

RADIO TEST REPORT

EN300 328 V1.4.1 (04-2003)

EN301 893 V1.2.3 (08-2003)

Product: *Wireless-AG Network Mini PCI Adapter*
Applicant: *Compex Systems Pte Ltd..*
Trade Name.....: *Compex*
Model: *IWAVEPORT WLM54AG*
Sample Received Date: *08/03/2005*
Report No.: *MLT0508EMC001-01*

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Test By

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Table of Contents :

<i>I. General of EUT</i>	<i>3.</i>
<i>II. TEST PROCEDURES AND RESULTS FOR 2.4GHz BAND</i>	<i>5.</i>
1. <i>Summary of Tests</i>	<i>5.</i>
2. <i>Transmitter E.I.R.P</i>	<i>6.</i>
3. <i>Transmitter Peak Power Density</i>	<i>9.</i>
4. <i>Transmitter Frequency Range</i>	<i>11.</i>
5. <i>Transmitter Spurious Emissions</i>	<i>14.</i>
6. <i>Receiver Spurious Emissions</i>	<i>23.</i>
<i>III. TEST PROCEDURES AND RESULTS FOR 5GHz BAND</i>	<i>32.</i>
1. <i>Carrier Frequencies and Channelization</i>	<i>32.</i>
2. <i>RF Output Power, Transmit Power Control (TPC) and Power Density</i>	<i>39.</i>
3. <i>Transmitter unwanted Emissions outside the hiperlan Bands</i>	<i>45.</i>
4. <i>Transmitter unwanted Emissions Within the Hiperlan Bands</i>	<i>52.</i>
5. <i>Dynamic Frequency Selection (DFS)</i>	<i>59.</i>
6. <i>Receiver Spurious Emissions</i>	<i>67.</i>
<i>Appendix I (Block Diagram)</i>	<i>74.</i>
<i>Appendix II (User Manual)</i>	<i>75.</i>
<i>Appendix III(EUT Photographs)</i>	<i>76.</i>

I. General of EUT

1.1 Identification of EUT

Equipment : **Wireless-AG Network Mini PCI Adapter**

Applicant : **Compex Systems Pte Ltd..**
135, Joo Seng Road, #08-01 PM Industrial Building Singapore 368363

Manufacturer : **Compex Systems Pte Ltd..**
135, Joo Seng Road, #08-01 PM Industrial Building Singapore 368363

Model No : **IWAVEPORT WLM54AG**

1.2 Technical data of EUT

Type of Modulation : **Direct Sequence Spread Spectrum**

Type of Antenna : **1/4 DIOPLE Antenna**

Antenna Gain (dBi) : **2.0dBi**

Frequency of Channel : **802.11b/g :13CH ; 802.11a : 19 CH**

Operating Frequency : **2412MHz~2472MHz ; 5150MHz~5350MHz ; 5470MHz~5725MHz**

Output Power : **20dBm**

Input Rating : **Powered By PC (Desktop)**

1.3 Standard Test Conditions

Temperature : **+22°C ~ +28 Degrees Celsius**

Relative Humidity : **60% ~ 85%**

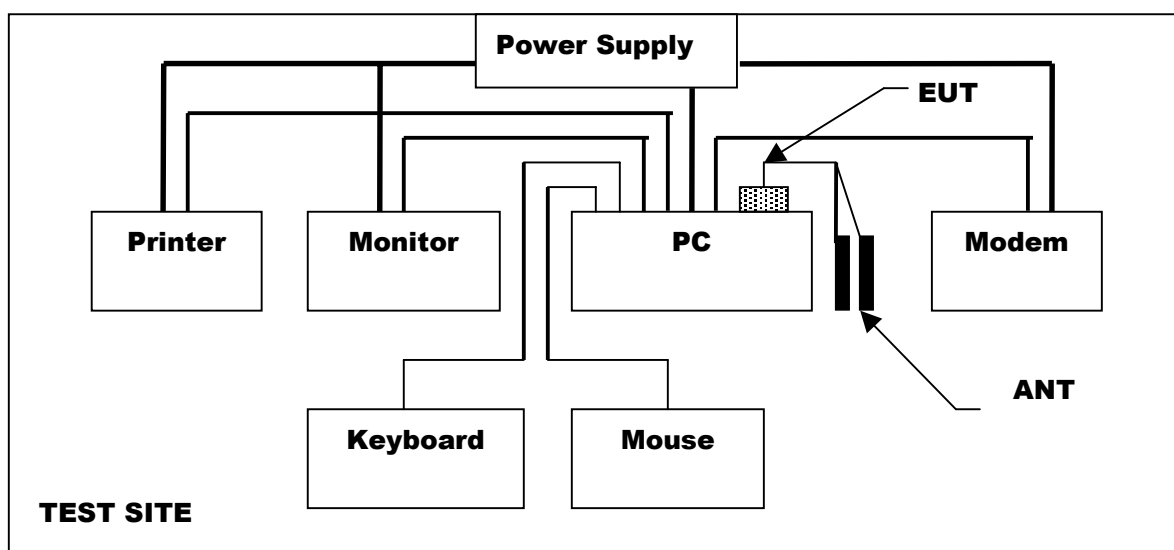
Supply Voltage : **230VAC**

1.4 Configuration of EUT

This **Wireless-AG Network Mini PCI Adapter** of

Item	Component	Manufacturer	Model
1.	Computer	IBM	16W
2.	Monitor	IBM	10L6145 030
3.	Keyboard	IBM	KB-9930
4.	Mouse	IBM	0180-05N
5.	Modem	ASKEY	WS1414SV
6.	Printer	PANASONIC	KX-P1080I

1.5 Configuration of System Under Test



During testing the EUT (Wireless Adapter) 's Mini PCI interface via a PCMCIA to mini-PCI extender connected to the Desktop PC, and the monitor/modem/keyboard/mouse/printer connected to desktop 's PC I/O port.

II. TEST PROCEDURES AND RESULTS FOR 2.4GHz BAND

1. Summary Of Tests

ETSI EN 300 328 (04-2003)			
Reference	Description/Transmitter	Results	Note
7.2.1	Effective Isotropically RF Power	PASS	
7.2.2	Peak Power Density (DSSS Equipment / Radiated)	N/A	
7.2.2	Peak Power Density (DSSS Equipment / Conducted)	PASS	
7.2.2	Peak Power Density (FHSS Equipment / Radiated)	N/A	
7.2.2	Peak Power Density (FHSS Equipment / Conducted)	N/A	
7.2.3	Frequency range of equipment using FHSS modulation	N/A	
7.2.4	Frequency range of equipment using other forms of modulation	PASS	
7.2.5	Spurious Emissions (Transmitter Operating / Radiated)	PASS	
7.2.5	Spurious Emissions (Transmitter Operating / Conducted)	N/A	
7.2.5	Spurious Emissions (Transmitter Standby / Radiated)	PASS	The transmitter on standby mode is equal to that of receiving mode. (1)
7.2.5	Spurious Emissions (Transmitter Standby / Conducted)	N/A	
Reference	Description/Receiver	Results	Note
9.1	Spurious Radiations / Radiated	PASS	
9.1	Spurious Radiations / Conducted	N/A	

Test Center: *Max Light Technology Co., Ltd.*

Remark : The test results only relate to the submitted test sample specified above.

2. Transmitter E.I.R.P (Clause 7.2.1)

2.1 Test Condition

Ambient Temperature.....: **+25 Degrees Celsius**

Relative Humidity.....: **62%**

2.2 Limits of Effective Radiated Power (Clause 5.2.1)

Condition	Limits (dBm/dBW)	
	Peak	Average
Under all test conditions	23dBm/-7dBW	20dBm/-10dBW

The effective radiated power is defined as the total power of the transmitter and is calculated according to the procedure given in sub-clause 7.2.1. The effective radiated power shall be equal to or less than -10 dBW (100 mW) e.i.r.p. This limit shall apply for any combination of power level and intended antenna assembly.

2.3 Test Equipment List:

- A. **HP 435A Power Metter**
- B. **HP 8481A Power Sensor**
- C. **Giant Force GT-150 Temperature Chamber**
- D. **HP CW Signal Generator**

2.4 Test Results

Applicant : **Complex Systems Pte Ltd..**
Model No : **IWAVEPORT WLM54AG**
EUT : **Wireless-AG Network Mini PCI Adapter**
Test Mode : **802.11b (CH01/CH07/CH10/CH13)**
Duty Cycle : **X=1.0 (See Clause 7.2.1 Step1)**

Test Conditions		Transmitter Power (dBm)			
Bitrate 11.0 Mbit/s		CH01	CH07	CH10	CH13
Tnom=+21° C	Vnom=230V	PK: 15.77dBm	PK: 15.61dBm	PK: 15.38dBm	PK: 15.48dBm
		AV: 13.68dBm	AV: 13.57dBm	AV: 13.22dBm	AV: 13.34dBm
Tnom=0°C	Vnom=207V	PK: 15.73dBm	PK: 15.54dBm	PK: 15.30dBm	PK: 15.45dBm
		AV: 13.61dBm	AV: 13.49dBm	AV: 13.16dBm	AV: 13.37dBm
	Vnom=253V	PK: 15.81dBm	PK: 15.66dBm	PK: 15.42dBm	PK: 15.51dBm
		AV: 13.72dBm	AV: 13.60dBm	AV: 13.31dBm	AV: 13.50dBm
Tnom=+55° C	Vnom=207V	PK: 15.76dBm	PK: 15.59dBm	PK: 15.45dBm	PK: 15.46dBm
		AV: 13.65dBm	AV: 13.56dBm	AV: 13.27dBm	AV: 13.45dBm
	Vnom=253V	PK: 15.83dBm	PK: 15.64dBm	PK: 15.36dBm	PK: 15.53dBm
		AV: 13.76dBm	AV: 13.65dBm	AV: 13.36dBm	AV: 13.57dBm
Measurement Uncertainty		-1.24dB / +1.20dB			

Notes :

- 1.AV is the average power and defined in clause 7.2.1.
- 2.PK is the peak power as defined in clause 7.2.1, increased with declared antenna gain (C+G).

2.5 Test Results

Applicant : **Complex Systems Pte Ltd..**
Model No : **IWAVEPORT WLM54AG**
EUT : **Wireless-AG Network Mini PCI Adapter**
Test Mode : **802.11g (CH01/CH07/CH10/CH13)**
Duty Cycle : **X=1.0 (See Clause 7.2.1 Step1)**

Test Conditions		Transmitter Power (dBm)			
Bitrate 11.0 Mbit/s		CH01	CH07	CH10	CH13
Tnom=+21° C	Vnom=230V	PK: 11.06dBm	PK: 10.99dBm	PK: 11.16dBm	PK: 11.01dBm
		AV: 10.08dBm	AV: 10.02dBm	AV: 10.25dBm	AV: 9.95dBm
Tnom=0°C	Vnom=207V	PK: 11.10dBm	PK: 11.10dBm	PK: 11.09dBm	PK: 10.91dBm
		AV: 10.13dBm	AV: 10.16dBm	AV: 10.10dBm	AV: 9.86dBm
	Vnom=253V	PK: 11.02dBm	PK: 10.95dBm	PK: 11.17dBm	PK: 11.06dBm
		AV: 10.01dBm	AV: 9.93dBm	AV: 10.06dBm	AV: 10.02dBm
Tnom=+55° C	Vnom=207V	PK: 10.97dBm	PK: 11.03dBm	PK: 11.08dBm	PK: 11.09dBm
		AV: 9.94dBm	AV: 10.00dBm	AV: 10.03dBm	AV: 10.07dBm
	Vnom=253V	PK: 11.05dBm	PK: 11.01dBm	PK: 11.12dBm	PK: 11.03dBm
		AV: 10.03dBm	AV: 10.06dBm	AV: 10.07dBm	AV: 9.99dBm
Measurement Uncertainty		-1.24dB / +1.20dB			

Notes :

- 1.AV is the average power and defined in clause 7.2.1.
- 2.PK is the peak power as defined in clause 7.2.1, increased with declared antenna gain (C+G).

3. Transmitter Peak Power Density (Clause 7.2.2)

DSSS and Other Types of Modulation

3.1 Test Condition

Ambient Temperature : **+26 Degrees Celsius**
Relative Humidity : **67%**

3.2 Limits of Transmitter Peak Power Density (Clause 5.2.2)

Condition	Limits (dBm/dBW)	
	DSSS Modulation	FHSS Modulation
Under all test conditions	10dBm/1MHz	20dBm/100KHz

The peak power density is defined as the highest instantaneous level of power in Watts per Hertz generated by the transmitter within the power envelope. For equipment using FHSS modulation, the power density shall be limited to -10 dBW (100 mW) per 100 kHz e.i.r.p. For equipment using other types of modulation, the peak power shall be limited to -20dBW(10mW)perMHz e.i.r.p.

3.3 Test Equipment List:

- A. **Agilent E4407B 9KHz-26.5GHz Spectrum Analyzer**
- B. **HP 8449B Pre Amplifier**
- C. **SCHWARZBECK BBHA 9120D Biconilog Antenna**
- D. **SCHWARZBECK BBHA 9170 Biconilog Antenna**

3.4 Test Results

Applicant : Compex Systems Pte Ltd..
Model No : IWAVEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : 802.11b (CH01 / CH07 / CH10 / CH13)
Duty Cycle : X=1.0 (See Clause 7.2.1 Step1)

Test Conditions		Transmitter Peak Power Density (dBm/1MHz)			
Bitrate 11.0 Mbit/s		CH01	CH07	CH10	CH13
Limit	10dBm/1MHz	8.53dBm/MHz	8.33dBm/MHz	8.47dBm/MHz	8.44dBm/MHz
Measurement Uncertainty		-1.15dB / +1.35dB			

3.5 Test Results

Applicant : Compex Systems Pte Ltd..
Model No : IWAVEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : 802.11g (CH01 / CH07 / CH10 / CH13)
Duty Cycle : X=1.0 (See Clause 7.2.1 Step1)

Test Conditions		Transmitter Peak Power Density (dBm/1MHz)			
Bitrate 11.0 Mbit/s		CH01	CH07	CH10	CH13
Limit	10dBm/1MHz	8.67dBm/MHz	8.64dBm/MHz	8.44dBm/MHz	8.36dBm/MHz
Measurement Uncertainty		-1.15dB / +1.35dB			

4. Transmitter Frequency Range (Clause 7.2.4)

DSSS and Other Types of Modulation

4.1 Test Condition

Ambient Temperature : **+26 Degrees Celsius**

Relative Humidity : **67%**

4.2 Limits of Transmitter Frequency Range (Clause 5.2.3)

Condition	Limits (MHz)	
	EU	France
Under all test conditions	$F_L \geq 2400.0 \text{ MHz}$ $F_H \geq 2483.5 \text{ MHz}$	$F_L \geq 2446.5 \text{ MHz}$ $F_H \geq 2483.5 \text{ MHz}$

The frequency range of the equipment is determined by the lowest and highest frequencies occupied by the power envelope. F_H is the highest frequency of the power envelope: it is the frequency furthest above the frequency of maximum power where the output power drops below the level of -80 dBm/Hz e.i.r.p. spectral power density (-30 dBm if measured in a 100 kHz bandwidth). F_L is the lowest frequency of the power envelope; it is the frequency furthest below the frequency of maximum power where the output power drops below the level equivalent to -80 dBm/Hz e.i.r.p. spectral power density (or -30 dBm if measured in a 100 kHz bandwidth). For a given operating frequency, the width of the power envelope is $(f_H - f_L)$. In equipment that allows adjustment or selection of different operating frequencies, the power envelope takes up different positions in the allocated band. The frequency range is determined by the lowest value of f_L and the highest value of f_H resulting from the adjustment of the equipment to the lowest and highest operating frequencies. For all equipment the frequency range shall lie within the band 2.4 GHz to 2.4835 GHz.

