

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
5.47 – 5.725GHz	13dB
5.725 – 5.825 GHz	13dB

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ADVANTEST SPECTRUM ANALYZER	U3772	160100280	April 10, 2008

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

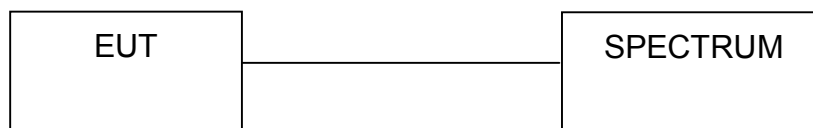
4.4.3 TEST PROCEDURE

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.



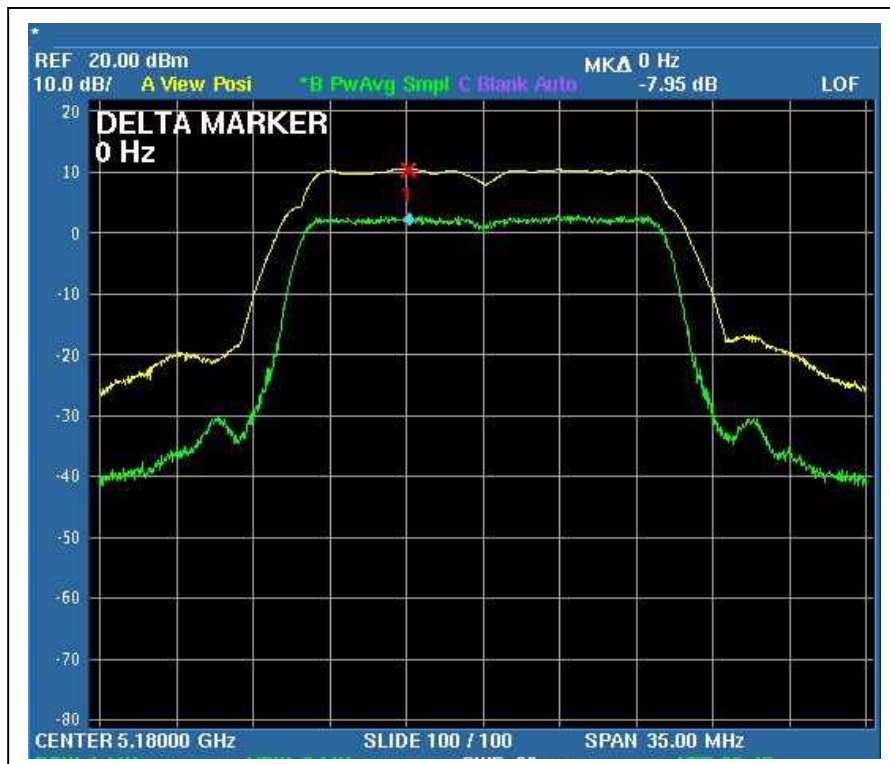
4.4.7 TEST RESULTS

802.11a OFDM modulation

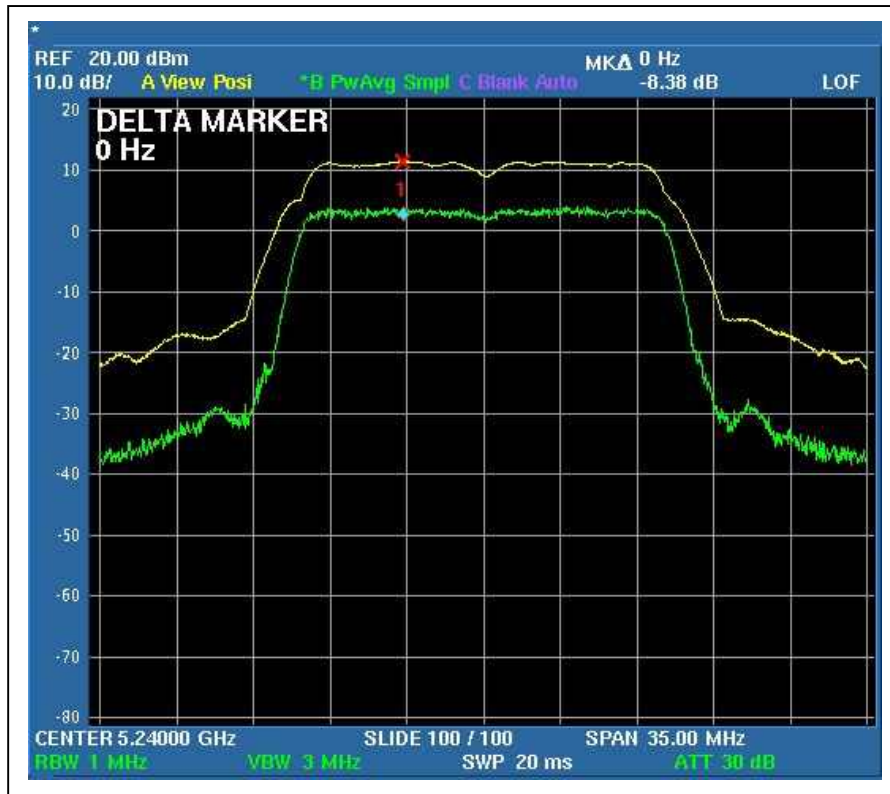
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 972hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5180	7.95	13	PASS
4	5240	8.38	13	PASS
5	5260	8.90	13	PASS
8	5320	8.10	13	PASS
9	5500	8.30	13	PASS
14	5600	8.22	13	PASS
19	5700	8.35	13	PASS

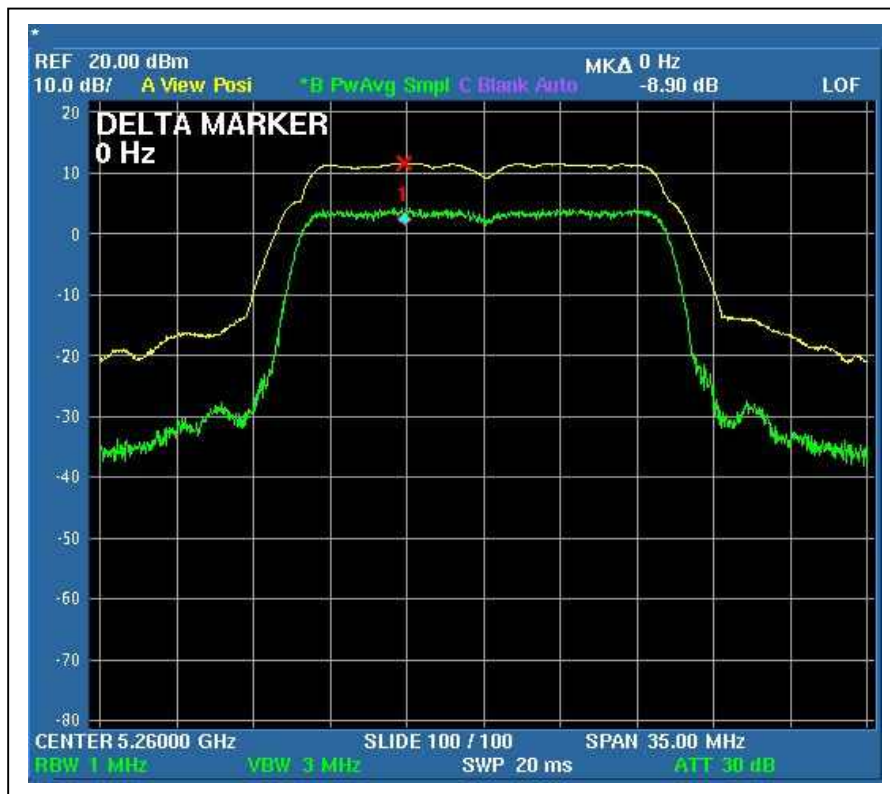
CH1



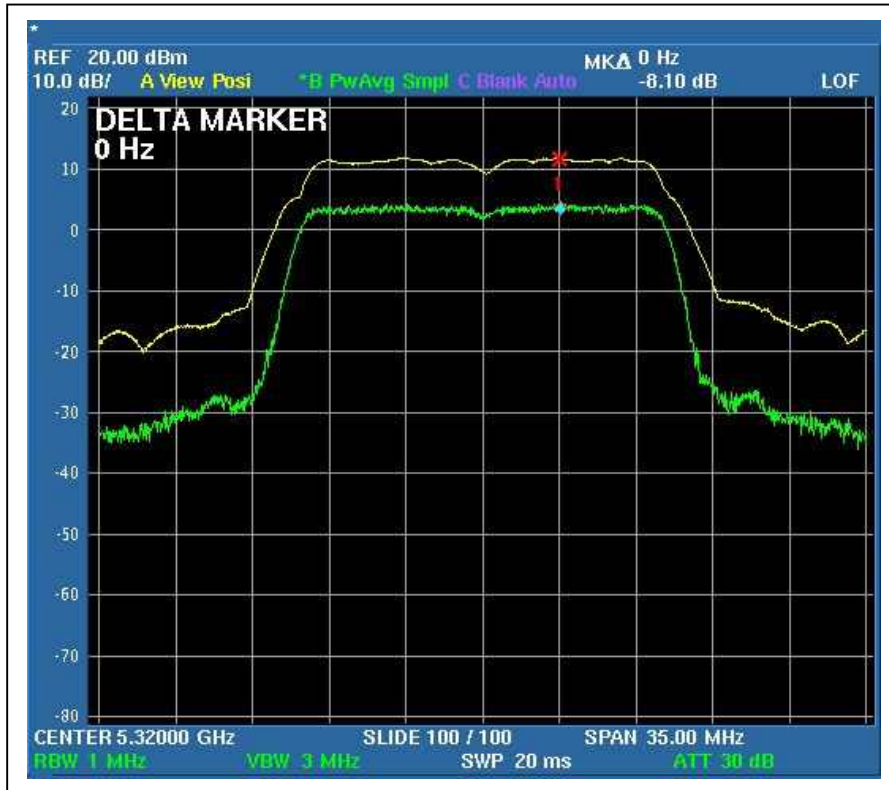
CH4



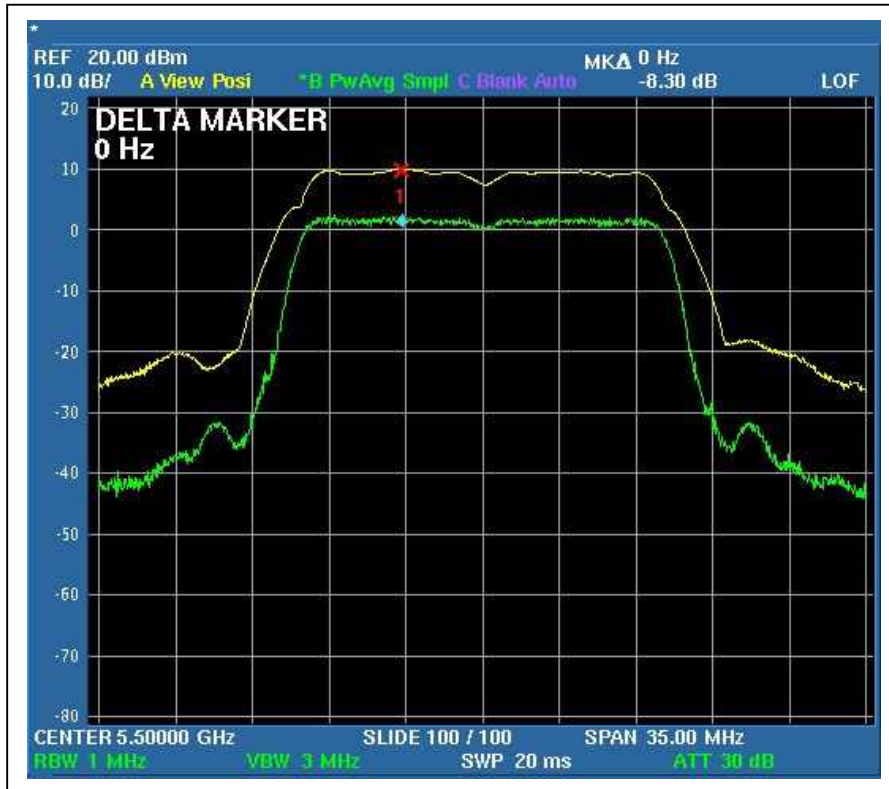
CH5



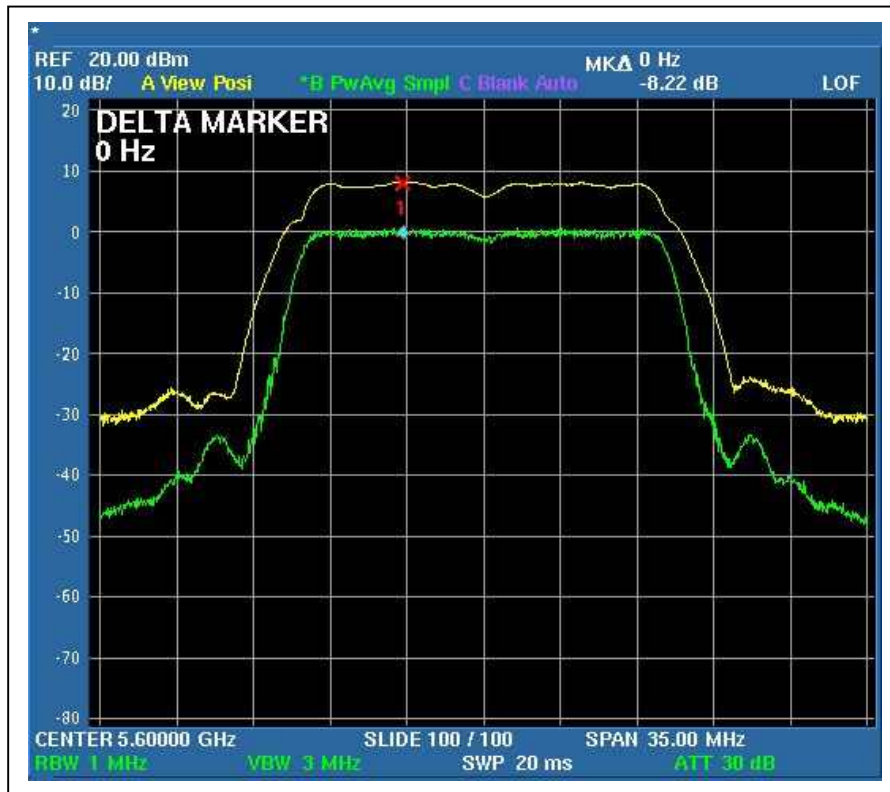
CH8



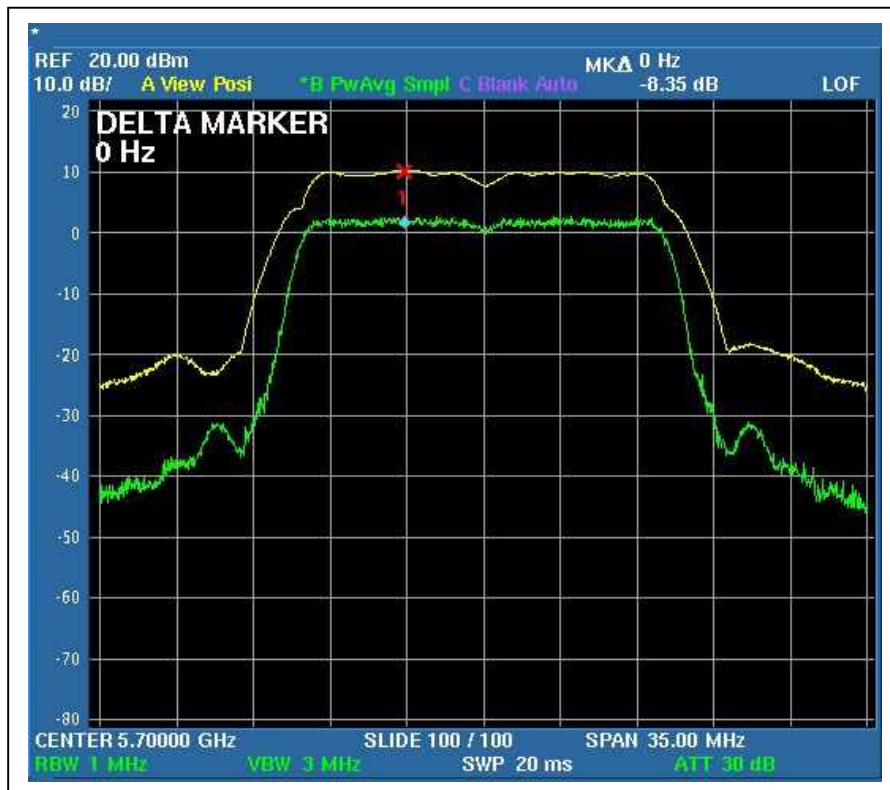
CH9



CH14



CH19



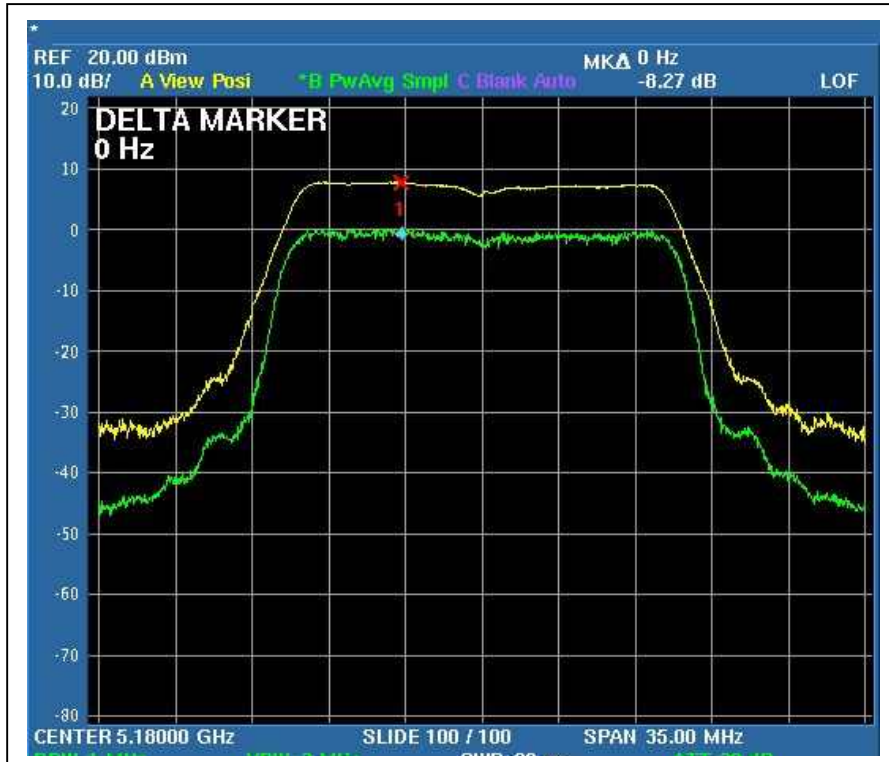


DRAFT 802.11n (20MHz) OFDM MODULATION:

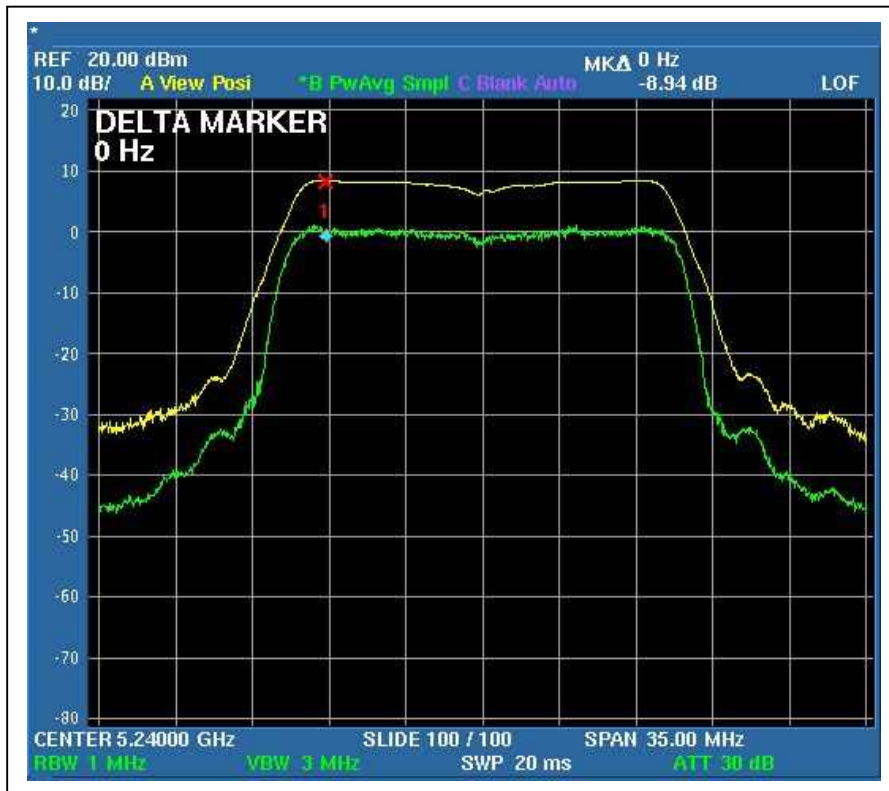
MODULATION TYPE	BPSK	TRANSFER RATE	13Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 972hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)		PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
		Chain (0)	Chain(1)		
1	5180	8.27	8.07	13	PASS
4	5240	8.94	8.75	13	PASS
5	5260	7.87	8.15	13	PASS
8	5320	8.21	8.50	13	PASS
9	5500	8.65	8.40	13	PASS
14	5600	8.96	8.91	13	PASS
19	5700	9.11	8.87	13	PASS
1	5180	8.27	8.07	13	PASS

