

FCC TEST REPORT

REPORT NO.: RF990501E01

MODEL NO.: AR5B197

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TESTED: May 11 to 17, 2010

ISSUED: June 07, 2010

APPLICANT: Atheros Communications, Inc.

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1. CERTIFICATION

PRODUCT: AR5B197 2x2 802.11n - BT Combo Card
BRAND NAME: Atheros
MODEL NO.: AR5B197
TEST SAMPLE: R&D SAMPLE
TESTED: May 11 to 17, 2010
APPLICANT: Atheros Communications, Inc.
STANDARDS: FCC Part 15, Subpart C (Section 15.247),
ANSI C63.4-2003
Canada RSS-210 issue 7
Canada RSS-Gen issue 2

The above equipment (Model: AR5B197) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and was in 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 : Midoli Peng , **DATE:** June 07, 2010
(Midoli Peng, Specialist)

TECHNICAL ACCEPTANCE : Hank Chung , **DATE:** June 07, 2010
(Hank Chung, Deputy Manager)

APPROVED BY : May Chen , **DATE:** June 07, 2010
(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C ; RSS-210; RSS-Gen					
Standard Section			Test Type and Limit	Result	REMARK
RSS-210	RSS-Gen	47 CFR Part 15			
-	7.2.2	15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -16.35dB at 0.209MHz
A8.2(a)	4.6	15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit
A8.4(4)	4.8	15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit
A8.5	4.9	15.247(c)	Transmitter Radiated Emissions FCC Limit: Table 15.209 RSS-210 Limit: Table 2	PASS	Meet the requirement of limit Minimum passing margin is -0.5dB at 2483.5MHz
-	6	-	Receiver Radiated Emissions RSS-210 Limit: Table 2	PASS	Meet the requirement of limit Minimum passing margin is -3.2dB at 176.61MHz
A8.2(b)	-	15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit
A8.5	-	15.247(c)	Conducted Out-Band Emission Measurement Limit: 20 dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit
	7.1.4	15.203	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.



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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:

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

Measurement	Value
Conducted emissions	2.45 dB
Radiated emissions (30MHz-1GHz)	3.76 dB
Radiated emissions (1GHz -18GHz)	2.19 dB
Radiated emissions (18GHz -40GHz)	2.55 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	AR5B197 2x2 802.11n - BT Combo Card
MODEL NO.	AR5B197
FCC ID	PPD-AR5B197
IC ID	4104A-AR5B197
POWER SUPPLY	DC 3.3V from host equipment
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	WLAN :DSSS, OFDM
TRANSFER RATE	802.11b: 11 / 5.5 / 2 / 1Mbps 802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps 802.11n (20MHz, 800ns GI): 65 / 58.5 / 52 / 39 / 26 / 19.5 / 13 / 6.5Mbps 802.11n (20MHz, 800ns GI): 130 / 117 / 104 / 78 / 52 / 39 / 26 / 13Mbps 802.11n (40MHz, 800ns GI): 135 / 121.5 / 108 / 81 / 54 / 40.5 / 27 / 13.5Mbps 802.11n (40MHz, 800ns GI): 270 / 243 / 216 / 162 / 108 / 81 / 54 / 27Mbps 802.11n (40MHz, 400ns GI): 150 / 135 / 120 / 90 / 60 / 45 / 30 / 15Mbps 802.11n (40MHz, 400ns GI): 300 / 270 / 240 / 180 / 120 / 90 / 60 / 30Mbps
OPRTAING FREQUENCY	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
MAXIMUM OUTPUT POWER	802.11b: 105.0mW 802.11g: 514.2mW 802.11n (20MHz): 508.2mW 802.11n (40MHz): 299.3mW
ANTENNA TYPE	See item 3.2
ANTENNA CONNECTOR	See item 3.2
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. There are Bluetooth technology and WLAN technology used for the EUT. <the Bluetooth test data please refer "RF990501E01-1">
2. The EUT incorporates CDD function with 802.11b, 802.11g and MIMO function with 802.11n.
3. The EUT is 2 * 2 spatial MIMO (2Tx & 2Rx) without beam forming function. The antenna configurations are two transmitter antennas and two receiver antennas. Spatial multiplexing modes for simultaneous transmission using 2 antennas, and for simultaneous receiver using 2 antennas.
4. The EUT complies with 802.11n standards and backwards compatible with 802.11b, 802.11g products.
5. The EUT was pre-tested under the following modes:

Test Mode	Data rate
Mode A	400ns GI
Mode B	800ns GI

From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

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

3.2 DESCRIPTION OF ANTENNA

There is one set antenna provided to this EUT, please refer to the following table:

Brand	Model	Gain(dBi) (included cable loss)	Antenna Type	Connector	Cable Loss(dB)	Cable Length
WNC	81-EBJ15.005 (Main)	3.00	PIFA	IPEX	1.15	300mm
	81-EBJ15.005 (AUX)	3.62			1.15	300mm

Note: Main – Wireless / Aux -- Wireless & BT

3.3 DESCRIPTION OF TEST MODES

Operated in 2400 ~ 2483.5MHz band:

Eleven channels are provided for 802.11b, 802.11g, 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 802.11n (40MHz):

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

3.3.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

Where **PLC**: Power Line Conducted Emission

RE < 1G: Radiated Emission below 1GHz

RE ≥ 1G: Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

ANTENNA COMBINATION MODE:

COMBINATION MODE	OPERATION MODE	TX CHAIN(0)	TX CHAIN(1)
A	802.11 b	√	√
B	802.11 g	√	√
C	802.11n(20MHz) for MCS0~7	√	√
D	802.11n(20MHz) for MCS8~15	√	√
E	802.11n(40MHz) for MCS0~7	√	√
F	802.11n(40MHz) for MCS8~15	√	√
COMBINATION MODE	OPERATION MODE	RX CHAIN(0)	RX CHAIN(1)
G	Receiver	√	√

Note:

- The above information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.
- Mode A, B, C, E and G the worst modes, were selected as representative mode for the report

POWER LINE CONDUCTED EMISSION TEST:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	TX COMBINATION
802.11n (20MHz)	1 to 11	6	OFDM	BPSK	6.5	C

RADIATED EMISSION TEST (BELOW 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ The receiving mode had show equal or better than Tx mode during the pre-scan and hence the Tx mode data is re-used for Receiving-mode worst-case data.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	TX COMBINATION
802.11n (20MHz)	1 to 11	6	OFDM	BPSK	6.5	C

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	TX COMBINATION
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1	A
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6	B
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	C
802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	13.5	E
Receiver	1 to 11	1, 6, 11	-	-	-	G

CONDUCTED OUT-BAND EMISSION MEASUREMENT:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	TX COMBINATION
802.11b	1 to 11	1, 11	DSSS	DBPSK	1	A
802.11g	1 to 11	1, 11	OFDM	BPSK	6	B
802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	6.5	C
802.11n (40MHz)	1 to 7	1, 7	OFDM	BPSK	13.5	E

ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	TX COMBINATION
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1	A
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6	B
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	C
802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	13.5	E

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE $\geq$ 1G	20deg. C, 70%RH, 1012 hPa	120Vac, 60Hz	Duke Tseng
RE<1G	21deg. C, 73%RH, 1012 hPa	120Vac, 60Hz	Duke Tseng
PLC	26deg. C, 63%RH, 1012 hPa	120Vac, 60Hz	Wen Yu
APCM	24deg. C, 67%RH, 1012 hPa	120Vac, 60Hz	Rex Huang

3.4 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

Canada RSS-210 issue 7

Canada RSS-Gen issue 2

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.

3.5 DESCRIPTION OF SUPPORT UNITS

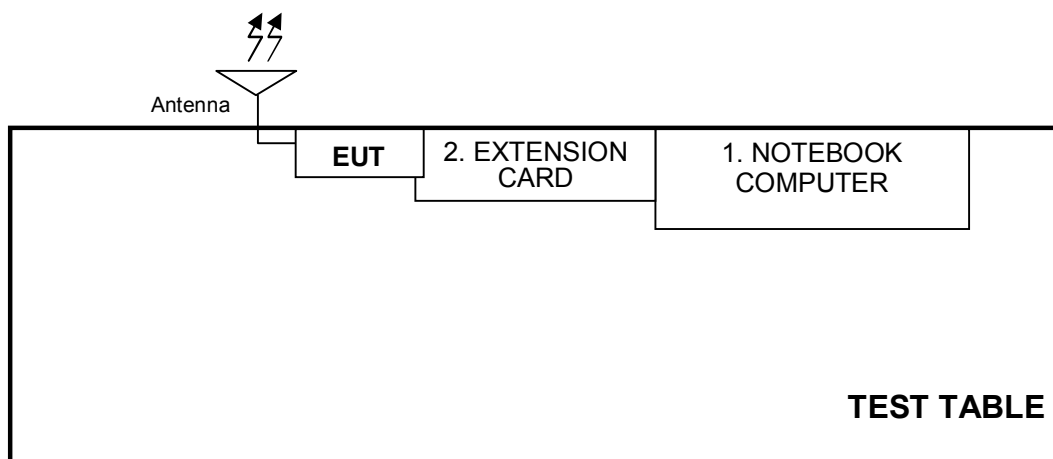
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP21L	CN-0GD366-70166-5B3-09ZX	QDS-BRCM1016
2	EXTENSION CARD	Atheros	NA	NA	NA

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

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

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100287	Mar. 01, 2010	Feb. 28, 2011
Line-Impedance Stabilization Network (for EUT)	NSLK 8127	8127-523	Sep. 23, 2009	Sep. 22, 2010
Line-Impedance Stabilization Network (for Peripheral)	ENV-216	100072	June 08, 2009	June 07, 2010
RF Cable (JYEBAO)	5DFB	COACAB-001	Dec. 14, 2009	Dec. 13, 2010
50 ohms Terminator	50	3	Oct. 28, 2009	Oct. 27, 2010
Software	BV 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 Shielded Room No. A.
3. The VCCI Con A Registration No. is C-817.

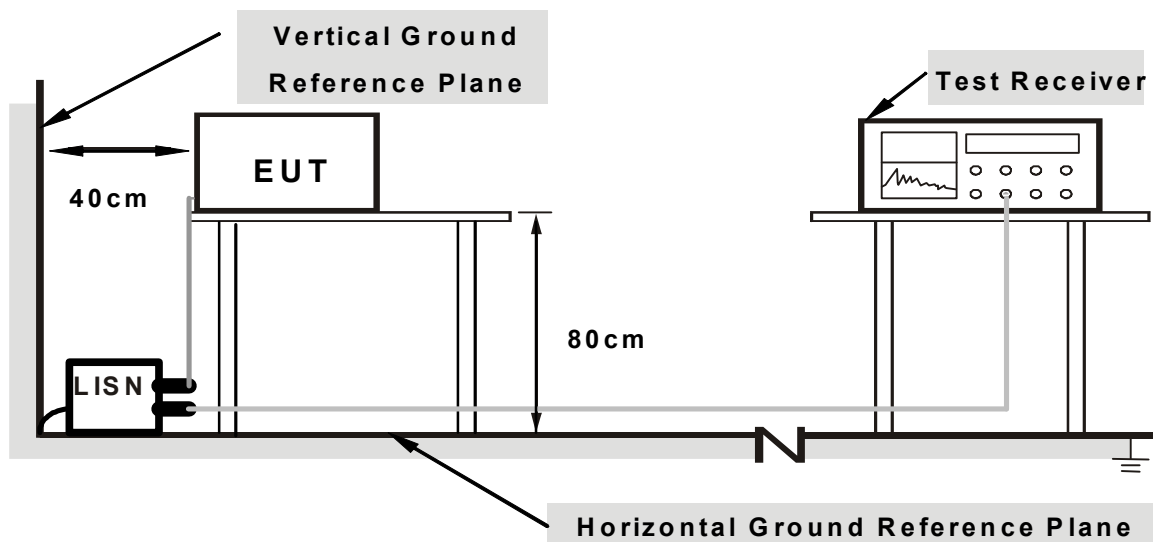
4.1.3 TEST PROCEDURES

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

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

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

4.1.6 EUT OPERATING CONDITIONS

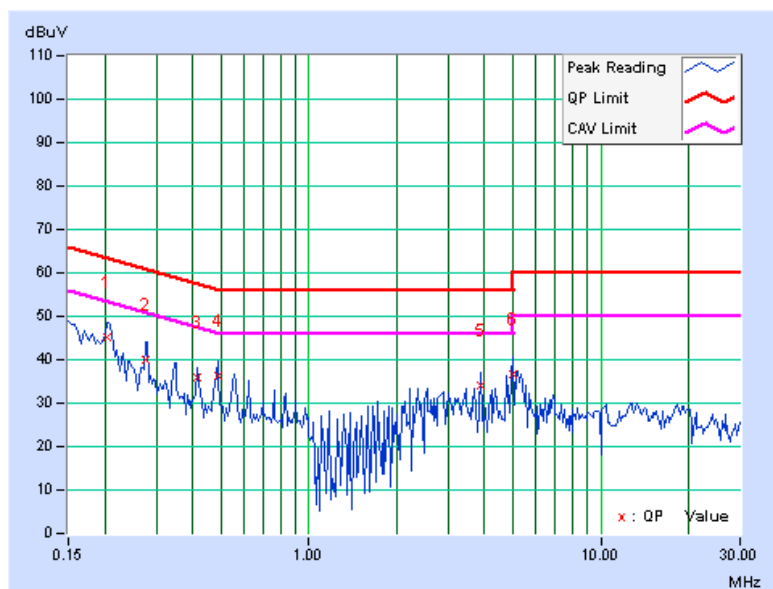
1. Connect the EUT with the support unit 1 (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program “ART V0.9B22” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 TEST RESULTS

PHASE	Line (L)	6dB BANDWIDTH	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.04	45.17	-	45.21	-	63.42	53.42	-18.21	-
2	0.275	0.05	40.02	-	40.07	-	60.97	50.97	-20.90	-
3	0.416	0.06	35.88	-	35.94	-	57.54	47.54	-21.59	-
4	0.486	0.06	36.33	-	36.39	-	56.24	46.24	-19.84	-
5	3.879	0.20	34.04	-	34.24	-	56.00	46.00	-21.76	-
6	4.984	0.23	36.41	-	36.64	-	56.00	46.00	-19.36	-

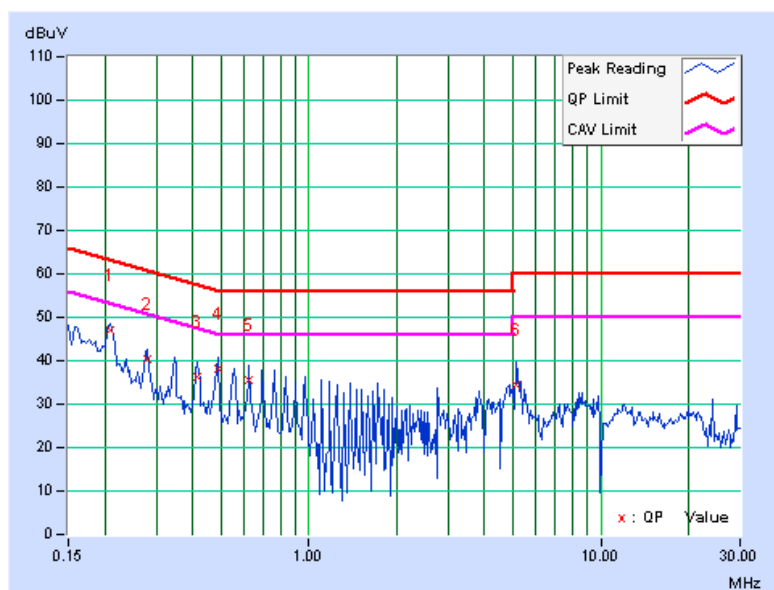
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
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	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.209	0.05	46.86	-	46.91	-	63.26	53.26	-16.35	-
2	0.279	0.06	40.34	-	40.40	-	60.85	50.85	-20.45	-
3	0.416	0.07	36.35	-	36.42	-	57.54	47.54	-21.11	-
4	0.486	0.07	38.18	-	38.25	-	56.24	46.24	-17.98	-
5	0.623	0.08	35.36	-	35.44	-	56.00	46.00	-20.56	-
6	5.121	0.25	34.02	-	34.27	-	60.00	50.00	-25.73	-

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



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209(RSS-210 table 2&3) as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250254	Aug. 03, 2009	Aug. 02, 2010
Agilent Pre-Selector	N9039A	MY46520310	Aug. 18, 2009	Aug. 17, 2010
Agilent Signal Generator	N5181A	MY49060347	July 18, 2009	July 17, 2010
LIG NEX1 Test Receiver	ER-265	L09068005	Aug. 31, 2009	Aug. 30, 2010
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-04	Nov. 18, 2009	Nov. 17, 2010
Agilent Pre-Amplifier	8449B	3008A02465	Mar. 01, 2010	Feb. 28, 2011
Miteq Pre-Amplifier	AFS33-1800265 0-30-8P-44	881786	NA	NA
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-361	Sep. 30, 2009	Sep. 29, 2010
AISI Horn_Antenna	AIH.8018	0000220091110	Nov. 16, 2009	Nov. 15, 2010
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Sep. 30, 2009	Sep. 29, 2010
RF CABLE	NA	RF104-205 RF104-207 RF104-208	Dec. 24, 2009	Dec. 23, 2010
RF Cable	NA	CHHCAB_001	NA	NA
Software	ADT_Radiated_V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 7450G-3.

4.2.3 TEST PROCEDURES

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

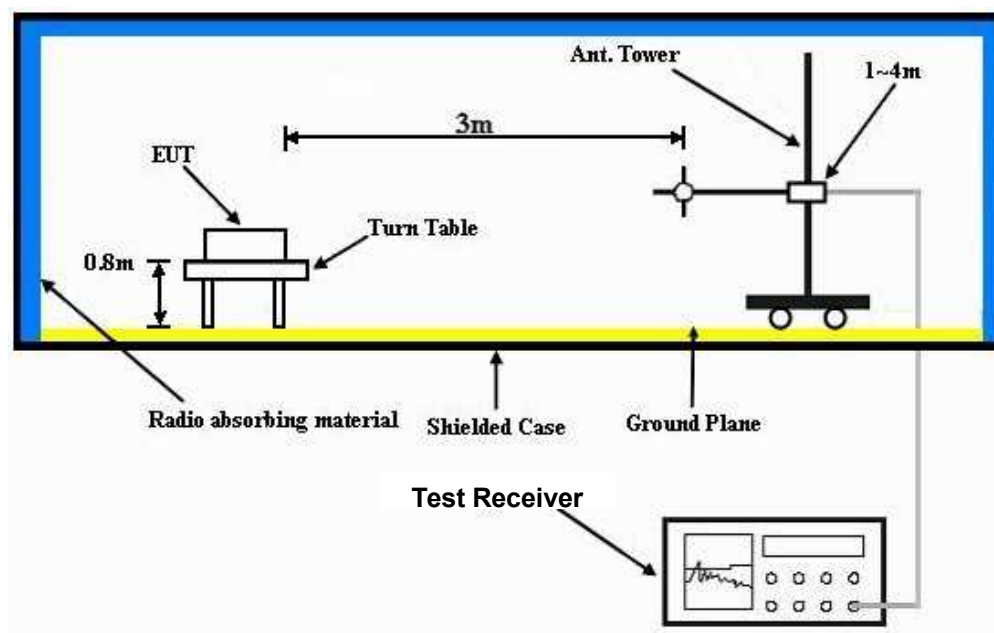
NOTE:

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS (FOR TRANSMITTER PART)

BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz) 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	21deg. C, 73%RH 1012 hPa	TESTED BY	Duke Tseng

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	124.16	33.6 QP	43.5	-9.9	2.50 H	343	21.46	12.13
2	176.61	40.3 QP	43.5	-3.2	2.25 H	241	30.81	9.51
3	248.63	42.7 QP	46.0	-3.3	1.25 H	180	29.07	13.62
4	431.22	40.1 QP	46.0	-5.9	2.00 H	189	22.04	18.10
5	566.57	40.3 QP	46.0	-5.7	1.50 H	148	19.32	20.95
6	846.05	39.3 QP	46.0	-6.7	1.50 H	241	14.28	24.99
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	34.15	34.6 QP	40.0	-5.4	1.00 V	238	17.47	17.12
2	106.50	38.3 QP	43.5	-5.2	1.25 V	237	26.76	11.51
3	123.91	39.1 QP	43.5	-4.5	1.00 V	23	26.92	12.13
4	199.94	36.9 QP	43.5	-6.6	1.75 V	201	27.15	9.75
5	239.96	37.6 QP	46.0	-8.4	1.00 V	257	24.66	12.93
6	846.88	32.3 QP	46.0	-13.7	1.25 V	136	7.29	25.01

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

ABOVE 1GHz WORST-CASE DATA

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	20deg. C, 70%RH 1012 hPa	TESTED BY	Duke Tseng

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	2389.73	57.4 PK	74.0	-16.6	1.27 H	72	26.14	31.21
2	2389.73	44.2 AV	54.0	-9.8	1.27 H	72	13.01	31.21
3	*2412.00	103.8 PK			1.27 H	72	72.51	31.27
4	*2412.00	101.8 AV			1.27 H	72	70.56	31.27
5	4824.00	55.3 PK	74.0	-18.7	1.00 H	255	15.92	39.42
6	4824.00	52.6 AV	54.0	-1.4	1.00 H	255	13.18	39.42
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	2389.20	56.9 PK	74.0	-17.1	1.00 V	16	25.70	31.21
2	2389.20	43.0 AV	54.0	-11.0	1.00 V	16	11.77	31.21
3	*2412.00	96.9 PK			1.00 V	16	65.61	31.27
4	*2412.00	94.6 AV			1.00 V	16	63.29	31.27
5	4824.00	55.7 PK	74.0	-18.3	1.04 V	320	16.32	39.42
6	4824.00	52.9 AV	54.0	-1.1	1.04 V	320	13.45	39.42

- 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.
 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	20deg. C, 70%RH 1012 hPa	TESTED BY	Duke Tseng

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	101.2 PK			1.25 H	72	69.87	31.34
2	*2437.00	99.0 AV			1.25 H	72	67.67	31.34
3	4874.00	56.1 PK	74.0	-17.9	1.00 H	287	16.49	39.62
4	4874.00	53.3 AV	54.0	-0.7	1.00 H	287	13.69	39.62
5	7311.00	51.3 PK	74.0	-22.7	1.52 H	229	7.21	44.10
6	7311.00	38.6 AV	54.0	-15.4	1.52 H	229	-5.51	44.10
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	94.3 PK			1.00 V	11	62.96	31.34
2	*2437.00	91.7 AV			1.00 V	11	60.33	31.34
3	4874.00	55.2 PK	74.0	-18.8	1.02 V	335	15.57	39.62
4	4874.00	52.0 AV	54.0	-2.0	1.02 V	335	12.38	39.62
5	7311.00	51.2 PK	74.0	-22.8	1.06 V	329	7.05	44.10
6	7311.00	38.4 AV	54.0	-15.6	1.06 V	329	-5.74	44.10

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.



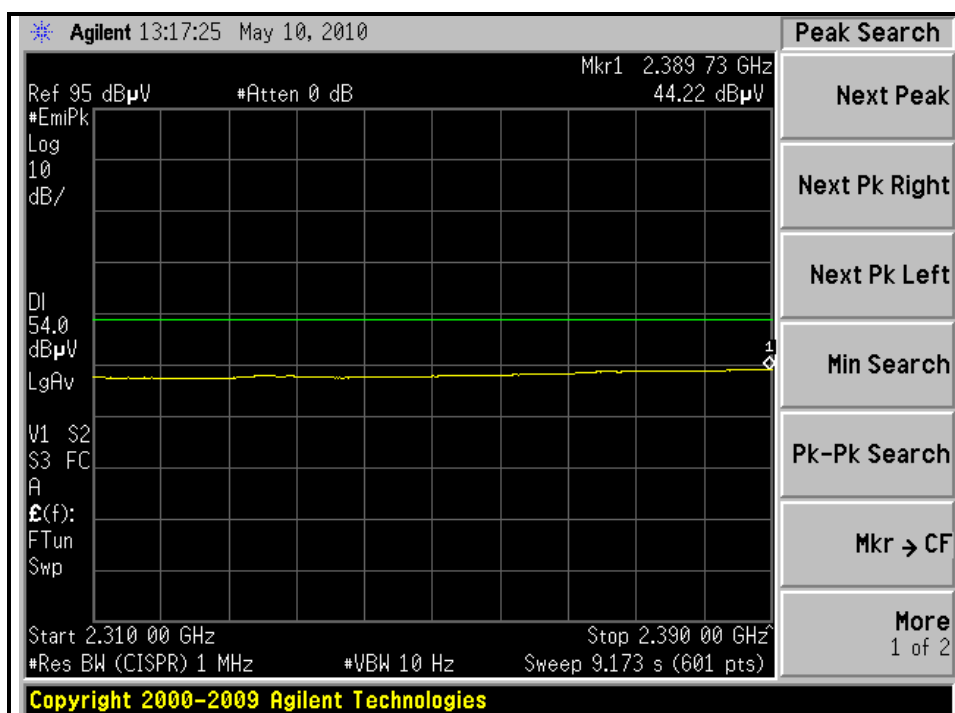
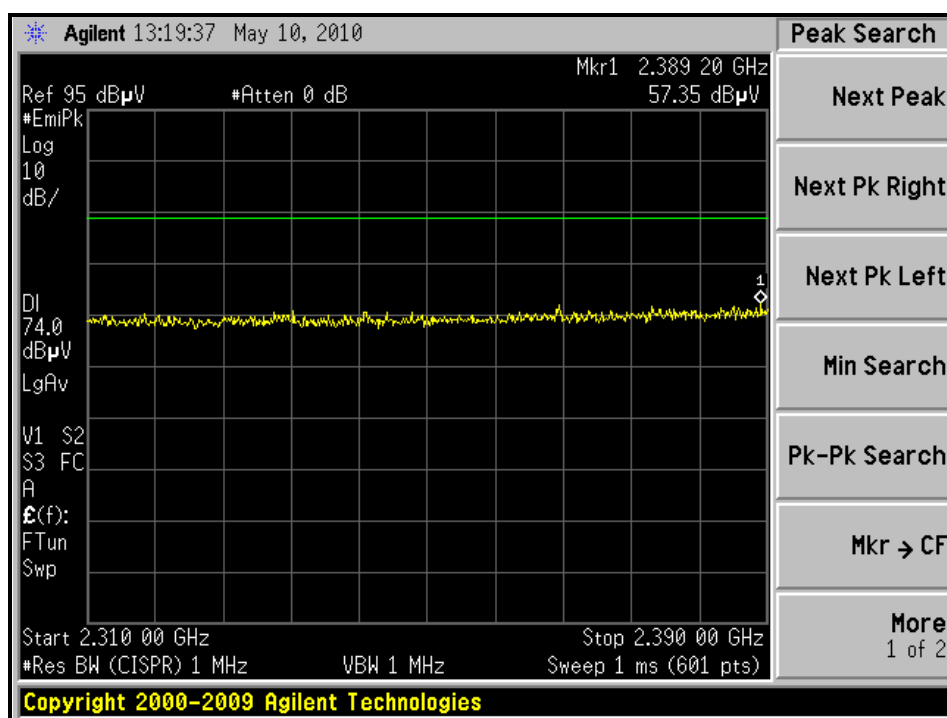
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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH 1012 hPa	TESTED BY	Duke Tseng

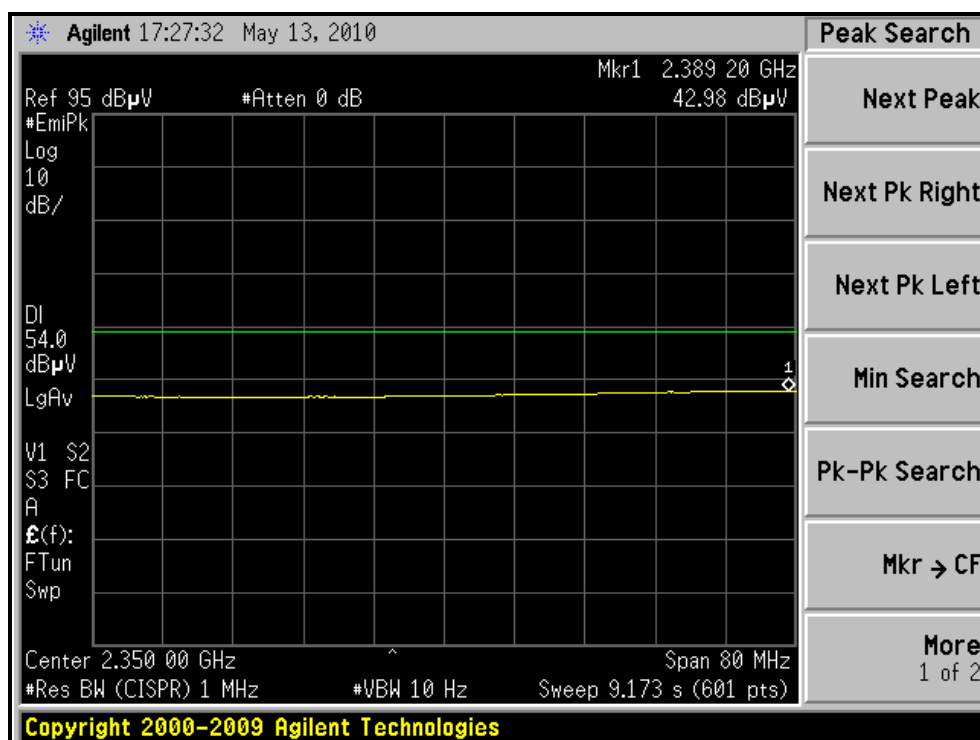
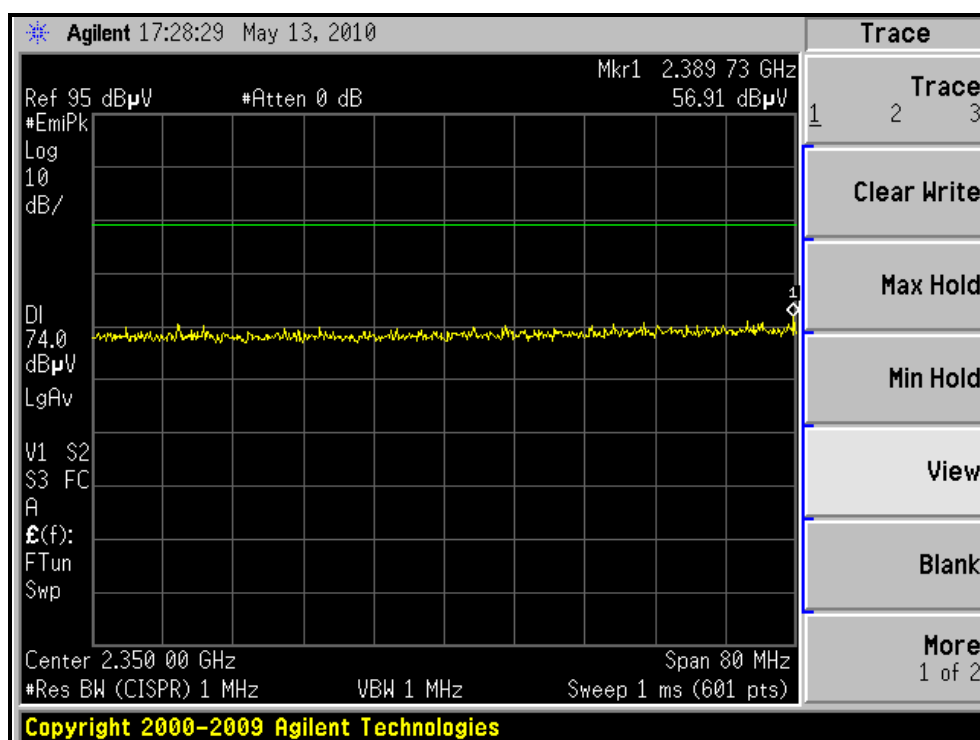
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NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	107.3 PK			1.23 H	95	75.91	31.40
2	*2462.00	105.2 AV			1.23 H	95	73.77	31.40
3	2483.50	57.8 PK	74.0	-16.2	1.23 H	95	26.36	31.46
4	2483.50	45.0 AV	54.0	-9.0	1.23 H	95	13.56	31.46
5	4924.00	55.7 PK	74.0	-18.3	1.00 H	288	15.90	39.82
6	4924.00	52.9 AV	54.0	-1.1	1.00 H	288	13.08	39.82
7	7386.00	52.2 PK	74.0	-21.8	1.52 H	227	7.98	44.18
8	7386.00	38.9 AV	54.0	-15.1	1.52 H	227	-5.28	44.18
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	101.1 PK			1.00 V	340	69.70	31.40
2	*2462.00	98.6 AV			1.00 V	340	67.19	31.40
3	2483.50	56.0 PK	74.0	-18.0	1.00 V	340	24.58	31.46
4	2483.50	42.5 AV	54.0	-11.5	1.00 V	340	11.01	31.46
5	4924.00	55.9 PK	74.0	-18.1	1.03 V	338	16.12	39.82
6	4924.00	52.6 AV	54.0	-1.4	1.03 V	338	12.74	39.82
7	7386.00	51.2 PK	74.0	-22.8	1.06 V	330	7.02	44.18
8	7386.00	38.4 AV	54.0	-15.6	1.06 V	330	-5.78	44.18

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.

