



Part 15B

TEST REPORT

Product Name	Wireless Office Communication System
Model Name	2002/2011
FCC ID	AJG-WROCA
Client	NewRock Technologies, Inc
Manufacturer	NewRock Technologies, Inc
Date of issue	April 18, 2013

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 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

Director

Revised by

EMC Manager

Performed by

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. This report only refers to the item that has undergone the test.

This report standalone dose 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 electrical 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
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E-mail: yangweizhong@ta-shanghai.com

1.3. Applicant Information

Company: NewRock Technologies, Inc
Address: 495 Shangzhong Rd, Building B, 2nd Floor, Shanghai
City: Shanghai
Postal Code: 200231
Country: P.R.China

1.4. Manufacturer Information

Company: NewRock Technologies, Inc
Address: 495 Shangzhong Rd, Building B, 2nd Floor, Shanghai
City: Shanghai
Postal Code: 200231
Country: P.R.China

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1.5. Information of EUT

General information

MAC:	000EA926001C
Hardware Version:	Ver1.1
Software Version:	Rev:2.2.5.79.30
Antenna Type:	External Antenna
Used Host Product:	Lenovo X61

Equipment under Test (EUT) is Wireless Office Communication System with external antenna. During the test, the EUT connect to the laptop Lenovo X61.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. Test Date

The test performed from February 28, 2013 to March 6, 2013.

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2. Test Information

2.1. Summary of test results

Number	Test Case	Clause in FCC Rules	Verdict
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 SD card I/O port. The EUT is used as the peripheral equipment of the PC. The model of laptop is Lenovo X61 Type 7675-L12 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.

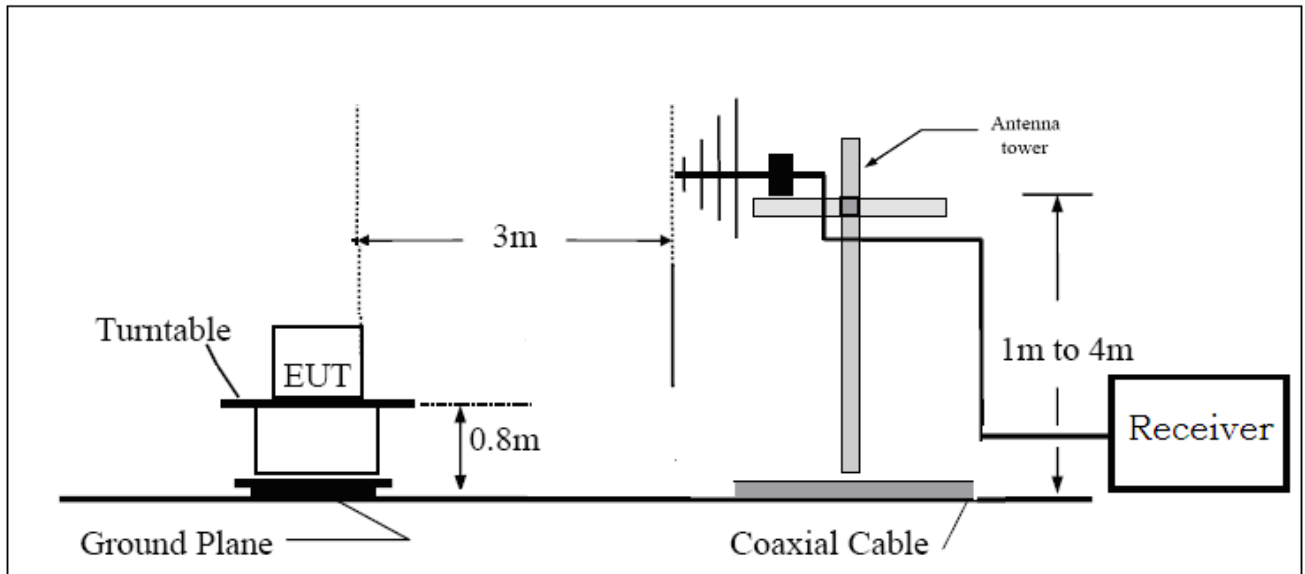
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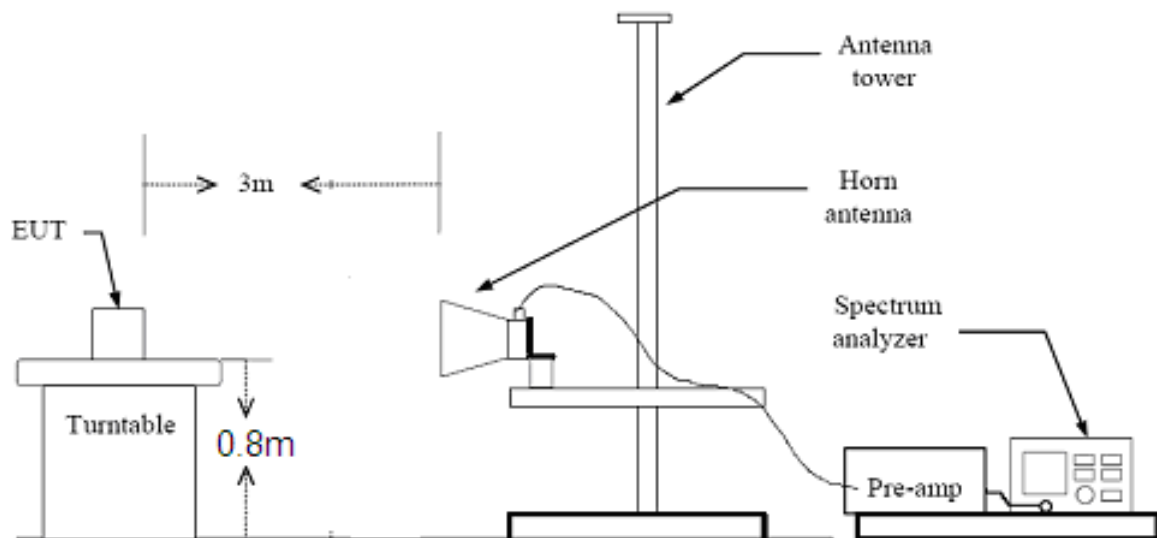
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Test Setup

