



Report on EMC Test of ADSL CPE

**M/N: SmartAX MT882
SmartAX MT880**

Report No: SYBH (E)07072007EB



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Notice 2

Modification Information:

For original equipment, following table is not applicable.

Table 1 Modification Information

Modification Information	1	
	2	
	3	<i>Not Applicable</i>
	4	
	5	
	6	
	7	



REPORT ON **EMC Test of ADSL CPE**
M/N: SmartAX MT882
SmartAX MT880

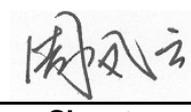
REGULATION **FCC CFR47 Part 15 Class B**
ICES-003 Class B

START OF TEST **Jul.25, 2007**
END OF TEST **Jul.27, 2007**

Final Judgement: **Pass**

Approver 2007-08-06 张兴海 
Date **Name** **Signature**

Reviewer 2007-08-06 余辉 
Date **Name** **Signature**

Operator 2007-08-03 周凤云 
Date **Name** **Signature**



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1 Status

1.1 Product Information

CLIENT: Huawei Technologies Co., Ltd.
ADDRESS: Bantian Longgang District Shenzhen, P.R. China
MANUFACTURING DESCRIPTION ADSL CPE
MANUFACTURERS MODEL NUMBER SmartAX MT882
SmartAX MT880

1.2 Applied Standard

APPLIED STANDARD FCC CFR47 Part 15: 2006
ICES-003: 2004

TEST METHODS ANSI C63.4: 2003
CAN/CSA-CEI/IEC CISPR 22:02
CISPR 22: 2005

1.3 Test Site

Site 1:
RELIABILITY LABORATORY OF HUAWEI TECHNOLOGIES CO., LTD

1.4 Test environment condition

Ambient temperature	20~25℃
Relative humidity	45~55%
Atmospheric pressure	101kPa



2 Summary of Results

Table 2 below shows a brief summary of the results obtained.

Table 2 Summary of results

EUT Classification:				
Telecommunication Terminal Equipment				
Test Items	Configuration	Limits	Result	Site
<u>Radiated Emissions</u> Enclosure Port	TC1	Class B	Pass	Site1
<u>Conducted Emissions</u> AC Power Port	TC1	Class B	Pass	Site1
Note: 1, Measurement taken is within the measurement uncertainty of measurement system. 2, TC = Test configuration				



3 Equipment Specification

3.1 General Description

The SmartAX MT882/MT880 is a type of asymmetric digital subscriber line (ADSL) terminal. Through the SmartAX MT882/MT880 and a telephone line, enjoy data, video and audio services at a high speed.

- 1-Port 10/100 Ethernet Interface
- 1-Port USB (slave) Interface (Only for MT882)
- 1-Port ADSL Interface

- High transmission rate: The maximum downlink transmission rate is 24 Mbit/s. The maximum uplink transmission rate is 1.2 Mbit/s.
- Strong network adaptability: The SmartAX MT882/MT880 can interconnect with multiple Digital Subscriber Line Access Multiplexers (DSLAMs).

The ADSL CPE Group, SmartAX MT88x series, include the following models that have the same structure,man board,power,and adapter. And the SmartAX MT882 is the most complex condition.The SmartAX MT882 was adpoted during the entire test.

The difference information of SmartAX MT88x series is as following:

Model Number	Features		
	ADSL Access	Ethernet	USB (slave)
MT882	Yes surpport ADSL2+	Yes 10/100M	Yes
MT880	Yes surpport ADSL2+	Yes 10/100M	None

3.2 Technical Data

3.2.1 Main Equipment Technical Data

Input Rated Voltage	~12V, 0.8A
Rated Power	Max 3.9 W
Dimensions	135(depth) × 115(width) × 30(height)(mm ³)
Weight	0.5kg



Figure 1.EUT Appearance



Figure 2.EUT Appearance



3.3 Sub-Assembly Identity

Table 3 Sub-Assembly Identity

Board				
Model Name	Qty.	Hardware Version	Serial Number	Description
MT88BCPE	1	VER.B	020CRV7S74000002	Main board
Accessory				
Name	Qty.	Manufacture	Serials number	Description
Adapter	1	TECHNICS	TEAC-41-120800U	Input voltage: ~120V/50-60Hz Output voltage: ~12V, 0.8A Rate power: 9.6W

4 System Configuration during EMC Test

The Equipment under Test (EUT) was functioning correctly during all tests. The EUT was installed within the test site and was configured to simulate a typical user installation.

