FCC TEST REPORT (15.247)

REPORT NO.:	RF971120H03
MODEL NO.:	WRT320N
RECEIVED:	Nov. 20, 2008
TESTED:	Nov. 20 to Dec. 22, 2008
ISSUED:	Dec. 26, 2008

APPLICANT:	Cisco-Linksys LLC
ADDRESS:	121 Theory Drive Irvine, CA 92617(USA)

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
TEST LOCATION:	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

Table of Contents

1. CERTIFICATION

PRODUCT:	Dual-Band Wireless-N Gigabit Router
BRAND NAME:	Linksys
MODEL NO.:	WRT320N
TEST SAMPLE:	ENGINEERING SAMPLE
TESTED:	Nov. 20 to Dec. 22, 2008
APPLICANT:	Cisco-Linksys LLC
STANDARDS:	FCC Part 15, Subpart C (Section 15.247), ANSI C63.4-2003

The above equipment (Model: WRT320N) 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 : _____ , **DATE:** Dec. 26, 2008
(Midoli Peng, Specialist)

TECHNICAL ACCEPTANCE : _____ , **DATE:** Dec. 26, 2008
Responsible for RF
(Hank Chung, Deputy Manager)

APPROVED BY : _____ , **DATE:** Dec. 26, 2008
(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 802.11b & g, 2412~2462MHz Band

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.247)			
Standard Section	**Test Type and Limit**	**Result**	**Remark**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -17.92dB at 0.166MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -0.50dB At 2389.3MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

For 802.11a, 5725~5850MHz Band

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.247)			
Standard Section	**Test Type and Limit**	**Result**	**Remark**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -14.95dB at 9.543MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -0.7dB at 11490.00MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

NOTE:

1. The EUT was operating in 2.400 ~ 2.4835GHz, 5.15~5.25GHz and 5.725~5.85GHz frequencies band. This report was recorded the RF parameters including 2.400 ~ 2.4835MHz and 5.725~5.850GHz. For the 5.15~5.25GHz RF parameters was recorded in another test report.

2.1 MEASUREMENT UNCERTAINTY

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

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

Measurement	Value
Conducted emissions	2.45 dB
Radiated emissions (30MHz-1GHz)	3.94 dB
Radiated emissions (1GHz -18GHz)	2.49 dB
Radiated emissions (18GHz -40GHz)	2.70 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Dual-Band Wireless-N Gigabit Router
MODEL NO.	WRT320N
FCC ID	Q87-WRT320N
POWER SUPPLY	DC 12V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11 / 5.5 / 2 / 1Mbps 802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps 802.11a: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps Draft 802.11n (20MHz): 130 / 117 / 104 / 78 / 65 / 58.5 / 52 / 39 / 26 / 19.5 /13 / 6.5Mbps Draft 802.11n (40MHz): 270 / 243 / 216 / 162 / 135 / 121.5 / 108 / 81 /54 / 40.5 / 27 / 13.5Mbps
FREQUENCY RANGE	**For 15.407** 802.11a: 5.18 ~ 5.24GHz
	For 15.247 802.11b & 802.11g: 2412 ~ 2462MHz 802.11a: 5.745 ~ 5.825GHz
NUMBER OF CHANNEL	**For 15.407** 4 for 802.11a, draft 802.11n (20MHz) 2 for draft 802.11n (40MHz)
	For 15.247(2.4GHz) 11 for 802.11b, 802.11g, draft 802.11n (20MHz) 7 for draft 802.11n (40MHz) **For 15.247(5GHz)** 5 for 802.11a, draft 802.11n (20MHz) 2 for draft 802.11n (40MHz)

MAXIMUM OUTPUT POWER	**For 15.407** 802.11a: 26.915mW draft 802.11n (20MHz): 27.168mW draft 802.11n (40MHz): 48.820mW **For 15.247(2.4GHz)** 802.11b: 154.882mW 802.11g: 301.995mW draft 802.11n (20MHz): 625.589mW draft 802.11n (40MHz): 662.965mW **For 15.247(5GHz)** 802.11a: 223.872mW draft 802.11n (20MHz): 375.228mW draft 802.11n (40MHz): 387.794mW
ANTENNA TYPE	Please see note 1
DATA CABLE	NA
I/O PORT	LAN port x 4 ,WAN port x 1
ASSOCIATED DEVICES	NA

NOTE:

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

Transmitter / Circuit	Antenna Gain			Antenna Type	Connector
	For 2.4GHz Gain (dBi)	For 5.15~ 5.25GHz Gain (dBi)	For 5.725~ 5.850GHz Gain (dBi)		
Chain(0)J9	2.0	4.3	5.6	PIFA	UFL
Chain(1)J14	4.5	5.6	4.9	PIFA	UFL
Chain(2)J10	4.2	4.4	4.5	PIFA	UFL

2. The EUT must be supplied with a power adapter as following:

Brand	Model No.	Spec.
Bestec	EA0121WAA	Input: 100-240V, 0.5A, 50-60Hz Output: DC12V, 1A DC output cable (unshielded, 1.8m)

3. For radiated test, The EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	Level-set
Mode B	Tower-set

From the above modes, the radiated (below 1GHz) worst case was found in **Mode B** and the radiated (above 1GHz) worst case was found in **Mode A**. Therefore only the test data of the modes were recorded in this report.

4. The EUT incorporates a MIMO function with draft 802.11n. Physically, the EUT provides two completed transmit and three completed receivers.
5. The EUT is 2 * 3 spatial MIMO (2Tx & 3Rx) without beam forming function. The antenna configurations are two transmitter antennas and three receiver antennas, as there are 3 PIFA antennas. Spatial multiplexing modes for simultaneous transmission using 2 antennas, and for simultaneous receiver using 3 antennas. The 11a and 11bg legacy mode is limited to single transmitter only.
6. When the EUT operating in draft 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 15.
7. The EUT complies with draft 802.11n standards and backwards compatible with 802. 11a, 802.11b, 802.11g products.
8. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 DESCRIPTION OF TEST MODES

Operated in 2400 ~ 2483.5MHz band:

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

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

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

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

Operated in 5725 ~ 5850MHz band:

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	5745 MHz	4	5805 MHz
2	5765 MHz	5	5825 MHz
3	5785 MHz		

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

CHANNEL	FREQUENCY
1	5755 MHz
2	5795 MHz

3.2.1 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	CHAIN(0) (TX)	CHAIN(1) (TX)	CHAIN(2) (TX)
A	802.11a	√		
B	802.11b	√		
C	802.11g	√		
D	DRAFT 802.11n for MCS 0~15	√		√
E	DRAFT 802.11n for MCS 0~15	√	√	
F	DRAFT 802.11n for MCS 0~15		√	√

Note:
1. The above information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.
2. Antenna 1 ~3 are PIFA antennas.

POWER LINE CONDUCTED EMISSION TEST:

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	TX COMBINATION
For 2.4 GHz Draft 802.11n (40MHz)	1 to 7	4	OFDM	BPSK	13.5	E
For 5 GHz Draft 802.11n (40MHz)	1 to 2	2	OFDM	BPSK	13.5	E

RADIATED EMISSION TEST (BELOW 1 GHz):

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	TX COMBINATION
For 2.4 GHz Draft 802.11n (20MHz)	1 to 11	1	OFDM	BPSK	6.5	E
For 5 GHz Draft 802.11n (20MHz)	1 to 5	1	OFDM	BPSK	6.5	D

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	B
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6	C
For 2.4 GHz Draft 802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	E
For 2.4 GHz Draft 802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	13.5	E
802.11a	1 to 5	1, 3, 5	OFDM	BPSK	6	A
For 5 GHz Draft 802.11n (20MHz)	1 to 5	1, 3, 5	OFDM	BPSK	6.5	D
For 5 GHz Draft 802.11n (40MHz)	1 to 2	1, 2	OFDM	BPSK	13.5	D

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	B
802.11g	1 to 11	1, 11	OFDM	BPSK	6	C
For 2.4 GHz Draft 802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	6.5	E
For 2.4 GHz Draft 802.11n (40MHz)	1 to 7	1, 7	OFDM	BPSK	13.5	E
802.11a	1 to 5	1, 5	OFDM	BPSK	6	A
For 5 GHz Draft 802.11n (20MHz)	1 to 5	1, 5	OFDM	BPSK	6.5	E
For 5 GHz Draft 802.11n (40MHz)	1 to 2	1, 2	OFDM	BPSK	13.5	E

ANTENNA PORT CONDUCTED MEASUREMENT:

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	TX COMBINATION
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1	B
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6	C
For 2.4 GHz Draft 802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	E
For 2.4 GHz Draft 802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	13.5	E
802.11a	1 to 5	1, 3, 5	OFDM	BPSK	6	A
For 5 GHz Draft 802.11n (20MHz)	1 to 5	1, 3, 5	OFDM	BPSK	13	E
For 5 GHz Draft 802.11n (40MHz)	1 to 2	1, 2	OFDM	BPSK	27	E

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Dual-Band Wireless-N Gigabit Router. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. (15.247)
ANSI C63.4-2003

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

3.4 DESCRIPTION OF SUPPORT UNITS

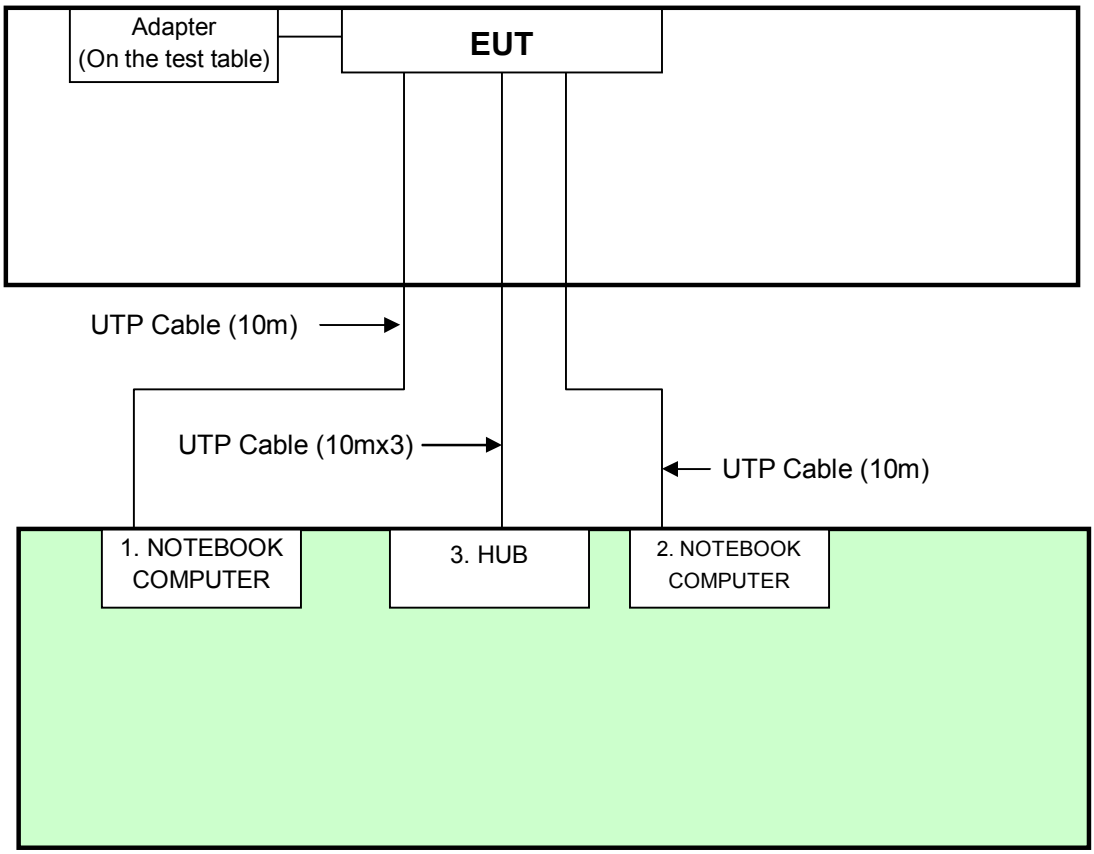
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP18L	6976685584	FCC DoC
2	NOTEBOOK COMPUTER	DELL	PP19L	CN-OHC416-70166-5CA-0448	PIW632500516610
3	HUB	AVSYS	110H8	01-20E-000002	FCC DoC

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

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

3.5 CONFIGURATION OF SYSTEM UNDER TEST



NOTE: 1. Support units 1 ~3 were kept in the control room during the test.

4.TEST TYPES AND RESULTS (802.11b & g, 2400 ~ 2483.5MHz Band)

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5 0.5-5 5-30	66 to 56 56 60	56 to 46 46 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	March 11, 2008	March 10, 2009
Line-Impedance Stabilization Network(for EUT)	KNW-407	8-1395-12	May 07, 2008	May 06, 2009
Line-Impedance Stabilization Network(for Peripheral)	ENV-216	100072	June 13, 2008	June 12, 2009
RF Cable (JYEBAO)	5DFB	COACAB-001	July 24, 2008	July 23, 2009
50 ohms Terminator	50	3	Nov. 16, 2008	Nov. 15, 2009
Software	BV ADT_Cond_V7.3.6	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.

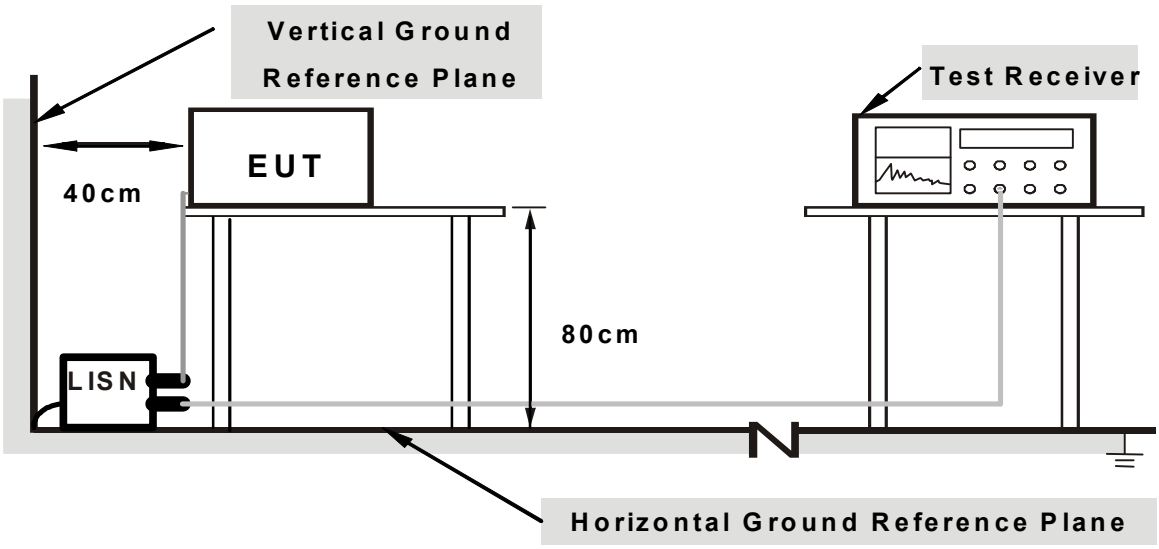
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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. Placed the EUT on testing table.
2. Prepared other computer systems (support units 1 ~ 2) to act as communication partners and placed them outside of testing area.
3. The communication partners run test program ”MFG tool” to enable EUT under transmission/receiving condition continuously via UTP cables and wireless.

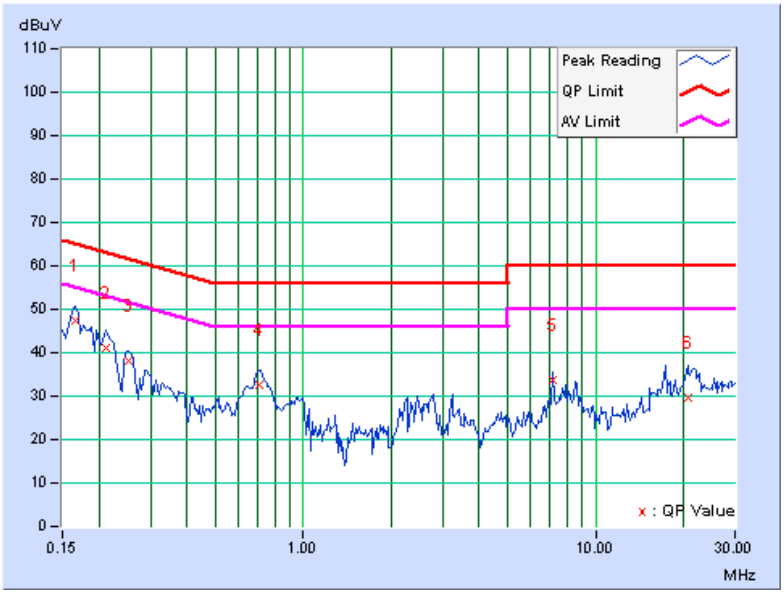
4.1.7 TEST RESULTS

DRAFT 802.11n (40MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	**PHASE**	Line (L)
MODULATION TYPE	BPSK	**6dB BANDWIDTH**	9 kHz
TRANSFER RATE	13.5Mbps	**INPUT POWER**	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	22deg. C, 57%RH, 965hPa	**TESTED BY**	Eagle Chen

	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	**0.166**	**0.58**	**46.68**	**-**	**47.26**	**-**	**65.18**	**55.18**	**-17.92**	**-**
2	0.213	0.49	40.67	-	41.16	-	63.11	53.11	-21.94	-
3	0.252	0.47	37.65	-	38.12	-	61.71	51.71	-23.58	-
4	0.709	0.44	32.10	-	32.54	-	56.00	46.00	-23.46	-
5	7.110	0.56	33.20	-	33.76	-	60.00	50.00	-26.24	-
6	20.660	0.78	28.99	-	29.77	-	60.00	50.00	-30.23	-

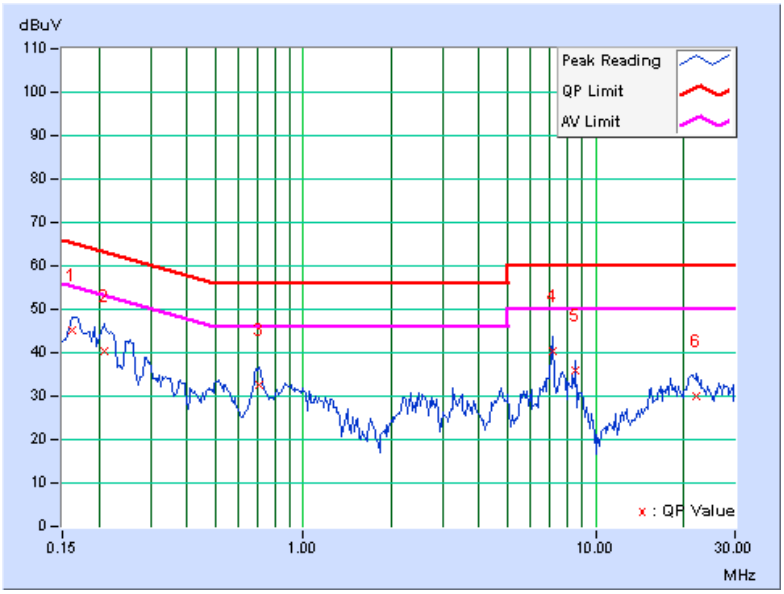
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	13.5Mbps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	22deg. C, 57%RH, 965hPa	TESTED BY	Eagle Chen

	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	0.162	0.33	44.98	-	45.31	-	65.38	55.38	-20.06	-
2	0.209	0.25	40.17	-	40.42	-	63.26	53.26	-22.84	-
3	0.709	0.20	32.44	-	32.64	-	56.00	46.00	-23.36	-
4	7.109	0.35	40.10	-	40.45	-	60.00	50.00	-19.55	-
5	8.527	0.39	35.50	-	35.89	-	60.00	50.00	-24.11	-
6	22.184	0.66	29.52	-	30.18	-	60.00	50.00	-29.82	-

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



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

NOTE:

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 16, 2008	July 15, 2009
HP Pre_Amplifier	8449B	3008A01922	Sep. 25, 2008	Sep. 24, 2009
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	April 01, 2008	Mar. 31, 2009
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 30, 2008	April 29, 2009
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 17, 2008	Dec. 16, 2009
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 28, 2008	Jan. 27, 2009
RF Switches	EMH-011	08009	Oct. 07, 2008	Oct. 06, 2009
RF CABLE (Chaintek)	SF102	22054-2	Dec. 07, 2008	Dec. 06, 2009
RF Cable	8DFB	STCCAB-30M-1GHz	Oct. 07, 2008	Oct. 06, 2009
Software	ADT_Radiated_V7.6.15.9.2	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, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: R3271A) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 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 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

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

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

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

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

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

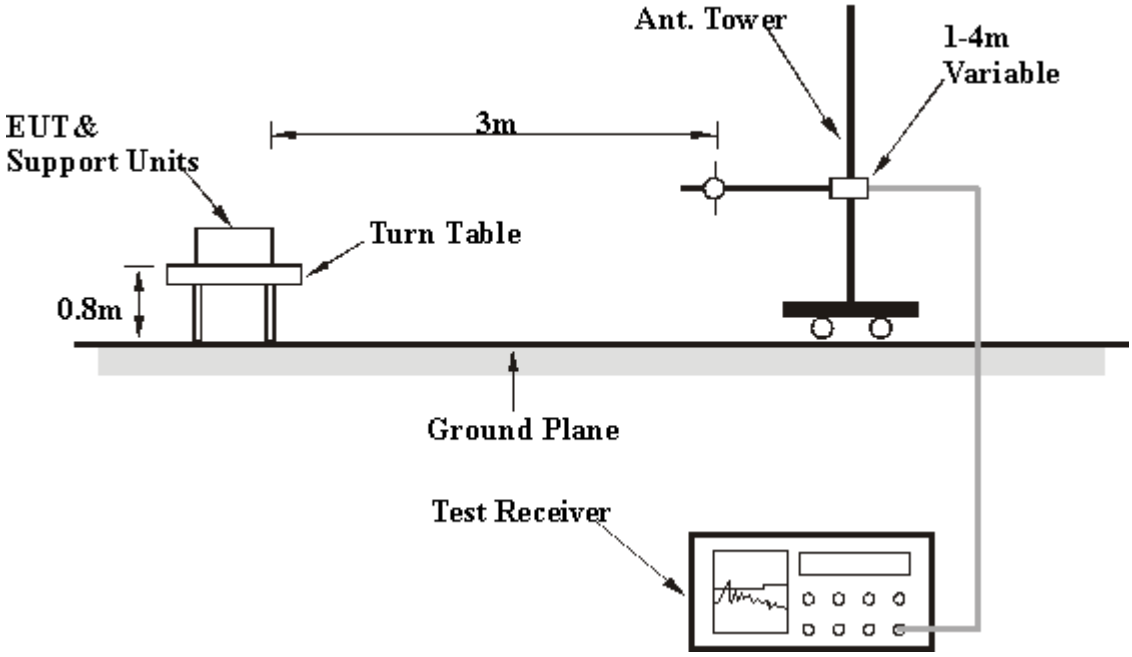
NOTE:

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

4.2.4 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 the 4.1.6

Below 1GHz Test Data

4.2.7 TEST RESULTS

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 965hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	39.49	17.18 QP	40.00	-22.82	1.48 H	291	3.98	13.20
2	125.00	31.91 QP	43.50	-11.59	1.33 H	280	17.79	14.12
3	250.00	37.13 QP	46.00	-8.87	1.00 H	271	21.71	15.42
4	375.00	37.25 QP	46.00	-8.75	1.85 H	301	17.15	20.10
5	500.00	35.76 QP	46.00	-10.24	1.56 H	43	13.10	22.66
6	625.00	36.67 QP	46.00	-9.33	1.05 H	51	11.33	25.34
7	750.00	33.60 QP	46.00	-12.40	1.00 H	149	5.14	28.46
8	875.00	37.77 QP	46.00	-8.23	1.00 H	133	7.05	30.72
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	39.49	32.29 QP	40.00	-7.71	1.00 V	354	19.09	13.20
2	125.00	31.15 QP	43.50	-12.35	1.00 V	153	17.03	14.12
3	250.00	32.78 QP	46.00	-13.22	1.00 V	140	17.36	15.42
4	375.00	43.65 QP	46.00	-2.35	1.25 V	146	23.55	20.10
5	500.00	37.36 QP	46.00	-8.64	1.00 V	244	14.70	22.66
6	625.00	39.27 QP	46.00	-6.73	1.00 V	198	13.93	25.34
7	750.00	35.02 QP	46.00	-10.98	1.21 V	179	6.56	28.46
8	875.00	38.15 QP	46.00	-7.85	1.33 V	97	7.43	30.72

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

Above 1GHz Test Data

4.2.8 TEST RESULTS

802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH 965hPa	TESTED BY	Frank Liu

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	57.06 PK	74.00	-16.94	1.00 H	172	27.03	30.03
2	2390.00	46.31 AV	54.00	-7.69	1.00 H	172	16.28	30.03
3	*2412.00	104.70 PK			1.00 H	172	74.58	30.12
4	*2412.00	100.00 AV			1.00 H	172	69.88	30.12
5	4824.00	50.70 PK	74.00	-23.30	1.62 H	185	15.31	35.39
6	4824.00	43.70 AV	54.00	-10.30	1.62 H	185	8.31	35.39
7	#7236.00	54.40 PK	84.70	-30.30	1.42 H	157	12.88	41.52
8	#7236.00	44.20 AV	80.00	-35.80	1.42 H	157	2.68	41.52
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	2389.30	64.05 PK	74.00	-9.95	1.10 V	20	34.02	30.03
2	**2389.30**	**53.50 AV**	**54.00**	**-0.50**	**1.10 V**	**20**	**23.47**	**30.03**
3	*2412.00	113.70 PK			1.07 V	20	83.58	30.12
4	*2412.00	109.30 AV			1.07 V	20	79.18	30.12
5	4824.00	52.70 PK	74.00	-21.30	1.00 V	89	17.31	35.39
6	4824.00	48.20 AV	54.00	-5.80	1.00 V	89	12.81	35.39
7	#7236.00	57.10 PK	93.70	-36.60	1.23 V	155	15.58	41.52
8	#7236.00	49.00 AV	89.30	-40.30	1.23 V	155	7.48	41.52

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 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH 965hPa	TESTED BY	Frank Liu

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	105.72 PK			1.02 H	146	75.51	30.21
2	*2437.00	100.92 AV			1.02 H	146	70.71	30.21
3	4874.00	51.40 PK	74.00	-22.60	1.86 H	87	15.90	35.50
4	4874.00	46.70 AV	54.00	-7.30	1.86 H	87	11.20	35.50
5	7311.00	57.18 PK	74.00	-16.82	1.36 H	293	15.48	41.70
6	7311.00	48.32 AV	54.00	-5.68	1.36 H	293	6.62	41.70
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	112.50 PK			1.01 V	79	82.29	30.21
2	*2437.00	108.10 AV			1.01 V	79	77.89	30.21
3	4874.00	50.80 PK	74.00	-23.20	1.02 V	133	15.30	35.50
4	4874.00	44.10 AV	54.00	-9.90	1.02 V	133	8.60	35.50
5	7311.00	58.70 PK	74.00	-15.30	1.23 V	191	17.00	41.70
6	7311.00	50.20 AV	54.00	-3.80	1.23 V	191	8.50	41.70

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH 965hPa	TESTED BY	Frank Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.51 PK			1.00 H	149	73.20	30.31
2	*2462.00	98.66 AV			1.00 H	149	68.35	30.31
3	2483.50	57.78 PK	74.00	-16.22	1.00 H	3	27.38	30.40
4	2483.50	45.83 AV	54.00	-8.17	1.00 H	3	15.43	30.40
5	4924.00	51.91 PK	74.00	-22.09	2.01 H	88	16.32	35.59
6	4924.00	47.40 AV	54.00	-6.60	2.01 H	88	11.81	35.59
7	7386.00	57.22 PK	74.00	-16.78	1.62 H	294	15.36	41.86
8	7386.00	47.80 AV	54.00	-6.20	1.62 H	294	5.94	41.86
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	109.40 PK			1.02 V	70	79.09	30.31
2	*2462.00	104.70 AV			1.02 V	70	74.39	30.31
3	2483.50	63.13 PK	74.00	-10.87	1.00 V	77	32.73	30.40
4	2483.50	52.93 AV	54.00	-1.07	1.00 V	77	22.53	30.40
5	4924.00	51.50 PK	74.00	-22.50	1.00 V	103	15.91	35.59
6	4924.00	45.30 AV	54.00	-8.70	1.00 V	103	9.71	35.59
7	7386.00	58.80 PK	74.00	-15.20	1.82 V	156	16.94	41.86
8	7386.00	50.30 AV	54.00	-3.70	1.82 V	156	8.44	41.86

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

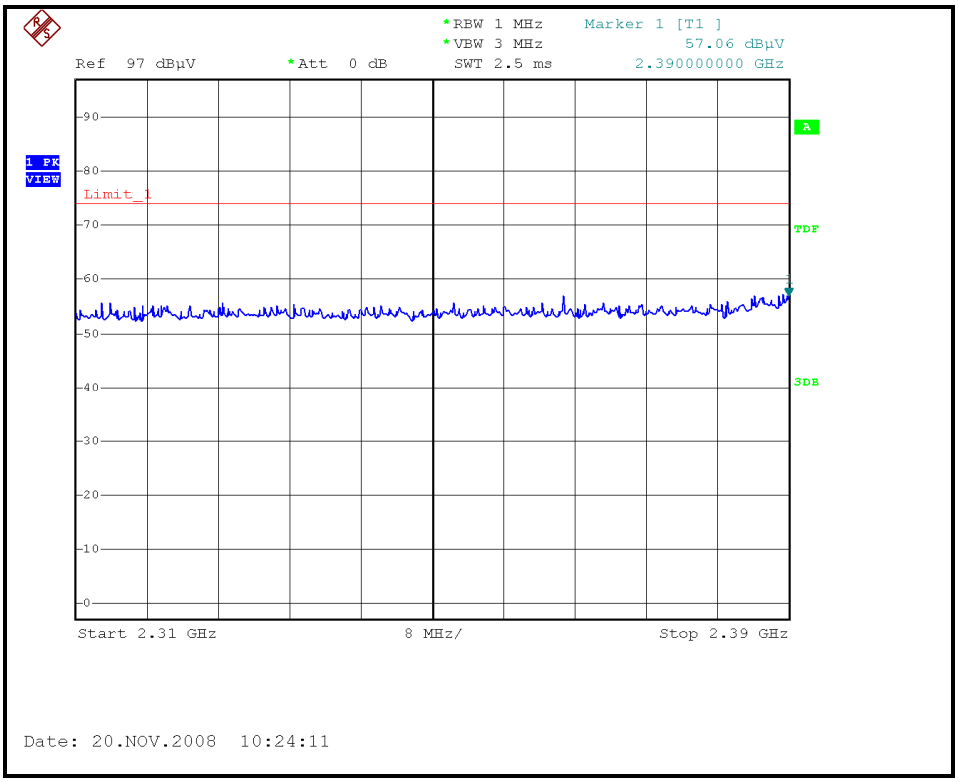
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

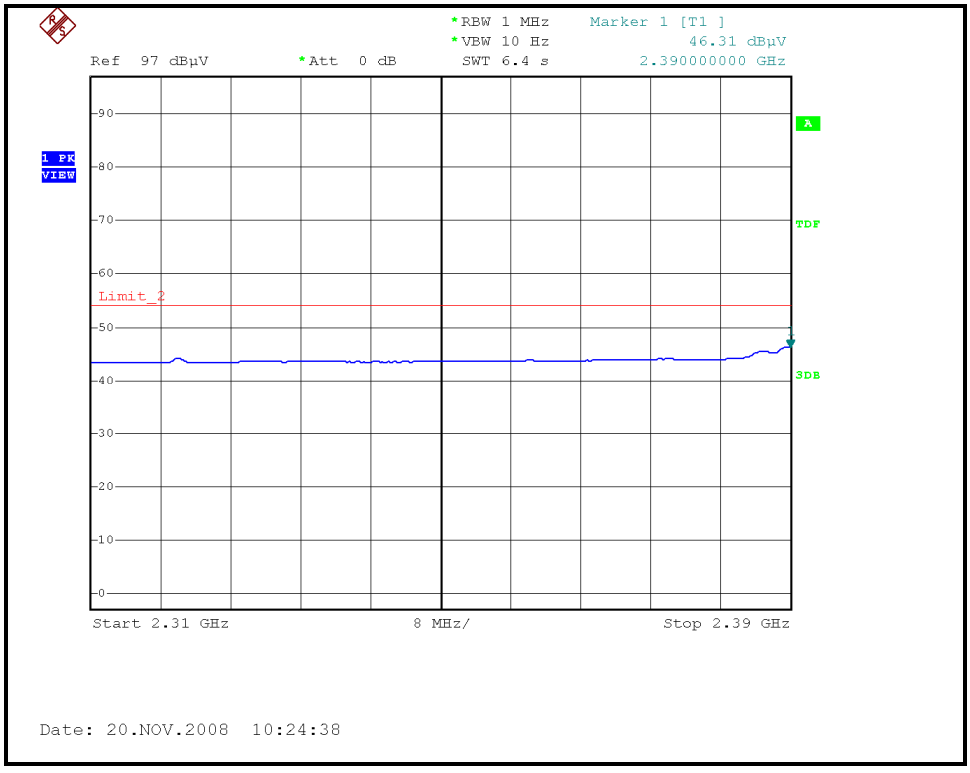
3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

5. " * ": Fundamental frequency.

RESTRICTED BANDEDGE (802.11b MODE,CH1, HORIZONTAL)





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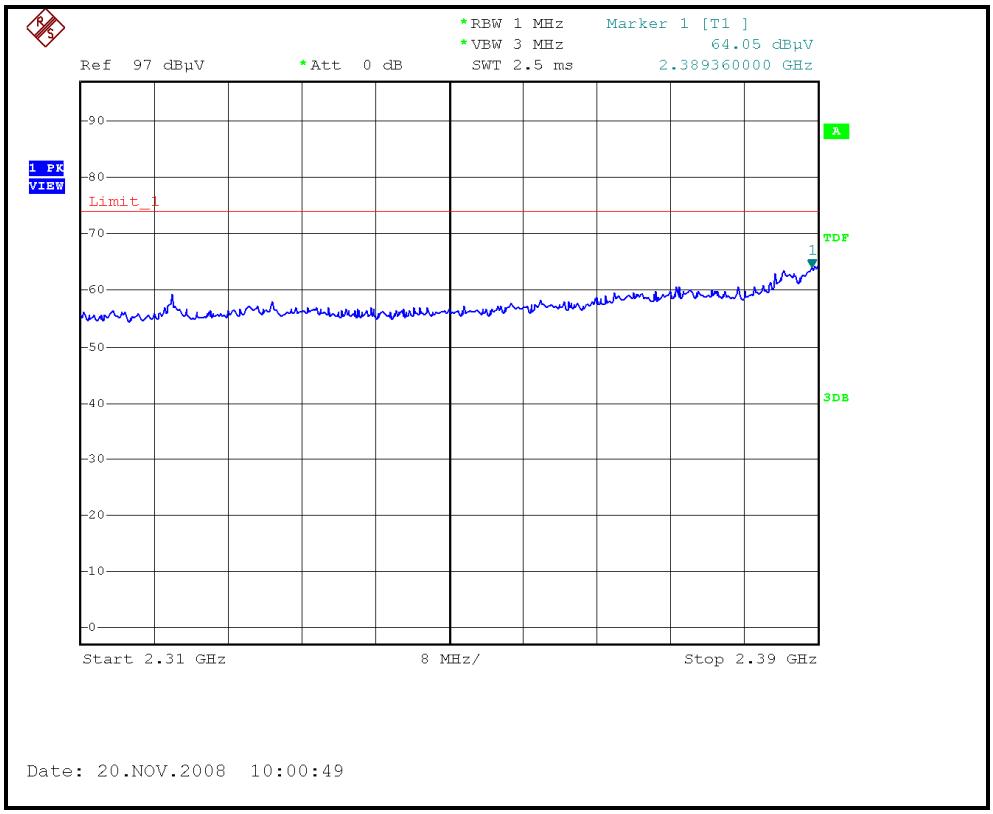

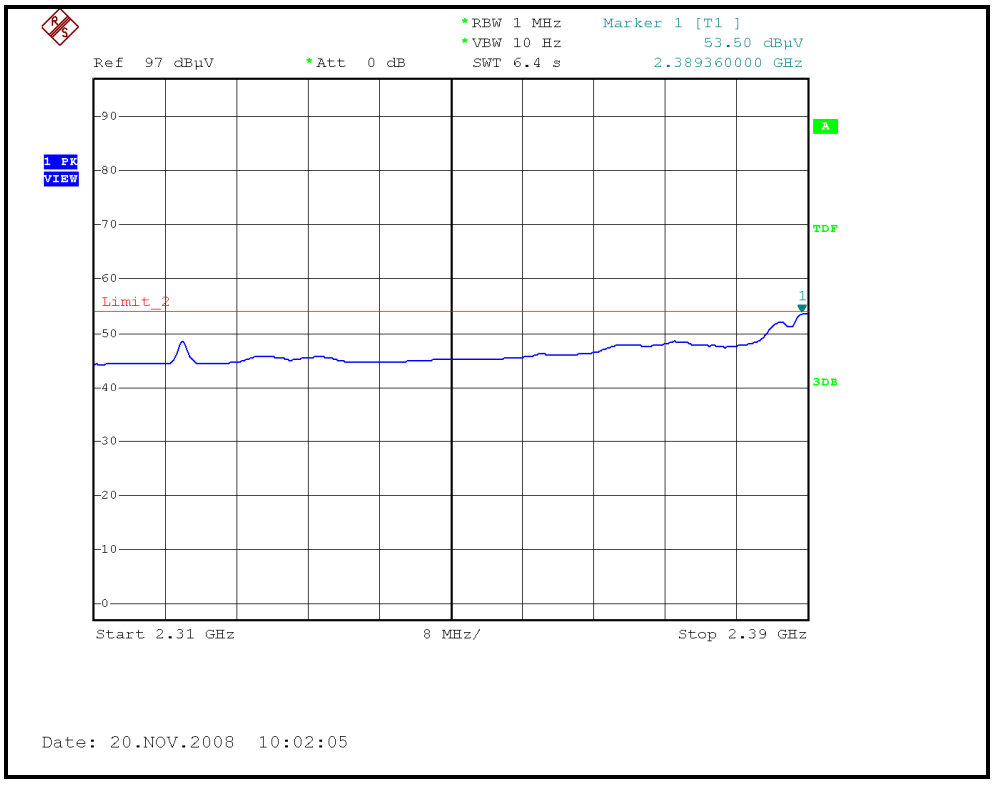

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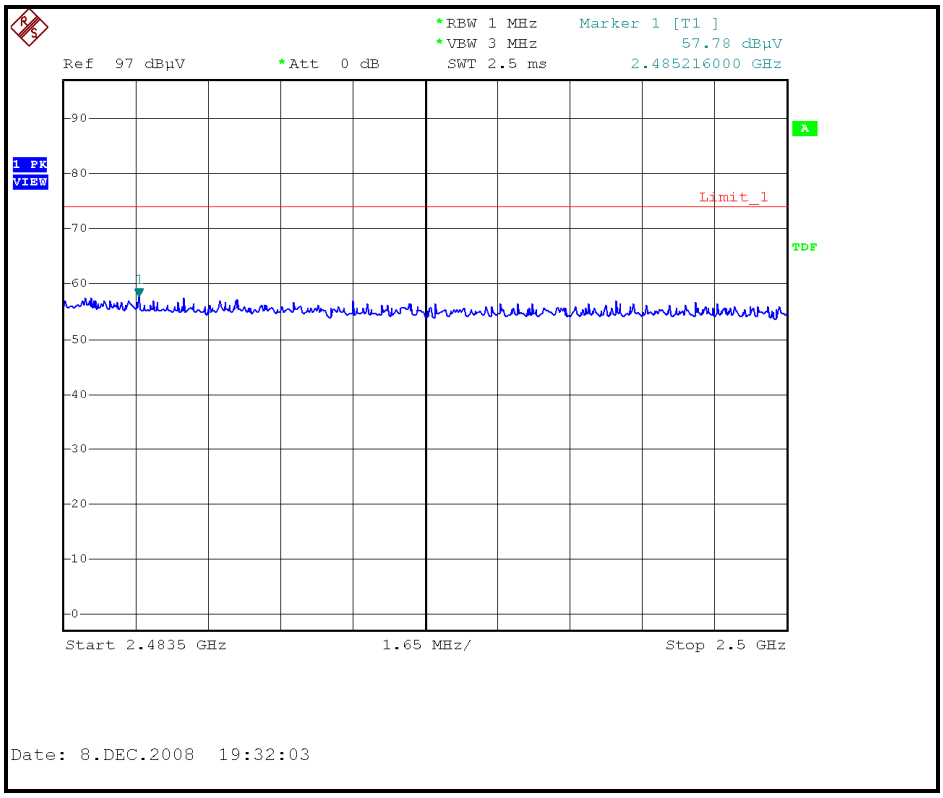
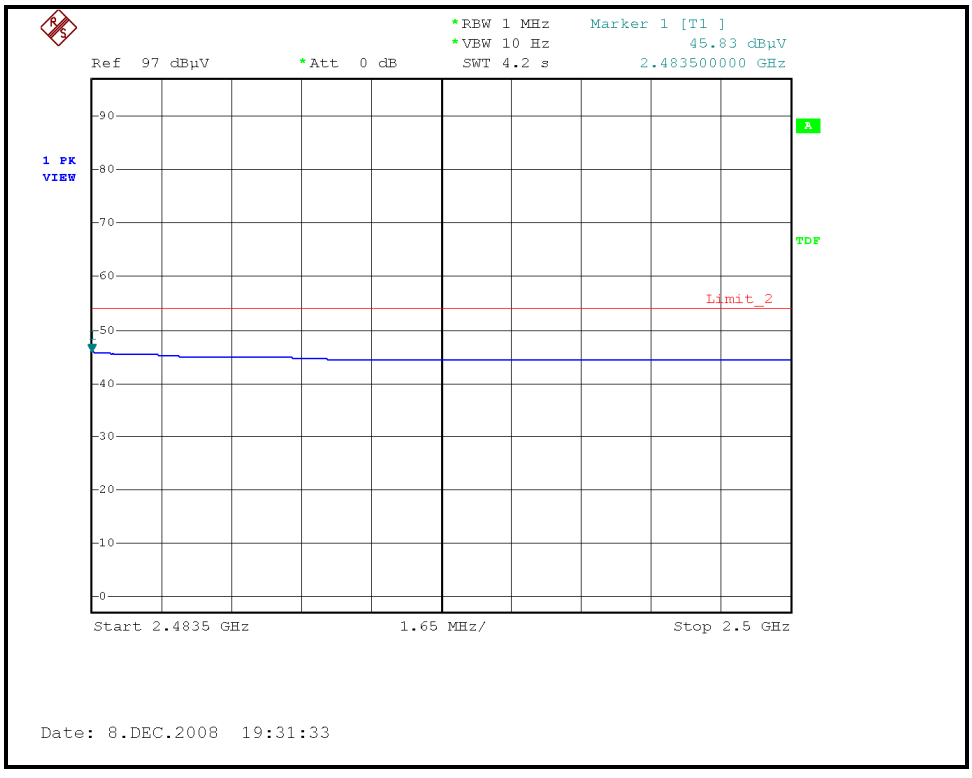
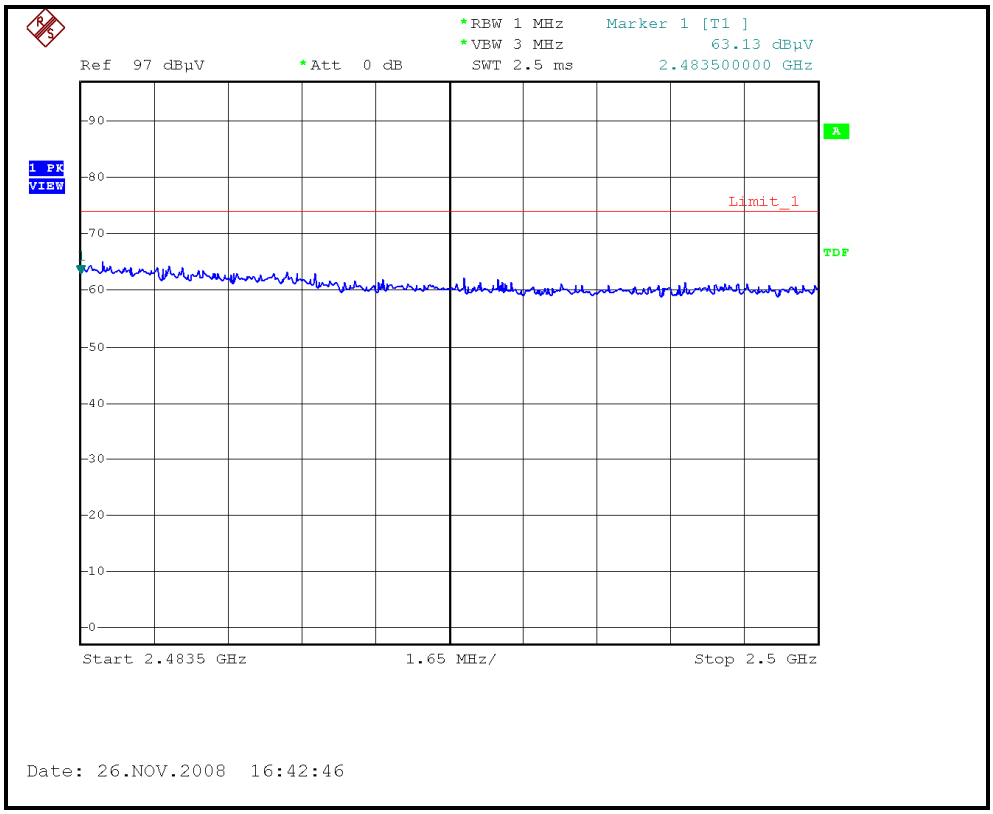
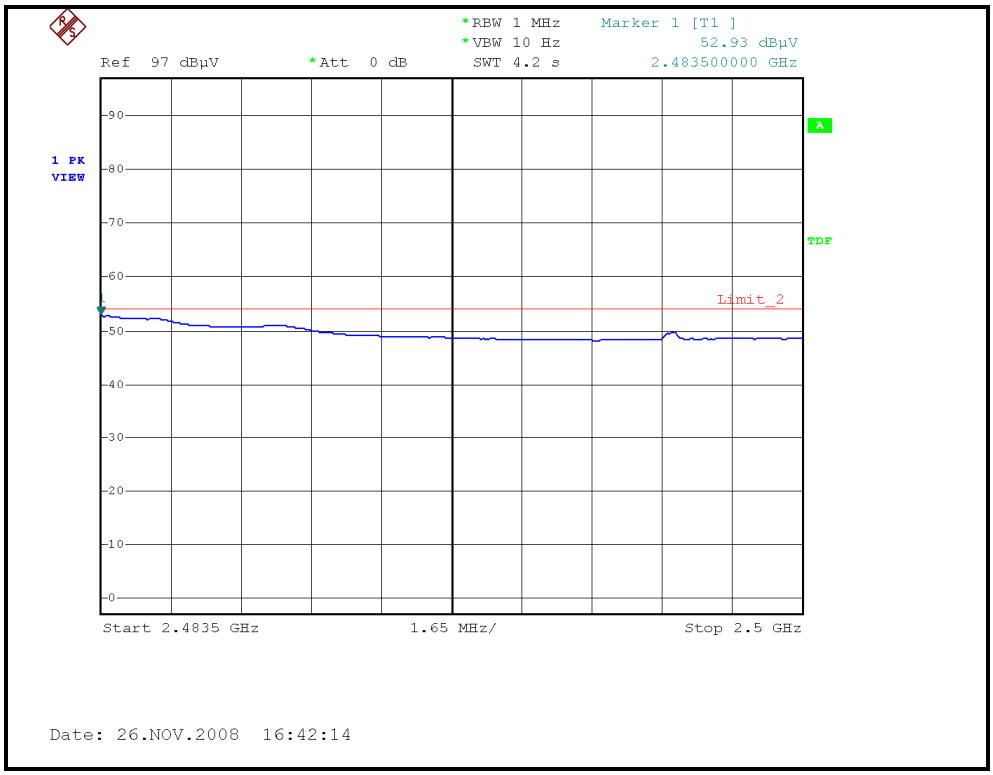




