

4.4 PEAK POWER EXCURSION MEASUREMENT

4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Frequency Band	Limit
5.15 – 5.25 GHz	13dB
5.25 – 5.35 GHz	13dB
5.725 – 5.825 GHz	13dB

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

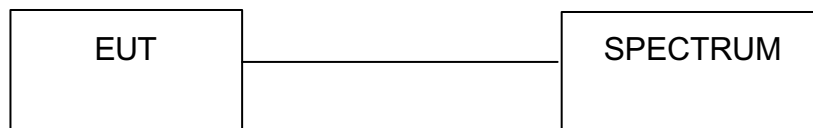
4.4.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set the spectrum bandwidth span to view the entire spectrum.
3. Using peak detector and Max-hold function for Trace 1 (RB=1MHz, VB=3MHz) and 2 (RB=1MHz, VB=300KHz).
4. The largest difference between Trace 1 and Trace 2 in any 1MHz band on any frequency was recorded.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

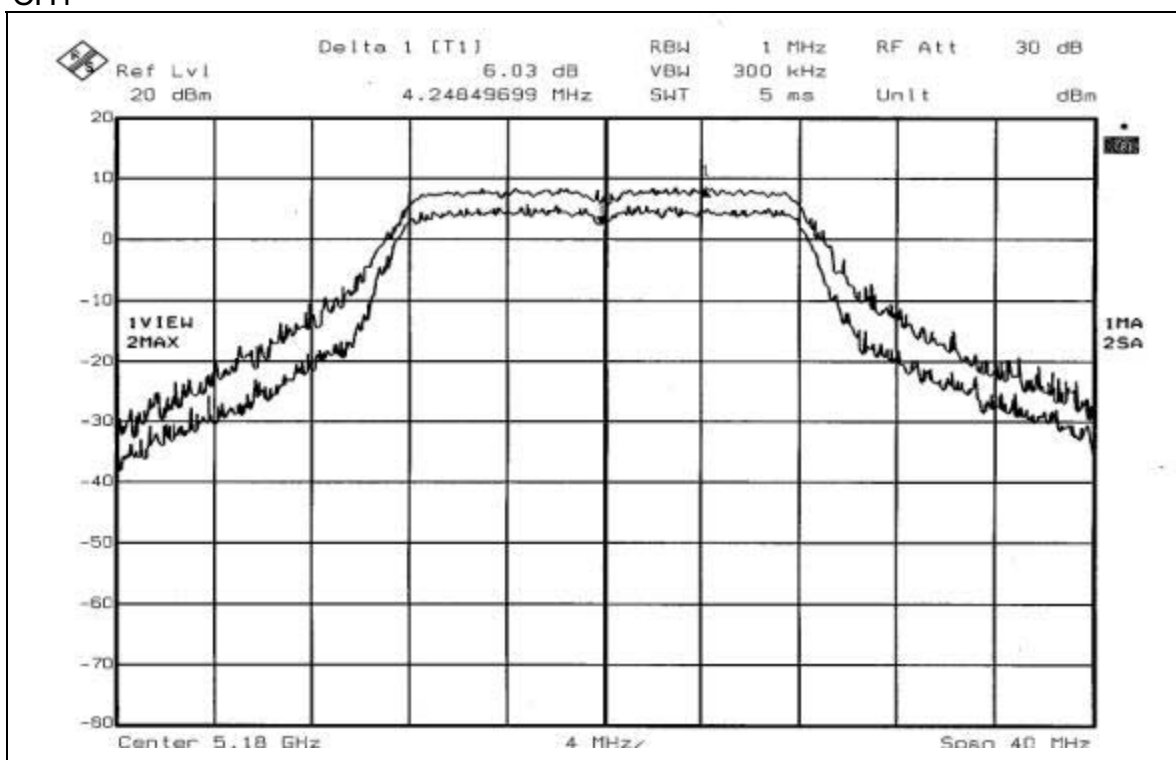
4.4.7 TEST RESULTS

802.11a OFDM modulation

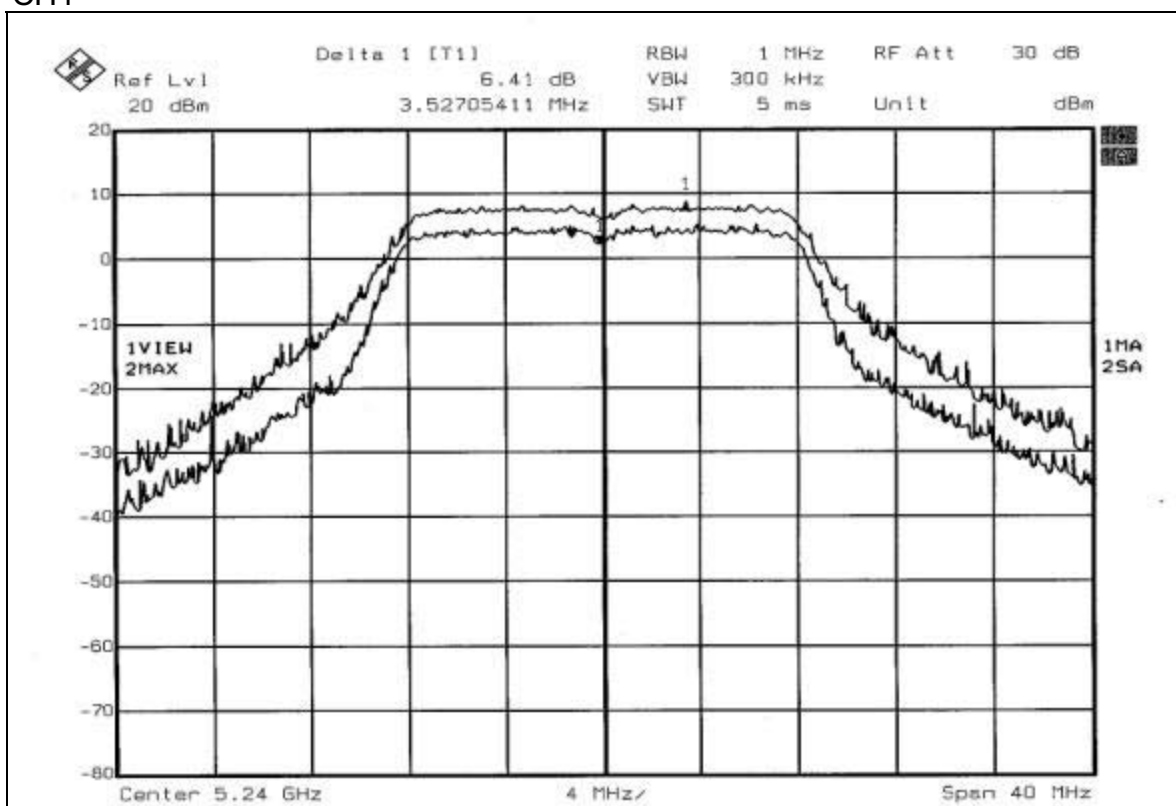
EUT	Wireless Mini PCI Card	MODEL	WLL4070
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 52%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5180	6.03	13	PASS
4	5240	6.41	13	PASS
5	5260	6.58	13	PASS
8	5320	6.17	13	PASS

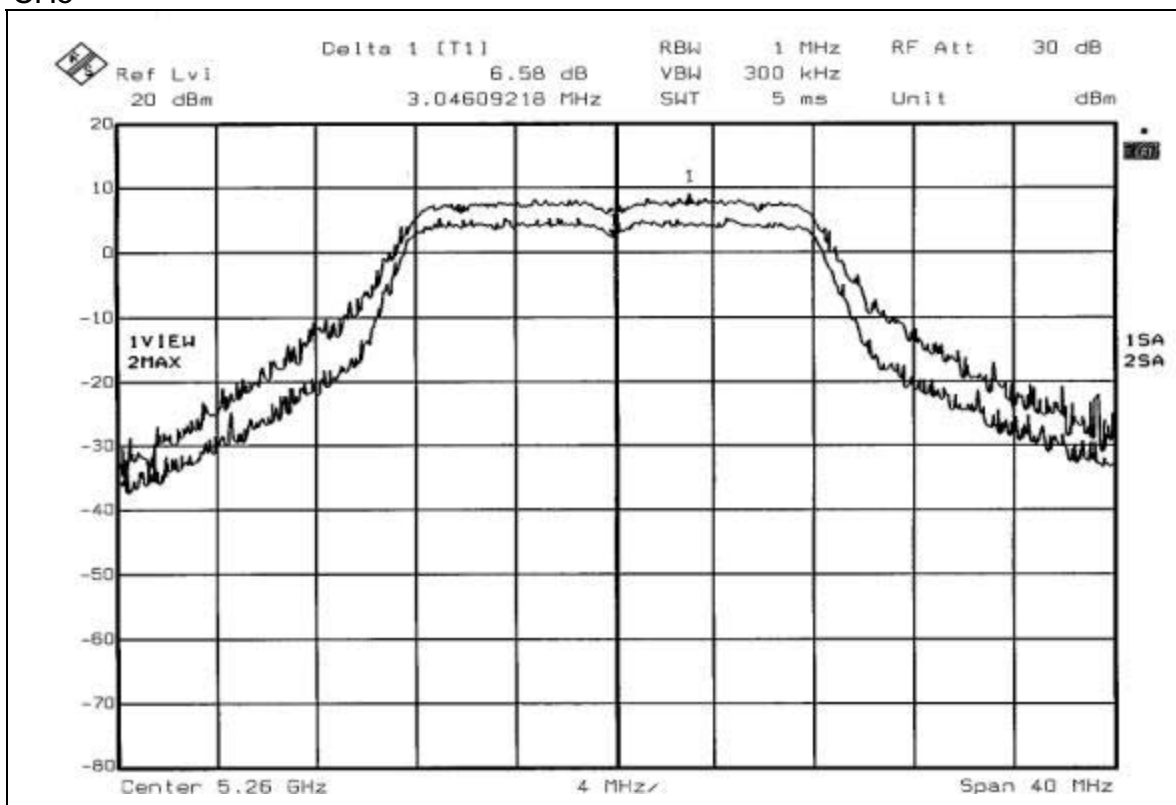
CH1



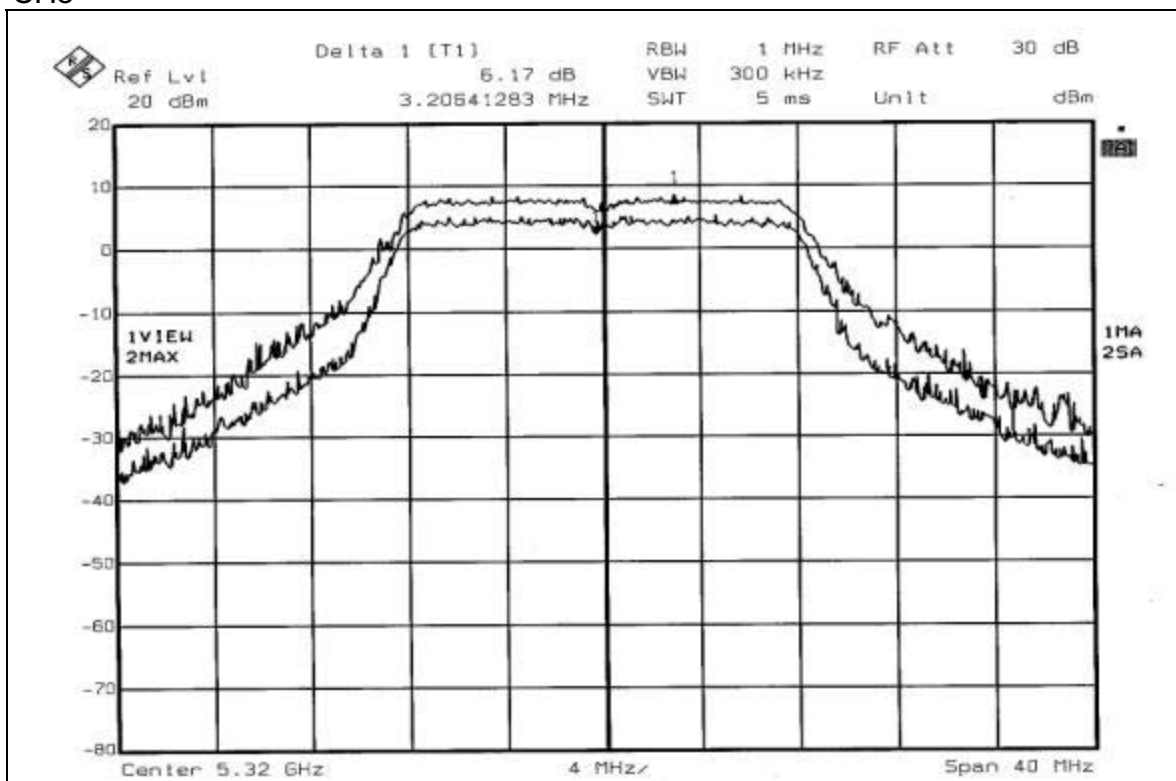
CH4



CH5



CH8



**802.11a Turbo OFDM modulation**

EUT	Wireless Mini PCI Card	MODEL	WLL4070
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 52%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5210	7.80	13	PASS
2	5250	7.67	13	PASS
3	5290	8.57	13	PASS

