

Test Report
for
FCC Part 15 Subpart B & C & E

of

Product Name

802.11a+g Access Point with PoE

Model

**RDAT-81;IA300 (IntraAir 300);
WNA-0501P;WDAP-2000PE**

(Brand: Wistron NeWeb)

Applied by:

Wistron Neweb Corporation
No. 10-1, Li-hsin Road 1,
Science-based Industrial Park,Hsinchu 300,
Taiwan, R. O. C.

Test Performed by:

International Standards Laboratory

No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd.
Lung-Tan Hsiang, Tao Yuan County 325
Taiwan, R.O.C.
Tel:(03)407-1718 Fax:(03)407-1738

Report Number: ISL-05LR021FC

Issue Date: 2005/09/21

HC LAB:NVLAP:200234-0;VCCI: R-341,C-354;NEMKO:ELA 113a,113c;BSMI:SL2-IN-E-0037;SL2-R1-E-0037;CNLA:1178

LT LAB:NVLAP:200234-0;VCCI: R-1435,C-1440;NEMKO:ELA 113b,113d;BSMI:SL2-IN-E-0013;CNLA:0997

ISL-T10-R29-1

Contents of Report

- 1. General 1
 - 1.1 Certification of Accuracy of Test Data 1
- 2. Test Results Summary 2
- 3. Description of Equipment Under Test (EUT) 3
- 4. TEST RESULTS (802.11a) 5
 - 4.1 Maximum Peak Output Power [Section 15.407 (a)(1)(2)(3)] 5
 - 4.1.1 Test Procedure 5
 - 4.1.2 Test Setup 5
 - 4.1.3 Test Data: (Normal Mode)..... 5
 - 4.1.4 Test Data: (Turbo Mode) 6
 - 4.2 Peak Power Spectral Density [Section 15.407(a)(1)(2)(3)] 13
 - 4.2.1 Test Procedure 13
 - 4.2.2 Test Setup 13
 - 4.2.3 Test Data: (Normal Mode)..... 13
 - 4.2.4 Test Data: (Turbo Mode) 13
 - 4.3 Peak Power Excursion Measurement [Section 15.407(a)(6)] 20
 - 4.3.1 Test Procedure 20
 - 4.3.2 Test Setup 20
 - 4.3.3 Test Data: (Normal Mode)..... 20
 - 4.3.4 Test Data: (Turbo Mode) 20
 - 4.4 Powerline Conducted Emissions [Section 15.207 & 15.407 (b)(5)] 27
 - 4.4.1 EUT Configuration 27
 - 4.4.2 Test Procedure 27
 - 4.4.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)..... 27
 - 4.4.4 Test Data: 28
 - 4.5 Radiated Emission Measurement [Section 15.209 & 15.407(b)(5)] 30
 - 4.5.1 EUT Configuration 30
 - 4.5.2 Test Procedure 30
 - 4.5.3 EMI Receiver/Spectrum Analyzer Configuration 30
 - 4.5.4 Test Data (30MHz – 1GHz) 31
 - 4.5.5 Test Data (1GHz – 40 GHz, Transmitting) 32
 - 4.6 Band Edge Measurement (Section 15.407 (b) (1) (2)) 44
 - 4.6.1 Test Procedure (Conducted) 44
 - 4.6.2 Test Setup (Conducted) 44
 - 4.6.3 Test Data (conducted): 44
 - 4.6.4 Bandedge Measurement Test Procedure (Radiated)..... 50
 - 4.6.5 Test Setup (Radiated) 51
 - 4.6.6 Test Data (Radiated): 52
 - 4.7 RF Exposure Measurement [Section 15.407(f)(4) & 1.1307(b)] 61
- Refer to MPE Test Report..... 61
- 4.8 Frequency Stability [Section 15.407(g)] 62
 - 4.8.1 Limits of Frequency Stability Measurement..... 62
 - 4.8.2 Test Procedure 62
 - 4.8.3 Test Setup 62
 - 4.8.4 Test Data 63
- 5. TEST RESULTS (802.11b) 64
 - 5.1 Powerline Conducted Emissions [Section 15.207] 64
 - 5.1.1 EUT Configuration 64
 - 5.1.2 Test Procedure 64
 - 5.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)..... 64
 - 5.1.4 Test Data: 65

5.2 Bandwidth for DSSS [Section 15.247 (a)(2)]..... 67

5.2.1 Test Procedure 67

5.2.2 Test Setup 67

5.2.3 Test Data:..... 67

5.3 DSSS Maximum Peak Output Power [Section 15.247 (b)(1)]..... 70

5.3.1 Test Procedure 70

5.3.2 Test Setup 70

5.3.3 Test Data..... 70

5.4 Radiated Emission Measurement [Section [15.247(c)(4)] 71

5.4.1 EUT Configuration 71

5.4.2 Test Procedure 71

5.4.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)..... 71

5.4.4 Test Data (30MHz – 1GHz): 72

5.4.5 Test Data (1GHz – 25 GHz) 73

5.5 Band Edge Measurement..... 77

5.5.1 Test Procedure (Conducted) 77

5.5.2 Test Setup (Conducted) 77

5.5.3 Test Data:..... 77

5.5.4 Test Procedure (Radiated) 79

5.5.5 Test Setup (Radiated) 79

5.5.6 Test Data..... 80

5.6 RF Exposure Measurement [Section 15.247(b)(4) & 1.1307(b)]..... 83

5.7 DSSS Peak Power Spectral Density [Section 15.247(d)]..... 84

5.7.1 Test Procedure 84

5.7.2 Test Setup 84

5.7.3 Test Data..... 84

6. TEST RESULTS (802.11g) 87

6.1 Powerline Conducted Emissions [Section 15.207] 87

6.1.1 EUT Configuration 87

6.1.2 Test Procedure 87

6.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)..... 87

6.1.4 Test Data:..... 88

6.2 Bandwidth for DSSS [Section 15.247 (a)(2)]..... 90

6.2.1 Test Procedure 90

6.2.2 Test Setup 90

6.2.3 Test Data:..... 90

6.3 DSSS Maximum Peak Output Power [Section 15.247 (b)(1)]..... 93

6.3.1 Test Procedure 93

6.3.2 Test Setup 93

6.3.3 Test Data..... 93

6.4 Radiated Emission Measurement [Section [15.247(c)(4)] 94

6.4.1 EUT Configuration 94

6.4.2 Test Procedure 94

6.4.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)..... 94

6.4.4 Test Data (30MHz – 1GHz): 95

6.4.5 Test Data (1GHz – 25 GHz) 96

6.5 Band Edge Measurement..... 99

6.5.1 Test Procedure (Conducted) 99

6.5.2 Test Setup (Conducted) 99

6.5.3 Test Data:..... 99

6.5.4 Test Procedure (Radiated) 101

6.5.5 Test Setup (Radiated) 101

6.5.6 Test Data..... 102

6.6 RF Exposure Measurement [Section 15.247(b)(4) & 1.1307(b)]..... 106

6.7 DSSS Peak Power Spectral Density [Section 15.247(d)]..... 107

6.7.1 Test Procedure 107

6.7.2 Test Setup 107
6.7.3 Test Data..... 107
7. Appendix 110
7.1 Appendix A: Measurement Procedure for Power line Conducted Emissions..... 110
7.2 Appendix B: Test Procedure for Radiated Emissions 111
7.3 Appendix C: Test Equipment 112
7.3.1 Test Equipment List..... 112
7.3.2 Software for Controlling Spectrum/Receiver and Calculating Test Data 112
7.4 Appendix D: Layout of EUT and Support Equipment 113
7.4.1 General Conducted Test Configuration 113
7.4.2 General Radiation Test Configuration 114
7.5 Appendix E: Description of Support Equipment..... 115
7.5.1 Description of Support Equipment 115
7.5.2 Software for Controlling Support Unit 115
7.5.3 I/O Cable Condition of EUT and Support Units..... 116
7.6 Appendix F: Accuracy of Measurement..... 117
7.7 Appendix G: Photographs of EUT Configuration Test Set Up 119
7.8 Appendix H: Antenna Spec. 122

1. General

1.1 Certification of Accuracy of Test Data

Standards: CFR 47 Part 15 Subpart B Class B
 CFR 47 Part 15 Subpart C (Section 15.247)
 CFR 47 Part 15 Subpart E (Section 15.407)

Test Procedure: ANSI C63.4:2003

Equipment Tested: 802.11a+g Access Point with PoE

Model: RDAT-81;IA300 (IntraAir
 300);WNA-0501P;WDAP-2000PE

Applied by: Wistron Neweb Corporation

Sample received Date: 2005/08/16

Final test Date : 2005/08/17-2005/09/15

Test Result PASS

Test Site: Chamber 02, Conduction 02

Temperature Refer to each site test data

Humidity: Refer to each site test data

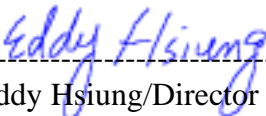


Test Engineer: Jerry Chiou

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Approve & Signature



 Eddy Hsiung/Director

Test results given in this report apply only to the specific sample(s) tested under stated test conditions. This report shall not be reproduced other than in full without the explicit written consent of ISL. This report totally contains 126 pages, including 1 cover page , 3 contents page, and 122 pages for the test description. This report must not be use to claim product endorsement by NVLAP or any agency of the U.S. Government.

