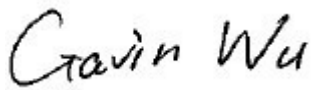




TEST REPORT

Report No.:	EM201200386-3	Application No.:	ZJ00018316
Client:	Harman International Industries, Incorporated		
Address:	8500 Balboa Blvd, Northridge, CA 91329, UNITED STATES		
Sample Description:	JBL Power Up Wireless Charging Speaker for Nokia		
Model:	MD-100W		
Test Location:	Guangzhou GRG Metrology and Test Co., Ltd.		
Test Specification:	FCC PART 18:2010		
Test Date:	2012-07-25 to 2012-09-20		
Issue Date:	2012-09-20		
Test Result:	Pass.		
Prepared By:	Reviewed By:	Approved By:	
Eddy Zong / Test Engineer	Jane Cao / Manager	Gavin Wu / Manager	
			
Date:2012-09-20	Date:2012-09-20	Date:2012-09-20	
Other Aspects:			
None			
Abbreviations: ok / P = passed; fail / F = failed; n.a. / N = not applicable			
The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT.			

GRG Metrology and Test Co., Ltd.

Address: 163, Pingyun Road, West of Huangpu Avenue, Guangzhou, Guangdong, P.R. China

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Email: emc@grg.net.cn

http://www.grgtest.com

Ver.:2.0/ 01. Jan. 2012

DIRECTIONS OF TEST

1. This station carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.
2. The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.
3. If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.

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1. TEST RESULT SUMMARY

FCC PART 18:2010			
Standard	Item	Limit / Severity	Result
FCC PART 18:2010	Conducted Emission	18.307	PASS
	Radiated Emission	18.305	PASS

2. GENERAL DESCRIPTION OF TUT

2.1 APPLICANT

Name: Harman International Industries, Incorporated
 Address: 8500 Balboa Blvd, Northridge, CA 91329, UNITED STATES

2.2 MANUFACTURER

Name: Harman International Industries, Incorporated
 Address: 8500 Balboa Blvd, Northridge, CA 91329, UNITED STATES

2.3 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: JBL PowerUp Wireless Charging Speaker for Nokia
 Model No.: MD-100W
 Trade Name: JBL, NOKIA
 Power supply: Input: AC 100-240V~ 50/60Hz 2A
 Output: DC 18V-2.5A
 Mode: Wireless Charging
 Wireless charging Operation frequency: 112kHz-205kHz
 Sample submitting way: Provided by customer Sampling
 Note: /

2.4 LOCAL SUPPORTIVE INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number
iphone	APPLE	A1303	/
PC	Lenovo	X220i	42863FC
Simulation load	/	/	/

3. LABORATORY AND ACCREDITATIONS

3.1 LABORATORY

The tests and measurements refer to this report were performed by EMC Laboratory of Guangzhou GRG Metrology and Test Co., Ltd.

Add. : 163 Pingyun Rd, West of Huangpu Ave, Guangzhou, 510656, P. R. China

Telephone: +86-20-38699959, 38699960, 38699961

Fax : +86-20-38695185

3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC Listed Lab No. 688188
China	CNAS NO.L0446
China	DILAC No.DL175
Canada	Registration No.:8355A-1

3.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement		Frequency	Uncertainty
Radiated Emission	Horizontal	30MHz~1000MHz	4.2dB
		1GHz~26.5GHz	4.2dB
	Vertical	9k~30MHz	3.2dB
		30MHz~1000MHz	4.4dB
		1GHz~26.5GHz	4.4dB
Conducted Emission		9kHz~30MHz	3.1 dB

This uncertainty represents an expanded uncertainty factor of $k=2$.

3.4 LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Radiated Emission				
Loop antenna	R&S	HFH2-Z2	881058/58	2014-05-26
EMI Receiver	R&S	ESU40	100106	2013-02-04
Conducted Emission				
EMI Receiver	R&S	ESU40	100106	2013-02-04
L.I.S.N	SCHWARZBECK	NSLK 8127	8127450	2013-08-05

4. EMISSION TEST

4.1 RADIATED ELECTROMAGNETIC DISTURBANCE MEASUREMENT

4.1.1 LIMITS

Frequency (MHz)	Quasi-peak(dB μ V/m)(distance 3m)
0.009 ~ 30	63.5

NOTE: (1) The test distance is 3m.

