FCC TEST REPORT (15.247)

REPORT NO.:	RF940617L13
MODEL NO.:	NUB-8301
RECEIVED:	Jun. 15, 2005
TESTED:	Jun. 15 ~ Jun. 27, 2005
ISSUED:	Jun. 29, 2005

APPLICANT:	SENAO INTERNATIONAL CO., LTD.
ADDRESS:	No. 500, Fusing 3rd Rd., Hwa-Ya Technical Park, Kuei-Shan Hsiang, Taoyuan County 333, Taiwan, R.O.C.

ISSUED BY:	Advance Data Technology Corporation
LAB ADDRESS:	No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang 244, Taipei Hsien, Taiwan, R.O.C.
TEST LOCATION:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

0528
ILAC MRA

No. 2177-01

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1. CERTIFICATION

PRODUCT:	Wireless 802.11a/g/b USB Dongle
BRAND NAME:	SENAO
OEM BRAND NAME:	EnGenius
MODEL NO.:	NUB-8301
APPLICANT:	SENAO INTERNATIONAL CO., LTD.
TEST SAMPLE:	ENGINEERING SAMPLE
TESTED:	Jun. 15 ~ Jun. 27, 2005
STANDARDS:	FCC Part 15, Subpart C (Section 15.247), ANSI C63.4-2003

The above equipment has been tested by **Advance Data Technology Corporation,** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Andrea Hsia , **DATE:** Jun. 29, 2005
(Andrea Hsia)

TECHNICAL ACCEPTANCE : Gary Chang , **DATE:** Jun. 29, 2005
Responsible for RF (Gary Chang)

APPROVED BY : , **DATE:** Jun. 29, 2005
(Cody Chang, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

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 –18.48dB at 0.154MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is –1.17dB at 2390.00MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

2.1 MEASUREMENT UNCERTAINTY

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

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.73 dB
	200MHz ~1000MHz	3.74 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Wireless 802.11a/g/b USB Dongle
MODEL NO.	NUB-8301
POWER SUPPLY	5Vdc from host equipment
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b:11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11a: 54/48/36/24/18/12/9/6Mbps
FREQUENCY RANGE	802.11b & 802.11g: 2.412 ~ 2.462GHz 802.11a: 5.150 ~ 5.350GHz and 5.725 ~ 5.850GHz
NUMBER OF CHANNEL	802.11b & 802.11g: 11 802.11a: 12
CHANNEL SPACING	802.11b & 802.11g: 5MHz 802.11a: 20MHz
OUTPUT POWER	59.841mW for 802.11b 57.412mW for 802.11g 28.510mW for 5.150 ~ 5.350GHz 45.604mW for 5.725 ~ 5.850GHz
ANTENNA TYPE	Printed antenna with 2.0dBi gain (for 2.4GHz) Printed antenna with 0dBi gain (for 5.0GHz)
DATA CABLE	NA
I/O PORTS	USB
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11b, 802.11g technology.
2. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 54Mbps.
3. The above EUT information was declared by the 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:

For 802.11b/g: Eleven channels are provided to this EUT.

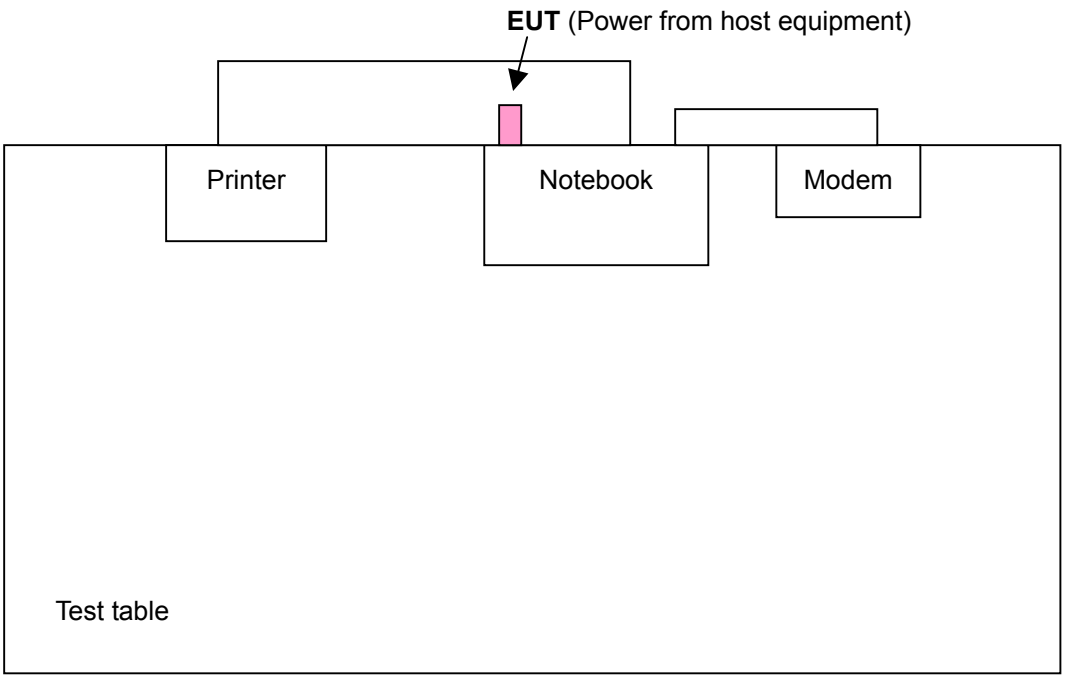
Channel	Frequency	Channel	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

Operated in 5725 ~ 5850MHz band:

For 802.11a: four channels are provided to this EUT.

Channel	Frequency
1	5745 MHz
2	5765 MHz
3	5785 MHz
4	5805 MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 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 RE: Radiated Emission below 1GHz
RE≥1G: Radiated Emission above 1GHz APCM: Antenna Port Conducted Measurement

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)
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11a	1 to 4	3	OFDM	BPSK	6

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)
802.11g	1 to 11	11	OFDM	BPSK	6
802.11a	1 to 4	3	OFDM	BPSK	6

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)
802.11b	1 to 11	1, 6, 11	DSSS	CCK	11
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11a	1 to 4	1, 3, 4	OFDM	BPSK	6

Bandedge Measurement:

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

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 11	DSSS	CCK	11
802.11g	1 to 11	1, 11	OFDM	BPSK	6
802.11a	1 to 4	1, 4	OFDM	BPSK	6

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)
802.11b	1 to 11	1, 6, 11	DSSS	CCK	11
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11a	1 to 4	1, 3, 4	OFDM	BPSK	6

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Wireless 802.11a/g/b USB Dongle. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

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

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

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

3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP05L	12130898320	E2K24CLNS
2	PRINTER	EPSON	LQ-300+	DCGY047265	FCC DoC Approved
3	MODEM	ACEEX	1414V/3	0401008248	IFAXDM1414

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.8 m shielded cable without core
3	1.2 m shielded cable without core

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

4. TEST TYPES AND RESULTS (802.11b & g 2412~2462MHz 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	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 16, 2005
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 09, 2006
LISN SCHWARZBECK	NNBL 8226-2	8226-142	May. 02, 2006
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 15, 2006
Software ADT	ADT_Cond_V3	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 1.

3. The VCCI Site Registration No. is C-2040.

4.1.3 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.

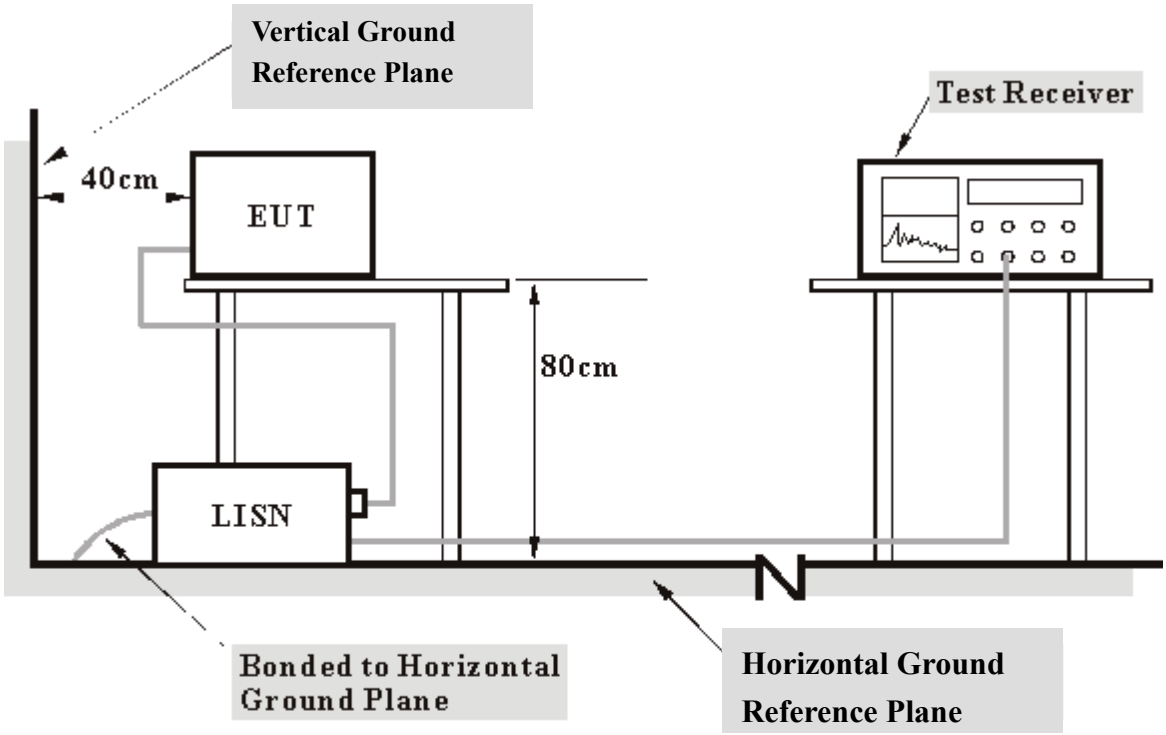
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

4.1.6 EUT OPERATING CONDITIONS

a. Connected the EUT into Notebook placed on a testing table.
b. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
c. The notebook system sent "H" messages to its screen.
d. The notebook system sent “H” messages to modem.
e. The notebook system sent "H" messages to printer, and the printer printed them on paper.
f. Steps c ~ e were repeated.

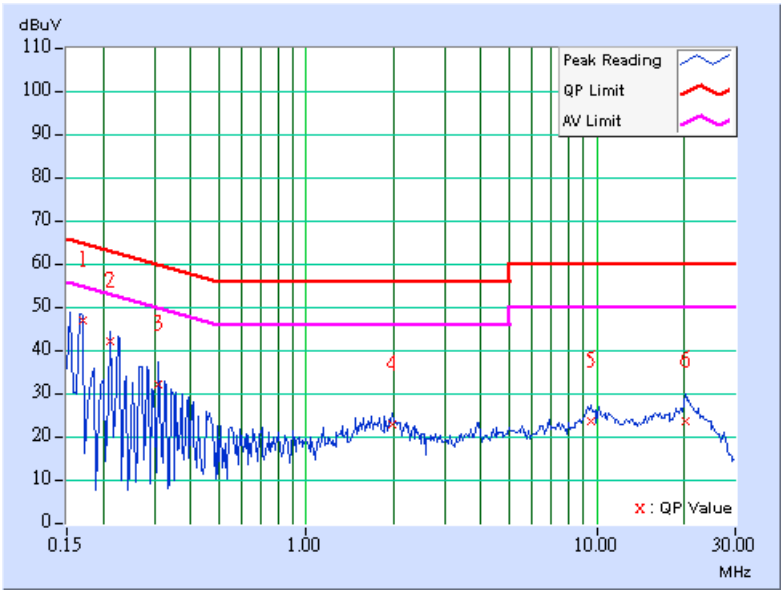
4.1.7 TEST RESULTS

Conducted Worst-Case Data

EUT	Wireless 802.11a/g/b USB Dongle	**MEASUREMENT DETAIL**	
MODEL	NUB-8301	**PHASE**	Line 1
CHANNEL	Channel 1	**6dB BANDWIDTH**	9 kHz
MODULATION TYPE	BPSK	**ENVIRONMENTAL CONDITIONS**	25deg. C, 65%RH, 991hPa
TRANSFER RATE	6Mbps	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.170	0.11	45.87	33.04	45.98	33.15	64.98	54.98	-19.01	-21.84
2	0.213	0.11	41.18	-	41.29	-	63.11	53.11	-21.82	-
3	0.310	0.11	31.02	-	31.13	-	59.97	49.97	-28.84	-
4	1.969	0.26	21.76	-	22.02	-	56.00	46.00	-33.98	-
5	9.590	0.53	22.75	-	23.28	-	60.00	50.00	-36.72	-
6	20.121	1.04	22.85	-	23.89	-	60.00	50.00	-36.11	-

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	Wireless 802.11a/g/b USB Dongle	MEASUREMENT DETAIL	
MODEL	NUB-8301	PHASE	Line 2
CHANNEL	Channel 1	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.154	0.11	44.21	-	44.32	-	65.79	55.79	-21.47	-
2	0.181	0.11	38.23	-	38.34	-	64.43	54.43	-26.09	-
3	0.228	0.11	34.33	-	34.44	-	62.52	52.52	-28.08	-
4	0.392	0.11	24.08	-	24.19	-	58.02	48.02	-33.83	-
5	2.113	0.27	21.57	-	21.84	-	56.00	46.00	-34.16	-
6	9.488	0.44	24.78	-	25.22	-	60.00	50.00	-34.78	-

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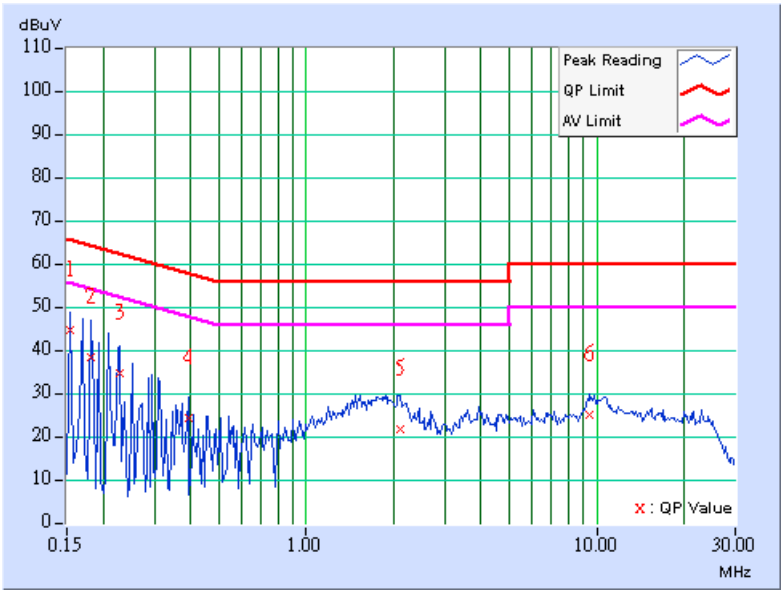
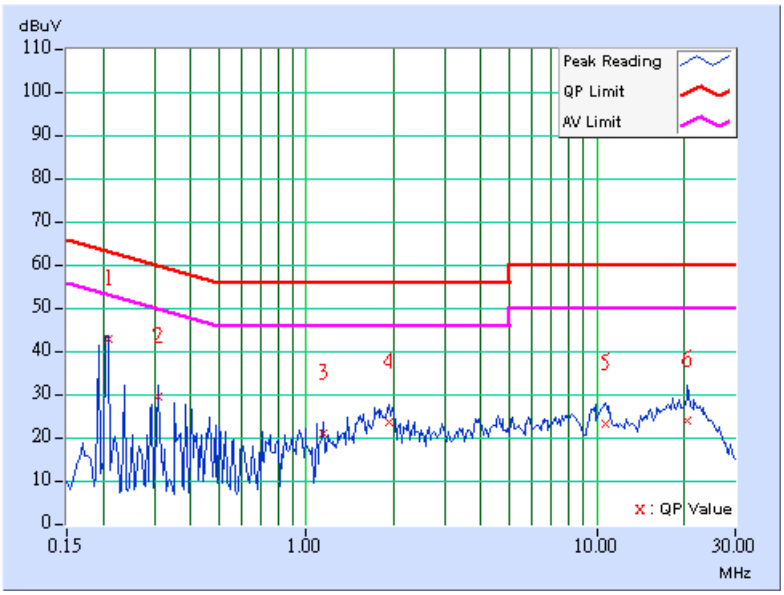
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Wireless 802.11a/g/b USB Dongle	MEASUREMENT DETAIL	
MODEL	NUB-8301	PHASE	Line 1
CHANNEL	Channel 6	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.209	0.11	42.01	-	42.12	-	63.26	53.26	-21.14	-
2	0.310	0.11	28.48	-	28.59	-	59.97	49.97	-31.38	-
3	1.141	0.24	20.18	-	20.42	-	56.00	46.00	-35.58	-
4	1.918	0.26	22.77	-	23.03	-	56.00	46.00	-32.97	-
5	10.754	0.54	22.33	-	22.87	-	60.00	50.00	-37.13	-
6	20.520	1.06	23.17	-	24.23	-	60.00	50.00	-35.77	-

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	Wireless 802.11a/g/b USB Dongle	MEASUREMENT DETAIL	
MODEL	NUB-8301	PHASE	Line 2
CHANNEL	Channel 6	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.11	42.29	-	42.40	-	63.42	53.42	-21.02	-
2	0.263	0.11	29.38	-	29.49	-	61.33	51.33	-31.84	-
3	0.306	0.11	27.06	-	27.17	-	60.07	50.07	-32.90	-
4	1.480	0.25	21.04	-	21.29	-	56.00	46.00	-34.71	-
5	9.461	0.44	23.30	-	23.74	-	60.00	50.00	-36.26	-
6	20.320	0.74	22.95	-	23.69	-	60.00	50.00	-36.31	-

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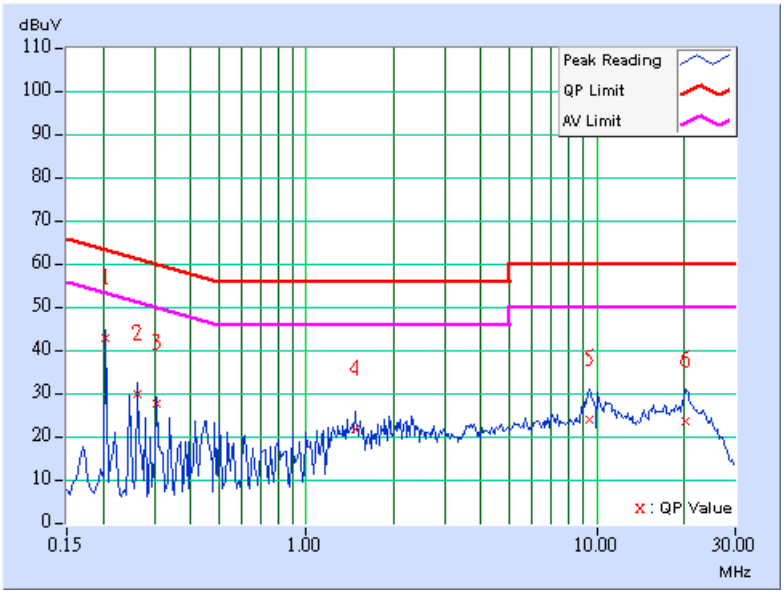
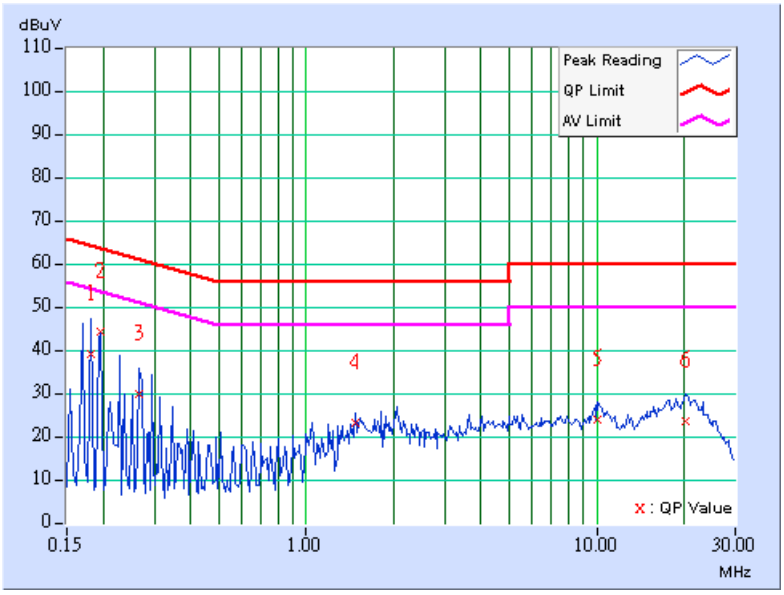
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Wireless 802.11a/g/b USB Dongle	MEASUREMENT DETAIL	
MODEL	NUB-8301	PHASE	Line 1
CHANNEL	Channel 11	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.11	38.11	-	38.22	-	64.43	54.43	-26.21	-
2	0.197	0.11	43.58	-	43.69	-	63.74	53.74	-20.05	-
3	0.267	0.11	29.10	-	29.21	-	61.20	51.20	-31.99	-
4	1.480	0.25	22.26	-	22.51	-	56.00	46.00	-33.49	-
5	10.121	0.54	23.08	-	23.62	-	60.00	50.00	-36.38	-
6	20.262	1.05	22.83	-	23.88	-	60.00	50.00	-36.12	-

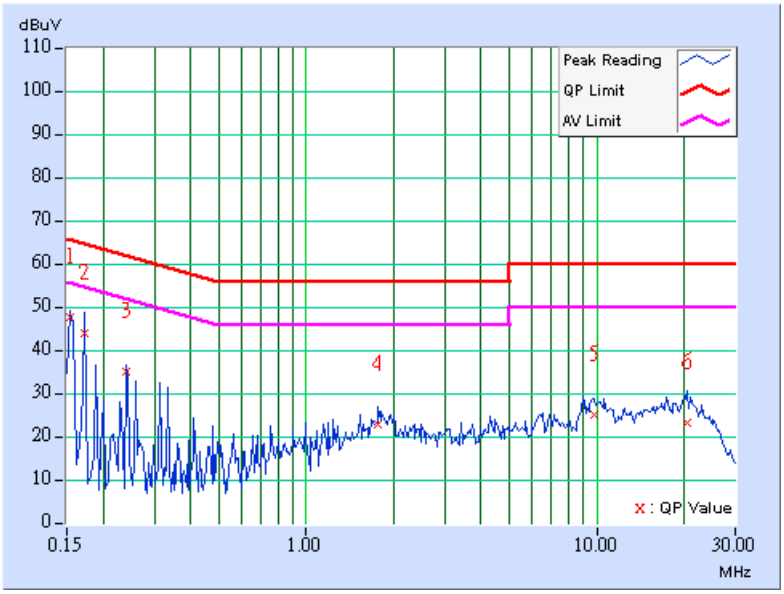
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Wireless 802.11a/g/b USB Dongle	MEASUREMENT DETAIL	
MODEL	NUB-8301	PHASE	Line 2
CHANNEL	Channel 11	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.154**	**0.11**	**47.20**	**29.42**	**47.31**	**29.53**	**65.79**	**55.79**	**-18.48**	**-26.26**
2	0.173	0.11	43.45	-	43.56	-	64.79	54.79	-21.24	-
3	0.240	0.11	34.53	-	34.64	-	62.10	52.10	-27.46	-
4	1.773	0.26	22.29	-	22.55	-	56.00	46.00	-33.45	-
5	9.832	0.44	24.27	-	24.71	-	60.00	50.00	-35.29	-
6	20.402	0.74	22.57	-	23.31	-	60.00	50.00	-36.69	-

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 UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	100033	May. 19, 2006
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Nov. 21, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Jun. 01, 2006
HORN Antenna SCHWARZBECK	9120D	9120D-408	Jan. 17, 2006
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Jan. 23, 2006
Preamplifier Agilent	8447D	2944A10633	Nov. 09, 2005
Preamplifier Agilent	8449B	3008A01964	Nov. 06, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218183/4	Jan. 26, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218195/4	Jan. 26, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA
Turn Table ADT.	TT100.	TT93021703	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 2.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The VCCI Site Registration No. is R-237.

