

#### 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
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 07, 2007

**NOTE:**

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

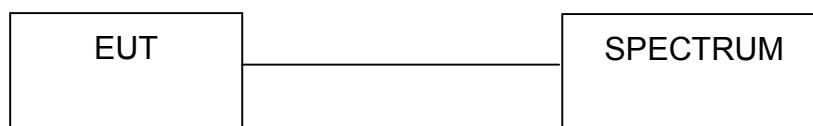
#### 4.4.3 TEST PROCEDURE

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 (ANTENNA A)

##### 802.11a OFDM modulation

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27deg.C, 53%RH, 961hPa
<b>TESTED BY</b>	Rex Huang		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER EXCURSION (dB)</b>	<b>PEAK to AVERAGE EXCURSION LIMIT (dB)</b>	<b>PASS/FAIL</b>
1	5180	7.23	13	PASS
4	5240	7.39	13	PASS
5	5745	7.43	13	PASS
7	5785	6.88	13	PASS
8	5805	7.20	13	PASS









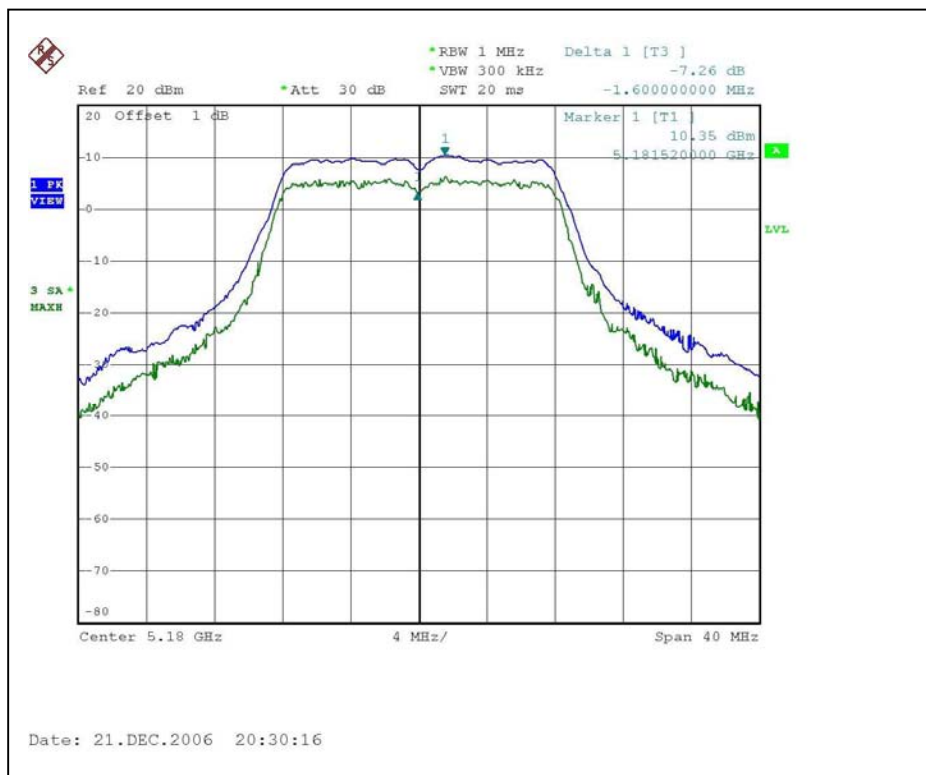
#### 4.4.8 TEST RESULTS (ANTENNA B)

##### 802.11a OFDM modulation

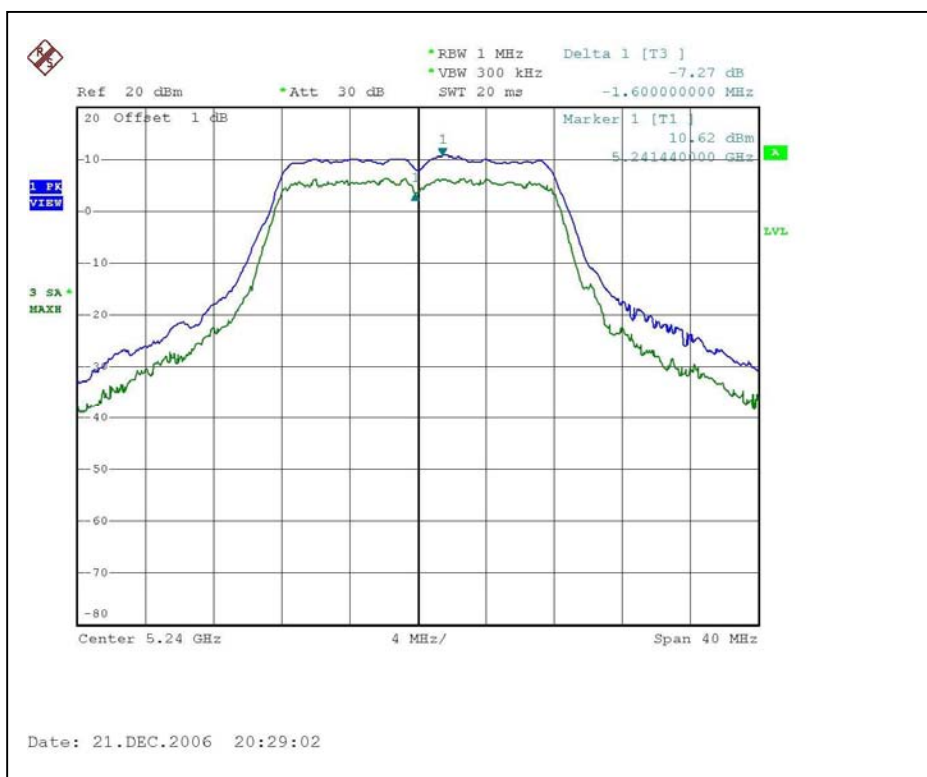
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27deg.C, 53%RH, 961hPa
<b>TESTED BY</b>	Rex Huang		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER EXCURSION (dB)</b>	<b>PEAK to AVERAGE EXCURSION LIMIT (dB)</b>	<b>PASS/FAIL</b>
1	5180	7.26	13	PASS
4	5240	7.27	13	PASS
5	5745	7.43	13	PASS
7	5785	6.88	13	PASS
8	5805	7.17	13	PASS

