



FCC TEST REPORT (15.407)

REPORT NO.: RF930507H06F

MODEL NO.: BR5811b, BR5811bE

RECEIVED: Nov. 15, 2006

TESTED: Nov. 20, 2006 to March 08, 2007

ISSUED: March 23, 2007

APPLICANT: Microelectronics Technology Inc.

ADDRESS: 1, Innovation Road II, Hsinchu 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.

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No. 2177-01

Table of Contents

1.	CERTIFICATION	5
2.	SUMMARY OF TEST RESULTS	6
2.1	MEASUREMENT UNCERTAINTY	7
3.	GENERAL INFORMATION	8
3.1	GENERAL DESCRIPTION OF EUT	8
3.2	DESCRIPTION OF TEST MODES	10
3.2.1	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:	11
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS.....	13
3.4	DESCRIPTION OF SUPPORT UNITS	14
3.5	CONFIGURATION OF SYSTEM UNDER TEST	15
4.	TEST TYPES AND RESULTS	17
4.1	CONDUCTED EMISSION MEASUREMENT	17
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	17
4.1.2	TEST INSTRUMENTS	17
4.1.3	TEST PROCEDURES.....	18
4.1.4	DEVIATION FROM TEST STANDARD	18
4.1.5	TEST SETUP	19
4.1.6	EUT OPERATING CONDITIONS	19
4.1.7	TEST RESULTS	20
4.2	RADIATED EMISSION MEASUREMENT	24
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	24
4.2.2	LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS.....	25
4.2.3	TEST INSTRUMENTS	26
4.2.4	TEST PROCEDURES.....	27
4.2.5	DEVIATION FROM TEST STANDARD	27
4.2.6	TEST SETUP	28
4.2.7	EUT OPERATING CONDITION.....	28
4.2.8	TEST RESULTS –ANTENNA 1.....	29
4.2.9	TEST RESULTS –ANTENNA A	33
4.3	PEAK TRANSMIT POWER MEASUREMENT	39
4.3.1	LIMITS OF PEAK TRANSMIT POWER MEASUREMENT	39



4.3.2	TEST INSTRUMENTS	39
4.3.3	TEST PROCEDURE	40
4.3.4	DEVIATION FROM TEST STANDARD	40
4.3.5	TEST SETUP	40
4.3.6	EUT OPERATING CONDITIONS	40
4.3.7	TEST RESULTS –ANTENNA 1.....	41
4.3.8	TEST RESULTS –ANTENNA A	45
4.4	PEAK POWER EXCURSION MEASUREMENT	52
4.4.1	LIMITS OF PEAK POWER EXCURSION MEASUREMENT	52
4.4.2	TEST INSTRUMENTS	52
4.4.3	TEST PROCEDURE	53
4.4.4	DEVIATION FROM TEST STANDARD	53
4.4.5	TEST SETUP	53
4.4.6	EUT OPERATING CONDITIONS	53
4.4.7	TEST RESULTS –ANTENNA 1.....	54
4.4.8	TEST RESULTS –ANTENNA A	56
4.5	PEAK POWER SPECTRAL DENSITY MEASUREMENT.....	59
4.5.1	LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT.....	59
4.5.2	TEST INSTRUMENTS	59
4.5.3	TEST PROCEDURES.....	60
4.5.4	DEVIATION FROM TEST STANDARD	60
4.5.5	TEST SETUP	60
4.5.6	EUT OPERATING CONDITIONS	60
4.5.7	TEST RESULTS –ANTENNA 1.....	61
4.5.8	TEST RESULTS –ANTENNA A	63
4.6	FREQUENCY STABILITY	66
4.6.1	LIMITS OF FREQUENCY STABILITY MEASUREMENT	66
4.6.2	TEST INSTRUMENTS	66
4.6.3	TEST PROCEDURE	66
4.6.4	DEVIATION FROM TEST STANDARD	67
4.6.5	TEST SETUP	67
4.6.6	EUT OPERATING CONDITION.....	67
4.6.7	TEST RESULTS	68



4.7	BAND EDGES MEASUREMENT	69
4.7.1	TEST INSTRUMENTS	69
4.7.2	TEST PROCEDURE	69
4.7.3	EUT OPERATING CONDITION.....	69
4.7.4	TEST RESULTS –ANTENNA 1.....	70
4.7.5	TEST RESULTS –ANTENNA A	75
4.8	ANTENNA REQUIREMENT.....	84
4.8.1	STANDARD APPLICABLE.....	84
4.8.2	ANTENNA CONNECTED CONSTRUCTION.....	84
5.	INFORMATION ON THE TESTING LABORATORIES.....	85
	APPENDIX-A.....	A-1



1. CERTIFICATION

PRODUCT: 802.11a Outdoor Bridge With Internal Antenna,
802.11a Outdoor Bridge With External Antenna

BRAND NAME: MTI

MODEL NO.: BR5811b, BR5811bE

TEST SAMPLE: MASS-PRODUCTION

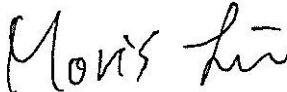
TESTED: Nov. 20, 2006 to March 08, 2007

APPLICANT: Microelectronics Technology Inc.

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

The above equipment (Model: BR5811b, BR5811bE) have 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:** March 23, 2007
(Midoli Peng)

TECHNICAL ACCEPTANCE :  , **DATE:** March 23, 2007
Responsible for RF (Moris Lin)

APPROVED BY :  , **DATE:** March 23, 2007
(Hank Chung, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart E (Section 15.407)			
Standard Section	Test Type	Result	Remark
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -18.18dB at 0.209MHz
15.407(b/1/2/3) (b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit. Minimum passing margin is -0.6dB at 550.00MHz & 5460.00MHz
15.407(a/1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.

NOTE:

1. The EUT was operating in 5.25~5.35GHz, 5.47~5.725GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 5.25~5.35GHz, 5.47~5.725GHz. For the 5.725 ~ 5.850GHz RF parameters was recorded in another test report.

2.1 MEASUREMENT UNCERTAINTY

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

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

Measurement	Value
Conducted emissions	2.41 dB
Radiated emissions (30MHz-1GHz)	3.89 dB
Radiated emissions (1GHz ~18GHz)	2.21 dB
Radiated emissions (18GHz ~40GHz)	1.88 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	802.11a Outdoor Bridge With Internal Antenna, 802.11a Outdoor Bridge With External Antenna
MODEL NO.	BR5811b, BR5811bE
FCC ID	MAD-BR5811B
POWER SUPPLY	48VDC from AC Adapter
MODULATION TYPE	OFDM(16QAM, 4QAM, QPSK, BPSK)
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	54/48/36/24/18/12/9/6Mbps
FREQUENCY RANGE	5.25~5.35GHz, 5.47~5.725GHz and 5.725~5.850GHz
NUMBER OF CHANNEL	802.11a: 20
CHANNEL SPACING	20MHz for Normal mode
OUTPUT POWER	For FCC15.247: 305.492mW For FCC15.407: 52.360mW
ANTENNA TYPE	Please see note 2 (on next page)

NOTE:

- The EUT has two model names which are identical to each other in all aspects except for the followings:

Brand Name	Model Name	Product Name	Description
MTI	BR5811b	802.11a Outdoor Bridge With Internal Antenna	Internal Antenna
	BR5811bE	802.11a Outdoor Bridge With External Antenna	External Antenna

2. This report is prepared for FCC class II permissive change. The difference compared with the Report No.:RF930507H06 design is as the following:

U Add one external antenna for model : BR5811bE as below:

Original Report (Report No.:RF930507H06)				
For 5GHz				
No.	Model No.	Gain (dBi)	Antenna Type	Antenna Connector
1	ANT05535	17.0dBi	Directional, Patch Panel (Internal Antenna)	Probe Pin
2	R0420-058	8.0dBi	Dipole, Omni (External Antenna)	N (Plug)
3	MTI09009 (4C10021)	23.0dBi	Directional, Patch Panel (External Antenna)	N (Jack)
U Add one new antenna				
For 5GHz(5250~5850MHz):				
'No.	Model No.	Gain (dBi)	Antenna Type	Antenna Connector
A	1GP-51809	9.0dBi	Dipole, Omni (External Antenna)	N female(Plug)
U Add 5470~5725MHz (new band)				
'No.	Model No.	Gain (dBi)	Antenna Type	Antenna Connector
1	ANT05535	17.0dBi	Directional, Patch Panel (Internal Antenna)	Probe Pin

3. The EUT was powered by the following adapter:

Brand:	MICROELECTRONICS TECH. INC.
Model No.:	TR60A-POE-L(0640-0086)
Input power :	INPUT: 100-240V~ 1.5A 47-63Hz
Output power :	OUTPUT: 48V, 1.2A

4. The EUT was tested with following modes:

Model No.	Description
BR5811b	With antenna 1 (test band:5470~5725MHz)
BR5811bE	With antenna A (test band: 5250~5850MHz)

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 5250MHz ~ 5350MHz bands:

Four channels are provided to this EUT.

Channel	Frequency
1	5260 MHz
2	5280 MHz
3	5300 MHz
4	5320 MHz

Operated in 5470MHz ~ 5725MHz bands:

Eleven channels are provided to this EUT.

Channel	Frequency
5	5500 MHz
6	5520 MHz
7	5540 MHz
8	5560 MHz
9	5580 MHz
10	5600 MHz
11	5620 MHz
12	5640 MHz
13	5660 MHz
14	5680 MHz
15	5700 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
Mode 1	√	√	√	√	BR5811b test with antenna 1 (5470~5725MHz)
Mode 2	√	√	√	√	BR5811bE test with antenna A (5250~5850MHz)

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 15	15	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 15	15	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 15	1, 4, 5, 10, 15	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)
802.11a	1 to 15	1, 4, 5, 15	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)
802.11a	1 to 15	1, 4, 5, 10, 15	OFDM	BPSK	6



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is an 802.11a Outdoor Bridge With Internal Antenna and 802.11a Outdoor Bridge With External Antenna. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)

ANSI C63.4-2003

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



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.

