



FCC RADIO TEST REPORT

FCC ID:Y4O-ENVOI

Product : Portable AC/Battery-Powered Speaker System

Trade Name : DENON PROFESSIONAL

Model Name : Envoi

Serial Model : N/A

Report No. : NTEK-2015NT0508601F1

Prepared for

INMUSIC BRANDS INC

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Prepared by

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TEST RESULT CERTIFICATION

Applicant's name INMUSIC BRANDS INC

Address 200 Scenic View Drive, Suite 201 CUMBERLAND, Rhode Island 02864, United States

Manufacture's Name... Ningbo Tonwel Audio Co.,LTD

Address No.500 Qihang Road Zhanqi Town Yingzhou Ningbo China

Product description

Product name..... Portable AC/Battery-Powered Speaker System

Model and/or type Envoi
reference

Serial Model N/A

Standards FCC CFR47 Part 74

Test procedure TIA/EIA-603C

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests.....: 09 May 2015~16 Jun. 2015

Date of Issue.....: 16 Jun. 2015

Test Result.....: **Pass**

Testing Engineer : Kyle Xu
(Kyle Xu)

Technical Manager : Brown Lu
(Brown Lu)

Authorized Signatory : Bill Yao
(Bill Yao)

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC CFR47 Part 74			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
74.861(e)(1)(ii)	RF Output Power	PASS	
2.1047(a)	Modulation Characteristics	PASS	
2.1049(c)(1)	Occupied Bandwidth	PASS	
2.1053 & 74.861(e)(6)	Radiated Emissions	PASS	
2.1051	Spurious emissions at antenna terminals	PASS	
2.1055(a)(1)	Frequencies Stability	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

1.1 TEST FACILITY

NTEK Testing Technology Co., Ltd

Add.:1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.

FCC Registration No.:238937; IC Registration No.:9270A-1

CNAS Registration No.:L5516

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 % .

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Portable AC/Battery-Powered Speaker System											
Trade Name	DENON PROFESSIONAL											
Model Name	Envoi											
Serial Model	N/A											
Model Difference	N/A											
Product Description	<p>The EUT is a Portable AC/Battery-Powered Speaker System</p> <table border="1"> <tr> <td>Operation Frequency:</td> <td>584.4 MHz</td> </tr> <tr> <td>Modulation Type:</td> <td>FM</td> </tr> <tr> <td>Number Of Channel</td> <td>1CH</td> </tr> <tr> <td>Antenna Designation:</td> <td>Please see Note 3.</td> </tr> <tr> <td>Antenna Gain (dBi)</td> <td>1.0dBi</td> </tr> </table>		Operation Frequency:	584.4 MHz	Modulation Type:	FM	Number Of Channel	1CH	Antenna Designation:	Please see Note 3.	Antenna Gain (dBi)	1.0dBi
Operation Frequency:	584.4 MHz											
Modulation Type:	FM											
Number Of Channel	1CH											
Antenna Designation:	Please see Note 3.											
Antenna Gain (dBi)	1.0dBi											
Channel List	Please refer to the Note 2.											
Ratings	DC 3.0V											
Adapter	N/A											
Battery	DC 1.5V*2 cell LR6											
Connecting I/O Port(s)	Please refer to the User's Manual											

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel	Frequency (MHz)
00	584.4

3.

Table for Filed Antenna

Ant .	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	PCB Antenna	N/A	1.0	Antenna

2.2 DESCRIPTION OF TEST MODES

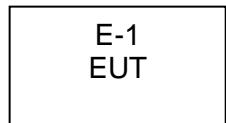
To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	CH00

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH00

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	Portable AC/Battery-Powered Speaker System	DENON PROFESSIONAL	Envoi	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2014.07.06	2015.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2015.06.07	2016.06.06	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2014.07.06	2015.07.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2015.06.07	2016.06.06	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2015.06.07	2016.06.06	1 year
6	Horn Antenna	EM	EM-AH-10180	2011071402	2014.07.06	2015.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2014.07.06	2015.07.05	1 year
8	Amplifier	EM	EM-30180	060538	2014.12.22	2015.12.21	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2015.06.08	2016.06.07	1 year
10	Power Meter	R&S	NRVS	100696	2014.07.06	2015.07.05	1 year
11	Power Sensor	R&S	URV5-Z4	0395.1619.05	2014.07.06	2015.07.05	1 year
12	Modulation Analyzer	HP	8920B	-	2014.07.06	2015.07.05	1 year

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2015.06.06	2016.06.05	1 year
2	LISN	R&S	ENV216	101313	2014.08.24	2015.08.23	1 year
3	LISN	EMCO	3816/2	00042990	2014.08.24	2015.08.23	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2015.06.07	2016.06.06	1 year
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	2015.06.07	2016.06.06	1 year
6	Absorbing clamp	R&S	MOS-21	100423	2015.06.08	2016.06.07	1 year

1	Attenuation	MCE	24-10-34	BN9258	2015.06.08	2016.06.07	1 year
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3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

