Bosch Automotive Service Solutions, Inc

RF Exposure Exhibit

SCOPE OF WORK
EMC TESTING – Connected AC Android Control Module Model: AP6255

REPORT NUMBER
103930307MPK-001B

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RF Exposure Exhibit
(mobile devices)

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Product Designation: Connected AC Android Control Module
Model Tested: AP6255

FCC ID: 2AHLA-SP01500243
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to

47CFR 2.1091
RSS-102 Issue 5

for

Bosch Automotive Service Solutions, Inc

Tested by:	**Client:**
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Report No. 103930307MPK-001B	
Equipment Under Test:	Connected AC Android Control Module
Trade Name:	Bosch Automotive Service Solutions, Inc
Model(s) Tested:	AP6255
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Applicable Regulation:	47CFR 2.1091 RSS-102 Issue 5

TABLE OF CONTENTS

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	$58.07/f^{0.25}$	$0.1540/f^{0.25}$	$8.944/f0.5$	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	$0.158f^{0.5}$	$4.21 \times 10\text{-}4f^{0.5}$	$6.67 \times 10^{-5}f$	$616000/f^{1.2}$

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

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 Connected AC Android Control Module, Model: AP6255 consists of three radios: Bluetooth Low Energy, 2.4 GHz Wifi, and 5GHz Wifi.

3.3 Maximum RF Power

Frequency Range (MHz)	RF Output (dBm)	Antenna Gain[1] (dBi)	Note
2402-2480	3.62	5	Conducted power measurements were taken from Report # 103930307MPK-003.
2412-2462	12.38	5	Conducted power measurements were taken from Report # 103930307MPK-001.
5180-5240	10.15	4.3	Conducted power measurements were taken from Report # 103930307MPK-002A.
5745-5825	9.19	4.3	Conducted power measurements were taken from Report # 103930307MPK-002B.

[1]As declared by the manufacturer.

3.4 RF Exposure Calculation

3.4.1 RF Exposure calculation for Bluetooth Low Energy & 2.4 GHz Wifi

Calculations for this report are based on highest power measured for each band.

Frequency Range (MHz)	EIRP (dBm)	EIRP (mW)	Power Density (W/m^2) @20 cm	RSS Limit (W/m^2)	MPE Ratio	Sum of MPE Ratios
2402-2480	8.62	7.278	0.0145	5.469	0.0027	0.0226
2412-2462	17.38	54.702	0.1088	5.442	0.0200	

Frequency Range (MHz)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm^2) @20 cm	FCC Limit (mW/cm^2)	MPE Ratio	Sum of MPE Ratios
2402-2480	8.62	7.278	0.0014	1	0.0014	0.0123
2412-2462	17.38	54.702	0.0109	1	0.0109	

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

3.4.2 RF Exposure calculation for Bluetooth Low Energy & 5 GHz Wifi

Calculations for this report are based on highest power measured for each band.

Frequency Range (MHz)	EIRP (dBm)	EIRP (mW)	Power Density (W/m^2) @20 cm	RSS Limit (W/m^2)	MPE Ratio	Sum of MPE Ratios
2402-2480	8.62	7.278	0.0145	5.469	0.0027	0.0087
5180-5240	14.45	27.861	0.0554	9.119	0.0061	

Frequency Range (MHz)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm^2) @20 cm	FCC Limit (mW/m^2)	MPE Ratio	Sum of MPE Ratios
2402-2480	8.62	7.278	0.0014	1	0.0014	0.0069
5180-5240	14.45	27.861	0.0055	1	0.0055	

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

The summation of the MPE ratio is less than 1, therefore, the EUT complies for the MPE requirement of simultaneous transmission.

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/cm^2
D is the distance from the antenna in cm.

4.0 Document History

Revision/ Job Number	Writer Initials	Reviewers Initials	Date	Change
01/ G103930307	TM	KV	August 21, 2019	Original document