CH1

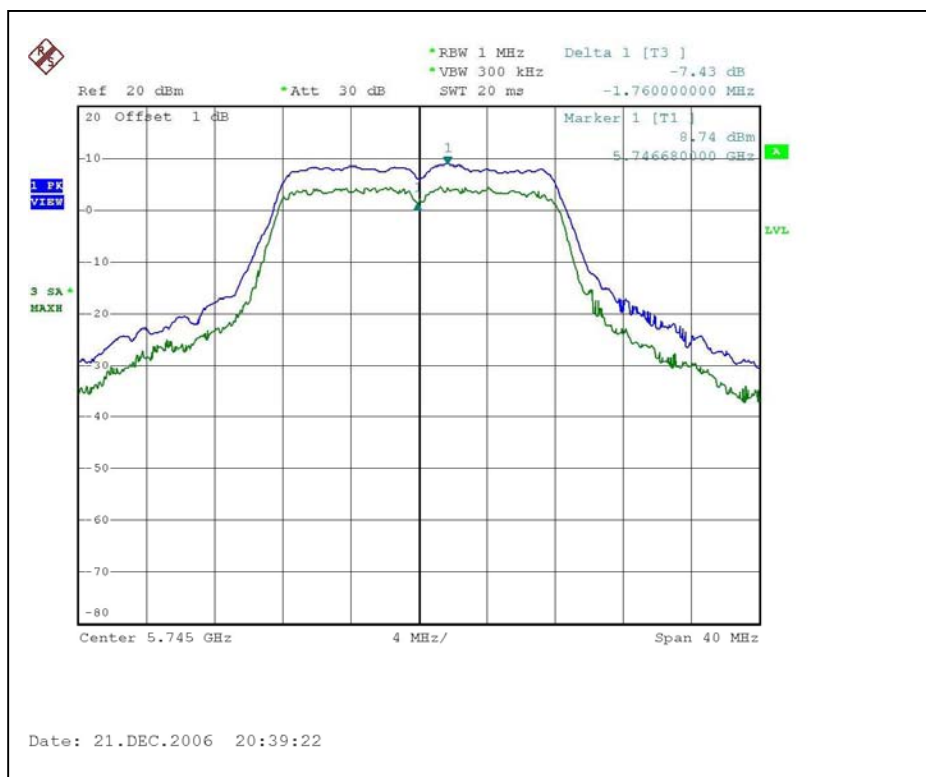


CH4

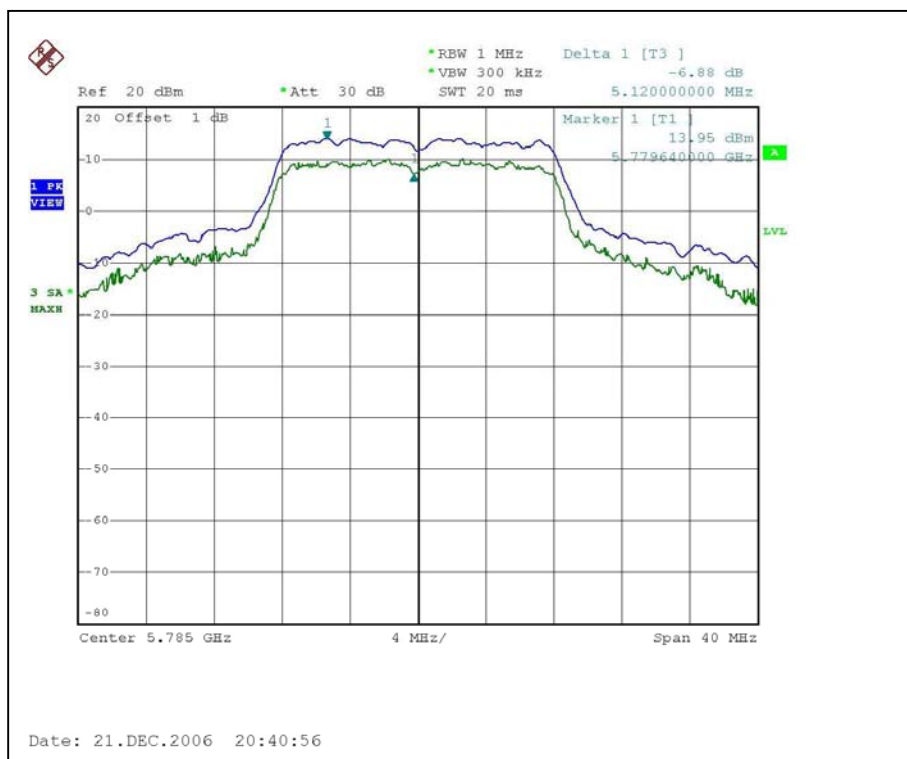




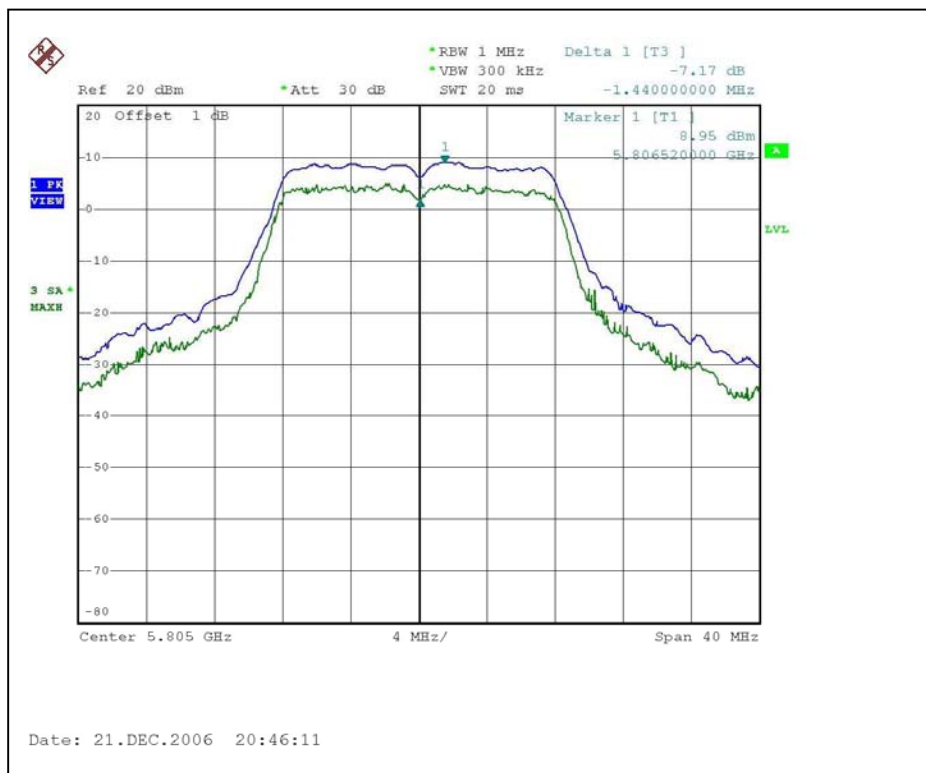
### CH5



### CH7



CH8





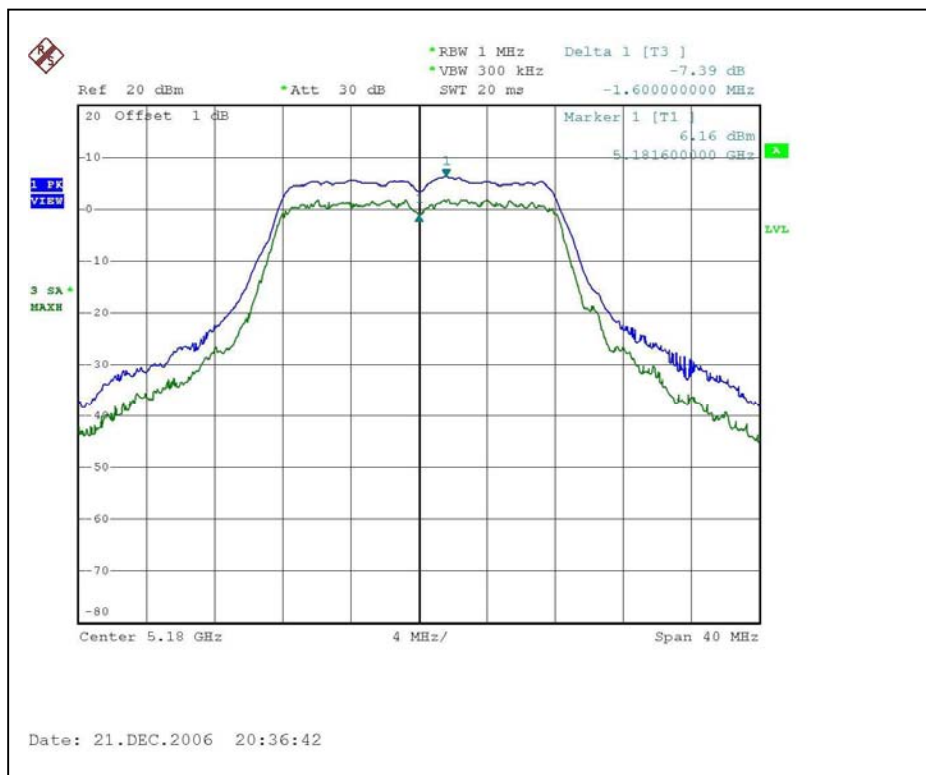
#### 4.4.9 TEST RESULTS (ANTENNA C)

##### 802.11a OFDM modulation

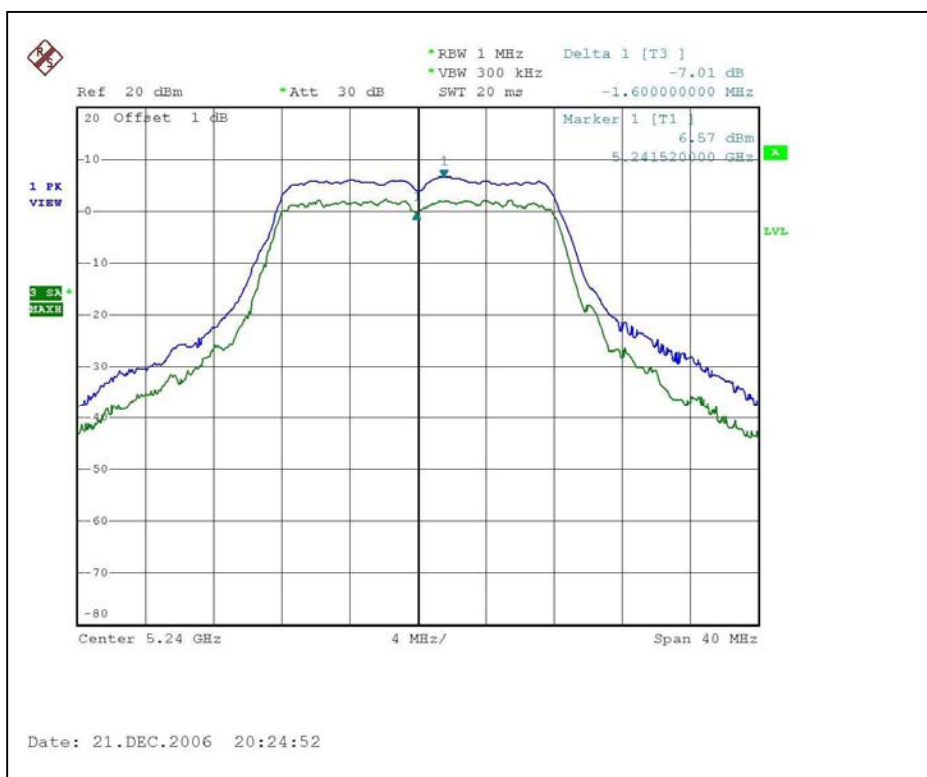
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27deg.C, 53%RH, 961hPa
<b>TESTED BY</b>	Rex Huang		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER EXCURSION (dB)</b>	<b>PEAK to AVERAGE EXCURSION LIMIT (dB)</b>	<b>PASS/FAIL</b>
1	5180	7.39	13	PASS
4	5240	7.01	13	PASS
5	5745	7.33	13	PASS
7	5785	6.88	13	PASS
8	5805	6.96	13	PASS