This test data shown below is traceable to NIST or national or international standard. International Standards Laboratory certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

2. Test Results Summary

The 802.11b functions of EUT has been tested according to the FCC regulations listed below:

Tested Standards: 47 CFR Part 15 Subpart C			
Standard Section	Test Type	Result	Remarks
15.207	AC Power Line Emissions	Pass	
15.247(a)(2)	Spectrum Bandwidth Of DSSS device	Pass	
15.247(b)	Max. Peak Output Power	Pass	
15.247(c)	Radiated Emissions 30MHz – 25 GHz	Pass	
15.247 (c)	Band Edge Measurement	Pass	
15.247(b)(4)	Radiation Exposure	Pass	MPE report attached
15.247 (d)	Power Spectral Density	Pass	

The 802.11g functions of EUT has been tested according to the FCC regulations listed below:

Tested Standards: 47 CFR Part 15 Subpart C			
Standard Section	Test Type	Result	Remarks
15.207	AC Power Line Emissions	Pass	
15.247(a)(2)	Spectrum Bandwidth Of DSSS device	Pass	
15.247(b)	Max. Peak Output Power	Pass	
15.247(c)	Radiated Emissions 30MHz – 25 GHz	Pass	
15.247 (c)	Band Edge Measurement	Pass	
15.247(b)(4)	Radiation Exposure	Pass	MPE report attached
15.247 (d)	Power Spectral Density	Pass	

The 802.11a functions of EUT has been tested to the FCC regulations listed below:

Tested Standards: 47 CFR Part 15 Subpart E			
Standard Section	Test Type	Result	Remarks
15.407 (a)(1)(2)(3)	Peak Transmit Power	Pass	
15.407 (a)(1)(2)(3)	Peak Power Spectral Density	Pass	
15.407 (a)(6)	Peak Power Excursion	Pass	
15.407 (b)(5)	AC Power Line Emissions	Pass	
15.407 (b)(5)	Radiated Emissions 30MHz – 40 GHz	Pass	
15.407(f)	Radiation exposure	Pass	MPE report attached
15.407 (g)	Frequency Stability	Pass	

3. Description of Equipment Under Test (EUT)

EUT:	
Description:	802.11a+g Access Point with PoE
Condition:	Pre-Production
Model:	RDAT-81;IA300 (IntraAir 300); WNA-0501P;WDAP-2000PE
Serial Number:	N/A
FCC ID:	NKRRDAT-81
Brand:	Wistron NeWeb
Frequency Range 802.11a:	5150~5350 MHz, 5725~5825 MHz
Frequency Range 802.11b/g:	2400~2483.5 MHz
Support channel:	
802.11a	12 Channels
802.11a Turbo mode	5 Channels
802.11b/g	11 Channels
Modulation Skill:	
802.11a Normal mode	OFDM (6 Mbps – 54 Mbps)
802.11a Turbo mode	OFDM (12 Mbps – 108 MBps)
802.11b	DBPSK(1Mbps), DQPSK(2Mbps), CCK(5.5/11Mbps)
802.11g	OFDM (6M - 54Mbps)
Antennas Type:	
Antenna 1	
Left / Right Antenna	Omni-directional Antenna (F1B-204406-52 , made by LONG CHU
ELECTRONICS	CO., LTD.)
Antenna 2	
Left / Right Antenna	Dipole (C478-510028-A , made by WHA YU
INDUSTRIAL	Co., LTD)
Antenna Connected:	Connected to the reverse SMA connector of the EUT
Antenna peak Gain:	
Antenna 1	
Left / Right Antenna	1.82 dBi (11b/g) ,4.28 dBi(11a)
Antenna 2	
Left / Right Antenna	2.5 dBi (11b/g) ,5 dBi(11a)
WLAN Power Type :	3.3V DC from the EUT

The channel and the operation frequency of 802.11b and 802.11g is listed below:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	2412	07	2442
02	2417	08	2447
03	2422	09	2452
04	2427	10	2457
05	2432	11	2462
06	2437		

The channel and the operation frequency of 802.11a Normal Mode is listed below:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	5180	07	5300
02	5200	08	5320
03	5220	09	5745
04	5240	10	5765
05	5260	11	5785
06	5280	12	5805

The channel and the operation frequency of 802.11a Turbo Mode is listed below:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	5210	04	5760
02	5250	05	5800
03	5290		

All types of Antenna have been tested, we present the worst case(Antenna 2) test data in the report.

AC-DC Adapter: DVE (Model:DSA-12W-05)
 Power Input Port: one
 RJ-45 Port: 1-Port 8-pin (10Mbps/100Mbps)
 Wireless Antenna: two

EMI Noise Source:
 Crystal: 40MHz(Y1), 25MHz(Y2)

EMI Solution:
 None

4. TEST RESULTS (802.11a)

4.1 Maximum Peak Output Power [Section 15.407 (a)(1)(2)(3)]

4.1.1 Test Procedure

The transmitter output of EUT was connected to the peak power analyzer.

4.1.2 Test Setup



Frequency Band	Limit
5.15 – 5.25 GHz	The lesser of 50mW (17dBm) or 4dBm+10logB
5.25 – 5.35GHz	The lesser of 250mW (24dBm) or 11dBm+10logB
5.725-5.825GHz	The lesser of 1W (30dBm) or 17dBm+10logB

Note: B is the 26dB emission bandwidth in MHz

4.1.3 Test Data: (Normal Mode)

Maximum Peak Output Power

Temperature ():25

Test Engineer:Jerry Chiou

Humidity (%):50

Chennel	Frequency (Mhz)	Peak Power Output (dBm)	26 dBc BW/Limit Mhz/dBm	The lesser Limit (dBm)	Pass/Fail
1	5180	16.57	26.53/ 18.24	17	Pass
4	5240	16.85	27.23/ 18.35	17	Pass
5	5260	18.65	27.23/ 25.35	24	Pass
8	5320	17.59	26.32/ 25.20	24	Pass
9	5745	16.44	26.11/ 31.17	30	Pass
10	5765	19.13	26.11/ 31.17	30	Pass
12	5805	19.33	25.97/ 31.14	30	Pass

4.1.4 Test Data: (Turbo Mode)

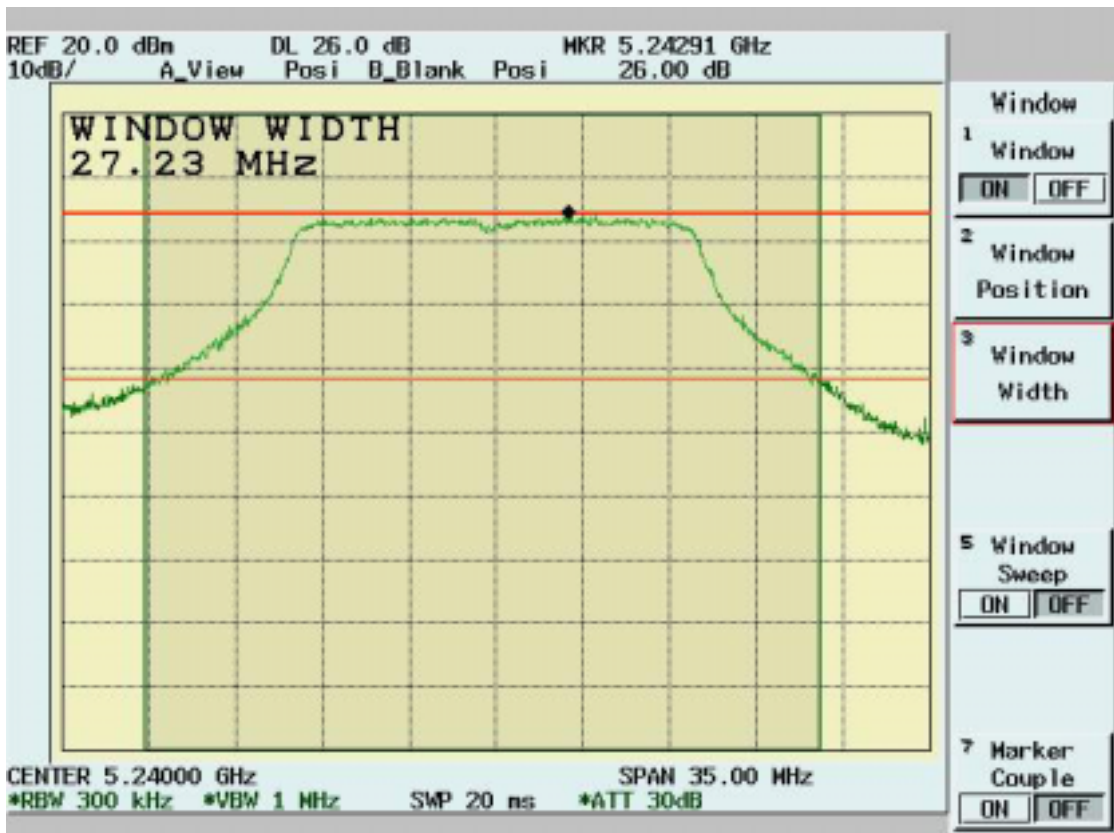
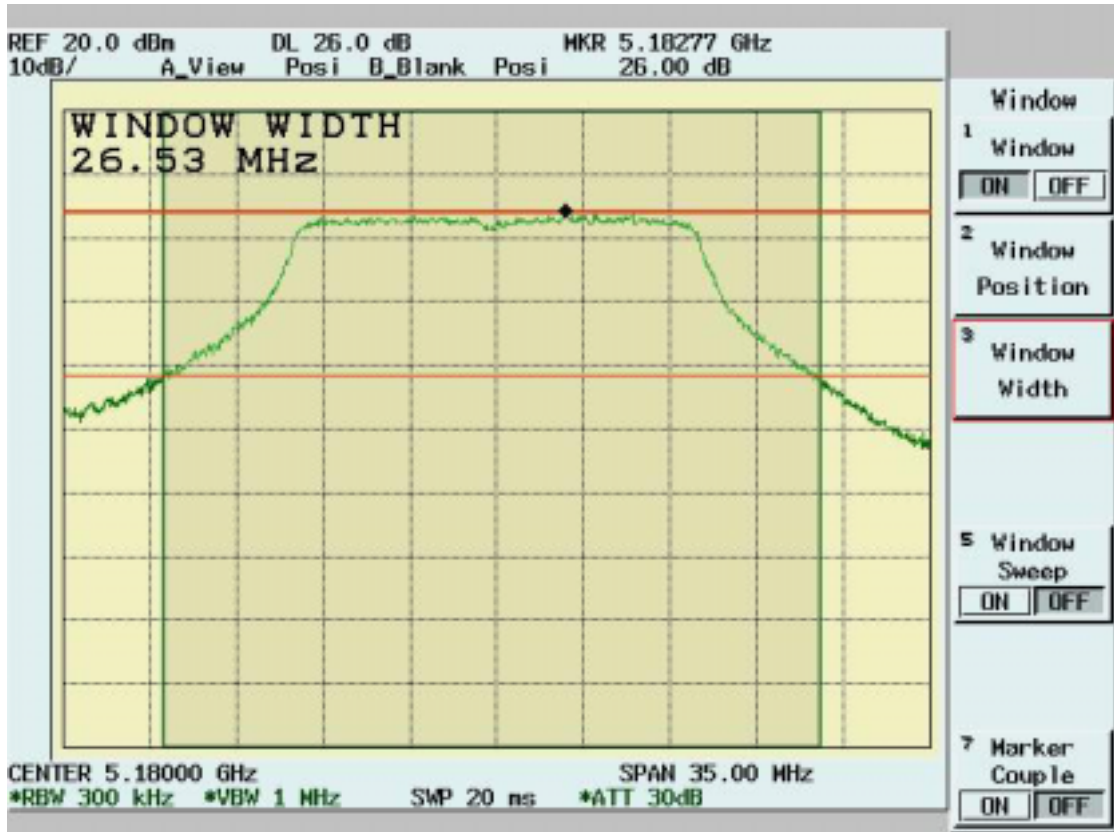
Maximum Peak Output Power