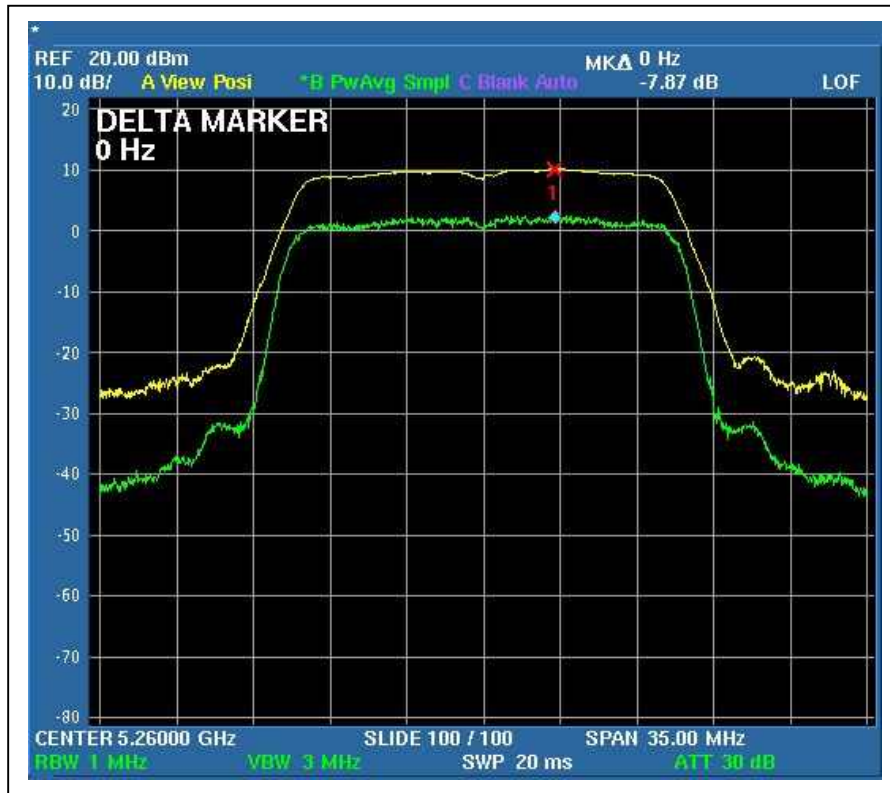
For Chain (0) : CH1



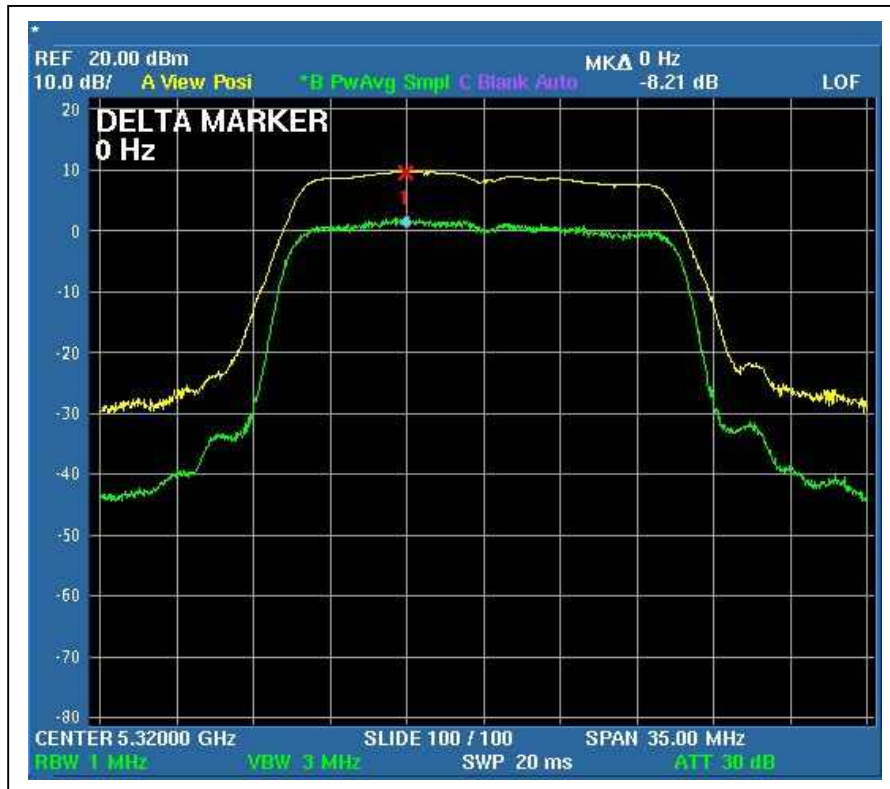
CH4



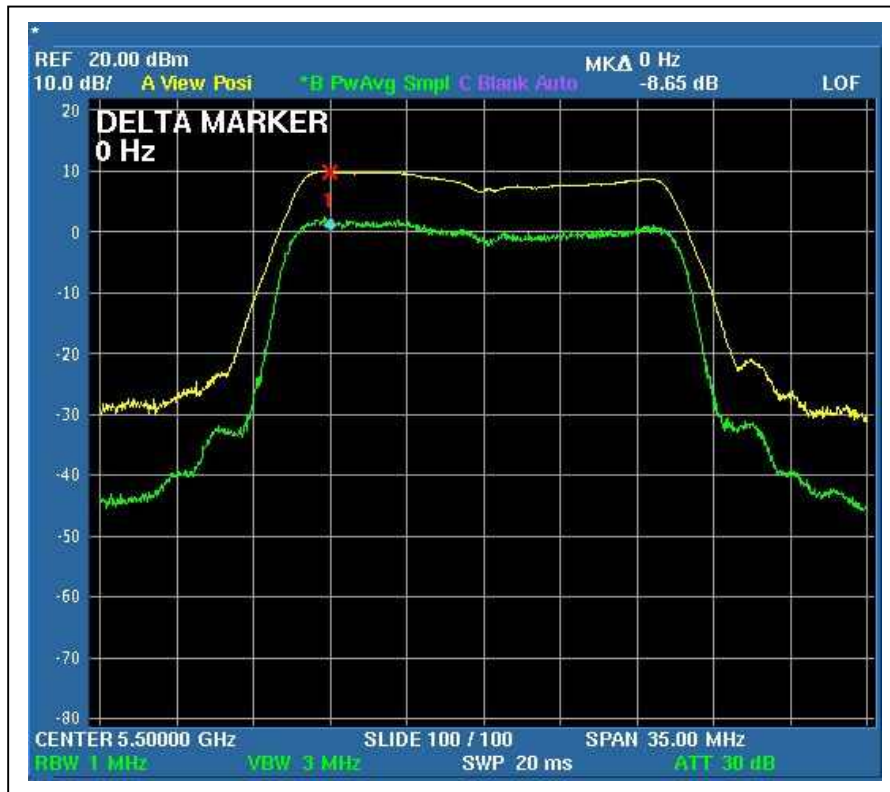
CH5



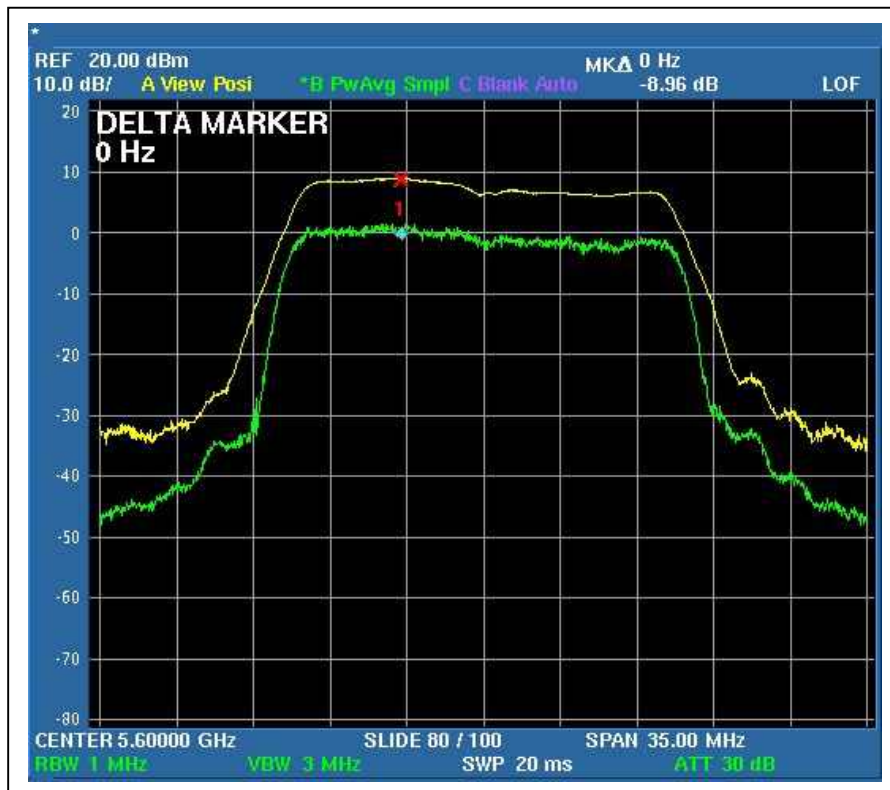
CH8



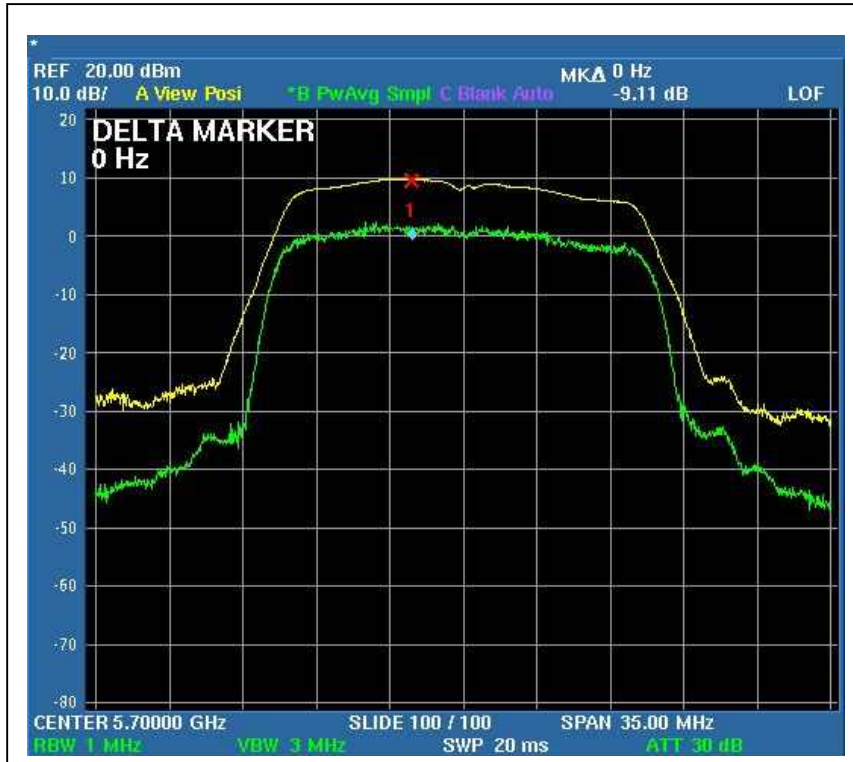
CH9



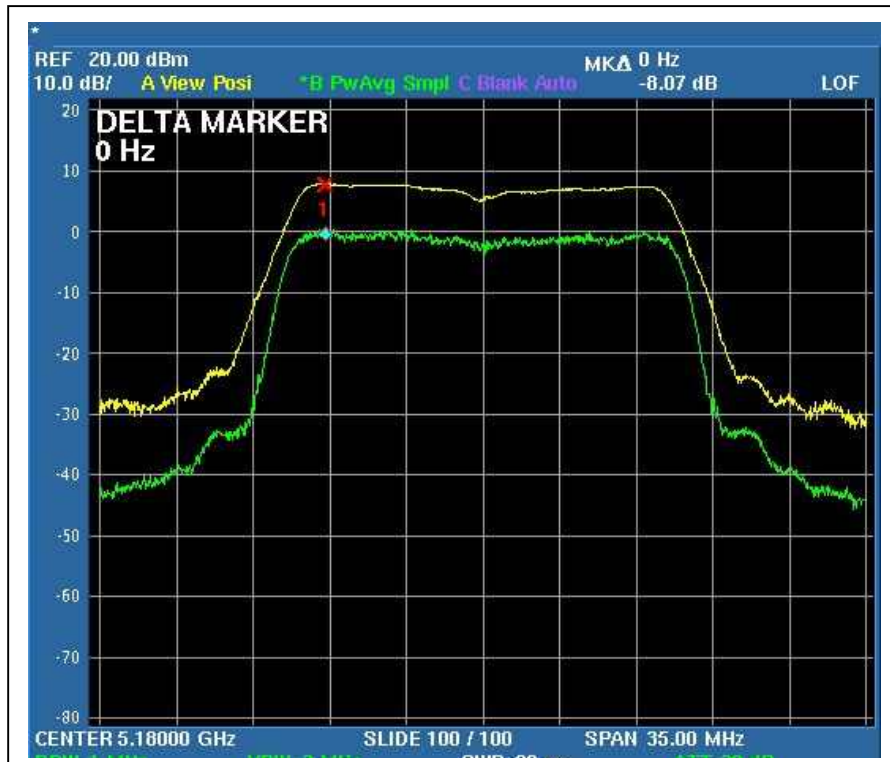
CH14



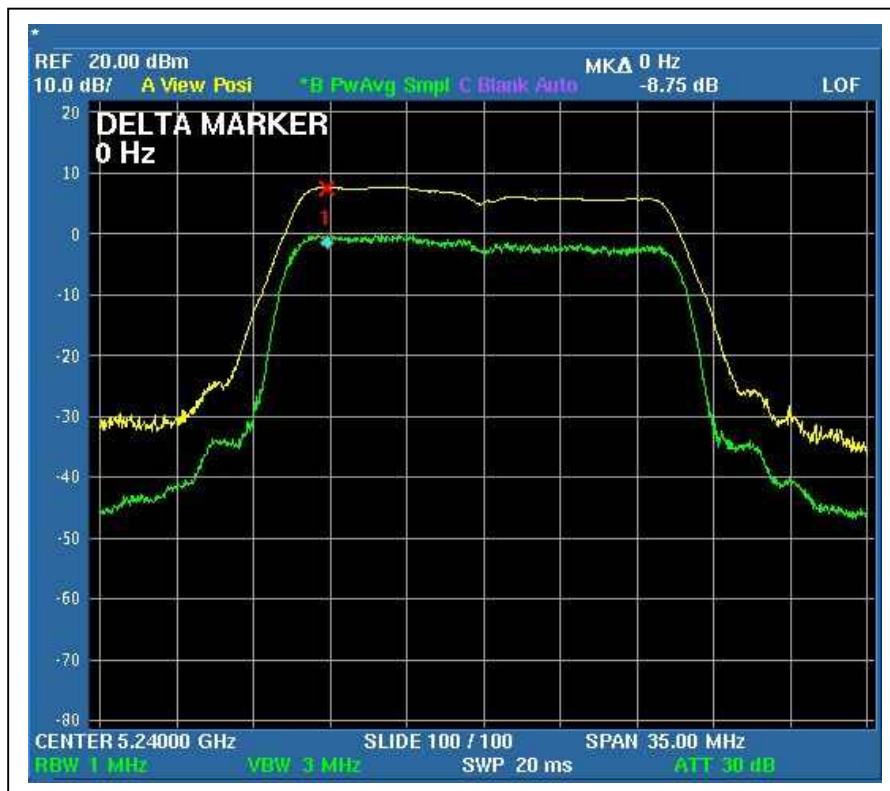
CH19



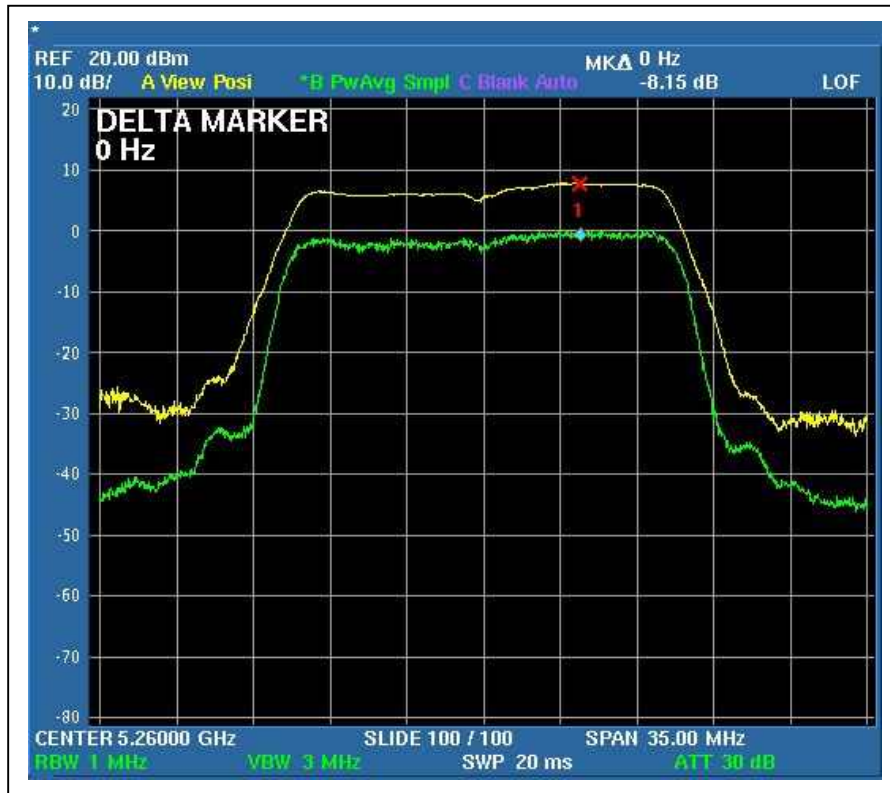
For Chain (1) : CH1



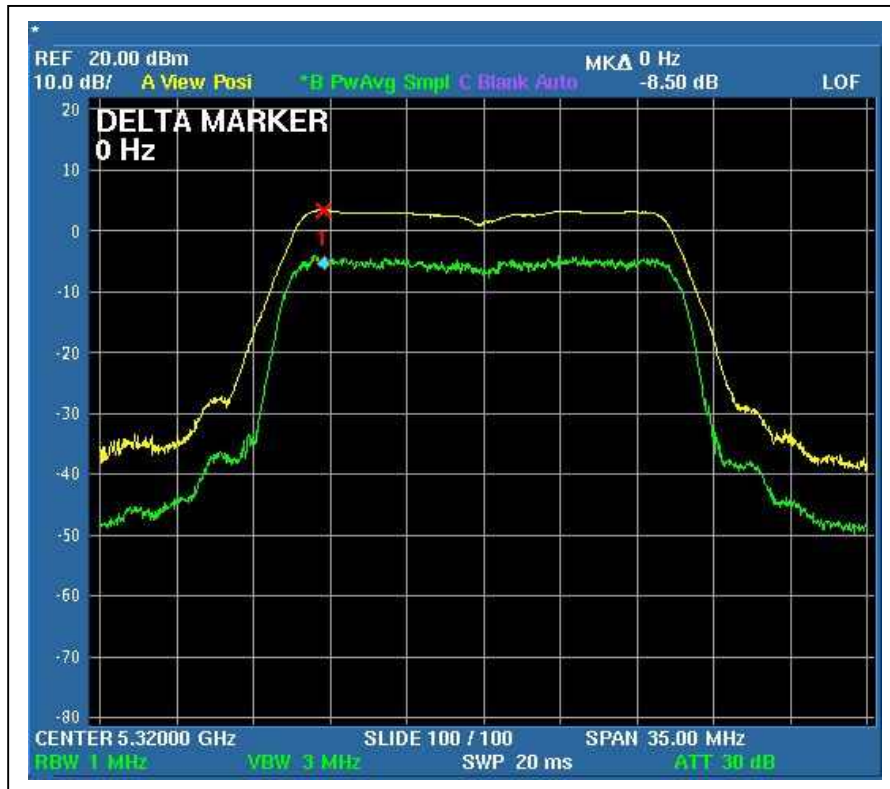
CH4



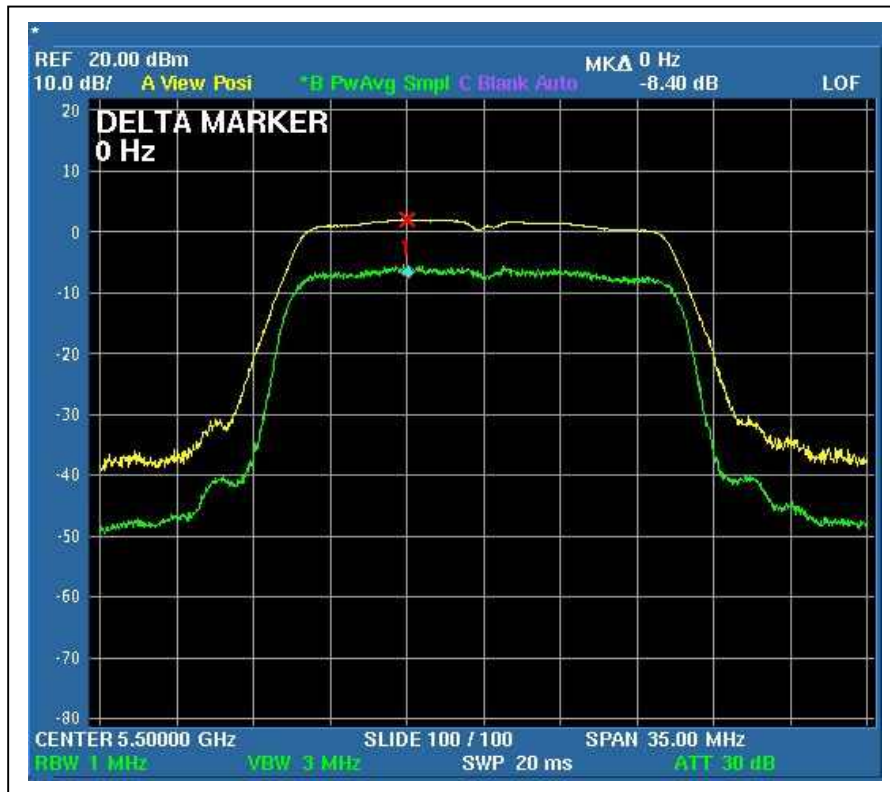
CH5



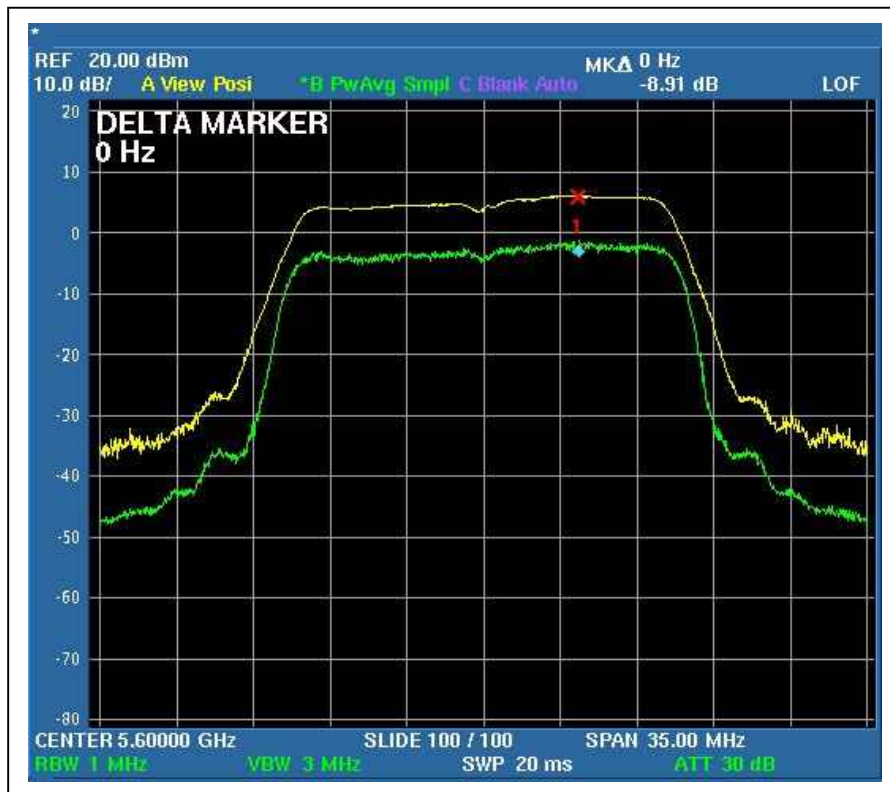
CH8



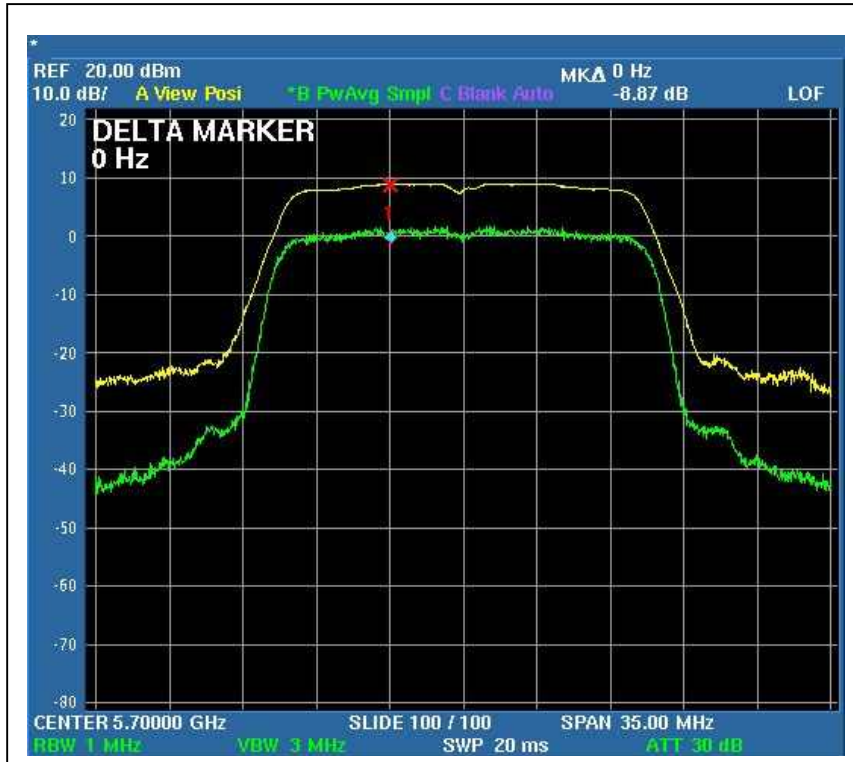
CH9



CH14



CH19





DRAFT 802.11n (40MHz) OFDM MODULATION:

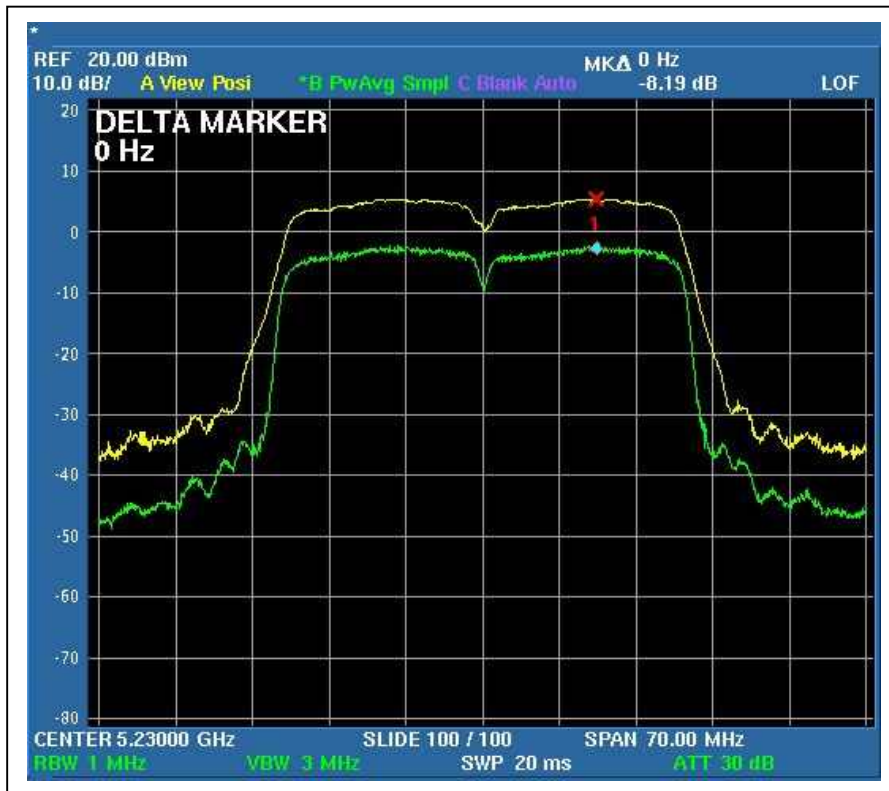
MODULATION TYPE	BPSK	TRANSFER RATE	27Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 972hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)		PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
		Chain (0)	Chain(1)		
1	5190	8.27	8.31	13	PASS
2	5230	8.19	8.35	13	PASS
3	5270	8.74	8.38	13	PASS
4	5310	8.54	8.87	13	PASS
5	5510	8.16	8.25	13	PASS
7	5590	8.05	7.54	13	PASS
9	5670	8.42	9.19	13	PASS

