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47 CFR Part 2.1091
Radiofrequency radiation exposure evaluation: Mobile devices

Test Sample:	MCSS RF MODULE
Model Number:	6LP GW & 6LP SN
Tested For:	ROBERT BOSCH (AUSTRALIA) PTY LTD
Report Number:	M181127-2
Date of Issue:	16 January 2019

Contents

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Radiofrequency radiation exposure evaluation: Mobile devices

Issued by: EMC TECHNOLOGIES PTY. LTD.,
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FCC registration number: 90560 and ISED Canada iOATS number: IC 3569B

Test Sample:	MCSS RF MODULE
Model Number:	6LP GW & 6LP SN
Manufacturer:	ROBERT BOSCH (AUSTRALIA) PTY LTD

Tested for:	ROBERT BOSCH (AUSTRALIA) PTY LTD
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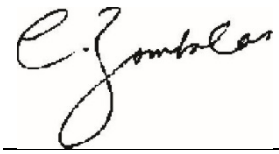
KDB: **447498 D01 General RF Exposure Guidance v06**
RF exposure procedures and equipment authorization policies for mobile and portable devices.

Result: The MCSS RF MODULE model 6LP GW & 6LP SN complied with the RF exposure requirements of 47 CFR Part 2.1091, however an exclusion zone of 20 cm in front of the antenna applies, elsewhere the exposure level was below the mobile device limits.

Test Date: 16th January 2019

Test Officer: Emad Mansour
EMR/EME Test Engineer
EMC Technologies Pty Ltd



Checked by: Chris Zombolas
Technical Director
EMC Technologies Pty Ltd

1 INTRODUCTION

This report is intended to demonstrate compliance of the (6LP GW & 6LP SN) MCSS RF MODULE with the RF exposure requirements of 47 CFR Part 2.1091. Evaluation was performed in accordance with FCC KDB 447498 D01.

The test sample was provided by the Client. The conclusion herein is based on the information provided by the client.

2 GENERAL INFORMATION

(Information supplied by the Client)

Radio frequency module encompassing two variants. This module operates as a frequency hopping system in the 915MHz band. The variants have identical RF sections and only differ in parts loading with connectors and a USB to UART section.

2.1 EUT (Transmitter) Details

Radio Module:	MCSS RF module transmitter
Model Number:	6LP GW & 6LP SN
Operating Band:	902 MHz - 928 MHz
Modulation	FHSS
Maximum Output power	24.90 dBm
Antenna:	
Antenna Model:	W5012 antenna
Antenna Gain:	2 dBi

Note1: For output power and antenna gain refer to M181127-1 report issued by EMC technologies

3 LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE), §1.1310

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
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
300-1,500			f/300	6
1,500-100,000			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
300-1,500			f/1500	30
1,500-100,000			1.0	30

Where f = Frequency in MHz, * = Plane-wave power density

4 UNCERTAINTY

EMC Technologies has evaluated the tools and methods used to perform Radiated Electromagnetic Field predictions.
The estimated measurement uncertainties for the calculation shown within this report are as follows:
Electromagnetic Modelling
30 MHz to 100GHz ±2.8 dB
The above expanded uncertainties are based on standard uncertainties multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

5 ASSUMPTIONS IN THIS ASSESSMENT

This assessment does not include accumulated RF fields from nearby sites/antennas or possible radio signal reflections or attenuation due to buildings or the general environment.
Antenna Parameters and power settings were supplied by the customer.
100% duty cycle assumed for calculation
The aperture of the radiating element assumed to be a point source in free space and far field conditions.

6 EVALUATION RESULT

The MPE was evaluated at 20 cm to show compliance with the power density listed in table 1,

The following formula was used to calculate the power density at 20 cm

$$S = \frac{P * G}{4\pi R^2}$$

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

Where

(S): Power density (mW/cm^2)
(P): Output power at antenna terminal (mW)
(G): Gain (ratio)
(R): Minimum test separation distance (20 cm)

Technology	Frequency Band	Power	Gain	Duty Cycle	EIRP	EIRP	Flux Density at 20 cm	Flux Density limit	Percentage of the limit
		dBm	dBi	%	dBm	mW	mW/cm^2	mW/cm^2	%
MCSS RF Module	902 MHz	24.9	2	100%	26.90	489.78	0.0975	0.60	16.21%

7 CONCLUSION

The 6LP GW & 6LP SN was evaluated on behalf of ROBERT BOSCH (AUSTRALIA) PTY LTD with the RF exposure requirements of 47 CFR Part 2.1091. An exclusion zone of 20 cm was required in front of the antennas, away from this area the electric field measured at 20 cm did not exceed the MPE limit.