



FCC TEST REPORT (15.407)

REPORT NO.: RF960905L09-1

MODEL NO.: DGL-4500

RECEIVED: Sep. 06, 2007

TESTED: Sep. 12 ~ Sep. 19, 2007

ISSUED: Sep. 20, 2007

APPLICANT: D-Link Corporation

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ISSUED BY: Advance Data Technology Corporation

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1. CERTIFICATION

PRODUCT: Xtreme N GAMING ROUTER

MODEL: DGL-4500

BRAND: D-Link

APPLICANT: D-Link Corporation

TEST SAMPLE: ENGINEERING SAMPLE

TESTED: Sep. 12 ~ Sep. 19, 2007

STANDARDS: FCC Part 15, Subpart E (Section 15.407)

ANSI C63.4-2003

The above equipment (Model: DGL-4500) has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Rennie Wang , **DATE:** Sep. 20, 2007
Rennie Wang / Senior Specialist

TECHNICAL ACCEPTANCE : Long Chen , **DATE:** Sep. 20, 2007
Responsible for RF Long Chen / Senior Engineer

APPROVED BY : Gary Chang , **DATE:** Sep. 20, 2007
Gary Chang / Assistant Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -11.04dB at 0.193MHz
15.407(b)(1/2/3) (b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 4000MHz	PASS	Meet the requirement of limit. Minimum passing margin is -1.22dB at 249.60MHz and 877.61MHz
15.407(a)(1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz ~ 30MHz	2.44dB
Radiated emissions	30MHz ~ 200MHz	2.93dB
	200MHz ~ 1000MHz	2.95dB
	1GHz ~ 18GHz	2.26dB
	18GHz ~ 40GHz	1.94dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Xtreme N GAMING ROUTER
MODEL NO.	DGL-4500
FCC ID	KA2DGL4500A1
POWER SUPPLY	12Vdc from AC adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps Draft 802.11n (20MHz): 144.444/ 130.000/ 115.556/ 86.667/ 57.778/ 43.333/ 28.889/ 14.444/ 72.2/ 65.0/ 57.8/ 43.3/ 28.9/ 21.7/ 14.4/ 7.2Mbps Draft 802.11n (40MHz): 300/ 270/ 240/ 180/ 120/ 90/ 60/ 30/ 150/ 135/ 120/ 90/ 60/ 45/ 30/ 15Mbps
FREQUENCY RANGE	2.4GHz: 2400 ~ 2483.5MHz 5.0GHz: 5150 ~ 5250MHz, 5725 ~ 5850MHz
NUMBER OF CHANNEL	2.4GHz: 11 for 802.11b, 802.11g, draft 802.11n (20MHz) 7 for draft 802.11n (40MHz) 5.0GHz: 9 for 802.11a, draft 802.11n (20MHz) 4 for draft 802.11n (40MHz)
OUTPUT POWER	77.751mW for 2400.0 ~ 2483.5MHz 43.904mW for 5150.0 ~ 5250.0MHz 150.249mW for 5725.0 ~ 5850.0MHz
ANTENNA TYPE	2.4GHz: Dipole antenna with 2.0dBi gain 5.0GHz: Dipole antenna with 2.0dBi gain
DATA CABLE	NA
I/O PORTS	RJ45, USB
ASSOCIATED DEVICES	Adapter

NOTE:

1. This report only covered frequency range: 5150 ~ 5250MHz. Frequency range: 2400 ~ 2483.5MHz and 5725 ~ 5850MHz showed in another report, which report no. is RF960905L09.
2. The frequency bands used in this EUT are listed as follows:

Frequency Band (MHz)	2400~2483.5	5150~5250	5725~5850
802.11b	√		
802.11g	√		
802.11a		√	√
Draft 11n(20MHz)	√	√	√
Draft 11n(40MHz)	√	√	√

3. The EUT was powered by the following adapter:

BRAND:	D-Link
MODEL:	AG2412-B
INPUT:	100-240Vac, 50-60Hz, 0.5A
OUTPUT:	12Vdc, 2A
POWER LINE:	1.8m non-shielded cable without core

4. The EUT incorporates a MIMO function. Physically, the card provides three completed transmitters and three receivers.
5. The EUT is 3 * 3 spatial MIMO (3Tx & 3Rx) without beam forming function.
6. When the EUT operating in 802.11b, 802.11g, 802.11a, the software operation, which is defined by manufacturer, only set single Tx.
7. When the EUT operating in draft 802.11n, the software operation, which is defined by manufacturer, only set 0 ~ 15 of "MCS" (MCS: Modulation and Coding Schemes) for triple Tx.
8. The EUT complies with draft 802.11n standards and backwards compatible with 802.11b, 802.11g, 802.11a products.
9. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 300Mbps.
10. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 DESCRIPTION OF TEST MODES

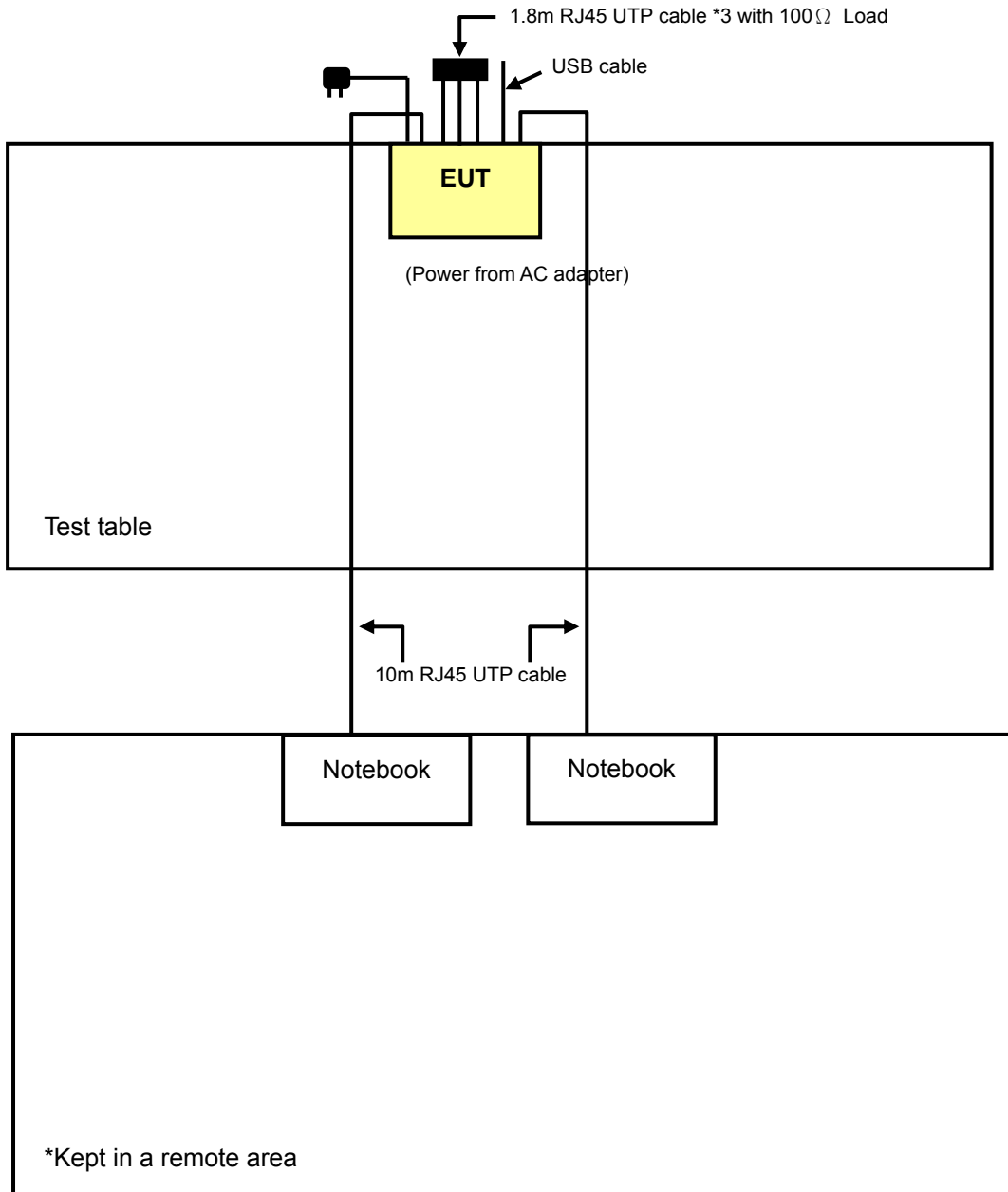
4 channels are provided for 802.11a, draft 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	5180MHz	3	5220MHz
2	5200MHz	4	5240MHz

2 channels are provided for draft 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	5190MHz	2	5230MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE<1G	RE≥1G	APCM	
-	√	√	√	√	-

Where **PLC**: Power Line Conducted Emission **RE<1G**: Radiated Emission below 1GHz
RE≥1G: Radiated Emission above 1GHz **APCM**: Antenna Port Conducted Measurement

POWER LINE CONDUCTED EMISSION TEST:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	1 to 4	1	OFDM	BPSK	6.0
Draft 802.11n (20MHz)	1 to 4	1	OFDM	BPSK	7.2
Draft 802.11n (40MHz)	1 to 2	1	OFDM	BPSK	15.0

RADIATED EMISSION TEST (BELOW 1GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	1 to 4	1	OFDM	BPSK	6.0
Draft 802.11n (20MHz)	1 to 4	1	OFDM	BPSK	7.2
Draft 802.11n (40MHz)	1 to 2	1	OFDM	BPSK	15.0

RADIATED EMISSION TEST (ABOVE 1GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	1 to 4	1, 2, 4	OFDM	BPSK	6.0
Draft 802.11n (20MHz)	1 to 4	1, 2, 4	OFDM	BPSK	7.2
Draft 802.11n (40MHz)	1 to 2	1, 2	OFDM	BPSK	15.0

BANDEDGE MEASUREMENT:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	1 to 4	1, 4	OFDM	BPSK	6.0
Draft 802.11n (20MHz)	1 to 4	1, 4	OFDM	BPSK	7.2
Draft 802.11n (40MHz)	1 to 2	1, 2	OFDM	BPSK	15.0

ANTENNA PORT CONDUCTED MEASUREMENT:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	1 to 4	1, 2, 4	OFDM	BPSK	6.0
Draft 802.11n (20MHz)	1 to 4	1, 2, 4	OFDM	BPSK	7.2
Draft 802.11n (40MHz)	1 to 2	1, 2	OFDM	BPSK	15.0



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)

ANSI C63.4-2003

All test items have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP05L	12130898320	E2K24CLNS
2	NOTEBOOK COMPUTER	DELL	PP05L	16484462992	E2K24CLNS

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m UTP RJ 45 cable
2	10m UTP RJ 45 cable

NOTE: 1. All power cords of the above support units are non shielded (1.8m).
2. Item 1-2 acted as communication partners to transfer data.

4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Sep. 25, 2007
RF signal cable Woken	5D-FB	Cable-HYCO3-01	Jan. 06, 2008
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 08, 2008
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Jan. 16, 2008
Software ADT	ADT_Cond_V3	NA	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 2.
 3. The VCCI Site Registration No. is C-2047.

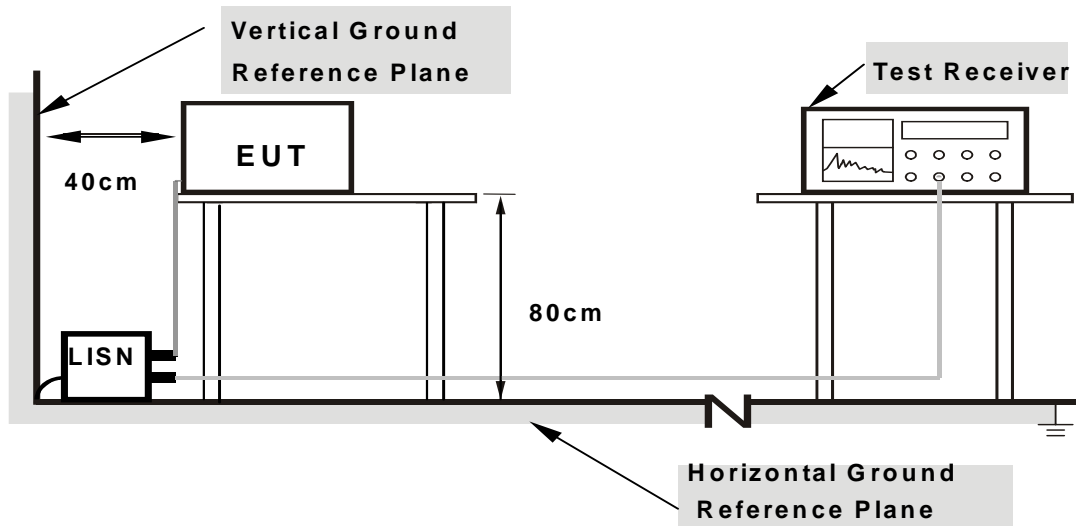
4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on the testing table.
- b. Prepared notebook systems to act as a communication partner and placed them outside of testing area.
- c. The communication partners connected with EUT via a UTP cable and run a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- d. The communication partners sent data to EUT by command "PING".

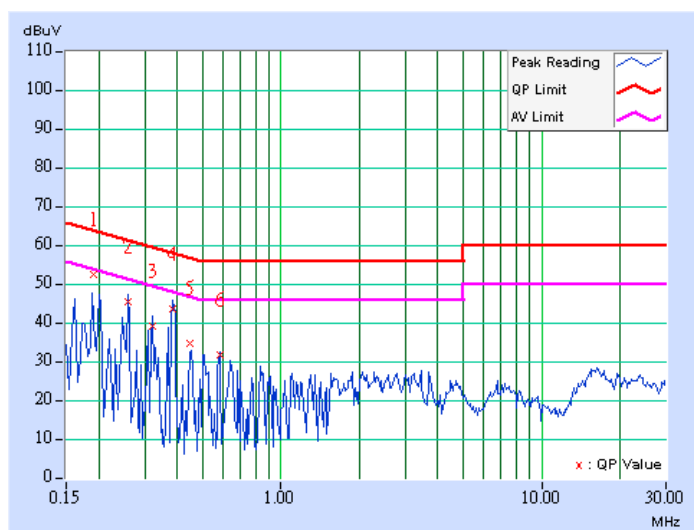
4.1.7 TEST RESULTS

CONDUCTED WORST-CASE DATA: 802.11a OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 1
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
TRANSFER RATE	6.0Mbps	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH, 982hPa	TESTED BY	Dean Wang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.191	0.10	52.56	-	52.66	-	63.97	53.97	-11.31	-
2	0.258	0.10	45.47	-	45.57	-	61.49	51.49	-15.92	-
3	0.322	0.10	39.22	-	39.32	-	59.66	49.66	-20.34	-
4	0.386	0.10	43.66	-	43.76	-	58.16	48.16	-14.40	-
5	0.450	0.10	34.58	-	34.68	-	56.87	46.87	-22.19	-
6	0.584	0.10	31.63	-	31.73	-	56.00	46.00	-24.27	-

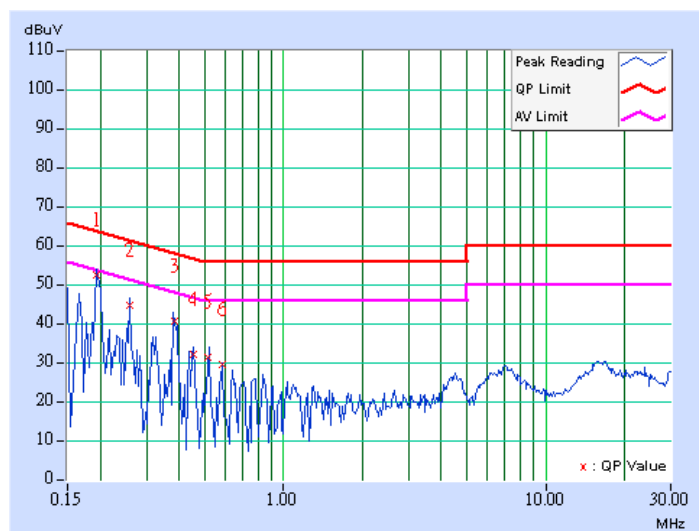
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
TRANSFER RATE	6.0Mbps	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH, 982hPa	TESTED BY	Dean Wang

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	52.56	-	52.66	-	63.91	53.91	-11.25	-
2	0.258	0.10	44.51	-	44.61	-	61.50	51.50	-16.89	-
3	0.386	0.10	40.75	-	40.85	-	58.16	48.16	-17.31	-
4	0.451	0.11	32.22	-	32.33	-	56.86	46.86	-24.53	-
5	0.517	0.12	31.31	-	31.43	-	56.00	46.00	-24.57	-
6	0.584	0.13	29.51	-	29.64	-	56.00	46.00	-26.36	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

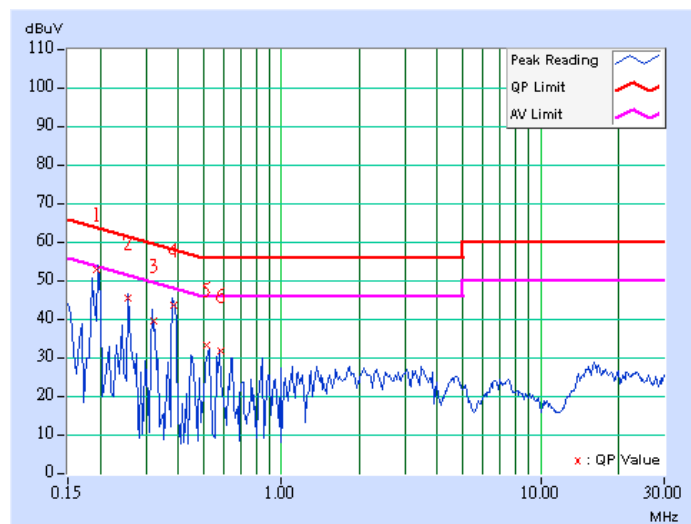


DRAFT 802.11n (20MHz) OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 1
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
TRANSFER RATE	7.2Mbps	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH, 982hPa	TESTED BY	Dean Wang

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	52.76	-	52.86	-	63.90	53.90	-11.04	-
2	0.257	0.10	45.41	-	45.51	-	61.52	51.52	-16.01	-
3	0.321	0.10	39.39	-	39.49	-	59.69	49.69	-20.20	-
4	0.386	0.10	43.64	-	43.74	-	58.16	48.16	-14.42	-
5	0.517	0.10	33.10	-	33.20	-	56.00	46.00	-22.80	-
6	0.584	0.10	31.67	-	31.77	-	56.00	46.00	-24.23	-

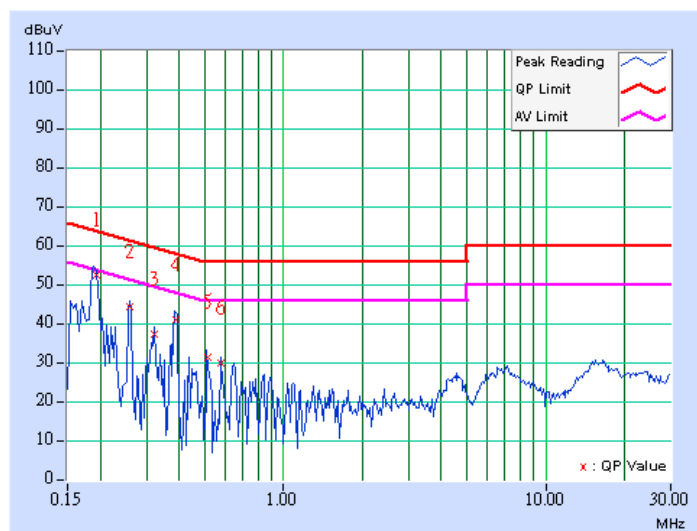
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
TRANSFER RATE	7.2Mbps	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH, 982hPa	TESTED BY	Dean Wang

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.194	0.10	52.36	-	52.46	-	63.85	53.85	-11.39	-
2	0.259	0.10	44.40	-	44.50	-	61.45	51.45	-16.95	-
3	0.322	0.10	37.27	-	37.37	-	59.66	49.66	-22.29	-
4	0.387	0.10	41.01	-	41.11	-	58.13	48.13	-17.02	-
5	0.516	0.12	31.31	-	31.43	-	56.00	46.00	-24.57	-
6	0.580	0.13	29.73	-	29.86	-	56.00	46.00	-26.14	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

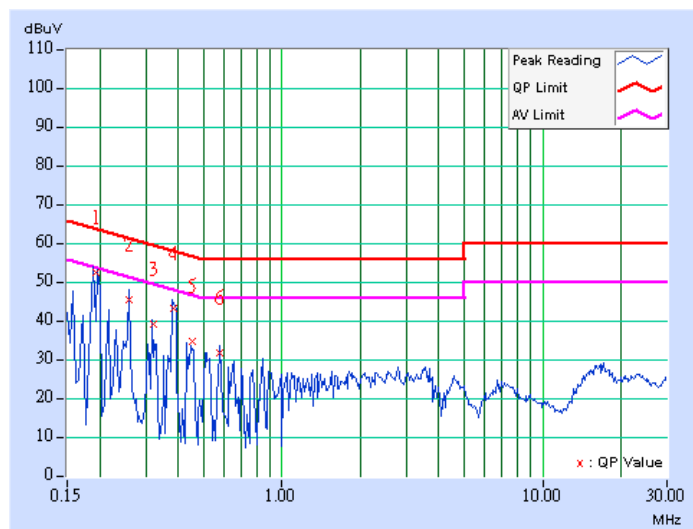


DRAFT 802.11n (40MHz) OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 1
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
TRANSFER RATE	15.0Mbps	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH, 982hPa	TESTED BY	Dean Wang

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.194	0.10	52.60	-	52.70	-	63.86	53.86	-11.16	-
2	0.258	0.10	45.45	-	45.55	-	61.50	51.50	-15.95	-
3	0.322	0.10	39.24	-	39.34	-	59.66	49.66	-20.32	-
4	0.384	0.10	43.38	-	43.48	-	58.19	48.19	-14.71	-
5	0.451	0.10	34.80	-	34.90	-	56.86	46.86	-21.96	-
6	0.580	0.10	31.69	-	31.79	-	56.00	46.00	-24.21	-

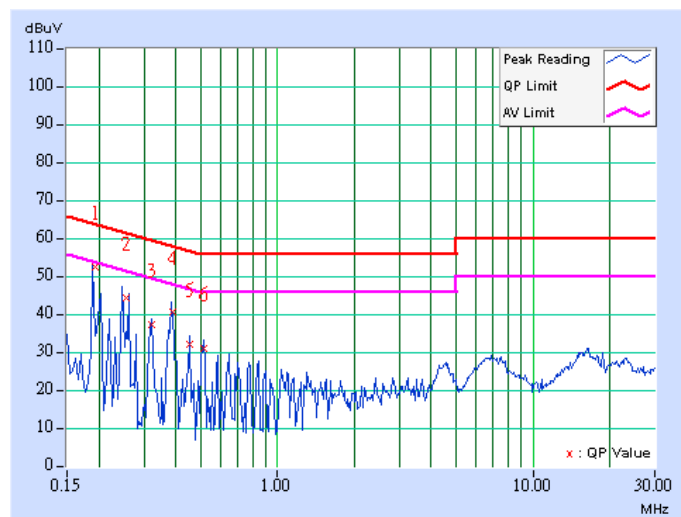
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	BPSK	INPUT POWER (SYSTEM)	120Vac, 60Hz
TRANSFER RATE	15.0Mbps	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 68%RH, 982hPa	TESTED BY	Dean Wang

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	52.60	-	52.70	-	63.91	53.91	-11.21	-
2	0.257	0.10	44.47	-	44.57	-	61.52	51.52	-16.95	-
3	0.322	0.10	37.37	-	37.47	-	59.66	49.66	-22.19	-
4	0.387	0.10	40.77	-	40.87	-	58.13	48.13	-17.26	-
5	0.451	0.11	32.18	-	32.29	-	56.86	46.86	-24.57	-
6	0.513	0.12	31.10	-	31.22	-	56.00	46.00	-24.78	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

FREQUENCIES (MHz)	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBμV/m) *NOTE 3
5150 ~ 5250	-27	68.3
5250 ~ 5350	-27	68.3
5725 ~ 5825	-27 *note 1	68.3
	-17 *note 2	78.3

NOTE:

1. For frequencies 10MHz or greater above or below the band edge.
2. All emissions within the frequency range from the band edge to 10MHz above or below the band edge.
3. The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$



4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Jul. 27, 2008
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Aug. 05, 2008
BILOG Antenna SCHWARZBECK	VULB9168	9168-153	Jan. 04, 2008
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Jul. 30, 2008
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 16, 2008
Preamplifier Agilent	8449B	3008A01910	Sep. 21, 2007
Preamplifier Agilent	8447D	2944A10638	Dec. 20, 2007
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218188/218189	Nov. 14, 2007
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 09, 2008
Software	ADT_Radiated_V7.6	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA
Turn Table EMCO	2087-2.03	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	07026401	Apr. 23, 2008

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 9.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The IC Site Registration No. is IC3789B-9.

4.2.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

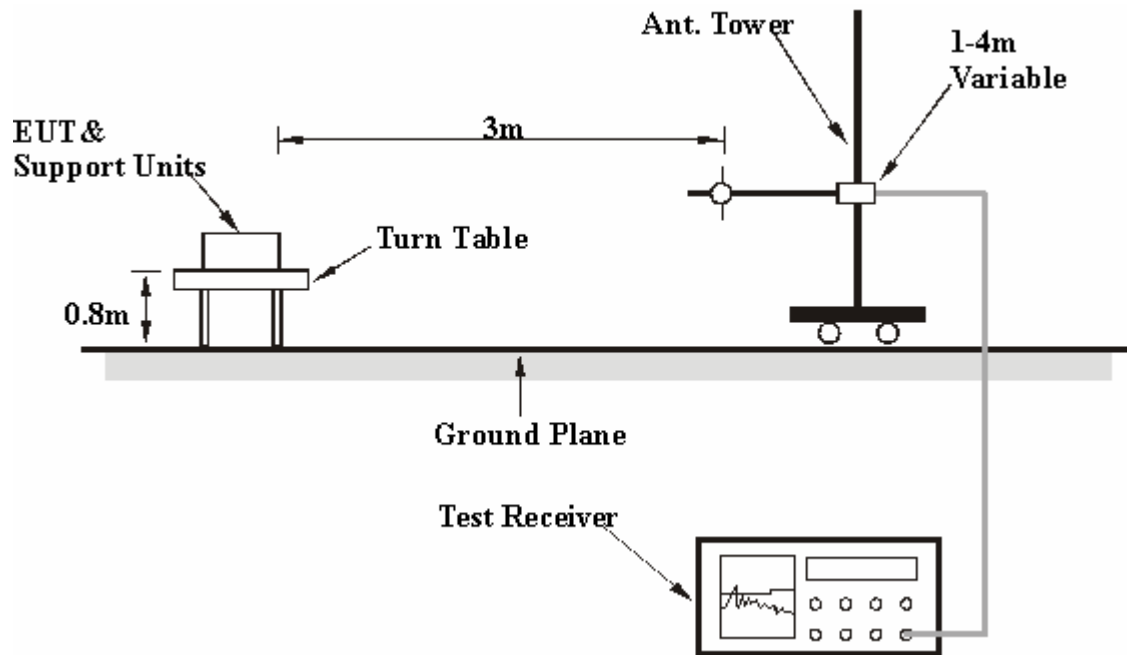
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.

