

REV	Δ	Description	Sheet Effected	Date	Drawn	Checked
A				25.07.04	D.Lanuel	S.Cohen

EMC Laboratory

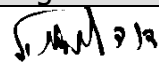


# GigAccess 900 RSU

Manufactured by  
WaveIP Ltd.

EMC Test Report

According FCC Part 15 Requirements

JULY 2004

	Function/Title	Name	Signature	Date
Prepared by	Test Engineer	D.Lanuel		25.07.04
Checked by	Test Engineer	D.Lanuel		25.07.04
Approved by	EMC Lab. Manager	S.Cohen		26.07.04

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## 1 GENERAL Information

### a. Description of equipment under test.

Equipment Under Test:	GigAccess 900 RSU
FCCID	QQ2-GA900-RSU
Manufacturer:	WaveIP.
Serial Numbers:	0-50-C2-1C-C435
Mode of Operation:	TX MODE
Operating frequency:	902-928MHZ
Year of Manufacture:	2004

### b. Applicant Information:

Applicant:	WaveIP Ltd.
Applicant Address	TAVOR Building YOKNEAM
Telephone:	+972-4-9937333
FAX:	+972-4-9592614
The testing was observed by:	Yoram Singer
Following applicant's personnel:	Yoram Singer

### c. Test Performance:

Date of reception for testing:	07.07.04
Dates of testing	07.07.04-20.07.04
Test Laboratory Location	TADIRAN EMC LAB , Hashoftim 26 Holon 58102 ISRAEL Tel: 972-3-5574476 Fax: 972-3-5575320

Applicable EMC Specification:	Federal Communication Commission (FCC), Code of Federal Regulations 47,
FCC Docket 89-103,Part 15:	Radio Frequency Devices, Sections 15.109, 15.209 & 15.207, 15.205, 15.247.

## 2 Test Summary and Signatures.

TADIRAN EMC Laboratory has completed testing of E.U.T in accordance with the requirements of the FCC 15.247

The E.U.T was found to comply with the requirements of the FCC Part 15.247 Regulations given below

Test Description	Specification Reference	Date of Testing	Test Report Paragraph	Compliance PASS/FAIL
Occupied 6dB Bandwidth	15.247 (a) (2)	07/07/04	4	PASS
Max peak output power	15.247 (b) (3)	07/07/04	5	PASS
Out of band Conducted emission	15.247 (c)	07/07/04	6	PASS
Spurious emission radiated In Restricted band	15.209 15.205(a ,c)	11/07/04- 20/07/04	7	PASS
Peak power spectral density	15.247 (d)	20.07.04	8	PASS
Unintentional radiated emission	15.109	20.07.04	9	PASS
Power leads Conducted emission	15.207, 15.107	20.07.04	10	PASS

a. **Test performed by:**

Mr. D. Lanuel Test Engineer



b. **Test Report prepared by:**

Mr. D. Lanuel Test Engineer



c. **Test Report Approved by:**

Mr. Samuel Cohen EMC Lab. Manager



### 3 EUT Description

#### a. General

**Model Number(s): GigAccess 900 RSU**

**Brief Description (Purpose of Device):**

GigAccess™ 900 is WaveIP's wireless point-to-multipoint broadband communication system. The basic subsystem –a Sector, consists of an AU (Access Unit) and up to 128 SUs (Subscriber Units). Each with full-duplex communication SUs and the WAN via the AU

**For detailed description see GigAccess™ 900 and 900A RSU User Guide.**

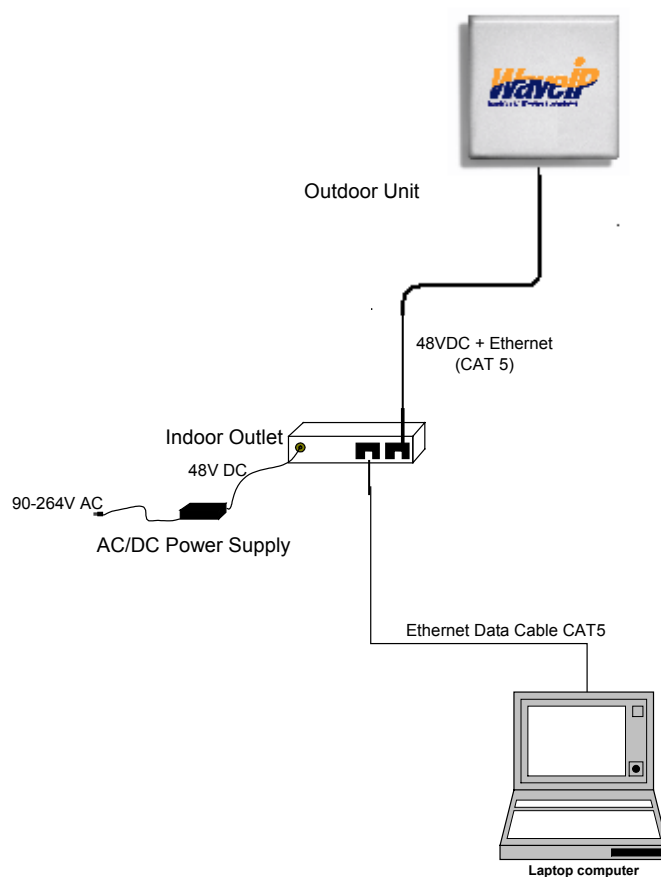
#### b. General Information:

- (1) Intended Environment: Outdoor
- (2) Operating Temperature Range: 0°C - +40°C
- (3) Physical Dimensions of Unit: 160 x 160 x 45 mm (with 6.5 dBi integrated antenna)

**EUT ports and lines1Table**

Port type	Port description	Connector type	Quan.	Cable type description	Cable length, m	Connected to
GigAccess Data input	Ethernet 802.3	RJ45	2	CAT 5 Shielded	Up to 100m	Any NIC
GigAccess Power input	3.3V DC	DC Jack	1	DC Standard	2m	AC/DC Unit input
AC/DC Unit input	90-264V AC	AC Jack	1	AC standard	2m	Power Wall Socket

## EUT test configuration1Figure



### c. RF Software Version: PCB-V10

### d. Transmitter description

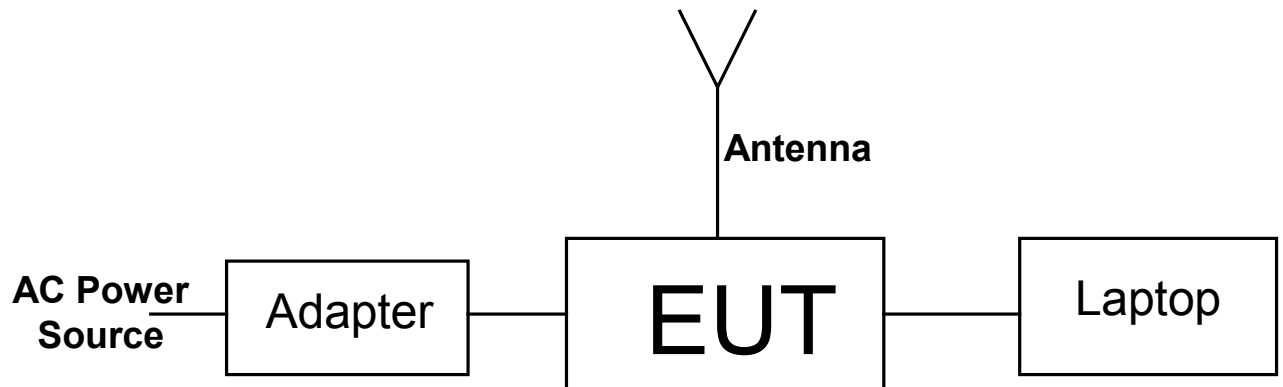
#### (1) Radio Specifications

Operating Frequency	902-928MHz ISM band
Output Power	Up to 30 dBm (at antenna port)
RF Waveform	Direct Sequence Spread spectrum (DSSS)
Number of Channel	7(912-918) in GA_900_RSU 15(907-923) in GA_900A_RSU
RF Cannel Spacing	1MHz
Type of modulation	DQOSK, 16CCK1, 256 CCK
Data Rate	11 Mbps, 5.5 Mbps in GA_900_RSU 5.5 Mbps, 2 Mbps in GA_900A_RSU
EIRP	36 dBm(max)
Antenna Gain	6.5 dbi