5. The IC Site Registration No. is IC4924-3.

4.2.3 TEST PROCEDURES

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

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

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

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

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

f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

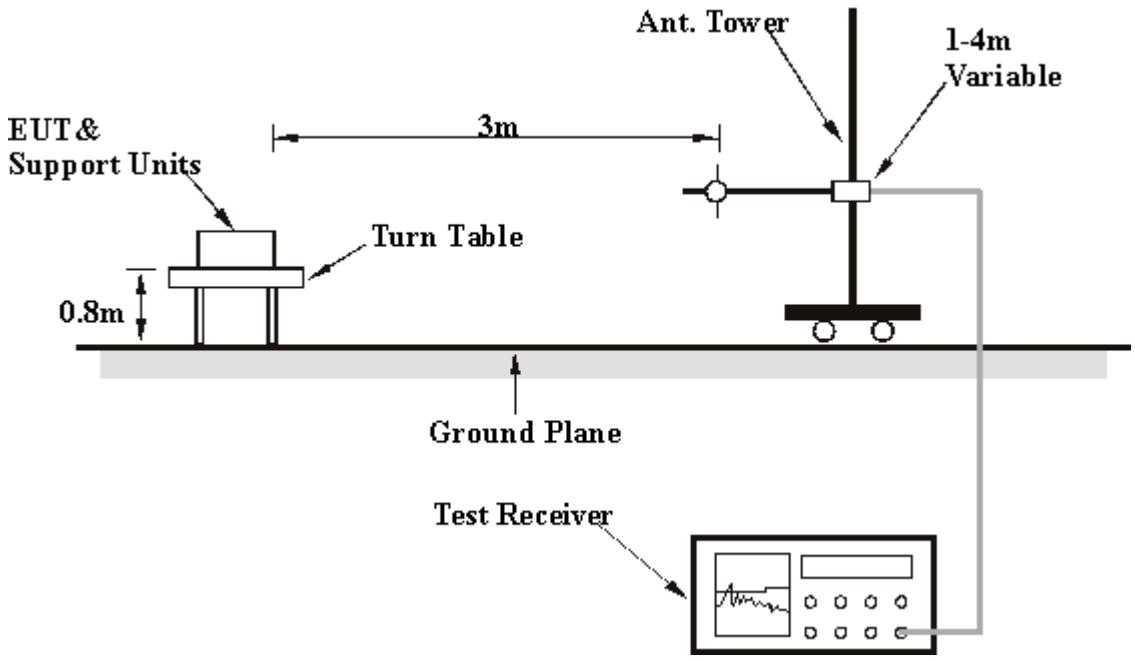
NOTE:

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

Below 1GHz Worst-Case Data

EUT	Wireless 802.11a/g/b USB Dongle	**MEASUREMENT DETAIL**	
MODEL	NUB-8301	**FREQUENCY RANGE**	Below 1000MHz
CHANNEL	Channel 11	**DETECTOR FUNCTION**	Quasi-Peak
MODULATION TYPE	BPSK	**ENVIRONMENTAL CONDITIONS**	22deg. C, 63%RH, 991hPa
TRANSFER RATE	6Mbps	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Mogran Chen		

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	113.59	38.11 QP	43.50	-5.39	1.00 H	142	25.40	12.70
2	199.12	36.72 QP	43.50	-6.78	1.00 H	241	24.79	11.93
3	640.38	33.21 QP	46.00	-12.79	1.00 H	247	11.04	22.17
4	720.08	36.37 QP	46.00	-9.63	1.00 H	247	12.89	23.48
5	799.78	37.74 QP	46.00	-8.26	1.00 H	103	13.17	24.57
6	881.42	37.85 QP	46.00	-8.15	1.00 H	97	12.28	25.57

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	31.94	27.33 QP	40.00	-12.67	1.00 V	4	13.15	14.19
2	113.59	30.81 QP	43.50	-12.69	1.00 V	274	18.11	12.70
3	449.88	32.96 QP	46.00	-13.04	1.00 V	334	14.32	18.64
4	720.08	36.51 QP	46.00	-9.49	1.00 V	319	13.03	23.48
5	799.78	38.36 QP	46.00	-7.64	1.00 V	331	13.78	24.57
6	881.42	41.00 QP	46.00	-5.00	1.50 V	349	15.43	25.57

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

802.11b DSSS modulation

EUT	Wireless 802.11a/g/b USB Dongle	**MEASUREMENT DETAIL**	
MODEL	NUB-8301	**FREQUENCY RANGE**	1 ~ 25GHz
CHANNEL	Channel 1	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
MODULATION TYPE	CCK	**ENVIRONMENTAL CONDITIONS**	25deg. C, 75%RH, 991hPa
TRANSFER RATE	11Mbps	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Mogran Chen		

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	57.08 PK	74.00	-16.92	1.47 H	217	25.76	31.32
1	2390.00	47.78 AV	54.00	-6.22	1.47 H	217	16.46	31.32
2	*2412.00	110.83 PK			1.47 H	217	79.42	31.41
2	*2412.00	107.40 AV			1.47 H	217	75.99	31.41
3	4824.00	50.45 PK	74.00	-23.55	1.24 H	287	13.64	36.81
3	4824.00	44.53 AV	54.00	-9.47	1.24 H	287	7.72	36.81
4	7236.00	53.69 PK	74.00	-20.31	1.30 H	6	11.09	42.60
4	7236.00	46.66 AV	54.00	-7.34	1.30 H	6	4.06	42.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	56.12 PK	74.00	-17.88	1.07 V	0	24.80	31.32
1	2390.00	45.44 AV	54.00	-8.56	1.07 V	0	14.12	31.32
2	*2412.00	108.26 PK			1.07 V	0	76.85	31.41
2	*2412.00	104.82 AV			1.07 V	0	73.41	31.41
3	4824.00	49.12 PK	74.00	-24.88	1.07 V	0	12.31	36.81
4	7236.00	51.78 PK	74.00	-22.22	1.25 V	358	9.18	42.60
4	7236.00	44.70 AV	54.00	-9.30	1.25 V	358	2.10	42.60

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. The limit value is defined as per 15.247
6. " * " : Fundamental frequency

EUT	Wireless 802.11a/g/b USB Dongle	MEASUREMENT DETAIL	
MODEL	NUB-8301	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 6	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	CCK	ENVIRONMENTAL CONDITIONS	25deg. C, 75%RH, 991hPa
TRANSFER RATE	11Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Mogran Chen		

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	112.86 PK			1.37 H	212	81.34	31.52
1	*2437.00	105.01 AV			1.37 H	212	73.49	31.52
2	4874.00	50.61 PK	74.00	-23.39	1.19 H	11	13.66	36.95
2	4874.00	43.82 AV	54.00	-10.18	1.19 H	11	6.87	36.95
3	7311.00	54.02 PK	74.00	-19.98	1.27 H	356	11.22	42.80
3	7311.00	47.04 AV	54.00	-6.96	1.27 H	356	4.24	42.80

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	*2437.00	110.79 PK			1.19 V	352	79.27	31.52
1	*2437.00	103.05 AV			1.19 V	352	71.53	31.52
2	4874.00	49.78 PK	74.00	-24.22	1.14 V	357	12.83	36.95
2	4874.00	42.45 AV	54.00	-11.55	1.14 V	357	5.50	36.95
3	7311.00	52.89 PK	74.00	-21.11	1.10 V	32	10.09	42.80
3	7311.00	45.85 AV	54.00	-8.15	1.10 V	32	3.05	42.80

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. The limit value is defined as per 15.247
6. " * " : Fundamental frequency

EUT	Wireless 802.11a/g/b USB Dongle	MEASUREMENT DETAIL	
MODEL	NUB-8301	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 11	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	CCK	ENVIRONMENTAL CONDITIONS	25deg. C, 75%RH, 991hPa
TRANSFER RATE	11Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Mogran Chen		

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	112.93 PK			1.39 H	208	81.30	31.63
1	*2462.00	105.11 AV			1.39 H	208	73.48	31.63
2	2483.50	55.91 PK	74.00	-18.09	1.39 H	208	24.19	31.72
2	2483.50	46.18 AV	54.00	-7.82	1.39 H	208	14.46	31.72
3	4924.00	50.57 PK	74.00	-23.43	1.09 H	3	13.46	37.10
3	4924.00	43.70 AV	54.00	-10.30	1.09 H	3	6.60	37.10
4	7236.00	53.98 PK	74.00	-20.02	1.28 H	3	11.38	42.60
4	7236.00	46.95 AV	54.00	-7.05	1.28 H	3	4.35	42.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	110.85 PK			1.16 V	335	79.22	31.63
1	*2462.00	103.08 AV			1.16 V	335	71.45	31.63
2	2483.50	54.78 PK	74.00	-19.22	1.16 V	335	23.06	31.72
2	2483.50	42.65 AV	54.00	-11.35	1.16 V	335	10.93	31.72
3	4924.00	49.45 PK	74.00	-24.55	1.14 V	318	12.35	37.10
3	4924.00	42.15 AV	54.00	-11.85	1.14 V	318	5.05	37.10
4	7236.00	52.96 PK	74.00	-21.04	1.15 V	325	10.36	42.60
4	7236.00	45.95 AV	54.00	-8.05	1.15 V	325	3.35	42.60

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. The limit value is defined as per 15.247
6. " * " : Fundamental frequency

802.11g OFDM modulation

EUT	Wireless 802.11a/g/b USB Dongle	**MEASUREMENT DETAIL**	
MODEL	NUB-8301	**FREQUENCY RANGE**	1 ~ 25GHz
CHANNEL	Channel 1	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	**ENVIRONMENTAL CONDITIONS**	25deg. C, 75%RH, 991hPa
TRANSFER RATE	6Mbps	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Mogran Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	68.42 PK	74.00	-5.58	1.43 H	206	37.10	31.32
1	**2390.00**	**52.83 AV**	**54.00**	**-1.17**	**1.43 H**	**206**	**21.51**	**31.32**
2	*2412.00	108.80 PK			1.43 H	206	77.39	31.41
2	*2412.00	99.15 AV			1.43 H	206	67.74	31.41
3	4824.00	56.76 PK	74.00	-17.24	1.20 H	38	19.95	36.81
3	4824.00	43.61 AV	54.00	-10.39	1.20 H	38	6.80	36.81

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	67.01 PK	74.00	-6.99	1.13 V	325	35.69	31.32
1	2390.00	51.09 AV	54.00	-2.91	1.13 V	325	19.77	31.32
2	*2412.00	105.81 PK			1.13 V	325	74.40	31.41
2	*2412.00	96.56 AV			1.13 V	325	65.15	31.41
3	4824.00	54.74 PK	74.00	-19.26	1.26 V	329	17.93	36.81
3	4824.00	41.52 AV	54.00	-12.48	1.26 V	329	4.71	36.81

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

EUT	Wireless 802.11a/g/b USB Dongle	MEASUREMENT DETAIL	
MODEL	NUB-8301	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 6	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 75%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Mogran Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	109.58 PK			1.19 H	199	78.06	31.52
1	*2437.00	100.25 AV			1.19 H	199	68.73	31.52
2	4874.00	56.60 PK	74.00	-17.40	1.11 H	5	19.64	36.95
2	4874.00	44.22 AV	54.00	-9.78	1.11 H	5	7.26	36.95
3	7311.00	55.30 PK	74.00	-18.70	1.39 H	333	12.50	42.80
3	7311.00	40.91 AV	54.00	-13.09	1.39 H	333	-1.89	42.80

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	*2437.00	106.65 PK			1.41 V	215	75.13	31.52
1	*2437.00	97.13 AV			1.41 V	215	65.61	31.52
2	4874.00	54.53 PK	74.00	-19.47	1.32 V	259	17.58	36.95
2	4874.00	42.15 AV	54.00	-11.85	1.32 V	259	5.20	36.95
3	7311.00	52.13 PK	74.00	-21.87	1.12 V	344	9.33	42.80
3	7311.00	38.56 AV	54.00	-15.44	1.12 V	344	-4.24	42.80

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. The limit value is defined as per 15.247
6. " * " : Fundamental frequency

EUT	Wireless 802.11a/g/b USB Dongle	MEASUREMENT DETAIL	
MODEL	NUB-8301	FREQUENCY RANGE	1 ~ 25GHz
CHANNEL	Channel 11	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 75%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Mogran Chen		

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	108.58 PK			1.45 H	207	76.95	31.63
1	*2462.00	99.42 AV			1.45 H	207	67.79	31.63
2	2483.50	68.78 PK	74.00	-5.22	1.45 H	207	37.06	31.72
2	2483.50	50.23 AV	54.00	-3.77	1.45 H	207	18.51	31.72
3	4924.00	56.64 PK	74.00	-17.36	1.04 H	305	19.53	37.10
3	4924.00	44.88 AV	54.00	-9.12	1.04 H	305	7.77	37.10

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	105.58 PK			1.24 V	359	73.95	31.63
1	*2462.00	96.43 AV			1.24 V	359	64.80	31.63
2	2483.50	66.77 PK	74.00	-7.23	1.24 V	359	35.05	31.72
2	2483.50	49.07 AV	54.00	-4.93	1.24 V	359	17.35	31.72
3	4924.00	51.92 PK	74.00	-22.08	1.37 V	0	14.81	37.10
3	4924.00	42.18 AV	54.00	-11.82	1.37 V	0	5.07	37.10

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

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 Until
SPECTRUM ANALYZER	FSEK 30	100049	Aug. 12, 2005

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

4.3.3 TEST PROCEDURE

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP

4.3.6 EUT OPERATING CONDITIONS

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

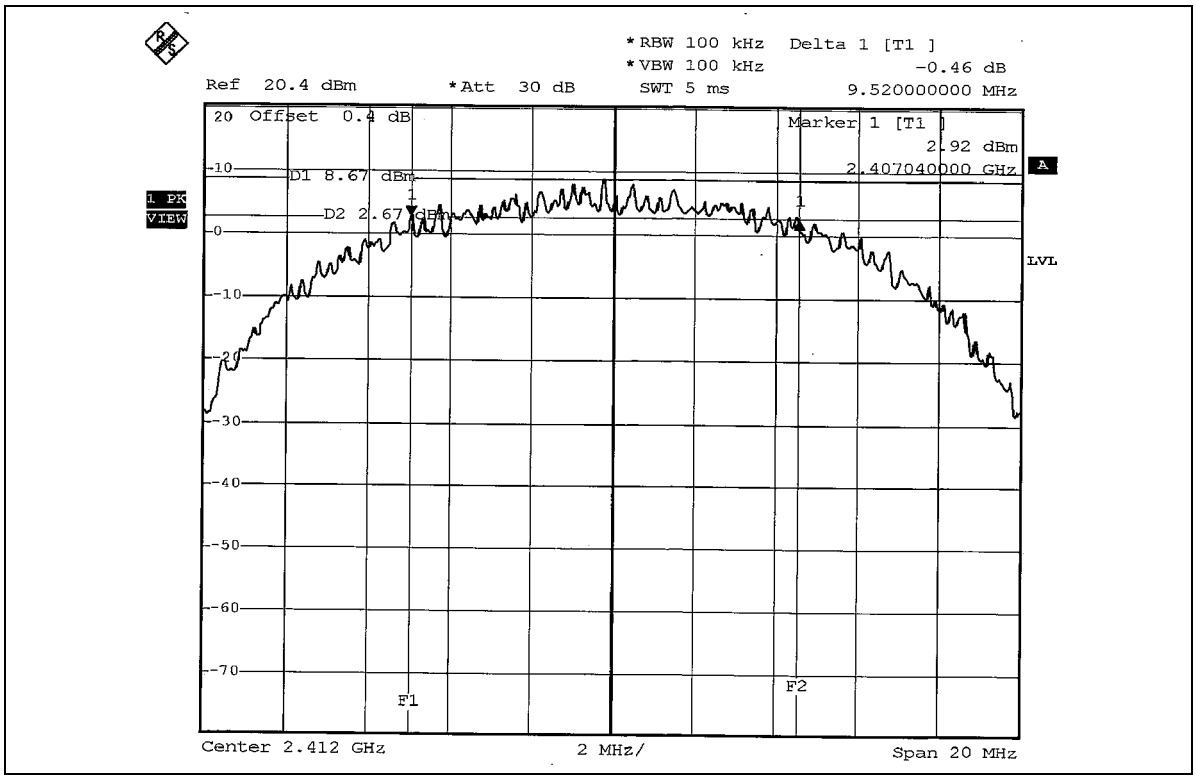
4.3.7 TEST RESULTS

802.11b DSSS modulation

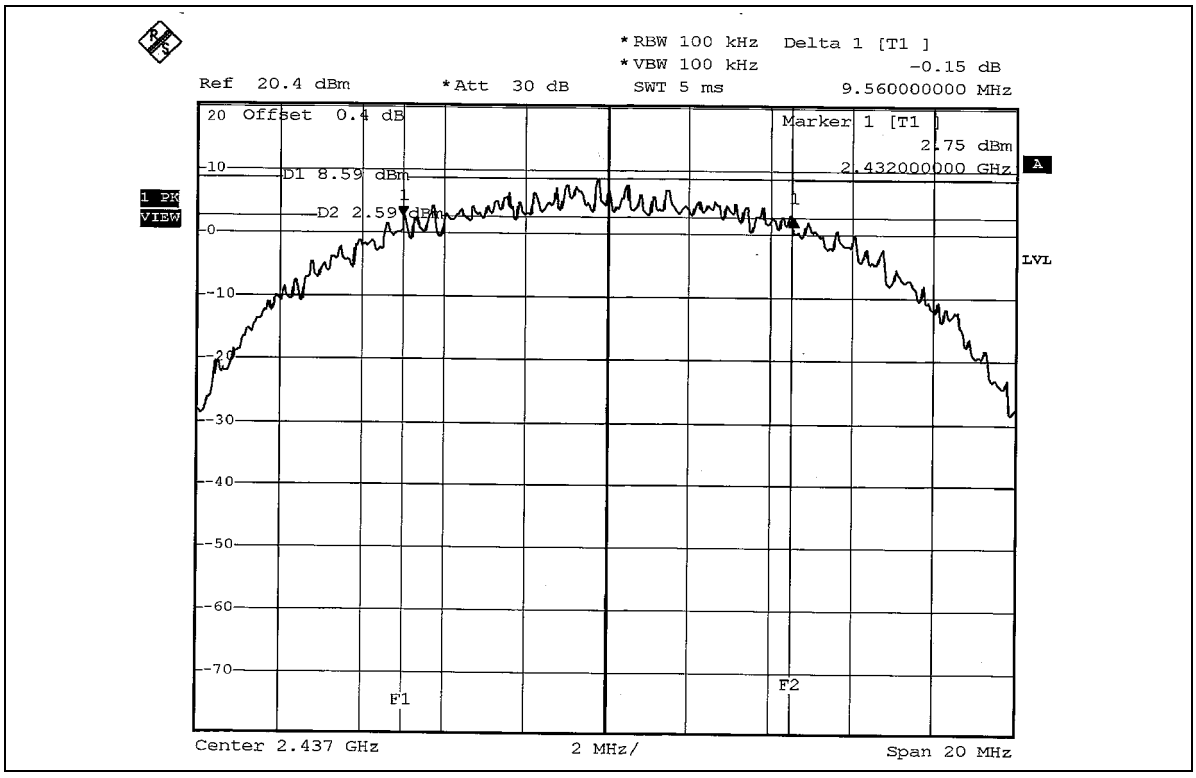
EUT	Wireless 802.11a/g/b USB Dongle	**MODEL**	NUB-8301
MODULATION TYPE	CCK	**TRANSFER RATE**	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 991hPa
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	9.52	0.5	PASS
6	2437	9.56	0.5	PASS
11	2462	9.44	0.5	PASS