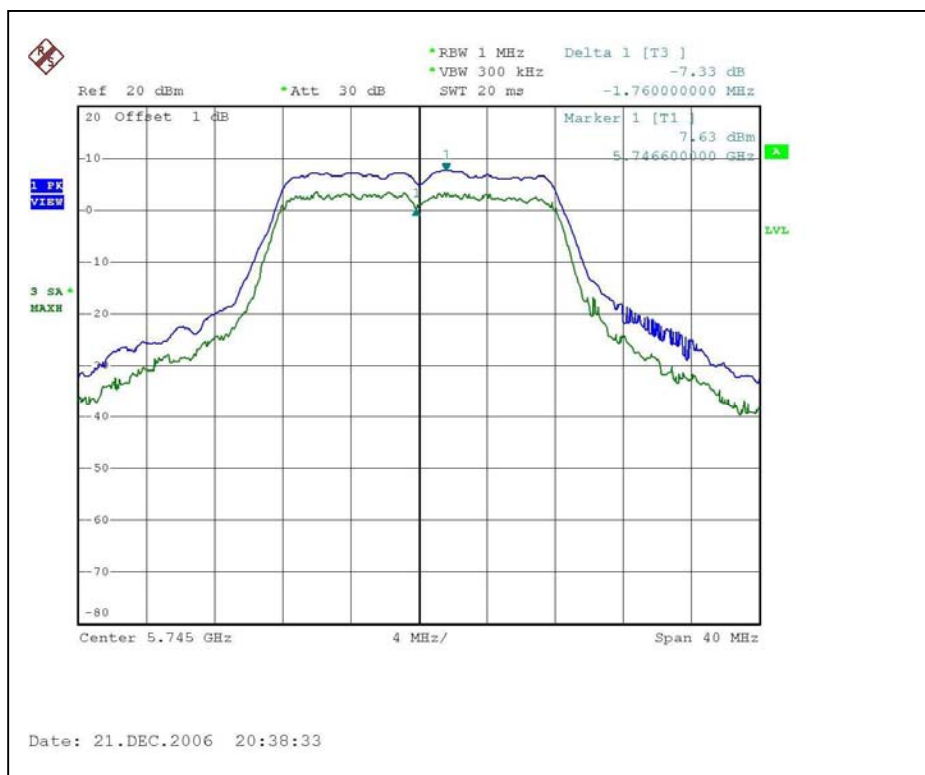
### CH1



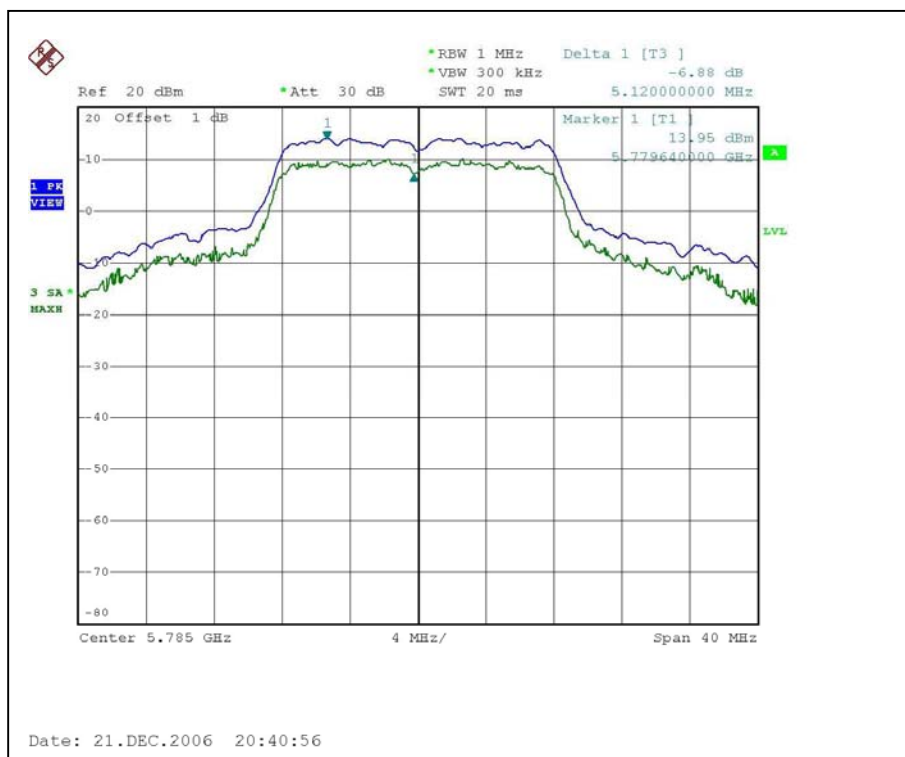
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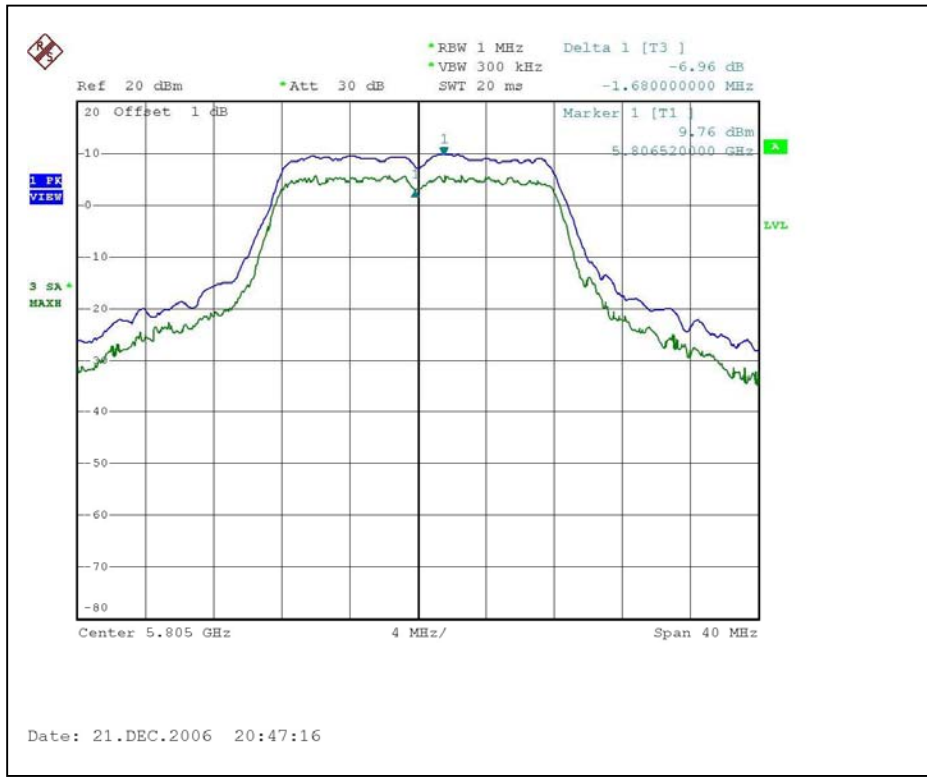
### CH5



### CH7



CH8





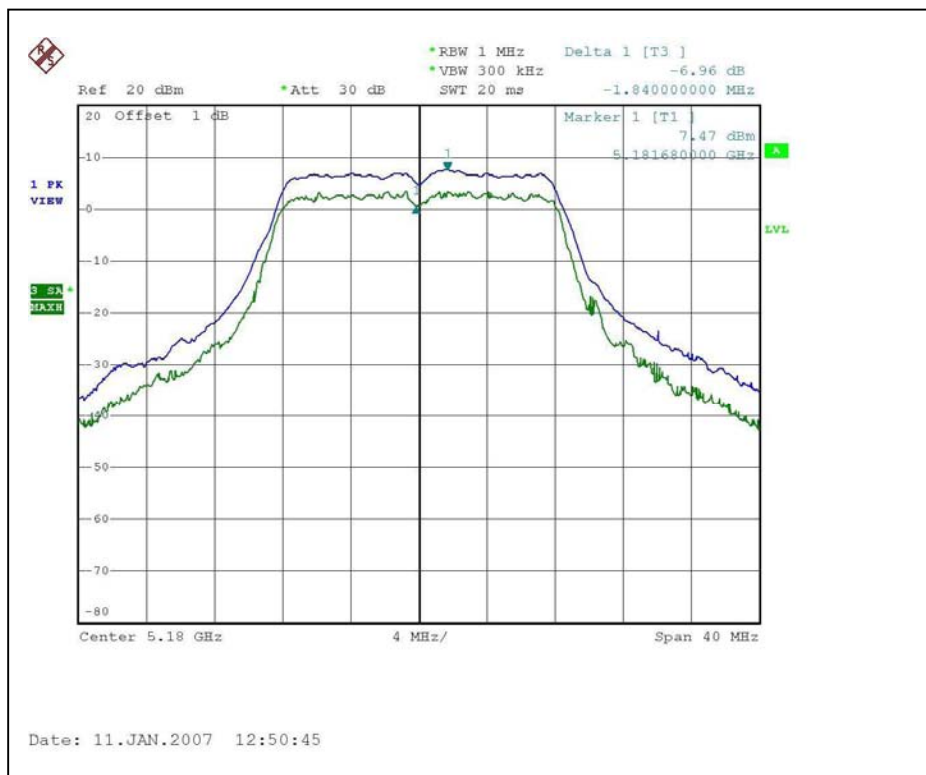
#### 4.4.10 TEST RESULTS (ANTENNA D)

##### 802.11a OFDM modulation

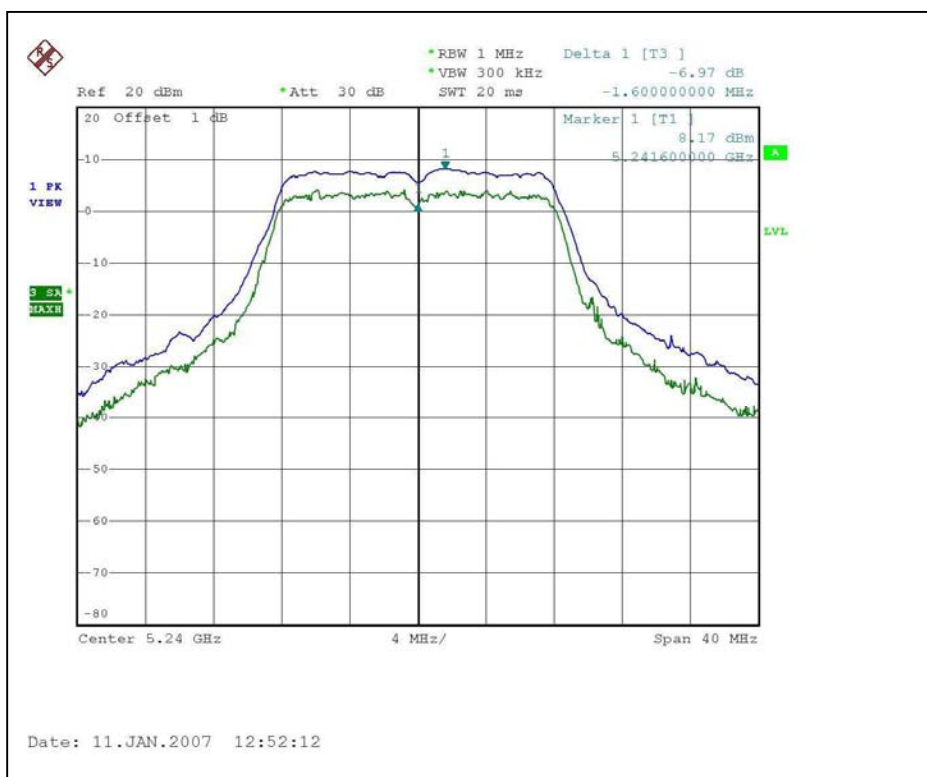
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 60%RH, 961hPa
<b>TESTED BY</b>	Rex Huang		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER EXCURSION (dB)</b>	<b>PEAK to AVERAGE EXCURSION LIMIT (dB)</b>	<b>PASS/FAIL</b>
1	5180	6.96	13	PASS
4	5240	6.97	13	PASS
5	5745	6.47	13	PASS
7	5785	6.88	13	PASS
8	5805	7.29	13	PASS

