



FCC TEST REPORT

REPORT NO.: RF971006L02

MODEL NO.: APL20-065

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TESTED: Nov. 17 ~ Nov. 18, 2008

ISSUED: Nov. 24, 2008

APPLICANT: Sonicwall, Inc.

ADDRESS: 1143 Borregas Ave. Sunnyvale CA 94089-1306
USA

ISSUED BY: Bureau Veritas Consumer Products Services
(H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou
Hsiang, Taipei Hsien 244, Taiwan, R.O.C.

TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei
Shan Hsiang, Taoyuan Hsien 333, Taiwan,
R.O.C.

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1. CERTIFICATION

PRODUCT: 802.11b/g/n Router
MODEL: APL20-065
BRAND: SonicWALL
APPLICANT: Sonicwall, Inc.
TESTED: Nov. 17 ~ Nov. 18, 2008
TEST SAMPLE: R&D SAMPLE
STANDARDS: FCC Part 15, Subpart C (Section 15.247)
ANSI C63.4-2003

The above equipment (model: APL20-065) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch,** 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 : Andrea Hsia , **DATE:** Nov. 24, 2008
Andrea Hsia / Specialist

TECHNICAL ACCEPTANCE : Long Chen , **DATE:** Nov. 24, 2008
Responsible for RF Long Chen / Senior Engineer

APPROVED BY : Gary Chang , **DATE:** Nov. 24, 2008
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 C			
Standard Section	Test Type and Limit	Result	Remark
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -8.31dB at 0.162MHz.
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -1.15dB at 4874.00 & 2390.00MHz.
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	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	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

PRODUCT	802.11b/g/n Router
MODEL NO.	APL20-065
FCC ID	QWU-06C
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 Draft 802.11n: up to 300.0Mbps
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, Draft 802.11n (20MHz) 7 for Draft 802.11n (40MHz)
MAXIMUM OUTPUT POWER	836.340mW
ANTENNA TYPE	Dipole antenna with 5dBi gain
DATA CABLE	NA
I/O PORTS	RJ45, USB
ACCESSORY DEVICES	AC Adapter

NOTE:

- The EUT were powered by the following adapters:

ADAPTER 1	
BRAND	SINO-AMERICAN
MODEL	SAL124A-1220V-6
INPUT POWER	100-240Vac, 50-60Hz, 0.8A
OUTPUT POWER	12Vdc, 1.66A, 19.92W
POWER LINE	1.5m non-shielded cable with one core

ADAPTER 2	
BRAND	LEI
MODEL	NU20-8120166-I1
INPUT POWER	100-240Vac, 50/60Hz, 1A
OUTPUT POWER	12Vdc, 1.66A
POWER LINE	1.5m non-shielded cable with one core



- 2. The EUT incorporates a MIMO function. Physically, the EUT provides three completed transmitters and three receivers.

MODULATION MODE	TX FUNCTION
802.11b	3TX
802.11g	3TX
Draft 802.11n (20MHz)	3TX
Draft 802.11n (40MHz)	3TX

- 3. 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

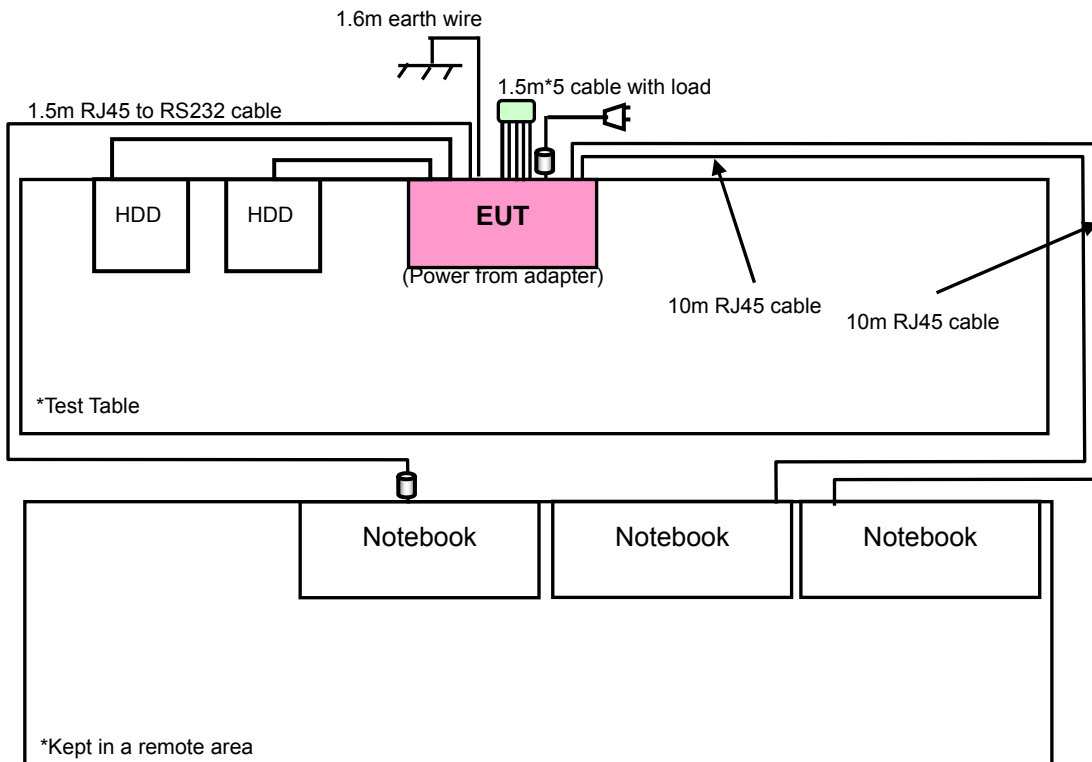
Eleven channels are provided for 802.11b, 802.11g and draft 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2422MHz	5	2442MHz
2	2427MHz	6	2447MHz
3	2432MHz	7	2452MHz
4	2437MHz		

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST





3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	For Adapter 1
B	-	√	√	-	For Adapter 2

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

NOTE: "-" means no effect

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
A	Draft 802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
A	Draft 802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	15

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11g	1 to 11	6	OFDM	BPSK	6
B	802.11g	1 to 11	6	OFDM	BPSK	6

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11g	1 to 11	6	OFDM	BPSK	6
B	802.11g	1 to 11	6	OFDM	BPSK	6

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 11	DSSS	DBPSK	1
A	802.11g	1 to 11	1, 11	OFDM	BPSK	6
A	Draft 802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2
A	Draft 802.11n (40MHz)	1 to 7	1, 7	OFDM	BPSK	15

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
A	Draft 802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
A	Draft 802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	15

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 C. (15.247)

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	External Hard Disk	Terasys	F12-UF	A0100222-4860009	FCC DoC Approved
2	External Hard Disk	Terasys	F12-UF	A0100222-4A60013	FCC DoC Approved
3	NOTEBOOK	DELL	D600	F8HBC1S	E2K24CLNS
4	NOTEBOOK	DELL	PP05L	FPBCB1S	E2K24CLNS
5	NOTEBOOK	DELL	PP18L	D1T5W1S 28407620224	QDS-BRCM1019

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.5 m shielded cable, terminated with USB connector, w/o core.
2	1.5 m shielded cable, terminated with USB connector, w/o core.
3	10m RJ45 cable
4	10m RJ45 cable
5	1.5m RJ45 to RS232 cable

NOTE 1: All power cords of the above support units are non-shielded (1.8m).

NOTE 2: Item 3-5 acted as a communication partner to transfer data.

NOTE 3: 1.5m RJ45 to RS232 cable was supplied from client.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 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.



4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	May 28, 2008	May 27, 2009
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Aug. 08, 2008	Aug. 07, 2009
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Apr. 25, 2008	Apr. 24, 2009
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 07, 2008	Jan. 06, 2009
Preamplifier Agilent	8449B	3008A01911	Sep. 10, 2008	Sep. 09, 2009
Preamplifier Agilent	8447D	2944A10634	Dec. 13, 2007	Dec. 12, 2008
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218190/4 231241/4	May 20, 2008	May 19, 2009
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 09, 2008	Aug. 08, 2009
Software	ADT_Radiated_V7.6	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	NA	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 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 FCC Site Registration No. is 215374.
 5. The IC Site Registration No. is IC3789B-9.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters 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 lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

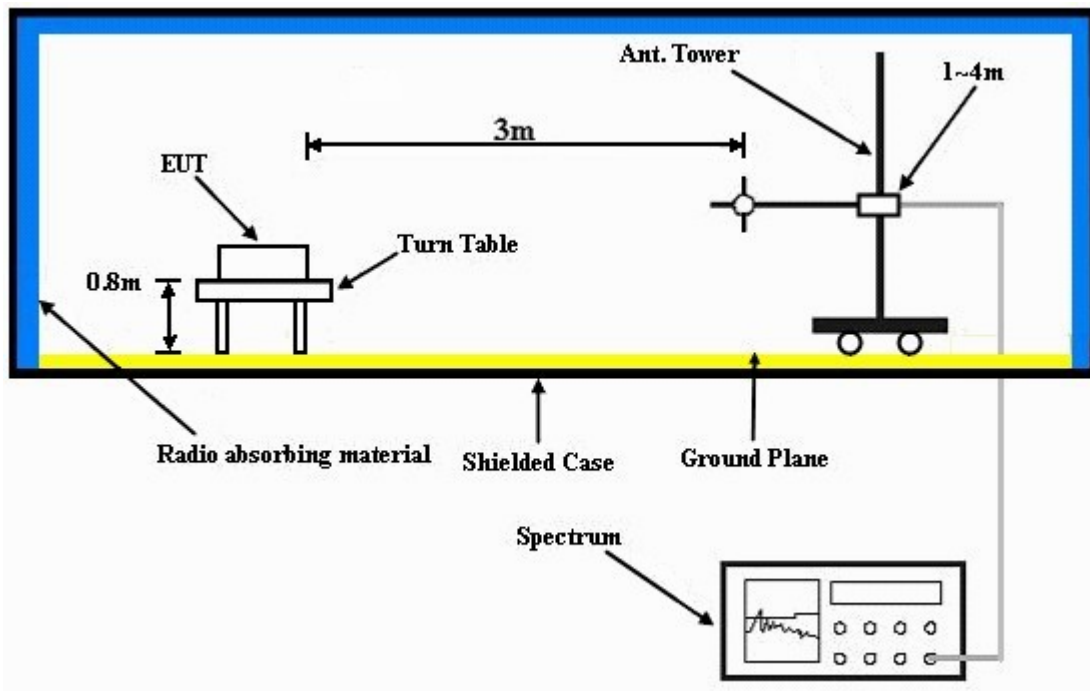
NOTE:

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 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. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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 necessary accessories enable the EUT in full functions.

4.1.7 TEST RESULTS

802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH 1000hPa	TESTED BY	Kevin Liang

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	2390.00	59.32 PK	74.00	-14.68	1.08 H	349	25.99	33.33
2	2390.00	47.52 AV	54.00	-6.48	1.08 H	349	14.19	33.33
3	*2412.00	101.15 PK			1.07 H	349	67.74	33.41
4	*2412.00	94.80 AV			1.07 H	349	61.39	33.41
5	4824.00	54.81 PK	74.00	-19.19	1.10 H	205	15.05	39.76
6	4824.00	52.49 AV	54.00	-1.51	1.10 H	205	12.73	39.76

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	2390.00	61.43 PK	74.00	-12.57	1.12 V	185	28.10	33.33
2	2390.00	51.11 AV	54.00	-2.89	1.12 V	185	17.78	33.33
3	*2412.00	110.53 PK			1.12 V	184	77.12	33.41
4	*2412.00	104.19 AV			1.12 V	184	70.78	33.41
5	4824.00	53.38 PK	74.00	-20.62	1.12 V	183	13.62	39.76
6	4824.00	51.34 AV	54.00	-2.66	1.12 V	183	11.58	39.76

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH 1000hPa	TESTED BY	Kevin Liang

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	*2437.00	101.24 PK			1.37 H	334	67.75	33.49
2	*2437.00	94.77 AV			1.37 H	334	61.28	33.49
3	4874.00	55.79 PK	74.00	-18.21	1.00 H	207	15.91	39.88
4	4874.00	52.85 AV	54.00	-1.15	1.00 H	207	12.97	39.88

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	*2437.00	110.52 PK			1.15 V	40	77.03	33.49
2	*2437.00	104.03 AV			1.15 V	40	70.54	33.49
3	4874.00	54.41 PK	74.00	-19.59	1.11 V	234	14.53	39.88
4	4874.00	52.48 AV	54.00	-1.52	1.11 V	234	12.60	39.88

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH 1000hPa	TESTED BY	Kevin Liang

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	*2462.00	101.37 PK			1.00 H	151	67.80	33.57
2	*2462.00	96.04 AV			1.00 H	151	62.47	33.57
3	2483.50	60.02 PK	74.00	-13.98	1.00 H	151	26.38	33.64
4	2483.50	47.75 AV	54.00	-6.25	1.00 H	151	14.11	33.64
5	4924.00	54.78 PK	74.00	-19.22	1.00 H	212	14.75	40.03
6	4924.00	52.48 AV	54.00	-1.52	1.00 H	212	12.45	40.03
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	*2462.00	110.42 PK			1.00 V	139	76.85	33.57
2	*2462.00	104.67 AV			1.00 V	139	71.10	33.57
3	2483.50	63.83 PK	74.00	-10.17	1.00 V	139	30.19	33.64
4	2483.50	52.83 AV	54.00	-1.17	1.00 V	139	19.19	33.64
5	4924.00	53.47 PK	74.00	-20.53	1.11 V	235	13.44	40.03
6	4924.00	50.95 AV	54.00	-3.05	1.11 V	235	10.91	40.03

- 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.



A D T

802.11g OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH 1000hPa	TESTED BY	Kevin Liang

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	2390.00	64.08 PK	74.00	-9.92	1.00 H	240	30.75	33.33
2	2390.00	49.04 AV	54.00	-4.96	1.00 H	240	15.71	33.33
3	*2412.00	103.88 PK			1.00 H	240	70.47	33.41
4	*2412.00	90.33 AV			1.00 H	240	56.92	33.41
5	4824.00	49.56 PK	74.00	-24.44	1.14 H	146	9.80	39.76
6	4824.00	36.90 AV	54.00	-17.10	1.14 H	146	-2.86	39.76
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	2390.00	71.73 PK	74.00	-2.27	1.12 V	54	38.40	33.33
2	2390.00	52.85 AV	54.00	-1.15	1.12 V	54	19.52	33.33
3	*2412.00	113.52 PK			1.12 V	54	80.11	33.41
4	*2412.00	99.54 AV			1.12 V	54	66.13	33.41
5	4824.00	47.55 PK	74.00	-26.45	1.04 V	85	7.79	39.76
6	4824.00	35.40 AV	54.00	-18.60	1.04 V	85	-4.36	39.76

- 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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH 1000hPa	TESTED BY	Kevin Liang

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	*2437.00	104.16 PK			1.00 H	237	70.67	33.49
2	*2437.00	91.38 AV			1.00 H	237	57.89	33.49
3	4874.00	48.03 PK	74.00	-25.97	1.07 H	224	8.15	39.88
4	4874.00	35.84 AV	54.00	-18.16	1.07 H	224	-4.04	39.88
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	*2437.00	113.70 PK			1.12 V	1	80.21	33.49
2	*2437.00	99.80 AV			1.12 V	1	66.31	33.49
3	4874.00	48.68 PK	74.00	-25.32	1.31 V	22	8.80	39.88
4	4874.00	37.00 AV	54.00	-17.00	1.31 V	22	-2.88	39.88

- 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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH 1000hPa	TESTED BY	Kevin Liang

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	*2462.00	103.36 PK			1.03 H	349	69.79	33.57
2	*2462.00	89.90 AV			1.03 H	349	56.33	33.57
3	2483.50	62.63 PK	74.00	-11.37	1.03 H	349	28.99	33.64
4	2483.50	48.04 AV	54.00	-5.96	1.03 H	349	14.40	33.64
5	4924.00	47.68 PK	74.00	-26.32	1.08 H	221	7.65	40.03
6	4924.00	35.64 AV	54.00	-18.36	1.08 H	221	-4.39	40.03
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	*2462.00	113.27 PK			1.12 V	1	79.70	33.57
2	*2462.00	99.50 AV			1.12 V	1	65.93	33.57
3	2483.50	71.16 PK	74.00	-2.84	1.12 V	1	37.52	33.64
4	2483.50	52.45 AV	54.00	-1.55	1.12 V	1	18.81	33.64
5	4924.00	48.45 PK	74.00	-25.55	1.33 V	26	8.42	40.03
6	4924.00	36.51 AV	54.00	-17.49	1.33 V	26	-3.52	40.03

- 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.



A D T

DRAFT 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH 1000hPa	TESTED BY	Kevin Liang

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	2390.00	62.38 PK	74.00	-11.62	1.00 H	239	29.05	33.33
2	2390.00	47.64 AV	54.00	-6.36	1.00 H	239	14.31	33.33
3	*2412.00	100.12 PK			1.00 H	239	66.71	33.41
4	*2412.00	87.04 AV			1.00 H	239	53.63	33.41
5	4824.00	50.58 PK	74.00	-23.42	1.10 H	187	10.82	39.76
6	4824.00	37.50 AV	54.00	-16.50	1.10 H	187	-2.26	39.76
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	2390.00	72.32 PK	74.00	-1.68	1.16 V	21	38.99	33.33
2	2390.00	52.14 AV	54.00	-1.86	1.16 V	21	18.81	33.33
3	*2412.00	111.78 PK			1.16 V	20	78.37	33.41
4	*2412.00	97.71 AV			1.16 V	20	64.30	33.41
5	4824.00	50.97 PK	74.00	-23.03	1.35 V	152	11.21	39.76
6	4824.00	37.35 AV	54.00	-16.65	1.35 V	152	-2.41	39.76

- 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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH 1000hPa	TESTED BY	Kevin Liang

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	*2437.00	101.99 PK			1.00 H	238	68.50	33.49
2	*2437.00	88.48 AV			1.00 H	238	54.99	33.49
3	4874.00	50.61 PK	74.00	-23.39	1.11 H	190	10.73	39.88
4	4874.00	37.72 AV	54.00	-16.28	1.11 H	190	-2.16	39.88
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	*2437.00	111.16 PK			1.14 V	19	77.67	33.49
2	*2437.00	97.47 AV			1.14 V	19	63.98	33.49
3	4874.00	50.88 PK	74.00	-23.12	1.33 V	157	11.00	39.88
4	4874.00	37.31 AV	54.00	-16.69	1.33 V	157	-2.57	39.88

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH 1000hPa	TESTED BY	Kevin Liang

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	*2462.00	99.63 PK			1.00 H	240	66.06	33.57
2	*2462.00	85.93 AV			1.00 H	240	52.36	33.57
3	2483.50	60.36 PK	74.00	-13.64	1.00 H	240	26.72	33.64
4	2483.50	47.57 AV	54.00	-6.43	1.00 H	240	13.93	33.64
5	4924.00	51.14 PK	74.00	-22.86	1.13 H	192	11.11	40.03
6	4924.00	37.73 AV	54.00	-16.27	1.13 H	192	-2.30	40.03
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	*2462.00	111.44 PK			1.11 V	4	77.87	33.57
2	*2462.00	98.24 AV			1.11 V	4	64.67	33.57
3	2483.50	67.78 PK	74.00	-6.22	1.11 V	4	34.14	33.64
4	2483.50	52.08 AV	54.00	-1.92	1.11 V	4	18.44	33.64
5	4924.00	51.22 PK	74.00	-22.78	1.31 V	166	11.19	40.03
6	4924.00	37.42 AV	54.00	-16.58	1.31 V	166	-2.61	40.03

- 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.



A D T

DRAFT 802.11n (40MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH 1000hPa	TESTED BY	Kevin Liang

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	2390.00	64.38 PK	74.00	-9.62	1.00 H	241	31.05	33.33
2	2390.00	49.06 AV	54.00	-4.94	1.00 H	241	15.73	33.33
3	*2422.00	95.40 PK			1.00 H	241	61.96	33.44
4	*2422.00	81.97 AV			1.00 H	241	48.53	33.44
5	4844.00	47.94 PK	74.00	-26.06	1.07 H	161	8.14	39.81
6	4844.00	33.73 AV	54.00	-20.27	1.07 H	161	-6.07	39.81
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	2390.00	70.84 PK	74.00	-3.16	1.07 V	96	37.51	33.33
2	2390.00	52.65 AV	54.00	-1.35	1.07 V	96	19.32	33.33
3	*2422.00	106.88 PK			1.07 V	96	73.44	33.44
4	*2422.00	91.64 AV			1.07 V	96	58.20	33.44
5	4844.00	47.50 PK	74.00	-26.50	1.37 V	153	7.70	39.81
6	4844.00	33.93 AV	54.00	-20.07	1.37 V	153	-5.87	39.81

- 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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH 1000hPa	TESTED BY	Kevin Liang

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	*2437.00	96.38 PK			1.00 H	238	62.89	33.49
2	*2437.00	82.47 AV			1.00 H	238	48.98	33.49
3	4874.00	48.06 PK	74.00	-25.94	1.09 H	169	8.18	39.88
4	4874.00	33.80 AV	54.00	-20.20	1.09 H	169	-6.08	39.88

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	*2437.00	106.65 PK			1.13 V	28	73.16	33.49
2	*2437.00	91.79 AV			1.13 V	28	58.30	33.49
3	4874.00	47.61 PK	74.00	-26.39	1.38 V	156	7.73	39.88
4	4874.00	34.08 AV	54.00	-19.92	1.38 V	156	-5.80	39.88

- 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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH 1000hPa	TESTED BY	Kevin Liang

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	*2462.00	93.63 PK			1.00 H	238	60.06	33.57
2	*2462.00	79.17 AV			1.00 H	238	45.60	33.57
3	2483.50	58.51 PK	74.00	-15.49	1.00 H	237	24.87	33.64
4	2483.50	47.14 AV	54.00	-6.86	1.00 H	237	13.50	33.64
5	4904.00	48.02 PK	74.00	-25.98	1.09 H	238	8.06	39.96
6	4904.00	33.81 AV	54.00	-20.19	1.09 H	238	-6.15	39.96
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	*2452.00	106.32 PK			1.12 V	20	72.78	33.54
2	*2452.00	91.69 AV			1.12 V	20	58.15	33.54
3	2483.50	64.18 PK	74.00	-9.82	1.12 V	20	30.54	33.64
4	2483.50	52.83 AV	54.00	-1.17	1.12 V	20	19.19	33.64
5	4904.00	47.56 PK	74.00	-26.44	1.35 V	150	7.60	39.96
6	4904.00	33.97 AV	54.00	-20.03	1.35 V	150	-5.99	39.96

- 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.

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 67%RH 999hPa	TEST MODE	A
TESTED BY	Match Tsui		

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	105.73	34.68 QP	43.50	-8.82	1.50 H	91	22.76	11.92
2	166.00	35.25 QP	43.50	-8.25	1.50 H	319	20.77	14.48
3	249.60	44.43 QP	46.00	-1.57	1.00 H	250	30.03	14.40
4	364.32	39.24 QP	46.00	-6.76	1.00 H	40	21.89	17.36
5	500.42	37.68 QP	46.00	-8.32	1.50 H	217	16.21	21.48
6	862.06	39.24 QP	46.00	-6.76	1.50 H	148	10.22	29.01
7	906.77	40.28 QP	46.00	-5.72	1.50 H	259	10.31	29.97
8	947.60	38.25 QP	46.00	-7.75	1.50 H	295	7.83	30.42
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	39.62	37.66 QP	40.00	-2.34	1.00 V	328	22.36	15.30
2	68.79	36.11 QP	40.00	-3.89	1.00 V	64	22.53	13.58
3	364.32	43.15 QP	46.00	-2.85	1.25 V	175	25.80	17.36
4	455.70	39.23 QP	46.00	-6.77	1.00 V	298	18.94	20.29
5	469.31	40.37 QP	46.00	-5.63	1.00 V	205	19.72	20.65
6	908.72	41.94 QP	46.00	-4.06	1.00 V	304	11.94	29.99
7	947.60	42.55 QP	46.00	-3.45	1.25 V	16	12.13	30.42

- 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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 67%RH 999hPa	TEST MODE	B
TESTED BY	Match Tsui		

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	249.60	41.04 QP	46.00	-4.96	1.00 H	94	26.63	14.40
2	358.48	41.34 QP	46.00	-4.66	1.00 H	310	24.24	17.10
3	638.46	40.78 QP	46.00	-5.22	1.25 H	247	16.04	24.74
4	737.62	43.61 QP	46.00	-2.39	1.00 H	148	16.70	26.91
5	788.17	40.47 QP	46.00	-5.53	1.00 H	292	13.05	27.43
6	902.89	42.84 QP	46.00	-3.16	1.50 H	151	12.91	29.93
7	947.60	41.68 QP	46.00	-4.32	1.50 H	130	11.26	30.42
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	358.48	44.23 QP	46.00	-1.77	1.25 V	166	27.14	17.10
2	424.59	39.43 QP	46.00	-6.57	1.00 V	163	19.90	19.53
3	465.42	39.82 QP	46.00	-6.18	1.00 V	184	19.28	20.55
4	632.63	41.56 QP	46.00	-4.44	1.00 V	343	16.98	24.58
5	677.35	40.21 QP	46.00	-5.79	1.50 V	22	14.36	25.85
6	737.62	40.37 QP	46.00	-5.63	1.25 V	169	13.46	26.91
7	797.89	42.72 QP	46.00	-3.28	1.50 V	10	15.20	27.52
8	906.77	44.08 QP	46.00	-1.92	2.50 V	340	14.11	29.97
9	949.55	40.13 QP	46.00	-5.87	1.25 V	277	9.68	30.44

- 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.

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 22, 2007	Nov. 21, 2008
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 04, 2008	Jan. 03, 2009
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jun. 13, 2008	Jun. 12, 2009
V-LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jun. 10, 2008	Jun. 09, 2009
Software ADT	ADT_Cond_V3	NA	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 1.
 3. The VCCI Site Registration No. is C-2040.

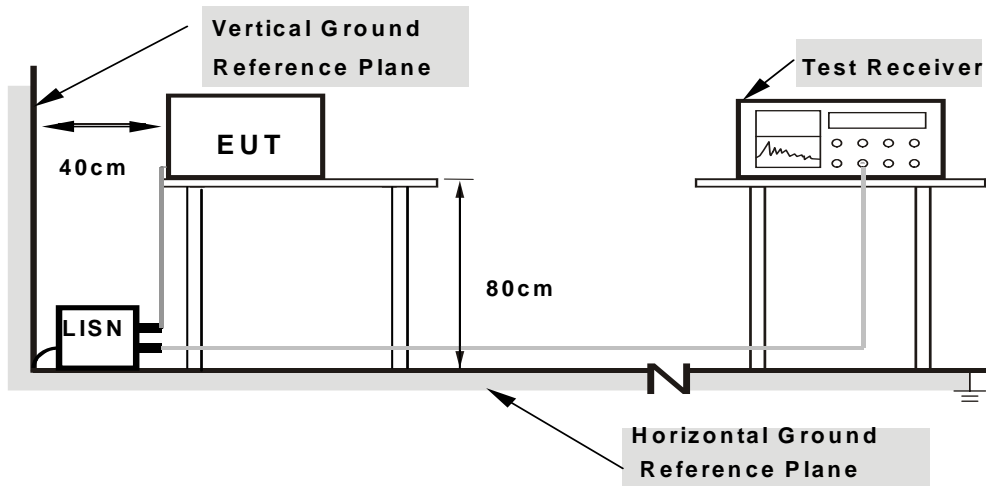
4.2.3 TEST PROCEDURES

- 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.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 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 attached file (Test Setup Photo).

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

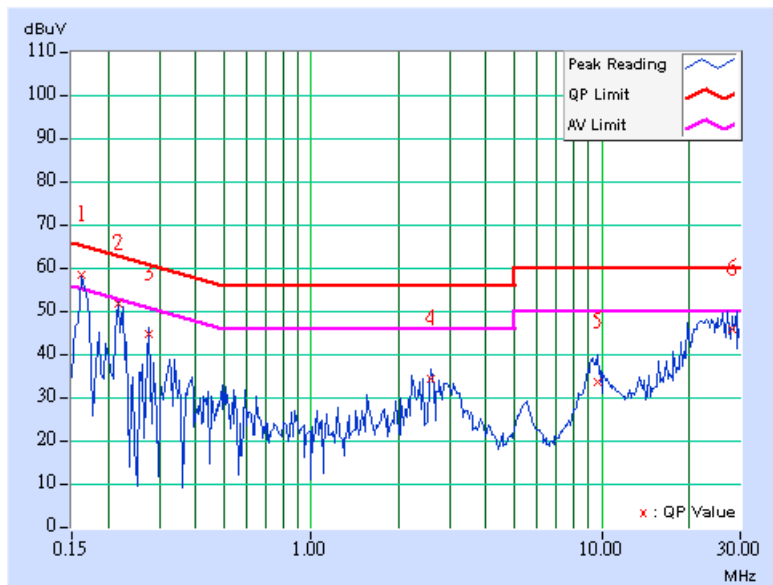
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA: 802.11g OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH, 991hPa	TEST MODE	A
TESTED BY	Match Tsui		

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	0.162	0.20	56.87	41.58	57.07	41.78	65.38
2	0.216	0.20	50.04	-	50.24	-	62.96	52.96	-12.72	-
3	0.275	0.20	42.82	-	43.02	-	60.97	50.97	-17.95	-
4	2.582	0.26	32.76	-	33.02	-	56.00	46.00	-22.98	-
5	9.645	0.52	31.77	-	32.29	-	60.00	50.00	-27.71	-
6	28.133	1.82	44.18	-	46.00	-	60.00	50.00	-14.00	-

- 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.



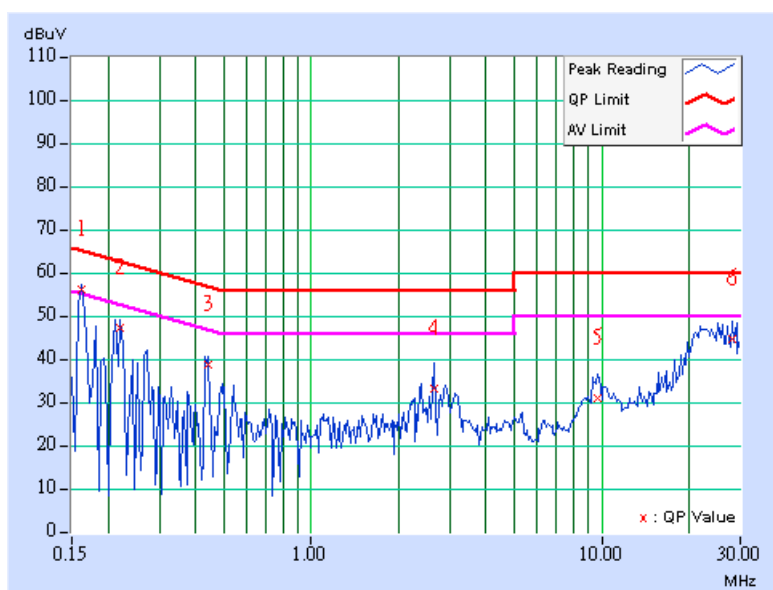


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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH, 991hPa	TEST MODE	A
TESTED BY	Match Tsui		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.162	0.20	55.72	44.38	55.92	44.58	65.38	55.38	-9.46	-10.80
2	0.220	0.20	46.91	-	47.11	-	62.81	52.81	-15.70	-
3	0.443	0.20	38.47	-	38.67	-	57.01	47.01	-18.34	-
4	2.645	0.26	32.73	-	32.99	-	56.00	46.00	-23.01	-
5	9.637	0.52	30.35	-	30.87	-	60.00	50.00	-29.13	-
6	28.121	0.60	44.11	-	44.71	-	60.00	50.00	-15.29	-

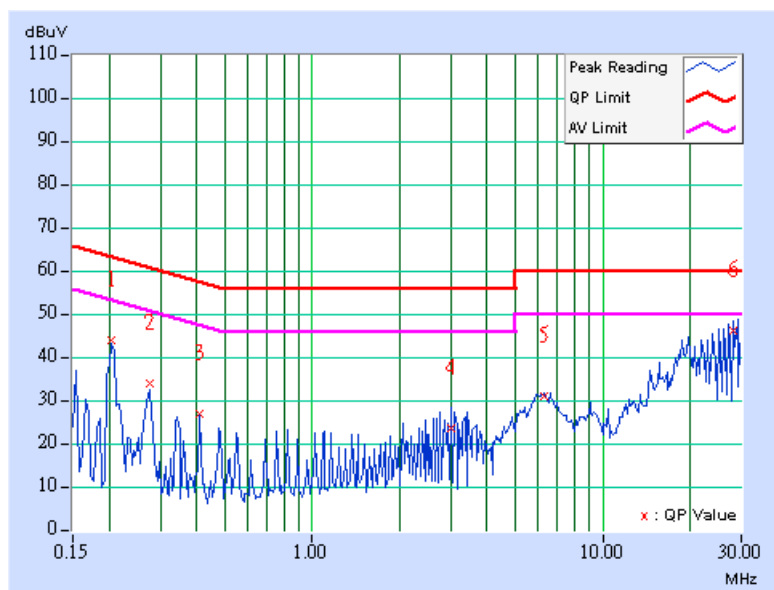
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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 6	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH, 991hPa	TEST MODE	B
TESTED BY	Match Tsui		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.20	42.08	-	42.28	-	63.42	53.42	-21.14	-
2	0.275	0.20	32.24	-	32.44	-	60.97	50.97	-28.53	-
3	0.412	0.20	25.22	-	25.42	-	57.61	47.61	-32.19	-
4	3.016	0.30	22.07	-	22.37	-	56.00	46.00	-33.63	-
5	6.301	0.45	29.47	-	29.92	-	60.00	50.00	-30.08	-
6	28.129	1.82	44.34	-	46.16	-	60.00	50.00	-13.84	-

- 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.



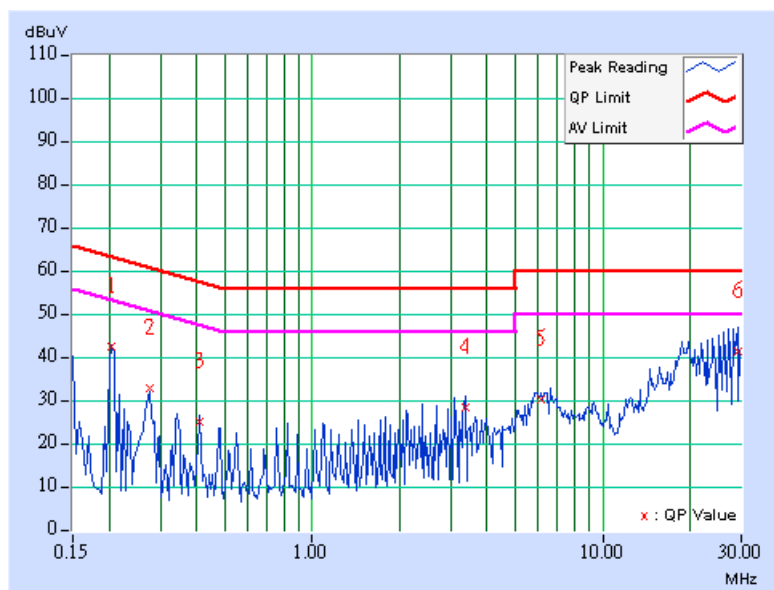


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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH, 991hPa	TEST MODE	B
TESTED BY	Match Tsui		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.20	41.97	-	42.17	-	63.42	53.42	-21.25	-
2	0.275	0.20	32.22	-	32.42	-	60.97	50.97	-28.55	-
3	0.412	0.20	24.70	-	24.90	-	57.61	47.61	-32.71	-
4	3.355	0.34	27.88	-	28.22	-	56.00	46.00	-27.78	-
5	6.164	0.45	29.74	-	30.19	-	60.00	50.00	-29.81	-
6	29.164	0.61	40.78	-	41.39	-	60.00	50.00	-18.61	-

- 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.



4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100041	Apr. 22, 2008	Apr. 21, 2009

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

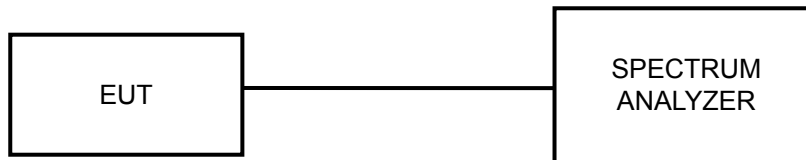
4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

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 lowest, middle and highest channel frequencies individually.



