



Report No: SYBH(R) 54022007
FCC ID: QISE270

FCC EMC TEST REPORT OF HUAWEI E270 HSDPA USB MODEM

M/N: E270

Apr. 18, 2007

Reliability Laboratory of Huawei Technologies Co., Ltd.

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REPORT ON**FCC Test of HUAWEI E270 HSDPA USB MODEM****M/N: E270****Report No: SYBH(E) 54022007****REGULATION****FCC CFR47 Part 15: Subpart B;****CONCLUSION**

There are 2 items need to be tested, 2 items have been tested. The sample of the model completely meets the requirements.

Final Judgement: Pass**General Manager****2007.04.20**

Date

Guo Xiaoqi

Name

Handwritten signature of Guo Xiaoqi in black ink, with a red circular official stamp containing Chinese characters and the name "Guo Xiaoqi" overlaid.

signature

**Technical Responsibility
For Area of Testing****2007.04.19**

Date

Zhang Xinghai

Name

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Test Lab Engineer**2007.04.18**

Date

Hu Jun

Name

Handwritten signature of Hu Jun in black ink.

signature

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1 Summary

The table below summarizes the measurements and results for the HUAWEI E270 HSDPA USB MODEM. Detailed results and descriptions are shown in the following pages.

Table 1 Summary of results

FCC Measurement Specification	FCC Limits Part(s)	Description	Result
-	15.107	Conducted Emission at Power Port	PASS
-	15.109	Radiated Emission of Enclosure	PASS

2 Product Description

2.1 Production Information

2.1.1 General Description

HUAWEI E270 HSDPA USB MODEM is subscriber equipment in the GSM system. The frequency band is 850MHz and 1900MHz. The E270 implements such functions as RF signal receiving / Transmitting, HSDPA/UMTS/EDGE/GPRS/GSM protocol processing and data service etc. Externally it provides USB interface (to connect to the notebook etc.), USIM card interface and antenna interface. It has two internal antennas as default. E270 uses Qualcomm MSM7200 chipset and Zero-IF technologies.

2.1.2 Support function and Service

The HUAWEI E270 HSDPA USB MODEM support the function and service as follows:

Table 2 Service and Test mode List

Service Name	Characteristic	Note
Data	Modulation: GMSK	GPRS/GSM
Data	Modulation: 8PSK	EDGE
Data	Modulation: QPSK	HSDPA/WCDMA

Note: * The specified GPRS test conditions & settings are defined in 3GPP TS51.010 V6.1.0 clause 40 and the EDGE test conditions & settings are defined in 3GPP TS51.010 V6.1.0 clause 50.

2.2 Modification Information

For original equipment, following table is not application.


Table 3 Modification Information

Model Number	Board/Module	Original Version	New Version	Modify Information
Not applicable				

3 Test Site Description

The test site of:

***Huawei Technologies Co. Ltd.
P.O. Box 518129
Huawei base, bantian,
Longgang District, Shenzhen, China***

The test site description has been submitted to  and registration granted under the registration number **97456** on April 20. 2006. The test site has been accredited by



and the accredited number is **2174.01** in Jan of 2006.

3.1 Testing Period

The test have been performed during the period of

Apr. 01, 2007 –Apr. 18, 2007

3.2 General Set up Description

HUAWEI E270 HSDPA USB MODEM can support GPRS/EDGE mode and 850M Band. During this measurement, the HUAWEI E270 HSDPA USB MODEM works in UMTS/GPRS/EDGE mode and 850MHz and 1900MHz Band.

4 SUMMARY OF RESULTS

Below shows a brief summary of the results obtained.

EUT Classification: Wireless Terminal			
Test Items	Configuration	Required Performance Criteria	Result
<u>Radiated Emissions</u> Enclosure Port 30MHz – 1000MHz Class B Limits	TC1	N/A	Pass
Conducted Emission Power port 150kHz – 30MHz Class B Limits	TC2	N/A	Pass

- Measurement taken is within the measurement uncertainty of measurement system.