### CH1

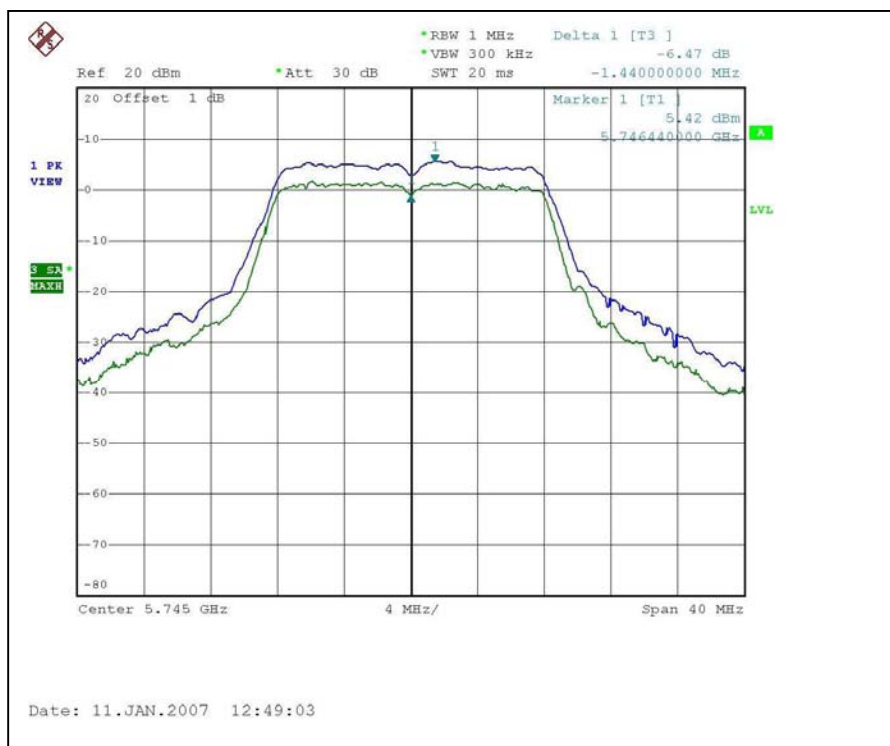


### CH4

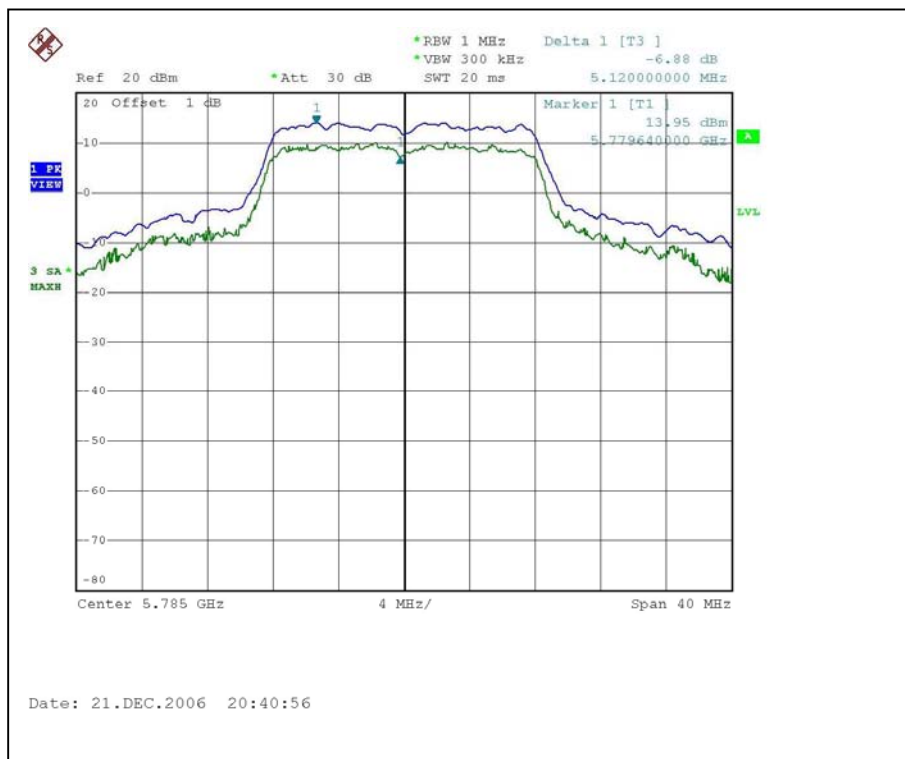




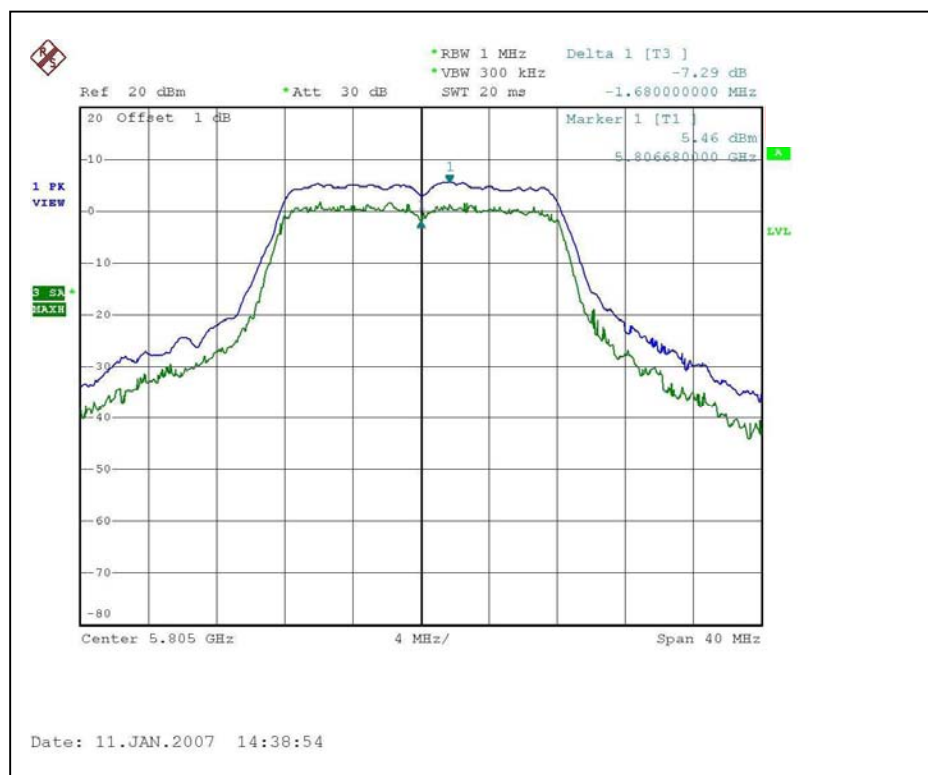
CH5



CH7



# CH8



## 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
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 07, 2007

**NOTE:**

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2.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 4.3.6

#### 4.5.7 TEST RESULTS (ANTENNA A)

##### 802.11a OFDM modulation

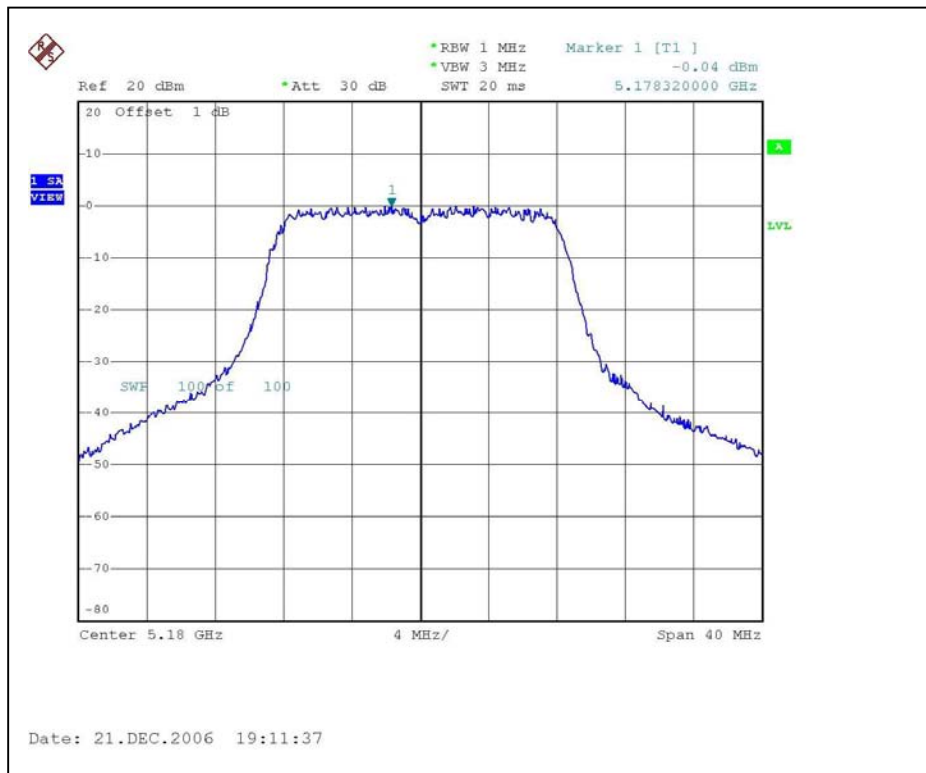
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 60%RH, 961hPa
<b>TESTED BY</b>	Rex Huang		

Antenna A (4.9GHz~5.25GHz) Gain : 7.0 dBi

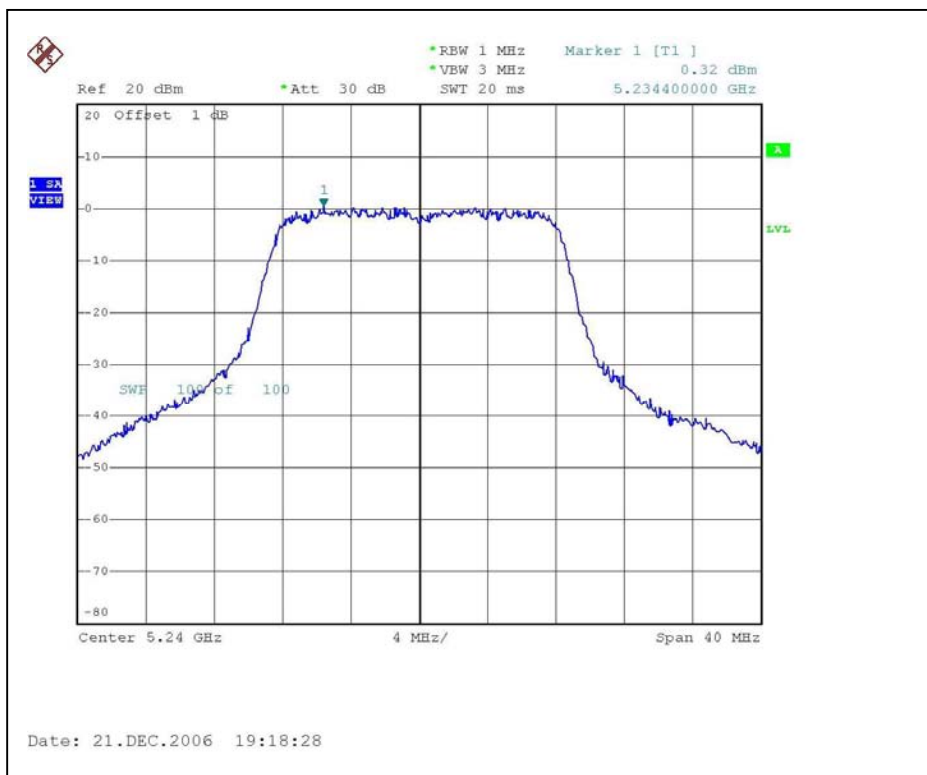
Antenna A (5.25GHz~5.9GHz) Gain : 10.7 dBi

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	-0.04	3	PASS
4	5240	0.32	3	PASS
5	5745	-1.43	12.3	PASS
7	5785	4.03	12.3	PASS
8	5805	-2.3	12.3	PASS

