

FCC TEST REPORT (15.247)

REPORT NO.: RF950707H06

MODEL NO.: WMP-D18

RECEIVED: July 07, 2006

TESTED: July 07, 2006

ISSUED: July 14, 2006

APPLICANT: Alpha Networks Inc.

ADDRESS: No.8 Li-shing 7th Rd., Science-based Industrial
Park, Hsinchu, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

TEST LOCATION: No. 81-1, Lu Liao Keng, 9 Ling, Wu Lung
Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien,
Taiwan, R.O.C.

This test report consists of 75 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CNLA, A2LA or any government agencies. The test results in the report only apply to the tested sample. The test results in this report are traceable to the national or international standards.



No. 2177-01

Table of Contents

1.	CERTIFICATION	4
2.	SUMMARY OF TEST RESULTS	5
3.	GENERAL INFORMATION	6
3.1	GENERAL DESCRIPTION OF EUT	6
3.2	DESCRIPTION OF TEST MODES	8
3.2.1	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:	9
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	11
3.4	DESCRIPTION OF SUPPORT UNITS.....	12
3.5	CONFIGURATION OF SYSTEM UNDER TEST	12
4.	TEST TYPES AND RESULTS (802.11a, 5725~5850MHz Band)	13
4.1	CONDUCTED EMISSION MEASUREMENT	13
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	13
4.1.2	TEST INSTRUMENTS.....	13
4.1.3	TEST PROCEDURES	14
4.1.4	DEVIATION FROM TEST STANDARD	14
4.1.5	TEST SETUP	15
4.1.6	EUT OPERATING CONDITIONS	15
4.1.7	TEST RESULTS	16
4.2	RADIATED EMISSION MEASUREMENT	18
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	18
4.2.2	TEST INSTRUMENTS.....	19
4.2.3	TEST PROCEDURES	20
4.2.4	DEVIATION FROM TEST STANDARD	20
4.2.5	TEST SETUP	21
4.2.6	EUT OPERATING CONDITIONS	21
4.2.7	TEST RESULTS –ANTENNA 1.....	22
4.2.8	TEST RESULTS –ANTENNA 2.....	28
4.3	6dB BANDWIDTH MEASUREMENT	34
4.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT	34
4.3.2	TEST INSTRUMENTS.....	34
4.3.3	TEST PROCEDURE.....	35
4.3.4	DEVIATION FROM TEST STANDARD	35
4.3.5	TEST SETUP	35
4.3.6	EUT OPERATING CONDITIONS	35
4.3.7	TEST RESULTS- ANTENNA 1.....	36
4.3.8	TEST RESULTS- ANTENNA 2.....	40
4.4	MAXIMUM PEAK OUTPUT POWER.....	44
4.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT	44
4.4.2	INSTRUMENTS.....	44

4.4.3	TEST PROCEDURES	45
4.4.4	DEVIATION FROM TEST STANDARD	45
4.4.5	TEST SETUP	45
4.4.6	EUT OPERATING CONDITIONS	45
4.4.7	TEST RESULTS	46
4.5	POWER SPECTRAL DENSITY MEASUREMENT	48
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	48
4.5.2	TEST INSTRUMENTS.....	48
4.5.3	TEST PROCEDURE.....	49
4.5.4	DEVIATION FROM TEST STANDARD	49
4.5.5	TEST SETUP	49
4.5.6	EUT OPERATING CONDITION.....	49
4.5.7	TEST RESULTS -ANTENNA 1	50
4.5.8	TEST RESULTS -ANTENNA 2	54
4.6	BAND EDGES MEASUREMENT	58
4.6.1	LIMITS OF BAND EDGES MEASUREMENT	58
4.6.2	TEST INSTRUMENTS.....	58
4.6.3	TEST PROCEDURE.....	59
4.6.4	DEVIATION FROM TEST STANDARD	59
4.6.5	EUT OPERATING CONDITION.....	59
4.6.6	TEST RESULTS -ANTENNA 1	60
4.6.7	TEST RESULTS -ANTENNA 2	65
4.7	ANTENNA REQUIREMENT	70
4.7.1	STANDARD APPLICABLE.....	70
4.7.2	ANTENNA CONNECTED CONSTRUCTION.....	70
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	71
6.	INFORMATION ON THE TESTING LABORATORIES	74
APPENDIX-A.....		A-1

1. CERTIFICATION

PRODUCT: IEEE 802.11a MiniPCI Card
BRAND NAME: Alpha
MODEL NO.: WMP-D18
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: July 07, 2006
APPLICANT: Alpha Networks Inc.
STANDARDS: FCC Part 15, Subpart C (Section 15.247),
ANSI C63.4-2003

The above equipment (Model: WMP-D18) 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 :  , **DATE:** July 14, 2006
(Midoli Peng)

TECHNICAL
ACCEPTANCE :  , **DATE:** July 14, 2006
Responsible for RF (Hank Chung)

APPROVED BY :  , **DATE:** July 14, 2006
(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

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 -20.08dB at 0.177MHz
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 -1.30dB at 11490.0MHz
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 5.150 ~ 5.350GHz and 5.725 ~ 5.850GHz frequencies band. This report was recorded the RF parameters including 5.725 ~ 5.850GHz. For the 5.150 ~ 5.350GHz RF parameters was recorded in another test report.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	IEEE 802.11a MiniPCI Card
MODEL NO.	WMP-D18
FCC ID	RRKWMPD18
POWER SUPPLY	DC 3.3V from host equipment
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54/48/36/24/18/12/9/6Mbps (Turbo mode: up to 108Mbps *see Note 1)
FREQUENCY RANGE	802.11a: 5.15 ~ 5.35GHz and 5.725 ~ 5.850GHz
NUMBER OF CHANNEL	802.11a: 13 (5 for 802.11a Turbo mode)
CHANNEL SPACING	802.11a: 20MHz for Normal mode
OUTPUT POWER	Please see note 4 (on next page)
DATA CABLE	NA
ANTENNA TYPE	Please see note 2 (on next page)
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. This EUT is capable of providing data rates of up to 108 Mbps in 802.11a Turbo mode depending upon reception quality.
2. There are two antennas provided to this EUT, please refer to the following table:

No.	Model No.	Gain (dBi)	Cable Loss (dB)	Net Gain (dB)	Antenna Type	Connector
1	SAA04-220080	5	1.8	3.2	Dipole	RP-N plug
2	ANT70-1800	18	2.96	15.04	Panel	N Jack

Note:

1. The antenna 2 is outdoor Antenna it can only be used in point-to-point applications.

3. Frequency Range of each Antennas are as followings:

Antenna No.	Frequency Range
No. 1	5.15GHz~5.35GHz and 5.725GHz ~ 5.850GHz
No. 2	5.25GHz~5.35GHz and 5.725GHz ~ 5.850GHz

4. Peak output power (Unit : mW) :

No.	Model No. (Antenna)	Operating Frequency (MHz)		
		5150~5250	5250~5350	5725~5850
1	SAA04-220080	48.641	153.109	141.254
2	ANT70-1800	NA	14.791	141.254

5. 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 5725 ~ 5850MHz band:

Five channels are provided to this EUT.

Channel	Frequency
1	5745 MHz
2	5765 MHz
3	5785 MHz
4	5805 MHz
5	5825 MHz

Two channels are provided to this EUT for turbo mode.

Channel	Frequency
1	5760 MHz
2	5800 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
-	√	√	√	√	NA

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)
802.11a	1 to 5	5	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)
802.11a	1 to 5	5	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)
802.11a	1 to 5	1, 3, 5	OFDM	BPSK	6
802.11a Turbo	1 to 2	1, 2	OFDM	BPSK	12

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)
802.11a	1 to 5	1, 5	OFDM	BPSK	6
802.11a Turbo	1 to 2	1, 2	OFDM	BPSK	12

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)
802.11a	1 to 5	1, 3, 5	OFDM	BPSK	6
802.11a Turbo	1 to 2	1, 2	OFDM	BPSK	12

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is an IEEE 802.11a MiniPCI Card. 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

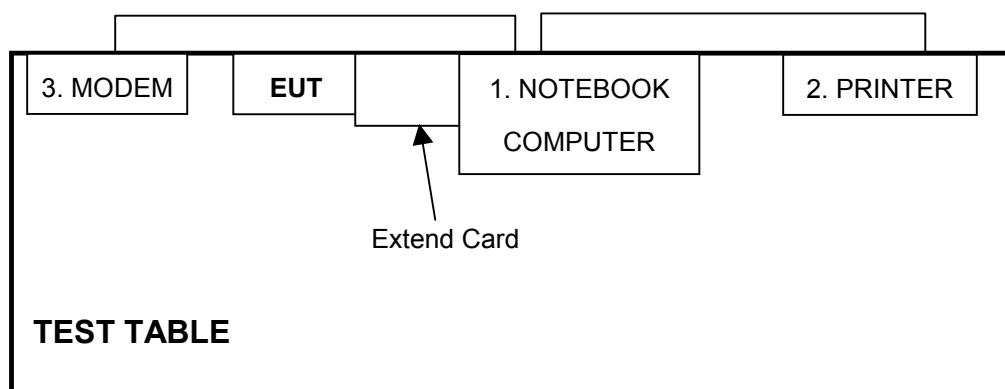
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	Dell	PP01L	TW-09c748-12800-165-3171	DoC
2	PRINTER	EPSON	LQ-300+	DCGY047261	B94C2642X
3	MODEM	ACEEX	1414	0206026775	IFAXDM1414
4	Extend Card	ADT	NA	NA	NA

No.	Signal cable description
1	NA
2	1.8m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core
3	1.3 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
4	NA

Note: 1. All power cords of the above support units are unshielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST



NOTE: 1. Please refer to the photos of test configuration in Item 5 also.

4. TEST TYPES AND RESULTS (802.11a, 5725~5850MHz 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	ESCS 30	847124/029	Dec. 15, 2006
Line-Impedance Stabilization Network(for EUT)	ENV-216	100071	Nov. 10, 2006
Line-Impedance Stabilization Network(for Peripheral)	KNW-407	8/1395/12	Jul. 19, 2006
RF Cable (JETBAO)	RG233/U	Cable_CB_01	Dec. 09, 2006
Terminator	50	2	Oct. 08, 2006
Software	ADT_Cond_V7.3.2	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 ADT Shielded Room No. B.
 3. The VCCI Con B Registration No. is C-2193.

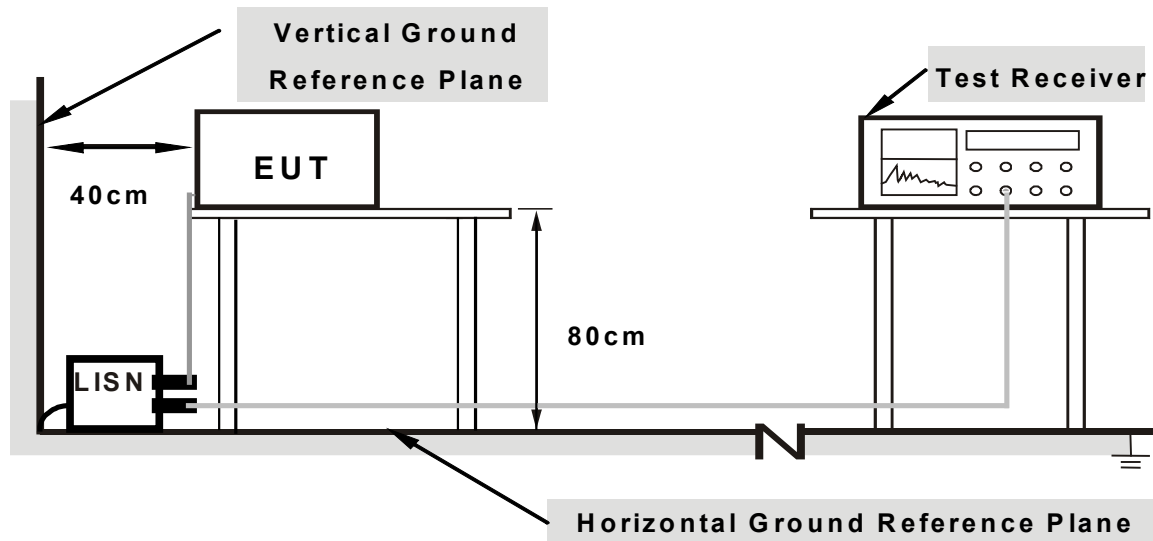
4.1.3 TEST PROCEDURES

- 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
- b. provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- d. The frequency range from 150kHz to 30MHz was searched. Emission level 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) 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

- a. Plug the EUT into test board and placed on the testing table.
- b. The support unit 1 (Notebook computer) ran a test program “ART52 build58” to enable EUT under transmission condition continuously at specific channel frequency.

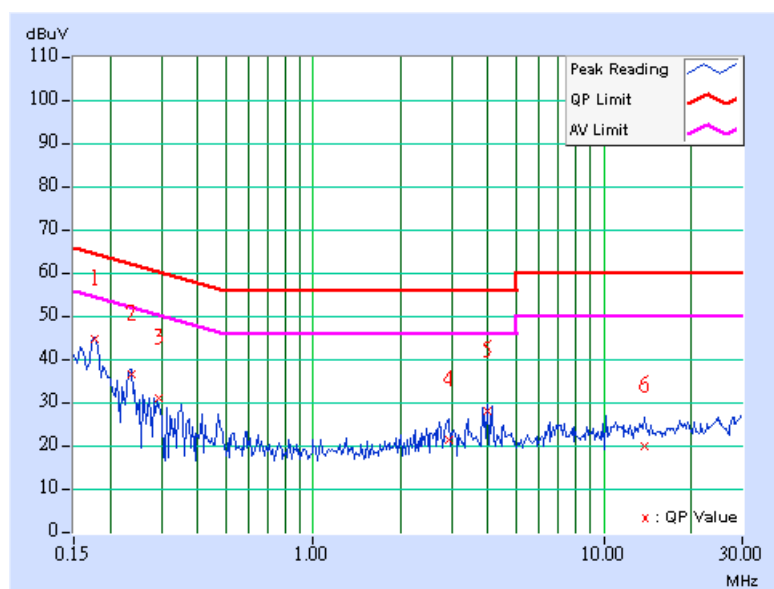
4.1.7 TEST RESULTS

Conducted Worst-Case Data

MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120VAC, 60 HZ	TRANSFER RATE	6Mbps
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 955hPa	PHASE	Line (L)
TESTED BY	Eric Lee		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.177	9.60	34.87	-	44.47	-	64.61	54.61	-20.14	-
2	0.236	9.60	26.47	-	36.07	-	62.24	52.24	-26.17	-
3	0.294	9.60	21.08	-	30.68	-	60.41	50.41	-29.73	-
4	2.935	9.70	11.41	-	21.11	-	56.00	46.00	-34.89	-
5	3.996	9.70	18.23	-	27.93	-	56.00	46.00	-28.07	-
6	13.867	10.05	10.03	-	20.08	-	60.00	50.00	-39.92	-

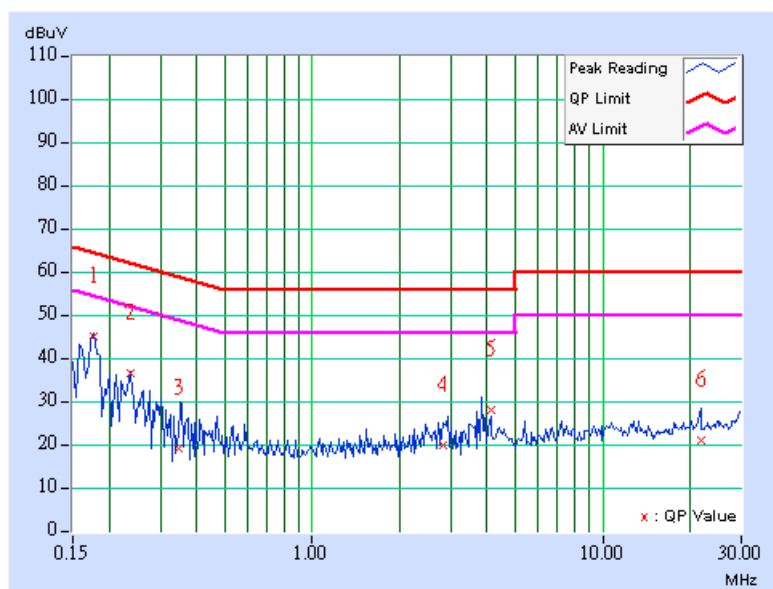
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TRANSFER RATE	6Mbps
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 955hPa	PHASE	Neutral (N)
TESTED BY	Eric Lee		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.177	9.60	34.93	-	44.53	-	64.61	54.61	-20.08	-
2	0.236	9.60	26.51	-	36.11	-	62.24	52.24	-26.13	-
3	0.345	9.60	9.30	-	18.90	-	59.07	49.07	-40.17	-
4	2.818	9.70	9.92	-	19.62	-	56.00	46.00	-36.38	-
5	4.113	9.70	17.96	-	27.66	-	56.00	46.00	-28.34	-
6	21.711	10.10	10.97	-	21.07	-	60.00	50.00	-38.93	-

- 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
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 07, 2007
HP Pre_Amplifier	8449B	3008A01922	Oct. 02, 2006
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Sep. 19, 2006
CHASE Broadband Antenna	VULB9168	138	Dec. 11, 2006
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 27, 2006
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 05, 2007
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 08, 2009
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 08, 2009
R&S Loop Antenna	HFH2-Z2	881058/15	Nov. 29, 2007
RF Switches (ARNITSU)	CS-201	1565157	NA
RF CABLE (Chaintek)	SF102	22054-2	Nov. 16, 2006
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1GHz	Jul. 16, 2006
Software	ADT_Radiated_V 5.14	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	NA

- Note: 1. The calibration interval of the above test instruments is 12 months (36 months for Biconical and Periodic Antenna) 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 ADT 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 4824A-3.
7. The following table is for the measurement uncertainty, which is calculated as per the document 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
Radiated emissions (30MHz-1GHz)	2.98 dB
Radiated emissions (1GHz ~18GHz)	2.21 dB
Radiated emissions (18GHz ~40GHz)	1.88 dB

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 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.