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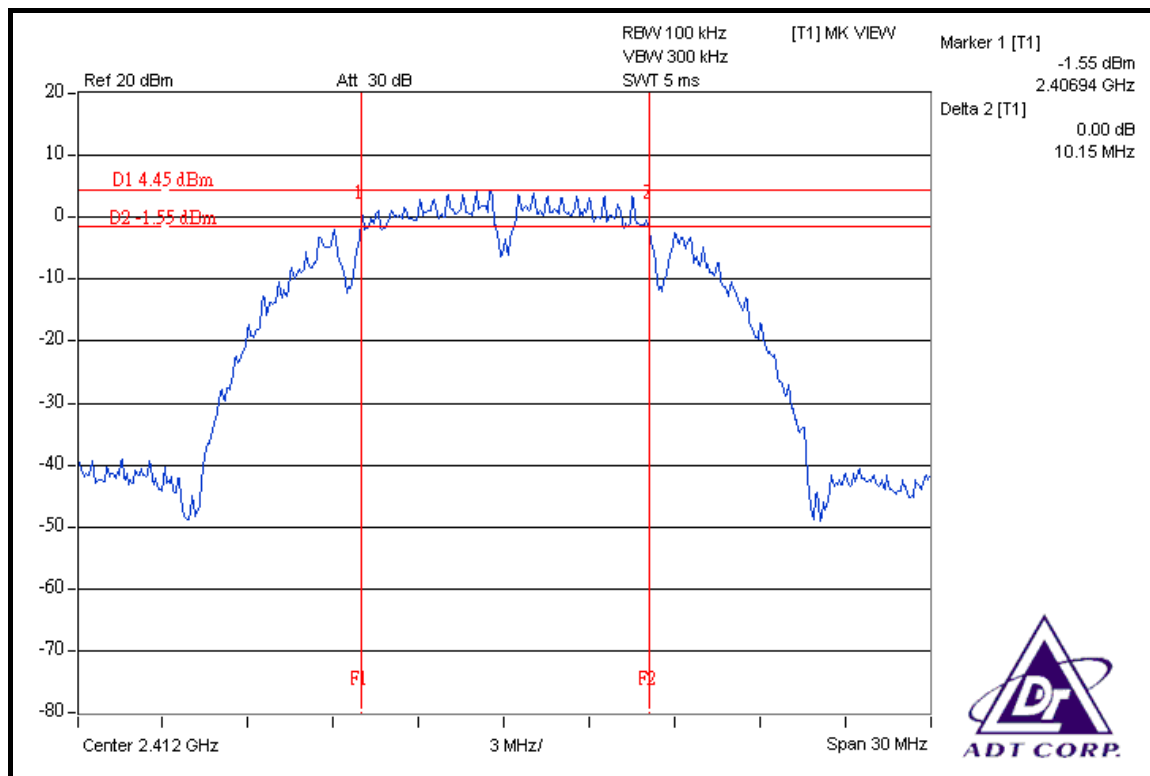
4.3.7 TEST RESULTS

802.11b DSSS MODULATION

MODULATION TYPE	DBPSK	TRANSFER RATE	1.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	10.15	11.11	11.14	0.5	PASS
6	2437	10.16	12.08	10.12	0.5	PASS
11	2462	11.14	11.18	11.10	0.5	PASS

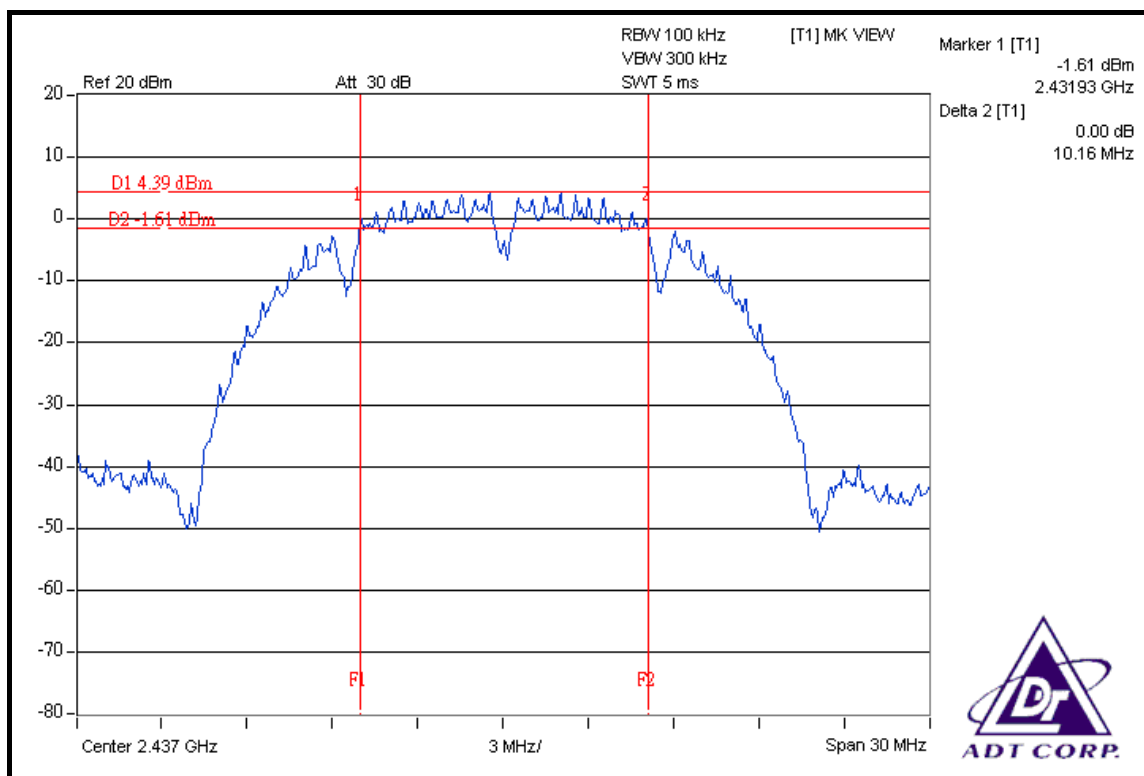
FOR CHAIN 0: CH 1



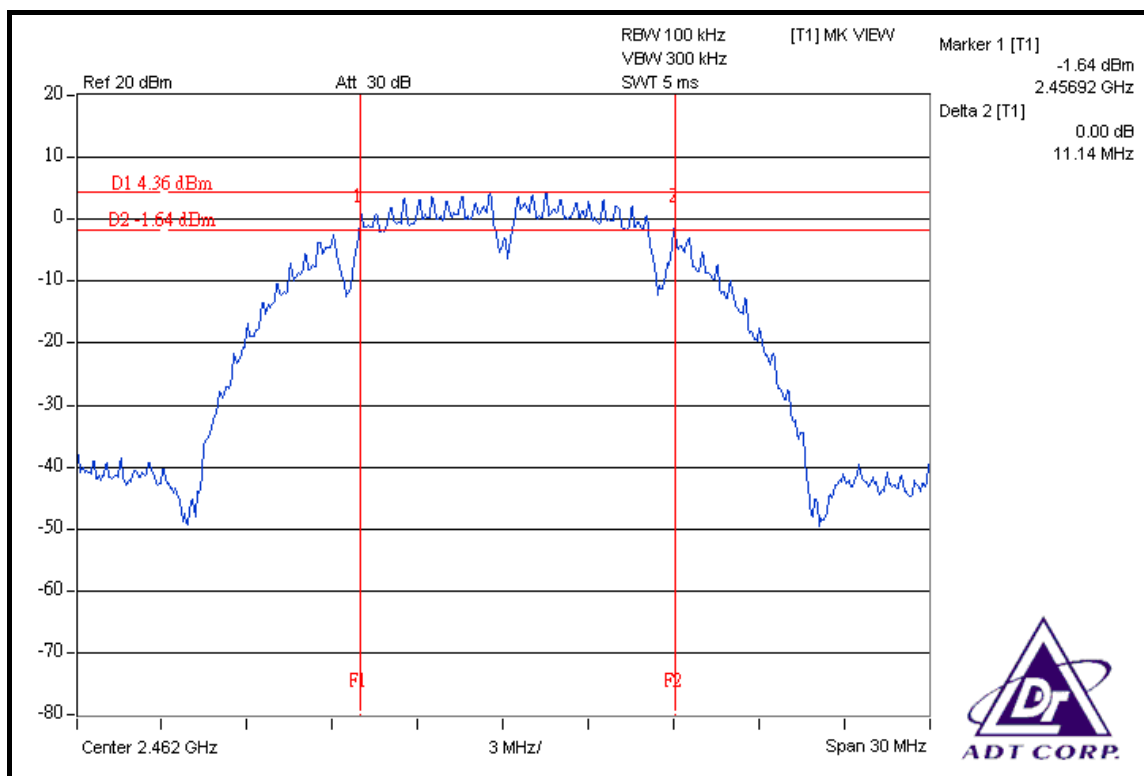


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CH 6



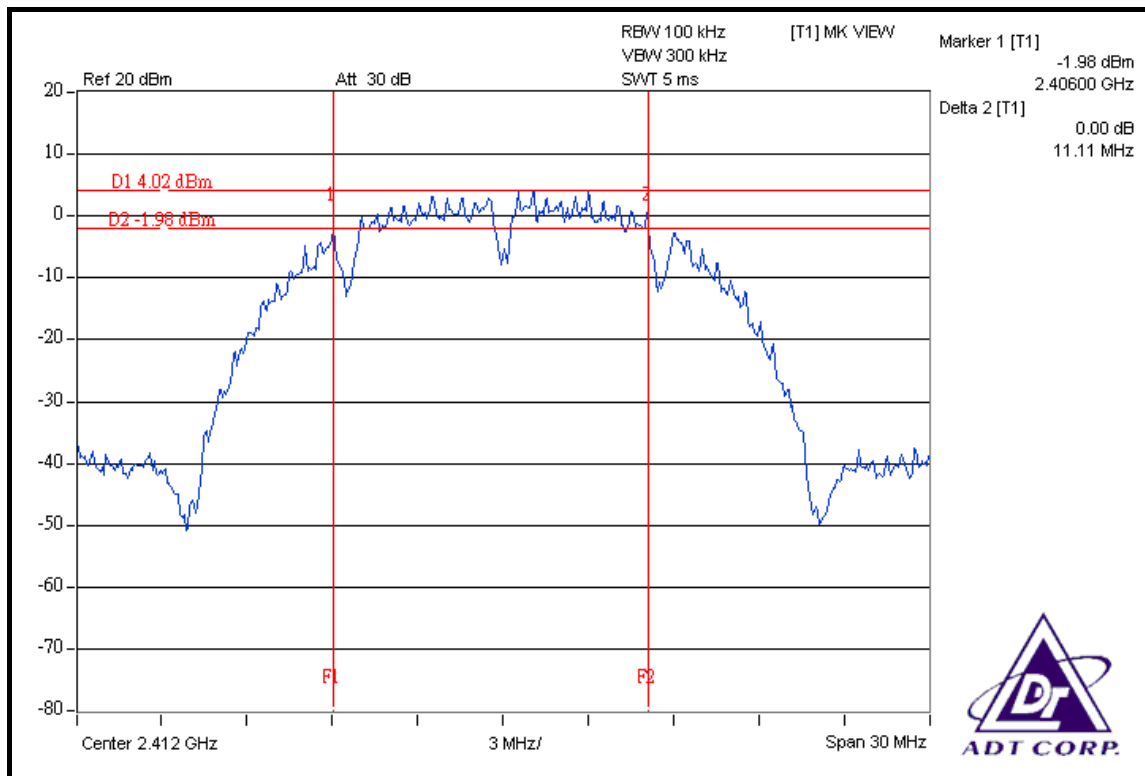
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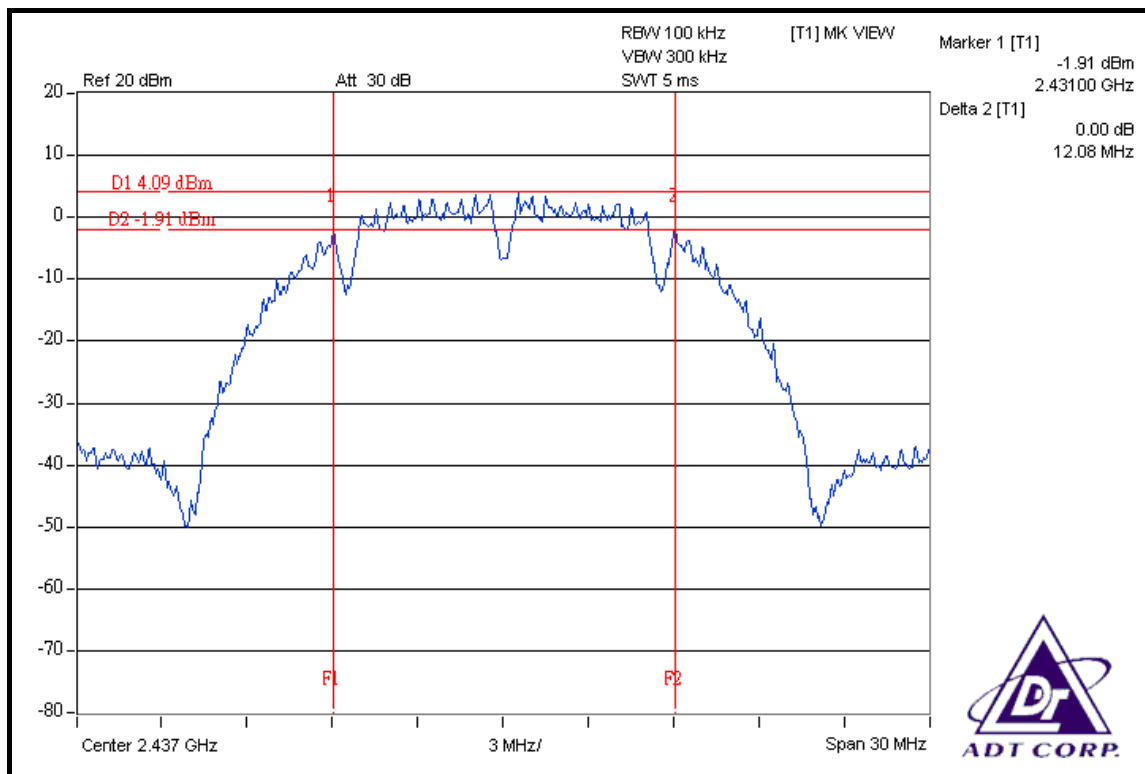


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FOR CHAIN 1: CH 1



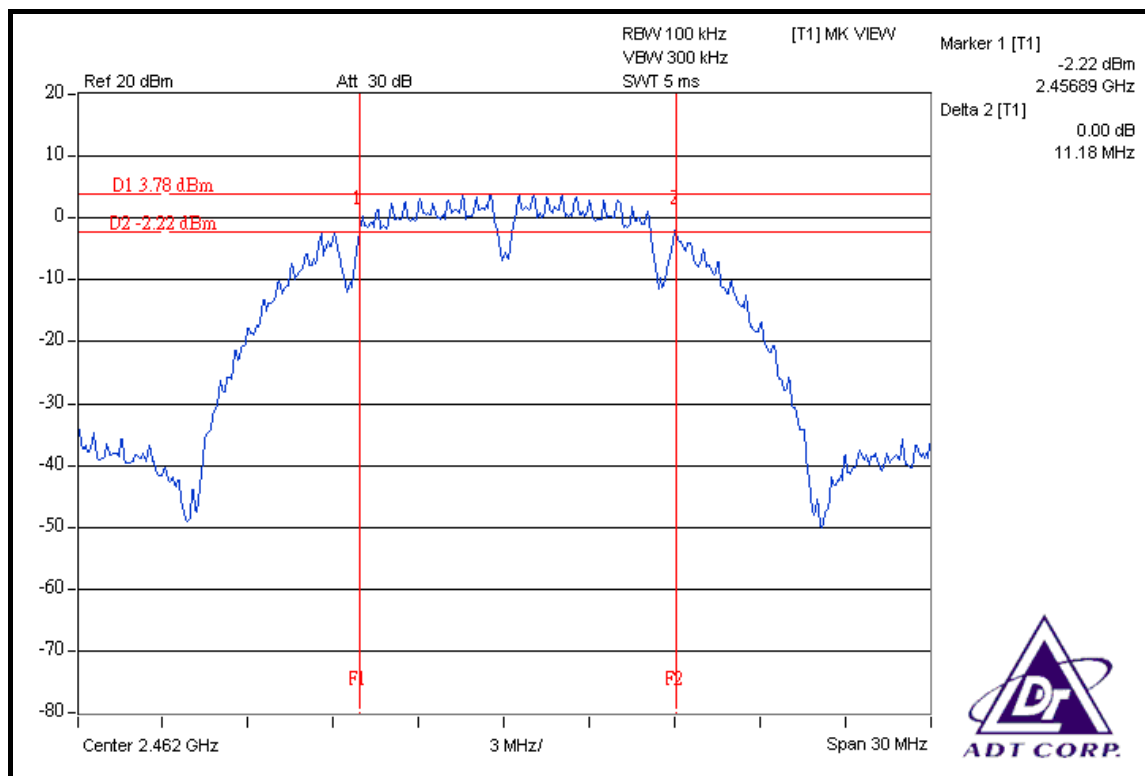
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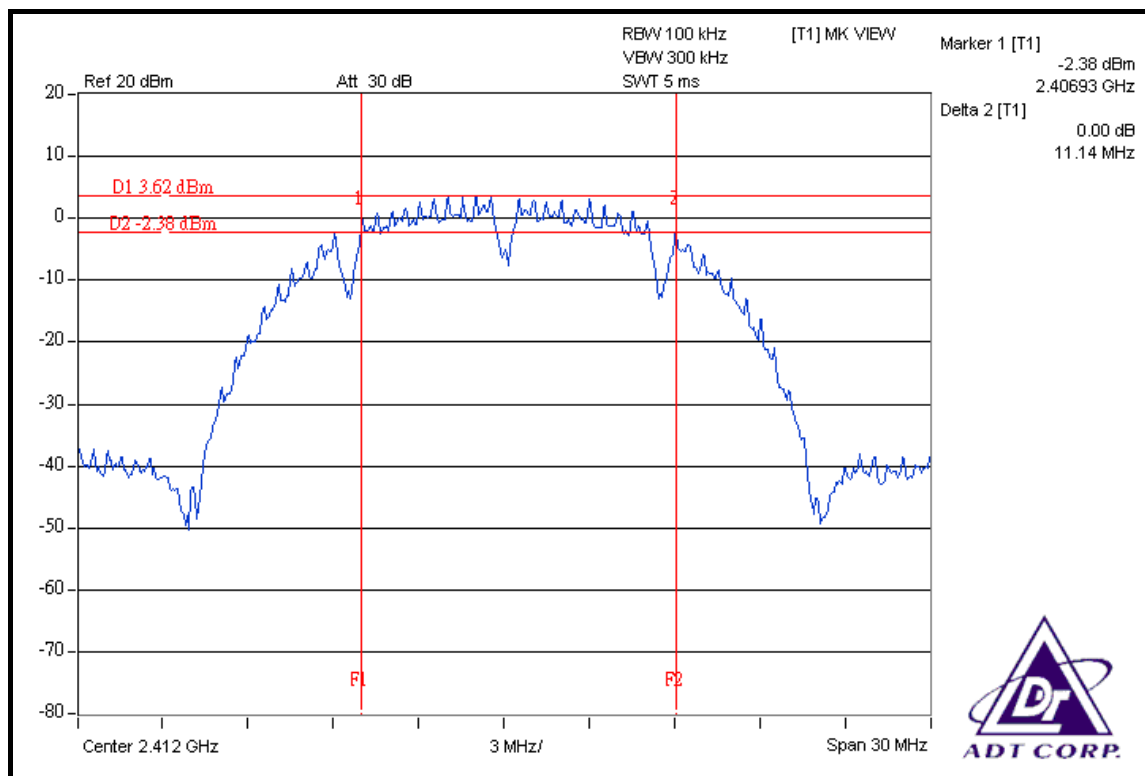


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CH 11



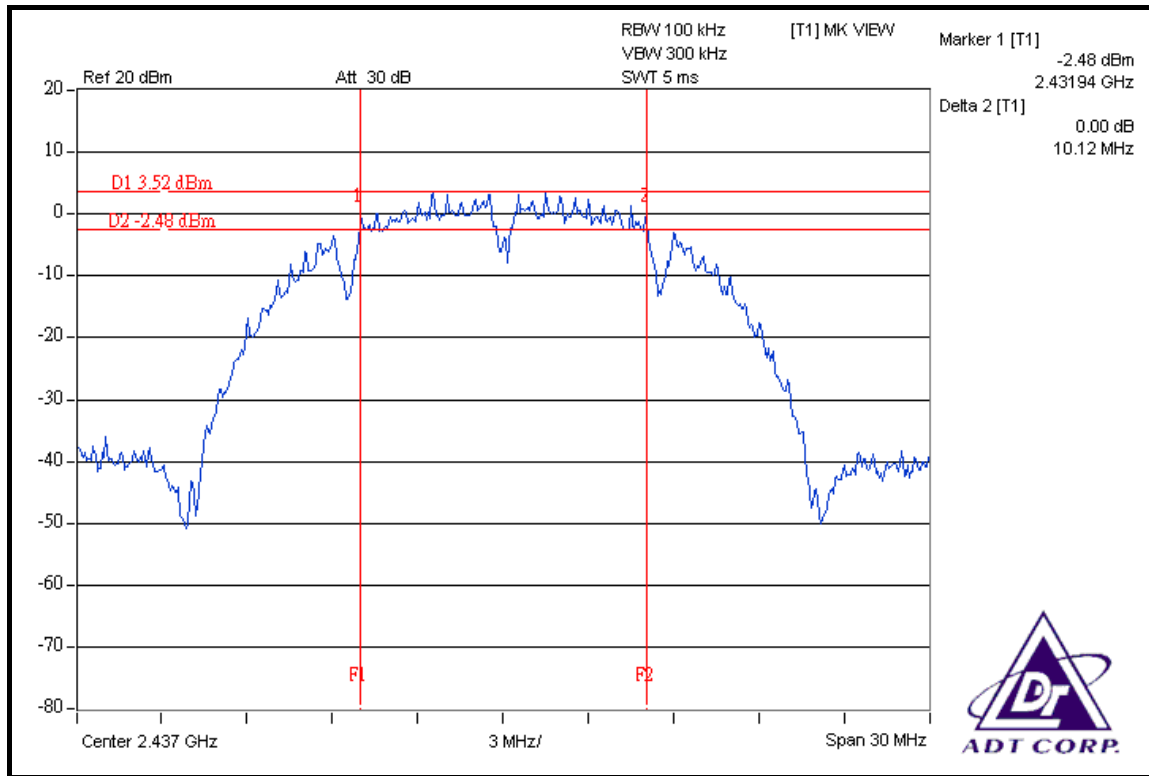
FOR CHAIN 2: CH 1



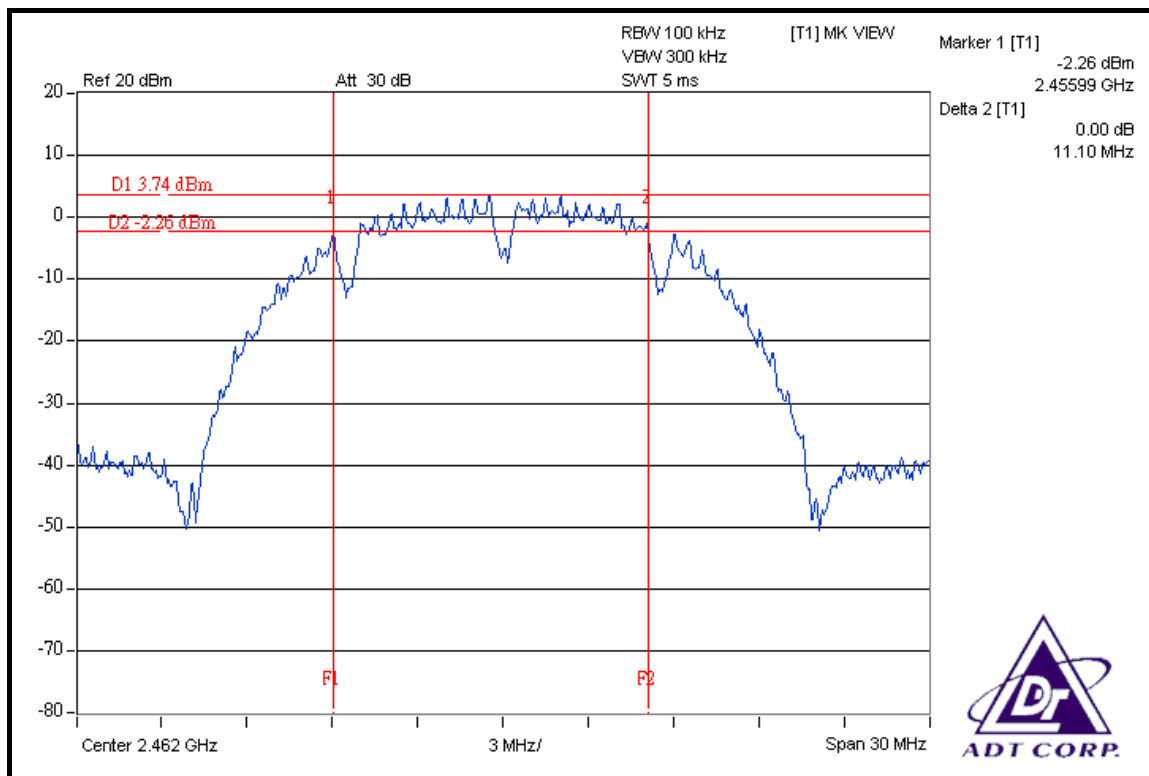


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CH 6



CH 11





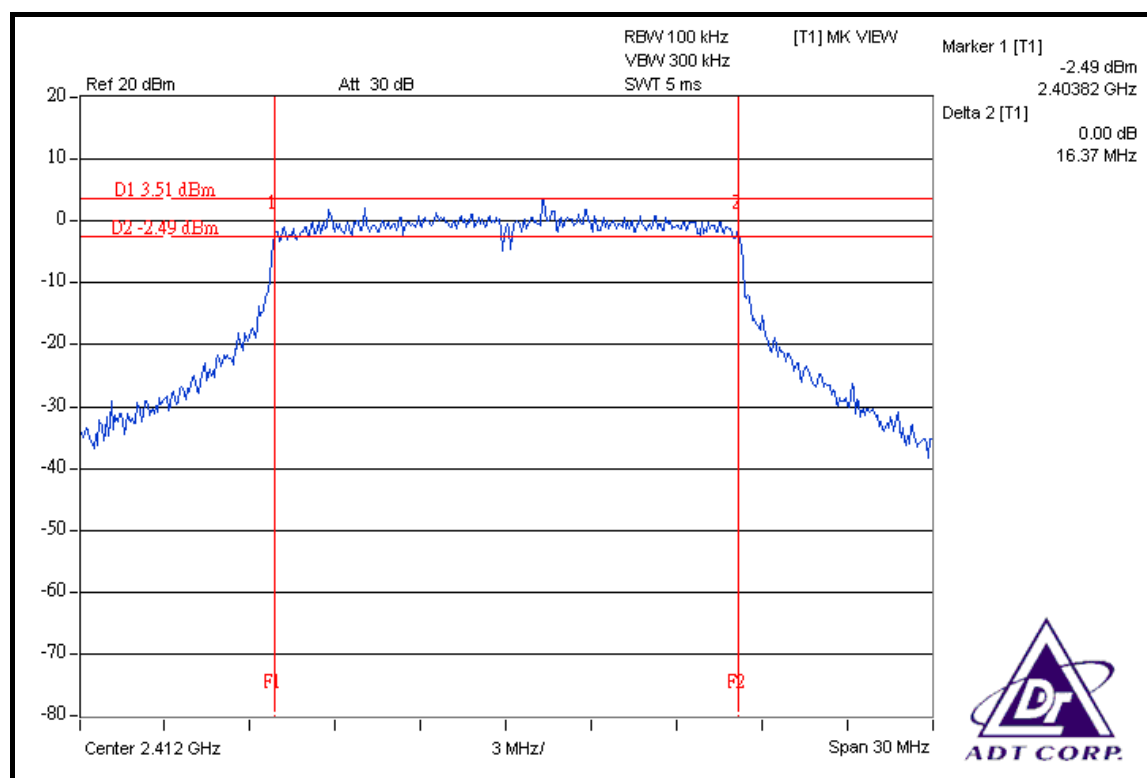
A D T

802.11g OFDM MODULATION

MODULATION TYPE	BPSK	TRANSFER RATE	6.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	16.37	16.47	16.40	0.5	PASS
6	2437	16.39	16.07	16.34	0.5	PASS
11	2462	16.37	16.41	16.40	0.5	PASS

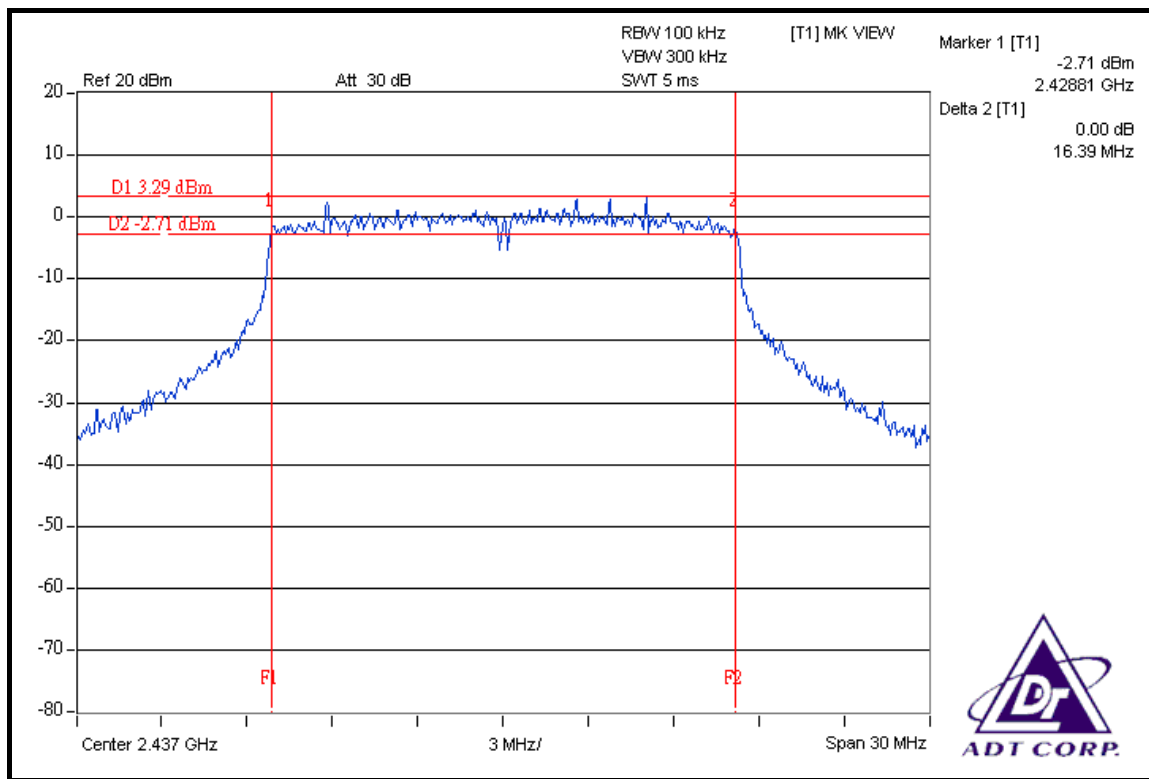
FOR CHAIN 0: CH 1



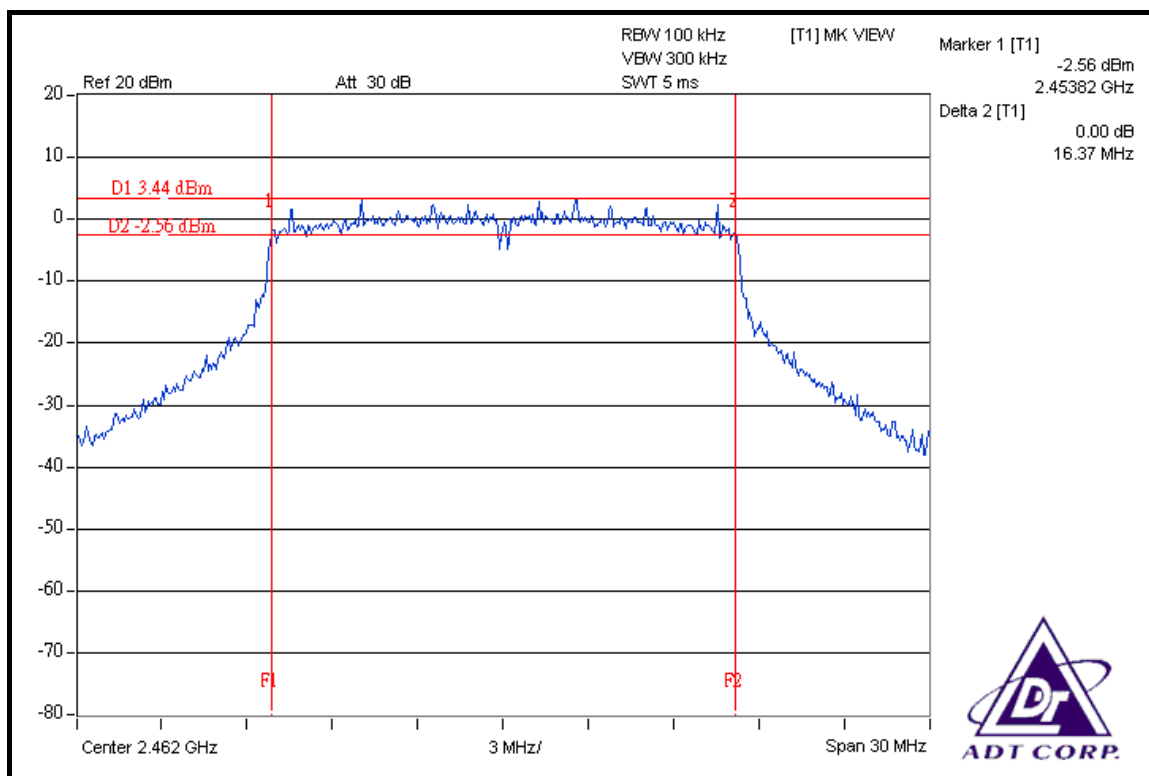


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CH 6



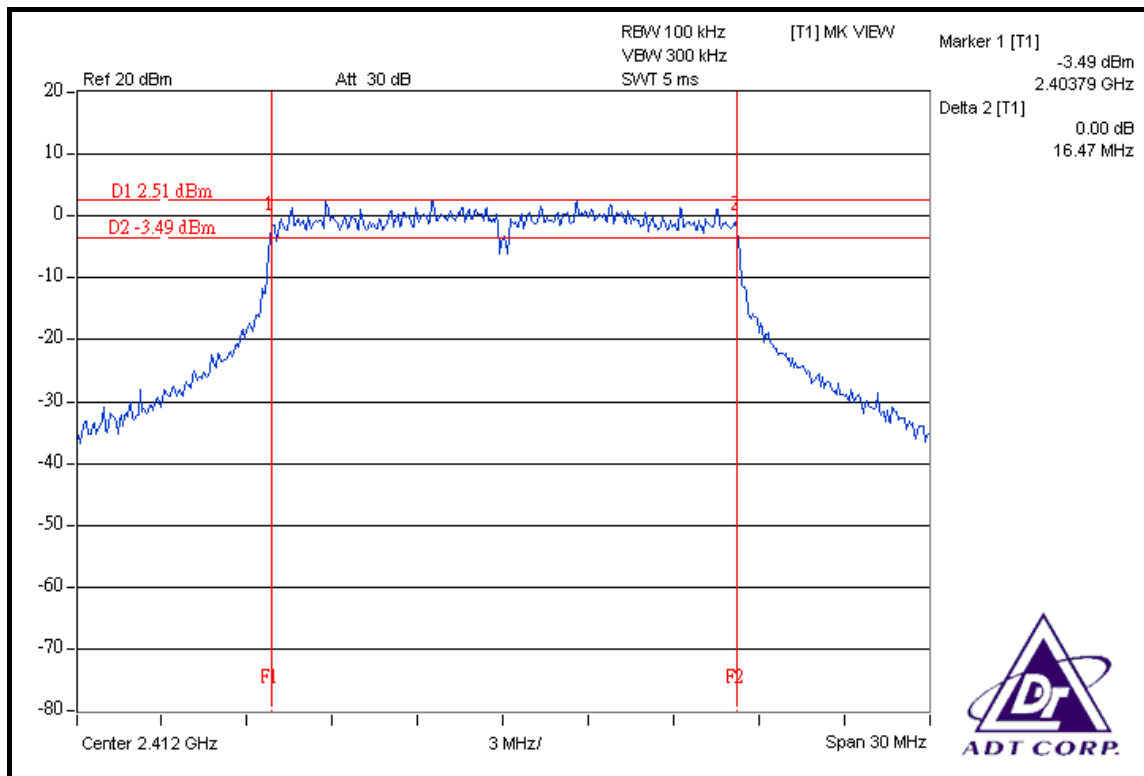
CH 11



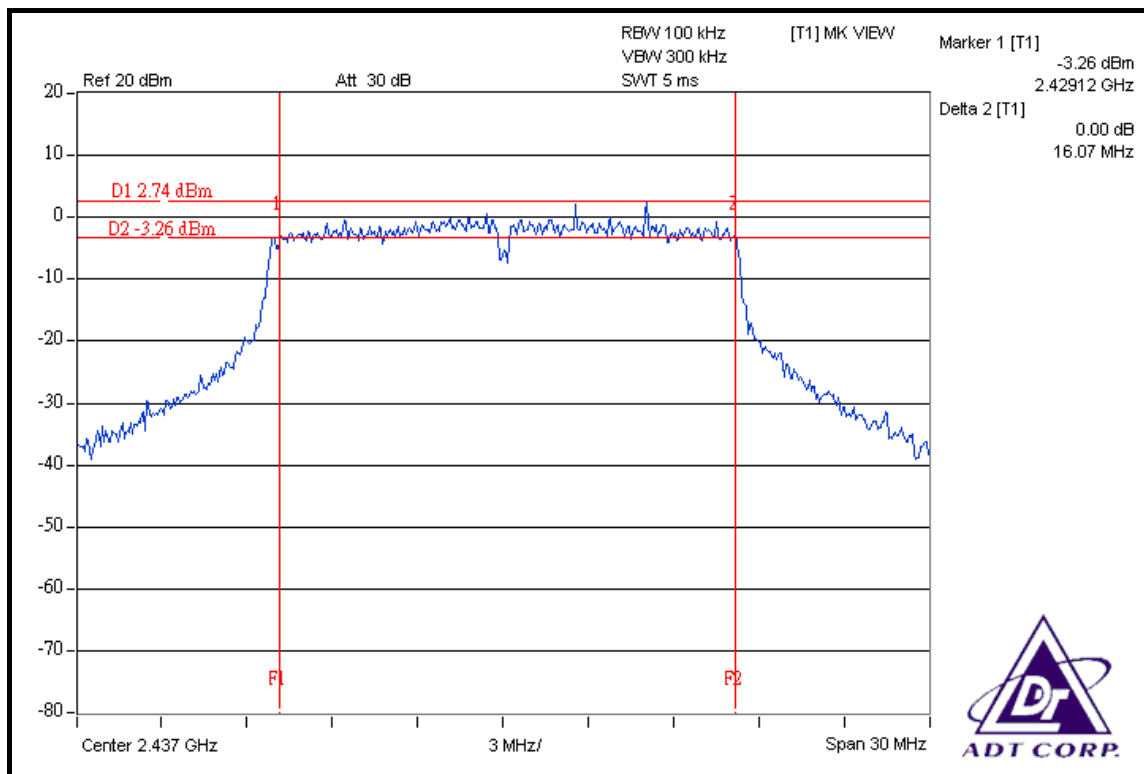


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FOR CHAIN 1: CH 1



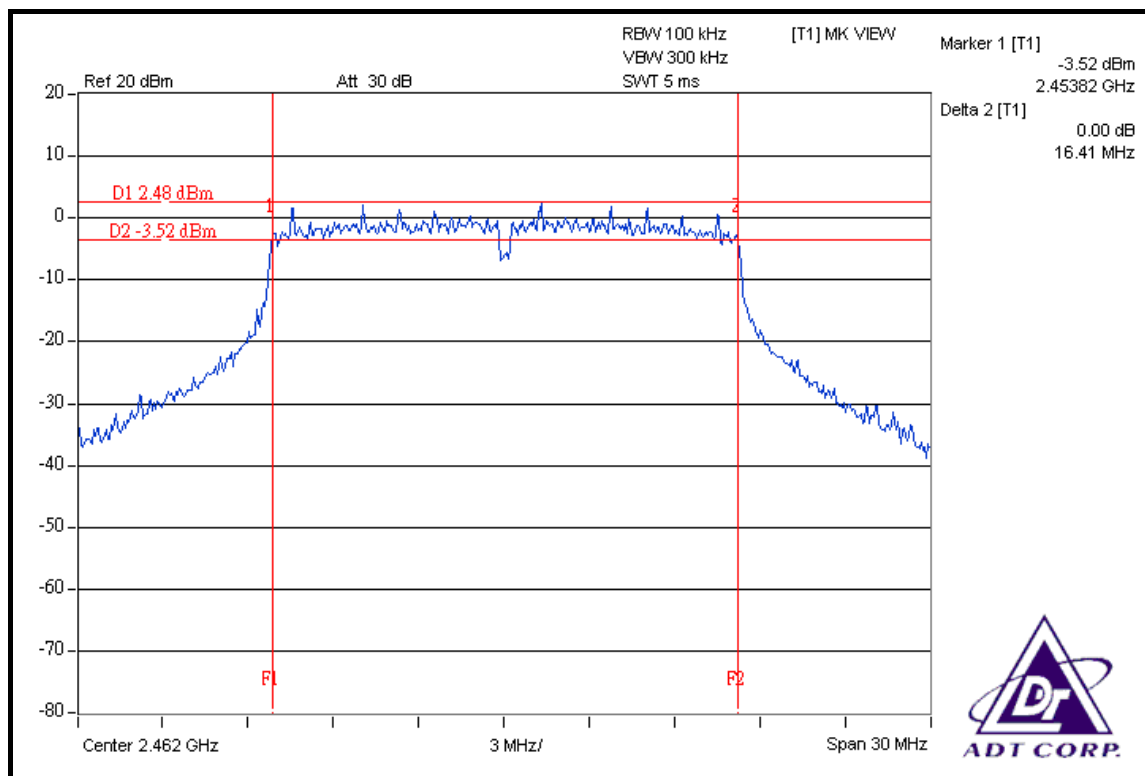
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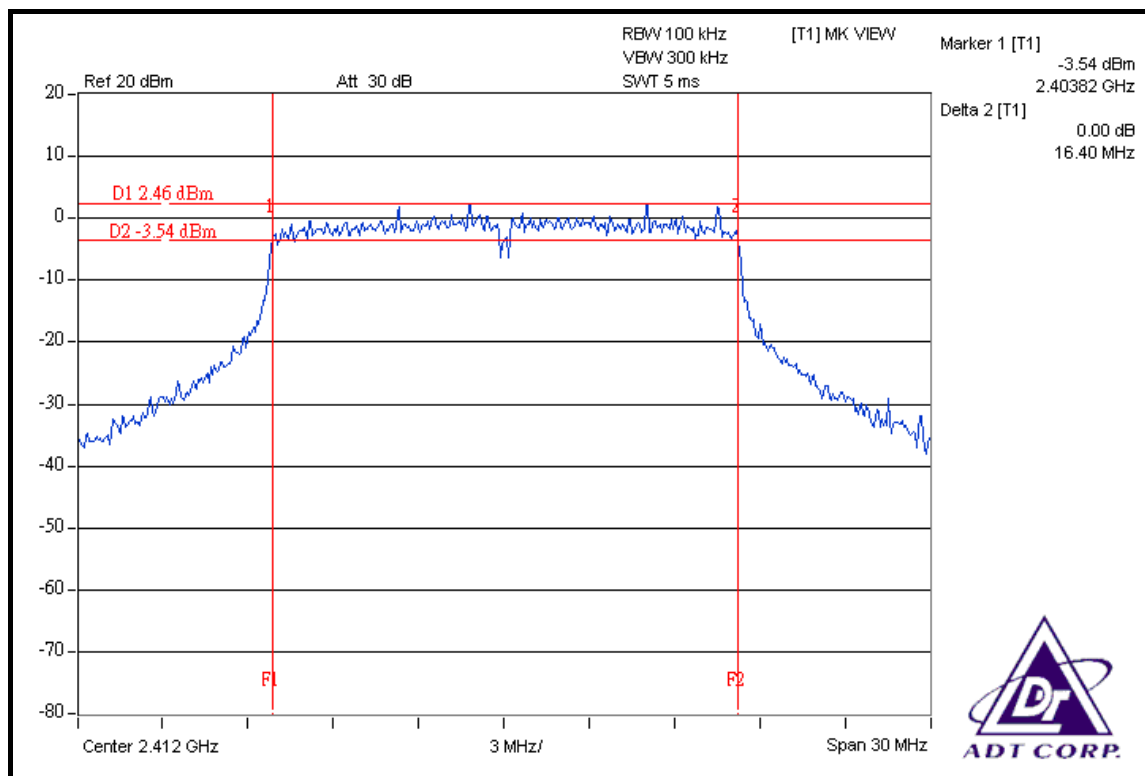