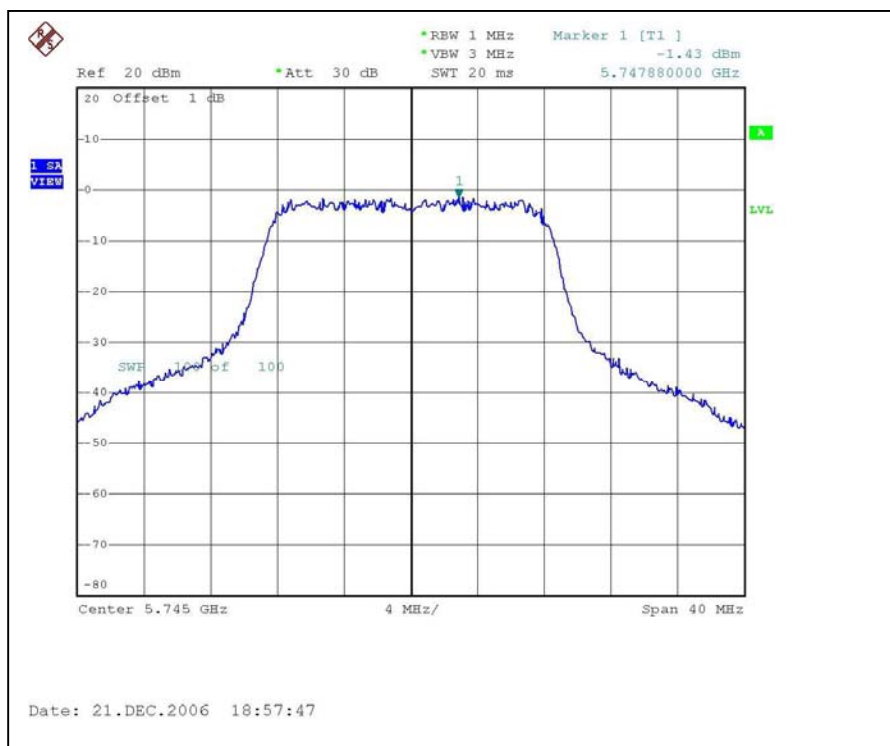
CH1



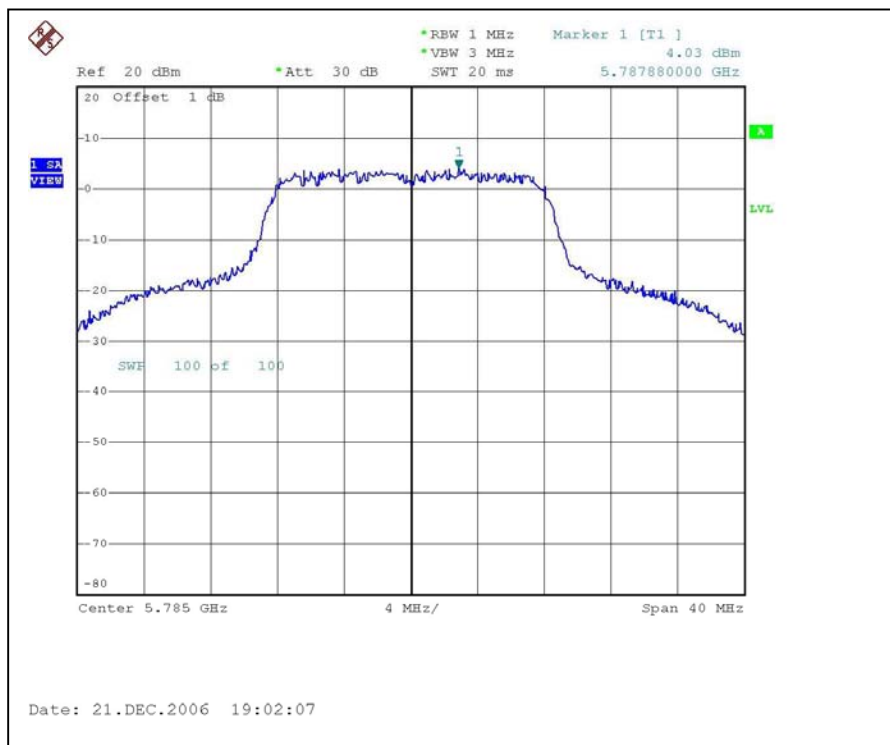
CH4



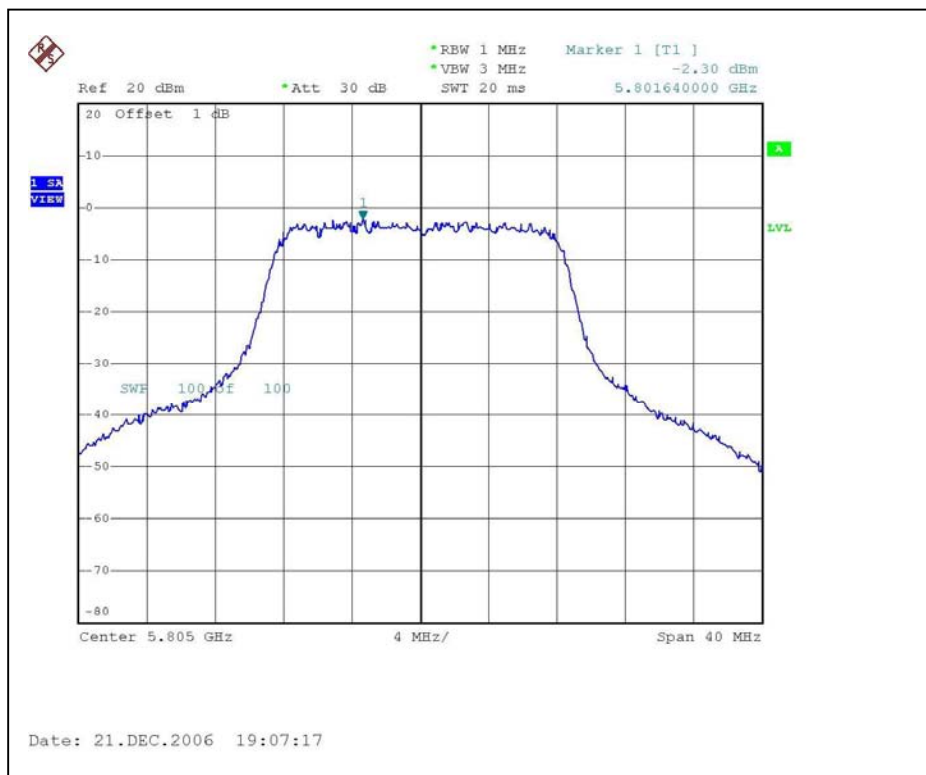
### CH5



### CH7



# CH8





#### 4.5.8 TEST RESULTS (ANTENNA B)

##### 802.11a OFDM modulation

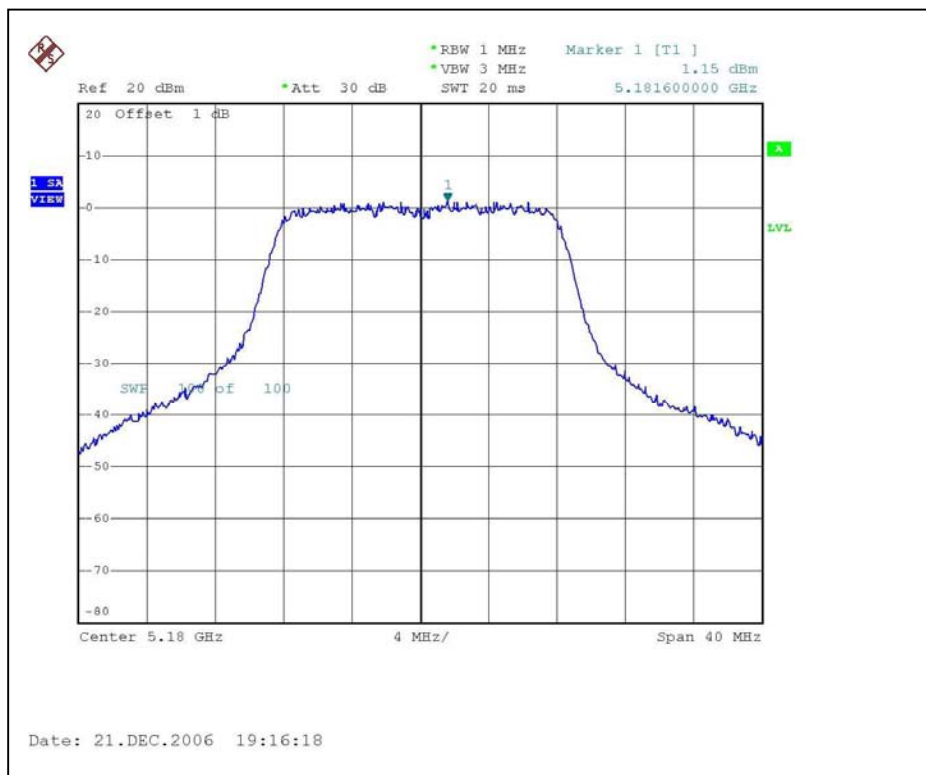
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 60%RH, 961hPa
<b>TESTED BY</b>	Rex Huang		

Antenna B (4.9GHz~5.25GHz) Gain : 5.0 dBi

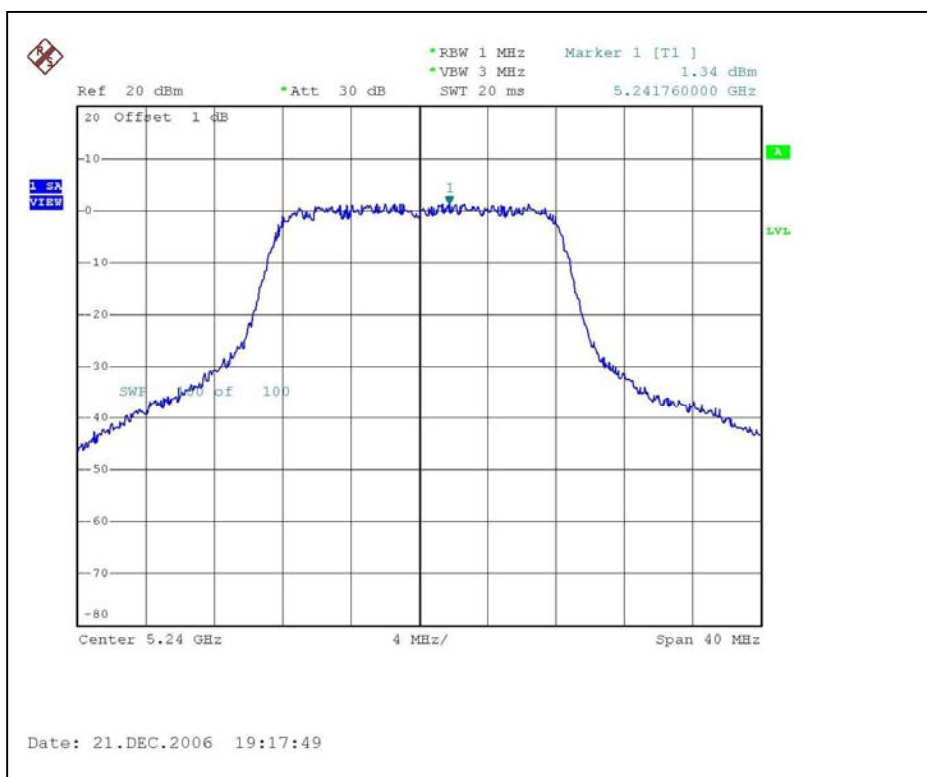
Antenna B (5.25GHz~5.9GHz) Gain : 7.5 dBi

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	1.15	4	PASS
4	5240	1.34	4	PASS
5	5745	-1.43	15.5	PASS
7	5785	4.03	15.5	PASS
8	5805	-1.13	15.5	PASS