#### (2) Transmitter Power Source Adapter 220VAC/3.3VDC

e. **E.U.T Test Configuration**

EUT test configuration is shown in figure bellow



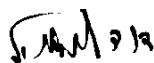
f. **E.U.T Mode of Operation description**

- (1) GA\_900\_RSU (912-918) -Transmit and Standby
- (2) GA\_900A\_RSU (907-923) -Transmit and Standby

#### 4 Occupied Bandwidth for DSSS System According to 15.247(a) (2)

E.U.T: GigAccess 900 RSU S/N:00-50C2-1C-C435  
Test Method: ANSI 63.4  
Date: 07/07/04  
Relative Humidity: 32%  
Ambient Temperature: 23°C  
Air Pressure: 1046hpa

**Testing Engineer:** D.Lanuel



**Date** 20/07/04

##### a. Test Results Summary & Conclusions

The E.U.T was found in compliance with OCCUPIED BANDWIDTH REQUIREMENTS

##### b. Limits of bandwidth

The test unit shall meet the limits of Table 4.b

Table 4.b Limits For Bandwidth

Operating Frequency (MHz)	Minimum allowed bandwidth
902 - 928	≥500KHz for 6dbc

##### c. Test Results

Table 4.c Bandwidth Test Result for GA\_900\_RSU mode

Frequency (MHz)	Bandwidth (MHz)	Bandwidth Max Limit (KHz)	Plot Results	PASS/F AIL
912	11.88	≥500KHz	Plot-1	PASS
			Plot-2	
915	11.13		Plot-3	PASS
			Plot-4	
918	10.75		Plot-5	PASS
			Plot-6	

Table 4.c1 Bandwidth Test Result for GA\_900A\_RSU mode

Frequency (MHz)	Bandwidth (MHz)	Bandwidth Max Limit (KHz)	Plot Results	PASS/F AIL
907	6.5	≥500KHz	Plot-7	PASS
915	7		Plot-8	PASS
923	7		Plot-9	PASS



d. **Test Instrumentation and Equipment**

Table 4.d Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Broadband Antenna	BTA-L	FRANKONIA	10.04.06
20 dB attenuator	2525-200	ATM	18.03.06
20 dB attenuator	2525-200	ATM	18.03.06

e. **Test Procedure**

The EUT output was connected to the spectrum analyzer through 40 dB attenuator, The test set up are shown in figure 4e bellow

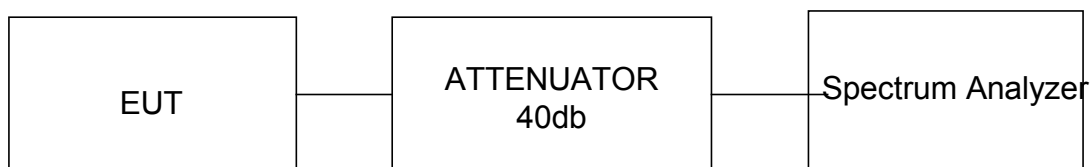


Figure 4e Test Setup for Occupied Bandwidth test

## 5 Maximum peak output power test according 15.247(b)(3)

E.U.T: GigAccess 900 RSU S/N:00-50C2-1C-C435  
 Test Method: ANSI 63.4  
 Date: 07/07/04  
 Relative Humidity: 32%  
 Ambient Temperature: 23°C  
 Air Pressure: 1046hpa  
 Test Setup: Figure 6.c.1

**Testing Engineer:** D.Lanuel



**Date** 20/07/04

### a. Test Results Summary & Conclusions

The E.U.T was found in compliance with peak output power requirement

### b. Limits

The test unit shall meet the limits of Table 5.b.

Table 5.b Limits For Fundamental

Operating frequency range (MHz)	Peak Max Limits (dBm)
902 - 928	30 (1W)

### c. Test Results

Table 5.c Peak output power Result for GA\_900\_RSU mode 1

Frequency (MHz)	Peak Result	Peak Limits	Margin (dB)	Plots Result	Pass/Fail
912MHz	29.85*	30 dBm (1W)	0.15	Plot 10-12	PASS
915MHz	29.66*		0.34	Plot 13-15	PASS
918MHz	29.70*		0.30	Plot 16-18	PASS

\*See calculation bellow-based on test procedure paragraph 5e

Table 5.c1 Peak output power Result for GA\_900A\_RSU mode 2

Frequency (MHz)	Peak Result	Peak Limits	Margin (dB)	Plots Result	Pass/Fail
907MHz	29.80*	30 dBm (1W)	0.2	Plot-19	PASS
915MHz	29.53*		0.47	Plot-20	PASS
923MHz	29.57*		0.43	Plot-21	PASS

\*See calculation bellow-based on test procedure paragraph 5e

(1) 912MHz peak power calculation –based on plot-7

- a) *BW correction factor is:*  $10\log 6\text{dB BW of emission/analyzer RBW}$   
b)  $10\log 11.6/3=5.87$   
c) *Output power:*  $23.98+5.87=29.85$

(2) 915MHz peak power calculation – based on plot-8

- a) *BW correction factor is:*  $10\log 6\text{dB BW of emission/analyzer RBW}$   
b)  $10\log 10.95/3=5.63$   
c) *Output power:*  $24.03+5.63=29.66$

(3) 918MHz peak power calculation – based on plot-9

- a) *BW correction factor is:*  $10\log 6\text{dB BW of emission/analyzer RBW}$   
b)  $10\log 11.25/3=5.74$   
c) *Output power:*  $23.96+5.74=29.70$

(4) 902MHz peak power calculation – based on plot-9

- a) *BW correction factor is:*  $10\log 6\text{dB BW of emission/analyzer RBW}$   
b)  $10\log 7.75/3=4.12$   
c) *Output power:*  $25.68+4.12=29.80$

(5) 915MHz peak power calculation – based on plot-9

- a) *BW correction factor is:*  $10\log 6\text{dB BW of emission/analyzer RBW}$   
b)  $10\log 7.65/3=4.06$   
c) *Output power:*  $25.47+4.06=29.53$

(6) 923MHz peak power calculation – based on plot-9

- a) *BW correction factor is:*  $10\log 6\text{dB BW of emission/analyzer RBW}$   
b)  $10\log 7.5/3=3.98$   
c) *Output power:*  $25.59+3.98=29.57$

d. **Test Instrumentation and Equipment**

Table5.d Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Broadband Antenna	BTA-L	FRANKONIA	10.04.05
20 dB attenuator	2525-200	ATM	18.03.06

