



FCC PART 74H CERTIFICATION TEST REPORT

FOR

Applicant : ION AUDIO,LLC
Address : 200 SCENIC VIEW DRIVE, SUITE 201, RI02864, U.S.A.
Equipment under Test : Karaoke Pro
Model No : iPA46
Trade Mark : ION
FCC ID : Y4O-IPA46TX
Manufacturer : Integrity Electronic Co.,Ltd
Address : NO. 68, Huanghe Rd., Fenghuanggang, Tangxia
Township, Dongguan City, Guangdong Province, China

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

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Report No: DDT-RE120030

Issued Date: May.23, 2012

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TEST REPORT DECLARE

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Manufacturer : Integrity Electronic Co.,Ltd
Address : NO. 68, Huanghe Rd., Fenghuanggang, Tangxia Township, Dongguan City, Guangdong Province, China

Test Standard Used: FCC Rules and Regulations Part 74 Subpart H: 2010

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-RE120030

Date of Test: May 10 to May 15,2012

Date of Report: May.23,2012

Approved By:



Jamy Yu / 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

EMISSION			
Description of Test Item	Test Requirement	Standard Paragraph	Results
Carrier Output Power	FCC Part 2.1046	FCC Part 74.861 (e)(1)	PASS
Modulation Characteristics	FCC Part 2.1047	FCC Part 74.861 (e)(3)	PASS
Occupied Bandwidth	FCC Part 2.1049(c)	FCC Part 74.861 (e)(5)	PASS
Radiated Spurious Emissions	FCC Part 2.1053	FCC Part 74.861 (d)(3) ; FCC Part 74.861 (e)(6)	PASS
Frequencies Stability	FCC Part 2.1055	FCC Part 74.861 (e)(4)	PASS

2. General test information

2.1. Description of EUT

EUT* Name	:	Karaoke Pro
Model Number	:	iPA46
EUT function description	:	Please reference user manual of this device
Power supply	:	DC 3V from battery
FCC ID	:	Y4O-IPA46TX
FCC Operation frequency	:	174.8MHz
Modulation	:	FM
Antenna Type	:	Integrated Loop antenna, Gain: 0dBi
Date of Receipt	:	2012/05/06
Sample Type	:	Series production

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

2.2. Accessories of EUT

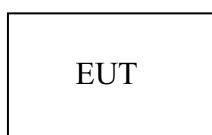
Description of Accessories	Manufacturer	Model number or Type	Other
/	/	/	/

2.3. Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	Other
/	/	/	/

2.4. Block diagram of EUT configuration for test

TX Mode:



Note: For all the test, new battery was used.

2.5. Test environment conditions

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

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

2.6. 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

2.7. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.40dB
Uncertainty for Radiation Emission test (150KHz-30MHz)	3.21dB
Uncertainty for Radiation Emission test (30MHz-1GHz)	2.78 dB (Polarize: V)
	3.20 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz to 25GHz)	2.08dB(Polarize: V)
	2.56dB (Polarize: H)
Uncertainty for radio frequency	1×10^{-9}
Uncertainty for conducted RF Power	0.65dB

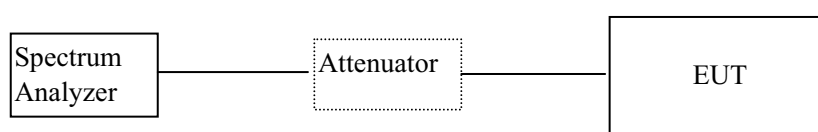
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

3. Carrier Output Power

3.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2011/11/23	1Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2011/11/23	1 Y
3	RF Cable	R&S	R01	10403	2011/11/23	1Y

3.2. Block diagram of test setup



3.3. Limits

According to Part 74.861(e)(1)(i), the output power shall not exceed 50mW(16.99dBm)

3.4. Test Procedure

The maximum carrier output power was measured with a spectrum analyzer connected to the antenna terminal though a 10dB attenuator, while EUT was operating in normal situation.