Temperature ():25

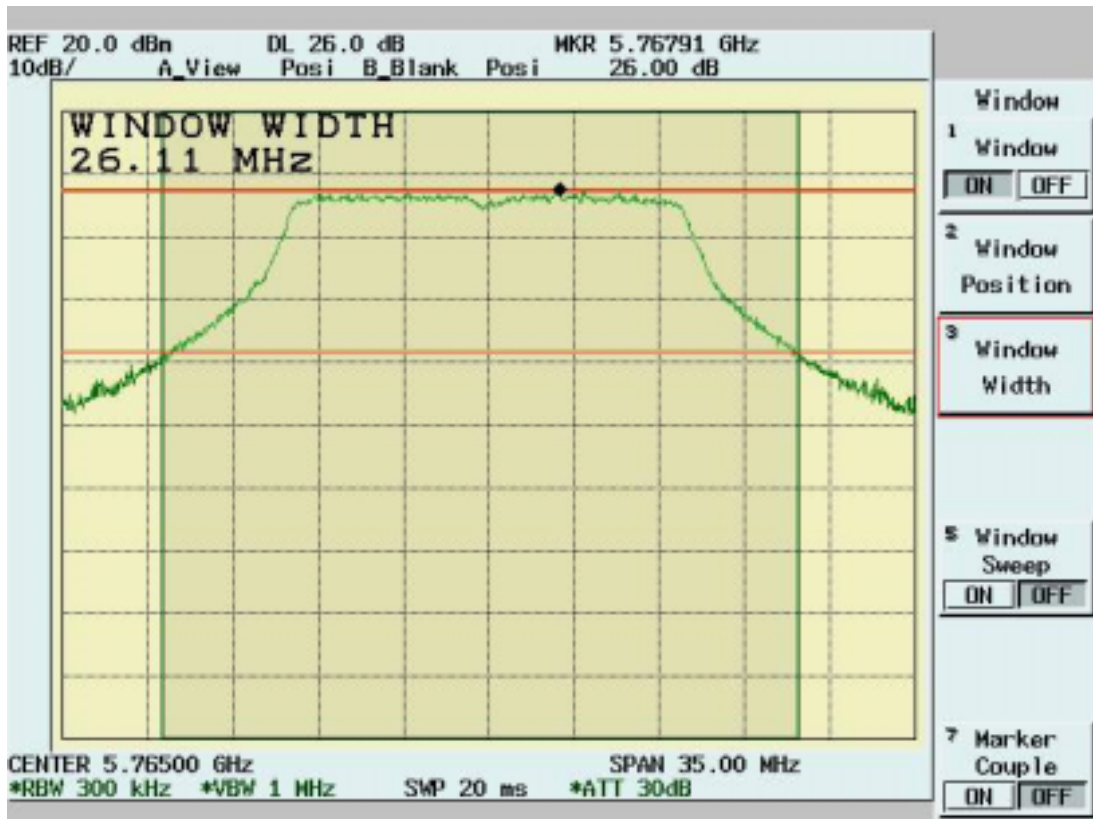
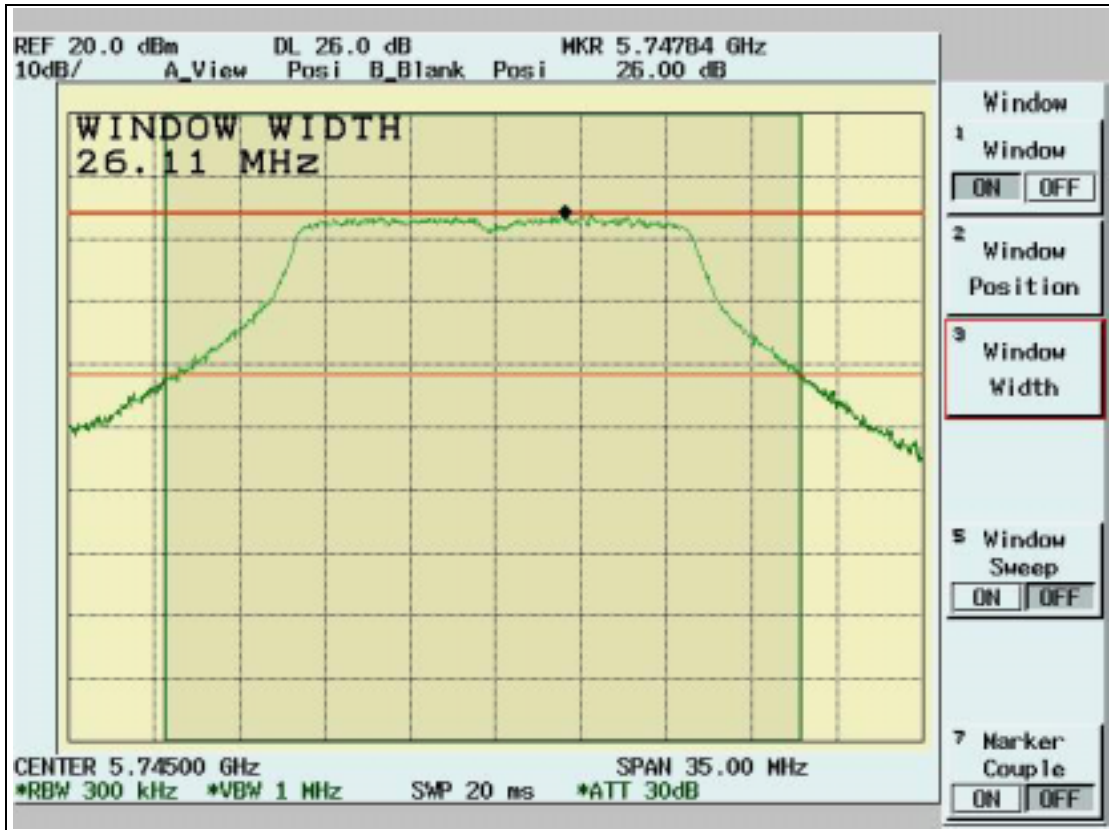
Test Engineer:Jerry Chiou

