Applicant: Tyco Safety Products/Sensormatic
Correspondence Reference Number: 18641
731 Confirmation Number: TC686531

Subject: FCC ID: BVCIDRDR2

Date of Original FCC Email: 03/22/2005

Dear Mr. Harrington,

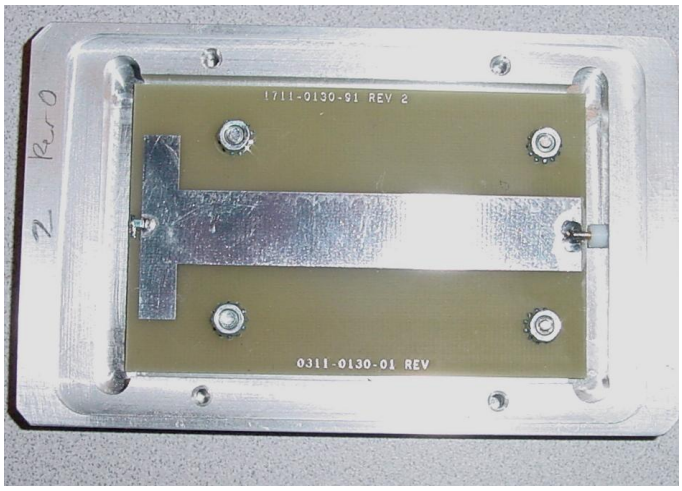
Please find below the responses to the OET request for additional information regarding FCC ID: BVCIDRDR2:

TCB to address:

Cover letter states:
"The new antenna is a near field antenna designed to be installed into the peel tip on mechanical RFID label applicators." In support of 15.247(i) compliance, please submit RF exposure info for new antenna, including final-product device photos/drawings and how 23 cm separation distance will maintained.

Response:

The new antenna is a near-field micro-strip line antenna as pictured below:



Empirical testing and FEM models show that the gain of the antenna is approximately -17.7 dBi

From this information, new RF Exposure information can be calculated.

RF Exposure Compliance Requirements

Results

EUT Output Power = +30 dBm
Antenna Gain = -17.7 dBi
S = .6 mW / cm^2 (CFR 47 Part 1.1310)

Minimum MPE safe distance (using equation below) = 1.5 cm

Calculations

E = SQR ROOT (30*P*G) / d And S= E^2 / 3770

Where
E = Field Strength in Volts/meter
P= Power In Watts
G = Numeric Antenna Gain
d = Distance in Meters
S = Power Density in mW / square cm

Combining equations and rearranging the terms to express d as a function of the other variables yields:

d = SQR ROOT (30*P*G) / (3770 * S)

Changing to units of mW and cm:

P(mW) = P(W) / 1000 And d(cm)= 100 *d(m)

Yields

d = 100 * SQR ROOT ((30*P*G) / (3770*S))

Therefore

d = 0.282* SQR ROOT (P*G/S) d = Distance in Meters
P= Power In mW
G = Numeric Antenna Gain
S= Power Density in mW / cm^2

Substituting the log form of gain and power:

P (mW) = 10^ (P(dBm)/10) And G (numeric) = 10 ^ (G(dBi) / 10)

Yields

d = .282 * (10 ^ ((P+G) / 20)) / (SQR ROOT (S))

Where

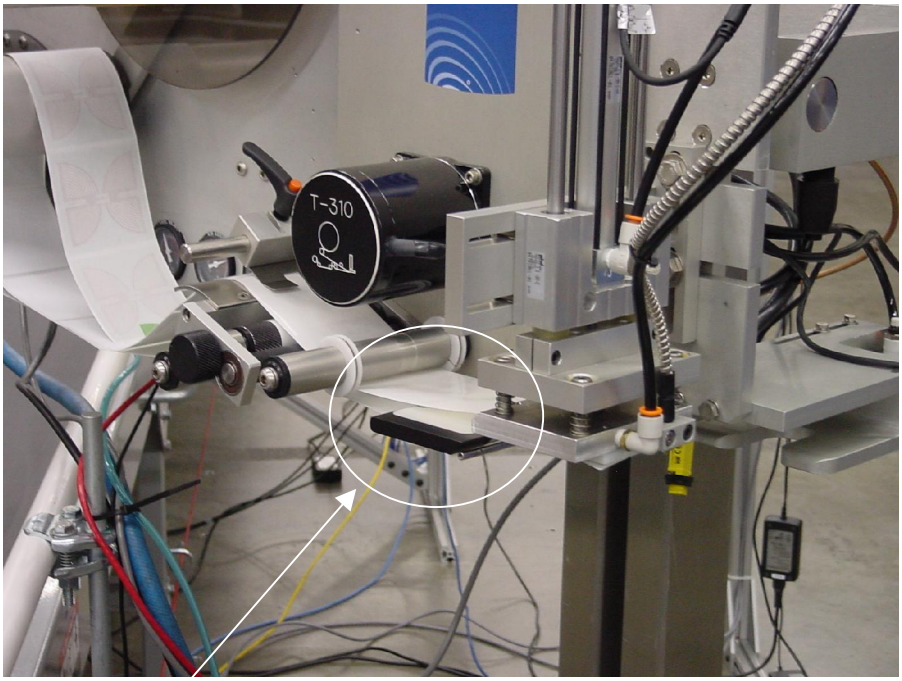
d = MPE Safe Distance in cm

P= Power In dBm
G = Antenna Gain in dBi
S= Power Density Limit in mW / cm^2

Device Photos – How Separation Distances are Maintained

The following photograph shows the near-field probe in its intended application: mechanical RFID label applicators.

The RFID probe is on the other side of the pneumatic plunger as shown below:



RFID Near Field Probe for Reading Labels Prior to Application

In its typical application, the mechanical RFID label applicator is positioned over a conveyor belt and applies labels to boxes as they pass by the machine. The RFID probe is used to verify correct encoding of RFID labels before the labels are applied to product.

Please feel free to contact me with any further questions.

Sincerely,

William M. Elliott

Sr. EMC Engineer – Compliance Engineering

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