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Report On

RF Exposure Estimation of the
DragonWave Inc. Microwave Outdoor Unit Harmony Lite 3GHz (3650 – 3700MHz) In accordance with FCC CFR 47 Part 90Z and Industry Canada RSS-102: Issue 4

COMMERCIAL-IN-CONFIDENCE

FCC ID: QB8LT3G
IC ID: 4679A-LT3G

Document 57014125 Report 02 Issue 1 September 2014

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REPORT ON RF Exposure Estimation of the
DragonWave Inc.
Microwave Outdoor Unit Harmony Lite 3GHz

Document 57014125 Report 02 Issue 1

September 2014

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DATED 12 September 2014

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47: Part 1, 2, 90Z and Industry Canada RSS-102. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

Y He C Zhang

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RF Exposure Measurement

1 Introduction

This document was prepared to analyze the expected level of Radiofrequency Radiation Exposure caused by the radio transmission equipment Microwave Outdoor Unit Harmony Lite 3GHz belonging to DragonWave Inc.

2 Limits and Guidelines on Maximum Permissible Exposure (MPE)

Based on Section FCC Part 1.1307(b) and Industry Canada RSS-102 requirements for environmental impact of human exposure to radio-frequency (RF) radiation, according to the RF Exposure Procedures and Equipment Authorization Policies, a device may be used in exposure condition with no restrictions when output power is ≤ $60/f_{(GHz)}$ mW as specified in the following table:

Limits for Maximum Permissible Exposure

Exposure Category	Limit
General Population	1.0mW/cm^2 or 10W/m^2

NOTE: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

3 Calculation of Output Power threshold

In accordance with FCC 47 CFR Part 2.1091 and Industry Canada RSS-102.

Below method describes a theoretical approach to compare the output power of the Microwave Outdoor Unit Harmony Lite 3GHz based on a typical configuration device.

3.1 Typical Configuration

Microwave Outdoor Unit Harmony Lite 3GHz supports frequency band of 3650 - 3700MHz. It supports BPSK, QPSK, 16QAM and 64QAM modulation with channel bandwidth 20MHz and 40MHz.

3.2 Antennas and Technical Description

20MHz OBW

	Modulation Type	Bottom (3660MHz)	Middle (3675MHz)	Top (3690MHz)
Max. output power at antenna connector(dBm)-total	BPSK	21.51	21.37	20.80
	QPSK	21.52	**21.63**	20.82
	16QAM	21.53	21.41	20.81
	64QAM	21.49	21.38	20.80
Transmitter frequency band	3650MHz - 3700MHz			
Number of antenna ports	2 ports(2*2MIMO)			
Antenna MT–384022/SVH/A Gain	14.5			
Antenna MT–385006/SVH/A Gain	19.5			
Antenna MT–405042/NVH/D Gain	21.0			

40MHz OBW

	Modulation Type	Bottom (3670MHz)	Middle (3675MHz)	Top (3680MHz)
Max. output power at antenna connector(dBm)-total	BPSK	**24.27**	24.17	24.13
	QPSK	24.25	24.21	24.11
	16QAM	24.27	24.20	24.09
	64QAM	24.27	24.20	24.09
Transmitter frequency band	3650MHz - 3700MHz			
Number of antenna ports	2 ports(2*2MIMO)			
Antenna MT–384022/SVH/A Gain	14.5			
Antenna MT–385006/SVH/A Gain	19.5			
Antenna MT–405042/NVH/D Gain	**21.0**			

3.3 Calculation result

The maximum measured antenna conducted power, $\mathbf{P_{max}=24.27dBm}$
The antenna gain, $\mathbf{G_{max}=21dBi}$,

So, the maximum EIRP power= $P+G_{max}$=**45.27dBm,** or **33.651W**
The limit for Maximum Permissible Exposure (MPE) for transmitter at **3.7GHz is 10W/m^2**

The power density is related to EIRP with the equation:
$S = EIRP/4\pi D^2$, which equal to $10=33.651/4\pi D^2$, thus **D=0.5175m**

The minimum safe separation distance D= 0.5175m.