

Smart Socket Measurement Assessment II

—Electrical performance assessment

With the rapid development of Internet of Things, the smart socket has become a very important product in family life. Whether it can facilitate people's life, it depends on its electrical performance.

The professional electrical T&M instruments are required in smart socket RD and the check before leaving the factory. ITECH star product IT8615 AC/DC electronic load can be used to simulate the working status of different household appliance, and the IT7326 AC power supply can simulate the city AC power supply, and then to test the smart socket from a well-known brand.



Pic.1 IT8615 AC/DC load+IT9121power meter Pic.2 IT7326AC power supply

I .The measurement of client end parameters

Compared with normal socket, via the phone, remote control is available, the smart socket can be switched-on-off and the parameters can be checked as well. For example, when the appliance is working with 2.95A, the smart socket can send electricity data to cloud server for user to check at any time. The problem is that whether the smart socket can be so accurate and actual in recording all the data? Then we can verify through ITECH power testing instruments. First, we will use IT8615 AC/DC load to simulate the regular working of a household appliance and set the current to be 2.95A, at the same time we connect the smart socket with the actual power grid, and finally we can compare the data from the real-time screenshot of IT8615 and the smart socket's client end.



Picture 3 Load test parameters & user terminal parameters

Through the comparison, we can find there's 0.002A difference. As a household item, it can meet the basic requirements.

II、 Power grid frequency fluctuation test

The smart socket is used to connect the power grid and the household appliances. Due to the over-working of the power grid in some areas, it will lead to the fluctuation of grid frequency and then to affect the normal application of the appliances which are sensible to frequency and even lead to switching off. According to international frequency fluctuation level regulations, there're three levels A, B, C, and the highest frequency should be $\leq \pm 1\text{Hz}$.



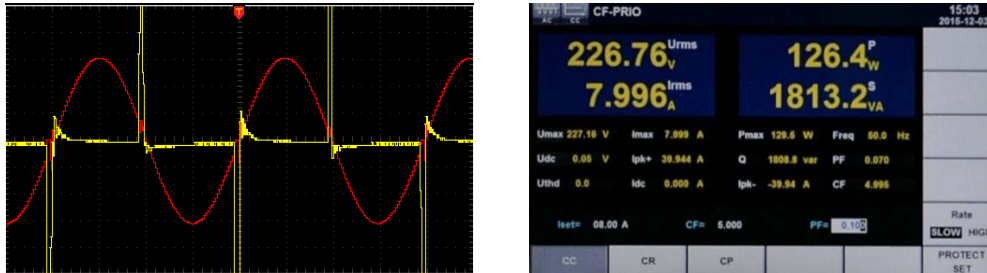
Picture 4 Simulation of power grid's frequency 49Hz~51Hz

IT7326 from ITECH is with frequency-adjustable function, and the frequency is 45-500Hz adjustable, so as to simulate power grid frequency fluctuation. As showed in picture 4, we set the power supply's output frequency to be 49Hz and 51Hz. After test, the smart socket can work normally under the set frequency fluctuation range. It's worth mentioning that IT7326 can not only set different adjustable frequency, but also it can simulate the fluctuation of power grid voltage so as to be applied in the anti-interference of the smart socket.

III. Anti-high-current test

Household appliance has a rated working current when it's under normal work, but there is a very high instant current when it starts. Take the example of a 1.5 HP air conditioner: its normal working current is 6A while its starting current is 6-7 times of the normal working current, which

means maximum 42A. For smart phones, whether the internal components can undertake such big current is a question? IT8615 AC/DC load has CF (Crest Factor) adjustable function, and its adjusting range is 1.414-5. Based on to-be-test smart socket's maximum rated current 8A, we do the test. When CF is set as 5, the peak current I_{peak} can reach 40A, we can clearly see the crest factor variation via IT8615 oscilloscope display function. Besides, by PF (Power factor) adjustable range 0-1, IT8615 can simulate the actual working status of different loads.



Picture 5 Simulation of the waveform and parameters of the instant high-current

When the current is under periodical variation, we can find that the smart socket can still work normally. It means that the instant peak current when starting the appliances will not affect the normal work of the smart socket, thus the smart socket can work normally to ensure the normal work of the appliances.

IV、 Over-current protection point test

With more appliances to be used in each house, especially the high-power ones, when they make our life convenient, they will also bring more risks of electricity safety. At present, when current is over high or there's short circuit, the protection can be done via the air switches. As a control device, when there's over current, the smart socket should also have short-circuited protection. By combining IT7326 AC power supply, IT8615 AC/DC load, and IT9121 power meter (including IT185 fixture), a test platform for smart socket over-current point has been set up, so that we can do test of over-current protection of the smart socket. Please check Picture 6



Picture 6 Screenshot of over current protection point

Set the AC power supply to be 220V city power voltage, to connect the AC/DC load via the smart socket, adjust the pulse knob to change the AC load's load current. The smart socket rated current is 8A, and to load the current with a 0.01A gradual elevation till the



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over-current-protection point of the smart socket, we can clearly find that the over-current protection point is 10.791A.

From the above tests, it has been proved that the smart socket can meet its basic electrical performance. With the rapid development of technology, people's life has been moving towards to the direction of intelligence and energy-saving. Besides the smart sockets, all smart products for people's life will appear. As a professional manufacturer of power testing instruments, ITECH will continue to launch more product testing solutions so as to support the tests of our life safety and the development of internet of things.

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