834}) * 1.31 * 10^{-2} \text{ W} = 2.7 \text{ W}$

The EUT is exempted from routine evaluation at 20 cm as the maximum 19.5 mW EIRP is less than 2.7 W.

6.8 FCC – BLE

Worst Case Scenario: 5.3 dBm at 2480 MHz

Tune-Up Tolerance: 4.0 dB

Total Power: 9.3 dBm = 8.5 mW

Peak Antenna Gain: 5.5 dBi

Minimum test separation distance: To be calculated (EUT is a module).

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: 9.30 (dBm)

Maximum peak output power at antenna input terminal: 8.511 (mW)

Antenna gain(peak): 5.5 (dBi)

Maximum antenna gain: 5.500 (numeric)

Prediction distance: 20 (cm)

Prediction frequency: 2480 (MHz)

MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm²)

Power density at prediction frequency: 0.009313 (mW/cm²)

The EUT is exempt from routine evaluation, as the power density is lower than the MPE limit.

6.9 ISED Canada – BLE

Per Section 2.5.2:

Maximum EIRP = (f(MHz)^{0.6834}) * 1.31 * 10⁻² W = 2.7 W

The EUT is exempted from routine evaluation at 20 cm as the maximum 8.5 mW EIRP is less than 2.7 W.

7 REVISION HISTORY

Version	Date	Notes	Person
V0	1/15/20	First Draft	Shane Dock
V1	2/12/20	Second Draft	Shane Dock
V2	4/14/20	Review Concluded	Shane Dock
V3	7/1/20	Shift to mobile	Shane Dock

END OF REPORT