

FCC CERTIFICATION TEST REPORT

FOR

Applicant	:	Harman International Industries, Incorporated
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Equipment under Test	:	Electrical Engine Sound Simulator
Model No.	:	JBL DRG
Trade Mark	:	JBL
FCC ID	:	APIJBLDRG
Manufacturer	:	Harman International Industries, Incorporated
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City,
Guangdong Province, China, 523808

Tel: +86-0769-22891499 [Http://www.dgddt.com](http://www.dgddt.com)

REPORT

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TEST REPORT DECLARE

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Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C section 15.239: 2015.

Test procedure used:

ANSI C63.10:2013, ANSI C63.4:2014.

We Declare:

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No:	DDT-R16Q1201-2E1		
Date of Test:	Dec. 01, 2016 ~ Dec. 08, 2016	Date of Report:	Dec. 11, 2016

Prepared By:

Damon Hu

Damon Hu/Engineer

Approved By:



Kevin Peng/EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

1. Summary of test results

Description of Test Item	Standard	Results
Field Strength of the Fundamental Signal	FCC Part 15: 15.239(b) ANSI C63.10:2013 ANSI C63.4:2014	PASS
20dB Bandwidth	FCC Part 15: 15.239(a) ANSI C63.10:2013 ANSI C63.4:2014	PASS
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.239(c) ANSI C63.10:2013 ANSI C63.4:2014	PASS
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.10:2013 ANSI C63.4:2014	N/A
Antenna requirement	FCC Part 15: 15.203 ANSI C63.10:2014	PASS

2. General test information

2.1. Description of EUT

EUT* Name	:	Electrical Engine Sound Simulator
Model Number	:	JBL DRG
EUT function description	:	Please reference user manual of this device
Power supply	:	DC 12V
Operation frequency	:	88.1MHz -107.9MHz
Modulation	:	FM
Channel Separation	:	100kHz
Antenna Type	:	Integrated antenna, maximum PK gain: 0dBi
Date of Receipt	:	Dec. 01, 2016
Sample Type	:	Series production

Note: EUT is the ab. of equipment under test.

2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number	Serial No.	Other
/	/	/	/	/

2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Serial No.	Other
Mobile phone	HUAWEI	EVA-TL00	/	/

2.4. Block diagram of EUT configuration for test



In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The Lowest channel	88.1MHz
The Middle channel	98MHz
The Highest channel	107.9MHz

FM channel as below table:

Operation Frequency each of Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	88.1MHz	48	92.8MHz	98	97.8MHz	148	102.8MHz
2	88.2MHz	49	92.9MHz	99	97.9MHz	149	102.9MHz
3	88.3MHz	50	93.0MHz	100	98.0MHz	150	103.0MHz
4	88.4MHz	51	93.1MHz	101	98.1MHz	151	103.1MHz
5	88.5MHz	52	93.2MHz	102	98.2MHz	152	103.2MHz
6	88.6MHz	53	93.3MHz	103	98.3MHz	153	103.3MHz
7	88.7MHz	54	93.4MHz	104	98.4MHz	154	103.4MHz
8	88.8MHz	55	93.5MHz	105	98.5MHz	155	103.5MHz
9	88.9MHz	56	93.6MHz	106	98.6MHz	156	103.6MHz
10	89.0MHz	57	93.7MHz	107	98.7MHz	157	103.7MHz
11	89.1MHz	58	93.8MHz	108	98.8MHz	158	103.8MHz
12	89.2MHz	59	93.9MHz	109	98.9MHz	159	103.9MHz
13	89.3MHz	60	94.0MHz	110	99.0MHz	160	104.0MHz
.....							
47	92.7MHz	97	97.7MHz	147	102.7MHz	199	107.9MHz

2.5. Deviations of test standard

No Deviation.

2.6. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25°C
Humidity range:	40-75%
Pressure range:	86-106kPa

2.7. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong

Province, China, 523808 Tel: +86-0769-22891499 <http://www.dgddt.com>

FCC Registration Number: 270092 Industry Canada site registration number: 10288A-1

2.8. Measurement uncertainty

Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power(Conducted)(Spectrum analyzer)	0.86dB(10 MHz $\leq$ f < 3.6GHz);
	1.38dB(3.6GHz $\leq$ f < 8GHz)
Peak Output Power(Conducted)(Power Sensor)	0.74dB
Dwell Time	0.6%
Conducted spurious emissions	0.86dB(10 MHz $\leq$ f < 3.6GHz);
	1.40dB(3.6GHz $\leq$ f < 8GHz)
	1.66dB(8GHz $\leq$ f < 22GHz)
Uncertainty for radio frequency (RBW<20KHz)	3×10^{-8}
Temperature	0.4°C
Humidity	2%
Uncertainty for Radiation Emission test (30MHz-1GHz)	4.70 dB (Antenna Polarize: V)
	4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1GHz-18GHz)	4.10dB(1-6GHz)
	4.40dB (6GHz-18Gz)
Uncertainty for Power line conduction emission test	3.32dB (150KHz-30MHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