3.5. Test Result

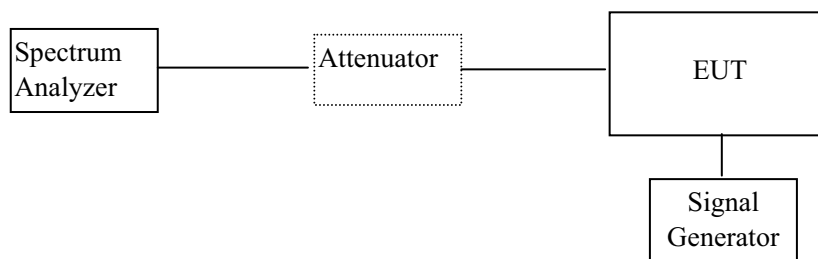
EUT: Karaoke Pro M/N: iPA46					
Mode	Freq (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Conclusion
Carrier Tx Mode	174.8MHz	6.90	16.99	10.09	PASS
Test Date : 2012/05/10			Test Engineer : Damon_Hu		

4. Modulation Characteristics

4.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2011/11/23	1Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2011/11/23	1 Y
3	RF Cable	R&S	R01	10403	2011/11/23	1Y
4	Signal Generator	R&S	SMBV100A	1407.6004K0 2	2011/11/23	1Y

4.2. Block diagram of test setup



4.3. Limit

According to Part2.1047 (a), for Voice Modulated communication Equipment, the frequency response of the audio modulation circuit over a range of 100Hz to 5000Hz shall be measured. A maximum deviation of $\pm 75\text{KHz}$ is permitted when frequency modulation is employed.

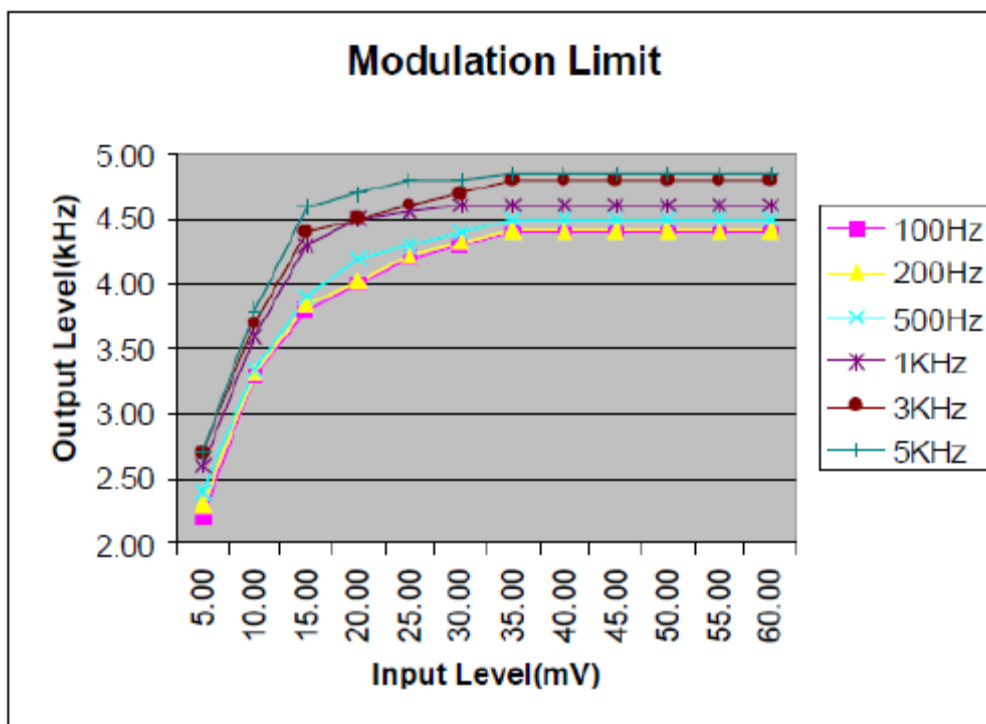
4.4. Test Procedure

- (1) Configure EUT and test equipments as clause 4.2
- (2) The RF output of the EUT was connected to the input of spectrum analyzer with FM deviation module though attenuator. An audio signal generator was connected to the audio input of microphone.
- (3) Adjust the audio input frequency to 100Hz and the input level from 0V to maximum permitted input voltage with recording each carrier frequency deviation responding to respective input level.
- (4) Repeat step (3) with changing the input frequency for 200, 500, 1000, 3000 and 5000 Hz in sequence.