4.3 Test Equipment List:

- A. **Agilent E4407B 9KHz-26.5GHz Spectrum Analyzer**
- B. **HP 8449B Pre Amplifier**
- C. **SCHWARZBECK BBHA 9120D Biconilog Antenna**
- D. **SCHWARZBECK BBHA 9170 Biconilog Antenna**

4.4 Test Results (For Other EU Countries & France)

Applicant : Compex Systems Pte Ltd..
Model No : IWAPEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : 802.11b {CH01~CH13 (For EU) / CH10~CH13 (For France)}

Test Conditions		Frequency (MHz) at which -80dBm/Hz occurs		
CH01~CH13 (For EU)		Lowest	Highest	Limit (MHz)
Tnom=+21°C	Vnom=230V	2401.68MHz	2482.24MHz	FL>=2400.0MHz FH>=2483.5MHz
Tnom=0°C	Vnom=207V	2401.59MHz	2482.21MHz	FL>=2400.0MHz FH>=2483.5MHz
	Vnom=253V	2401.65MHz	2482.29MHz	FL>=2400.0MHz FH>=2483.5MHz
Tnom=+55°C	Vnom=207V	2401.61MHz	2482.19MHz	FL>=2400.0MHz FH>=2483.5MHz
	Vnom=253V	2401.64MHz	2482.25MHz	FL>=2400.0MHz FH>=2483.5MHz
Test Conditions		Frequency (MHz) at which -80dBm/Hz occurs		
CH10~CH13 (For France)		Lowest	Highest	Limit (MHz)
Tnom=+21°C	Vnom=230V	2446.68MHz	2482.24MHz	FL>=2446.5MHz FH>=2483.5MHz
Tnom=0°C	Vnom=207V	2446.57MHz	2482.21MHz	FL>=2446.5MHz FH>=2483.5MHz
	Vnom=253V	2446.64MHz	2482.29MHz	FL>=2446.5MHz FH>=2483.5MHz
Tnom=+55°C	Vnom=207V	2446.61MHz	2482.19MHz	FL>=2446.5MHz FH>=2483.5MHz
	Vnom=253V	2446.73MHz	2482.25MHz	FL>=2446.5MHz FH>=2483.5MHz
Measurement Uncertainty		+-100KHz@fo=2400MHz		

4.5 Test Results (For Other EU Countries & France)

Applicant : Compex Systems Pte Ltd..
Model No : IWAVEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : 802.11g {CH01~CH13 (For EU) / CH10~CH13 (For France)}

Test Conditions		Frequency (MHz) at which -80dBm/Hz occurs		
CH01~CH13 (For EU)		Lowest	Highest	Limit (MHz)
Tnom=+21°C	Vnom=230V	2402.32MHz	2481.60MHz	FL>=2400.0MHz FH>=2483.5MHz
Tnom=0°C	Vnom=207V	2402.35MHz	2481.55MHz	FL>=2400.0MHz FH>=2483.5MHz
	Vnom=253V	2402.28MHz	2481.63MHz	FL>=2400.0MHz FH>=2483.5MHz
Tnom=+55°C	Vnom=207V	2402.34MHz	2481.58MHz	FL>=2400.0MHz FH>=2483.5MHz
	Vnom=253V	2402.39MHz	2481.71MHz	FL>=2400.0MHz FH>=2483.5MHz
Test Conditions		Frequency (MHz) at which -80dBm/Hz occurs		
CH10~CH13 (For France)		Lowest	Highest	Limit (MHz)
Tnom=+21°C	Vnom=230V	2447.08MHz	2481.60MHz	FL>=2446.5MHz FH>=2483.5MHz
Tnom=0°C	Vnom=207V	2446.99MHz	2481.55MHz	FL>=2446.5MHz FH>=2483.5MHz
	Vnom=253V	2447.06MHz	2481.63MHz	FL>=2446.5MHz FH>=2483.5MHz
Tnom=+55°C	Vnom=207V	2447.02MHz	2481.58MHz	FL>=2446.5MHz FH>=2483.5MHz
	Vnom=253V	2447.11MHz	2481.71MHz	FL>=2446.5MHz FH>=2483.5MHz
Measurement Uncertainty		+-100KHz@fo=2400MHz		

5. Transmitter Spurious Emissions (Clause 7.2.5)

5.1 Test Condition

Ambient Temperature.....: **+25 Degrees Celsius**

Relative Humidity.....: **65%**

5.2 Transmitter Limits for Spurious Emissions (Clause 5.2.4)

Narrowband Spurious Emissions

Frequency Range	Limits (dBm)	
	Operating Limit	Standby Limit
30MHz to 1GHz	-36dBm	-57dBm
Above 1GHz to 12.75GHz	-30dBm	-47dBm
1.8GHz to 1.9GHz, 5.15GHz to 5.3GHz	-47dBm	-47dBm

Wideband Spurious Emissions

Frequency Range	Limits (dBm/Hz)	
	Operating Limit	Standby Limit
30MHz to 1GHz	-86dBm/Hz	-107dBm/Hz
Above 1GHz to 12.75GHz	-80dBm/Hz	-97dBm/Hz
1.8GHz to 1.9GHz, 5.15GHz to 5.3GHz	-97dBm/Hz	-97dBm/Hz

5.3 Test Equipment List:

- A. **Agilent E4407B 9KHz-26.5GHz Spectrum Analyzer**
- B. **HP 8449B Pre Amplifier**
- C. **HP 84300-80038 High Pass Filter**
- D. **HP 84300-80039 High Pass Filter**
- E. **SCHWARZBECK BBHA 9120D Biconilog Antenna**
- F. **SCHWARZBECK BBHA 9170 Biconilog Antenna**

5.4 Test Results (Radiated)

1.4.1 Measurement Data Of Spurious Emissions (802.11b)

Applicant : Compex Systems Pte Ltd..
Model No : IWAVEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH01 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.88	-57.53	-36	-21.53
499.30	-51.73	-36	-15.73
699.61	-52.46	-36	-16.46
1347.50	-54.66	-30	-24.66
1877.50	-49.98	-30	-19.98
4825.00	-46.98	-30	-16.98
7235.50	-44.87	-30	-14.87
9649.00	-43.55	-30	-13.55
12057.50	-43.83	-30	-13.83
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.80	-54.20	-36	-18.20
499.28	-56.14	-36	-20.14
699.63	-54.82	-36	-18.82
1347.50	-53.62	-30	-23.62
1877.50	-50.77	-30	-20.77
3765.50	-47.54	-30	-17.54
7235.50	-42.51	-30	-12.51
9649.00	-44.98	-30	-14.98
12057.50	-45.38	-30	-15.38
Measurement Uncertainty		+2.41dB/-1.85dB	

5.4.2 Measurement Data Of Spurious Emissions (802.11b)

Applicant : Compex Systems Pte Ltd..
Model No : IWAVEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH07 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.85	-56.83	-36	-20.83
498.99	-54.74	-36	-18.74
700.02	-55.19	-36	-19.19
1345.00	-51.01	-30	-21.01
1870.50	-49.53	-30	-19.53
4885.00	-48.47	-30	-18.47
7327.50	-44.55	-30	-14.55
9768.50	-43.87	-30	-13.87
12211.00	-46.08	-30	-16.08
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.86	-54.86	-36	-18.86
498.99	-56.95	-36	-20.95
700.01	-56.77	-36	-20.77
1345.00	-51.42	-30	-21.42
1870.50	-49.33	-30	-19.33
3765.00	-48.73	-30	-18.73
7327.50	-44.74	-30	-14.74
9768.50	-45.02	-30	-15.02
12211.00	-44.81	-30	-14.81
Measurement Uncertainty		+2.41dB/-1.85dB	

5.4.3 Measurement Data Of Spurious Emissions (802.11b)

Applicant : Compex Systems Pte Ltd..
Model No : IWAPEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH10 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.90	-58.65	-36	-22.65
499.32	-54.14	-36	-18.14
699.60	-53.55	-36	-17.55
1345.50	-53.77	-30	-23.77
1870.50	-49.28	-30	-19.28
4914.50	-46.22	-30	-16.22
7372.00	-44.08	-30	-14.08
9828.50	-43.41	-30	-13.41
12286.00	-45.25	-30	-15.25
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.91	-55.73	-36	-19.73
499.33	-57.41	-36	-21.41
699.60	-58.95	-36	-22.95
1345.50	-54.33	-30	-24.33
1870.50	-50.52	-30	-20.52
3765.50	-48.63	-30	-18.63
7372.00	-47.53	-30	-17.53
9828.50	-43.44	-30	-13.44
12286.00	-45.89	-30	-15.89
Measurement Uncertainty		+2.41dB/-1.85dB	

5.4.4 Measurement Data Of Spurious Emissions (802.11b)

Applicant : Compex Systems Pte Ltd..
Model No : IWAPEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH13 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.82	-57.44	-36	-21.44
499.25	-56.88	-36	-20.88
699.57	-56.37	-36	-20.37
1345.50	-50.98	-30	-20.98
1870.50	-47.54	-30	-17.54
4945.00	-46.98	-30	-16.98
7416.50	-44.38	-30	-14.38
9889.50	-45.21	-30	-15.21
12361.50	-45.87	-30	-15.87
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.82	-58.22	-36	-22.22
499.25	-55.44	-36	-19.44
699.58	-53.06	-36	-17.06
1345.50	-51.73	-30	-21.73
1870.50	-49.28	-30	-19.28
3766.00	-48.21	-30	-18.21
7416.50	-45.43	-30	-15.43
9889.50	-44.08	-30	-14.08
12361.50	-45.16	-30	-15.16
Measurement Uncertainty		+2.41dB/-1.85dB	

5.4.5 Measurement Data Of Spurious Emissions (802.11g)

Applicant : Compex Systems Pte Ltd..
Model No : IWAPEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH01 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.88	-57.83	-36	-21.83
499.30	-55.22	-36	-19.22
699.61	-53.10	-36	-17.10
1347.50	-50.75	-30	-20.75
1877.50	-48.63	-30	-18.63
4825.00	-46.44	-30	-16.44
7235.50	-43.87	-30	-13.87
9649.00	-44.29	-30	-14.29
12057.50	-45.11	-30	-15.11
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.87	-55.37	-36	-19.37
499.30	-54.85	-36	-18.85
699.63	-53.63	-36	-17.63
1347.50	-50.25	-30	-20.25
1877.50	-50.72	-30	-20.72
3765.50	-48.25	-30	-18.25
7235.50	-44.22	-30	-14.22
9649.00	-45.72	-30	-15.72
12057.50	-46.19	-30	-16.19
Measurement Uncertainty		+2.41dB/-1.85dB	

5.4.6 Measurement Data Of Spurious Emissions (802.11g)

Applicant : Complex Systems Pte Ltd..
Model No : IWAVEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH07 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.84	-57.28	-36	-21.28
498.97	-57.58	-36	-21.58
700.01	-53.43	-36	-17.43
1345.00	-54.29	-30	-24.29
1870.50	-50.14	-30	-20.14
4885.00	-48.36	-30	-18.36
7327.50	-47.42	-30	-17.42
9768.50	-45.84	-30	-15.84
12211.00	-46.96	-30	-16.96
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.86	-57.41	-36	-21.41
498.97	-54.88	-36	-18.88
700.01	-53.29	-36	-17.29
1345.00	-55.08	-30	-25.08
1870.50	-49.91	-30	-19.91
3765.00	-48.37	-30	-18.37
7327.50	-45.95	-30	-15.95
9768.50	-46.02	-30	-16.02
12211.00	-45.33	-30	-15.33
Measurement Uncertainty		+2.41dB/-1.85dB	

5.4.7 Measurement Data Of Spurious Emissions (802.11g)

Applicant : Compex Systems Pte Ltd..
Model No : IWAPEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH10 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.91	-56.79	-36	-20.79
499.41	-58.02	-36	-22.02
699.62	-57.34	-36	-21.34
1345.50	-50.63	-30	-20.63
1870.50	-47.25	-30	-17.25
4914.00	-48.94	-30	-18.94
7372.00	-46.55	-30	-16.55
9828.50	-44.87	-30	-14.87
12286.00	-46.03	-30	-16.03
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.91	-57.22	-36	-21.22
499.41	-55.84	-36	-19.84
699.60	-55.62	-36	-19.62
1345.50	-51.42	-30	-21.42
1870.50	-51.02	-30	-21.02
3765.50	-47.44	-30	-17.44
7372.00	-45.25	-30	-15.25
9828.50	-43.61	-30	-13.61
12286.00	-43.98	-30	-13.98
Measurement Uncertainty		+2.41dB/-1.85dB	

5.4.8 Measurement Data Of Spurious Emissions (802.11g)

Applicant : Compex Systems Pte Ltd..
Model No : IWAPEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH13 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.84	-58.24	-36	-22.24
499.26	-56.37	-36	-20.37
699.55	-52.81	-36	-16.81
1345.50	-50.77	-30	-20.77
1870.50	-49.72	-30	-19.72
4945.00	-48.37	-30	-18.37
7416.50	-44.63	-30	-14.63
9889.50	-44.23	-30	-14.23
12361.50	-43.98	-30	-13.98
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.83	-56.38	-36	-20.38
499.26	-54.15	-36	-18.15
699.56	-55.27	-36	-19.27
1345.50	-56.02	-30	-26.02
1870.50	-50.01	-30	-20.01
3766.00	-47.48	-30	-17.48
7416.50	-46.53	-30	-16.53
9889.00	-43.41	-30	-13.41
12361.50	-44.28	-30	-14.28
Measurement Uncertainty		+2.41dB/-1.85dB	

6. Receiver Spurious Emissions (Clause 7.3.2)

6.1 Test Condition

Ambient Temperature: **+26°C**

Relative Humidity: **65%**

6.2 Receiver Limits for Spurious Emissions (Clause 5.3.2)

Narrowband Spurious Emissions

Frequency Range	Limits (dBm)
30MHz to 1GHz	-57dBm
Above 1GHz to 12.75GHz	-47dBm

Wideband Spurious Emissions

Frequency Range	Limits (dBm/Hz)
30MHz to 1GHz	-107dBm/Hz
Above 1GHz to 12.75GHz	-97dBm/Hz