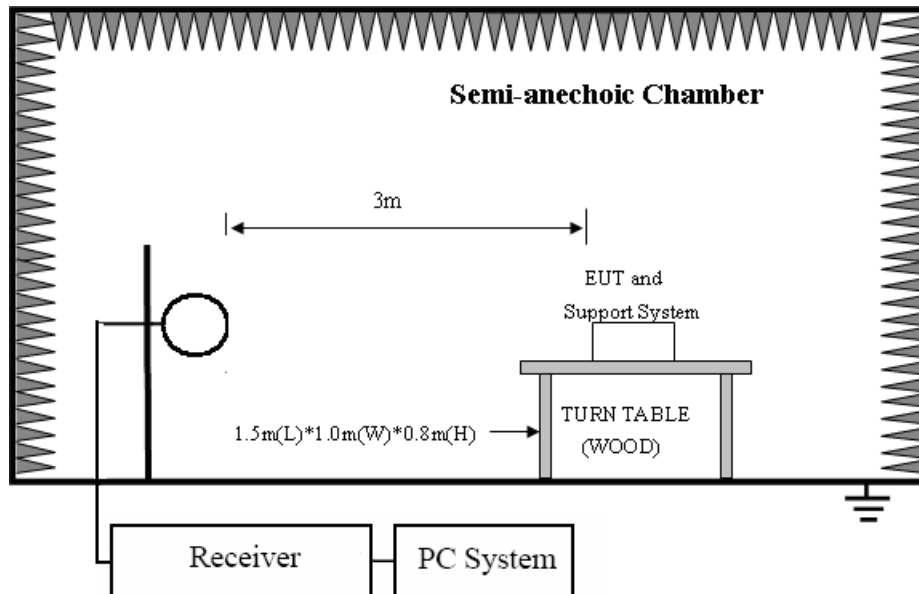
3. Equipment used during test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
RF Connected Test					
Spectrum analyzer	R&S	FSU26	1166.1660.26	Oct. 16, 2016	1 Year
Vector Signal Generator	Agilent	E8267D	MY52098743	Oct. 20, 2016	1 Year
Vector Signal Generator	Agilent	N5182A	MY48180737	Jul. 05, 2016	1 Year
Power Sensor	Agilent	U2021XA	MY55150010	Apr. 18, 2016	1 Year
Power Sensor	Agilent	U2021XA	MY55150011	Apr. 19, 2016	1 Year
DC Power Source	MATRIS	MPS-3005L-3	D813058W	Oct. 24, 2016	1 Year
Attenuator	Mini-Circuits	BW-S10W2	101109	Aug. 18, 2016	1 Year
RF Cable	Micable	C10-01-01-1	100309	Aug. 18, 2016	1 Year
Test Software	JS Tonscend	JS1120-2	Ver.2.5	N/A	N/A
USB Data acquisition	Agilent	U2531A	TW55043503	N/A	N/A
Auto control Unit	JS Tonscend	JS0806-2	158060010	N/A	N/A
Radiated Emission Test					
EMI Test Receiver	R&S	ESU8	100316	Oct. 16, 2016	1 Year
Spectrum analyzer	R&S	FSU26	1166.1660.26	Oct. 16, 2016	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	Oct. 27, 2016	1 Year
Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	Oct. 16, 2016	1 Year
Double Ridged Horn Antenna	R&S	HF907	100276	Oct. 12, 2016	1 Year
Pre-amplifier	A.H.	PAM-0118	360	Oct. 16, 2016	1 Year
RF Cable	HUBSER	CP-X2	W11.03	Oct. 16, 2016	1 Year
RF Cable	HUBSER	CP-X1	W12.02	Oct. 16, 2016	1 Year
MI Cable	HUBSER	C10-01-01-1M	1091629	Oct. 16, 2016	1 Year
Test software	Audix	E3	V 6.11111b	/	/
Power Line Conducted Emissions Test					
Test Receiver	R&S	ESU8	100316	Oct. 16, 2016	1 Year
LISN 1	R&S	ENV216	101109	Oct. 16, 2016	1 Year
LISN 2	R&S	ESH2-Z5	100309	Oct. 16, 2016	1 Year
Pulse Limiter	R&S	ESH3-Z2	101242	Oct. 16, 2016	1 Year
CE Cable 1	HUBSER	ESU8/RF2	W10.01	Oct. 16, 2016	1 Year
Test software	Audix	E3	V 6.11111b	/	/

