



Part 15B

TEST REPORT

Product Name	Neptune pine
FCC ID	2ABWUP312
Model	P312
Applicant	NEPTUNE COMPUTER INC.
Manufacturer	NEPTUNE COMPUTER INC.
Date of issue	June 6, 2014

TA Technology (Shanghai) Co., Ltd.

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GENERAL SUMMARY

Reference Standard(s)	FCC Code CFR47 Part15B (2012) Radio frequency device. ANSI C63.4 (2009) Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40GHz.
Conclusion	This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 2 of this test report are below limits specified in the relevant standards. General Judgment : Pass
Comment	The test result only responds to the measured sample.

Approved by Weizhong Yang

Weizhong Yang
Director

Revised by Guangchang Fan

Guangchang Fan
EMC Manager

Performed by Jiangpeng Lan

Jiangpeng Lan
EMC Engineer

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1. General Information

1.1. Notes of the test report

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L2264.

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 428261.

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 8510A.

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

TA Technology (Shanghai) Co., Ltd. is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test. The sample under test was selected by the Client. This report only refers to the item that has undergone the test.

This report alone does not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities. This report can not be used partially or in full for publicity and/or promotional purposes without previous written approval of **TA Technology (Shanghai) Co., Ltd.** and the Accreditation Bodies, if it applies.

If the electronic report is inconsistent with the printed one, it should be subject to the latter.

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1.2. Testing laboratory

Company: TA Technology (Shanghai) Co., Ltd.

Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong

City: Shanghai

Post code: 201201

Country: P. R. China

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Website: <http://www.ta-shanghai.com>

E-mail: yangweizhong@ta-shanghai.com

1.3. Applicant Information

Company: NEPTUNE COMPUTER INC.

Address: 666 SHERBROOKE ST. W., SUITE 1000

City: MONTREAL

Postal Code: H3A 1E7

Country: CANADA

1.4. Manufacturer Information

Company: NEPTUNE COMPUTER INC.

Address: 666 SHERBROOKE ST. W., SUITE 1000

City: MONTREAL

Postal Code: H3A 1E7

Country: CANADA

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1.5. Information of EUT

General information

Name of EUT:	Neptune pine
IMEI:	354727049900715
Hardware Version:	P1
Software Version:	JB_V0.29
Antenna Type:	Internal Antenna
Used Host Product:	Lenovo X61
Test mode:	USB mode

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Auxiliary equipment details

AE1: Battery

Model: Mini Phone
Manufacturer: Tian Yu Communication Technology (Kun Shan) CO.,Ltd
S/N: /

AE2: Adapter

Model: DSA-5PFK-05 FUS 050100a
Manufacturer: DEE VAN ENTERPRISE CO., LTD.
S/N: /

1.6. Test Date

The test is performed on March 5, 2014.

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2. Test Information

2.1. Summary of test results

Number	Test Case	Clause in FCC Rules	conclusion
1	Radiated Emission	15.109, ANSI C63.4-2009	PASS
2	Conducted Emission	15.107, ANSI C63.4-2009	PASS

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2.2. Radiated Emission

Ambient condition

Temperature	Relative humidity	Pressure
24°C~26°C	45%~50%	102.5kPa

Methods of Measurement

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The distance between EUT and receive antenna should be 3 meters. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2009. Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier. During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. During the test, EUT is connected to a laptop via a USB cable in the case of USB mode. The EUT is used as the peripheral equipment of the PC. The model of laptop is Lenovo X61 and the serial number of laptop is L3-D1224

The data is transferred from EUT to PC; PC is connected to server via a long LAN cable.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. During the test, the EUT is worked at maximum output power.