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CH 11



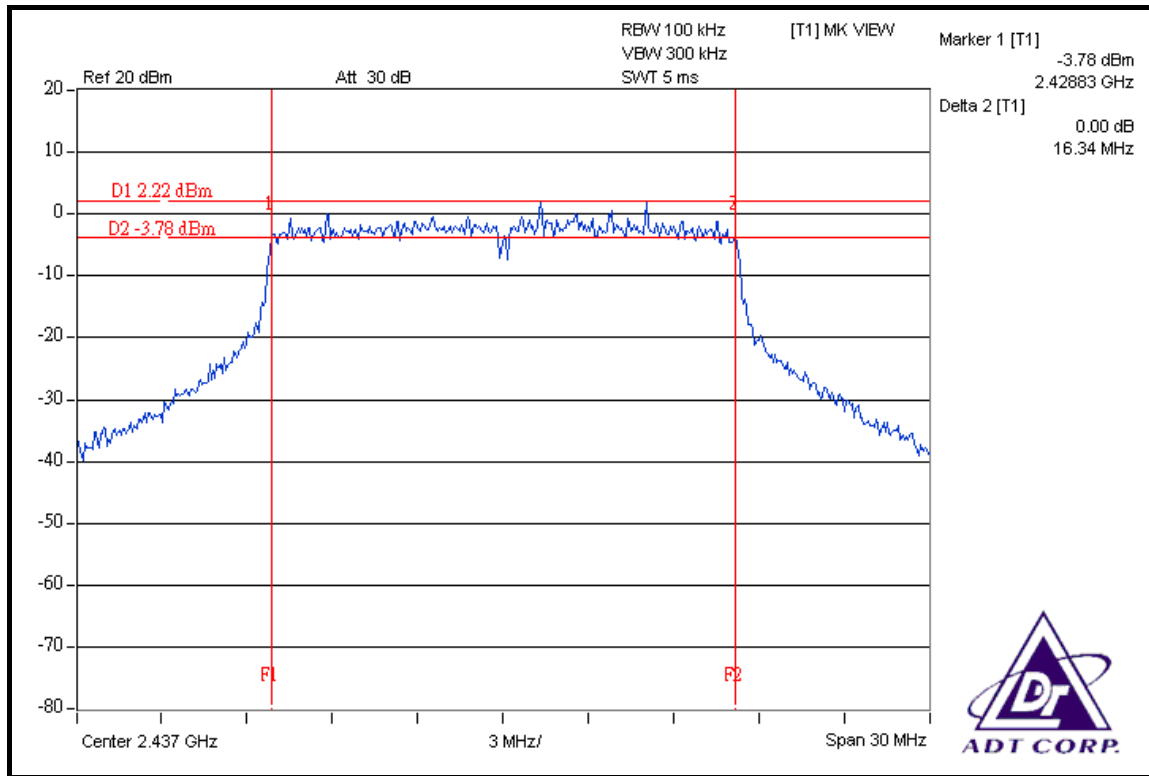
FOR CHAIN 2: CH 1



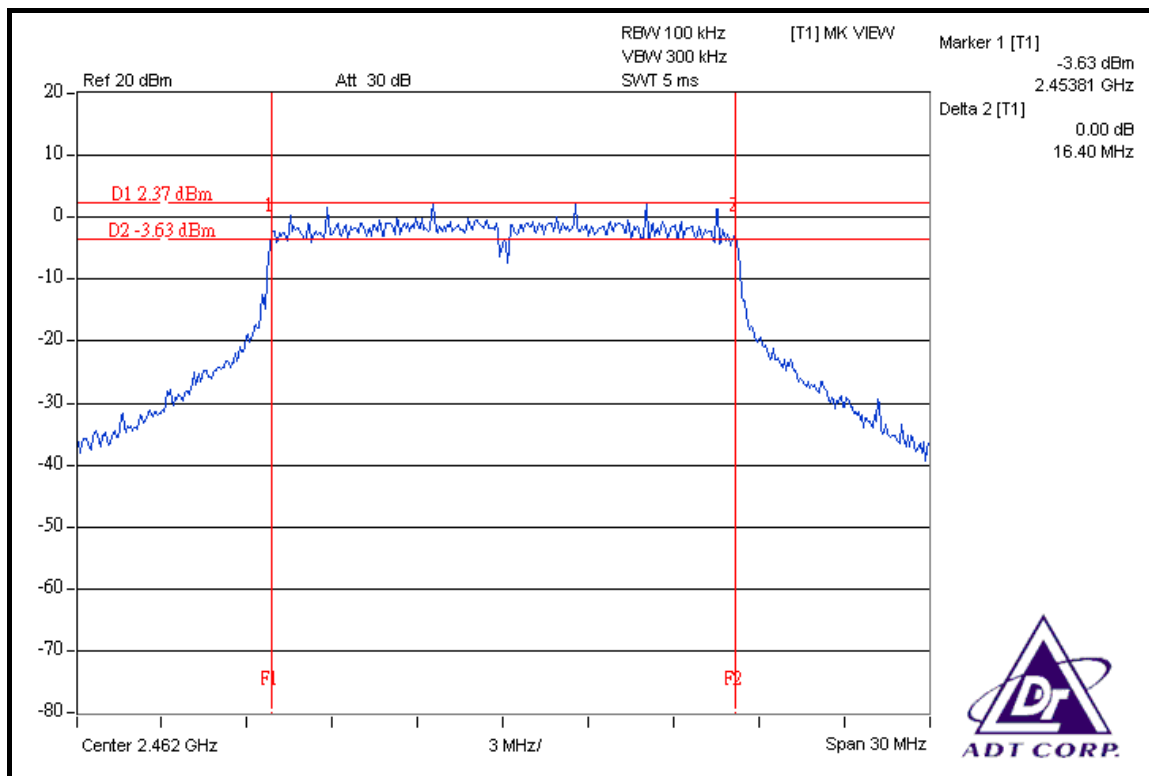


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CH 6



CH 11





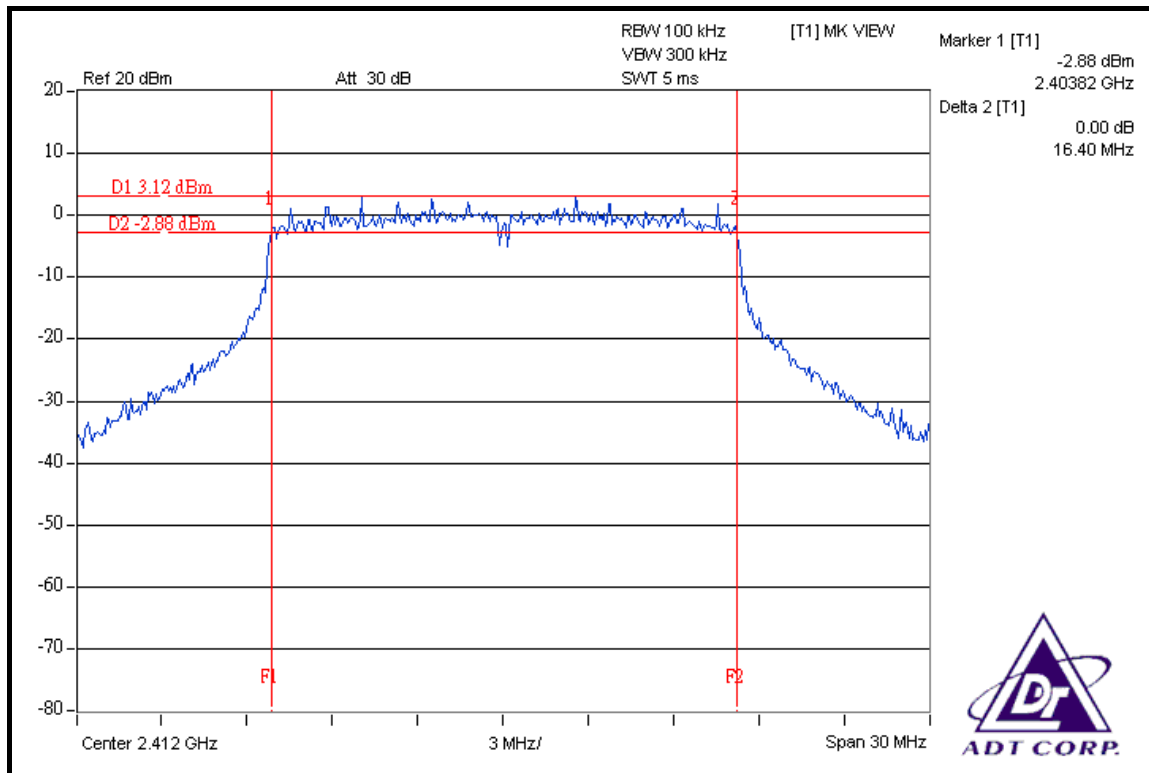
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DRAFT 802.11n (20MHz) OFDM MODULATION

MODULATION TYPE	BPSK	TRANSFER RATE	7.2Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	16.40	16.42	16.40	0.5	PASS
6	2437	16.35	16.37	16.37	0.5	PASS
11	2462	16.37	16.37	16.37	0.5	PASS

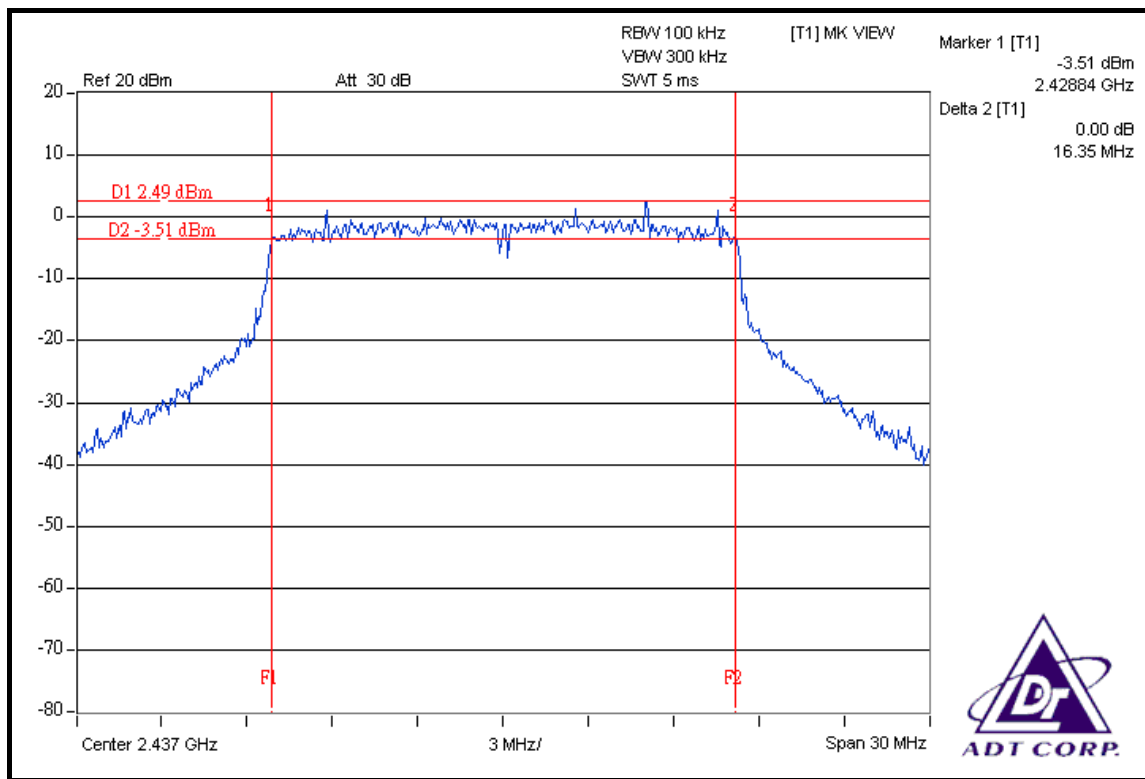
FOR CHAIN 0: CH 1



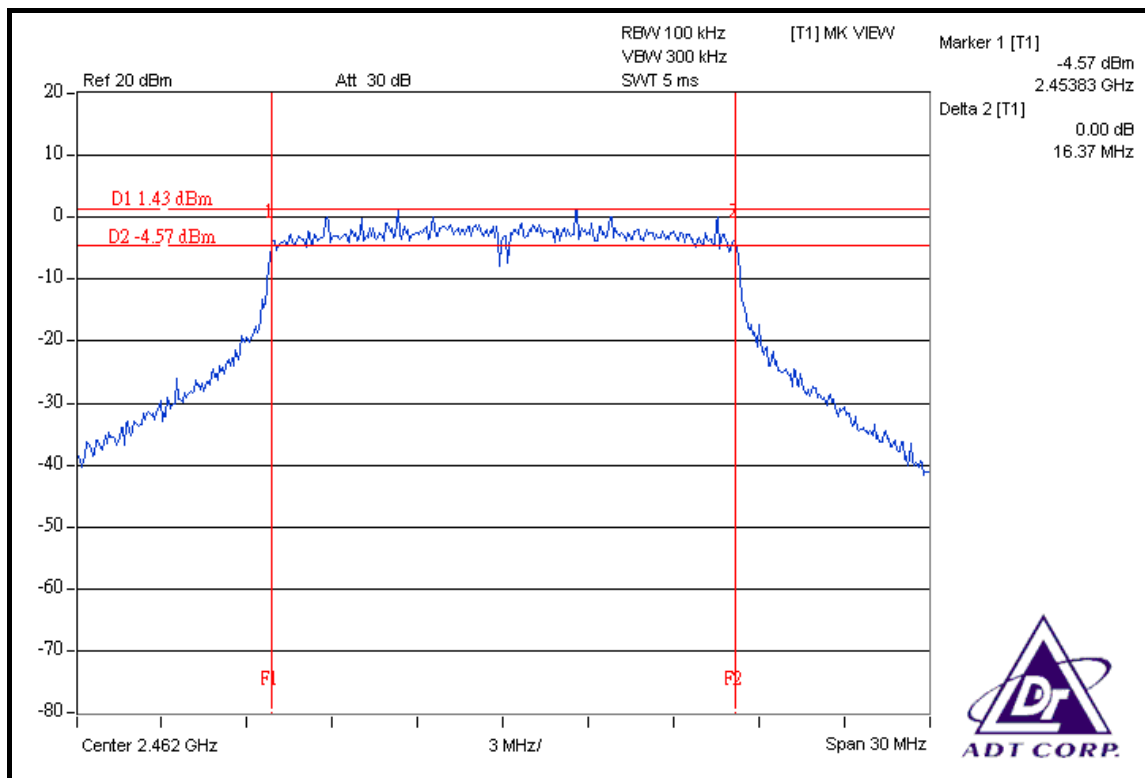


A D T

CH 6



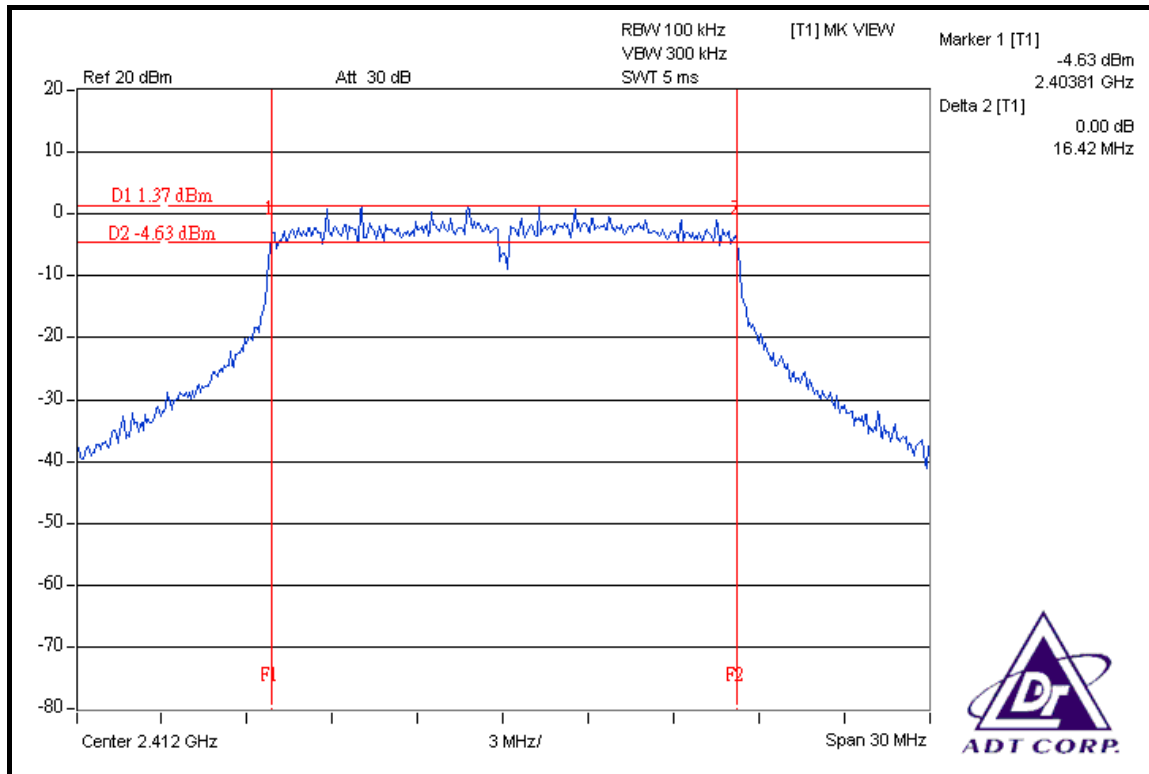
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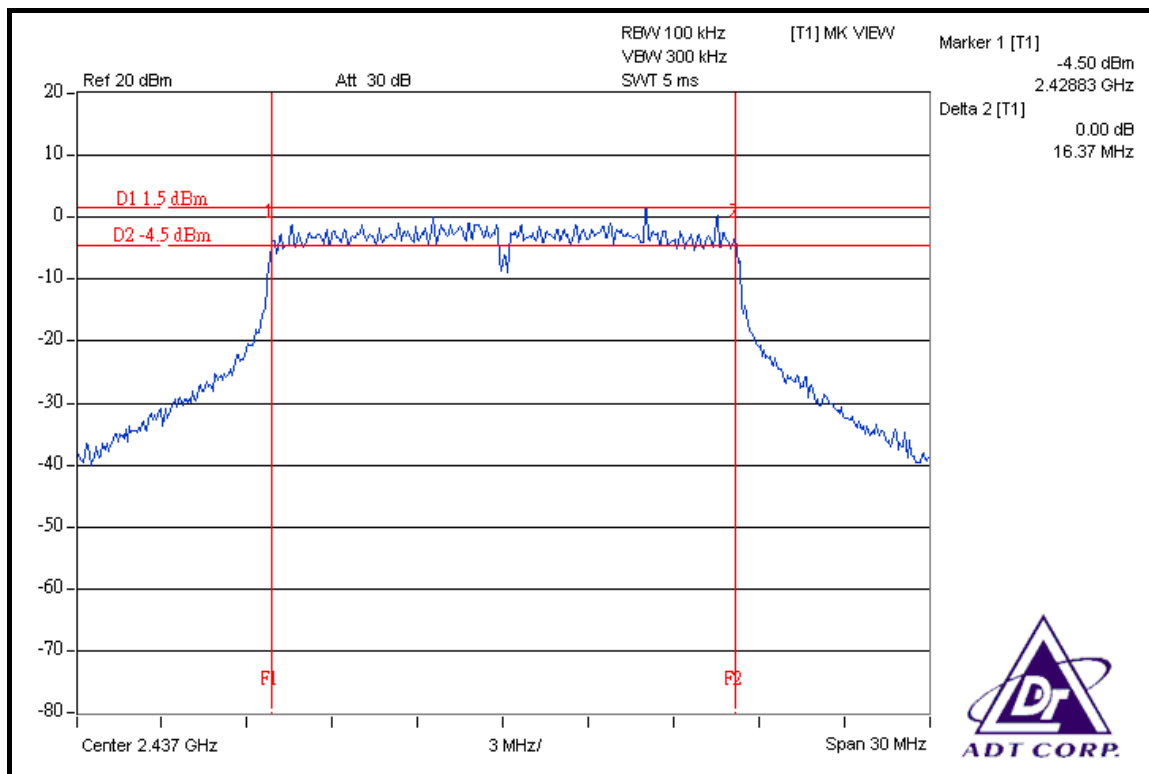


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FOR CHAIN 1: CH 1



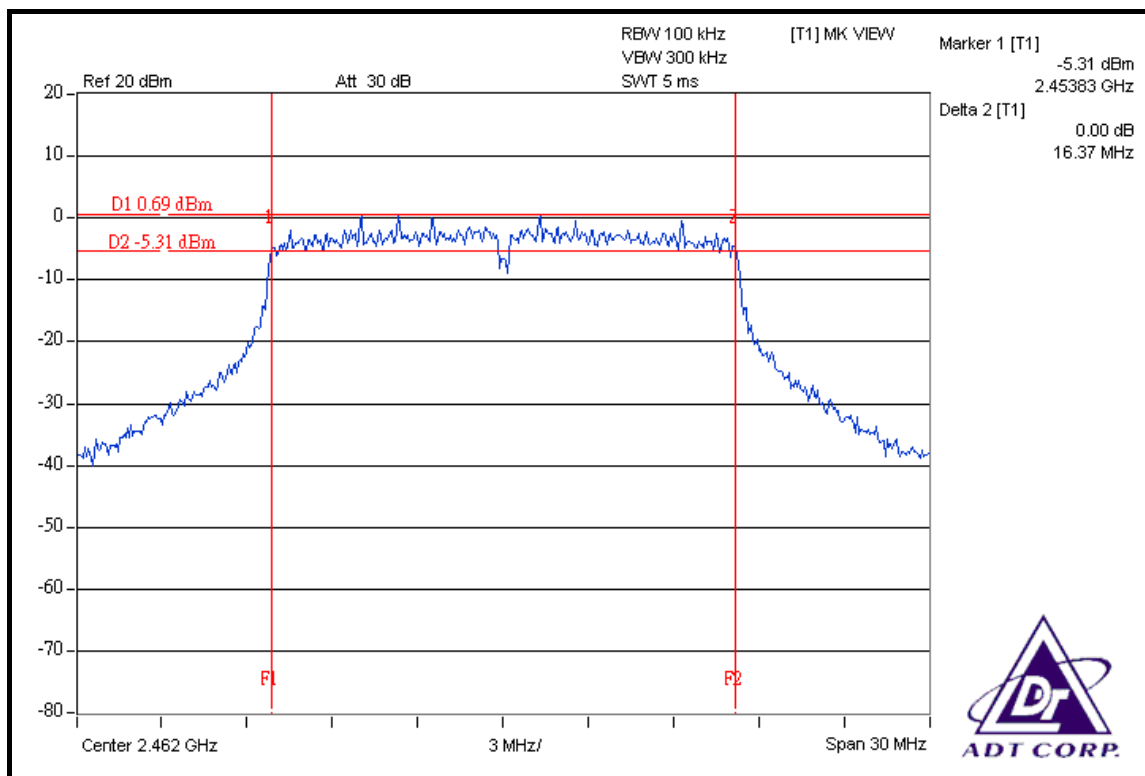
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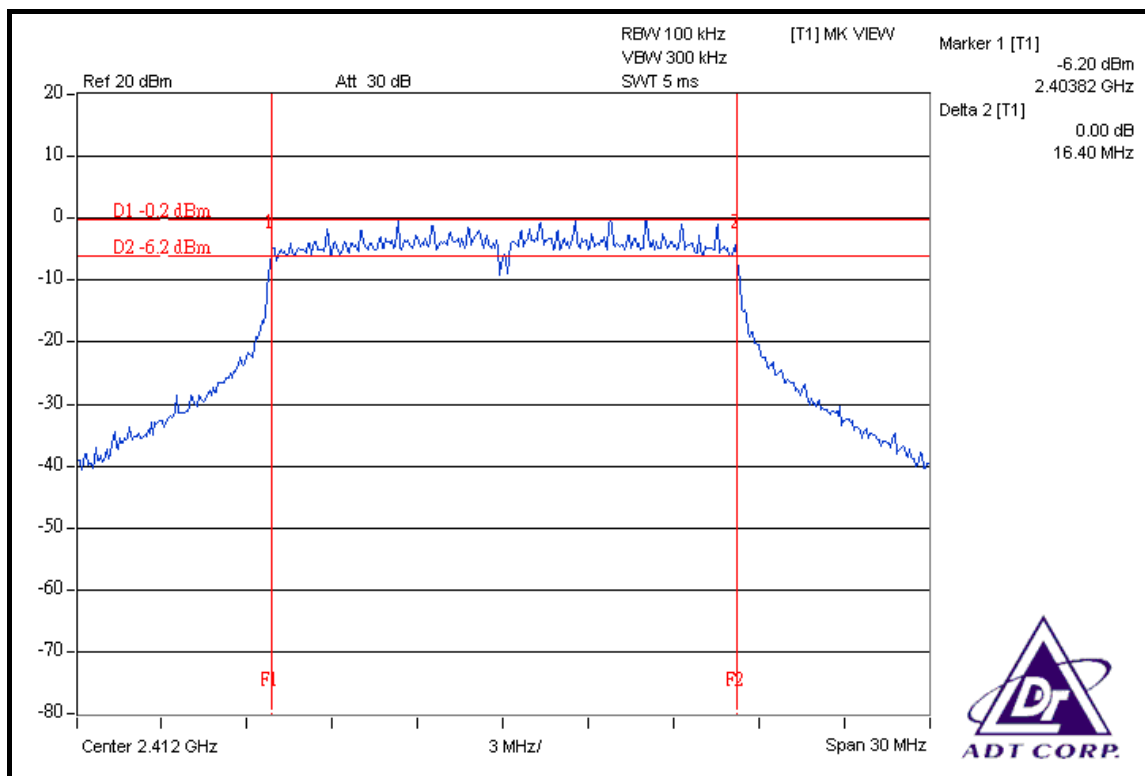


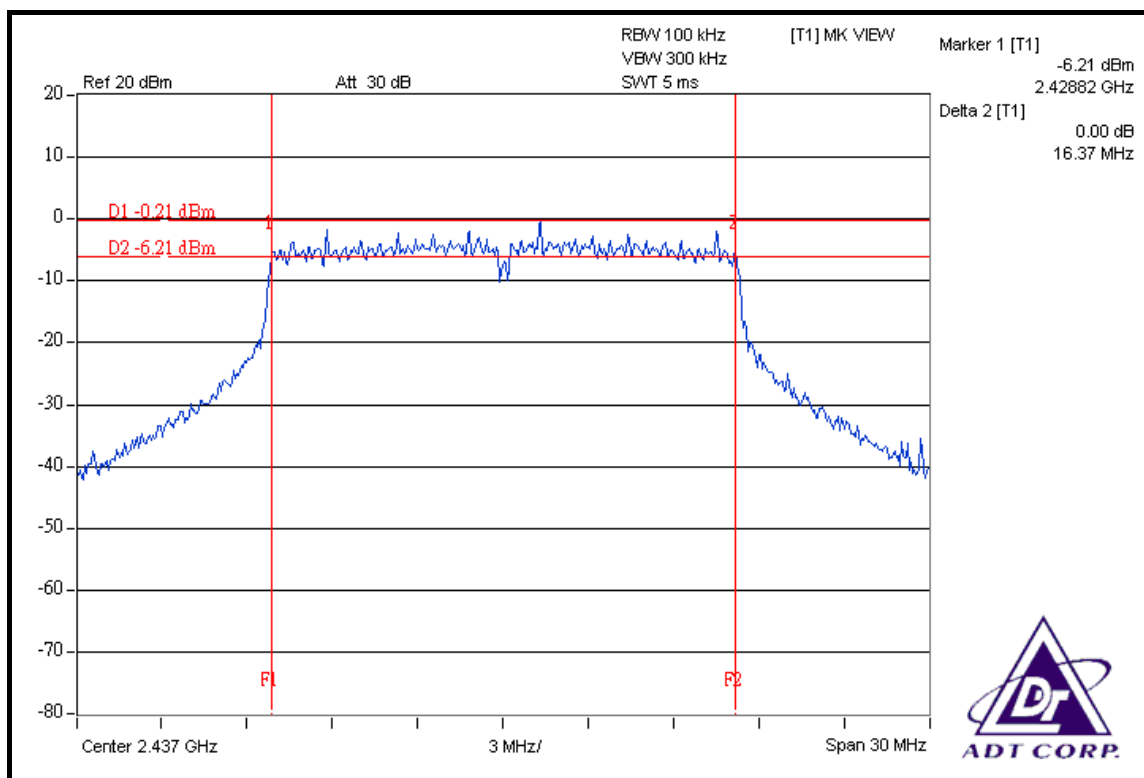
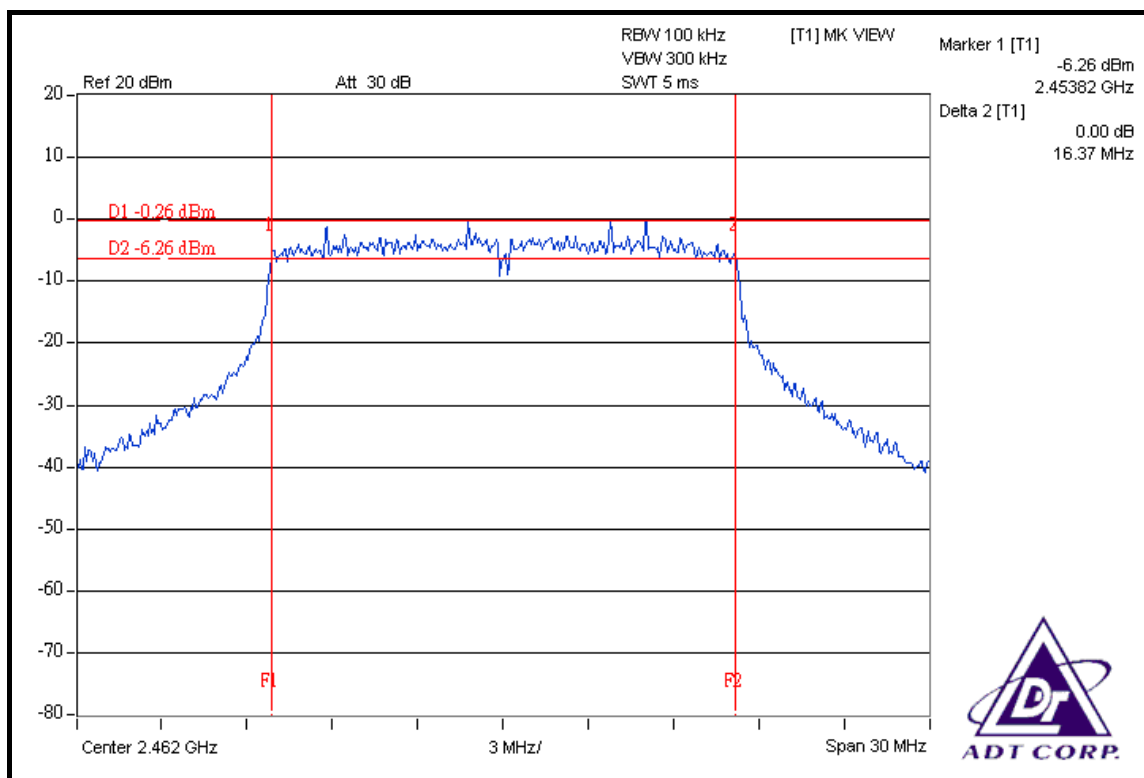
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CH 11



FOR CHAIN 2: CH 1



CH 6

CH 11




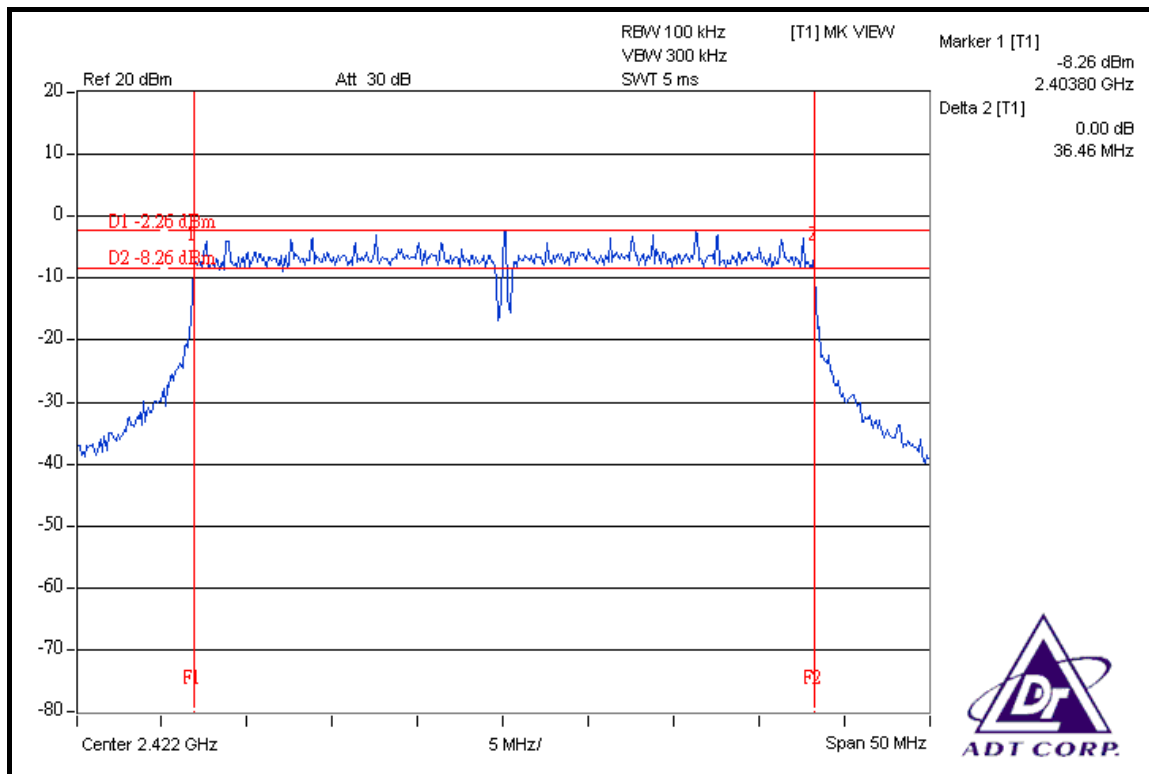
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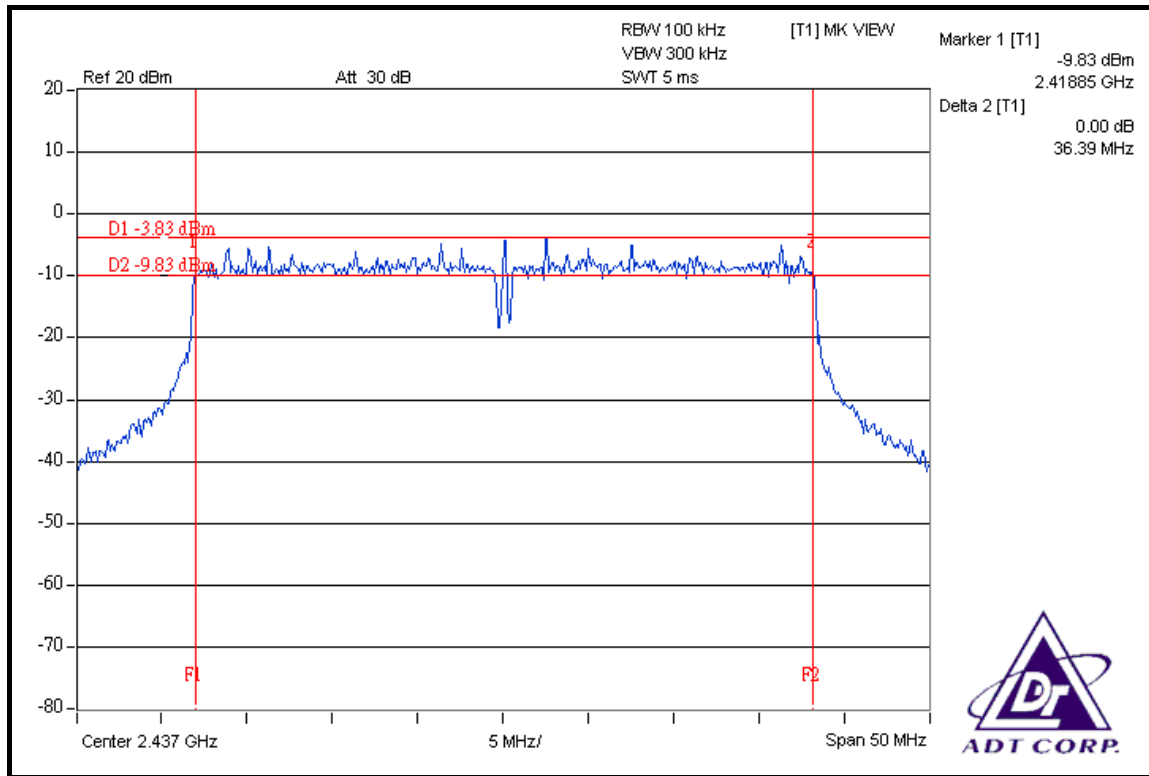
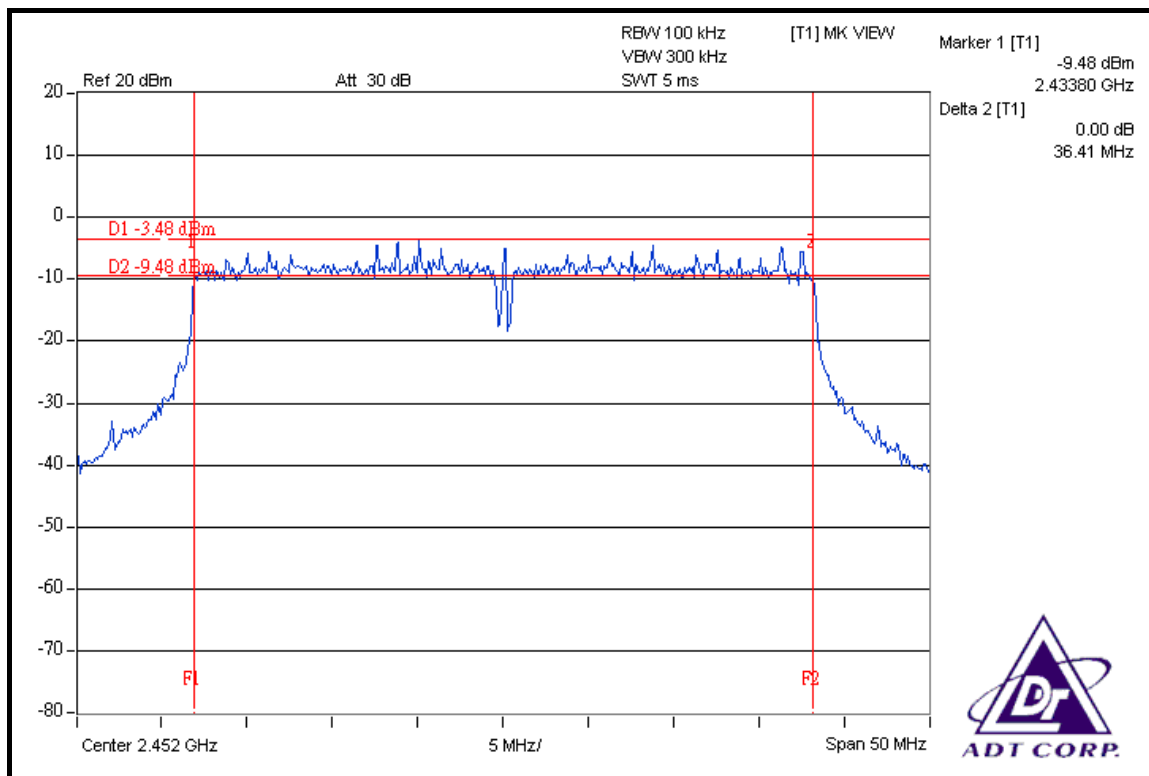
DRAFT 802.11n (40MHz) OFDM MODULATION