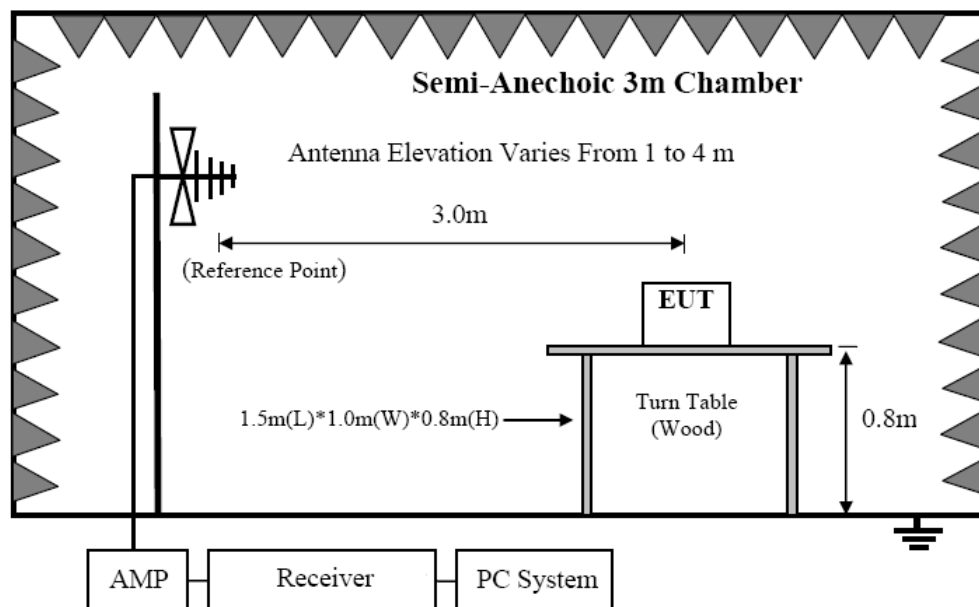
4. Radiated emission

4.1. Block diagram of test setup

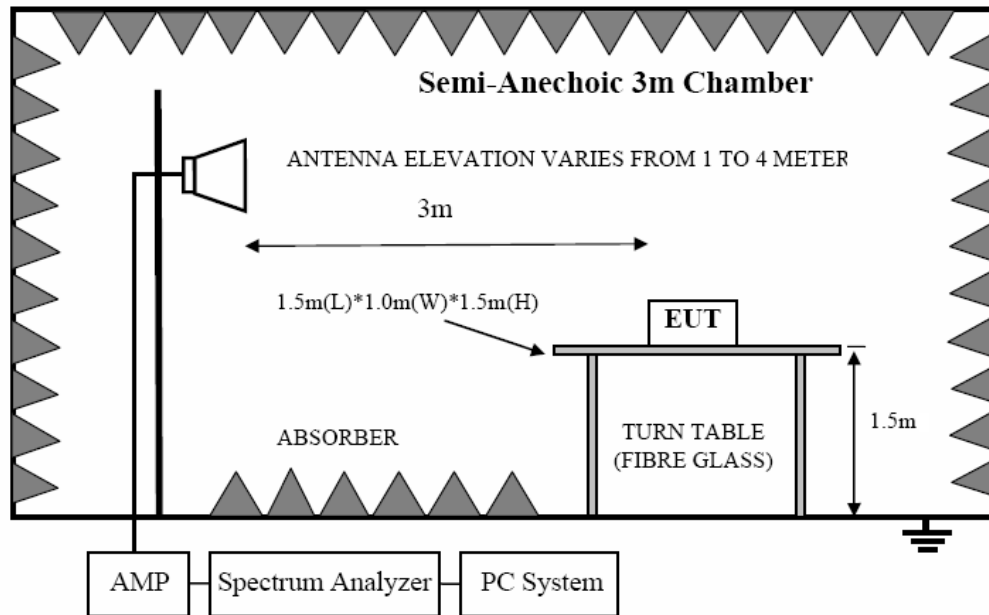
In 3m Anechoic Chamber Test Setup Diagram for 9KHz-30MHz



In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

4.2. Limit

4.2.1 FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

4.2.2 FCC 15.209 Limit.

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
0.009 ~ 0.490	300	2400/F(KHz)	67.6-20log(F)
0.490 ~ 1.705	30	24000/F(KHz)	87.6-20log(F)
1.705 ~ 30.0	30	30	29.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

4.2.3 FCC 15.239(b) Limit.

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
88 ~ 108	3	250	48.0(Average)
			68.0(Peak)

Note: (1)The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz and above 1000MHz.Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer then that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3\text{m}}(\text{dB}\mu\text{V}/\text{m}) = \text{Limit}_{30\text{m}}(\text{dB}\mu\text{V}/\text{m}) + 40\text{Log}(30\text{m}/3\text{m})$$

4.2.3 Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209 and 15.239, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

4.3. Test Procedure

(1) EUT was placed on a non-metallic table, 100 cm above the ground plane inside a semi-anechoic chamber.

(2) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used
9KHz-30MHz	Active Loop antenna
30MHz-1GHz	Trilog Broadband Antenna
1GHz-18GHz	Double Ridged Horn Antenna(1GHz-18GHz)
18GHz-40GHz	Horn Antenna(18GHz-40GHz)

According ANSI C63.10:2013 clause 6.4.4.2 and 6.5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum

response at each azimuth position around the EUT. And the loop antenna also be positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30MHz, the Trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9 KHz to 1GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m(Except loop antenna, it's fixed 1m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9 KHz to 1GHz (tenth harmonic of fundamental frequency) was investigated, the EUT works the highest frequency in 107.9MHz under the FM transmitting mode, therefore the test is performed up to 1GHz, and there is no obvious emissions were detected from 9 kHz to 30MHz, so below final test was performed with frequency range from 30MHz to 1GHz.

(4) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2013 on Radiated Emission test.

(5) The emissions from 9KHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz, for emissions from 9KHz-90KHz,110KHz-490KHz and above 1GHz were measured based on average detector, for emissions above 1GHz, peak emissions also be measured and need comply with Peak limit.

(6) The emissions from 9 KHz to 1GHz, QP or average values were measured with EMI receiver with below RBW.

