

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

FCC PART 27 SUBPART C&L REQUIREMENT

for

Lineary power amplifier

Model No.:LPA2100-160-SW01

FCC ID: WBKLPA2100

Trade Name: N/A

Report No.: SZEE080512118701

Issue Date: May 21, 2008

Prepared for

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1. General Information

Applicant: Bravo Tech(Shenzhen)Co.,Ltd
No.8 Building,The 3 rd Zone,Tangtou Industrial
Park,Shiyan,Baoan District,Shenzhen City,P.R.China

Manufacturer: Bravo Tech(Shenzhen)Co.,Ltd
No.8 Building,The 3 rd Zone,Tangtou Industrial
Park,Shiyan,Baoan District,Shenzhen City,P.R.China

Trade Name: N/A

Product Name : Lineary power amplifier

Model No.: LPA2100-160-SW01

Report No.: SZEE080512118701

Date of Test: May 14, 2008 to May 21, 2008

We hereby certify that:

The above equipment was tested by Centre Testing International (CTI), The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with Requirement of FCC Rules Part 27 Subpart C&L.

The test results of this report relate only to the tested sample identified in this report.

Prepared by :



Forrest Lei

Inspected by :



Daisy Wu

Approved by:



Jacky Guo
General Manager

Date :

May . 21, 2008

2. Product Information

System Specification for LPA2100-160-SW01

PARAMETER SPECIFICATION

PARAMETER	SPECIFICATION	
Frequency	2110 ~ 2155 MHz	
Output Power	150Watts average max. (CDMA2000, PAR: 8.0dB)	
Spurious Emission	-45dBc@ $\Delta f=885-1.25\text{MHz}$, 30kHz RBW -55dBc@ $\Delta f=1.25-1.98\text{MHz}$, 30kHz RBW -55dBc@ $\Delta f=1.25-2.25\text{MHz}$, 30kHz RBW -13dBm@ $\Delta f=2.25-4\text{MHz}$, 30kHz RBW	
RF Gain	57.0 \pm 1.0dB @ frequency range, +30Vdc, room temp.	
Normal Operating Voltage	+30Vdc \pm 1.0Vdc	
Operating Voltage	+29Vdc ~ +31Vdc	
RF Gain Variation over Voltage & Temperature	$\pm 1.5\text{dB}$ @ +29 $\leq V_{sup} \leq$ +31V, -20 $^{\circ}\text{C}$ to +50 $^{\circ}\text{C}$	
Gain Flatness	Peak to Peak 0.2dB over any 5MHz	
Input/Output Return Loss	-16dB min.	
Output Protection	Mismatch protected with isolator	
Efficiency	$\geq 12\%$ @+30Volts, Po=+52dBm	
Operating Temperature	-20 $^{\circ}\text{C}$ to +50 $^{\circ}\text{C}$ (Air Temperature inside System),	
Input Power ALC	Operating point	Output power: 52.5dBm \pm 0.5dB
	Operating range	6dB min
	Over Pwr	Output Pwr: 53dBm \pm 0.5dB

3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Spurious emission testing was performed at an antenna to EUT distance 3 meters.

4. Test Facility

The 3m Semi-Anechoic chamber test site and conducted measurement facility used to collect the radiated data is located on the address:

1F., Building C, Hongwei Industrial Zone 70 District., Baoan, Shenzhen, Guangdong, China.

The Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003 requirements. The test site

FCC Registration Number: 614926

5. Special Accessories

Not available for this EUT intended for grant.

6. Equipment Modifications

Not available for this EUT intended for grant.

7. Test Condition

7.1 Test Configuration

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the EUT and the supported equipments were installed to meet FCC requirement and operated in a manner which tends to maximize its emission level in a typical application.

7.2 EUT operation

EUT was tested according to the following operation modes provided by the specifications given by the manufacturer, and reported the worst emissions.