Test Configurations of Traffic Mode — TC1

The EUT will be connected to test system (Base Station Simulator) in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).

The EUT is required to be in the traffic mode, a call is set up according to the generic call set up procedure and enter the EUT into loop back test mode.(WCDMA see 3GPP TS 34.121,GSM see ETSI TS 151.010).

For WCDMA, the following conditions shall also be met:

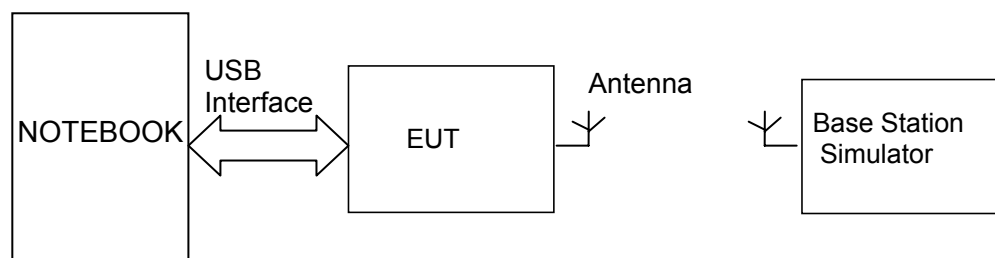
Logical Test Interface for details regarding generic call set-up procedure and BER, BLER test loop scenarios:

- set and send continuously up power control commands to the UE;
- The DTX shall be disabled;
- Inner Loop Power Control shall be enabled;
- transmitting and/or receiving (UL/DL) bit rate for reference test channel shall be 12.2 kbit / s.
- The EUT shall be commanded to operate at maximum transmit power;

For EGSM and DCS, the following conditions shall also be met:

- The EUT shall be commanded to operate at maximum transmit power;
- The downlink RXQUAL shall be monitored.

Assign channel frequency to an appropriate channel number. Often the middle channel number is set.



Test Configuration TC1

Test Configuration of Idle Mode — TC2

The EUT will be connected to test system (Base Station Simulator) in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).

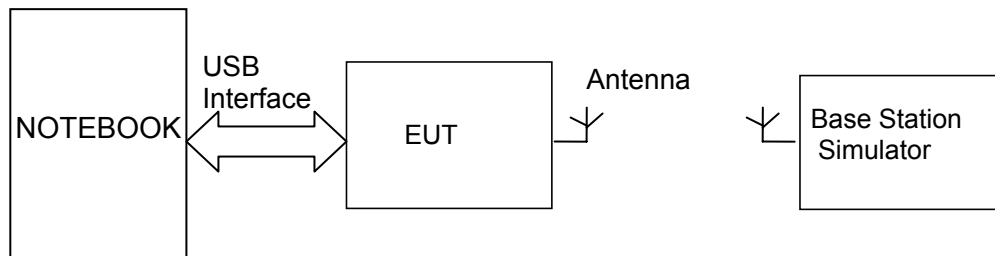
The EUT is required to be in the idle mode.

For WCDMA, the following conditions shall be met:

- UE shall be camped on a cell;
- UE shall perform Location Registration (LR) before the test, but not during the test;
- UE's neighbour cell list shall be empty;
- Paging repetition period and DRX cycle shall be set to minimum (shortest possible time interval).

For GSM and DCS, the following conditions shall be met:

When the EUT is required to be in the idle mode, the test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages. Periodic Location Updating shall be disabled.



Test Configuration TC2

5 Product Description

5.1 Technical Characteristics

5.1.1 Frequency Range

Table 4 Frequency Range

Uplink band:	824 to 849 MHz 1850 to 1910 MHz
Downlink band:	869 to 894 MHz 1930 to 1990 MHz

5.1.2 Channel Spacing / Separation

Table 5 Channel Spacing / Separation

	EDGE/GPRS/GSM	UMTS/HSDPA
Channel spacing	200k Hz	200k Hz
Channel separation:	200k Hz	5M Hz