4.1 Cables Used during Test

Table 4 Cable Used during Test

Port	Connector	Type of Cable
AC Power Port		Unshielded
FE	RJ45	STP-5
ADSL	RJ11	Unshielded
USB	USB Device	Unshielded

4.2 Associated Equipment Used during Test

Table 5 Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Cal Date	Cal Interval (month)
Data network analyzer	Smartbits2000	Huawei	SZ0500038070	2007-05-28	12
DSLAM	MA5105	Huawei	210235076910 6B000026	NA	NA
Personal Computer	P4 2.6G/512M/80 G/17"	Lenovo	SA04574562	NA	NA

4.3 Test Configurations for Emission Test

4.3.1 Test Configuration.

The SmartAX MT882 system was connected to ancillary in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment). There was one test configuration. TC1 was shown in the diagram below:

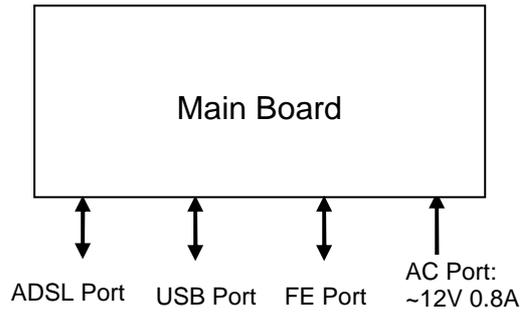


Figure 3.: Test Configuration

4.4 Test conditions and test connections

4.4.1 Test Conditions

The broadband service traffic was generated by the FE port of the Smartbits and then sent to the ADSL modem (SmartAX MT882). After passing the splitter board, the traffic was sent to the service board MA5105. The traffic was then sent to the Smartbits2000. The second service traffic was generated by the FE port of the Smartbits and then sent to the MA5101 DSLAM. After pass XDSL line simulator, the traffic came to ADSL modem (SmartAX MT882). Then the traffic was sent to the FE of Smartbits2000. The ADSL modem (SmartAX MT882) was connected to the test PC through USB port, and the test PC was used to transmitted IP packages to the EUT.

4.4.2 Test connections

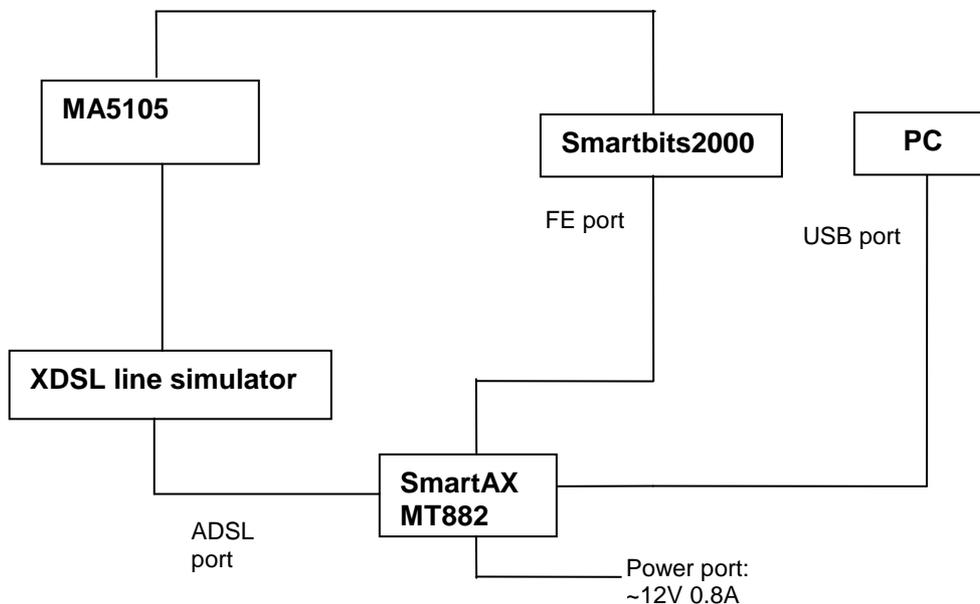


Figure 4.: Test Connection



5 Enclosure Port

5.1 Radiated Disturbance 30MHz to 2000MHz

5.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4. The test distance was 3m. The set-up and test methods were according to ANSI C63.4.