7.3 Peripherals / Support Equipment Used

Following peripheral devices and interface cables were connected during the measurement:

Type of Peripheral Equipment Used:

Description	Model Name	Serial No.	Manufacturer	FCC ID
Multi-carrier high power outdoor Booster	BMB2100-140-SW01	N/A	BTI	ID

8. Summary of Test Results

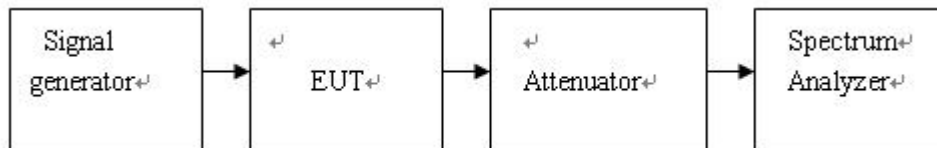
FCC Rules	Description Of Test	Result
PART27.50/2.1046	RF Power out put	Pass
PART27/2.1047	Modulation characteristics	Not applicable
PART27.53/2.1049	Occupied Bandwidth	Pass
PART27.53/2.1051	Spurious Emissions at output Terminals	Pass
PART27.53/2.1053	Field strength of spurious Radiation	Pass
PART27.54/2.1055	Frequency Stability	Not applicable

9. RF power output Test

9.1 Measurement Procedure

Please see the “TIA 603-C, 2004 and 24.232(d)”

9.2 Test Set-up (Block Diagram of Configuration)



9.3 27.50 Power and antenna height limits.

(d) The following power and antenna height requirements apply to stations transmitting in the 1710–1755MHz and 2110–2155 MHz bands:

- (1) The power of each fixed or base station transmitting in the 2110–2155 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to a peak equivalent isotropically radiated power (EIRP) of 3280 watts. The power of each fixed or base station transmitting in the 2110–2155 MHz band from any other location is limited to a peak EIRP of 1640 watts. A licensee operating a base or fixed station utilizing a power of more than 1640 watts EIRP must coordinate such operations in advance with all Government and non-Government satellite entities in the 2025–2110 MHz band. Operations above 1640 watts EIRP must also be coordinated in advance with the following licensees within 120 kilometers (75 miles) of the base or fixed station: all Broadband Radio Service (BRS) licensees authorized under part 27 in the 2155–2160 MHz band and all AWS licensees in the 2110–2155 MHz band.
- (2) Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to a peak EIRP of 1 watt. Fixed stations operating in this band are limited to a maximum antenna height of 10 meters above ground, and mobile and portable stations must employ a means for limiting power to the minimum necessary for successful communications.

Applicable RF Power Limit from Above: 1640 watts EIRP

9.4 Operating Mode During Test

The transmitter was tested while in a continuous work mode. The EUT was tuned to a low, middle, and high frequency in both the downlink (base to mobile) and uplink (mobile to base) directions. In the course of this testing, it was found that operating the device with a fixed rf gain and adjusting rf input signal to obtain maximum rf output power produced the worst-case results.

9.5 Test Results

The EUT is in compliance with the limits as specified above.

Frequency	Reading	Factor	power at amplifier output
2110MHZ	7.42dBm	44.63dB	52.05dBm
2132.5MHZ	7.43dBm	44.66dB	52.09dBm
2155MHZ	7.38dBm	44.7dB	52.08dBm

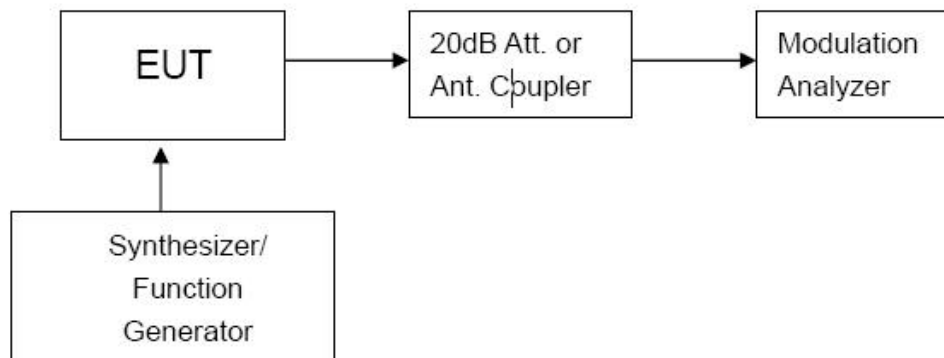
Notes: It's take from the worst data

10. Modulation Characteristics

10.1 Measurement Procedure

This device does not generate any modulation signals but only repeats a modulated rf waveform.