Below 1GHz



Above 1GHz



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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.

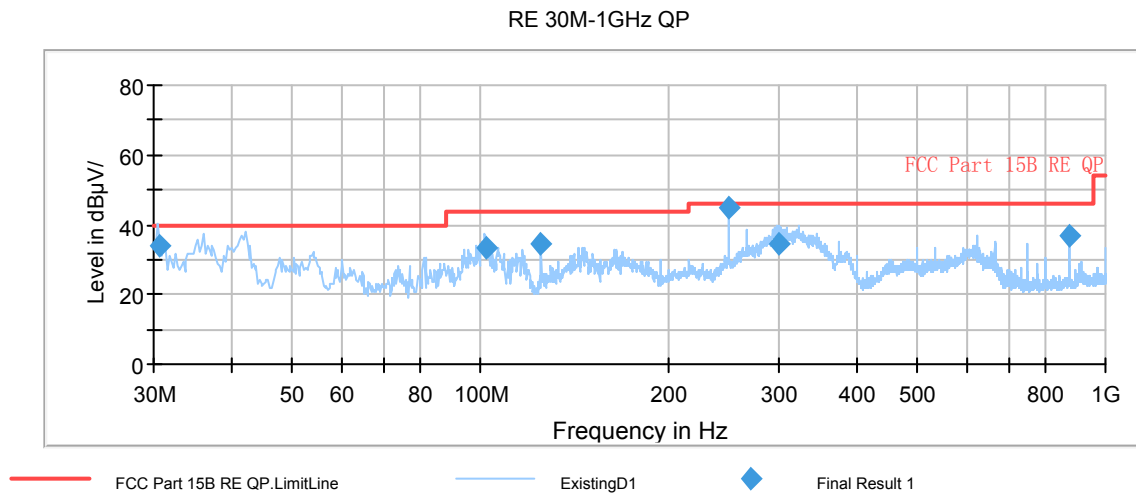
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Test Results



Radiated Emission from 30MHz to 1GHz

Note: plots show Polarization (V) and Polarization (H) maximum value that is synthesized by software.