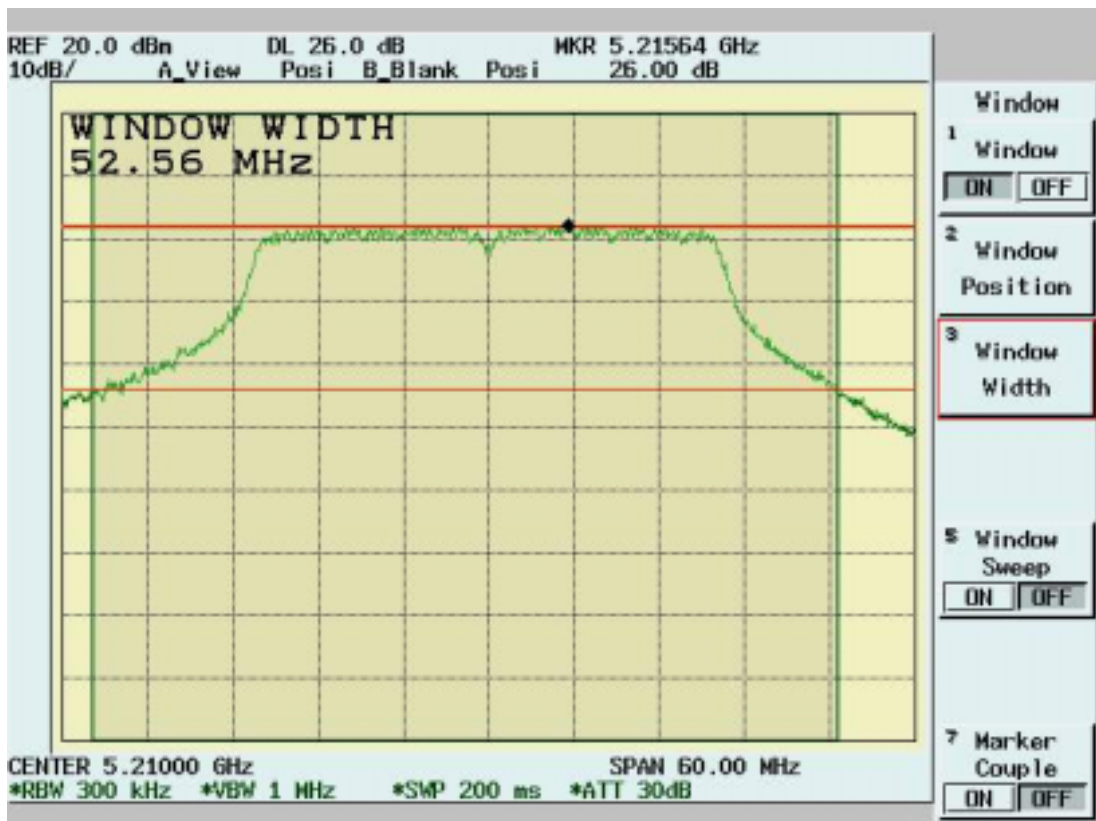
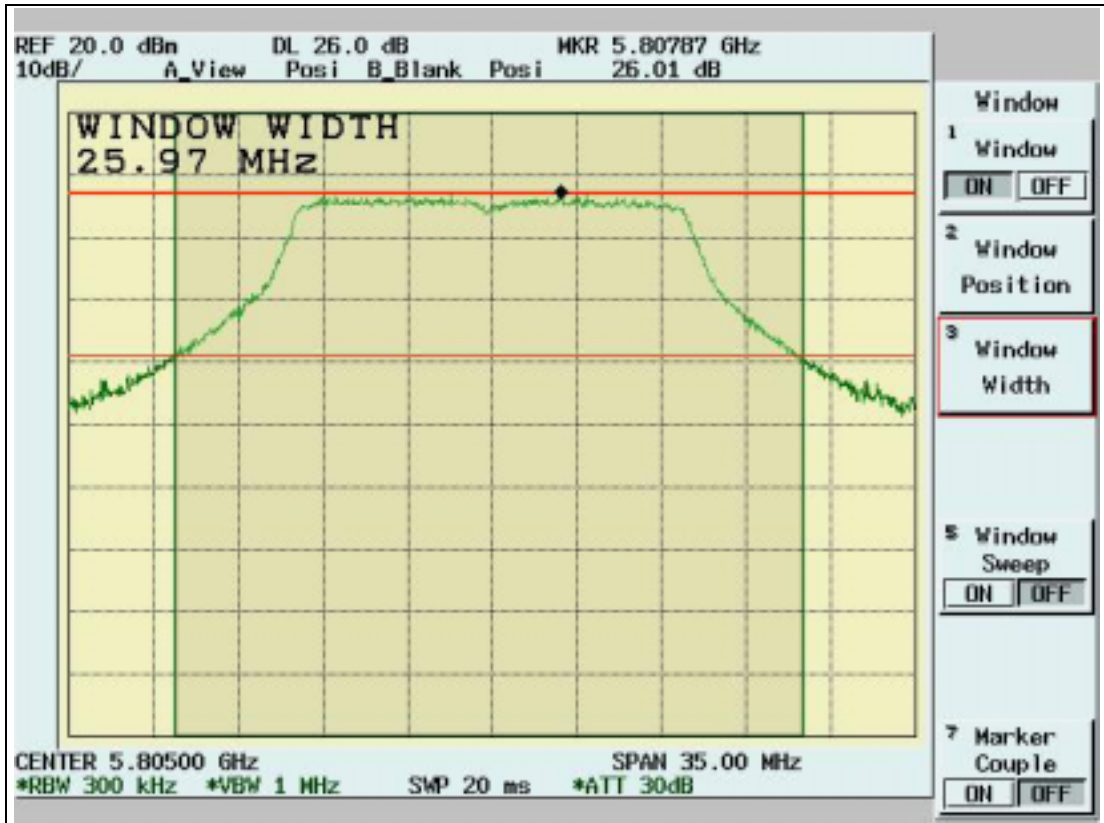
Humidity (%):50

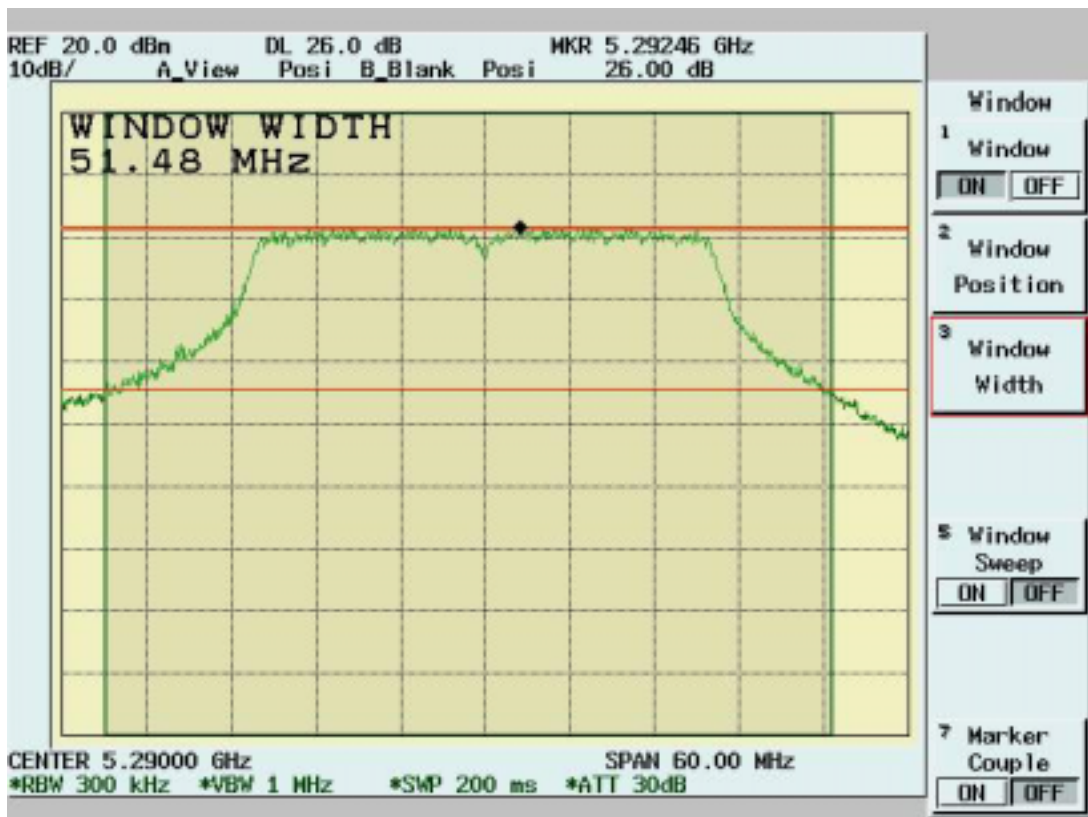
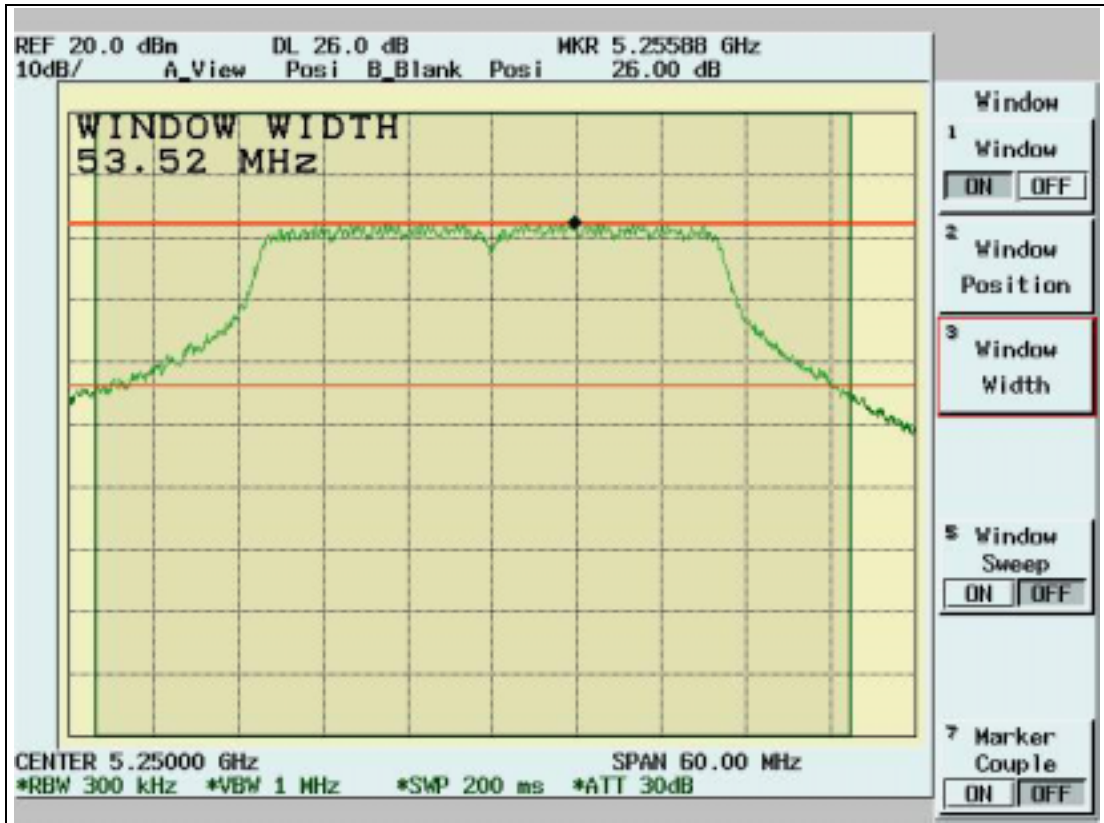
Chennel	Frequency (Mhz)	Peak Power Output (dBm)	26 dBc BW/Limit Mhz/dBm	The lesser Limit (dBm)	Pass/Fail
1	5210	16.86	52.56/ 21.21	17	Pass
2	5250	16.34	53.52/ 21.29	17	Pass
3	5290	16.00	51.48/ 28.12	24	Pass
4	5760	14.00	50.88/ 34.07	30	Pass
5	5800	13.46	50.16/ 34.00	30	Pass