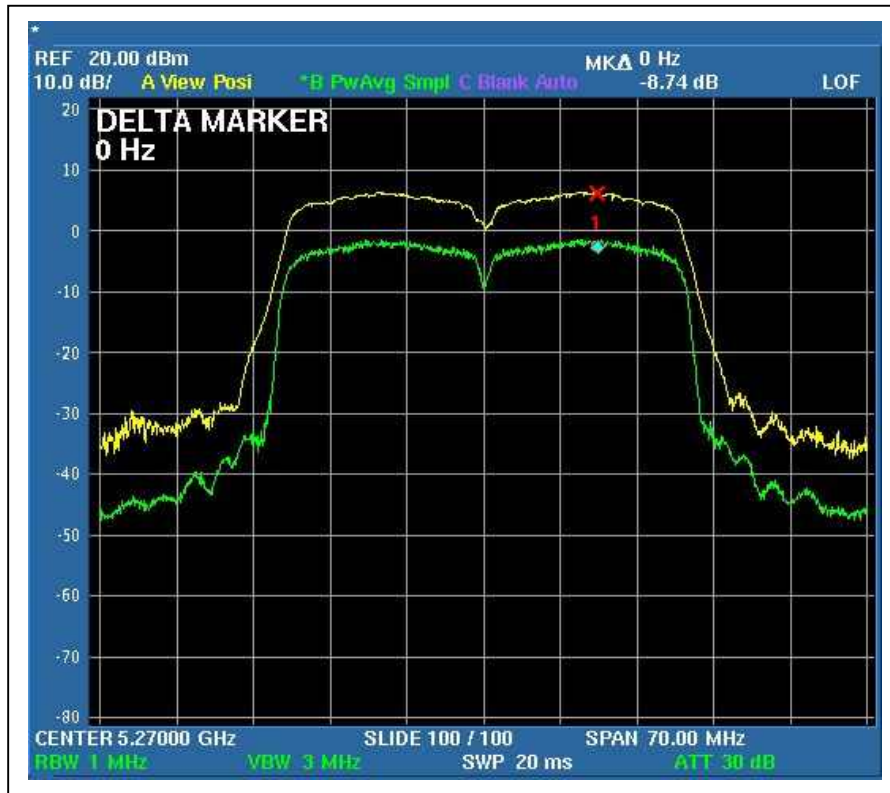
For Chain (0) : CH1



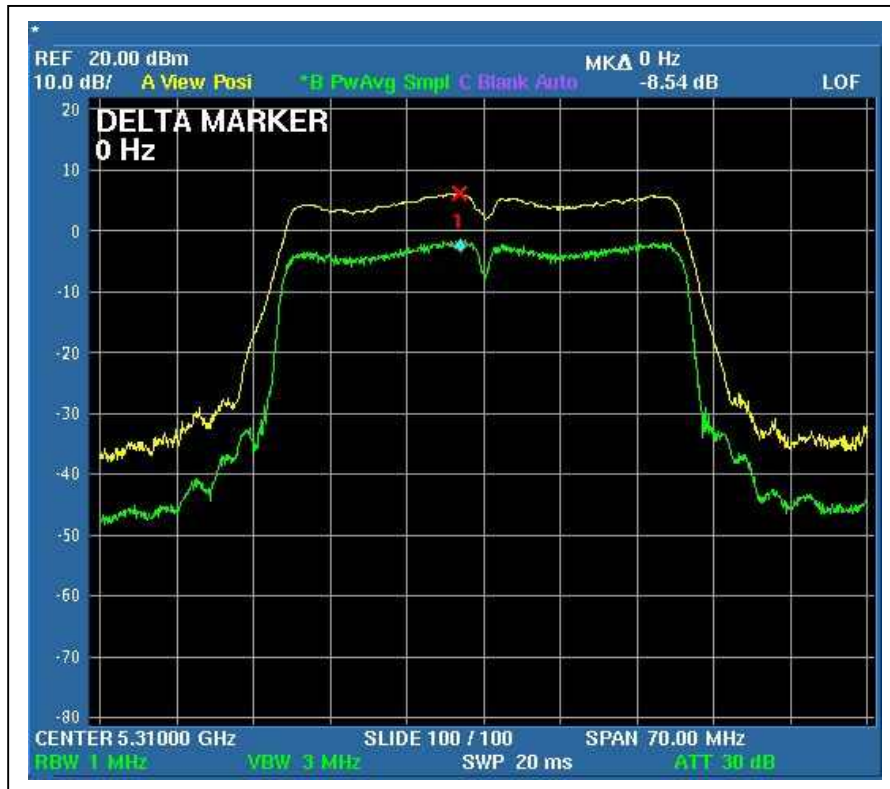
CH2



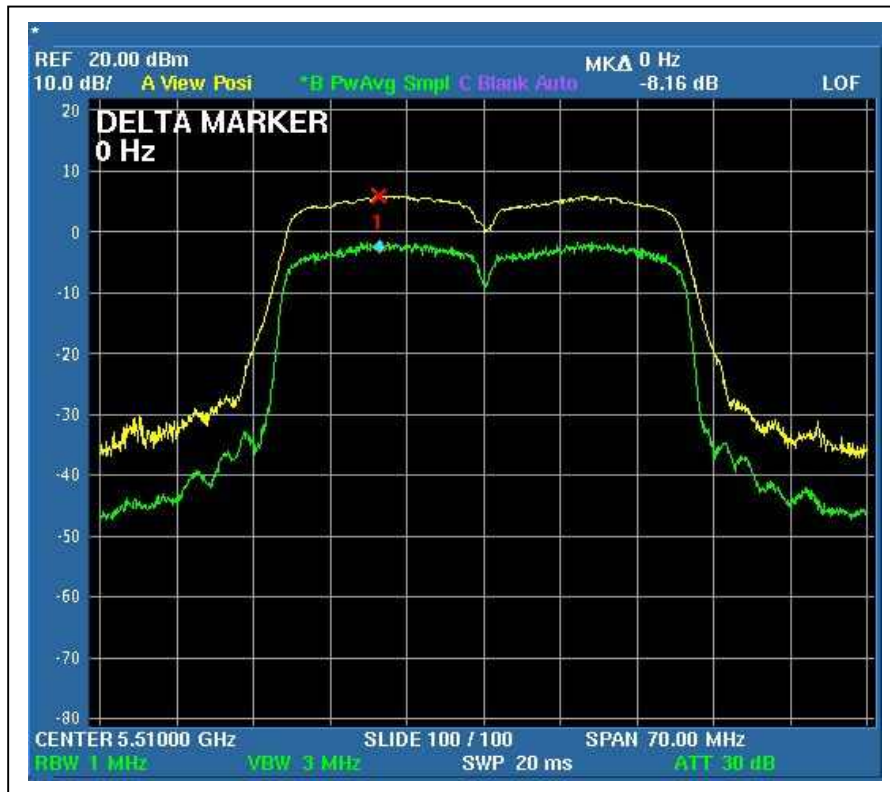
CH3



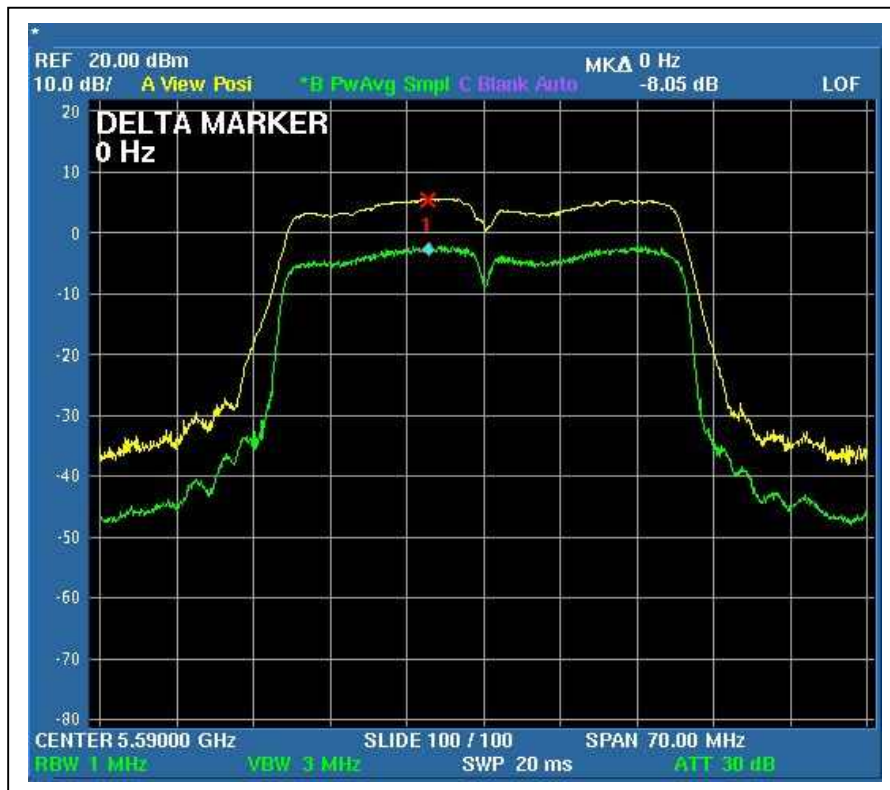
CH4



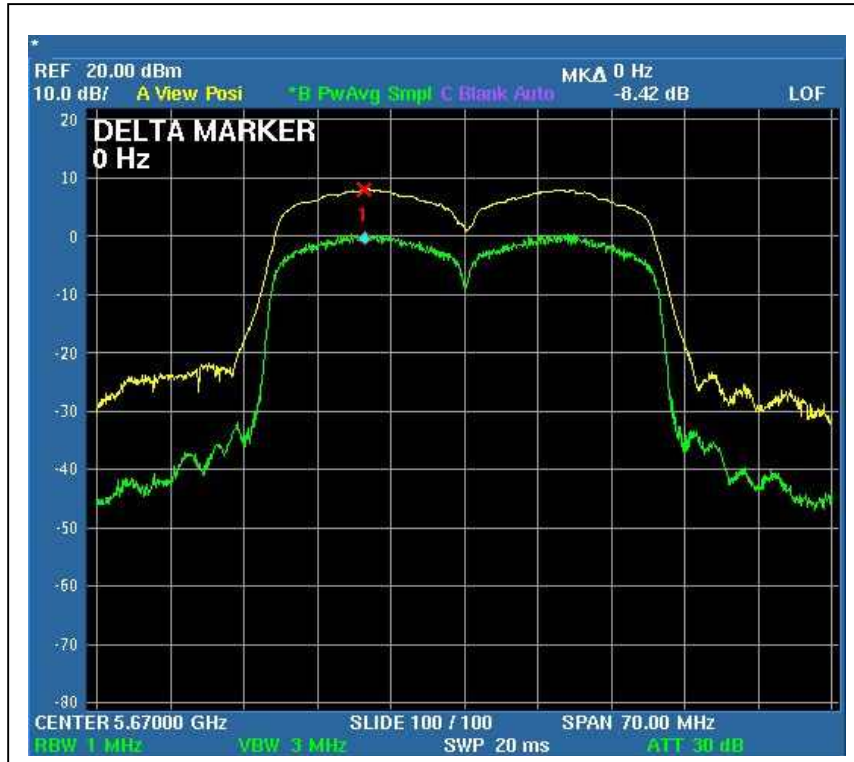
CH5



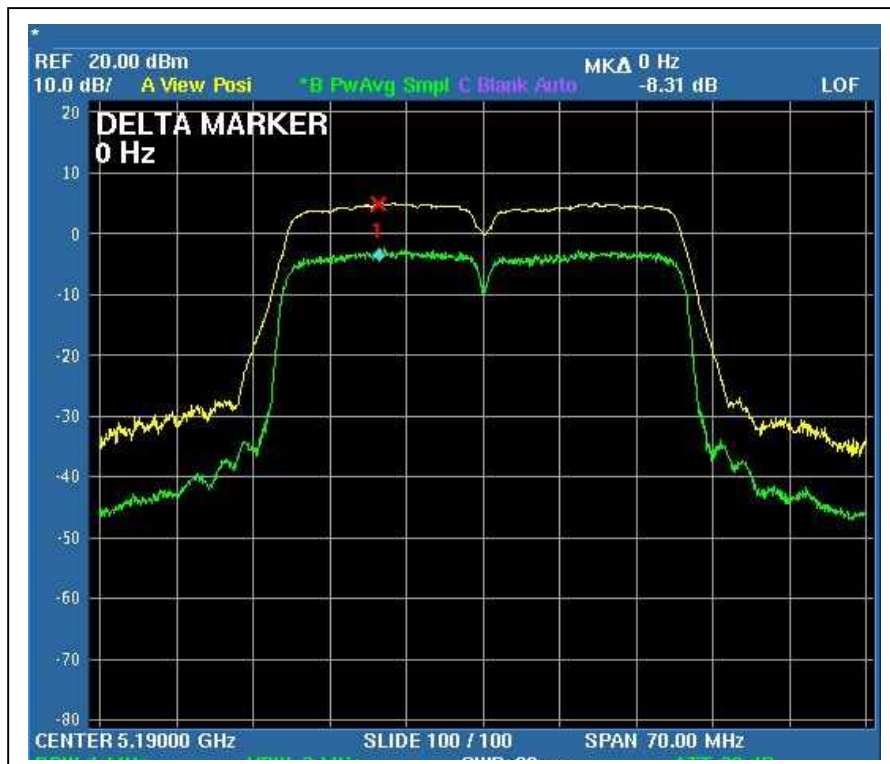
CH7



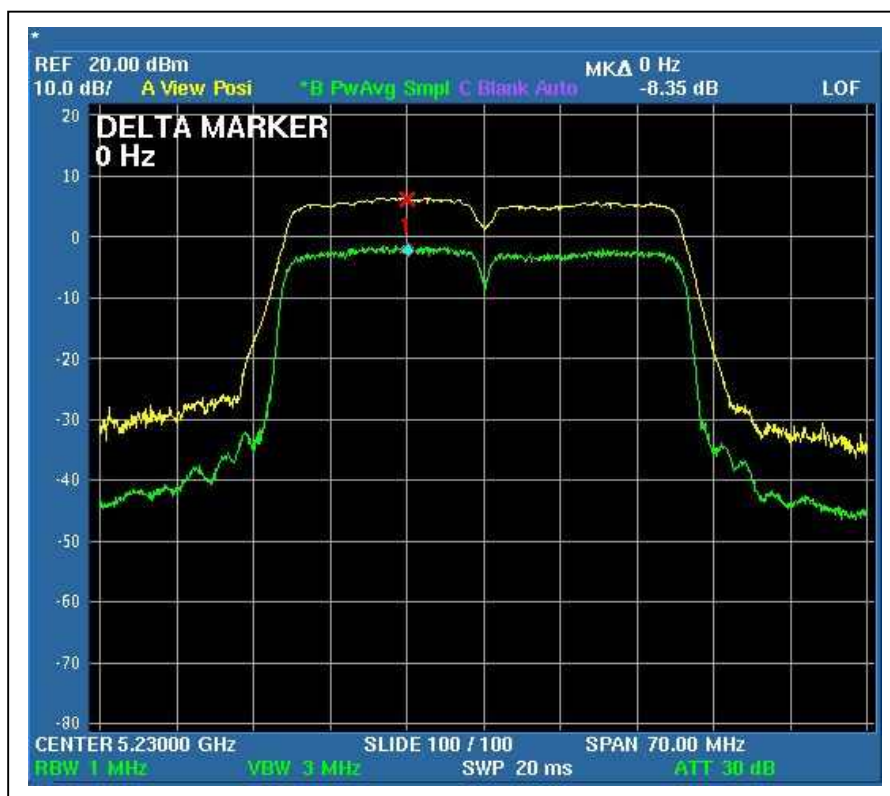
CH9



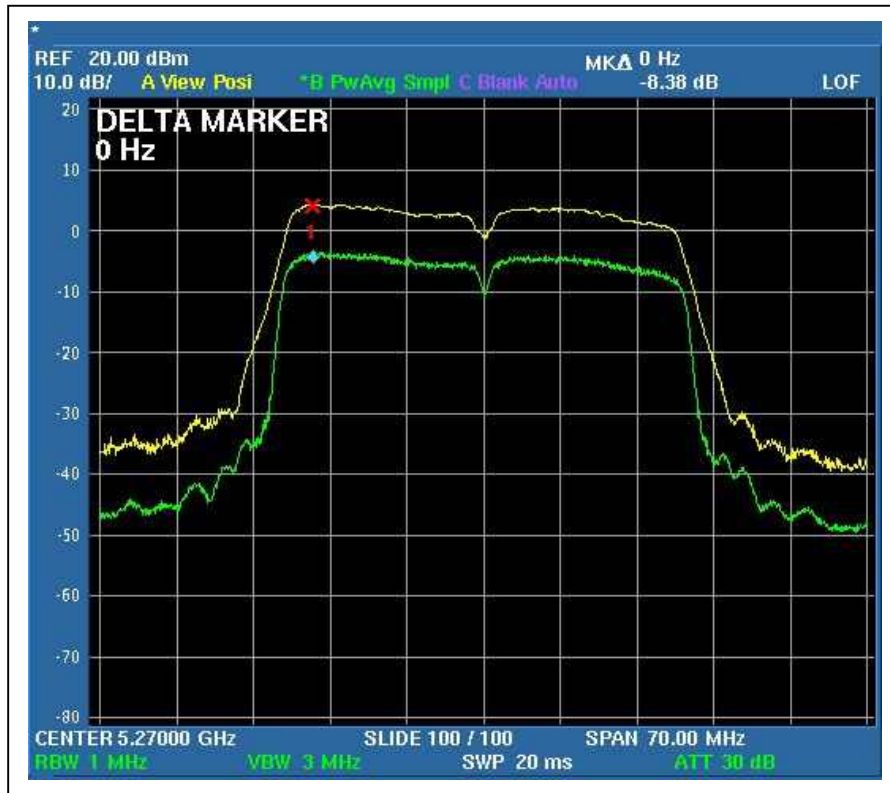
For Chain (1) : CH1



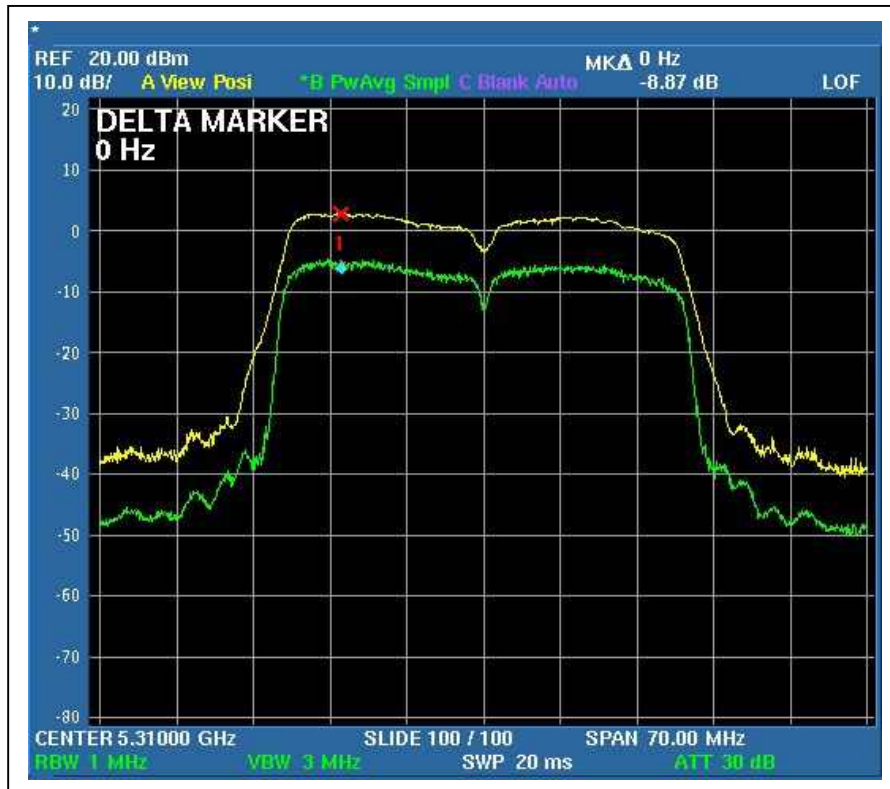
CH2



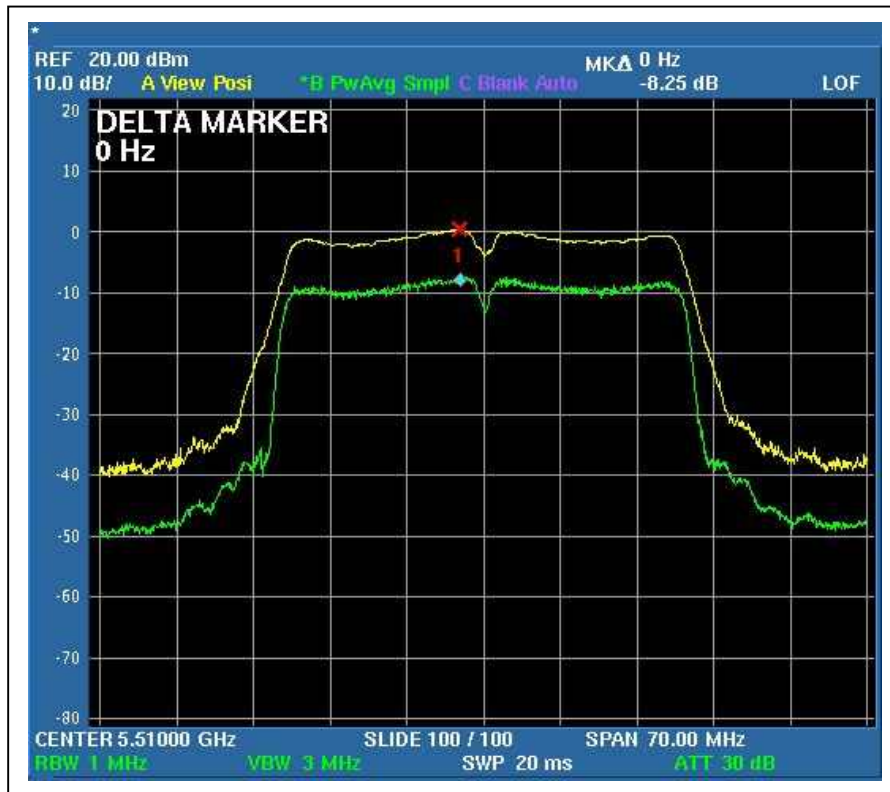
CH3



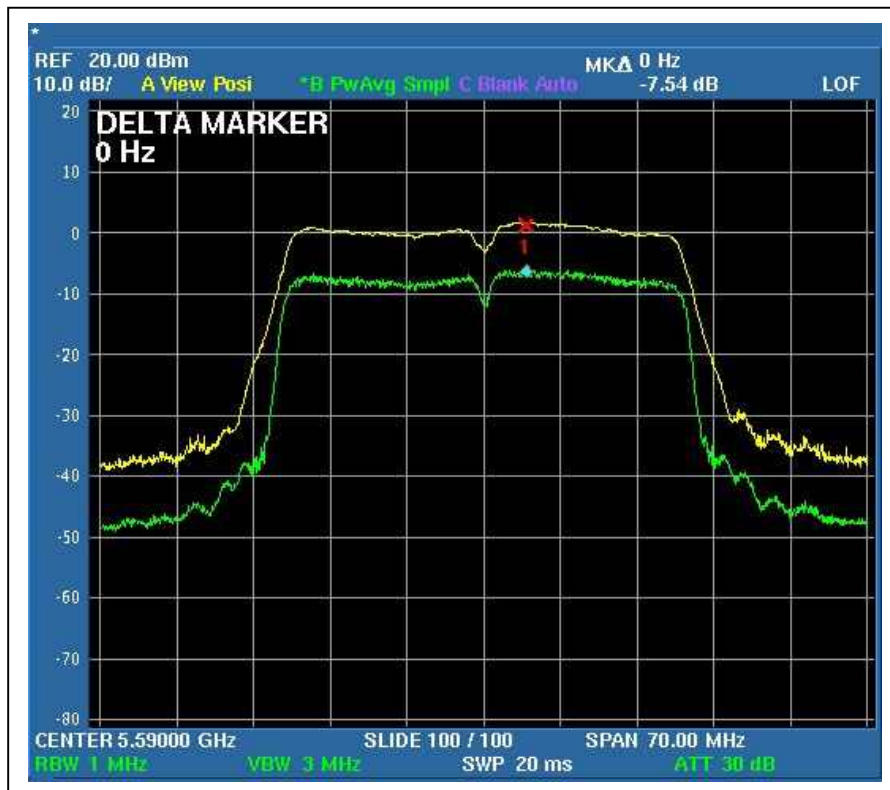
CH4



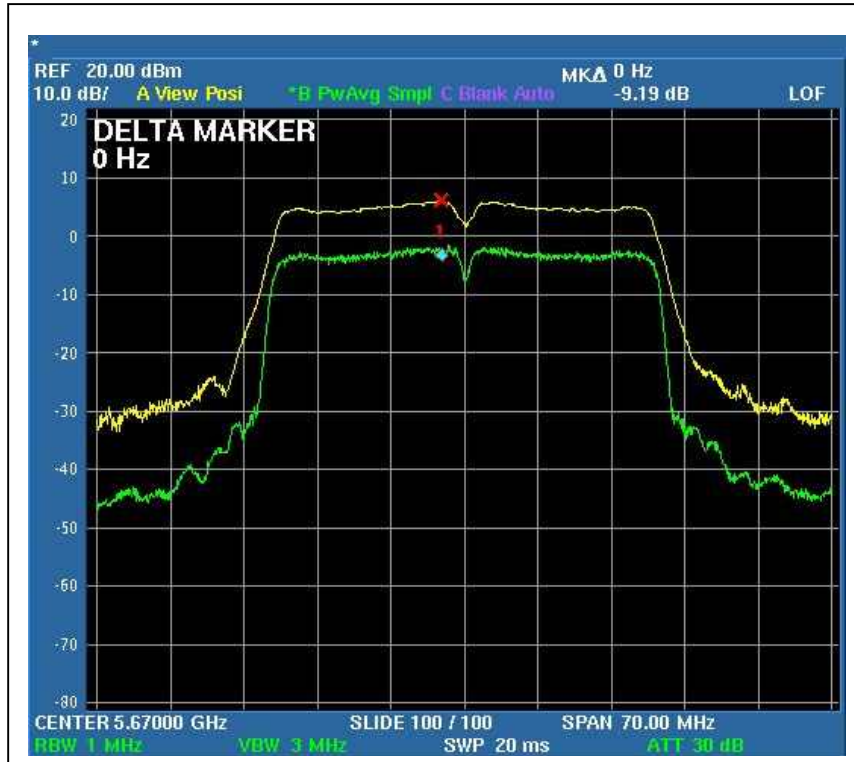
CH5



CH7



CH9



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
5.47 – 5.725GHz	11dBm
5.725 ~ 5.825GHz	17dBm

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ADVANTEST SPECTRUM ANALYZER	U3772	160100280	April 10, 2008

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

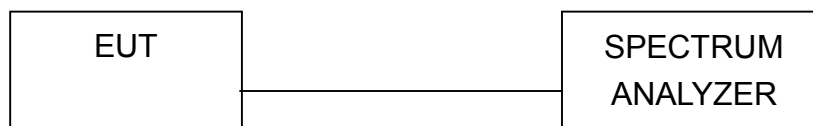
4.5.3 TEST PROCEDURES

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

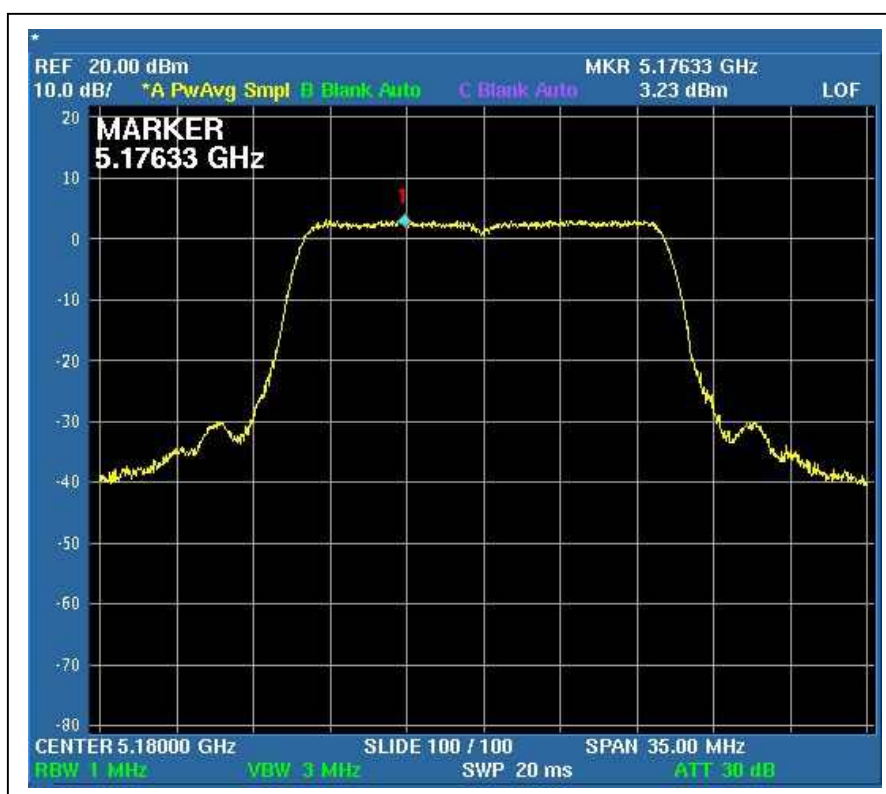
4.5.7 TEST RESULTS

802.11a OFDM modulation

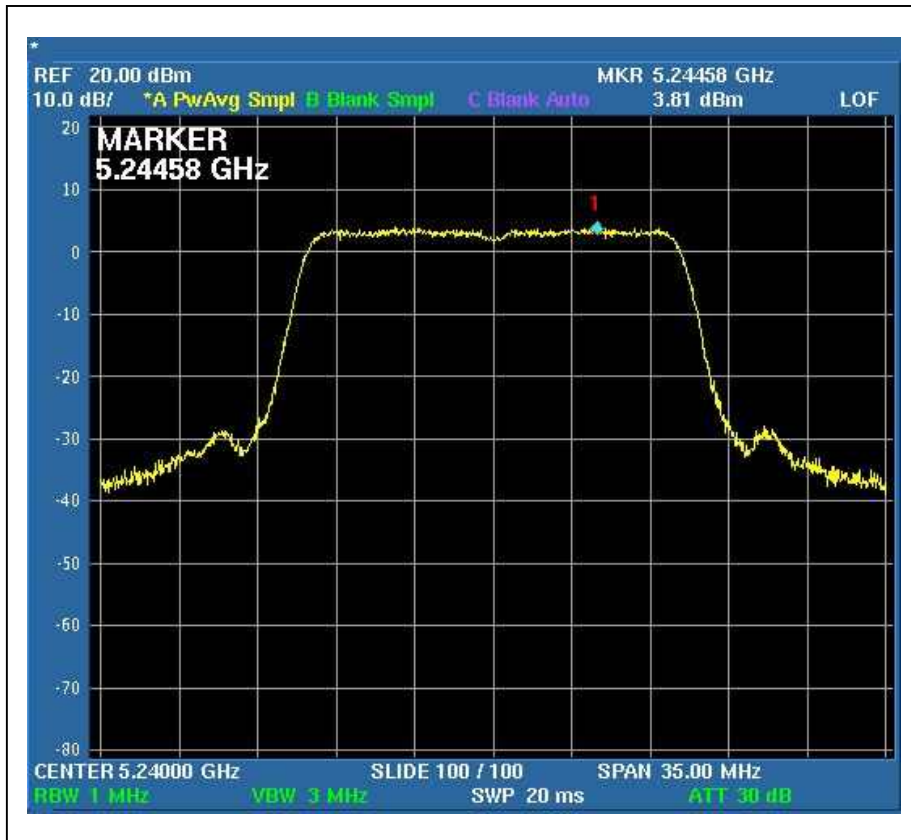
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 972hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	3.23	4	PASS
4	5240	3.81	4	PASS
5	5260	4.10	11	PASS
8	5320	4.53	11	PASS
9	5500	2.28	11	PASS
14	5600	0.30	11	PASS
19	5700	2.52	11	PASS

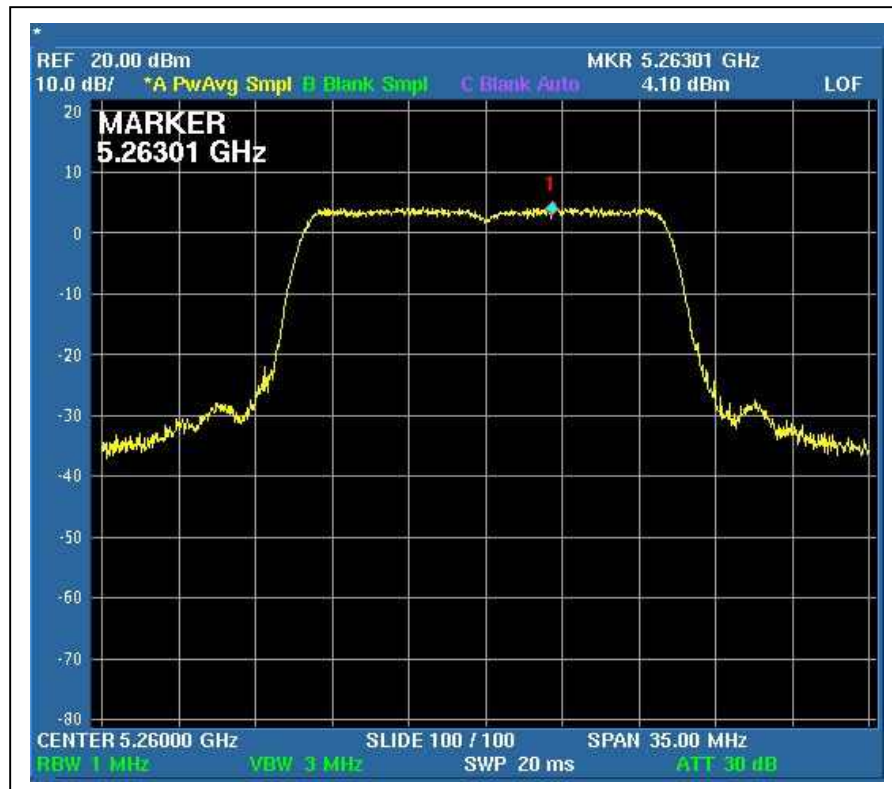
CH1



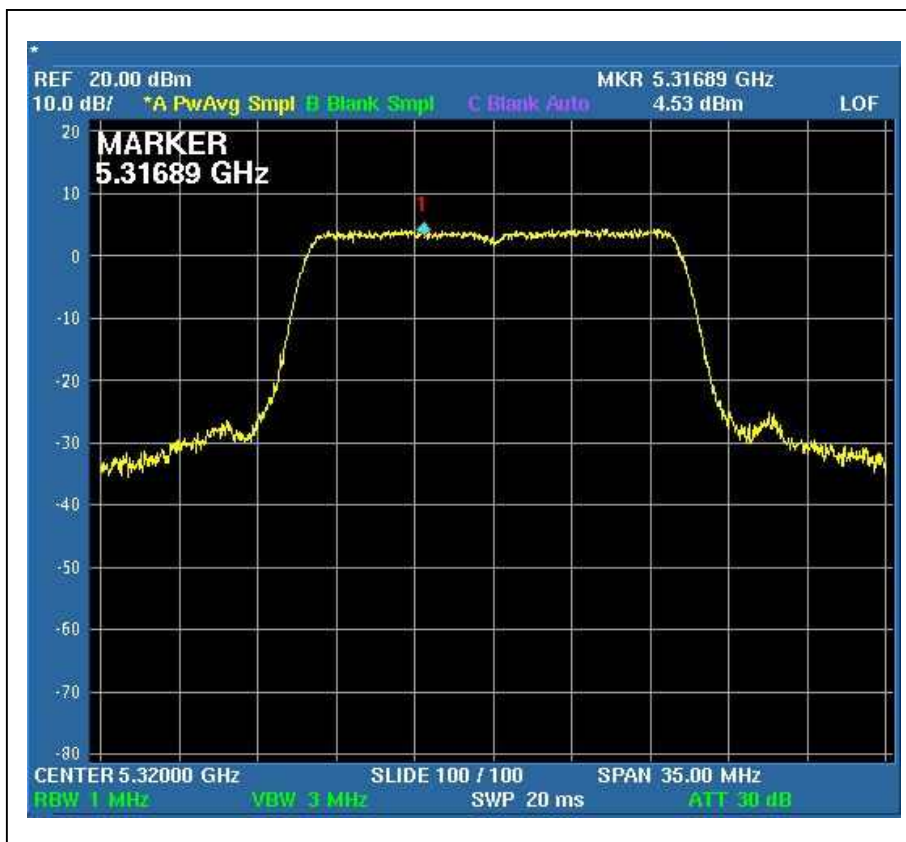
CH4



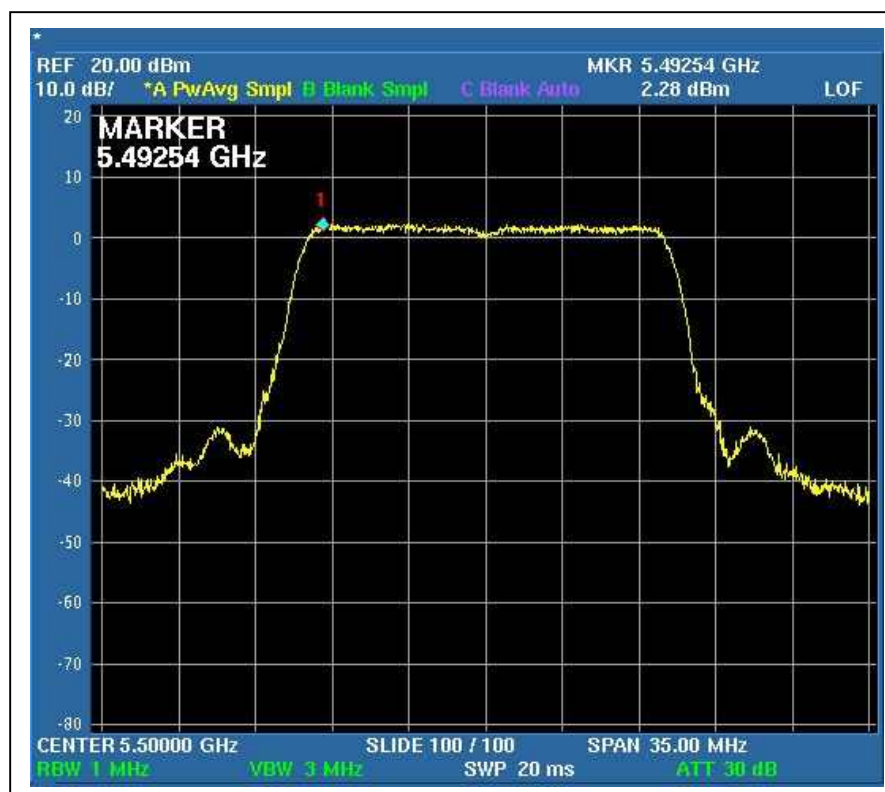
CH5



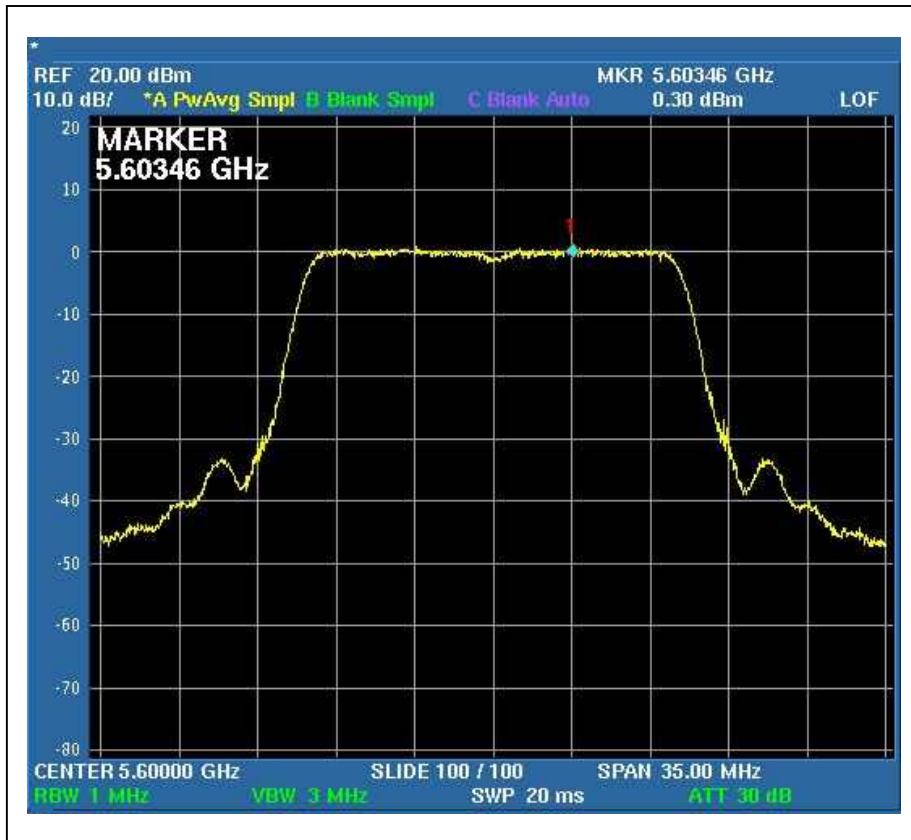
CH8



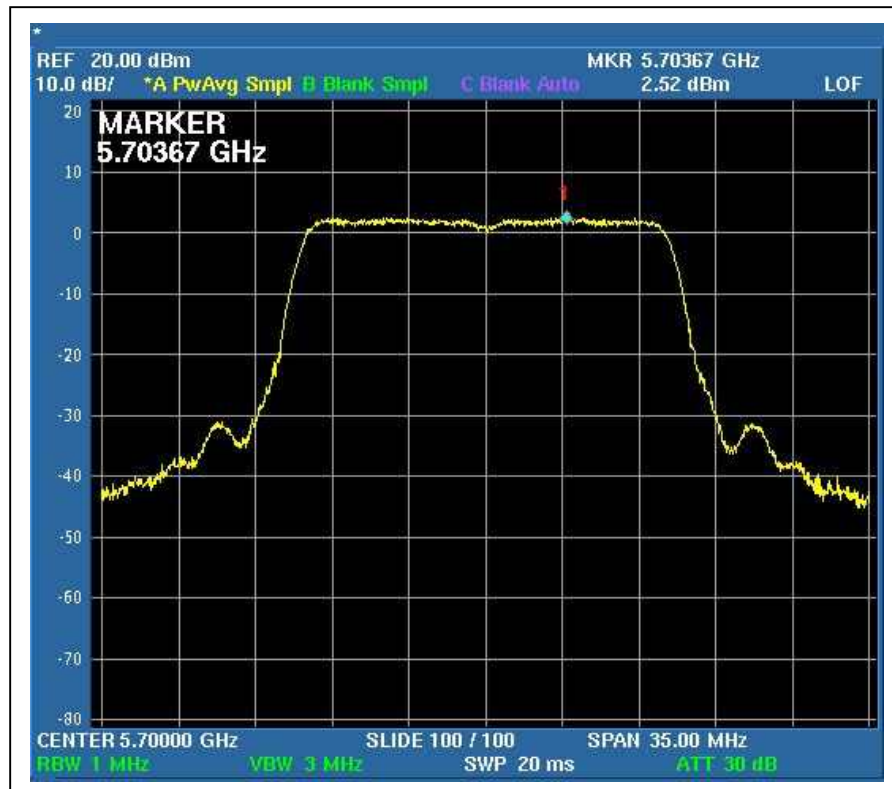
CH9



CH14



CH19



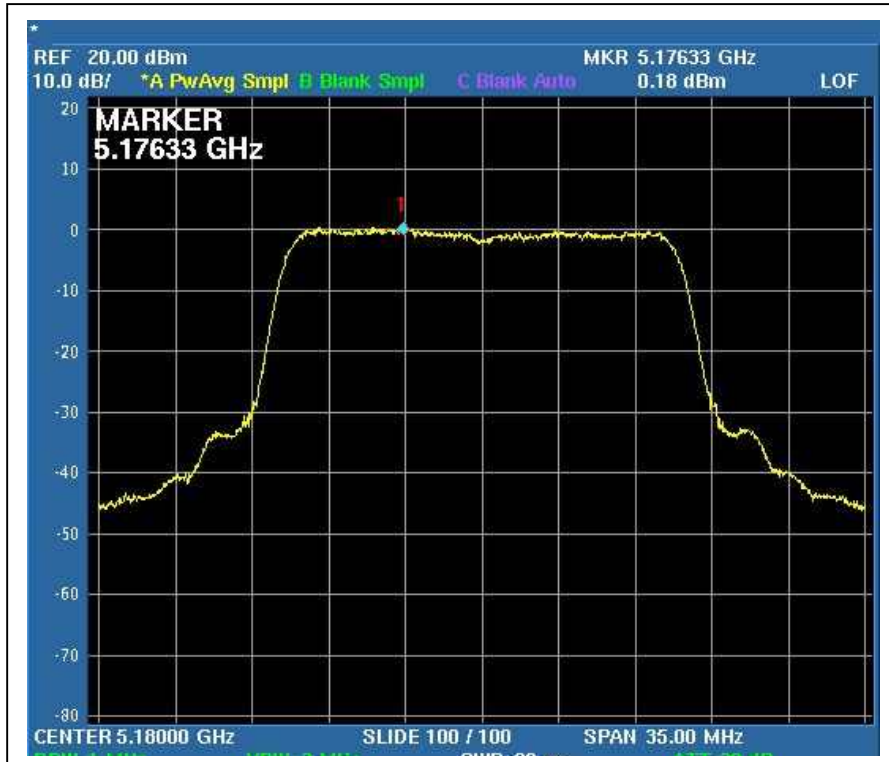


DRAFT 802.11n (20MHz) OFDM MODULATION:

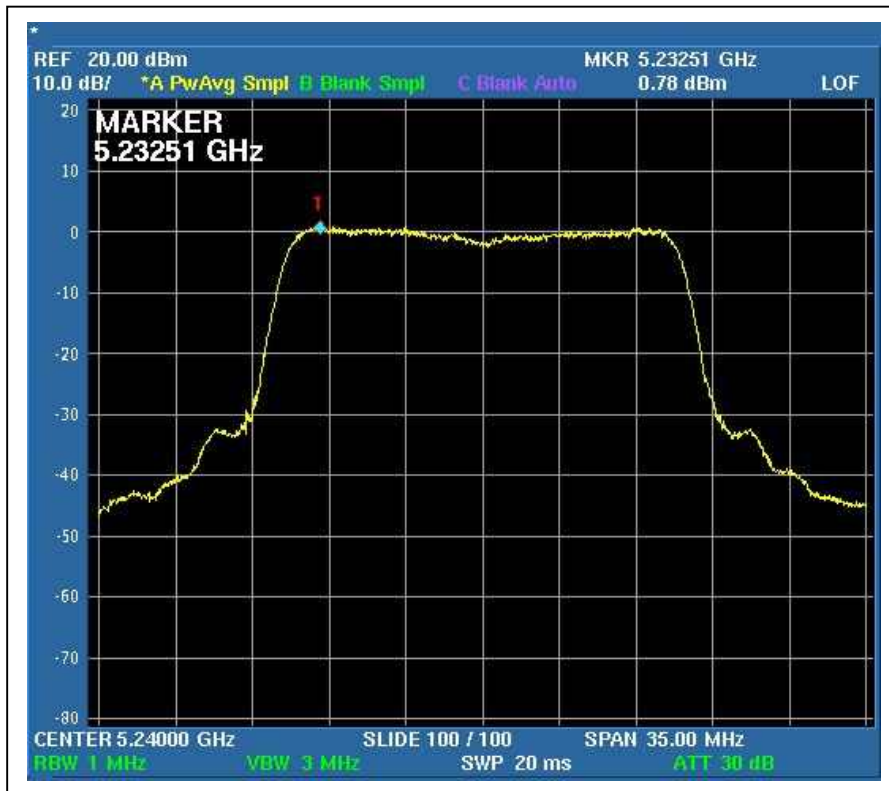
MODULATION TYPE	BPSK	TRANSFER RATE	13Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 972hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)		MAXIMUM LIMIT (dBm)	PASS/FAIL
		Chain (0)	Chain(1)		
1	5180	0.18	0.52	4	PASS
4	5240	0.78	0.05	4	PASS
5	5260	2.57	0.08	11	PASS
8	5320	2.19	-4.26	11	PASS
9	5500	2.31	-5.38	11	PASS
14	5600	1.61	-1.29	11	PASS
19	5700	2.07	1.52	11	PASS

