1. FCC SAR TEST EXCLUSION CALCULATIONS

FCC ID: VC7120-0157
Model number: CHROMA74
Based on guidance from KDB 447498

1.1 SAR TEST EXCLUSION CALCULATION

Time averaged conducted power		
Nominal power output	-5dBm	Set by Firmware
Production tolerance	+0.5dB	IC tolerance over temperature and supply
max conducted power	-4.5dBm (0.35mW)	“tune up tolerance”
Max theoretical duty cycle in normal operation	0.14%	25ms every 17.6s
Max average conducted power	0.00049 mW	
Rounded up to nearest mW	1 mW	(clause 4.3.1)

Minimum test Separation Distance	
Minimum 5mm is used (clause 4.1.5)	It is conceivable that a user might touch the electronic shelf label display while it is transmitting. Antenna is 3mm from the surface of the display.

Minimum frequency	902.5 MHz
Maximum frequency	927.5 MHz

SAR test exclusion threshold calculation (clause 4.3.1)

*Calculation = Power of channel (mW) / min test separation(mm) * [sqrt freq (GHz)]. result rounded to 1decimal place*

Min channel : 1 / 5 * [sqrt 0.9025] = 0.2
Max channel: 1 / 5 * [sqrt 0.9275] = 0.2

This is below the limits for 1-g SAR (3.0) and 10-g SAR (7.5) and so the product meets the thresholds for SAR test exclusion.

2. MPE CALCULATION AND RADIATION EXPOSURE RISK ASSESSMENT

FCC ID: VC7120-0157
IC ID: 8910A-1200157
Model: CHROMA74

2.1 MPE CALCULATION AND EXPOSURE RISK

Following guidelines in KDB 447498 D03 supplement C Cross-reference v01

Prediction of MPE limit at a given distance

$$S = \frac{1.64ERP}{4\pi R^2} \quad \text{re-arranged } R = \sqrt{\frac{1.64ERP}{S4\pi}}$$

where:

S = power density
R = distance to the centre of radiation of the antenna
ERP = EUT Maximum power

With the maximum test case 100% duty cycle the MPE calculation result based on radiated field measurements from CHROMA74 test report 16R445 FR (Max Result @ 913.5MHz = 76.47dBuV @ 3m = 0.008mW ERP)

Prediction frequency (MHz)	Max ERP (mW)	Power density limit (S) (mW/cm2)	Distance R cm required to be less than 0.6mW/cm2
913.5MHz	0.008	0.6	0.04

Exposure risk in normal operation

The maximum theoretical transmitter duty cycle in operation is 25ms every 17.6s, (0.14%), which reduces the average ERP to 0.000012mW.

In practice, it is impossible to reach the power density limit of 0.6mW/cm2 even with 100% duty cycle, because the required distance R is smaller than the distance from the antenna to the outside surface of the device enclosure.

CHROMA74 is a fixed installation. In a retail shelf edge context it is possible human body will contact the device, but with only momentary exposure.

3. INDUSTRY CANADA RSS-102 exemption requirements

IC ID: 8910A-1200157

Installation of the device when in service could be <20cm from any part of the user.
Therefore the electronic shelf label CHROMA74 falls under RSS-102 issue 5, section 2.5.1
To meet the requirement for exemption from routine evaluation the maximum EIRP must then be less than 200mW.

From CHROMA74 test report 16R445FR:-

Maximum TX power = 76.47dBuV @ 3m @ 913.5MHz = 0.013mW EIRP (0.008mW ERP)

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