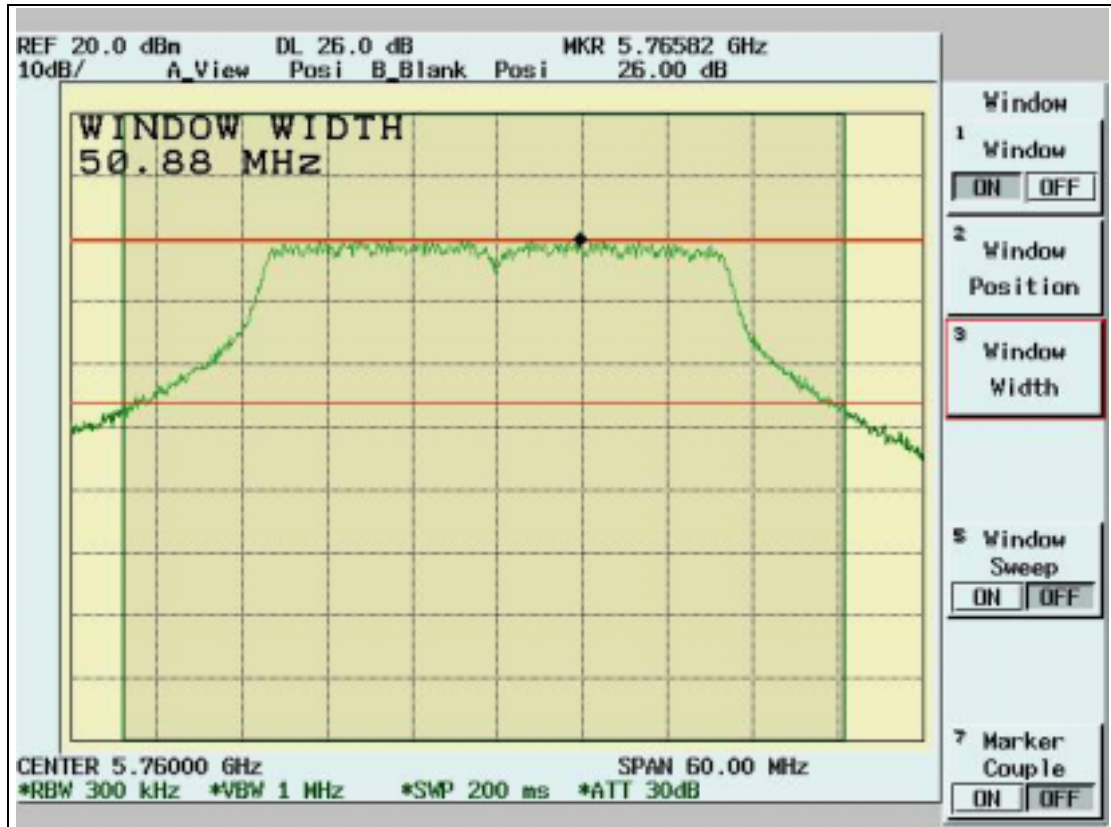










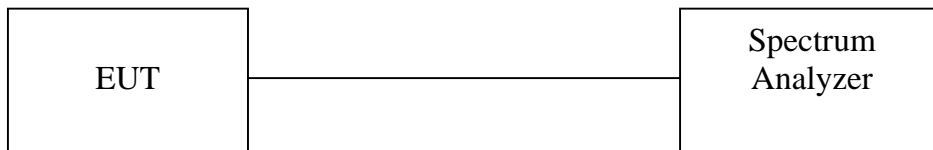


4.2 Peak Power Spectral Density [Section 15.407(a)(1)(2)(3)]

4.2.1 Test Procedure

1. The Transmitter output of EUT was connected to the spectrum analyzer.
 Equipment mode: Spectrum analyzer
 Detector function: Peak mode
 SPAN: 30MHz or 50MHz
 RBW: 1MHz
 VBW: 3MHz
 Sweep time: 30 or 50 sec.
 Center frequency: fundamental frequency tested
2. Peak search was read to the peak power after maximum hold function is completed.

4.2.2 Test Setup



4.2.3 Test Data: (Normal Mode)

Maximum Peak Output Power Density

Temperature ():25

Test Engineer:Jerry Chiou

Humidity (%):50

Channel	Frequency (Mhz)	Spectrum Reading (dBm)	Cable Loss(dB)	Peak Power Output dBm/MHz)	Limit (dBm/Mhz)	Pass/Fail
1	5180	-2.52	1.30	-1.22	4	Pass
4	5240	-3.20	1.30	-1.90	4	Pass
5	5260	0.70	1.30	2.00	11	Pass
8	5320	0.21	1.30	1.51	11	Pass
9	5745	-2.29	1.30	-0.99	17	Pass
10	5765	0.96	1.30	2.26	17	Pass
12	5805	1.30	1.30	2.60	17	Pass

4.2.4 Test Data: (Turbo Mode)

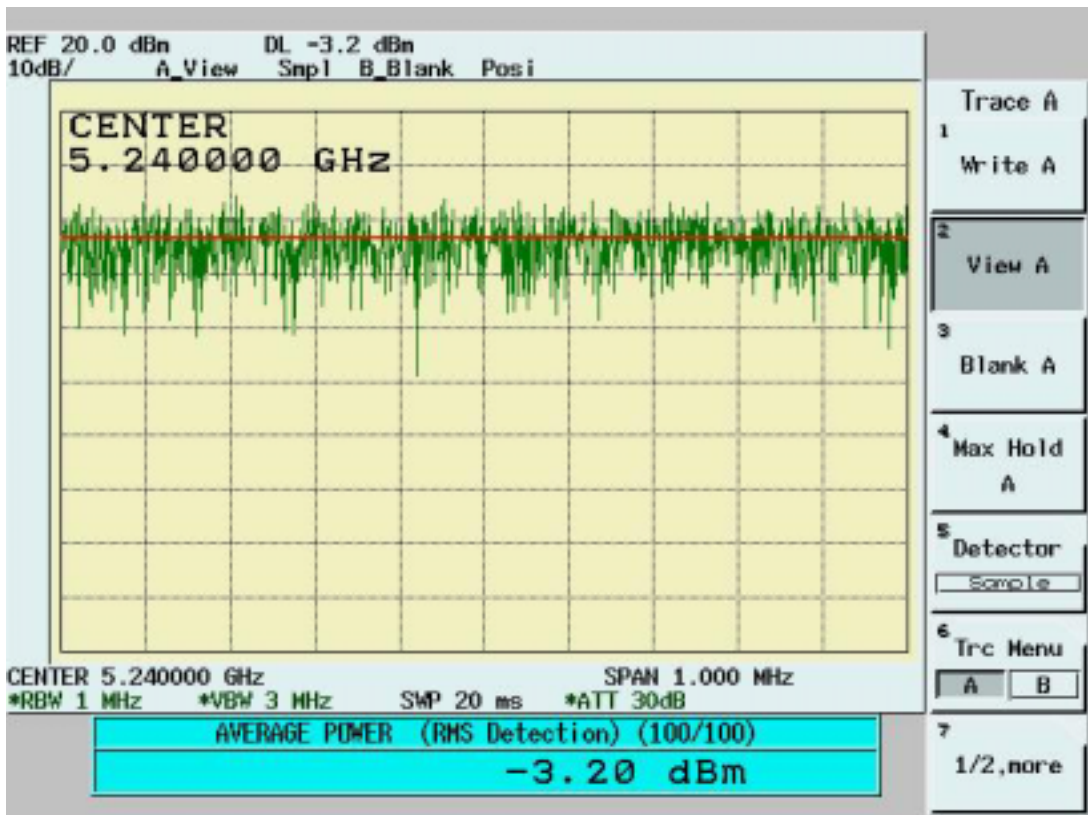
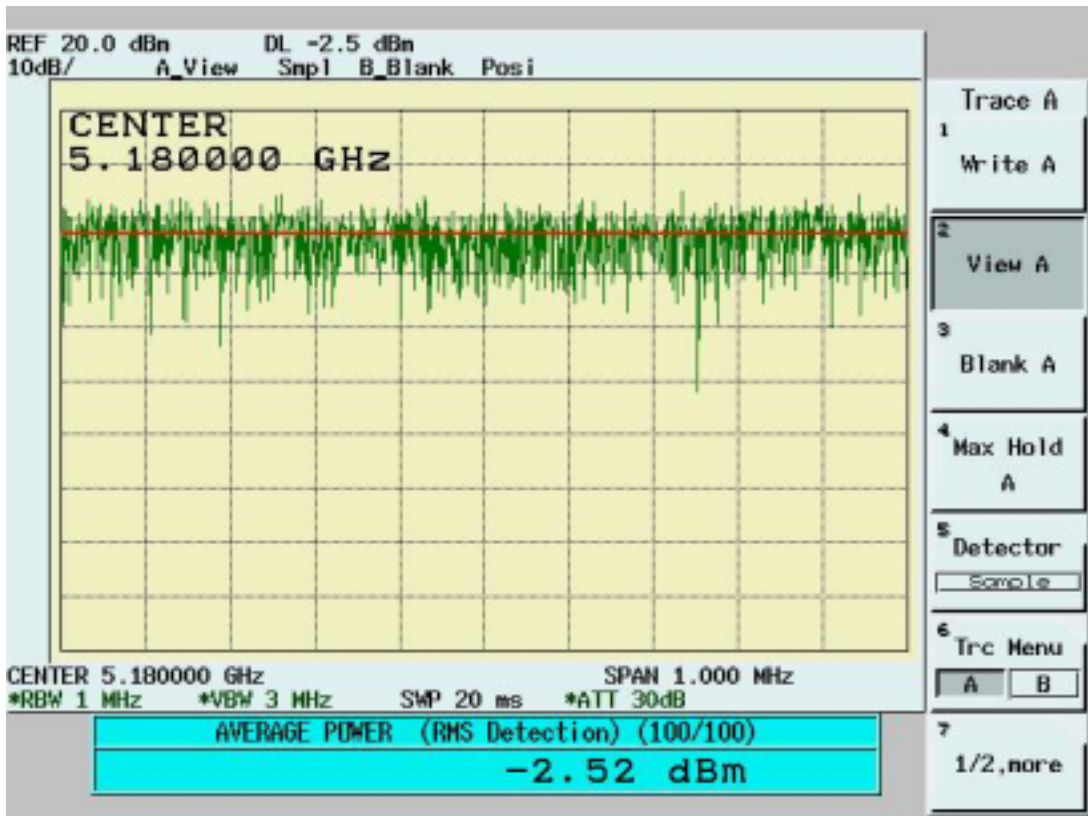
Maximum Peak Output Power Density