5.1.3 Environmental Requirements

Table 6 Environmental Requirements

Minimum temperature:	- 10 °C
Maximum temperature:	+ 55 °C
Relative Humidity:	5%-95%RH

5.1.4 Power Source

Table 7 Power Source

DC voltage nominal:	⎓ +5V; Supplied by USB port of notebook
DC voltage range	⎓ +4.75-5.25V
DC current maximal:	600mA

5.2 EUT Identification List

5.2.1 Board Information

Table 8 Board Information

HUAWEI E270 HSDPA USB MODEM		
E270		
Board and Module		
Equipment Designation / Description	Serial Number	Remarks
-MAINBOARD	EF1AA10740700007	TCPU Ver.B

5.2.2 Adapter Technical Data

No Applicable.

5.2.3 Battery Technical Data

No Applicable.

5.2.4 FCC Identification

Grantee Code: QIS
Product Code: E270
FCC Identification: QISE270

6 Main Test Instruments

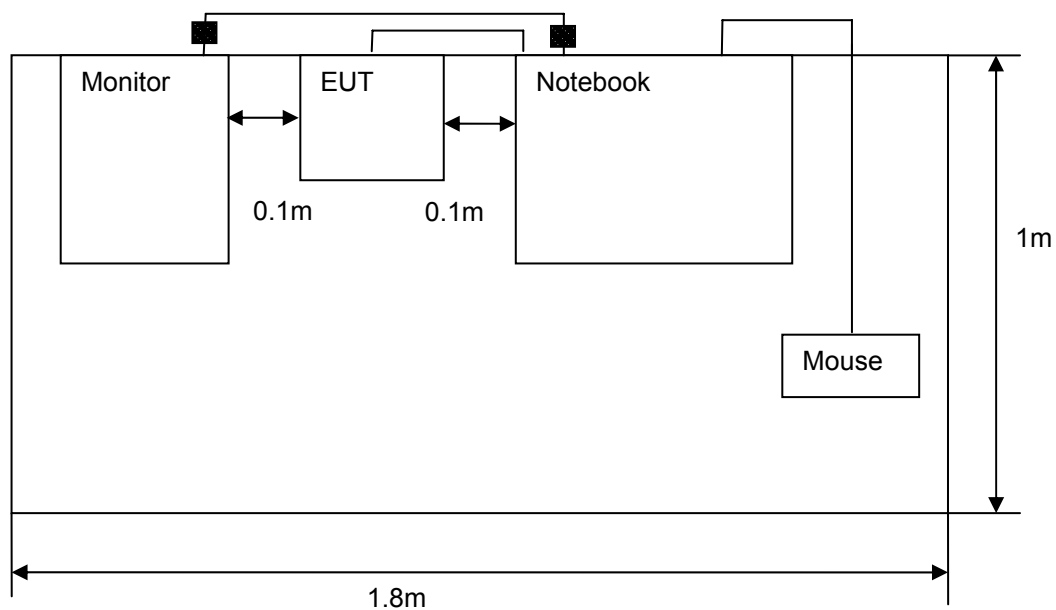
Table 9 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until (MM.DD.YYYY)
3m Semi Anechoic Chamber	S+M	N/A	N/A	12.24.2007
Test Receiver	R&S	ESMI	829214/011	07.30.2007
Test Receiver	R&S	ESCS30	830245/018	07.30.2007
Pre-Amplifier	Agilent	8447D	2944A10146	07.30.2007
BiLog Antenna	Schaffner	CBL 6112B	2747	08.30.2007
Artificial Mains Network	Schwarzbeck	NNLK8121	8121416	09.29.2007
Universal Radio Communication Tester	R&S	CMU200	108035	07.20.2007

6.1 Auxiliary Equipment Used during Test and EUT

Name	Model	Manufacturer	S/N	Cable Type
Notebook	X40	IBM	99-BNA39	NA
Monitor	6331-02N	IBM	23-HH524	1.8m shielding cable
Mouse	MO32BO	IBM	003000	1.2m unshielding cable
EUT	E270	HUAWEI	EF1AA10740700007	0.8m shielding cable

Test Setup Figure



7 EMC Test

7.1 Conducted Emission at Power Port

7.1.1 Test Conditions

Table 10 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Power port
Ambient temperature:	+25°C
Relative humidity:	52 %
Test Configurations:	TM1 : Traffic mode

7.1.2 Test Specifications and Limits

7.1.2.1 Specification

CFR 47 (FCC) part 15.107

7.1.2.2 Supporting Standards

Table 11 Supporting Standards:

ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
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7.1.2.3 Limits

Compliance with part 15.107, conducted emission must meet the requirement of following table.