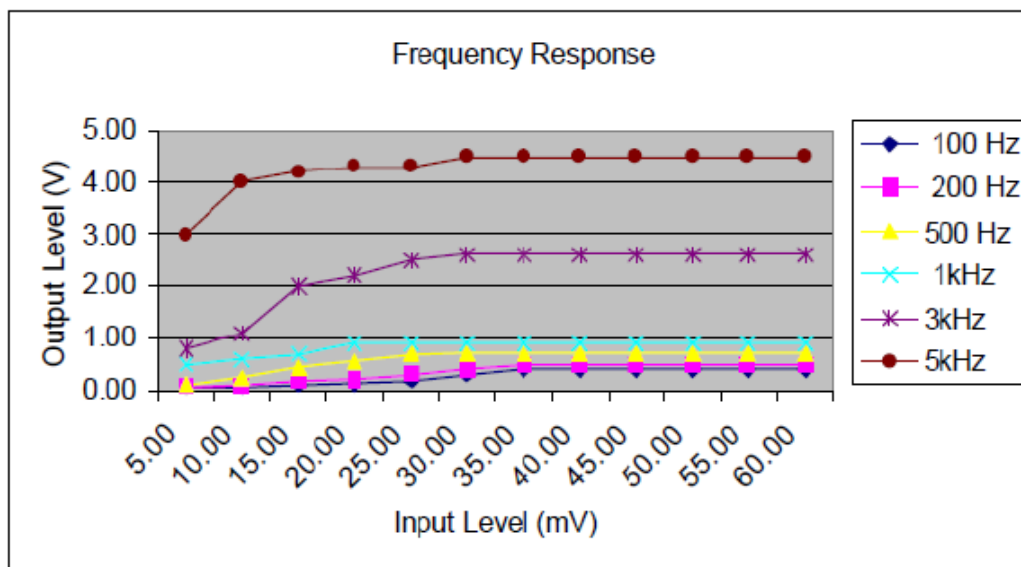
4.5. Test result

PASS. (See below detailed test result)

Modulation Limit



Frequency Response:

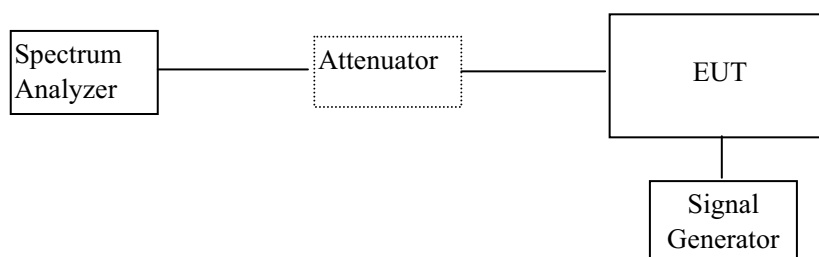


5. Occupied Bandwidth

5.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2011/11/23	1Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2011/11/23	1 Y
3	RF Cable	R&S	R01	10403	2011/11/23	1Y
4	Signal Generator	R&S	SMBV100A	1407.6004K0 2	2011/11/23	1Y

5.2. Block diagram of test setup



5.3. Limit

According to FCC 74.861(e)(5) , the frequency emission bandwidth shall not exceed 200KHz.