Delta 1 [T1] 7.80 dB RBW 1 MHz RF Att 30 dB
 Ref Lvl 20 dBm VBW 300 kHz Unit dBm
 6.73346693 MHz SWT 5 ms

1VIEW
 2MAX

1
 2SA

Center 5.21 GHz 8 MHz 80 MHz

Delta 1 [T1] RBW 1 MHz RF Att 30 dB
 7.67 dB VBW 300 kHz
 10.90180361 MHz SWT 5 ms Unit dBm

Ref Lvl 20 dBm

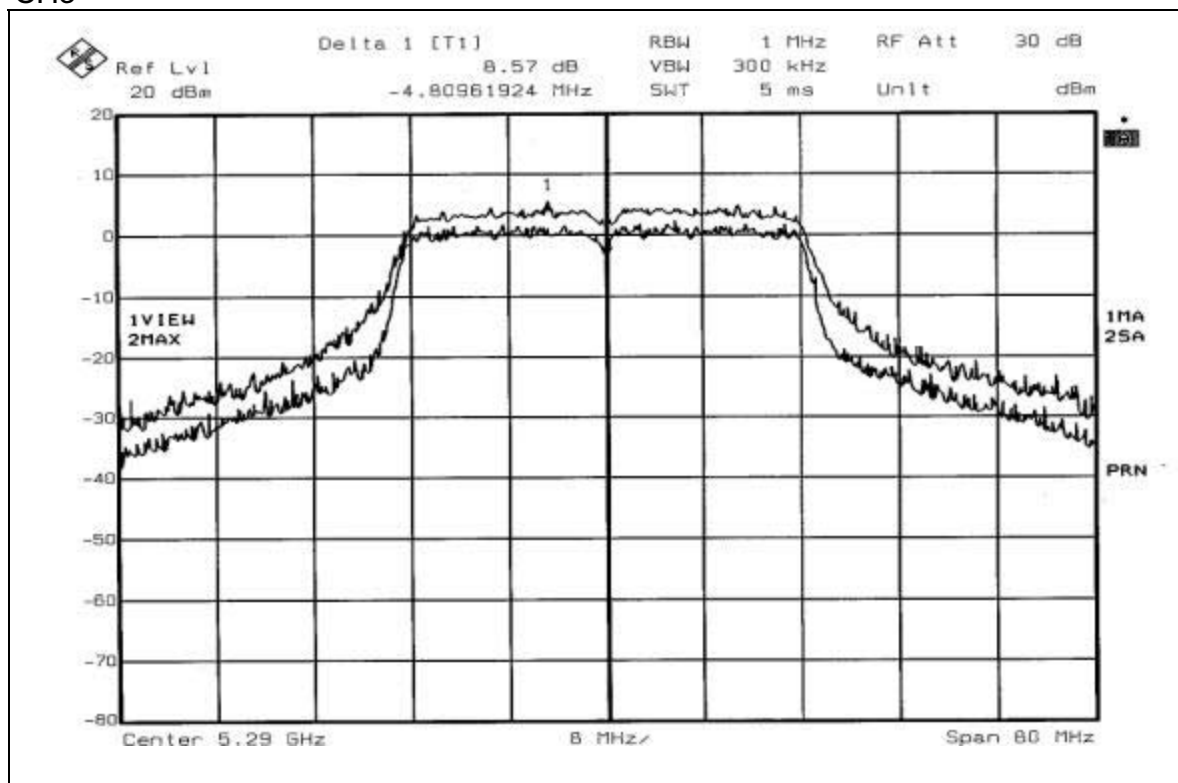
1VIEW
 2MAX

1

1MA
 25A

Center 5.249466132 GHz 8 MHz Span 80 MHz

CH3



4.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Frequency Band	Limit
5.15 ~ 5.25GHz	4dBm
5.25 ~ 5.35GHz	11dBm
5.725 ~ 5.825GHz	17dBm

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

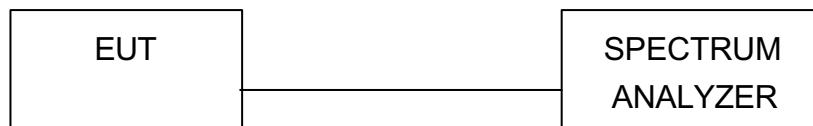
4.5.3 TEST PROCEDURES

1. The transmitter output was connected to the spectrum analyzer.
2. Set RBW=1MHz, VBW=3MHz. The PPSD is the highest level found across the emission in any 1MHz band.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

Same as 5.3.6

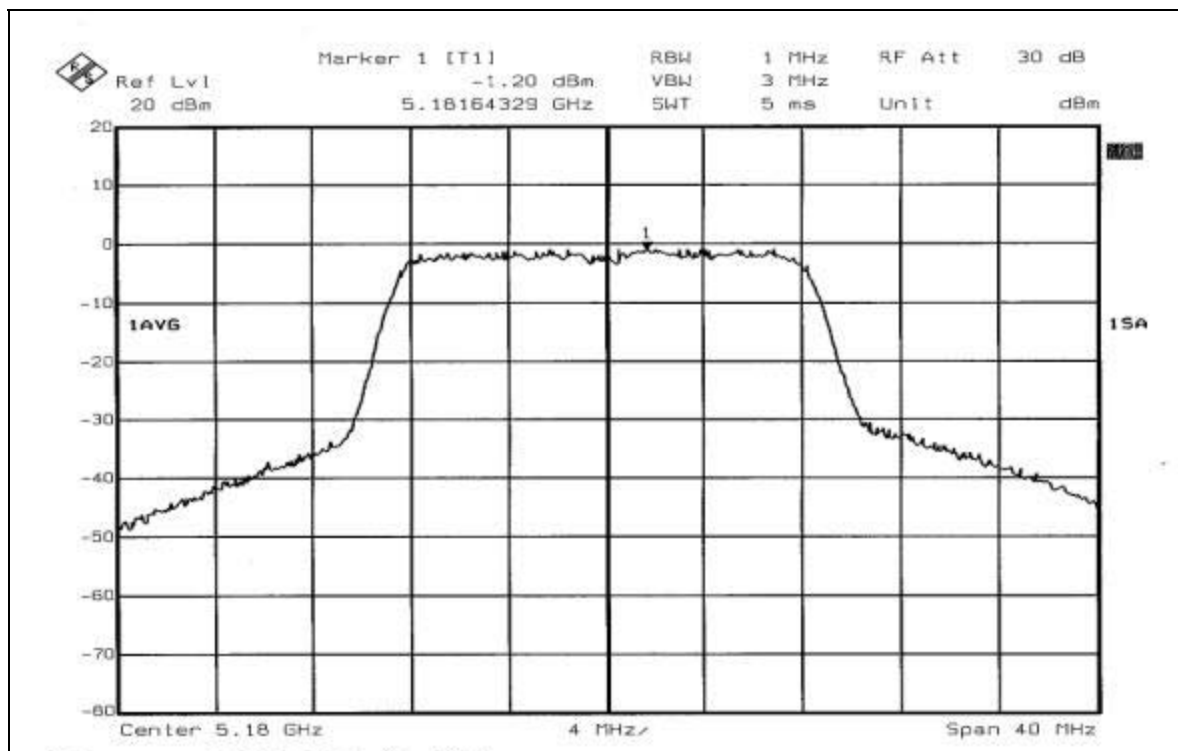
4.5.7 TEST RESULTS

802.11a OFDM modulation

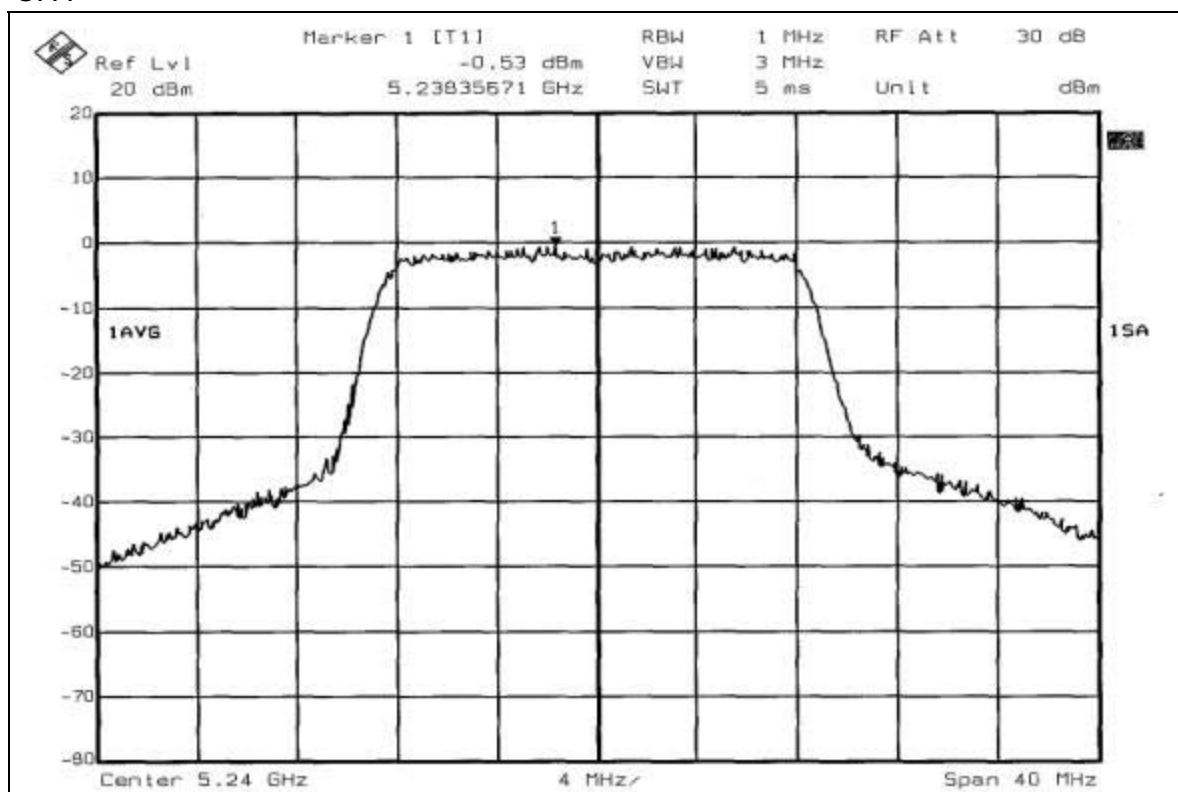
EUT	Wireless Mini PCI Card	MODEL	WLL4070
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 52%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	-1.20	4	PASS
4	5240	-0.53	4	PASS
5	5260	-0.64	11	PASS
8	5320	-1.08	11	PASS