4.1.2 TEST PROCEDURE

Test procedures follow MP-5.

Procedure of Preliminary Test

Radiated emission tests shall be made with the receive or transmit antenna located at a horizontal distance of 3 m plus half of the maximum width of the EUT being tested, measured from the centre of the EUT. The tests shall be performed with the equipment configured as closely as possible to its typical, practical operation. Unless stated otherwise, cables and wiring shall be as specified by the manufacturer and the equipment shall be in its housing (or cabinet) with all covers and access panels in place. Any deviation from normal EUT operating conditions shall be included in the test report.

The EUT (on a non-conductive support structure, where applicable) shall be placed on a remotely operated turntable, to allow the EUT to be rotated. The height of the EUT above the ground plane shall be according to the following requirements.

- Table-top equipment is placed on a non-conductive set-up table with height $0.8\text{ m} \pm 0.01\text{ m}$; MP-5 specifies the method to determine the impact of the non-conductive set-up table on test results.
- Floor-standing equipment is placed on a non-conductive support, as specified in the applicable product standard. If there are no EUT height placement requirements in the product standard, the EUT shall be placed on a non-conductive support at a height of 5 cm to 15 cm above the ground plane.

Interface cables, loads, and devices should be connected to at least one of each type of the interface ports of the EUT and, where practical, each cable shall be terminated in a device typical for its actual use. Where there are multiple interface ports of the same type, a typical number of these devices shall be connected to devices or loads. It is sufficient to connect only one of the loads, provided that it can be shown, for example by preliminary testing, that the connection of further ports would not significantly increase the level of disturbance (that is, more than 2 dB) or significantly degrade the immunity level.

The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level. The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.

Above 30MHz: The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT 0 to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level. Record at least six highest emissions. Emission frequency, amplitude, antenna

position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and peak reading is presented. The test data of the worst-case condition(s) was recorded.

Below 30MHz: The Analyzer / Receiver scanned from 9kHz to 30MHz. Emissions were scanned, varying cable placement and positioning the antenna 2 meters above the ground plane, in both the X, Y, Z axis of vertical polarization, to maximize the emission reading level. Record at least six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and peak reading is presented. The test data of the worst-case condition(s) was recorded.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both polarizations, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

Below 150kHz, Set the spectrum analyzer: RBW =200Hz, VBW \geq RBW, Span = enough to catch the trace. Sweep = auto; Detector Function = Quasi-peak. Trace = Max hold.

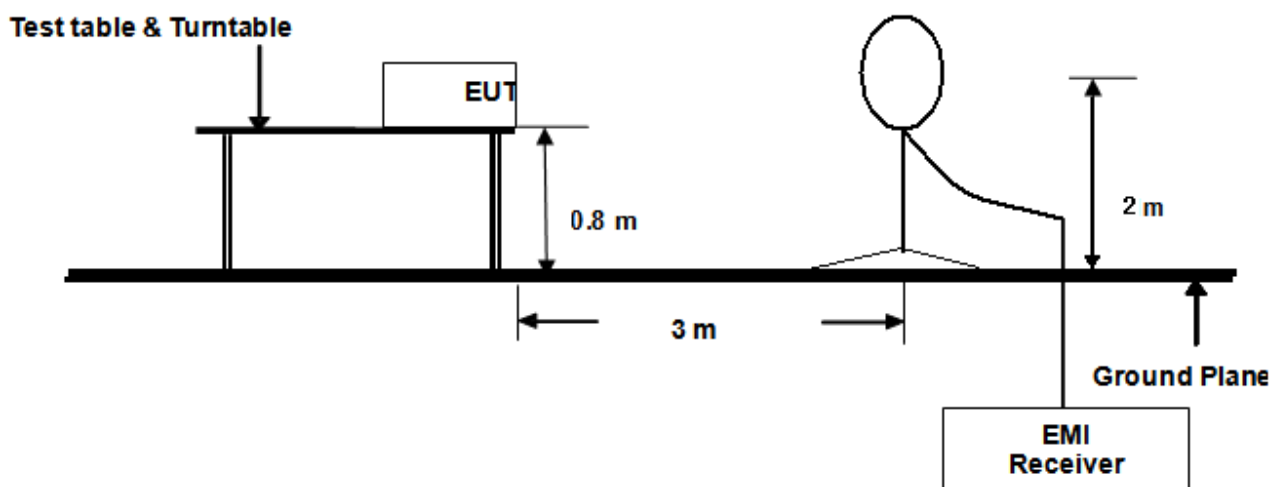
150kHz to 30MHz, Set the spectrum analyzer: RBW =9kHz, VBW \geq RBW, Span = enough to catch the trace. Sweep = auto; Detector Function = Quasi-peak. Trace = Max hold.

