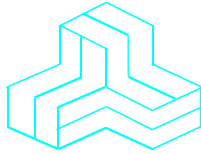


ENGINEERING TEST REPORT



Product / Model # PR34X-V
FCC ID: PQG-PR34X-V

Applicant:

Lyngsoe Systems Ltd.
101 Simona Dr., Unit 2
Bolton, Ontario L7E 4E8

Federal Communications Commission (FCC)
Maximum Permissible Exposure (MPE) Evaluation

UltraTech's File No.: 16LY1130_MPE

This Test report is Issued under the Authority of
Tri M. Luu
Vice President of Engineering
UltraTech Group of Labs

Date: April 14, 2016

Report Prepared by: Dharmajit Solanki

Tested by: N/A

Issued Date: April 14, 2016

Test Dates: N/A

- The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.
- This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.

UltraTech

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NVLAP LAB
CODE 200093-0



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File #: 16LYI130_MPE

April 14, 2016

All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

EXHIBIT 1. GENERAL INFORMATION

1.1. CLIENT INFORMATION

APPLICANT	
Name:	Lyngsoe Systems Ltd.
Address:	101 Simona Dr., Unit 2 Bolton, Ontario Canada L7E 4E8
Contact Person:	Donald Ferguson Phone #: 905-501-1533 Fax #: 905-501-1538 Email Address: dfe@lyngsoesystems.com

1.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information was supplied by the applicant.

Brand Name:	Lyngsoe Systems
Product Name:	PR34X-V
Model Name or Number:	PR34X-V
Type of Equipment:	LTE Radio Module (Licensed Non Broadcast Station Transmitter)
Co-located Transmitter 1:	2.4 GHz Wi-Fi DTS Module, FCC ID: QPU8000
Co-located Transmitter 2:	900 MHz RFID Module, FCC ID: QV5MERCURY6EM
Primary User Functions of EUT:	Unit will be mounted on a belt loader and reads UHF passive tags going on and off the plane

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EXHIBIT 2. RF EXPOSURE REQUIREMENTS [§§ 15.247(i), 1.1310 & 2.1091]

2.1. Limits

§ 1.1310: 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)	Averaging time (minutes)
(A) Limits for Occupational/Controlled 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 power density

Note 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2: 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 can not exercise control over their exposure.

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2.2. Method of Measurements

Calculation Method of Power Density/RF Safety Distance:

$$S = \frac{PG}{4\pi \cdot r^2} = \frac{EIRP}{4\pi \cdot r^2}$$

Where,
P: power input to the antenna in mW
EIRP: equivalent (or effective) isotropically radiated power
S: power density mW/cm²
G: numeric gain of antenna relative to isotropic radiator
r: distance to centre of radiation in cm

2.3. RF Evaluation, Co-location with Wi-Fi & RFID Modules

Pursuant to KDB 447498 D01 General RF Exposure Guidance v06, Section 7.2:

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0 , according to calculated/estimated, numerically modeled, or measured field strengths or power density.

As per Manufacturer's C2PC declaration of PR34X-V, this model consisted of the following 3 radio modules and their associated antennas. Power Densities are calculated as below. Prediction Distance: 30cm.

- 1) LTE transmitters integrated in the PR34X-V:
 - (a) LTE 700 MHz: O/p Power: 201 mW, Max Gain: 9 dBi, Power Density $S = 0.141 \text{ mW/cm}^2$
 - (b) LTE 1700 MHz: O/p Power: 211 mW, Max Gain: 6 dBi, Power Density $S = 0.074 \text{ mW/cm}^2$
- 2) Wi-Fi Transmitter integrated in the PR34X-V:
2.4 GHz Tx: O/p Power: 195 mW, Max Gain: 0.8 dBi, Power Density $S = 0.020 \text{ mW/cm}^2$
- 3) RFID Transmitter integrated in the PR34X-V:
900 MHz Tx: O/p Power: 933.25 mW, Max Gain: 6.0 dBi, Power Density $S = 0.328 \text{ mW/cm}^2$

Co-location at minimum **30 cm** evaluation separation distance when operated is required by the operating configurations and exposure conditions of the host device with integrated Wi-Fi and RFID modules.

The following MPE evaluation of the PR34X-V is to show that the MPE ratio is ≤ 1 . The test data is the worst-case derived from MPE reports of integrated Wi-Fi and RFID modules from FCC site.

MPE Ratio Calculation of all 3 Modules at an Evaluation Distance of 30 cm

Modules	Max. Power Density, S (mW/cm ²)	MPE Limit (mW/cm ²)	MPE Ratio
Radio Module LTE Band (700 MHz)	0.141	0.518	0.272
Radio Module LTE Band (1700 MHz)	0.074	1.000	0.074
Wi-Fi Module (2.4GHz)	0.020	1.000	0.020
RFID Module (900 MHz)	0.328	0.612	0.536
Maximum MPE Ratio:			0.902

Verdict: Based on the above configurations and computation, the maximum MPE ratio of the model PR34X-V is 0.902 and is ≤ 1.0 is in compliance with FCC RF exposure requirements and requires minimum MPE separation distance of **30cm** from General Populations/Equipment Operators when installed and shall be declared by the manufacturer under RF Exposure warning in the user manual.