A preliminary scan and a final scan of the emissions were made from 30 MHz to 1GHz. the preliminary scan used PK Detector, and final scan used Quasi-Peak Detector. And a preliminary scan and a final scan of the emissions were made above 1GHz. the preliminary scan used PK Detector, and final scan used AV Detector. The maximal emission value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0 to 360°, The receive antenna has two polarizations V and H.

5.1.2 Test Results

The EUT has met the requirements of FCC Part15 and ICES 003 for Radiated Emission of enclosure port. The test data see section 9.1 of this report.

Table 6 Test Limits

Frequency range	30~ 1000MHz	
Classification	Class B	
Limits(FCC Part15)	30MHz~88MHz	40 dBµV/m
	88MHz~216MHz	43.5 dBµV/m
	216MHz~960MHz	46 dBµV/m
	960MHz~2000MHz	53.9 dBµV/m
Limits(ICES 003)	30MHz~230MHz	40 dBµV/m
	230MHz~1000MHz	47 dBµV/m



6 AC Power Port Tests

6.1 Conducted Disturbance

6.1.1 Test Procedure

The EUT was configured as described in section 4 for this test. The mains cable of the EUT being measured shall be connected to LISN, The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8 m from the LISN.

All telecommunication and signal ports must be correctly terminated using either an appropriate associated equipment or a representative termination during the measurement of the conducted disturbances at the mains.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.

6.1.2 Test Results

The EUT has met the requirements of FCC Part15 and ICES 003 for Conducted Disturbance of AC Power Port.

The test data see section 9.2 of this report.

Table 7 Test Results

Frequency range	150kHz ~ 30MHz	
Classification	Class B	
Limit(Class B)	Voltage limits	
	QP	AV
0.15MHz~0.5MHz	66~56 dB μ V	56~46 dB μ V
0.5MHz~5MHz	56 dB μ V	46 dB μ V
5MHz~30MHz	60 dB μ V	50 dB μ V



7 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Table 8 System Measurement Uncertainty

Items		Extended Uncertainty
RE	Field strength (dB μ V/m)	U=4.6dB; k=2
CE	Disturbance Voltage (dB μ V)	U=3.3dB; k=2

8 Main Test Instruments

Table 9 Main Test Equipments

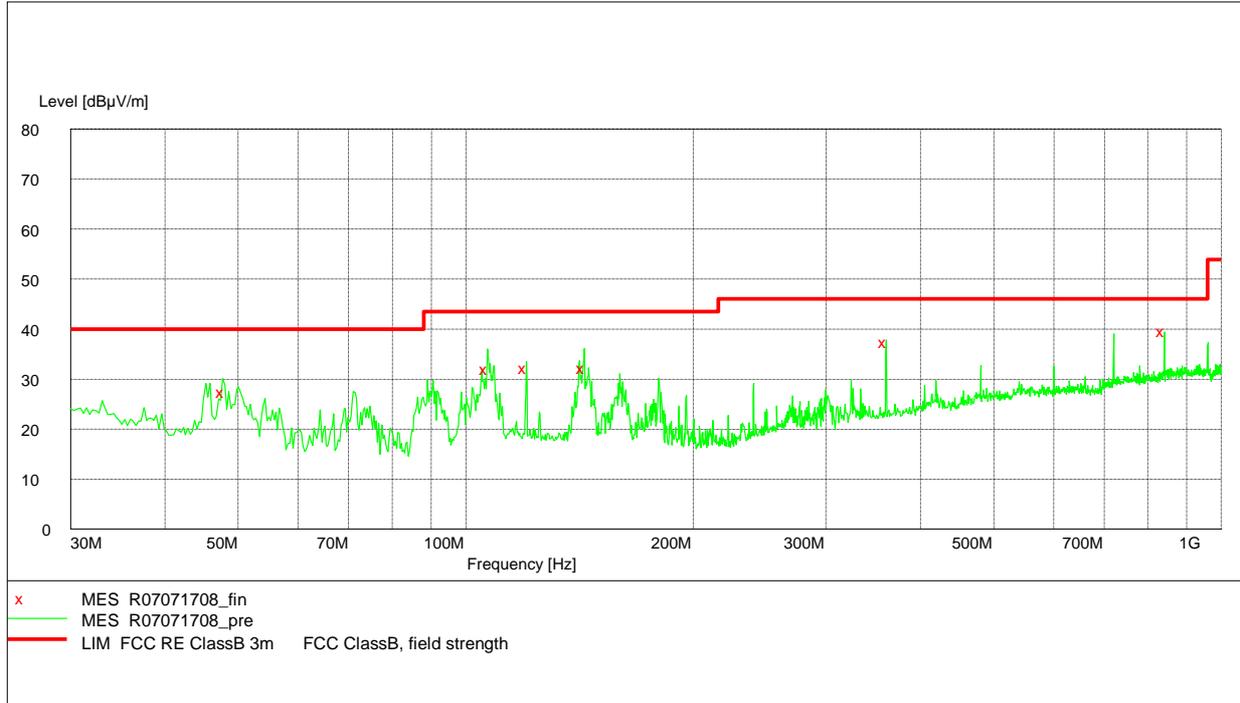
Test item	Test Instrument	Model	Manufacturer	Cal-Date	Cal Interval (month)
RE	EMI Test receiver	ESMI	R&S	April.23, 2007	12
	Broadband Antenna	CBL 6112B	SCHAFFNER	Sep.27, 2006	12
CE	EMI Test receiver	ESCS30	R&S	May.30, 2007	12
	Artificial Mains Network	ENV4200	R&S	May.21, 2007	12
Software Information					
Test Item	Software Name	Manufacturer		Version	
RE/CE	ES-K1	R&S		1.7.1	