**e. Test Procedure**

- (1) Spectrum analyzer measured the transmitter peak output power while the RBW of analyzer is 3MHz and the RBW of transmitter is 20MHz.
- (2) When the analyzer RBW is not large enough as required. The peak output power procedure is as follows:
  - a) *Set the RBW and VBW to the maximum available.*
  - b) *Set the band limit to 6 dB*
  - c) *Set sweep to automatic*
  - d) *Set the span just enough to capture the emission*
  - e) *Use the peak detector on max hold*
  - f) *Set the analyzer on linear mode display*
  - g) *Let the emission stabilize before making a final reading*

**BW correction factor is:  $10\log 6 \text{ dB BW of emission/analyzer RBW}$**

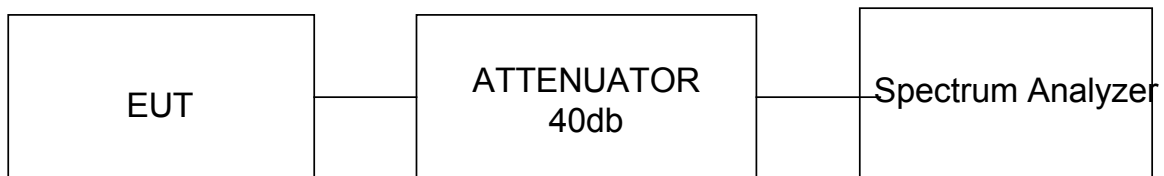
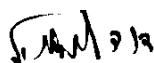


Figure 5e Test Setup for Peak output power

## 6 Out of band conducted emission test according to 15.247(c)

E.U.T: GigAccess 900 RSU S/N:00-50C2-1C-C435  
 Test Method: ANSI 63.4  
 Date: 07/07/04  
 Relative Humidity: 29%  
 Ambient Temperature: 21°C  
 Air Pressure: 1053hpa  
 Test Setup: Figure 6.c.1

**Testing Engineer:** D.Lanuel



**Date** 20/07/04

### a. Test Results Summary & Conclusions

The E.U.T was found in compliance with Out of band conducted emission test according to 15.247(c)

### b. Limits of out of band conducted emission according to 15.247 (c)

The test unit shall meet the limits of Table 9.b.

Table 6.b Limits For 15.247(c)

Frequency range (MHz)	Limits (dB $\mu$ V/m)
0.009 – 9200	110 (20 dB below peak power)

### c. Test Results

Table 6.c Results for GA\_900\_RSU mode

Operating Frequency (MHz)	Frequency range (MHz)	Results (dB $\mu$ V/m)	Plots Result
915MHz	0.009 – 9200	All emission were found Min 30 dB below the specified limits	20 - 31

Table 6.c1 Results For GA\_900A\_RSU mode

Operating Frequency (MHz)	Frequency range (MHz)	Results (dB $\mu$ V/m)	Plots Result
915MHz	0.009 – 9200	All emission were found Min 30 dB below the specified limits	32 - 41

d. **Test Instrumentation and Equipment**

Table 6.d Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
20 dB attenuator	2525-200	ATM	18.03.06
20 dB attenuator	2525-200	ATM	18.03.06

e. **Test Procedure**

The EUT output was connected to the spectrum analyzer through 40 dB attenuator. The test set up is shown in figure 6e bellow.

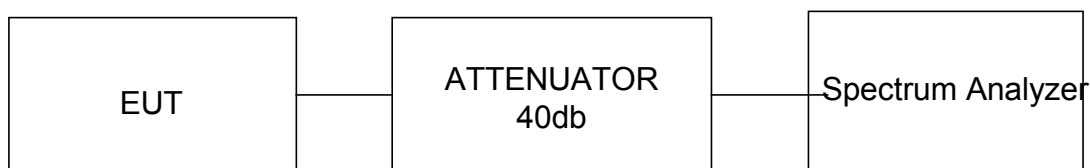


Figure 6e Test Setup for Conducted emission

## 7 Radiated emission in restricted bands test according 15.247(c), 15.205 and 15.209

E.U.T:	GigAccess 900 RSU S/N:00-50C2-1C-C435
Test Method:	ANSI 63.4
Date:	07/07/04
Relative Humidity:	32%
Ambient Temperature:	23°C
Air Pressure:	1046hpa
Test Setup:	Figure 6.c.1

**Testing Engineer:** D.Lanuel

*[Signature]*

**Date** 20/07/04

### a. Test Results Summary & Conclusions

The E.U.T was found in compliance with radiated emission restricted band test

- b. **Limit:** Radiated emission, which fall in the restricted bandwidth must comply with 15.209(a) Limits. See limits in table 8c bellow.

Table 7.b Limits For 15.209 Class B equipment

Frequency Range (MHz)	Quasi-peak Limits (dB $\mu$ V/m)
0.009 – 1.705	128 - 70
1.705 - 30	70
30 - 88	40
88 - 216	43
216 - 960	46
960 - 2000	54

### c. Results

#### (1) Preliminary Results

Table 7.c1 Preliminary test results

Configuration	Transmitting Frequency	Frequency Range	Plots Results	PASS/FAIL
GA_900_RSU	912MHz	9KHz-9.2GHz	42 - 54	PASS
	915MHz		55 - 66	PASS
	918MHz		67 - 79	PASS
GA_900A_RSU	907MHz		80 - 92	PASS
	915MHz		93 - 104	PASS
	923MHz		105 - 117	PASS

#### (2) Final Test Results

Table 7c2 Six Highest for GA\_900\_RSU

Transmit Freq (MHz)	Freq. MHz	QP Reading (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity /Height	Angle
912MHz	33.85	27.2	100*	>20	V/1.3m	252
	87.99	34.5	100*	>20	V/1	0
915MHz	33.99	36.5	100*	>20	V/1.27	247
	87.99	36.1	100*	>20	V/1	355
918MHz	32.45	33	100*	>20	V/1	0
	43.98	35.4	100*	>20	V/1	0

\*NOT RESTRICTED BAND

Table 7c3 Six Highest for GA\_900A\_RSU

Transmit Freq (MHz)	Freq. MHz	QP Reading (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity /Height	Angle
907MHz	33.05	36	100*	>20	V/1.65m	180
	131.98	38.6	43.5	-4.9	V/1	288
	175.99	41	100*	>20	H/165	108
	219.99	40.9	100*	>20	H/1	216
915MHz	32.18	38.3	100*	>20	V/1.65	329
	131.99	40.3	43.5	-3.2	V/1	288
	175.99	37.8	100*	>20	H/1	252
	219.99	42.3	100*	>20	H/1	252
918MHz	31.84	36.7	100*	>20	V/1/65	252
	131.98	39.2	43.5	-4.3	V/1	288
	175.99	41.5	100*	>20	H/1.65	108
	219.99	40.3	100*	>20	H/1	252

