FCC TEST REPORT (15.407)

REPORT NO.:	RF980724L11-1
MODEL NO.:	EUB9801 (Refer to item 3.1 for the more details)
RECEIVED:	Jul. 27, 2009
TESTED:	Jul. 30 ~ Aug. 11, 2009
ISSUED:	Aug. 14, 2009

APPLICANT:	Senao Networks Inc.
ADDRESS:	3F, No. 529, Chung Cheng Rd., Hsintien, Taipei, Taiwan, R.O.C.

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: Wireless Dual Band 802.11 a/b/g/n USB adapter

MODEL: EUB9801 (Refer to item 3.1 for the more details)

BRAND: EnGenius (Refer to item 3.1 for the more details)

APPLICANT: Senao Networks Inc.

TEST SAMPLE: ENGINEERING SAMPLE

TESTED: Jul. 30 ~ Aug. 11, 2009

STANDARDS: **FCC Part 15, Subpart E (Section 15.407)**
ANSI C63.4-2003

The above equipment (Model: EUB9801) 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	: Polly Chien Polly Chien / Specialist	**, DATE :**	Aug. 14, 2009
TECHNICAL ACCEPTANCE Responsible for RF	: Long Chen Long Chen / Senior Engineer	**, DATE :**	Aug. 14, 2009
APPROVED BY	: Gary Chang Gary Chang / Assistant Manager	**, DATE :**	Aug. 14, 2009

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -14.34dB at 22.570MHz.
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 -3.07dB at 47.40MHz.
15.407(a/1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 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

EUT	Wireless Dual Band 802.11 a/b/g/n USB adapter
MODEL NO.	EUB9801 (Refer to Note 1 for the more details)
FCC ID	U2M-UB9801
POWER SUPPLY	5Vdc from host equipment
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps Draft 802.11n: up to 300.0Mbps
OPERATING FREQUENCY	5180.0 ~ 5240.0MHz
NUMBER OF CHANNEL	4 for 802.11a, draft 802.11n (20MHz) 2 for draft 802.11n (40MHz)
OUTPUT POWER	46.56mW
ANTENNA TYPE	Printed antenna with -3dBi gain
I/O PORTS	NA
DATA CABLE	USB
ACCESSORY DEVICES	NA

NOTE:

1. The following models are electrically identical, different model names and brands are for marketing purpose.

BRAND	MODEL	DIFFERENCE
EnGenius	EUB9801	Marketing different
Rosewill	RNX-N1-Dual	
Sitecom	WL-329	

2. The EUT is a Wireless Dual Band 802.11 a/b/g/n USB adapter. The functions of EUT listed as below:

	TEST STANDARD	REFERENCE REPORT
WLAN 802.11b/g, draft 802.11n	FCC Part 15, Subpart C (Section 15.247)	RF980724L11
WLAN 802.11a, draft 802.11n (5745~5825 MHz)		
WLAN 802.11a, draft 802.11n (5180~ 5240MHz)	FCC Part 15, Subpart E (Section 15.407)	RF980724L11-1

3. The frequency bands used in this EUT are listed as follows:

Frequency Band (MHz)	2412~2462	5180~5240	5745~5825
802.11b	√		
802.11g	√		
802.11a		√	√
Draft 802.11n (20MHz)	√	√	√
Draft 802.11n (40MHz)	√	√	√

4. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

MODULATION MODE	TX FUNCTION
802.11b	2TX
802.11g	2TX
802.11a	2TX
Draft 802.11n (20MHz)	2TX
Draft 802.11n (40MHz)	2TX

5. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 DESCRIPTION OF TEST MODES

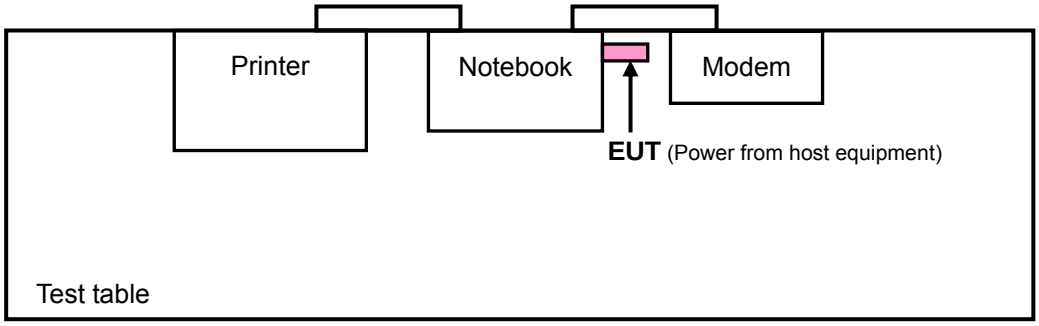
4 channels are provided for 802.11a, draft 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190MHz	46	5230MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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

RADIATED EMISSION TEST (ABOVE 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	Draft 802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	7.2
-	Draft 802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	15.0

RADIATED EMISSION TEST (BELOW 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	Draft 802.11n (20MHz)	36 to 48	40	OFDM	BPSK	7.2

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)
-	Draft 802.11n (20MHz)	36 to 48	40	OFDM	BPSK	7.2

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)
-	802.11a	36 to 48	36, 48	OFDM	BPSK	6.0
-	Draft 802.11n (20MHz)	36 to 48	36, 48	OFDM	BPSK	7.2
-	Draft 802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	15.0

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	Draft 802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	7.2
-	Draft 802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	15.0

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart E (15.407)
ANSI C63.4-2003

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

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

3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	D531	CN-0XM006-48643 -81U-2786	QDS-BRCM1020
2	PRINTER	HP	1300	CNBJC66727	FCC DoC Approved
3	MODEM	ACEEX	1414V/3	0401008260	IFAXDM1414

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.8m braid shielded wire, DB25 connector, w/o core.
3	1.2m braid shielded wire, DB25 & DB9 connector, w/o core.

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

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 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

FREQUENCIES (MHz)	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBμV/m) *NOTE 3
	PK	PK
5150 ~ 5250	-27	68.3

NOTE: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	100033	Jul. 06, 2009	Jul. 05, 2010
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100076	May. 26, 2009	May. 25, 2010
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 27, 2009	Apr. 26, 2010
HORN Antenna SCHWARZBECK	9120D	9120D-209	Jul. 01, 2009	Jun. 30, 2010
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 25, 2008	Dec. 24, 2009
Preamplifier Agilent	8447D	2944A10633	Nov. 03, 2008	Nov. 02, 2009
Preamplifier Agilent	8449B	3008A01964	Oct. 23, 2008	Oct. 22, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	238141/4	May 13, 2009	May 12, 2010
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	May 13, 2009	May 12, 2010
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100.	TT93021703	NA	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	07026401	Aug. 27, 2008	Aug. 26, 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. The test was performed in HwaYa Chamber 3.
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 988962.
5. The IC Site Registration No. is IC 7450F-3.

4.1.4 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

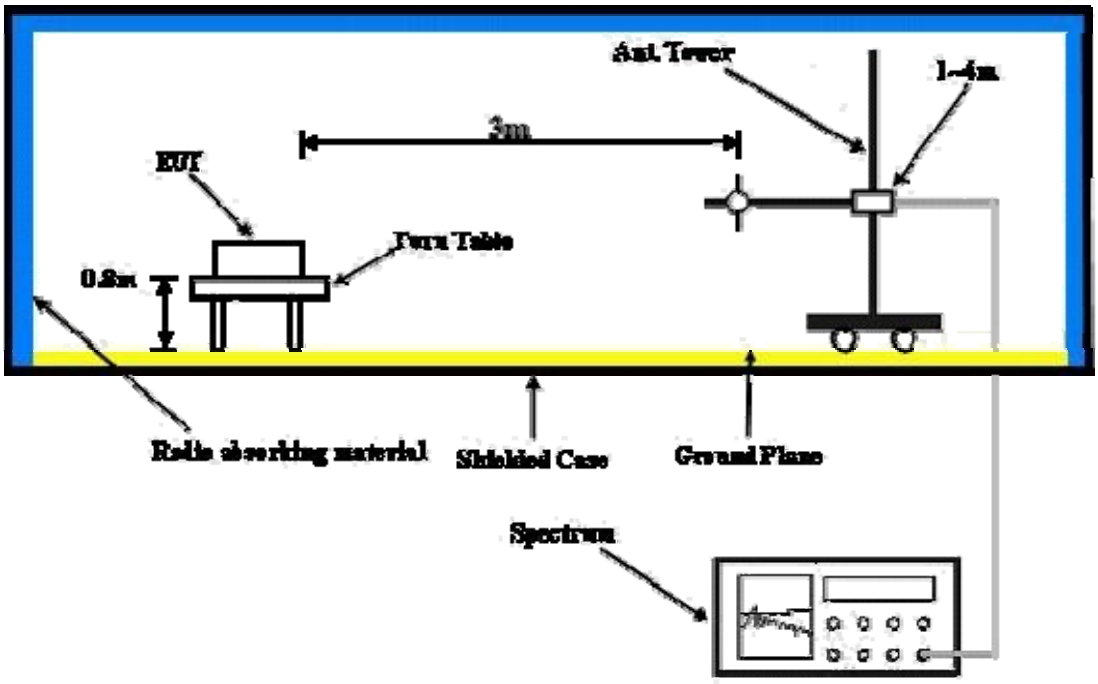
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 DEVIATION FROM TEST STANDARD

No deviation.

4.1.6 TEST SETUP



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

4.1.7 EUT OPERATING CONDITION

a. Plugged the EUT into a notebook system and placed on a testing table.

b. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

c. The necessary accessories enable the system in full functions.

4.1.8 TEST RESULTS

802.11a OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	**FREQUENCY RANGE**	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH 1000 hPa	**TESTED BY**	Sun Lin

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	54.80 PK	74.00	-19.20	1.18 H	199	17.77	37.04
2	5150.00	40.87 AV	54.00	-13.13	1.18 H	199	3.83	37.04
3	*5180.00	108.29 PK			1.04 H	200	71.22	37.07
4	*5180.00	98.12 AV			1.04 H	200	61.05	37.07
5	#10360.00	58.97 PK	68.20	-9.23	1.01 H	35	11.71	47.26
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	52.68 PK	74.00	-21.32	1.32 V	358	15.64	37.04
2	5150.00	38.53 AV	54.00	-15.47	1.32 V	358	1.49	37.04
3	*5180.00	105.72 PK			1.01 V	44	68.65	37.07
4	*5180.00	95.61 AV			1.01 V	44	58.54	37.07
5	#10360.00	57.94 PK	68.20	-10.26	1.08 V	301	10.68	47.26

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 is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH 1000 hPa	TESTED BY	Sun Lin

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	*5200.00	107.54 PK			1.03 H	200	70.45	37.09
2	*5200.00	97.49 AV			1.03 H	200	60.40	37.09
3	#10400.00	59.19 PK	68.20	-9.01	1.15 H	53	11.72	47.47
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	*5200.00	105.11 PK			1.02 V	45	68.02	37.09
2	*5200.00	95.02 AV			1.02 V	45	57.93	37.09
3	#10400.00	58.39 PK	68.20	-9.81	1.28 V	311	10.92	47.47

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 is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH 1000 hPa	TESTED BY	Sun Lin

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	*5240.00	108.15 PK			1.29 H	200	70.95	37.20
2	*5240.00	98.13 AV			1.29 H	200	60.93	37.20
3	5350.00	51.46 PK	74.00	-22.54	1.17 H	219	14.06	37.40
4	5350.00	39.09 AV	54.00	-14.91	1.17 H	219	1.69	37.40
5	#10480.00	59.49 PK	68.20	-8.71	1.21 H	330	11.83	47.66
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	105.58 PK			1.00 V	44	68.38	37.20
2	*5240.00	95.45 AV			1.00 V	44	58.25	37.20
3	5350.00	50.82 PK	74.00	-23.18	1.02 V	38	13.42	37.40
4	5350.00	37.17 AV	54.00	-16.83	1.02 V	38	-0.23	37.40
5	#10480.00	57.41 PK	68.20	-10.79	1.03 V	353	9.75	47.66

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 is out the restricted band.

DRAFT 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH 1000 hPa	TESTED BY	Sun Lin

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	49.63 PK	74.00	-24.37	1.32 H	333	12.59	37.04
2	5150.00	37.51 AV	54.00	-16.49	1.32 H	333	0.47	37.04
3	*5180.00	108.79 PK			1.03 H	203	71.72	37.07
4	*5180.00	98.67 AV			1.03 H	203	61.60	37.07
5	#10360.00	59.76 PK	68.20	-8.44	1.20 H	314	12.50	47.26
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	51.45 PK	74.00	-22.55	1.01 V	37	14.41	37.04
2	5150.00	38.91 AV	54.00	-15.09	1.01 V	37	1.87	37.04
3	*5180.00	106.30 PK			1.02 V	43	69.23	37.07
4	*5180.00	96.22 AV			1.02 V	43	59.15	37.07
5	#10360.00	58.42 PK	68.20	-9.78	1.02 V	140	11.16	47.26

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 is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH 1000 hPa	TESTED BY	Sun Lin

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	*5200.00	108.15 PK			1.18 H	9	71.06	37.09
2	*5200.00	98.05 AV			1.18 H	9	60.96	37.09
3	#10400.00	59.08 PK	68.20	-9.12	1.35 H	144	11.61	47.47
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	*5200.00	105.98 PK			1.00 V	45	68.89	37.09
2	*5200.00	95.88 AV			1.00 V	45	58.79	37.09
3	#10400.00	58.81 PK	68.20	-9.39	1.03 V	235	11.34	47.47

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 is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH 1000 hPa	TESTED BY	Sun Lin

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	*5240.00	108.11 PK			1.06 H	9	70.91	37.20
2	*5240.00	98.02 AV			1.06 H	9	60.82	37.20
3	5350.00	48.52 PK	74.00	-25.48	1.04 H	299	11.12	37.40
4	5350.00	35.36 AV	54.00	-18.64	1.04 H	299	-2.04	37.40
5	#10480.00	59.67 PK	68.20	-8.53	1.30 H	331	12.01	47.66
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	106.84 PK			1.01 V	45	69.64	37.20
2	*5240.00	96.71 AV			1.01 V	45	59.51	37.20
3	5350.00	50.65 PK	74.00	-23.35	1.23 V	47	13.25	37.40
4	5350.00	37.76 AV	54.00	-16.24	1.23 V	47	0.36	37.40
5	#10480.00	58.14 PK	68.20	-10.06	1.43 V	189	10.48	47.66

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 is out the restricted band.

DRAFT 802.11n (40MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH 1000 hPa	TESTED BY	Sun Lin

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	59.72 PK	74.00	-14.28	1.15 H	225	22.68	37.04
2	5150.00	43.91 AV	54.00	-10.09	1.15 H	225	6.87	37.04
3	*5190.00	104.46 PK			1.20 H	8	67.38	37.08
4	*5190.00	94.38 AV			1.20 H	8	57.30	37.08
5	#10380.00	59.50 PK	68.20	-8.70	1.41 H	100	12.14	47.36
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	53.39 PK	74.00	-20.61	1.02 V	38	16.35	37.04
2	5150.00	41.05 AV	54.00	-12.95	1.02 V	38	4.01	37.04
3	*5190.00	103.48 PK			1.00 V	45	66.40	37.08
4	*5190.00	93.41 AV			1.00 V	45	56.33	37.08
5	#10380.00	58.75 PK	68.20	-9.45	1.07 V	293	11.39	47.36

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 is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 64%RH 1000 hPa	TESTED BY	Sun Lin

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	*5320.00	104.18 PK			1.29 H	200	66.80	37.38
2	*5320.00	94.06 AV			1.29 H	200	56.68	37.38
3	5350.00	51.44 PK	74.00	-22.56	1.61 H	130	14.04	37.40
4	5350.00	38.65 AV	54.00	-15.35	1.61 H	130	1.25	37.40
5	#10460.00	59.65 PK	68.20	-8.55	1.15 H	235	12.04	47.61
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	103.14 PK			1.00 V	45	65.97	37.17
2	*5230.00	93.02 AV			1.00 V	45	55.85	37.17
3	5350.00	48.69 PK	74.00	-25.31	1.28 V	305	11.29	37.40
4	5350.00	37.03 AV	54.00	-16.97	1.28 V	305	-0.37	37.40
5	#10460.00	58.87 PK	68.20	-9.33	1.20 V	117	11.26	47.61

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.

BELOW 1GHz WORST-CASE DATA：DRAFT 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 999 hPa	TESTED BY	Brad Wu

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	160.17	33.63 QP	43.50	-9.87	1.50 H	277	19.32	14.31
2	399.31	35.64 QP	46.00	-10.36	1.00 H	31	17.62	18.02
3	533.47	37.39 QP	46.00	-8.61	1.25 H	7	16.26	21.13
4	667.63	36.76 QP	46.00	-9.24	1.25 H	7	12.53	24.23
5	801.78	30.70 QP	46.00	-15.30	1.00 H	10	4.64	26.05
6	960.00	33.22 QP	46.00	-12.78	1.50 H	46	4.62	28.60
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	**47.40**	**36.93 QP**	**40.00**	**-3.07**	**1.50 V**	**85**	**23.19**	**13.74**
2	113.50	37.57 QP	43.50	-5.93	1.00 V	229	26.15	11.41
3	167.94	38.80 QP	43.50	-4.70	1.00 V	334	24.96	13.83
4	399.31	36.17 QP	46.00	-9.83	1.25 V	262	18.15	18.02
5	665.68	37.61 QP	46.00	-8.39	1.00 V	79	13.43	24.18
6	961.21	34.96 QP	54.00	-19.04	1.00 V	127	6.35	28.61

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

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

NOTE: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 19, 2008	Nov. 18, 2009
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 31, 2008	Dec. 30, 2009
LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jun. 03, 2009	Jun. 02, 2010
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Dec. 04, 2008	Dec. 03, 2009
Software ADT	ADT_Cond_ V7.3.7	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.

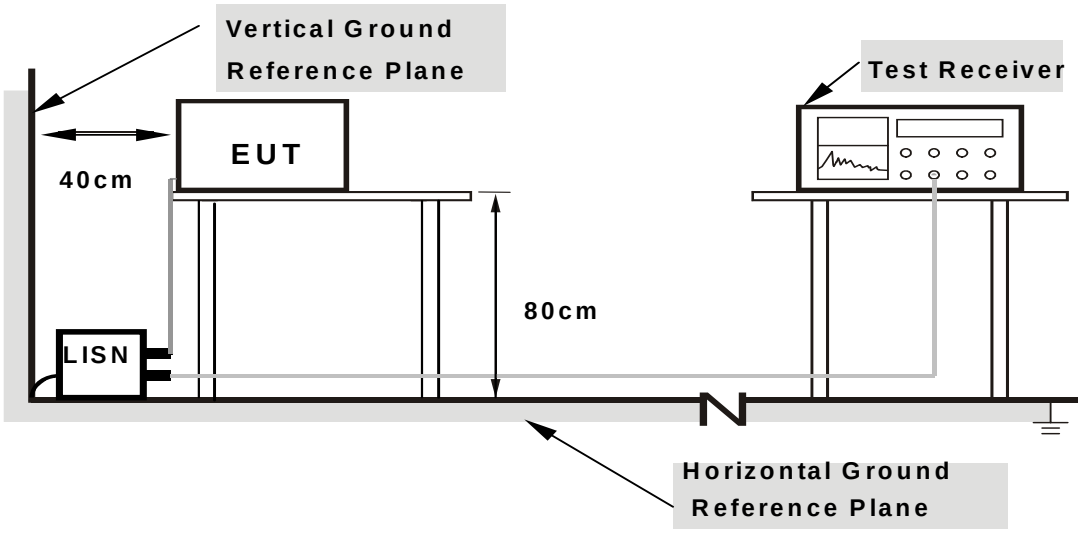
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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.

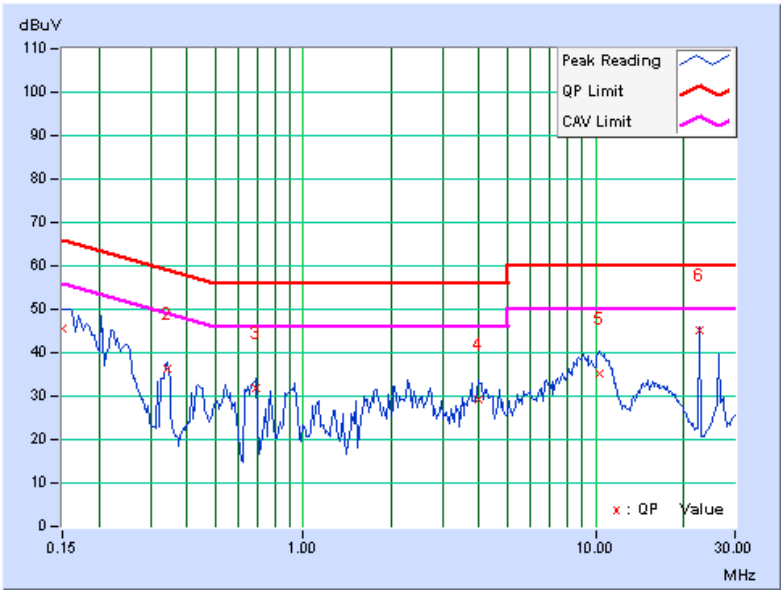
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA：DRAFT 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	PHASE	Line 1
MODULATION TYPE	BPSK	INPUT POWER	120Vac, 60Hz
TRANSFER RATE	7.2Mbps	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 1021hPa	TESTED BY	Match Tsui

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.13	45.29	-	45.42	-	66.00	56.00	-20.58	-
2	0.341	0.14	36.34	-	36.48	-	59.17	49.17	-22.69	-
3	0.689	0.16	31.83	-	31.99	-	56.00	46.00	-24.01	-
4	4.004	0.37	29.06	-	29.43	-	56.00	46.00	-26.57	-
5	10.352	0.68	34.57	-	35.25	-	60.00	50.00	-24.75	-
6	22.570	1.19	43.98	-	45.17	-	60.00	50.00	-14.83	-

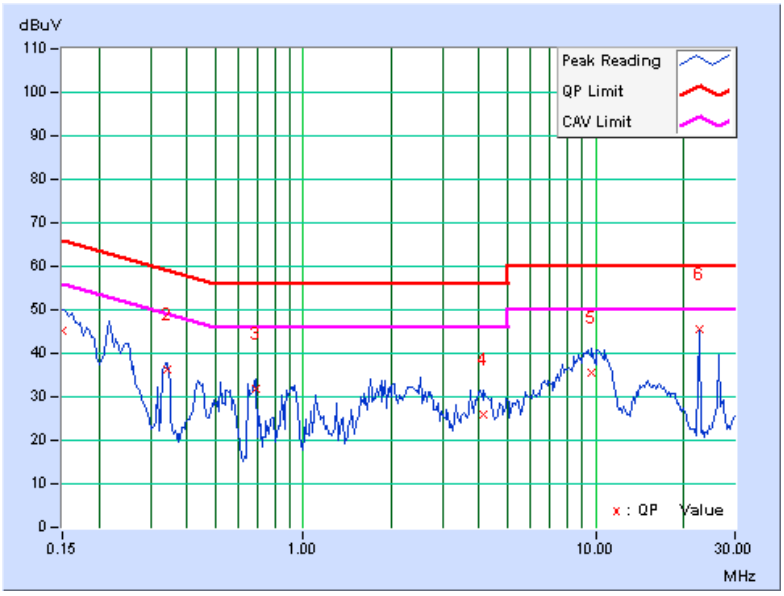
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	PHASE	Line 2
MODULATION TYPE	BPSK	INPUT POWER	120Vac, 60Hz
TRANSFER RATE	7.2Mbps	6dB BANDWIDTH	9kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 1021hPa	TESTED BY	Match Tsui

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.14	44.89	-	45.03	-	66.00	56.00	-20.97	-
2	0.341	0.16	36.00	-	36.16	-	59.17	49.17	-23.01	-
3	0.685	0.18	31.64	-	31.82	-	56.00	46.00	-24.18	-
4	4.125	0.40	25.71	-	26.11	-	56.00	46.00	-29.89	-
5	9.734	0.65	34.87	-	35.52	-	60.00	50.00	-24.48	-
6	**22.570**	**0.92**	**44.74**	**-**	**45.66**	**-**	**60.00**	**50.00**	**-14.34**	**-**

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 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

NOTE: Where B is the 26dB emission bandwidth in MHz.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY44360128	Dec. 12, 2008	Dec.11. 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

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

b. Set span to encompass the entire emission bandwidth of the signal.

c. Set RBW to 1MHz, VBW to 3MHz.

d. Using the spectrum analyzer's channel power measurement function to measure the output power.

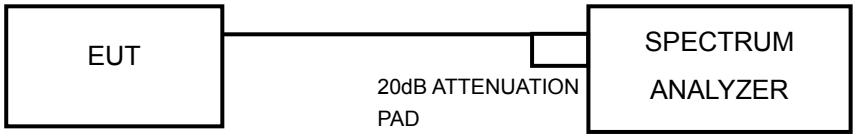
NOTE: The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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

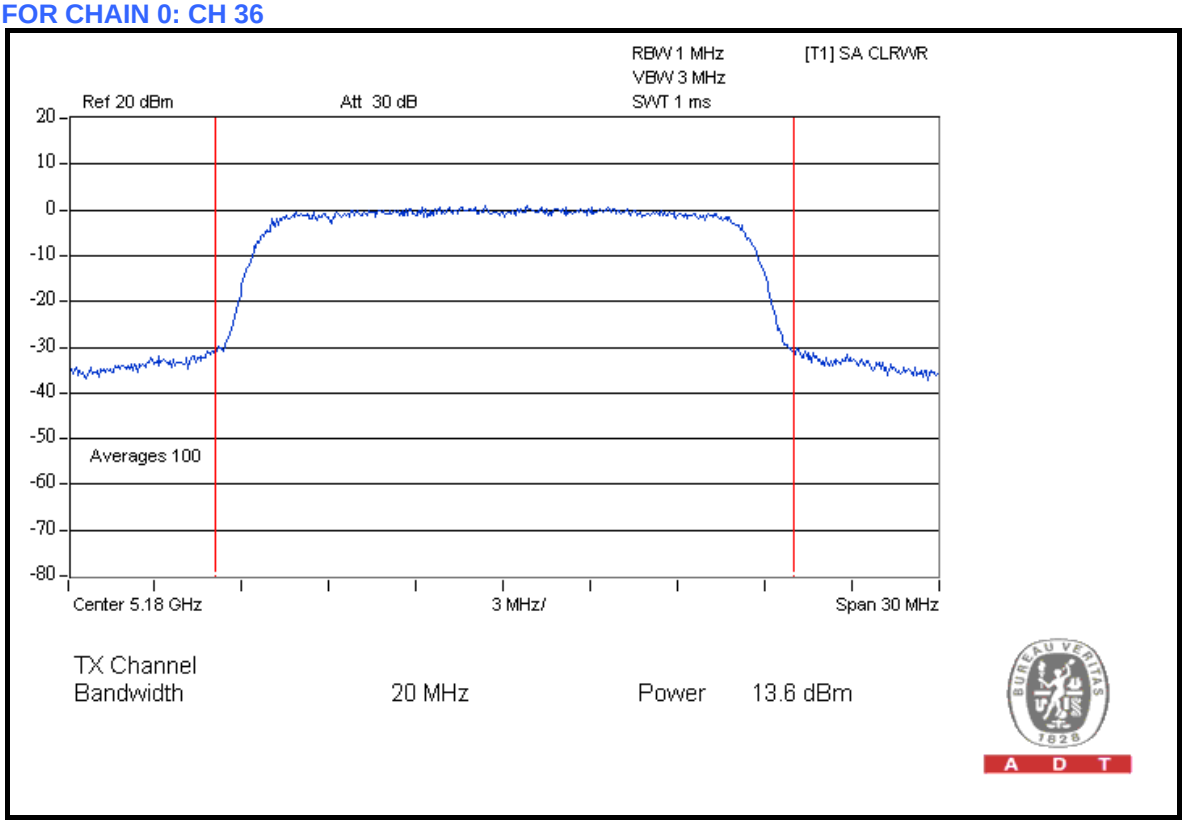
4.3.7 TEST RESULTS

PEAK POWER OUTPUT: 802.11a OFDM MODULATION

MODULATION TYPE	BPSK	**TRANSFER RATE**	6.0Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg.C, 64%RH, 1021hPa
TESTED BY	Sun Lin		

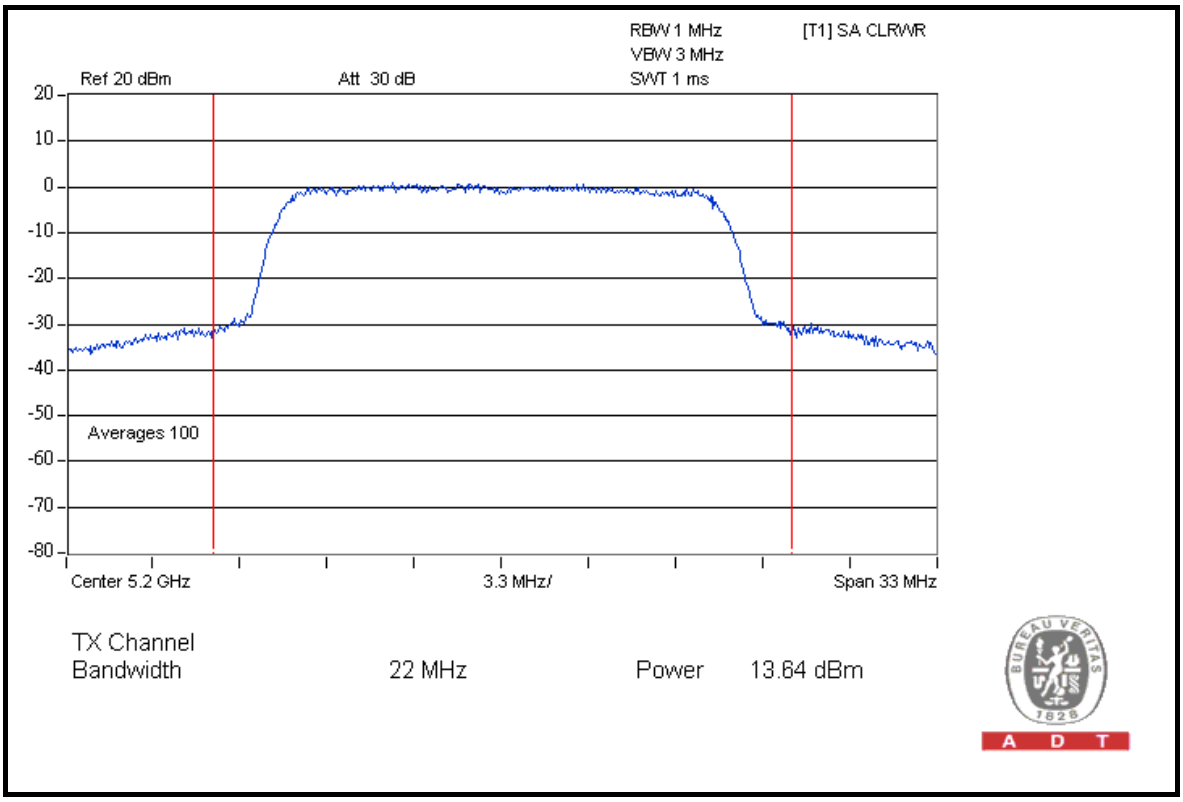
CHAN.	CHAN. FREQ. (MHz)	PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	13.60	13.54	45.50	16.58	17	PASS
40	5200	13.64	13.64	46.24	16.65	17	PASS
48	5240	13.65	13.55	45.82	16.61	17	PASS

FOR CHAIN 0: CH 36



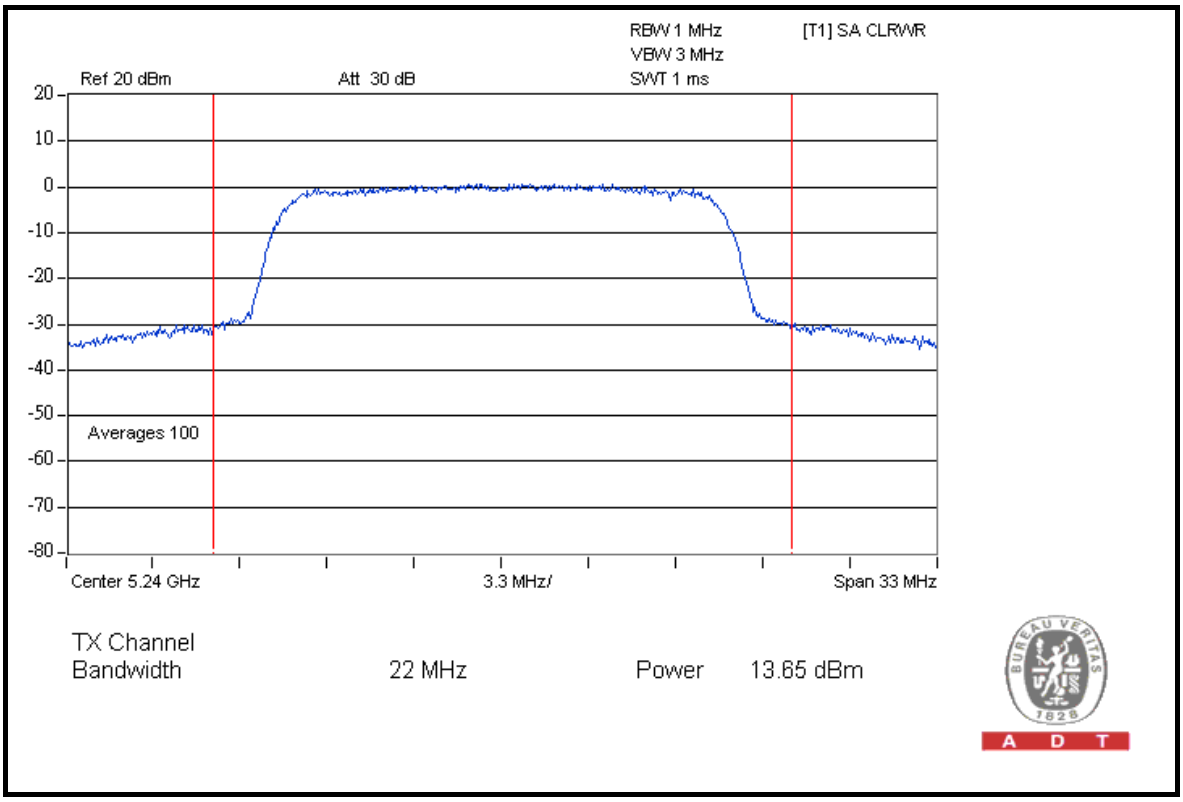
TX Channel Bandwidth 20 MHz Power 13.6 dBm

CH 40

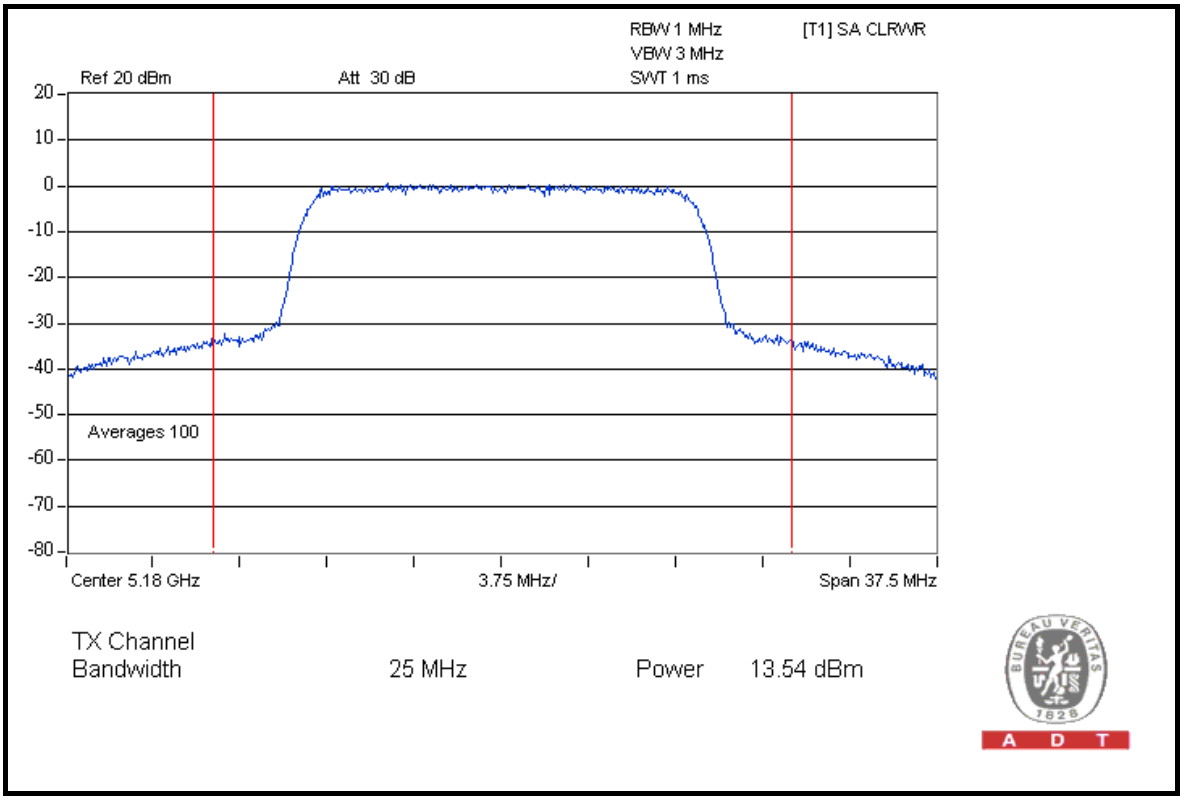


TX Channel Bandwidth 22 MHz Power 13.64 dBm

CH 48



FOR CHAIN 1: CH 36



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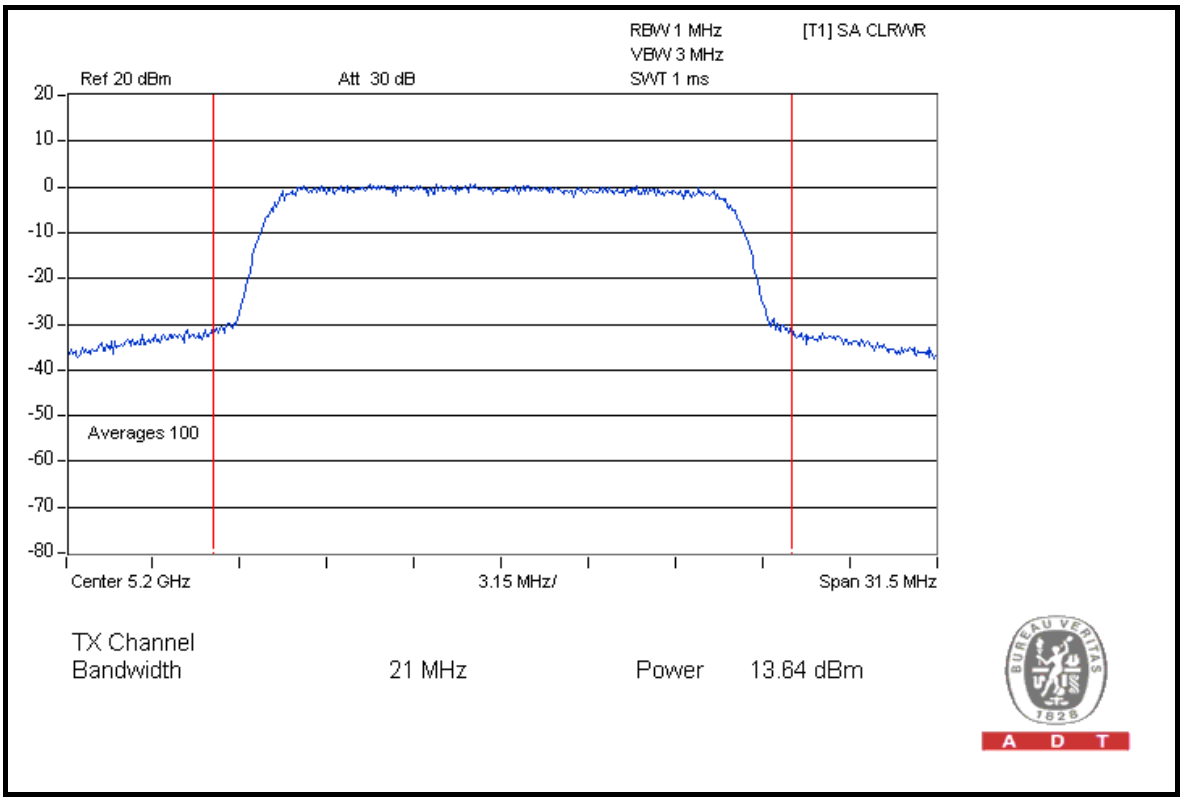
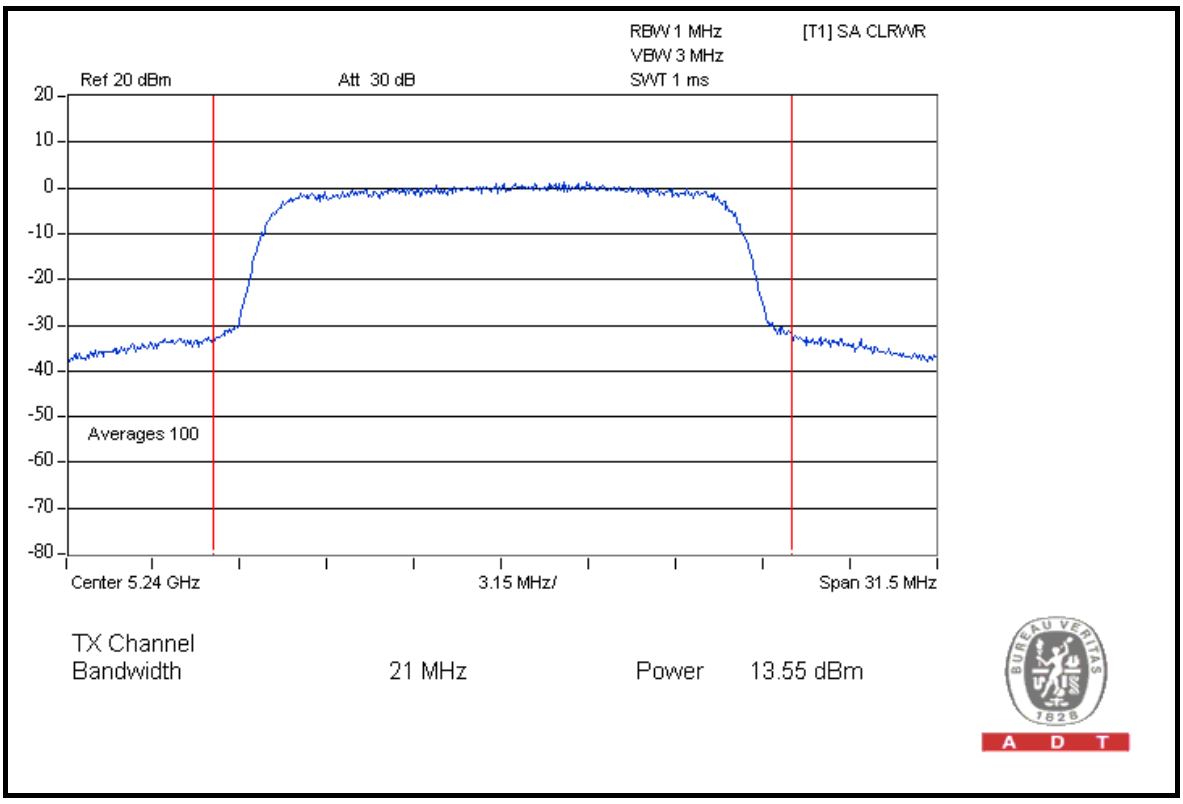