RESTRICTED BANDEDGE (802.11b MODE,CH11, VERTICAL)





802.11g OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH 965hPa	TESTED BY	Frank Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.01 PK	74.00	-9.99	1.01 H	151	33.98	30.03
2	2390.00	47.62 AV	54.00	-6.38	1.01 H	151	17.59	30.03
3	*2412.00	105.04 PK			1.00 H	147	74.92	30.12
4	*2412.00	93.90 AV			1.00 H	147	63.78	30.12
5	4824.00	50.90 PK	74.00	-23.10	1.84 H	72	15.51	35.39
6	4824.00	35.70 AV	54.00	-18.30	1.84 H	72	0.31	35.39
7	#7236.00	54.20 PK	85.04	-30.84	1.86 H	283	12.68	41.52
8	#7236.00	41.30 AV	73.90	-32.60	1.86 H	283	-0.22	41.52
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.98 PK	74.00	-3.02	1.03 V	76	40.95	30.03
2	2390.00	52.53 AV	54.00	-1.47	1.03 V	76	22.50	30.03
3	*2412.00	111.50 PK			1.02 V	76	81.38	30.12
4	*2412.00	100.50 AV			1.02 V	76	70.38	30.12
5	4824.00	49.30 PK	74.00	-24.70	1.01 V	109	13.91	35.39
6	4824.00	34.60 AV	54.00	-19.40	1.01 V	109	-0.79	35.39
7	#7236.00	57.60 PK	91.50	-33.90	1.27 V	184	16.08	41.52
8	#7236.00	43.20 AV	80.50	-37.30	1.27 V	184	1.68	41.52

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 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH 965hPa	TESTED BY	Frank Liu

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	107.56 PK			1.00 H	173	77.35	30.21
2	*2437.00	96.89 AV			1.00 H	173	66.68	30.21
3	4874.00	52.80 PK	74.00	-21.20	1.86 H	96	17.30	35.50
4	4874.00	38.20 AV	54.00	-15.80	1.86 H	96	2.70	35.50
5	7311.00	57.89 PK	74.00	-16.11	1.83 H	295	16.19	41.70
6	7311.00	43.56 AV	54.00	-10.44	1.83 H	295	1.86	41.70
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	115.60 PK			1.01 V	94	85.39	30.21
2	*2437.00	104.60 AV			1.01 V	94	74.39	30.21
3	4874.00	52.40 PK	74.00	-21.60	1.00 V	102	16.90	35.50
4	4874.00	37.80 AV	54.00	-16.20	1.00 V	102	2.30	35.50
5	7311.00	60.80 PK	74.00	-13.20	1.22 V	193	19.10	41.70
6	7311.00	46.10 AV	54.00	-7.90	1.22 V	193	4.40	41.70

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH 965hPa	TESTED BY	Frank Liu

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	102.50 PK			1.00 H	13	72.19	30.31
2	*2462.00	91.50 AV			1.00 H	13	61.19	30.31
3	2483.50	61.59 PK	74.00	-12.41	1.00 H	20	31.19	30.40
4	2483.50	45.83 AV	54.00	-8.17	1.00 H	20	15.43	30.40
5	4924.00	49.70 PK	74.00	-24.30	1.42 H	79	14.11	35.59
6	4924.00	34.60 AV	54.00	-19.40	1.42 H	79	-0.99	35.59
7	7386.00	53.80 PK	74.00	-20.20	1.83 H	264	11.94	41.86
8	7386.00	40.30 AV	54.00	-13.70	1.83 H	264	-1.56	41.86
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	113.00 PK			1.00 V	76	82.69	30.31
2	*2462.00	101.30 AV			1.00 V	76	70.99	30.31
3	2483.50	72.60 PK	74.00	-1.40	1.00 V	77	42.20	30.40
4	2483.50	52.57 AV	54.00	-1.43	1.00 V	77	22.17	30.40
5	4924.00	48.40 PK	74.00	-25.60	1.04 V	108	12.81	35.59
6	4924.00	33.70 AV	54.00	-20.30	1.04 V	108	-1.89	35.59
7	7386.00	56.80 PK	74.00	-17.20	1.33 V	172	14.94	41.86
8	7386.00	42.90 AV	54.00	-11.10	1.33 V	172	1.04	41.86

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

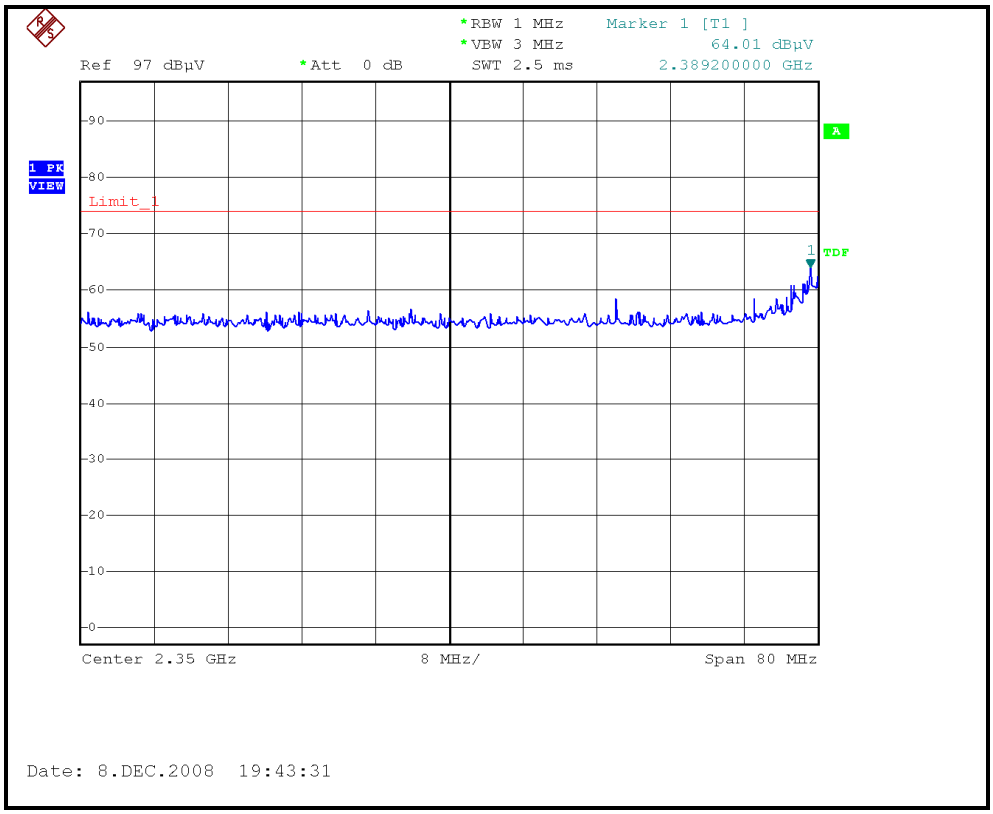
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

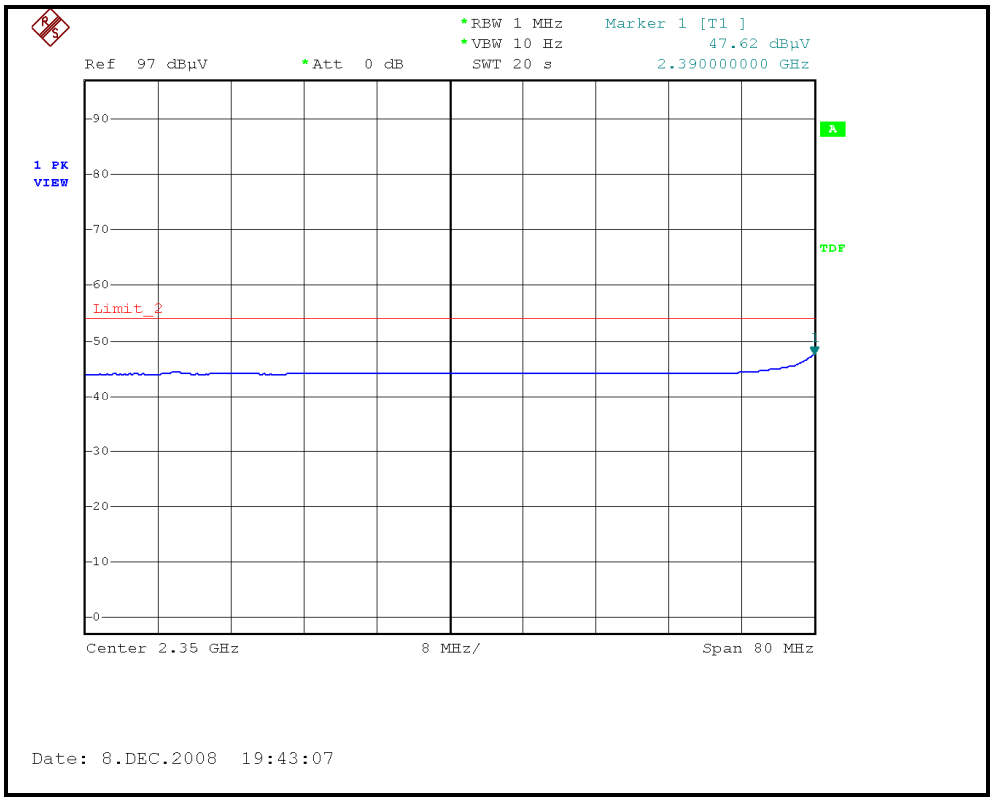
3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

5. " * ": Fundamental frequency.

RESTRICTED BANDEDGE (802.11g MODE,CH1, HORIZONTAL)





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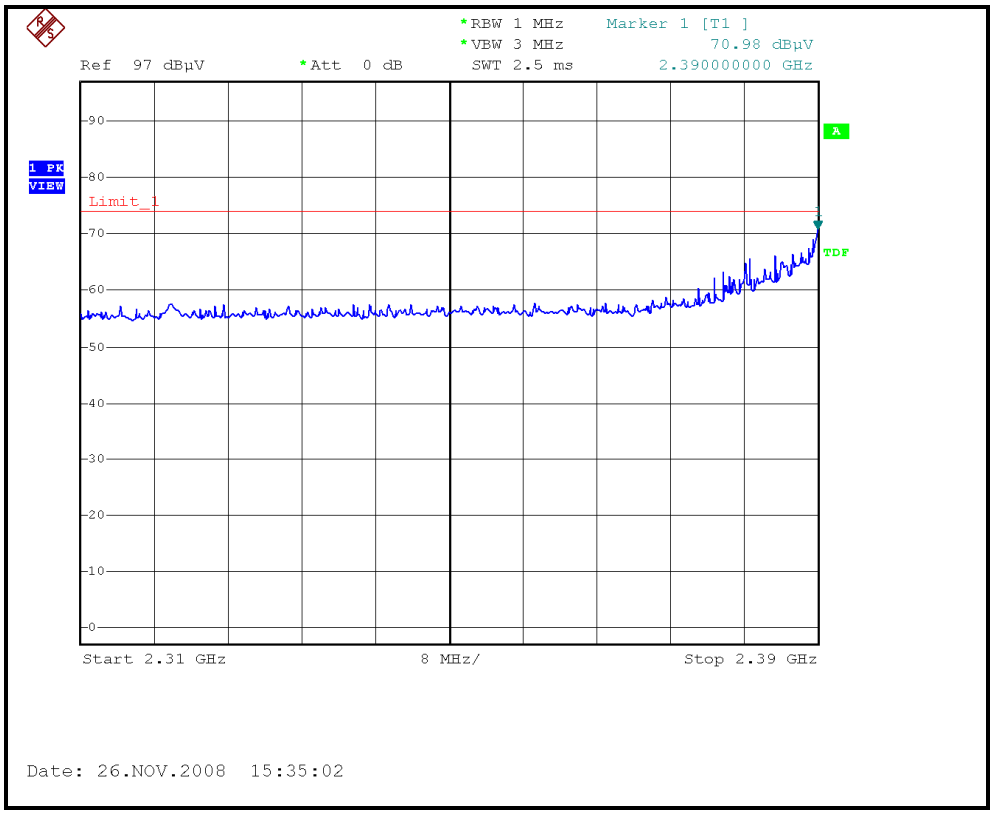
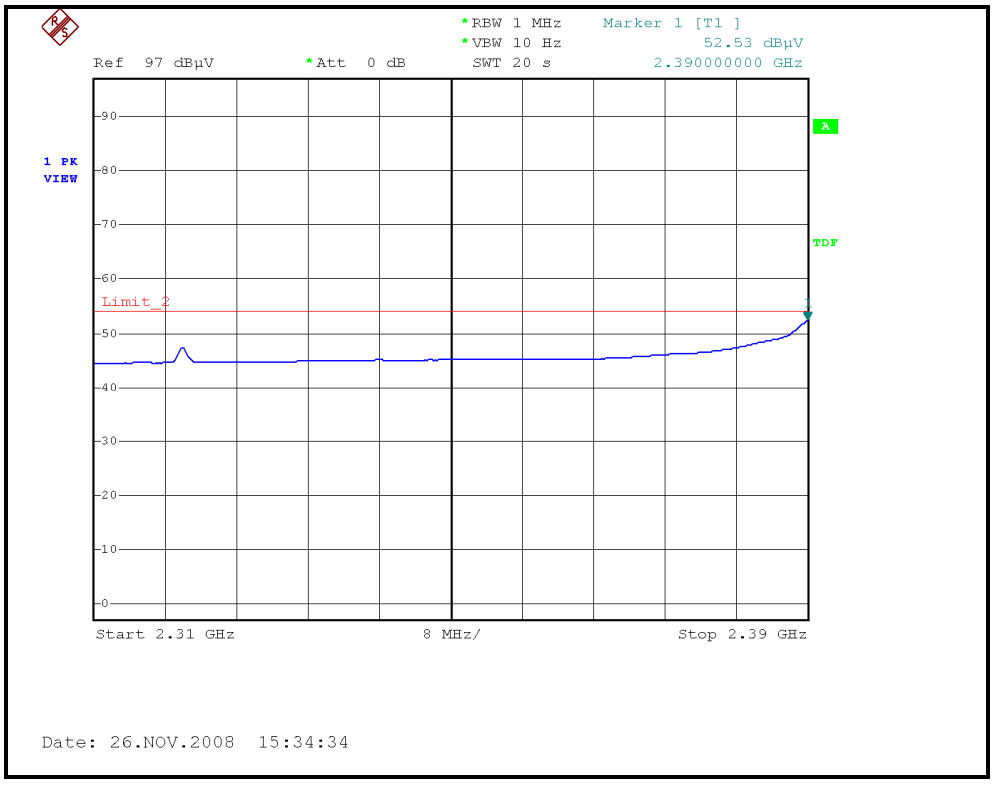
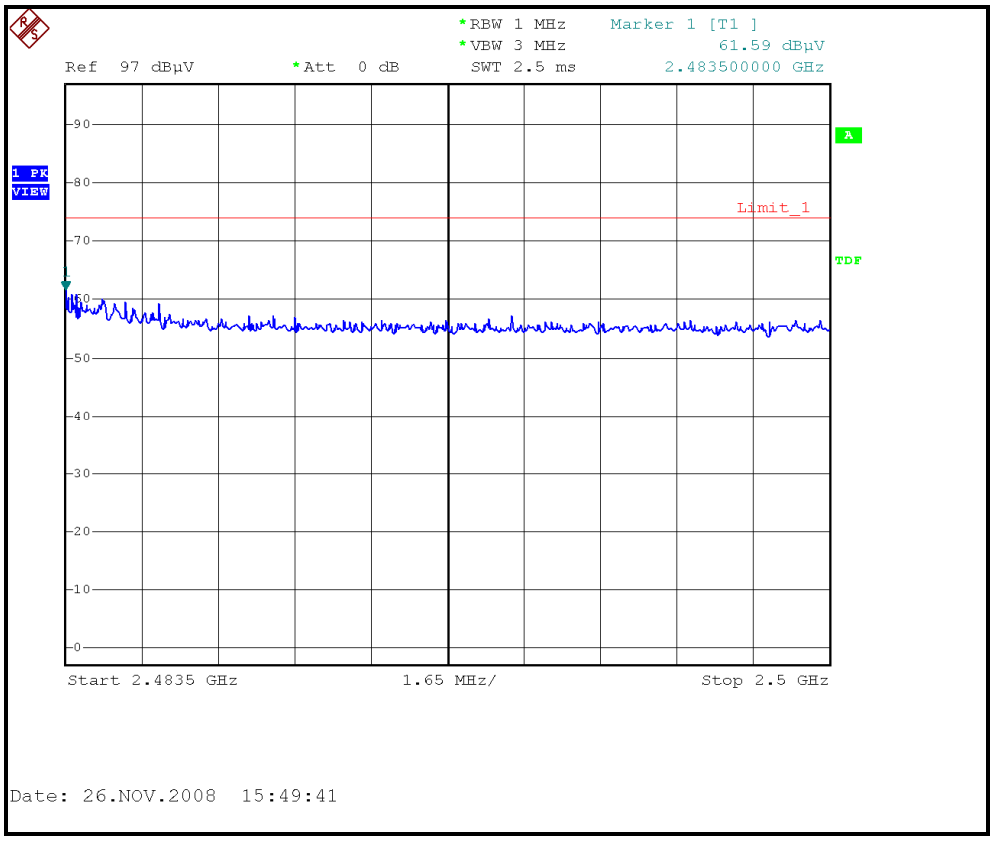
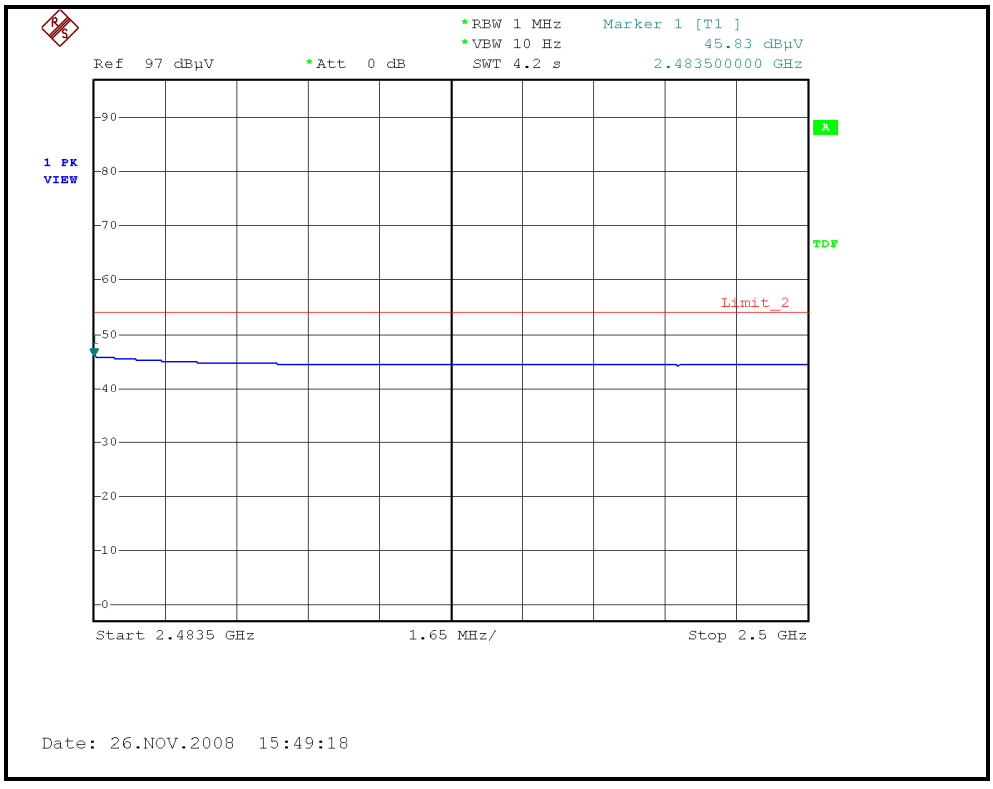


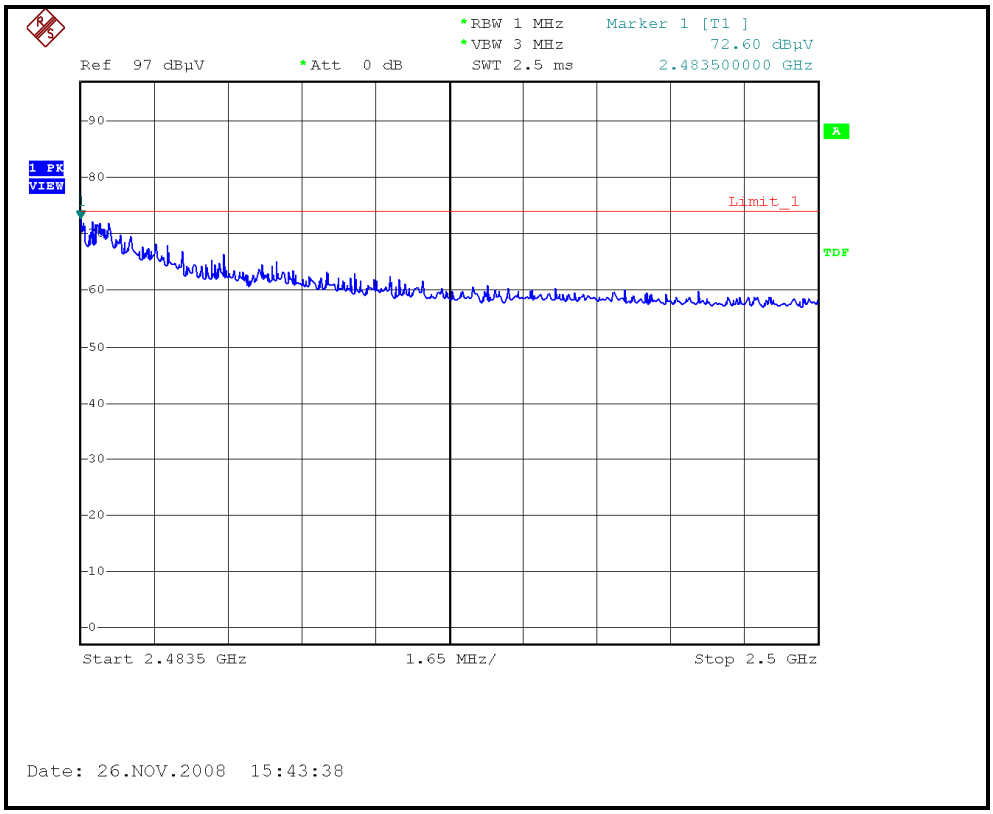


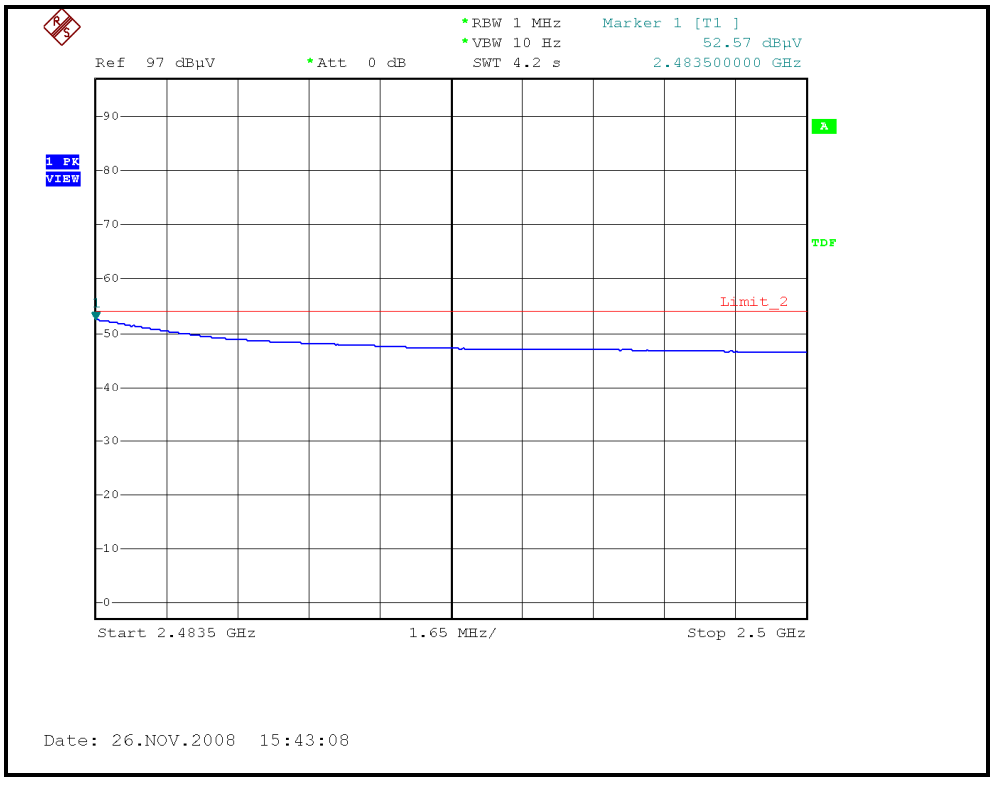
RESTRICTED BANDEDGE (802.11g MODE,CH11, HORIZONTAL)





RESTRICTED BANDEDGE (802.11g MODE,CH11, VERTICAL)





DRAFT 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH 965hPa	TESTED BY	Frank Liu

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	69.73 PK	74.00	-4.27	1.01 H	323	39.70	30.03
2	2390.00	50.79 AV	54.00	-3.21	1.01 H	323	20.76	30.03
3	*2412.00	109.80 PK			1.00 H	327	79.68	30.12
4	*2412.00	98.20 AV			1.00 H	327	68.08	30.12
5	4824.00	48.30 PK	74.00	-25.70	1.24 H	79	12.91	35.39
6	4824.00	34.70 AV	54.00	-19.30	1.24 H	79	-0.69	35.39
7	#7236.00	49.20 PK	89.80	-40.60	1.67 H	321	7.68	41.52
8	#7236.00	35.20 AV	78.20	-43.00	1.67 H	321	-6.32	41.52
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.65 PK	74.00	-3.35	1.11 V	21	40.62	30.03
2	2390.00	51.17 AV	54.00	-2.83	1.11 V	21	21.14	30.03
3	*2412.00	111.50 PK			1.11 V	21	81.38	30.12
4	*2412.00	100.40 AV			1.11 V	21	70.28	30.12
5	4824.00	47.50 PK	74.00	-26.50	1.00 V	82	12.11	35.39
6	4824.00	33.50 AV	54.00	-20.50	1.00 V	82	-1.89	35.39
7	#7236.00	52.60 PK	91.50	-38.90	1.19 V	336	11.08	41.52
8	#7236.00	37.00 AV	80.40	-43.40	1.19 V	336	-4.52	41.52

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 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH 965hPa	TESTED BY	Frank Liu

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	107.12 PK			1.00 H	146	76.91	30.21
2	*2437.00	96.76 AV			1.00 H	146	66.55	30.21
3	4874.00	50.70 PK	74.00	-23.30	1.29 H	84	15.20	35.50
4	4874.00	37.20 AV	54.00	-16.80	1.29 H	84	1.70	35.50
5	7311.00	54.30 PK	74.00	-19.70	1.64 H	32	12.60	41.70
6	7311.00	39.80 AV	54.00	-14.20	1.64 H	32	-1.90	41.70
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	115.70 PK			1.04 V	69	85.49	30.21
2	*2437.00	104.30 AV			1.04 V	69	74.09	30.21
3	4874.00	49.20 PK	74.00	-24.80	1.00 V	92	13.70	35.50
4	4874.00	36.30 AV	54.00	-17.70	1.00 V	92	0.80	35.50
5	7311.00	55.20 PK	74.00	-18.80	1.68 V	353	13.50	41.70
6	7311.00	40.20 AV	54.00	-13.80	1.68 V	353	-1.50	41.70

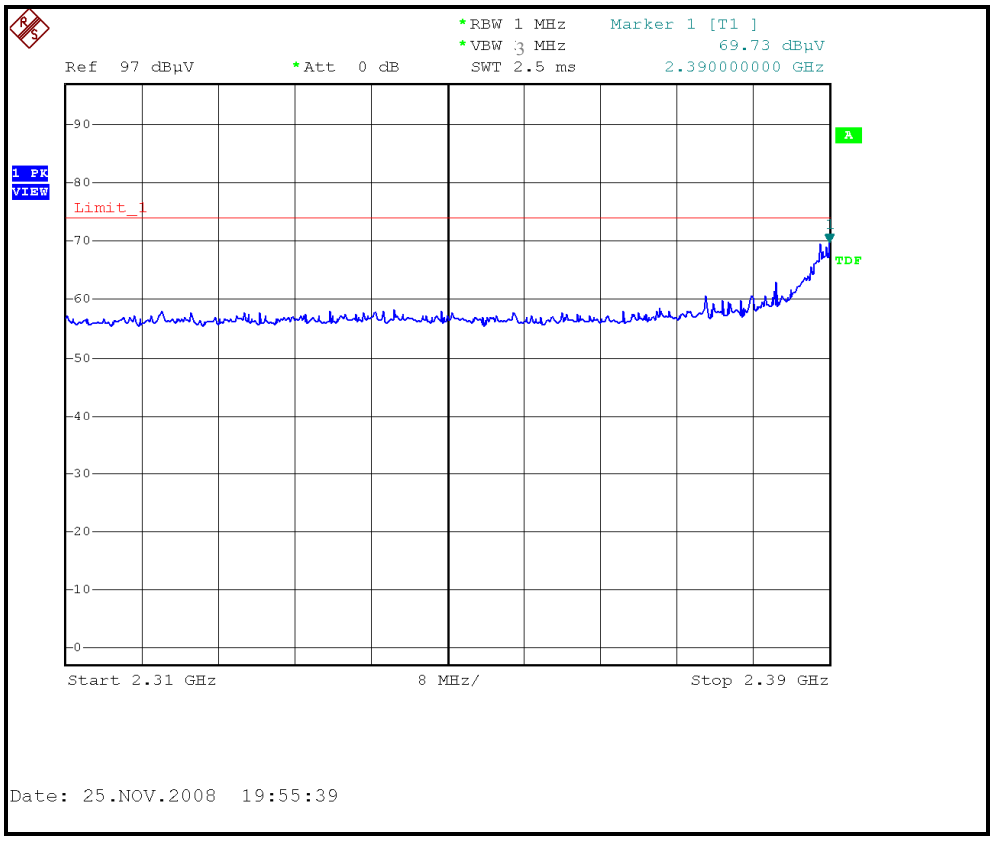
REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

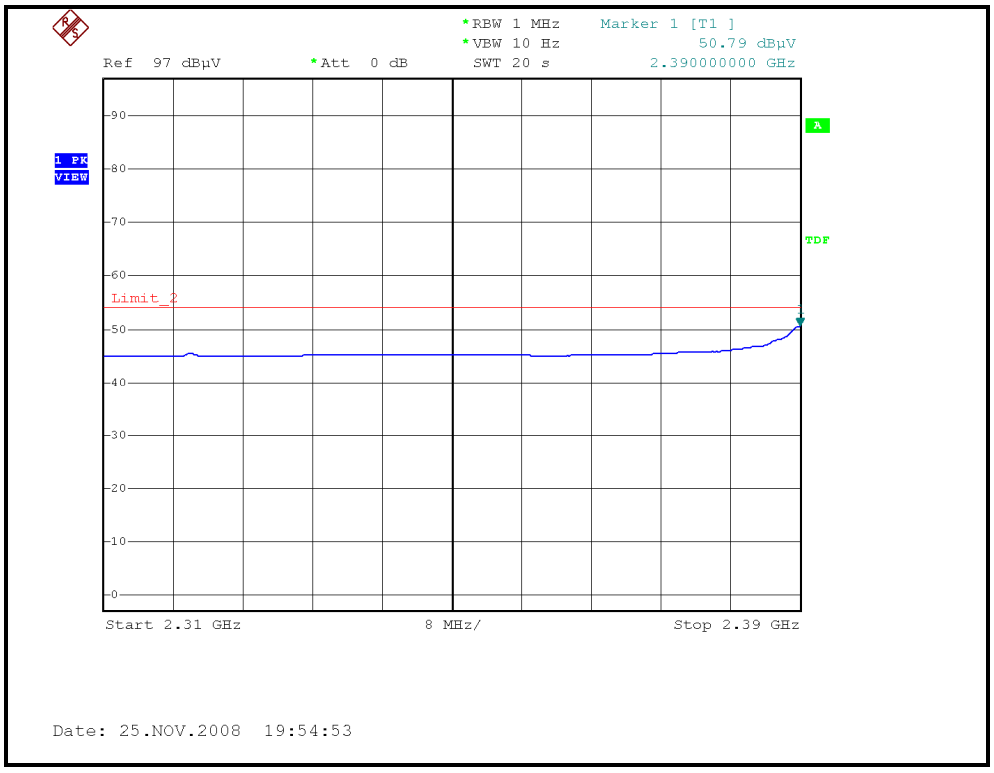
EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH 965hPa	TESTED BY	Frank Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	101.90 PK			1.00 H	147	71.59	30.31
2	*2462.00	91.01 AV			1.00 H	147	60.70	30.31
3	2483.50	61.93 PK	74.00	-12.07	1.00 H	151	31.53	30.40
4	2483.50	45.96 AV	54.00	-8.04	1.00 H	151	15.56	30.40
5	4924.00	49.30 PK	74.00	-24.70	1.31 H	79	13.71	35.59
6	4924.00	35.20 AV	54.00	-18.80	1.31 H	79	-0.39	35.59
7	7386.00	55.20 PK	74.00	-18.80	1.54 H	321	13.34	41.86
8	7386.00	39.40 AV	54.00	-14.60	1.54 H	321	-2.46	41.86
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	112.30 PK			1.07 V	25	81.99	30.31
2	*2462.00	101.60 AV			1.07 V	25	71.29	30.31
3	2483.50	70.39 PK	74.00	-3.61	1.07 V	25	39.99	30.40
4	2483.50	53.01 AV	54.00	-0.99	1.07 V	25	22.61	30.40
5	4924.00	48.60 PK	74.00	-25.40	1.03 V	94	13.01	35.59
6	4924.00	34.70 AV	54.00	-19.30	1.03 V	94	-0.89	35.59
7	7386.00	53.80 PK	74.00	-20.20	1.62 V	351	11.94	41.86
8	7386.00	38.90 AV	54.00	-15.10	1.62 V	351	-2.96	41.86

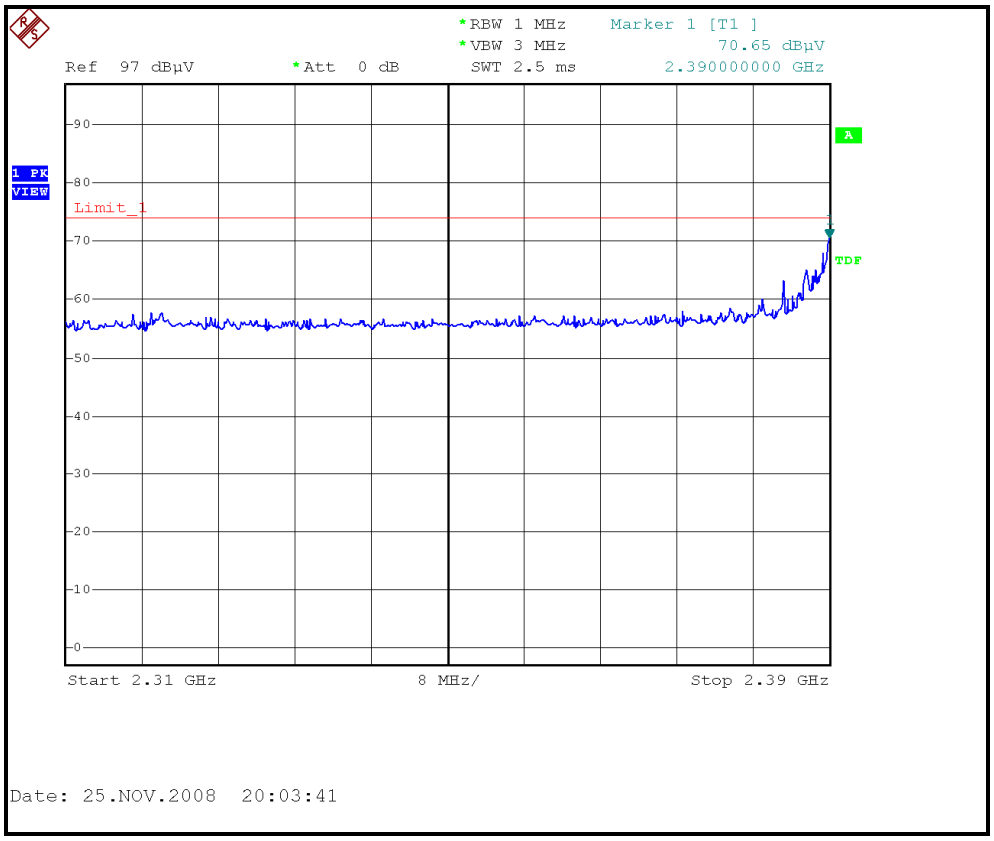
REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

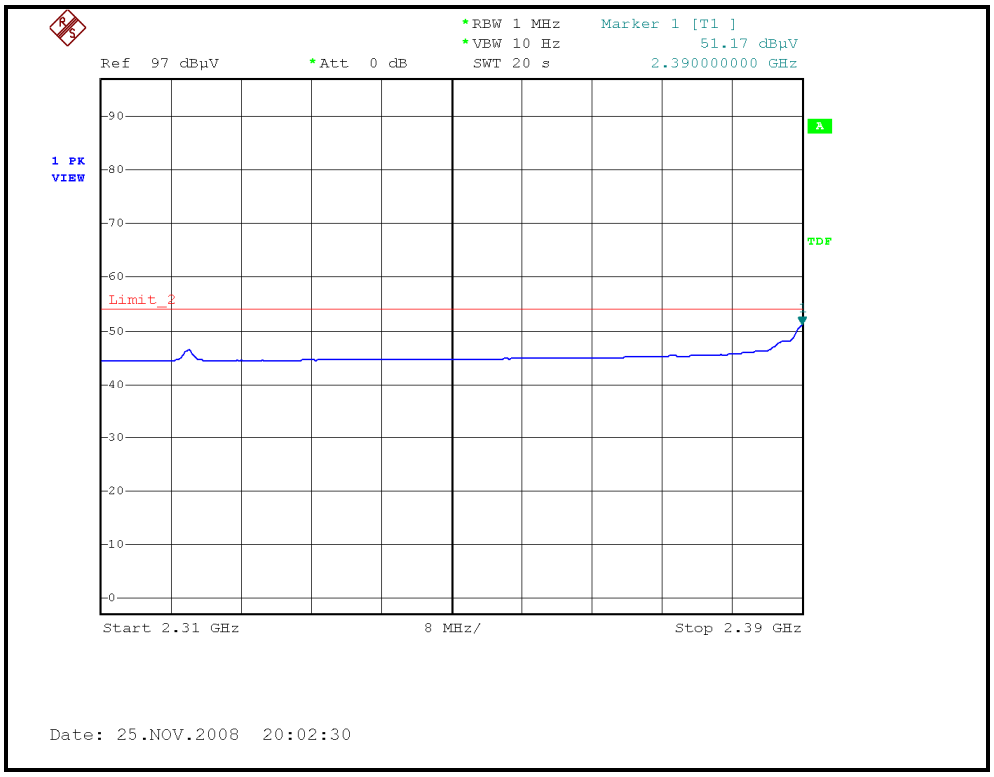
RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE,CH1, HORIZONTAL)