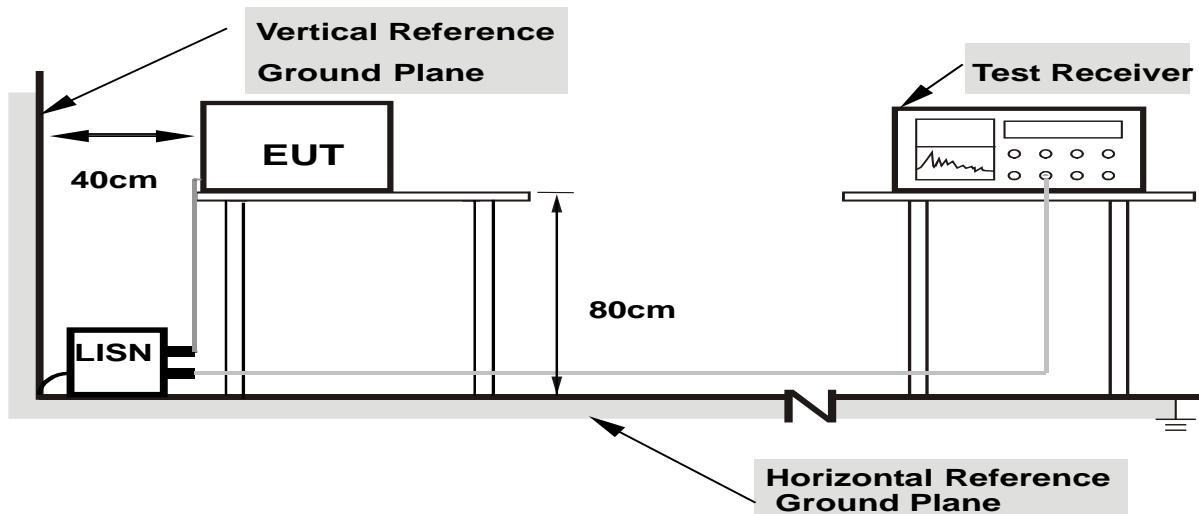
3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note:

1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.1.6 TEST RESULTS

EUT :	Portable AC/Battery-Powered Speaker System	Model Name. :	Envoi
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	N/A
Test Voltage :	N/A	Test Mode :	N/A

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

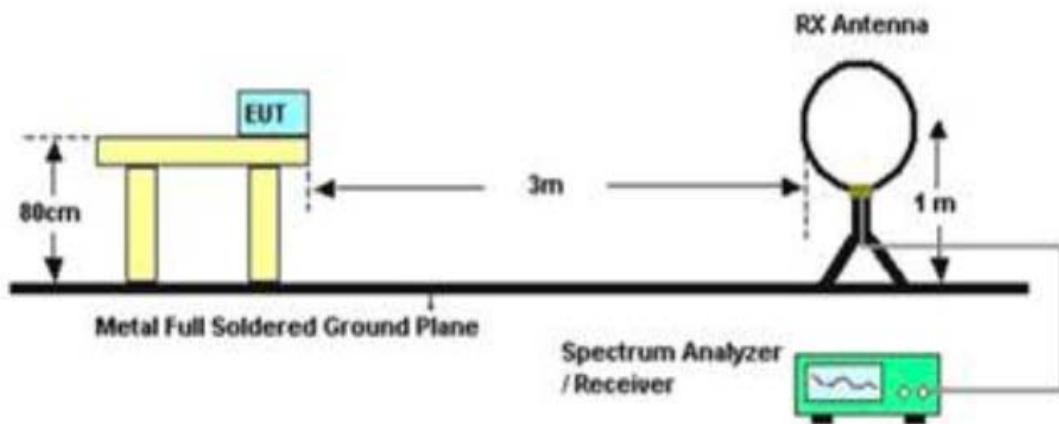
Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Peak	1 MHz	10 Hz