30MHz to 1GHz, Set the spectrum analyzer: RBW =100KHz, VBW \geq RBW, Span = enough to catch the trace. Sweep = auto; Detector Function = Quasi-peak. Trace = Max hold.

Above 1GHz, Set the spectrum analyzer: RBW =1MHz, VBW \geq RBW, Span = enough to catch the trace. Sweep = auto; Detector Function = Quasi-peak. Trace = Max, hold.

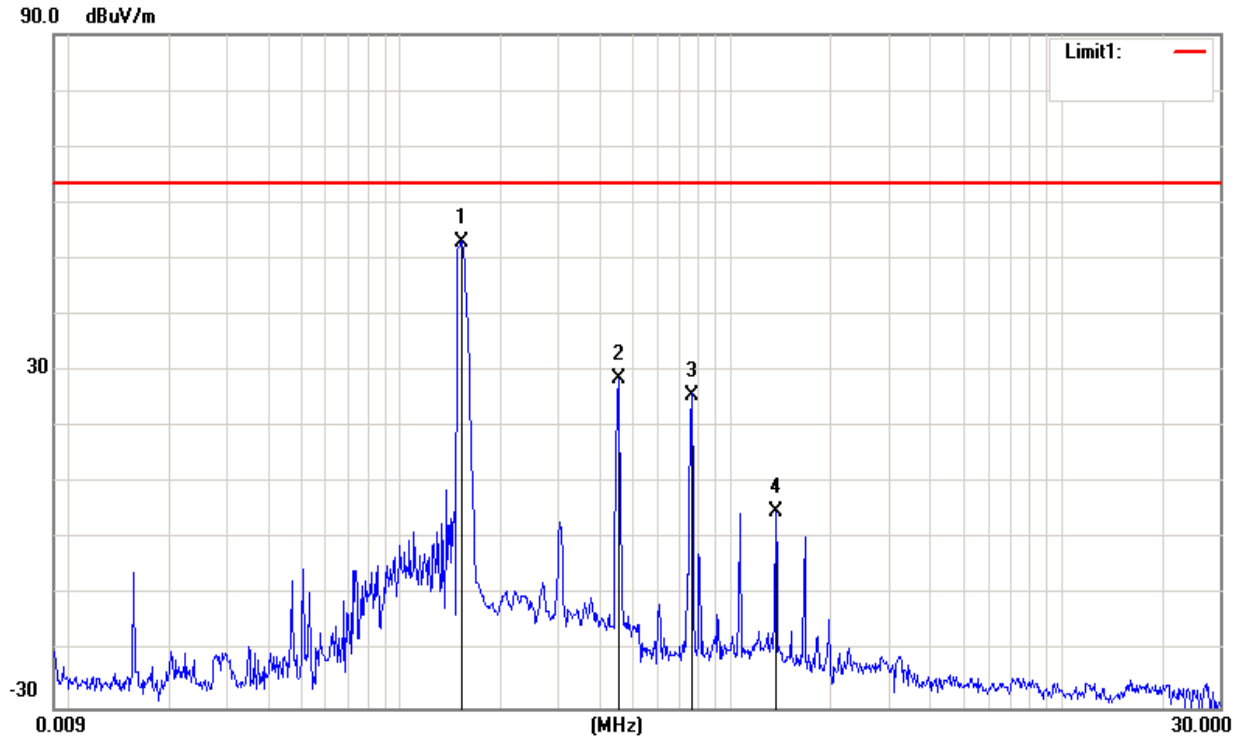
Pre-test the charging frequency at 112.91 kHz、153.90 kHz、204.17 kHz to find 153.90 kHz is worst case, so only record test data of 153.90 kHz.