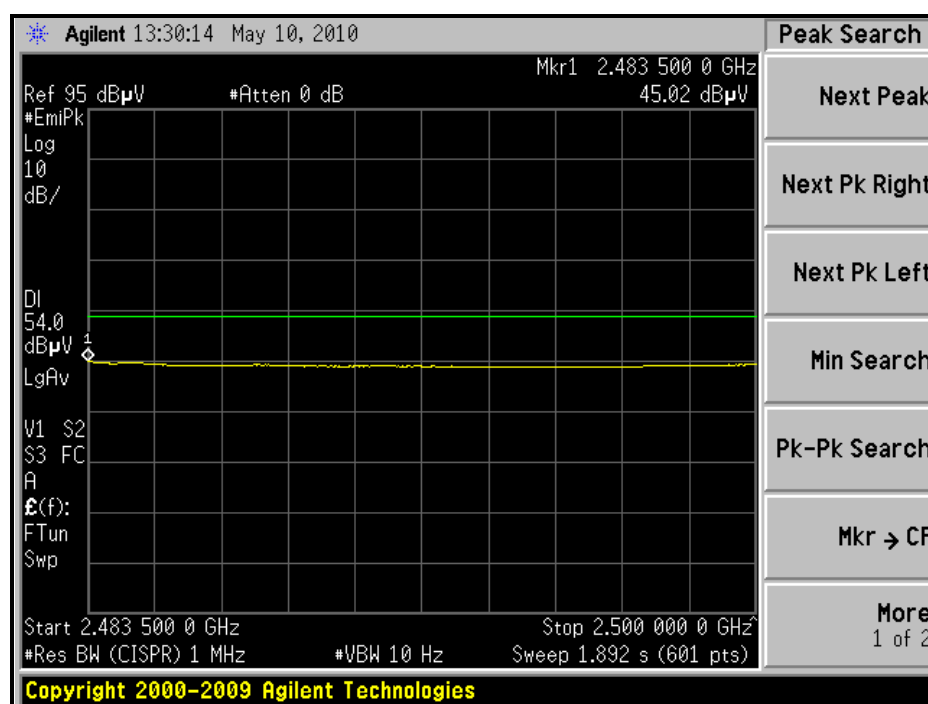
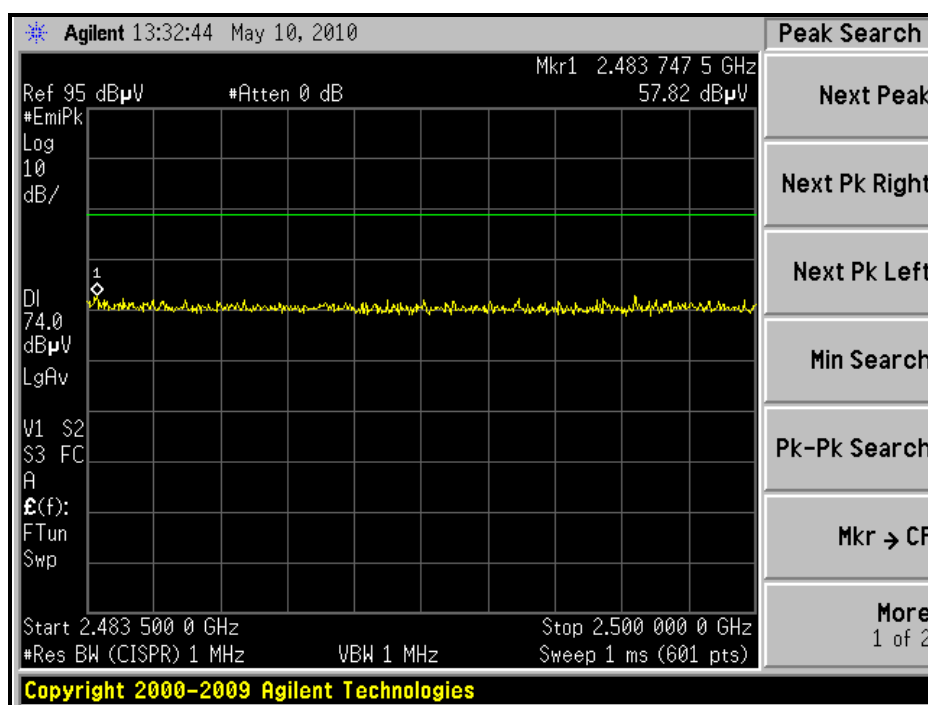
RESTRICTED BANDEDGE (802.11b MODE,CH1, HORIZONTAL)



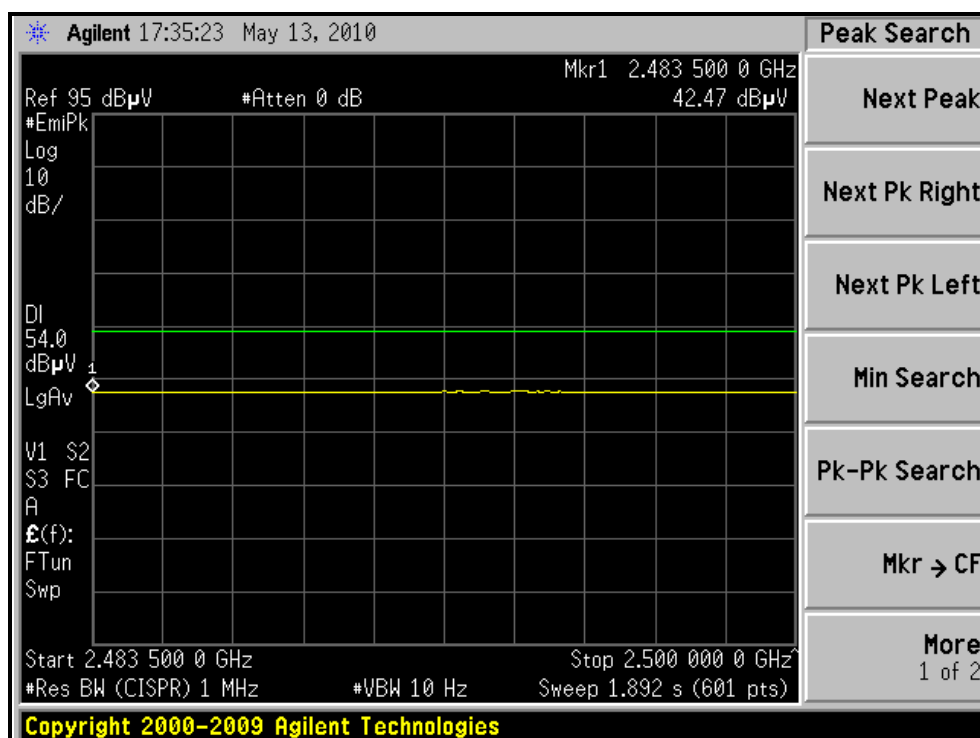
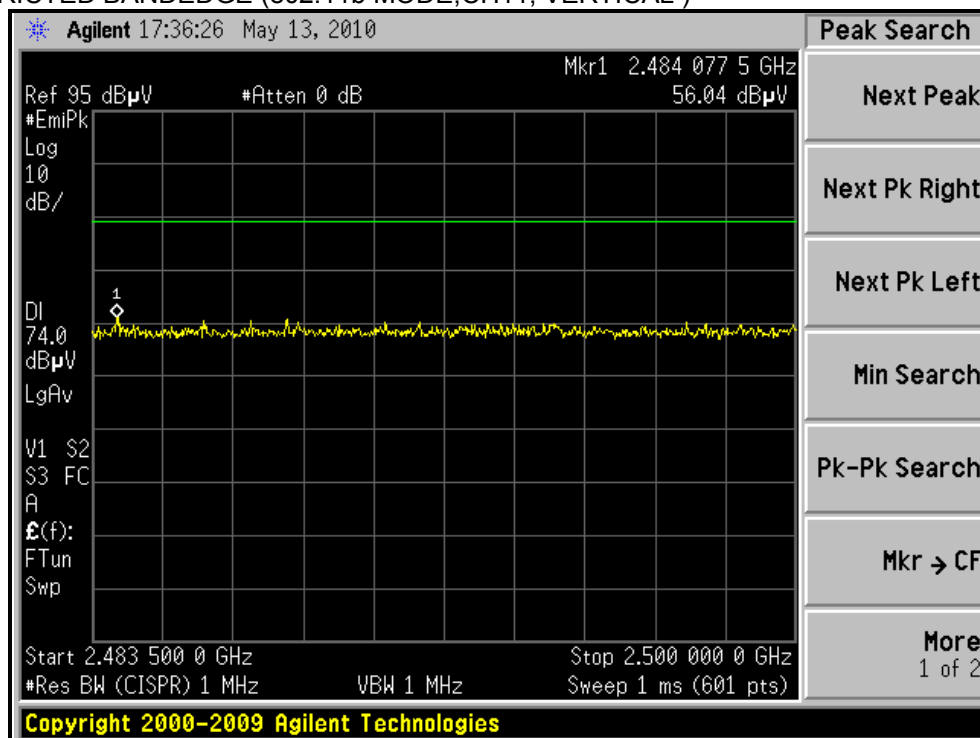
RESTRICTED BANDEDGE (802.11b MODE,CH1, VERTICAL)



RESTRICTED BANDEDGE (802.11b MODE,CH11, HORIZONTAL)



RESTRICTED BANDEDGE (802.11b MODE, CH11, VERTICAL)





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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	20deg. C, 70%RH 1012 hPa	TESTED BY	Duke Tseng

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	73.1 PK	74.0	-0.9	1.30 H	71	41.87	31.21
2	2390.00	53.2 AV	54.0	-0.8	1.30 H	71	22.02	31.21
3	*2412.00	106.3 PK			1.29 H	72	75.05	31.27
4	*2412.00	97.1 AV			1.29 H	72	65.78	31.27
5	4824.00	53.0 PK	74.0	-21.0	1.02 H	114	13.53	39.42
6	4824.00	40.1 AV	54.0	-13.9	1.02 H	114	0.68	39.42
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	2390.00	63.8 PK	74.0	-10.2	1.00 V	20	32.61	31.21
2	2390.00	46.6 AV	54.0	-7.4	1.00 V	20	15.43	31.21
3	*2412.00	98.5 PK			1.00 V	11	67.21	31.27
4	*2412.00	89.0 AV			1.00 V	11	57.73	31.27
5	4824.00	53.5 PK	74.0	-20.5	1.06 V	296	14.03	39.42
6	4824.00	40.3 AV	54.0	-13.7	1.06 V	296	0.83	39.42

- 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.
 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	20deg. C, 70%RH 1012 hPa	TESTED BY	Duke Tseng

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	109.1 PK			1.28 H	70	77.72	31.34
2	*2437.00	99.9 AV			1.28 H	70	68.55	31.34
3	4874.00	56.2 PK	74.0	-17.8	1.00 H	115	16.57	39.62
4	4874.00	45.0 AV	54.0	-9.0	1.00 H	115	5.38	39.62
5	7311.00	51.3 PK	74.0	-22.7	1.49 H	230	7.21	44.10
6	7311.00	38.7 AV	54.0	-15.3	1.49 H	230	-5.40	44.10
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	102.6 PK			1.51 V	235	71.23	31.34
2	*2437.00	91.2 AV			1.51 V	235	59.86	31.34
3	4874.00	57.4 PK	74.0	-16.6	1.04 V	295	17.74	39.62
4	4874.00	45.5 AV	54.0	-8.5	1.04 V	295	5.92	39.62
5	7311.00	51.2 PK	74.0	-22.8	1.05 V	25	7.13	44.10
6	7311.00	38.7 AV	54.0	-15.3	1.05 V	25	-5.44	44.10

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.



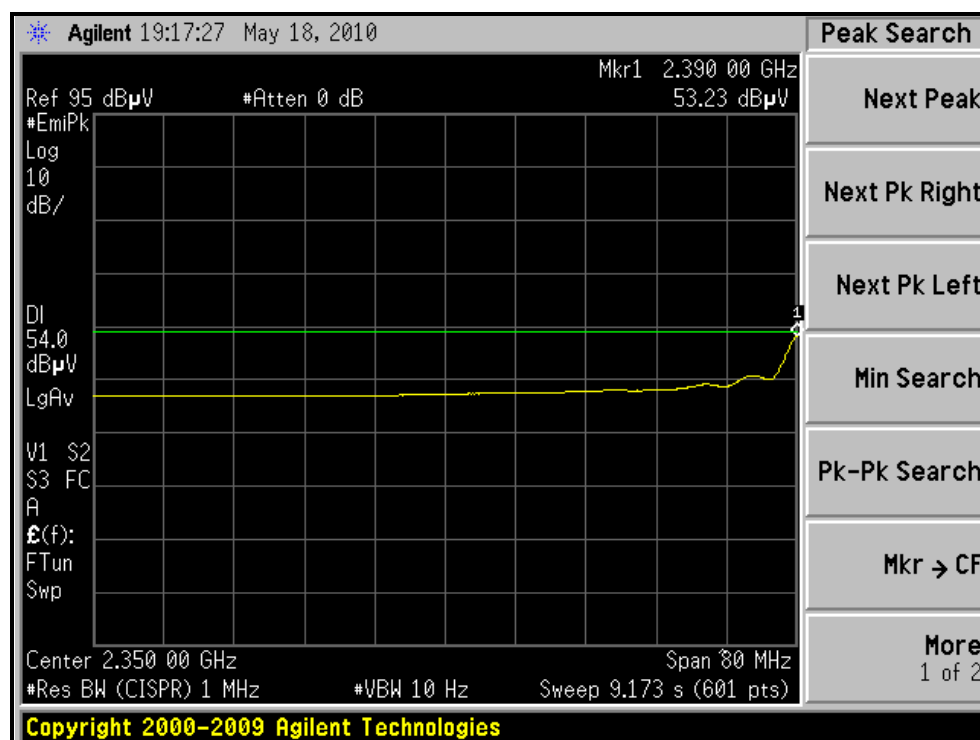
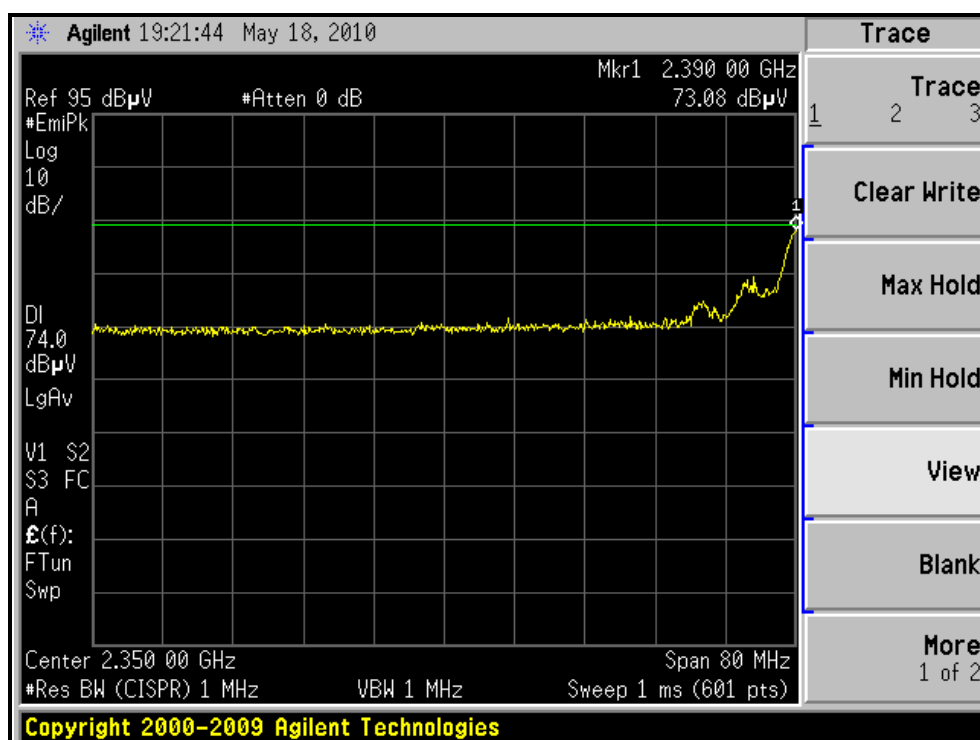
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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH 1012 hPa	TESTED BY	Duke Tseng

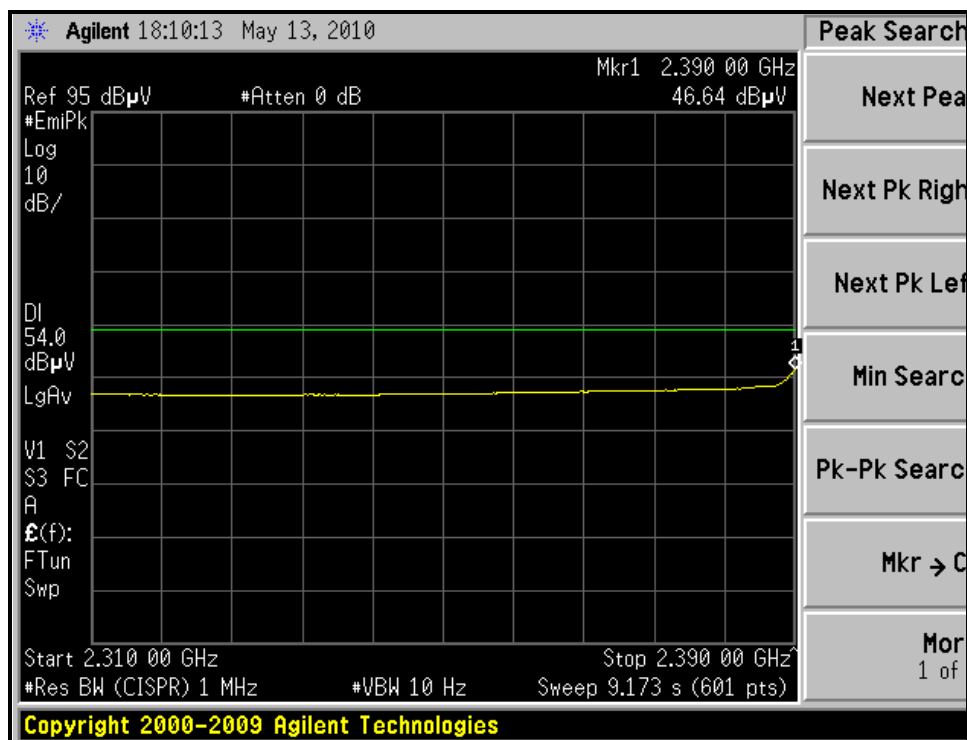
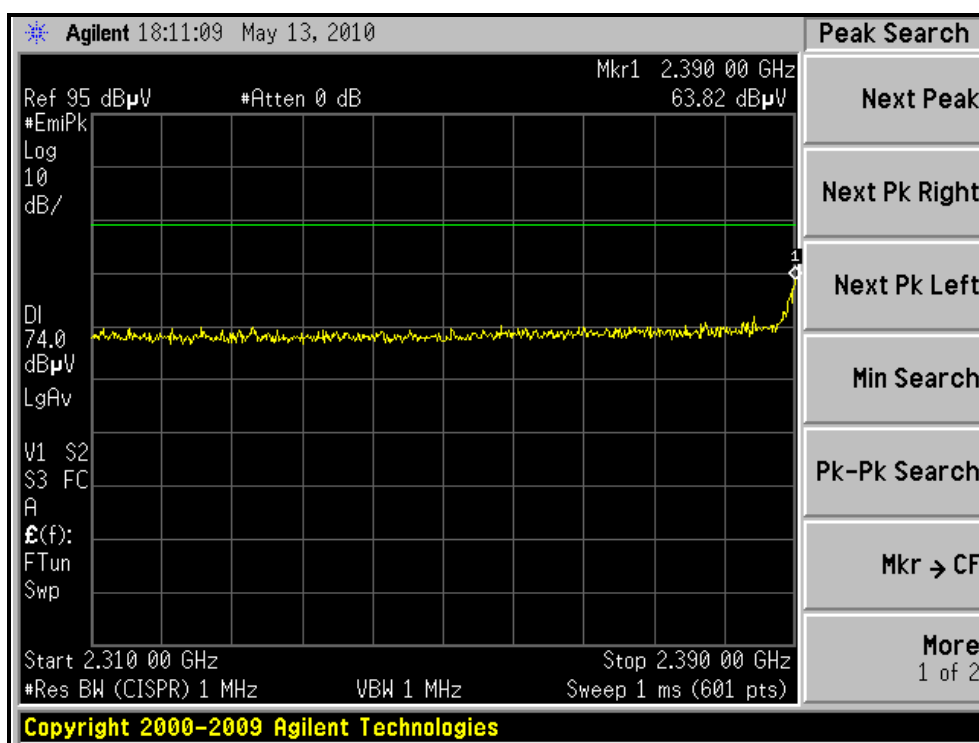
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.9 PK			1.24 H	87	75.50	31.40
2	*2462.00	97.7 AV			1.24 H	87	66.26	31.40
3	2483.50	73.2 PK	74.0	-0.8	1.24 H	110	41.75	31.46
4	2483.50	53.5 AV	54.0	-0.5	1.24 H	110	21.99	31.46
5	4924.00	50.1 PK	74.0	-23.9	1.00 H	114	10.28	39.82
6	4924.00	37.2 AV	54.0	-16.8	1.00 H	114	-2.59	39.82
7	7386.00	51.8 PK	74.0	-22.2	1.50 H	226	7.66	44.18
8	7386.00	38.7 AV	54.0	-15.3	1.50 H	226	-5.53	44.18
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	97.9 PK			1.42 V	232	66.49	31.40
2	*2462.00	88.6 AV			1.42 V	232	57.23	31.40
3	2483.50	65.6 PK	74.0	-8.4	1.42 V	233	34.14	31.46
4	2483.50	46.5 AV	54.0	-7.5	1.42 V	233	15.07	31.46
5	4924.00	50.9 PK	74.0	-23.1	1.09 V	236	11.03	39.82
6	4924.00	37.7 AV	54.0	-16.3	1.09 V	236	-2.13	39.82
7	7386.00	51.5 PK	74.0	-22.5	1.06 V	21	7.32	44.18
8	7386.00	38.6 AV	54.0	-15.4	1.06 V	21	-5.55	44.18

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.

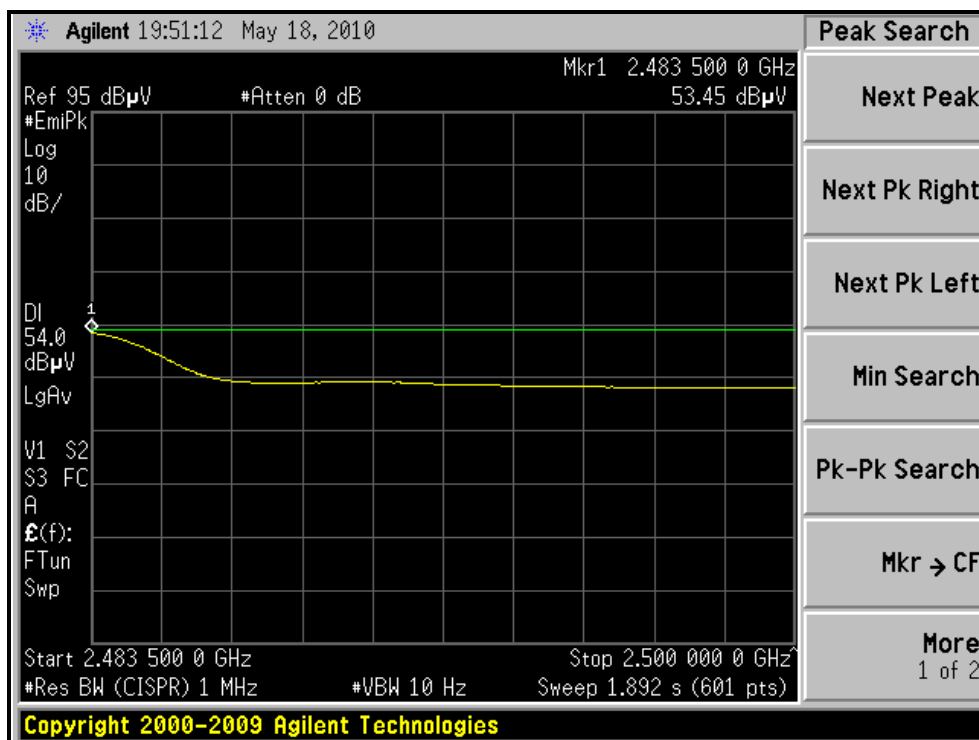
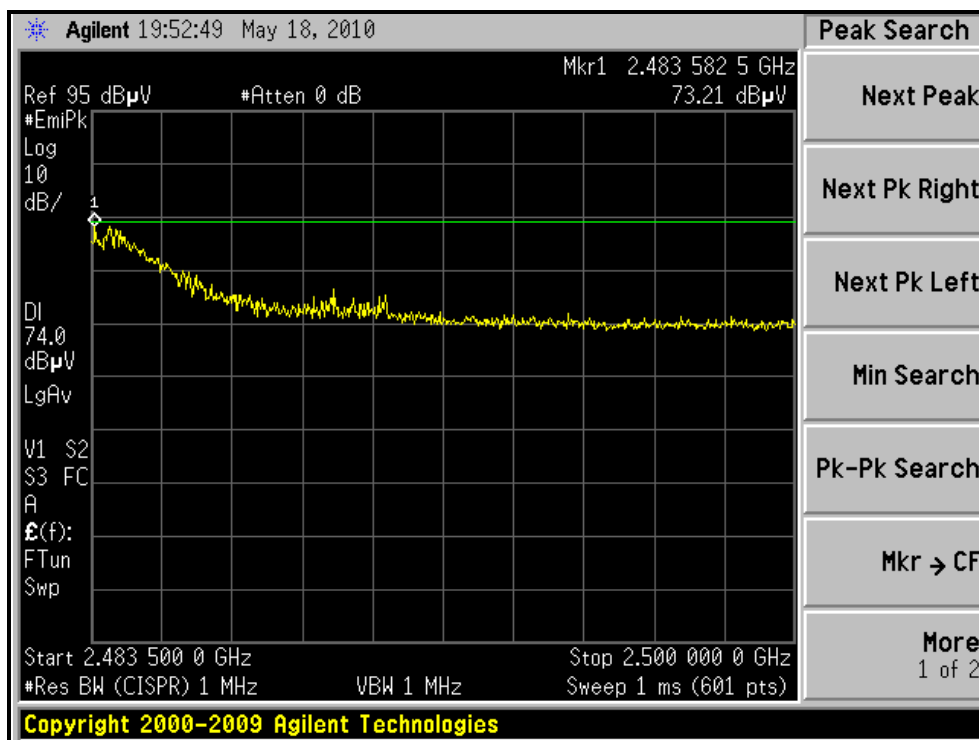
RESTRICTED BANDEDGE (802.11g MODE,CH1, HORIZONTAL)



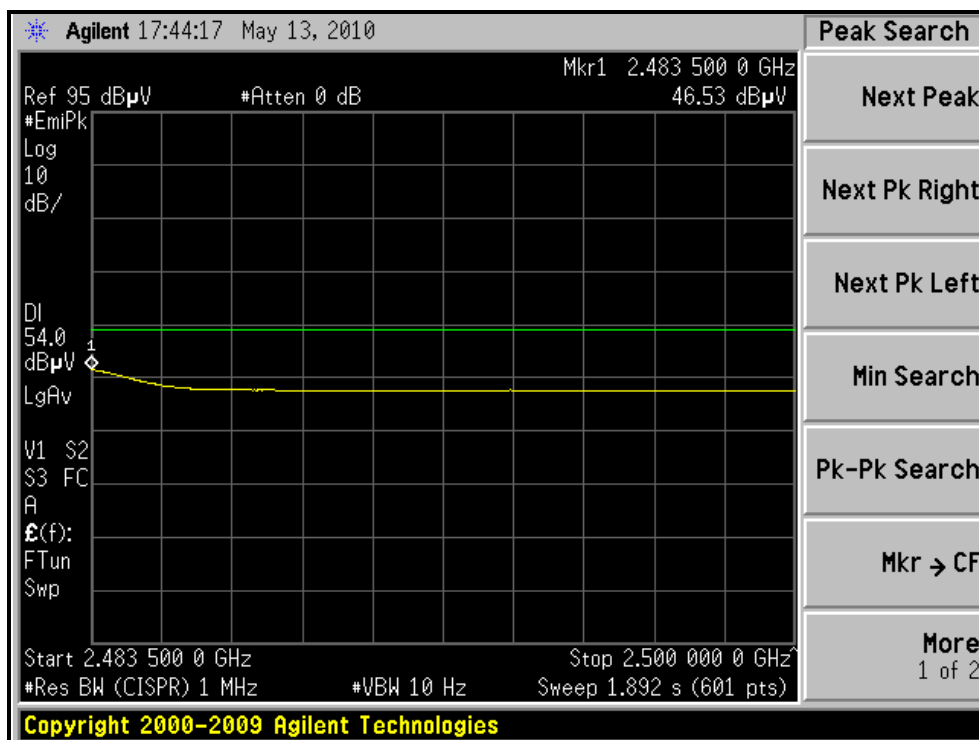
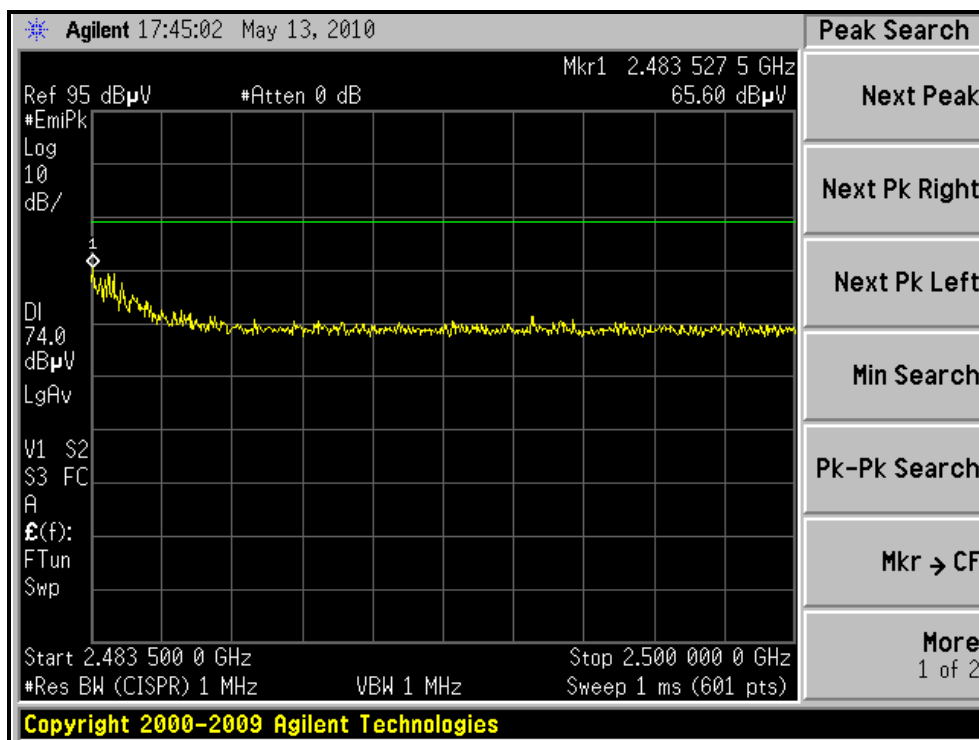
RESTRICTED BANDEDGE (802.11g MODE,CH1, VERTICAL)



RESTRICTED BANDEDGE (802.11g MODE,CH11, HORIZONTAL)



RESTRICTED BANDEDGE (802.11g MODE,CH11, VERTICAL)





A D T

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	20deg. C, 70%RH 1012 hPa	TESTED BY	Duke Tseng

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	72.4 PK	74.0	-1.6	1.32 H	107	41.16	31.21
2	2390.00	53.4 AV	54.0	-0.6	1.32 H	107	22.17	31.21
3	*2412.00	104.6 PK			1.27 H	70	73.31	31.27
4	*2412.00	95.1 AV			1.27 H	70	63.79	31.27
5	4824.00	49.5 PK	74.0	-24.5	1.03 H	114	10.10	39.42
6	4824.00	37.7 AV	54.0	-16.3	1.03 H	114	-1.71	39.42
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	2390.00	63.5 PK	74.0	-10.5	1.00 V	20	32.26	31.21
2	2390.00	46.5 AV	54.0	-7.5	1.00 V	20	15.33	31.21
3	*2412.00	96.2 PK			1.00 V	10	64.89	31.27
4	*2412.00	86.8 AV			1.00 V	10	55.56	31.27
5	4824.00	51.4 PK	74.0	-22.6	1.04 V	296	11.95	39.42
6	4824.00	38.4 AV	54.0	-15.6	1.04 V	296	-1.02	39.42

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.
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	20deg. C, 70%RH 1012 hPa	TESTED BY	Duke Tseng

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	107.8 PK			1.28 H	84	76.50	31.34
2	*2437.00	97.9 AV			1.28 H	84	66.56	31.34
3	4874.00	55.3 PK	74.0	-18.7	1.00 H	114	15.69	39.62
4	4874.00	44.0 AV	54.0	-10.0	1.00 H	114	4.41	39.62
5	7311.00	50.9 PK	74.0	-23.1	1.50 H	230	6.79	44.10
6	7311.00	38.5 AV	54.0	-15.5	1.50 H	230	-5.63	44.10
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	99.3 PK			1.51 V	235	67.97	31.34
2	*2437.00	90.0 AV			1.51 V	235	58.66	31.34
3	4874.00	57.5 PK	74.0	-16.5	1.01 V	296	17.86	39.62
4	4874.00	44.8 AV	54.0	-9.2	1.01 V	296	5.14	39.62
5	7311.00	50.7 PK	74.0	-23.3	1.07 V	28	6.55	44.10
6	7311.00	38.4 AV	54.0	-15.6	1.07 V	28	-5.73	44.10

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.



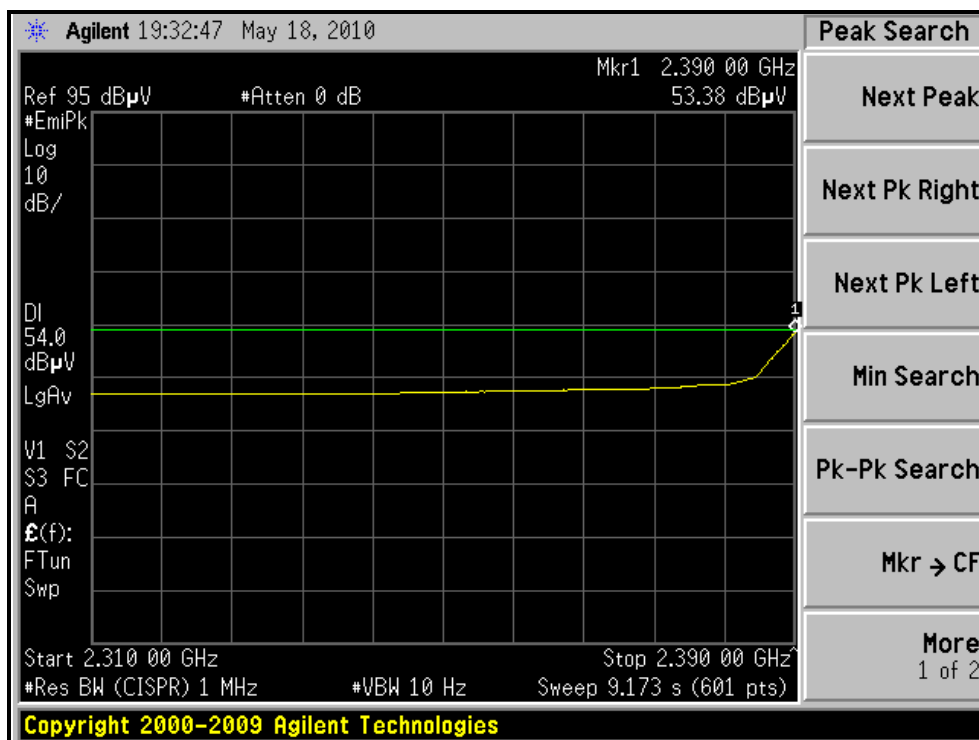
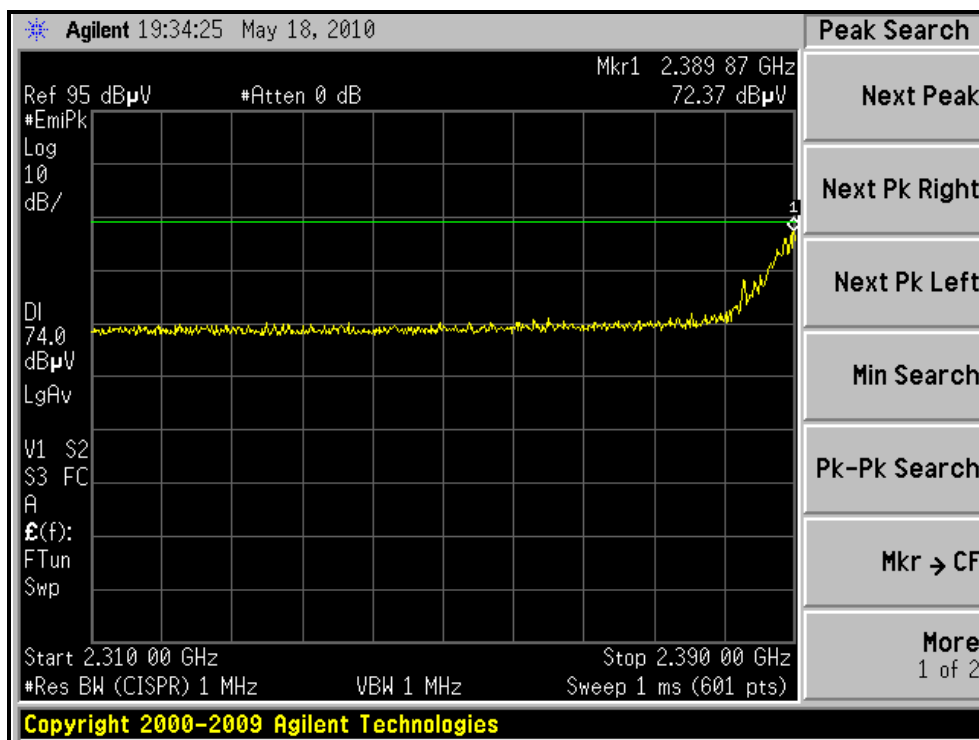
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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH 1012 hPa	TESTED BY	Duke Tseng

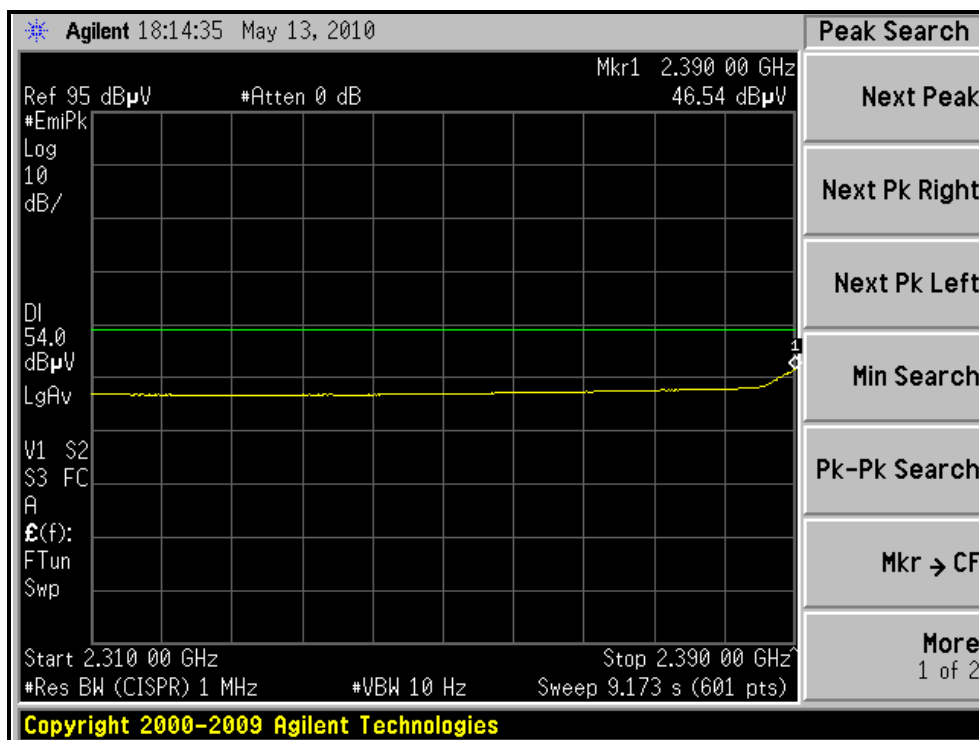
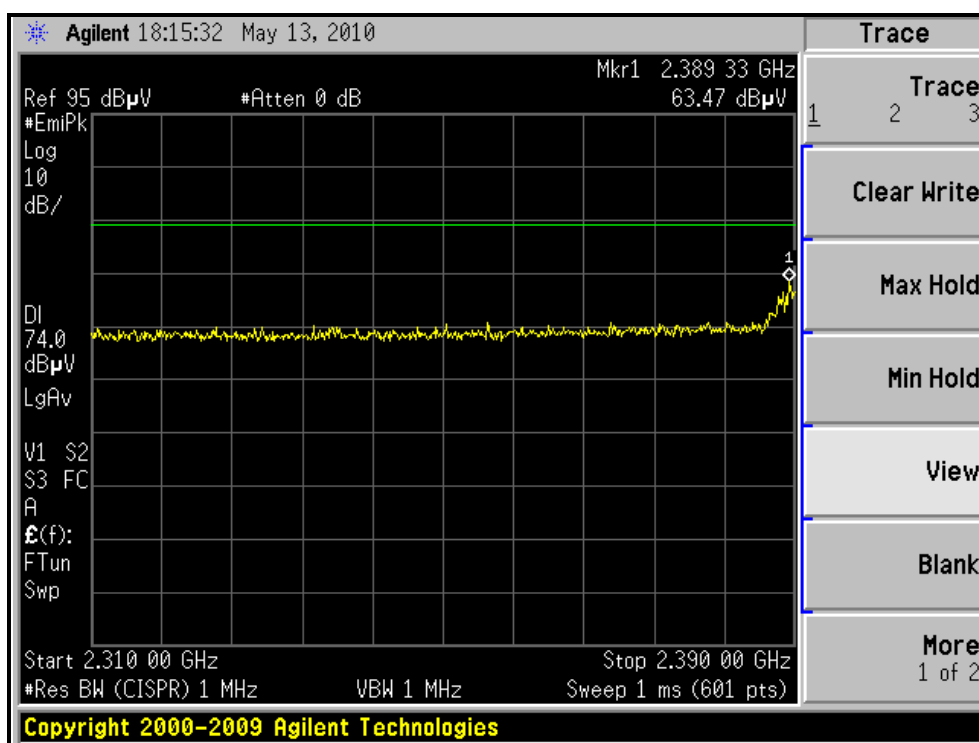
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.9 PK			1.25 H	107	74.54	31.40
2	*2462.00	96.2 AV			1.25 H	107	64.82	31.40
3	2483.50	72.5 PK	74.0	-1.5	1.25 H	113	41.04	31.46
4	2483.50	53.4 AV	54.0	-0.6	1.25 H	113	21.97	31.46
5	4924.00	48.9 PK	74.0	-25.1	1.01 H	113	9.11	39.82
6	4924.00	36.6 AV	54.0	-17.4	1.01 H	113	-3.20	39.82
7	7386.00	51.0 PK	74.0	-23.0	1.49 H	227	6.82	44.18
8	7386.00	38.5 AV	54.0	-15.5	1.49 H	227	-5.67	44.18
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	98.3 PK			1.35 V	233	66.89	31.40
2	*2462.00	89.0 AV			1.35 V	233	57.60	31.40
3	2483.50	63.8 PK	74.0	-10.2	1.42 V	230	32.33	31.46
4	2483.50	46.5 AV	54.0	-7.5	1.42 V	230	15.02	31.46
5	4924.00	50.4 PK	74.0	-23.6	1.00 V	296	10.58	39.82
6	4924.00	37.3 AV	54.0	-16.7	1.00 V	296	-2.56	39.82
7	7386.00	51.2 PK	74.0	-22.8	1.06 V	25	7.02	44.18
8	7386.00	38.5 AV	54.0	-15.5	1.06 V	25	-5.64	44.18

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.

