

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

FCC PART 24 SUBPART E REQUIREMENT

for

RF power amplifier

Model No.:LPA1900-120-SC01

FCC ID: WBKLPA1900

Trade Name: BTI

Report No.: SZEE080822264307

Issue Date: September 2, 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: BTI

Product Name : RF power amplifier

Model No.: LPA1900-120-SC01

Report No.: SZEE080822264307

Date of Test: August 15, 2008 to September 2, 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 TIA603 and the energy emitted by the sample EUT tested as described in this report is in compliance with Requirement of FCC Rules Part 24 Subpart E.

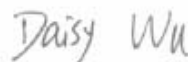
The test results of this report relate only to the tested sample identified in this report.

Prepared by :



Forrest Lei

Inspected by :



Daisy Wu

Approved by:



Jacky Guo
General Manager

Date :

September . 2, 2008

2. Product Information

System Specification for LPA1900-120-SC01

PARAMETER	SPECIFICATION	
Frequency	1930 ~ 1990 MHz	
Output Power	120Watts max (CDMA2000)	
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 1.0dB @ +29 \leq Vsup \leq +31V, -30 $^{\circ}$ C to +55 $^{\circ}$ C	
Gain Flatness	Peak to Peak 0.2dB over any 5MHz	
Input/Output Return Loss	-18dB min.	
Output Protection	Mismatch protected with isolator	
Efficiency	\geq 15%@+30Volts, Po=+50.8dBm	
Operating Temperature	-30 $^{\circ}$ C to +55 $^{\circ}$ C (Air Temperature inside System),	
Input Power ALC	Operating point	Output power:52.0dBm \pm 0.5dB
	Operating range	6dB min
	Over Pwr	Output Pwr:52dBm \pm 0.5dB

3. Test Methodology

radiated testing were performed according to the procedures in TIA603. 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
Power supply	GEA60-55	N/A	LAMBDA	N/A
Signal Generator	IFR3413	341006/286	AEROFLFX	N/A
Power meter	E4418A	GB38273033	HP	N/A
Signal Generator	E4438C	MY45095744	Agilent	N/A

8. Summary of Test Results

FCC Rules	Description Of Test	Result
PART24.232/2.1046	Maximum Peak Output Power	Pass
PART24.235/2.1055	Frequency Stability	Not applicable
PART24.238(b)/2.1049	Occupied Bandwidth	Pass
PART24.238/2.1051	Conducted Spurious Emissions	Pass
PART24.238/2.1053	Radiated Spurious Emissions	Pass
2-11-04/EAB/RF	Out of band rejection	Pass
PART24.238	Band Edge	Pass

9. RF power output Test

9.1 Measurement Procedure

Connected the EUT to Spectrum analyzer through enough attenuator, Turning the Signal generator so that the EUT output max power. The spectrum analyzer detector is peak detector. Set the spectrum analyzer RBW=VBW=30KHZ,SPAN=5MHZ. For more details, Please see the "TIA 603-C, 2004 and 24.232(d)"

9.2 Power and antenna height limits.

(a) Base stations are limited to 1640 watts peak equivalent isotropic ally radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below. See § 24.53 for HAAT calculation method. Base station antenna heights may exceed 300 meters with a corresponding reduction in power; see Table 1 of this section. The service area boundary limit and microwave protection criteria specified in §§ 24.236 and 24.237 apply.

(b) Base stations that are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census, are limited to 3280 watts peak equivalent isotropic ally radiated power (EIRP) with an antenna height up to 300 meters HAAT

(c) Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications

Applicable RF Power Limit from Above: 1640 watts

9.3 Operating Mode During Test

The Amplifier was tested while in a continuous work mode. The EUT was tuned to a low, middle, and high frequency single channel in the downlink (base to mobile) 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.

9.4 Test Results

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

Frequency	Reading	Factor	Output power
1930MHZ	-10.47dBm	60.8dB	50.33dBm
1960MHZ	-10.7dBm	60.88dB	50.18dBm
1990MHZ	-9.66dBm	60.36dB	50.7dBm

Notes: It's take from the worst data

10. Occupied Bandwidth

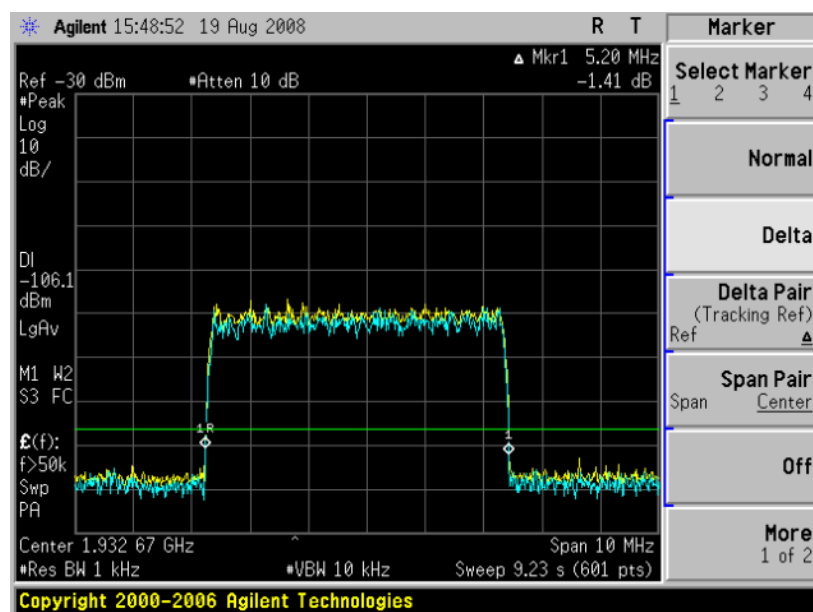
10.1 Measurement Procedure

- The EUT was placed on a turn table which is 0.8m above ground plane.
- Make the EUT Work in low, middle, high frequency.
- Set SPA Center Frequency = fundamental frequency,
spectrum analyzer RBW=1KHZ,VBW=10KHZ,SPAN=10MHZ.
- Set SPA Max hold. Mark peak, -26 dB.