4.2.5 DEVIATION FROM TEST STANDARD

No deviation

4.2.6 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.7 EUT OPERATING CONDITION

Same as 4.1.6

4.2.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA: 802.11a OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	TRANSFER RATE	6.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 988hPa	TESTED BY	Dean Wang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	158.22	40.67 QP	43.50	-2.83	1.50 H	268	27.17	13.50
2	249.60	44.77 QP	46.00	-1.23	1.00 H	151	32.23	12.54
3	300.16	39.98 QP	46.00	-6.02	1.00 H	247	26.62	13.36
4	375.98	38.81 QP	46.00	-7.19	1.00 H	259	23.65	15.16
5	500.42	42.08 QP	46.00	-3.92	1.50 H	169	23.32	18.76
6	626.80	41.16 QP	46.00	-4.84	1.00 H	247	19.82	21.34
7	751.23	42.15 QP	46.00	-3.85	1.00 H	268	18.93	23.22
8	877.61	44.72 QP	46.00	-1.28	1.50 H	304	19.61	25.11

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	49.34	36.52 QP	40.00	-3.48	1.00 V	82	23.00	13.52
2	150.45	39.31 QP	43.50	-4.19	1.00 V	10	25.65	13.66
3	249.60	44.00 QP	46.00	-2.00	1.00 V	334	31.47	12.54
4	300.16	40.36 QP	46.00	-5.64	1.50 V	223	27.01	13.36
5	500.42	43.44 QP	46.00	-2.56	1.00 V	352	24.68	18.76
6	626.80	43.20 QP	46.00	-2.80	1.50 V	190	21.86	21.34
7	877.61	44.76 QP	46.00	-1.24	1.00 V	250	19.65	25.11

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

DRAFT 802.11n (20MHz) OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	TRANSFER RATE	7.2Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 988hPa	TESTED BY	Dean Wang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	154.33	40.63 QP	43.50	-2.87	1.50 H	259	27.05	13.58
2	179.61	38.38 QP	43.50	-5.12	1.50 H	265	26.32	12.06
3	249.60	44.70 QP	46.00	-1.30	1.00 H	238	32.16	12.54
4	300.16	40.04 QP	46.00	-5.96	1.00 H	253	26.69	13.36
5	500.42	42.90 QP	46.00	-3.10	2.00 H	322	24.14	18.76
6	626.80	41.11 QP	46.00	-4.89	1.00 H	244	19.78	21.34
7	751.23	42.85 QP	46.00	-3.15	1.00 H	271	19.63	23.22
8	877.61	44.74 QP	46.00	-1.26	1.50 H	319	19.63	25.11

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	47.40	36.72 QP	40.00	-3.28	1.00 V	52	23.73	12.99
2	64.90	34.43 QP	40.00	-5.57	1.50 V	346	22.10	12.34
3	154.33	39.00 QP	43.50	-4.50	1.50 V	352	25.42	13.58
4	249.60	43.76 QP	46.00	-2.24	1.00 V	337	31.22	12.54
5	500.42	43.44 QP	46.00	-2.56	1.00 V	157	24.68	18.76
6	626.80	43.37 QP	46.00	-2.63	2.00 V	169	22.03	21.34
7	877.61	44.75 QP	46.00	-1.25	1.00 V	256	19.64	25.11

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

DRAFT 802.11n (40MHz) OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	TRANSFER RATE	15.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH, 988hPa	TESTED BY	Dean Wang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	156.28	39.67 QP	43.50	-3.83	1.50 H	271	26.13	13.54
2	177.67	38.20 QP	43.50	-5.30	1.50 H	268	26.01	12.20
3	249.60	44.78 QP	46.00	-1.22	1.00 H	136	32.24	12.54
4	300.16	40.32 QP	46.00	-5.68	1.00 H	166	26.96	13.36
5	500.42	41.52 QP	46.00	-4.48	1.50 H	313	22.76	18.76
6	751.23	43.20 QP	46.00	-2.80	1.00 H	232	19.98	23.22
7	877.61	44.71 QP	46.00	-1.29	1.50 H	310	19.60	25.11

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	49.34	35.86 QP	40.00	-4.14	1.00 V	10	22.34	13.52
2	150.45	39.32 QP	43.50	-4.18	1.00 V	10	25.66	13.66
3	249.60	44.67 QP	46.00	-1.33	1.00 V	343	32.13	12.54
4	300.16	40.50 QP	46.00	-5.50	1.50 V	220	27.14	13.36
5	500.42	44.23 QP	46.00	-1.77	1.00 V	160	25.46	18.76
6	626.80	44.07 QP	46.00	-1.93	1.50 V	163	22.73	21.34
7	751.23	40.45 QP	46.00	-5.55	1.00 V	190	17.23	23.22
8	877.61	44.78 QP	46.00	-1.22	1.00 V	256	19.67	25.11

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



ABOVE 1GHz DATA: 802.11a OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH, 991hPa	TESTED BY	Morgan Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5150.000	55.15 PK	74.00	-18.85	1.08 H	215	16.26	38.89
2	#5150.000	40.11 AV	54.00	-13.89	1.08 H	215	1.22	38.89
3	*5180.000	100.13 PK			1.08 H	216	61.15	38.98
4	*5180.000	89.62 AV			1.08 H	216	50.64	38.98
5	10360.000	57.65 PK	68.30	-10.65	1.00 H	320	8.11	49.54

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5150.000	64.73 PK	74.00	-9.27	1.15 V	15	25.84	38.89
2	#5150.000	46.55 AV	54.00	-7.45	1.15 V	15	7.66	38.89
3	*5180.000	110.85 PK			1.15 V	15	71.87	38.98
4	*5180.000	99.89 AV			1.15 V	15	60.91	38.98
5	10360.000	58.76 PK	68.30	-9.54	1.15 V	15	9.22	49.54

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. “ # “: The radiated frequency falling in the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 2	FREQUENCY RANGE	1 ~ 40GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH, 991hPa	TESTED BY	Morgan Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.000	100.08 PK			1.06 H	325	61.04	39.04
2	*5200.000	89.57 AV			1.06 H	325	50.53	39.04
3	10400.000	57.89 PK	68.30	-10.41	1.00 H	311	8.21	49.68

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.000	110.61 PK			1.02 V	15	71.57	39.04
2	*5200.000	99.92 AV			1.02 V	15	60.88	39.04
3	10400.000	58.58 PK	68.30	-9.72	1.11 V	235	8.90	49.68

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. “ # “: The radiated frequency falling in the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 40GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH, 991hPa	TESTED BY	Morgan Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.000	100.25 PK			1.00 H	311	61.14	39.11
2	*5240.000	89.94 AV			1.00 H	311	50.83	39.11
3	#5350.000	47.56 PK	74.00	-26.44	1.00 H	311	8.35	39.21
4	#5350.000	36.45 AV	54.00	-17.55	1.00 H	311	-2.76	39.21
5	10480.000	57.81 PK	68.30	-10.49	1.00 H	336	7.99	49.82

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.000	110.96 PK			1.02 V	15	71.85	39.11
2	*5240.000	100.23 AV			1.02 V	15	61.12	39.11
3	#5350.000	51.09 PK	74.00	-22.91	1.02 V	15	11.88	39.21
4	#5350.000	40.34 AV	54.00	-13.66	1.02 V	15	1.12	39.21
5	10480.000	59.11 PK	68.30	-9.19	1.18 V	23	9.29	49.82

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ”: Fundamental frequency.
 6. “ # ”: The radiated frequency falling in the restricted band.



DRAFT 802.11n (20MHz) OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40GHz
MODULATION TYPE	BPSK	TRANSFER RATE	7.2Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH, 991hPa	TESTED BY	Morgan Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5150.000	52.36 PK	74.00	-21.64	1.22 H	222	13.47	38.89
2	#5150.000	37.52 AV	54.00	-16.48	1.22 H	222	-1.37	38.89
3	*5180.000	101.96 PK			1.22 H	222	62.98	38.98
4	*5180.000	91.63 AV			1.22 H	222	52.65	38.98
5	10360.000	59.15 PK	68.30	-9.15	1.00 H	322	9.61	49.54

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5150.000	61.19 PK	74.00	-12.81	1.05 V	10	22.30	38.89
2	#5150.000	45.56 AV	54.00	-8.44	1.05 V	10	6.67	38.89
3	*5180.000	111.84 PK			1.05 V	10	72.86	38.98
4	*5180.000	101.49 AV			1.05 V	10	62.51	38.98
5	10360.000	60.23 PK	68.30	-8.07	1.08 V	5	10.69	49.54

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ”: Fundamental frequency.
 6. “ # ”: The radiated frequency falling in the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 2	FREQUENCY RANGE	1 ~ 40GHz
MODULATION TYPE	BPSK	TRANSFER RATE	7.2Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH, 991hPa	TESTED BY	Morgan Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.000	101.77 PK			1.20 H	236	62.73	39.04
2	*5200.000	91.45 AV			1.20 H	236	52.41	39.04
3	10400.000	59.08 PK	68.30	-9.22	1.00 H	316	9.40	49.68

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.000	111.68 PK			1.08 V	16	72.64	39.04
2	*5200.000	101.35 AV			1.08 V	16	62.31	39.04
3	10400.000	60.13 PK	68.30	-8.17	1.11 V	9	10.45	49.68

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. “ # “: The radiated frequency falling in the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 40GHz
MODULATION TYPE	BPSK	TRANSFER RATE	7.2Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH, 991hPa	TESTED BY	Morgan Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.000	101.81 PK			1.25 H	205	62.70	39.11
2	*5240.000	91.56 AV			1.25 H	205	52.45	39.11
3	#5350.000	47.89 PK	74.00	-26.11	1.25 H	205	8.68	39.21
4	#5350.000	36.75 AV	54.00	-17.25	1.25 H	205	-2.46	39.21
5	10480.000	59.32 PK	68.30	-8.98	1.00 H	315	9.50	49.82

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.000	111.77 PK			1.08 V	7	72.66	39.11
2	*5240.000	101.52 AV			1.08 V	7	62.41	39.11
3	#5350.000	52.31 PK	74.00	-21.69	1.08 V	7	13.10	39.21
4	#5350.000	41.87 AV	54.00	-12.13	1.08 V	7	2.66	39.21
5	10480.000	60.35 PK	68.30	-7.95	1.11 V	4	10.53	49.82

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ”: Fundamental frequency.
 6. “ # ”: The radiated frequency falling in the restricted band.



DRAFT 802.11n (40MHz) OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40GHz
MODULATION TYPE	BPSK	TRANSFER RATE	15.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH, 991hPa	TESTED BY	Morgan Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5150.000	55.69 PK	74.00	-18.31	1.05 H	213	16.80	38.89
2	#5150.000	42.56 AV	54.00	-11.44	1.05 H	213	3.67	38.89
3	*5190.000	98.65 PK			1.05 H	213	59.64	39.01
4	*5190.000	88.26 AV			1.05 H	213	49.25	39.01
5	10380.000	57.89 PK	68.30	-10.41	1.07 H	5	8.28	49.61

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5150.000	66.29 PK	74.00	-7.71	1.17 V	326	27.40	38.89
2	#5150.000	52.39 AV	54.00	-1.61	1.17 V	326	13.50	38.89
3	*5190.000	109.86 PK			1.28 V	326	70.85	39.01
4	*5190.000	99.36 AV			1.28 V	326	60.35	39.01
5	10380.000	58.98 PK	68.30	-9.32	1.08 V	3	9.37	49.61

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. “ # ”: The radiated frequency falling in the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 2	FREQUENCY RANGE	1 ~ 40GHz
MODULATION TYPE	BPSK	TRANSFER RATE	15.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH, 991hPa	TESTED BY	Morgan Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.000	98.78 PK			1.03 H	233	59.69	39.09
2	*5230.000	88.39 AV			1.03 H	233	49.30	39.09
3	#5350.000	47.35 PK	74.00	-26.65	1.03 H	233	8.14	39.21
4	#5350.000	36.25 AV	54.00	-17.75	1.03 H	233	-2.96	39.21
5	10460.000	57.93 PK	68.30	-10.37	1.09 H	8	8.14	49.79

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.000	110.40 PK			1.24 V	19	71.31	39.09
2	*5230.000	99.73 AV			1.24 V	19	60.64	39.09
3	#5350.000	52.85 PK	74.00	-21.15	1.24 V	19	13.64	39.21
4	#5350.000	41.24 AV	54.00	-12.76	1.24 V	19	2.03	39.21
5	10460.000	59.05 PK	68.30	-9.25	1.07 V	13	9.26	49.79

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. “ # “: The radiated frequency falling in the restricted band.



4.3 PEAK TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

FREQUENCY BAND	LIMIT
5.15 ~ 5.25GHz	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: Where B is the 26dB emission bandwidth in MHz.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100040	Jun. 28, 2008

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

4.3.3 TEST PROCEDURE

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set span to encompass the entire emission bandwidth of the signal.
- c. Set RBW to 1MHz, VBW to 3MHz.
- d. Using the spectrum analyzer's channel power measurement function to measure the output power.

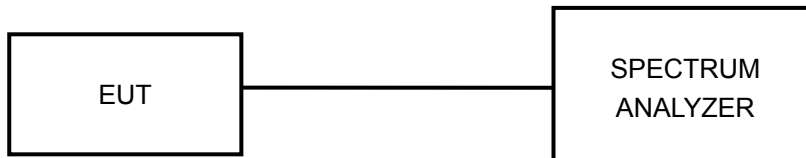
NOTE: The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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

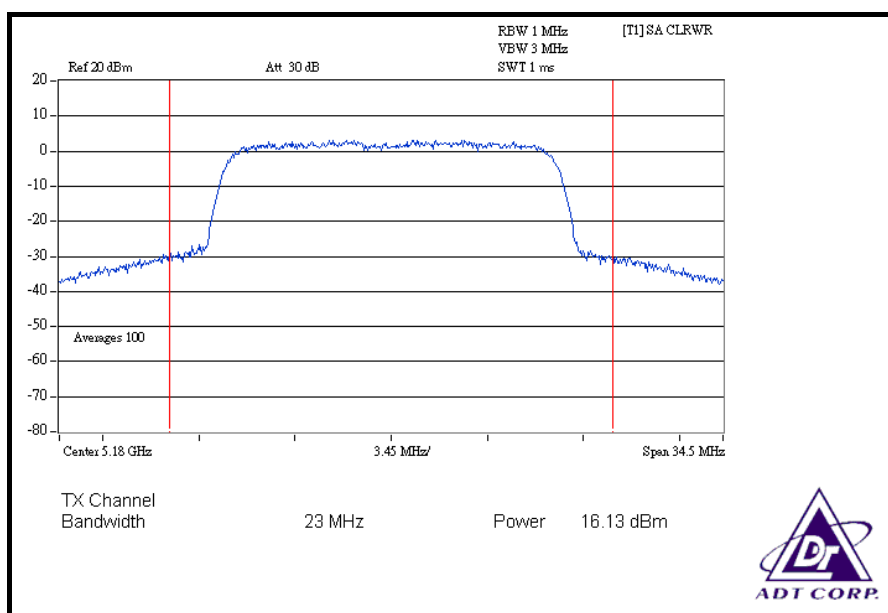
4.3.7 TEST RESULTS

PEAK POWER OUTPUT: 802.11a OFDM MODULATION:

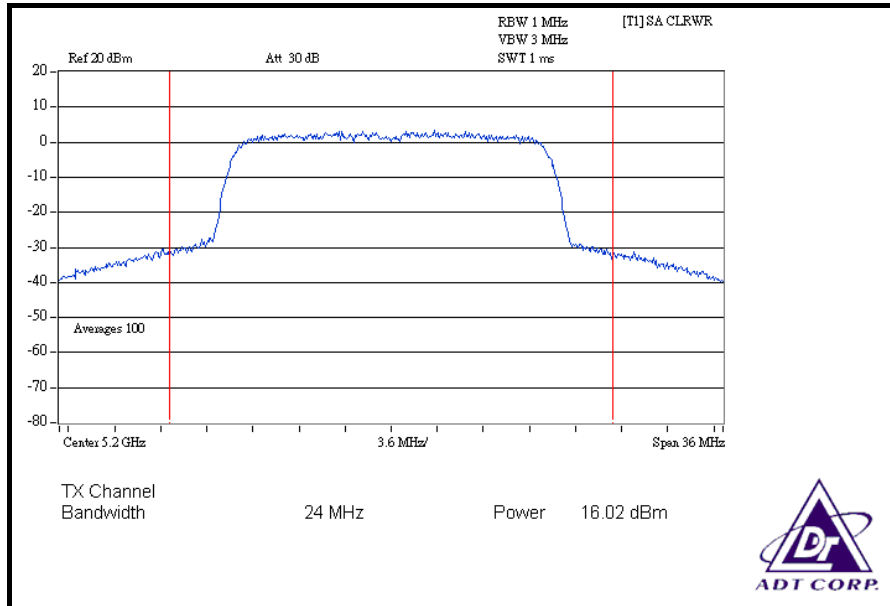
MODULATION TYPE	BPSK	TRANSFER RATE	6.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 67%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	5180	41.020	16.13	17.00	PASS
2	5200	39.994	16.02	17.00	PASS
4	5240	39.994	16.02	17.00	PASS

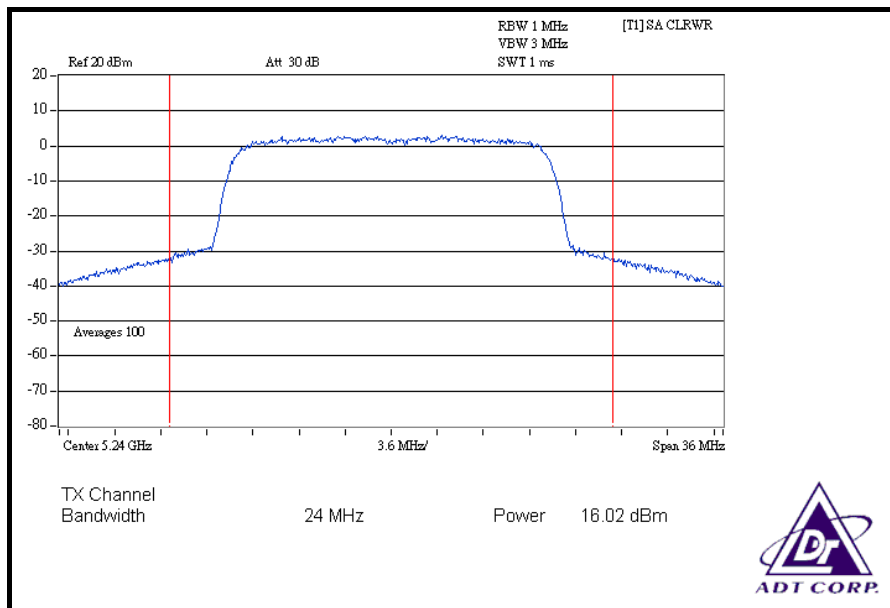
CH 1



CH 2



CH 4



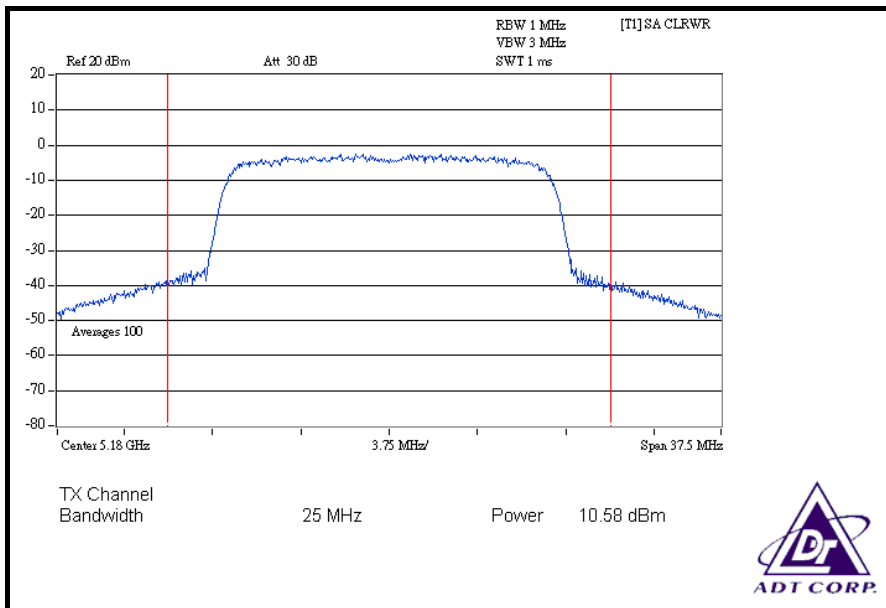


DRAFT 802.11n (20MHz) OFDM MODULATION:

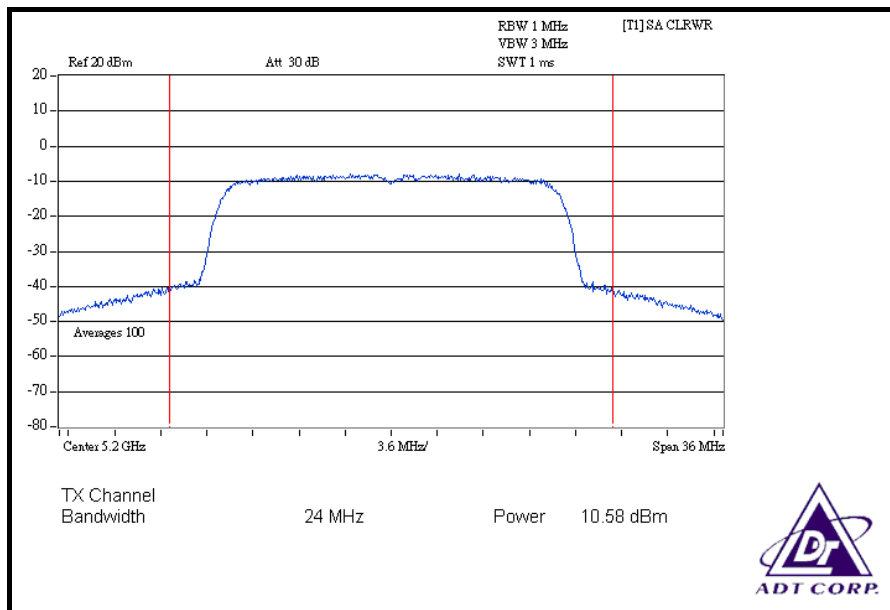
MODULATION TYPE	BPSK	TRANSFER RATE	7.2Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 67%RH, 991hPa
TESTED BY	Brad Wu		

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER OUTPUT (mW)			PEAK POWER OUTPUT (dBm)			TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN0	CHAIN1	CHAIN2	CHAIN0	CHAIN1	CHAIN2				
1	5180	11.429	16.069	16.144	10.58	12.06	12.08	43.642	16.40	30	PASS
2	5200	11.429	16.406	16.069	10.58	12.15	12.06	43.904	16.43	30	PASS
4	5240	11.298	16.181	16.144	10.53	12.09	12.08	43.623	16.40	30	PASS