TX Channel Bandwidth 21 MHz Power 13.64 dBm

CH 48



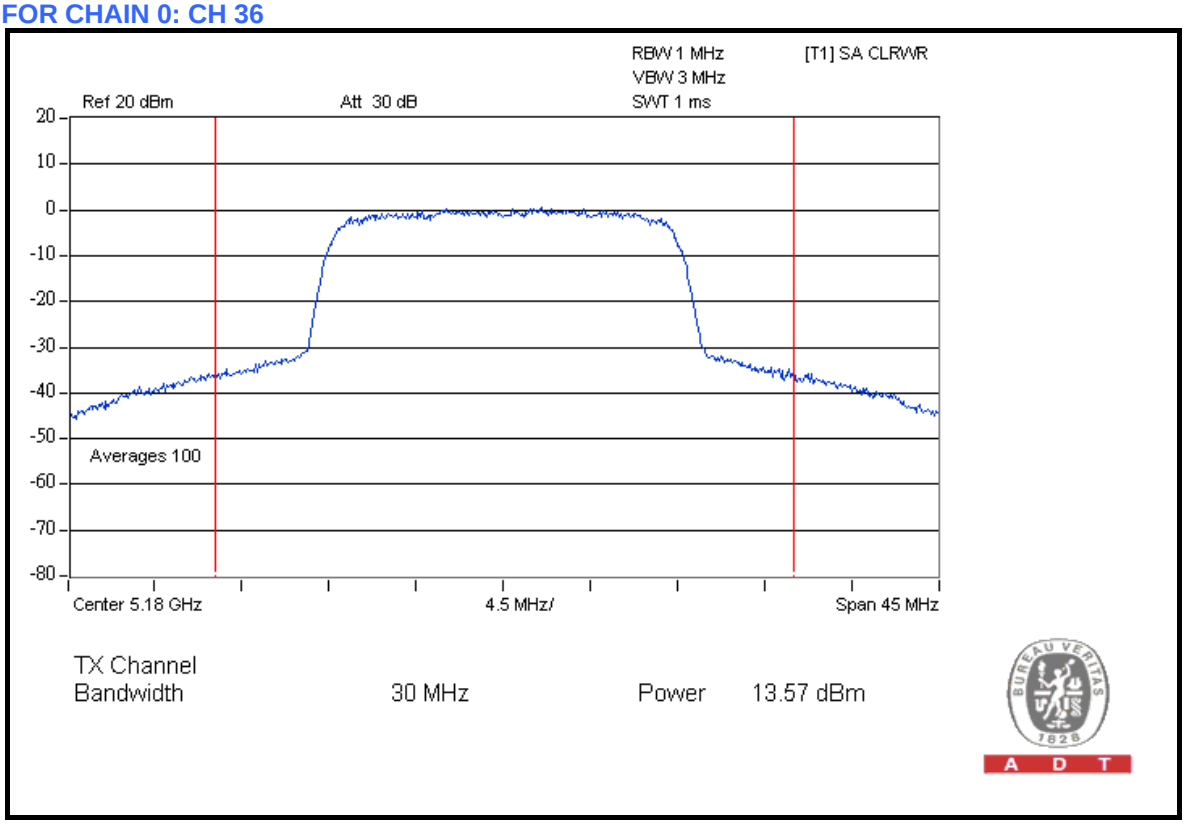
TX Channel Bandwidth 21 MHz Power 13.55 dBm

DRAFT 802.11n (20MHz) OFDM MODULATION

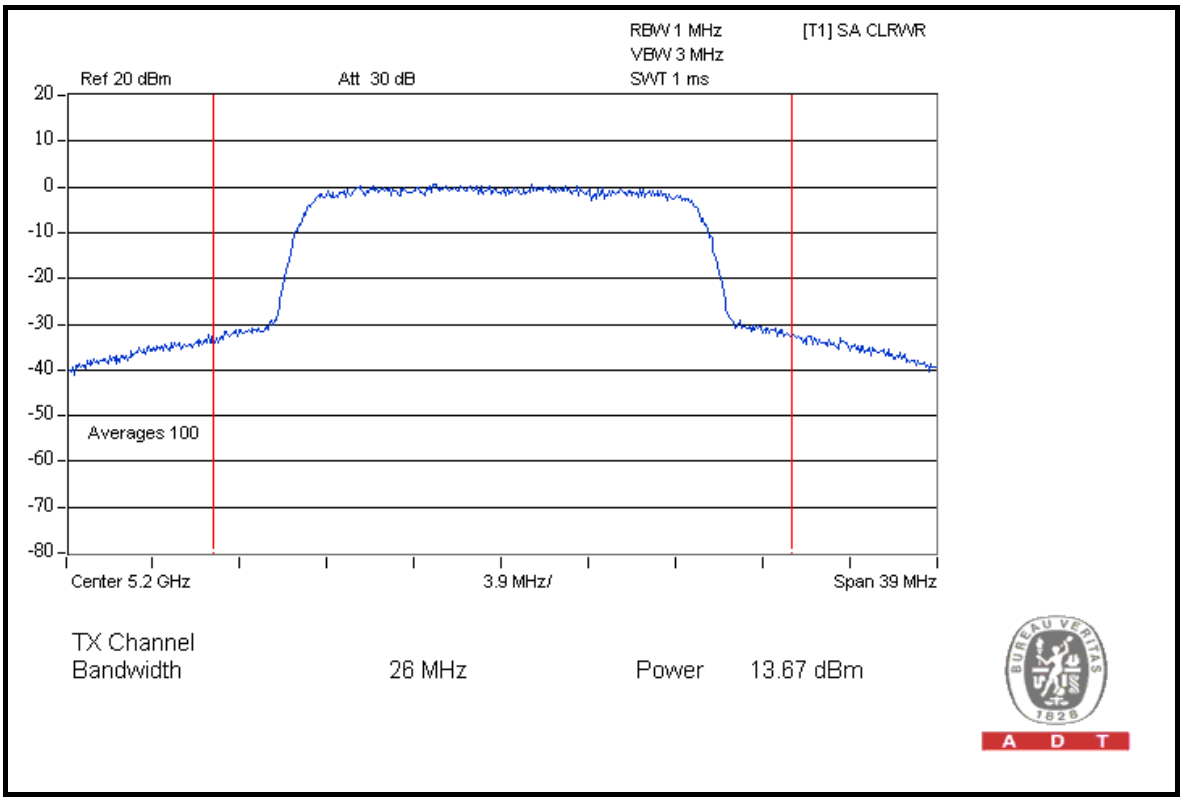
MODULATION TYPE	BPSK	**TRANSFER RATE**	7.2Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg.C, 64%RH, 1021hPa
TESTED BY	Sun Lin		

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	13.57	13.64	45.87	16.62	17	PASS
40	5200	13.67	13.67	46.56	16.68	17	PASS
48	5240	13.61	13.65	46.14	16.64	17	PASS

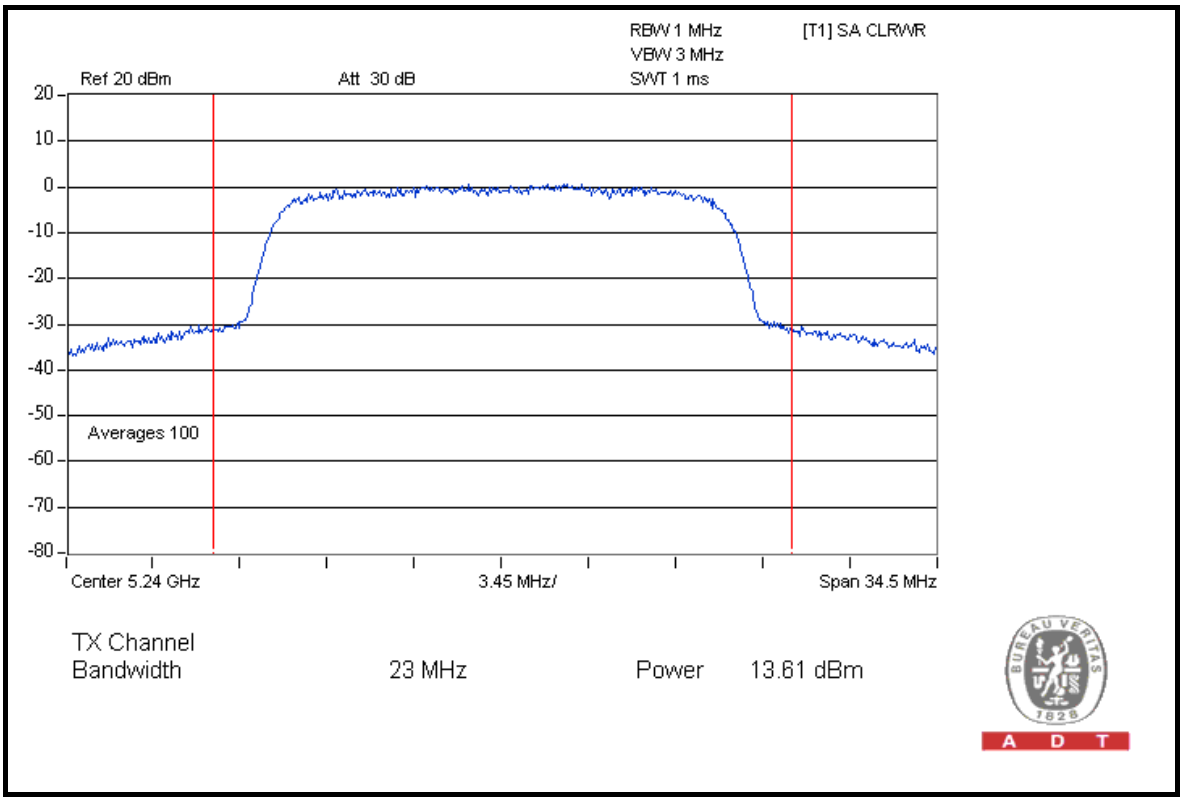
FOR CHAIN 0: CH 36



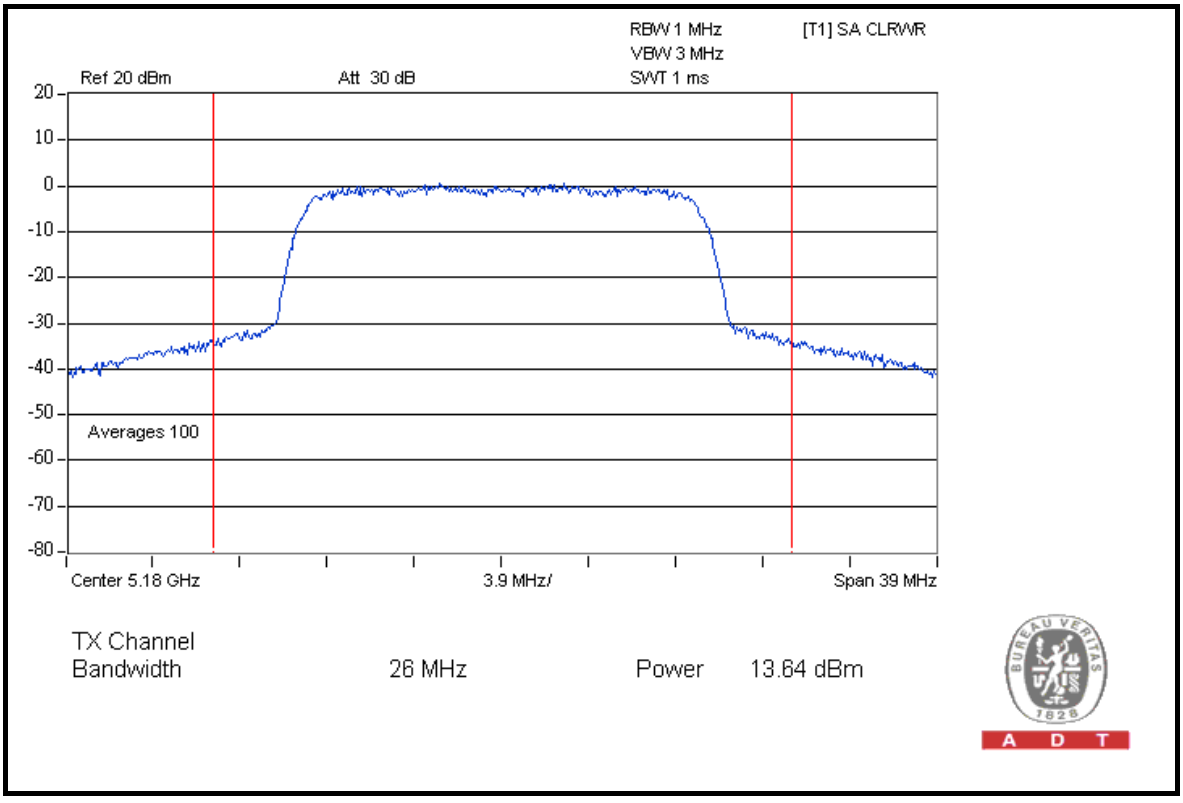
CH 40



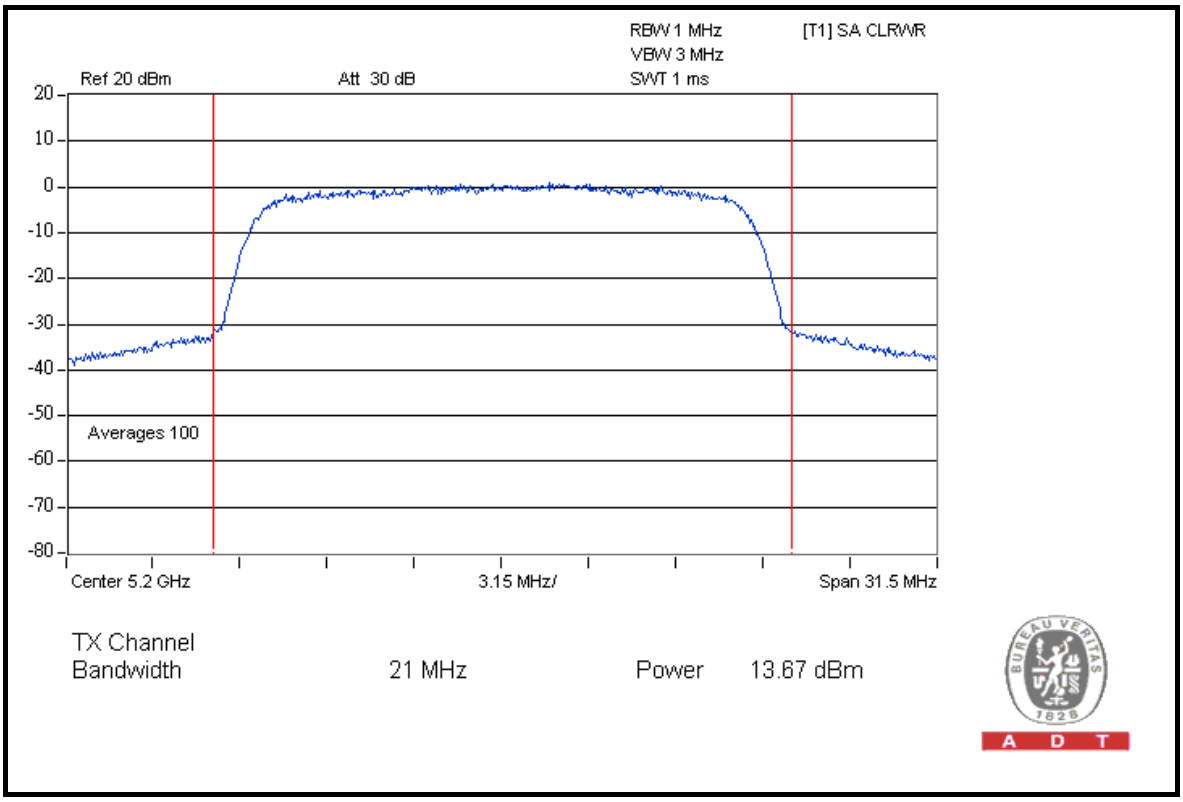
CH 48



FOR CHAIN 1: CH 36

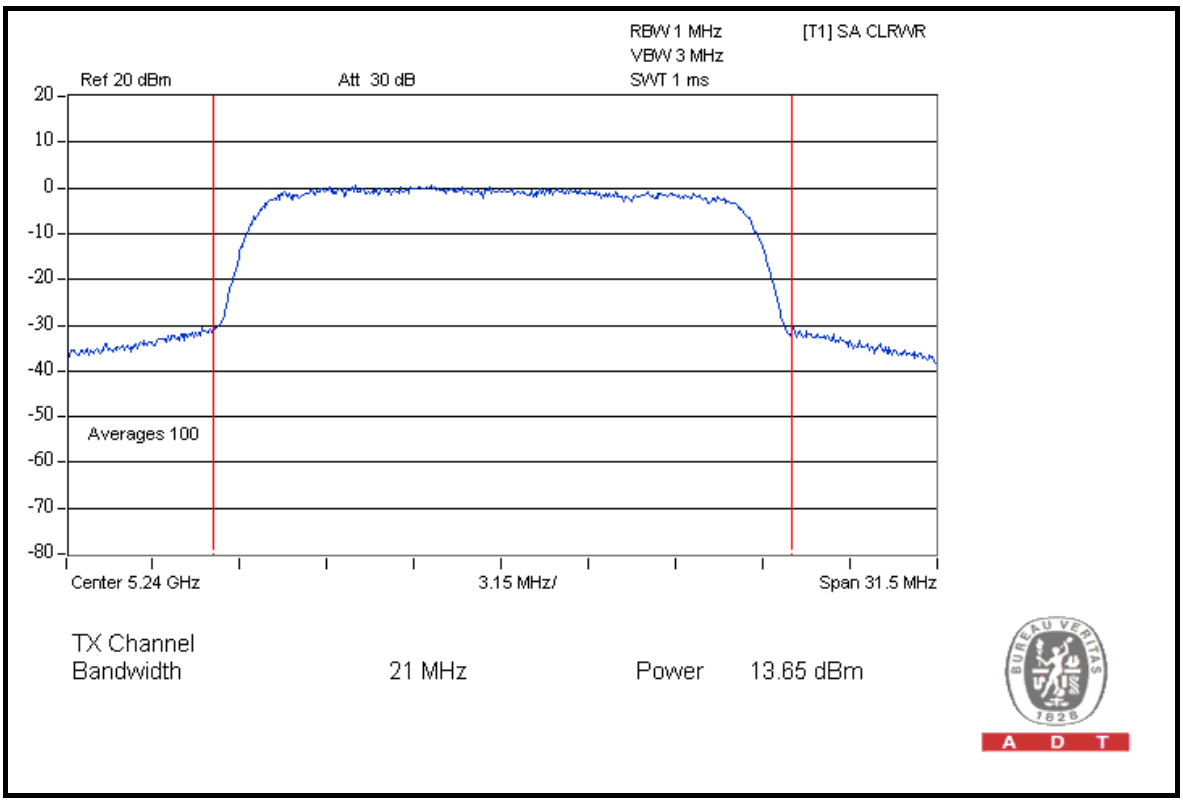


CH 40



TX Channel Bandwidth 21 MHz Power 13.67 dBm

CH 48



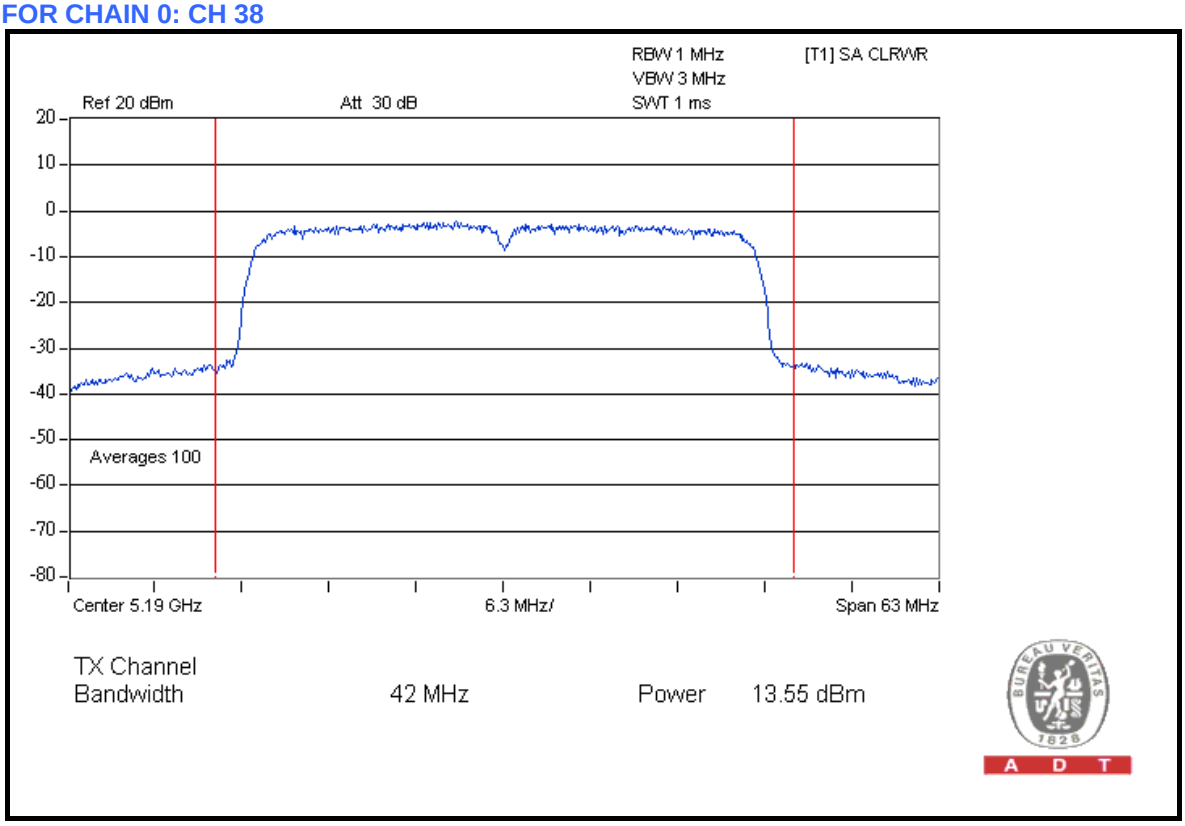
TX Channel Bandwidth 21 MHz Power 13.65 dBm

DRAFT 802.11n (40MHz) OFDM MODULATION

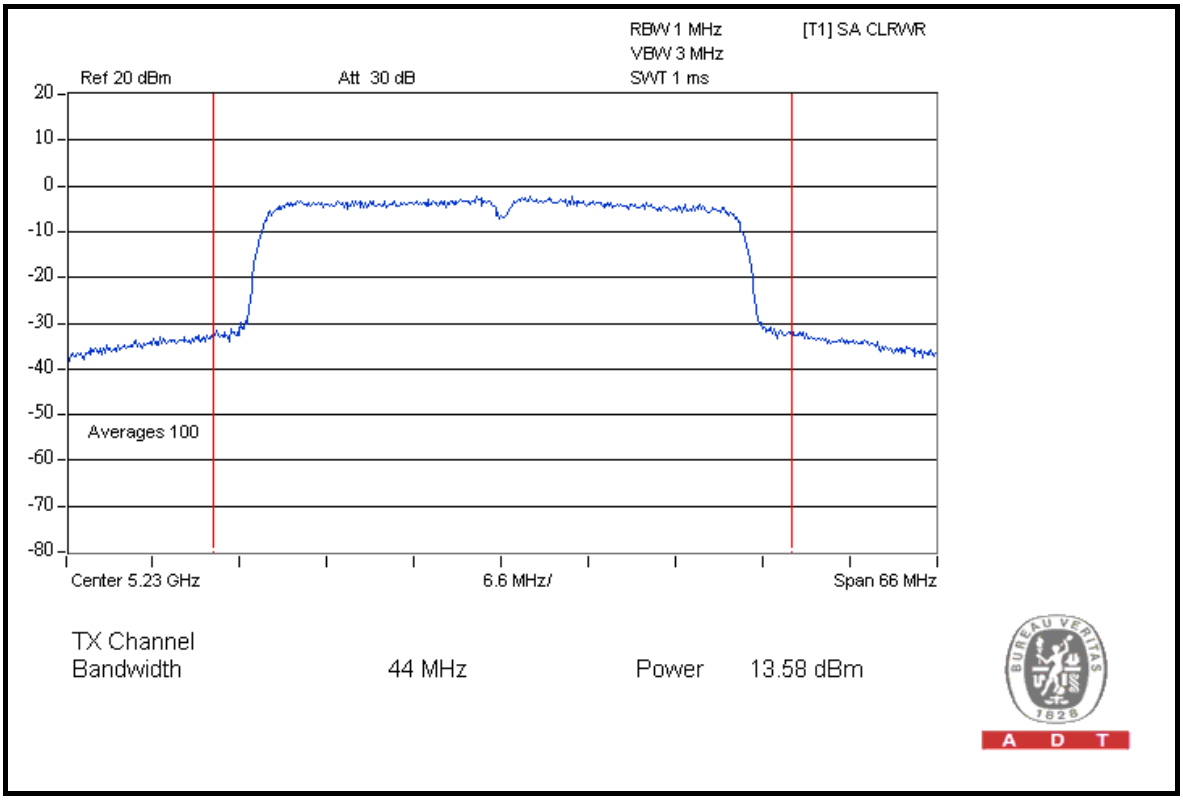
MODULATION TYPE	BPSK	**TRANSFER RATE**	15.0Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg.C, 64%RH, 1021hPa
TESTED BY	Sun Lin		

CHAN.	CHAN. FREQ. (MHz)	PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	13.55	13.61	45.61	16.59	17	PASS
46	5230	13.58	13.68	46.14	16.64	17	PASS

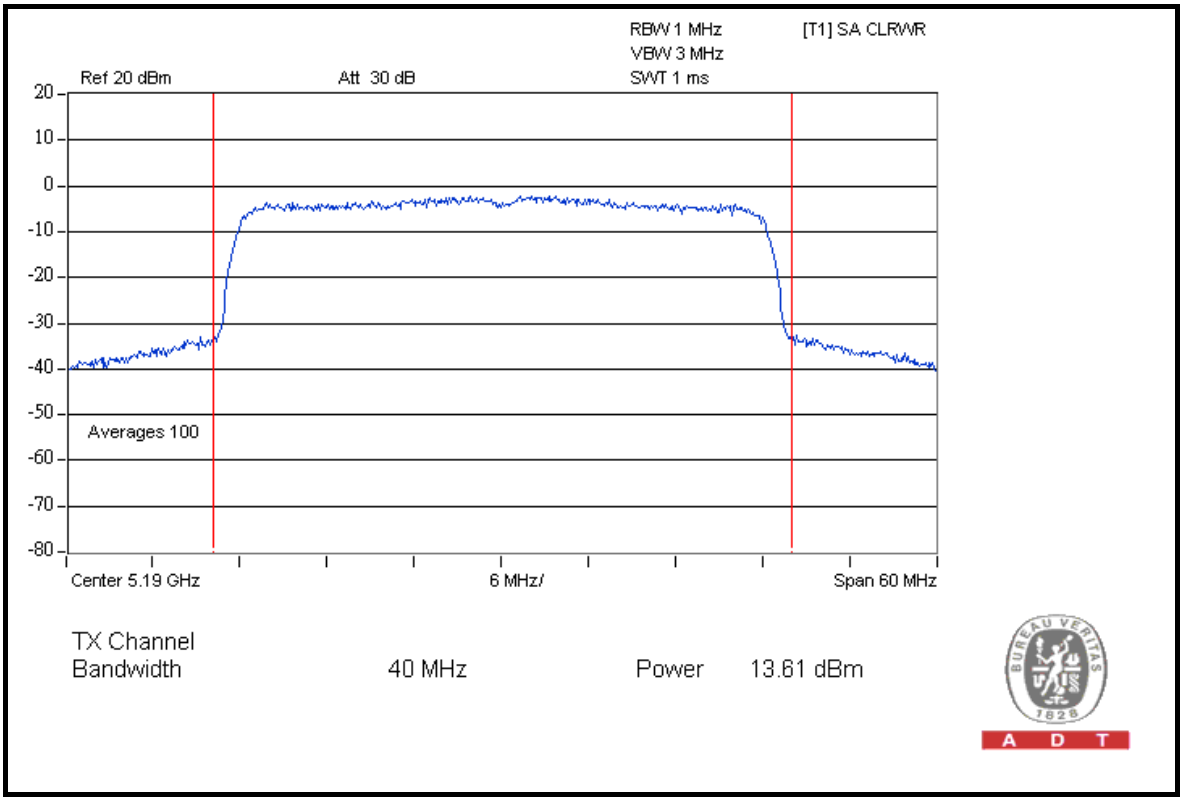
FOR CHAIN 0: CH 38



CH 46

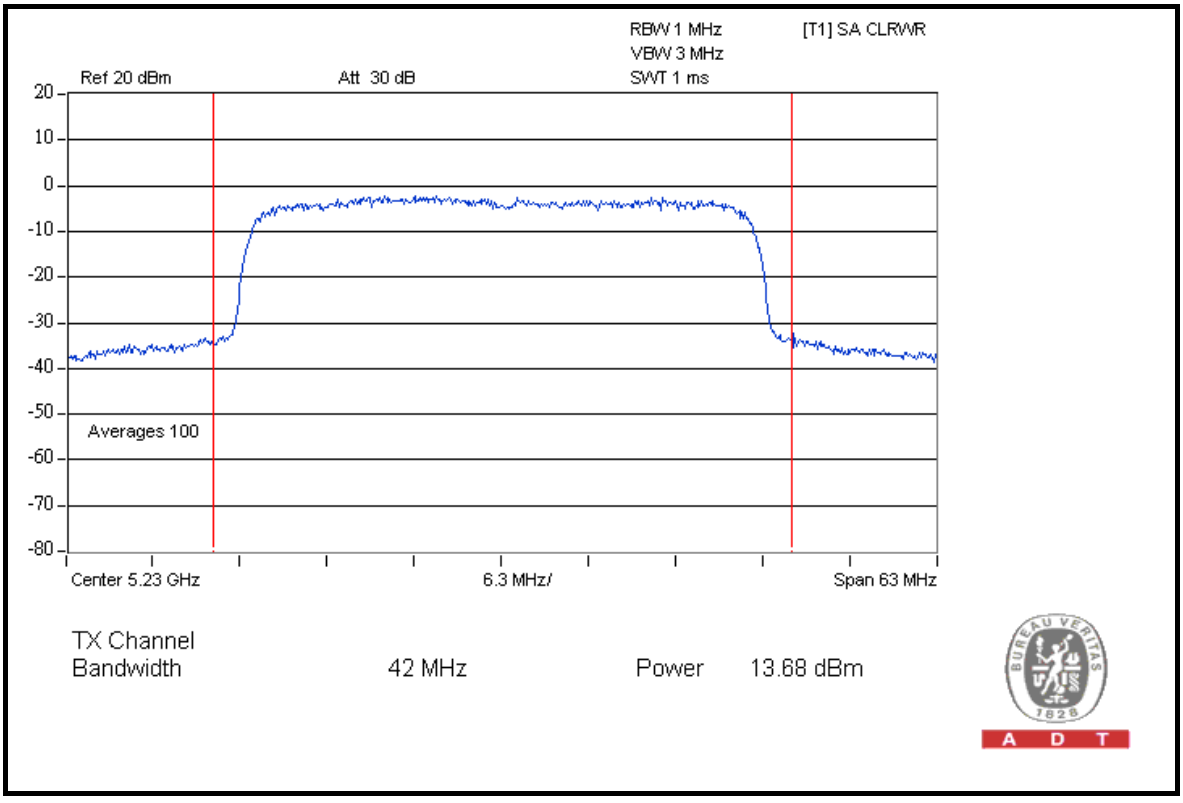


FOR CHAIN 1: CH 38



TX Channel Bandwidth 40 MHz Power 13.61 dBm

CH 46



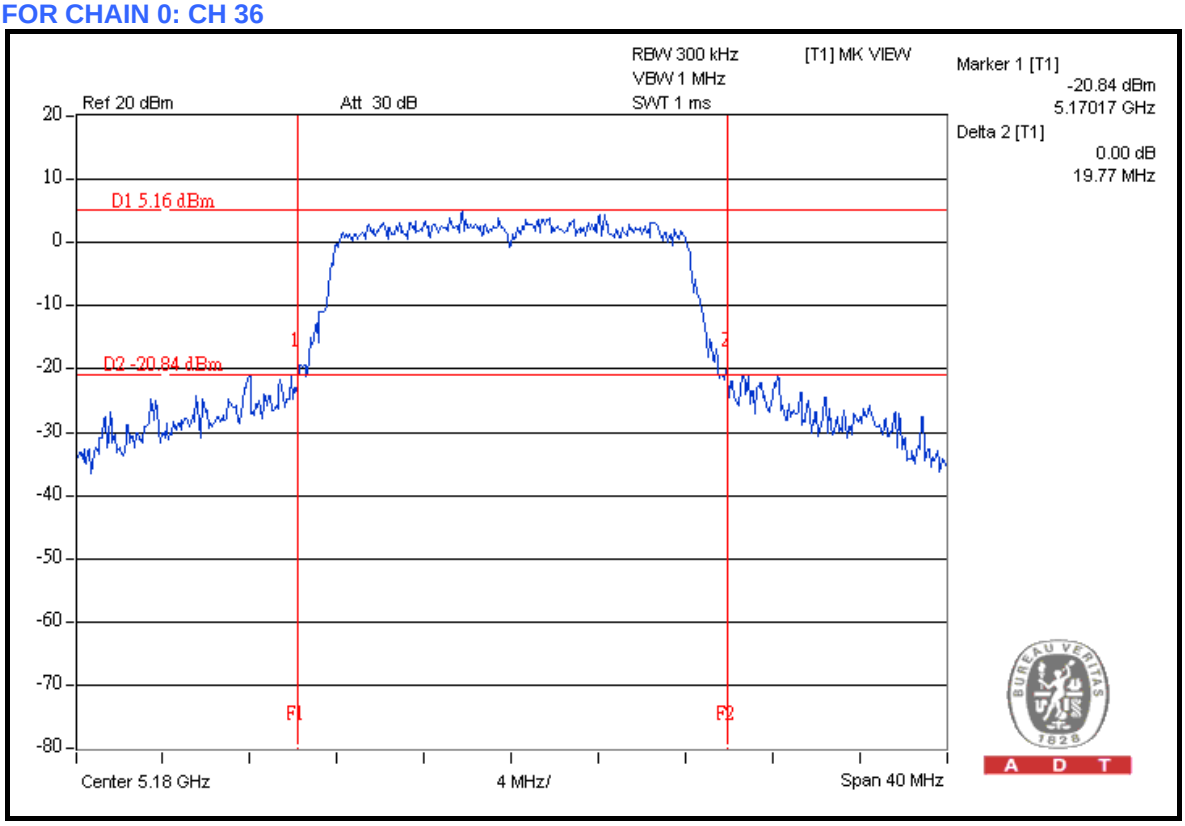
TX Channel Bandwidth 42 MHz Power 13.68 dBm

26dB OCCUPIED BANDWIDTH: 802.11a OFDM MODULATION

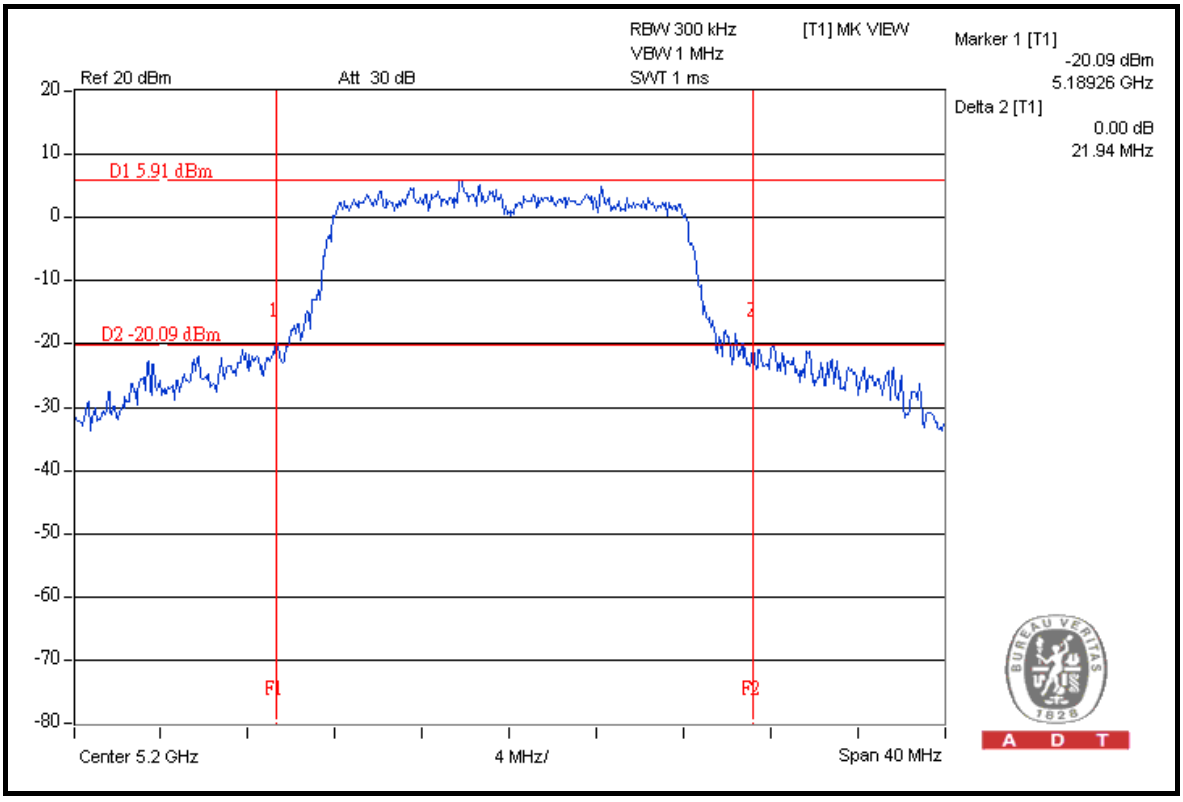
MODULATION TYPE	BPSK	**TRANSFER RATE**	6.0Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg.C, 64%RH, 1021hPa
TESTED BY	Sun Lin		

CHANNEL	**CHANNEL FREQUENCY (MHz)**	**26dBc OCCUPIED BANDWIDTH (MHz)**		**PASS / FAIL**
		CHAIN 0	**CHAIN 1**	
36	5180	19.77	24.44	PASS
40	5200	21.94	20.43	PASS
48	5240	21.11	20.30	PASS