9 Graph and Data of Emission Test

9.1 Radiated Disturbance

9.1.1 Radiated Disturbance for FCC Part15 (30MHz-1GHz)

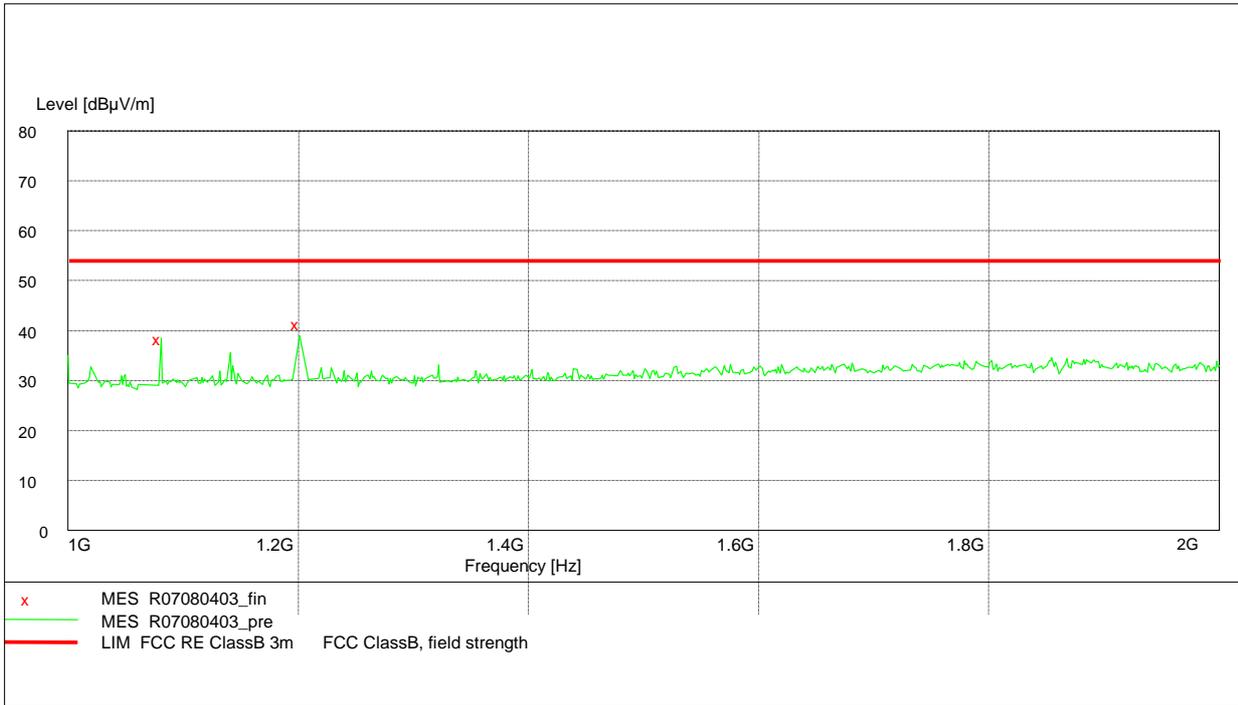


MEASUREMENT RESULT: QP Detector

Frequency (MHz)	Level (dBµV/m)	Transd (dB)	Limit FCC	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
47.760000	27.60	-13.3	40.0	12.4	100.0	18.00	VERTICAL
106.740000	32.10	-10.0	43.5	11.4	100.0	147.00	VERTICAL
120.000000	32.50	-9.5	43.5	11.0	112.0	165.00	VERTICAL