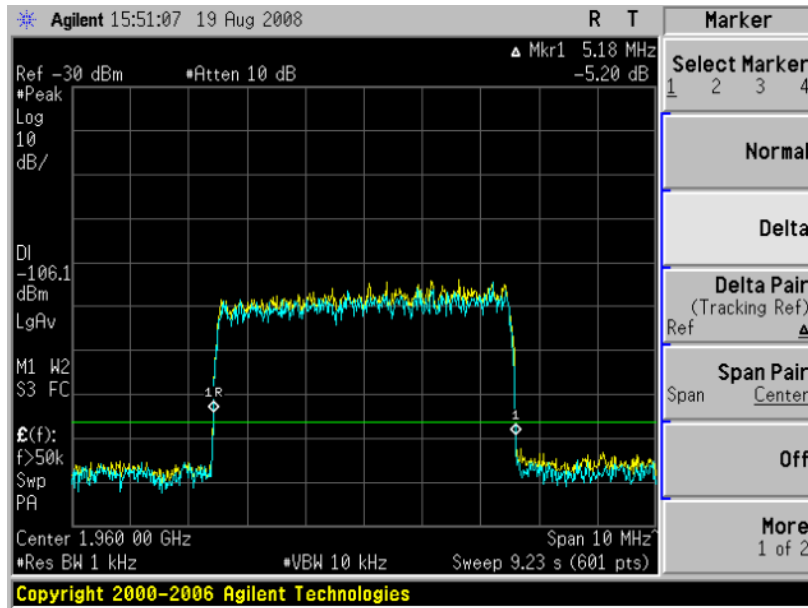
10.2 Specification

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.

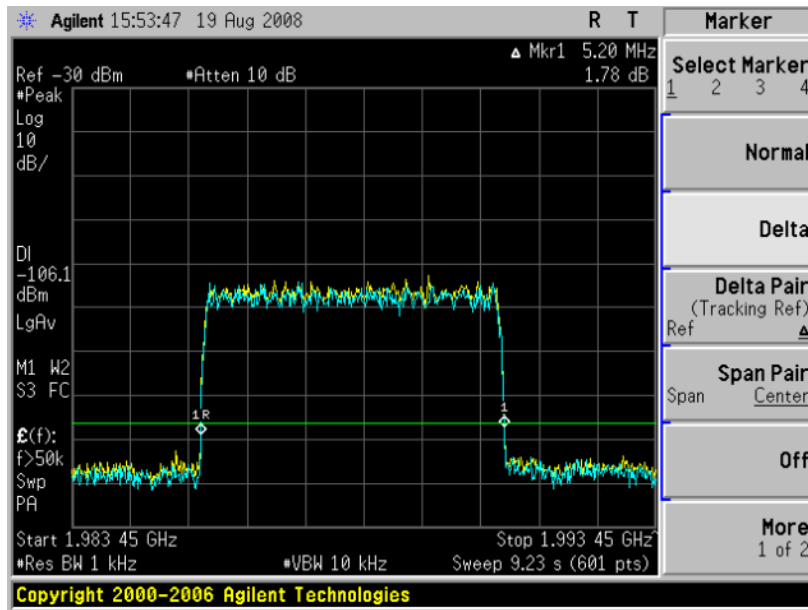
10.3 Test results.



1930MHZ Bandwidth



1960MHZ Bandwidth



1990MHZ Bandwidth

Clause 2-11-04/EAB/RF out of band rejection

Minimum Standard:

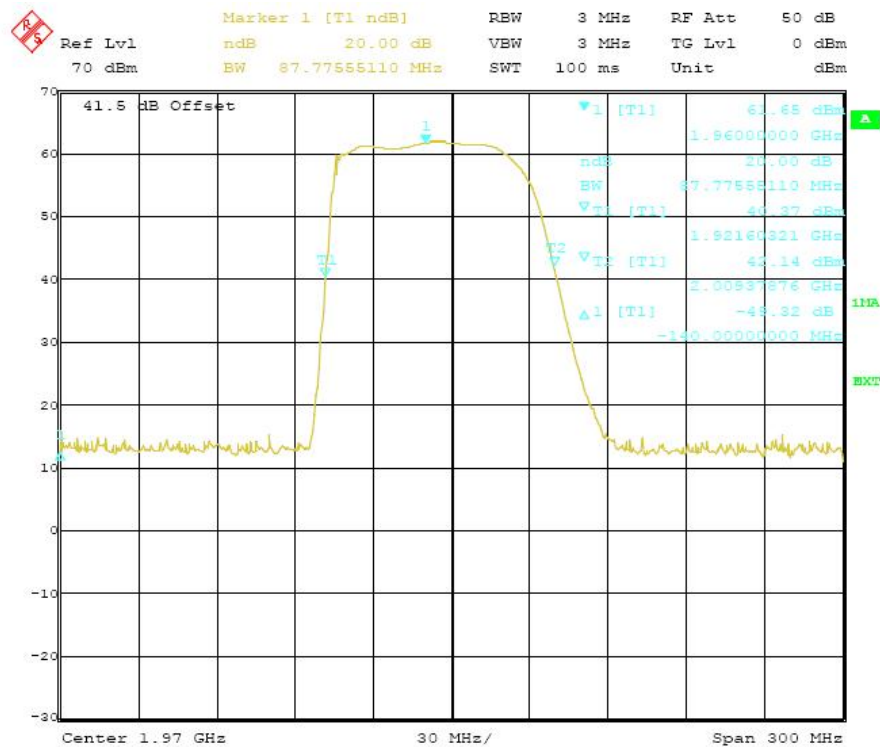
The pass band gain shall not exceed the nominal gain by more than 1.0 dB. The 20 dB bandwidth shall not exceed the nominal bandwidth that is stated by the manufacturer. Outside of the 20 dB bandwidth, the gain shall not exceed the gain at the 20 dB point.

Method of Measurement:

Adjust the internal gain control of the equipment under test to the nominal gain for which equipment certification is sought.

With the aid of a signal generator and spectrum analyzer, measure the 20 dB bandwidth of the amplifier (i.e. at the point where the gain has fallen by 20 dB). Measure the gain-versus-frequency response of the amplifier from the midband frequency f_0 of the pass band up to at least $f_0 \pm 250\%$ of the 20 dB bandwidth.

Test Result: Please see the attached plots

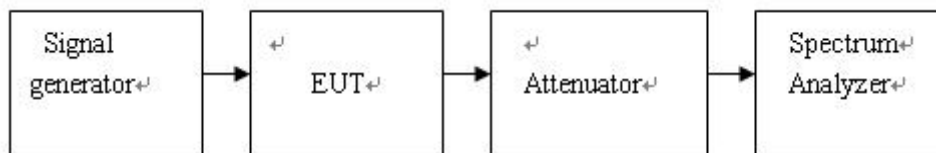


11. Conducted Spurious Emissions

11.1 Measurement Procedure

- 1 Connect the EUT through attenuator to Spectrum analyzer.
- 2 Make the EUT work in low, middle, high frequency channel
- 3 Set RBW=100 kHz and VBW=300KHZ below 1GHZ, RBW=1MHZ and VBW=3MHZ above 1GHZ. Fundamental frequency in center
- 4 Check the spurious emissions

11.2 Test Set-up (Block Diagram of Configuration)



11.3 Specification

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

11.4 Test results.

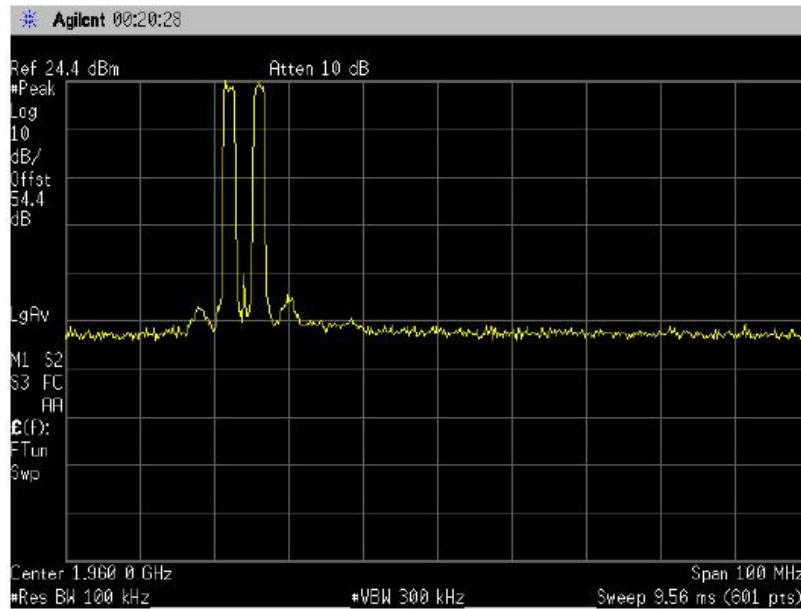
See the Attached plots

Intermodulations continued

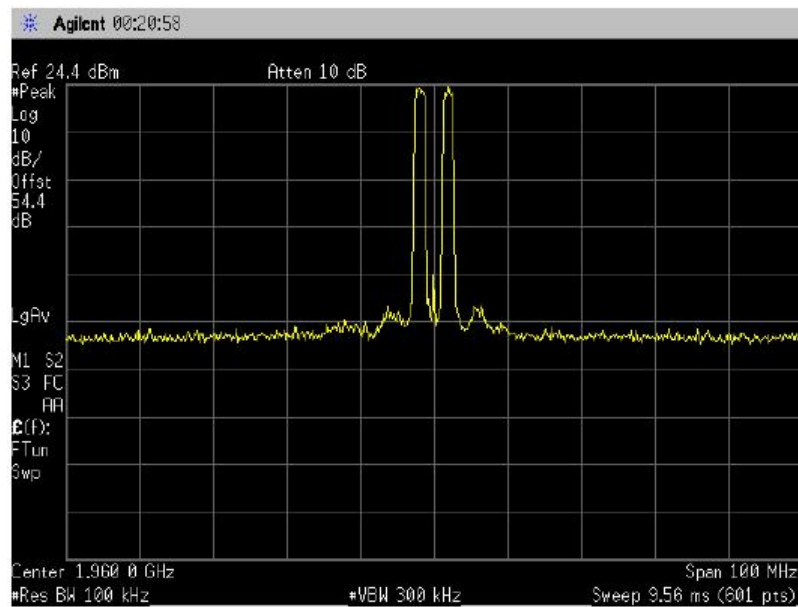
3rd Order Intermodulation products, Lower and Upper band edge checks