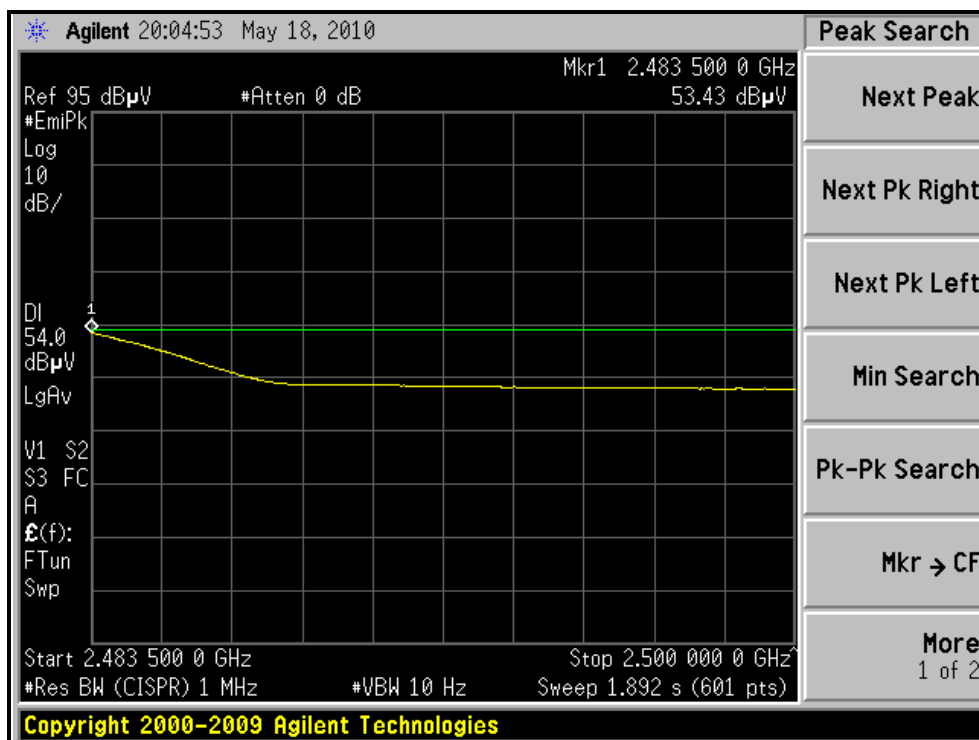
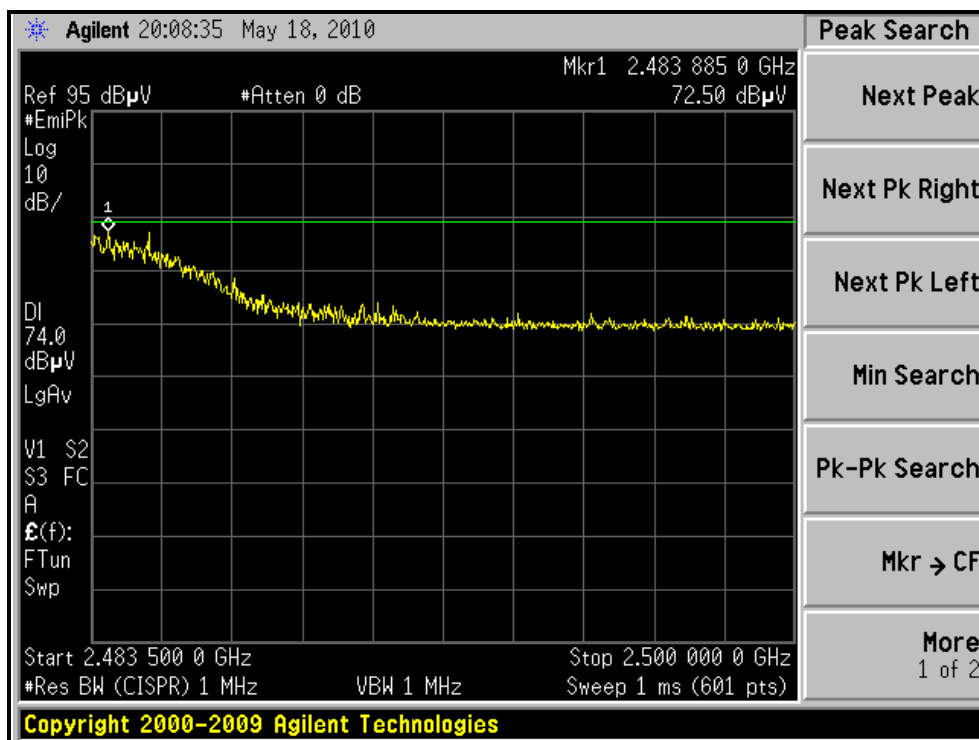
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH1, HORIZONTAL)



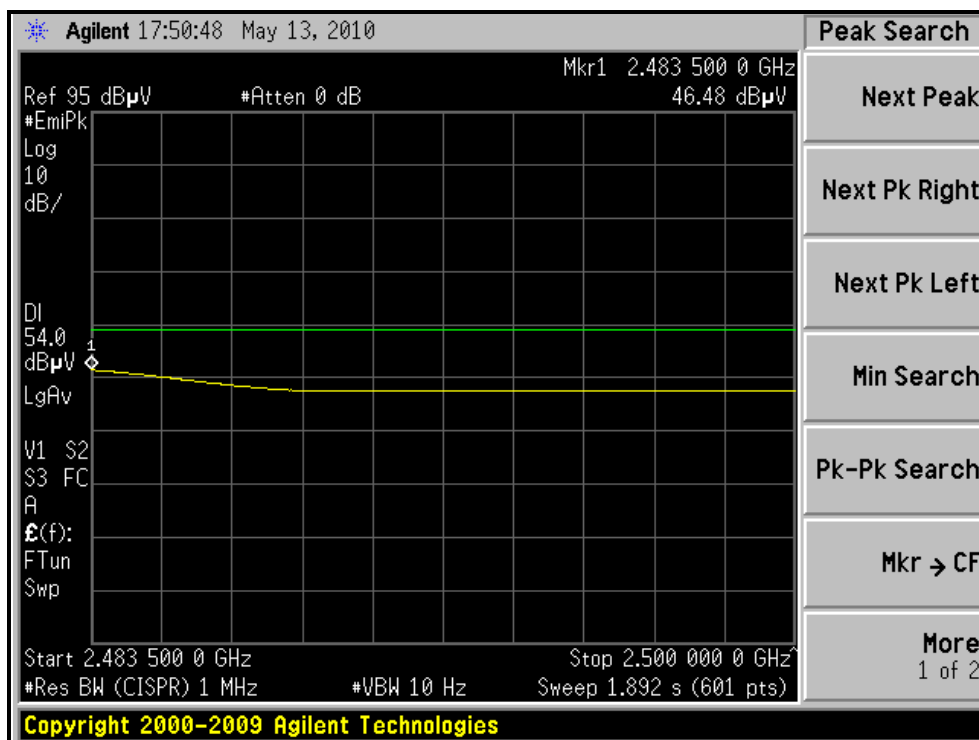
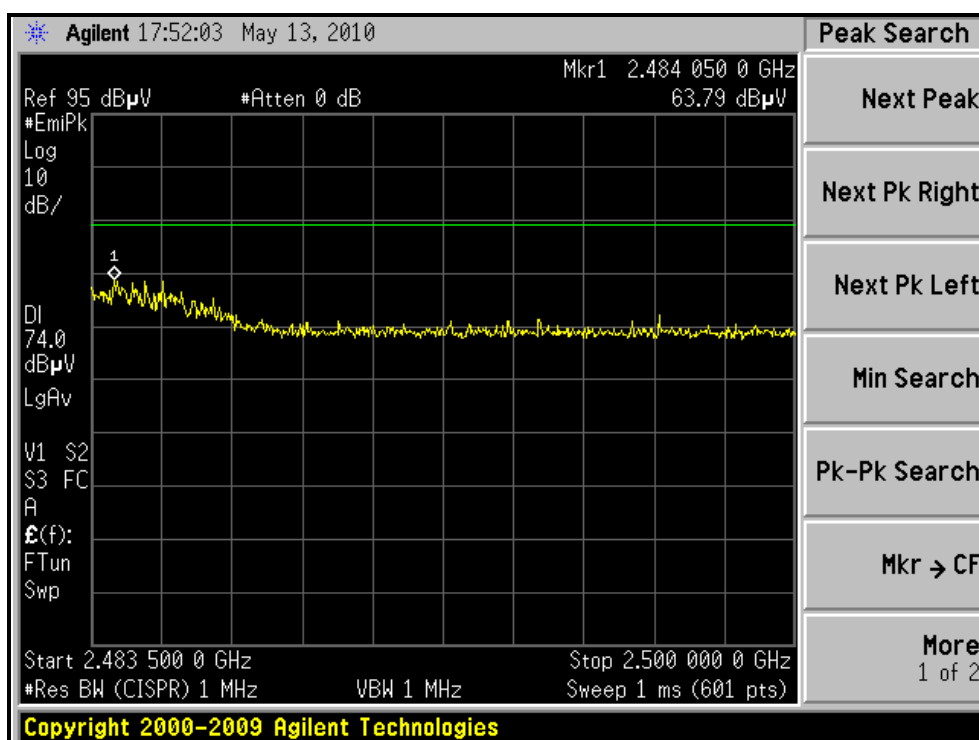
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH1, VERTICAL)



RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH11, HORIZONTAL)



RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH11, VERTICAL)



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	20deg. C, 70%RH 1012 hPa	TESTED BY	Duke Tseng

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	68.0 PK	74.0	-6.0	1.31 H	91	36.78	31.21
2	2390.00	53.2 AV	54.0	-0.8	1.31 H	91	22.02	31.21
3	*2422.00	98.8 PK			1.26 H	91	67.45	31.30
4	*2422.00	89.1 AV			1.26 H	91	57.82	31.30
5	4844.00	46.4 PK	74.0	-27.6	1.01 H	114	6.92	39.50
6	4844.00	34.3 AV	54.0	-19.7	1.01 H	114	-5.20	39.50
7	7266.00	50.6 PK	74.0	-23.4	1.51 H	232	6.55	44.06
8	7266.00	38.3 AV	54.0	-15.7	1.51 H	232	-5.76	44.06
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	2389.87	59.2 PK	74.0	-14.8	1.00 V	20	27.97	31.21
2	2389.87	46.3 AV	54.0	-7.7	1.00 V	20	15.08	31.21
3	*2422.00	90.1 PK			1.00 V	9	58.80	31.30
4	*2422.00	81.2 AV			1.00 V	9	49.89	31.30
5	4844.00	46.8 PK	74.0	-27.2	1.03 V	297	7.25	39.50
6	4844.00	34.7 AV	54.0	-19.3	1.03 V	297	-4.78	39.50
7	7266.00	51.0 PK	74.0	-23.0	1.07 V	325	6.94	44.06
8	7266.00	38.3 AV	54.0	-15.7	1.07 V	325	-5.79	44.06

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 4	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH 1012 hPa	TESTED BY	Duke Tseng

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	103.6 PK			1.26 H	72	72.23	31.34
2	*2437.00	94.1 AV			1.26 H	72	62.79	31.34
3	2483.50	70.0 PK	74.0	-4.0	1.27 H	96	38.57	31.46
4	2483.50	53.1 AV	54.0	-0.9	1.27 H	96	21.64	31.46
5	4874.00	50.2 PK	74.0	-23.8	1.01 H	115	10.54	39.62
6	4874.00	38.2 AV	54.0	-15.8	1.01 H	115	-1.42	39.62
7	7311.00	51.0 PK	74.0	-23.0	1.49 H	233	6.87	44.10
8	7311.00	38.4 AV	54.0	-15.6	1.49 H	233	-5.71	44.10
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	95.6 PK			1.50 V	233	64.26	31.34
2	*2437.00	86.0 AV			1.50 V	233	54.63	31.34
3	2483.50	65.1 PK	74.0	-8.9	1.11 V	48	33.59	31.46
4	2483.50	46.1 AV	54.0	-7.9	1.11 V	48	14.65	31.46
5	4874.00	52.0 PK	74.0	-22.0	1.05 V	296	12.37	39.62
6	4874.00	39.2 AV	54.0	-14.8	1.05 V	296	-0.47	39.62
7	7311.00	51.0 PK	74.0	-23.0	1.05 V	324	6.93	44.10
8	7311.00	38.4 AV	54.0	-15.6	1.05 V	324	-5.71	44.10

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.



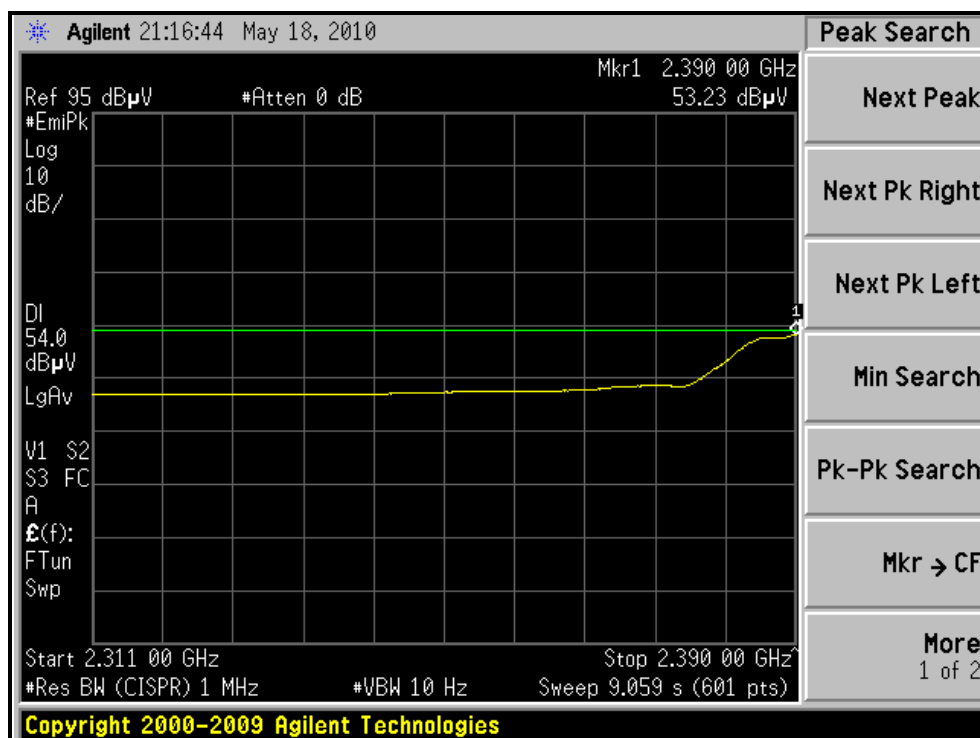
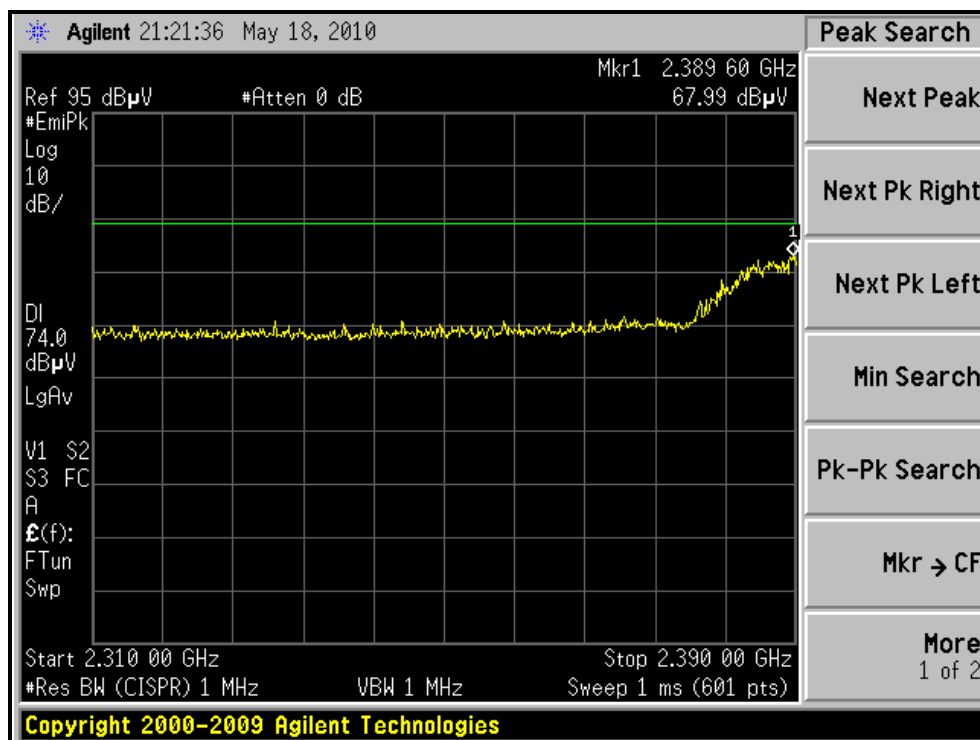
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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH 1012 hPa	TESTED BY	Duke Tseng

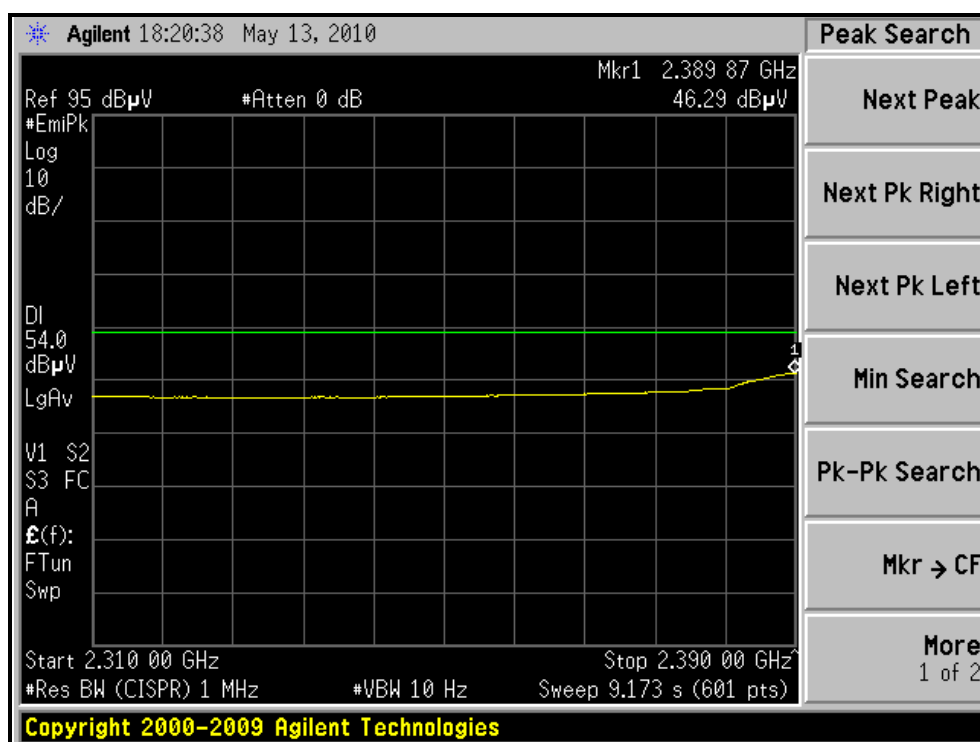
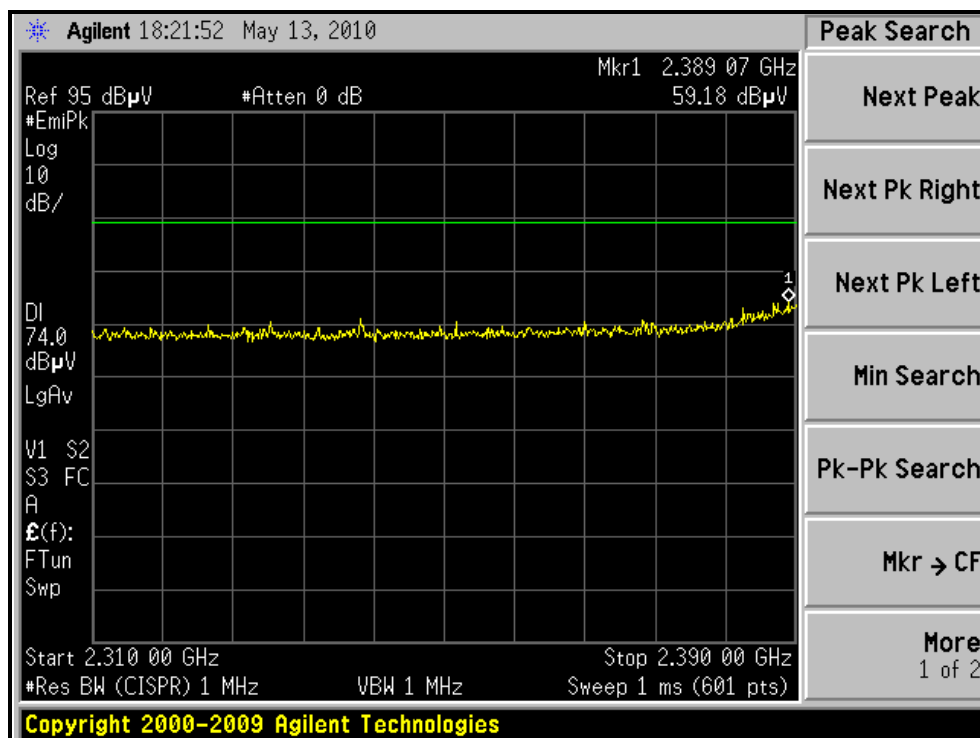
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	100.4 PK			1.24 H	93	69.06	31.38
2	*2452.00	91.4 AV			1.24 H	93	60.02	31.38
3	2483.50	68.4 PK	74.0	-5.6	1.25 H	70	36.95	31.46
4	2483.50	53.1 AV	54.0	-0.9	1.25 H	70	21.62	31.46
5	4904.00	46.1 PK	74.0	-27.9	1.03 H	114	6.36	39.74
6	4904.00	34.2 AV	54.0	-19.8	1.03 H	114	-5.57	39.74
7	7356.00	51.1 PK	74.0	-22.9	1.51 H	230	6.95	44.15
8	7356.00	38.4 AV	54.0	-15.6	1.51 H	230	-5.75	44.15
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	93.0 PK			1.48 V	234	61.64	31.38
2	*2452.00	83.6 AV			1.48 V	234	52.21	31.38
3	2483.67	60.8 PK	74.0	-13.2	1.45 V	232	29.31	31.46
4	2483.67	46.5 AV	54.0	-7.5	1.45 V	232	15.00	31.46
5	4904.00	46.3 PK	74.0	-27.7	1.04 V	295	6.56	39.74
6	4904.00	34.7 AV	54.0	-19.3	1.04 V	295	-5.08	39.74
7	7356.00	51.2 PK	74.0	-22.8	1.06 V	328	7.00	44.15
8	7356.00	38.4 AV	54.0	-15.6	1.06 V	328	-5.73	44.15

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.

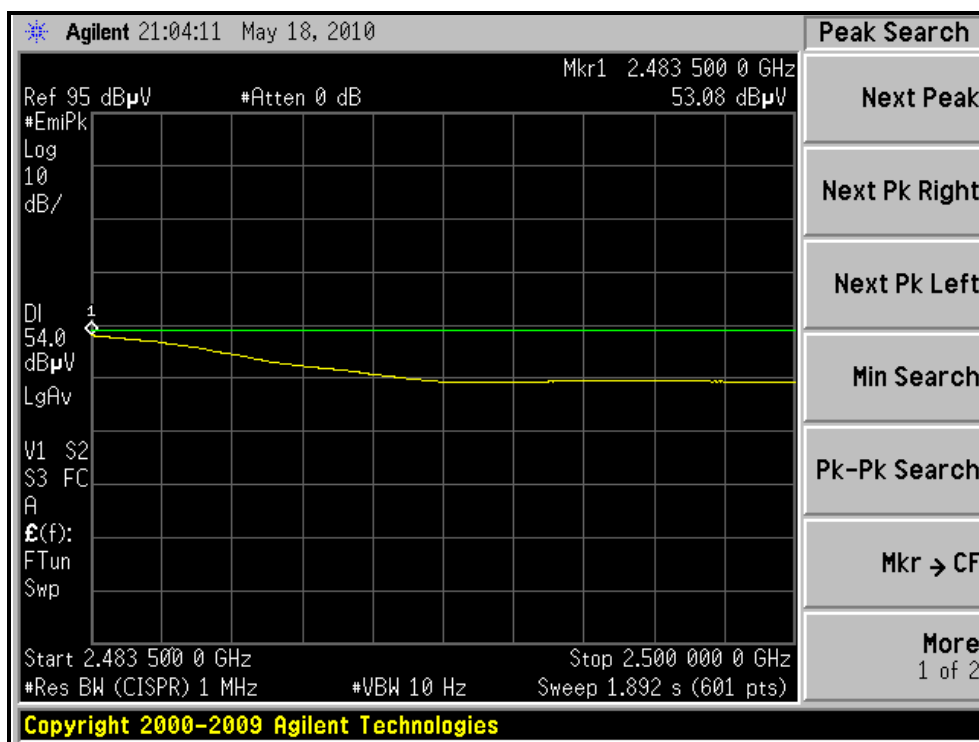
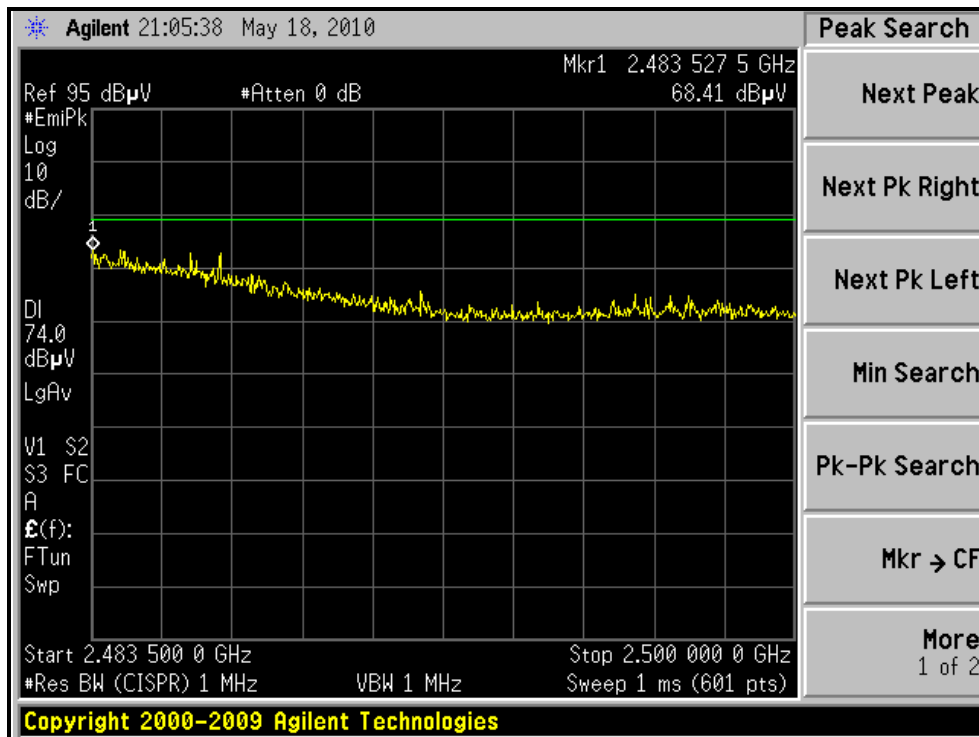
RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH1, HORIZONTAL)



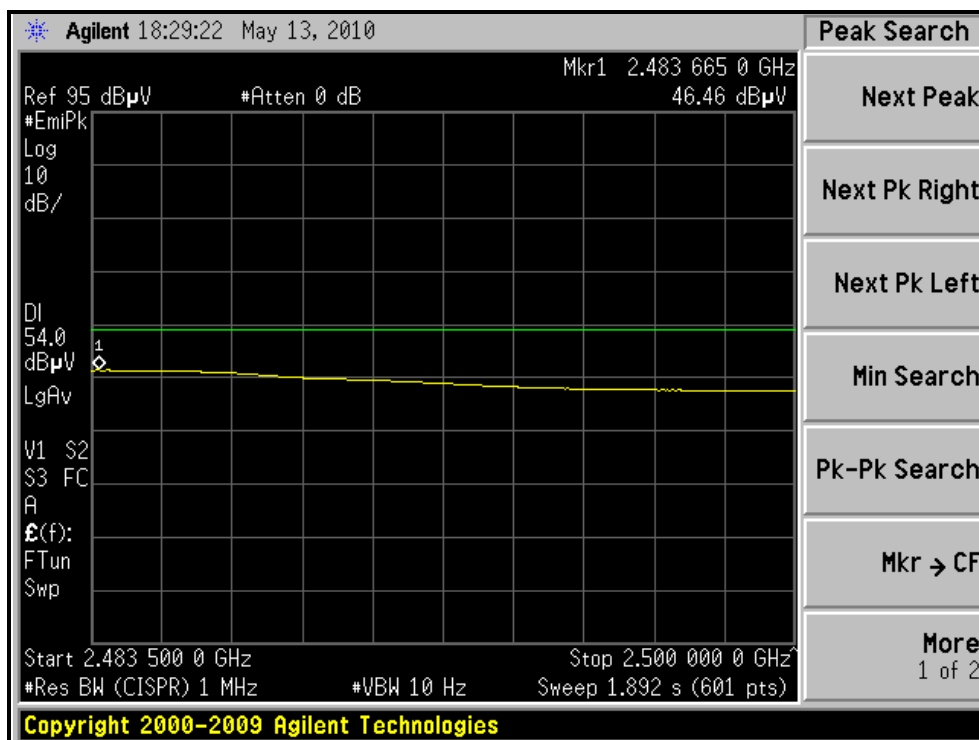
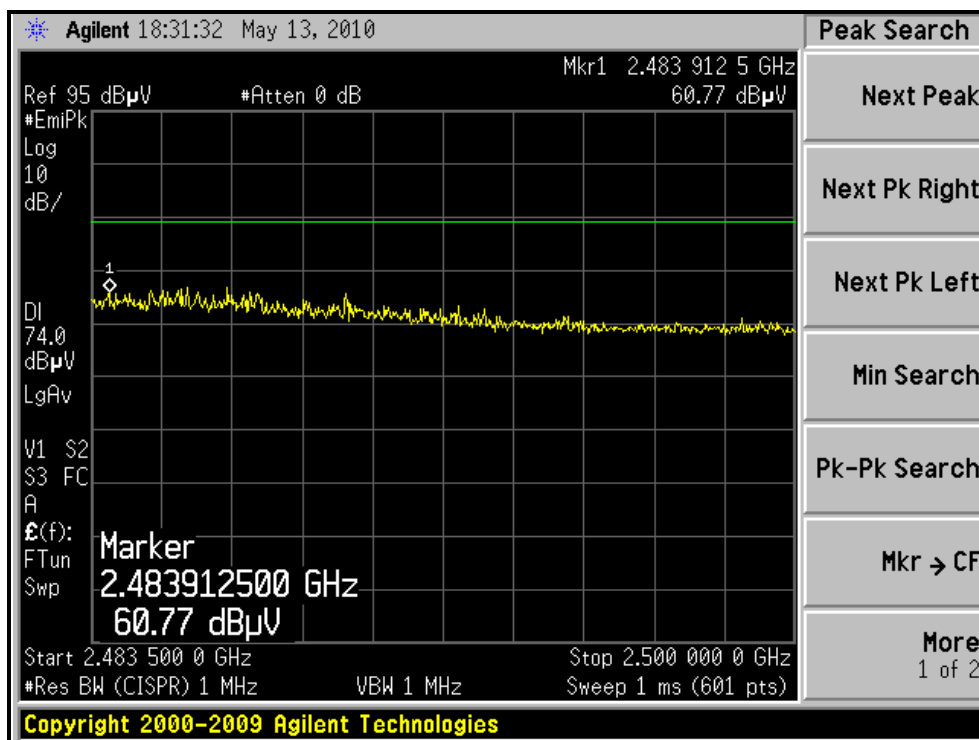
RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH1, VERTICAL)



RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH7, HORIZONTAL)



RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH7, VERTICAL)



4.2.8 TEST RESULTS (FOR RECEIVER PART)

BELOW 1GHz WORST-CASE DATA :

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	21deg. C, 73%RH 1012 hPa	TESTED BY	Duke Tseng

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	124.16	33.6 QP	43.5	-9.9	2.50 H	343	21.46	12.13
2	176.61	40.3 QP	43.5	-3.2	2.25 H	241	30.81	9.51
3	248.63	42.7 QP	46.0	-3.3	1.25 H	180	29.07	13.62
4	431.22	40.1 QP	46.0	-5.9	2.00 H	189	22.04	18.10
5	566.57	40.3 QP	46.0	-5.7	1.50 H	148	19.32	20.95
6	846.05	39.3 QP	46.0	-6.7	1.50 H	241	14.28	24.99
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	34.15	34.6 QP	40.0	-5.4	1.00 V	238	17.47	17.12
2	106.50	38.3 QP	43.5	-5.2	1.25 V	237	26.76	11.51
3	123.91	39.1 QP	43.5	-4.5	1.00 V	23	26.92	12.13
4	199.94	36.9 QP	43.5	-6.6	1.75 V	201	27.15	9.75
5	239.96	37.6 QP	46.0	-8.4	1.00 V	257	24.66	12.93
6	846.88	32.3 QP	46.0	-13.7	1.25 V	136	7.29	25.01

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

ABOVE 1GHz WORST-CASE DATA

802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 7.5GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH 1012 hPa	TESTED BY	Duke Tseng

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	3216.00	44.5 PK	74.0	-29.5	1.53 H	0	11.18	33.36
2	3216.00	36.1 AV	54.0	-17.9	1.53 H	0	2.69	33.36
3	6432.00	49.3 PK	74.0	-24.7	1.00 H	20	7.05	42.25
4	6432.00	36.3 AV	54.0	-17.7	1.00 H	20	-5.92	42.25
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	3216.00	43.5 PK	74.0	-30.5	1.07 V	214	10.10	33.36
2	3216.00	31.8 AV	54.0	-22.2	1.07 V	214	-1.61	33.36
3	6432.00	49.4 PK	74.0	-24.6	1.00 V	0	7.13	42.25
4	6432.00	36.4 AV	54.0	-17.6	1.00 V	0	-5.89	42.25