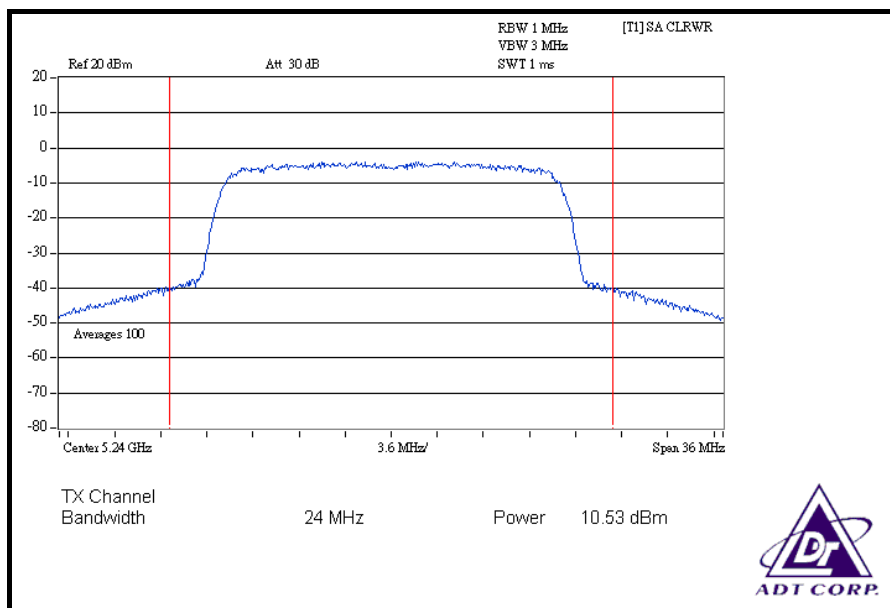
FOR CHAIN 0: CH 1



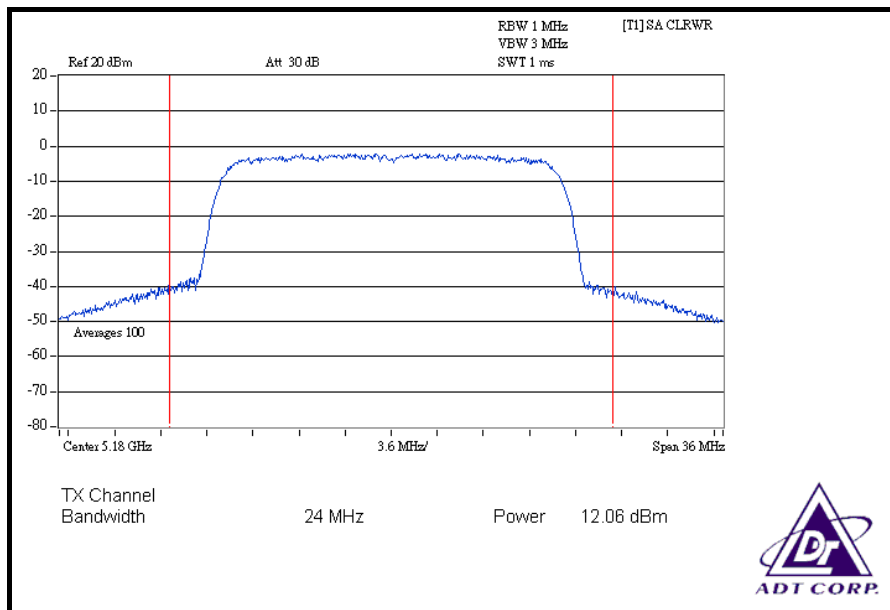
CH 2



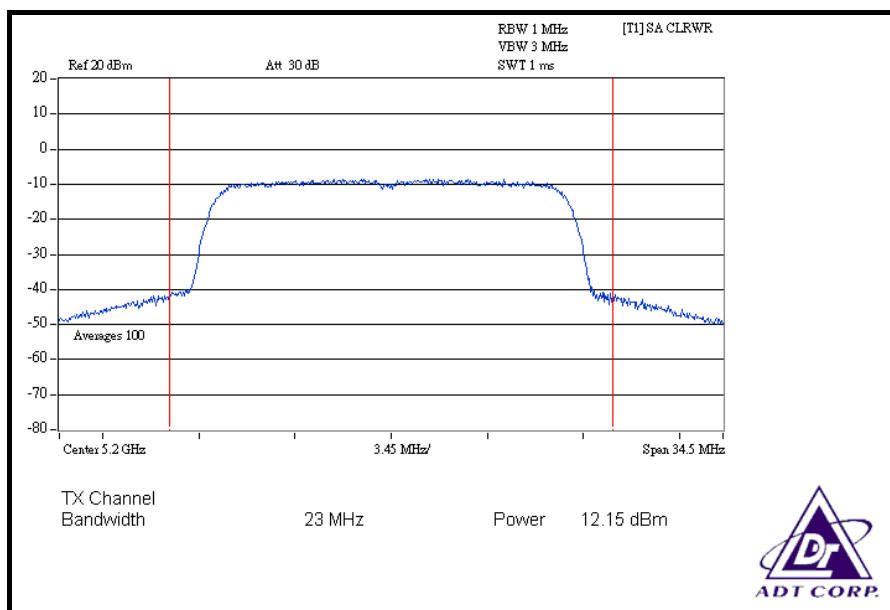
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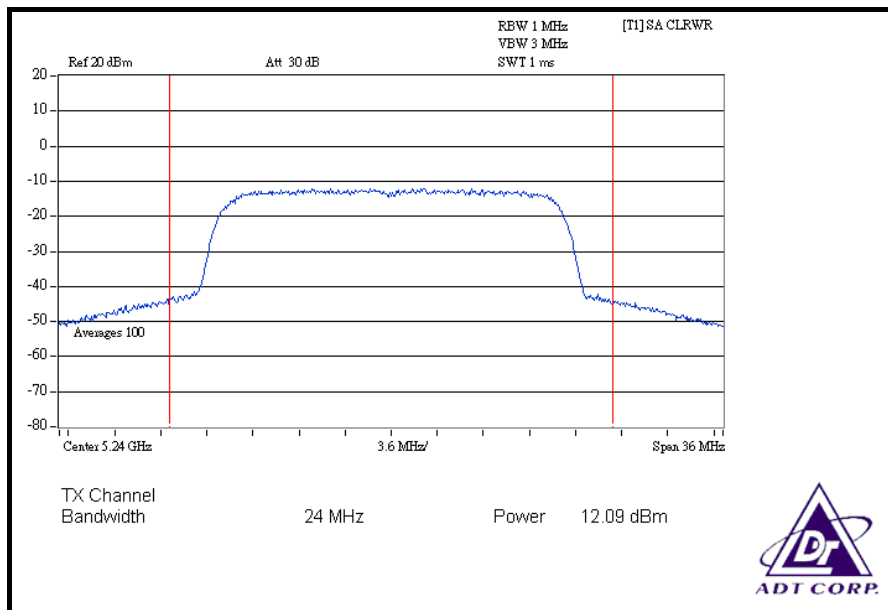
FOR CHAIN 1: CH 1



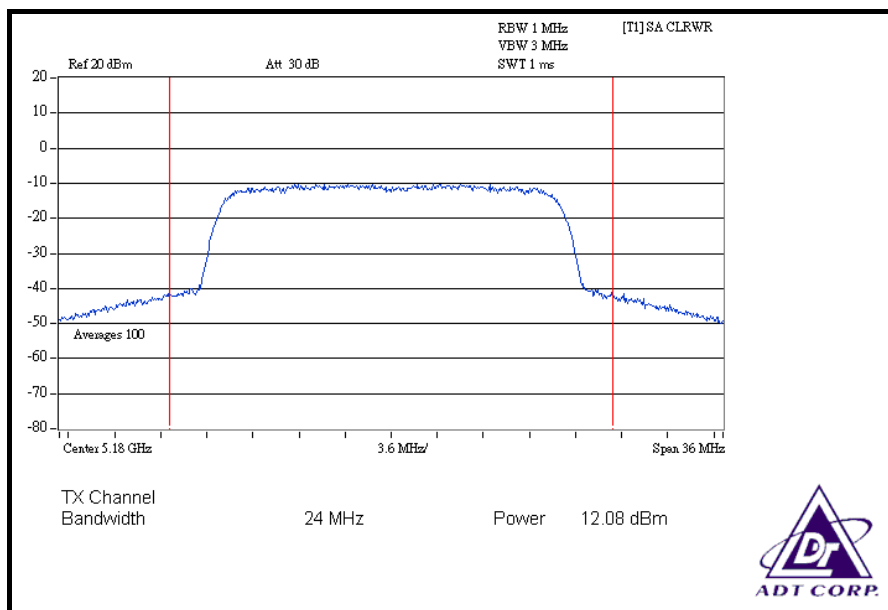
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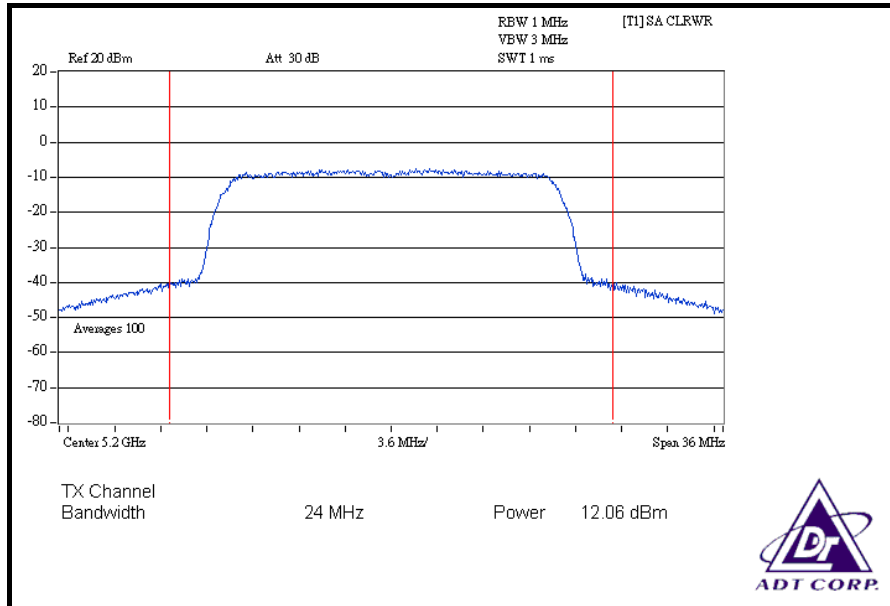
CH 4



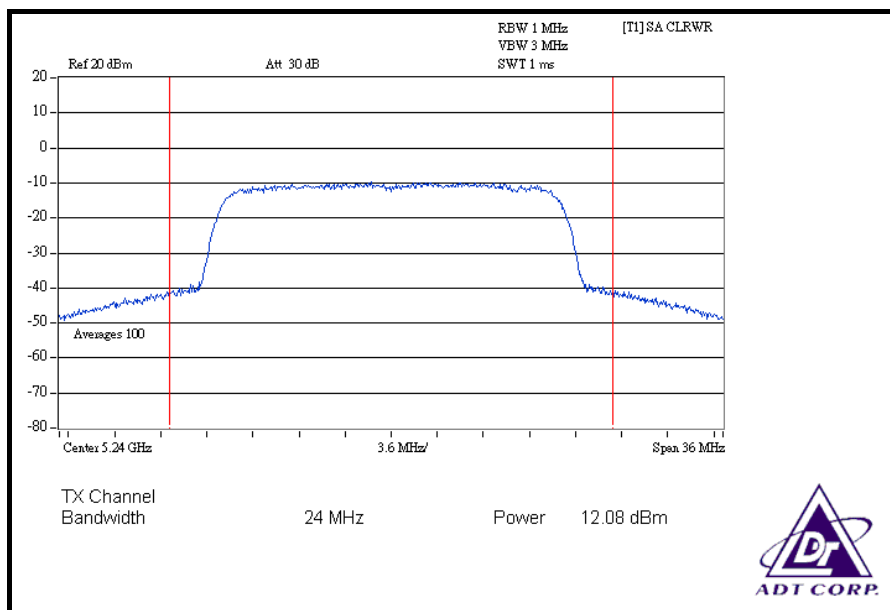
FOR CHAIN 2: CH 1



CH 2



CH 4



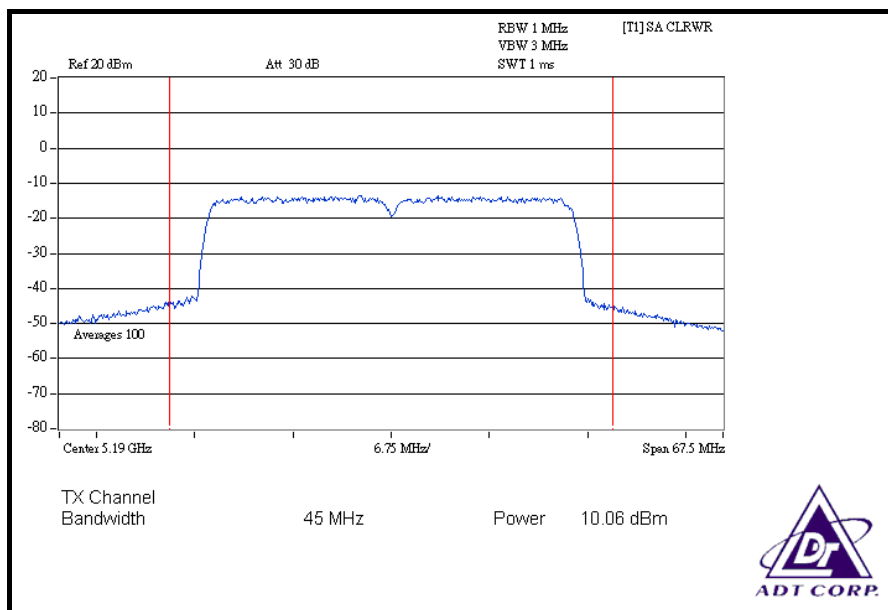


DRAFT 802.11n (40MHz) OFDM MODULATION:

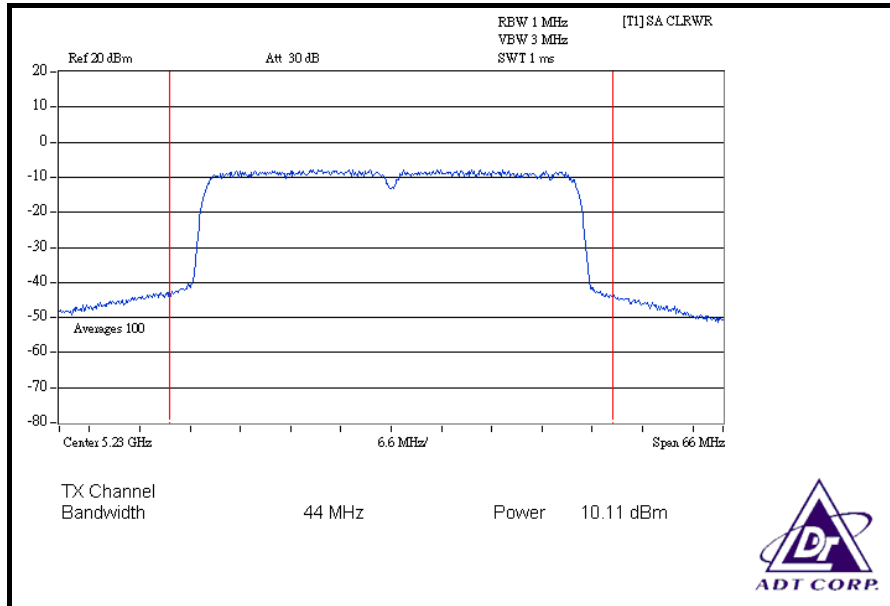
MODULATION TYPE	BPSK	TRANSFER RATE	15.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 67%RH, 991hPa
TESTED BY	Brad Wu		

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER OUTPUT (mW)			PEAK POWER OUTPUT (dBm)			TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN0	CHAIN1	CHAIN2	CHAIN0	CHAIN1	CHAIN2				
1	5190	10.139	15.959	15.959	10.06	12.03	12.03	42.057	16.24	30	PASS
2	5230	10.257	16.032	16.069	10.11	12.05	12.06	42.358	16.27	30	PASS

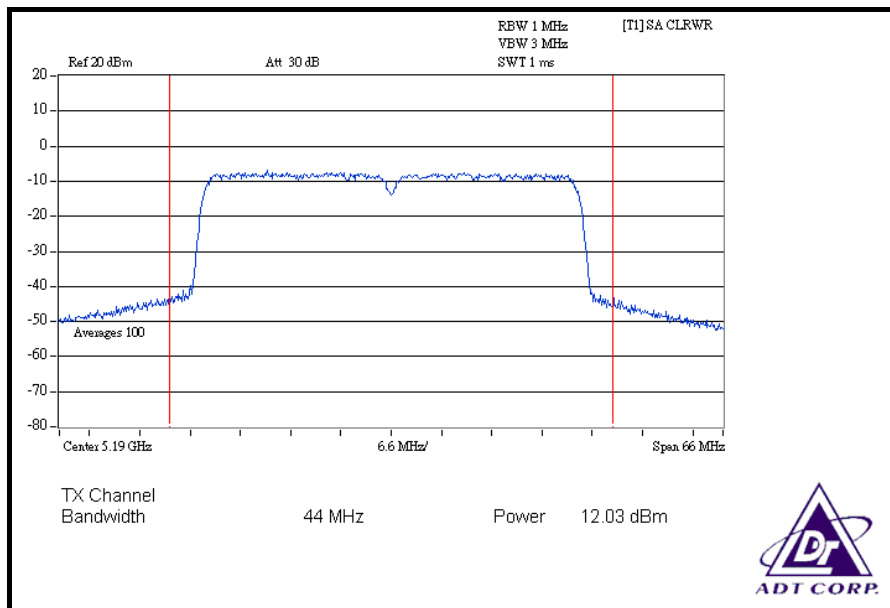
FOR CHAIN 0: CH 1



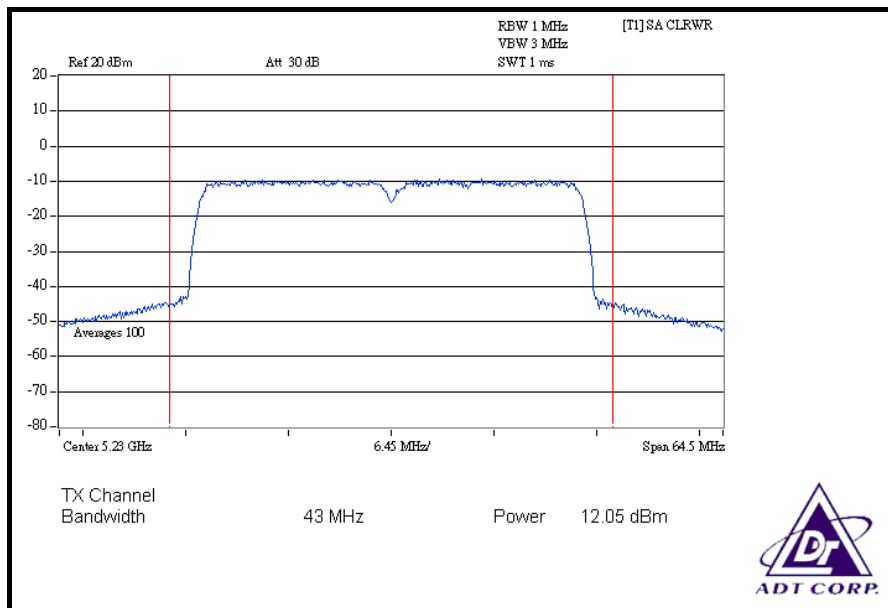
CH 2



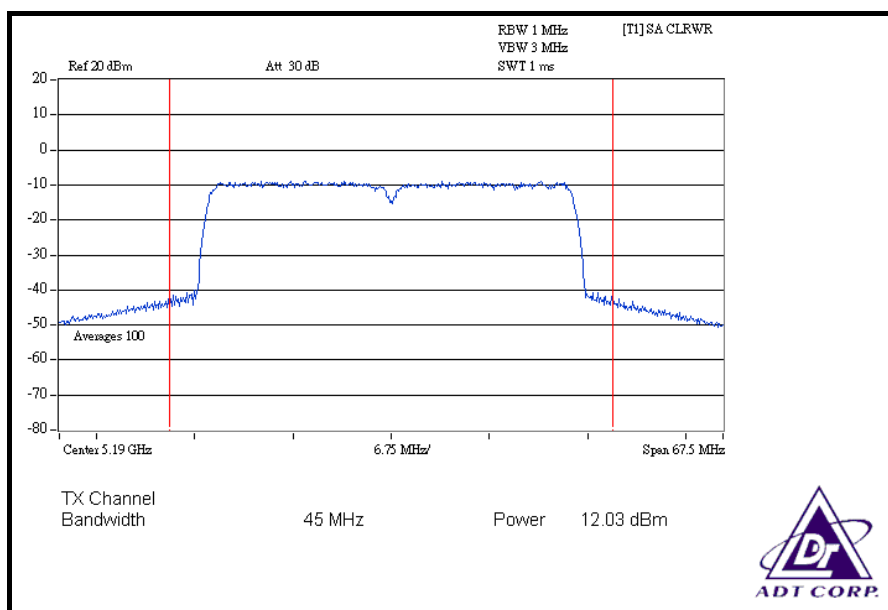
FOR CHAIN 1: CH 1



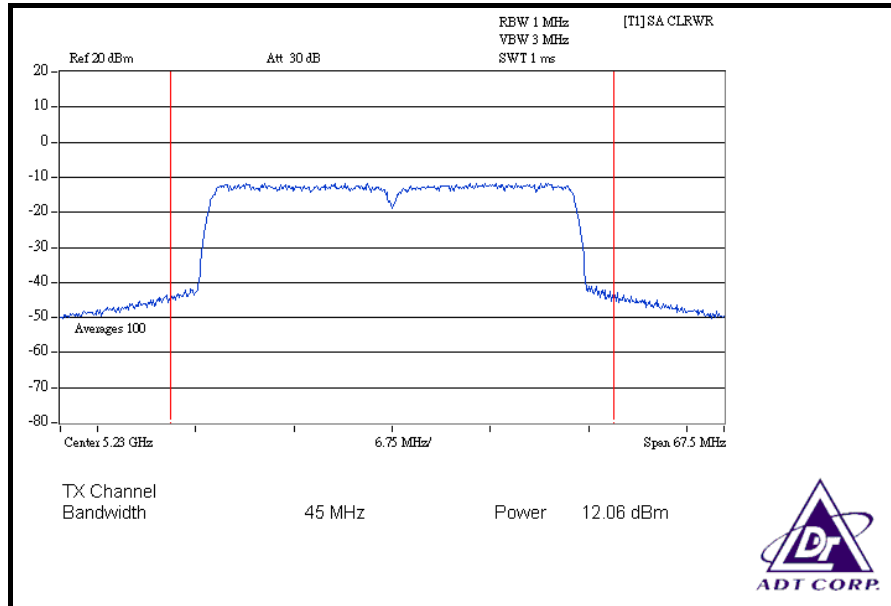
CH 2



FOR CHAIN 2: CH 1



CH 2



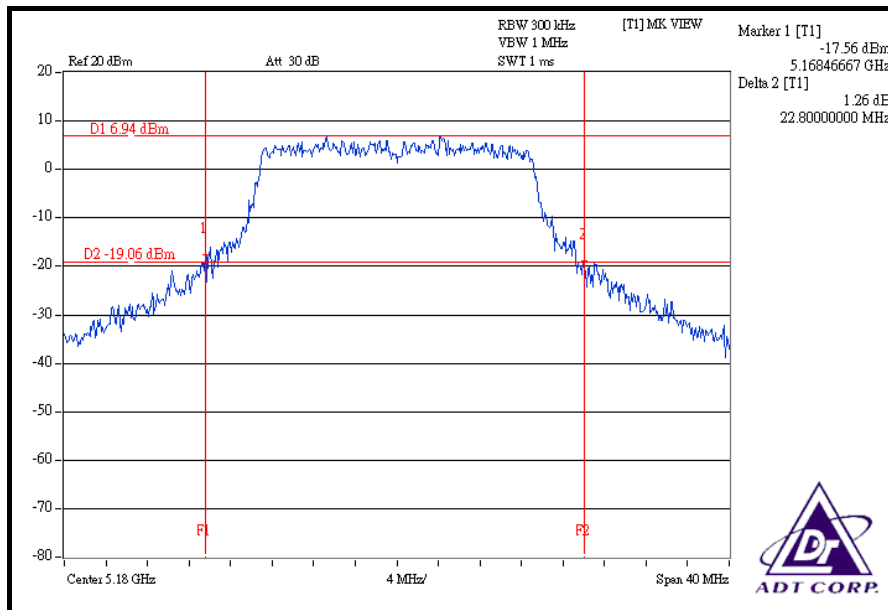


26dB OCCUPIED BANDWIDTH: 802.11a OFDM MODULATION:

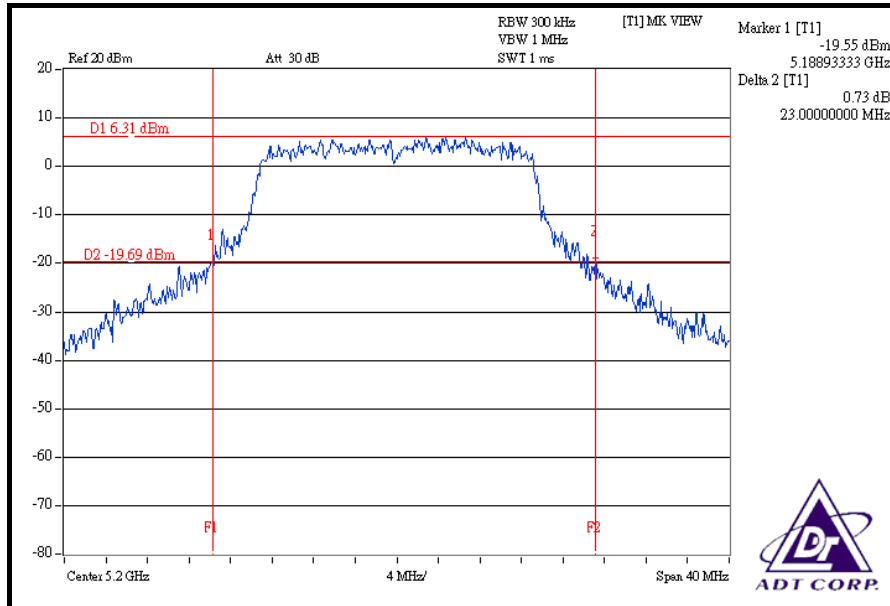
MODULATION TYPE	BPSK	TRANSFER RATE	6.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 67%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc OCCUPIED BANDWIDTH (MHz)	PASS / FAIL
1	5180	22.80	PASS
2	5200	23.00	PASS
4	5240	23.13	PASS

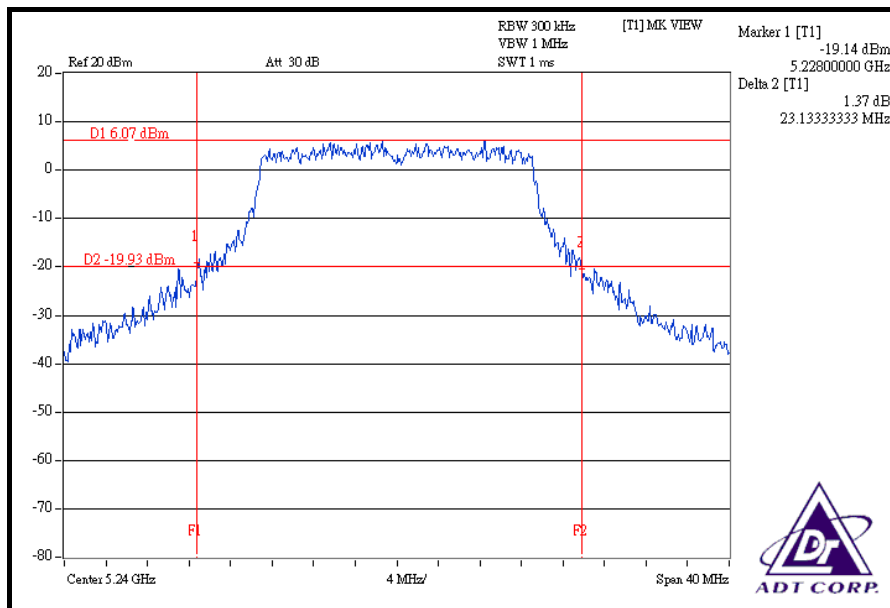
CH 1



CH 2



CH 4



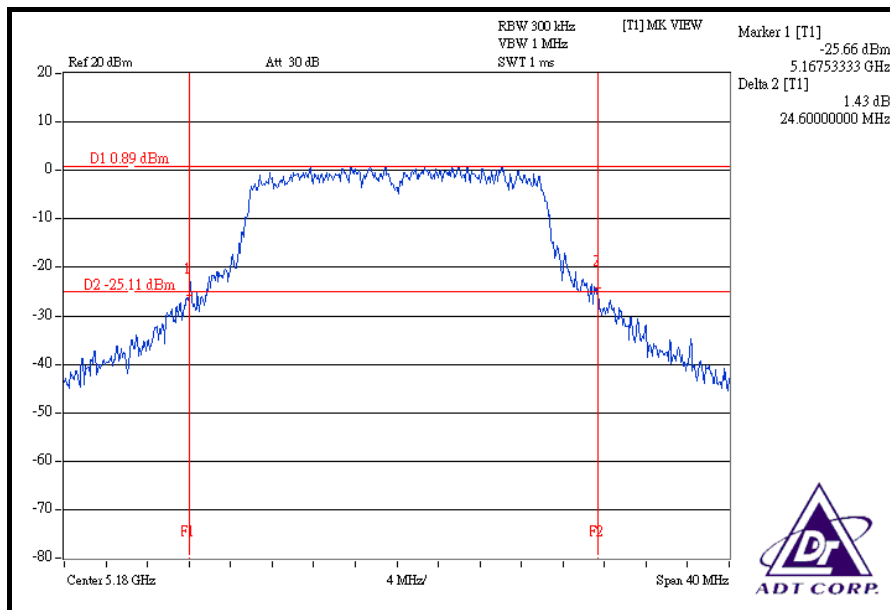


DRAFT 802.11n (20MHz) OFDM MODULATION:

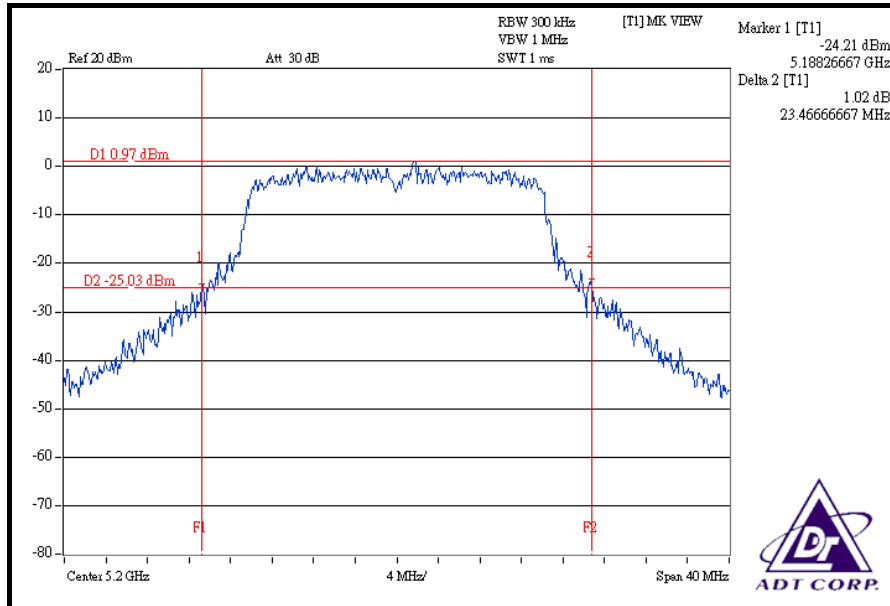
MODULATION TYPE	BPSK	TRANSFER RATE	7.2Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 67%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc OCCUPIED BANDWIDTH (MHz)			PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2	
1	5180	24.60	23.73	23.73	PASS
2	5200	23.46	22.93	23.60	PASS
4	5240	23.86	23.26	23.86	PASS

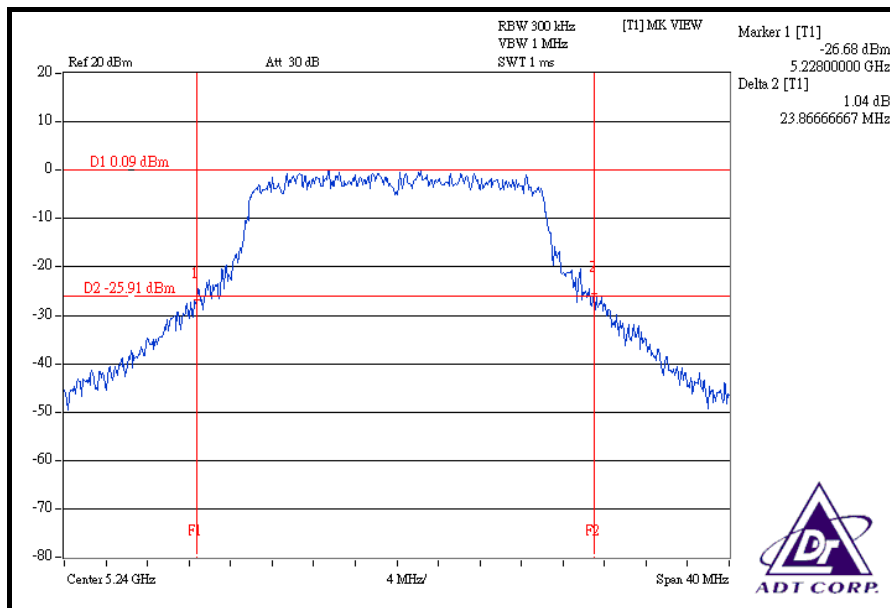
FOR CHAIN 0: CH 1



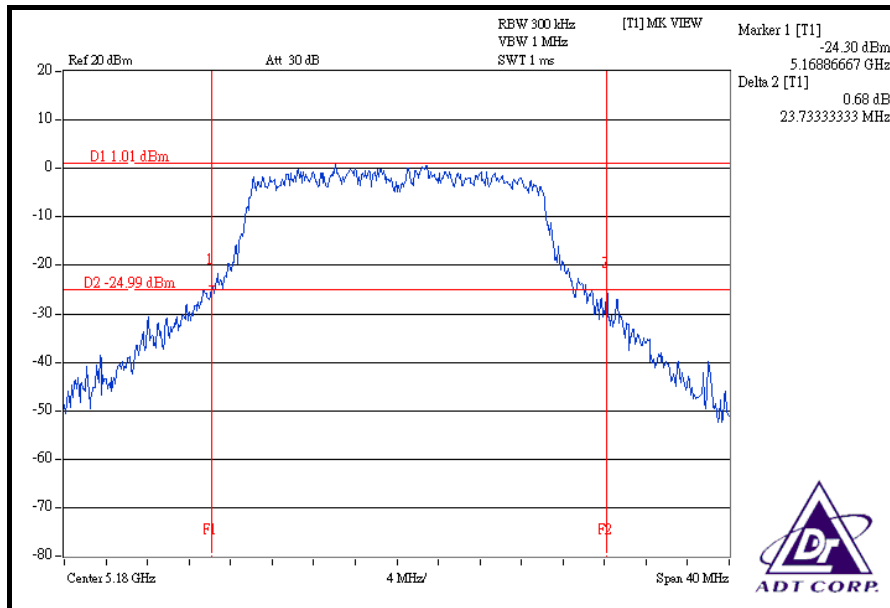
CH 2



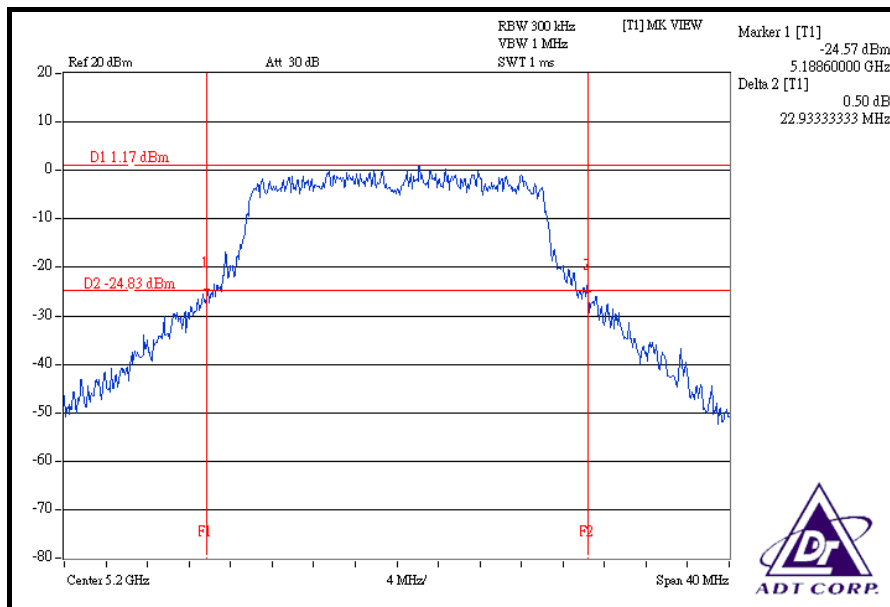
CH 4



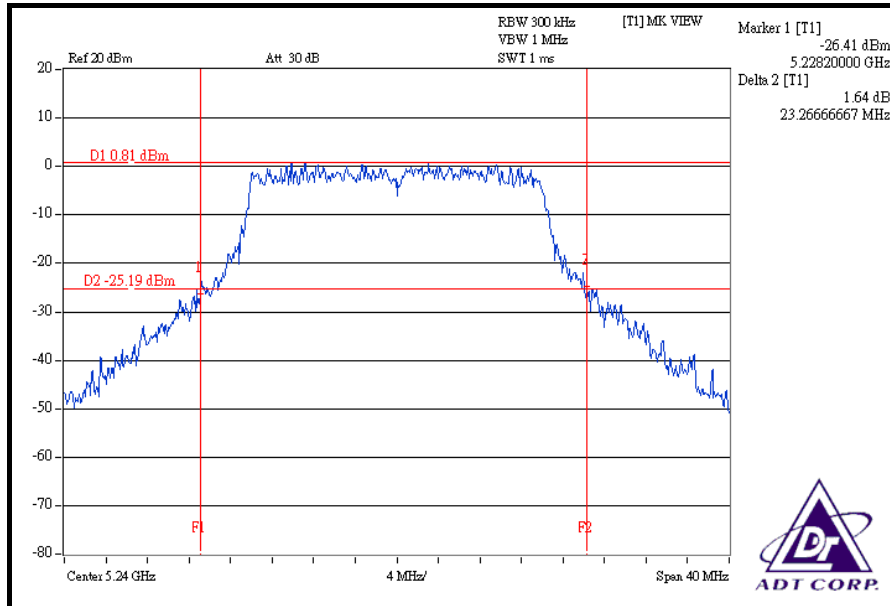
FOR CHAIN 1: CH 1



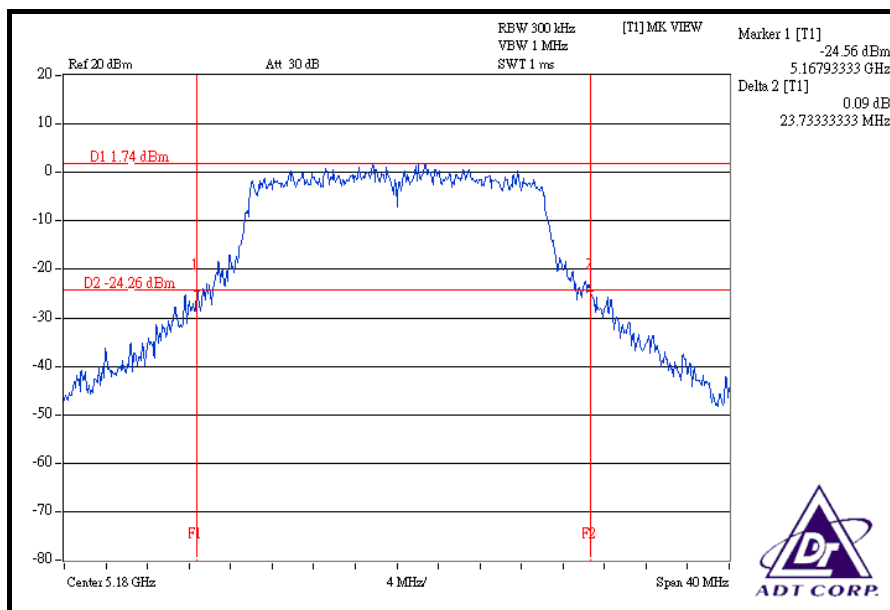
CH 2



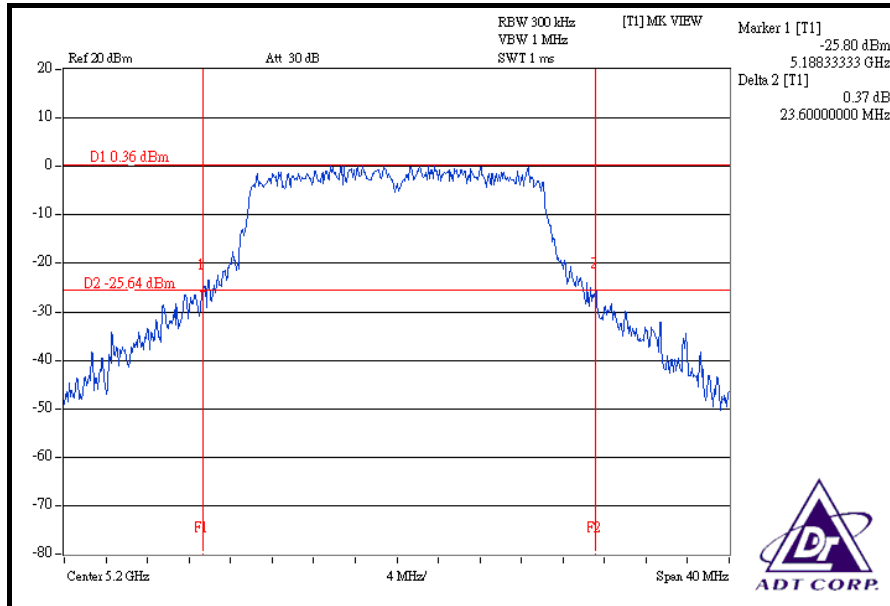
CH 4



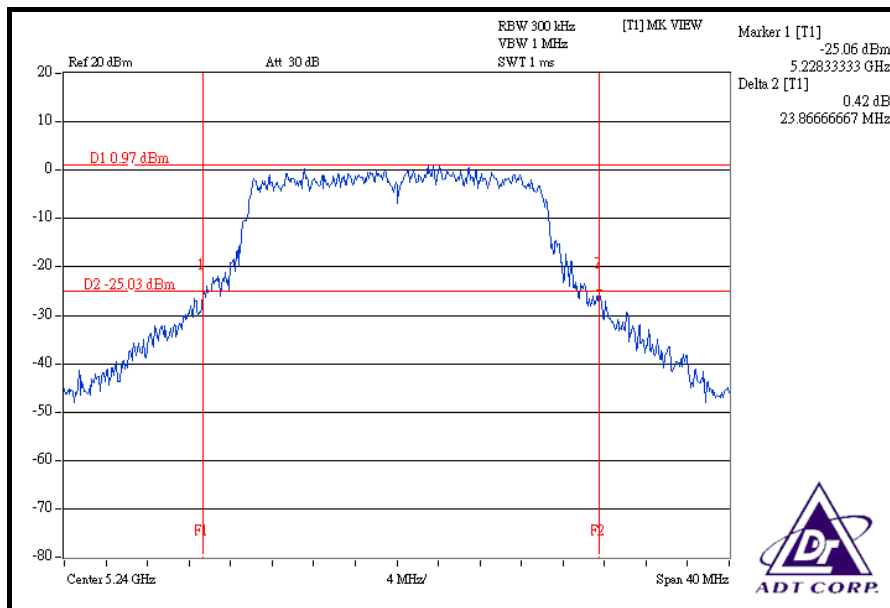
FOR CHAIN 2: CH 1



CH 2



CH 4



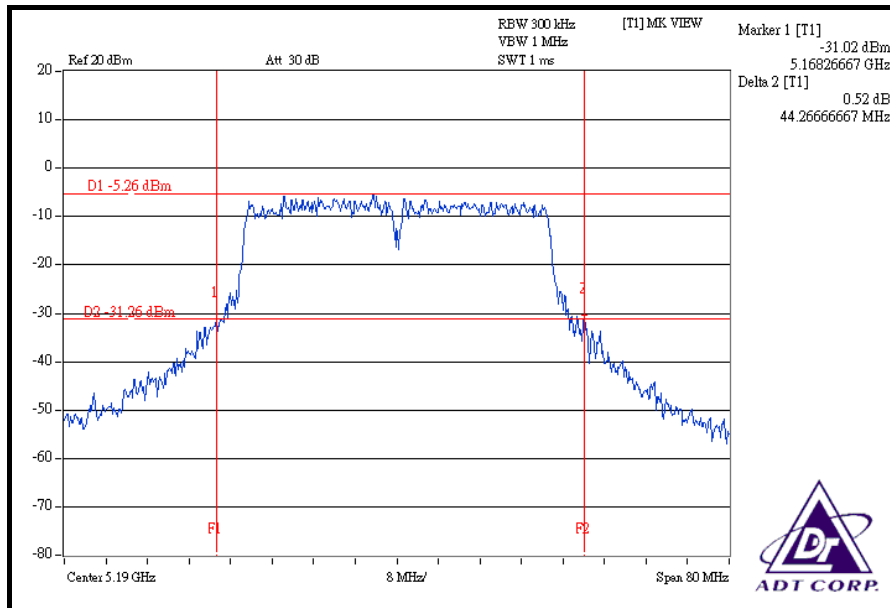


DRAFT 802.11n (40MHz) OFDM MODULATION:

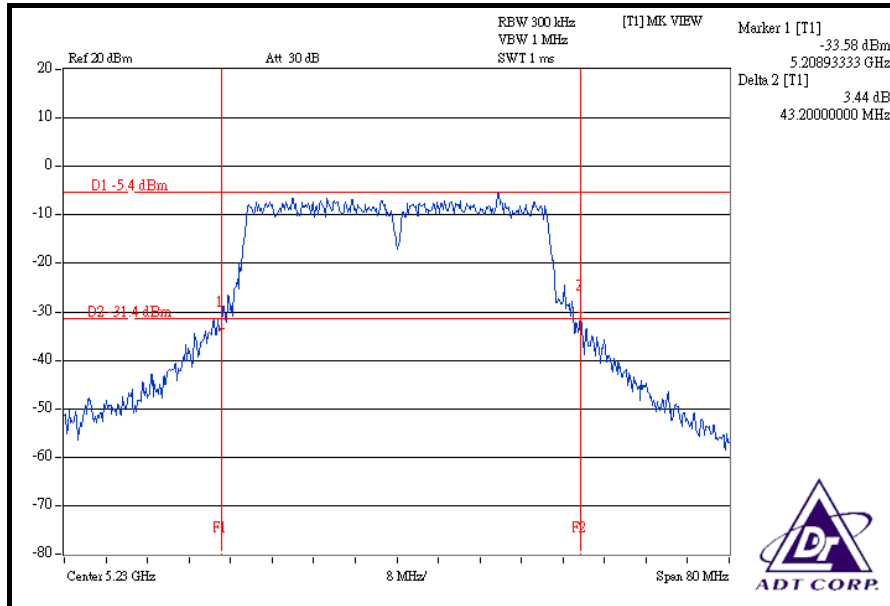
MODULATION TYPE	BPSK	TRANSFER RATE	15.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 67%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc OCCUPIED BANDWIDTH (MHz)			PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2	
1	5190	44.27	43.87	44.40	PASS
2	5230	43.20	42.53	44.13	PASS

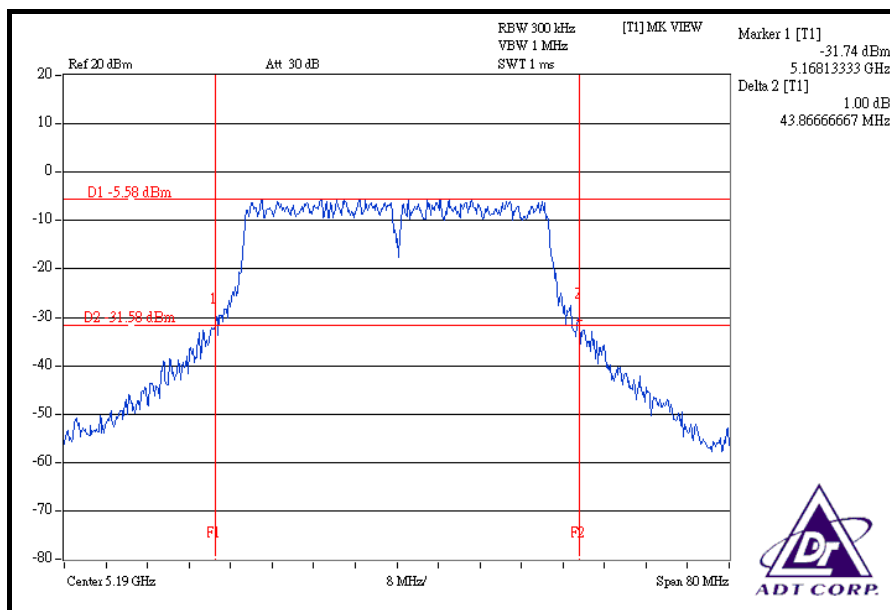
FOR CHAIN 0: CH 1



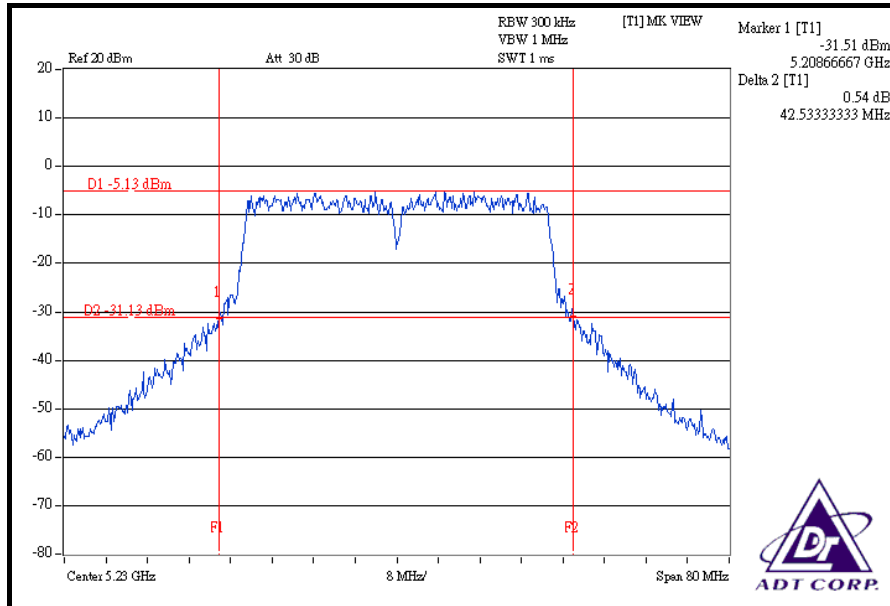
CH 2



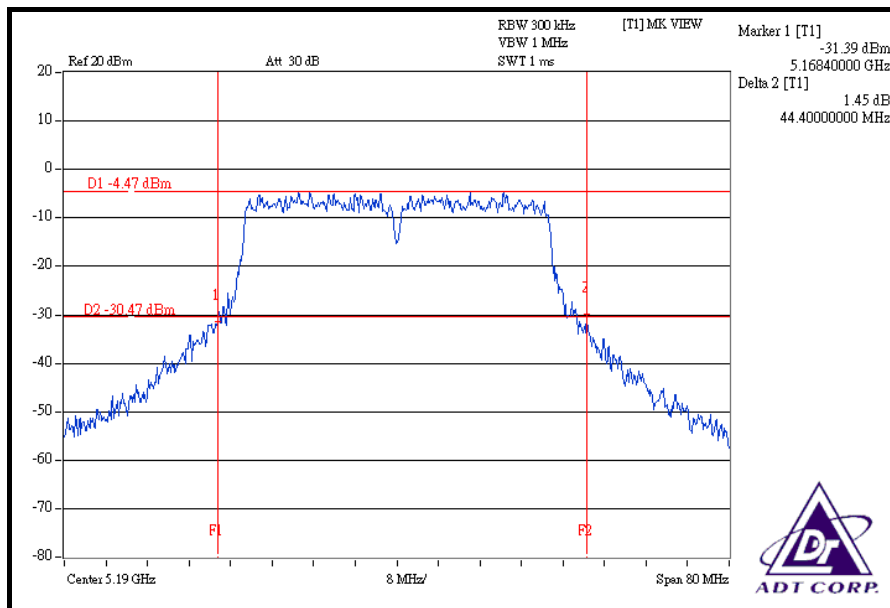
FOR CHAIN 1: CH 1



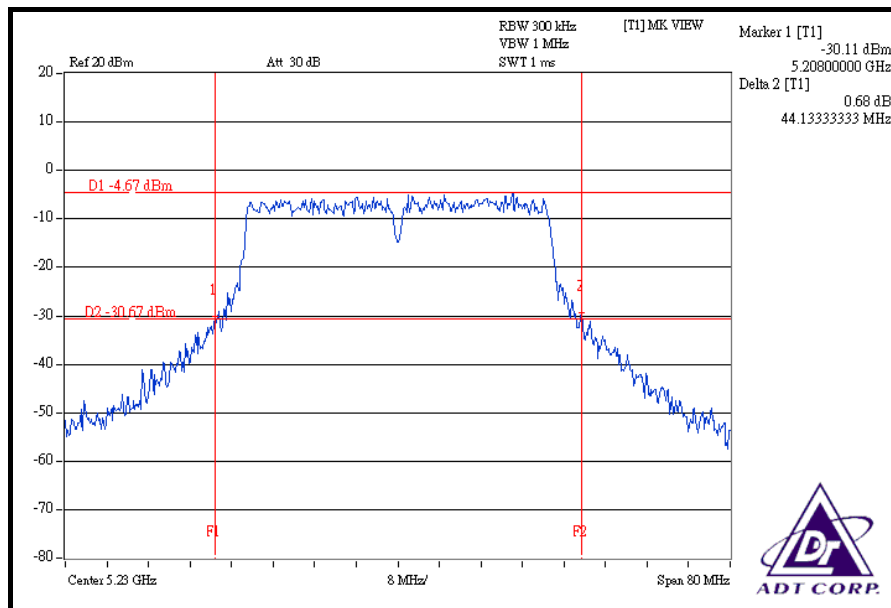
CH 2



FOR CHAIN 2: CH 1



CH 2



4.4 PEAK POWER EXCURSION MEASUREMENT

4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

FREQUENCY BAND	LIMIT
5.15 ~ 5.25GHz	13dB
5.25 ~ 5.35GHz	13dB
5.725 ~ 5.825GHz	13dB

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100040	Jun. 28, 2008

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

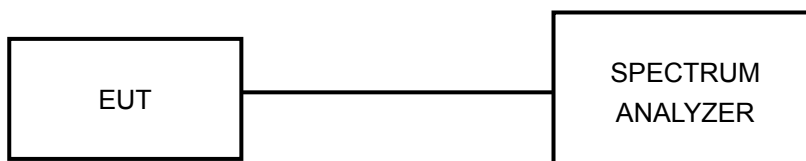
4.4.3 TEST PROCEDURE

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set the spectrum bandwidth span to view the entire spectrum.
- c. Using peak detector and Max-hold function for Trace 1 (RB = 1MHz, VB = 3MHz) and 2 (RB = 1MHz, VB = 300kHz).
- d. 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.