Set the spectrum analyzer in the following:

Below 1GHz:

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=1MHz VBW=3MHz/ Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

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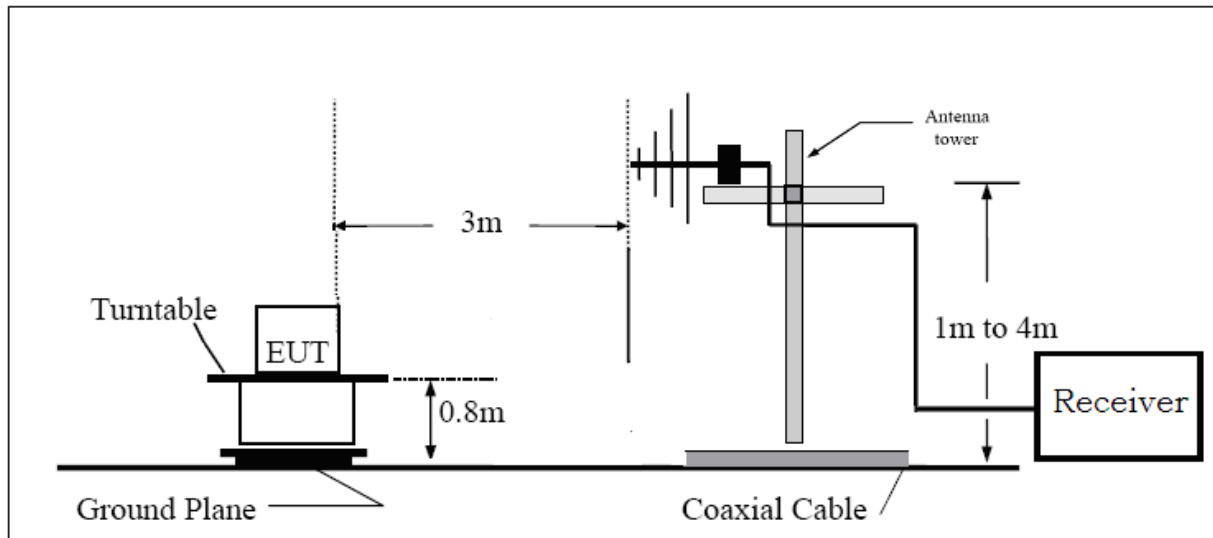
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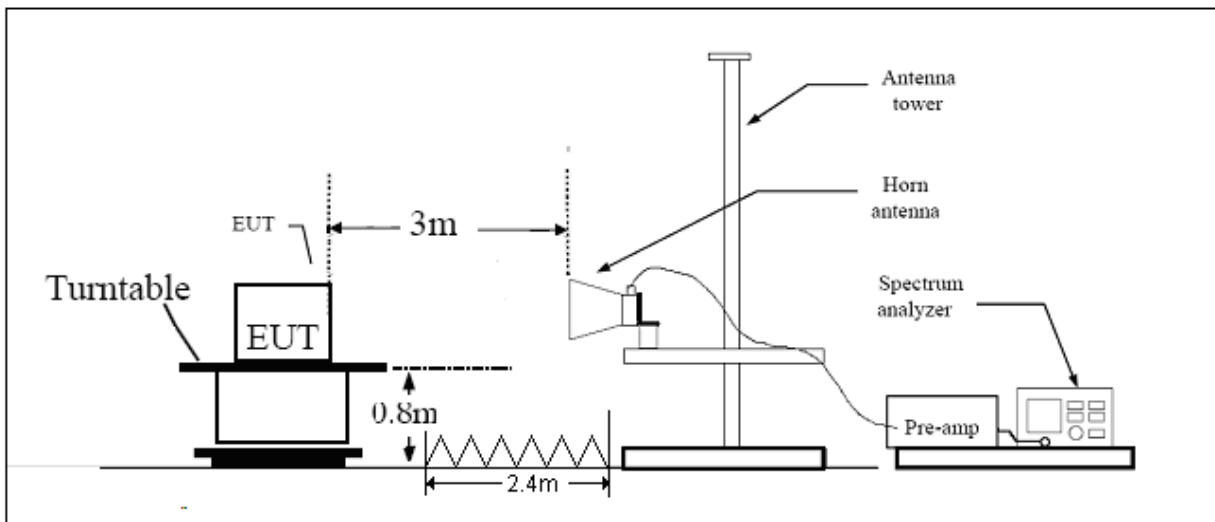
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Test Setup