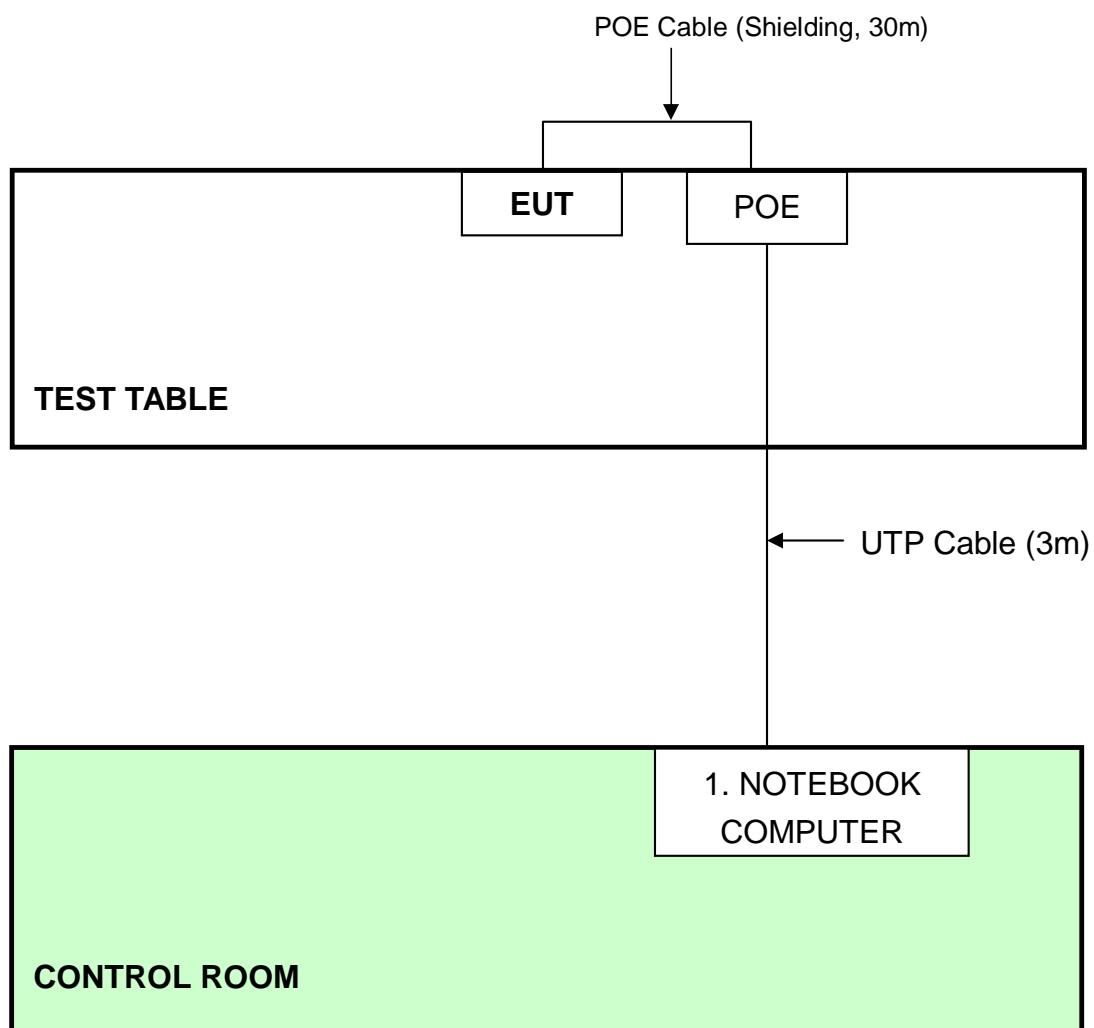
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP19L	CN-OHC416-70166- 5CA-0448	PIW632500516610

No.	Signal cable description
1	NA

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

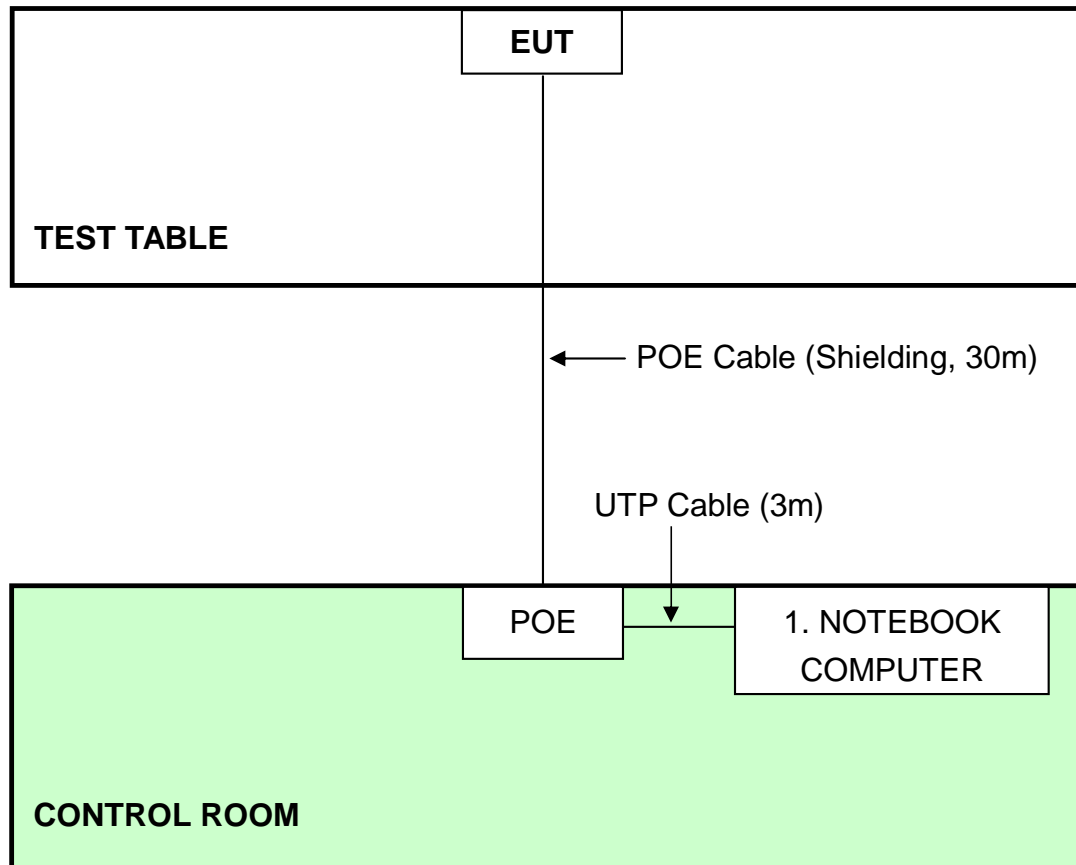
3.5 CONFIGURATION OF SYSTEM UNDER TEST

For conducted test :



- NOTE:** 1. Support unit 1 was kept in the control room during the test.
2. Please refer to the photos of test configuration.

For radiated test :



- NOTE:** 1. Support unit 1 was kept in the control room during the test.
2. Please refer to the photos of test configuration.

4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100287	Mar. 06, 2008
Line-Impedance Stabilization Network(for EUT)	ENV-216	100072	Oct. 20, 2007
Line-Impedance Stabilization Network(for Peripheral)	KNW-407	8-1395-12	Aug. 15, 2007
RF Cable (JETBAO)	RG233/U	Cable_CA_01	Jul. 19, 2007
Terminator	50	1	Oct. 30, 2007
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. A.
 3. The VCCI Con A Registration No. is C-817.

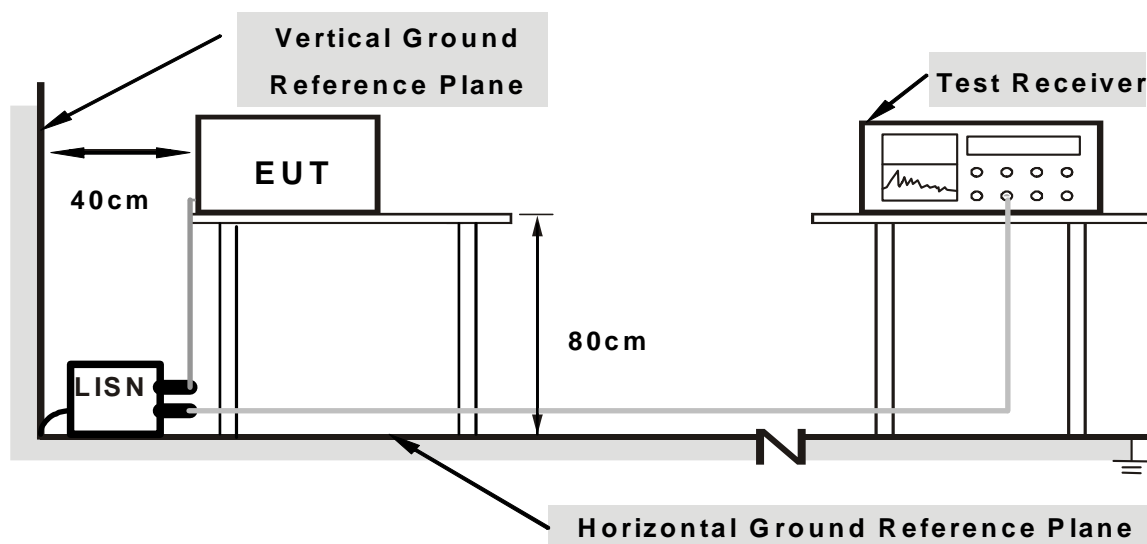
4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs
- 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. Placed the EUT on the testing table.
- b. Prepared another computer system to act as a communication partner and placed it outside of testing area.
- c. The communication partner run a test program “Art 48 b 5” to enable EUT under transmission/receiving condition continuously at specific channel frequency via RJ 45 cable and wireless.

