

Honeywell International, Inc. RF Exposure Exhibit

SCOPE OF WORK

EMC TESTING – Beats IP FCU Controller, Model: UNI-RL1644ESB24NM

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105214557MPK-015

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RF Exposure Exhibit (Mobile Devices)

Report Number: 105214557MPK-015
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Report Issue Date: January 5, 2023
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Testing performed on the
Beats IP FCU Controller
Model Tested: UNI-RL1644ESB24NM
Model Not Tested: UNI-RL1644ESB24NM(C/D)
UN-RL1644ESB24NM
UN-RL1644ESB24NM(C/D)

to

47CFR 2.1091
RSS-102 Issue 5

for

Honeywell International, Inc.

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Report No. 105214557MPK-015	
Equipment Under Test:	Beats IP FCU Controller
Model Number:	UNI-RL1644ESB24NM
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Applicable Regulation:	47CFR 2.1091 RSS-102 Issue 5

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TABLE OF CONTENTS

<i>Honeywell International, Inc.</i>	1
1.0 RF Exposure Summary	5
2.0 RF Exposure Limits	5
3.0 Test Results (Mobile Configuration)	7
Appendix A: Power Density Calculation	9
4.0 Document History	10

1.0 RF Exposure Summary

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

2.0 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	Electric Field	Magnetic Field	Power Density	Reference Period
(MHz)	(V/m rms)	(A/m rms)	(W/m ²)	(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	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619 f ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000/ f ^{1.2}

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

3.0 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 Beats IP FCU Controller, Model: UNI-RL1644ESB24NM consists of one radio: 2.4 GHz BLE.

For RF exposure compliance refer to reports below:

Radio	Report Number
2.4 GHz - BLE	105214557MPK-013

3.3 Maximum RF Power

Frequency Range (MHz)	RF Output (dBm)	Antenna Gain ¹ (dBi)	Note
2402 - 2480	7.12	3.72	Conducted power measurements were taken from Report #105214557MPK-013.

¹As provided by the client. Intertek takes no responsibility for the accuracy of this information.

3.4 RF Exposure Calculation

3.4.1 RF Exposure calculation for 2.4 GHz BLE

Frequency Range (MHz)	EIRP ¹ (dBm)	EIRP ¹ (mW)	Power Density (mW/cm ²) @20 cm	FCC Limit (mW/cm ²)
2402 – 2480	10.84	12.13	0.00242	1.00

Note: Antenna gains below 0 are considered as 0dBi.

Frequency Range (MHz)	EIRP ¹ (dBm)	EIRP ¹ (mW)	Power Density (W/m ²) @20 cm	RSS Limit (W/m ²)
2402 – 2480	10.84	12.13	0.0242	5.35

Note: Antenna gains below 0 are considered as 0dBi.

4.0 Variant Models

UNI-RL1644ESB24NM(C/D)
UN-RL1644ESB24NM
UN-RL1644ESB24NM(C/D)

Per Honeywell International Inc.:

- Model UN-RL1644ESB24NM is electrically and mechanically identical to the tested model UNI-RL1644ESB24NM. The model number was changed after production began as the factory system limits the number of characters for the model number.
- (C) or (D) modifiers – used to indicate channel of distribution for sales. May be added to customer orders or invoices when product is sold and does not appear on labels. No difference between models without the modifier.

Appendix A: Power Density Calculation

The Power Density can be calculated using the formula

$$S = EIRP / 4\pi D^2$$

Where: S is Power Density in mW/cm²
D is the distance from the antenna in cm.

5.0 Document History

Revision/ Job Number	Writer Initials	Reviewers Initials	Date	Change
1.0 / G105214557	EC	AS	January 5, 2023	Original Document
1.1 / G105245638	EC	AS	February 10, 2023	Per client request, added variant models: UN-RL1644ESB24NM (C/D), UN-RL1644ESB24NM, UN-RL1644ESB24NM (C/D)
1.2 / G105245638	EC	AS	March 7, 2023	Updated calculation of EIRP in mW to correct value.