Below 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

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Limits

Frequency (MHz)	Field Strength (dB μ V/m)	Detector
30 -88	40.0	Quasi-peak
88-216	43.5	Quasi-peak
216 – 960	46.0	Quasi-peak
960-1000	54.0	Quasi-peak
1000-5 th harmonic of the highest frequency or 40GHz, which is lower	54 74	Average Peak

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$. $U = 3.92$ dB.

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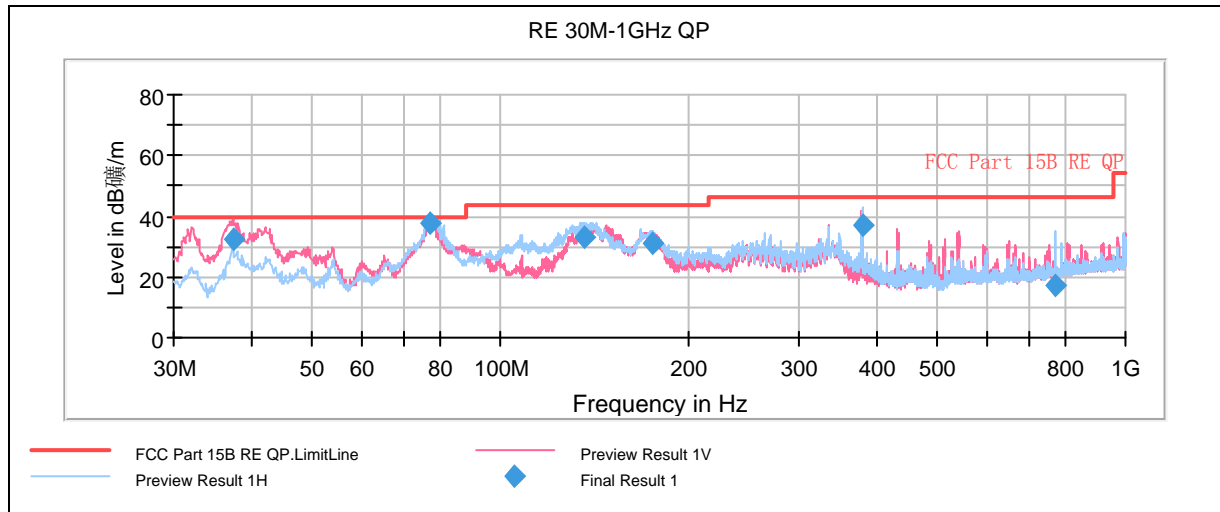
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Test Results

USB Mode



Note: This graph displays the maximum values of horizontal and vertical by software

Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dB μ V/m)	Reading value (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dB μ V/m)
37.382760	32.4	51.7	104.0	V	0.0	-19.3	7.6	40.0
77.333334	37.6	66	222.0	H	296.0	-28.4	2.4	40.0
136.115410	32.8	62	206.0	H	334.0	-29.2	10.7	43.5
174.776516	31.0	59	177.0	H	136.0	-28.0	12.5	43.5
378.809250	36.9	58.3	99.0	H	249.0	-21.4	9.1	46.0
773.735750	17.1	31.9	102.0	H	22.0	-14.8	28.9	46.0