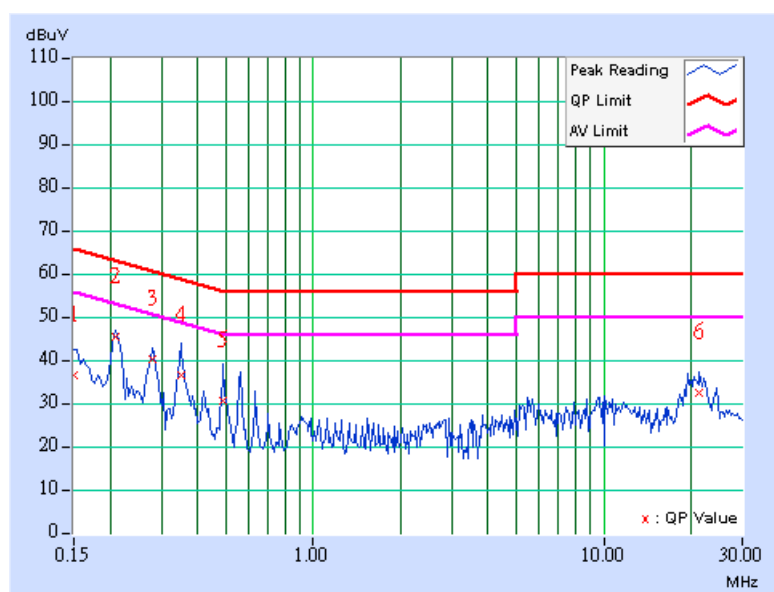
4.1.7 TEST RESULTS

Conducted Worst-Case Data

MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TEST MODE	With Antenna 1	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	15deg. C, 60%RH, 972hPa	TESTED BY	Wen Yu

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.150	9.75	26.51	-	36.26	-	66.00
2	0.209	9.80	35.28	-	45.08	-	63.26	53.26	-18.18	-
3	0.279	9.80	30.23	-	40.03	-	60.85	50.85	-20.82	-
4	0.349	9.80	26.58	-	36.38	-	58.98	48.98	-22.60	-
5	0.490	9.81	20.74	-	30.55	-	56.17	46.17	-25.62	-
6	21.340	10.13	22.65	-	32.78	-	60.00	50.00	-27.22	-

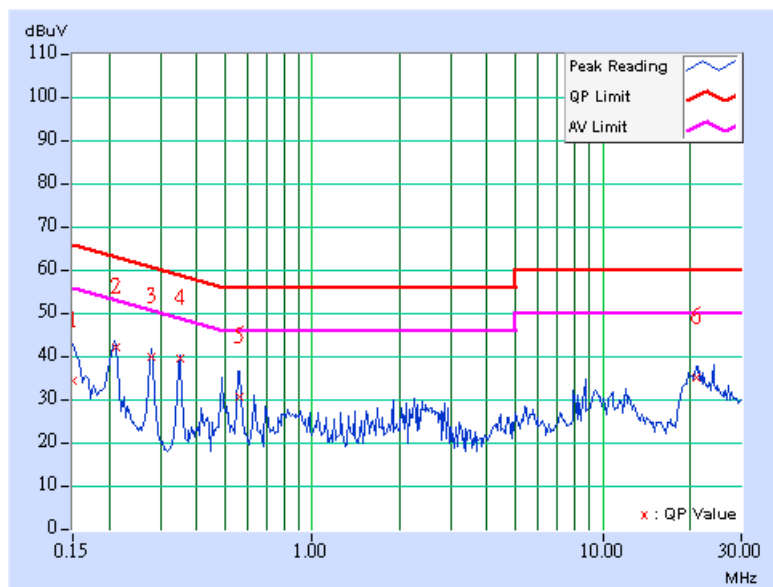
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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
TEST MODE	With Antenna 1	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	15deg. C, 60%RH, 972hPa	TESTED BY	Wen Yu

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.150	9.80	24.05	-	33.85	-	66.00	56.00	-32.15
2	0.211	9.80	31.74	-	41.54	-	63.17	53.17	-21.63	-
3	0.279	9.80	29.63	-	39.43	-	60.85	50.85	-21.42	-
4	0.349	9.80	29.12	-	38.92	-	58.98	48.98	-20.06	-
5	0.560	9.83	20.24	-	30.07	-	56.00	46.00	-25.93	-
6	20.979	10.42	24.90	-	35.32	-	60.00	50.00	-24.68	-

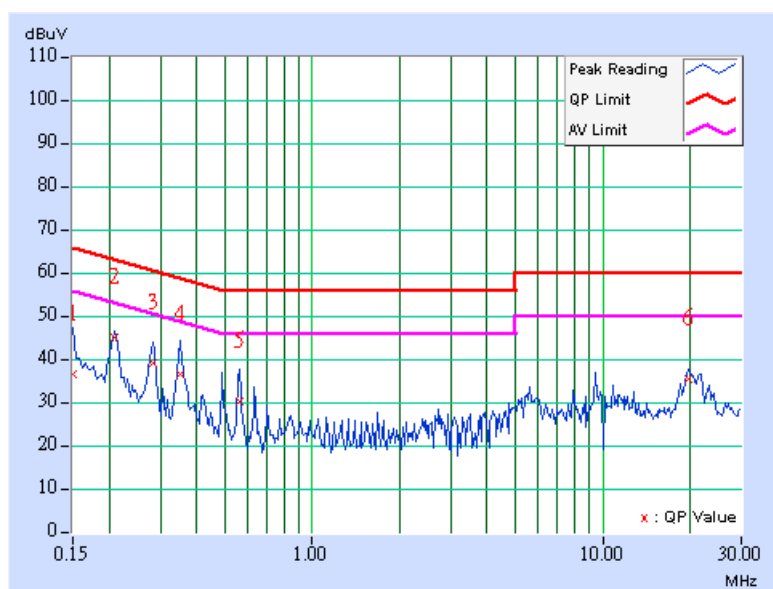
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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
TEST MODE	With Antenna A	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	15deg. C, 60%RH, 972hPa	TESTED BY	Wen Yu

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.150	9.75	26.53	-	36.28	-	66.00	56.00	-29.72
2	0.209	9.80	34.98	-	44.78	-	63.26	53.26	-18.48	-
3	0.283	9.80	29.00	-	38.80	-	60.73	50.73	-21.93	-
4	0.349	9.80	26.56	-	36.36	-	58.98	48.98	-22.62	-
5	0.560	9.83	20.40	-	30.23	-	56.00	46.00	-25.77	-
6	19.623	10.11	25.61	-	35.72	-	60.00	50.00	-24.28	-

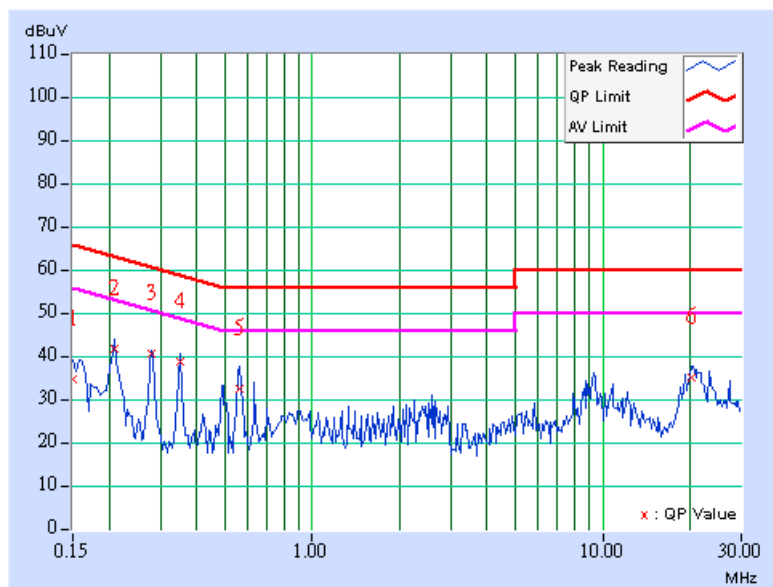
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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
TEST MODE	With Antenna A	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	15deg. C, 60%RH, 972hPa	TESTED BY	Wen Yu

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.150	9.80	24.29	-	34.09	-	66.00	56.00	-31.91
2	0.209	9.80	31.58	-	41.38	-	63.26	53.26	-21.88	-
3	0.279	9.80	30.21	-	40.01	-	60.85	50.85	-20.84	-
4	0.353	9.80	28.56	-	38.36	-	58.89	48.89	-20.53	-
5	0.560	9.83	22.05	-	31.88	-	56.00	46.00	-24.12	-
6	20.210	10.40	24.60	-	35.00	-	60.00	50.00	-25.00	-

- 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 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

Frequencies (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dB μ V/m) *note 3
5150~5250	-27	68.3
5250~5350	-27	68.3
5470~5725	-27	68.3
5725~5825	-27 *note 1	68.3
	-17 *note 2	78.3

NOTE:

1. For frequencies 10MHz or greater above or below the band edge.
2. All emissions within the frequency range from the band edge to 10MHz above or below the band edge.
3. The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength

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



4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 03, 2007
HP Pre_Amplifier	8449B	3008A01922	Sep. 18, 2007
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Sep. 20, 2007
CHASE Broadband Antenna	VULB9168	138	Dec. 10, 2007
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jan. 01, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 04, 2008
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. 14. 2007
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Jul. 15, 2007
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. Loop antenna was used for all emissions below 30 MHz.

4.2.4 TEST PROCEDURES

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

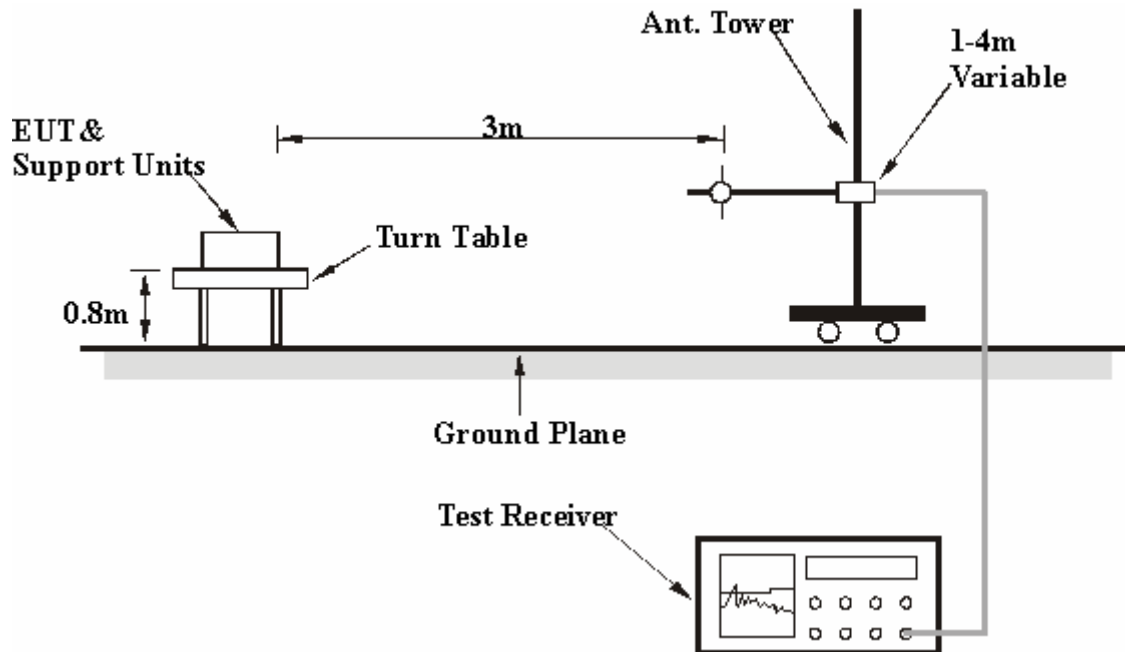
NOTE:

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 is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) 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.