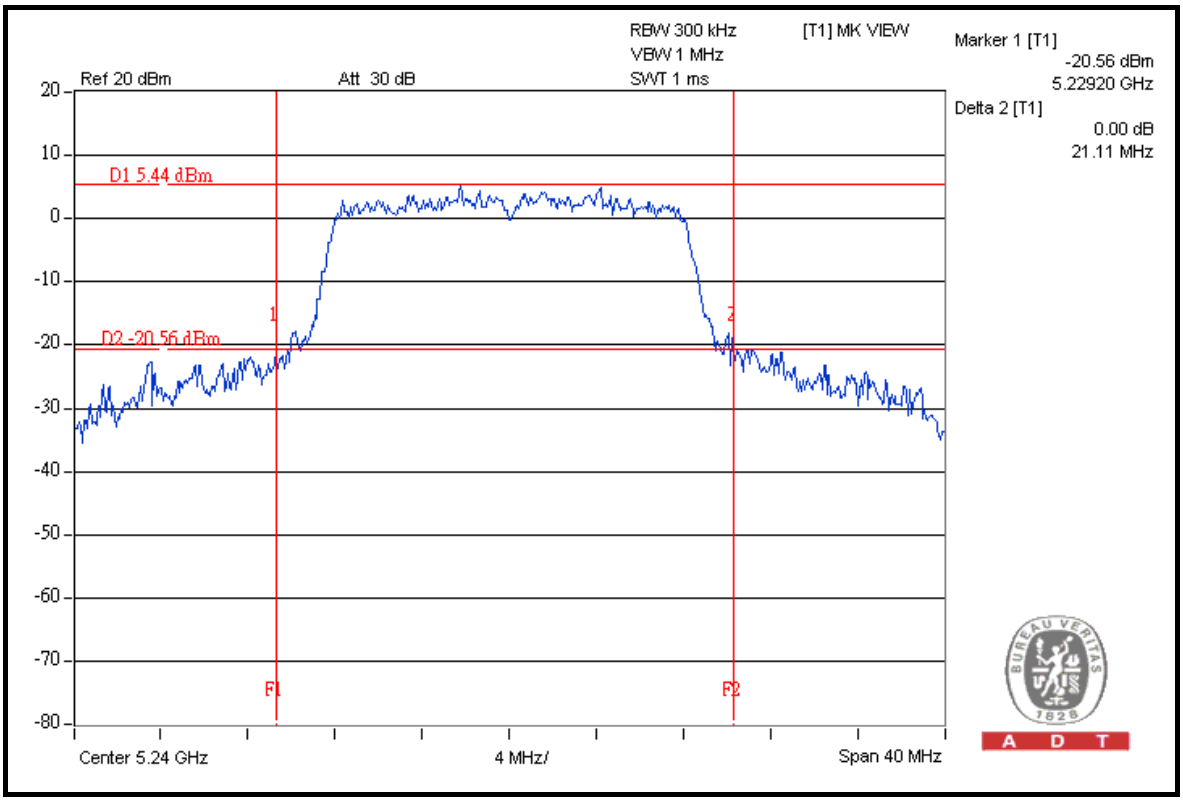
FOR CHAIN 0: CH 36



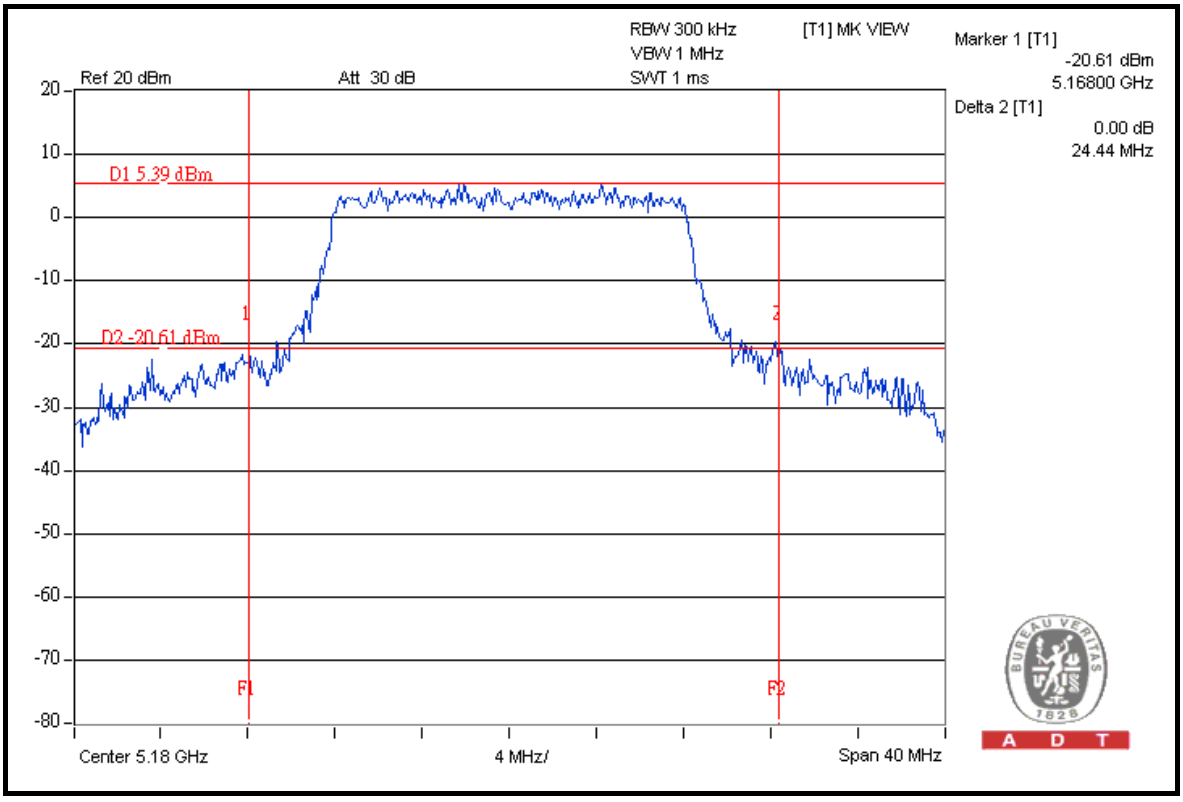
CH 40



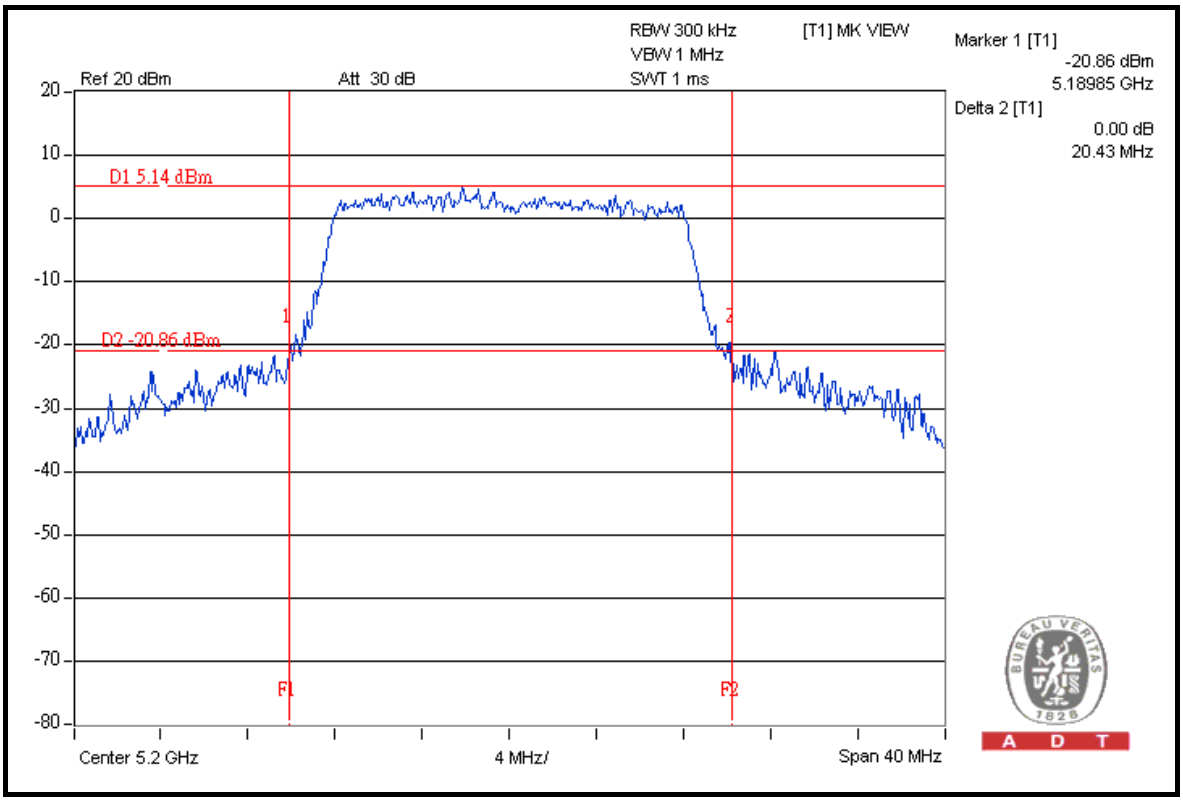
CH 48



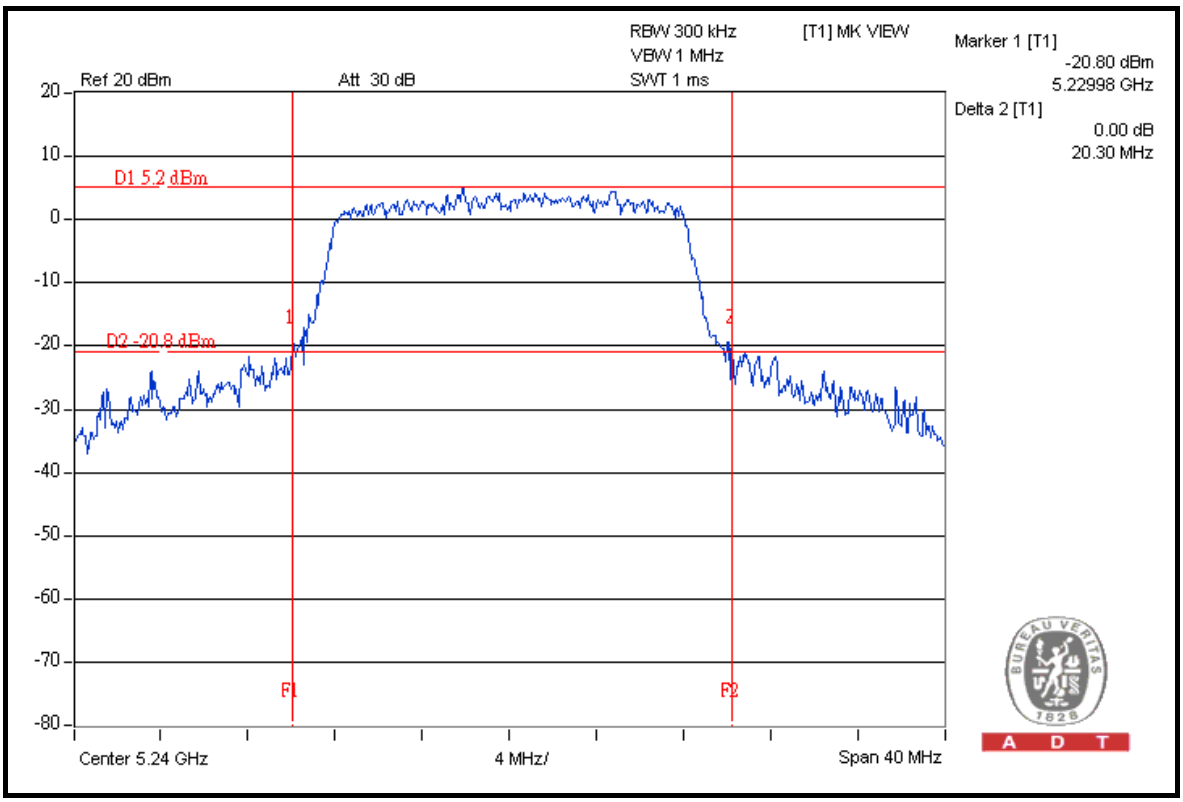
FOR CHAIN 1: CH 36



CH 40


RBW 300 kHz
VBW 1 MHz
SWT 1 ms
[T1] MK VIEW
Marker 1 [T1]
-20.86 dBm
5.18985 GHz
Delta 2 [T1]
0.00 dB
20.43 MHz
Ref 20 dBm
Att 30 dB
D1 5.14 dBm
D2 -20.86 dBm
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.2 GHz
4 MHz/
Span 40 MHz

CH 48

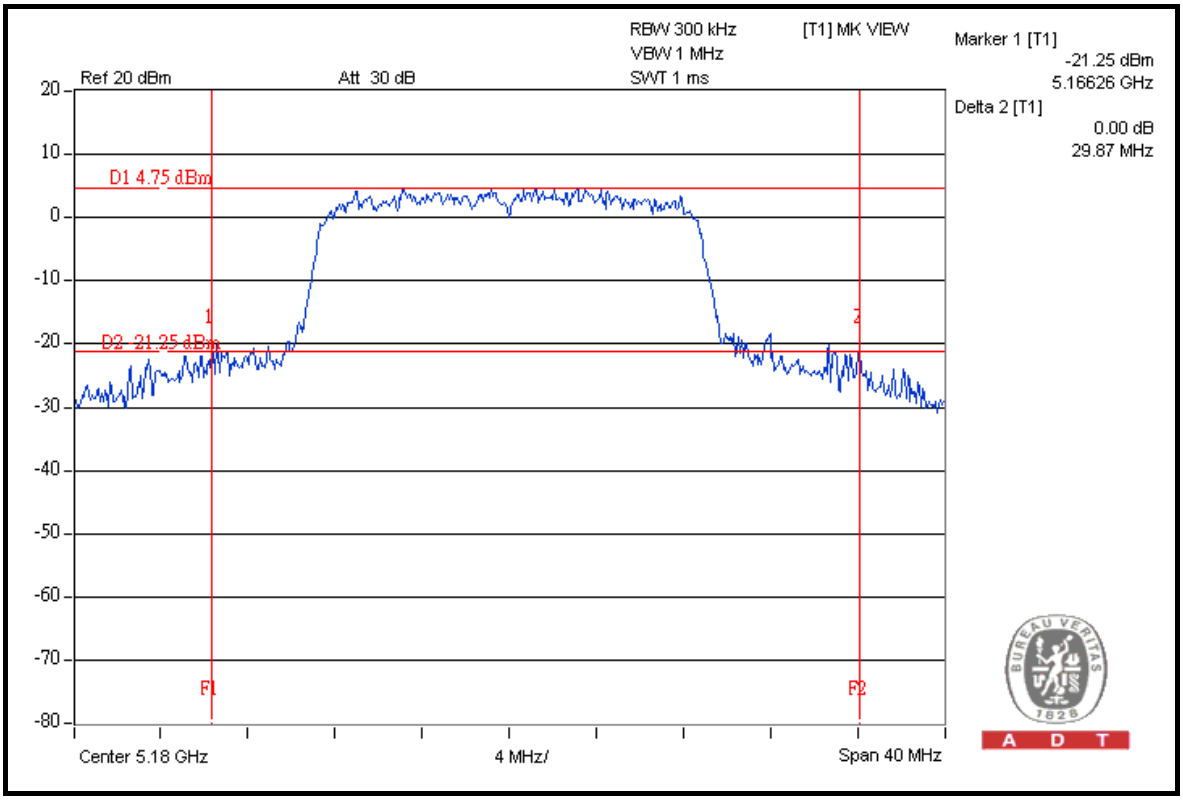

RBW 300 kHz
VBW 1 MHz
SWT 1 ms
[T1] MK VIEW
Marker 1 [T1]
-20.80 dBm
5.22998 GHz
Delta 2 [T1]
0.00 dB
20.30 MHz
Ref 20 dBm
Att 30 dB
D1 5.2 dBm
D2 -20.8 dBm
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.24 GHz
4 MHz/
Span 40 MHz

DRAFT 802.11n (20MHz) OFDM MODULATION

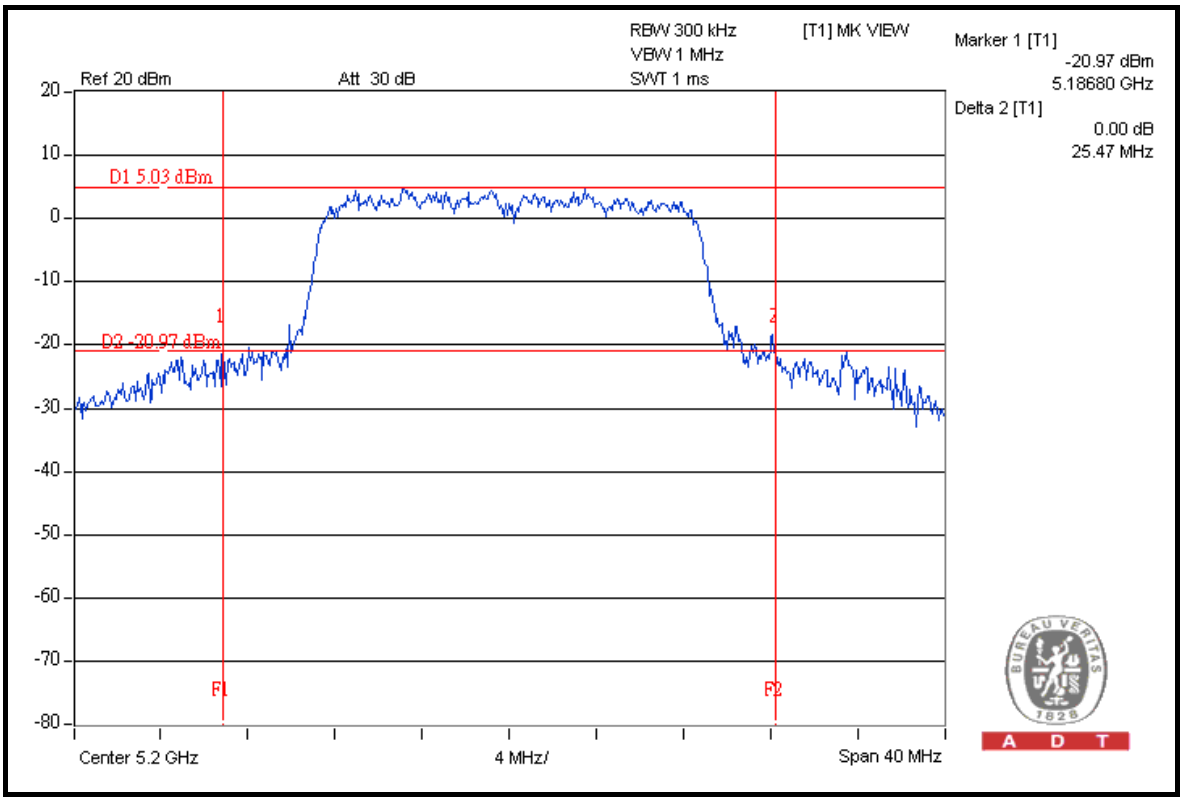
MODULATION TYPE	BPSK	**TRANSFER RATE**	7.2Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg.C, 64%RH, 1021hPa
TESTED BY	Sun Lin		

CHANNEL	**CHANNEL FREQUENCY (MHz)**	**26dBc OCCUPIED BANDWIDTH (MHz)**		**PASS / FAIL**
		CHAIN 0	**CHAIN 1**	
36	5180	29.87	25.55	PASS
40	5200	25.47	20.34	PASS
48	5240	22.47	20.69	PASS

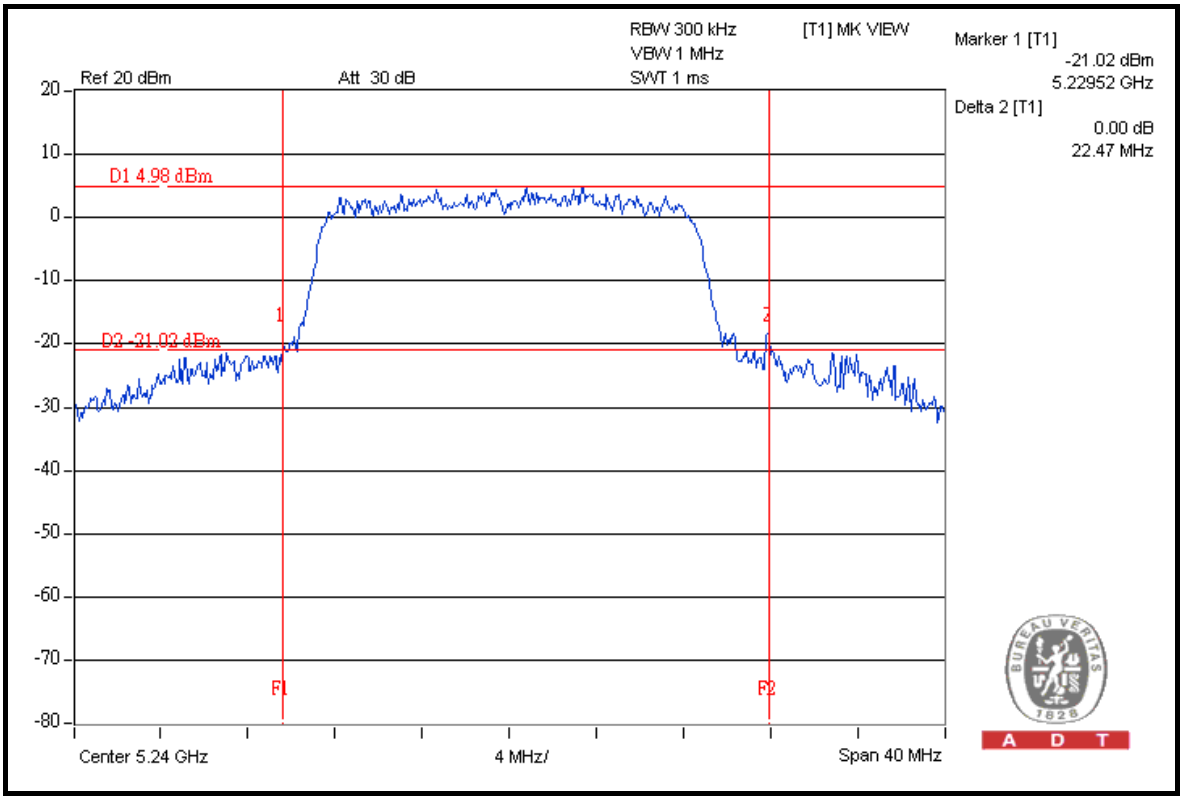
FOR CHAIN 0: CH 36



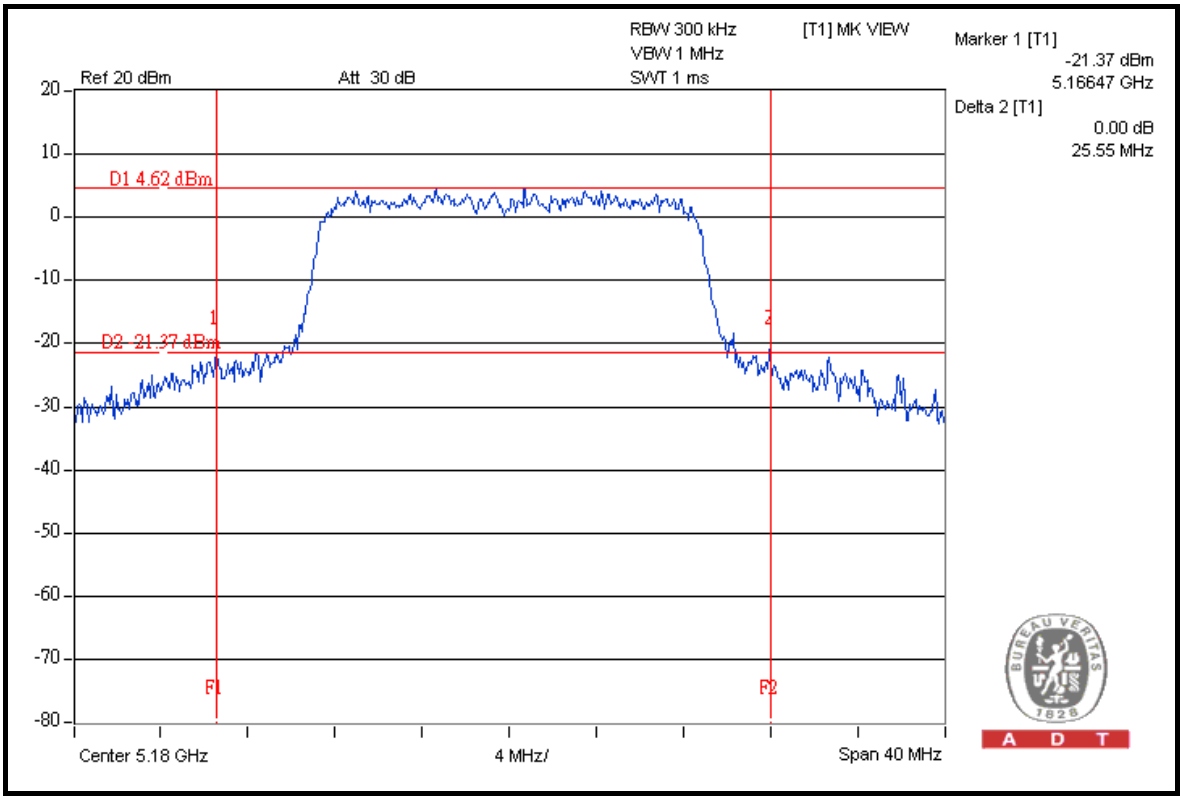
CH 40



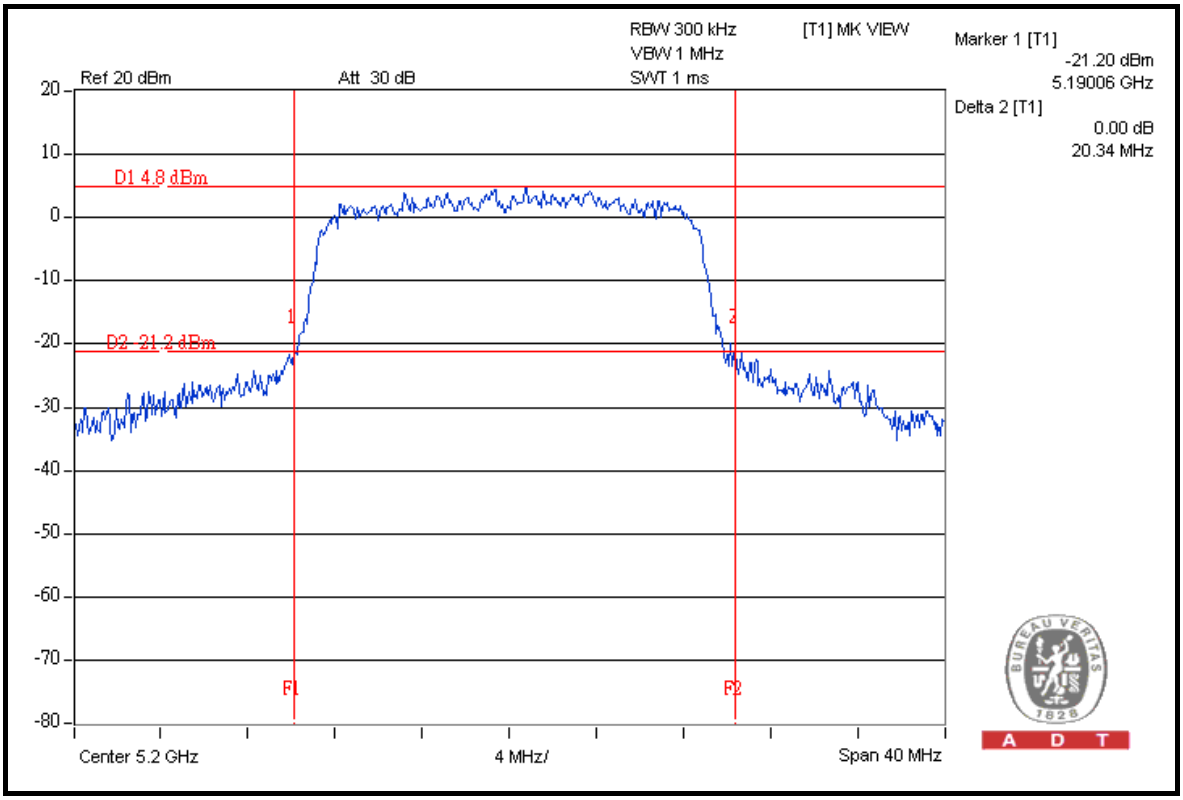
CH 48



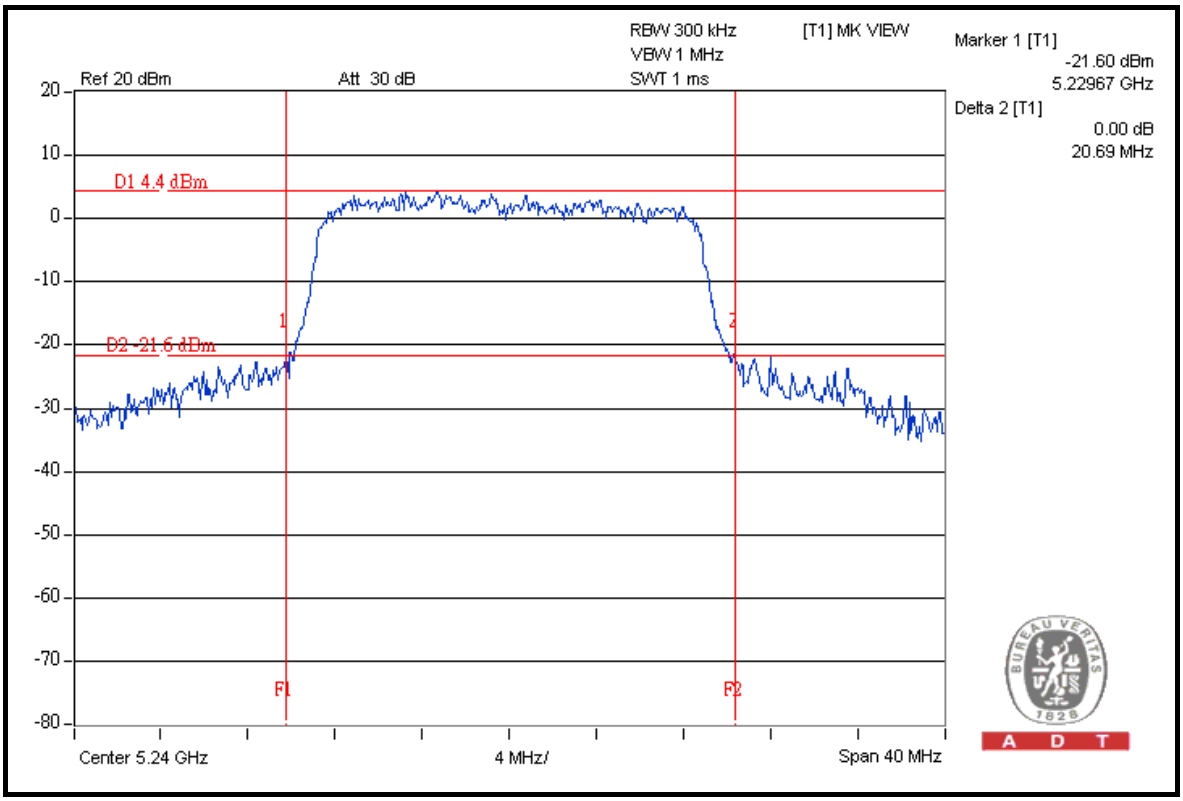
FOR CHAIN 1: CH 36



CH 40


RBW 300 kHz
VBW 1 MHz
SWT 1 ms
[T1] MK VIEW
Marker 1 [T1]
-21.20 dBm
5.19006 GHz
Delta 2 [T1]
0.00 dB
20.34 MHz
Ref 20 dBm
Att 30 dB
D1 4.8 dBm
D2 -21.2 dBm
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.2 GHz
4 MHz/
Span 40 MHz

CH 48

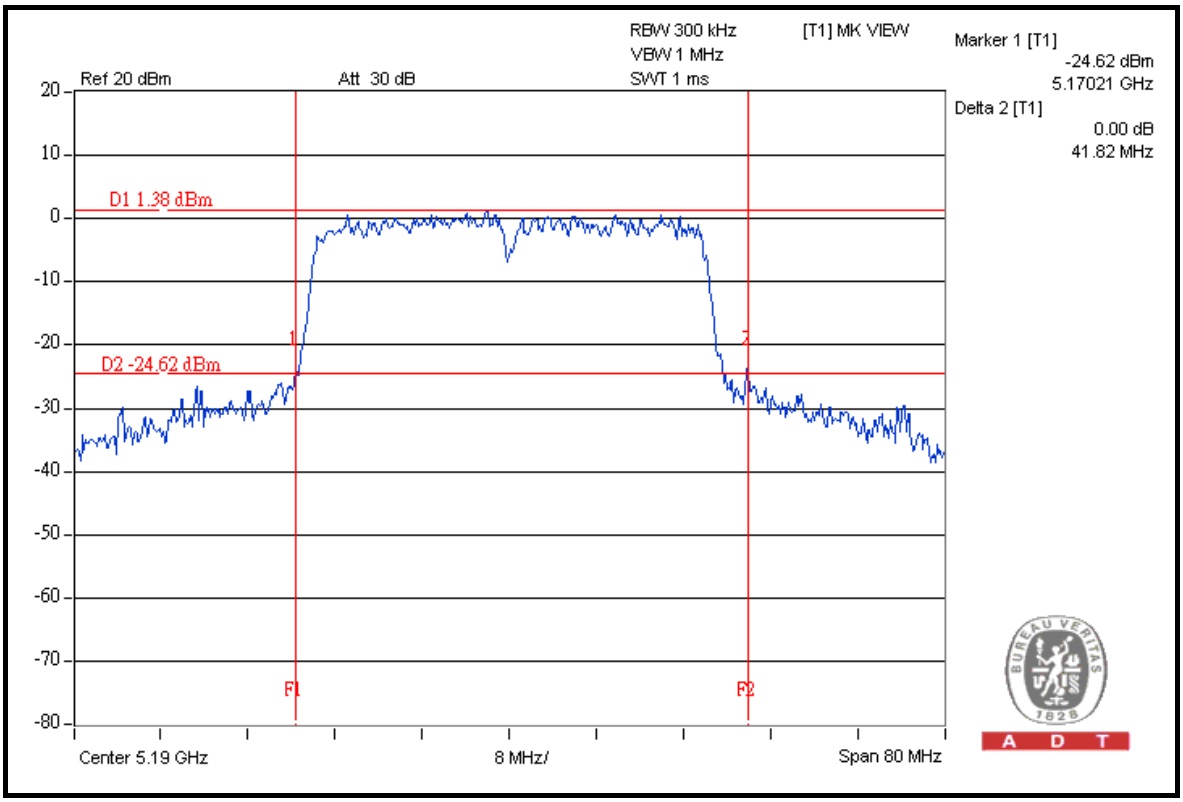

RBW 300 kHz
VBW 1 MHz
SWT 1 ms
[T1] MK VIEW
Marker 1 [T1]
-21.60 dBm
5.22967 GHz
Delta 2 [T1]
0.00 dB
20.69 MHz
Ref 20 dBm
Att 30 dB
D1 4.4 dBm
D2 -21.6 dBm
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.24 GHz
4 MHz/
Span 40 MHz

DRAFT 802.11n (40MHz) OFDM MODULATION

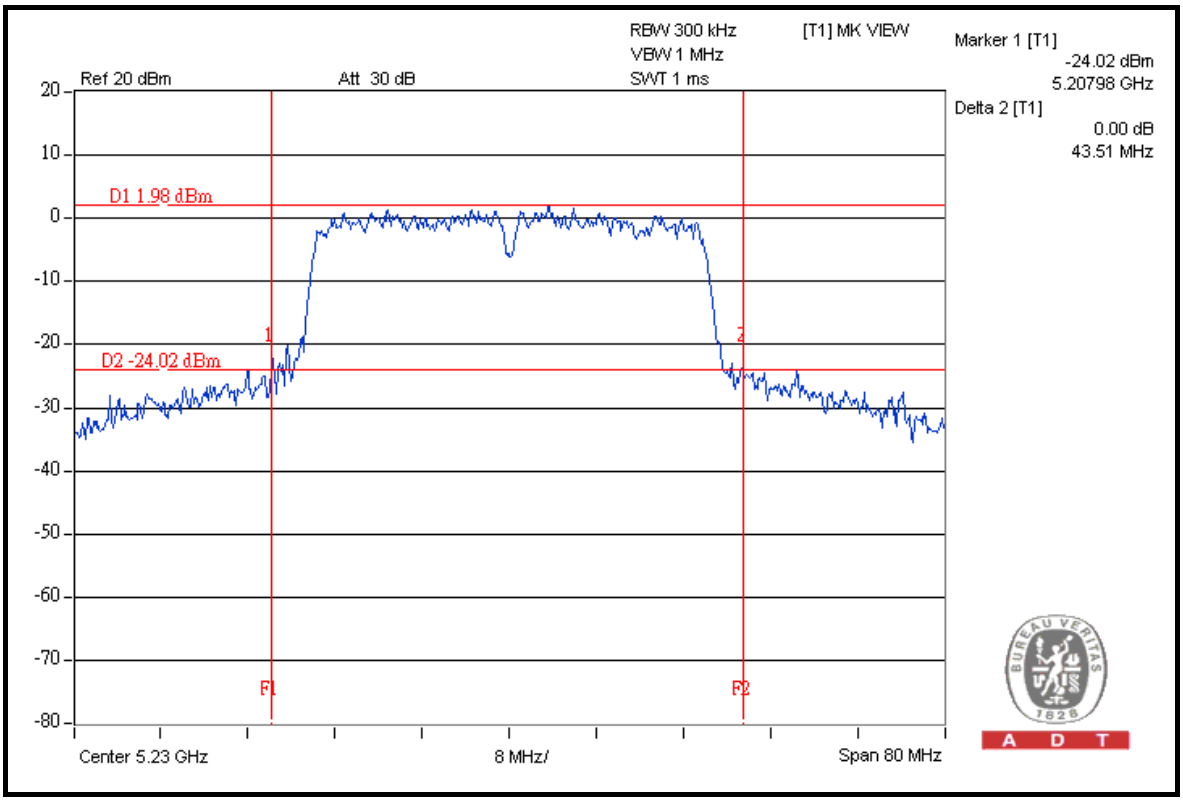
MODULATION TYPE	BPSK	**TRANSFER RATE**	15.0Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg.C, 64%RH, 1021hPa
TESTED BY	Sun Lin		

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc OCCUPIED BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	41.82	39.42	PASS
46	5230	43.51	41.88	PASS

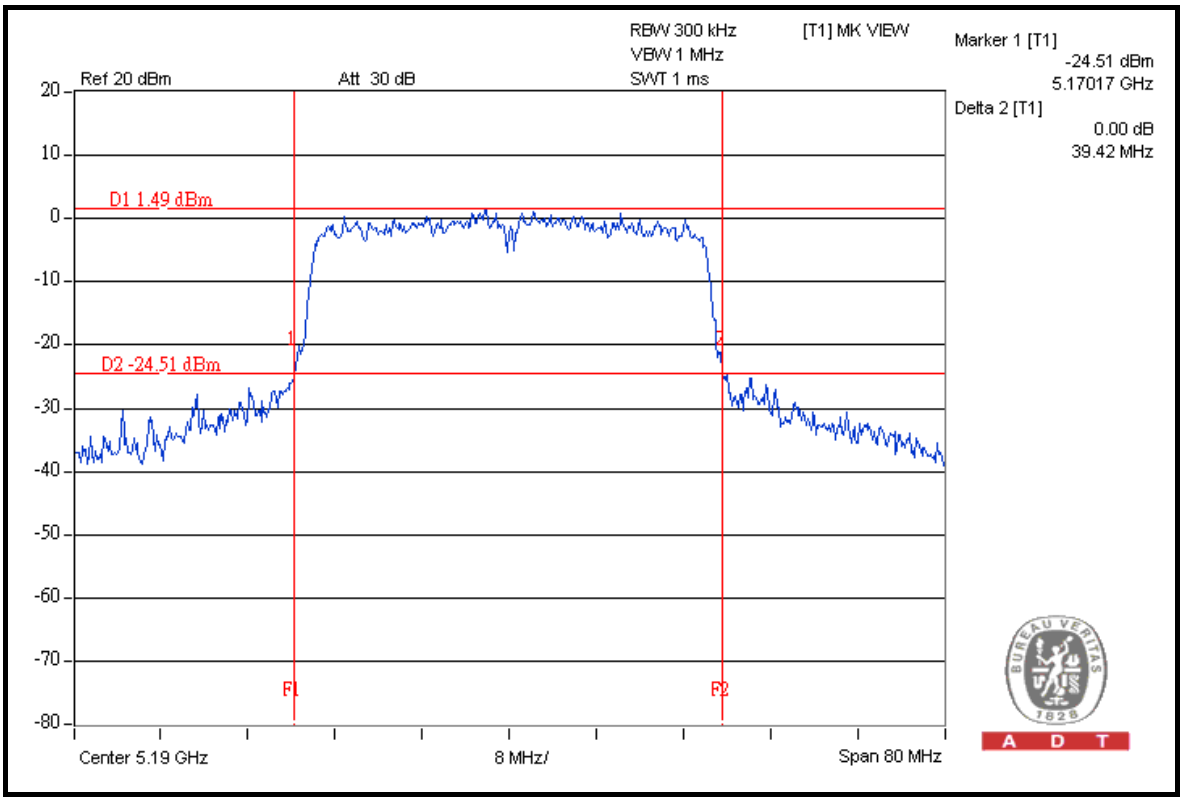
FOR CHAIN 0: CH 38



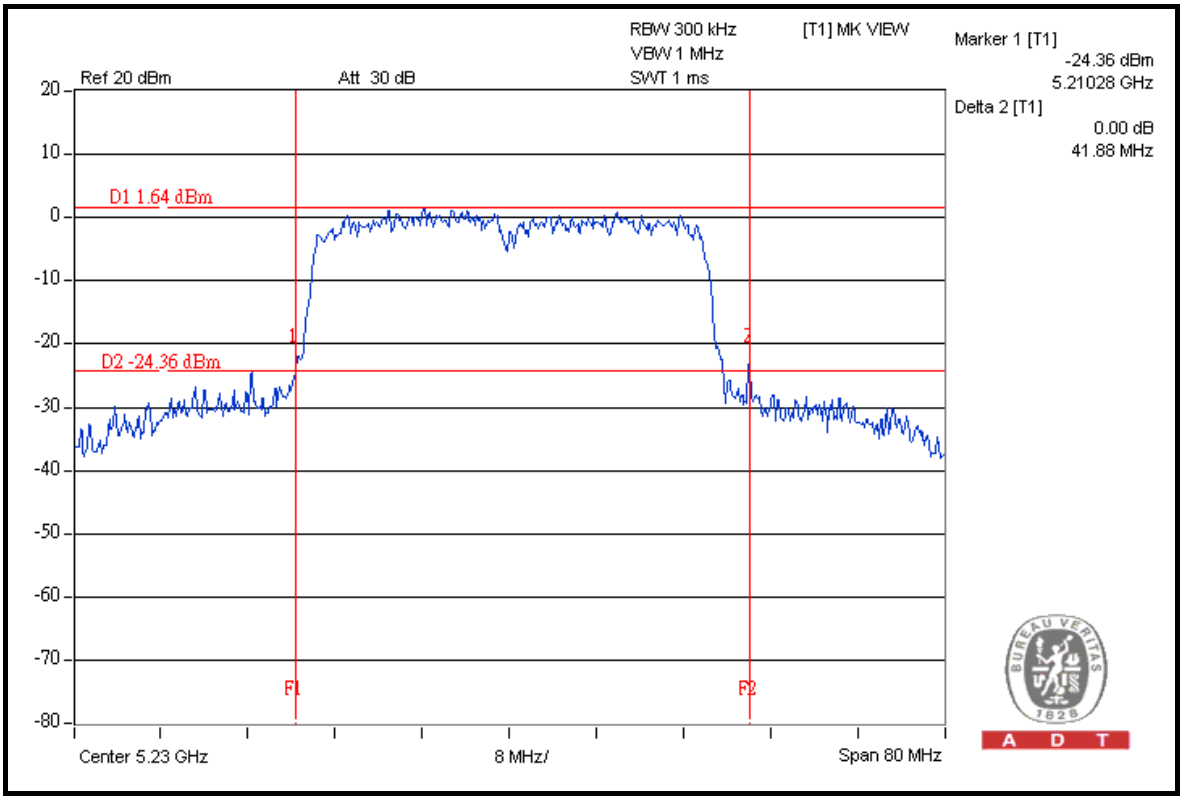
CH 46



FOR CHAIN 1: CH 38



CH 46



4.4 PEAK POWER EXCURSION MEASUREMENT

4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

FREQUENCY BAND	LIMIT
5.15 ~ 5.25GHz	13dB

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100040	Jul. 07, 2009	Jul. 06, 2010

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

4.4.3 TEST PROCEDURE

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

b. Set the spectrum bandwidth span to view the entire spectrum.