4.1.3 TEST SETUP



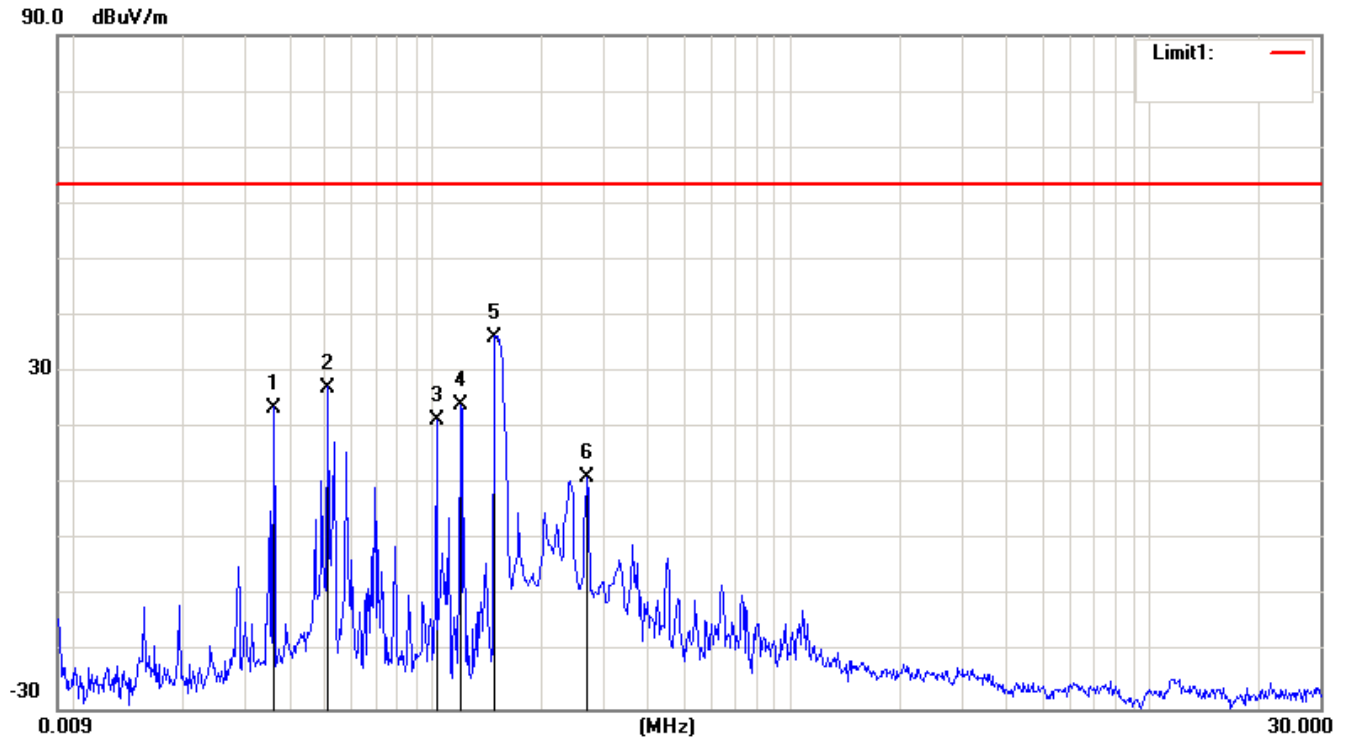
4.1.4 TEST RESULTS

Test Result:	Pass	Probe:	X
Standard:	(RE)FCC PART 18-QI 3m	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2012-8-16
Temp./Hum.(%RH):	23/55%RH	Time:	17:12:35
EUT:	JBL Power Up Wireless Charging Speaker for Nokia	Model:	MD-100W
Note:	Test in the worst charging frequency 153.90 kHz (load=23Ω)		