4.2.5 DEVIATION FROM TEST STANDARD

No deviation

4.2.6 TEST SETUP



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

4.2.7 EUT OPERATING CONDITION

- a. Placed the EUT on the testing table.
- b. Prepared another computer system to act as a communication partner and placed it outside of testing area.
- c. The communication partner run a test program “Art 48 b 5” to enable EUT under transmission/receiving condition continuously at specific channel frequency via RJ 45 cable and wireless.

4.2.8 TEST RESULTS –ANTENNA 1

Below 1GHz Worst-Case Data

MODE	Channel 5	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH, 972hPa	TESTED BY	Phoenix 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	60.98	28.00 QP	40.00	-12.00	1.50 H	121	14.40	13.60
2	134.27	30.60 QP	43.50	-12.90	1.50 H	92	17.60	13.00
3	187.50	29.40 QP	43.50	-14.10	1.32 H	122	16.90	12.50
4	220.04	28.10 QP	46.00	-17.90	1.54 H	222	15.60	12.50
5	550.00	45.40 QP	46.00	-0.60	1.39 H	21	22.20	23.20
6	660.10	35.60 QP	46.00	-10.40	1.14 H	21	10.50	25.20
7	770.10	34.70 QP	46.00	-11.30	1.14 H	198	7.30	27.40
8	880.10	35.40 QP	46.00	-10.60	1.00 H	150	6.70	28.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	68.65	31.20 QP	40.00	-8.80	1.00 V	339	18.50	12.70
2	134.36	30.30 QP	43.50	-13.20	1.00 V	261	17.40	13.00
3	187.50	34.00 QP	43.50	-9.50	1.00 V	35	21.50	12.50
4	250.00	30.60 QP	46.00	-15.40	1.00 V	18	16.80	13.80
5	550.00	44.70 QP	46.00	-1.30	1.44 V	337	21.50	23.20
6	660.00	34.20 QP	46.00	-11.80	1.00 V	259	9.00	25.20
7	770.00	33.50 QP	46.00	-12.50	1.57 V	283	6.10	27.40
8	879.99	31.20 QP	46.00	-14.80	1.00 V	297	2.50	28.70

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

802.11a OFDM modulation

MODE	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	23deg. C, 56%RH, 972hPa	TESTED BY	Phoenix 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	#5460.00	50.50 PK	74.00	-23.50	1.17 H	116	13.50	37.00
1	#5460.00	35.60 AV	54.00	-18.40	1.17 H	116	-1.40	37.00
2	*5500.00	98.10 PK			1.17 H	116	61.10	37.00
2	*5500.00	87.20 AV			1.17 H	116	50.20	37.00
3	#11000.00	63.30 PK	74.00	-10.70	1.77 H	312	16.70	46.60
3	#11000.00	50.20 AV	54.00	-3.80	1.77 H	312	3.60	46.60

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	#5460.00	68.10 PK	74.00	-5.90	1.01 V	179	31.10	37.00
1	#5460.00	53.40 AV	54.00	-0.60	1.01 V	179	16.40	37.00
2	*5500.00	115.70 PK			1.01 V	179	78.70	37.00
2	*5500.00	105.00 AV			1.01 V	179	68.00	37.00
3	#11000.00	66.80 PK	74.00	-7.20	1.55 V	356	20.20	46.60
3	#11000.00	53.20 AV	54.00	-0.80	1.55 V	356	6.60	46.60

- 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.



MODE	Channel 10	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	23deg. C, 56%RH, 972hPa	TESTED BY	Phoenix 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	*5600.00	101.20 PK			1.18 H	120	63.90	37.30
1	*5600.00	90.20 AV			1.18 H	120	52.90	37.30
2	#11200.00	63.50 PK	74.00	-10.50	1.39 H	235	16.70	46.80
2	#11200.00	49.30 AV	54.00	-4.70	1.39 H	235	2.50	46.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5600.00	116.60 PK			1.00 V	179	79.30	37.30
1	*5600.00	105.40 AV			1.00 V	179	68.10	37.30
2	#11200.00	61.40 PK	74.00	-12.60	1.62 V	92	14.60	46.80
2	#11200.00	49.00 AV	54.00	-5.00	1.62 V	92	2.20	46.80

- 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.



MODE	Channel 15	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	23deg. C, 56%RH, 972hPa	TESTED BY	Phoenix 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	*5700.00	100.90 PK			1.13 H	115	63.40	37.50
1	*5700.00	90.10 AV			1.13 H	115	52.60	37.50
2	#11400.00	59.30 PK	74.00	-14.70	1.25 H	292	12.40	47.00
2	#11400.00	46.60 AV	54.00	-7.40	1.25 H	292	-0.30	47.00

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	*5700.00	115.20 PK			1.00 V	177	77.70	37.50
1	*5700.00	104.40 AV			1.00 V	177	66.90	37.50
2	#11400.00	58.90 PK	74.00	-15.10	1.91 V	0	11.90	47.00
2	#11400.00	45.80 AV	54.00	-8.20	1.91 V	0	-1.20	47.00

- 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.

4.2.9 TEST RESULTS –ANTENNA A

Below 1GHz Worst-Case Data

MODE	Channel 5	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH, 972hPa	TESTED BY	Phoenix 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	133.72	31.10 QP	43.50	-12.40	1.00 H	90	18.20	12.90
2	250.00	30.40 QP	46.00	-15.60	1.00 H	288	16.60	13.80
3	330.20	30.40 QP	46.00	-15.60	1.35 H	209	13.30	17.20
4	550.00	45.40 QP	46.00	-0.60	1.17 H	259	22.20	23.20
5	660.10	32.70 QP	46.00	-13.30	1.15 H	59	7.50	25.20
6	770.40	37.00 QP	46.00	-9.00	1.07 H	244	9.60	27.40
7	880.00	35.90 QP	46.00	-10.10	1.00 H	197	7.30	28.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	66.43	29.10 QP	40.00	-10.90	1.00 V	8	16.10	13.00
2	133.72	35.60 QP	43.50	-7.90	1.00 V	325	22.70	12.90
3	187.50	28.30 QP	43.50	-15.20	1.00 V	247	15.80	12.50
4	250.06	27.90 QP	46.00	-18.10	1.00 V	120	14.10	13.80
5	550.00	39.40 QP	46.00	-6.60	1.00 V	300	16.20	23.20
6	660.00	36.20 QP	46.00	-9.80	1.33 V	173	11.00	25.20
7	770.10	37.00 QP	46.00	-9.00	1.21 V	221	9.60	27.40
8	880.10	35.60 QP	46.00	-10.40	1.12 V	168	6.90	28.70

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

802.11a OFDM modulation

MODE	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	23deg. C, 56%RH, 972hPa	TESTED BY	Phoenix 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	#5150.00	47.60 PK	74.00	-26.40	1.19 H	264	11.00	36.60
1	#5150.00	31.90 AV	54.00	-22.10	1.19 H	264	-4.70	36.60
2	5260.00	102.00 PK			1.19 H	264	65.20	36.70
2	5260.00	90.30 AV			1.19 H	264	53.60	36.70
3	10520.00	63.30 PK	68.30	-5.00	1.51 H	221	17.10	46.20

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	#5150.00	63.00 PK	74.00	-11.00	1.26 V	285	26.40	36.60
1	#5150.00	48.30 AV	54.00	-5.70	1.26 V	285	11.70	36.60
2	5260.00	117.30 PK			1.26 V	285	80.60	36.70
2	5260.00	106.80 AV			1.26 V	285	70.00	36.70
3	10520.00	63.20 PK	68.30	-5.10	1.51 V	225	17.00	46.20

- 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.

MODE	Channel 4	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	23deg. C, 56%RH, 972hPa	TESTED BY	Phoenix 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	5320.00	98.20 PK			1.17 H	260	61.40	36.80
1	5320.00	86.90 AV			1.17 H	260	50.10	36.80
2	#5350.00	51.00 PK	74.00	-23.00	1.17 H	260	14.20	36.80
2	#5350.00	36.50 AV	54.00	-17.50	1.17 H	260	-0.40	36.80
3	#10640.00	61.00 PK	74.00	-13.00	1.42 H	233	14.70	46.30
3	#10640.00	48.30 AV	54.00	-5.70	1.42 H	233	2.00	46.30

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	5320.00	113.80 PK			1.34 V	272	77.00	36.80
1	5320.00	103.10 AV			1.34 V	272	66.30	36.80
2	#5350.00	66.60 PK	74.00	-7.40	1.34 V	272	29.80	36.80
2	#5350.00	52.60 AV	54.00	-1.40	1.34 V	272	15.80	36.80
3	#10640.00	61.00 PK	74.00	-13.00	1.37 V	205	14.70	46.30
3	#10640.00	47.80 AV	54.00	-6.20	1.37 V	205	1.50	46.30

- 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.

MODE	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	23deg. C, 56%RH, 972hPa	TESTED BY	Phoenix 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	#5460.00	56.40 PK	74.00	-17.60	1.06 H	252	19.40	37.00
1	#5460.00	35.80 AV	54.00	-18.20	1.06 H	252	-1.20	37.00
2	*5500.00	102.40 PK			1.06 H	252	65.40	37.00
2	*5500.00	90.70 AV			1.06 H	252	53.60	37.00
3	#11000.00	59.70 PK	74.00	-14.30	1.40 H	47	13.10	46.60
3	#11000.00	47.20 AV	54.00	-6.80	1.40 H	47	0.60	46.60

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	#5460.00	70.80 PK	74.00	-3.20	1.19 V	273	33.90	37.00
1	#5460.00	50.30 AV	54.00	-3.70	1.19 V	273	13.30	37.00
2	*5500.00	116.90 PK			1.19 V	273	79.90	37.00
2	*5500.00	105.20 AV			1.19 V	273	68.20	37.00
3	#11000.00	60.60 PK	74.00	-13.40	1.30 V	80	14.00	46.60
3	#11000.00	47.70 AV	54.00	-6.30	1.30 V	80	1.10	46.60

- 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.

MODE	Channel 10	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	23deg. C, 56%RH, 972hPa	TESTED BY	Phoenix 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	*5600.00	102.90 PK			1.18 H	253	65.70	37.30
1	*5600.00	91.30 AV			1.18 H	253	54.10	37.30
2	#11200.00	64.50 PK	74.00	-9.50	1.24 H	54	17.70	46.80
2	#11200.00	50.20 AV	54.00	-3.80	1.24 H	54	3.40	46.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5600.00	117.70 PK			1.18 V	277	80.50	37.30
1	*5600.00	106.80 AV			1.18 V	277	69.60	37.30
2	#11200.00	65.40 PK	74.00	-8.60	1.15 V	165	18.60	46.80
2	#11200.00	51.40 AV	54.00	-2.60	1.15 V	165	4.60	46.80

- 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.



