

FCC TEST REPORT (15.407)

REPORT NO.: RF970306H01

MODEL NO.: WMP-ND03

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TESTED: April 03 to 30, 2008

ISSUED: June 04, 2008

APPLICANT: Alpha Networks Inc.

ADDRESS: No.8 Li-shing 7th Rd., Science-based
Industrial Park, Hsinchu, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

TEST LOCATION: No. 81-1, Lu Liao Keng, 9 Ling, Wu Lung
Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien,
Taiwan, R.O.C.

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TESTING CERT #2177-01

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1. CERTIFICATION

PRODUCT: IEEE 802.11a/b/g/n MiniPCI Card
BRAND NAME: Alpha
MODEL NO.: WMP-ND03
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: April 03 to 30, 2008
APPLICANT: Alpha Networks Inc.
STANDARDS: FCC Part 15, Subpart E (Section 15.407)
ANSI C63.4-2003

The above equipment (Model: WMP-ND03) 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 : Claire Kuan , **DATE:** June 04, 2008
(Claire Kuan, Specialist)

TECHNICAL
ACCEPTANCE : Hank Chung , **DATE:** June 04, 2008
Responsible for RF (Hank Chung, Deputy Manager)

APPROVED BY : May Chen , **DATE:** June 04, 2008
(May Chen, Deputy 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	Result	Remark
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -15.68dB at 4.129MHz
15.407(b/1/2/3)(b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit. Minimum passing margin is -0.49dB at 167.23MHz
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.

NOTE:

1. The EUT was operating in 2.412 ~ 2.462GHz, 5.15~5.25GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 5.15~5.25GHz. For the 2.412 ~ 2.462GHz and 5.725 ~ 5.850GHz RF parameters was recorded in another test report.

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:

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

Measurement	Value
Conducted emissions	2.44 dB
Radiated emissions (30MHz-1GHz)	3.94 dB
Radiated emissions (1GHz -18GHz)	2.33 dB
Radiated emissions (18GHz -40GHz)	2.55 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	IEEE 802.11a/b/g/n MiniPCI Card
MODEL NO.	WMP-ND03
FCC ID	RRKWMPND03
POWER SUPPLY	DC 5V from host equipment
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11 / 5.5 / 2 / 1Mbps 802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps 802.11a: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps HT20 MCS0~7 (800ns GI): 65 / 58.5 / 52 / 39 / 26 / 19.5 / 13 / 6.5Mbps. HT20 MCS8~15 (800ns GI): 130 / 117 / 104 / 78 / 52 / 39 / 26 / 13Mbps. HT40 MCS0~7 (800ns GI): 135 / 121.5 / 108 / 81 / 54 / 40.5 / 27 / 13.5Mbps. HT40 MCS8~15 (800ns GI): 270 / 243 / 216 / 162 / 108 / 81 / 54 / 27Mbps. HT20 MCS0~7 (400ns GI): 72.2 / 65 / 57.8 / 43.3 / 28.9 / 21.7 / 14.4 / 7.2Mbps. HT20 MCS8~15 (400ns GI): 144.444 / 130 / 115.556 / 86.667 / 57.778 / 43.333 / 28.889 / 14.444Mbps. HT40 MCS0~7 (400ns GI): 150 / 135 / 120 / 90 / 60 / 45 / 30 / 15Mbps. HT40 MCS8~15 (400ns GI): 300 / 270 / 240 / 180 / 120 / 90 / 60 / 30Mbps.
FREQUENCY RANGE	For 15.407 802.11a: 5.18 ~ 5.24GHz
	For 15.247 802.11b & 802.11g: 2412 ~ 2462MHz 802.11a: 5.745 ~ 5.825GHz
NUMBER OF CHANNEL	For 15.407 4 for 802.11a, draft 802.11n (20MHz) 2 for draft 802.11n (40MHz)
	For 15.247(2.4GHz) 11 for 802.11b, 802.11g, draft 802.11n (20MHz) 7 for draft 802.11n (40MHz) For 15.247(5GHz) 5 for 802.11a, draft 802.11n (20MHz) 3 for draft 802.11n (40MHz)

MAXIMUM OUTPUT POWER	For 15.407 802.11a: 29.063mW draft 802.11n (20MHz): 28.621mW draft 802.11n (40MHz): 44.274mW For 15.247(2.4GHz) 802.11b: 442.301mW 802.11g: 439.189mW draft 802.11n (20MHz): 265.484mW draft 802.11n (40MHz): 152.907mW For 15.247(5GHz) 802.11a: 329.592mW draft 802.11n (20MHz): 515.461mW draft 802.11n (40MHz): 313.455mW
ANTENNA TYPE	Please see note 1
DATA CABLE	NA

NOTE:

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

No	Model No.	Antenna Gain	For 2.4GHz Gain (dBi)	For 5.15~5.25GHz Gain (dBi)	For 5.725~5.850GHz Gain (dBi)	Antenna Type	Connector
1	DAP-2590	Gain (dBi)	4	6.10	7.12	Dipole	Reverse SMA
		Cable Loss (dB)	0.3		0.6		
		Net Gain (dB)	3.7	5.5	6.52		
2	ALP05-220170	Gain (dBi)	4.83	4.98	6.00	Dipole	RP SMA Plug
		Cable Loss (dB)	0.3		0.6		
		Net Gain (dB)	4.53	4.38	5.4		

Note: From above antennas, 2.4GHz worst case was antenna 2 and 5GHz worst case was antenna 1.

2. The EUT incorporates a MIMO function with 802.11a, 802.11b, 802.11g, draft 802.11n. Physically, the EUT provides three completed transmit and three completed receivers.

3. The EUT is 3 * 3 spatial MIMO (3Tx & 3Rx) without beam forming function. The antenna configurations are three transmitter antennas and three receiver antennas, as there are 3 dipole antennas. Spatial multiplexing modes for simultaneous transmission using 3 antennas, and for simultaneous receiver using 3 antennas.
4. When the EUT operating in draft 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 15.
5. The EUT complies with draft 802.11n standards and backwards compatible with 802.11a, 802.11b, 802.11g products.
6. 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

Operated in 5150MHz ~ 5250MHz bands:

Four channels are provided for 802.11a and draft 802.11n (20MHz):

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

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

CHANNEL	FREQUENCY
1	5190 MHz
2	5230 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ³ 1G	APCM	
-	√	√	√	√	-

Where **PLC**: Power Line Conducted Emission

RE < 1G: Radiated Emission below 1GHz

RE ³ 1G: Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

ANTENNA COMBINATION MODE:

COMBINATION MODE	OPERATION MODE	CHAIN(0) (TX)	CHAIN(1) (TX)	CHAIN(2) (TX)
A	802.11 a	√	√	√
B	DRAFT 802.11n(20MHz)	√	√	√
C	DRAFT 802.11n(40MHz)	√	√	√
Note: 1. The above information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual. 2. From above mode, the different modes were chosen for pretest.				

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)	TX COMBINATION
For 5 GHz Draft 802.11n (40MHz)	1 to 2	2	OFDM	BPSK	27	C

Radiated Emission Test (Below 1 GHz):

- ☒ 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)	TX COMBINATION
802.11a	1 to 4	1	OFDM	BPSK	6	A

Radiated Emission Test (Above 1 GHz):

- ☒ 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)	TX COMBINATION
802.11a	1 to 4	1, 2, 4	OFDM	BPSK	6	A
For 5 GHz Draft 802.11n (20MHz)	1 to 4	1, 2, 4	OFDM	BPSK	13	B
For 5 GHz Draft 802.11n (40MHz)	1 to 2	1, 2	OFDM	BPSK	27	C

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)	TX COMBINATION
802.11a	1 to 4	1,4	OFDM	BPSK	6	A
For 5 GHz Draft 802.11n (20MHz)	1 to 4	1, 4	OFDM	BPSK	13	B
For 5 GHz Draft 802.11n (40MHz)	1 to 2	1, 2	OFDM	BPSK	27	C

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)	TX COMBINATION
802.11a	1 to 4	1, 2, 4	OFDM	BPSK	6	A
For 5 GHz Draft 802.11n (20MHz)	1 to 4	1, 2, 4	OFDM	BPSK	13	B
For 5 GHz Draft 802.11n (40MHz)	1 to 2	1, 2	OFDM	BPSK	27	C

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is an IEEE 802.11a/b/g/n MiniPCI Card. 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.

3.4 DESCRIPTION OF SUPPORT UNITS

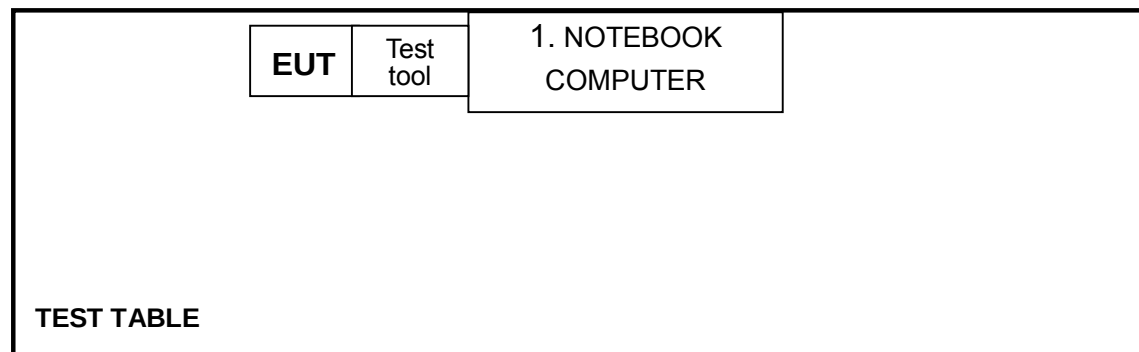
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP18L	6976685584	FCC DoC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

NOTE: All power cords of the above support units are non-shielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST



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 0.50 MHz.
 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	ESCS 30	847124/029	Mar. 28, 2009
Line-Impedance Stabilization Network(for EUT)	ESH3-Z5	848773/004	Nov. 08, 2008
Line-Impedance Stabilization Network(for Peripheral)	ENV-216	100071	Nov. 26, 2008
RF Cable (JETBAO)	RG233/U	Cable_CB_01	Dec. 09, 2008
50 ohms Terminator	50	3	Nov. 15, 2008
Software	ADT_Cond_V7.3.2	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 ADT Shielded Room No. B.
3. The VCCI Con B Registration No. is C-2193.
4. The measurement uncertainty is 2.44 dB, which is calculated as per the document CISPR 16-4. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

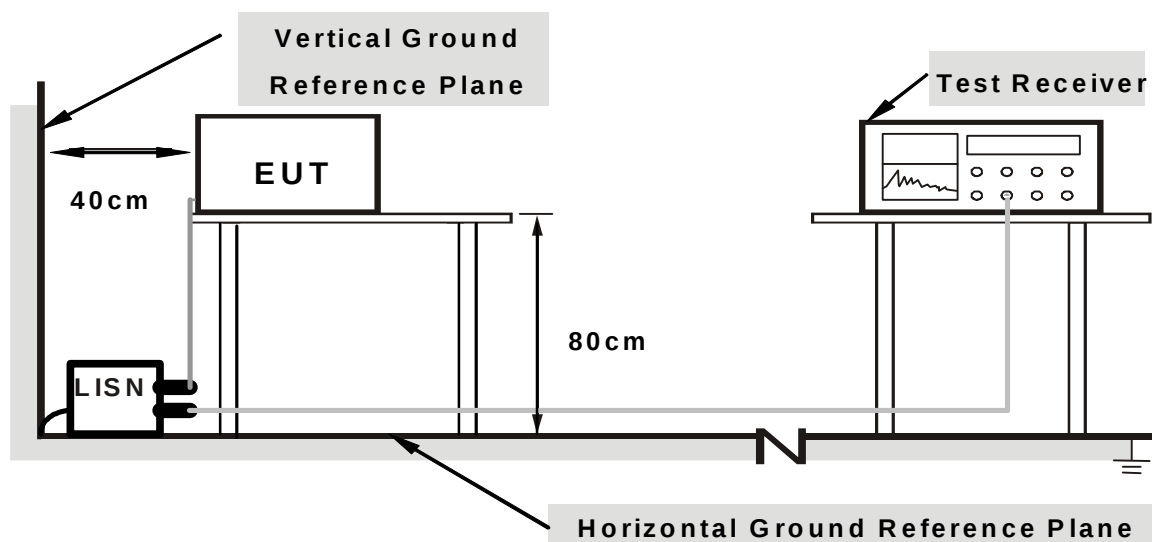
4.1.3 TEST PROCEDURES

- 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
- b. provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- d. The frequency range from 150kHz to 30MHz was searched. Emission level 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 from other units and other metal planes

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

- a. Plug the EUT into test board and placed on the testing table.
- b. The support unit 1 (Notebook Computer) ran a test program “ART v0_5_b25ALL” to enable EUT under transmission condition continuously at specific channel frequency.

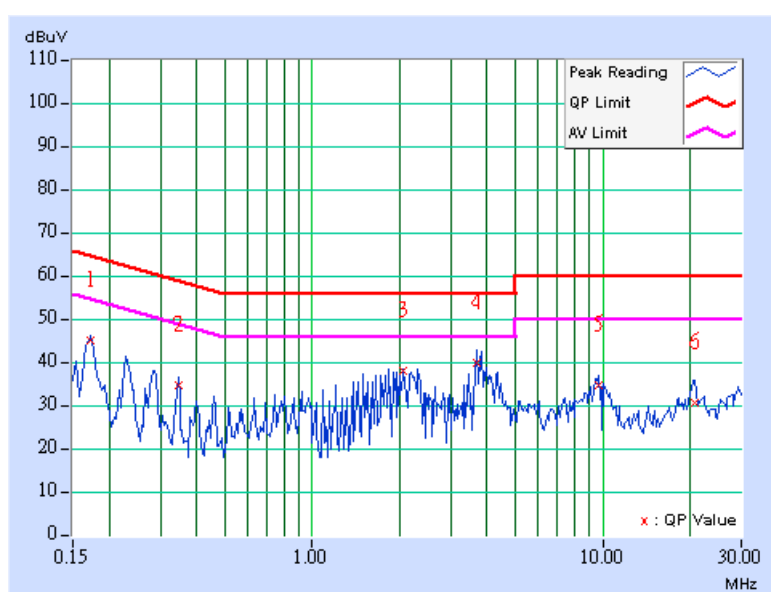
4.1.7 TEST RESULTS

802.11a OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 2	PHASE	Line (L)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	27Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 960hPa	TESTED BY	Rex Huang

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	0.173	9.65	34.84	-	44.49	-	64.79	54.79	-20.31	-
2	0.345	9.66	24.62	-	34.28	-	59.07	49.07	-24.80	-
3	2.066	9.86	27.94	-	37.80	-	56.00	46.00	-18.20	-
4	3.672	9.79	29.80	-	39.59	-	56.00	46.00	-16.41	-
5	9.641	10.12	24.53	-	34.65	-	60.00	50.00	-25.35	-
6	20.715	10.24	20.47	-	30.71	-	60.00	50.00	-29.29	-

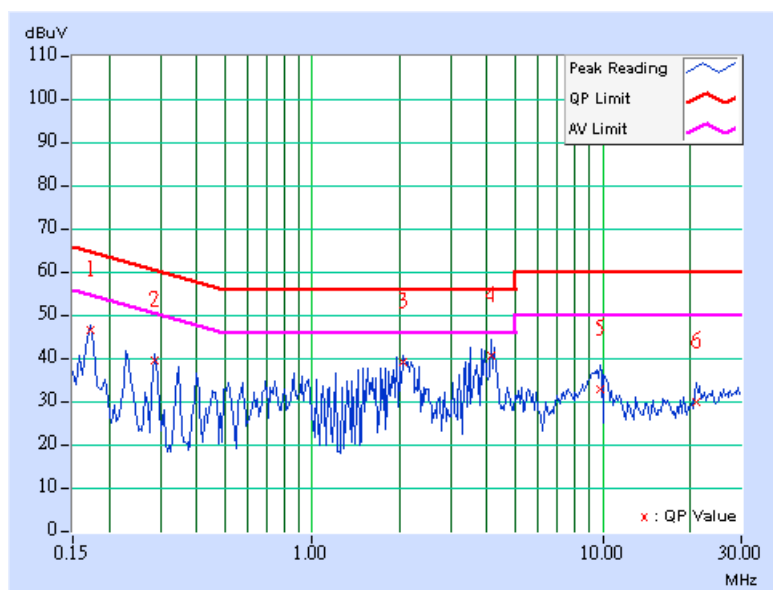
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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 2	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	27Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 960hPa	TESTED BY	Rex Huang

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	0.173	9.65	36.28	-	45.93	-	64.79	54.79	-18.87	-
2	0.287	9.65	29.13	-	38.78	-	60.62	50.62	-21.84	-
3	2.066	9.86	28.95	-	38.81	-	56.00	46.00	-17.19	-
4	4.129	9.79	30.53	-	40.32	-	56.00	46.00	-15.68	-
5	9.762	10.15	22.43	-	32.58	-	60.00	50.00	-27.42	-
6	21.117	10.37	19.51	-	29.88	-	60.00	50.00	-30.12	-

- 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
5470~5725	-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
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 15, 2008
HP Pre_Amplifier	8449B	3008A01922	Oct. 04, 2008
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Mar. 26, 2009
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	July 26, 2008
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 16, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 27, 2009
RF Switches (ARNITSU)	CS-201	1565157	Aug. 13, 2008
RF CABLE (Chaintek)	SF102	22054-2	Nov. 14, 2008
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Aug. 13, 2008
Software	ADT_Radiated_V 7.6.15.8	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	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 horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: R3271A) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in ADT Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 3789C-3.

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 10 meter open area test site. 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.

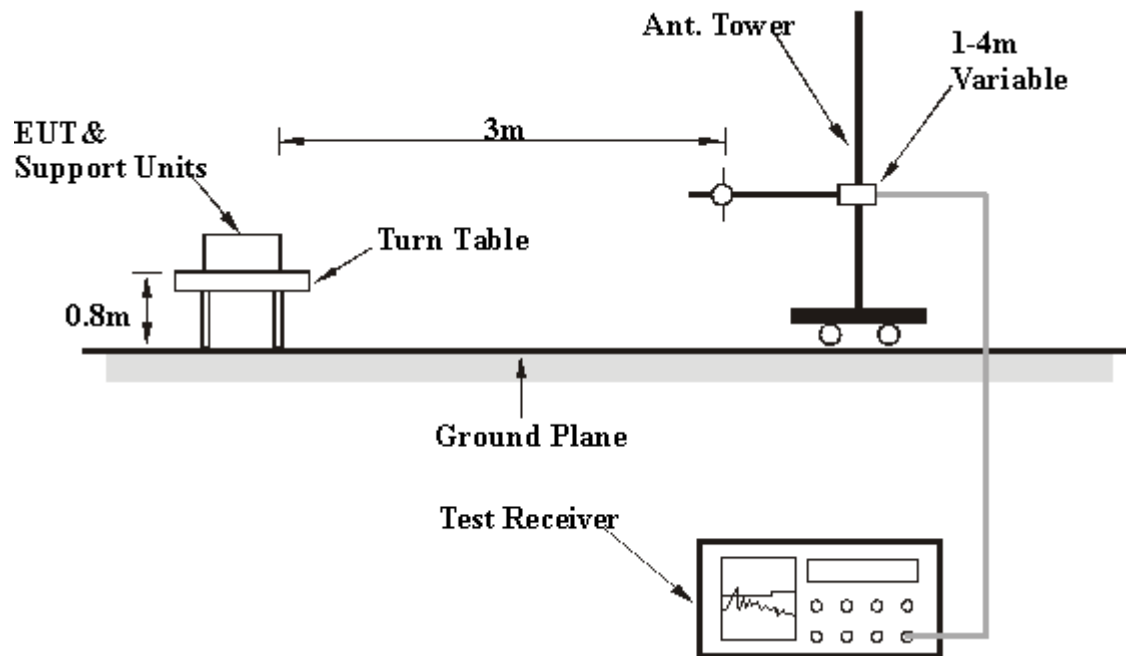
NOTE:

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 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz 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 related item – Photographs of the Test Configuration.

4.2.7 EUT OPERATING CONDITION

Same as 4.1.6

Below 1GHz Test Data

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
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 72%RH 960hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
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	133.88	38.89 QP	43.50	-4.61	2.20 H	21	25.02	13.87
2	167.23	43.01 QP	43.50	-0.49	2.20 H	0	28.45	14.56
3	200.10	38.34 QP	43.50	-5.16	1.51 H	243	26.31	12.03
4	233.41	34.24 QP	46.00	-11.76	1.26 H	351	21.68	12.56
5	300.80	29.17 QP	46.00	-16.83	1.06 H	304	12.57	16.60
6	315.00	33.09 QP	46.00	-12.91	1.04 H	21	16.40	16.69
7	390.30	35.87 QP	46.00	-10.13	1.00 H	110	18.04	17.83
8	420.00	33.27 QP	46.00	-12.73	1.00 H	282	14.49	18.78
9	455.18	39.08 QP	46.00	-6.92	2.02 H	275	19.08	20.00
10	600.00	31.64 QP	46.00	-14.36	1.17 H	298	8.10	23.54
11	724.99	36.58 QP	46.00	-9.42	1.16 H	147	10.69	25.89
12	767.67	31.46 QP	46.00	-14.54	1.00 H	34	3.92	27.54
13	835.58	33.49 QP	46.00	-12.51	1.66 H	210	5.14	28.35
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
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	167.25	36.44 QP	43.50	-7.06	2.00 V	307	21.89	14.55
2	201.20	28.55 QP	43.50	-14.95	1.07 V	309	16.50	12.05
3	334.00	27.28 QP	46.00	-18.72	1.68 V	82	10.47	16.81
4	432.06	27.49 QP	46.00	-18.51	1.60 V	211	8.27	19.22
5	499.96	27.68 QP	46.00	-18.32	1.00 V	179	6.63	21.05
6	600.00	29.23 QP	46.00	-16.77	1.70 V	128	5.69	23.54
7	866.59	29.64 QP	46.00	-16.36	1.81 V	21	0.77	28.87

- 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 Test Data

4.2.9 TEST RESULTS

802.11a OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH 960hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
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	#5150.00	53.34 PK	74.00	-20.66	1.43 H	175	17.10	36.24
2	#5150.00	41.53 AV	54.00	-12.47	1.43 H	175	5.29	36.24
3	*5180.00	102.30 PK			1.42 H	142	66.02	36.28
4	*5180.00	88.50 AV			1.42 H	142	52.22	36.28
5	10360.00	55.70 PK	88.30	-32.60	1.48 H	166	9.80	45.90
6	10360.00	42.00 AV	68.30	-26.30	1.48 H	166	-3.90	45.90
7	#15540.00	63.94 PK	74.00	-10.06	1.44 H	134	15.96	47.98
8	#15540.00	47.29 AV	54.00	-6.71	1.44 H	134	-0.69	47.98
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
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	#5150.00	70.87 PK	74.00	-3.13	1.10 V	81	34.63	36.24
2	#5150.00	52.19 AV	54.00	-1.81	1.10 V	81	15.95	36.24
3	*5180.00	124.90 PK			1.08 V	72	88.62	36.28
4	*5180.00	110.90 AV			1.08 V	72	74.62	36.28
5	10360.00	55.20 PK	88.30	-33.10	1.53 V	62	9.30	45.90
6	10360.00	41.00 AV	68.30	-27.30	1.53 V	62	-4.90	45.90
7	#15540.00	59.83 PK	74.00	-14.17	1.33 V	89	11.85	47.98
8	#15540.00	47.00 AV	54.00	-7.00	1.33 V	89	-0.98	47.98

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
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH 960hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
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	#5149.90	56.10 PK	74.00	-17.90	1.54 H	144	19.86	36.24
2	#5149.90	43.40 AV	54.00	-10.60	1.54 H	144	7.16	36.24
3	*5200.00	108.60 PK			1.60 H	277	72.30	36.30
4	*5200.00	95.60 AV			1.60 H	277	59.30	36.30
5	#5351.80	57.10 PK	74.00	-16.90	1.48 H	112	20.62	36.48
6	#5351.80	44.30 AV	54.00	-9.70	1.48 H	112	7.82	36.48
7	10400.00	59.10 PK	88.30	-29.20	1.56 H	144	13.13	45.97
8	10400.00	44.60 AV	68.30	-23.70	1.56 H	144	-1.37	45.97
9	#15600.00	73.00 PK	74.00	-1.00	1.42 H	0	25.10	47.90
10	#15600.00	52.70 AV	54.00	-1.30	1.42 H	0	4.80	47.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
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	#5149.90	71.84 PK	74.00	-2.16	1.10 V	95	35.60	36.24
2	#5149.90	51.26 AV	54.00	-2.74	1.10 V	95	15.02	36.24
3	*5200.00	127.40 PK			1.11 V	81	91.10	36.30
4	*5200.00	113.90 AV			1.11 V	81	77.60	36.30
5	#5351.80	62.62 PK	74.00	-11.38	1.13 V	93	26.14	36.48
6	#5351.80	50.39 AV	54.00	-3.61	1.13 V	93	13.91	36.48
7	10400.00	57.70 PK	88.30	-30.60	1.68 V	202	11.73	45.97
8	10400.00	44.00 AV	68.30	-24.30	1.68 V	202	-1.97	45.97
9	#15600.00	70.20 PK	74.00	-3.80	1.22 V	197	22.30	47.90
10	#15600.00	50.80 AV	54.00	-3.20	1.22 V	197	2.90	47.90

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
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH 960hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
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	#5066.60	56.60 PK	74.00	-17.40	1.57 H	141	20.46	36.14
2	#5066.60	44.20 AV	54.00	-9.80	1.57 H	141	8.06	36.14
3	*5240.00	108.10 PK			2.14 H	325	71.75	36.35
4	*5240.00	95.20 AV			2.14 H	325	58.85	36.35
5	#5351.00	53.86 PK	74.00	-20.14	2.13 H	311	17.38	36.48
6	#5351.00	42.03 AV	54.00	-11.97	2.13 H	311	5.55	36.48
7	#5365.40	57.40 PK	74.00	-16.60	1.50 H	130	20.90	36.50
8	#5365.40	44.60 AV	54.00	-9.40	1.50 H	130	8.10	36.50
9	10480.00	58.30 PK	88.30	-30.00	1.60 H	152	12.19	46.11
10	10480.00	44.00 AV	68.30	-24.30	1.60 H	152	-2.11	46.11
11	#15720.00	70.10 PK	74.00	-3.90	1.09 H	165	22.36	47.74
12	#15720.00	52.87 AV	54.00	-1.13	1.09 H	165	5.13	47.74
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
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	#5066.60	63.14 PK	74.00	-10.86	1.15 V	80	27.00	36.14
2	#5066.60	51.68 AV	54.00	-2.32	1.15 V	80	15.54	36.14
3	*5240.00	127.40 PK			1.17 V	79	91.05	36.35
4	*5240.00	114.20 AV			1.17 V	79	77.85	36.35
5	#5350.00	62.19 PK	74.00	-11.81	1.00 V	90	25.71	36.48
6	#5350.00	50.12 AV	54.00	-3.88	1.00 V	90	13.64	36.48
7	#5365.40	65.37 PK	74.00	-8.63	1.10 V	37	28.87	36.50
8	#5365.40	50.60 AV	54.00	-3.40	1.10 V	37	14.10	36.50
9	10480.00	61.60 PK	88.30	-26.70	1.60 V	202	15.49	46.11
10	10480.00	46.80 AV	68.30	-21.50	1.60 V	202	0.69	46.11
11	#15720.00	68.00 PK	74.00	-6.00	1.24 V	165	20.26	47.74
12	#15720.00	51.80 AV	54.00	-2.20	1.24 V	165	4.06	47.74

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).

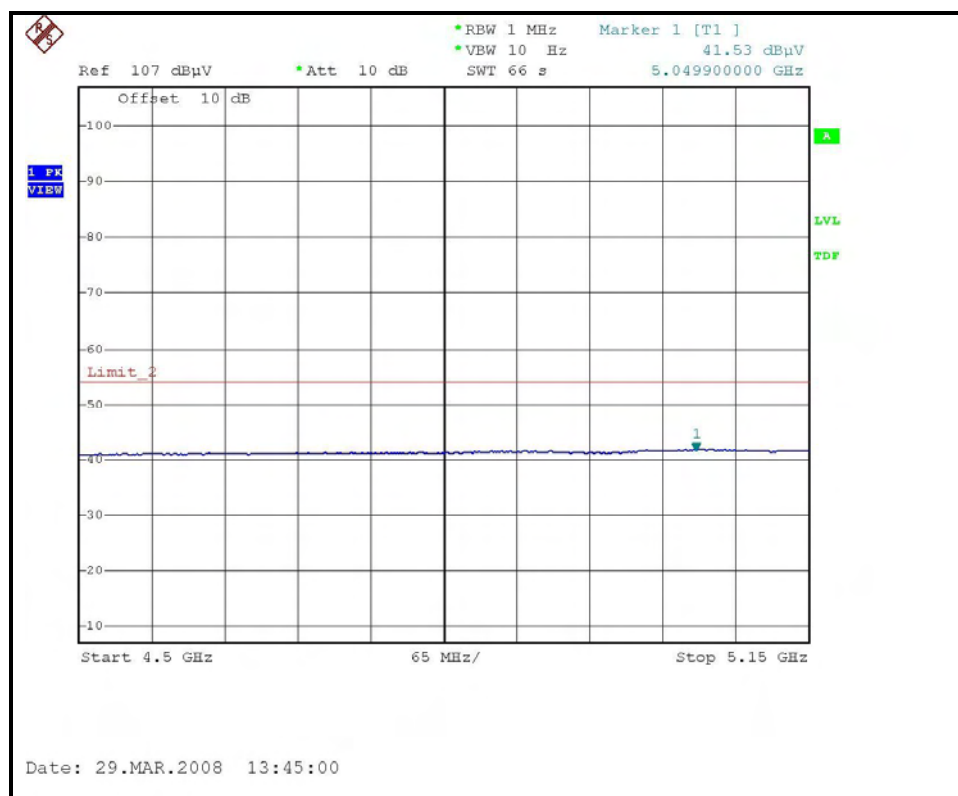
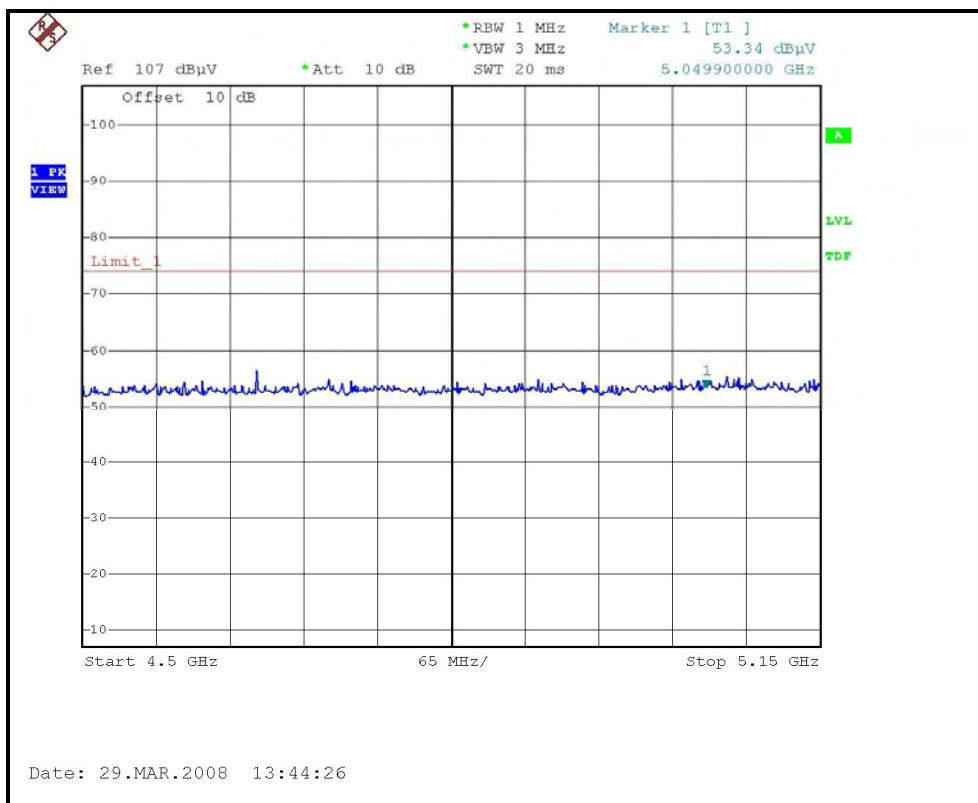
3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

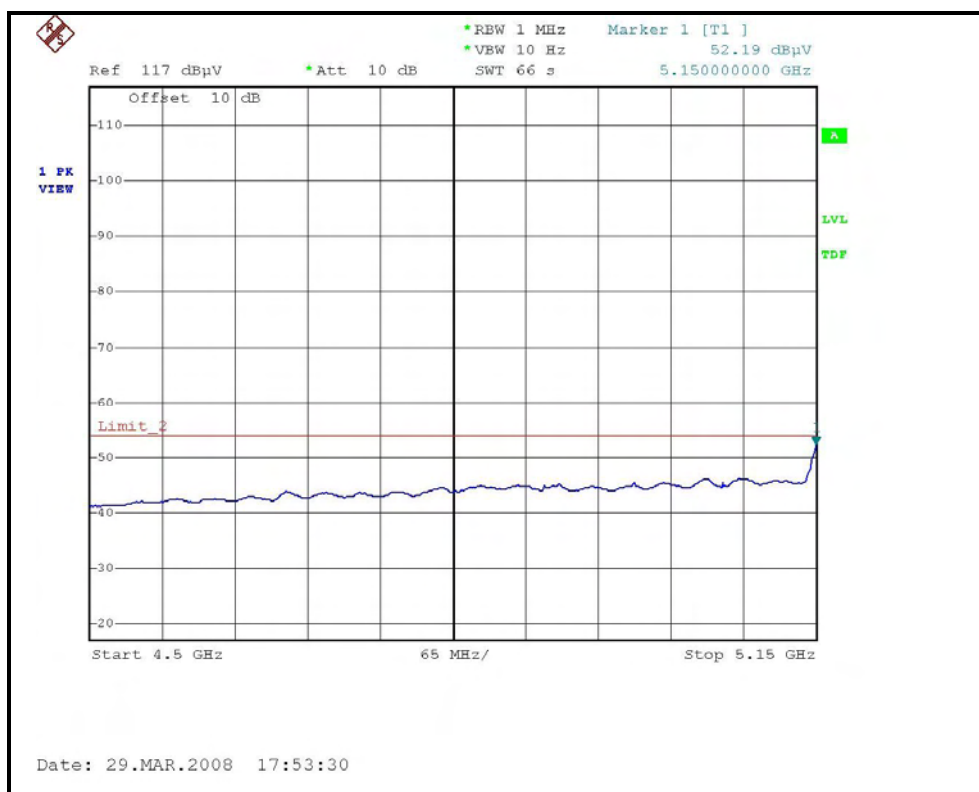
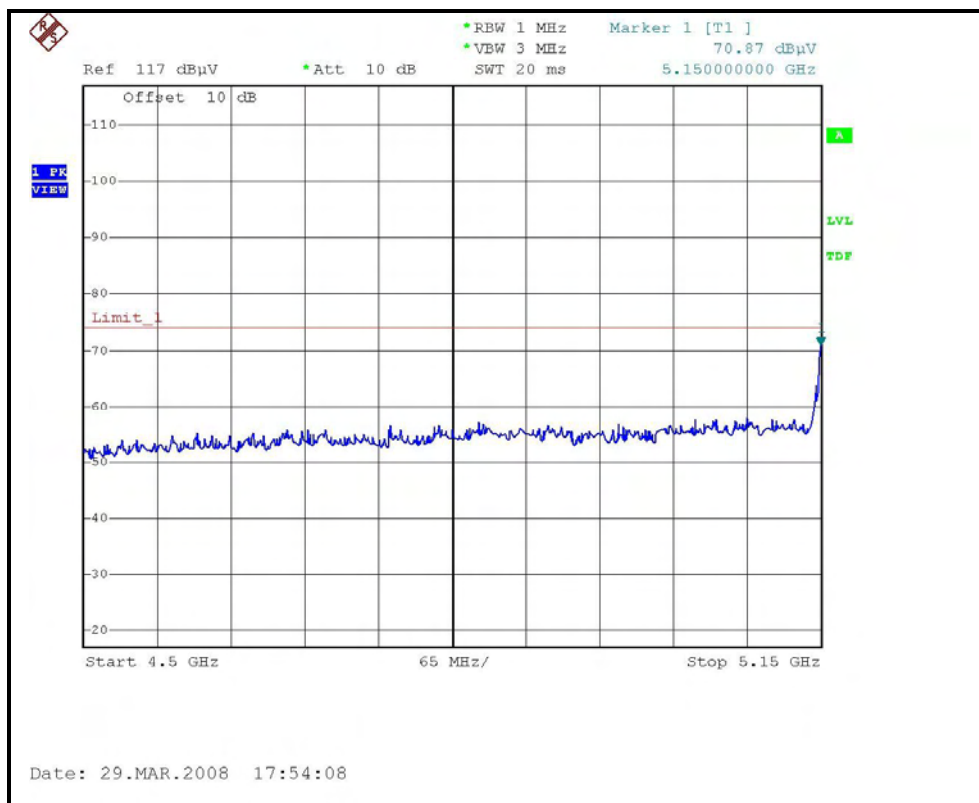
5. “ * “: Fundamental frequency.

6. “ # ”: The radiated frequency falling in the restricted band.

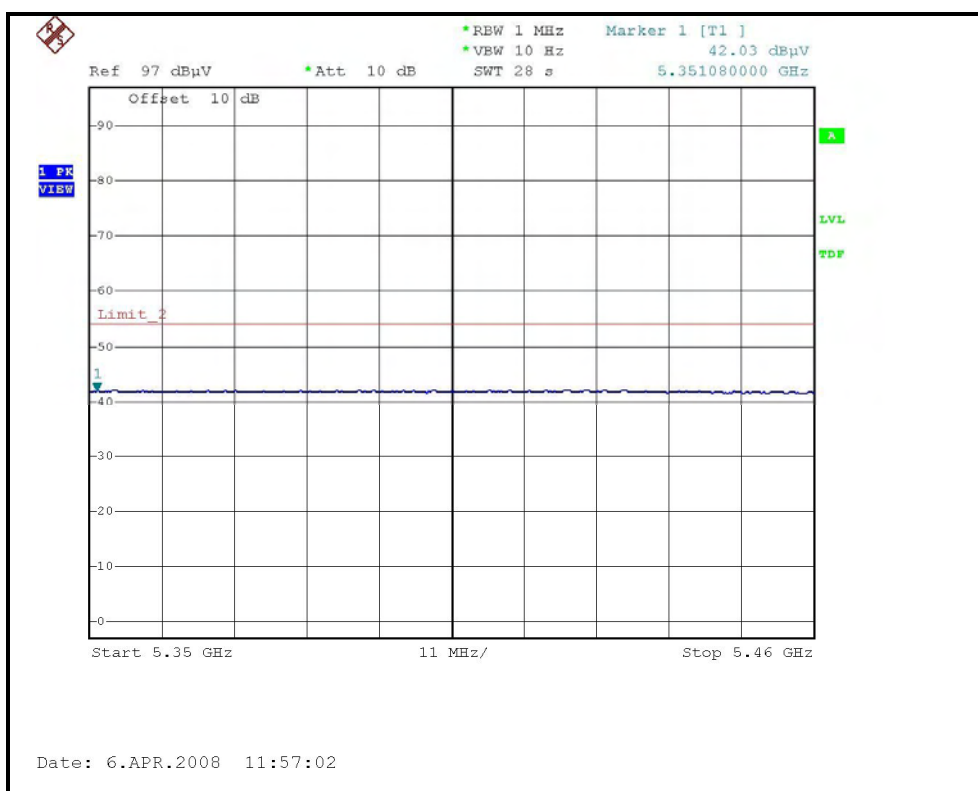
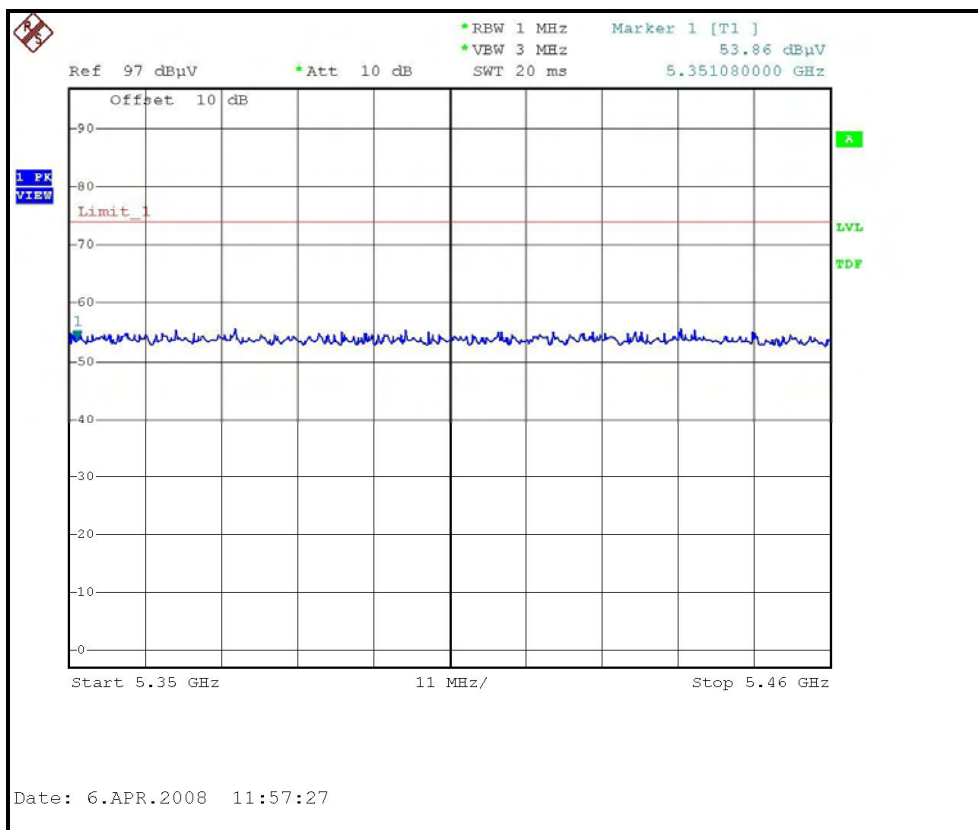
RESTRICTED BANDEDGE (802.11a MODE, CH1, HORIZONTAL)



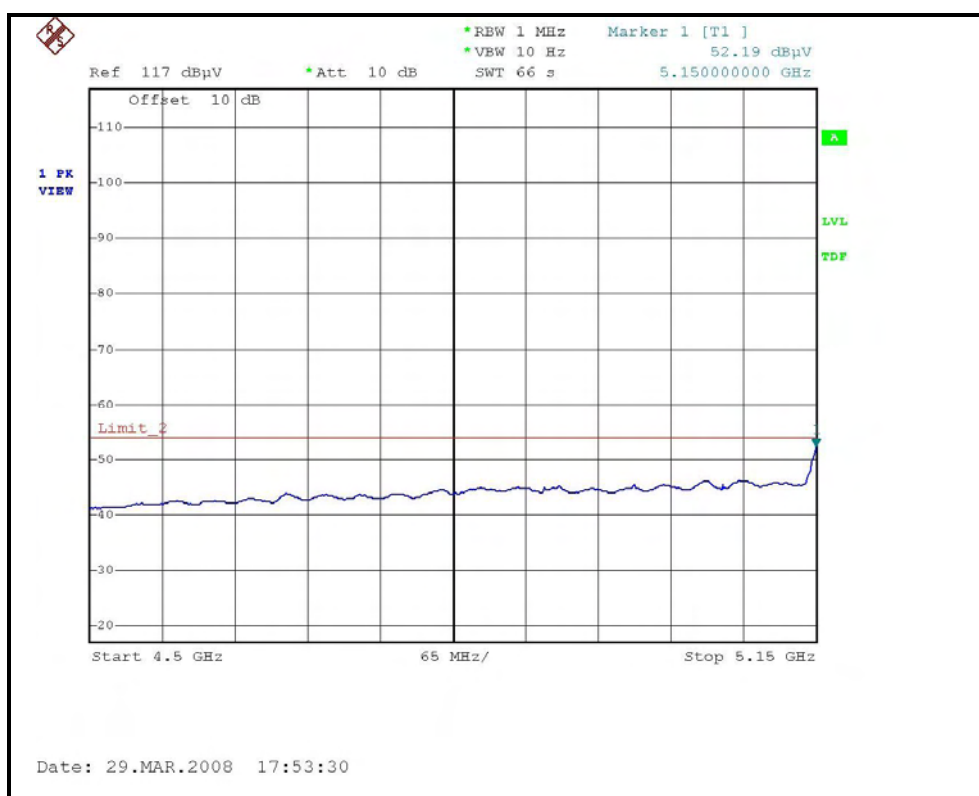
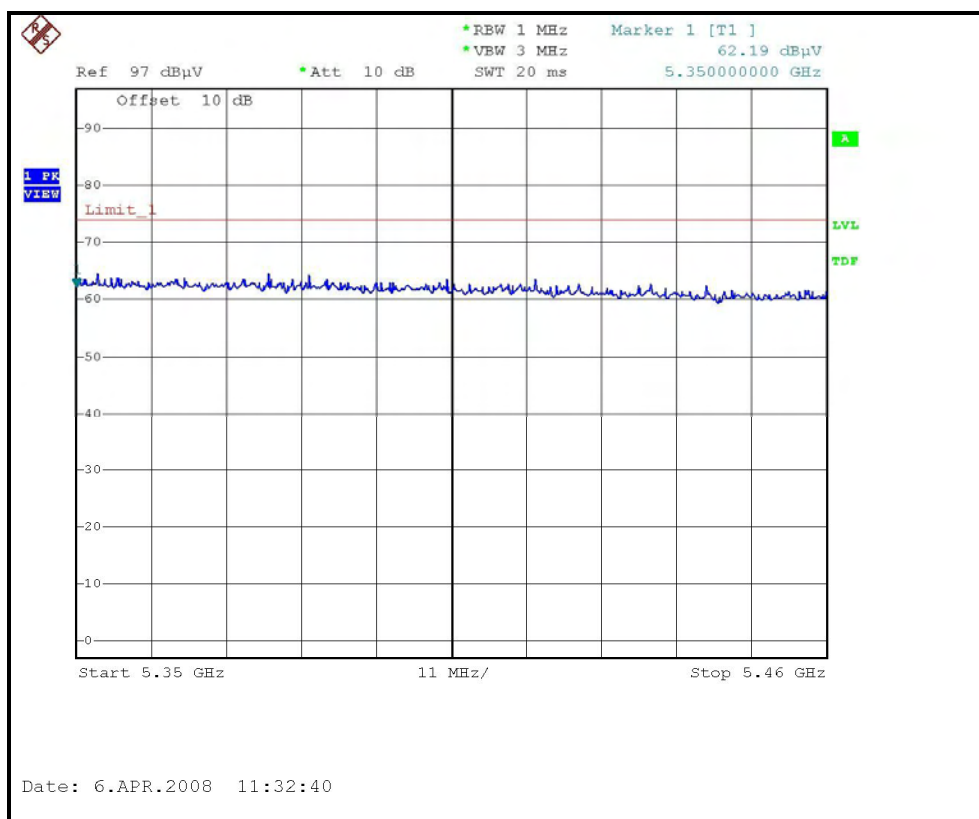
RESTRICTED BANDEDGE (802.11a MODE, CH1, VERTICAL)



RESTRICTED BANDEDGE (802.11a MODE, CH4, HORIZONTAL)



RESTRICTED BANDEDGE (802.11a MODE, CH4, VERTICAL)



DRAFT 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 80%RH 960hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
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	#5150.00	54.73 PK	74.00	-19.27	1.48 H	92	18.49	36.24
2	#5150.00	42.19 AV	54.00	-11.81	1.48 H	92	5.95	36.24
3	*5180.00	103.20 PK			1.48 H	282	66.92	36.28
4	*5180.00	89.30 AV			1.48 H	282	53.02	36.28
5	10360.00	57.06 PK	88.30	-31.24	1.53 H	143	11.16	45.90
6	10360.00	43.96 AV	68.30	-24.34	1.53 H	143	-1.94	45.90
7	#15540.00	61.95 PK	74.00	-12.05	1.44 H	135	13.97	47.98
8	#15540.00	47.02 AV	54.00	-6.98	1.44 H	135	-0.96	47.98
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
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	#5150.00	69.36 PK	74.00	-4.64	1.12 V	88	33.12	36.24
2	#5150.00	52.83 AV	54.00	-1.17	1.12 V	88	16.59	36.24
3	*5180.00	123.50 PK			1.07 V	62	87.22	36.28
4	*5180.00	108.40 AV			1.07 V	62	72.12	36.28
5	10360.00	57.89 PK	88.30	-30.41	1.60 V	203	11.99	45.90
6	10360.00	44.60 AV	68.30	-23.70	1.60 V	203	-1.30	45.90
7	#15540.00	60.12 PK	74.00	-13.88	1.22 V	84	12.14	47.98
8	#15540.00	46.88 AV	54.00	-7.12	1.22 V	84	-1.10	47.98

- 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
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH 960hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
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	#5094.33	56.80 PK	74.00	-17.20	1.38 H	132	20.63	36.17
2	#5094.33	45.70 AV	54.00	-8.30	1.38 H	132	9.53	36.17
3	*5200.00	106.42 PK			2.07 H	280	70.12	36.30
4	*5200.00	92.41 AV			2.07 H	280	56.11	36.30
5	#5364.78	55.90 PK	74.00	-18.10	1.57 H	140	19.40	36.50
6	#5364.78	45.20 AV	54.00	-8.80	1.57 H	140	8.70	36.50
7	10400.00	57.00 PK	88.30	-31.30	1.66 H	156	11.03	45.97
8	10400.00	44.00 AV	68.30	-24.30	1.66 H	156	-1.97	45.97
9	#15600.00	73.20 PK	74.00	-0.80	1.25 H	133	25.30	47.90
10	#15600.00	53.26 AV	54.00	-0.74	1.25 H	133	5.36	47.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
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	#5094.10	64.66 PK	74.00	-9.34	1.14 V	80	28.49	36.17
2	#5094.10	51.60 AV	54.00	-2.40	1.14 V	80	15.43	36.17
3	*5200.00	124.09 PK			1.10 V	81	87.79	36.30
4	*5200.00	110.57 AV			1.10 V	81	74.27	36.30
5	#5365.40	61.78 PK	74.00	-12.22	1.18 V	93	25.28	36.50
6	#5365.40	50.70 AV	54.00	-3.30	1.18 V	93	14.20	36.50
7	10400.00	59.64 PK	88.30	-28.66	1.60 V	204	13.67	45.97
8	10400.00	45.87 AV	68.30	-22.43	1.60 V	204	-0.10	45.97
9	#15600.00	65.93 PK	74.00	-8.07	1.09 V	92	18.03	47.90
10	#15600.00	48.49 AV	54.00	-5.51	1.09 V	92	0.59	47.90