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
30.561213	33.7	100.0	V	60.0	56.2	-22.5	6.3	40.0
101.885550	33.6	225.0	H	191.0	60.3	-26.7	9.9	43.5
124.987350	34.3	100.0	V	296.0	64.4	-30.1	9.2	43.5
250.002500	45.0	100.0	H	87.0	71.9	-26.9	1.0	46.0
299.923000	34.7	121.0	H	0.0	60.7	-26.0	11.3	46.0
875.004500	37.0	100.0	H	49.0	53.1	-16.1	9.0	46.0

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

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

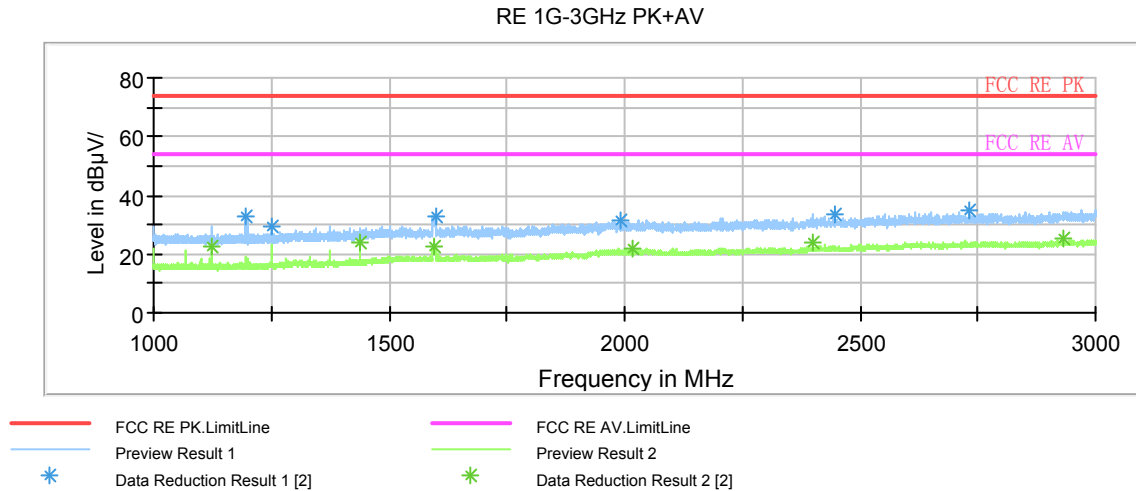
3. Margin = Limit – Quasi-Peak

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

Radiated Emission from 1GHz to 3GHz

Note: plots show Polarization (V) and Polarization (H) maximum value that is synthesized by software.

Data Reduction Result 1

Frequency (MHz)	MaxPeak (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
1196.250000	32.5	100.0	H	204.0	-14.4	41.5	74
1250.000000	29.7	100.0	V	51.0	-14.2	44.3	74
1598.625000	33.0	100.0	H	0.0	-10.8	41	74
1991.625000	31.6	100.0	H	0.0	-8.9	42.4	74
2448.000000	33.7	100.0	V	0.0	-7.5	40.3	74
2731.500000	34.8	100.0	V	0.0	-6.2	39.2	74

Data Reduction Result 2

Frequency (MHz)	Average (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
1125.000000	22.3	100.0	H	227.0	-14.2	31.7	54
1440.250000	24.1	100.0	V	74.0	-12.9	29.9	54
1596.750000	22.6	100.0	H	0.0	-10.8	31.4	54
2017.125000	21.9	100.0	H	0.0	-8.9	32.1	54
2400.375000	24.1	100.0	V	0.0	-7.5	29.9	54
2932.875000	25.1	100.0	V	0.0	-5.0	28.9	54