Frequency band	RBW
9KHz-150KHz	200Hz
150KHz-30MHz	9KHz
30MHz-1GHz	120KHz

(7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RMS detector RBW 1MHz VBW 3MHz for Average measure(according ANSI C63.10:2013 clause 4.2.3.2.3 procedure for average measure).

(8) X axis, Y axis, Z axis are tested, and worse setup X axis is reported.

4.4. Test result

PASS. (See below detailed test result)

4.4.1 Field Strength of the Fundamental Signal

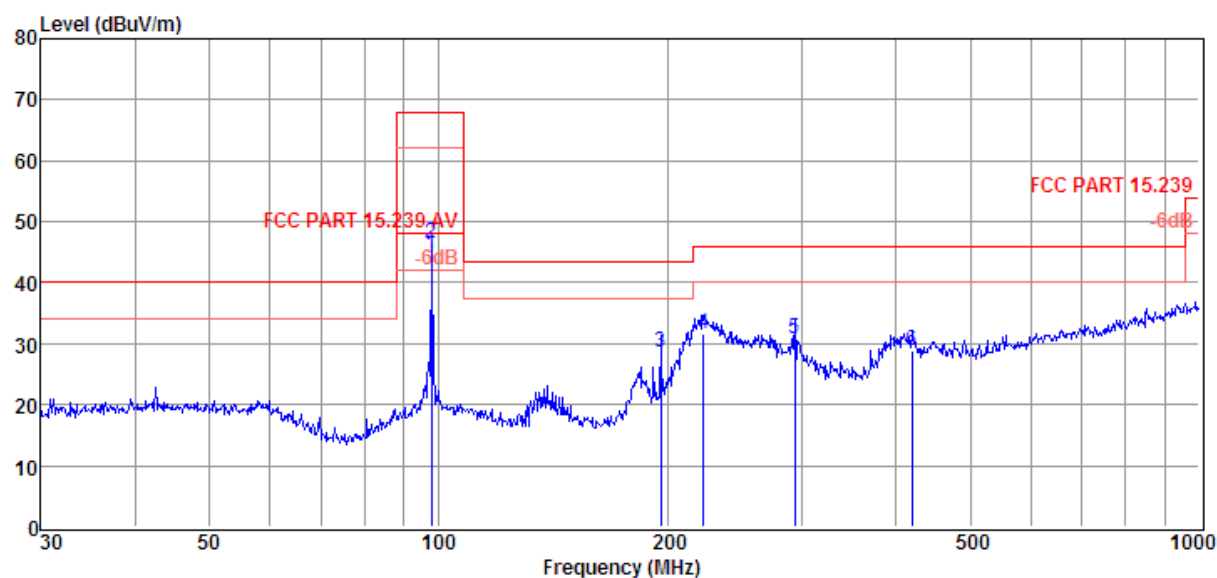
Freq.	Read Level	Antenna Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector	Polarization
(MHz)	(dB μ V)	(dB/m)	dB	(dB μ V/m)	(dB μ V/m)	(dB)		
88.10	27.99	10.07	4.21	42.27	48.00	-5.73	Average	HORIZONTAL
88.10	28.76	10.07	4.21	43.04	68.00	-24.96	Peak	HORIZONTAL
88.10	29.39	10.07	4.21	43.67	48.00	-4.33	Average	VERTICAL
88.10	29.65	10.07	4.21	43.93	68.00	-24.07	Peak	VERTICAL
98.00	28.29	11.84	4.28	44.41	48.00	-3.59	Average	VERTICAL
98.00	30.29	11.84	4.28	46.41	68.00	-21.59	Peak	VERTICAL
98.00	28.17	11.84	4.28	44.29	48.00	-3.71	Average	HORIZONTAL
98.00	31.17	11.84	4.28	47.29	68.00	-20.71	Peak	HORIZONTAL
107.90	26.00	11.25	4.35	41.60	48.00	-6.40	Average	VERTICAL
107.90	26.67	11.25	4.35	42.27	68.00	-25.73	Peak	VERTICAL
107.90	25.60	11.25	4.35	41.20	48.00	-6.80	Average	HORIZONTAL
107.90	26.08	11.25	4.35	41.68	68.00	-26.32	Peak	HORIZONTAL

4.4.2 Radiated Emissions

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber	Y:\2016 Report Data\16Q1201-2\RE.EM6
Test Date	: 2016-12-01	Tested By : Jerry
EUT	: Electrical Engine Sound Simulator	Model Number : JBL DRG
Power Supply	: DC 12V	Test Mode : FM(98MHz) mode
Condition	: Temp:24.5°C,Humi:55%, Press:100.1kPa	Antenna/Distance : 2016 VULB9163 1#/3m/VERTICAL
Memo	:	

Data: 44



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	98.000	28.29	11.84	4.28	44.41	48.00	-3.59	Average	VERTICAL
2	98.000	30.29	11.84	4.28	46.41	68.00	-21.59	Peak	VERTICAL
3	195.822	13.46	10.13	4.88	28.47	43.50	-15.03	QP	VERTICAL
4	222.950	15.20	11.42	5.01	31.63	46.00	-14.37	QP	VERTICAL
5	294.114	11.95	13.42	5.35	30.72	46.00	-15.28	QP	VERTICAL
6	419.108	6.85	16.26	5.87	28.98	46.00	-17.02	QP	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