3.2.3 DEVIATION FROM TEST STANDARD

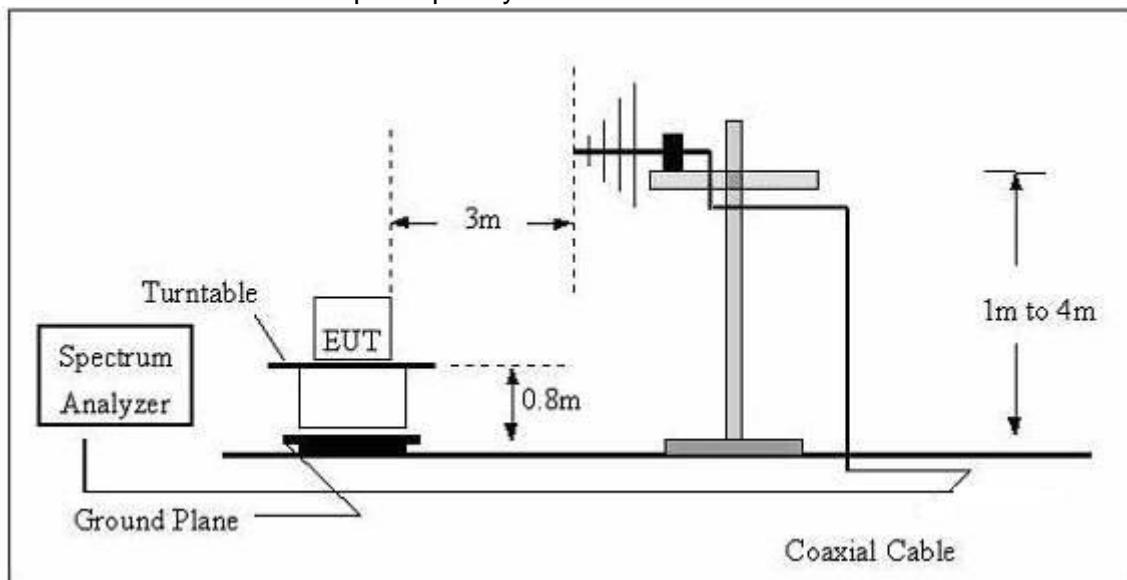
No deviation

3.2.4 TEST SETUP

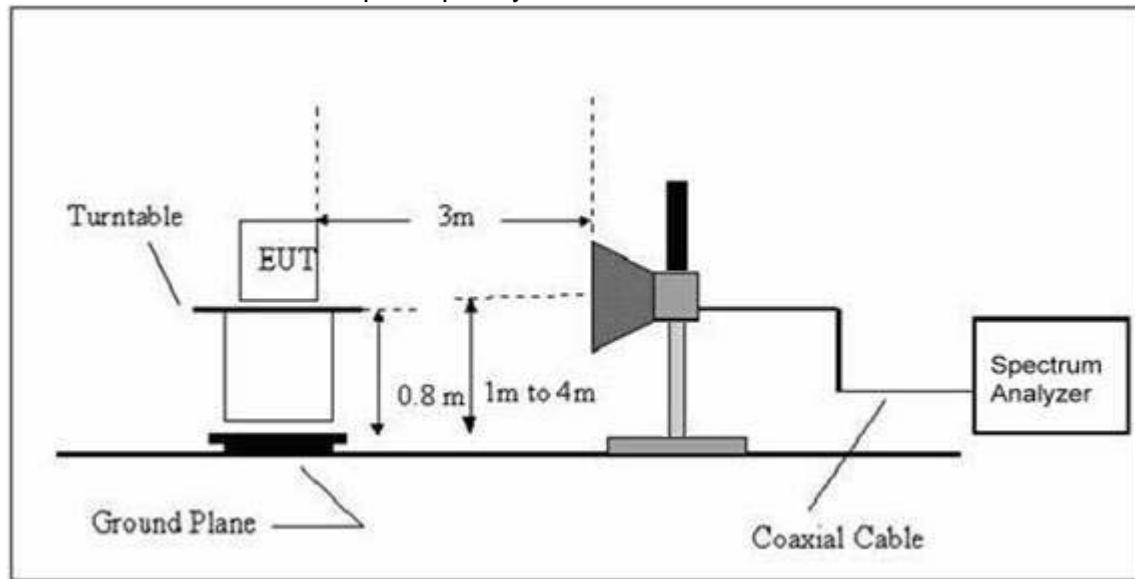
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT:	Portable AC/Battery-Powered Speaker System	Model Name. :	Envoi
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.0V
Test Mode :	TX	Polarization :	--

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log \left(\frac{\text{specific distance}}{\text{test distance}} \right)$ (dB);
Limit line = specific limits(dBuV) + distance extrapolation factor.

3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT :	Portable AC/Battery-Powered Speaker System	Model Name :	Envoi
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.0V
Test Mode :	TX		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBm)	(dBm)	(dB)	
V	73.0231	-72.18	28.91	-43.27	-13.00	-30.27	peak
V	132.3986	-67.44	22.76	-44.68	-13.00	-31.68	peak
V	181.9526	-65.78	24.84	-40.94	-13.00	-27.94	peak
V	260.0185	-66.62	22.94	-43.68	-13.00	-30.68	peak
V	427.9823	-77.86	29.75	-48.11	-13.00	-35.11	peak
V	720.9751	-86.92	35.06	-51.86	-13.00	-38.86	peak
H	77.3788	-81.03	26.81	-54.22	-13.00	-41.22	peak
H	109.9567	-76.77	19.12	-57.65	-13.00	-44.65	peak
H	178.9713	-71.13	24.85	-46.28	-13.00	-33.28	peak
H	272.7951	-65.93	23.59	-42.34	-13.00	-29.34	peak
H	391.5327	-74.46	28.31	-46.15	-13.00	-33.15	peak
H	490.0541	-84.49	31.25	-53.24	-13.00	-40.24	peak

Remark:
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit

3.2.8 TEST RESULTS (ABOVE 1000 MHZ)

EUT :	Portable AC/Battery-Powered Speaker System	Model Name :	Envoi
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.0V
Test Mode :	TX		

Polar (H/V)	Frequency (MHz)	Meter Reading (dBm)	Factor (dB)	Emission Level (dBm)	Limits (dBm)	Margin (dB)	Detector Type
V	1178.812	-28.04	-2.88	-30.92	-13	-17.92	peak
V	1773.256	-39.38	-1.79	-41.17	-13	-28.17	peak
V	2367.631	-32.28	1.36	-30.92	-13	-17.92	peak
H	1178.815	-27.34	-2.87	-30.21	-13	-17.21	peak
H	1773.253	-23.18	-1.80	-24.98	-13	-11.98	peak
H	2367.637	-23.54	1.35	-22.19	-13	-9.19	peak