MODULATION TYPE	BPSK	TRANSFER RATE	15.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2422	36.46	36.50	36.47	0.5	PASS
4	2437	36.39	36.44	36.49	0.5	PASS
7	2452	36.41	36.47	36.49	0.5	PASS

FOR CHAIN 0: CH 1

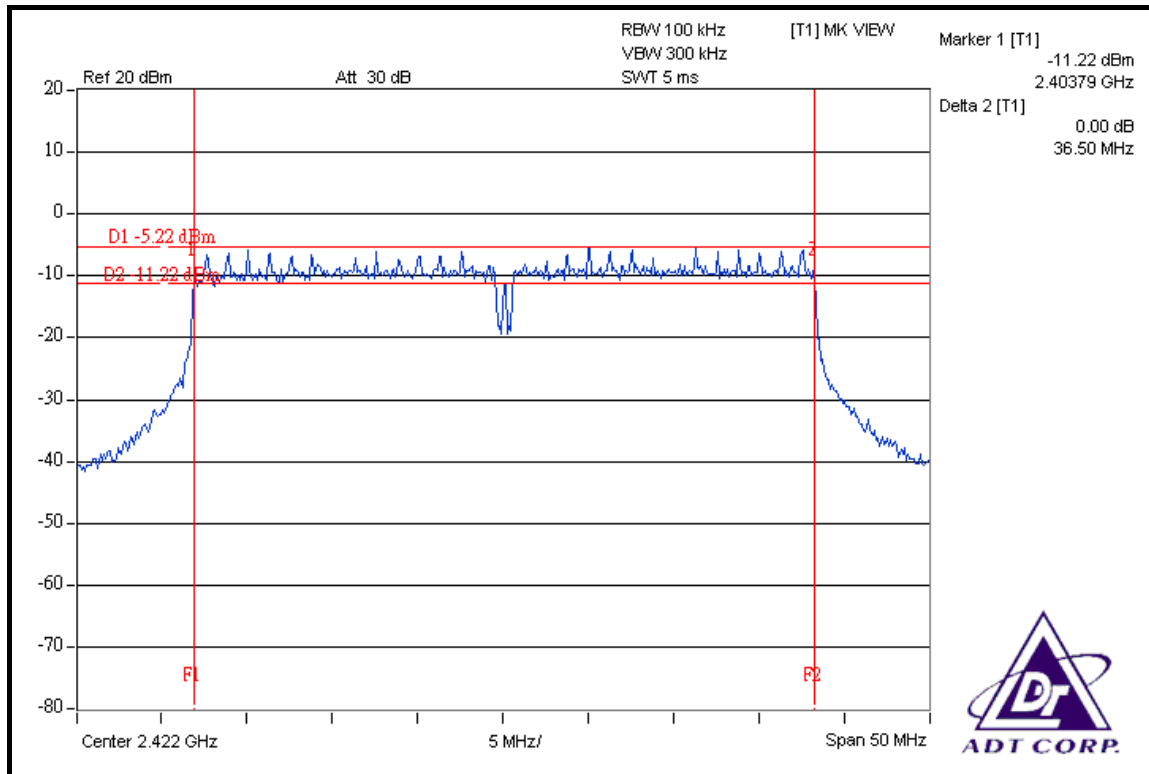


CH 4

CH 7


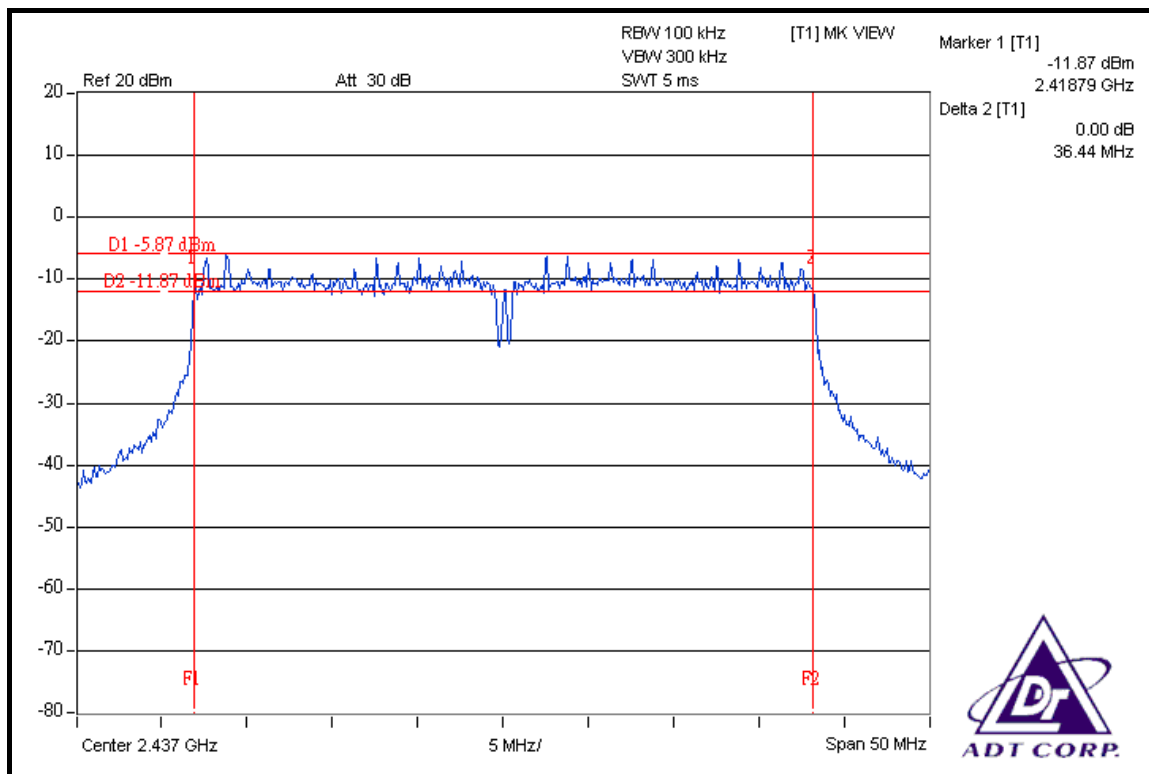


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FOR CHAIN 1: CH 1



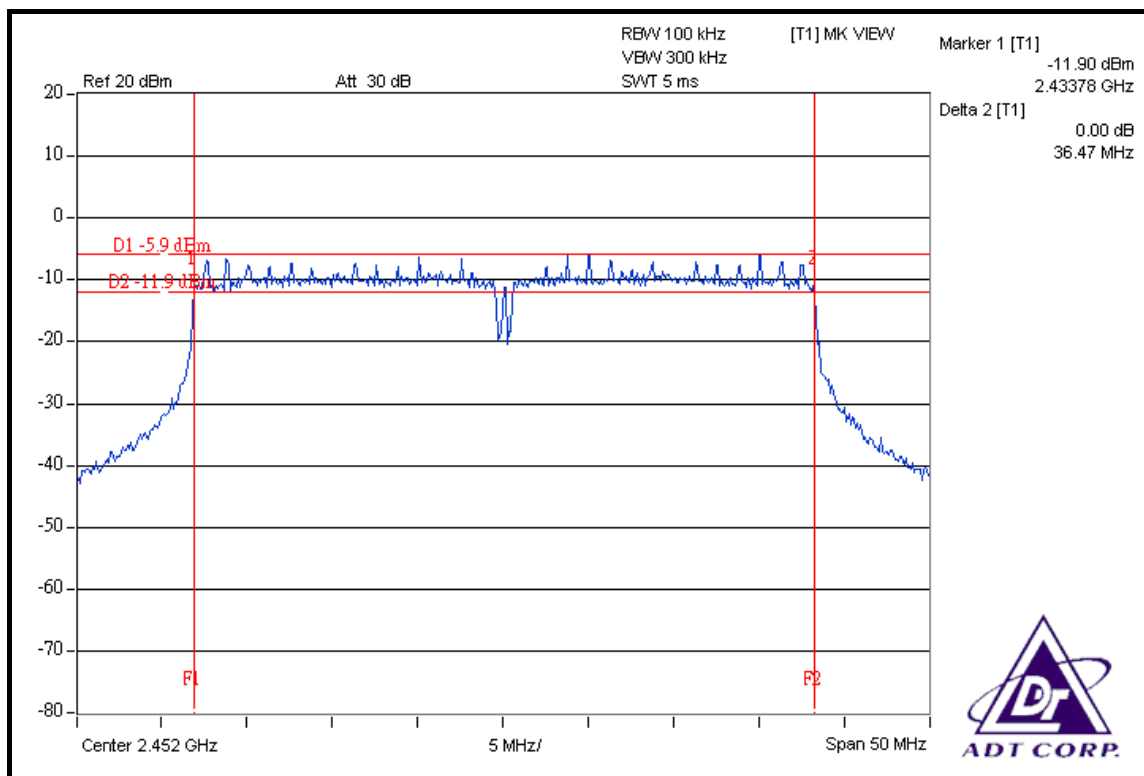
CH 4



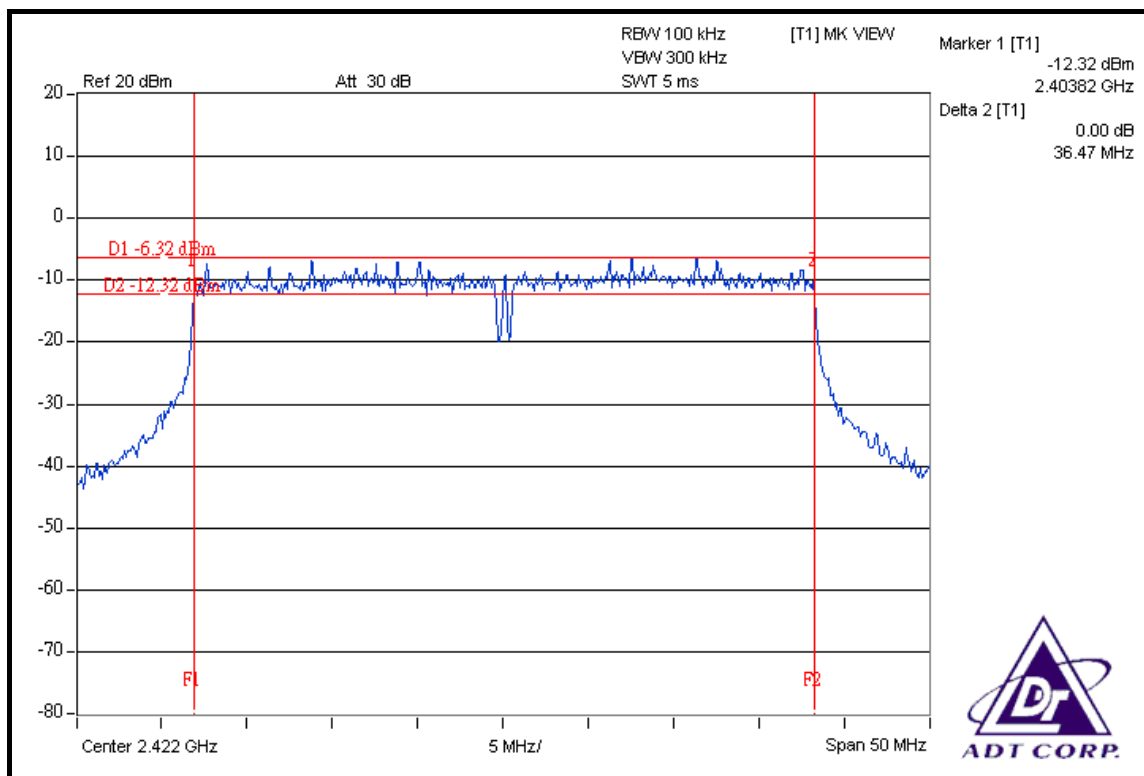


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CH 7



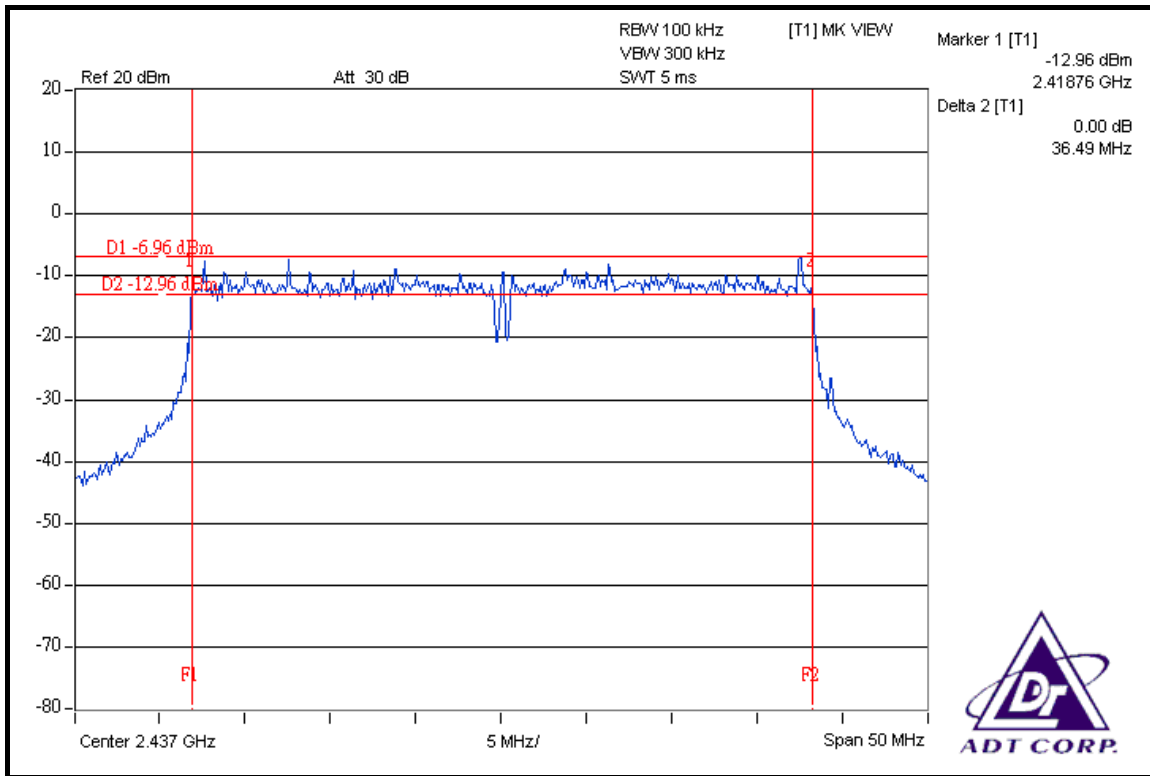
FOR CHAIN 2: CH 1



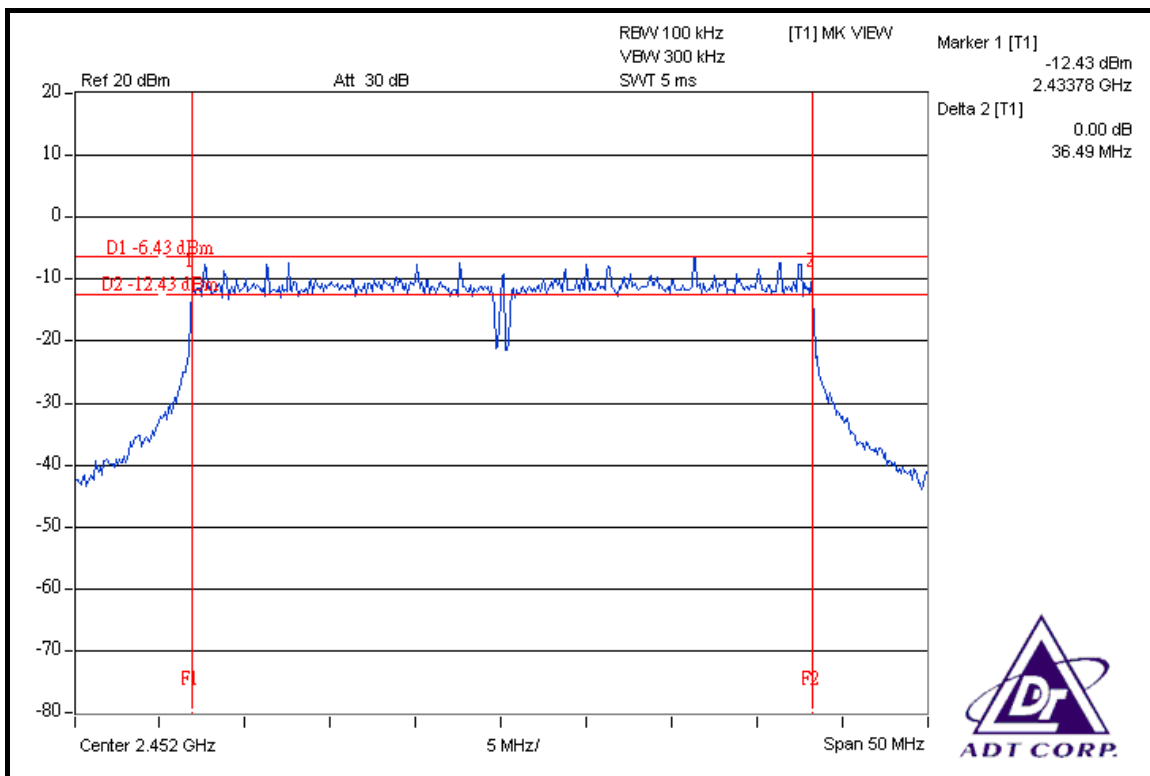


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CH 4



CH 7



4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	CALIBRATED UNTIL
High Speed Peak Power Meter	ML2495A	0824012	Aug. 04, 2008	Aug. 03, 2009
Power Sensor	MA2444B	0738138	Aug. 04, 2008	Aug. 03, 2009

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. Measurement Bandwidth of ML2495A is 65MHz greater than 6dB bandwidth of emission.

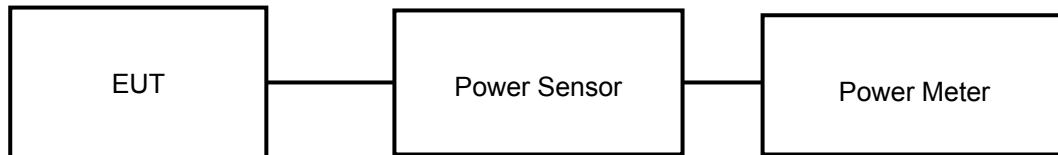
4.4.3 TEST PROCEDURES

A power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6



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4.4.7 TEST RESULTS

802.11b DSSS MODULATION

MODULATION TYPE	DBPSK	TRANSFER RATE	1.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)			TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	17.08	16.56	16.02	136.335	21.35	30	PASS
6	2437	17.06	16.52	16.10	136.429	21.35	30	PASS
11	2462	17.10	16.58	16.06	137.149	21.37	30	PASS

802.11g OFDM MODULATION

MODULATION TYPE	BPSK	TRANSFER RATE	6.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)			TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	25.08	24.02	24.06	829.138	29.19	30	PASS
6	2437	25.09	24.11	24.08	836.340	29.22	30	PASS
11	2462	25.03	24.06	24.07	828.373	29.18	30	PASS



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DRAFT 802.11n (20MHz) OFDM MODULATION

MODULATION TYPE	BPSK	TRANSFER RATE	7.2Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)			TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	24.52	22.56	21.02	589.915	27.71	30	PASS
6	2437	24.08	22.59	21.08	565.643	27.53	30	PASS
11	2462	23.01	22.07	21.04	488.108	26.89	30	PASS

DRAFT 802.11n (40MHz) OFDM MODULATION

MODULATION TYPE	BPSK	TRANSFER RATE	15.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)			TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2422	24.55	21.52	20.56	540.770	27.33	30	PASS
4	2437	23.08	21.05	20.02	431.048	26.35	30	PASS
7	2452	23.56	21.06	20.53	467.610	26.70	30	PASS



4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100041	Apr. 22, 2008	Apr. 21, 2009

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 PROCEDURE

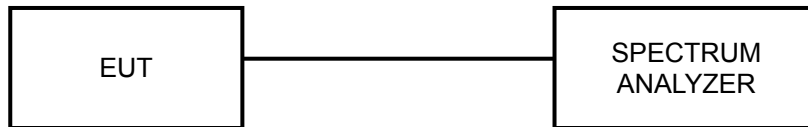
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

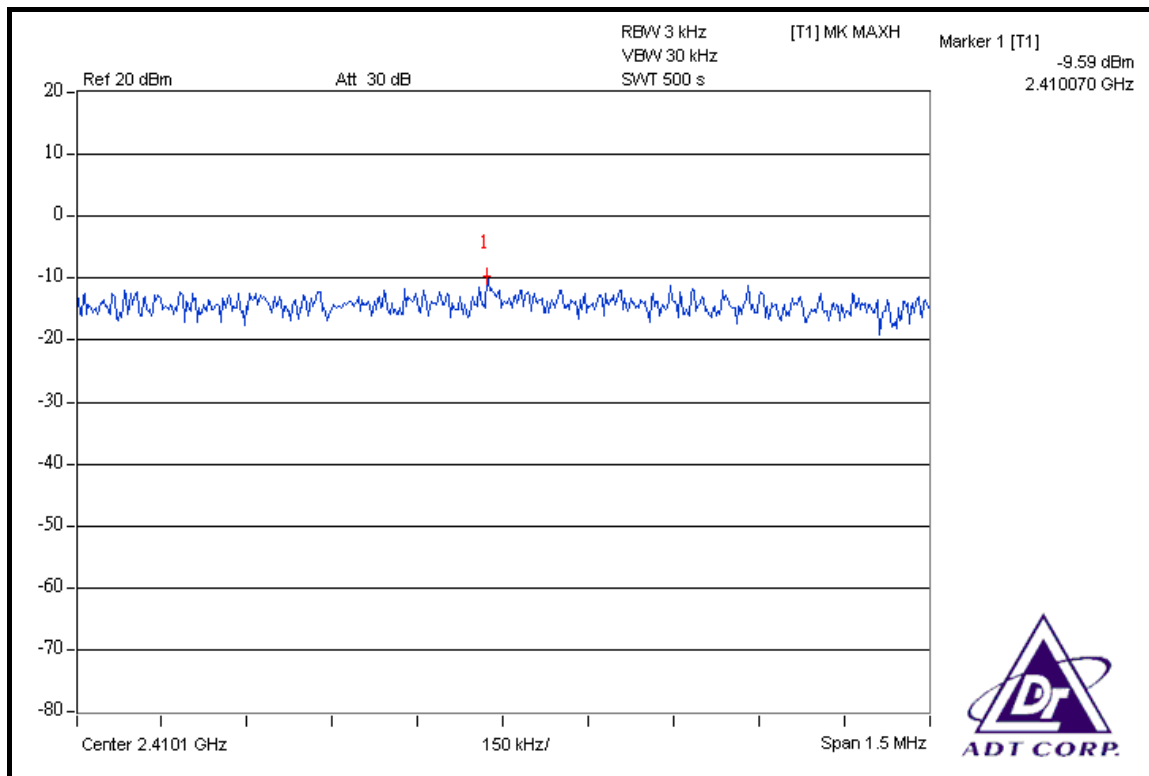
4.5.7 TEST RESULTS

802.11b DSSS MODULATION

MODULATION TYPE	DBPSK	TRANSFER RATE	1.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)			TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	-9.59	-10.05	-10.06	0.307	-5.12	8	PASS
6	2437	-9.39	-10.04	-10.18	0.310	-5.08	8	PASS
11	2462	-9.72	-9.82	-9.83	0.315	-5.02	8	PASS

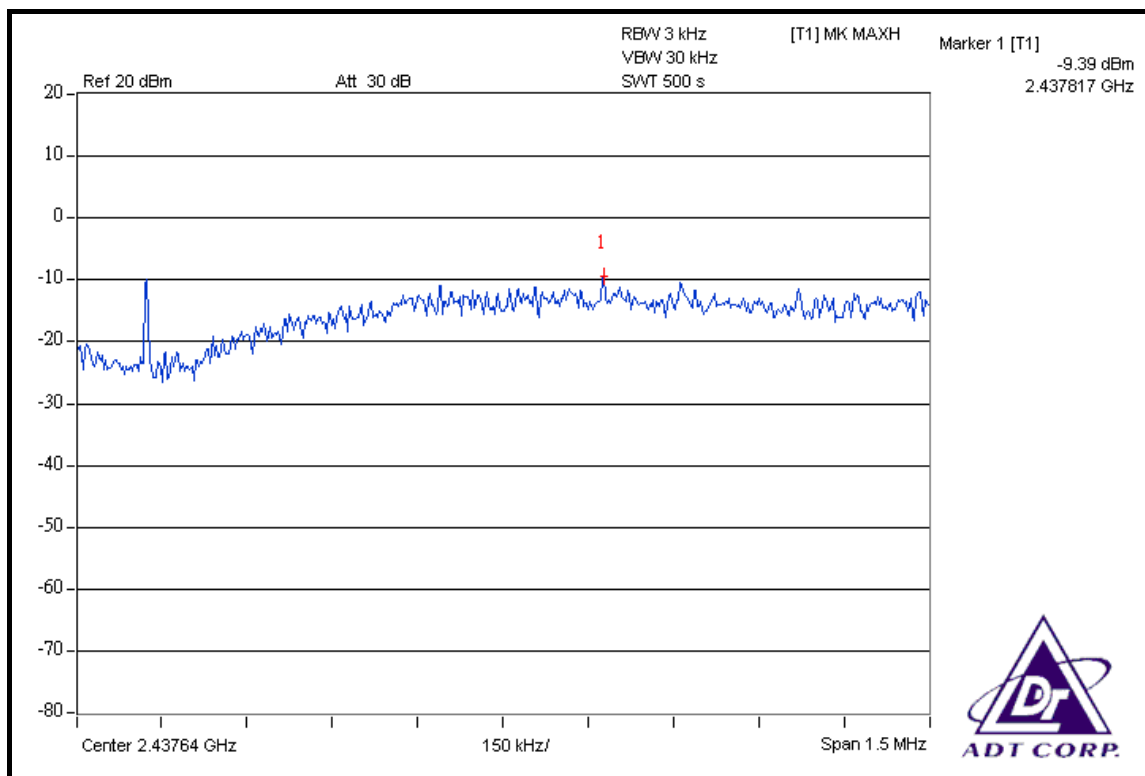
FOR CHAIN 0: CH 1



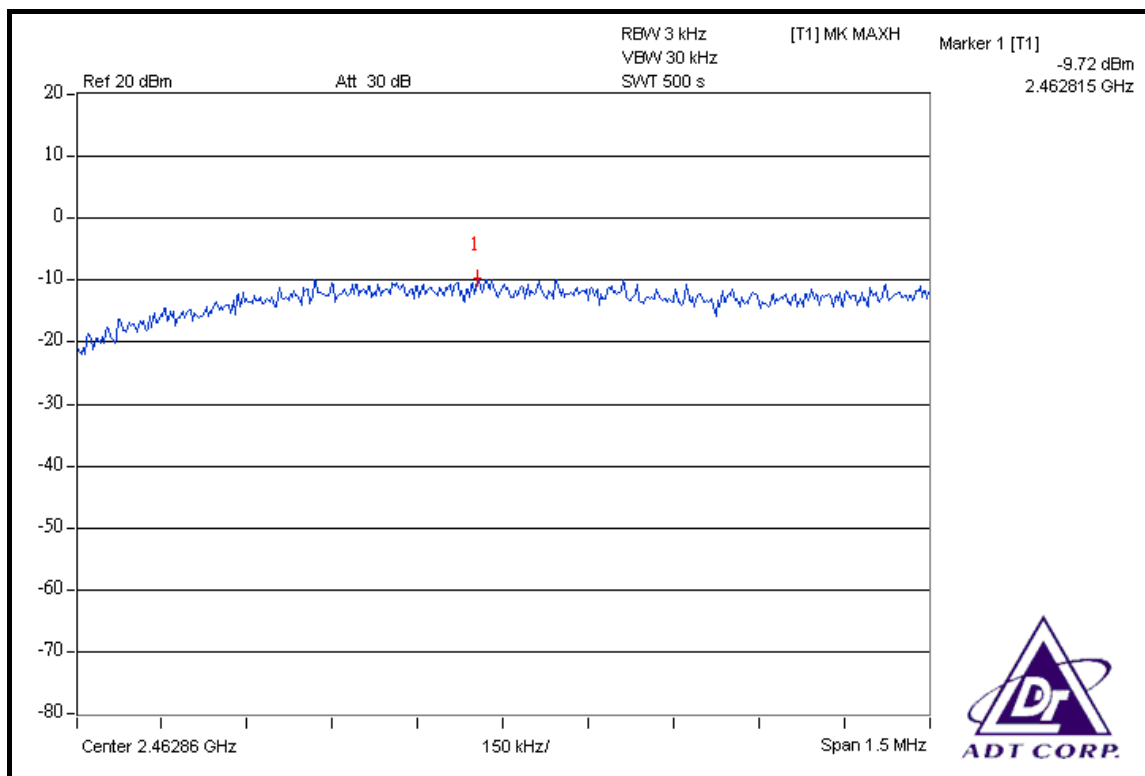


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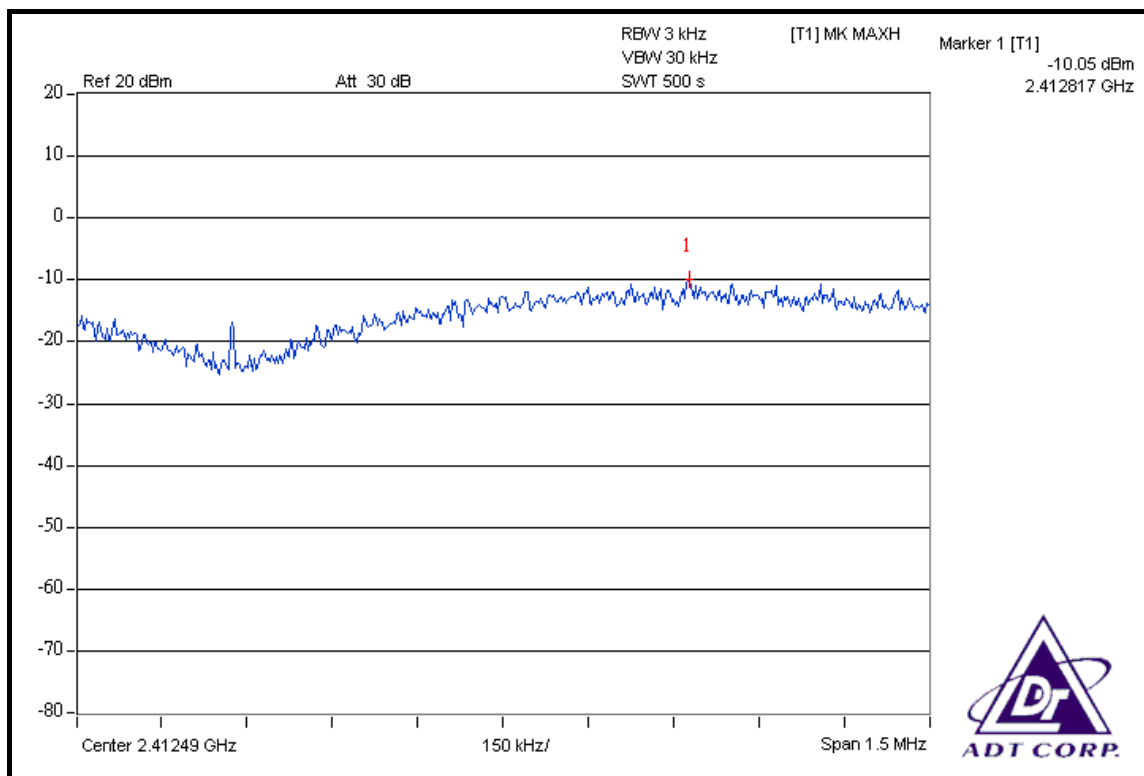
CH 11