Remark: 1. Quasi-Peak = Reading value + Correction factor

2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

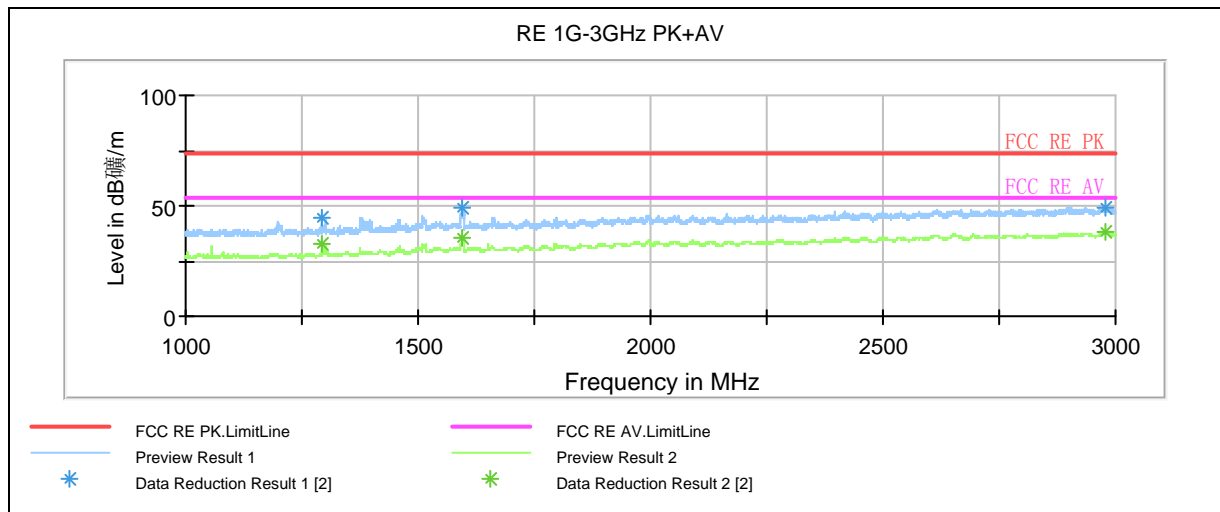
3. Margin = Limit – Quasi-Peak

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Note: Blue trace uses the peak detection Green trace uses the average detection
This graph displays the maximum values of horizontal and vertical by software

Radiated Emission from 1GHz to 3GHz

Frequency (MHz)	Peak (dB μ V/m)	Reading value (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dB μ V/m)
1294.750000	44.6	53.8	100.0	V	156.0	-9.2	29.4	74
1593.250000	48.7	55.4	200.0	V	112.0	-6.7	25.3	74
2979.000000	49.5	48.2	100.0	V	349.0	1.3	24.5	74

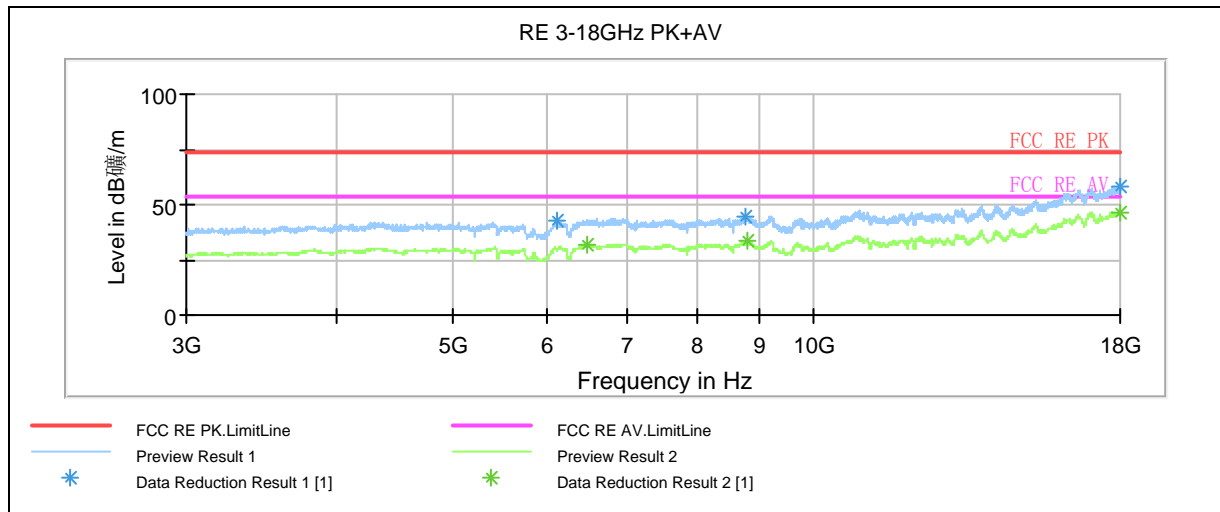
Frequency (MHz)	Average (dB μ V/m)	Reading value (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dB μ V/m)
1294.750000	32.6	41.8	100.0	V	156.0	-9.2	21.4	54
1596.000000	35.7	42.4	200.0	V	97.0	-6.7	18.3	54
2977.500000	38.3	37.0	100.0	H	156.0	1.3	15.7	54