4. RF OUTPUT POWER

4.1 APPLIED PROCEDURES / LIMIT

Test requirement: FCC CFR47 Part 74 Section 74.861(e)(1)(ii)

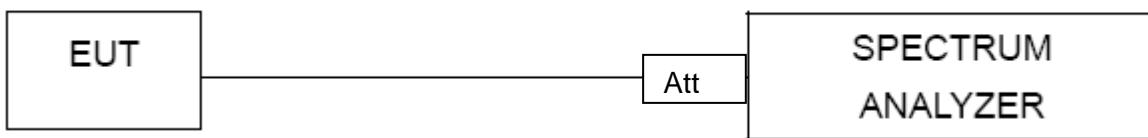
Test method: Based on TIA/EIA-603-C-2004

Limit: According to Part 74.861(e)(1)(ii), the output power shall not exceed 250mW (23.98 dBm).

4.1.1 TEST PROCEDURE

The maximum peak output power was measured with a spectrum analyzer connected to the antenna terminal (conducted measurement) while EUT was operating in normal situation.

4.1.2 TEST SETUP



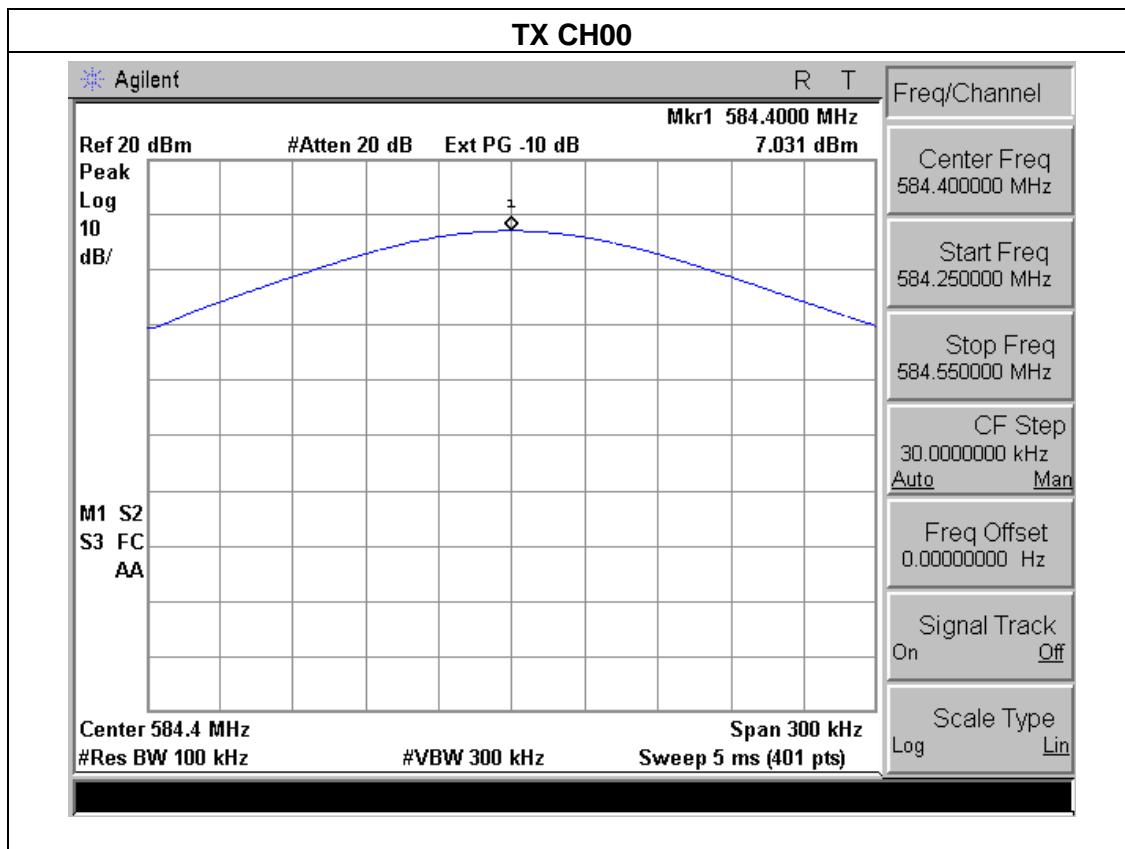
4.1.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.4 TEST RESULTS

EUT :	Portable AC/Battery-Powered Speaker System	Model Name :	Envoi
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1015 hPa	Test Voltage :	DC 3.0V
Test Mode :	TX Mode		

Test Channel	Frequency (MHz)	Maximum Conducted Output Power(PK)	LIMIT dBm
		(dBm)	
CH00	584.4	7.031	23.98



5. MODULATION CHARACTERISTICS

5.1 APPLIED PROCEDURES / LIMIT

Test requirement: FCC CFR47 Part 2 Section 2.1047(a)

Test method: Based on TIA/EIA-603-C-2004

Requirement: According to Part 2.1047(a), for Voice Modulated Communication Equipment, the frequency response of the audio modulating circuit over a range of 100Hz to 5000Hz shall be measured.