6.3 Test Equipment List:

- A. **Agilent E4407B 9KHz-26.5GHz Spectrum Analyzer**
- B. **HP 8449B Pre Amplifier**
- C. **HP 84300-80038 High Pass Filter**
- D. **HP 84300-80039 High Pass Filter**
- E. **SCHWARZBECK BBHA 9120D Biconilog Antenna**
- F. **SCHWARZBECK BBHA 9170 Biconilog Antenna**

6.4 Test Results (Radiated)

6.4.1 Measurement Data Of Spurious Emissions (802.11b)

Applicant : Compex Systems Pte Ltd.
Model No : IWAVEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH01 (Receiver)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
52.73	-67.53	-57	-10.53
125.02	-64.38	-57	-7.38
177.82	-65.28	-57	-8.28
389.27	-63.16	-57	-6.16
640.27	-64.44	-57	-7.44
720.52	-63.98	-57	-6.98
1538.50	-58.75	-47	-11.75
3782.50	-59.03	-47	-12.03
6951.00	-58.88	-47	-11.88
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
52.72	-66.99	-57	-9.99
125.02	-68.20	-57	-11.20
177.80	-65.43	-57	-8.43
389.28	-64.18	-57	-7.18
640.27	-64.03	-57	-7.03
720.51	-66.93	-57	-9.93
1538.50	-57.28	-47	-10.28
3782.50	-56.44	-47	-9.44
6951.00	-57.14	-47	-10.14
Measurement Uncertainty		+2.41dB/-1.85dB	

6.4.2 Measurement Data Of Spurious Emissions (802.11b)

Applicant : Compex Systems Pte Ltd..
Model No : IWAVEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH07 (Receiver)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
50.83	-68.73	-57	-11.73
125.11	-65.62	-57	-8.62
165.42	-64.33	-57	-7.33
395.77	-65.98	-57	-8.98
644.27	-63.74	-57	-6.74
720.43	-66.02	-57	-9.02
1538.50	-58.55	-47	-11.55
3782.50	-57.46	-47	-10.46
6951.00	-56.38	-47	-9.38
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
50.80	-69.01	-57	-12.01
125.10	-64.33	-57	-7.33
165.42	-65.61	-57	-8.61
395.76	-64.27	-57	-7.27
644.25	-66.31	-57	-9.31
720.44	-63.79	-57	-6.79
1538.50	-57.18	-47	-10.18
3782.50	-57.42	-47	-10.42
6951.00	-56.08	-47	-9.08
Measurement Uncertainty		+2.41dB/-1.85dB	

6.4.3 Measurement Data Of Spurious Emissions (802.11b)

Applicant : Compex Systems Pte Ltd..
Model No : IWAPEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH10 (Receiver)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
51.43	-67.99	-57	-10.99
125.06	-66.47	-57	-9.47
175.47	-65.28	-57	-8.28
384.97	-64.18	-57	-7.18
641.33	-64.79	-57	-7.79
721.67	-65.33	-57	-8.33
1538.50	-59.28	-47	-12.28
3782.50	-57.85	-47	-10.85
6951.00	-56.08	-47	-9.08
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
51.44	-66.38	-57	-9.38
125.06	-65.29	-57	-8.29
175.45	-65.33	-57	-8.33
384.98	-64.17	-57	-7.17
641.33	-65.61	-57	-8.61
721.62	-67.42	-57	-10.42
1538.50	-60.08	-47	-13.08
3782.50	-57.53	-47	-10.53
6951.00	-54.29	-47	-7.29
Measurement Uncertainty		+2.41dB/-1.85dB	

6.4.4 Measurement Data Of Spurious Emissions (802.11b)

Applicant : Compex Systems Pte Ltd..
Model No : IWAPEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH13 (Receiver)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
52.52	-67.28	-57	-10.28
124.89	-66.33	-57	-9.33
176.33	-66.29	-57	-9.29
390.52	-64.87	-57	-7.87
640.54	-65.28	-57	-8.28
720.17	-64.10	-57	-7.10
1538.50	-56.38	-47	-9.38
3782.50	-55.27	-47	-8.27
6951.00	-56.09	-47	-9.09
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
52.51	-66.31	-57	-9.31
124.88	-67.29	-57	-10.29
176.33	-65.82	-57	-8.82
390.51	-64.33	-57	-7.33
640.52	-64.16	-57	-7.16
720.16	-66.08	-57	-9.08
1538.50	-57.24	-47	-10.24
3782.50	-56.58	-47	-9.58
6951.00	-58.11	-47	-11.11
Measurement Uncertainty		+2.41dB/-1.85dB	

6.4.5 Measurement Data Of Spurious Emissions (802.11g)

Applicant : Compex Systems Pte Ltd..
Model No : IWAPEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH01 (Receiver)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
52.72	-68.36	-57	-11.36
125.05	-69.88	-57	-12.88
177.81	-67.41	-57	-10.41
389.24	-65.38	-57	-8.38
640.22	-64.69	-57	-7.69
720.50	-65.08	-57	-8.08
1538.50	-57.56	-47	-10.56
3782.50	-58.43	-47	-11.43
6951.00	-57.19	-47	-10.19
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
52.72	-68.42	-57	-11.42
125.02	-67.38	-57	-10.38
177.80	-66.94	-57	-9.94
389.28	-65.72	-57	-8.72
640.27	-64.28	-57	-7.28
720.51	-64.14	-57	-7.14
1538.50	-59.53	-47	-12.53
3782.50	-58.77	-47	-11.77
6951.00	-57.73	-47	-10.73
Measurement Uncertainty		+2.41dB/-1.85dB	

6.4.6 Measurement Data Of Spurious Emissions (802.11g)

Applicant : Compex Systems Pte Ltd..
Model No : IWAPEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH07 (Receiver)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
50.80	-66.53	-57	-9.53
125.10	-67.84	-57	-10.84
165.44	-67.24	-57	-10.24
395.71	-66.58	-57	-9.58
644.29	-66.49	-57	-9.49
720.40	-64.27	-57	-7.27
1538.50	-57.18	-47	-10.18
3782.50	-58.33	-47	-11.33
6951.00	-57.49	-47	-10.49
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
50.82	-68.37	-57	-11.37
125.15	-64.27	-57	-7.27
165.43	-67.59	-57	-10.59
395.78	-66.33	-57	-9.33
644.26	-65.08	-57	-8.08
720.40	-63.27	-57	-6.27
1538.50	-59.99	-47	-12.99
3782.50	-58.74	-47	-11.74
6951.00	-59.06	-47	-12.06
Measurement Uncertainty		+2.41dB/-1.85dB	

6.4.7 Measurement Data Of Spurious Emissions (802.11g)

Applicant : Compex Systems Pte Ltd..
Model No : IWAPEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH10 (Receiver)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
51.39	-69.25	-57	-12.25
125.08	-67.43	-57	-10.43
175.52	-66.33	-57	-9.33
384.94	-67.28	-57	-10.28
641.30	-65.28	-57	-8.28
721.65	-63.77	-57	-6.77
1538.50	-58.42	-47	-11.42
3782.50	-59.38	-47	-12.38
6951.00	-57.19	-47	-10.19
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
51.38	-66.22	-57	-9.22
125.04	-67.15	-57	-10.15
175.38	-65.83	-57	-8.83
384.94	-64.98	-57	-7.98
641.31	-65.27	-57	-8.27
721.60	-64.12	-57	-7.12
1538.50	-57.63	-47	-10.63
3782.50	-56.56	-47	-9.56
6951.00	-55.87	-47	-8.87
Measurement Uncertainty		+2.41dB/-1.85dB	

6.4.8 Measurement Data Of Spurious Emissions (802.11g)

Applicant : Compex Systems Pte Ltd..
Model No : IWAPEPORT WLM54AG
EUT : Wireless-AG Network Mini PCI Adapter
Test Mode : CH13 (Receiver)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
52.51	-67.24	-57	-10.24
124.82	-68.06	-57	-11.06
176.43	-66.41	-57	-9.41
390.65	-65.22	-57	-8.22
640.57	-66.53	-57	-9.53
720.21	-65.87	-57	-8.87
1538.50	-58.27	-47	-11.27
3782.50	-56.98	-47	-9.98
6951.00	-56.53	-47	-9.53
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
52.51	-67.14	-57	-10.14
124.85	-66.53	-57	-9.53
176.36	-64.98	-57	-7.98
390.47	-65.27	-57	-8.27
640.53	-64.74	-57	-7.74
720.15	-65.36	-57	-8.36
1538.50	-56.33	-47	-9.33
3782.50	-57.28	-47	-10.28
6951.00	-56.43	-47	-9.43
Measurement Uncertainty		+2.41dB/-1.85dB	

III. TEST PROCEDURES AND RESULTS FOR 5GHz BAND

Technical data of EUT

Type of Modulation	: Direct Sequence Spread Spectrum
Type of Antenna	: 1/4 λ DIPOLE Antenna
Antenna Gain (dBi)	: 2.0dBi
Frequency of Channel	: 19CH
Operating Frequency	: 5150MHZ – 5350MHZ ; 5470MHZ – 5725MHZ
Output Power	: 20dBm
Input Rating	: Powered By PC (Desktop)

Standard Test Conditions

Temperature	: +22°C ~ +28 Degrees Celsius
Relative Humidity	: 60% ~ 85%

1. Carrier Frequencies and Channelization

1.1 Test Condition

Ambient Temperature	: +25 Degrees Celsius
Relative Humidity	: 65%

1.2 Test Limit

Reference to ETSI DEN 301 893 Clause 5.3.1

The EUT transmitter is adjusted to produce a CW carrier without modulation.

Temperature :55 ; 21 ; 0

Limit : ± 20 ppm



MAX LIGHT

MEASUREMENT REPORT

Page: 33/81

Carrier Frequency :

Channel	Frequency	Channel	Frequency
1	5180	11	5540
2	5200	12	5560
3	5220	13	5580
4	5240	14	5600
5	5260	15	5620
6	5280	16	5640
7	5300	17	5660
8	5320	18	5680
9	5500	19	5700
10	5520		

1.3 Test Equipment List :

Agilent E4407B 9KHz-26.5GHz Spectrum Analyzer)

Variable AC Power Supply

Environmental Chamber GTH-064S

Multimeter Fluke 45

1.4 Test Results

Duty Cycle : X=1.0

Condition : 21 230V AC				
Channel Frequency (MHz)	Results Frequency (MHz)	Delta Frequency (kHz)	20ppm Limit ±kHz	Margin kHz
5180	5180.0005	-0.5	103.6	103.1
5200	5199.9998	0.2	104.0	103.8
5220	5219.9997	0.3	104.4	104.1
5240	5239.9998	0.2	104.8	104.6
5260	5259.9998	0.2	105.2	105.0
5280	5279.9995	0.5	105.6	105.1
5300	5299.9996	0.4	106.0	105.6
5320	5319.9995	0.5	106.4	105.9
5500	5499.9996	0.4	110.0	109.6
5520	5519.9997	0.3	110.4	110.1
5540	5539.9992	0.8	110.8	110.0
5560	5559.9993	0.7	111.2	110.5
5580	5579.9991	0.9	111.6	110.7
5600	5599.9989	1.1	112.0	110.9
5620	5619.9987	1.3	112.4	111.1
5640	5639.9993	0.7	112.8	112.1
5660	5659.9994	0.6	113.2	112.6
5680	5679.9995	0.5	113.6	113.1
5700	5699.9993	0.7	114.0	113.3

Condition : 0 207V AC				
Channel Frequency (MHz)	Results Frequency (MHz)	Delta Frequency (kHz)	20ppm Limit \pm kHz	Margin kHz
5180	5180.0001	-0.1	103.6	103.5
5200	5199.9994	0.6	104.0	103.4
5220	5219.9992	0.8	104.4	103.6
5240	5239.9992	0.8	104.8	104.0
5260	5259.9993	0.7	105.2	104.5
5280	5279.9990	1	105.6	104.6
5300	5299.9991	0.9	106.0	105.1
5320	5319.9991	0.9	106.4	105.5
5500	5499.9990	1	110.0	109.0
5520	5519.9991	0.9	110.4	109.5
5540	5539.9988	1.2	110.8	109.6
5560	5559.9986	1.4	111.2	109.8
5580	5579.9988	1.2	111.6	110.4
5600	5599.9989	1.1	112.0	110.9
5620	5619.9982	1.8	112.4	110.6
5640	5639.9983	1.7	112.8	111.1
5660	5659.9984	1.6	113.2	111.6
5680	5679.9983	1.7	113.6	111.9
5700	5699.9983	1.7	114.0	112.3

Condition : 0 253V AC				
Channel Frequency (MHz)	Results Frequency (MHz)	Delta Frequency (kHz)	20ppm Limit \pm kHz	Margin kHz
5180	5179.9998	0.2	103.6	103.4
5200	5199.9996	0.4	104.0	103.6
5220	5219.9995	0.5	104.4	103.9
5240	5239.9995	0.5	104.8	104.3
5260	5259.9996	0.4	105.2	104.8
5280	5279.9992	0.8	105.6	104.8
5300	5299.9990	1	106.0	105.0
5320	5319.9994	0.6	106.4	105.8
5500	5499.9992	0.8	110.0	109.2
5520	5519.9992	0.8	110.4	109.6
5540	5539.9989	1.1	110.8	109.7
5560	5559.9989	1.1	111.2	110.1
5580	5579.9987	1.3	111.6	110.3
5600	5599.9987	1.3	112.0	110.7
5620	5619.9985	1.5	112.4	110.9
5640	5639.9987	1.3	112.8	111.5
5660	5659.9986	1.4	113.2	111.8
5680	5679.9985	1.5	113.6	112.1
5700	5699.9984	1.6	114.0	112.4

Condition : 55 207V AC				
Channel Frequency (MHz)	Results Frequency (MHz)	Delta Frequency (kHz)	20ppm Limit ±kHz	Margin kHz
5180	5179.9987	1.3	103.6	102.3
5200	5199.9985	1.5	104.0	102.5
5220	5219.9983	1.7	104.4	102.7
5240	5239.9987	1.3	104.8	103.5
5260	5259.9985	1.5	105.2	103.7
5280	5279.9985	1.5	105.6	104.1
5300	5299.9986	1.4	106.0	104.6
5320	5319.9986	1.4	106.4	105.0
5500	5499.9983	1.7	110.0	108.3
5520	5519.9986	1.4	110.4	109.0
5540	5539.9983	1.7	110.8	109.1
5560	5559.9984	1.6	111.2	109.6
5580	5579.9987	1.3	111.6	110.3
5600	5599.9986	1.4	112.0	110.6
5620	5619.9983	1.7	112.4	110.7
5640	5639.9986	1.4	112.8	111.4
5660	5659.9987	1.3	113.2	111.9
5680	5679.9986	1.4	113.6	112.2
5700	5699.9985	1.5	114.0	112.5