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





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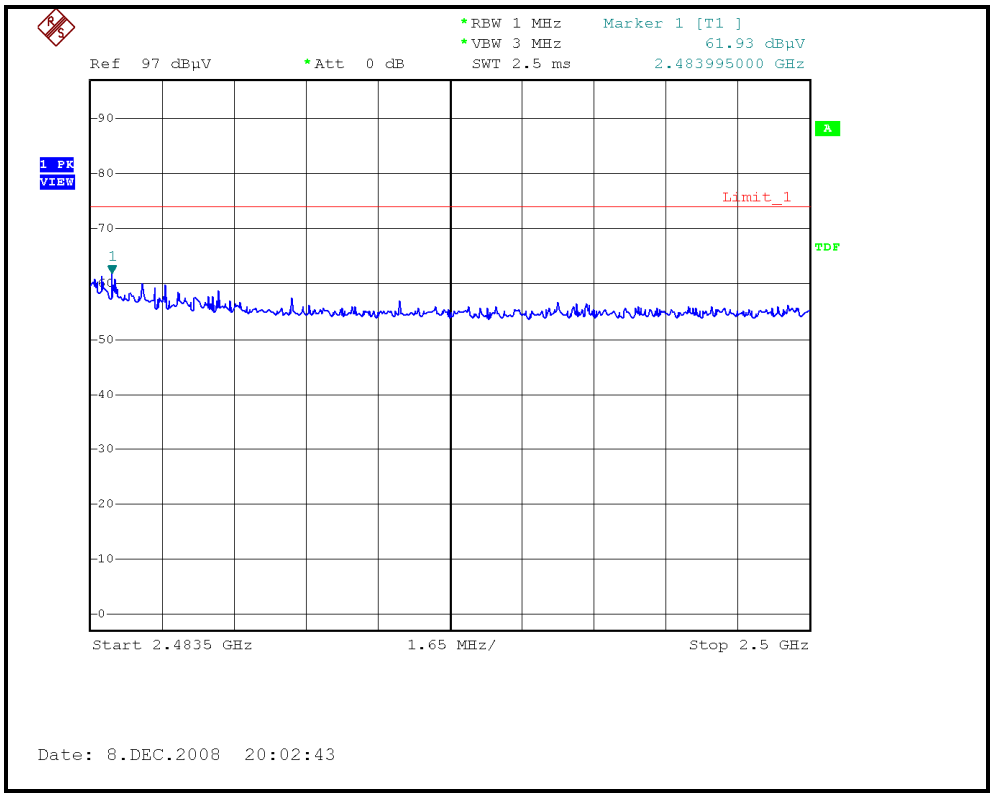
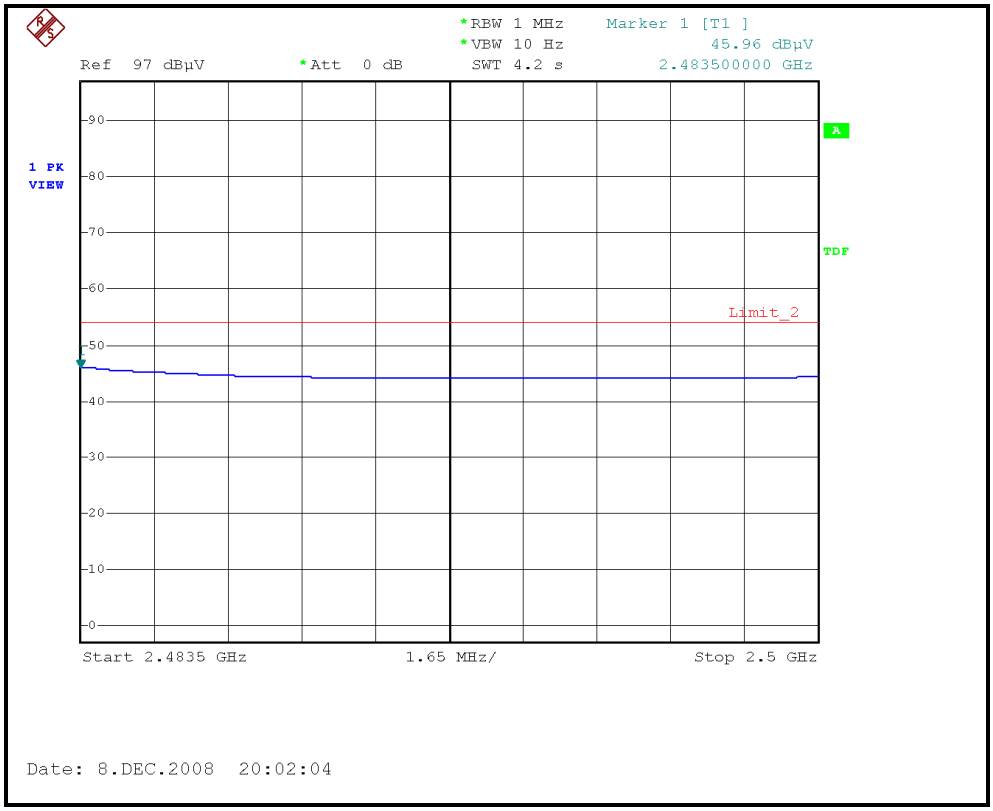
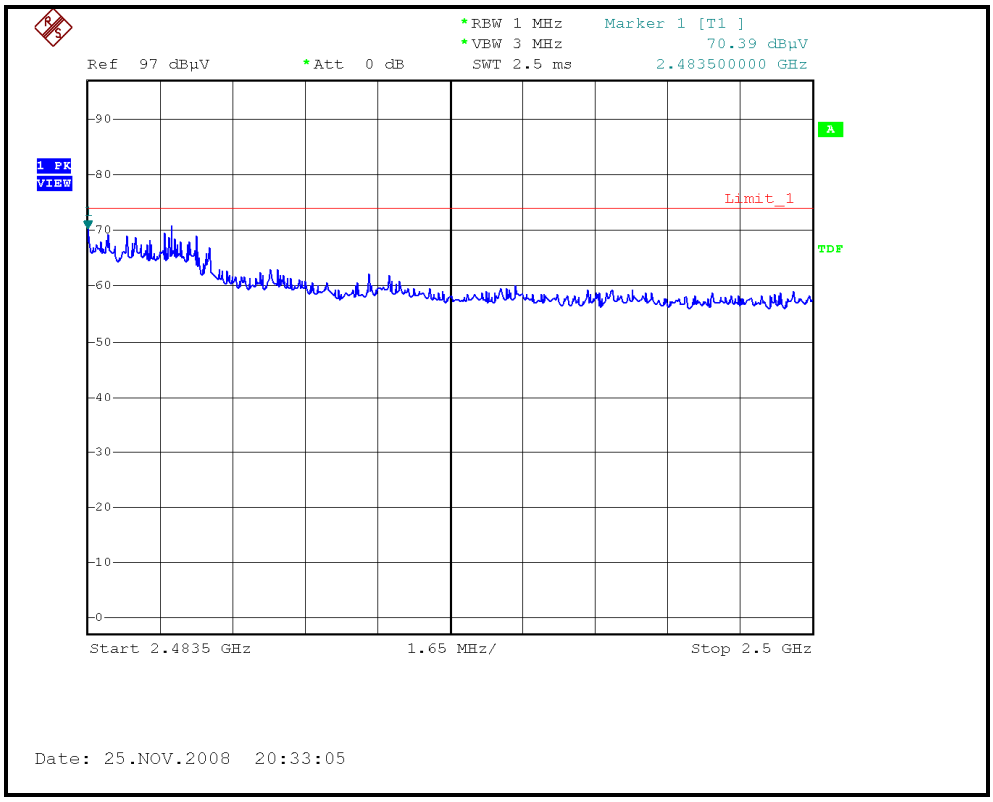
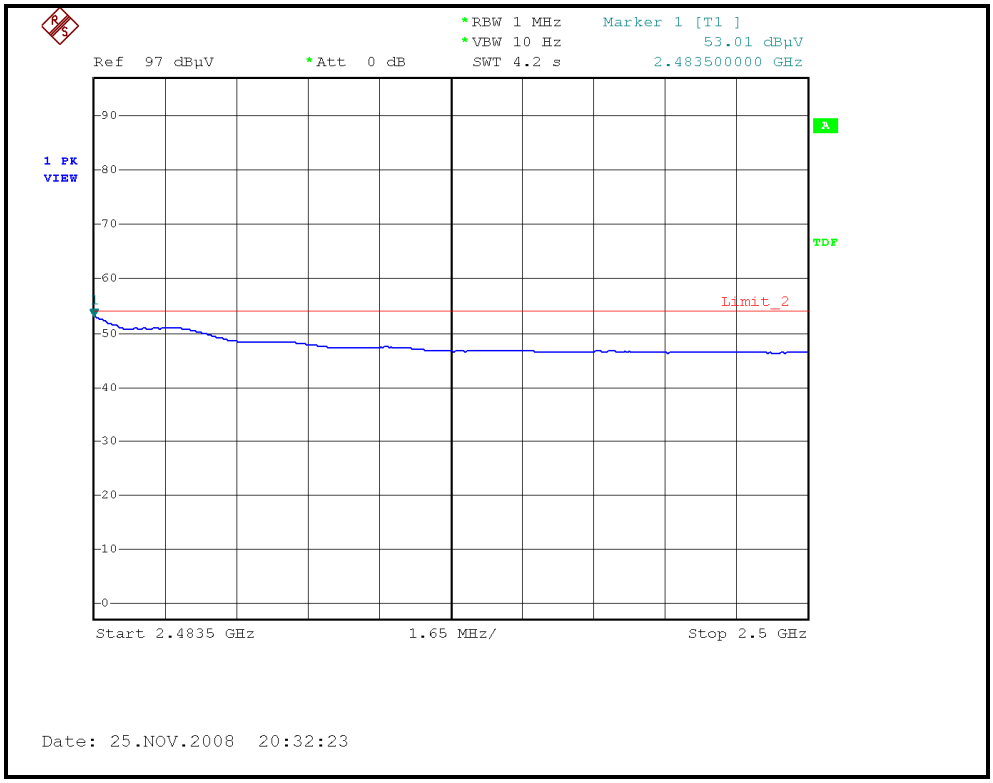




RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE,CH11, VERTICAL)





DRAFT 802.11n (40MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH 965hPa	TESTED BY	Frank Liu

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	61.74 PK	74.00	-12.26	1.00 H	149	31.71	30.03
2	2390.00	46.76 AV	54.00	-7.24	1.00 H	149	16.73	30.03
3	*2422.00	97.82 PK			1.00 H	147	67.66	30.16
4	*2422.00	86.50 AV			1.00 H	147	56.34	30.16
5	4844.00	46.93 PK	74.00	-27.07	1.05 H	311	11.50	35.43
6	4844.00	34.10 AV	54.00	-19.90	1.05 H	311	-1.33	35.43
7	7266.00	53.87 PK	74.00	-20.13	1.03 H	224	12.27	41.59
8	7266.00	41.03 AV	54.00	-12.97	1.03 H	224	-0.56	41.59
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	66.50 PK	74.00	-7.50	1.10 V	21	68.39	-1.89
2	2390.00	53.10 AV	54.00	-0.90	1.10 V	21	54.99	-1.89
3	*2422.00	107.20 PK			1.10 V	20	109.14	-1.94
4	*2422.00	95.00 AV			1.10 V	20	96.94	-1.94
5	4844.00	45.60 PK	74.00	-28.40	1.24 V	23	41.72	3.88
6	4844.00	33.20 AV	54.00	-20.80	1.24 V	23	29.32	3.88
7	7266.00	54.80 PK	74.00	-19.20	1.07 V	98	46.24	8.56
8	7266.00	42.30 AV	54.00	-11.70	1.07 V	98	33.74	8.56

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH 965hPa	TESTED BY	Frank Liu

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	102.53 PK			1.00 H	148	72.32	30.21
2	*2437.00	91.15 AV			1.00 H	148	60.94	30.21
3	4874.00	46.90 PK	74.00	-27.10	1.86 H	183	11.40	35.50
4	4874.00	35.13 AV	54.00	-18.87	1.86 H	183	-0.37	35.50
5	7311.00	54.23 PK	74.00	-19.77	1.53 H	294	12.53	41.70
6	7311.00	51.32 AV	54.00	-2.68	1.53 H	294	9.62	41.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	110.80 PK			1.08 V	27	80.59	30.21
2	*2437.00	100.20 AV			1.08 V	27	69.99	30.21
3	4874.00	45.30 PK	74.00	-28.70	1.21 V	29	9.80	35.50
4	4874.00	34.20 AV	54.00	-19.80	1.21 V	29	-1.30	35.50
5	7311.00	55.80 PK	74.00	-18.20	1.01 V	78	14.10	41.70
6	7311.00	42.70 AV	54.00	-11.30	1.01 V	78	1.00	41.70

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH 965hPa	TESTED BY	Frank Liu

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	97.96 PK			1.03 H	147	67.69	30.27
2	*2452.00	86.39 AV			1.03 H	147	56.12	30.27
3	2483.50	58.93 PK	74.00	-15.07	1.00 H	172	28.53	30.40
4	2483.50	45.53 AV	54.00	-8.47	1.00 H	172	15.13	30.40
5	4904.00	46.72 PK	74.00	-27.28	1.00 H	324	11.16	35.56
6	4904.00	33.70 AV	54.00	-20.30	1.00 H	324	-1.86	35.56
7	7356.00	53.72 PK	74.00	-20.28	1.02 H	223	11.92	41.80
8	7356.00	40.50 AV	54.00	-13.50	1.02 H	223	-1.30	41.80
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	107.20 PK			1.00 V	20	76.93	30.27
2	*2452.00	95.00 AV			1.00 V	20	64.73	30.27
3	2483.50	65.88 PK	74.00	-8.12	1.08 V	35	35.48	30.40
4	2483.50	52.68 AV	54.00	-1.32	1.08 V	35	22.28	30.40
5	4904.00	45.80 PK	74.00	-28.20	1.07 V	26	10.24	35.56
6	4904.00	32.60 AV	54.00	-21.40	1.07 V	26	-2.96	35.56
7	7356.00	54.90 PK	74.00	-19.10	1.21 V	31	13.10	41.80
8	7356.00	43.10 AV	54.00	-10.90	1.21 V	31	1.30	41.80

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

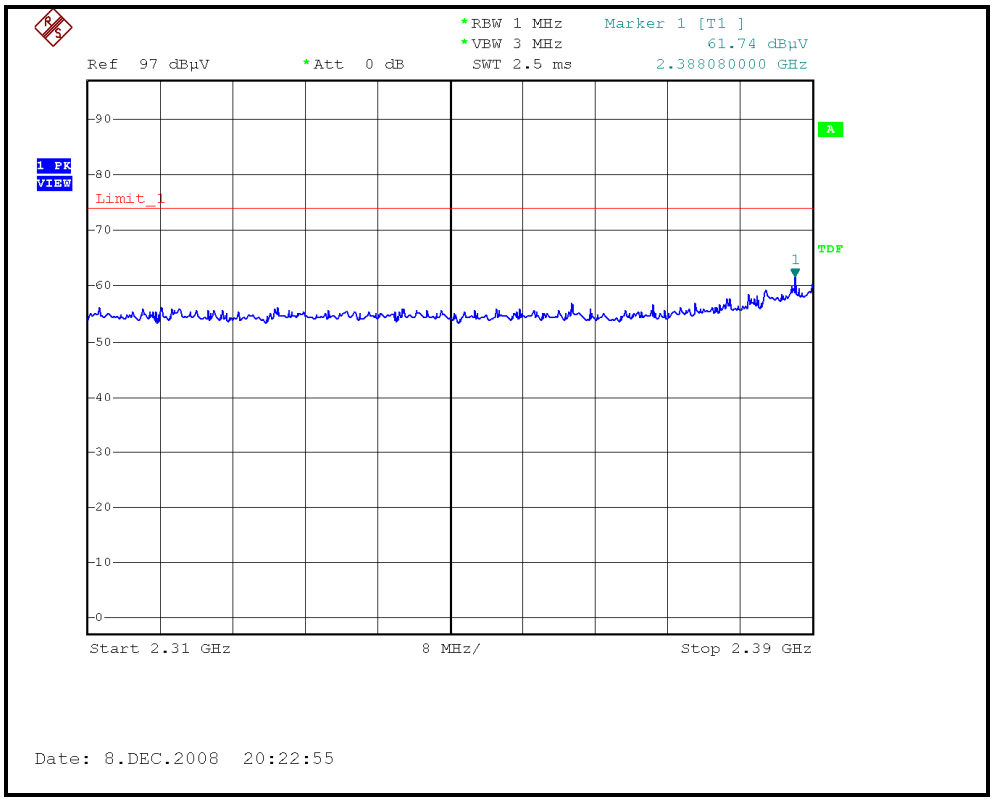
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

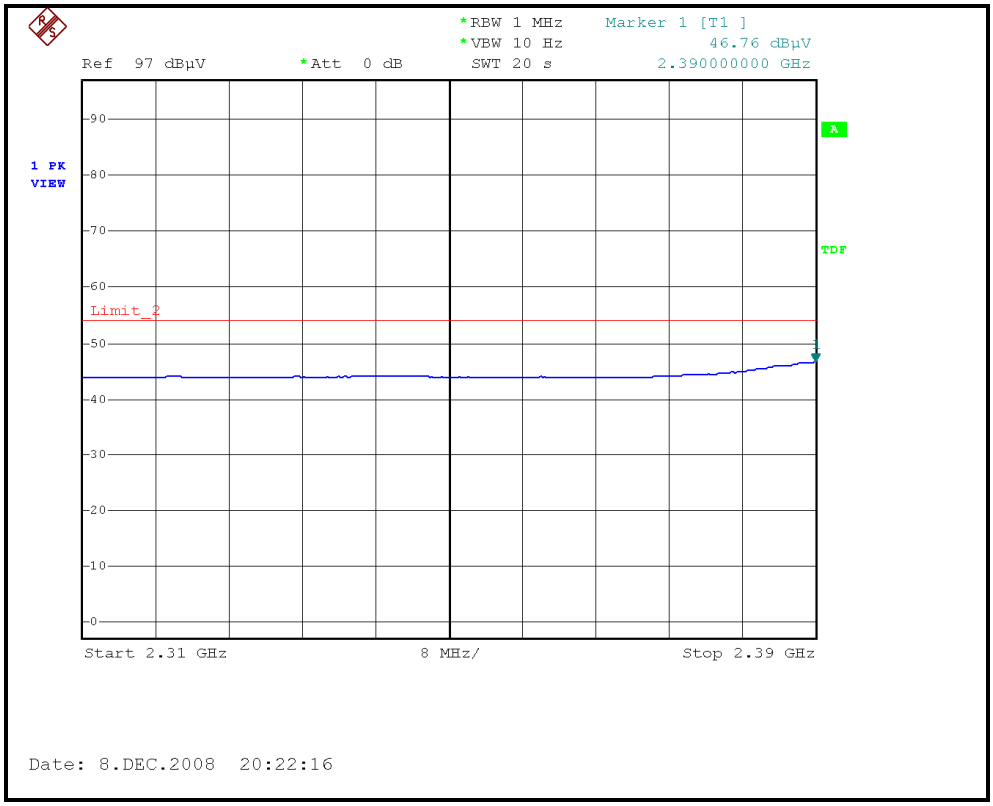
3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

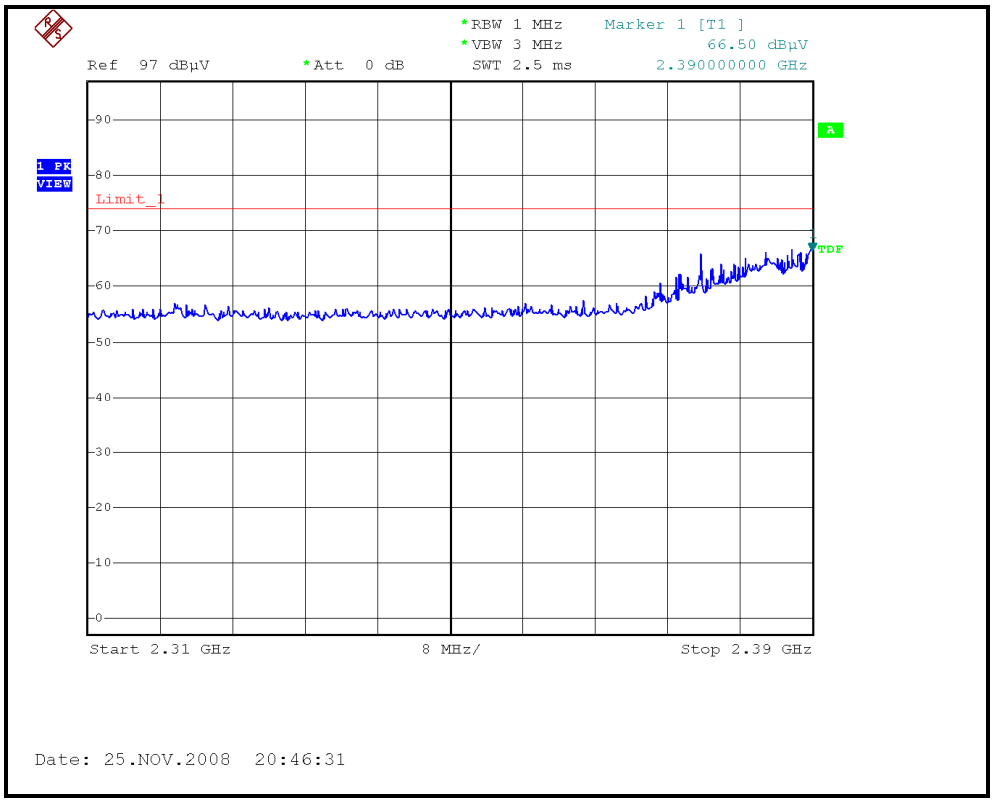
5. " * ": Fundamental frequency.

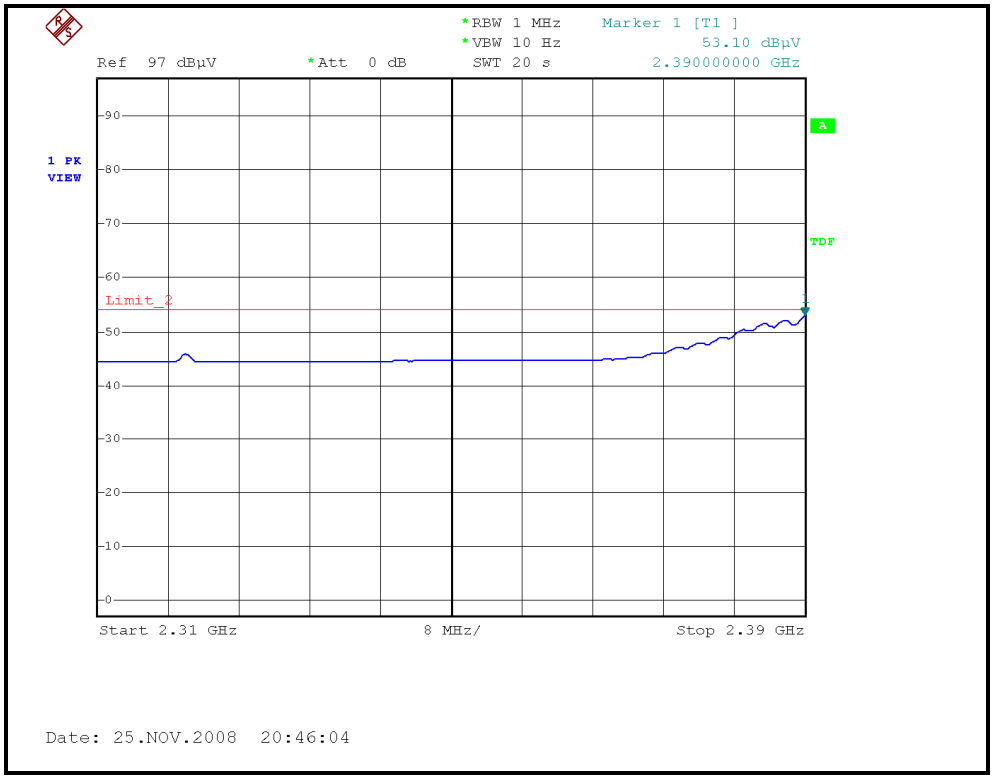
RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE,CH1, HORIZONTAL)



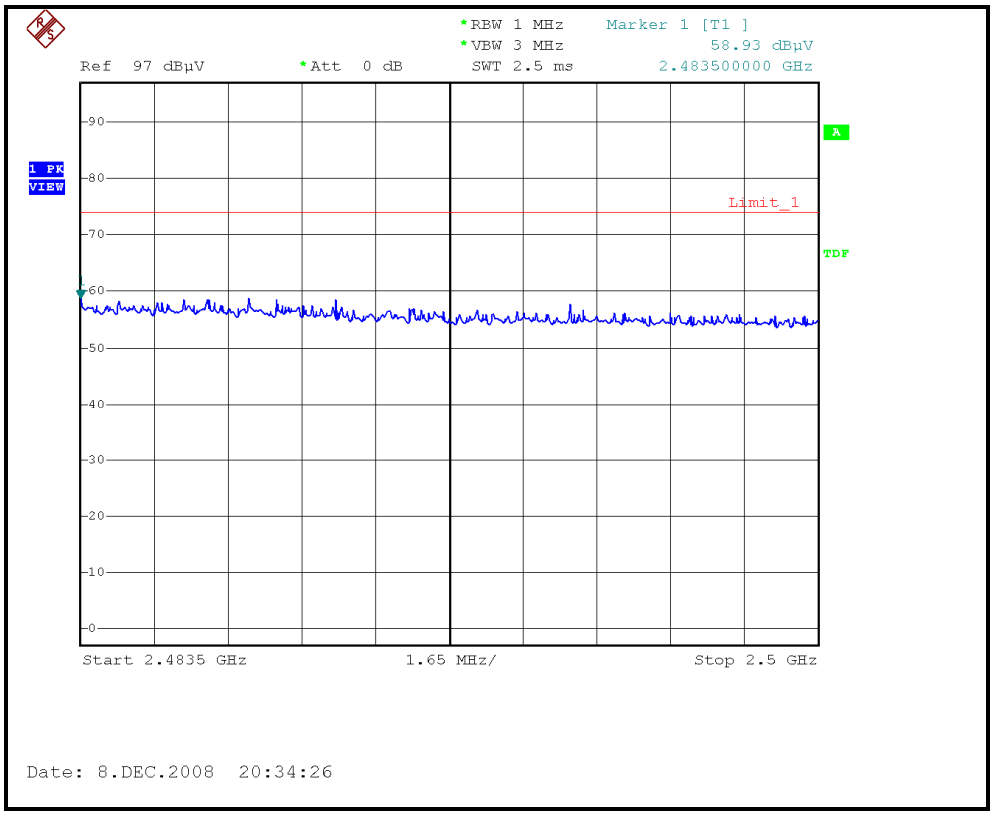


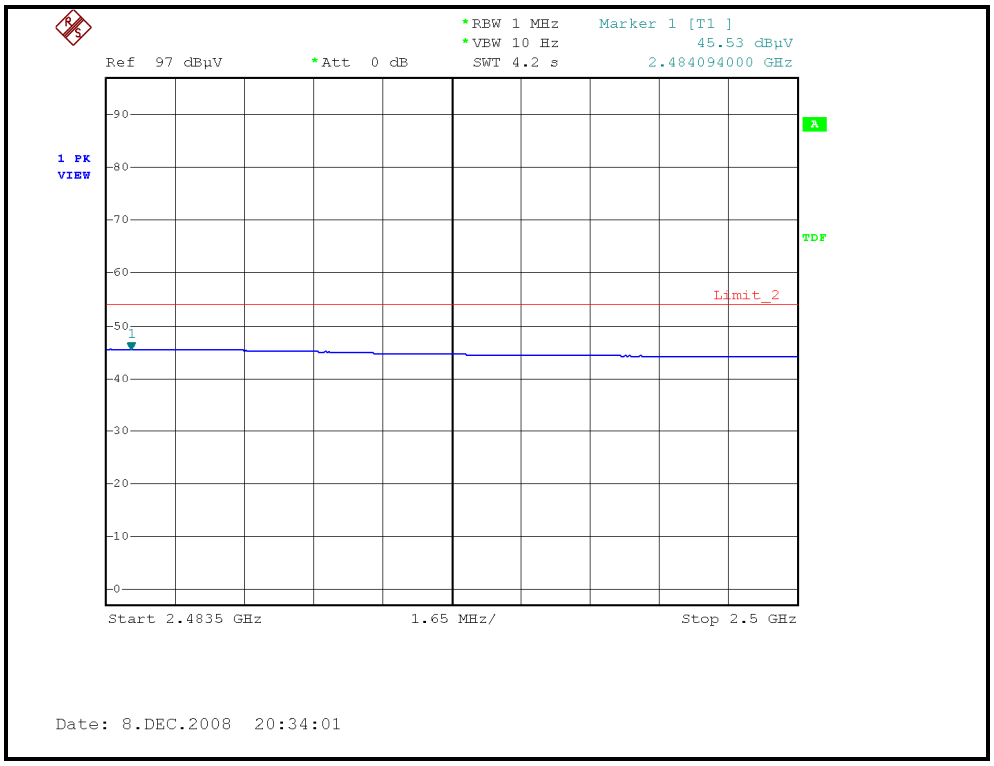
RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE,CH1, VERTICAL)



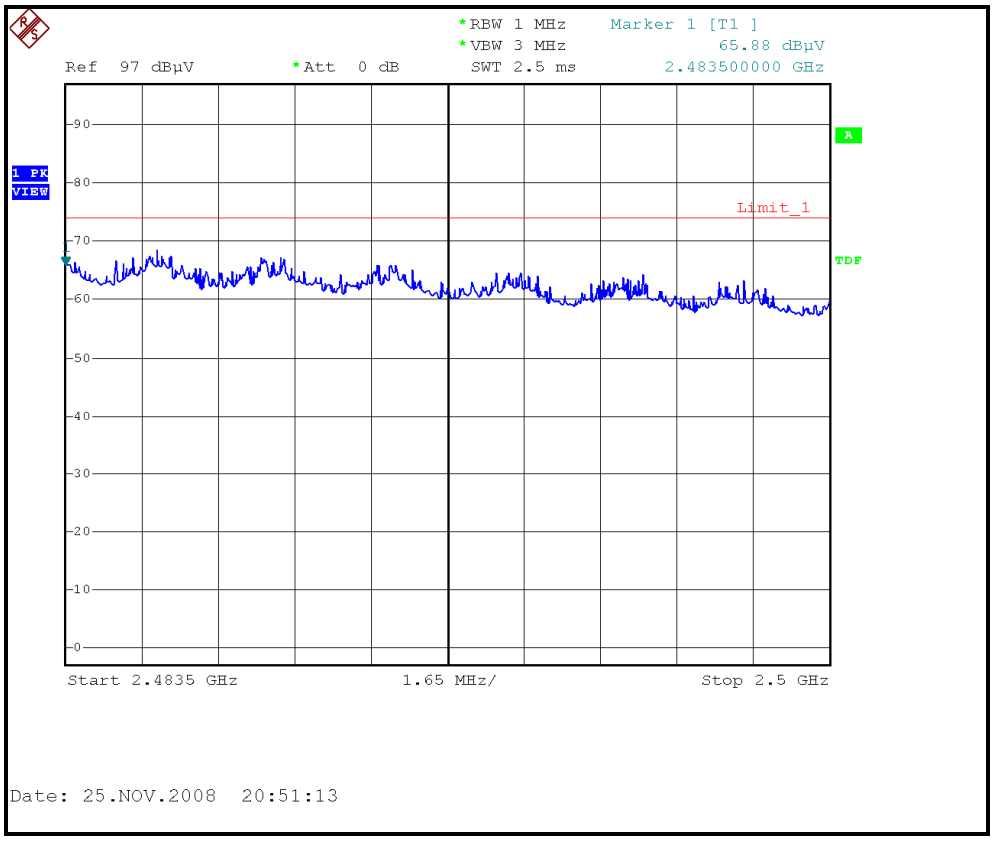


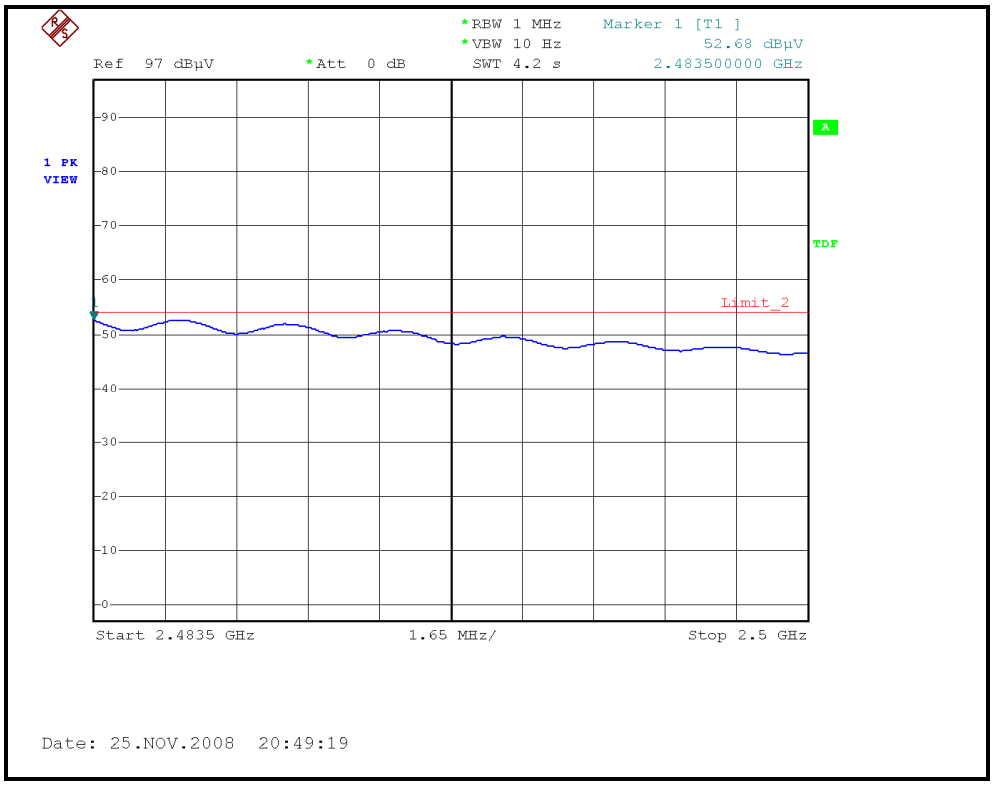
RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE,CH7, HORIZONTAL)





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





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
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2008	Aug. 08, 2009

NOTE:

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

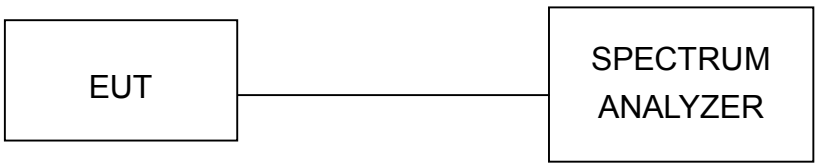
4.3.3 TEST PROCEDURE

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.

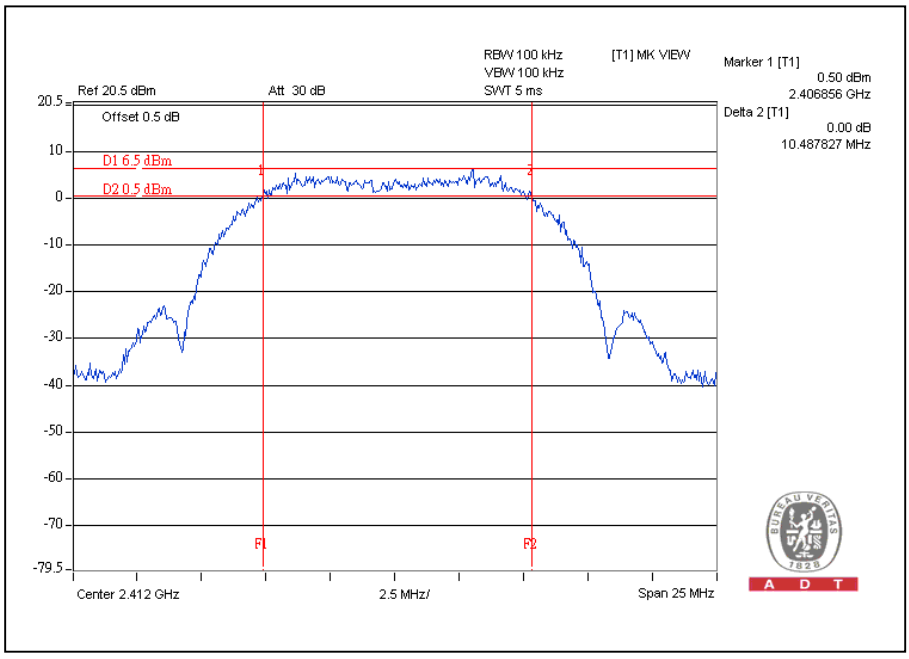
4.3.7 TEST RESULTS

802.11b DSSS MODULATION:

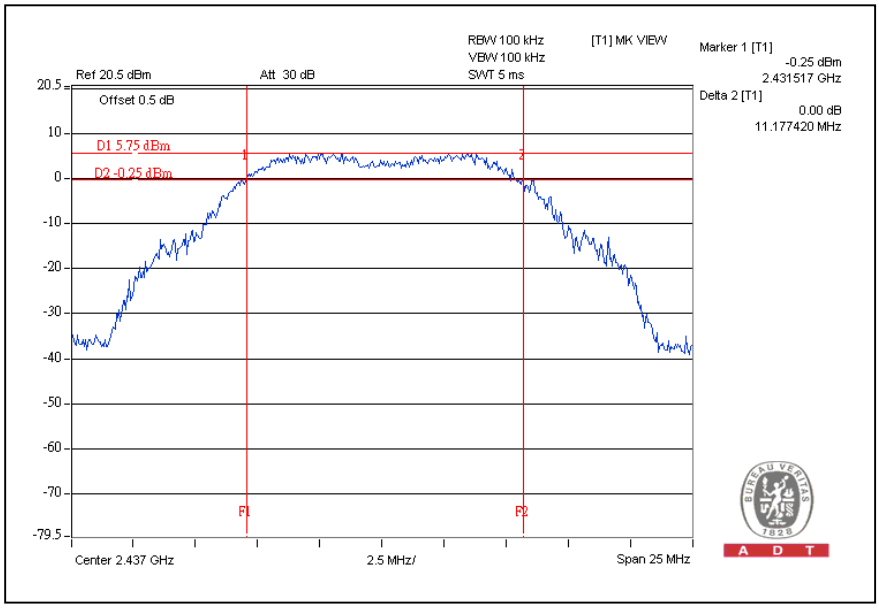
MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.49	0.5	PASS
6	2437	11.18	0.5	PASS
11	2462	10.70	0.5	PASS

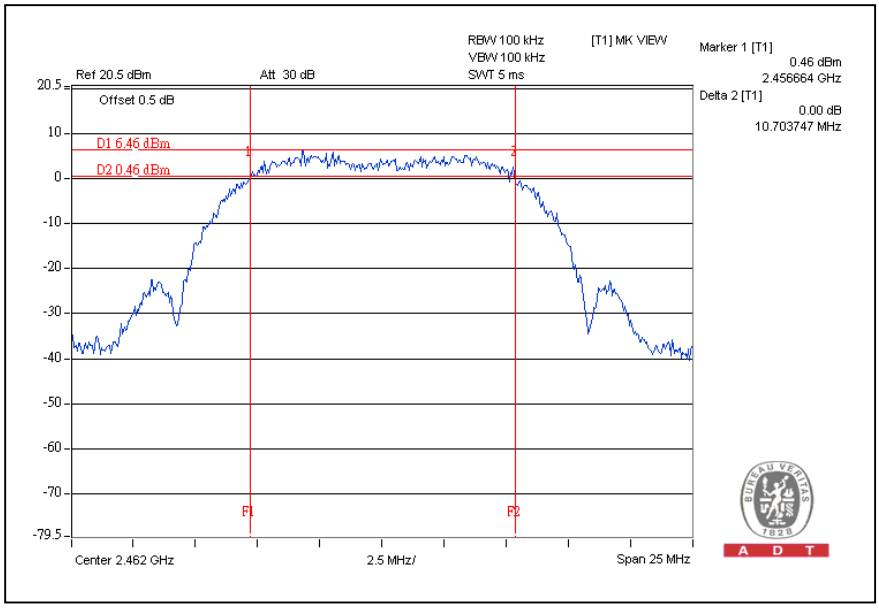
CH1



CH6


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-0.25 dBm
2.431517 GHz
Delta 2 [T1]
0.00 dB
11.177420 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 5.75 dBm
D2 -0.25 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
F1
F2
Center 2.437 GHz
2.5 MHz/
Span 25 MHz

CH11

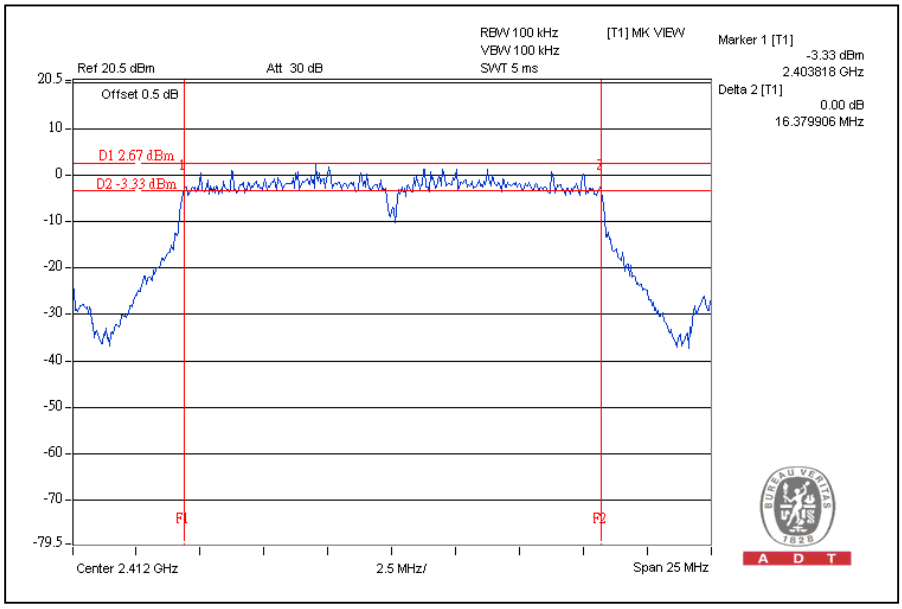

RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
0.46 dBm
2.456664 GHz
Delta 2 [T1]
0.00 dB
10.703747 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 6.46 dBm
D2 0.46 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
F1
F2
Center 2.462 GHz
2.5 MHz/
Span 25 MHz

802.11g OFDM MODULATION:

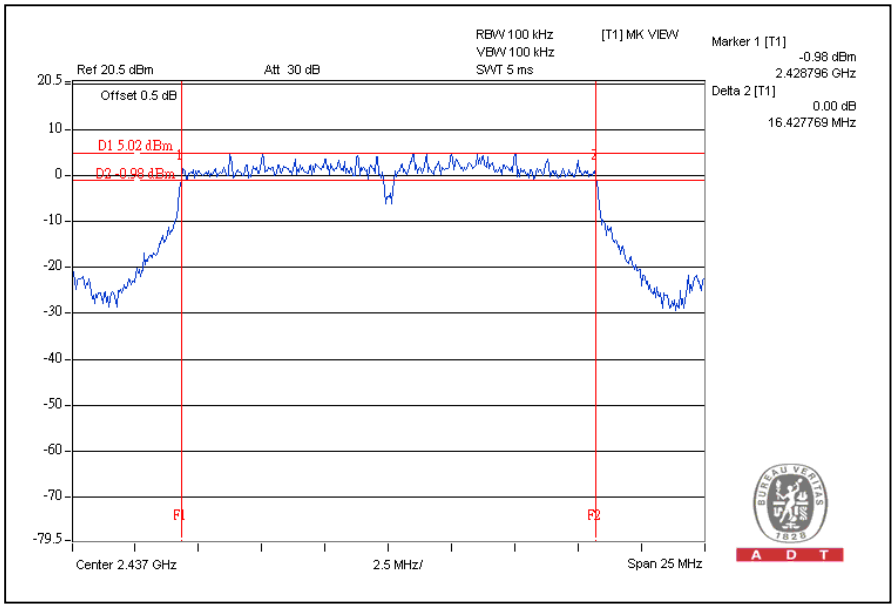
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.38	0.5	PASS
6	2437	16.43	0.5	PASS
11	2462	16.42	0.5	PASS

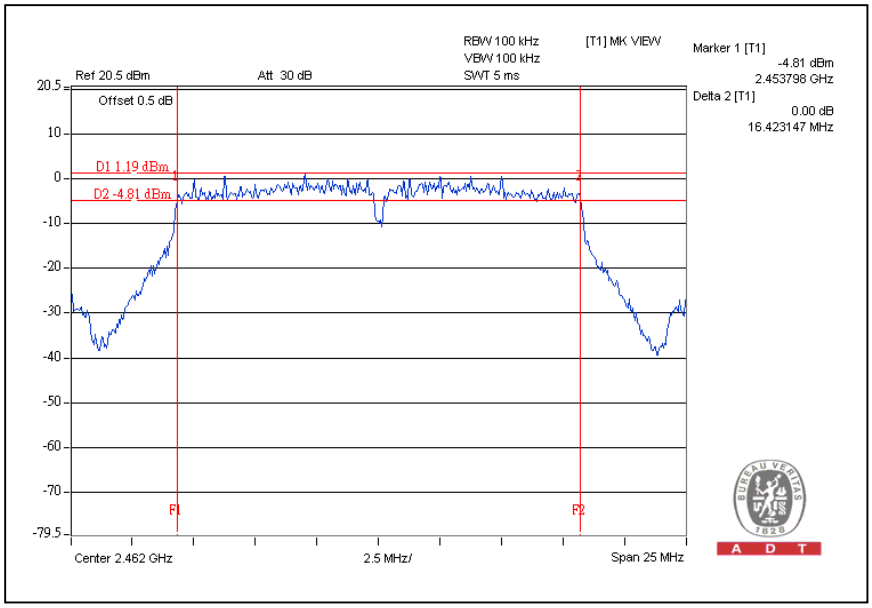
CH1



CH6


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-0.98 dBm
2.428796 GHz
Delta 2 [T1]
0.00 dB
16.427769 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 5.02 dBm
D2 -0.98 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
F1
F2
Center 2.437 GHz
2.5 MHz/
Span 25 MHz