Table 12 Limits

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

Note: * Decreases with the logarithm of the frequency.

7.1.3 Test Method and Setup

The Table-top EUT was placed upon a non-metallic table 0.8 m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.4: 2003.

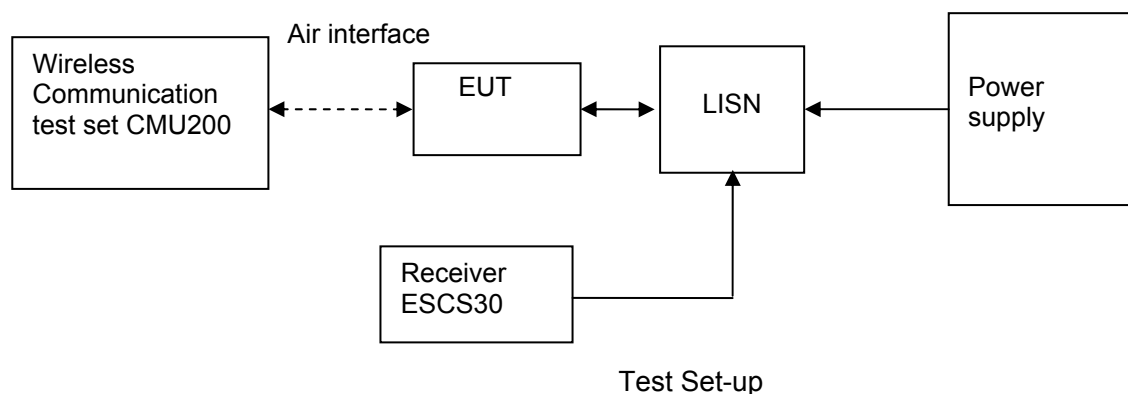
Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.

The EUT was communicated with the BTS simulator through Air interface, the BTS simulator controls the EUT to transmitter the maximum power which defined in specification of product. The EUT operated on the typical channel.

Measurement bandwidth (RBW) for 150kHz to 30 MHz: 9 kHz;

Test Set-up

The Mobile Phone was setup in the screened chamber and operated under nominal conditions.



7.1.4 Measurement Results

Table 13 MEASUREMENT RESULT:QP DECTER

Frequency (MHz)	Level (dBμV)	Transd (dB)	Limit (dBμV)	Margin (dB)	Line	PE
0.298500	44.70	10.3	60	15.3	L3	GND
0.519000	33.70	10.0	56	22.3	L3	GND
1.869000	32.60	10.1	56	23.4	N	GND
3.592500	42.20	10.0	56	13.8	N	GND
5.230500	35.60	10.2	60	24.4	N	GND
12.394500	27.60	11.7	60	32.4	N	GND

Table 14 MEASUREMENT RESULT:AV DECTER

Frequency (MHz)	Level (dBμV)	Transd (dB)	Limit (dBμV)	Margin (dB)	Line	PE
0.186000	37.60	10.6	54	16.4	L3	GND
0.487500	22.10	10.0	46	24.1	N	GND
1.860000	26.40	10.1	46	19.6	N	GND
3.588000	29.60	10.0	46	16.4	L3	GND
10.702500	30.40	11.5	50	19.6	N	GND
12.376500	22.20	11.7	50	27.8	N	GND

7.1.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix A.