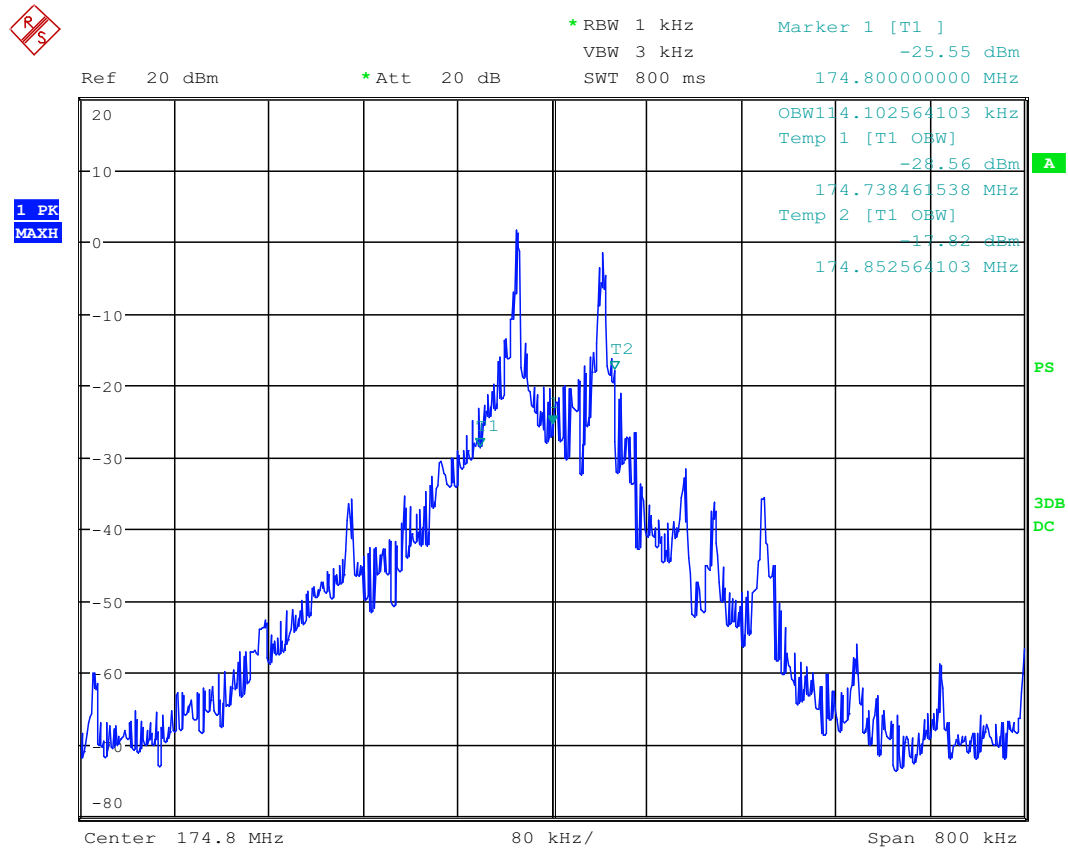
5.4. Test Procedure

1. Configure EUT and test equipments as clause 5.2
2. The RF output of the EUT was connected to the input of spectrum analyzer with FM deviation module though attenuator. An audio signal generator was connected to the audio input of microphone.
3. Input 2500Hz signal to the microphone, find the 50% rated deviation, add the level 16dB, test the 99% occupied bandwidth and record it.

3.1. Test result

EUT: Karaoke Pro M/N: iPA46					
Mode	Freq (MHz)	Result (KHz)	Limit (KHz)	Margin (KHz)	Conclusion
Carrier Tx Mode	174.8MHz	114.10	200	85.90	PASS
Test Date : 2012/05/10			Test Engineer : Damon_Hu		

Original test data for occupied bandwidth:

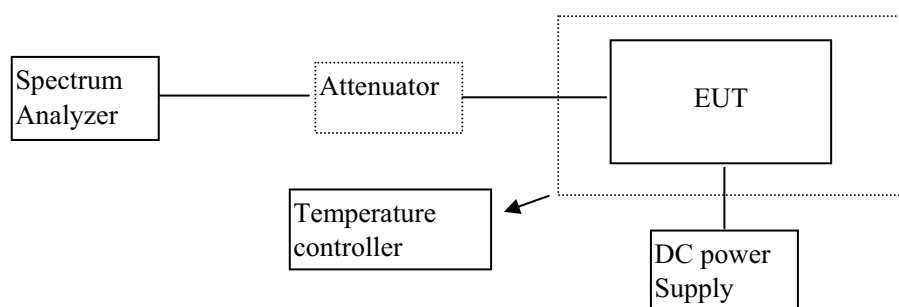


6. Frequency Stability

6.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2011/11/23	1Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2011/11/23	1 Y
3	RF Cable	R&S	R01	10403	2011/11/23	1Y
4	Signal Generator	R&S	SMBV100A	1407.6004K0 2	2011/11/23	1Y
6	Temperature controller	Terchy	MHQ	120	2011/11/23	1Year
7	DC power supply					

6.2. Block diagram of test setup



6.3. Limit

According to FCC 74.861(e) (4), the frequency tolerance of the transmitter shall be 0.005 percent.