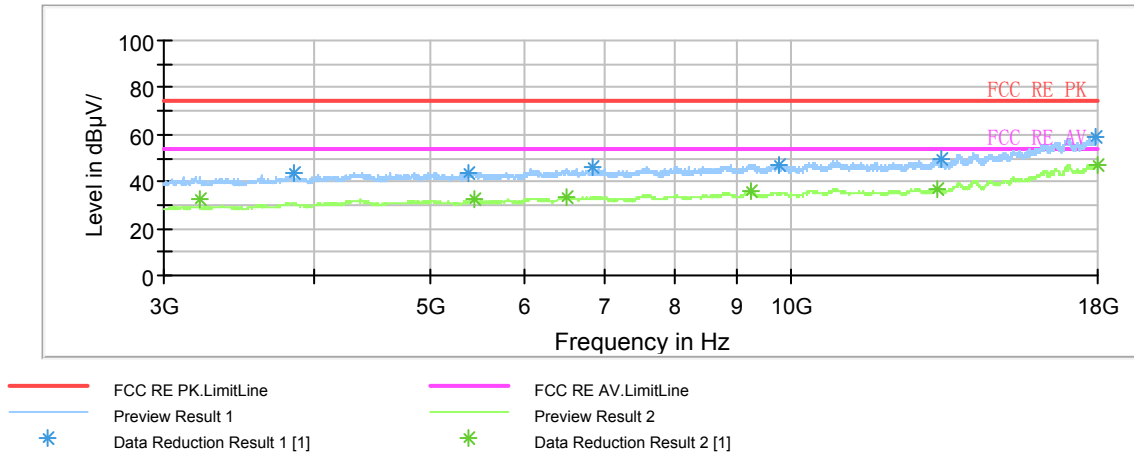
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RE 3-18GHz PK+AV



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

Radiated Emission from 3GHz to 18GHz

Note: plots show Polarization (V) and Polarization (H) maximum value that is synthesized by software.

Data Reduction Result 1 [1]

Frequency (MHz)	MaxPeak (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
3845.625000	43.6	100.0	V	285.0	-0.3	30.4	74
5383.125000	43.9	100.0	V	334.0	2.2	30.1	74
6834.375000	46.0	100.0	V	111.0	4.5	28	74
9757.500000	47.2	100.0	V	312.0	8.8	26.8	74
13350.000000	49.3	100.0	V	228.0	12.4	24.7	74
17941.875000	58.7	100.0	H	180.0	23.4	15.3	74

Data Reduction Result 2 [1]

Frequency (MHz)	Average (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
3215.625000	32.9	100.0	V	75.0	-2.7	21.1	54
5437.500000	32.3	100.0	H	29.0	2.8	21.7	54
6485.625000	33.4	100.0	V	357.0	4.7	20.6	54
9249.375000	35.5	100.0	V	0.0	8.7	18.5	54
13228.125000	37.1	100.0	V	334.0	12.7	16.9	54
18000.000000	47.4	100.0	V	205.0	23.5	6.6	54

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2.3. Conducted Emission

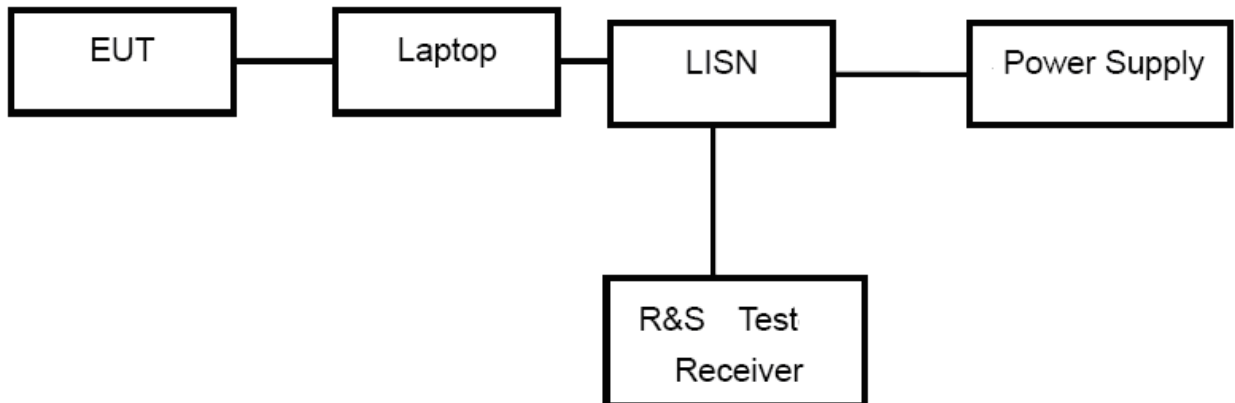
Ambient condition

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 SD card I/O port. The EUT is used as the peripheral equipment of the PC. The model of laptop is Lenovo X61 Type 7675-L12 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.