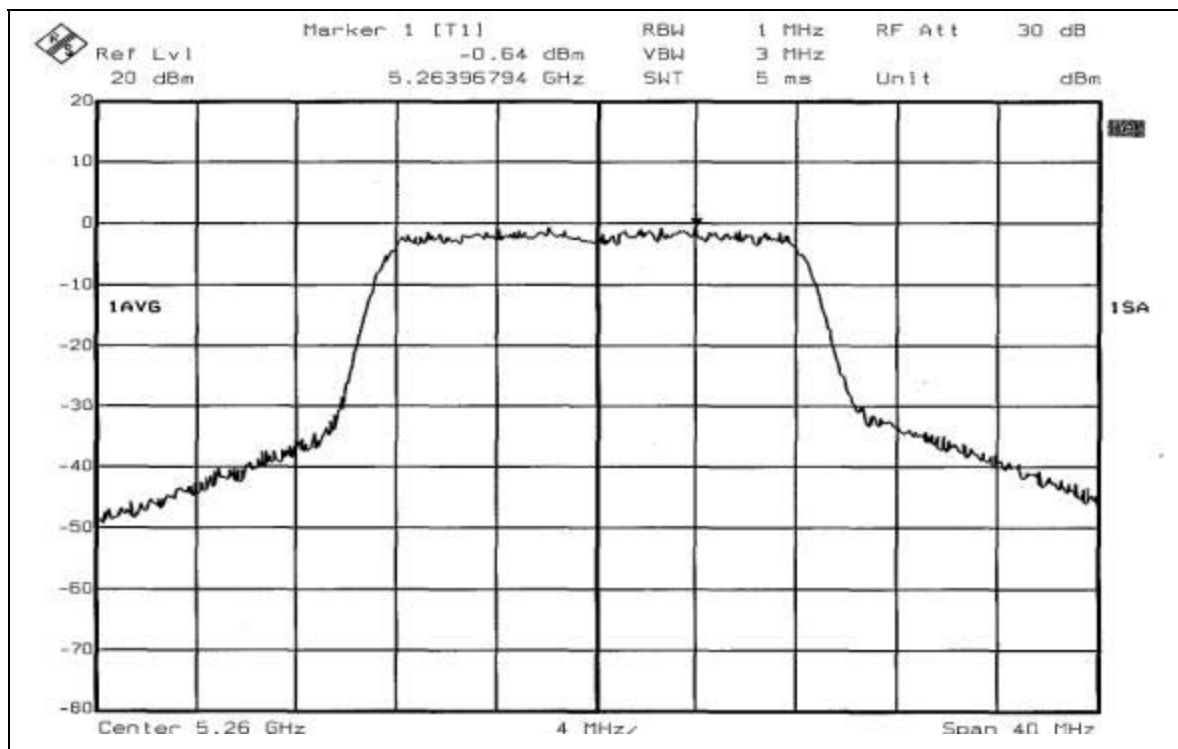
CH1



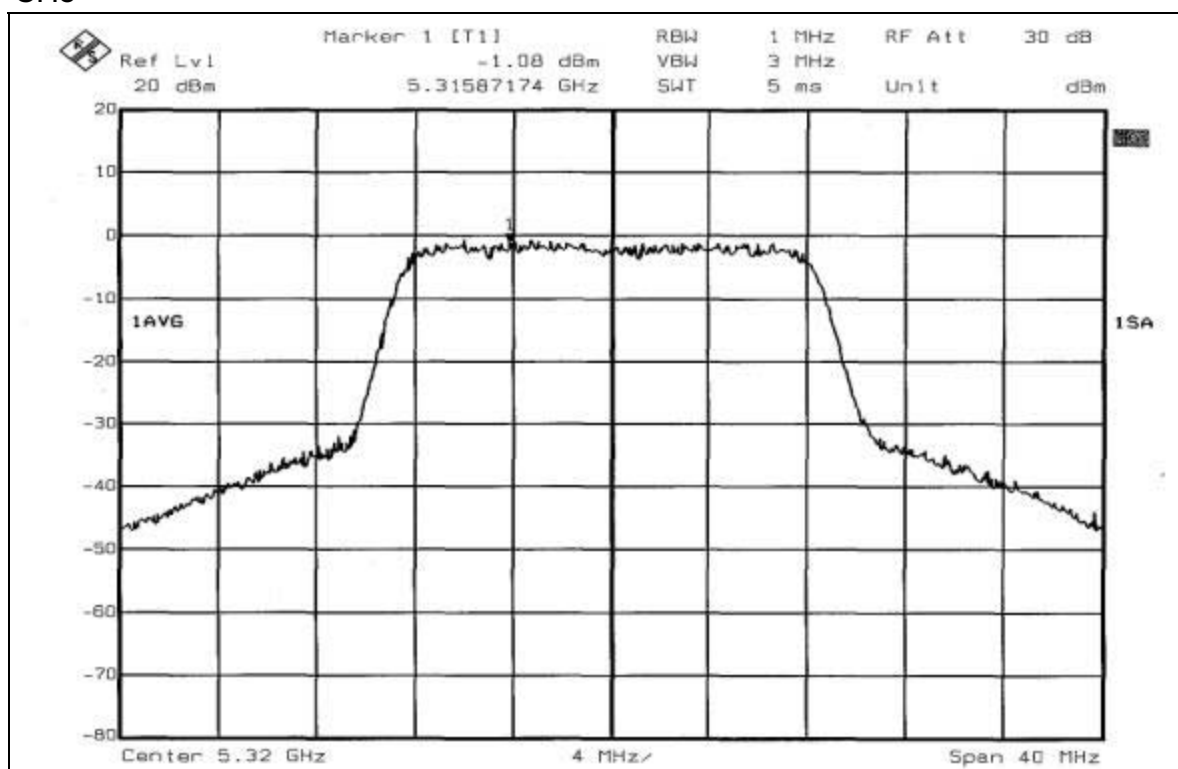
CH4



CH5



CH8

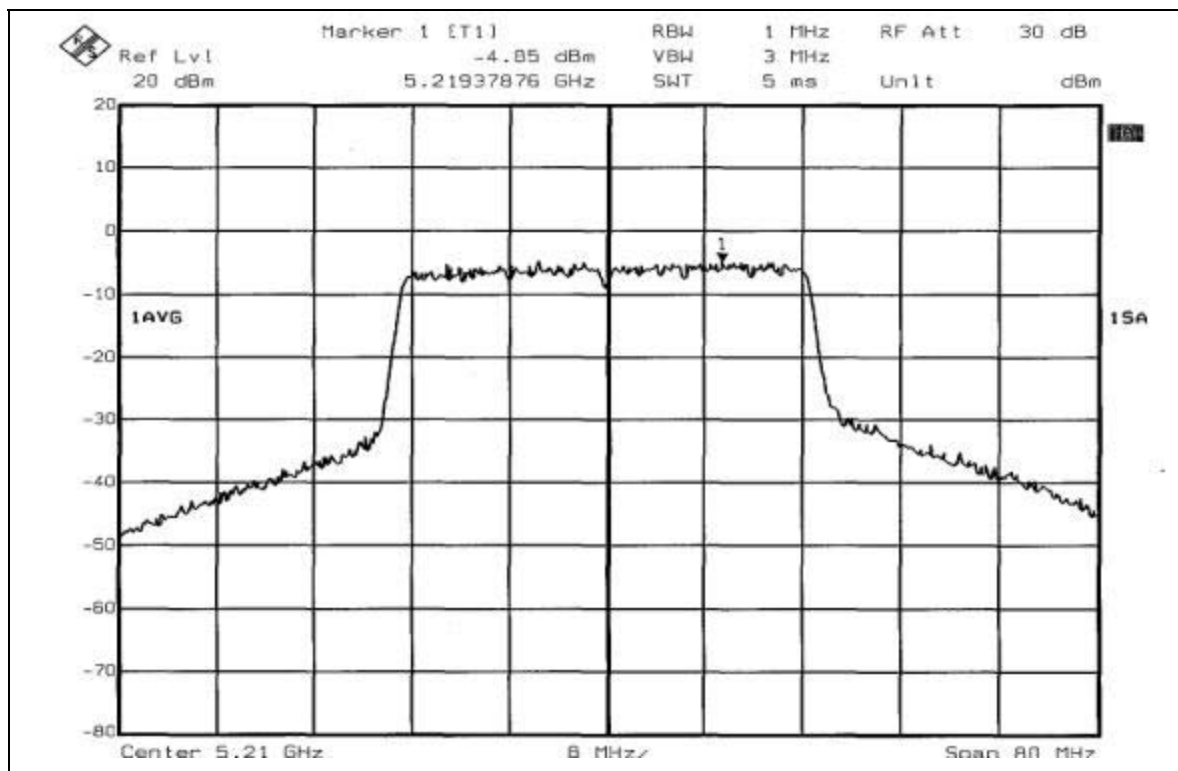


**802.11a Turbo OFDM modulation**

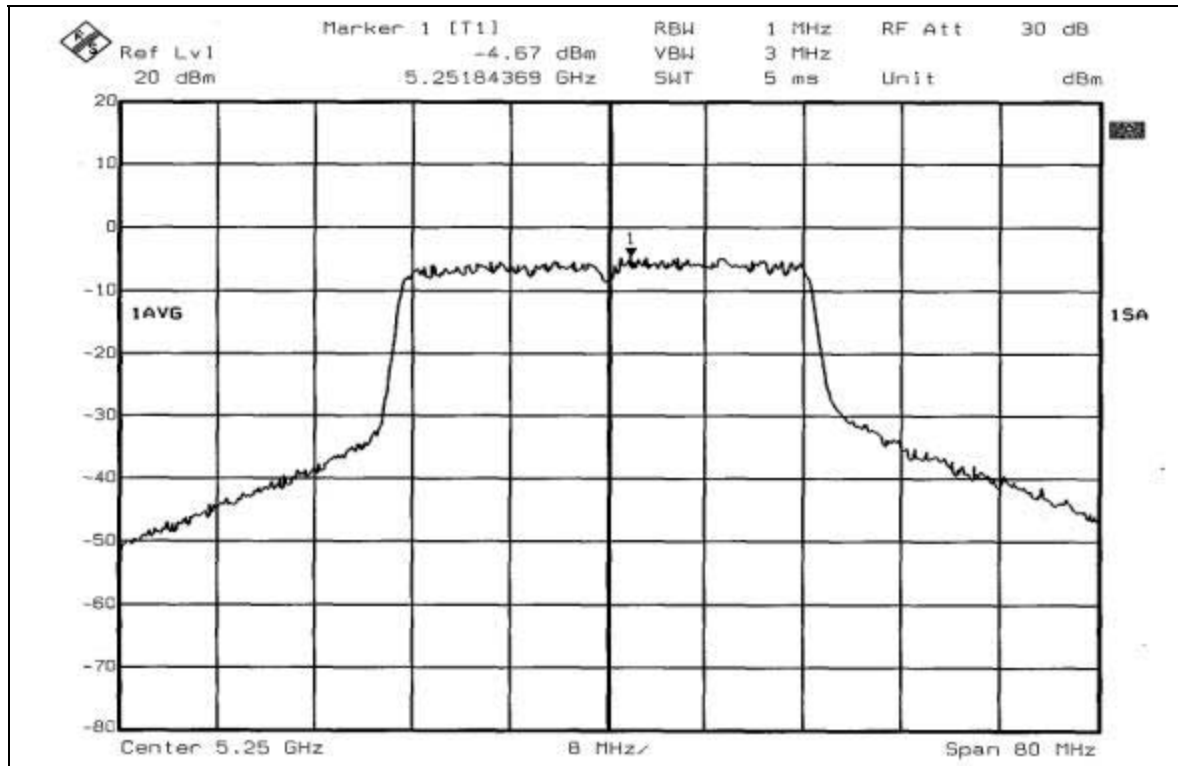
EUT	Wireless Mini PCI Card	MODEL	WLL4070
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 52%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1 MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5210	-4.85	4	PASS
2	5250	-4.67	4	PASS
3	5290	-5.83	11	PASS

CH1

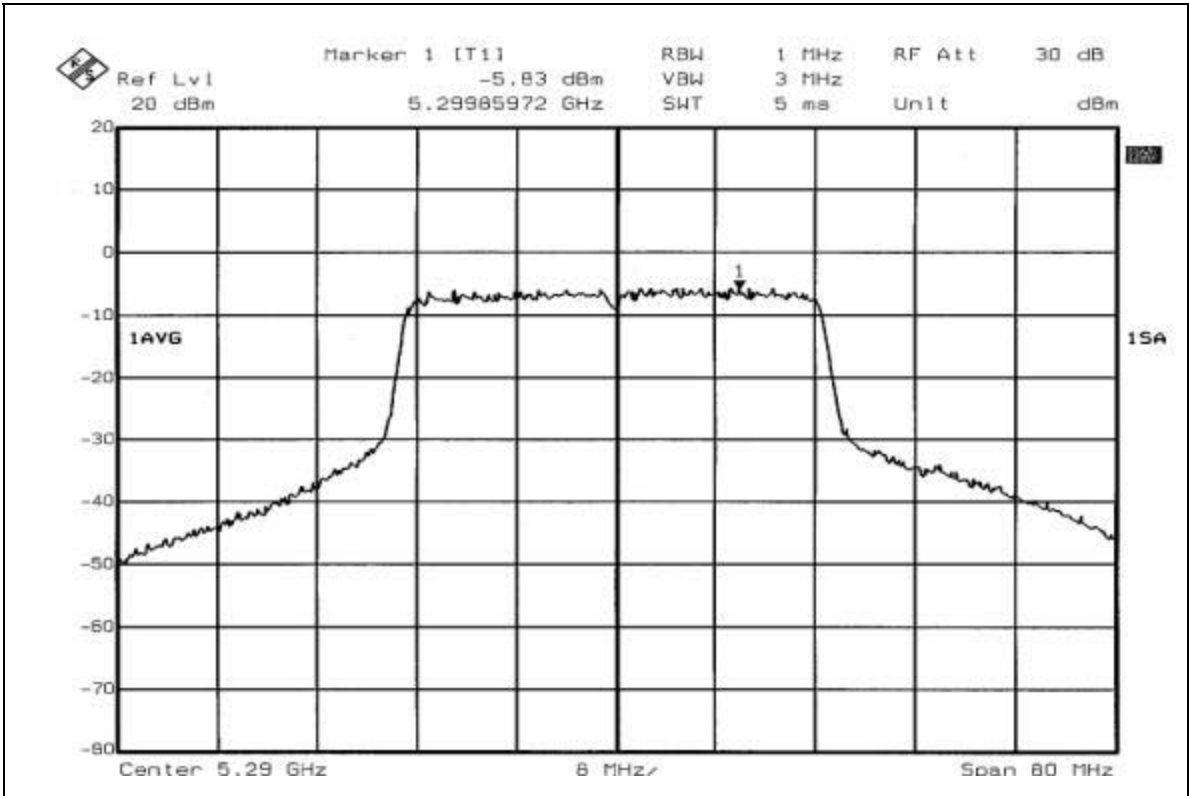


CH2





CH3



4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within +/- 0.02% of the operating frequency over a temperature variation of -30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ANRITSU SPECTRUM ANALYZER	MS2667C	M10281	Feb. 09, 2006
WIT STANDARD TEMPERATURE AND HUMIDITY CHAMBER	TH-4S-C	W981030	Jul. 18, 2005