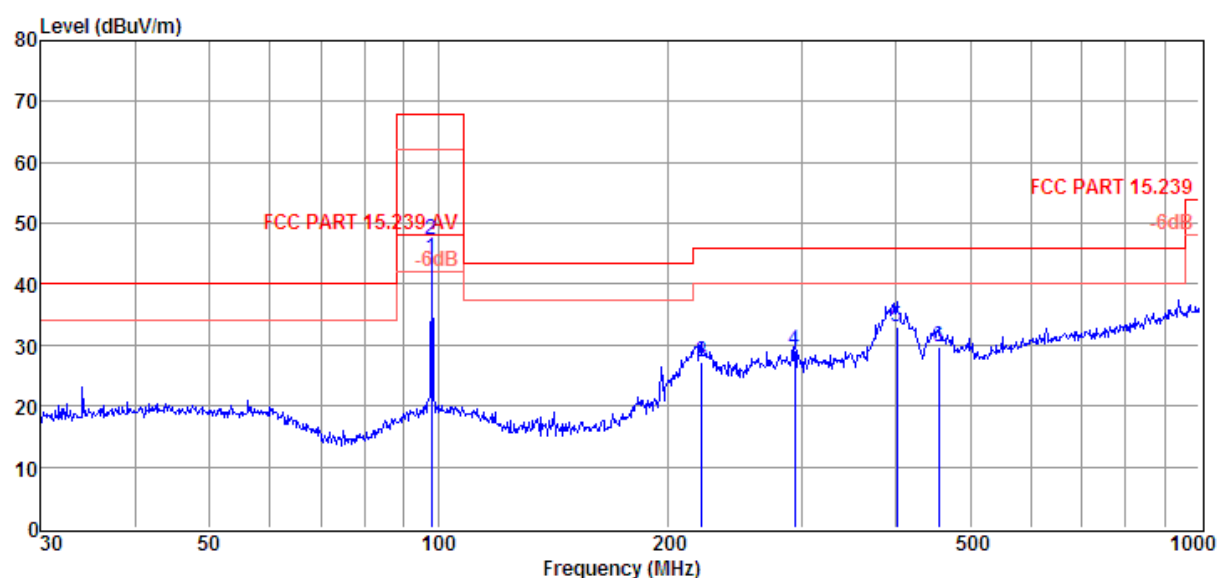
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **Y:\2016 Report Data\16Q1201-2\RE.EM6**
Test Date : 2016-12-01 **Tested By** : Jerry
EUT : Electrical Engine Sound Simulator **Model Number** : JBL DRG
Power Supply : DC 12V **Test Mode** : FM(98MHz) mode
Condition : Temp:24.5°C,Humi:55%,
Antenna/Distance : 2016 VULB9163 1#/3m/HORIZONTAL
Press:100.1kPa
Memo :

Data: 45



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	98.000	28.17	11.84	4.28	44.29	48.00	-3.71	Average	HORIZONTAL
2	98.000	31.17	11.84	4.28	47.29	68.00	-20.71	Peak	HORIZONTAL
3	222.170	10.72	11.39	5.01	27.12	46.00	-18.88	QP	HORIZONTAL
4	294.114	10.38	13.42	5.35	29.15	46.00	-16.85	QP	HORIZONTAL
5	400.432	11.47	15.71	5.80	32.98	46.00	-13.02	QP	HORIZONTAL
6	454.310	7.42	16.30	6.00	29.72	46.00	-16.28	QP	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

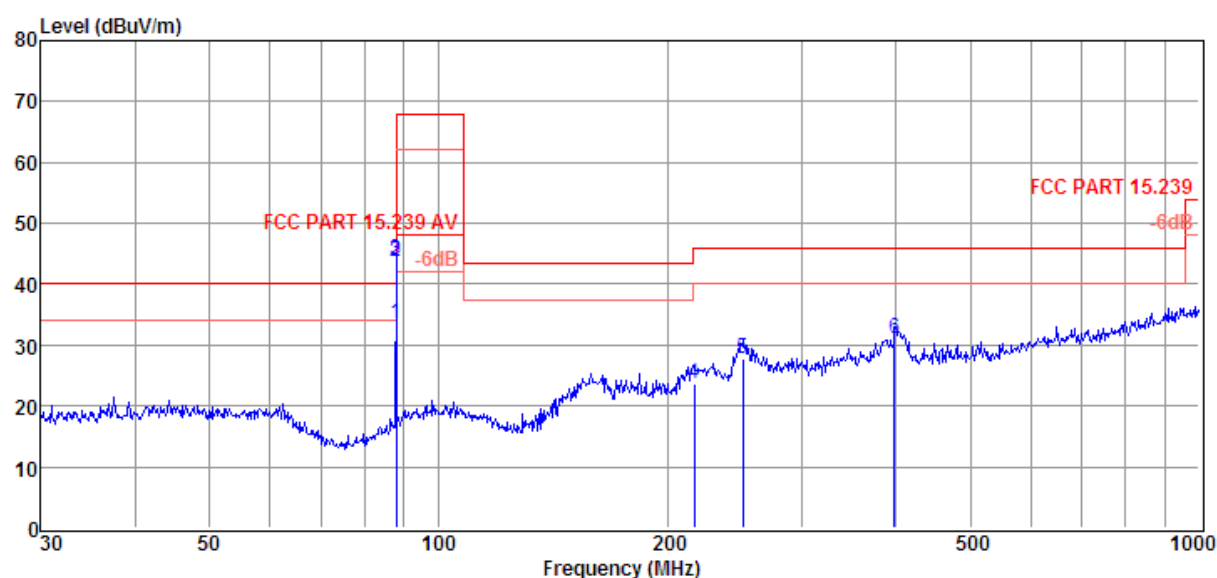
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber 1# **D:\2016 Report Data\16Q1201-2\RE.EM6**
Test Date : 2016-12-01 **Tested By** : Jerry
EUT : Electrical Engine Sound Simulator **Model Number** : JBL DRG
Power Supply : DC 12V **Test Mode** : FM(88.1MHz) mode
Condition : Temp:24.5°C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2016 VULB9163 1#/3m/VERTICAL
Memo :