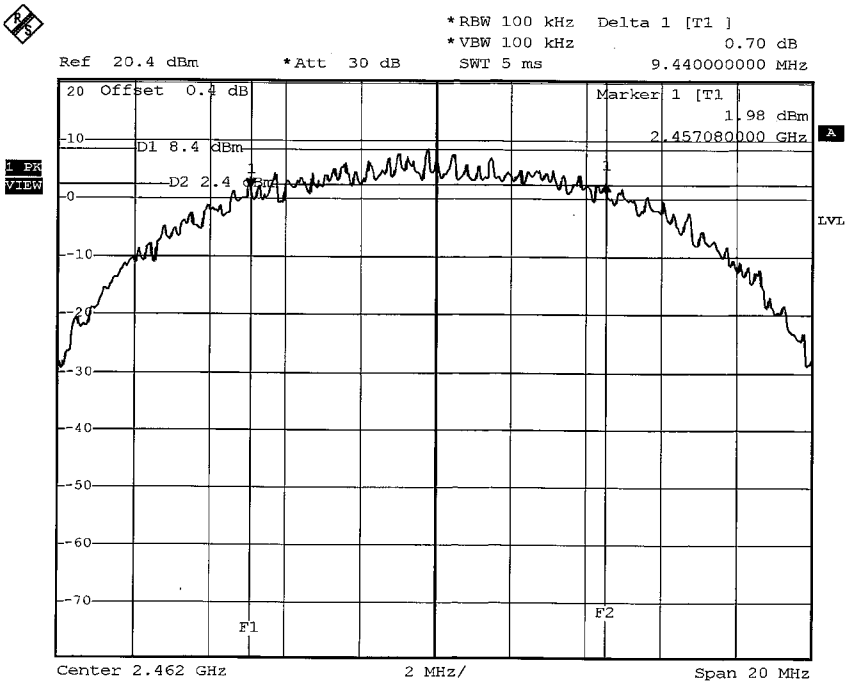
CH 1


*RBW 100 kHz
*VBW 100 kHz
SWT 5 ms
Delta 1 [T1]
-0.46 dB
9.520000000 MHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 1 [T1]
2.92 dBm
2.407040000 GHz
D1 8.67 dBm
D2 2.67 dBm
1 PK
VIEW
A
LVL
-10
0
-10
-20
-30
-40
-50
-60
-70
F1
F2
Center 2.412 GHz
2 MHz/
Span 20 MHz

CH 6


*RBW 100 kHz
*VBW 100 kHz
SWT 5 ms
Delta 1 [T1]
-0.15 dB
9.560000000 MHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 1 [T1]
2.75 dBm
2.432000000 GHz
D1 8.59 dBm
D2 2.59 dBm
1 PK
VIEW
A
LVL
-10
0
-10
-20
-30
-40
-50
-60
-70
F1
F2
Center 2.437 GHz
2 MHz/
Span 20 MHz

CH 11

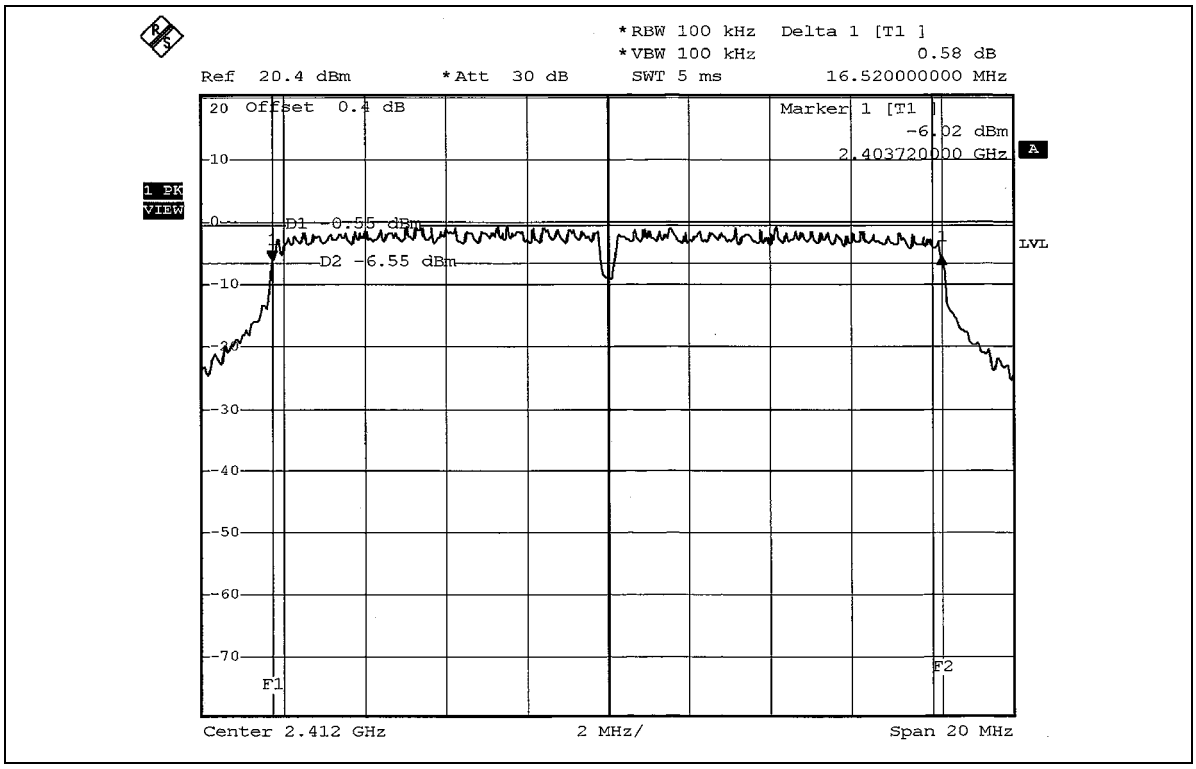

*RBW 100 kHz
*VBW 100 kHz
SWT 5 ms
Delta 1 [T1]
0.70 dB
9.440000000 MHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 1 [T1]
1.98 dBm
2.457080000 GHz
D1 8.4 dBm
D2 2.4 dBm
LVL
F1
F2
Center 2.462 GHz
2 MHz/
Span 20 MHz

802.11g OFDM modulation

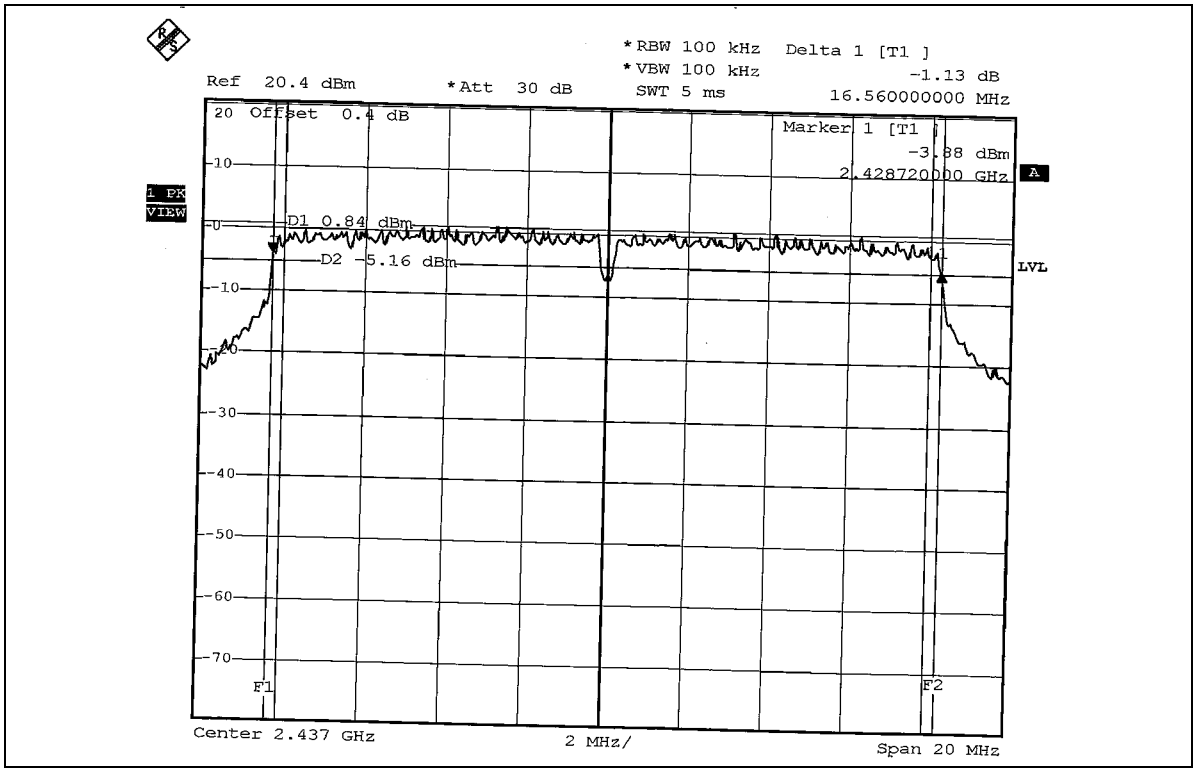
EUT	Wireless 802.11a/g/b USB Dongle	**MODEL**	NUB-8301
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 991hPa
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	16.52	0.5	PASS
6	2437	16.56	0.5	PASS
11	2462	16.52	0.5	PASS

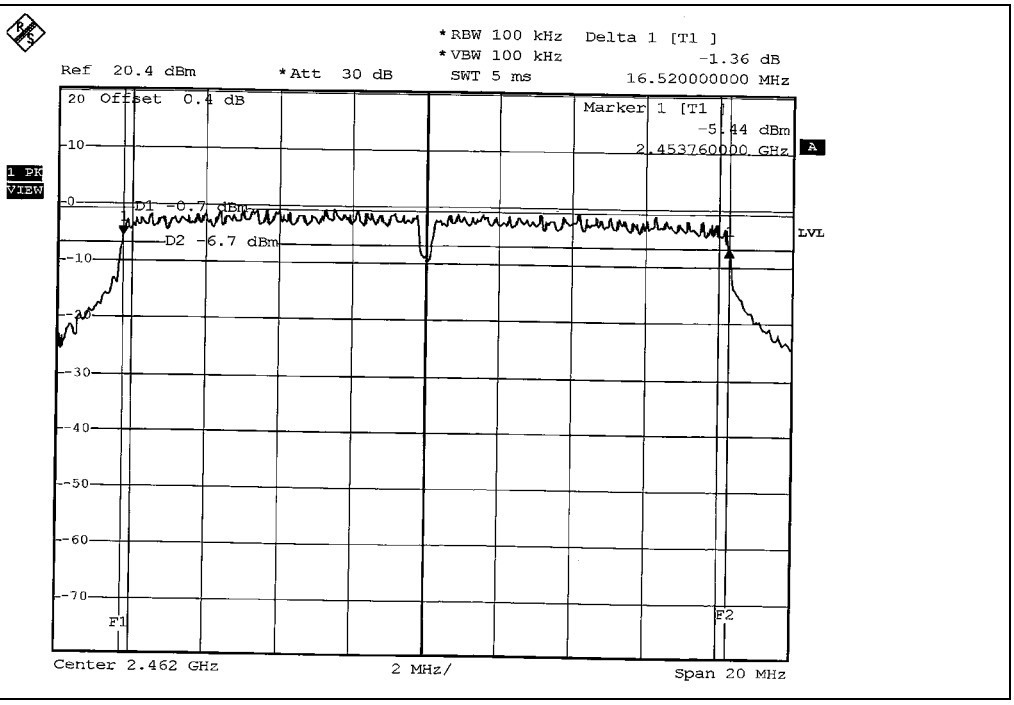
CH 1


*RBW 100 kHz
*VBW 100 kHz
SWT 5 ms
Delta 1 [T1]
0.58 dB
16.520000000 MHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 1 [T1]
-6.02 dBm
2.403720000 GHz
1 PK VIEW
D1 -0.55 dBm
D2 -6.55 dBm
LVL
F1
F2
Center 2.412 GHz
2 MHz/
Span 20 MHz

CH 6


*RBW 100 kHz
*VBW 100 kHz
SWT 5 ms
Delta 1 [T1]
-1.13 dB
16.560000000 MHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 1 [T1]
-3.88 dBm
2.428720000 GHz
1 PK VIEW
D1 0.84 dBm
D2 -5.16 dBm
LVL
F1
F2
Center 2.437 GHz
2 MHz/
Span 20 MHz

CH 11


*RBW 100 kHz
*VBW 100 kHz
SWT 5 ms
Delta 1 [T1]
-1.36 dB
16.520000000 MHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 1 [T1]
-5.44 dBm
2.453760000 GHz
1 PK
VIEW
A
LVL
D1 -0.7 dBm
D2 -6.7 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
F1
F2
Center 2.462 GHz
2 MHz/
Span 20 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 Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005
AGILENT SIGNAL GENERATOR	E8257C	MY43320668	Dec. 31, 2005
TEKTRONIX OSCILLOSCOPE	TDS 1012	C019167	Feb. 01, 2006
NARDA DETECTOR	4503A	FSCM99899	NA

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

4.4.1 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. Record the power level.

4.4.2 DEVIATION FROM TEST STANDARD

No deviation

4.4.3 TEST SETUP

4.4.4 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.3 TEST RESULTS

802.11b DSSS modulation

EUT	Wireless 802.11a/g/b USB Dongle	**MODEL**	NUB-8301
MODULATION TYPE	CCK	**TRANSFER RATE**	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 991hPa
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	59.841	17.77	30	PASS
6	2437	58.479	17.67	30	PASS
11	2462	57.016	17.56	30	PASS

802.11g OFDM modulation

EUT	Wireless 802.11a/g/b USB Dongle	**MODEL**	NUB-8301
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 991hPa
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	40.087	16.03	30	PASS
6	2437	57.412	17.59	30	PASS
11	2462	40.926	16.12	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 Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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

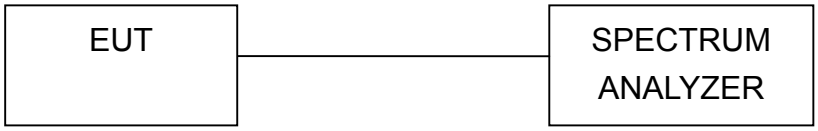
4.5.3 TEST PROCEDURE

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

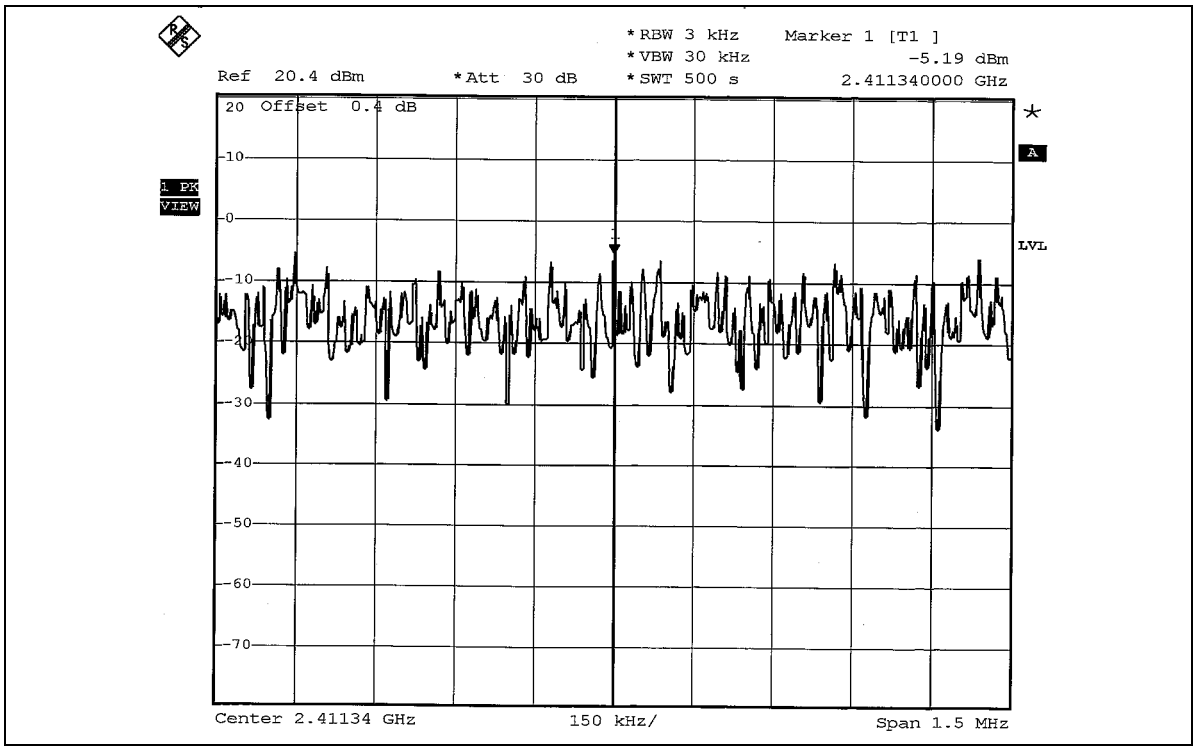
4.5.7 TEST RESULTS

802.11b DSSS modulation

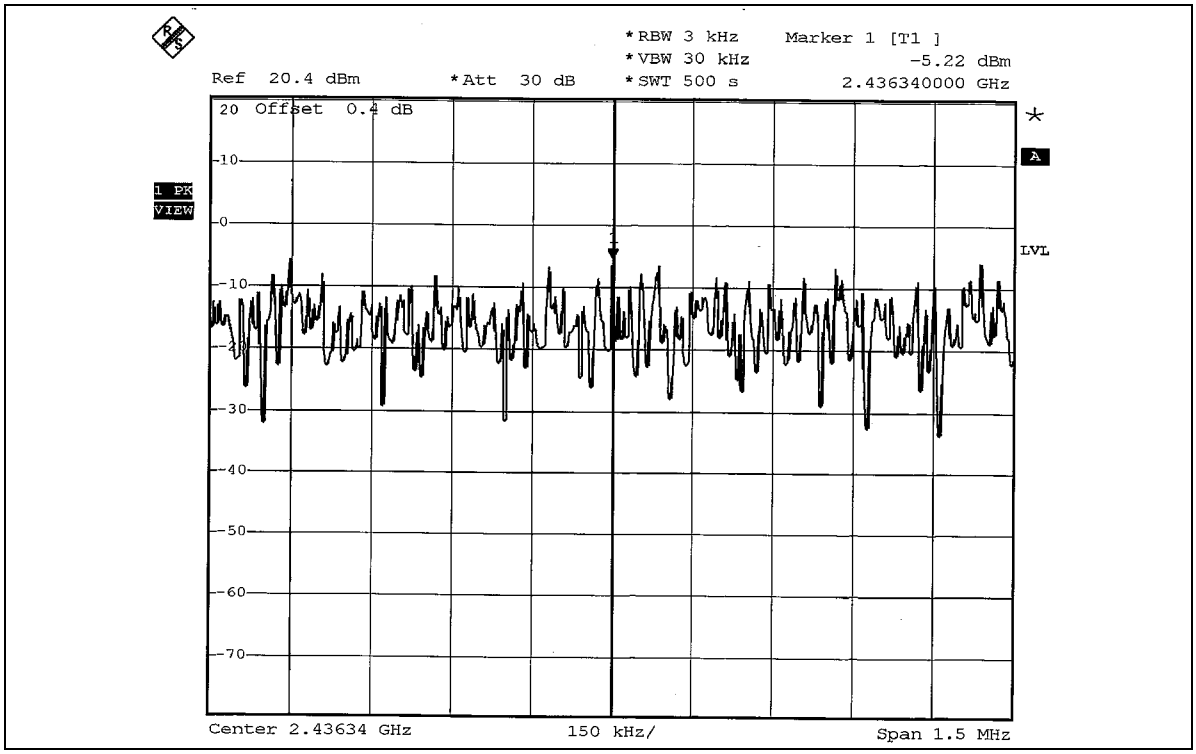
EUT	Wireless 802.11a/g/b USB Dongle	**MODEL**	NUB-8301
MODULATION TYPE	CCK	**TRANSFER RATE**	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 991hPa
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-5.19	8	PASS
6	2437	-5.22	8	PASS
11	2462	-5.69	8	PASS

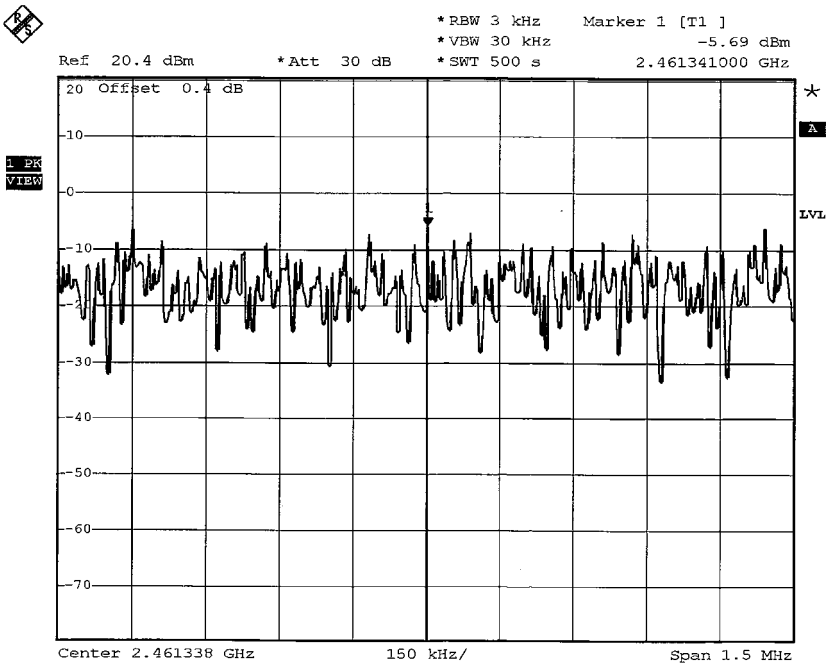
CH 1


*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1]
-5.19 dBm
2.411340000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
1 PK VIEW
A
LVL
-10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.41134 GHz
150 kHz/
Span 1.5 MHz