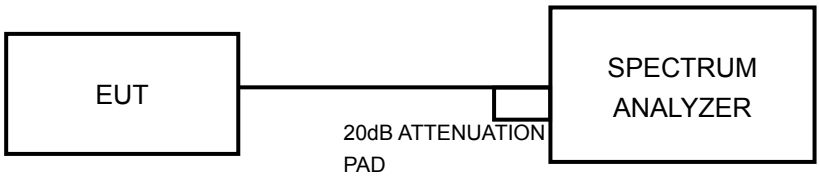
c. Using peak detector and Max-hold function for Trace 1 (RB = 1MHz, VB = 3MHz) and 2 (RB = 1MHz, VB = 300kHz).

d. The differences between Trace1 and Trace 2 in any 1MHz band at f1 to f2 range were recorded and showed to another trace.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

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

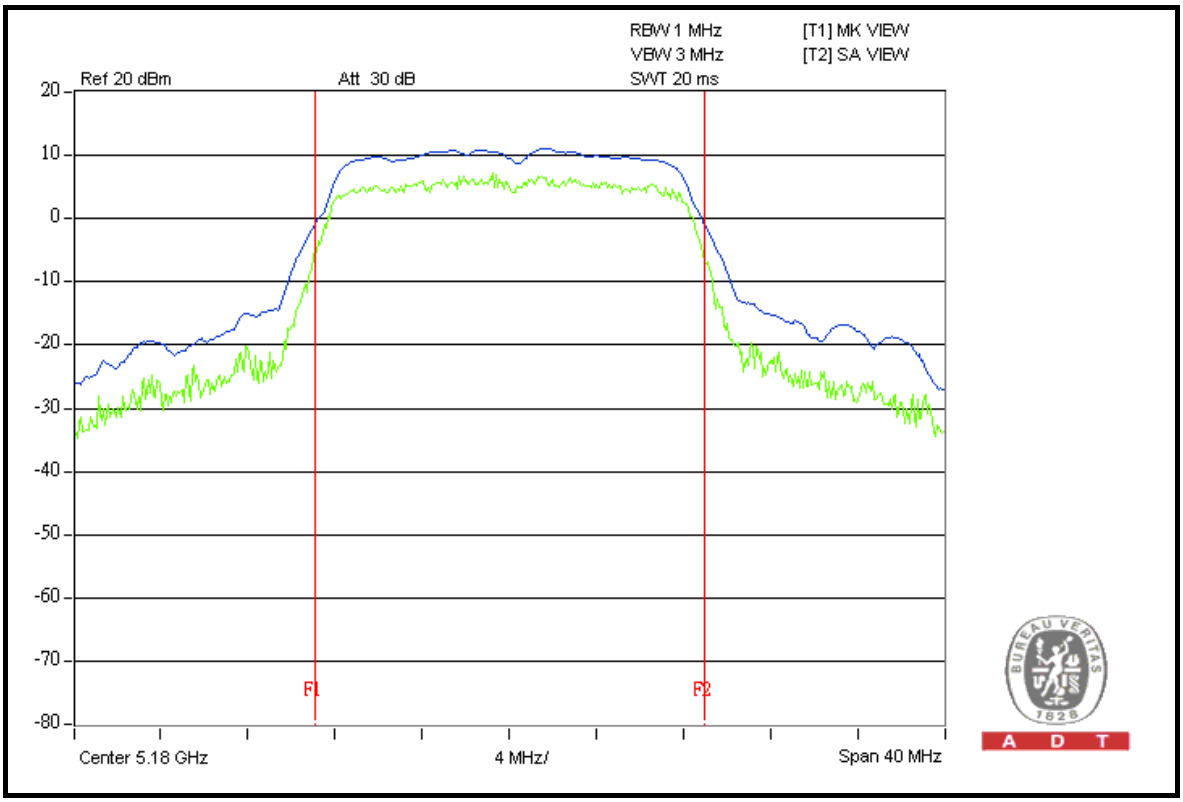
4.4.7 TEST RESULTS

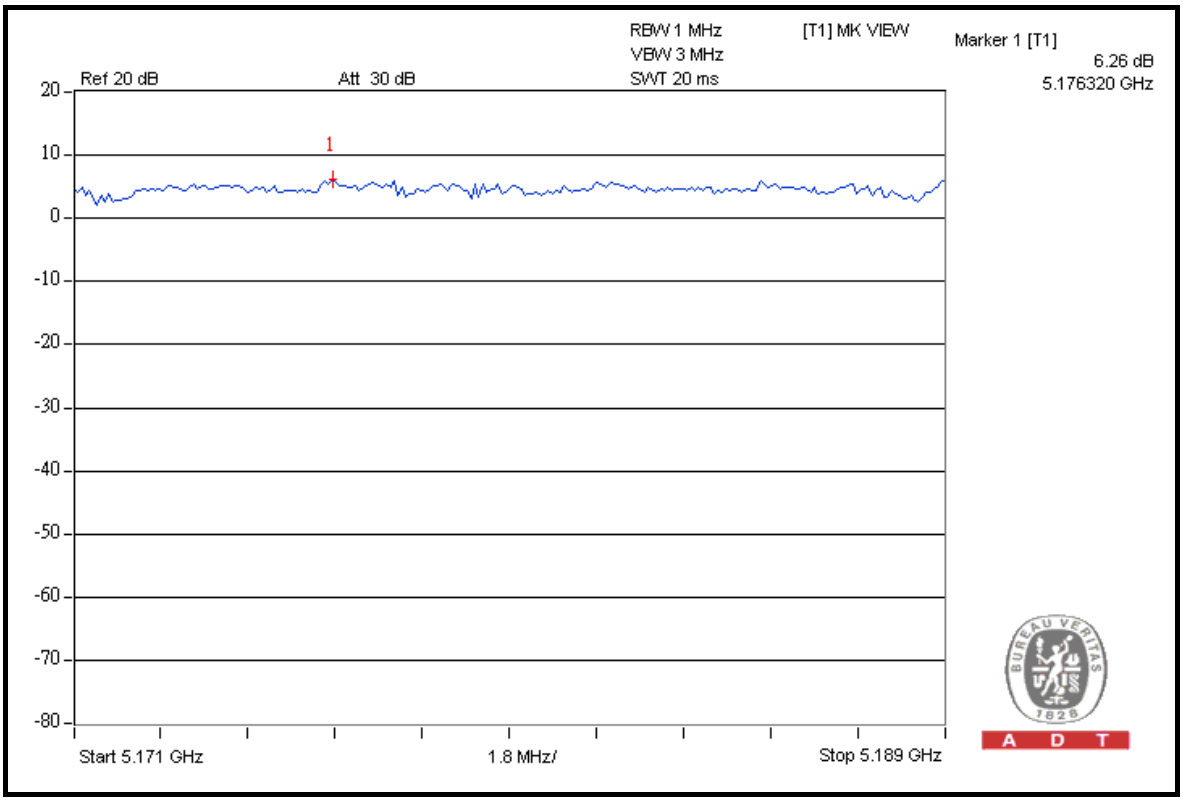
802.11a OFDM MODULATION

MODULATION TYPE	BPSK	TRANSFER RATE	6.0Mbps
INPUT POWER	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 1021hPa
TESTED BY	Sun Lin		

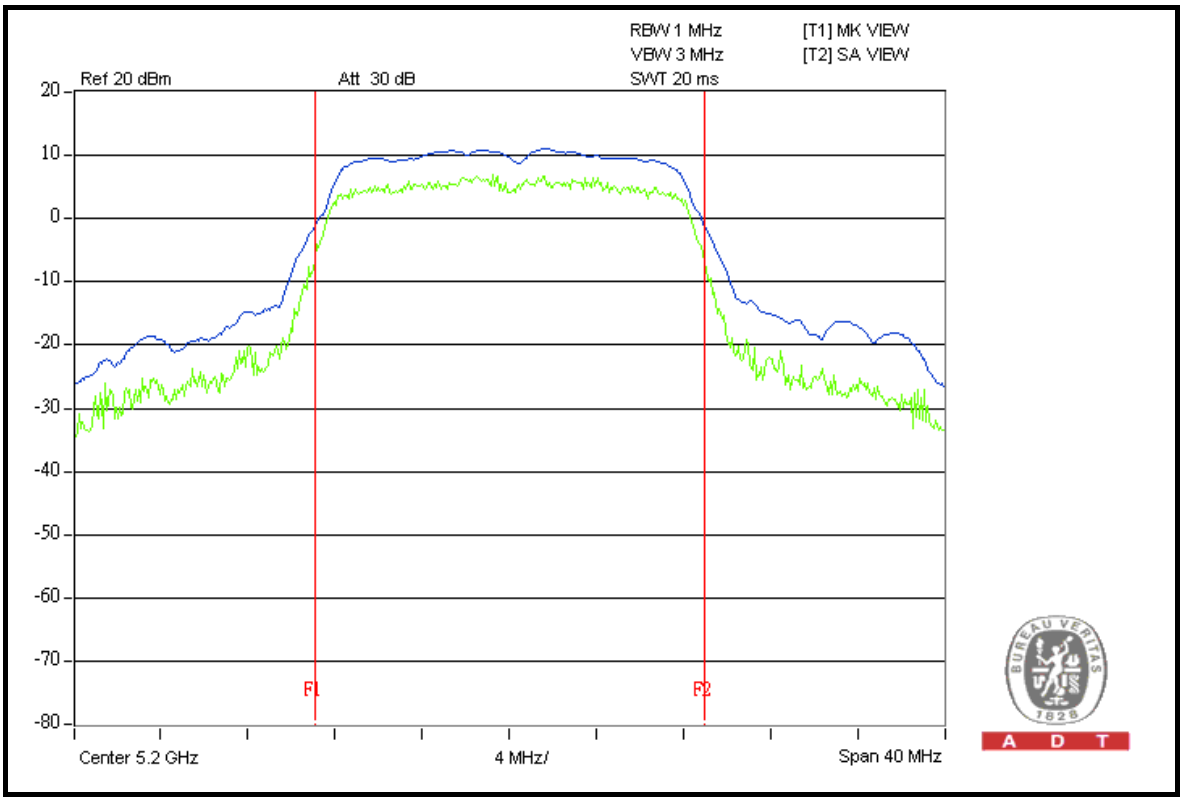
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)		PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
		CHAIN 0	CHAIN 1		
36	5180	6.26	6.22	13	PASS
40	5200	6.31	6.17	13	PASS
48	5240	6.49	7.51	13	PASS

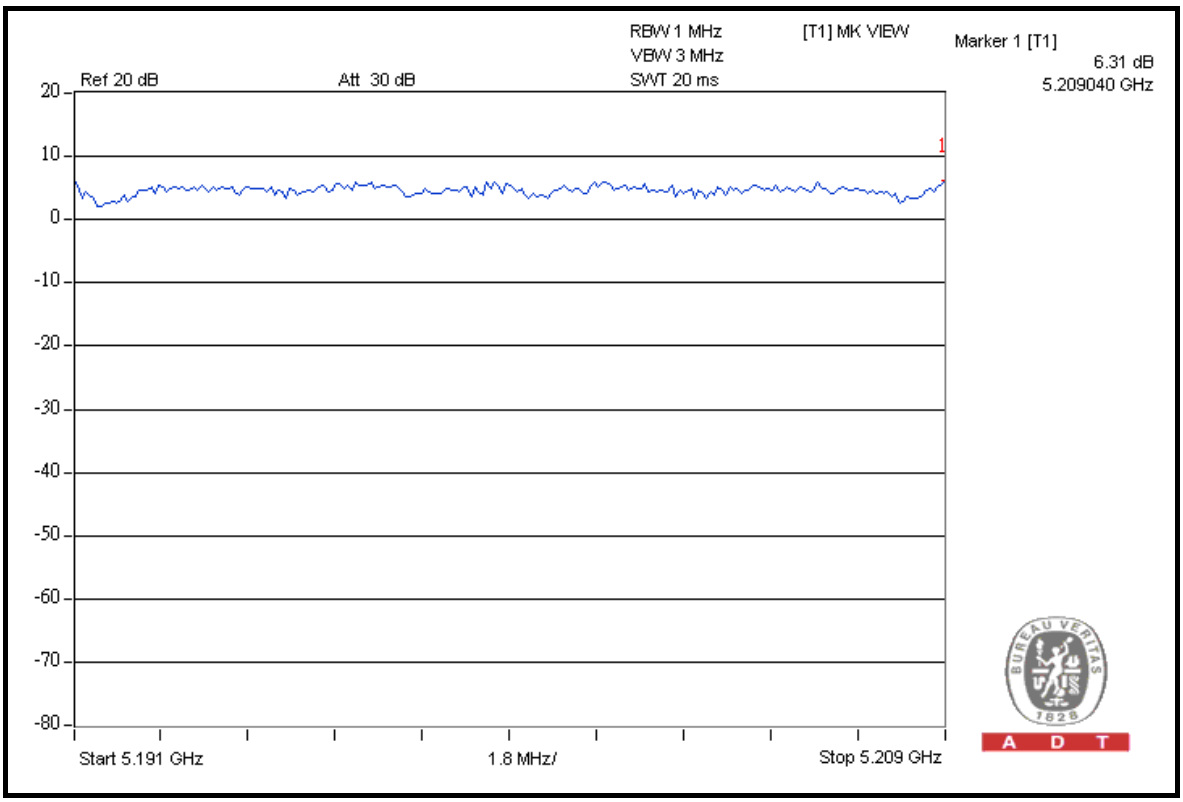
FOR CHAIN 0: CH 36



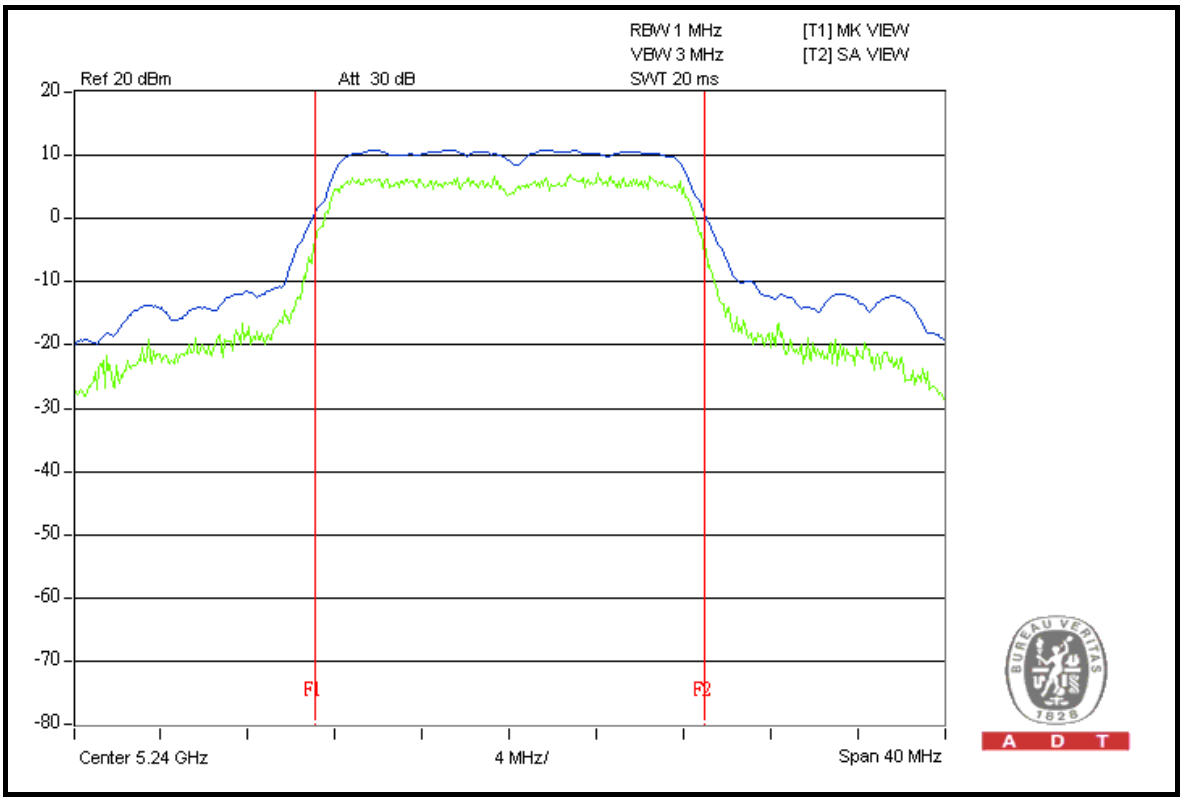


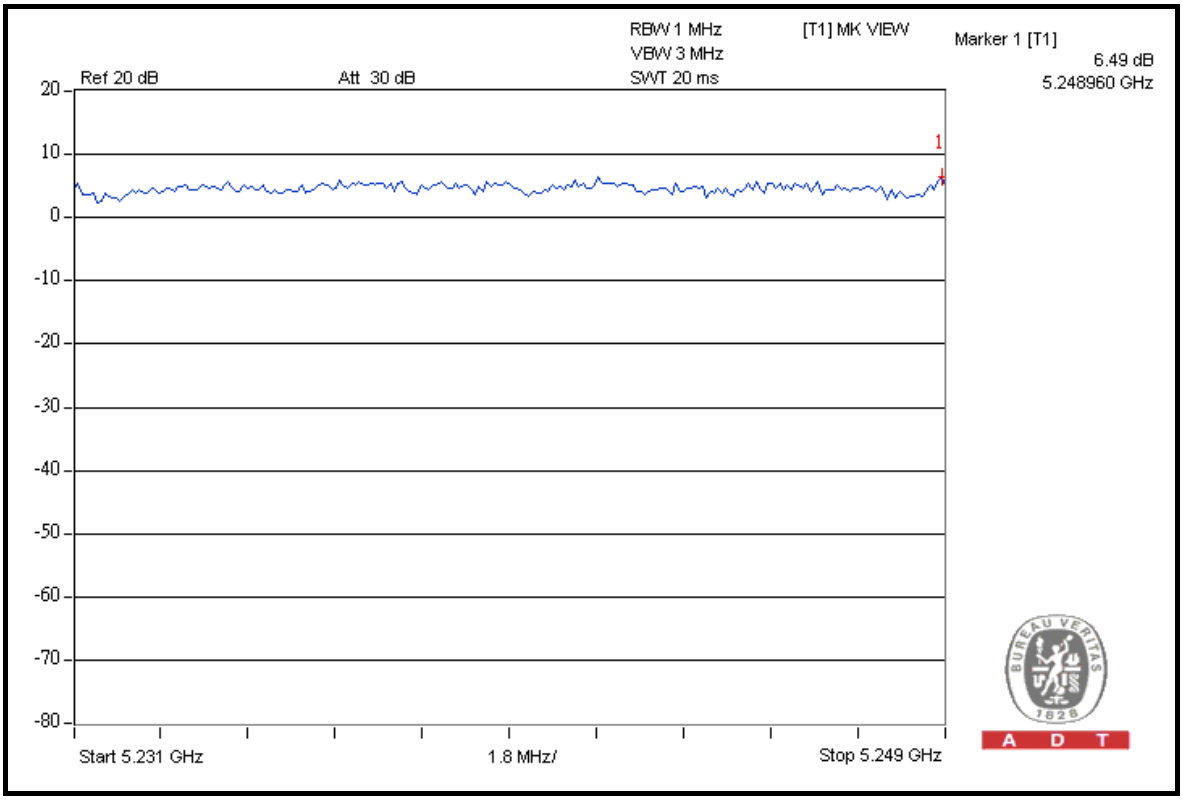
CH 40


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
[T2] SA VIEW
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.2 GHz
4 MHz/
Span 40 MHz

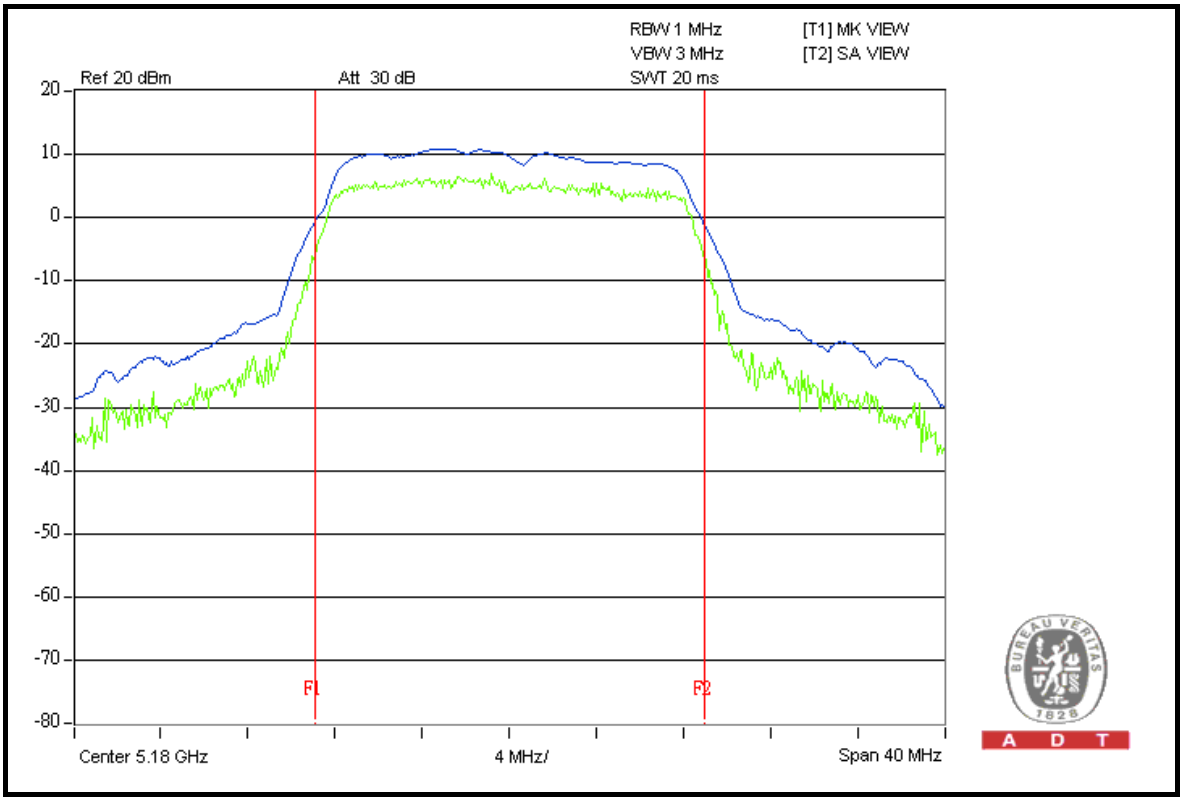

RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
6.31 dB
5.209040 GHz
Ref 20 dB
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 5.191 GHz
1.8 MHz/
Stop 5.209 GHz

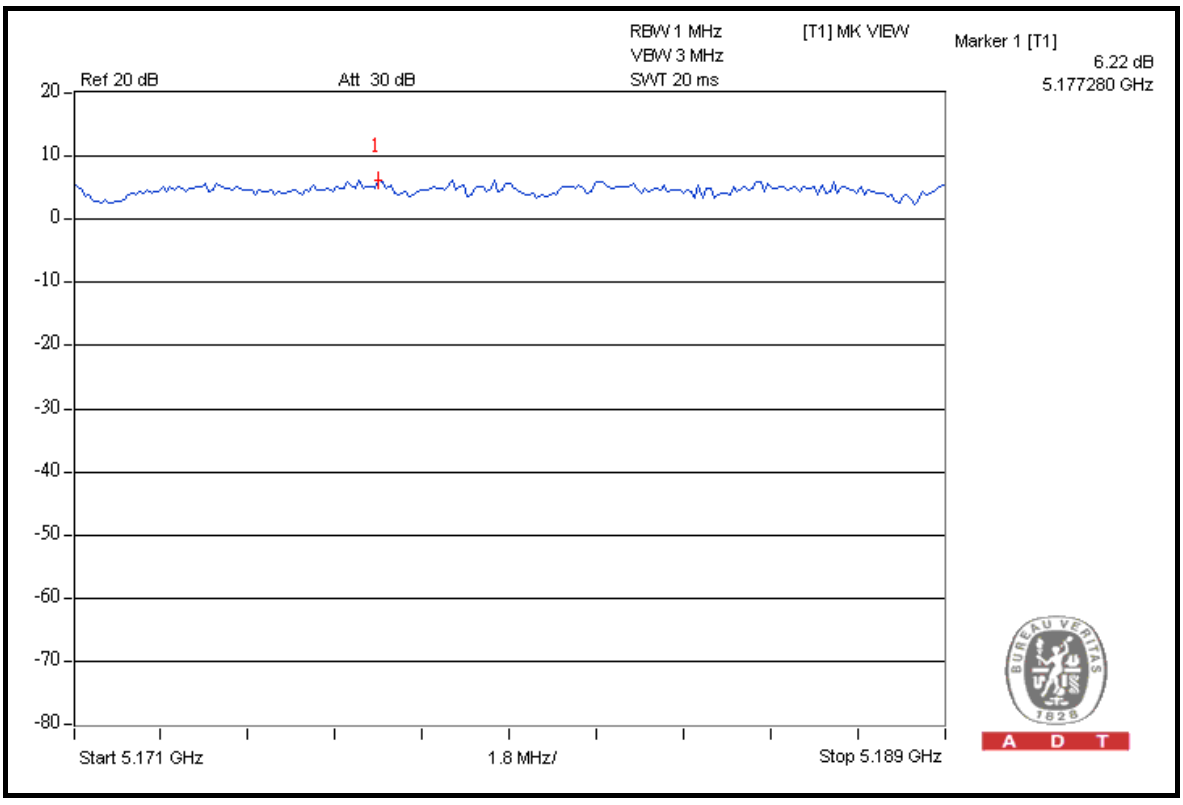
CH 48


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
[T2] SA VIEW
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.24 GHz
4 MHz/
Span 40 MHz

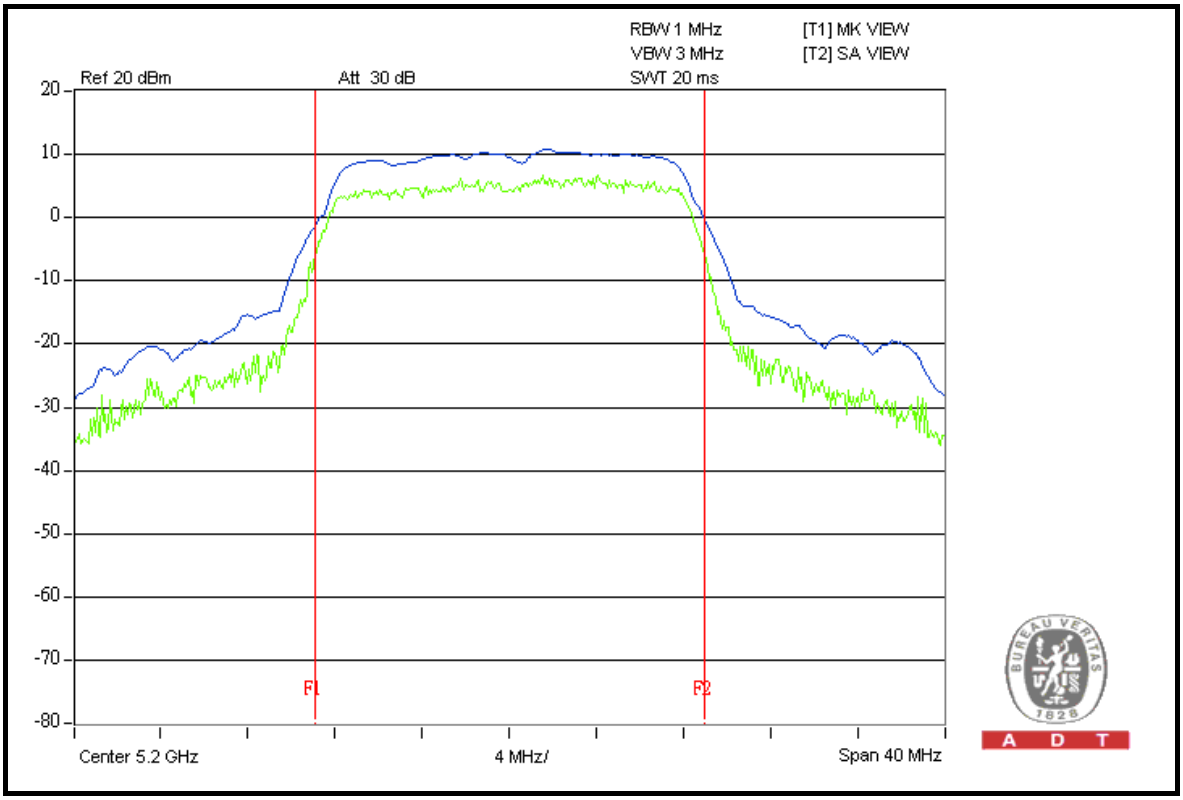

RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
6.49 dB
5.248960 GHz
Ref 20 dB
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 5.231 GHz
1.8 MHz/
Stop 5.249 GHz

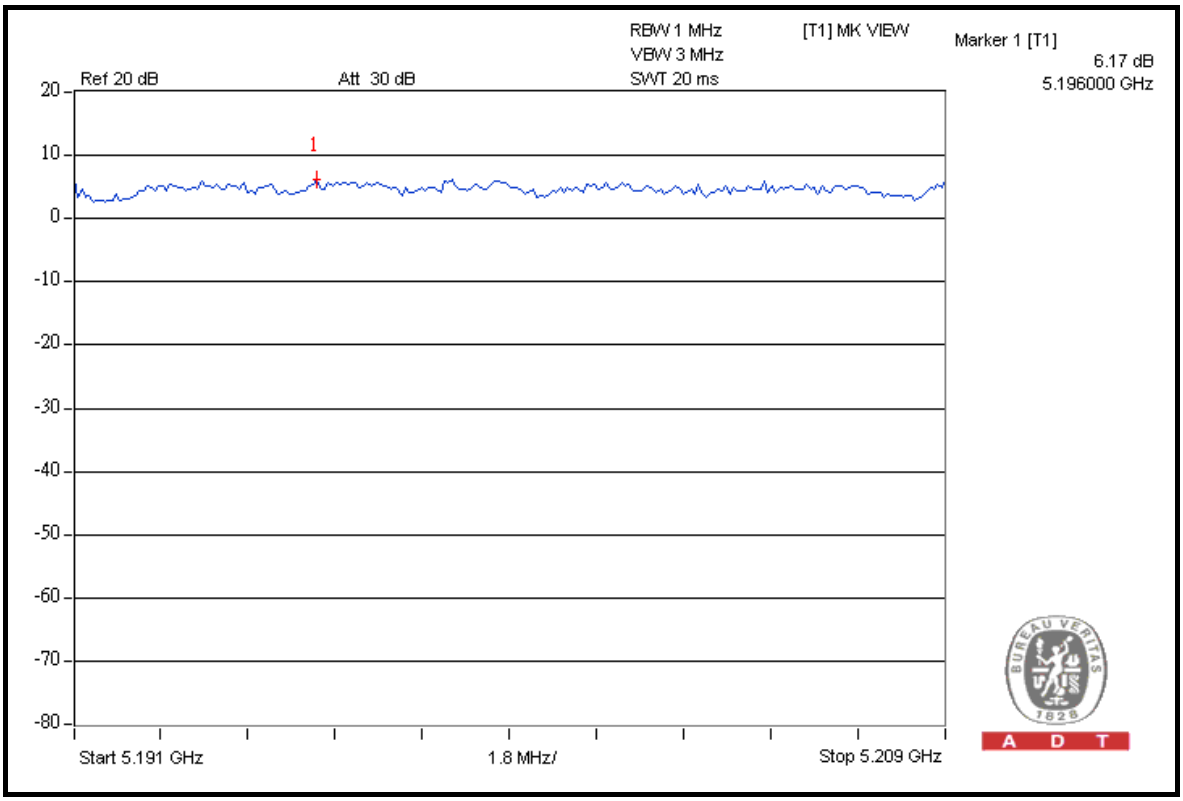
FOR CHAIN 1: CH 36



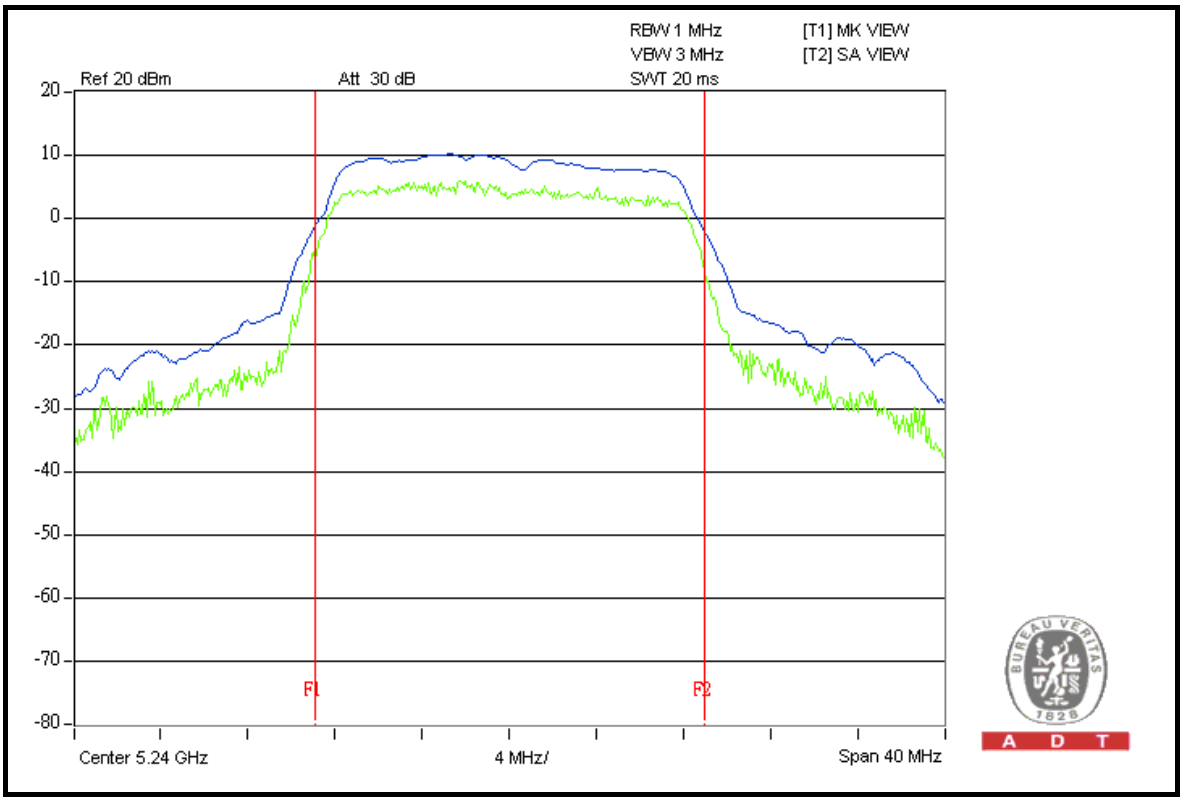


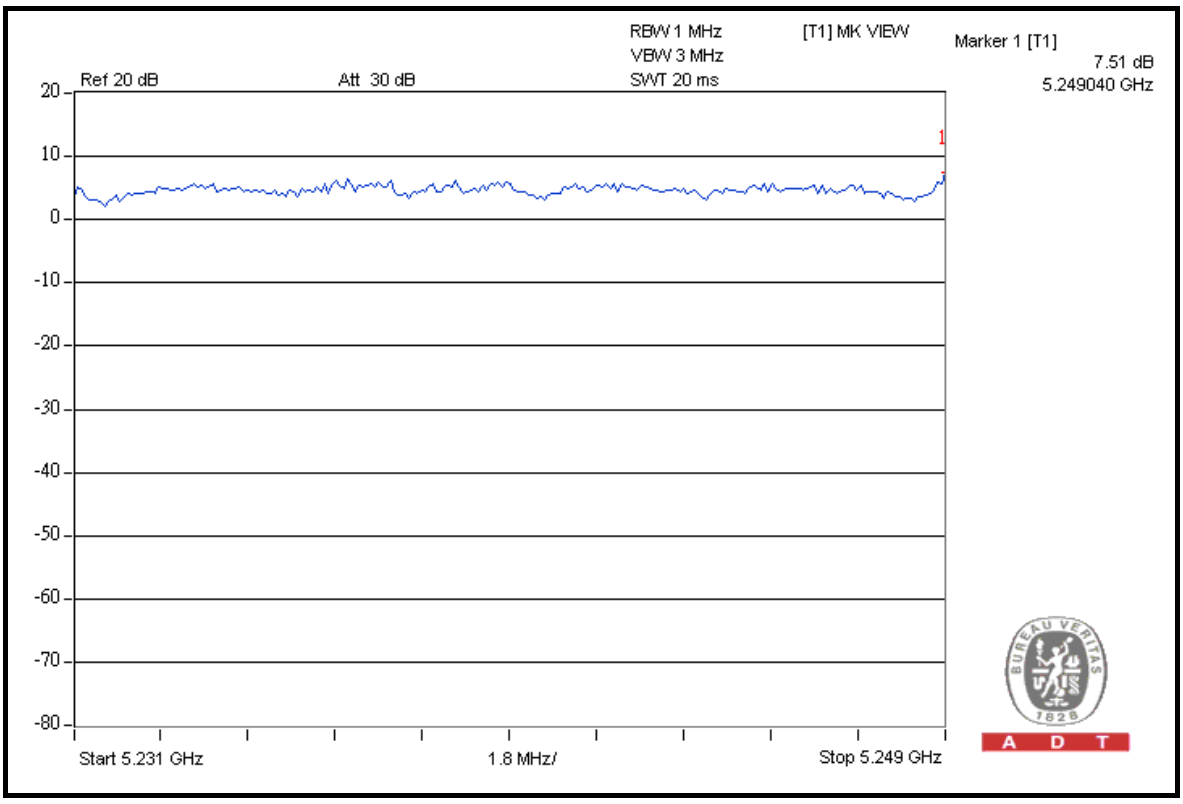
CH 40


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
[T2] SA VIEW
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.2 GHz
4 MHz/
Span 40 MHz


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
6.17 dB
5.196000 GHz
Ref 20 dB
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 5.191 GHz
1.8 MHz/
Stop 5.209 GHz

CH 48


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
[T2] SA VIEW
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.24 GHz
4 MHz/
Span 40 MHz

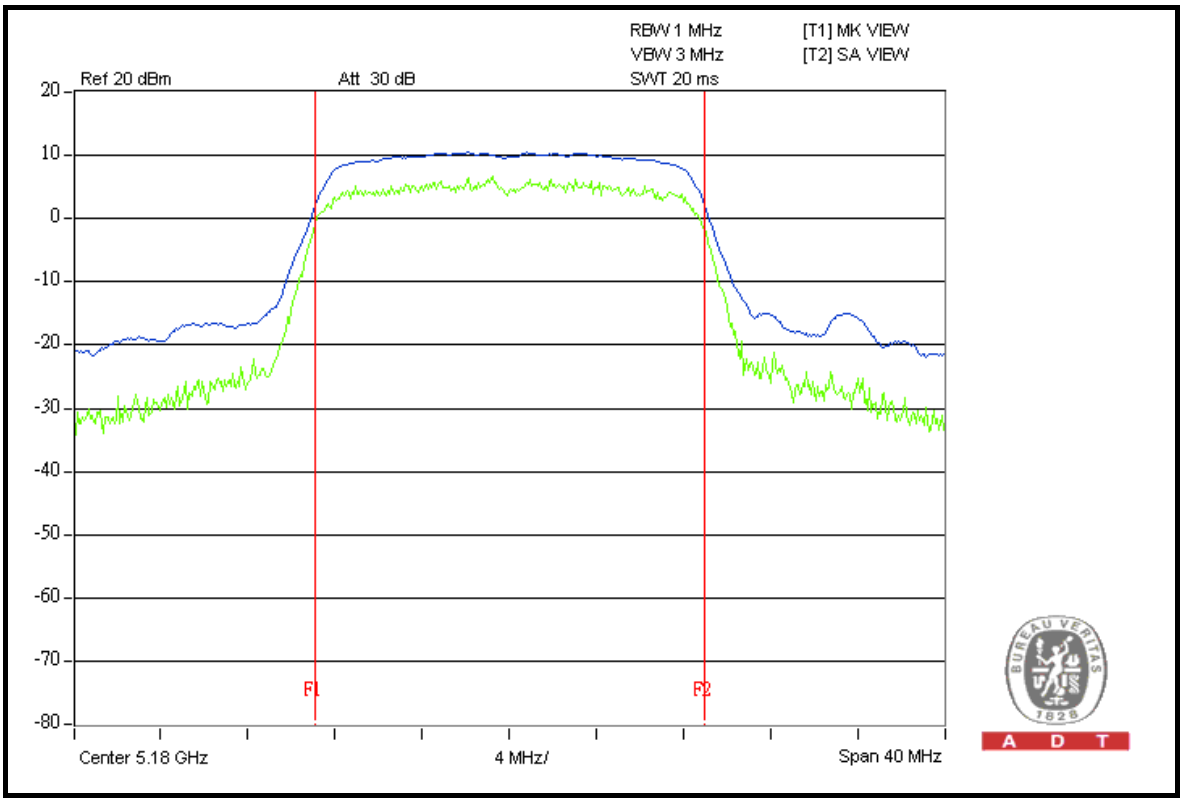

RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
7.51 dB
5.249040 GHz
Ref 20 dB
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 5.231 GHz
1.8 MHz/
Stop 5.249 GHz

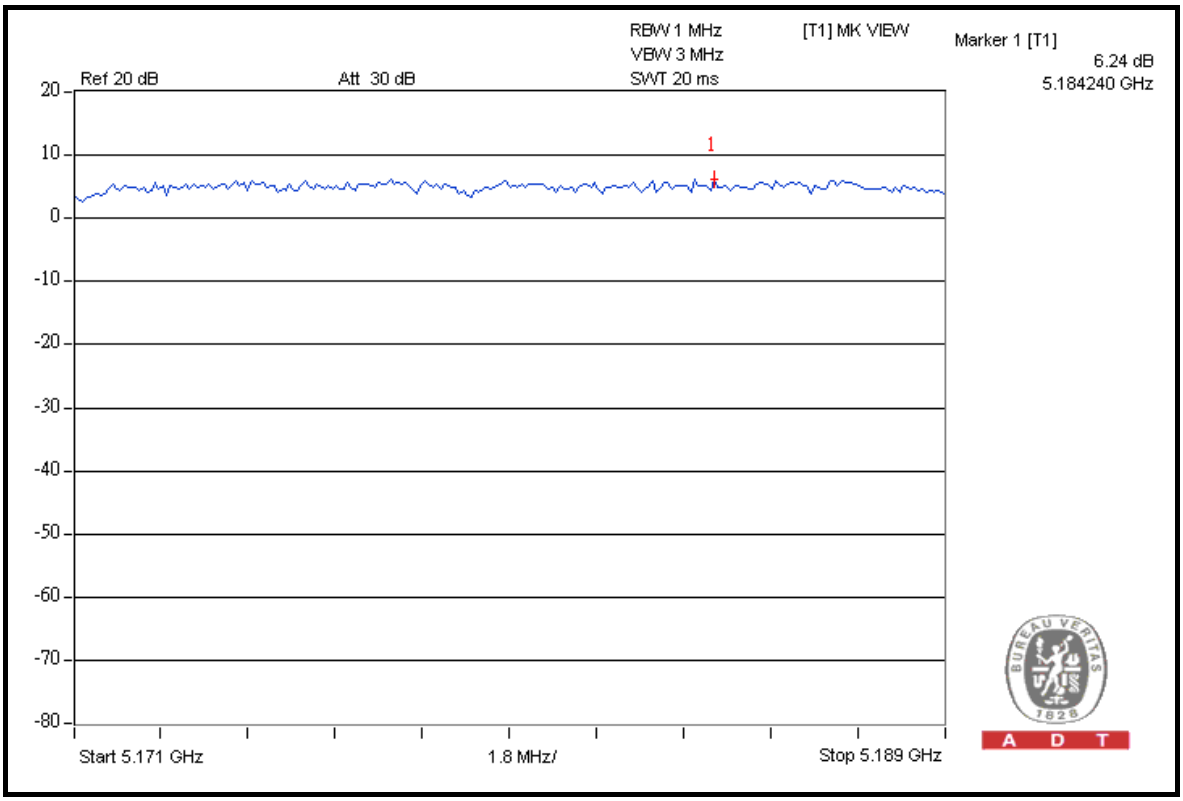
DRAFT 802.11n (20MHz) OFDM MODULATION

MODULATION TYPE	BPSK	**TRANSFER RATE**	7.2Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg.C, 64%RH, 1021hPa
TESTED BY	Sun Lin		

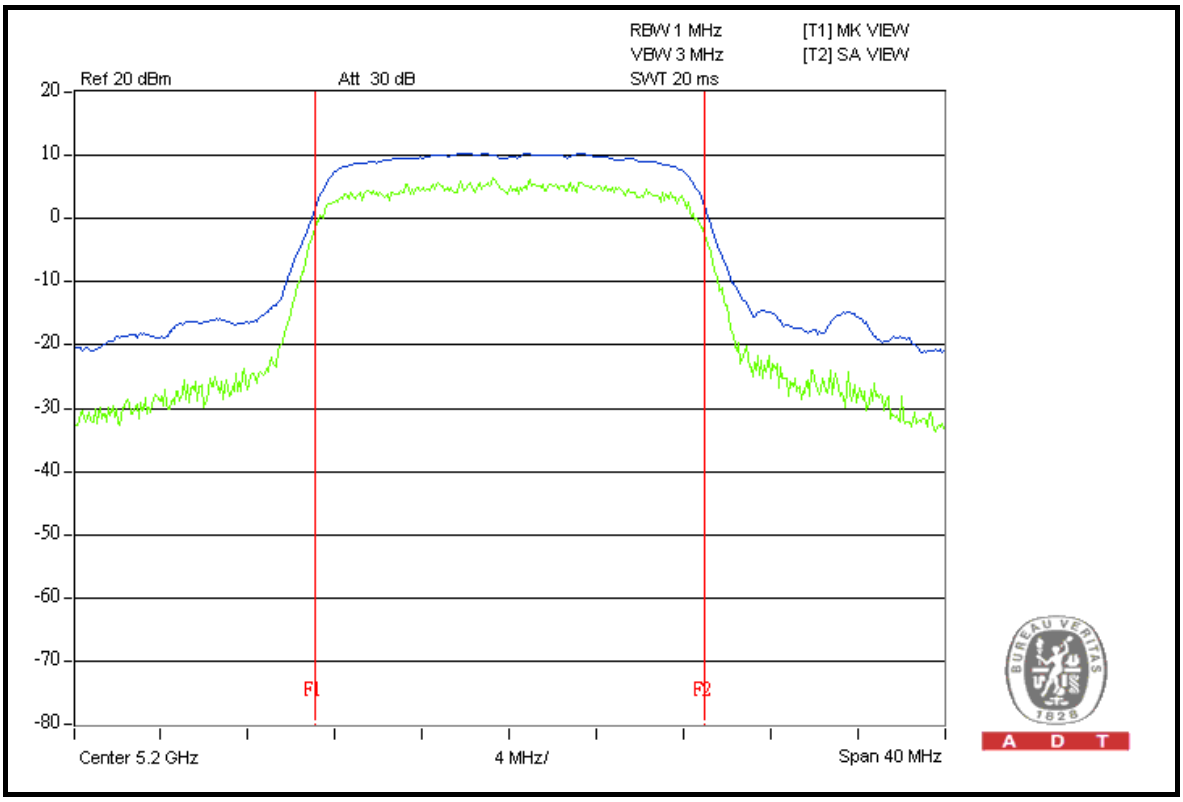
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)		PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
		CHAIN 0	CHAIN 1		
36	5180	6.24	6.35	13	PASS
40	5200	6.31	6.18	13	PASS
48	5240	6.30	6.28	13	PASS