MODE	Channel 15	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	23deg. C, 56%RH, 972hPa	TESTED BY	Phoenix 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	*5700.00	102.10 PK			1.12 H	250	64.60	37.50
1	*5700.00	90.80 AV			1.12 H	250	53.30	37.50
2	#11400.00	59.70 PK	74.00	-14.30	1.33 H	12	12.70	47.00
2	#11400.00	47.30 AV	54.00	-6.70	1.33 H	12	0.40	47.00

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	*5700.00	115.70 PK			1.15 V	224	78.20	37.50
1	*5700.00	104.90 AV			1.15 V	224	67.40	37.50
2	#11400.00	64.30 PK	74.00	-9.70	1.17 V	162	17.30	47.00
2	#11400.00	51.40 AV	54.00	-2.60	1.17 V	162	4.40	47.00

- 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.

4.3 PEAK TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

Frequency Band	Limit
5.15 – 5.25GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB
5.25 – 5.35GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.47 – 5.725GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.725 – 5.825GHz	The lesser of 1W (30dBm) or 17dBm + 10logB

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

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ADVANTEST SPECTRUM ANALYZER	U3772	160100280	April. 10.2007

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

1. The transmitter output was connected to the spectrum analyzer.
2. Set span to encompass the entire emission bandwidth of the signal.
3. Set RBW to 1MHz, VBW to 300kHz.
4. Using the spectrum analyzer's channel power measurement function to measure the output power.

NOTE:

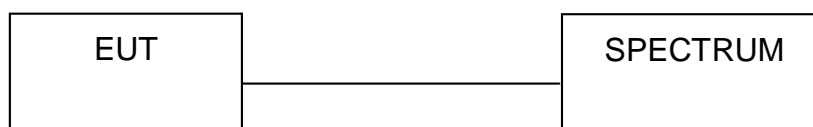
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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



4.3.7 TEST RESULTS –ANTENNA 1

802.11a OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg.C, 56%RH, 972hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
5	5500	8.73	7.464	13	25.27	PASS
10	5600	8.85	7.674	13	25.20	PASS
15	5700	8.58	7.211	13	25.80	PASS

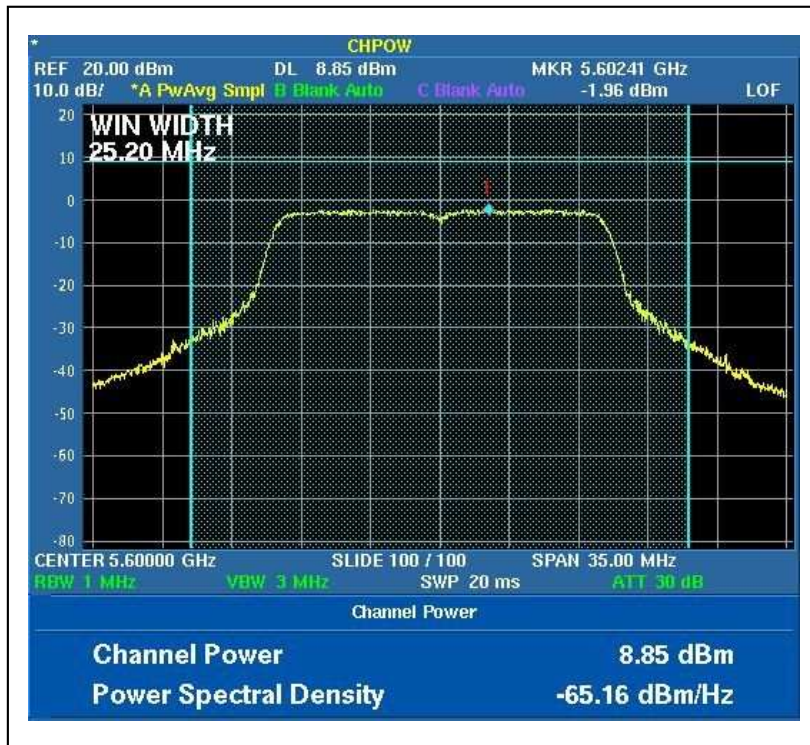
NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

Peak Power Output:

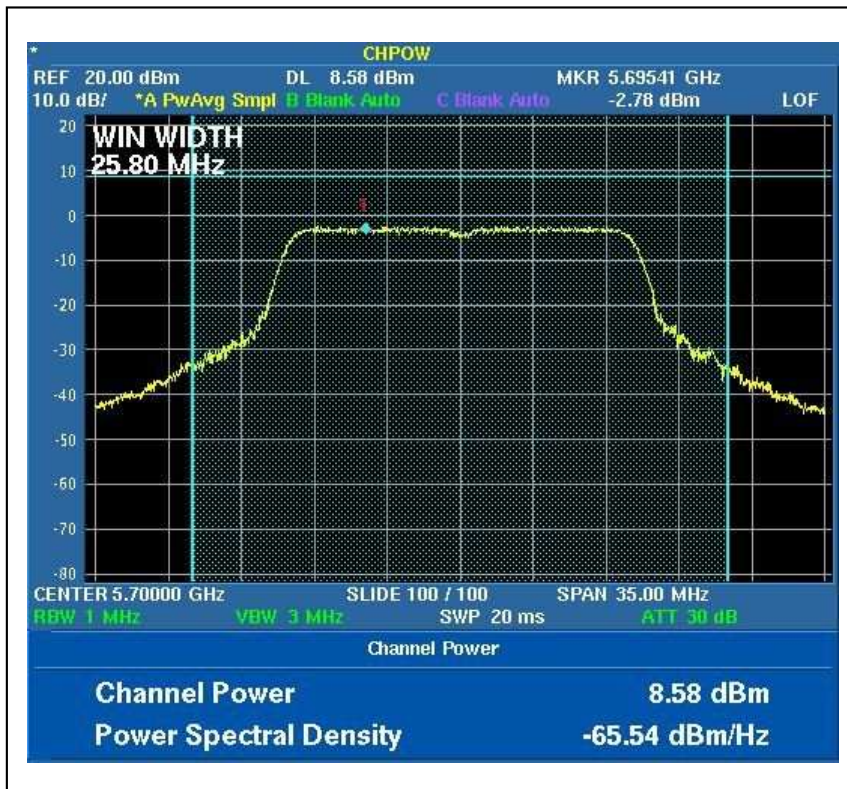
CH5



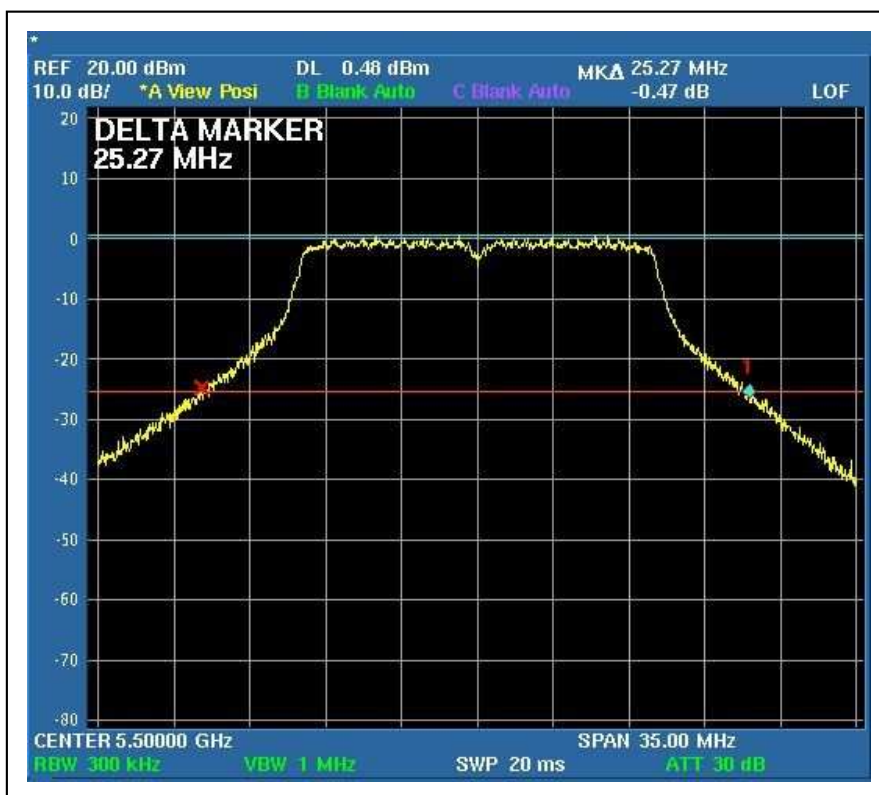
CH10



CH11



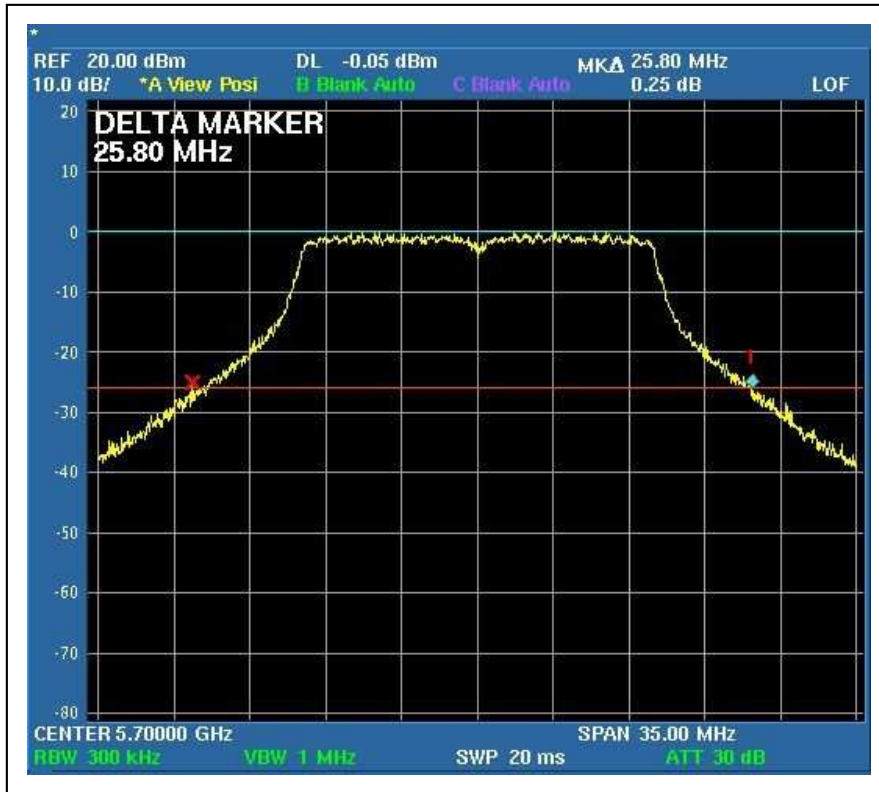
26dB Occupied Bandwidth:
CH5



CH10



CH15





4.3.8 TEST RESULTS –ANTENNA A

802.11a OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg.C, 56%RH, 972hPa
TESTED BY	Wen Yu		