UL/DL: Down link

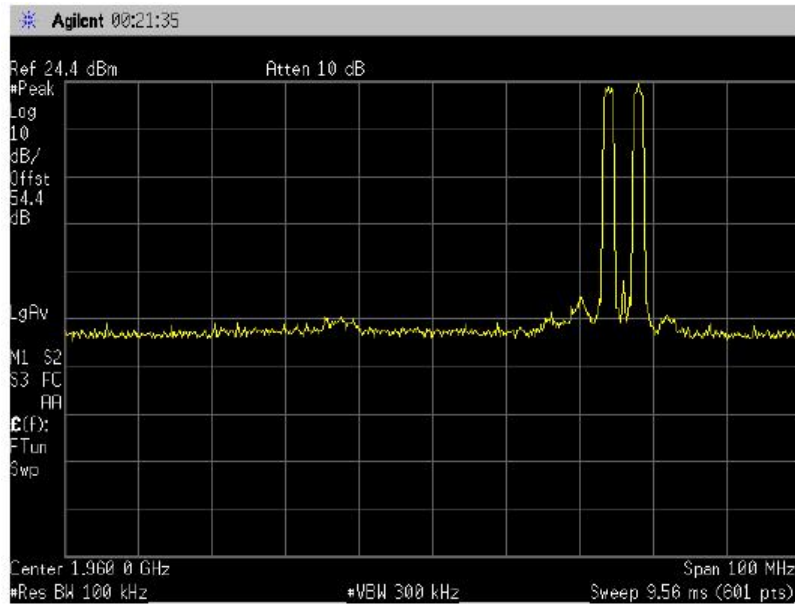
Modulation type: CDMA



Low channel

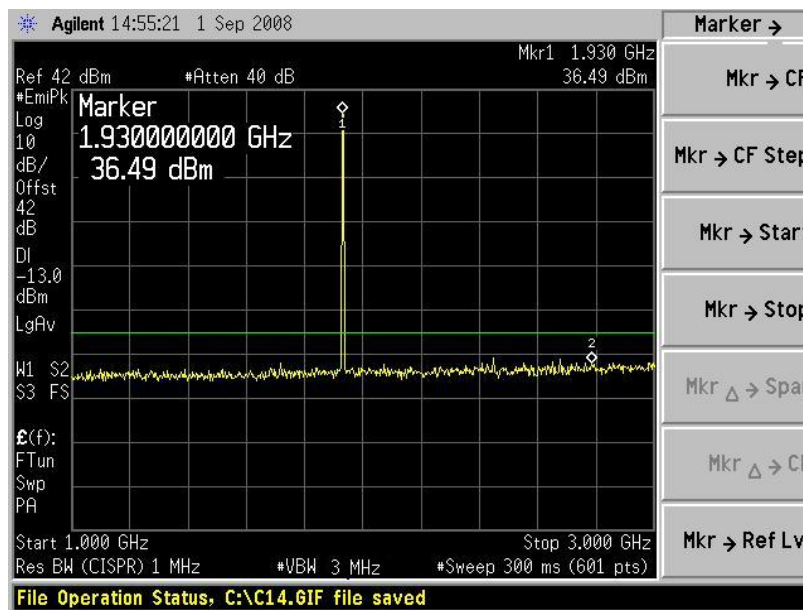


Middle channel

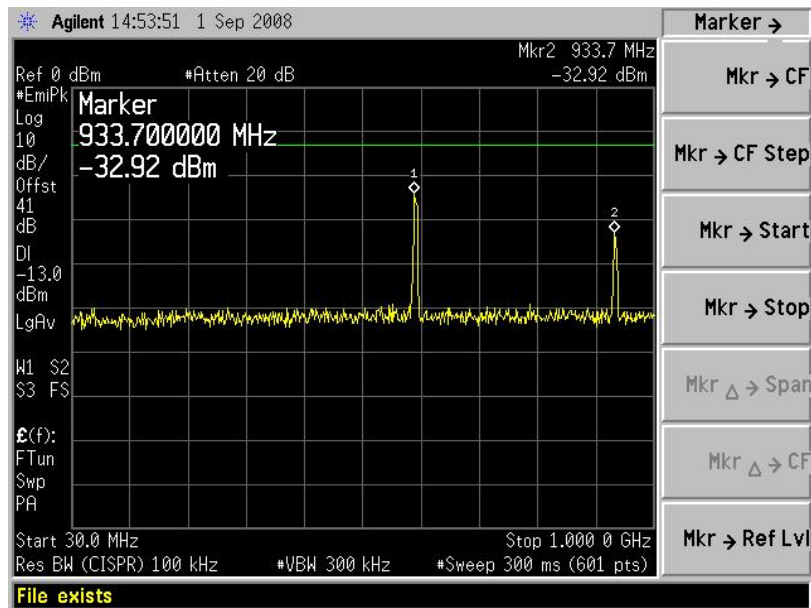


High Channel

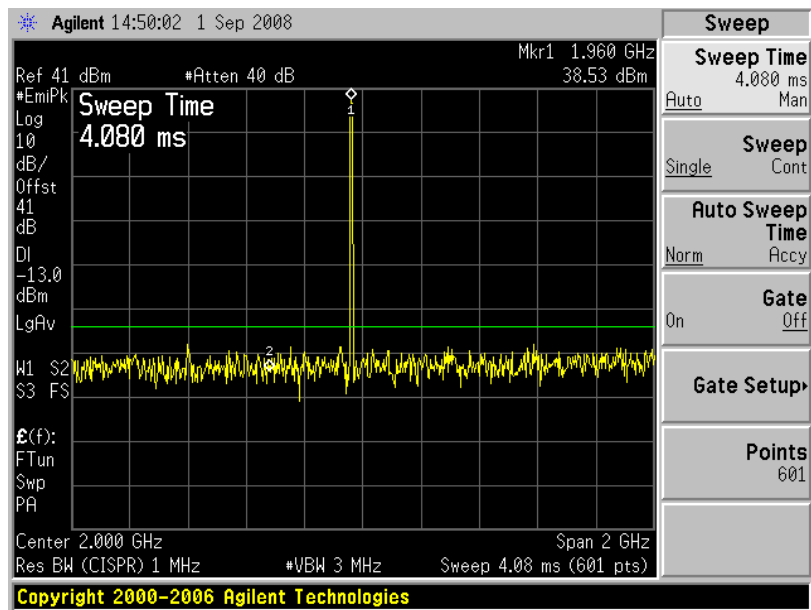
Spurious Emissions of output Terminal



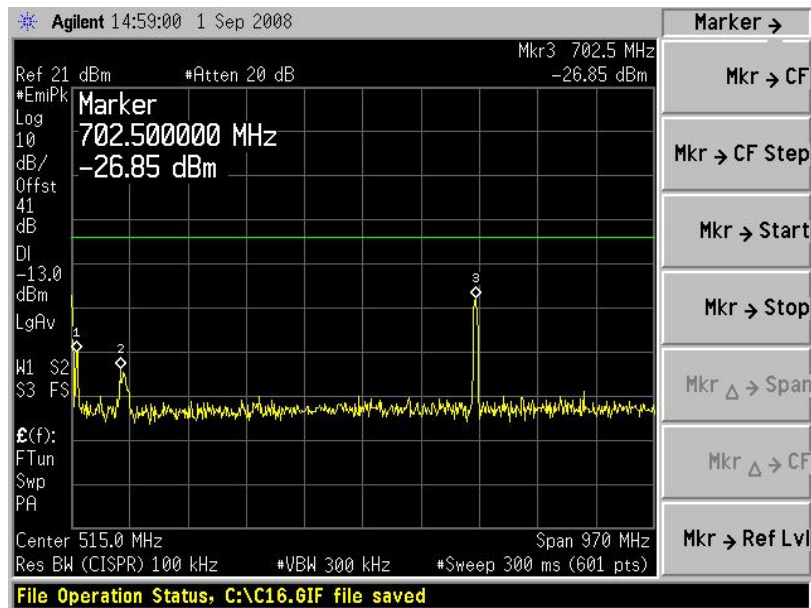
1930MHZ



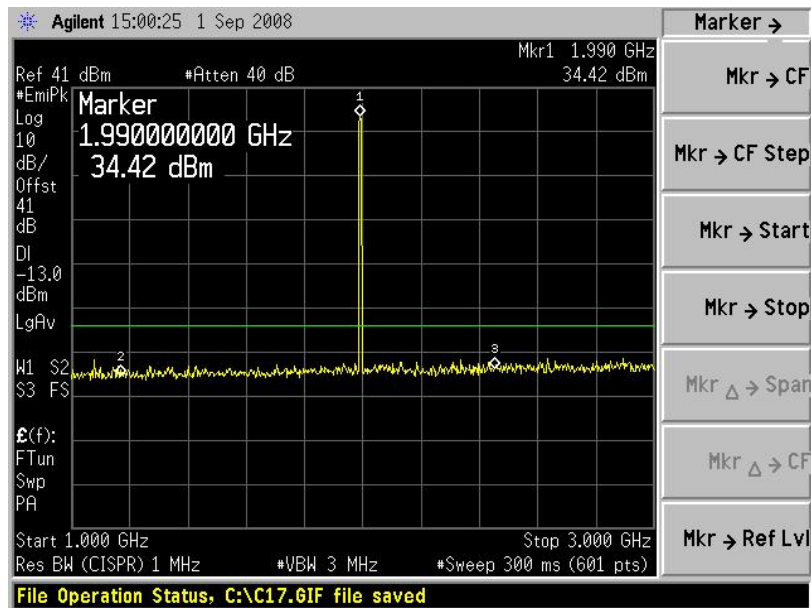
Below 1GHZ



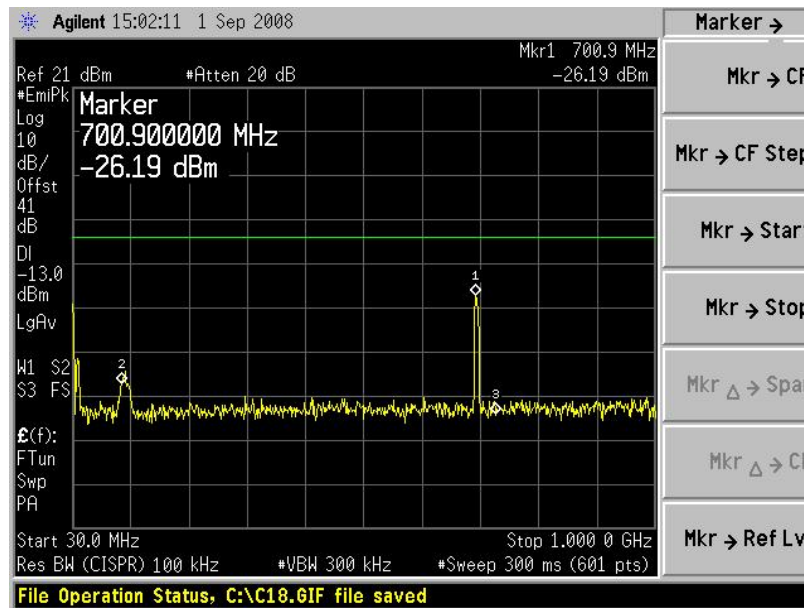
1960MHZ



Below 1GHZ



1990MHZ



Below 1GHZ