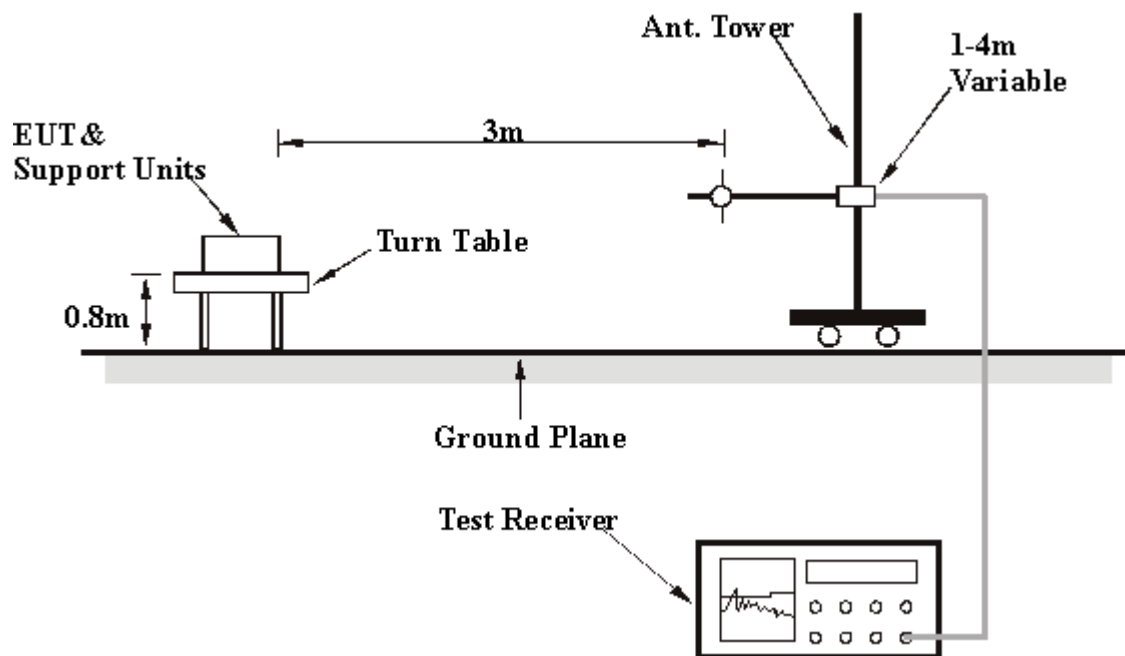
NOTE:

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 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.

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 –ANTENNA 1

Below 1GHz Worst-Case Data

MODULATION TYPE	BPSK	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TRANSFER RATE	6Mbps
ENVIRONMENTAL CONDITIONS	27deg. C, 53%RH, 955hPa	DETECTOR FUNCTION	Quasi-Peak
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	133.48	34.70 QP	43.50	-8.80	2.43 H	326	21.80	12.90
2	200.72	36.10 QP	43.50	-7.40	2.28 H	217	24.50	11.60
3	233.87	39.30 QP	46.00	-6.70	2.15 H	38	26.20	13.10
4	300.65	38.30 QP	46.00	-7.70	1.79 H	15	21.50	16.80
5	400.84	35.10 QP	46.00	-10.90	1.43 H	88	16.10	19.00
6	467.02	29.60 QP	46.00	-16.40	1.32 H	139	8.70	20.90

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	133.56	34.10 QP	43.50	-9.40	1.21 V	288	21.20	12.90
2	200.64	36.90 QP	43.50	-6.60	1.00 V	105	25.30	11.60
3	233.82	37.40 QP	46.00	-8.60	1.00 V	37	24.30	13.10
4	300.54	33.40 QP	46.00	-12.60	1.00 V	84	16.60	16.80
5	400.35	32.10 QP	46.00	-13.90	1.00 V	239	13.10	19.00
6	466.97	31.50 QP	46.00	-14.50	1.32 V	314	10.60	20.90

- 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

CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 70%RH, 955hPa	TESTED BY	Wen Yu

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	#3830.00	48.30 PK	74.00	-25.70	1.14 H	324	15.60	32.80
1	#3830.00	42.80 AV	54.00	-11.20	1.14 H	324	10.10	32.80
2	*5745.00	102.40 PK			1.16 H	307	65.90	36.50
2	*5745.00	92.40 AV			1.16 H	307	55.90	36.50
3	#11490.00	63.00 PK	74.00	-11.00	1.47 H	0	11.50	51.50
3	#11490.00	49.40 AV	54.00	-4.60	1.47 H	0	-2.10	51.50

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	#3830.00	47.80 PK	74.00	-26.20	1.00 V	358	15.10	32.80
1	#3830.00	40.80 AV	54.00	-13.20	1.00 V	358	8.10	32.80
2	*5745.00	114.30 PK			1.17 V	52	77.80	36.50
2	*5745.00	103.70 AV			1.17 V	52	67.20	36.50
3	#11490.00	66.40 PK	74.00	-7.60	1.63 V	51	14.90	51.50
3	#11490.00	52.70 AV	54.00	-1.30	1.63 V	51	1.20	51.50

- 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

CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 70%RH, 955hPa	TESTED BY	Wen Yu

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	#3856.60	50.90 PK	74.00	-23.10	1.14 H	316	18.20	32.80
1	#3856.60	46.90 AV	54.00	-7.10	1.14 H	316	14.20	32.80
2	*5785.00	103.00 PK			1.22 H	311	66.30	36.70
2	*5785.00	93.10 AV			1.22 H	311	56.40	36.70
3	#11570.00	63.00 PK	74.00	-11.00	1.48 H	1	11.70	51.30
3	#11570.00	49.30 AV	54.00	-4.70	1.48 H	1	-2.00	51.30

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	#3856.60	49.00 PK	74.00	-25.00	1.48 V	351	16.30	32.80
1	#3856.60	44.20 AV	54.00	-9.80	1.48 V	351	11.50	32.80
2	*5785.00	114.20 PK			1.14 V	53	77.50	36.70
2	*5785.00	104.40 AV			1.14 V	53	67.70	36.70
3	#11570.00	65.50 PK	74.00	-8.50	1.78 V	53	14.20	51.30
3	#11570.00	52.30 AV	54.00	-1.70	1.78 V	53	1.00	51.30

- 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

CHANNEL	Channel 5	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 70%RH, 955hPa	TESTED BY	Wen Yu

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	#3883.30	55.60 PK	74.00	-18.40	1.15 H	313	22.90	32.80
1	#3883.30	51.20 AV	54.00	-2.80	1.15 H	313	18.50	32.80
2	*5825.00	104.10 PK			1.14 H	309	67.30	36.80
2	*5825.00	94.20 AV			1.14 H	309	57.40	36.80
3	#11650.00	62.70 PK	74.00	-11.30	1.50 H	0	11.80	51.00
3	#11650.00	49.00 AV	54.00	-5.00	1.50 H	0	-1.90	51.00

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	#3883.30	50.50 PK	74.00	-23.50	1.72 V	241	17.80	32.80
1	#3883.30	46.60 AV	54.00	-7.40	1.72 V	241	13.90	32.80
2	*5825.00	114.70 PK			1.15 V	306	77.90	36.80
2	*5825.00	104.70 AV			1.15 V	306	67.90	36.80
3	#11650.00	65.30 PK	74.00	-8.70	1.75 V	52	14.40	51.00
3	#11650.00	52.20 AV	54.00	-1.80	1.75 V	52	1.30	51.00

- 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

802.11a Turbo OFDM modulation

CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 70%RH, 955hPa	TESTED BY	Wen Yu

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	#3840.00	46.50 PK	74.00	-27.50	1.00 H	307	13.80	32.80
1	#3840.00	39.20 AV	54.00	-14.80	1.00 H	307	6.50	32.80
2	*5760.00	101.60 PK			1.21 H	310	65.00	36.60
2	*5760.00	89.90 AV			1.21 H	310	53.30	36.60
3	#11520.00	62.80 PK	74.00	-11.20	1.22 H	351	11.30	51.50
3	#11520.00	49.50 AV	54.00	-4.50	1.22 H	351	-2.00	51.50

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	#3840.00	46.00 PK	74.00	-28.00	1.00 V	151	13.30	32.80
1	#3840.00	37.70 AV	54.00	-16.30	1.00 V	151	5.00	32.80
2	*5760.00	112.80 PK			1.21 V	321	76.20	36.60
2	*5760.00	103.20 AV			1.21 V	321	66.60	36.60
3	#11520.00	62.50 PK	74.00	-11.50	1.12 V	43	11.00	51.50
3	#11520.00	49.80 AV	54.00	-4.20	1.12 V	43	-1.70	51.50

- 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

CHANNEL	Channel 2	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 70%RH, 955hPa	TESTED BY	Wen Yu

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	#3866.60	46.90 PK	74.00	-27.10	1.00 H	296	14.20	32.80
1	#3866.60	40.40 AV	54.00	-13.60	1.00 H	296	7.70	32.80
2	*5800.00	102.50 PK			1.20 H	309	65.80	36.70
2	*5800.00	92.70 AV			1.20 H	309	56.00	36.70
3	#11600.00	62.30 PK	74.00	-11.70	1.20 H	342	11.20	51.20
3	#11600.00	48.90 AV	54.00	-5.10	1.20 H	342	-2.20	51.20

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	#3866.60	46.20 PK	74.00	-27.80	1.00 V	305	13.50	32.80
1	#3866.60	37.80 AV	54.00	-16.20	1.00 V	305	5.10	32.80
2	*5800.00	112.60 PK			1.14 V	50	75.90	36.70
2	*5800.00	103.10 AV			1.14 V	50	66.40	36.70
3	#11600.00	62.70 PK	74.00	-11.30	1.11 V	42	11.60	51.20
3	#11600.00	49.40 AV	54.00	-4.60	1.11 V	42	-1.70	51.20

- 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

4.2.8 TEST RESULTS –ANTENNA 2

Below 1GHz Worst-Case Data

MODULATION TYPE	BPSK	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TRANSFER RATE	6Mbps
ENVIRONMENTAL CONDITIONS	27deg. C, 53%RH, 955hPa	DETECTOR FUNCTION	Quasi-Peak
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	133.74	34.20 QP	43.50	-9.30	2.16 H	34	21.30	12.90
2	200.42	36.30 QP	43.50	-7.20	2.17 H	89	24.70	11.60
3	233.73	40.50 QP	46.00	-5.50	2.06 H	112	27.40	13.10
4	300.74	39.10 QP	46.00	-6.90	1.94 H	93	22.30	16.80
5	400.68	34.60 QP	46.00	-11.40	1.13 H	107	15.60	19.00
6	466.59	29.40 QP	46.00	-16.60	1.41 H	135	8.50	20.90

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	133.54	33.40 QP	43.50	-10.10	1.00 V	143	20.50	12.90
2	200.39	37.10 QP	43.50	-6.40	1.00 V	284	25.50	11.60
3	233.92	36.30 QP	46.00	-9.70	1.00 V	166	23.20	13.10
4	300.88	33.40 QP	46.00	-12.60	1.05 V	353	16.60	16.80
5	400.56	32.80 QP	46.00	-13.20	1.00 V	97	13.80	19.00
6	466.78	31.10 QP	46.00	-14.90	1.43 V	39	10.20	20.90

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

CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 70%RH, 955hPa	TESTED BY	Wen Yu

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	#3830.00	49.80 PK	74.00	-24.20	1.50 H	25	17.10	32.80
1	#3830.00	45.30 AV	54.00	-8.70	1.50 H	25	12.60	32.80
2	*5745.00	99.10 PK			1.49 H	43	62.60	36.50
2	*5745.00	88.90 AV			1.49 H	43	52.40	36.50
3	#11490.00	62.20 PK	74.00	-11.80	1.57 H	36	10.70	51.50
3	#11490.00	49.20 AV	54.00	-4.80	1.57 H	36	-2.30	51.50

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	#3830.00	53.70 PK	74.00	-20.30	1.04 V	53	21.00	32.80
1	#3830.00	51.10 AV	54.00	-2.90	1.04 V	53	18.40	32.80
2	*5745.00	113.50 PK			1.00 V	1	77.00	36.50
2	*5745.00	102.90 AV			1.00 V	1	66.40	36.50
3	#11490.00	65.50 PK	74.00	-8.50	1.39 V	78	14.00	51.50
3	#11490.00	52.30 AV	54.00	-1.70	1.39 V	78	0.80	51.50

- 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

CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 70%RH, 955hPa	TESTED BY	Wen Yu

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	#3856.60	47.30 PK	74.00	-26.70	1.54 H	321	14.60	32.80
1	#3856.60	41.10 AV	54.00	-12.90	1.54 H	321	8.40	32.80
2	*5785.00	99.70 PK			1.49 H	49	63.00	36.70
2	*5785.00	90.00 AV			1.49 H	49	53.30	36.70
3	#11570.00	62.10 PK	74.00	-11.90	1.55 H	35	10.80	51.30
3	#11570.00	48.90 AV	54.00	-5.10	1.55 H	35	-2.40	51.30

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	#3856.60	52.00 PK	74.00	-22.00	1.02 V	58	19.30	32.80
1	#3856.60	49.80 AV	54.00	-4.20	1.02 V	58	17.10	32.80
2	*5785.00	112.50 PK			1.00 V	1	75.80	36.70
2	*5785.00	103.10 AV			1.00 V	1	66.40	36.70
3	#11570.00	66.00 PK	74.00	-8.00	1.40 V	76	14.70	51.30
3	#11570.00	52.10 AV	54.00	-1.90	1.40 V	76	0.80	51.30