7.2 Radiated Emission of Enclosure

7.2.1 Test Conditions

Table 15 Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	25 °C
Relative humidity:	52 %
Test Configurations:	TM2: Idle mode

7.2.2 Test Specifications and Limits

7.2.2.1 Specification

CFR 47 (FCC) part 15.109

7.2.2.2 Supporting Standards

Table 16 Supporting Standards:

ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
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7.2.2.3 Limits

The Radiated Emission of enclosure of EUT should compliance with the requirement of part 15.109. The limit showed in following table.

Table 17 Limits

Frequency of Emission (MHz)	Radiated Limit	
	Unit(μ V/m)	Unit(dB μ V/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
960-1000	500	54

7.2.3 Test Method and Setup

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2003). The test distance was 3m. The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4. The Radiated Disturbance measurements were made using a Rohde and Schwarz ESMI Test Receiver and control software ES-K1.

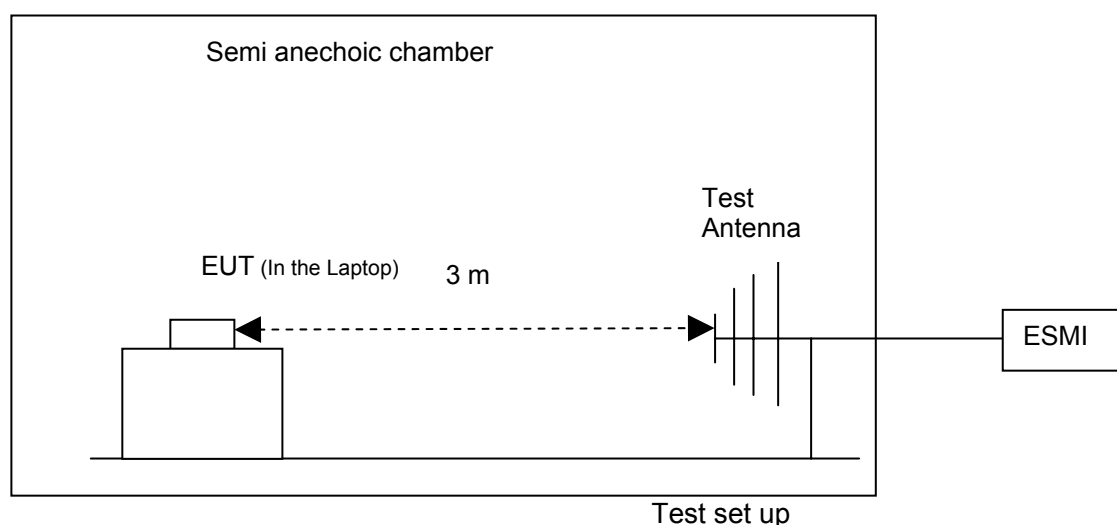
A preliminary scan and a final scan of the emissions were made from 30 MHz to 1GHz by using test

script of software; the emissions were measured using a Quasi-Peak 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.

Huawei E270 communicated with the BTS simulator through Air interface. For FCC Part 15B test, unintentional radiators, the E270 operated on the typical channel and the E270 worked in idle mode, transmitter did not work.

Measurement bandwidth: 30 MHz – 1000 MHz, 120 kHz

Test set up



7.2.4 Measurement Results

Table 18 MEASUREMENT RESULT: QP DECTER

Frequency (MHz)	Level (dBμV/m)	Transd (dB)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
30.120000	25.50	-4.2	40.0	21.5	237.0	0.00	HORIZONTAL
72.000000	26.20	-16.2	40.0	16.8	113.0	156.00	VERTICAL
99.840000	24.60	-10.8	40.0	17.4	100.0	270.00	VERTICAL
227.640000	28.80	-10.5	40.0	15.2	110.0	270.00	HORIZONTAL
432.000000	34.30	-3.9	47.0	12.7	183.0	201.00	HORIZONTAL
700.020000	32.60	-1.2	47.0	14.4	100.0	270.00	HORIZONTAL

7.2.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix B.