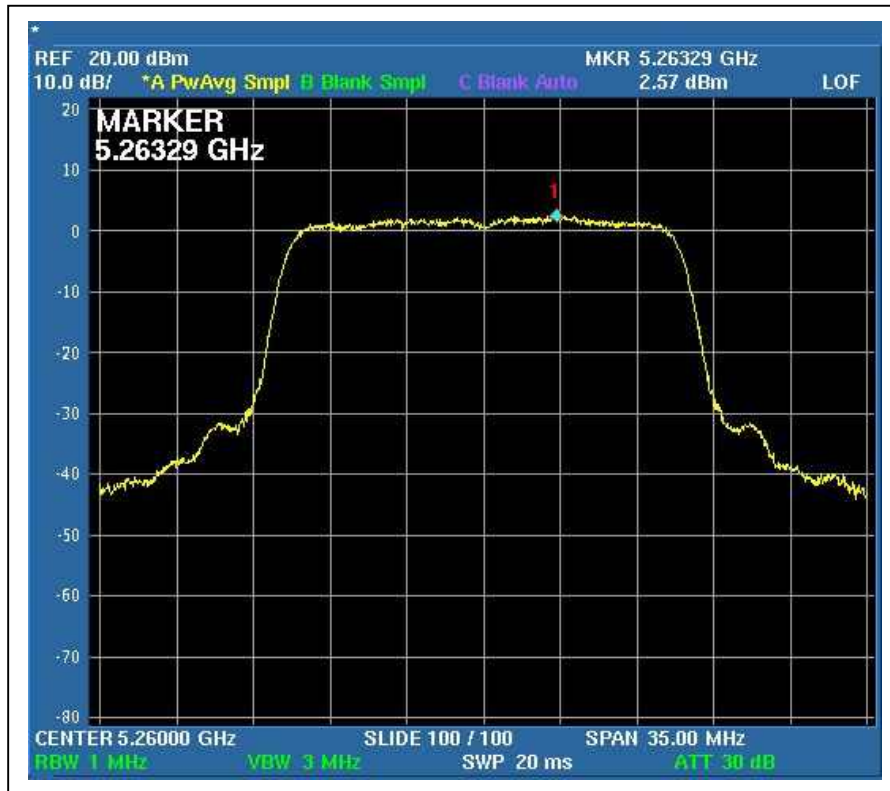
For Chain (0) : CH1



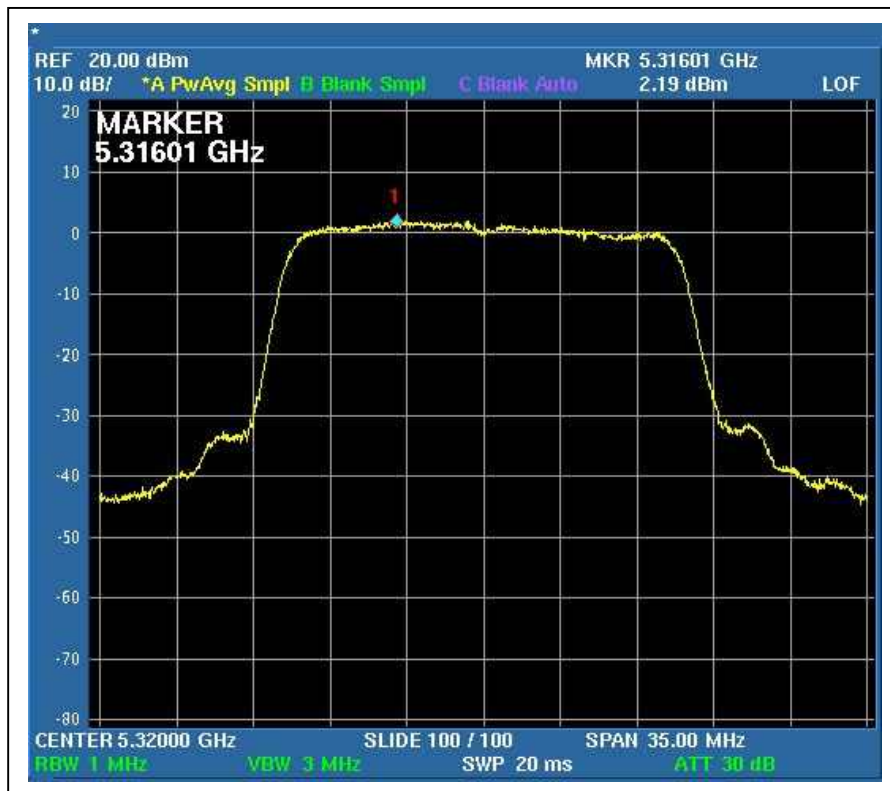
CH4



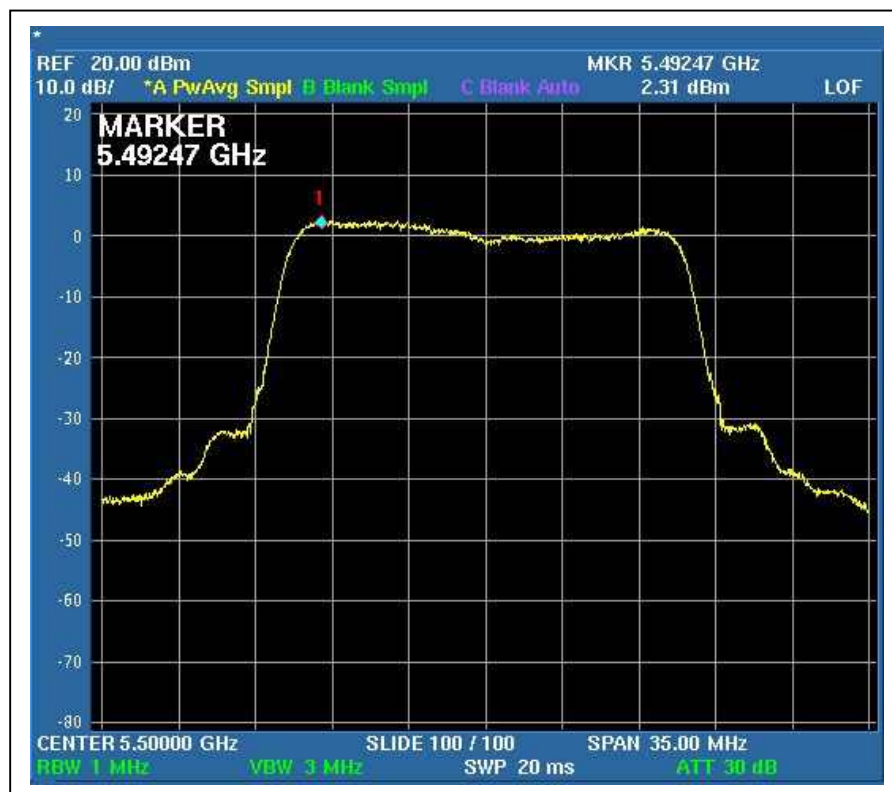
CH5



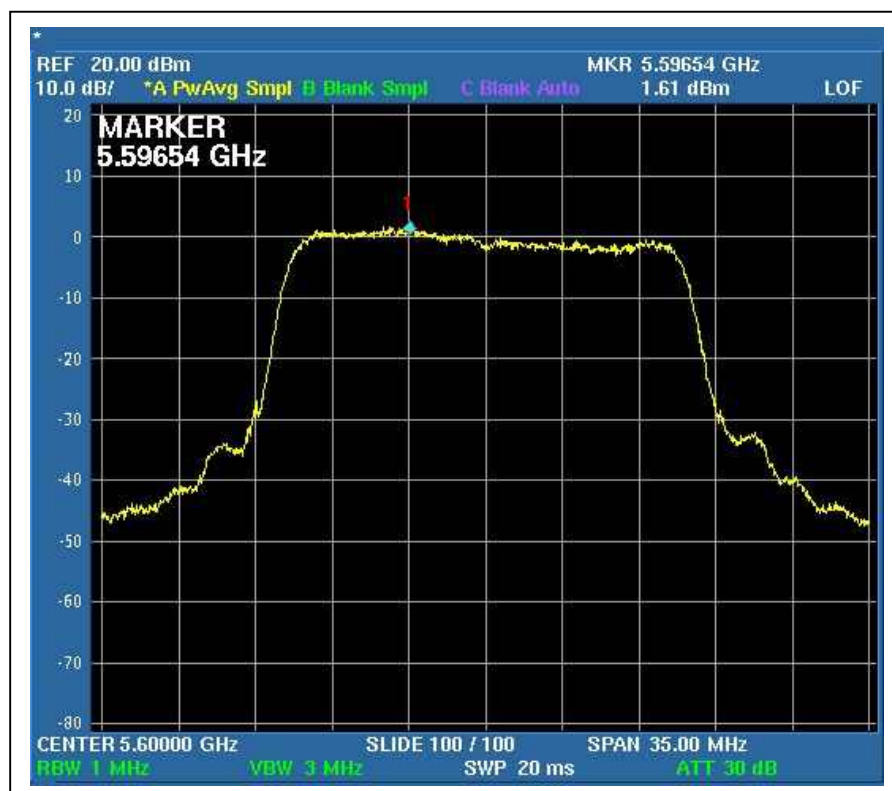
CH8



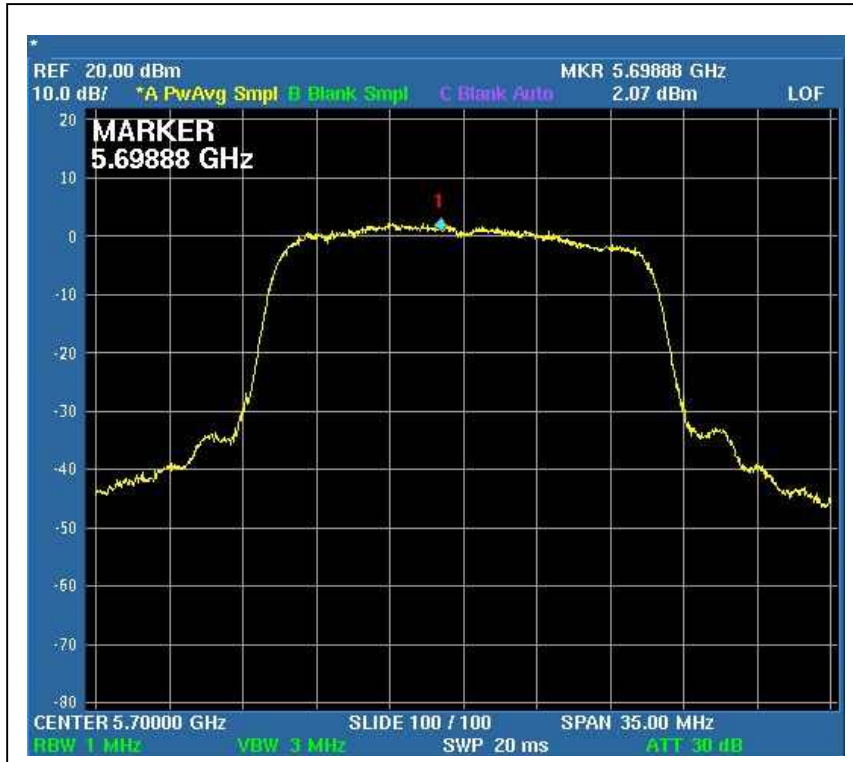
CH9



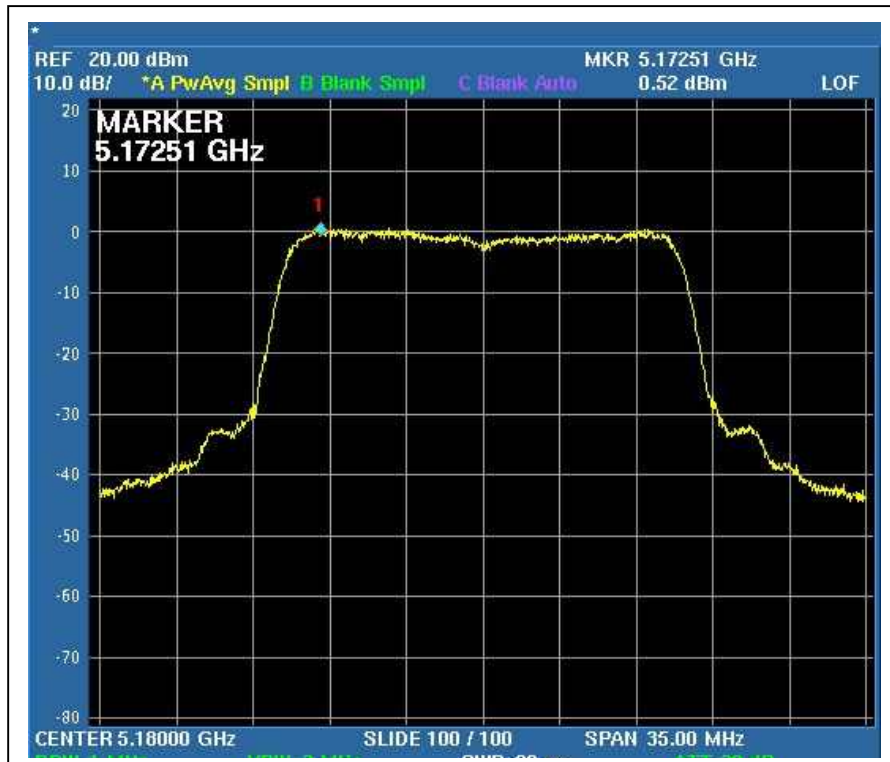
CH14



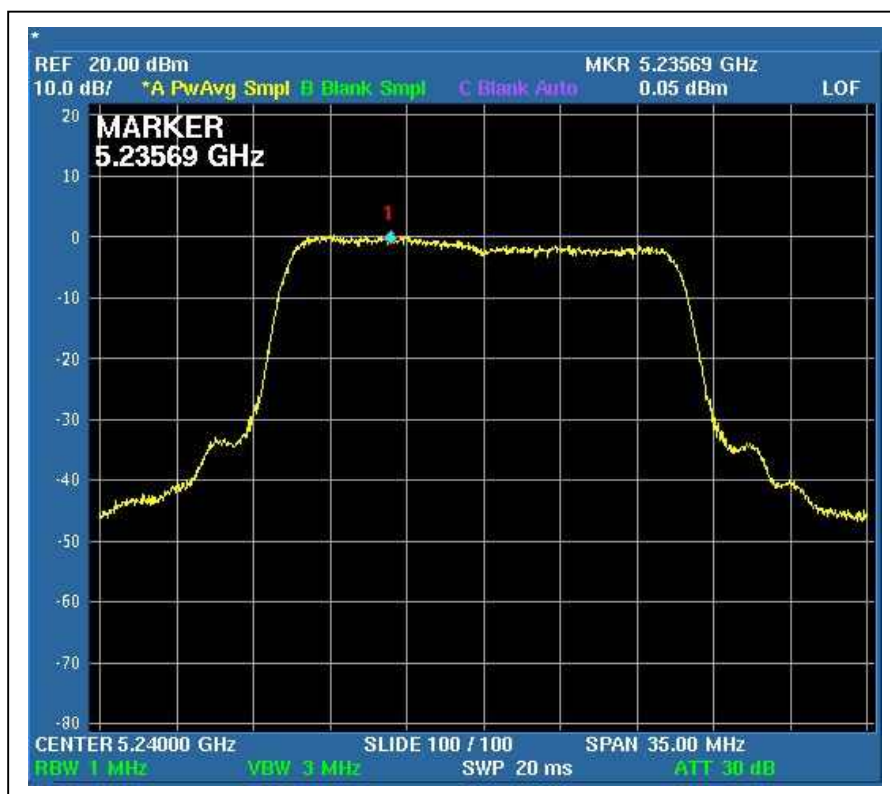
CH19



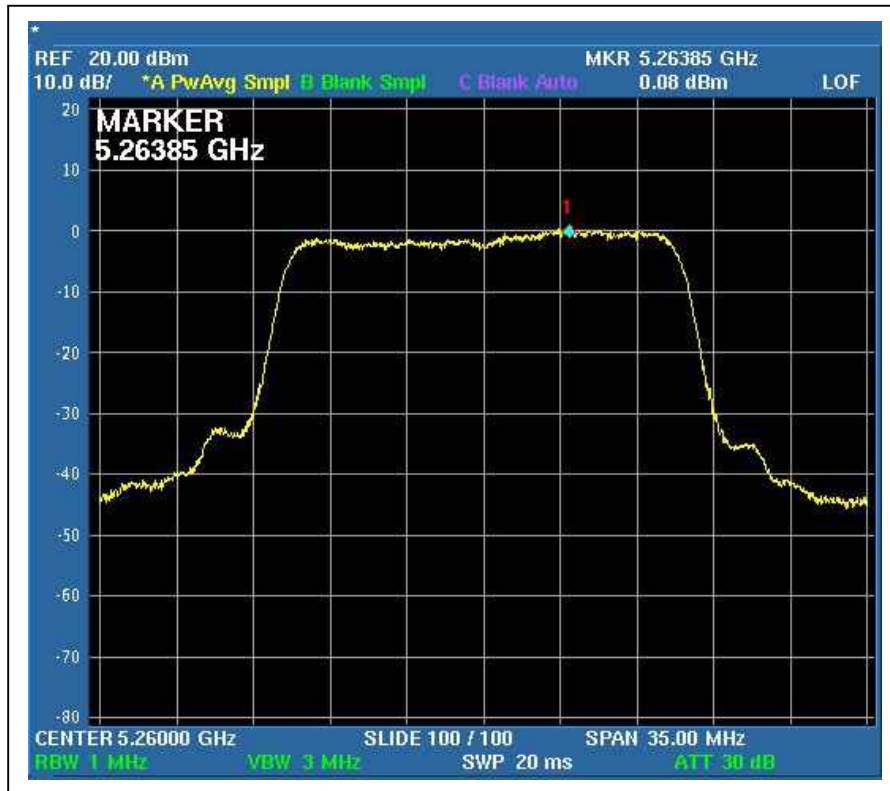
For Chain (1) : CH1



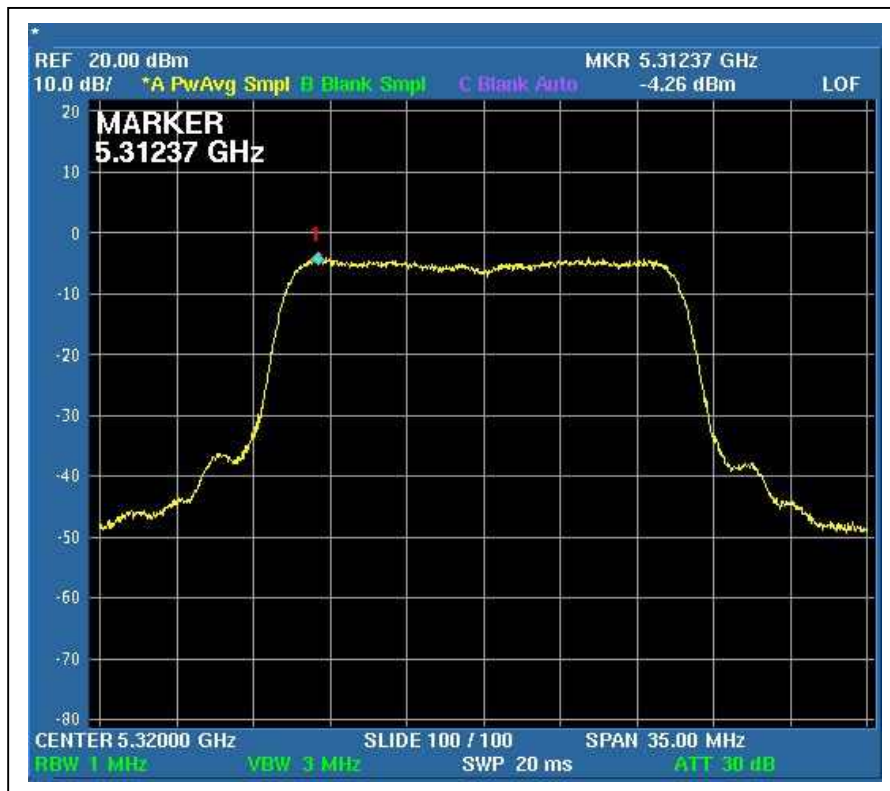
CH4



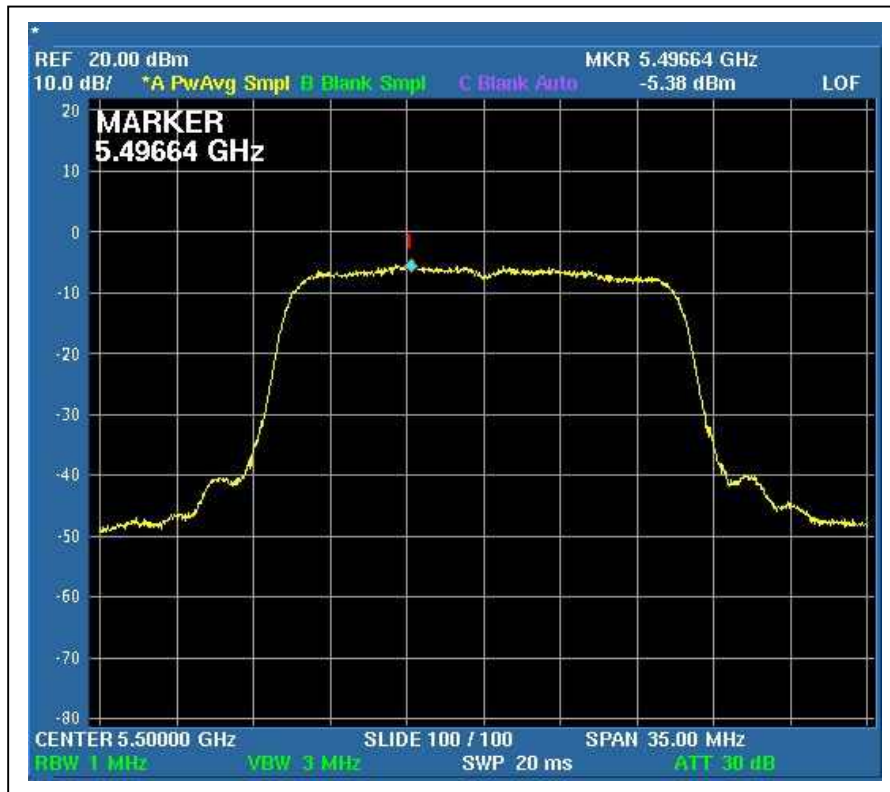
CH5



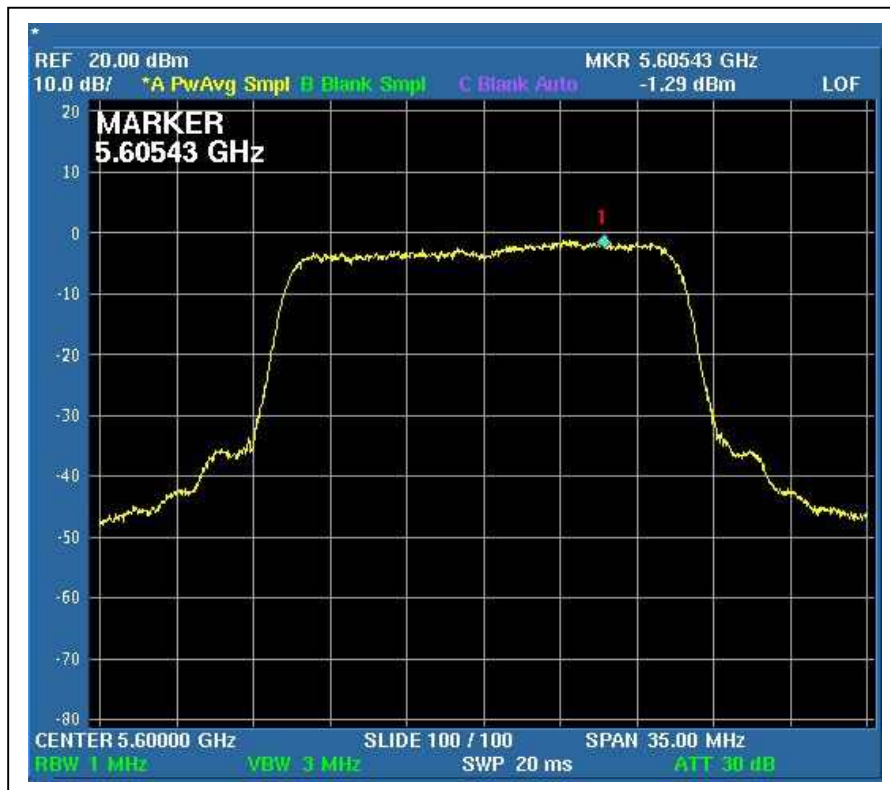
CH8



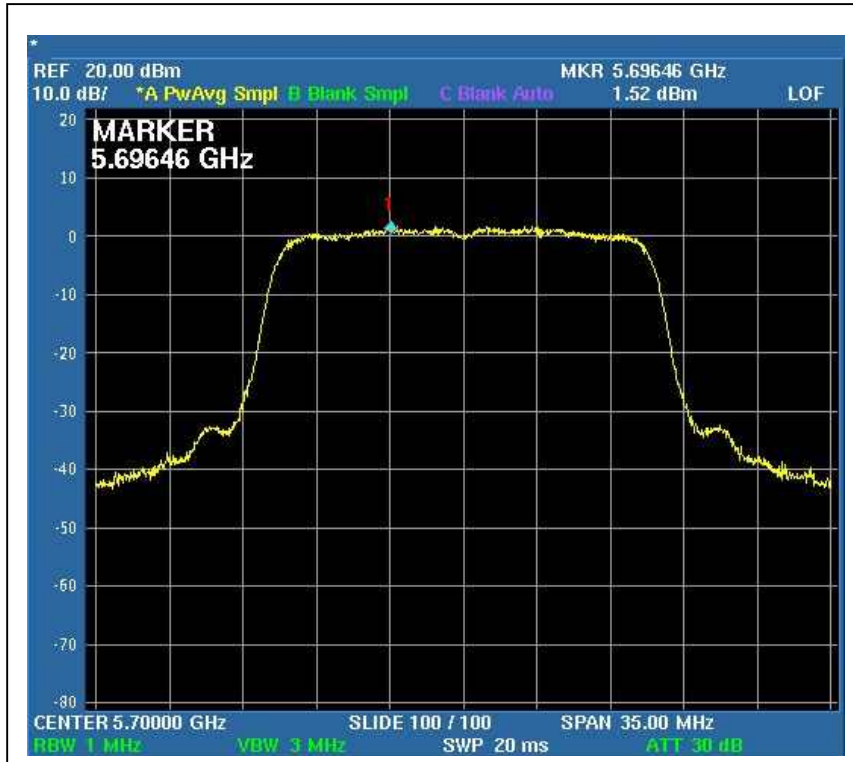
CH9



CH14



CH19





DRAFT 802.11n (40MHz) OFDM MODULATION:

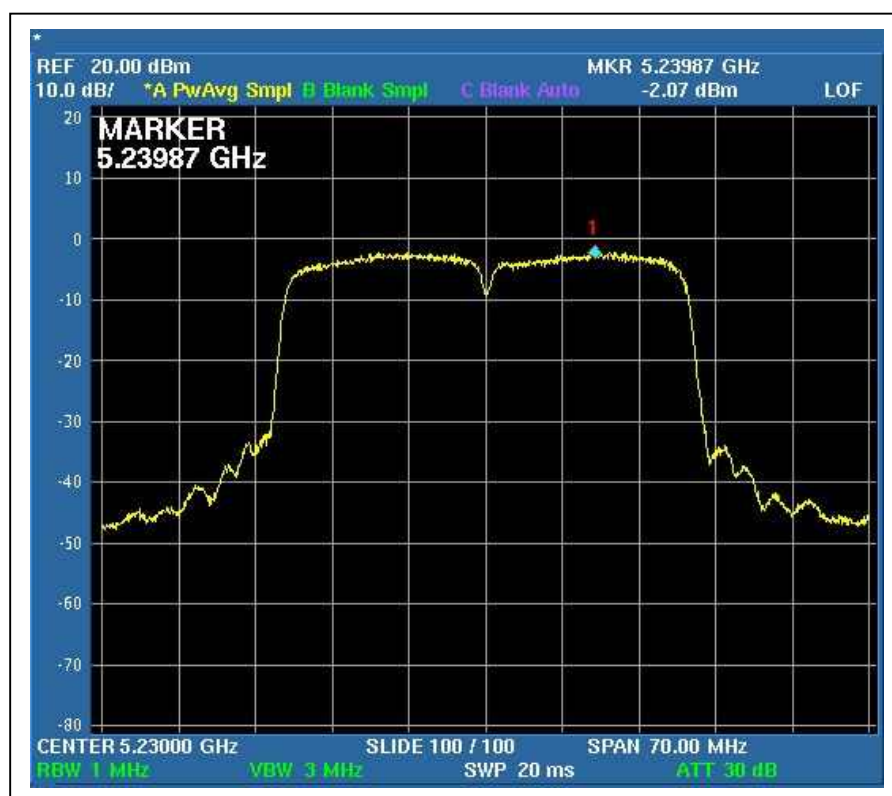
MODULATION TYPE	BPSK	TRANSFER RATE	27Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 972hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)		MAXIMUM LIMIT (dBm)	PASS/FAIL
		Chain (0)	Chain(1)		
1	5190	-2.01	-2.86	4	PASS
2	5230	-2.07	-1.19	4	PASS
3	5270	-1.34	-3.20	11	PASS
4	5310	-1.43	-4.46	11	PASS
5	5510	-1.59	-7.51	11	PASS
7	5590	-1.90	-5.96	11	PASS
9	5670	0.36	-1.53	11	PASS