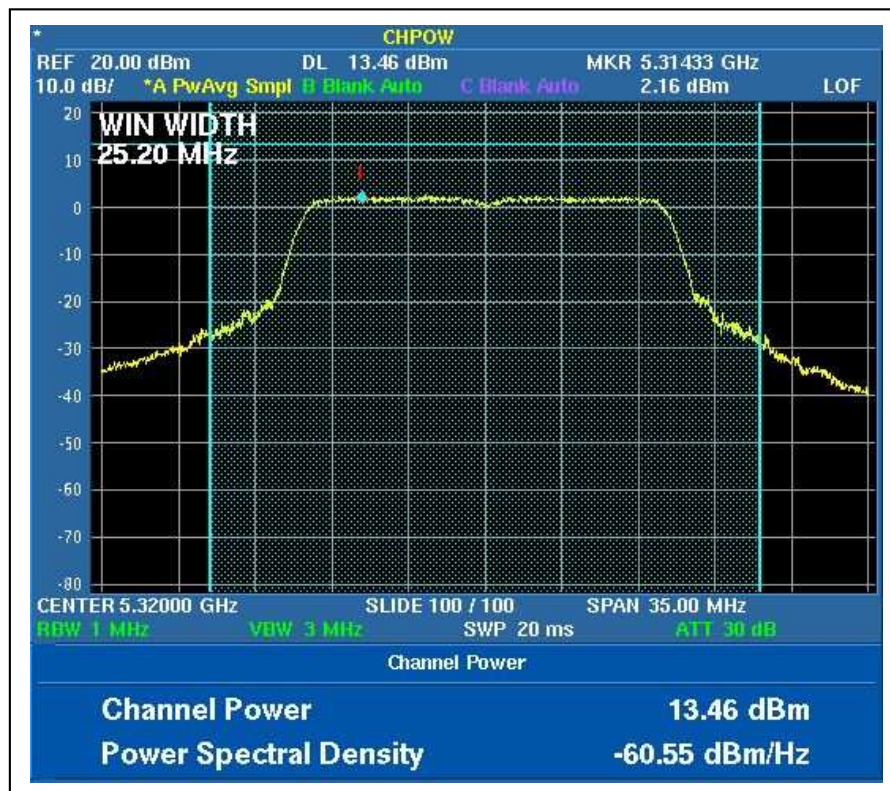
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5260	15.20	33.113	21	25.52	PASS
4	5320	13.46	22.182	21	25.20	PASS
5	5500	15.29	33.806	21	25.62	PASS
10	5600	17.19	52.360	21	24.75	PASS
15	5700	15.05	31.989	21	25.69	PASS

NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

Peak Power Output:
CH1



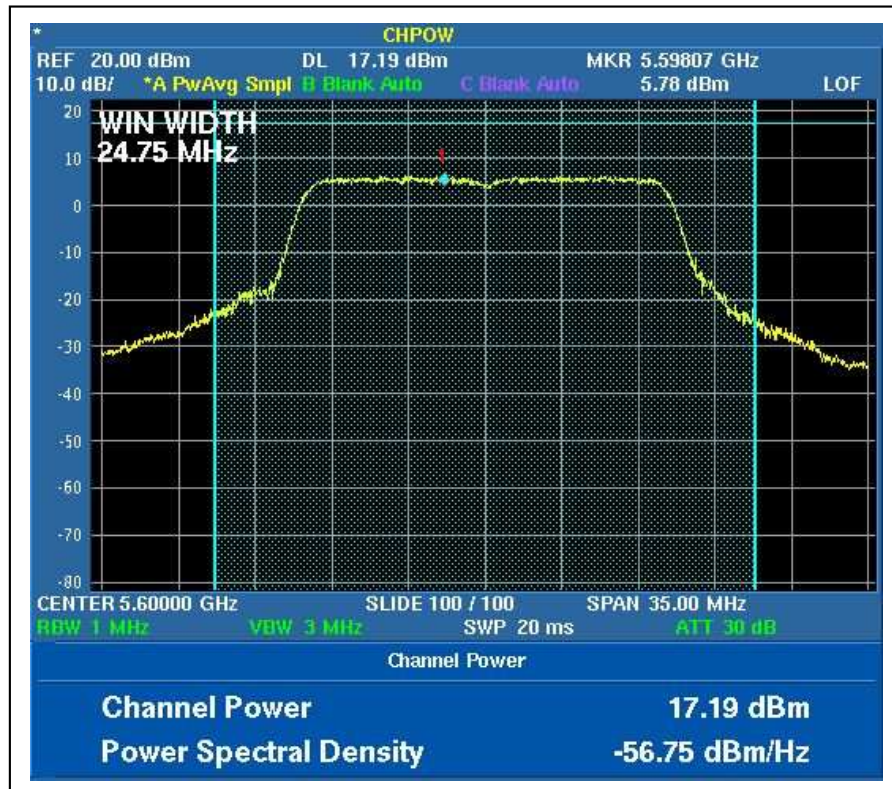
CH4



CH5



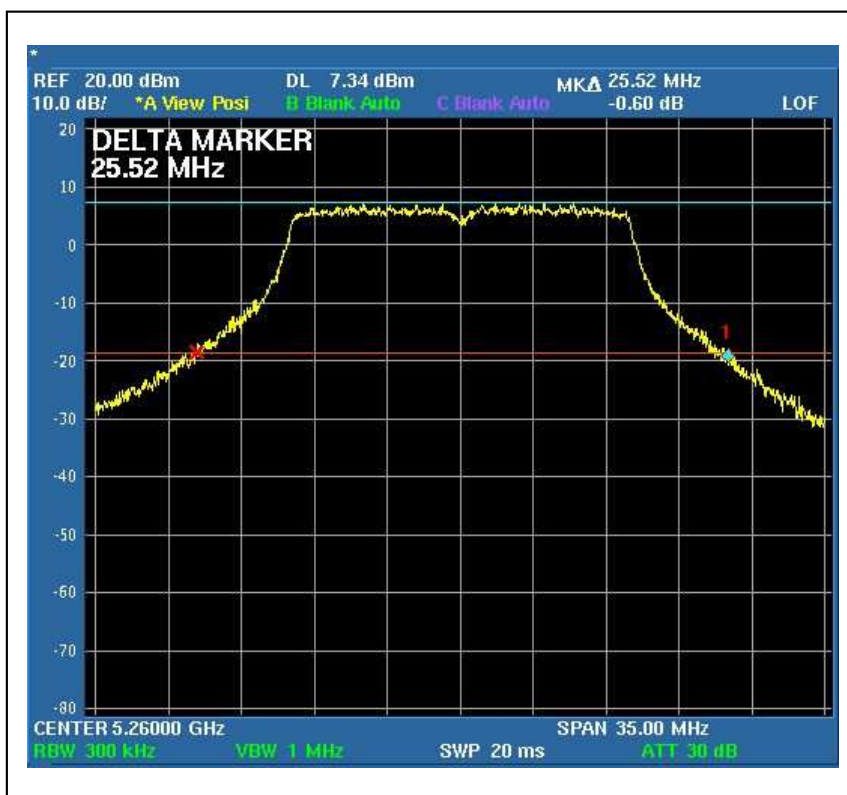
CH10



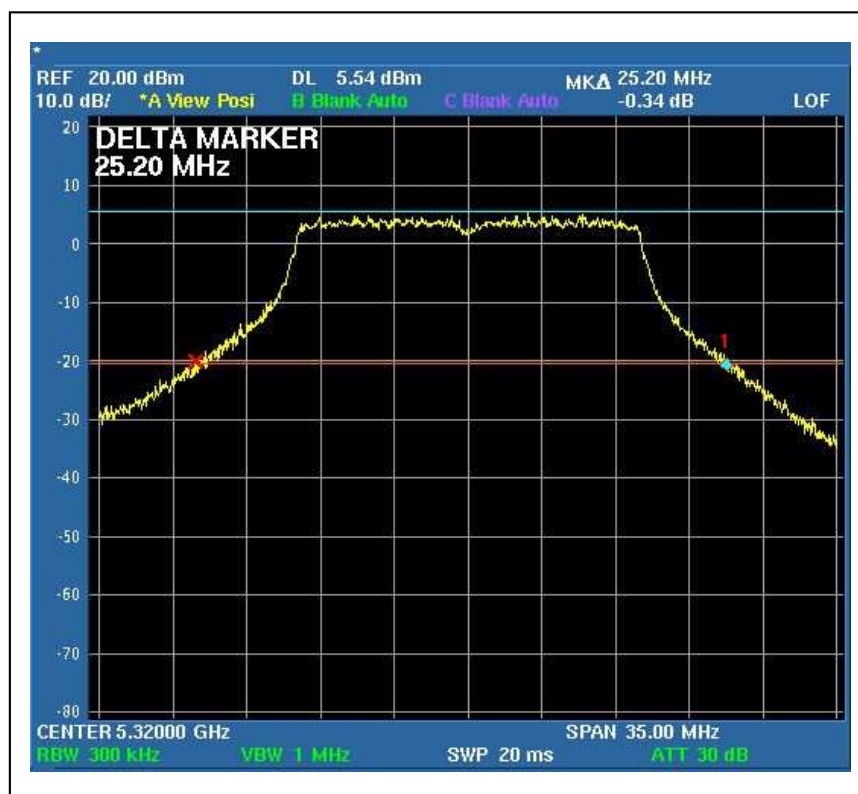
CH15



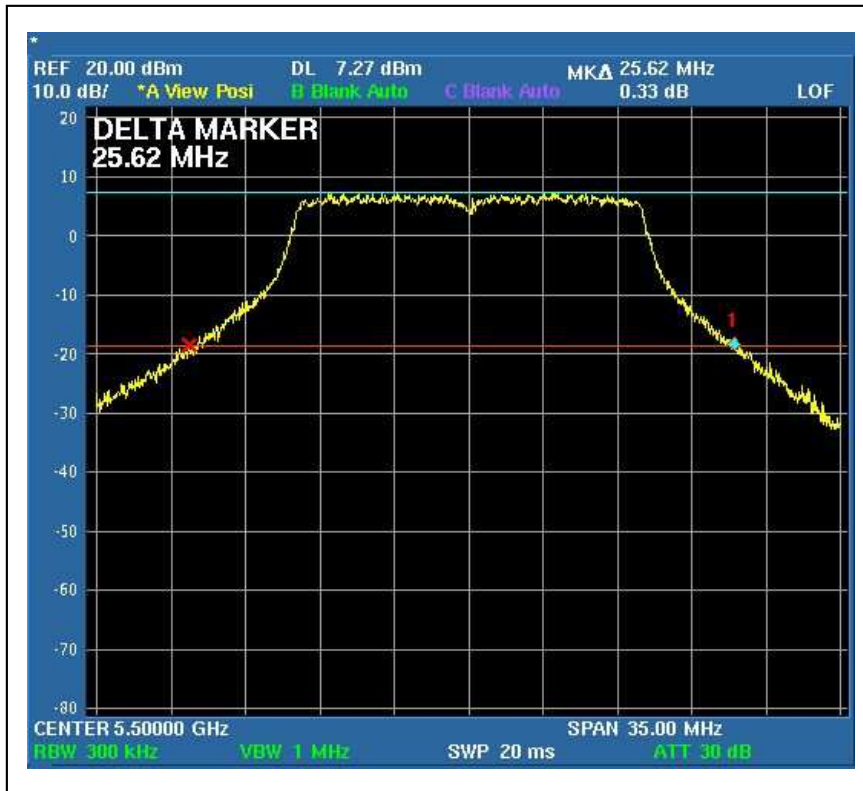
26dB Occupied Bandwidth:
CH1



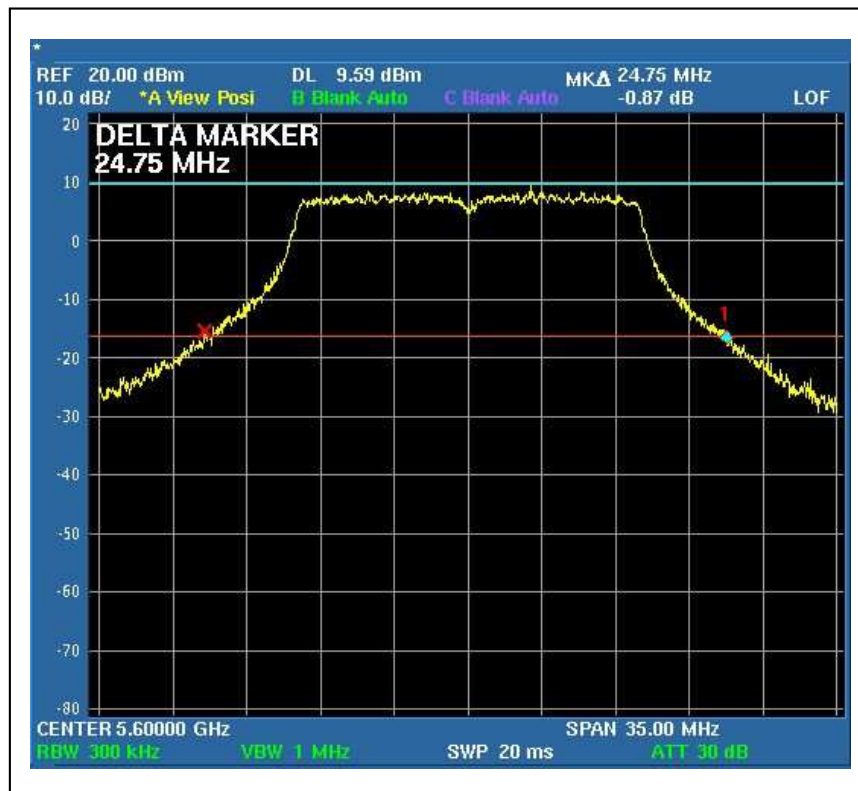
CH4



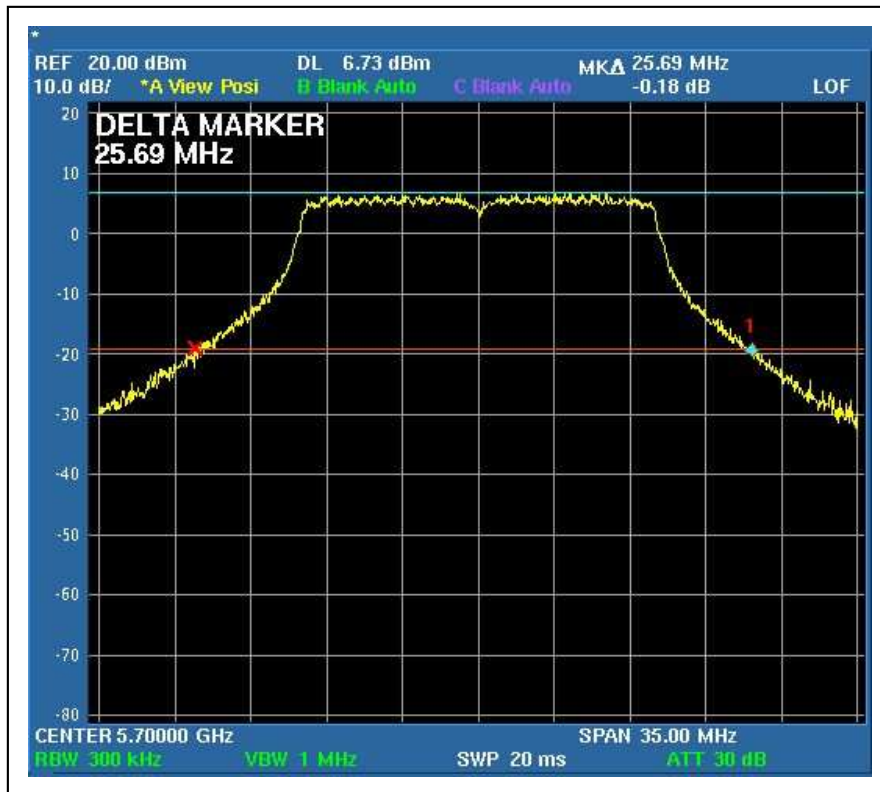
CH5



CH10



CH15





4.4 PEAK POWER EXCURSION MEASUREMENT

4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Frequency Band	Limit
5.15 – 5.25 GHz	13dB
5.25 – 5.35 GHz	13dB
5.47 – 5.725 GHz	13dB
5.725 – 5.825 GHz	13dB

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ADVANTEST SPECTRUM ANALYZER	U3772	160100280	April. 10.2007

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.

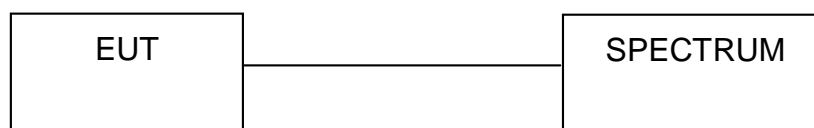
4.4.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set the spectrum bandwidth span to view the entire spectrum.
3. Using peak detector and Max-hold function for Trace 1 (RB=1MHz, VB=3MHz) and 2 (RB=1MHz, VB=300KHz).
4. The largest difference between Trace 1 and Trace 2 in any 1MHz band on any frequency was recorded.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

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



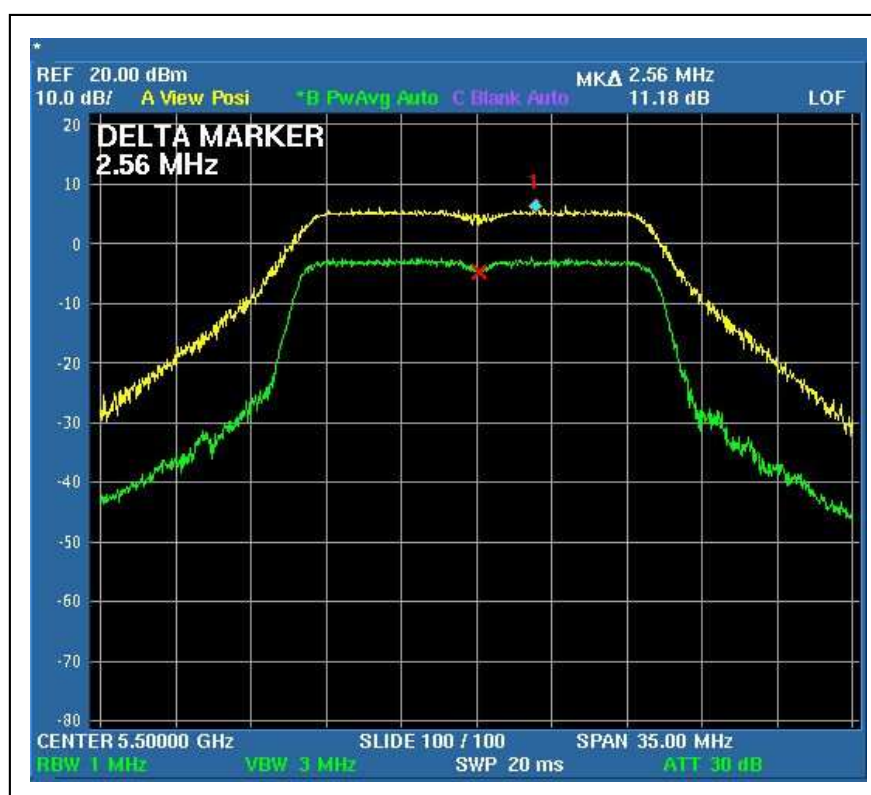
4.4.7 TEST RESULTS –ANTENNA 1

802.11a OFDM modulation

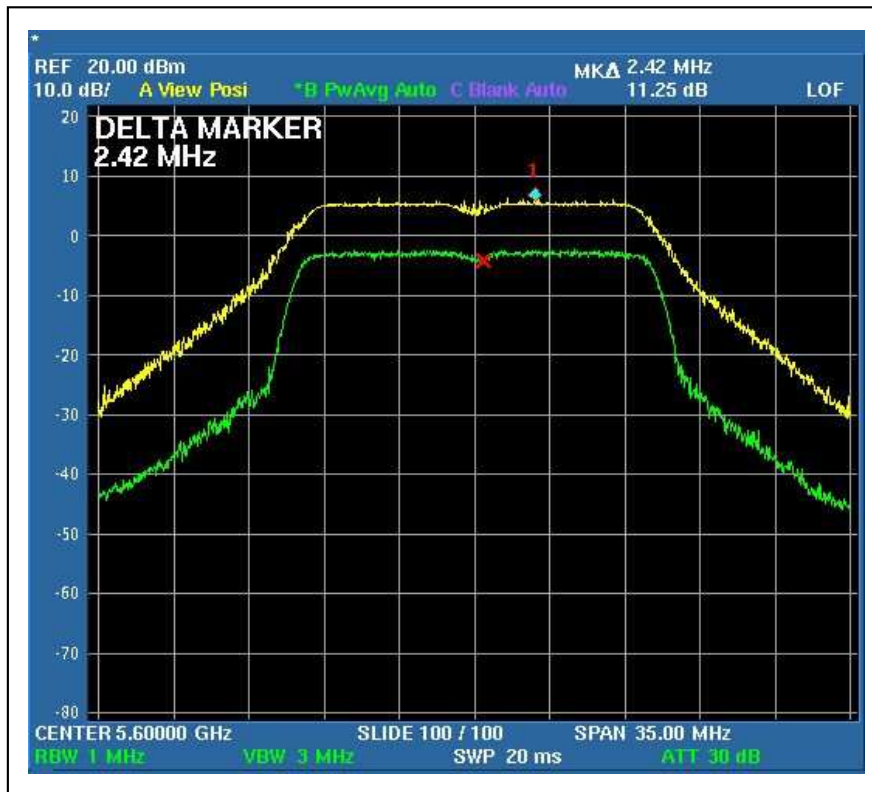
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg.C, 56%RH, 972hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
5	5500	11.18	13	PASS
10	5600	11.25	13	PASS
15	5700	11.39	13	PASS