5.1.1 TEST PROCEDURE

(a) Test Configuration

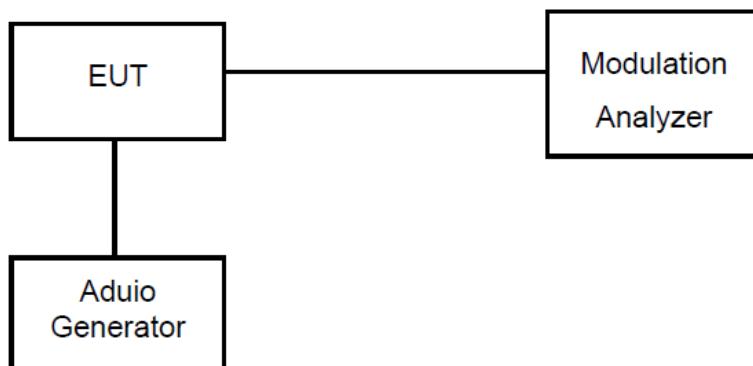
(b) Audio Frequency Response:

- 1) Apply a 1000 Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation.
- 2) Set the test receiver to measure rms deviation and record the deviation reading as DEVREF .
- 3) Set the audio frequency generator to the desired test frequency between 100 Hz and 5000 Hz.
- 4) Record the test receiver deviation reading as DEVFREQ .
- 5) Calculate the audio frequency response at the present frequency as:
audio frequency response = $20\lg(\text{DEVFREQ}/ \text{DEVREF})$
- 6) Repeat steps 4) through 5) for all the desired test frequencies.

(c) Modulation Limiting:

- 1) Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator, and adjust the level to obtain 60% of full rated system deviation.
- 2) Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level.
- 3) With the level from the audio frequency generator held constant at the level obtained in step e), slowly vary the audio frequency from 300 Hz to 3000Hz and observe the steady-state deviation. Record the maximum deviation.
- 4) Set the test receiver to measure peak negative deviation and repeat steps 1) through 3).
- 5) The values recorded in steps 3) and 4) are the modulation limiting.

TEST SETUP

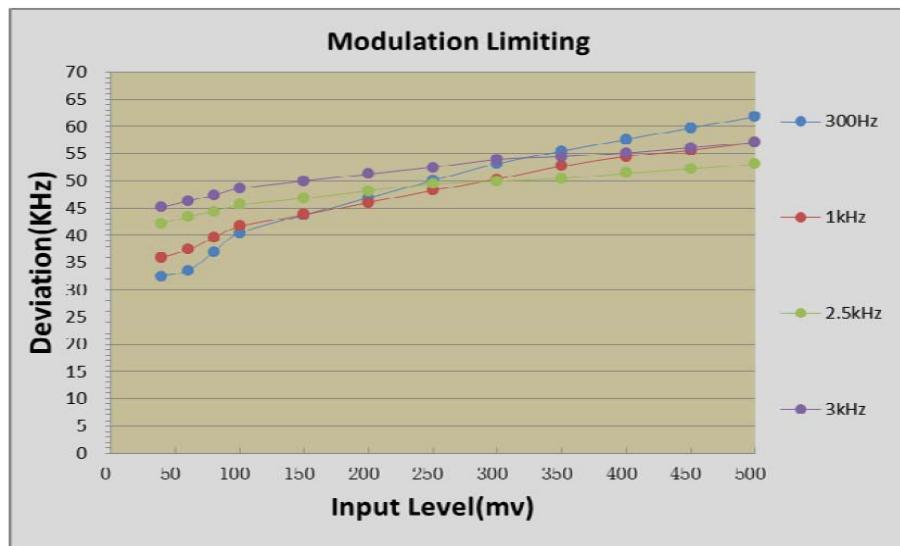
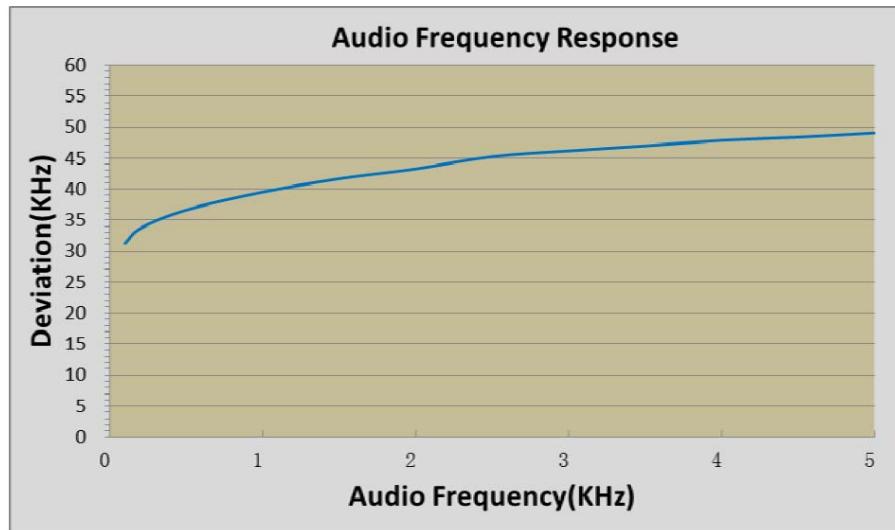


