Analysis Report

The Equipment-Under-Test (EUT) Dartslive2 EX is a dart game tower. The EUT contains two 13.56MHz modules which are CardRW and Live Credit (RFID reader). The CardRW module is for the gamer ID recognition and the Live Credit is for the credit adding. The EUT can operate in offline and online mode. The EUT is powered by 120VAC.

CardRW
Antenna Type: Internal antenna
Antenna Gain: 0dBi
Nominal rated field strength: 41.4 dBμV/m at 3m
Maximum allowed field strength of production tolerance: +/- 3dB

Live Credit
Antenna Type: Internal antenna
Antenna Gain: 0dBi
Nominal rated field strength: 50.8 dBμV/m at 3m
Maximum allowed field strength of production tolerance: +/- 3dB

For Maximum Permissible Exposure (MPE) evaluation of the Dartslive2 EX, the maximum power density at 20 cm from this mobile transmitter shall be less than the General Population / Uncontrolled MPE limit in OET Bulletin 65.

1) For the CardRW portion of tested model of Dartslive2 EX, the maximum field strength measured (FS) was 44.4 dBμV/m. The distance (D) between the antenna and the equipment under test (EUT) was 3 meters. And the maximum source-based time-averaging duty factor is 100%. From these data, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna can be calculated according to OET Bulletin 65 as follow:

The radiated power = (FS*D)2 / 30
= 0.00000826 mW

The power density at 20 cm from the antenna
= EIRP / 4πR2
= 0.00000000164mW cm-2

2) For the Live Credit portion of tested model of Dartslive2 EX, the maximum field strength measured (FS) was 53.8 dBμV/m. The distance (D) between the antenna and the equipment under test (EUT) was 3 meters. And the maximum source-based time-averaging duty factor is 100%. From these data, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna can be calculated according to OET Bulletin 65 as follow:

The radiated power = (FS*D)2 / 30
= 0.00007197 mW

The power density at 20 cm from the antenna
= EIRP / 4πR2
= 0.00000001433 mW cm-2

Per KDB 447498 D01 v06, simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on calculated or measured field strengths or power density, is ≤ 1.0.

The MPE ratio for CardRW can be calculated as follow:

= The power density at 20 cm / MPE limit
= 0.00000000164 mW cm^{-2} / 1.0 mW cm^{-2}
= 0.00000000164

The MPE ratio for Live Credit can be calculated as follow:

= The power density at 20 cm / MPE limit
= 0.00000001433 mW cm^{-2} / 1.0 mW cm^{-2}
= 0.00000001433

The sum of the MPE ratios for all simultaneous transmitting antennas
= 0.00000000164 + 0.00000001433
= 0.00000001597

As the sum of MPE ratios for all simultaneous transmitting antennas is ≤ 1.0, simultaneous transmission MPE test exclusion will be applied.

Conclusion

In the frequency range of 1,500 - 100,000MHz, the MPE limit is 1.0 mWcm-2 for general population and uncontrolled exposure. As the measured power density at 20cm from the transmitter is lower than the MPE limit, the compliance to the MPE limit can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structures and body of the user or nearby persons.

The following RF exposure statement is proposed to be included in the user manual:

“ FCC RF Radiation Exposure Statement
Caution: To maintain compliance with the FCC’s RF exposure guidelines, place the unit at least 20cm from nearby persons.”