6.4. Test Procedure

Frequency stability versus input voltage

1. Configure EUT and test equipments as clause 6.2.
2. Install new batteries in the EUT, set spectrum analyzer center frequency to the EUT operation frequency and set RBW to 30 KHz, VBW to 100 KHz and frequency span to 500KHz. Record this frequency to be a reference.
3. For battery operated only device, supply the EUT primary voltage at the battery operating end point which is specified by the manufacture (2.7V for this device) and record the frequency.

Frequency stability versus environmental temperature

1. Configure EUT and test equipments as clause 6.2.
2. Install new batteries in the EUT, set spectrum analyzer center frequency to the EUT operation frequency and set RBW to 30 KHz, VBW to 100 KHz and frequency span to 500KHz. Record this frequency to be a reference.
3. Set the temperature of temperature controller to 50°C. Allow sufficient time (approximately 30 min)

for the temperature of the controller to stabilize. While maintaining a constant temperature inside the controller, turn the EUT on and measure the EUT operating frequency.

4. Repeat step 2 with a 10°C decreased per stage until the lowest temperature -30°C is measured, record all measurement frequencies.

6.5. Test result

Frequency stability versus input voltage (2.7V)

EUT: Karaoke Pro M/N: iPA46					
Reference Freq (MHz)	Environment Temperature (°C)	Frequency Measured at end point voltage (MHz)	Frequency Tolerance (%)	Limit	Conclusion
174.801MHz	20	174.804	0.0017	0.005	PASA
Test Date : 2012/05/10			Test Engineer : Damon_Hu		

Frequency stability versus environmental temperature

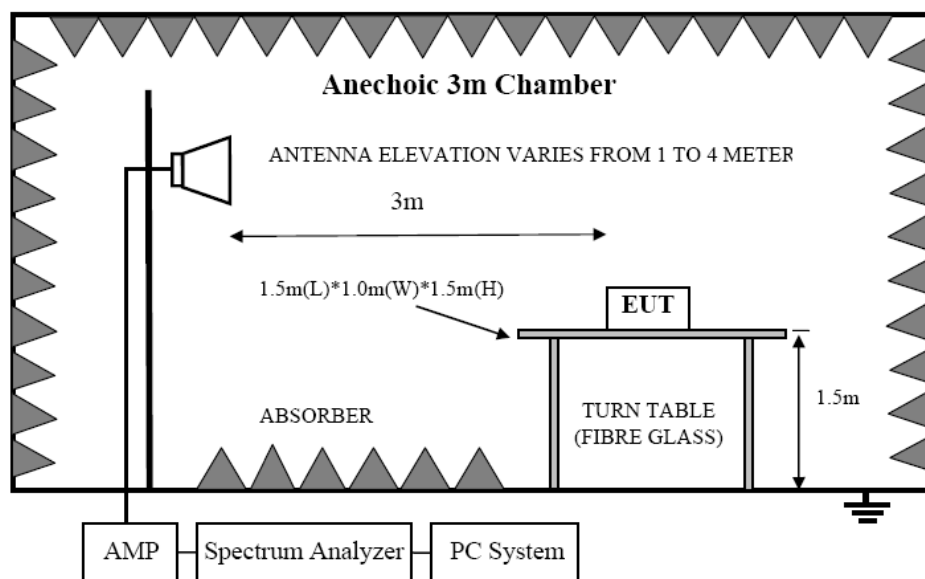
EUT: Karaoke Pro M/N: iPA46					
Reference Freq (MHz)	Environment Temperature (°C)	Frequency Measured at end point voltage (MHz)	Frequency Tolerance (%)	Limit	Conclusion
174.801MHz	50	174.802	0.0005	0.005	PASA
	40	174.796	0.0028	0.005	PASA
	30	174.800	0.0005	0.005	PASA
	20	174.798	0.0017	0.005	PASA
	10	174.803	0.0011	0.005	PASA
	0	174.799	0.0011	0.005	PASA
	-10	174.796	0.0028	0.005	PASA
	-20	174.797	0.0022	0.005	PASA
	-30	174.803	0.0011	0.005	PASA
Test Date : 2012/05/10			Test Engineer : Damon_Hu		

