EMI 测试标准

一、简介

目前，涉及到 EMI 测试的相关标准，主要为：欧规（EN55022），美规（FCC）
相关名词：
非故意辐射（Unintentional）：产品产生不想要的电磁波辐射，造成干扰；如：电脑，LCD Monitor,DVD,电视，投影机等；
故意辐射（intentional）：使用无线电波进行通信；
FCC 只测试 EMI:
RE(辐射干扰)：测试频率范围 30MHZ~1GHZ;
CE(电源干扰)：测试频率范围 150KHZ~30MHZ;
主要的 EMI 测试参考标准：
欧盟：EN55022(EMI 参考测试标准)；EN55024(EMS 参考测试标准)；
美国：FCC Part 15B(EMI 参考测试标准)；
台湾：CNS 13438 (EMI 参考测试标准)

Country	Standard
United States	FCC Part 15
Canada	ICES 003
Australia	AS/NZS:CISPR22 / AS 3548
Japan	VCCI - V series
New Zealand	Ministry of Commerce - CISPR 22
Europe	EN 55022 / EN 55024(传导&辐射测试)
	IEC / CISPR 22
	CISPR 11
	CISPR 13
	CISPR 20
	EN 61000-6-3
	EN 61000-6-4
	EN 60601-1-2
	EN 61000-3-2（电源谐波测试）
	EN 61000-3-3（电源变动测试）
	EN 61326-1
Taipei - Taiwan	BSMI (CNS13489 / CNS 13438)

二、测试

EMI 测试定义：测试待测物 EUT 产生的辐射干扰强度，分为 RE 测试和 CE 测试两种。
1)、RE 测试：量测 EUT 产生的辐射干扰,其测试频率范围：30MHZ~1GHZ。
测试方法：参考相关测试标准 EN55022 或者其他测试标准；
测试距离及场合：10 米量测，在开放式场合；
测试方式：量测 EUT 产生的电磁波辐射（30MHZ~1GHZ）.
2)、CE 测试：量测 EUT 产生的传导辐射干扰，其测试频率范围：150K~30MHZ.
测试方法：参考相关测试标准 EN55022 或者其他测试标准；

测试方式 1：量测电磁波杂讯出现在 EUT 的 DA 和 AC 电影端（150K~30MHZ）；
测试方式 2：量测电信端口端出现的辐射干扰值（150K~30MHZ）.
说明：由于 RE 测试是采用开放式的测试场合，易受空中的广播 FM(88MHZ~108MHZ),手机（900MHZ）杂讯的干扰；

三、测试要求

通过测试 EUT，检测其辐射干扰数值
1)、FCC 测试要求：

测试频率	CLASS A		CLASS B	
Frequency (MHz)	**Limit (dBuV)**		**Limit (dBuV)**	
	Q.P.	Ave.	Q.P.	Ave.
0.15-0.5	79	66	66-56	56-46
0.5-5.0	73	60	56	46
5.0-30	73	60	60	50
Frequency (MHz)	Limit (dBuV/m)		Limit (dBuV/m)	
30-230	40		30	
230-1000	47		37	
說明：				
1. **輻射測試距離為** 10m				
2. Class A **為產品在商業與工業區域使用**				
3. Class B **為產品在住宅及家庭區域使用**				

2)、EN55022 测试要求:
a).传导干扰测试标准

Table 1 – Limits for conducted disturbance at the mains ports of class A ITE

Frequency range MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60
NOTE The lower limit shall apply at the transition frequency.		

Table 2 – Limits for conducted disturbance at the mains ports of class B ITE

Frequency range MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50
NOTE 1 The lower limit shall apply at the transition frequencies. NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

b)共模干扰测试标准：

Table 3 – Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports in the frequency range 0,15 MHz to 30 MHz for class A equipment

Frequency range MHz	Voltage limits dB (µV)		Current limits dB (µA)	
	Quasi-peak	Average	Quasi-peak	Average
0,15 to 0,5	97 to 87	84 to 74	53 to 43	40 to 30
0,5 to 30	87	74	43	30

NOTE 1 The limits decrease linearly with the logarithm of the frequency in the range 0,15 MHz to 0,5 MHz.

NOTE 2 The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test (conversion factor is 20 $\log_{10}$ 150 / I = 44 dB).

Table 4 – Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports in the frequency range 0,15 MHz to 30 MHz for class B equipment

Frequency range MHz	Voltage limits dB(µV)		Current limits dB(µA)	
	Quasi-peak	Average	Quasi-peak	Average
0,15 to 0,5	84 to 74	74 to 64	40 to 30	30 to 20
0,5 to 30	74	64	30	20

NOTE 1 The limits decrease linearly with the logarithm of the frequency in the range 0,15 MHz to 0,5 MHz.

NOTE 2 The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test (conversion factor is 20 $\log_{10}$ 150 / I = 44 dB).

c)辐射干扰测试标准：

Table 5 – Limits for radiated disturbance of class A ITE at a measuring distance of 10 m

Frequency range MHz	Quasi-peak limits dB(µV/m)
30 to 230	40
230 to 1 000	47

NOTE 1 The lower limit shall apply at the transition frequency.

NOTE 2 Additional provisions may be required for cases where interference occurs.

Table 6 – Limits for radiated disturbance of class B ITE at a measuring distance of 10 m

Frequency range MHz	Quasi-peak limits dB(µV/m)
30 to 230	30
230 to 1 000	37

NOTE 1 The lower limit shall apply at the transition frequency.

NOTE 2 Additional provisions may be required for cases where interference occurs.