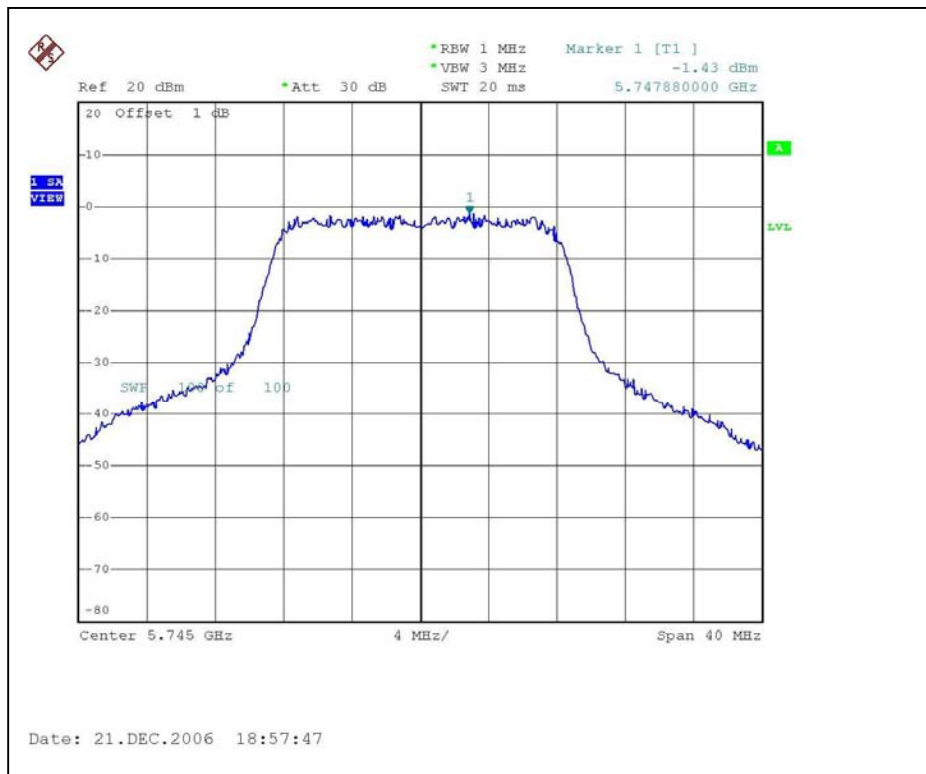
### CH1



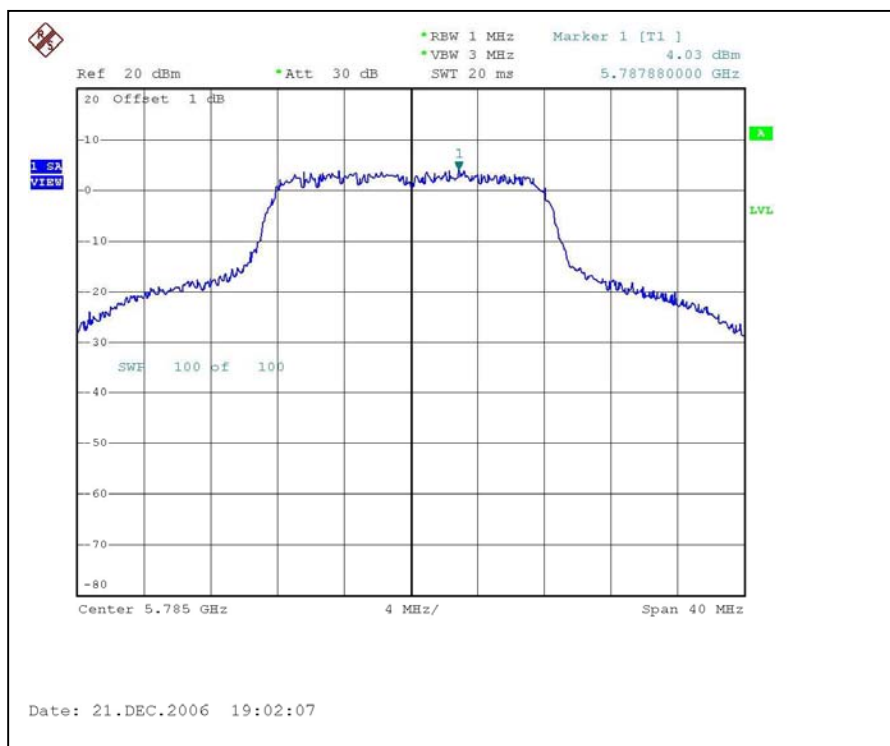
### CH4



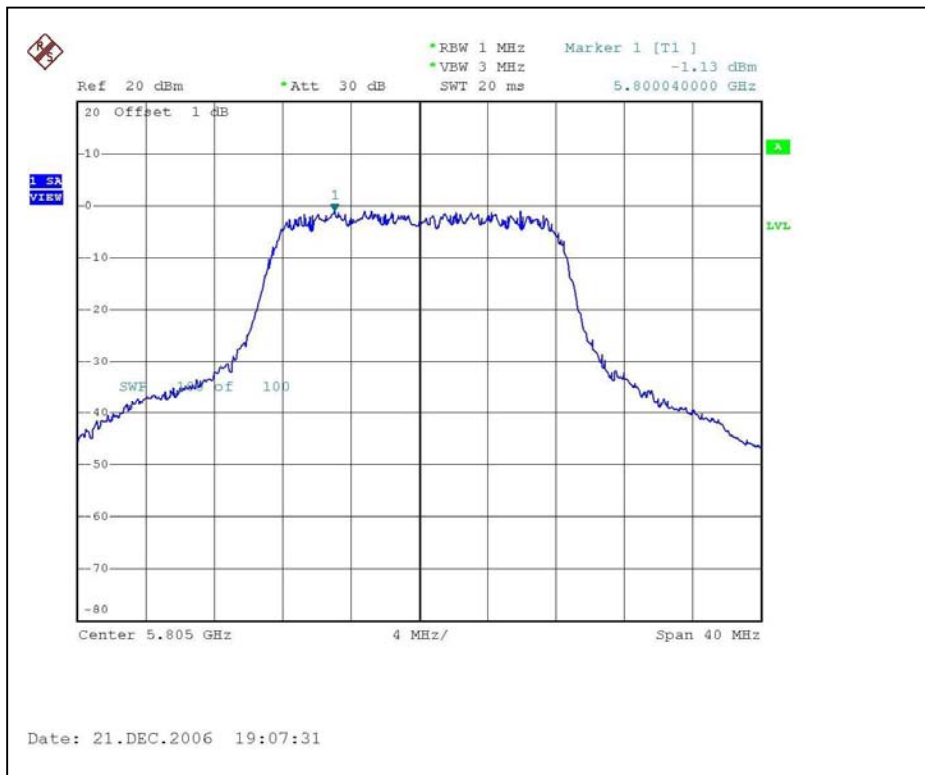
### CH5



### CH7



CH8



#### 4.5.9 TEST RESULTS (ANTENNA C)

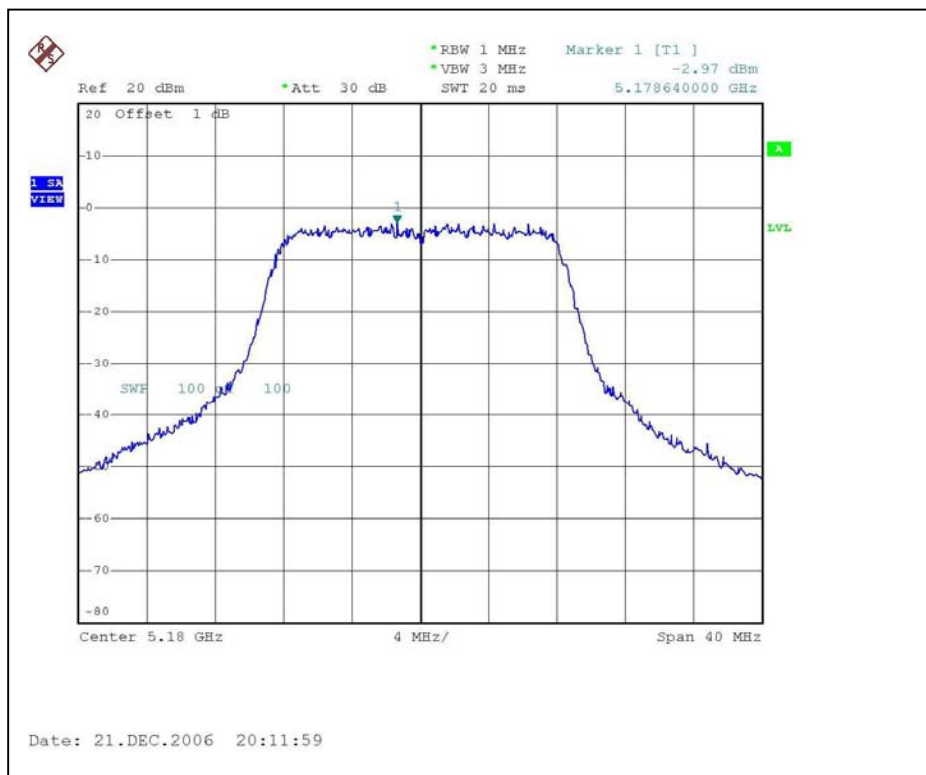
##### 802.11a OFDM modulation

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 60%RH, 961hPa
<b>TESTED BY</b>	Rex Huang		

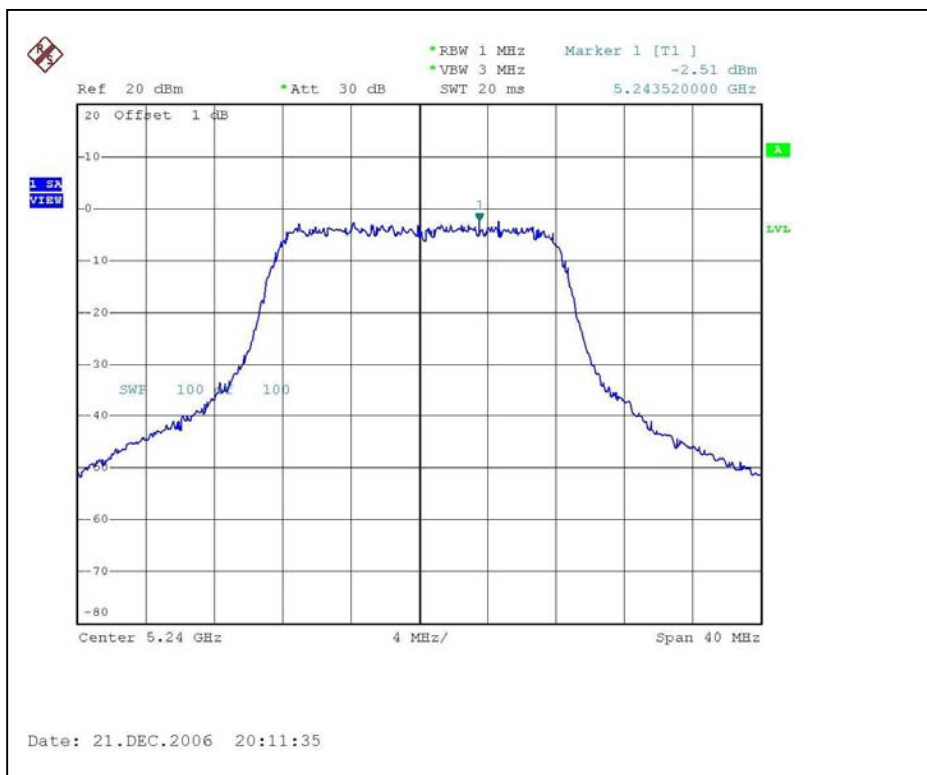
Antenna B Gain : 10 dBi

CHANNEL	CHANNEL FREQUENCY (MHz )	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	-2.97	0	PASS
4	5240	-2.51	0	PASS
5	5745	-2.31	13	PASS
7	5785	4.03	13	PASS
8	5805	-0.18	13	PASS