10.2 Test Set-up (Block Diagram of Configuration)



10.3 Specifications

2.1047 – Modulation Characteristics

(a) *Voice modulated communication equipment.* A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

(b) *Equipment which employs modulation limiting.* A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.

(c) *Single sideband and independent sideband radiotelephone transmitters which employ a device or circuit to limit peak envelope power.* A curve showing the peak envelope power output versus the modulation input voltage shall be supplied. The modulating signals shall be the same in frequency as specified in paragraph (c) of §2.1049 for the occupied bandwidth tests.

(d) *Other types of equipment.* A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

10.4 Test results

Not applicable – The device does not produce a baseband signal but simply repeats a modulated rf waveform.

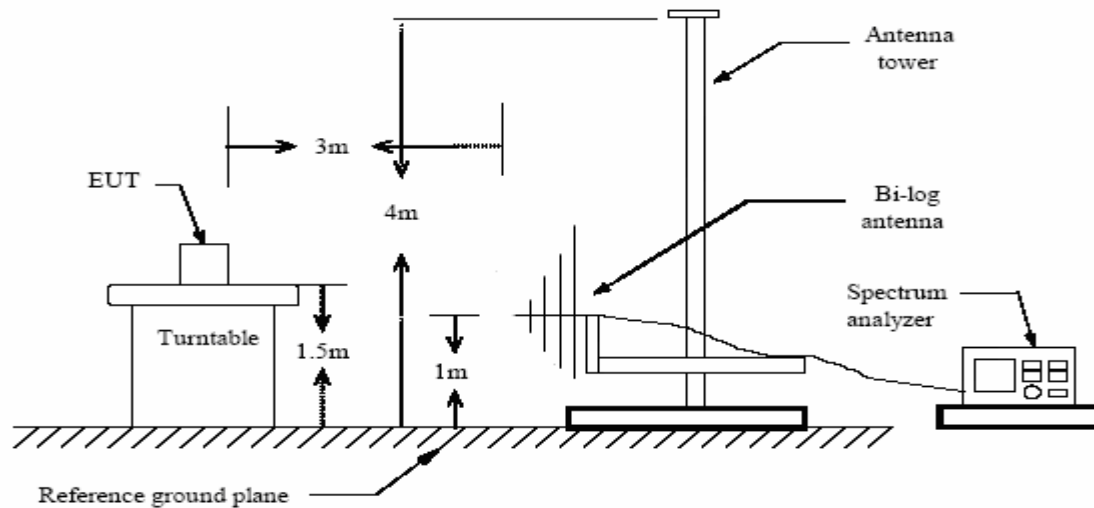
11. Occupied Bandwidth

11.1 Measurement Procedure

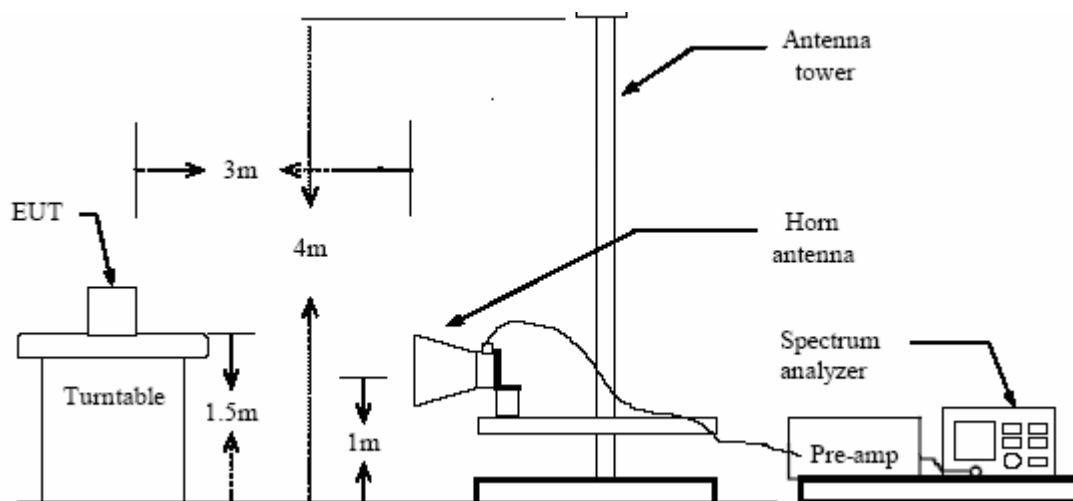
- a The EUT was placed on a turn table which is 0.8m above ground plane.
- b. Make the EUT Work in low, middle, high frequency.
- c. Set SPA Center Frequency = fundamental frequency, RBW=VBW= 300 Hz, Span =50 KHz.
- d. Set SPA Max hold. Mark peak, -26 dB.

11.2 Test Set-up (Block Diagram of Configuration)

A. ERP. Test Set-Up, Frequency below 1000MHz



B. ERP. Test Set-Up, Frequency above 1000MHz



11.3 Specification

(g) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

(1) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(3) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

11.4 Test results.

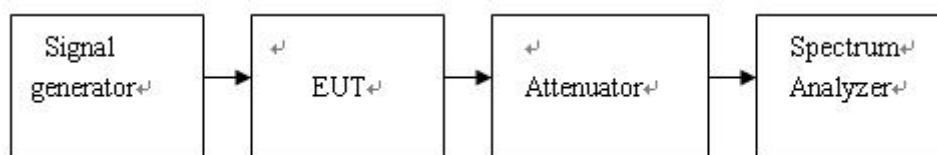