8 System Measurement Uncertainty

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

Table 19 System Measurement Uncertainty

Items		Extended Uncertainty
Conducted Emission at Power Port	Disturbance Voltage (dB μ V)	U=3.3dB; k=2
Radiated Emission of enclosure at ideal mode	Field strength (dB μ V /m)	U=4.6dB; k=2

9 Appendixes

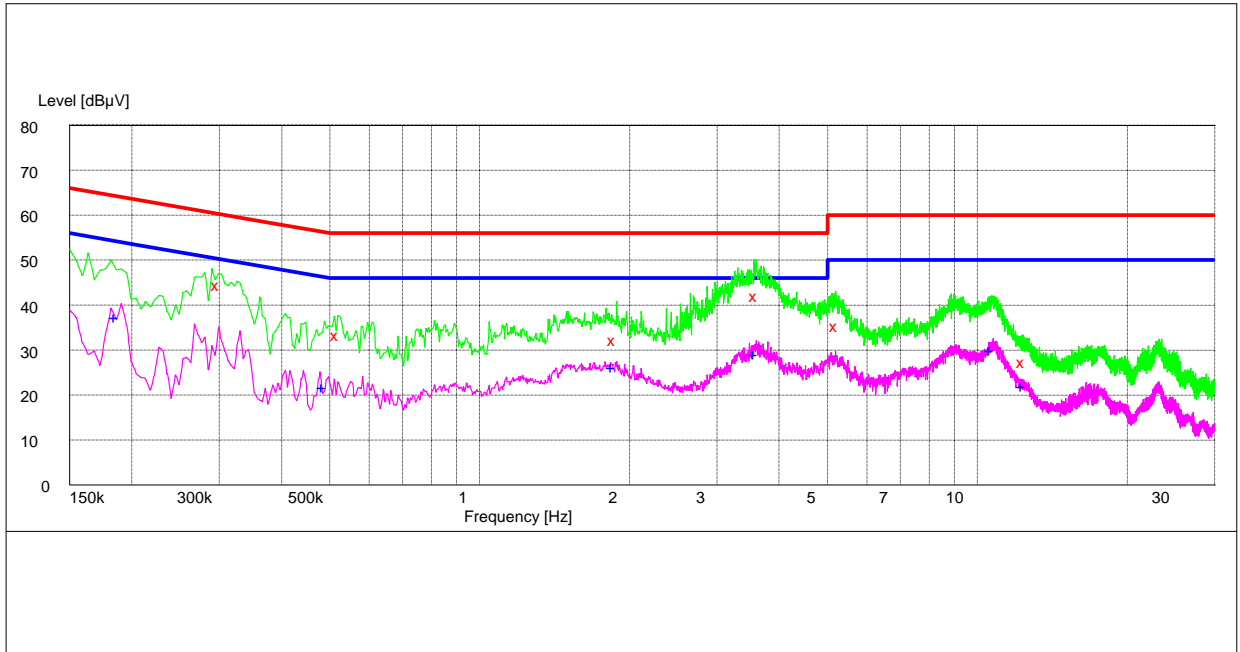
Appendix A	Measurement Results Conducted Emission at Power Port	2 pages
Appendix B	Measurement Results Radiated Emission of Enclosure	2 pages
Appendix C	Photos of Test Setup	2 pages

Appendix A

Conducted Emission at Power Port

According to FCC Part 15.107

TRAFFIC MODE



MEASUREMENT RESULT:QP DECTER

Frequency (MHz)	Level (dBμV)	Transd (dB)	Limit (dBμV)	Margin (dB)	Line	PE
0.298500	44.70	10.3	60	15.3	L3	GND
0.519000	33.70	10.0	56	22.3	L3	GND
1.869000	32.60	10.1	56	23.4	N	GND
3.592500	42.20	10.0	56	13.8	N	GND
5.230500	35.60	10.2	60	24.4	N	GND
12.394500	27.60	11.7	60	32.4	N	GND