- 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

CHANNEL	Channel 5	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 70%RH, 955hPa	TESTED BY	Wen Yu

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	#3883.30	47.70 PK	74.00	-26.30	1.54 H	31	15.00	32.80
1	#3883.30	42.20 AV	54.00	-11.80	1.54 H	31	9.50	32.80
2	*5825.00	99.30 PK			1.48 H	47	62.50	36.80
2	*5825.00	88.90 AV			1.48 H	47	52.10	36.80
3	#11650.00	61.40 PK	74.00	-12.60	1.55 H	32	10.50	51.00
3	#11650.00	48.40 AV	54.00	-5.60	1.55 H	32	-2.50	51.00

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	#3883.30	53.90 PK	74.00	-20.10	1.01 V	60	21.20	32.80
1	#3883.30	51.60 AV	54.00	-2.40	1.01 V	60	18.90	32.80
2	*5825.00	111.50 PK			1.00 V	1	74.70	36.80
2	*5825.00	101.50 AV			1.00 V	1	64.70	36.80
3	#11650.00	65.60 PK	74.00	-8.40	1.36 V	77	14.70	51.00
3	#11650.00	52.40 AV	54.00	-1.60	1.36 V	77	1.50	51.00

- 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

802.11a Turbo OFDM modulation

CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 70%RH, 955hPa	TESTED BY	Wen Yu

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	#3840.00	45.90 PK	74.00	-28.10	1.00 H	347	13.20	32.80
1	#3840.00	38.10 AV	54.00	-15.90	1.00 H	347	5.40	32.80
2	*5760.00	104.10 PK			1.20 H	40	67.50	36.60
2	*5760.00	94.10 AV			1.20 H	40	57.50	36.60
3	#11520.00	63.50 PK	74.00	-10.50	1.52 H	336	12.00	51.50
3	#11520.00	49.60 AV	54.00	-4.40	1.52 H	336	-1.90	51.50

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	#3840.00	48.20 PK	74.00	-25.80	1.18 V	50	15.50	32.80
1	#3840.00	42.50 AV	54.00	-11.50	1.18 V	50	9.80	32.80
2	*5760.00	118.80 PK			1.00 V	2	82.20	36.60
2	*5760.00	109.10 AV			1.00 V	2	72.50	36.60
3	#11520.00	63.80 PK	74.00	-10.20	1.28 V	358	12.30	51.50
3	#11520.00	50.50 AV	54.00	-3.50	1.28 V	358	-1.00	51.50

- 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

CHANNEL	Channel 2	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 70%RH, 955hPa	TESTED BY	Wen Yu

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	#3866.60	46.50 PK	74.00	-27.50	1.00 H	346	13.80	32.80
1	#3866.60	38.70 AV	54.00	-15.30	1.00 H	346	6.00	32.80
2	*5800.00	104.60 PK			1.11 H	325	67.90	36.70
2	*5800.00	94.40 AV			1.11 H	325	57.70	36.70
3	#11600.00	63.40 PK	74.00	-10.60	1.44 H	334	12.30	51.20
3	#11600.00	49.70 AV	54.00	-4.30	1.44 H	334	-1.40	51.20

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	#3866.60	48.30 PK	74.00	-25.70	1.01 V	57	15.60	32.80
1	#3866.60	43.50 AV	54.00	-10.50	1.01 V	57	10.80	32.80
2	*5800.00	118.30 PK			1.00 V	2	81.60	36.70
2	*5800.00	108.30 AV			1.00 V	2	71.60	36.70
3	#11600.00	63.80 PK	74.00	-10.20	1.30 V	5	12.70	51.20
3	#11600.00	50.10 AV	54.00	-3.90	1.30 V	5	-1.00	51.20

- 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

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
R&S SPECTRUM ANALYZER	FSP40	100036	Nov. 23, 2006

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.

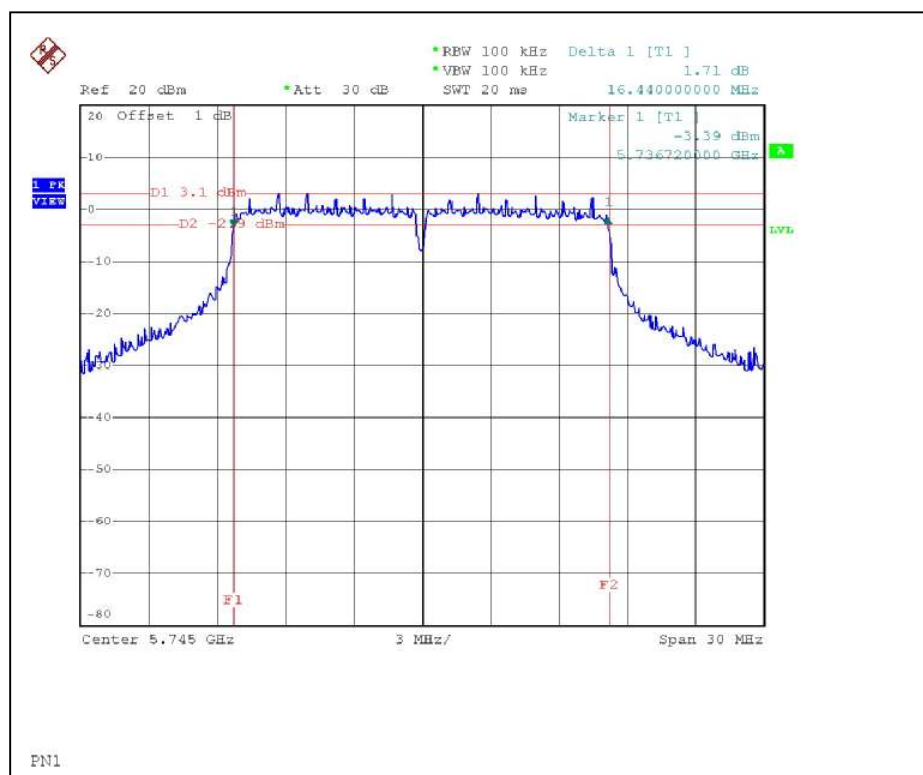
4.3.7 TEST RESULTS- ANTENNA 1

802.11a OFDM modulation

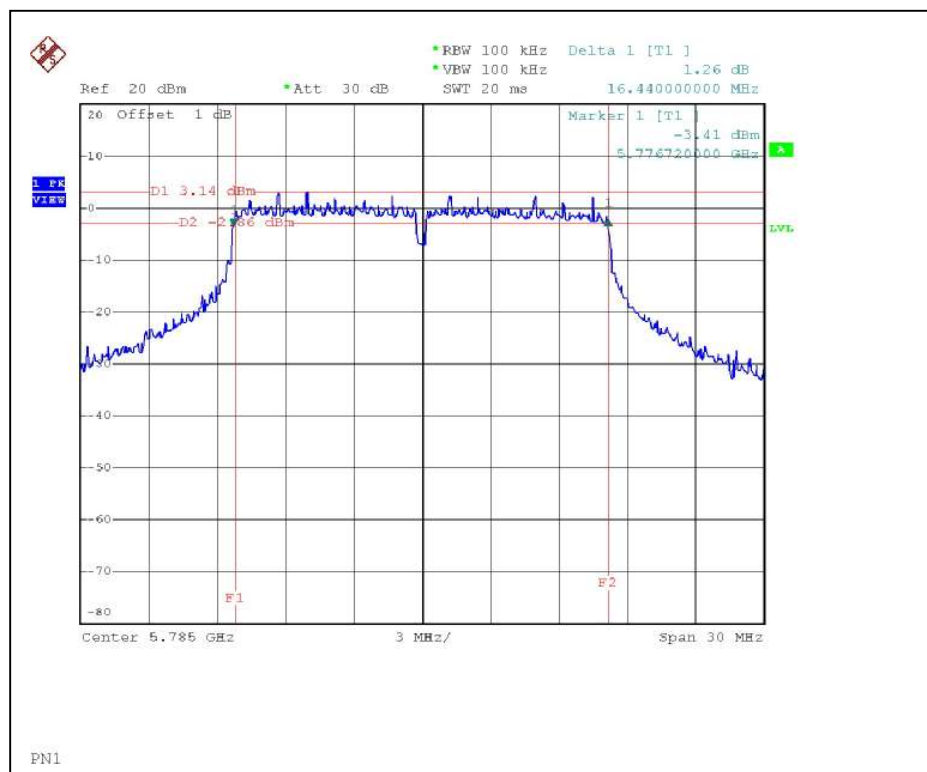
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 62%RH, 955hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	5745	16.44	0.5	PASS
3	5785	16.44	0.5	PASS
5	5825	16.44	0.5	PASS

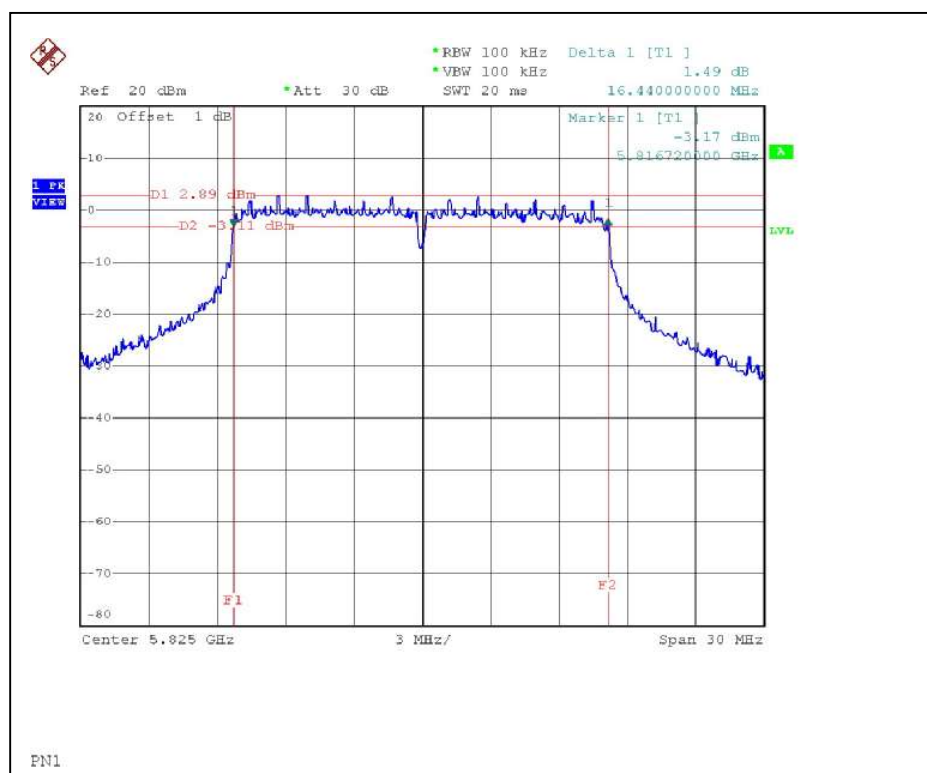
CH1



CH3



CH5

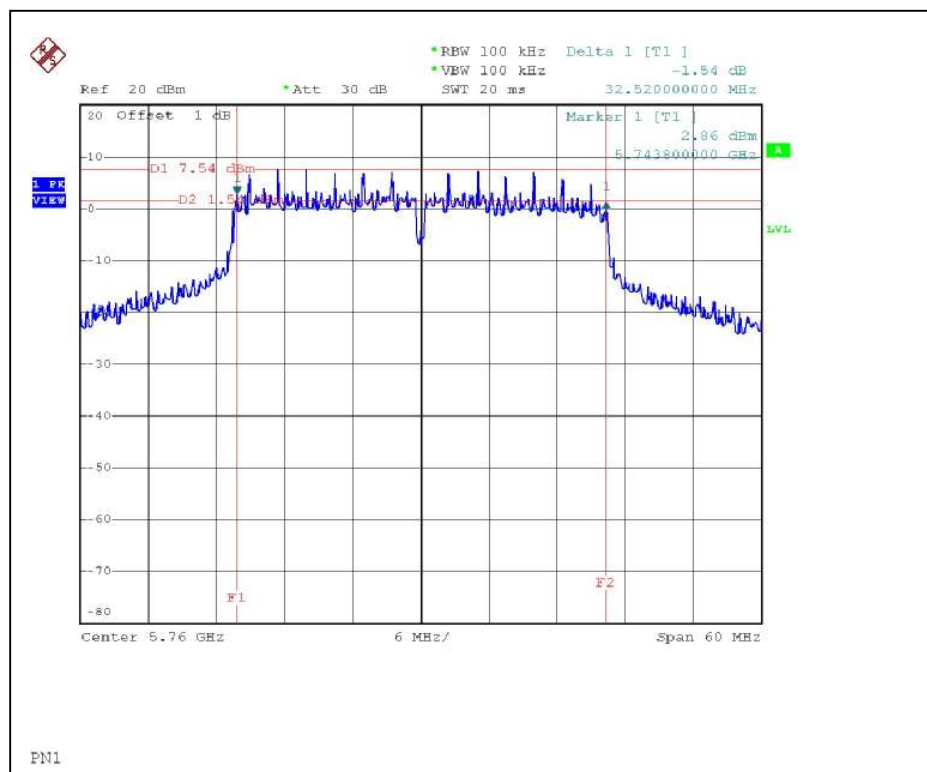


802.11a Turbo OFDM modulation

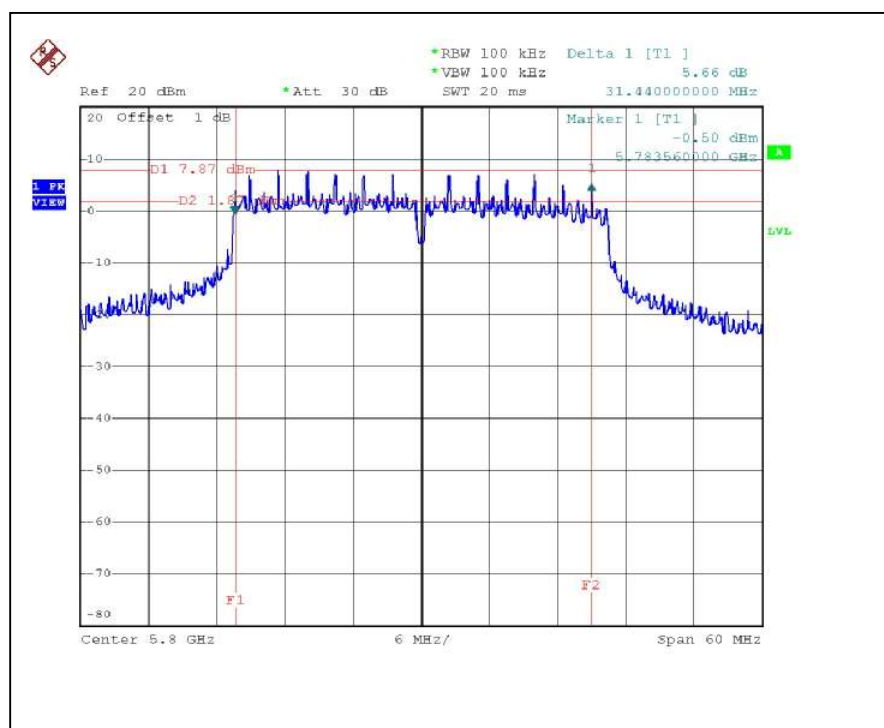
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 62%RH, 955hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	5760	32.52	0.5	PASS
2	5800	31.44	0.5	PASS