CH 6


*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1]
-5.22 dBm
2.436340000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
1 PK VIEW
A
LVL
-10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.43634 GHz
150 kHz/
Span 1.5 MHz

CH 11

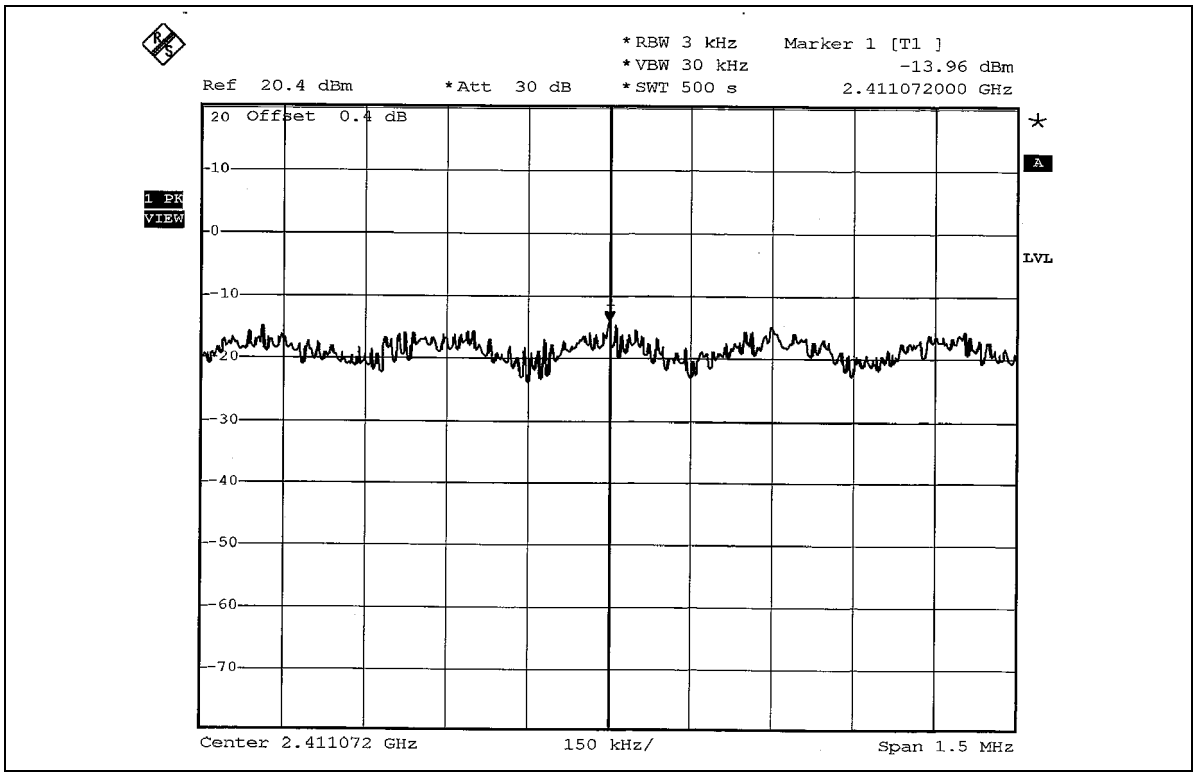

*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1]
-5.69 dBm
2.461341000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
1 PK VIEW
LVL
Center 2.461338 GHz
150 kHz/
Span 1.5 MHz

802.11g OFDM modulation

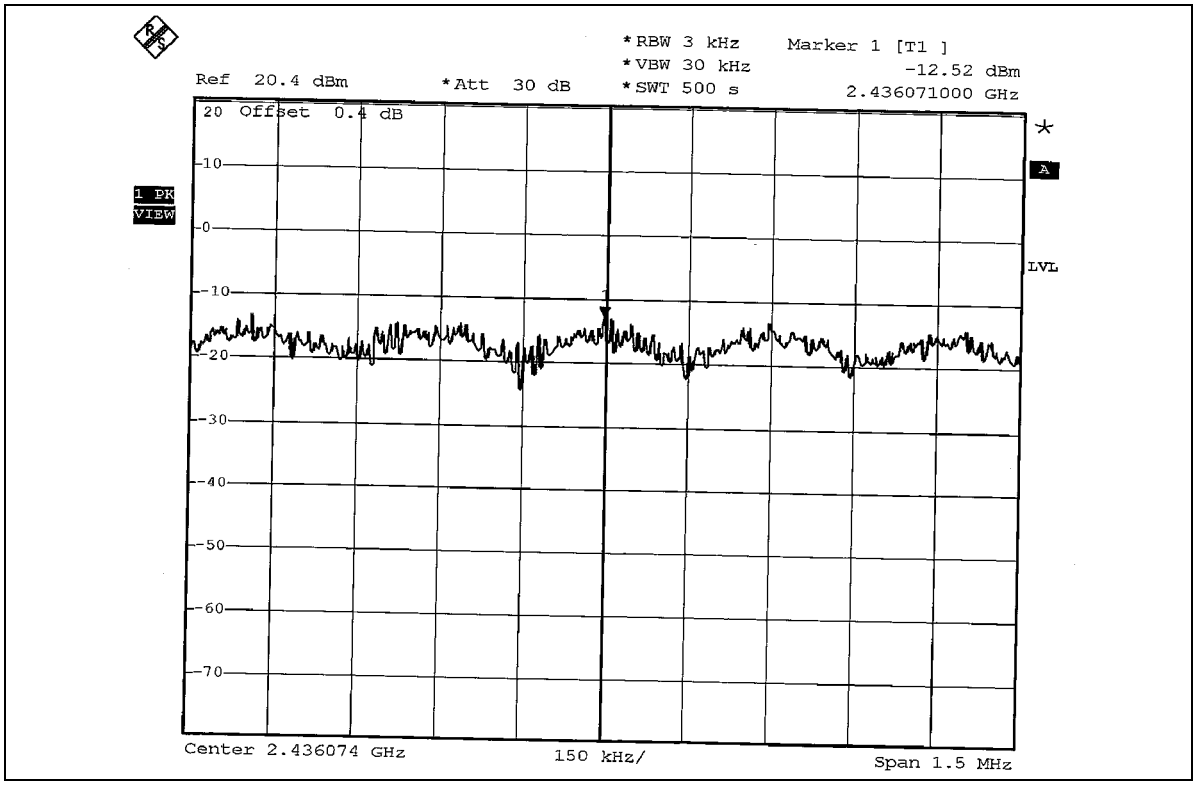
EUT	Wireless 802.11a/g/b USB Dongle	**MODEL**	NUB-8301
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 991hPa
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-13.96	8	PASS
6	2437	-12.52	8	PASS
11	2462	-14.17	8	PASS

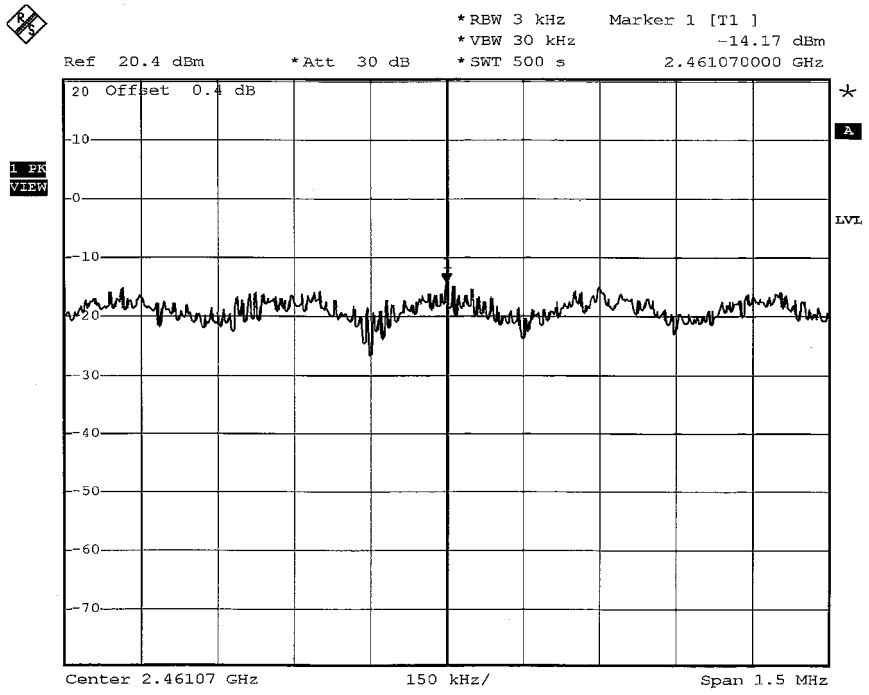
CH 1


*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1]
-13.96 dBm
2.411072000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
1 PK VIEW
A
LVL
Center 2.411072 GHz
150 kHz/
Span 1.5 MHz

CH 6


*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1]
-12.52 dBm
2.436071000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
1 PK VIEW
A
LVL
Center 2.436074 GHz
150 kHz/
Span 1.5 MHz

CH 11


*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1]
-14.17 dBm
2.461070000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
1 PK VIEW
A
LVL
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.46107 GHz
150 kHz/
Span 1.5 MHz

4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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

4.6.3 TEST PROCEDURE

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

The spectrum plots (Peak RBW=VBW=100kHz ; Average RBW=1MHz, VBW=10Hz) 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 12 images. D2 line indicates the highest level, and D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

802.11b DSSS modulation

NOTE 1: The band edge emission plot on page 55 shows 56.89dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 110.83dBuV/m (Peak), so the maximum field strength in restrict band is 110.83-56.89=53.94dBuV/m which is under 74dBuV/m limit.

The band edge emission plot of on page 55 shows 62.45dBc between carrier maximum power and local maximum emission in restrict band (2.3878GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 107.40dBuV/m (Average), so the maximum field strength in restrict band is 107.40-62.45=44.95dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on page 56 shows 54.74dBc between carrier maximum power and local maximum emission in restrict band (2.4865GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 112.93dBuV/m (Peak), so the maximum field strength in restrict band is 112.93-54.74=58.19dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 57 shows 63.90dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 105.11dBuV/m (Average), so the maximum field strength in restrict band is 105.11-63.90=41.21dBuV/m which is under 54dBuV/m limit.

802.11g OFDM modulation

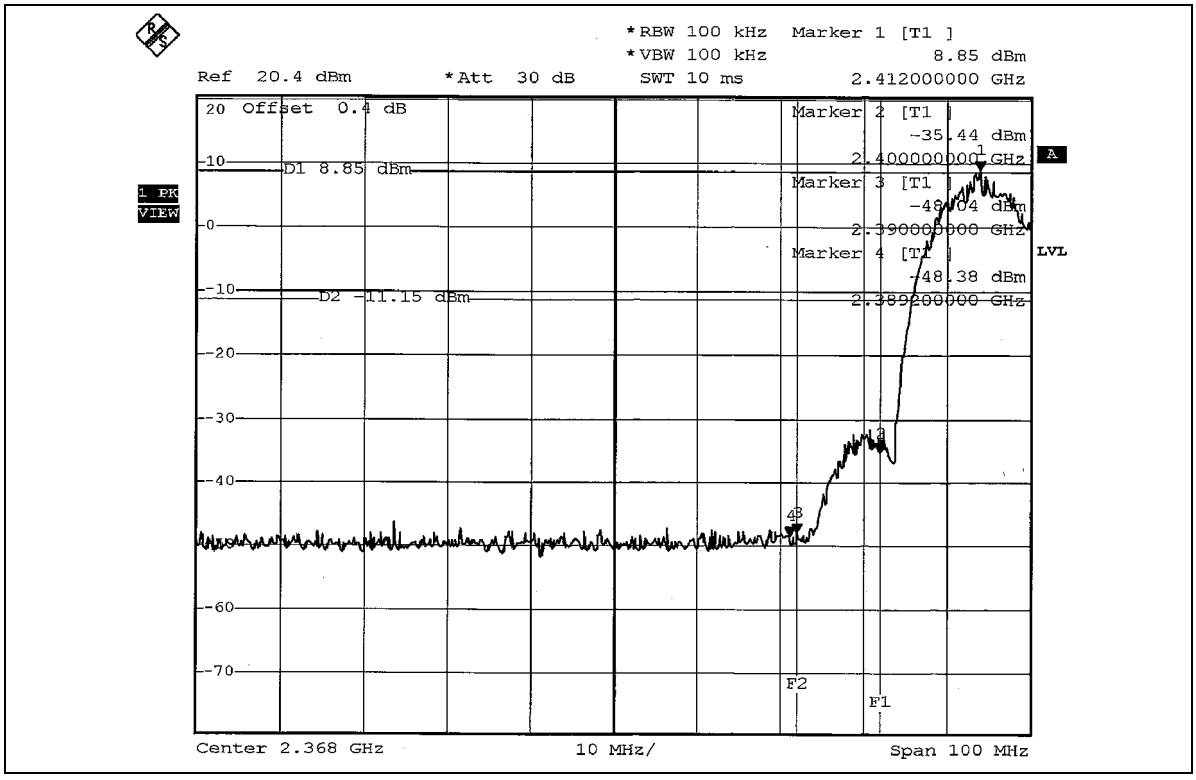
NOTE 1: The band edge emission plot on page 58 shows 39.28dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 108.80dBuV/m (Peak), so the maximum field strength in restrict band is 108.80-39.28=69.52dBuV/m which is under 74dBuV/m limit.

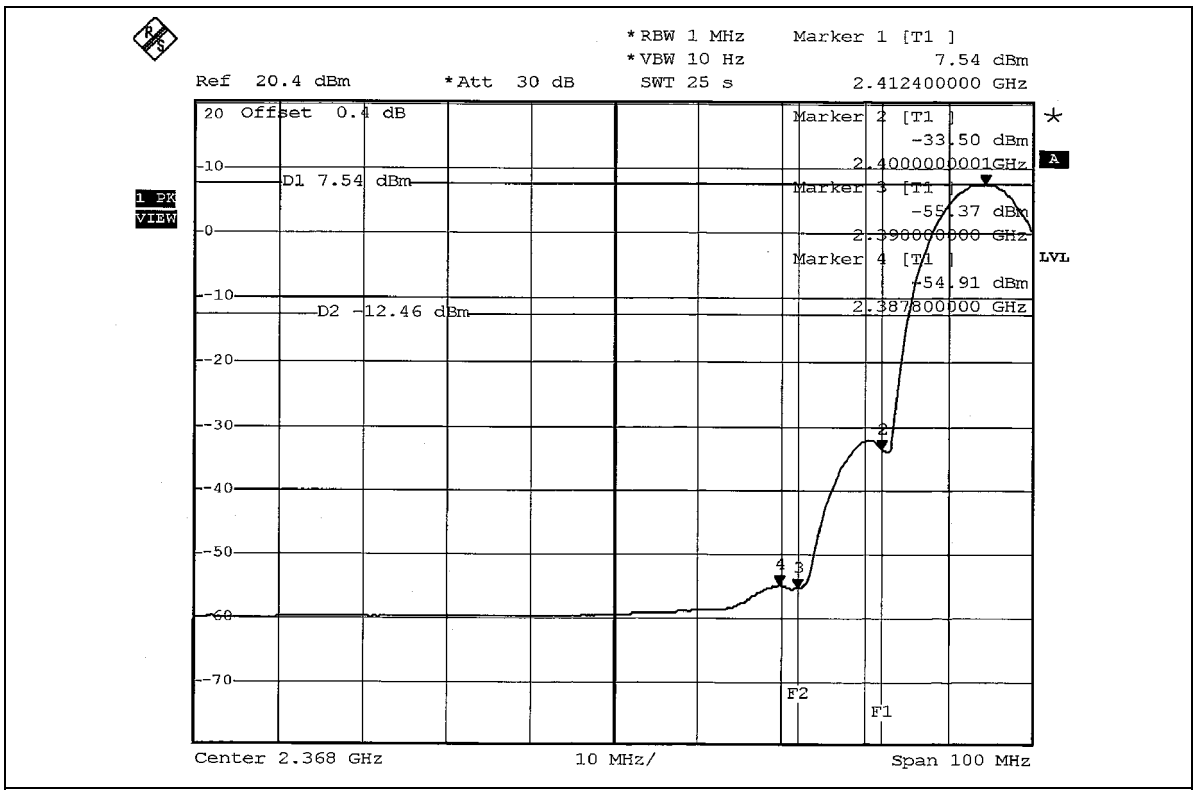
The band edge emission plot of on page 58 shows 46.30dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 99.15dBuV/m (Average), so the maximum field strength in restrict band is 99.15-46.30=52.85dBuV/m which is under 54dBuV/m limit.

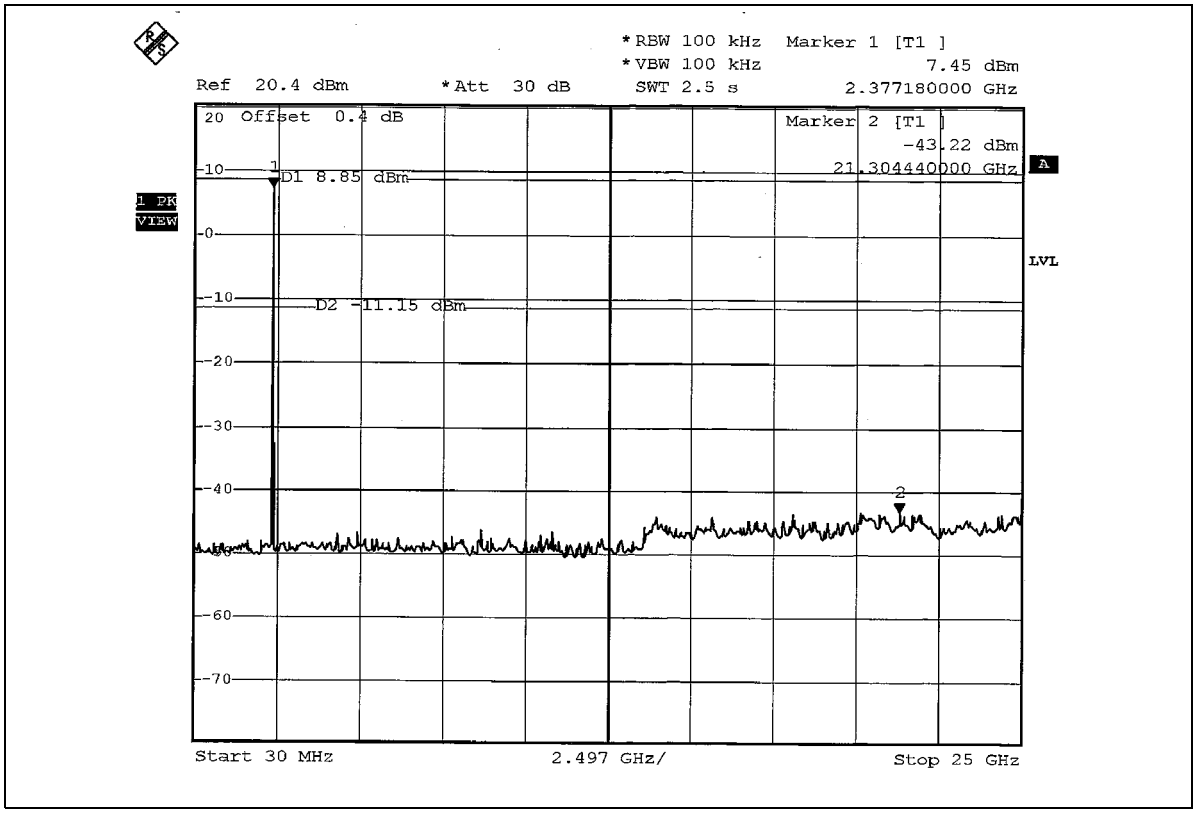
NOTE 2: The band edge emission plot on page 59 shows 42.68dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 108.58dBuV/m (Peak), so the maximum field strength in restrict band is 108.58-42.68=65.90dBuV/m which is under 74dBuV/m limit.