\*NOT RESTRICTED BAND



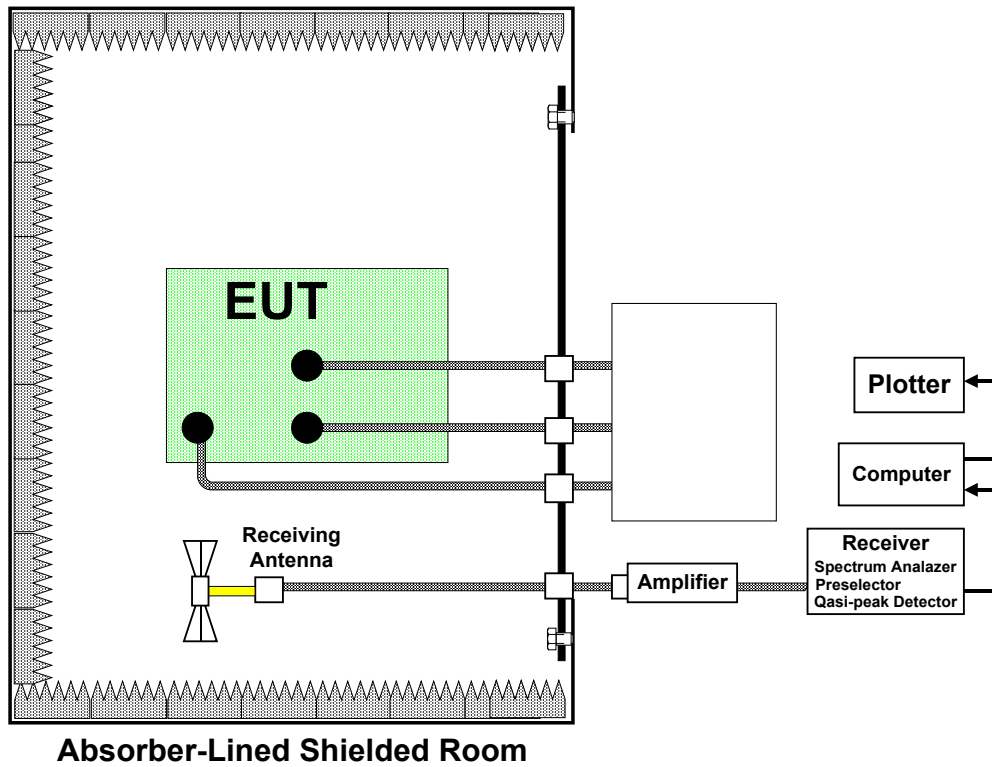
d. **Test Instrumentation and Equipment**

Table 7.d Test Instrumentation and Equipment

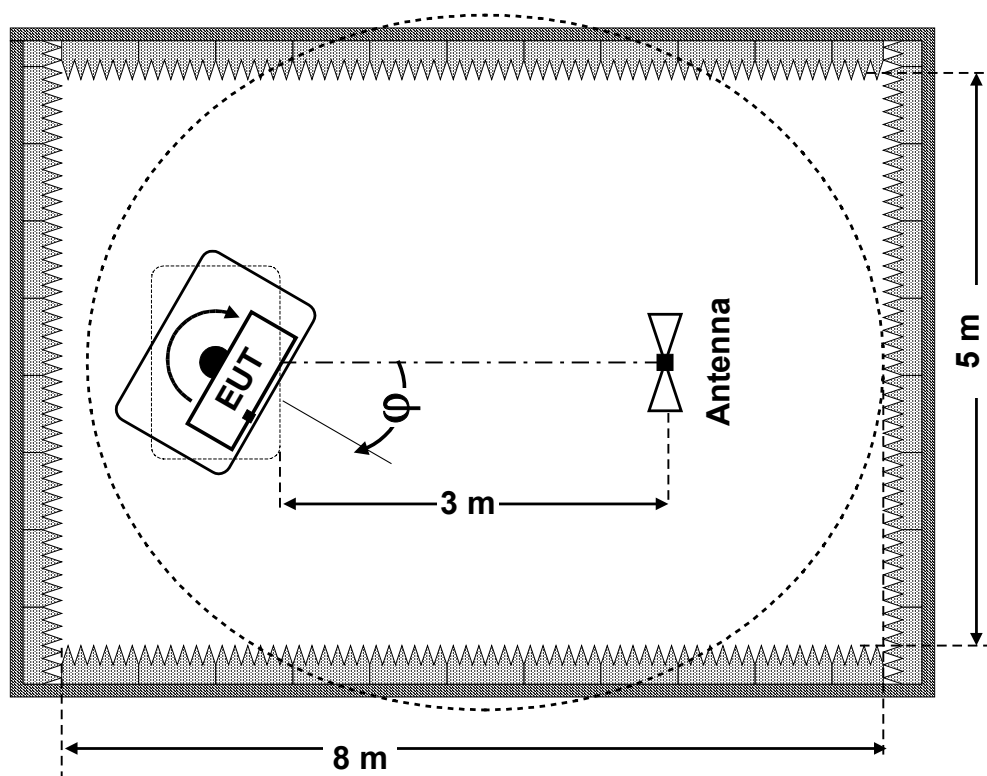
Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Double Ridge Guide Antenna (1-18GHz)	3105	EMCO	24.04.05
Broadband Antenna	BTA-L	FRANKONIA	10.04.05
Low Noise Amplifier (0-1GHz)	AM-1300-N	MITEQ	14.01.05
Low Noise Amplifier (1-4GHz)	AMM 003N	AVANTEK	14.01.05
Low Noise Amplifier (2-6GHz)	MWA-02060	ELISRA	14.01.05
Low Noise Amplifier (6-18GHz)	MWA-06180	ELISRA	14.01.05
Low pass filter 100MHz	LD110	FSY	17.04.05
Low pass filter 700MHz	360A	HP	18.05.05
Band reject filter 902 – 928MHz	BRF 900	TADIRAN	20.05.05
Attenuator 20db	2525-20	ATW	18.03.06
Attenuator 3db	AN9146	WEINSCHTEL	23.06.05
Attenuator 6db	AP2542	WEINSCHTEL	23.06.05

(1) Preliminary test procedure

- a) The measuring system block diagram is shown in Figure 7.a.1.
- b) E.U.T orientation and antenna position shown in Figure 7.a.2