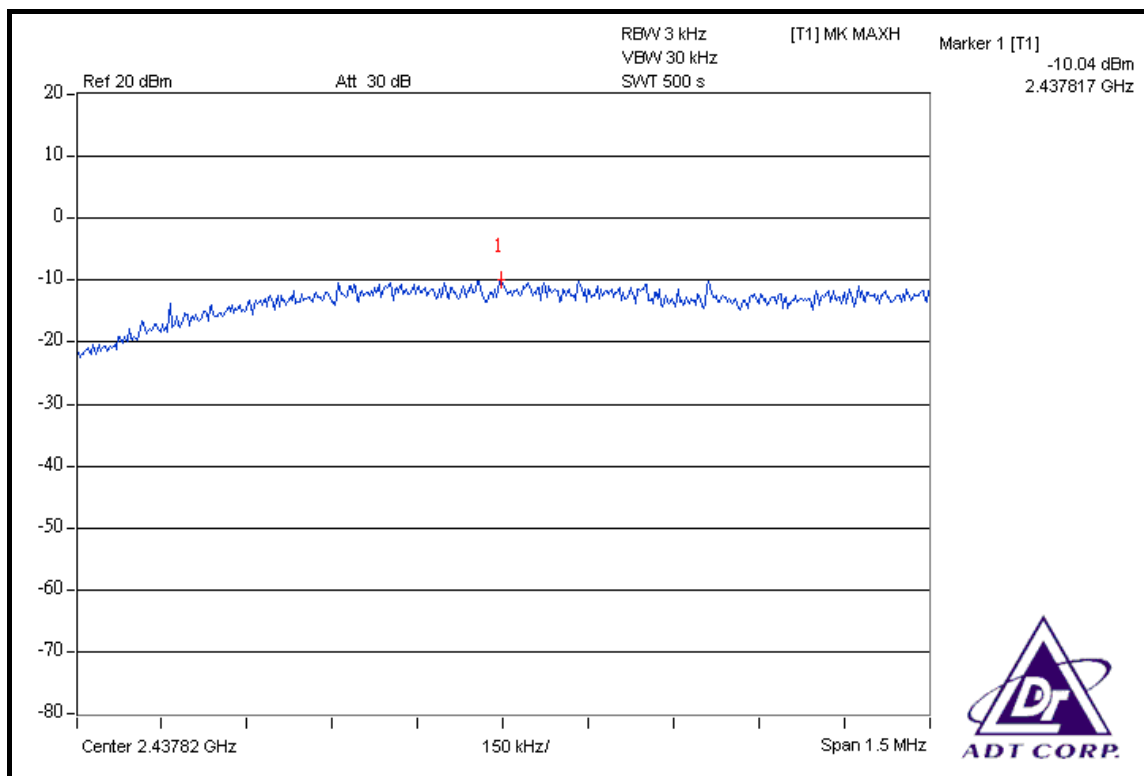


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FOR CHAIN 1: CH 1



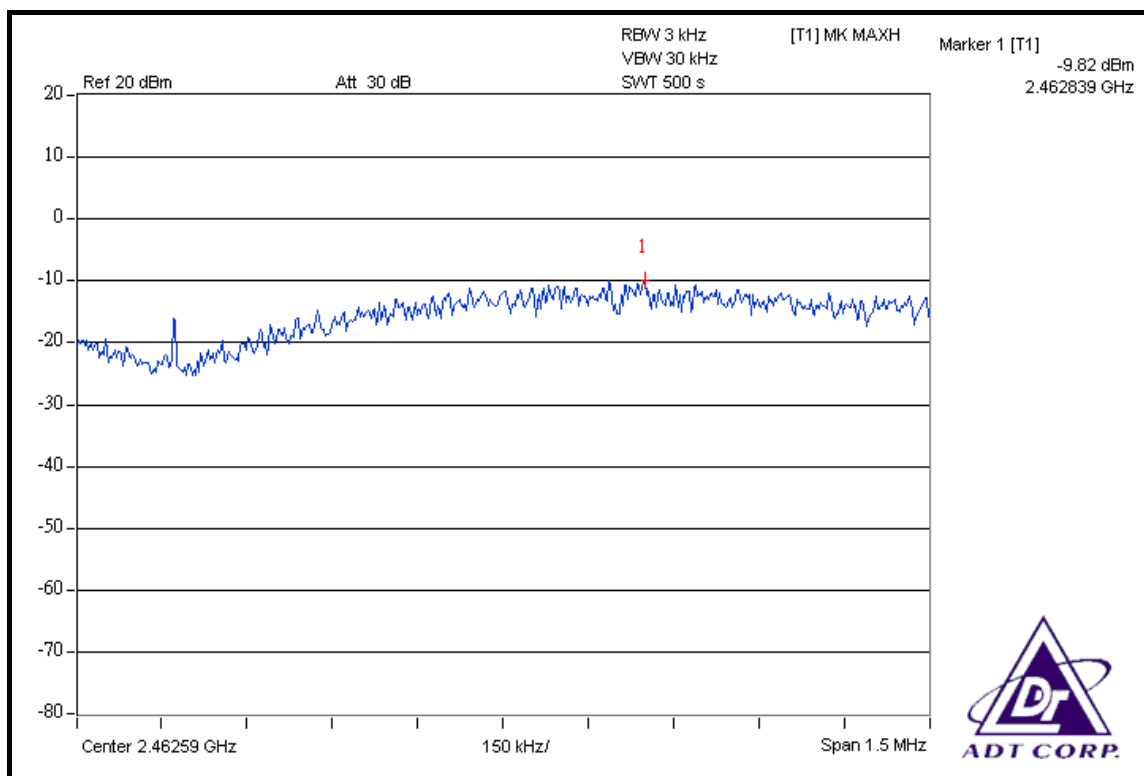
CH 6



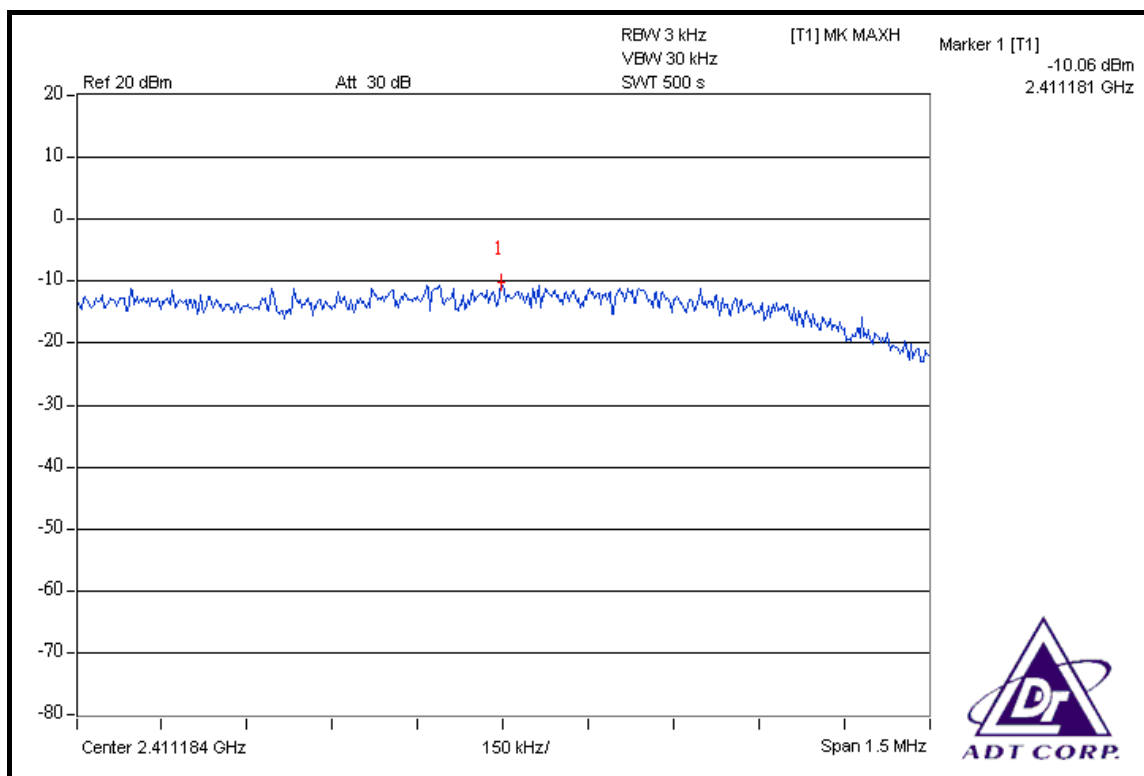


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CH 11



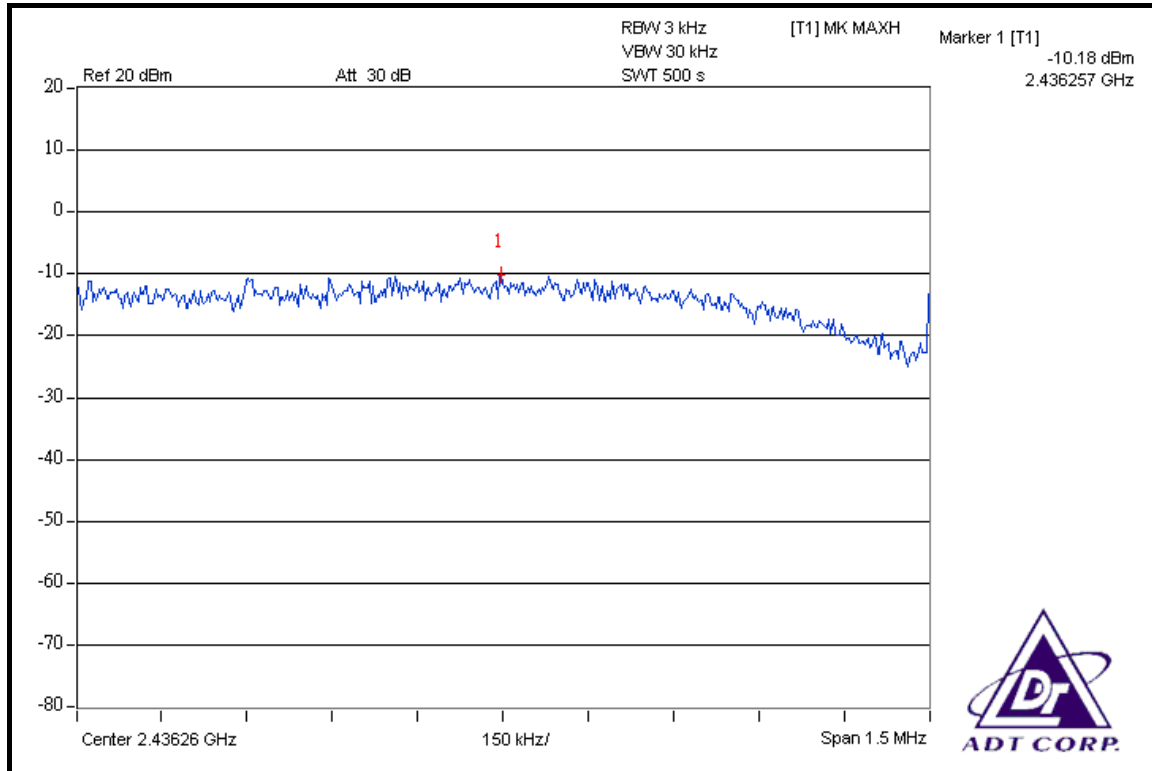
FOR CHAIN 2: CH 1



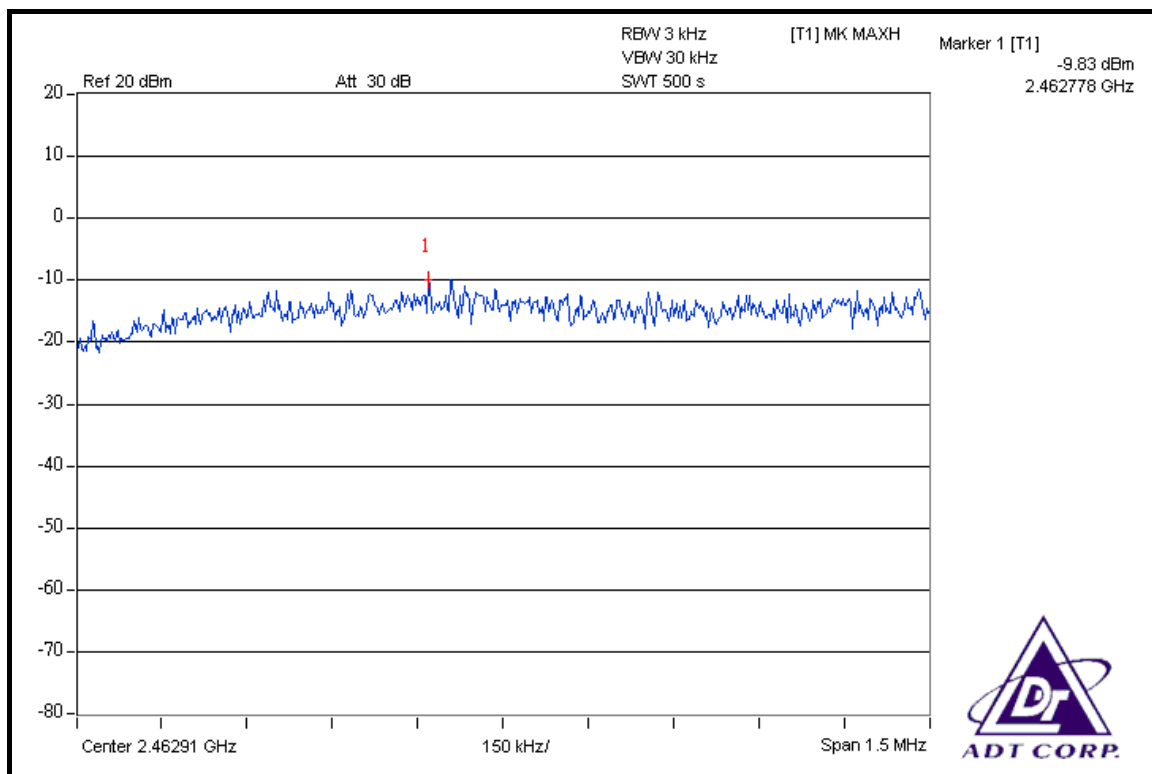


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CH 6



CH 11





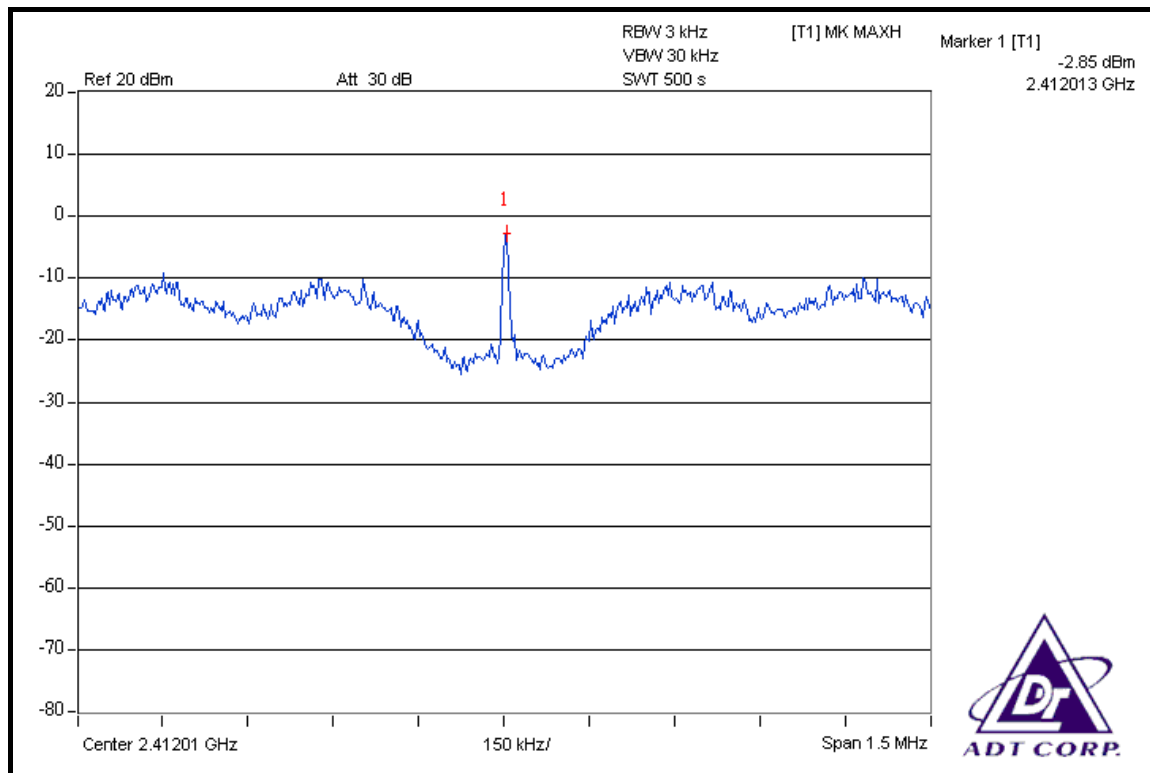
A D T

802.11g OFDM MODULATION

MODULATION TYPE	BPSK	TRANSFER RATE	6.0Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)			TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	-2.85	-9.43	-7.34	0.817	-0.88	8	PASS
6	2437	-2.72	-9.39	-7.45	0.830	-0.81	8	PASS
11	2462	-2.94	-9.59	-7.31	0.804	-0.95	8	PASS

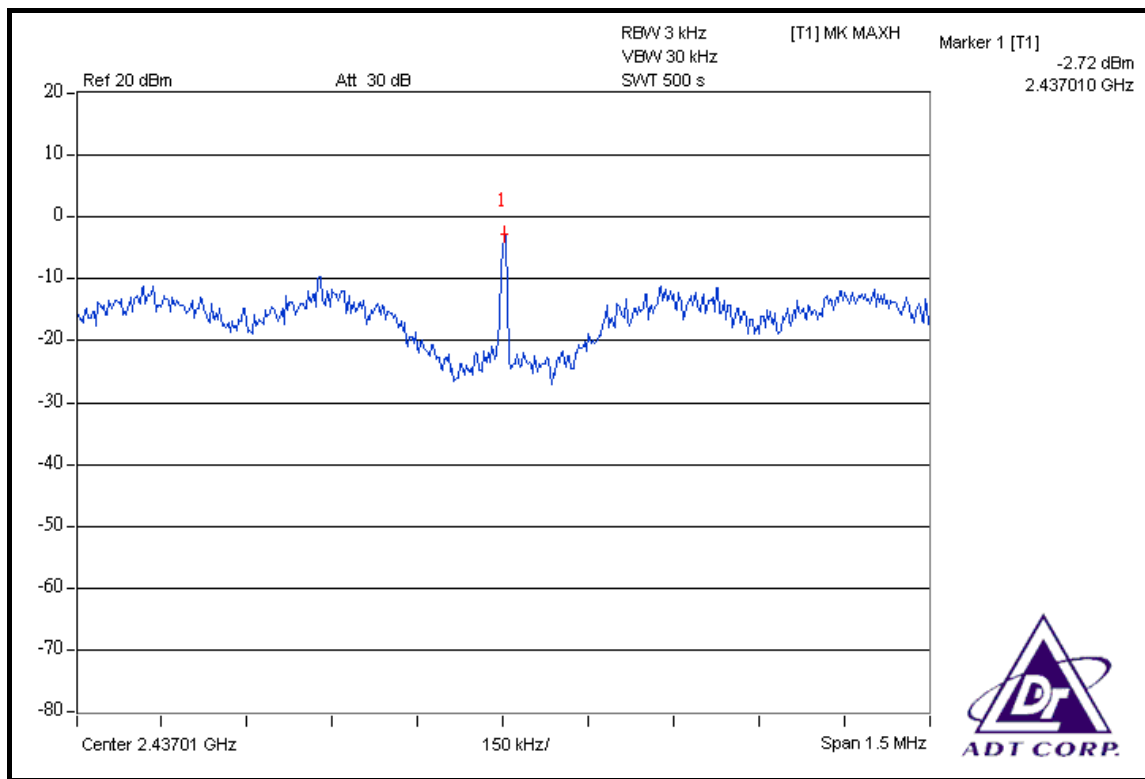
FOR CHAIN 0: CH 1



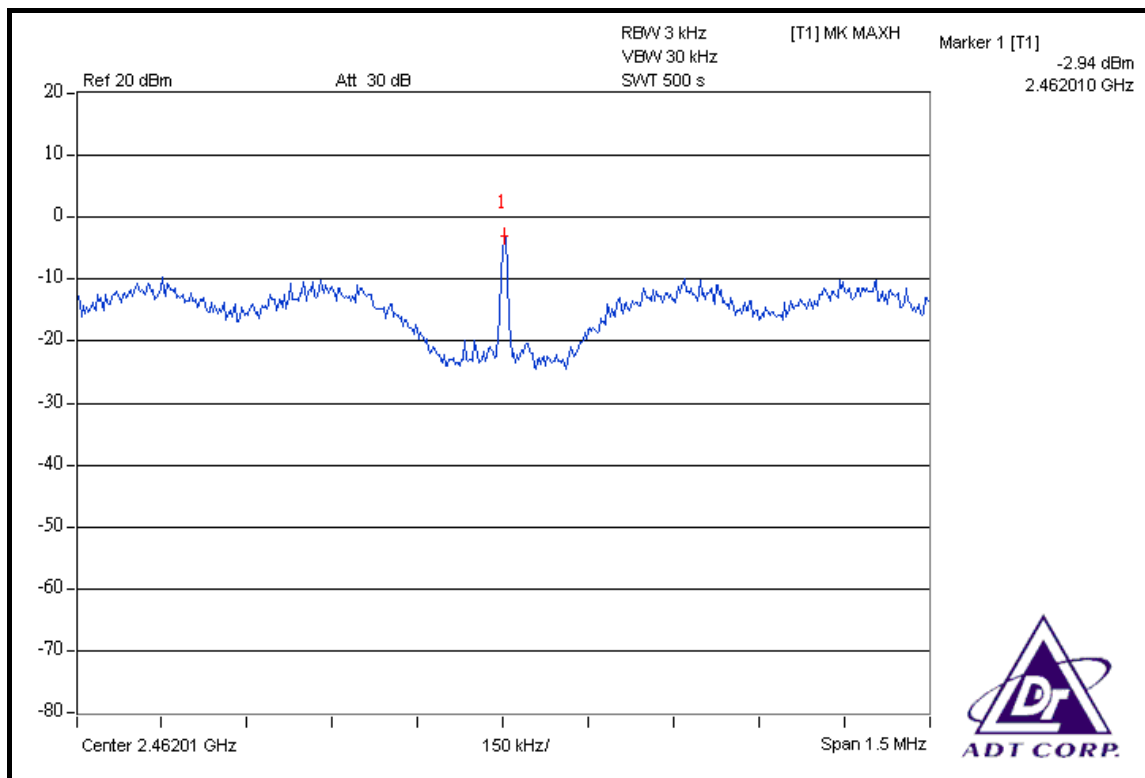


A D T

CH 6



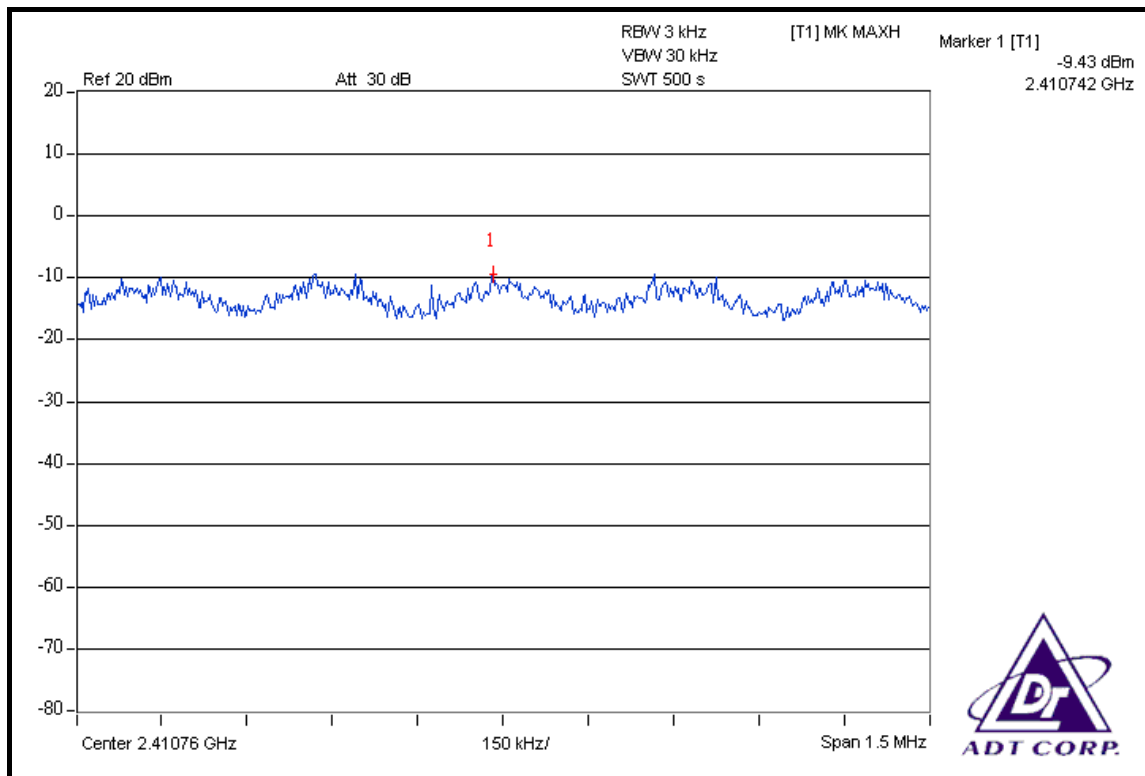
CH 11



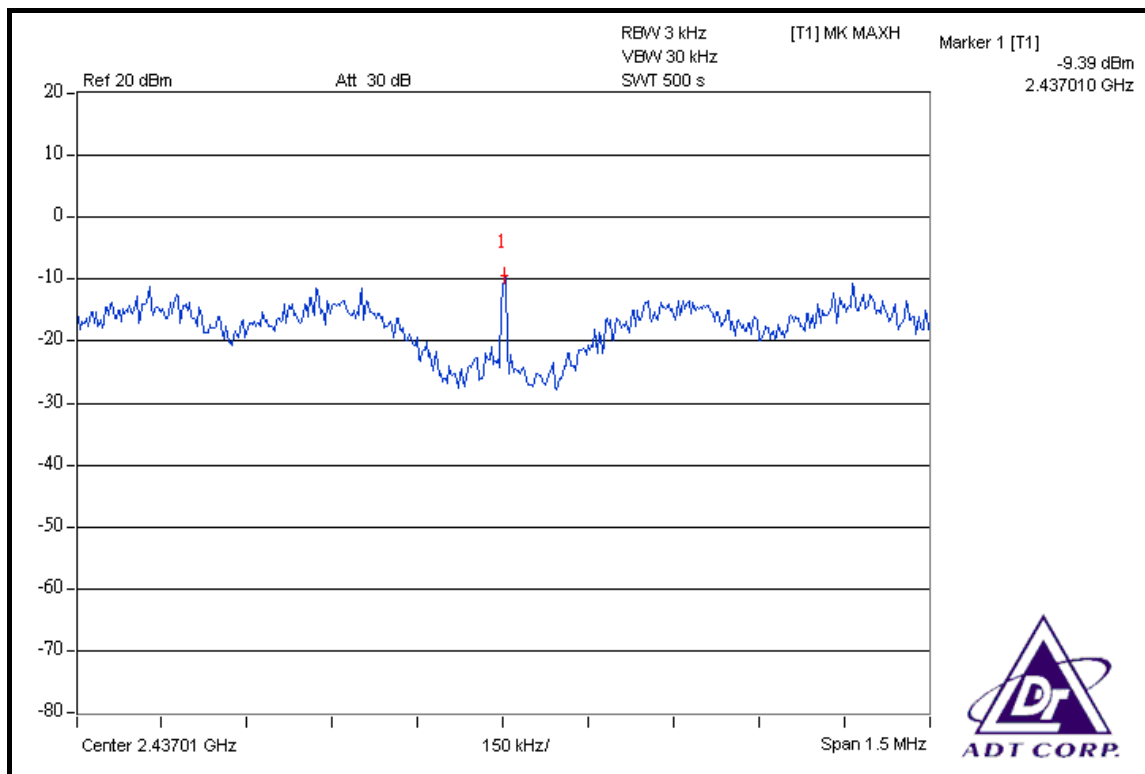


A D T

FOR CHAIN 1: CH 1



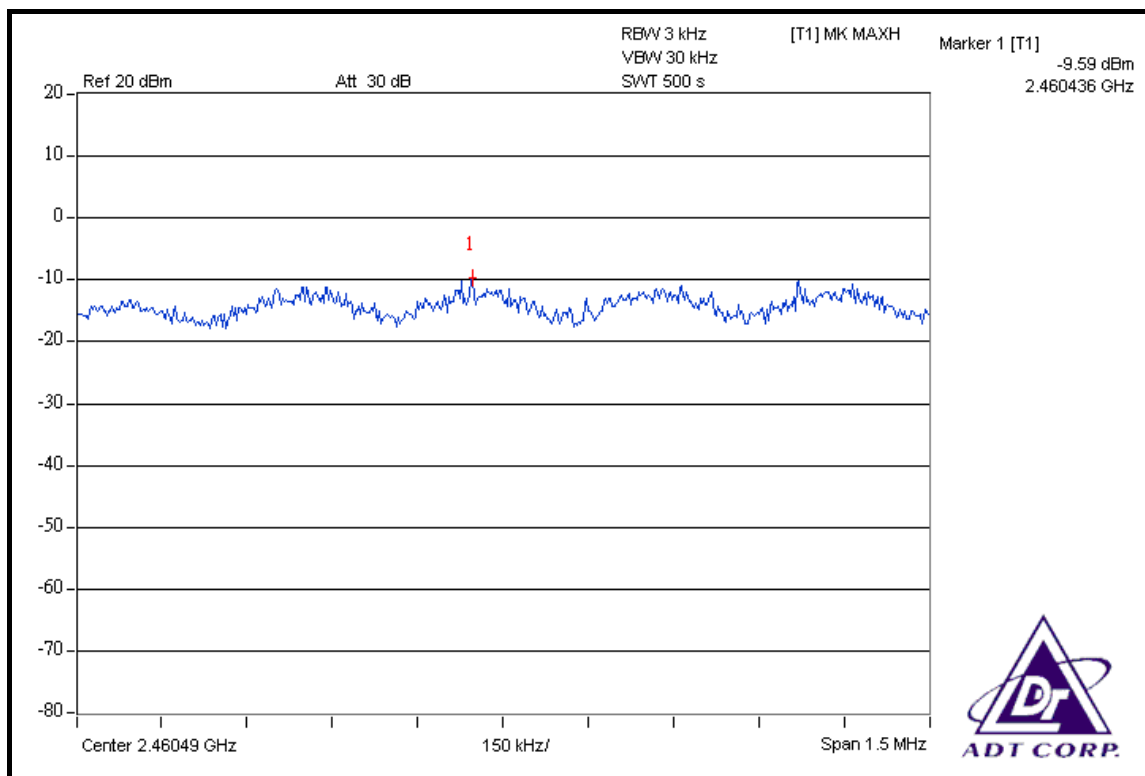
CH 6



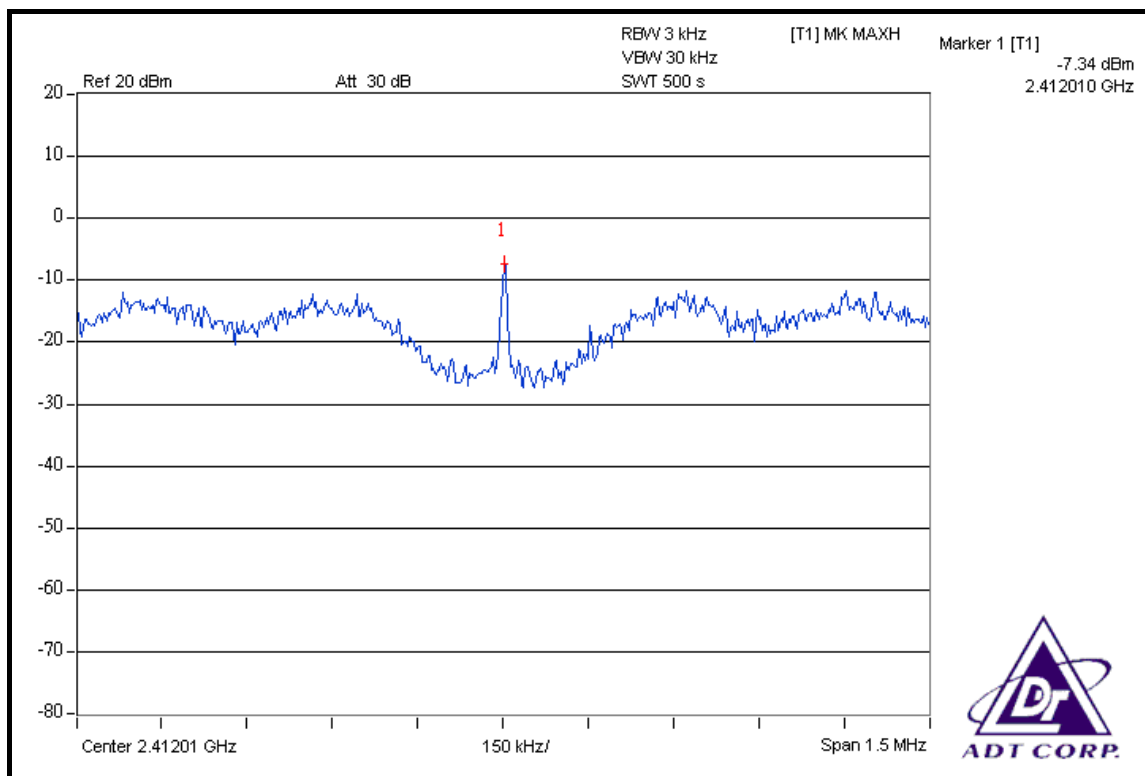


A D T

CH 11



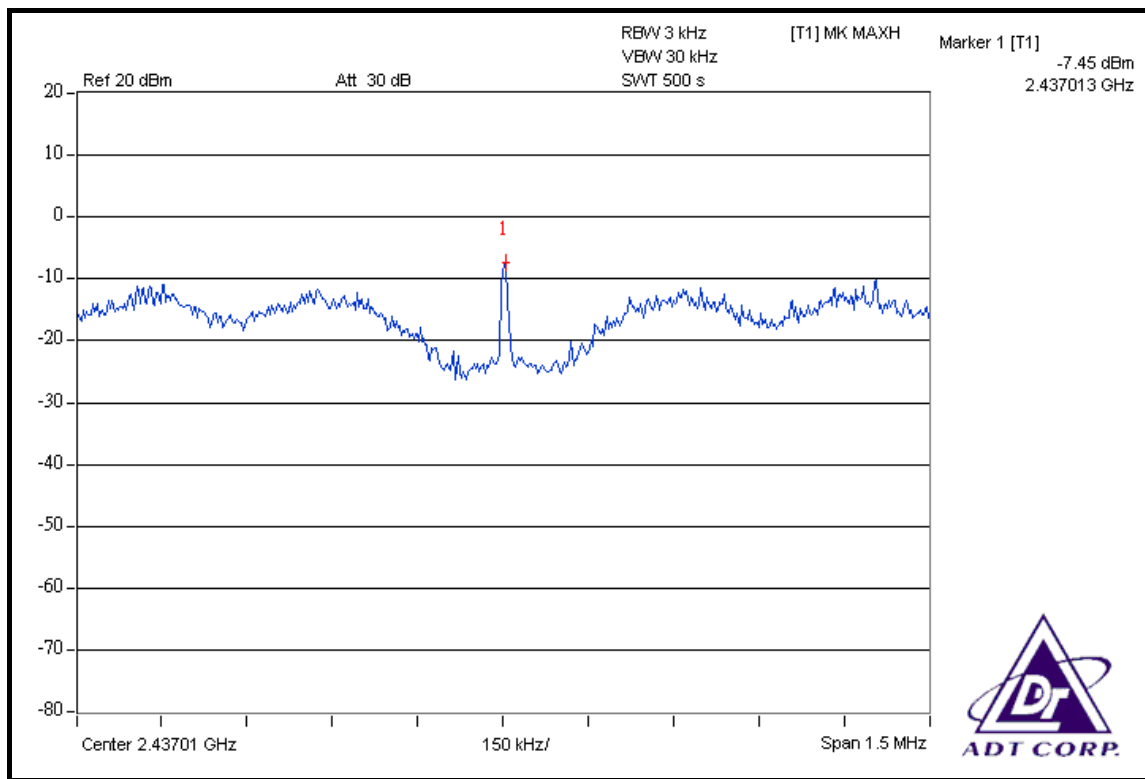
FOR CHAIN 2: CH 1



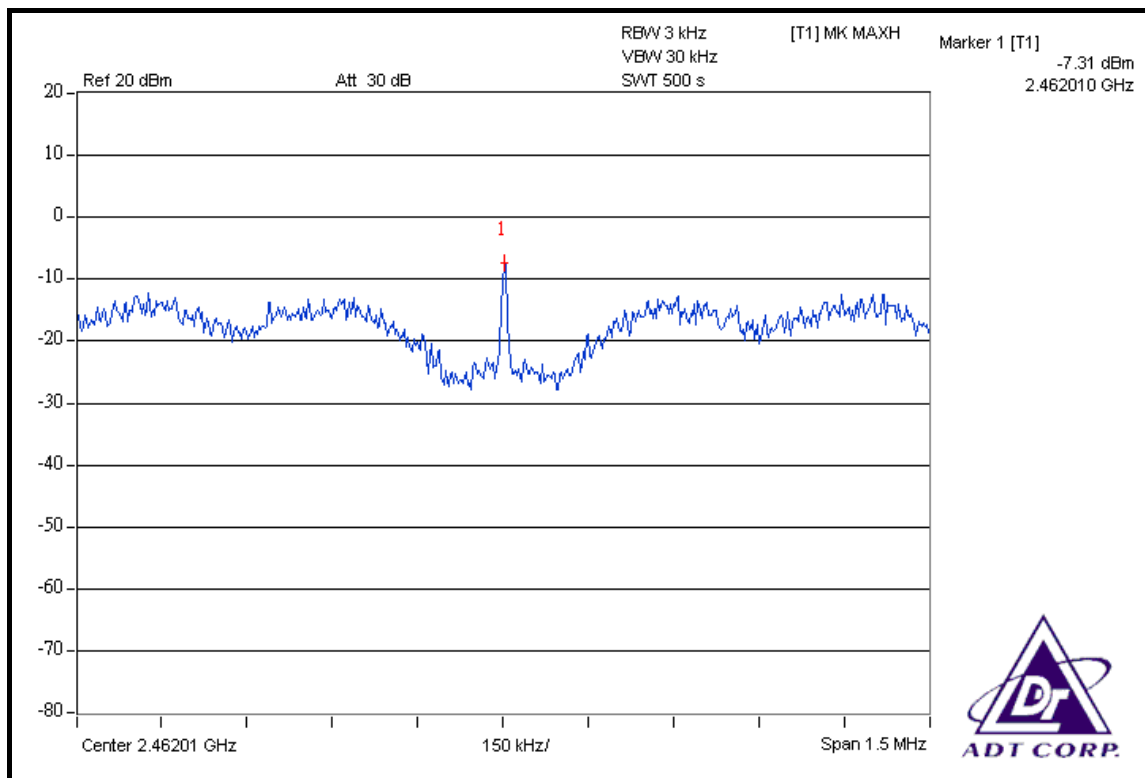


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CH 6



CH 11





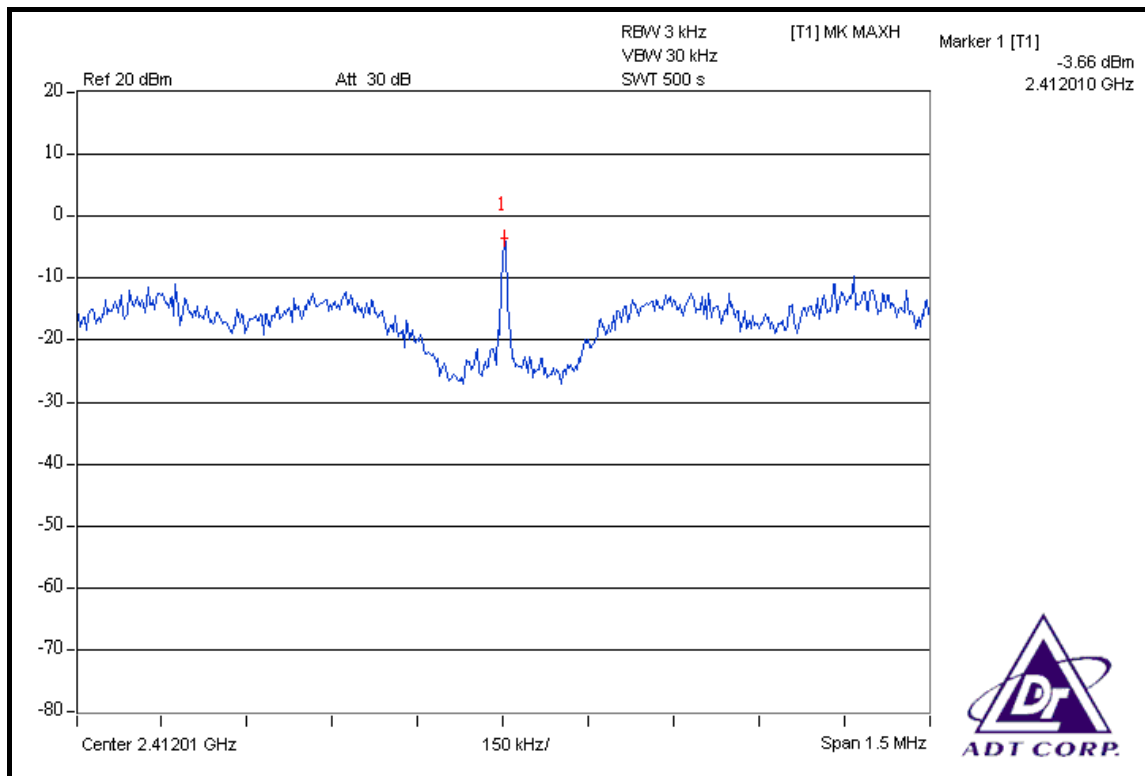
A D T

DRAFT 802.11n (20MHz) OFDM MODULATION

MODULATION TYPE	BPSK	TRANSFER RATE	7.2Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)			TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	-3.66	-10.56	-10.20	0.614	-2.12	8	PASS
6	2437	-4.33	-10.72	-10.19	0.549	-2.60	8	PASS
11	2462	-5.29	-11.17	-10.17	0.468	-3.29	8	PASS