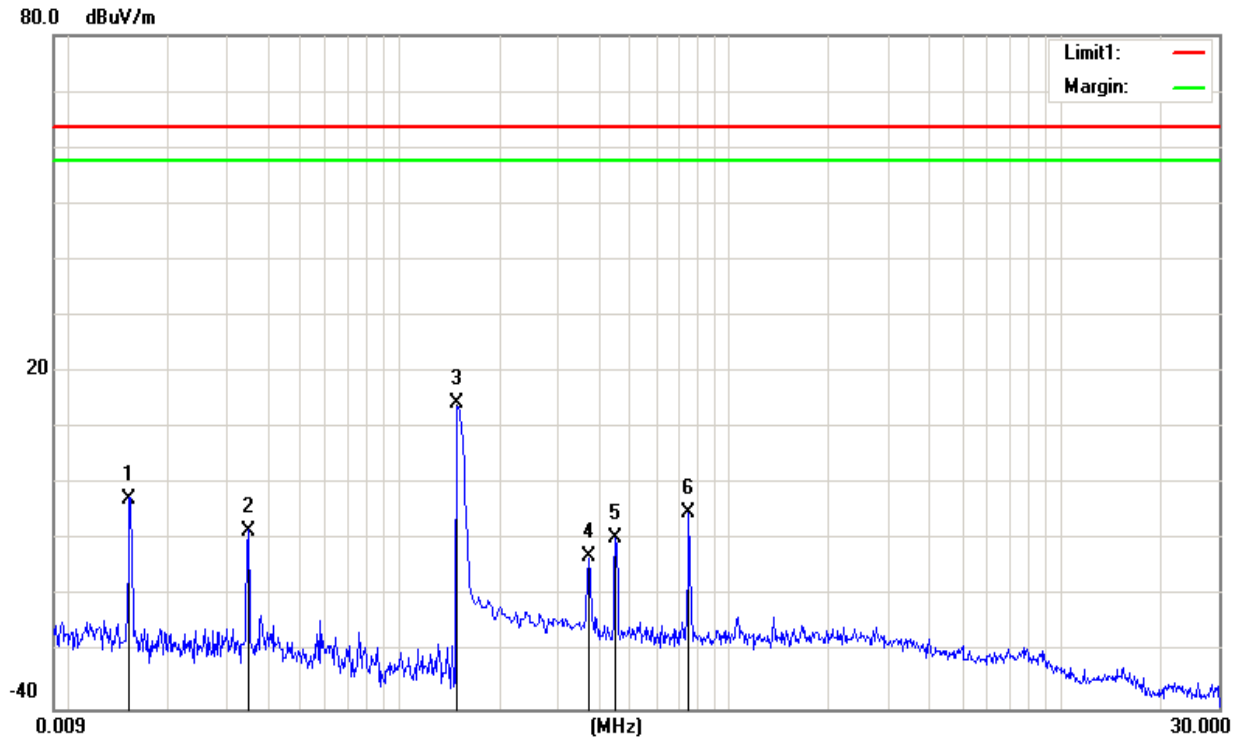
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1539	84.30	-31.20	53.10	63.50	-10.40	QP
2	0.4562	59.80	-31.10	28.70	63.50	-34.80	QP
3	0.7607	56.70	-31.10	25.60	63.50	-37.90	QP
4	1.3643	35.96	-31.06	4.90	63.50	-58.60	QP

Test Result:	Pass	Probe:	Y
Standard:	(RE)FCC PART 18-QI 3m	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2012-8-16
Temp./Hum.(%RH):	23/55%RH	Time:	17:12:35
EUT:	JBL PowerUp Wireless Charging Speaker for Nokia	Model:	MD-100W
Note:	Test in the worst charging frequency 153.90 kHz (load=25Ω)		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0360	54.65	-31.15	23.50	63.50	-40.00	QP
2	0.0511	58.45	-31.15	27.30	63.50	-36.20	QP
3	0.1026	52.55	-31.05	21.50	63.50	-42.00	QP
4	0.1197	55.20	-31.10	24.10	63.50	-39.40	QP
5	0.1490	67.39	-31.19	36.20	63.50	-27.30	QP
6	0.2694	42.40	-31.10	11.30	63.50	-52.20	QP

Test Result:	Pass	Probe:	Z
Standard:	(RE)FCC PART 18-QI 3m	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2012-8-16
Temp./Hum.(%RH):	23/55%RH	Time:	17:12:35
EUT:	JBL PowerUp Wireless Charging Speaker for Nokia	Model:	MD-100W
Note:	Test in the worst charging frequency 153.90 kHz (load=25Ω)		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0153	28.65	-31.15	-2.50	63.50	-66.00	QP
2	0.0349	22.73	-31.13	-8.40	63.50	-71.90	QP
3	0.1500	45.68	-31.08	14.60	63.50	-48.90	QP
4	0.3740	18.26	-31.06	-12.80	63.50	-76.30	QP
5	0.4500	21.65	-31.05	-9.40	63.50	-72.90	QP
6	0.7539	26.02	-31.02	-5.00	63.50	-68.50	QP

Note: X: Field strength which this device generates since the position of the charging coil and loop antenna differ by 0 degrees.