Condition : 55 253V AC				
Channel Frequency (MHz)	Results Frequency (MHz)	Delta Frequency (kHz)	20ppm Limit ±kHz	Margin kHz
5180	5179.9986	1.4	103.6	102.2
5200	5199.9986	1.4	104.0	102.6
5220	5219.9984	1.6	104.4	102.8
5240	5239.9985	1.5	104.8	103.3
5260	5259.9985	1.5	105.2	103.7
5280	5279.9986	1.4	105.6	104.2
5300	5299.9984	1.6	106.0	104.4
5320	5319.9984	1.6	106.4	104.8
5500	5499.9983	1.7	110.0	108.3
5520	5519.9983	1.7	110.4	108.7
5540	5539.9981	1.9	110.8	108.9
5560	5559.9982	1.8	111.2	109.4
5580	5579.9982	1.8	111.6	109.8
5600	5599.9982	1.8	112.0	110.2
5620	5619.9981	1.9	112.4	110.5
5640	5639.99816	1.84	112.8	111.0
5660	5659.9983	1.7	113.2	111.5
5680	5679.9982	1.8	113.6	111.8
5700	5699.9982	1.8	114.0	112.2

2. RF Output Power, Transmit Power Control (TPC) and Power Density

2.1 Test Condition

Reference to ETSI DEN 301 893 Clause 5.3.2.1

Ambient Temperature: **+25 Degrees Celsius**

Relative Humidity: **65%**

2.2 Limits of RF output power and power density at the highest power level

Frequency (MHz)	RF Power Level (dBm)	Power Density Limit
5150 - 5350	23.0	11 dBm/MHz
5470 - 5725	30.0	18 dBm/MHz

2.2.1 Limits of RF output power at the lowest power level

Frequency (MHz)	Limit
5150 - 5350	17 dBm
5470 - 5725	17 dBm

2.3 Test Equipment List :

Agilent E4407B 9KHz-26.5GHz Spectrum Analyzer

Variable AC Power Supply

Environmental Chamber GTH-064S

Multimeter Fluke 45

2.4 Test Results : output power at the lowest power level

Duty Cycle === 100 %
 Cable Loss === 7.52dB
 EUT Antenna Gain === 2.0dBi

Condition : 21 230V AC				
Frequency (MHz)	Results (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
5180	5.61	15.13	17.0	-1.87
5260	4.83	14.35	17.0	-2.65
5320	4.46	13.98	17.0	-3.02
5500	5.94	15.46	24.0	-8.54
5600	5.73	15.25	24.0	-8.75
5700	6.03	15.55	24.0	-8.45
Measurement Uncertainty		-1.24dB / +1.20dB		

Condition : 0 207V AC				
Frequency (MHz)	Results (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
5180	5.96	15.48	17.0	-1.52
5260	5.43	14.95	17.0	-2.05
5320	5.34	14.86	17.0	-2.14
5500	6.50	16.02	24.0	-7.98
5600	6.35	15.87	24.0	-8.13
5700	6.79	16.31	24.0	-7.69
Measurement Uncertainty		-1.24dB / +1.20dB		

Condition : 0 253V AC				
Frequency (MHz)	Results (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
5180	5.98	15.50	17.0	-1.50
5260	5.31	14.83	17.0	-2.17
5320	5.28	14.80	17.0	-2.20
5500	6.45	15.97	24.0	-8.03
5600	6.24	15.76	24.0	-8.24
5700	6.69	16.21	24.0	-7.79
Measurement Uncertainty		-1.24dB / +1.20dB		

Condition : 55 207V AC				
Frequency (MHz)	Results (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
5180	5.47	14.99	17.0	-2.01
5260	4.71	14.23	17.0	-2.77
5320	4.21	13.73	17.0	-3.27
5500	5.71	15.23	24.0	-8.77
5600	5.11	14.63	24.0	-9.37
5700	5.37	14.89	24.0	-9.11
Measurement Uncertainty		-1.24dB / +1.20dB		

Condition : 55 253V AC				
Frequency (MHz)	Results (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
5180	5.33	14.85	17.0	-2.15
5260	4.58	14.10	17.0	-2.90
5320	4.12	13.64	17.0	-3.36
5500	5.57	15.09	24.0	-8.91
5600	4.95	14.47	24.0	-9.53
5700	5.22	14.74	24.0	-9.26
Measurement Uncertainty		-1.24dB / +1.20dB		

Condition : 55 253V AC				
Frequency (MHz)	Results (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
5180	5.33	14.85	17.0	-2.15
5260	4.58	14.10	17.0	-2.90
5320	4.12	13.64	17.0	-3.36
5500	5.57	15.09	24.0	-8.91
5600	4.95	14.47	24.0	-9.53
5700	5.22	14.74	24.0	-9.26
Measurement Uncertainty		-1.24dB / +1.20dB		

Test Results : output power and power density at the highest power level

Duty Cycle === 100 %
 Cable Loss === 7.52dB
 EUT Antenna Gain === 2.0dBi

Condition : 21 230V AC				
Frequency (MHz)	Results (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
5180	11.45	20.97	23.0	-2.03
5260	10.62	20.14	23.0	-2.86
5320	10.29	19.81	23.0	-3.19
5500	11.75	21.27	30.0	-8.73
5600	11.65	21.17	30.0	-8.83
5700	11.75	21.27	30.0	-8.73
Measurement Uncertainty		-1.24dB / +1.20dB		

Condition : 0 207V AC				
Frequency (MHz)	Results (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
5180	11.59	21.11	23.0	-1.89
5260	11.30	20.82	23.0	-2.18
5320	11.21	20.73	23.0	-2.27
5500	12.24	21.76	30.0	-8.24
5600	12.08	21.60	30.0	-8.40
5700	12.61	22.13	30.0	-7.87
Measurement Uncertainty		-1.24dB / +1.20dB		

Condition : 0 253V AC				
Frequency (MHz)	Results (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
5180	11.63	21.15	23.0	-1.85
5260	11.02	20.54	23.0	-2.46
5320	10.98	20.50	23.0	-2.50
5500	12.29	21.81	30.0	-8.19
5600	11.90	21.42	30.0	-8.58
5700	12.61	22.13	30.0	-7.87
Measurement Uncertainty		-1.24dB / +1.20dB		

Condition : 55 207V AC				
Frequency (MHz)	Results (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
5180	11.26	20.78	23.0	-2.22
5260	10.37	19.89	23.0	-3.11
5320	9.94	19.46	23.0	-3.54
5500	11.49	21.01	30.0	-8.99
5600	10.85	20.37	30.0	-9.63
5700	11.26	20.78	30.0	-9.22
Measurement Uncertainty		-1.24dB / +1.20dB		

Test Results : Power Density

Condition : 25 230V AC			
Frequency (MHz)	EIRP (dBm/MHz)	Limit (dBm/MHz)	Margin (dBm)
5180	5.23	11	-5.77
5260	4.89	11	-6.11
5320	4.50	11	-6.50
5500	4.39	18	-13.61
5600	4.22	18	-13.78
5700	4.01	18	-13.99
Measurement Uncertainty		-1.24dB / +1.20dB	

3. Transmitter unwanted Emissions outside the hiperlan Bands (Radiated)

3.1 Test Condition

Reference to ETSI DEN 301 893 Clause 5.3.3.2

Ambient Temperature : **+25 Degrees Celsius**

Relative Humidity : **65%**

3.2 Test Limit

Frequency Range (MHz)	Maximum power, ERP (dBm)	Bandwidth (kHz)
25 to 47	-36	100
47 to 74	-54	100
74 to 87.5	-36	100
87.5 to 118	-54	100
118 to 174	-36	100
174 to 230	-54	100
230 to 470	-36	100
470 to 862	-54	100
862 to 1000	-36	100
1000 to 5150	-30	1000
5150 to 5470	-30	1000
5470 to 26.5GHz	-30	1000

3.3 Test Equipment List :

Agilent E4407B 9KHz-26.5GHz Spectrum Analyzer

3.4 Test Results (Radiated)

Test Mode : CH01 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.86	-57.83	-36	-21.83
149.37	-51.67	-36	-15.67
699.61	-53.10	-36	-17.10
800.10	-53.57	-30	-23.57
846.90	-49.80	-30	-19.80
3765.50	-53.62	-30	-23.62
5440.30	-46.96	-30	-16.96
11496.60	-48.73	-30	-18.73
16795.30	-46.92	-30	-16.92
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.87	-55.37	-36	-19.37
149.37	-53.17	-36	-17.17
699.63	-53.51	-36	-17.51
800.10	-50.04	-30	-20.04
846.92	-51.15	-30	-21.15
3765.5	-48.51	-30	-18.51
5440.3	-45.37	-30	-15.37
11496.7	-43.62	-30	-13.62
16795.5	-48.32	-30	-18.32
Measurement Uncertainty		+2.41dB/-1.85dB	

Test Mode : CH04(Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.87	-57.83	-36	-21.83
149.37	-50.21	-36	-14.21
699.60	-54.20	-36	-18.20
800.08	-54.09	-30	-24.09
846.88	-50.07	-30	-20.07
3765.5	-53.20	-30	-23.20
5440.3	-45.91	-30	-15.91
11496.6	-47.97	-30	-17.97
16795.3	-46.80	-30	-16.80
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.9	-54.80	-36	-18.80
149.4	-51.87	-36	-15.87
699.6	-54.32	-36	-18.32
800.1	-49.49	-30	-19.49
846.9	-49.54	-30	-19.54
3765.5	-49.43	-30	-19.43
5440.3	-45.53	-30	-15.53
11496.7	-42.87	-30	-12.87
16795.5	-48.43	-30	-18.43
Measurement Uncertainty		+2.41dB/-1.85dB	

Test Mode : CH08 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.87	-57.76	-36	-21.76
149.39	-50.58	-36	-14.58
699.64	-52.11	-36	-16.11
800.09	-53.33	-30	-23.33
846.87	-51.71	-30	-21.71
3765.49	-53.88	-30	-23.88
5440.33	-46.08	-30	-16.08
11496.62	-46.91	-30	-16.91
16795.28	-48.88	-30	-18.88
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.86	-57.51	-36	-21.51
149.36	-51.70	-36	-15.70
699.62	-54.95	-36	-18.95
800.10	-47.89	-30	-17.89
846.94	-52.57	-30	-22.57
3765.49	-48.79	-30	-18.79
5440.31	-43.55	-30	-13.55
11496.70	-44.08	-30	-14.08
16795.52	-49.24	-30	-19.24
Measurement Uncertainty		+2.41dB/-1.85dB	

Test Mode : CH09 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.88	-56.10	-36	-20.10
149.38	-51.45	-36	-15.45
699.63	-54.05	-36	-18.05
800.08	-52.97	-30	-22.97
846.88	-51.09	-30	-21.09
3765.52	-55.49	-30	-25.49
5440.28	-47.86	-30	-17.86
11496.61	-47.60	-30	-17.60
16795.29	-46.78	-30	-16.78
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.87	-53.83	-36	-17.83
149.38	-52.91	-36	-16.91
699.64	-55.18	-36	-19.18
800.12	-48.71	-30	-18.71
846.92	-51.71	-30	-21.71
3765.51	-48.59	-30	-18.59
5440.28	-47.12	-30	-17.12
11496.73	-44.65	-30	-14.65
16795.48	-49.09	-30	-19.09
Measurement Uncertainty		+2.41dB/-1.85dB	

Test Mode : CH14 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.85	-57.29	-36	-21.29
149.35	-53.58	-36	-17.58
699.61	-54.70	-36	-18.70
800.11	-55.52	-30	-25.52
846.91	-49.84	-30	-19.84
3765.51	-54.99	-30	-24.99
5440.30	-48.21	-30	-18.21
11496.60	-50.04	-30	-20.04
16795.31	-46.98	-30	-16.98
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.87	-55.46	-36	-19.46
149.36	-54.75	-36	-18.75
699.61	-55.53	-36	-19.53
800.09	-51.17	-30	-21.17
846.94	-49.19	-30	-19.19
3765.52	-49.88	-30	-19.88
5440.29	-44.93	-30	-14.93
11496.73	-42.79	-30	-12.79
16795.47	-48.76	-30	-18.76
Measurement Uncertainty		+2.41dB/-1.85dB	

Test Mode : CH19 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.88	-56.80	-36	-20.80
149.38	-53.29	-36	-17.29
699.58	-55.24	-36	-19.24
800.12	-54.47	-30	-24.47
846.91	-51.64	-30	-21.64
3765.53	-53.50	-30	-23.50
5440.29	-48.47	-30	-18.47
11496.57	-49.05	-30	-19.05
16795.32	-47.08	-30	-17.08
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
99.89	-55.54	-36	-19.54
149.35	-55.31	-36	-19.31
699.63	-54.21	-36	-18.21
800.10	-50.08	-30	-20.08
846.94	-52.10	-30	-22.10
3765.51	-46.80	-30	-16.80
5440.30	-45.74	-30	-15.74
11496.71	-44.35	-30	-14.35
16795.49	-49.49	-30	-19.49
Measurement Uncertainty		+2.41dB/-1.85dB	