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	1 ~ 7.5GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH 1012 hPa	TESTED BY	Duke Tseng

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	3249.33	45.1 PK	74.0	-28.9	1.51 H	0	11.68	33.46
2	3249.33	38.6 AV	54.0	-15.4	1.51 H	0	5.13	33.46
3	6498.67	49.3 PK	74.0	-24.7	1.00 H	18	7.00	42.34
4	6498.67	36.4 AV	54.0	-17.6	1.00 H	18	-5.98	42.34
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	3249.33	42.9 PK	74.0	-31.1	1.01 V	217	9.44	33.46
2	3249.33	30.9 AV	54.0	-23.1	1.01 V	217	-2.56	33.46
3	6498.67	49.5 PK	74.0	-24.5	1.00 V	2	7.11	42.34
4	6498.67	36.5 AV	54.0	-17.5	1.00 V	2	-5.89	42.34

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 7.5GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH 1012 hPa	TESTED BY	Duke Tseng

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	3282.67	44.8 PK	74.0	-29.2	1.45 H	0	11.22	33.55
2	3282.67	36.6 AV	54.0	-17.4	1.45 H	0	3.01	33.55
3	6565.33	49.3 PK	74.0	-24.7	1.00 H	21	6.77	42.54
4	6565.33	36.4 AV	54.0	-17.6	1.00 H	21	-6.19	42.54
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	3282.67	42.5 PK	74.0	-31.5	1.14 V	232	8.94	33.55
2	3282.67	30.7 AV	54.0	-23.3	1.14 V	232	-2.82	33.55
3	6565.33	49.5 PK	74.0	-24.5	1.00 V	3	6.98	42.54
4	6565.33	36.5 AV	54.0	-17.5	1.00 V	3	-6.07	42.54

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

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.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY4825025 4	Aug. 03, 2009	Aug. 02, 2010

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

4.3.3 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

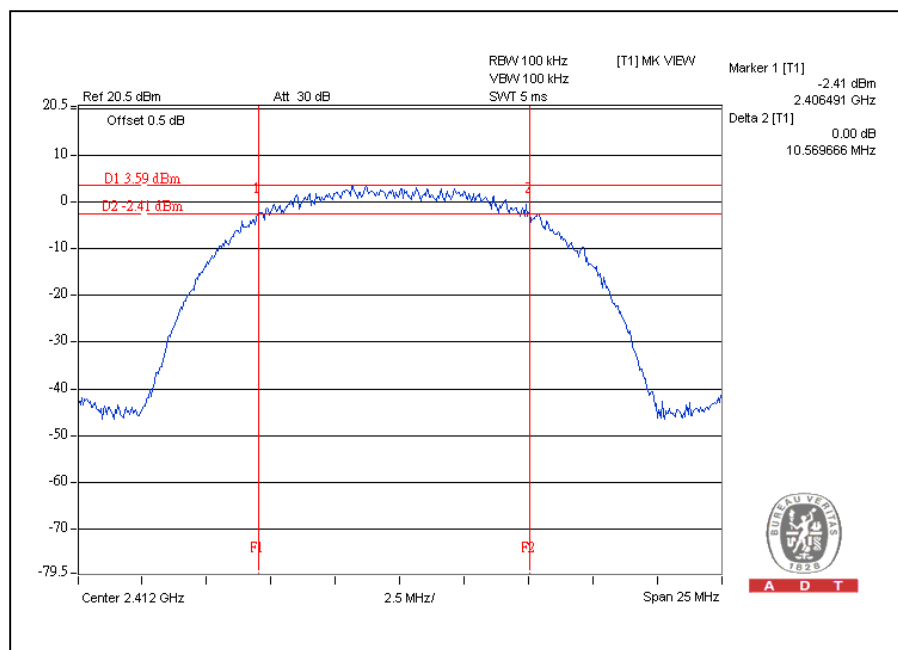
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULTS

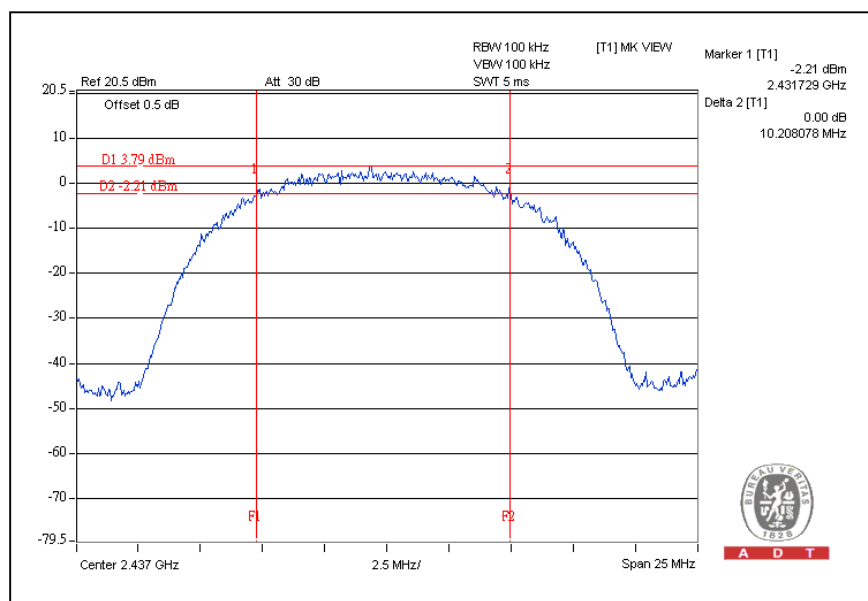
802.11b DSSS MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.56	0.5	PASS
6	2437	10.20	0.5	PASS
11	2462	11.01	0.5	PASS

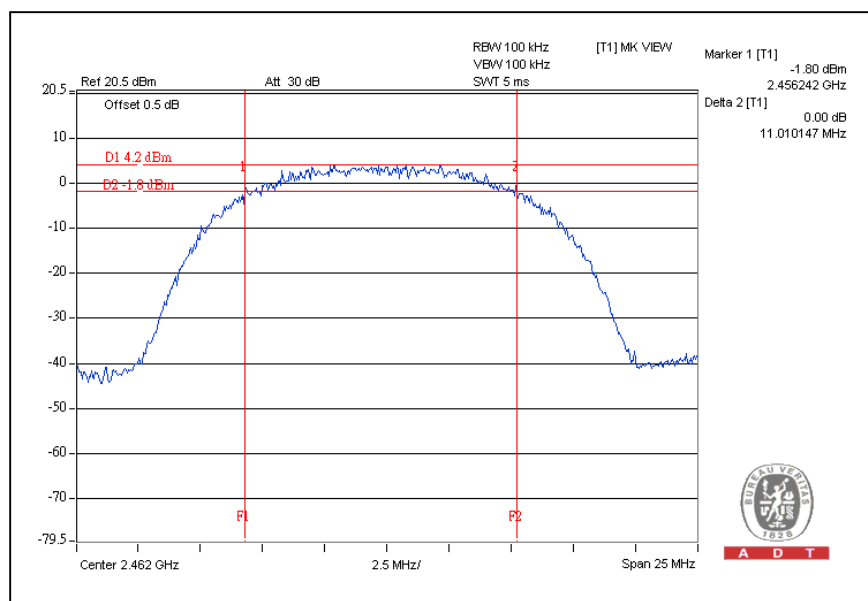
CH1



CH6



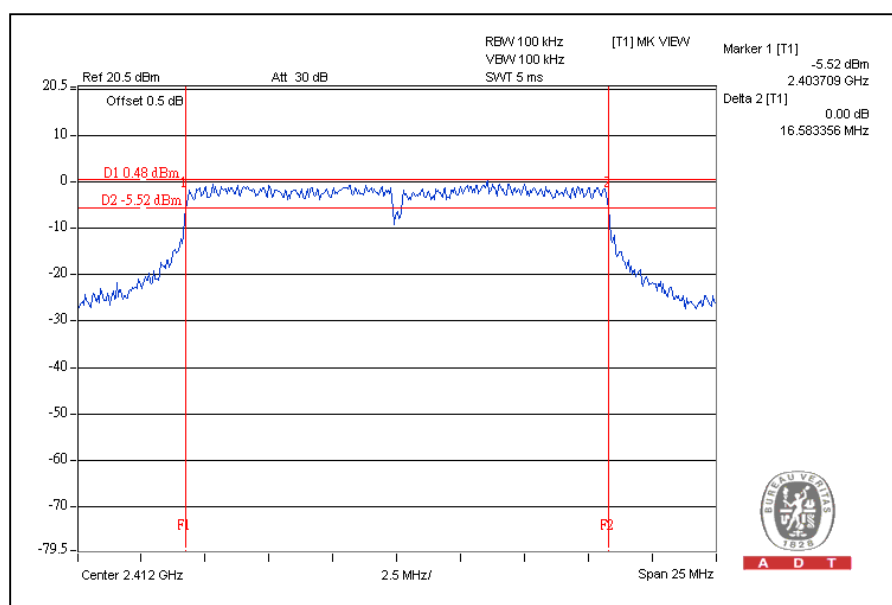
CH11



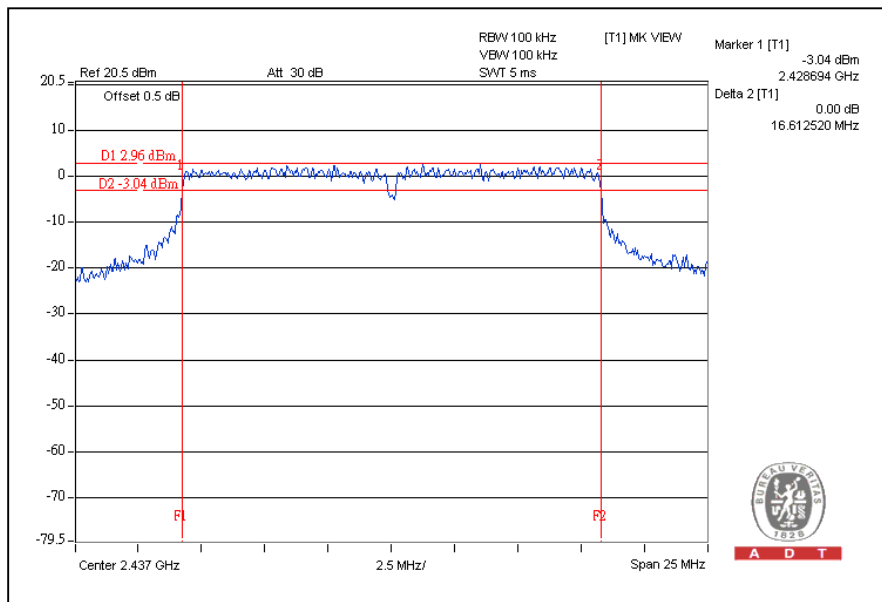
802.11g OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.58	0.5	PASS
6	2437	16.61	0.5	PASS
11	2462	16.61	0.5	PASS

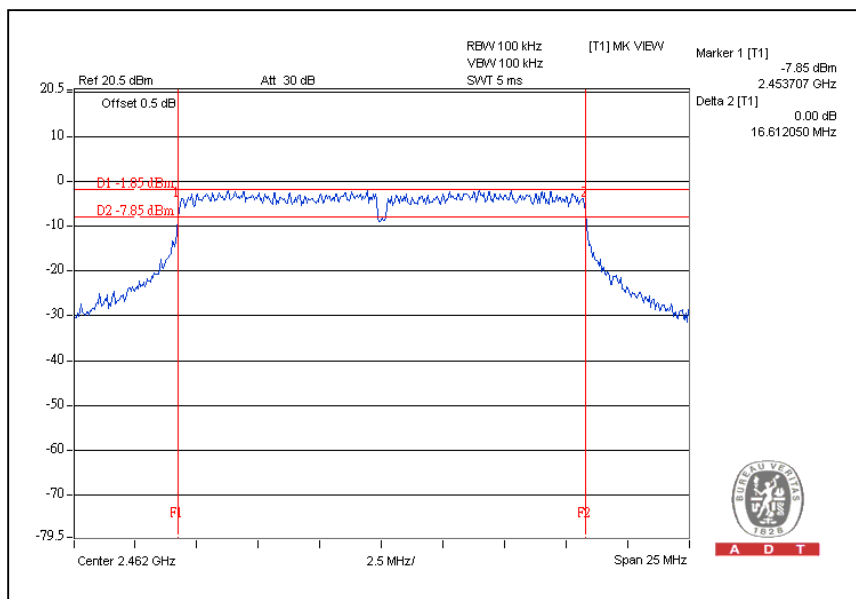
CH1



CH6



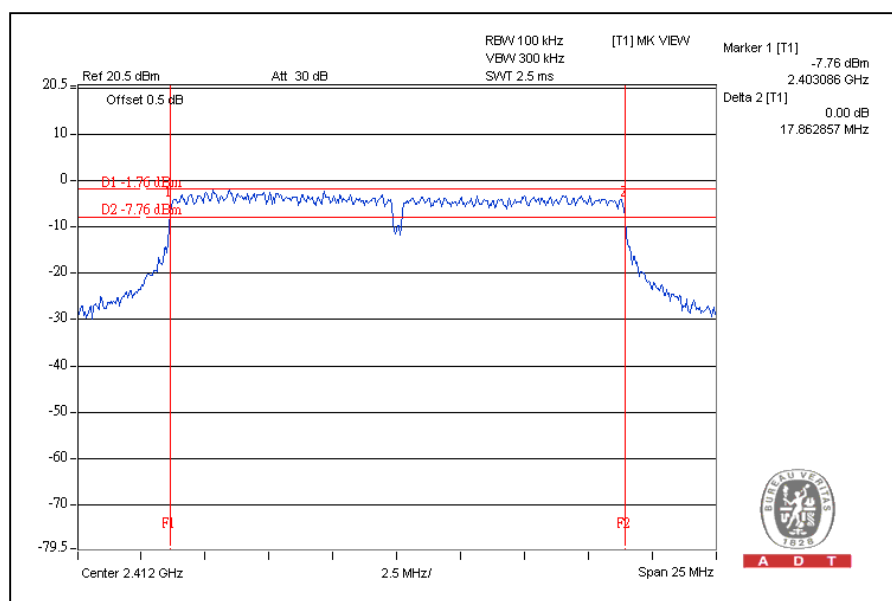
CH11



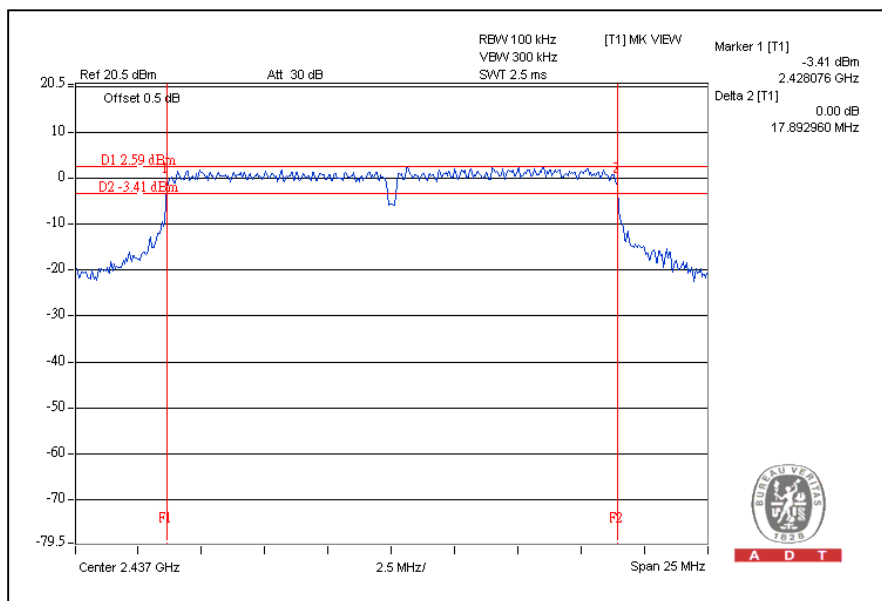
802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.86	0.5	PASS
6	2437	17.89	0.5	PASS
11	2462	17.88	0.5	PASS

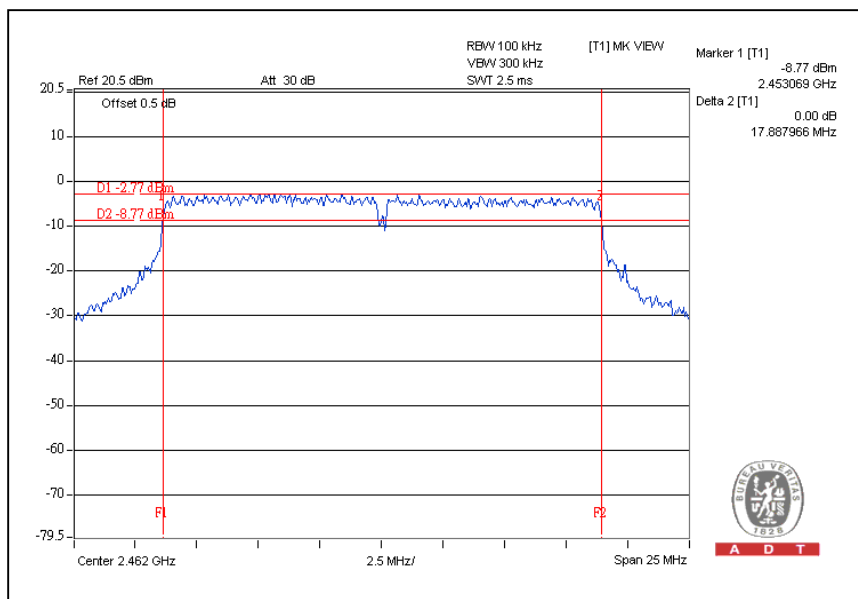
CH1



CH6



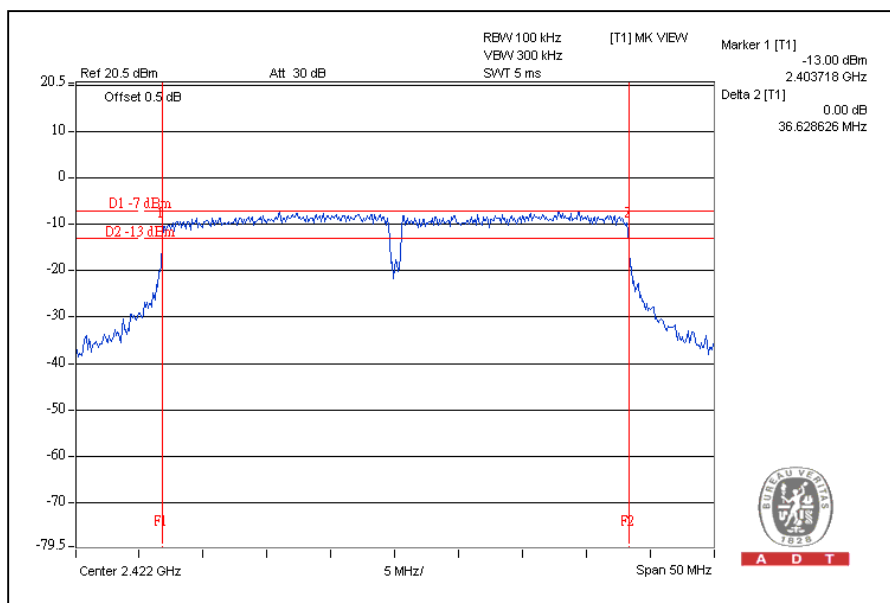
CH11



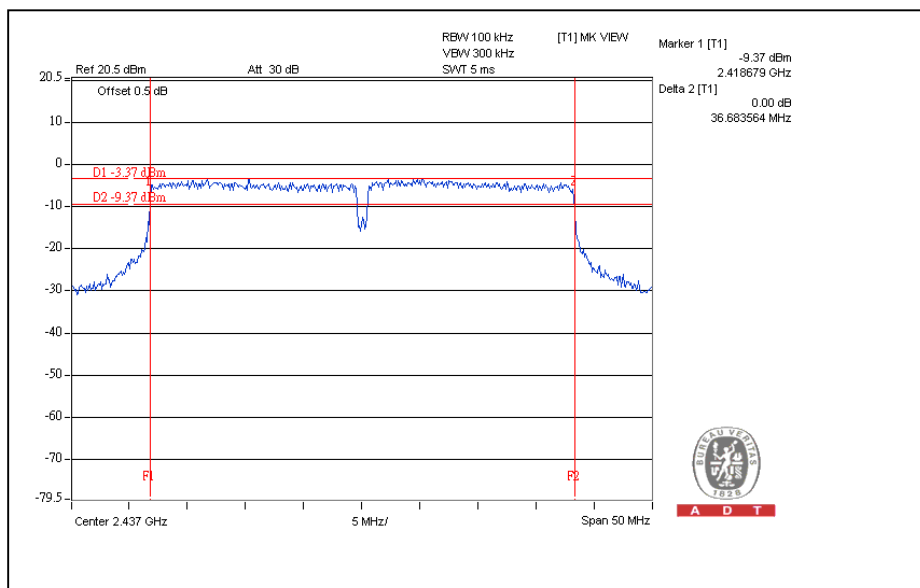
802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2422	36.62	0.5	PASS
4	2437	36.68	0.5	PASS
7	2452	36.65	0.5	PASS

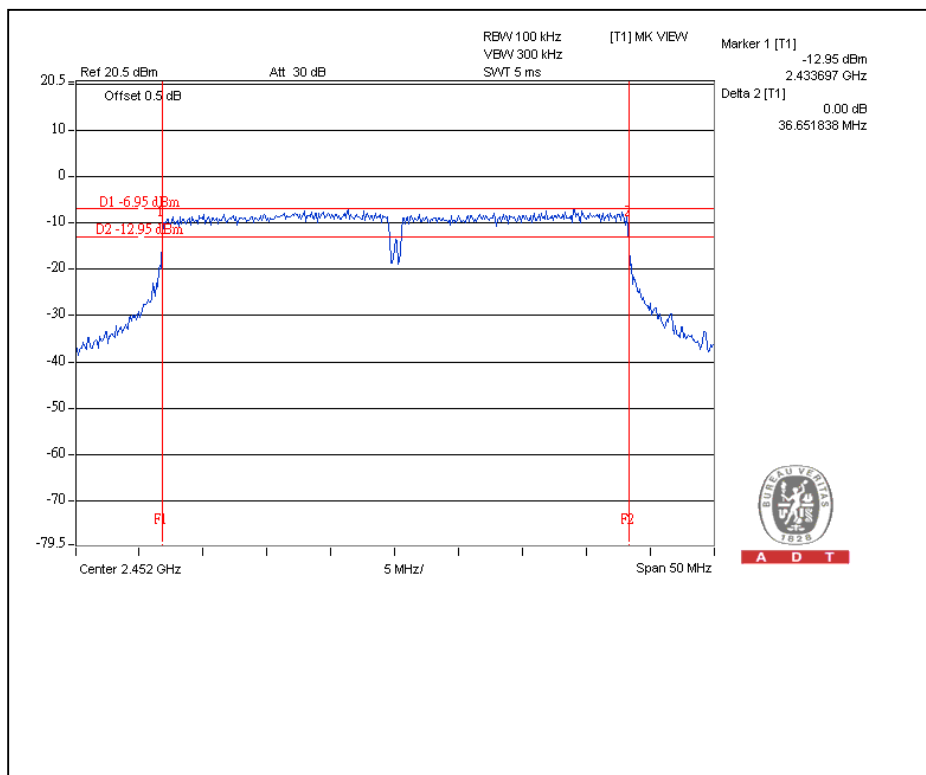
CH1



CH4



CH7





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4.4 99% BANDWIDTH MEASUREMENT

4.4.1 TEST INSTRUMENTS

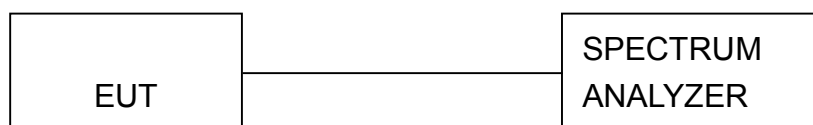
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY4825025 4	Aug. 03, 2009	Aug. 02, 2010

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

4.4.2 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.

4.4.3 TEST SETUP



4.4.4 EUT OPERATING CONDITIONS

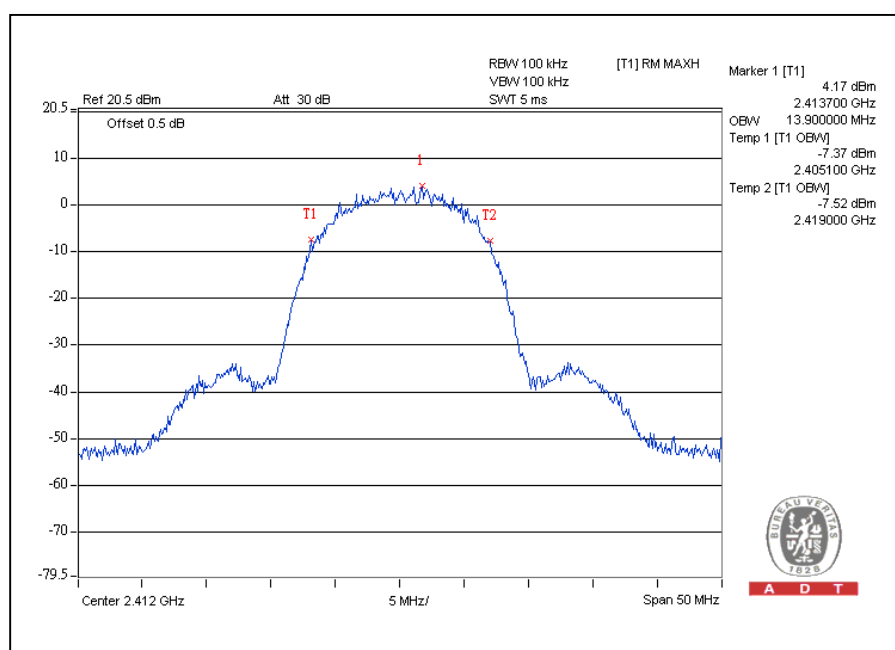
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.4.5 TEST RESULTS

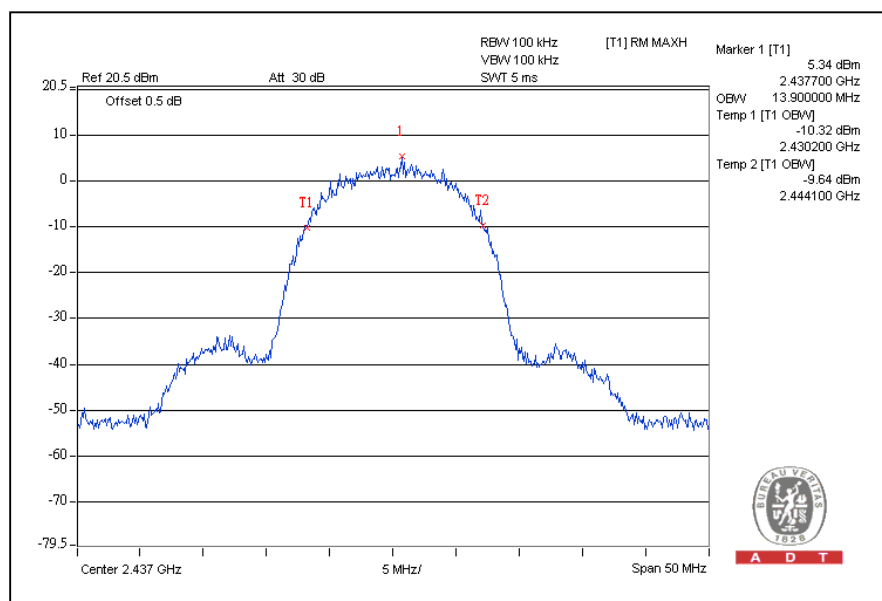
802.11b DSSS MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	99% BANDWIDTH (MHz)	
		CHAIN(0)	CHAIN(1)
1	2412	13.9	13.9
6	2437	13.9	13.9
11	2462	14.0	13.9

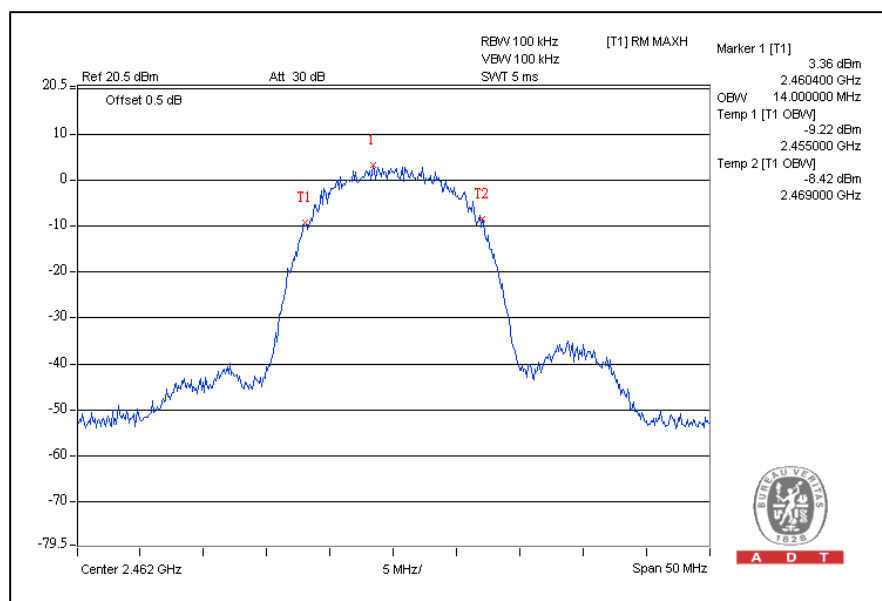
For Chain(0) :CH1



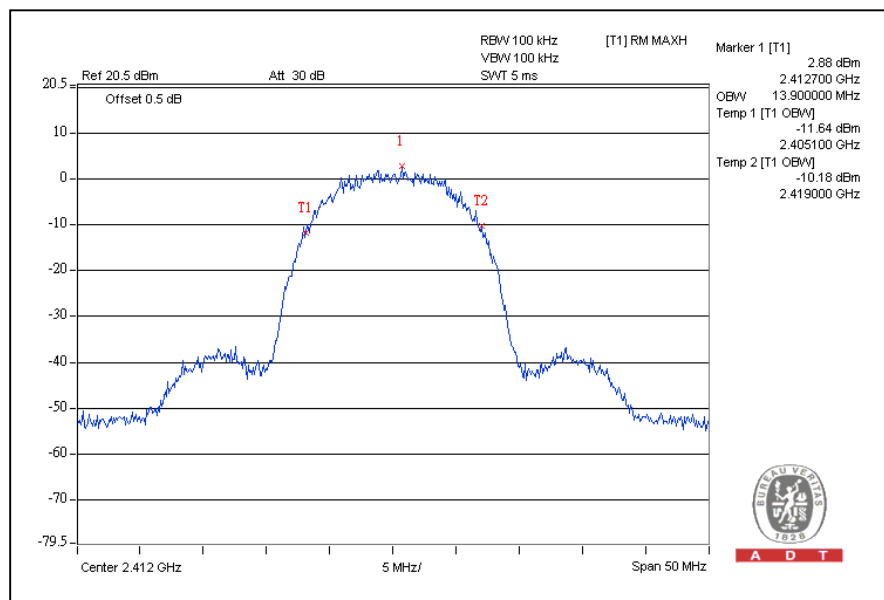
CH6



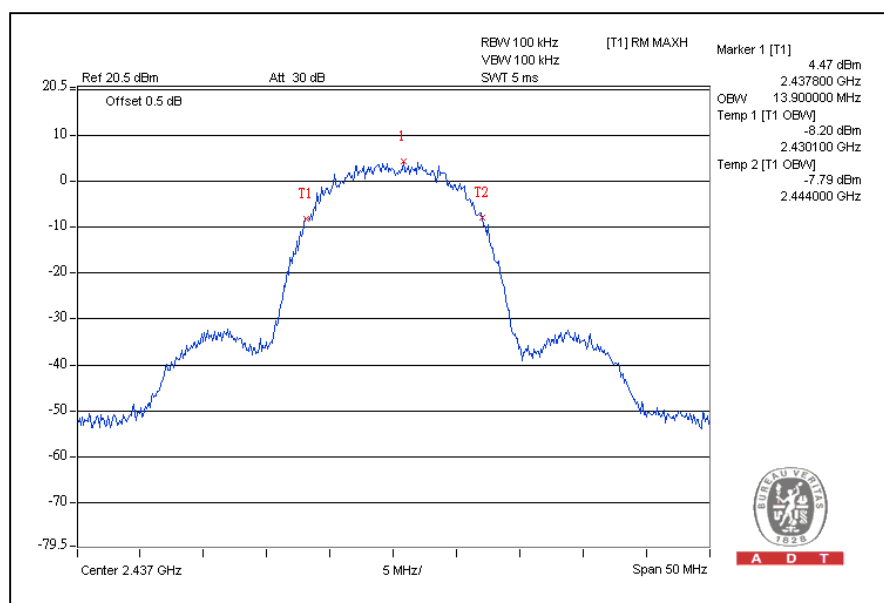
CH11



For Chain(1) :CH1



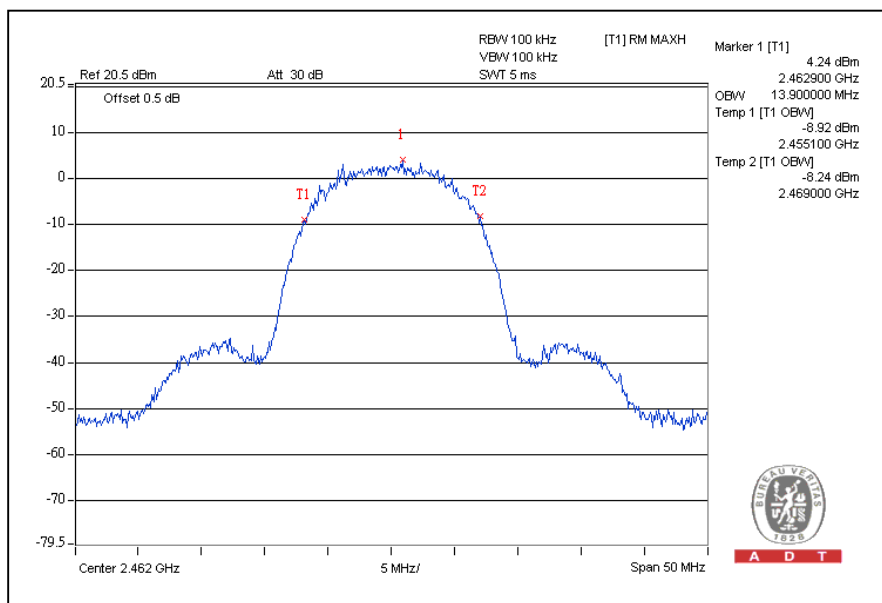
CH6





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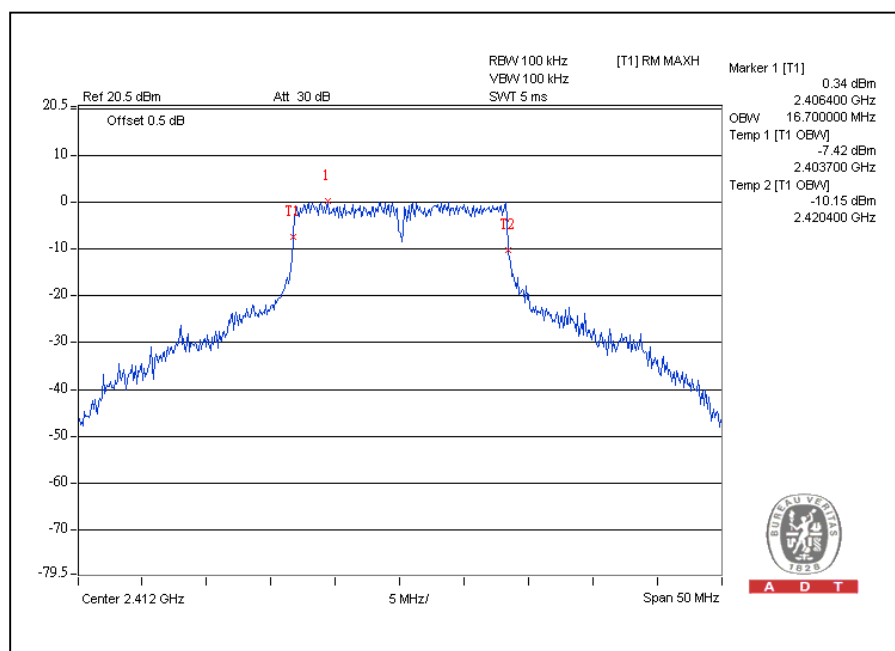
CH11