12. Radiated spurious emission

12.1 Measurement Procedure

For more detail, please see the TIA603

12.2 Specifications

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

12.3 Test results

All emissions at least have 20 dB margin below the limit.

Additional observations:

The spectrum was searched from 30MHz to 10th harmonic and the EUT was assessed at low, middle and high channels.

All measurements were performed using a peak detector with 100 KHz RBW Below 1GHZ and 1MHz above 1GHZ at a distance 3 meters.

13. Frequency Stability

13.1 Measurement Procedure

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

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

13.2 Test setup

None

13.3 Specifications

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

13.4 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.

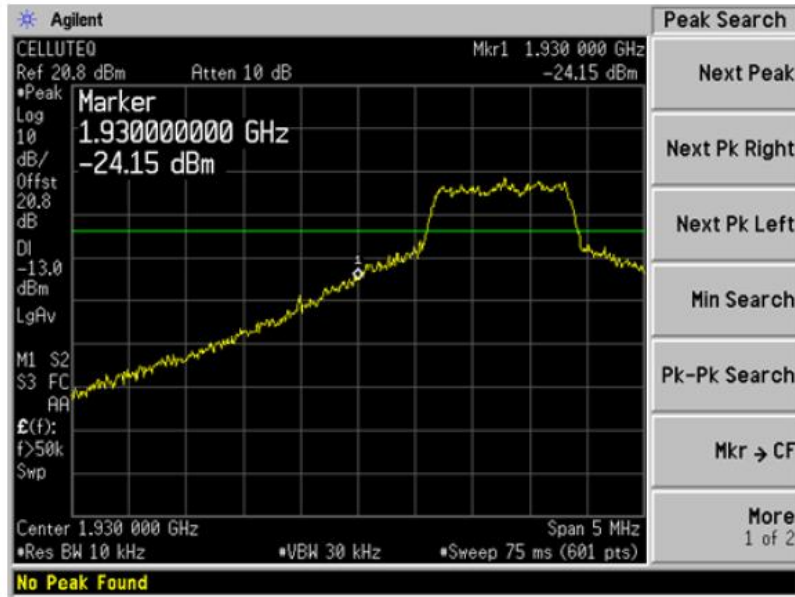
14. Band edge

14.1 Specifications

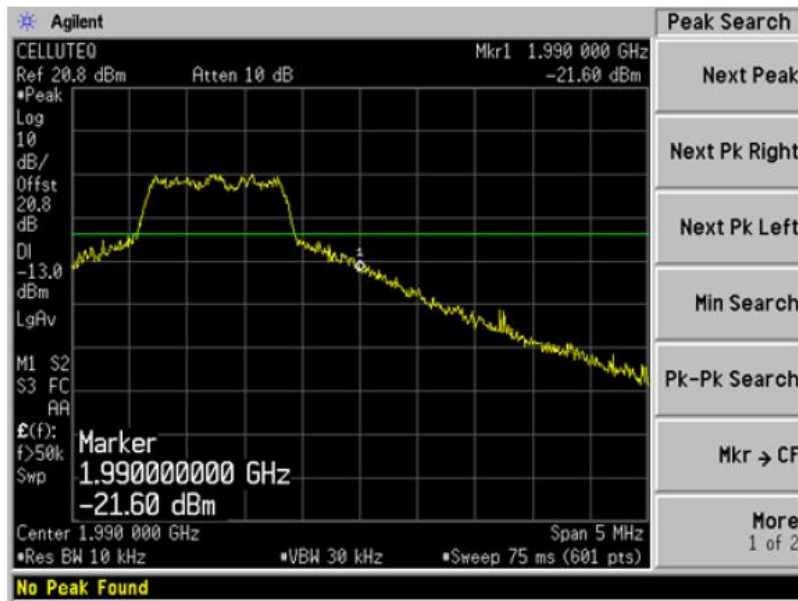
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