**Figure 7.e.1**

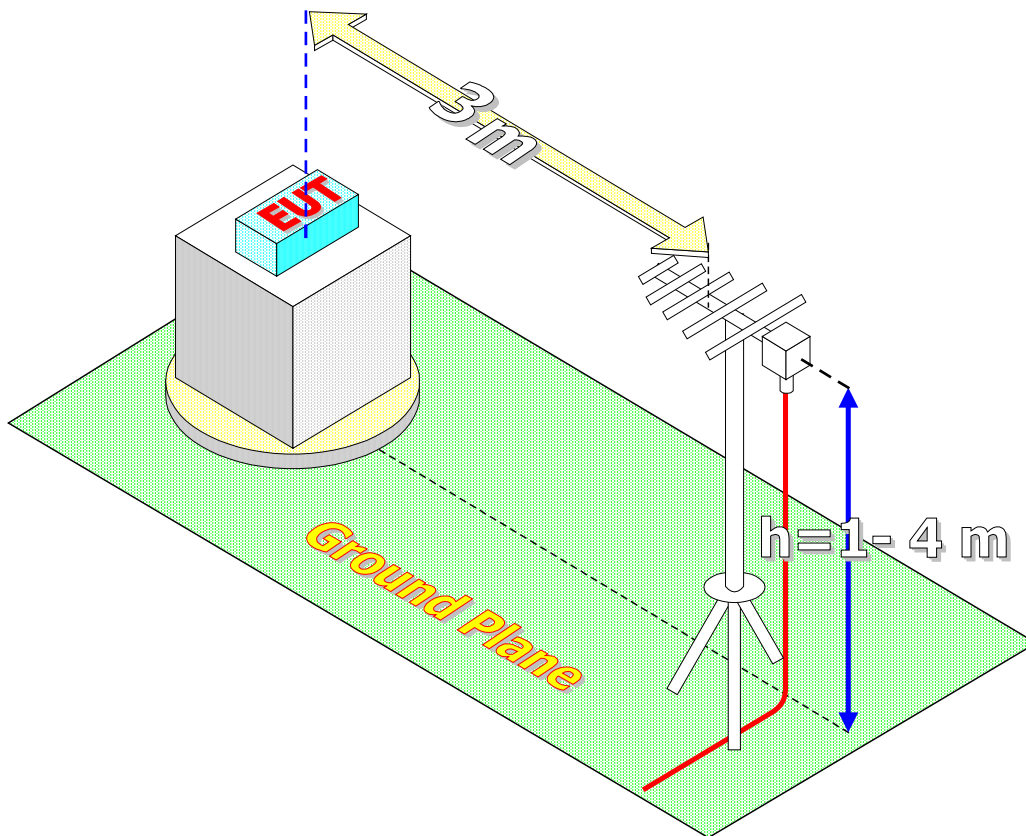
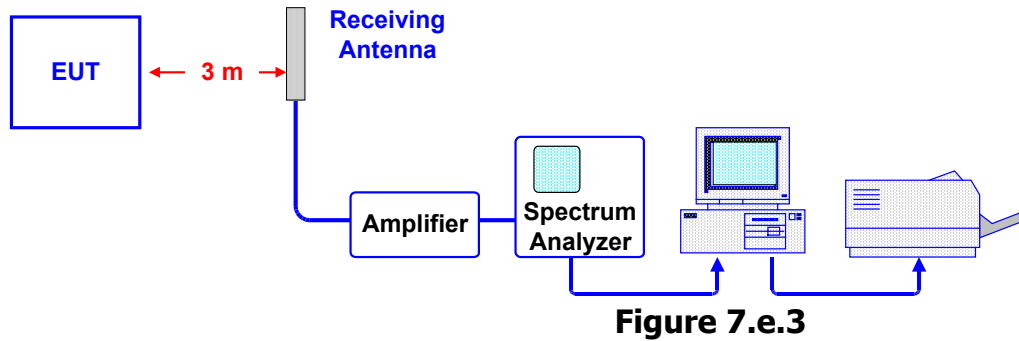


**Figure 7.e.2**

- c) Maintain setup in absorber-lined shielded room as shown in Figures 4.a.1, 4.a.2
- d) Turn on the E.U.T and allow sufficient time for stabilization.
- e) Monitor the frequency range of interest at a fixed antenna height and E.U.T azimuth.
- f) Rotate the E.U.T 360° to maximize the suspected highest amplitude signal.
- g) Move the antenna over its full-allowed range of travel to maximize the suspected highest amplitude signal.
- h) Change the polarity of the antenna and repeat step d and e. compare the result suspected highest amplitude signal with that found for the other polarity. Select and note the higher of the two signals. The signal is termed the highest observed signal with the respect to the limit.
- i) Repeat testing for each operational mode of the E.U.T.
- j) Choose six highest emissions relative to limit and record antenna heights and polarities, E.U.T configuration for each emission frequency.
- k) Perform measurements for selected frequencies using quasi-peak detector.

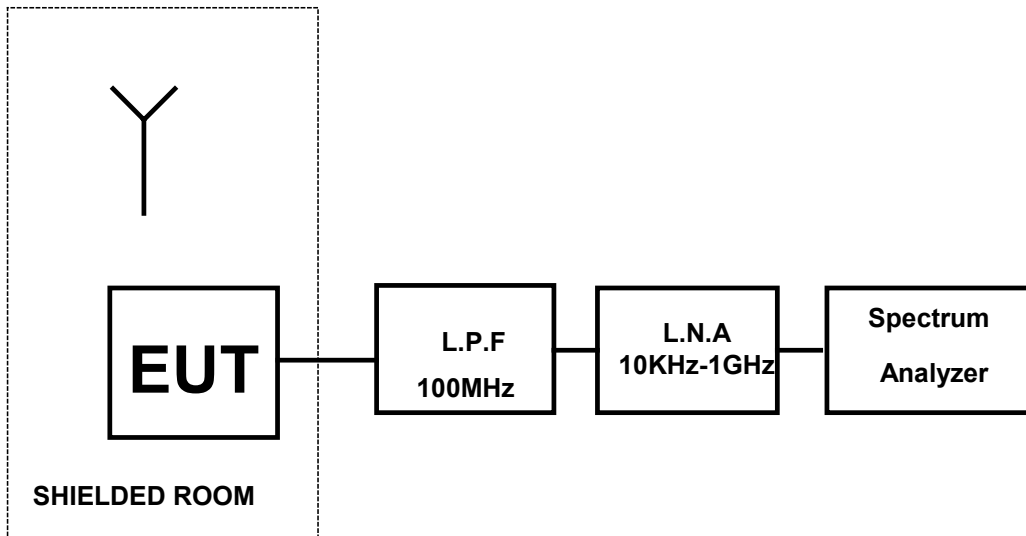
(2) Final test procedure

- a) The measuring system block diagram shown in Figure 7.e.3
- b) E.U.T orientation and antenna position shown in Figure 7.e.4