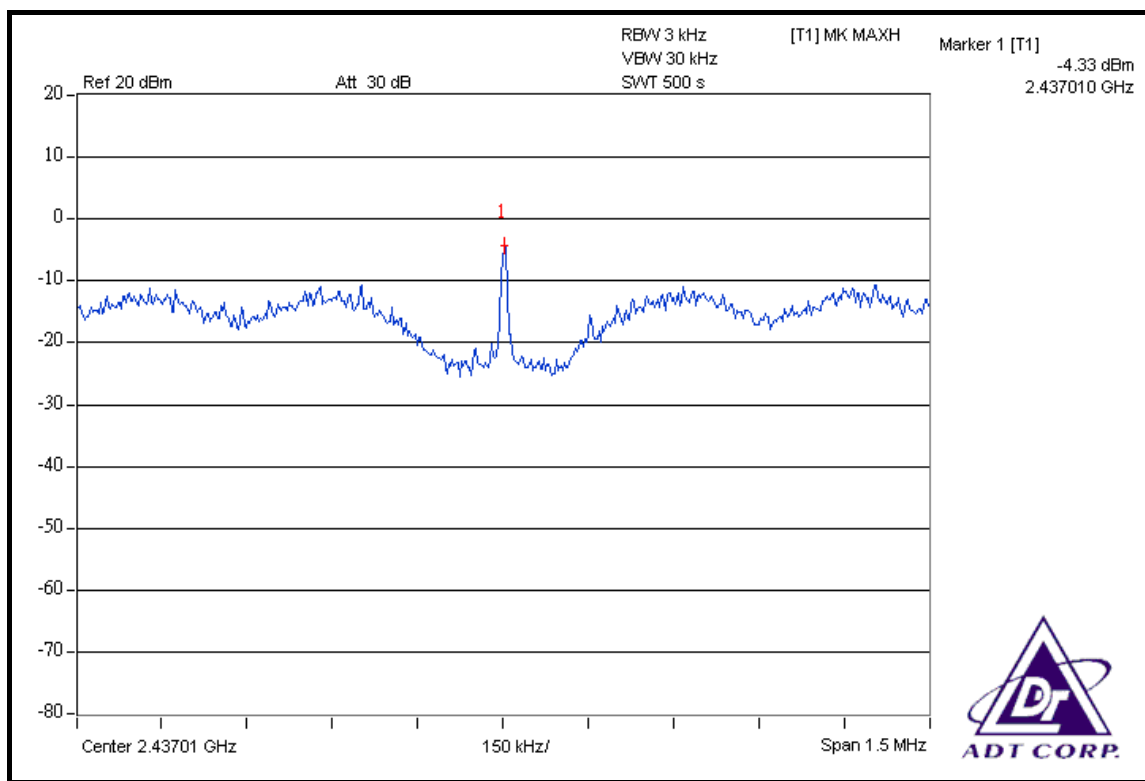
FOR CHAIN 0: CH 1



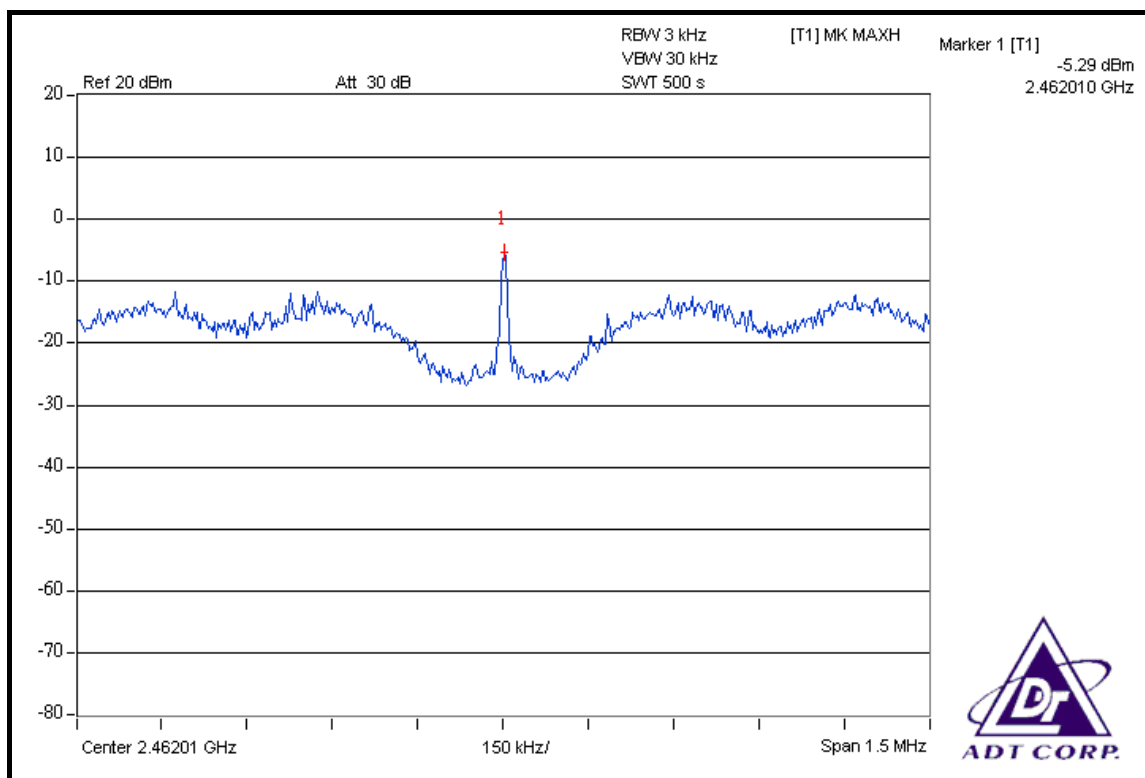


A D T

CH 6



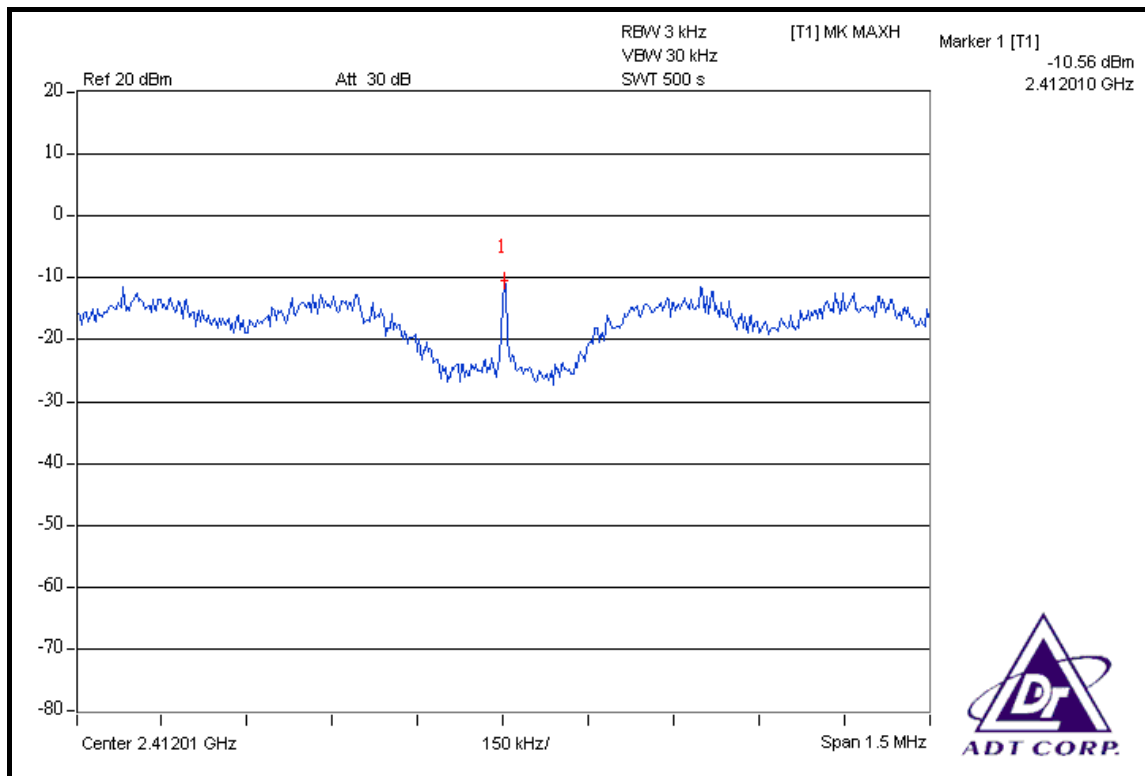
CH 11



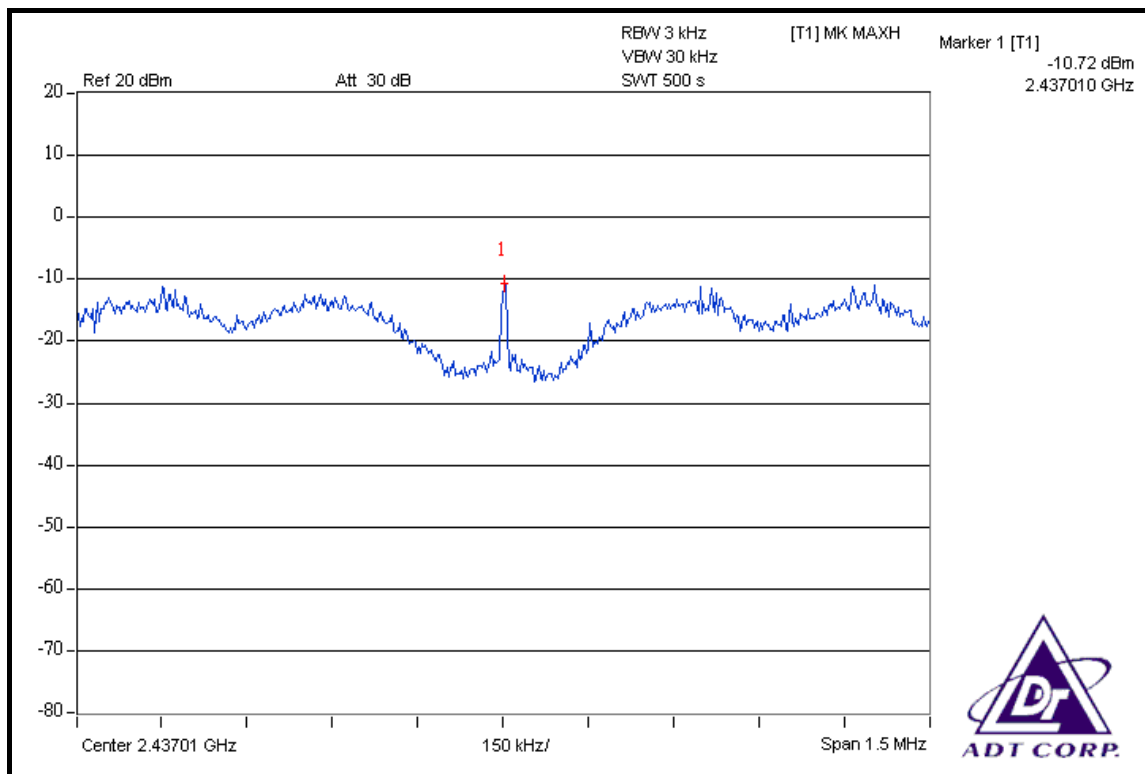


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FOR CHAIN 1: CH 1



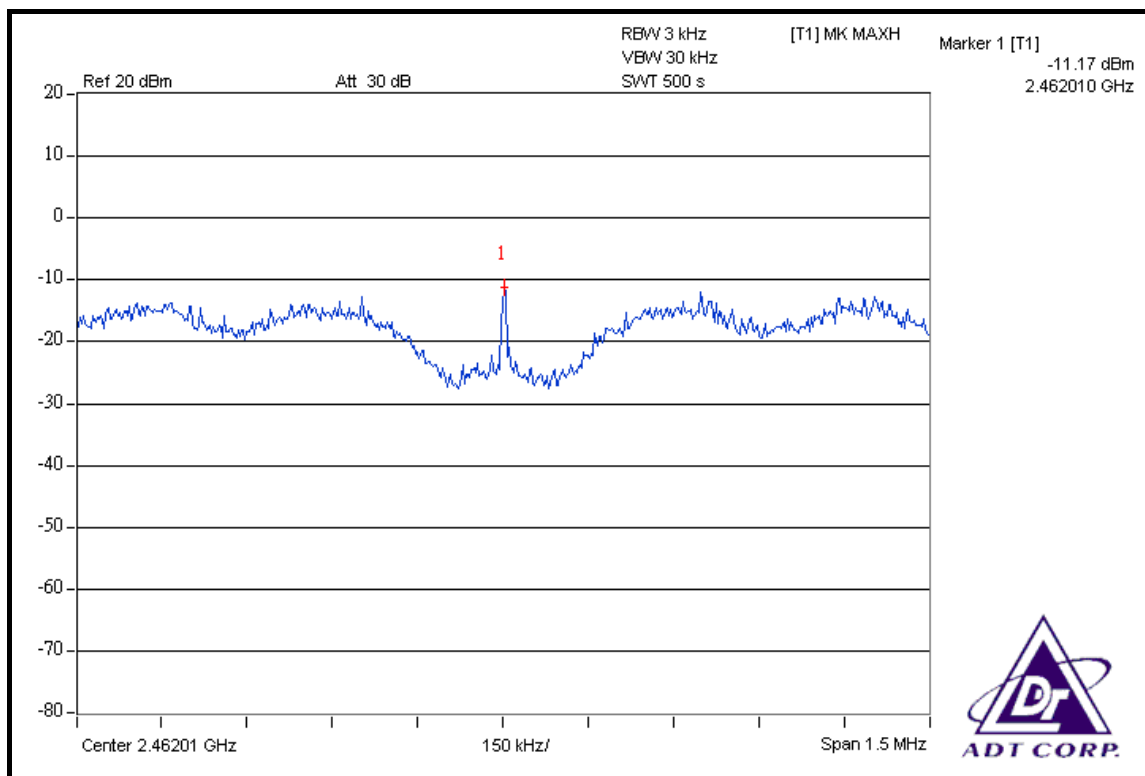
CH 6



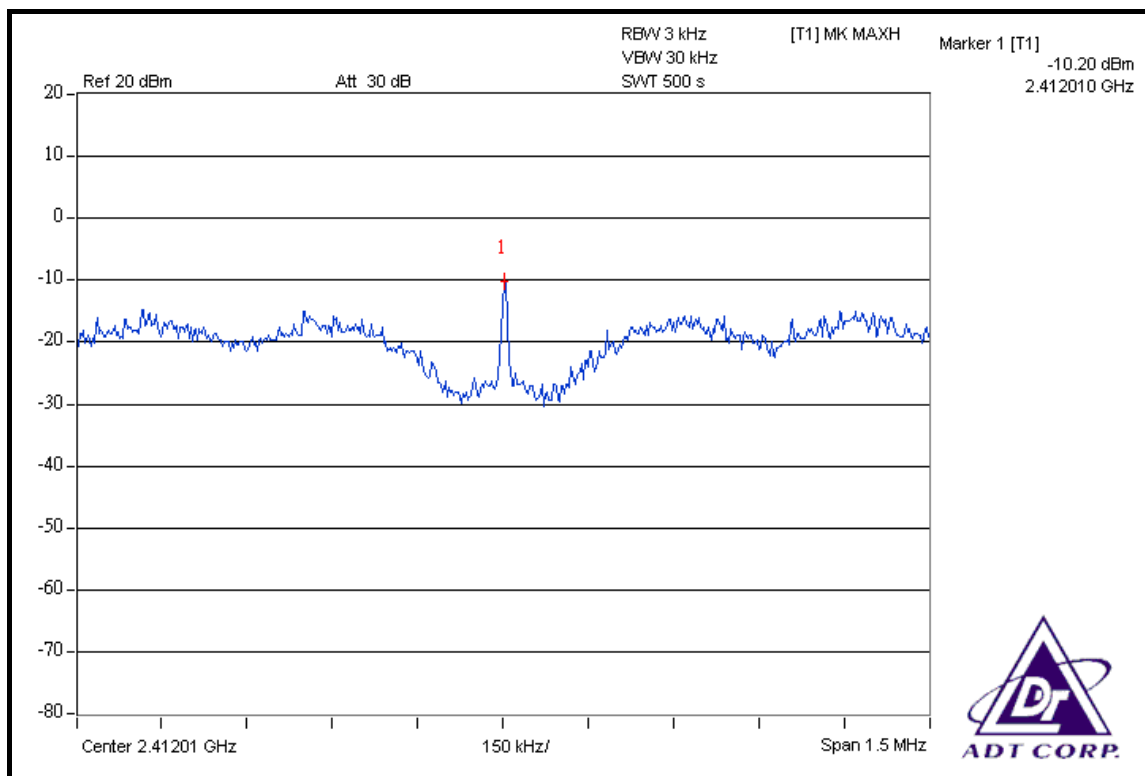


A D T

CH 11



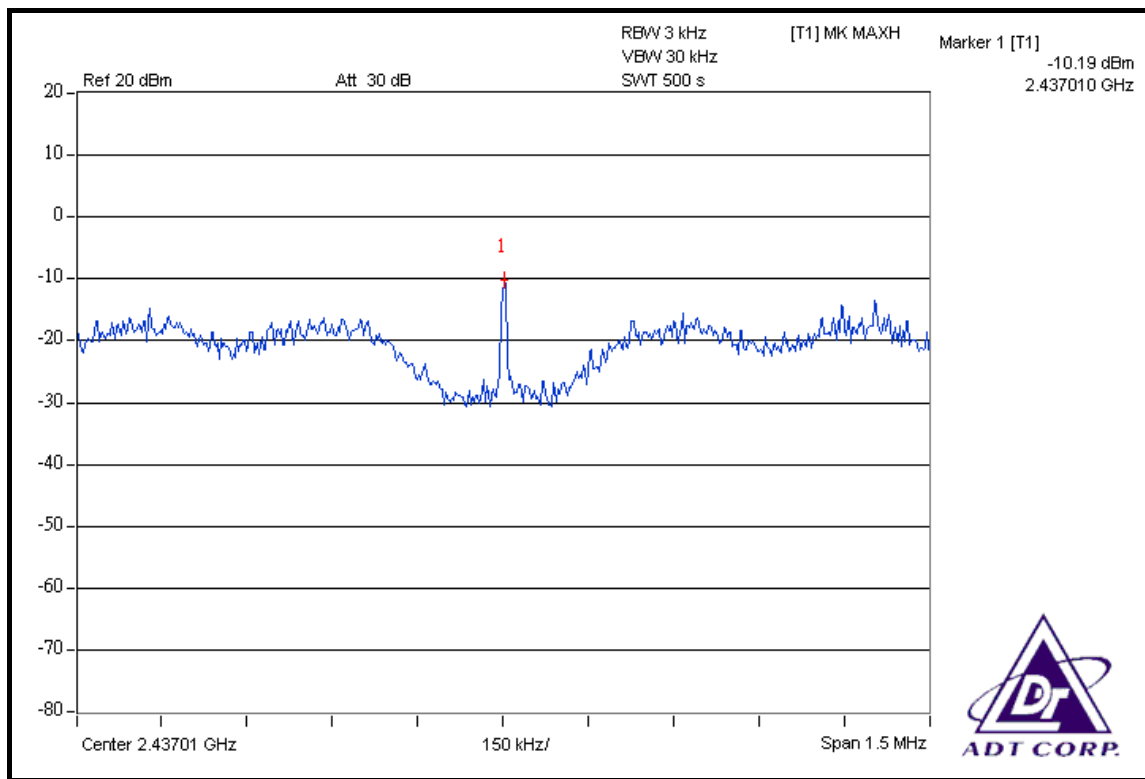
FOR CHAIN 2: CH 1



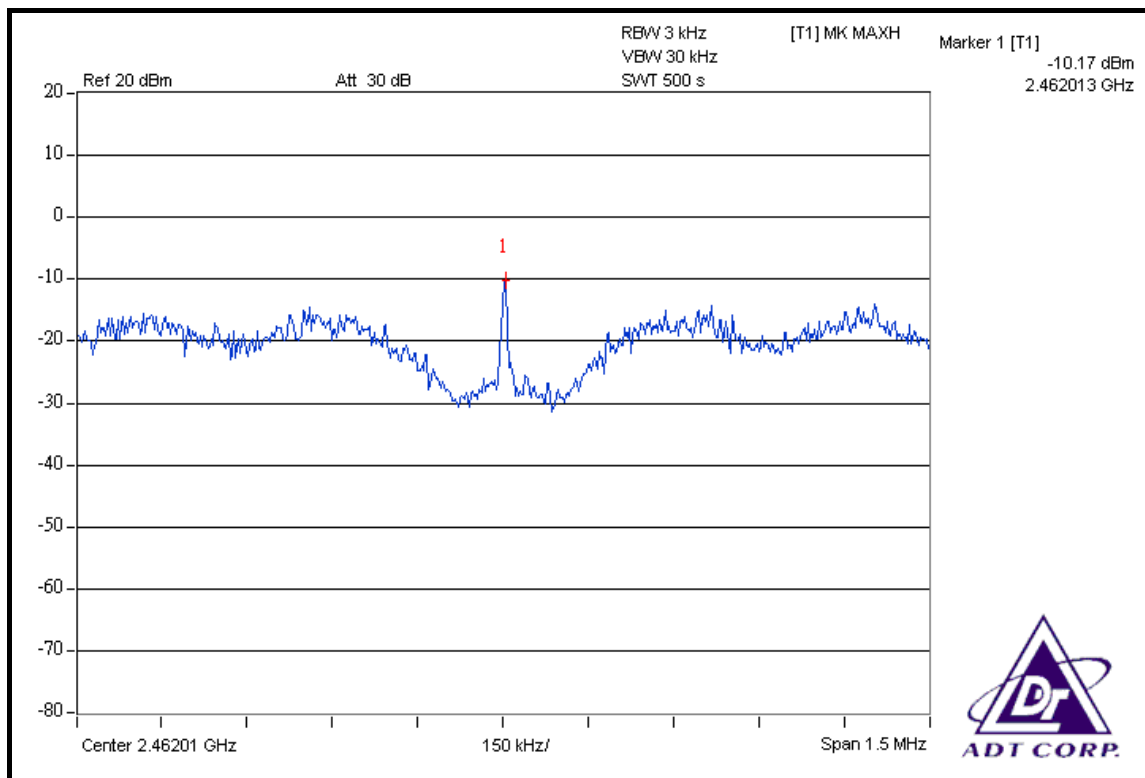


A D T

CH 6



CH 11





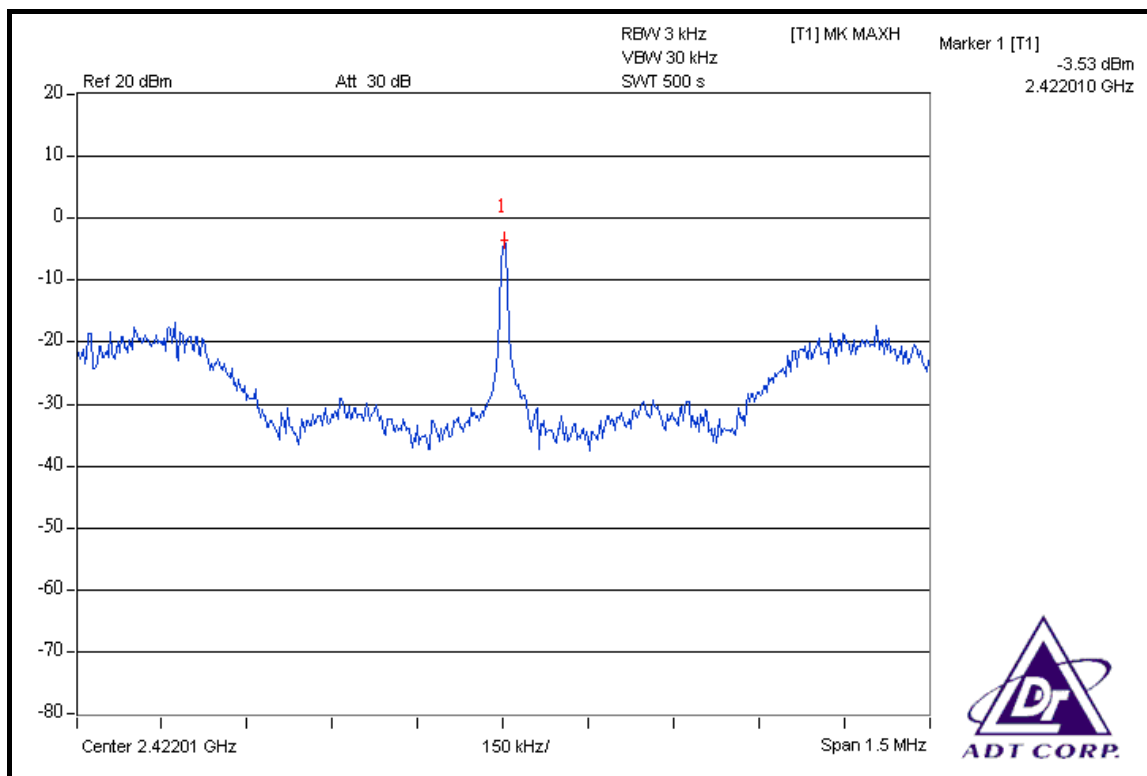
A D T

DRAFT 802.11n (40MHz) OFDM MODULATION

MODULATION TYPE	BPSK	TRANSFER RATE	15Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)			TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2422	-3.53	-13.22	-10.32	0.584	-2.33	8	PASS
4	2437	-4.90	-13.70	-10.64	0.453	-3.44	8	PASS
7	2452	-4.39	-13.53	-10.16	0.505	-2.97	8	PASS