143.220000	32.30	-10.7	43.5	11.2	100.0	180.00	VERTICAL
360.000000	37.60	-5.4	46.0	8.4	112.0	178.00	VERTICAL
840.000000	39.70	0.8	46.0	6.3	100.0	180.00	HORIZONTAL



9.1.2 Radiated Disturbance for FCC Part15 (1GHz-2GHz)

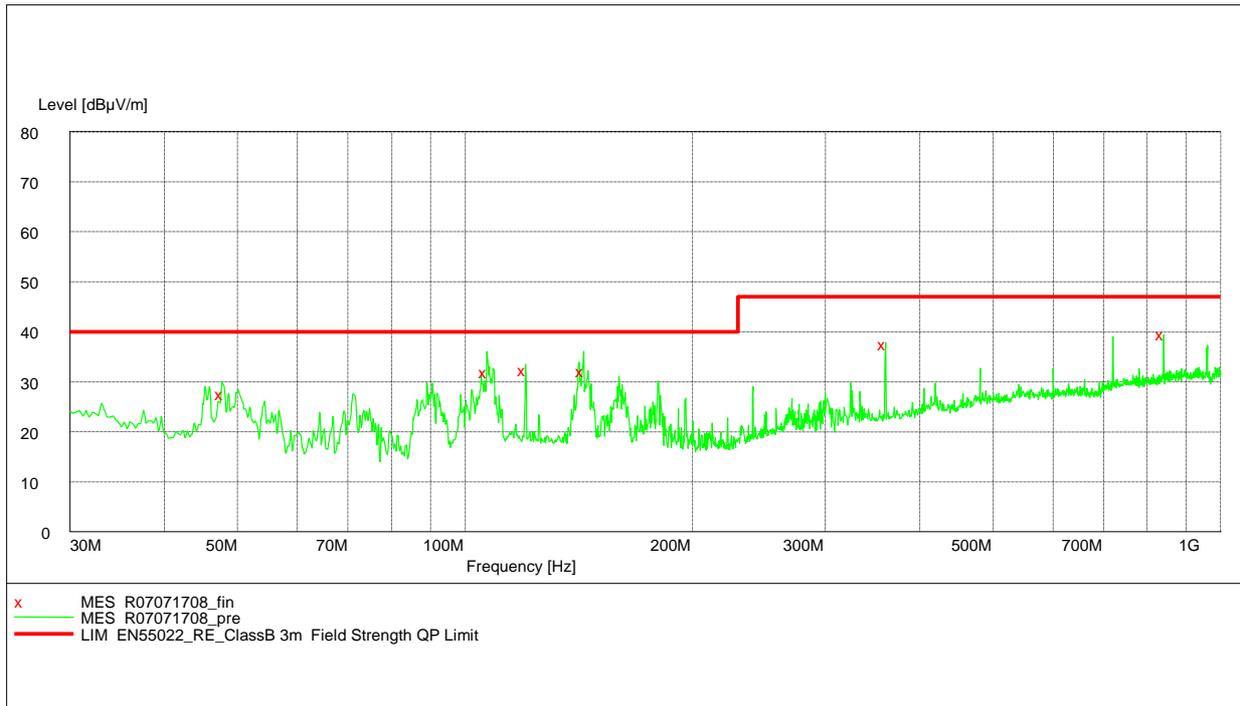


MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dBµV/m)	Transd (dB)	Limit FCC	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
1080.000000	38.50	-5.9	53.9	15.4	100.0	333.00	VERTICAL
1200.000000	41.50	-4.7	53.9	12.4	106.0	253.00	VERTICAL



