

Intragrain Technologies, Inc RF Exposure Exhibit

SCOPE OF WORK

EMC TESTING – BIN-SENSE Live Remote Unit, Model: 106201

REPORT NUMBER

104915573MPK-005

ISSUE DATE

March 03, 2022

REVISED DATE

N/A

PAGES

10

DOCUMENT CONTROL NUMBER

Non-Specific Radio Report Shell Rev. December 2017 MPK

© 2017 INTERTEK



**RF Exposure Exhibit
(mobile devices)****Report Number: 104915573MPK-005
Project Number: G104915573****Report Issue Date: March 03, 2022****Product Designation: BIN-SENSE Live Remote Unit
Model Tested: 106201****FCC ID: 2AUTY-106103RU-V06****to****47CFR 2.1091
RSS-102 Issue 5****for****Intragrain Technologies, Inc****Tested by:**
Intertek
1365 Adams Court
Menlo Park, CA 94025
USA**Client:**
Intragrain Technologies, Inc
118 Husum Road
RM of Sherwood, SK S4K0A4
Canada**Report prepared by:****Anderson Sougnpanya / Project Engineer****Report reviewed by:****Krishna Vemuri / EMC Manager**

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

Report No. 104915573MPK-005	
Equipment Under Test:	BIN-SENSE Live Remote Unit
Trade Name:	Intragrain Technologies, Inc
Model(s) Tested:	106201
Applicant:	Intragrain Technologies, Inc
Contact:	Grant Kerr
Address:	Intragrain Technologies, Inc. 118 Husum Road RM of Sherwood, SK S4K0A4
Country:	Canada
Tel. Number:	(604) 528-8732
Email:	Grantkerr@intragrain.com
Applicable Regulation:	47CFR 2.1091 RSS-102 Issue 5

Table of Contents

RF EXPOSURE SUMMARY.....	5
1.0 RF EXPOSURE LIMITS	5
2.1 FCC LIMITS	5
2.2 INDUSTRY CANADA LIMITS	6
2.0 TEST RESULTS (MOBILE CONFIGURATION).....	7
3.1 CLASSIFICATION.....	7
3.2 EIRP CALCULATIONS	7
3.3 MAXIMUM RF POWER.....	7
3.4 RF EXPOSURE CALCULATION.....	8
APPENDIX A: POWER DENSITY CALCULATION.....	9
4.0 DOCUMENT HISTORY.....	10

RF Exposure Summary

Test	Reference FCC	Reference Industry Canada	Result
Radio frequency Radiation Exposure Evaluation	47 CFR§2.1091	RSS-102 Issue 5	Complies

1.0 RF Exposure Limits

In this document, we evaluate the RF Exposure to human body due the intentional transmission from the transmitter (EUT). The limits for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 and RSS-102 are followed.

2.1 FCC Limits

According to FCC 1.1310 table 1: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
(A)Limits For Occupational / Control Exposures				
0.3 – 3.0	614	1.63	*100	6
3.0 – 30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300 - 1500	...	...	F/300	6
1500 - 100,000	...	...	5	6
(B)Limits For General Population / Uncontrolled Exposure				
0.3 – 1.34	614	1.63	*100	30
1.34 – 30	824/f	2.19/f	*180/f ²	30
30 – 300	27.5	0.073	0.2	30
300 - 1500	...	...	F/1500	30
1500 - 100,000	...	...	1.0	30

F = Frequency in MHz

* = plane wave equivalent density

2.2 Industry Canada Limits

According to RSS-102, Industry Canada has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline, Safety Code 6.

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	$87/f^{0.5}$	-	-	6**
10-20	27.46	0.0728	-2	6
20-48	$58.07/f^{0.25}$	$0.1540/f^{0.25}$	$8.944/f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142f^{0.3417}$	$0.008335f^{0.3417}$	$0.02619f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	$0.158f^{0.5}$	$4.21 \times 10^{-4}f^{0.5}$	$6.67 \times 10^{-5}f$	$616000/f^{1.2}$

Note: f is frequency in MHz.
 * Based on nerve stimulation (NS).
 ** Based on specific absorption rate (SAR).

2.0 Test Results (Mobile Configuration)

3.1 Classification

Radio is installed inside a mobile host device. The antenna of the product, under normal use condition, is at least 20 cm away from the body of the user and accessible to the end user. Warning statement to the user for keeping at least 20 cm or more separation distance with the antenna should be included in user's manual.

3.2 EIRP calculations

The BIN-SENSE Live Remote Unit, Model: 106201 consists of one 2.4GHz Zigbee radio.

3.3 Maximum RF Power

Frequency Range (MHz)	RF Output (dBm)	Antenna Gain ¹ (dBi)	Note
Zigbee 2410 – 2465	18.94	1.5	Conducted power measurements were taken from Report # 104915573MPK-002.

¹As declared by the manufacturer. Antenna gains below 0 are considered as 0 dBi.

3.4 RF Exposure Calculation

3.4.1 RF Exposure calculation for 2.4GHz Zigbee

Calculations for this report are based on highest power measured.

Radio	Frequency Range (MHz)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm ²) @20 cm	FCC Limit (mW/m ²)	Results
Zigbee	2410 - 2465	20.44	110.6624	0.0220	1.0000	Complies

Radio	Frequency Range (MHz)	EIRP (dBm)	EIRP (mW)	Power Density (W/m ²) @20 cm	RSS Limit (W/m ²)	Results
Zigbee	2410 - 2465	20.44	110.6624	0.2203	5.3630	Complies

Appendix A: Power Density Calculation

The Power Density can be calculated using the formula

$$S = \text{EIRP} / 4\pi D^2$$

Where: S is Power Density in mW/cm²

D is the distance from the antenna in cm.

4.0 Document History

Revision/ Job Number	Writer Initials	Reviewers Initials	Date	Change
1.0/G104915573	AS	KV	March 03, 2022	Original document