5.1.2 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.3 TEST RESULTS

EUT :	Portable AC/Battery-Powered Speaker System	Model Name :	Envoi
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3.0V
Test Mode :	TX Mode		



6. OCCUPIED BANDWIDTH OF EMISSION

6.1 APPLIED PROCEDURES / LIMIT

Test requirement: FCC CFR47 Part 2 Section 2.1049©(1)

Test method: Based on TIA/EIA-603-C-2004

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

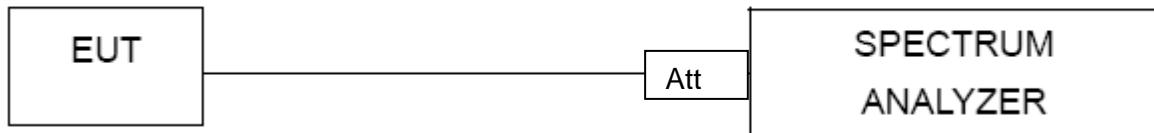
6.1.1 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and set it to any one convenient frequency within its operating range.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



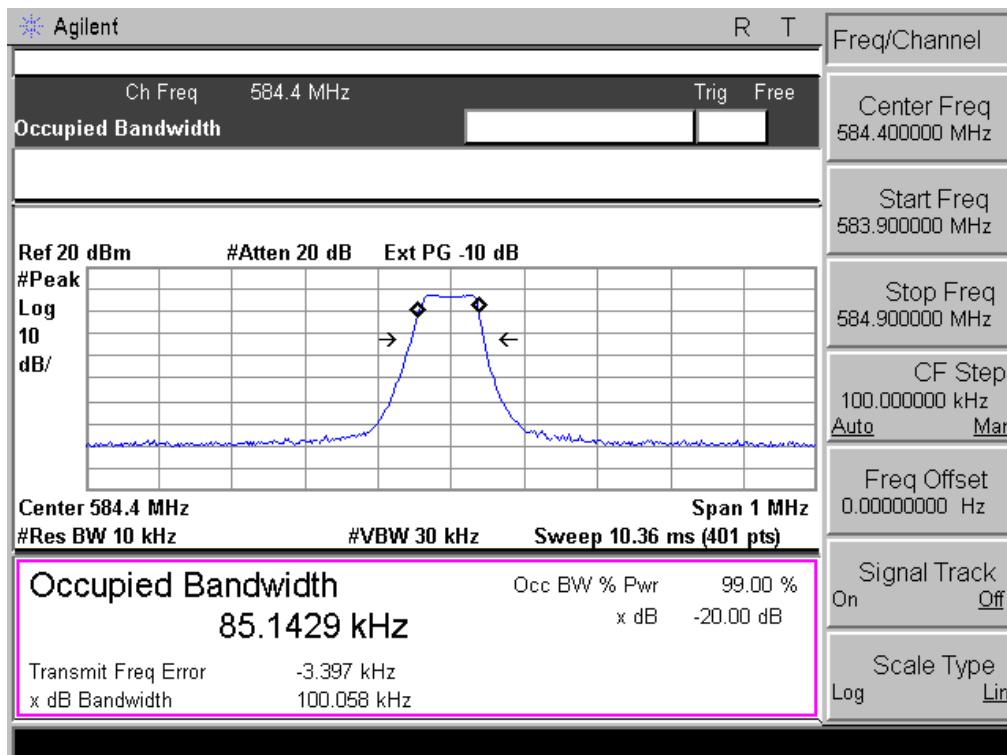
6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 TEST RESULTS

EUT :	Portable AC/Battery-Powered Speaker System	Model Name :	Envoi
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.0V
Test Mode :	TX Mode		

Frequency	99% Bandwidth (kHz)	Limit (kHz)	Result
584.4 MHz	85.1429	200	PASS



7. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test requirement: FCC CFR47 Part 2 Section 2.1053

Test method: Based on TIA/EIA-603-C-2004

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 $43 + 10 \log$ (output power in watts)dB.

7.1 TEST PROCEDURE

1. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
2. Set the SA on Max-Hold Mode, and then keep the EUT in transmitting mode. Record all the signals from each channel until each one has been recorded.
3. Set the SA on View mode and then plot the result on SA screen.
4. Repeat above procedures until all frequencies measured were complete.