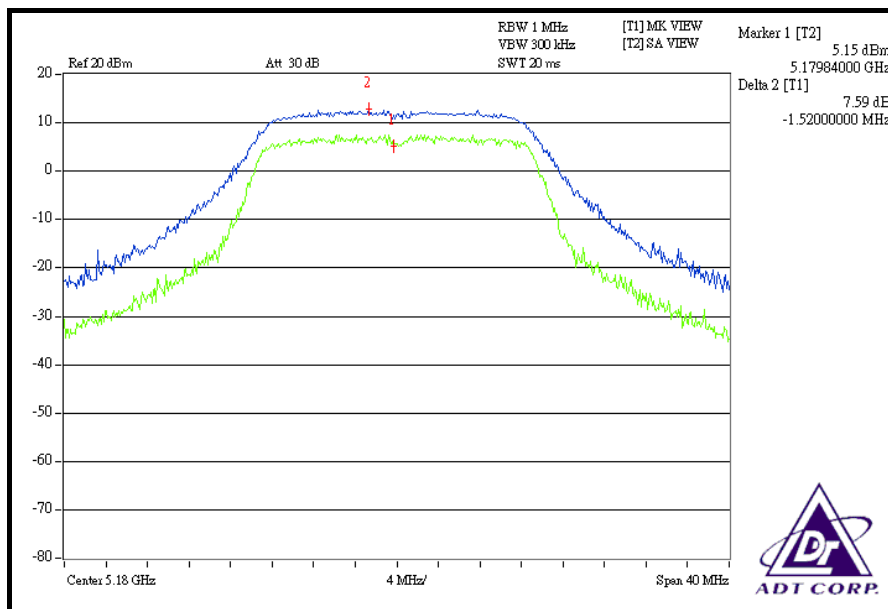
4.4.7 TEST RESULTS

802.11a OFDM MODULATION:

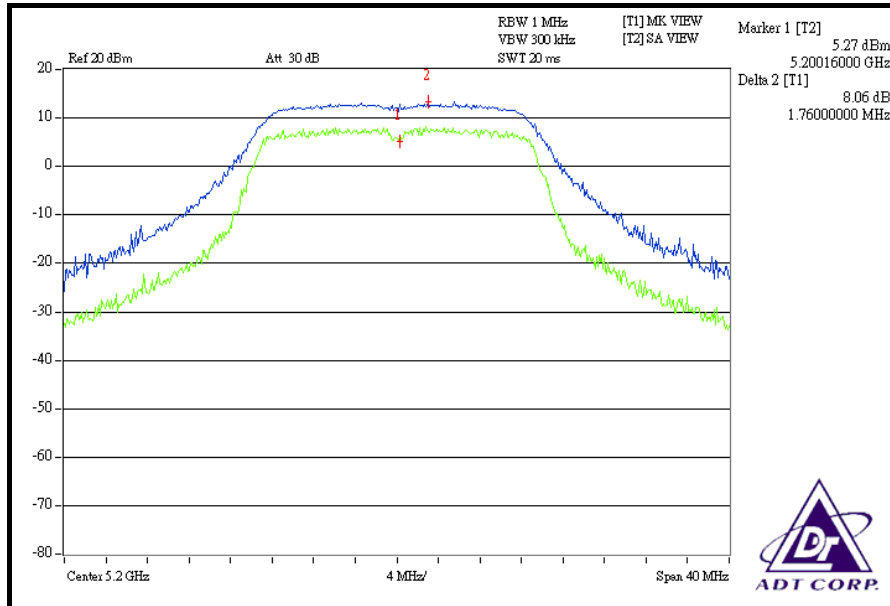
MODULATION TYPE	BPSK	TRANSFER RATE	6.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 67%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK TO AVERAGE EXCURSION LIMIT (dB)	PASS / FAIL
1	5180	7.59	13	PASS
2	5200	8.06	13	PASS
4	5240	7.92	13	PASS

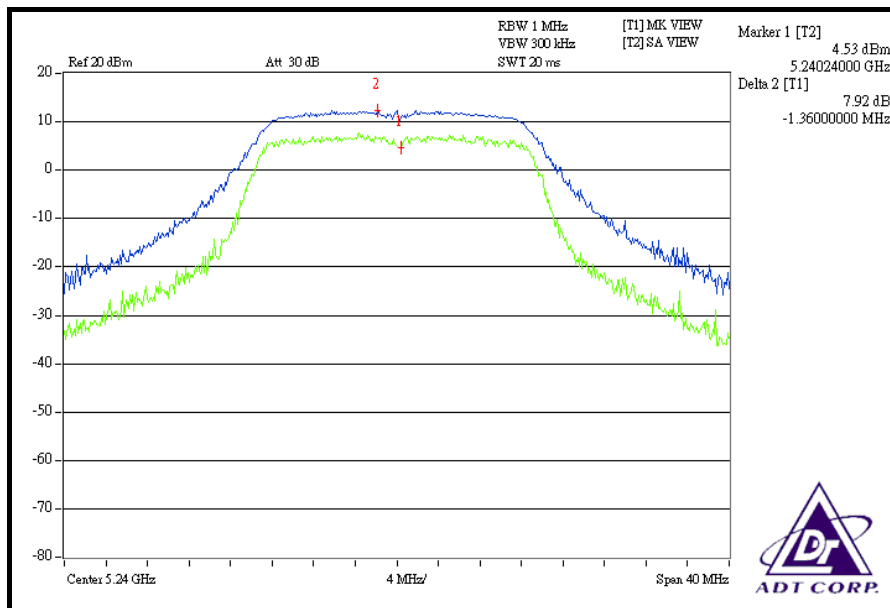
CH 1



CH 2



CH 4



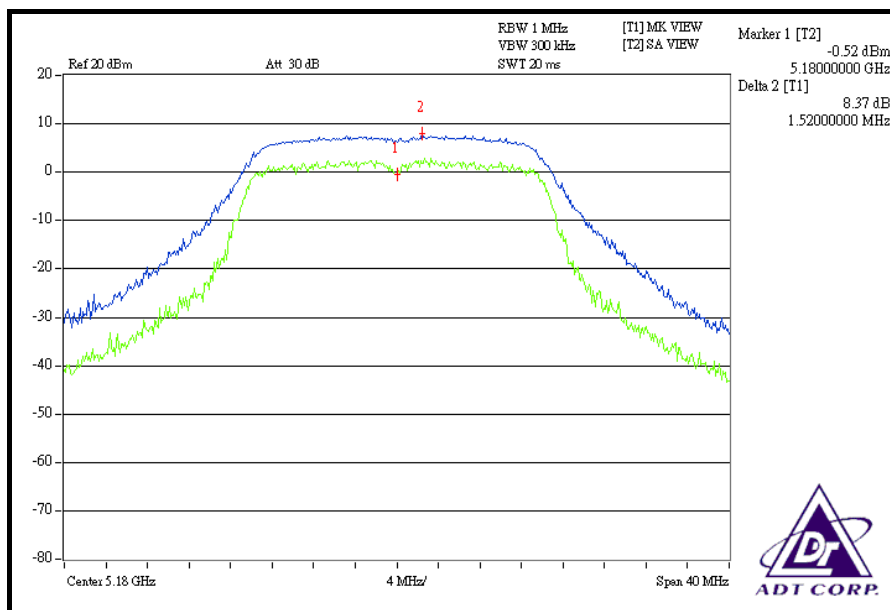


DRAFT 802.11n (20MHz) OFDM MODULATION:

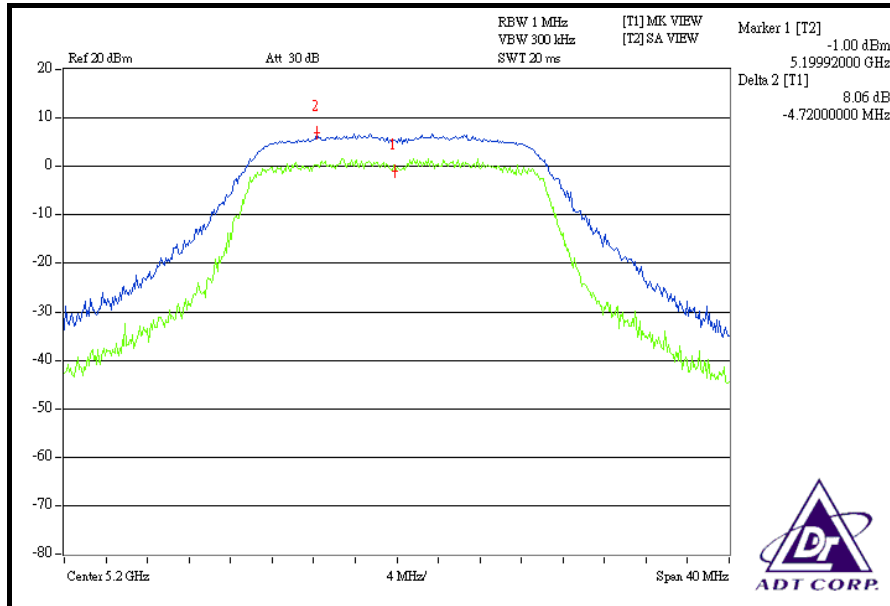
MODULATION TYPE	BPSK	TRANSFER RATE	7.2Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 67%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)			PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	5180	8.37	9.61	8.73	13	PASS
2	5200	8.06	9.31	9.29	13	PASS
4	5240	8.02	9.79	8.70	13	PASS

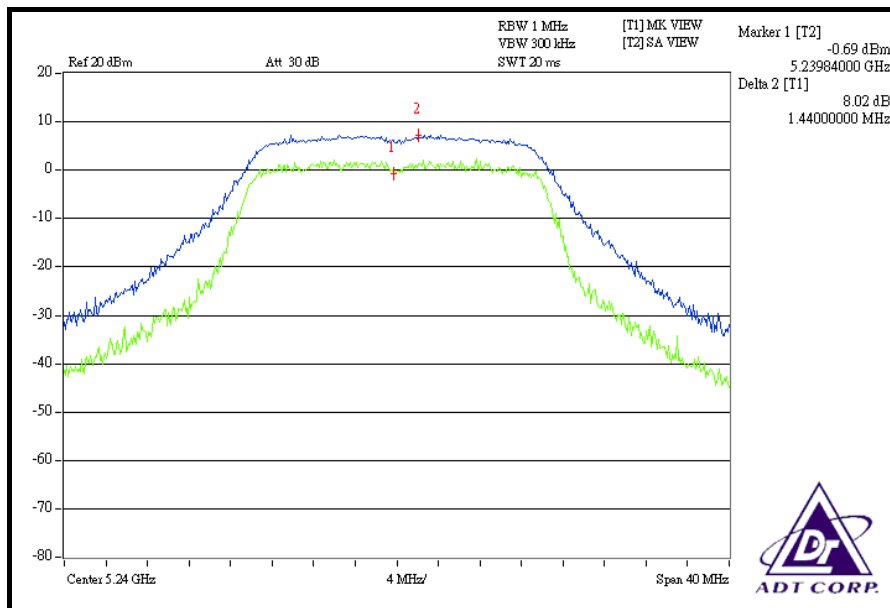
FOR CHAIN 0: CH 1



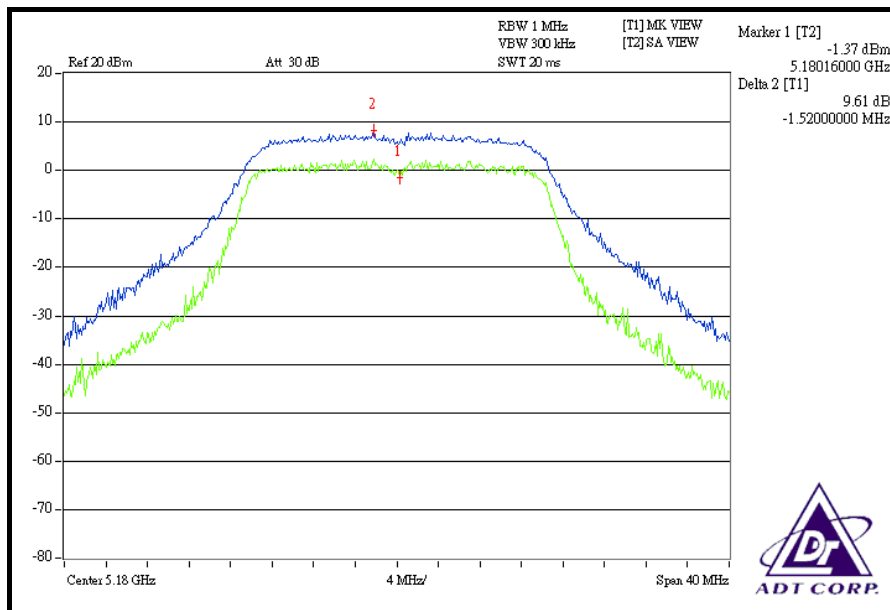
CH 2



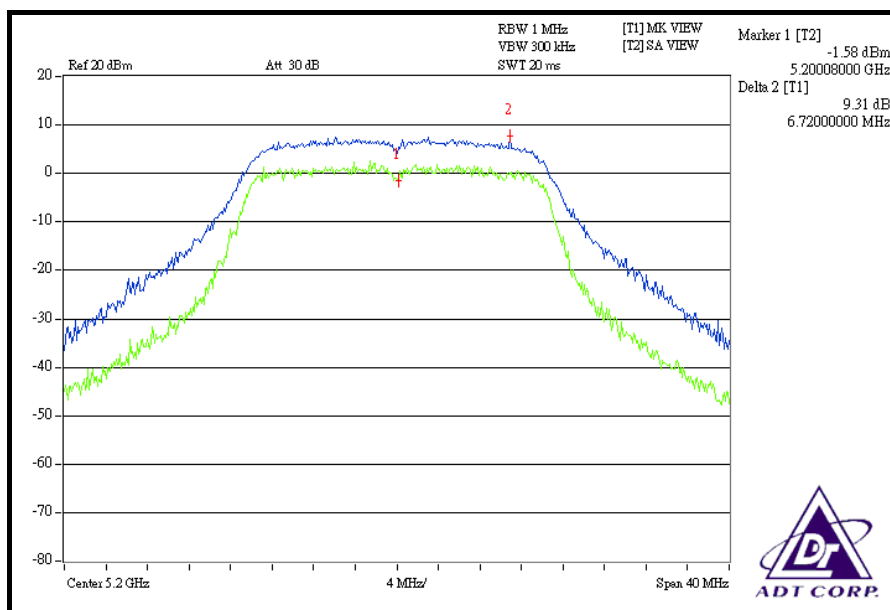
CH 4



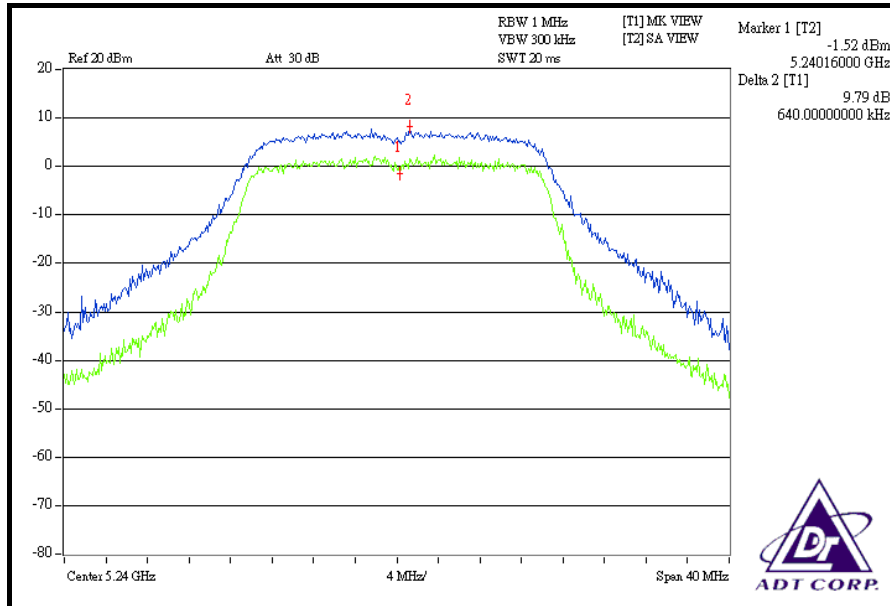
FOR CHAIN 1: CH 1



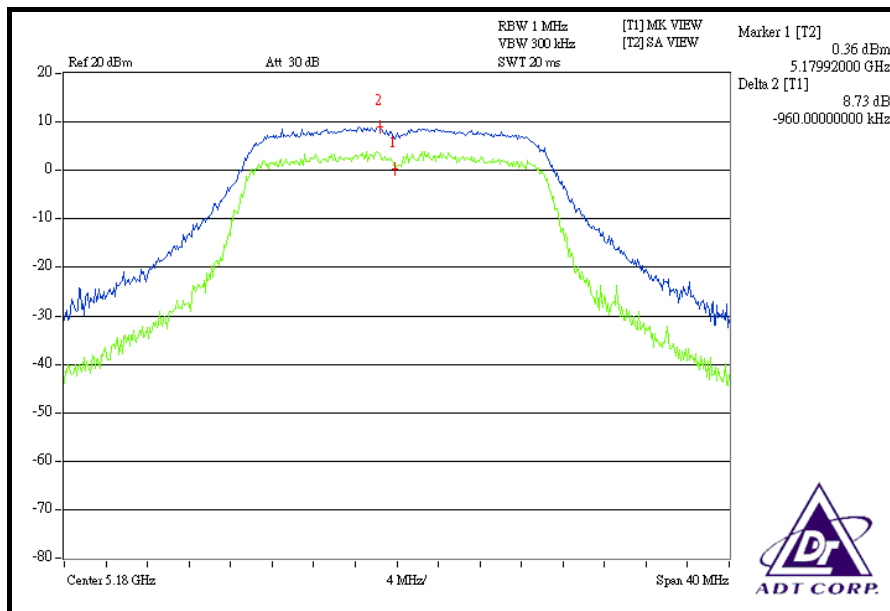
CH 2



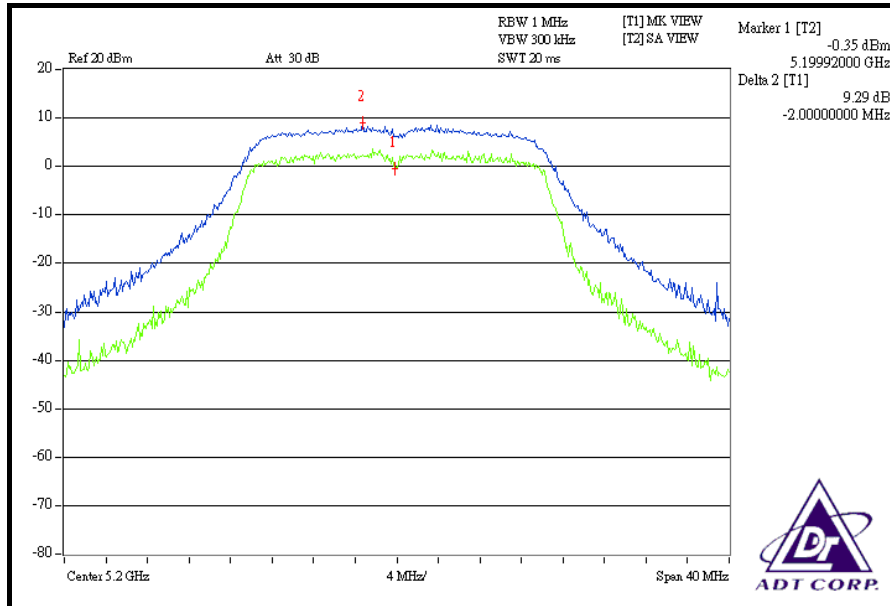
CH 4



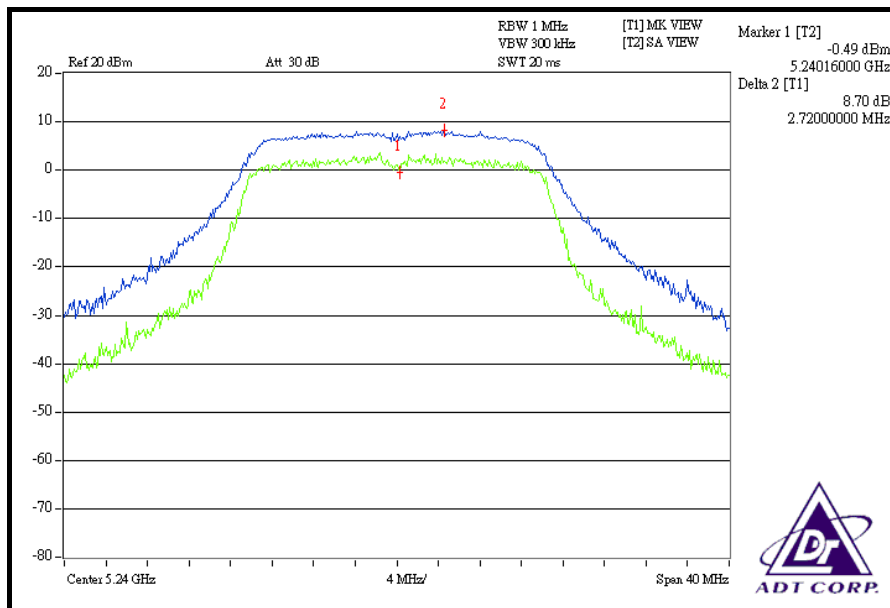
FOR CHAIN 2: CH 1



CH 2



CH 4



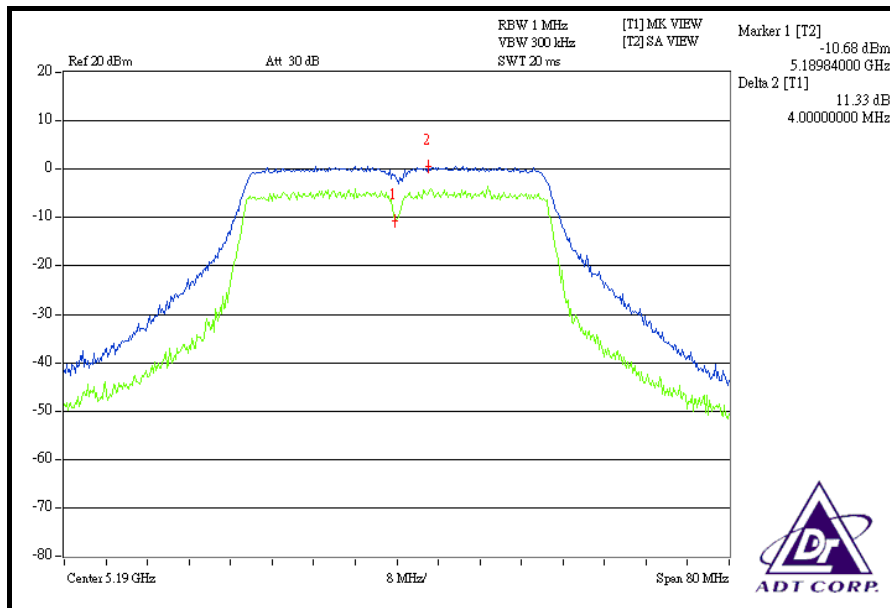


DRAFT 802.11n (40MHz) OFDM MODULATION:

MODULATION TYPE	BPSK	TRANSFER RATE	15.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 67%RH, 991hPa
TESTED BY	Brad Wu		

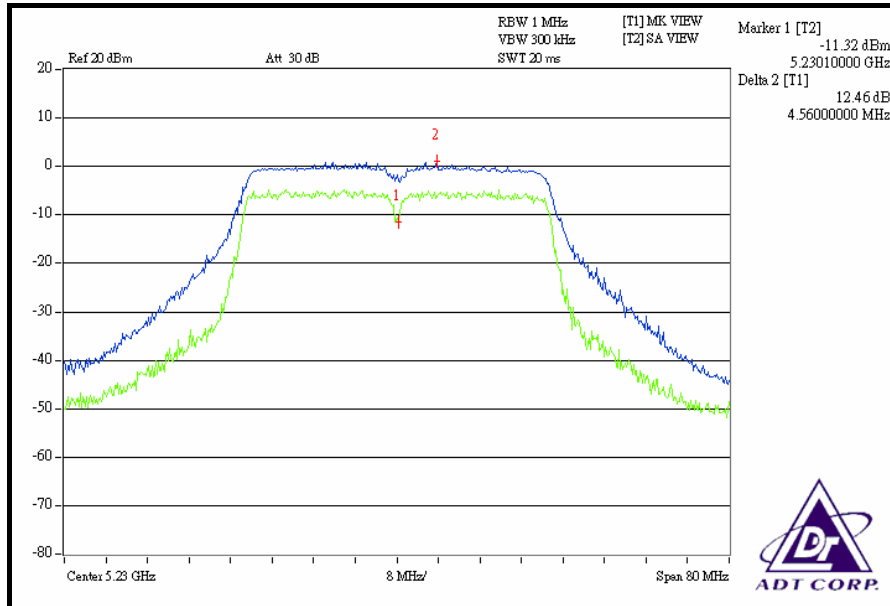
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)			PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	5190	11.33	12.19	12.25	13	PASS
2	5230	12.46	11.51	11.45	13	PASS