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Note: Blue trace uses the peak detection Green trace uses the average detection
This graph displays the maximum values of horizontal and vertical by software

Radiated Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBμV/m)	Reading value (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBμV/m)
6105.000000	42.4	38.7	200.0	H	0.0	3.7	31.6	74
8775.000000	44.9	36.8	200.0	H	0.0	8.1	29.1	74
17985.000000	58.6	35.2	200.0	H	0.0	23.4	15.4	74

Frequency (MHz)	Average (dBμV/m)	Reading value (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBμV/m)
6461.250000	31.8	27.1	200.0	V	160.0	4.7	22.2	54
8788.125000	33.2	25.1	100.0	H	93.0	8.1	20.8	54
17994.375000	46.7	23.2	200.0	H	316.0	23.5	7.3	54

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2.3. Conducted Emission

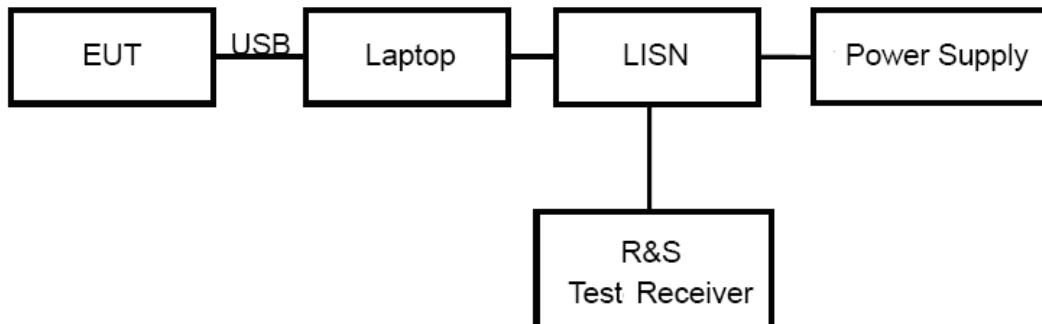
Ambient condition

Temperature	Relative humidity	Pressure
24°C ~26°C	50%~55%	102.5kPa

Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2009. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line. During the test, EUT is connected to a laptop via a USB cable in the case of USB mode. The EUT is used as the peripheral equipment of the PC. The model of laptop is Lenovo X61 and the serial number of laptop is L3-D1224

Test Setup



Note: Power Supply is AC Power source and it is used to change the voltage from 220V/50Hz to 110V/60Hz.

Limits

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46 *
0.5 - 5	56	46
5 - 30	60	50
*: Decreases with the logarithm of the frequency.		

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$. $U = 2.69$ dB.