Y: Field strength which this device generates since the position of the charging coil and loop antenna differ by 90 degrees.

Z: Field strength which this device generates since the position of the charging coil and loop antenna differ by 180 degrees.

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS

Frequency range	Limits (dB μ V)	
	Quasi-peak	Average
150kHz ~ 0.5MHz	66~56	56~46
0.5 MHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50

NOTE: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases in line with the logarithm of the frequency in the range of 150kHz to 0.5MHz.

4.2.2 TEST PROCEDURES

Procedure of Preliminary Test

For measurement of the disturbance voltage the equipment under test (EUT) is connected to the power supply mains and any other extended network via one or more artificial network(s). An EUT, whether intended to be grounded or not, and which is to be used on a table is configured as follows:

- Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:

- 1) Place the EUT on a table of non-conducting material which is at least 80 cm high. Place the EUT so that it is 40 cm from the wall of the shielded room, or

- 2) place the EUT on a table of non-conducting material which is 40 cm high so that the bottom of the EUT is 40 cm above the ground plane;

- All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;

- The EUT are placed on the floor that one side of the housings is 40 cm from the vertical reference ground plane and other metallic parts;

- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between the ground plane and the table.

- I/O cables that are connected to a peripheral shall be bundled in the centre. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.

The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level. The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

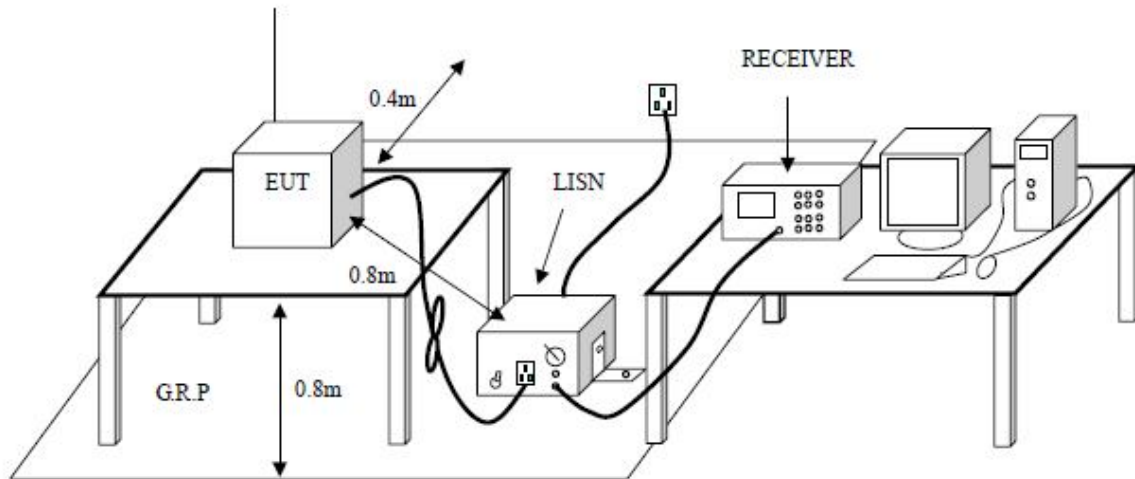
Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least