**Figure 7.f**

(3) Tests Setup



**Radiated emission Test setup for freq range of Figure 7.e.5  
10KHz – 100MHz**

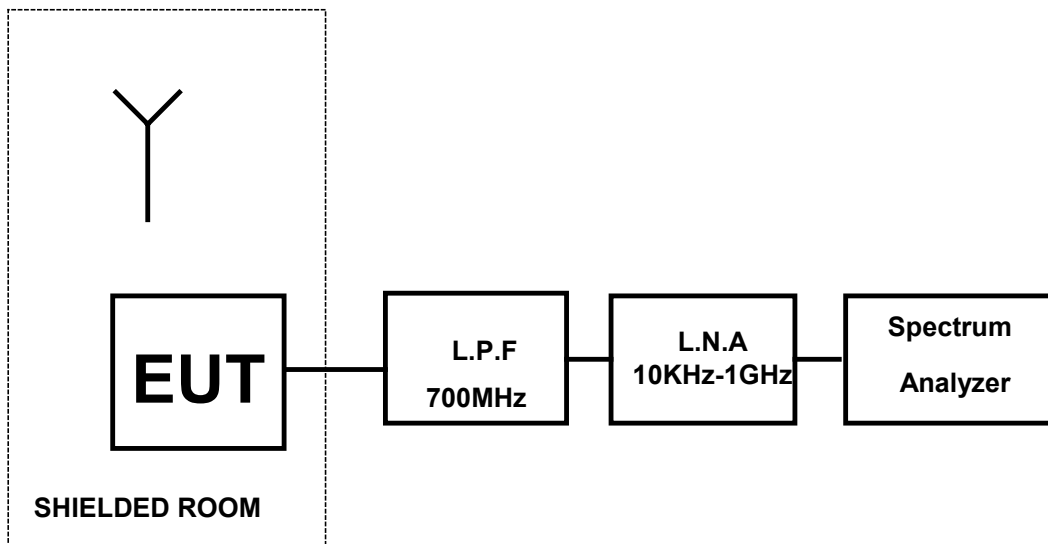


Figure 7.e.6 Radiated emission Test setup for freq range of 100MHz – 700MHz

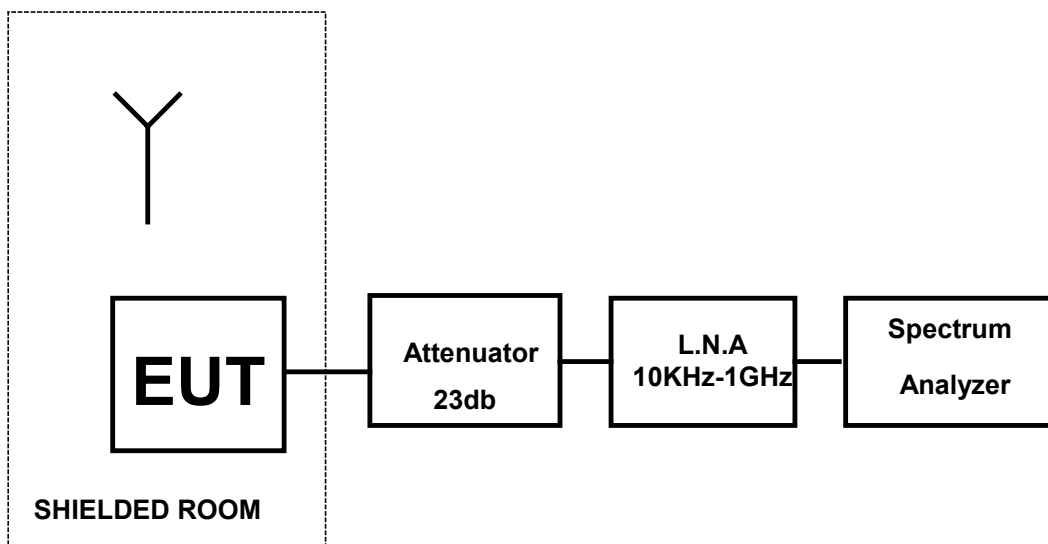


Figure 7.e.7 Radiated emission Test setup for freq range of 960MHz – 1GHz

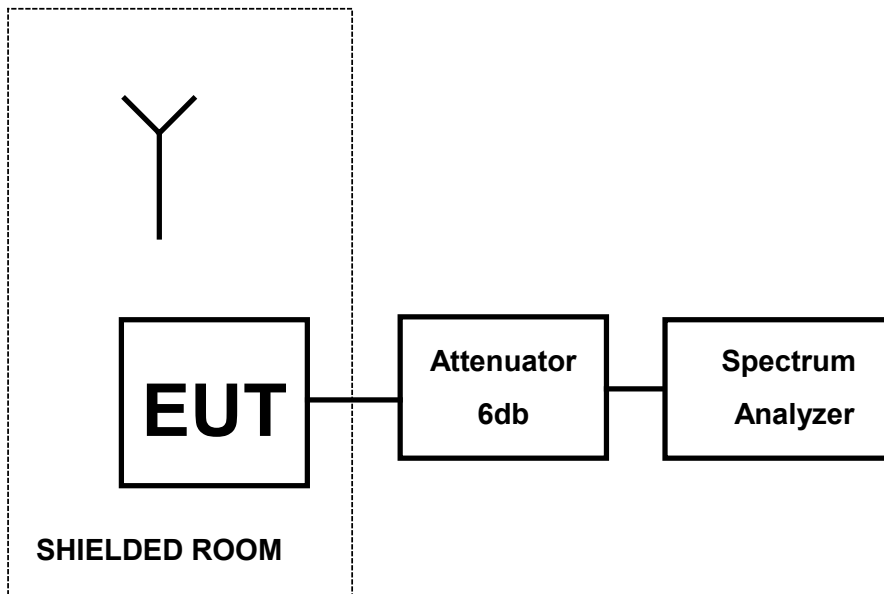


Figure 7.e.8 Radiated emission Test setup for freq range of 1GHz – 2GHz

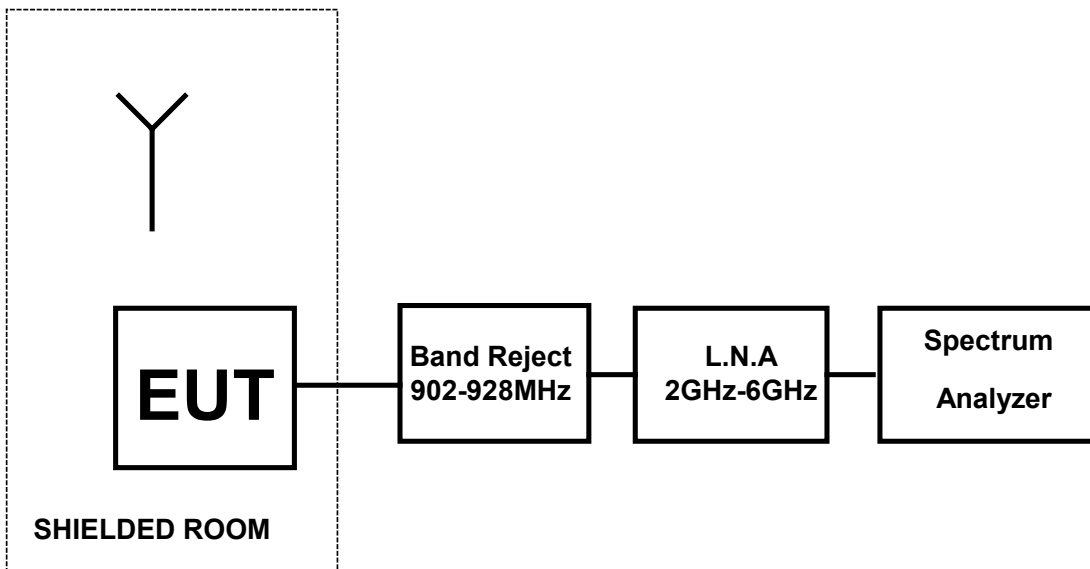


Figure 7.e.9 Radiated emission Test setup for freq range of 2GHz – 6GHz

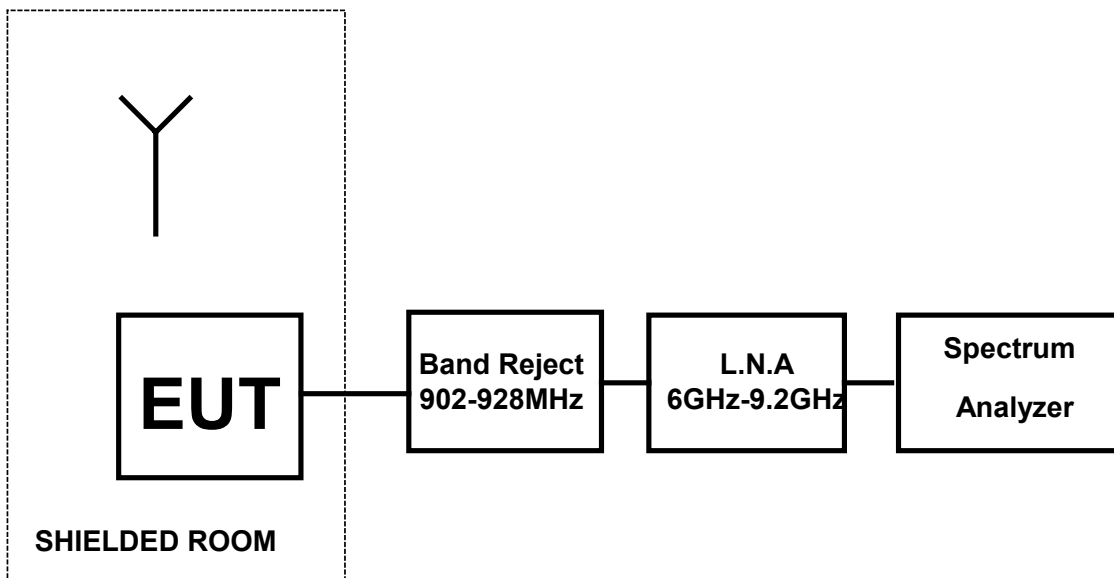
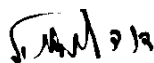