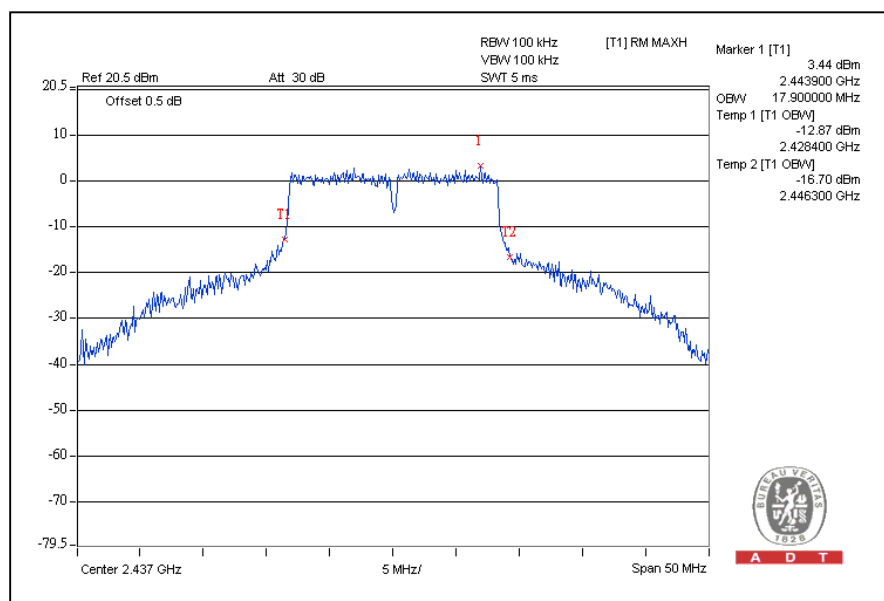
802.11g OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	99% BANDWIDTH (MHz)	
		CHAIN(0)	CHAIN(1)
1	2412	16.7	16.6
6	2437	17.9	17.0
11	2462	16.6	16.6

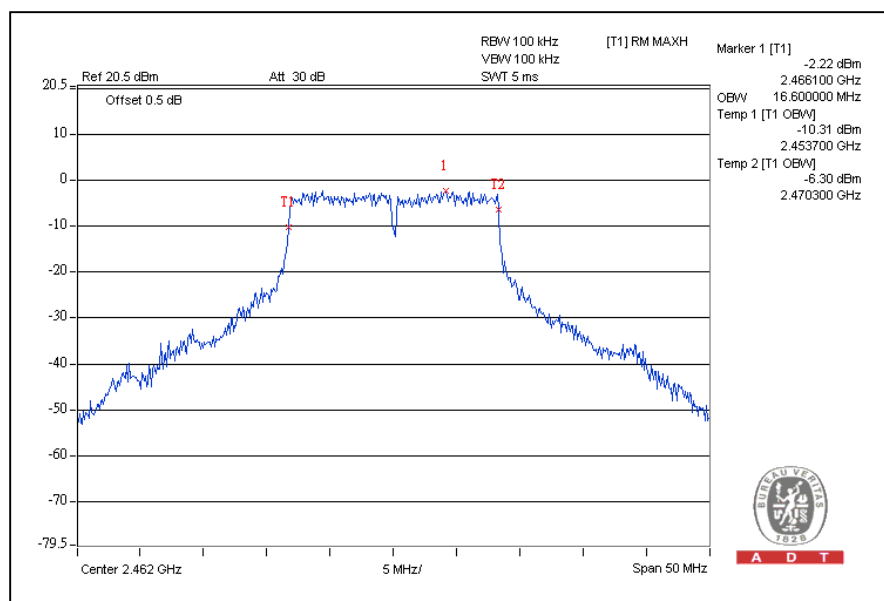
For Chain(0) :CH1



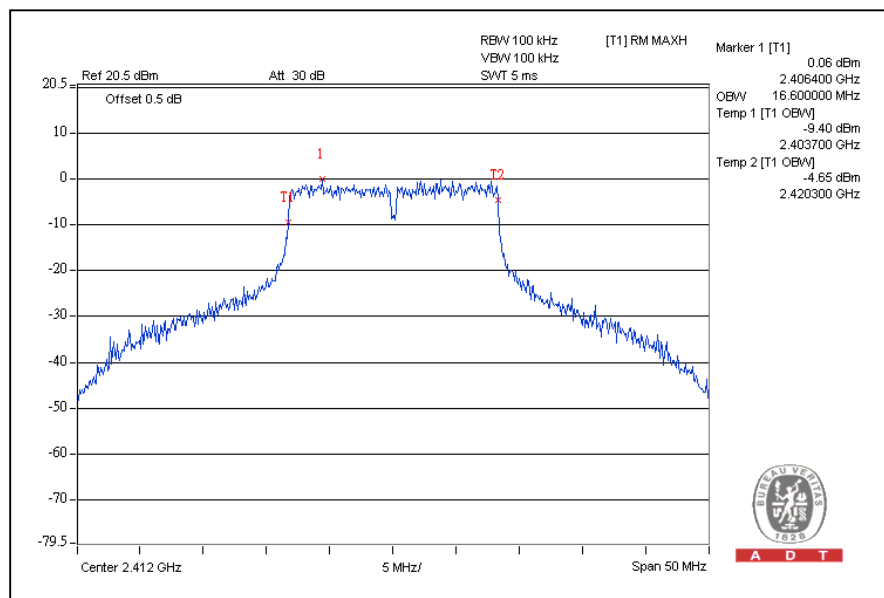
CH6



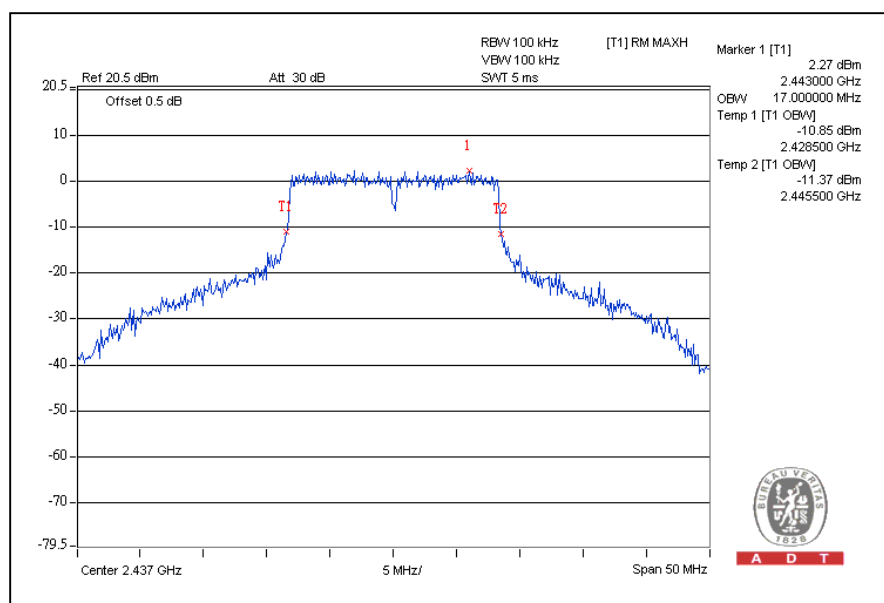
CH11



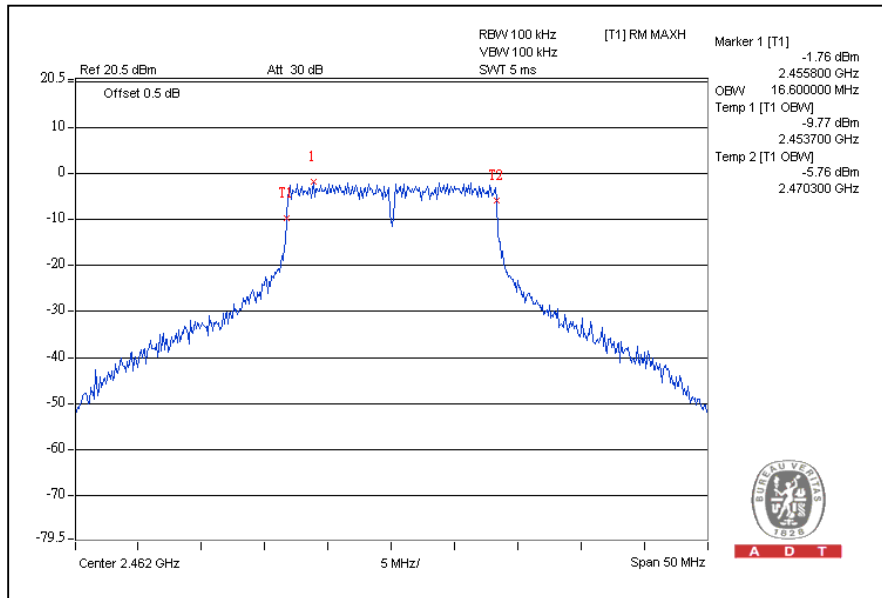
For Chain(1) :CH1



CH6



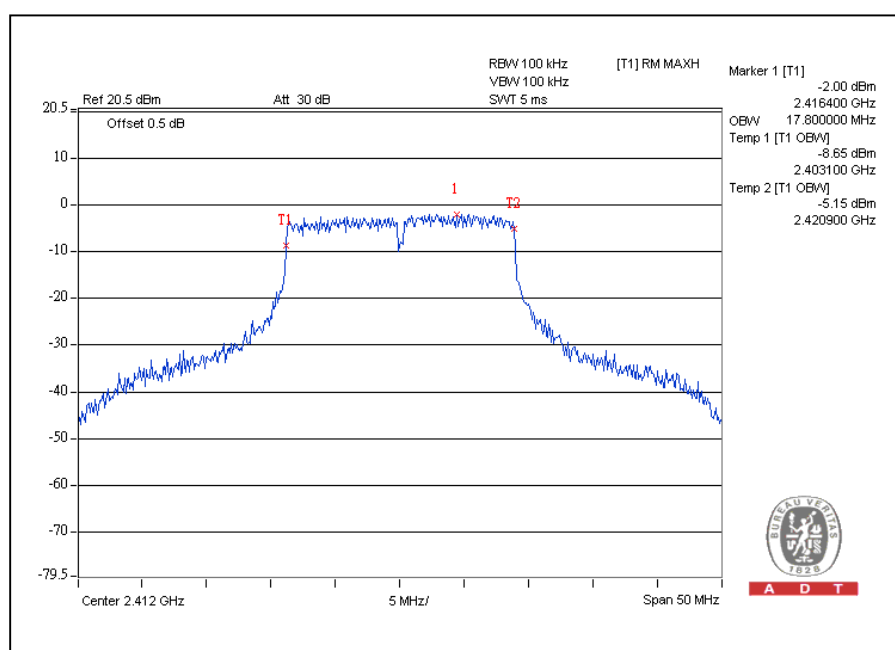
CH11



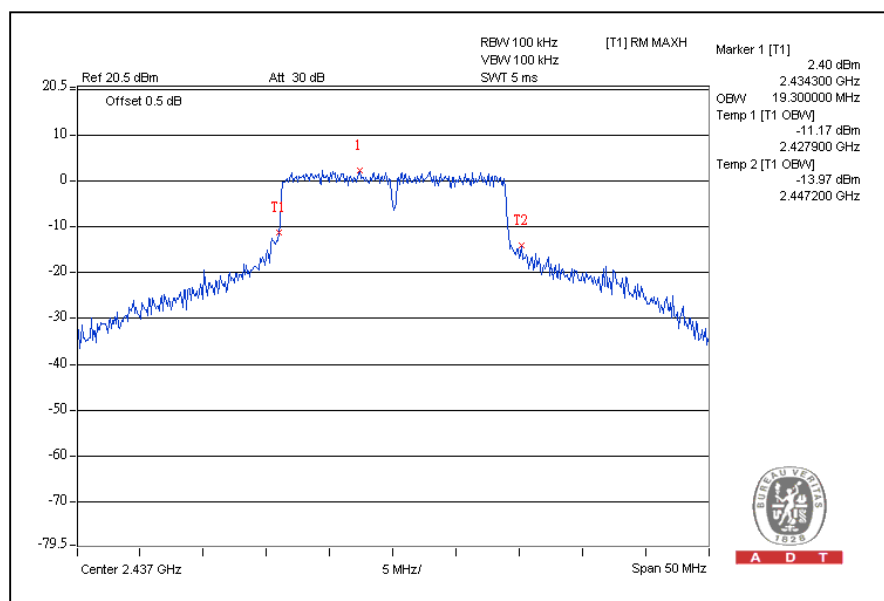
802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	99% BANDWIDTH (MHz)	
		CHAIN(0)	CHAIN(1)
1	2412	17.8	16.6
6	2437	19.3	17.0
11	2462	17.8	16.5

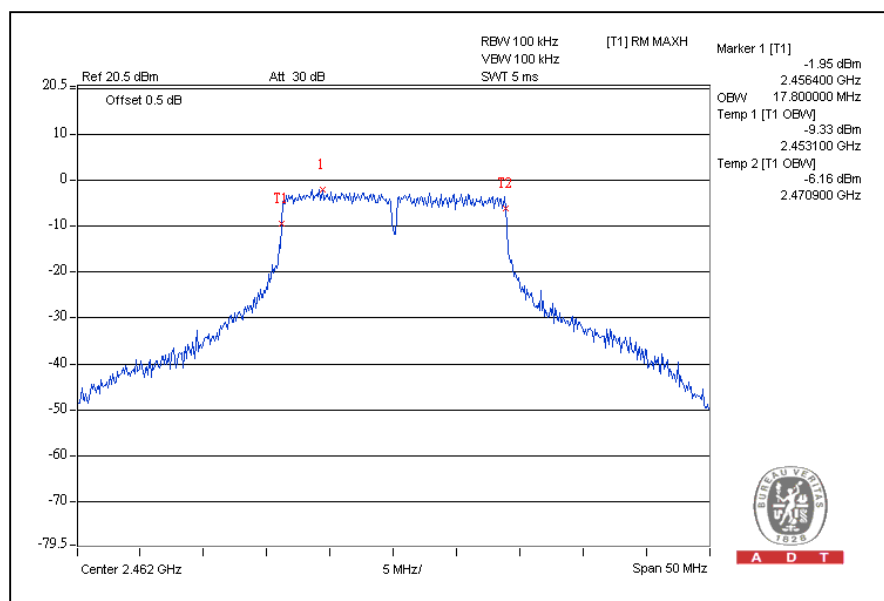
For Chain(0) :CH1



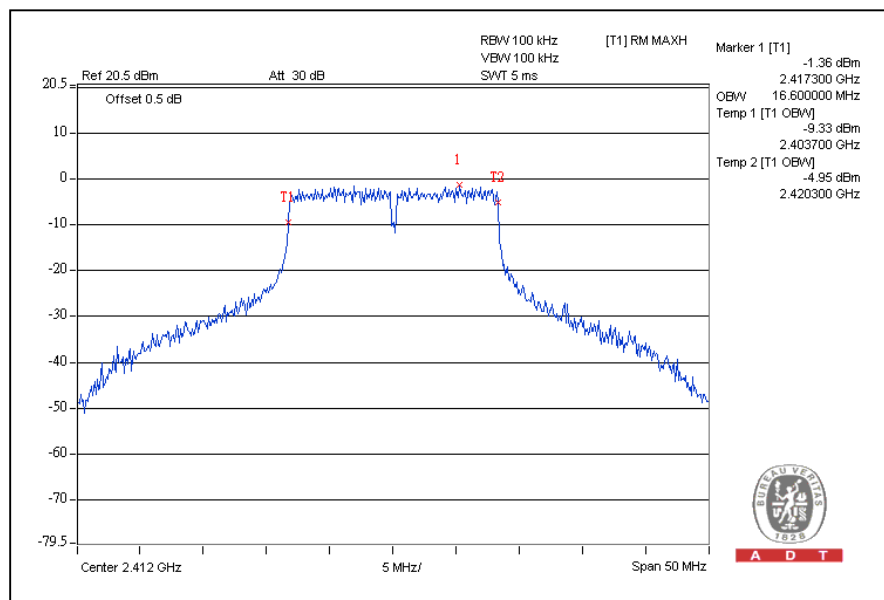
CH6



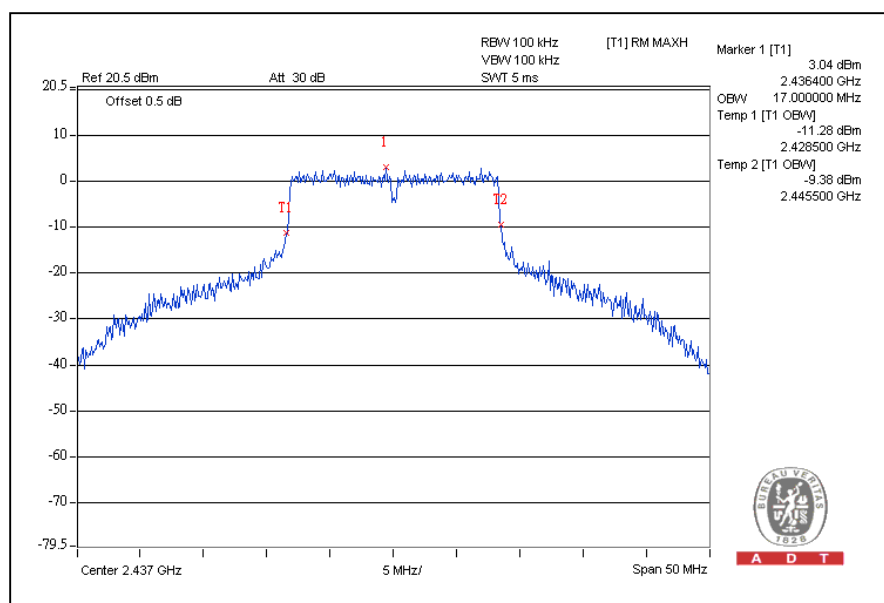
CH11



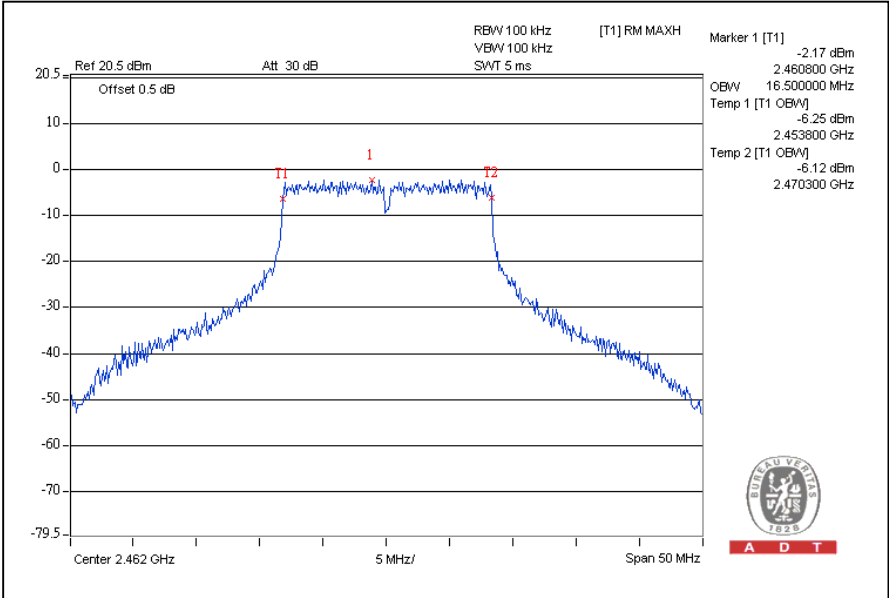
For Chain(1) :CH1



CH6



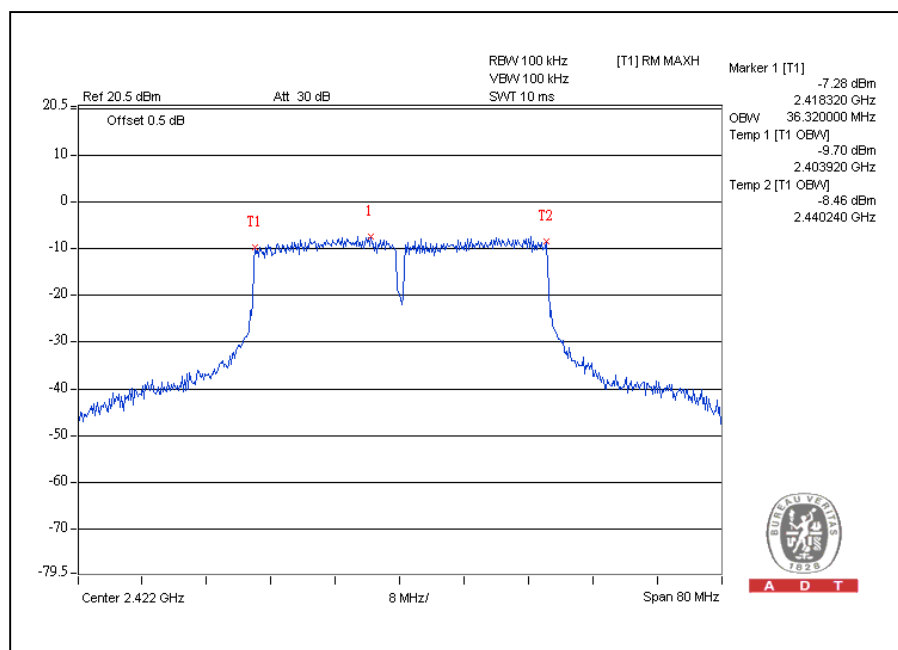
CH11



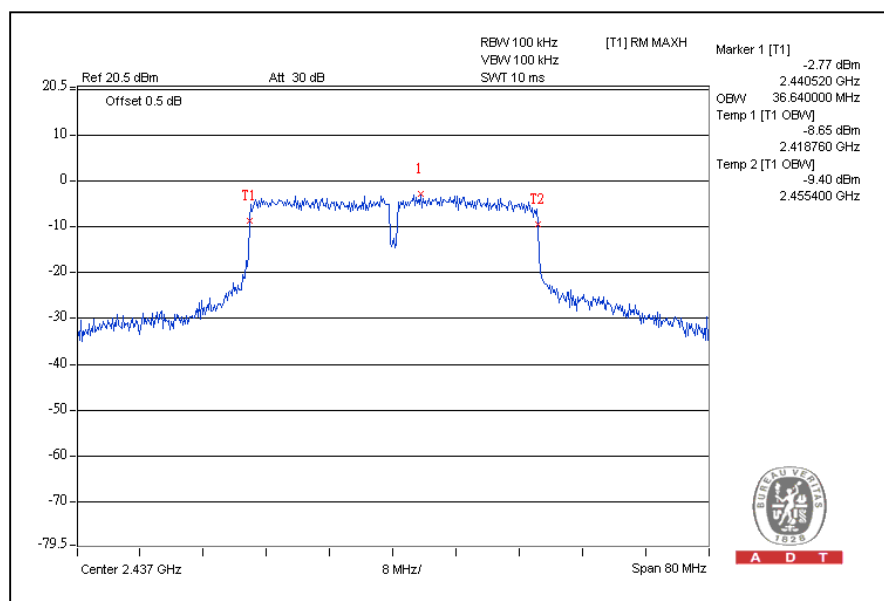
802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	99% BANDWIDTH (MHz)	
		CHAIN(0)	CHAIN(1)
1	2422	36.32	36.32
4	2437	36.64	36.48
7	2452	36.32	36.32

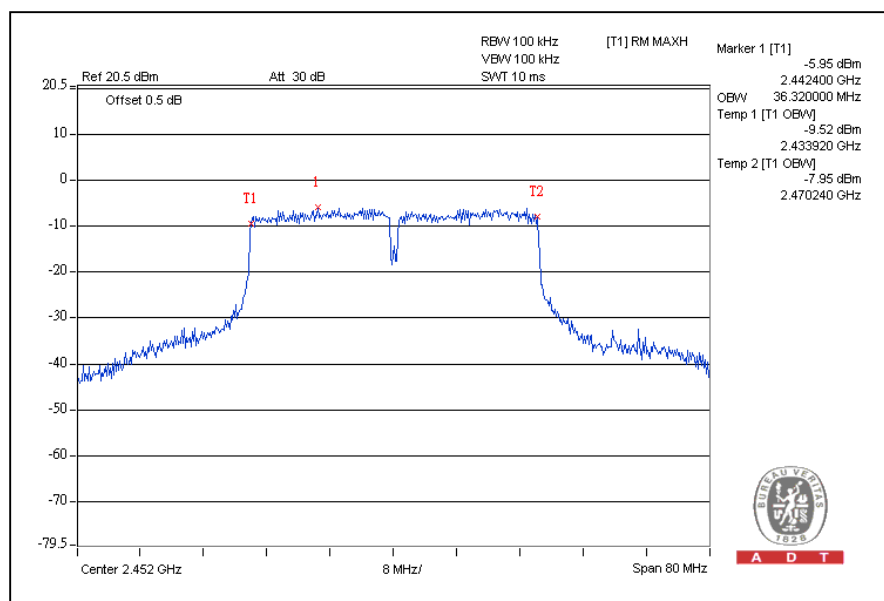
For Chain(0) :CH1



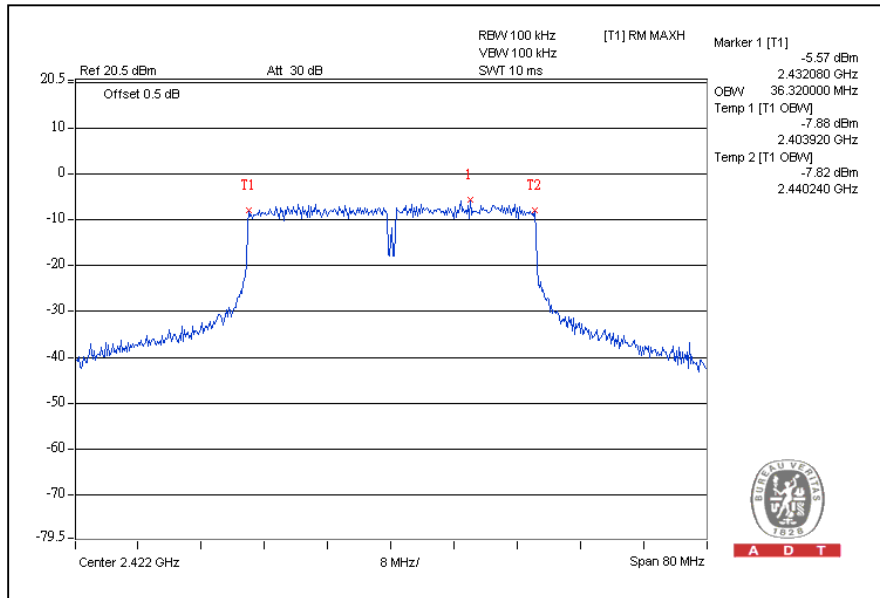
CH4



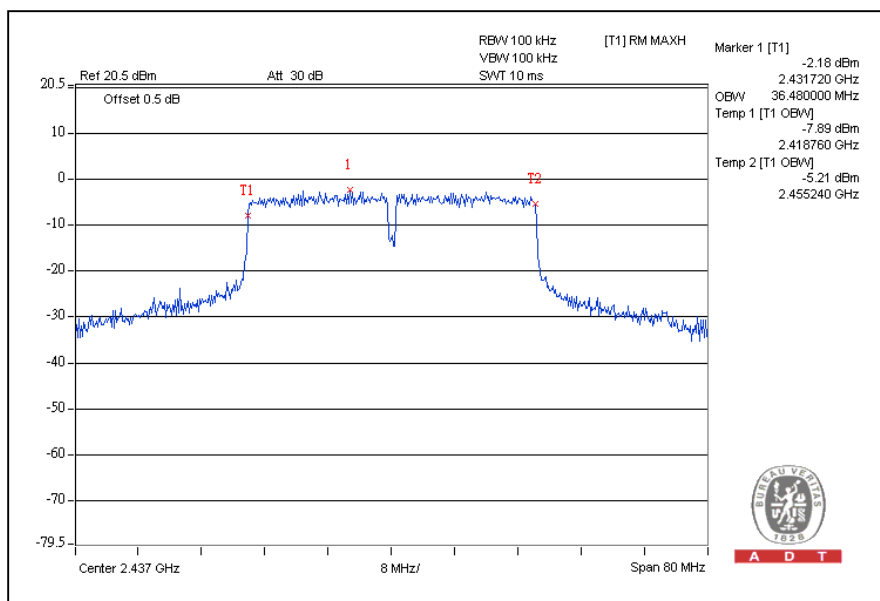
CH7



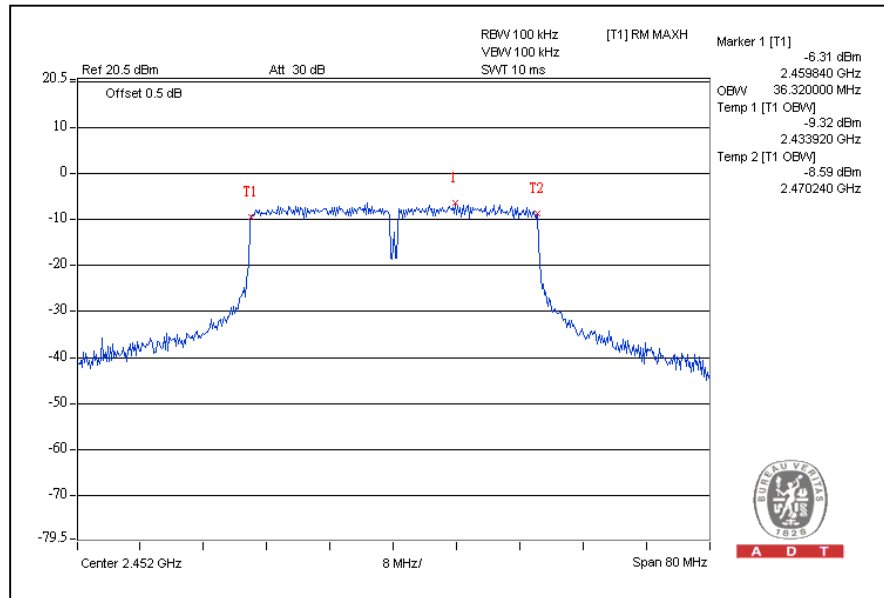
For Chain(1) :CH1



CH4



CH7



4.5 MAXIMUM PEAK OUTPUT POWER

4.5.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.5.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Peak Power Meter	ML2495A	0824006	May 04, 2010	May 03, 2011
Power Sensor	MA2411B	0738172	May 04, 2010	May 03, 2011

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

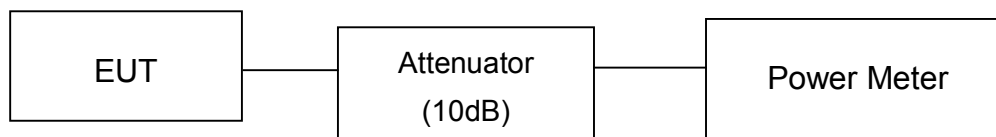
4.5.3 TEST PROCEDURES

1. The transmitter output was connected to the power meter through an attenuator; the bandwidth of the fundamental frequency was measured with the power meter.
2. Record the power level.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b DSSS MODULATION:

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)				
1	2412	16.2	16.5	86.4	19.4	29.7	PASS
6	2437	16.3	16.5	87.3	19.4	29.7	PASS
11	2462	17.3	17.1	105.0	20.2	29.7	PASS

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain (dBi)=6.3

The effective legacy gain is 6dBi, therefore the limit need to reduce.

802.11g OFDM MODULATION:

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)				
1	2412	22.0	22.3	328.3	25.2	29.7	PASS
6	2437	24.0	24.2	514.2	27.1	29.7	PASS
11	2462	21.7	21.0	273.8	24.4	29.7	PASS

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain (dBi)=6.3

The effective legacy gain is 6dBi, therefore the limit need to reduce.

802.11n (20MHz) OFDM MODULATION:

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)				
1	2412	21.1	21.1	257.7	24.1	30	PASS
6	2437	24.0	24.1	508.2	27.1	30	PASS
11	2462	20.4	20.0	209.6	23.2	30	PASS

802.11n (40MHz) OFDM MODULATION:

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)				
1	2422	19.3	19.3	170.2	22.3	30	PASS
4	2437	21.7	21.8	299.3	24.8	30	PASS
7	2452	18.3	18.1	132.2	21.2	30	PASS

4.6 AVERAGE OUTPUT POWER

4.6.1 FOR REFERENCE.

4.6.2 TEST INSTRUMENTS

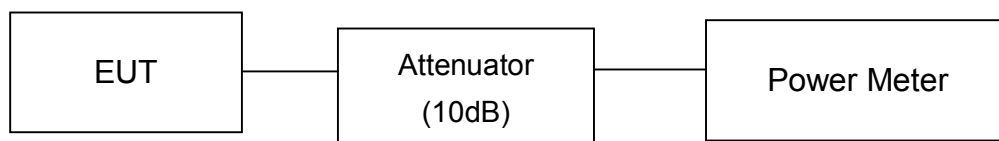
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Peak Power Meter	ML2495A	0824006	May 04, 2010	May 03, 2011
Power Sensor	MA2411B	0738172	May 04, 2010	May 03, 2011

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 PROCEDURES

1. The transmitter output was connected to the power meter through an attenuator, the bandwidth of the fundamental frequency was measured with the power meter.
2. Record the average power level.

4.6.4 TEST SETUP



4.6.5 EUT OPERATING CONDITIONS

Same as Item 4.3.5

4.6.6 TEST RESULTS

802.11b DSSS MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)		TOTAL PEAK POWER (dBm)
		CHAIN(0)	CHAIN(1)	
1	2412	14.2	14.5	17.4
6	2437	14.2	14.4	17.3
11	2462	15.2	15.1	18.2

802.11g OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)		TOTAL PEAK POWER (dBm)
		CHAIN(0)	CHAIN(1)	
1	2412	13.7	14.3	17.0
6	2437	16.2	16.7	19.5
11	2462	12.8	12.1	15.5

802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)		TOTAL PEAK POWER (dBm)
		CHAIN(0)	CHAIN(1)	
1	2412	12.5	12.5	15.5
6	2437	16.3	16.7	19.5
11	2462	11.4	10.8	14.1

802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)		TOTAL PEAK POWER (dBm)
		CHAIN(0)	CHAIN(1)	
1	2422	10.3	10.2	13.3
4	2437	13.2	13.5	16.4
7	2452	9.4	9.1	12.3

4.7 POWER SPECTRAL DENSITY MEASUREMENT

4.7.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY48250254	Aug. 03, 2009	Aug. 02, 2010

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

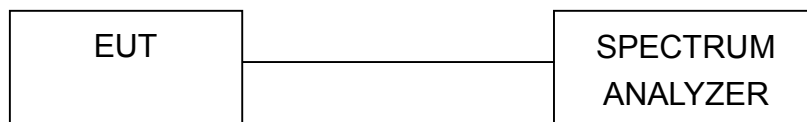
4.7.3 TEST PROCEDURE

1. 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.
2. The measurement include through a combiner with both chain and each chain when operate simultaneously.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



4.7.6 EUT OPERATING CONDITION

Same as Item 4.3.6

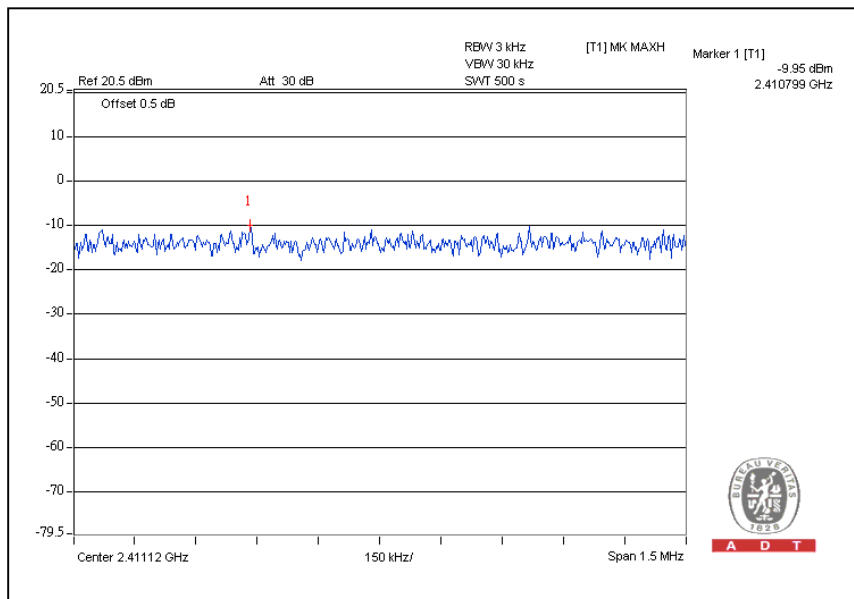
4.7.7 TEST RESULTS

802.11b DSSS MODULATION:

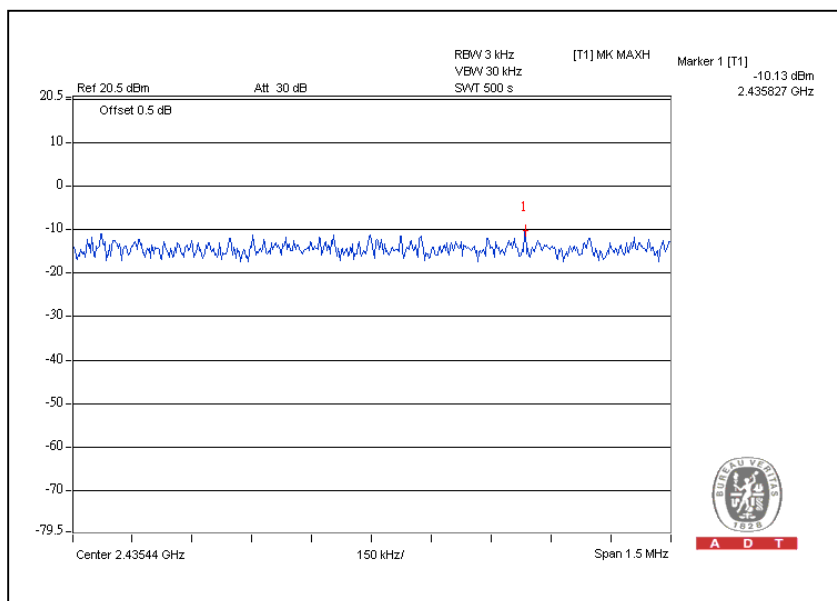
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY –With Combiner(dBm)	* TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
1	2412	-10.0	-7.8	1.3	-5.8	8	PASS
6	2437	-10.1	-6.8	0.5	-5.1	8	PASS
11	2462	-4.8	-10.1	2.6	-3.7	8	PASS

* Aggregate PSD across transmitters in linear power units across each transmitter output.