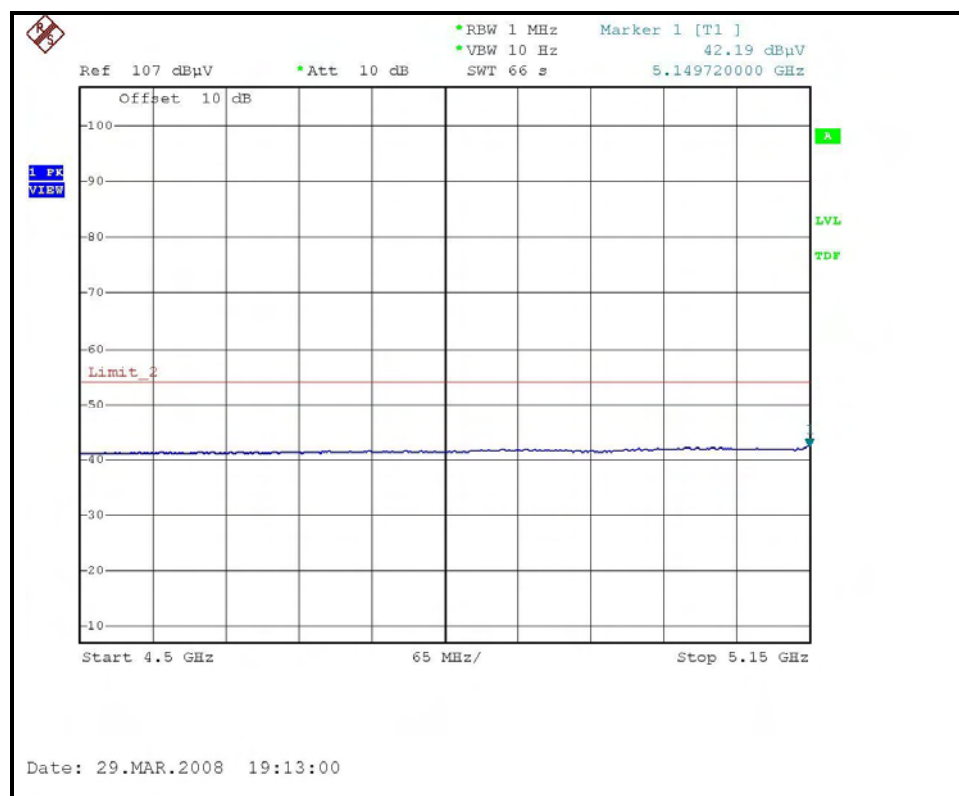
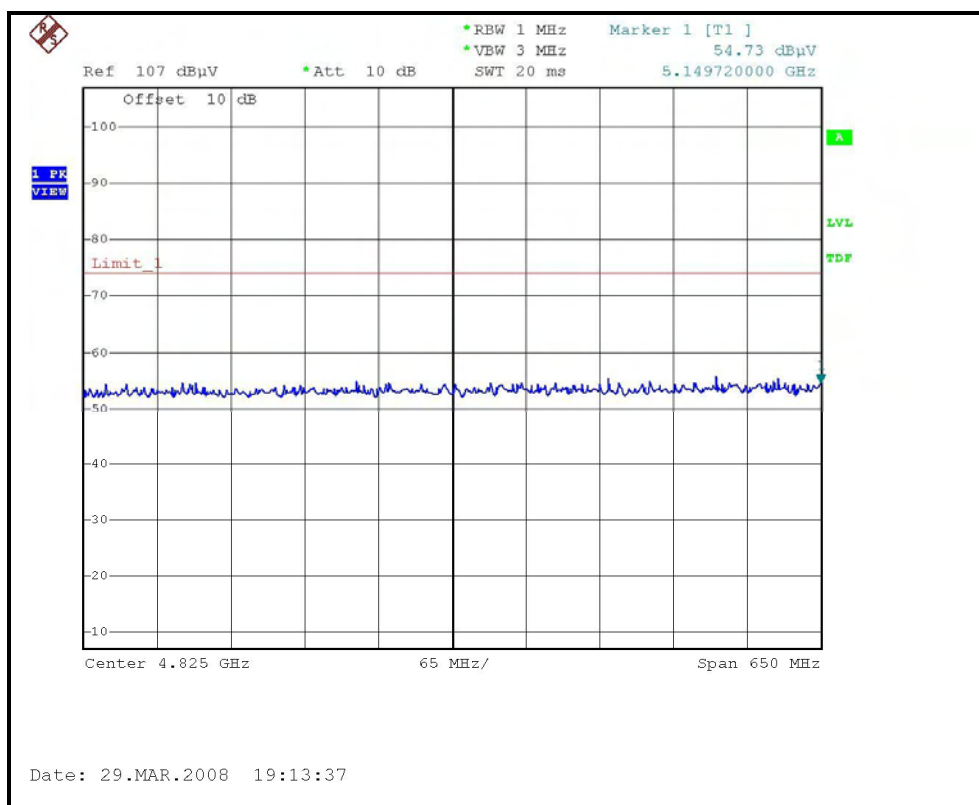
REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ”: Fundamental frequency.
6.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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH 960hPa	TESTED BY	Rex Huang

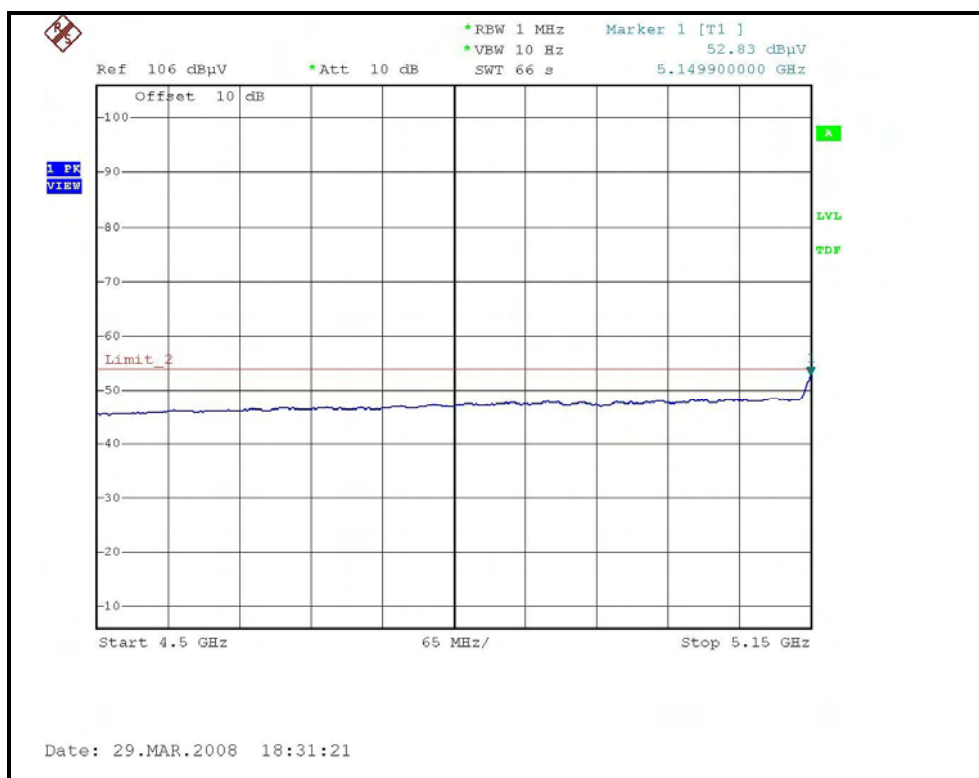
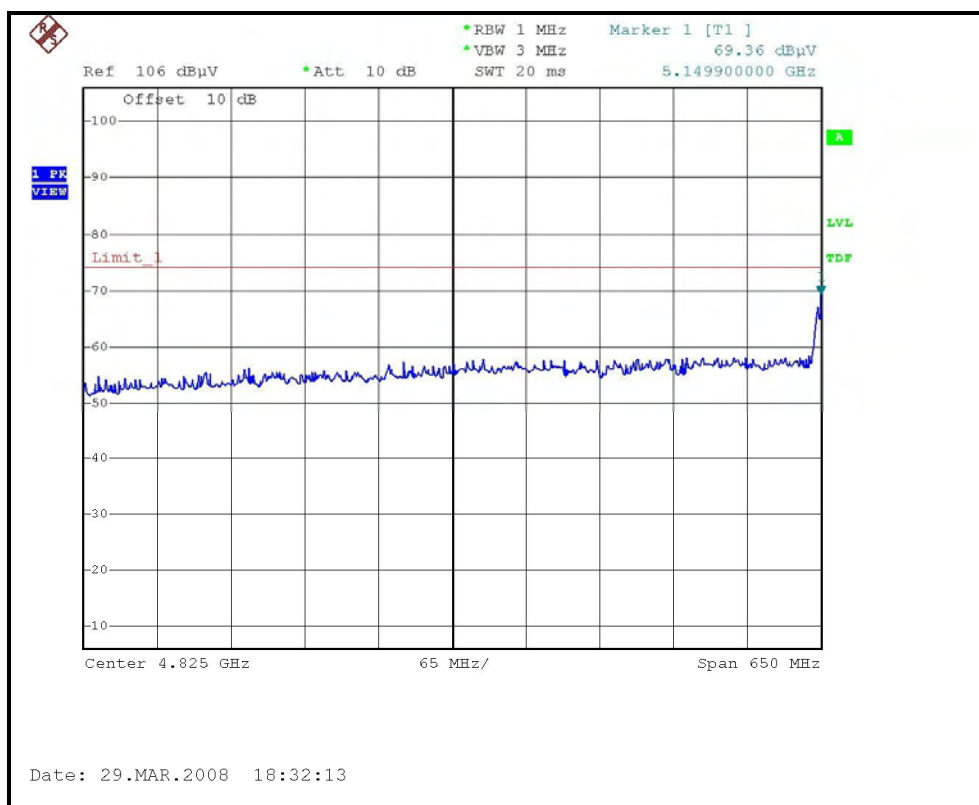
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5117.20	55.20 PK	74.00	-18.80	1.51 H	145	19.00	36.20
2	#5117.20	44.50 AV	54.00	-9.50	1.51 H	145	8.30	36.20
3	*5240.00	105.34 PK			1.89 H	267	68.99	36.35
4	*5240.00	92.50 AV			1.89 H	267	56.15	36.35
5	#5382.40	56.30 PK	74.00	-17.70	1.42 H	119	19.78	36.52
6	#5382.40	45.00 AV	54.00	-9.00	1.42 H	119	8.48	36.52
7	10480.00	58.90 PK	88.30	-29.40	1.56 H	158	12.79	46.11
8	10480.00	45.00 AV	68.30	-23.30	1.56 H	158	-1.11	46.11
9	#15720.00	72.30 PK	74.00	-1.70	1.14 H	120	24.56	47.74
10	#15720.00	50.50 AV	54.00	-3.50	1.14 H	120	2.76	47.74
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
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	*5240.00	123.30 PK			1.11 V	84	86.95	36.35
2	*5240.00	109.70 AV			1.11 V	84	73.35	36.35
3	#5386.74	63.40 PK	74.00	-10.60	1.20 V	84	26.88	36.52
4	#5386.74	51.30 AV	54.00	-2.70	1.20 V	84	14.78	36.52
5	#5417.40	62.00 PK	74.00	-12.00	1.14 V	81	25.44	36.56
6	#5417.40	51.20 AV	54.00	-2.80	1.14 V	81	14.64	36.56
7	10480.00	59.86 PK	88.30	-28.44	1.58 V	202	13.75	46.11
8	10480.00	45.29 AV	68.30	-23.01	1.58 V	202	-0.82	46.11
9	#15720.00	65.30 PK	74.00	-8.70	1.28 V	83	17.56	47.74
10	#15720.00	48.15 AV	54.00	-5.85	1.28 V	83	0.41	47.74

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.

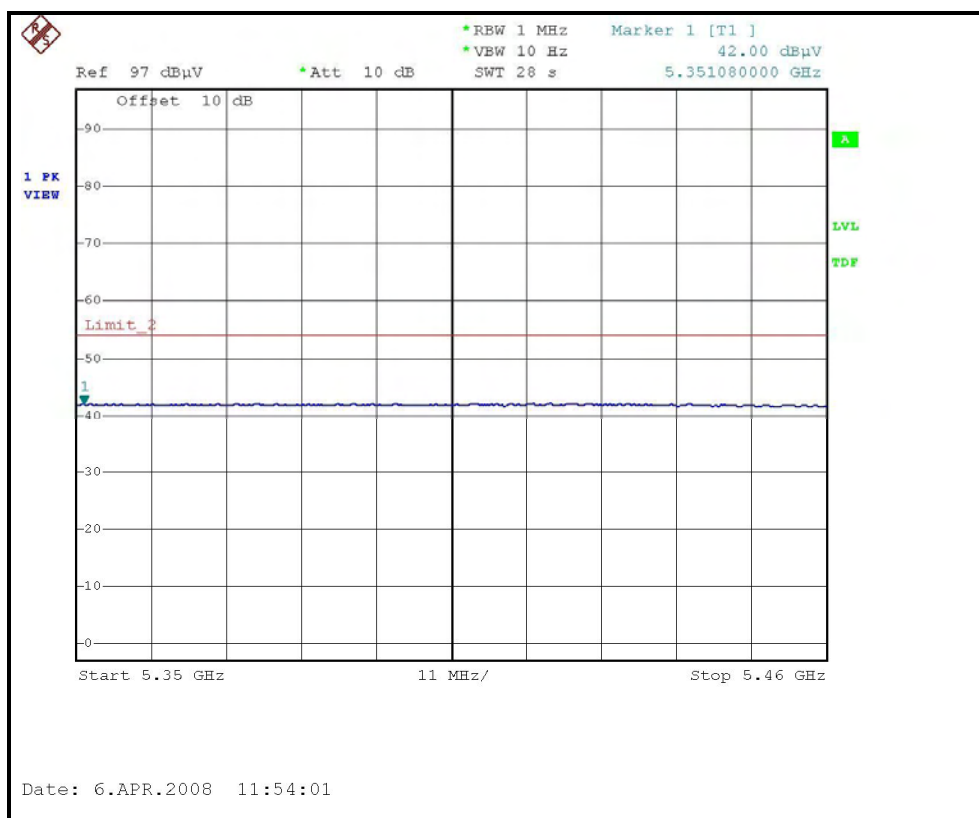
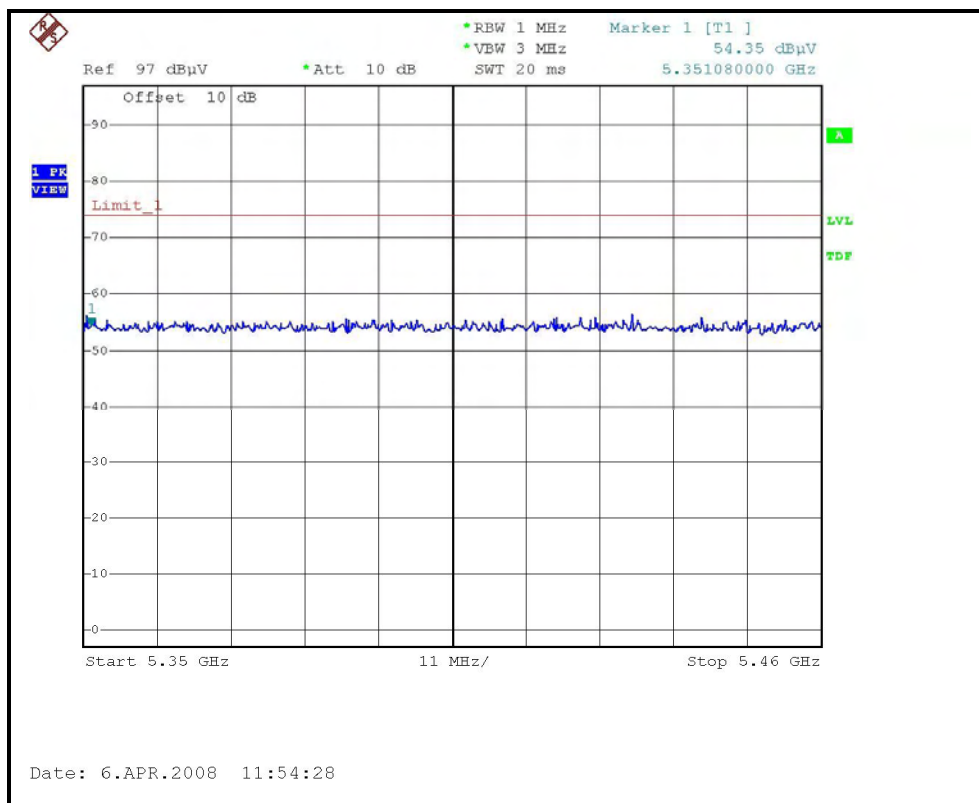
RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE,CH1, HORIZONTAL)



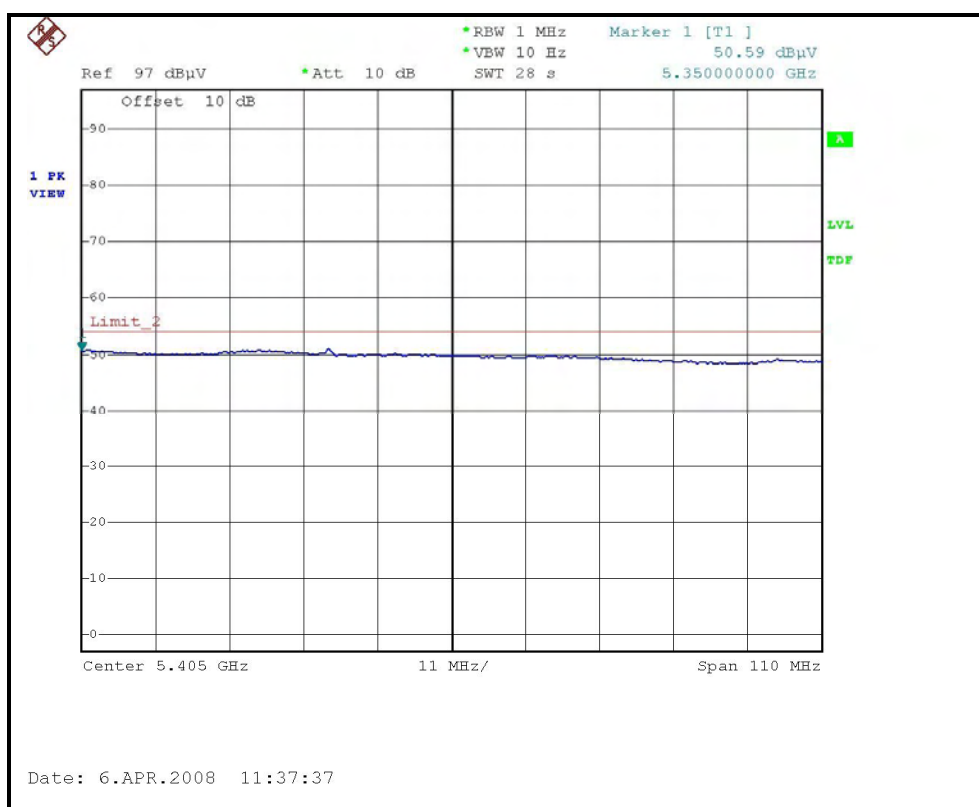
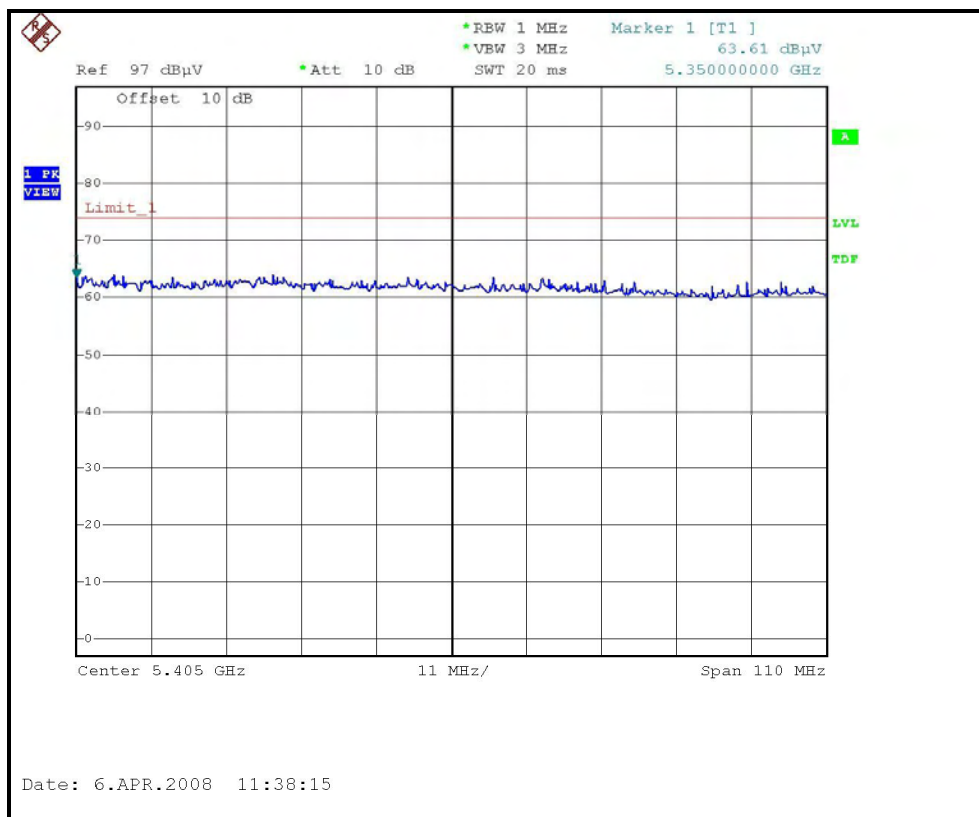
RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE,CH1, VERTICAL)



RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE,CH4, HORIZONTAL)



RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE,CH4, VERTICAL)



DRAFT 802.11n (40MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH 960hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
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	#5150.00	58.85 PK	74.00	-15.15	2.05 H	226	22.61	36.24
2	#5150.00	47.20 AV	54.00	-6.80	2.05 H	226	10.96	36.24
3	*5190.00	94.43 PK			2.11 H	217	58.14	36.29
4	*5190.00	80.50 AV			2.11 H	217	44.21	36.29
5	10380.00	56.20 PK	88.30	-32.10	1.22 H	15	10.27	45.93
6	10380.00	42.50 AV	68.30	-25.80	1.22 H	15	-3.43	45.93
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
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	#5150.00	68.27 PK	74.00	-5.73	1.14 V	85	32.03	36.24
2	#5150.00	53.36 AV	54.00	-0.64	1.14 V	85	17.12	36.24
3	*5190.00	112.30 PK			1.21 V	87	76.01	36.29
4	*5190.00	98.24 AV			1.21 V	87	61.95	36.29
5	10380.00	56.70 PK	88.30	-31.60	1.10 V	250	10.77	45.93
6	10380.00	42.90 AV	68.30	-25.40	1.10 V	250	-3.03	45.93

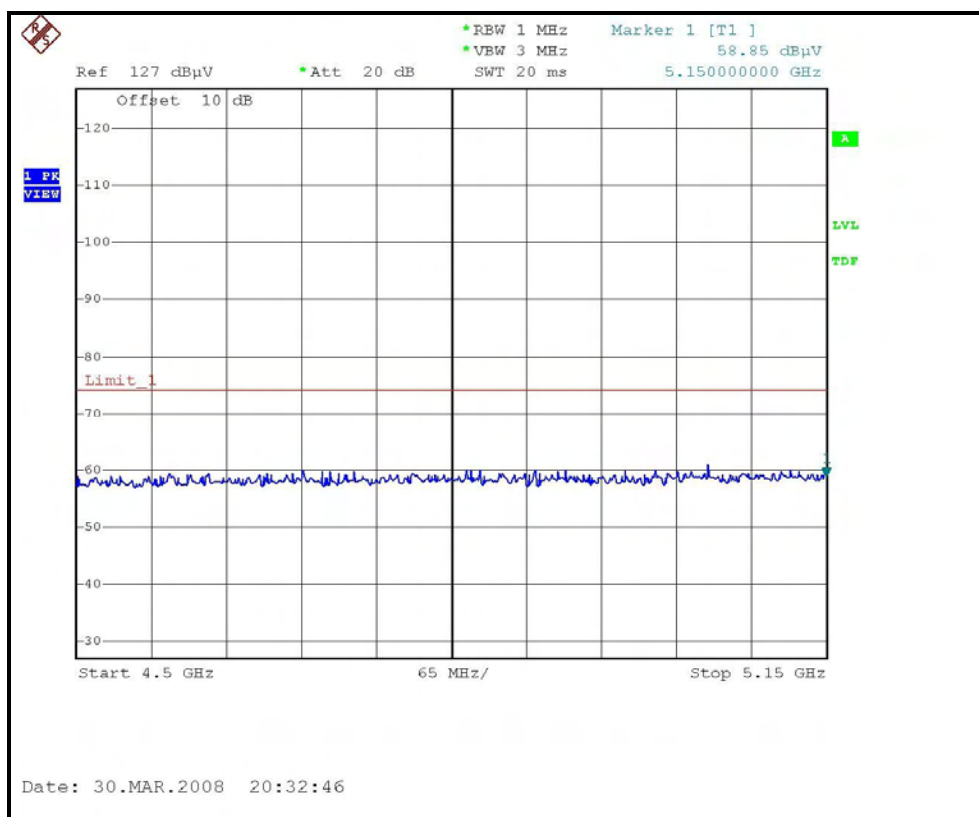
- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ”: Fundamental frequency.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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 2	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH 960hPa	TESTED BY	Rex Huang

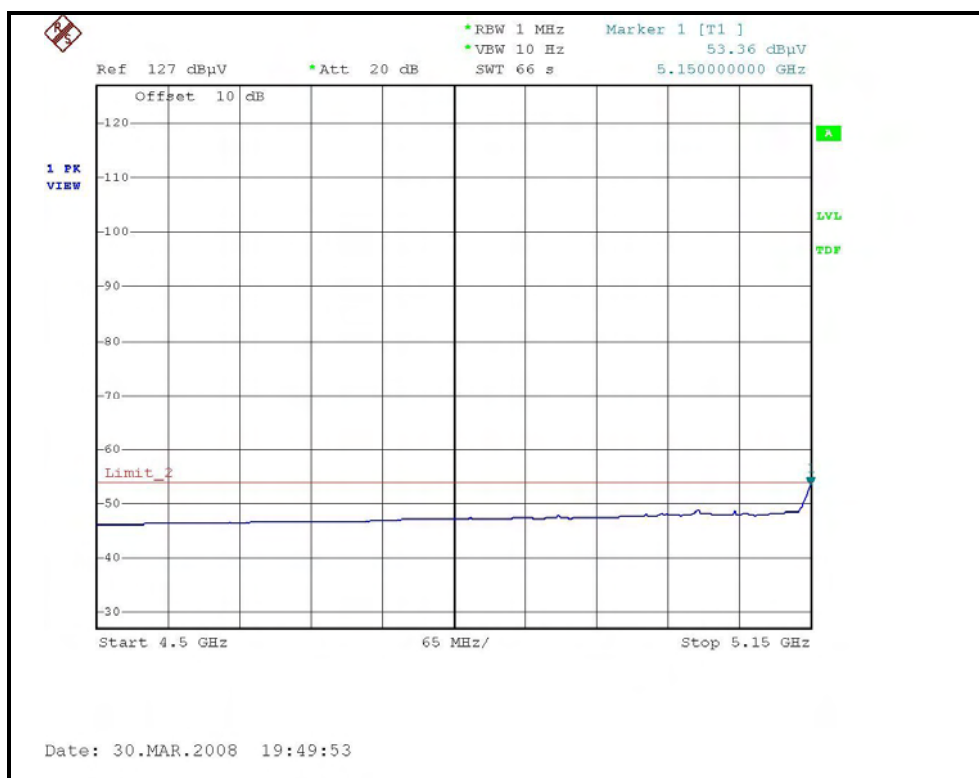
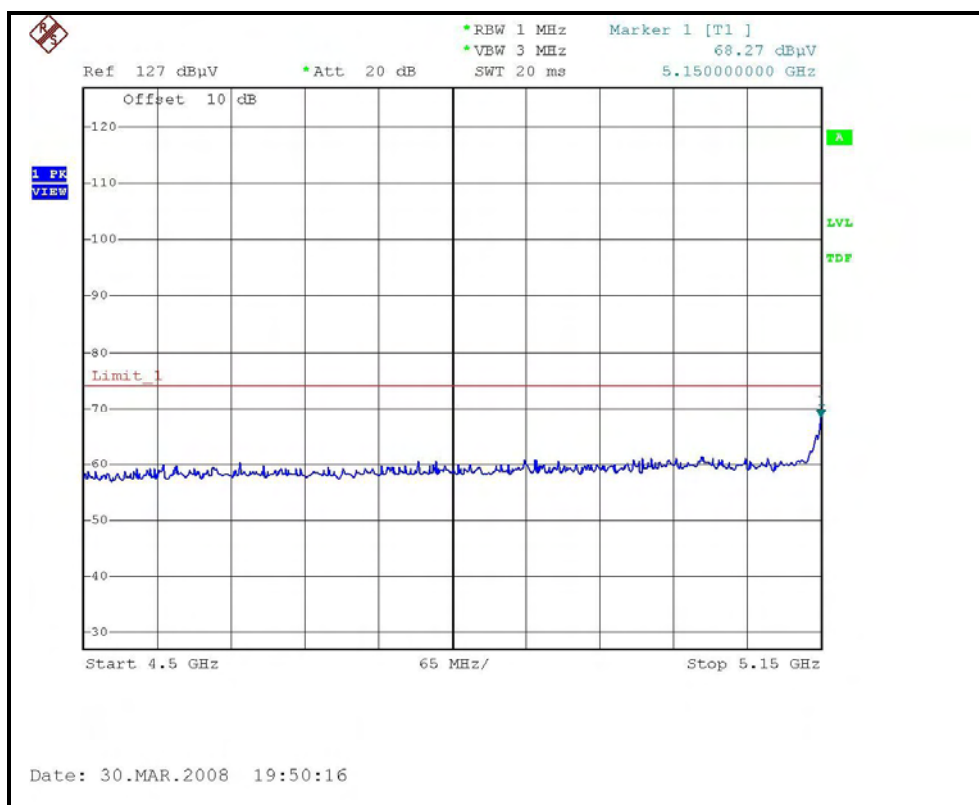
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	105.80 PK			1.48 H	265	69.46	36.34
2	*5230.00	91.20 AV			1.48 H	265	54.86	36.34
3	#5350.60	55.02 PK	74.00	-18.98	1.55 H	250	18.54	36.48
4	#5350.60	41.91 AV	54.00	-12.09	1.55 H	250	5.43	36.48
5	10460.00	56.80 PK	88.30	-31.50	1.42 H	32	10.72	46.08
6	10460.00	42.20 AV	68.30	-26.10	1.42 H	32	-3.88	46.08
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
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	*5230.00	122.50 PK			1.14 V	78	86.16	36.34
2	*5230.00	108.00 AV			1.14 V	78	71.66	36.34
3	#5359.00	61.59 PK	74.00	-12.41	1.10 V	88	25.10	36.49
4	#5359.00	50.34 AV	54.00	-3.66	1.10 V	88	13.85	36.49
5	10460.00	57.20 PK	88.30	-31.10	1.60 V	2	11.12	46.08
6	10460.00	43.10 AV	68.30	-25.20	1.60 V	2	-2.98	46.08

- 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.

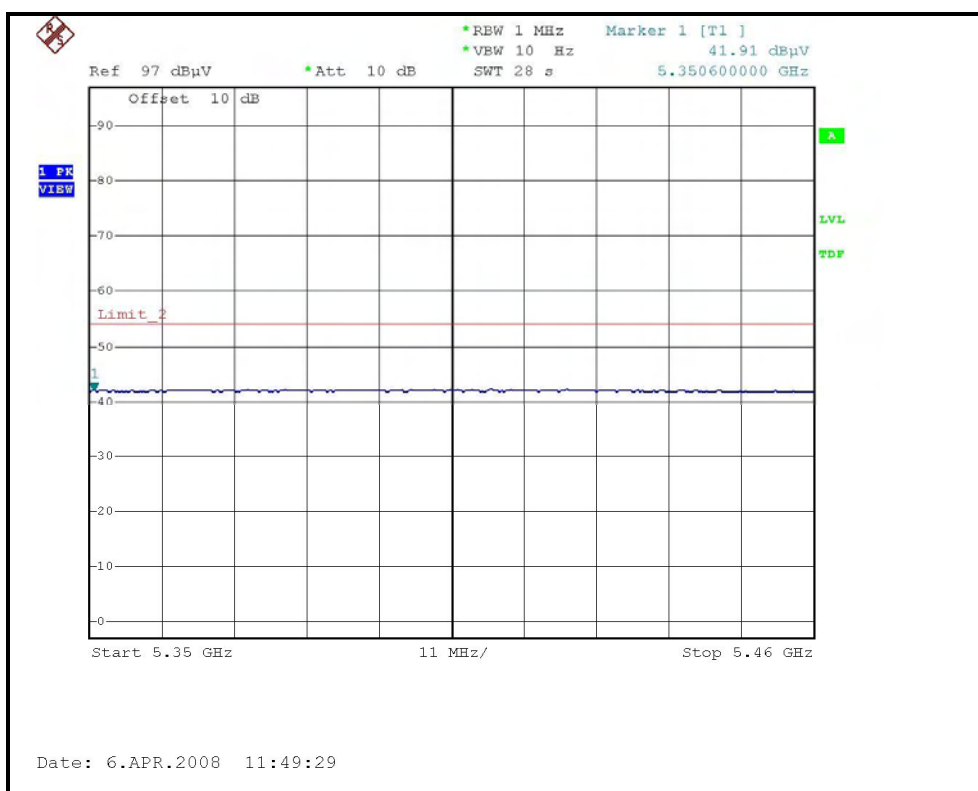
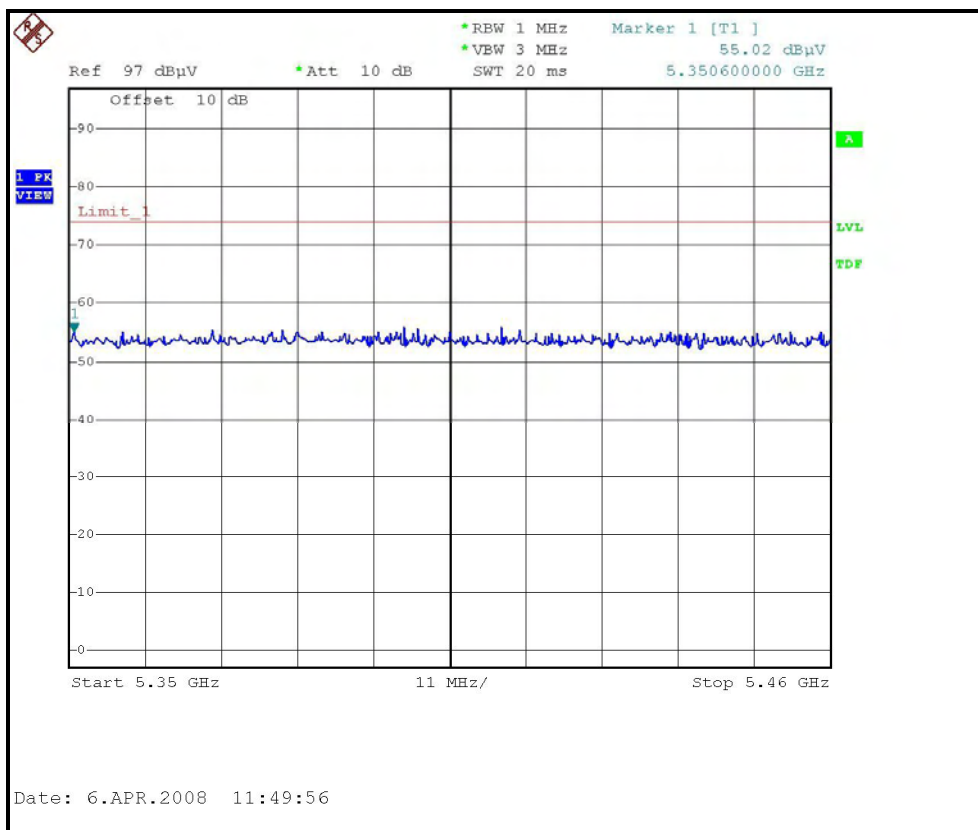
RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE, CH 1, HORIZONTAL)



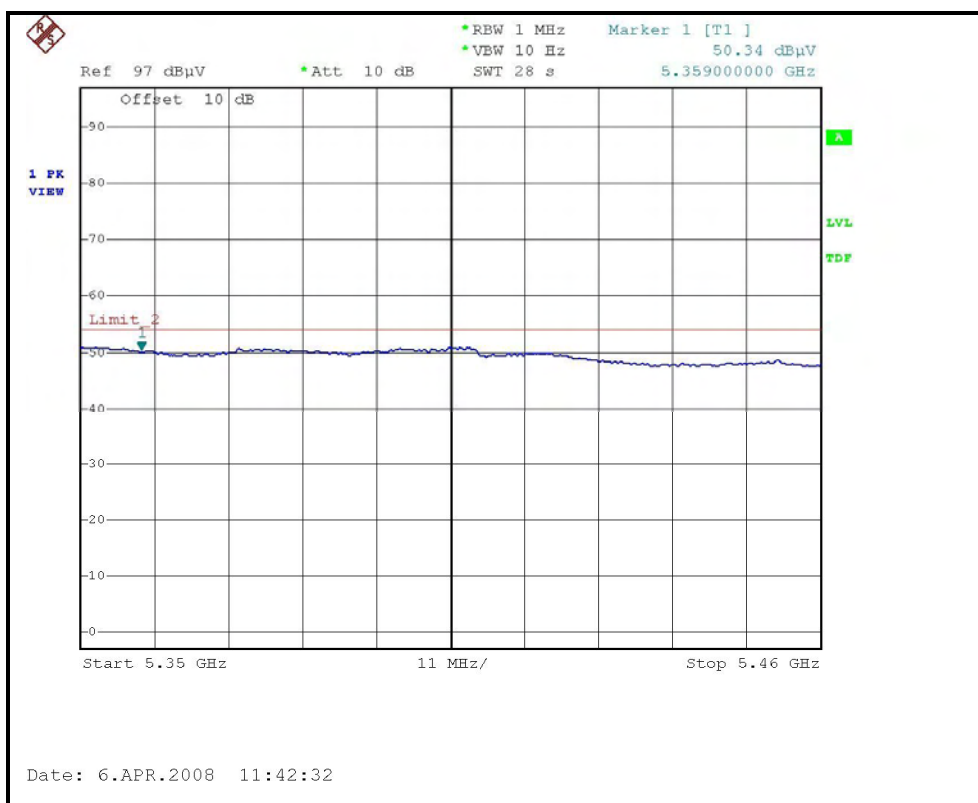
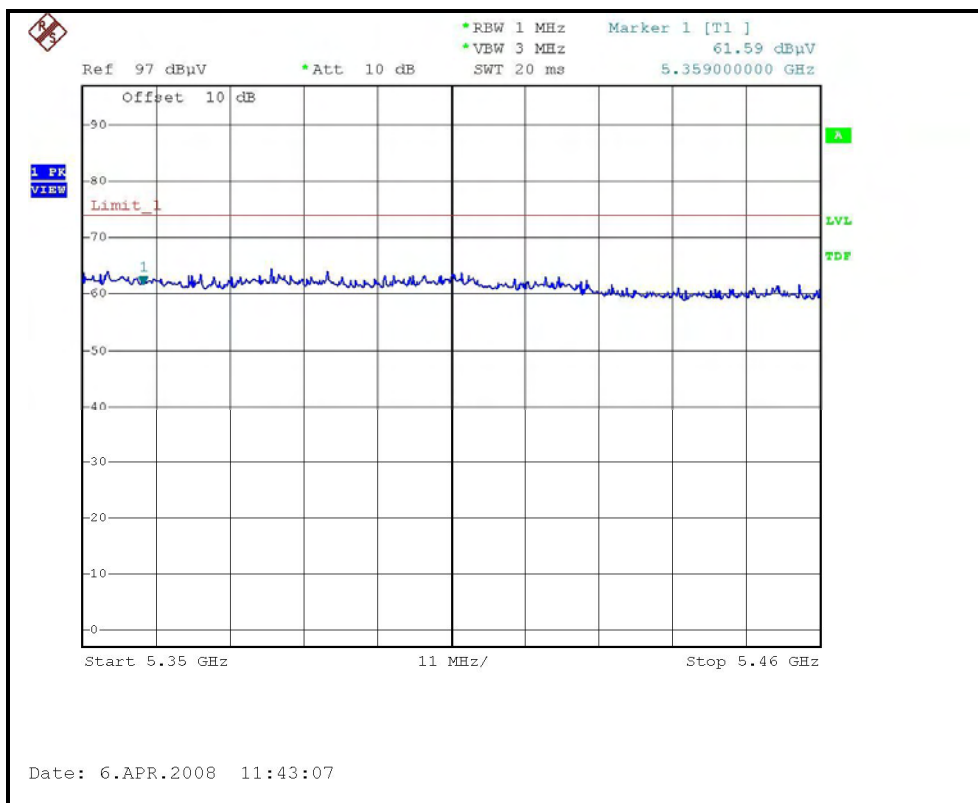
RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE,CH 1, VERTICAL)



RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE, CH2, HORIZONTAL)



RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE, CH2, VERTICAL)



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
5.47 – 5.725GHz	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
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.

4.3.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set span to encompass the entire emission bandwidth of the signal.
3. Set RBW to 1MHz, VBW to 300kHz.
4. Using the spectrum analyzer's channel power measurement function to measure the output power.

NOTE:

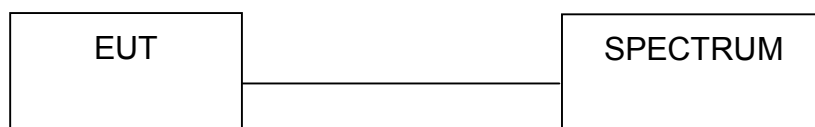
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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

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		

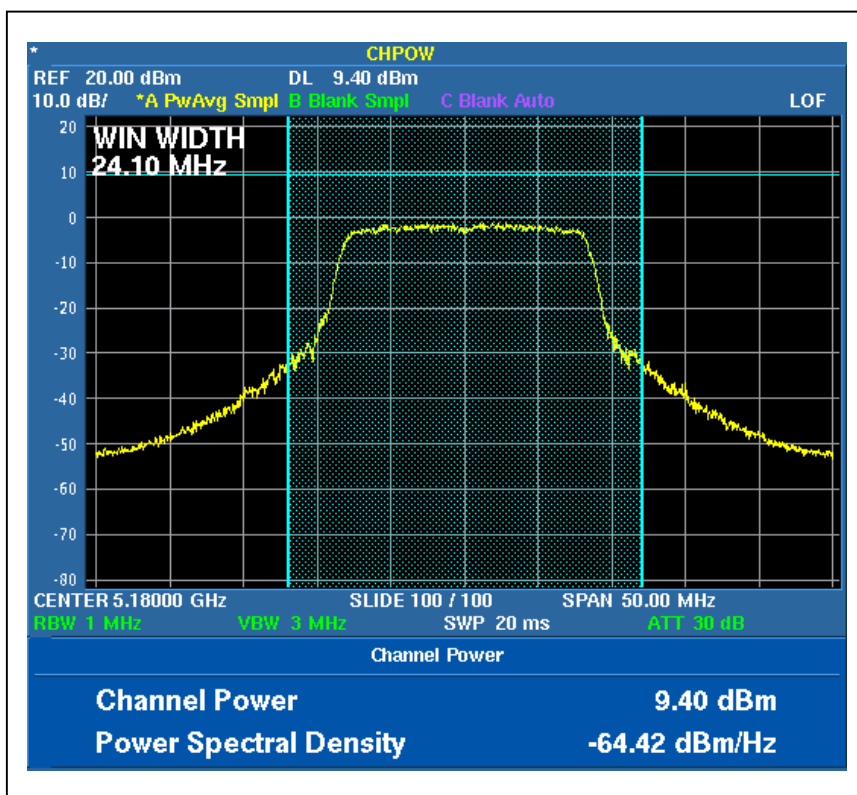
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)			PEAK POWER OUTPUT (dBm)			TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		Chain 0	Chain 1	Chain 2	Chain 0	Chain 1	Chain 2				
1	5180	8.710	9.954	10.399	9.40	9.98	10.17	29.063	14.63	16.48	PASS
2	5200	7.413	9.727	8.610	8.70	9.88	9.35	25.750	14.11	16.48	PASS
4	5240	7.161	10.375	9.120	8.55	10.16	9.60	26.656	14.26	16.48	PASS

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc Occupied Bandwidth (MHz)			MINIMUM LIMIT (dBm)	PASS / FAIL
		Chain 0	Chain 1	Chain 2		
1	5180	24.10	23.10	23.10	0.5	PASS
2	5200	23.45	23.25	22.75	0.5	PASS
4	5240	23.70	23.15	23.10	0.5	PASS

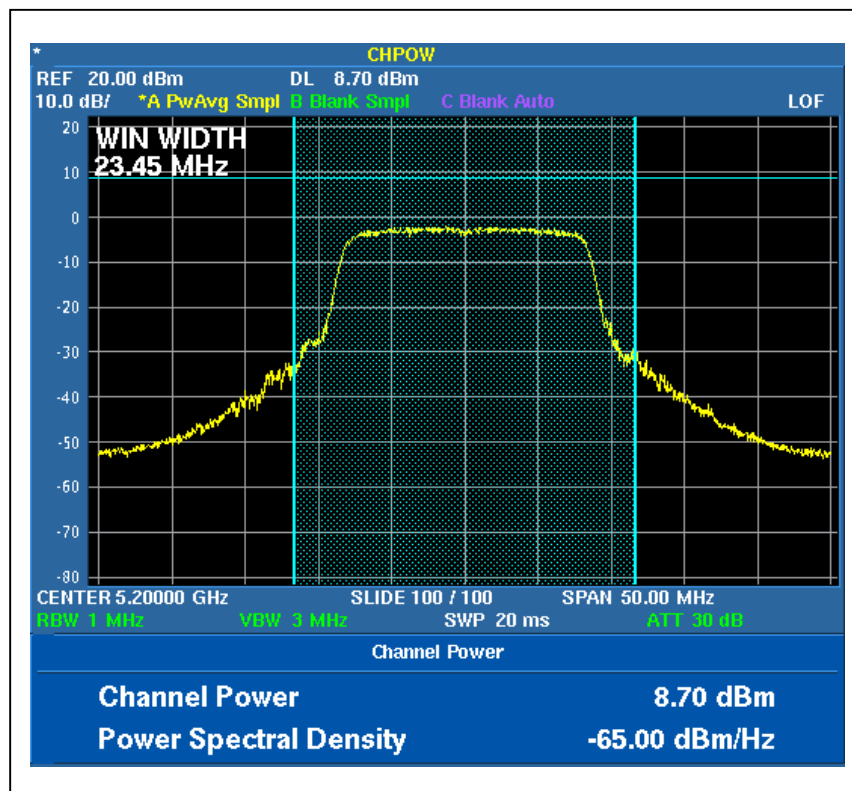
NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