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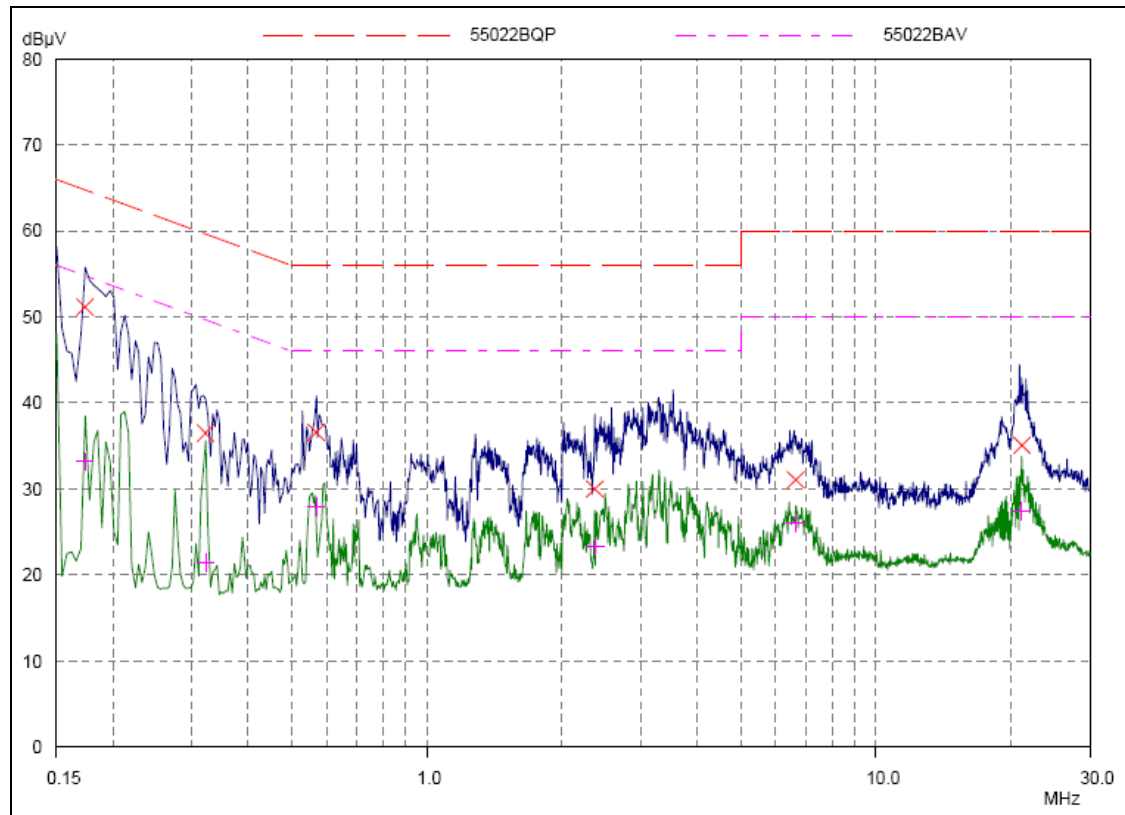
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Test Results

USB Mode



Note: Blue trace uses the peak detection Green trace uses the average detection
L line