4. Transmitter unwanted Emissions Within the Hiperlan Bands

4.1 Test Condition

Reference to ETSI DEN 301 893 Clause 5.3.4.2

Ambient Temperature : **+25 Degrees Celsius**

Relative Humidity : **65%**

4.2 Limits

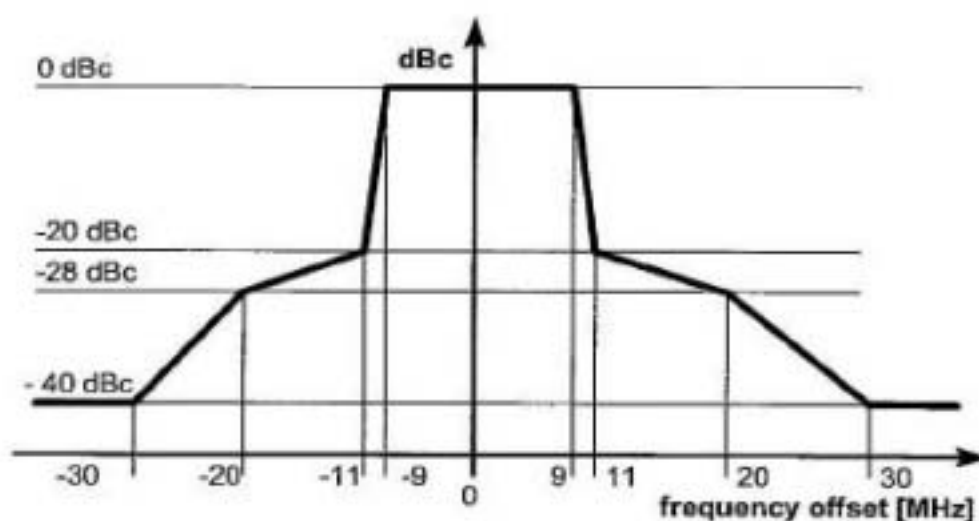


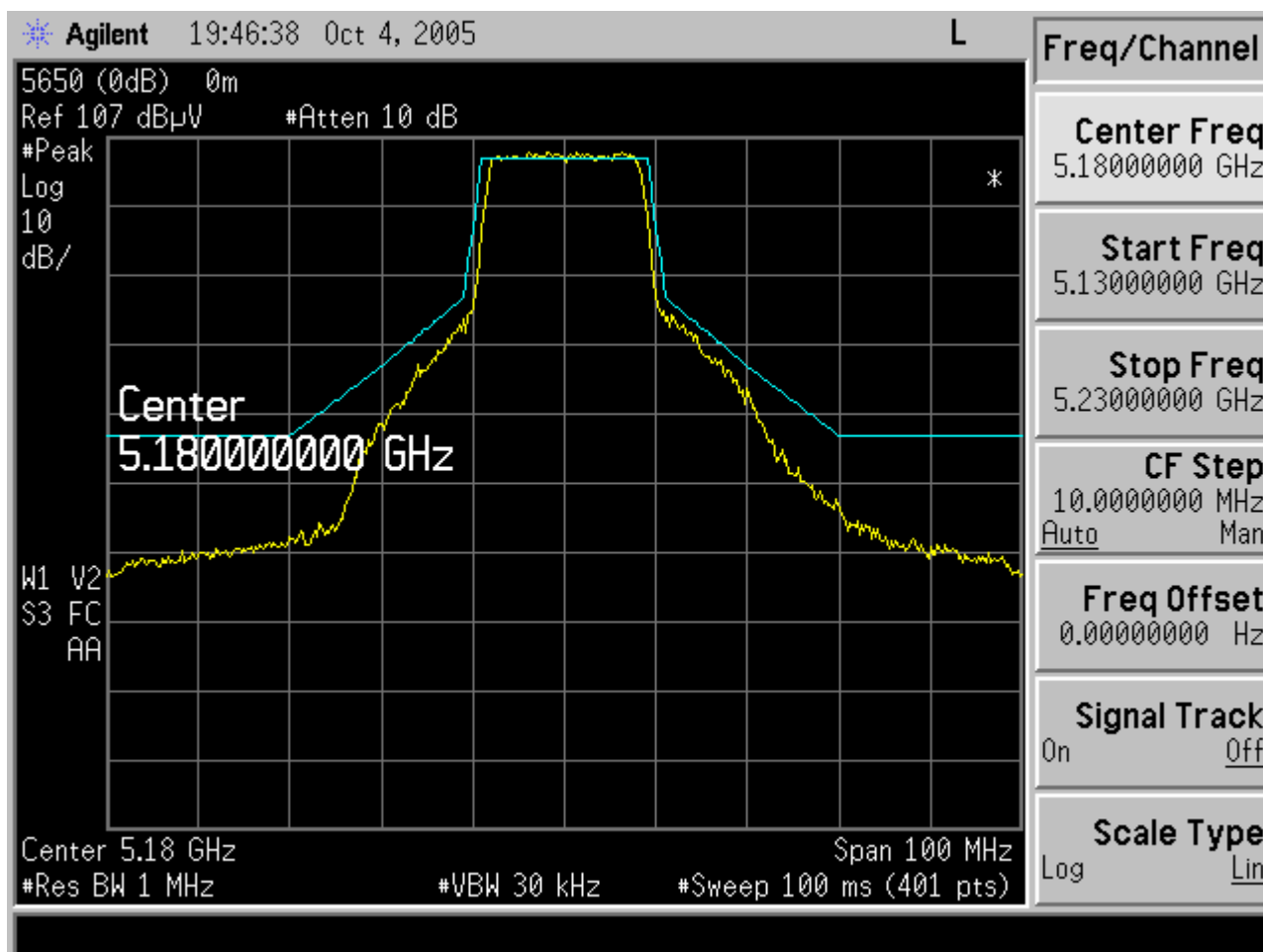
Figure : Transmit spectral power mask. dBc is the spectral density relative to the maximum spectral power density of the transmitted signal.

4.3 Test Equipment List :

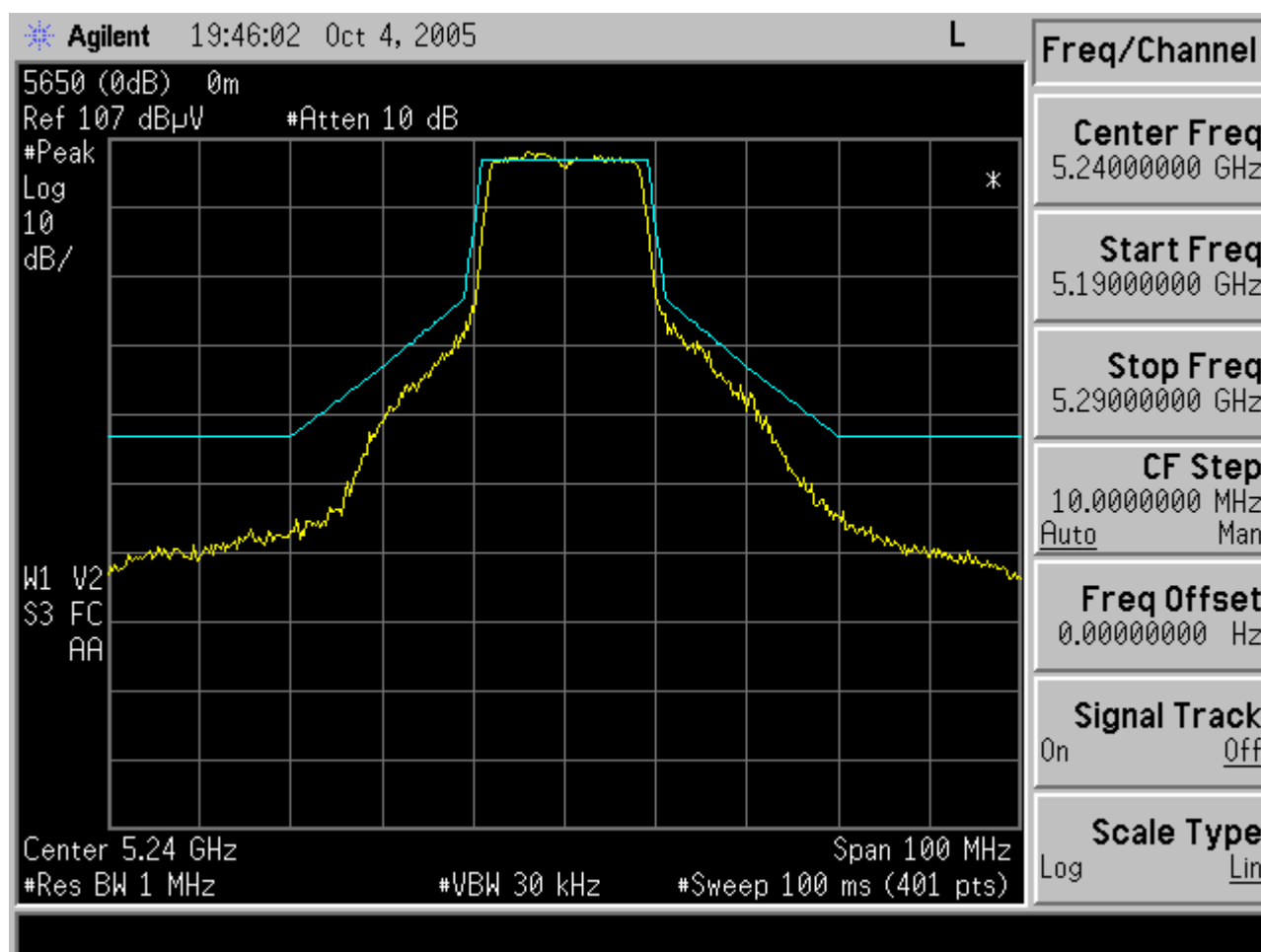
Agilent E4407B 9KHz-26.5GHz Spectrum Analyzer