MEASUREMENT RESULT:AV DECTER

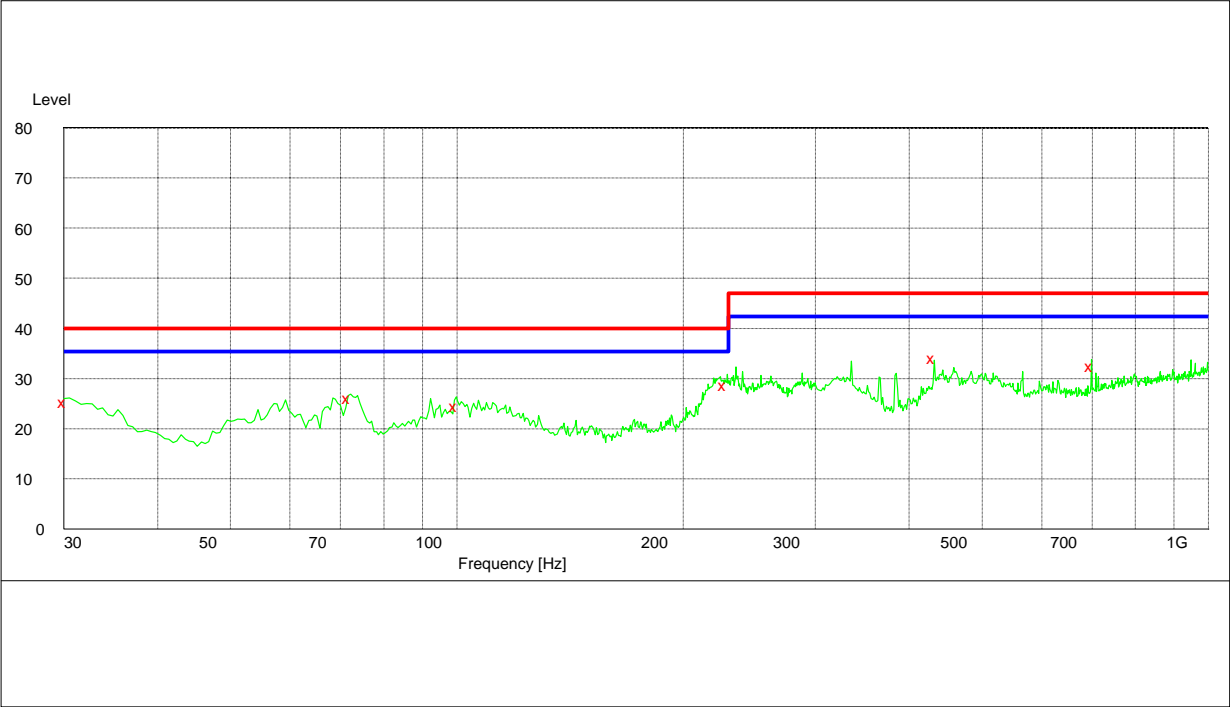
Frequency (MHz)	Level (dBμV)	Transd (dB)	Limit (dBμV)	Margin (dB)	Line	PE
0.186000	37.60	10.6	54	16.4	L3	GND
0.487500	22.10	10.0	46	24.1	N	GND
1.860000	26.40	10.1	46	19.6	N	GND
3.588000	29.60	10.0	46	16.4	L3	GND
10.702500	30.40	11.5	50	19.6	N	GND
12.376500	22.20	11.7	50	27.8	N	GND

Appendix B

Radiated Emission of Enclosure

According to FCC Part 15.109

IDLE MODE



MEASUREMENT RESULT: QP DECTER

Frequency (MHz)	Level (dBµV/m)	Transd (dB)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
30.120000	25.50	-4.2	40.0	21.5	237.0	0.00	HORIZONTAL
72.000000	26.20	-16.2	40.0	16.8	113.0	156.00	VERTICAL
99.840000	24.60	-10.8	40.0	17.4	100.0	270.00	VERTICAL
227.640000	28.80	-10.5	40.0	15.2	110.0	270.00	HORIZONTAL
432.000000	34.30	-3.9	47.0	12.7	183.0	201.00	HORIZONTAL
700.020000	32.60	-1.2	47.0	14.4	100.0	270.00	HORIZONTAL