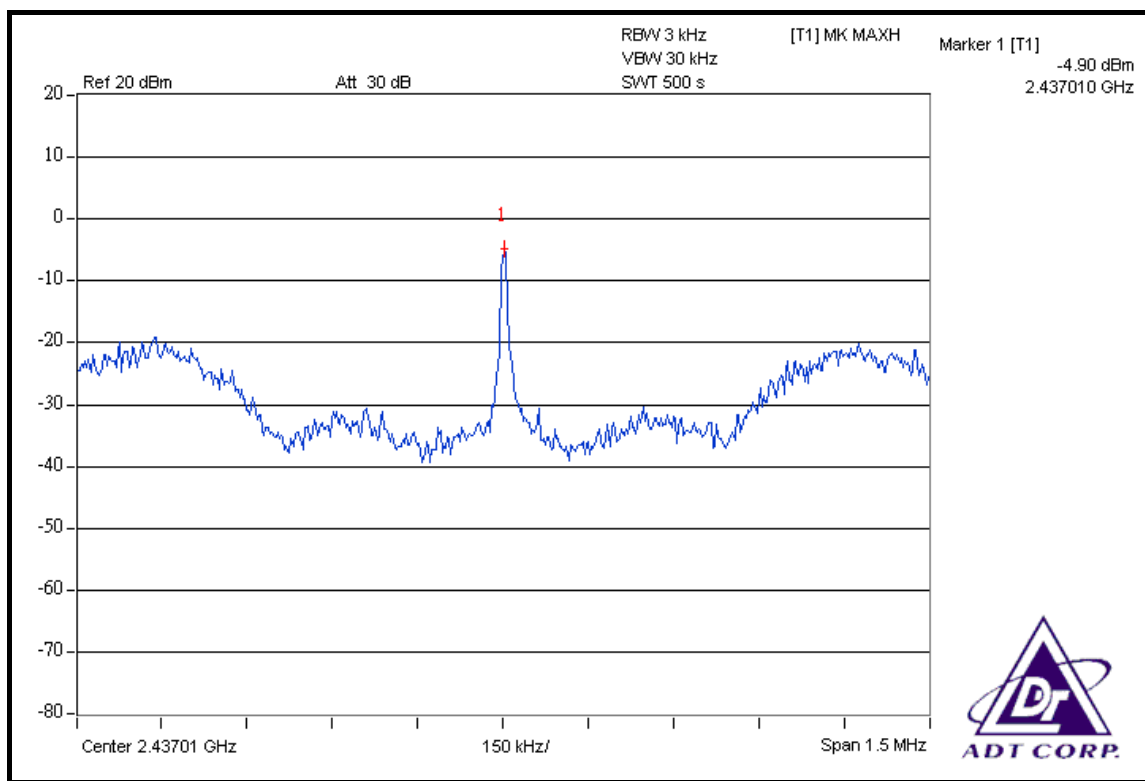
FOR CHAIN 0: CH 1



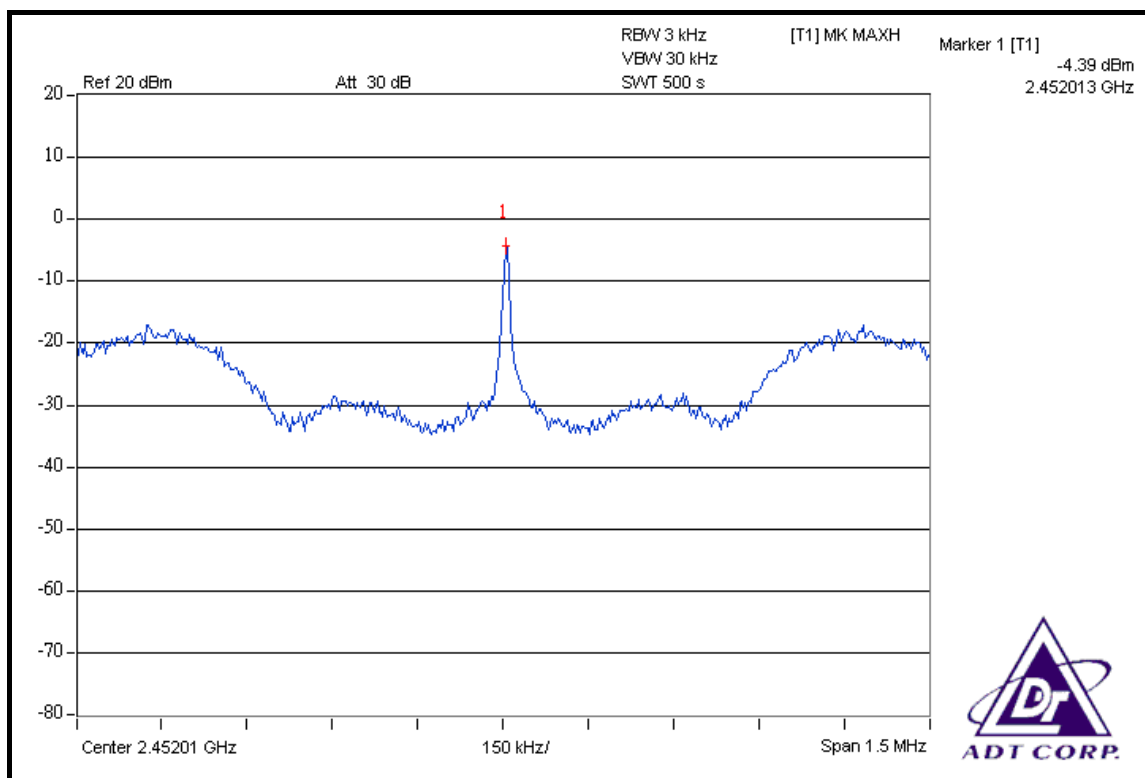


A D T

CH 4



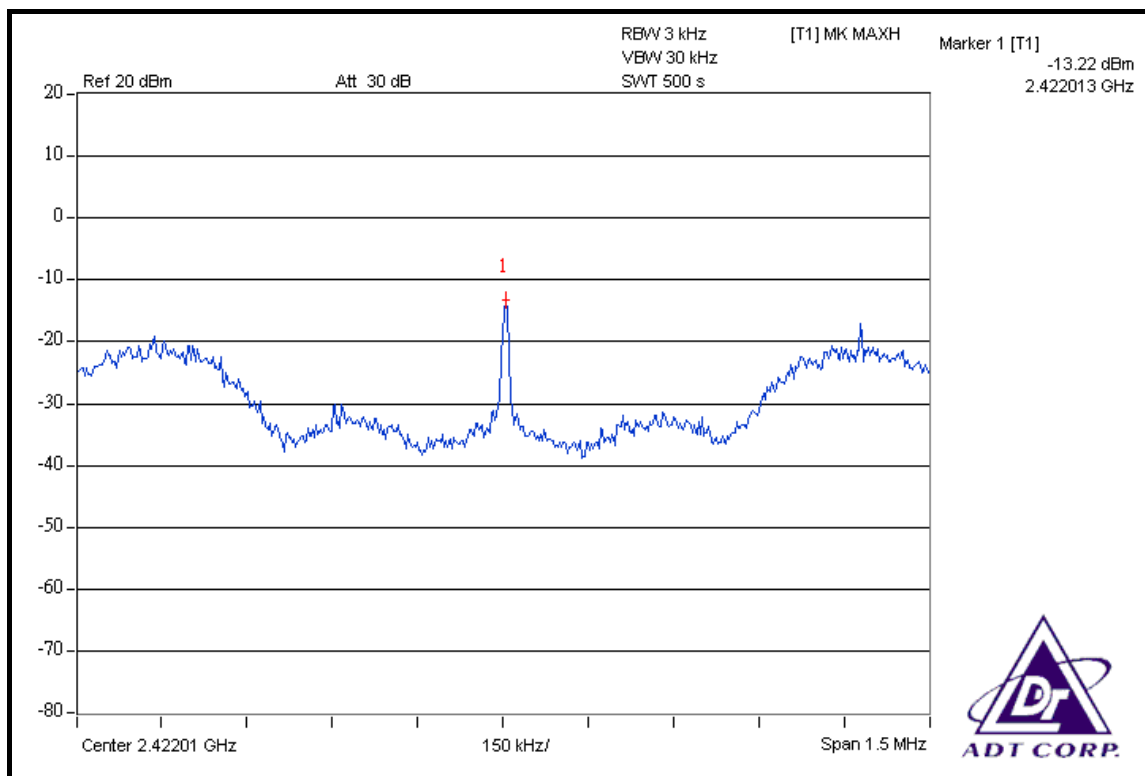
CH 7



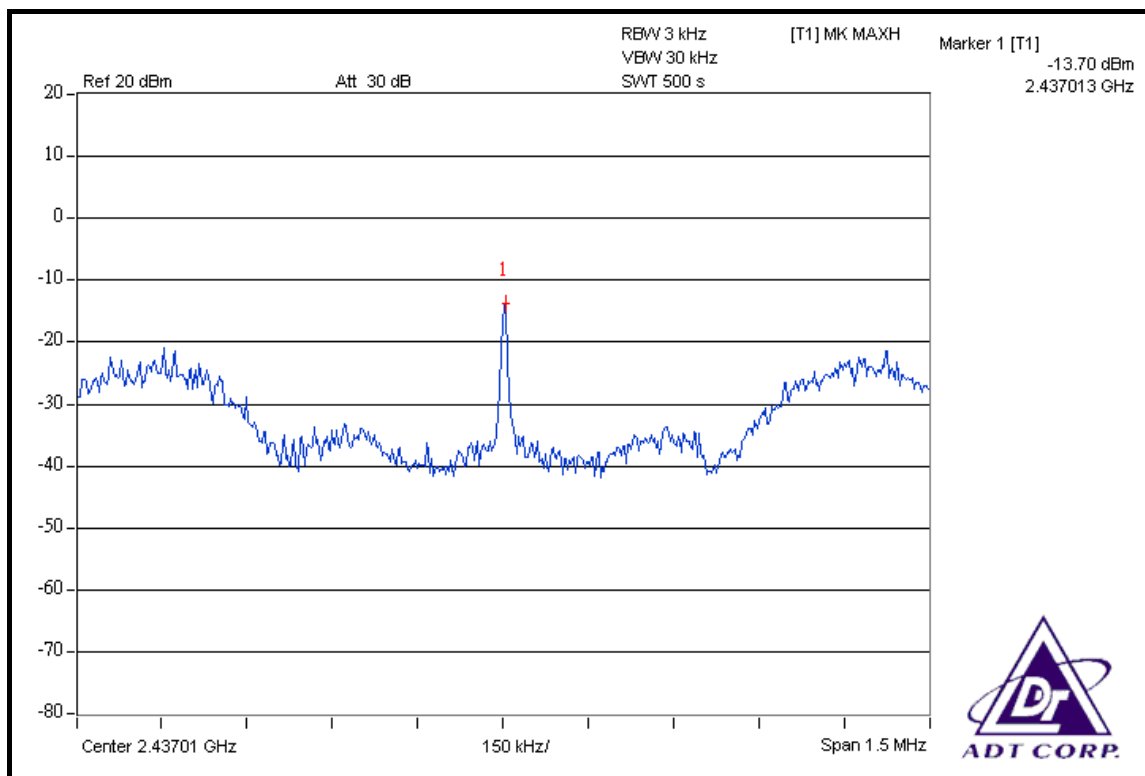


A D T

FOR CHAIN 1: CH 1



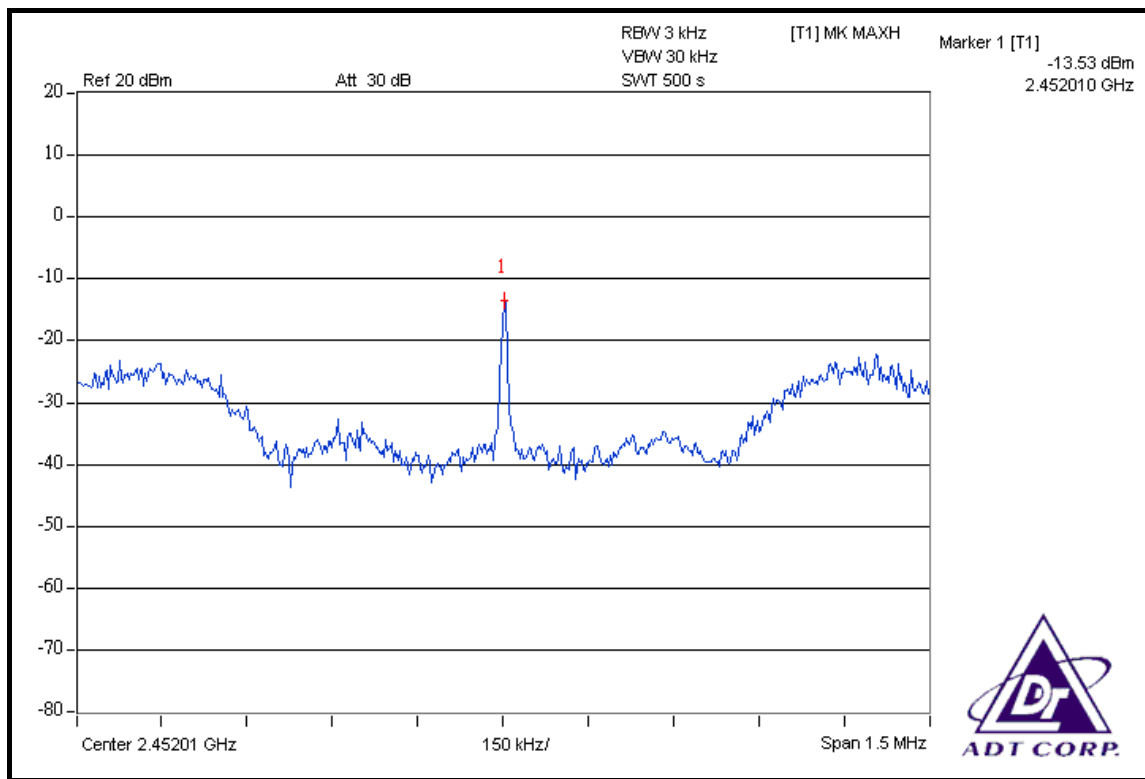
CH 4



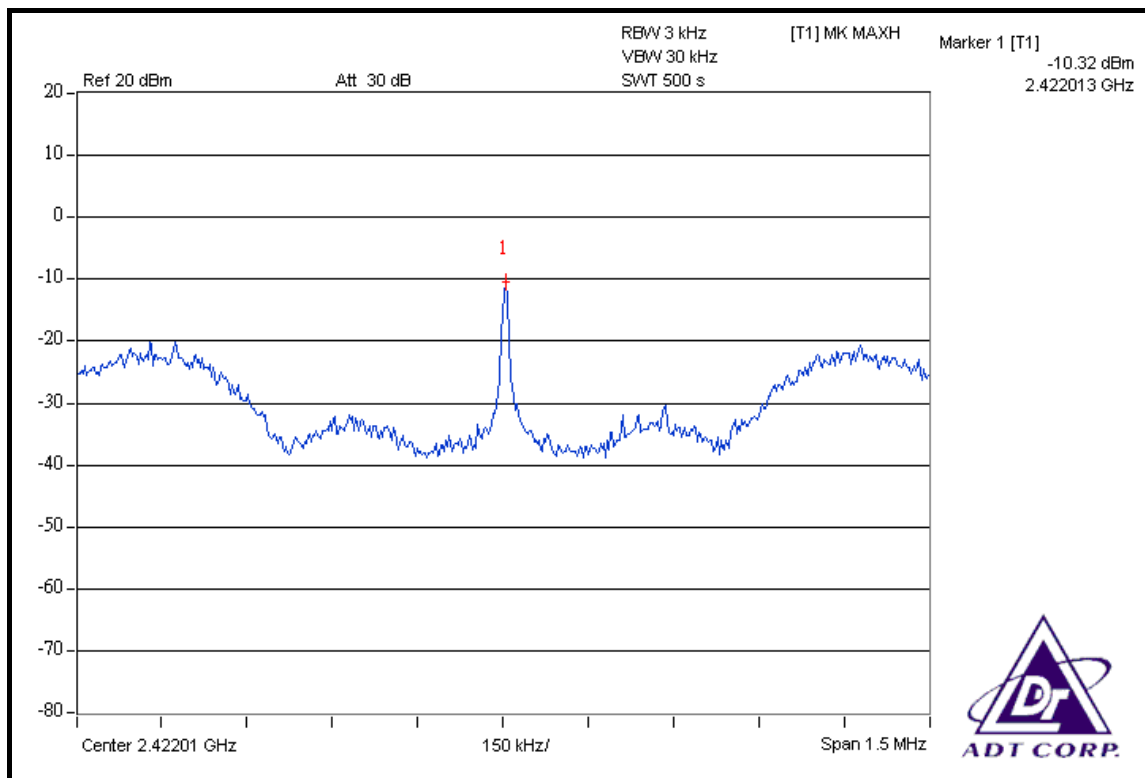


A D T

CH 7



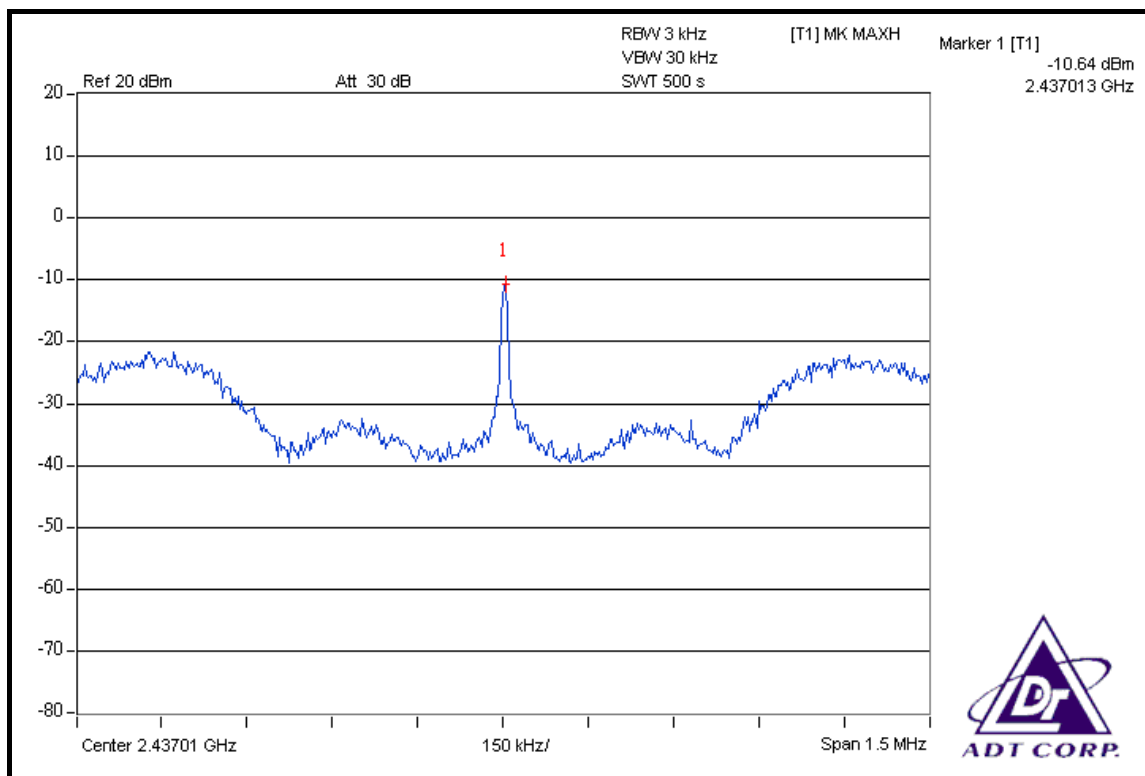
FOR CHAIN 2: CH 1



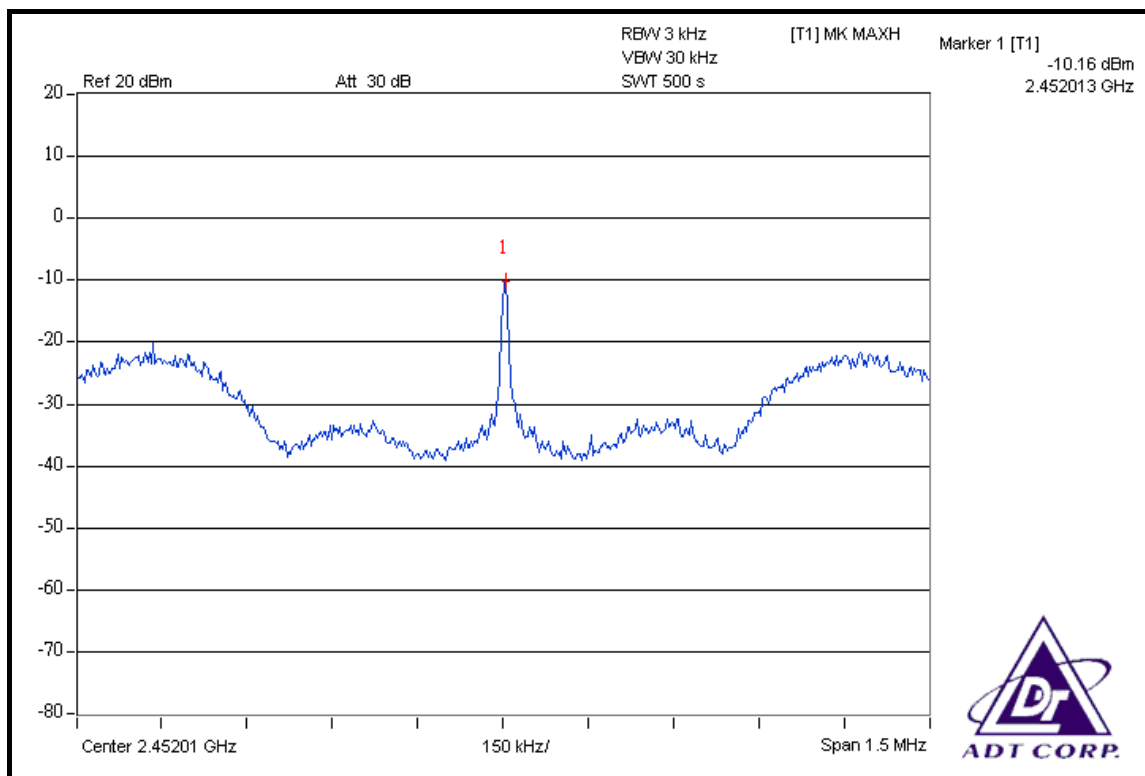


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CH 4



CH 7



4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	May 28, 2008	May 27, 2009
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Aug. 08, 2008	Aug. 07, 2009
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Apr. 25, 2008	Apr. 24, 2009
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 07, 2008	Jan. 06, 2009
Preamplifier Agilent	8449B	3008A01911	Sep. 10, 2008	Sep. 09, 2009
Preamplifier Agilent	8447D	2944A10634	Dec. 13, 2007	Dec. 12, 2008
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218190/4 231241/4	May 20, 2008	May 19, 2009
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 09, 2008	Aug. 08, 2009
Software	ADT_Radiated_V7.6	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	NA	NA	NA

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 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 100kHz with suitable frequency span including 100MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW = 100kHz, VBW = 300kHz; Average RBW = 1MHz, VBW = 10Hz)

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.6 TEST RESULTS

The spectrum plots are attached on the following 24 images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

802.11b DSSS MODULATION

NOTE 1: The band edge emission plot on the next page shows 50.67dBc between carrier maximum power and local maximum emission in restrict band (2.3896GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.1.7 is 110.53dBuV/m (Peak), so the maximum field strength in restrict band is $110.53 - 50.67 = 59.86$ dBuV/m which is under 74dBuV/m limit.

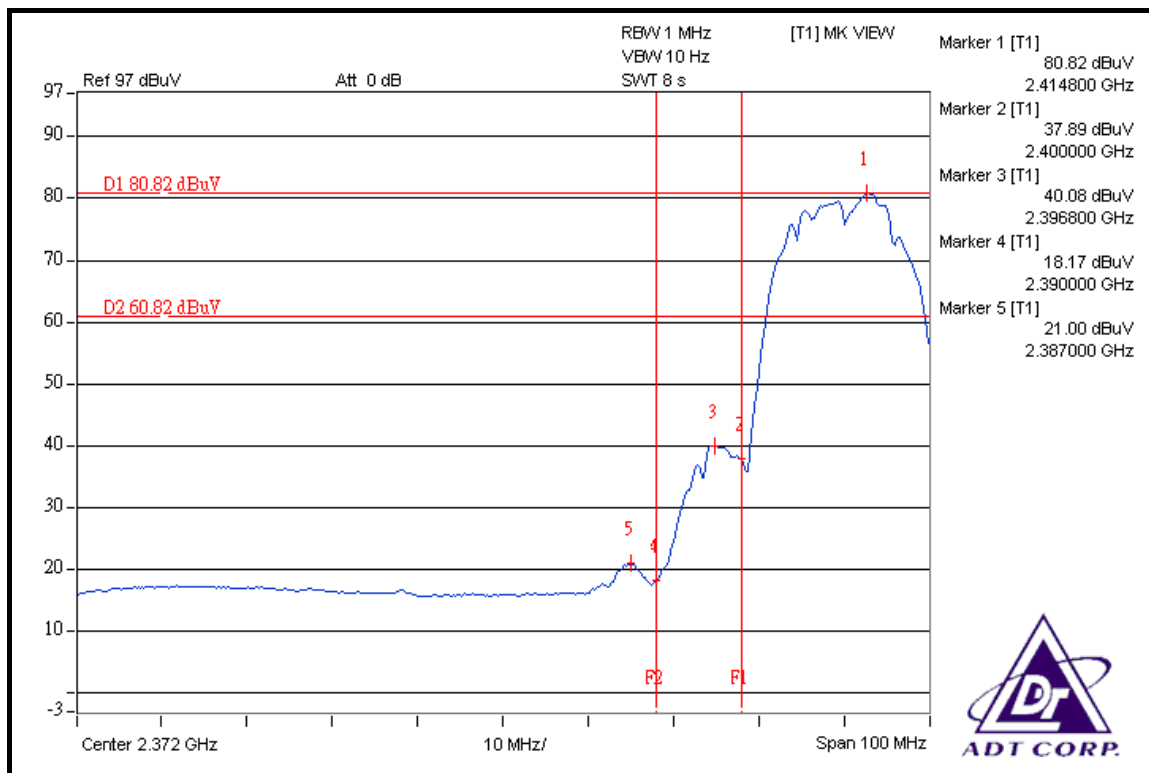
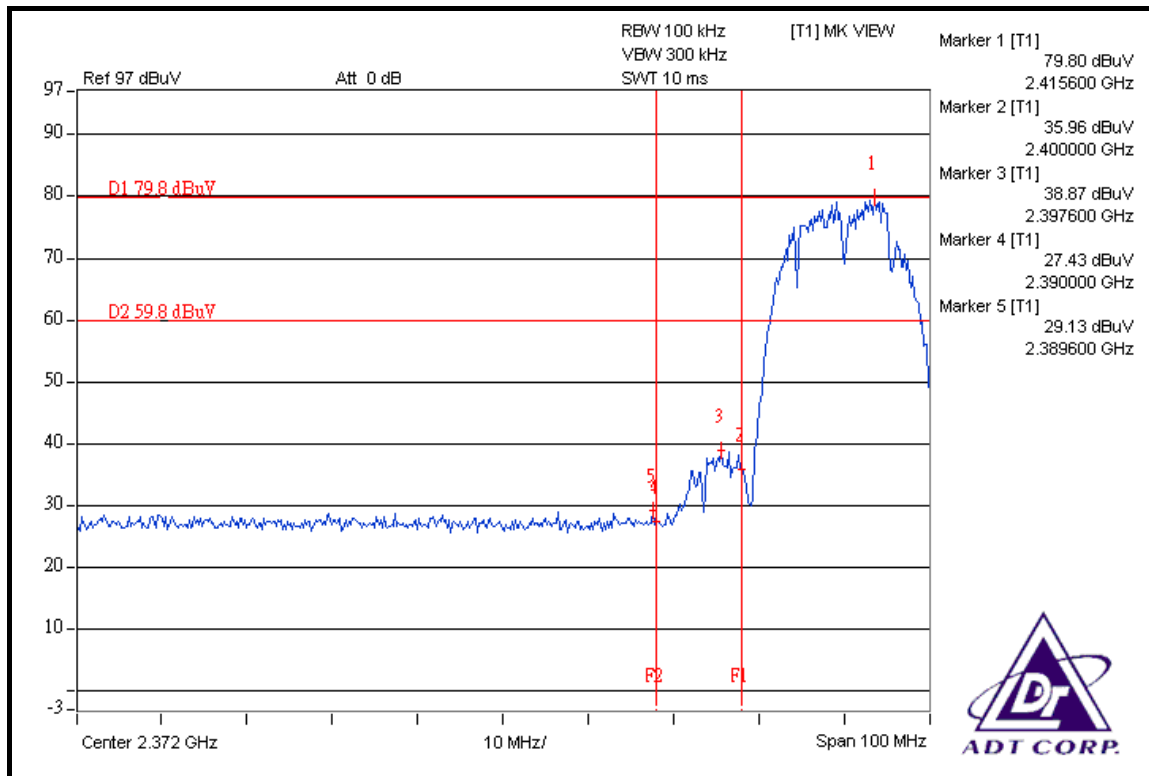
The band edge emission plot on the next page shows 59.82dBc between carrier maximum power and local maximum emission in restrict band (2.3870GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.1.7 is 104.19dBuV/m (Average), so the maximum field strength in restrict band is $104.19 - 59.82 = 44.37$ dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on the next second page shows 50.19dBc between carrier maximum power and local maximum emission in restrict band (2.4880GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.1.7 is 110.42dBuV/m (Peak), so the maximum field strength in restrict band is $110.42 - 50.19 = 60.23$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 55.08dBc between carrier maximum power and local maximum emission in restrict band (2.4886GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.1.7 is 104.67dBuV/m (Average), so the maximum field strength in restrict band is $104.67 - 55.08 = 49.59$ dBuV/m which is under 54dBuV/m limit.

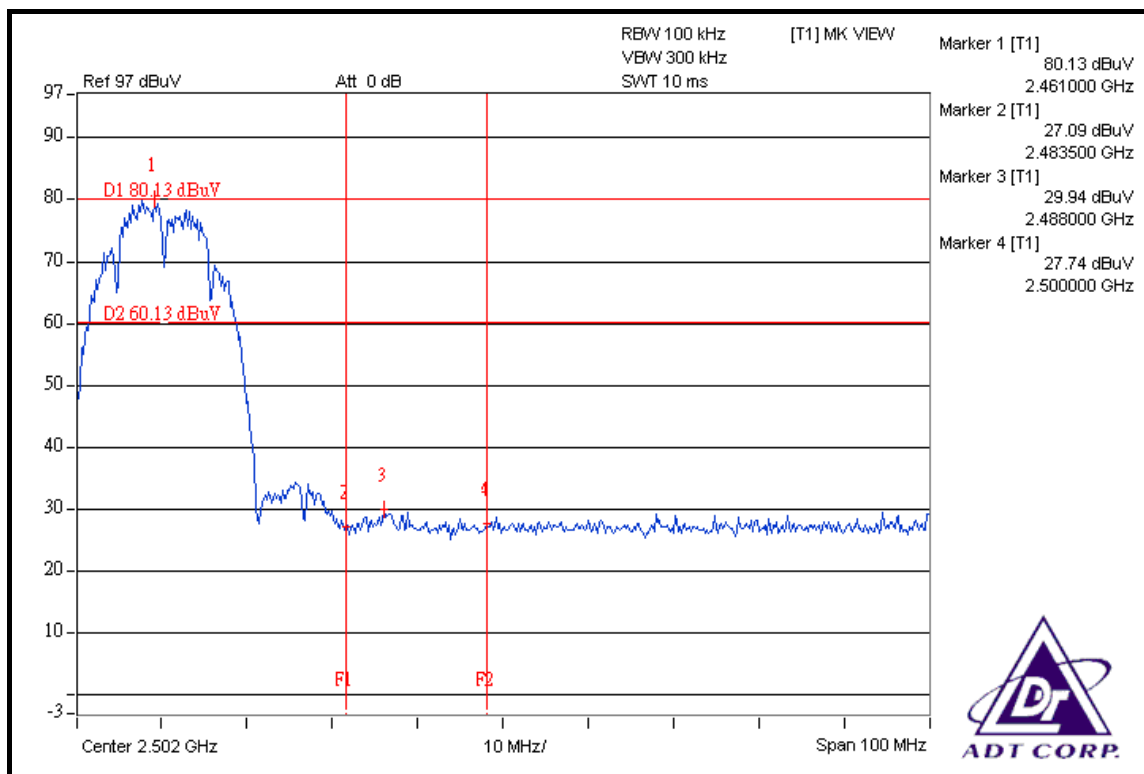
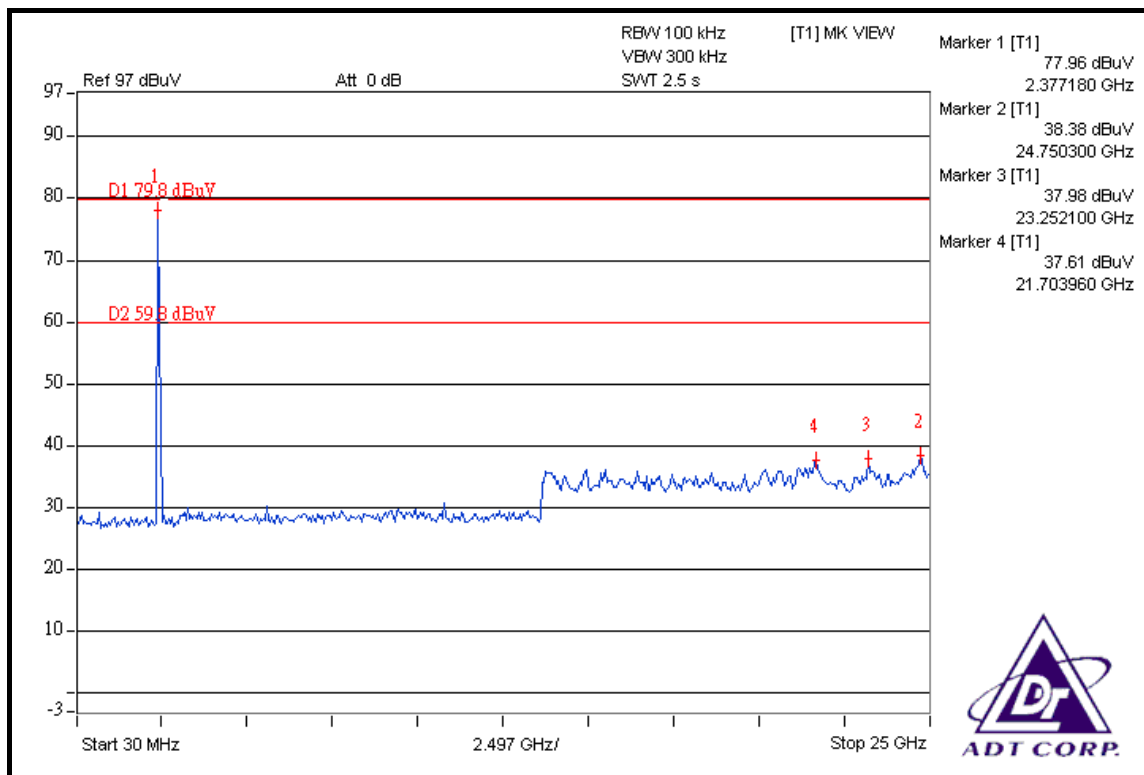


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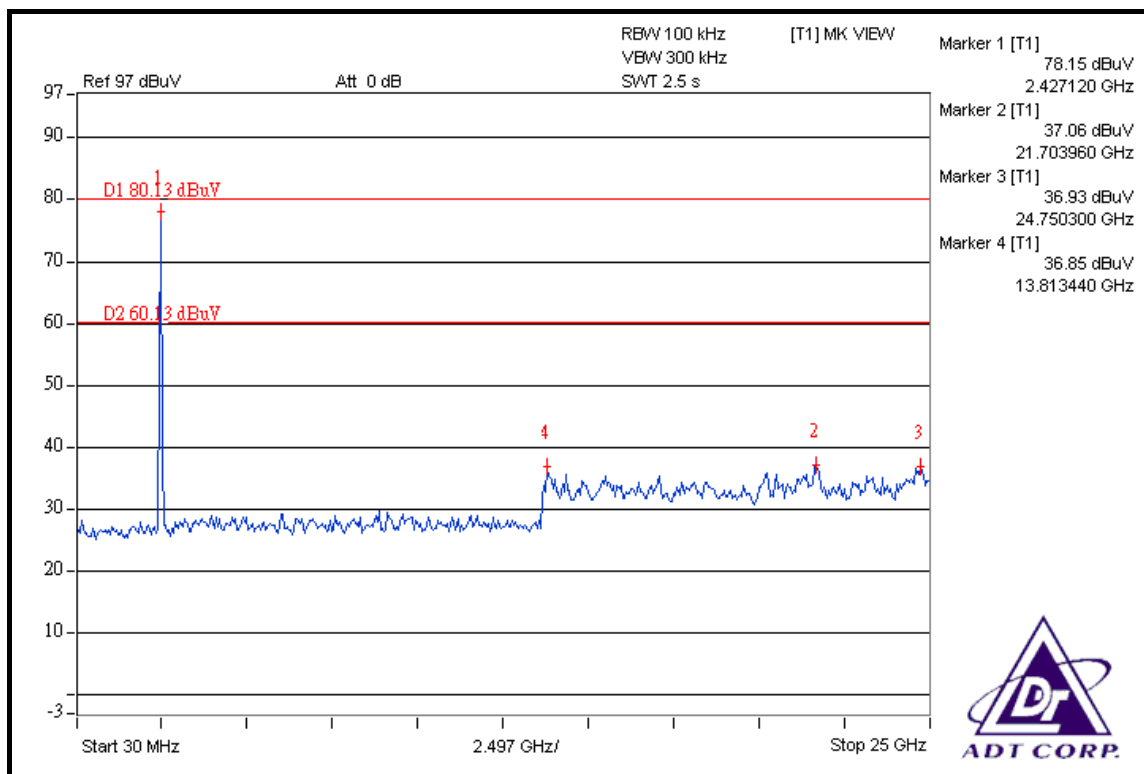
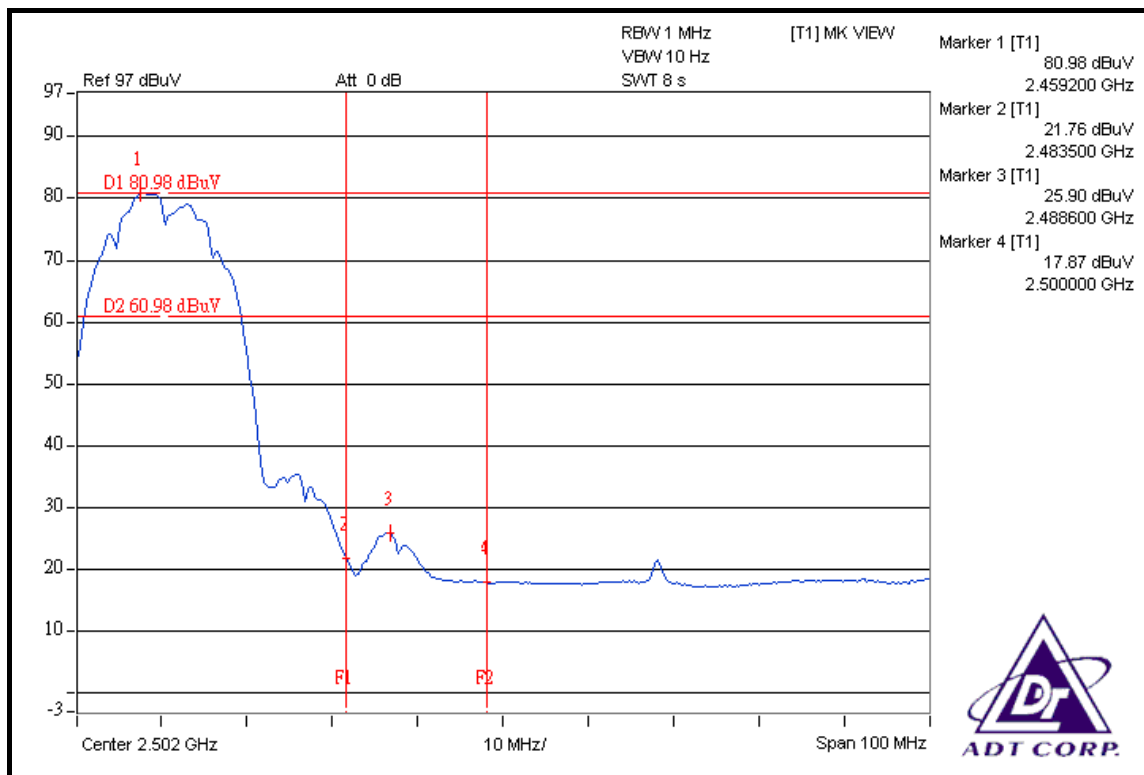


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802.11g OFDM MODULATION

NOTE 1: The band edge emission plot on the next page shows 45.14dBc between carrier maximum power and local maximum emission in restrict band (2.3850GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.1.7 is 113.52dBuV/m (Peak), so the maximum field strength in restrict band is $113.52 - 45.14 = 68.38$ dBuV/m which is under 74dBuV/m limit.

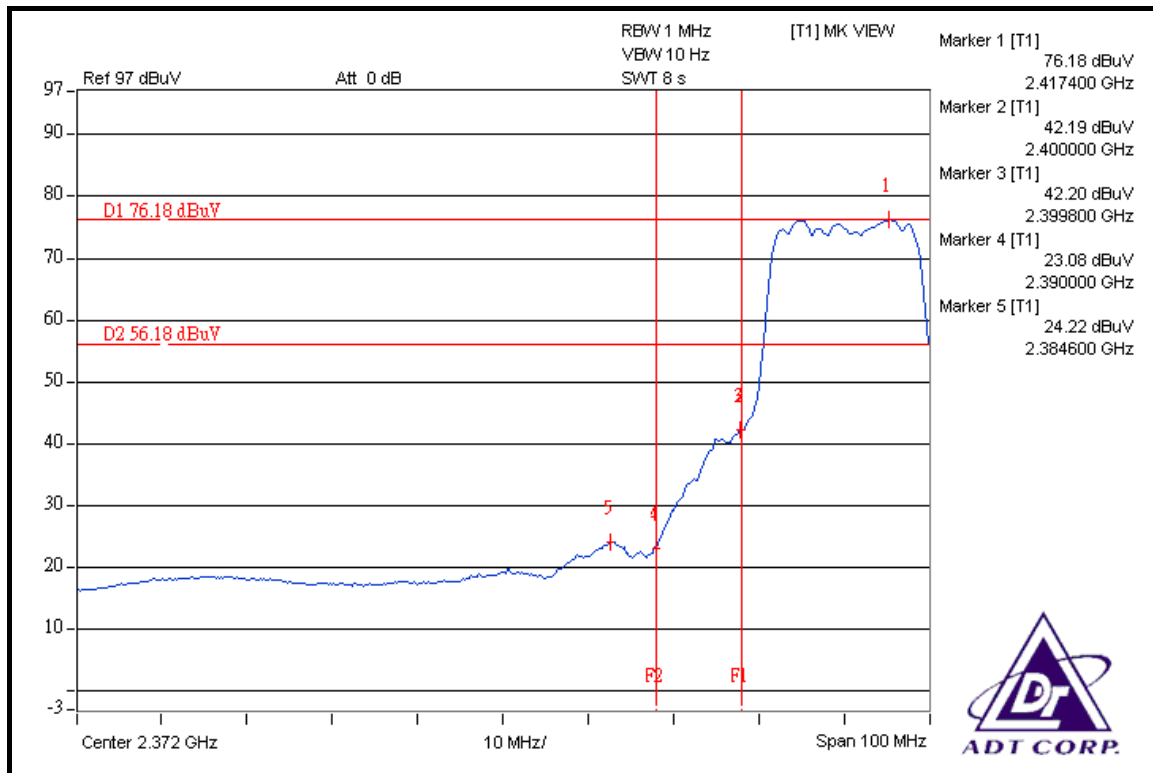
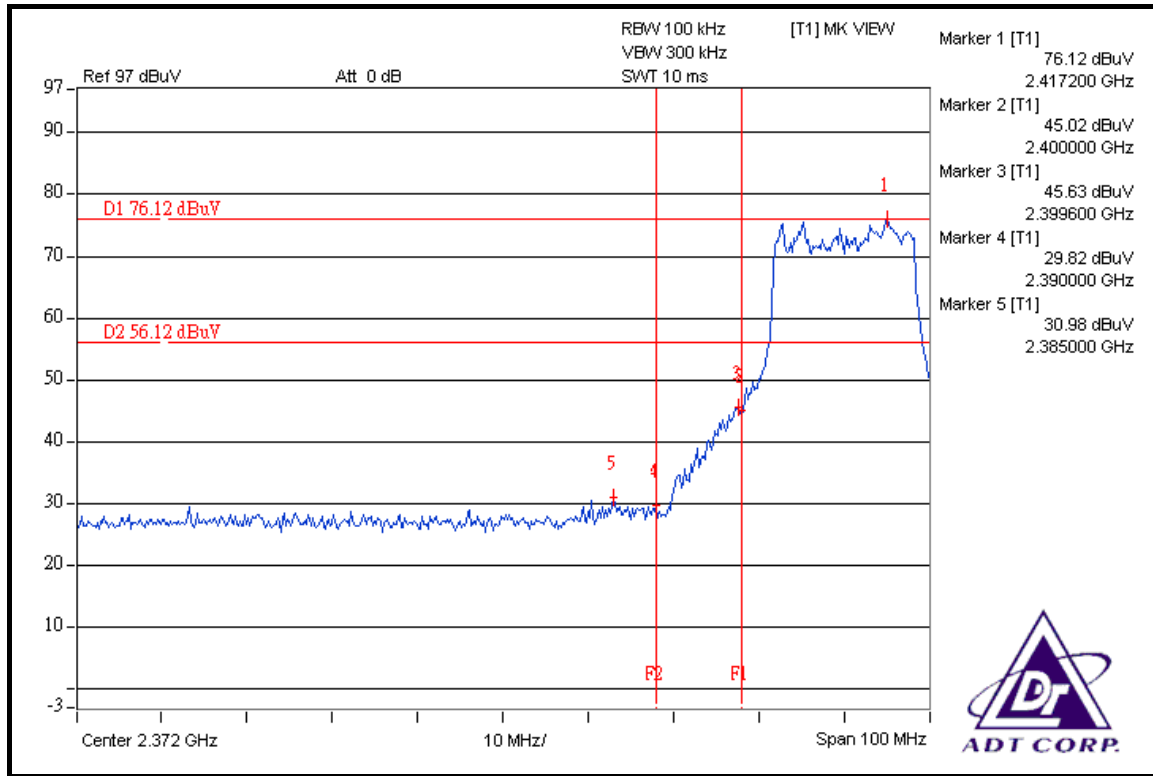
The band edge emission plot on the next page shows 51.96dBc between carrier maximum power and local maximum emission in restrict band (2.3846GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.1.7 is 99.54dBuV/m (Average), so the maximum field strength in restrict band is $99.54 - 51.96 = 47.58$ dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on the next second page shows 44.85dBc between carrier maximum power and local maximum emission in restrict band (2.4864GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.1.7 is 113.27dBuV/m (Peak), so the maximum field strength in restrict band is $113.27 - 44.85 = 68.42$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 48.15dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.1.7 is 99.50dBuV/m (Average), so the maximum field strength in restrict band is $99.50 - 48.15 = 51.35$ dBuV/m which is under 54dBuV/m limit.

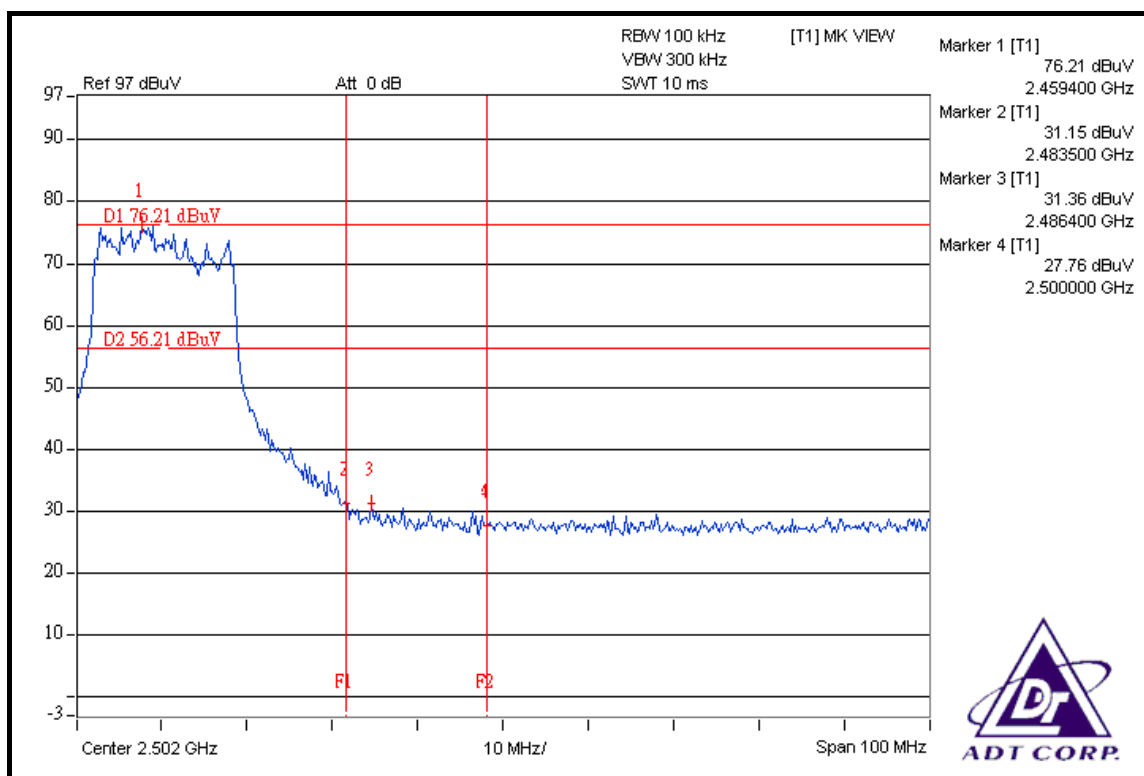
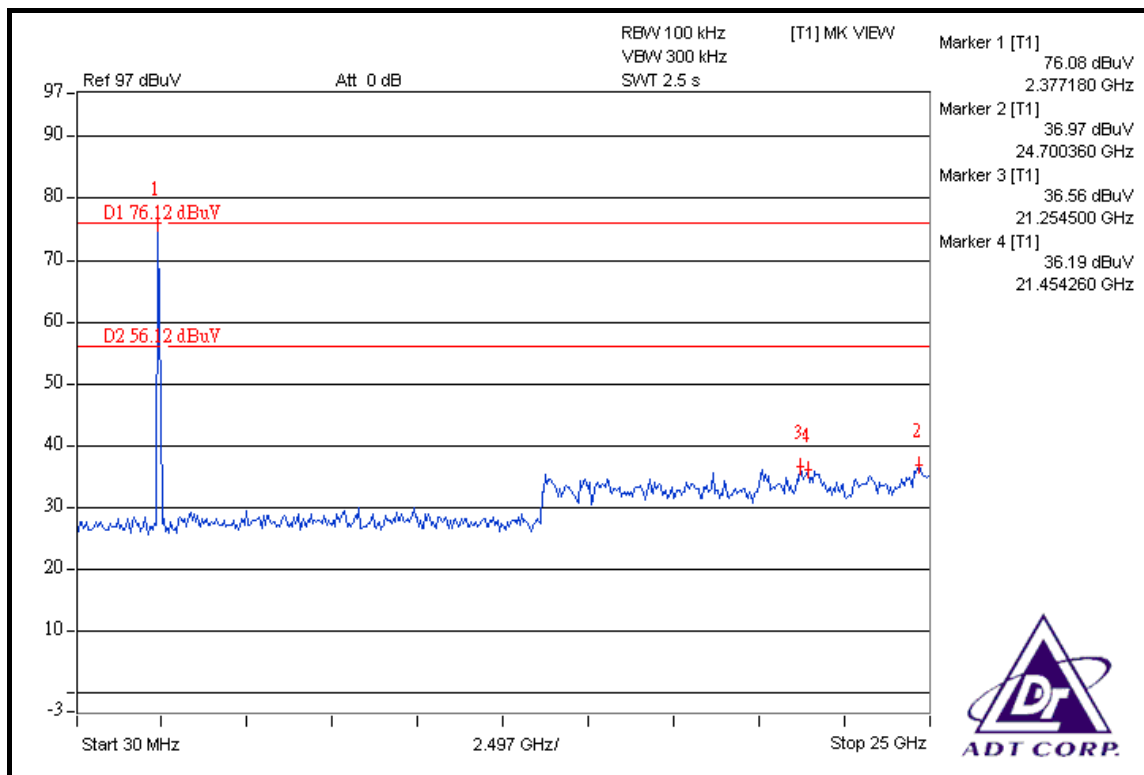


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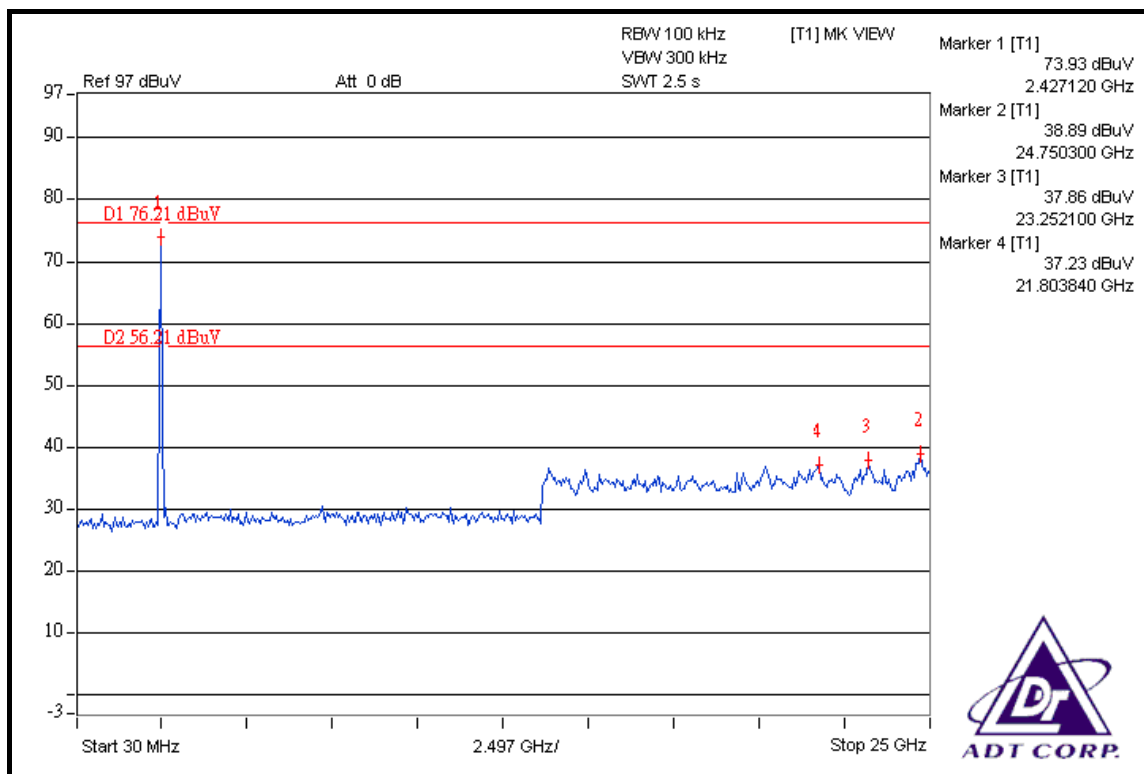
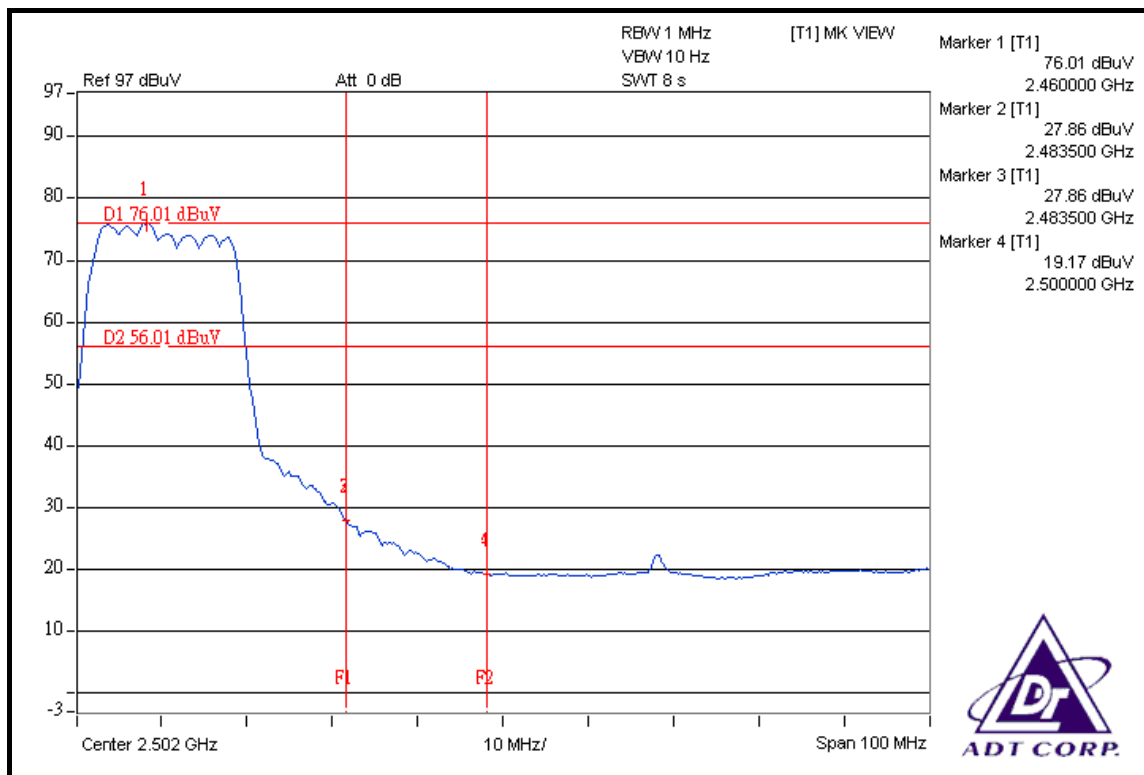


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DRAFT 802.11n (20MHz) OFDM MODULATION

NOTE 1: The band edge emission plot on the next page shows 44.58dBc between carrier maximum power and local maximum emission in restrict band (2.3434GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.1.7 is 111.78dBuV/m (Peak), so the maximum field strength in restrict band is $111.78 - 44.58 = 67.20$ dBuV/m which is under 74dBuV/m limit.