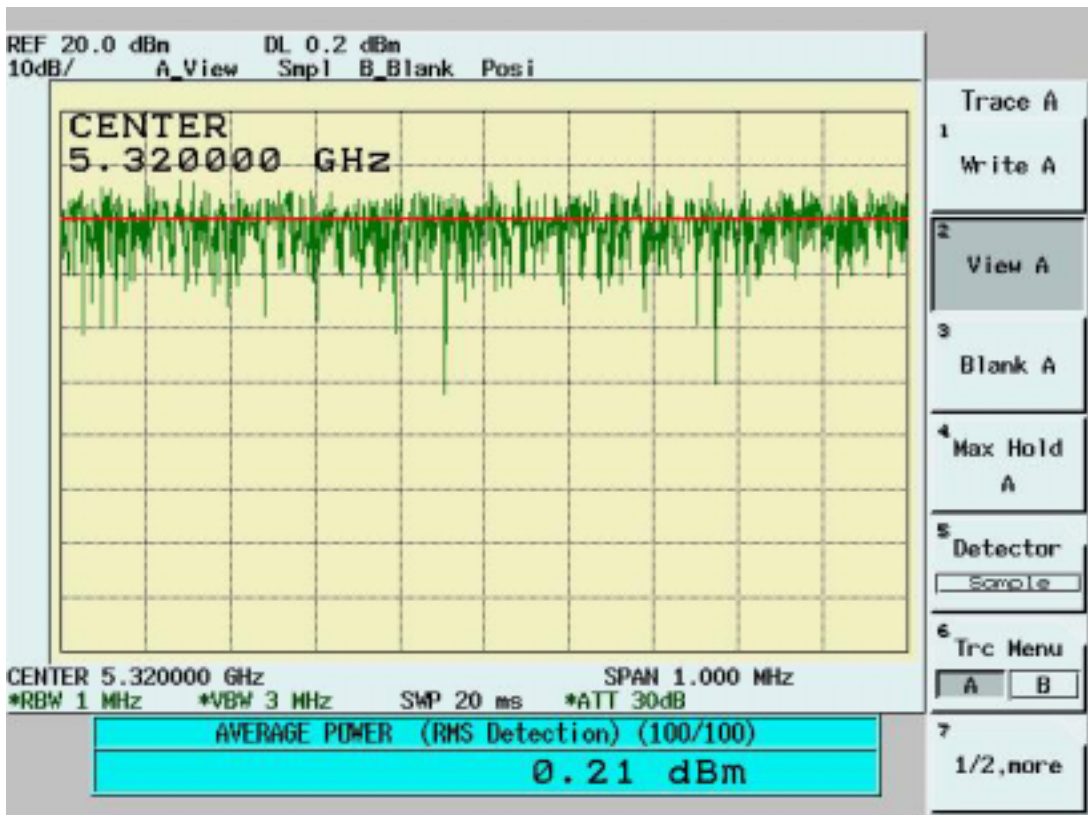
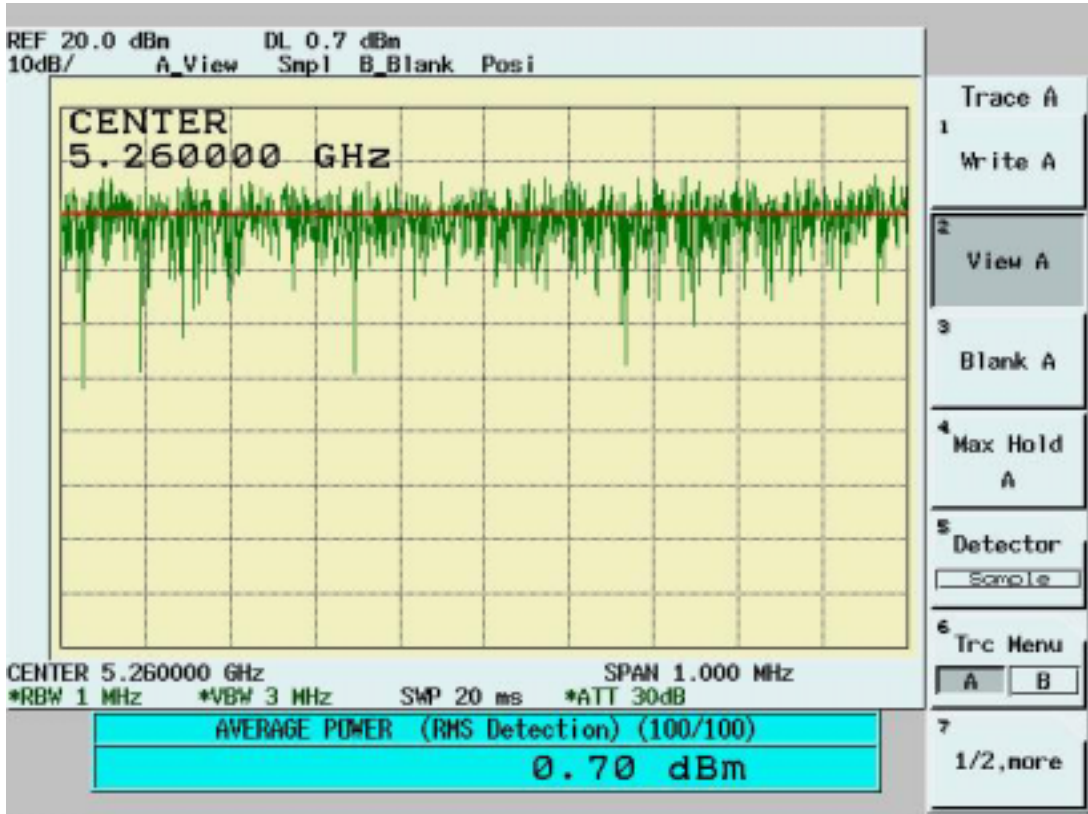
Temperature ():25

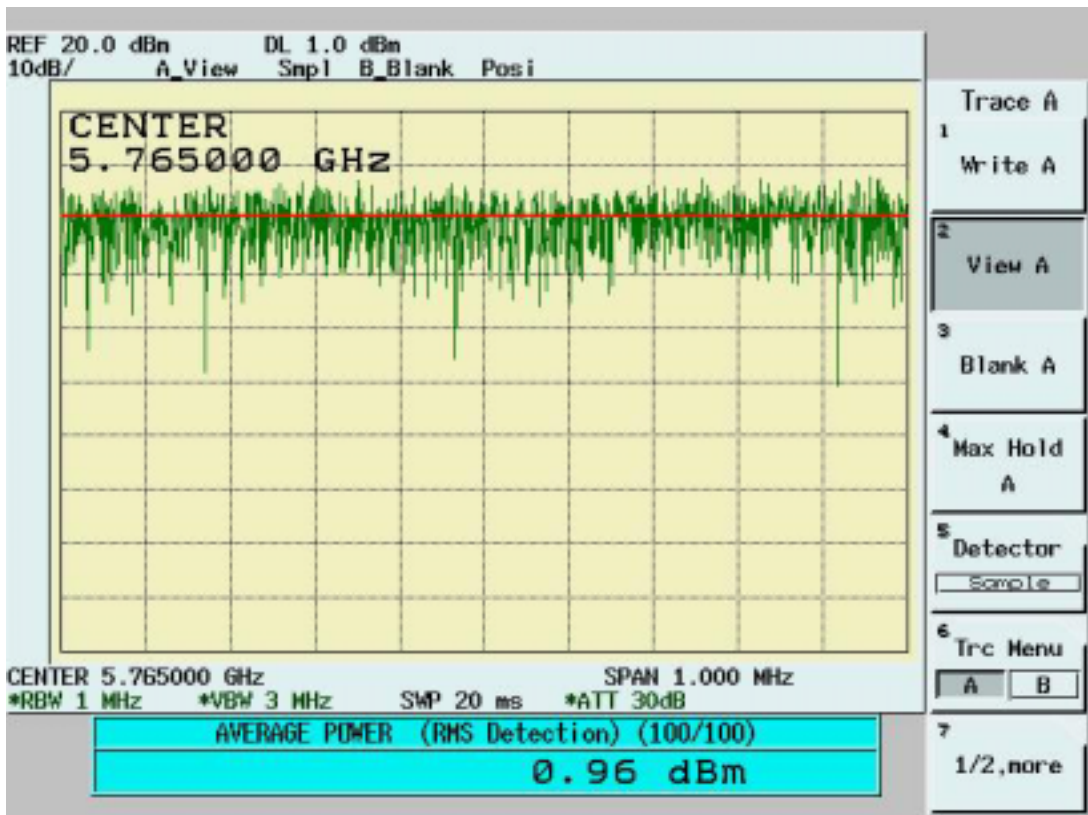
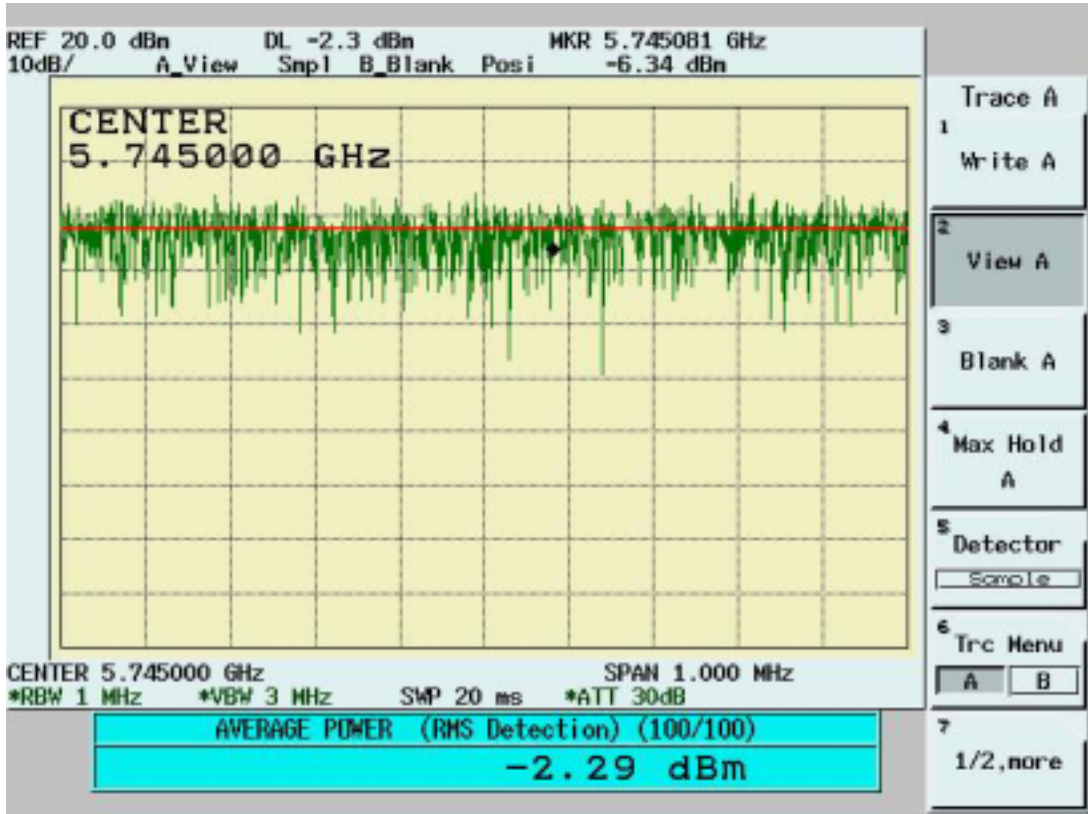
Test Engineer:Jerry Chiou