CH1



CH2



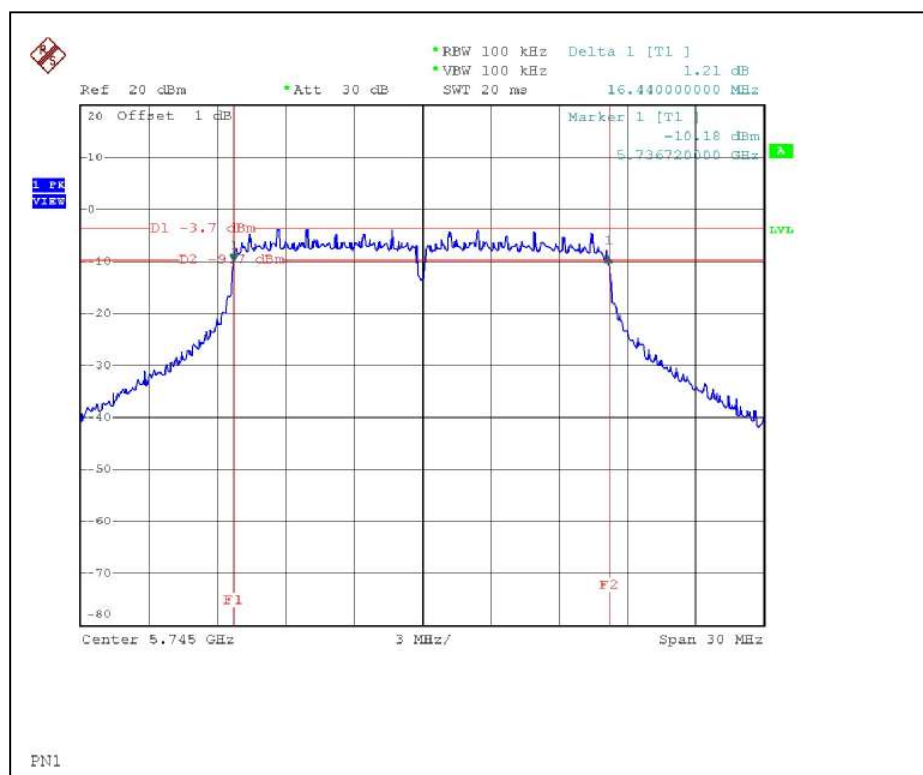
4.3.8 TEST RESULTS- ANTENNA 2

802.11a OFDM modulation

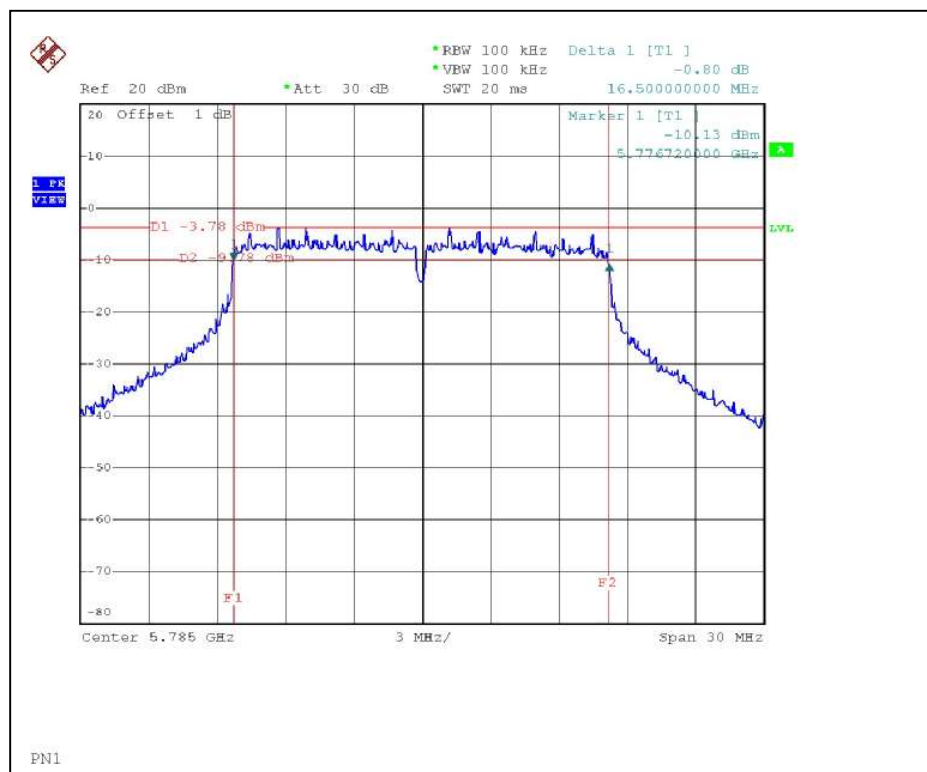
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 62%RH, 955hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	5745	16.44	0.5	PASS
3	5785	16.50	0.5	PASS
5	5825	16.38	0.5	PASS

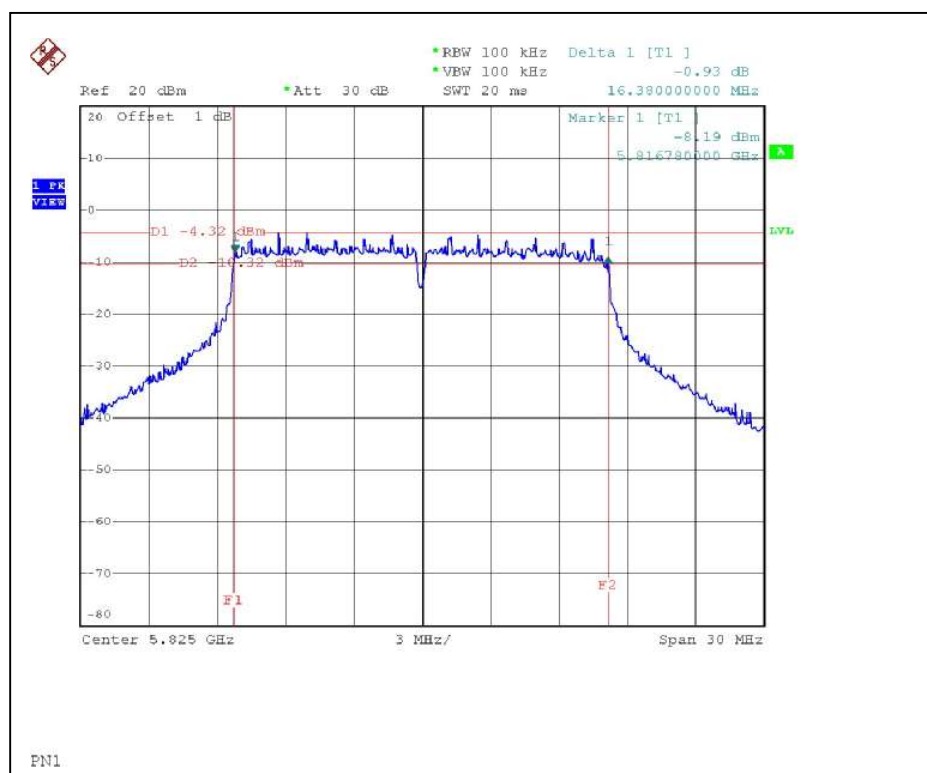
CH1



CH3



CH5

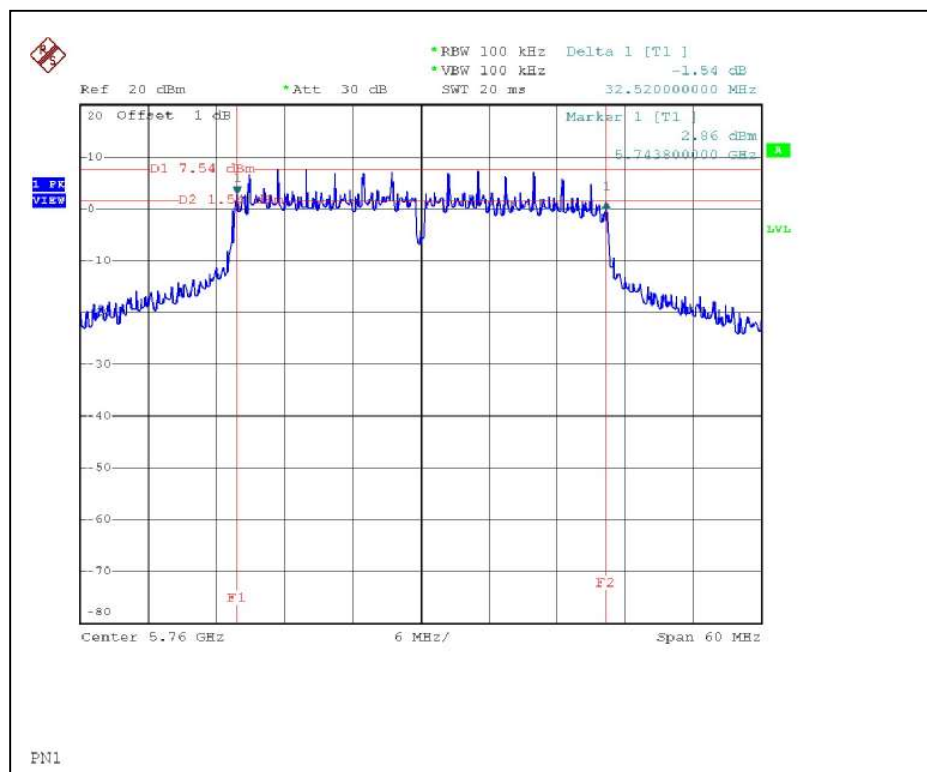


802.11a Turbo OFDM modulation

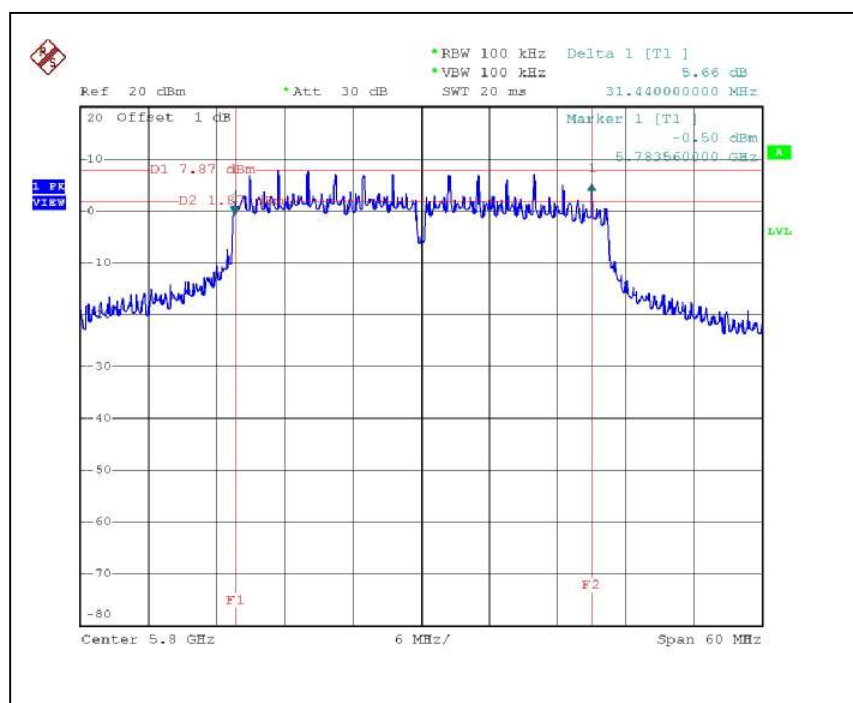
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 62%RH, 955hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	5760	32.52	0.5	PASS
2	5800	31.44	0.5	PASS

CH1



CH2



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	FSP40	100036	Nov. 23, 2006
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 07, 2006
TEKTRONIX OSCILLOSCOPE	TDS380	B016335	July 04, 2007
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.

4.4.3 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.

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

802.11a OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 62%RH, 955hPa
TESTED BY	Wen Yu		

Antenna 1 (Gain : 5 dBi) + Antenna Cable (1.8dB loss)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	5745	83.176	19.2	30	PASS
3	5785	83.176	19.2	30	PASS
5	5825	89.125	19.5	30	PASS

Antenna 2 (Gain : 18 dBi) + Antenna Cable (2.96dB loss)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	5745	19.054	12.8	30	PASS
3	5785	19.054	12.8	30	PASS
5	5825	15.849	12.0	30	PASS

802.11a Turbo OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 52%RH, 955hPa
TESTED BY	Wen Yu		

Antenna 1 (Gain : 5 dBi) + Antenna Cable (1.8dB loss)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	5760	141.254	21.5	30	PASS
2	5800	141.254	21.5	30	PASS

Antenna 2 (Gain : 18 dBi) + Antenna Cable (2.96dB loss)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	5760	141.254	21.5	30	PASS
2	5800	141.254	21.5	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	FSP40	100036	Nov. 23, 2006

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 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

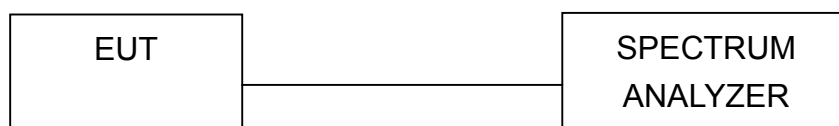
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time = span/3 kHz. The power spectral density was measured and recorded.

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

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

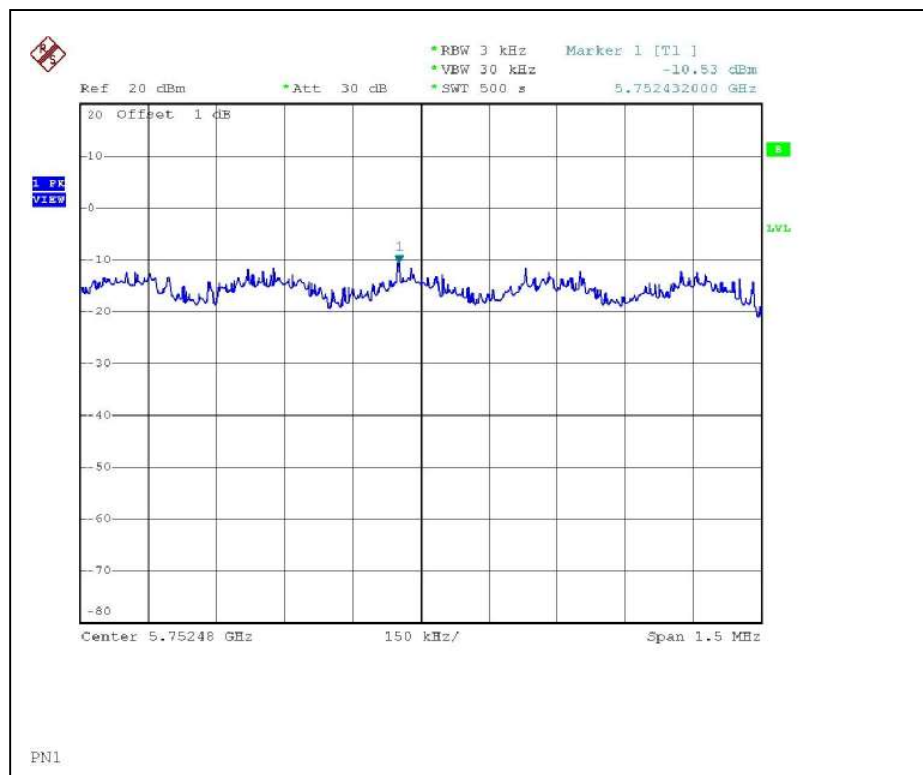
4.5.7 TEST RESULTS -ANTENNA 1

802.11a OFDM modulation

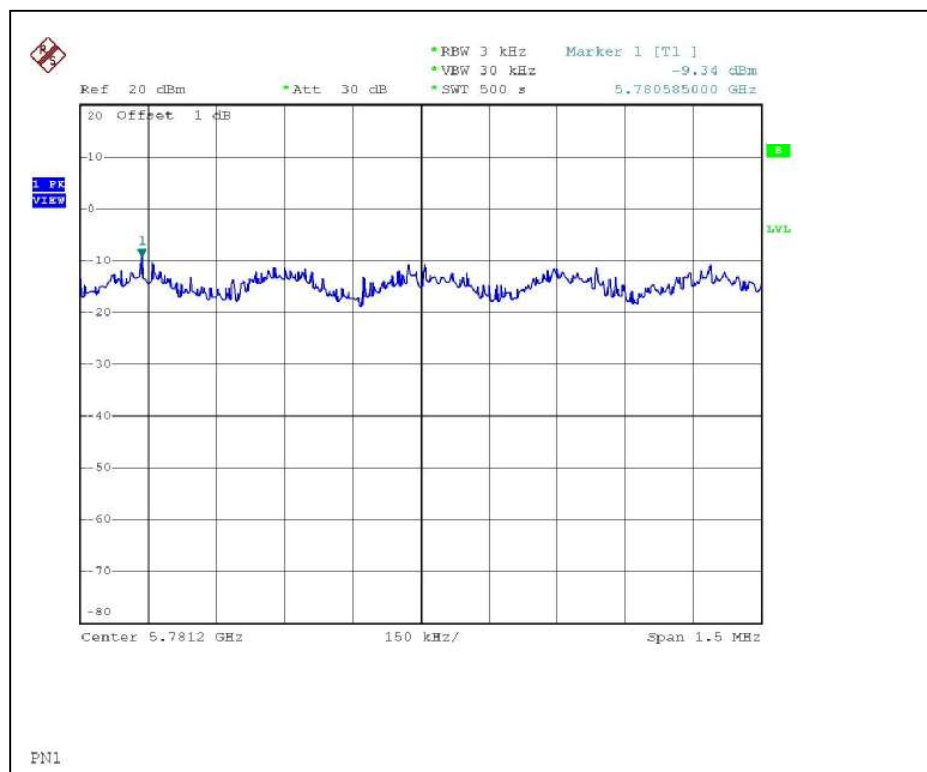
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 62%RH, 955hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5745	-10.53	8	PASS
3	5785	-9.34	8	PASS
5	5825	-10.90	8	PASS