9.1.3 Radiated Disturbance for ICES 003

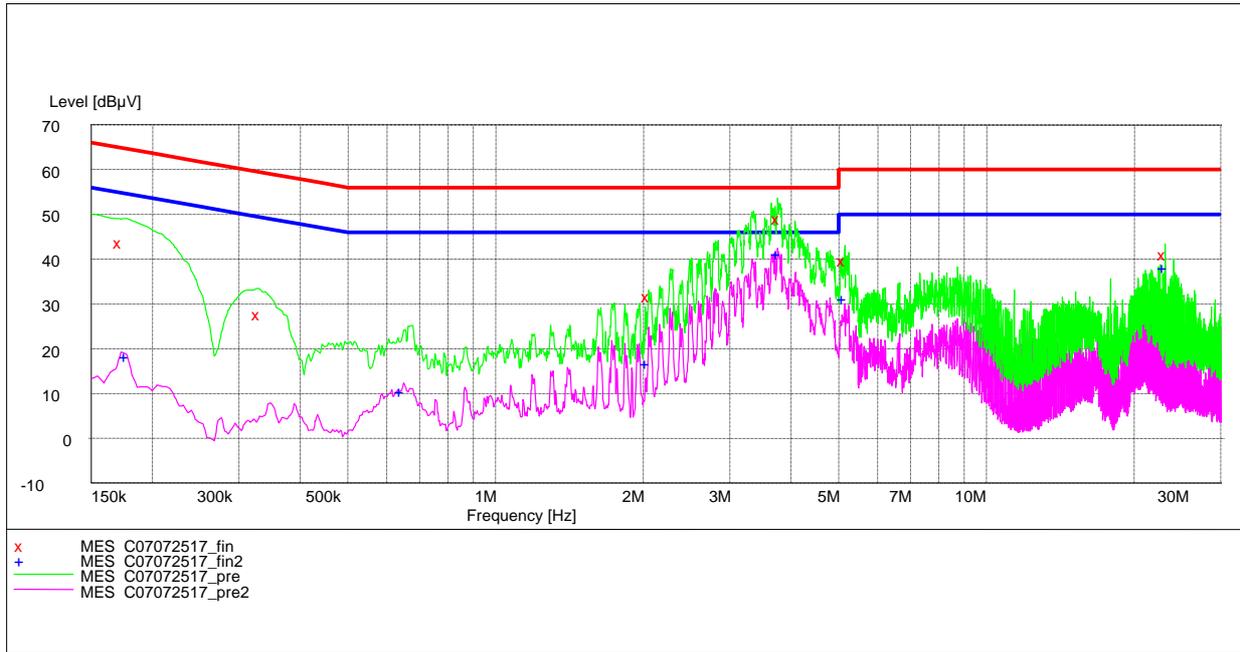


MEASUREMENT RESULT: QP Detector

Frequency (MHz)	Level (dBµV/m)	Transd (dB)	Limit ICES 003	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
47.760000	27.60	-13.3	40.0	12.4	100.0	18.00	VERTICAL
106.740000	32.10	-10.0	40.0	7.9	100.0	147.00	VERTICAL
120.000000	32.50	-9.5	40.0	7.5	112.0	165.00	VERTICAL
143.220000	32.30	-10.7	40.0	7.7	100.0	180.00	VERTICAL
360.000000	37.60	-5.4	47.0	9.4	112.0	178.00	VERTICAL
840.000000	39.70	0.8	47.0	7.3	100.0	180.00	HORIZONTAL



9.2 Conducted Disturbance
9.2.1 AC Power Port Test Data



MEASUREMENT RESULT: QP Detector

Frequency (MHz)	Level (dBµV)	Transd (dB)	Limit (dBµV)	Margin (dB)	Line	PE
0.172500	44.00	10.8	65	20.8	N	FLO
0.330000	28.00	10.2	59	31.4	N	FLO
2.049000	32.00	10.1	56	24.0	N	FLO
3.772500	49.50	10.1	56	6.5	N	FLO
5.127000	40.00	10.1	60	20.0	N	FLO
23.127000	41.50	15.5	60	18.5	L3	FLO

MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dBµV)	Transd (dB)	Limit (dBµV)	Margin (dB)	Line	PE
0.177000	18.80	10.7	55	35.8	N	FLO
0.645000	10.80	10.0	46	35.2	N	FLO
2.040000	17.10	10.1	46	28.9	N	FLO
3.772500	41.70	10.1	46	4.3	N	FLO
5.127000	31.50	10.1	50	18.5	N	FLO
23.127000	38.60	15.5	50	11.4	N	FLO



10 Photographs of Test Set-ups

10.1 Radiated Emissions



Radiated Disturbance (30MHz-1GHz)



Radiated Disturbance (1GHz-2GHz)



10.2 Conducted Emissions



Conducted Emissions for AC Power Port

END