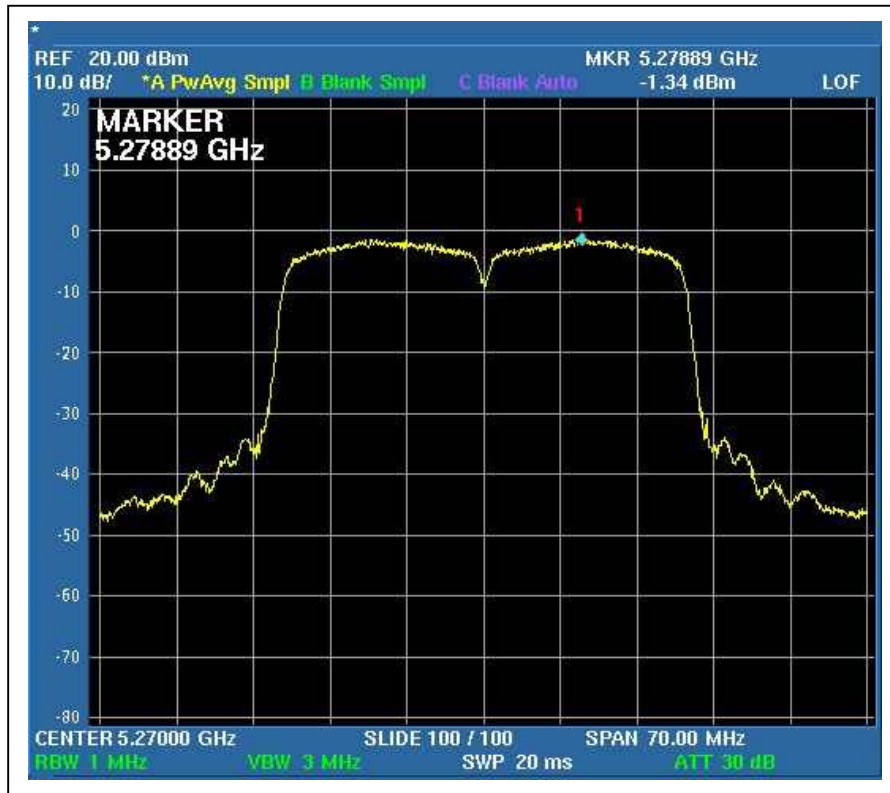
For Chain (0) : CH1



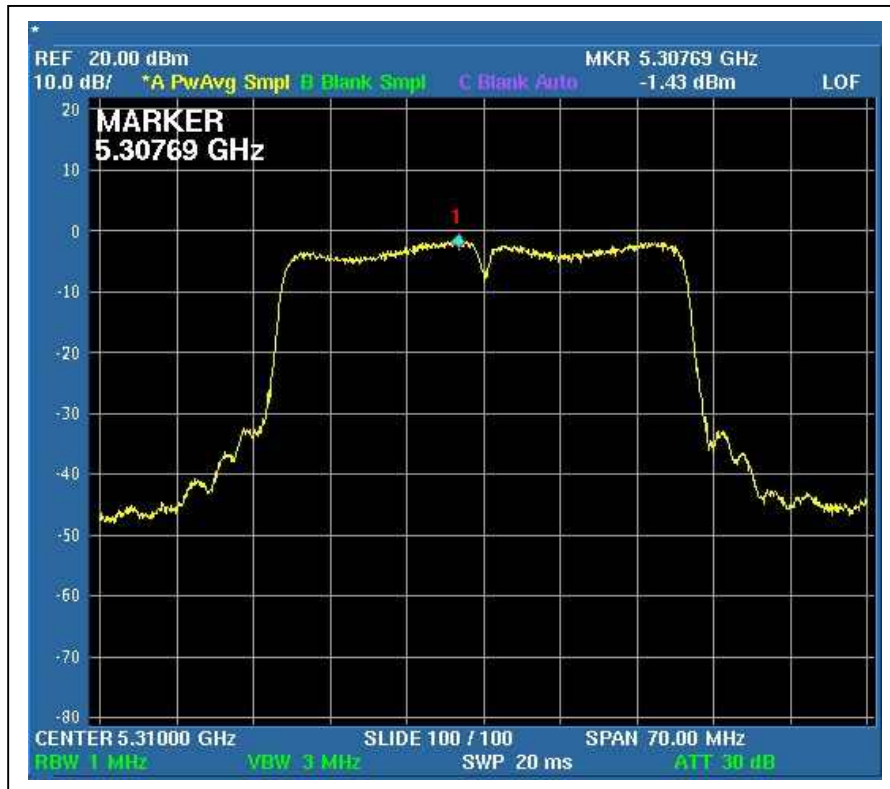
CH2



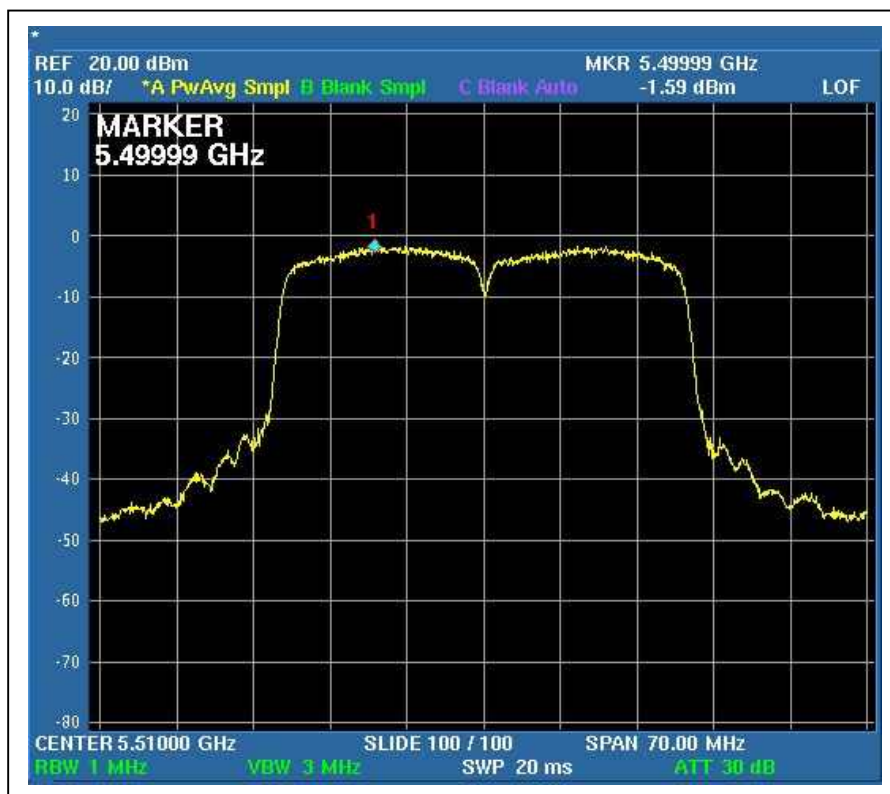
CH3



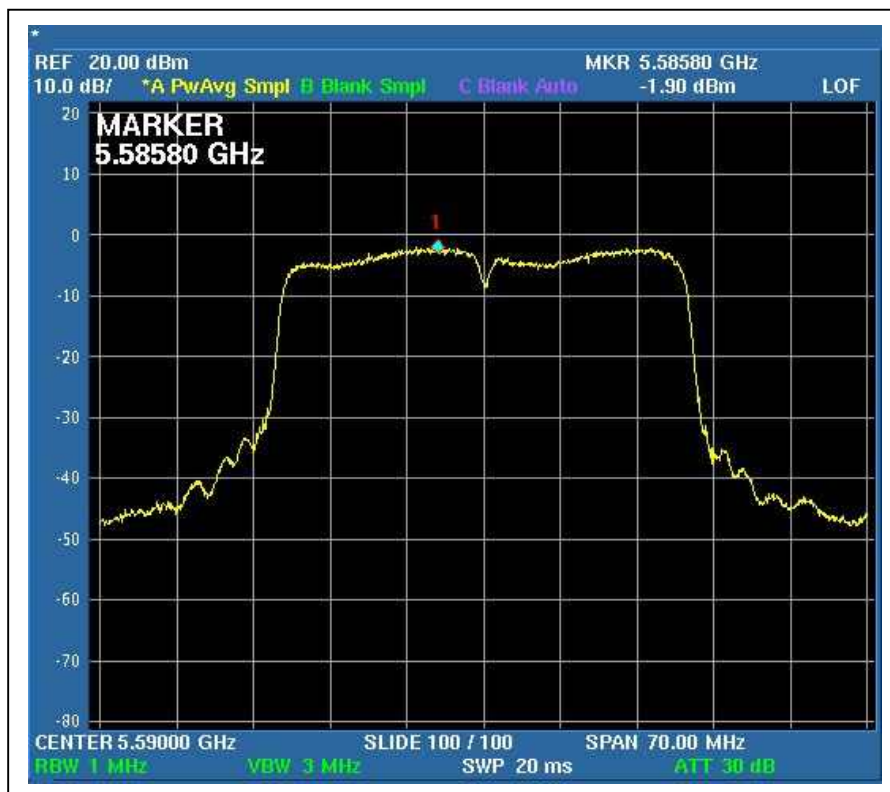
CH4



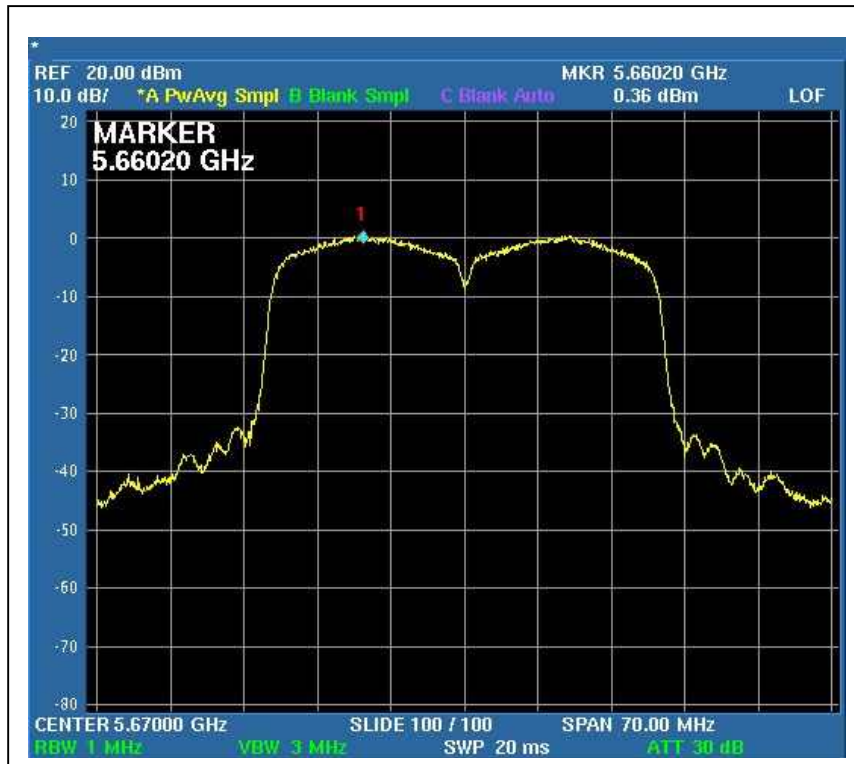
CH5



CH7



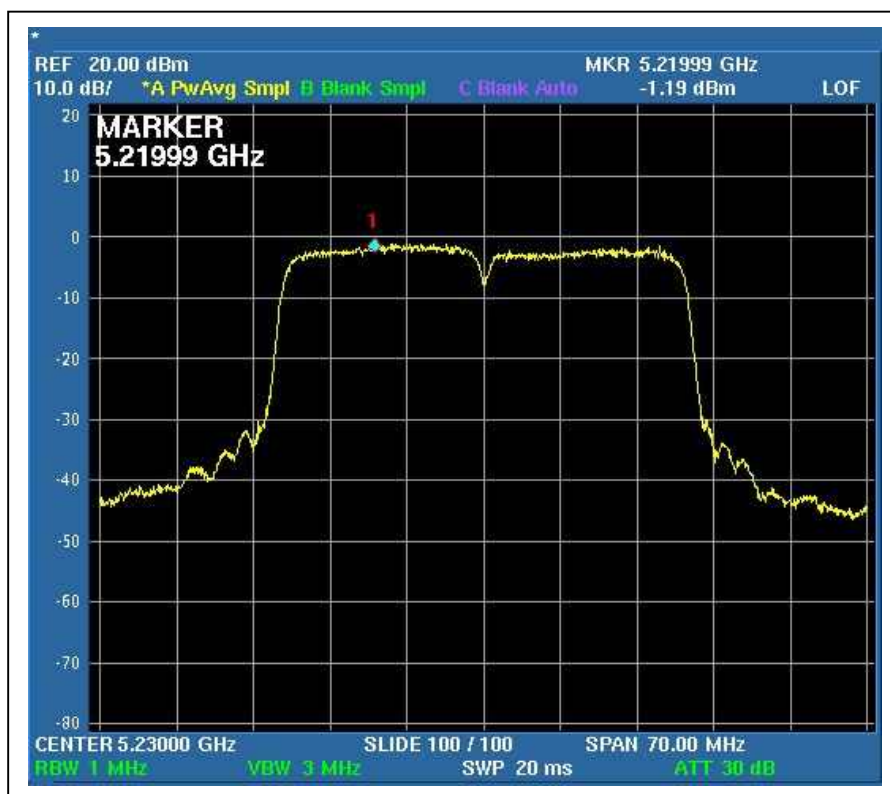
CH9



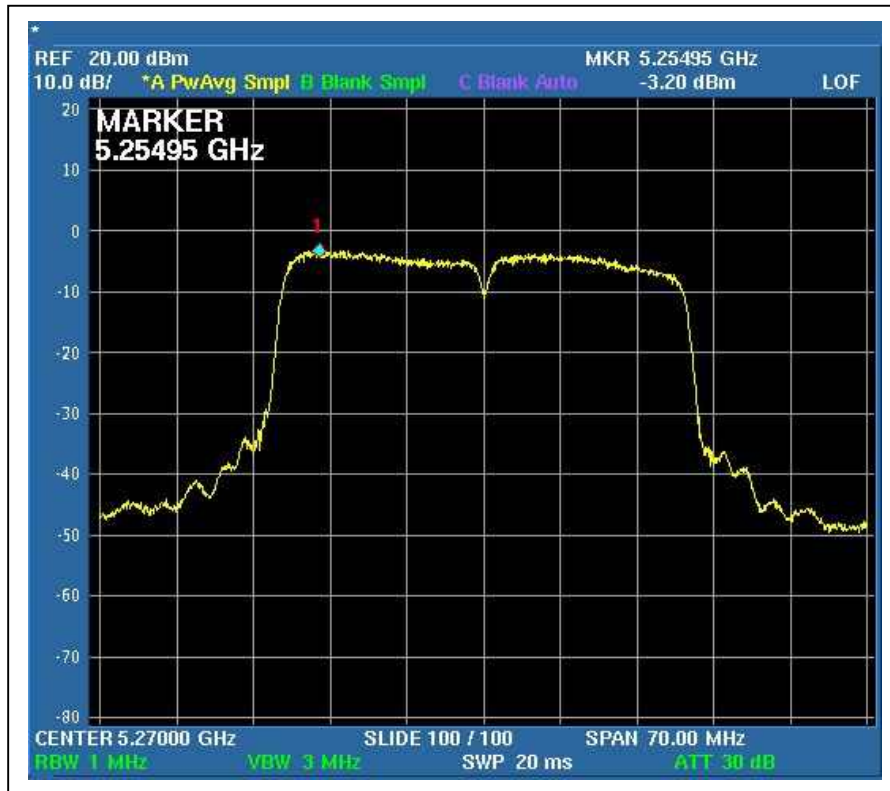
For Chain (1) : CH1



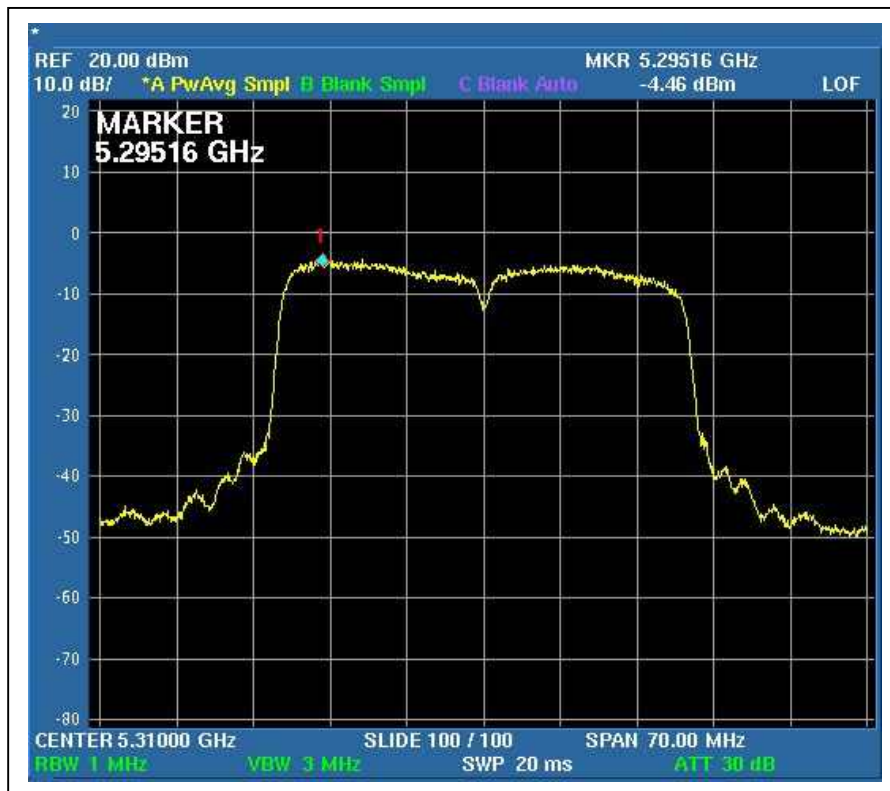
CH2



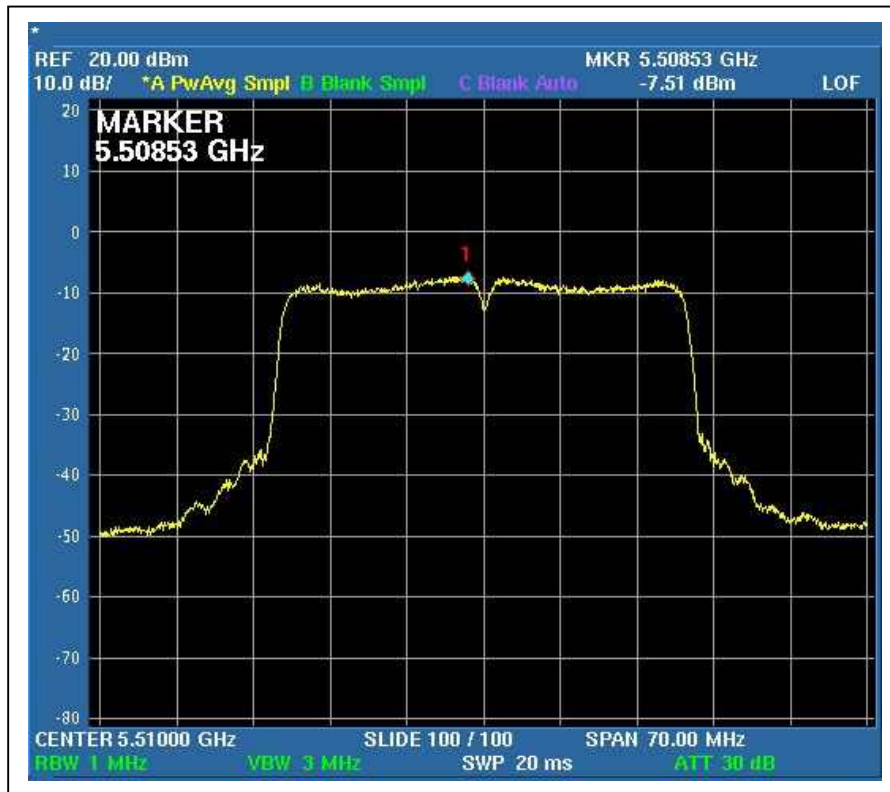
CH3



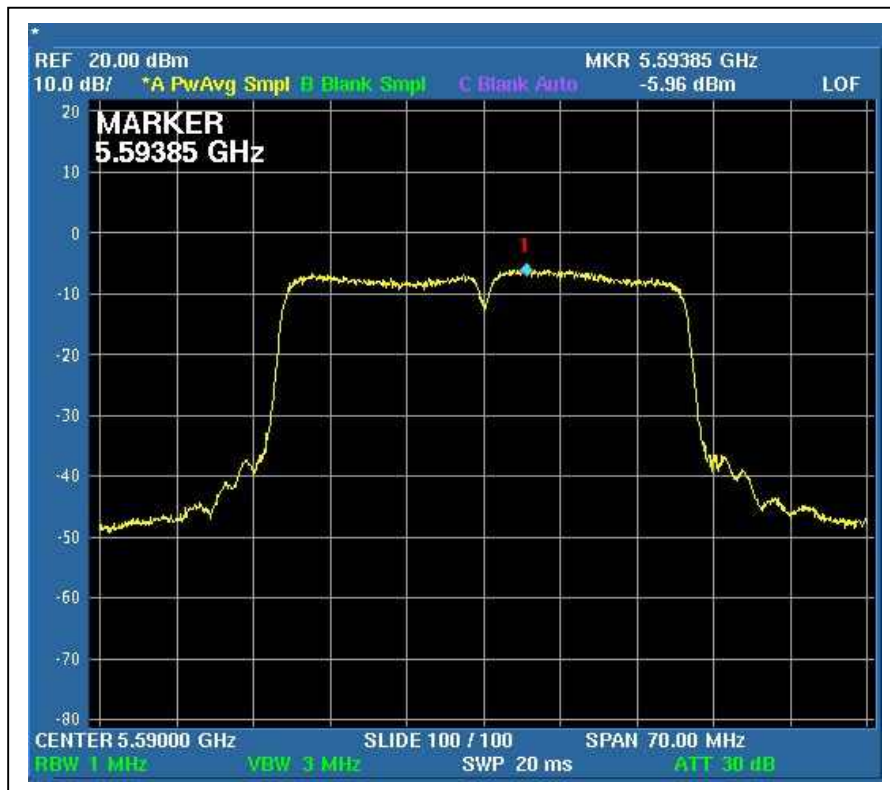
CH4



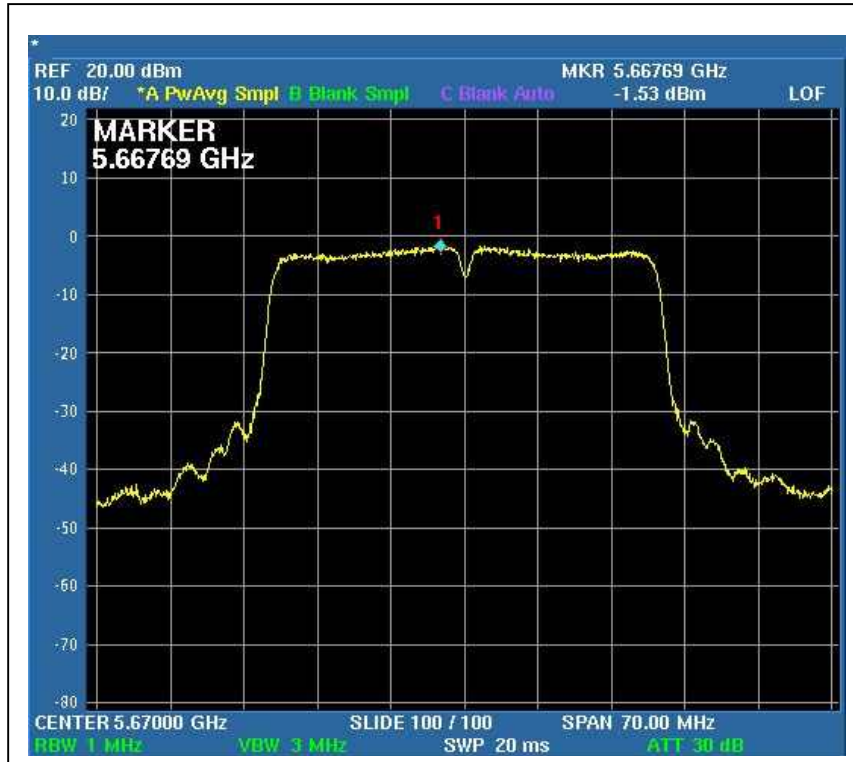
CH5



CH7



CH9



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	100037	Aug. 12, 2008

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.

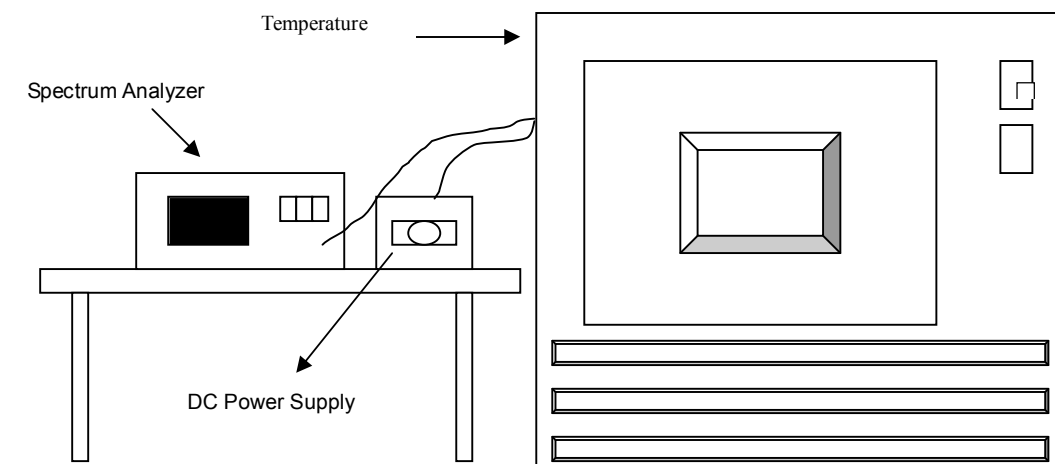
4.6.3 TEST PROCEDURE

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: 5320MHz				Limit : $\pm 0.01\%$	
Temp. (°C)	Power supply (VAC)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	126.5	5319.9755	0.000461	5319.9854	0.000274	5319.9859	0.000265
	110	5319.9756	0.000459	5319.9854	0.000274	5319.9861	0.000261
	93.5	5319.9855	0.000273	5319.9857	0.000269	5319.9858	0.000267
40	126.5	5319.9998	0.000004	5319.999	0.000019	5320.0005	0.000009
	110	5319.9986	0.000026	5319.9994	0.000011	5320.0007	0.000013
	93.5	5319.9994	0.000011	5319.9999	0.000002	5320.0004	0.000008
30	126.5	5319.9992	0.000015	5319.9989	0.000021	5319.9994	0.000011
	110	5319.999	0.000019	5319.9991	0.000017	5319.9997	0.000006
	93.5	5319.9985	0.000028	5319.9989	0.000021	5319.9994	0.000011
20	126.5	5319.9945	0.000103	5319.9946	0.000102	5319.9951	0.000092
	110	5319.9946	0.000102	5319.995	0.000094	5319.9955	0.000085
	93.5	5319.9945	0.000103	5319.9946	0.000102	5319.9951	0.000092
10	126.5	5320.0104	0.000195	5320.0058	0.000109	5320.0066	0.000124
	110	5320.0104	0.000195	5320.0088	0.000165	5320.0076	0.000143
	93.5	5320.0084	0.000158	5320.0058	0.000109	5320.0066	0.000124
0	126.5	5320.018	0.000338	5320.0168	0.000316	5320.0156	0.000293
	110	5320.0178	0.000335	5320.0188	0.000353	5320.0176	0.000331
	93.5	5320.0178	0.000335	5320.0158	0.000297	5320.0156	0.000293
-10	126.5	5320.0238	0.000447	5320.0245	0.000461	5320.0254	0.000477
	110	5320.0238	0.000447	5320.0244	0.000459	5320.0254	0.000477
	93.5	5320.024	0.000451	5320.0242	0.000455	5320.0254	0.000477
-20	126.5	5320.0174	0.000327	5320.0128	0.000241	5320.0096	0.000180
	110	5320.0180	0.000338	5320.0158	0.000297	5320.0126	0.000237
	93.5	5320.0192	0.000361	5320.0118	0.000222	5320.0106	0.000199
-30	126.5	5319.9796	0.000383	5319.9797	0.000382	5319.9803	0.000370
	110	5319.9796	0.000383	5319.9799	0.000378	5319.9804	0.000368
	93.5	5319.9798	0.000380	5319.9797	0.000382	5319.9802	0.000372
-40	126.5	5319.9998	0.000004	5319.999	0.000019	5320.0005	0.000009
	110	5319.9986	0.000026	5319.9994	0.000011	5320.0007	0.000013
	93.5	5319.9994	0.000011	5319.9999	0.000002	5320.0004	0.000008

4.7 BAND EDGES MEASUREMENT

4.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 12, 2008

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.

4.7.2 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set RBW 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.

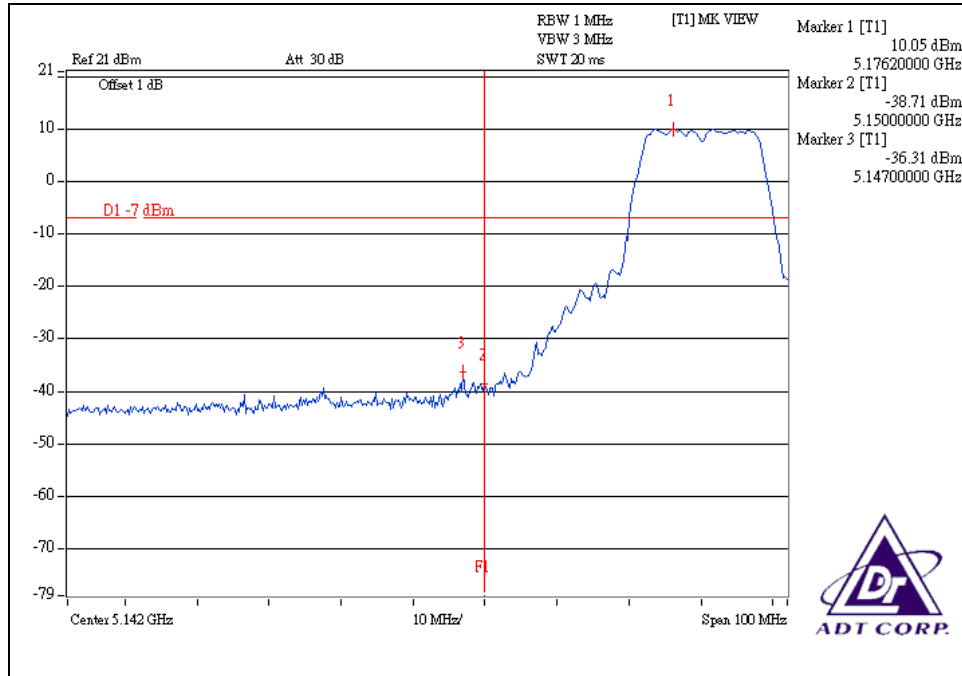
4.7.4 TEST RESULTS

For 5.15 to 5.35GHz band:

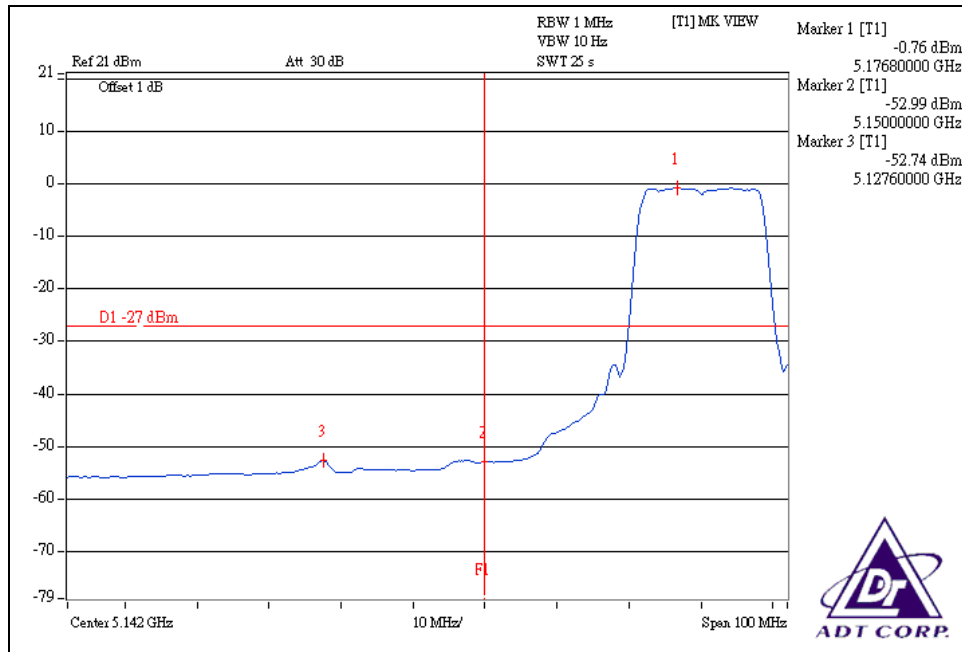
The spectrum plots (Peak RBW=1MHz, VBW=3MHz; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

802.11a OFDM modulation

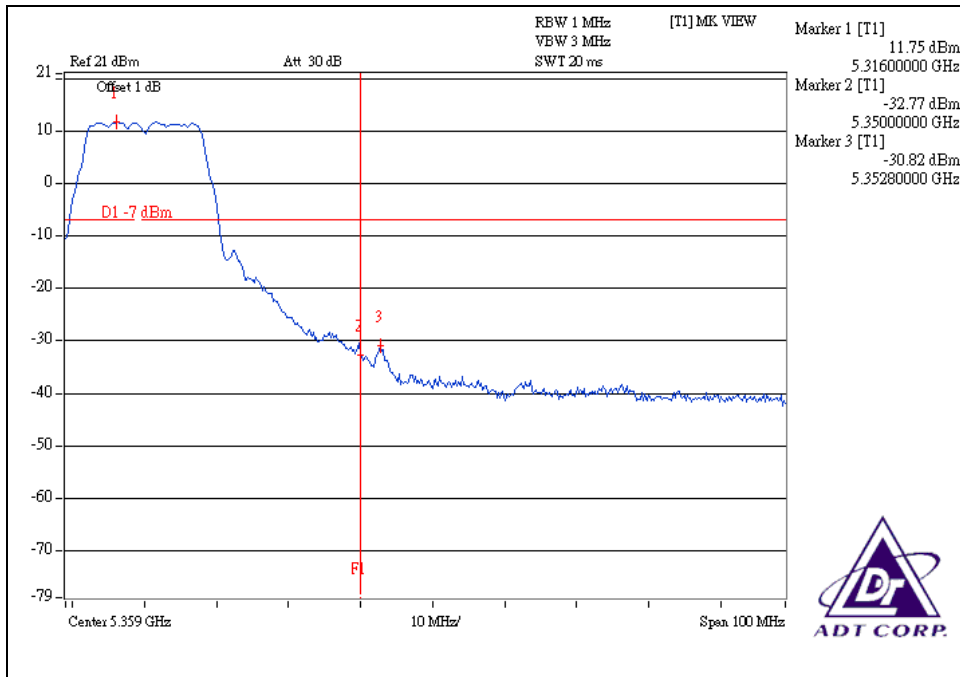
CH 1



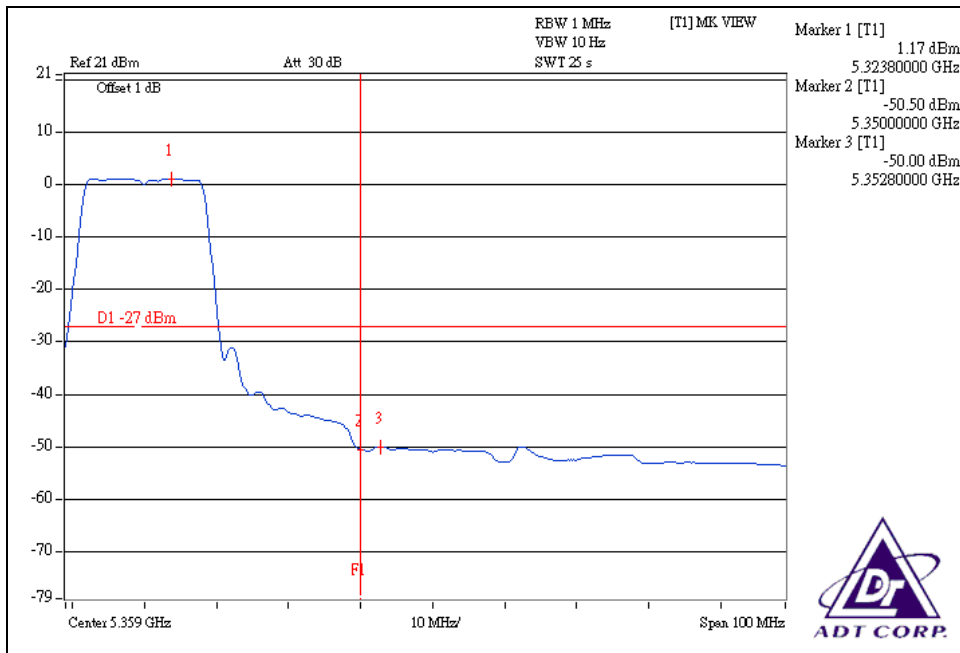
CH 1



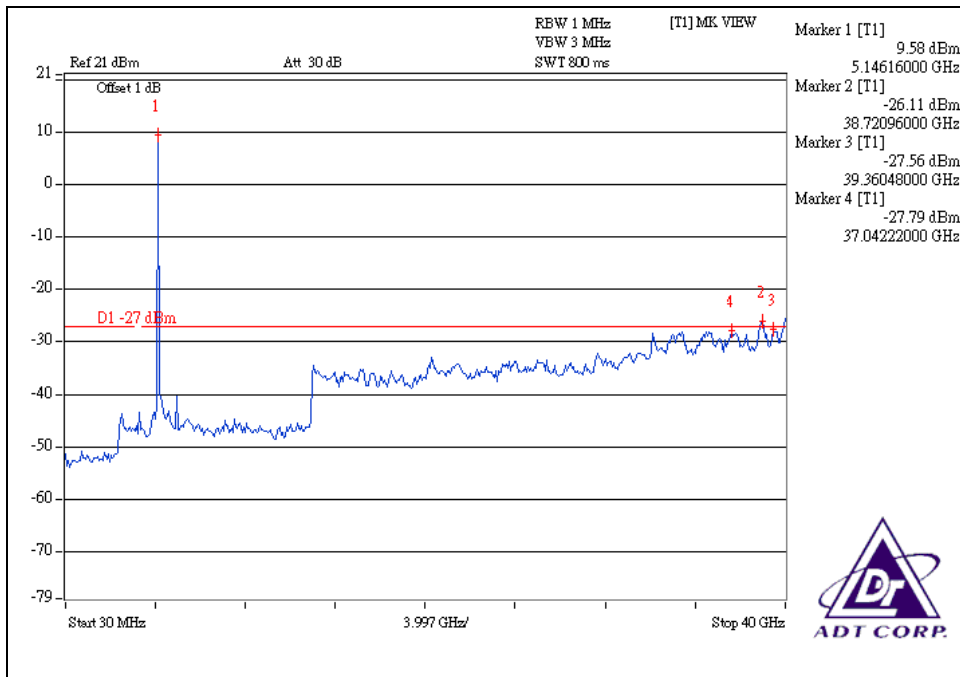
CH 8



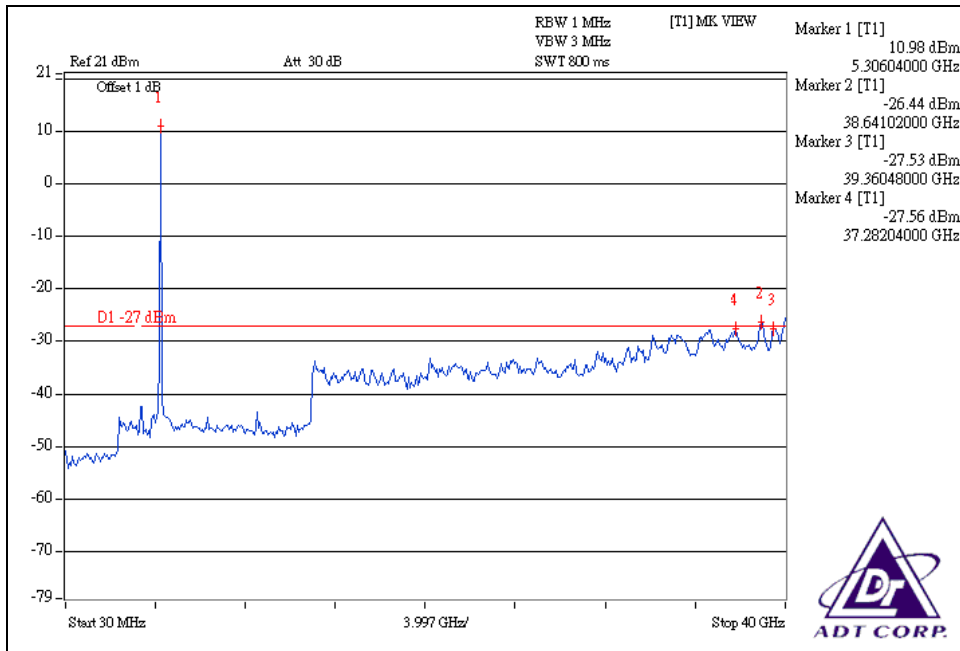
CH 8



CH 1



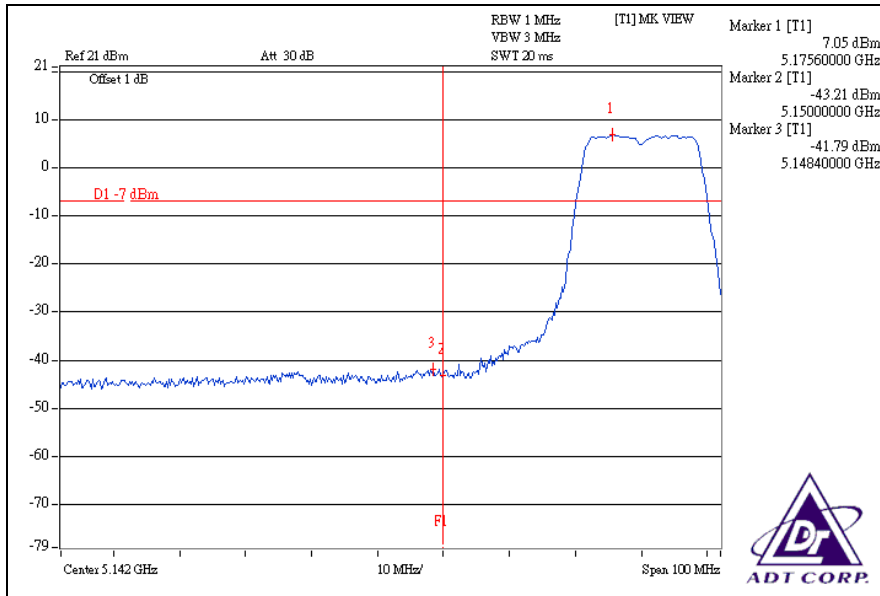
CH 8



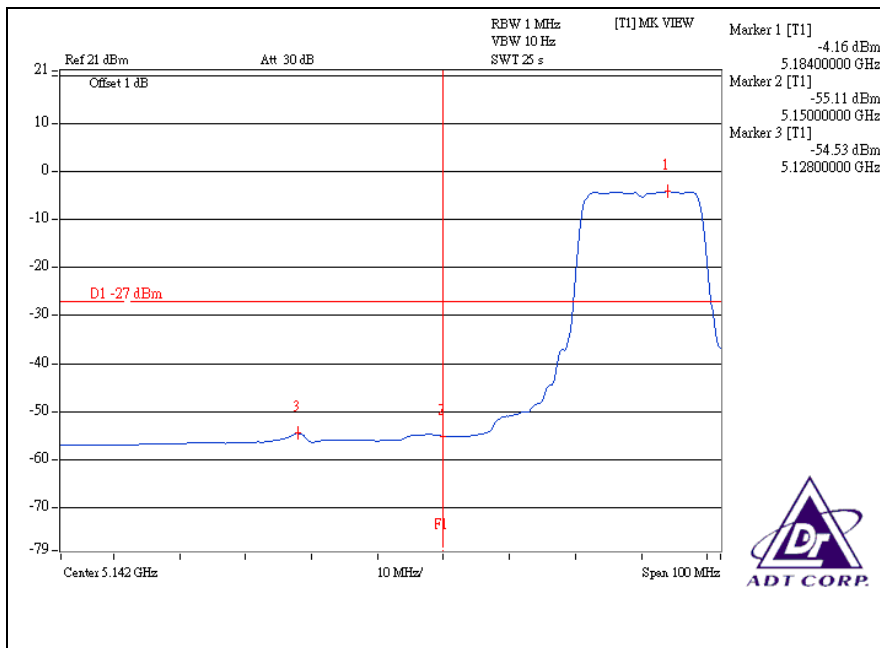
DRAFT 802.11n (20MHz) OFDM MODULATION:

For chain (0):

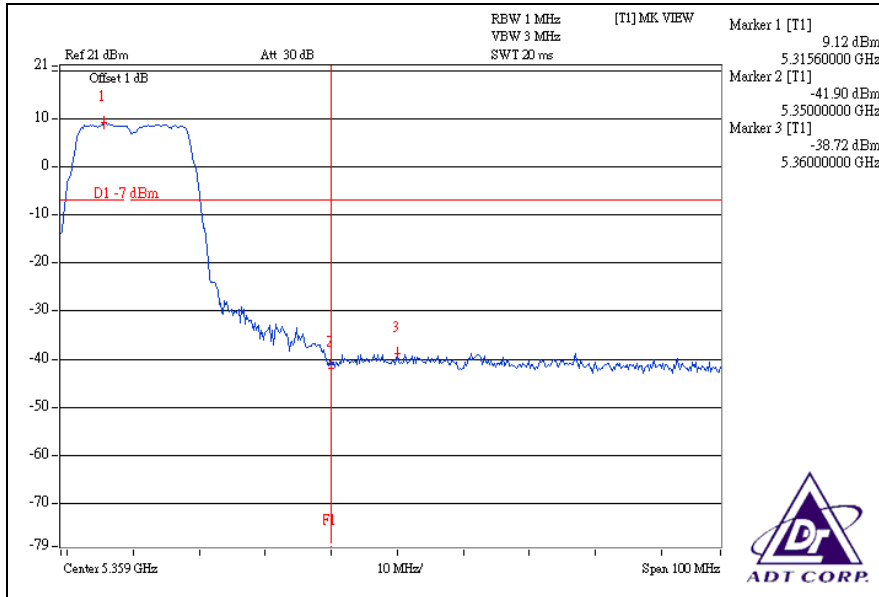
CH1



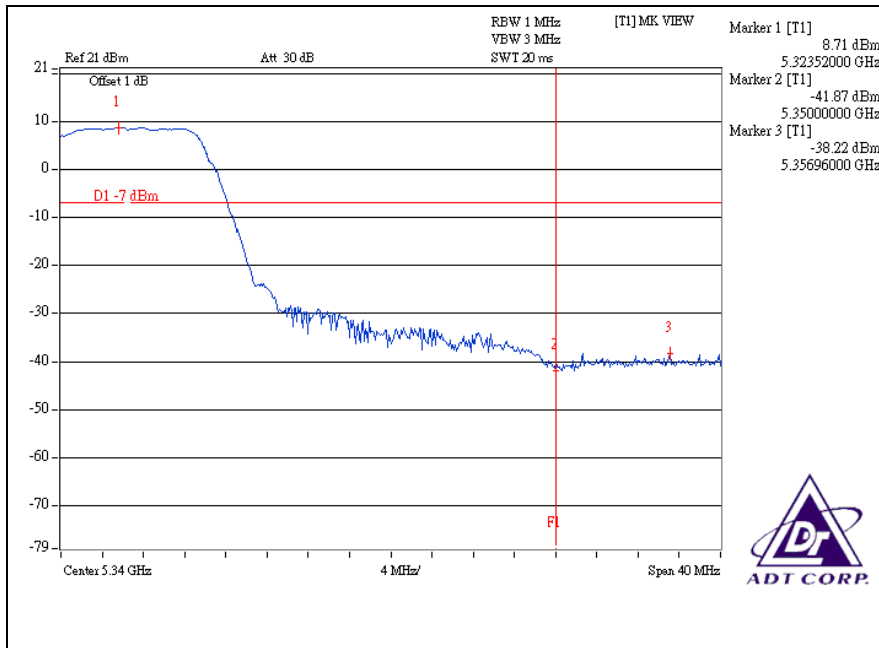
CH1



CH8

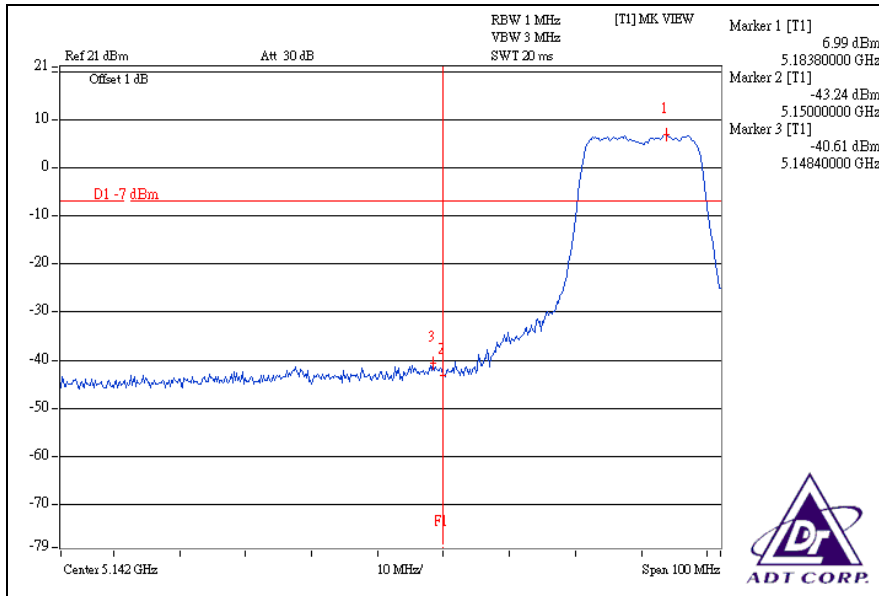


CH8

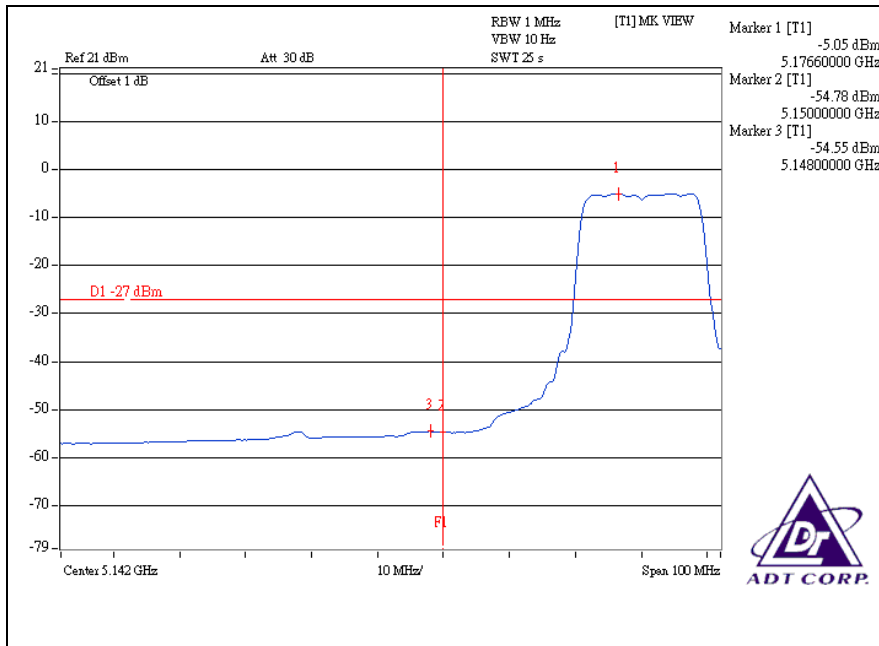


For chain (1):

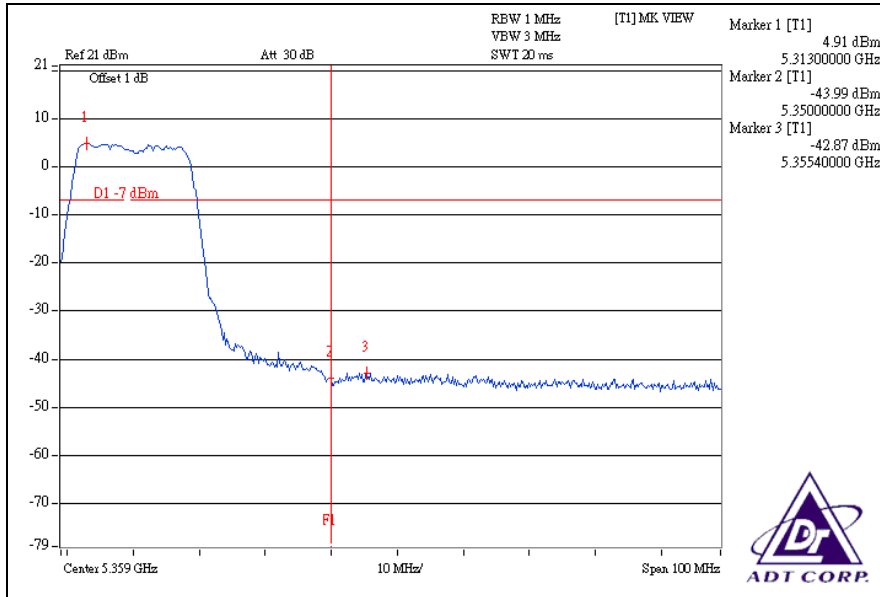
CH1



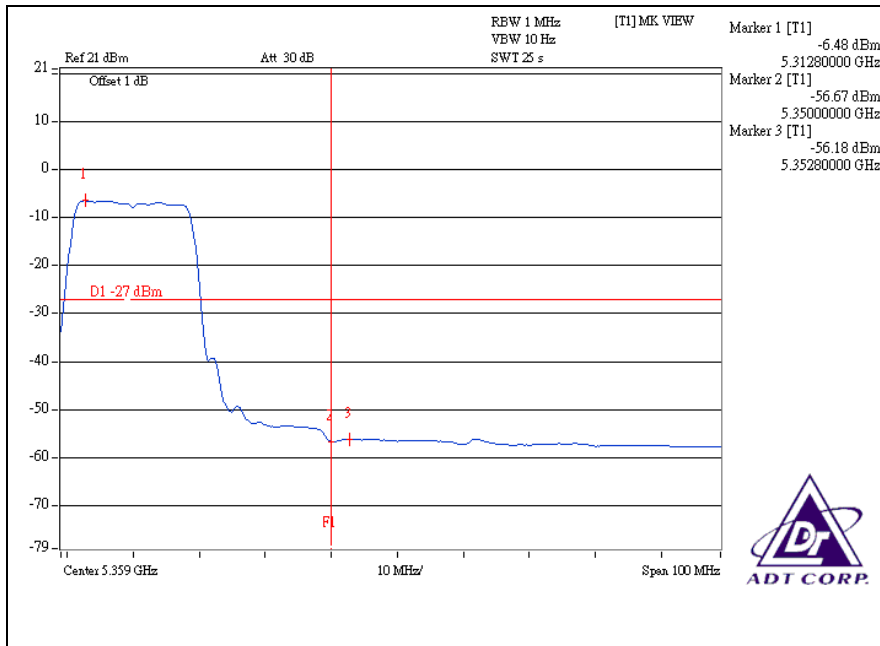
CH1



CH8

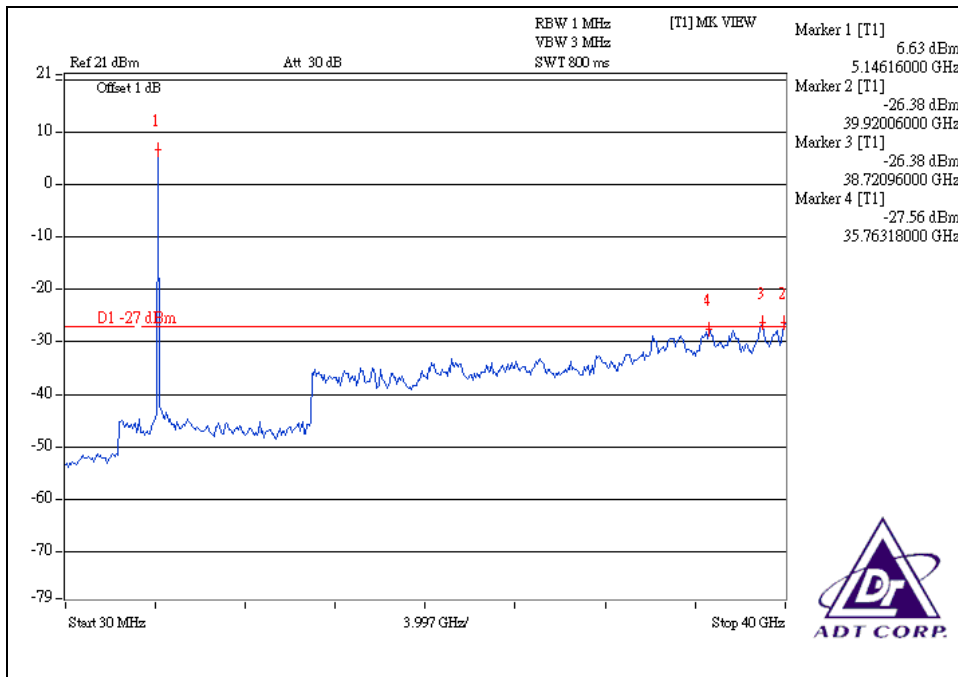


CH8

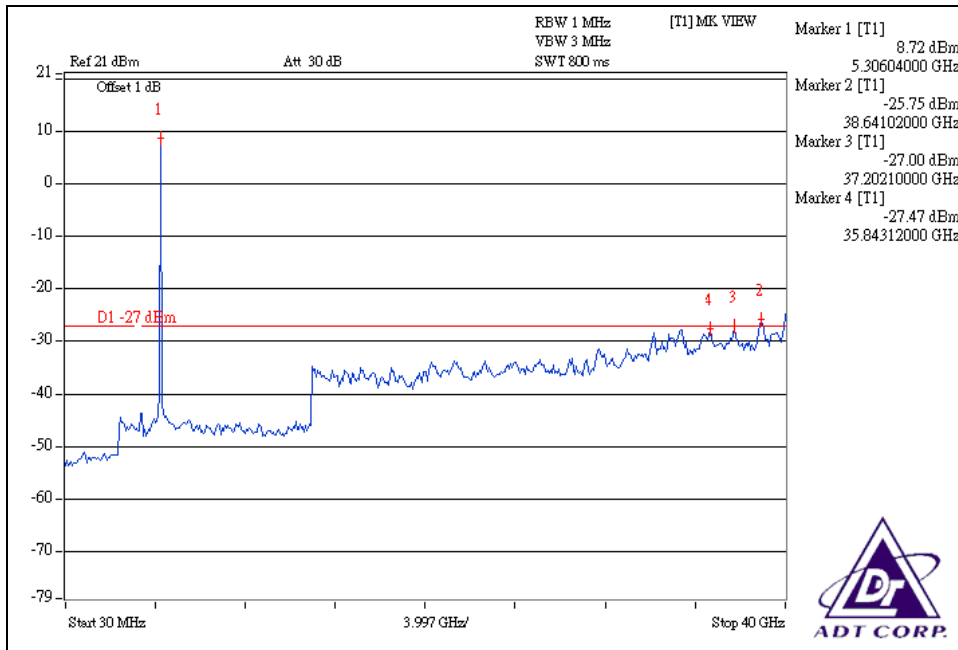


For chain (0):

CH1



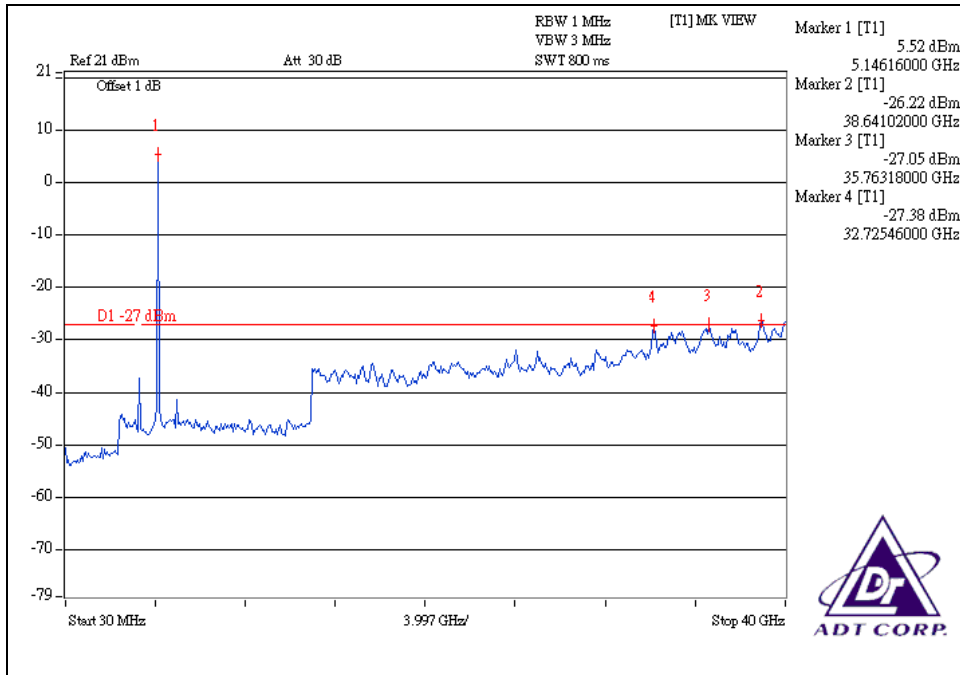
CH8



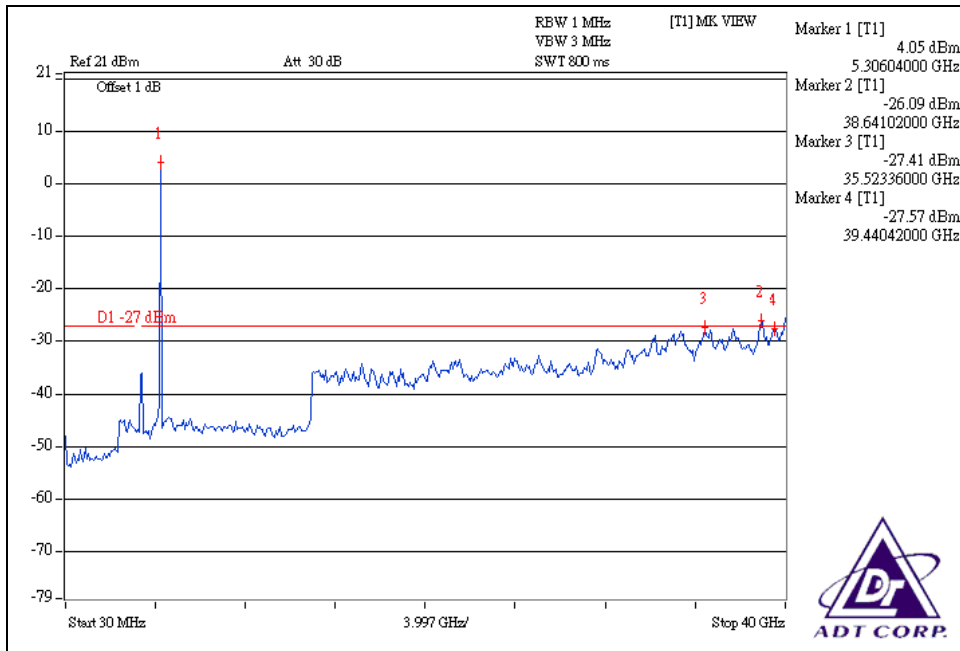


For chain (1):

CH1



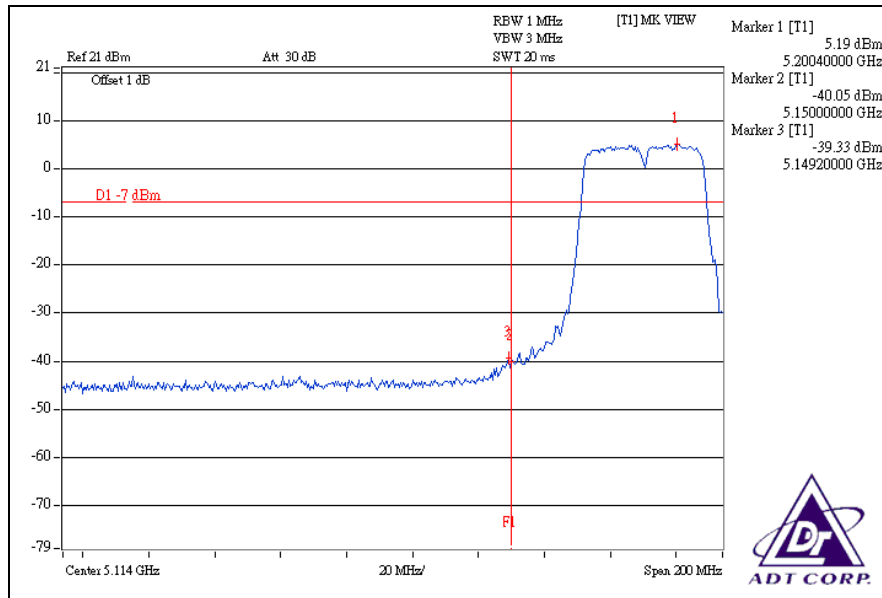
CH8



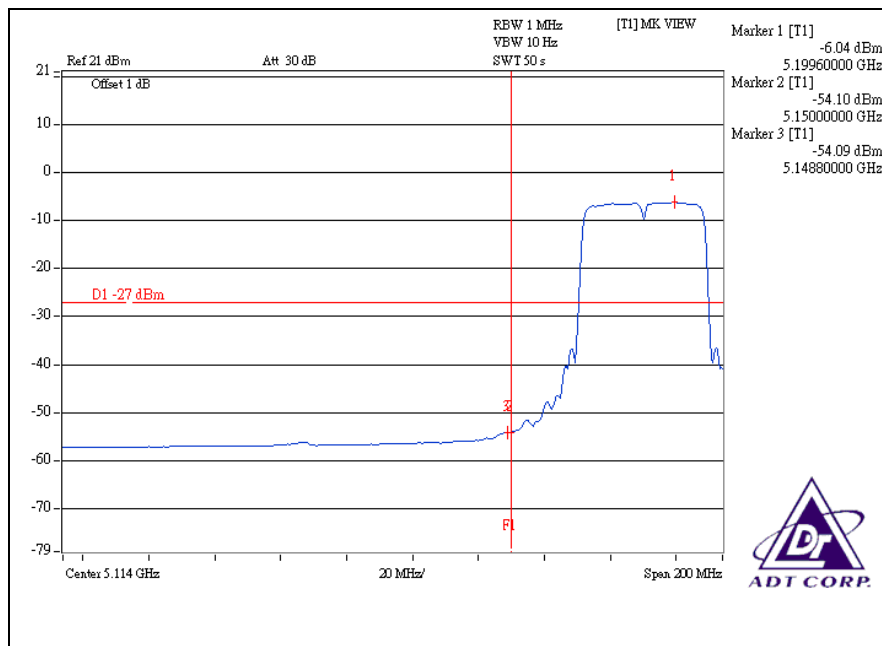
DRAFT 802.11n (40MHz) OFDM MODULATION:

For chain (0):

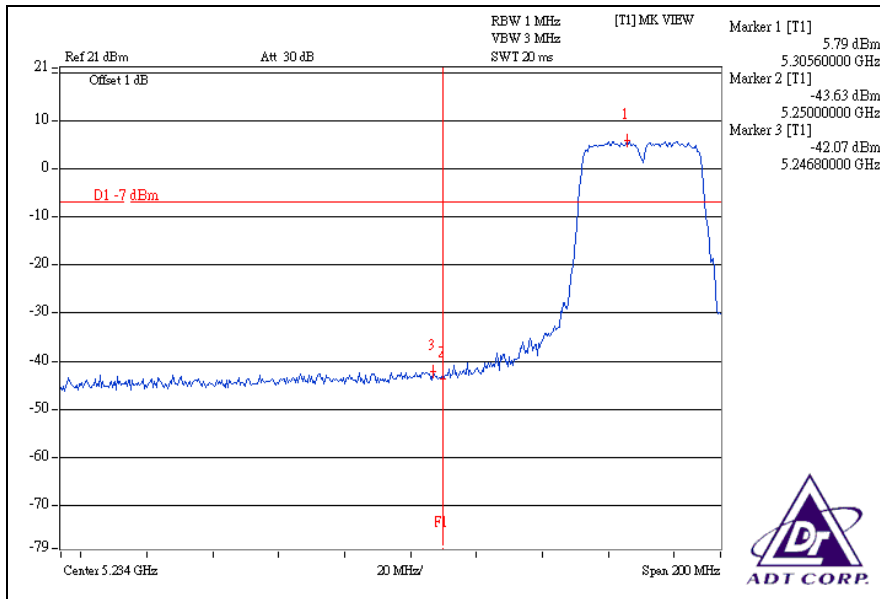
CH1



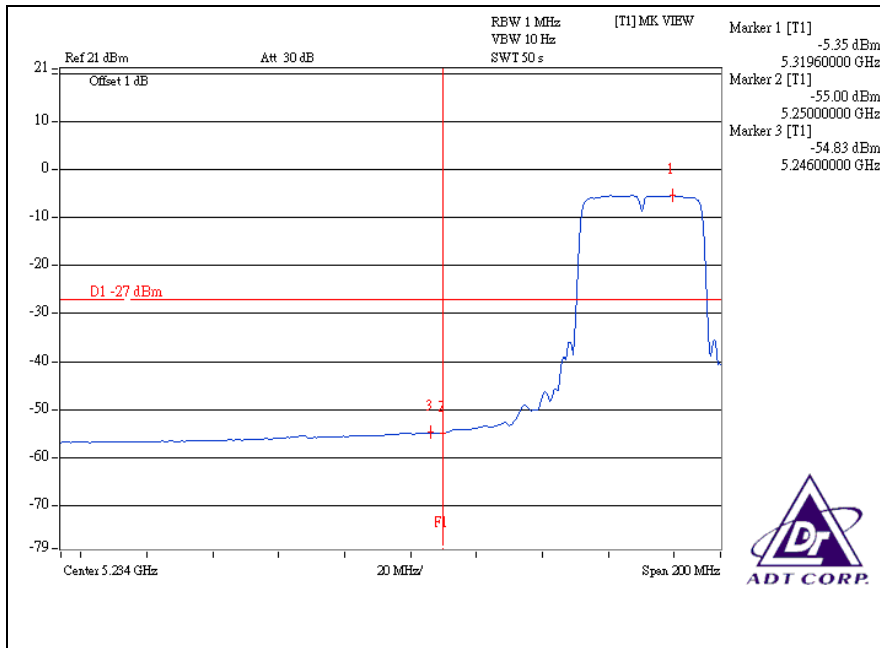
CH1



CH4

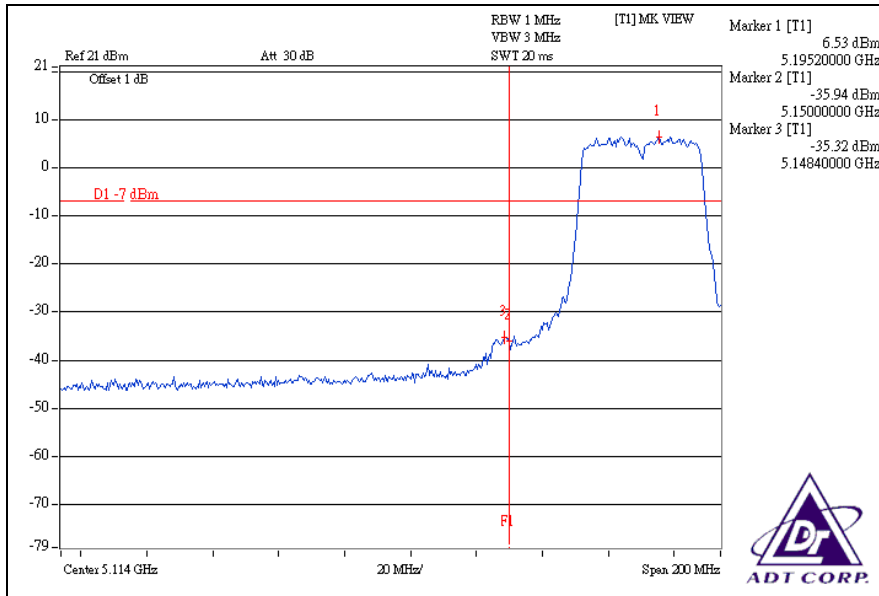


CH4

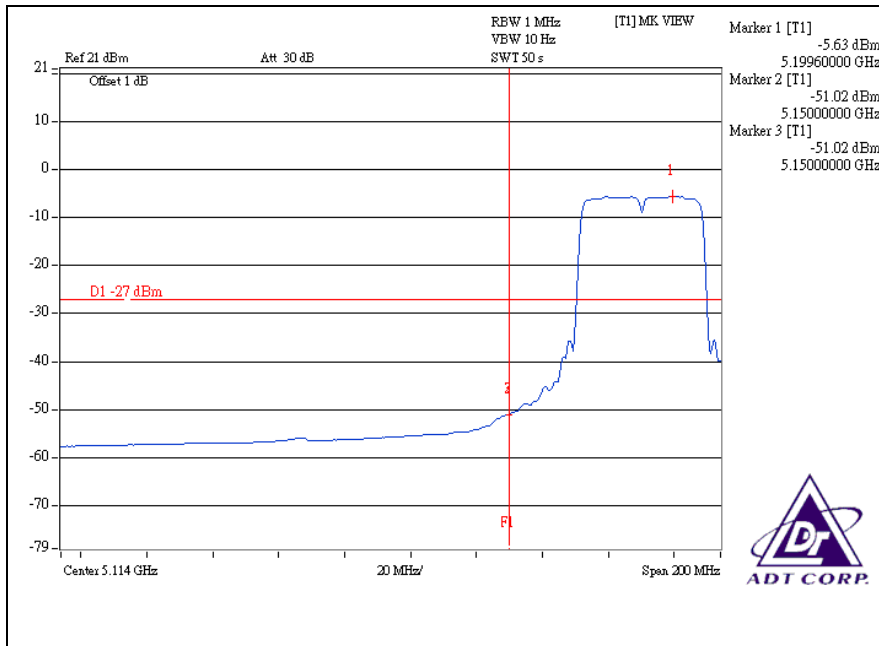


For chain (1):