Data: 98



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	88.00	19.40	10.03	4.21	33.64	40.00	-6.36	QP	VERTICAL
2	88.10	29.39	10.07	4.21	43.67	48.00	-4.33	Average	VERTICAL
3	88.10	29.65	10.07	4.21	43.93	68.00	-24.07	Peak	VERTICAL
4	216.78	7.57	11.11	4.98	23.66	46.00	-22.34	QP	VERTICAL
5	251.18	10.30	12.30	5.14	27.74	46.00	-18.26	QP	VERTICAL
6	397.63	9.50	15.65	5.79	30.94	46.00	-15.06	QP	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

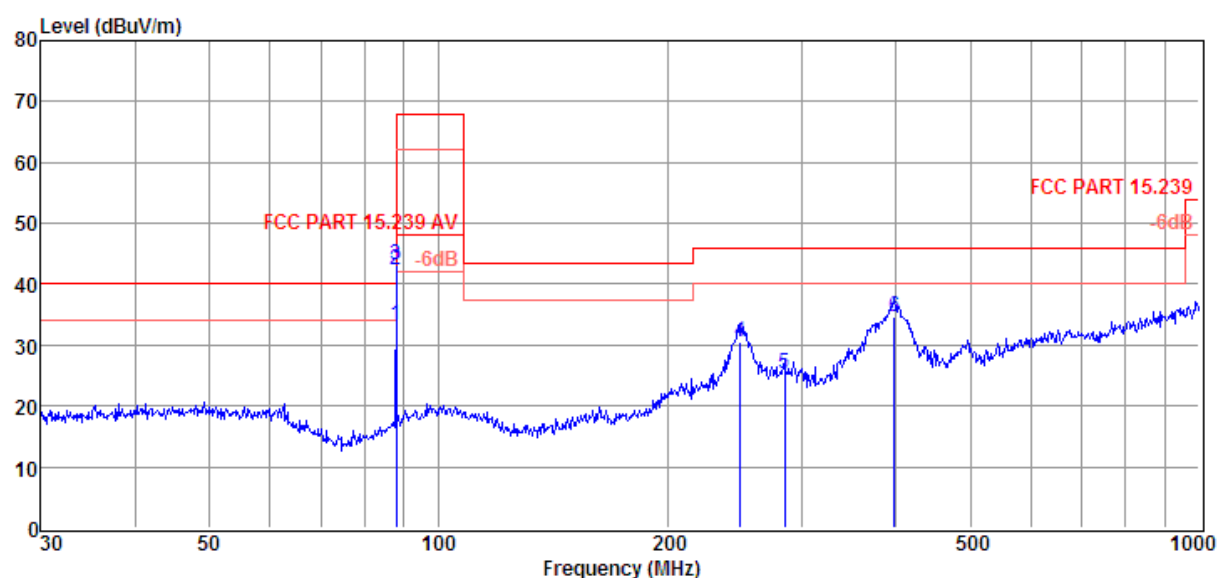
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber 1# **D:\2016 Report Data\16Q1201-2\RE.EM6**
Test Date : 2016-12-01 **Tested By** : Jerry
EUT : Electrical Engine Sound Simulator **Model Number** : JBL DRG
Power Supply : DC 12V **Test Mode** : FM(88.1MHz) mode
Condition : Temp:24.5°C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2016 VULB9163 1#/3m/HORIZONTAL
Memo :

Data: 99



Item (Mark)	Freq. (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	88.00	19.03	10.03	4.21	33.27	40.00	-6.73	QP	HORIZONTAL
2	88.10	27.99	10.07	4.21	42.27	48.00	-5.73	Average	HORIZONTAL
3	88.10	28.76	10.07	4.21	43.04	68.00	-24.96	Peak	HORIZONTAL
4	249.43	13.18	12.30	5.14	30.62	46.00	-15.38	QP	HORIZONTAL
5	284.98	7.15	12.90	5.31	25.36	46.00	-20.64	QP	HORIZONTAL
6	397.63	13.09	15.65	5.79	34.53	46.00	-11.47	QP	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