4.4 Test Results

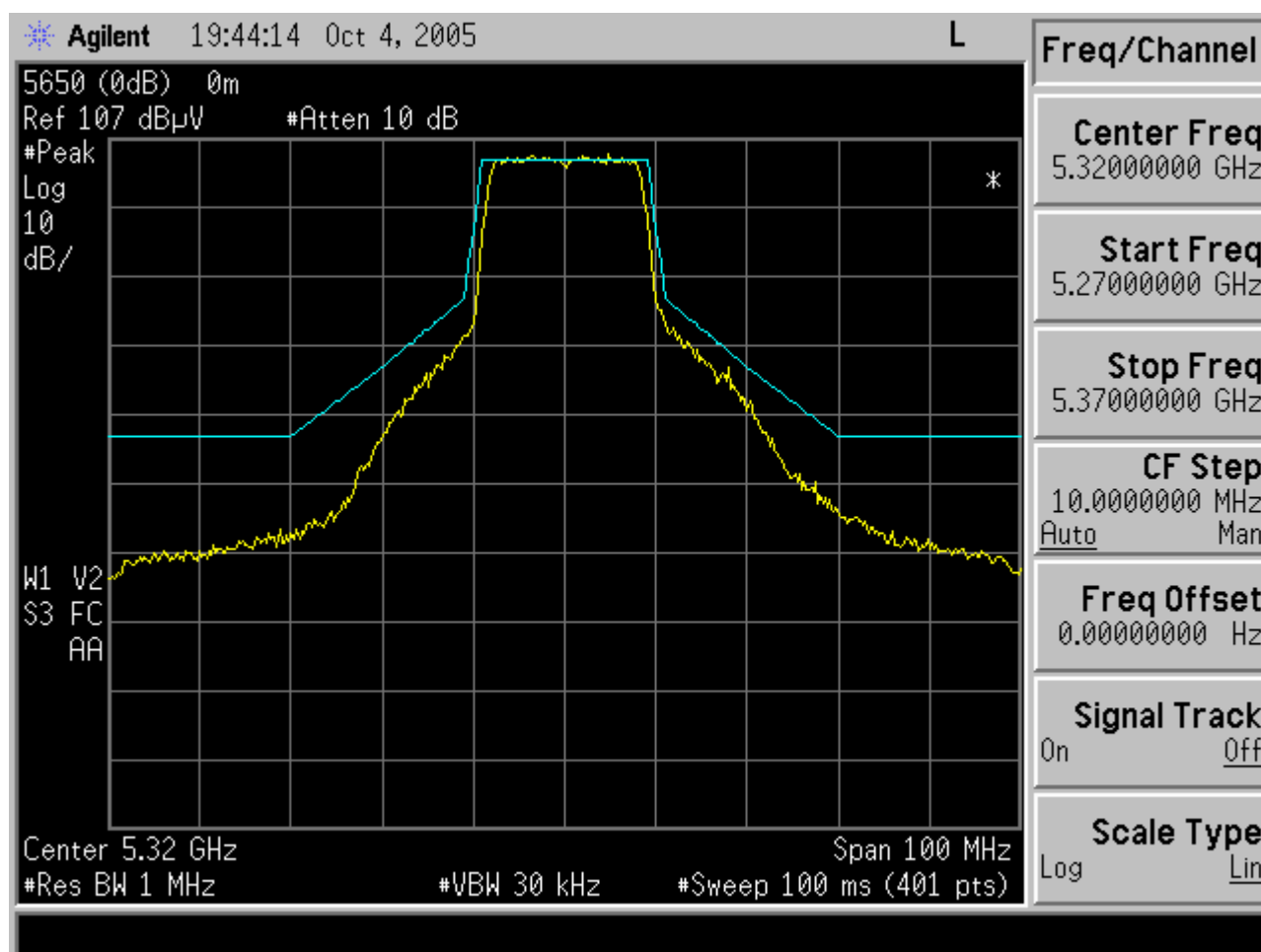
CH01 5180MHz



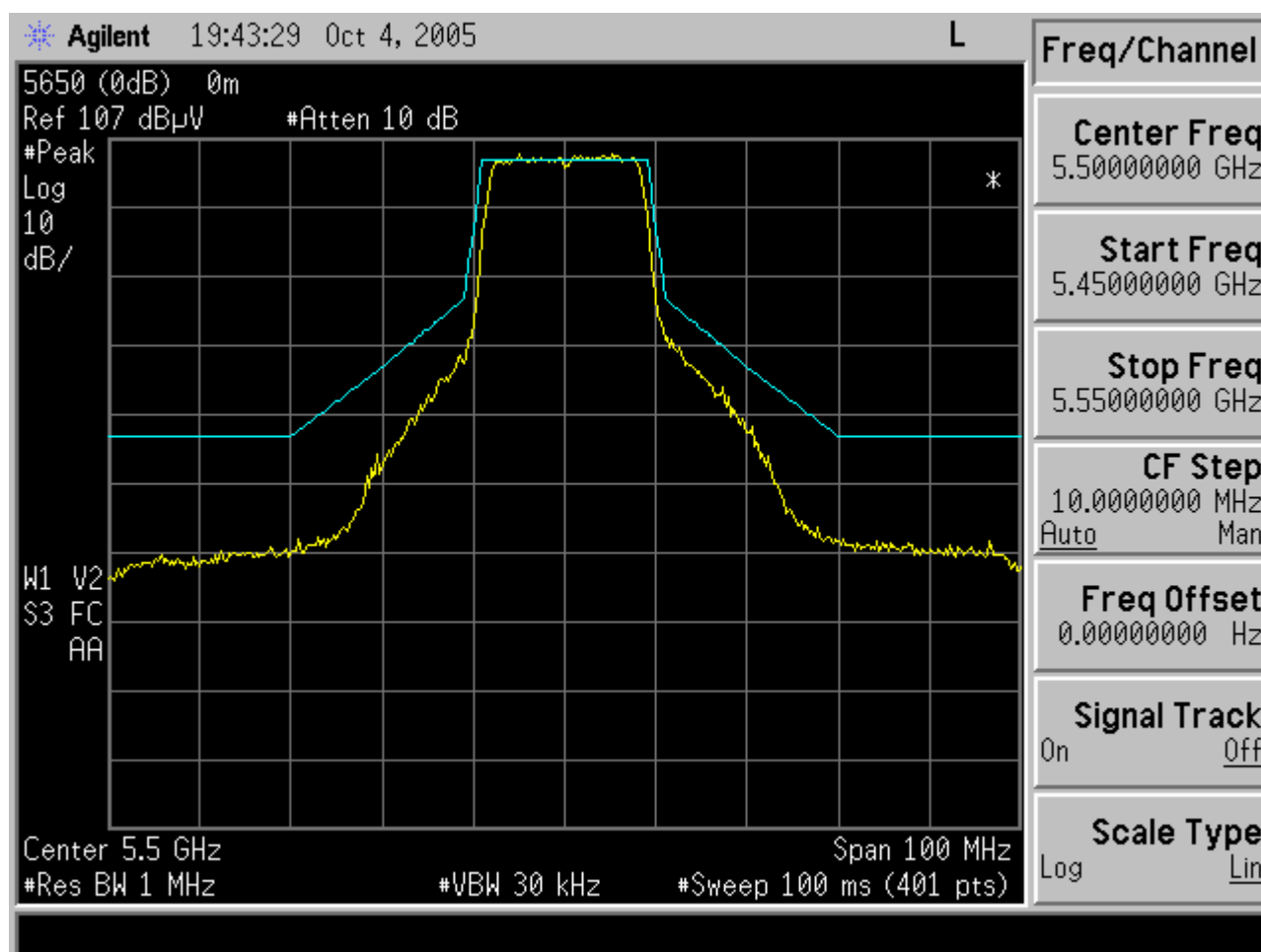
CH04 5240MHz



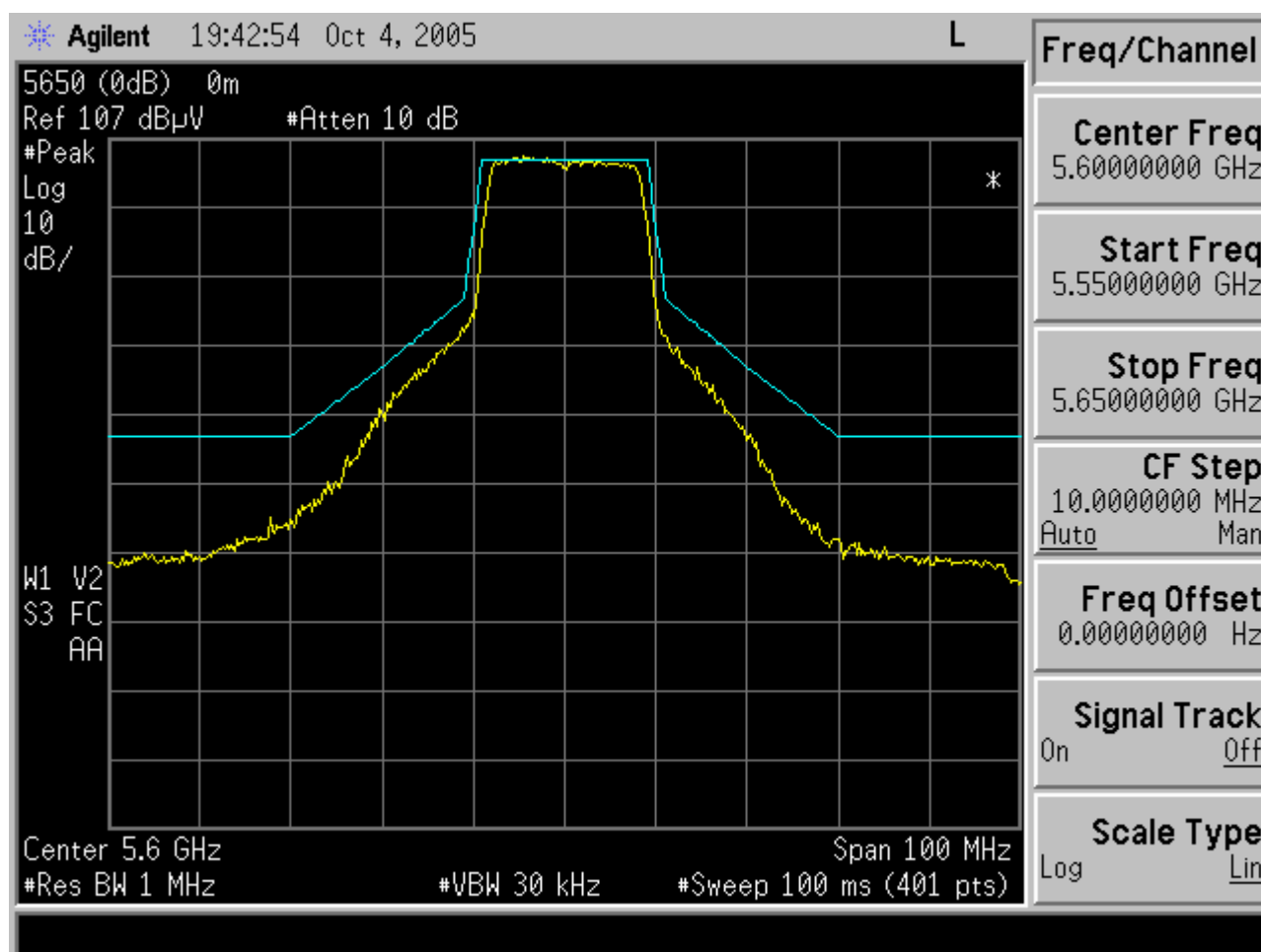
CH08 5320MHz



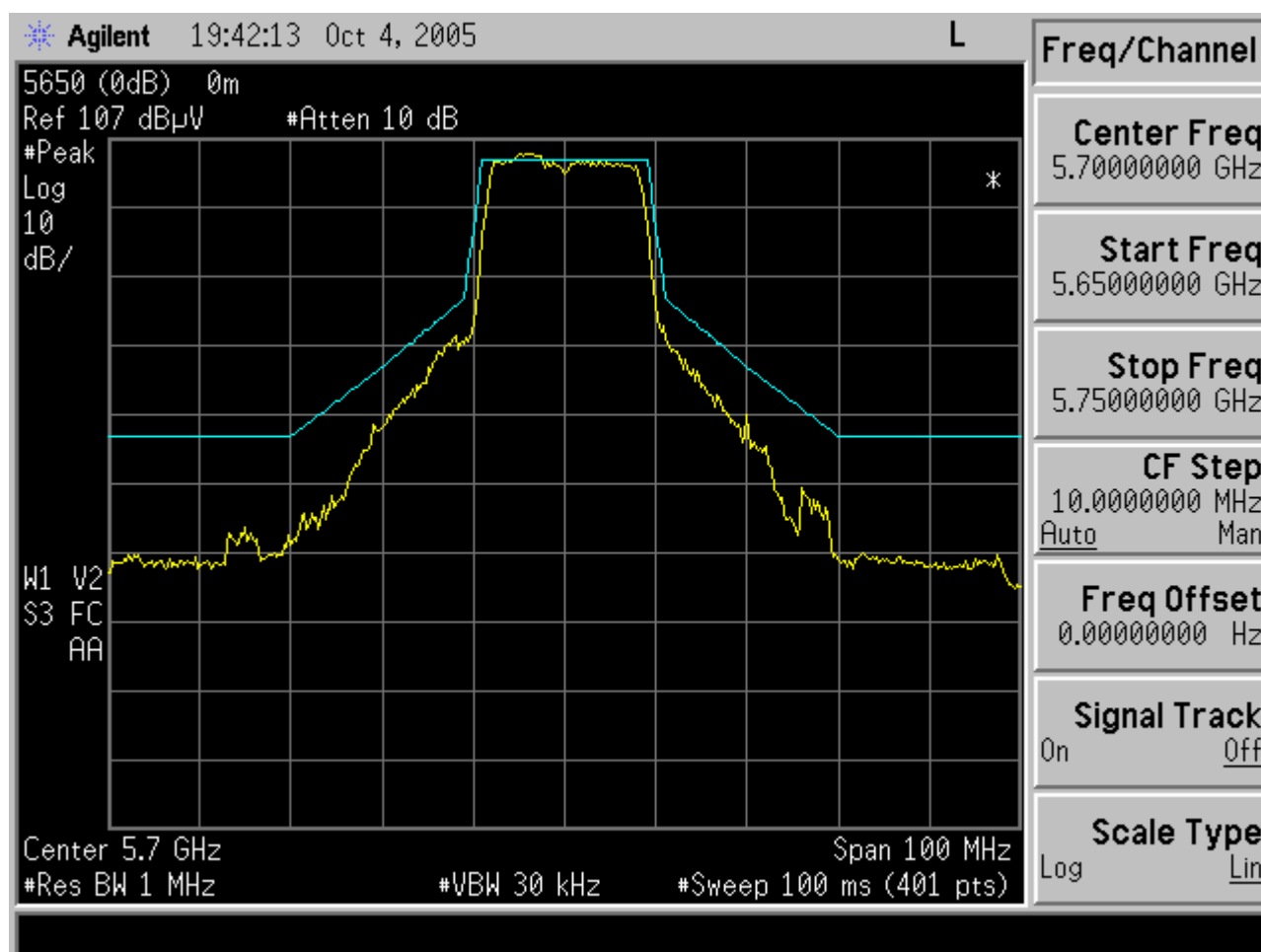
CH09 5500MHz



CH14 5600MHz



CH19 5700MHz



5. Dynamic Frequency Selection (DFS)

5.1 Test Condition

Ambient Temperature : **+25 Degrees Celsius**

Relative Humidity : **65%**

5.2 Test Limits and Radar Signal Parameters

Reference to ETSI DEN 301 893 Clause 4.6.1 and Appendix D.

Maximum Transmit Power	Limit
>200mW (>23dBm)	-64 dBm
<200mW (<23dBm)	-62 dBm
This level is only for 0dBi EUT antenna gain	

Radar Signal Parameters

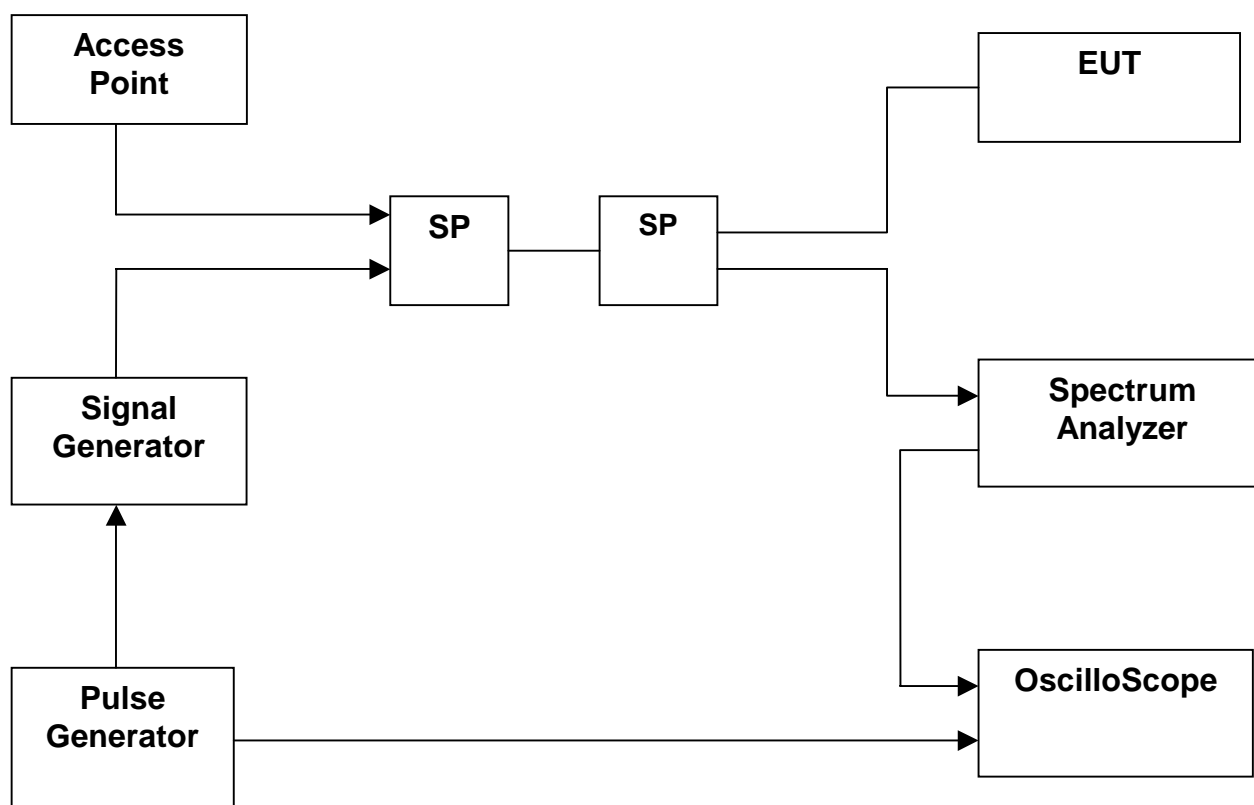
Radar Signal	Pulse Repetition Frequency (pps)	Pulse Width (us)	Number of Pulse Per Burst	Burst Period (sec)
1	700	1	18	10
2	1800	1	10	2
3	330	2	70	60

DFS REQUIREMENT TIME VALUE

Reference to ETSI DEN 301 893 Clause 4.6.2 – 4.6.4 and Appendix D.

ITEM	Time Limit
Channel available check time	60s
Channel move time	10s
Channel Closing	260ms

