

## 1. FCC SAR TEST EXCLUSION CALCULATIONS

**FCC ID: VC7120-0144**

**Model number: CHROMA16**

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.

<b>Minimum frequency</b>	902.5 MHz
<b>Maximum frequency</b>	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 1 decimal place*

Min channel :  $1 / 5 * [\text{sqrt } 0.9025] = 0.2$

Max channel:  $1 / 5 * [\text{sqrt } 0.9275] = 0.2$

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: VC7120-0144**

**IC ID: 8910A-1200144**

**Model: CHROMA16**

### 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

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

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 CHROMA16 test report 16R205 FR (Max Result @ 927.5MHz = 79.8dBuV @ 3m = 0.018mW ERP)

Prediction frequency (MHz)	Max ERP (mW)	Power density limit (S) (mW/cm2)	Distance R cm required to be less than 0.6mW/cm2
927.5MHz	0.018	0.6	0.2

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 0.000025mW.

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=0.2cm is smaller than the distance from the antenna to the outside surface of the device enclosure.

CHROMA16 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-1200144**

Installation of the device when in service could be <20cm from any part of the user.

Therefore the electronic shelf label CHROMA16 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 CHROMA16 test report 16R205FR:-

Maximum TX power = 79.8dBuV @ 3m @ 927.5MHz = 0.03mW EIRP  
(0.018mW ERP)

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