Peak Power Output: Chain 0

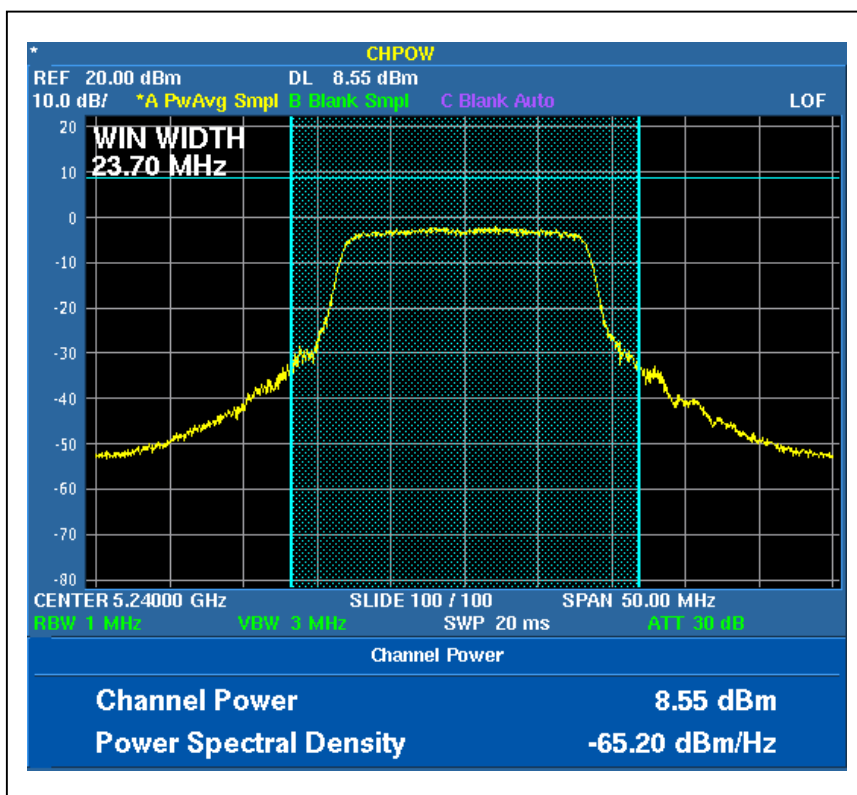
CH1



CH2

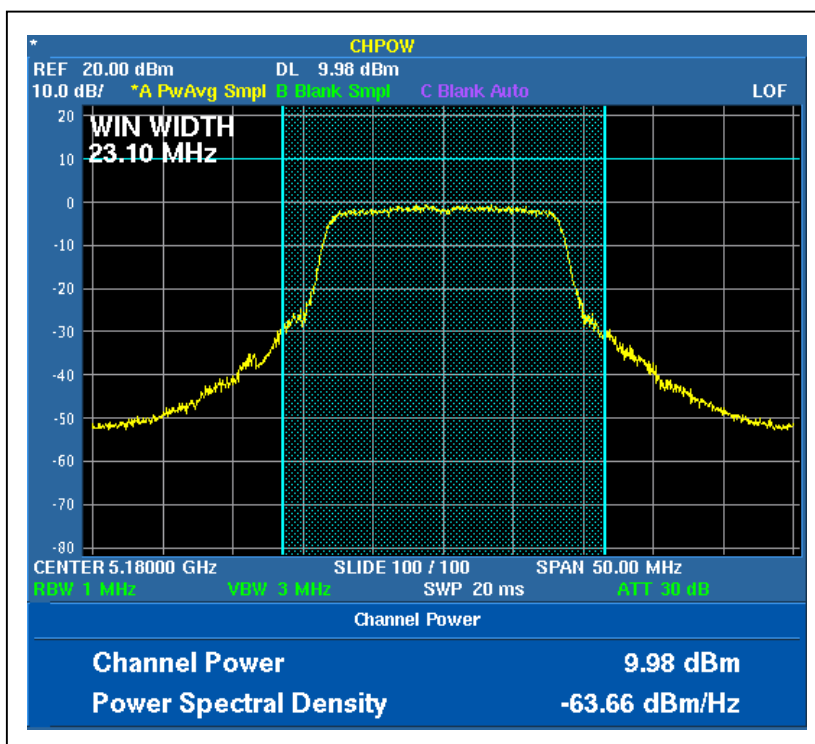


CH4

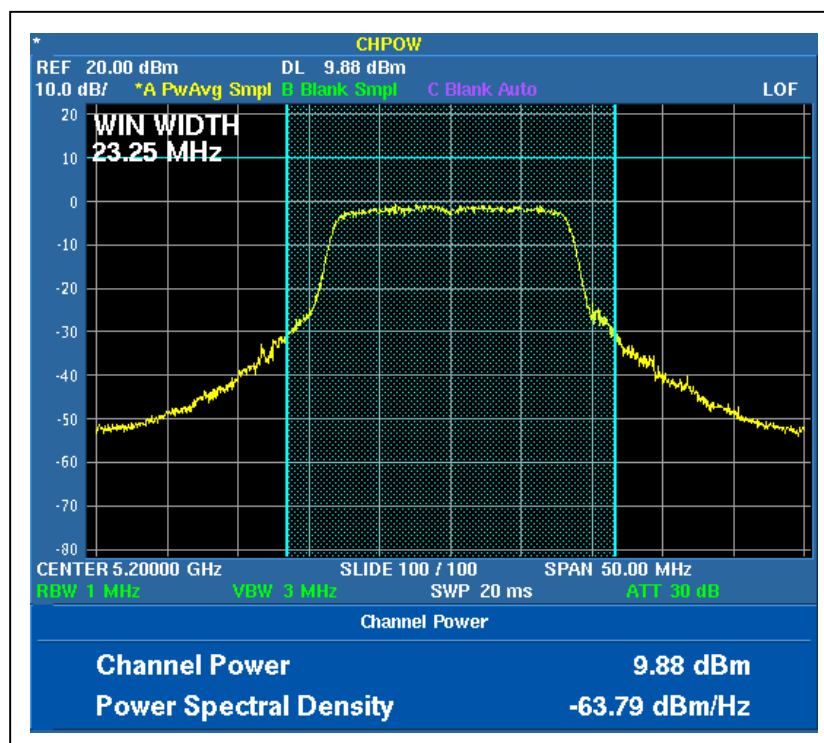


Peak Power Output: Chain 1

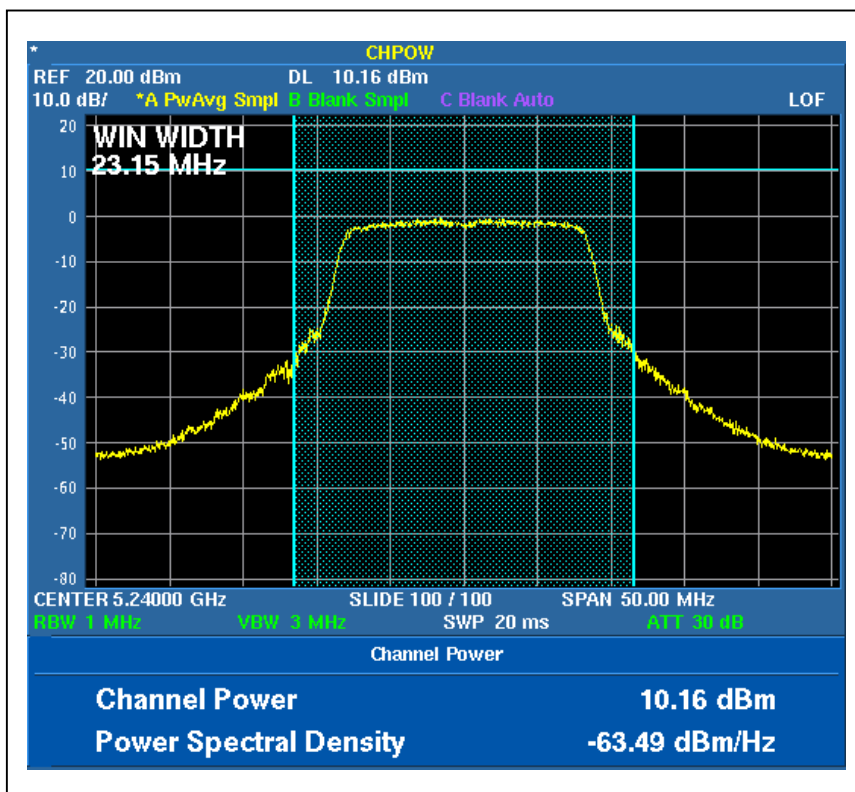
CH1



CH2

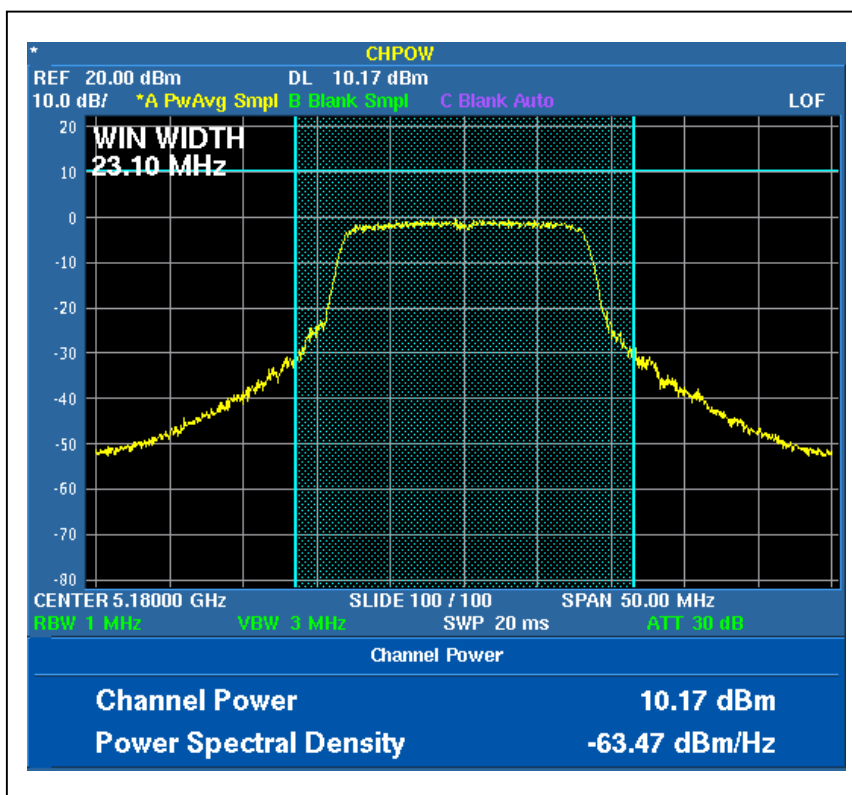


CH4

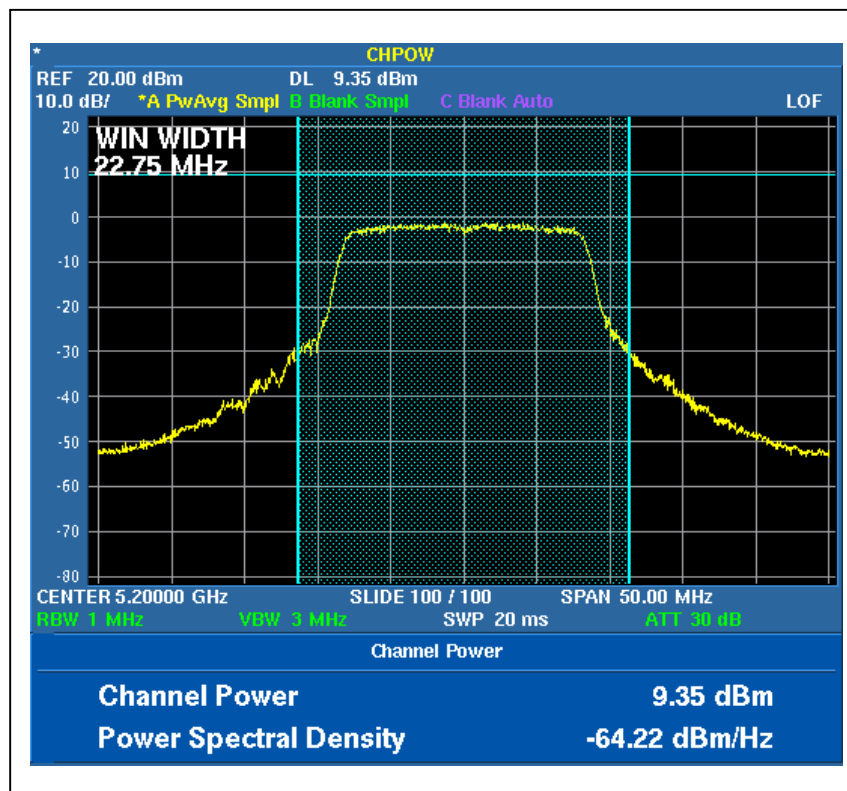


Peak Power Output: Chain 2

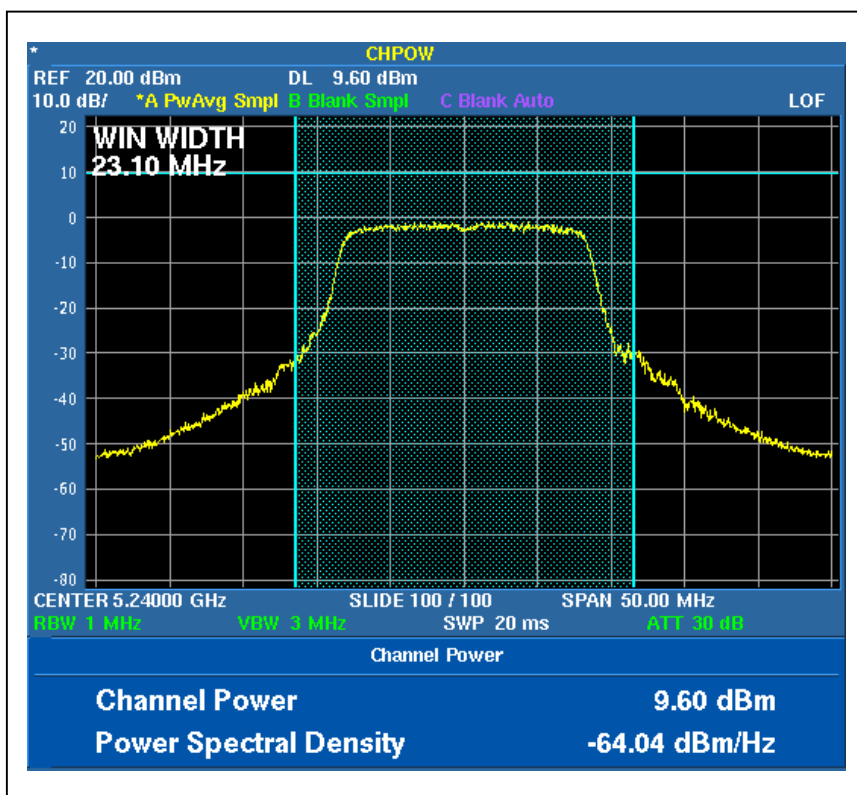
CH1



CH2

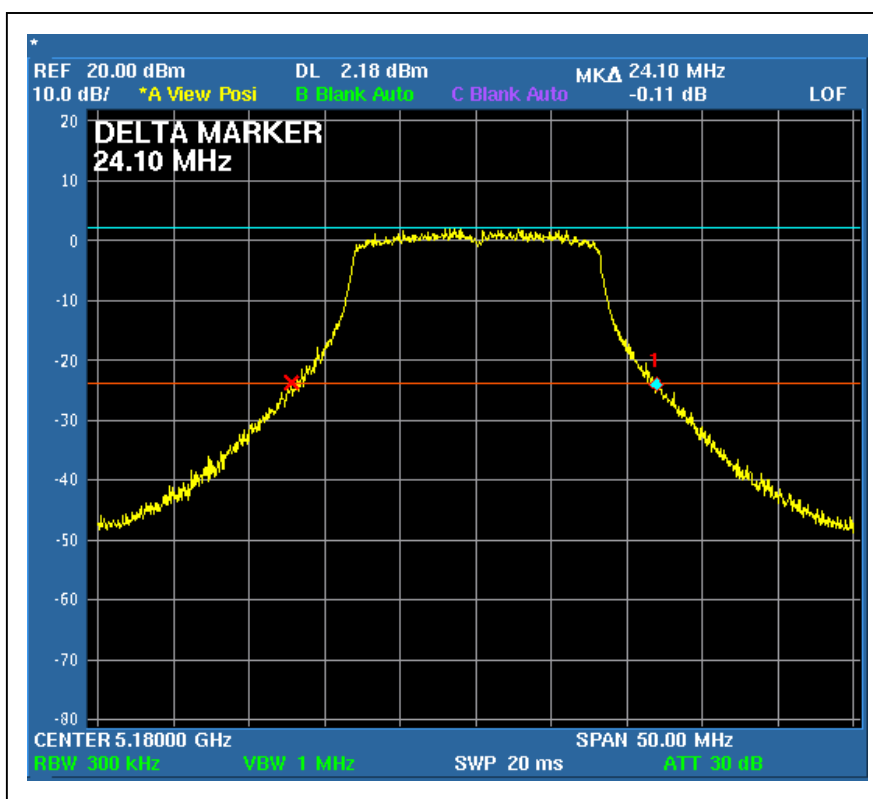


CH4

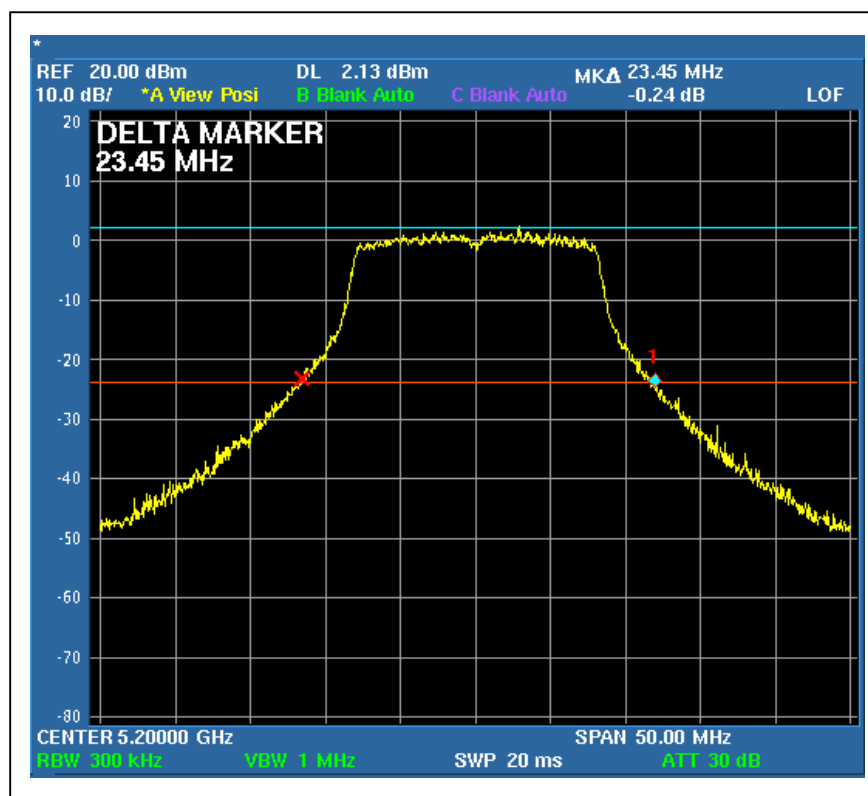


26dB Occupied Bandwidth: Chain 0

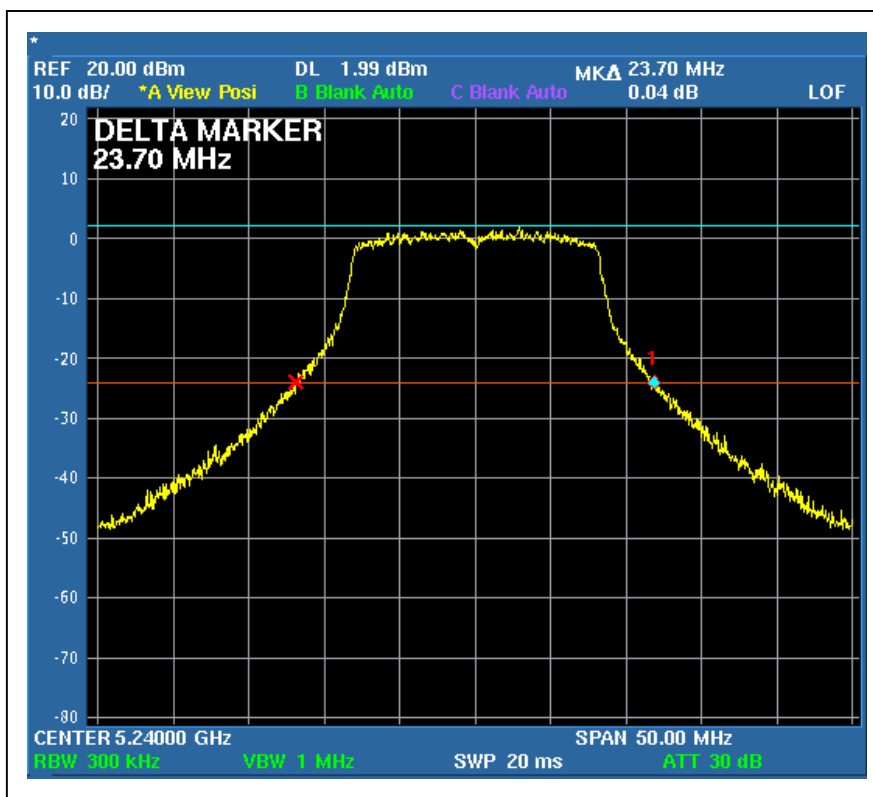
CH1



CH2

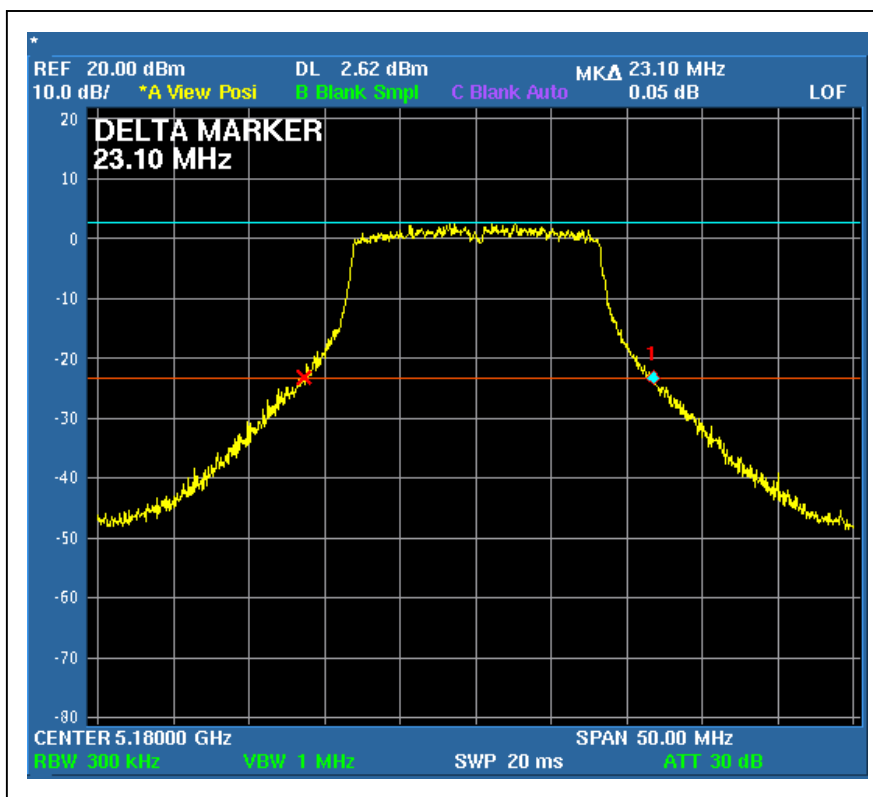


CH4

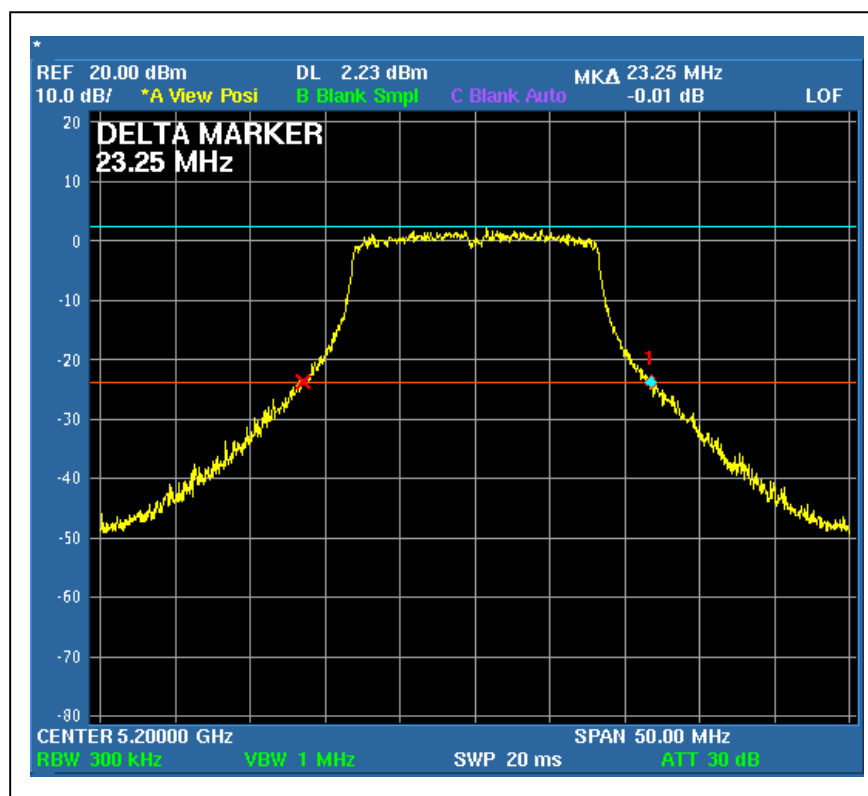


26dB Occupied Bandwidth: Chain 1

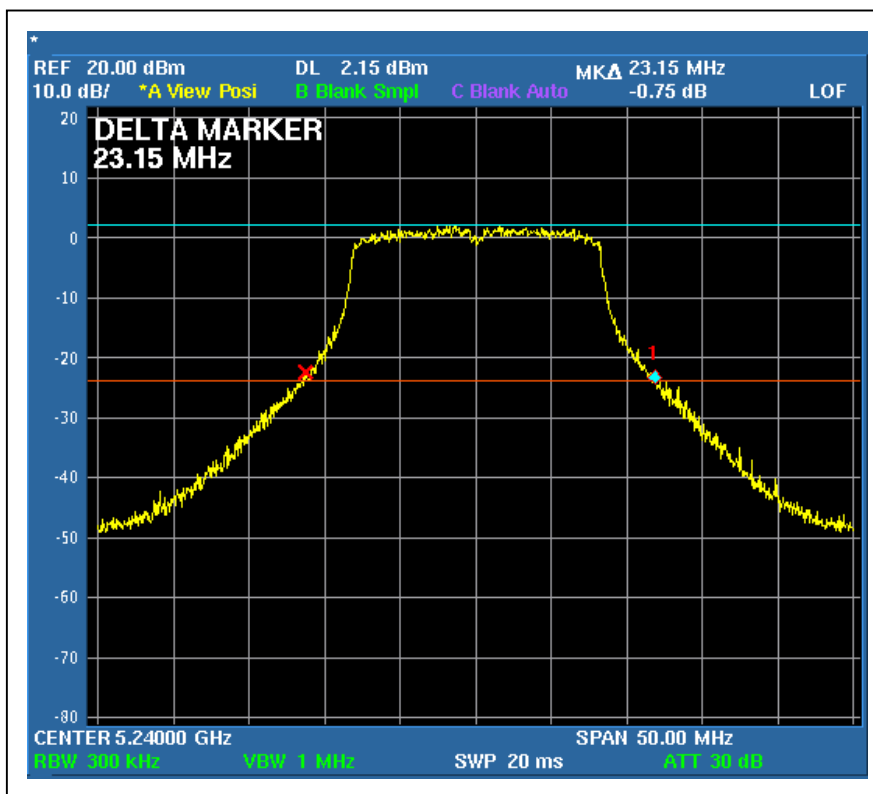
CH1



CH2

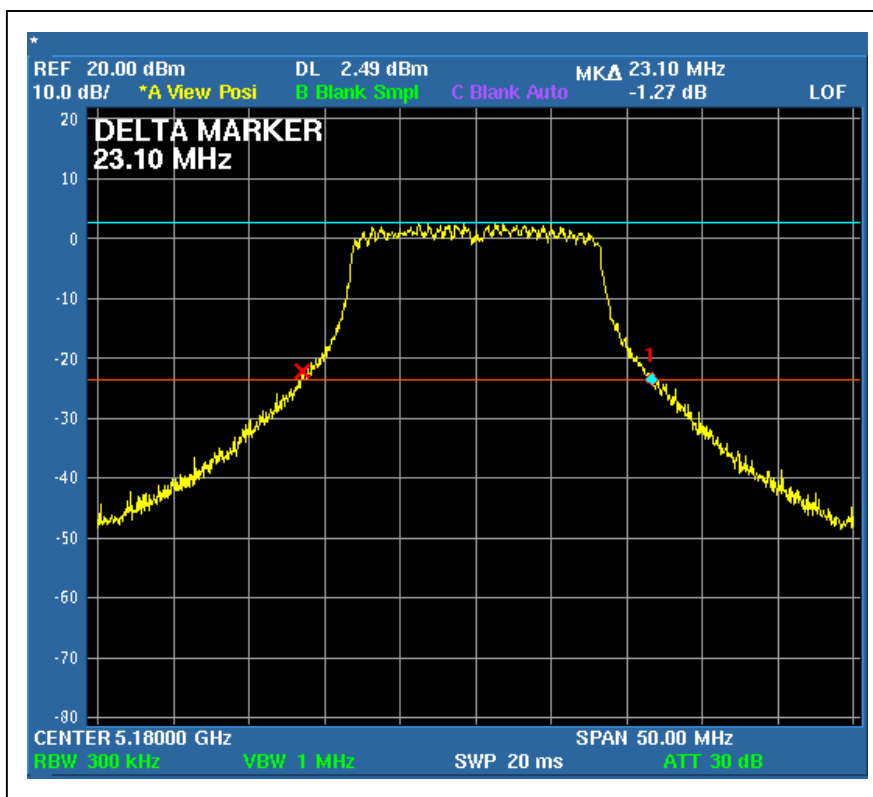


CH4

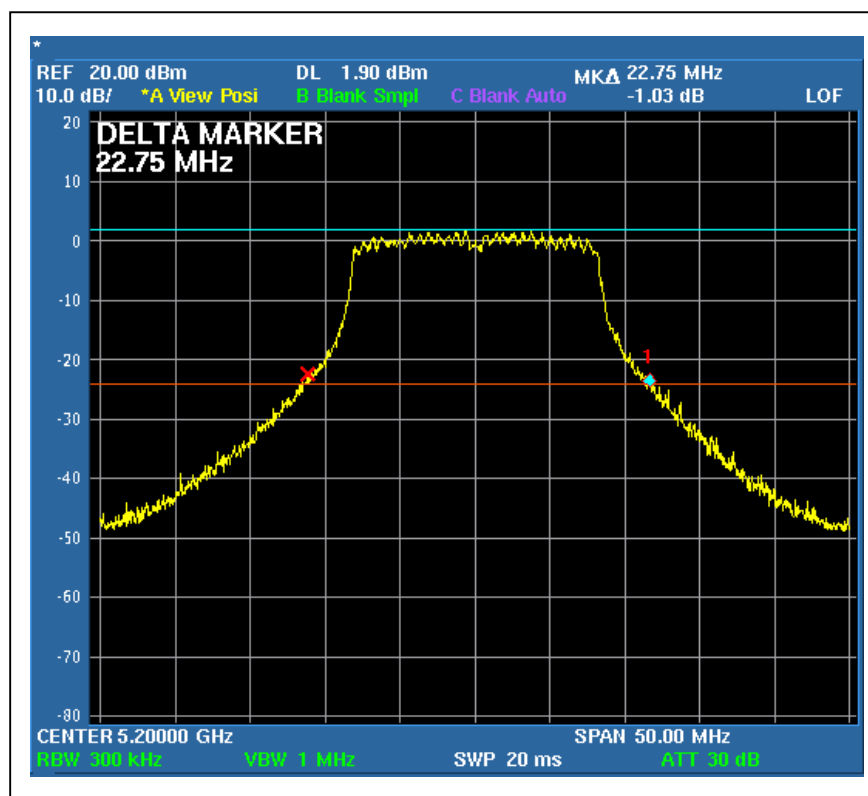


26dB Occupied Bandwidth: Chain 2

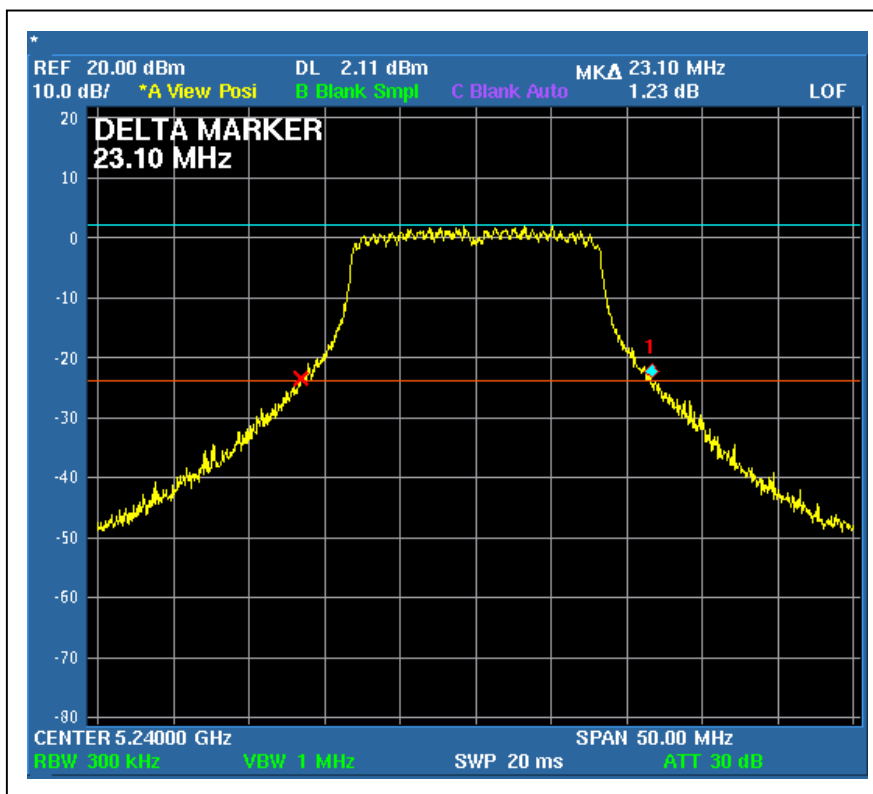
CH1



CH2



CH4



DRAFT 802.11n (20MHz) OFDM modulation:

MODULATION TYPE	BPSK	TRANSFER RATE	13Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 960hPa
TESTED BY	Rex Huang		

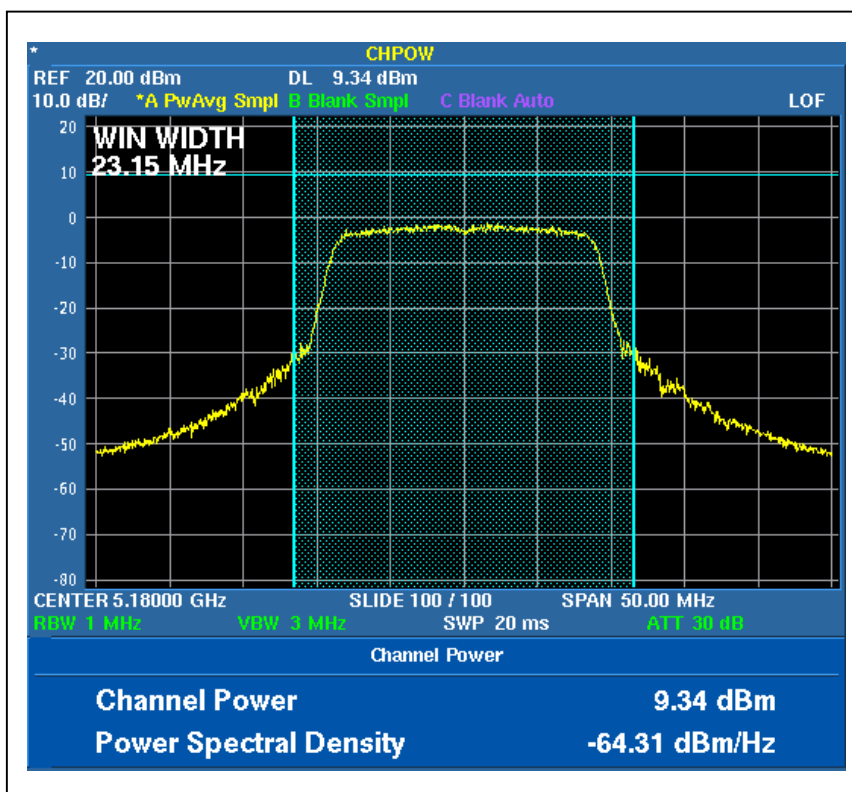
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)			PEAK POWER OUTPUT (dBm)			TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		Chain 0	Chain 1	Chain 2	Chain 0	Chain 1	Chain 2				
1	5180	8.590	9.727	10.304	9.34	9.88	10.13	28.621	14.57	16.48	PASS
2	5200	7.079	9.419	8.260	8.5	9.74	9.17	24.758	13.94	16.48	PASS
4	5240	7.063	9.795	8.831	8.49	9.91	9.46	25.689	14.10	16.48	PASS

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc Occupied Bandwidth (MHz)			MINIMUM LIMIT (dBm)	PASS / FAIL
		Chain 0	Chain 1	Chain 2		
1	5180	23.15	23.65	23.20	0.5	PASS
2	5200	23.70	23.15	23.55	0.5	PASS
4	5240	23.55	23.10	23.90	0.5	PASS

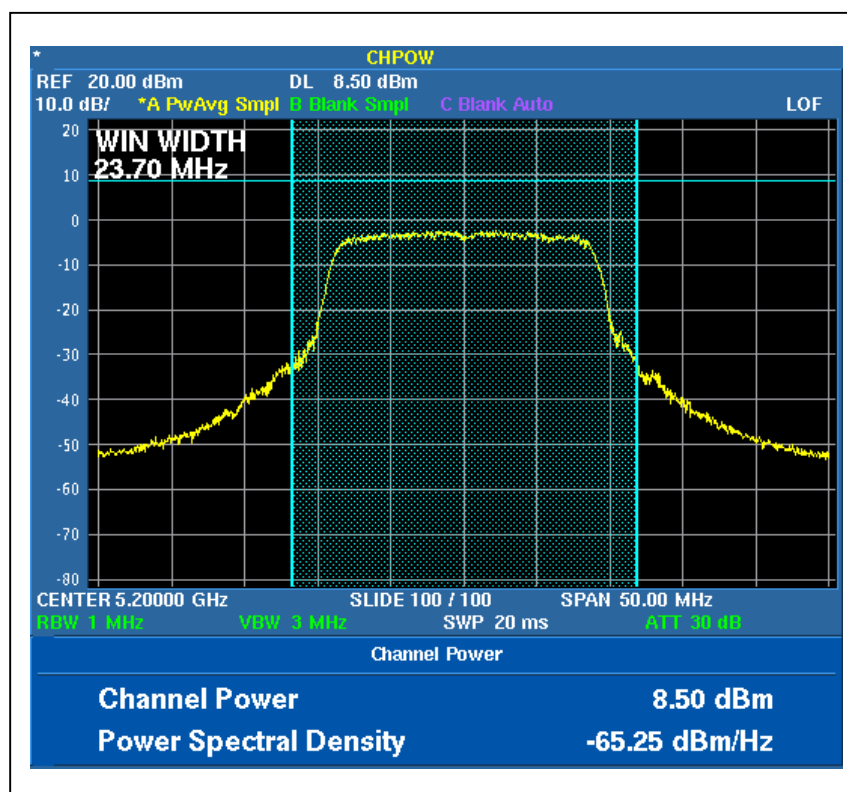
NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