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

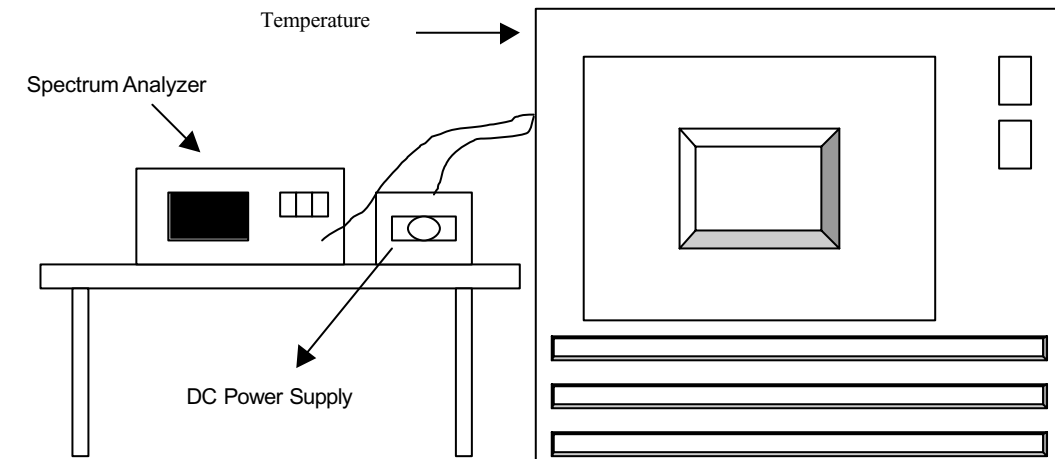
4.6.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

4.6.7 TEST RESULTS

Operating frequency: 5320MHz						Limit : $\pm 0.015\%$			
Temp. (°C)	Power supply (Vac)	0 minute		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	138	5320.0365	0.0006861	5320.0636	0.0011962	5320.0367	0.0006898	5320.0364	0.0006842
	120	5320.0364	0.0006842	5320.0366	0.0006880	5320.0365	0.0006861	5320.0367	0.0006898
	102	5320.0362	0.0006805	5320.0361	0.0006786	5320.0363	0.0006823	5320.0369	0.0006936
40	138	5320.0335	0.0006297	5320.0337	0.0006335	5320.0338	0.0006353	5320.0335	0.0006297
	120	5320.0334	0.0006278	5320.0335	0.0006297	5320.0336	0.0006316	5320.0332	0.0006241
	102	5320.0332	0.0006241	5320.0333	0.0006259	5320.0333	0.0006259	5320.0331	0.0006222
30	138	5320.0321	0.0006034	5320.0324	0.0006090	5320.0323	0.0006071	5320.0322	0.0006053
	120	5320.0322	0.0006053	5320.0323	0.0006071	5320.0321	0.0006034	5320.0320	0.0006015
	102	5320.0320	0.0006015	5320.0322	0.0006053	5320.0323	0.0006071	5320.0321	0.0006034
20	138	5320.0295	0.0005545	5320.0296	0.0005564	5320.0294	0.0005526	5320.0296	0.0005564
	120	5320.0294	0.0005526	5320.0293	0.0005508	5320.0292	0.0005489	5320.0295	0.0005545
	102	5320.0292	0.0005489	5320.0293	0.0005508	5320.0294	0.0005526	5320.0291	0.0005470
10	138	5320.0210	0.0003947	5320.0211	0.0003966	5320.0210	0.0003947	5320.0209	0.0003929
	120	5320.0209	0.0003929	5320.0210	0.0003947	5320.0211	0.0003966	5320.0210	0.0003947
	102	5320.0207	0.0003891	5320.0208	0.0003910	5320.0207	0.0003891	5320.0209	0.0003929
0	138	5320.0185	0.0003477	5320.0186	0.0003496	5320.0184	0.0003459	5320.0183	0.0003440
	120	5320.0184	0.0003459	5320.0184	0.0003459	5320.0183	0.0003440	5320.0185	0.0003477
	102	5320.0182	0.0003421	5320.0183	0.0003440	5320.0181	0.0003402	5320.0180	0.0003383
-10	138	5320.0115	0.0002162	5320.0114	0.0002143	5320.0116	0.0002180	5320.0013	0.0000244
	120	5320.0115	0.0002162	5320.0116	0.0002180	5320.0013	0.0000244	5320.0117	0.0002199
	102	5320.0113	0.0002124	5320.0114	0.0002143	5320.0116	0.0002180	5320.0112	0.0002105
-20	138	5320.0012	0.0000226	5320.0013	0.0000244	5320.0014	0.0000263	5320.0011	0.0000207
	120	5320.0011	0.0000207	5320.0010	0.0000188	5320.0009	0.0000169	5320.0008	0.0000150
	102	5320.0010	0.0000188	5320.0011	0.0000207	5320.0010	0.0000188	5320.0009	0.0000169
-30	138	5319.9921	-0.0001485	5319.9922	-0.0001466	5319.9923	-0.0001447	5319.9921	-0.0001485
	120	5319.9922	-0.0001466	5319.9921	-0.0001485	5319.9923	-0.0001447	5319.9924	-0.0001429
	102	5319.9921	-0.0001485	5319.9923	-0.0001447	5319.9924	-0.0001429	5319.9920	-0.0001504

4.7 BAND EDGES MEASUREMENT

4.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.7.2 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 1MHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

4.7.3 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

4.7.4 TEST RESULTS

For signals in the restricted bands above and below the 5.15 to 5.35GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak filed strength of the intentional signal made on the OATS to calculate the field strength of the unintentional signals.

The spectrum plots (Peak RBW=VBW=1MHz; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

**802.11a OFDM modulation****Channel 1 (5180MHz)**

The band edge emission plot on the page 97 shows 50.46dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 109.47dBuV/m (Peak), so the maximum field strength in restrict band is $109.47 - 50.46 = 59.01$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the page 97 shows 54.77dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 100.23dBuV/m (Average), so the maximum field strength in restrict band is $100.23 - 54.77 = 45.46$ dBuV/m which is under 54dBuV/m limit.

Channel 8 (5320MHz)

The band edge emission plot on the page 98 shows 53.70dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 110.39dBuV/m (Peak), so the maximum field strength in restrict band is $110.39 - 53.70 = 56.69$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the page 99 shows 55.54dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 101.02dBuV/m (Average), so the maximum field strength in restrict band is $101.02 - 55.54 = 45.48$ dBuV/m which is under 54dBuV/m limit.

**802.11a Turbo OFDM modulation****Channel 1 (5210MHz)**

The band edge emission plot on the page 100 shows 51.67dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 105.46dBuV/m (Peak), so the maximum field strength in restrict band is $105.46 - 51.67 = 53.79$ dBuV/m which is under 74dBuV/m limit.

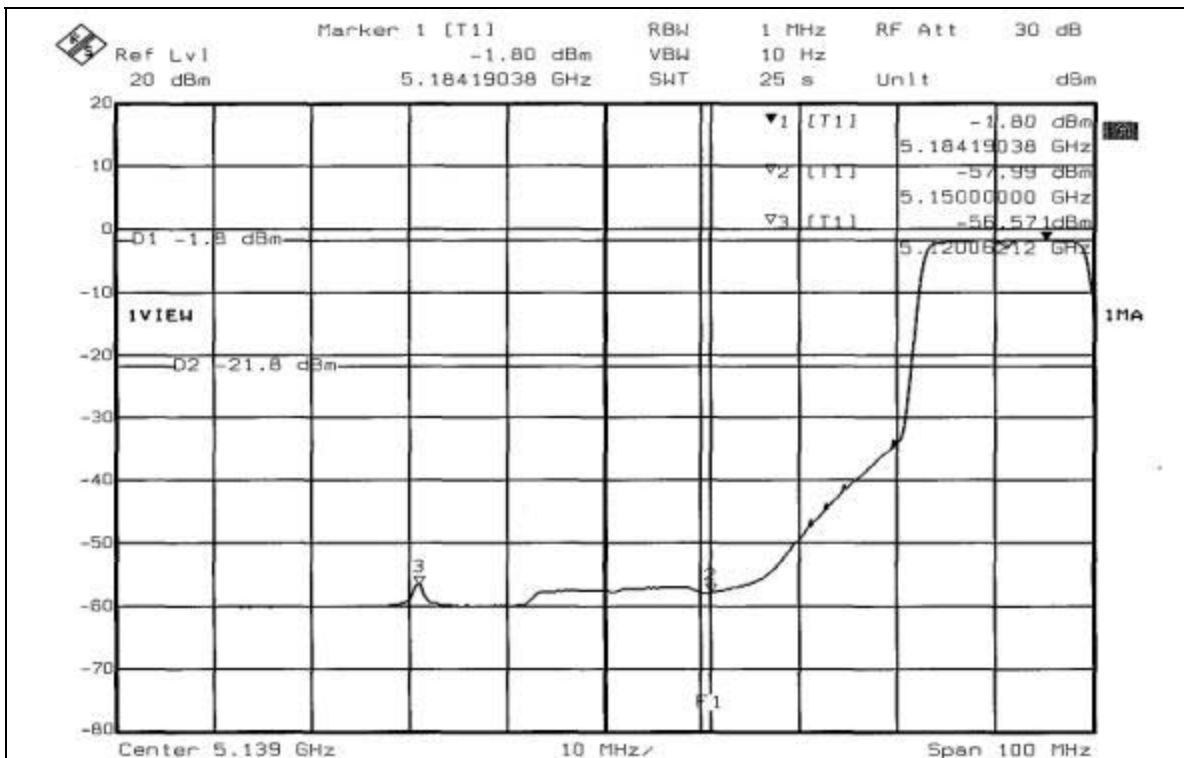
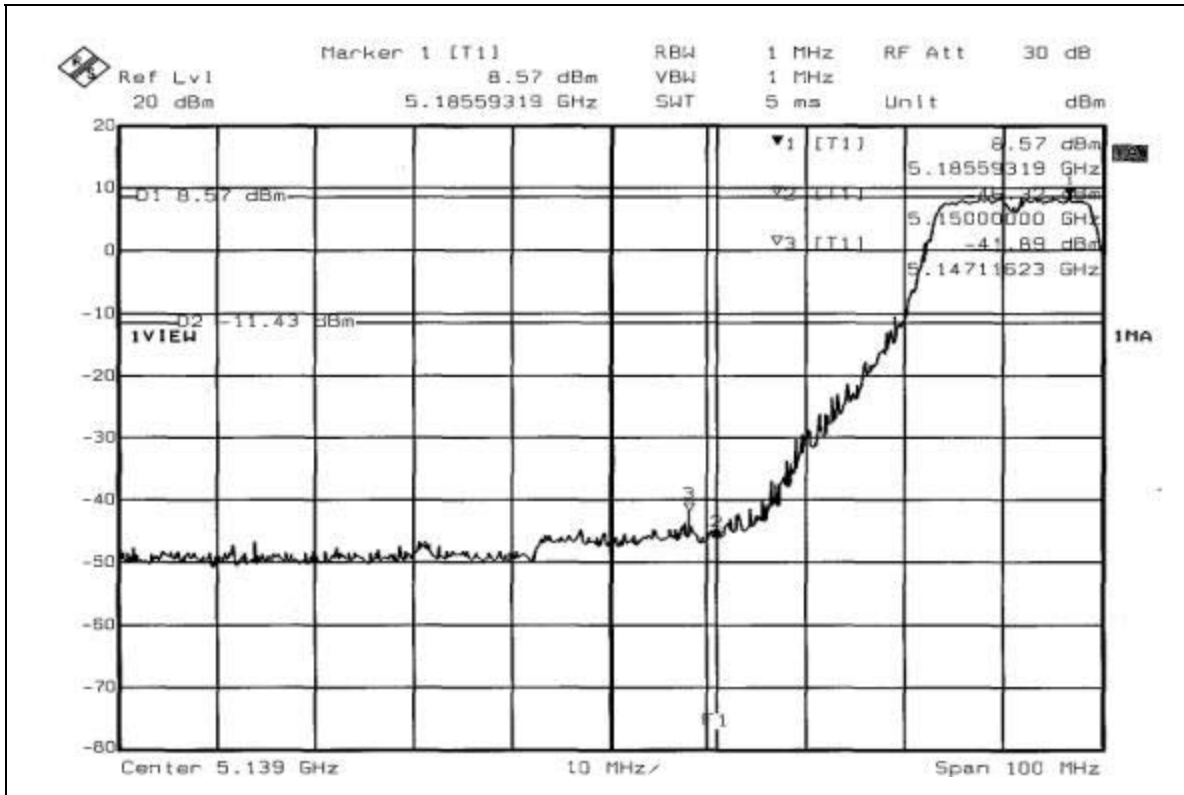
The band edge emission plot on the page 100 shows 51.16dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 95.75dBuV/m (Average), so the maximum field strength in restrict band is $95.75 - 51.16 = 44.59$ dBuV/m which is under 54dBuV/m limit.