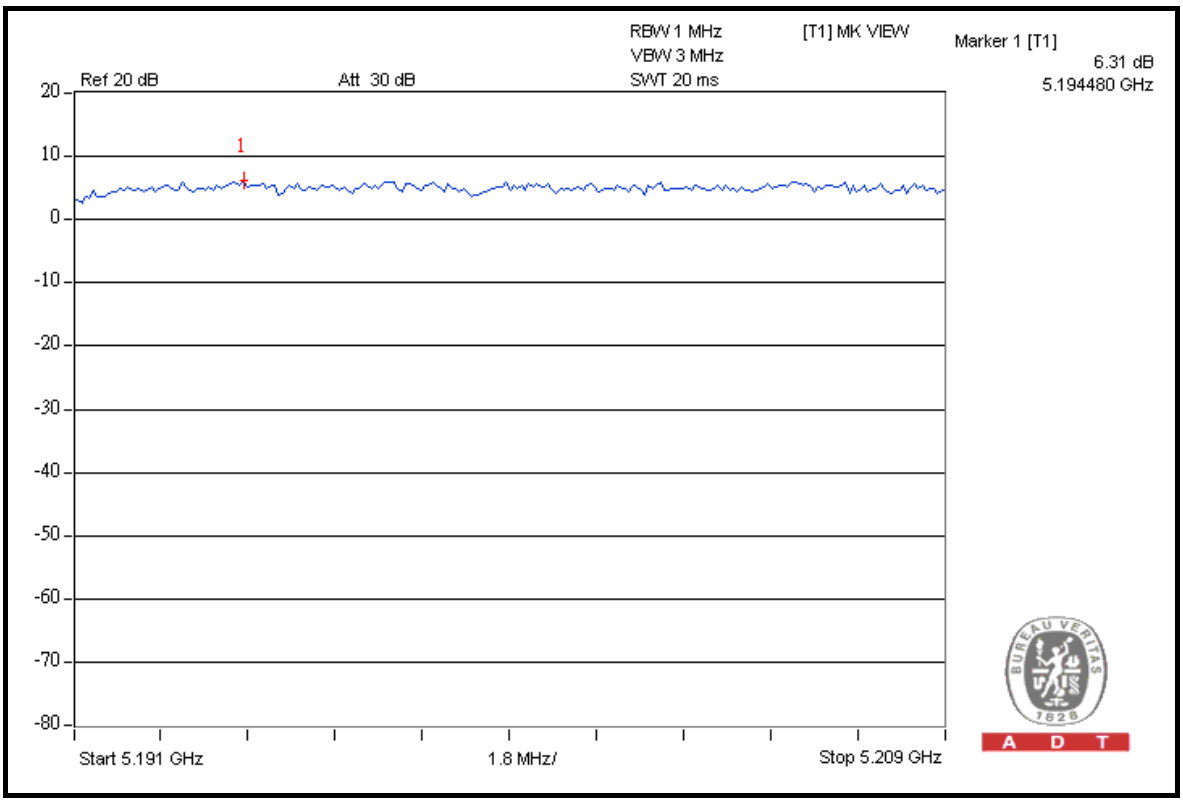
FOR CHAIN 0: CH 36



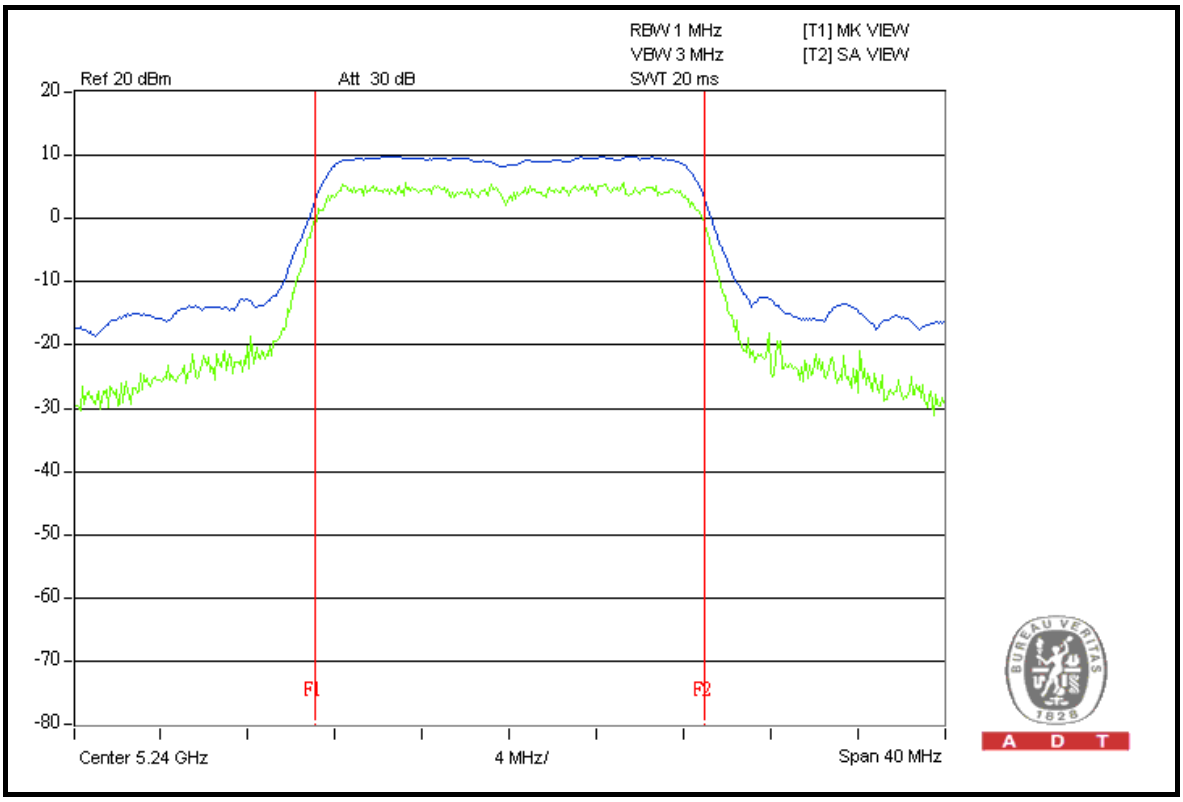


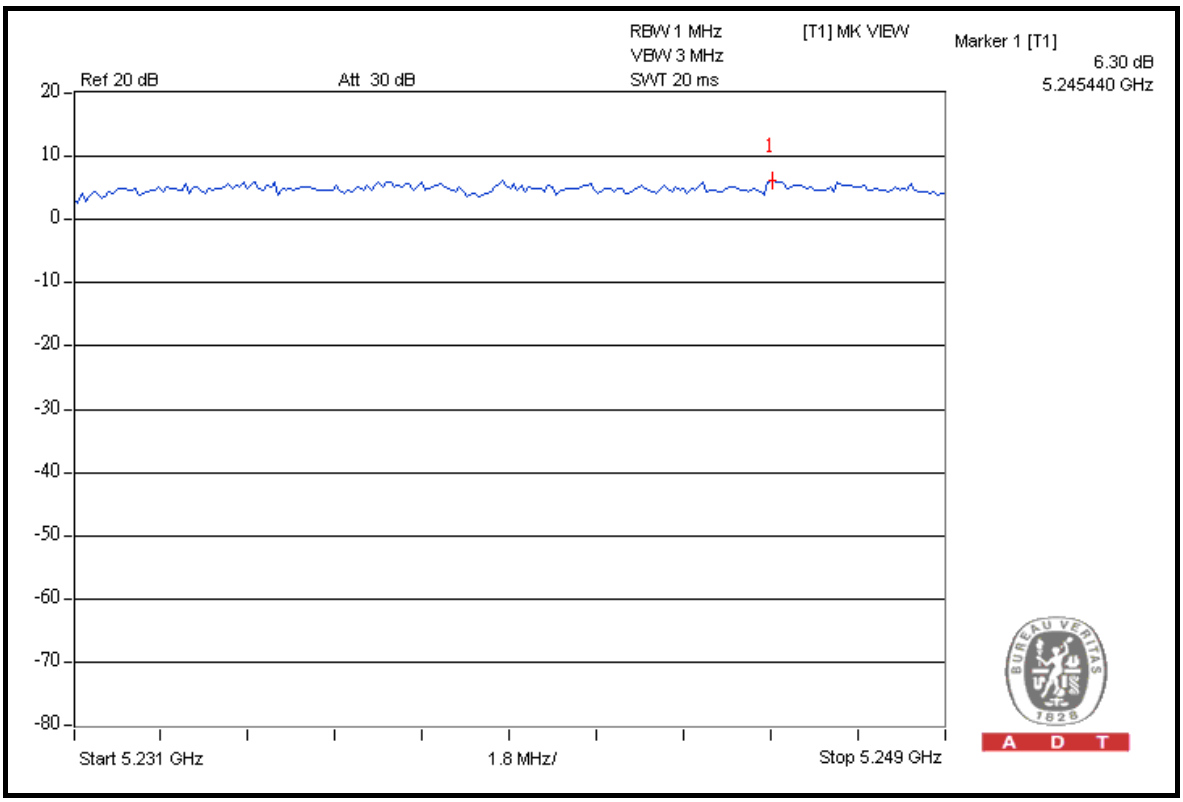
CH 40


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
[T2] SA VIEW
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.2 GHz
4 MHz/
Span 40 MHz

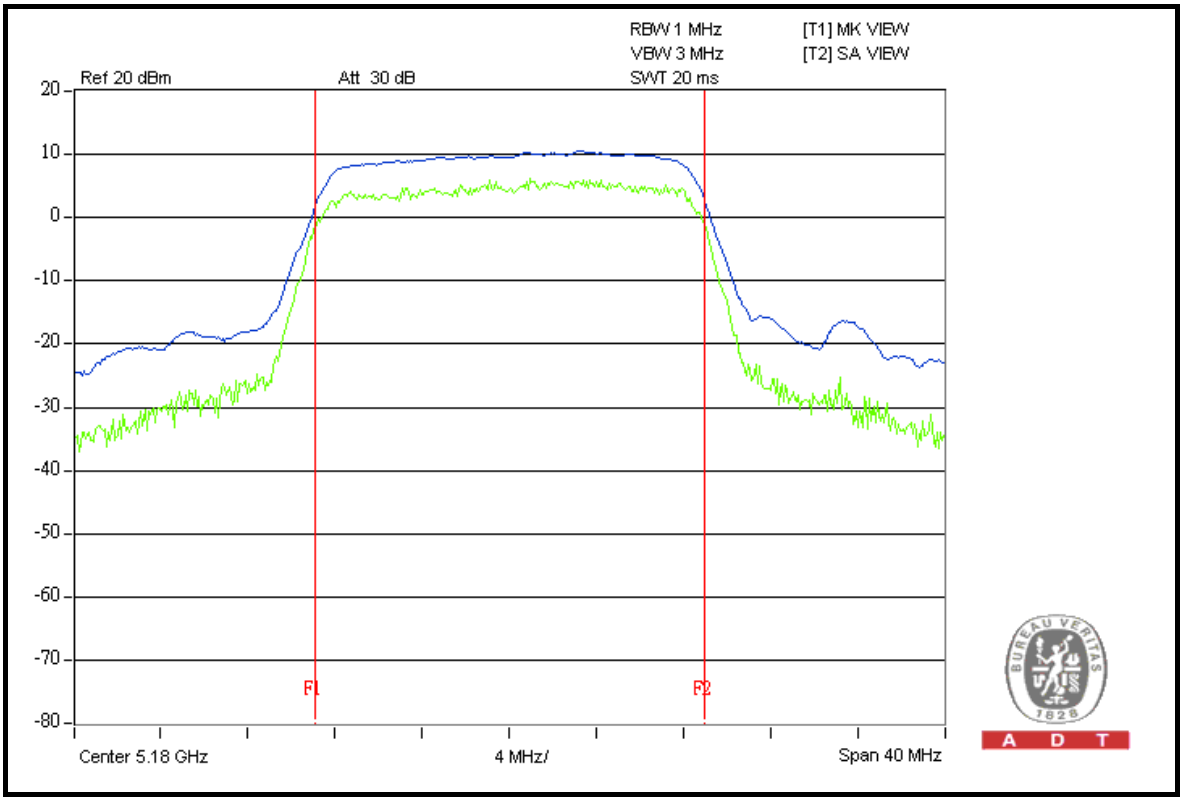

RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
6.31 dB
5.194480 GHz
Ref 20 dB
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 5.191 GHz
1.8 MHz/
Stop 5.209 GHz

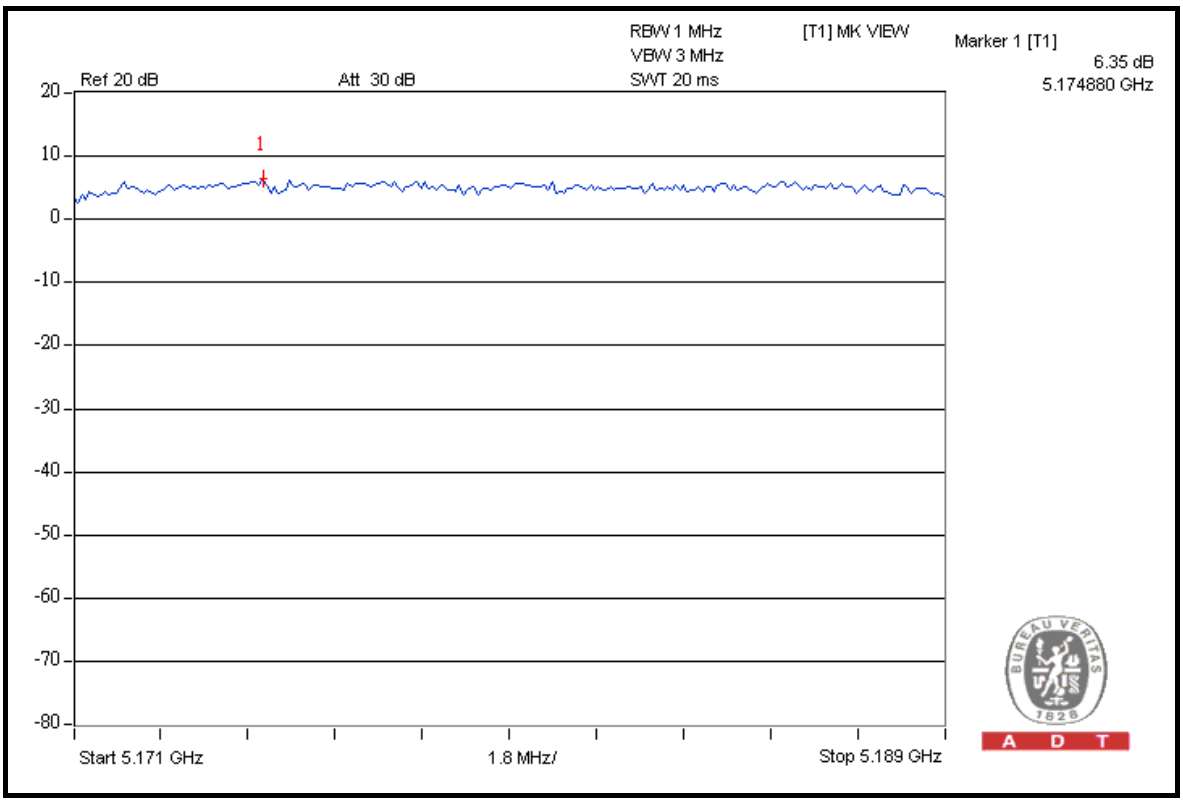
CH 48


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
[T2] SA VIEW
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.24 GHz
4 MHz/
Span 40 MHz

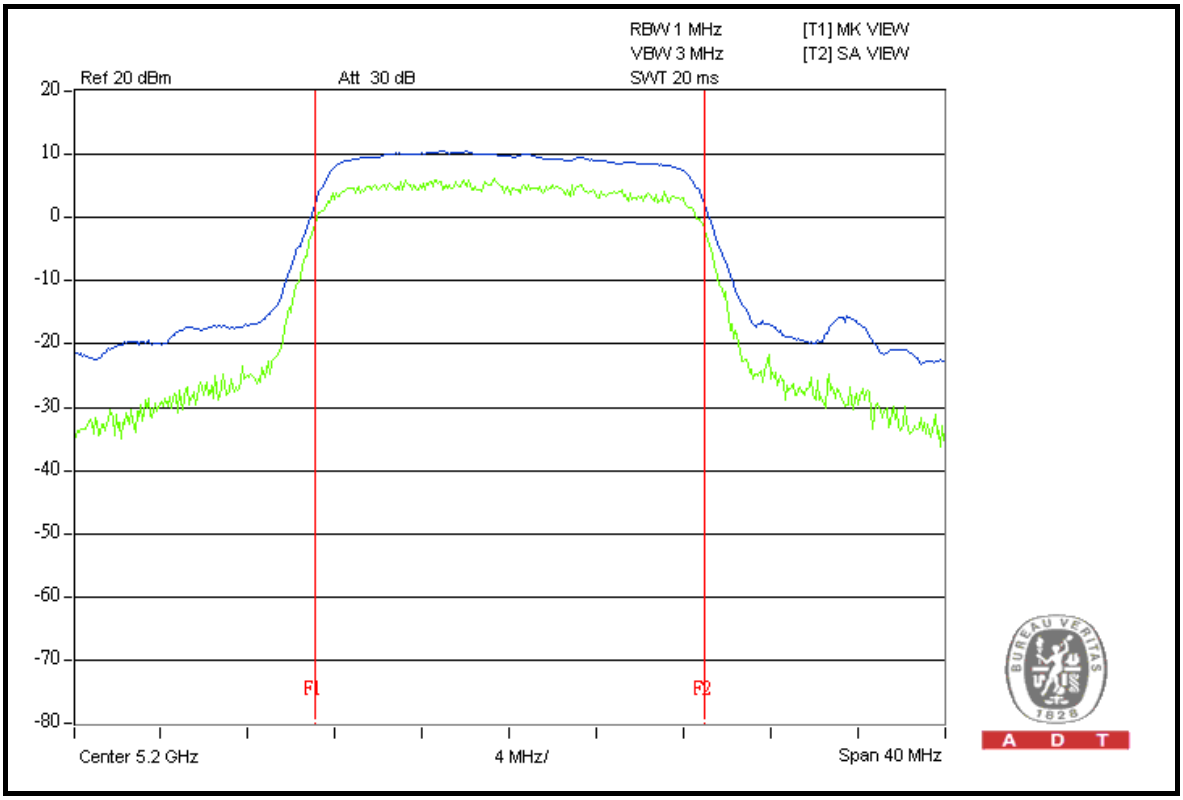

RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
6.30 dB
5.245440 GHz
Ref 20 dB
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 5.231 GHz
1.8 MHz/
Stop 5.249 GHz

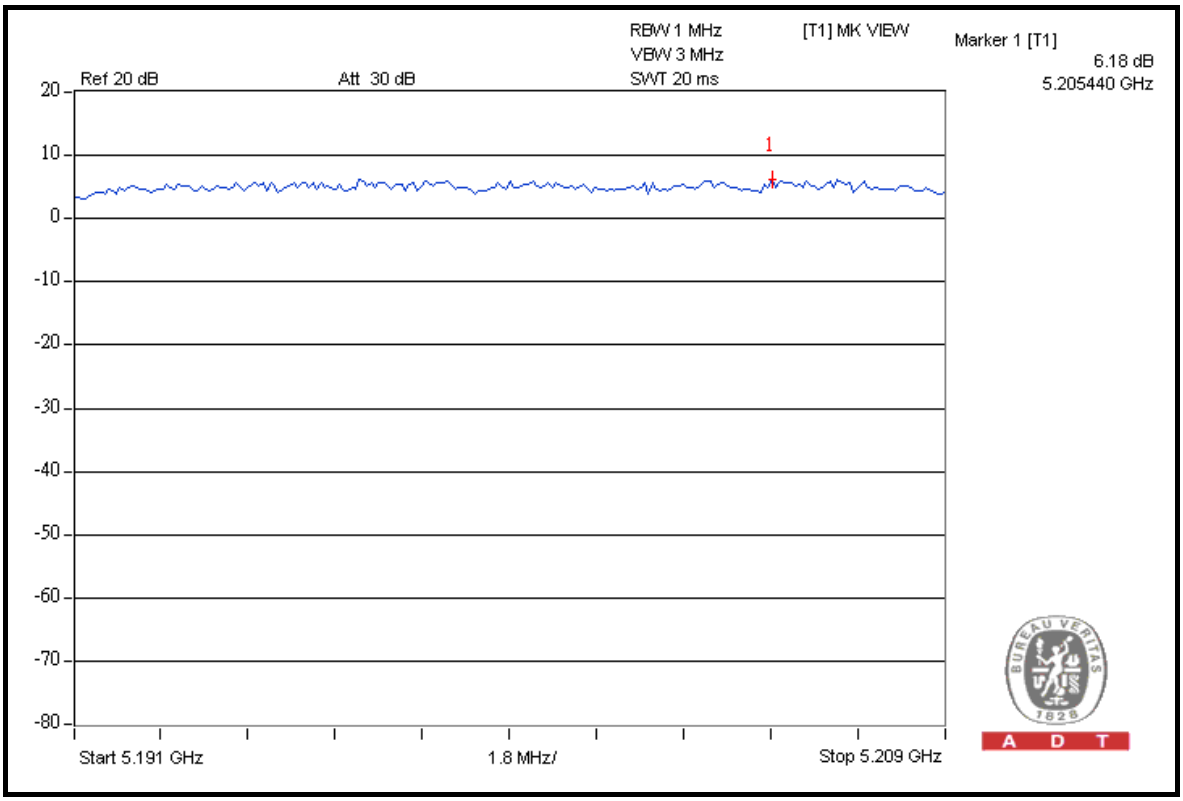
FOR CHAIN 1: CH 36



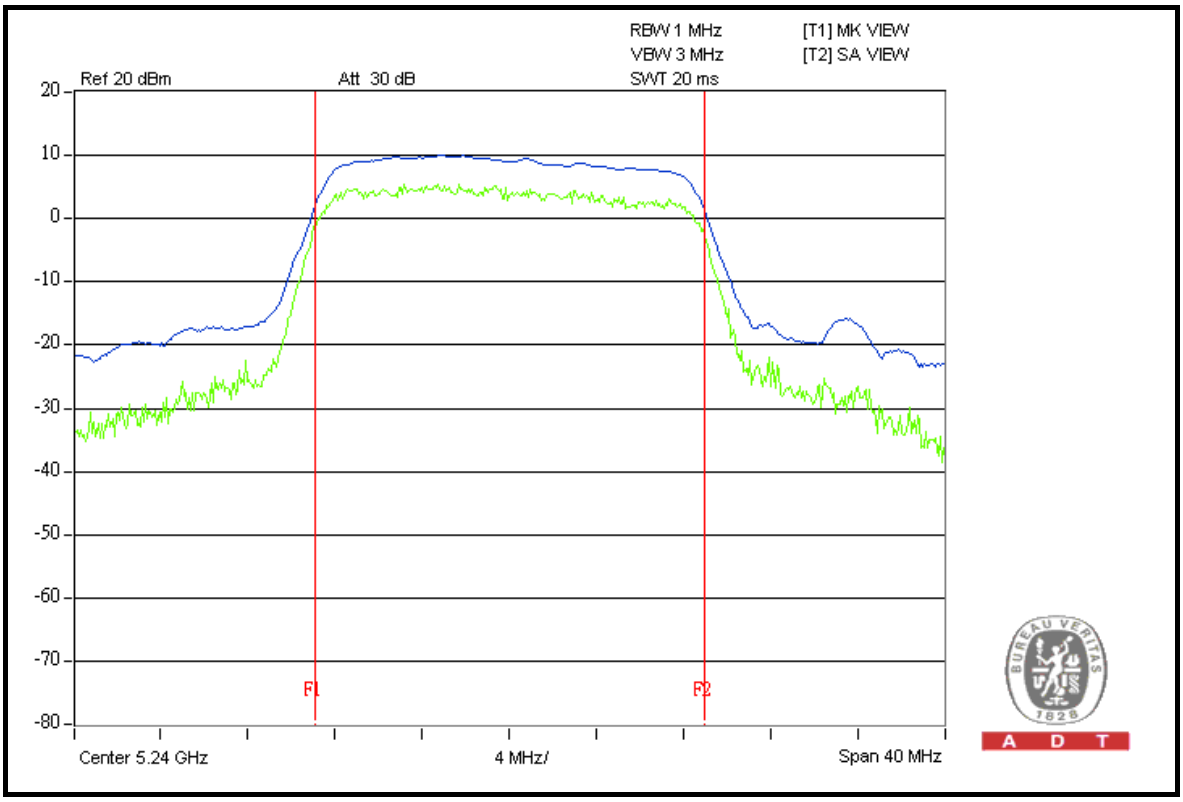


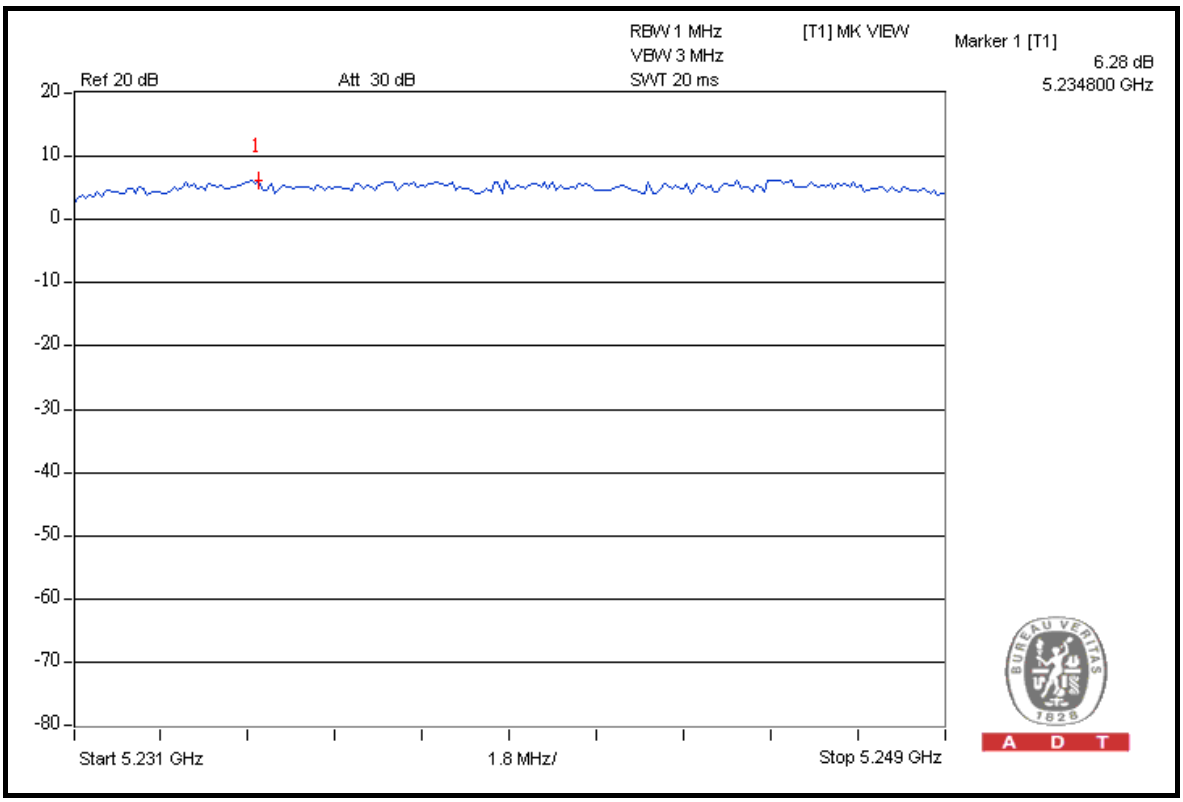
CH 40


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
[T2] SA VIEW
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.2 GHz
4 MHz/
Span 40 MHz


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
6.18 dB
5.205440 GHz
Ref 20 dB
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 5.191 GHz
1.8 MHz/
Stop 5.209 GHz

CH 48


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
[T2] SA VIEW
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.24 GHz
4 MHz/
Span 40 MHz

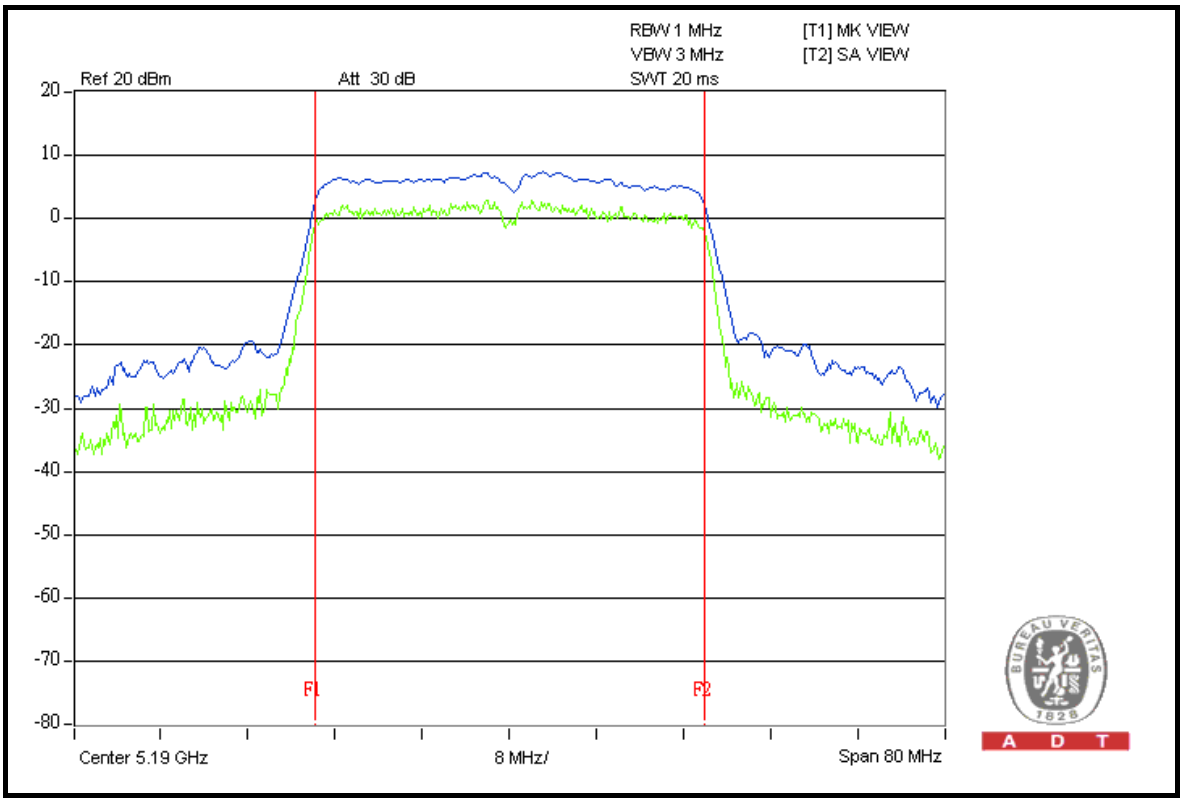

RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
6.28 dB
5.234800 GHz
Ref 20 dB
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 5.231 GHz
1.8 MHz/
Stop 5.249 GHz

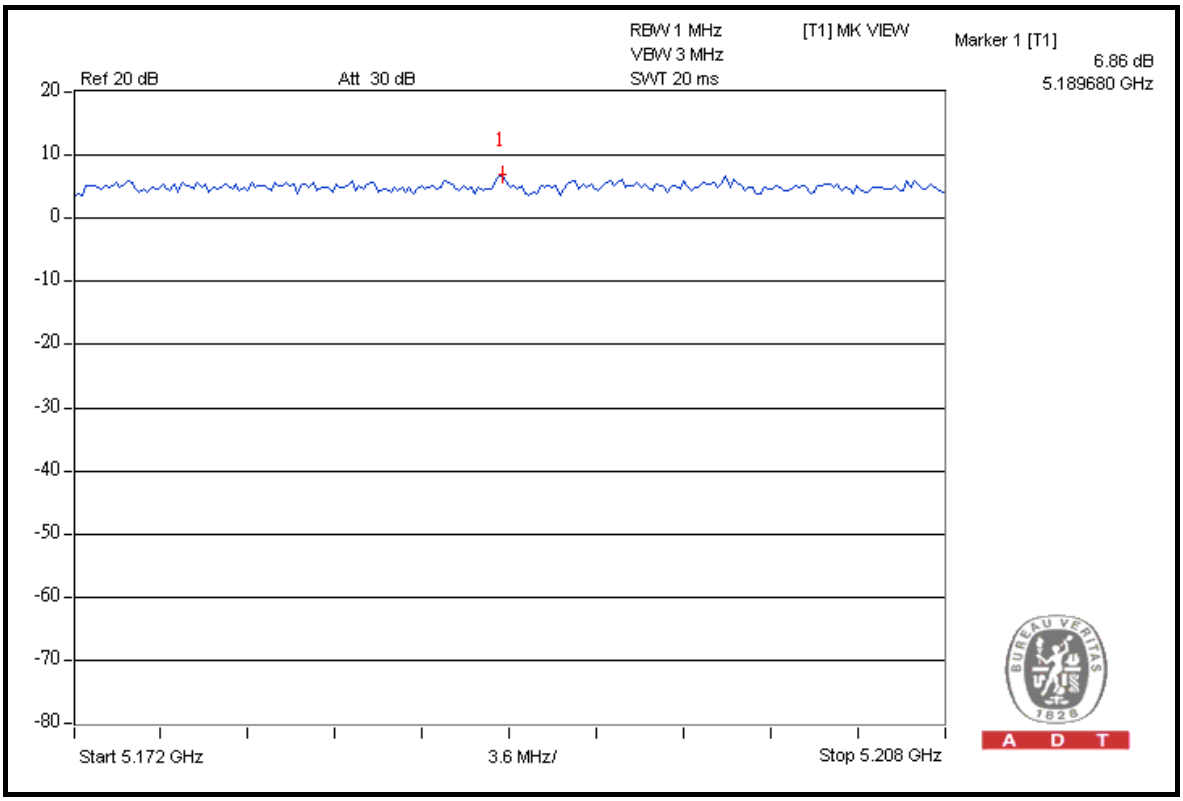
DRAFT 802.11n (40MHz) OFDM MODULATION

MODULATION TYPE	BPSK	**TRANSFER RATE**	15.0Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg.C, 64%RH, 1021hPa
TESTED BY	Sun Lin		

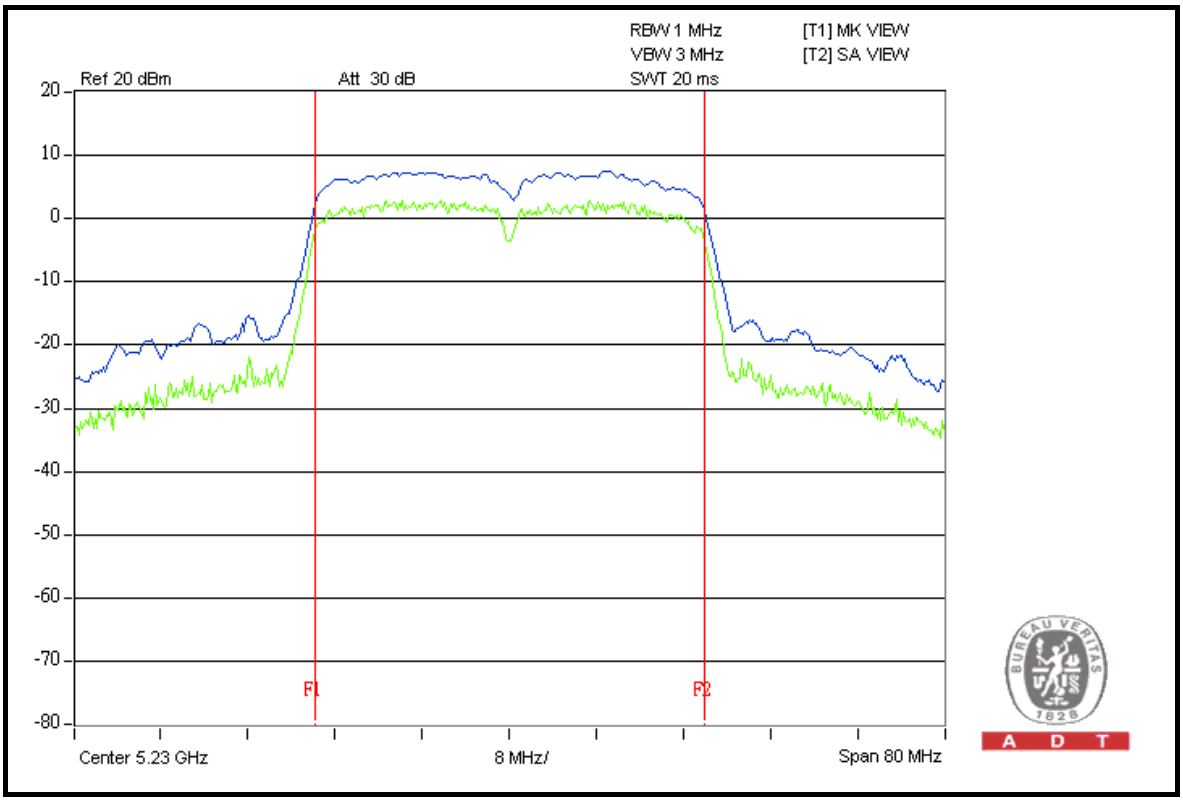
CHANNEL	**CHANNEL FREQUENCY (MHz)**	**PEAK POWER EXCURSION (dB)**		**PEAK to AVERAGE EXCURSION LIMIT (dB)**	**PASS/FAIL**
		CHAIN 0	**CHAIN 1**		
38	5190	6.86	7.03	13	PASS
46	5230	7.52	6.74	13	PASS

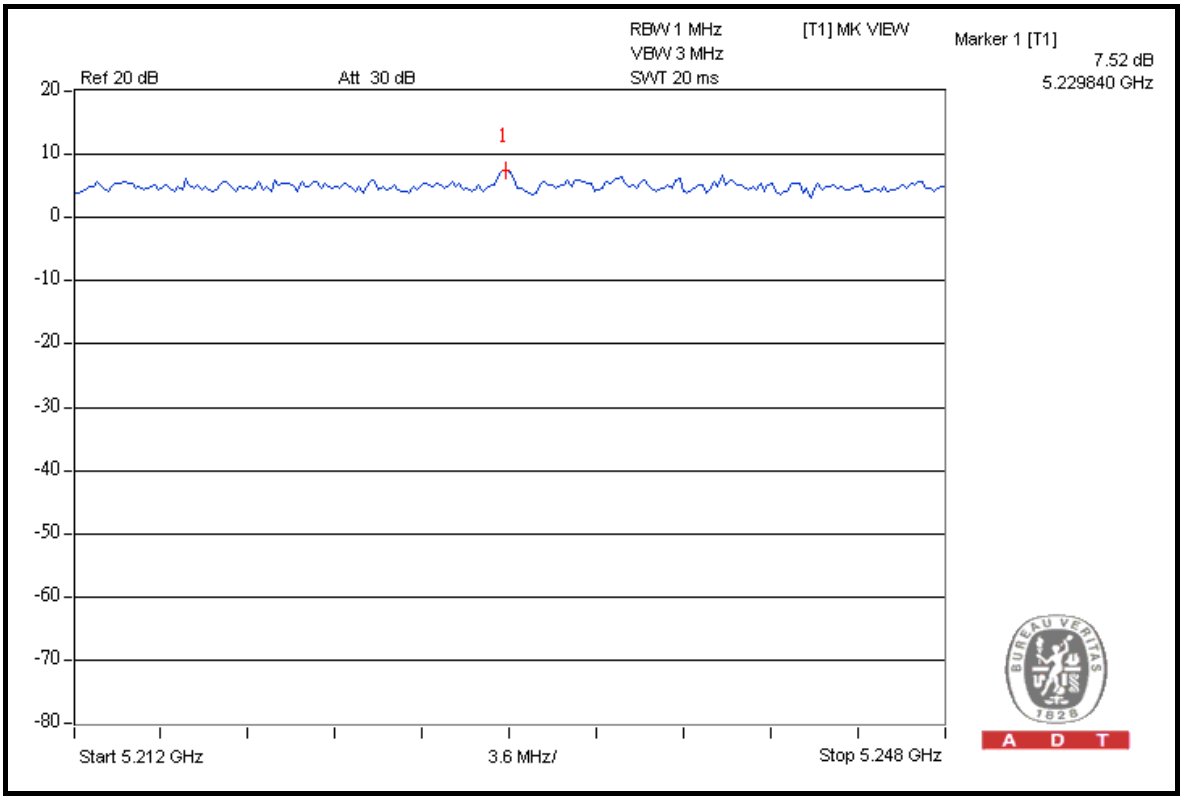
FOR CHAIN 0: CH 38



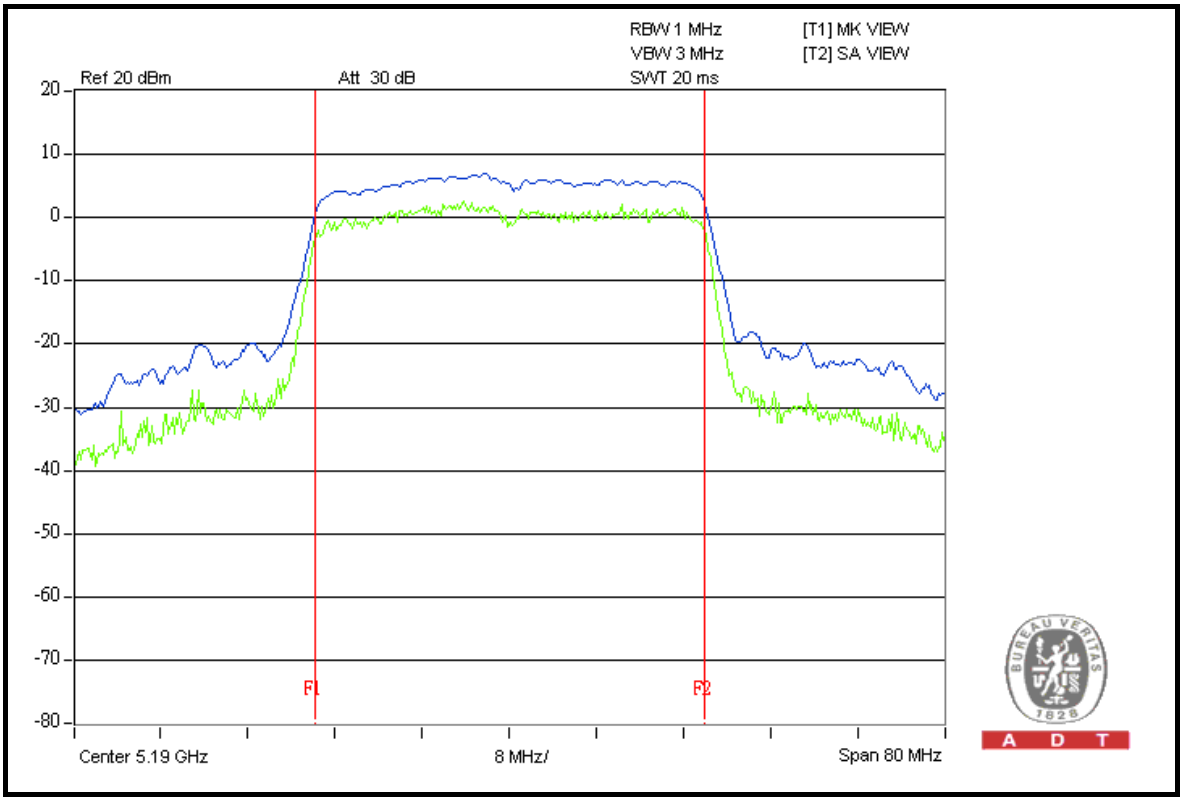


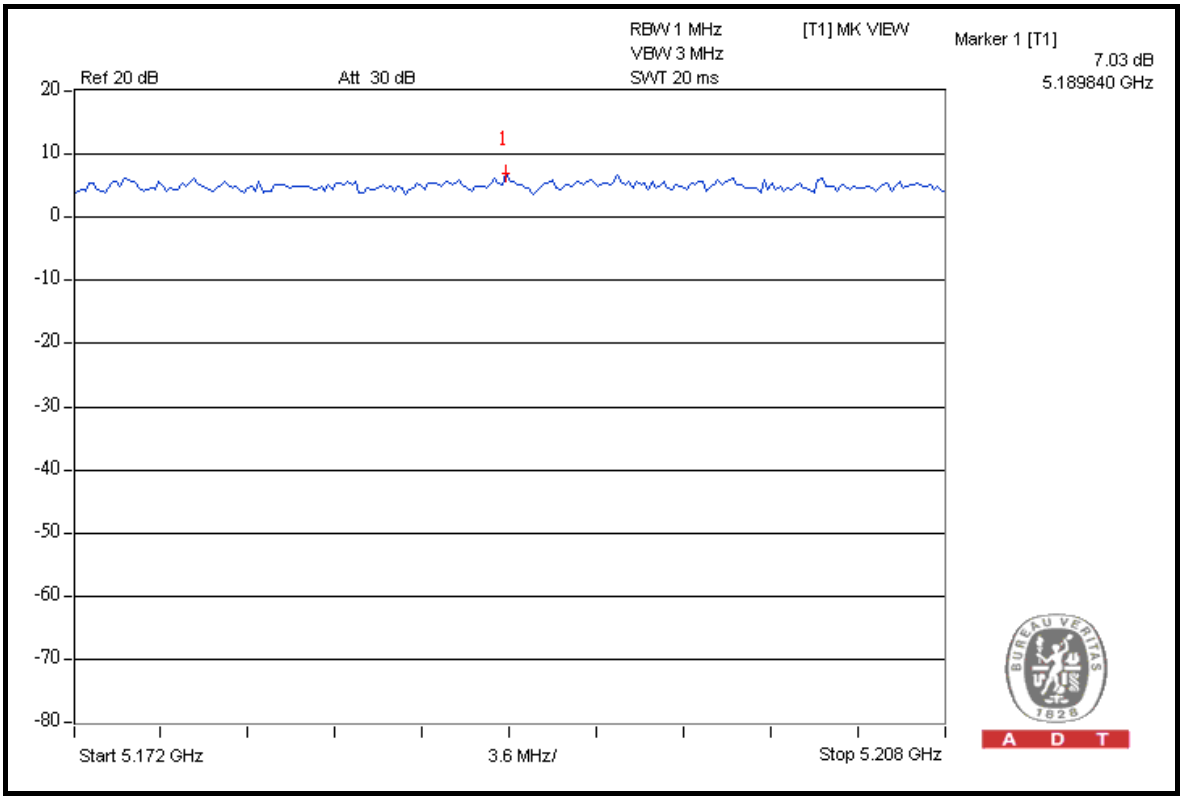
CH 46


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
[T2] SA VIEW
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.23 GHz
8 MHz/
Span 80 MHz