CH11

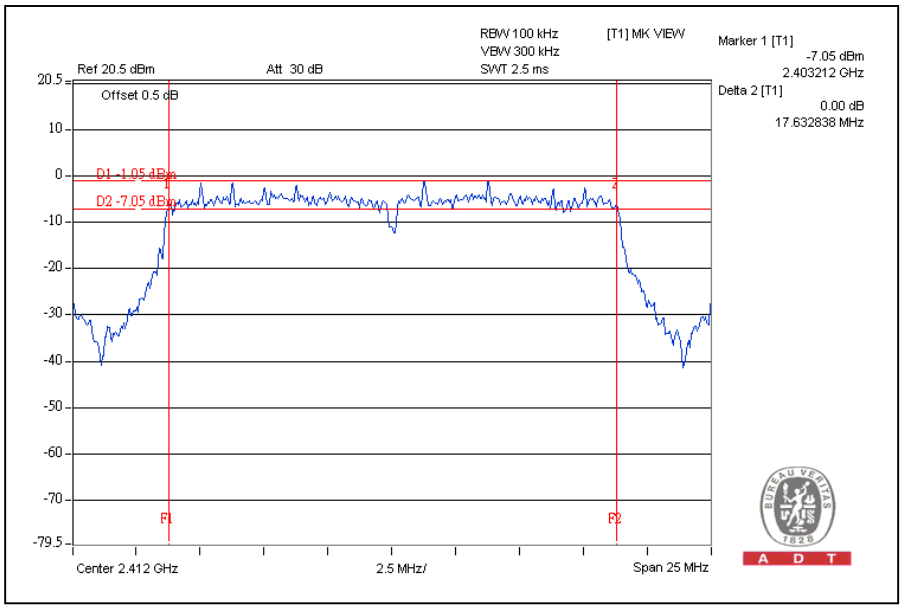

RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-4.81 dBm
2.453798 GHz
Delta 2 [T1]
0.00 dB
16.423147 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 1.19 dBm
D2 -4.81 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
F1
F2
Center 2.462 GHz
2.5 MHz/
Span 25 MHz

DRAFT 802.11n (20MHz) OFDM MODULATION:

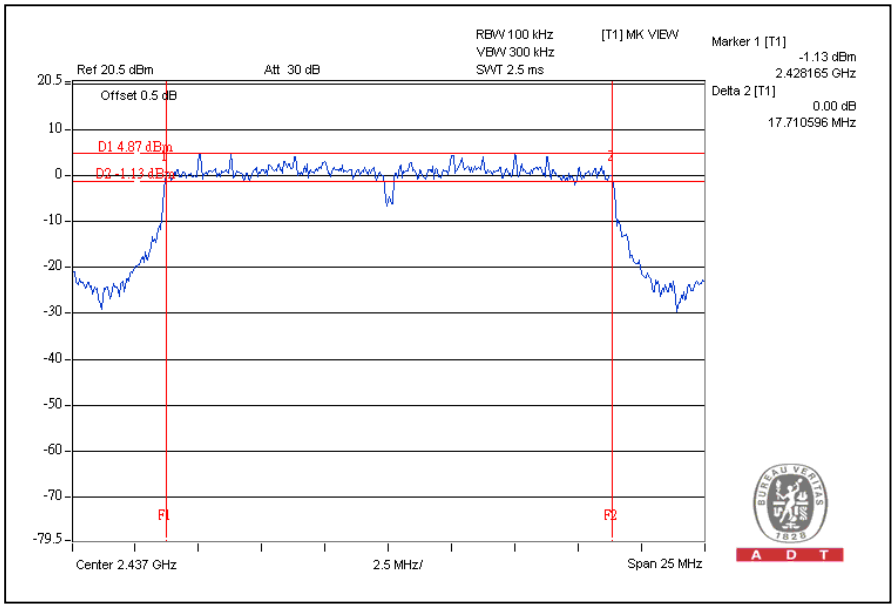
MODULATION TYPE	BPSK	TRANSFER RATE	6.5Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN(0)	CHAIN(1)		
1	2412	17.63	17.66	0.5	PASS
6	2437	17.71	17.65	0.5	PASS
11	2462	17.67	17.03	0.5	PASS

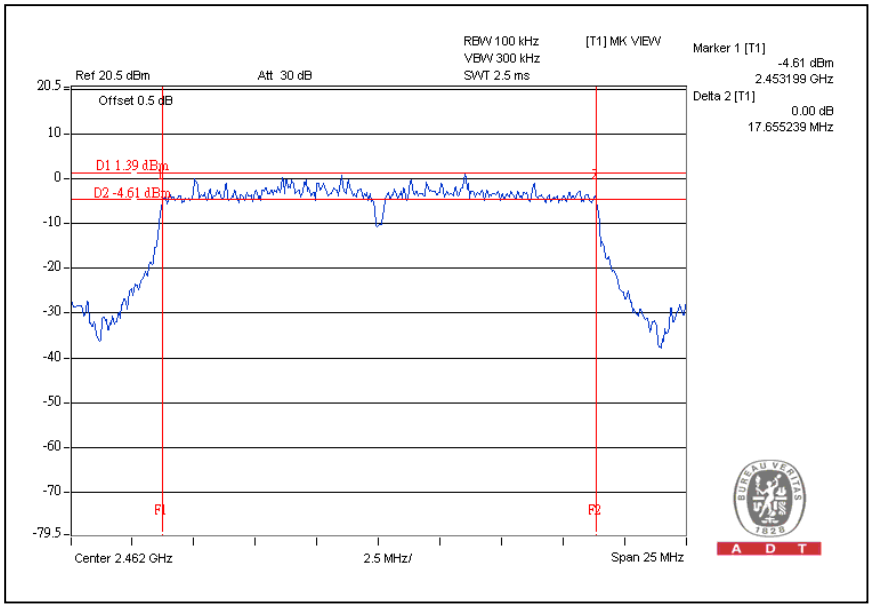
For Chain(0): CH1



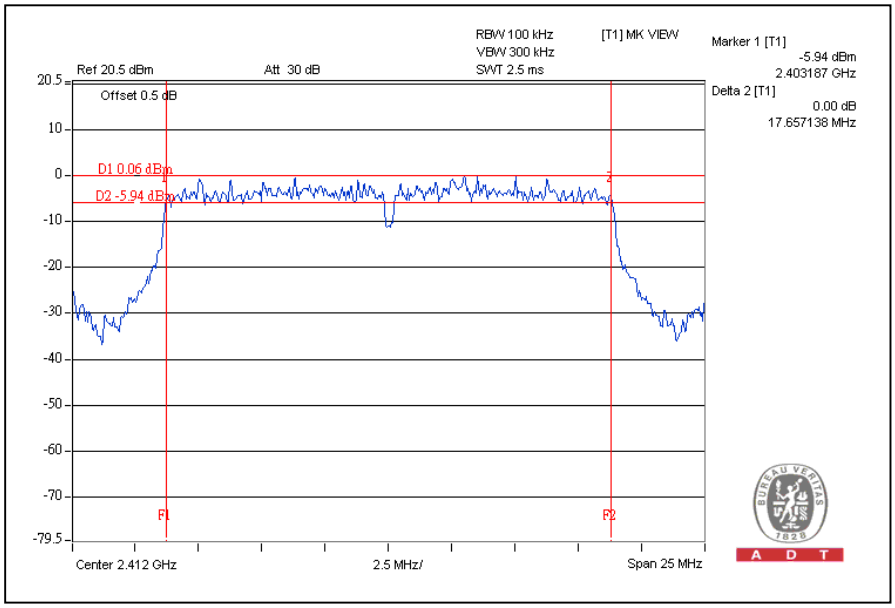
CH6


RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
[T1] MK VIEW
Marker 1 [T1]
-1.13 dBm
2.428165 GHz
Delta 2 [T1]
0.00 dB
17.710596 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 4.87 dBm
D2 -1.13 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
F1
F2
Center 2.437 GHz
2.5 MHz/
Span 25 MHz

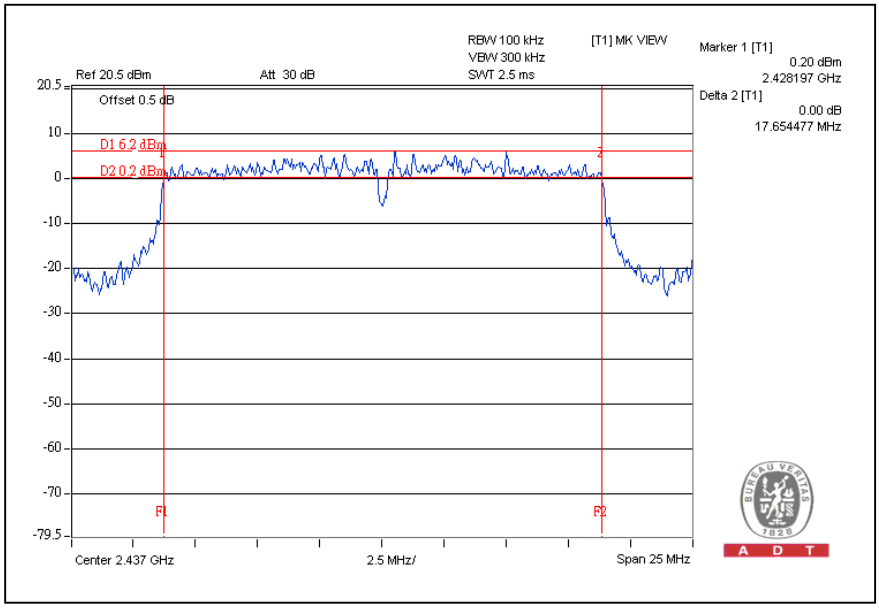
CH11


RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
[T1] MK VIEW
Marker 1 [T1]
-4.61 dBm
2.453199 GHz
Delta 2 [T1]
0.00 dB
17.655239 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 1.39 dBm
D2 -4.61 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
F1
F2
Center 2.462 GHz
2.5 MHz/
Span 25 MHz

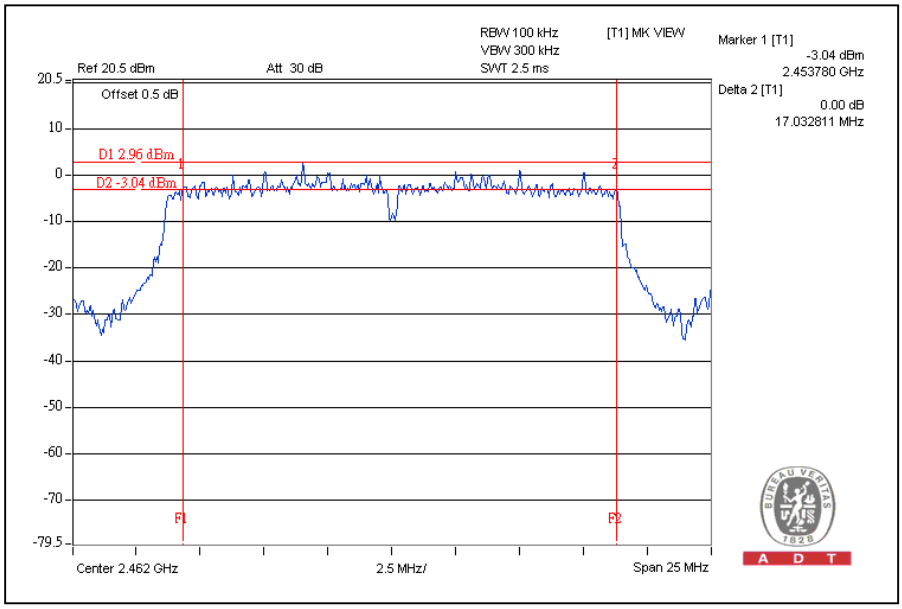
For CHAIN(1): CH1



CH6



CH11

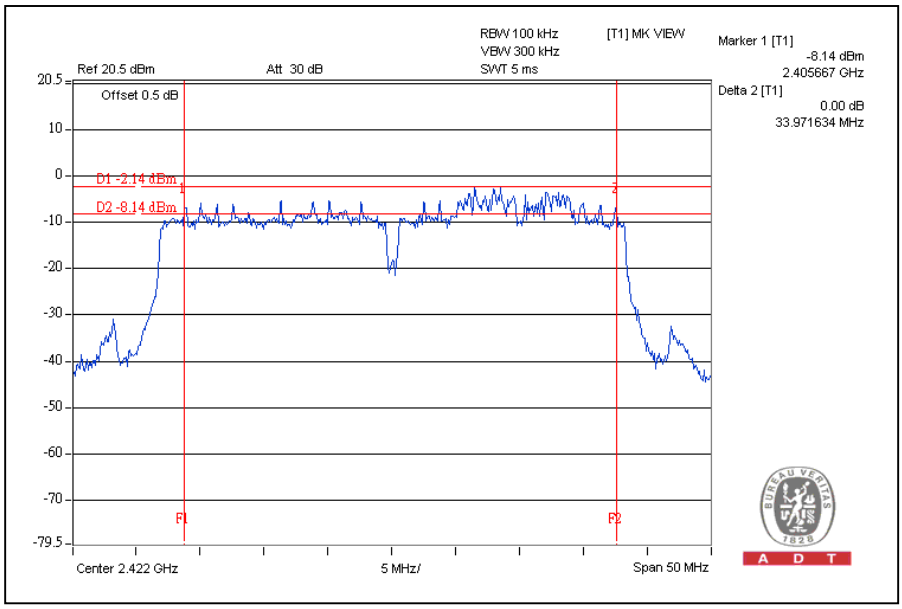

RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
[T1] MK VIEW
Marker 1 [T1]
-3.04 dBm
2.453780 GHz
Delta 2 [T1]
0.00 dB
17.032811 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 2.96 dBm
D2 -3.04 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
F1
F2
Center 2.462 GHz
2.5 MHz/
Span 25 MHz

DRAFT 802.11n (40MHz) OFDM MODULATION:

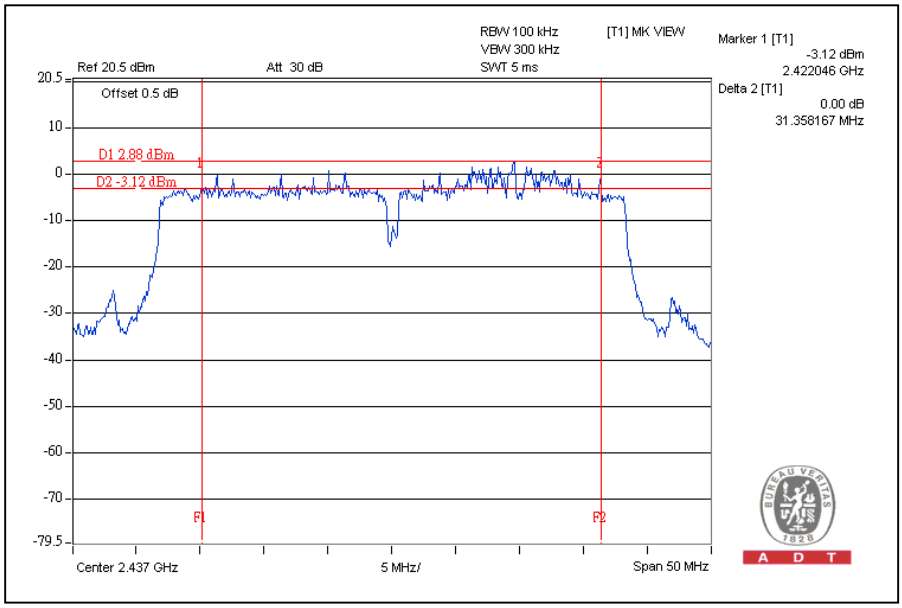
MODULATION TYPE	BPSK	TRANSFER RATE	13.5Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN(0)	CHAIN(1)		
1	2422	33.97	35.15	0.5	PASS
4	2437	31.36	36.42	0.5	PASS
7	2452	33.96	35.22	0.5	PASS

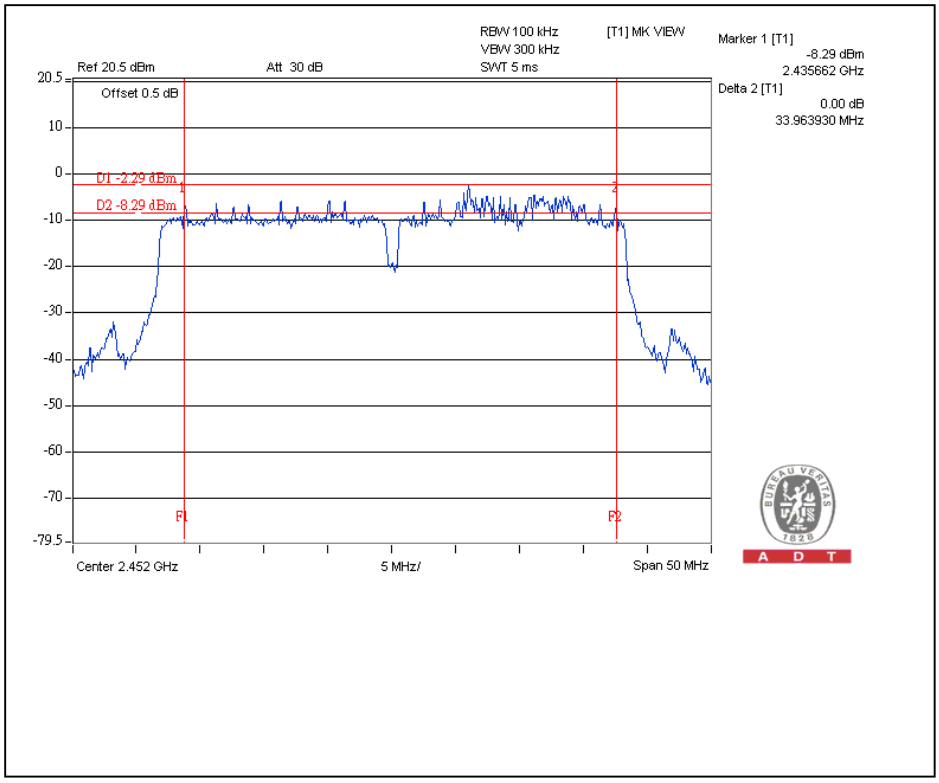
For Chain (0): CH1



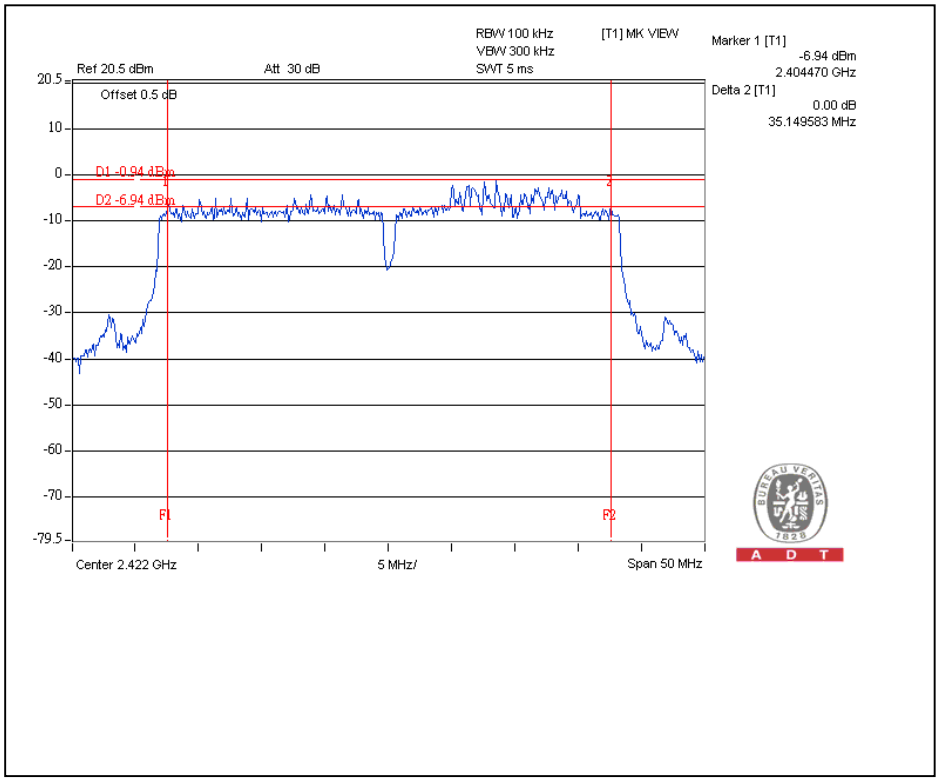
CH4


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-3.12 dBm
2.422046 GHz
Delta 2 [T1]
0.00 dB
31.358167 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 2.88 dBm
D2 -3.12 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
F1
F2
Center 2.437 GHz
5 MHz/
Span 50 MHz

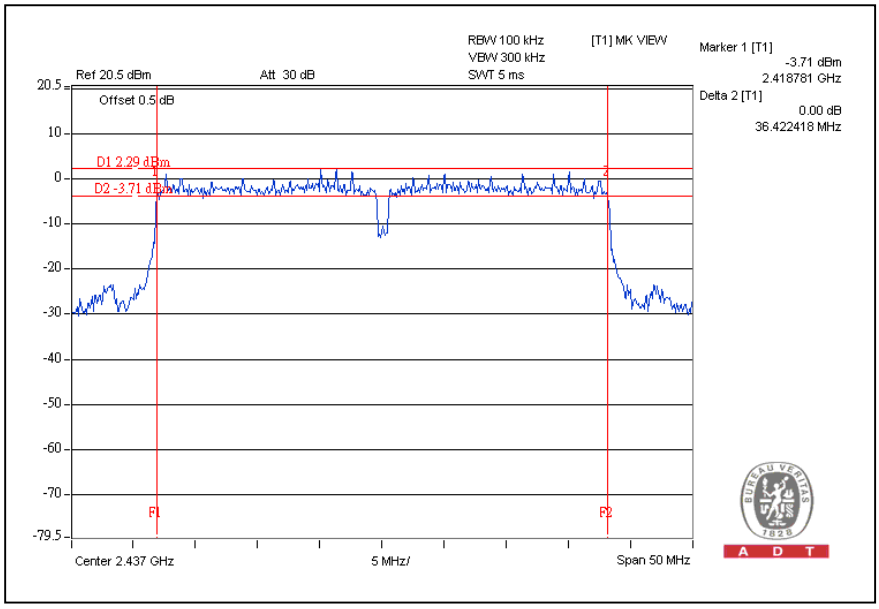
CH7


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-8.29 dBm
2.435662 GHz
Delta 2 [T1]
0.00 dB
33.963930 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -2.29 dBm
D2 -8.29 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
F1
F2
Center 2.452 GHz
5 MHz/
Span 50 MHz

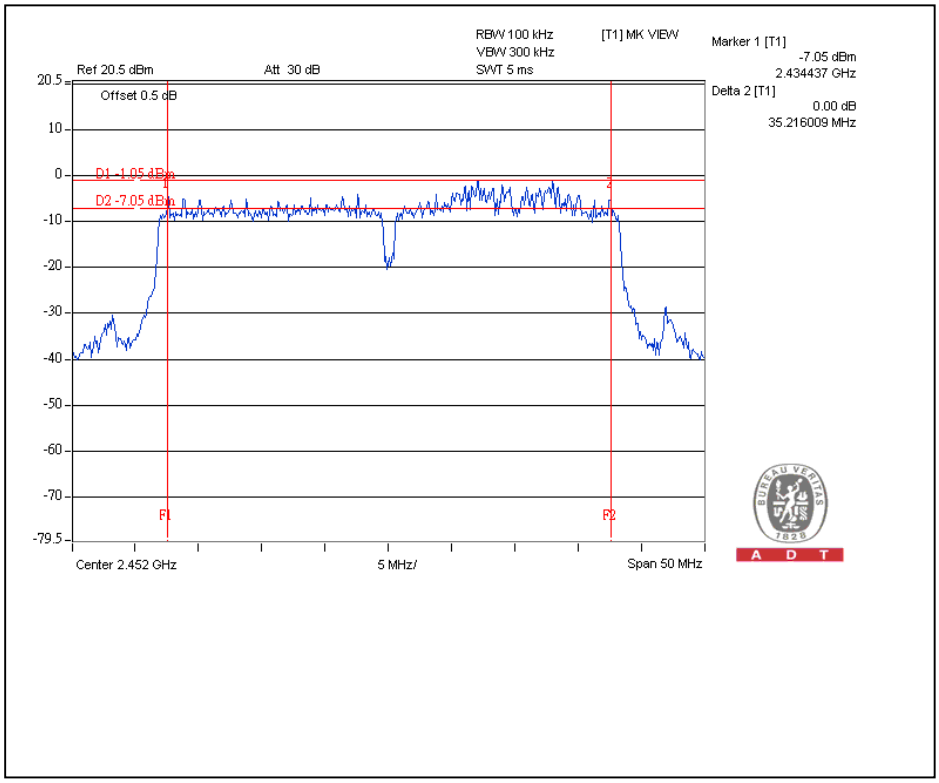
For Chain (1): CH1



CH4



CH7


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-7.05 dBm
2.434437 GHz
Delta 2 [T1]
0.00 dB
35.216009 MHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -1.05 dBm
D2 -7.05 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
F1
F2
Center 2.452 GHz
5 MHz/
Span 50 MHz

4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 13, 2008	Aug. 12, 2009
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 26, 2007	Dec. 25, 2008
Anritsu Power Meter	ML2495A	0824006	NA	NA
Pulse Power Sensor	MA2411B	0738172	NA	NA

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

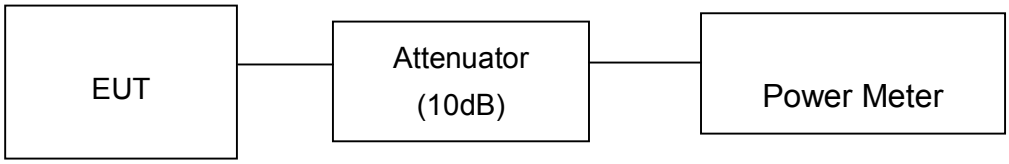
4.4.3 TEST PROCEDURES

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.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS

802.11b DSSS MODULATION:

MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	20.80	120.226	30	PASS
6	2437	21.90	154.882	30	PASS
11	2462	20.60	114.815	30	PASS

802.11g OFDM MODULATION:

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	23.60	229.087	30	PASS
6	2437	24.80	301.995	30	PASS
11	2462	23.10	204.174	30	PASS

DRAFT 802.11n (20MHz) OFDM MODULATION:

MODULATION TYPE	BPSK	**TRANSFER RATE**	6.5Mbps
INPUT POWER	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 60%RH, 965hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)		PEAK POWER OUTPUT (mW)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(0)	CHAIN(1)				
1	2412	22.70	22.80	186.209	190.546	376.755	25.76	30	PASS
6	2437	24.80	25.10	301.995	323.594	625.589	27.96	30	PASS
11	2462	22.10	23.40	162.181	218.776	380.957	25.81	30	PASS

DRAFT 802.11n (40MHz) OFDM MODULATION:

MODULATION TYPE	BPSK	**TRANSFER RATE**	13.5Mbps
INPUT POWER	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 60%RH, 965hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)		PEAK POWER OUTPUT (mW)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(0)	CHAIN(1)				
1	2422	20.80	21.10	120.226	128.825	249.051	23.96	30	PASS
4	2437	25.00	25.40	316.228	346.737	662.965	28.21	30	PASS
7	2452	21.20	20.80	131.826	120.226	252.052	24.01	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2008	Aug. 08, 2009

NOTE:

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

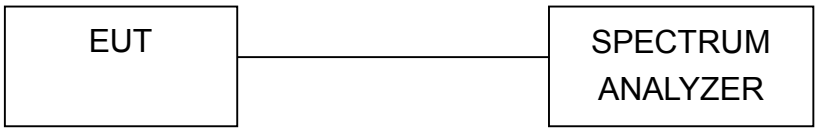
4.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.
The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

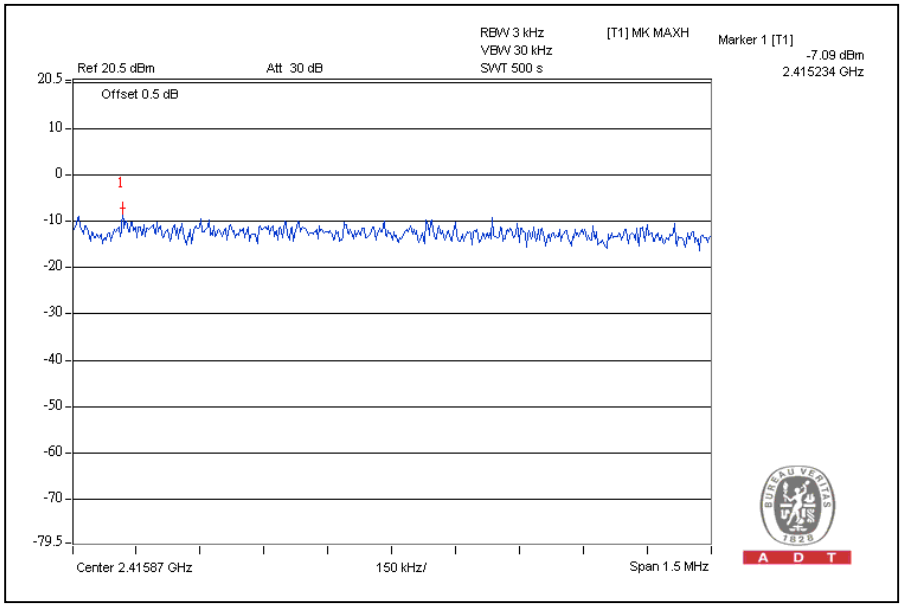
4.5.7 TEST RESULTS

802.11b DSSS MODULATION:

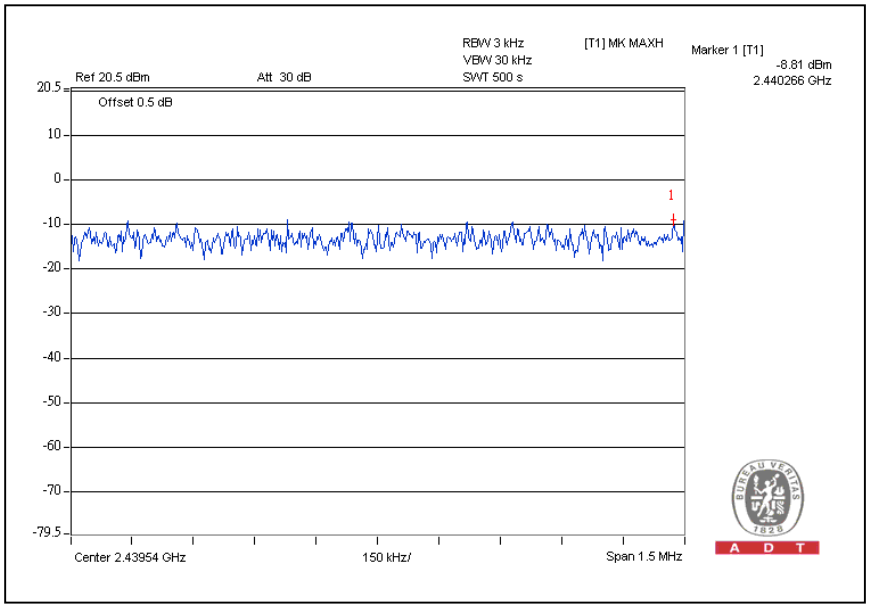
MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-7.09	8	PASS
6	2437	-8.81	8	PASS
11	2462	-8.61	8	PASS

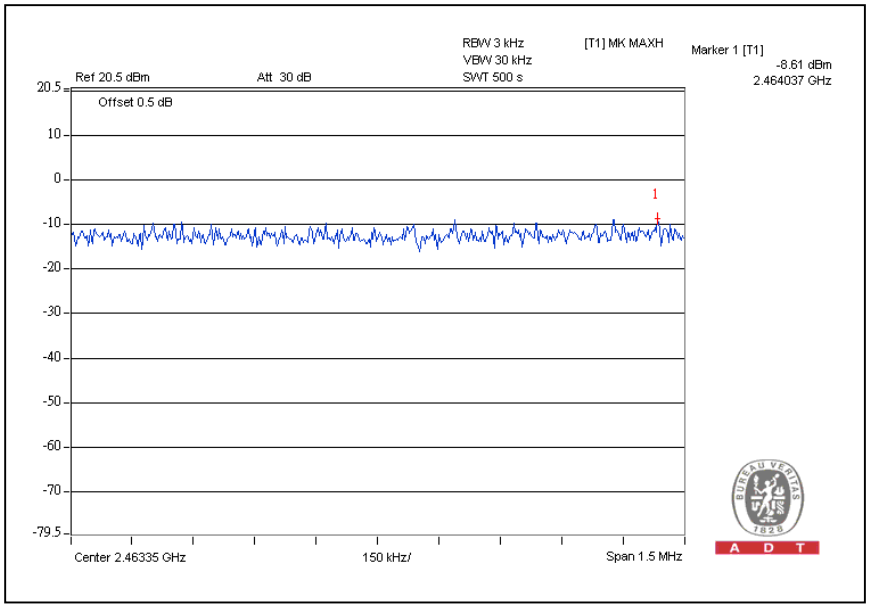
CH1



CH6


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-8.81 dBm
2.440266 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.43954 GHz
150 kHz/
Span 1.5 MHz

CH11

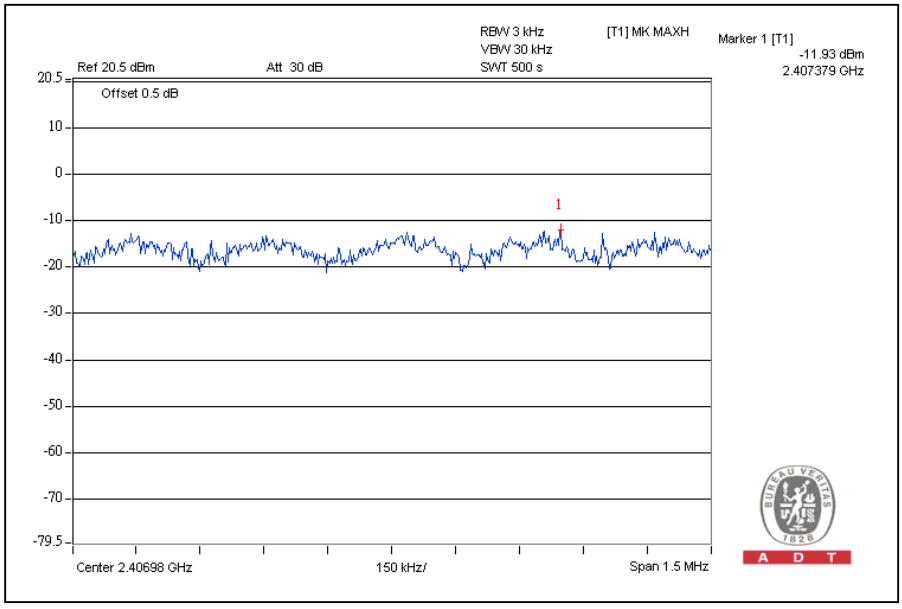

RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-8.61 dBm
2.464037 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.46335 GHz
150 kHz/
Span 1.5 MHz

802.11g OFDM MODULATION:

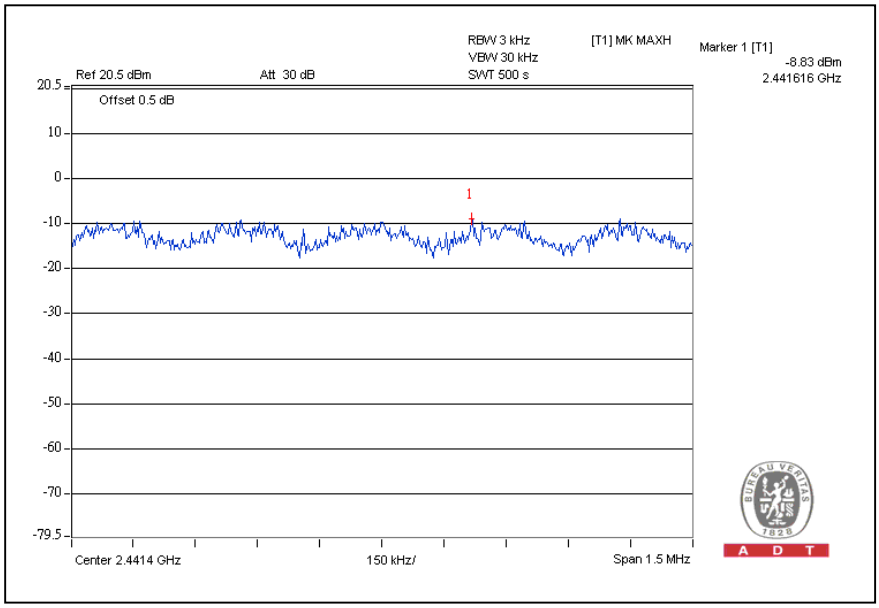
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-11.93	8	PASS
6	2437	-8.83	8	PASS
11	2462	-12.38	8	PASS

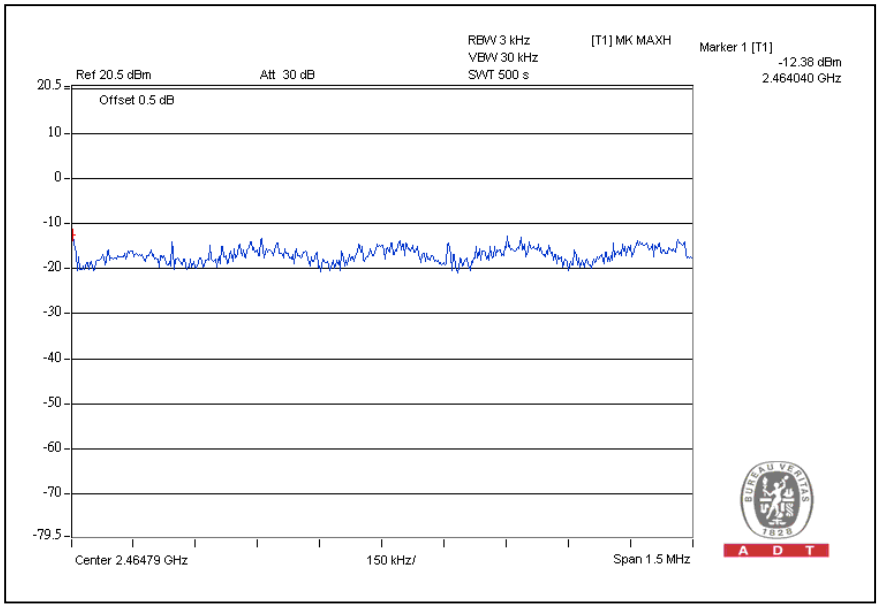
CH1



CH6


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-8.83 dBm
2.441616 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.4414 GHz
150 kHz/
Span 1.5 MHz

CH11

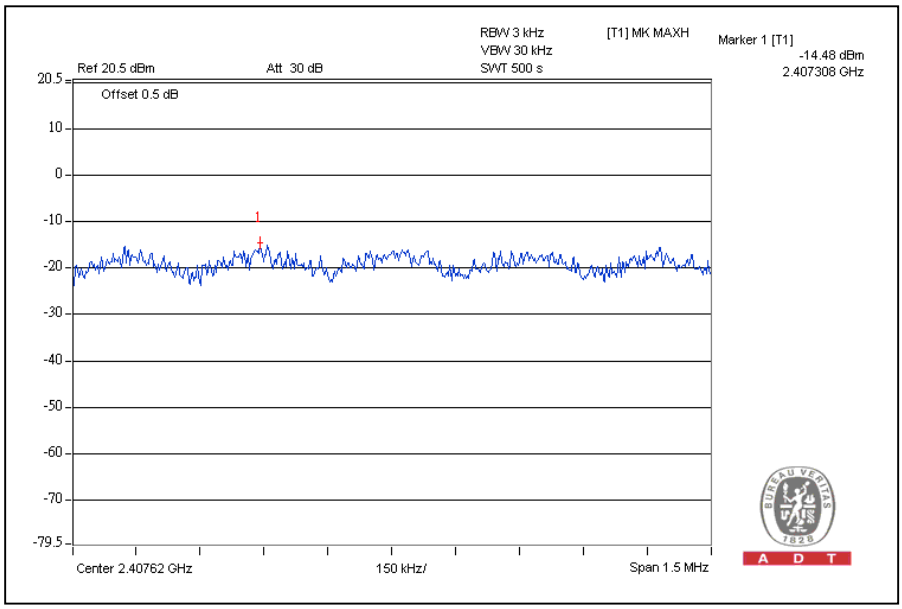

RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-12.38 dBm
2.464040 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.46479 GHz
150 kHz/
Span 1.5 MHz

DRAFT 802.11n (20MHz) OFDM MODULATION:

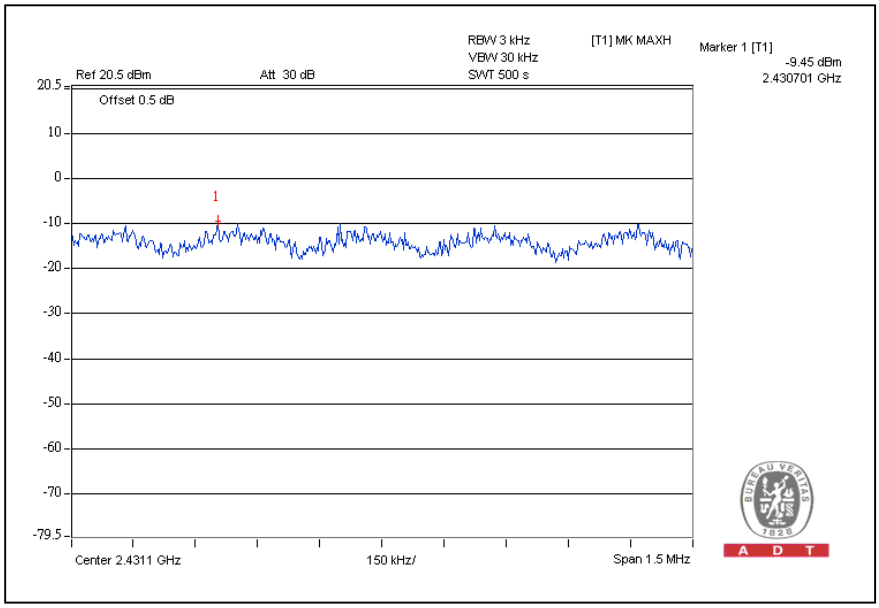
MODULATION TYPE	BPSK	TRANSFER RATE	6.5Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25 deg.C, 60%RH, 965hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (mW)		RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(0)	CHAIN(1)				
1	2412	0.036	0.042	-14.48	-13.77	0.078	-11.08	8	PASS
6	2437	0.114	0.168	-9.45	-7.74	0.282	-5.50	8	PASS
11	2462	0.047	0.045	-13.30	-13.43	0.092	-10.36	8	PASS

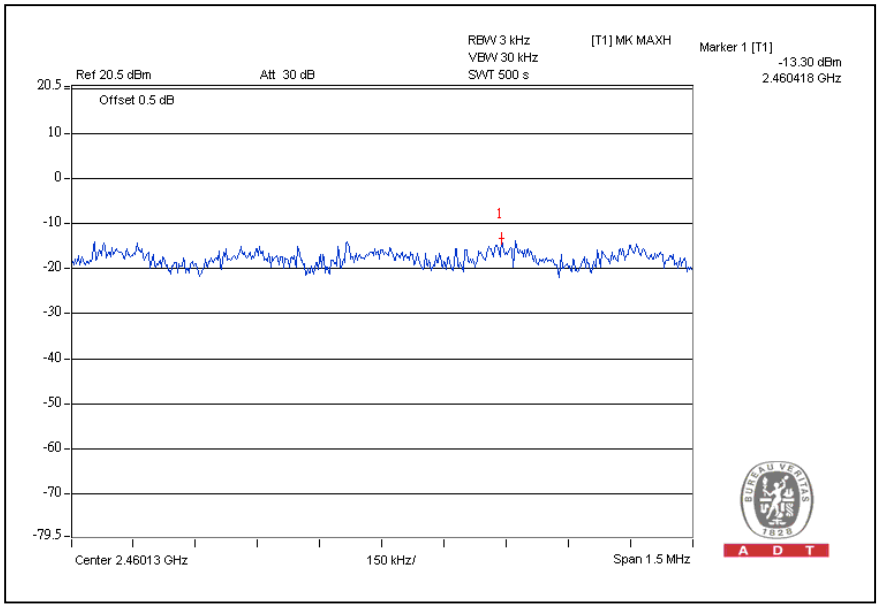
For Chain(0): CH1



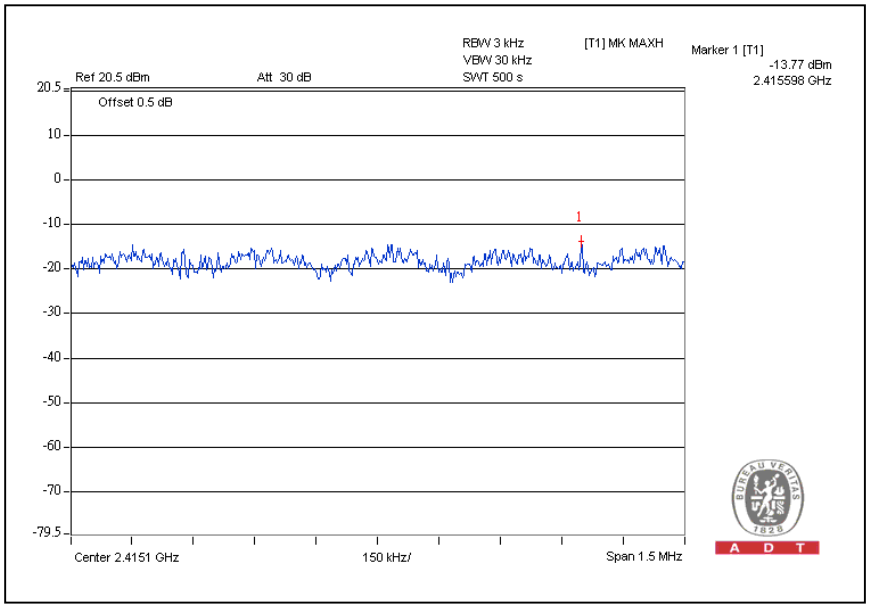
CH6


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-9.45 dBm
2.430701 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.4311 GHz
150 kHz/
Span 1.5 MHz