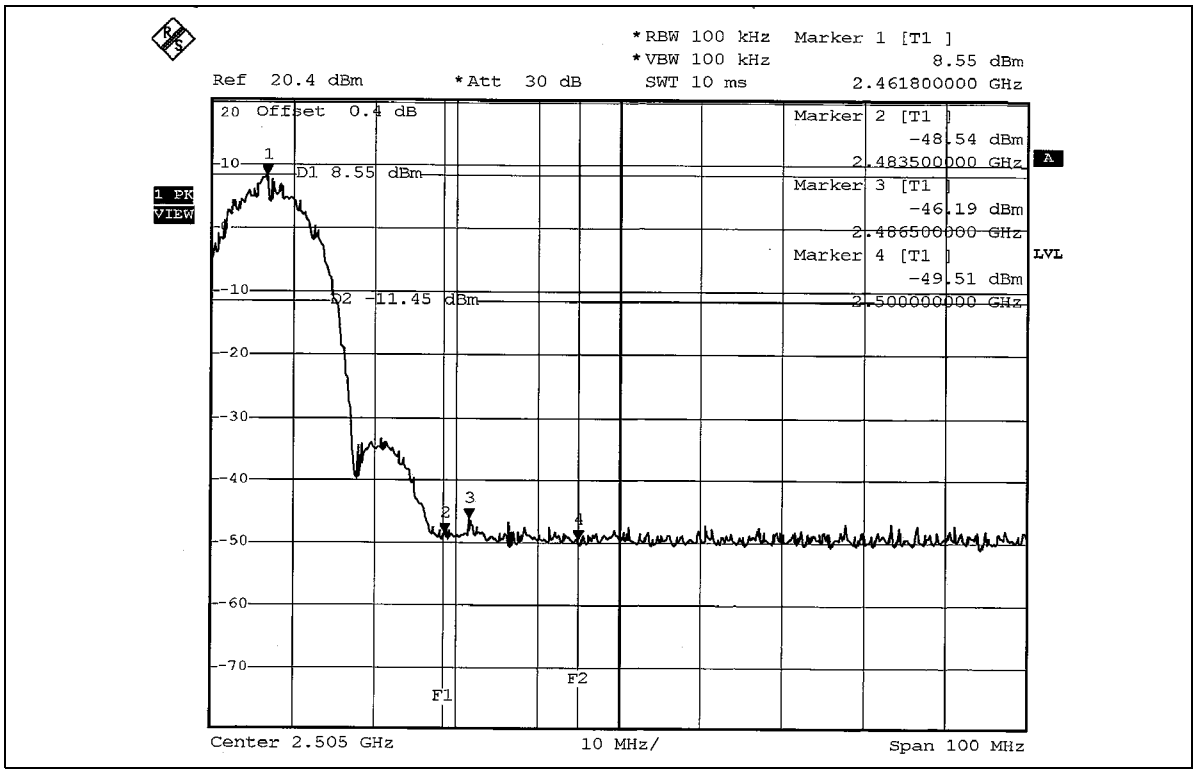
The band edge emission plot on page 60 shows 49.21dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 99.42dBuV/m (Average), so the maximum field strength in restrict band is 99.42-49.21=50.21dBuV/m which is under 54dBuV/m limit.

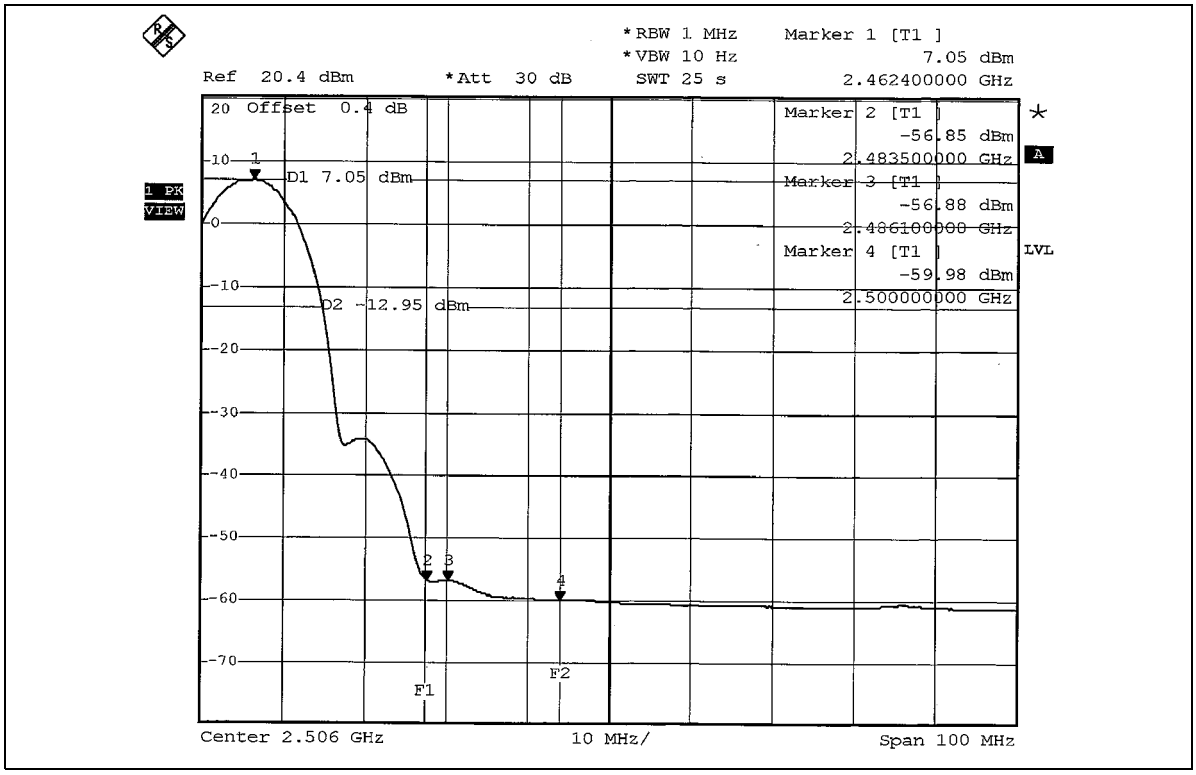
802.11b DSSS modulation

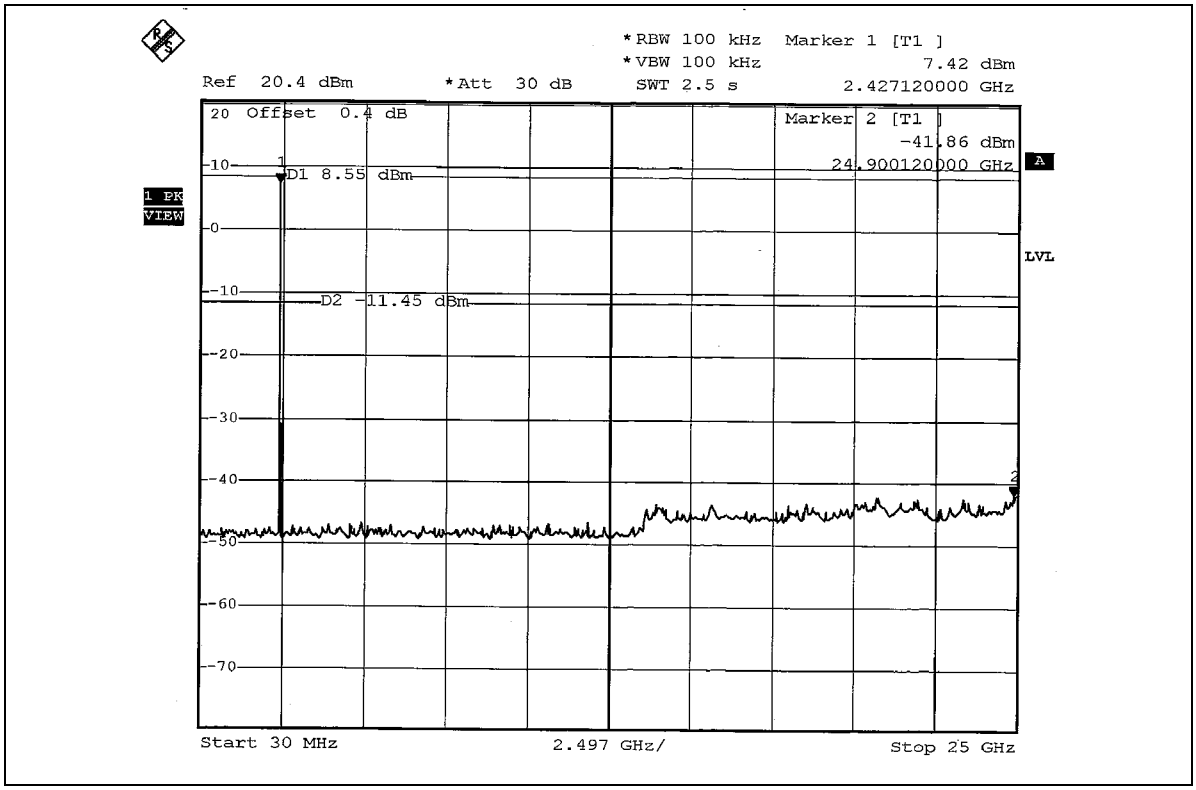




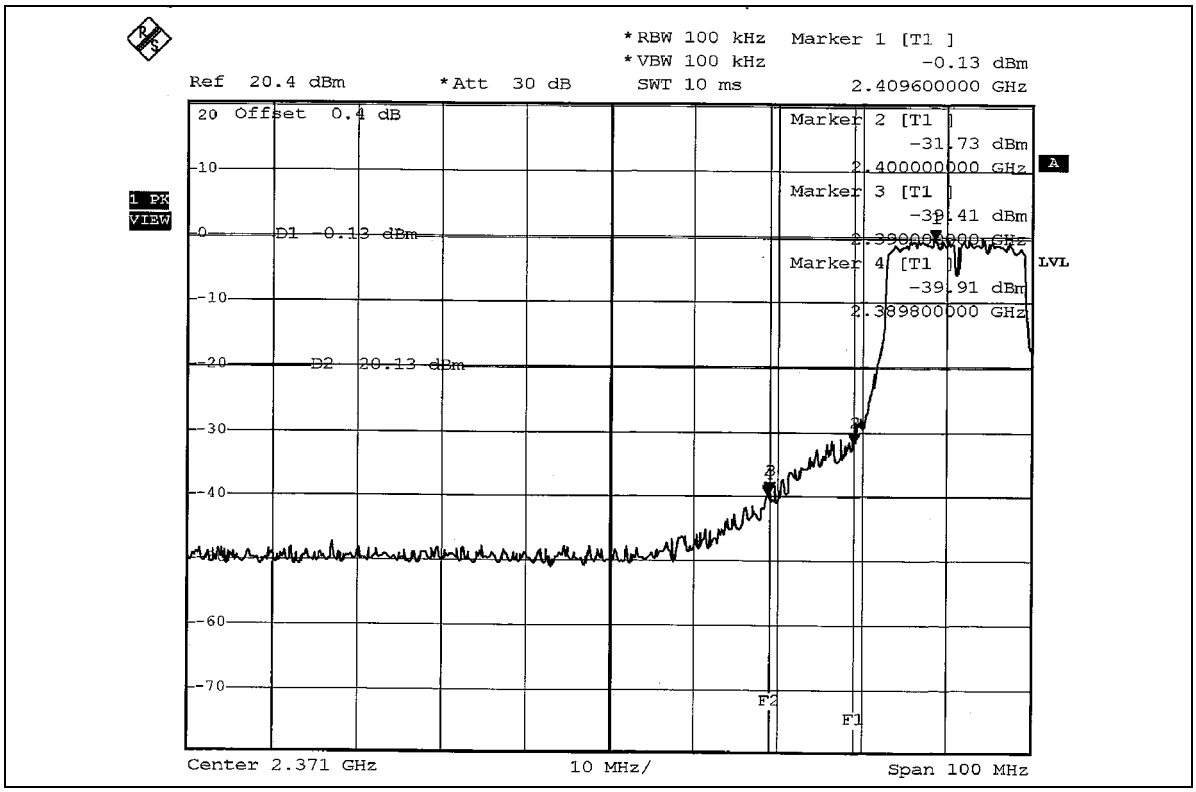

*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 s
Marker 1 [T1]
7.45 dBm
2.377180000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-43.22 dBm
21.304440000 GHz
D1 8.85 dBm
D2 -11.15 dBm
1 PK
VIEW
A
LVL
Start 30 MHz
2.497 GHz/
Stop 25 GHz

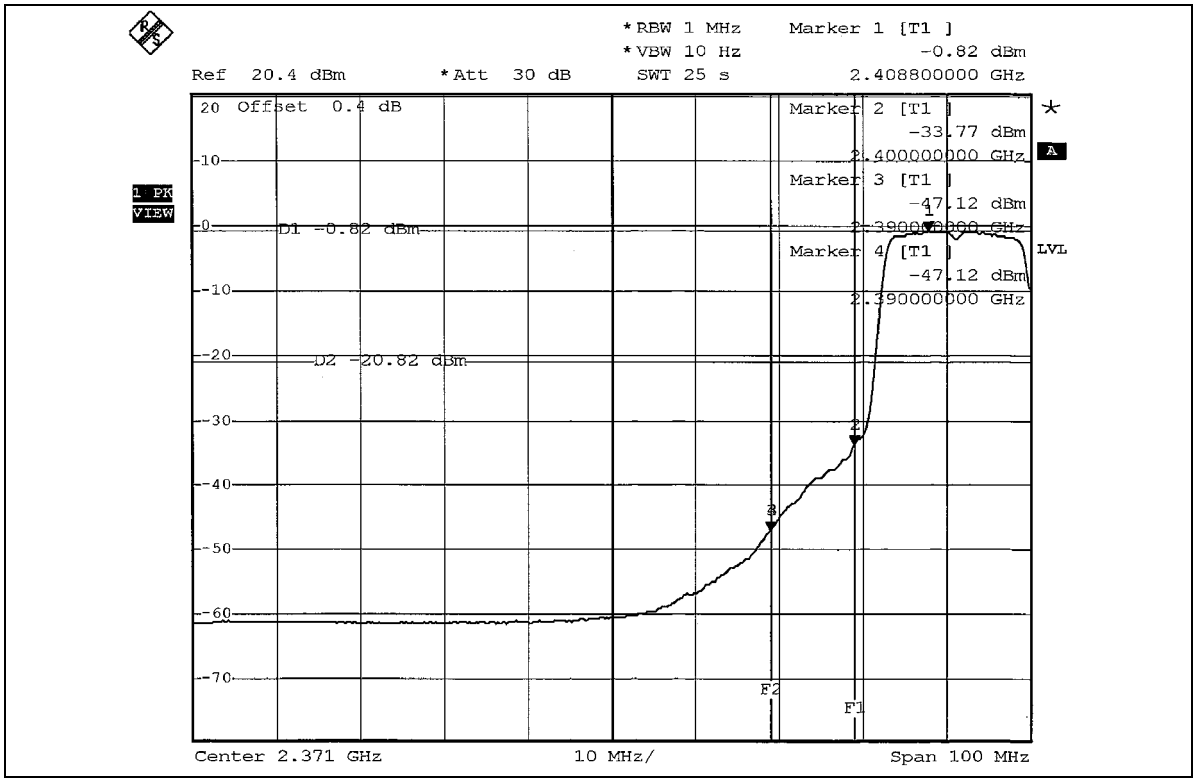

*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
8.55 dBm
2.461800000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-48.54 dBm
2.483500000 GHz
Marker 3 [T1]
-46.19 dBm
2.486500000 GHz
Marker 4 [T1]
-49.51 dBm
2.500000000 GHz
D1 8.55 dBm
D2 -11.45 dBm
1 PK
VIEW
A
LVL
F1
F2
Center 2.505 GHz
10 MHz/
Span 100 MHz

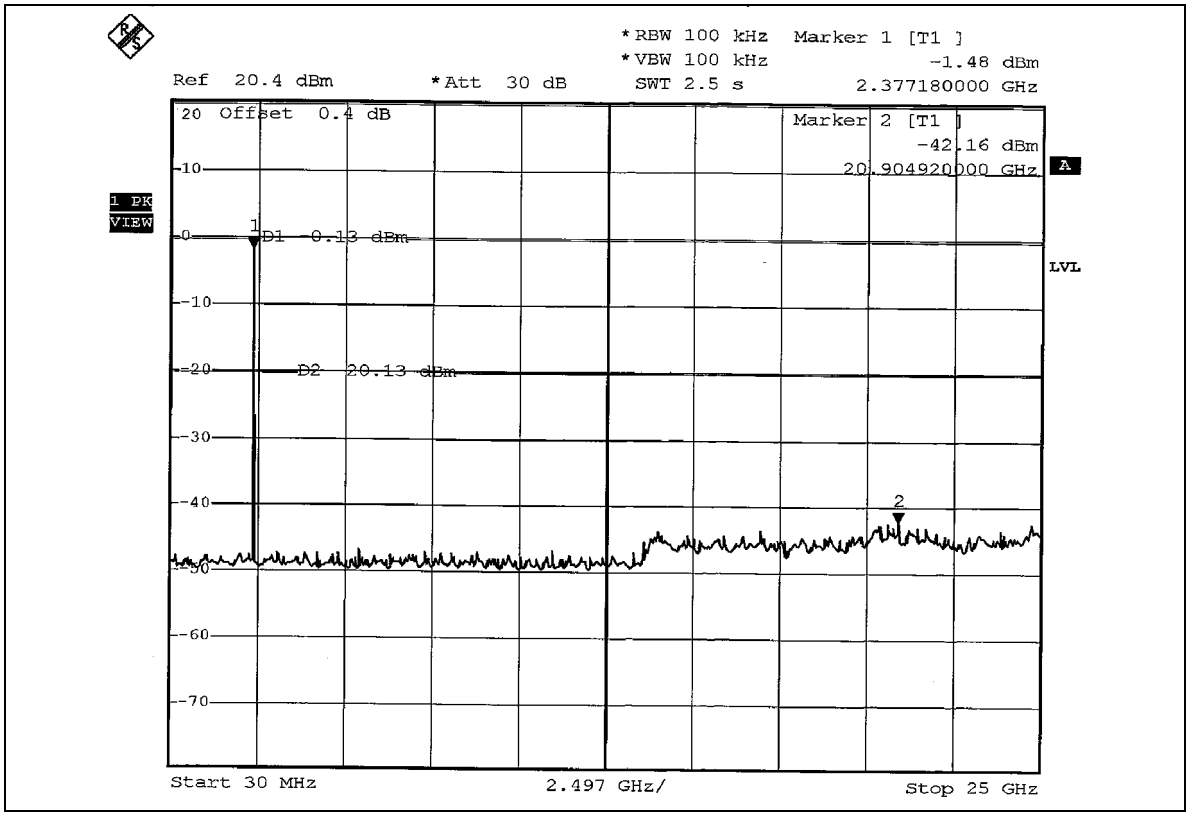

*RBW 1 MHz
*VBW 10 Hz
SWT 25 s
Marker 1 [T1]
7.05 dBm
2.462400000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-56.85 dBm
2.483500000 GHz
Marker 3 [T1]
-56.88 dBm
2.486100000 GHz
Marker 4 [T1]
-59.98 dBm
2.500000000 GHz
D1 7.05 dBm
D2 -12.95 dBm
1 PK VIEW
A
LVL
F1
F2
Center 2.506 GHz
10 MHz/
Span 100 MHz

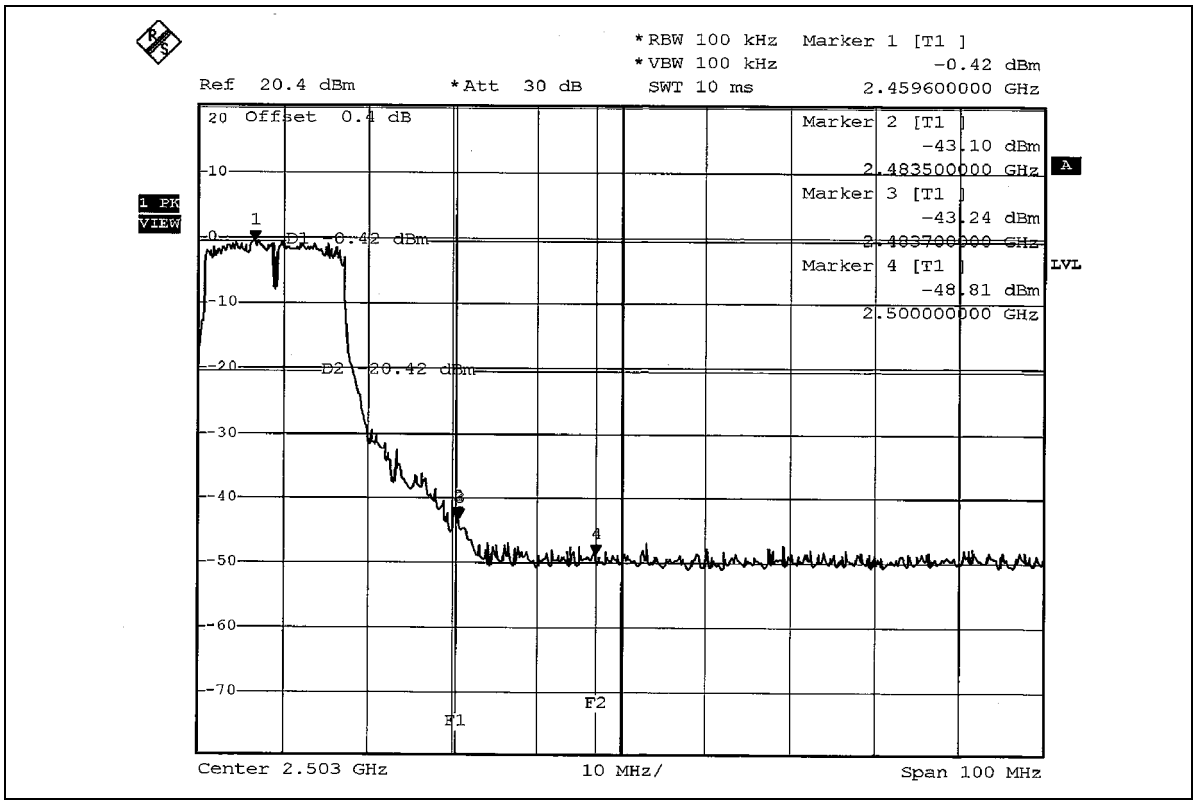

*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 s
Marker 1 [T1]
7.42 dBm
2.427120000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-41.86 dBm
24.900120000 GHz
D1 8.55 dBm
D2 -11.45 dBm
1 PK VIEW
A
LVL
Start 30 MHz
2.497 GHz/
Stop 25 GHz