14.2 Test result

Please see the attached plots



Low frequency



High frequency

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP
RADIATED 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

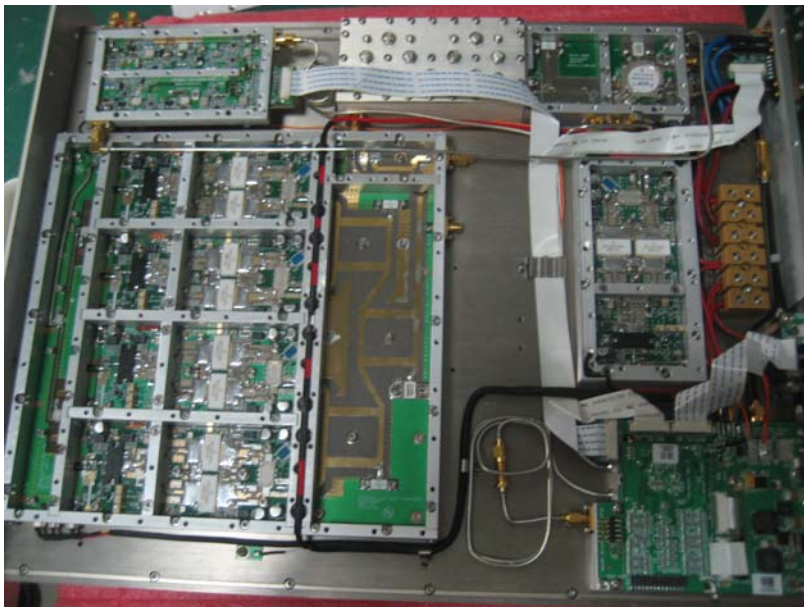


APPENDIX 3 INTERNAL PHOTOGRAPHS OF EUT

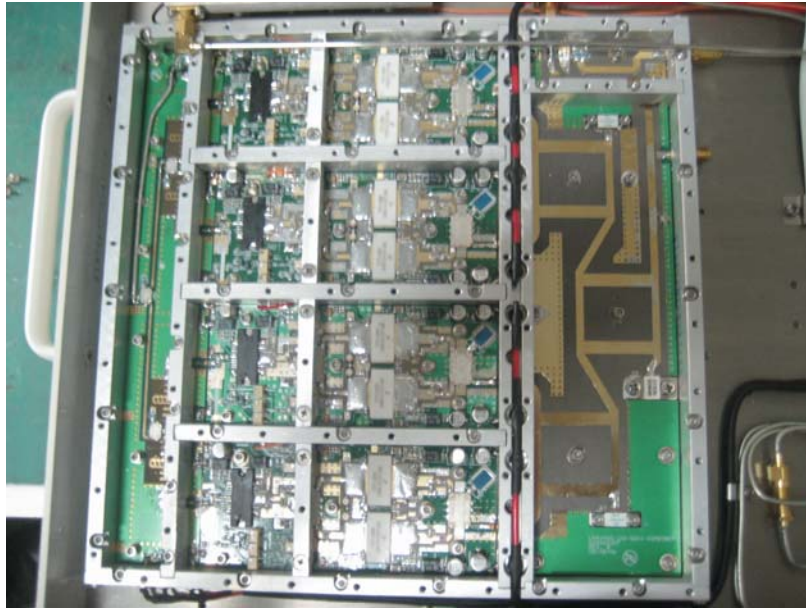
Whole Internal view1 of EUT



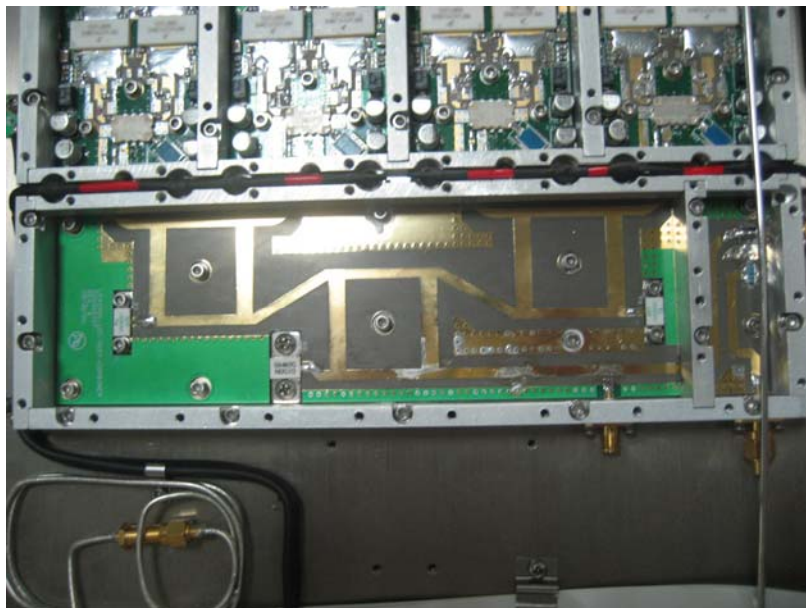
Whole Internal view2 of EUT



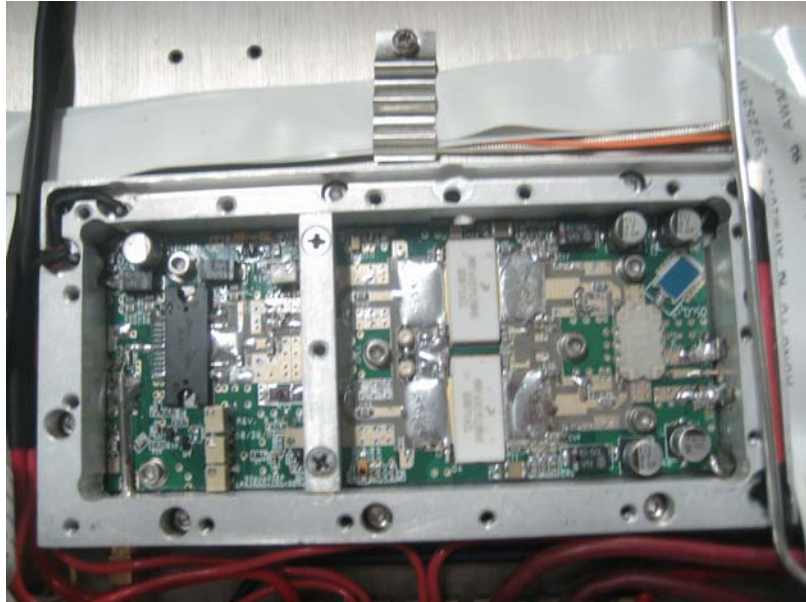
Internal view 1



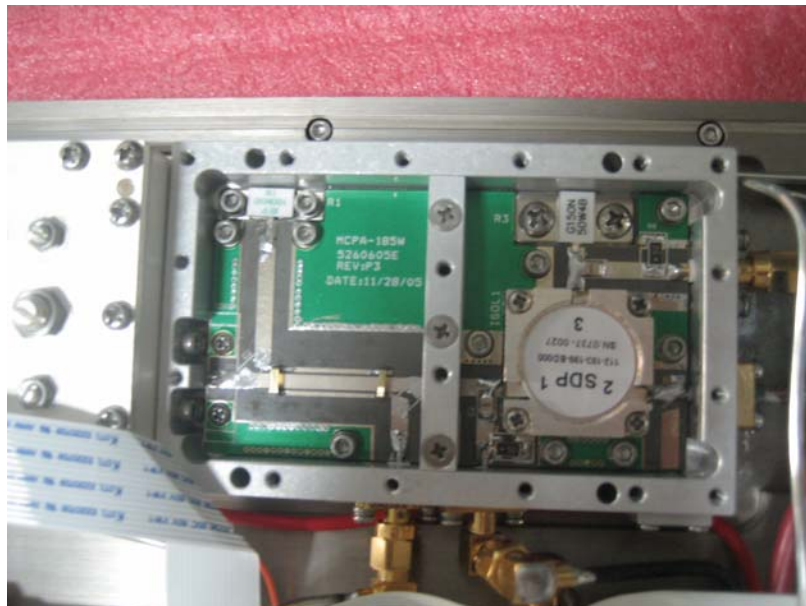