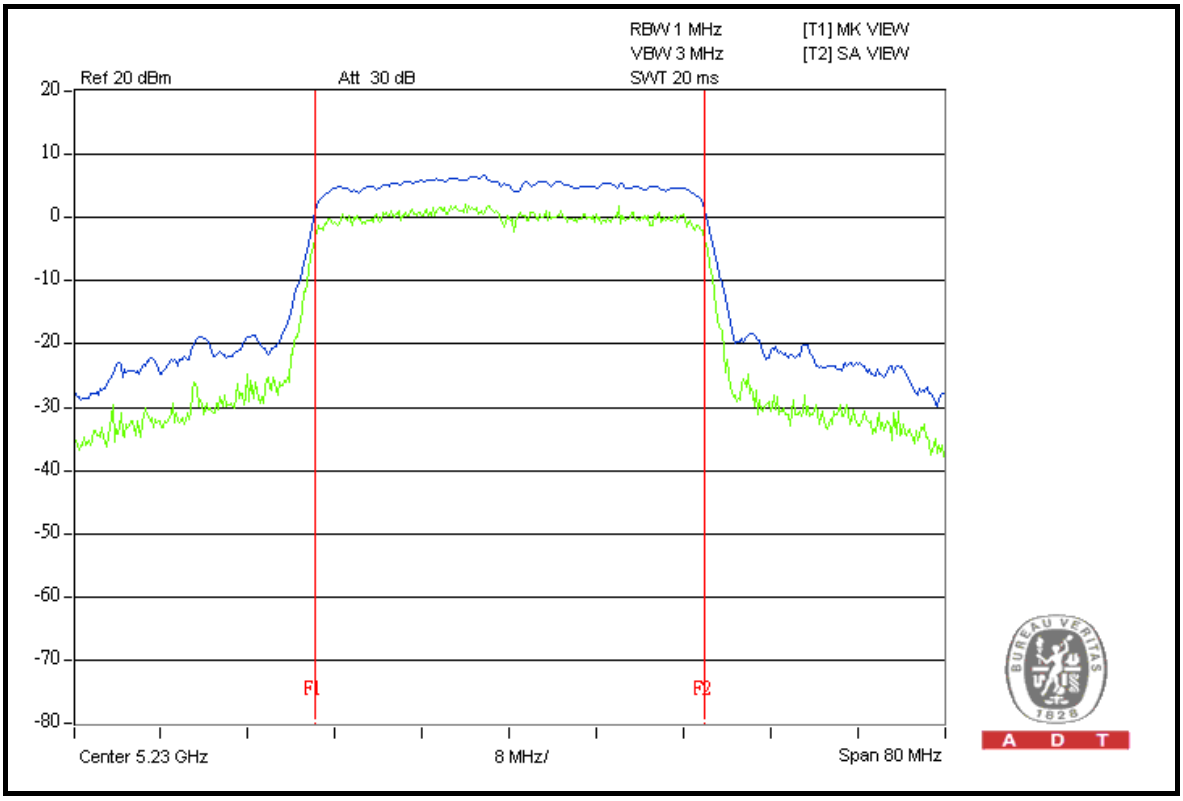

RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
7.52 dB
5.229840 GHz
Ref 20 dB
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 5.212 GHz
3.6 MHz/
Stop 5.248 GHz

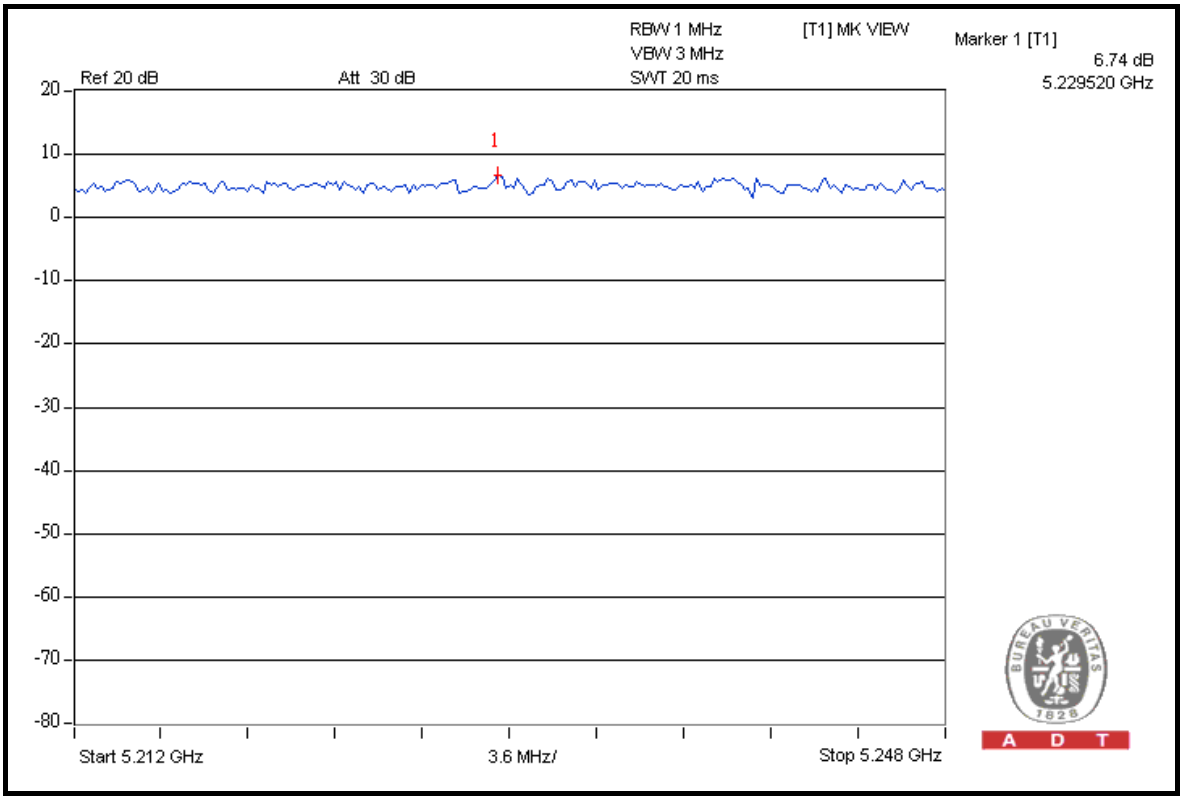
FOR CHAIN 1: CH 38





CH 46


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
[T2] SA VIEW
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
F1
F2
Center 5.23 GHz
8 MHz/
Span 80 MHz


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
6.74 dB
5.229520 GHz
Ref 20 dB
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 5.212 GHz
3.6 MHz/
Stop 5.248 GHz

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

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100040	Jul. 07, 2009	Jul. 06, 2010

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

4.5.3 TEST PROCEDURES

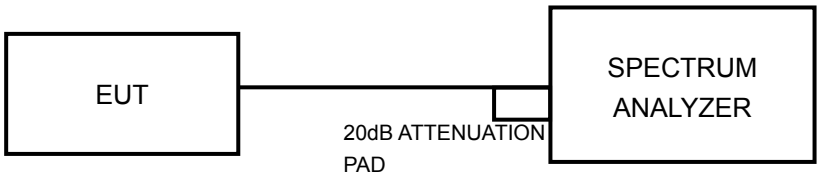
a. The transmitter output was connected to the spectrum analyzer.

b. Set RBW = 1MHz, VBW = 3MHz. The PPSD is the highest level found across the emission in any 1MHz band.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

Same as 4.4.6.

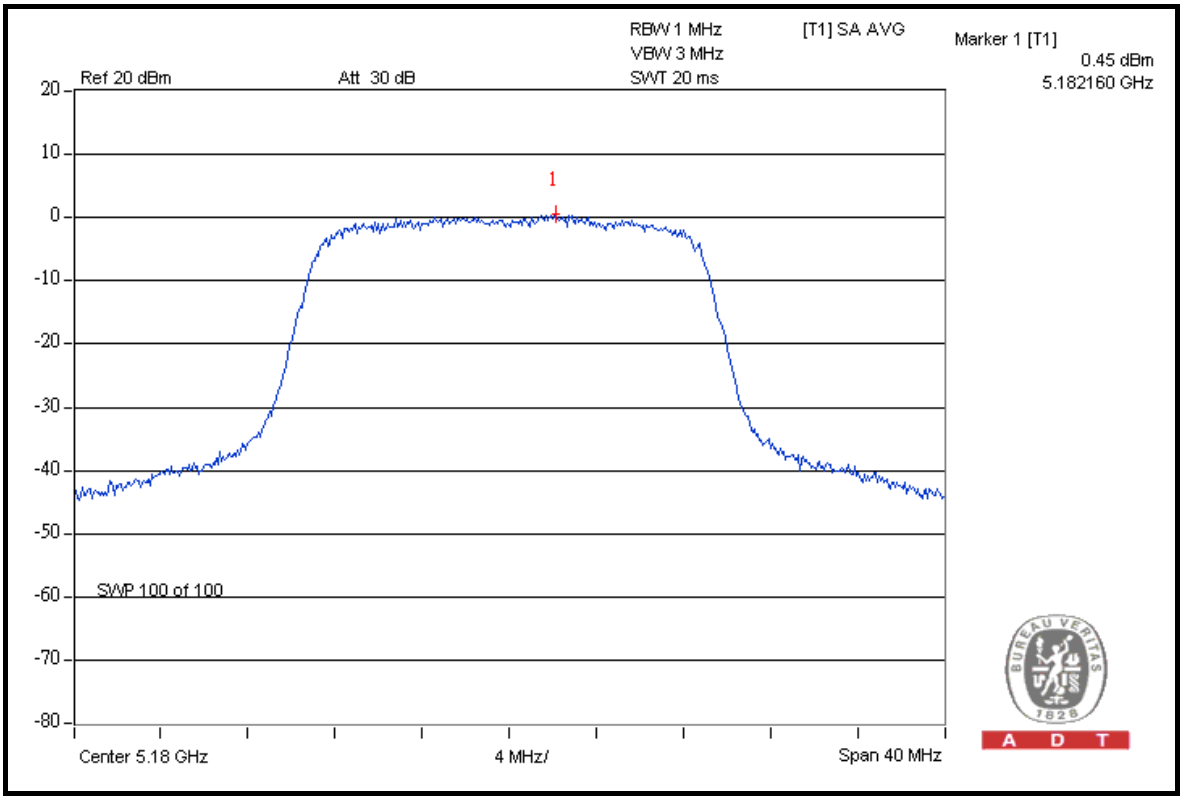
4.5.7 TEST RESULTS

802.11a OFDM MODULATION

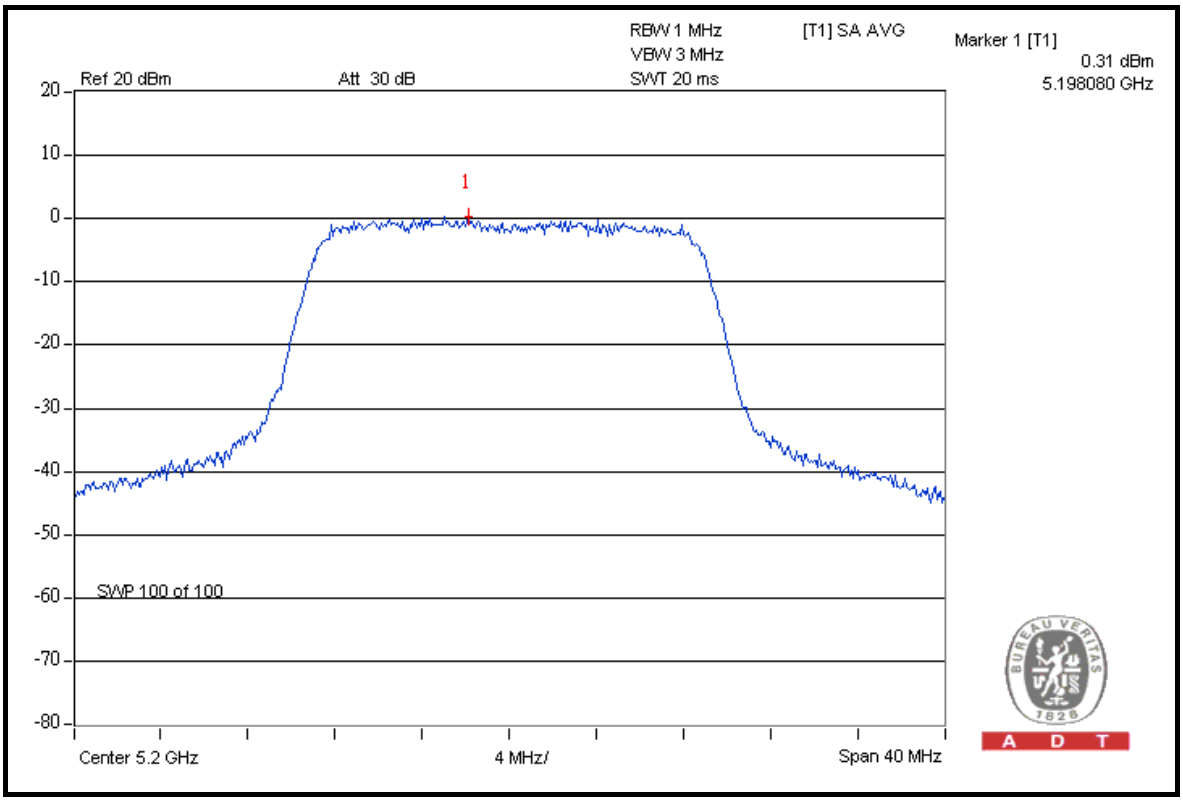
MODULATION TYPE	BPSK	**TRANSFER RATE**	6.0Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg.C, 64%RH, 1021hPa
TESTED BY	Sun Lin		

CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	0.45	0.97	2.36	3.73	4	PASS
40	5200	0.31	1.15	2.38	3.76	4	PASS
48	5240	0.51	0.82	2.33	3.68	4	PASS

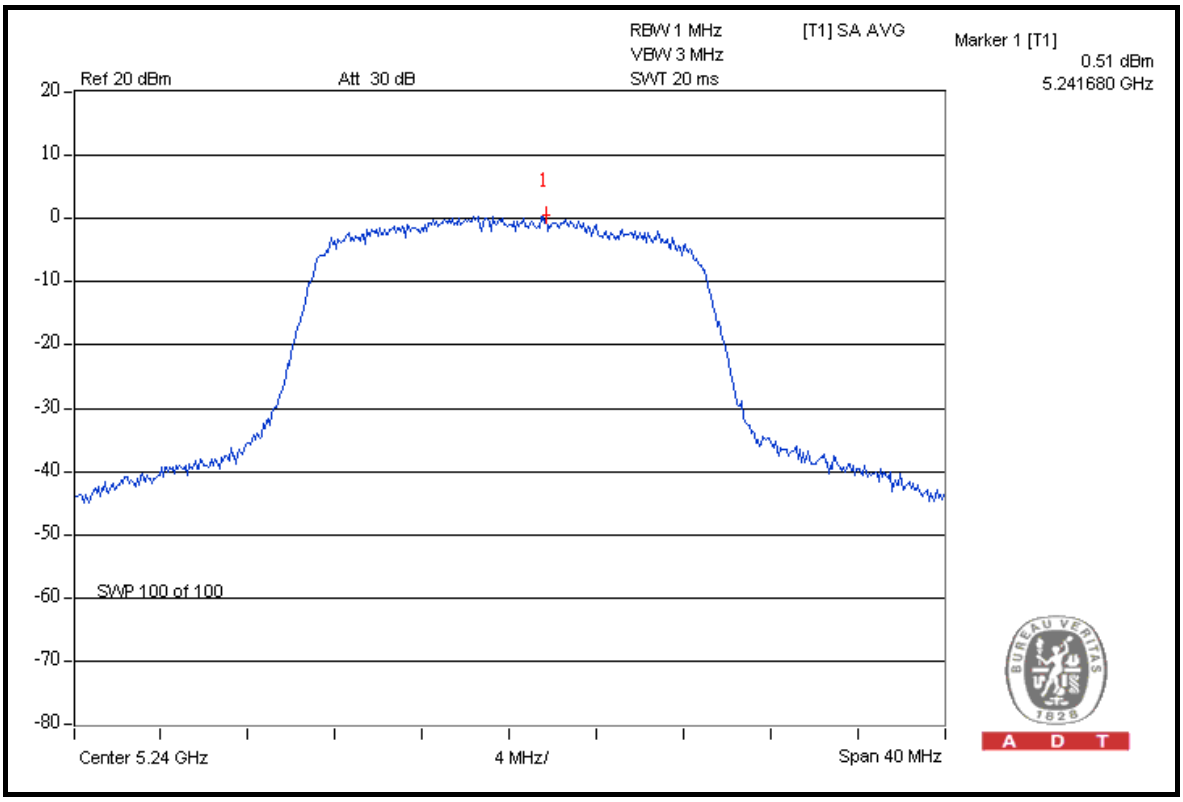
FOR CHAIN 0: CH 36



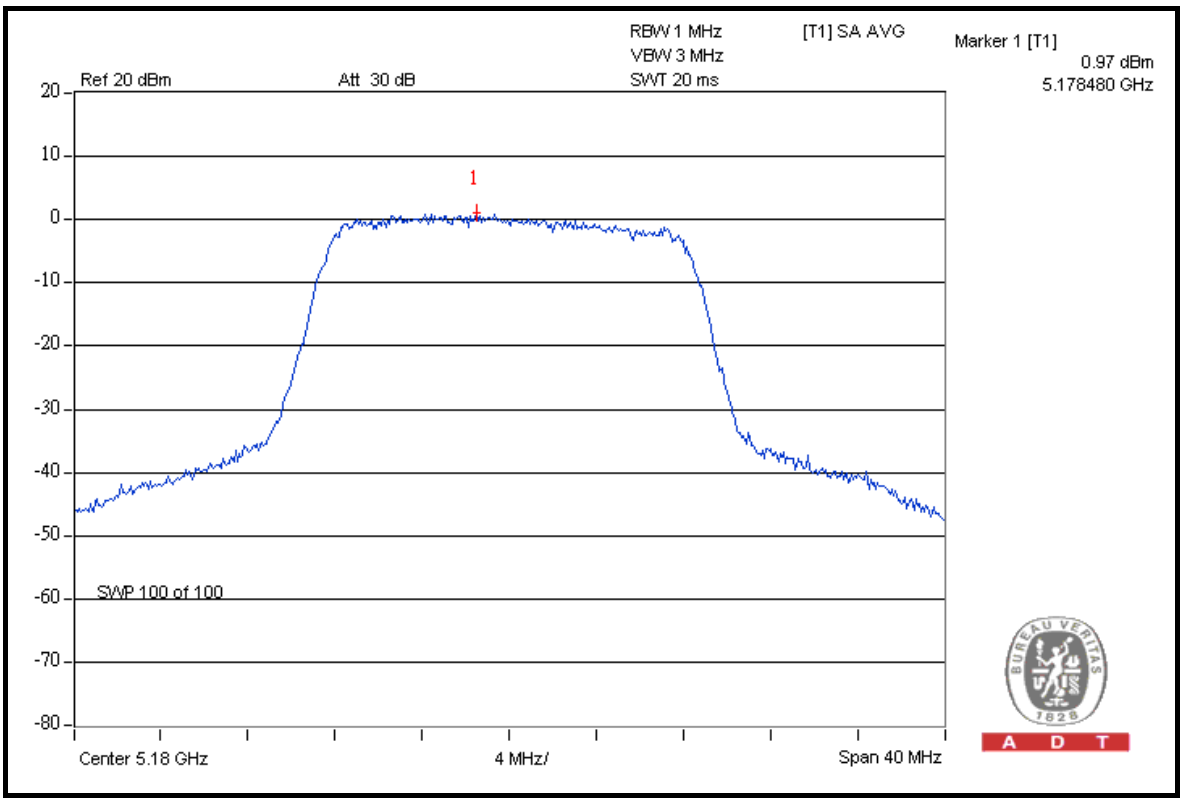
CH 40



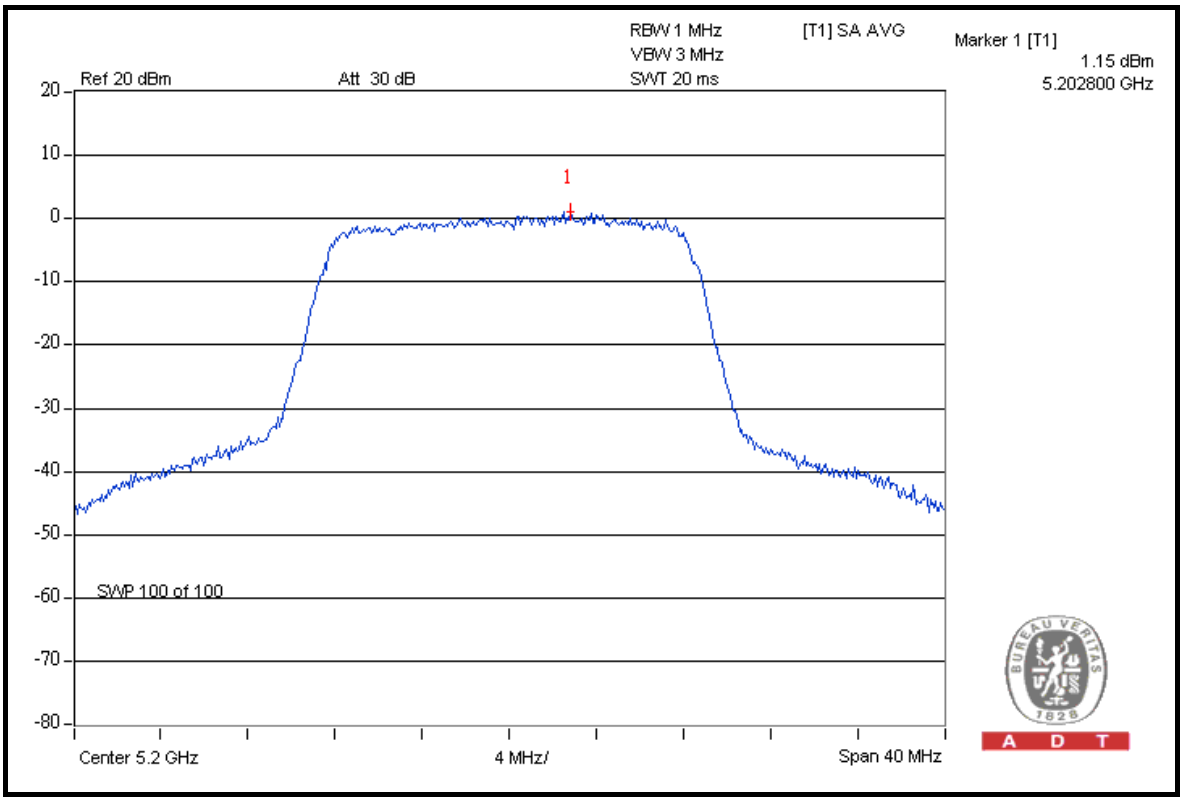
CH 48



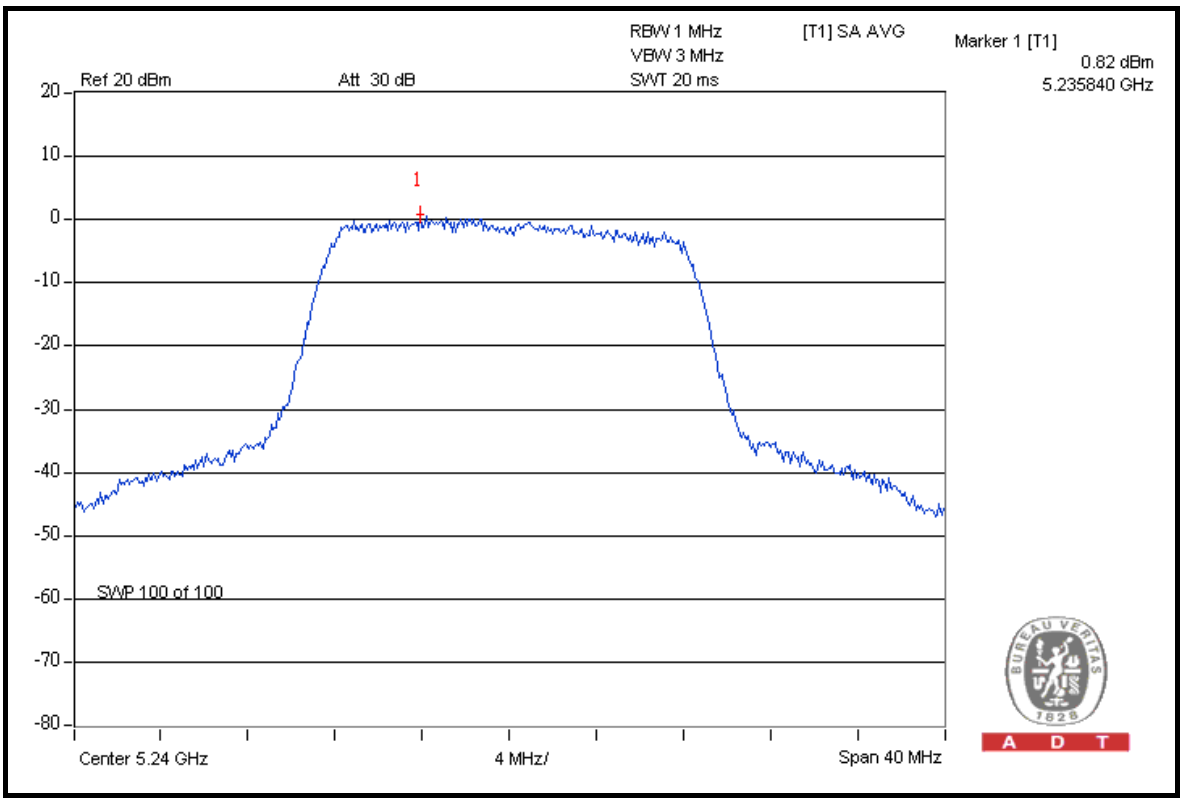
FOR CHAIN 1: CH 36



CH 40


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] SA AVG
Marker 1 [T1]
1.15 dBm
5.202800 GHz
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
SWP 100 of 100
Center 5.2 GHz
4 MHz/
Span 40 MHz

CH 48

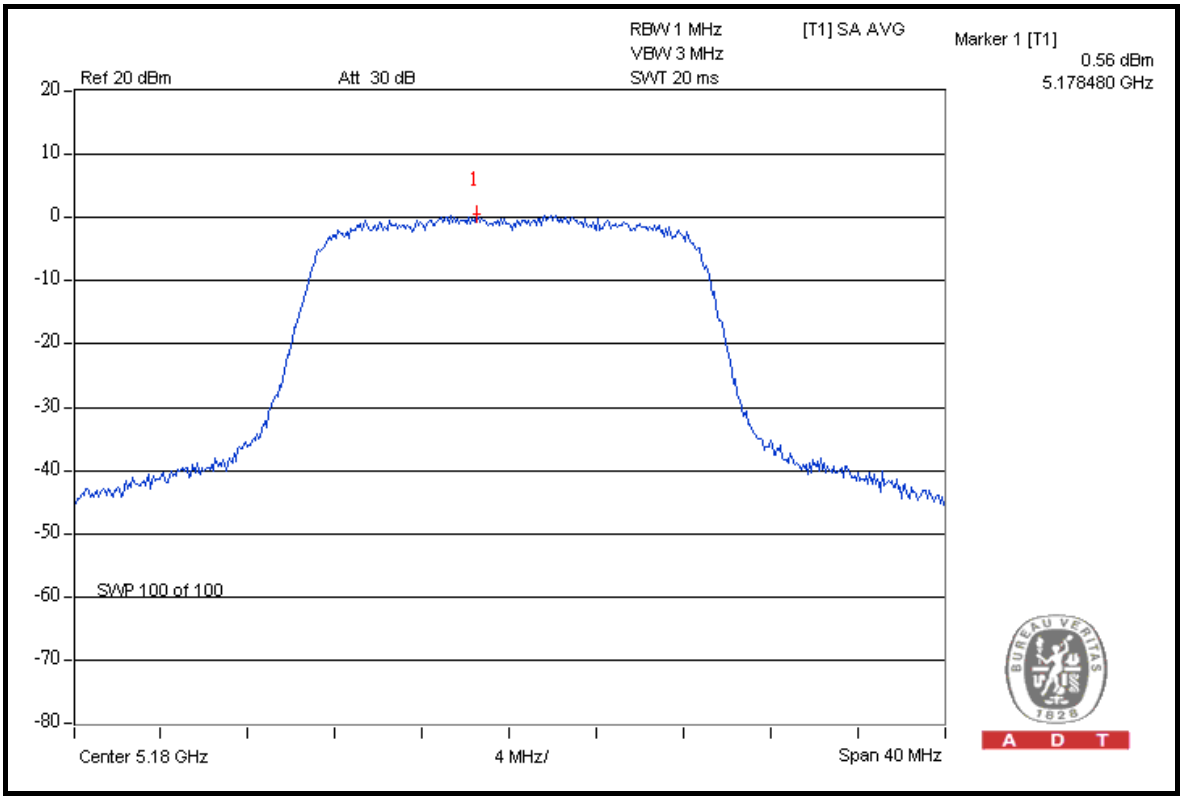

RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] SA AVG
Marker 1 [T1]
0.82 dBm
5.235840 GHz
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
SWP 100 of 100
Center 5.24 GHz
4 MHz/
Span 40 MHz

DRAFT 802.11n (20MHz) OFDM MODULATION

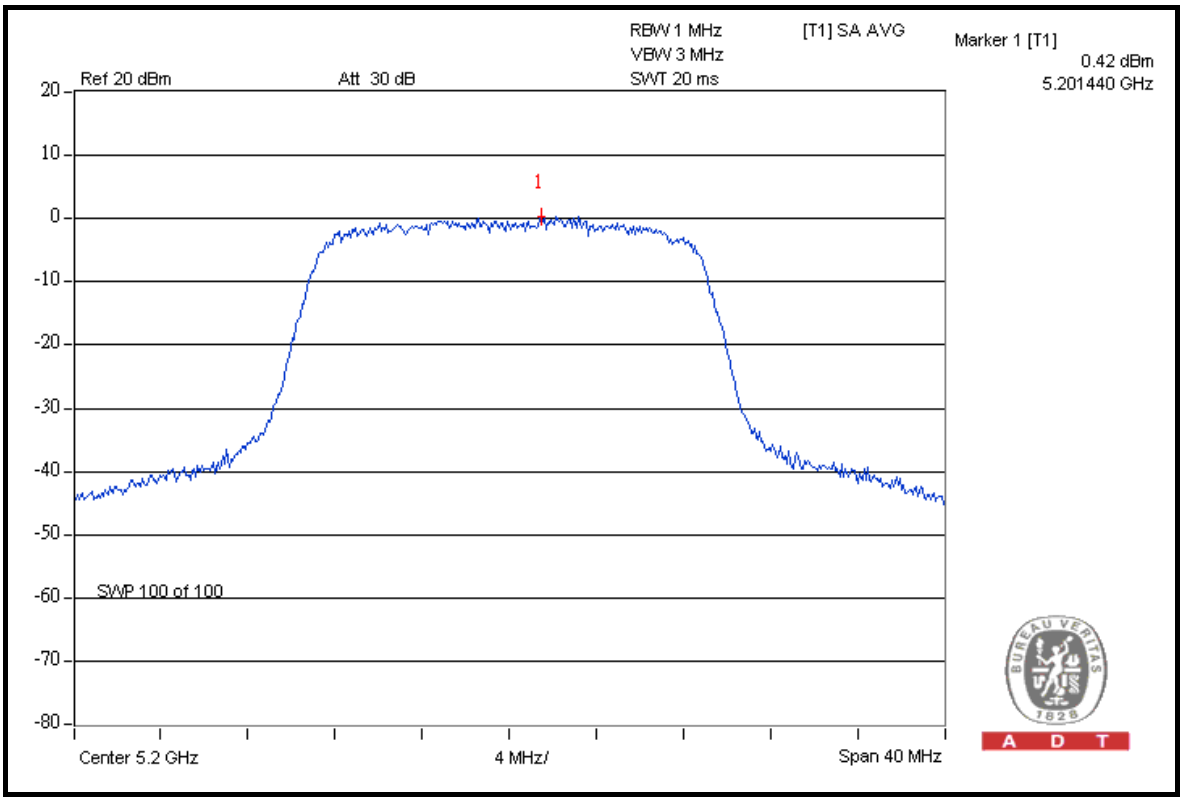
MODULATION TYPE	BPSK	**TRANSFER RATE**	7.2Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg.C, 64%RH, 1021hPa
TESTED BY	Sun Lin		

CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	0.56	0.52	2.27	3.55	4	PASS
40	5200	0.42	0.58	2.24	3.51	4	PASS
48	5240	0.50	0.52	2.25	3.52	4	PASS

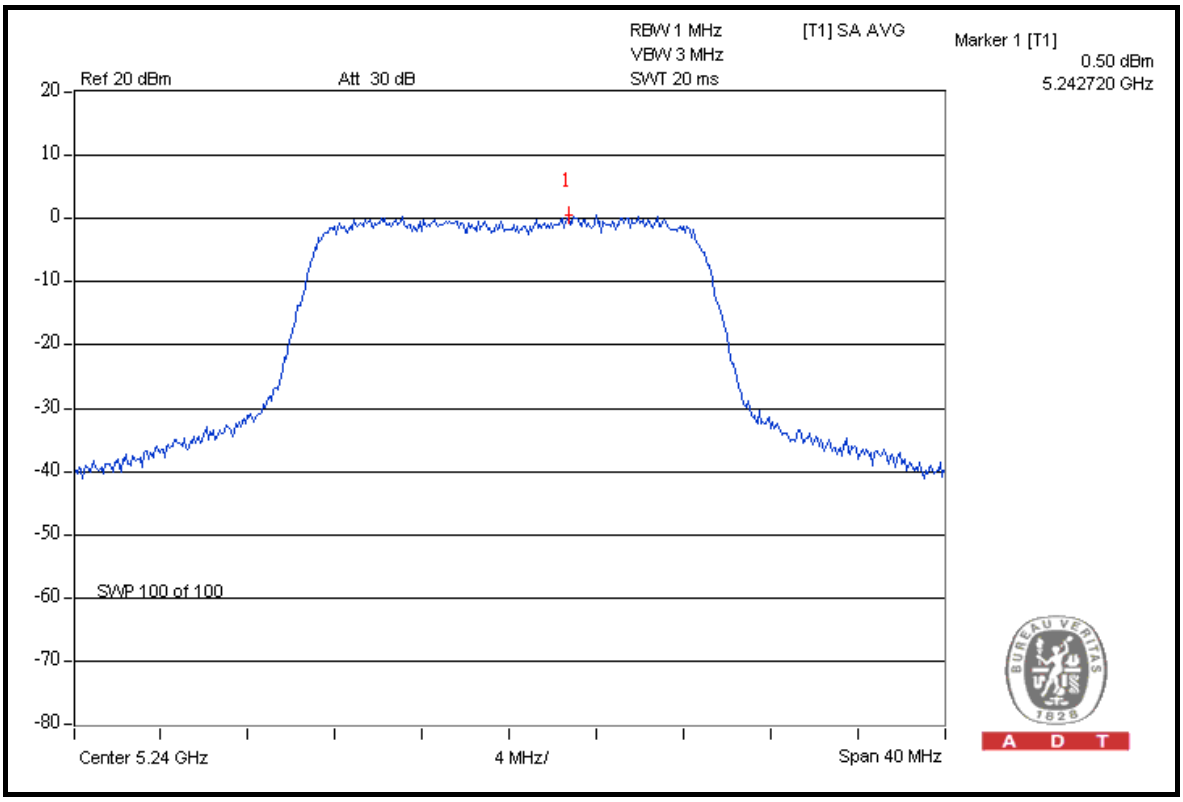
FOR CHAIN 0: CH 36



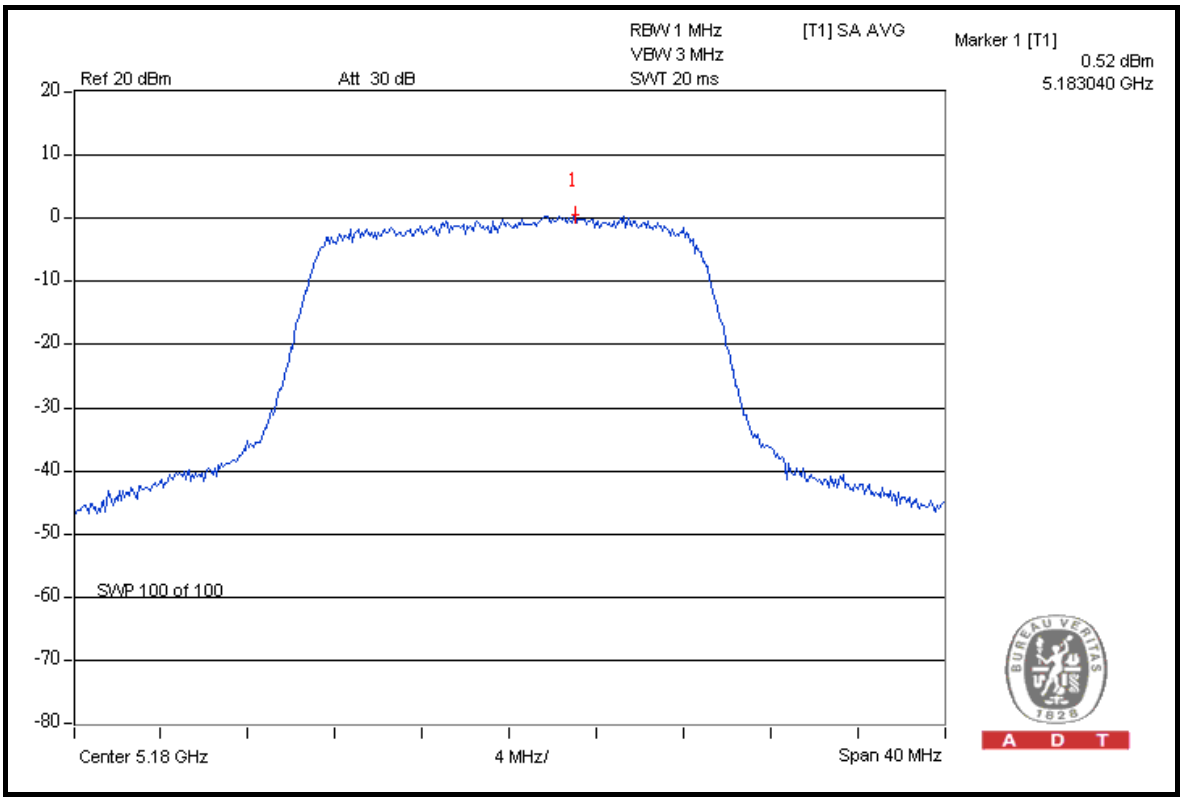
CH 40



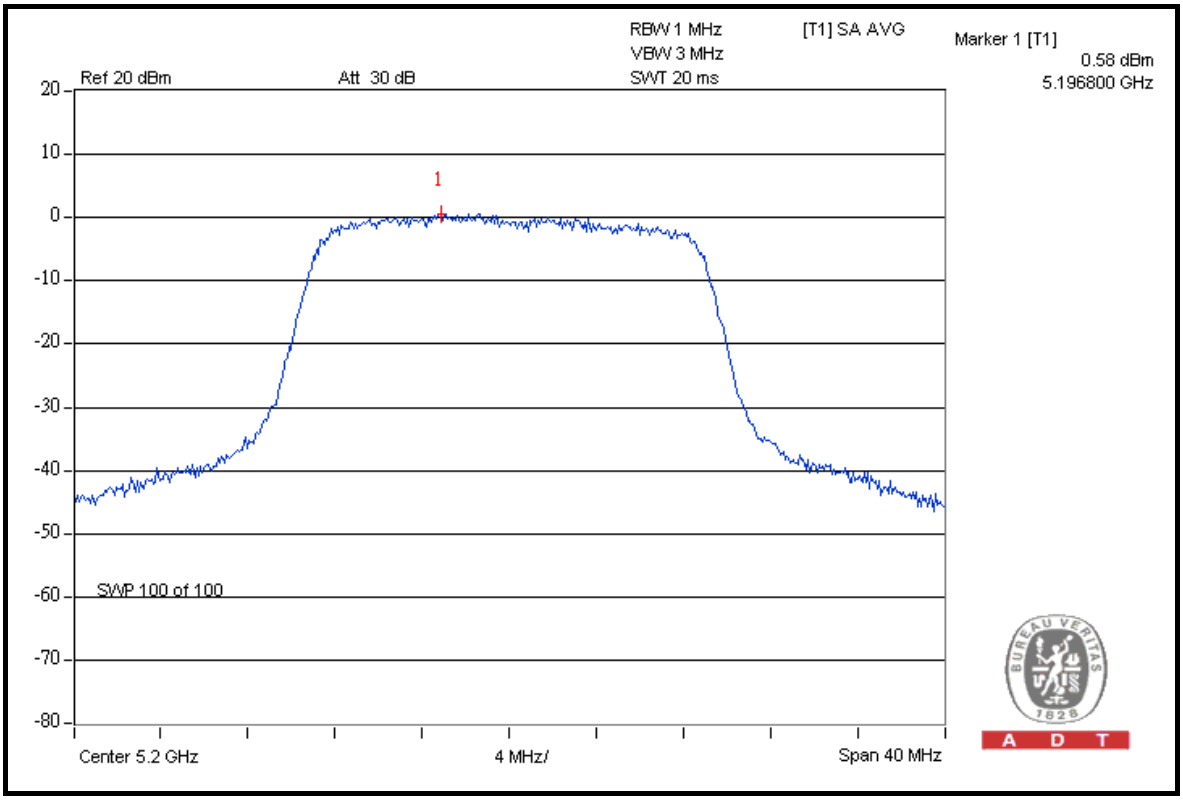
CH 48



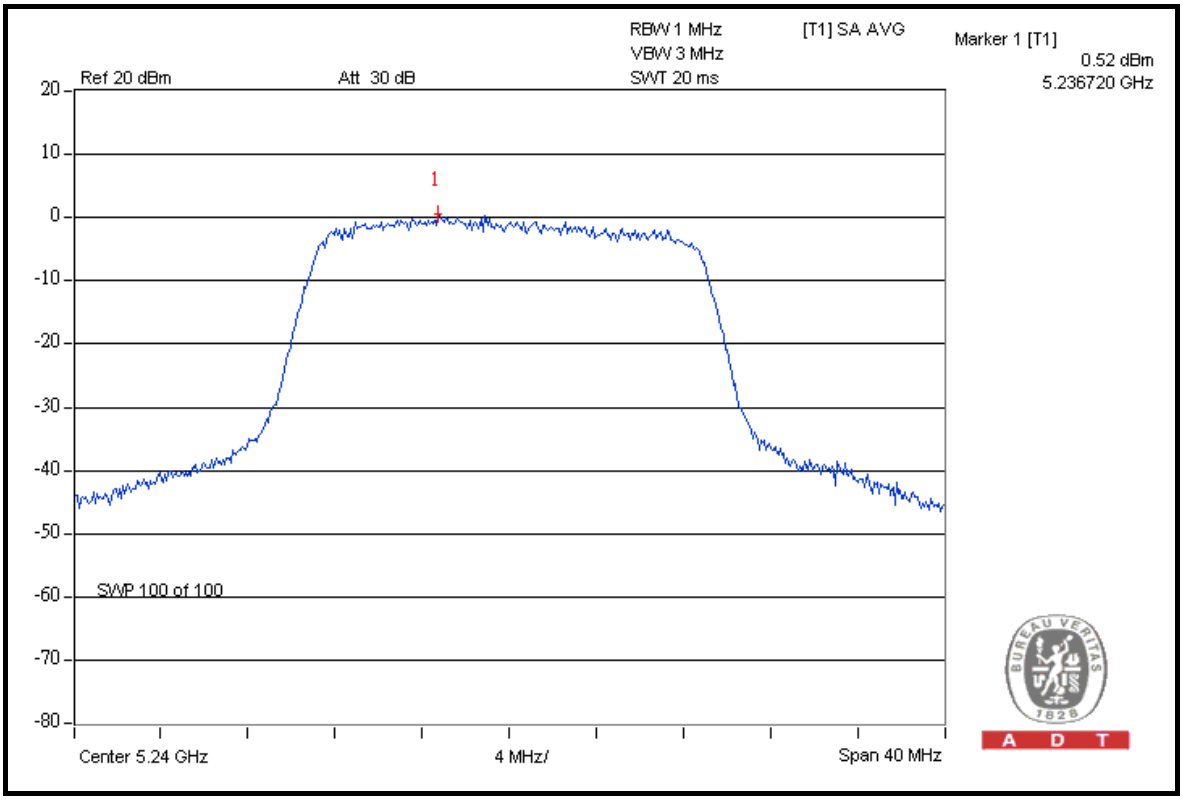
FOR CHAIN 1: CH 36



CH 40


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] SA AVG
Marker 1 [T1]
0.58 dBm
5.196800 GHz
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
SWP 100 of 100
Center 5.2 GHz
4 MHz/
Span 40 MHz