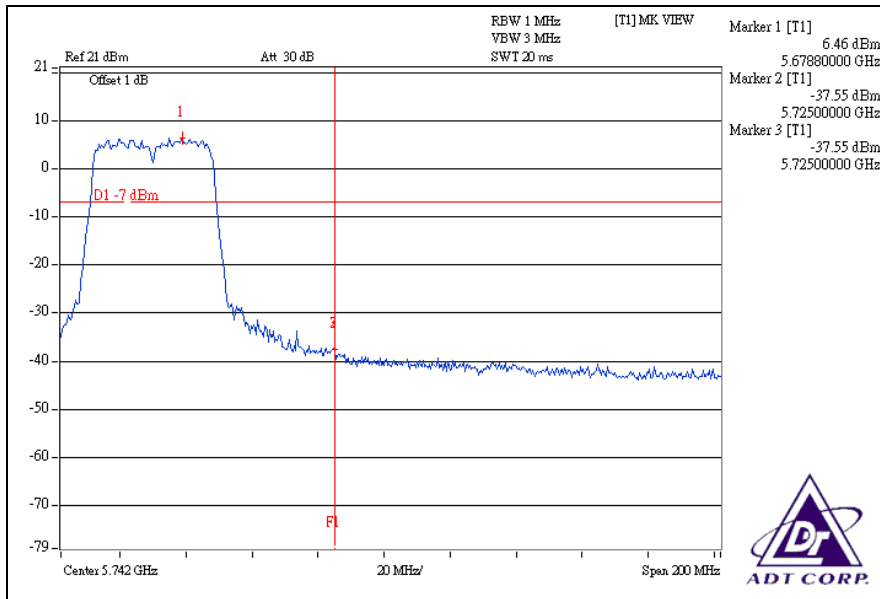
CH1



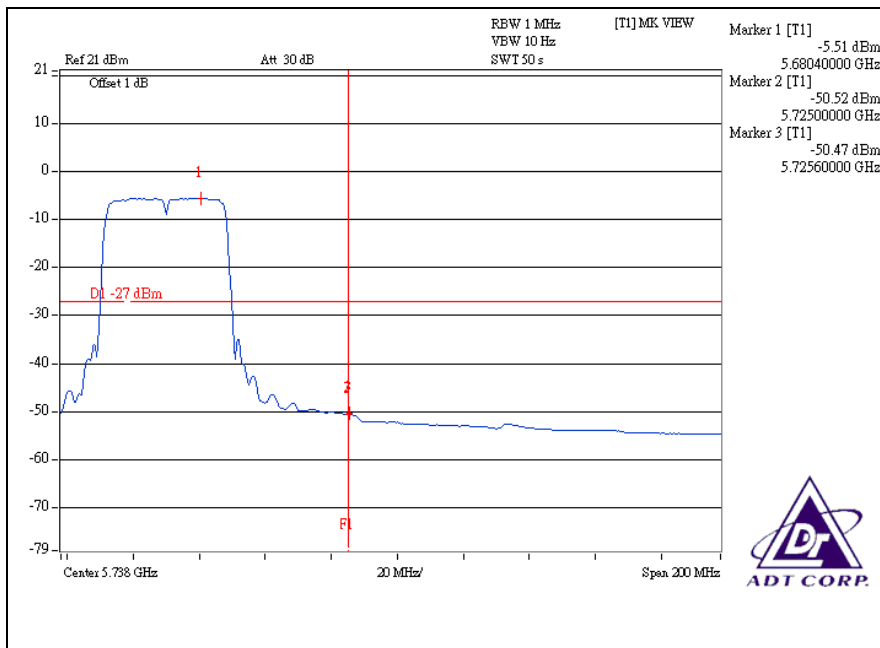
CH1



CH4

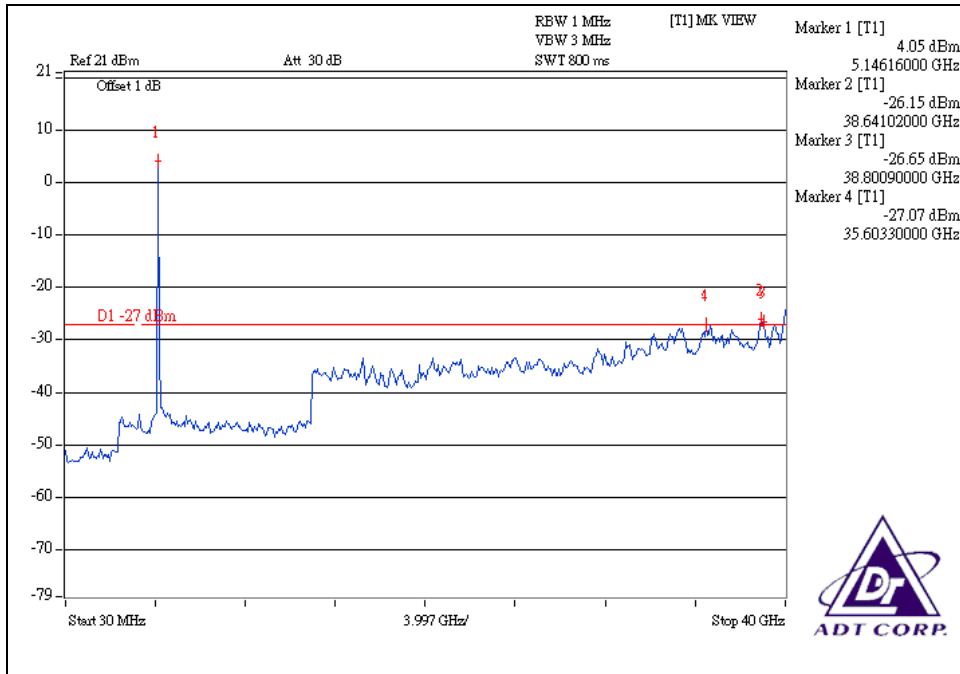


CH4

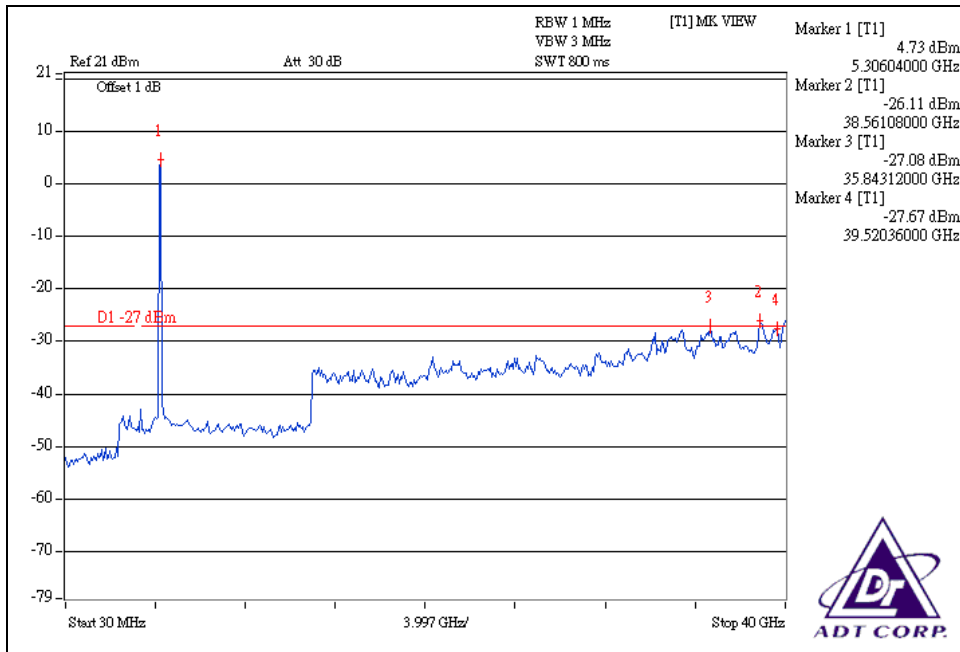


For chain (0):

CH1

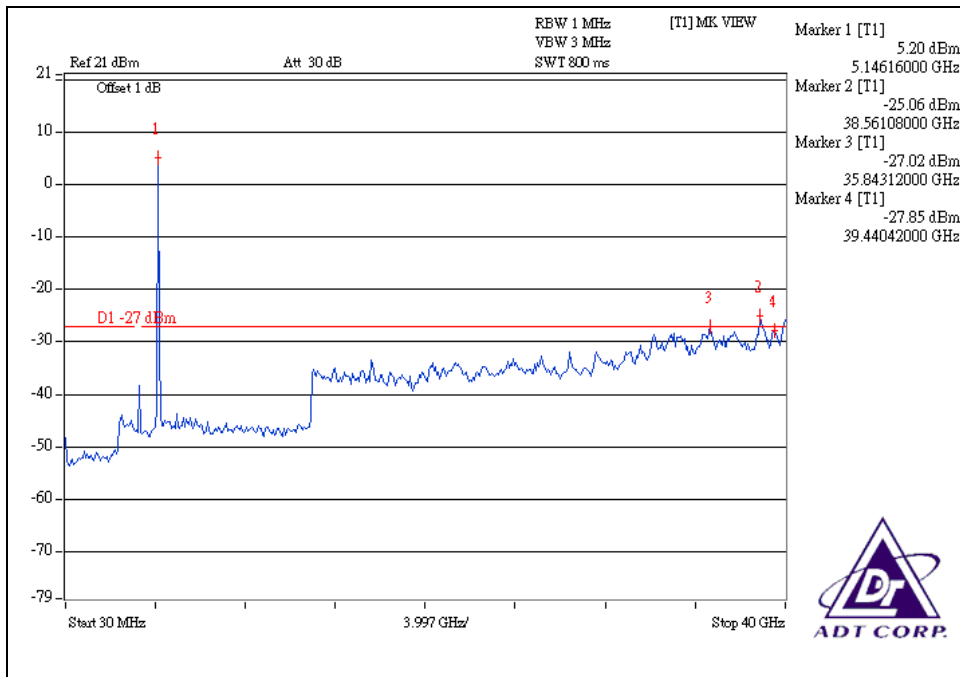


CH4

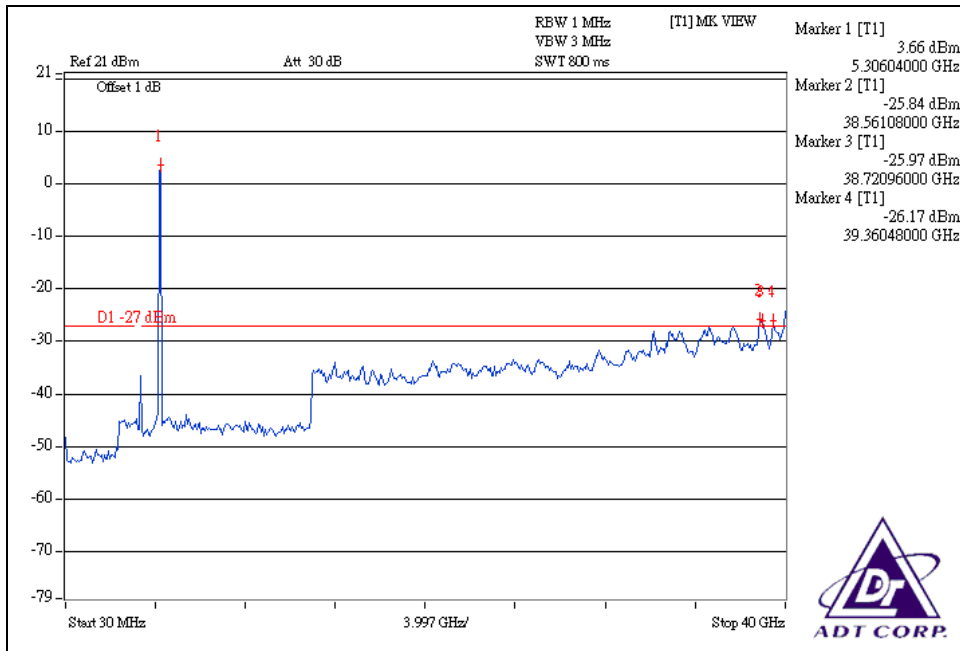


For chain (1):

CH1



CH4



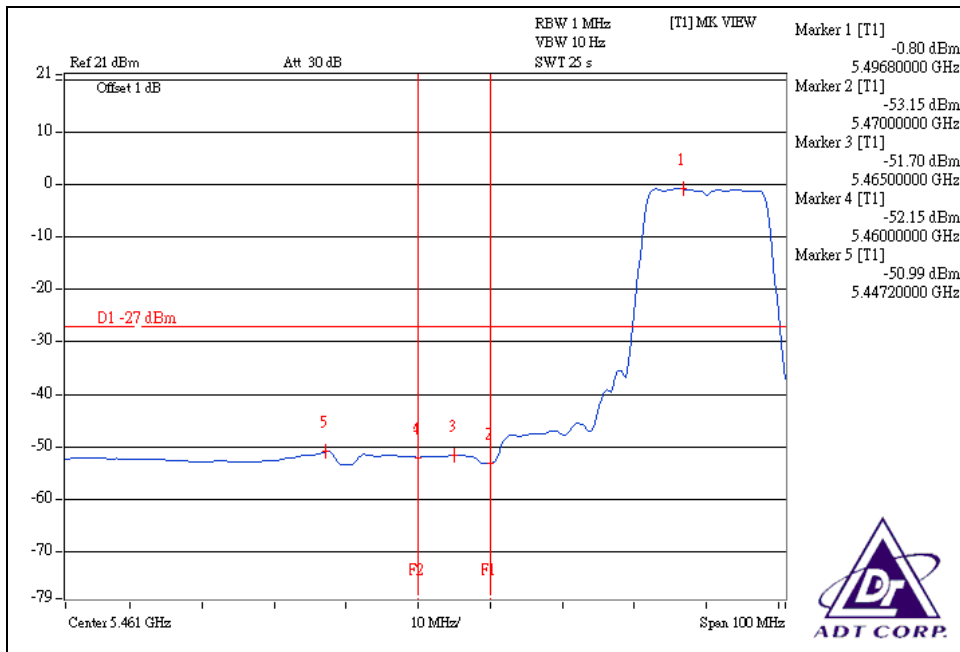
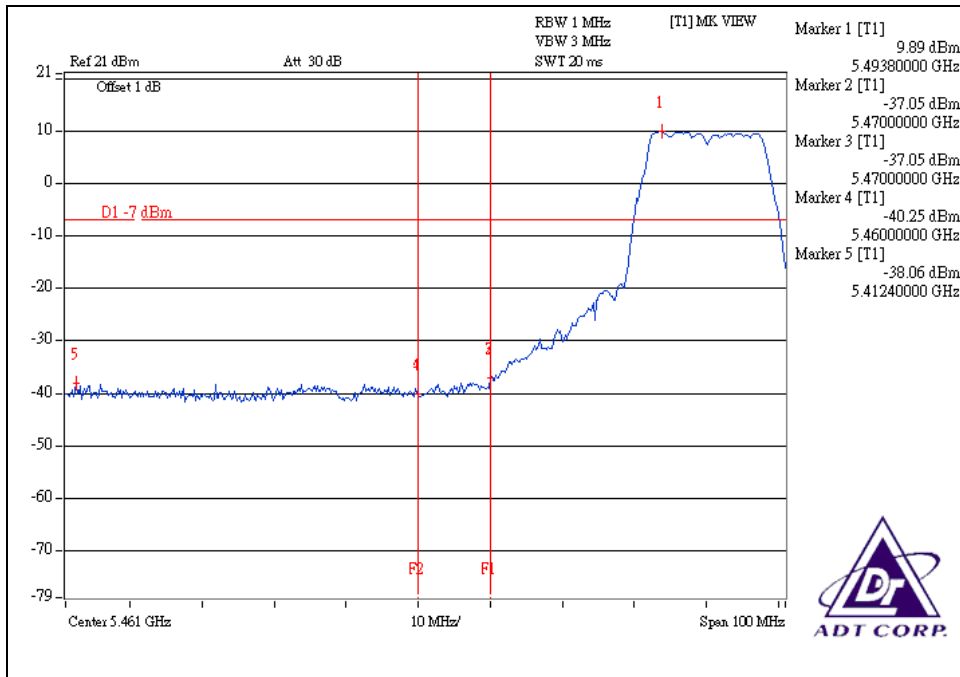


For 5.47 to 5.725GHz band:

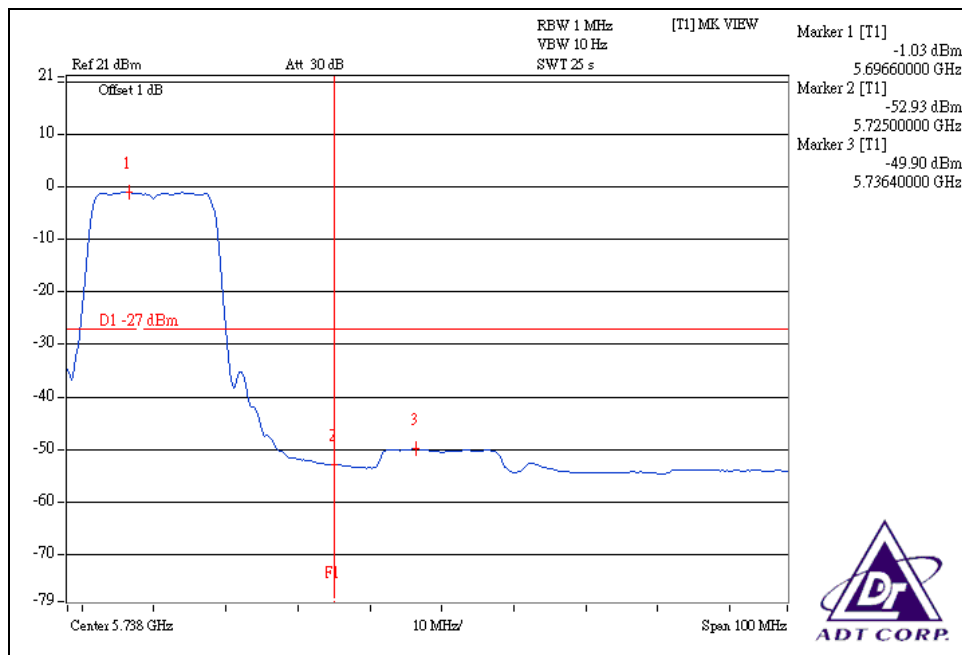
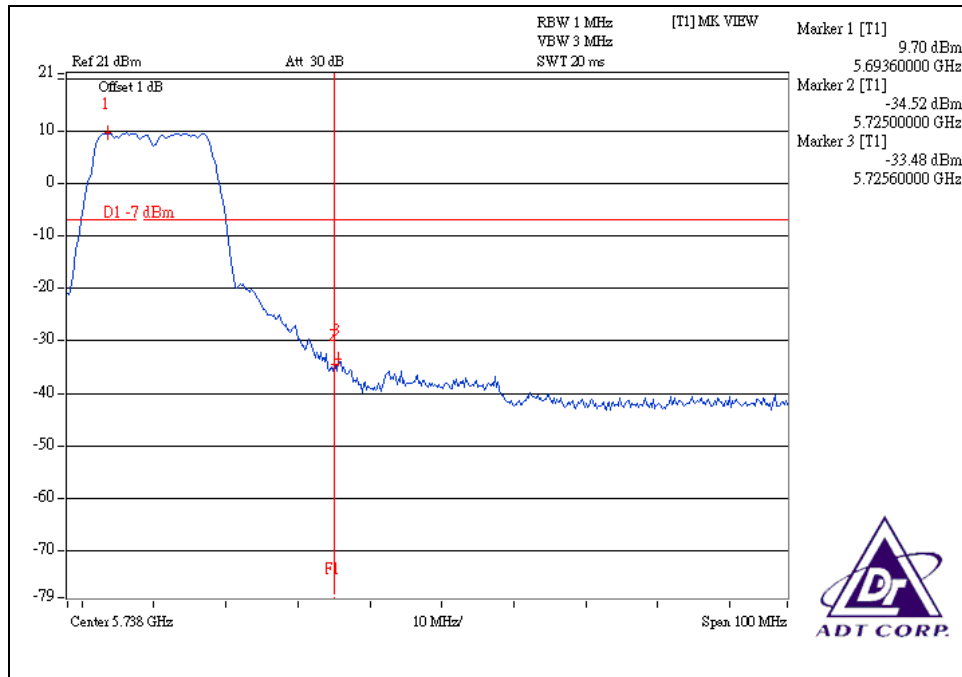
The spectrum plots (Peak RBW=1MHz, VBW=3MHz; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

802.11a OFDM modulation

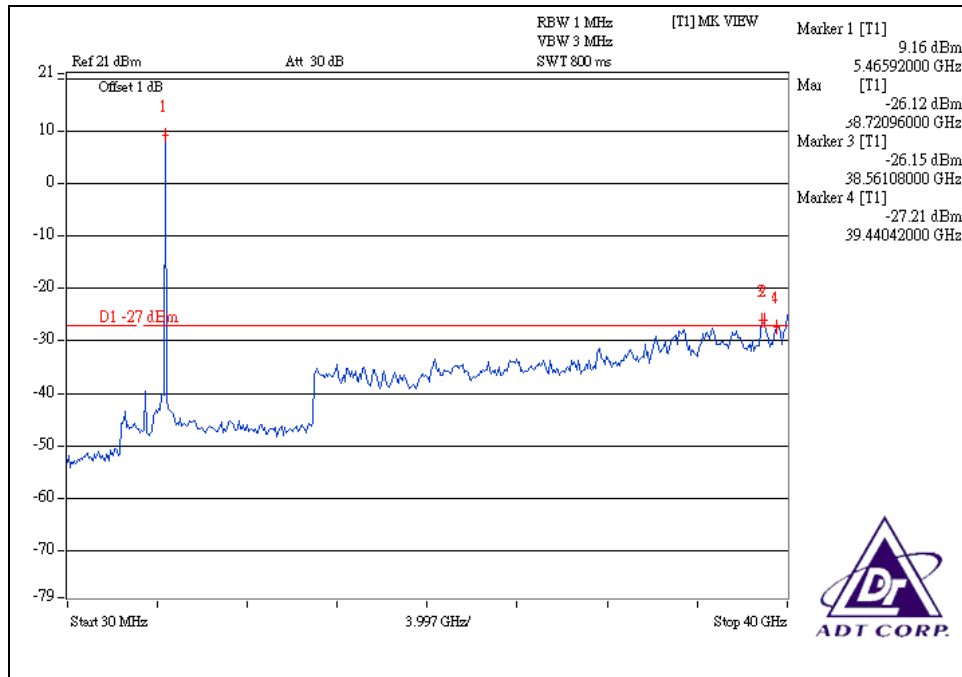
CH 9



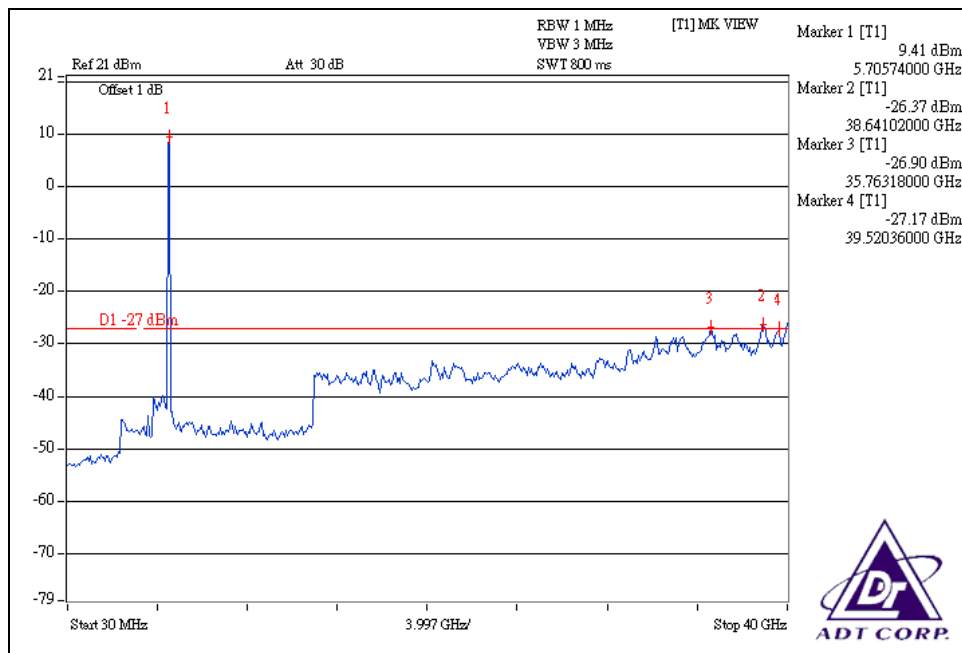
CH 19



CH 9



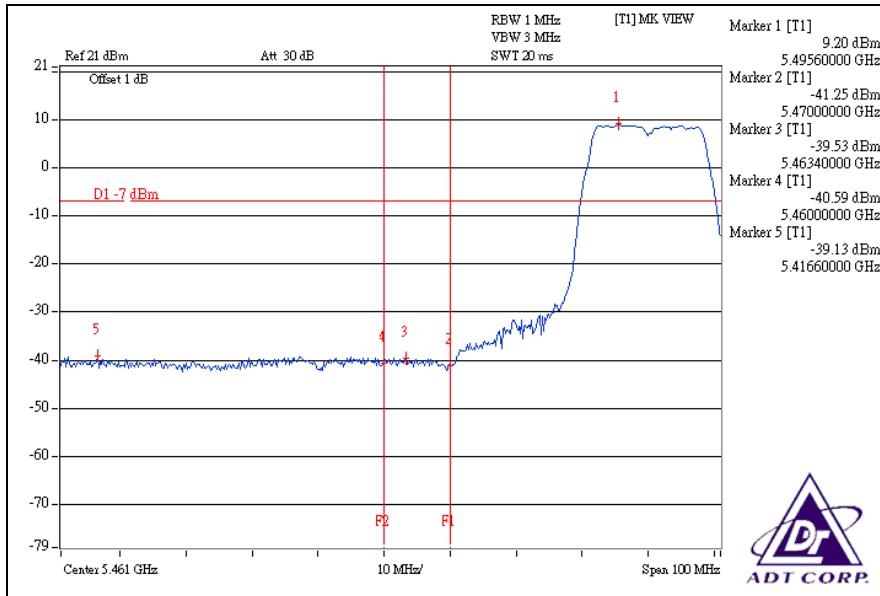
CH 19



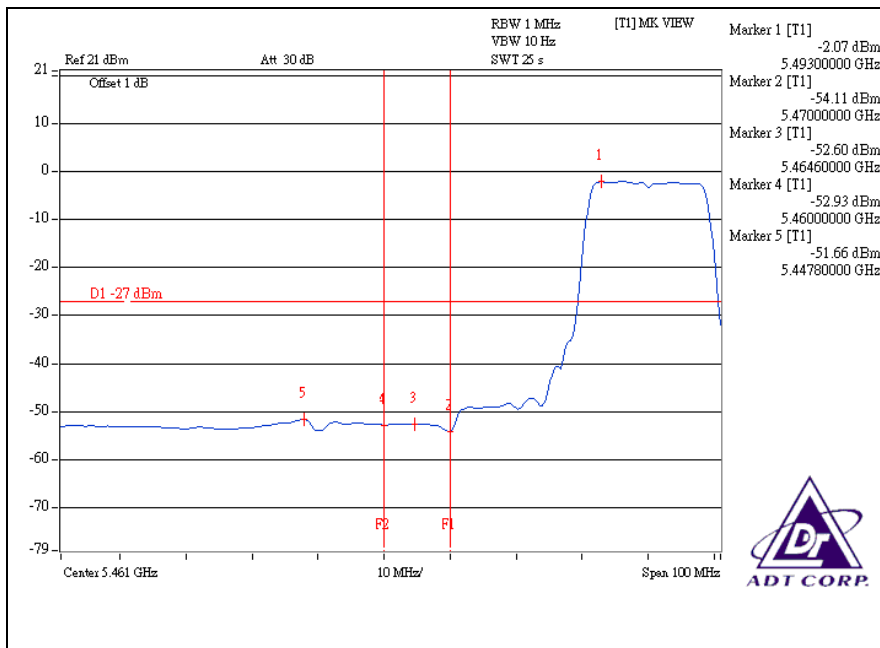
DRAFT 802.11n (20MHz) OFDM MODULATION:

For chain (0):

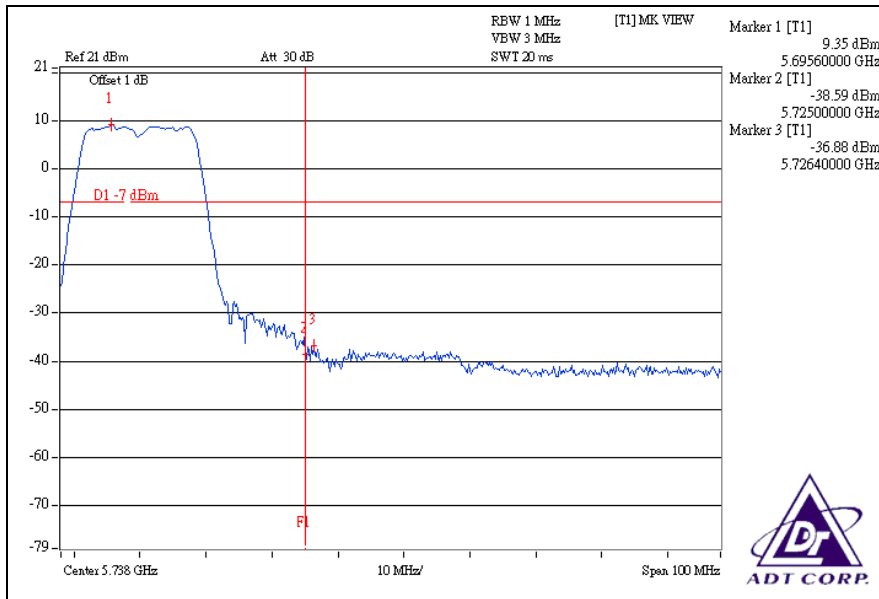
CH9



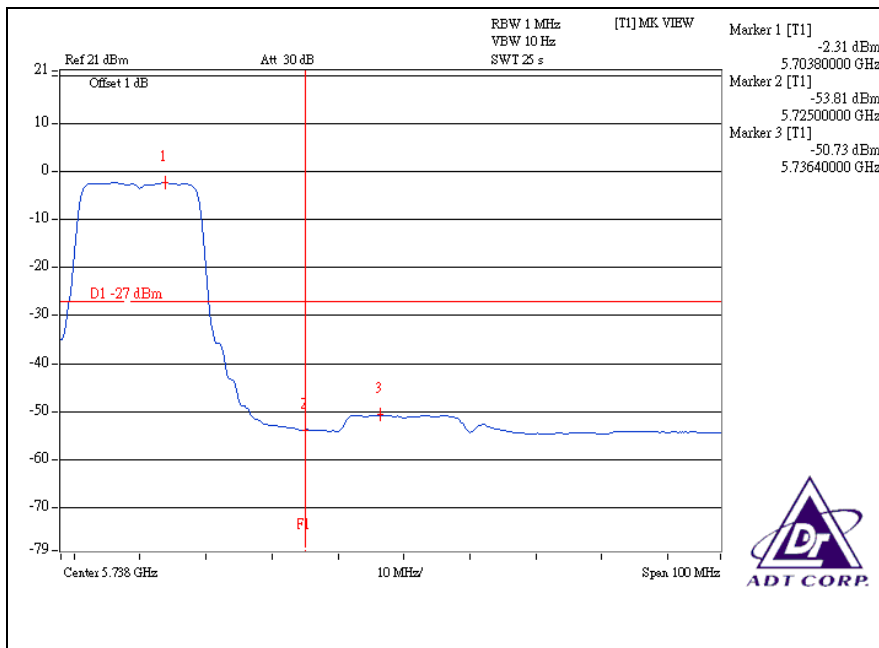
CH9



CH19

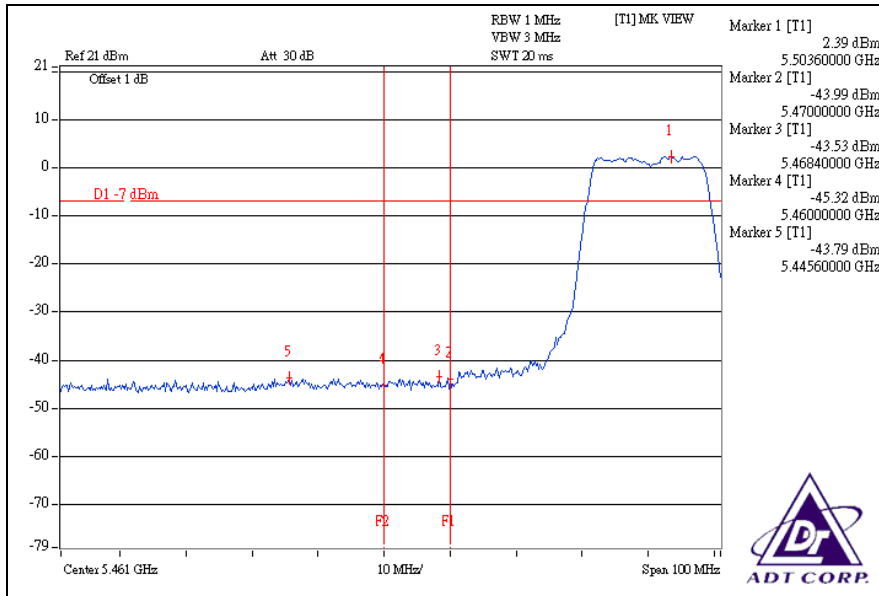


CH19

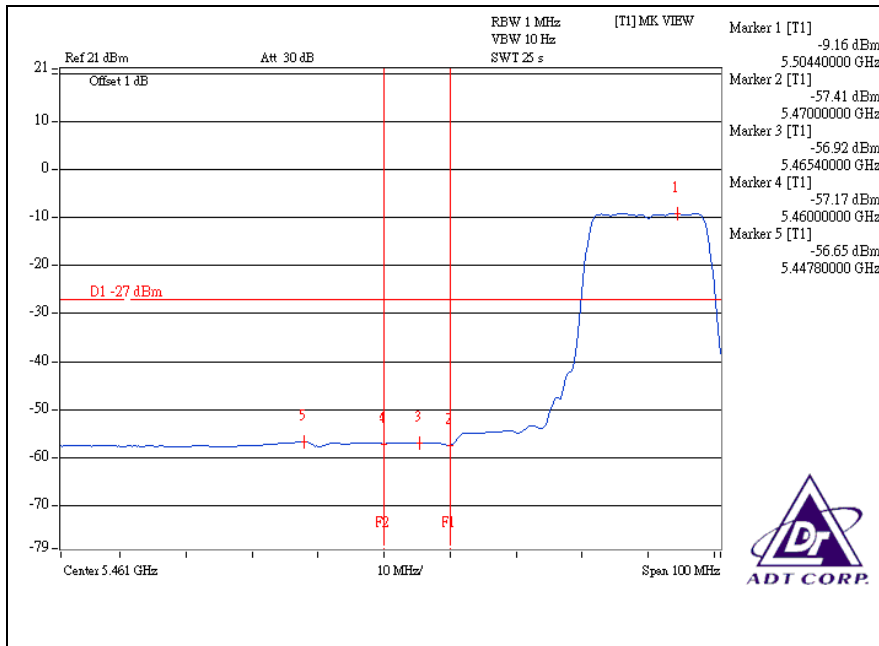


For chain (1):