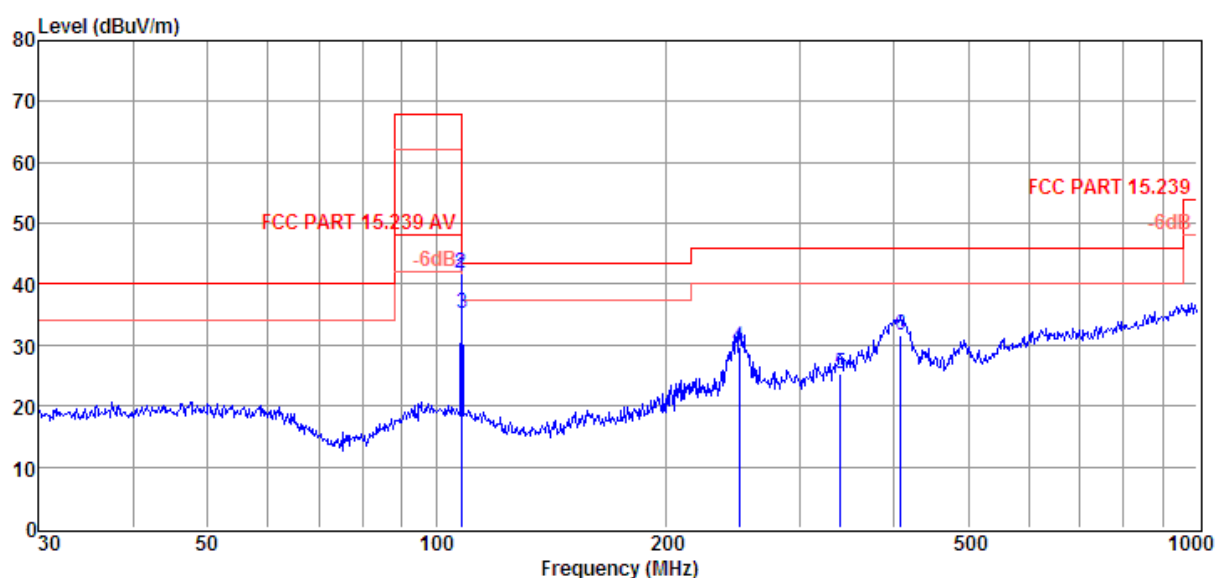
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber 1# **D:\2016 Report Data\16Q1201-2\RE.EM6**
Test Date : 2016-12-01 **Tested By** : Jerry
EUT : Electrical Engine Sound Simulator **Model Number** : JBL DRG
Power Supply : DC 12V **Test Mode** : FM(107.9MHz) mode
Condition : Temp:24.5°C,Humi:55%,
Press:100.1kPa **Antenna/Distance** : 2016 VULB9163 1#/3m/HORIZONTAL
Memo :

Data: 100



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	107.90	25.60	11.25	4.35	41.20	48.00	-6.80	Average	HORIZONTAL
2	107.90	26.08	11.25	4.35	41.68	68.00	-26.32	Peak	HORIZONTAL
3	108.00	19.61	11.24	4.35	35.20	43.50	-8.30	QP	HORIZONTAL
4	250.30	12.17	12.30	5.14	29.61	46.00	-16.39	QP	HORIZONTAL
5	339.59	5.16	14.67	5.55	25.38	46.00	-20.62	QP	HORIZONTAL
6	407.51	9.89	15.85	5.83	31.57	46.00	-14.43	QP	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

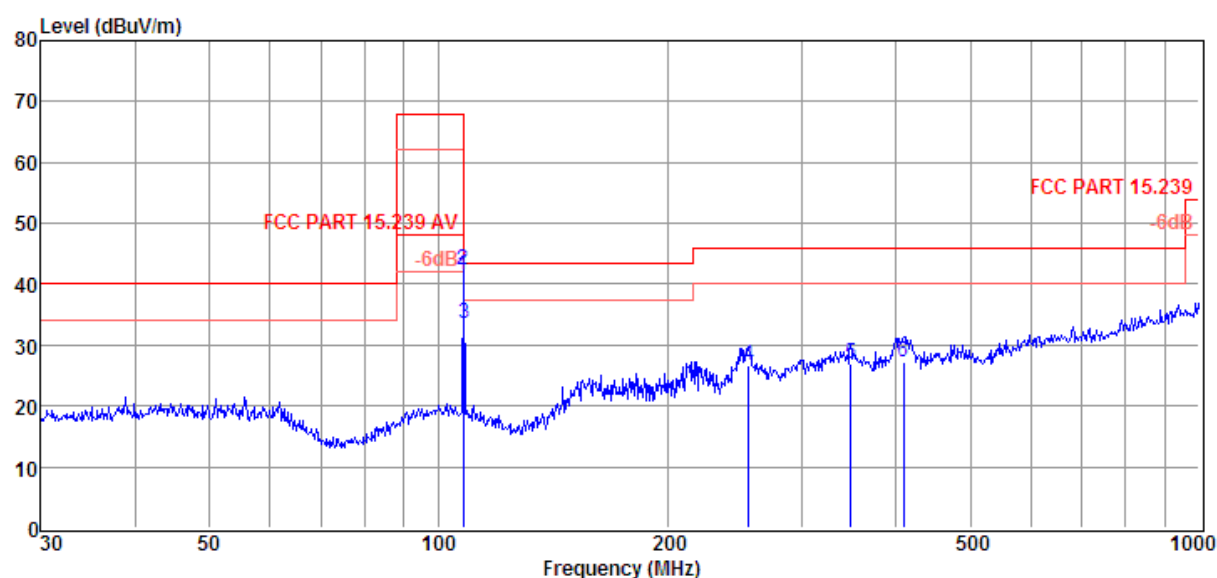
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber 1# **D:\2016 Report Data\16Q1201-2\RE.EM6**
Test Date : 2016-12-01 **Tested By** : Jerry
EUT : Electrical Engine Sound Simulator **Model Number** : JBL DRG
Power Supply : DC 12V **Test Mode** : FM(107.9MHz) mode
Condition : Temp:24.5°C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2016 VULB9163 1#/3m/VERTICAL
Memo :