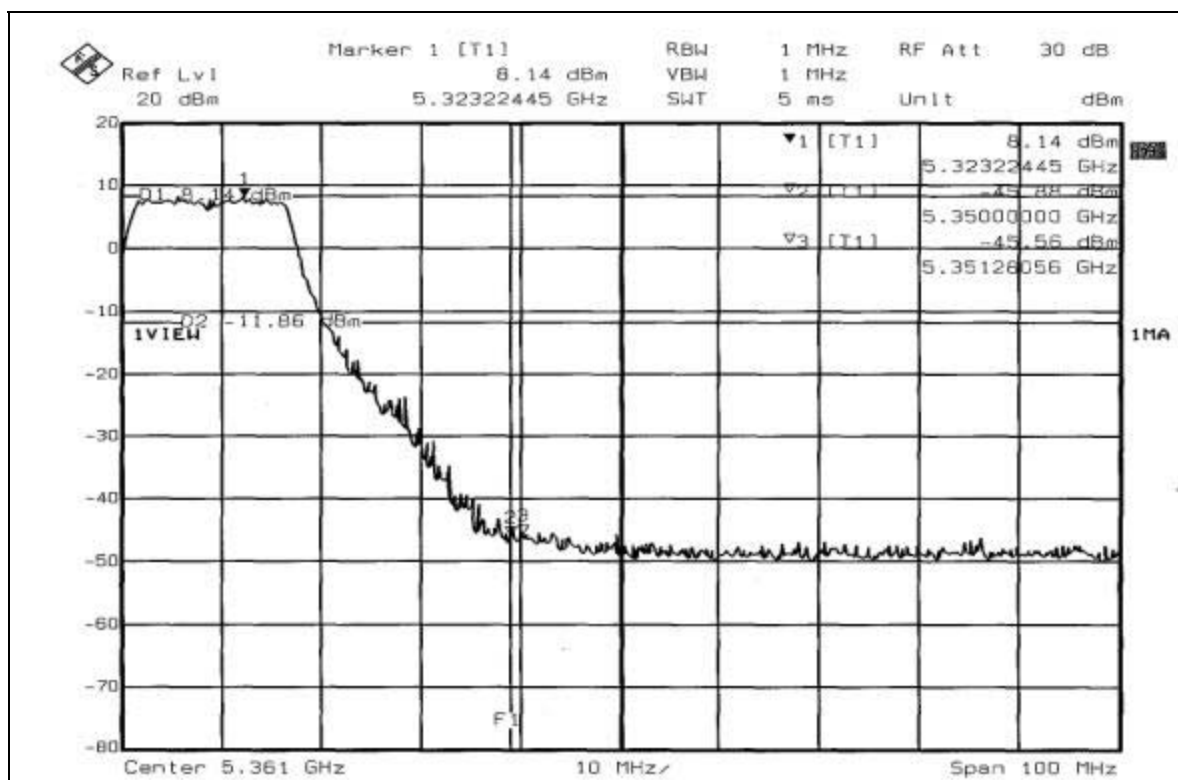
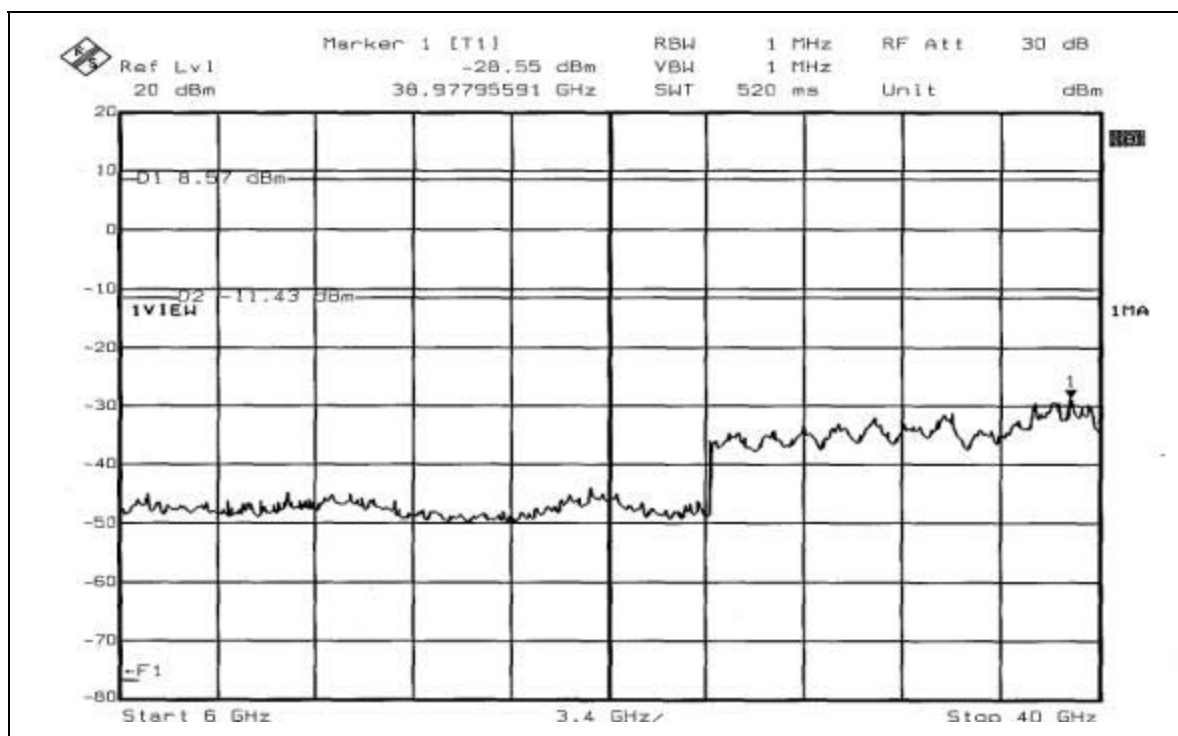
Channel 3 (5290MHz)

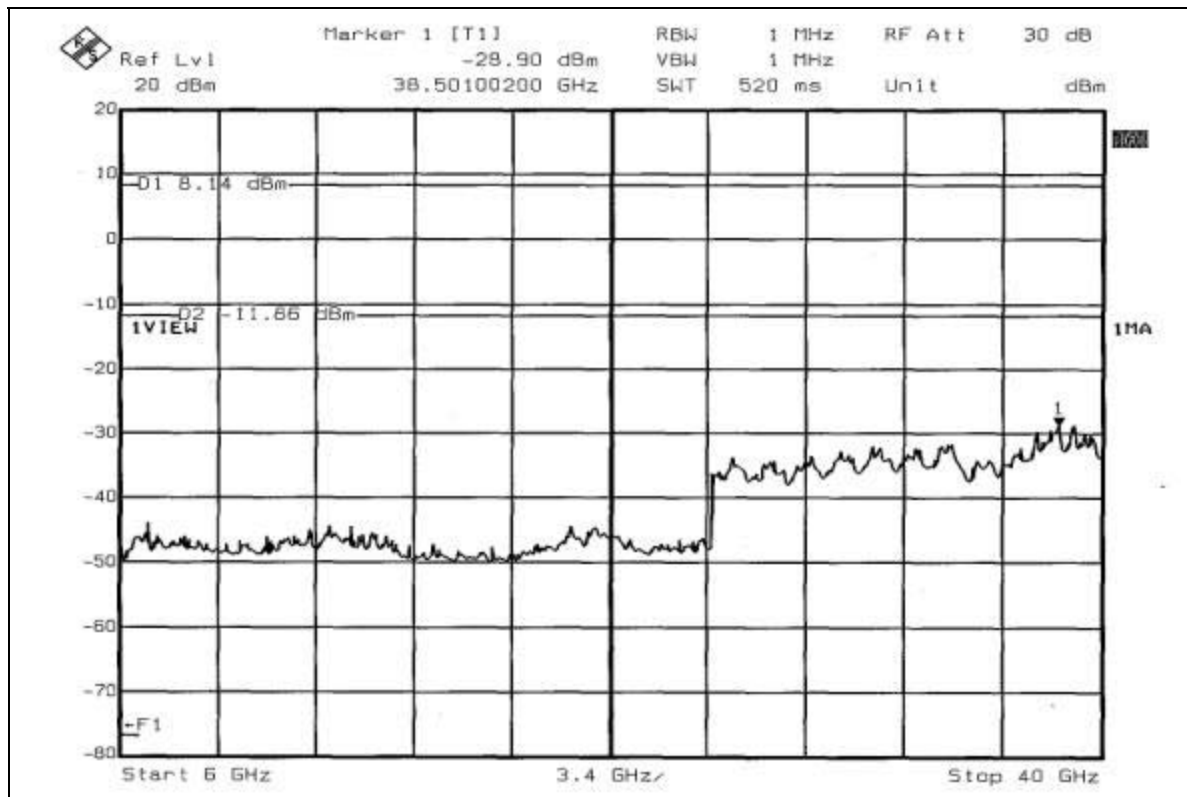
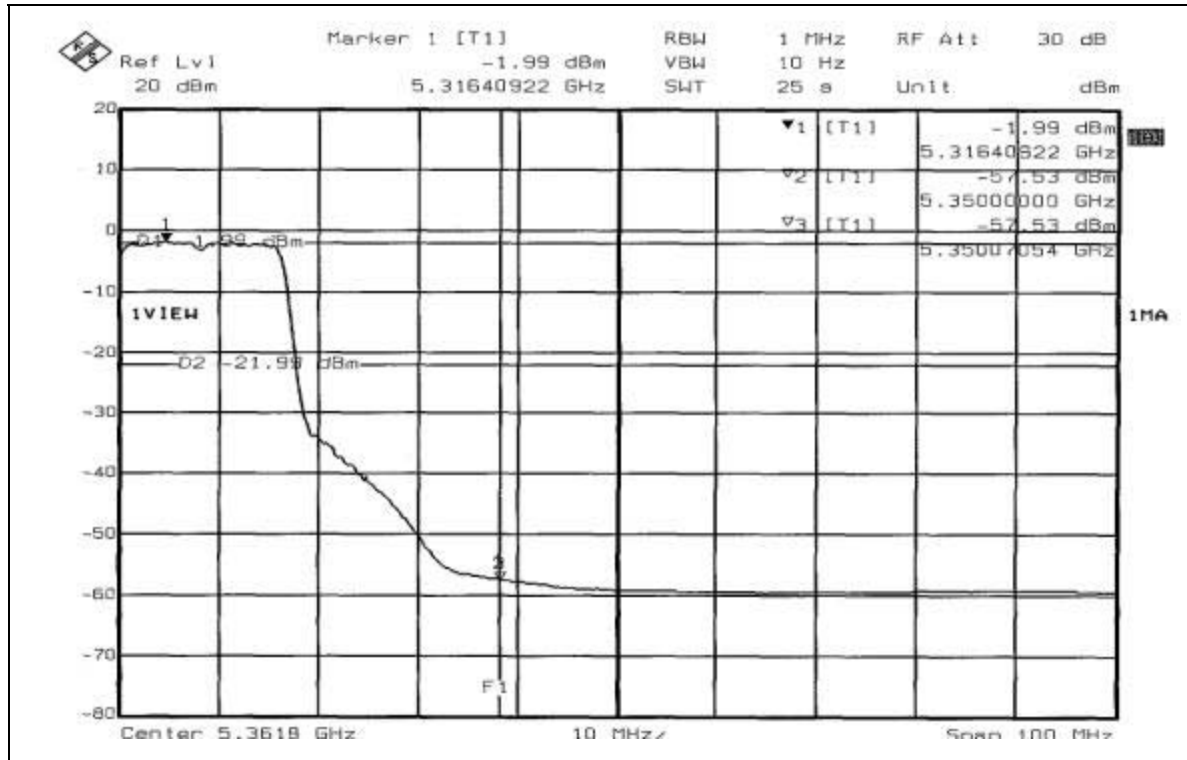
The band edge emission plot on the page 101 shows 49.55dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 3 is 106.41dBuV/m (Peak), so the maximum field strength in restrict band is $106.41 - 49.55 = 56.86$ dBuV/m which is under 74dBuV/m limit.