the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

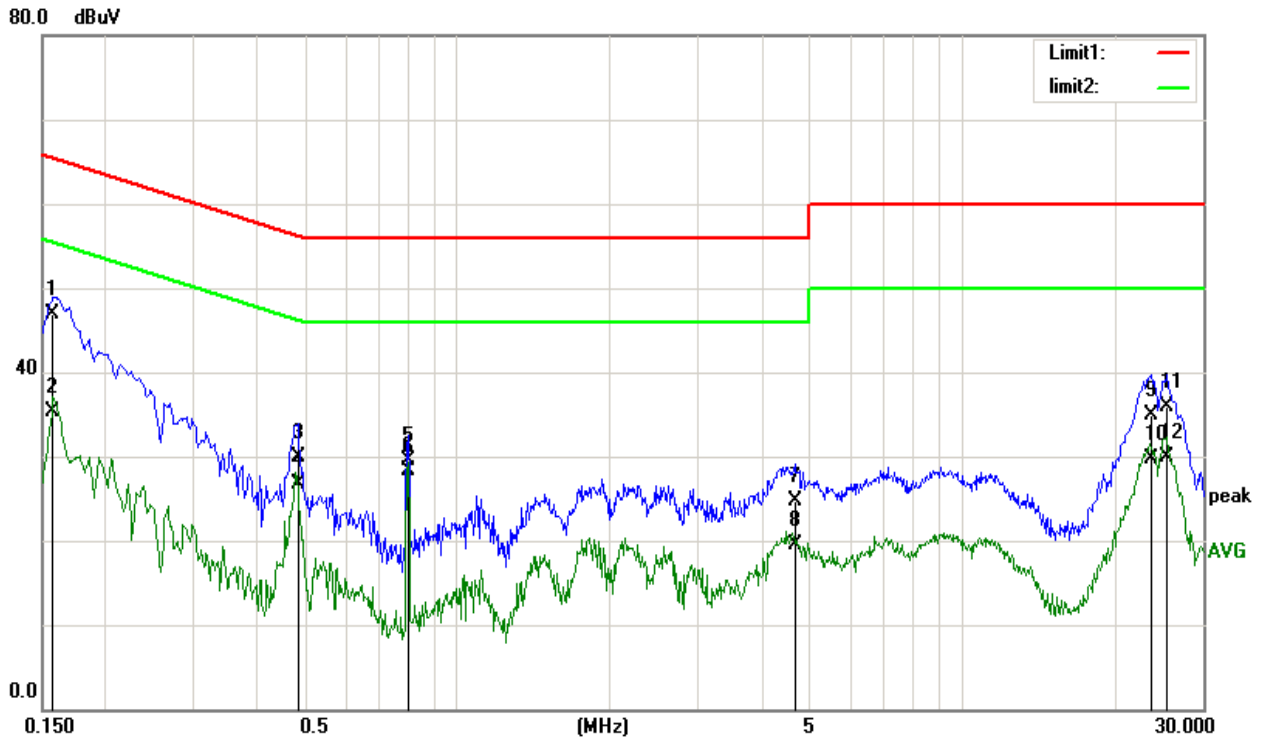
Pre-test the charging frequency at 112.91 kHz、153.90 kHz、204.17 kHz to find 153.90 kHz is worst case, so only record test data of 153.90 kHz.