Peak Power Output: Chain 0

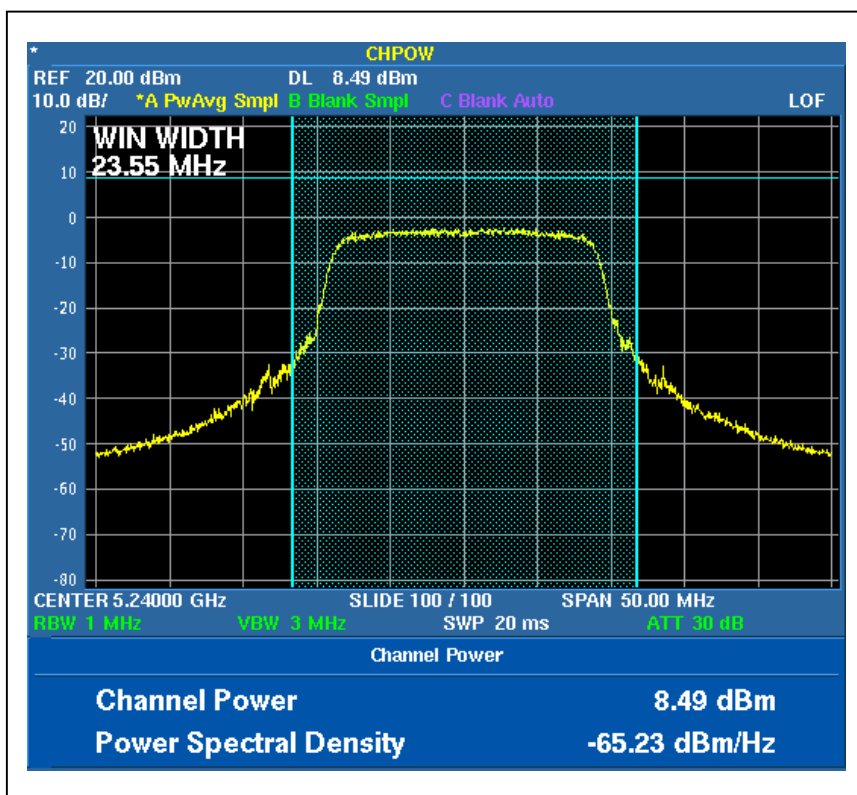
CH1



CH2

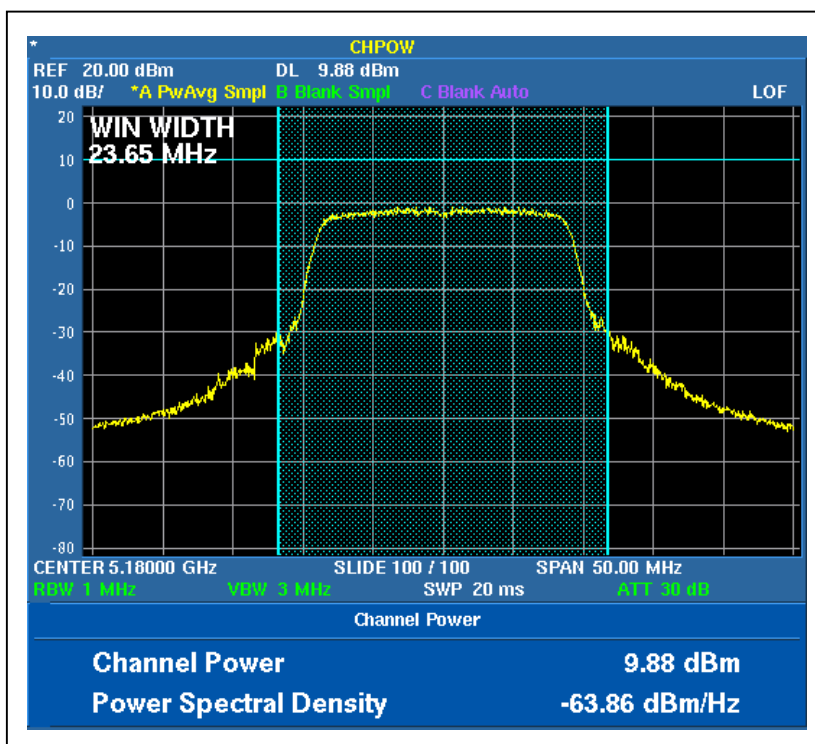


CH4

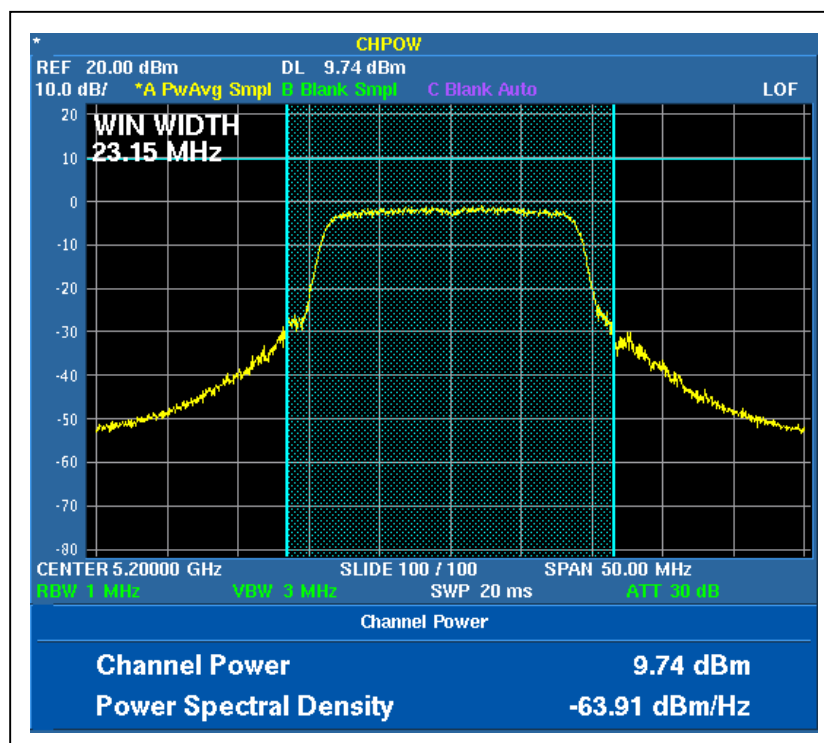


Peak Power Output: Chain 1

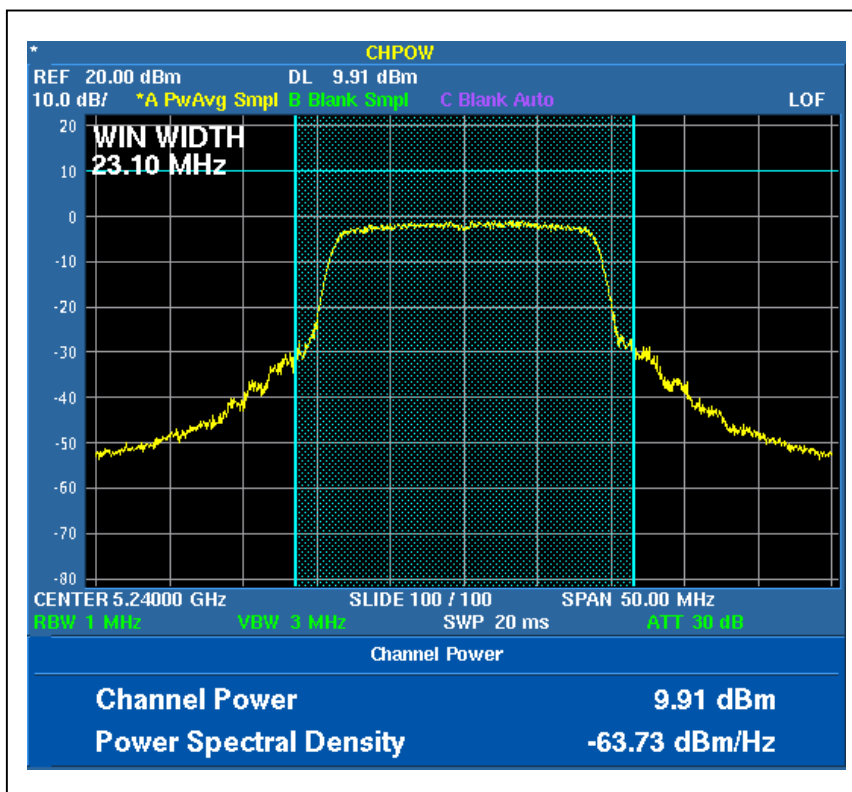
CH1



CH2

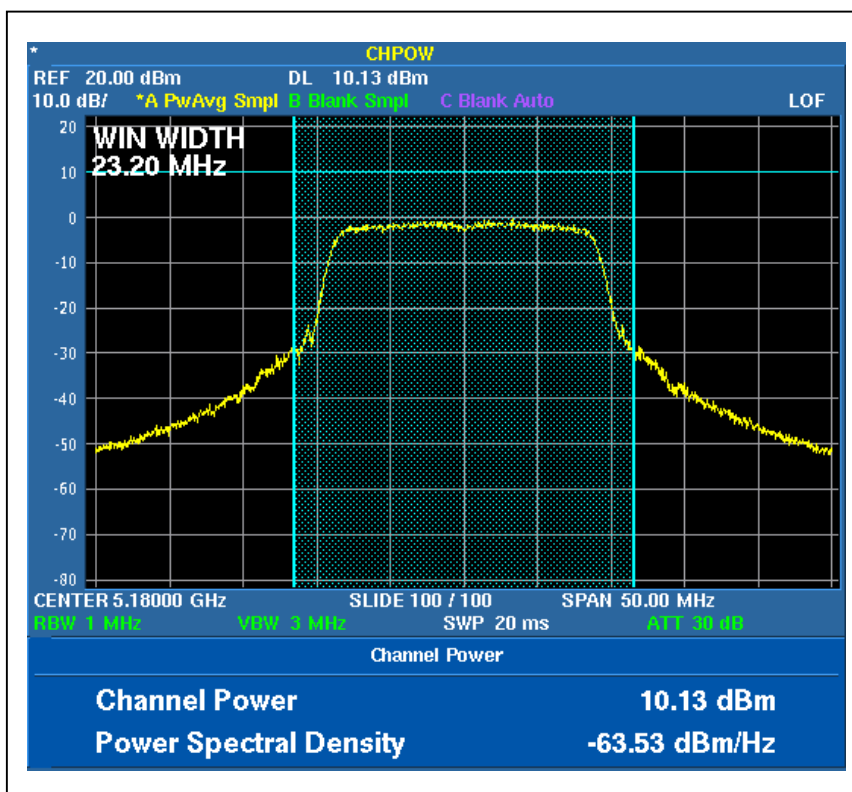


CH4

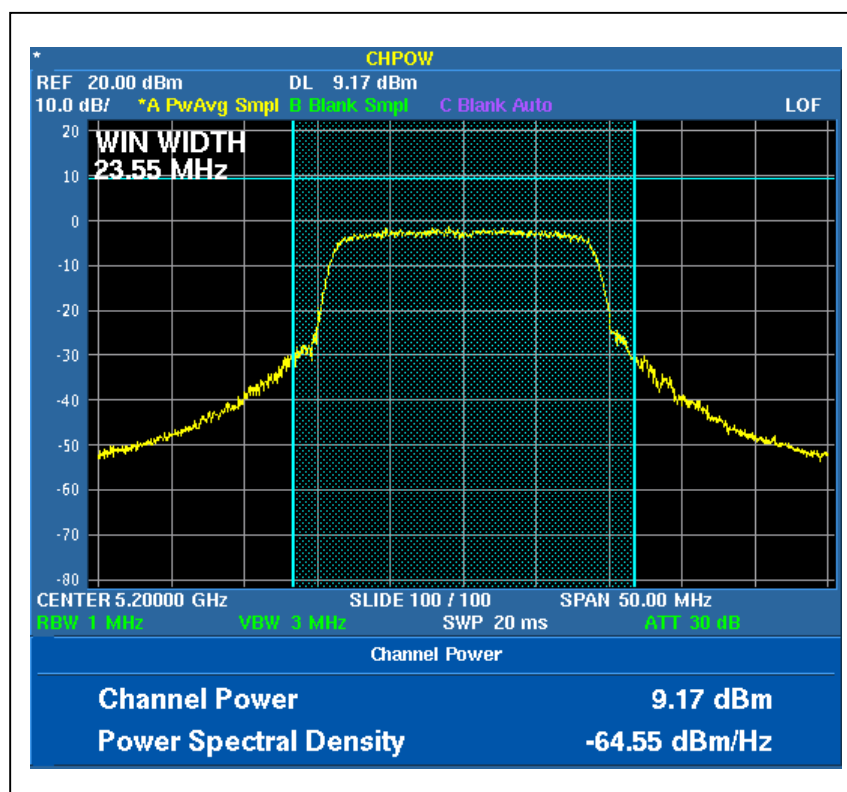


Peak Power Output: Chain 2

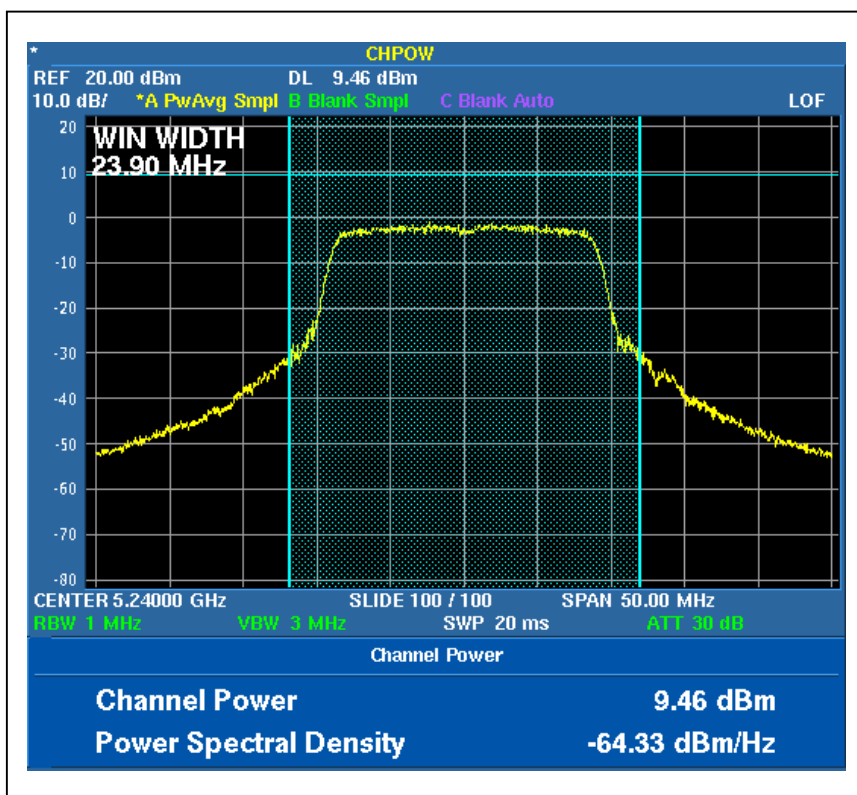
CH1



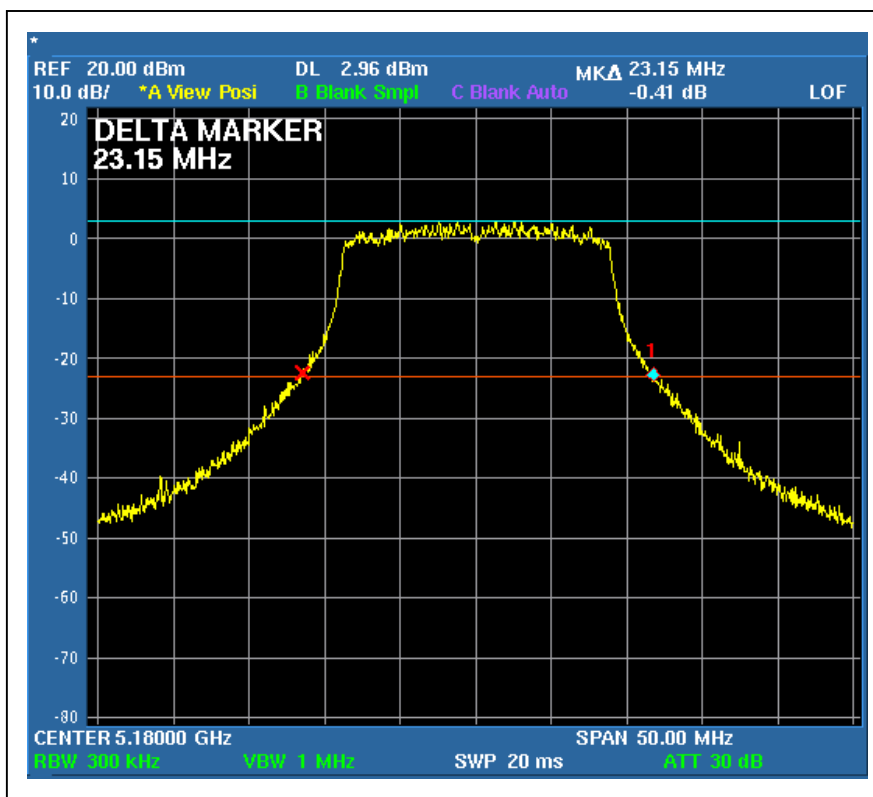
CH2



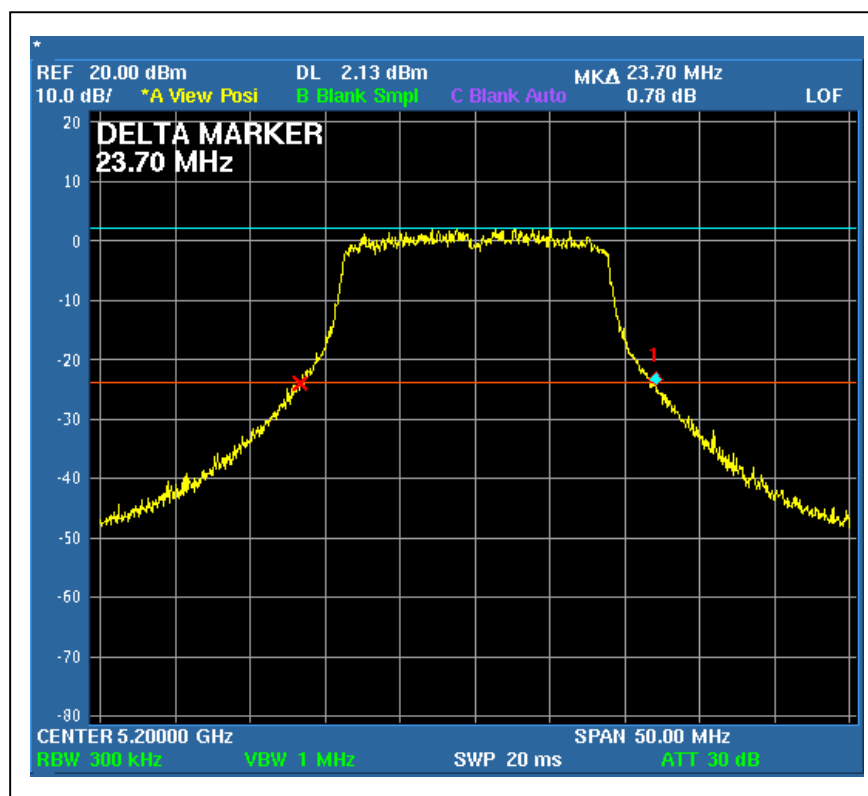
CH4



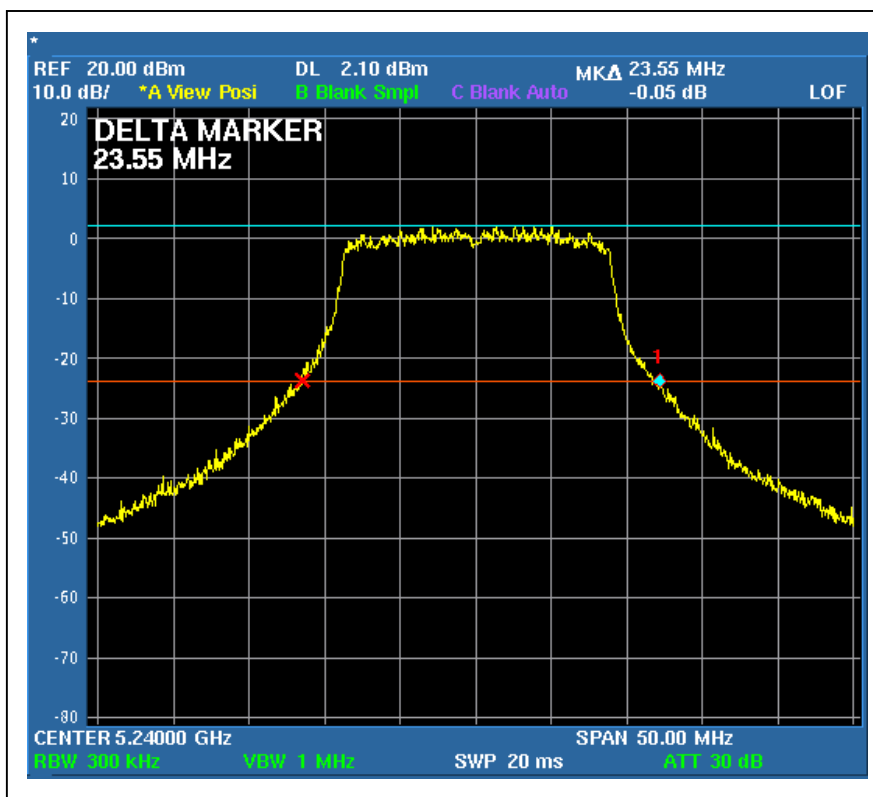
26dB Occupied Bandwidth: Chain 0 CH1



CH2

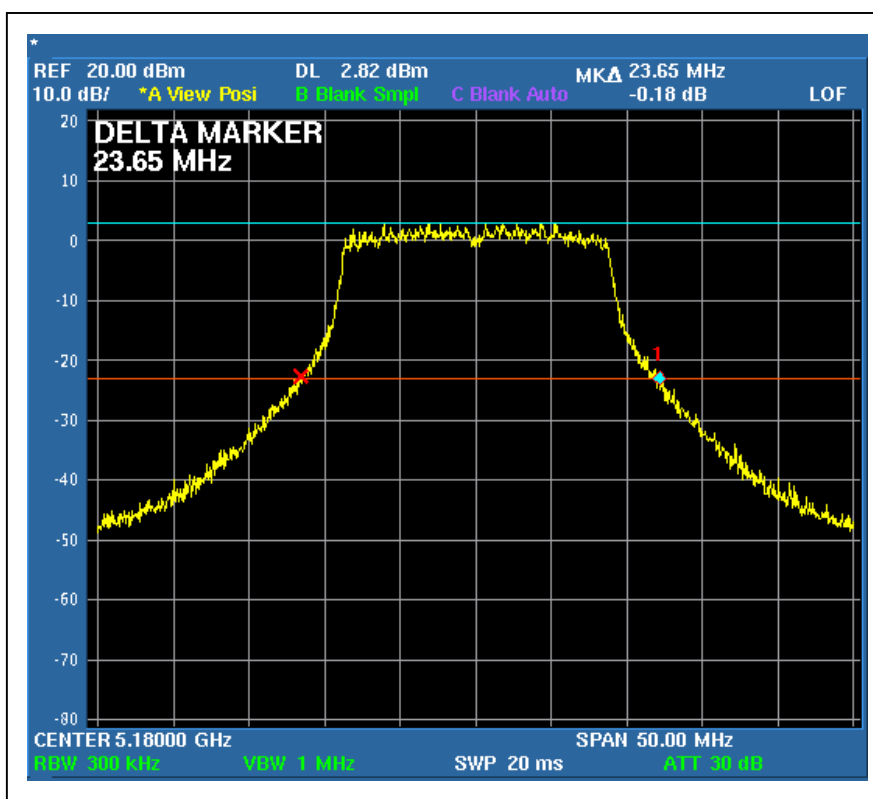


CH4

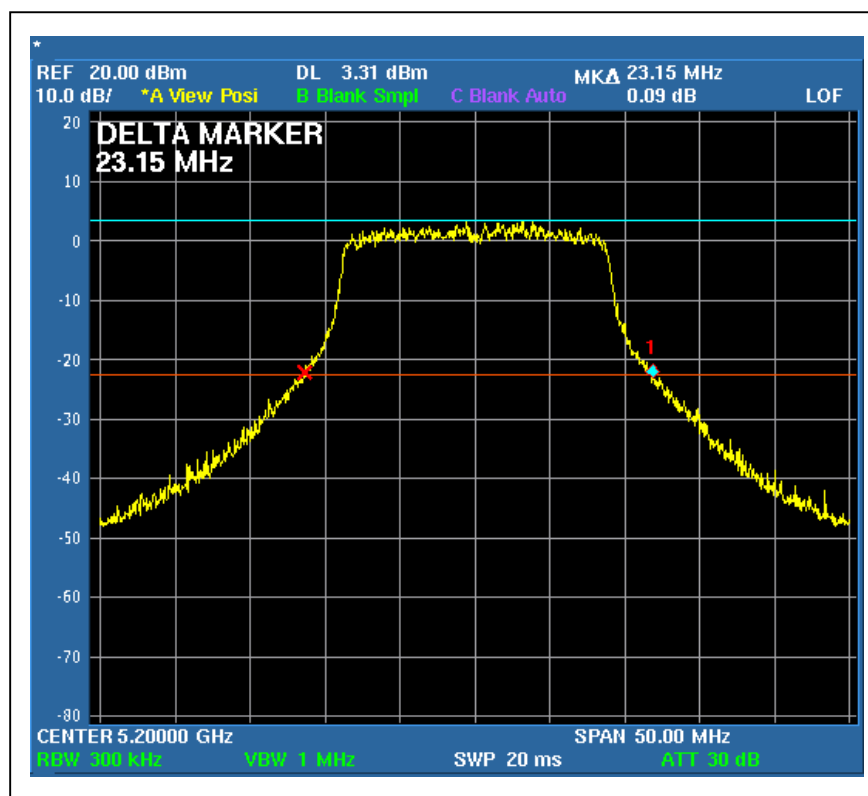


26dB Occupied Bandwidth: Chain 1

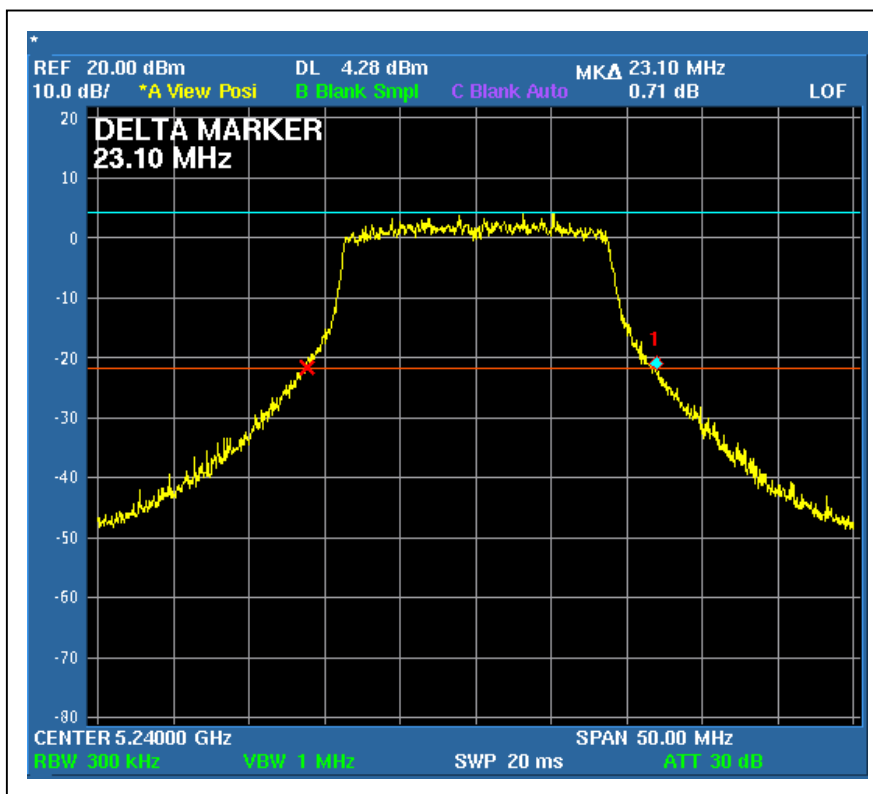
CH1



CH2

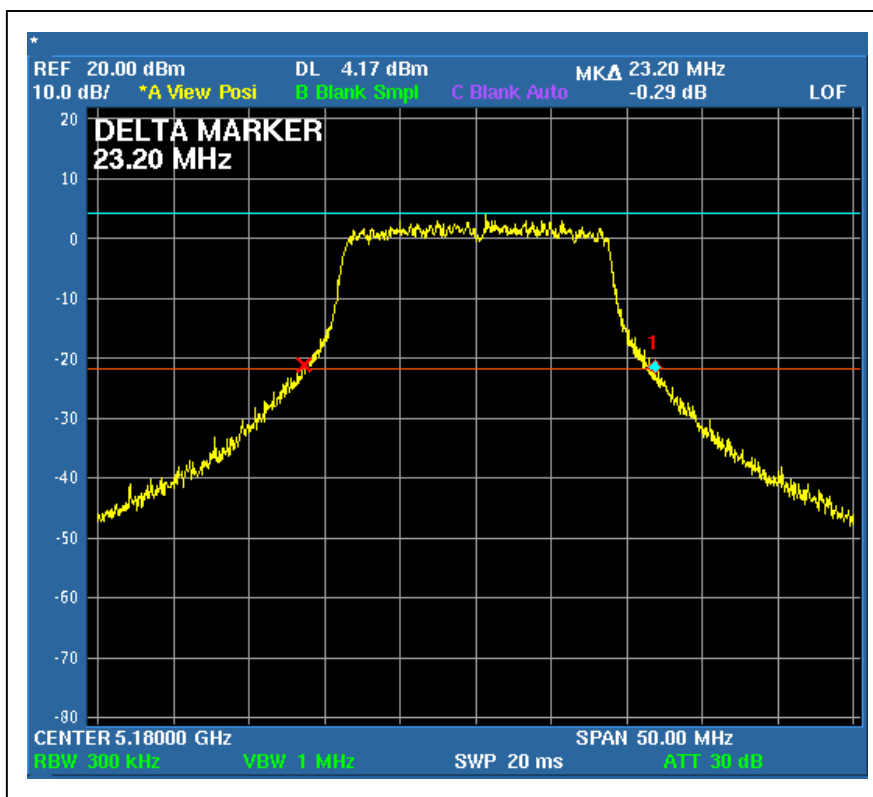


CH4

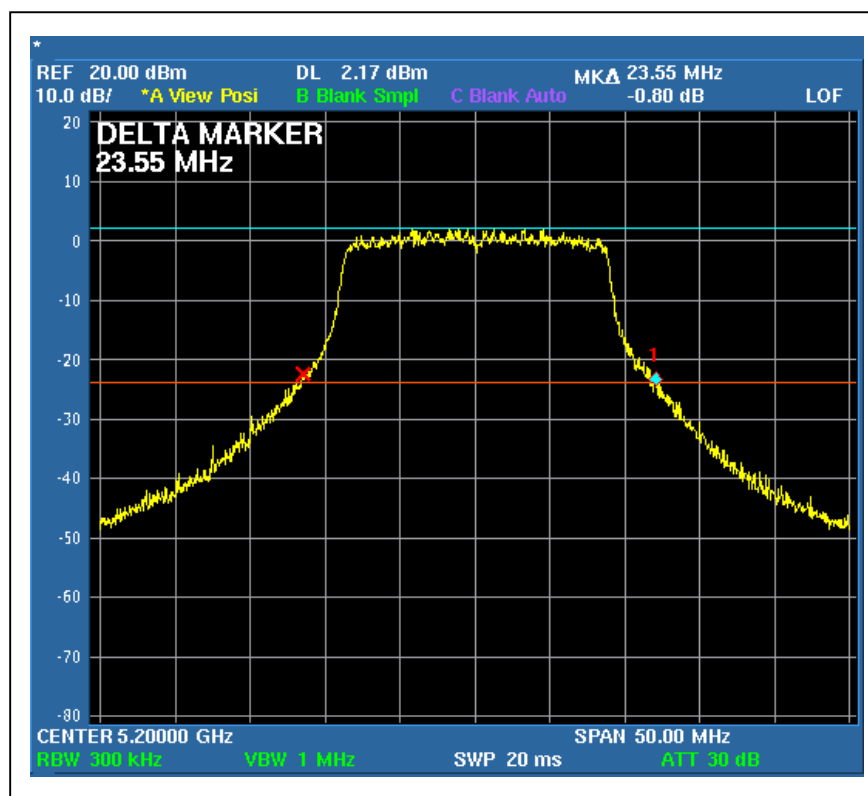


26dB Occupied Bandwidth: Chain 2

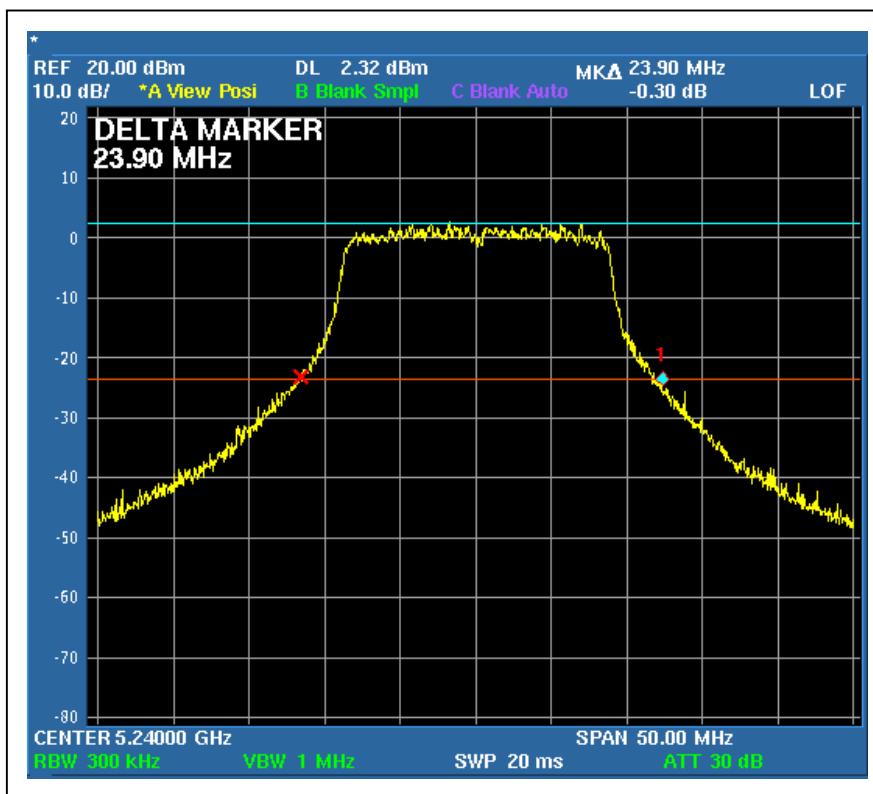
CH1



CH2



CH4



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		

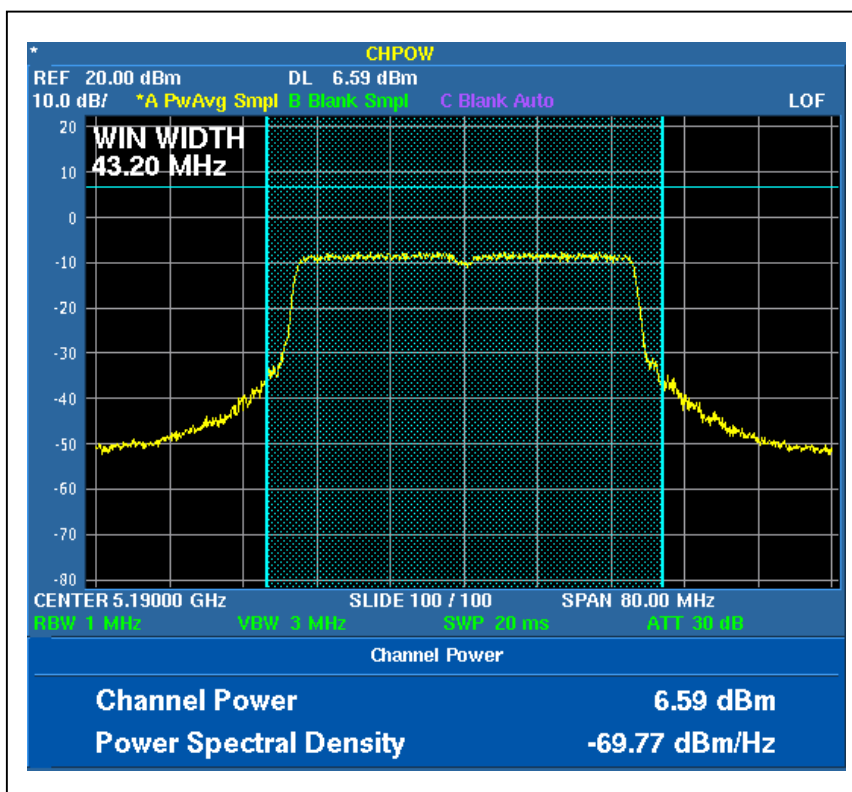
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)			PEAK POWER OUTPUT (dBm)			TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		Chain 0	Chain 1	Chain 2	Chain 0	Chain 1	Chain 2				
1	5190	4.955	6.237	5.559	6.95	7.95	7.45	16.751	12.24	16.48	PASS
2	5230	12.190	16.596	15.488	10.86	12.20	11.90	44.274	16.461	16.48	PASS

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc Occupied Bandwidth (MHz)			MINIMUM LIMIT (dBm)	PASS / FAIL
		Chain 0	Chain 1	Chain 2		
1	5190	43.20	43.04	44.24	0.5	PASS
2	5230	43.52	44.24	44.32	0.5	PASS

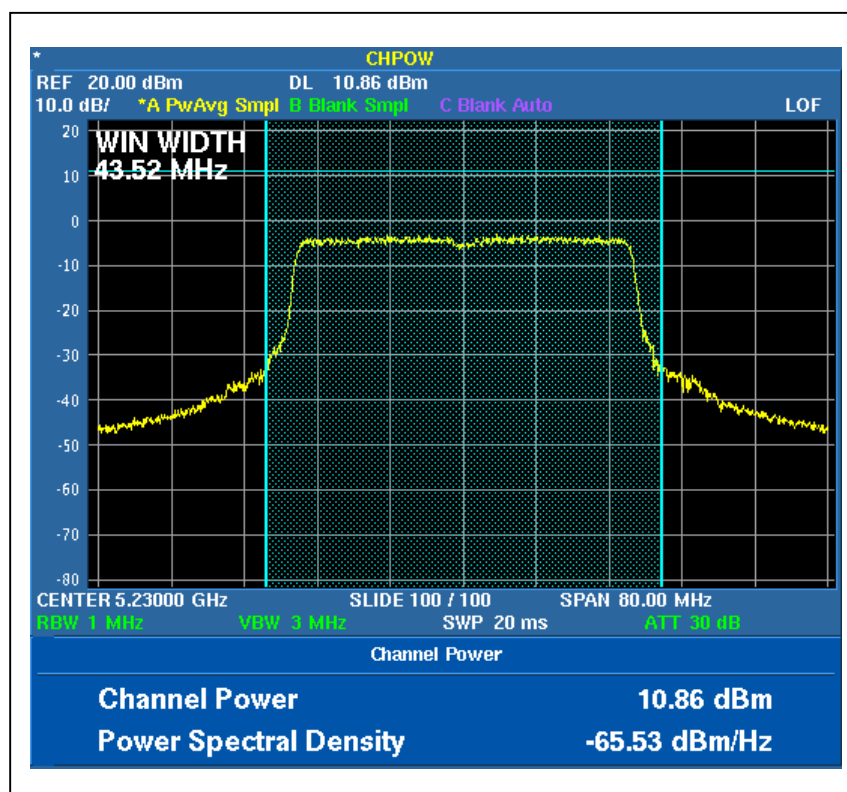
NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

Peak Power Output: Chain 0

CH1

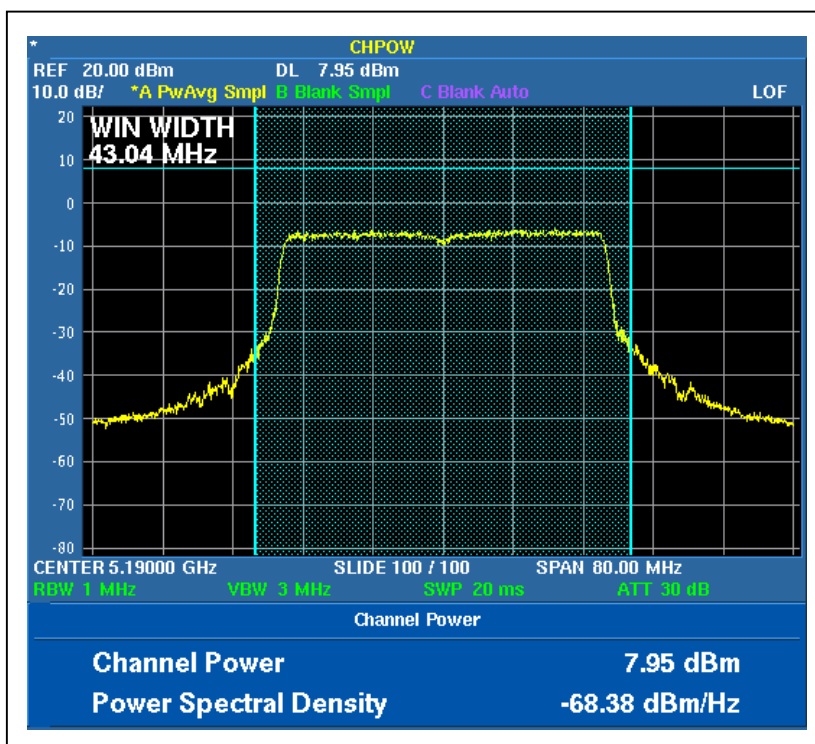


CH2

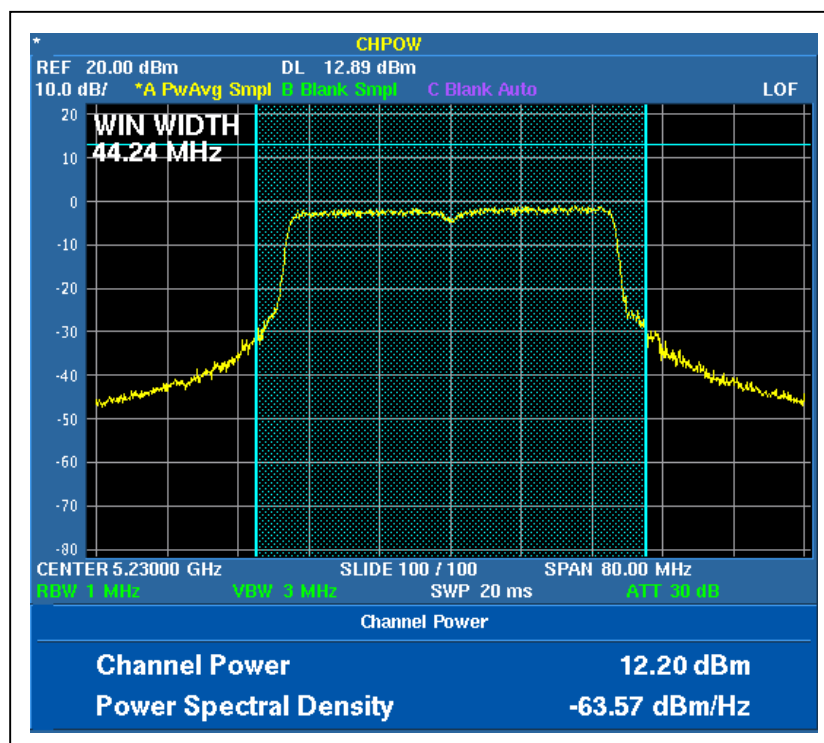


Peak Power Output: Chain 1

CH1

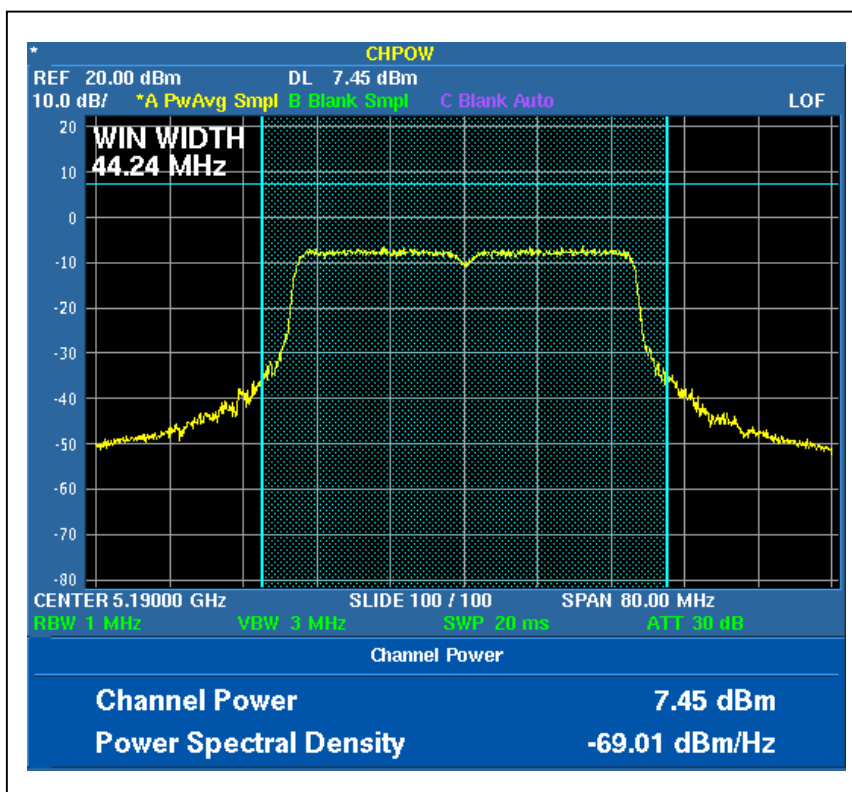


CH2

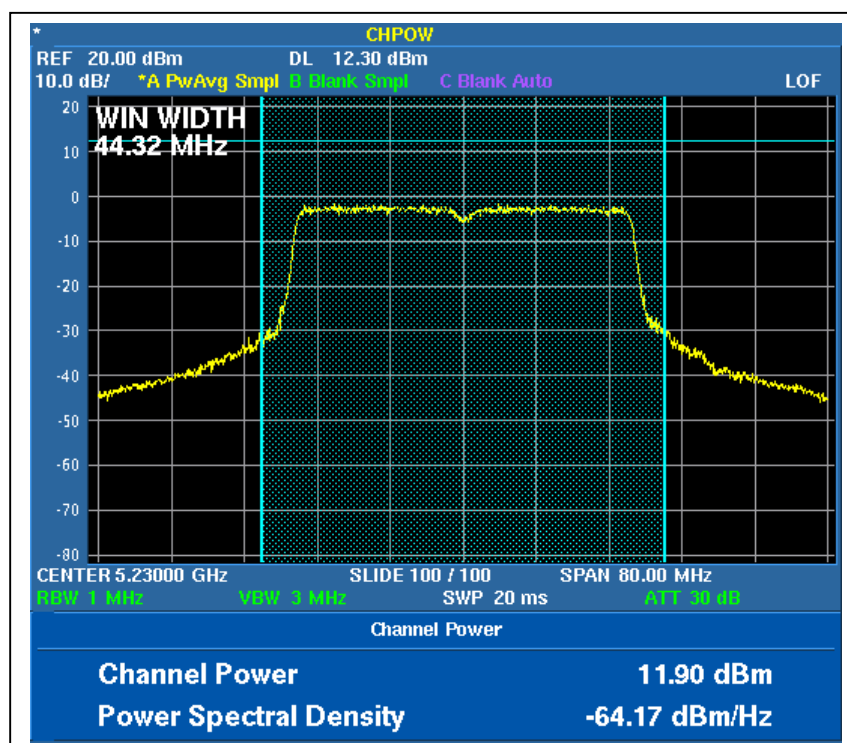


Peak Power Output: Chain 2

CH1

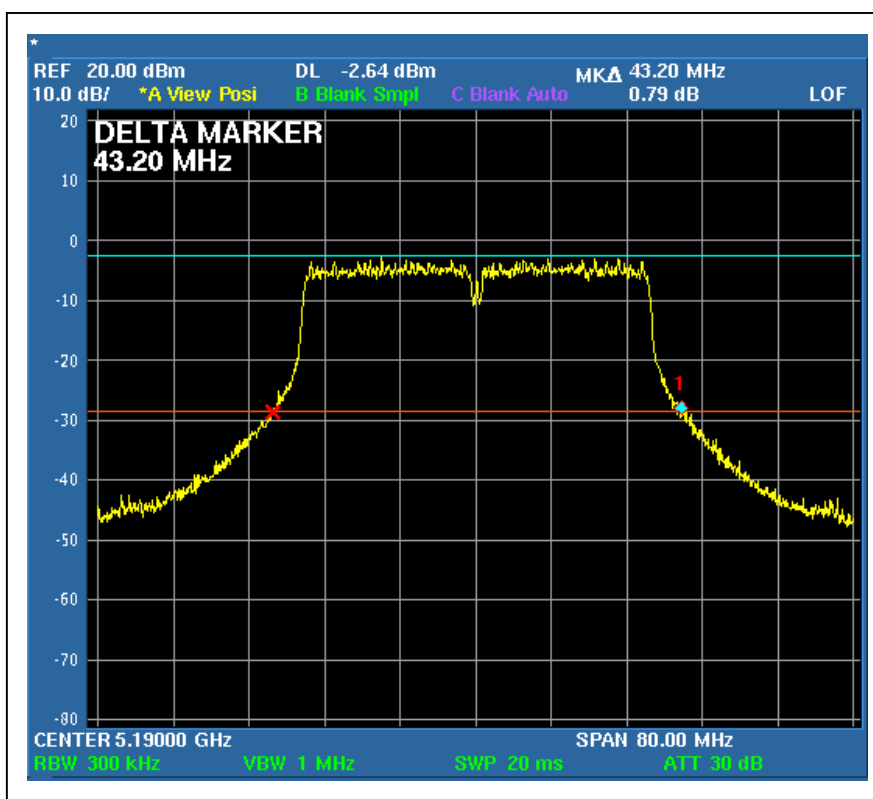


CH2

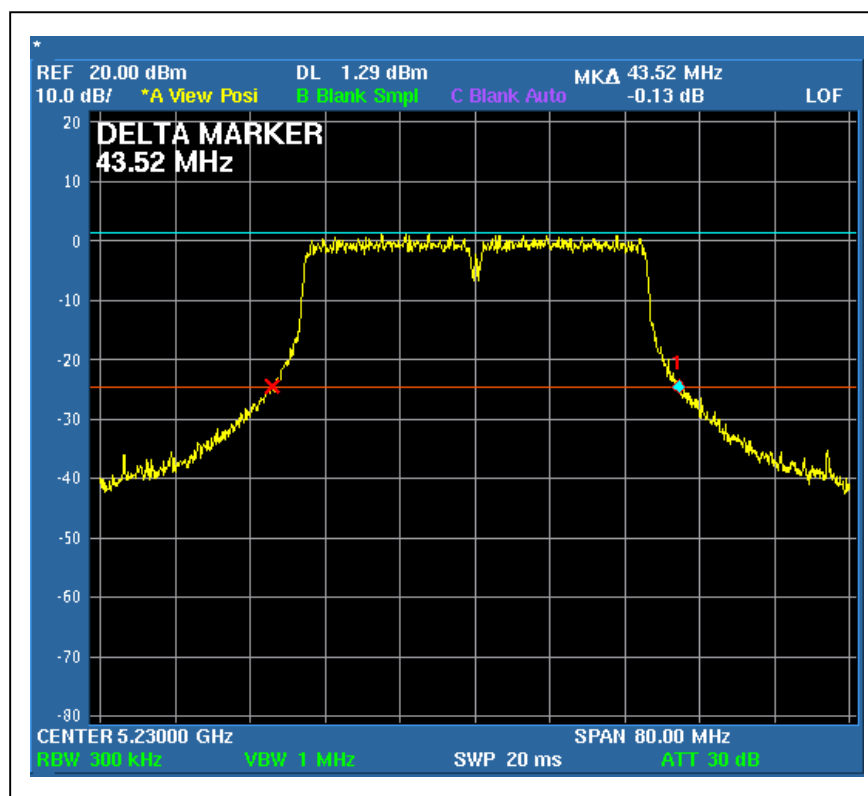


26dB Occupied Bandwidth: Chain 0

CH1

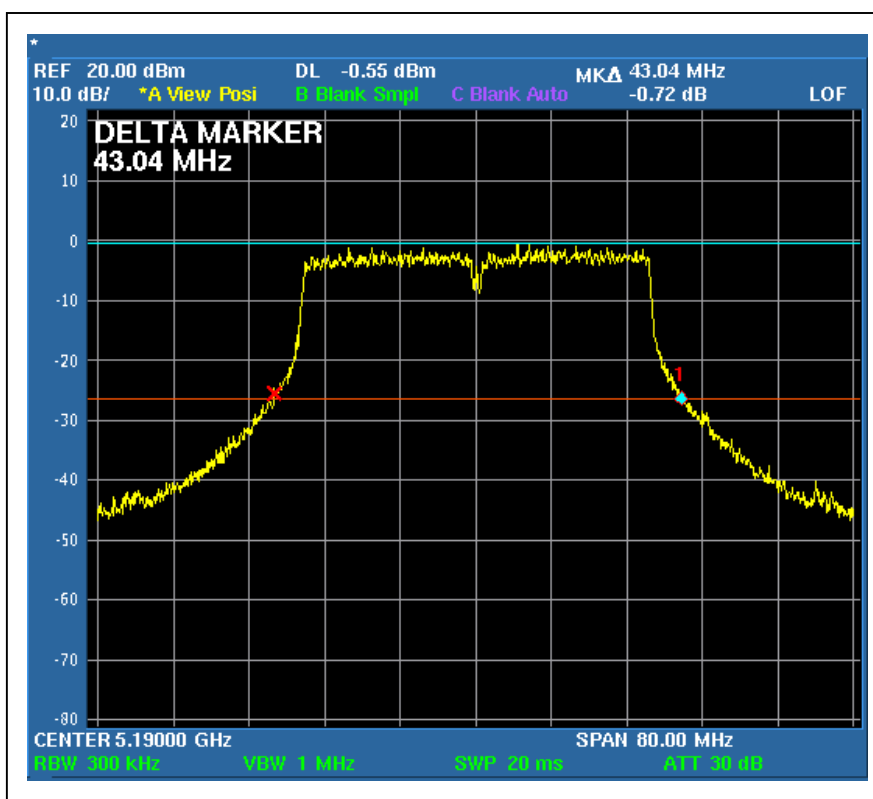


CH2

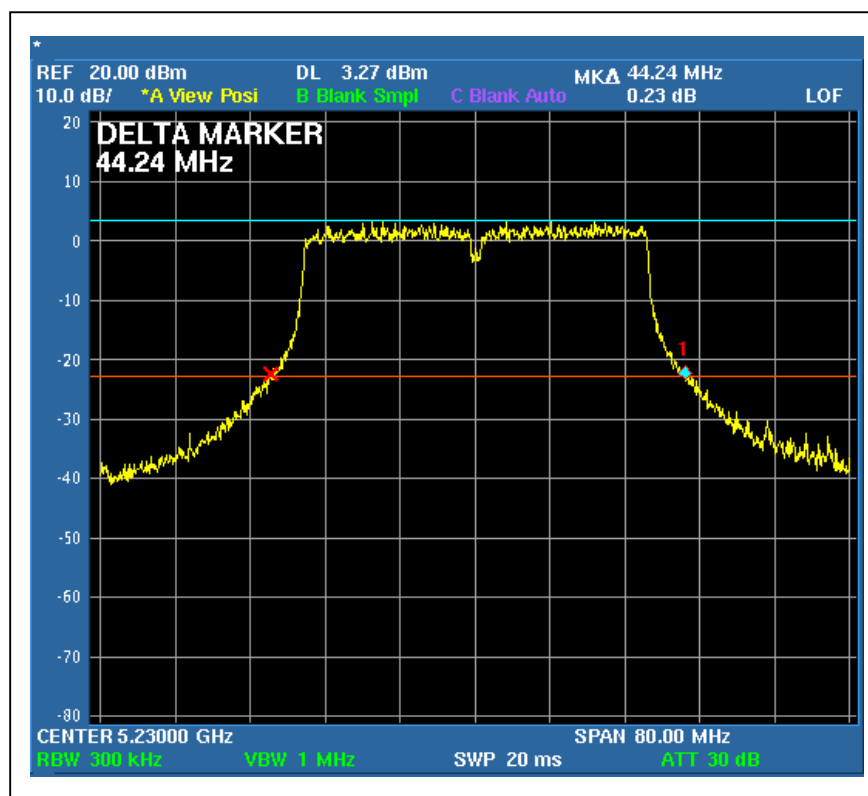


26dB Occupied Bandwidth: Chain 1

CH1

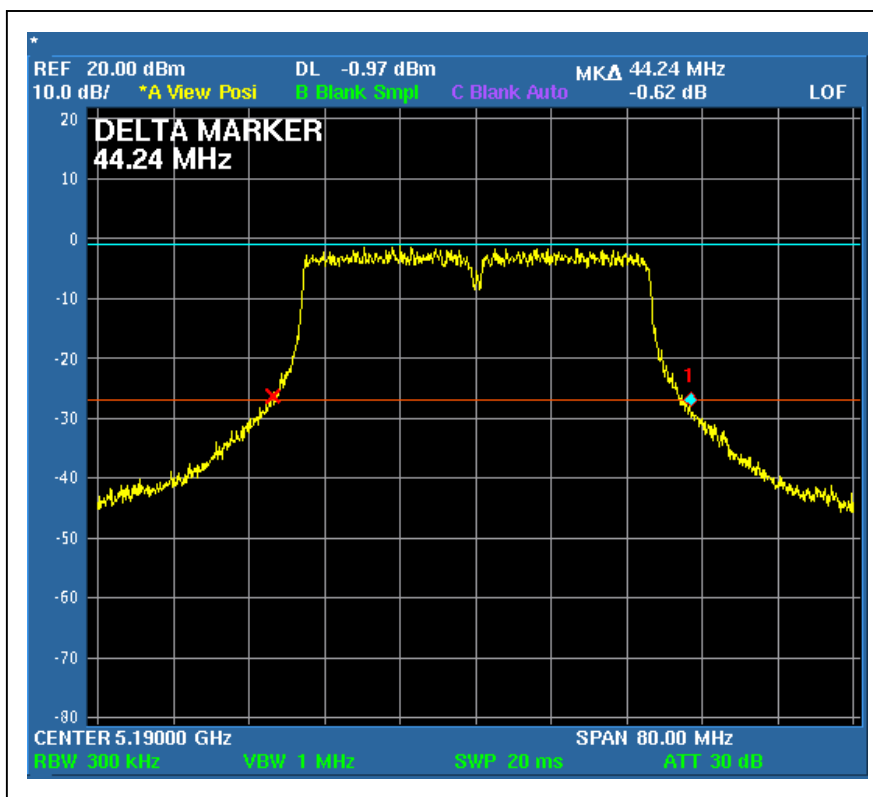


CH2

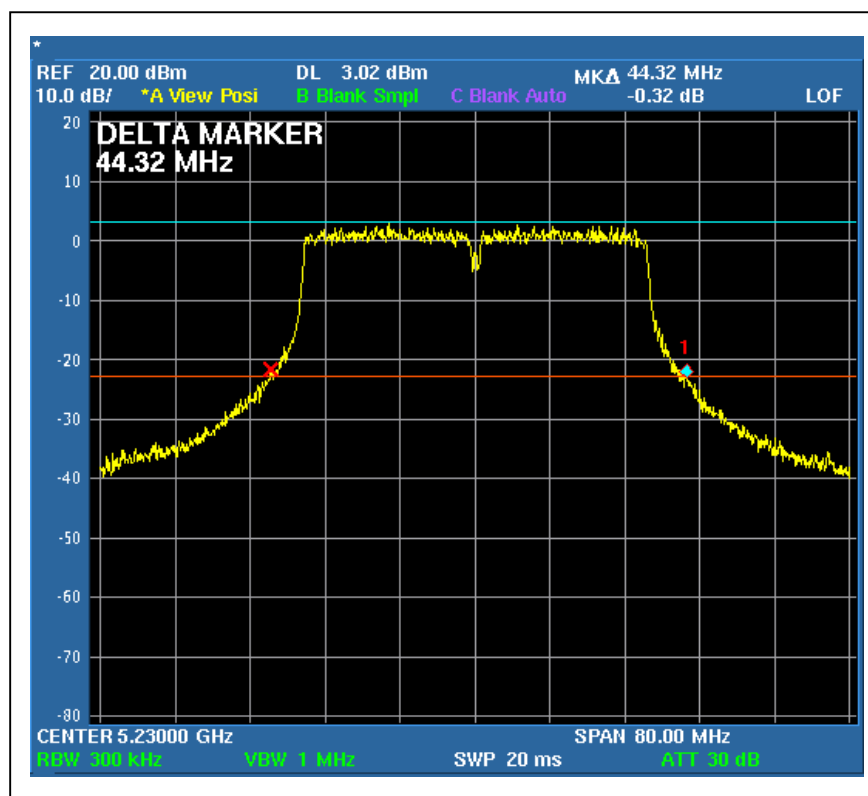


26dB Occupied Bandwidth: Chain 2

CH1



CH2



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, 2009

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

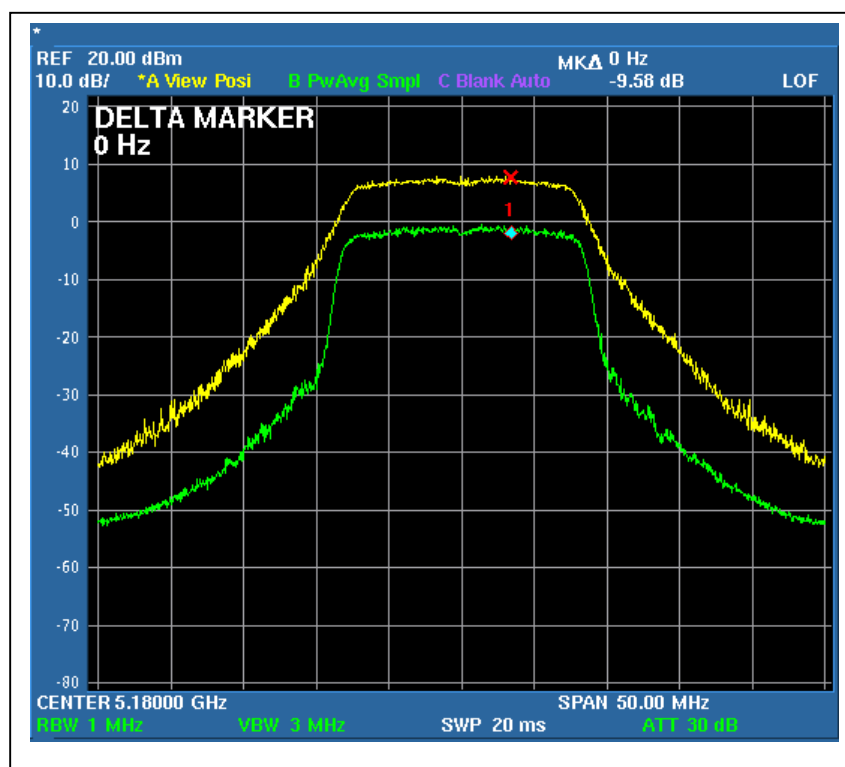
802.11a OFDM modulation

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

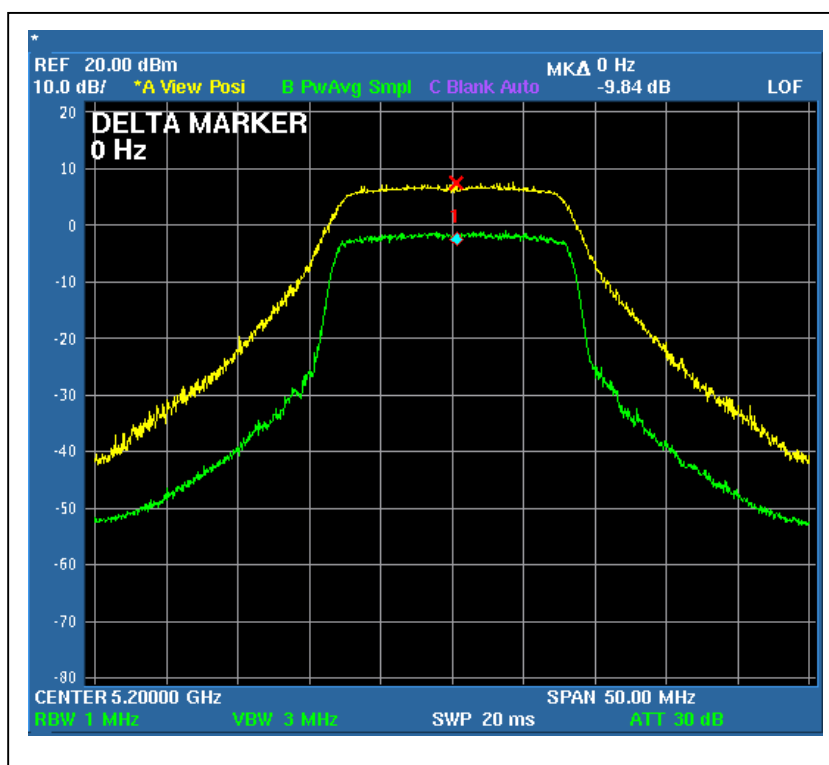
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)			PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
		Chain 0	Chain 1	Chain 2		
1	5180	9.58	10.89	11.06	13	PASS
2	5200	9.84	10.80	10.70	13	PASS
4	5240	9.67	9.76	12.17	13	PASS