Data: 101



Item (Mark)	Freq. (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	107.90	26.00	11.25	4.35	41.60	48.00	-6.40	Average	VERTICAL
2	107.90	26.67	11.25	4.35	42.27	68.00	-25.73	Peak	VERTICAL
3	108.00	18.01	11.24	4.35	33.60	43.50	-9.90	QP	VERTICAL
4	255.62	9.16	12.31	5.17	26.64	46.00	-19.36	QP	VERTICAL
5	348.03	6.55	14.70	5.58	26.83	46.00	-19.17	QP	VERTICAL
6	408.95	5.56	15.88	5.83	27.27	46.00	-18.73	QP	VERTICAL

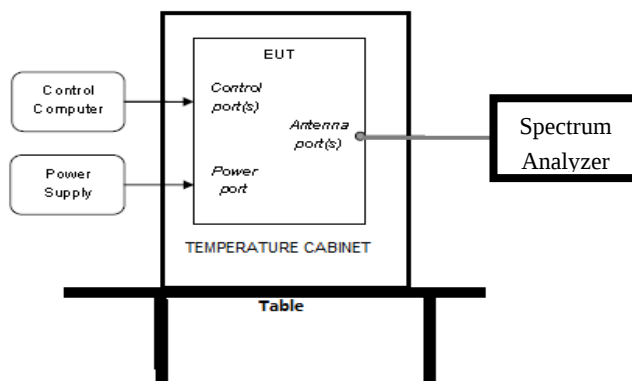
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

5. 20dB Bandwidth

5.1. Block diagram of test setup



5.2. Limits

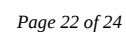
Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz

5.3. Test Procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) The bandwidth of the fundamental frequency was measured by spectrum analyzer with 10 kHz RBW and 30 kHz VBW, span 500kHz. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

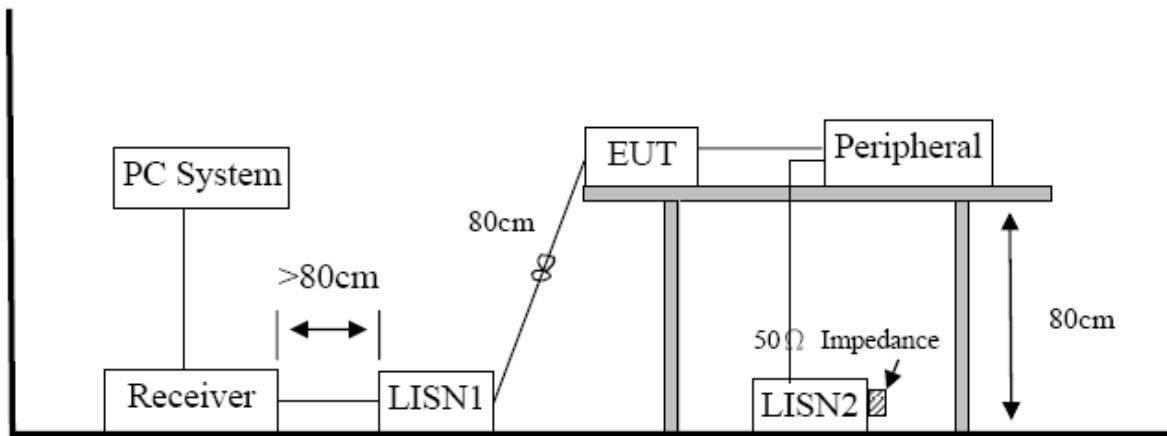
5.4. Test Result

Freq. (MHz)	20dB bandwidth Result (kHz)	Limit (kHz)	Conclusion
88.1	191.5	200	PASS
98.0	188.0	200	PASS
107.9	181.0	200	PASS



6. Power Line Conducted Emission

6.1. Block diagram of test setup



6.2. Power Line Conducted Emission Limits(Class B)

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

6.3. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 3 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the 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, Neutral and Line, 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.

The bandwidth of test receiver is set at 9 KHz.

6.4. Test Result

Test result: Not applicable

Note: This product is powered by DC source; according FCC regulation part15.107, there is no limit applies to DC power input product.

7. Antenna Requirements

7.1. Limit

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

7.2. Result

The antennas used for this product are integrated antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 0dBi.

END OF REPORT