7. Radiated spurious emissions

7.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESU8	100316	2011/11/23	1Y
2	Spectrum analyzer	R&S	FSU26	1166.1660.26	2011/11/23	1Y
3	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2010/11/09	2 Y
4	Double Ridged Horn Antenna	R&S	HF907	100276	2011/01/16	2 Y
5	Double Ridged Horn Antenna	R&S	HF907	100546	2011/01/16	2 Y
6	Dipole antenna	Schwarzbeck	UHAP	1101	2011/01/16	2 Y
7	Dipole antenna	Schwarzbeck	VHAP	1118	2011/01/16	2 Y
8	Pre-Amplifier	R&S	SCU-01	10049	2011/11/23	1Y
9	Pre-amplifier	A.H.	PAM0-0118	360	2011/12/20	1Y
10	RF Cable	R&S	R01	10403	2011/11/23	1Y
11	RF Cable	R&S	R02	10512	2011/11/23	1Y
12	RF Cable	R&S	R01	10454	2011/11/23	1Y
13	RF Cable	R&S	R02	10343	2011/11/23	1Y
14	Signal Generator	R&S	SMBV100A	1407.6004K02	2011/11/23	1Y

7.2. Block diagram of test setup



7.3. Limit

According to Part 74.861 (e)(6), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:(i) on any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB. (ii) on any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB. (iii) on any frequency removed from the operating frequency by more than 250 percent up to and the authorized bandwidth shall be attenuated below the un-modulated carrier by at least $43 + 10 \text{ Log (output power in watts)dB}$.

7.4. Test Procedure

- (1) Configure EUT and assistant system according clause 7.2
- (2) All the spurious emissions from 30MHz to 2GHz at 3m distance was measured and recorded with receive antenna in both vertical and horizontal by rotating the turntable and by lowering the receive antenna.
- (3) In order to found maximum radiated spurious emissions, below test procedure of method was followed:
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
 - (c) Change power supply range from 85% to 115% of the rated supply voltage
 - (d) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produce highest emissions
- (4) When all the maximum emissions were tested and recorded, the EUT was then removed and replaced with a substitution antenna in the same position and the substitution antenna must have the same polarization with the receive antenna.
- (5) A signal which have the same frequency obtained in step 2 was fed to the substitution antenna ,the receive antenna was raised and lowered to obtain a maximum reading at the test receiver, the level of the signal generator was adjusted until the measured field strength level in step 2 was obtained, recorded the level of the signal generator.
- (6) Repeated step 4 with both antenna polarizations.
- (7) The spurious emissions are equal to the power supplied by the signal generator and corrections due to the gain of the substitution antenna and the cable loss between the signal generator and the substitution antenna.

7.5. Test Results

EUT: Karaoke Pro M/N: iPA46					
Test Mode: Carrier Tx Mode 174.8 MHz					
Frequency (MHz)	Antenna polarization	Result (dBm)	Limit (dBm)	Margin (dB)	Conclusion
349.61	H	-48.75	-13	35.75	PASS
524.40	H	-31.41	-13	18.41	PASS
612.00	H	-43.83	-13	30.83	PASS
699.20	H	-42.72	-13	29.72	PASS
874.87	H	-46.72	-13	33.72	PASS
1048.00	H	-38.08	-13	25.08	PASS
1136.00	H	-43.60	-13	30.60	PASS
1311.00	H	-48.39	-13	35.39	PASS
1486.00	H	-41.49	-13	28.49	PASS
350.10	V	-29.55	-13	16.55	PASS
524.70	V	-23.99	-13	10.99	PASS
699.30	V	-26.39	-13	13.39	PASS
874.87	V	-25.94	-13	12.94	PASS
1048.00	V	-38.08	-13	25.08	PASS
1136.00	V	-43.60	-13	30.60	PASS
1311.00	V	-48.39	-13	35.39	PASS
1486.00	V	-41.49	-13	28.49	PASS