Chain 0

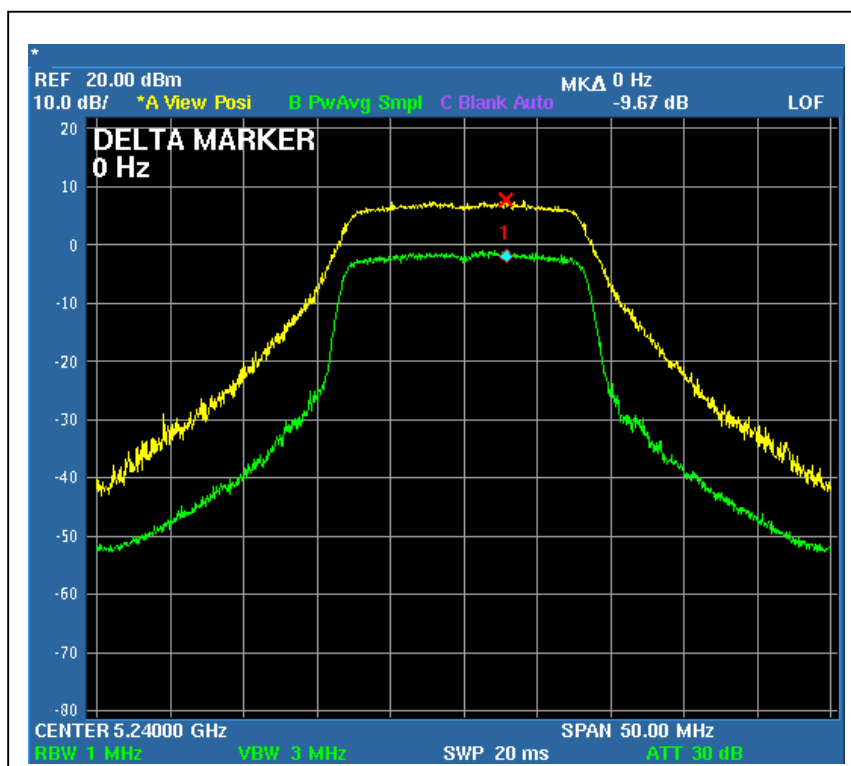
CH1



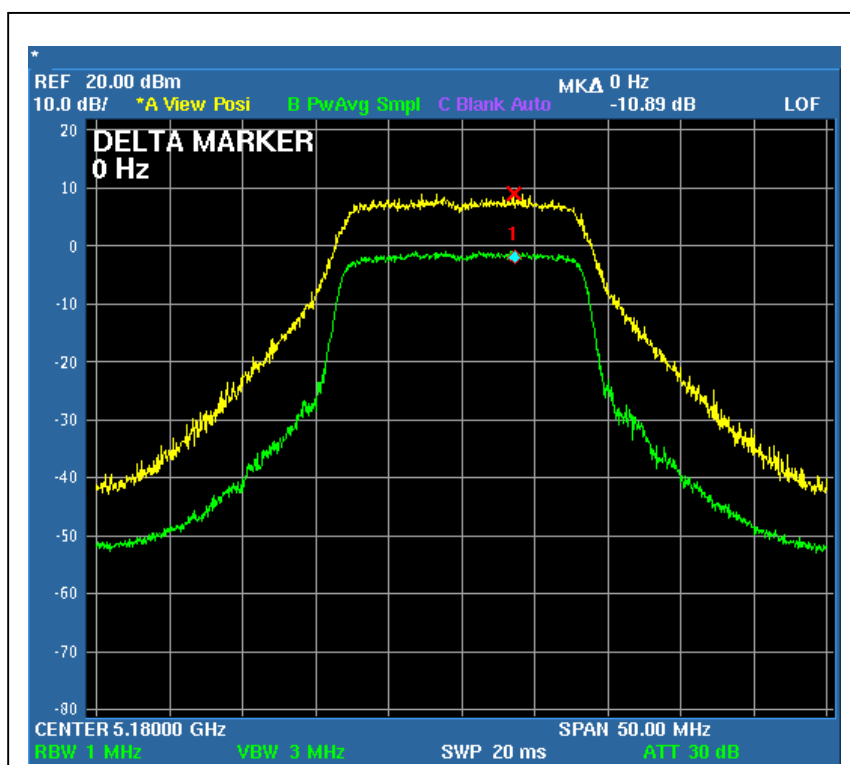
CH2



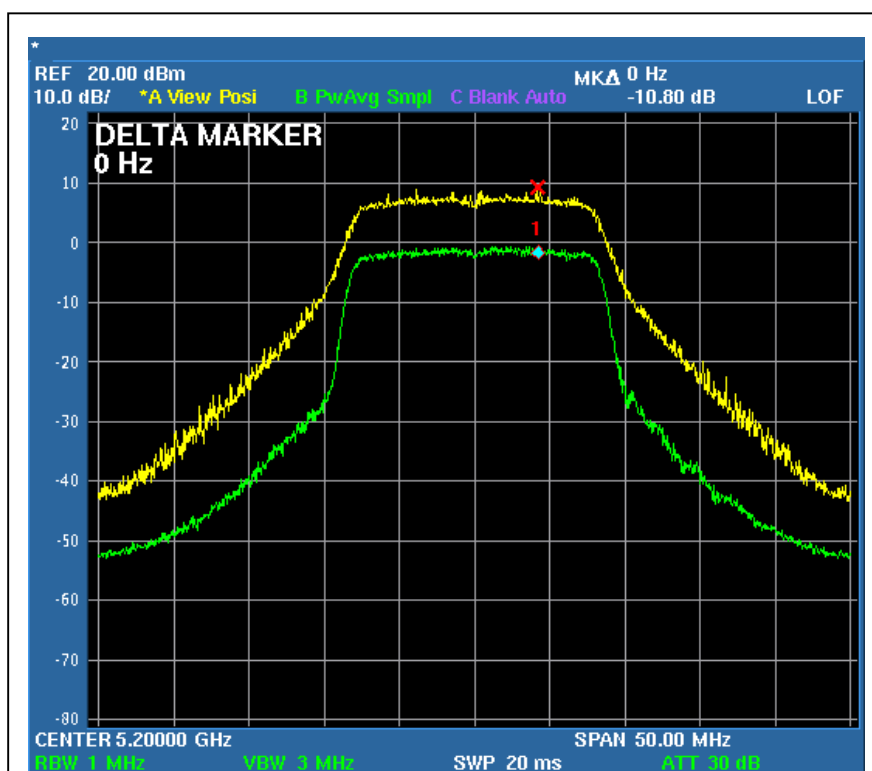
CH4



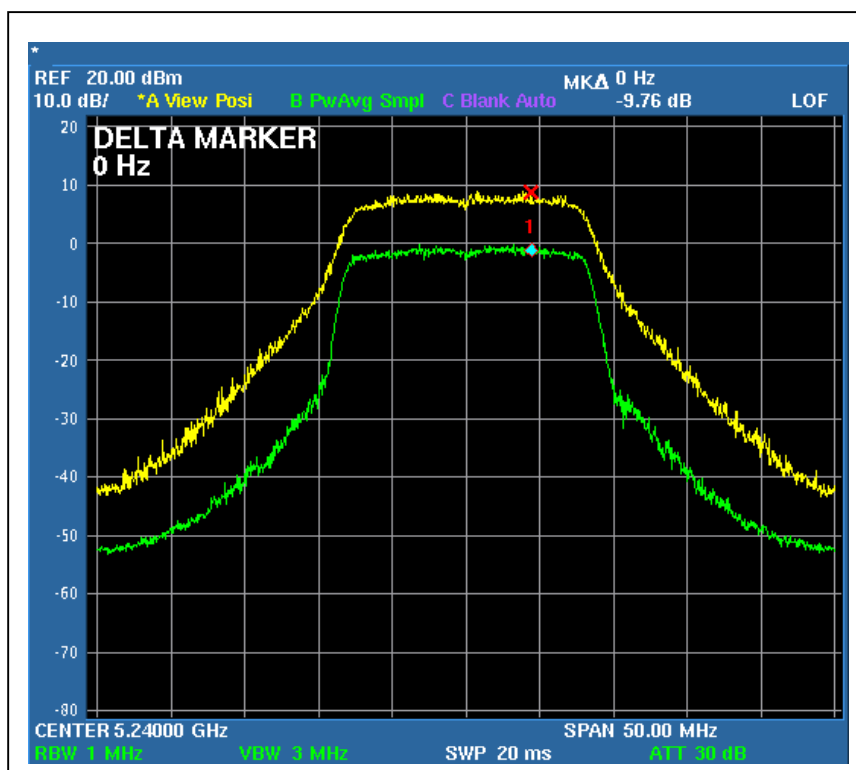
Chain 1
CH1



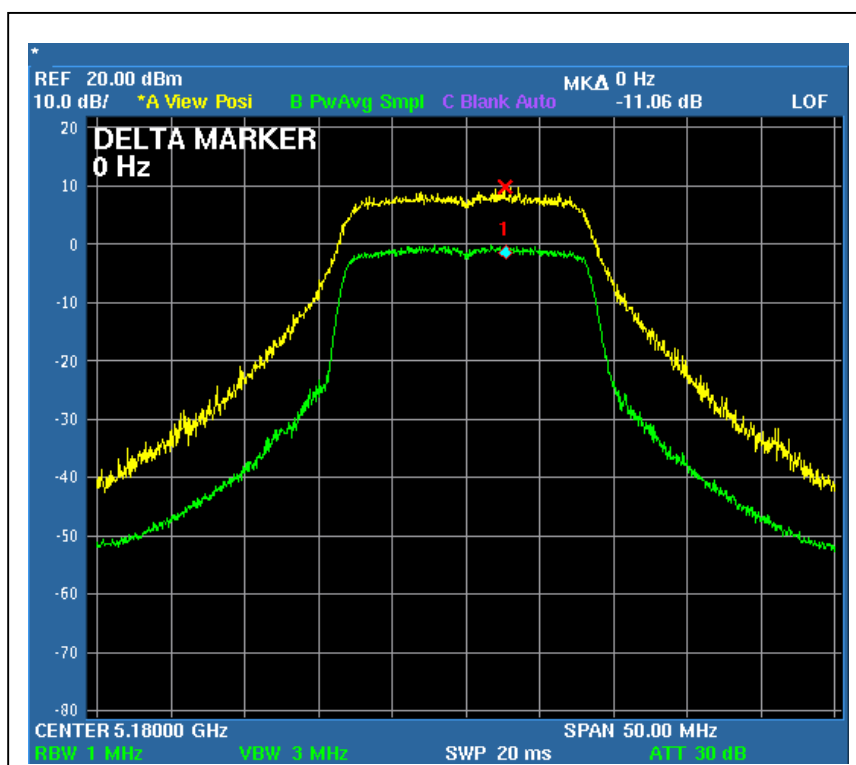
CH2



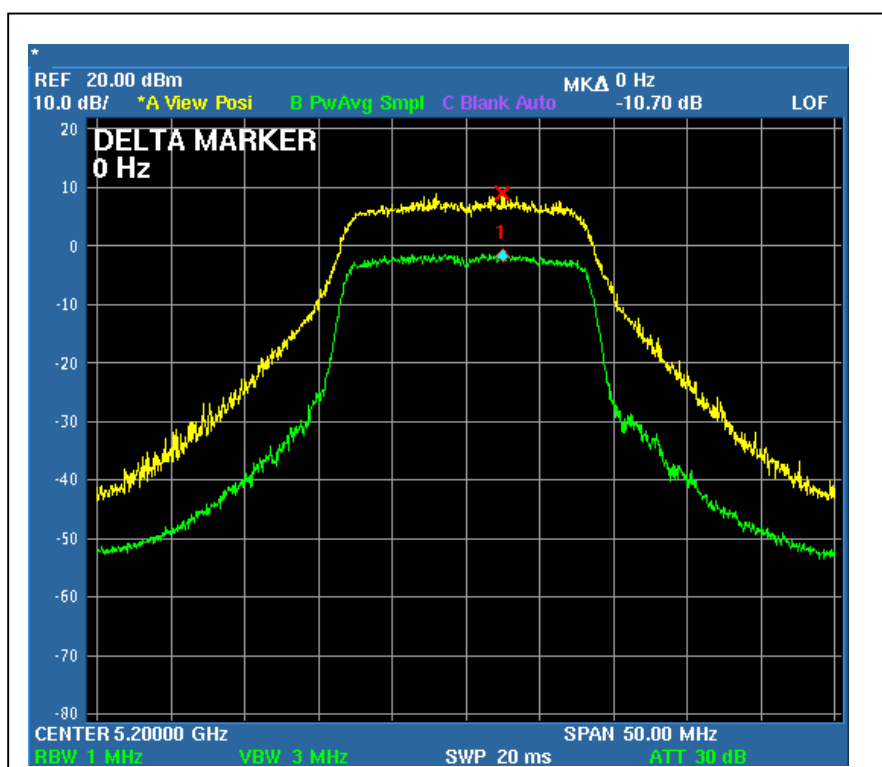
CH4



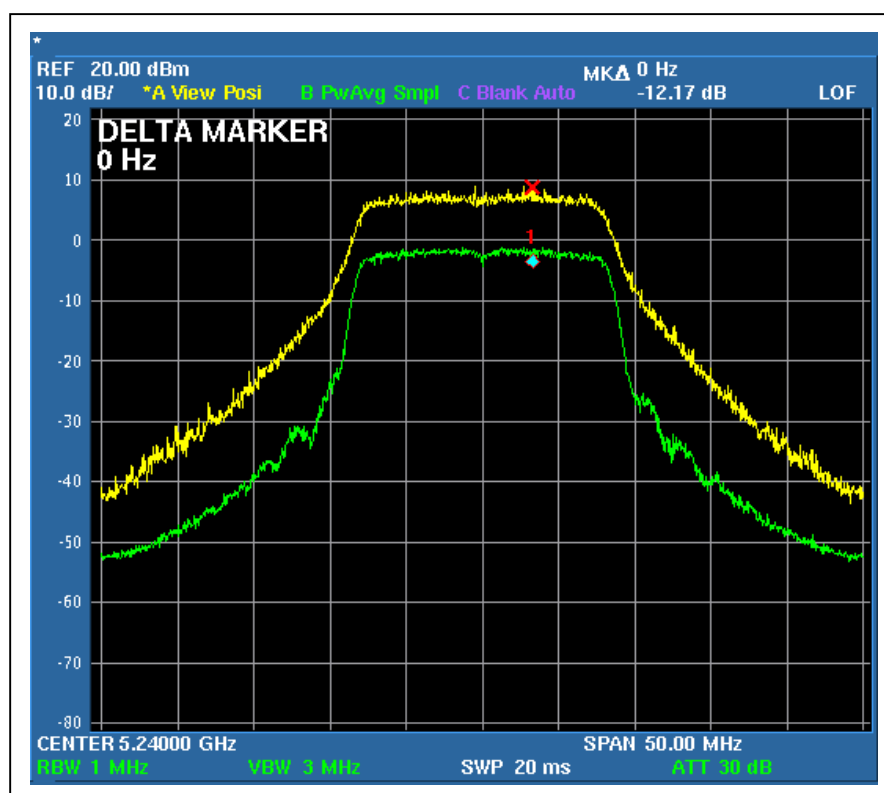
Chain 2
CH1



CH2



CH4



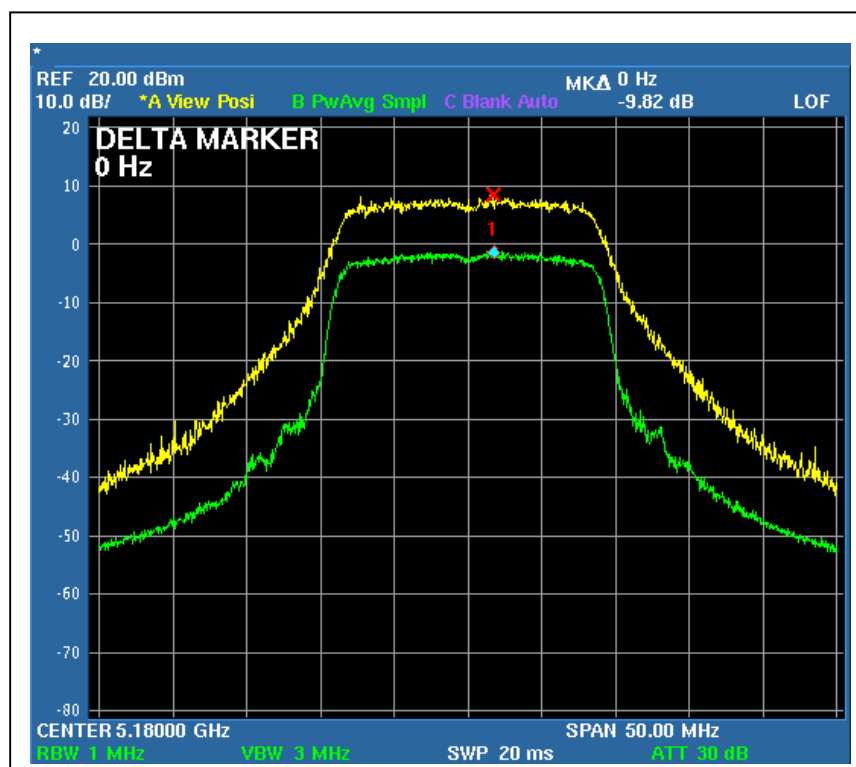
DRAFT 802.11n (20MHz) OFDM MODULATION:

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

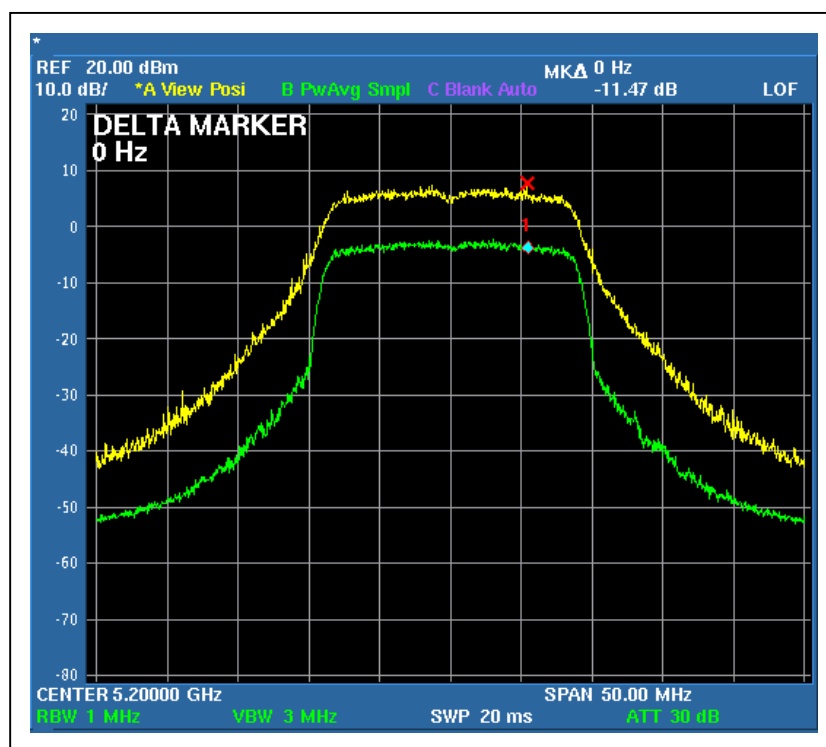
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)			PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
		Chain 0	Chain 1	Chain 2		
1	5180	9.82	10.18	12.09	13	PASS
2	5200	11.47	10.53	11.05	13	PASS
4	5240	10.44	10.19	11.55	13	PASS

Chain 0

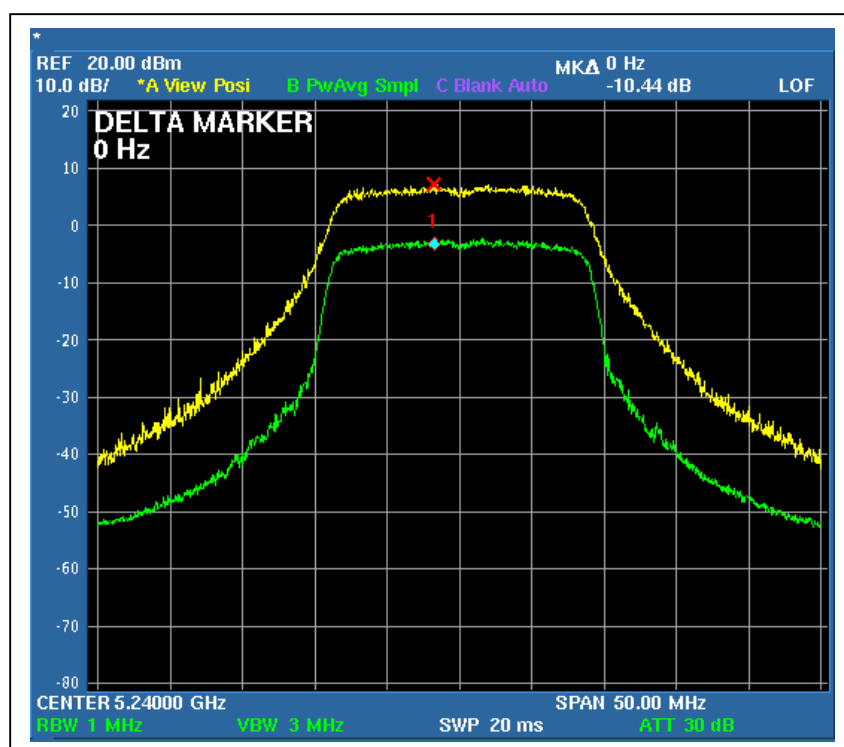
CH1



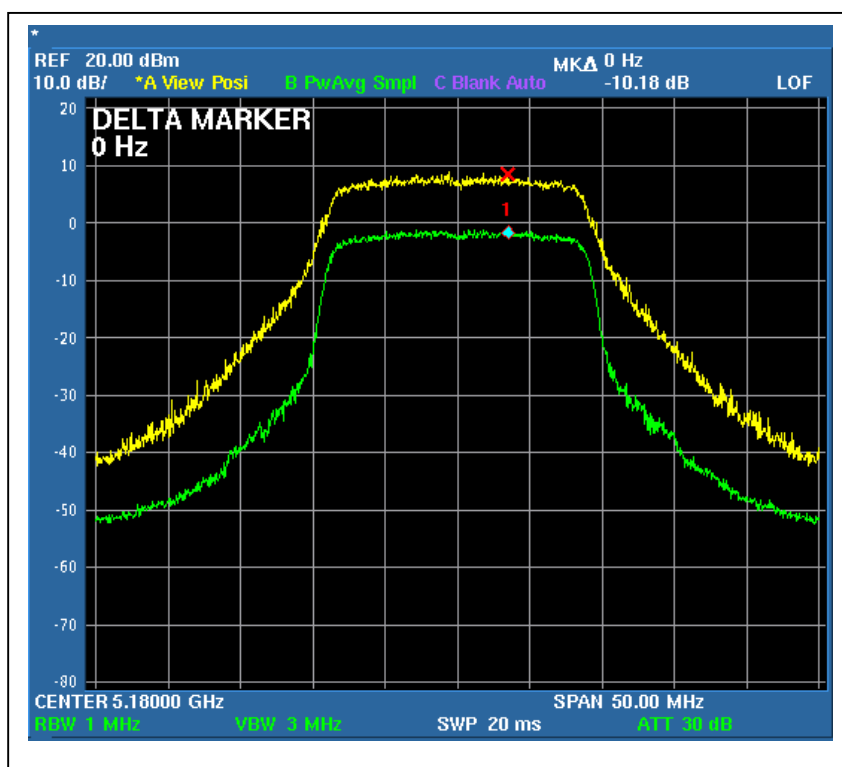
CH2



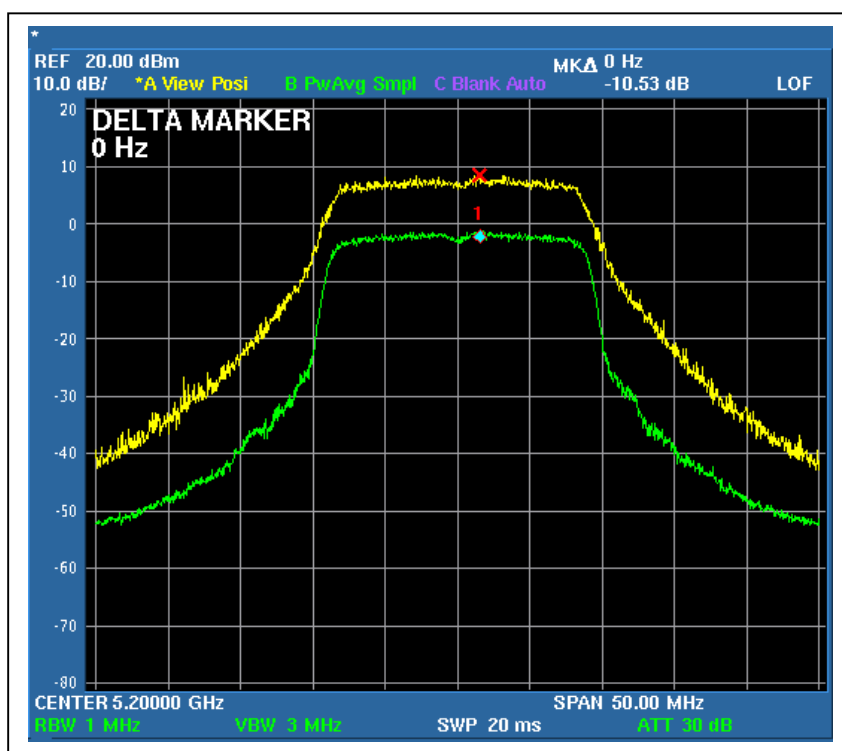
CH4



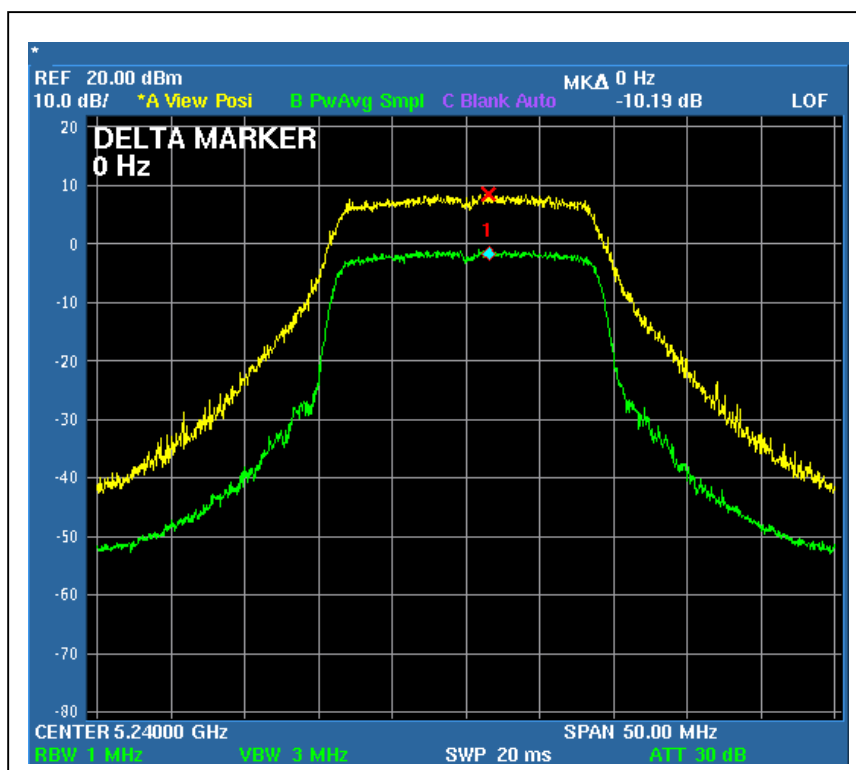
Chain 1
CH1



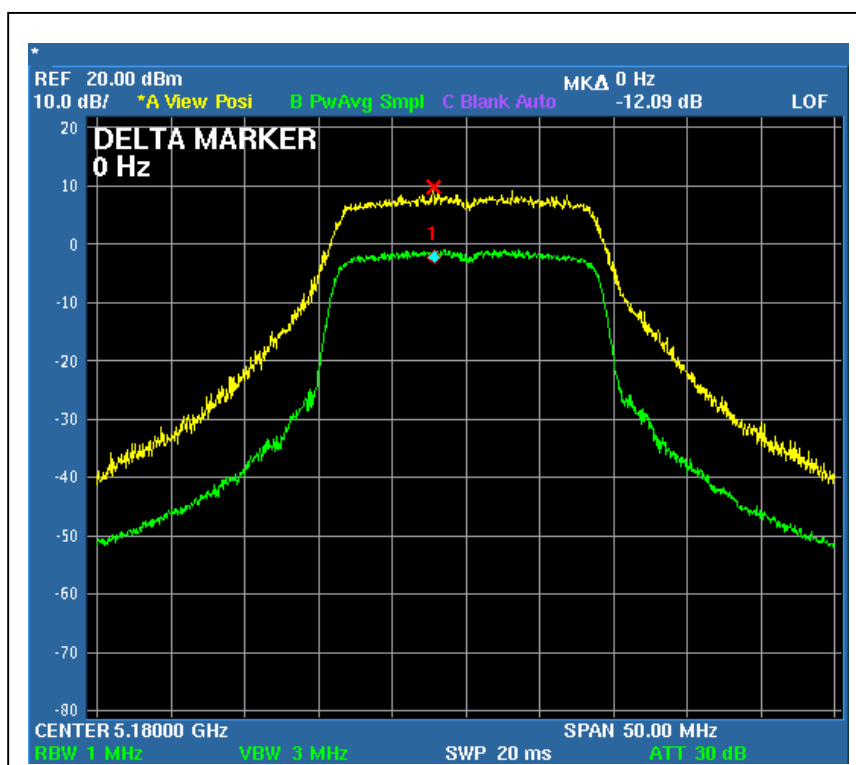
CH2



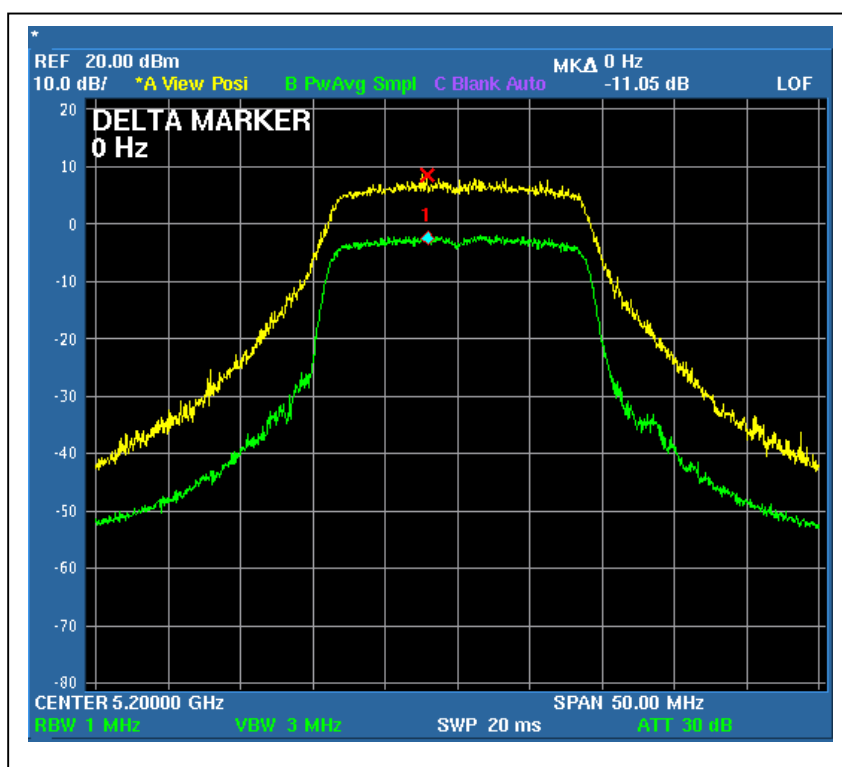
CH4



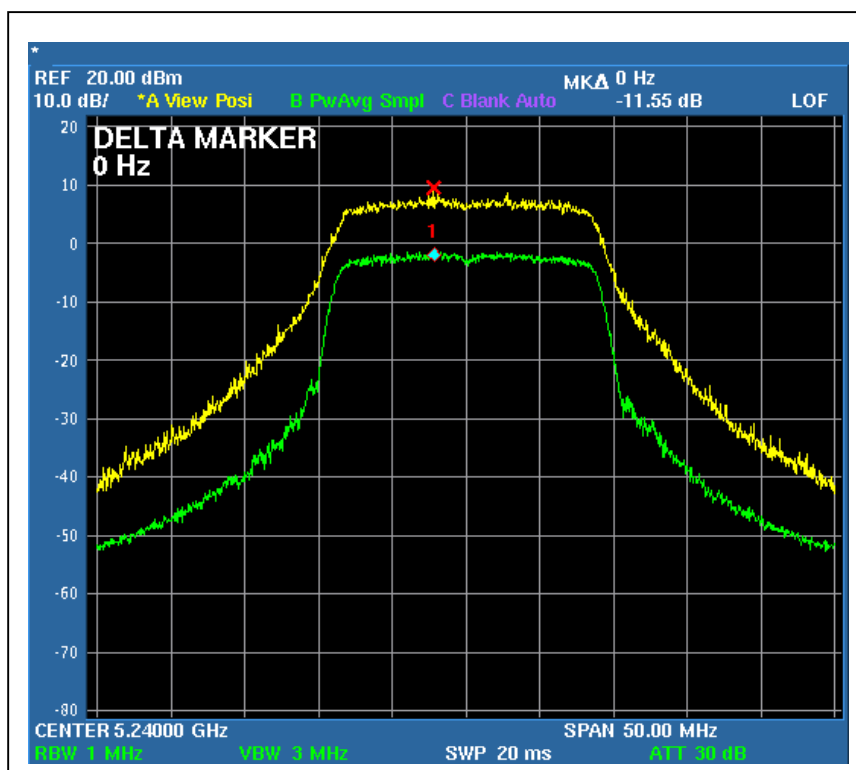
Chain 2
CH1



CH2



CH4



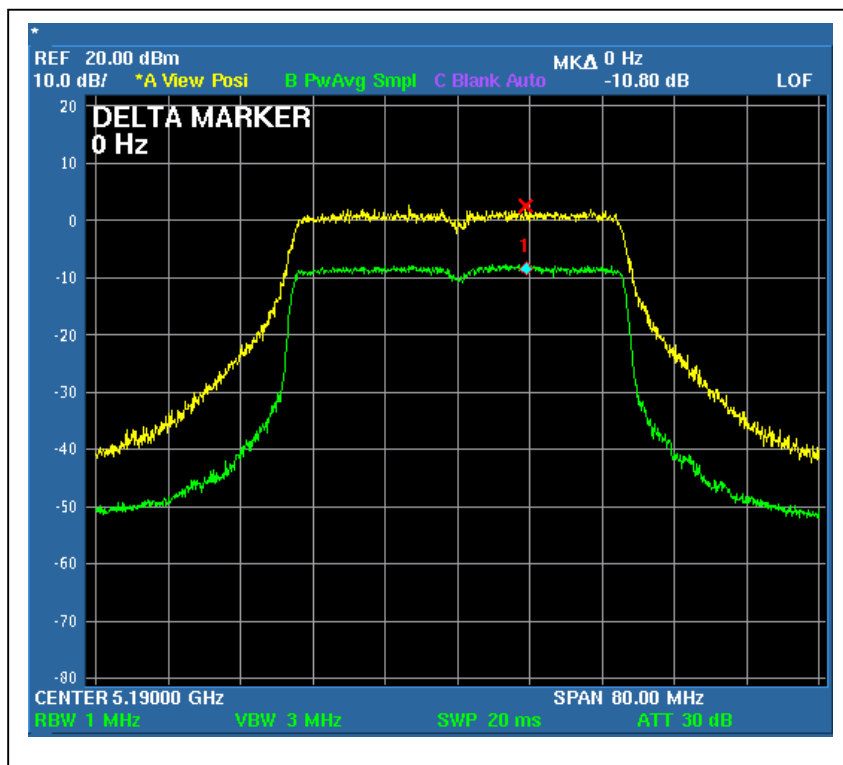


DRAFT 802.11n (40MHz) OFDM MODULATION:

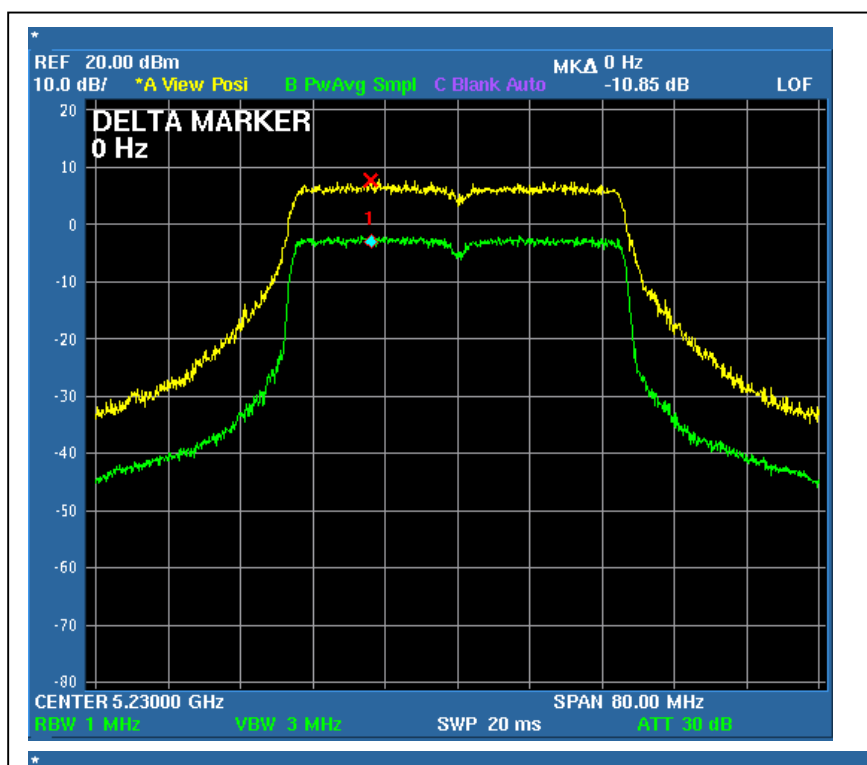
MODULATION TYPE	BPSK	TRANSFER RATE	27Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 972hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)			PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
		Chain 0	Chain 1	Chain 2		
1	5190	10.80	11.03	11.33	13	PASS
2	5230	10.85	11.13	11.17	13	PASS

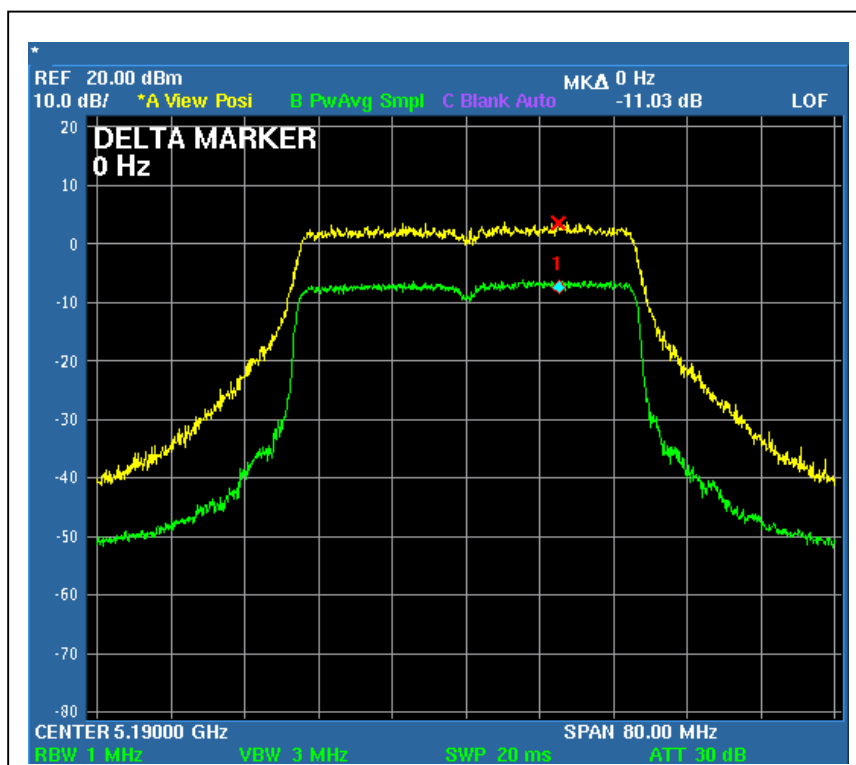
Chain 0
CH1



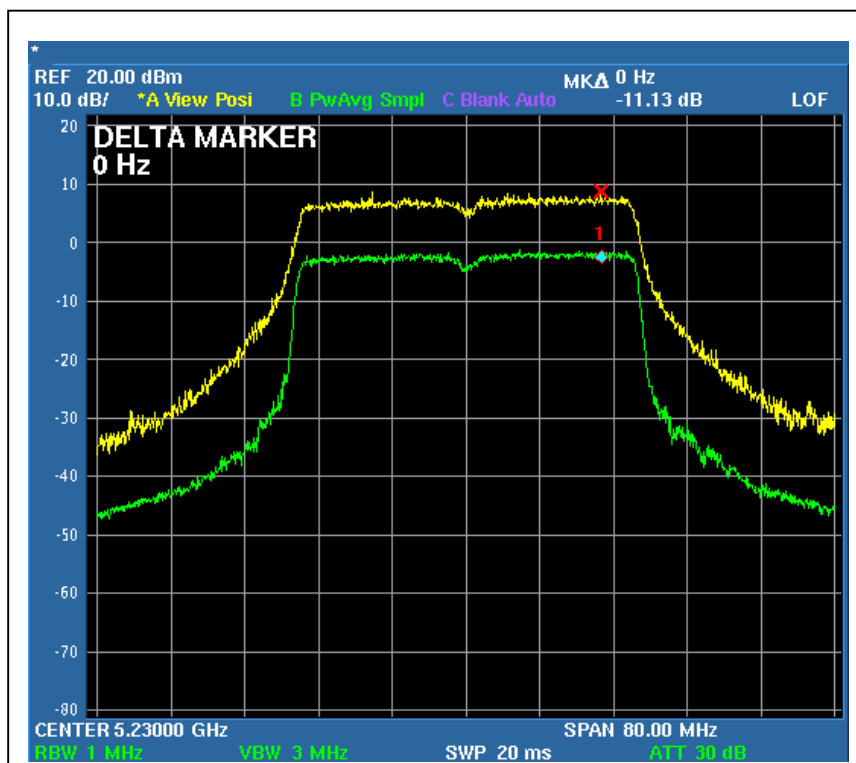
CH2



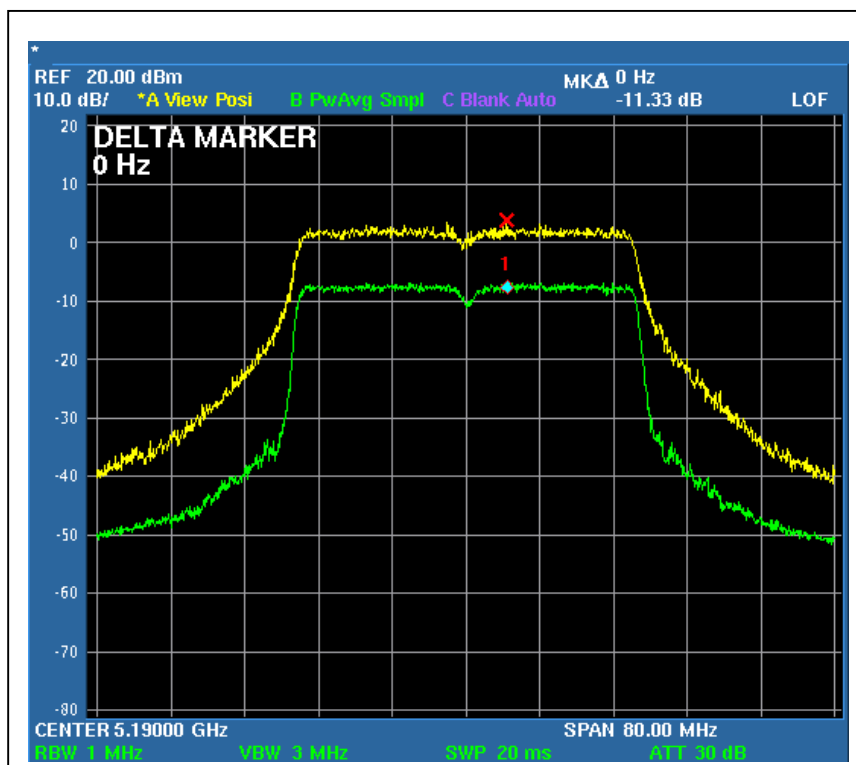
Chain 1
CH1



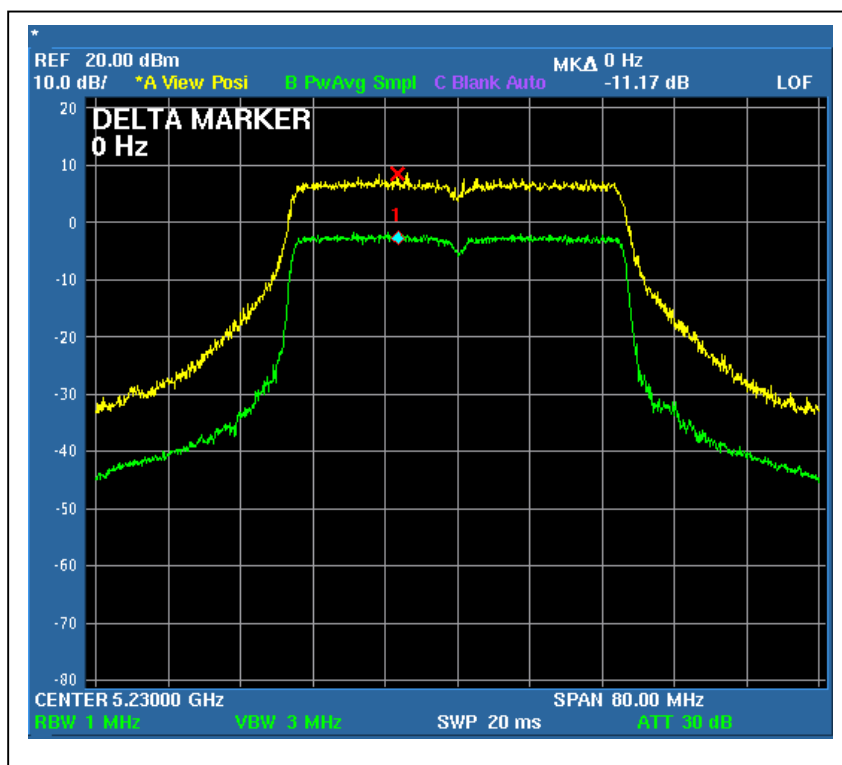
CH2



Chain 2
CH1



CH2



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, 2009

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.

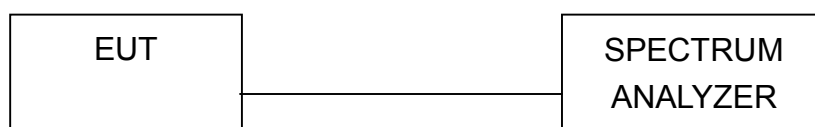
4.5.3 TEST PROCEDURES

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

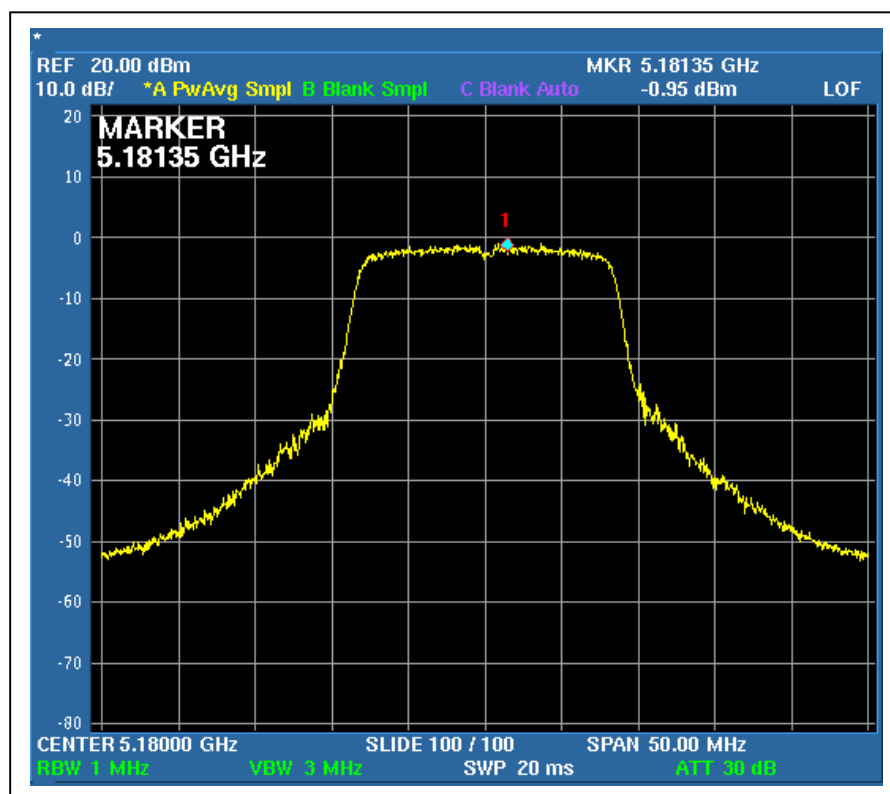
802.11a OFDM modulation

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

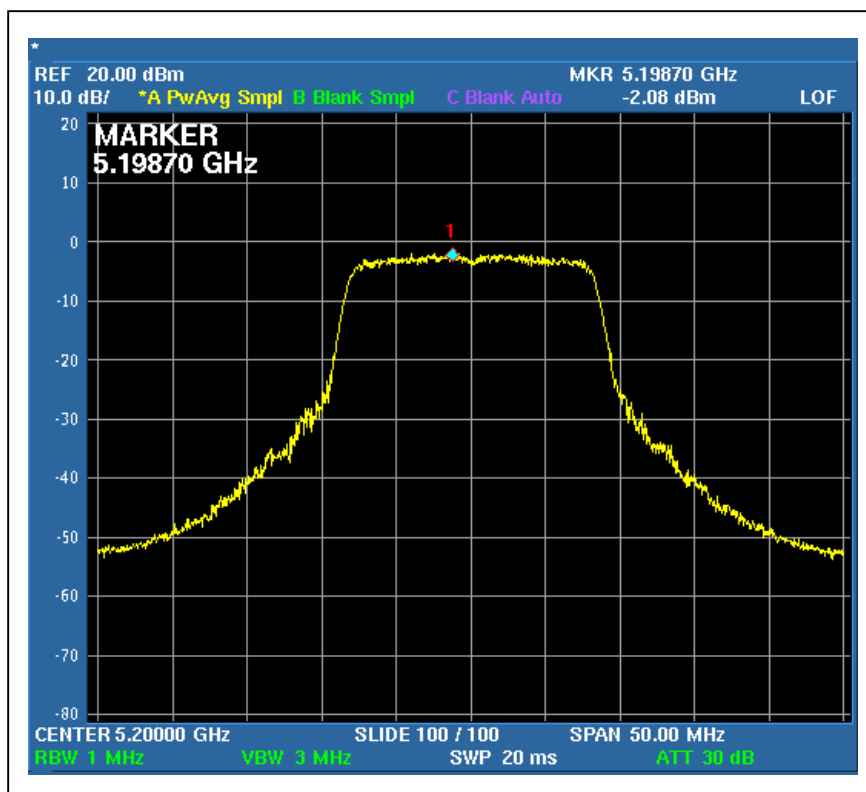
CHANNEL	CHANNEL FREQUENCY (MHz)	POWER DENSITY (mW)			RF POWER LEVEL IN 3kHz BW (dBm)			TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 0	CHAIN 1	CHAIN 2				
1	5180	0.804	0.843	0.849	-0.95	-0.74	-0.71	2.496	3.97	4	PASS
2	5200	0.619	0.822	0.745	-2.08	-0.85	-1.28	2.186	3.40	4	PASS
4	5240	0.601	0.859	0.793	-2.21	-0.66	-1.01	2.253	3.53	4	PASS