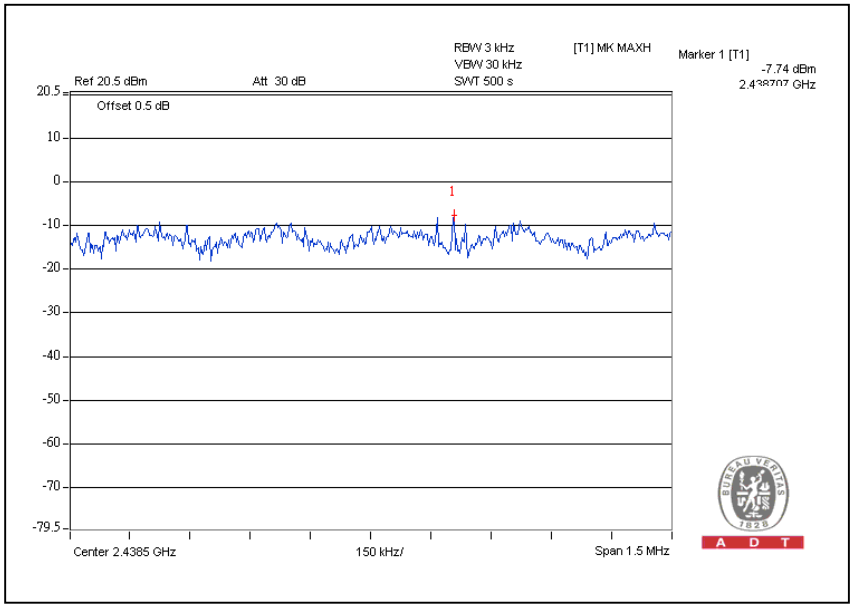
CH11


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-13.30 dBm
2.460418 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.46013 GHz
150 kHz/
Span 1.5 MHz

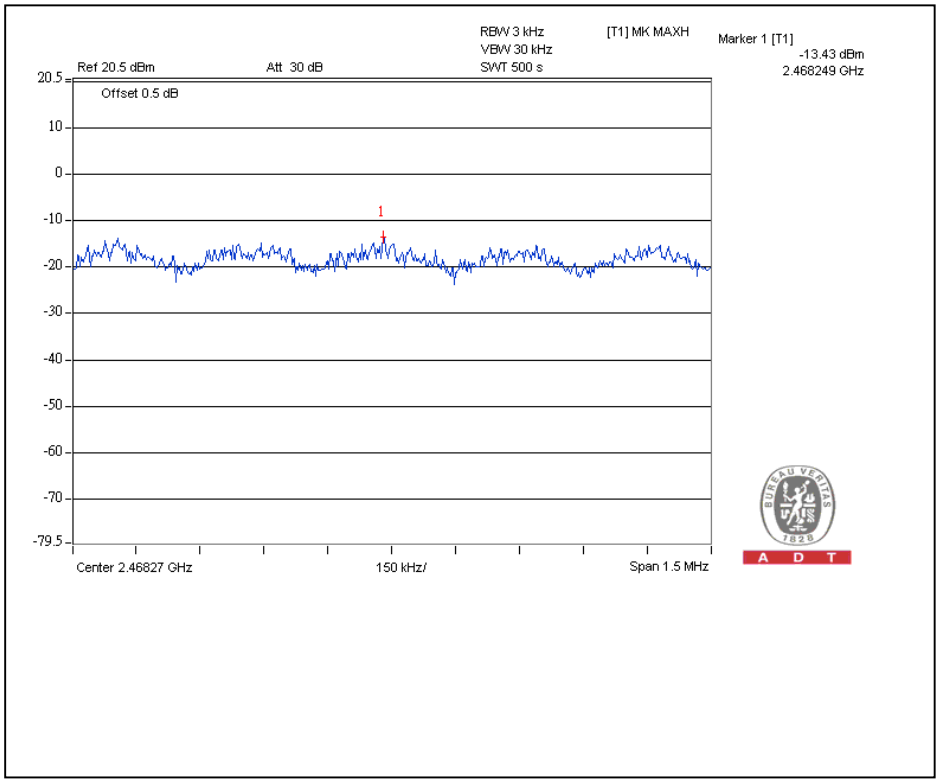
For Chain (1): CH1



CH6



CH11

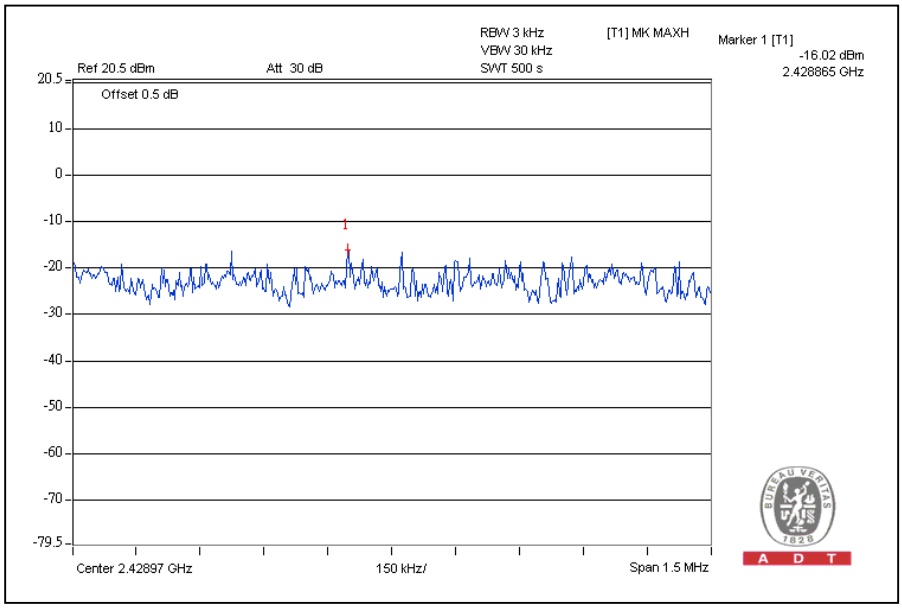

RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-13.43 dBm
2.468249 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
1
Center 2.46827 GHz
150 kHz/
Span 1.5 MHz

DRAFT 802.11n (40MHz) OFDM MODULATION:

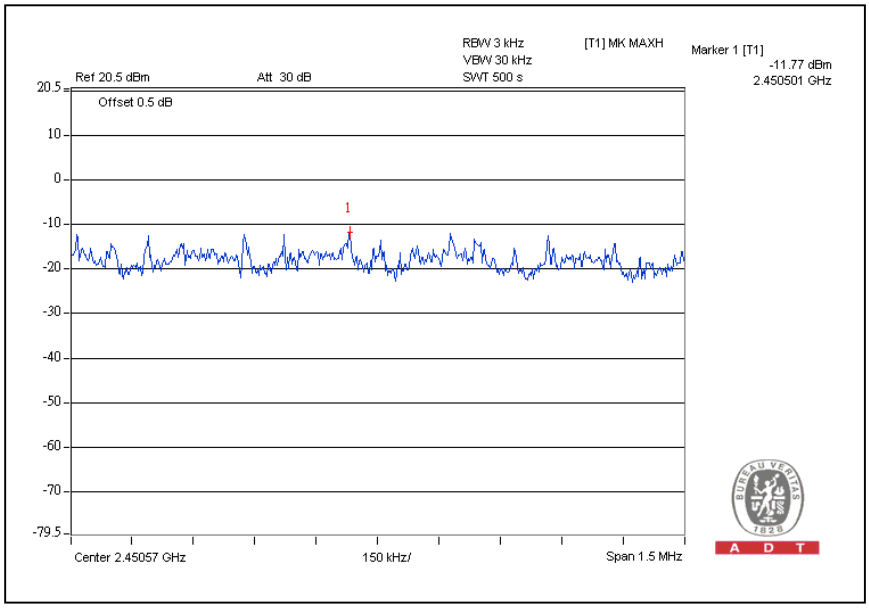
MODULATION TYPE	BPSK	TRANSFER RATE	13.5Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (mW)		RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(0)	CHAIN(1)				
1	2422	0.025	0.020	-16.02	-16.99	0.045	-13.47	8	PASS
4	2437	0.067	0.114	-11.77	-9.45	0.181	-7.42	8	PASS
7	2452	0.016	0.032	-17.89	-14.94	0.048	-13.19	8	PASS

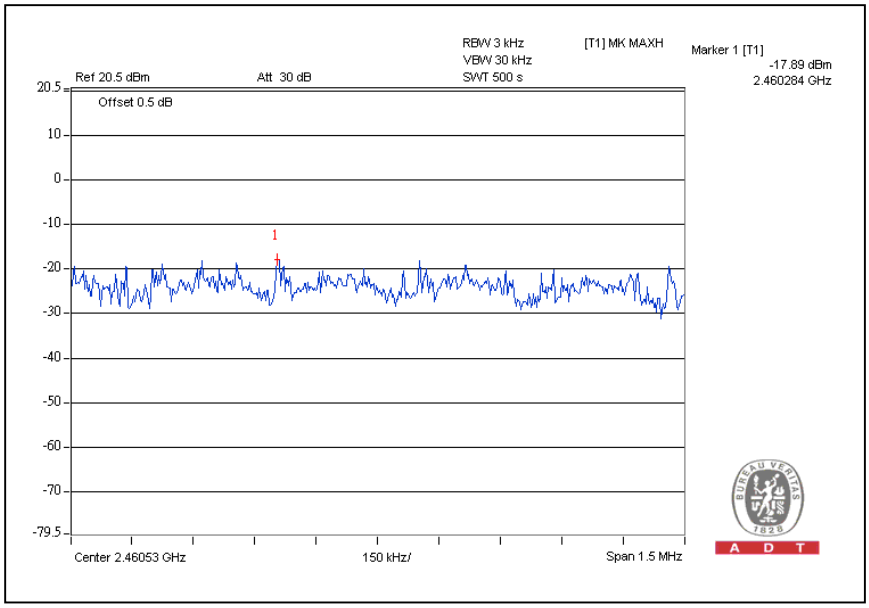
For Chain (0): CH1



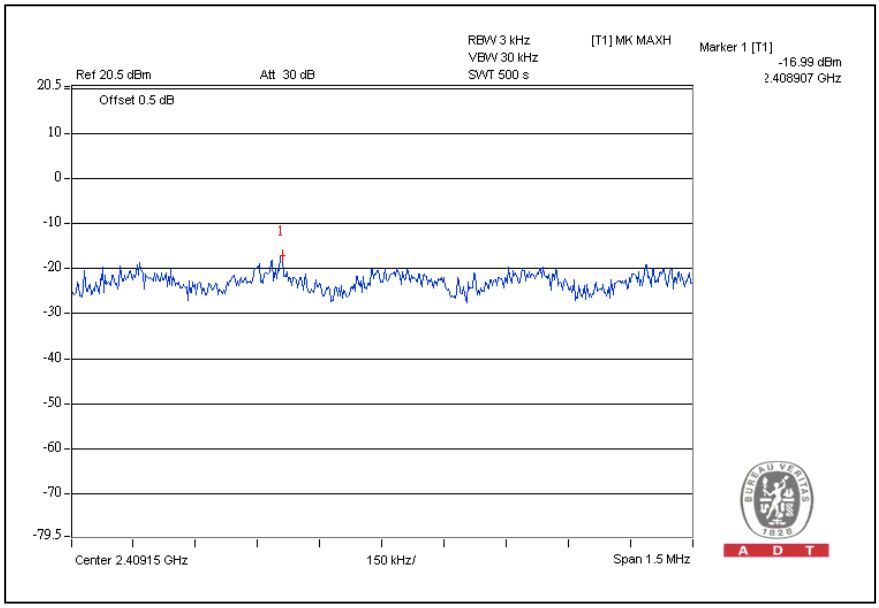
CH4


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-11.77 dBm
2.450501 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.45057 GHz
150 kHz/
Span 1.5 MHz

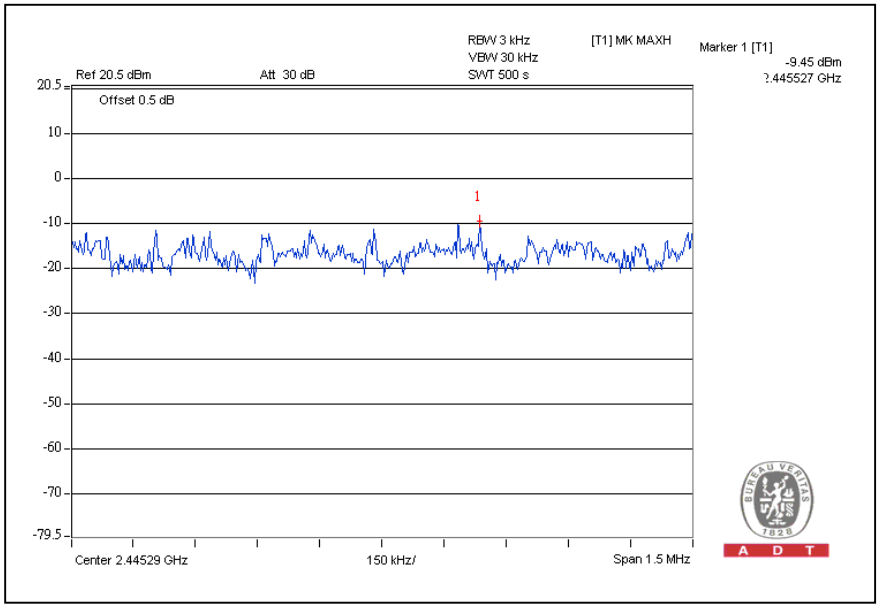
CH7


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-17.89 dBm
2.460284 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.46053 GHz
150 kHz/
Span 1.5 MHz

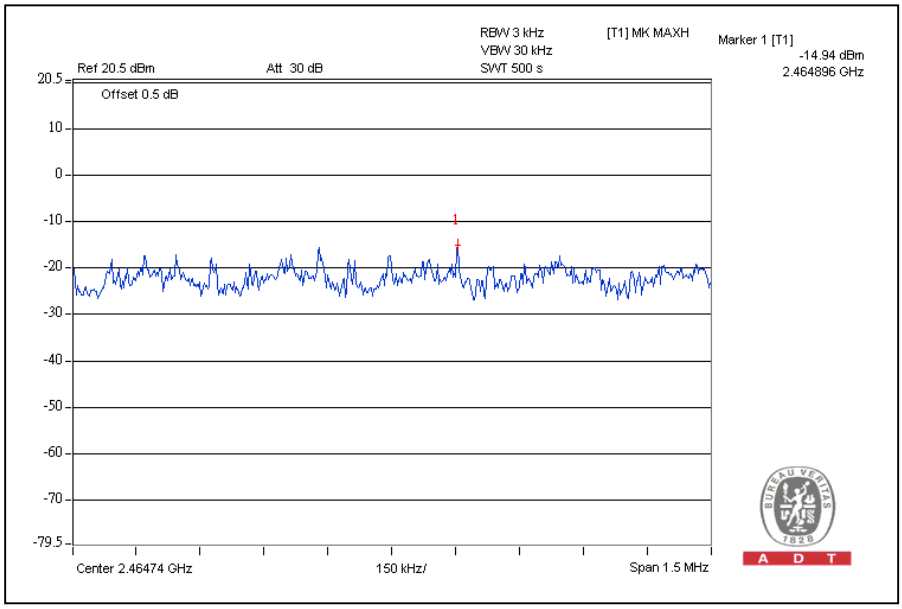
For Chain (1): CH1



CH4



CH7


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-14.94 dBm
2.464896 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.46474 GHz
150 kHz/
Span 1.5 MHz

4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2008	Aug. 08, 2009

NOTE:

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

4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose 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.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 EUT OPERATING CONDITION

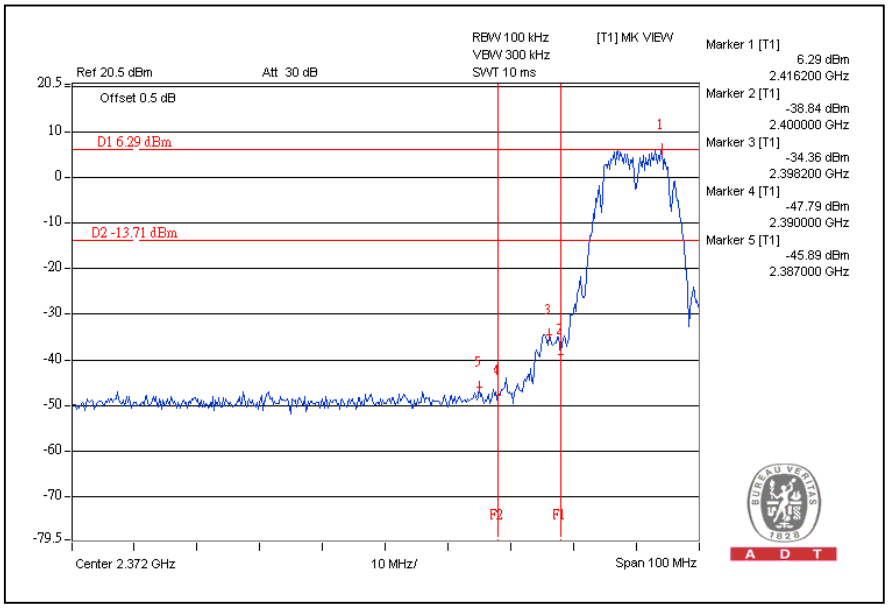
Same as Item 4.3.6

4.6.6 TEST RESULTS

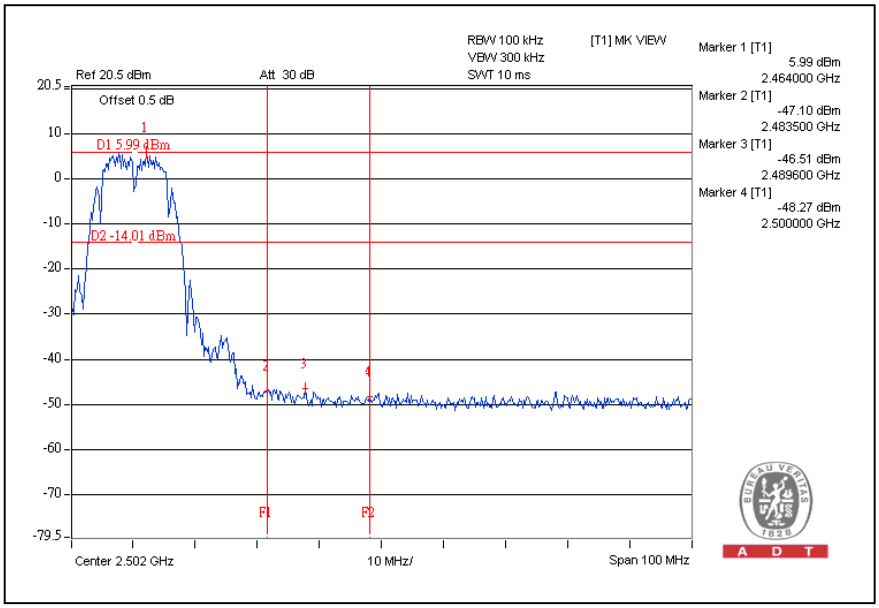
The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

802.11b DSSS MODULATION:

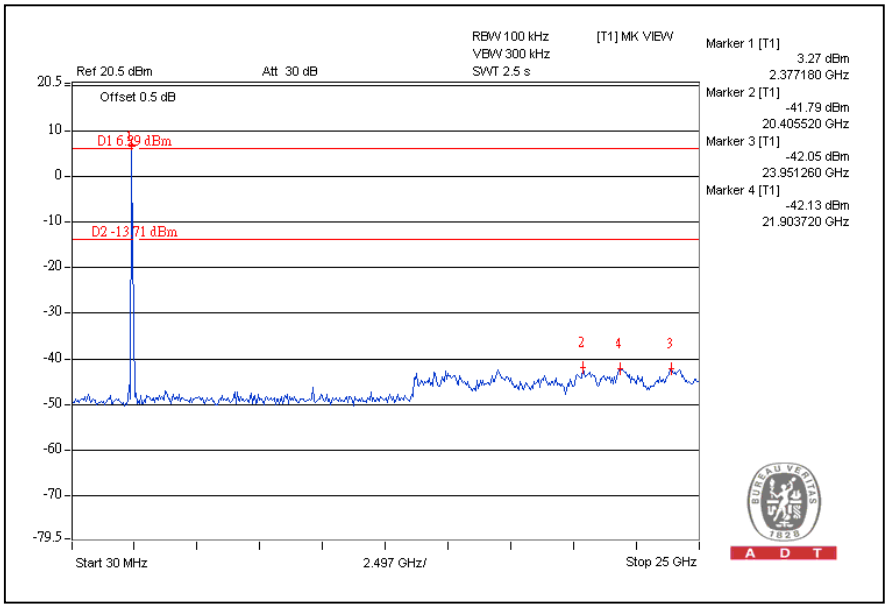
CH1



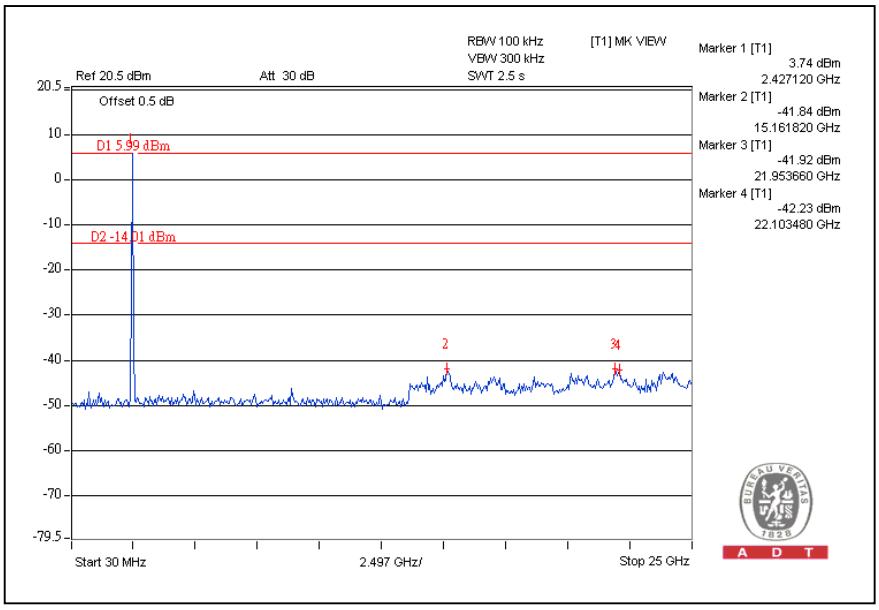
CH11



CH1

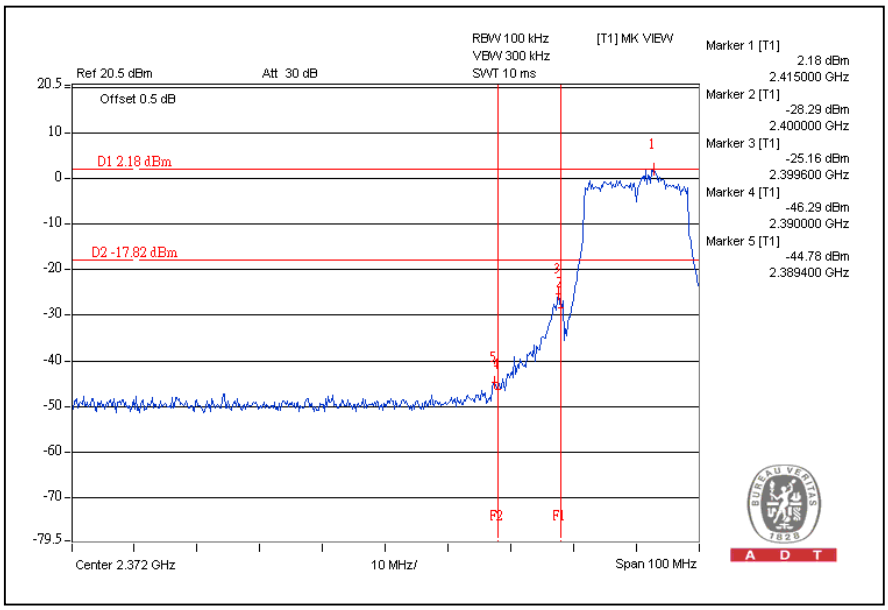

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 6.29 dBm
D2 -13.71 dBm
Marker 1 [T1]
3.27 dBm
2.377180 GHz
Marker 2 [T1]
-41.79 dBm
20.405520 GHz
Marker 3 [T1]
-42.05 dBm
23.951260 GHz
Marker 4 [T1]
-42.13 dBm
21.903720 GHz
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH11

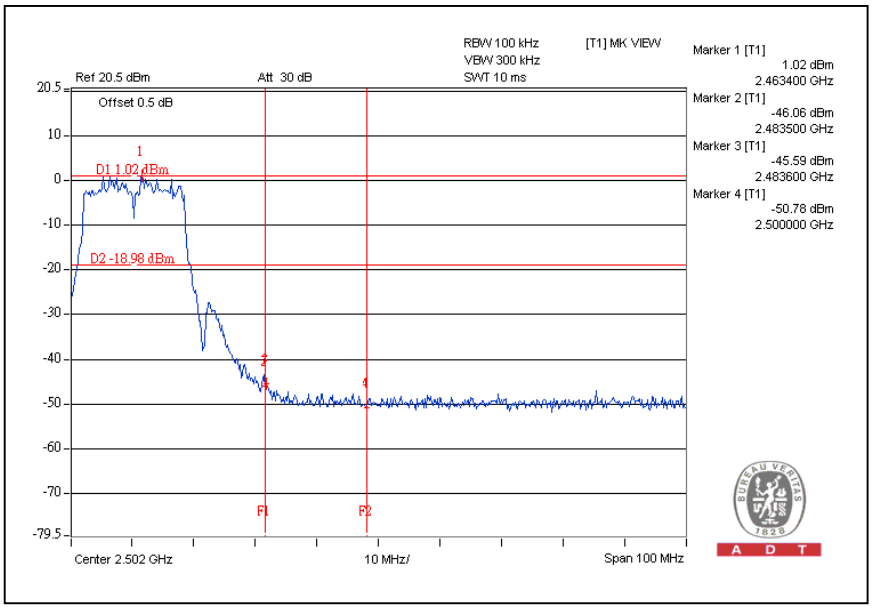

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 5.99 dBm
D2 -14.01 dBm
Marker 1 [T1]
3.74 dBm
2.427120 GHz
Marker 2 [T1]
-41.84 dBm
15.161820 GHz
Marker 3 [T1]
-41.92 dBm
21.953660 GHz
Marker 4 [T1]
-42.23 dBm
22.103480 GHz
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

802.11g OFDM MODULATION:

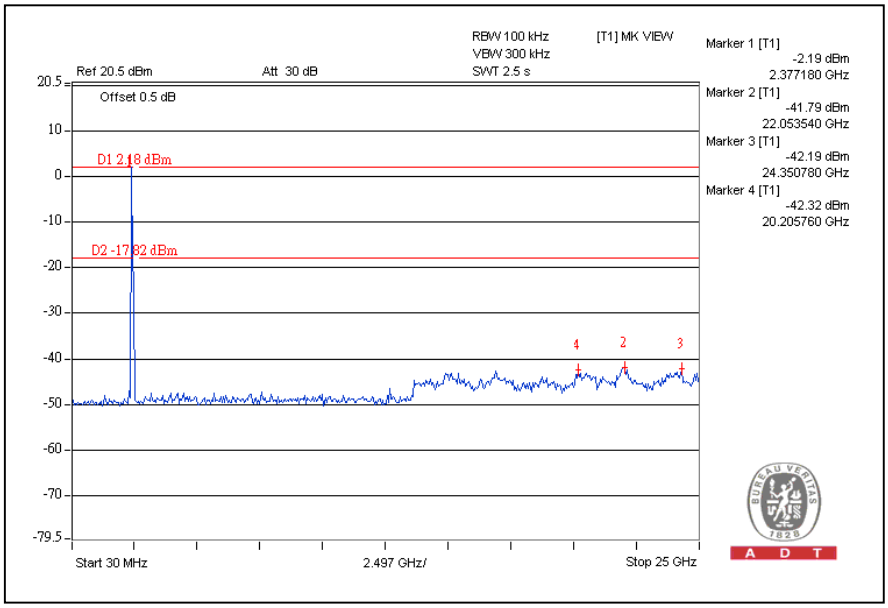
CH1



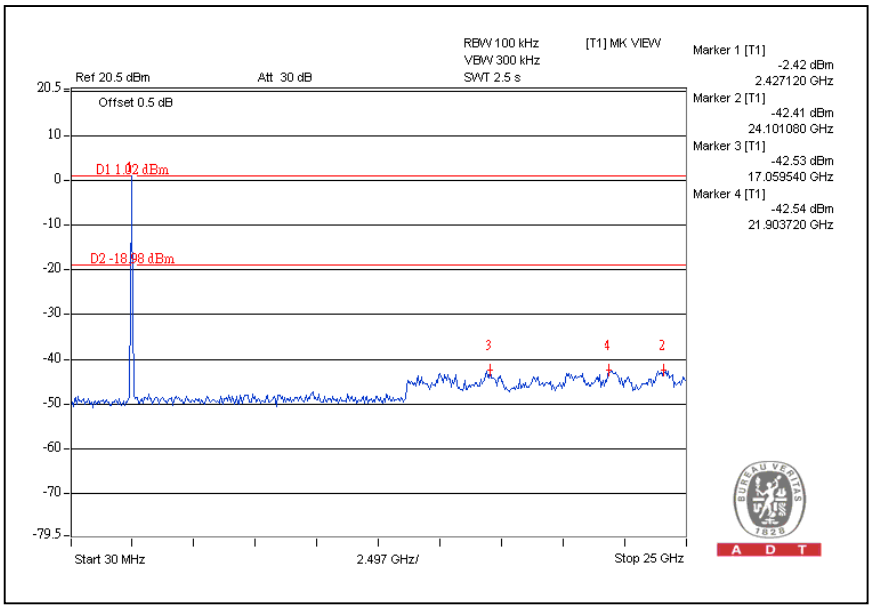
CH11



CH1

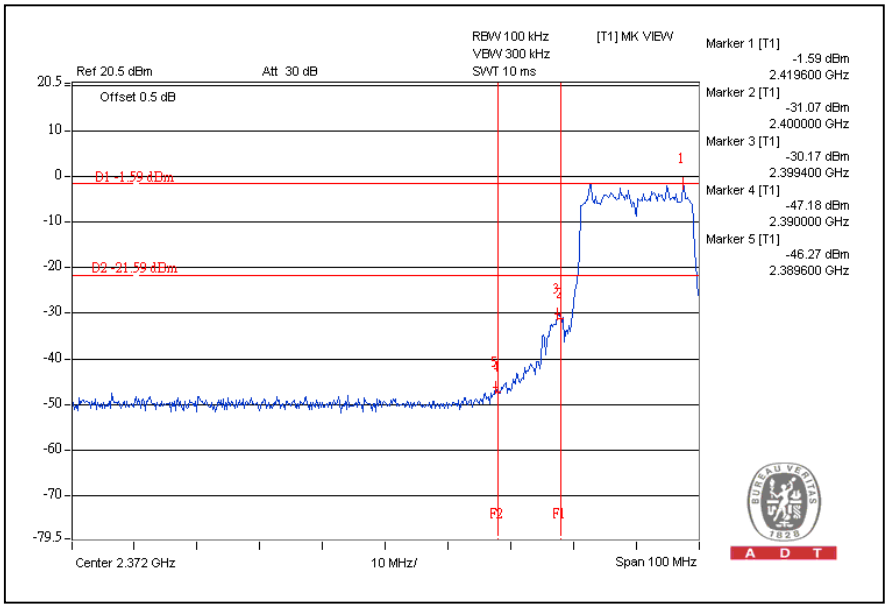

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Marker 1 [T1]
-2.19 dBm
2.377180 GHz
Marker 2 [T1]
-41.79 dBm
22.053540 GHz
Marker 3 [T1]
-42.19 dBm
24.350780 GHz
Marker 4 [T1]
-42.32 dBm
20.205760 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 2.18 dBm
D2 -17.82 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH11

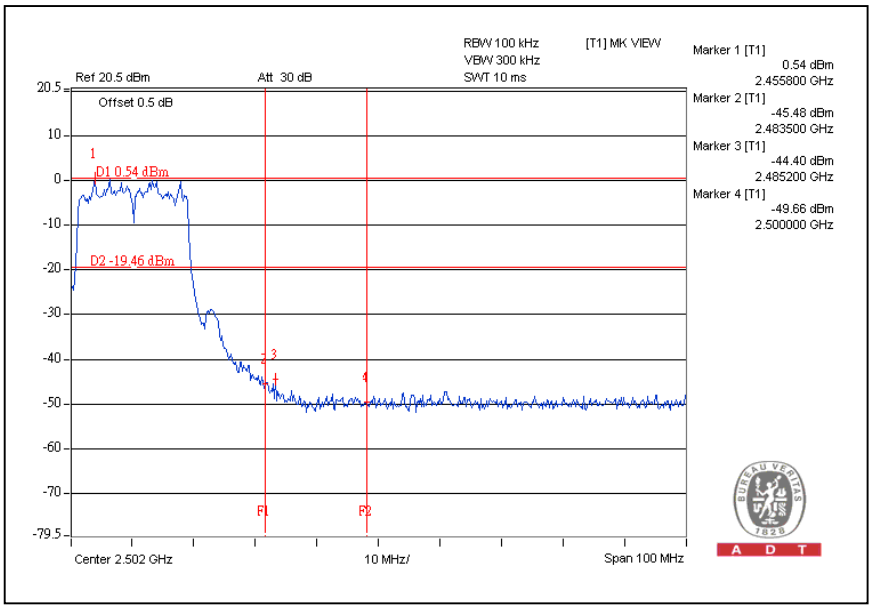

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Marker 1 [T1]
-2.42 dBm
2.427120 GHz
Marker 2 [T1]
-42.41 dBm
24.101080 GHz
Marker 3 [T1]
-42.53 dBm
17.059540 GHz
Marker 4 [T1]
-42.54 dBm
21.903720 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 1.02 dBm
D2 -18.98 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

DRAFT 802.11n (20MHz) OFDM MODULATION:

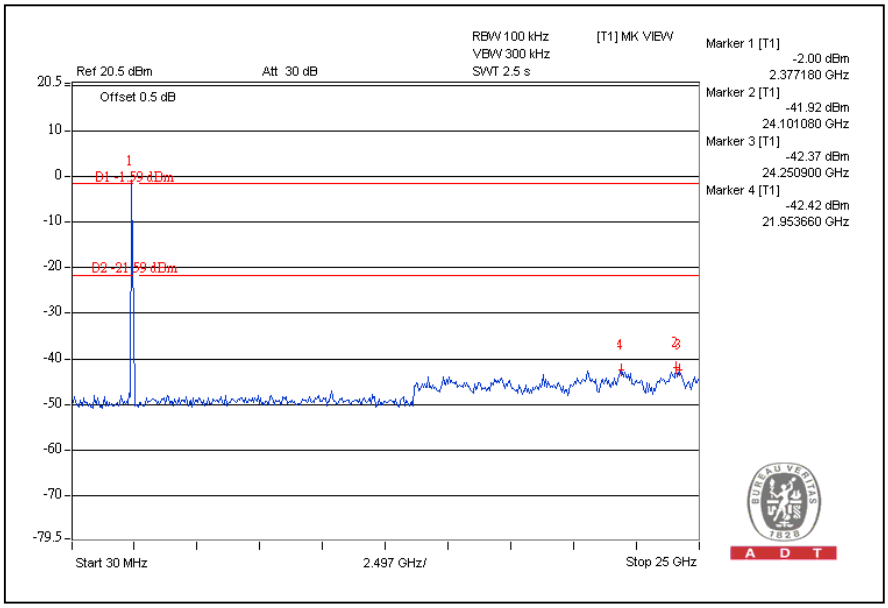
For Chain (0):CH1



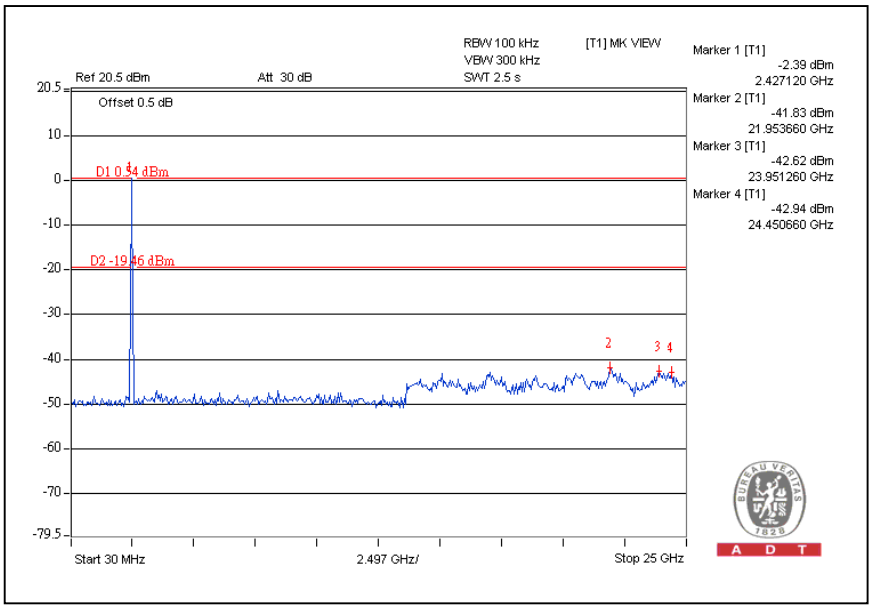
CH11



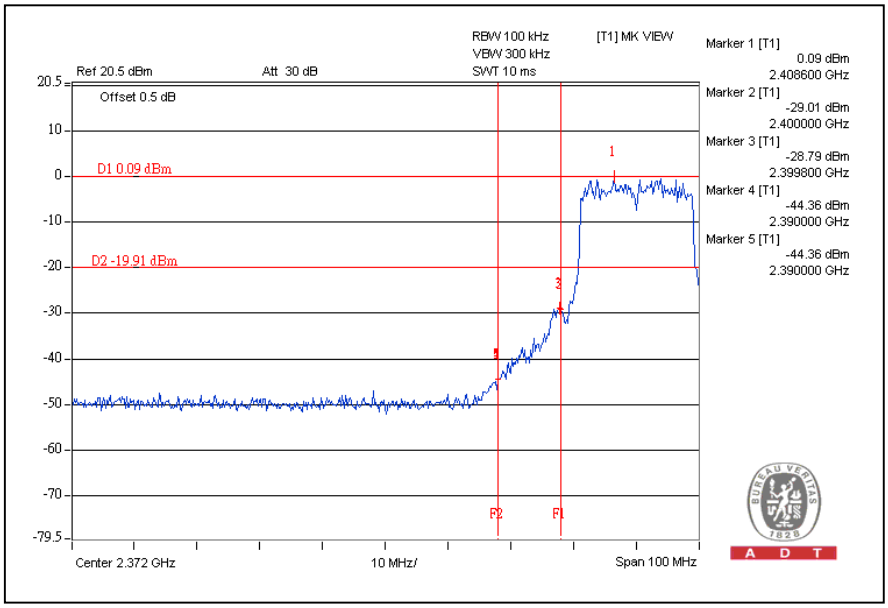
CH1


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Marker 1 [T1]
-2.00 dBm
2.377180 GHz
Marker 2 [T1]
-41.92 dBm
24.101080 GHz
Marker 3 [T1]
-42.37 dBm
24.250900 GHz
Marker 4 [T1]
-42.42 dBm
21.953660 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -1.59 dBm
D2 -21.59 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

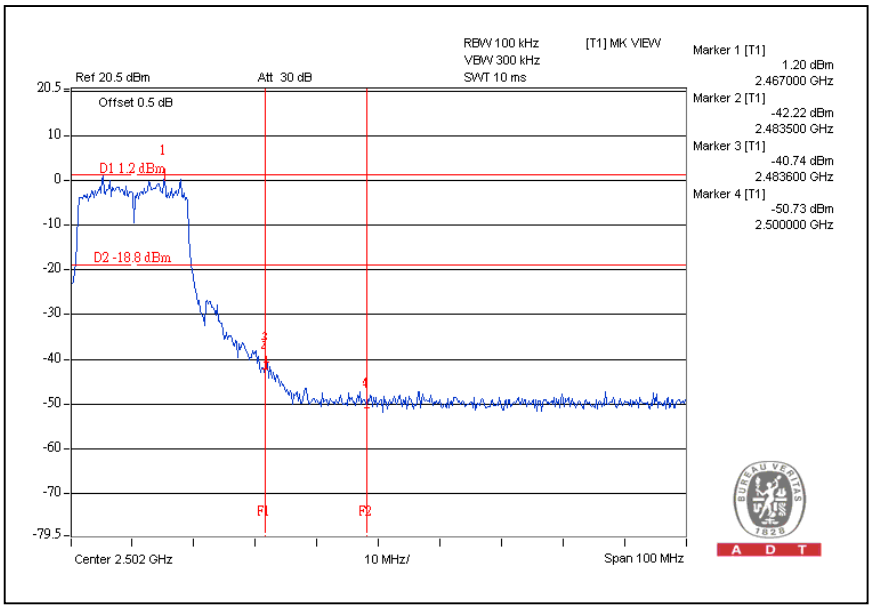
CH11


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Marker 1 [T1]
-2.39 dBm
2.427120 GHz
Marker 2 [T1]
-41.83 dBm
21.953660 GHz
Marker 3 [T1]
-42.62 dBm
23.951260 GHz
Marker 4 [T1]
-42.94 dBm
24.450660 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 0.54 dBm
D2 -19.46 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