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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

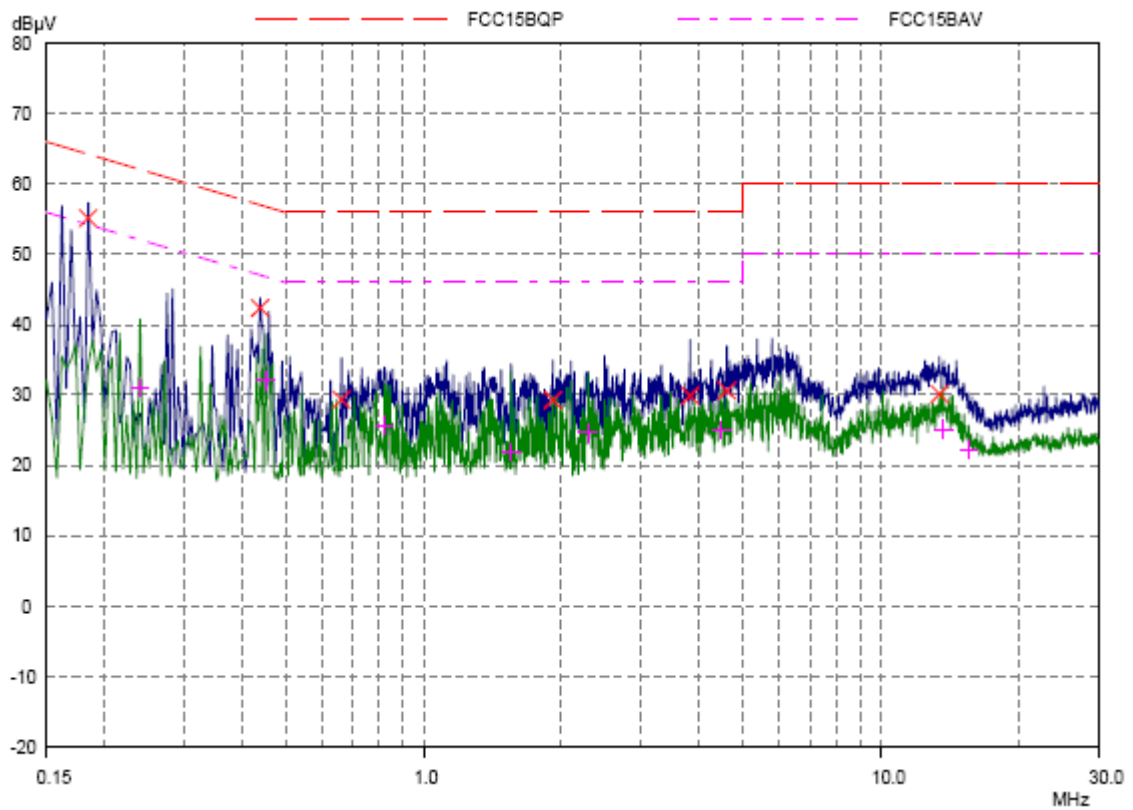
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$. $U = 2.69$ dB.