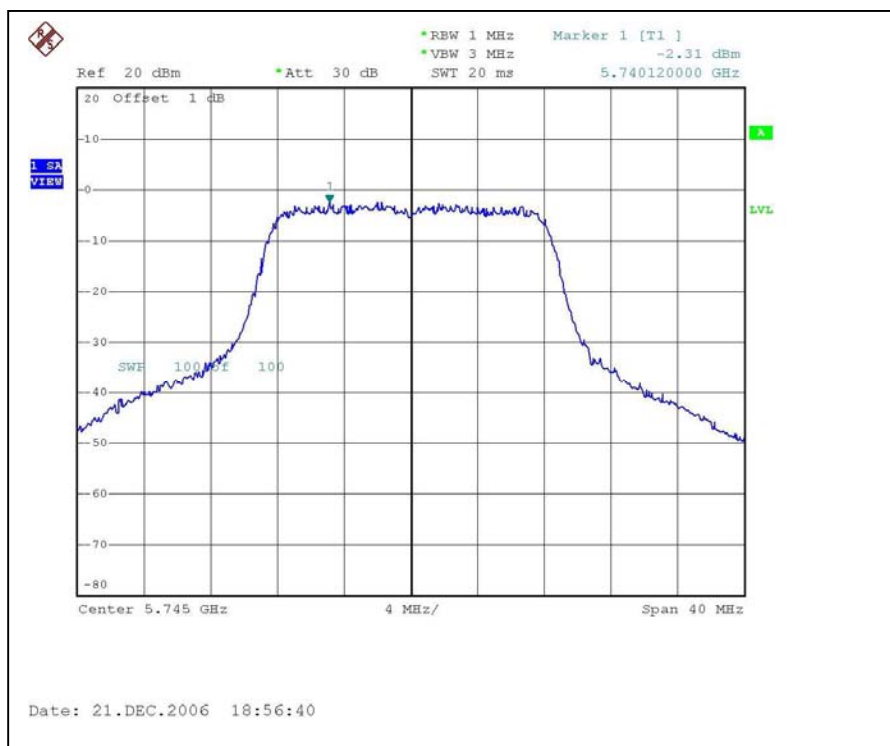
CH1



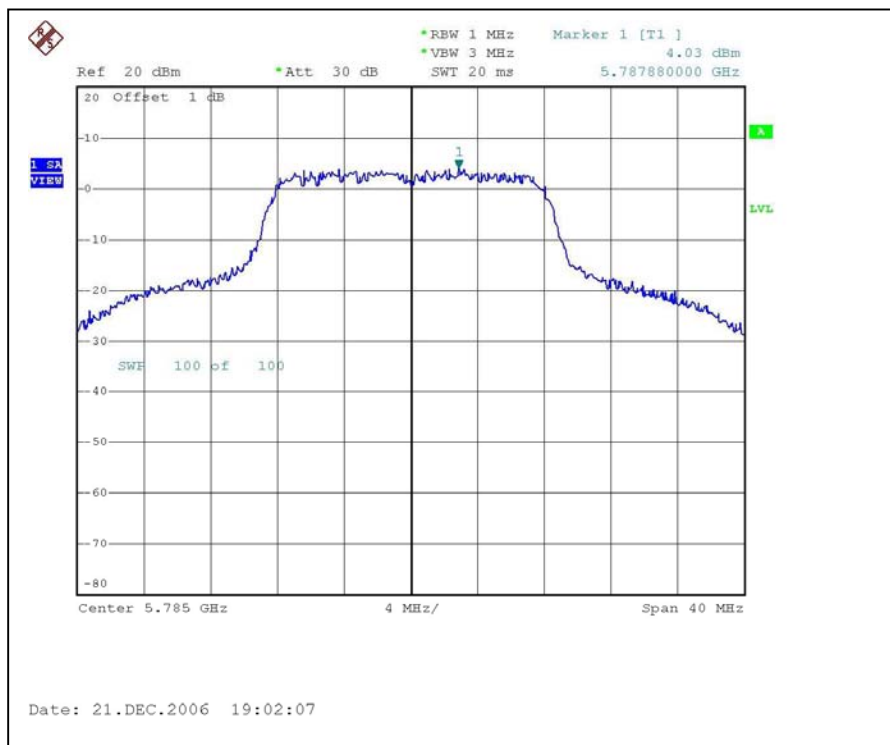
CH4



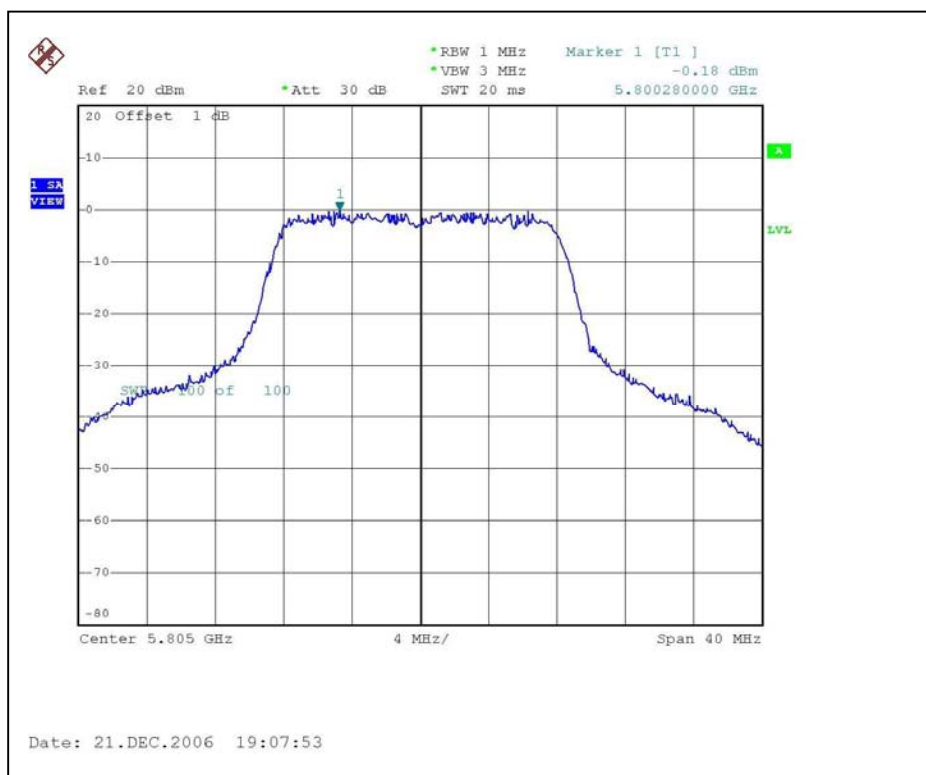
### CH5



### CH7



CH8





#### 4.5.10 TEST RESULTS (ANTENNA D)

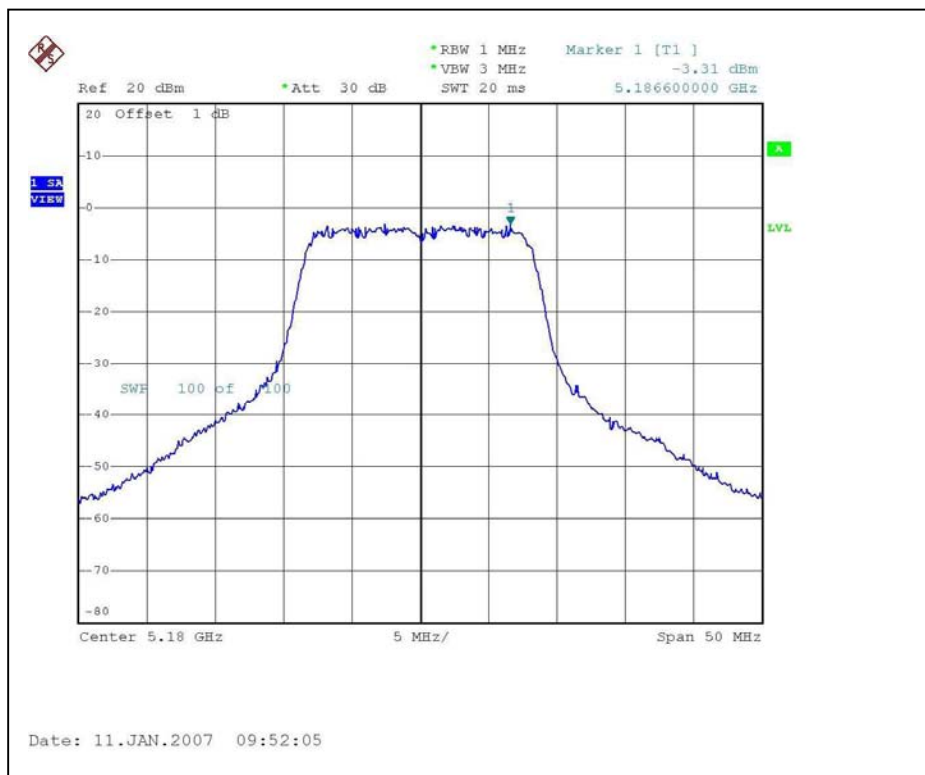
##### 802.11a OFDM modulation

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg.C, 60%RH, 961hPa
<b>TESTED BY</b>	Rex Huang		

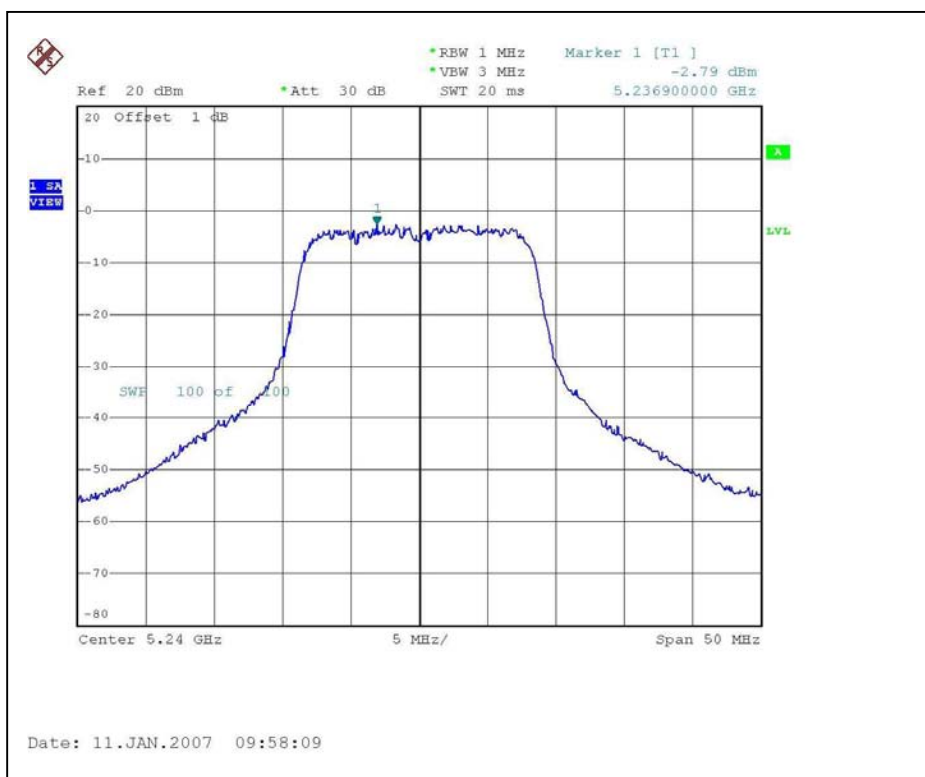
Antenna D Gain : 8 dBi

CHANNEL	CHANNEL FREQUENCY (MHz )	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	-3.31	2	PASS
4	5240	-2.79	2	PASS
5	5745	-5.14	15	PASS
7	5785	4.03	15	PASS
8	5805	-4.63	15	PASS