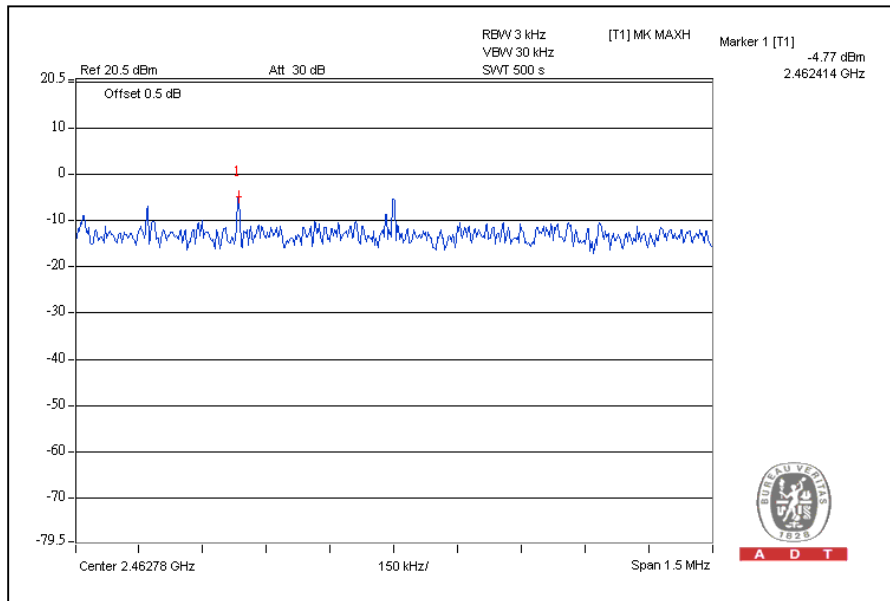
For Chain (0): CH1



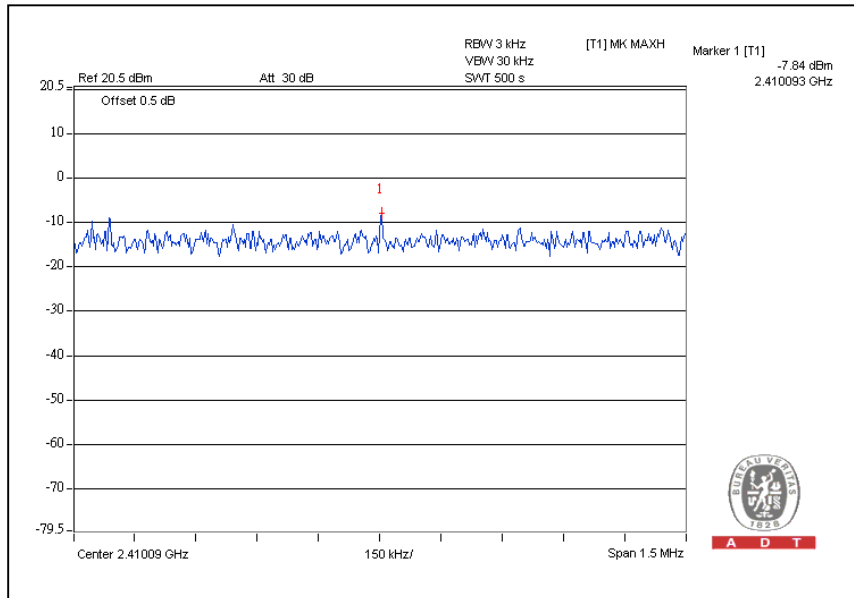
CH6



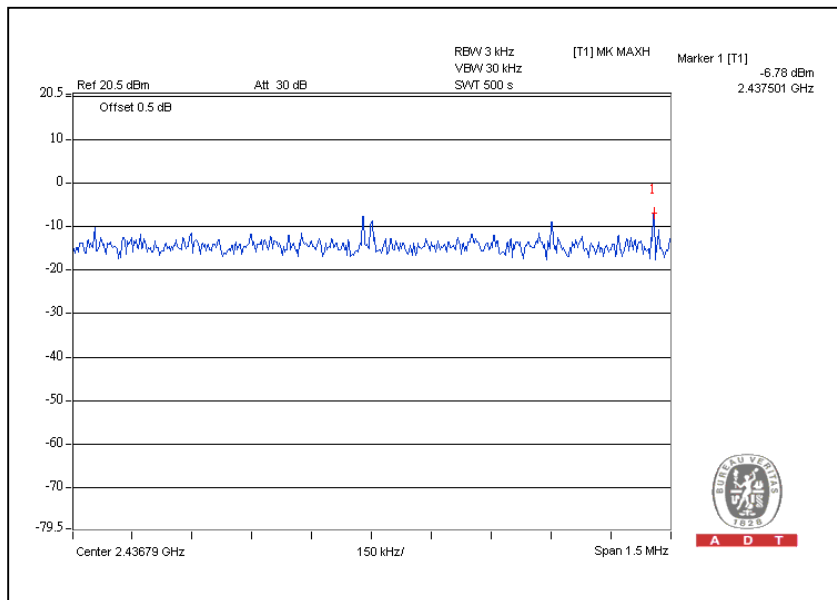
CH11



For Chain (1): CH1



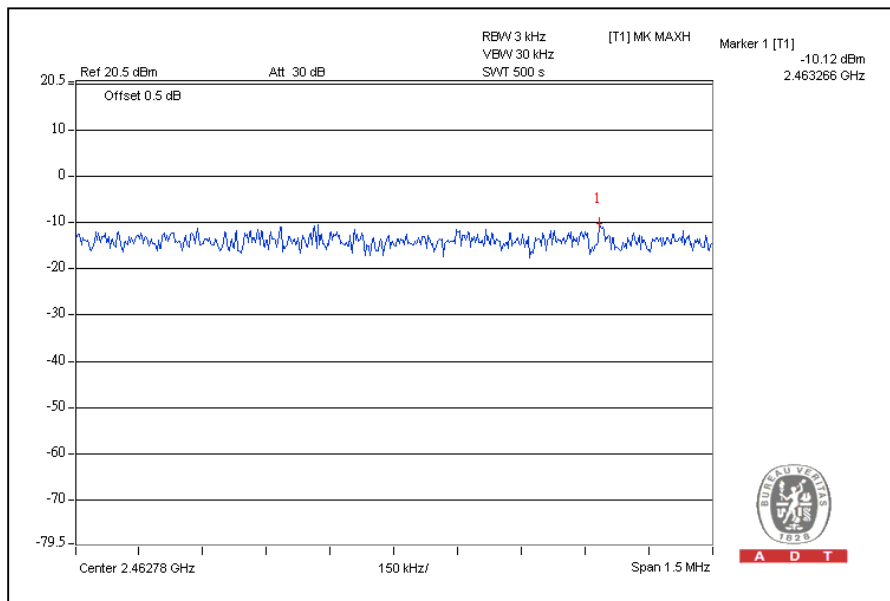
CH6



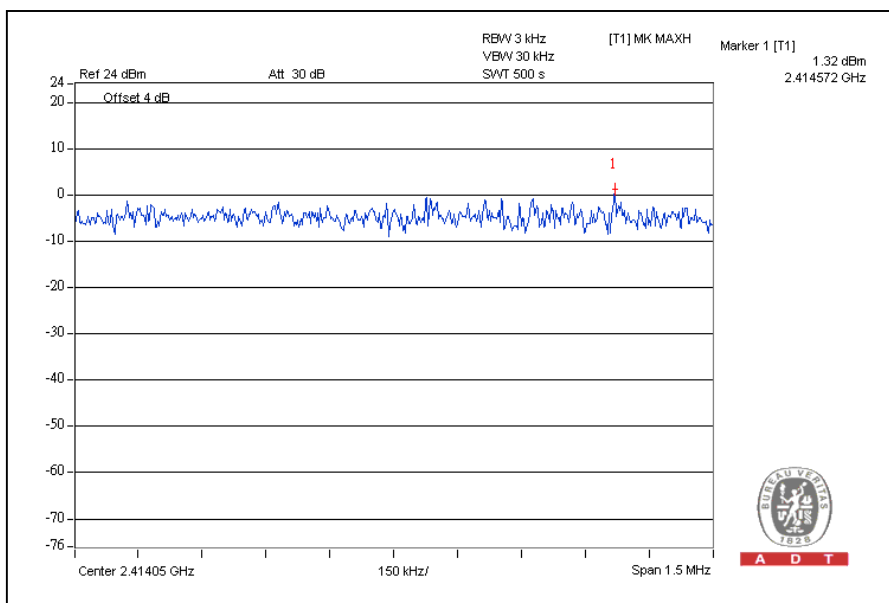


A D T

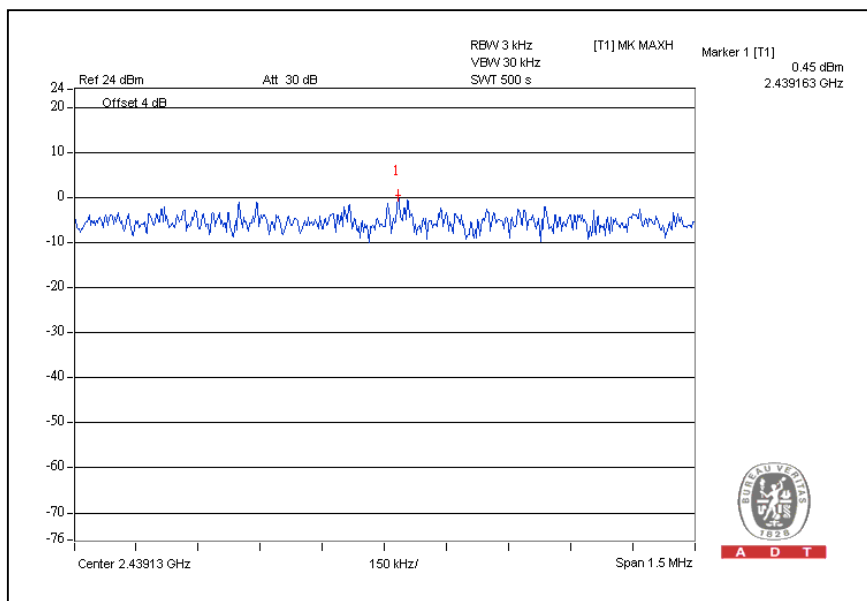
CH11



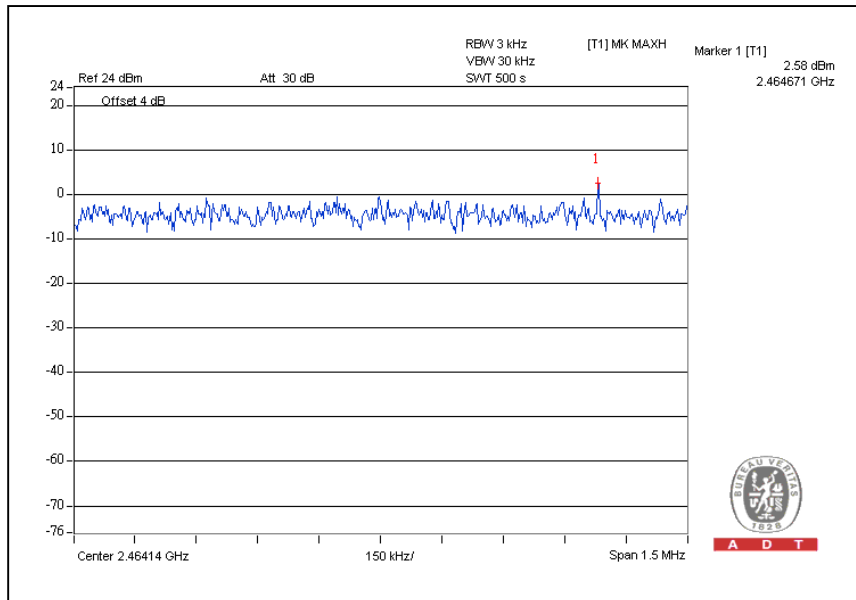
With Combiner : CH1



CH 6



CH11





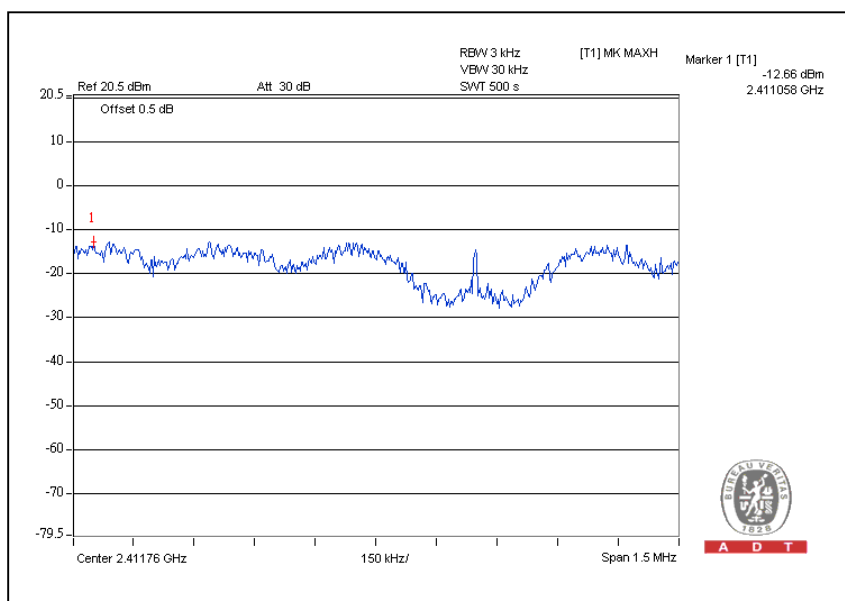
A D T

802.11g OFDM MODULATION:

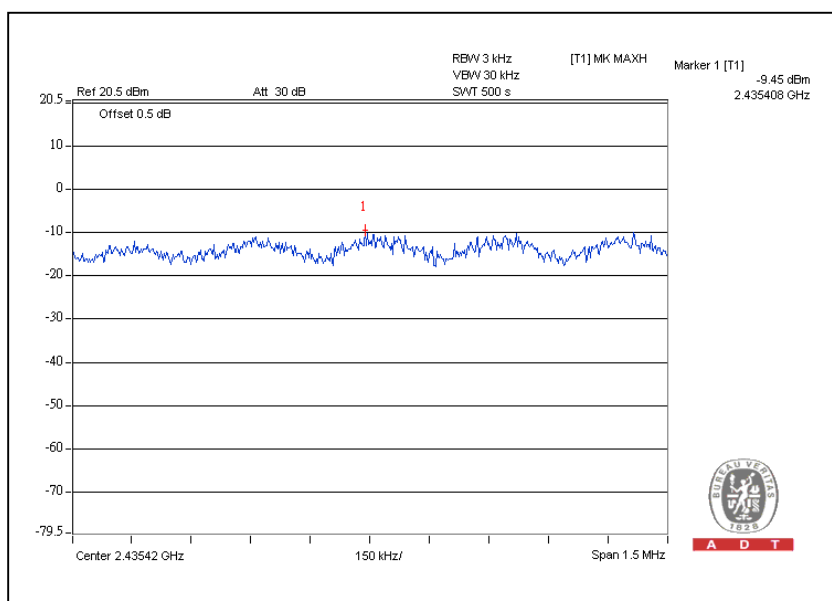
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY –With Combiner(dBm)	* TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
1	2412	-12.7	-11.6	-2.9	-9.1	8	PASS
6	2437	-9.5	-7.4	-1.2	-5.3	8	PASS
11	2462	-12.6	-13.4	-3.0	-10.0	8	PASS

* Aggregate PSD across transmitters in linear power units across each transmitter output.

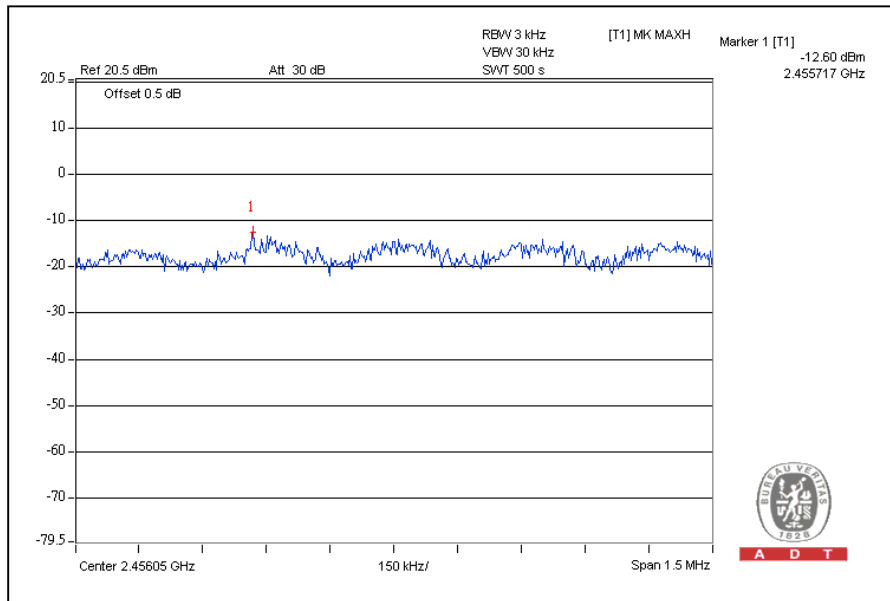
For Chain (0): CH1



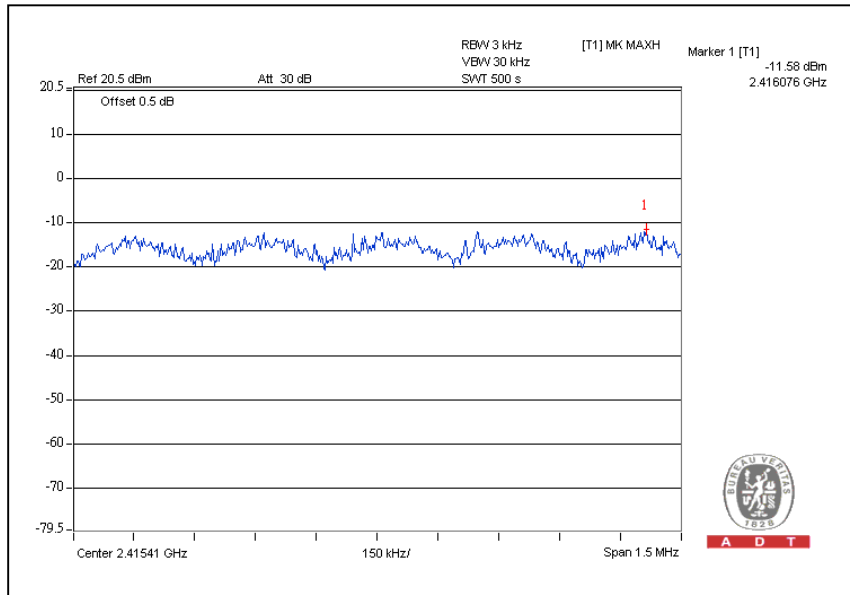
CH6



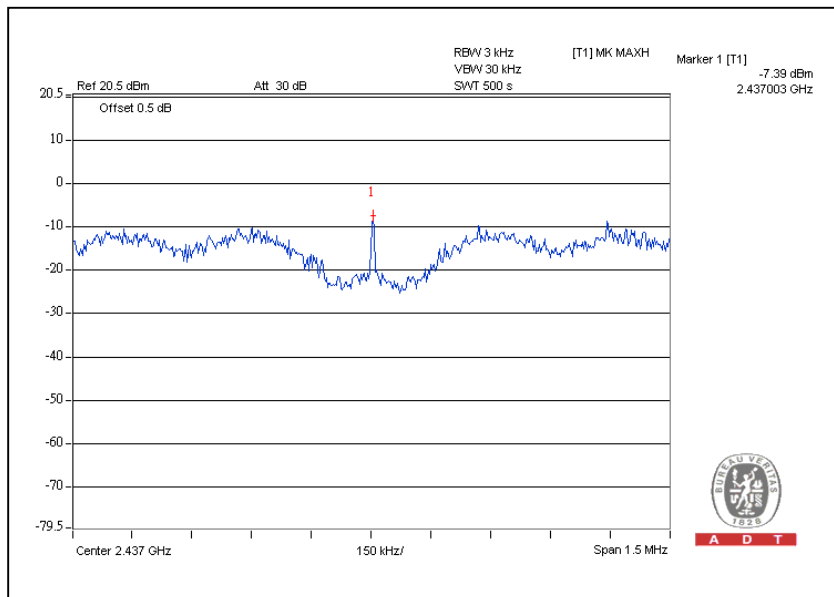
CH11



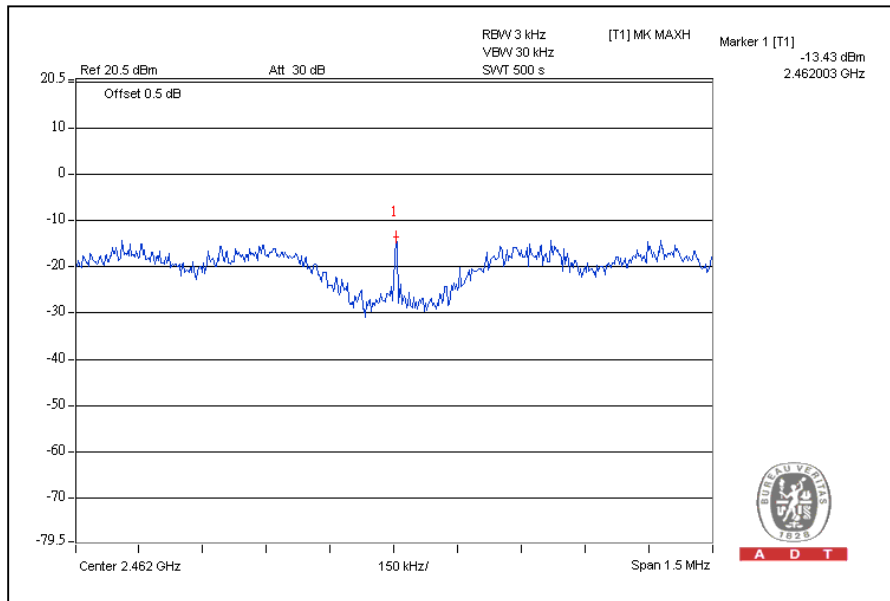
For Chain (1): CH1



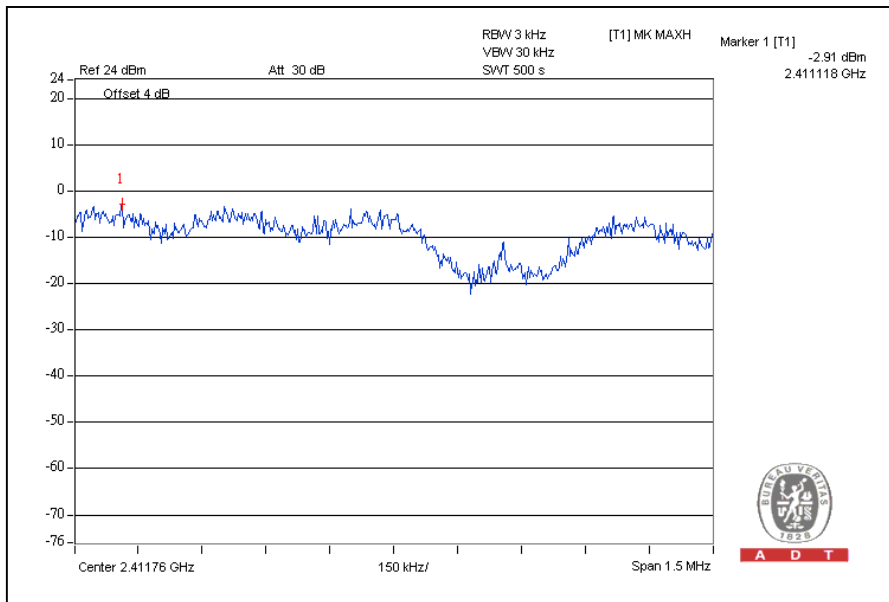
CH6



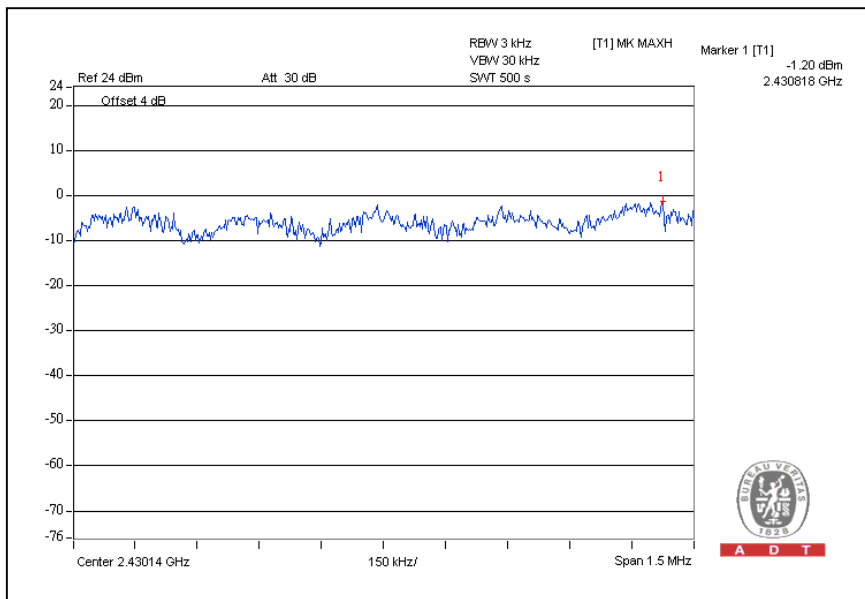
CH11



With Combiner : CH1



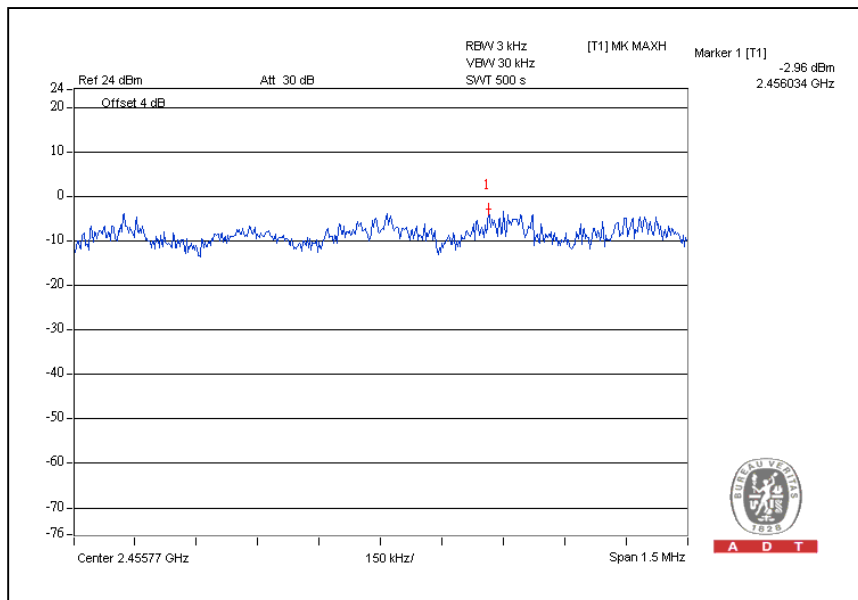
CH 6





A D T

CH11

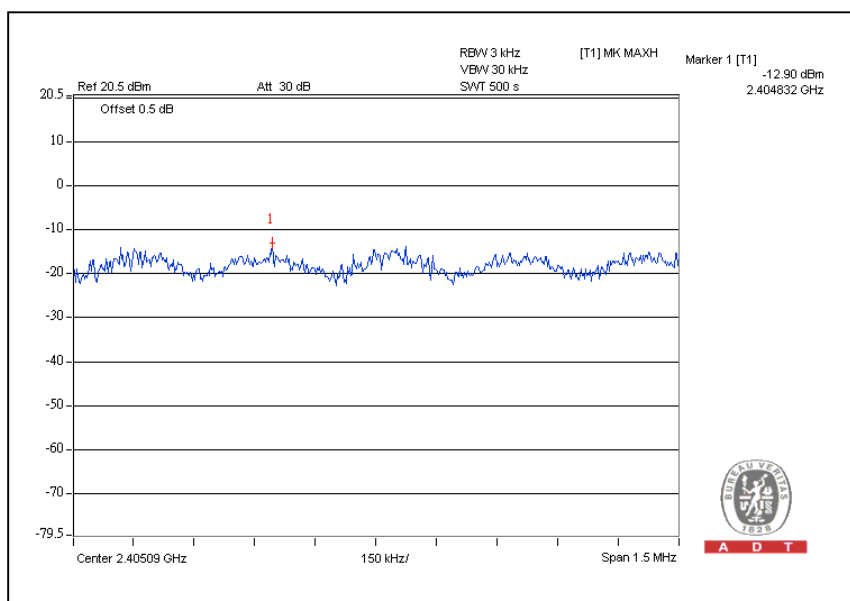


802.11n (20MHz) OFDM MODULATION:

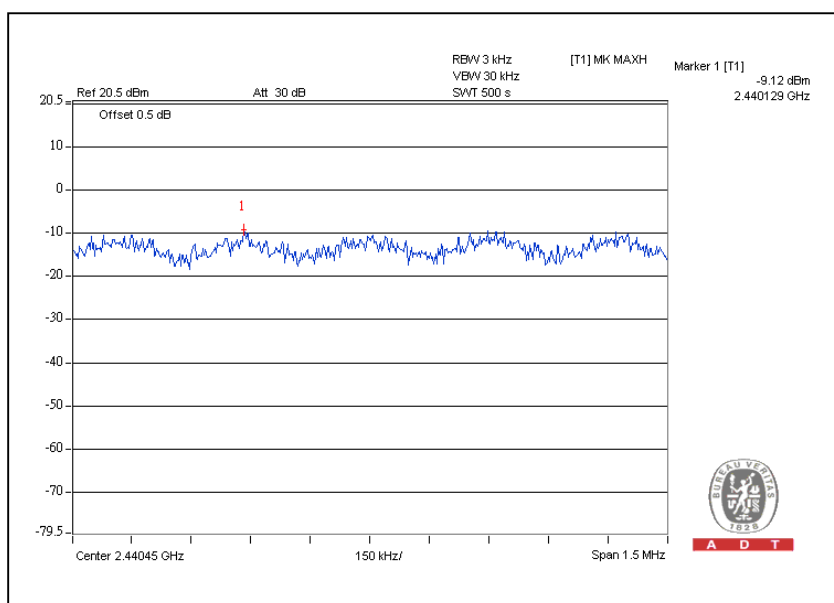
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY –With Combiner(dBm)	* TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
1	2412	-12.9	-11.8	-4.5	-9.3	8	PASS
6	2437	-9.1	-9.1	0	-6.1	8	PASS
11	2462	-14.3	-15.5	-4.0	-11.8	8	PASS

* Aggregate PSD across transmitters in linear power units across each transmitter output.