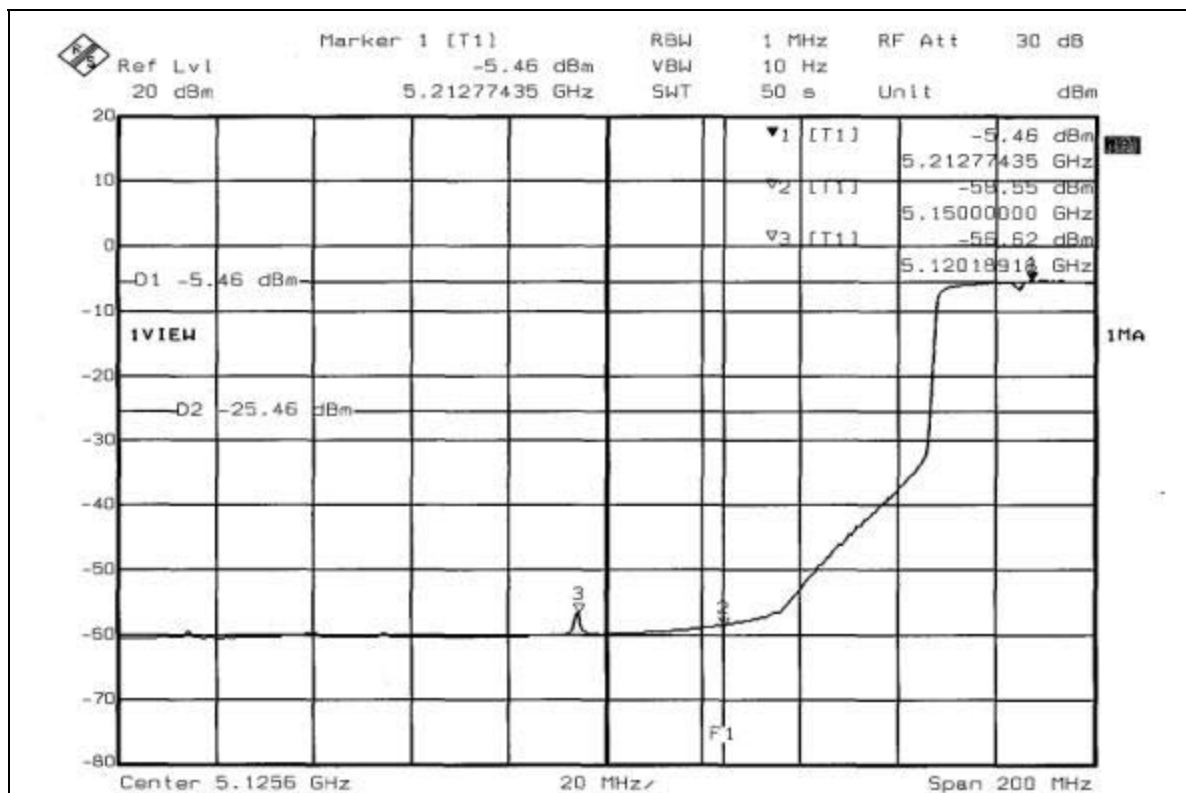
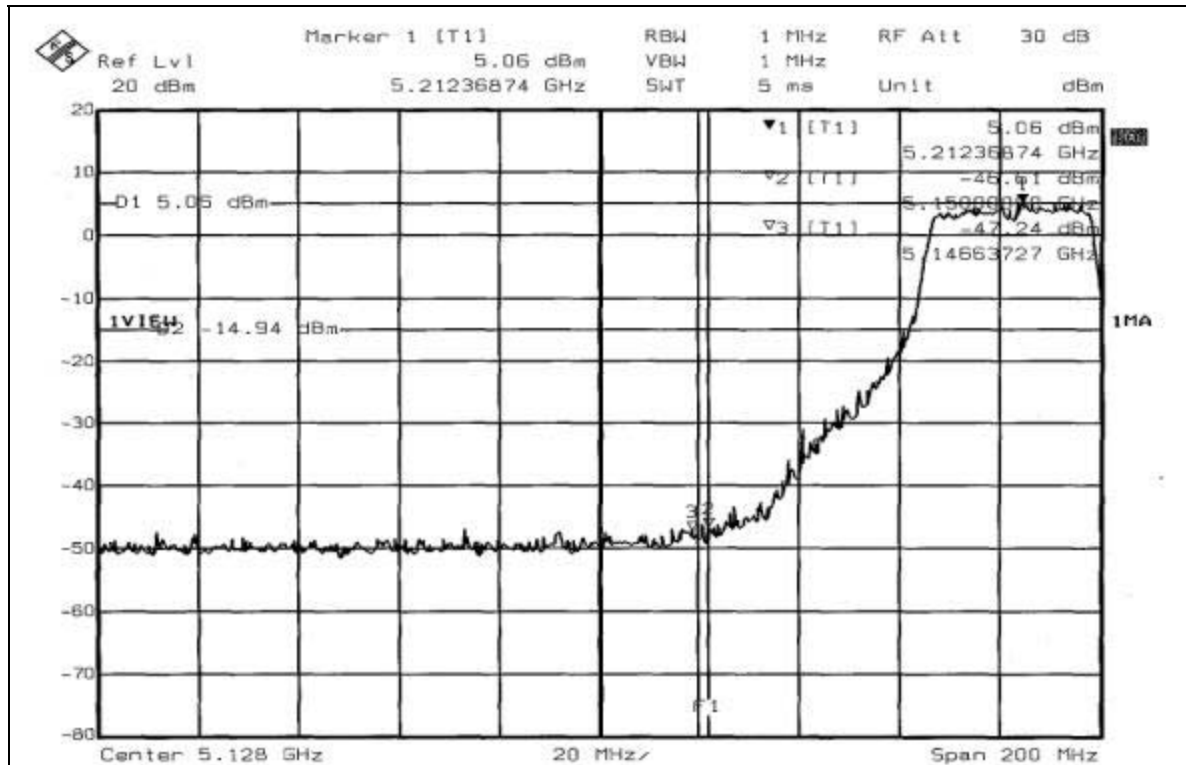
The band edge emission plot on the page 102 shows 52.22dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 3 is 96.70dBuV/m (Average), so the maximum field strength in restrict band is $96.70 - 52.22 = 44.48$ dBuV/m which is under 54dBuV/m limit.

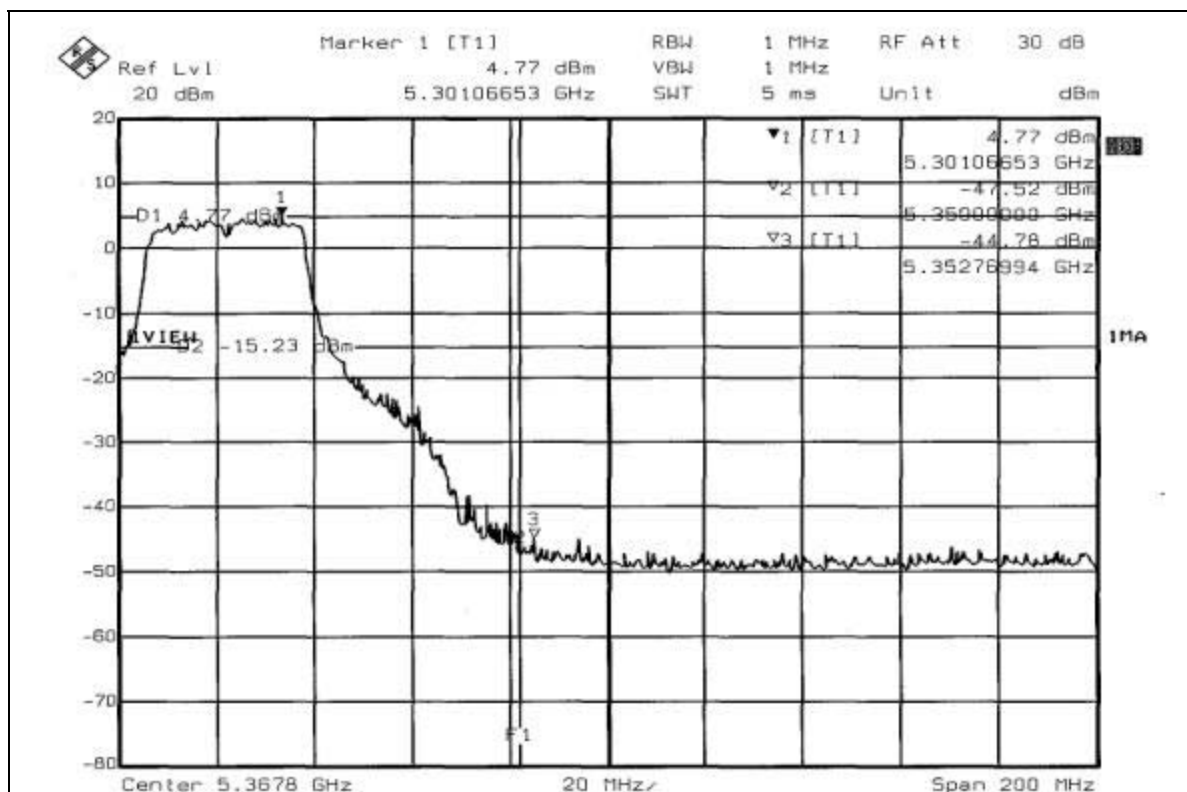
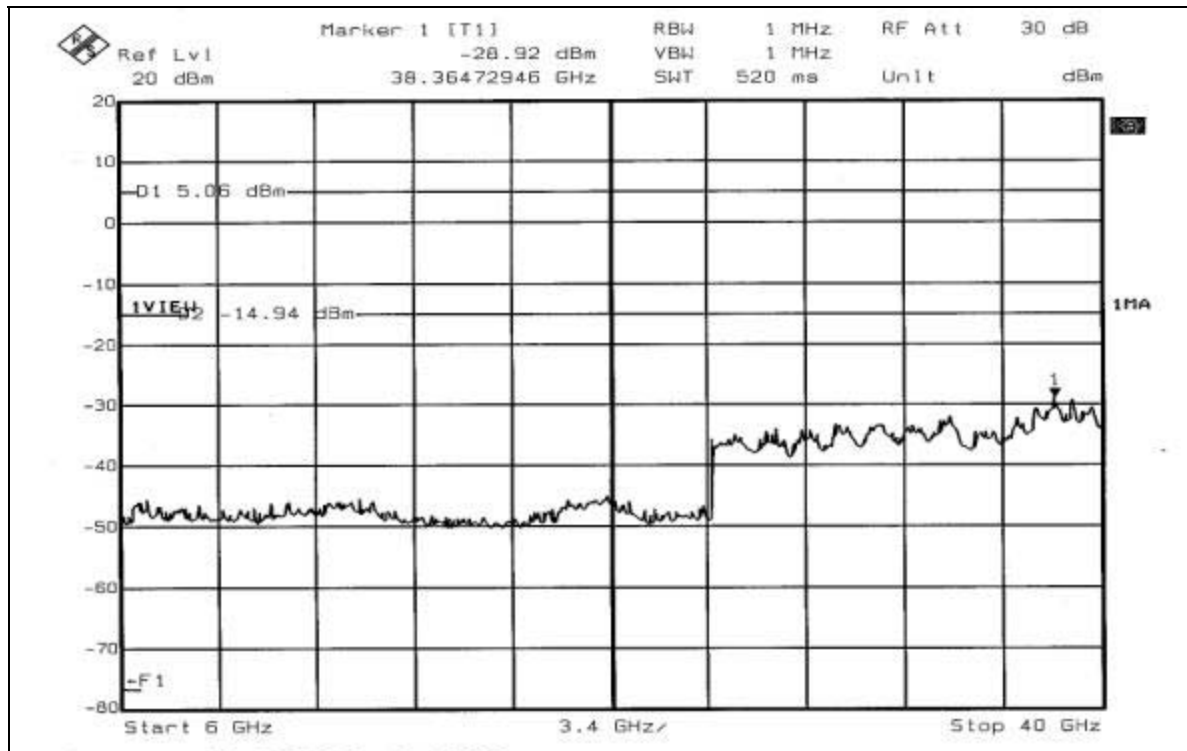
802.11a OFDM modulation