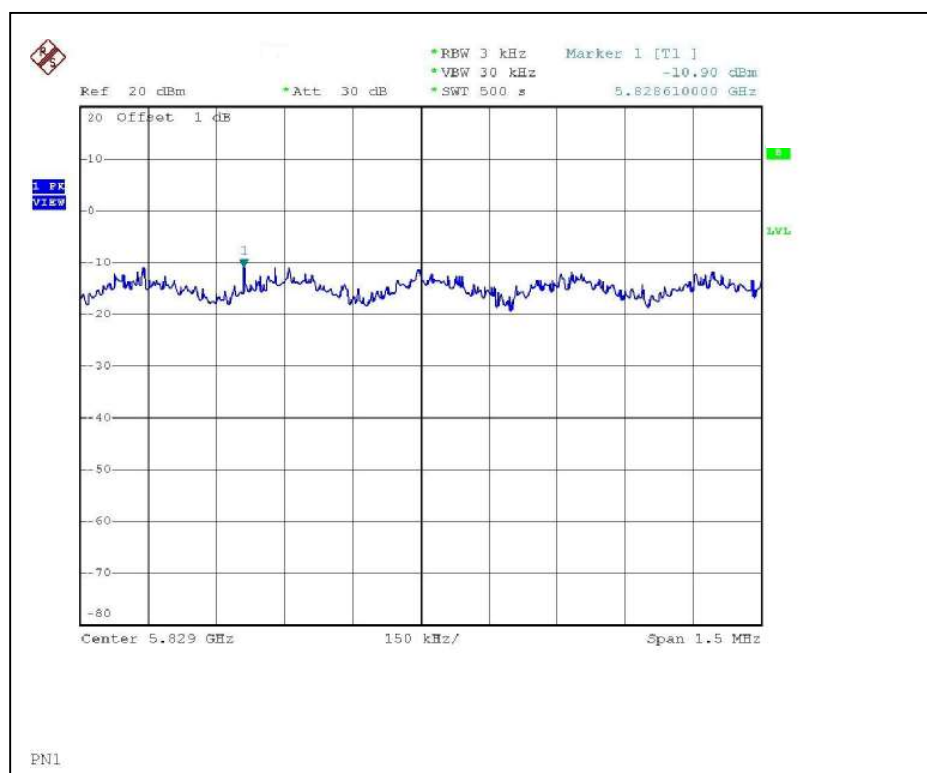
CH1



CH3



CH5

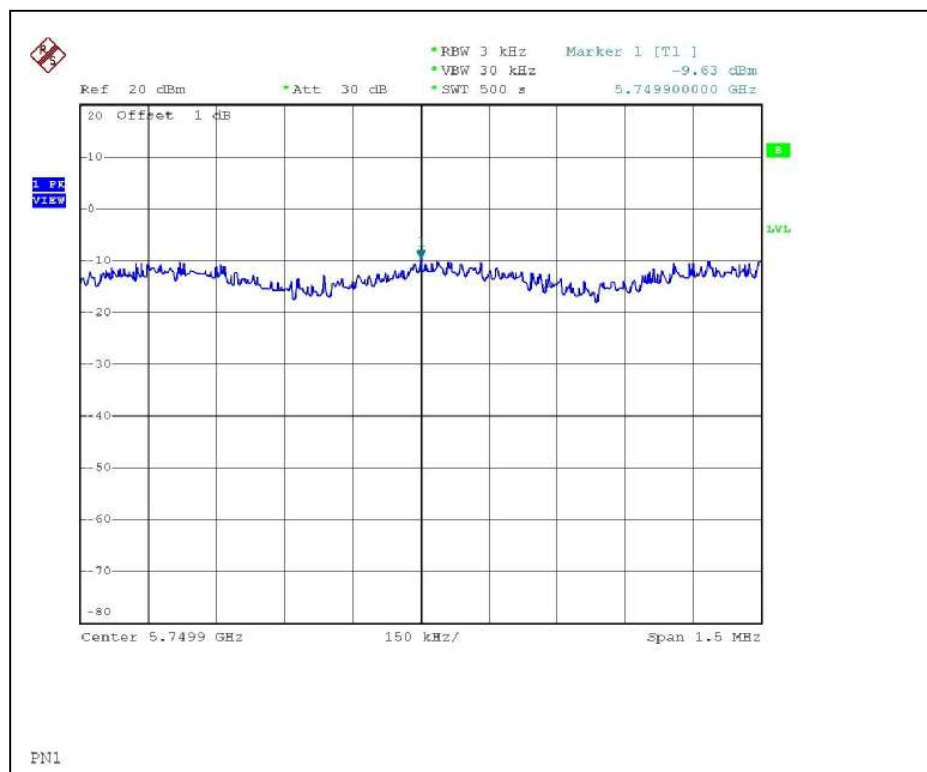


802.11a Turbo OFDM modulation

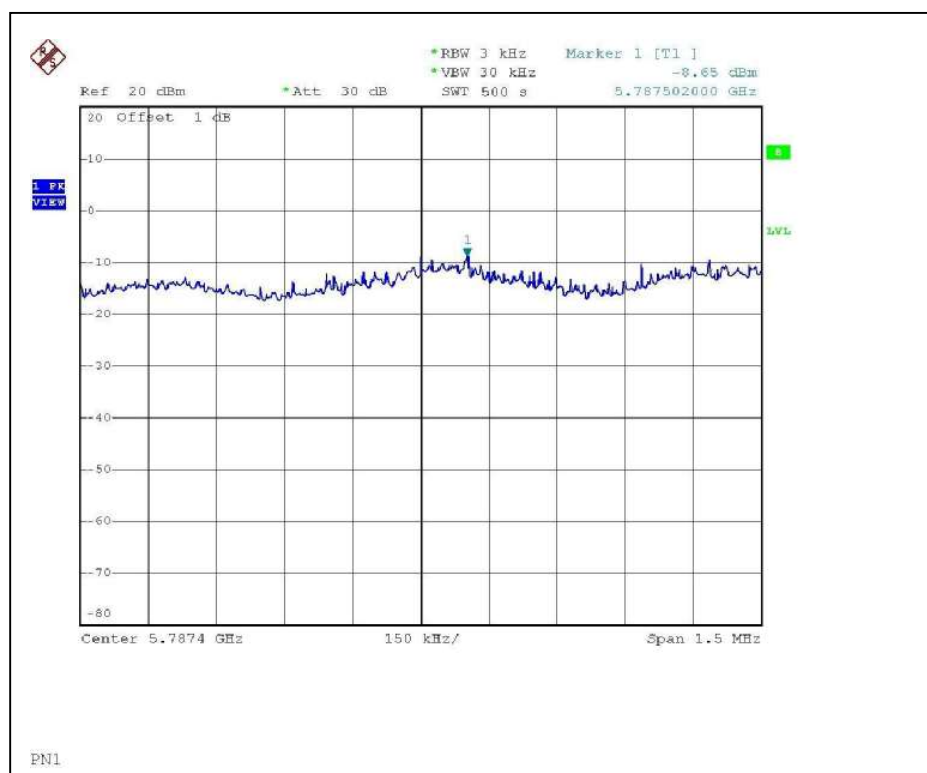
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 62%RH, 955hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5760	-9.63	8	PASS
2	5800	-8.65	8	PASS

CH1



CH2



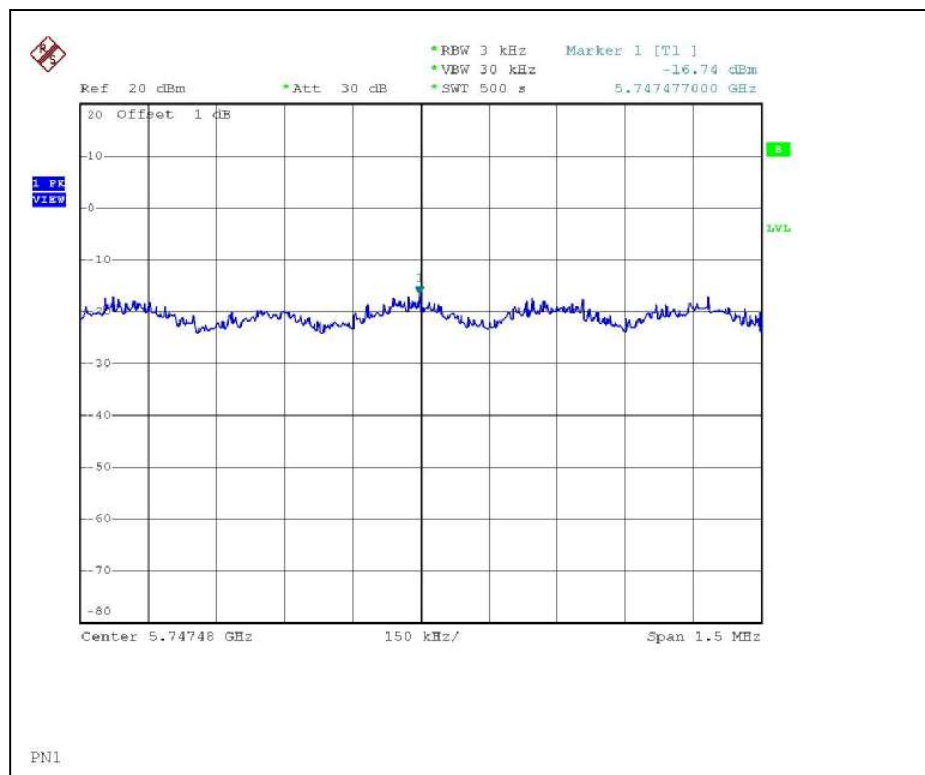
4.5.8 TEST RESULTS -ANTENNA 2

802.11a OFDM modulation

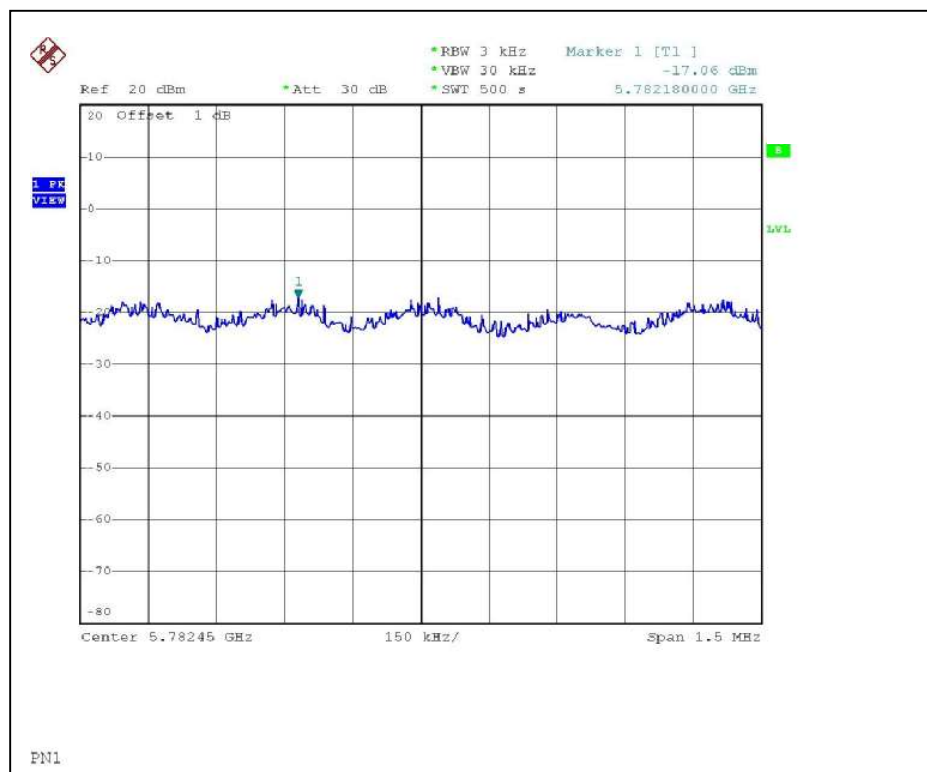
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 62%RH, 955hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5745	-16.74	8	PASS
3	5785	-17.06	8	PASS
5	5825	-17.74	8	PASS