For more details, Please see the Annex A.

12. Spurious Emissions at output Terminals

12.1 Measurement Procedure

- 1 connect the EUT through attenuator to Spectrum analyzer.
- 2 Make the EUT work in low , middle, high frequency channel
- 3 set span to 5 MHz, RBW=50 KHz, VBW=200 KHz. fundamental frequency in center
- 4 check the spurious emissions

12.2 Test Set-up (Block Diagram of Configuration)



12.3 Specification

(g) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

(1) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(3) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

12.4 Test results.

For more details, Please see the Annex B.

13. Field strength of spurious Radiation

13.1 Measurement method

ANSI C63.4 2003

13.2 Test setup

Same as bandwidth test

13.3 Specifications

(g) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

(1) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(3) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

13.4 Test results

For more details, please see the Annex C

14.Frequency Stability

14.1 Measurement Procedure

The frequency stability shall be measured with variation of ambient temperature as follows:

(1) Form -30° to $+50^{\circ}$ centigrade for all equipment except that specified in subparagraphs (2) and (3) of paragraph 2.1055

14.2 Test setup

None

14.3 Specifications

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

14.4 Test results

Not Applicable. This device uses a common oscillator to down-convert and up-convert the modulated rf carrier so that the output frequency tracks the input frequency. This was determined by inspection of the schematics provided by the client.