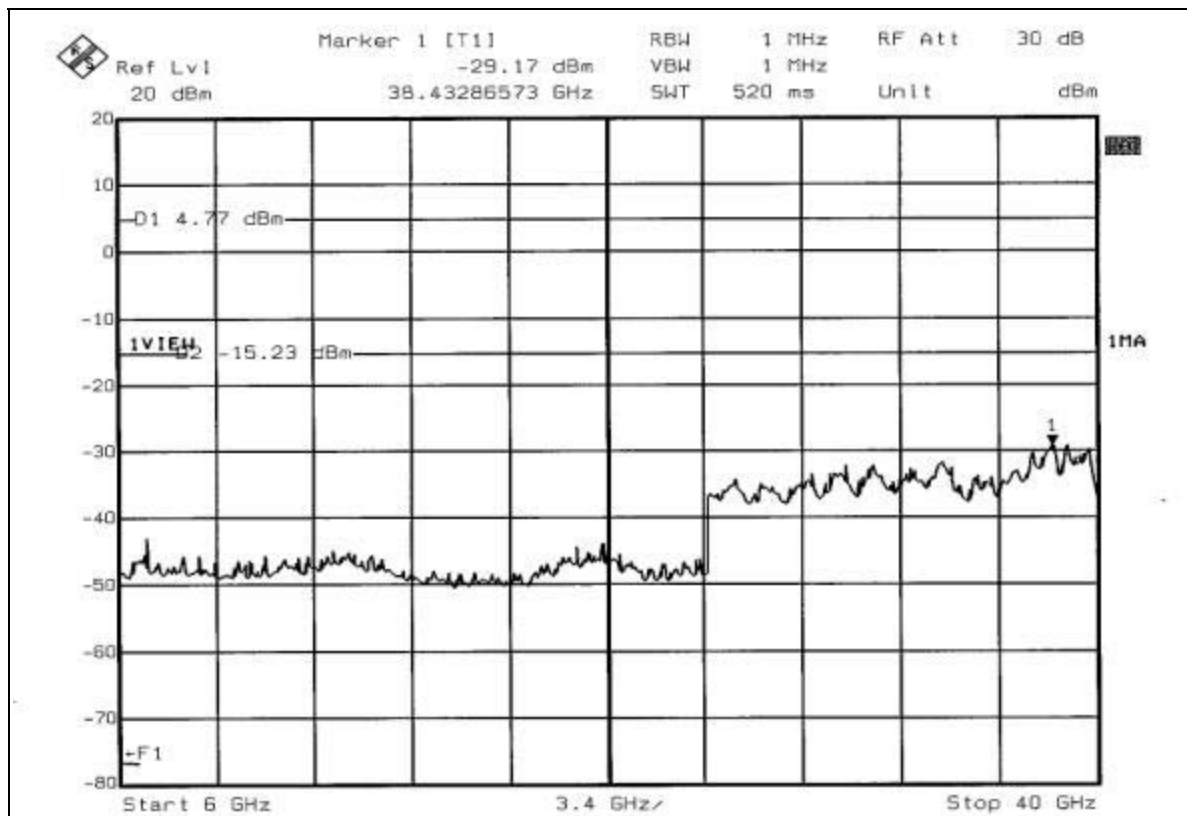
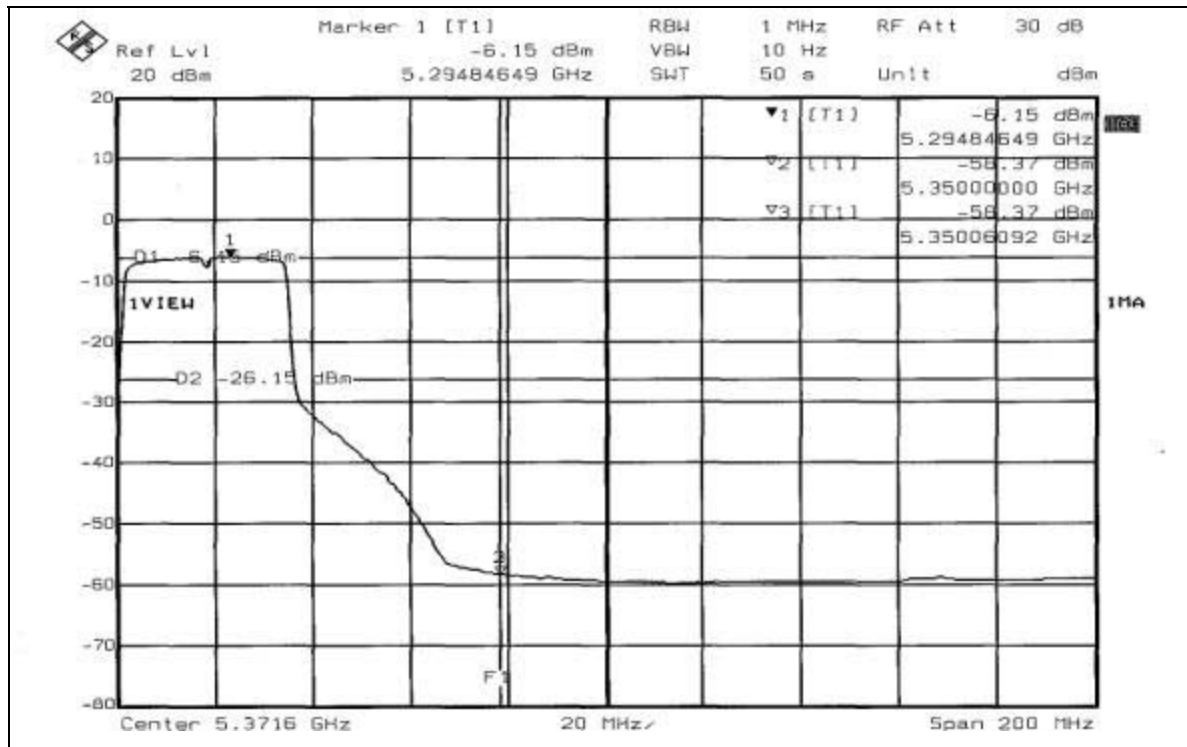






802.11a Turbo OFDM modulation







4.8 ANTENNA REQUIREMENT

4.8.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.407(a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.8.2 ANTENNA CONNECTED CONSTRUCTION

The antennas used in this product are Inverted F and Monopole antenna with UFL antenna connector. The maximum Gain of the antenna is 4.91dBi.