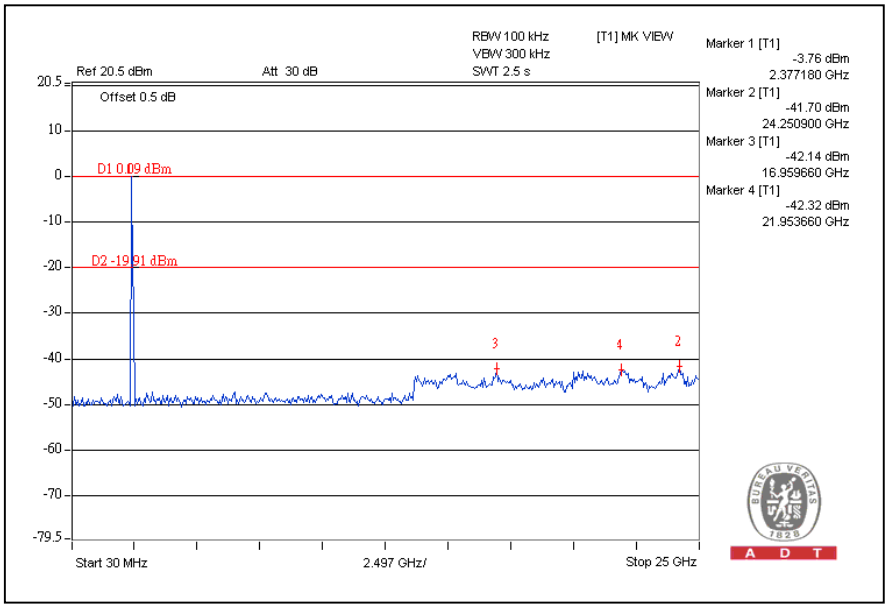
For Chain (1):CH1



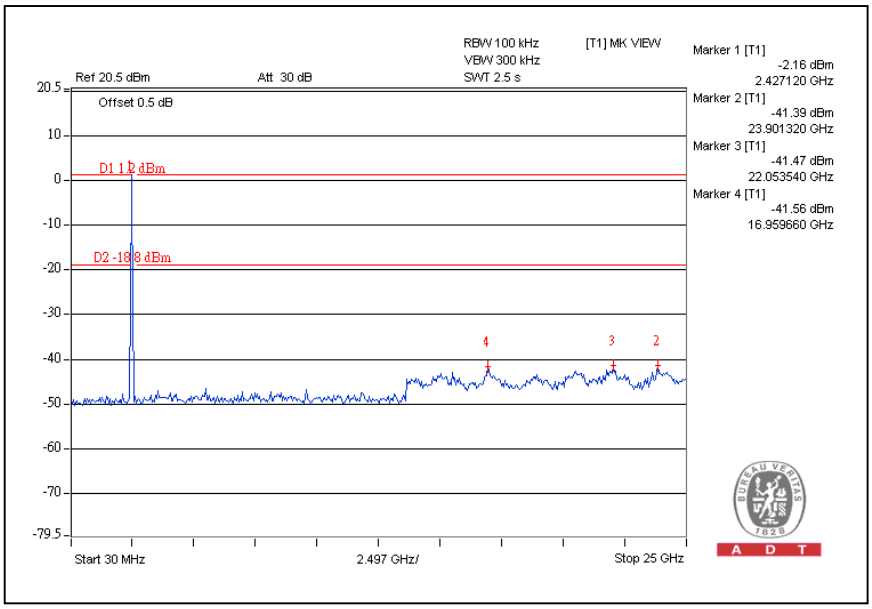
CH11



CH1

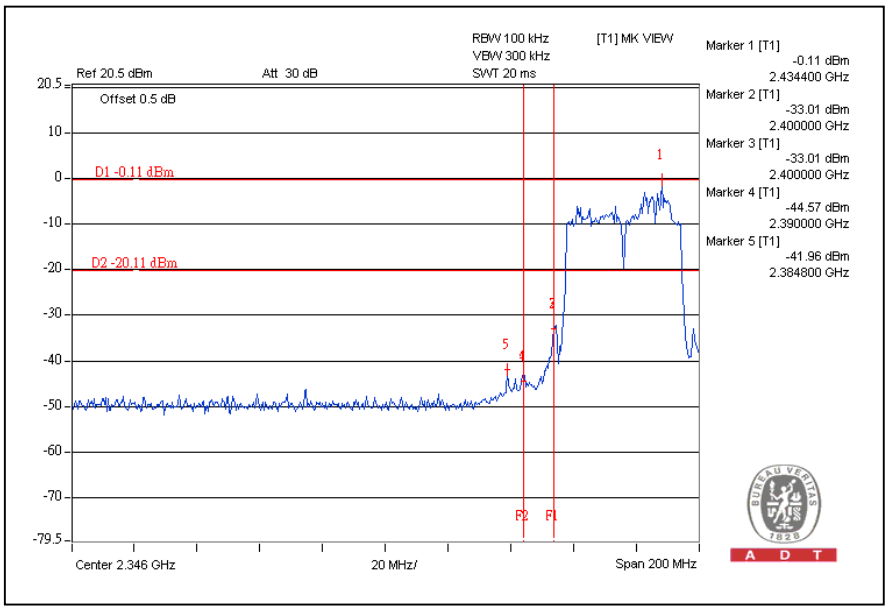

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Marker 1 [T1]
-3.76 dBm
2.377180 GHz
Marker 2 [T1]
-41.70 dBm
24.250900 GHz
Marker 3 [T1]
-42.14 dBm
16.959660 GHz
Marker 4 [T1]
-42.32 dBm
21.953660 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 0.09 dBm
D2 -19.91 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH11

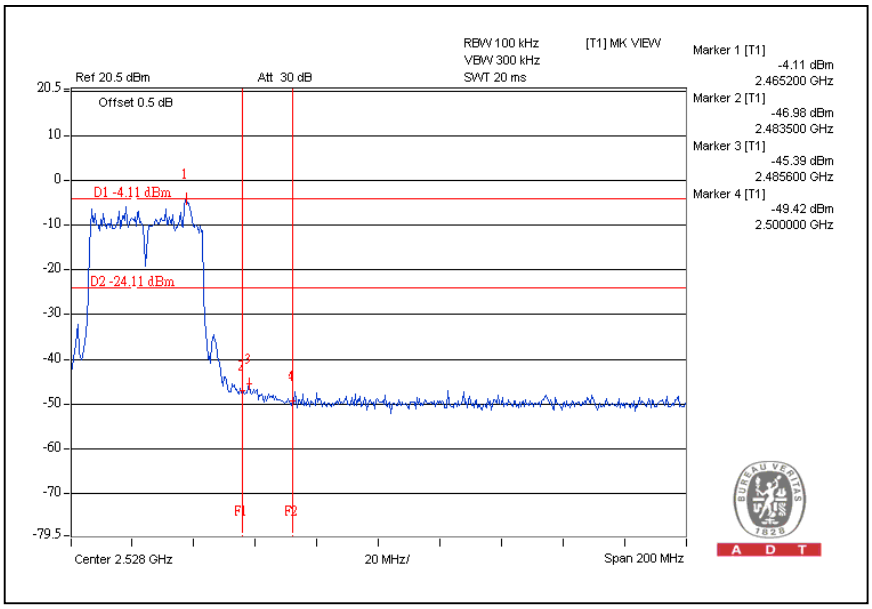

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Marker 1 [T1]
-2.16 dBm
2.427120 GHz
Marker 2 [T1]
-41.39 dBm
23.901320 GHz
Marker 3 [T1]
-41.47 dBm
22.053540 GHz
Marker 4 [T1]
-41.56 dBm
16.959660 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 1.12 dBm
D2 -18.88 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

DRAFT 802.11n (40MHz) OFDM MODULATION:

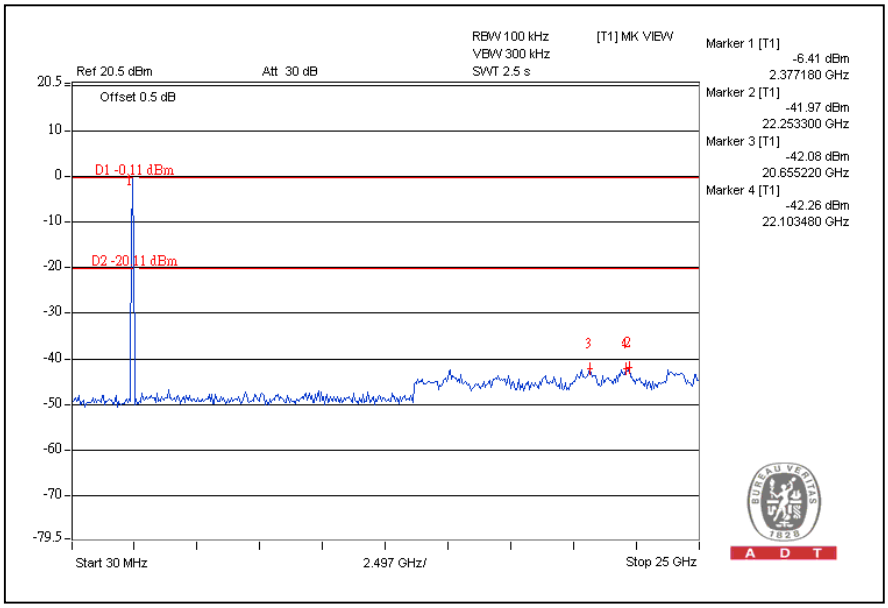
For Chain (0):CH1



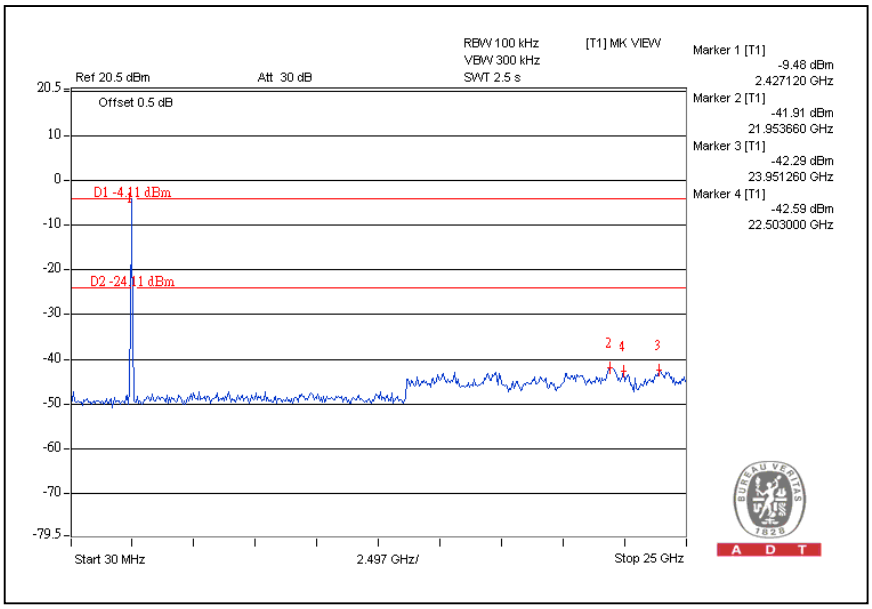
CH7



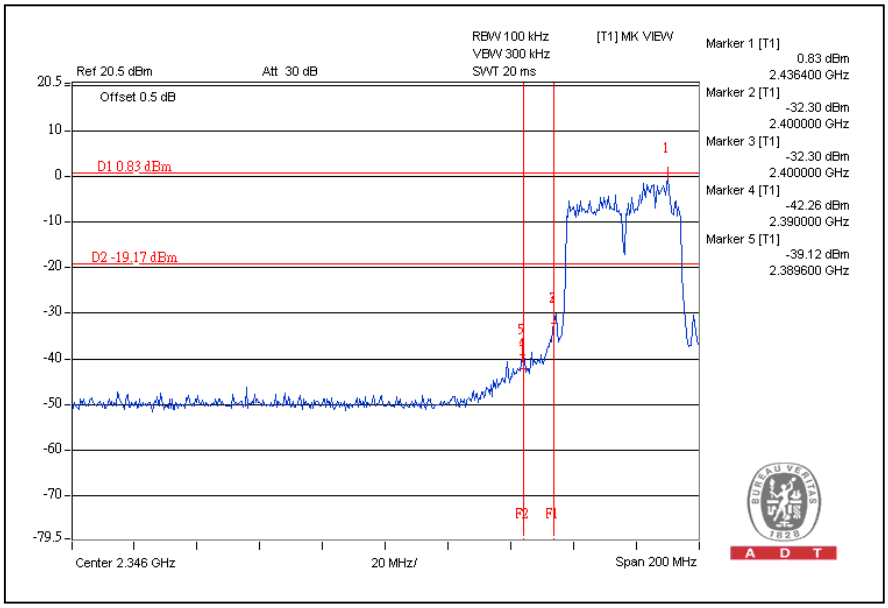
CH1


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Marker 1 [T1]
-6.41 dBm
2.377180 GHz
Marker 2 [T1]
-41.97 dBm
22.253300 GHz
Marker 3 [T1]
-42.08 dBm
20.655220 GHz
Marker 4 [T1]
-42.26 dBm
22.103480 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -0.11 dBm
D2 -20.11 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

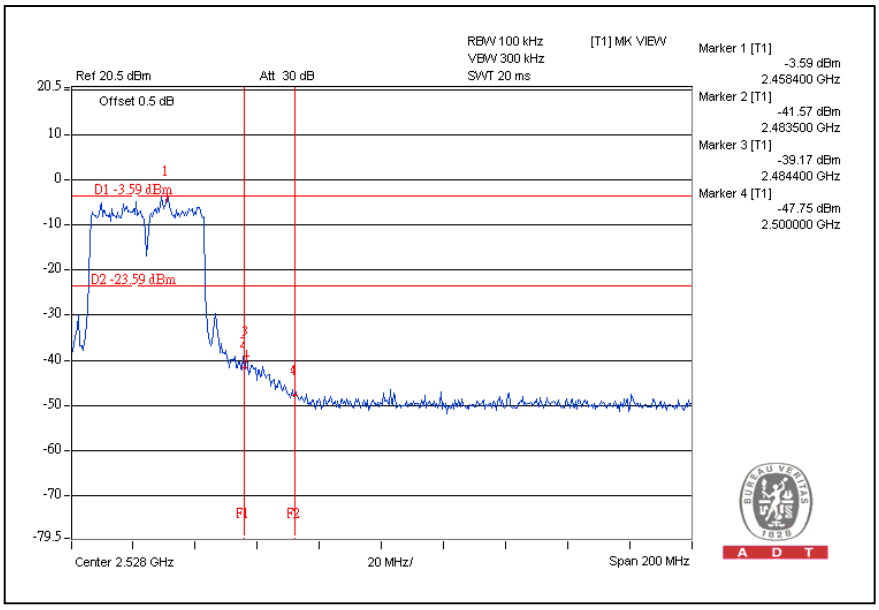
CH7


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Marker 1 [T1]
-9.48 dBm
2.427120 GHz
Marker 2 [T1]
-41.91 dBm
21.953660 GHz
Marker 3 [T1]
-42.29 dBm
23.951260 GHz
Marker 4 [T1]
-42.59 dBm
22.503000 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -4.11 dBm
D2 -24.11 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

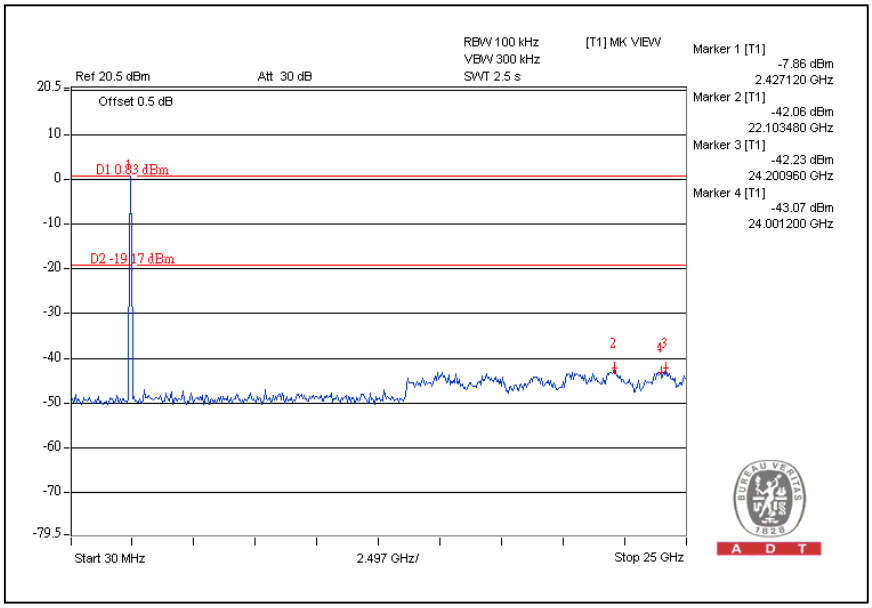
For Chain (1):CH1



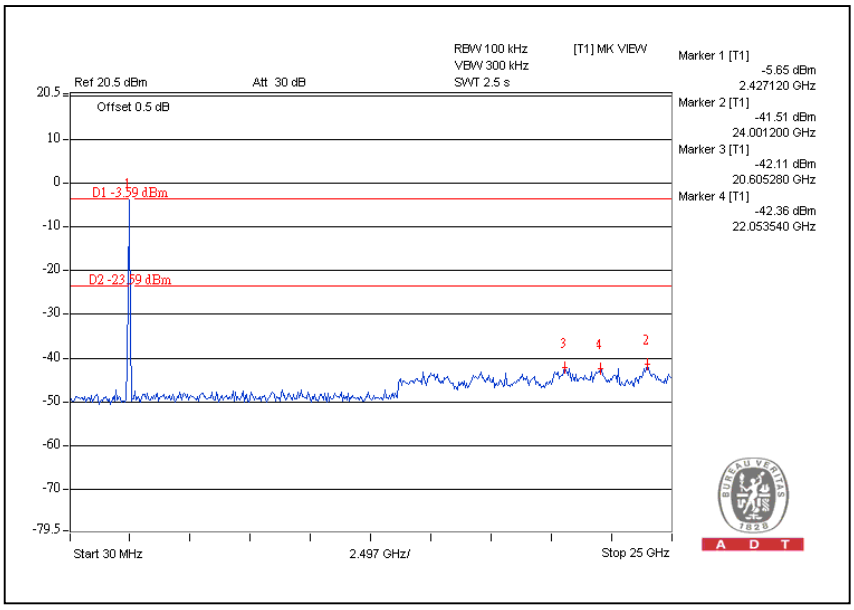
CH7



CH1


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 0.83 dBm
D2 -19.17 dBm
Marker 1 [T1]
-7.86 dBm
2.427120 GHz
Marker 2 [T1]
-42.06 dBm
22.103480 GHz
Marker 3 [T1]
-42.23 dBm
24.200960 GHz
Marker 4 [T1]
-43.07 dBm
24.001200 GHz
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH7


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -3.59 dBm
D2 -23.59 dBm
Marker 1 [T1]
-5.65 dBm
2.427120 GHz
Marker 2 [T1]
-41.51 dBm
24.001200 GHz
Marker 3 [T1]
-42.11 dBm
20.605280 GHz
Marker 4 [T1]
-42.36 dBm
22.053540 GHz
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

4.7 ANTENNA REQUIREMENT

4.7.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.7.2 ANTENNA CONNECTED CONSTRUCTION

There are three antennas provided to this EUT, please refer to the following table:

Transmitter / Circuit	Antenna Gain			Antenna Type	Connector
	For 2.4GHz Gain (dBi)	For 5.15~ 5.25GHz Gain (dBi)	For 5.725~ 5.850GHz Gain (dBi)		
Chain(0)J9	2.0	4.3	5.6	PIFA	UFL
Chain(1)J14	4.5	5.6	4.9	PIFA	UFL
Chain(2)J10	4.2	4.4	4.5	PIFA	UFL

5. TEST TYPES AND RESULTS (802.11a, 5725~5850MHz Band)

5.1 CONDUCTED EMISSION MEASUREMENT

5.1.1 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 0.50 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.

5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100287	March 11, 2008	March 10, 2009
Line-Impedance Stabilization Network(for EUT)	KNW-407	8-1395-12	May 07, 2008	May 06, 2009
Line-Impedance Stabilization Network(for Peripheral)	ENV-216	100072	June 13, 2008	June 12, 2009
RF Cable (JYEBAO)	5DFB	COACAB-001	July 24, 2008	July 23, 2009
50 ohms Terminator	50	3	Nov. 16, 2008	Nov. 15, 2009
Software	BV ADT_Cond_V7.3.6	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.

5.1.3 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.

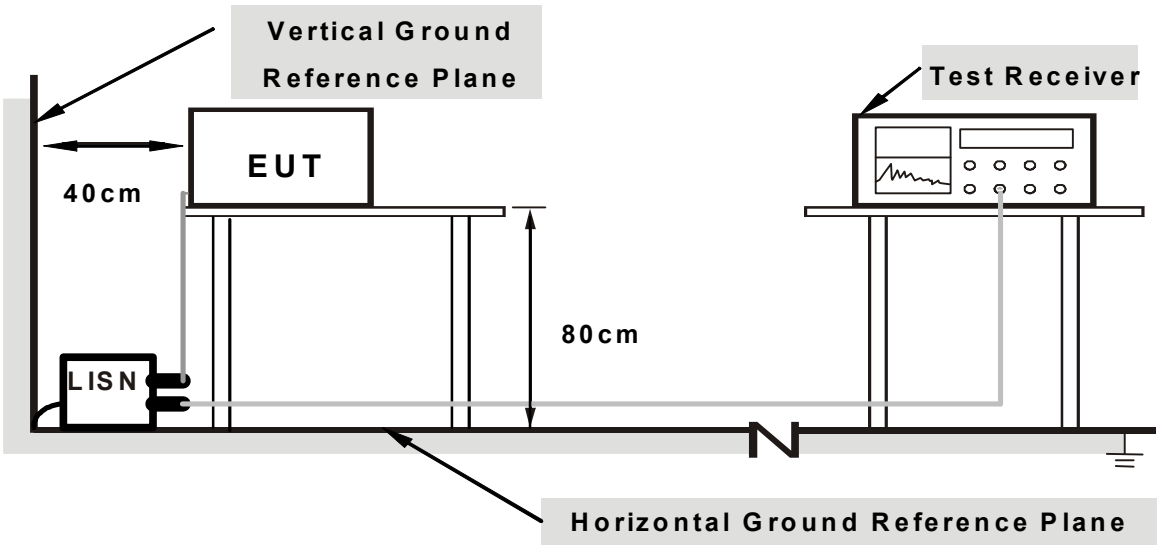
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit – 20dB) were not recorded.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation

5.1.5 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.

5.1.6 EUT OPERATING CONDITIONS

Same as the 4.1.6

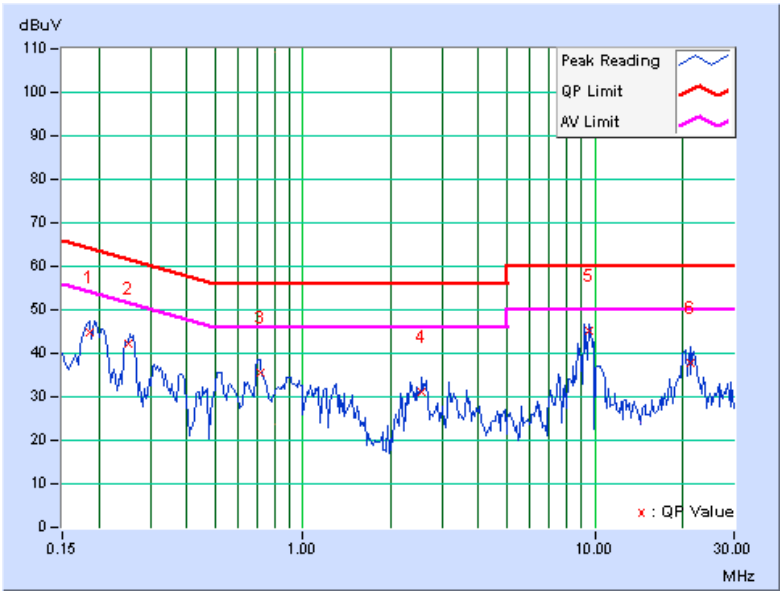
5.1.7 TEST RESULTS

DRAFT 802.11n (20MHz) OFDM modulation:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 2	**PHASE**	Line (L)
MODULATION TYPE	BPSK	**6dB BANDWIDTH**	9 kHz
TRANSFER RATE	13.5Mbps	**INPUT POWER**	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 60%RH, 965hPa	**TESTED BY**	Moris Lin

	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	0.185	0.53	44.36	-	44.89	-	64.25	54.25	-19.36	-
2	0.253	0.47	41.64	-	42.11	-	61.66	51.66	-19.55	-
3	0.713	0.44	35.00	-	35.44	-	56.00	46.00	-20.56	-
4	2.555	0.47	30.65	-	31.12	-	56.00	46.00	-24.88	-
5	**9.543**	**0.62**	**44.43**	**-**	**45.05**	**-**	**60.00**	**50.00**	**-14.95**	**-**
6	21.168	0.79	37.03	-	37.82	-	60.00	50.00	-22.18	-

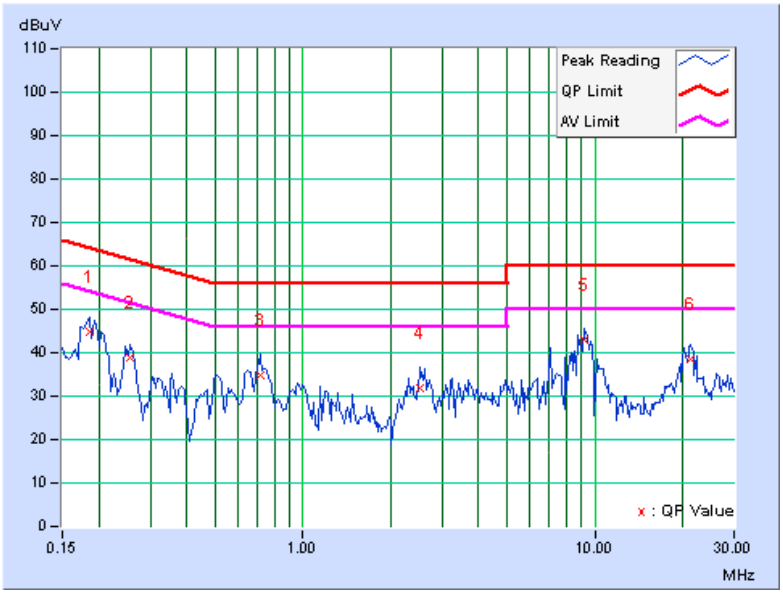
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 2	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	13.5Mbps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 60%RH, 965hPa	TESTED BY	Moris Lin

	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	0.185	0.28	44.50	-	44.78	-	64.25	54.25	-19.47	-
2	0.255	0.23	38.78	-	39.01	-	61.58	51.58	-22.57	-
3	0.713	0.20	34.54	-	34.74	-	56.00	46.00	-21.26	-
4	2.523	0.25	31.73	-	31.98	-	56.00	46.00	-24.02	-
5	9.166	0.41	42.55	-	42.96	-	60.00	50.00	-17.04	-
6	21.358	0.64	37.81	-	38.45	-	60.00	50.00	-21.55	-

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.



5.2 RADIATED EMISSION MEASUREMENT

5.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

NOTE:

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

5.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 16, 2008	July 15, 2009
HP Pre_Amplifier	8449B	3008A01922	Sep. 25, 2008	Sep. 24, 2009
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	April 01, 2008	Mar. 31, 2009
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 30, 2008	April 29, 2009
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 17, 2008	Dec. 16, 2009
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 28, 2008	Jan. 27, 2009
RF Switches	EMH-011	08009	Oct. 07, 2008	Oct. 06, 2009
RF CABLE (Chaintek)	SF102	22054-2	Dec. 07, 2008	Dec. 06, 2009
RF Cable	8DFB	STCCAB-30 M-1GHz	Oct. 07, 2008	Oct. 06, 2009
Software	ADT_Radiated _V7.6.15.9.2	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, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: R3271A) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 7450G-3.

5.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter 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.

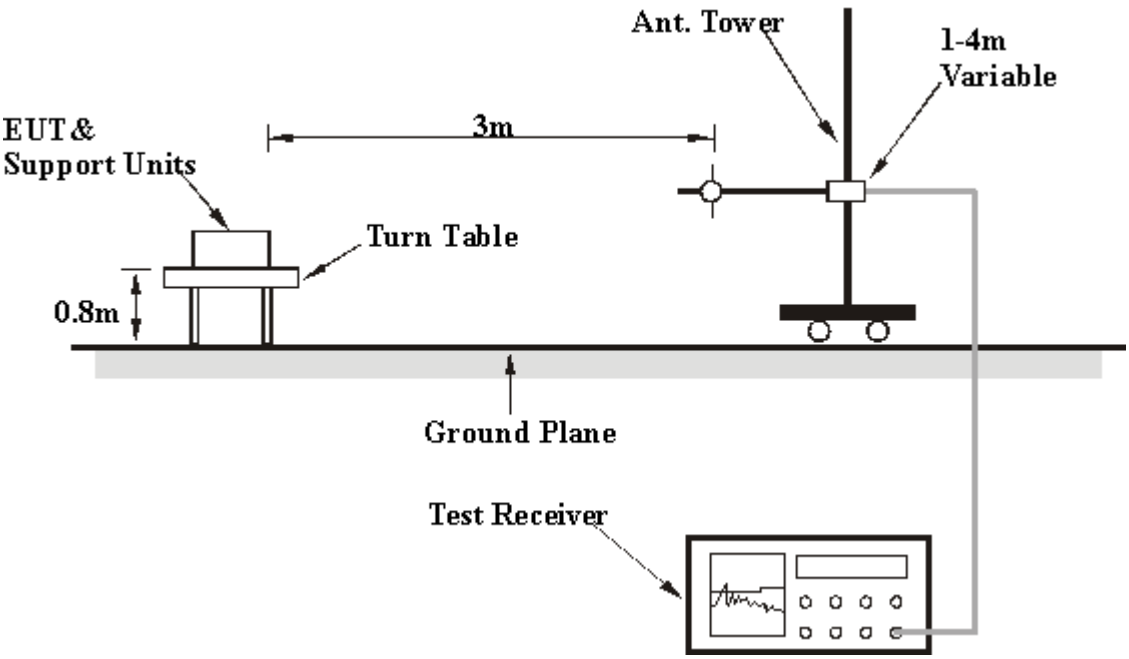
NOTE:

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 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.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation

5.2.5 TEST SETUP



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

5.2.6 EUT OPERATING CONDITIONS

Same as the 4.1.6

Below 1GHz Test Data

5.2.7 TEST RESULTS

DRAFT 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 965hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	39.49	19.24 QP	40.00	-20.76	1.34 H	257	6.04	13.20
2	125.00	31.23 QP	43.50	-12.27	1.24 H	259	17.11	14.12
3	250.00	35.67 QP	46.00	-10.33	1.02 H	243	20.25	15.42
4	375.00	37.19 QP	46.00	-8.81	1.29 H	346	17.09	20.10
5	500.00	35.85 QP	46.00	-10.15	1.43 H	64	13.19	22.66
6	625.00	36.64 QP	46.00	-9.36	1.15 H	123	11.30	25.34
7	750.00	35.53 QP	46.00	-10.47	1.00 H	173	7.07	28.46
8	875.00	37.89 QP	46.00	-8.11	1.00 H	143	7.17	30.72
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	39.49	34.13 QP	40.00	-5.87	1.00 V	273	20.93	13.20
2	125.00	33.24 QP	43.50	-10.26	1.01 V	177	19.12	14.12
3	250.00	33.41 QP	46.00	-12.59	1.03 V	153	17.99	15.42
4	375.00	42.78 QP	46.00	-3.22	1.19 V	135	22.68	20.10
5	500.00	37.65 QP	46.00	-8.35	1.00 V	265	14.99	22.66
6	625.00	37.65 QP	46.00	-8.35	1.00 V	131	12.31	25.34
7	750.00	38.45 QP	46.00	-7.55	1.25 V	178	9.99	28.46
8	875.00	39.78 QP	46.00	-6.22	1.34 V	129	9.06	30.72

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

Above 1GHz Test Data

5.2.8 TEST RESULTS

802.11a OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 965hPa	TESTED BY	Frank Liu

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	4596.00	54.69 PK	74.00	-19.31	1.42 H	104	19.47	35.22
2	4596.00	41.48 AV	54.00	-12.52	1.42 H	104	6.26	35.22
3	*5745.00	106.15 PK			1.95 H	339	69.09	37.06
4	*5745.00	94.38 AV			1.95 H	339	57.32	37.06
5	11490.00	62.65 PK	74.00	-11.35	1.47 H	269	15.72	46.93
6	11490.00	46.52 AV	54.00	-7.48	1.47 H	269	-0.41	46.93
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4596.00	55.62 PK	74.00	-18.38	1.58 V	160	20.40	35.22
2	4596.00	40.82 AV	54.00	-13.18	1.58 V	160	5.60	35.22
3	*5745.00	115.62 PK			1.08 V	182	78.56	37.06
4	*5745.00	103.45 AV			1.08 V	182	66.39	37.06
5	11490.00	67.74 PK	74.00	-6.26	1.39 V	238	20.81	46.93
6	11490.00	53.13 AV	54.00	-0.87	1.39 V	238	6.20	46.93

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 965hPa	TESTED BY	Frank Liu

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	4628.00	54.58 PK	74.00	-19.42	1.58 H	2	19.29	35.29
2	4628.00	41.53 AV	54.00	-12.47	1.58 H	2	6.24	35.29
3	*5785.00	104.29 PK			1.82 H	93	67.15	37.14
4	*5785.00	93.01 AV			1.82 H	93	55.87	37.14
5	11570.00	63.29 PK	74.00	-10.71	1.50 H	300	16.49	46.80
6	11570.00	47.11 AV	54.00	-6.89	1.50 H	300	0.31	46.80
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	4628.00	55.11 PK	74.00	-18.89	1.20 V	38	19.82	35.29
2	4628.00	40.33 AV	54.00	-13.67	1.20 V	38	5.04	35.29
3	*5785.00	112.89 PK			1.09 V	201	75.75	37.14
4	*5785.00	101.11 AV			1.09 V	201	63.97	37.14
5	11570.00	65.77 PK	74.00	-8.23	1.38 V	260	18.97	46.80
6	11570.00	50.02 AV	54.00	-3.98	1.38 V	260	3.22	46.80

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 limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 5	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 965hPa	TESTED BY	Frank Liu

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	4644.00	55.88 PK	74.00	-18.12	1.41 H	89	20.56	35.32
2	4644.00	40.33 AV	54.00	-13.67	1.41 H	89	5.01	35.32
3	*5825.00	106.18 PK			1.90 H	248	68.96	37.22
4	*5825.00	94.73 AV			1.90 H	248	57.51	37.22
5	11610.00	62.05 PK	74.00	-11.95	1.47 H	261	15.33	46.72
6	11610.00	46.83 AV	54.00	-7.17	1.47 H	261	0.11	46.72
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	4644.00	56.02 PK	74.00	-17.98	1.11 V	209	20.70	35.32
2	4644.00	40.62 AV	54.00	-13.38	1.11 V	209	5.30	35.32
3	*5825.00	114.18 PK			1.06 V	193	76.96	37.22
4	*5825.00	102.09 AV			1.06 V	193	64.87	37.22
5	11610.00	68.82 PK	74.00	-5.18	1.45 V	162	22.10	46.72
6	11610.00	53.09 AV	54.00	-0.91	1.45 V	162	6.37	46.72

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 limit value is defined as per 15.247.

DRAFT 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 965hPa	TESTED BY	Frank Liu

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	4596.00	55.86 PK	74.00	-18.14	1.38 H	269	20.64	35.22
2	4596.00	41.22 AV	54.00	-12.78	1.38 H	269	6.00	35.22
3	*5745.00	114.62 PK			1.88 H	111	77.56	37.06
4	*5745.00	102.38 AV			1.88 H	111	65.32	37.06
5	11490.00	60.58 PK	74.00	-13.42	1.41 H	289	13.65	46.93
6	11490.00	46.47 AV	54.00	-7.53	1.41 H	289	-0.46	46.93
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4596.00	55.42 PK	74.00	-18.58	1.30 V	88	20.20	35.22
2	4596.00	41.00 AV	54.00	-13.00	1.30 V	88	5.78	35.22
3	*5745.00	115.09 PK			1.40 V	284	78.03	37.06
4	*5745.00	103.29 AV			1.40 V	284	66.23	37.06
5	11490.00	66.77 PK	74.00	-7.23	1.28 V	96	19.84	46.93
6	**11490.00**	**53.30 AV**	**54.00**	**-0.70**	**1.28 V**	**96**	**6.37**	**46.93**

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 965hPa	TESTED BY	Frank Liu

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	4640.00	53.99 PK	74.00	-20.01	1.28 H	169	18.68	35.31
2	4640.00	41.49 AV	54.00	-12.51	1.28 H	169	6.18	35.31
3	*5785.00	115.99 PK			1.99 H	106	78.85	37.14
4	*5785.00	102.88 AV			1.99 H	106	65.74	37.14
5	11570.00	61.99 PK	74.00	-12.01	1.58 H	190	15.19	46.80
6	11570.00	47.63 AV	54.00	-6.37	1.58 H	190	0.83	46.80
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	4640.00	55.38 PK	74.00	-18.62	1.28 V	76	20.07	35.31
2	4640.00	41.23 AV	54.00	-12.77	1.28 V	76	5.92	35.31
3	*5785.00	116.11 PK			1.37 V	192	78.97	37.14
4	*5785.00	103.92 AV			1.37 V	192	66.78	37.14
5	11570.00	67.80 PK	74.00	-6.20	1.40 V	196	21.00	46.80
6	11570.00	53.24 AV	54.00	-0.76	1.40 V	196	6.44	46.80

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 limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 5	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 965hPa	TESTED BY	Frank Liu

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	4644.00	56.04 PK	74.00	-17.96	1.72 H	69	20.72	35.32
2	4644.00	40.62 AV	54.00	-13.38	1.72 H	69	5.30	35.32
3	*5825.00	113.89 PK			2.01 H	100	76.67	37.22
4	*5825.00	101.11 AV			2.01 H	100	63.89	37.22
5	11650.00	60.74 PK	74.00	-13.26	1.50 H	201	14.09	46.65
6	11650.00	46.83 AV	54.00	-7.17	1.50 H	201	0.18	46.65
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	4644.00	55.83 PK	74.00	-18.17	1.50 V	8	20.51	35.32
2	4644.00	41.24 AV	54.00	-12.76	1.50 V	8	5.92	35.32
3	*5825.00	115.51 PK			1.42 V	81	78.29	37.22
4	*5825.00	103.10 AV			1.42 V	81	65.88	37.22
5	11650.00	65.07 PK	74.00	-8.93	1.40 V	252	18.42	46.65
6	11650.00	51.11 AV	54.00	-2.89	1.40 V	252	4.46	46.65

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 limit value is defined as per 15.247.

DRAFT 802.11n (40MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 965hPa	TESTED BY	Frank Liu

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	4604.00	54.62 PK	74.00	-19.38	1.14 H	350	19.38	35.24
2	4604.00	41.33 AV	54.00	-12.67	1.14 H	350	6.09	35.24
3	*5755.00	110.82 PK			1.90 H	106	73.74	37.08
4	*5755.00	98.21 AV			1.90 H	106	61.13	37.08
5	11510.00	59.03 PK	74.00	-14.97	1.20 H	69	12.12	46.91
6	11510.00	44.98 AV	54.00	-9.02	1.20 H	69	-1.93	46.91
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	4604.00	55.83 PK	74.00	-18.17	1.14 V	101	20.59	35.24
2	4604.00	41.48 AV	54.00	-12.52	1.14 V	101	6.24	35.24
3	*5755.00	111.72 PK			1.65 V	301	74.64	37.08
4	*5755.00	99.21 AV			1.65 V	301	62.13	37.08
5	11510.00	66.69 PK	74.00	-7.31	1.40 V	255	19.78	46.91
6	11510.00	52.87 AV	54.00	-1.13	1.40 V	255	5.96	46.91

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 limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 2	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 965hPa	TESTED BY	Frank Liu

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	4636.00	53.62 PK	74.00	-20.38	1.09 H	200	18.32	35.30
2	4636.00	42.65 AV	54.00	-11.35	1.09 H	200	7.35	35.30
3	*5795.00	110.89 PK			1.91 H	110	73.73	37.16
4	*5795.00	97.98 AV			1.91 H	110	60.82	37.16
5	11590.00	58.99 PK	74.00	-15.01	1.23 H	66	12.23	46.76
6	11590.00	43.58 AV	54.00	-10.42	1.23 H	66	-3.18	46.76
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4636.00	56.01 PK	74.00	-17.99	1.20 V	280	20.71	35.30
2	4636.00	42.30 AV	54.00	-11.70	1.20 V	280	7.00	35.30
3	*5795.00	111.31 PK			1.61 V	298	74.15	37.16
4	*5795.00	98.80 AV			1.61 V	298	61.64	37.16
5	11590.00	66.58 PK	74.00	-7.42	1.40 V	260	19.82	46.76
6	11590.00	51.75 AV	54.00	-2.25	1.40 V	260	4.99	46.76

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The limit value is defined as per 15.247.

5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

5.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2008	Aug. 08, 2009

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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

5.3.3 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.