Conducted Emission from 150 KHz to 30 MHz

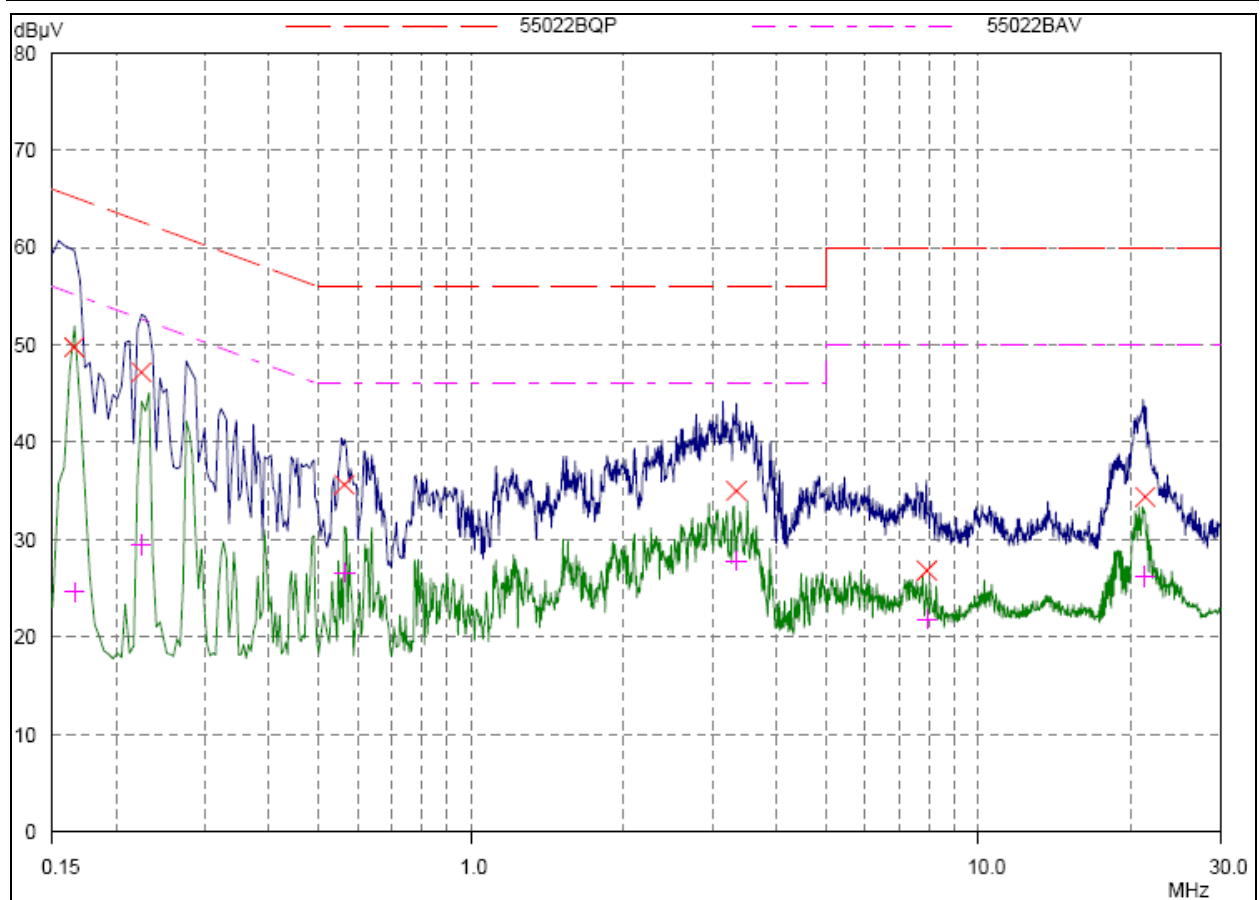
Final Measurement Results				
Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB	Phase -
0.17343	51.12	64.79	13.67	L1
0.32187	36.48	59.66	23.18	L1
0.56796	36.56	56.00	19.44	L1
2.36875	29.97	56.00	26.03	L1
6.63437	31.07	60.00	28.93	L1
21.13046	35.09	60.00	24.91	L1
Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB	Phase -
0.17343	33.20	54.79	21.59	L1
0.32187	21.46	49.66	28.20	L1
0.56796	27.93	46.00	18.07	L1
2.36875	23.25	46.00	22.75	L1
6.63437	26.00	50.00	24.00	L1
21.13046	27.43	50.00	22.57	L1

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Note: Blue trace uses the peak detection Green trace uses the average detection
N line

Conducted Emission from 150 KHz to 30 MHz

Final Measurement Results				
Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB	Phase -
0.16562	49.78	65.18	15.40	N
0.22421	47.16	62.66	15.50	N
0.56406	35.66	56.00	20.34	N
3.33359	35.01	56.00	20.99	N
7.92343	26.82	60.00	33.18	N
21.32187	34.37	60.00	25.63	N
Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB	Phase -
0.16562	24.62	55.18	30.56	N
0.22421	29.49	52.66	23.17	N
0.56406	26.63	46.00	19.37	N
3.33359	27.83	46.00	18.17	N
7.92343	21.82	50.00	28.18	N
21.32187	26.19	50.00	23.81	N