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Test Results



Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB	Phase -	PE -
0.18515	55.11	64.25	9.14	L1	gnd
0.43908	42.36	57.08	14.72	L1	gnd
0.66171	29.37	56.00	26.63	L1	gnd
1.91953	29.27	56.00	26.73	L1	gnd
3.82187	29.91	56.00	26.09	L1	gnd
4.60312	30.58	56.00	25.42	L1	gnd
13.4039	30.09	60.00	29.91	L1	gnd

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB	Phase -	PE -
0.23984	30.96	52.10	21.14	L1	gnd
0.45078	32.02	46.86	14.84	L1	gnd
0.82187	25.66	46.00	20.34	L1	gnd
1.55234	21.88	46.00	24.12	L1	gnd
2.29062	24.57	46.00	21.43	L1	gnd
4.48203	25.04	46.00	20.96	L1	gnd
13.67343	25.12	50.00	24.88	L1	gnd
15.53281	22.26	50.00	27.74	L1	gnd

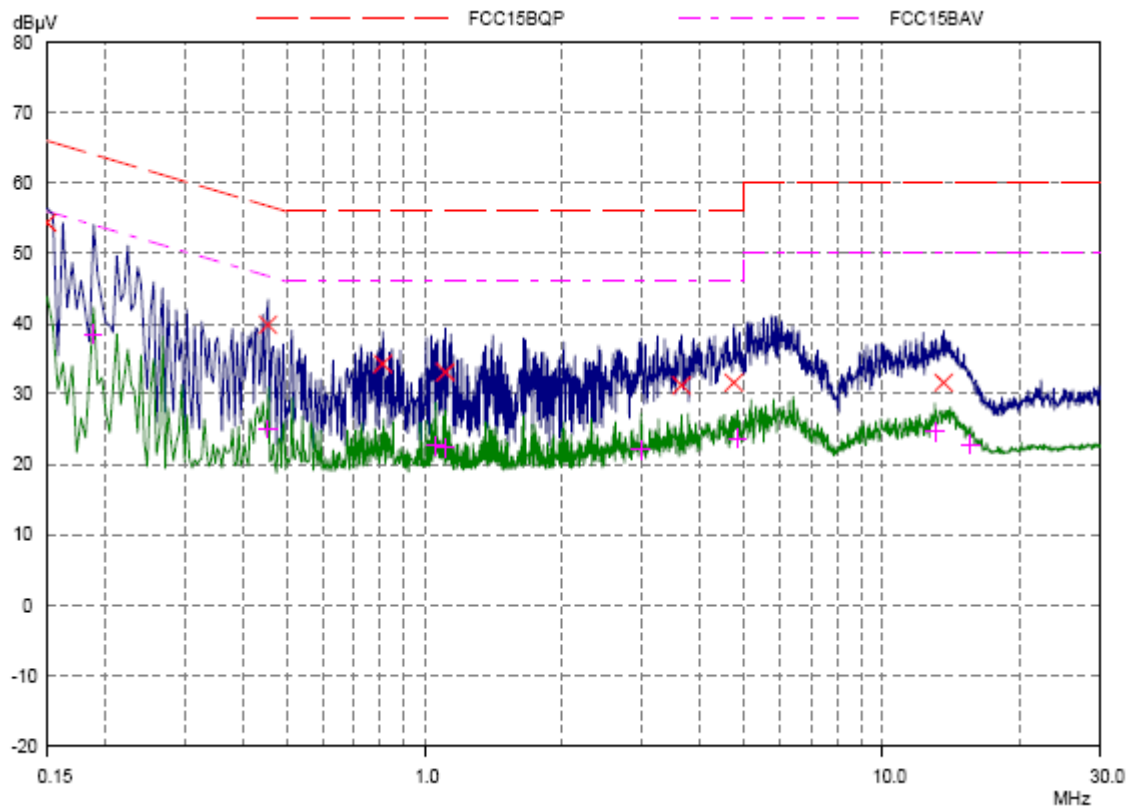
Note: Blue trace uses the peak detection Green trace uses the average detection
L line

Conducted Emission from 150 KHz to 30 MHz

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Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB	Phase -	PE -
0.15	54.38	66.00	11.64	N	gnd
0.45468	39.87	56.79	16.92	N	gnd
0.81015	34.25	56.00	21.75	N	gnd
1.11093	33.08	56.00	22.92	N	gnd
3.65	31.20	56.00	24.80	N	gnd
4.74765	31.64	56.00	24.36	N	gnd
13.64609	31.60	60.00	28.40	N	gnd