TEST SETUP



1.3 Test Equipment List :

Agilent E4407B 9KHz-26.5GHz Spectrum Analyzer

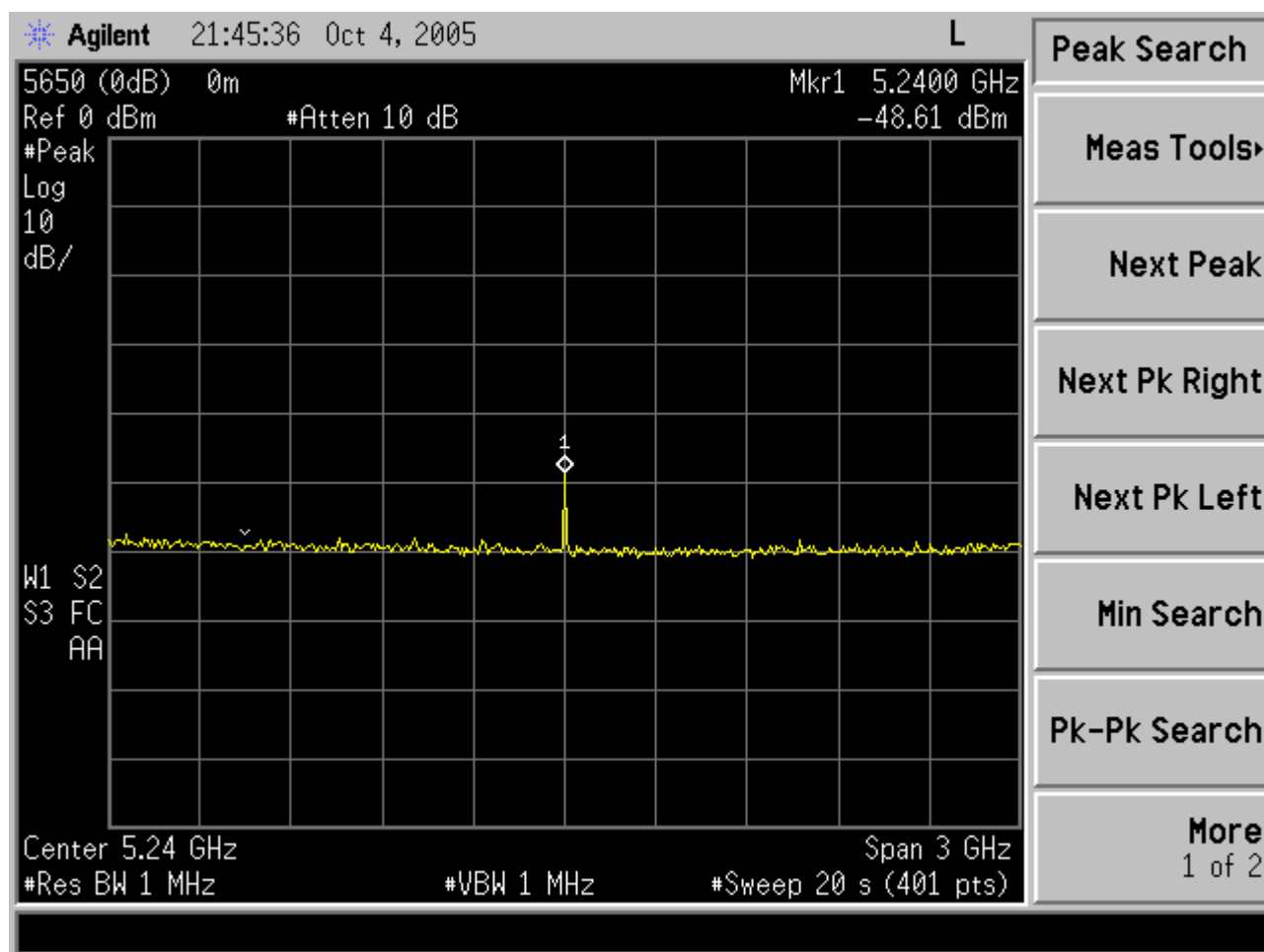
Agilent E8257C Signal Generator

Agilent 33220A Pulse Generator

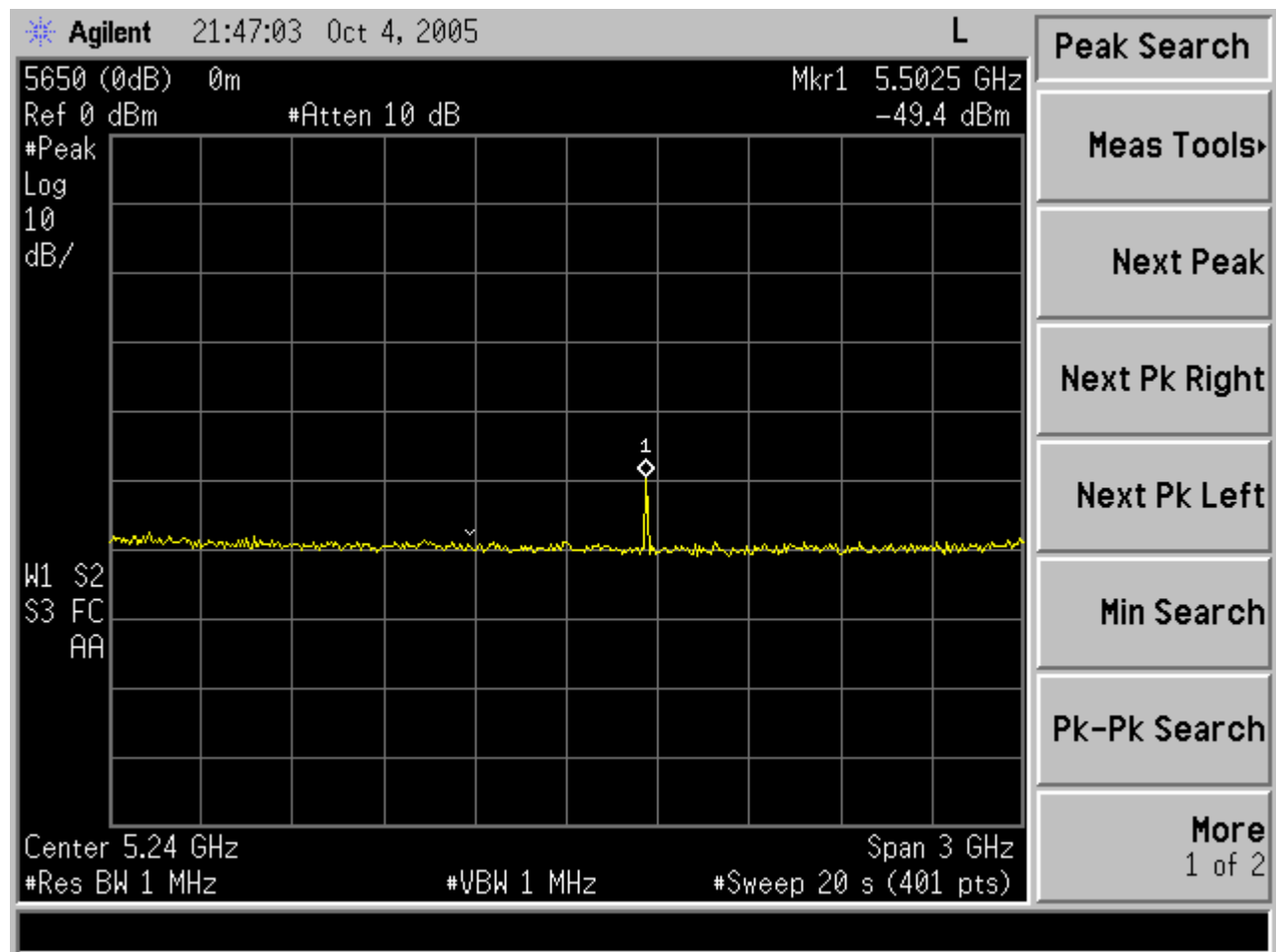
5.4 Test Results

1.4.1 Interference Threshold

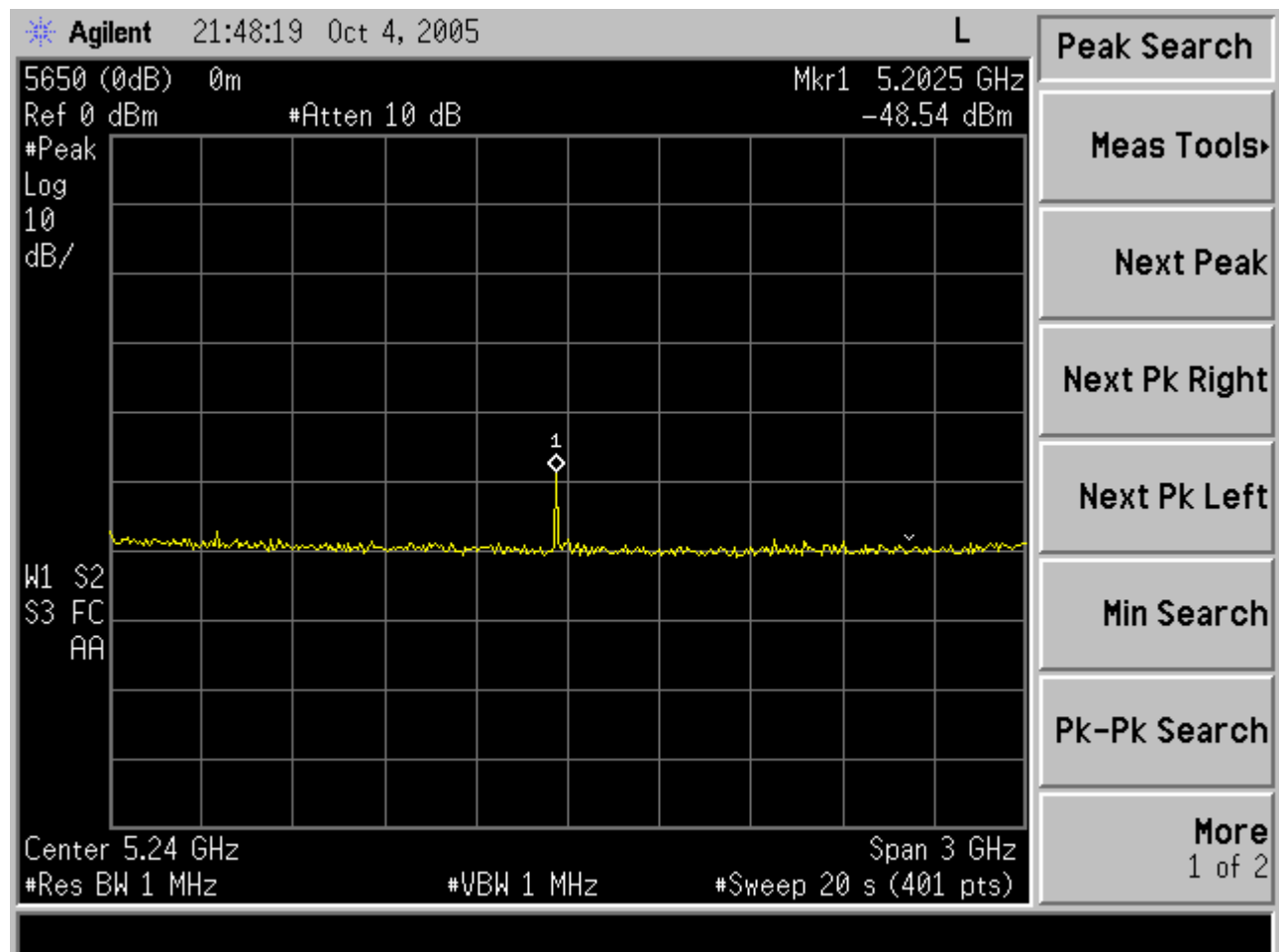
Radar 1



Radar 2



Radar 3



5.4.2 Channel Available Cheek Time

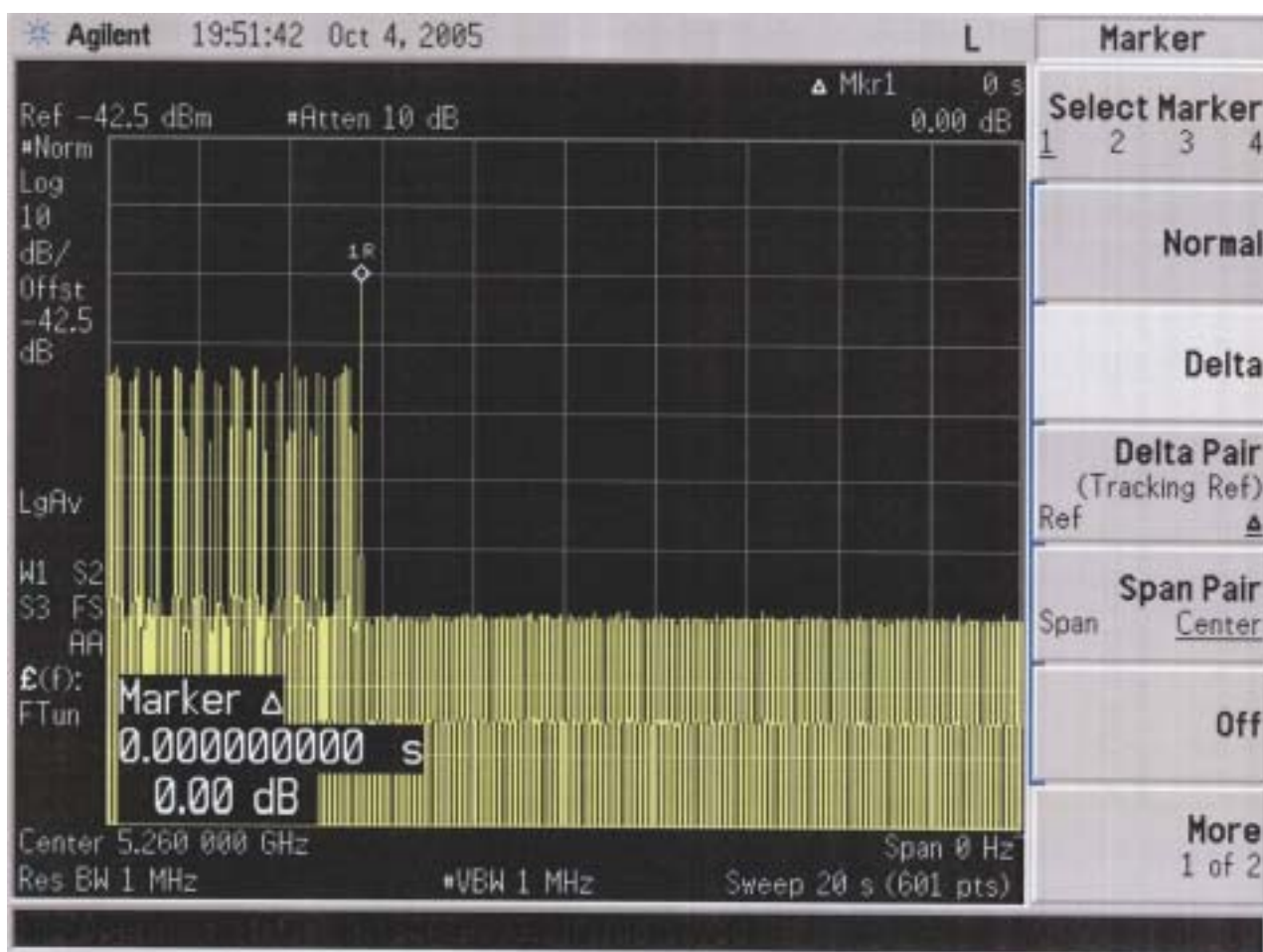
RADAR BURST	Pulse Width (us)	Number of Pulse Per Burst
Within 1sec to 6 sec	Detected	5260MHz
Within 1sec to 60 sec	Detected	5260MHz