CH 48

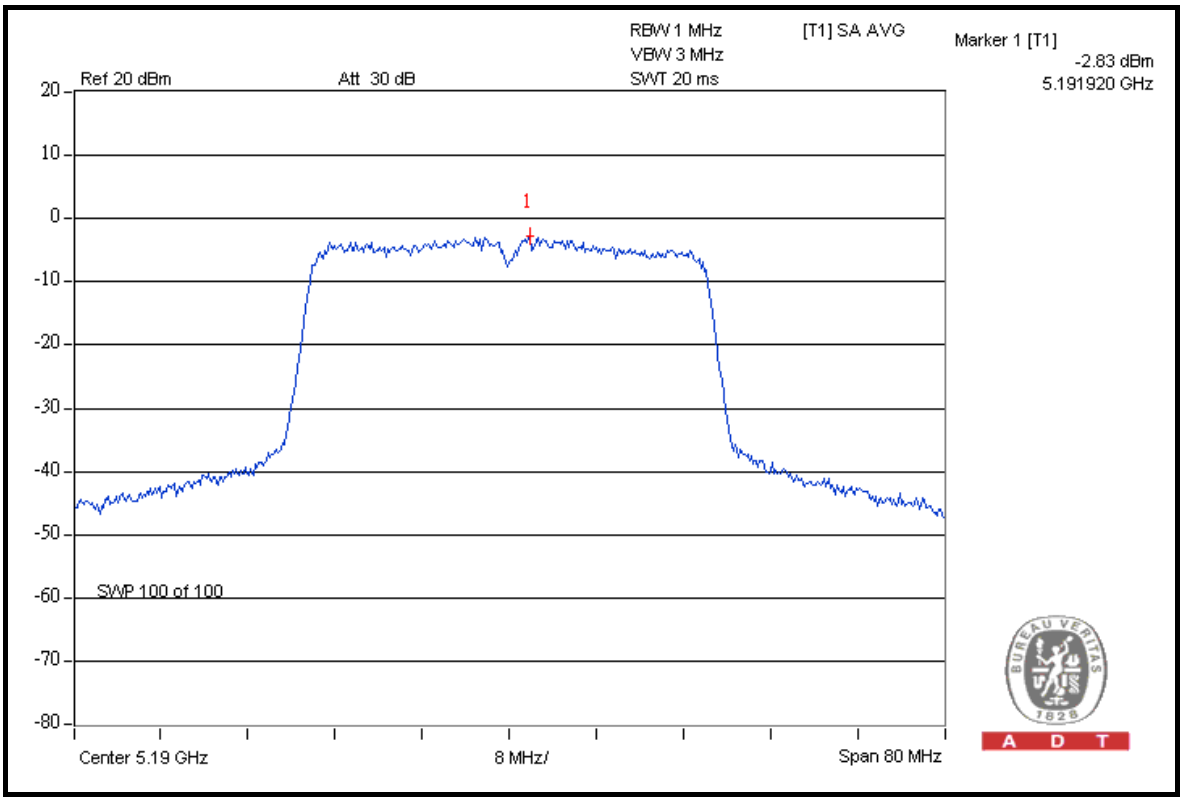

RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] SA AVG
Marker 1 [T1]
0.52 dBm
5.236720 GHz
Ref 20 dBm
Att 30 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
SWP 100 of 100
Center 5.24 GHz
4 MHz/
Span 40 MHz

DRAFT 802.11n (40MHz) OFDM MODULATION

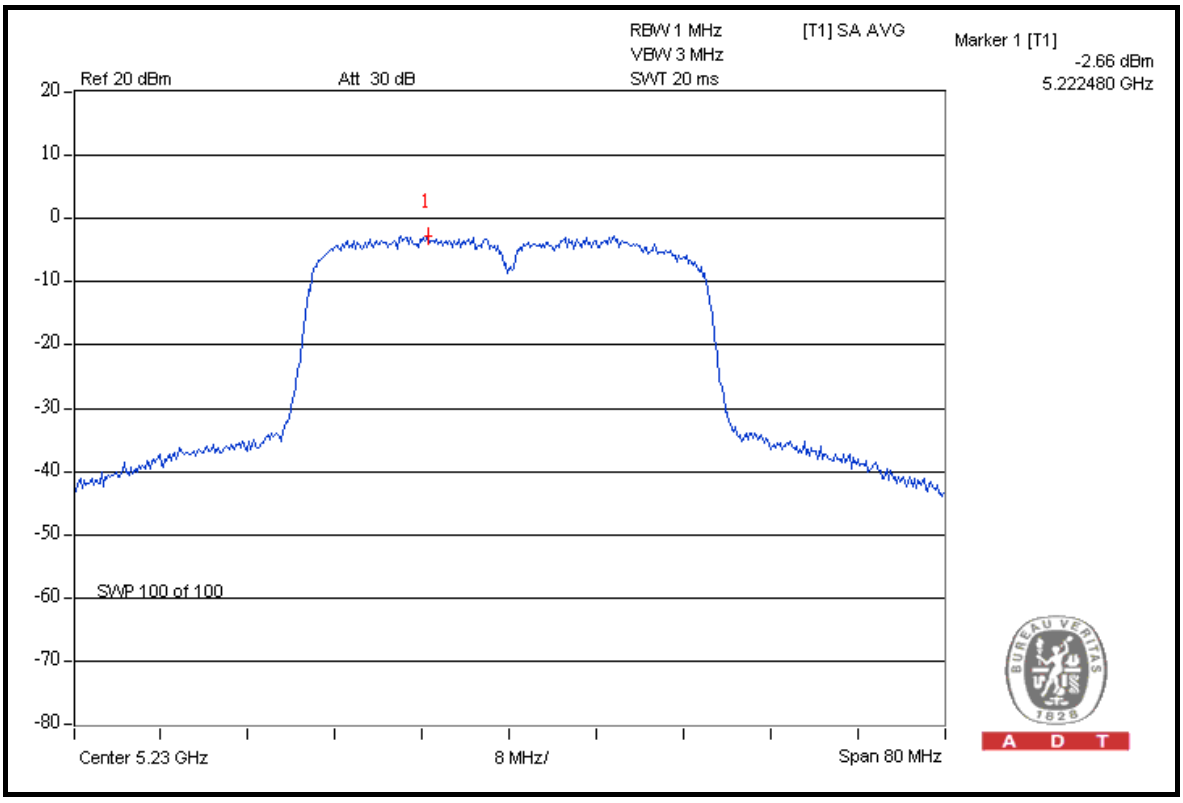
MODULATION TYPE	BPSK	**TRANSFER RATE**	15.0Mbps
INPUT POWER	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg.C, 64%RH, 1021hPa
TESTED BY	Sun Lin		

CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	-2.83	-3.26	0.99	-0.03	4	PASS
46	5230	-2.66	-3.01	1.04	0.18	4	PASS

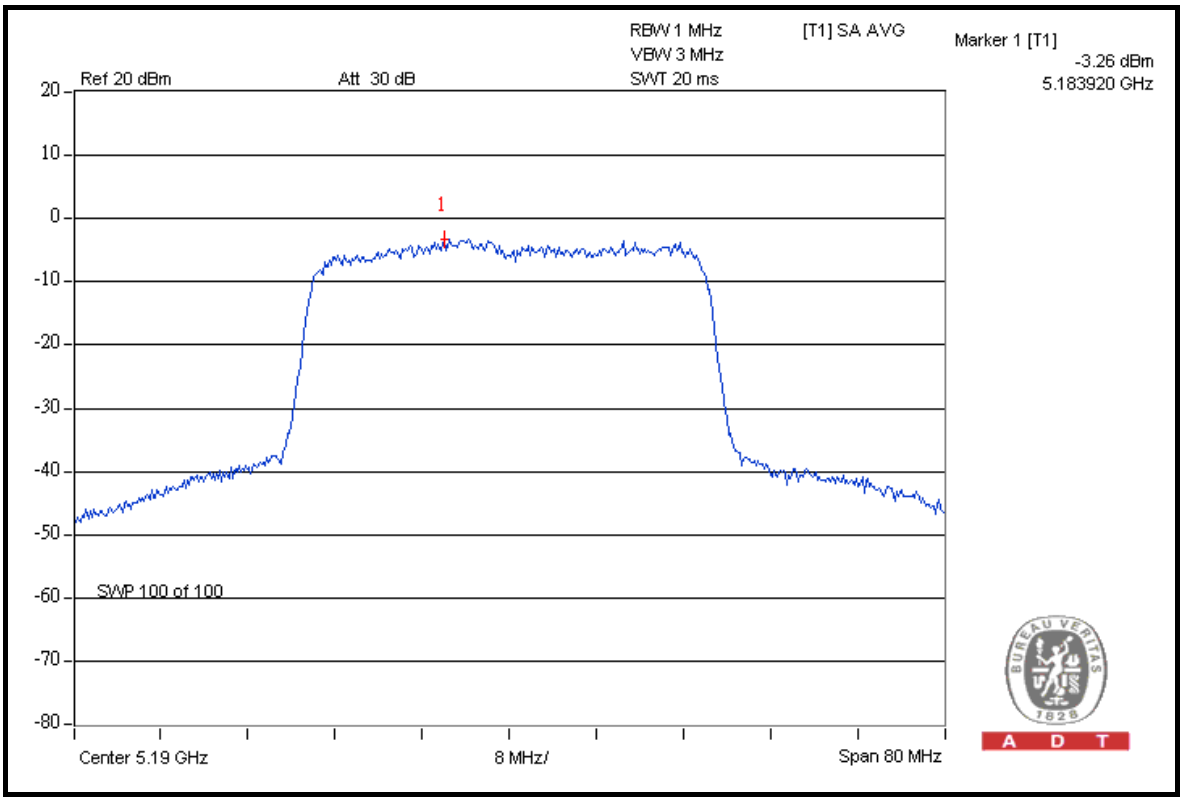
FOR CHAIN 0: CH 38



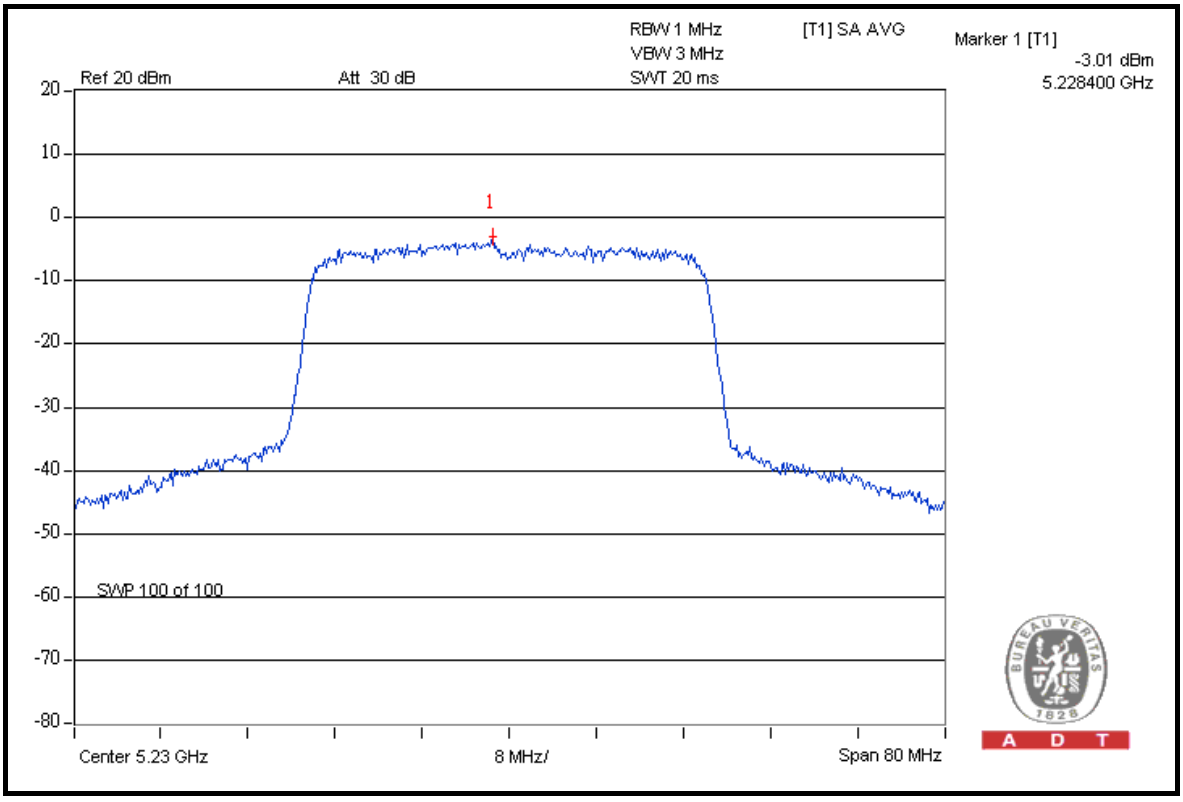
CH 46



FOR CHAIN 1: CH 38



CH 46



4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within the band of operation 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.	DATE OF CALIBRATION	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100040	Jul. 07, 2009	Jul. 06, 2010
WIT STANDARD TEMPERATURE AND HUMIDITY CHAMBER	TH-4S-C	W981030	Jun. 24, 2009	Jun. 23, 2010

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

4.6.3 TEST PROCEDURE

a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.

b. Turn the EUT on and couple its output to a spectrum analyzer.

c. Turn the EUT off and set the chamber to the highest temperature specified.

d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.

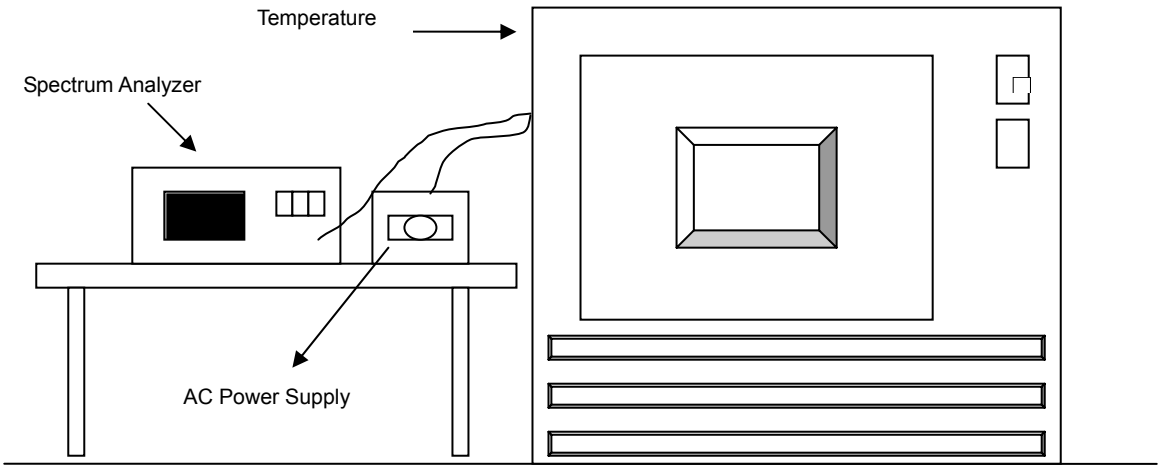
e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.

f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

Same as Item 4.1.6.

4.6.7 TEST RESULTS

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5200MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	ppm	(MHz)	ppm	(MHz)	ppm	(MHz)	ppm
65	110.0	5199.996713	-0.632	5199.996824	-0.611	5199.997131	-0.552	5199.996760	-0.623
60	110.0	5199.997505	-0.480	5199.997890	-0.406	5199.997547	-0.472	5199.997853	-0.413
50	110.0	5199.996294	-0.713	5199.996946	-0.587	5199.996388	-0.695	5199.996223	-0.726
40	110.0	5199.996568	-0.660	5199.996959	-0.585	5199.996749	-0.625	5199.996793	-0.617
30	110.0	5199.997055	-0.566	5199.997520	-0.477	5199.996873	-0.601	5199.997127	-0.552
20	110.0	5199.996651	-0.644	5199.996863	-0.603	5199.996639	-0.646	5199.996454	-0.682
10	110.0	5199.996525	-0.668	5199.996710	-0.633	5199.997036	-0.570	5199.996843	-0.607
0	110.0	5199.996758	-0.623	5199.997185	-0.541	5199.996636	-0.647	5199.997096	-0.558
-10	110.0	5199.996486	-0.676	5199.996760	-0.623	5199.996486	-0.676	5199.996783	-0.619
-20	110.0	5199.997329	-0.514	5199.997378	-0.504	5199.997428	-0.495	5199.997554	-0.470
-30	110.0	5199.996730	-0.629	5199.996583	-0.657	5199.997031	-0.571	5199.997136	-0.551
-40	110.0	5199.997019	-0.573	5199.996802	-0.615	5199.997150	-0.548	5199.996983	-0.580

FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5200MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	ppm	(MHz)	ppm	(MHz)	ppm	(MHz)	ppm
20	93.5	5199.997746	-0.433	5199.997659	-0.450	5199.997629	-0.456	5199.997746	-0.433
	110.0	5199.996651	-0.644	5199.996863	-0.603	5199.996639	-0.646	5199.996454	-0.682
	126.5	5199.997198	-0.539	5199.996997	-0.577	5199.997104	-0.557	5199.997087	-0.560

4.7 BAND EDGES MEASUREMENT

4.7.1 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	100033	Jul. 06, 2009	Jul. 05, 2010
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100076	May. 26, 2009	May. 25, 2010
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 27, 2009	Apr. 26, 2010
HORN Antenna SCHWARZBECK	9120D	9120D-209	Jul. 01, 2009	Jun. 30, 2010
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 25, 2008	Dec. 24, 2009
Preamplifier Agilent	8447D	2944A10633	Nov. 03, 2008	Nov. 02, 2009
Preamplifier Agilent	8449B	3008A01964	Oct. 23, 2008	Oct. 22, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	238141/4	May 13, 2009	May 12, 2010
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	May 13, 2009	May 12, 2010
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100.	TT93021703	NA	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	07026401	Aug. 27, 2008	Aug. 26, 2009

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

4.7.2 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 1MHz and 3MHz with suitable frequency span including 100MHz bandwidth from band edge. The band edges was measured and recorded.

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

4.7.3 EUT OPERATING CONDITION

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

4.7.4 TEST RESULTS

For signals in the restricted bands above and below the 5.15 to 5.25GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak filed strength of the intentional signal made on the OATS to calculate the field strength of the unintentional signals.

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

802.11a OFDM MODULATION

Channel 36 (5180MHz)

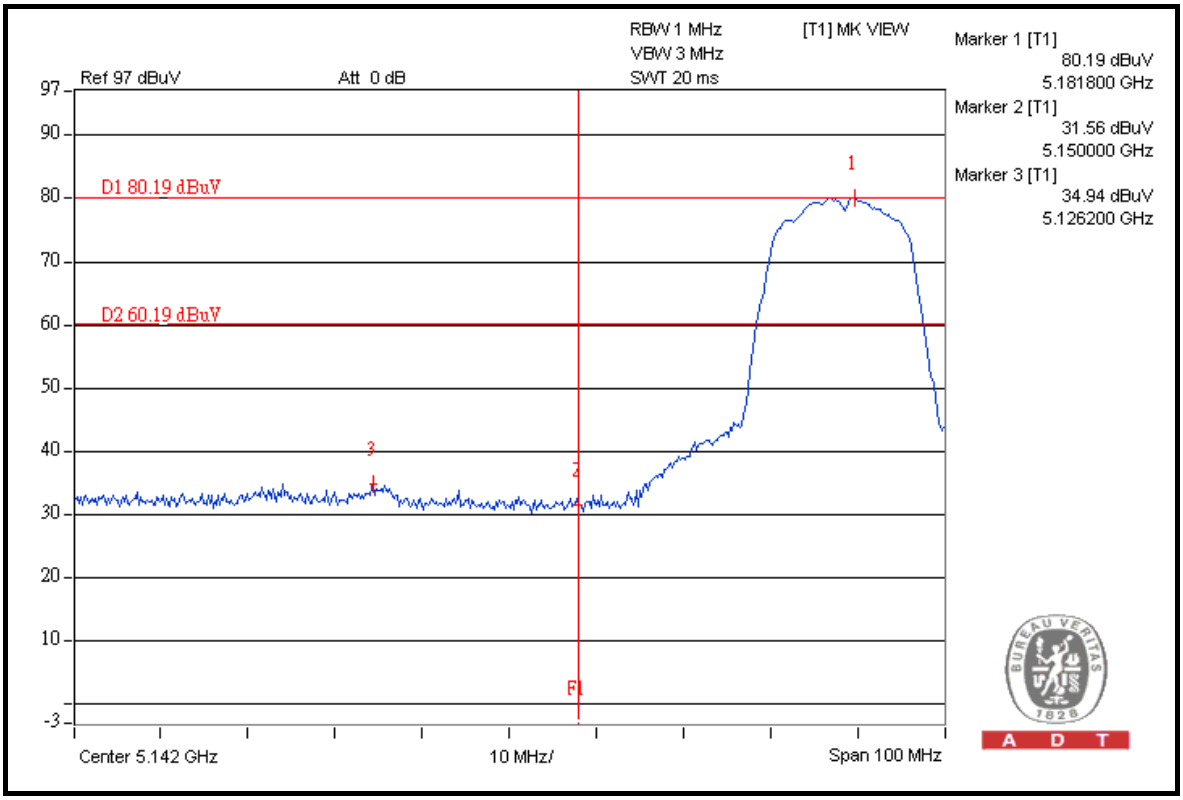
The band edge emission plot on the next page shows 45.25dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 36 is 108.29dBuV/m (Peak), so the maximum field strength in restrict band is 108.29 – 45.25 = 63.04dBuV/m which is under 74dBuV/m limit.

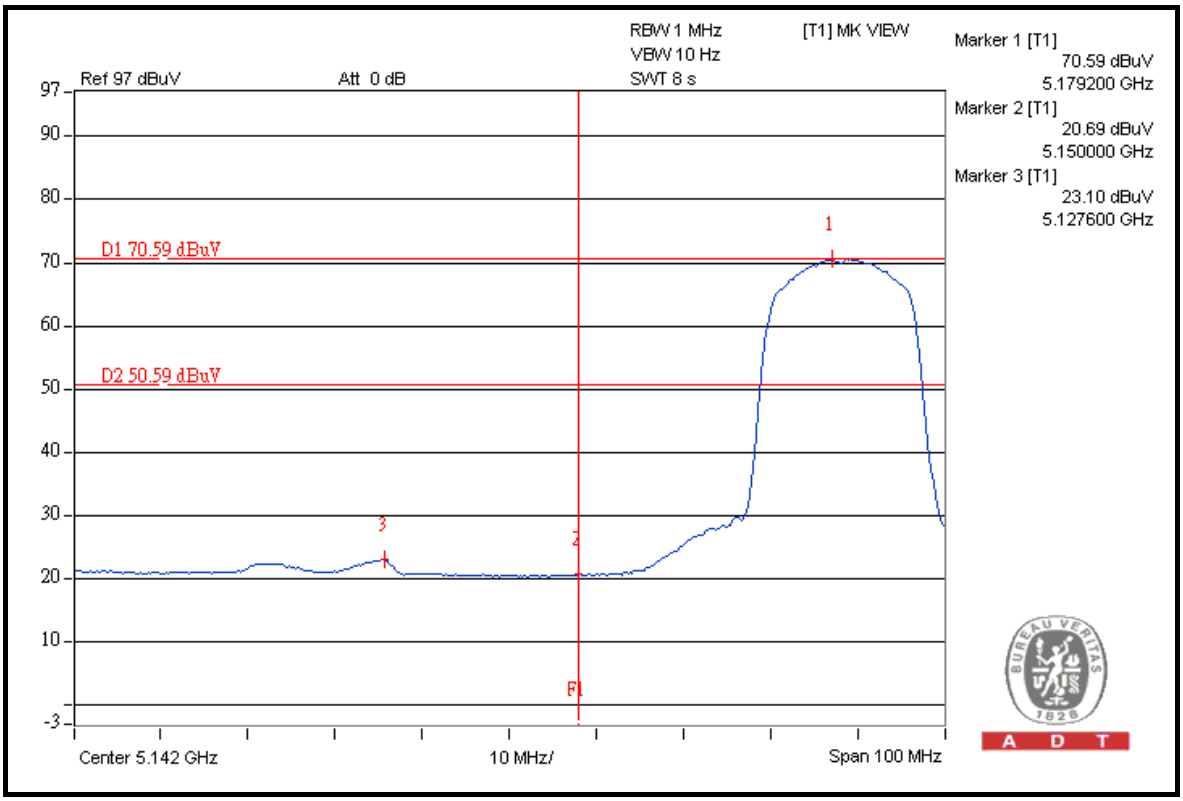
The band edge emission plot on the next page shows 47.49dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 36 is 98.12dBuV/m (Average), so the maximum field strength in restrict band is 98.12 – 47.49 = 50.63dBuV/m which is under 54dBuV/m limit.

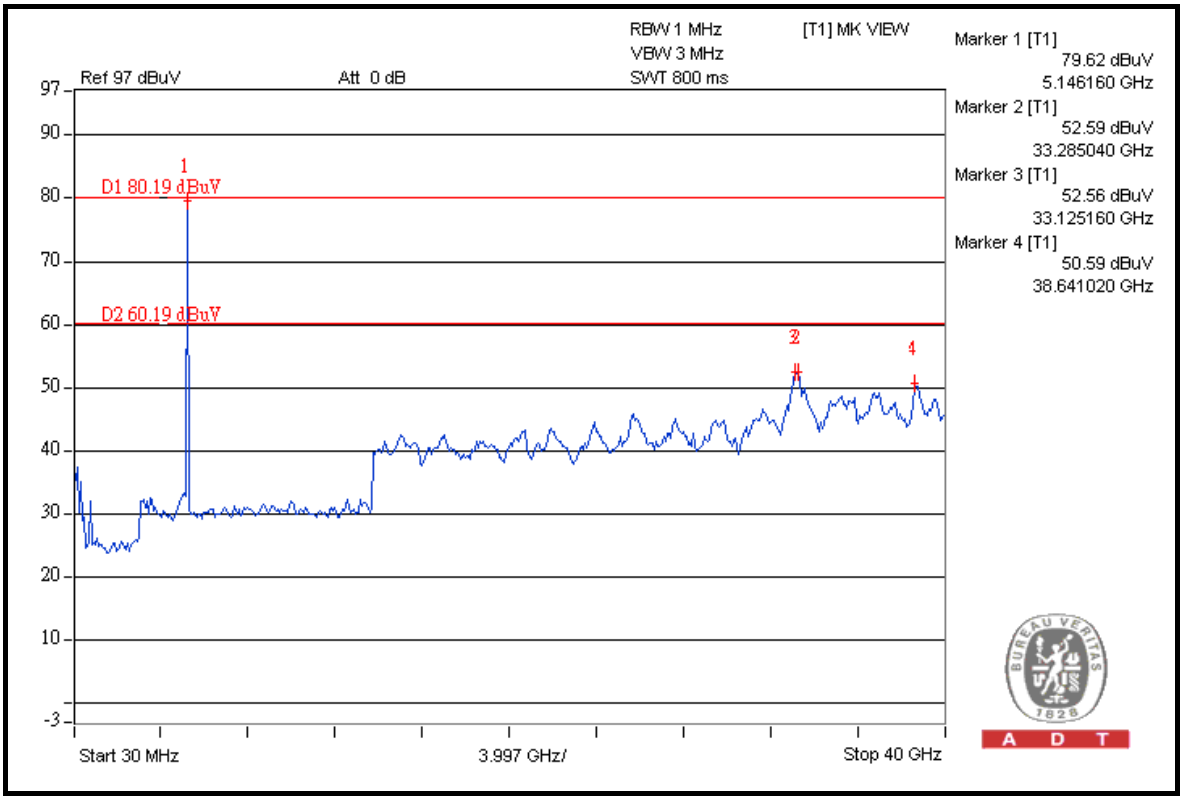
Channel 48 (5240MHz)

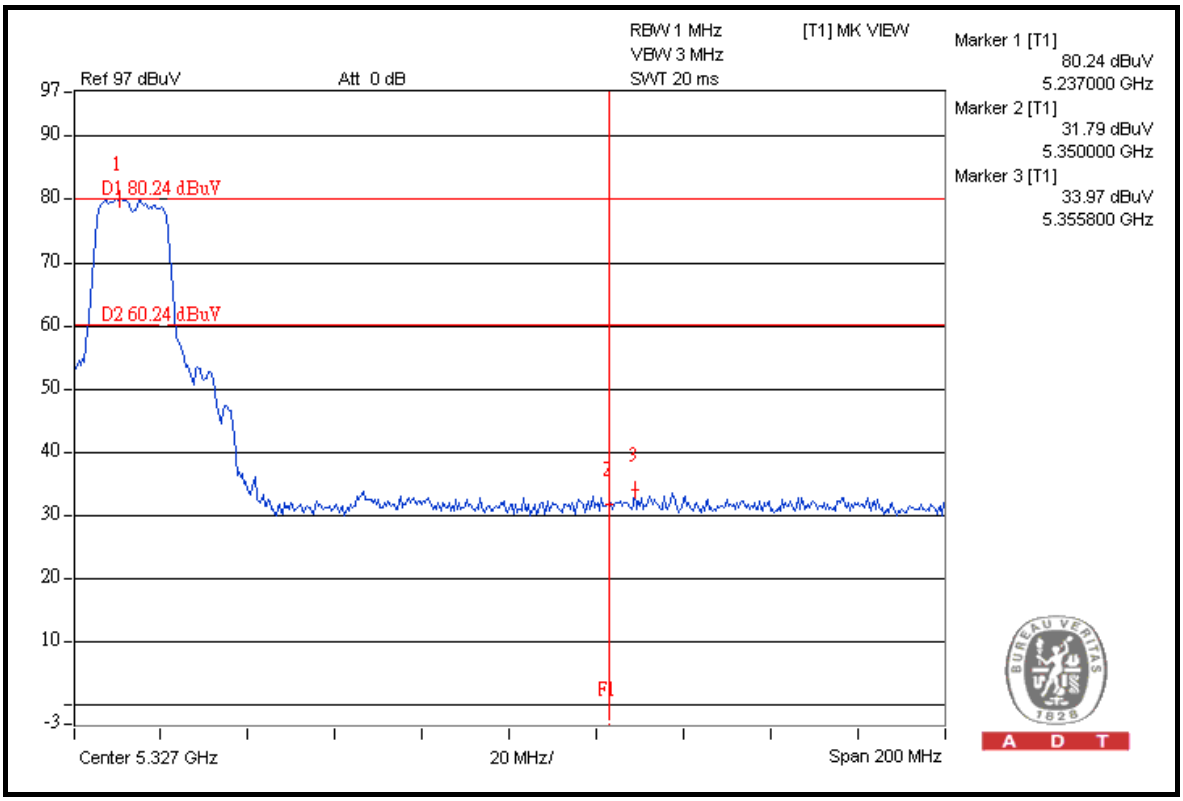
The band edge emission plot on the next second page shows 46.27dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 48 is 108.15dBuV/m (Peak), so the maximum field strength in restrict band is 108.15 – 46.27 = 61.88dBuV/m which is under 74dBuV/m limit.

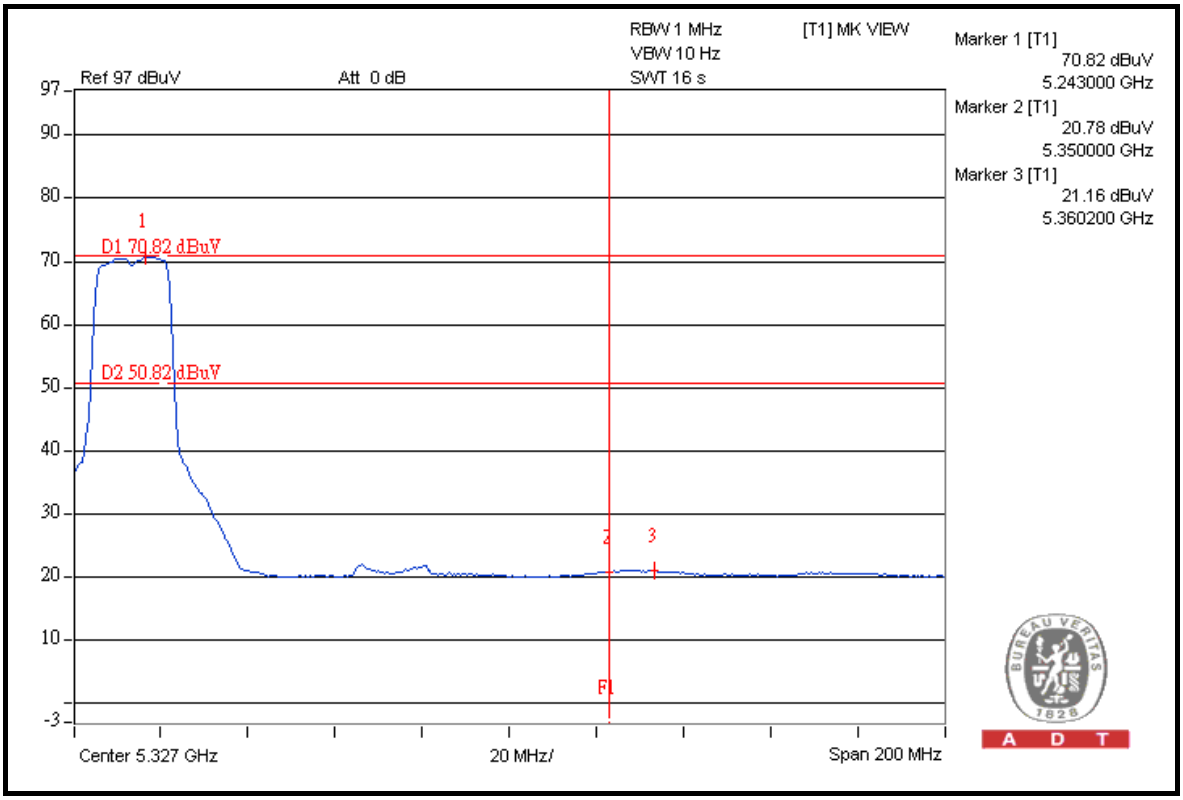
The band edge emission plot on the next third page shows 49.66dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 48 is 98.13dBuV/m (Average), so the maximum field strength in restrict band is 98.13 – 49.66 = 48.47dBuV/m which is under 54dBuV/m limit.

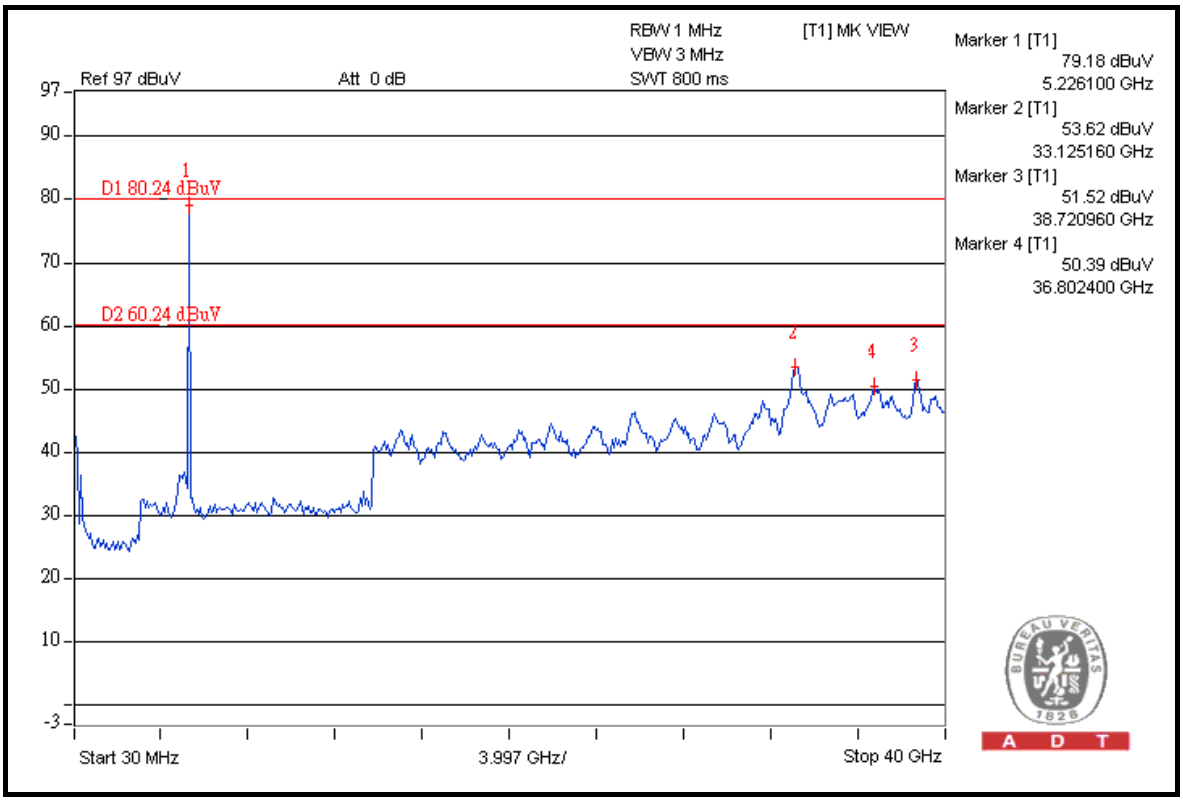

RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
80.19 dBuV
5.181800 GHz
Marker 2 [T1]
31.56 dBuV
5.150000 GHz
Marker 3 [T1]
34.94 dBuV
5.126200 GHz
D1 80.19 dBuV
D2 60.19 dBuV
97
90
80
70
60
50
40
30
20
10
-3
Center 5.142 GHz
10 MHz/
Span 100 MHz


RBW 1 MHz
VBW 10 Hz
SWT 8 s
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
70.59 dBuV
5.179200 GHz
Marker 2 [T1]
20.69 dBuV
5.150000 GHz
Marker 3 [T1]
23.10 dBuV
5.127600 GHz
D1 70.59 dBuV
D2 50.59 dBuV
97
90
80
70
60
50
40
30
20
10
-3
Center 5.142 GHz
10 MHz/
Span 100 MHz


RBW 1 MHz
VBW 3 MHz
SWT 800 ms
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
79.62 dBuV
5.146160 GHz
Marker 2 [T1]
52.59 dBuV
33.285040 GHz
Marker 3 [T1]
52.56 dBuV
33.125160 GHz
Marker 4 [T1]
50.59 dBuV
38.641020 GHz
D1 80.19 dBuV
D2 60.19 dBuV
97
90
80
70
60
50
40
30
20
10
-3
Start 30 MHz
3.997 GHz/
Stop 40 GHz


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
80.24 dBuV
5.237000 GHz
Marker 2 [T1]
31.79 dBuV
5.350000 GHz
Marker 3 [T1]
33.97 dBuV
5.355800 GHz
D1 80.24 dBuV
D2 60.24 dBuV
97
90
80
70
60
50
40
30
20
10
-3
Center 5.327 GHz
20 MHz/
Span 200 MHz


RBW 1 MHz
VBW 10 Hz
SWT 16 s
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
70.82 dBuV
5.243000 GHz
Marker 2 [T1]
20.78 dBuV
5.350000 GHz
Marker 3 [T1]
21.16 dBuV
5.360200 GHz
D1 70.82 dBuV
D2 50.82 dBuV
Center 5.327 GHz
20 MHz/
Span 200 MHz


RBW 1 MHz
VBW 3 MHz
SWT 800 ms
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
79.18 dBuV
5.226100 GHz
Marker 2 [T1]
53.62 dBuV
33.125160 GHz
Marker 3 [T1]
51.52 dBuV
38.720960 GHz
Marker 4 [T1]
50.39 dBuV
36.802400 GHz
D1 80.24 dBuV
D2 60.24 dBuV
Start 30 MHz
3.997 GHz/
Stop 40 GHz

DRAFT 802.11n (20MHz) OFDM MODULATION

Channel 36 (5180MHz)

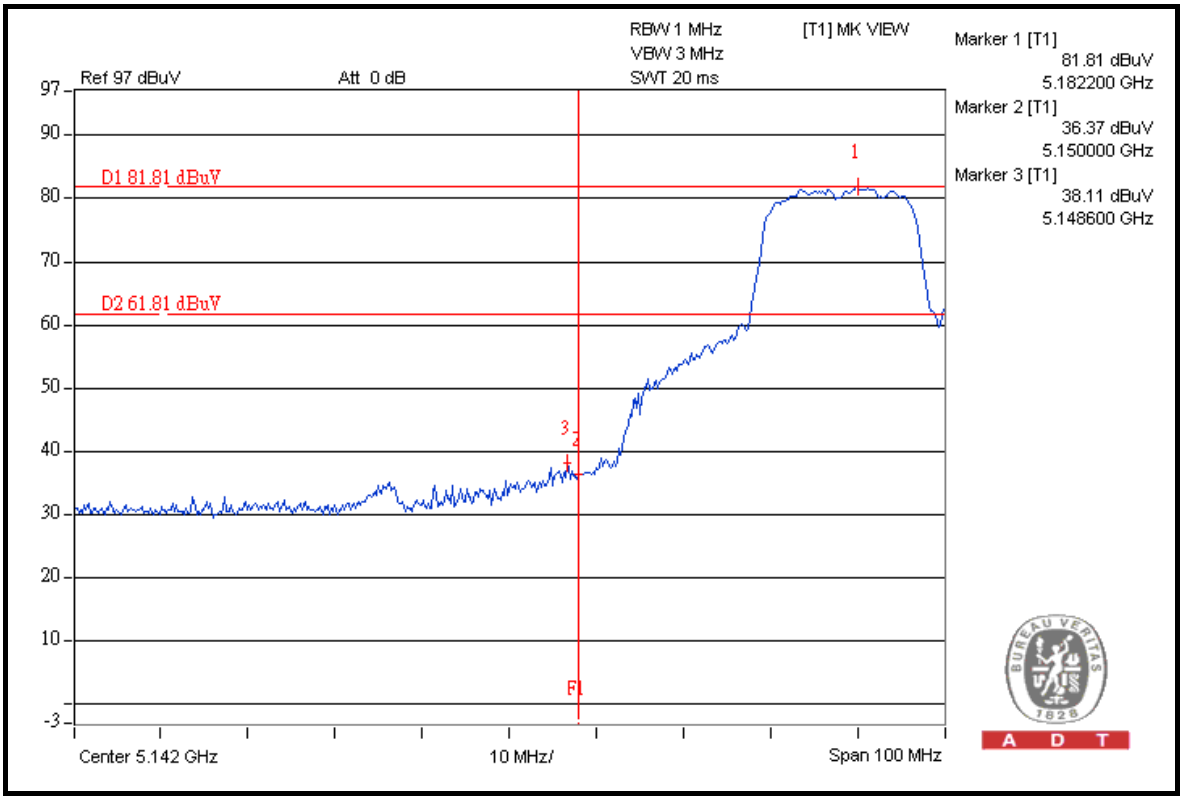
The band edge emission plot on the next page shows 43.70dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 36 is 108.79dBuV/m (Peak), so the maximum field strength in restrict band is 108.79 – 43.70 = 65.09dBuV/m which is under 74dBuV/m limit.