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB	Phase -	PE -
0.18906	38.50	54.08	15.58	N	gnd
0.45468	24.97	46.79	21.82	N	gnd
1.06015	22.62	46.00	23.38	N	gnd
1.11093	22.40	46.00	23.60	N	gnd
2.9664	22.07	46.00	23.93	N	gnd
4.8375	23.66	46.00	22.34	N	gnd
13.05625	24.65	50.00	25.35	N	gnd
15.63046	22.84	50.00	27.16	N	gnd

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

Conducted Emission from 150 KHz to 30 MHz

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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	2012-06-30	One year
02	Trilog Antenna	VULB 9163	SCHWARZB ECK	9163-201	2010-06-20	Three years
03	Signal Analyzer	FSV30	R&S	100815	2012-06-30	One year
04	Horn Antenna	HF907	R&S	100126	2012-07-01	Three years
05	EMI Test Receiver	ESCS30	R&S	100138	2013-01-15	One year
06	LISN	ENV216	R&S	101171	2010-04-16	Three years

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

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ANNEX A: The EUT Appearance and Test Setup

A.1 EUT Appearance



Picture 1 EUT

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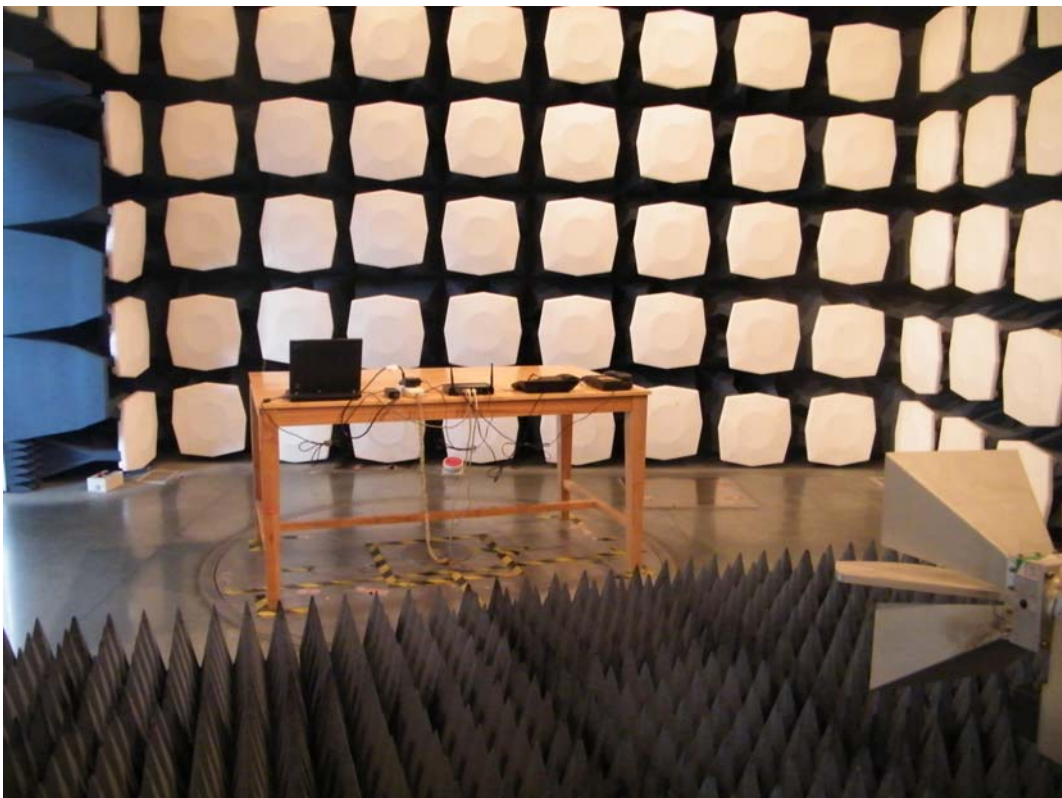
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A.2 Test Setup



a: Below 1GHz



b: Above 1GHz

Picture 2 Radiated Emission Test Setup

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a: Front View



b: Back View

Picture 3 Conducted Emission Test Setup