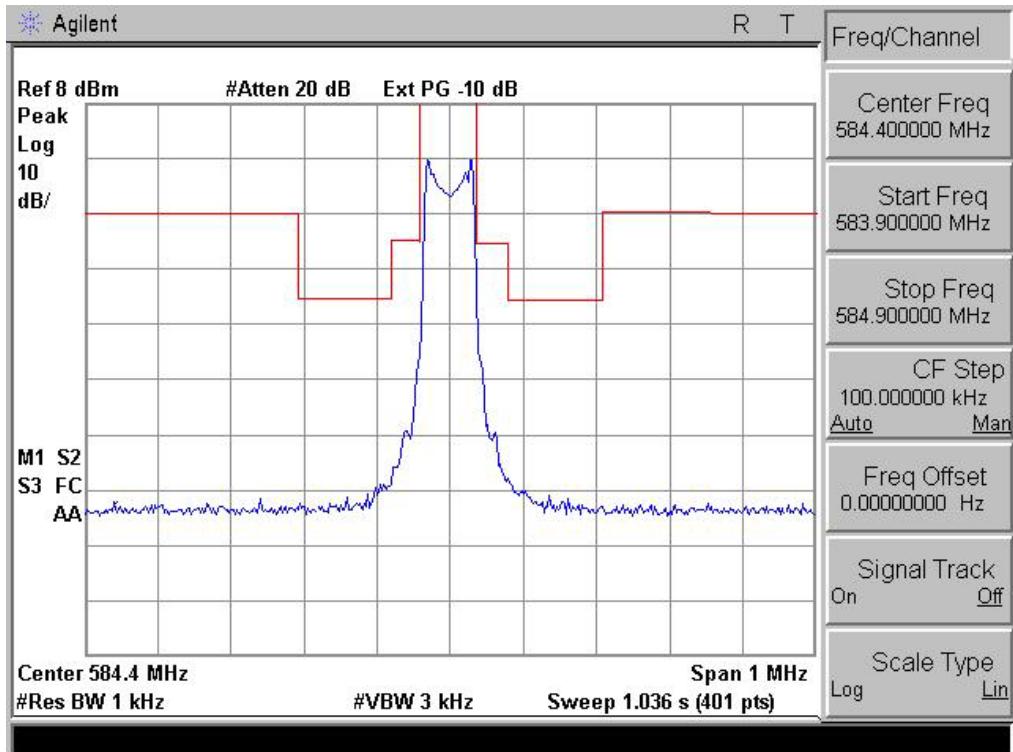
7.2 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

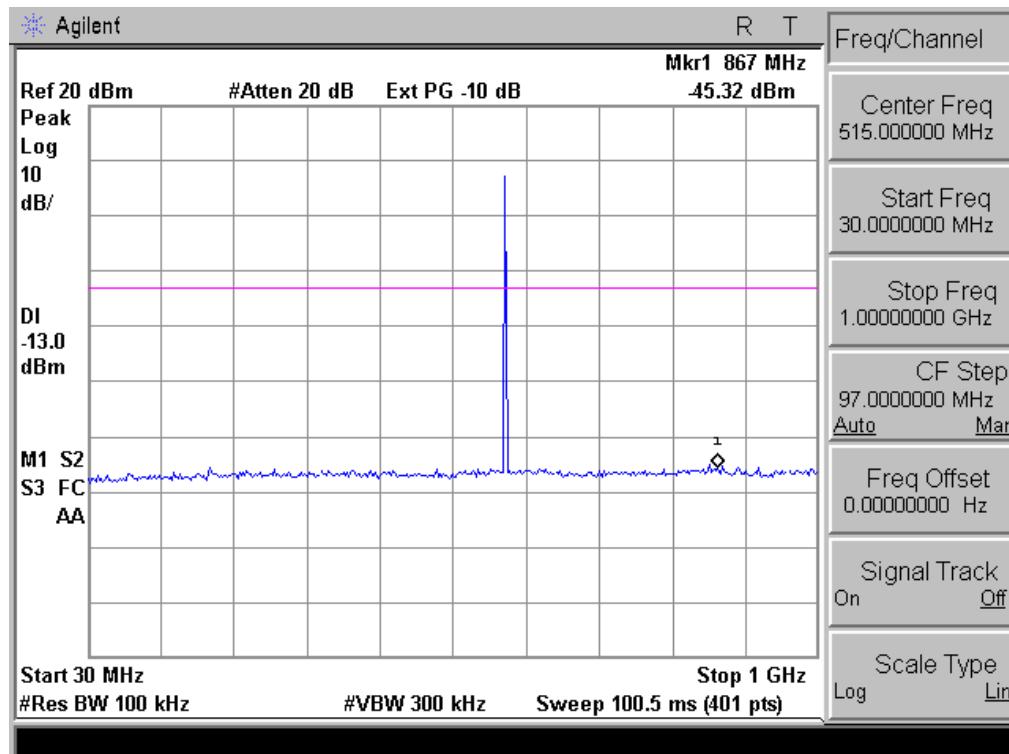
7.3 TEST RESULTS

EUT :	Portable AC/Battery-Powered Speaker System	Model Name :	Envoi
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3.0V