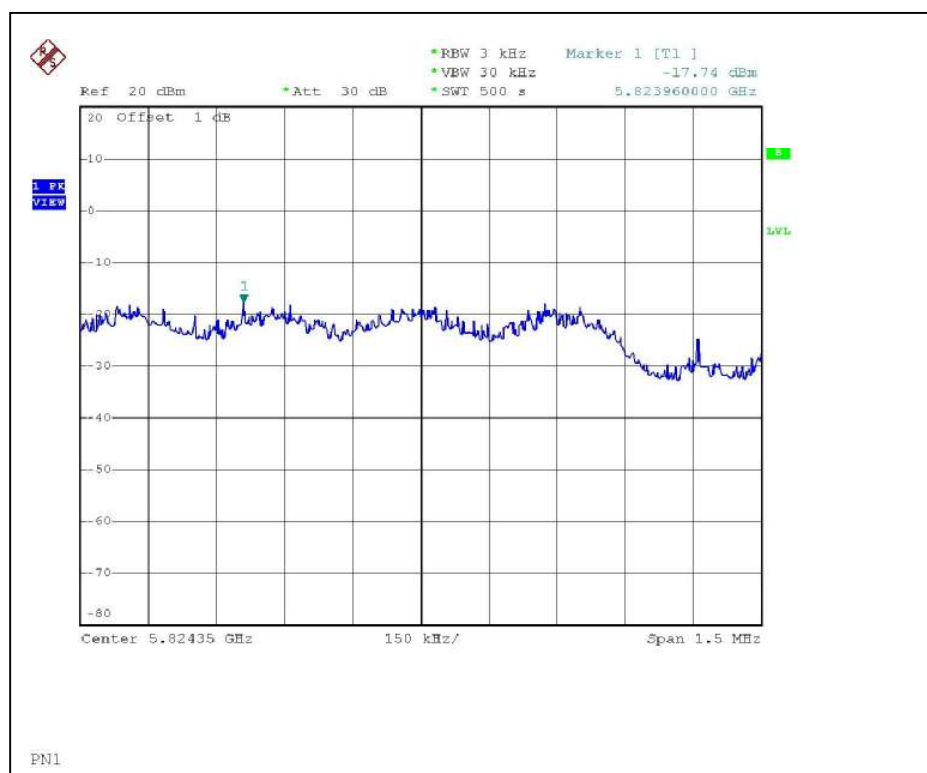
CH1



CH3



CH5

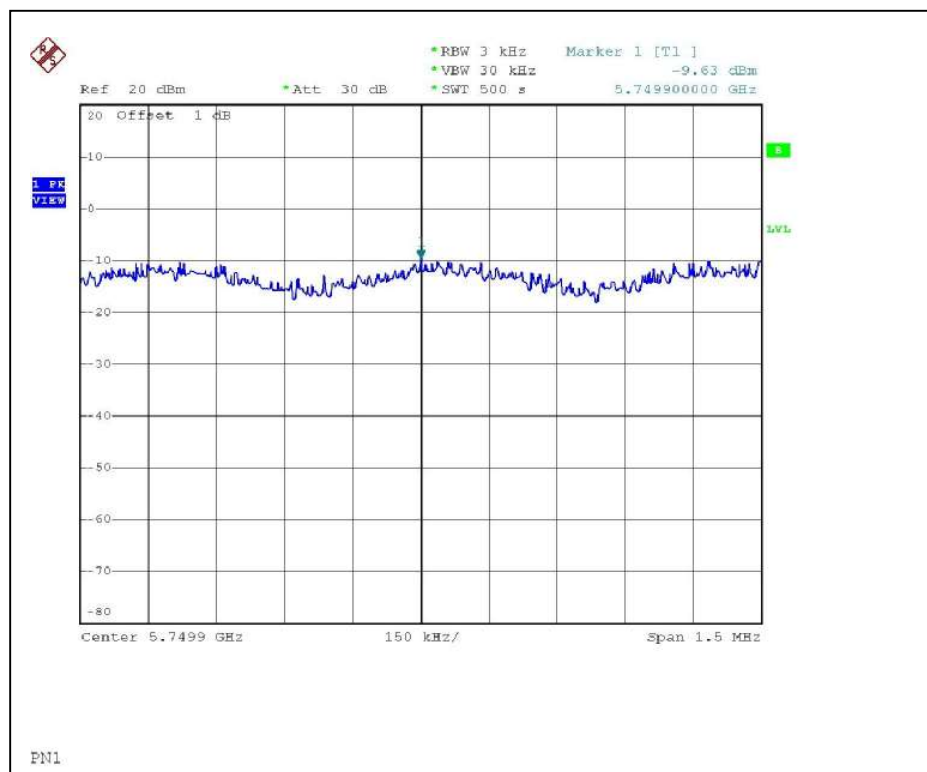


802.11a Turbo OFDM modulation

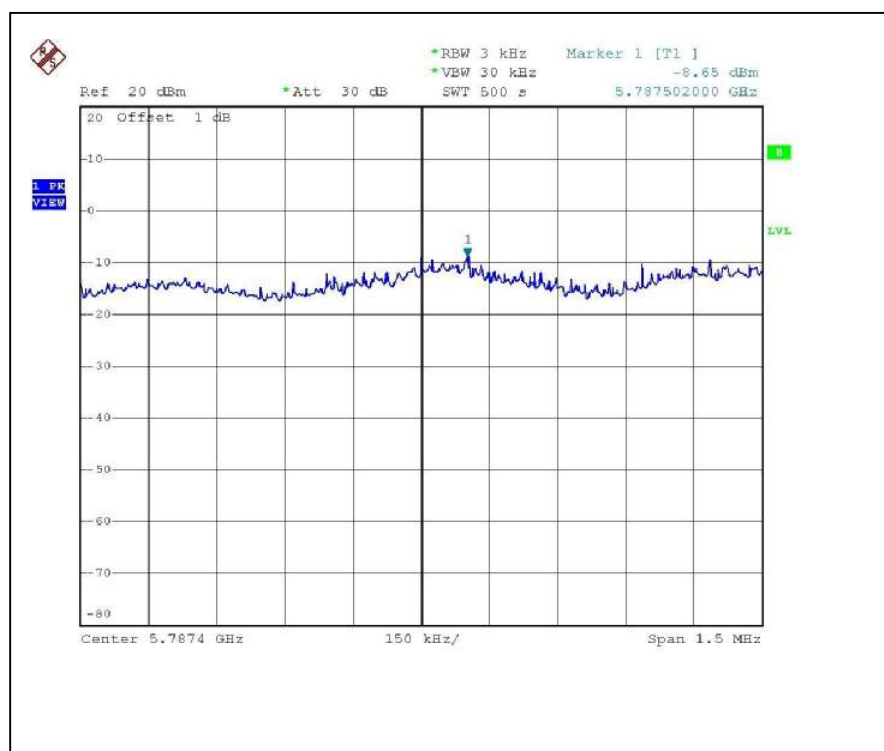
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 62%RH, 955hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5760	-9.63	8	PASS
2	5800	-8.65	8	PASS

CH1



CH2



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	FSP40	100036	Nov. 23, 2006

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 loss 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.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

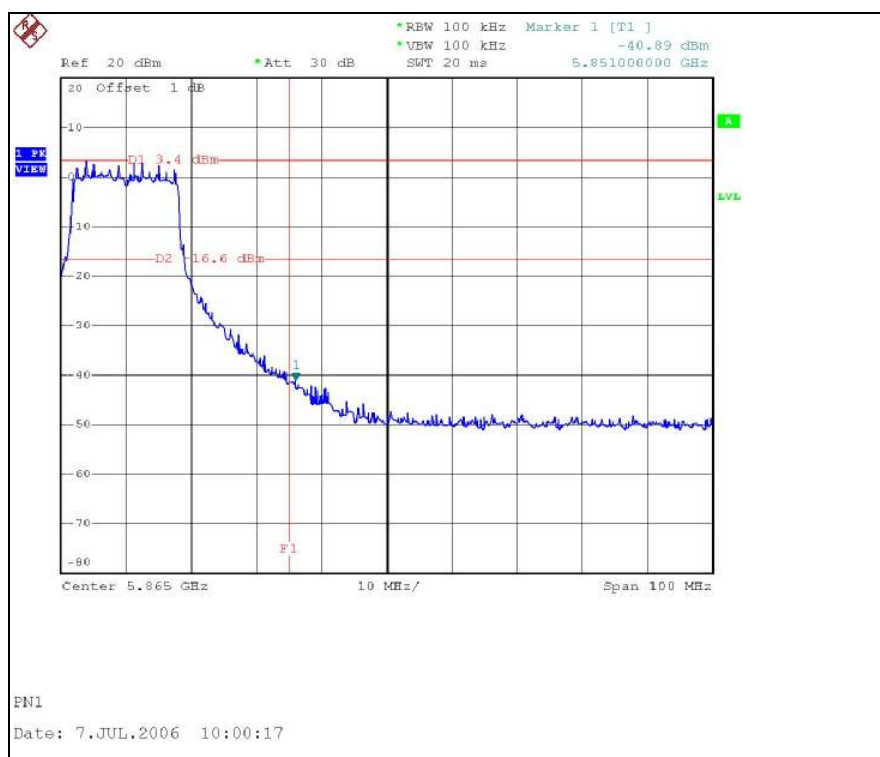
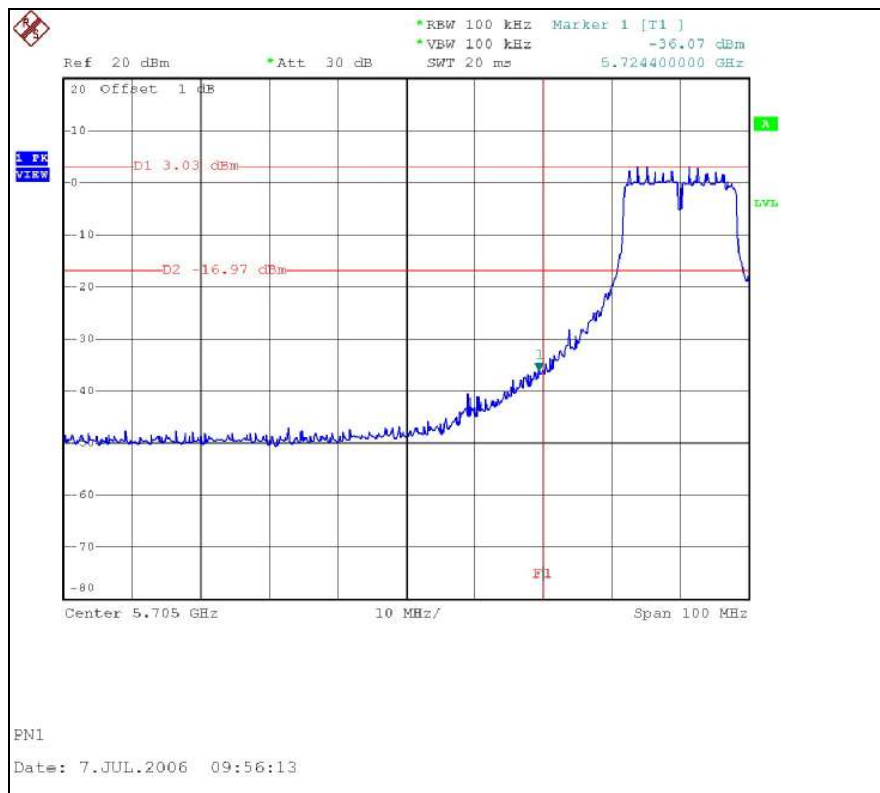
4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6

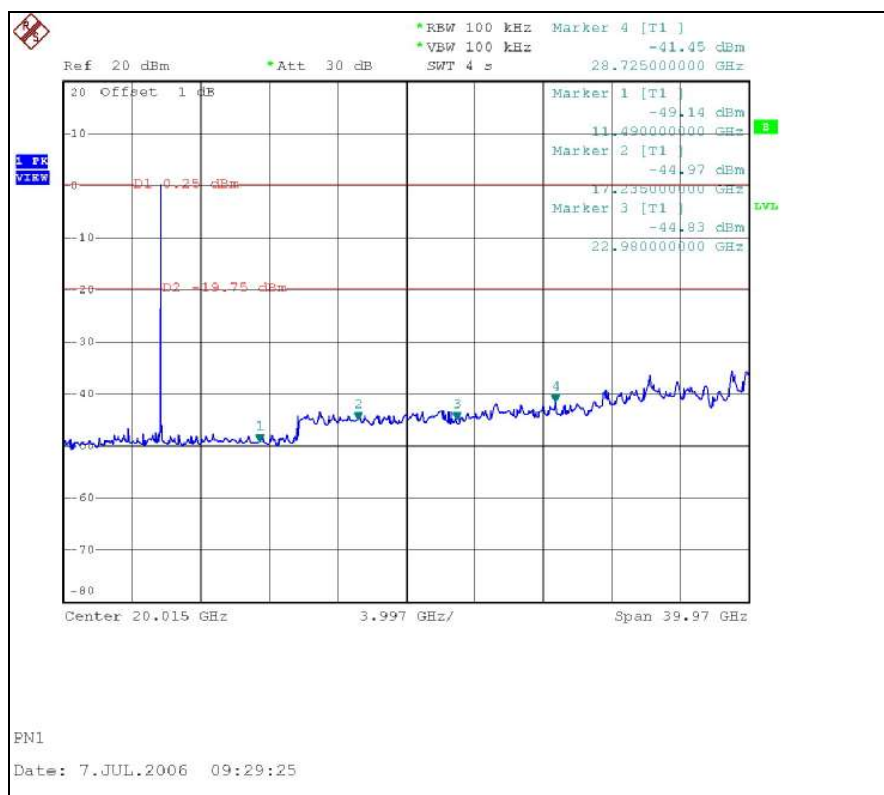
4.6.6 TEST RESULTS -ANTENNA 1

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).