FOR CHAIN 0: CH 1

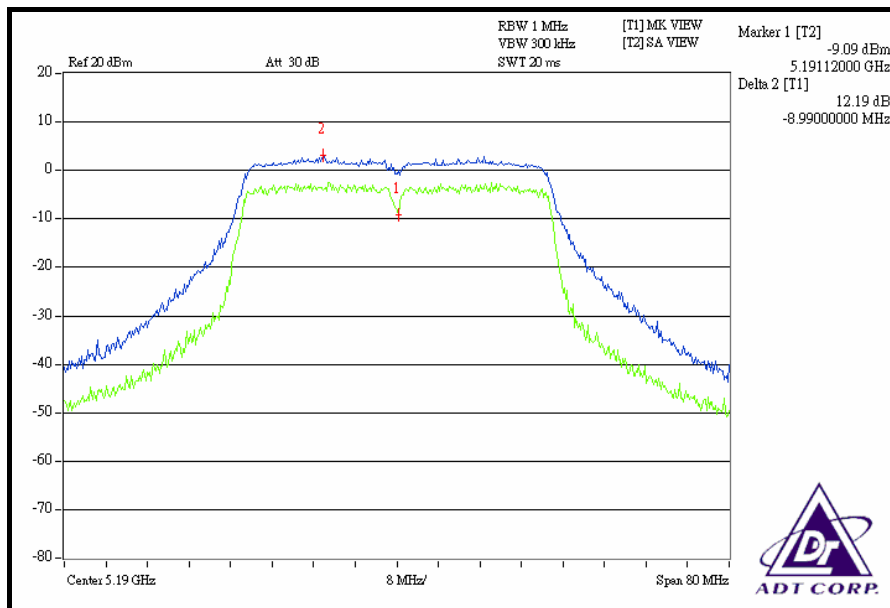




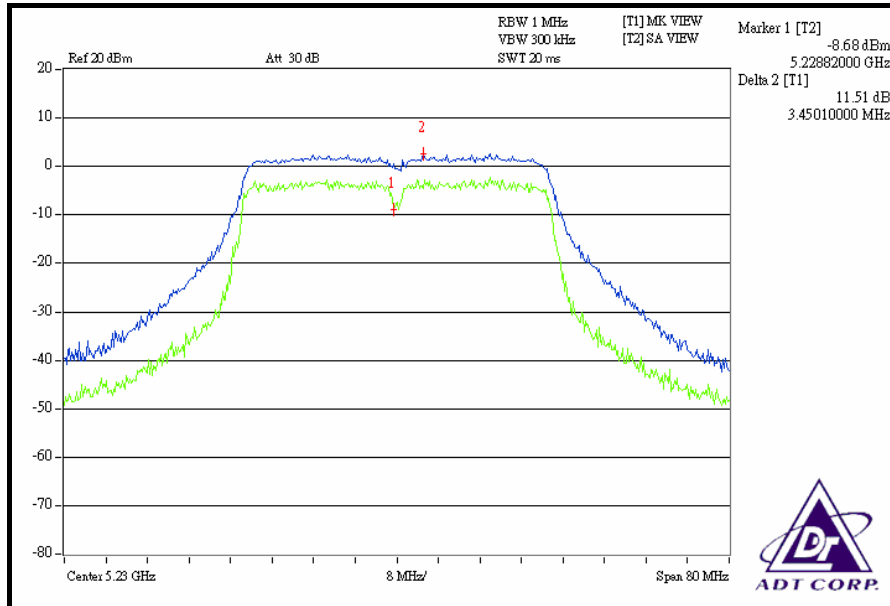
CH 2



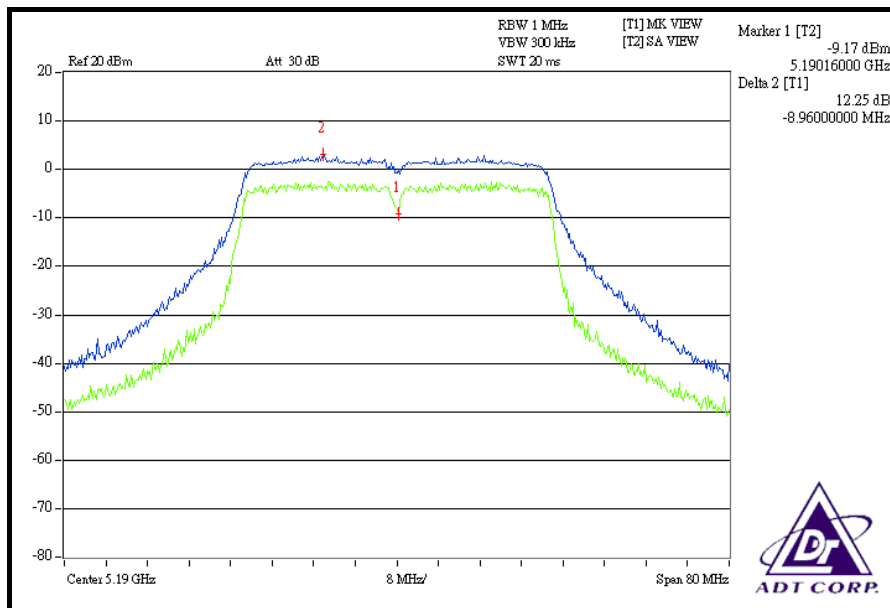
FOR CHAIN 1: CH 1



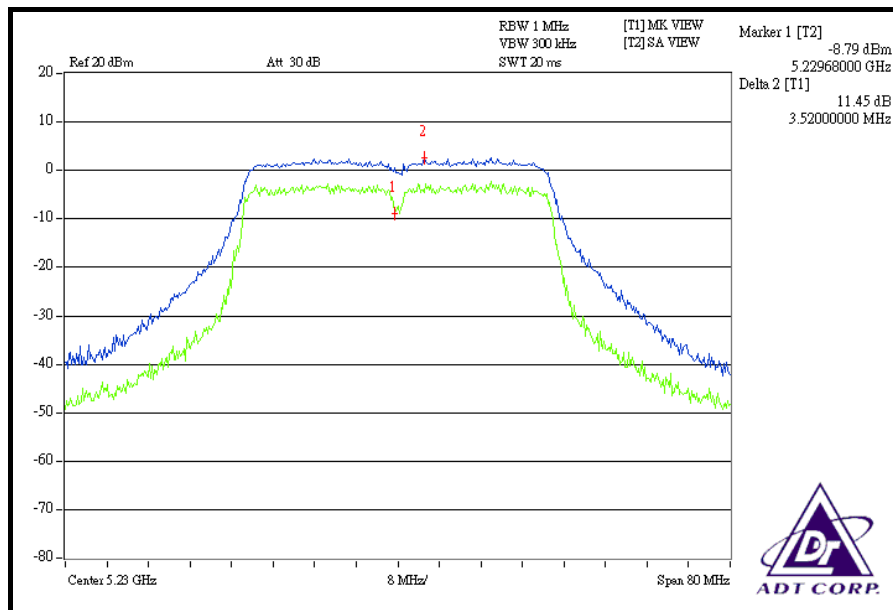
CH 2



FOR CHAIN 2: CH 1



CH 2





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	100040	Jun. 28, 2008

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

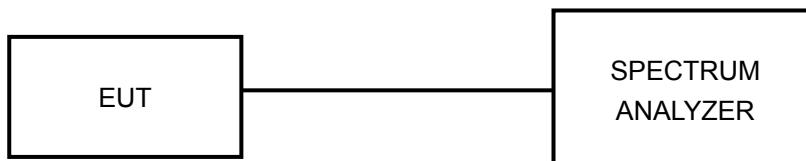
4.5.3 TEST PROCEDURES

- a. The transmitter output was connected to the spectrum analyzer.
- b. 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

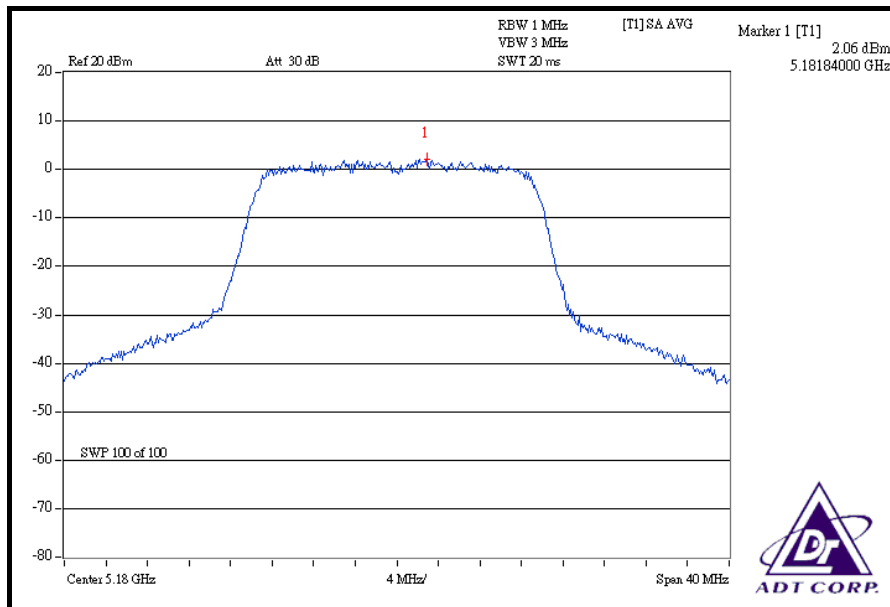
4.5.7 TEST RESULTS

802.11a OFDM MODULATION:

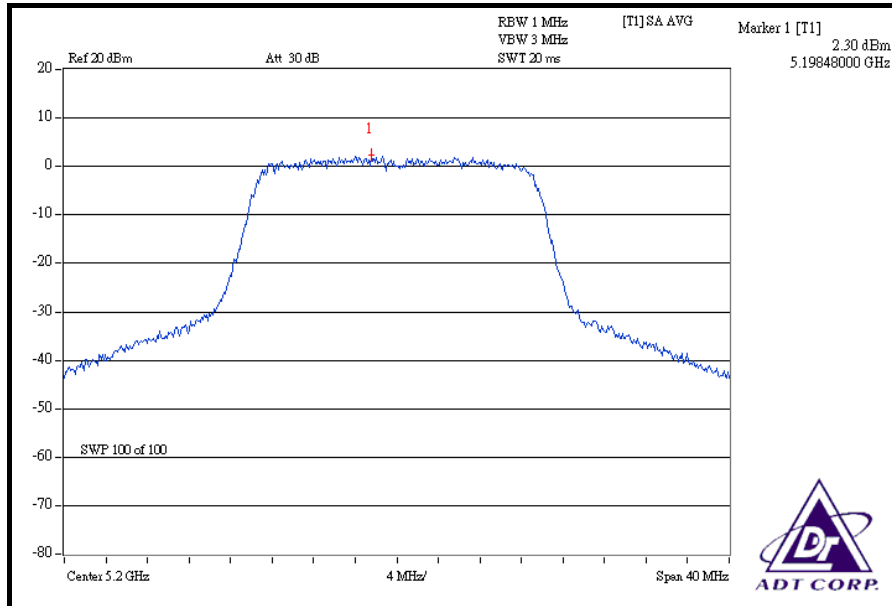
MODULATION TYPE	BPSK	TRANSFER RATE	6.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 67%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	5180	2.06	4	PASS
2	5200	2.30	4	PASS
4	5240	1.88	4	PASS

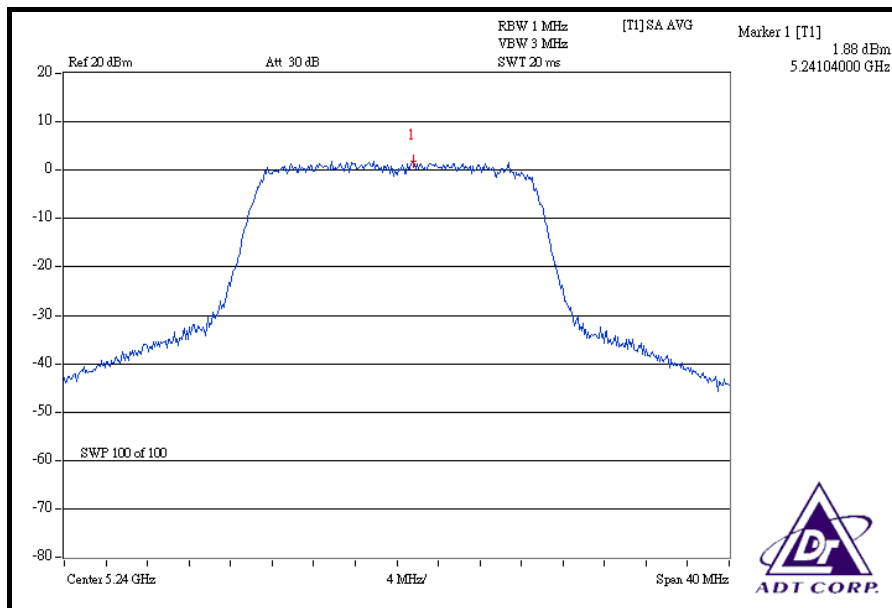
CH 1



CH 2



CH 4



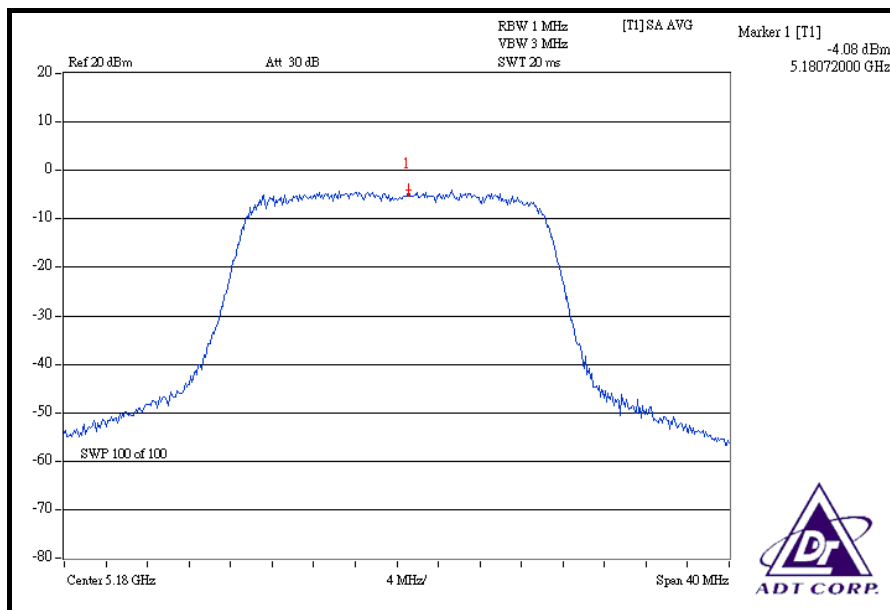


DRAFT 802.11n (20MHz) OFDM MODULATION:

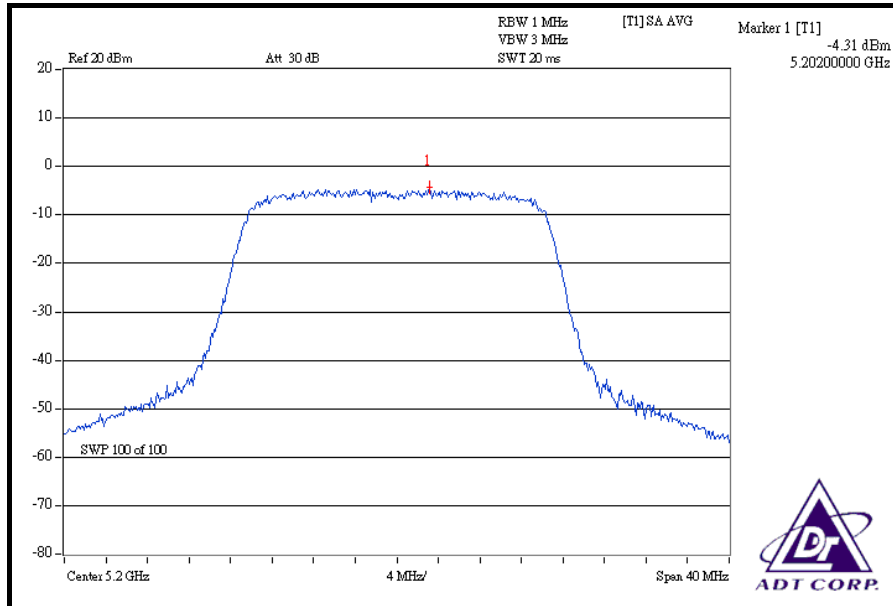
MODULATION TYPE	BPSK	TRANSFER RATE	7.2Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 67%RH, 991hPa
TESTED BY	Brad Wu		

CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 1MHz BW (mW)			RF POWER LEVEL IN 1MHz BW (dBm)			TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN0	CHAIN1	CHAIN2	CHAIN0	CHAIN1	CHAIN2				
1	5180	0.391	0.542	0.552	-4.08	-2.66	-2.58	1.485	1.72	4	PASS
2	5200	0.371	0.573	0.532	-4.31	-2.42	-2.74	1.476	1.69	4	PASS
4	5240	0.371	0.564	0.540	-4.31	-2.49	-2.68	1.475	1.68	4	PASS

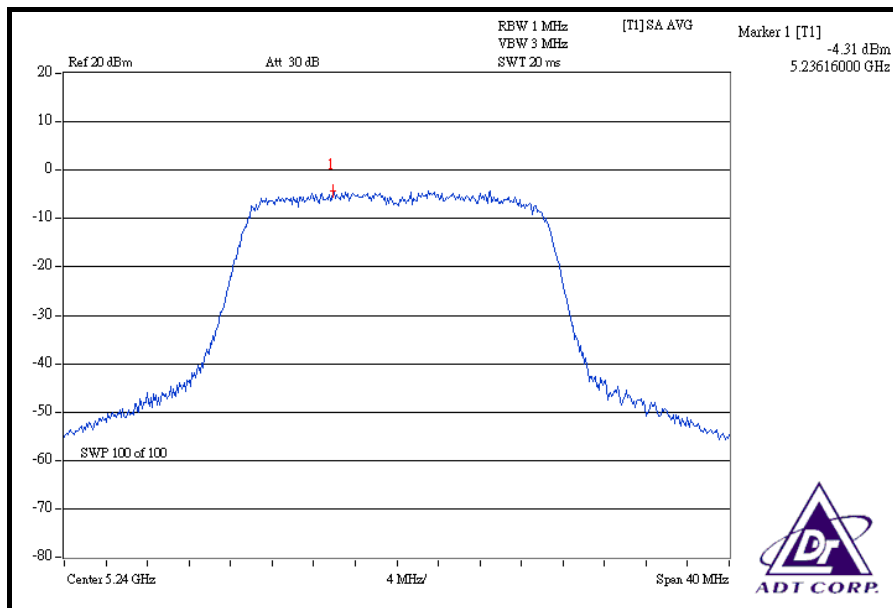
FOR CHAIN 0: CH 1



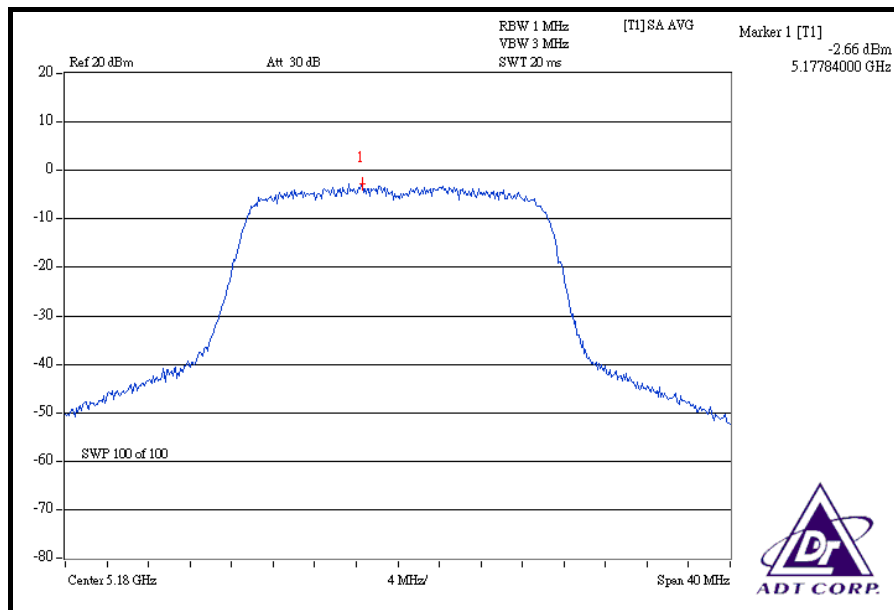
CH 2



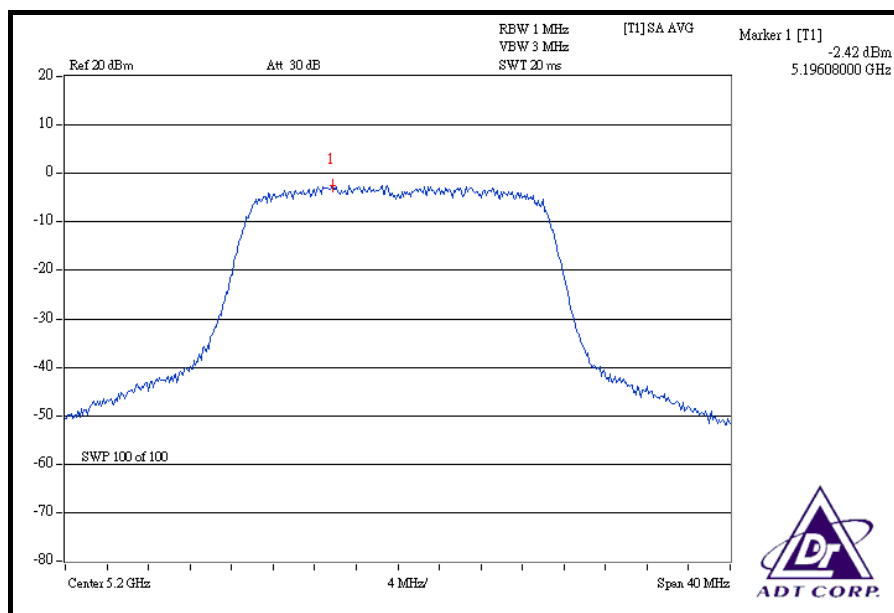
CH 4



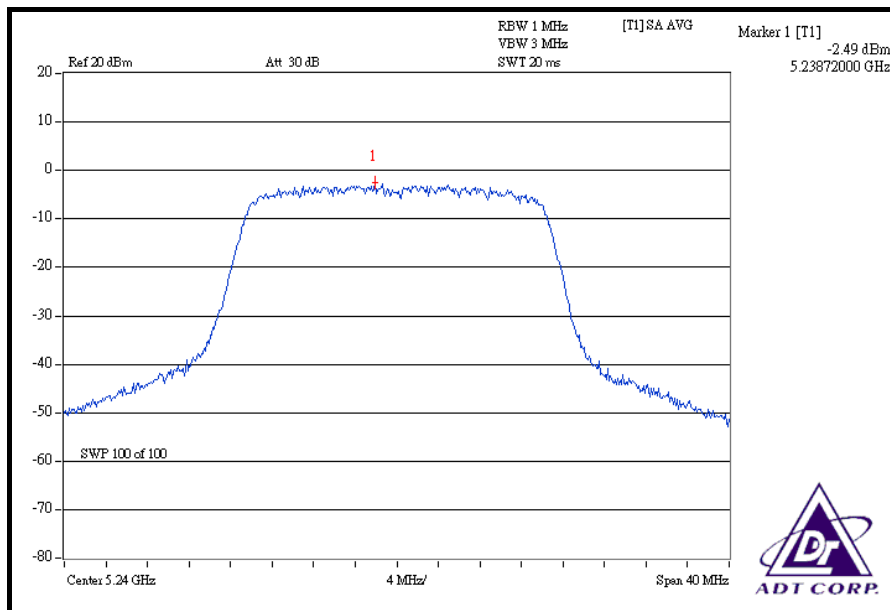
FOR CHAIN 1: CH 1



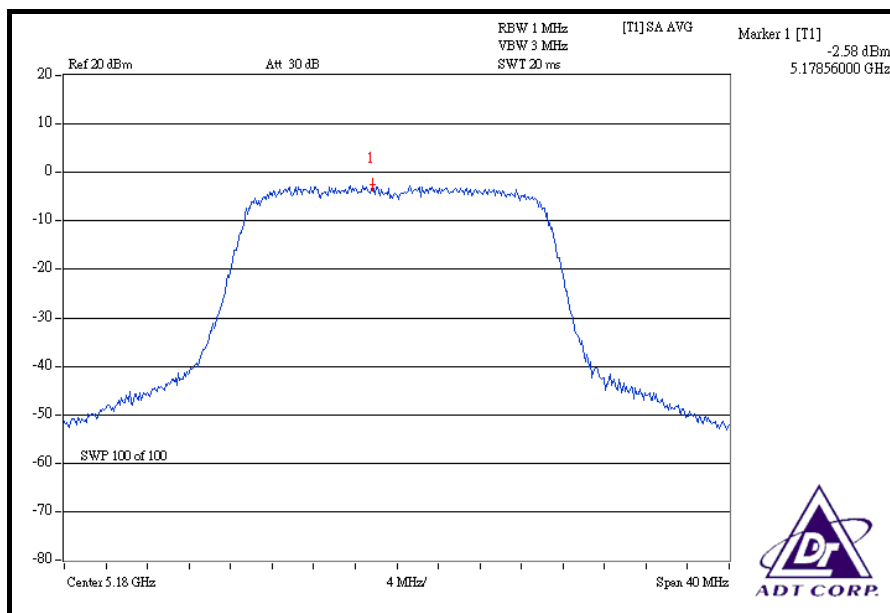
CH 2



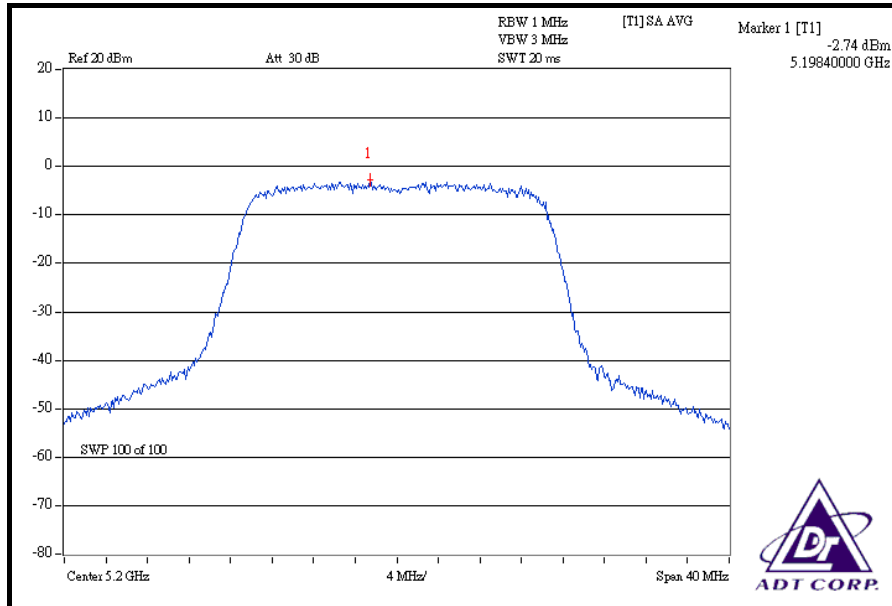
CH 4



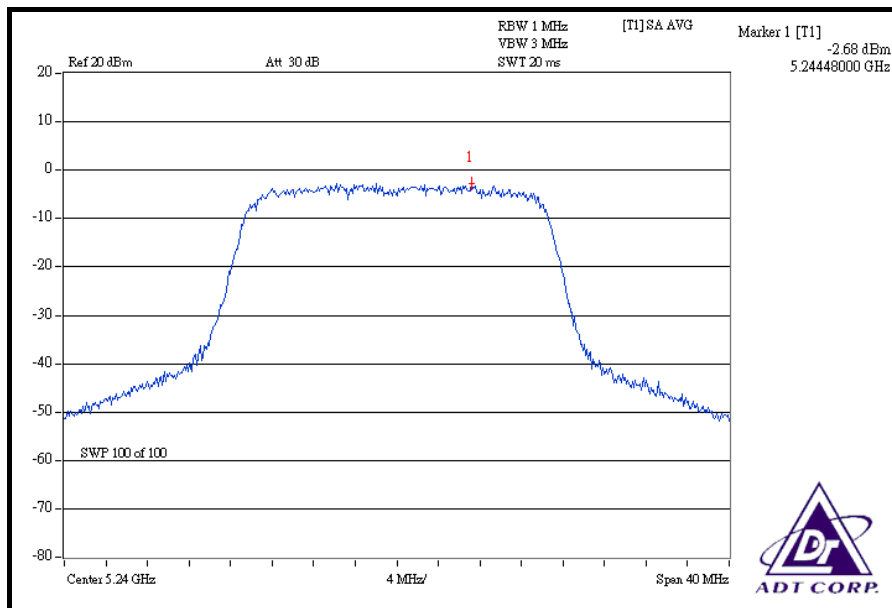
FOR CHAIN 2: CH 1



CH 2



CH 4



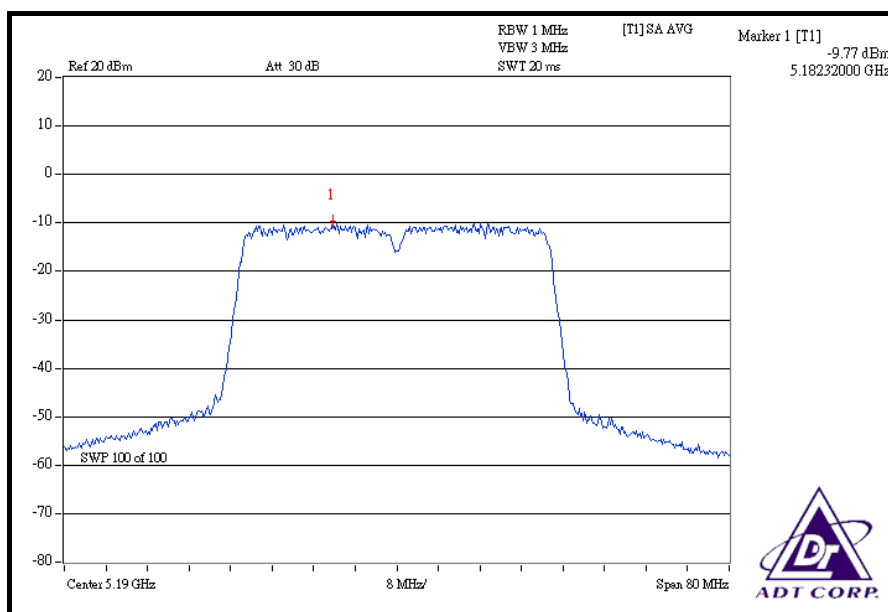


DRAFT 802.11n (40MHz) OFDM MODULATION:

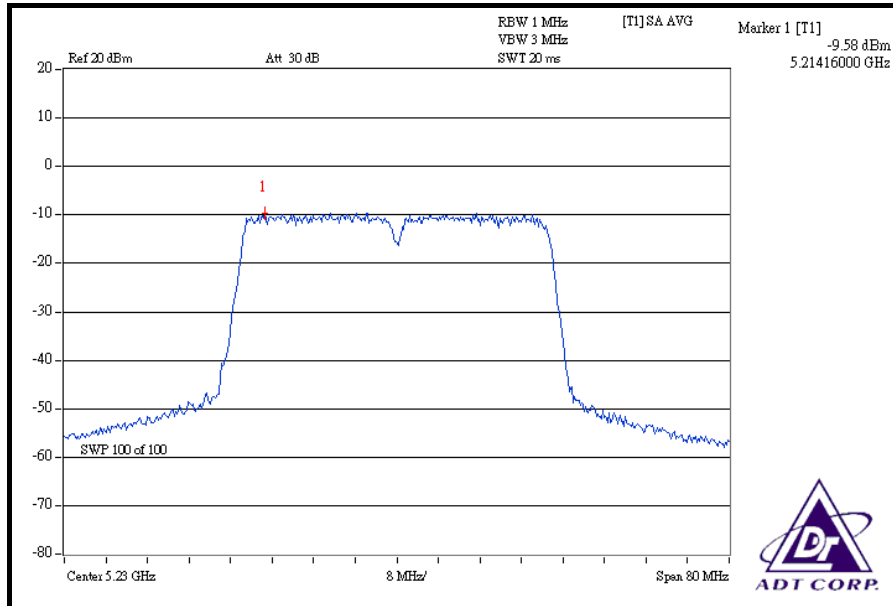
MODULATION TYPE	BPSK	TRANSFER RATE	15.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 67%RH, 991hPa
TESTED BY	Brad Wu		

CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 1MHz BW (mW)			RF POWER LEVEL IN 1MHz BW (dBm)			TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN0	CHAIN1	CHAIN2	CHAIN0	CHAIN1	CHAIN2				
1	5190	0.105	0.182	0.185	-9.77	-7.39	-7.32	0.472	-3.25	4	PASS
2	5230	0.110	0.180	0.181	-9.58	-7.45	-7.42	0.471	-3.27	4	PASS

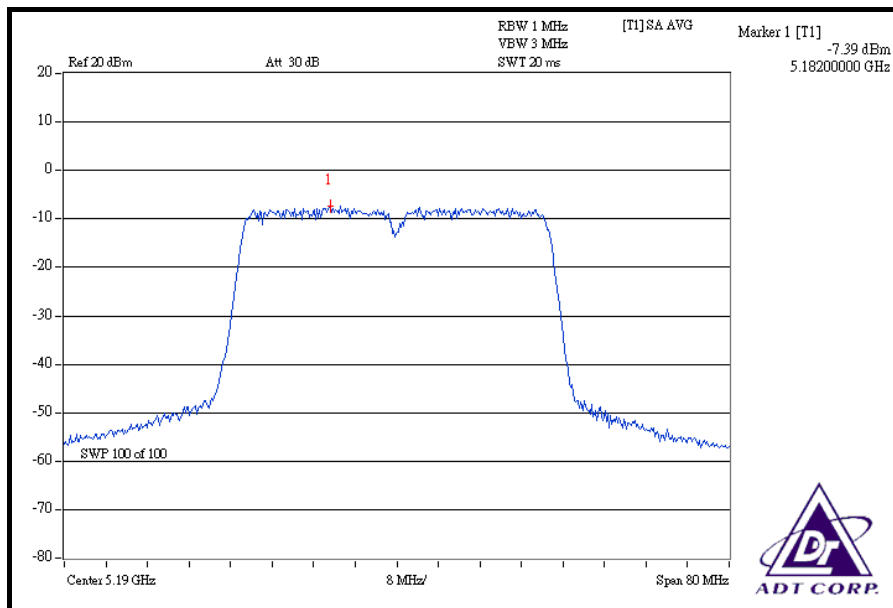
FOR CHAIN 0: CH 1



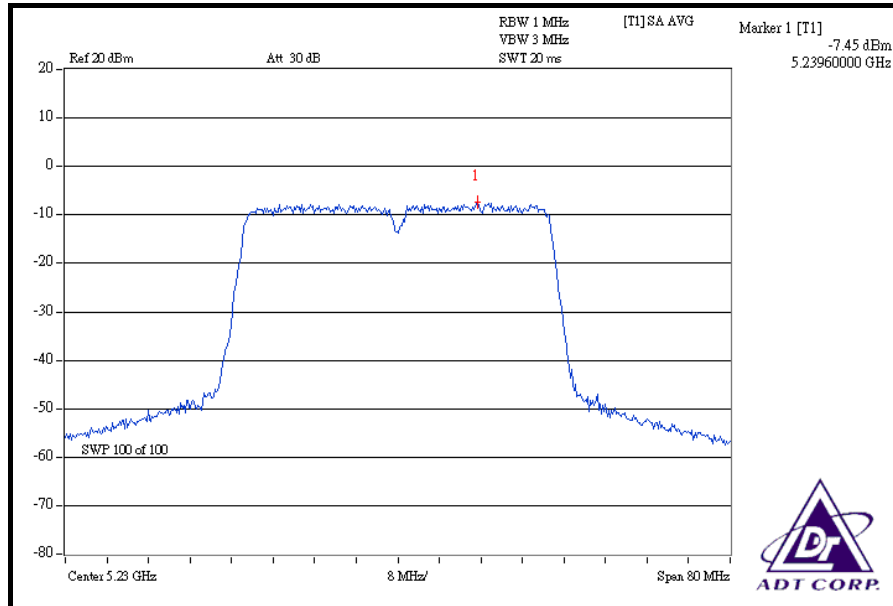
CH 2



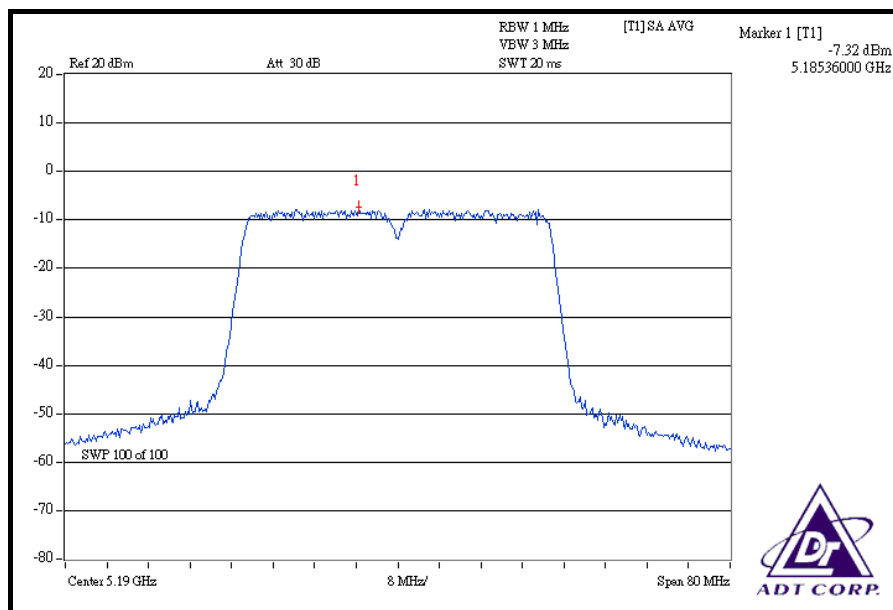
FOR CHAIN 1: CH 1



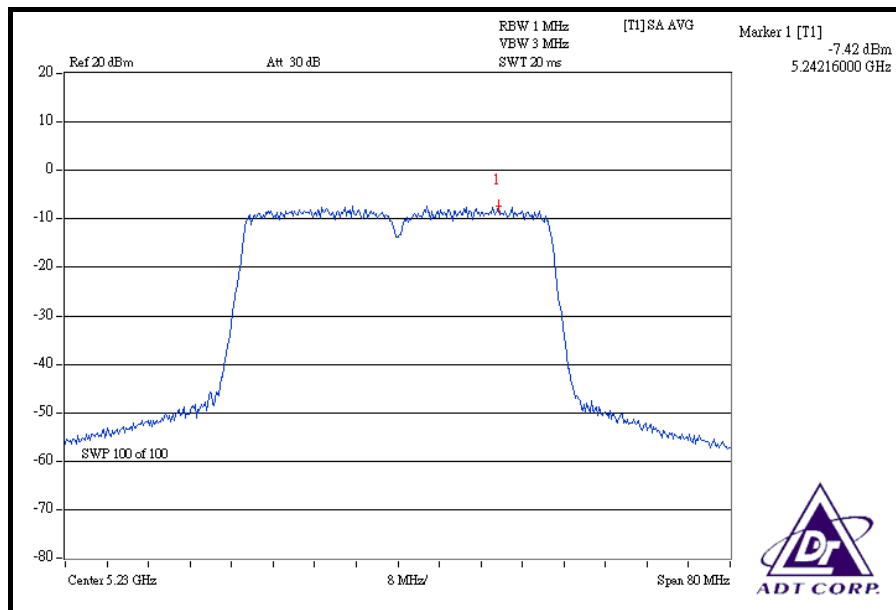
CH 2



FOR CHAIN 2: CH 1



CH 2





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	Mar. 07, 2008
WIT STANDARD TEMPERATURE AND HUMIDITY CHAMBER	TH-4S-C	W981030	Jun. 28, 2008

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

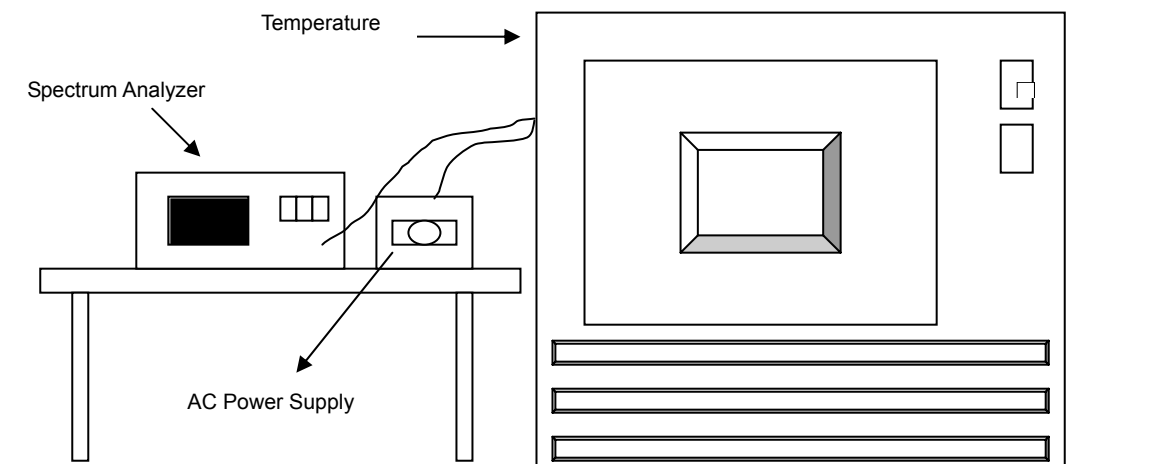
4.6.3 TEST PROCEDURE

- a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- b. Turn the EUT on and couple its output to a spectrum analyzer.
- c. Turn the EUT off and set the chamber to the highest temperature specified.
- d. 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.
- e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- f. 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

Same as Item 4.1.6

4.6.7 TEST RESULTS

OPERATING FREQUENCY: 5200MHz						LIMIT: $\pm 0.01\%$			
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	126.5	5199.906904	-0.0017903	5199.922769	-0.0014852	5199.946972	-0.0010198	5199.947665	-0.0010064
	110.0	5199.922904	-0.0014826	5199.934769	-0.0012544	5199.950372	-0.0009544	5199.951565	-0.0009314
	93.5	5199.925704	-0.0014288	5199.935169	-0.0012467	5199.955572	-0.0008544	5199.958765	-0.0007930
40	126.5	5199.918004	-0.0015768	5199.931769	-0.0013121	5199.951372	-0.0009352	5199.952565	-0.0009122
	110.0	5199.924204	-0.0014576	5199.940569	-0.0011429	5199.956172	-0.0008428	5199.956665	-0.0008334
	93.5	5199.935804	-0.0012345	5199.948469	-0.0009910	5199.959072	-0.0007871	5199.963265	-0.0007064
30	126.5	5199.919304	-0.0015518	5199.937869	-0.0011948	5199.957072	-0.0008255	5199.958765	-0.0007930
	110.0	5199.925104	-0.0014403	5199.953469	-0.0008948	5199.964672	-0.0006794	5199.958765	-0.0007930
	93.5	5199.943204	-0.0010922	5199.961869	-0.0007333	5199.965772	-0.0006582	5199.968965	-0.0005968
20	126.5	5199.926304	-0.0014172	5199.941769	-0.0011198	5199.960372	-0.0007621	5199.963865	-0.0006949
	110.0	5199.926604	-0.0014115	5199.959169	-0.0007852	5199.968172	-0.0006121	5199.968265	-0.0006103
	93.5	5199.950904	-0.0009442	5199.970369	-0.0005698	5199.969672	-0.0005832	5199.971665	-0.0005449
10	126.5	5199.933504	-0.0012788	5199.952569	-0.0009121	5199.967772	-0.0006198	5199.970265	-0.0005718
	110.0	5199.942104	-0.0011134	5199.963469	-0.0007025	5199.970072	-0.0005755	5199.971665	-0.0005449
	93.5	5199.957004	-0.0008268	5199.975169	-0.0004775	5199.977772	-0.0004275	5199.981665	-0.0003526
0	126.5	5199.937204	-0.0012076	5199.959569	-0.0007775	5199.971372	-0.0005505	5199.975665	-0.0004680
	110.0	5199.948704	-0.0009865	5199.968969	-0.0005967	5199.978172	-0.0004198	5199.978765	-0.0004084
	93.5	5199.963304	-0.0007057	5199.978269	-0.0004179	5199.980172	-0.0003813	5199.984365	-0.0003007
-10	126.5	5199.949304	-0.0009749	5199.965069	-0.0006718	5199.978172	-0.0004198	5199.980565	-0.0003738
	110.0	5199.955804	-0.0008499	5199.975069	-0.0004794	5199.981372	-0.0003582	5199.985465	-0.0002795
	93.5	5199.970404	-0.0005692	5199.981469	-0.0003564	5199.985072	-0.0002871	5199.988765	-0.0002161
-20	126.5	5199.954204	-0.0008807	5199.971469	-0.0005487	5199.981672	-0.0003525	5199.985665	-0.0002757
	110.0	5199.959604	-0.0007768	5199.979469	-0.0003948	5199.987872	-0.0002332	5199.988665	-0.0002180
	93.5	5199.974404	-0.0004922	5199.988869	-0.0002141	5199.989072	-0.0002102	5199.989665	-0.0001987
-30	126.5	5199.959504	-0.0007788	5199.978269	-0.0004179	5199.987972	-0.0002313	5199.988065	-0.0002295
	110.0	5199.973904	-0.0005018	5199.984569	-0.0002967	5199.990372	-0.0001852	5199.992665	-0.0001411
	93.5	5199.977004	-0.0004422	5199.994069	-0.0001141	5199.994472	-0.0001063	5199.995865	-0.0000795



4.7 BAND EDGES MEASUREMENT

4.7.1 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
802.11a:			
R&S SPECTRUM ANALYZER	FSP40	100040	Jun. 28, 2008
DRAFT 802.11n (20MHz), DRAFT 802.11n (40MHz):			
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Jul. 27, 2008
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Aug. 05, 2008
BILOG Antenna SCHWARZBECK	VULB9168	9168-153	Jan. 04, 2008
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Jul. 30, 2008
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 16, 2008
Preamplifier Agilent	8449B	3008A01910	Sep. 21, 2007
Preamplifier Agilent	8447D	2944A10638	Dec. 20, 2007
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218188/218189	Nov. 14, 2007
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 09, 2008
Software	ADT_Radiated_V7.6	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA
Turn Table EMCO	2087-2.03	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	07026401	Apr. 23, 2008

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

802.11a:

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set both RBW and VBW of spectrum analyzer to 1MHz and 3MHz with suitable frequency span including 100MHz bandwidth from band edge. The band edges was measured and recorded.

DRAFT 802.11n (20MHz), DRAFT 802.11n (40MHz):

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. Set both RBW and VBW of spectrum analyzer to 1MHz and 3MHz with suitable frequency span including 100MHz bandwidth from band edge. The band edges was measured and recorded.

NOTE: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz

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 5.25GHz 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 field strength of the intentional signal made on the OATS to calculate the field strength of the unintentional signals.

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

802.11a OFDM MODULATION:

Channel 1 (5180MHz)

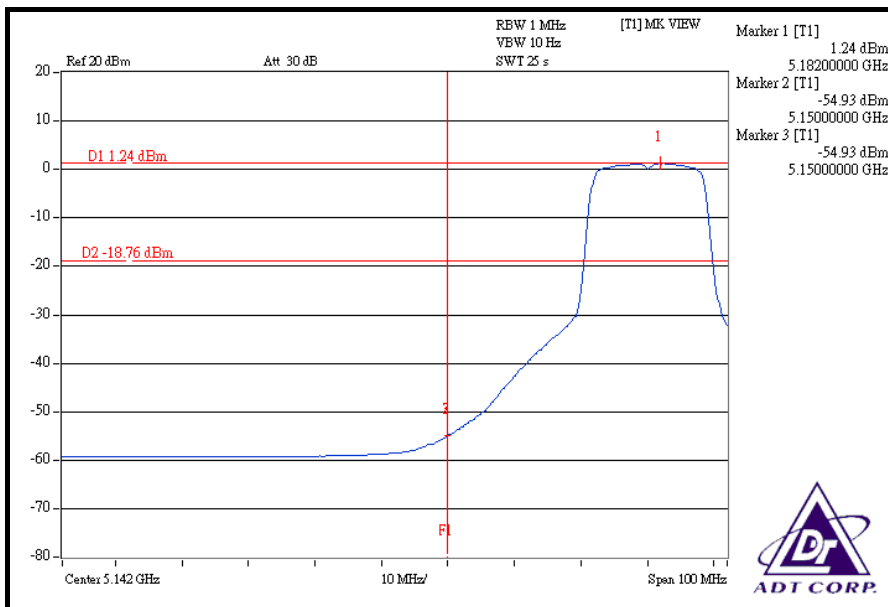
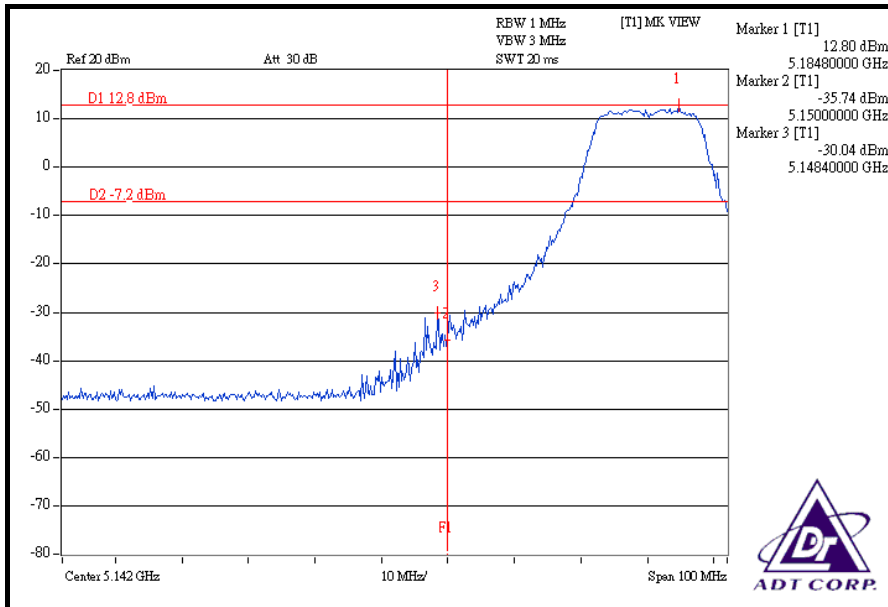
The band edge emission plot on the next page shows 42.84dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 110.85dBuV/m (Peak), so the maximum field strength in restrict band is $110.85 - 42.84 = 68.01$ dBuV/m which is under 74dBuV/m limit.

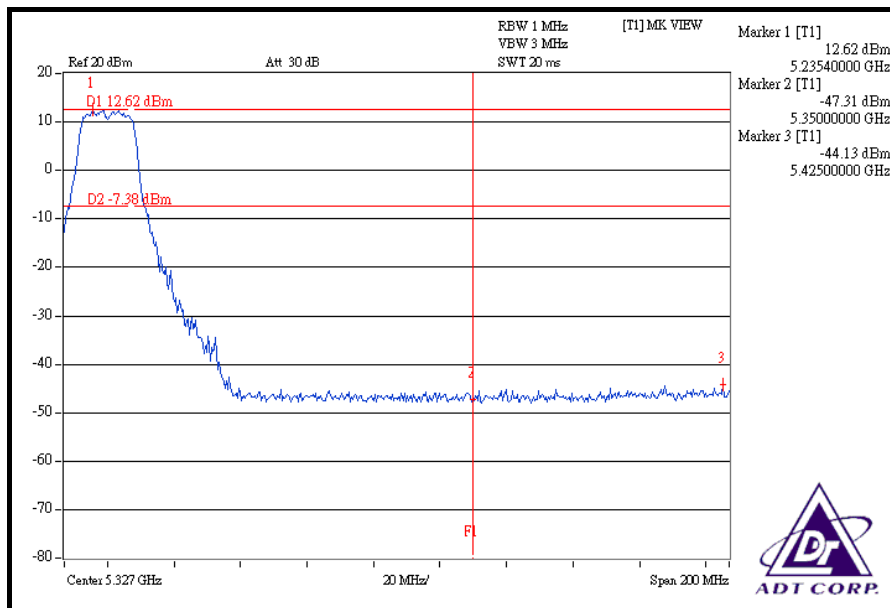
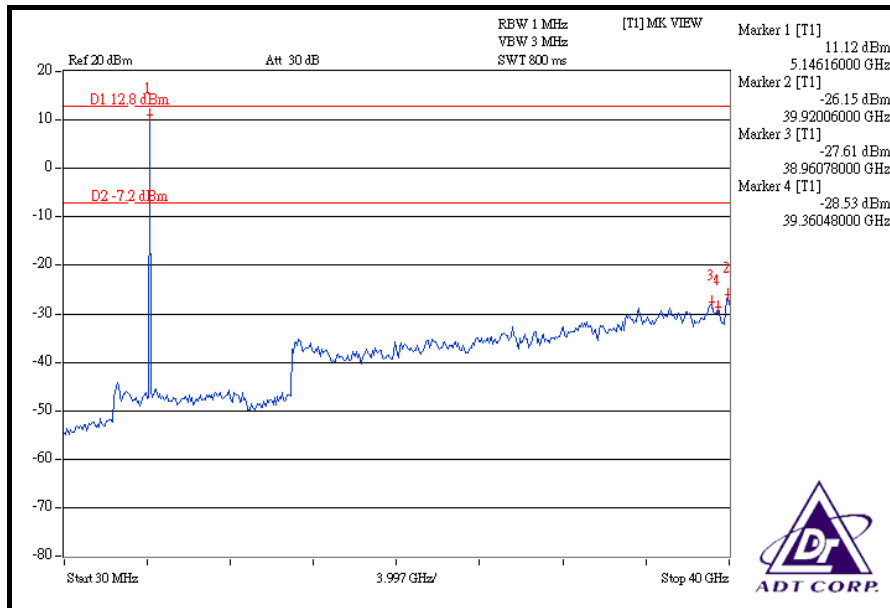
The band edge emission plot on the next page shows 56.17dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 99.89dBuV/m (Average), so the maximum field strength in restrict band is $99.89 - 56.17 = 43.72$ dBuV/m which is under 54dBuV/m limit.