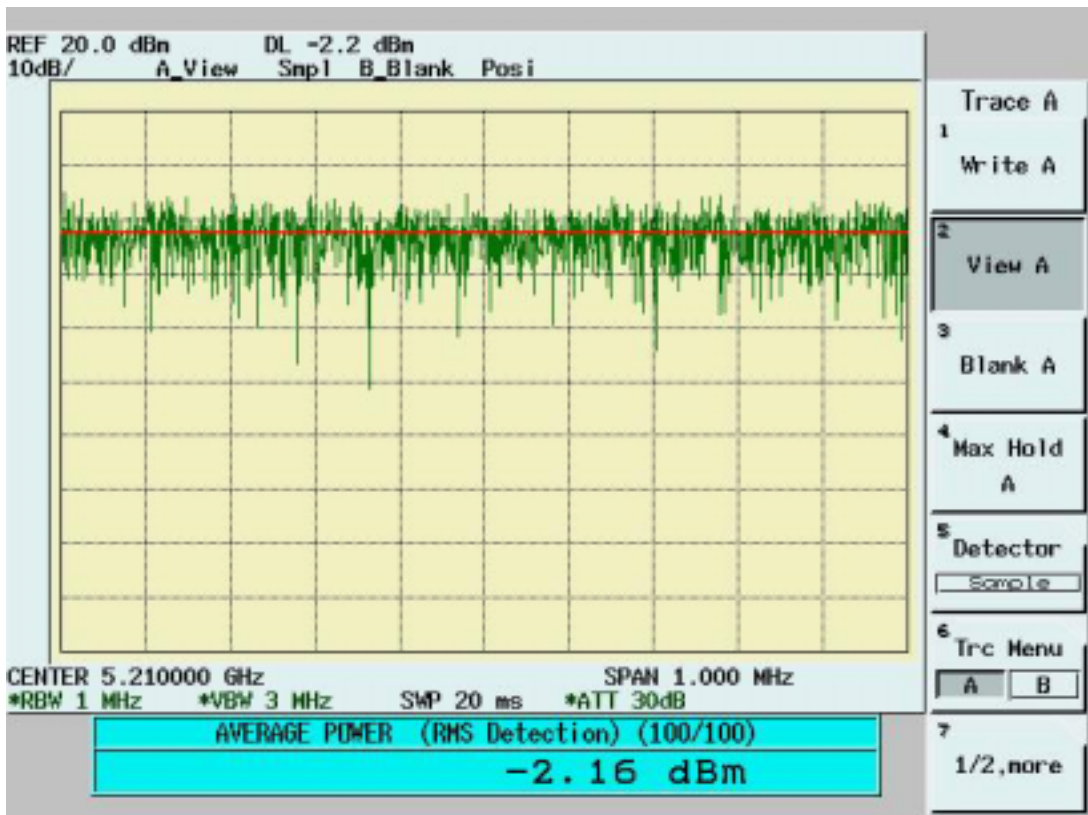
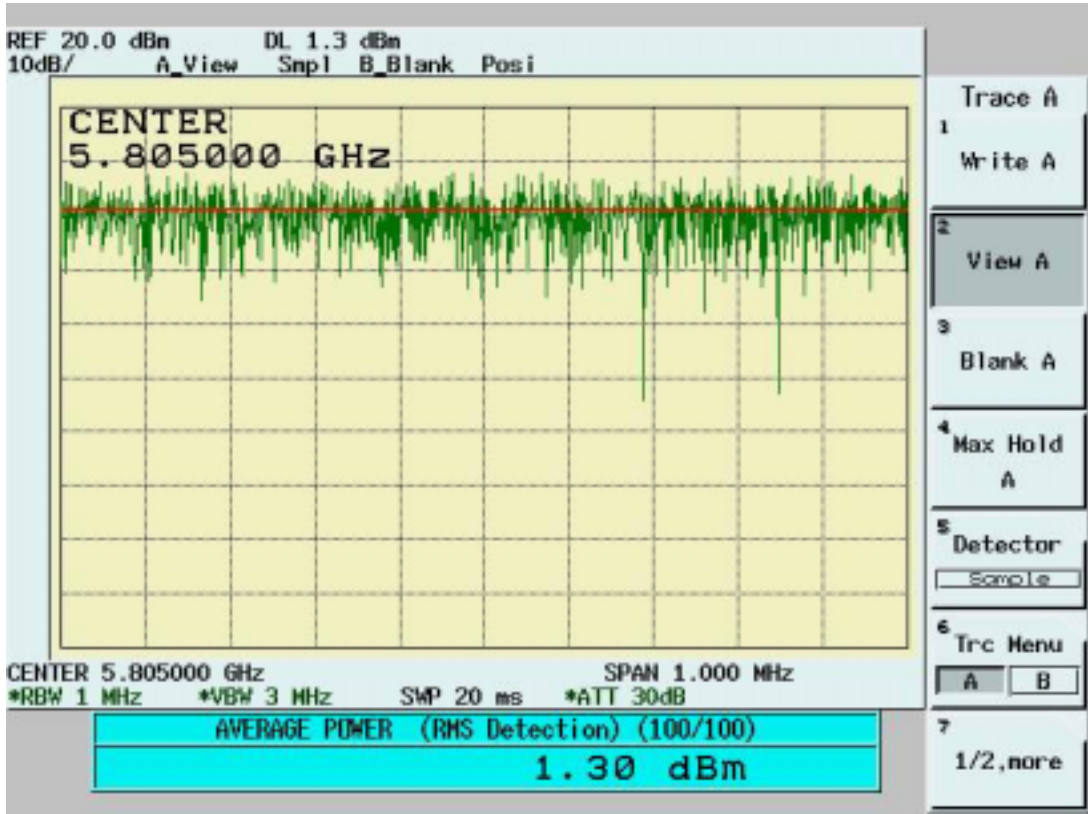
Humidity (%):50