Figure 7.e.10 Radiated emission Test setup for freq range of 6Hz – 9.2GHz

## 8 Peak power spectral density of DSSS according 15.247d

E.U.T: GigAccess 900 RSU S/N:00-50C2-1C-C435  
Test Method: ANSI 63.4  
Date: 07/07/04  
Relative Humidity: 29%  
Ambient Temperature: 21°C  
Air Pressure: 1053hpa  
Test Setup: Figure 6.c.1

**Testing Engineer:** D.Lanuel



**Date** 20/07/04

### a. Test Results Summary & Conclusions

The E.U.T was found in compliance peak power spectral density test

### b. Limit

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmission

### c. Test Results

Table 6.c Results for GA\_900\_RSU mode

Carrier Frequency (MHz)	Measured peak power spectral density (dBm/3KHz)	Plots
912	-0.8 (106.2dBuV)	118, 119
915	-0.8(106.2dBuV)	120,121
918	-0.4(106.6dBuV)	122,123

Table 6.c Results for GA\_900A\_RSU mode

Carrier Frequency (MHz)	Measured peak power spectral density (dBm/3KHz)	Plots
907	4.3	124, 125
915	3.27	126,127
923	2.32	128,129

d. **Test Instrumentation and Equipment**

Table 8.d Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Broadband Antenna	BTA-L	FRANKONIA	10.04.06
20dB attenuator	2525-200	ATM	18.03.06

e. **Procedure**

The EUT RF output was connected to the spectrum analyzer through 40db attenuator according to test setup bellow.

The test was performed with transmitter operating 3-carrier frequency, Fmin-912MHz, Fcenter-915MHz, and Fmax-918MHz.

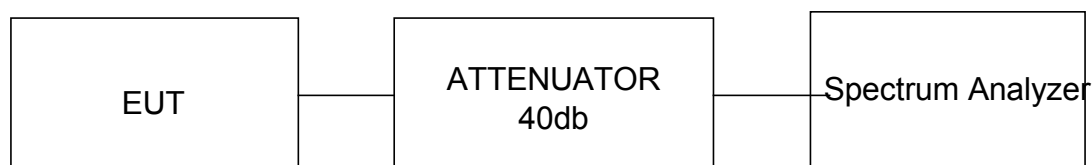


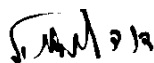
Figure 5e Test Setup for peak power spectral density



## 9 Unintentional radiated emission test according to 15.109

E.U.T: GigAccess 900 RSU S/N:00-50C2-1C-C435  
Test Method: ANSI 63.4  
Date: 07/07/04  
Relative Humidity: 29%  
Ambient Temperature: 21°C  
Air Pressure: 1053hpa  
Test Setup: Figure 6.c.1

**Testing Engineer:** D.Lanuel



**Date** 20/07/04

### a. Test Results Summary & Conclusions

The E.U.T was found in compliance with unintentional radiated emission requirements.

### b. Limit:

Unintentional radiated emission must comply with 15.109Limits. See limits in table 10c bellow.

Table 9.b Limits For 15.109 Class B equipment

Frequency Range (MHz)	Quasi-peak Limits (dB $\mu$ V/m)
30 - 88	40
88 - 216	43
216 - 960	46
960 - 2000	54

### c. Test Results

Table 9.c. Preliminary test results

Configuration	Antenna Polarization	Frequency Range (MHz)	Plots Results	PASS/FAIL
6dBi antenna Integrated	Both	30-1000	130	PASS
		1-2.8GHz	131	PASS
		2.8 – 6GHz	132	PASS
		6GHz – 9.2GHz	-	PASS

Table 9.C1 Six Highest 15.109

Freq. MHz	QP Reading (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity/Height	Angle	Plots
131.99	38	43.5	-5.5	V/1.3m	288	130
180.35	27	43.5	-16.5	H/1.65	72	
224	25.6	46	-20.4	H/1	216	
704.15	29.4	46	-16.6	H/1.65	216	
793.87	33.3	46	-12.7	H/1	216	
879.99	40.2	46	-5.8	V/1	185	

d. **Test Instrumentation and Equipment**

Table 9.d Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Double Ridge Guide Antenna (1-18GHz)	3105	EMCO	24.04.05
Broadband Antenna (30-1000MHz)	BTA-L	FRANKONIA	10.04.05
Low Noise Amplifier (0-1GHz)	AM-1300-N	MITEQ	14.01.05
Low Noise Amplifier (1-4GHz)	SMC-09	MITEQ	14.01.05
Low Noise Amplifier (2-6GHz)	SMC-09	MITEQ	14.01.05
Low Noise Amplifier (6-10GHz)	SMC-09	MITEQ	14.01.05

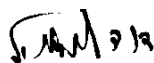
e. **Procedure**

The EUT output was connected to the spectrum analyzer through appropriate low noise amplifier while the EUT is in STBY mode.

## 10 Conducted emission test according to 15.207 & 15.107

E.U.T: GigAccess 900 RSU S/N:00-50C2-1C-C435  
 Test Method: ANSI 63.4  
 Date: 07/07/04  
 Relative Humidity: 29%  
 Ambient Temperature: 21°C  
 Air Pressure: 1053hpa  
 Test Setup: Figure 6.c.1

**Testing Engineer:** D.Lanuel



**Date** 20/07/04

### a. Test Results Summary & Conclusions

The E.U.T was found in compliance with conducted emission power leads requirements.

### b. Limit:

Conducted emission must comply with 15.107 Limits. See limits in table 10b bellow.

Table 10.b Limits For 15.209 Class B equipment

Frequency (MHz)	Quasi-peak Limits (dBμV/m)
0.15 – 0.5	66-56
0.5 - 5	56
5 - 30	60

### c. Test Results

Table 10.c test results

Frequency Range (MHz)	Tested Line	Plots Results	PASS/FAIL
0.15 - 30	PHASE	133	PASS
0.15 - 30	NEUTRAL	134	PASS