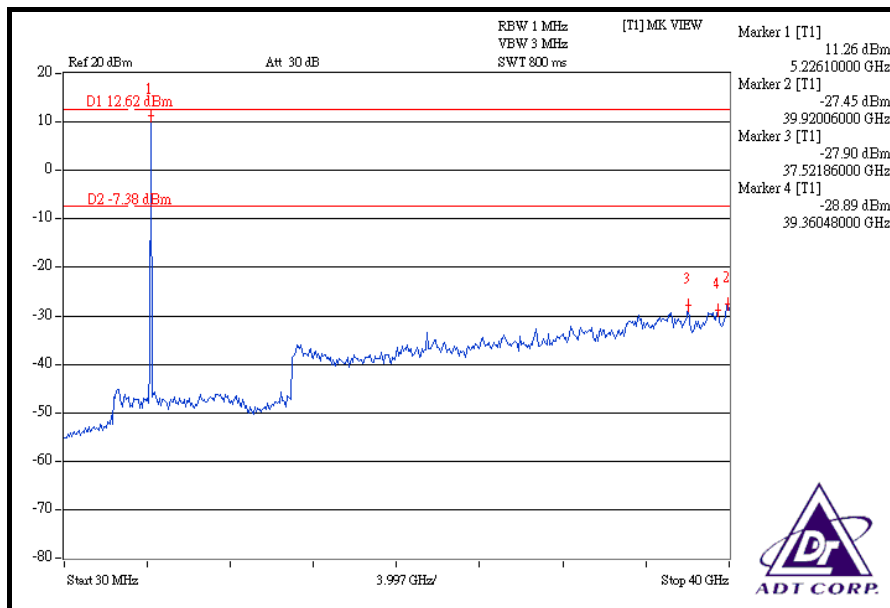
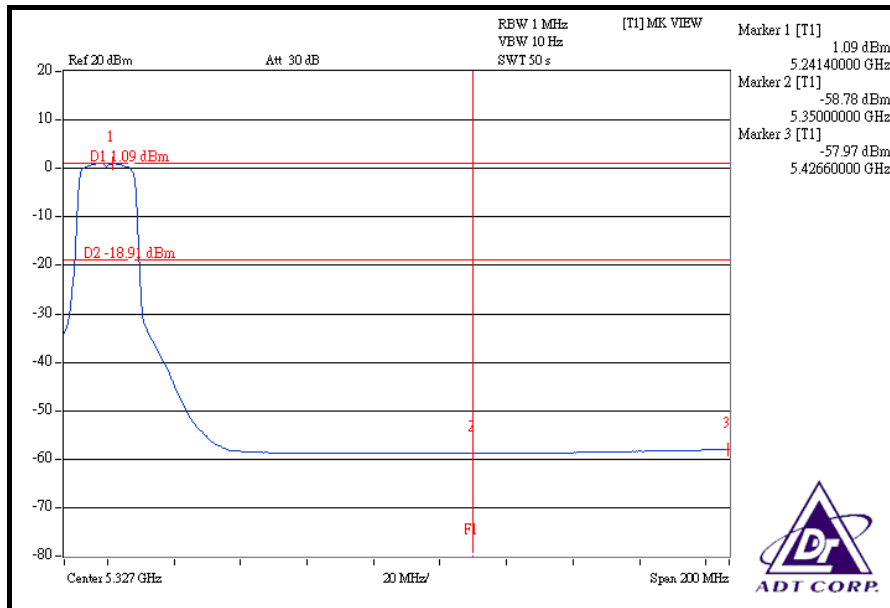
Channel 4 (5240MHz)

The band edge emission plot on the next second page shows 56.75dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 4 is 110.96dBuV/m (Peak), so the maximum field strength in restrict band is $110.96 - 56.75 = 54.21$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 59.06dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 4 is 100.23dBuV/m (Average), so the maximum field strength in restrict band is $100.23 - 59.06 = 41.17$ dBuV/m which is under 54dBuV/m limit.







DRAFT 802.11n (20MHz) OFDM MODULATION:

Channel 1 (5180MHz)

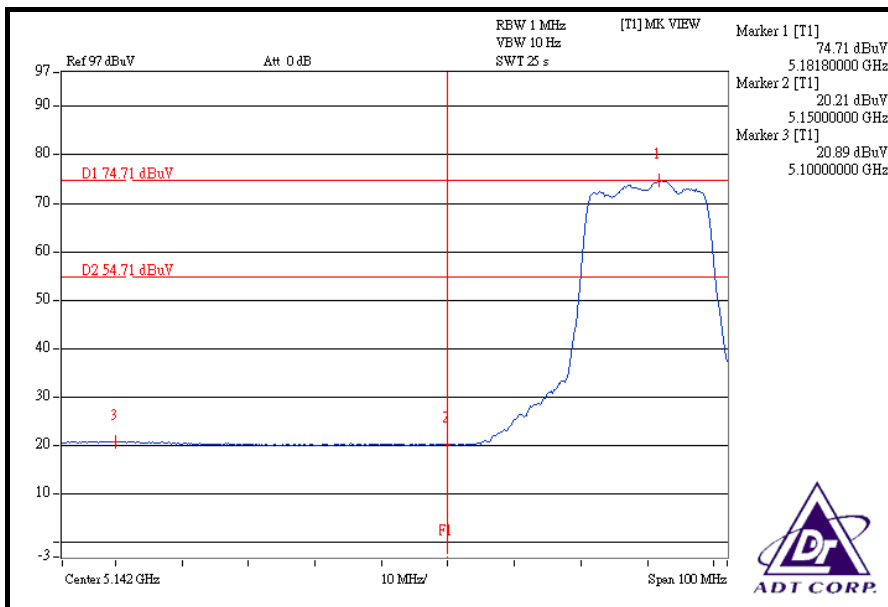
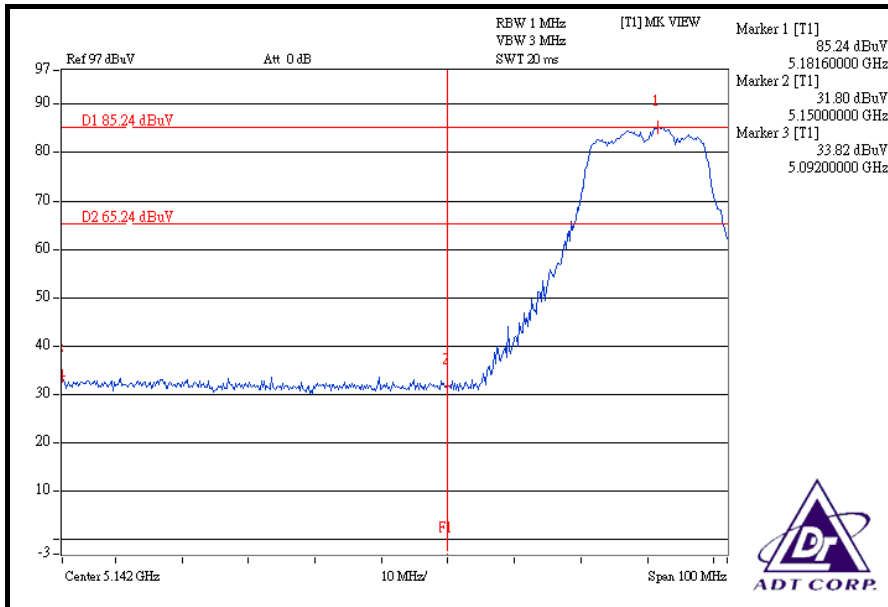
The band edge emission plot on the next page shows 51.42dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 111.84dBuV/m (Peak), so the maximum field strength in restrict band is $111.84 - 51.42 = 60.42$ dBuV/m which is under 74dBuV/m limit.

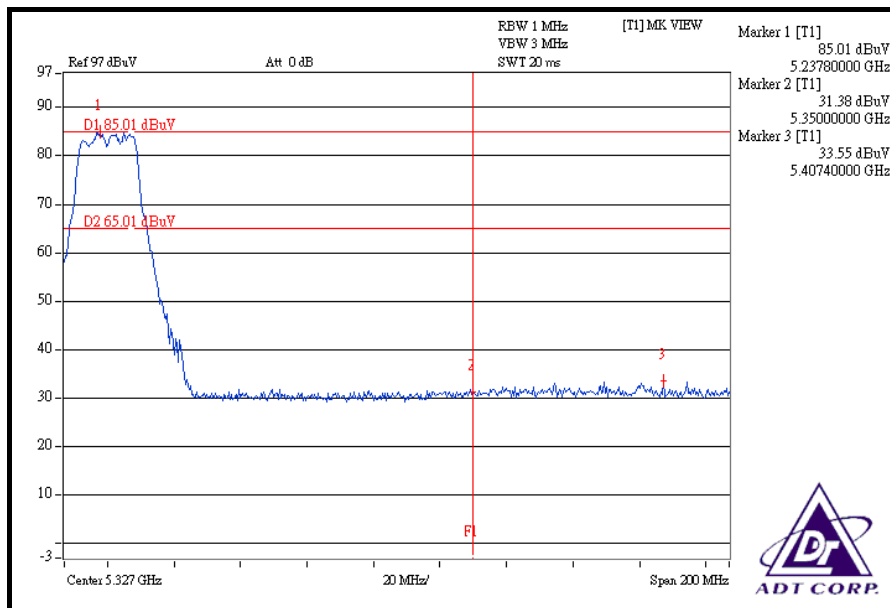
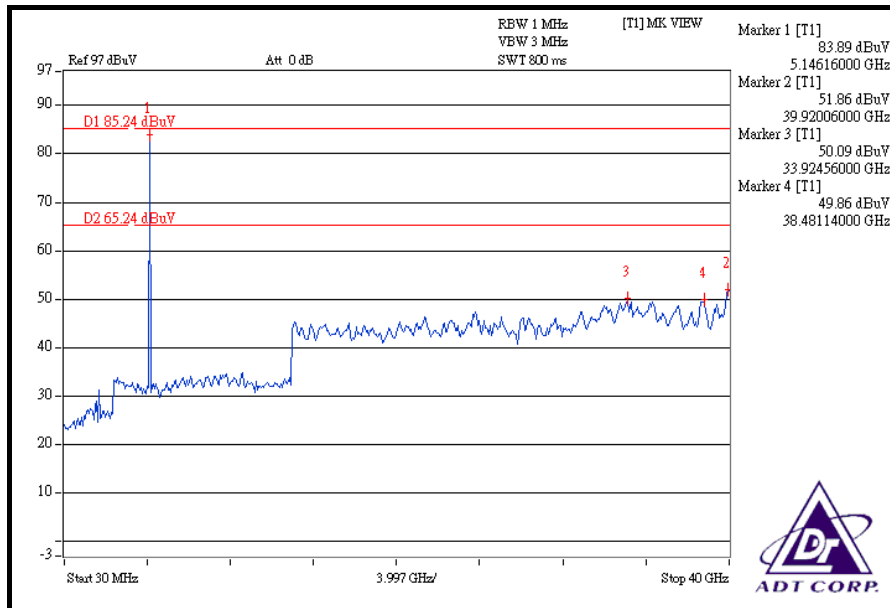
The band edge emission plot on the next page shows 53.82dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 101.49dBuV/m (Average), so the maximum field strength in restrict band is $101.49 - 53.82 = 47.67$ dBuV/m which is under 54dBuV/m limit.

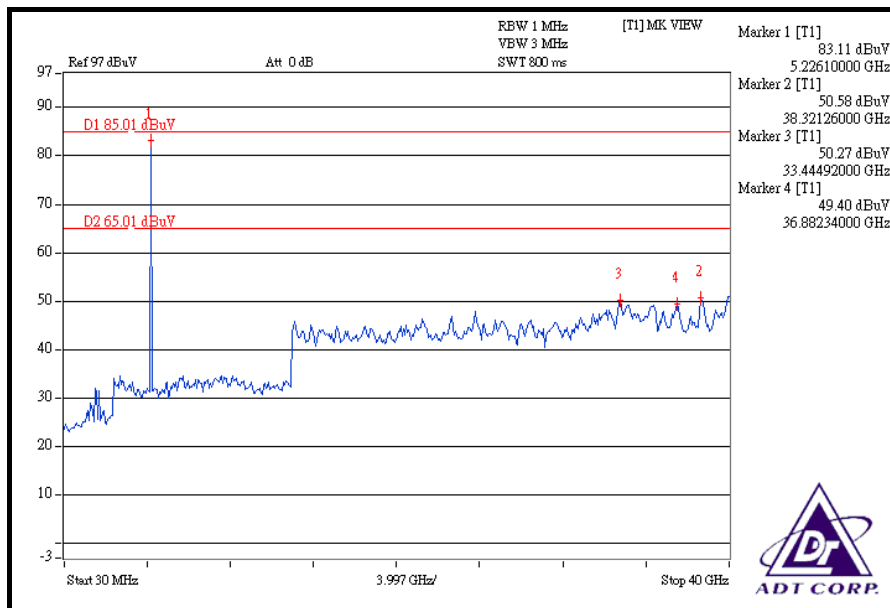
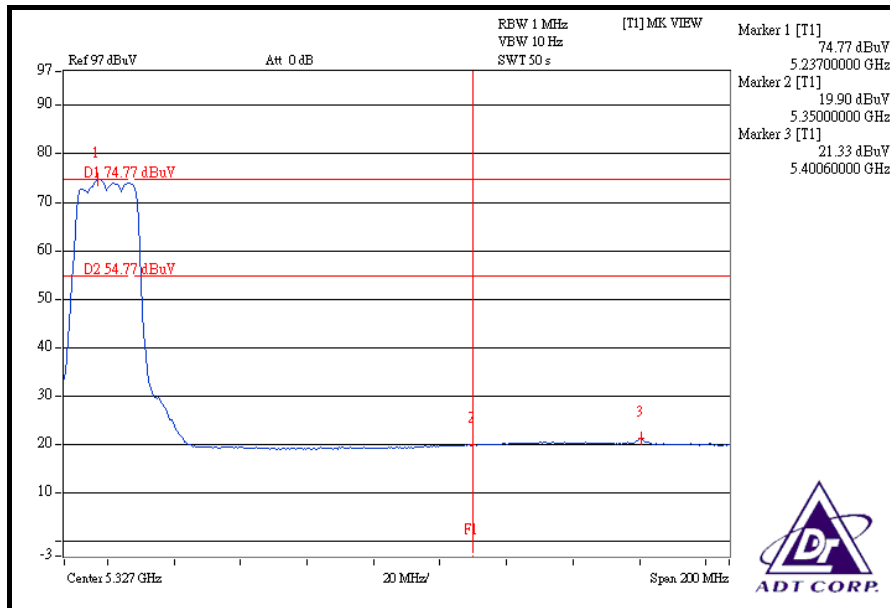
Channel 4 (5240MHz)

The band edge emission plot on the next second page shows 51.46dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 4 is 111.77dBuV/m (Peak), so the maximum field strength in restrict band is $111.77 - 51.46 = 60.31$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 53.44dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 4 is 101.52dBuV/m (Average), so the maximum field strength in restrict band is $101.52 - 53.44 = 48.08$ dBuV/m which is under 54dBuV/m limit.







DRAFT 802.11n (40MHz) OFDM MODULATION:

Channel 1 (5190MHz)

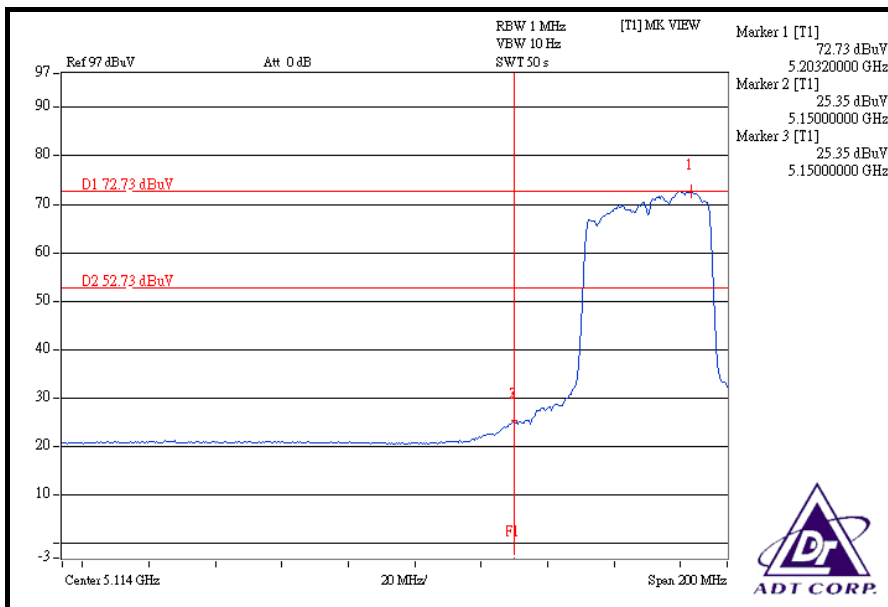
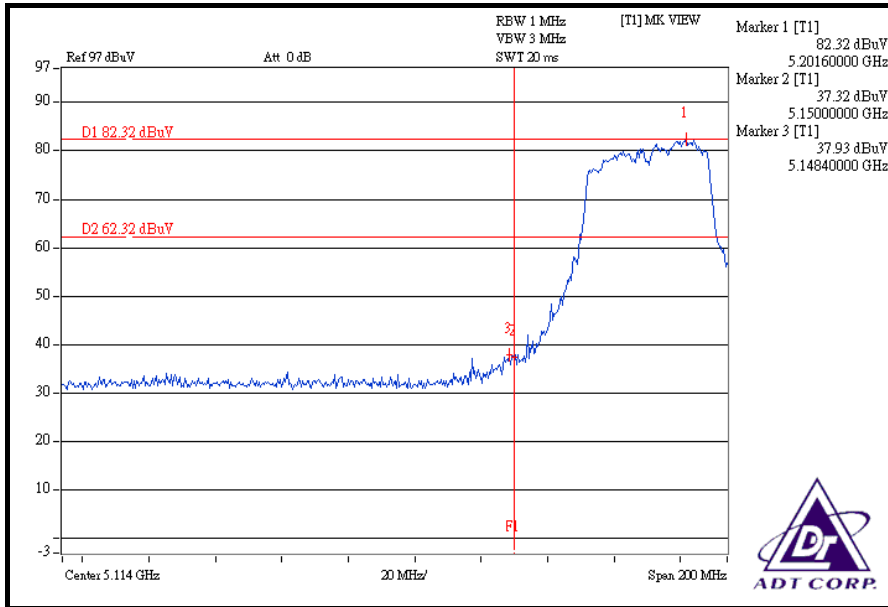
The band edge emission plot on the next page shows 44.39dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 109.86dBuV/m (Peak), so the maximum field strength in restrict band is $109.86 - 44.39 = 65.47$ dBuV/m which is under 74dBuV/m limit.

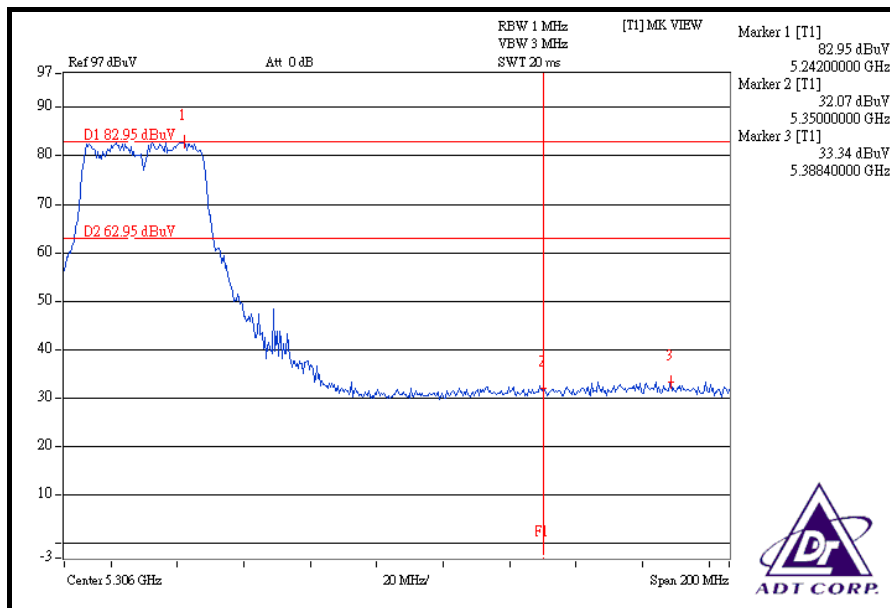
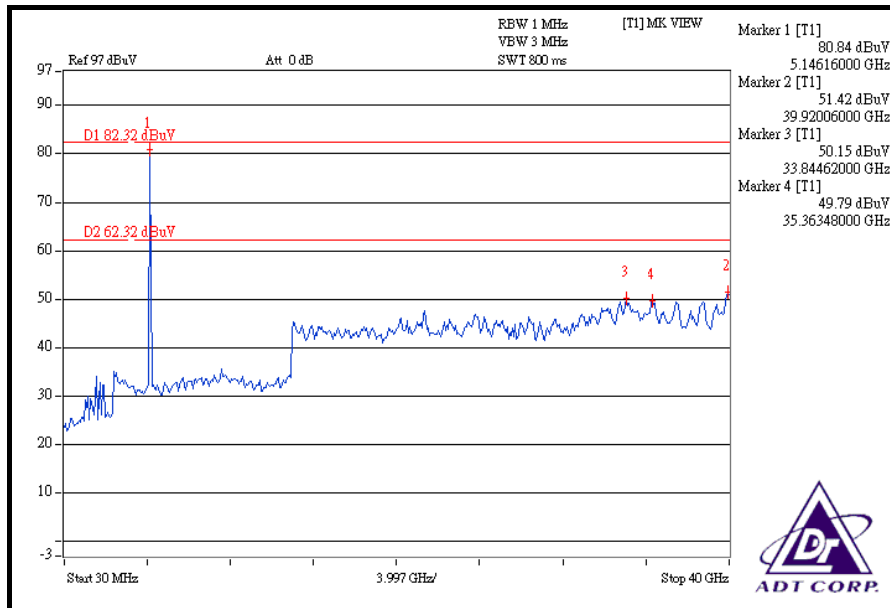
The band edge emission plot on the next page shows 47.38dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 99.36dBuV/m (Average), so the maximum field strength in restrict band is $99.36 - 47.38 = 51.98$ dBuV/m which is under 54dBuV/m limit.

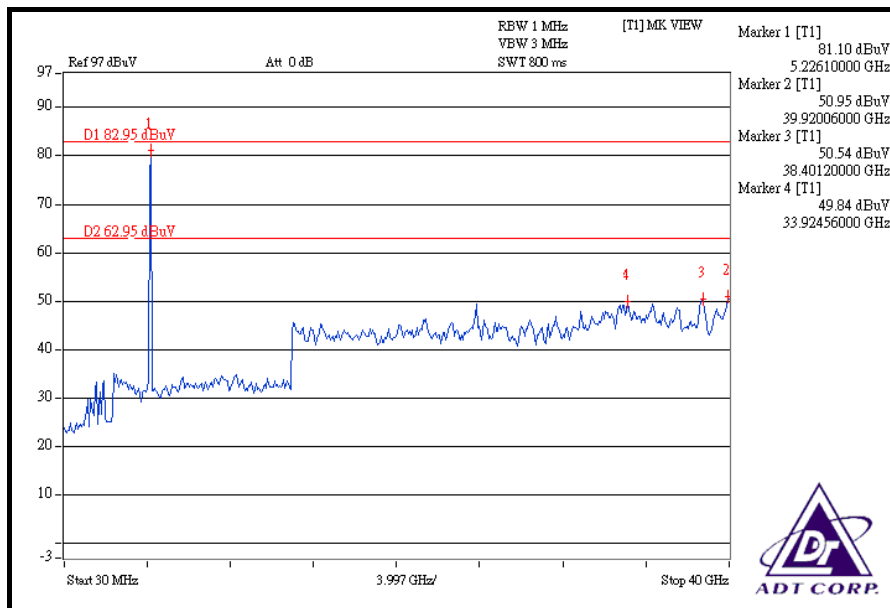
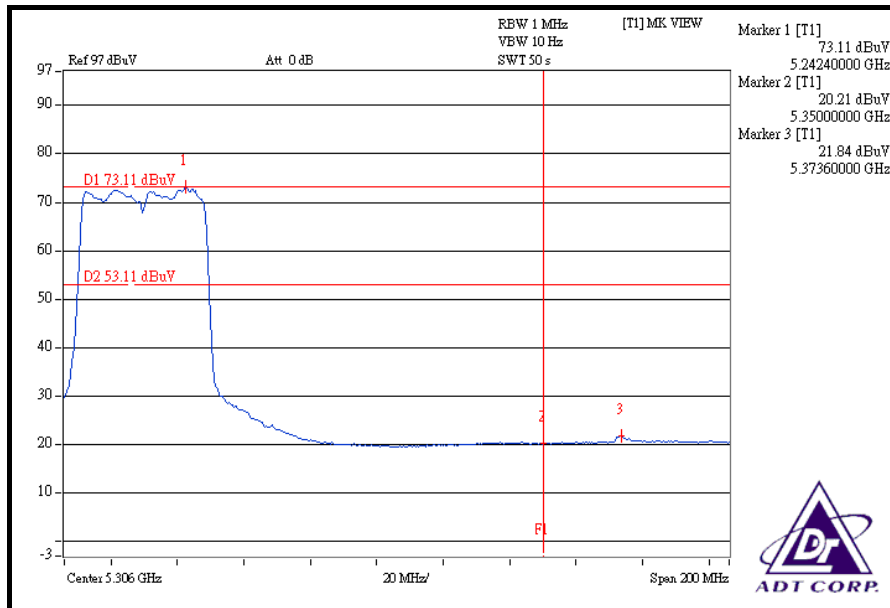
Channel 2 (5230MHz)

The band edge emission plot on the next second page shows 49.61dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 2 is 110.40dBuV/m (Peak), so the maximum field strength in restrict band is $110.40 - 49.61 = 60.79$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 51.27dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 2 is 99.73dBuV/m (Average), so the maximum field strength in restrict band is $99.73 - 51.27 = 48.46$ dBuV/m which is under 54dBuV/m limit.









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 antenna used in this product is Dipole antenna with R-SMA connector. The maximum Gain of the antenna is 2dBi.



5. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



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, 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: 886-2-26051924

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.

7. 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.