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

SPURIOUS EMISSION TEST



APPENDIX 2 EXTERNAL PHOTOGRAPHS OF EUT

View of EUT-1



View of EUT-2



View of EUT-3



View of EUT-4

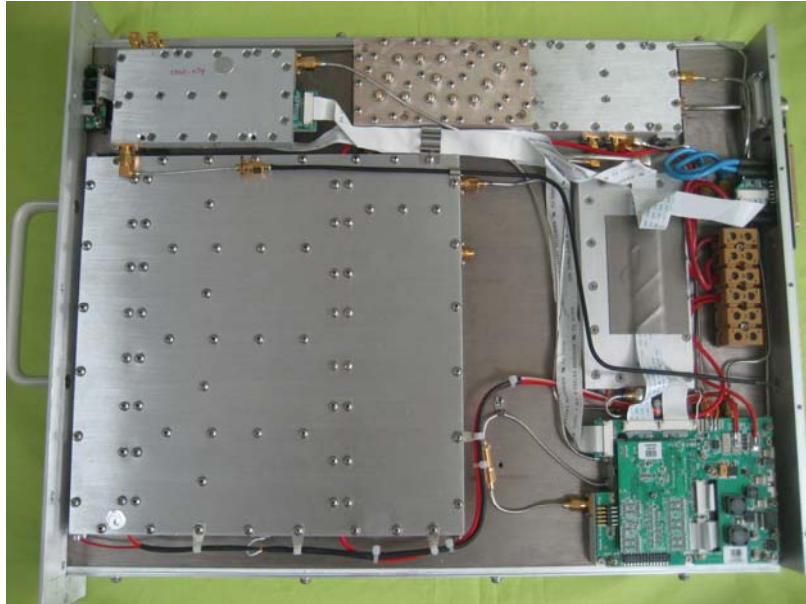


View of EUT-5

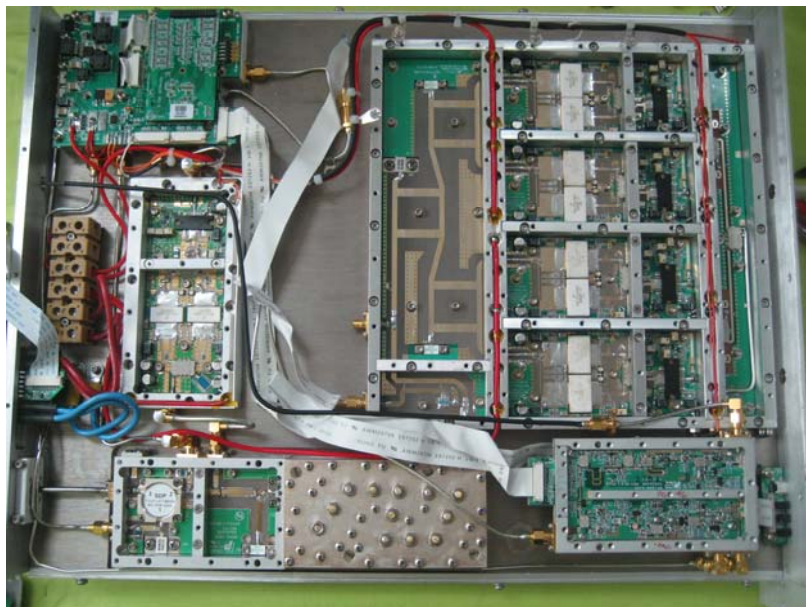


APPENDIX 3 INTERNAL PHOTOGRAPHS OF EUT

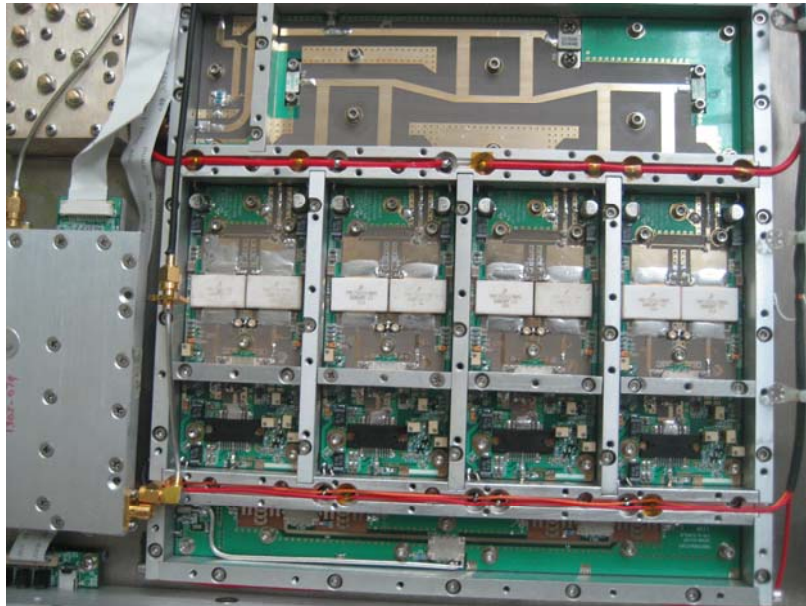
Whole Internal view1 of EUT



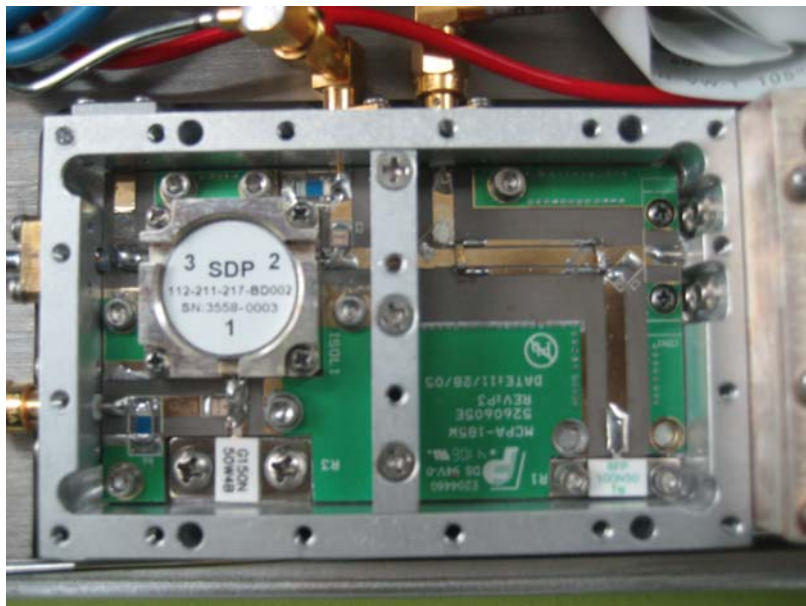