Chain 0

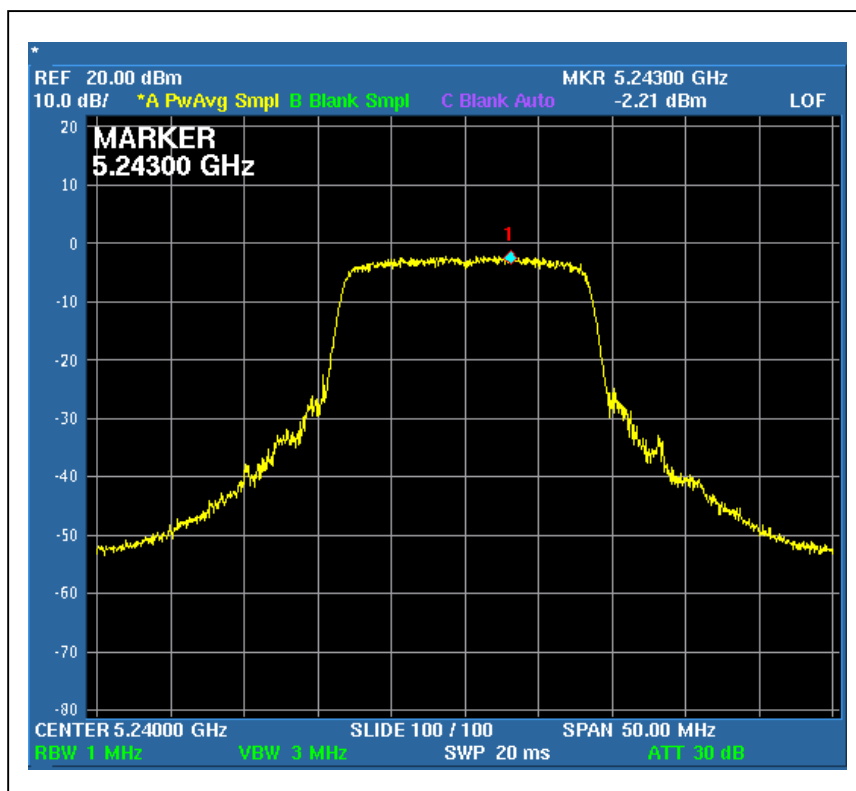
CH1



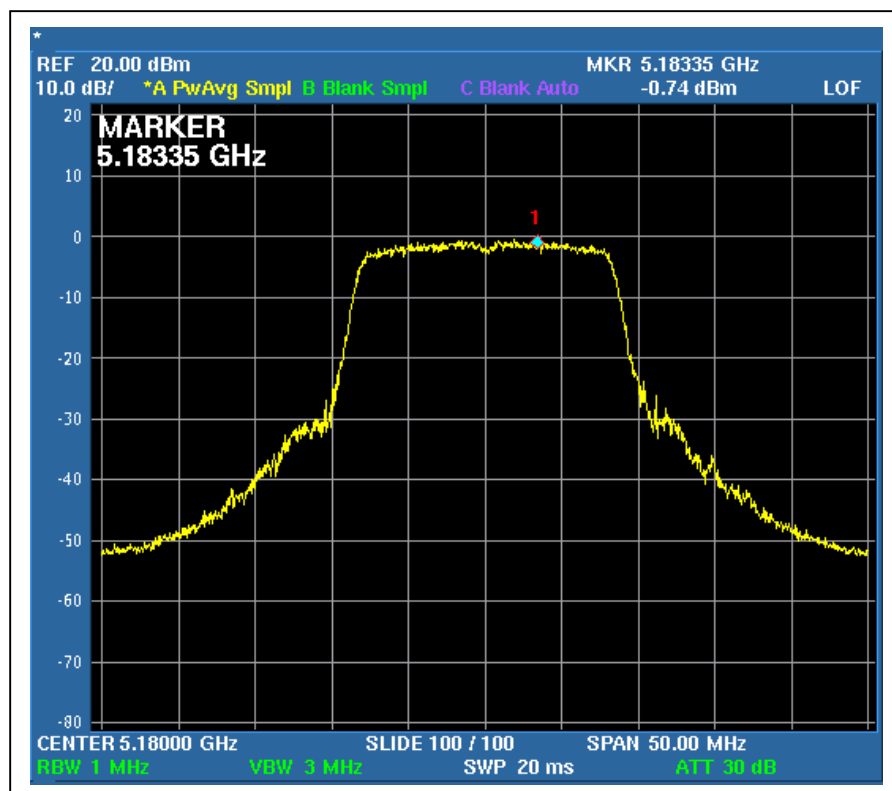
CH2



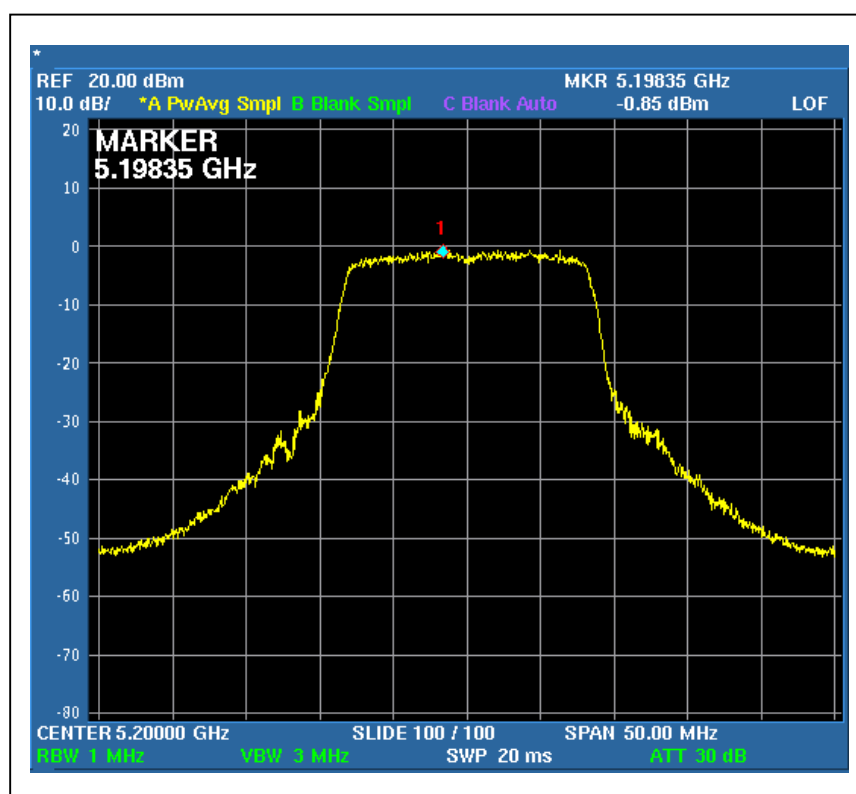
CH4



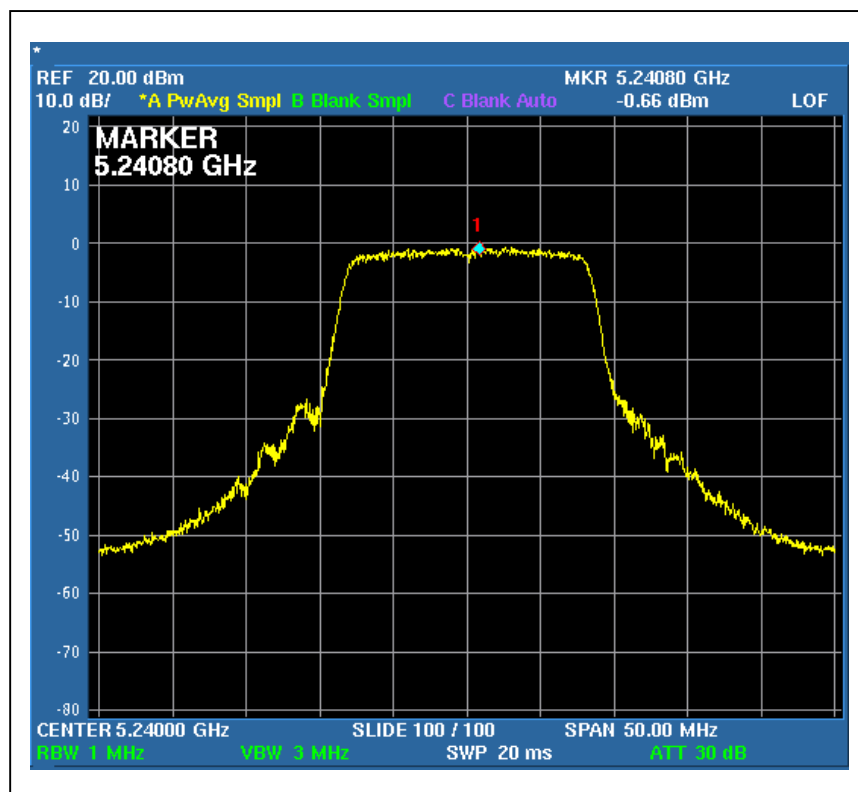
Chain 1
CH1



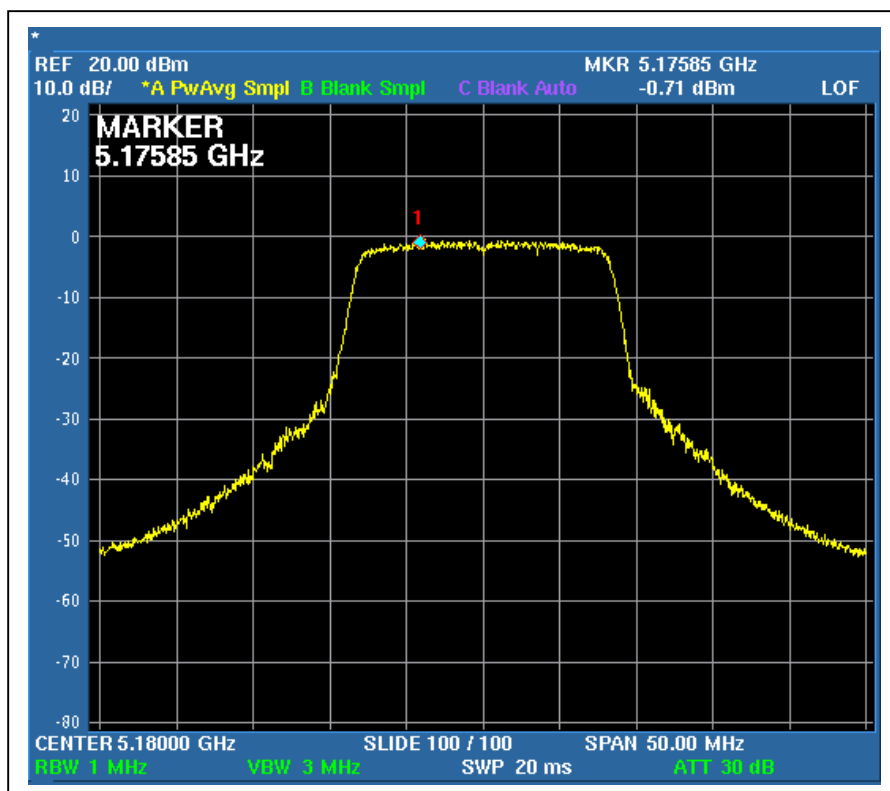
CH2



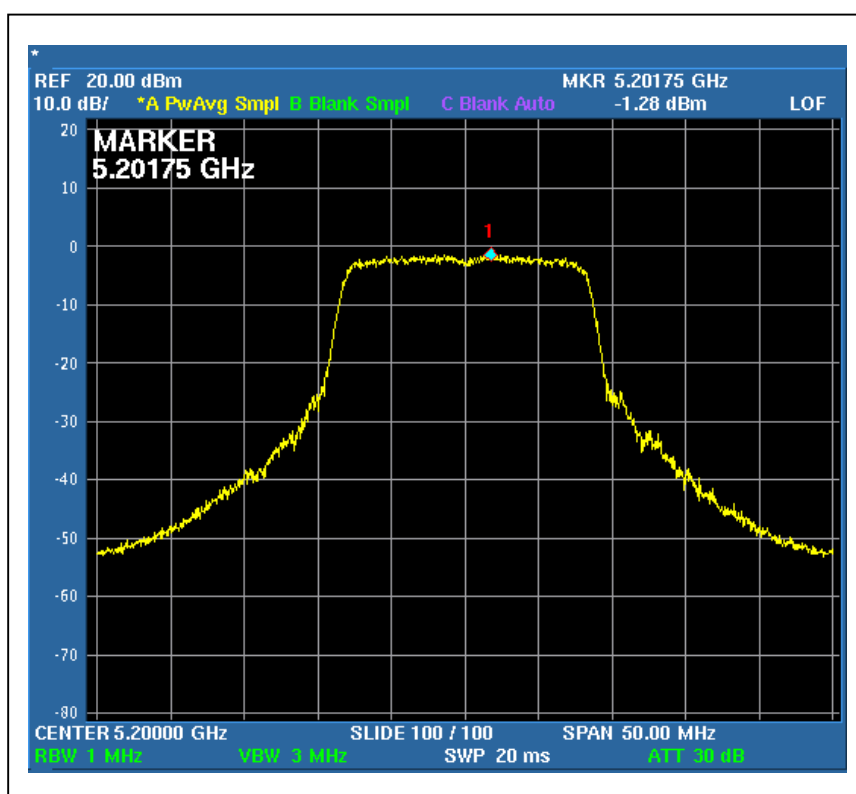
CH4



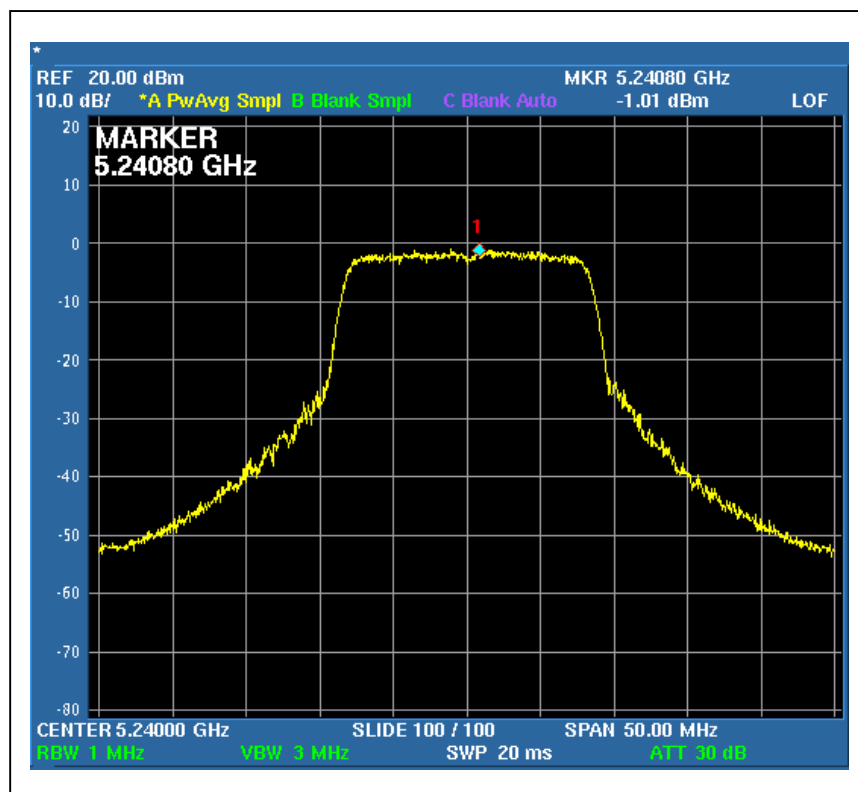
Chain 2
CH1



CH2



CH4

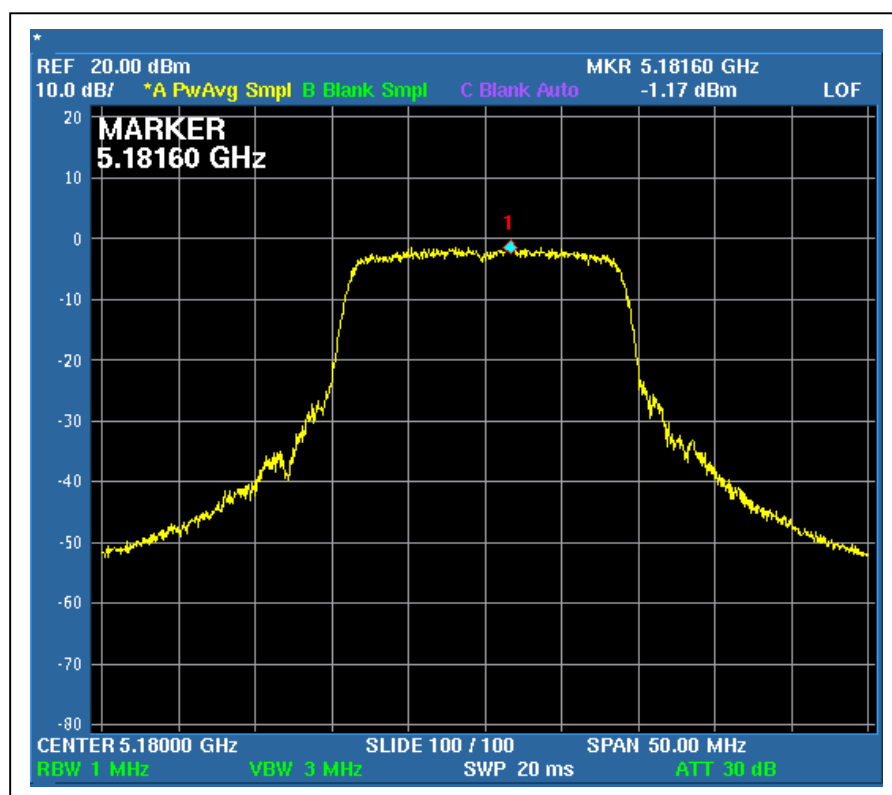


DRAFT 802.11n (20MHz) OFDM MODULATION:

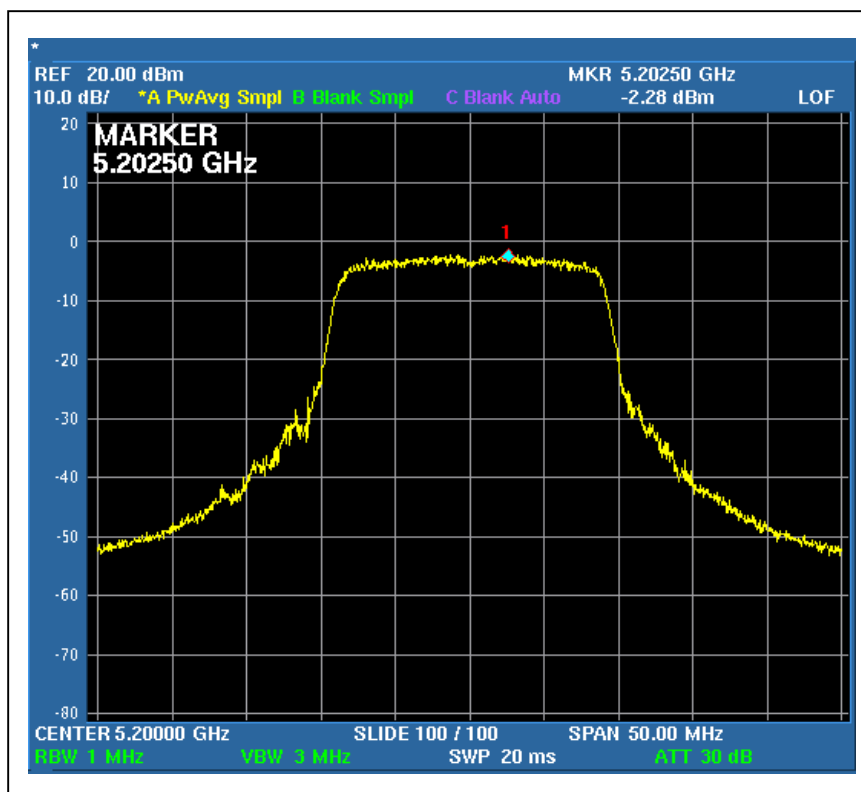
MODULATION TYPE	BPSK	TRANSFER RATE	13Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 972hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER DENSITY (mW)			RF POWER LEVEL IN 3kHz BW (dBm)			TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 0	CHAIN 1	CHAIN 2				
1	5180	0.764	0.813	0.847	-1.17	-0.90	-0.72	2.424	3.845	4	PASS
2	5200	0.592	0.832	0.628	-2.28	-0.80	-2.02	2.052	3.122	4	PASS
4	5240	0.561	0.813	0.728	-2.51	-0.90	-1.38	2.102	3.226	4	PASS

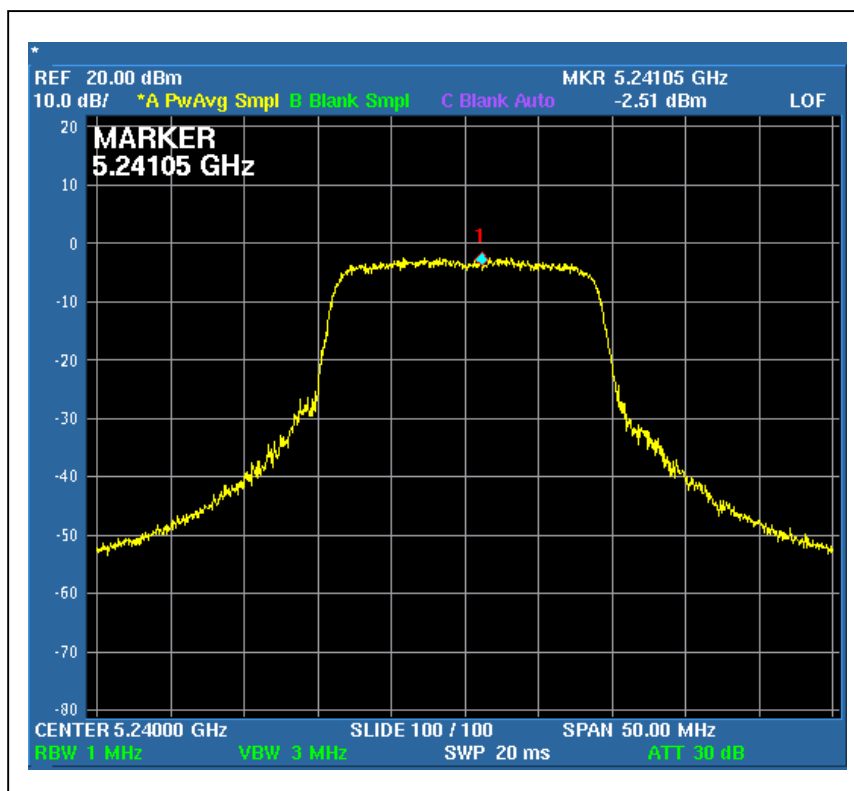
Chain 0
CH1



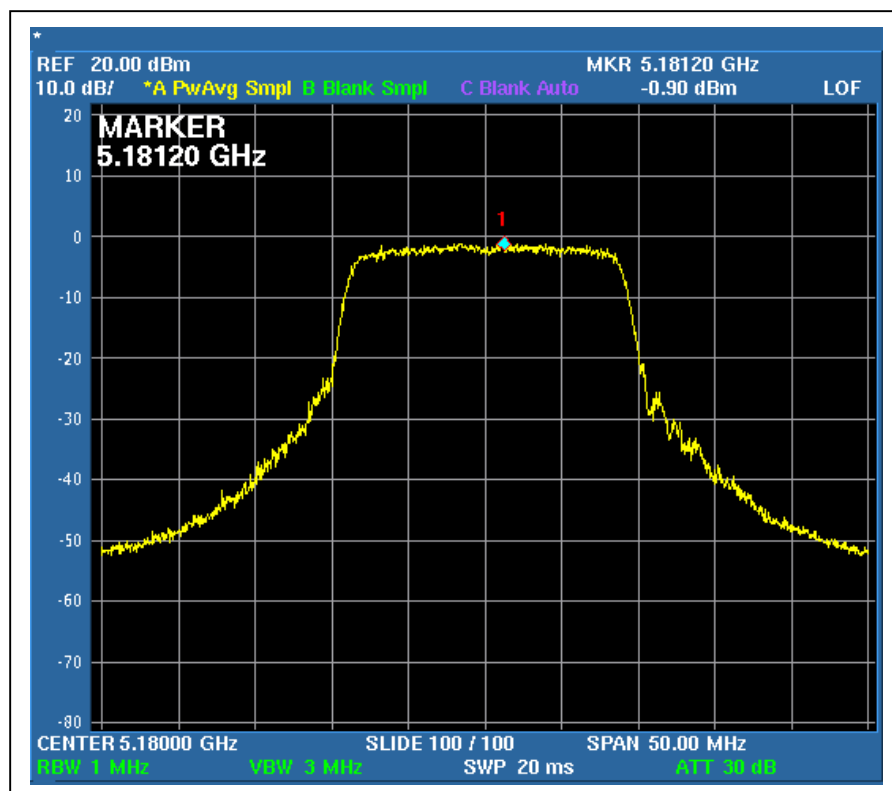
CH2



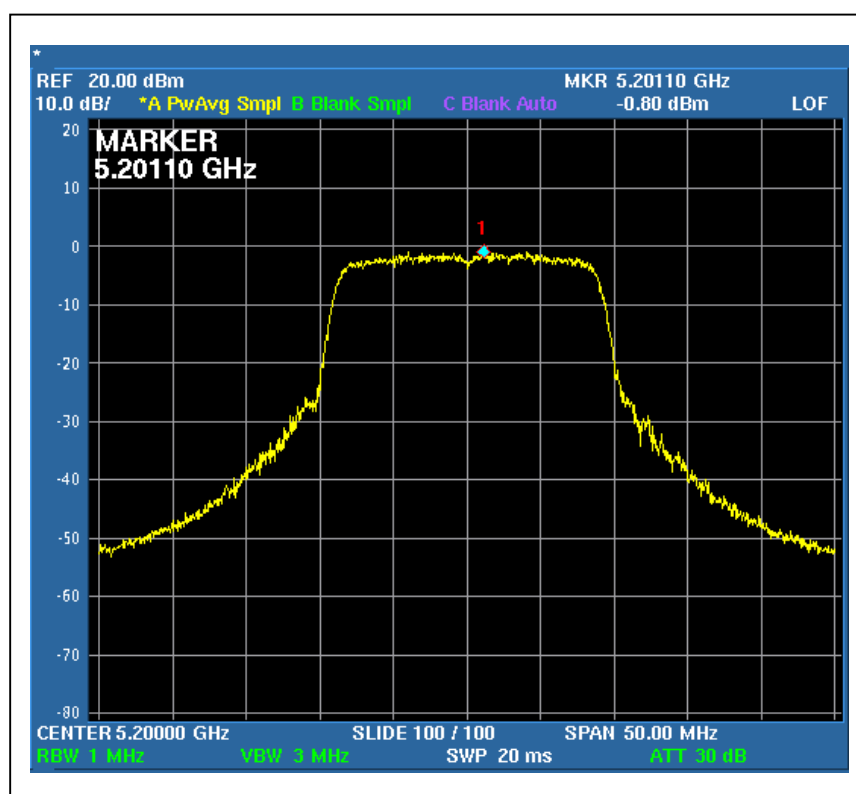
CH4



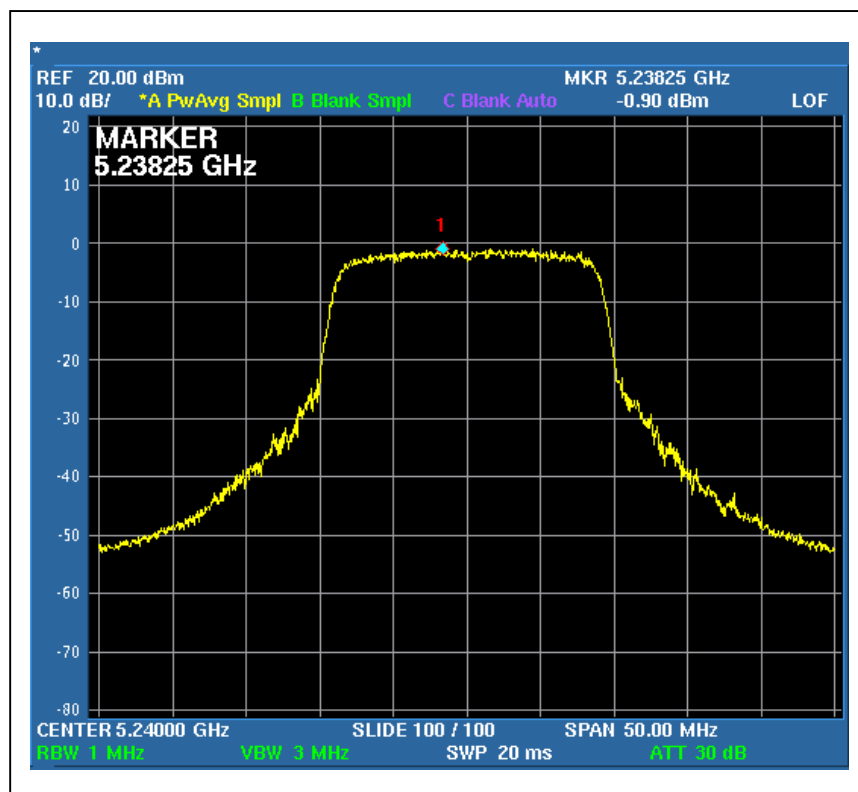
Chain 1
CH1



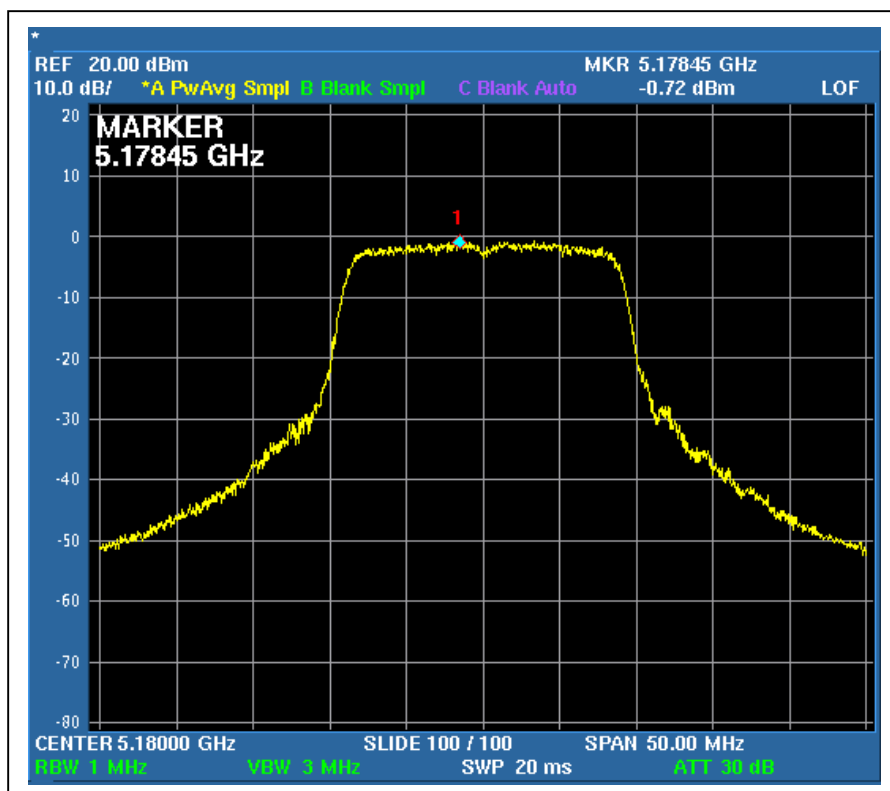
CH2



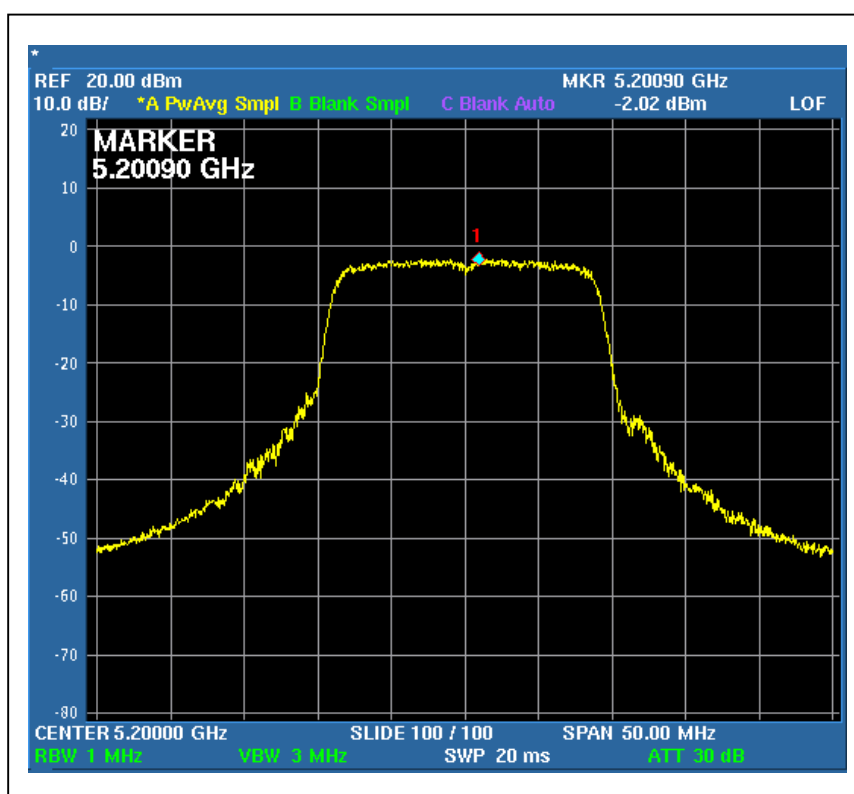
CH4



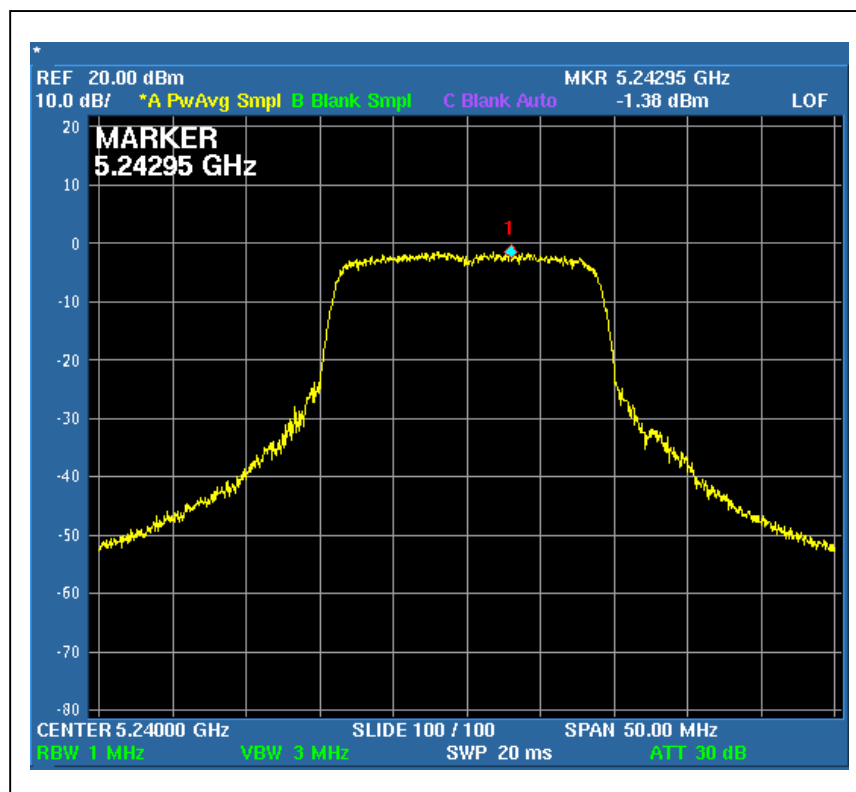
Chain 2
CH1



CH2



CH4

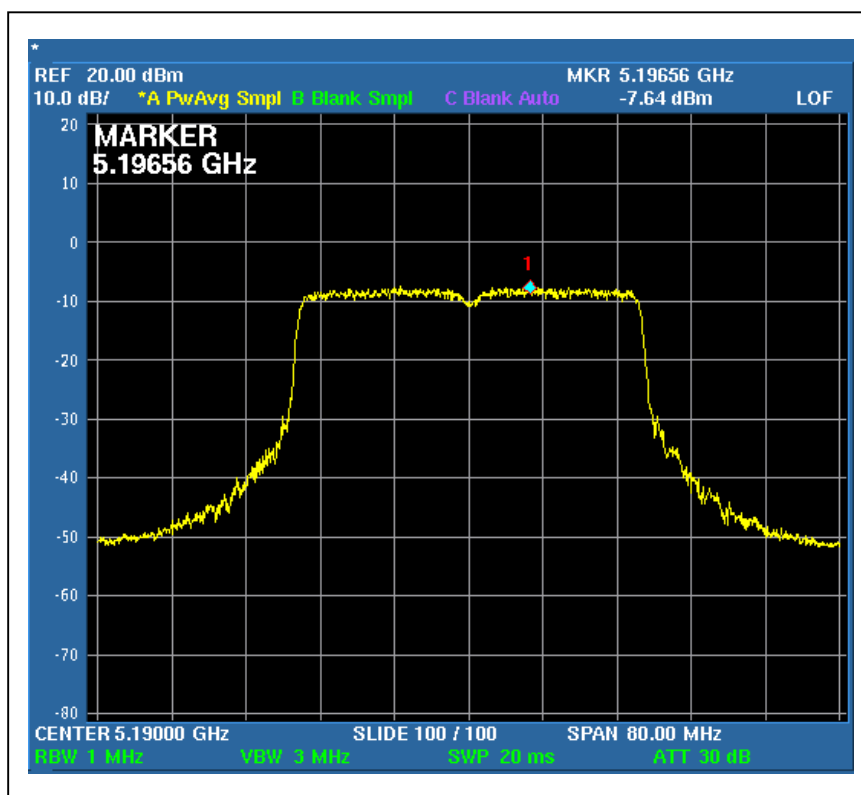


DRAFT 802.11n (40MHz) OFDM MODULATION:

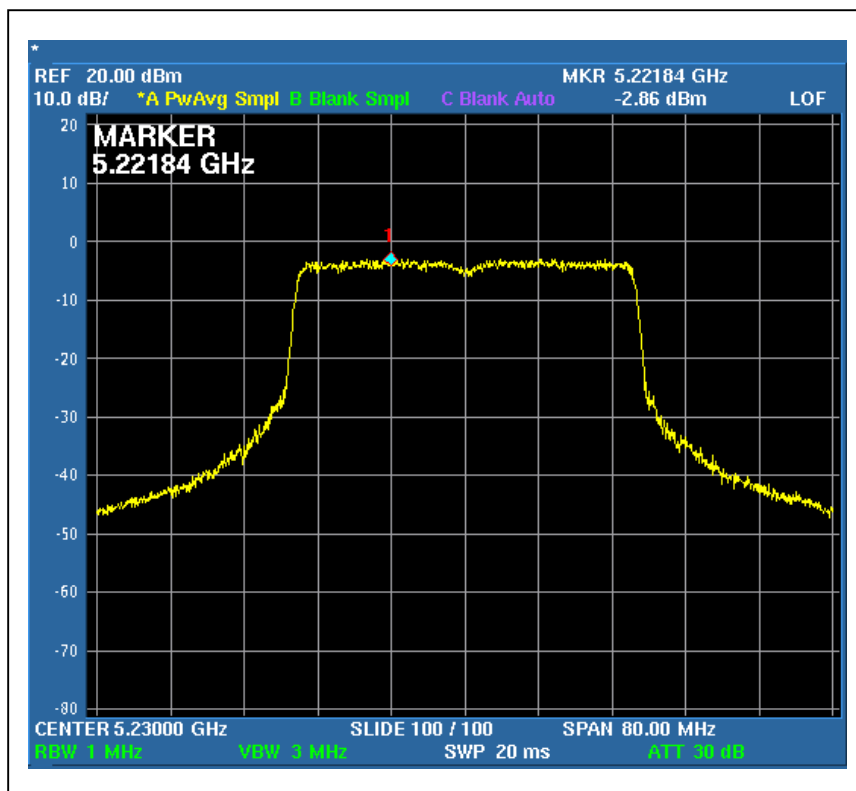
MODULATION TYPE	BPSK	TRANSFER RATE	27Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 60%RH, 960hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER DENSITY (mW)			RF POWER LEVEL IN 3kHz BW (dBm)			TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 0	CHAIN 1	CHAIN 2				
1	5190	0.172	0.244	0.221	-7.64	-6.13	-6.56	0.637	-1.96	4	PASS
2	5230	0.518	0.865	0.767	-2.86	-0.63	-1.15	2.150	3.32	4	PASS

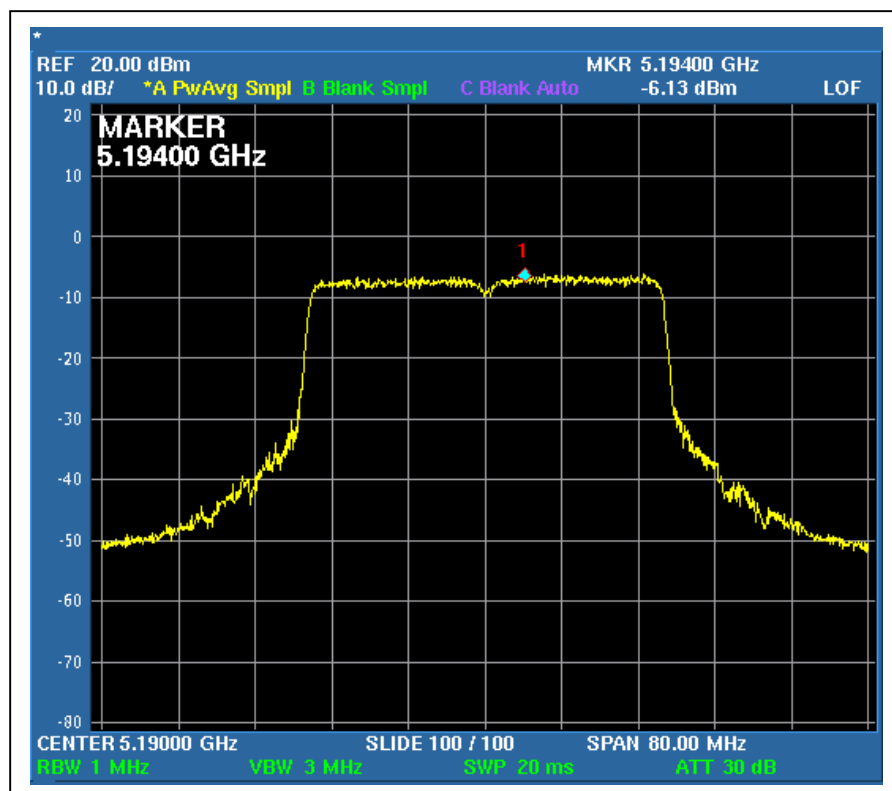
Chain 0
CH1



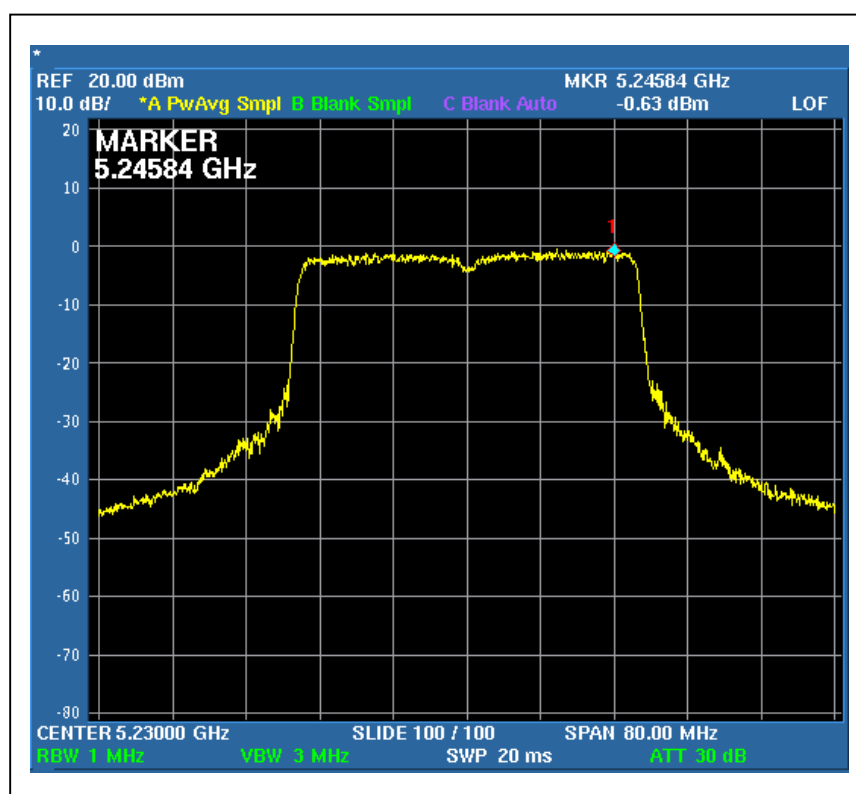
CH2



Chain 1
CH1

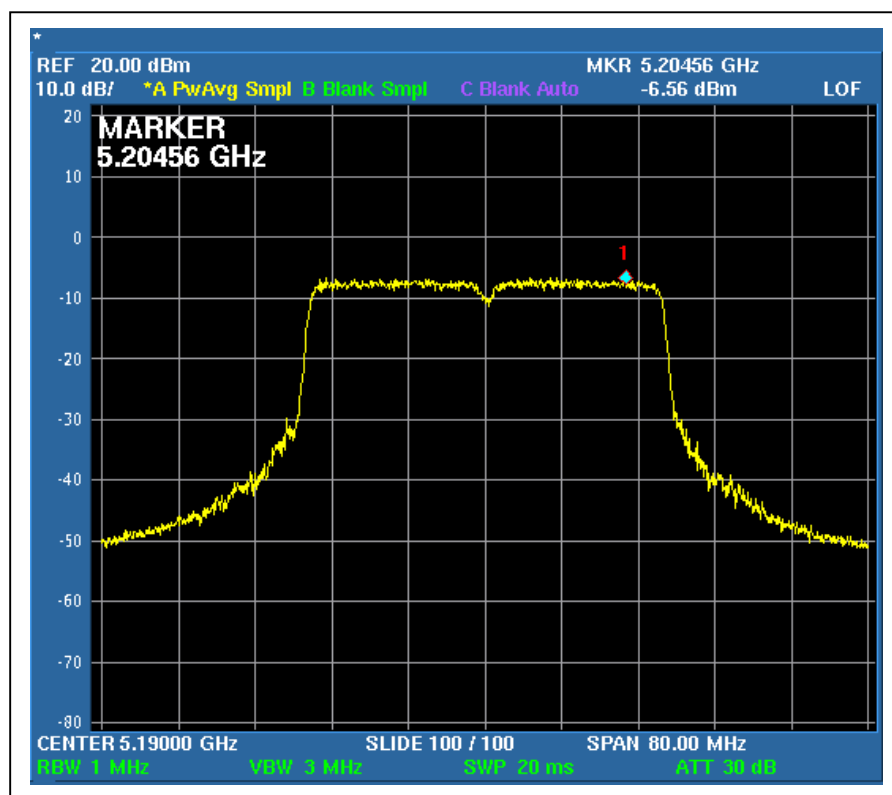


CH2

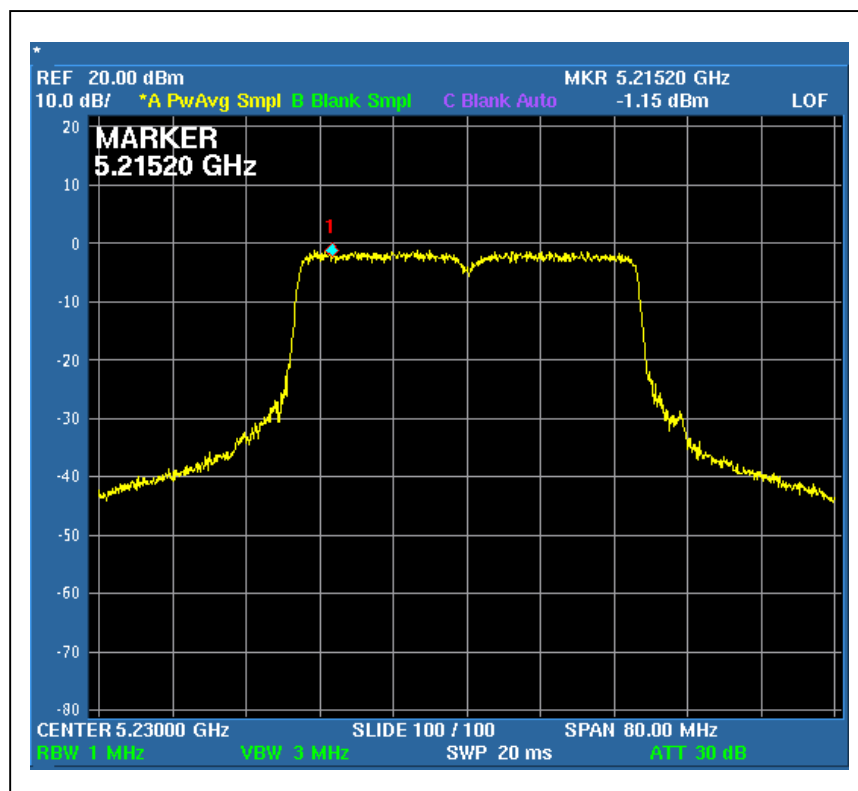


Chain 2

CH1



CH2



4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.02\%$ 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, 2009

NOTE:

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

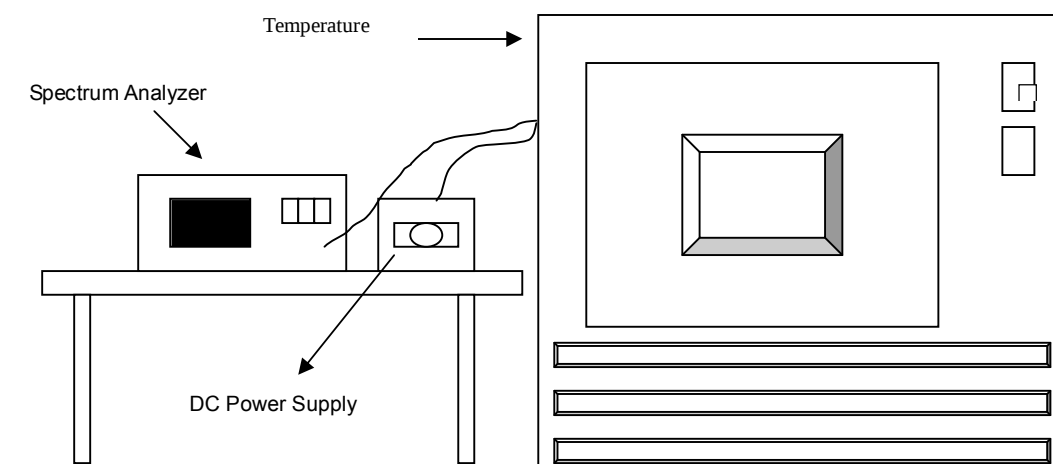
4.6.3 TEST PROCEDURE

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

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

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

4.6.7 TEST RESULTS

Operating frequency: 5240MHz				Limit : $\pm 0.02\%$			
Temp. (°C)	Power supply (VAC)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	126.5	5239.9919	0.000155	5239.9914	0.000164	5239.9917	0.000158
	110	5239.992	0.000153	5239.9918	0.000156	5239.9921	0.000151
	93.5	5239.9919	0.000155	5239.9914	0.000164	5239.9917	0.000158
40	126.5	5240.0148	0.000282	5240.0096	0.000183	5240.0062	0.000118
	110	5240.0148	0.000282	5240.0126	0.000240	5240.0092	0.000176
	93.5	5240.0148	0.000282	5240.0086	0.000164	5240.0072	0.000137
30	126.5	5239.9972	0.000053	5239.9968	0.000061	5239.9971	0.000055
	110	5239.9972	0.000053	5239.9968	0.000061	5239.9973	0.000052
	93.5	5239.9972	0.000053	5239.9967	0.000063	5239.9970	0.000057
20	126.5	5239.977	0.000439	5239.9765	0.000448	5239.9769	0.000441
	110	5239.977	0.000439	5239.9767	0.000445	5239.9770	0.000439
	93.5	5239.977	0.000439	5239.9765	0.000448	5239.9768	0.000443
10	126.5	5239.9729	0.000517	5239.9822	0.000340	5239.9825	0.000334
	110	5239.973	0.000515	5239.9822	0.000340	5239.9827	0.000330
	93.5	5239.9829	0.000326	5239.9825	0.000334	5239.9824	0.000336
0	126.5	5240.0078	0.000149	5240.0026	0.000050	5240.0032	0.000061
	110	5240.0078	0.000149	5240.0056	0.000107	5240.0042	0.000080
	93.5	5240.0058	0.000111	5240.0026	0.000050	5240.0032	0.000061
-10	126.5	5239.9964	0.000069	5239.9957	0.000082	5239.9960	0.000076
	110	5239.9964	0.000069	5239.9959	0.000078	5239.9963	0.000071
	93.5	5239.9964	0.000069	5239.9957	0.000082	5239.9960	0.000076
-20	126.5	5240.0154	0.000294	5240.0136	0.000260	5240.0122	0.000233
	110	5240.0152	0.000290	5240.0156	0.000298	5240.0142	0.000271
	93.5	5240.0152	0.000290	5240.0126	0.000240	5240.0122	0.000233
-30	126.5	5240.0212	0.000405	5240.0213	0.000406	5240.0220	0.000420
	110	5240.0212	0.000405	5240.0212	0.000405	5240.0220	0.000420
	93.5	5240.0214	0.000408	5240.021	0.000401	5240.0220	0.000420

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, 2009

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 loss 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

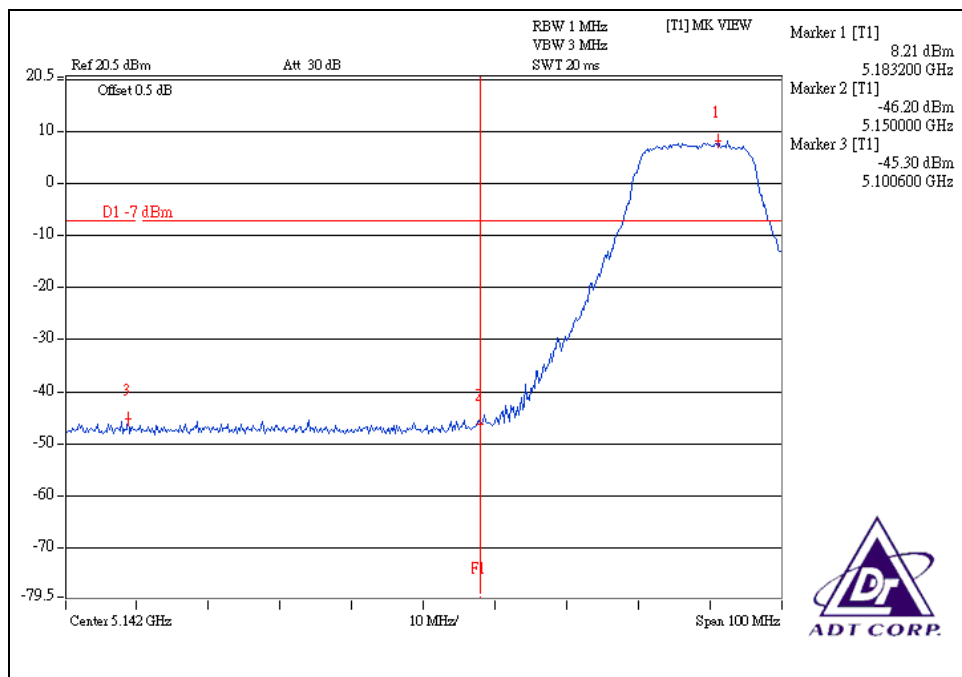
For 5.15 to 5.35GHz band:

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

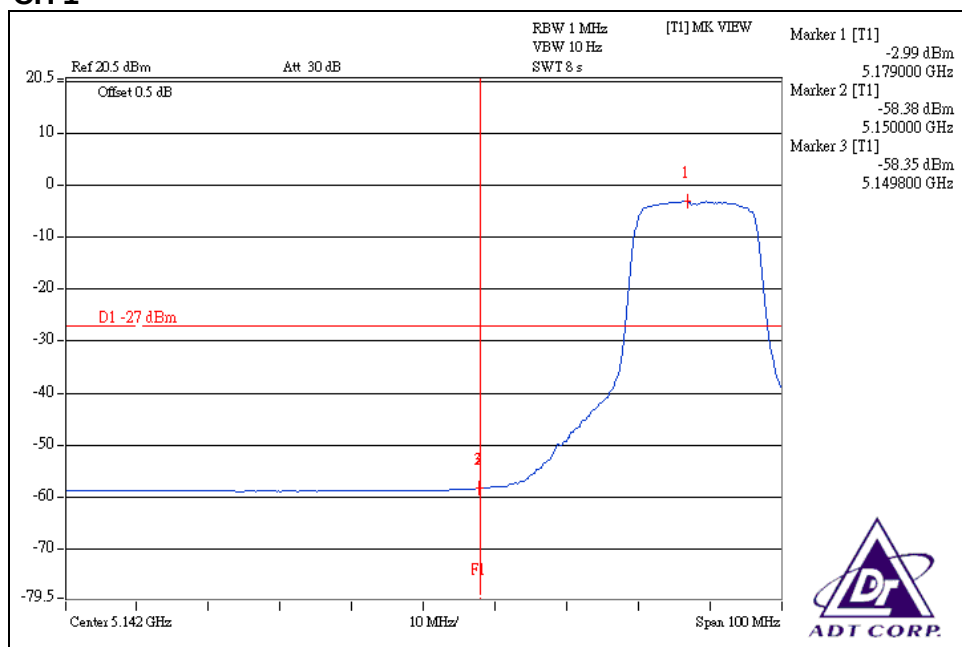
802.11a OFDM modulation

Chain 0

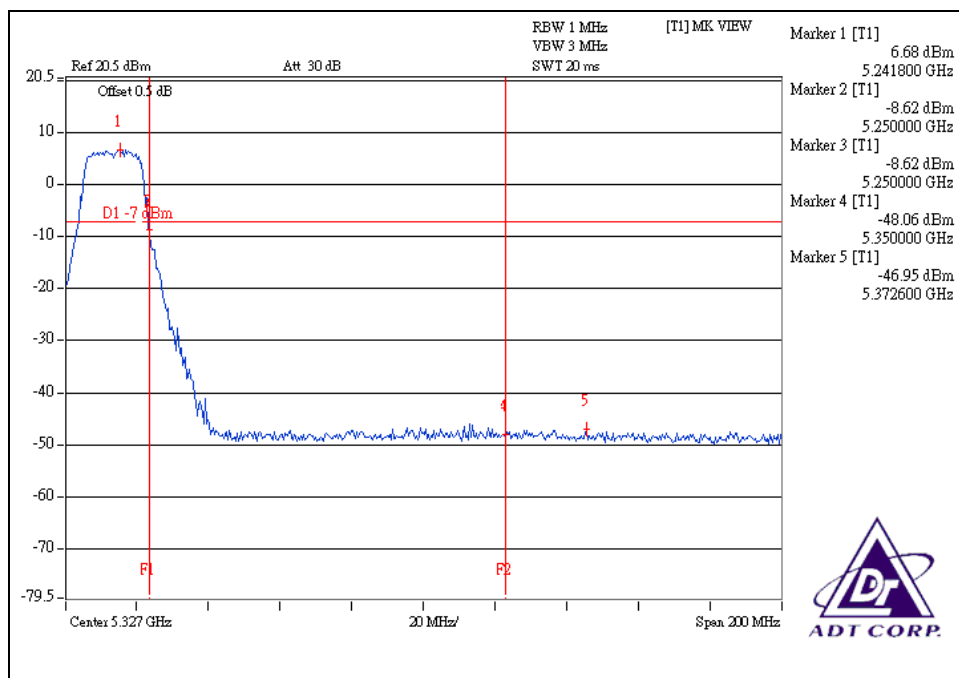
CH 1



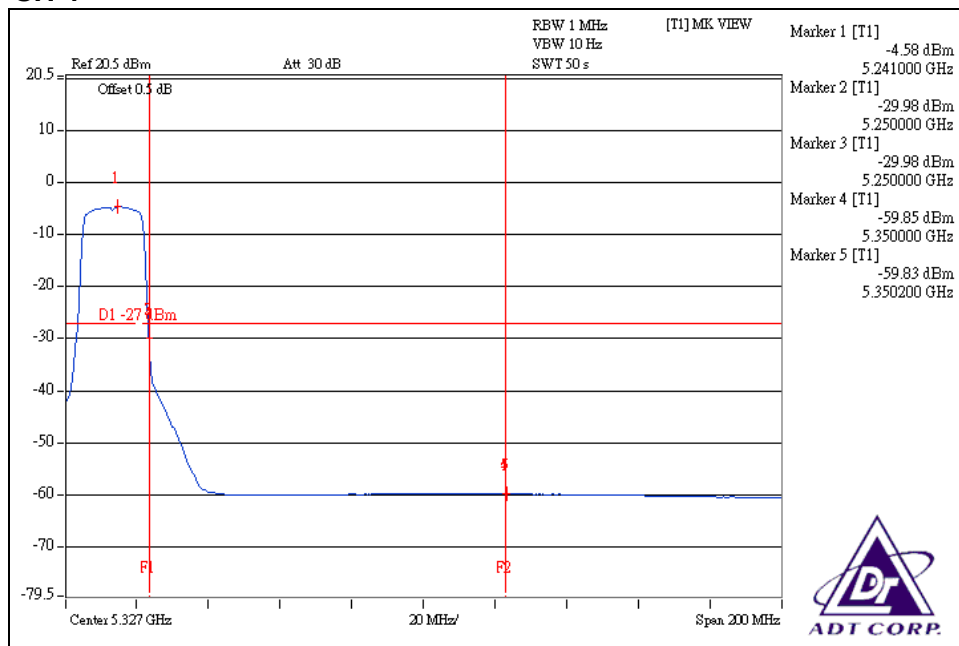
CH 1



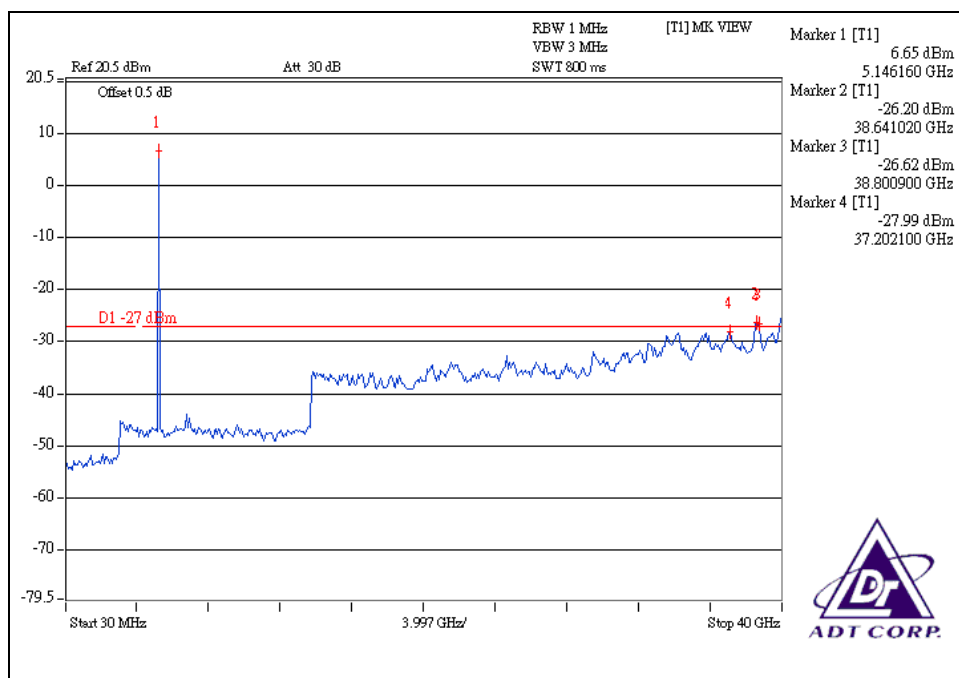
CH 4



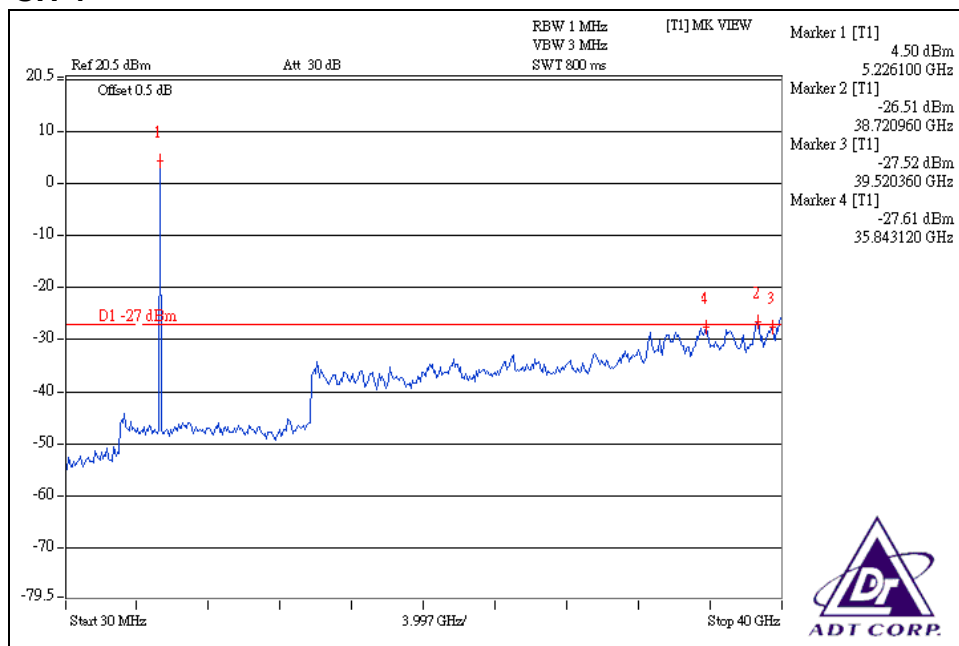
CH 4



CH 1

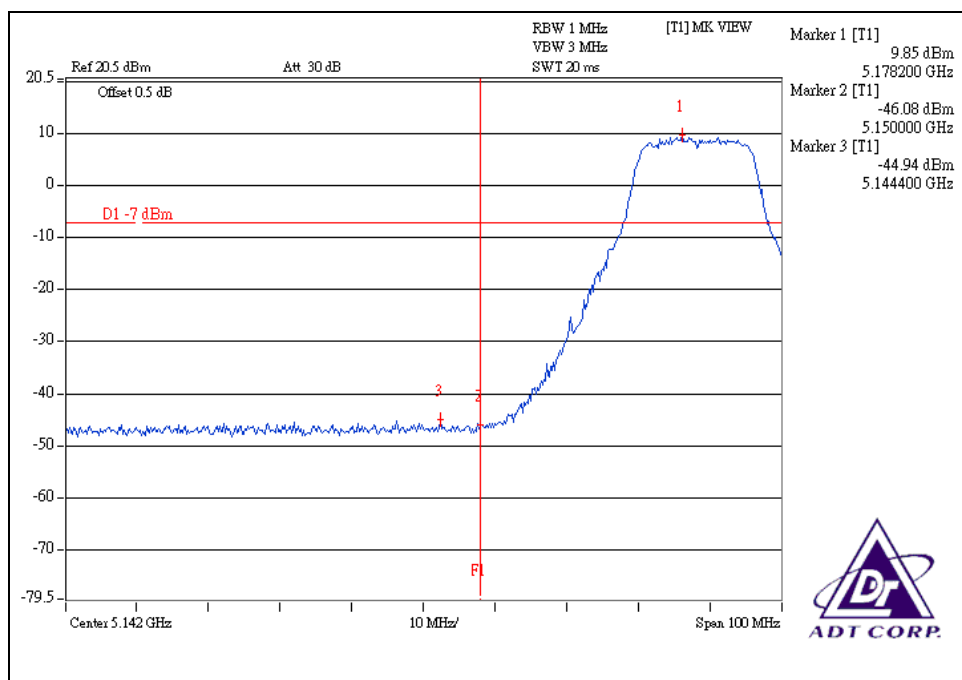


CH 4

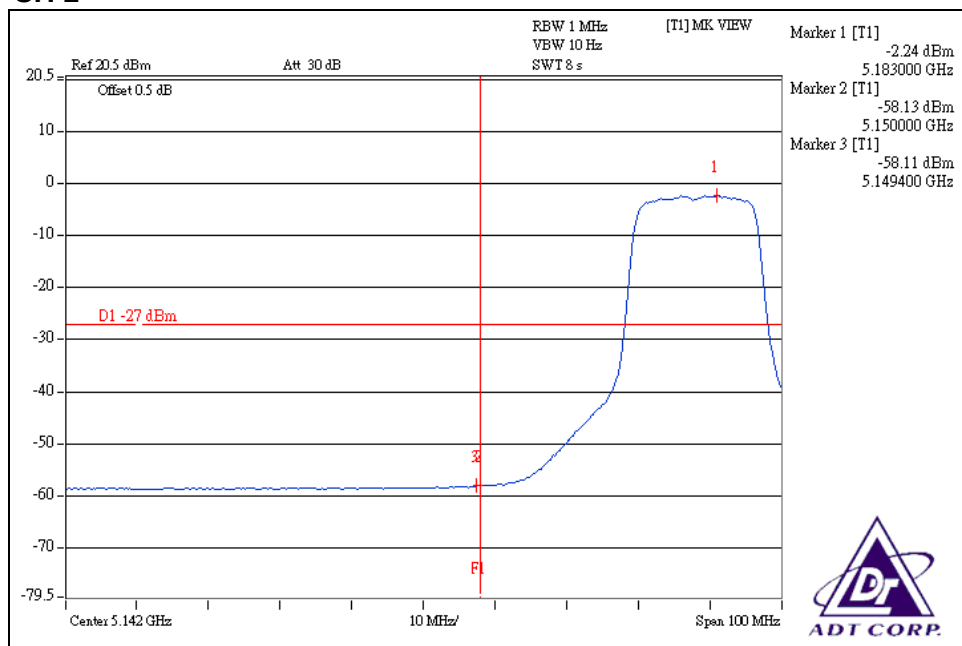


Chain 1

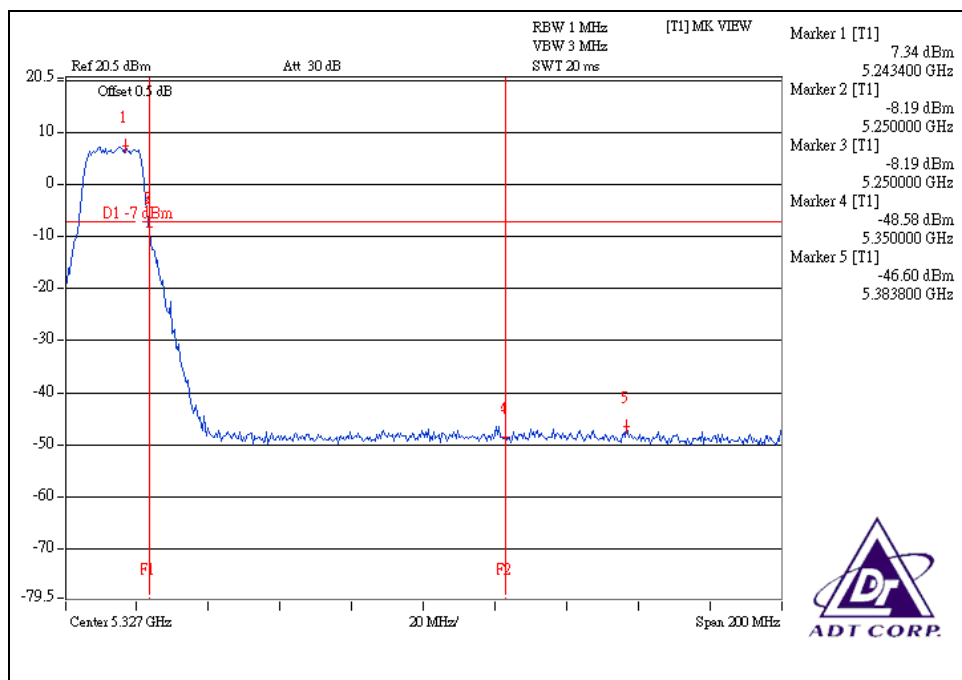
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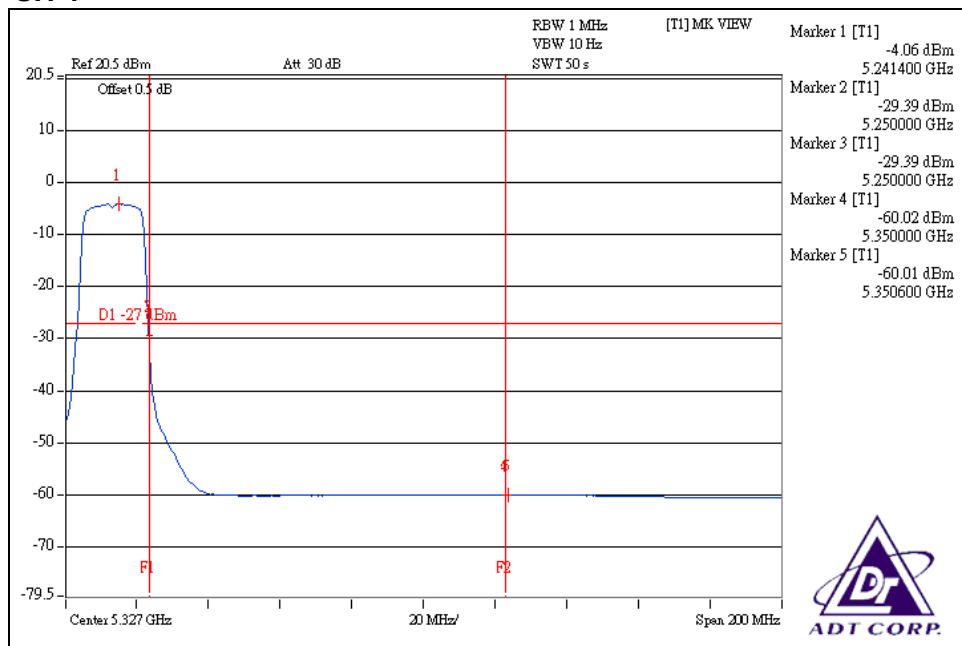
CH 1



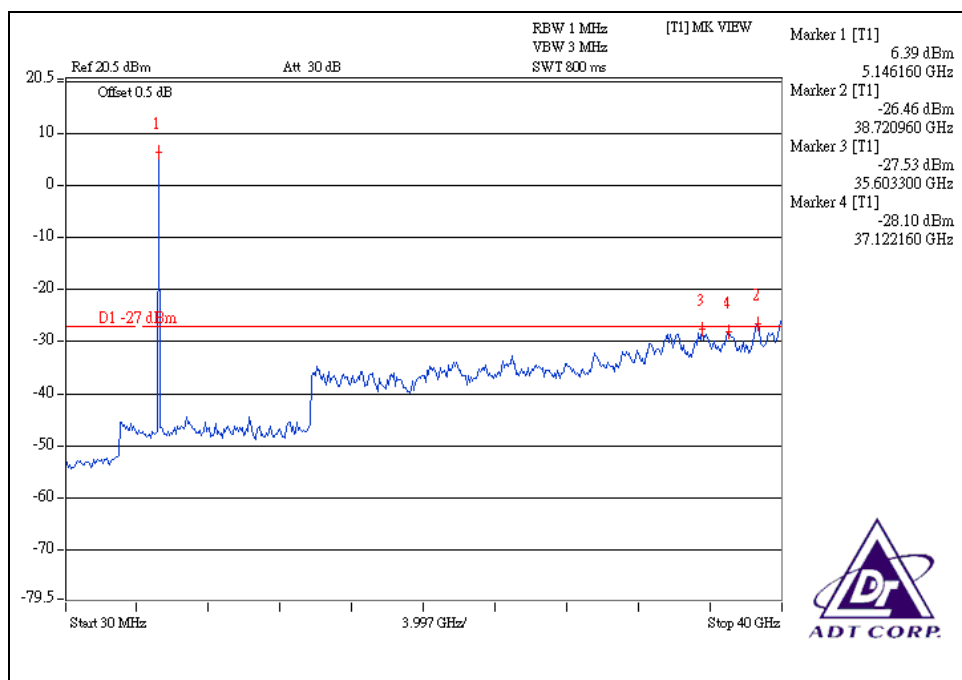
CH 4



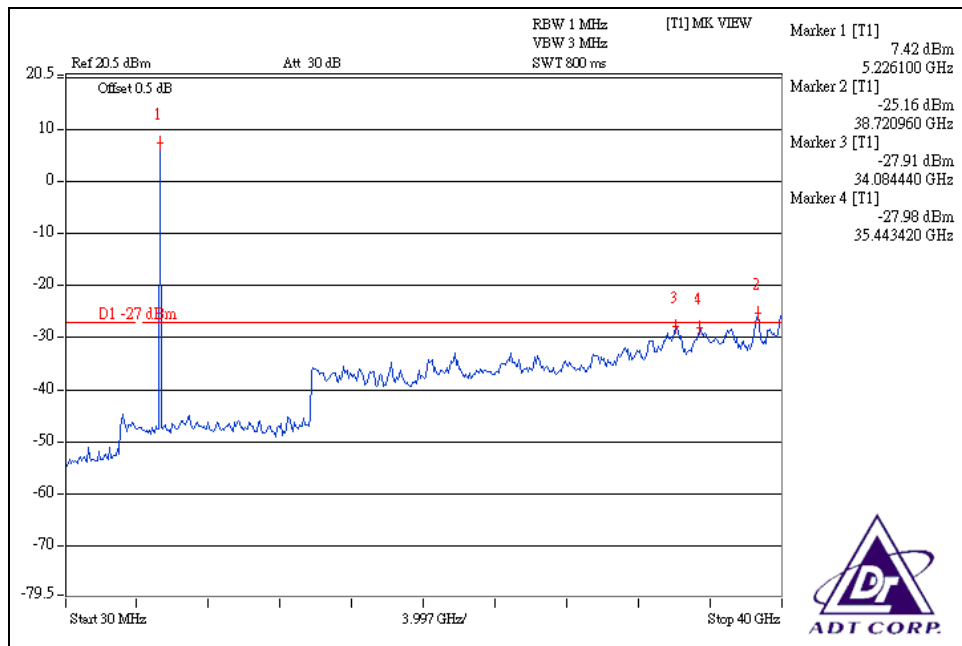
CH 4



CH 1

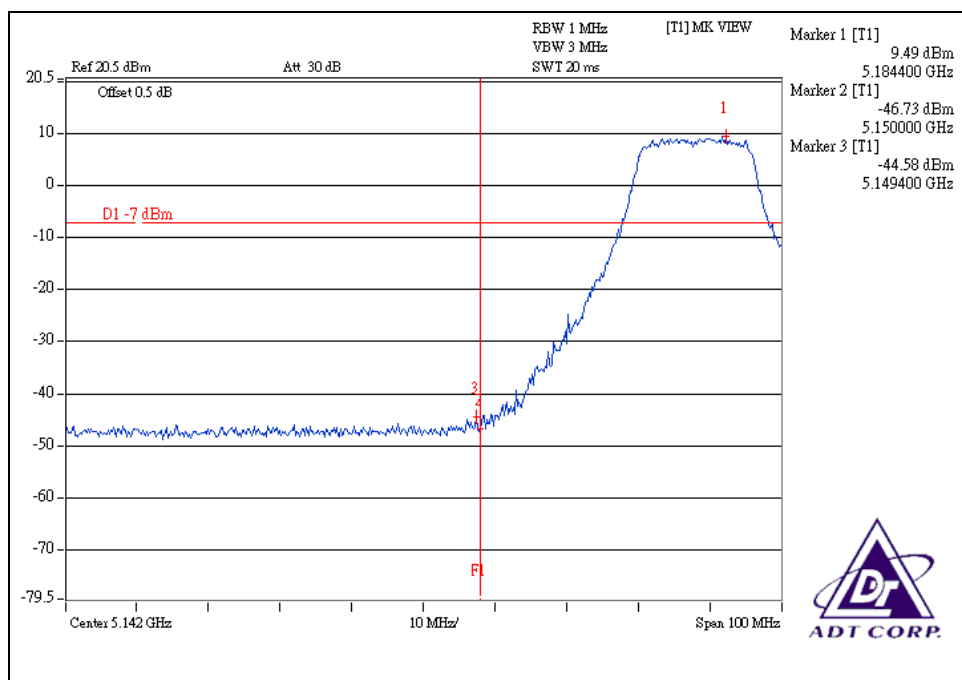


CH 4

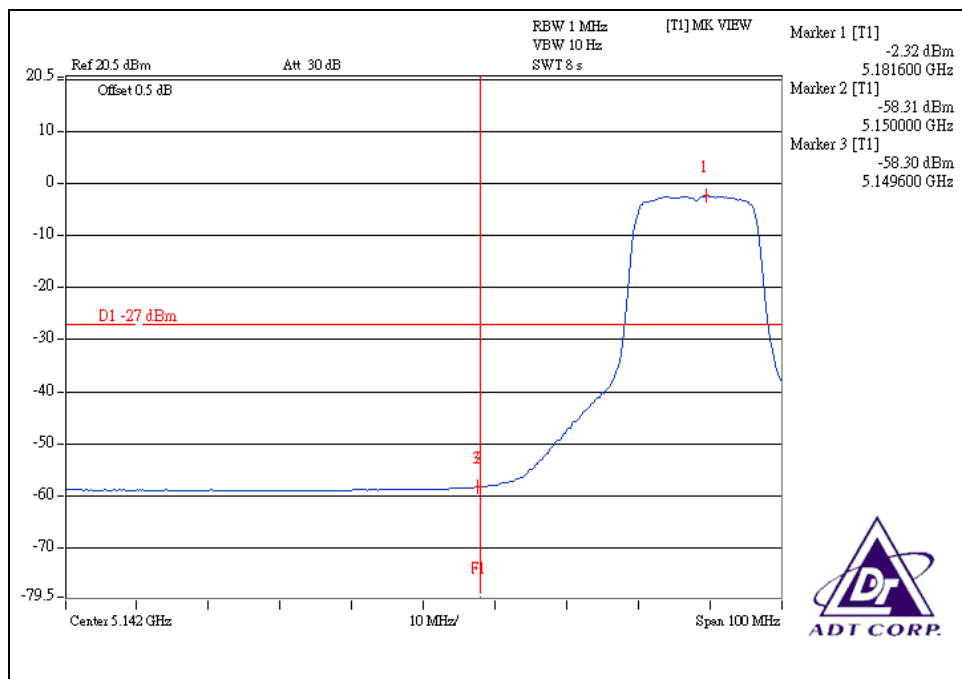


Chain 2

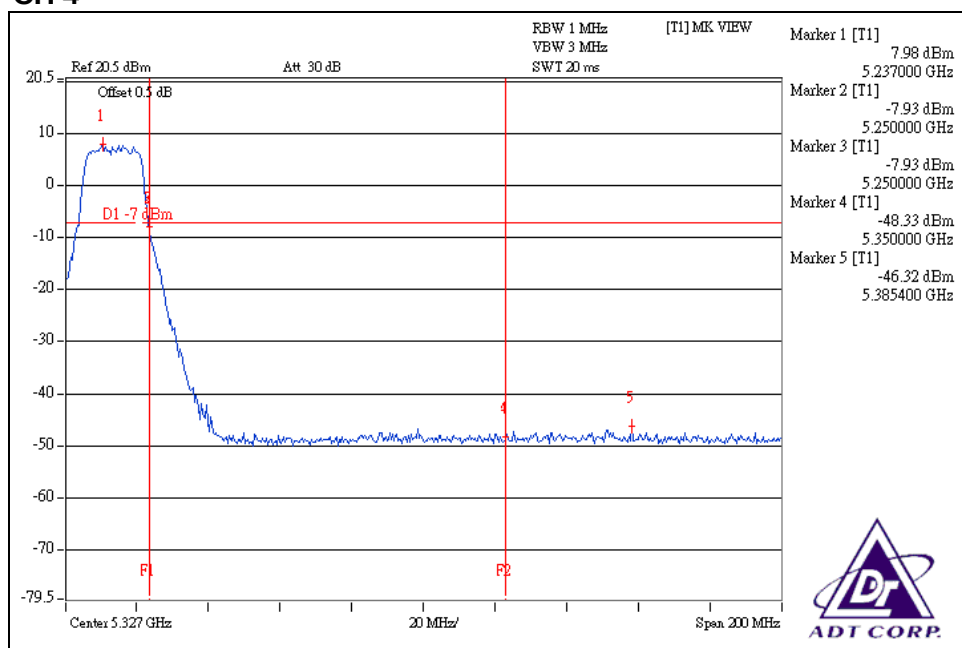
CH 1



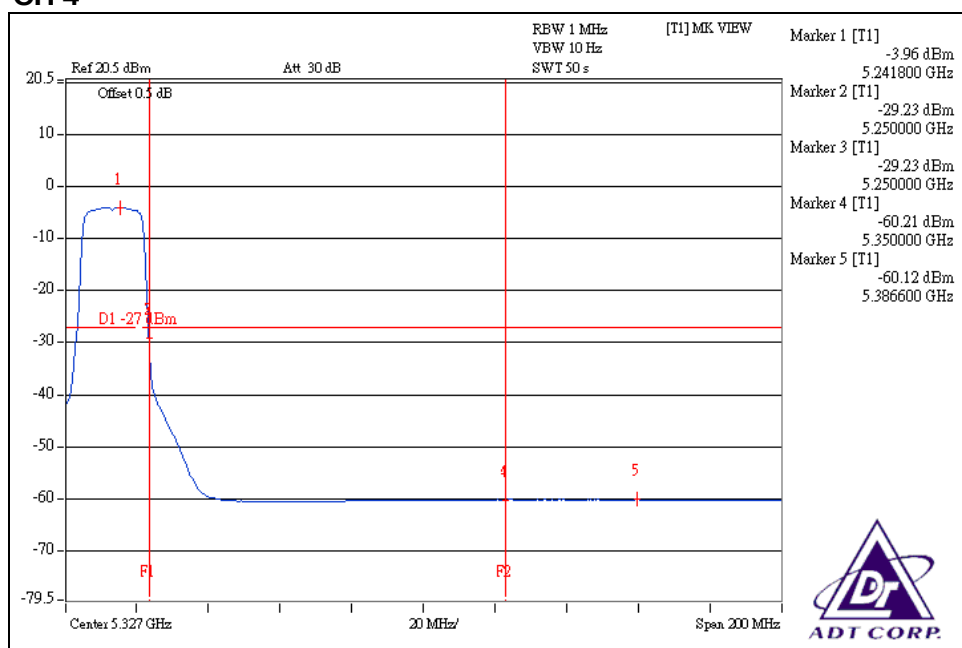
CH 1



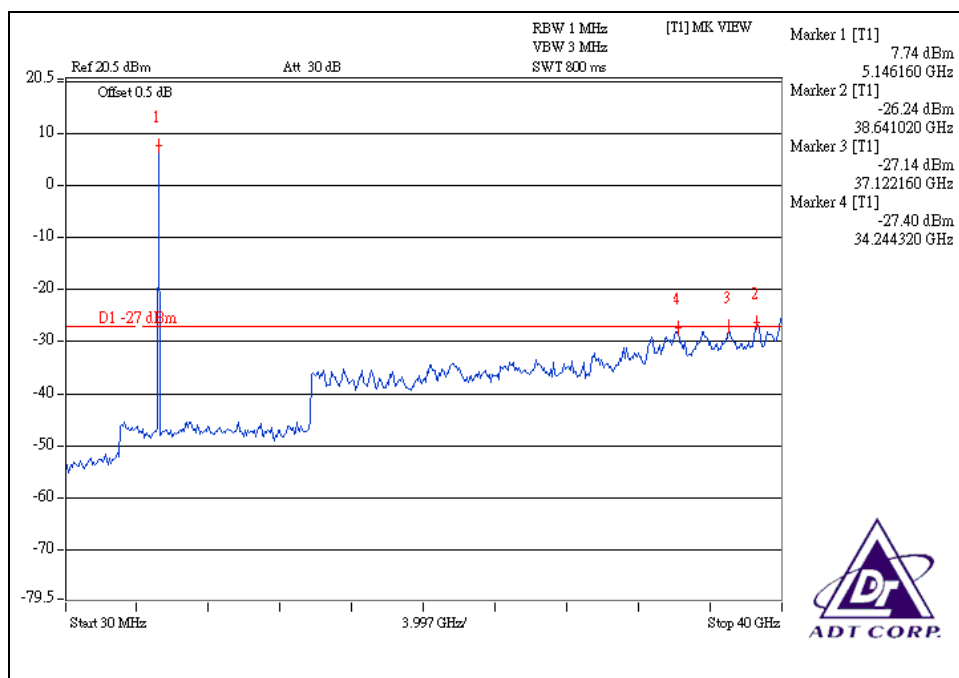
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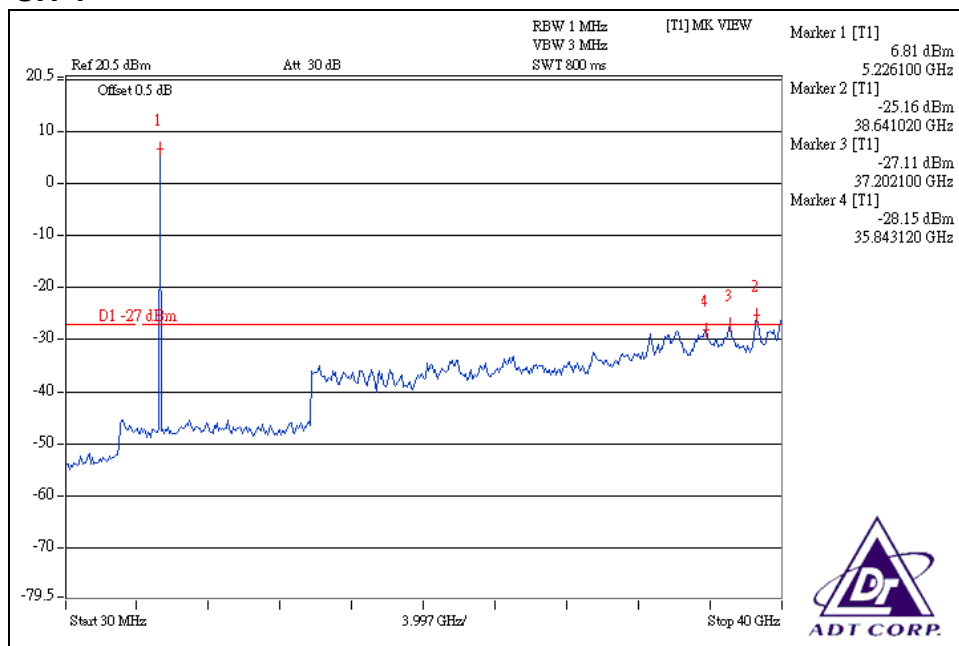
CH 4



CH 1



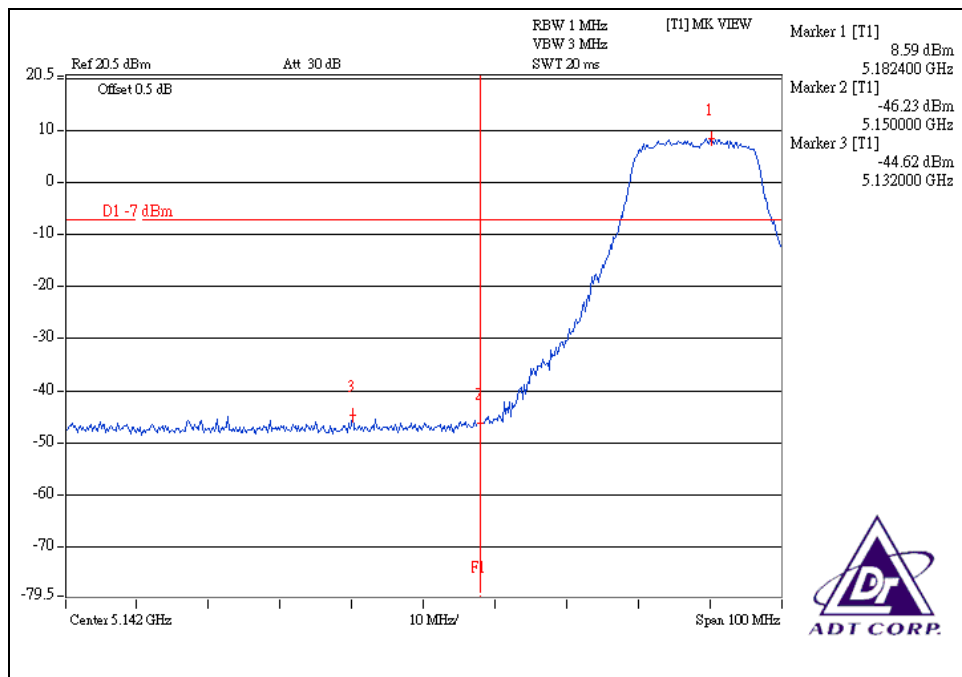
CH 4



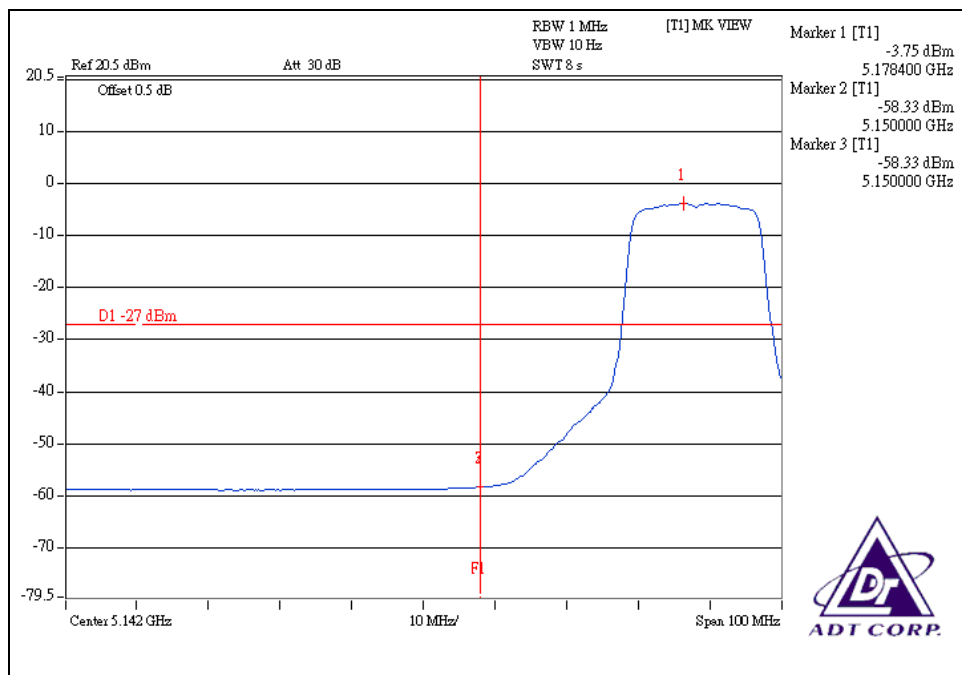
DRAFT 802.11n (20MHz) OFDM MODULATION:

Chain 0

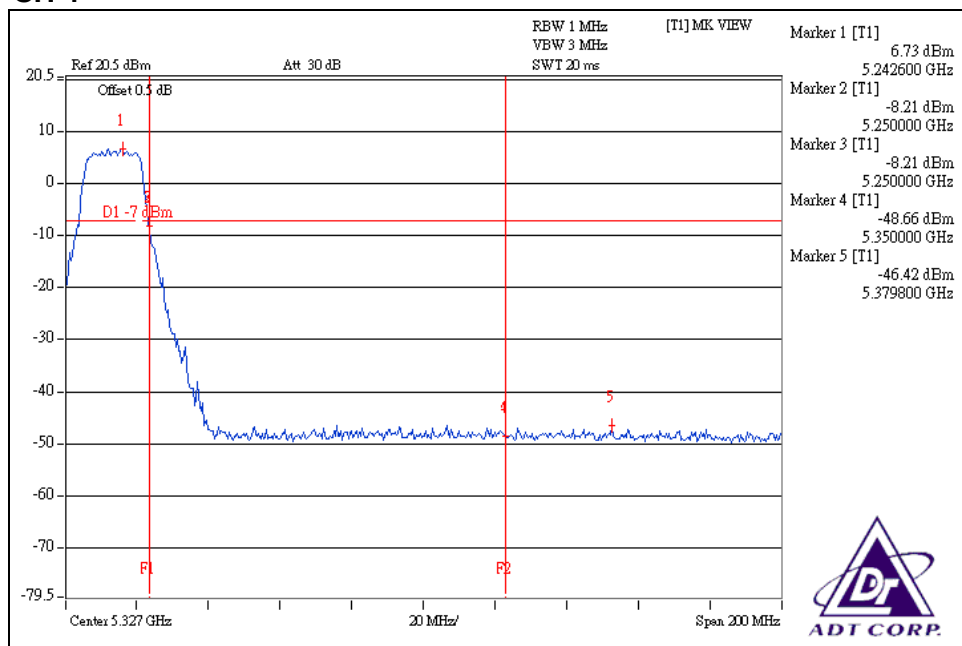
CH 1



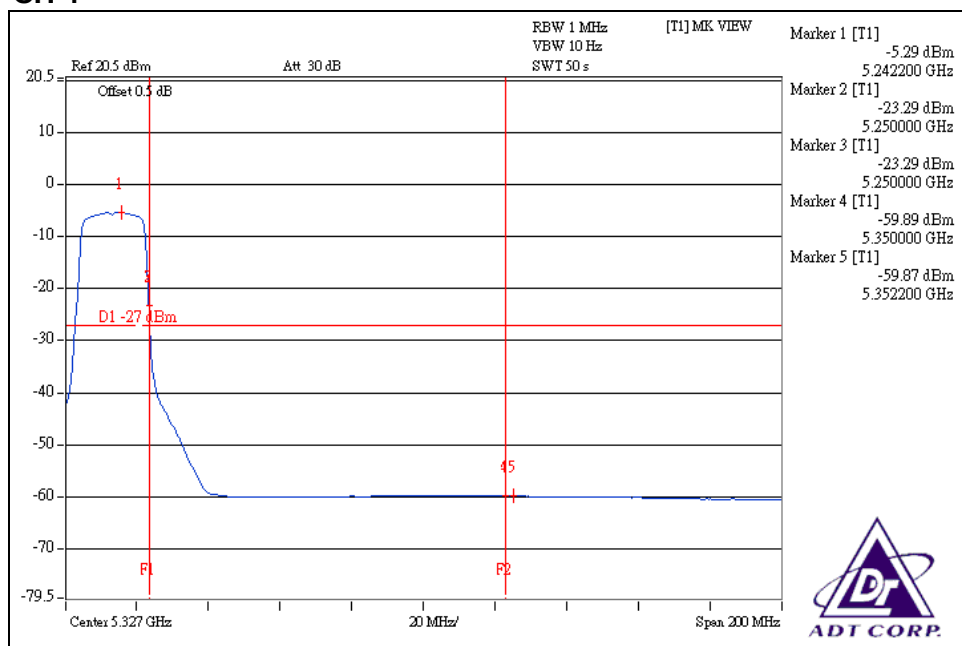
CH 1



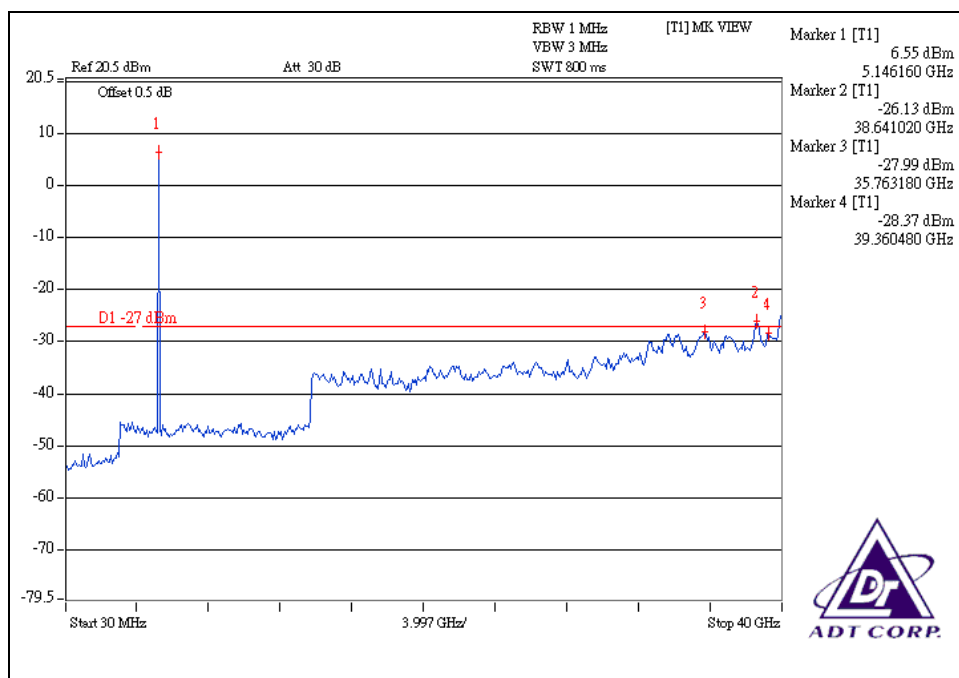
CH 4



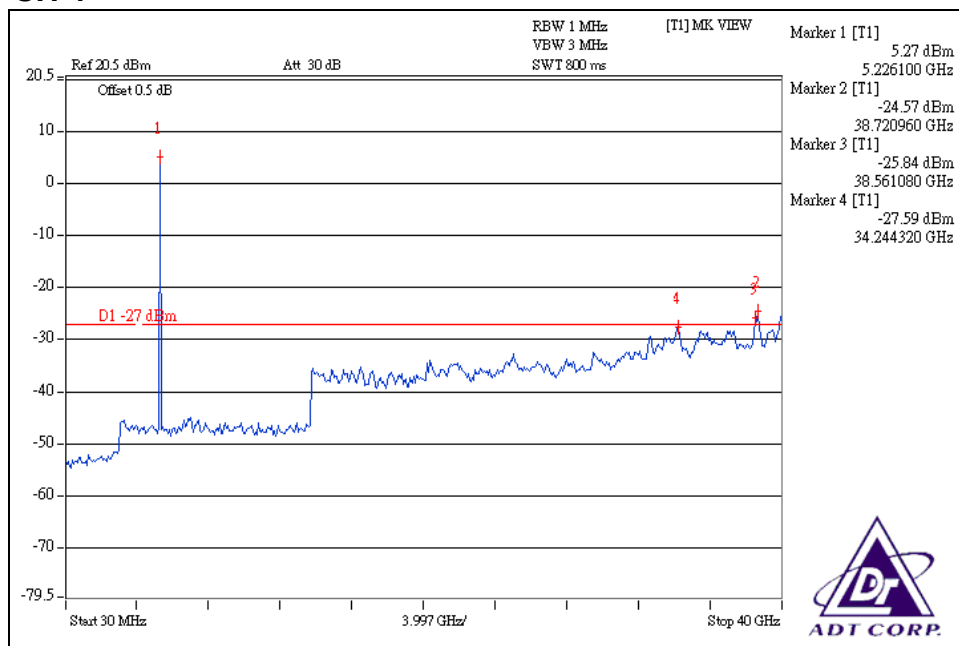
CH 4



CH 1

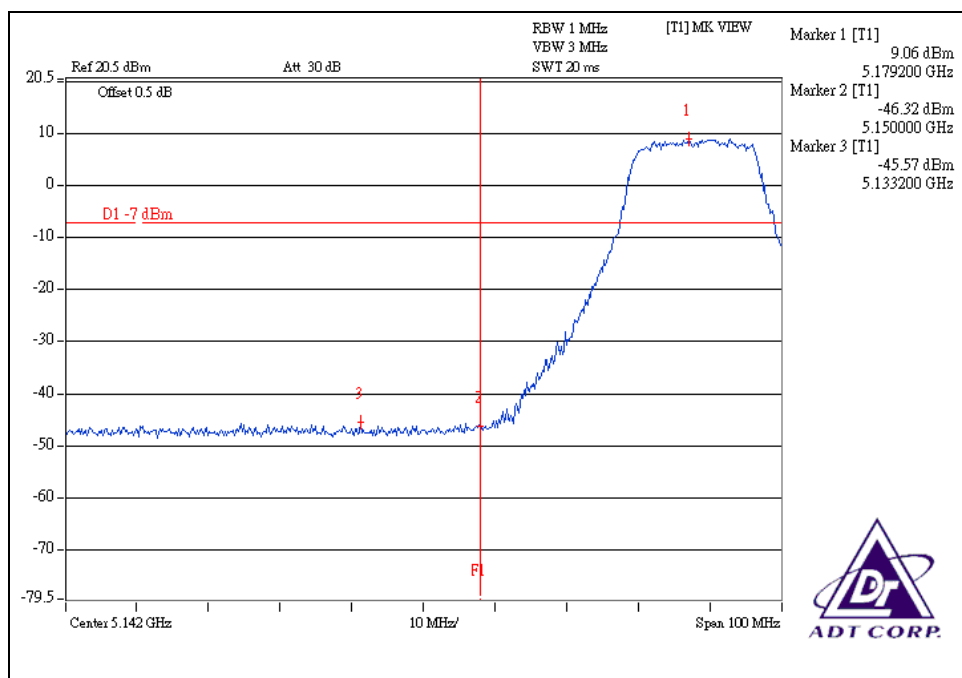


CH 4

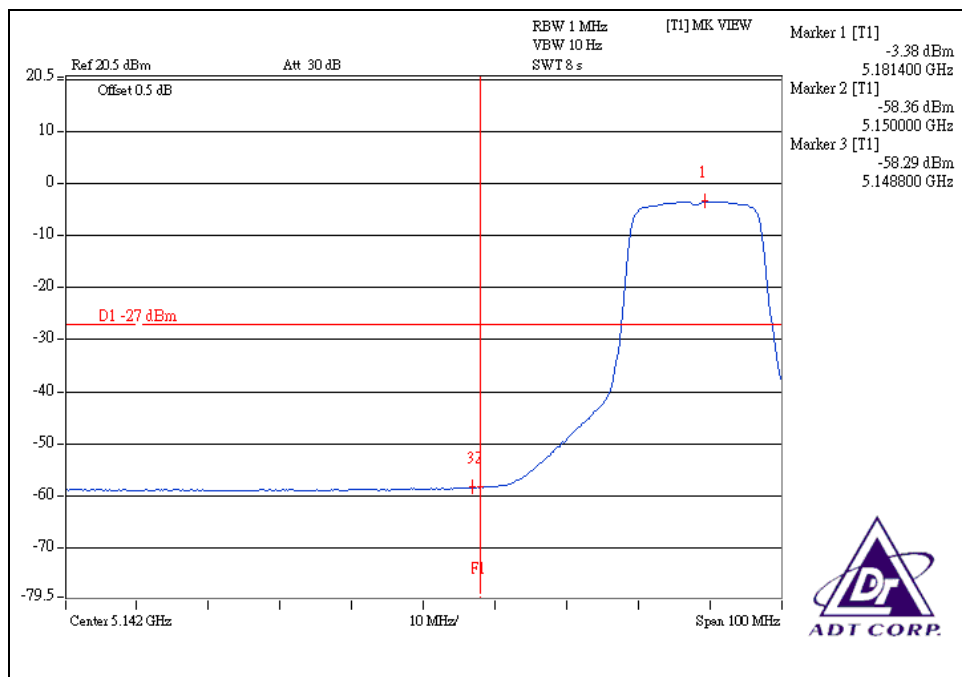


Chain 1

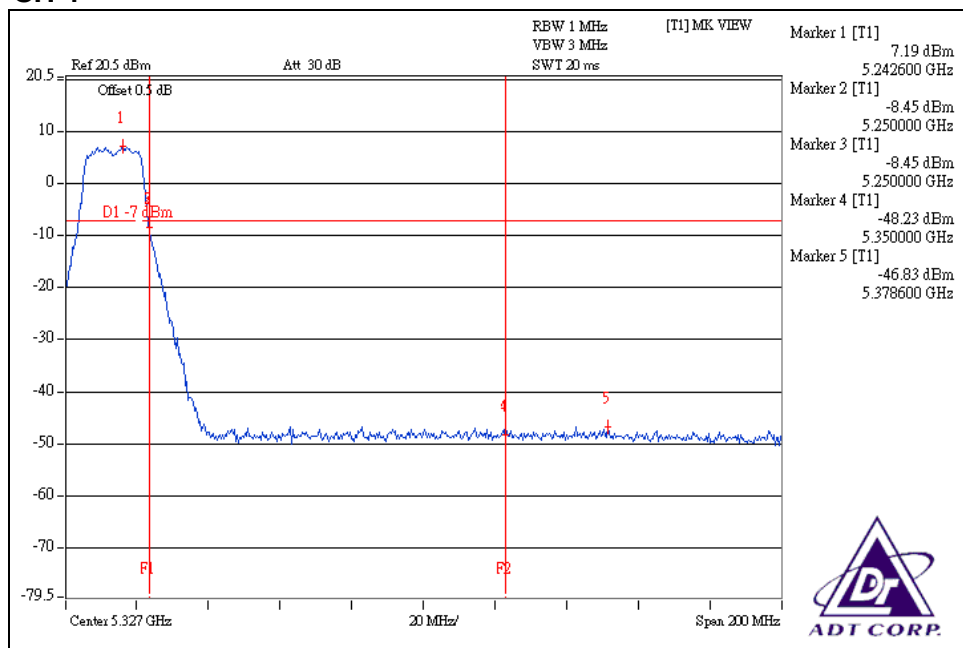
CH 1



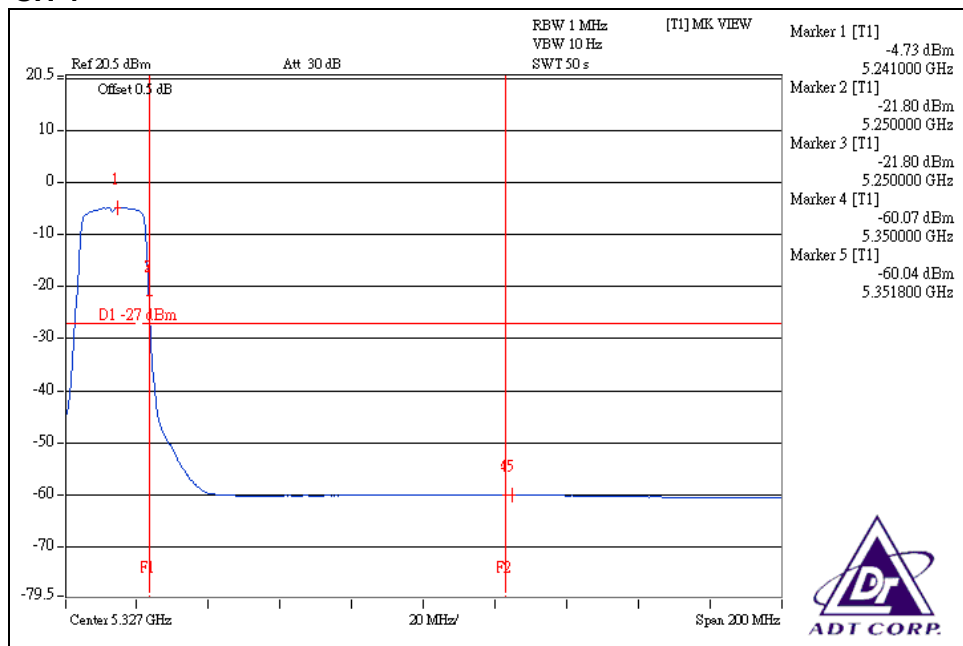
CH 1



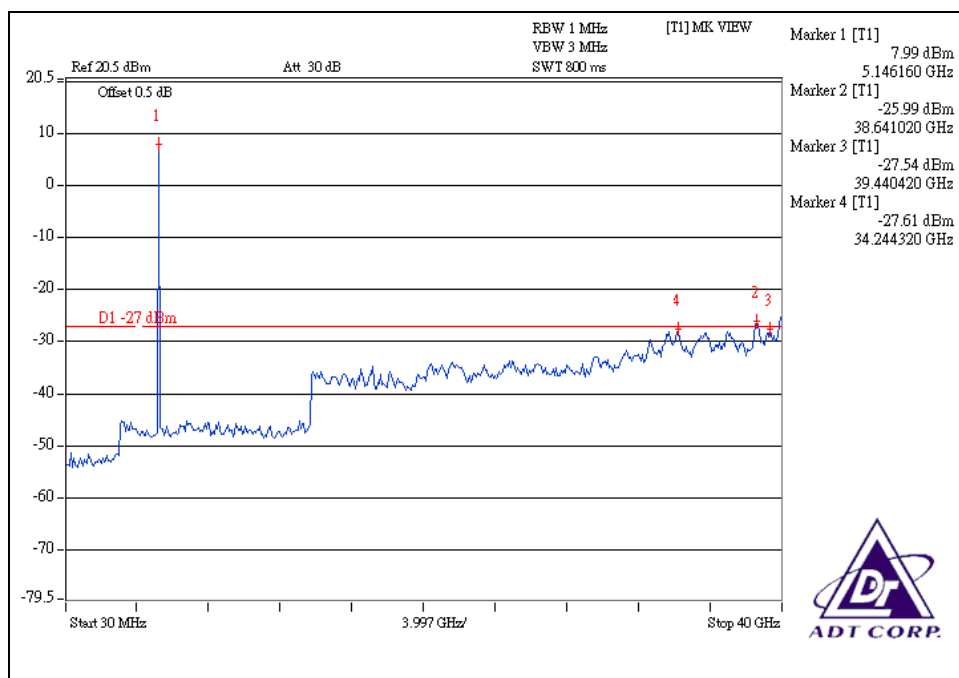
CH 4



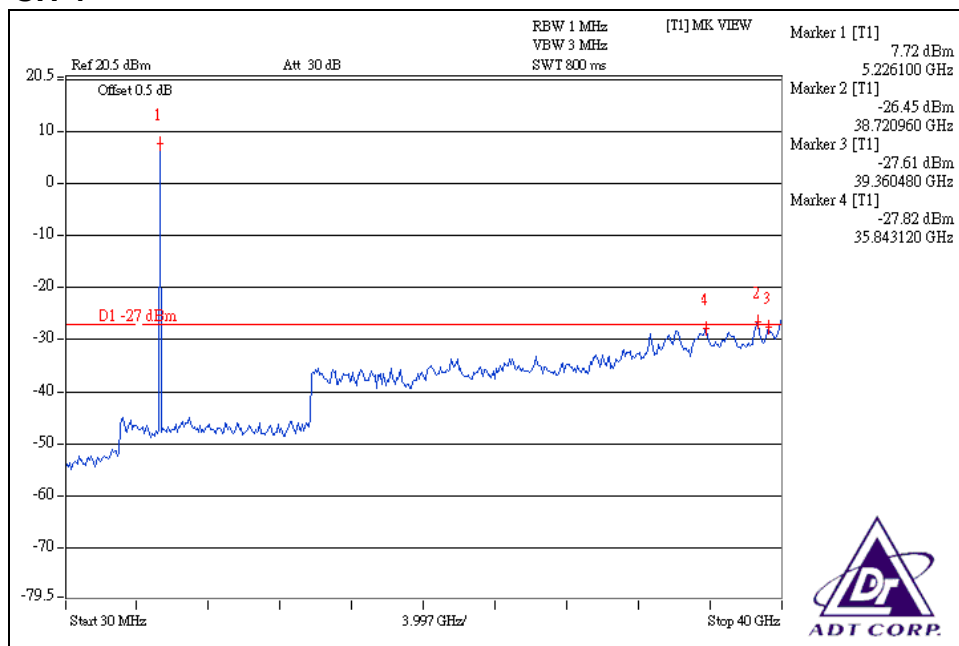
CH 4



CH 1

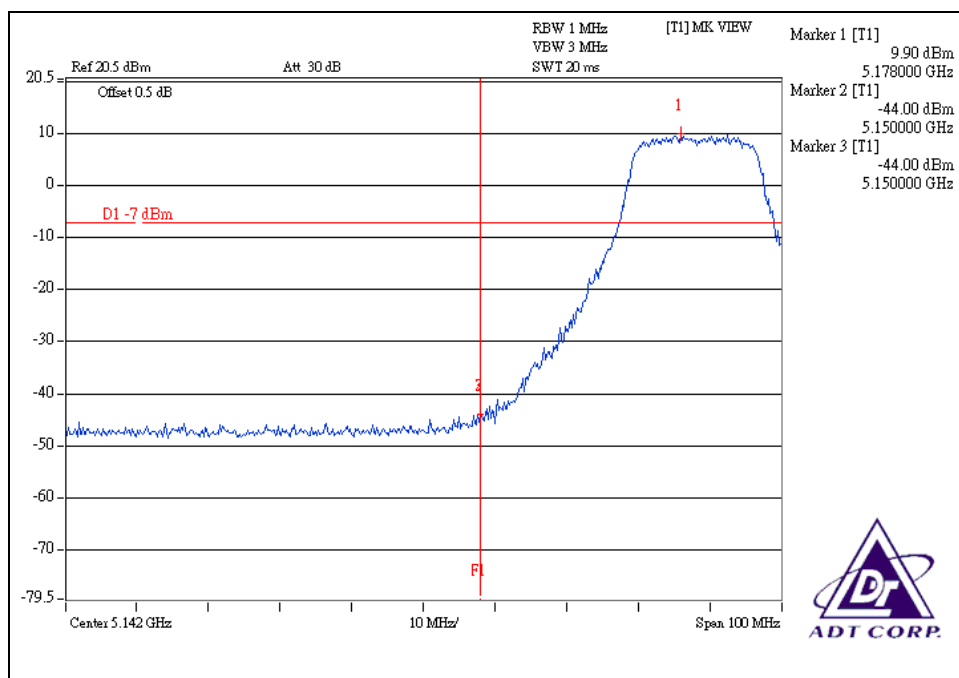


CH 4

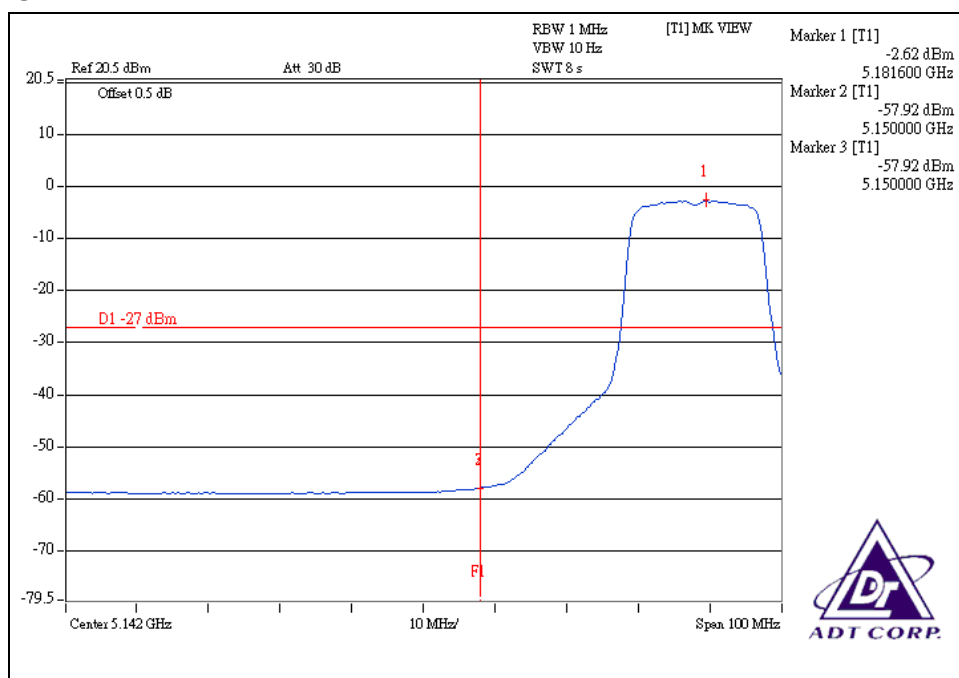


Chain 2

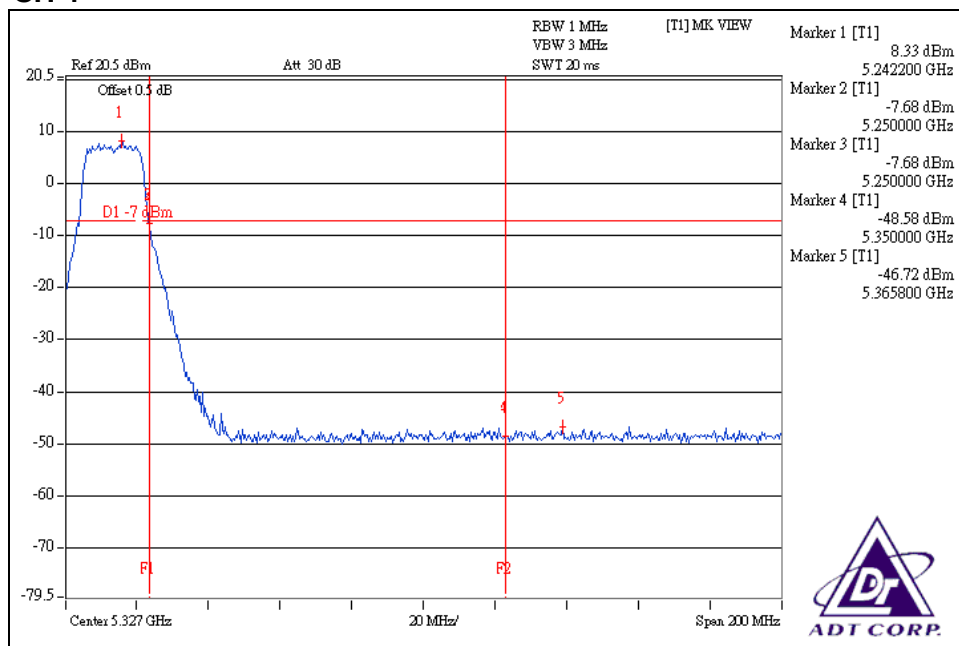
CH 1



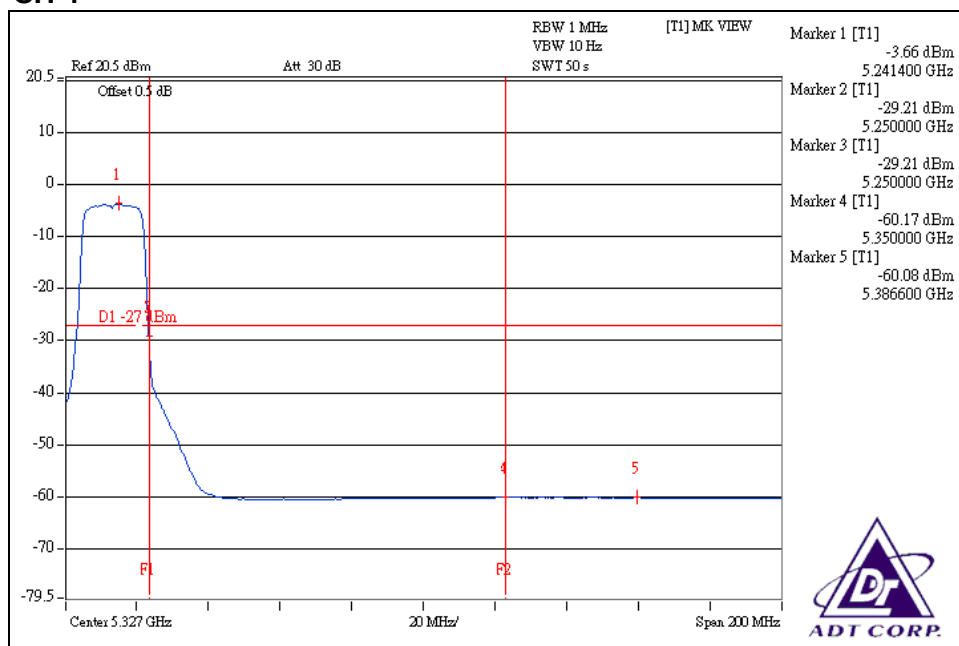
CH 1



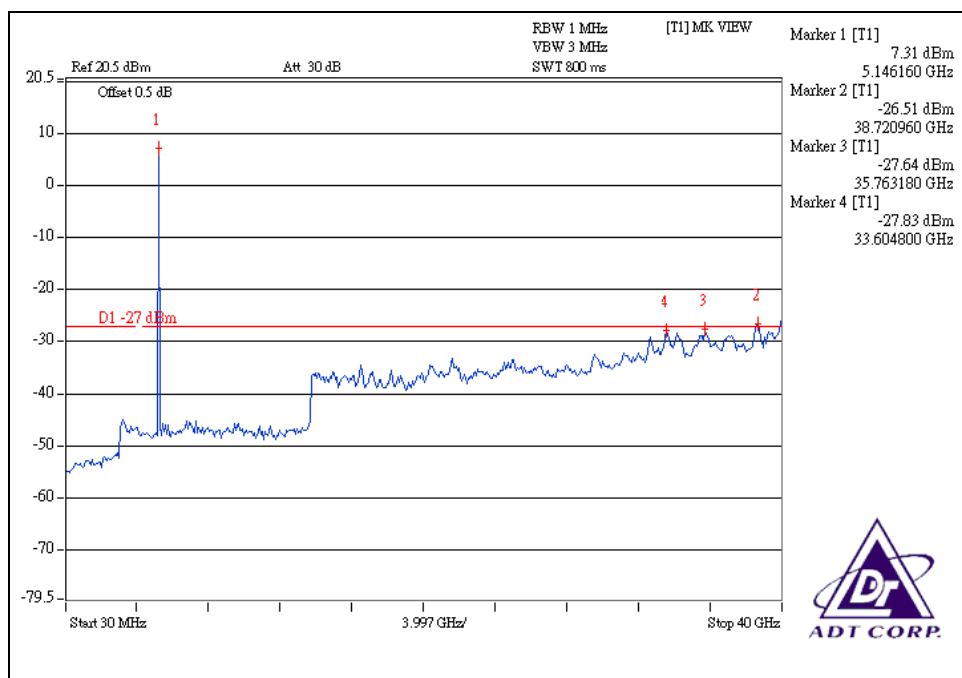
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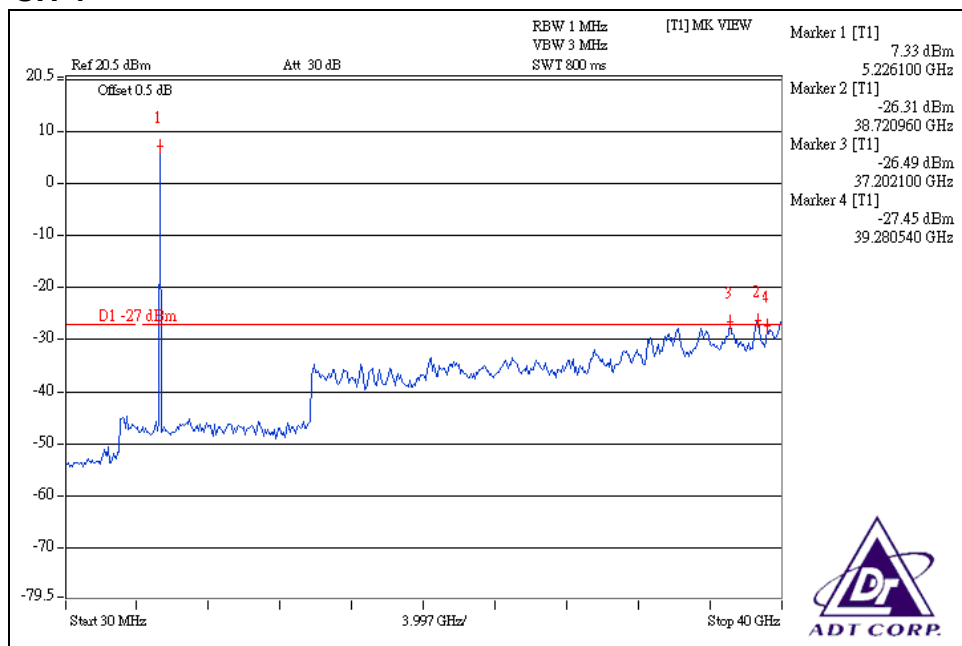
CH 4



CH 1



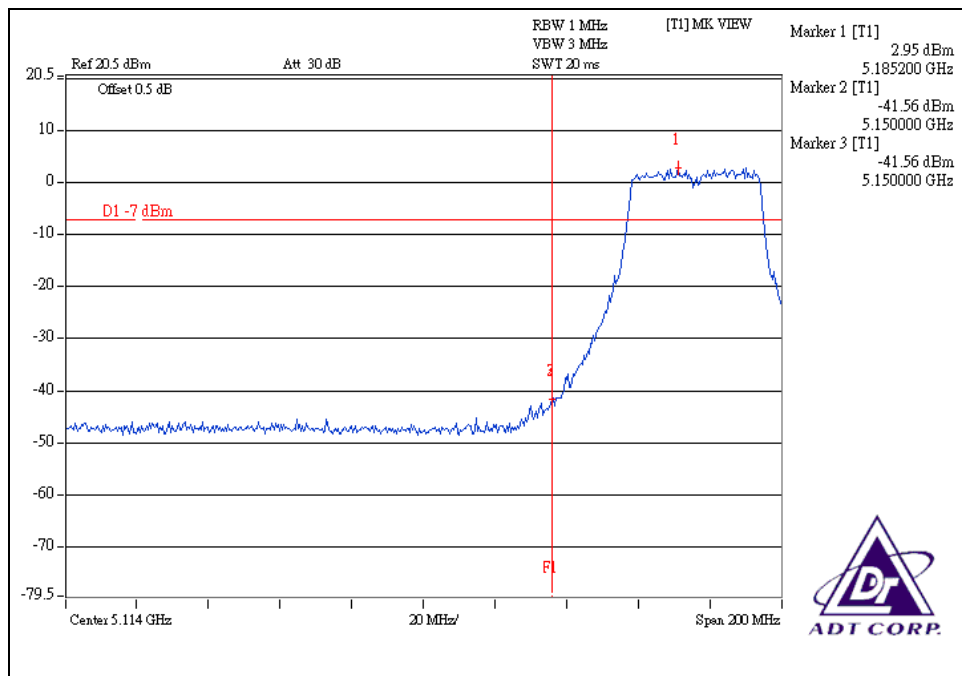
CH 4



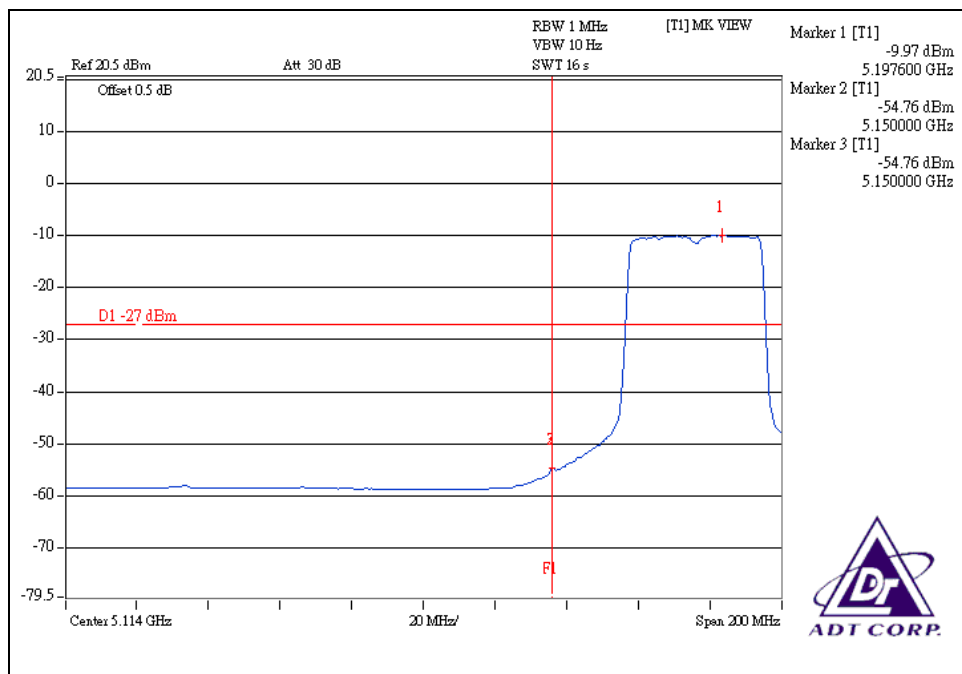
DRAFT 802.11n (40MHz) OFDM MODULATION:

Chain 0

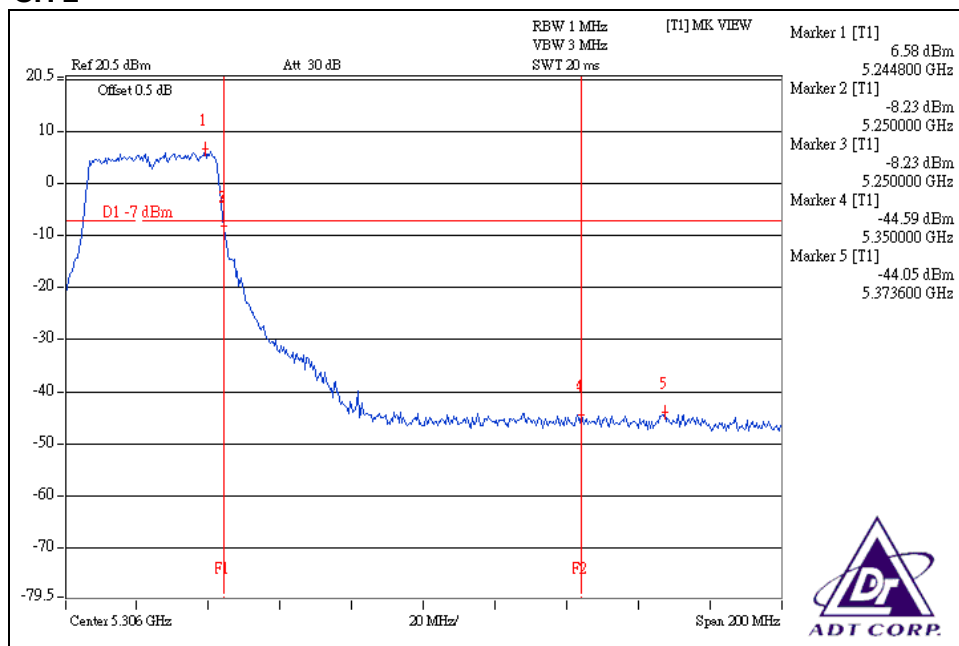
CH 1



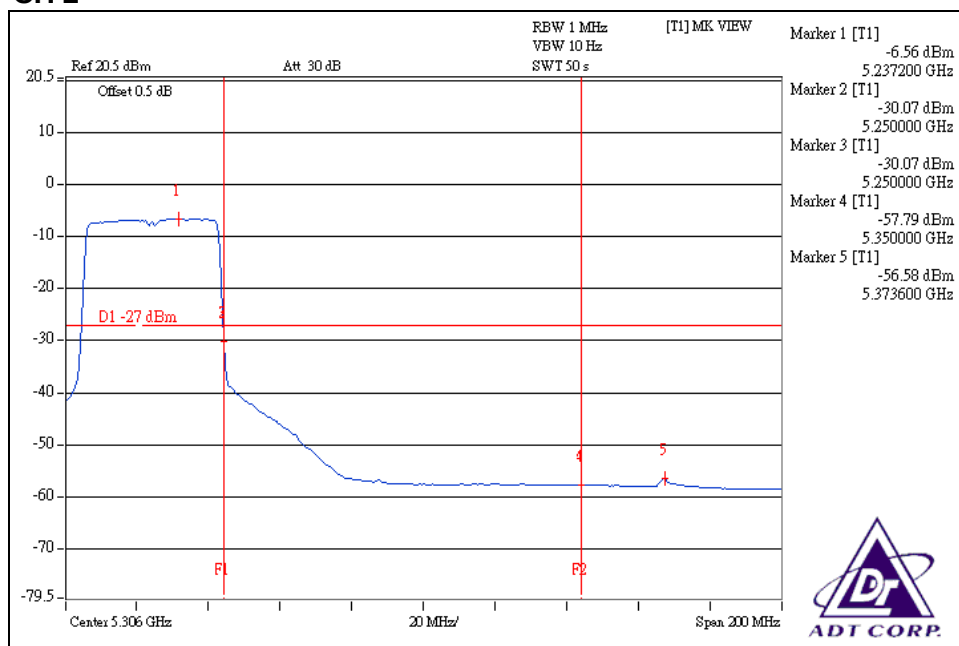
CH 1



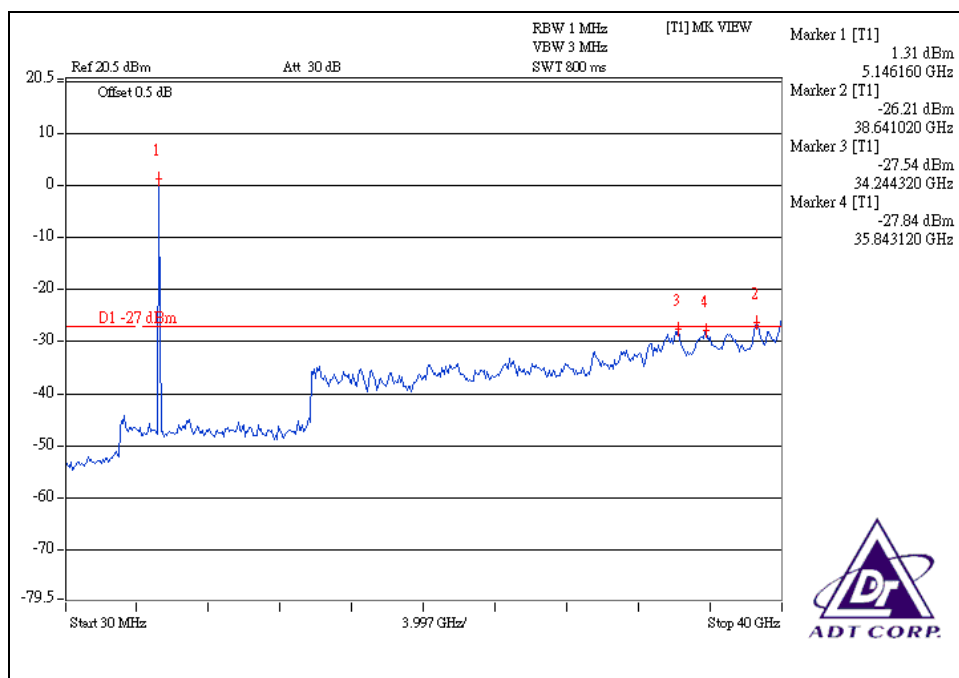
CH 2



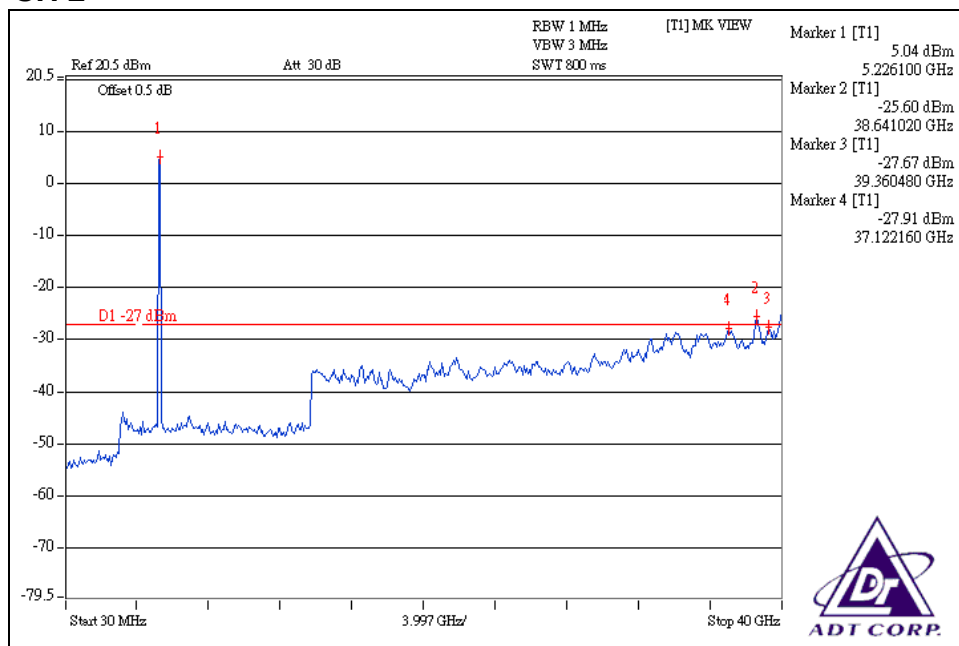
CH 2



CH 1

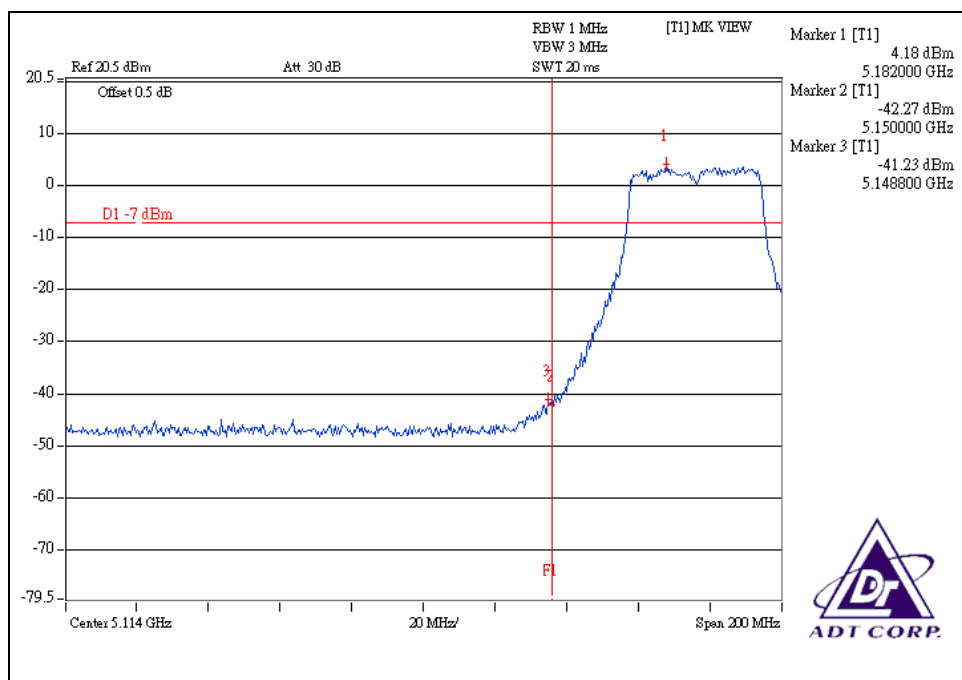


CH 2

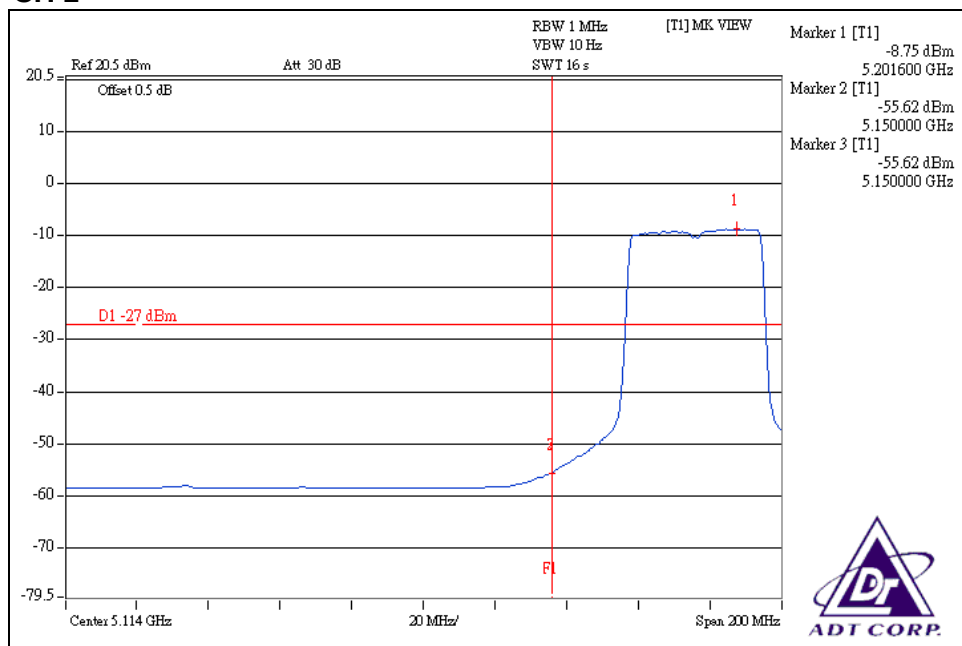


Chain 1

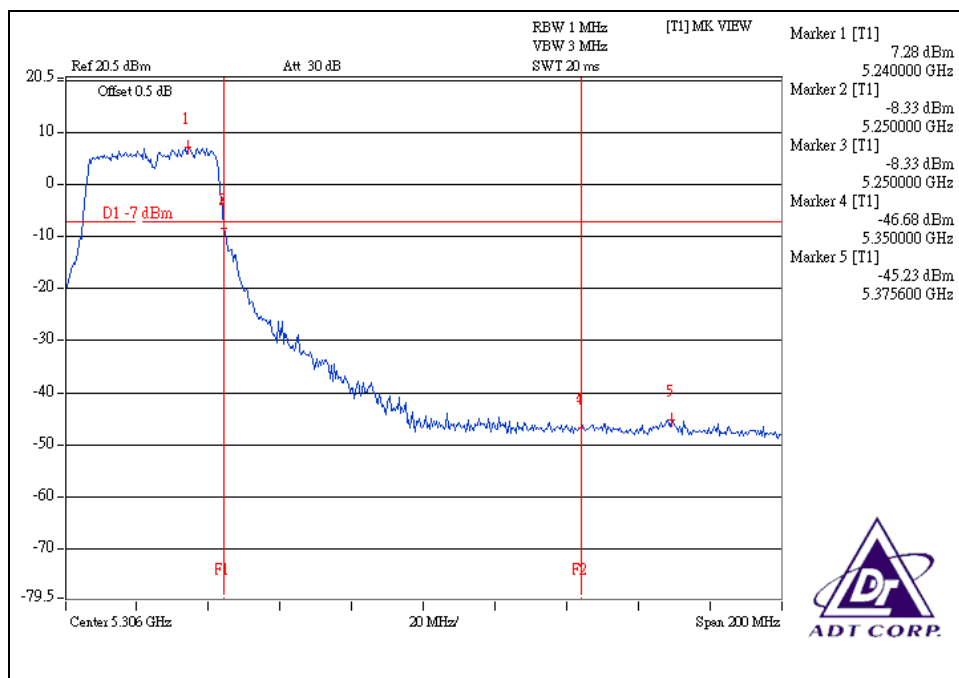
CH 1



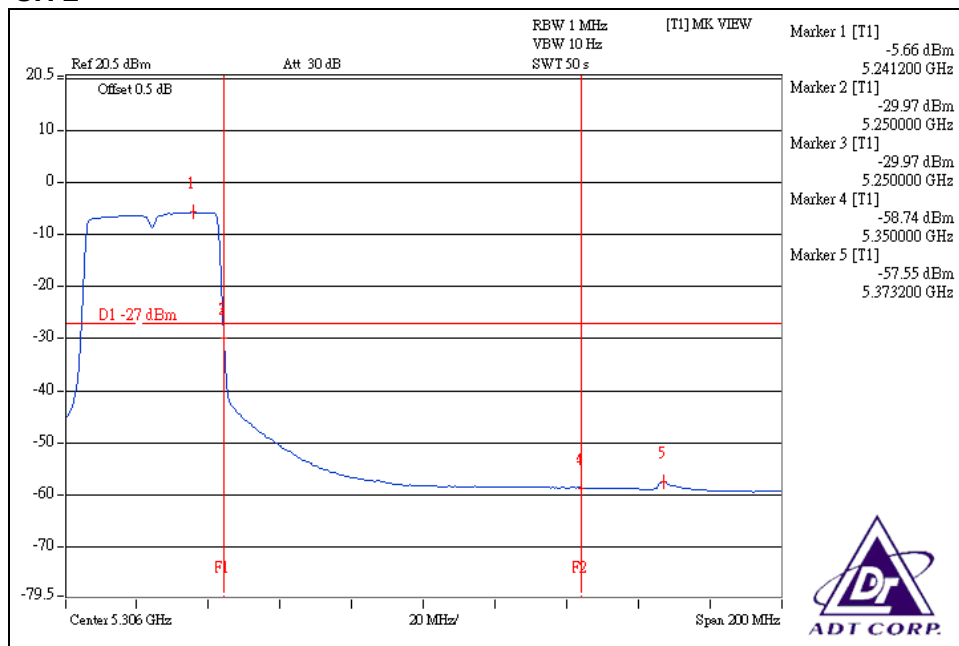
CH 1



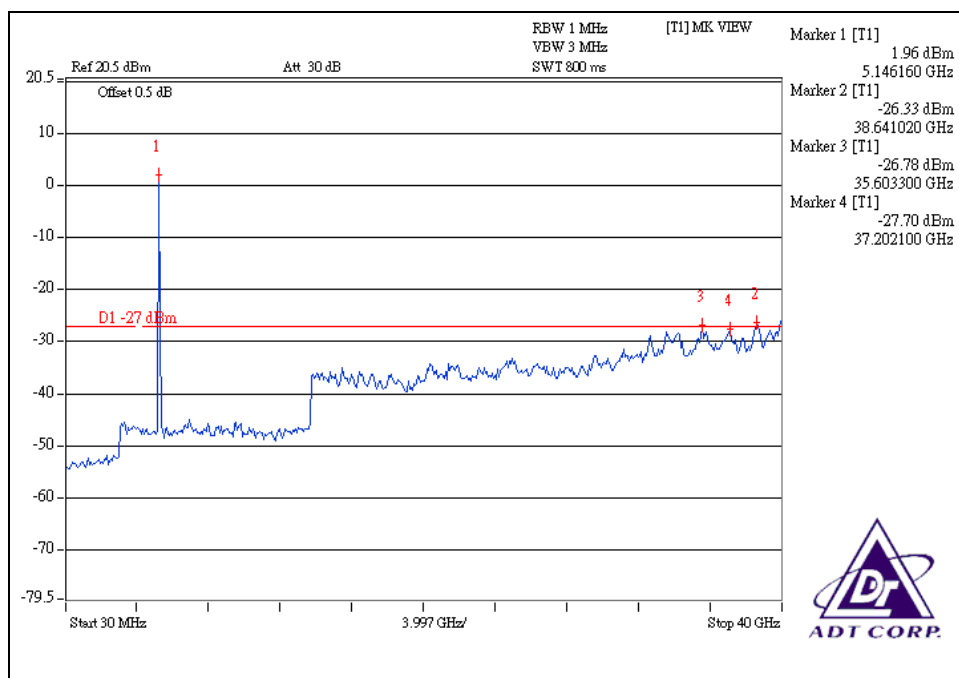
CH 2



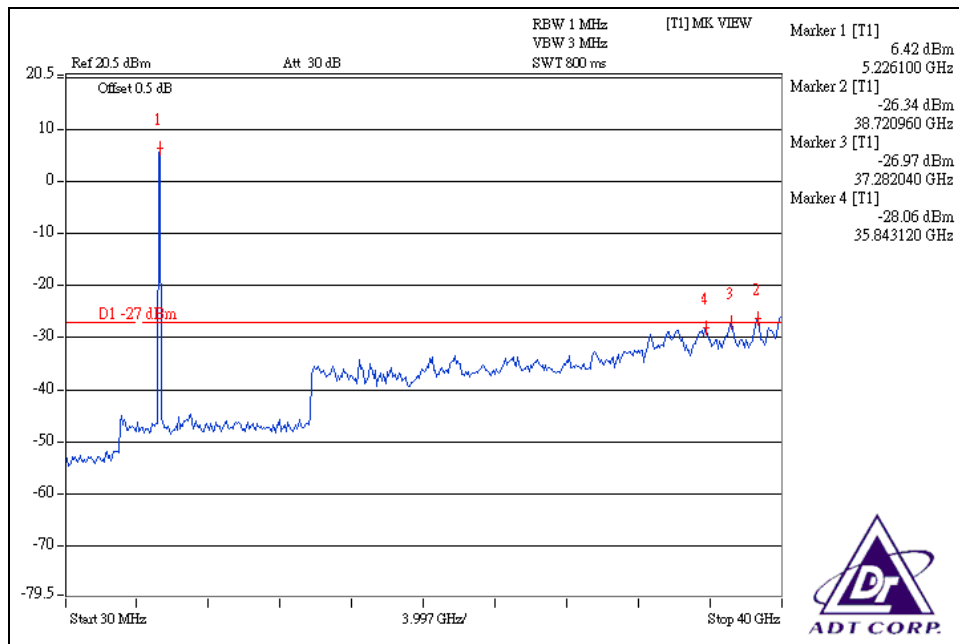
CH 2



CH 1

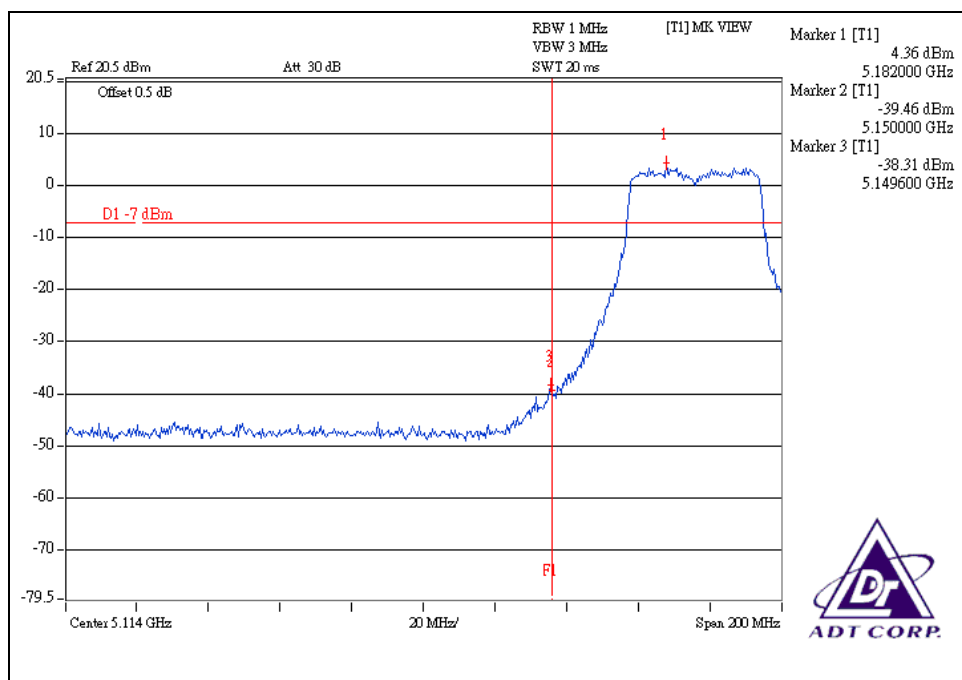


CH 2

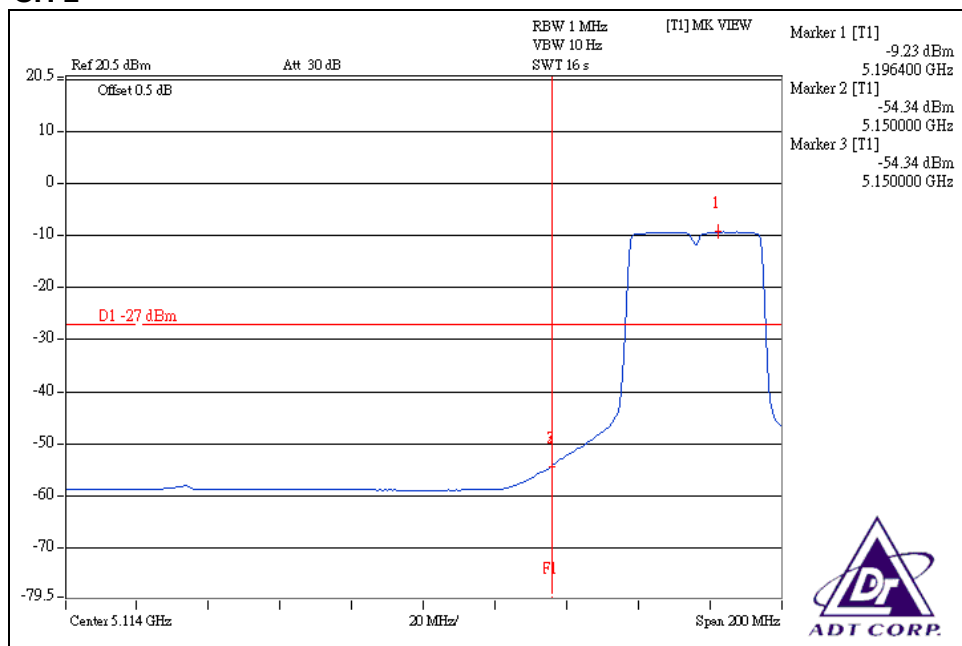


Chain 2

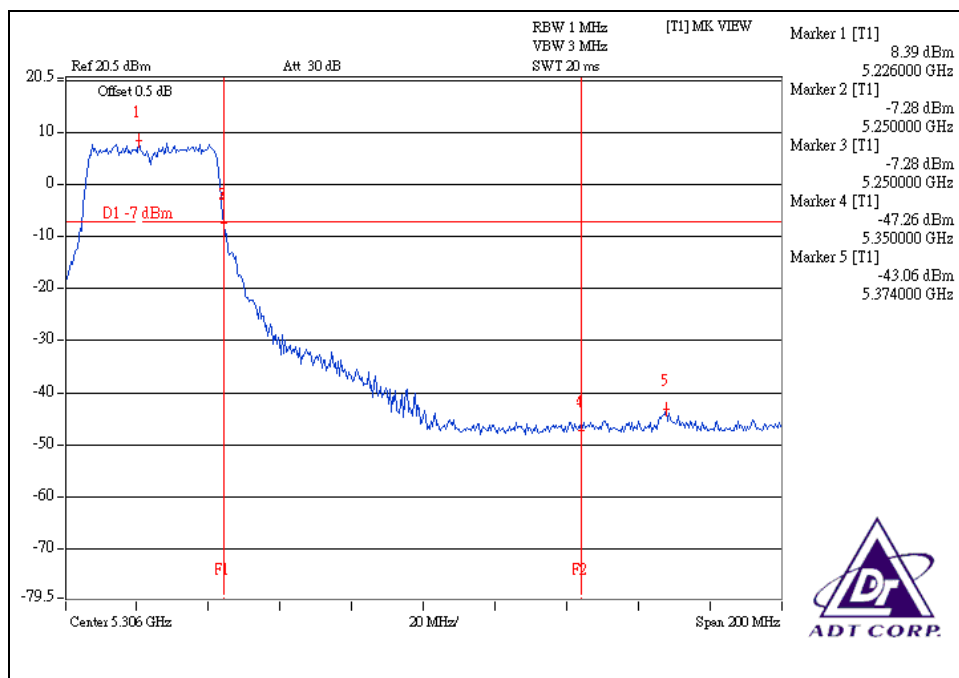
CH 1



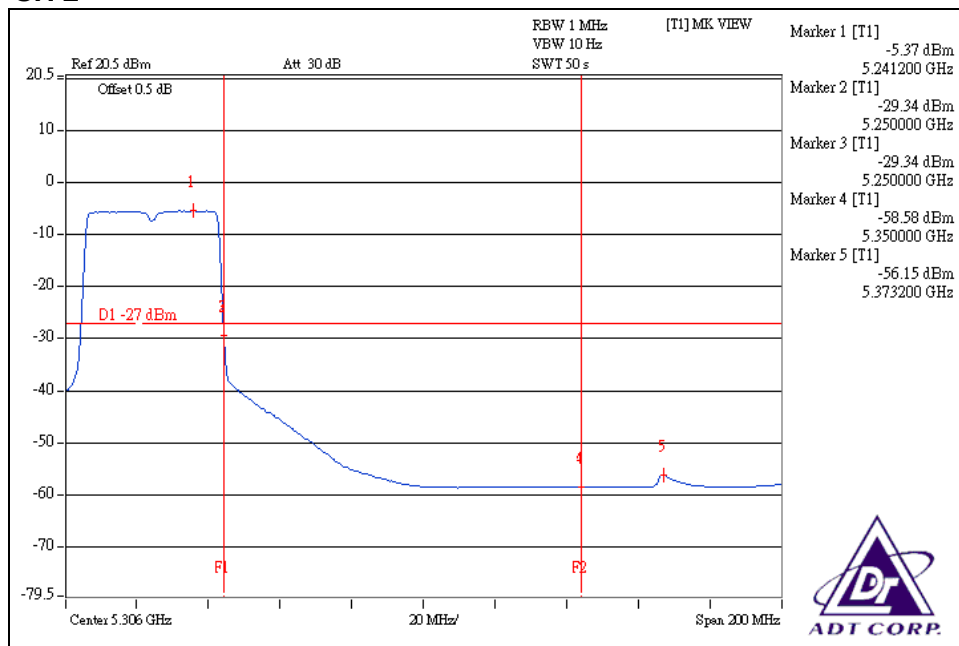
CH 1



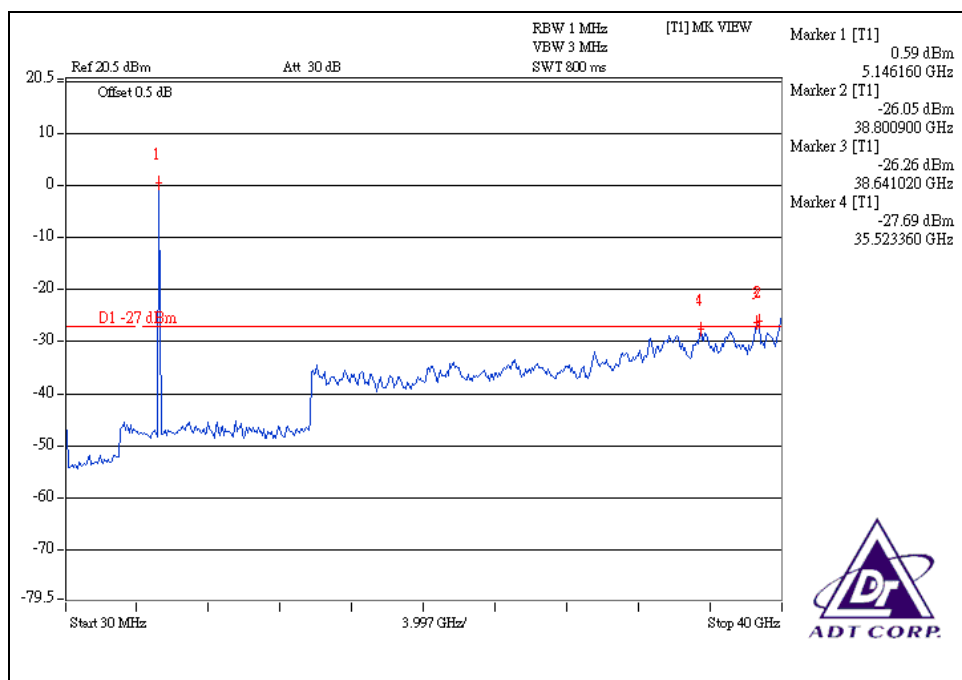
CH 2



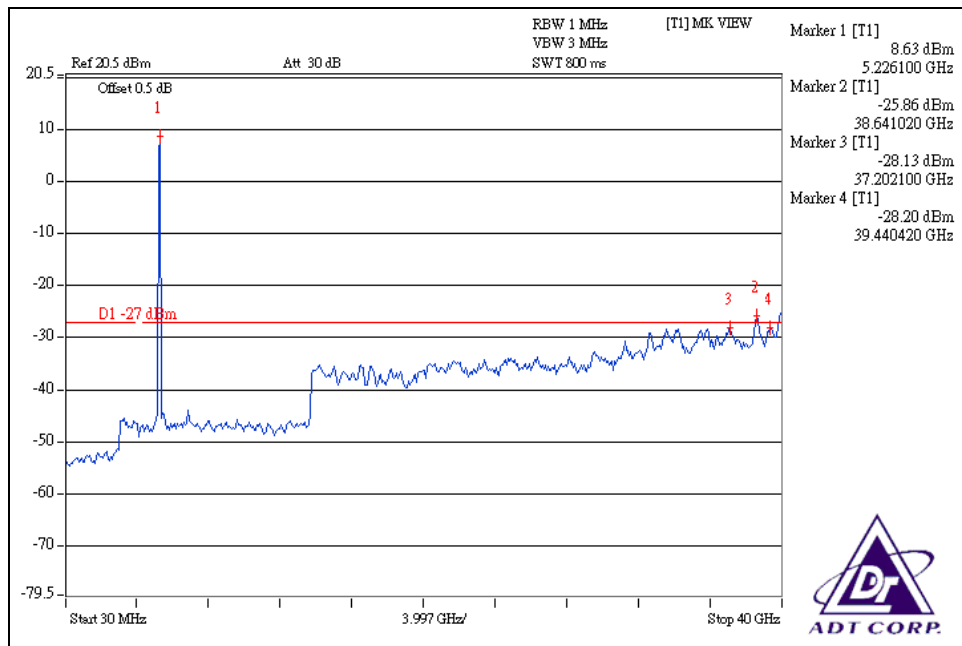
CH 2



CH 1



CH 2



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	Model No.	Antenna Gain	For 2.4GHz Gain (dBi)	For 5.15~5.25GHz Gain (dBi)	For 5.725~5.850GHz Gain (dBi)	Antenna Type	Connector
1	DAP-2590	Gain (dBi)	4	6.10	7.12	Dipole	Reverse SMA
		Cable Loss (dB)	0.3		0.6		
		Net Gain (dB)	3.7	5.5	6.52		
2	ALP05-220170	Gain (dBi)	4.83	4.98	6.00	Dipole	RP SMA Plug
		Cable Loss (dB)	0.3		0.6		
		Net Gain (dB)	4.53	4.38	5.4		

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.