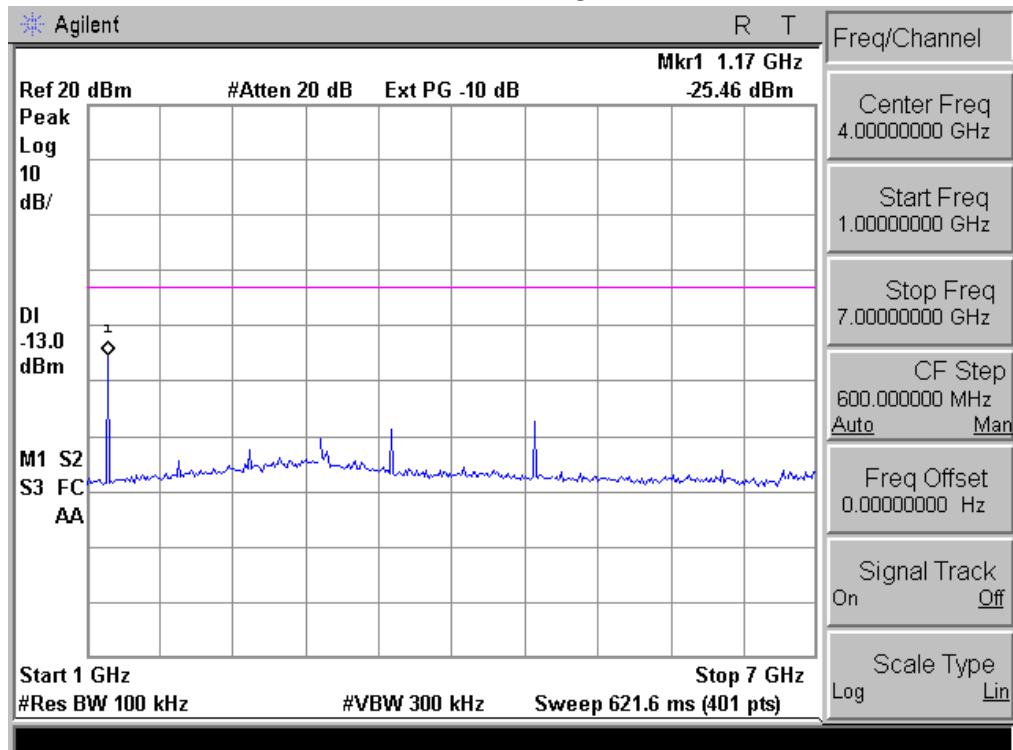
Emission Mask



30-1G



1-7G



8. FREQUENCY STABILITY

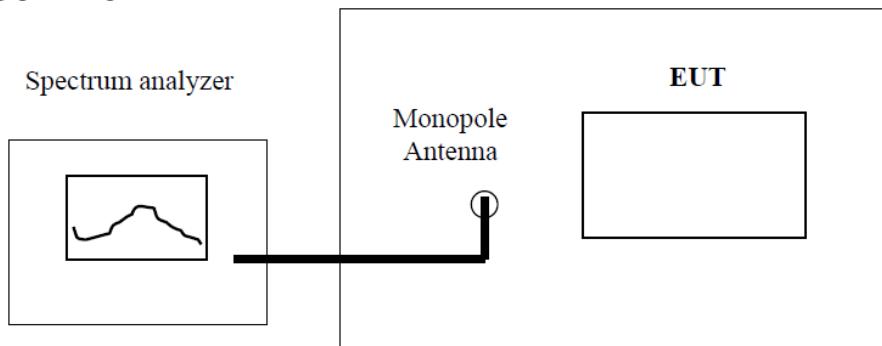
8.1 STANDARD REQUIREMENT

Test requirement: FCC CFR47 Part 2 Section 2.1055(a)(a)

Test method: Based on TIA/EIA-603-C-2004

Limit: According to FCC 74.86(e)(4), the frequency tolerance of the transmitter shall be 0.005 percent.

8.2 TEST CONFIGURATION



8.3 TEST PROCEDURE

A) Frequency stability versus input voltage

1. Setup the configuration per figure 1 for frequencies measured at an environmental chamber whose temperature is set to 20 °C. Install new batteries in the EUT.
2. Set SA center frequency to the EUT operation frequency. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.
3. Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

B) Frequency stability versus environmental temperature

1. Setup the configuration per figure 1 for frequencies measured at an environmental chamber, Install new batteries in the EUT.
2. Turn on EUT and set SA center frequency to the EUT operation frequency, then set SA RBW to 30kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.
3. Set the temperature of chamber to 50°C. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, 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.

8.4 TEST RESULT

a) Frequency stability versus input voltage

Power Supply	Reference Frequency (MHz)	Environment Temperature (°C)	Frequency Measured	Frequency Tolerance (%)
DC 2.55V	584.400	20	584.404	0.0007
DC 3.45V	584.400	20	584.408	0.0014

b) Frequency stability versus environmental temperature

Environment Temperature(°C)	Power Supply	Frequency Deviation measured with time Elapse(30 minutes)	
		MHz	%
50	DC 3.0V	584.402	0.0003
40	DC 3.0V	584.406	0.001
30	DC 3.0V	584.403	0.0005
20	DC 3.0V	584.402	0.0003
10	DC 3.0V	584.403	0.0005
0	DC 3.0V	584.405	0.0008
-10	DC 3.0V	584.407	0.001
-20	DC 3.0V	584.402	0.0003
-30	DC 3.0V	584.407	0.001

9. EUT TEST PHOTO