

Analysis Report

The Equipment Under Test (EUT) is a Wireless Airplay Music System, equipped with a 2.4GHz WiFi (6201) and Bluetooth (CSR8645) modules. The 2.4GHz WiFi (6201) module is controlled by network media processor DM870 to provide Airplay music streaming features. The Bluetooth (CSR8645) modules provides audio playback via Bluetooth device. The 2.4GHz WiFi (6201) operates in the frequency range between 2412MHz and 2462MHz (11 channels with 5 MHz channel spacing, 802.11 b and g only). The Bluetooth (CSR8645) module operates in the frequency range between 2402MHz and 2480MHz (79 channels with 1 MHz channel spacing). The EUT can also accept digitized audio signal from LAN network (Intertek Radio), USB flash and TOSLINK SPDIF optical input. The EUT has built-in digital power amplifier driving the internal loudspeakers. The EUT is powered by 100-240VAC (universal input with earth pin).

The 2.4GHz WiFi module (6201) contains two antennas. Only one antenna is emitting at the same time.

Bluetooth module (CSR8645) contains single antenna only.

WiFi and Bluetooth do not emit simultaneously in actual product operation.

WiFi Antenna Type: Internal, Integral
(antenna 1 and 2: 2412MHz – 2462MHz, 11 channels, 5MHz spacing)

Bluetooth Antenna Type: Internal, Integral
(single antenna: 2402MHz – 2480MHz, 79 channels, 1MHz spacing)

The WiFi and Bluetooth modules were tested in according with the following power output and in actual application the below limit shall not be exceeded.

Operating mode	Nominal Radiated Field Strength	Production Tolerance	Modulation Type	Antenna Gain
802.11b	104.8dBµV/m at 3m	+/- 10dB	DSSS	0 dBi
802.11g	98.3dBµV/m at 3m	+/- 10dB	OFDM	0 dBi
Bluetooth	90.5dBµV/m at 3m	+/- 10dB	GFSK	0 dBi

INTERTEK TESTING SERVICE

For the WiFi (wireless LAN) module, the Maximum Permissible Exposure (MPE) evaluation of the VISO 1 AP Wireless Airplay Music System, 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.

For Wireless Airplay Music System of tested model VISO 1 AP, the maximum field strength of WiFi (wireless LAN) module measured (FS) was 114.8 dB μ V/m. The distance (D) between the antenna and the equipment under test (EUT) was 3 meters. 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:

$$\begin{aligned}\text{The radiated power} &= (FS \cdot D)^2 / 30 \\ &= 90.6 \text{ mW}\end{aligned}$$

$$\begin{aligned}\text{The power density at 20 cm from the antenna} &= \text{EIRP} / 4\pi R^2 \\ &= 0.018 \text{ mW cm}^{-2}\end{aligned}$$

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 VISO 1 AP at least 20cm from nearby persons.”

INTERTEK TESTING SERVICE

For the Bluetooth module, the Maximum Permissible Exposure (MPE) evaluation of the VISO 1 AP Wireless Airplay Music System, 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.

For Wireless Airplay Music System of tested model VISO 1 AP, the maximum field strength of Bluetooth module measured (FS) was 100.5 dB μ V/m. The distance (D) between the antenna and the equipment under test (EUT) was 3 meters. 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:

$$\begin{aligned} \text{The radiated power} &= (FS \cdot D)^2 / 30 \\ &= 3.37 \text{ mW} \end{aligned}$$

$$\begin{aligned} \text{The power density at 20 cm from the antenna} \\ &= \text{EIRP} / 4\pi R^2 \\ &= 0.00067 \text{ mW cm}^{-2} \end{aligned}$$

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.

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