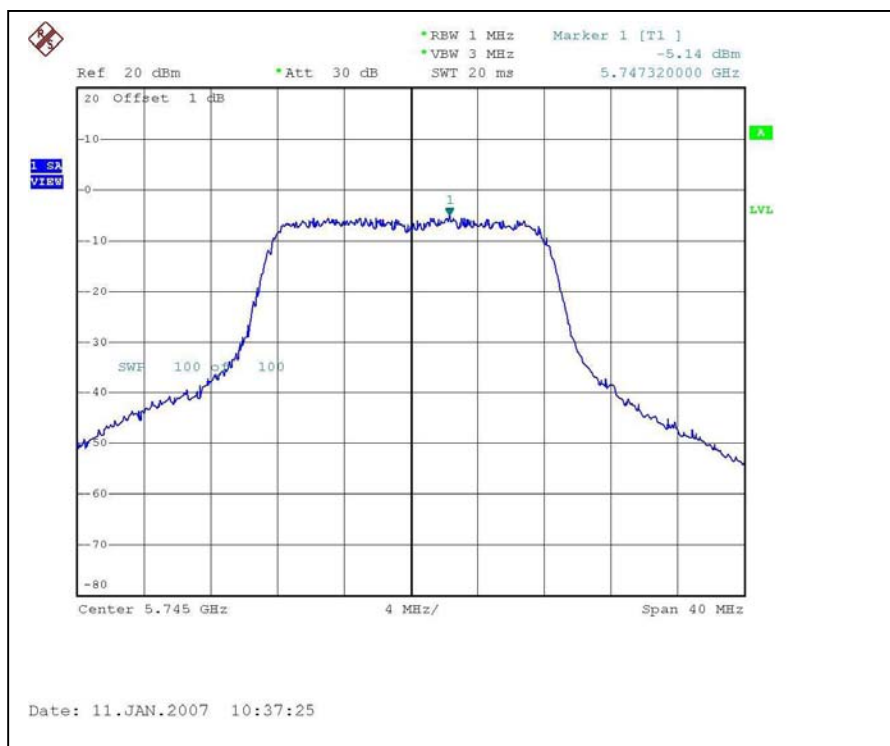
### CH1



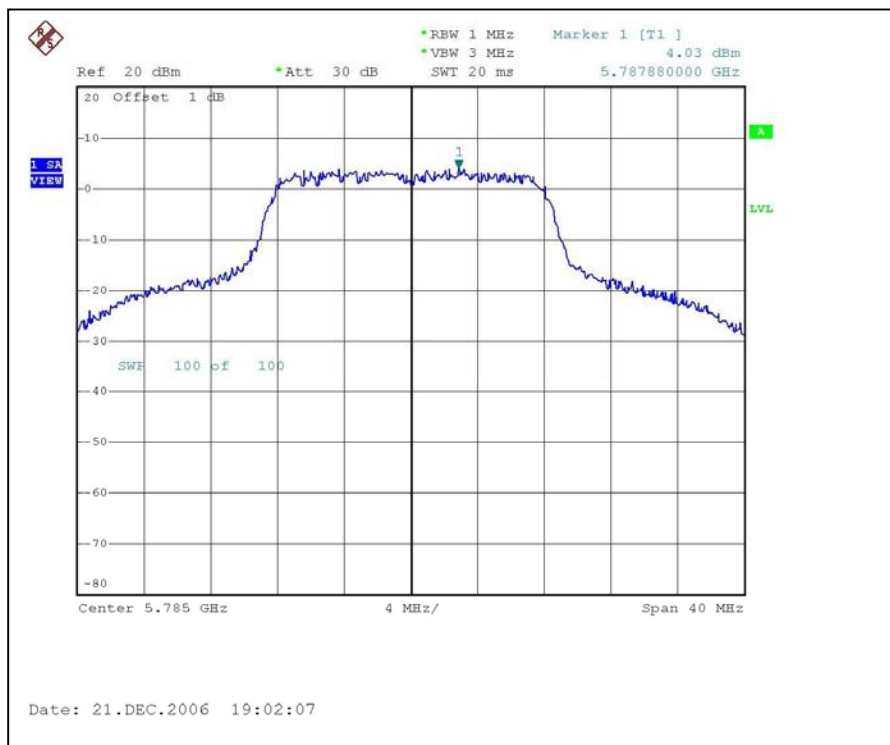
### CH4



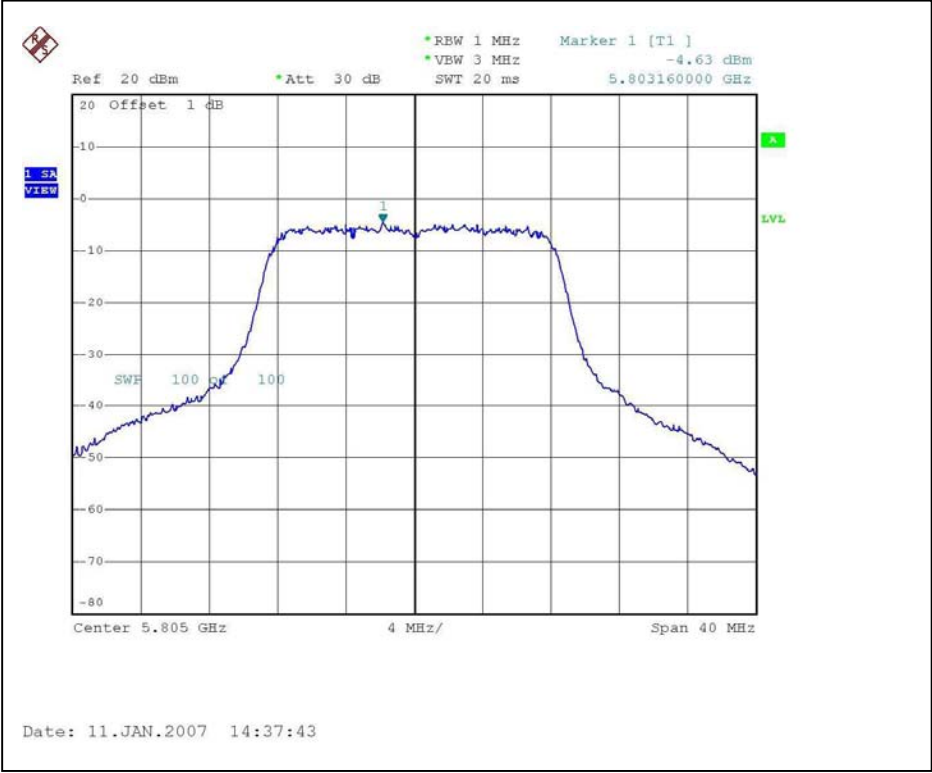
### CH5



### CH7



CH8



## 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
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 07, 2007

**NOTE:**

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

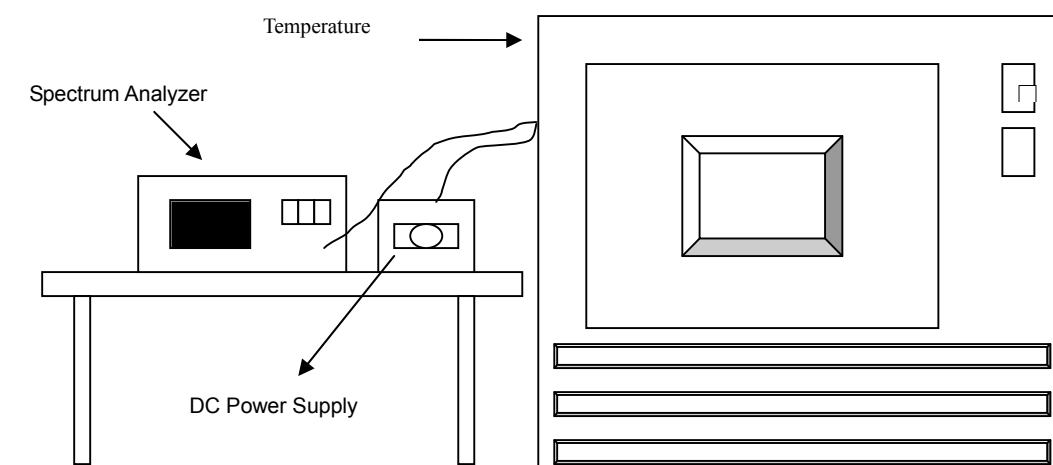
### 4.6.3 TEST PROCEDURE

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: 5240MHz				Limit : $\pm 0.02\%$	
Temp. (°C)	Power supply (VAC)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	126.5	5240.0082	0.000156	5240.0066	0.000126	5240.0059	0.000113
	110	5240.0062	0.000118	5240.0046	0.000088	5240.0036	0.000069
	93.5	5240.0060	0.000115	5240.0052	0.000099	5240.0040	0.000076
40	126.5	5240.0196	0.000374	5240.0214	0.000408	5240.0228	0.000435
	110	5240.0168	0.000321	5240.02	0.000382	5240.0212	0.000405
	93.5	5240.0176	0.000336	5240.0204	0.000389	5240.0208	0.000397
30	126.5	5240.028	0.000534	5240.0286	0.000546	5240.0290	0.000553
	110	5240.0308	0.000588	5240.029	0.000553	5240.0278	0.000531
	93.5	5240.0302	0.000576	5240.0288	0.000550	5240.0282	0.000538
20	126.5	5240.0148	0.000282	5240.0182	0.000347	5240.0201	0.000384
	110	5240.0198	0.000378	5240.0205	0.000391	5240.0187	0.000357
	93.5	5240.0152	0.000290	5240.0182	0.000347	5240.0195	0.000372
10	126.5	5240.0073	0.000139	5240.0086	0.000164	5240.0090	0.000172
	110	5240.0067	0.000128	5240.0076	0.000145	5240.0078	0.000149
	93.5	5240.007	0.000134	5240.0082	0.000156	5240.0086	0.000164
0	126.5	5239.9858	0.000271	5239.9850	0.000286	5239.9826	0.000332
	110	5239.9866	0.000256	5239.9850	0.000286	5239.9836	0.000313
	93.5	5239.9897	0.000197	5239.9888	0.000214	5239.9870	0.000248
-10	126.5	5240.0069	0.000132	5240.0075	0.000143	5240.0082	0.000156
	110	5240.0067	0.000128	5240.0076	0.000145	5240.0080	0.000153
	93.5	5240.0102	0.000195	5240.0095	0.000181	5240.0088	0.000168
-20	126.5	5240.0241	0.000460	5240.0263	0.000502	5240.0272	0.000519
	110	5240.0256	0.000489	5240.0265	0.000506	5240.0272	0.000519
	93.5	5240.0232	0.000443	5240.0244	0.000466	5240.0248	0.000473
-30	126.5	5239.9878	0.000233	5239.989	0.000210	5239.9896	0.000198
	110	5239.9892	0.000206	5239.99	0.000191	5239.9908	0.000176
	93.5	5239.991	0.000172	5239.9895	0.000200	5239.9890	0.000210