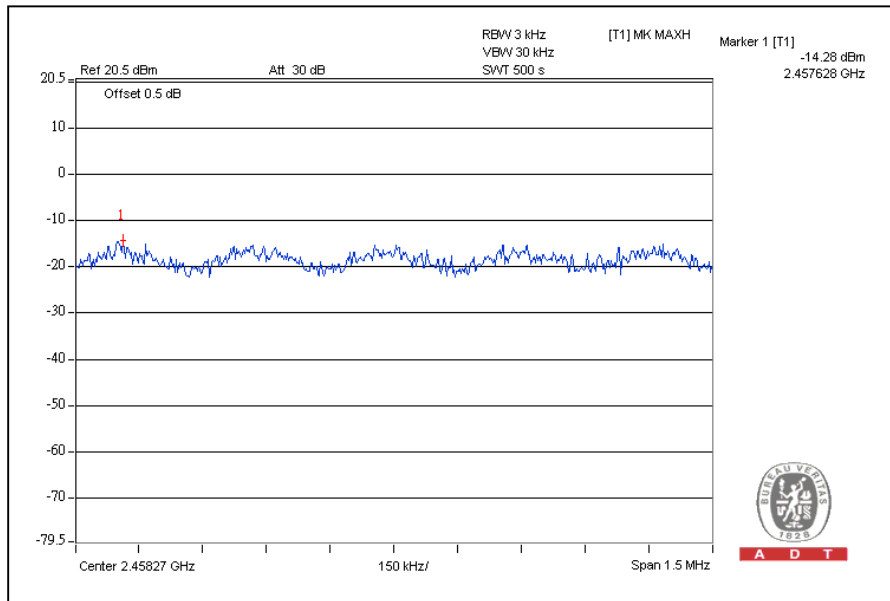
For Chain (0): CH1



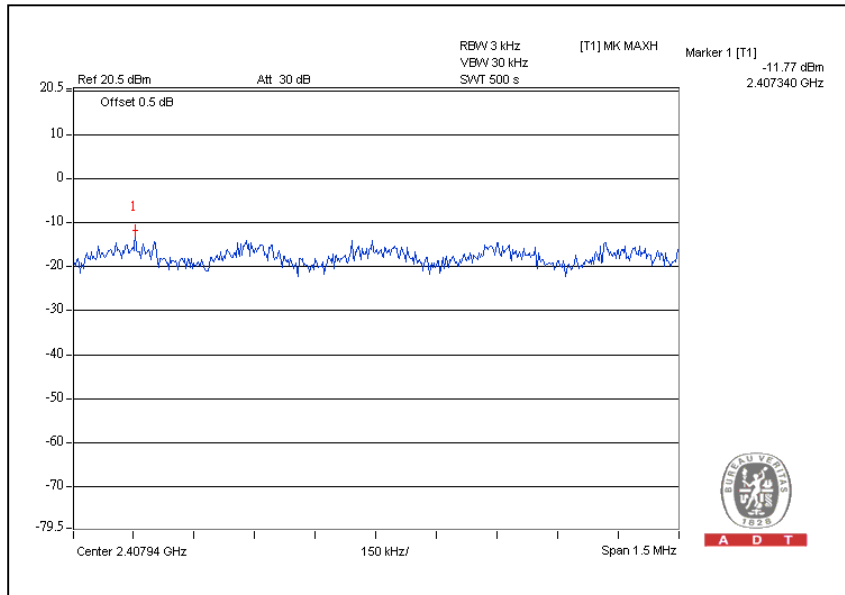
CH6



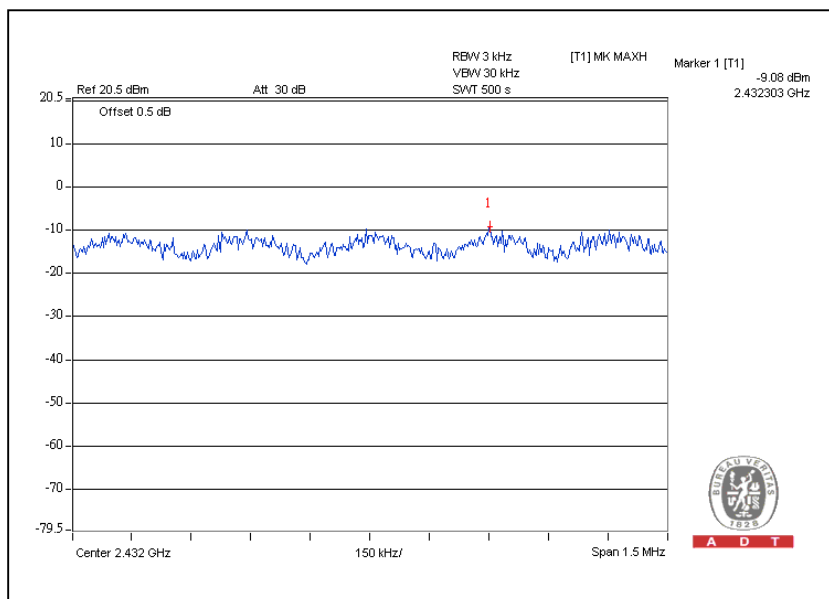
CH11



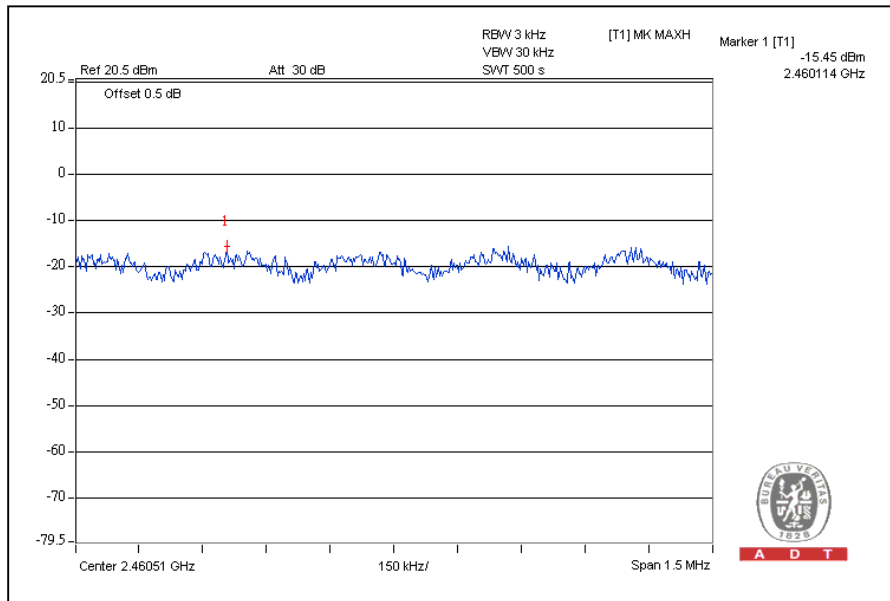
For Chain (1): CH1



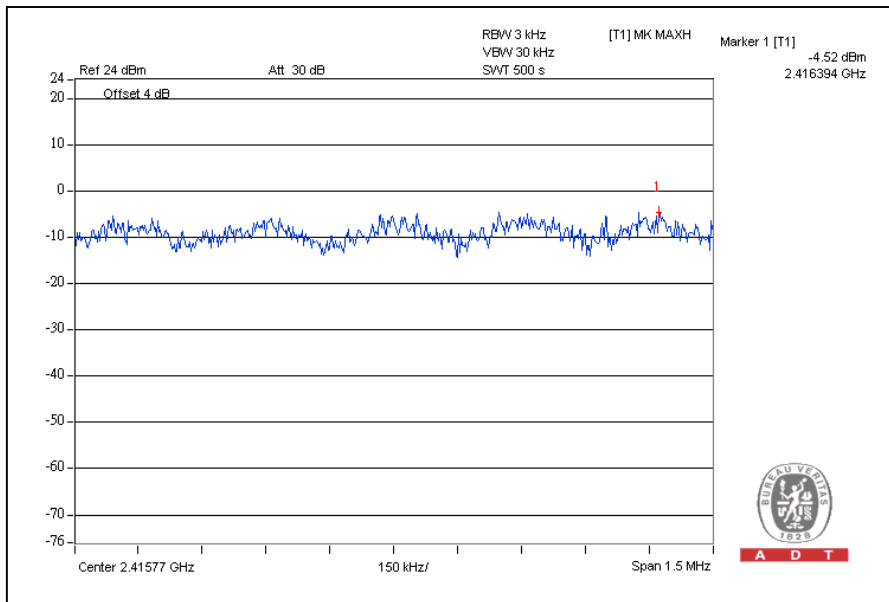
CH6



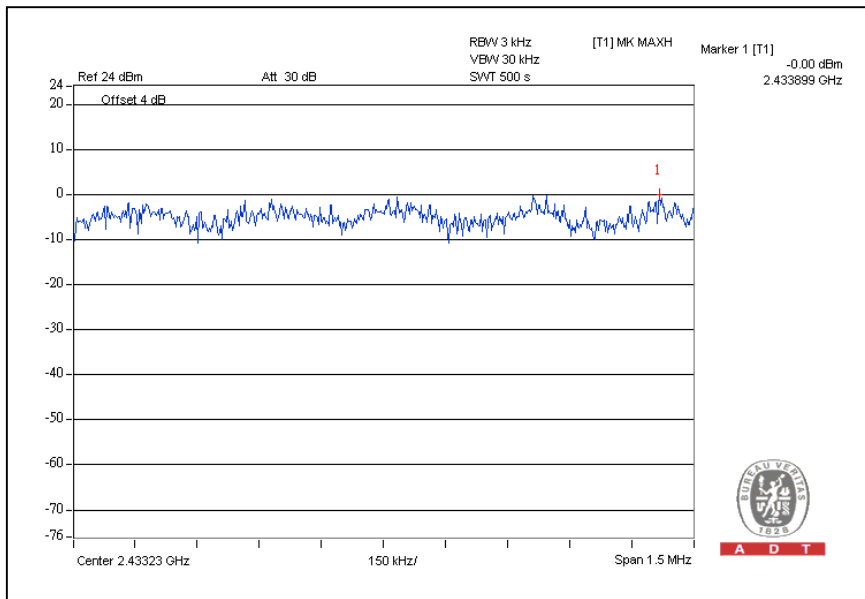
CH11



With Combiner : CH1



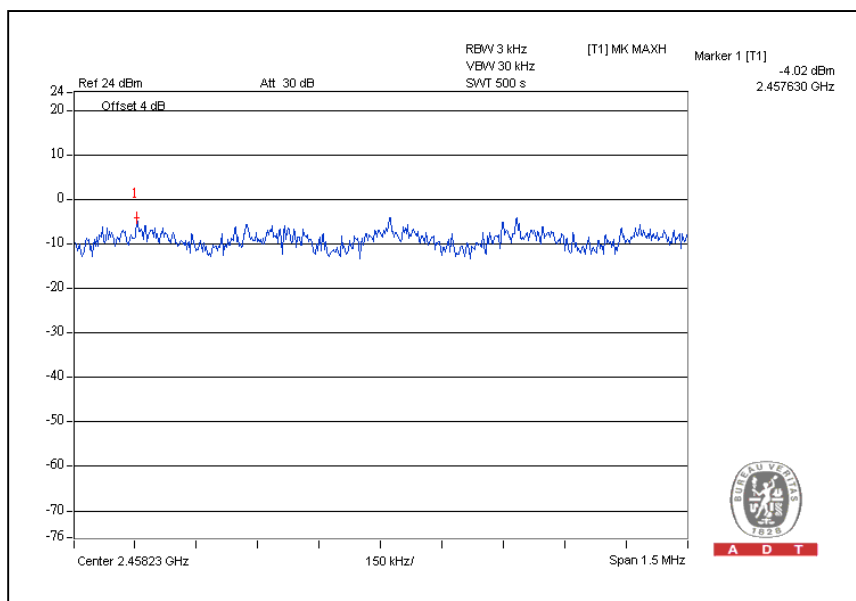
CH 6





A D T

CH11

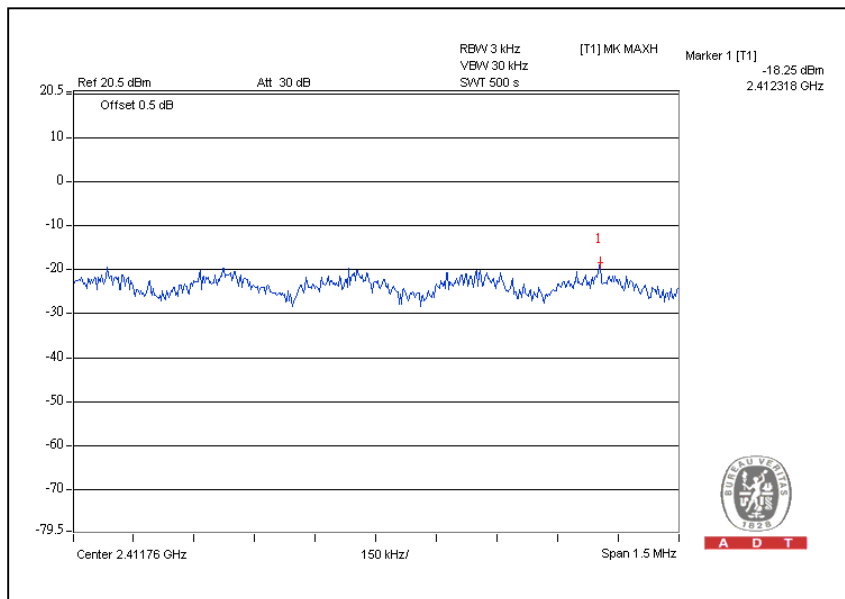


802.11n (40MHz) OFDM MODULATION:

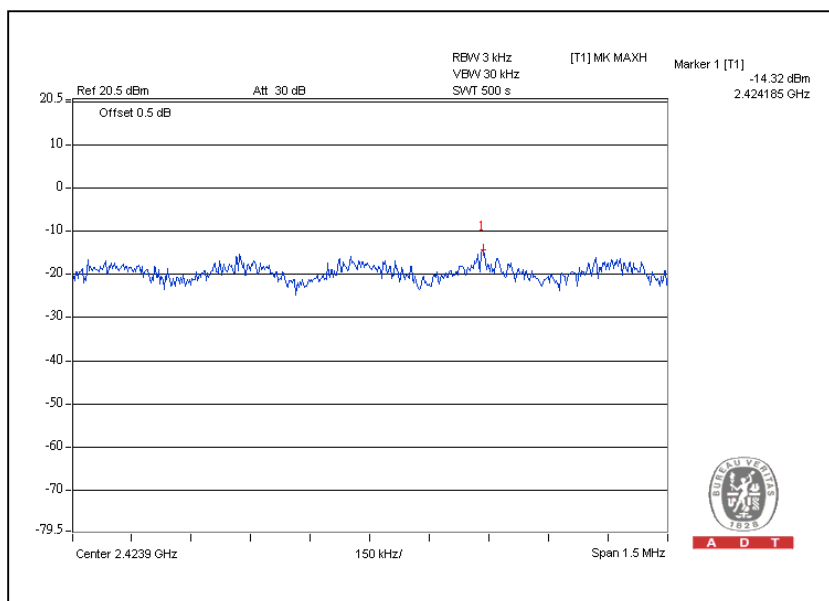
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY –With Combiner(dBm)	* TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
1	2422	-18.3	-17.9	-9.1	-15.1	8	PASS
4	2437	-14.3	-15.4	-5.7	-11.8	8	PASS
7	2452	-16.8	-19.0	-9.4	-14.8	8	PASS

* Aggregate PSD across transmitters in linear power units across each transmitter output.

For Chain (0): CH1



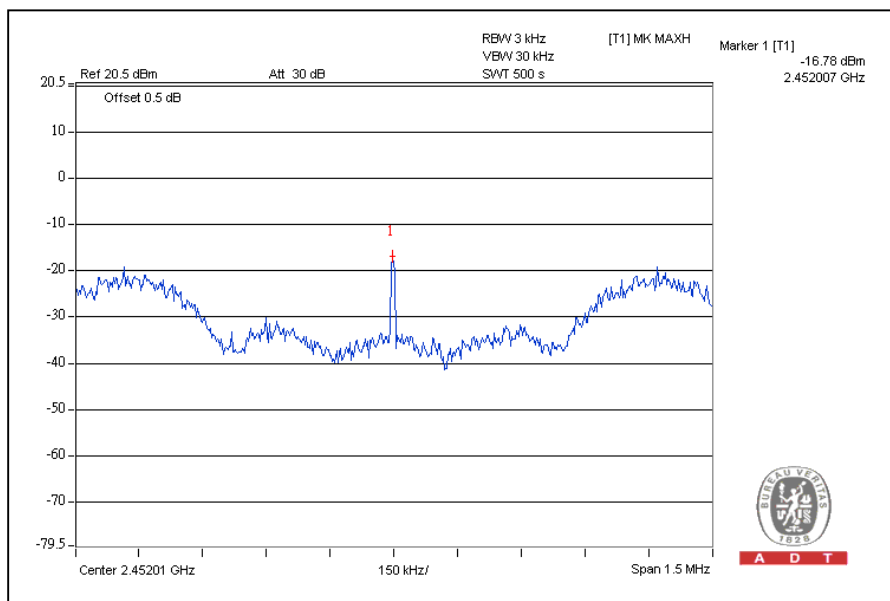
CH4



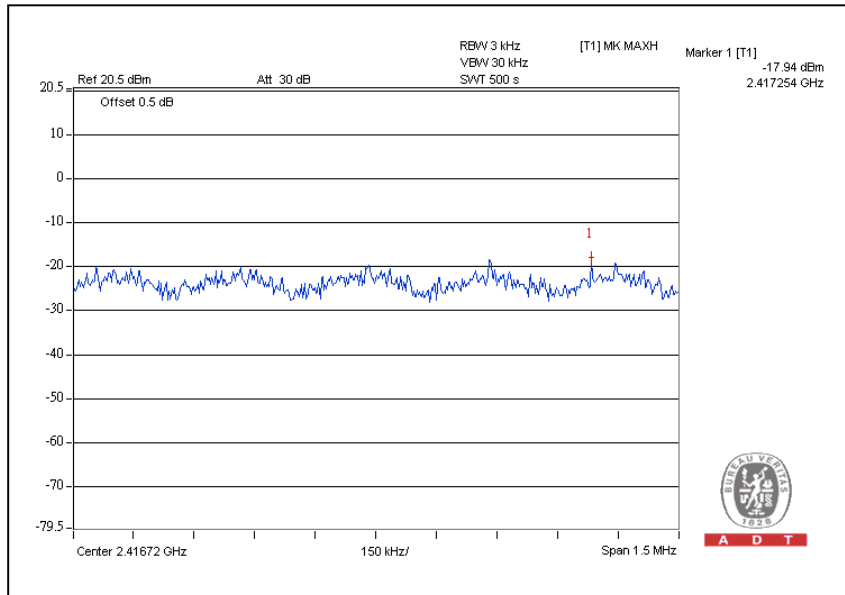


A D T

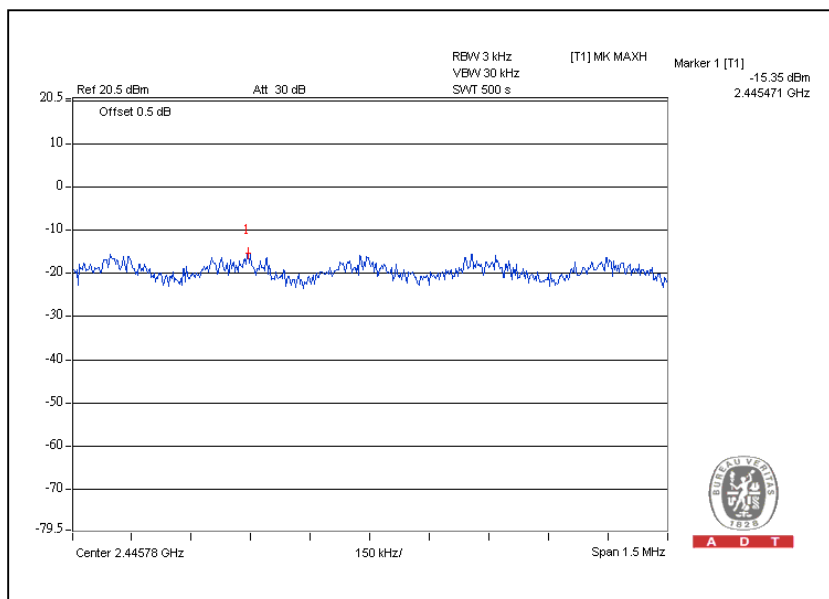
CH7



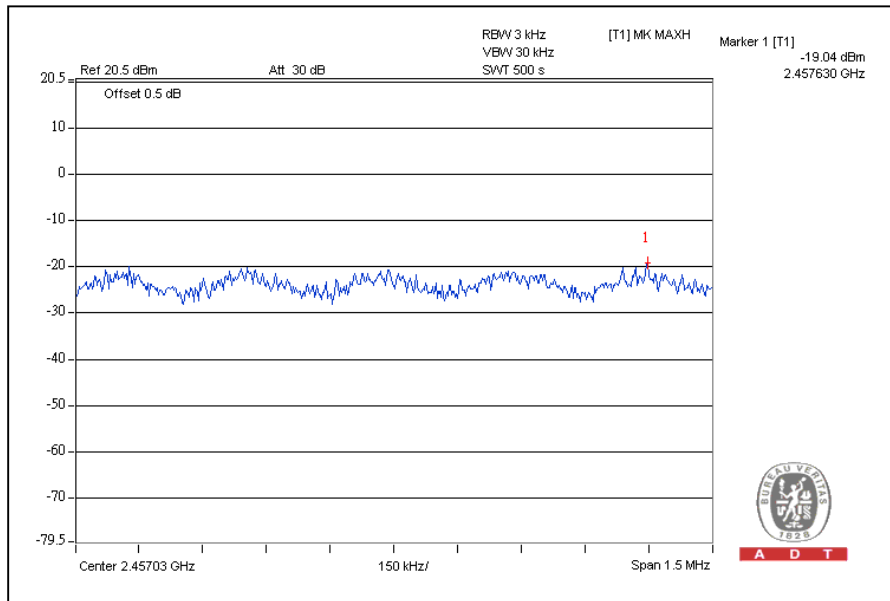
For Chain (1): CH1



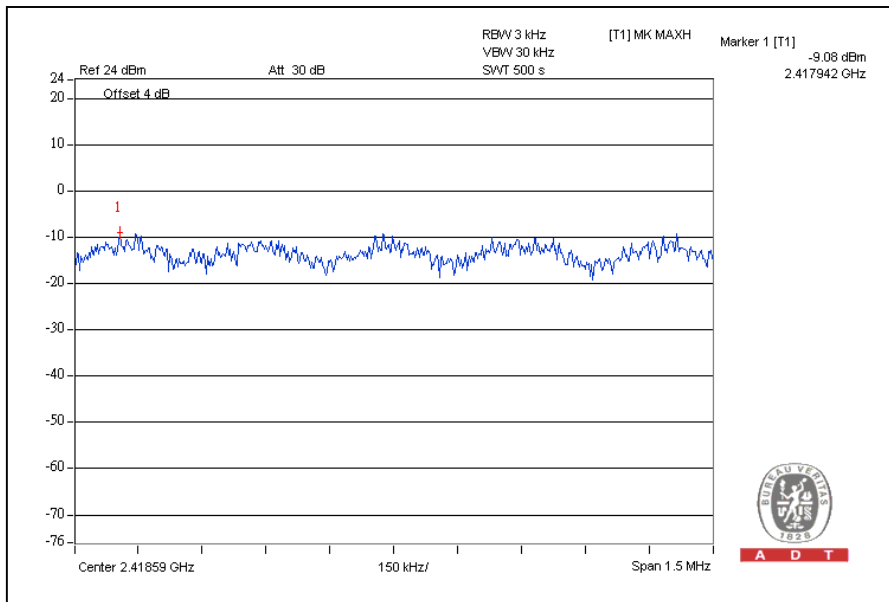
CH4



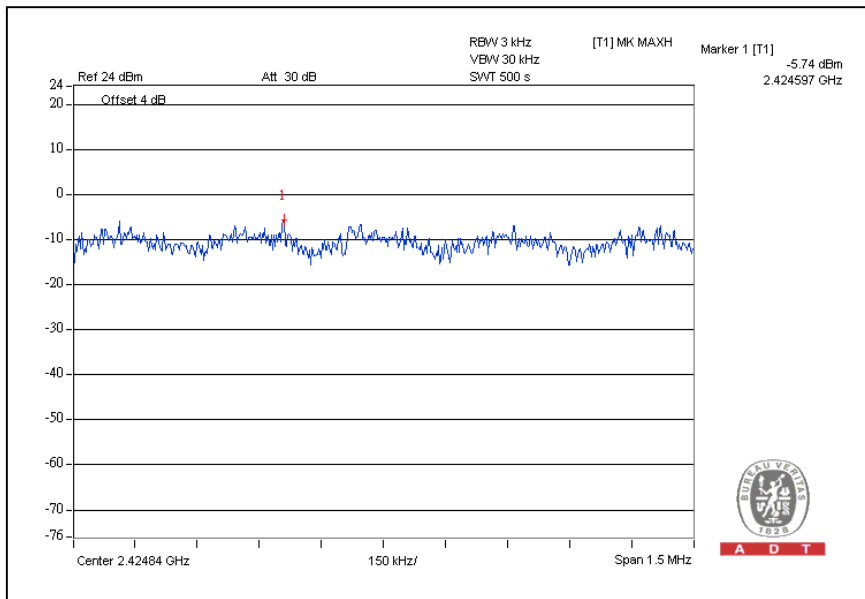
CH7



With Combiner : CH1



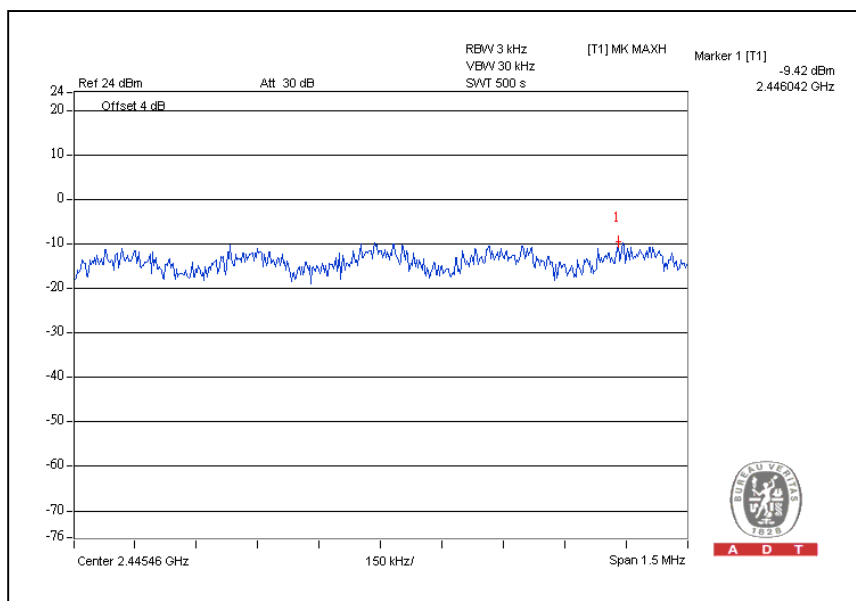
CH 4





A D T

CH7





A D T

4.8 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.8.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

4.8.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY4825025 4	Aug. 03, 2009	Aug. 02, 2010

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

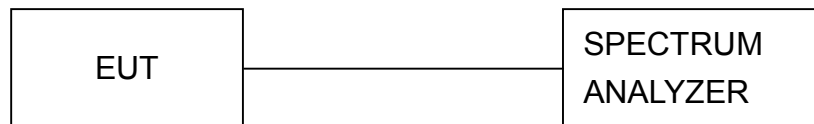
4.8.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer via a low loss cable. Set RBW of spectrum analyzer to 100kHz and VBW of spectrum analyzer to 300kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (RBW = 100kHz, VBW = 300kHz) are attached on the following pages.

2. The measurement include through a combiner with both chain and each chain when operate simultaneously.

4.8.4 TEST SETUP



4.8.5 DEVIATION FROM TEST STANDARD

No deviation

4.8.6 EUT OPERATING CONDITION

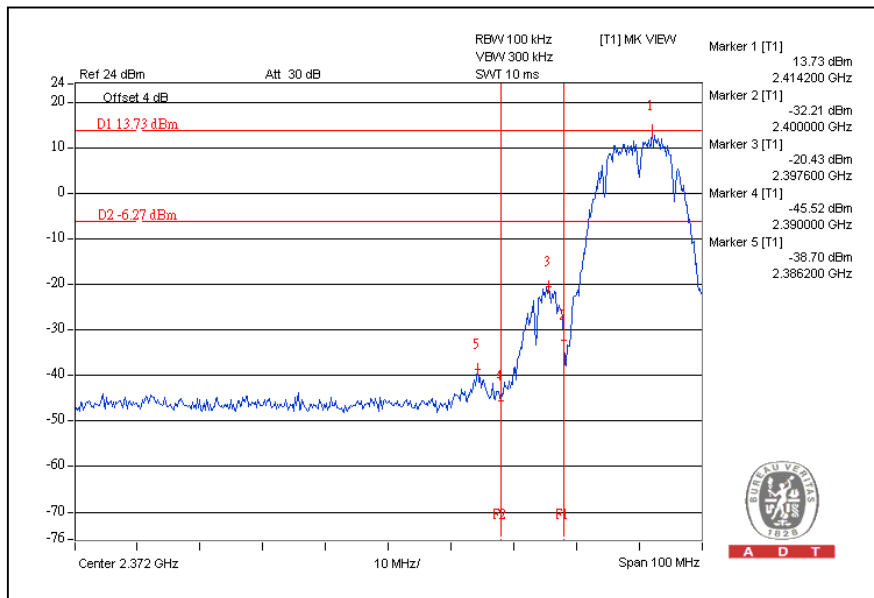
Same as Item 4.3.6

4.8.7 TEST RESULTS

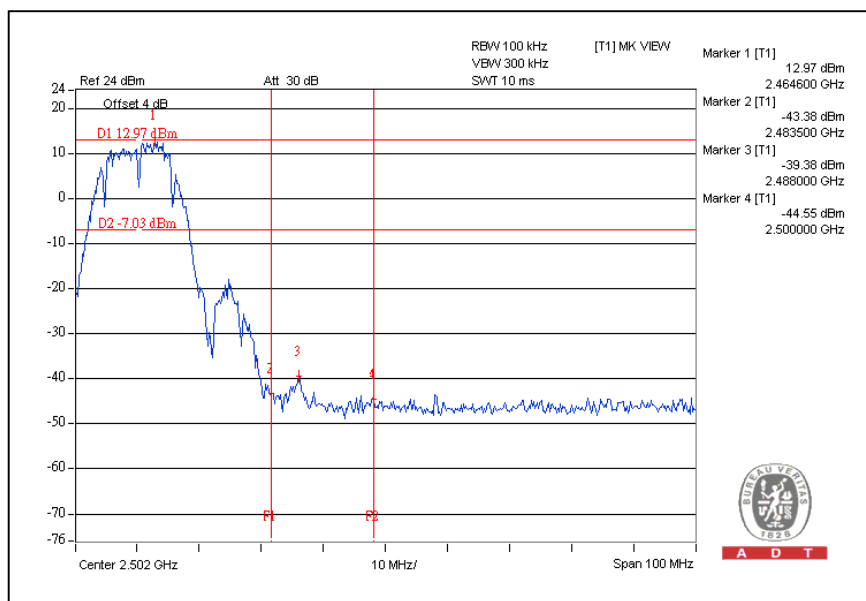
The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

802.11b DSSS MODULATION:

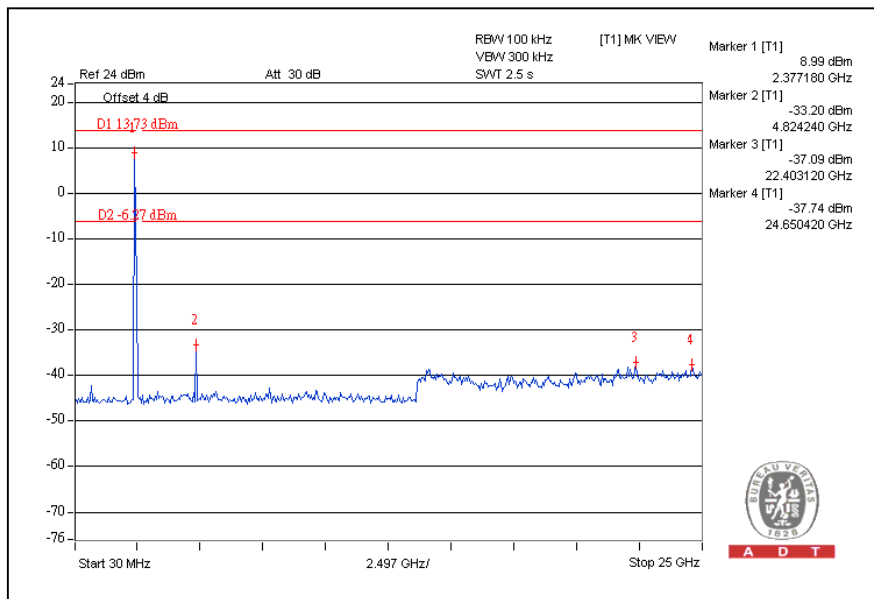
With combiner: CH1



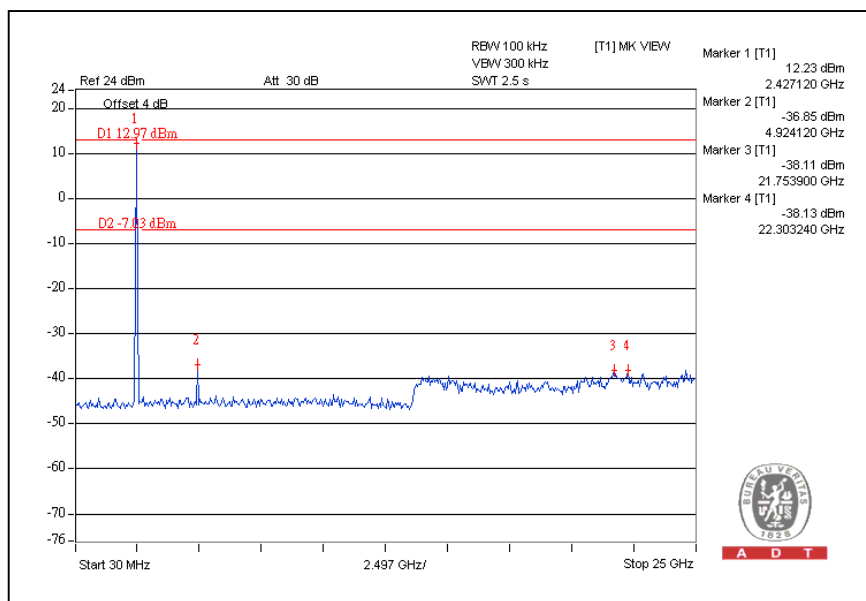
CH11



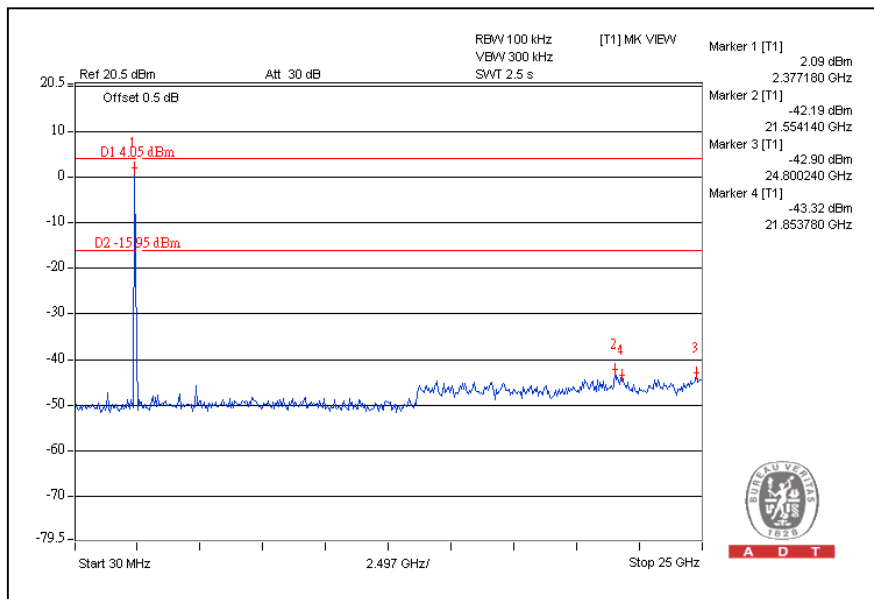
With combiner: CH1



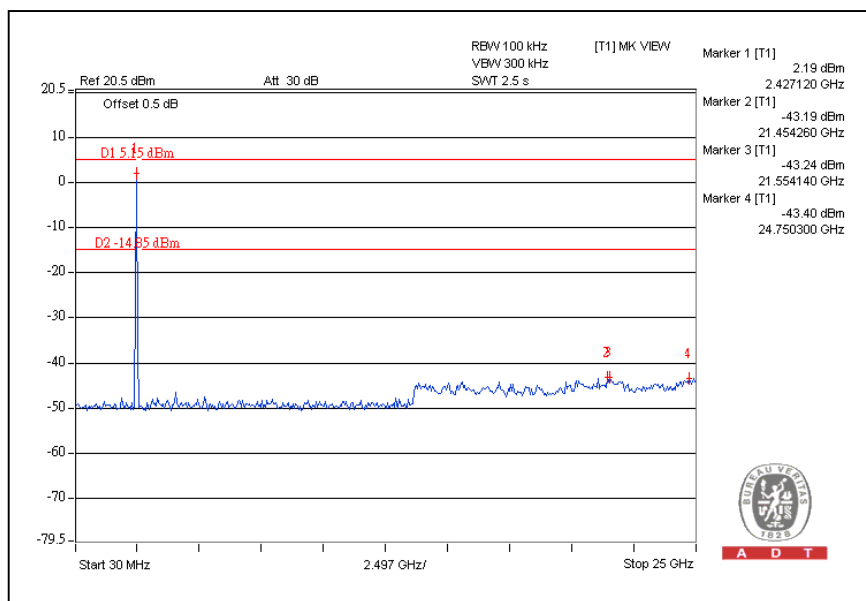
CH11



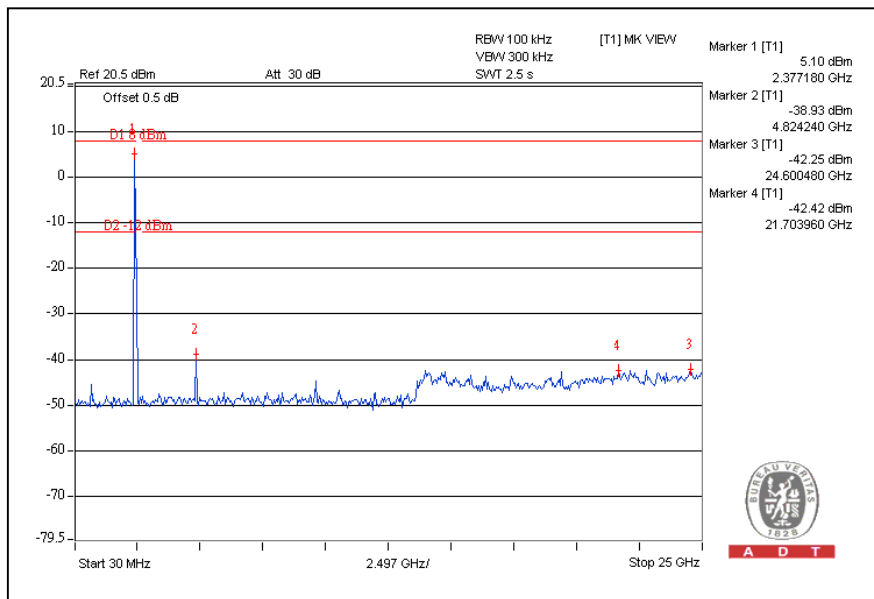
For Chain 0: CH1



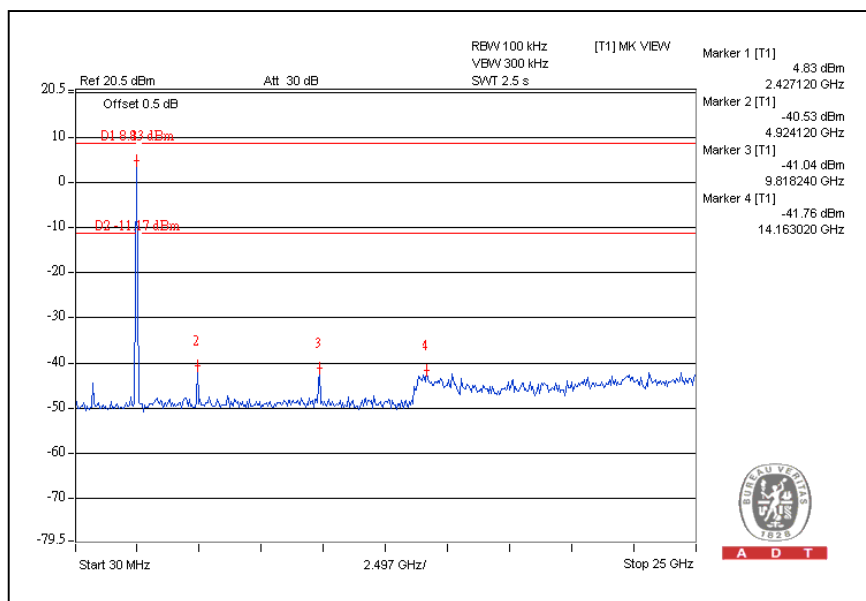
CH11



For Chain 1: CH1

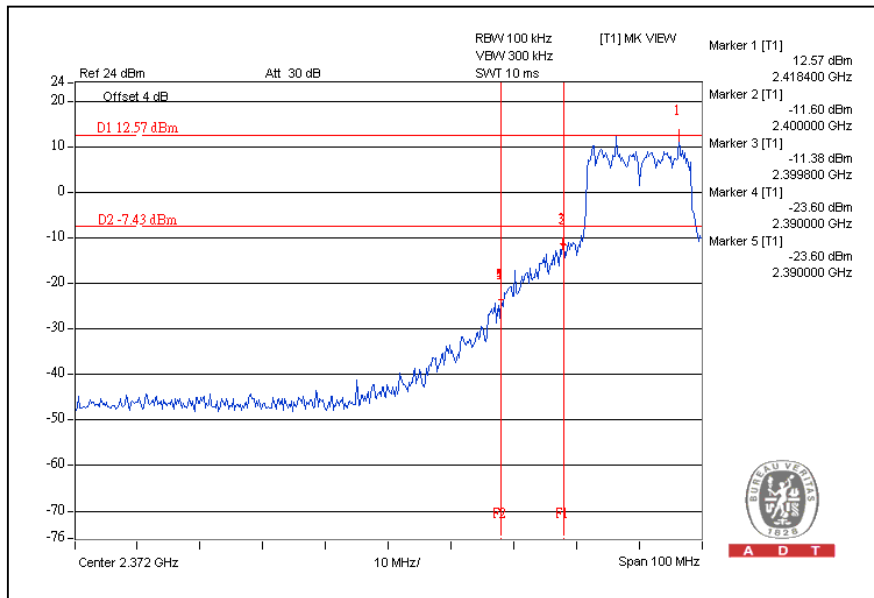


CH11

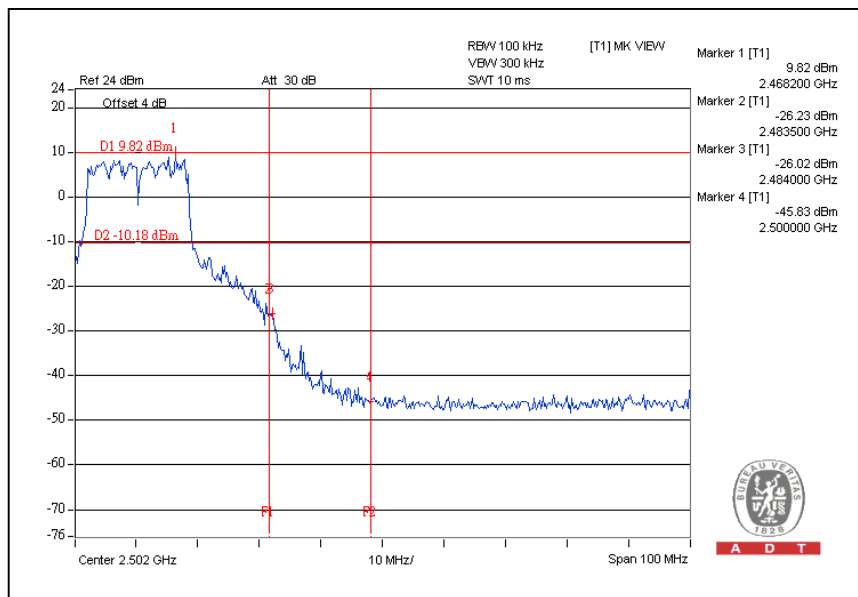


802.11g OFDM MODULATION:

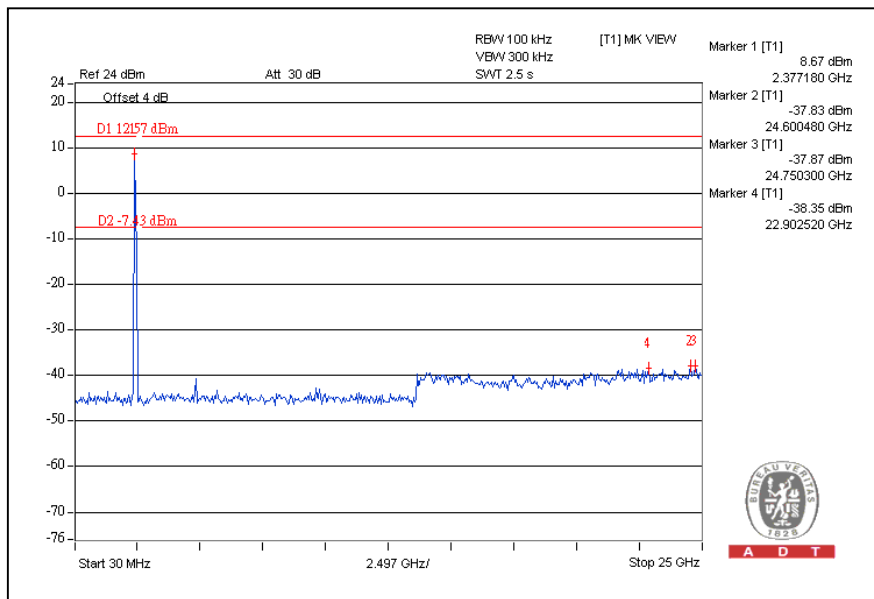
With combiner:CH1



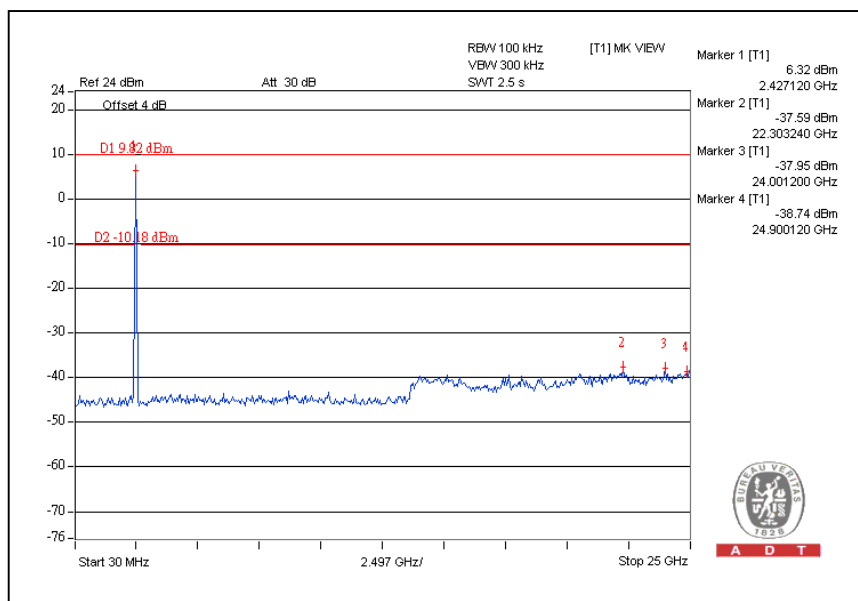
CH11



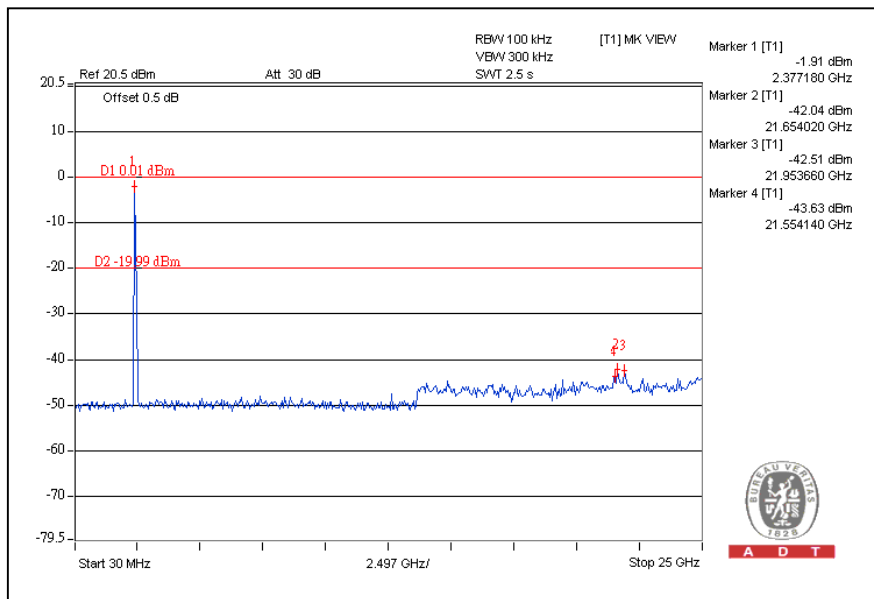
With combiner:CH1



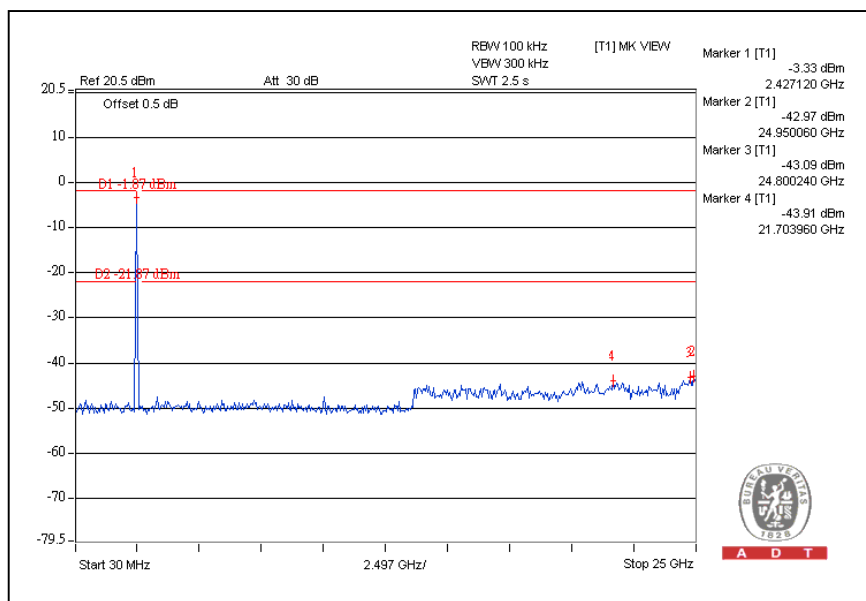
CH11



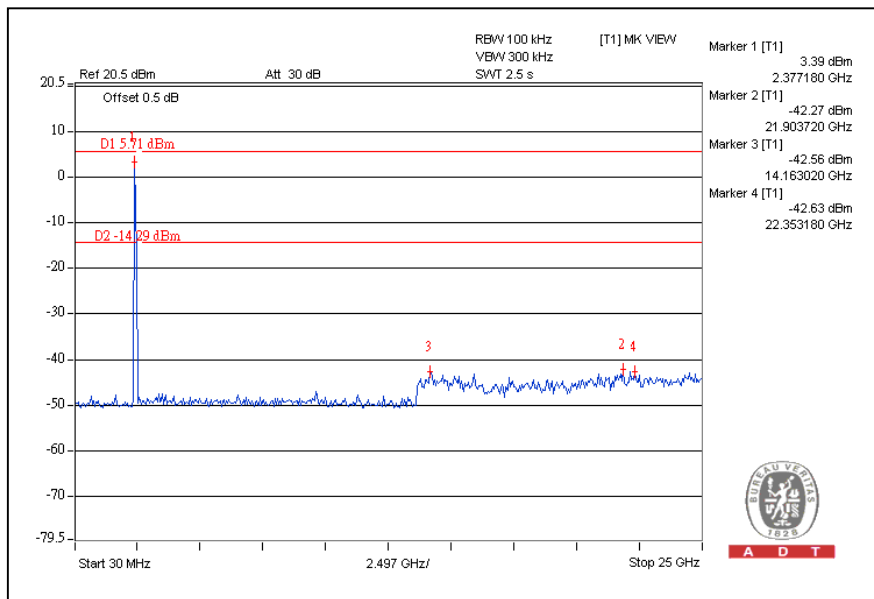
For Chain 0: CH1



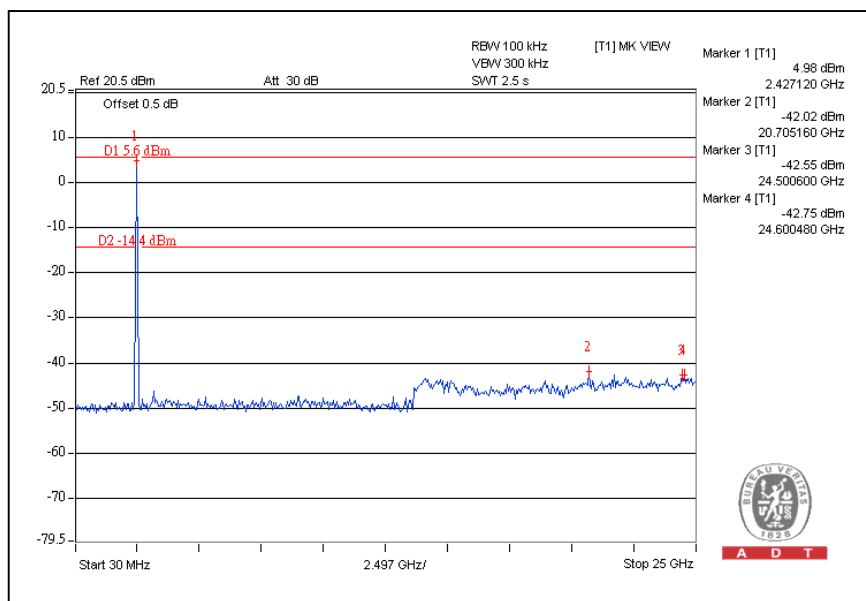
CH11



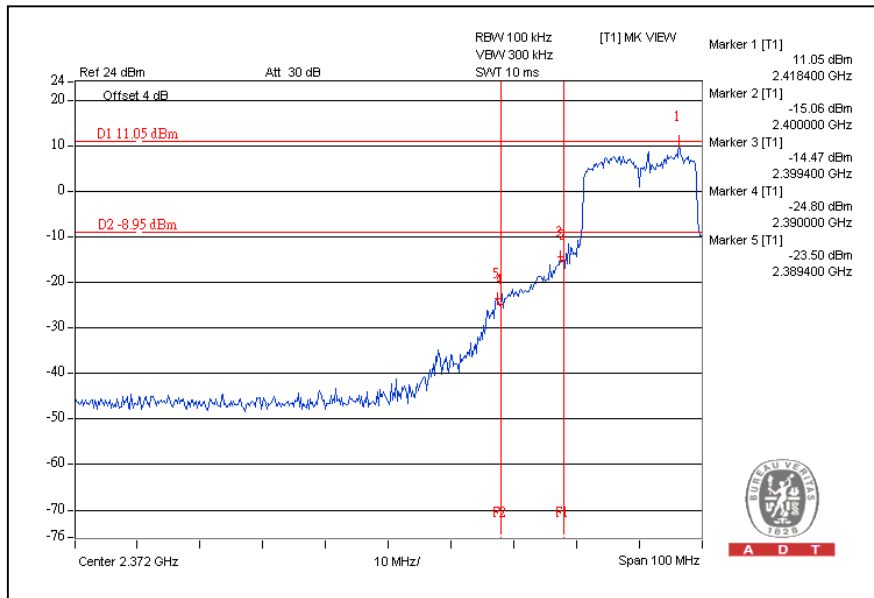
For Chain 1: CH1



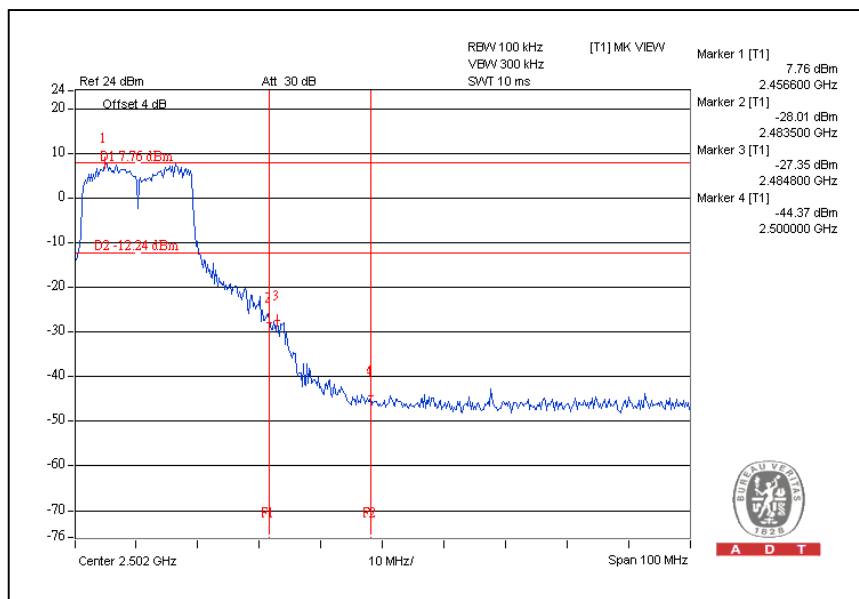
CH11



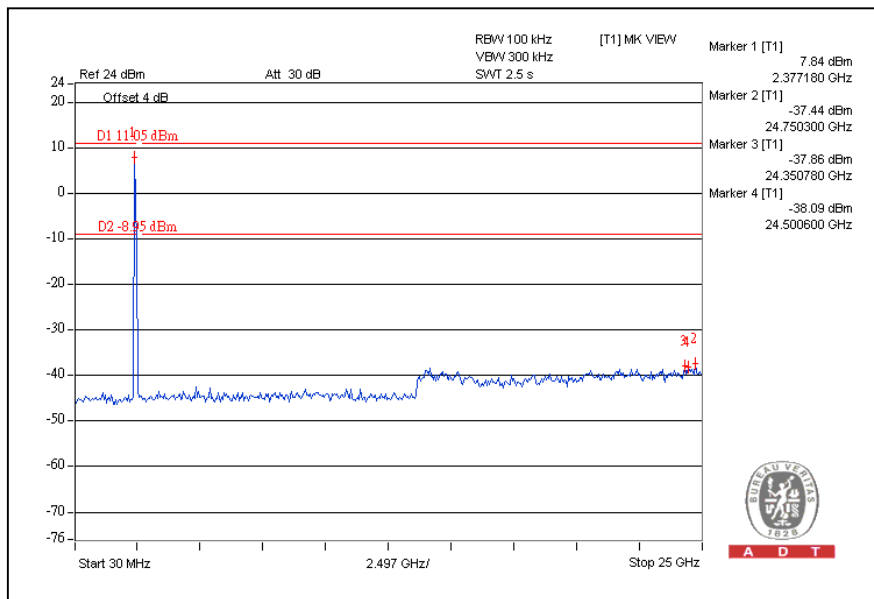
802.11n (20MHz) OFDM MODULATION: With combiner:CH1



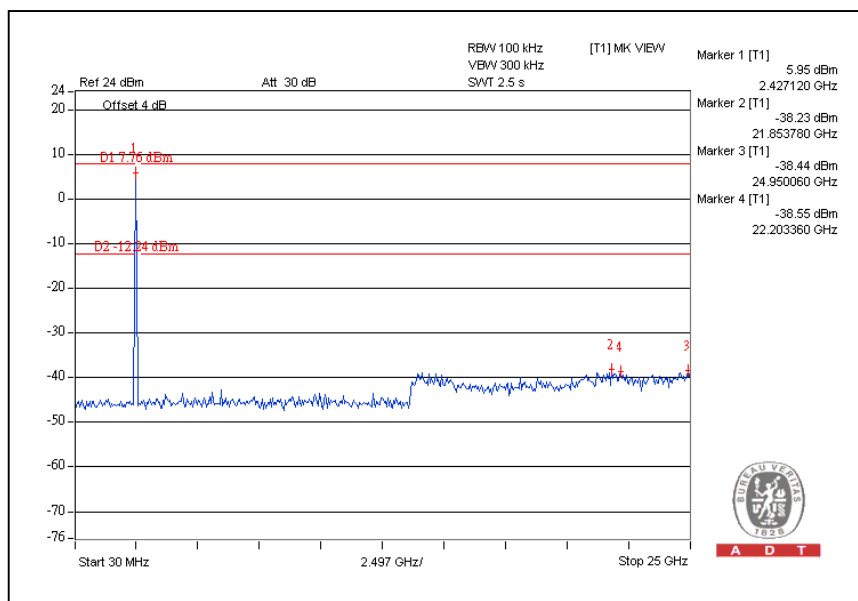
CH11



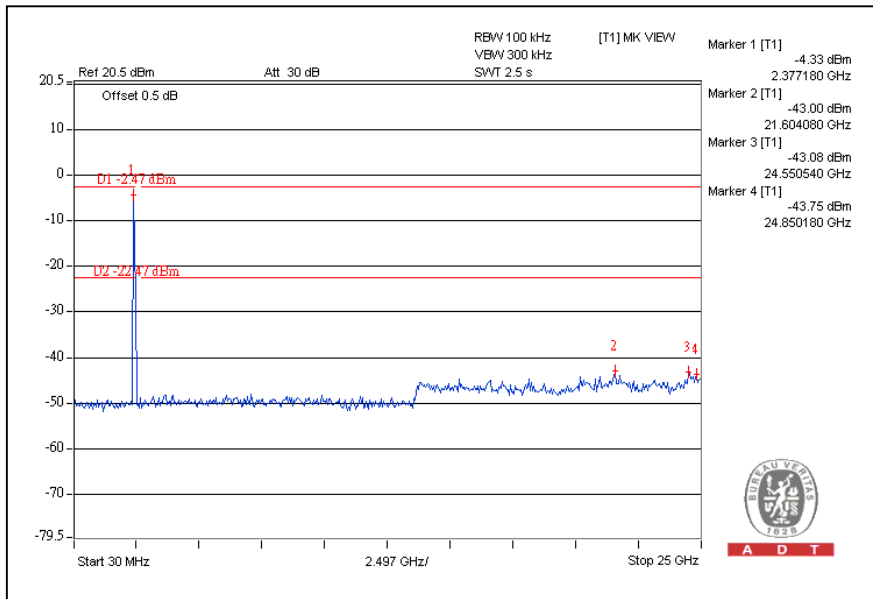
With combiner:CH1



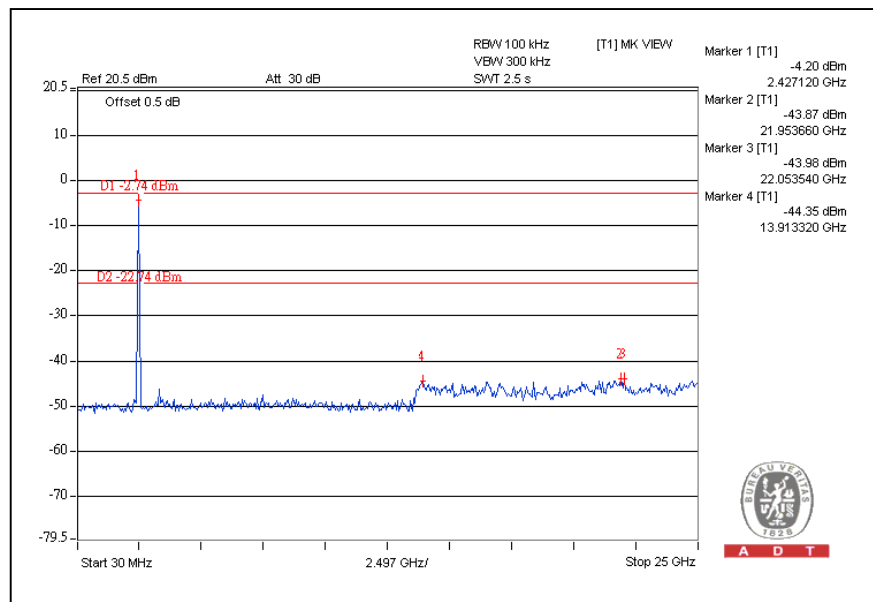
CH11



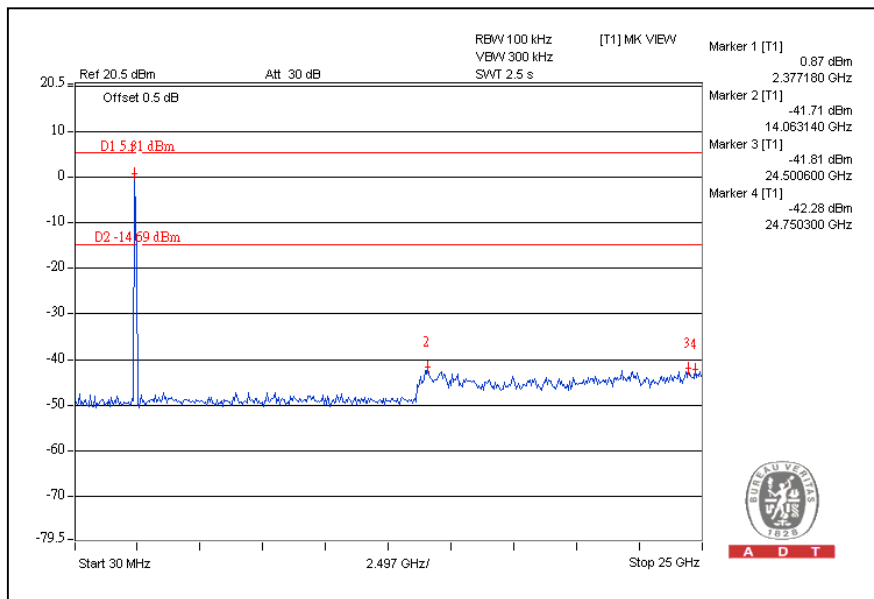
For Chain 0: CH1



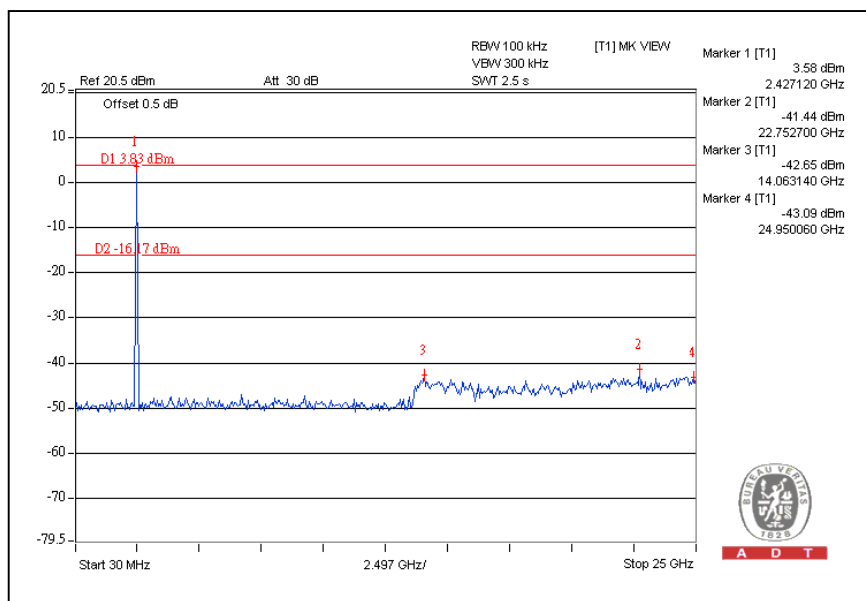
CH11



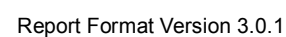
For Chain 1: CH1



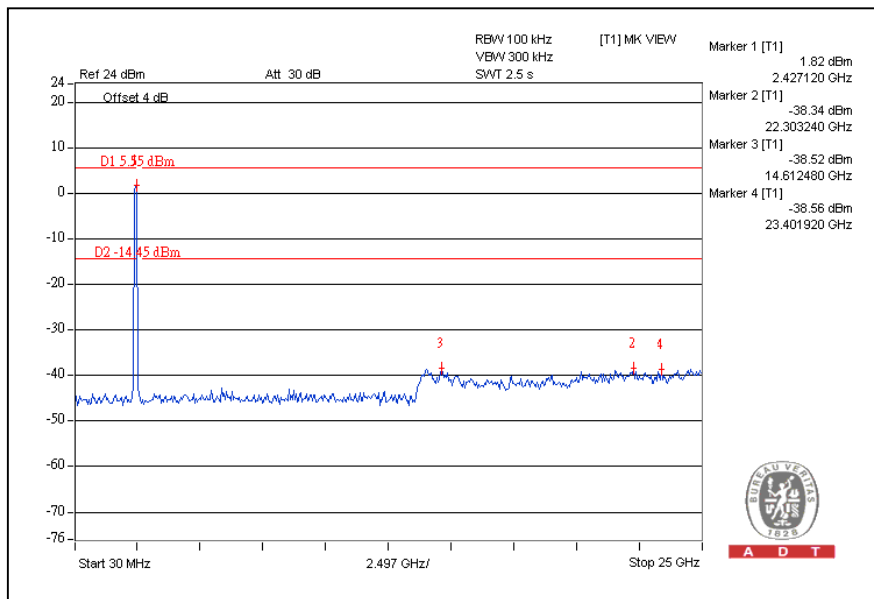
CH11



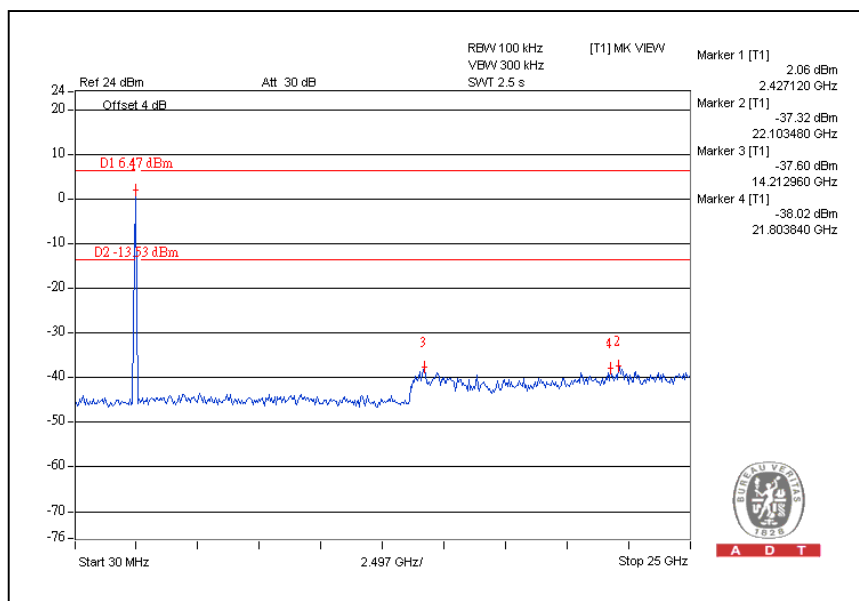
With combiner:CH1



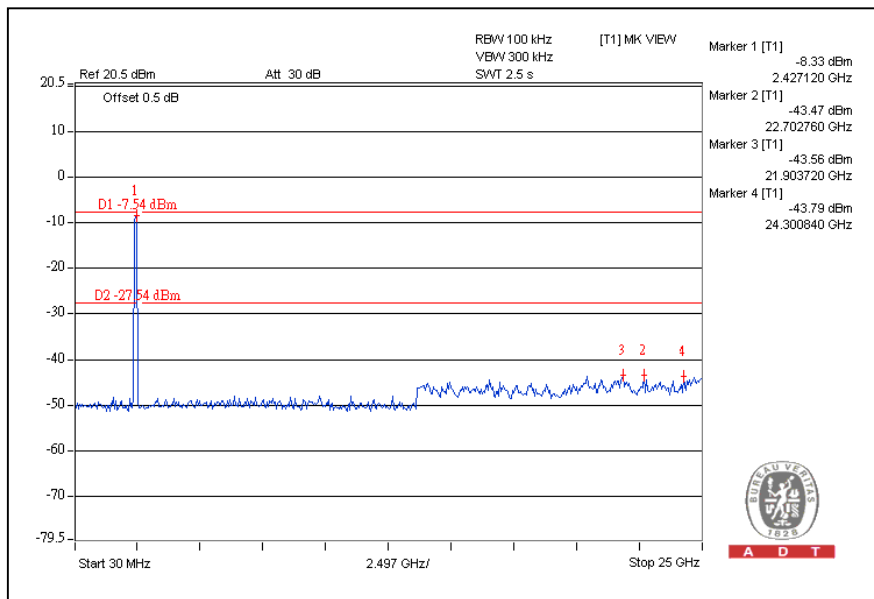
With combiner:CH1



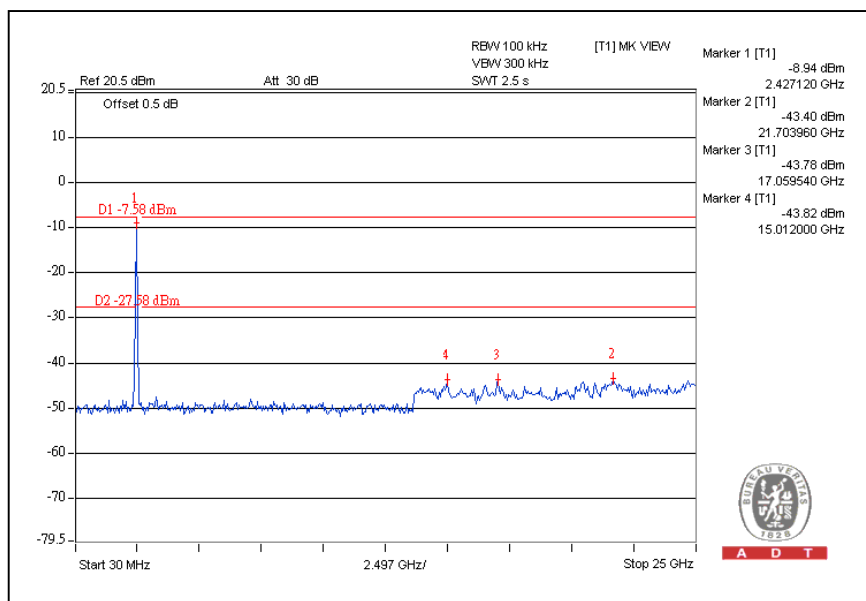
CH7



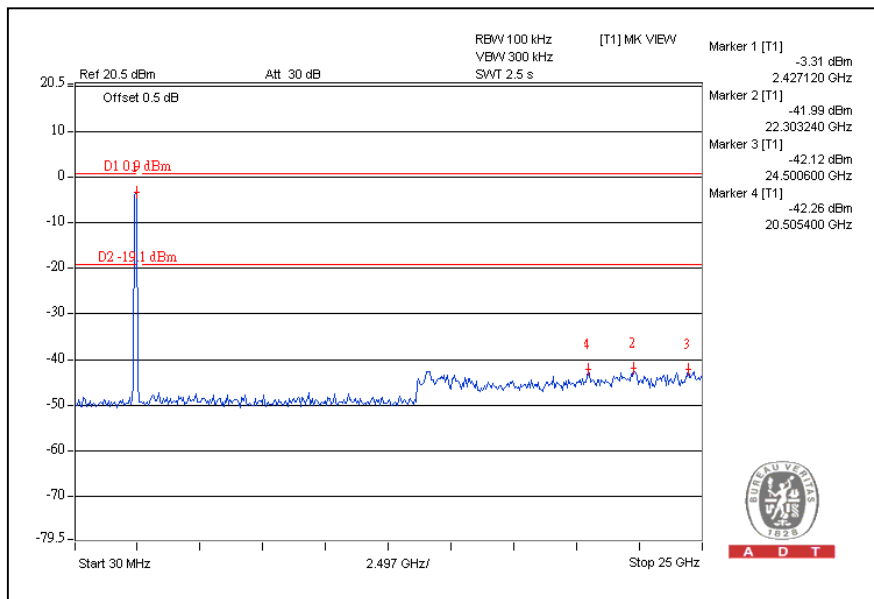
For Chain 0: CH1



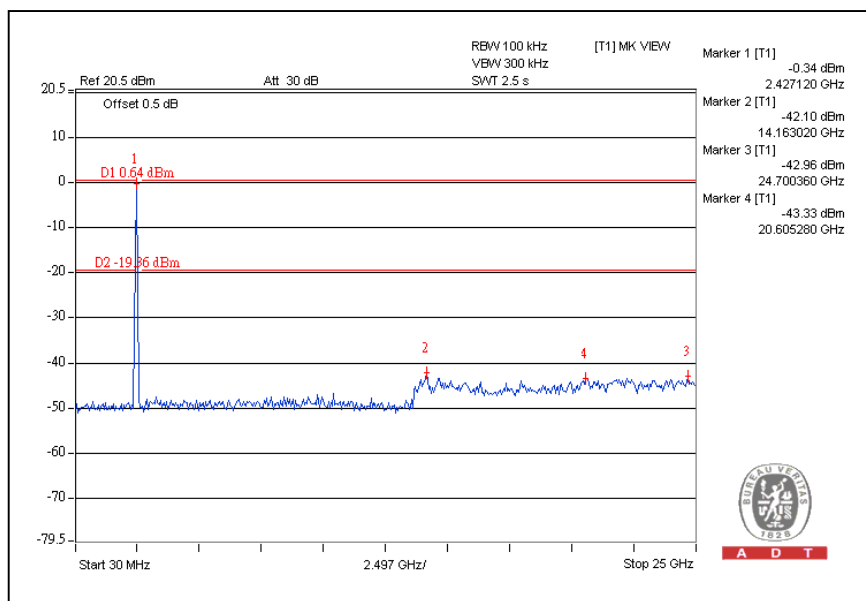
CH7



For Chain 1: CH1



CH7



5. 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 according to ISO/IEC 17025:

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:
www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Web Site: www.adt.com.tw

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



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

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

---END---