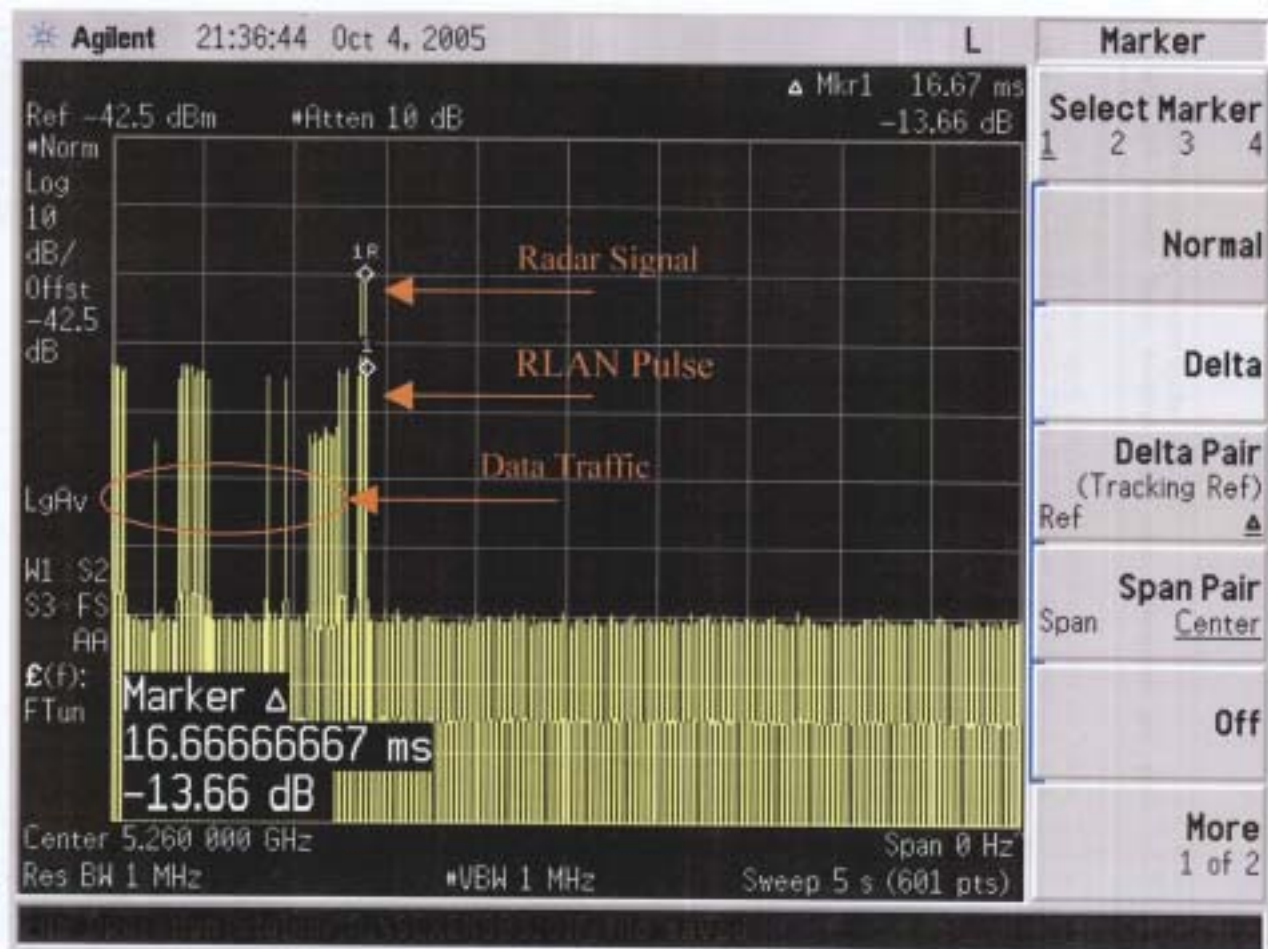
5.4.3 Channel Closing Transmission Time

Radar Type	Channel Closing Transmission Time (ms)	Limit (ms)
1	0	260
2	0	260
3	0	260

5.4.4 Channel Move Time

Radar Type	Channel Move Time (s)	Limit
1	0.00	10s
2	0.00	10s
3	0.00	10s







MAX LIGHT

MEASUREMENT REPORT

Page: 67/81

6. Receiver Spurious Emissions (Radiated)

6.1 Test Condition

Reference to ETSI DEN 301 893 Clause 5.3.5.2

Ambient Temperature : **+25 Degrees Celsius**

Relative Humidity : **65%**

6.2 Test Limit

25MHz to 1GHz -57 dBm in a 100kHz Bandwidth

1GHz to 26.5GHz -47 dBm in a 1MHz Bandwidth

6.3 Test Equipment List :

Agilent E4407B 9KHz-26.5GHz Spectrum Analyzer

6.4 Test Results (Radiated)

Test Mode : CH01 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
237.56	-72.38	-57	-15.38
416.88	-71.42	-57	-14.42
446.68	-65.71	-57	-8.71
2980.1	-69.93	-47	-22.93
15663.6	-65.65	-47	-18.65
17751.2	-65.58	-47	-18.58
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
237.57	-72.97	-57	-15.97
416.88	-72.57	-57	-15.57
446.68	-69.38	-57	-12.38
2980.2	-68.62	-47	-21.62
15662.8	-65.39	-47	-18.39
17751.7	-66.70	-47	-19.70
Measurement Uncertainty		+2.41dB/-1.85dB	

Test Mode : CH04 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
237.57	-73.74	-57	-16.74
416.88	-72.80	-57	-15.80
446.66	-65.65	-57	-8.65
2980.1	-69.24	-47	-22.24
15663.6	-64.18	-47	-17.18
17751.2	-66.10	-47	-19.10
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
237.56	-73.35	-57	-16.35
416.87	-71.11	-57	-14.11
446.67	-68.46	-57	-11.46
2980.2	-69.66	-47	-22.66
15662.8	-66.11	-47	-19.11
17751.7	-65.71	-47	-18.71
Measurement Uncertainty		+2.41dB/-1.85dB	

Test Mode : CH08 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
237.58	-73.41	-57	-16.41
416.88	-72.23	-57	-15.23
446.70	-66.76	-57	-9.76
2980.1	-70.32	-47	-23.32
15663.6	-65.69	-47	-18.69
17751.2	-64.67	-47	-17.67
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
237.55	-71.27	-57	-14.27
416.91	-74.31	-57	-17.31
446.70	-68.70	-57	-11.70
2980.1	-66.72	-47	-19.72
15662.8	-66.49	-47	-19.49
17751.7	-67.52	-47	-20.52
Measurement Uncertainty		+2.41dB/-1.85dB	

Test Mode : CH09 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
237.56	-72.34	-57	-15.34
416.86	-70.77	-57	-13.77
446.68	-66.48	-57	-9.48
2980.1	-68.99	-47	-21.99
15663.6	-67.52	-47	-20.52
17751.2	-65.06	-47	-18.06
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
237.59	-73.18	-57	-16.18
416.90	-72.55	-57	-15.55
446.69	-70.24	-57	-13.24
2980.1	-69.17	-47	-22.17
15662.8	-65.06	-47	-18.06
17751.7	-67.38	-47	-20.38
Measurement Uncertainty		+2.41dB/-1.85dB	

Test Mode : CH14 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
237.56	-71.91	-57	-14.91
416.85	-69.95	-57	-12.95
446.66	-64.21	-57	-7.21
2980.1	-68.63	-47	-21.63
15663.6	-66.11	-47	-19.11
17751.2	-67.21	-47	-20.21
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
237.55	-72.32	-57	-15.32
416.90	-71.12	-57	-14.12
446.68	-67.79	-57	-10.79
2980.2	-69.99	-47	-22.99
15662.8	-66.99	-47	-19.99
17751.8	-66.03	-47	-19.03
Measurement Uncertainty		+2.41dB/-1.85dB	

Test Mode : CH19 (Operating)

Spurious Emissions (HORIZONTAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
237.55	-71.94	-57	-14.94
416.86	-69.92	-57	-12.92
446.68	-65.79	-57	-8.79
2980.1	-69.64	-47	-22.64
15663.6	-66.86	-47	-19.86
17751.2	-63.50	-47	-16.50
Measurement Uncertainty		+2.41dB/-1.85dB	

Spurious Emissions (VERTICAL)			
Frequency (MHz)	Amplitude (dBm)	Limits (dBm)	Margin (dB)
237.57	-71.20	-57	-14.20
416.89	-70.89	-57	-13.89
446.65	-70.24	-57	-13.24
2980.1	-70.49	-47	-23.49
15662.8	-64.29	-47	-17.29
17751.7	-67.33	-47	-20.33
Measurement Uncertainty		+2.41dB/-1.85dB	



MAX LIGHT

MEASUREMENT REPORT

Page: 74/81

Appendix I- Block Diagram

See Next Page



MAX LIGHT

MEASUREMENT REPORT

Page: 75/81

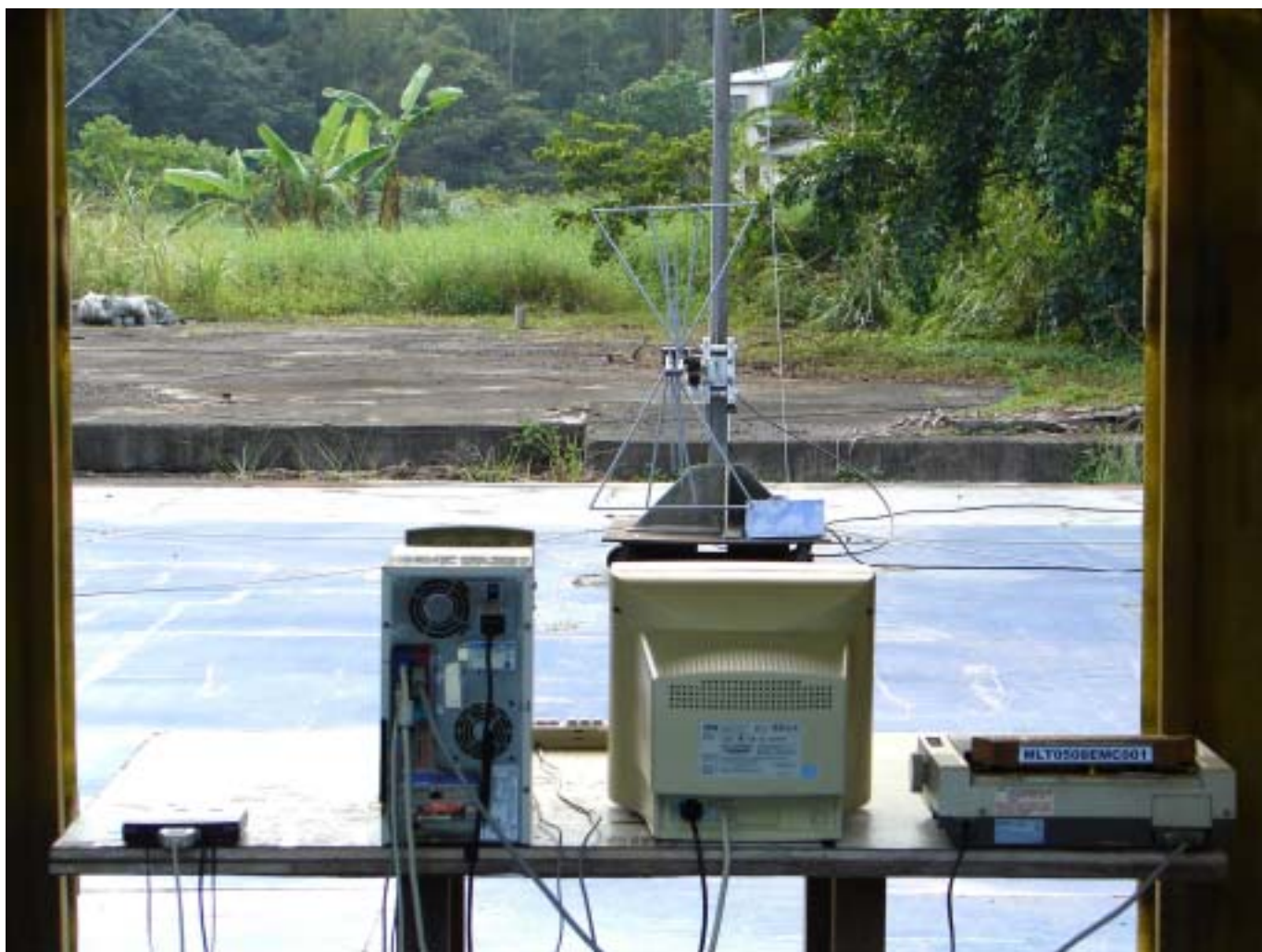
Appendix II- User Manual

See Next Page

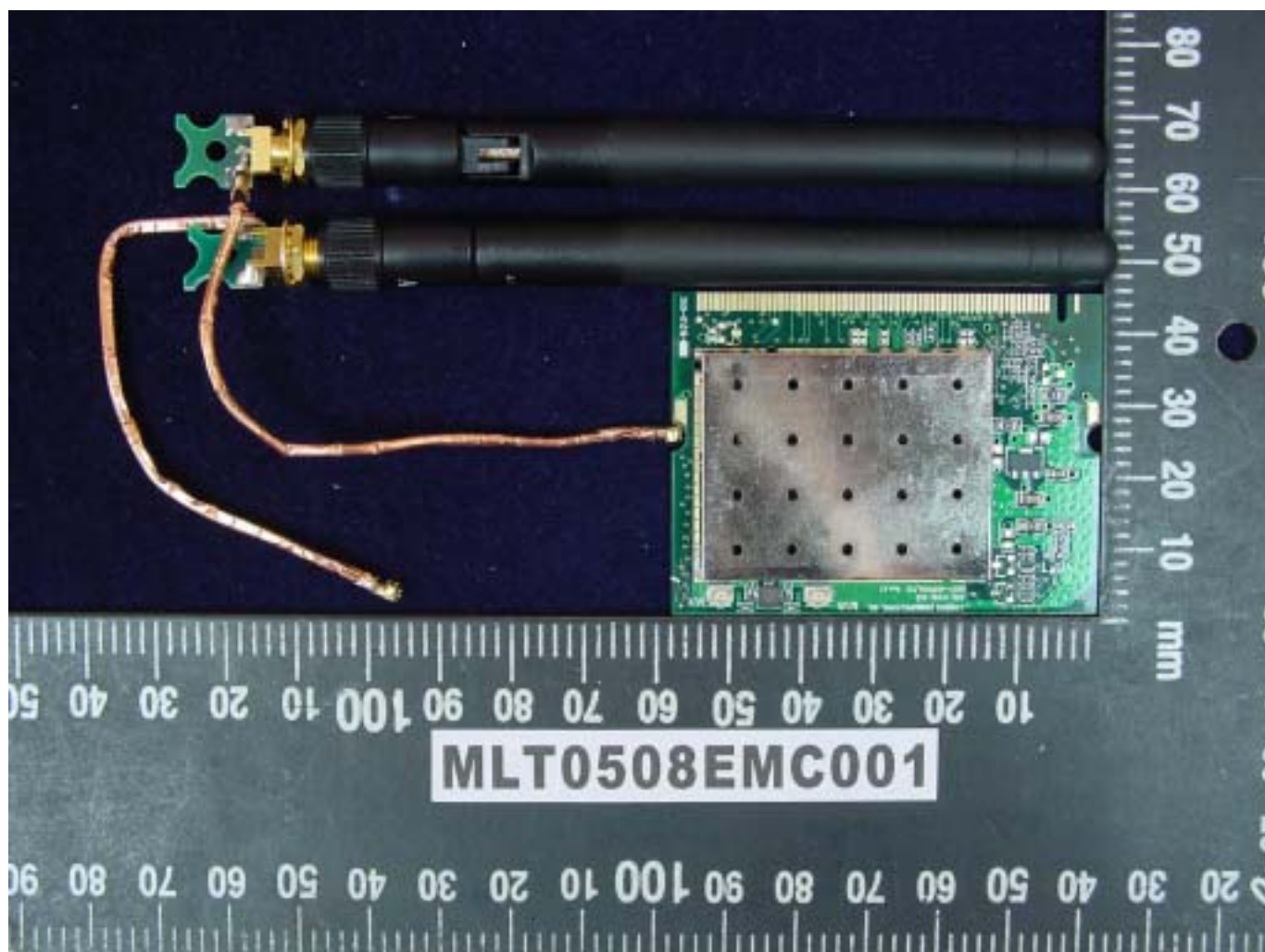
Appendix III- EUT Photographs



Appendix III- EUT Photographs



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Appendix III- EUT Photographs