Table 10.C1 Six Highest 15.107

Freq. MHz	QP Reading (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Plots
0.631	52.6	56	-3.4	133,134
1.421	53.7	56	-2.3	
1.577	53.8	56	-2.8	
2.359	53.9	56	-2.1	
2.51	54.2	56	-1.8	

d. **Test Instrumentation and Equipment**

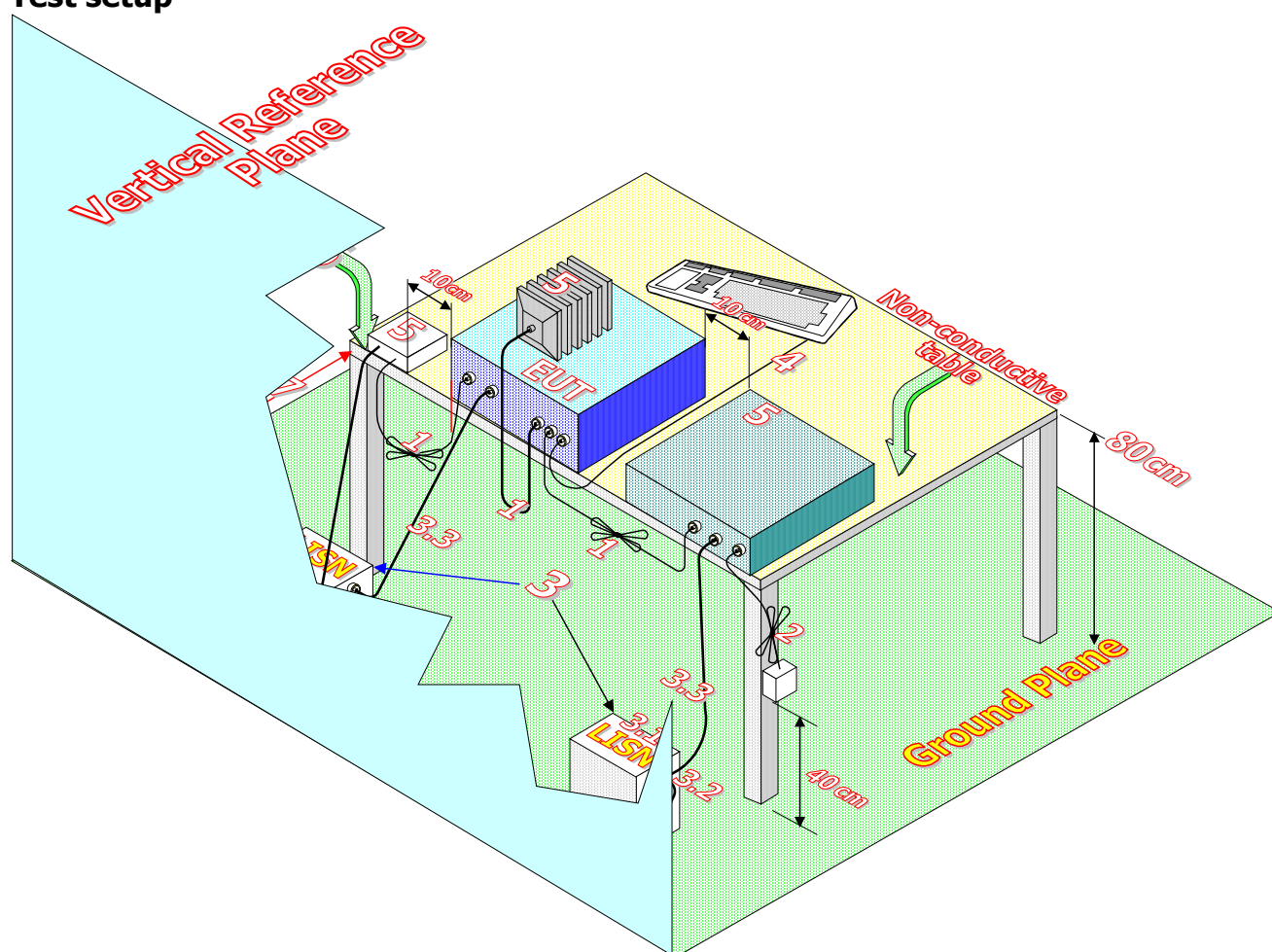
Table 10.d Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
LISN	DC-AC-20A/01	TADIRAN	N.P.C.R
20DB attenuator	2525	ATM	18.03.06

e. **Test Procedure**

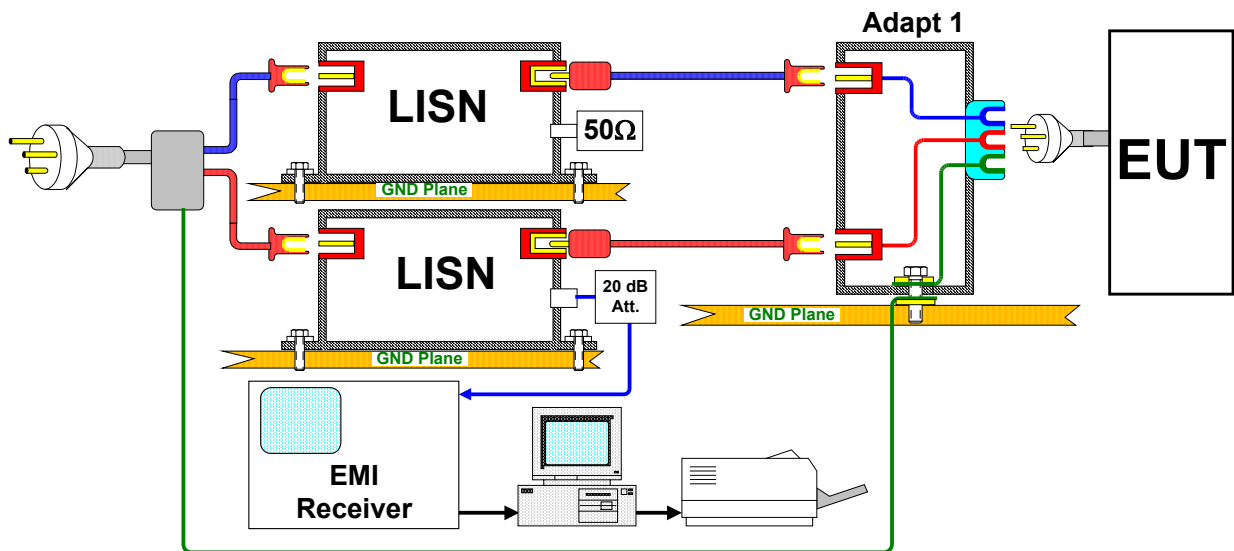
- The EUT was placed on the top of table 1m by 1.5m, raised 0.8 meters above the conducting ground plane
- The rear panel of the EUT was located 40cm to the vertical wall of the screen room
- Each EUT power leads were individually connected through an LISN to the input power source. Unused 50 ohm connector of the LISN was terminated in 50ohm and other was connected to the spectrum analyzer through 20dB attenuator for maximum conducted interference

f. **Test setup**



**Conducted emission Test Configuration Figure 9.e**

- 1 Interconnecting cables that hang closer than 40 cm to the horizontal ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between ground plane and table.
- 2 I/O cables are connected to a peripheral shall be bundled in the center. The end of the cable may be terminated if required using correct terminating impedance.
- 3 The total length shall not exceed 1 m.
- 3 EUT is connected to one LISN. Unused LISN connectors shall be terminated in  $50\ \Omega$ .
- 4 All other equipment powered from second LISN
- 5 A multiple outer strip can be used for multiple power cords of non-EUT equipment.
- 6 LISN at least 80 cm from nearest part of EUT chassis.
- 7 Cables of hand operated devices such as keyboards, mouses; etc. have to be placed as close as possible to the host Non-EUT components being tested.
- 8 Rear of EUT, including peripherals shall be all aligned and flush with the rear tabletop.
- 9 Rear tabletop shall be 40 cm removed from a vertical conducting plane that bonded to the floor ground plane.



**Conducted emission Test setup Figure 9e1**