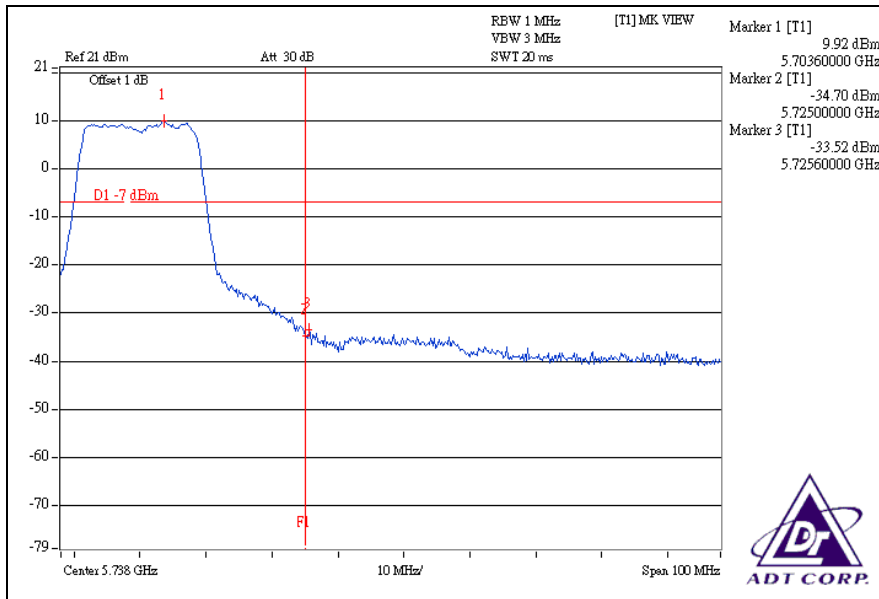
CH9



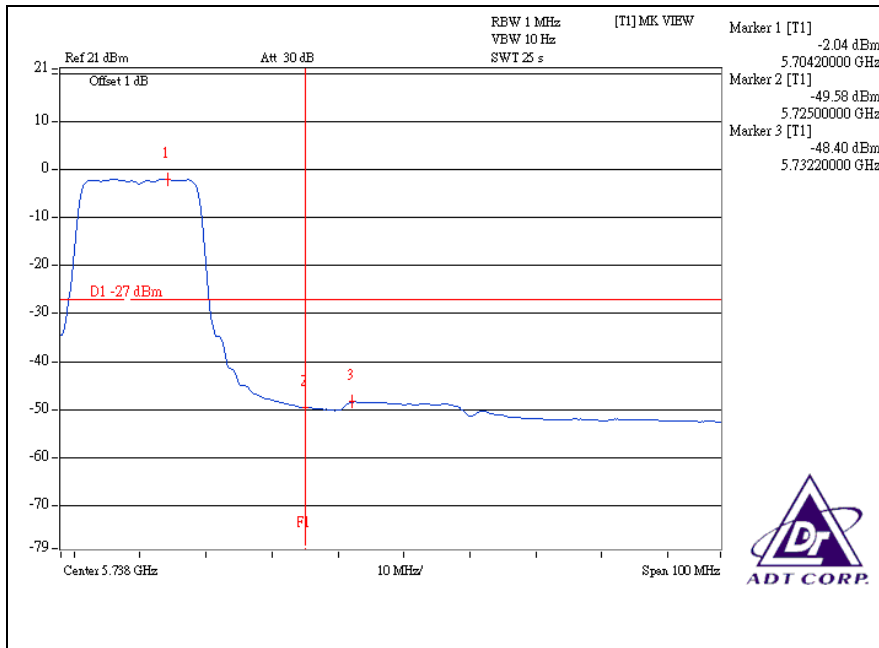
CH9



CH19

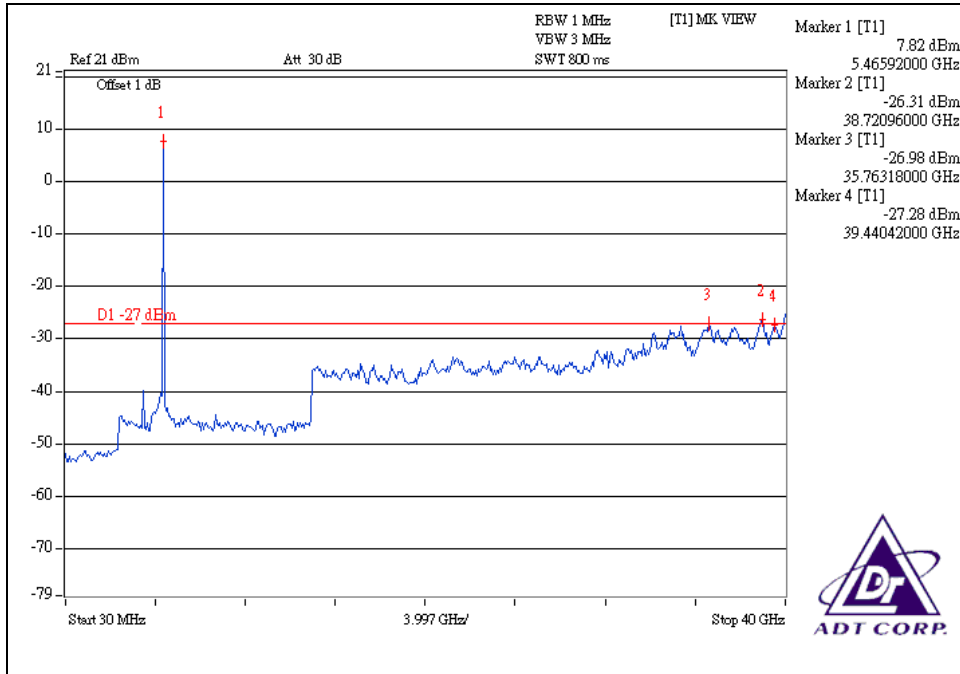


CH19

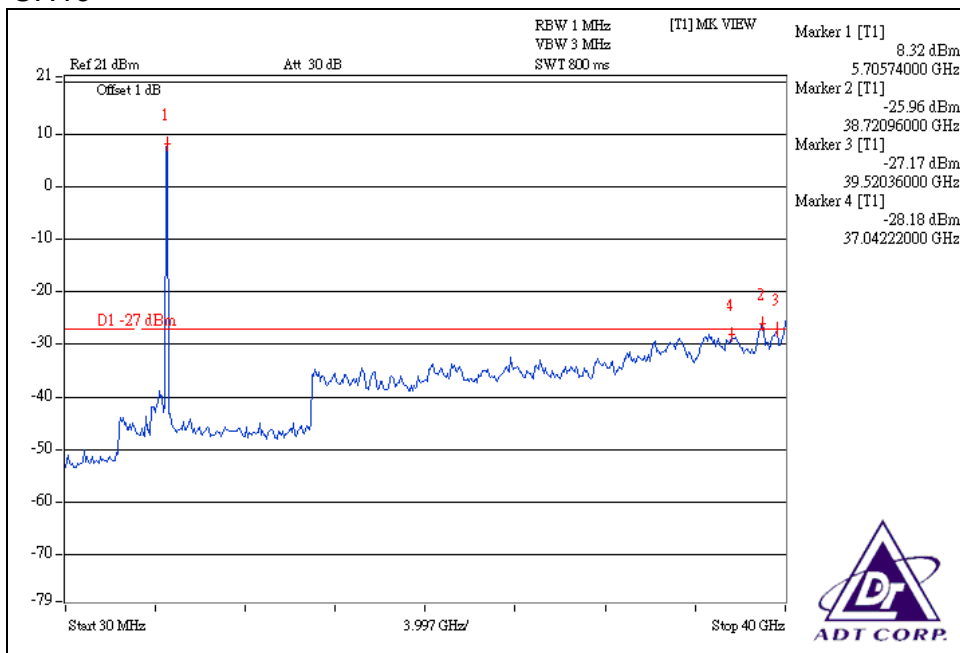


For chain (0):

CH9

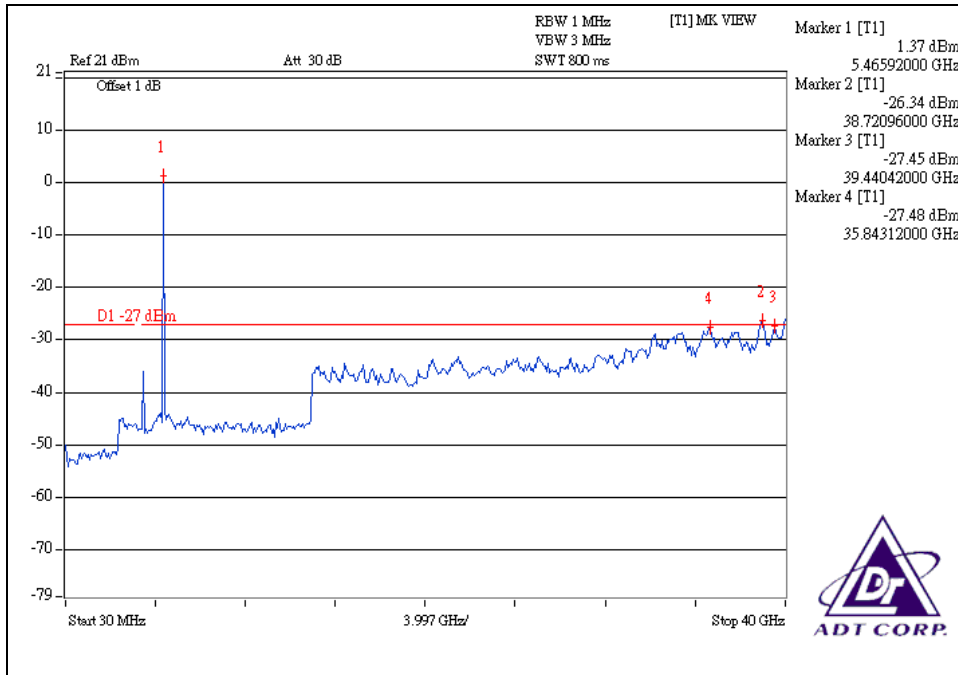


CH19

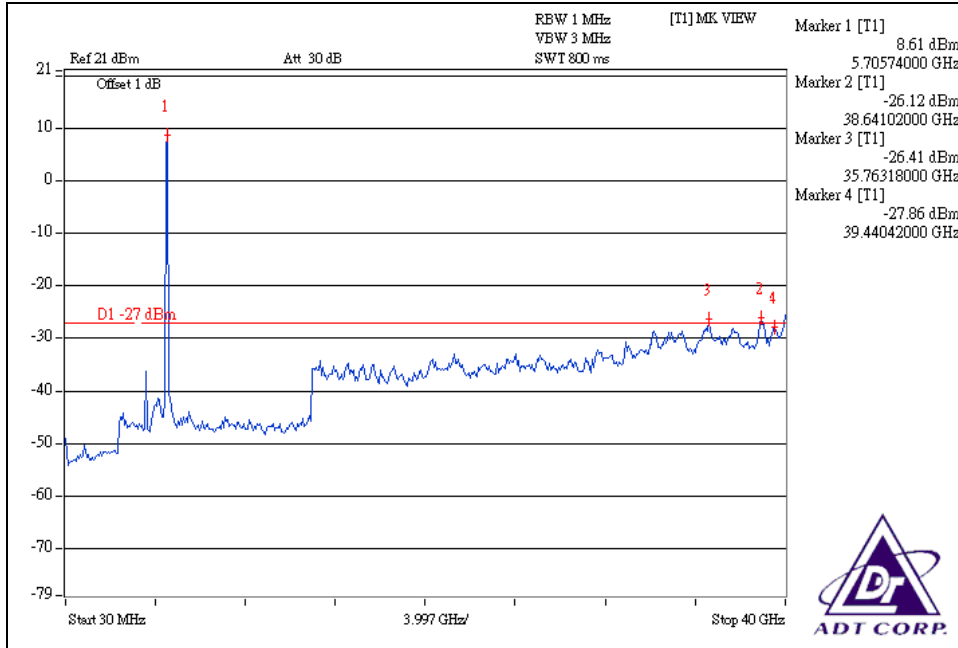


For chain (1):

CH9



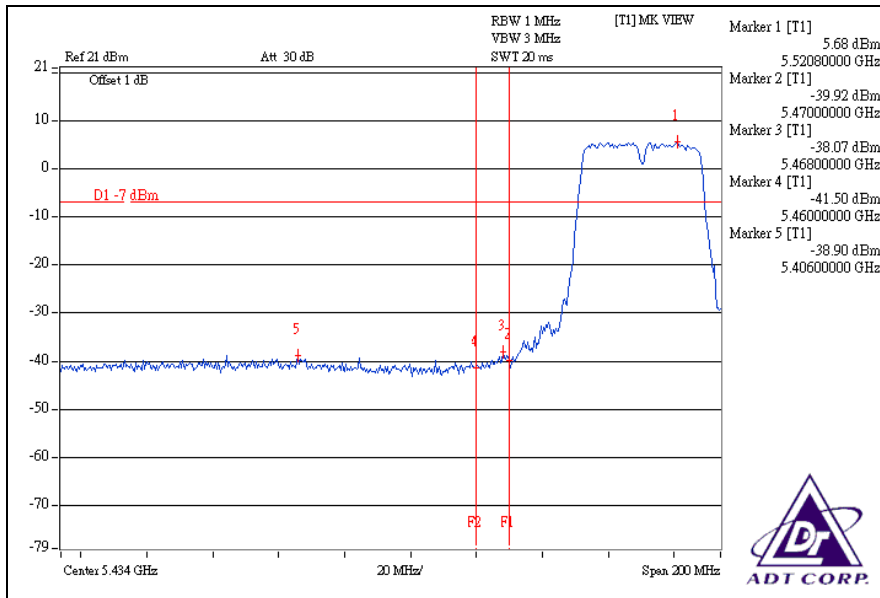
CH19



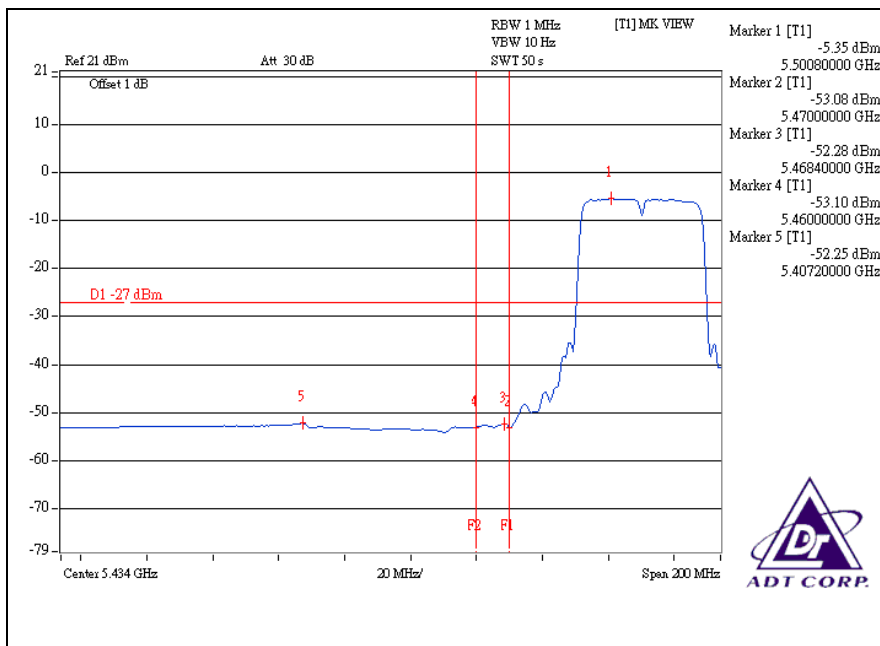
DRAFT 802.11n (40MHz) OFDM MODULATION:

For chain (0):

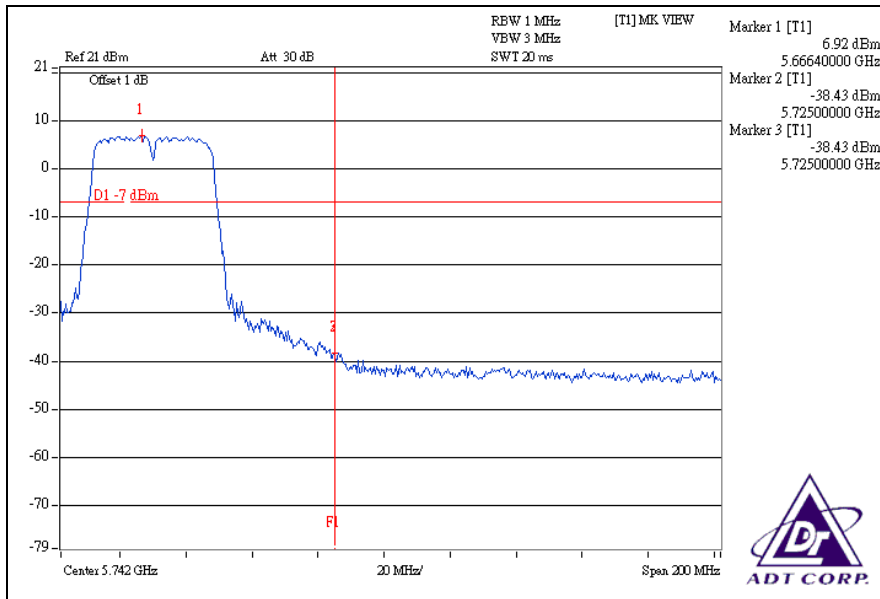
CH5



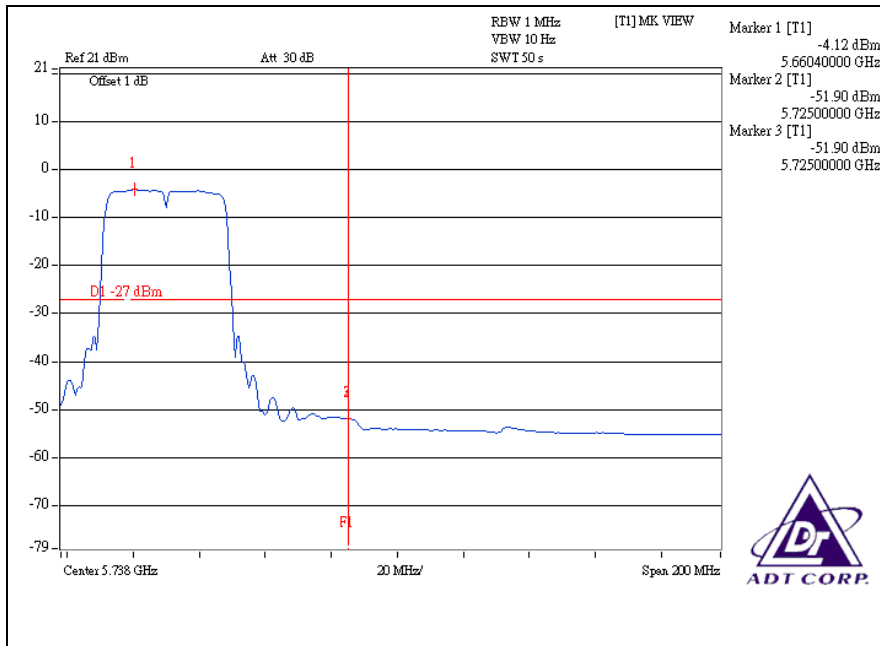
CH5



CH9

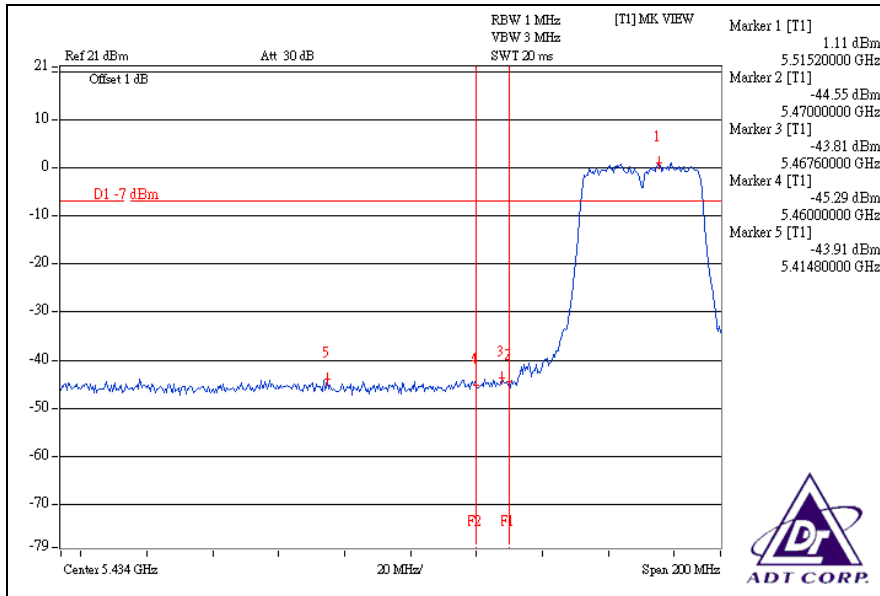


CH9

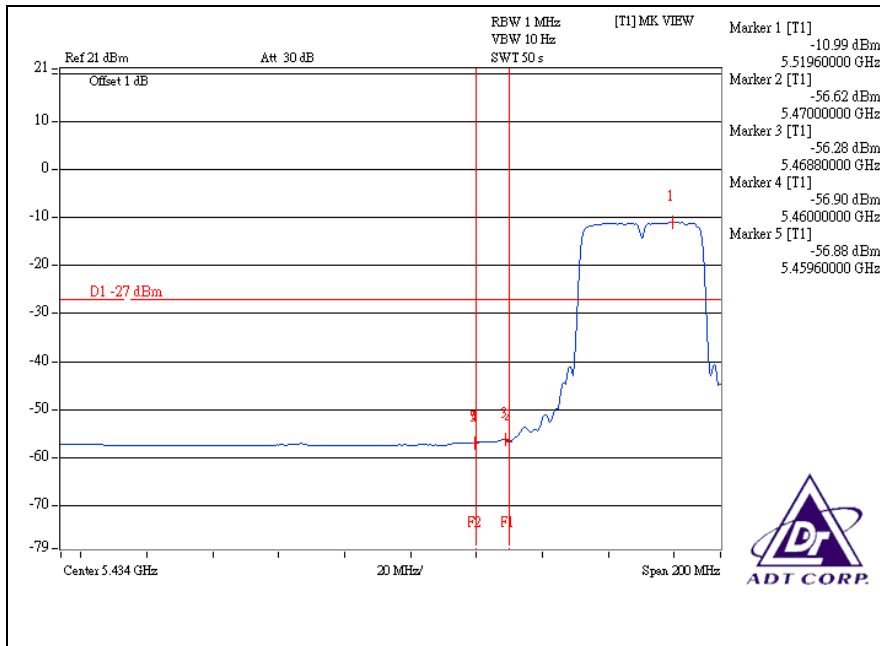


For chain (1):

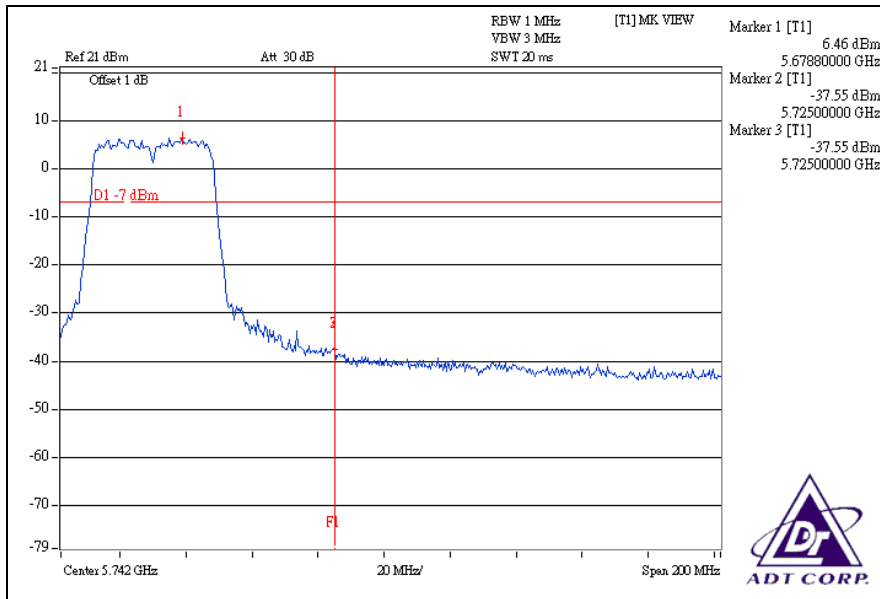
CH5



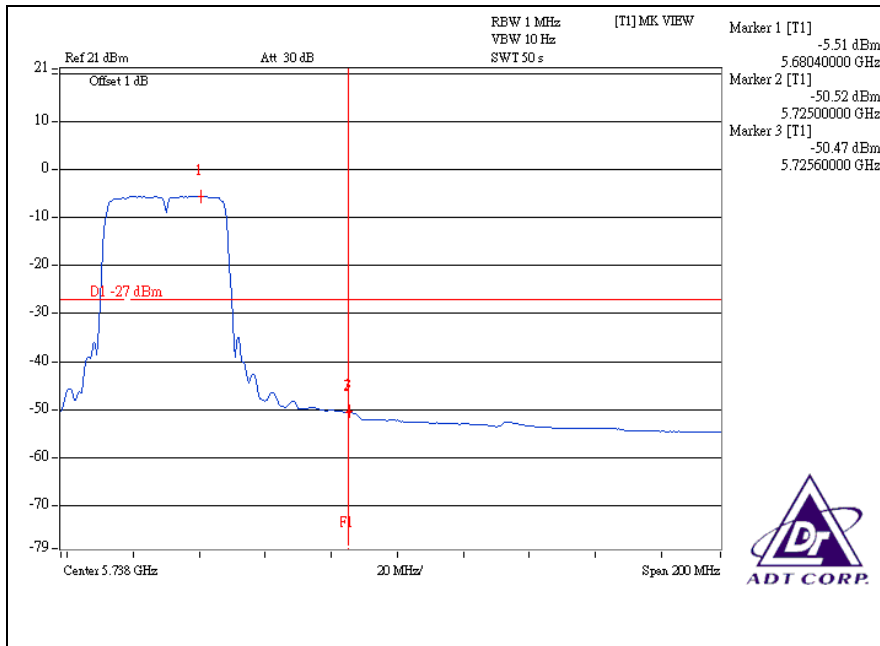
CH5



CH9

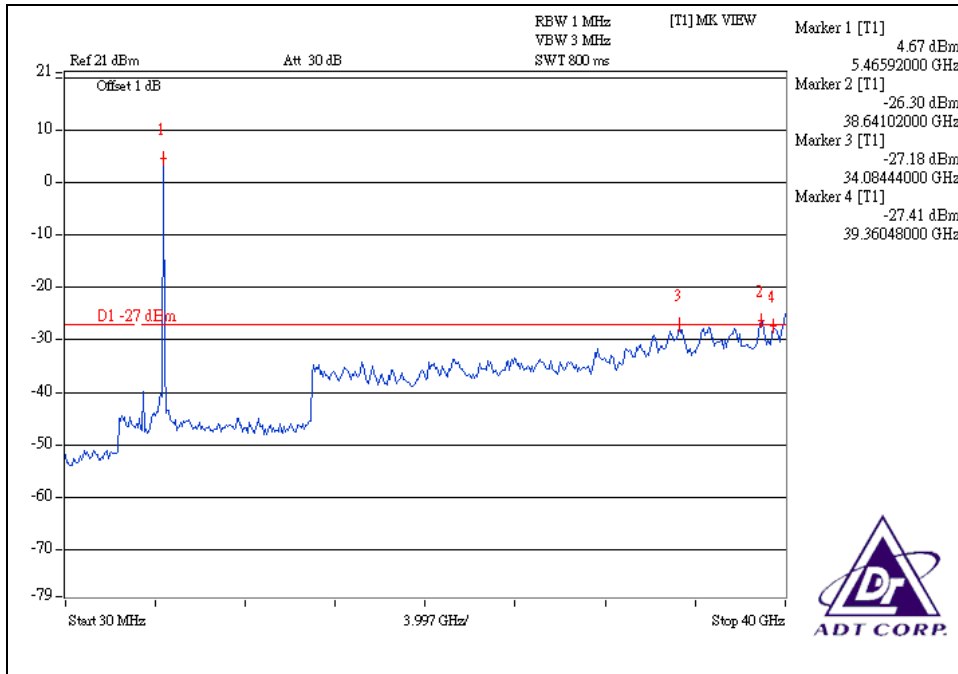


CH9

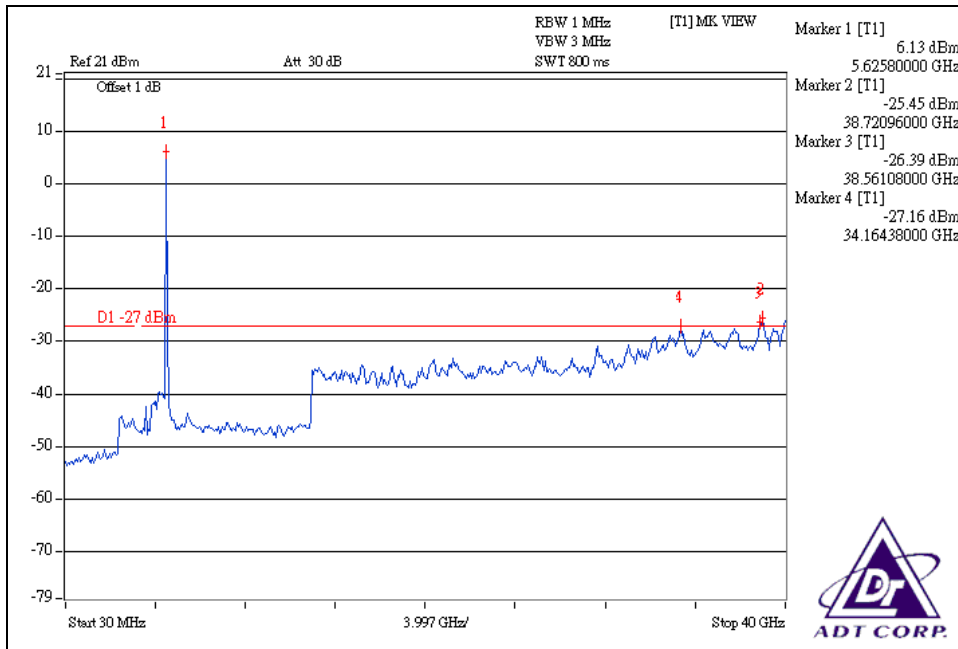


For chain (0):

CH5



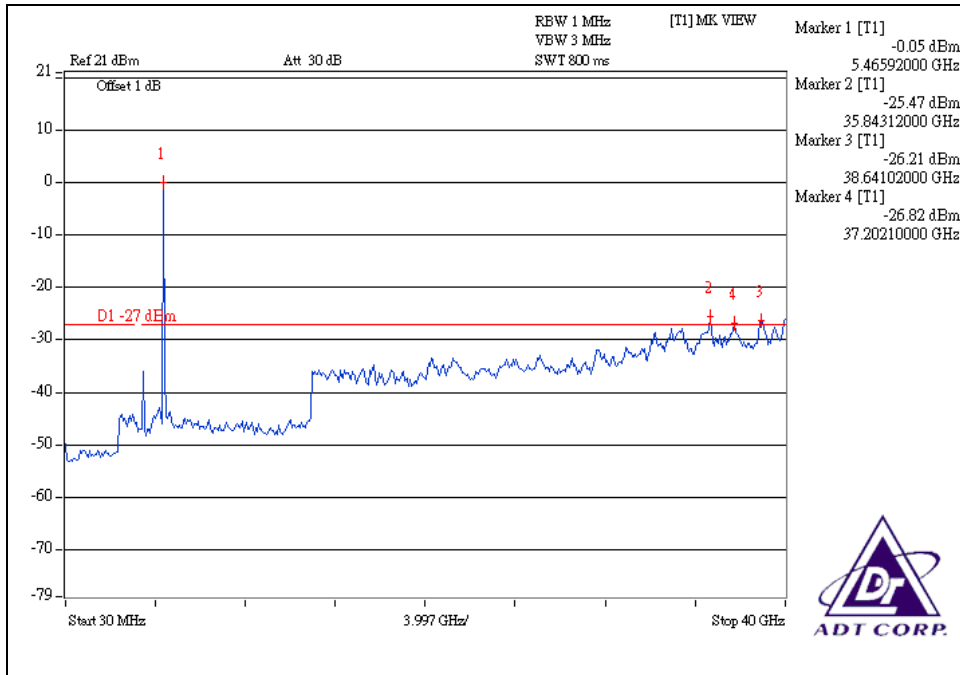
CH9



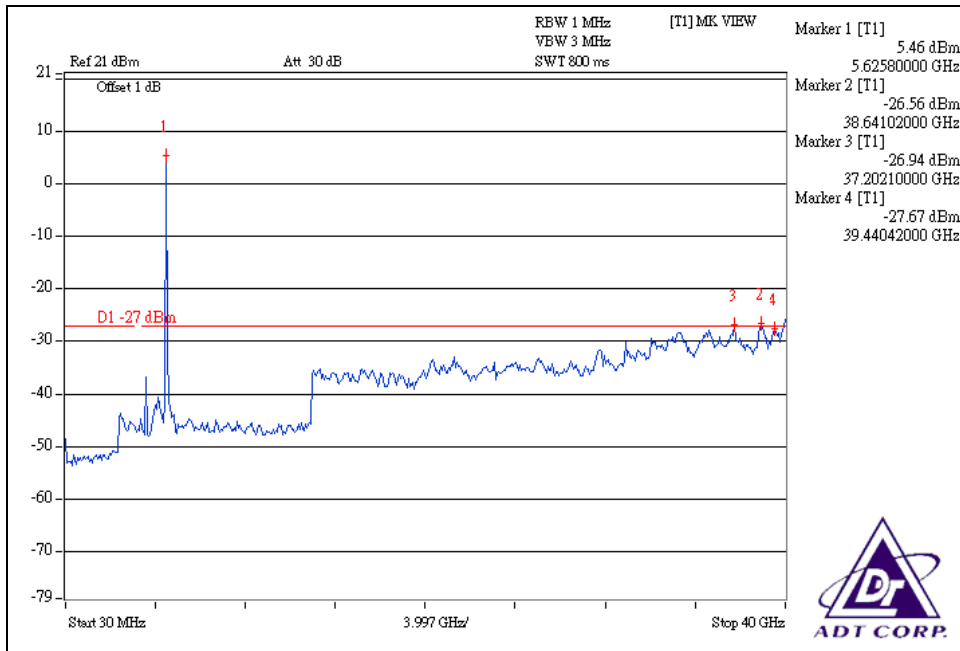


For chain (1):

CH5



CH9



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

There are two antennas provided to this EUT, please refer to the following table:

No.	Antenna Type	For 5GHz / Gain (dBi)	Antenna Connector
1	PCB Print	4	NA
2	PCB Print	4	NA



5. 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, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	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

Web Site: www.adt.com.tw

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



6. APPENDIX-A- MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.