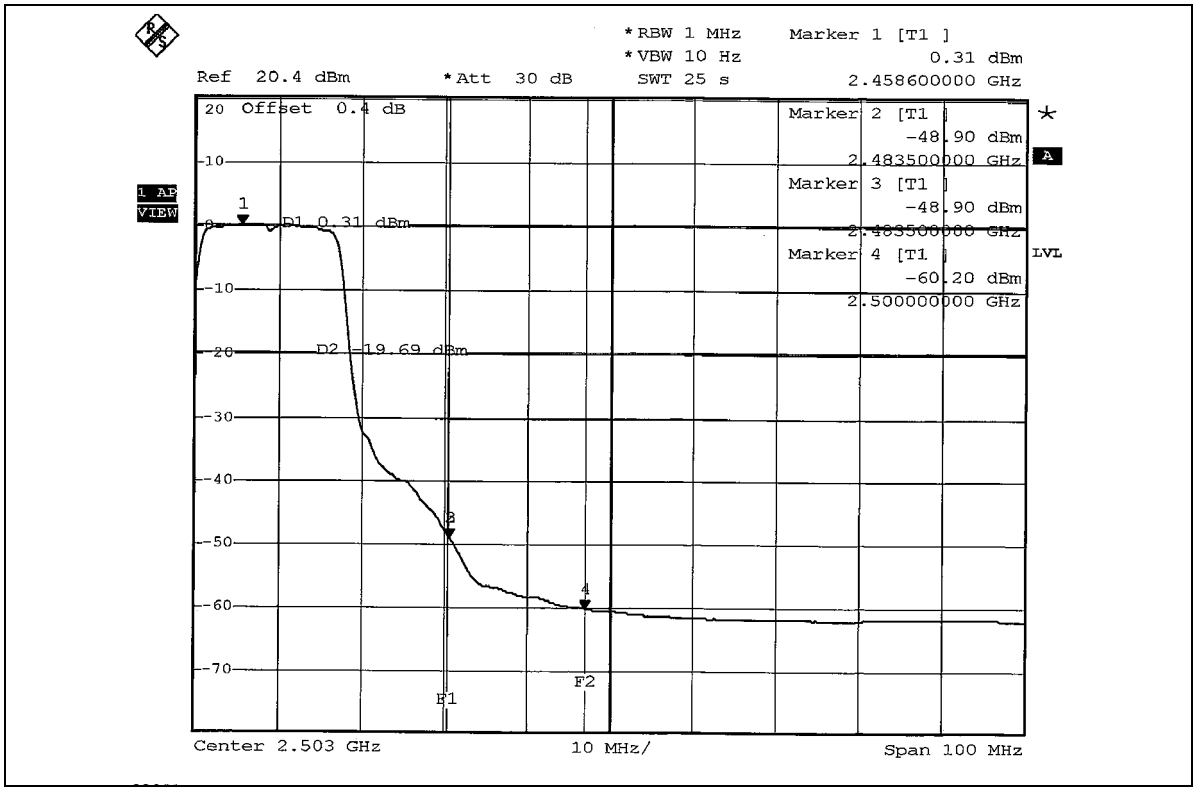
802.11g OFDM modulation

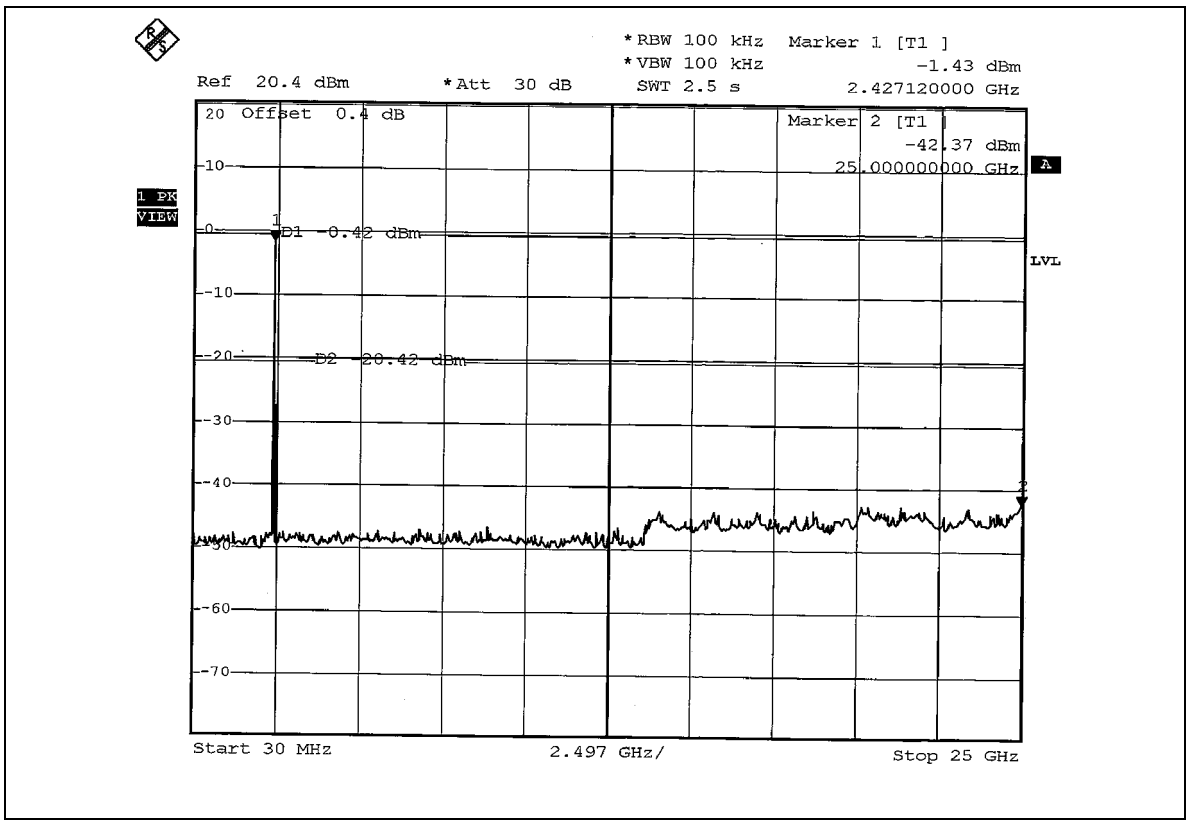





*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 s
Marker 1 [T1]
-1.48 dBm
2.377180000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-42.16 dBm
20.904920000 GHz
1 PK
VIEW
D1 -0.13 dBm
D2 -20.13 dBm
A
LVL
Start 30 MHz
2.497 GHz/
Stop 25 GHz


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1]
-0.42 dBm
2.459600000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-43.10 dBm
2.483500000 GHz
Marker 3 [T1]
-43.24 dBm
2.483700000 GHz
Marker 4 [T1]
-48.81 dBm
2.500000000 GHz
1 PK
VIEW
D1 -0.42 dBm
D2 -20.42 dBm
A
LVL
F1
F2
Center 2.503 GHz
10 MHz/
Span 100 MHz


*RBW 1 MHz
*VBW 10 Hz
SWT 25 s
Marker 1 [T1]
0.31 dBm
2.458600000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-48.90 dBm
2.483500000 GHz
Marker 3 [T1]
-48.90 dBm
2.483500000 GHz
Marker 4 [T1]
-60.20 dBm
2.500000000 GHz
1 AP
VIEW
D1 0.31 dBm
D2 -19.69 dBm
F1
F2
LVL
Center 2.503 GHz
10 MHz/
Span 100 MHz


*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 s
Marker 1 [T1]
-1.43 dBm
2.427120000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-42.37 dBm
25.000000000 GHz
1 PK
VIEW
D1 -0.42 dBm
D2 -20.42 dBm
LVL
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

The antenna used in this product is Printed antenna without connector. The maximum Gain of the antenna is 2.0dBi.

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 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.
1. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
2. 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 UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 16, 2005
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 09, 2006
LISN SCHWARZBECK	NNBL 8226-2	8226-142	May. 02, 2006
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 15, 2006
Software ADT	ADT_Cond_V3	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 1.

3. The VCCI Site Registration No. is C-2040.

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.

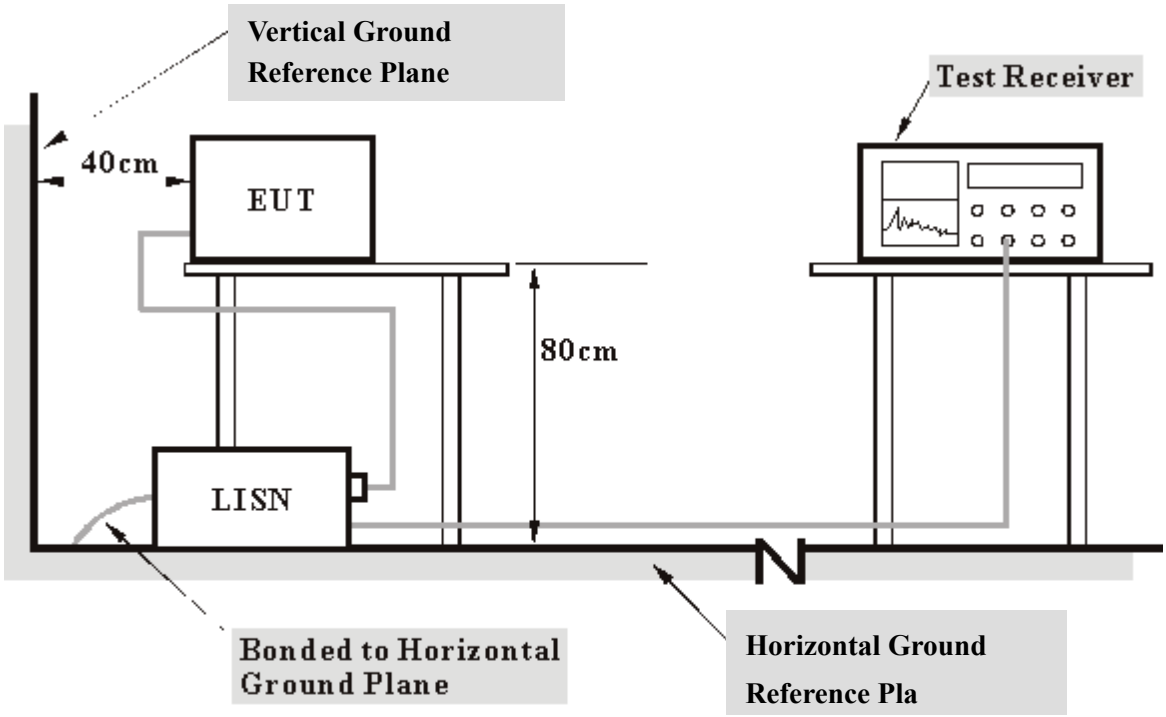
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit – 20dB) was 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) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6

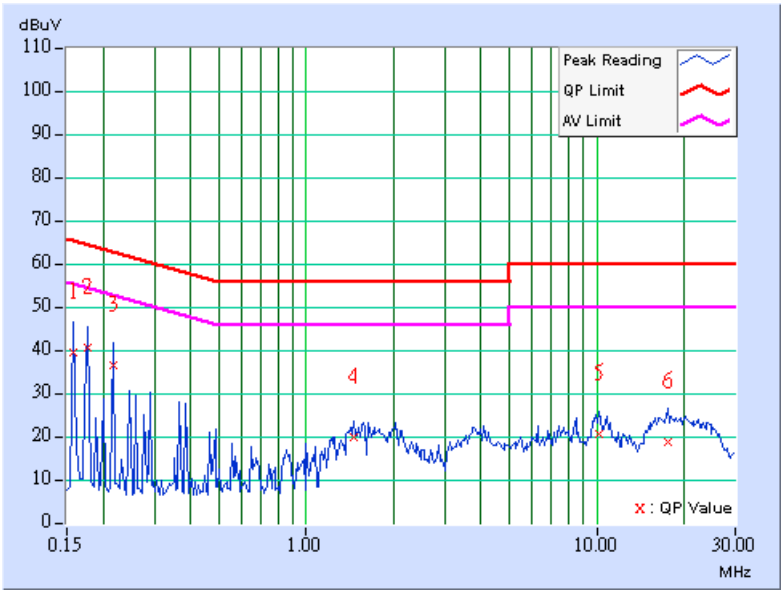
5.1.7 TEST RESULTS

Conducted Worst-Case Data

EUT	Wireless 802.11a/g/b USB Dongle	**MEASUREMENT DETAIL**	
MODEL	NUB-8301	**PHASE**	Line 1
CHANNEL	Channel 3	**6dB BANDWIDTH**	9 kHz
MODULATION TYPE	BPSK	**ENVIRONMENTAL CONDITIONS**	25deg. C, 65%RH, 991hPa
TRANSFER RATE	6Mbps	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.158	0.11	38.99	-	39.10	-	65.58	55.58	-26.48	-
2	0.177	0.11	39.90	-	40.01	-	64.61	54.61	-24.60	-
3	0.216	0.11	35.92	-	36.03	-	62.96	52.96	-26.93	-
4	1.457	0.25	19.16	-	19.41	-	56.00	46.00	-36.59	-
5	10.242	0.54	19.87	-	20.41	-	60.00	50.00	-39.59	-
6	17.500	0.79	18.03	-	18.82	-	60.00	50.00	-41.18	-

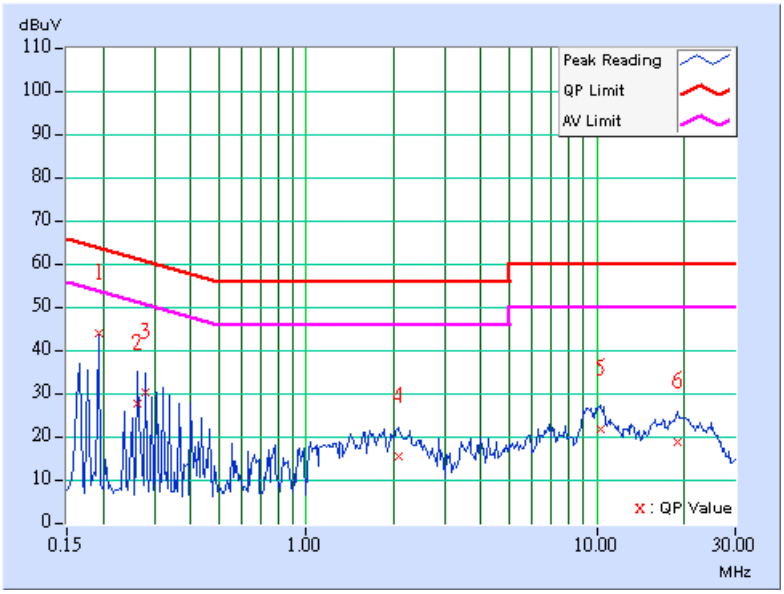
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Wireless 802.11a/g/b USB Dongle	MEASUREMENT DETAIL	
MODEL	NUB-8301	PHASE	Line 2
CHANNEL	Channel 3	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Brad Wu		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.11	43.40	-	43.51	-	63.91	53.91	-20.40	-
2	0.263	0.11	26.96	-	27.07	-	61.33	51.33	-34.26	-
3	0.279	0.11	29.66	-	29.77	-	60.85	50.85	-31.08	-
4	2.090	0.27	15.03	-	15.30	-	56.00	46.00	-40.70	-
5	10.293	0.44	21.29	-	21.73	-	60.00	50.00	-38.27	-
6	18.930	0.67	18.23	-	18.90	-	60.00	50.00	-41.10	-

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 UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	100033	May. 19, 2006
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Nov. 21, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Jun. 01, 2006
HORN Antenna SCHWARZBECK	9120D	9120D-408	Jan. 17, 2006
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Jan. 23, 2006
Preamplifier Agilent	8447D	2944A10633	Nov. 09, 2005
Preamplifier Agilent	8449B	3008A01964	Nov. 06, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218183/4	Jan. 26, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218195/4	Jan. 26, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA
Turn Table ADT.	TT100.	TT93021703	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 2.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The VCCI Site Registration No. is R-237.

5. The IC Site Registration No. is IC4924-3.

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 lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

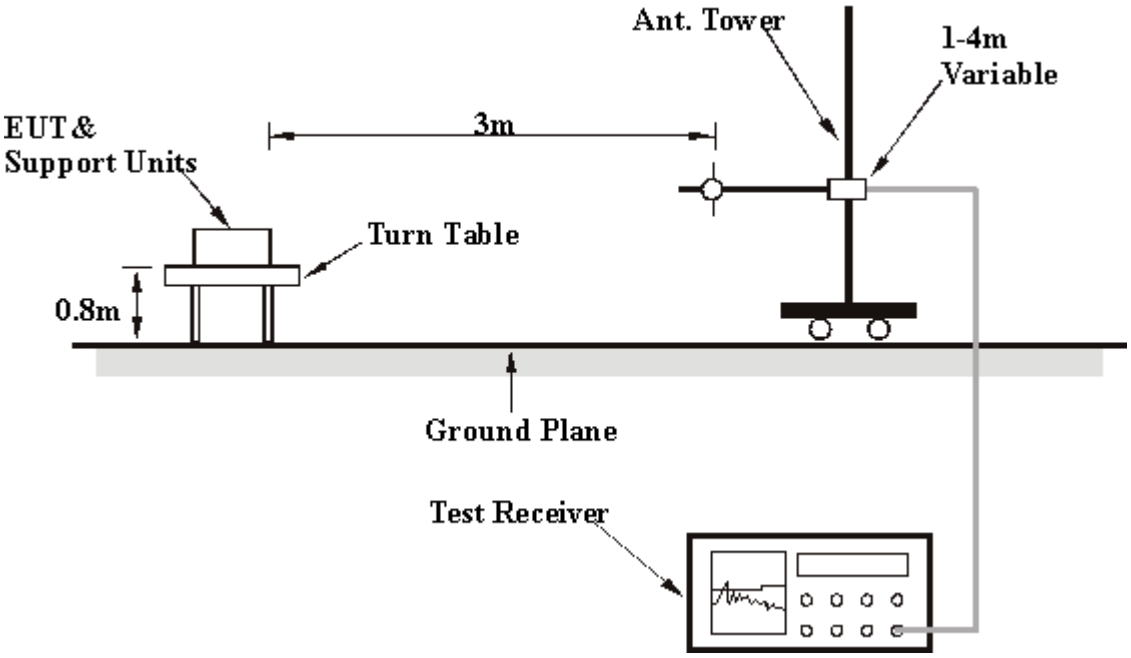
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection 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 4.1.6

5.2.7 TEST RESULTS

Below 1GHz Worst-Case Data

EUT	Wireless 802.11a/g/b USB Dongle	**MEASUREMENT DETAIL**	
MODEL	NUB-8301	**FREQUENCY RANGE**	Below 1000MHz
CHANNEL	Channel 3	**DETECTOR FUNCTION**	Quasi-Peak
MODULATION TYPE	BPSK	**ENVIRONMENTAL CONDITIONS**	22deg. C, 63%RH, 991hPa
TRANSFER RATE	6Mbps	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Morgan Chen		

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	115.53	40.63 QP	43.50	-2.87	1.50 H	280	27.73	12.91
2	199.12	38.52 QP	43.50	-4.98	1.00 H	40	26.59	11.93
3	560.68	34.52 QP	46.00	-11.48	1.50 H	247	13.92	20.59
4	601.50	34.19 QP	46.00	-11.81	1.00 H	34	12.48	21.71
5	720.08	37.53 QP	46.00	-8.47	1.00 H	25	14.05	23.48
6	881.42	39.71 QP	46.00	-6.29	1.50 H	226	14.14	25.57

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	31.94	26.47 QP	40.00	-13.53	1.00 V	322	12.28	14.19
2	113.59	27.26 QP	43.50	-16.24	3.45 V	10	14.56	12.70
3	560.68	31.14 QP	46.00	-14.86	1.00 V	355	10.54	20.59
4	640.38	31.55 QP	46.00	-14.45	1.00 V	16	9.38	22.17
5	720.08	33.39 QP	46.00	-12.61	1.25 V	38	9.91	23.48
6	881.42	31.15 QP	46.00	-14.85	1.25 V	19	5.58	25.57

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

802.11a OFDM modulation

EUT	Wireless 802.11a/g/b USB Dongle	MEASUREMENT DETAIL	
MODEL	NUB-8301	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 1	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Morgan Chen		

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	5725.00	73.29 PK	92.35	-19.06	1.02 H	320	35.13	38.16
2	*5745.00	112.35 PK			1.27 H	338	74.16	38.19
2	*5745.00	103.03 AV			1.27 H	338	64.84	38.19
3	#11490.00	61.91 PK	74.00	-12.09	1.13 H	347	13.93	47.98
3	#11490.00	48.95 AV	54.00	-5.05	1.13 H	347	0.97	47.98

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5725.00	68.38 PK	87.89	-24.51	1.12 V	351	30.22	38.16
2	*5745.00	107.89 PK			1.12 V	351	69.70	38.19
2	*5745.00	98.88 AV			1.12 V	351	60.69	38.19
3	#11490.00	62.35 PK	74.00	-11.65	1.27 V	342	14.37	47.98
3	#11490.00	49.26 AV	54.00	-4.74	1.27 V	342	1.28	47.98

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

EUT	Wireless 802.11a/g/b USB Dongle	**MEASUREMENT DETAIL**	
MODEL	NUB-8301	**FREQUENCY RANGE**	1 ~ 40 GHz
CHANNEL	Channel 3	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	**ENVIRONMENTAL CONDITIONS**	23deg. C, 68%RH, 991hPa
TRANSFER RATE	6Mbps	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Morgan Chen		

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	*5785.00	111.41 PK			1.22 H	5	73.17	38.24
1	*5785.00	102.01 AV			1.22 H	5	63.77	38.24
2	#11570.00	65.89 PK	74.00	-8.11	1.24 H	2	18.01	47.88
2	#11570.00	50.84 AV	54.00	-3.16	1.24 H	2	2.96	47.88

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5785.00	106.35 PK			1.13 V	324	68.11	38.24
1	*5785.00	94.32 AV			1.13 V	324	56.08	38.24
2	#11570.00	66.57 PK	74.00	-7.43	1.26 V	324	18.69	47.88
2	#11570.00	51.32 AV	54.00	-2.68	1.26 V	324	3.44	47.88

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

EUT	Wireless 802.11a/g/b USB Dongle	MEASUREMENT DETAIL	
MODEL	NUB-8301	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 4	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Morgan Chen		

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	*5805.00	110.82 PK			1.28 H	6	72.55	38.27
1	*5805.00	101.51 AV			1.28 H	6	63.24	38.27
2	#5850.00	49.05 PK	90.82	-41.77	1.28 H	6	10.72	38.33
3	*11610.00	65.77 PK	74.00	-8.23	1.19 H	34	17.94	47.83
3	*11610.00	50.20 AV	54.00	-3.80	1.19 H	34	2.37	47.83

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	*5805.00	105.78 PK			1.12 V	347	67.51	38.27
1	*5805.00	96.67 AV			1.12 V	347	58.40	38.27
2	#5850.00	49.02 PK	85.78	-36.76	1.28 V	6	10.70	38.33
3	*11610.00	65.88 PK	74.00	-8.12	1.25 V	25	18.05	47.83
3	*11610.00	50.38 AV	54.00	-3.62	1.25 V	25	2.55	47.83

NOTE: 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value
5. "*" : Fundamental frequency
6. "#"The radiated frequency falling in the restricted band.
7. 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 Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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

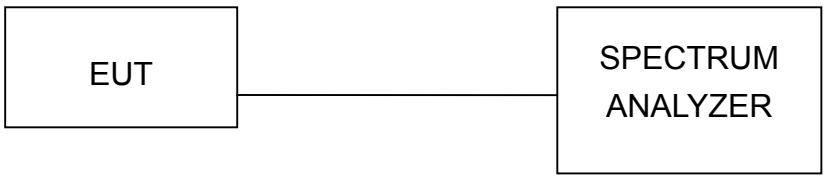
5.3.3 TEST PROCEDURE

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.