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

Test Mode A





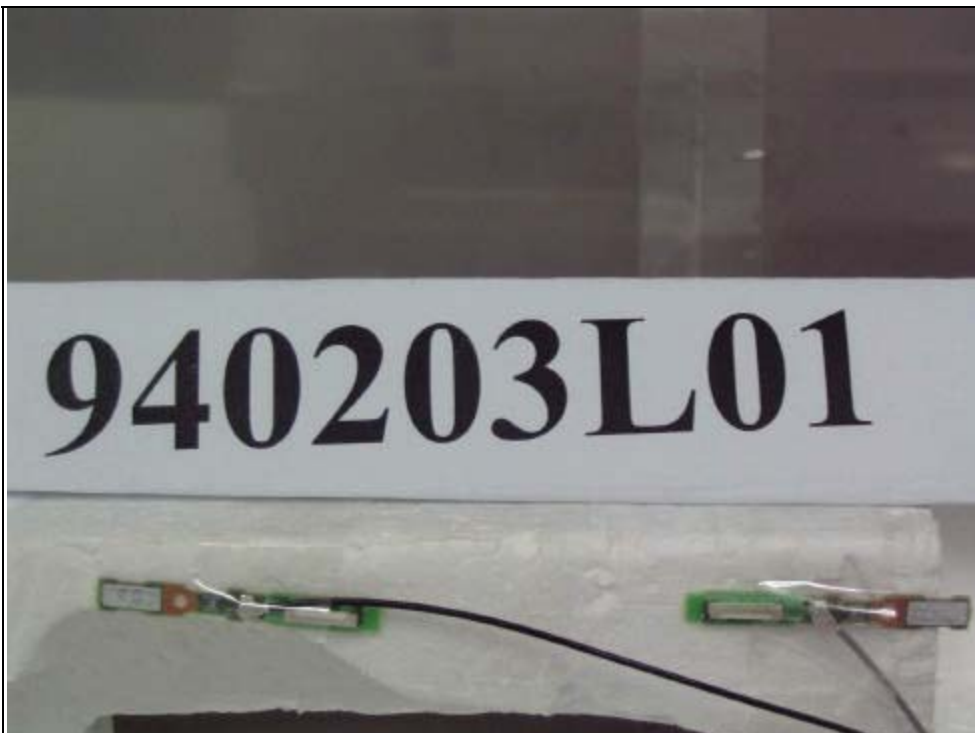
Test Mode B





Test Mode C





Test Mode D



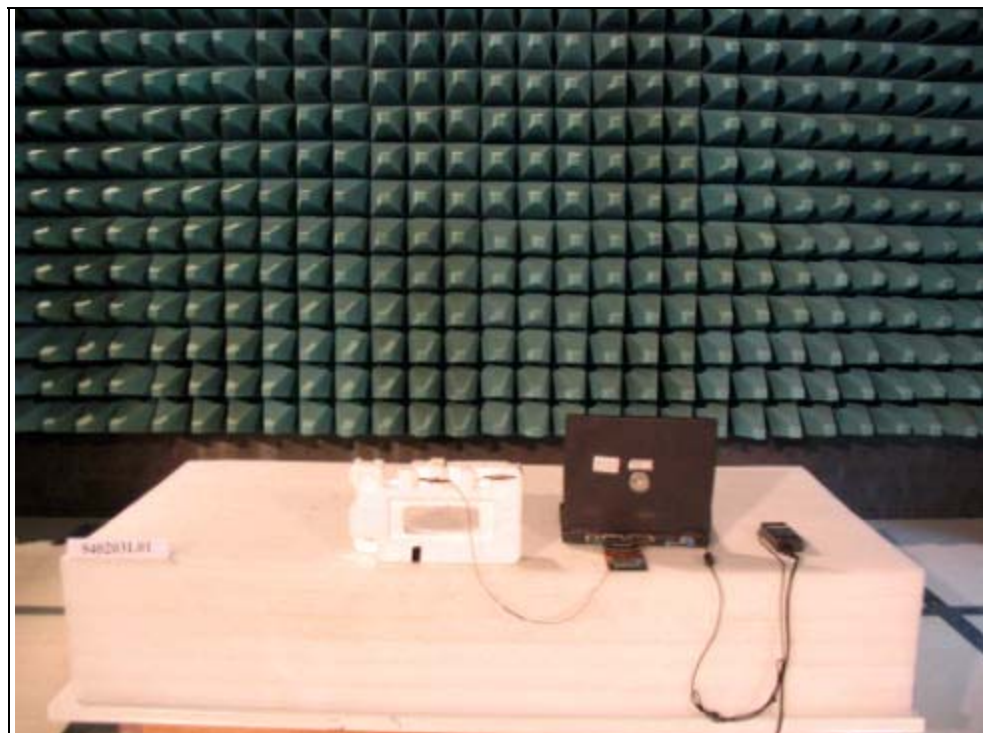


Test Mode E



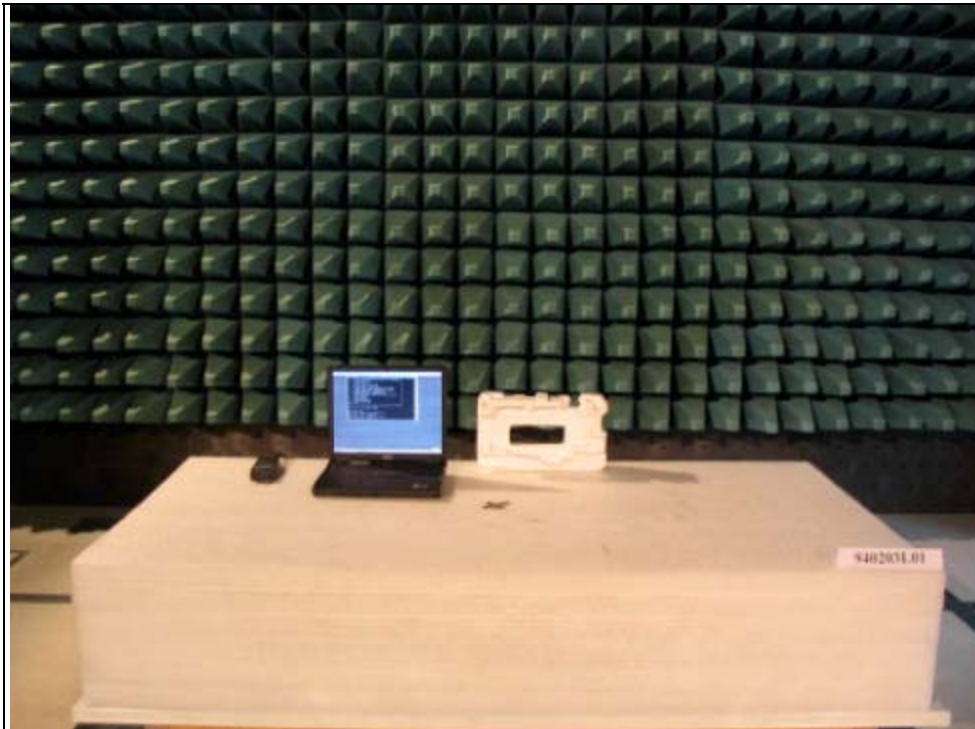


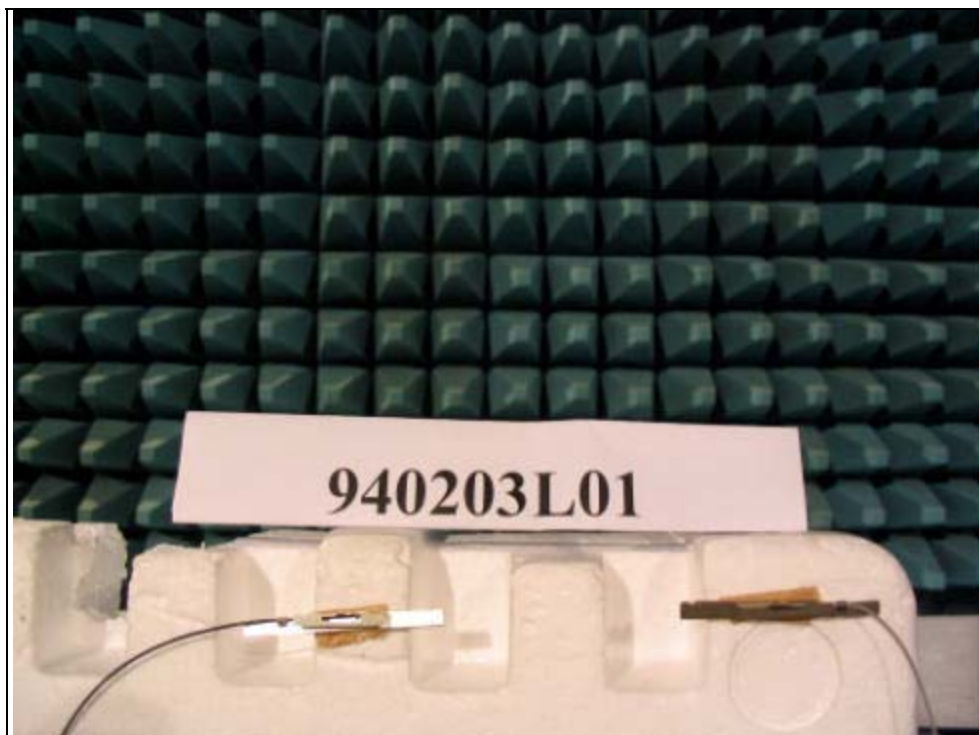
RADIATED EMISSION TEST
Test Mode A



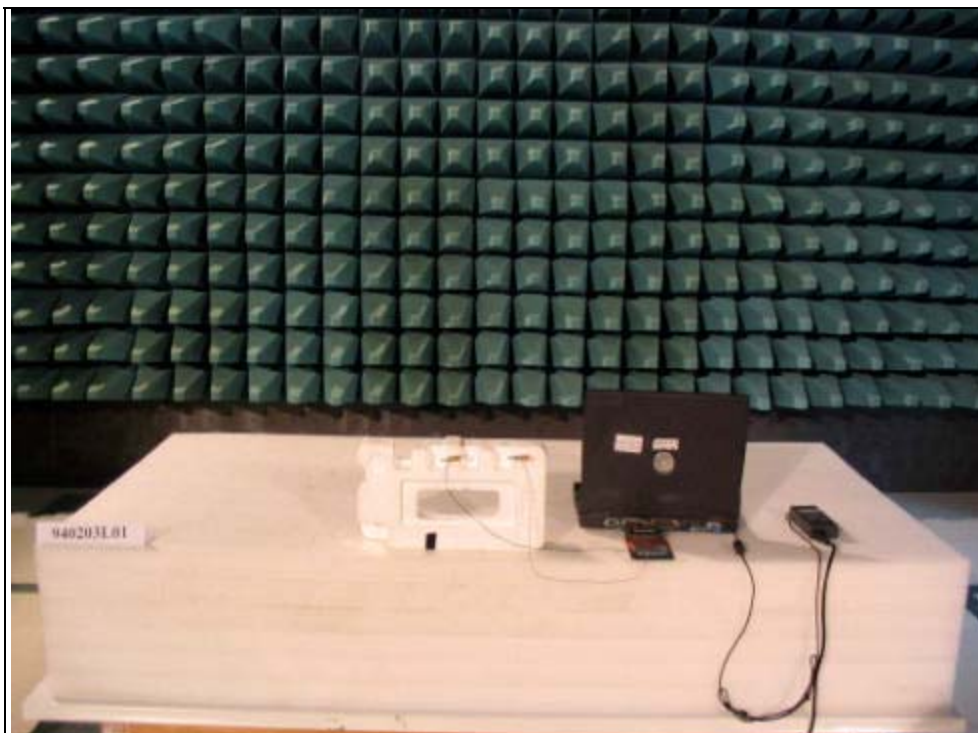


Test Mode B



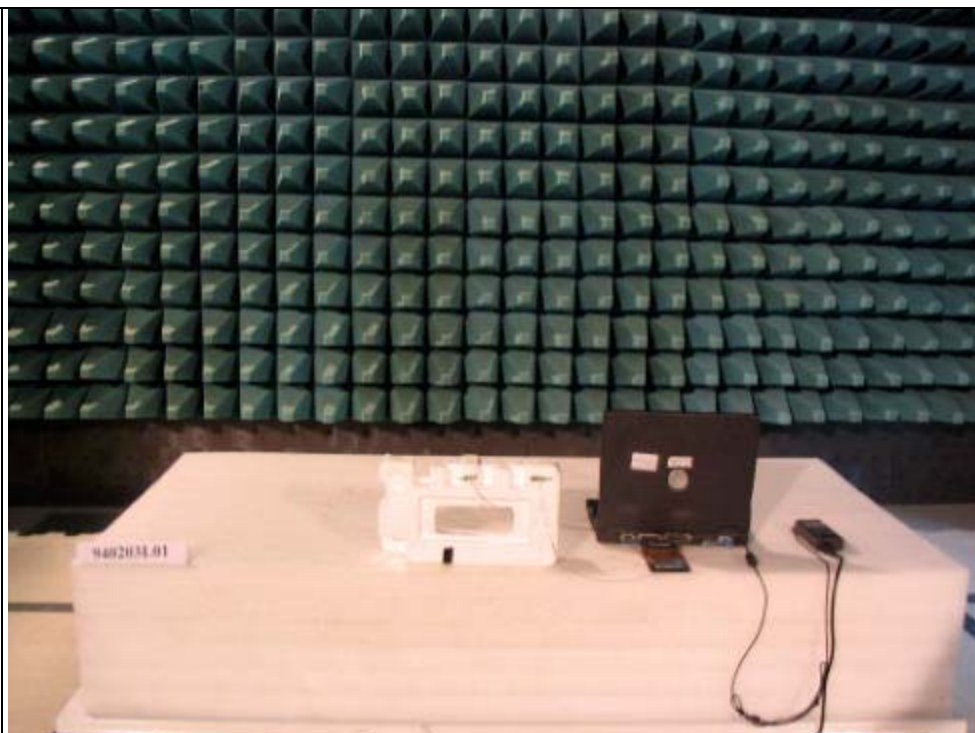
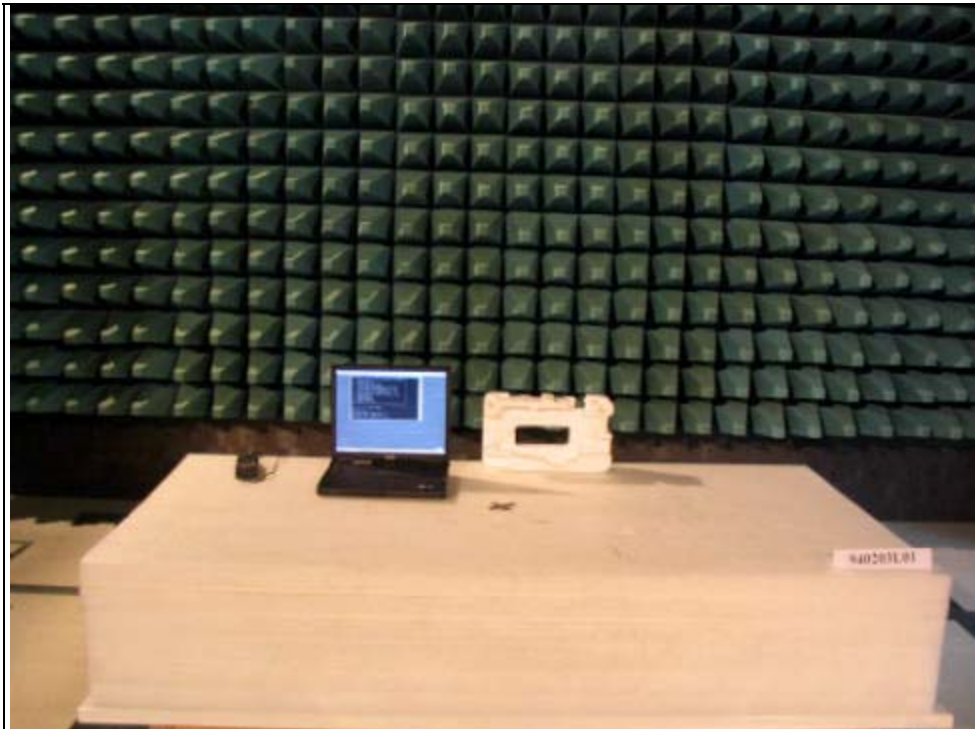


Test Mode C



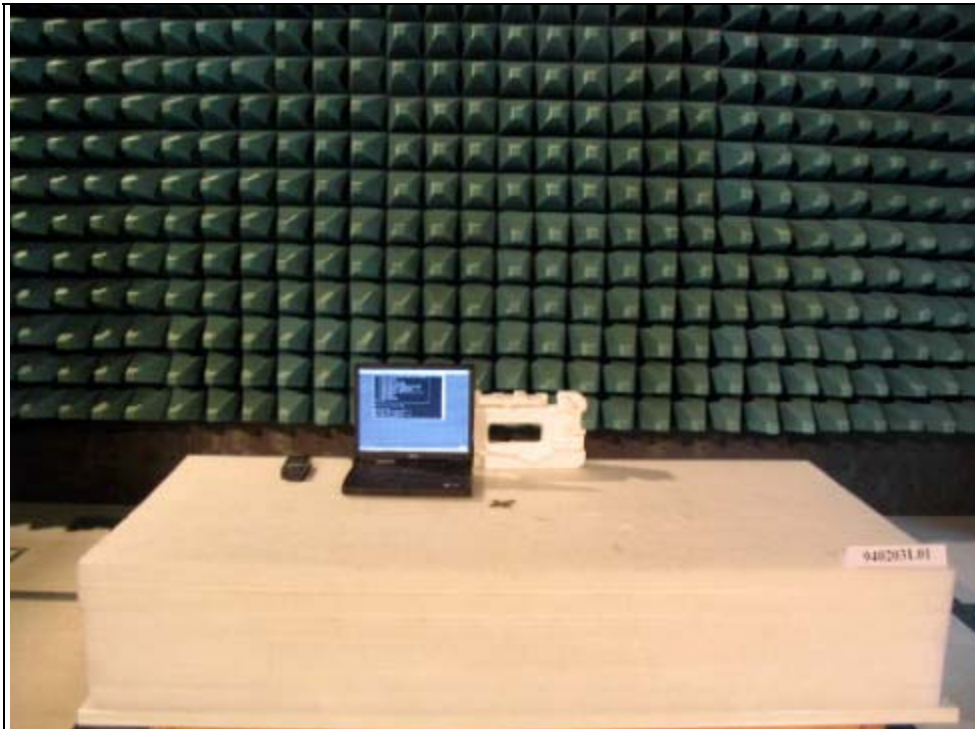


Test Mode D





Test Mode E







6. INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025:

USA	FCC, NVLAP, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB , GOST-ASIA(MOU)
Russia	CERTIS(MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

Linko RF Lab.

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The address and road map of all our labs can be found in our web site also