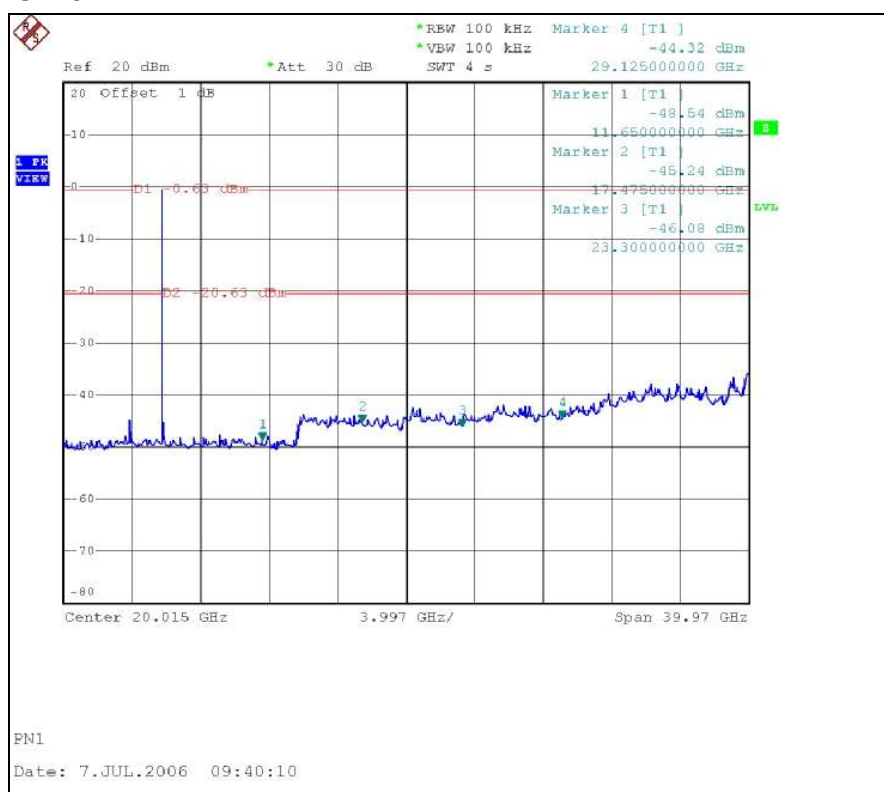
802.11a OFDM modulation



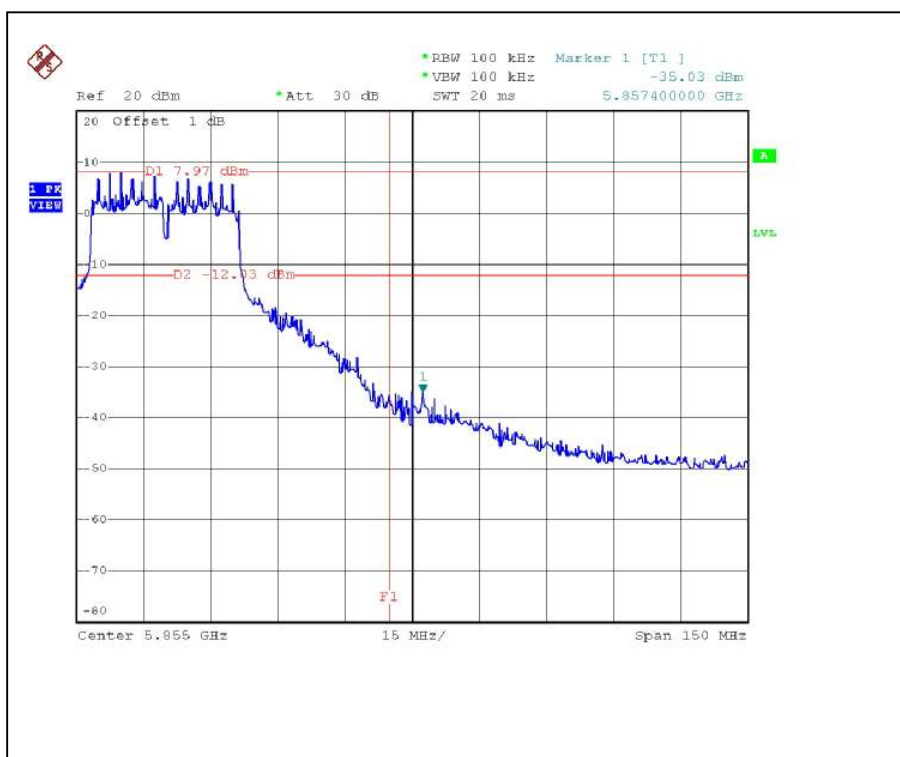
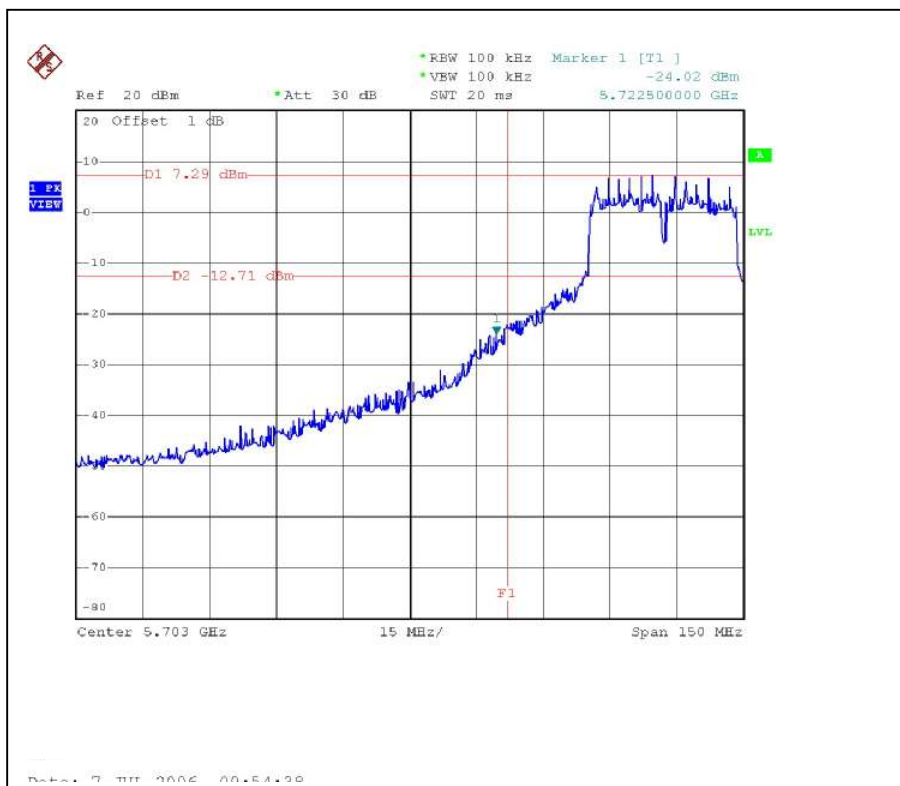
CH 1



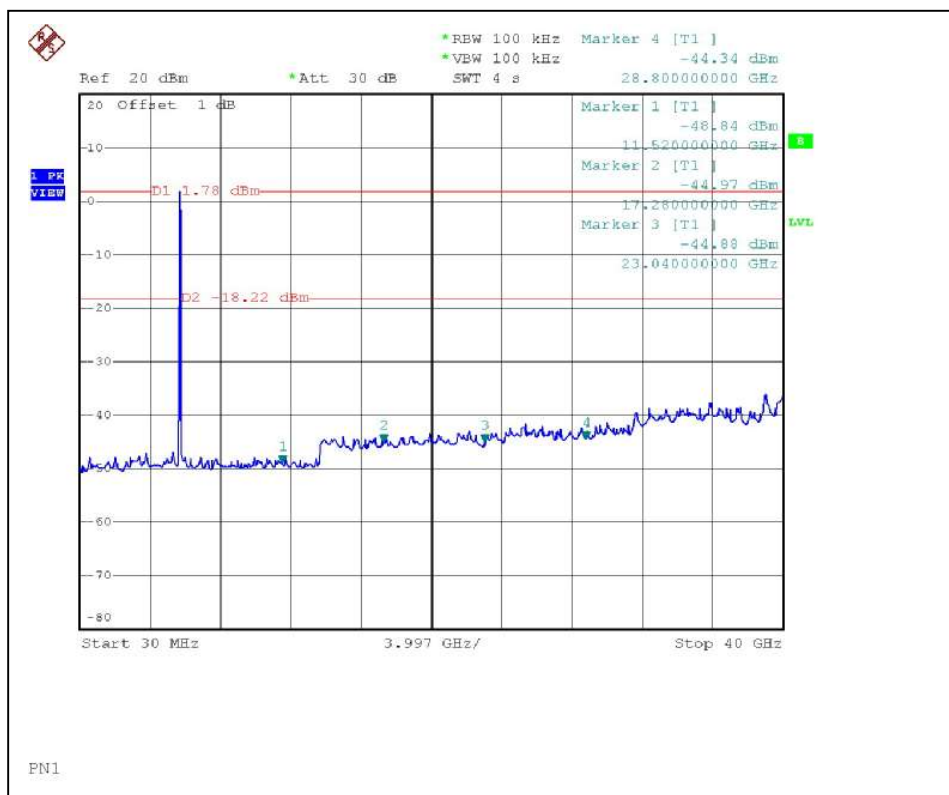
CH 5



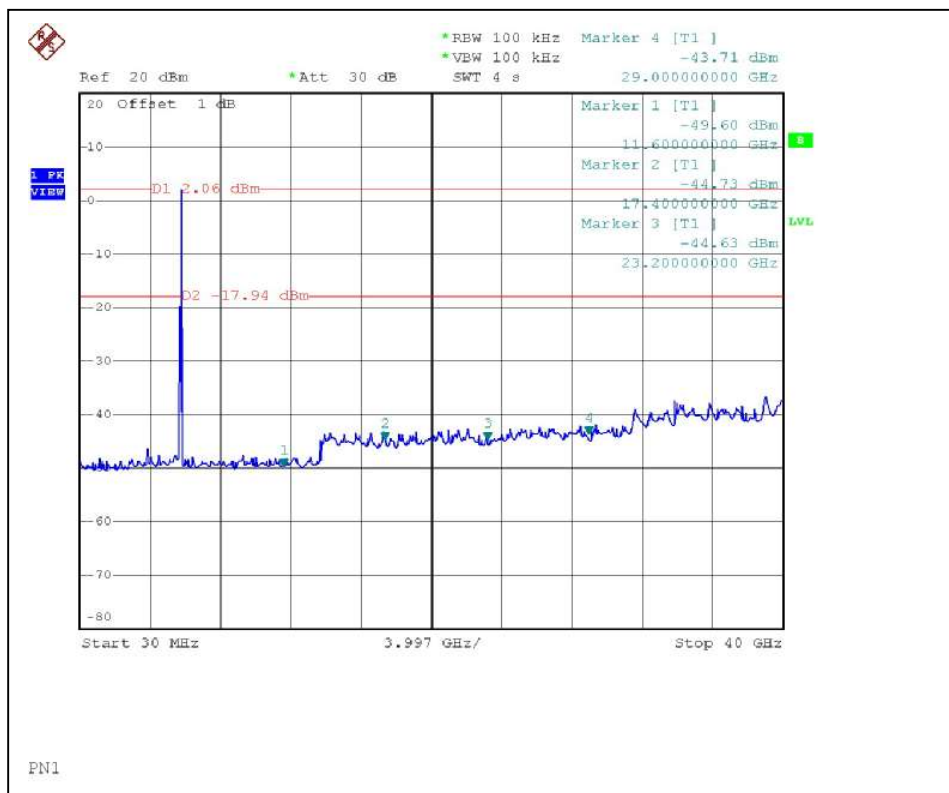
802.11a Turbo OFDM modulation



Turbo CH 1



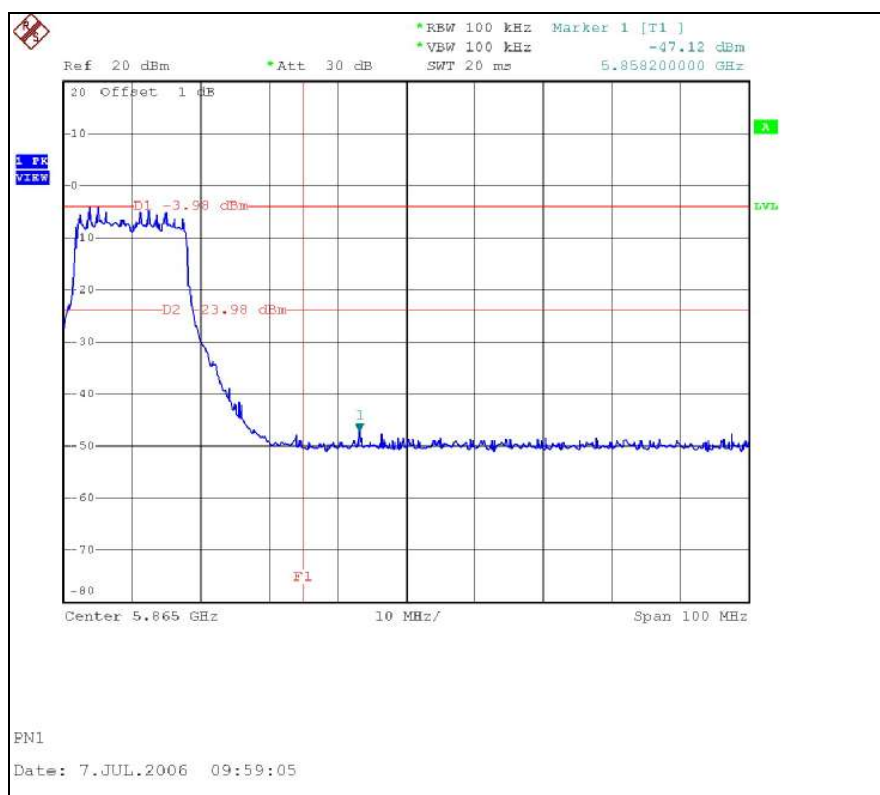
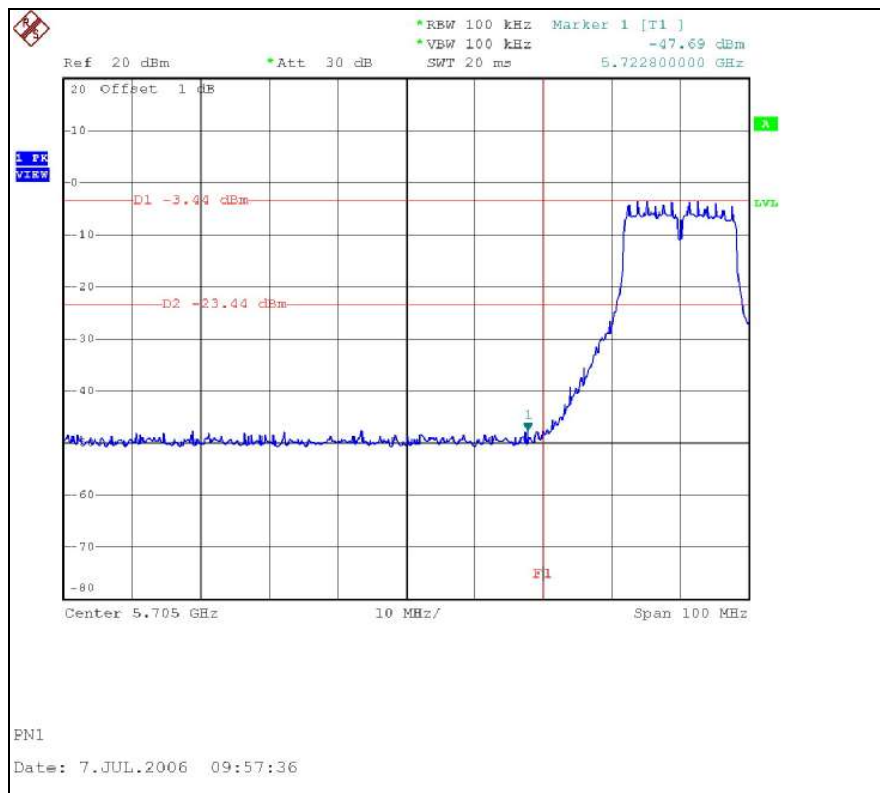
Turbo CH 2



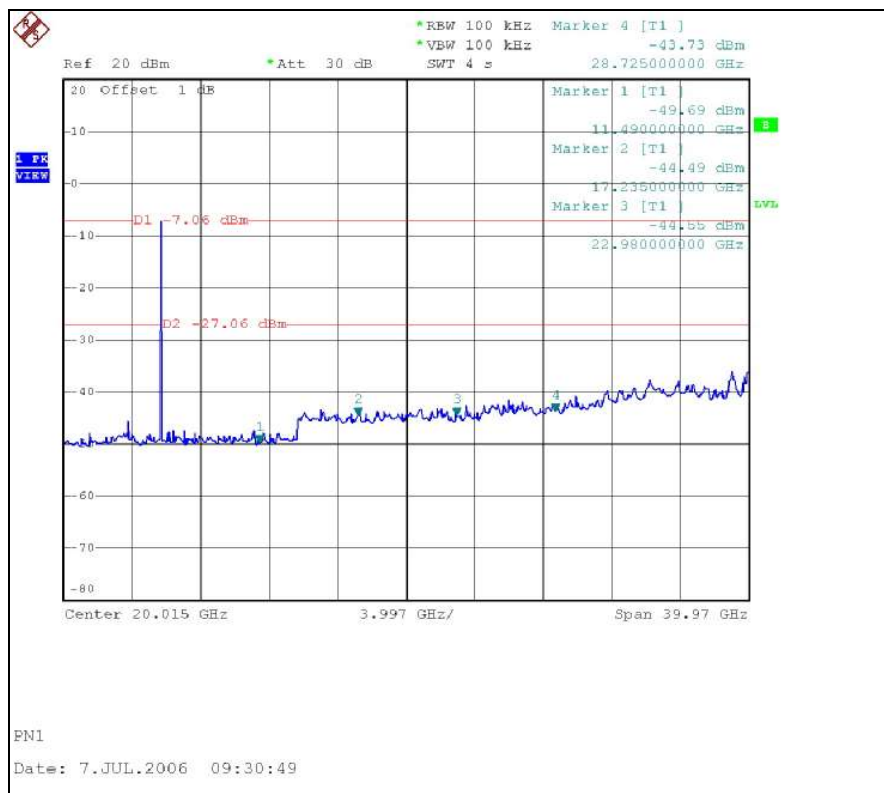
4.6.7 TEST RESULTS -ANTENNA 2

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).