Whole Internal view2 of EUT



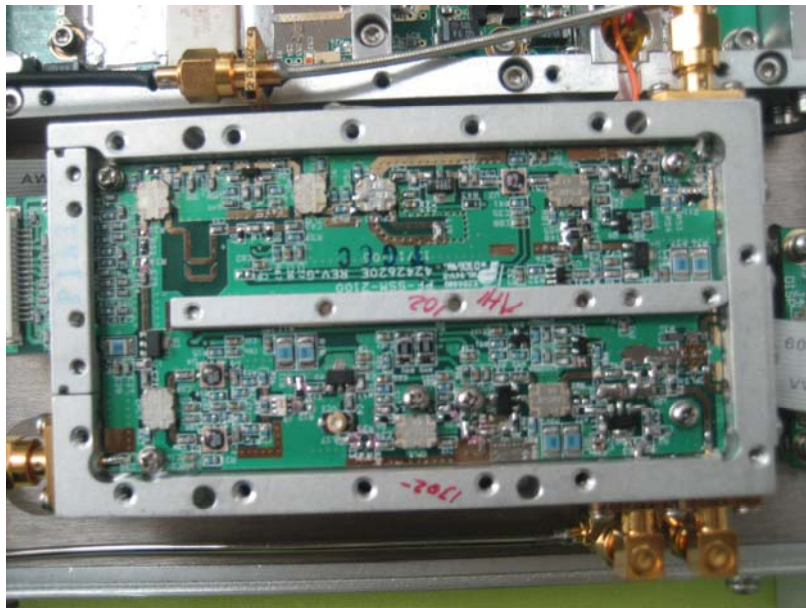
Internal view 1



Internal view 2



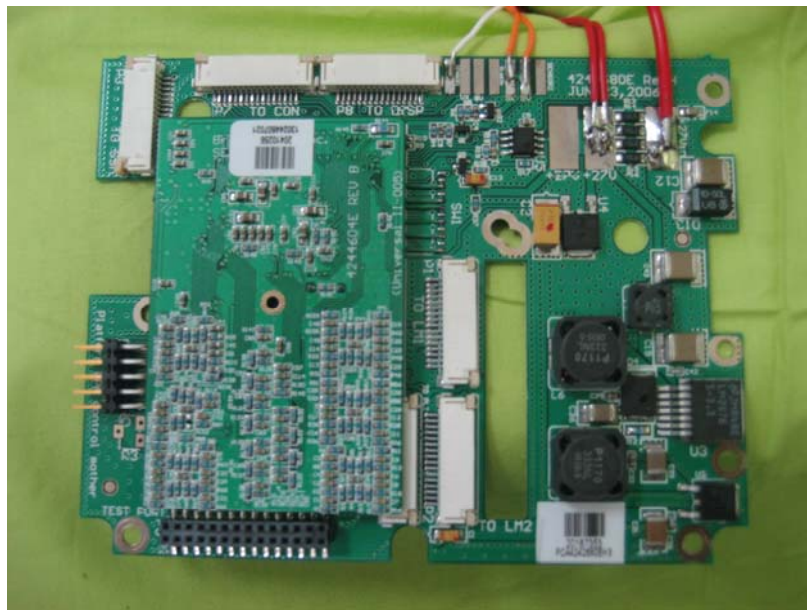
Internal view 3



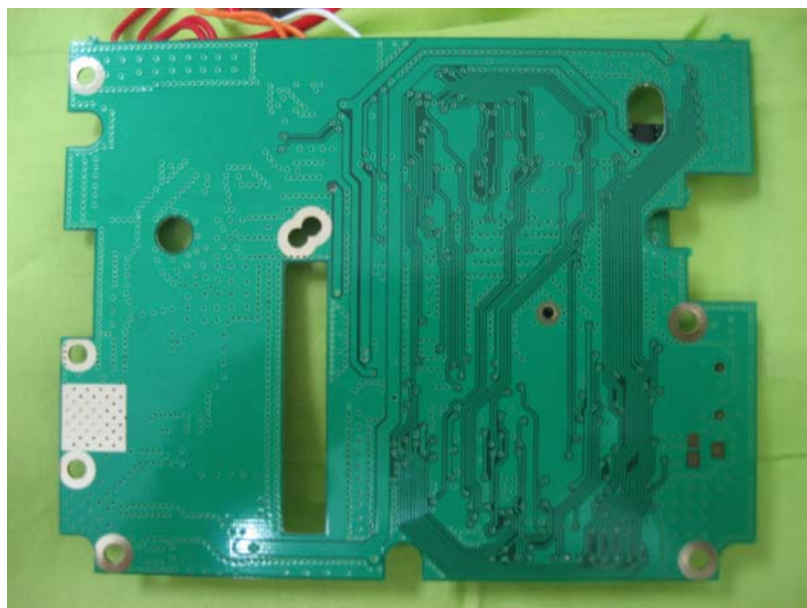
Internal view 4



Internal view 5



Internal view 6



APPENDIX 4 TEST EQUIPMENT LIST

Equipment Type	Manufacturer	Model Number	Serial Number	Last Calibration Date	Next Calibration Date
Receiver	R&S	ESCI	100435	01/29/2008	01/28/2009
LISN	ETS	3816	00060336	06/07/2007	06/06/2008
Spectrum Analyzer	Agilent	E4443A	MY46185649	06/29/2007	06/28/2008
Biconilog Antenna	ETS	3142C	920250	05/30/2007	05/29/2008
ETS Horn Antenna	ETS	3117	57410	05/30/2007	05/29/2008
Multi device Controller	ETS	2090	00057230	06/07/2007	06/06/2008
Signal Generator	IFR	2023B	0211467	06/07/2007	06/06/2008

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