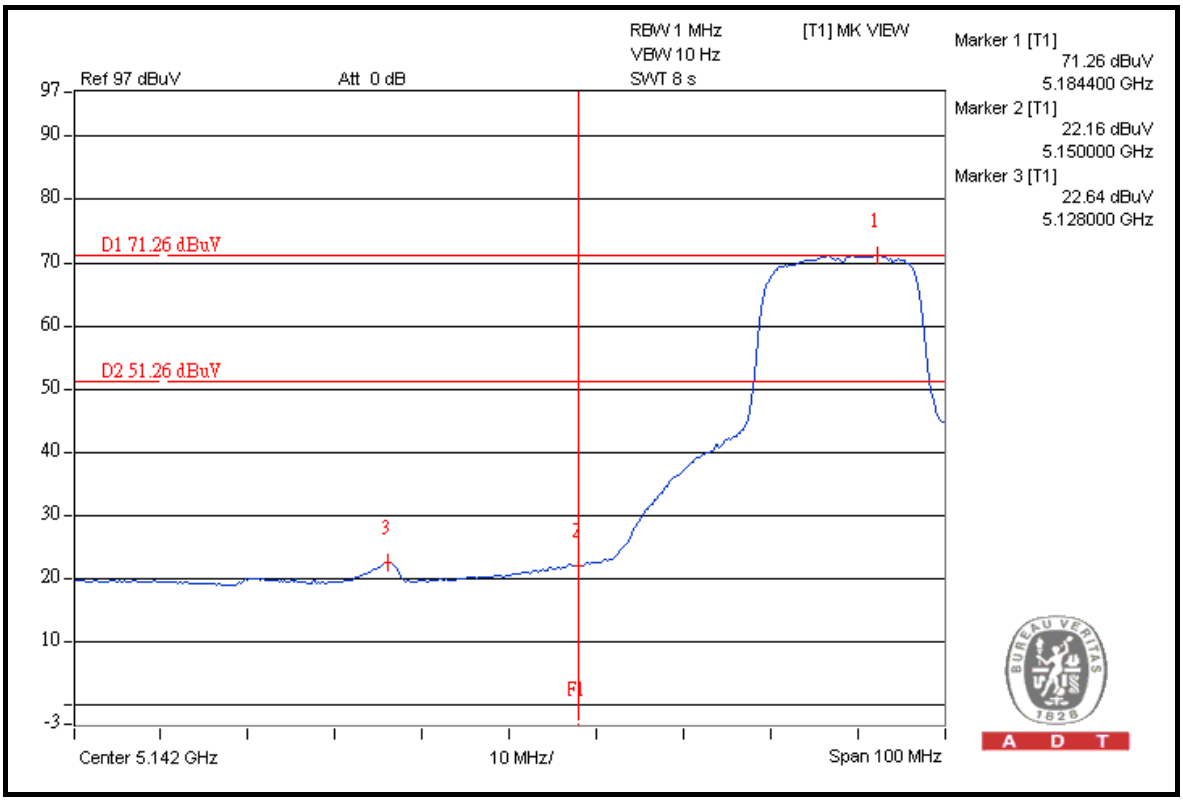
The band edge emission plot on the next page shows 48.62dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 36 is 98.67dBuV/m (Average), so the maximum field strength in restrict band is 98.67 – 48.62 = 50.05dBuV/m which is under 54dBuV/m limit.

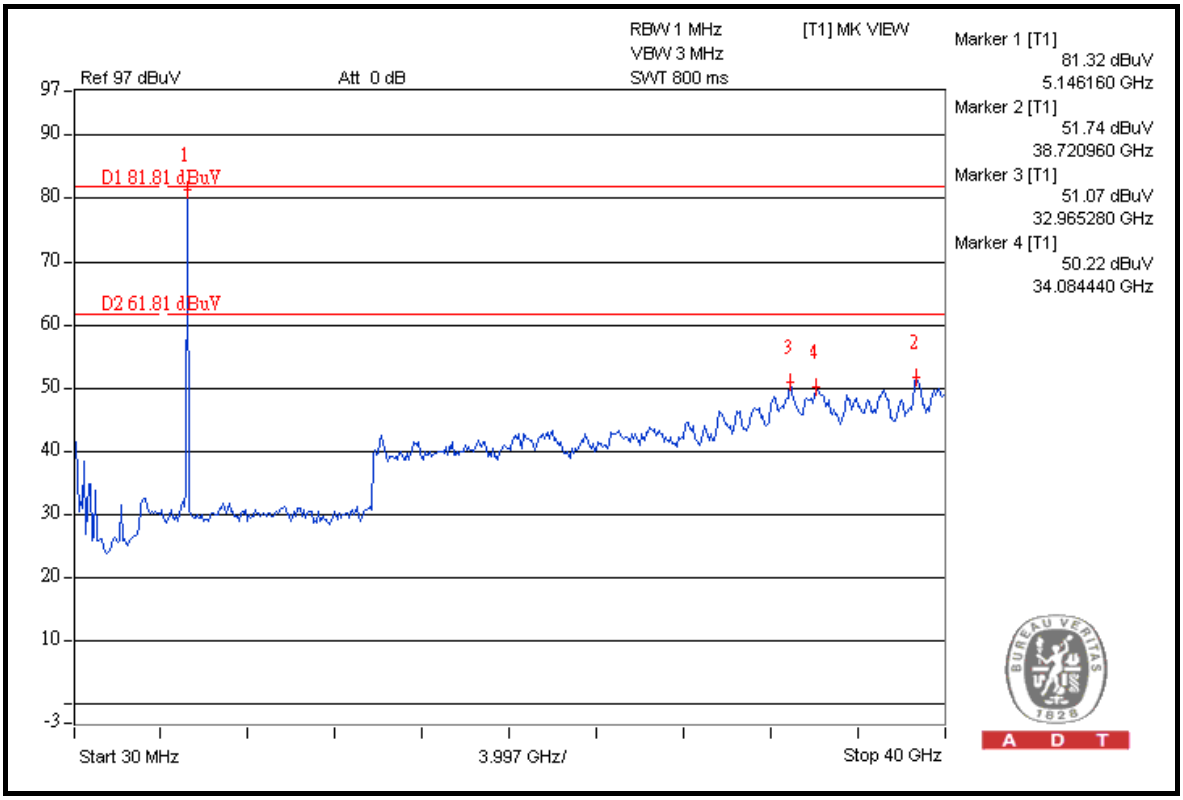
Channel 48 (5240MHz)

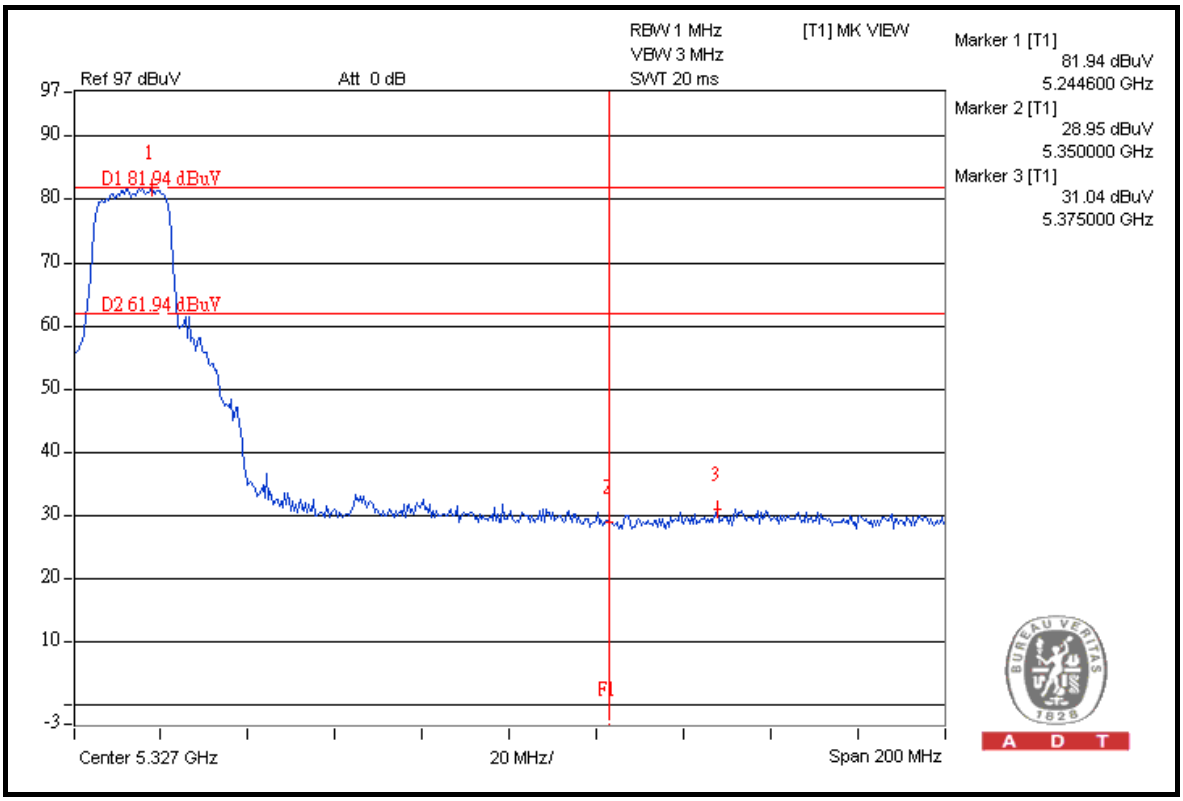
The band edge emission plot on the next second page shows 50.90dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 48 is 108.11dBuV/m (Peak), so the maximum field strength in restrict band is 108.11 – 50.90 = 57.21dBuV/m which is under 74dBuV/m limit.

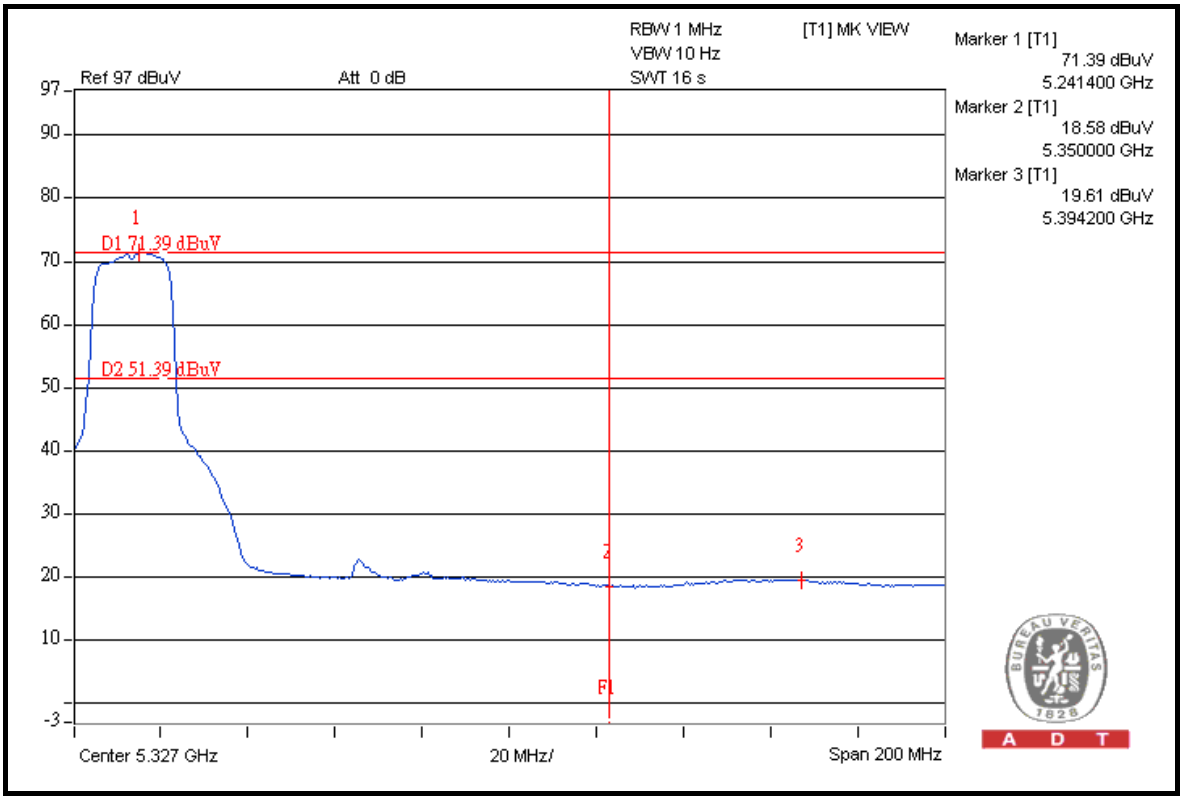
The band edge emission plot on the next third page shows 51.78dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 48 is 98.02dBuV/m (Average), so the maximum field strength in restrict band is 98.02 – 51.78 = 46.24dBuV/m which is under 54dBuV/m limit.

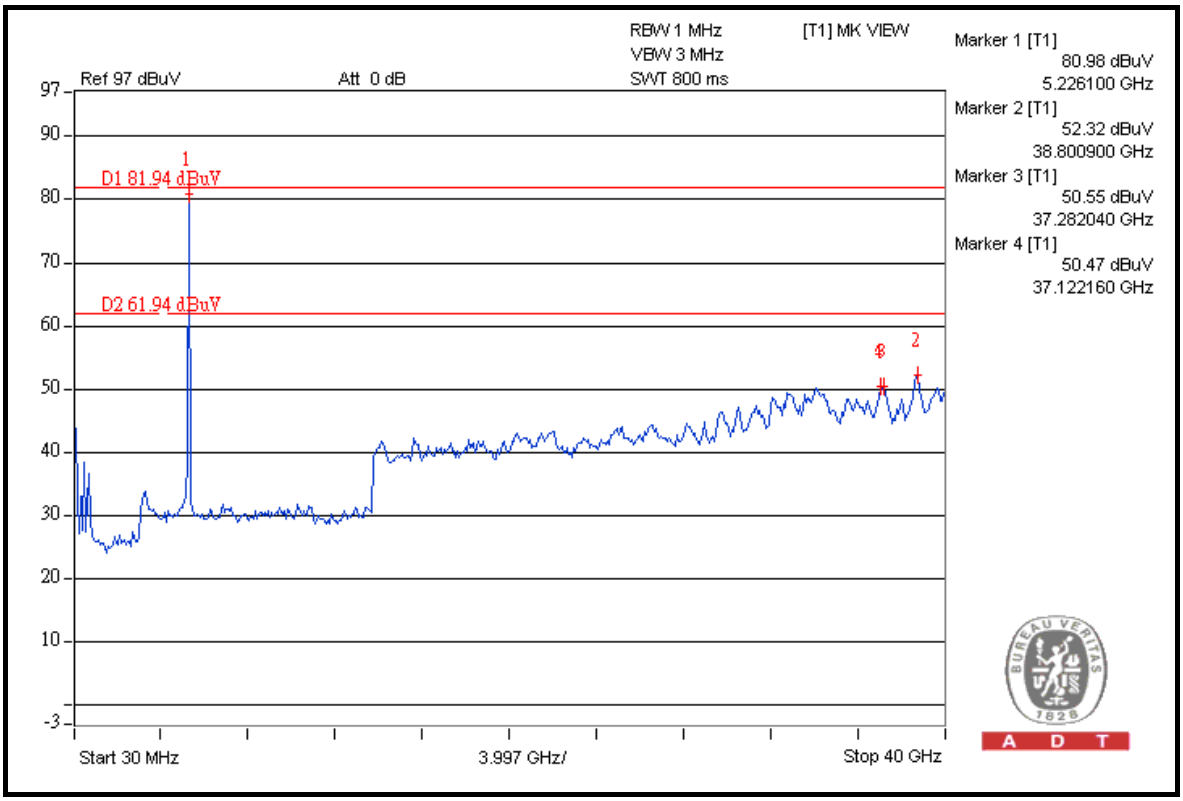

RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
81.81 dBuV
5.182200 GHz
Marker 2 [T1]
36.37 dBuV
5.150000 GHz
Marker 3 [T1]
38.11 dBuV
5.148600 GHz
D1 81.81 dBuV
D2 61.81 dBuV
97
90
80
70
60
50
40
30
20
10
-3
Center 5.142 GHz
10 MHz/
Span 100 MHz


RBW 1 MHz
VBW 10 Hz
SWT 8 s
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
71.26 dBuV
5.184400 GHz
Marker 2 [T1]
22.16 dBuV
5.150000 GHz
Marker 3 [T1]
22.64 dBuV
5.128000 GHz
D1 71.26 dBuV
D2 51.26 dBuV
97
90
80
70
60
50
40
30
20
10
-3
Center 5.142 GHz
10 MHz/
Span 100 MHz


RBW 1 MHz
VBW 3 MHz
SWT 800 ms
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
81.32 dBuV
5.146160 GHz
Marker 2 [T1]
51.74 dBuV
38.720960 GHz
Marker 3 [T1]
51.07 dBuV
32.965280 GHz
Marker 4 [T1]
50.22 dBuV
34.084440 GHz
D1 81.81 dBuV
D2 61.81 dBuV
97
90
80
70
60
50
40
30
20
10
-3
Start 30 MHz
3.997 GHz/
Stop 40 GHz


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
81.94 dBuV
5.244600 GHz
Marker 2 [T1]
28.95 dBuV
5.350000 GHz
Marker 3 [T1]
31.04 dBuV
5.375000 GHz
D1 81.94 dBuV
D2 61.94 dBuV
97
90
80
70
60
50
40
30
20
10
-3
Center 5.327 GHz
20 MHz/
Span 200 MHz


RBW 1 MHz
VBW 10 Hz
SWT 16 s
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
71.39 dBuV
5.241400 GHz
Marker 2 [T1]
18.58 dBuV
5.350000 GHz
Marker 3 [T1]
19.61 dBuV
5.394200 GHz
D1 71.39 dBuV
D2 51.39 dBuV
Center 5.327 GHz
20 MHz/
Span 200 MHz


RBW 1 MHz
VBW 3 MHz
SWT 800 ms
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
80.98 dBuV
5.226100 GHz
Marker 2 [T1]
52.32 dBuV
38.800900 GHz
Marker 3 [T1]
50.55 dBuV
37.282040 GHz
Marker 4 [T1]
50.47 dBuV
37.122160 GHz
D1 81.94 dBuV
D2 61.94 dBuV
Start 30 MHz
3.997 GHz/
Stop 40 GHz

DRAFT 802.11n (40MHz) OFDM MODULATION

Channel 38 (5190MHz)

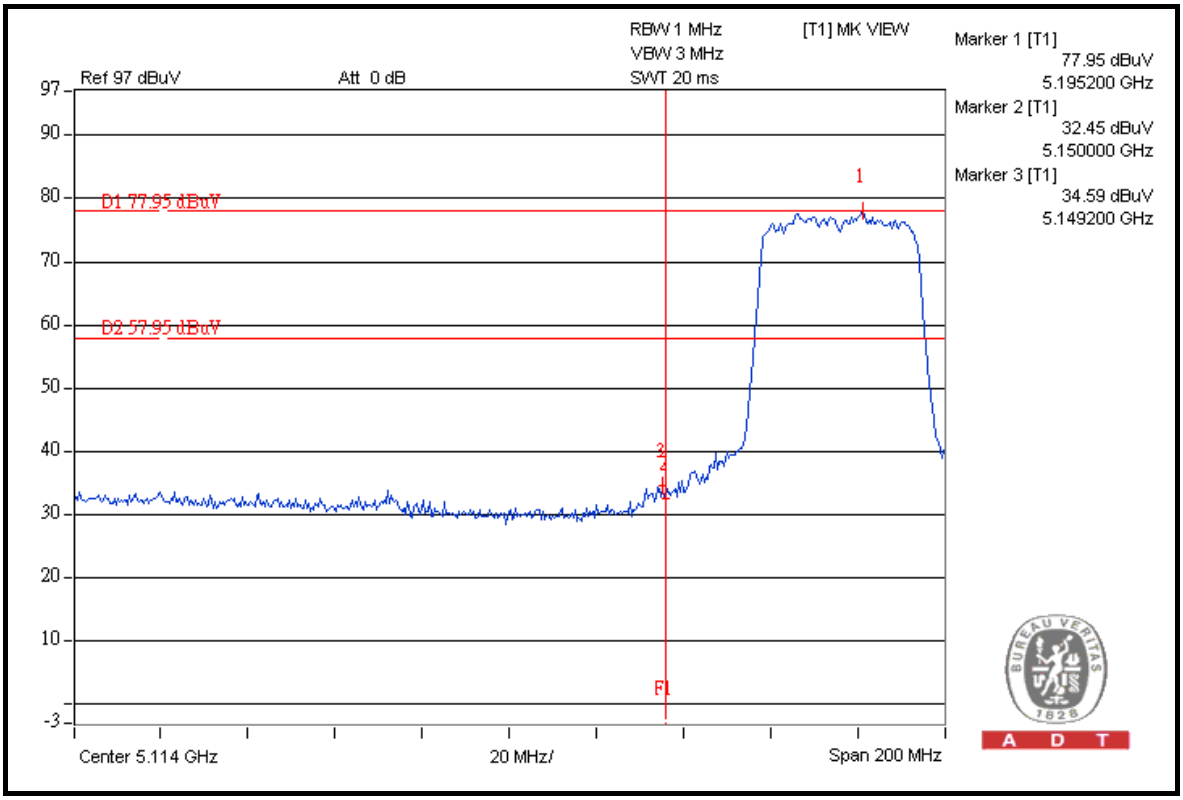
The band edge emission plot on the next page shows 43.36dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 38 is 104.46dBuV/m (Peak), so the maximum field strength in restrict band is 104.46 – 43.36 = 61.10dBuV/m which is under 74dBuV/m limit.

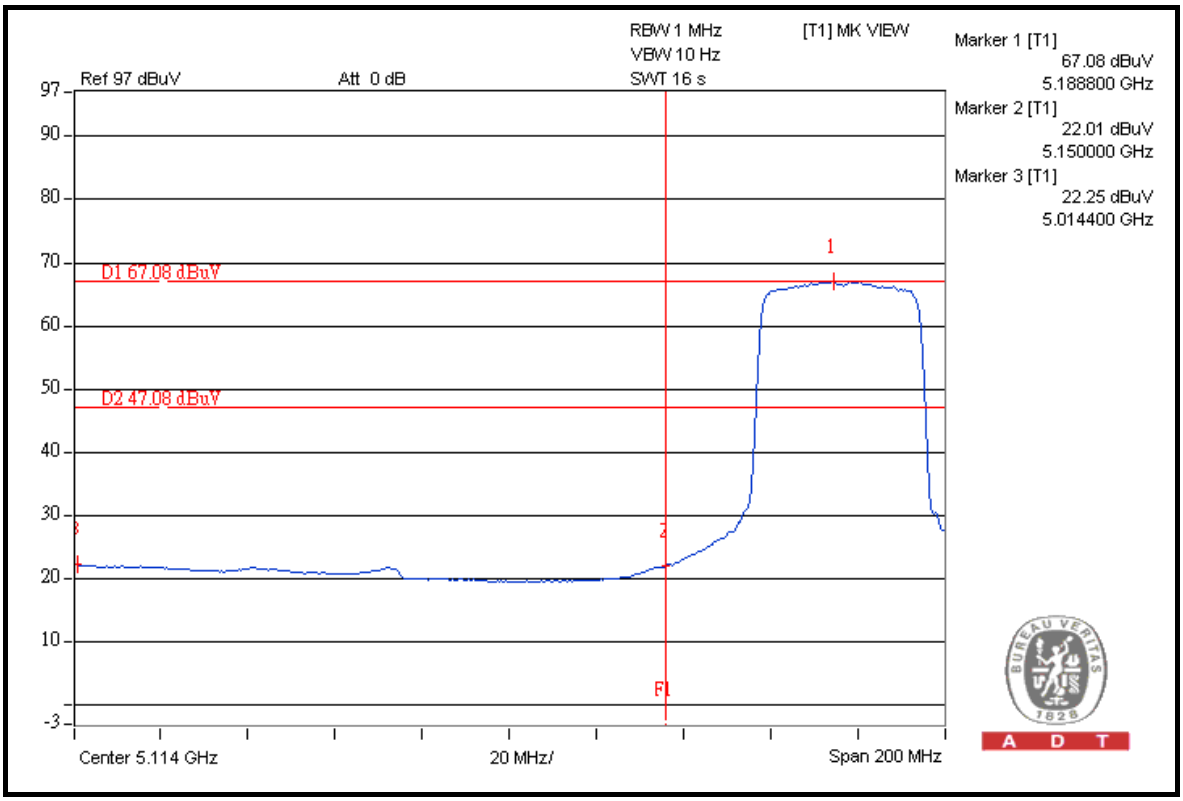
The band edge emission plot on the next page shows 44.83dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 38 is 94.38dBuV/m (Average), so the maximum field strength in restrict band is 94.38 – 44.83 = 49.55dBuV/m which is under 54dBuV/m limit.

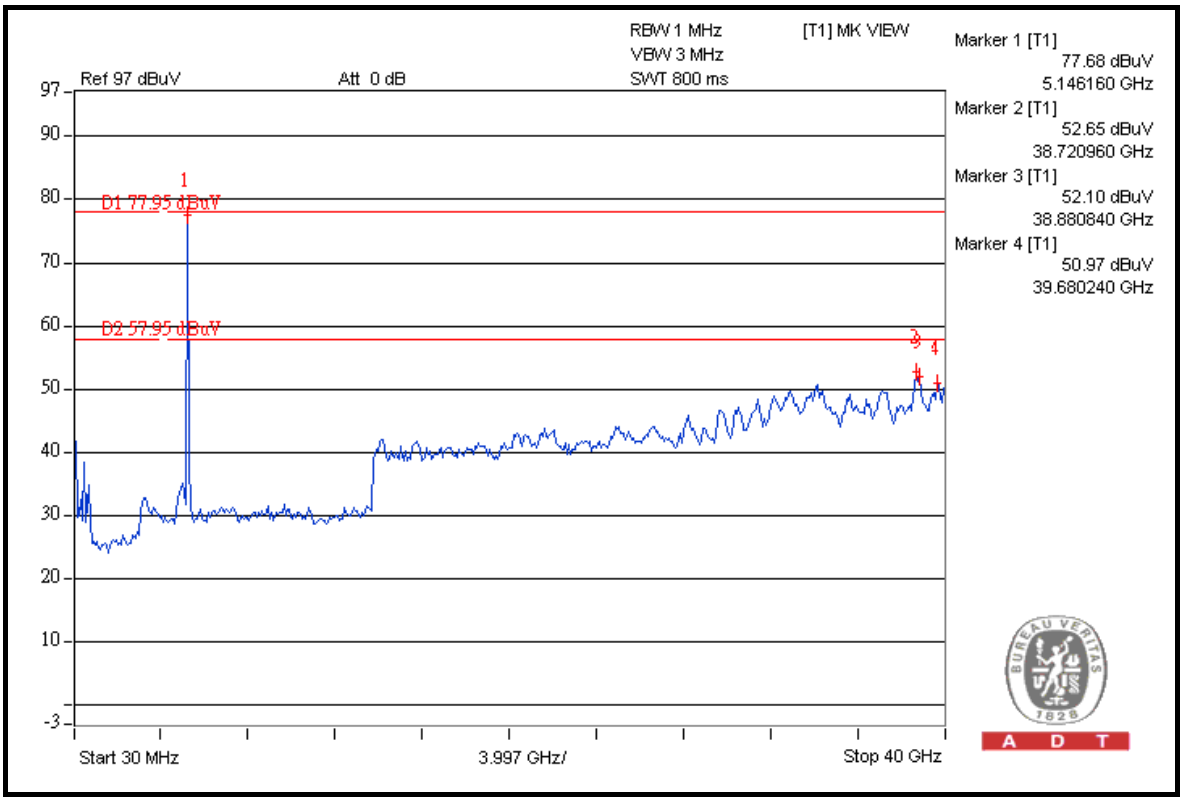
Channel 46 (5230MHz)

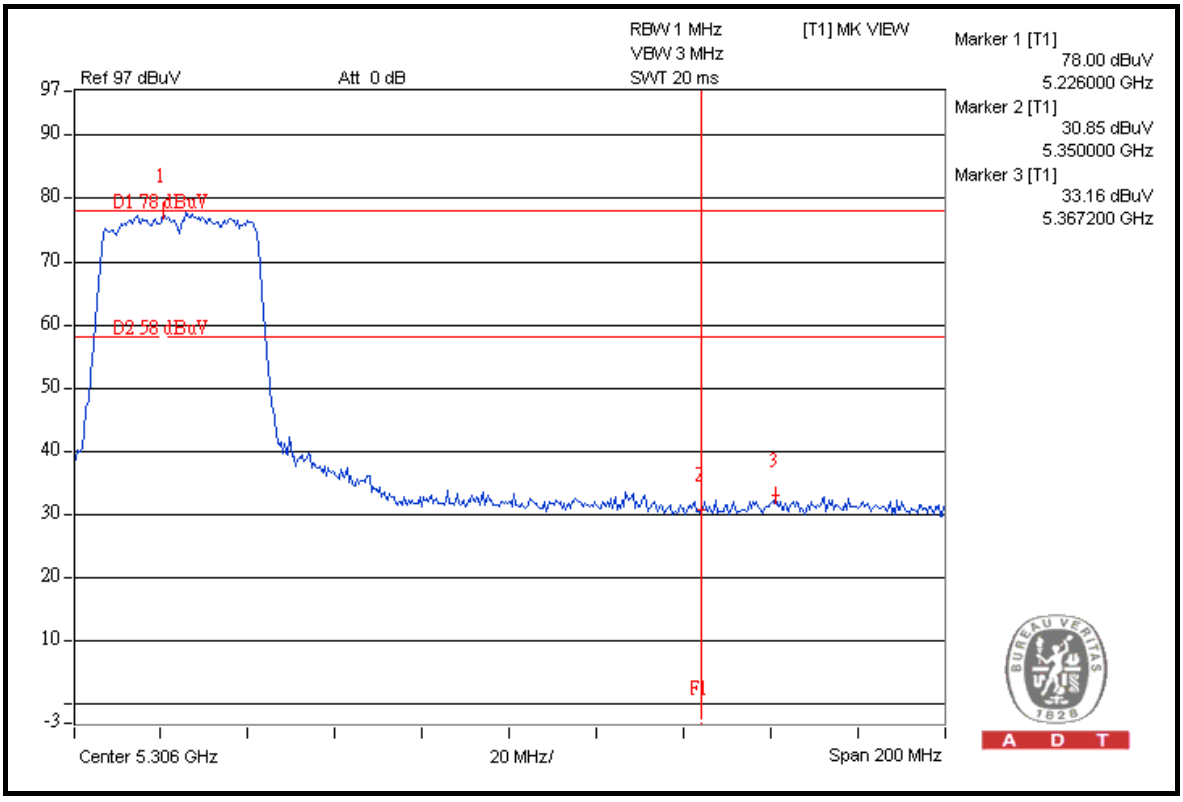
The band edge emission plot on the next second page shows 44.84dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 46 is 104.18dBuV/m (Peak), so the maximum field strength in restrict band is 104.18 – 44.84 = 59.34dBuV/m which is under 74dBuV/m limit.

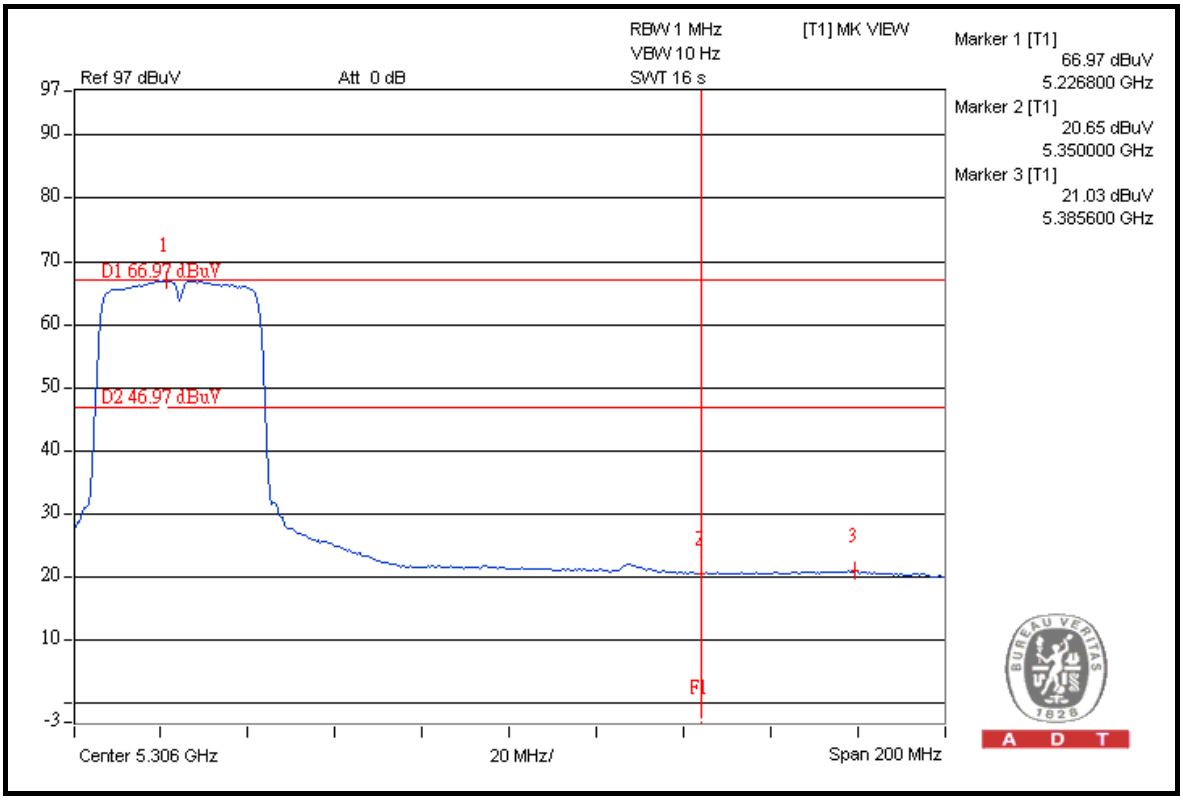
The band edge emission plot on the next third page shows 45.94dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 46 is 94.06dBuV/m (Average), so the maximum field strength in restrict band is 94.06 – 45.94 = 48.12dBuV/m which is under 54dBuV/m limit.

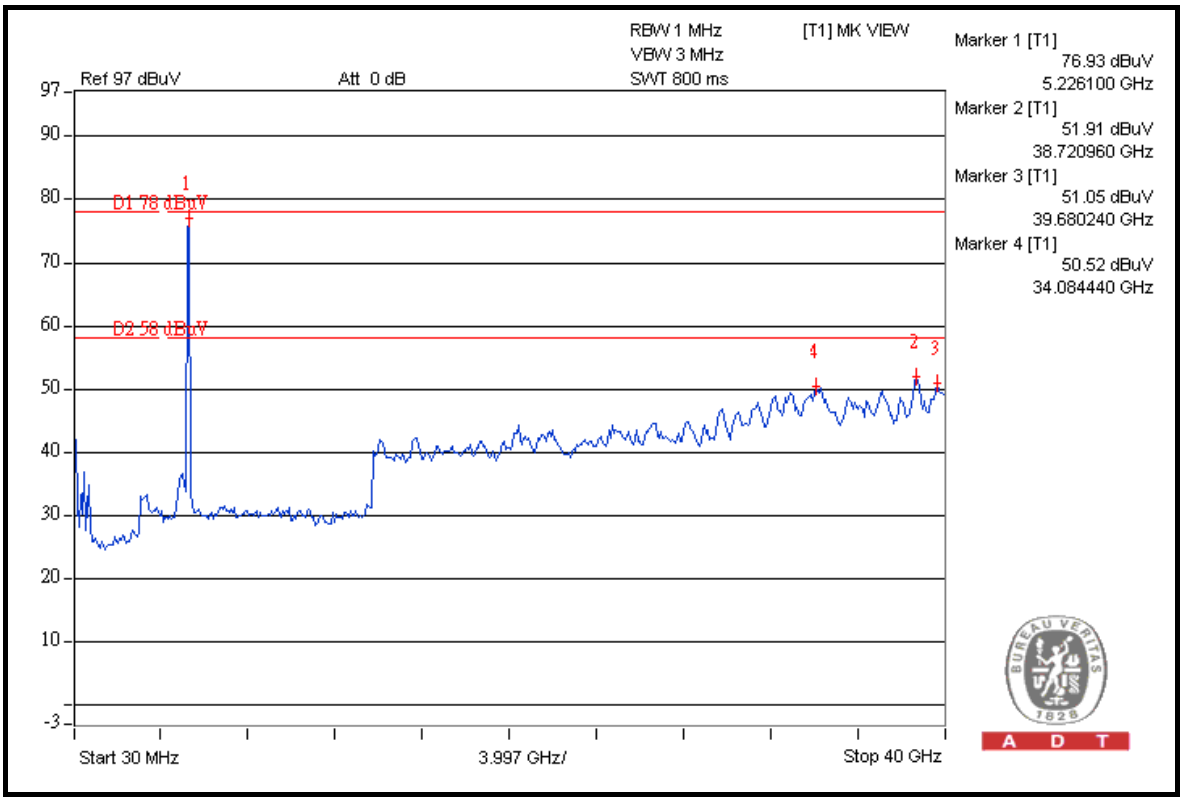

RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
77.95 dBuV
5.195200 GHz
Marker 2 [T1]
32.45 dBuV
5.150000 GHz
Marker 3 [T1]
34.59 dBuV
5.149200 GHz
D1 77.95 dBuV
D2 57.95 dBuV
Center 5.114 GHz
20 MHz/
Span 200 MHz


RBW 1 MHz
VBW 10 Hz
SWT 16 s
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
67.08 dBuV
5.188800 GHz
Marker 2 [T1]
22.01 dBuV
5.150000 GHz
Marker 3 [T1]
22.25 dBuV
5.014400 GHz
D1 67.08 dBuV
D2 47.08 dBuV
Center 5.114 GHz
20 MHz/
Span 200 MHz


RBW 1 MHz
VBW 3 MHz
SWT 800 ms
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
77.68 dBuV
5.146160 GHz
Marker 2 [T1]
52.65 dBuV
38.720960 GHz
Marker 3 [T1]
52.10 dBuV
38.880840 GHz
Marker 4 [T1]
50.97 dBuV
39.680240 GHz
D1 77.95 dBuV
D2 57.95 dBuV
Start 30 MHz
3.997 GHz/
Stop 40 GHz


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
78.00 dBuV
5.226000 GHz
Marker 2 [T1]
30.85 dBuV
5.350000 GHz
Marker 3 [T1]
33.16 dBuV
5.367200 GHz
D1 78 dBuV
D2 58 dBuV
Center 5.306 GHz
20 MHz/
Span 200 MHz


RBW 1 MHz
VBW 10 Hz
SWT 16 s
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
66.97 dBuV
5.226800 GHz
Marker 2 [T1]
20.65 dBuV
5.350000 GHz
Marker 3 [T1]
21.03 dBuV
5.385600 GHz
D1 66.97 dBuV
D2 46.97 dBuV
Center 5.306 GHz
20 MHz/
Span 200 MHz


RBW 1 MHz
VBW 3 MHz
SWT 800 ms
[T1] MK VIEW
Ref 97 dBuV
Att 0 dB
Marker 1 [T1]
76.93 dBuV
5.226100 GHz
Marker 2 [T1]
51.91 dBuV
38.720960 GHz
Marker 3 [T1]
51.05 dBuV
39.680240 GHz
Marker 4 [T1]
50.52 dBuV
34.084440 GHz
D1 78 dBuV
D2 58 dBuV
Start 30 MHz
3.997 GHz/
Stop 40 GHz

4.8 ANTENNA REQUIREMENT

4.8.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.407(a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.8.2 ANTENNA CONNECTED CONSTRUCTION

The antennas used in this product are Printed antenna without connector. The maximum gain of the antenna is -3dBi.

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, 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---