5.3.4 DEVIATION FROM TEST STANDARD

No deviation

5.3.5 TEST SETUP

5.3.6 EUT OPERATING CONDITIONS

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

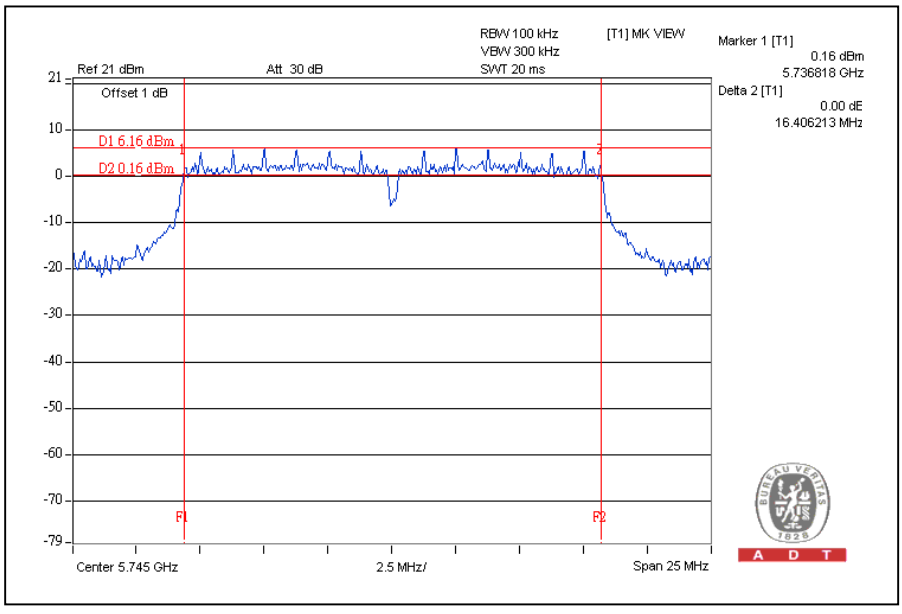
5.3.7 TEST RESULTS

802.11a OFDM MODULATION:

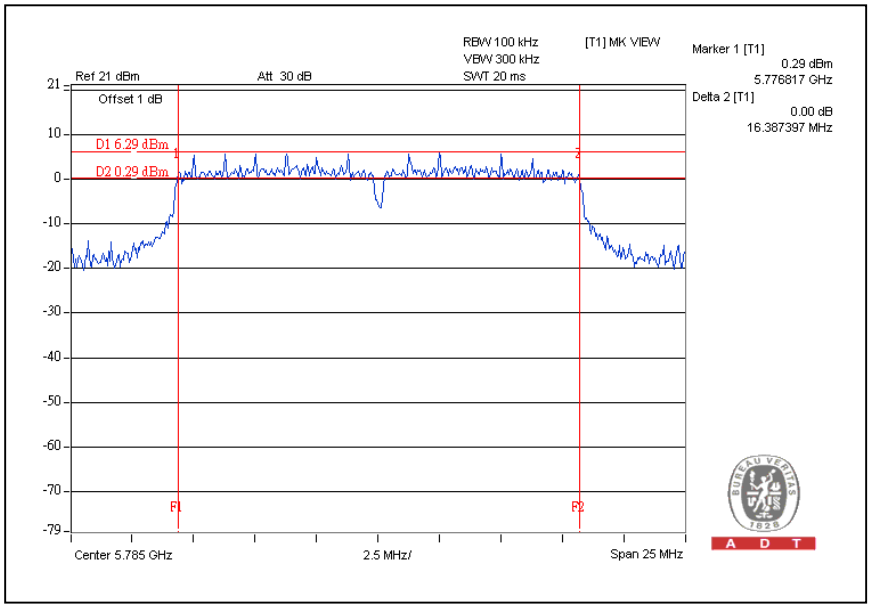
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	5745	16.41	0.5	PASS
3	5785	16.39	0.5	PASS
5	5825	16.39	0.5	PASS

CH1



CH3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VBW 300 kHz
SWT 20 ms
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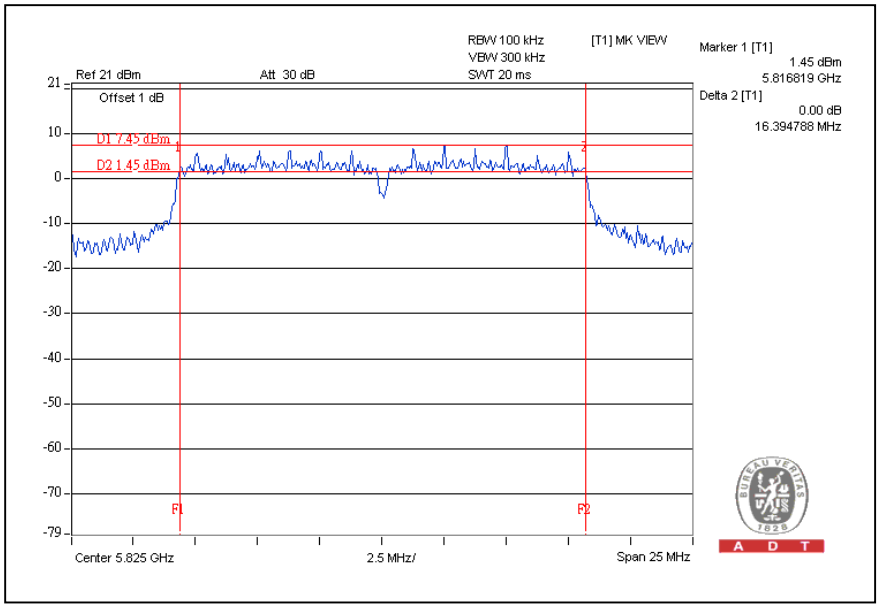
Marker 1 [T1]
0.29 dBm
5.776817 GHz
Delta 2 [T1]
0.00 dB
16.387397 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 6.29 dBm
D2 0.29 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 5.785 GHz
2.5 MHz/
Span 25 MHz

CH5

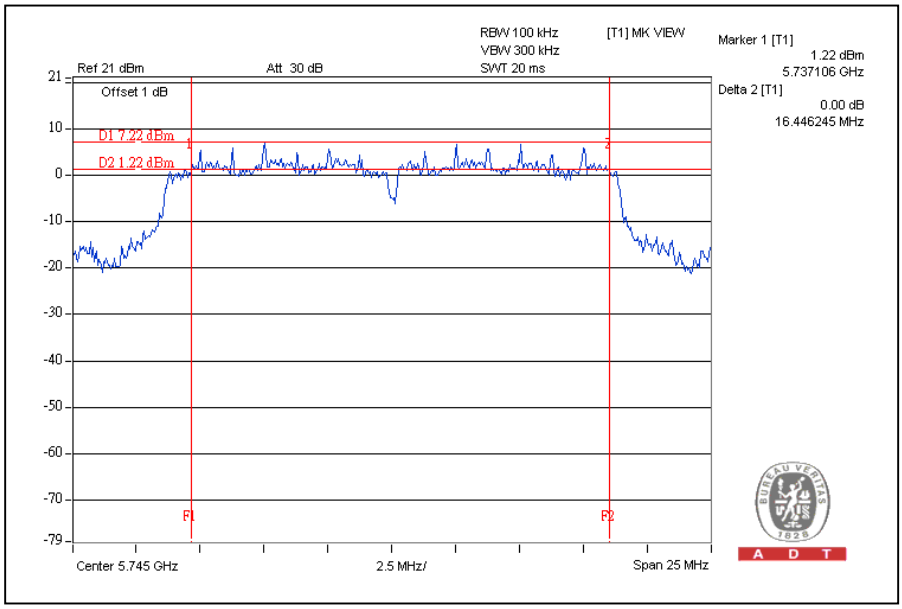

RBW 100 kHz
VBW 300 kHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
1.45 dBm
5.816819 GHz
Delta 2 [T1]
0.00 dB
16.394788 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 7.45 dBm
D2 1.45 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 5.825 GHz
2.5 MHz/
Span 25 MHz

DRAFT 802.11n (20MHz) OFDM MODULATION:

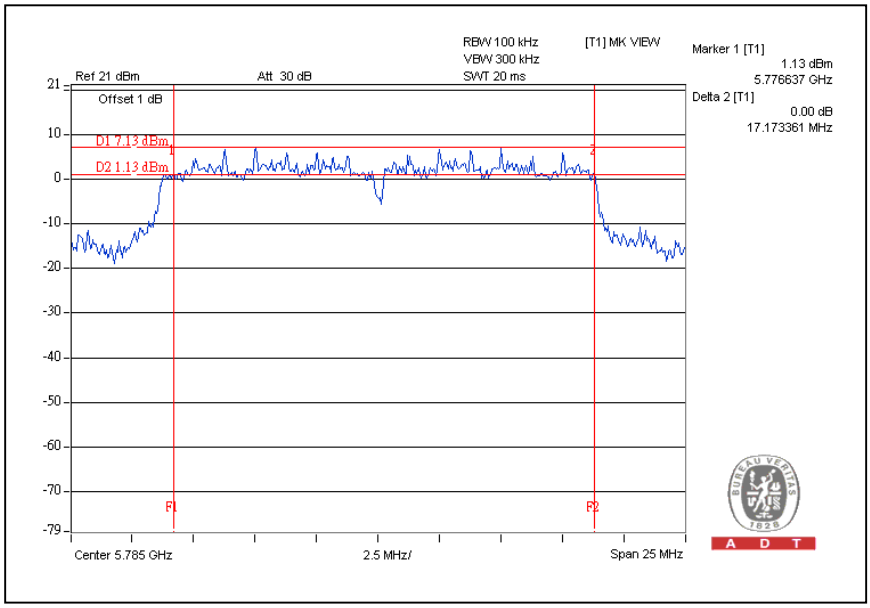
MODULATION TYPE	BPSK	TRANSFER RATE	13Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg. C, 54%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN(0)	CHAIN(1)		
1	5745	16.45	17.59	0.5	PASS
3	5785	17.17	17.64	0.5	PASS
5	5825	17.62	17.62	0.5	PASS

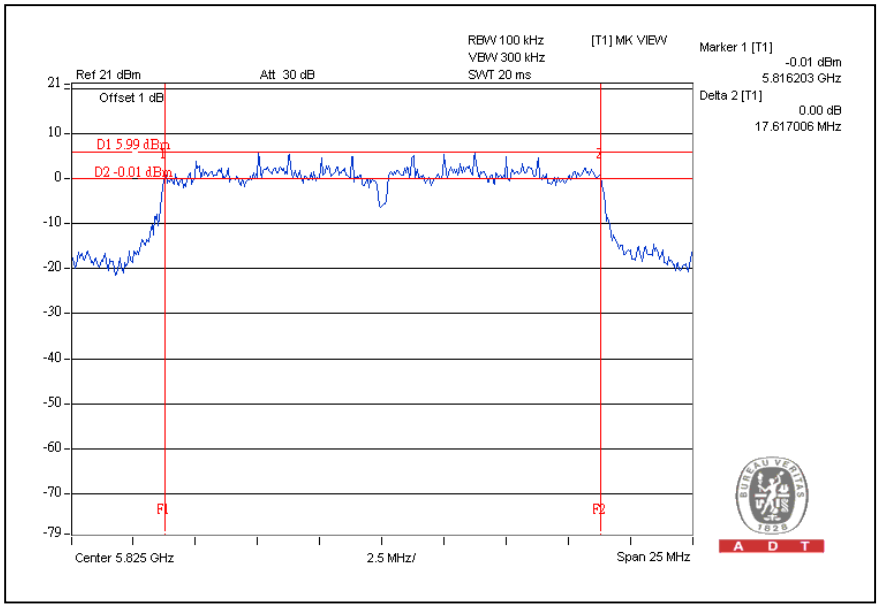
For Chain (0): CH1



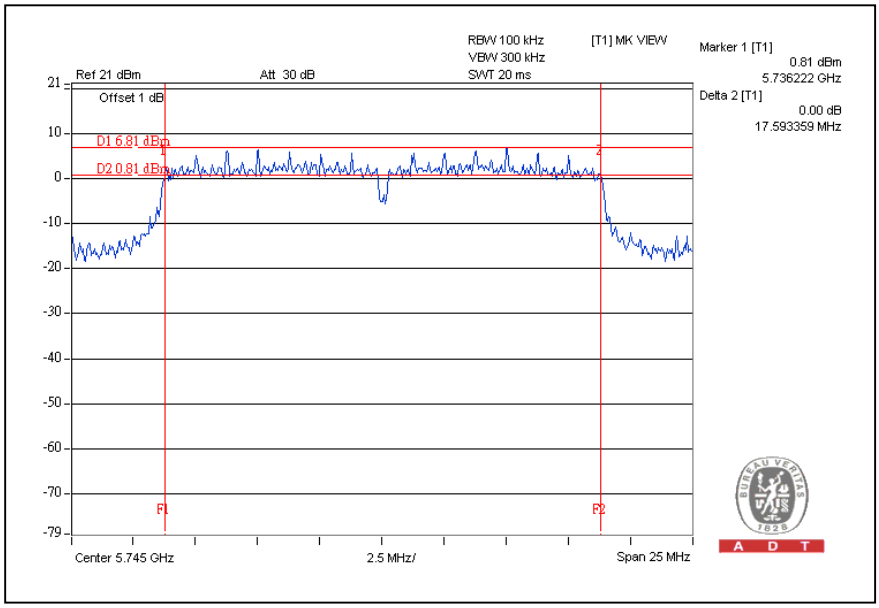
CH3


RBW 100 kHz
VBW 300 kHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
1.13 dBm
5.776637 GHz
Delta 2 [T1]
0.00 dB
17.173361 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 7.13 dBm
D2 1.13 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 5.785 GHz
2.5 MHz/
Span 25 MHz

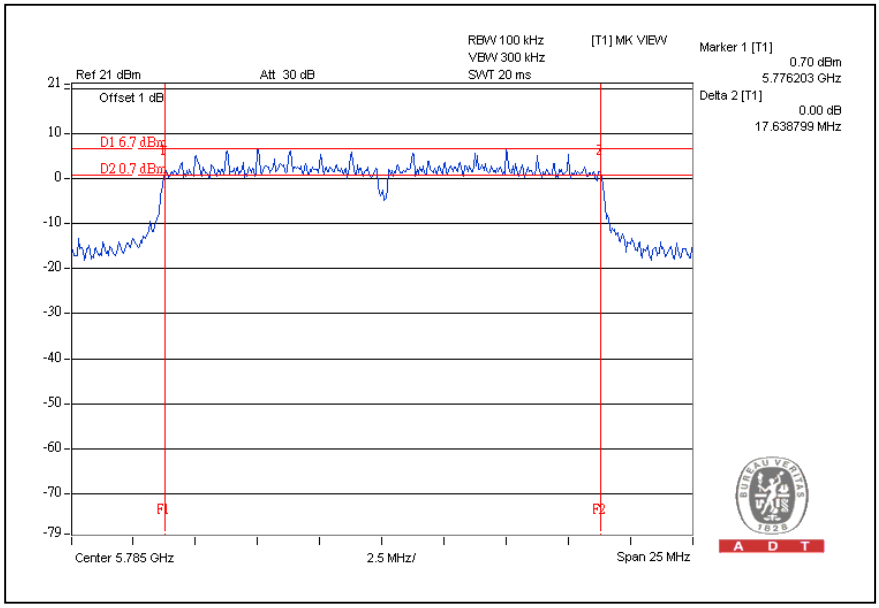
CH5


RBW 100 kHz
VBW 300 kHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
-0.01 dBm
5.816203 GHz
Delta 2 [T1]
0.00 dB
17.617006 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 5.99 dBm
D2 -0.01 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 5.825 GHz
2.5 MHz/
Span 25 MHz

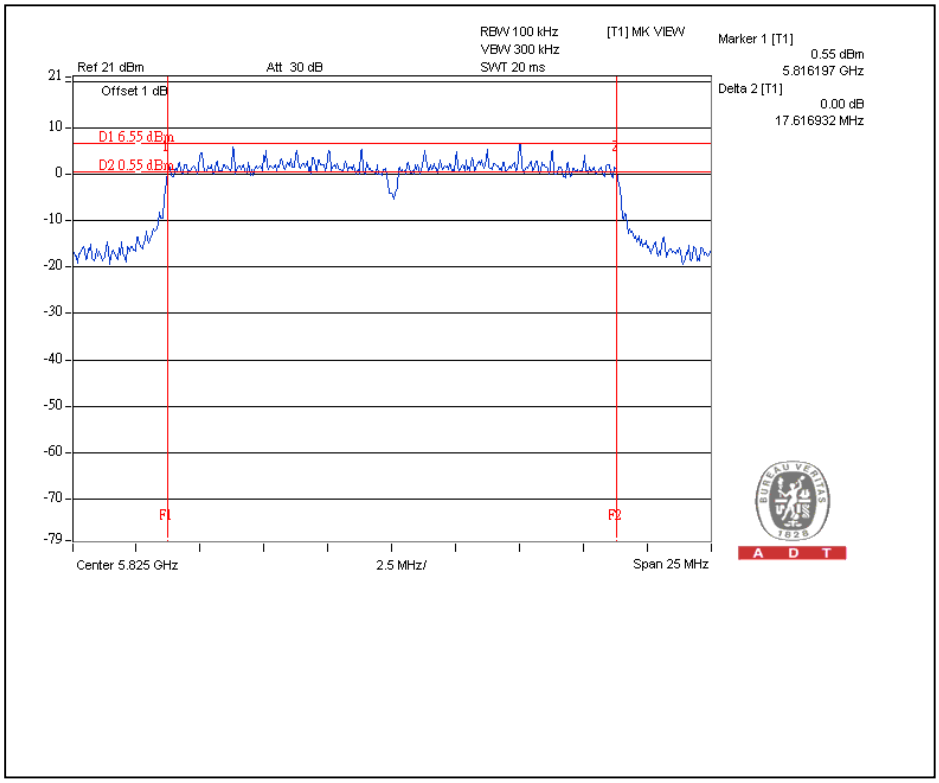
For Chain (1): CH1



CH3



CH5

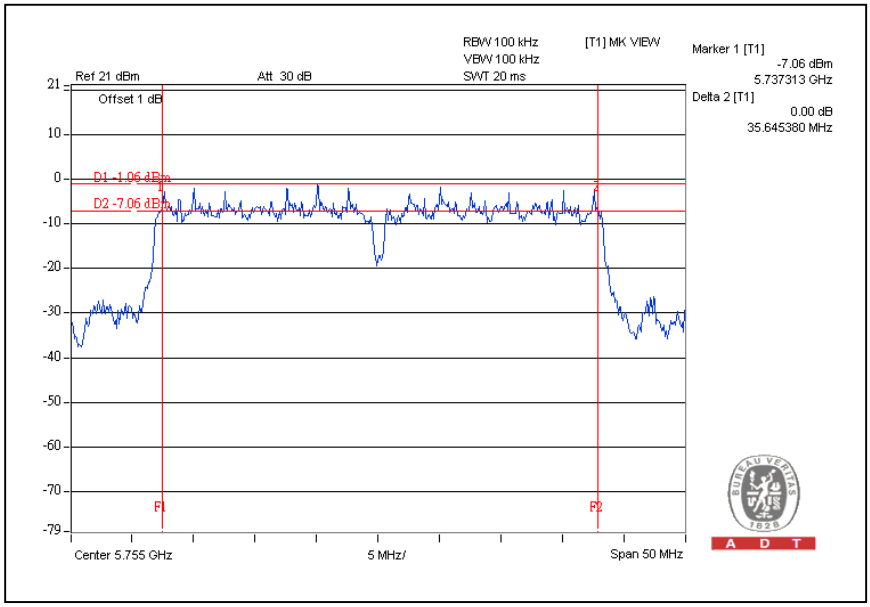

RBW 100 kHz
VBW 300 kHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
0.55 dBm
5.816197 GHz
Delta 2 [T1]
0.00 dB
17.616932 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 6.55 dBm
D2 0.55 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 5.825 GHz
2.5 MHz/
Span 25 MHz

DRAFT 802.11n (40MHz) OFDM MODULATION:

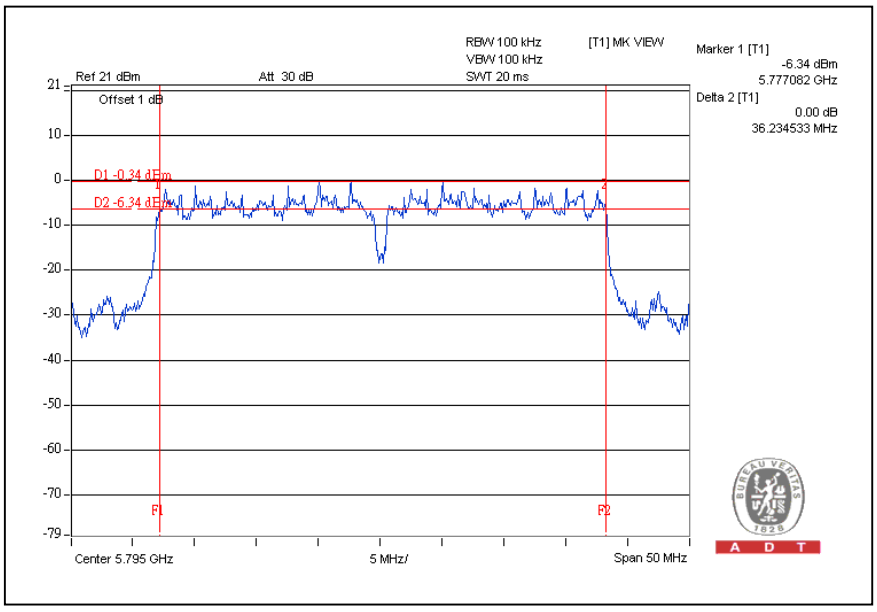
MODULATION TYPE	BPSK	**TRANSFER RATE**	27Mbps
INPUT POWER	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg. C, 60%RH, 965hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN(0)	CHAIN(1)		
1	5755	35.65	36.40	0.5	PASS
2	5795	36.23	36.49	0.5	PASS

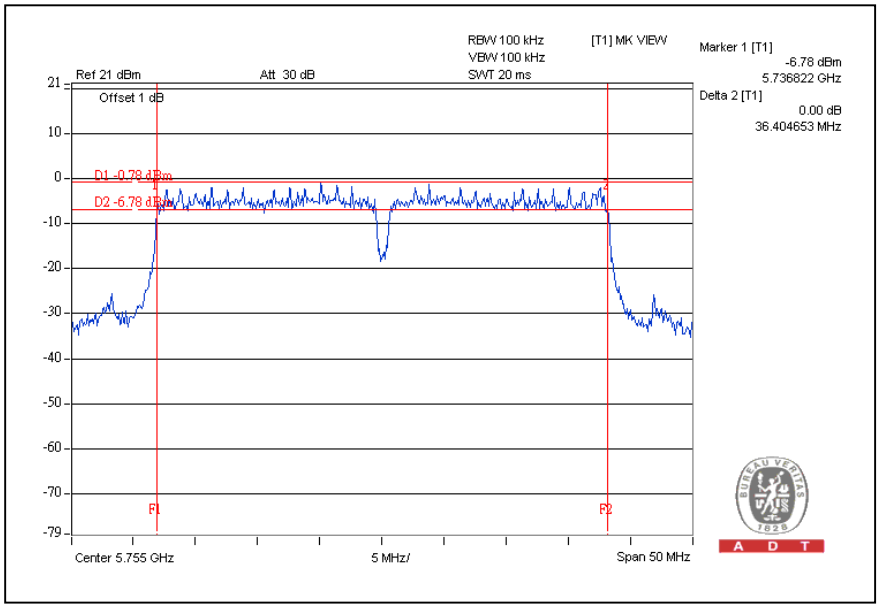
For Chain (0): CH1



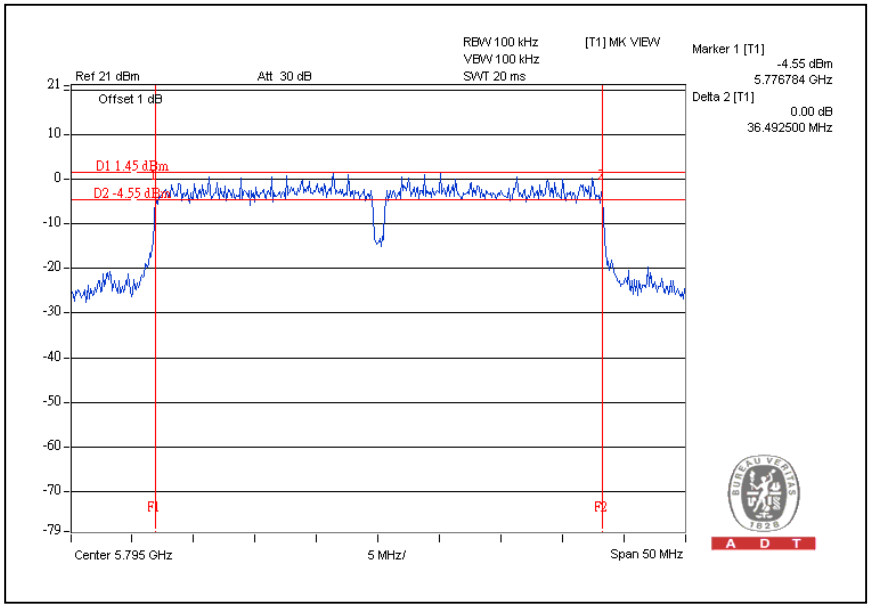
CH2



For Chain (1): CH1



CH2



5.4 MAXIMUM PEAK OUTPUT POWER

5.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

5.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 13, 2008	Aug. 12, 2009
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 26, 2007	Dec. 25, 2008
Anritsu Power Meter	ML2495A	0824006	NA	NA
Pulse Power Sensor	MA2411B	0738172	NA	NA

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

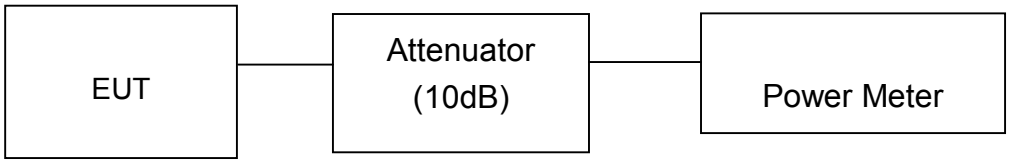
5.4.3 TEST PROCEDURES

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.

5.4.4 DEVIATION FROM TEST STANDARD

No deviation

5.4.5 TEST SETUP



5.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

5.4.7 TEST RESULTS

802.11a OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	5745	23.40	218.776	30	PASS
3	5785	22.20	165.959	30	PASS
5	5825	23.50	223.872	30	PASS

DRAFT 802.11n (20MHz) OFDM MODULATION:

MODULATION TYPE	BPSK	TRANSFER RATE	13Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (DBM)		PEAK POWER OUTPUT (MW)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(0)	CHAIN(1)				
1	5745	23.20	21.50	208.930	141.254	350.184	25.44	30	PASS
3	5785	22.70	21.80	186.209	151.356	337.565	25.28	30	PASS
5	5825	23.50	21.80	223.872	151.356	375.228	25.74	30	PASS

DRAFT 802.11n (40MHz) OFDM MODULATION:

MODULATION TYPE	BPSK	TRANSFER RATE	27Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (DBM)		PEAK POWER OUTPUT (mW)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(0)	CHAIN(1)				
1	5755	23.10	21.70	204.174	147.911	352.085	25.47	30	PASS
2	5795	23.80	21.70	239.883	147.911	387.794	25.89	30	PASS

5.5 POWER SPECTRAL DENSITY MEASUREMENT

5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2008	Aug. 08, 2009

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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

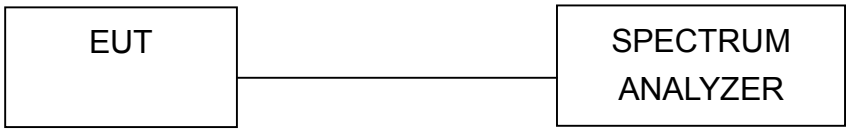
5.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time = span/3 kHz. The power spectral density was measured and recorded.
The sweep time is allowed to be longer than span/3 kHz for a full response of the mixer in the spectrum analyzer.

5.5.4 DEVIATION FROM TEST STANDARD

No deviation

5.5.5 TEST SETUP



5.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

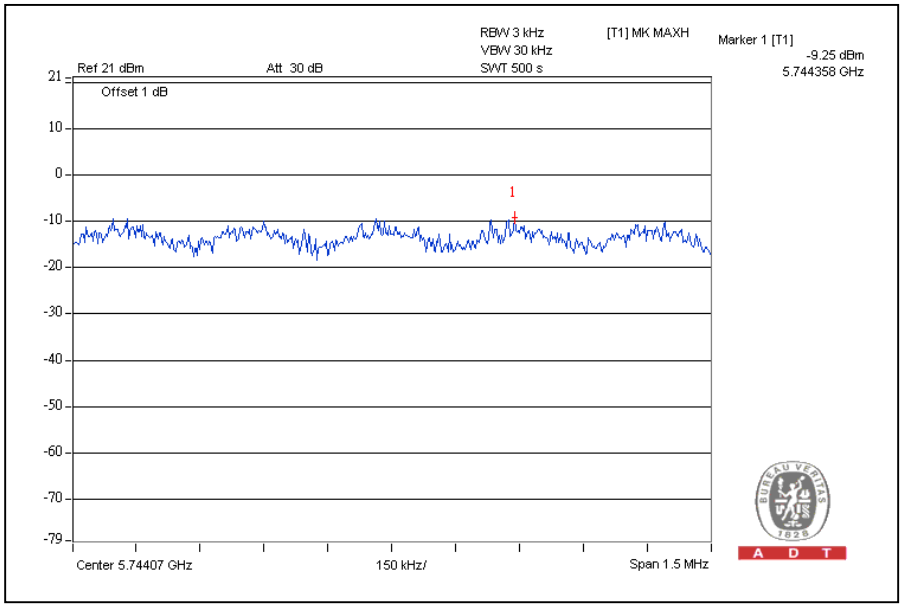
5.5.7 TEST RESULTS

802.11a OFDM modulation

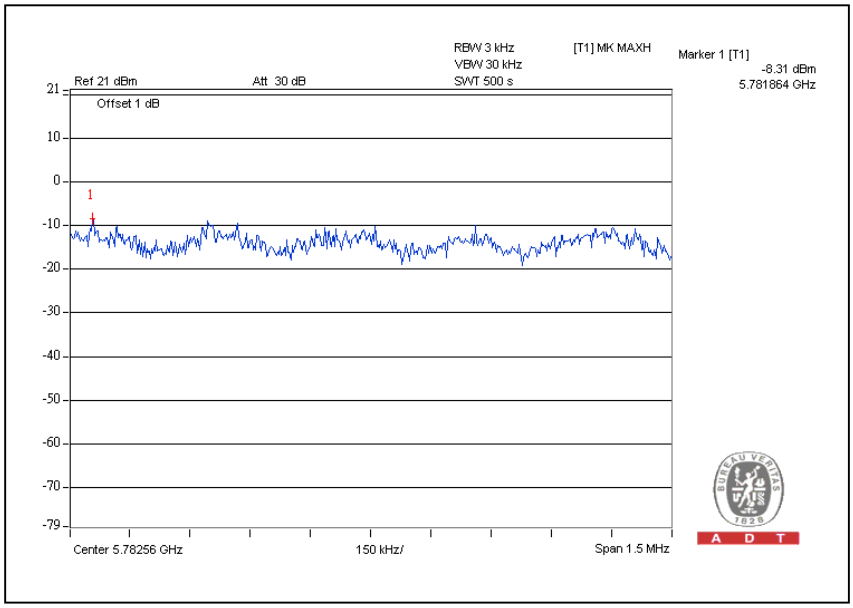
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	5745	-9.25	8	PASS
3	5785	-8.31	8	PASS
5	5825	-8.04	8	PASS

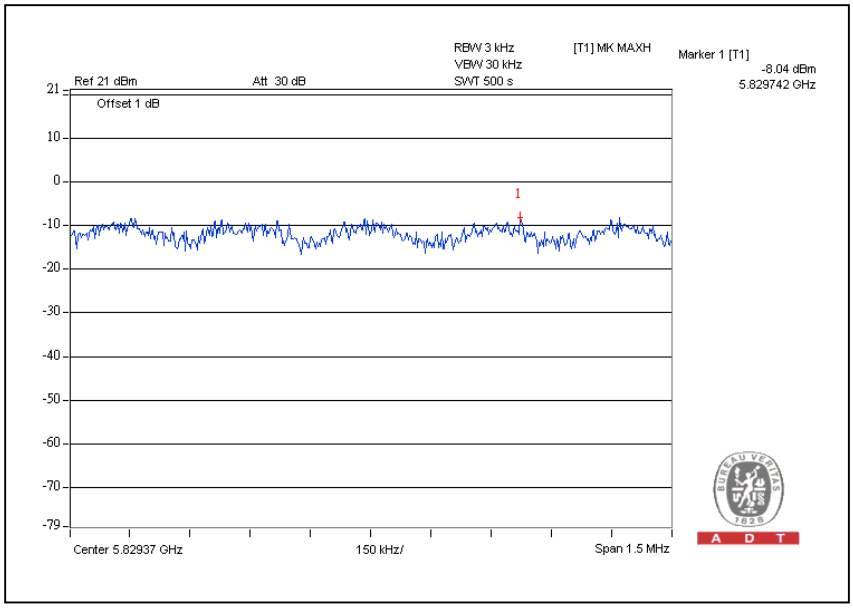
CH1



CH3


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-8.31 dBm
5.781864 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 5.78256 GHz
150 kHz/
Span 1.5 MHz

CH5

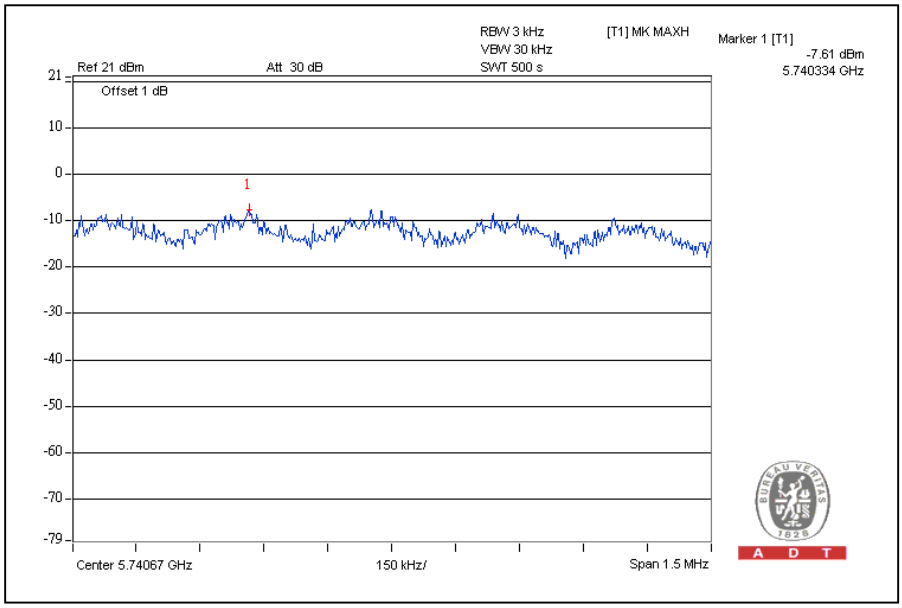

RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-8.04 dBm
5.829742 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 5.82937 GHz
150 kHz/
Span 1.5 MHz

DRAFT 802.11n (20MHz) OFDM MODULATION:

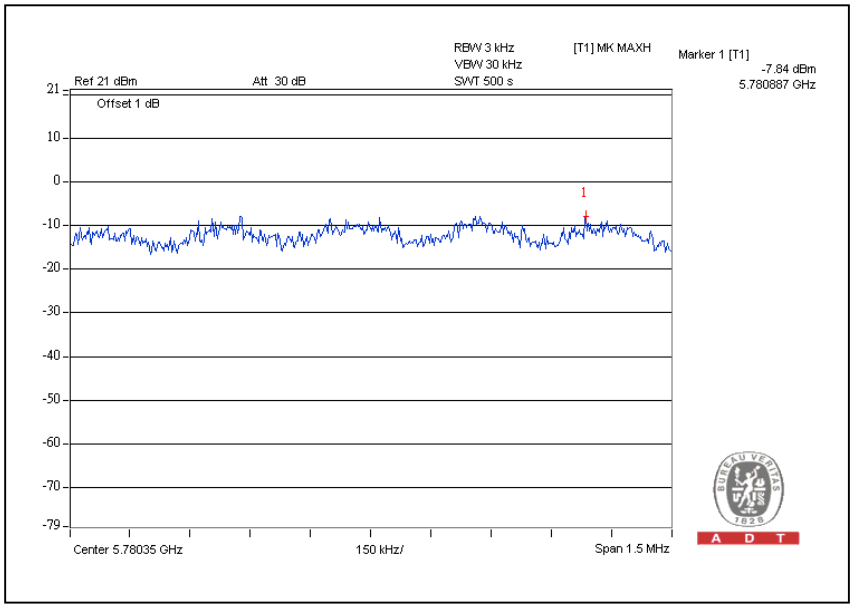
MODULATION TYPE	BPSK	TRANSFER RATE	13Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (mW)		RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(0)	CHAIN(1)				
1	5745	0.117	0.290	-7.61	-9.33	0.290	-5.38	8	PASS
3	5785	0.147	0.311	-7.84	-8.32	0.311	-5.07	8	PASS
5	5825	0.111	0.218	-9.70	-9.55	0.218	-6.62	8	PASS

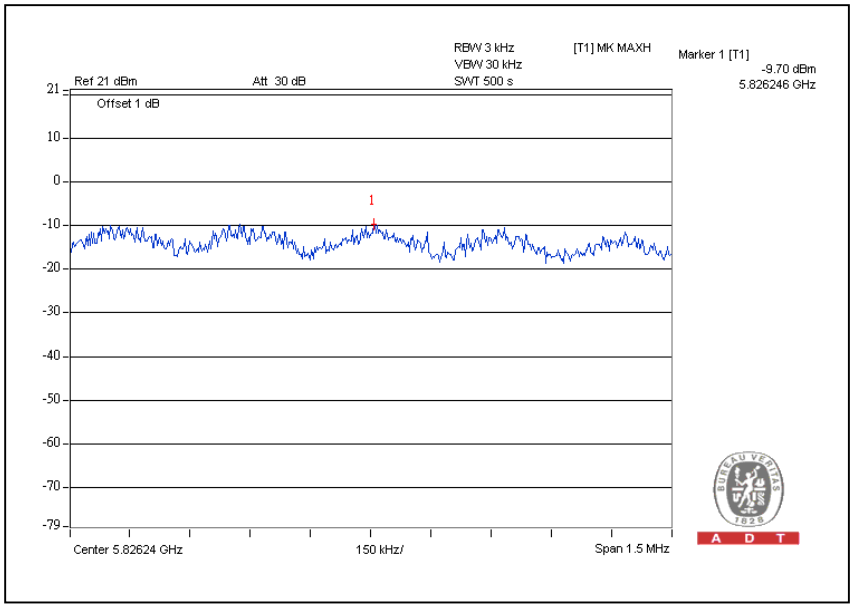
For Chain(0): CH1



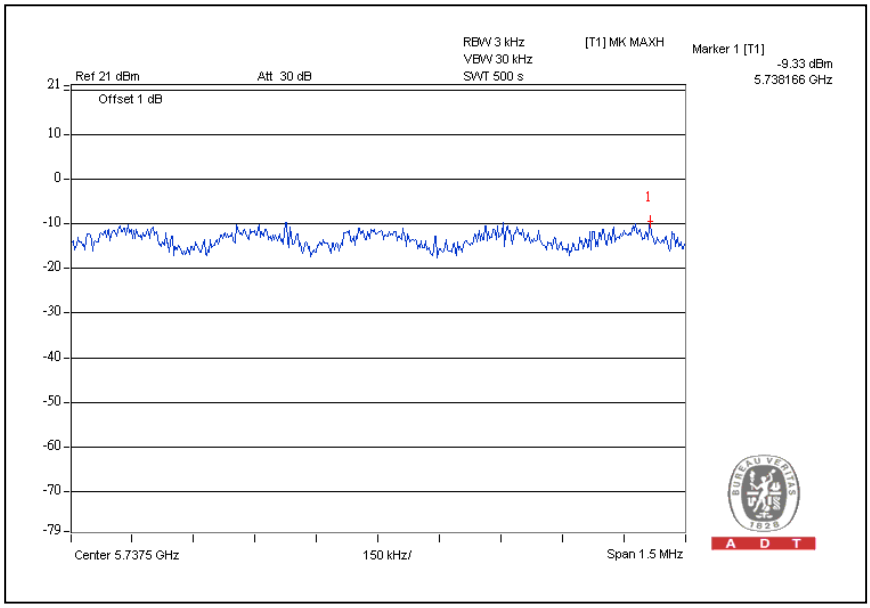
CH3


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-7.84 dBm
5.780887 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 5.78035 GHz
150 kHz/
Span 1.5 MHz

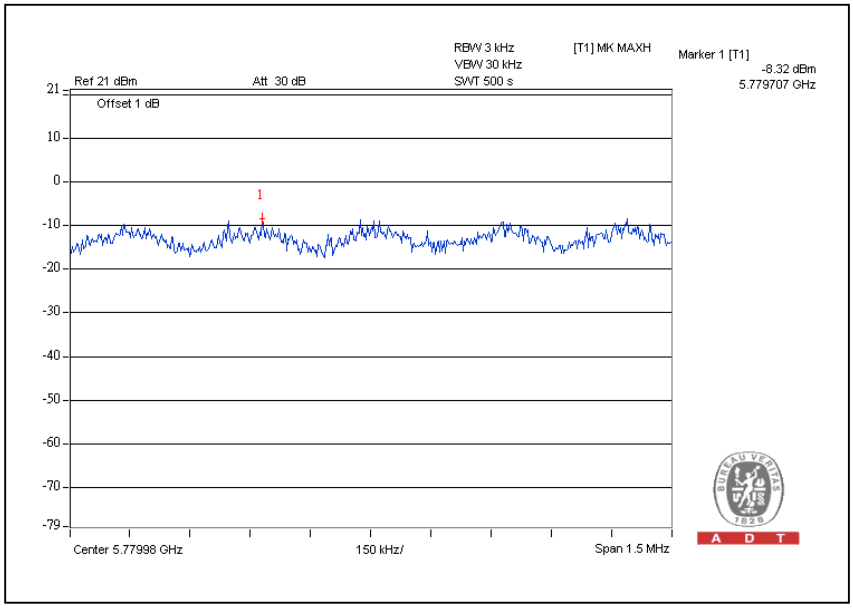
CH5


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-9.70 dBm
5.826246 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 5.82624 GHz
150 kHz/
Span 1.5 MHz

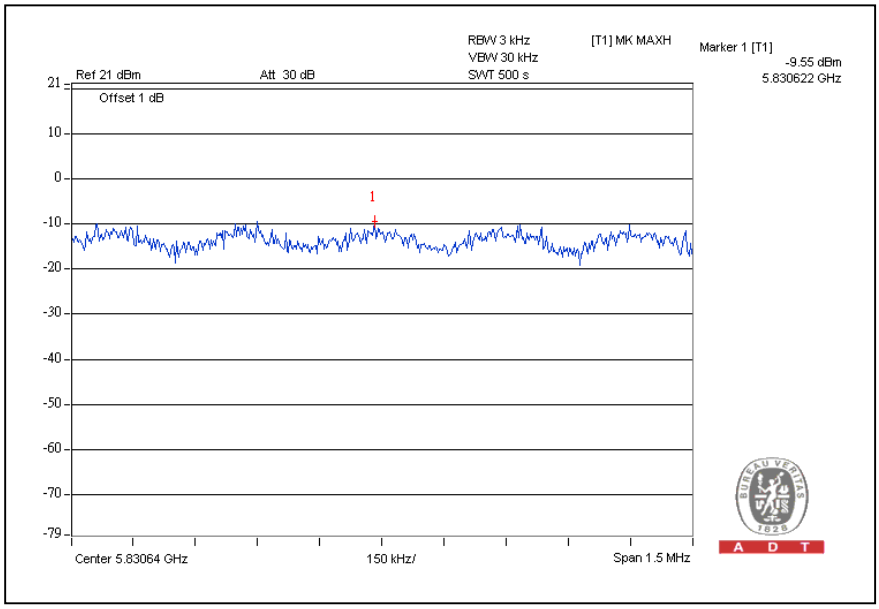
For Chain (1): CH1



CH3



CH5

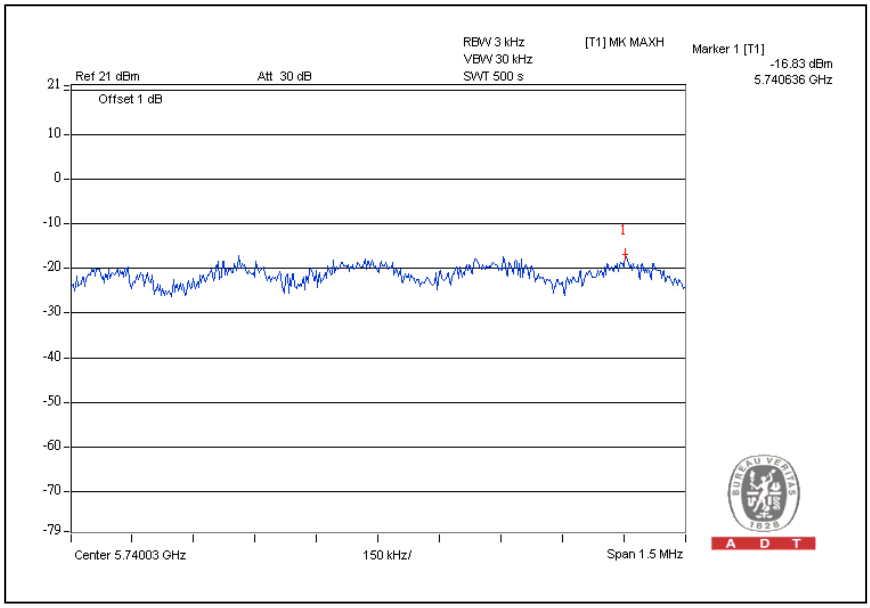

RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-9.55 dBm
5.830622 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 5.83064 GHz
150 kHz/
Span 1.5 MHz

DRAFT 802.11n (40MHz) OFDM MODULATION:

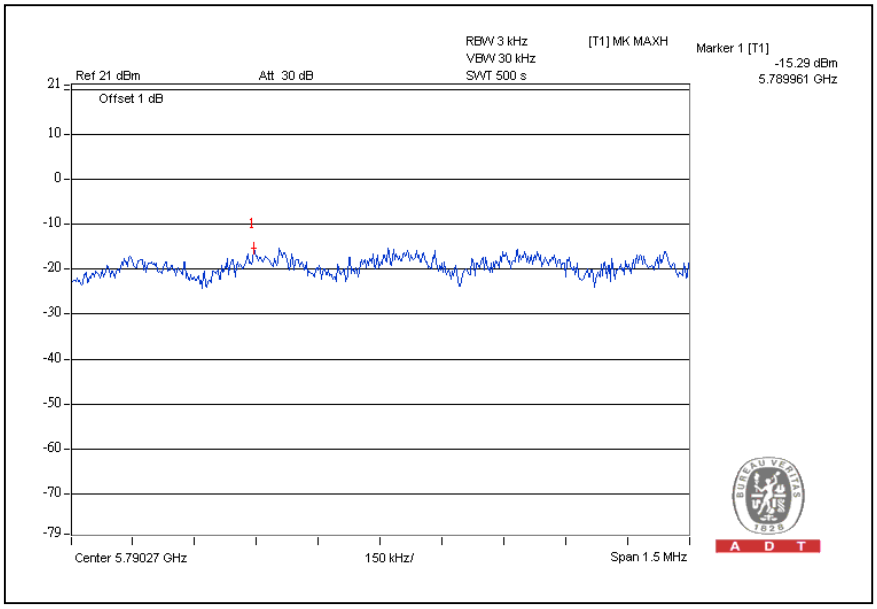
MODULATION TYPE	BPSK	TRANSFER RATE	27Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (mW)		RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(0)	CHAIN(1)				
1	5755	0.021	0.030	-16.83	-15.25	0.051	-12.92	8	PASS
2	5795	0.030	0.045	-15.29	-13.44	0.075	-11.25	8	PASS

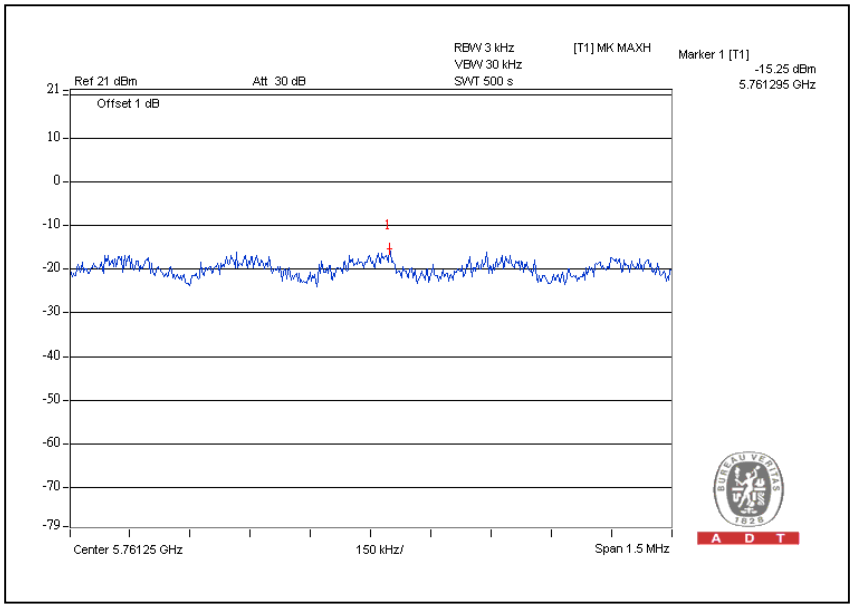
For Chain(0): CH1



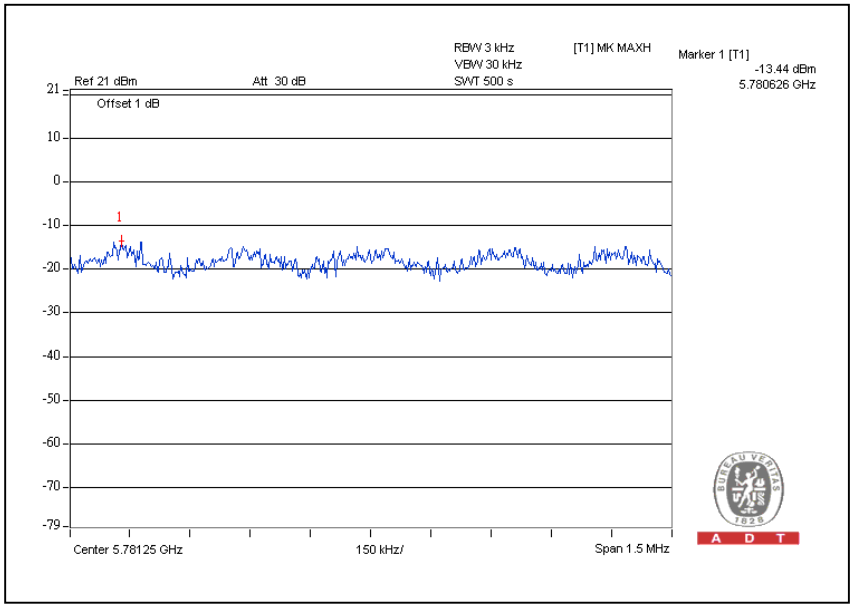
CH2



For Chain (1): CH1



CH2



5.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

5.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2008	Aug. 08, 2009

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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