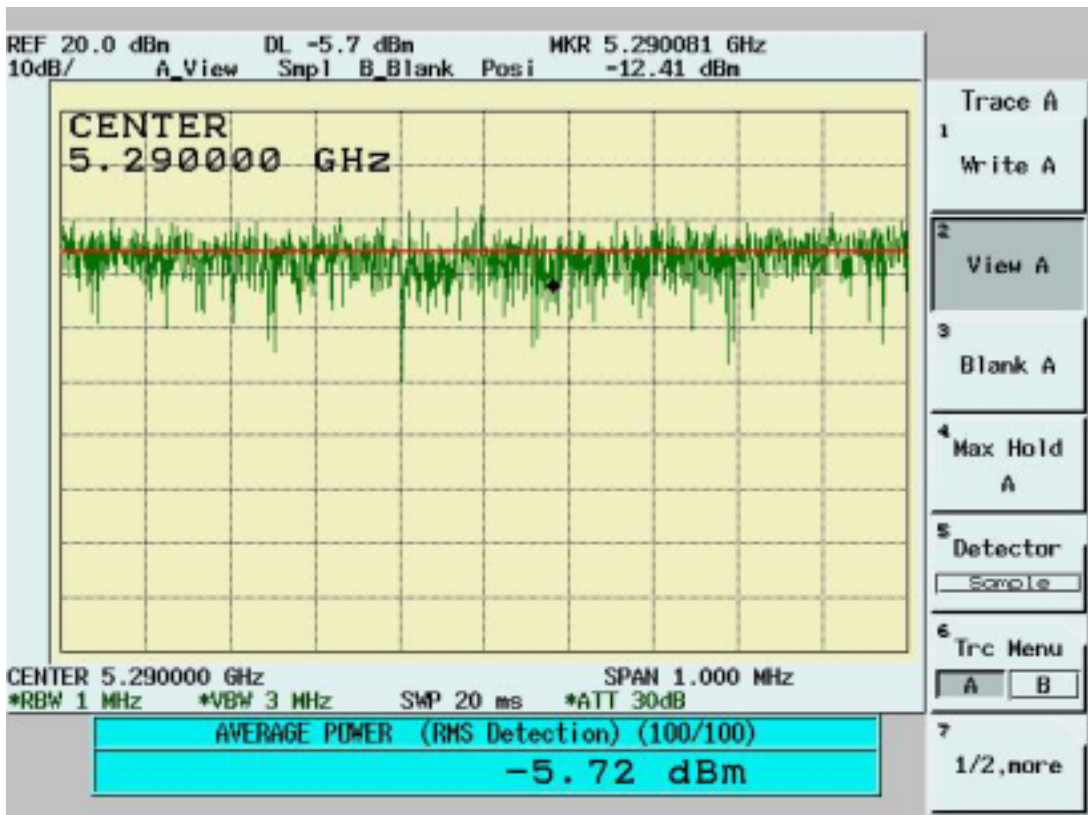
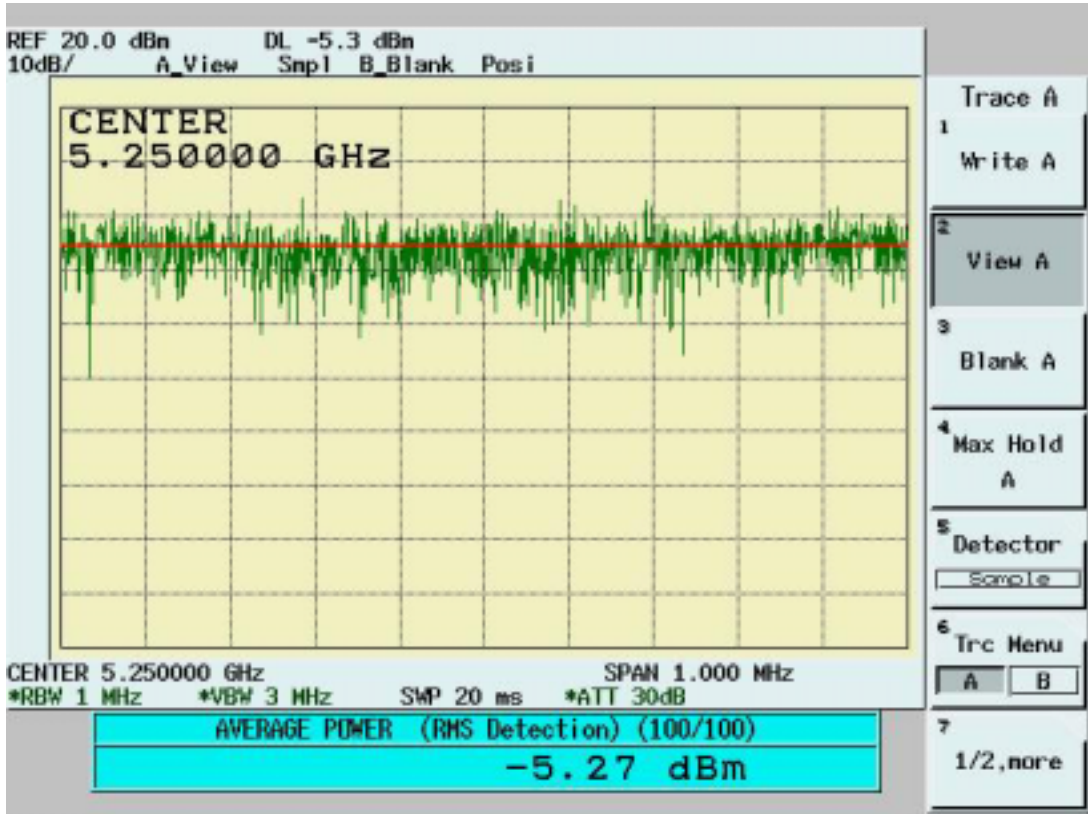
Channel	Frequency (Mhz)	Spectrum Reading (dBm)	Cable Loss(dB)	Peak Power Output dBm/MHz)	Limit (dBm/Mhz)	Pass/Fail
1	5210	-2.16	1.30	-0.86	4	Pass
2	5250	-5.27	1.30	-3.97	4	Pass
3	5290	-5.72	1.30	-4.42	11	Pass
4	5760	-7.90	1.30	-6.60	11	Pass
5	5800	-8.06	1.30	-6.76	17	Pass

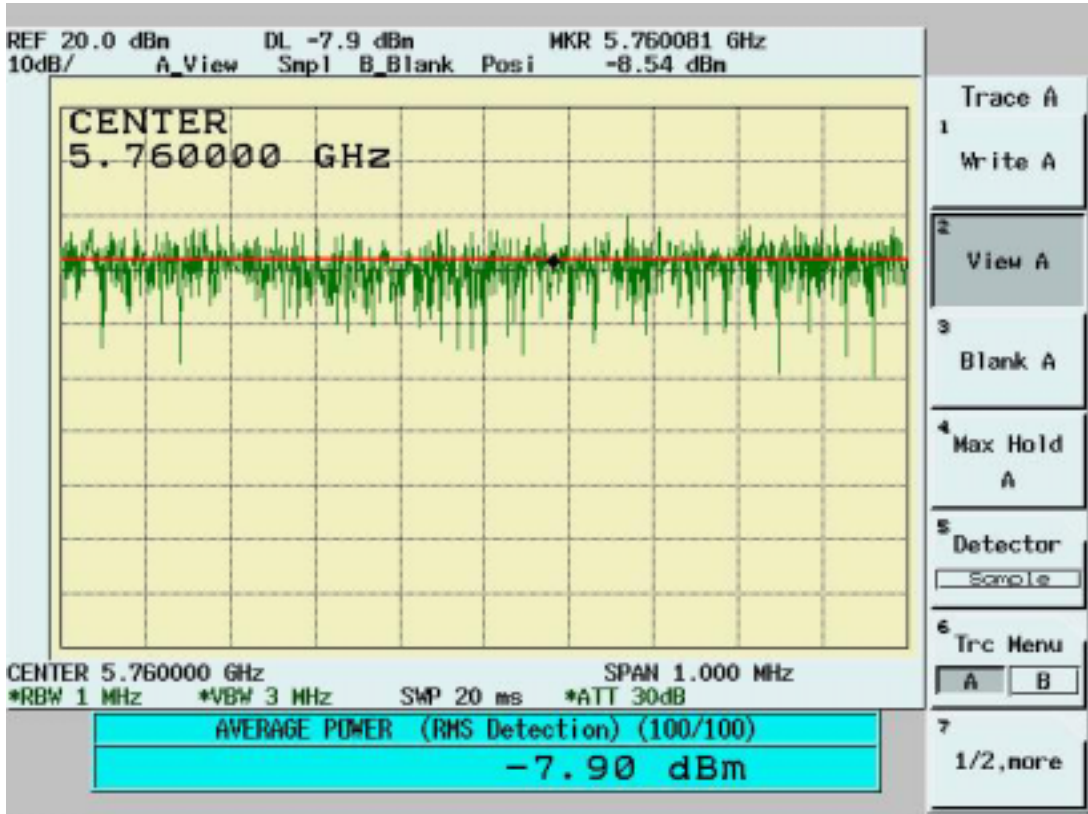










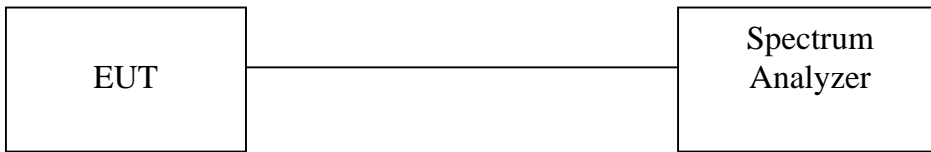


4.3 Peak Power Excursion Measurement [Section 15.407(a)(6)]

4.3.1 Test Procedure

1. The Transmitter output of EUT was connected to the spectrum analyzer.
2. Frequency SPAN of Spectrum: 30MHz or 50MHz.
3. Trace 1 : RBW: 1MHz, VBW: 3MHz. Using positive detector and Max -hold
4. Trace 2 : RBW: 1MHz, VBW: 3MHz. Using Sample detector and Max-hold
5. Record the largest difference between Trace 1 and Trace 2.

4.3.2 Test Setup



4.3.3 Test Data: (Normal Mode)

Peak Power Excursion

Temperature ():25

Test Engineer:Jerry Chiou

Humidity (%):50

Channel	Frequency (Mhz)	Peak Power Excursion (dBm)	Limit (dBm)	Pass/Fail
1	5180	8.84	13	Pass
4	5240	8.92	13	Pass
5	5260	8.26	13	Pass
8	5320	8.62	13	Pass
9	5745	9.45	13	Pass
10	5765	8.97	13	Pass
12	5805	9.29	13	Pass

4.3.4 Test Data: (Turbo Mode)

Peak Power Excursion

Temperature ():25

Test Engineer:Jerry Chiou

Humidity (%):50

Channel	Frequency (Mhz)	Peak Power Excursion (dBm)	Limit (dBm)	Pass/Fail
1	5210	8.87	13	Pass
2	5250	8.63	13	Pass
3	5290	8.73	13	Pass
4	5760	8.88	13	Pass
5	5800	9.57	13	Pass