Internal view 2



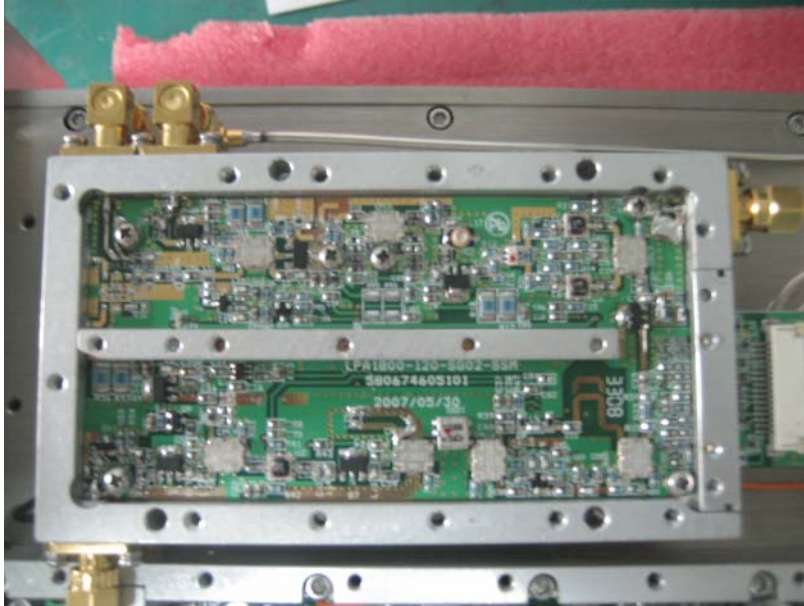
Internal view 3



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	06/07/2008	06/06/2009
Spectrum Analyzer	Agilent	E4443A	MY46185649	06/29/2008	06/28/2009
Biconilog Antenna	ETS	3142C	920250	05/30/2008	05/29/2009
ETS Horn Antenna	ETS	3117	57410	05/30/2008	05/29/2009
Multi device Controller	ETS	2090	00057230	06/07/2008	06/06/2009
Signal Generator	IFR	2023B	0211467	06/07/2008	06/06/2009
Signal Generator	Agilent	E4438C	MY45095744	06/07/2008	06/06/2009

----End of the report----