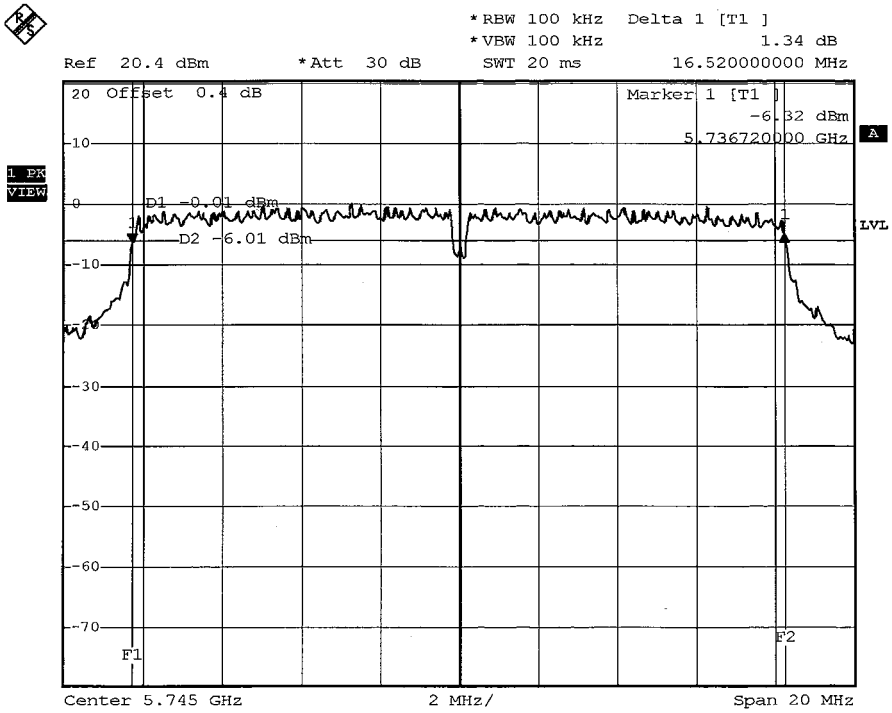
5.3.7 TEST RESULTS

802.11a OFDM modulation

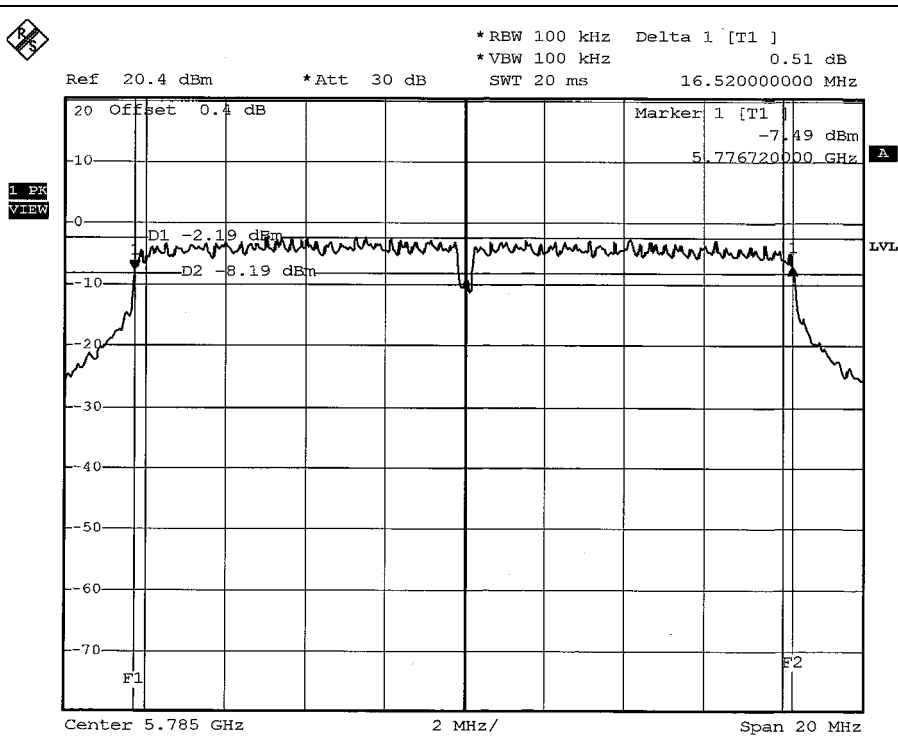
EUT	Wireless 802.11a/g/b USB Dongle	**MODEL**	NUB-8301
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 991hPa
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	5745	16.52	0.5	PASS
3	5785	16.52	0.5	PASS
4	5805	16.56	0.5	PASS

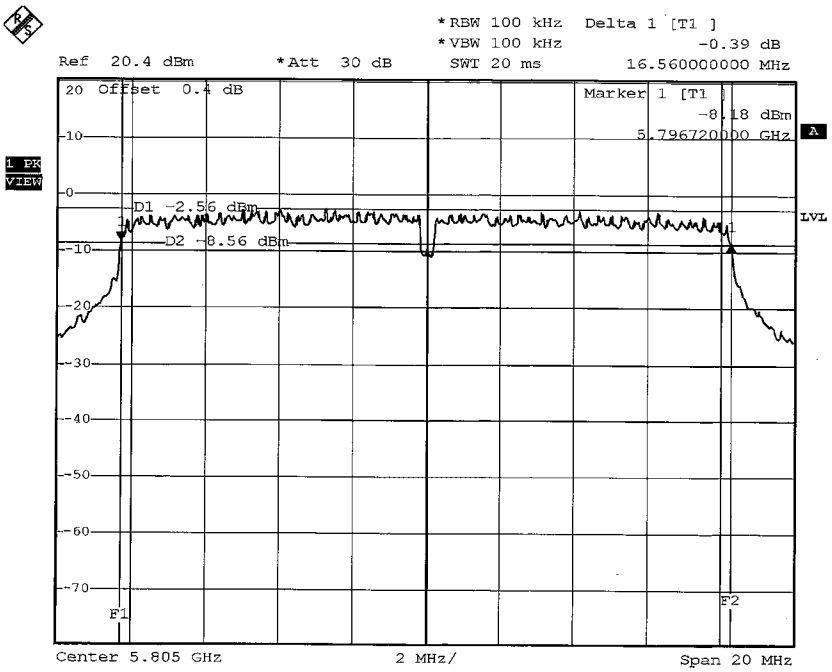
CH 1


*RBW 100 kHz
*VBW 100 kHz
SWT 20 ms
Delta 1 [T1]
1.34 dB
16.520000000 MHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 1 [T1]
-6.32 dBm
5.736720000 GHz
1 PK VIEW
D1 -0.01 dBm
D2 -6.01 dBm
LVL
F1
F2
Center 5.745 GHz
2 MHz/
Span 20 MHz

CH 3


*RBW 100 kHz
*VBW 100 kHz
SWT 20 ms
Delta 1 [T1]
0.51 dB
16.520000000 MHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 1 [T1]
-7.49 dBm
5.776720000 GHz
1 PK VIEW
D1 -2.19 dBm
D2 -8.19 dBm
LVL
F1
F2
Center 5.785 GHz
2 MHz/
Span 20 MHz

CH 4


*RBW 100 kHz
*VBW 100 kHz
SWT 20 ms
Delta 1 [T1]
-0.39 dB
16.560000000 MHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 1 [T1]
-8.18 dBm
5.796720000 GHz
1 PK
VIEW
A
LVL
D1 -2.56 dBm
D2 -8.56 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
F1
F2
Center 5.805 GHz
2 MHz/
Span 20 MHz

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 Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005
AGILENT SIGNAL GENERATOR	E8257C	MY43320668	Dec. 31, 2005
TEKTRONIX OSCILLOSCOPE	TDS 1012	C019167	Feb. 01, 2006
NARDA DETECTOR	4503A	FSCM99899	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. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator . The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. 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 5.3.6

5.4.7 TEST RESULTS

802.11a OFDM modulation

EUT	Wireless 802.11a/g/b USB Dongle	**MODEL**	NUB-8301
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 991hPa
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	5745	45.604	16.59	30	PASS
3	5785	32.509	15.12	30	PASS
4	5805	28.445	14.54	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 Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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

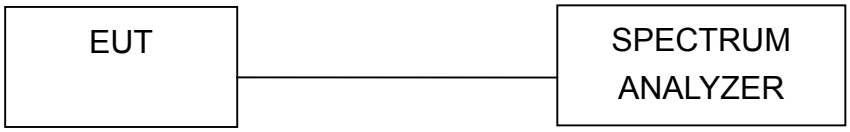
5.5.3 TEST PROCEDURE

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 5.3.6

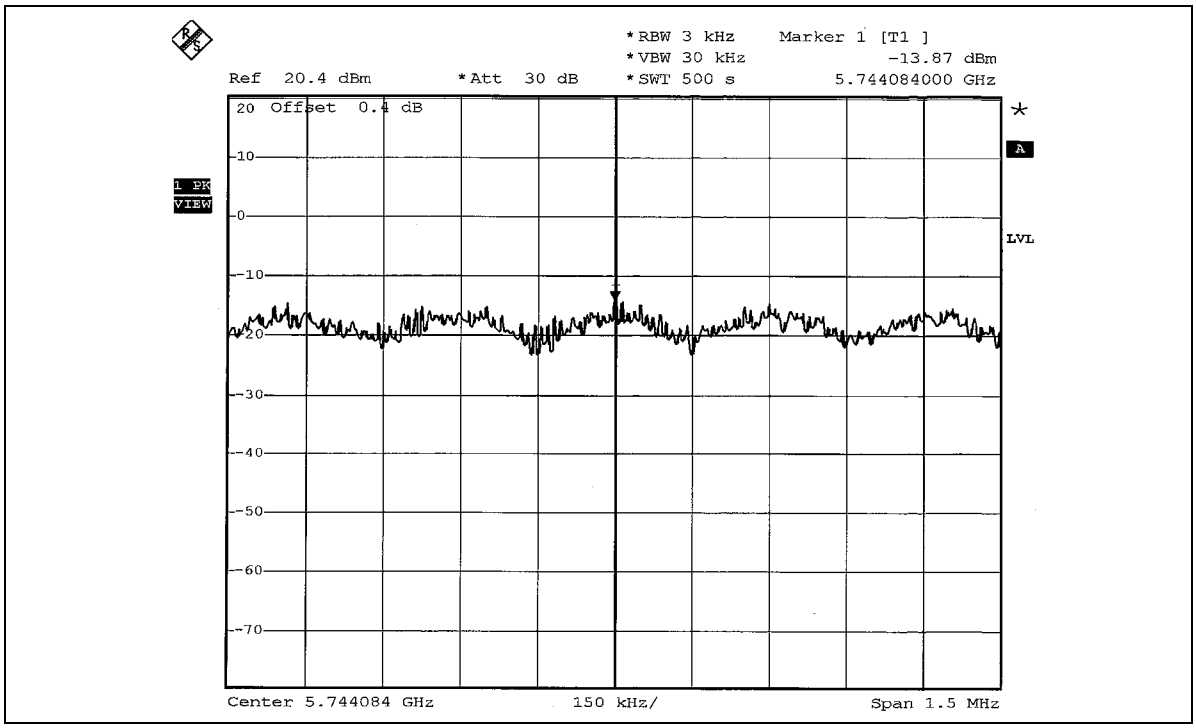
5.5.7 TEST RESULTS

802.11a OFDM modulation

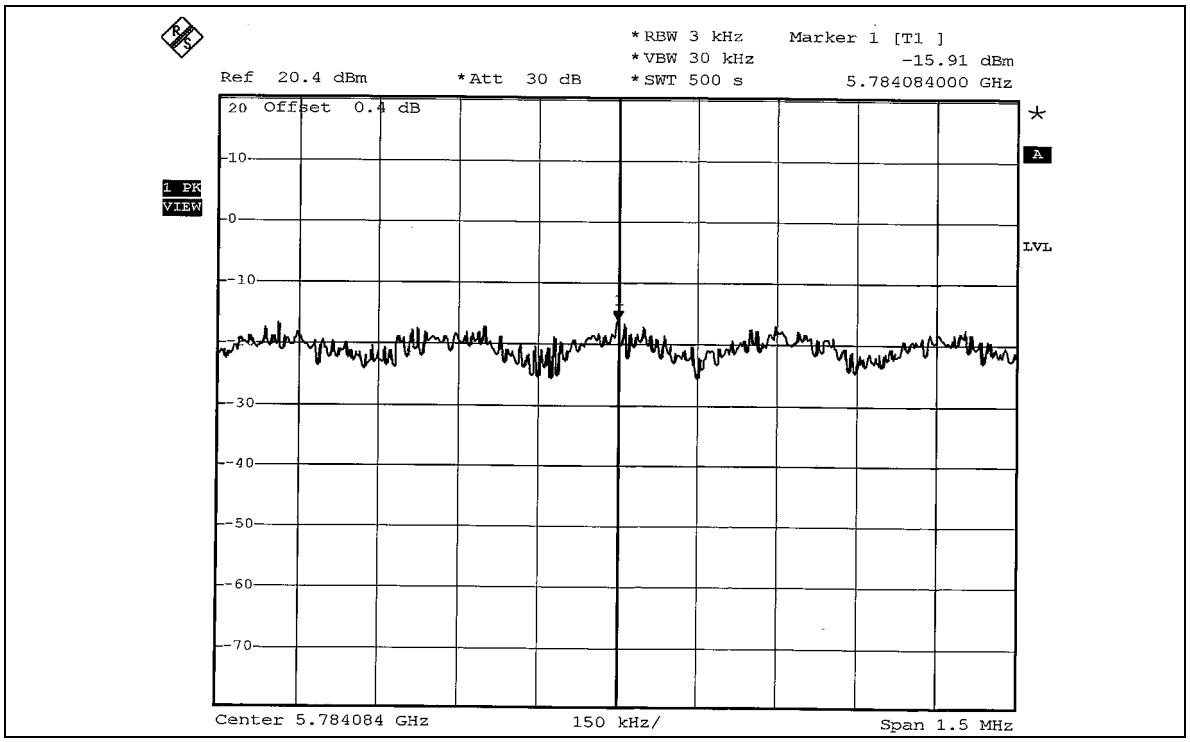
EUT	Wireless 802.11a/g/b USB Dongle	**MODEL**	NUB-8301
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 991hPa
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5745	-13.87	8	PASS
3	5785	-15.91	8	PASS
4	5805	-16.56	8	PASS

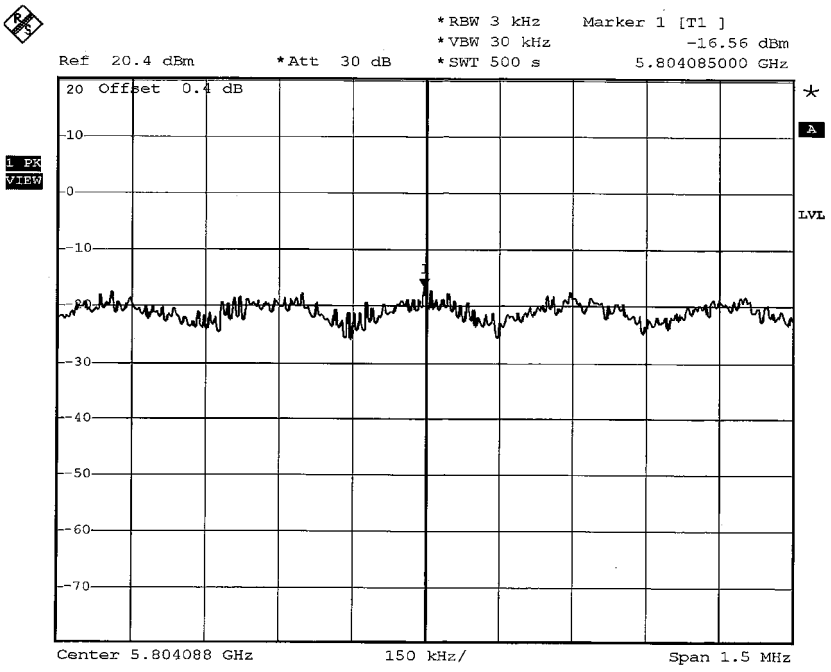
CH 1


*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1]
-13.87 dBm
5.744084000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
1 PK VIEW
A
LVL
10
0
-10
-20
-30
-40
-50
-60
-70
Center 5.744084 GHz
150 kHz/
Span 1.5 MHz

CH 3


*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1]
-15.91 dBm
5.784084000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
1 PK VIEW
A
LVL
10
0
-10
-30
-40
-50
-60
-70
Center 5.784084 GHz
150 kHz/
Span 1.5 MHz

CH 4


*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1]
-16.56 dBm
5.804085000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
1 PK
VIEW
A
LVL
10
0
-10
-20
-30
-40
-50
-60
-70
Center 5.804088 GHz
150 kHz/
Span 1.5 MHz

5.6 BAND EDGES MEASUREMENT

5.6.1 LIMITS OF BAND EDGES 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 Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTES:
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 both RBW and VBW 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