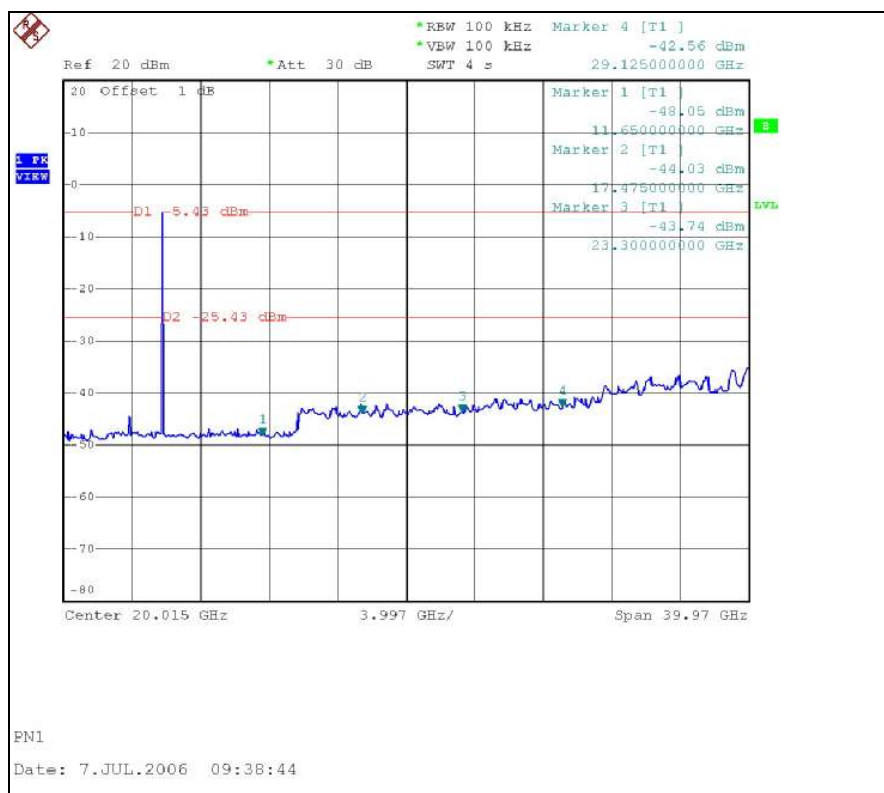
802.11a OFDM modulation



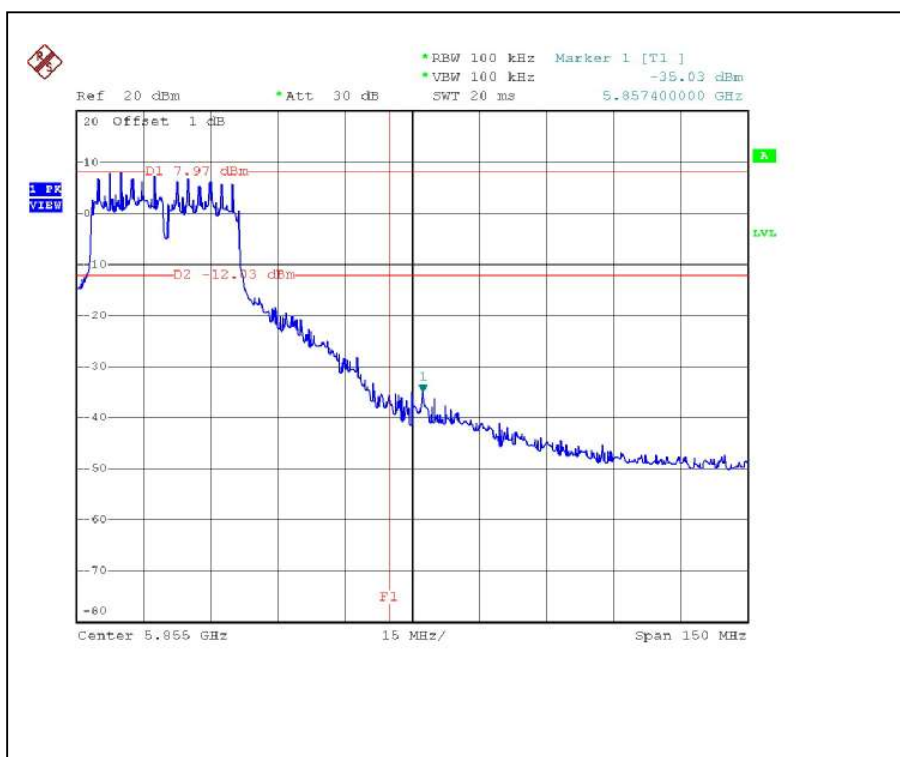
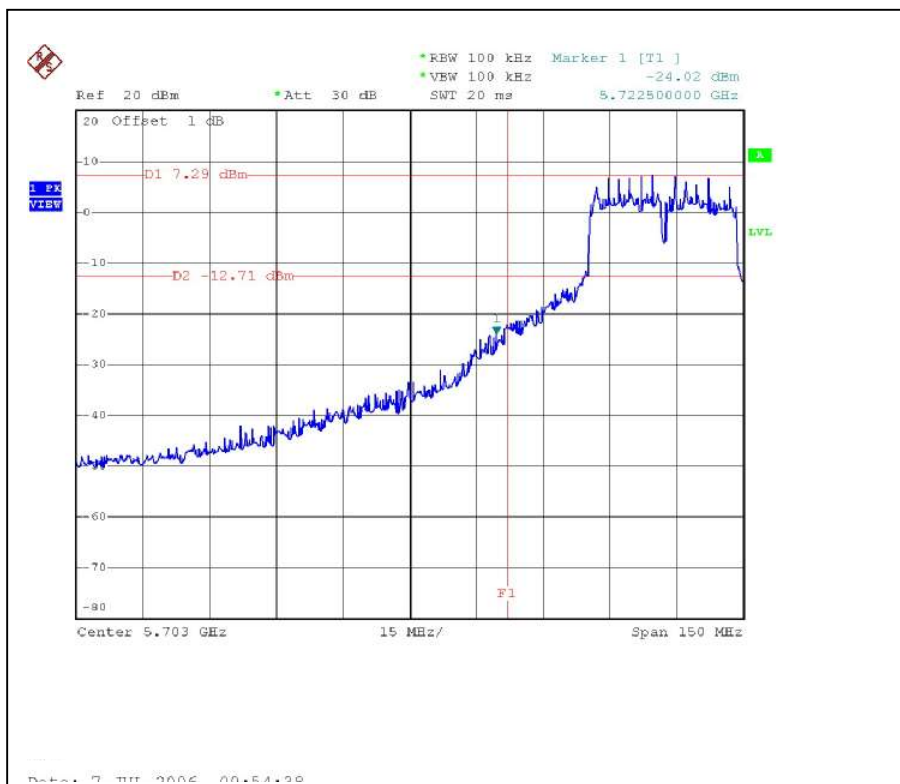
CH 1



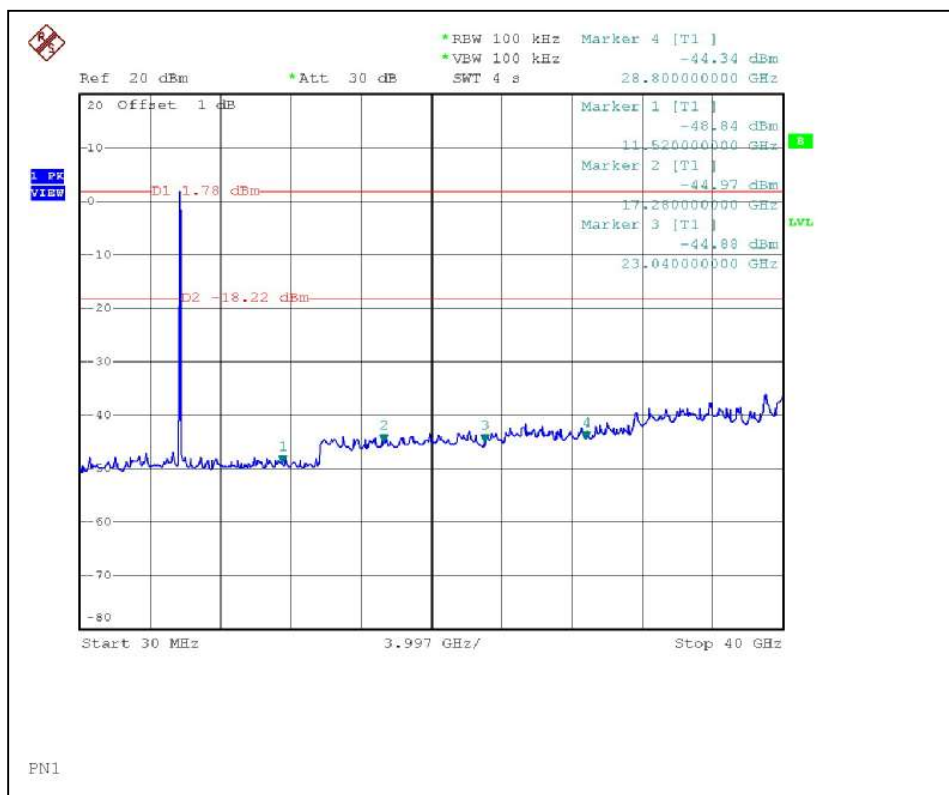
CH 5



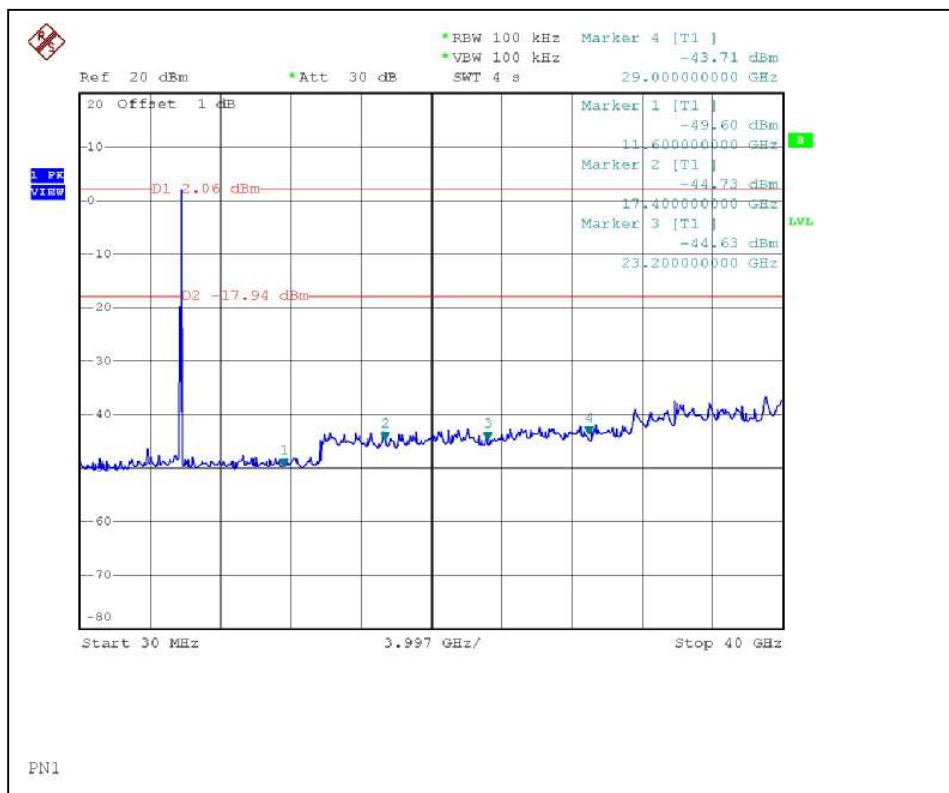
802.11a Turbo OFDM modulation



Turbo CH 1



Turbo CH 2



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(a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

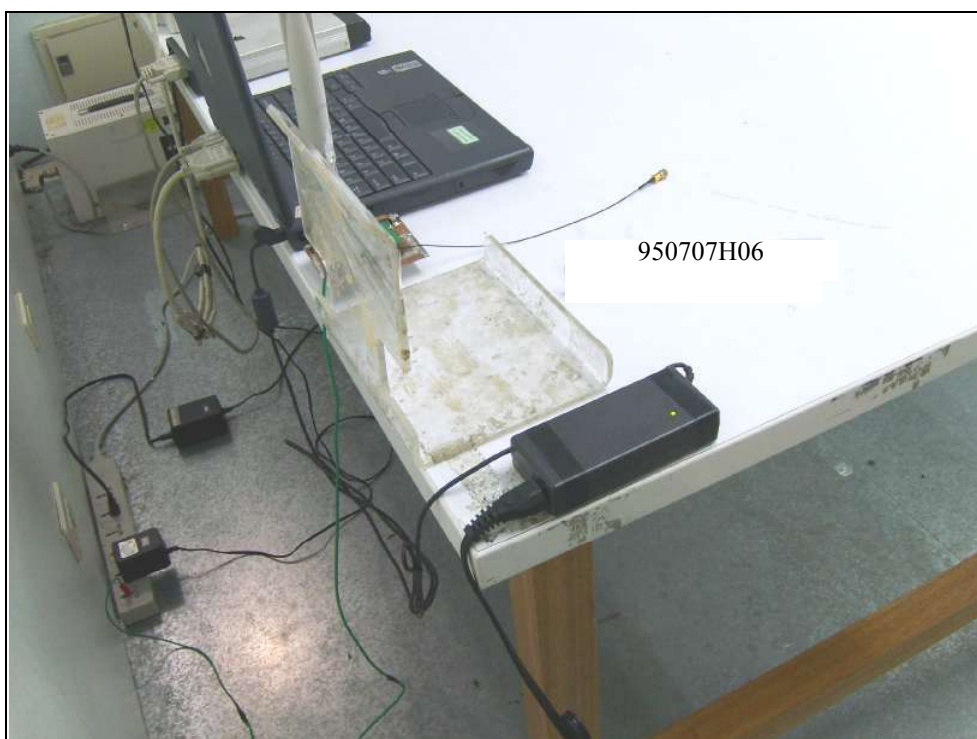
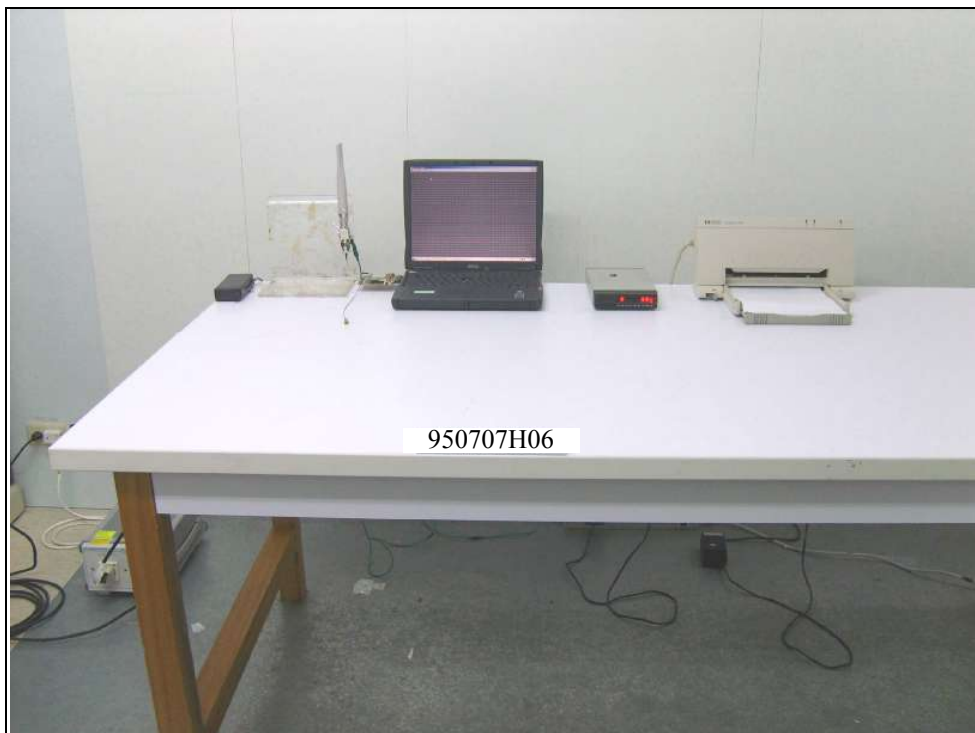
4.7.2 ANTENNA CONNECTED CONSTRUCTION

The antennas used in this product are as following:

No.	Model No.	Gain (dBi)	Cable Loss (dB)	Net Gain (dB)	Antenna Type	Connector
1	SAA04-220080	5	1.8	3.2	Dipole	RP-N plug
2	ANT70-1800	18	2.96	15.04	Panel	N Jack

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST



RADIATED EMISSION TEST (With Antenna 1)



RADIATED EMISSION TEST (With Antenna 2)



6. 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, 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

Web Site: www.adt.com.tw

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

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.