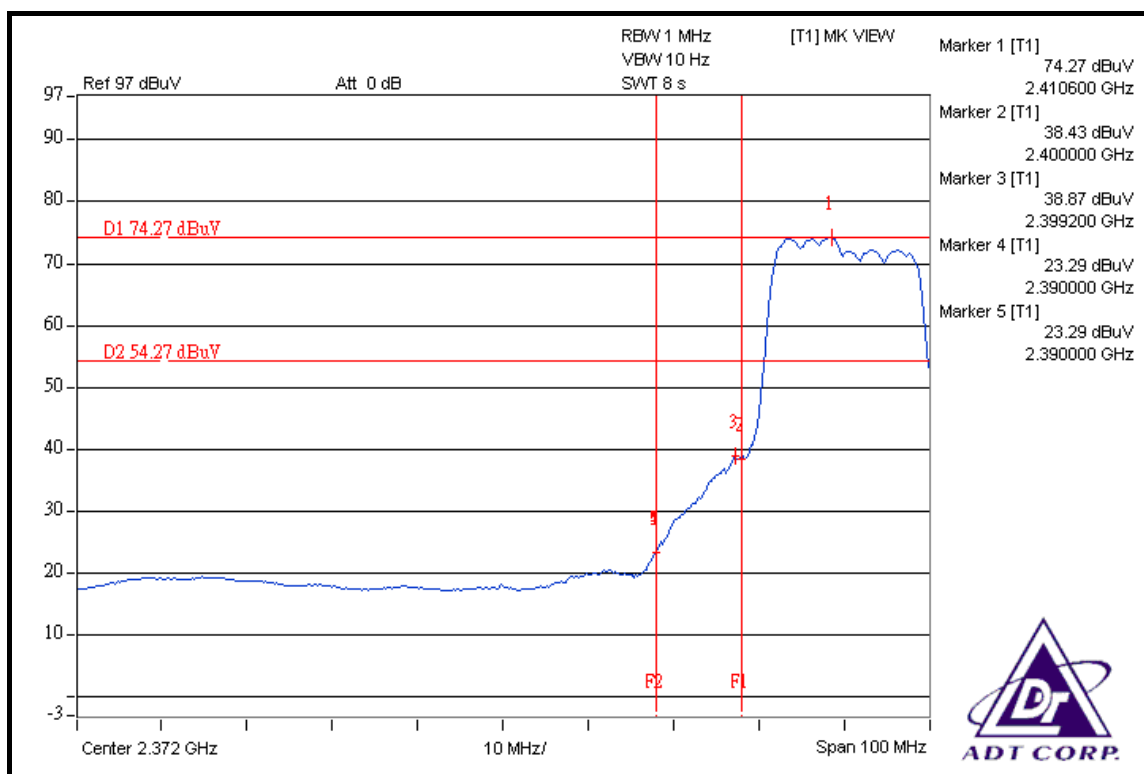
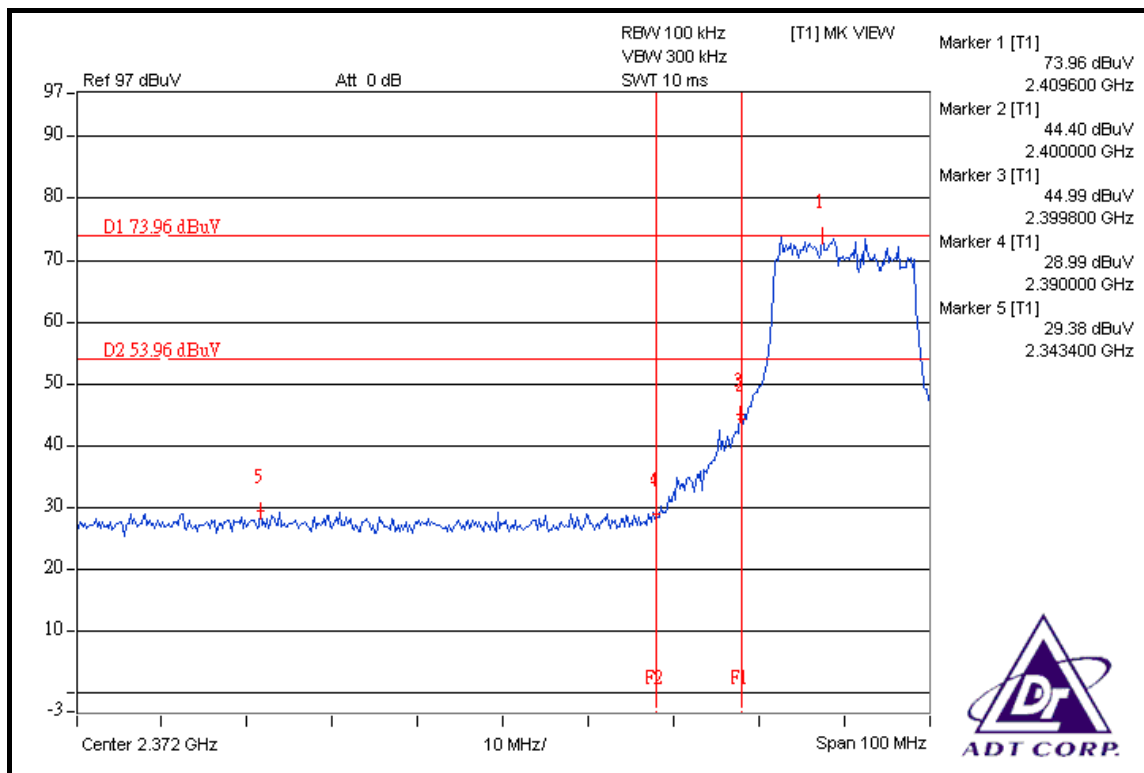
The band edge emission plot on the next page shows 50.98dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.1.7 is 97.71dBuV/m (Average), so the maximum field strength in restrict band is $97.71 - 50.98 = 46.73$ dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on the next second page shows 44.41dBc between carrier maximum power and local maximum emission in restrict band (2.4940GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.1.7 is 111.44dBuV/m (Peak), so the maximum field strength in restrict band is $111.44 - 44.41 = 67.03$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 53.47dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.1.7 is 98.24dBuV/m (Average), so the maximum field strength in restrict band is $98.24 - 53.47 = 44.77$ dBuV/m which is under 54dBuV/m limit.

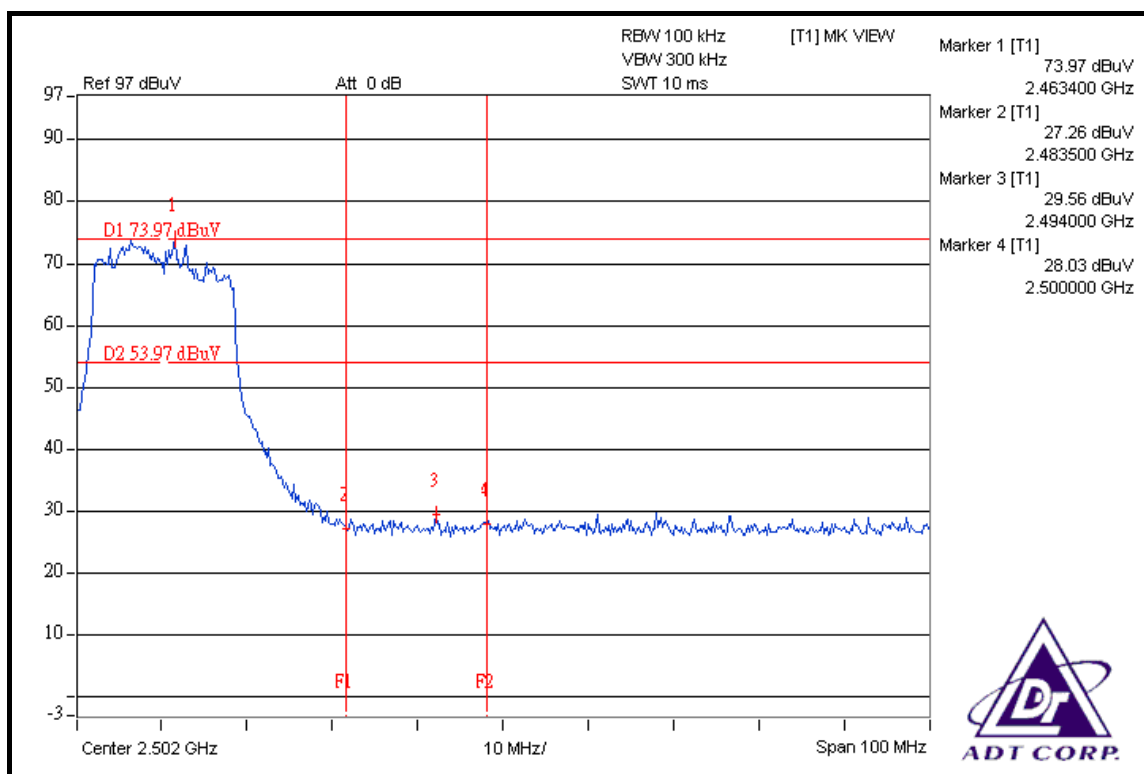
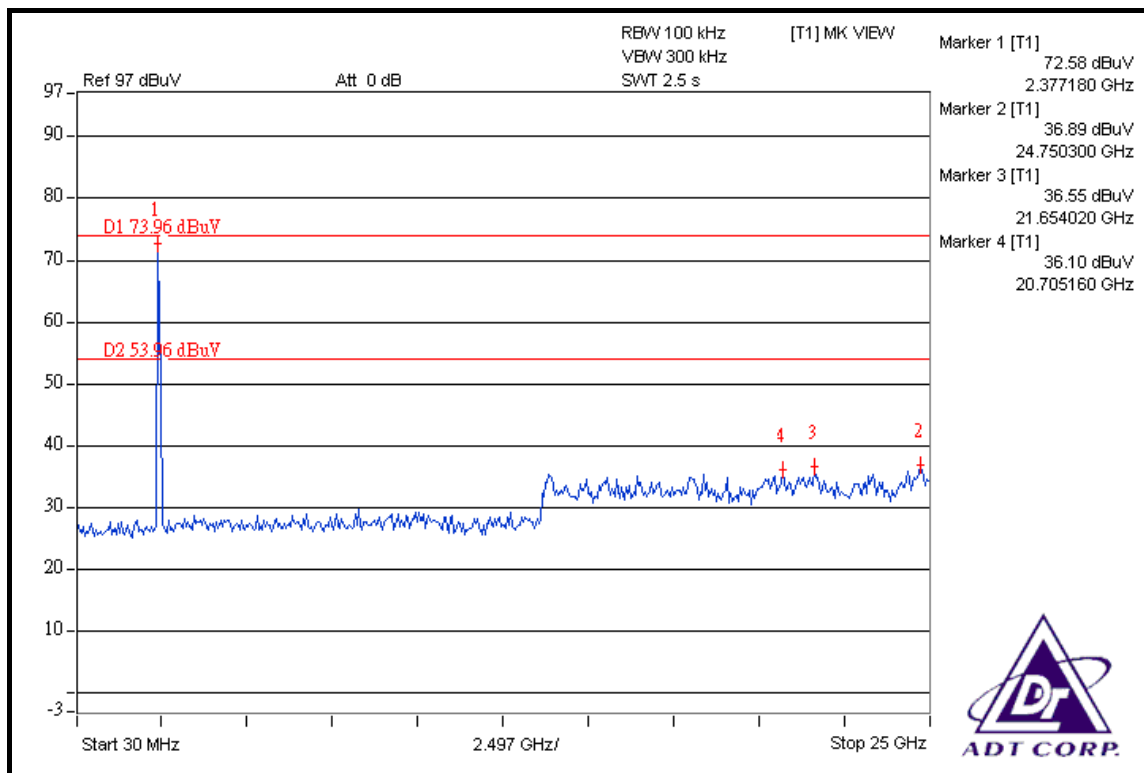


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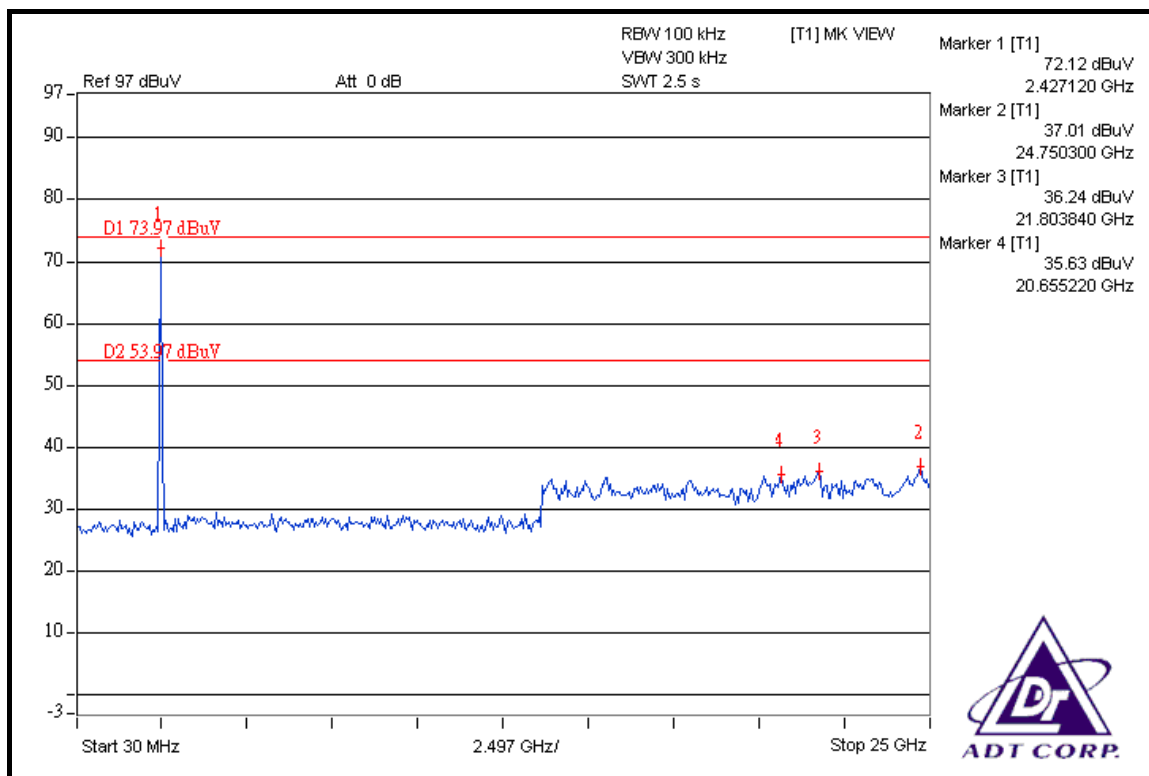
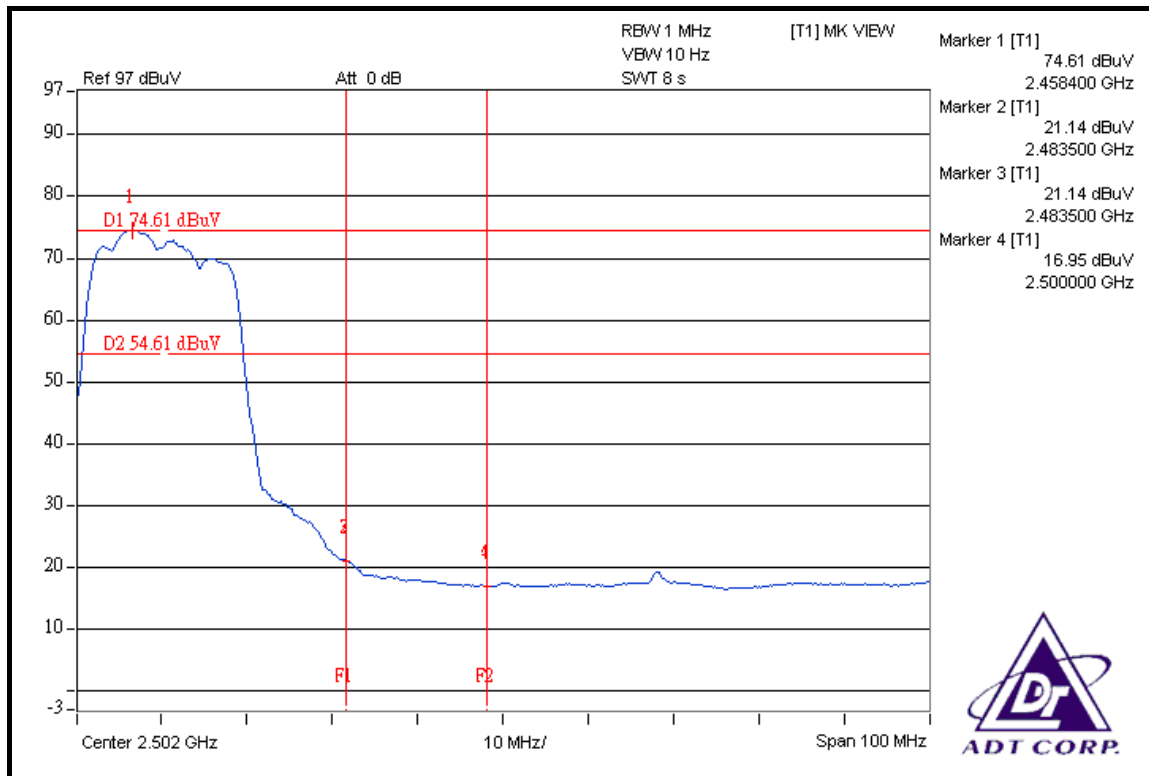


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DRAFT 802.11n (40MHz) OFDM MODULATION

NOTE 1: The band edge emission plot on the next page shows 38.66dBc between carrier maximum power and local maximum emission in restrict band (2.3824GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.1.7 is 106.88dBuV/m (Peak), so the maximum field strength in restrict band is $106.88 - 38.66 = 68.22$ dBuV/m which is under 74dBuV/m limit.

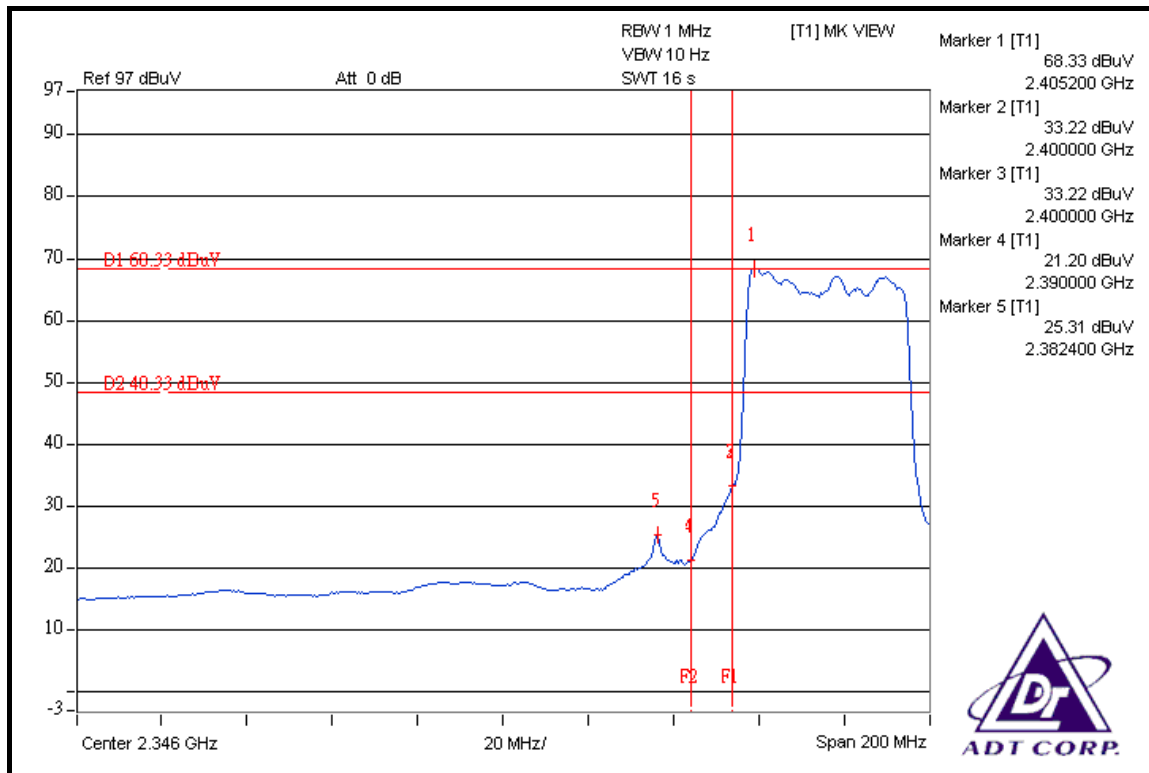
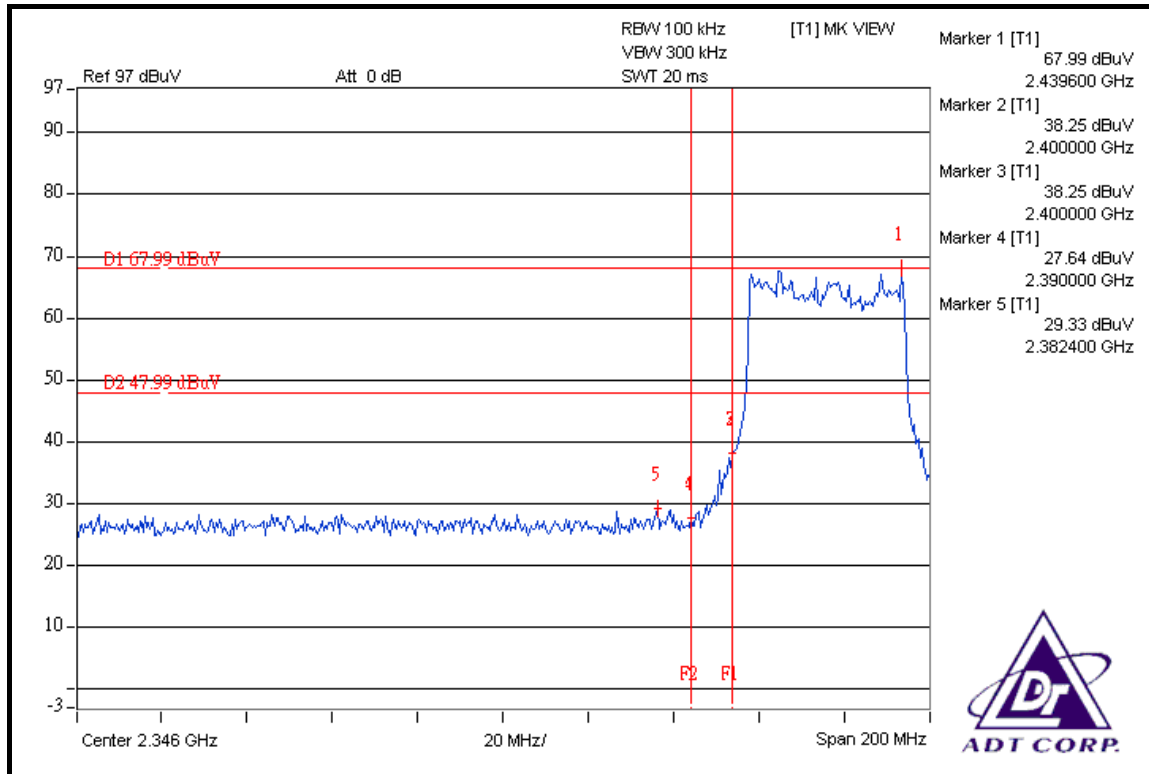
The band edge emission plot on the next page shows 43.02dBc between carrier maximum power and local maximum emission in restrict band (2.3824GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.1.7 is 91.64dBuV/m (Average), so the maximum field strength in restrict band is $91.64 - 43.02 = 48.62$ dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on the next second page shows 38.29dBc between carrier maximum power and local maximum emission in restrict band (2.4920GHz). The emission of carrier strength list in the test result of channel 7 at the item 4.1.7 is 106.32dBuV/m (Peak), so the maximum field strength in restrict band is $106.32 - 38.29 = 68.03$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 43.57dBc between carrier maximum power and local maximum emission in restrict band (2.4920GHz). The emission of carrier strength list in the test result of channel 7 at the item 4.1.7 is 91.69dBuV/m (Average), so the maximum field strength in restrict band is $91.69 - 43.57 = 48.12$ dBuV/m which is under 54dBuV/m limit.

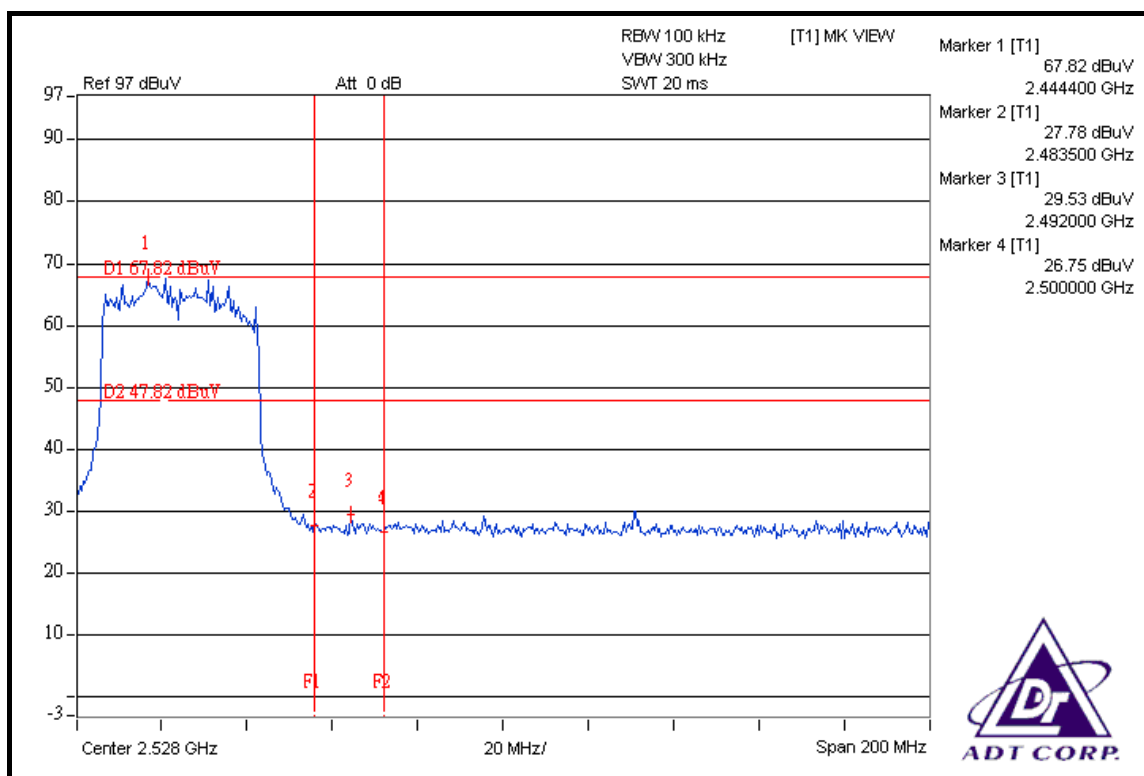
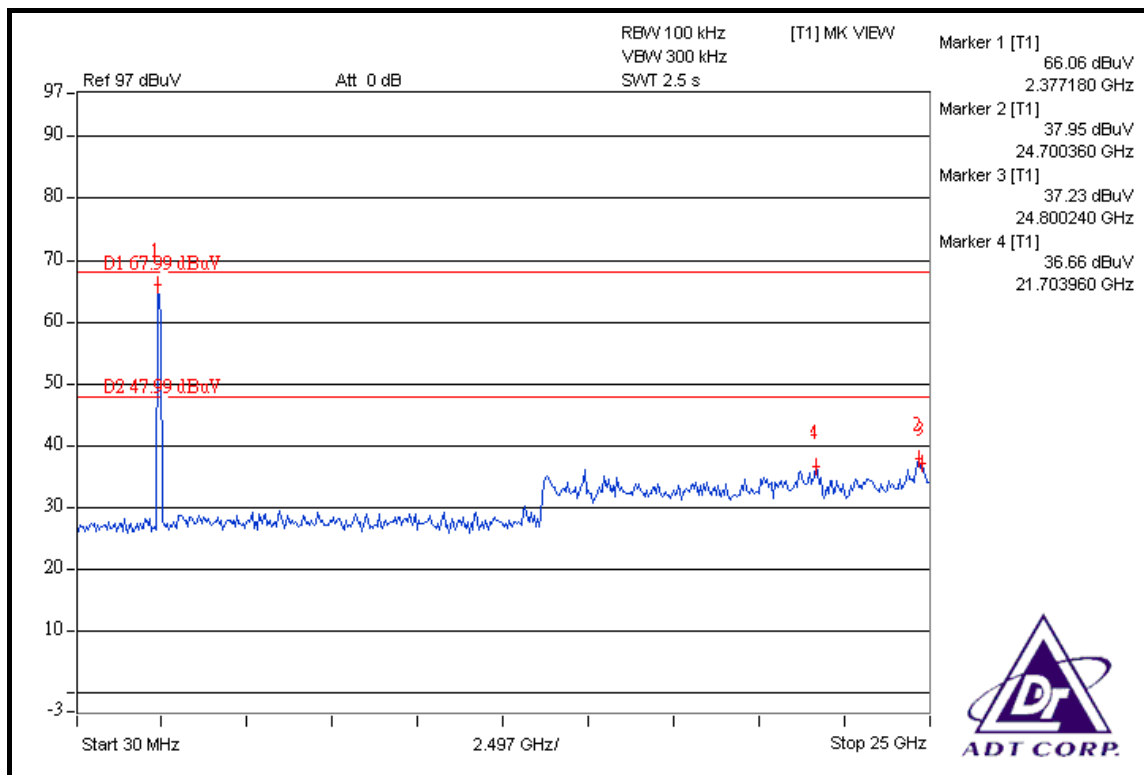


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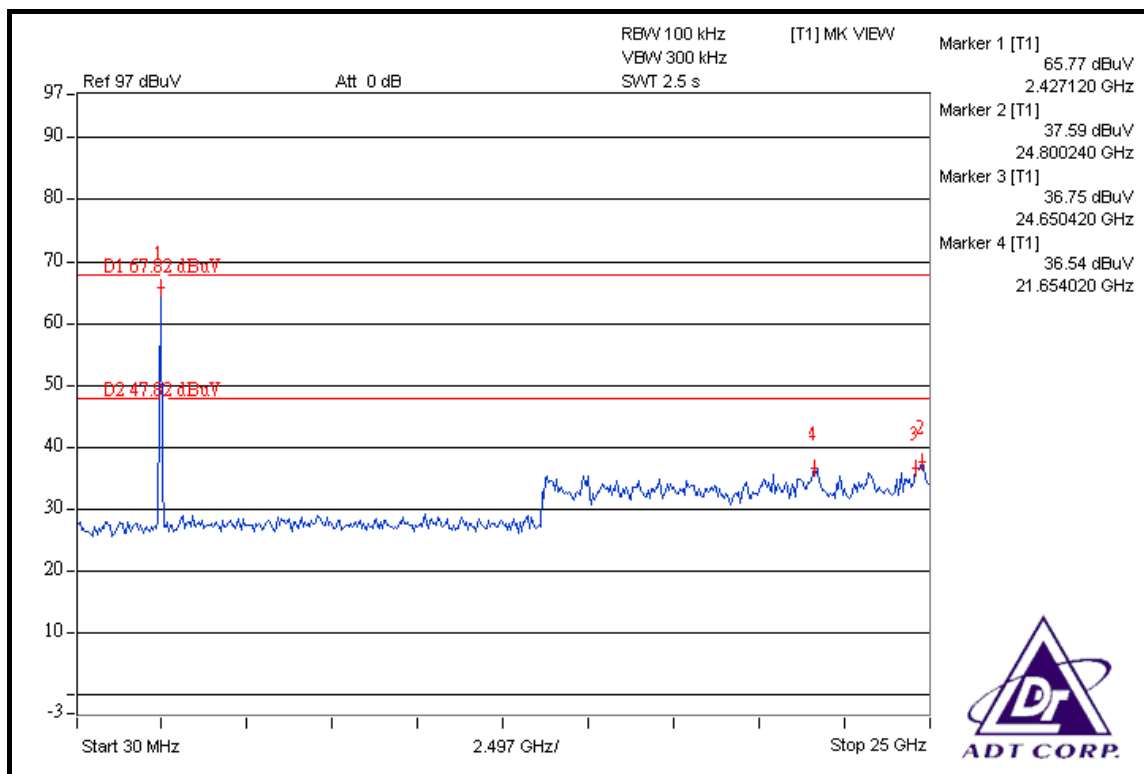
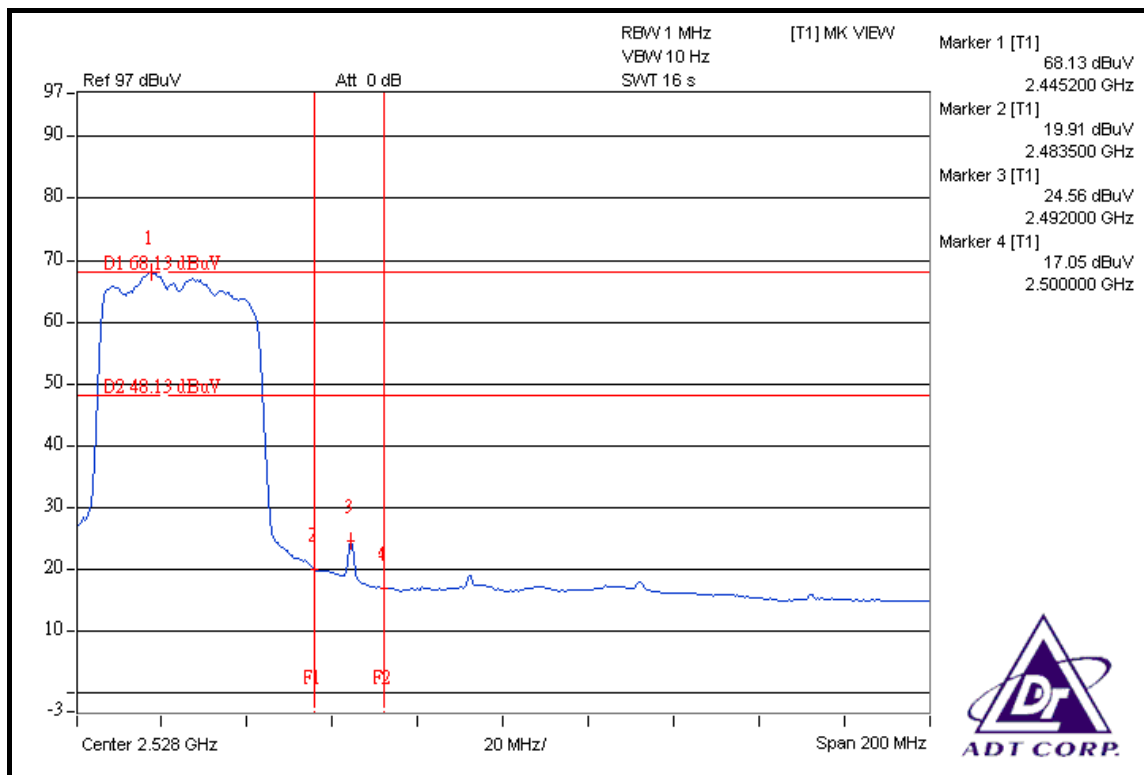


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4.7 ANTENNA REQUIREMENT

4.7.1 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 15.247 (b), 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.

4.7.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Dipole antenna with R-TNC antenna connector. The maximum Gain of the antenna is 5dBi.

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



6. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, 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, NVLAP
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.

--- END ---