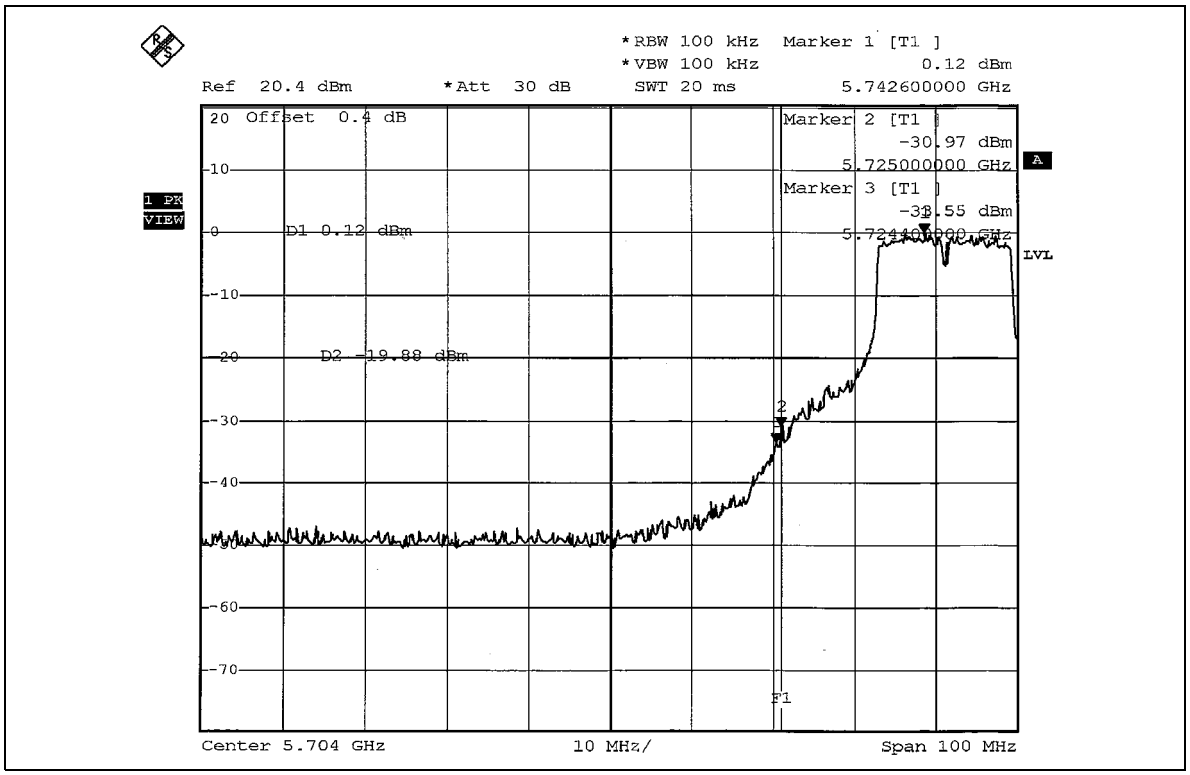
5.6.5 EUT OPERATING CONDITION

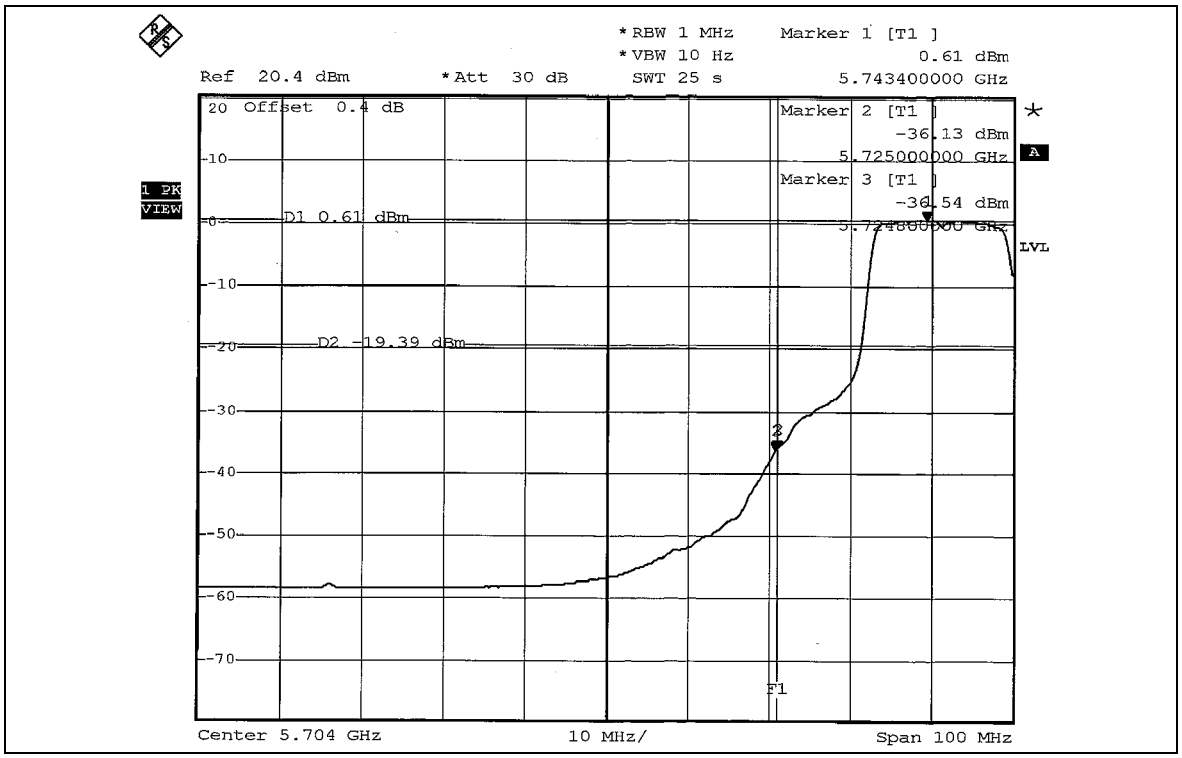
Same as Item 5.9.6

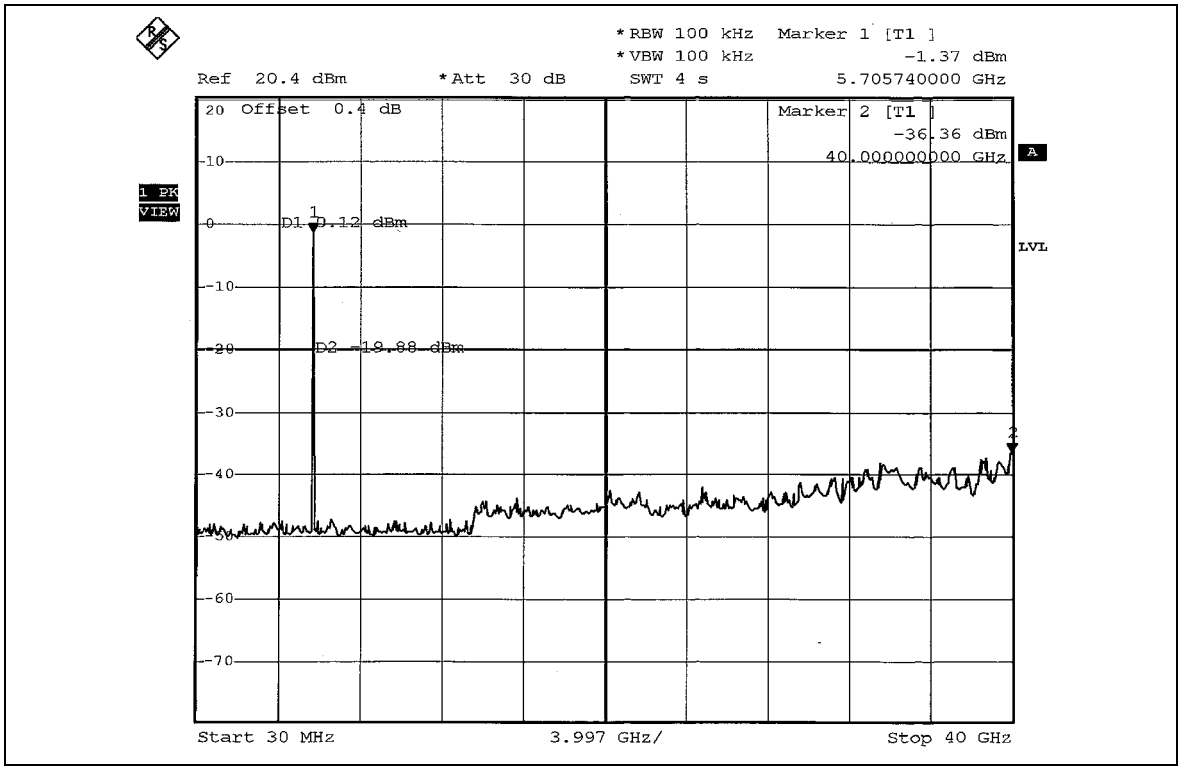
5.6.6 TEST RESULTS

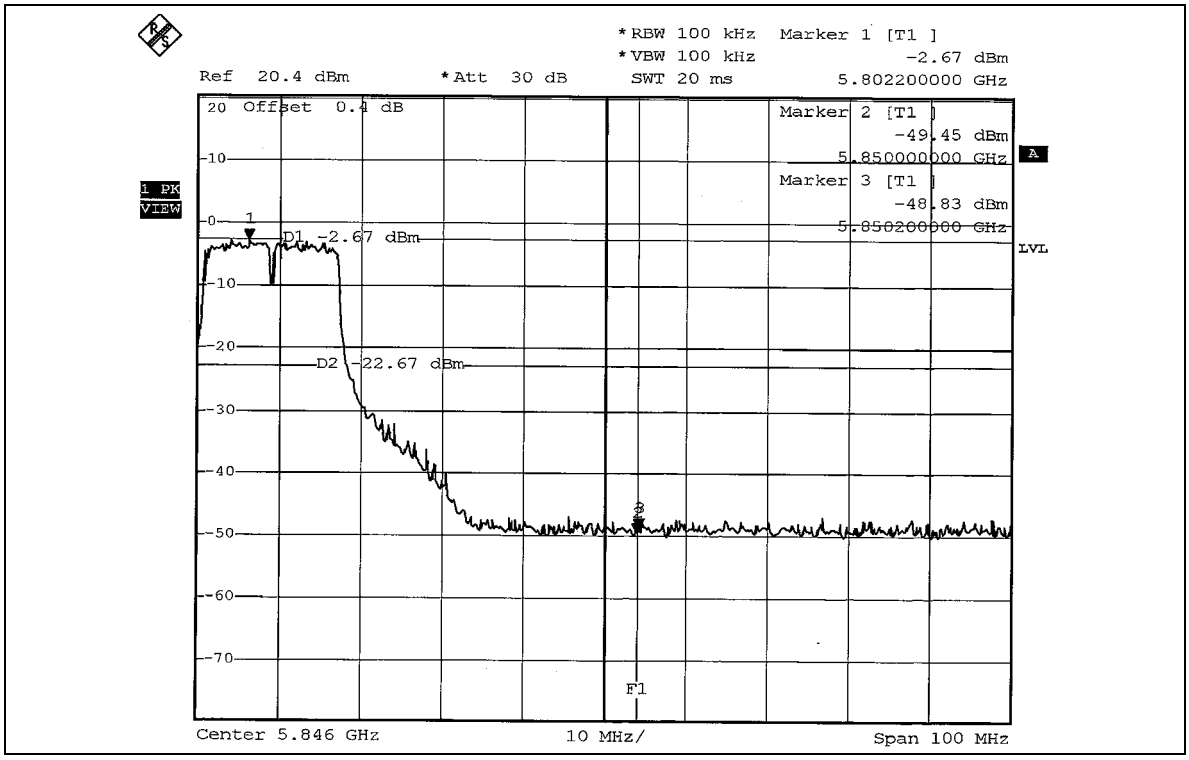
The spectrum plots are attached on the following pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

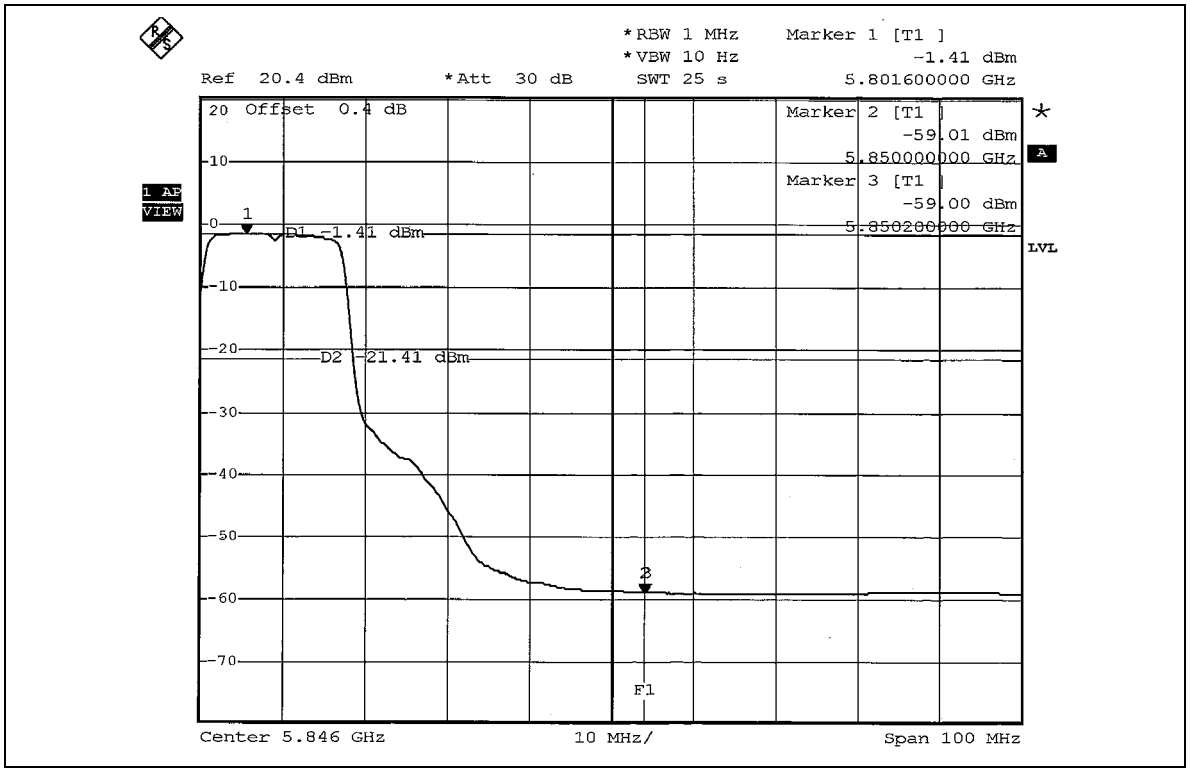
802.11a OFDM modulation

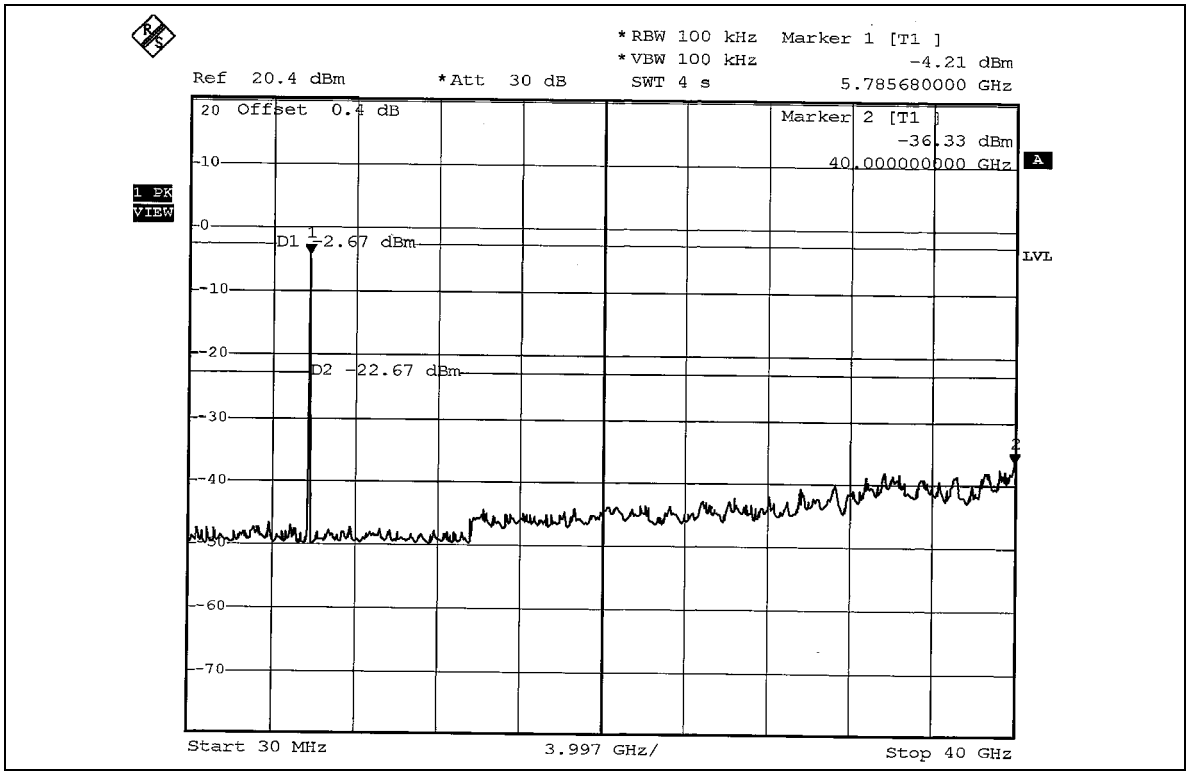





*RBW 100 kHz
*VBW 100 kHz
SWT 4 s
Marker 1 [T1]
-1.37 dBm
5.705740000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-36.36 dBm
40.000000000 GHz
1 PK
VIEW
D1 0.12 dBm
D2 -19.88 dBm
LVL
Start 30 MHz
3.997 GHz/
Stop 40 GHz


*RBW 100 kHz
*VBW 100 kHz
SWT 20 ms
Marker 1 [T1]
-2.67 dBm
5.802200000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-49.45 dBm
5.850000000 GHz
Marker 3 [T1]
-48.83 dBm
5.850200000 GHz
1 PK
VIEW
D1 -2.67 dBm
D2 -22.67 dBm
LVL
F1
Center 5.846 GHz
10 MHz/
Span 100 MHz


*RBW 1 MHz
*VBW 10 Hz
SWT 25 s
Marker 1 [T1]
-1.41 dBm
5.801600000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-59.01 dBm
5.850000000 GHz
Marker 3 [T1]
-59.00 dBm
5.850200000 GHz
1 AP
VIEW
D1 -1.41 dBm
D2 -21.41 dBm
A
LVL
Center 5.846 GHz
10 MHz/
Span 100 MHz


*RBW 100 kHz
*VBW 100 kHz
SWT 4 s
Marker 1 [T1]
-4.21 dBm
5.785680000 GHz
Ref 20.4 dBm
*Att 30 dB
20 Offset 0.4 dB
Marker 2 [T1]
-36.33 dBm
40.000000000 GHz
1 PK
VIEW
D1 -2.67 dBm
D2 -22.67 dBm
A
LVL
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.

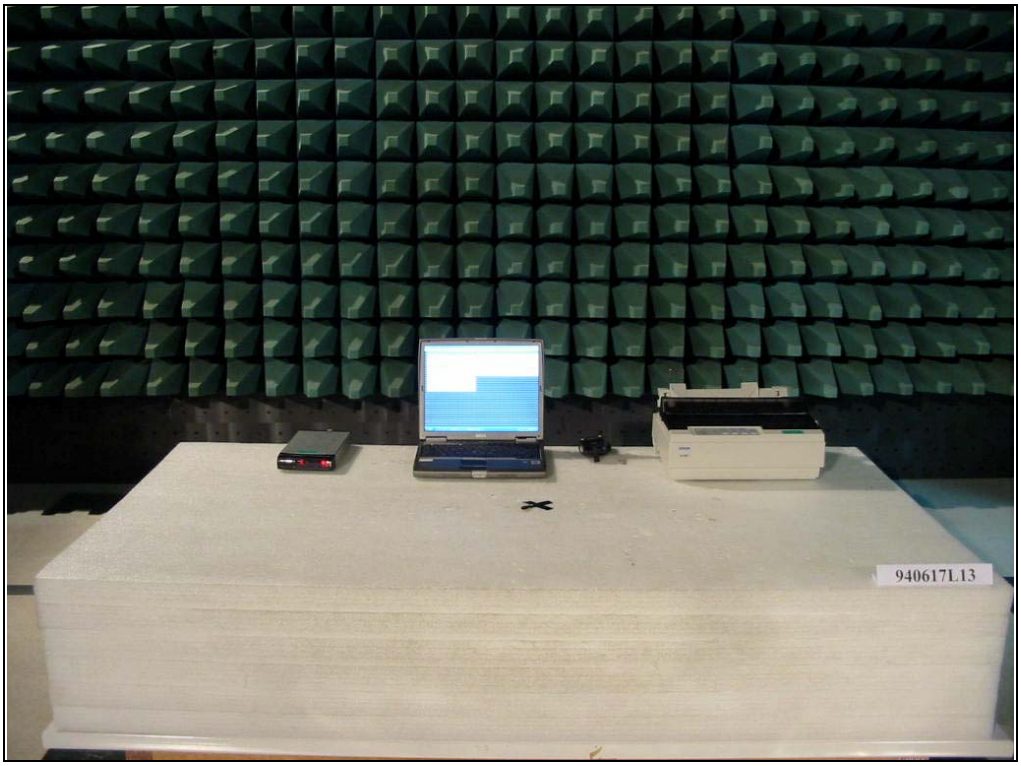
5.7.2 ANTENNA CONNECTED CONSTRUCTION

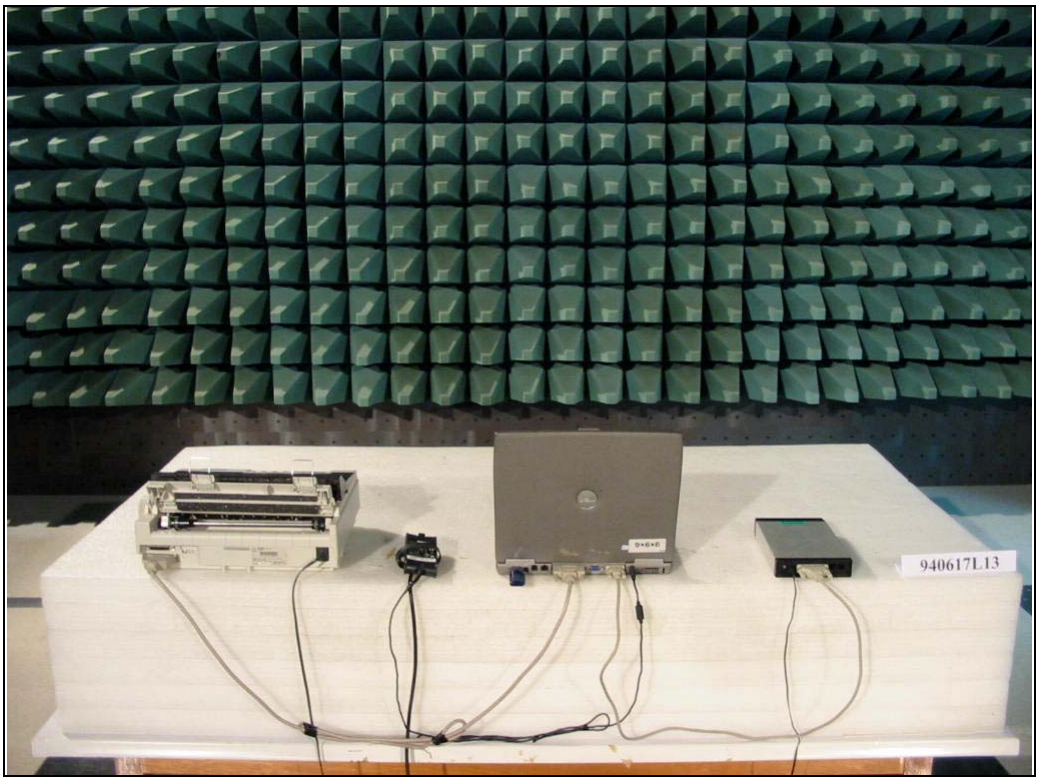
The antenna used in this product is Printed antenna without connector. The maximum Gain of the antenna is 0dBi.

6. PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

RADIATED EMISSION TEST





7. INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC, NVLAP, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB , 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

Linko RF Lab.
Tel: 886-3-3270910
Fax: 886-3-3270892

Web Site: www.adt.com.tw

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