

Permit but Ask Questions and Answers

1) Describe the operation of the device.

This device is a low-powered FM Stereo Transmitter who uses the 88-108MHz frequency range.

It only works with an iPod. The iPod gives a signal to the transmitter which then transmits the signal on the adjusted frequency. The frequency can be adjusted in 0.2 MHz steps but not lower than 88.1 MHz and 107.9 MHz.

Power is supplied by a standard 12V cigarette lighter socket.

The device has its own antenna.

For further information please see the attached Operational Description.

2) Provide information on the device and its antenna

The device is a FM Transmitter which is connected to the iPod using a cable.

It only works with an iPod.

Power is supplied by a standard 12V cigarette lighter socket.

It has its own wire antenna and don't use the car wiring as an antenna.

The frequency can be adjusted using the buttuns on the front of the device in 0.2 MHz steps but not lower than 88.1 MHz and 107.9 MHz.

3) How is it installed?

It is inserted in the automobile cigarette lighter or power socket. It will turn on instantly when connected to a power supply.

The iPod Connector cable is plugged into the docking connector on the iPod.

As soon as the iPod is started the transmitter will begin to transmit the iPod's music to the car's FM stereo on the selected FM frequency.

4) Describe the test procedure used.

This device only works with an iPod, so for all tests the EUT was connected to an iPod.

Different typical audio files (wav and mp3 files) were used to determine the worst case. After determine this worst case (wav file) all measurements were made using this audio file. The iPod was tuned to maximum volume during all tests.

All tests were made using different frequencies (lowest, middle and highest possible).

Radiated emissions according to 15.209 and Field Strength according to 15.239:

The radiated emissions measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 GHz in semi-anechoic chambers. The EUT is positioned on a turntable with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The turntable is able to rotate 360 degrees to determine the position of the maximum emission level.

The receiving antennas are conform with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The EUT was set in a distance of 3 meters to the antenna. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.

The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2003 clause 4.2.

Antennas are conform with ANSI C63.2-1996 item 15.

Occupied Bandwidth and Band Edge Compliance according to 15.239:

For this measurement we set the span to encompass the whole signal.

The offset was set in such a way, that we get the same output power, which we measured earlier using a RBW and VBW great enough to capture the whole signal.

We used a peak detector and the analyzer was set to max hold.

RBW and VBW were set to 3 kHz and we used the internal function of our analyzer to determine the 20 dB Bandwidth. We also added a line to 88MHz (for the lowest channel measurement) and to 108MHz (for the highest channel measurement) to show that the whole signal lies in the frequency range of 88-108 MHz.

5) If tested in a car, describe how was configured and tested.

Testing in a car was not necessary,
because the device has its own antenna and therefore
don't use the car wiring as an antenna.

6) At the present time, FM transmitters (subject to 15.239) tested in vehicles must also be tested on a test table. Provide both sets of data. All data must be compliant.
not applicable

7) Was the tuning range properly verified?

Lowest frequency that could be adjusted was 88.1 MHz and
highest was 107.9 MHz. Frequency can only be adjusted in 0.2 MHz steps.

8) Was the bandwidth properly tested with maximum audio input?

Maximum volume was tuned on the iPod, so the audio input was at maximum.

9) Use a typical audio file from a typical device.

We used different typical audio files (wav and mp3 files),
the plots in the Test Report show the worst cases (wav file).

10) Provide the test report showing compliance with the rules.

Attached