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3. Main Test Instruments

No.	Name	Type	Manufacturer	Serial Number	Calibration Date	Valid Period
01	EMI Test Receiver	ESCI	R&S	100948	2013-06-29	One year
02	Trilog Antenna	VULB 9163	SCHWARZB ECK	9163-201	2013-06-19	Three years
03	Signal Analyzer	FSV30	R&S	100815	2013-06-29	One year
04	Horn Antenna	HF907	R&S	100126	2012-07-01	Three years
05	Horn Antenna	3160-09	ETS-Lindgren	00102643	2012-07-01	Three years
06	EMI Test Receiver	ESCS30	R&S	100138	2014-01-14	One year
07	LISN	ENV216	R&S	101171	2013-04-13	One year

*******END OF REPORT BODY*******

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ANNEX A: The EUT Appearance and Test Setup

A.1 EUT Appearance



a: EUT



b: Adapter

Picture 1 EUT

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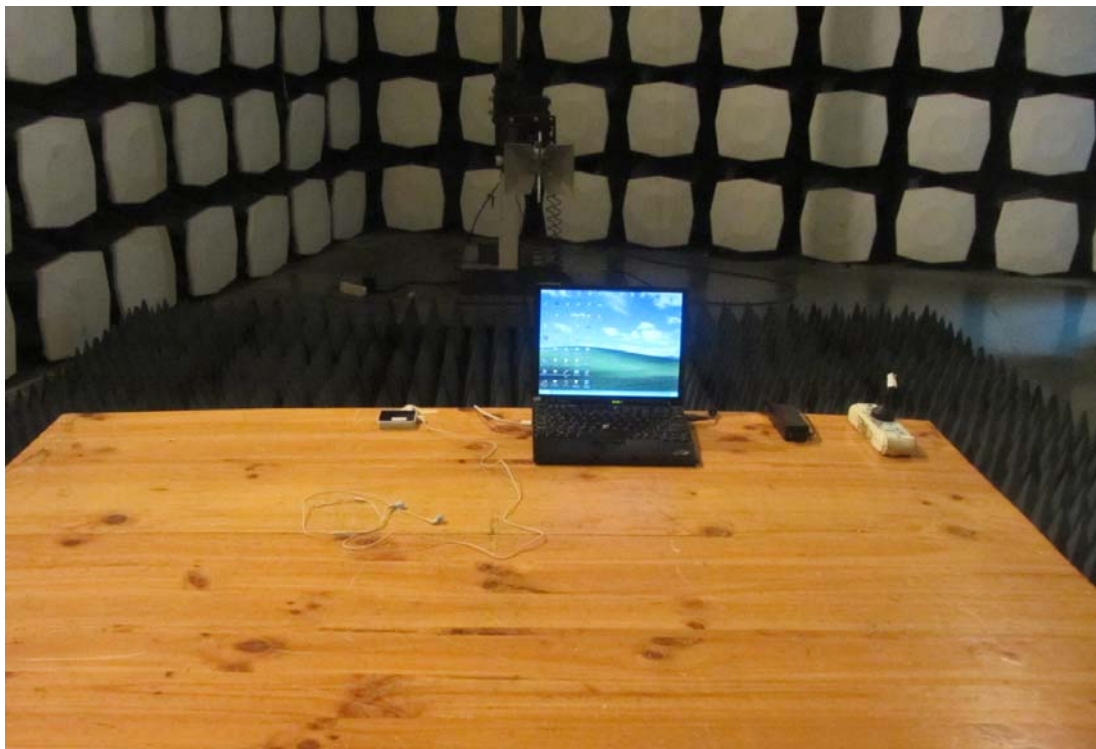
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A.2 Test Setup



a: Below 1GHz



b: Above 1GHz

Picture 2 Radiated Emission Test Setup

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Picture 3 Conducted Emission Test Setup