4.2.3 TEST SETUP



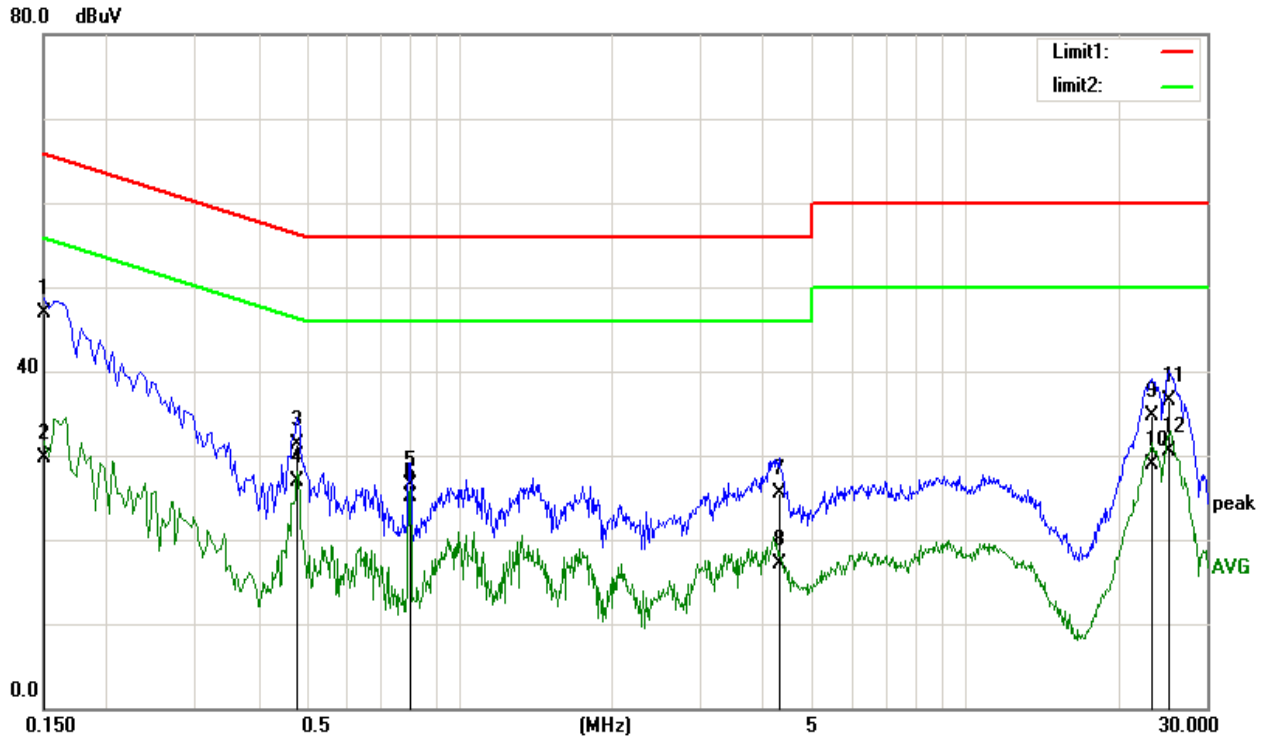
4.2.4 TEST RESULTS

Test Result:	Pass	Probe:	L
Standard:	(CE)FCC Part18_QP	Power Source:	AC 120V/60Hz
Test item:	Conduction Test	Date:	2012-7-27
Temp./Hum.(%RH):	23/55%RH	Time:	11:07:22
EUT:	JBL PowerUp Wireless Charging Speaker for Nokia	Model:	MD-100W
Note:	Test in the worst charging frequency 153.90kHz (load=23Ω)		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	35.09	11.81	46.90	65.56	-18.66	QP
2	0.1580	23.49	11.81	35.30	55.56	-20.26	AVG
3	0.4820	19.42	10.58	30.00	56.30	-26.30	QP
4	0.4820	16.22	10.58	26.80	46.30	-19.50	AVG
5	0.7980	19.19	10.41	29.60	56.00	-26.40	QP
6	0.7980	17.89	10.41	28.30	46.00	-17.70	AVG
7	4.6540	13.99	10.71	24.70	56.00	-31.30	QP
8	4.6540	8.89	10.71	19.60	46.00	-26.40	AVG
9	23.6420	23.80	11.10	34.90	60.00	-25.10	QP
10	23.6420	18.70	11.10	29.80	50.00	-20.20	AVG
11	25.4780	24.68	11.22	35.90	60.00	-24.10	QP
12	25.4780	18.68	11.22	29.90	50.00	-20.10	AVG

Test Result:	Pass	Probe:	N
Standard:	(CE)FCC Part18_QP	Power Source:	AC 120V/60Hz
Test item:	Conduction Test	Date:	2012-7-27
Temp./Hum.(%RH):	23/55%RH	Time:	11:18:45
EUT:	JBL PowerUp Wireless Charging Speaker for Nokia	Model:	MD-100W
Note:	Test in the worst charging frequency 153.90kHz (load=23Ω)		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1500	35.08	11.92	47.00	65.99	-18.99	QP
2	0.1500	17.78	11.92	29.70	55.99	-26.29	AVG
3	0.4780	20.81	10.59	31.40	56.37	-24.97	QP
4	0.4780	16.31	10.59	26.90	46.37	-19.47	AVG
5	0.7980	16.09	10.41	26.50	56.00	-29.50	QP
6	0.7980	14.69	10.41	25.10	46.00	-20.90	AVG
7	4.2780	14.89	10.71	25.60	56.00	-30.40	QP
8	4.2780	6.39	10.71	17.10	46.00	-28.90	AVG
9	23.3500	23.68	11.12	34.80	60.00	-25.20	QP
10	23.3500	17.88	11.12	29.00	50.00	-21.00	AVG
11	25.2580	25.32	11.18	36.50	60.00	-23.50	QP
12	25.2580	19.42	11.18	30.60	50.00	-19.40	AVG

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