5.6.3 TEST PROCEDURE

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

5.6.4 DEVIATION FROM TEST STANDARD

No deviation

5.6.5 EUT OPERATING CONDITION

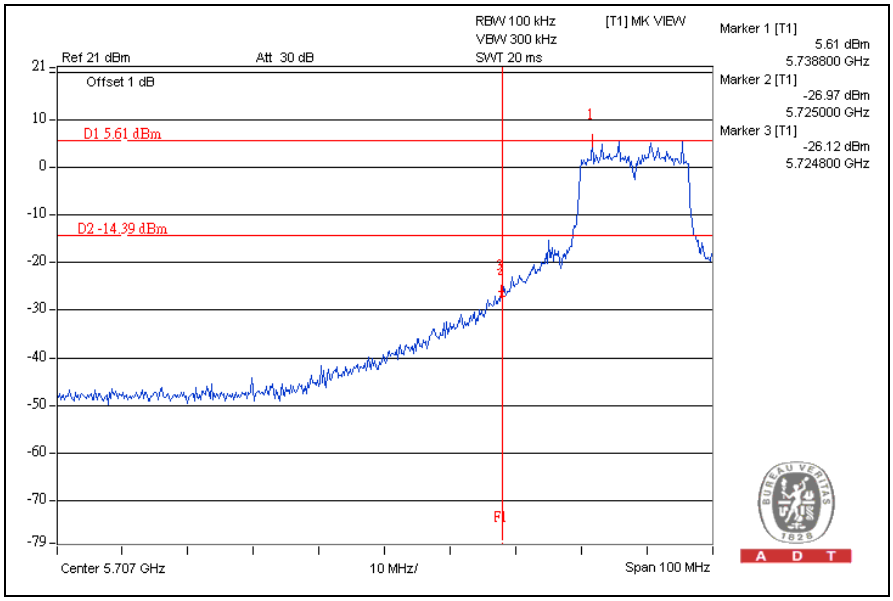
Same as Item 4.3.6

5.6.6 TEST RESULTS

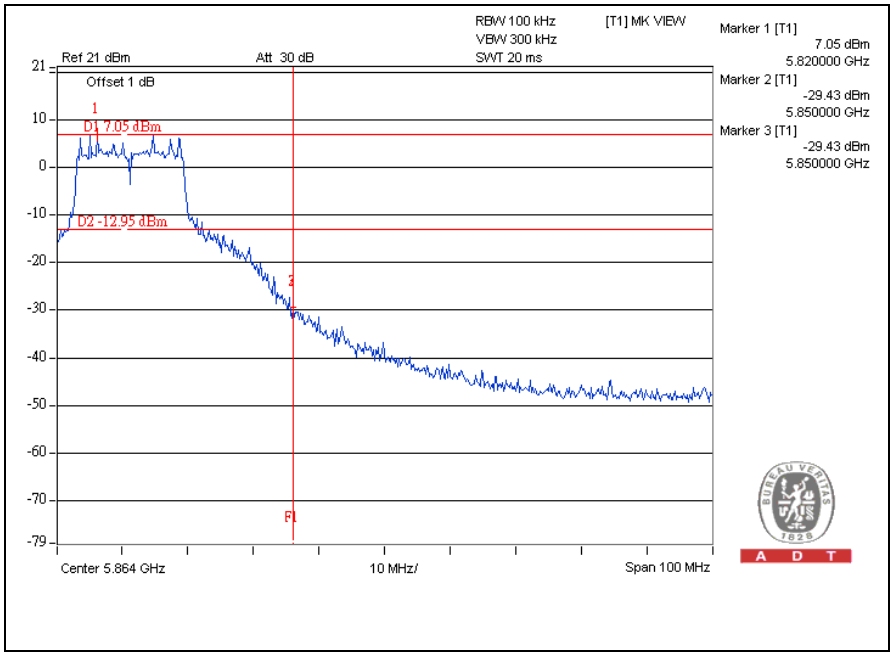
The spectrum plots are attached on the following pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

802.11a OFDM modulation

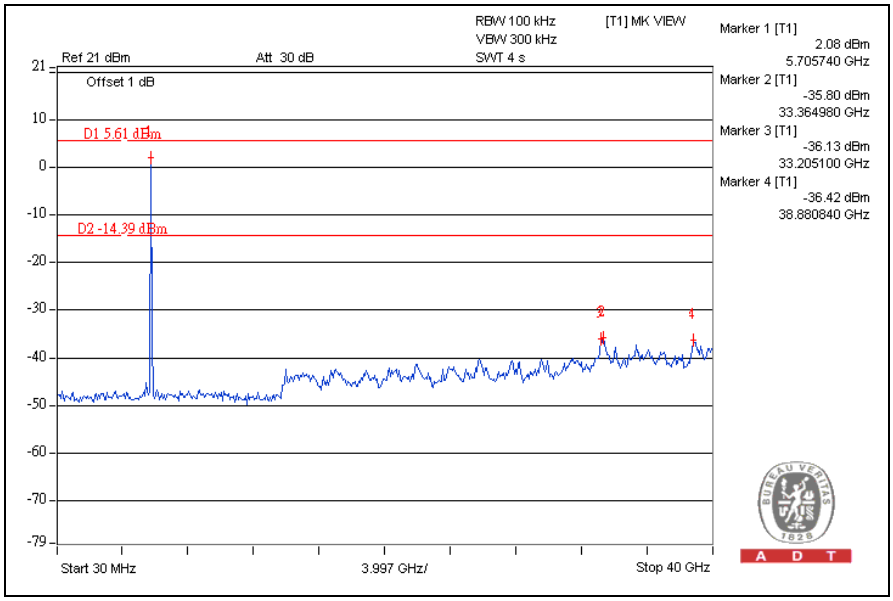
CH1



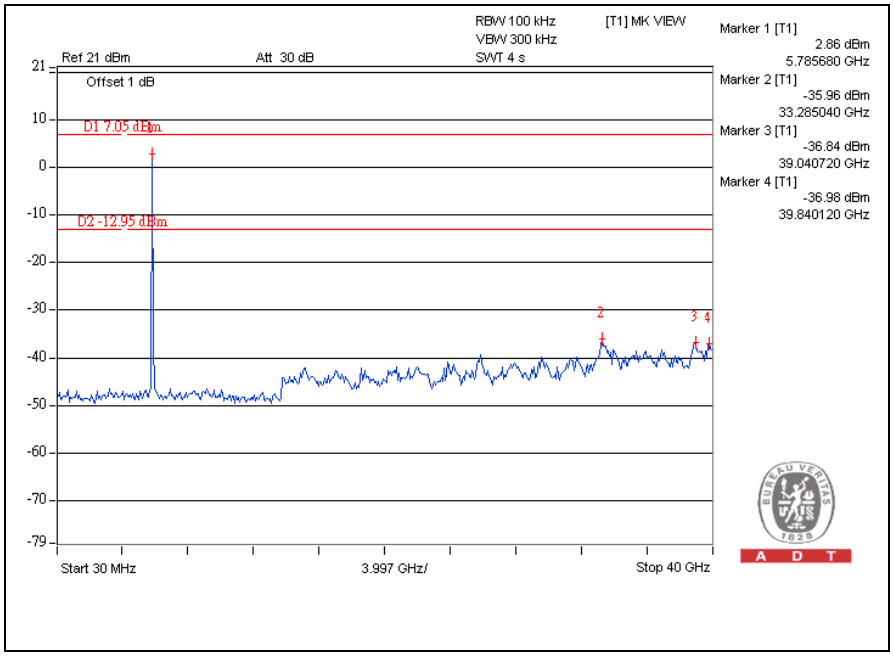
CH5



CH1

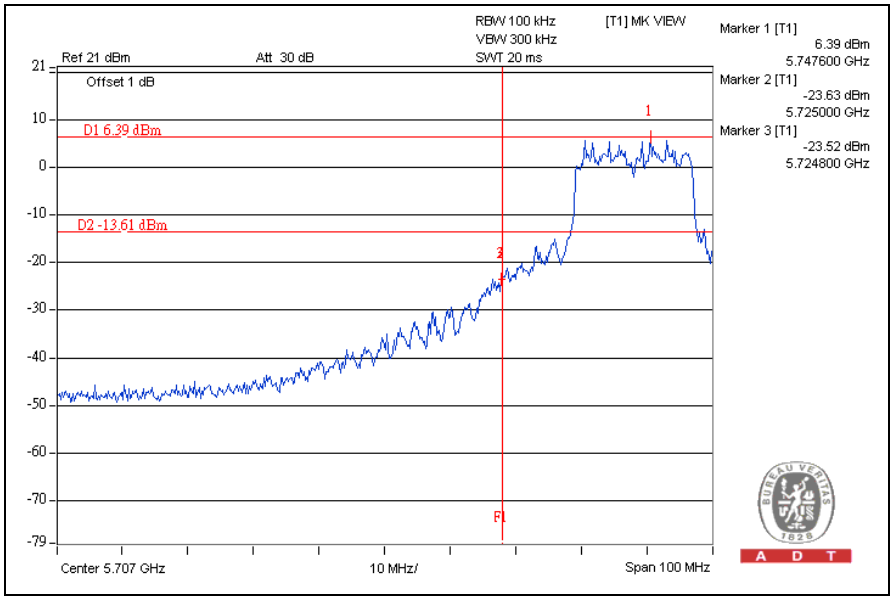

RBW 100 kHz
VBW 300 kHz
SWT 4 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 5.61 dBm
D2 -14.39 dBm
Marker 1 [T1]
2.08 dBm
5.705740 GHz
Marker 2 [T1]
-35.80 dBm
33.364980 GHz
Marker 3 [T1]
-36.13 dBm
33.205100 GHz
Marker 4 [T1]
-36.42 dBm
38.880840 GHz
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Start 30 MHz
3.997 GHz/
Stop 40 GHz

CH5

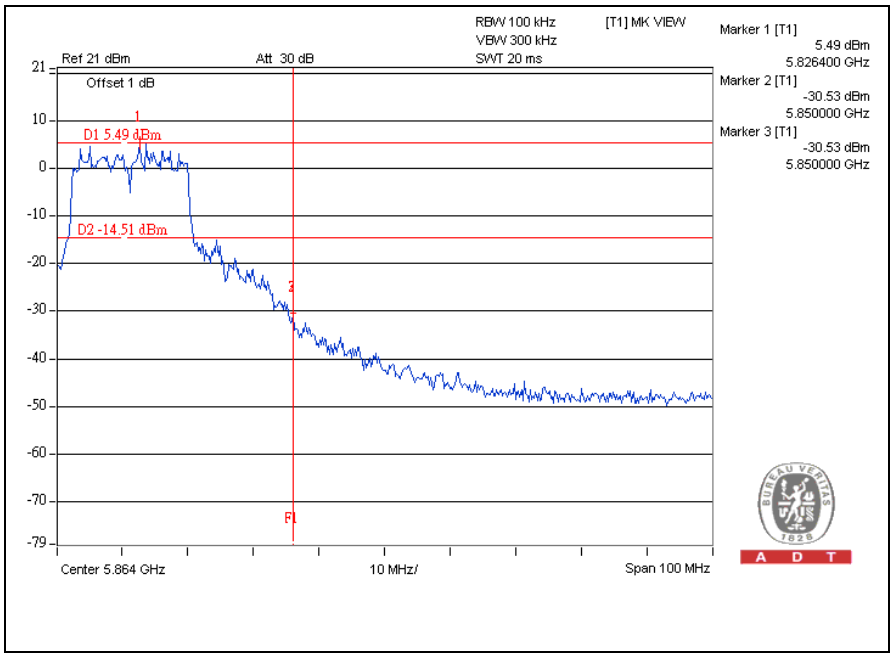

RBW 100 kHz
VBW 300 kHz
SWT 4 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 7.05 dBm
D2 -12.95 dBm
Marker 1 [T1]
2.86 dBm
5.785680 GHz
Marker 2 [T1]
-35.96 dBm
33.285040 GHz
Marker 3 [T1]
-36.84 dBm
39.040720 GHz
Marker 4 [T1]
-36.98 dBm
39.840120 GHz
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Start 30 MHz
3.997 GHz/
Stop 40 GHz

DRAFT 802.11n (20MHz) OFDM MODULATION:

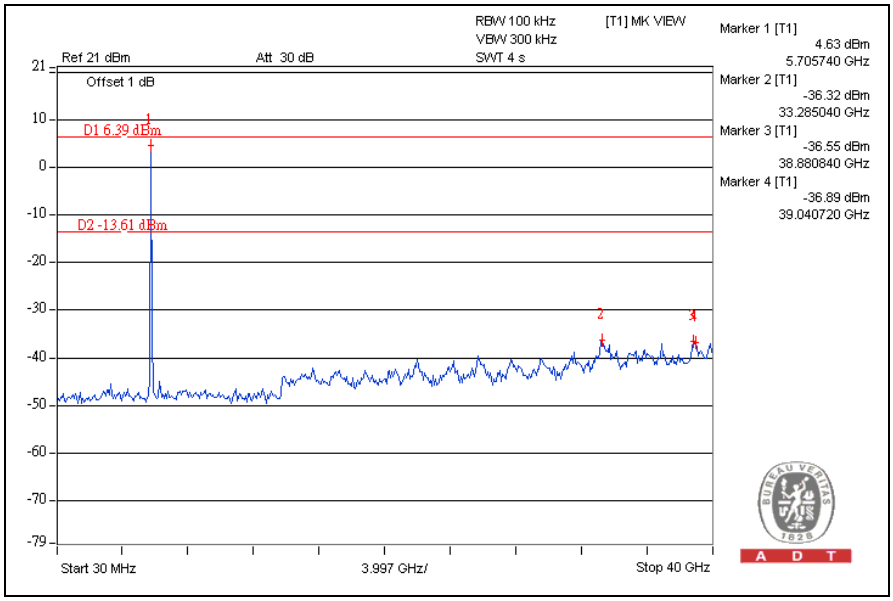
For chain (0) :CH1



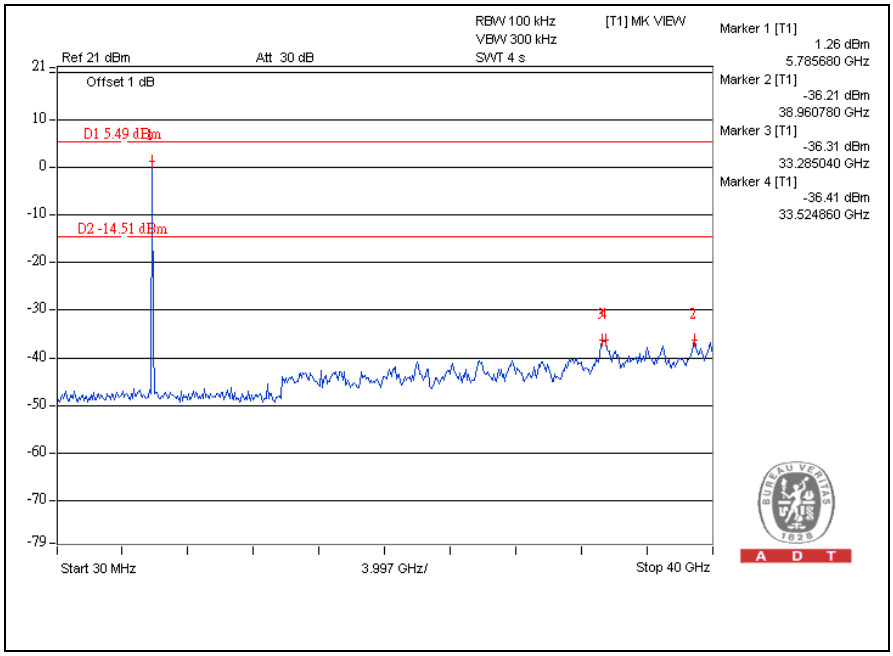
CH5



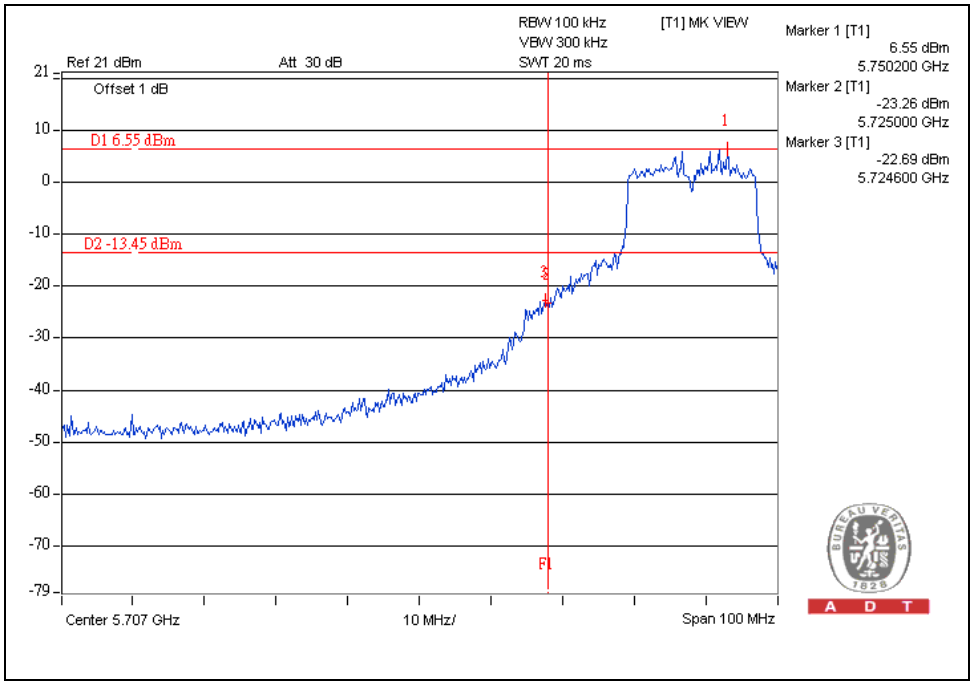
CH1


RBW 100 kHz
VBW 300 kHz
SWT 4 s
[T1] MK VIEW
Marker 1 [T1]
4.63 dBm
5.705740 GHz
Marker 2 [T1]
-36.32 dBm
33.285040 GHz
Marker 3 [T1]
-36.55 dBm
38.880840 GHz
Marker 4 [T1]
-36.89 dBm
39.040720 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 6.39 dBm
D2 -13.61 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Start 30 MHz
3.997 GHz/
Stop 40 GHz

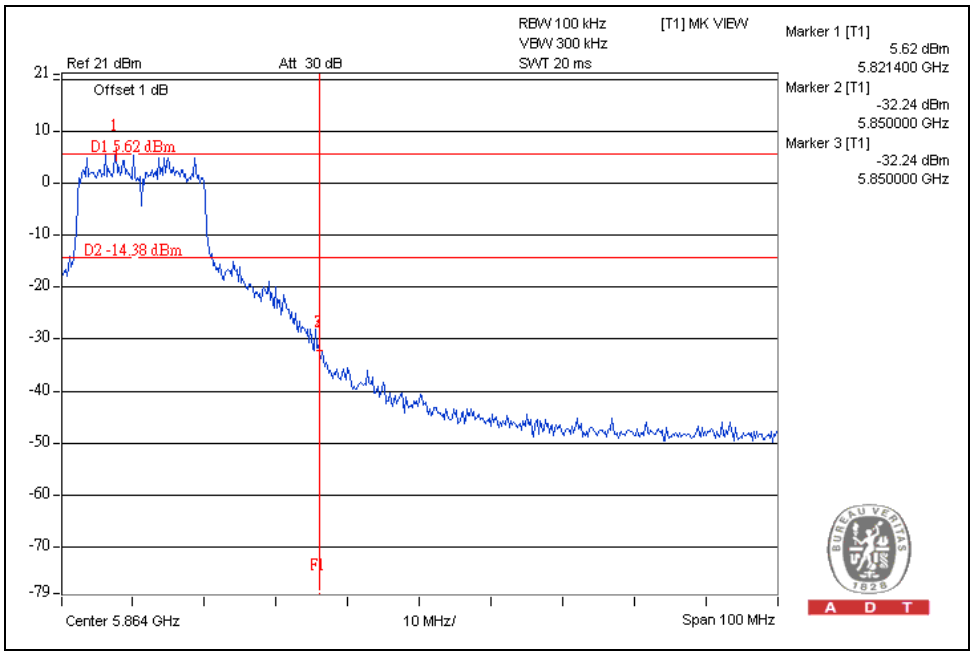
CH5


RBW 100 kHz
VBW 300 kHz
SWT 4 s
[T1] MK VIEW
Marker 1 [T1]
1.26 dBm
5.785680 GHz
Marker 2 [T1]
-36.21 dBm
38.960780 GHz
Marker 3 [T1]
-36.31 dBm
33.285040 GHz
Marker 4 [T1]
-36.41 dBm
33.524860 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 5.49 dBm
D2 -14.51 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Start 30 MHz
3.997 GHz/
Stop 40 GHz

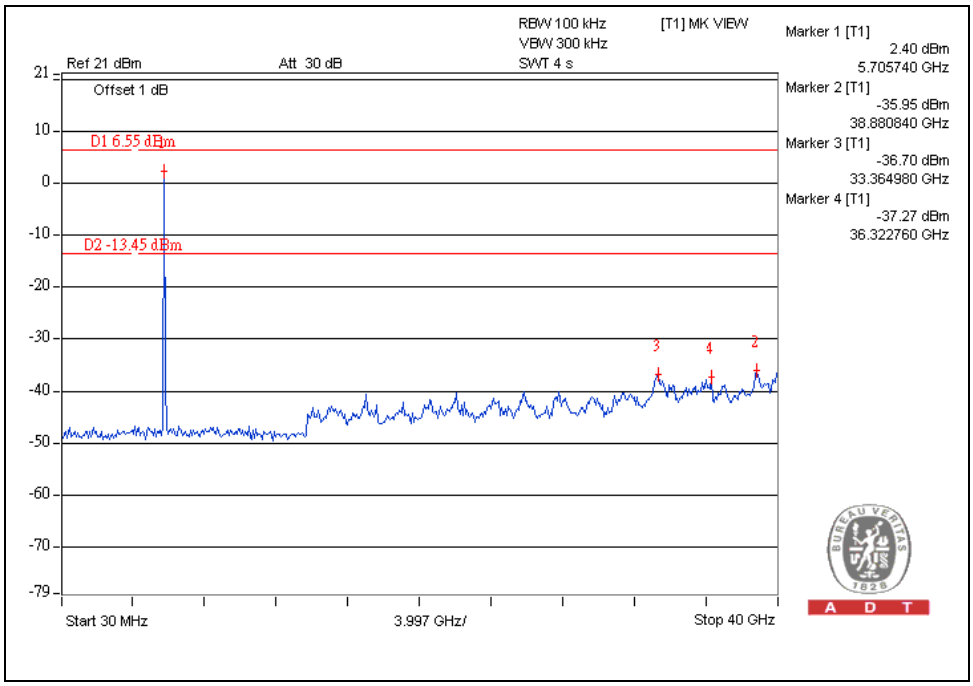
For chain (1):CH1



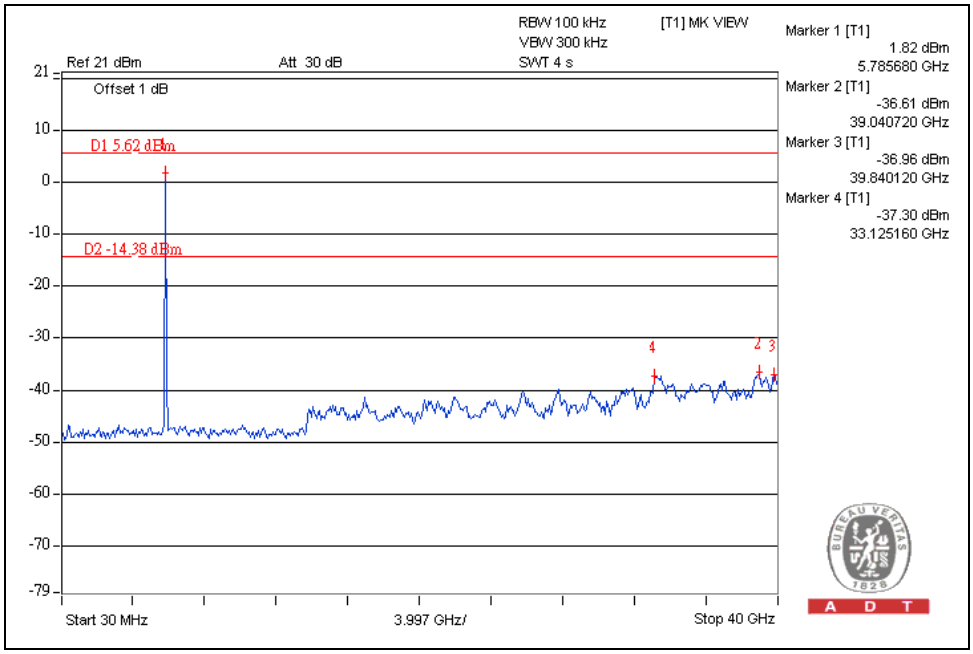
CH5



CH1

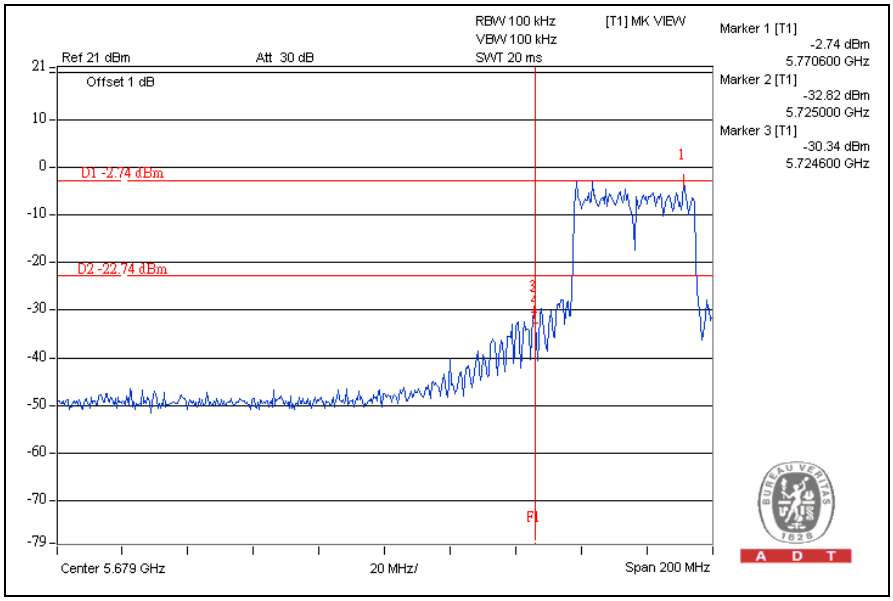

RBW 100 kHz
VBW 300 kHz
SWT 4 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 6.55 dBm
D2 -13.45 dBm
Marker 1 [T1]
2.40 dBm
5.705740 GHz
Marker 2 [T1]
-35.95 dBm
38.880840 GHz
Marker 3 [T1]
-36.70 dBm
33.364980 GHz
Marker 4 [T1]
-37.27 dBm
36.322760 GHz
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Start 30 MHz
3.997 GHz/
Stop 40 GHz

CH5

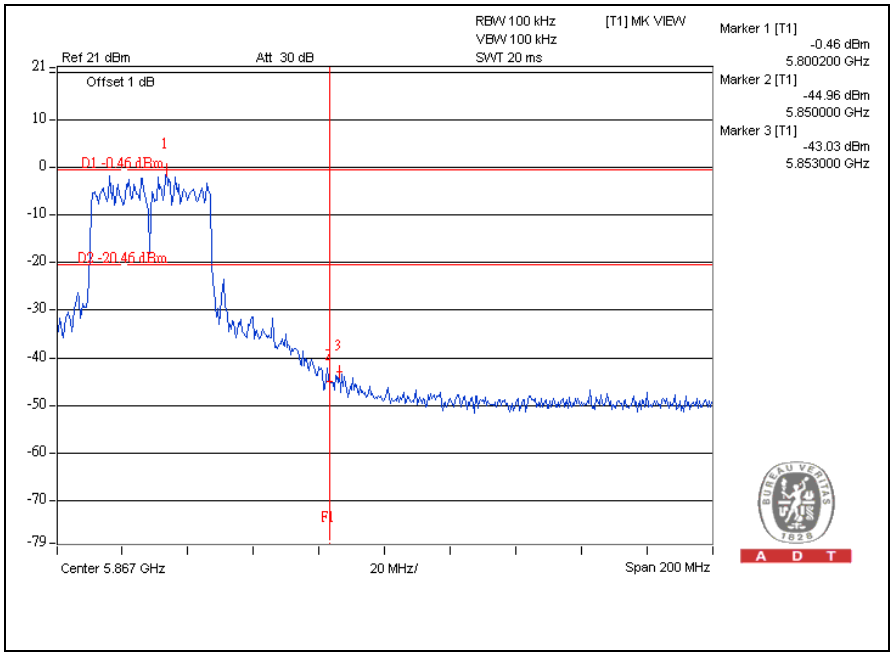

RBW 100 kHz
VBW 300 kHz
SWT 4 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 5.62 dBm
D2 -14.38 dBm
Marker 1 [T1]
1.82 dBm
5.785680 GHz
Marker 2 [T1]
-36.61 dBm
39.040720 GHz
Marker 3 [T1]
-36.96 dBm
39.840120 GHz
Marker 4 [T1]
-37.30 dBm
33.125160 GHz
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Start 30 MHz
3.997 GHz/
Stop 40 GHz

DRAFT 802.11n (40MHz) OFDM MODULATION:

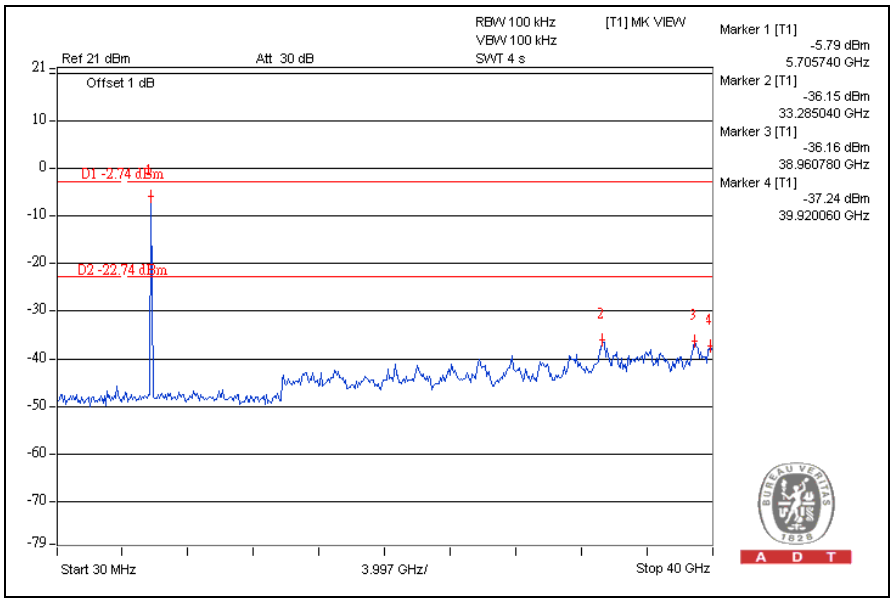
For chain (0) :CH1



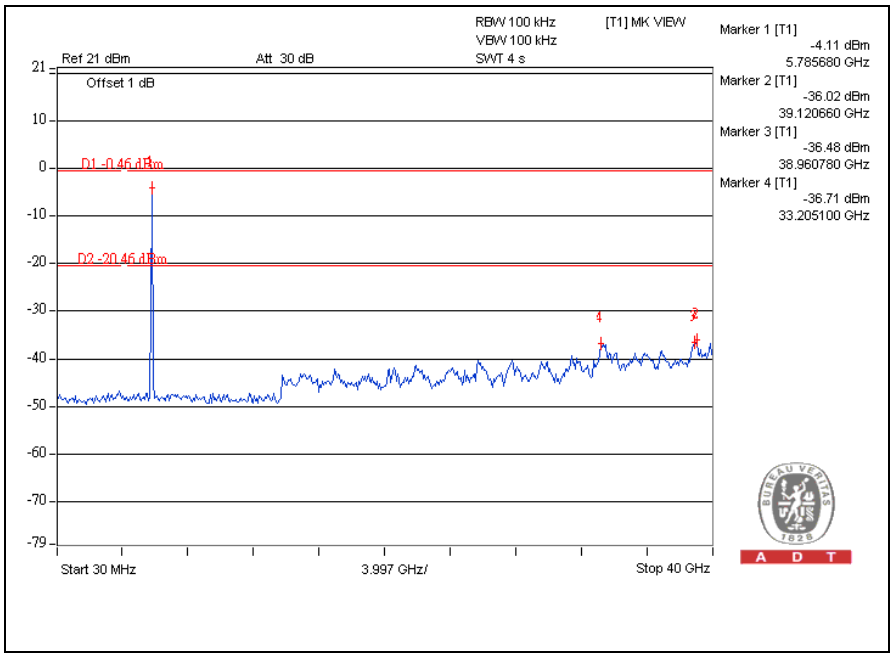
CH2



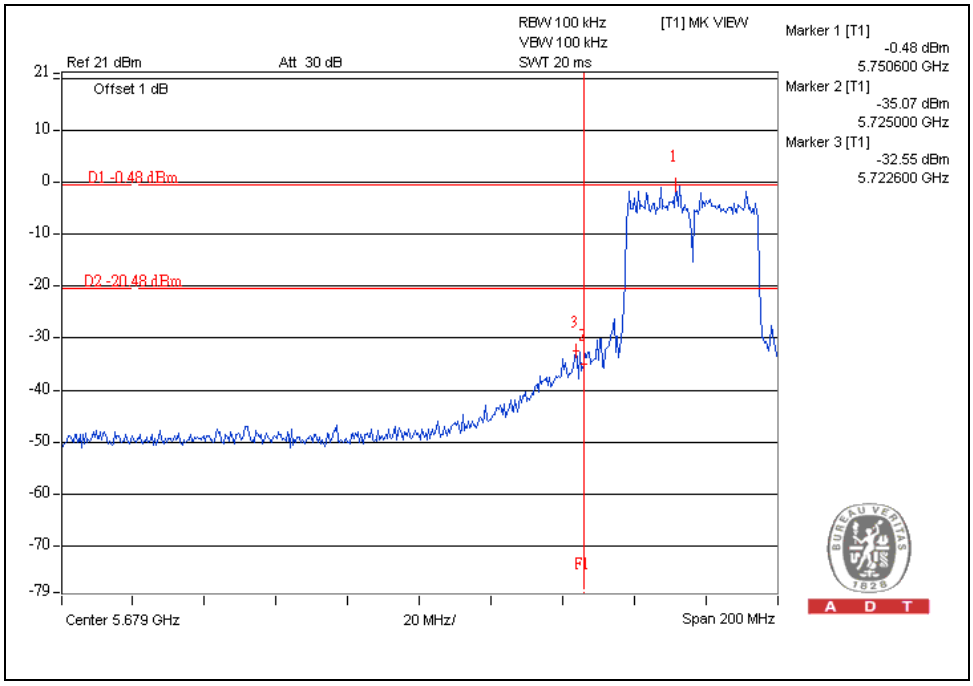
CH1


RBW 100 kHz
VBW 100 kHz
SWT 4 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -2.74 dBm
D2 -22.74 dBm
Marker 1 [T1]
-5.79 dBm
5.705740 GHz
Marker 2 [T1]
-36.15 dBm
33.285040 GHz
Marker 3 [T1]
-36.16 dBm
38.960780 GHz
Marker 4 [T1]
-37.24 dBm
39.920060 GHz
Start 30 MHz
3.997 GHz/
Stop 40 GHz

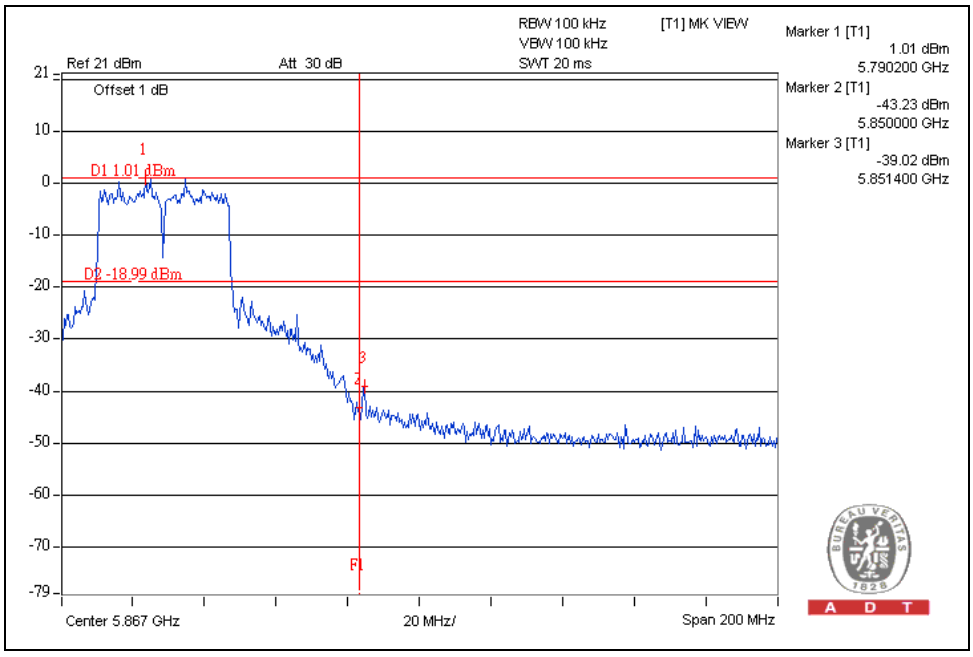
CH2


RBW 100 kHz
VBW 100 kHz
SWT 4 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -0.46 dBm
D2 -20.46 dBm
Marker 1 [T1]
-4.11 dBm
5.785680 GHz
Marker 2 [T1]
-36.02 dBm
39.120660 GHz
Marker 3 [T1]
-36.48 dBm
38.960780 GHz
Marker 4 [T1]
-36.71 dBm
33.205100 GHz
Start 30 MHz
3.997 GHz/
Stop 40 GHz

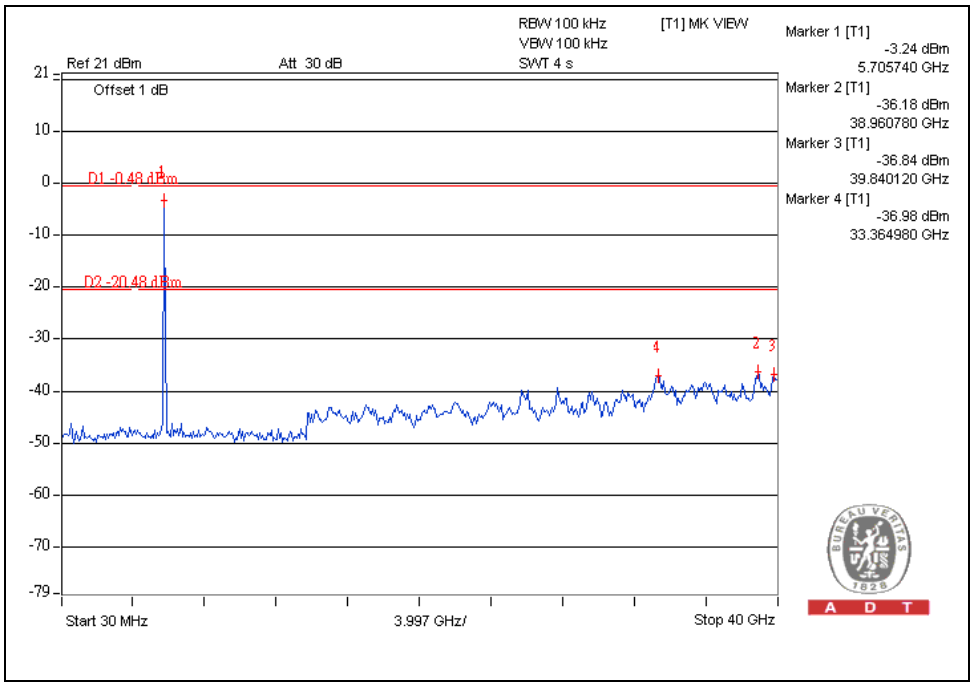
For chain (1) :CH1



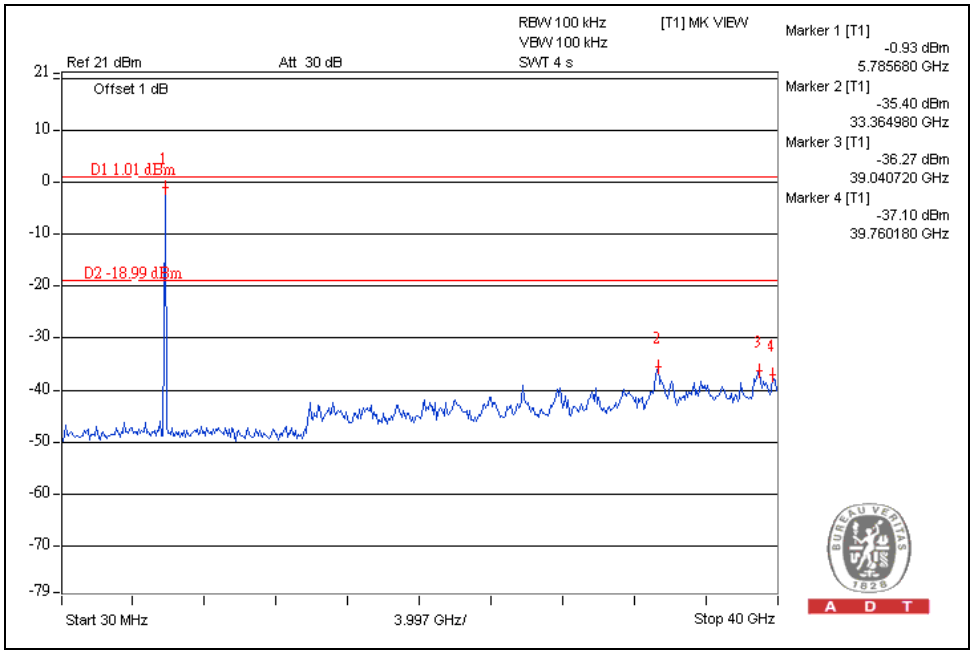
CH2



CH1


RBW 100 kHz
VBW 100 kHz
SWT 4 s
[T1] MK VIEW
Marker 1 [T1]
-3.24 dBm
5.705740 GHz
Marker 2 [T1]
-36.18 dBm
38.960780 GHz
Marker 3 [T1]
-36.84 dBm
39.840120 GHz
Marker 4 [T1]
-36.98 dBm
33.364980 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -1.48 dBm
D2 -20.48 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Start 30 MHz
3.997 GHz/
Stop 40 GHz

CH2


RBW 100 kHz
VBW 100 kHz
SWT 4 s
[T1] MK VIEW
Marker 1 [T1]
-0.93 dBm
5.785680 GHz
Marker 2 [T1]
-35.40 dBm
33.364980 GHz
Marker 3 [T1]
-36.27 dBm
39.040720 GHz
Marker 4 [T1]
-37.10 dBm
39.760180 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 1.01 dBm
D2 -18.99 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Start 30 MHz
3.997 GHz/
Stop 40 GHz

5.7 ANTENNA REQUIREMENT

5.7.1 STANDARD APPLICABLE

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

And according to FCC 47 CFR Section 15.247(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.

5.7.2 ANTENNA CONNECTED CONSTRUCTION

There are three antennas provided to this EUT, please refer to the following table:

Transmitter / Circuit	Antenna Gain			Antenna Type	Connector
	For 2.4GHz Gain (dBi)	For 5.15~ 5.25GHz Gain (dBi)	For 5.725~ 5.850GHz Gain (dBi)		
Chain(0)J9	2.0	4.3	5.6	PIFA	UFL
Chain(1)J14	4.5	5.6	4.9	PIFA	UFL
Chain(2)J10	4.2	4.4	4.5	PIFA	UFL

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: 886-2-26052943

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

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 ---