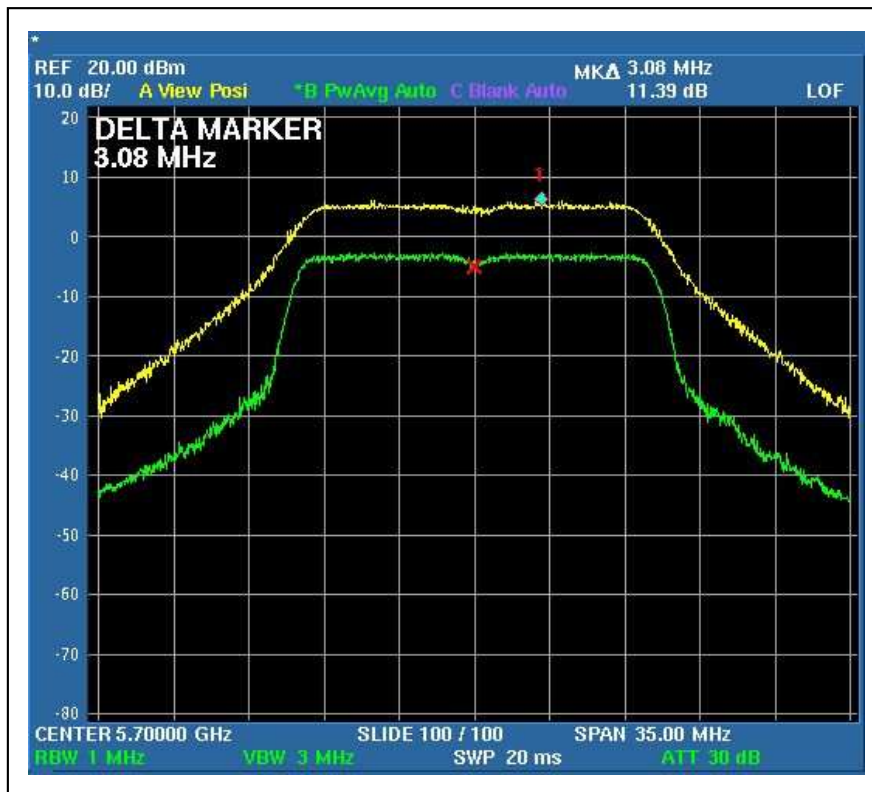
CH5



CH10



CH15





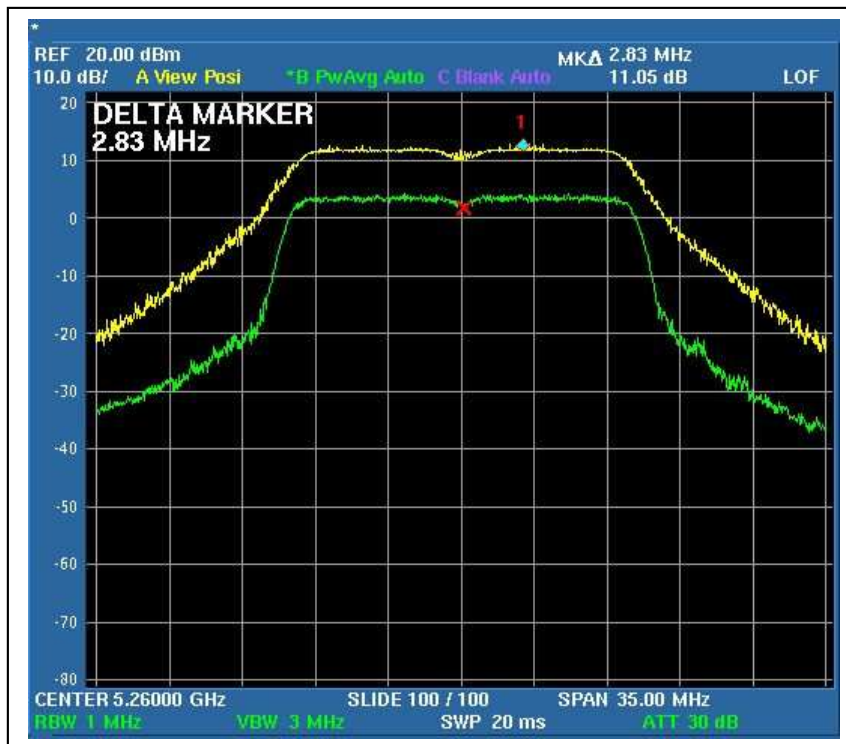
4.4.8 TEST RESULTS –ANTENNA A

802.11a OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg.C, 56%RH, 972hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5260	11.05	13	PASS
4	5320	10.21	13	PASS
5	5500	10.67	13	PASS
10	5600	9.89	13	PASS
15	5700	9.72	13	PASS

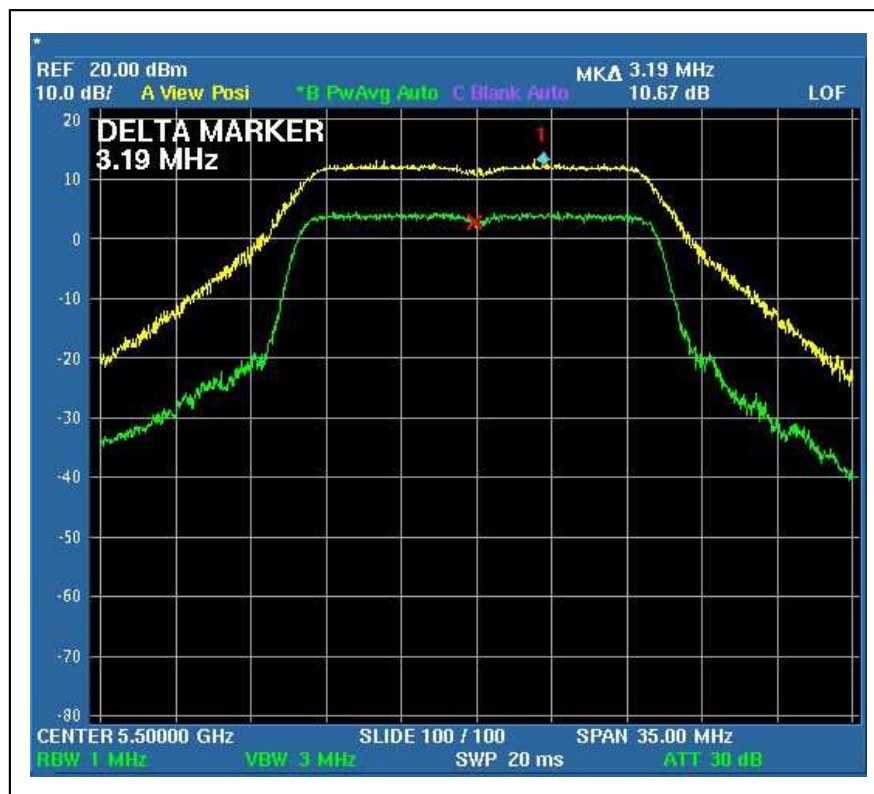
CH1



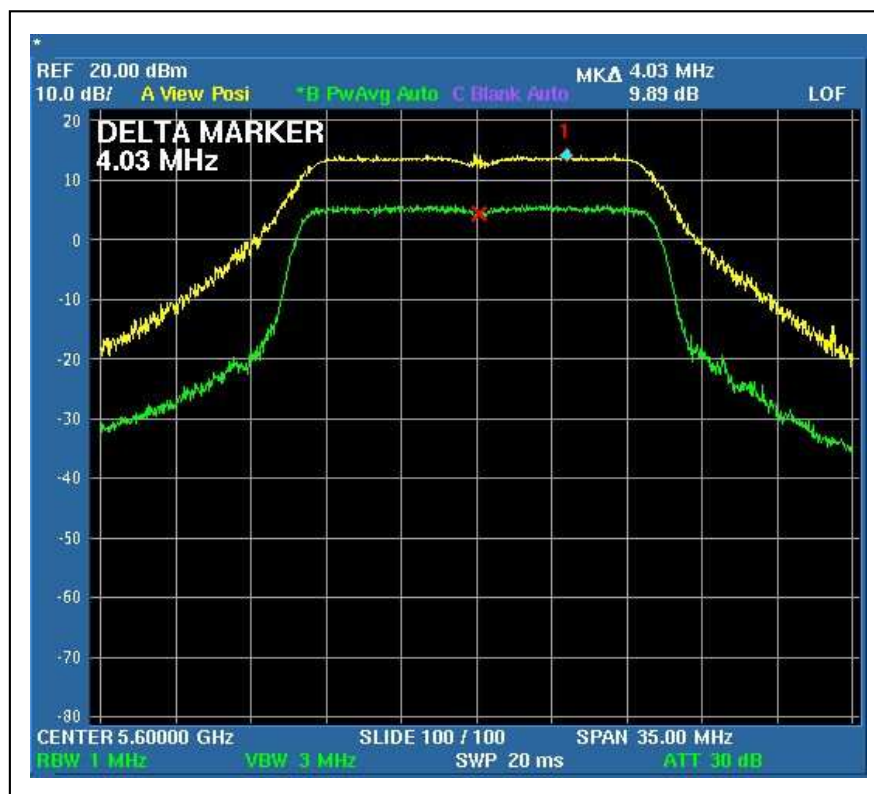
CH4



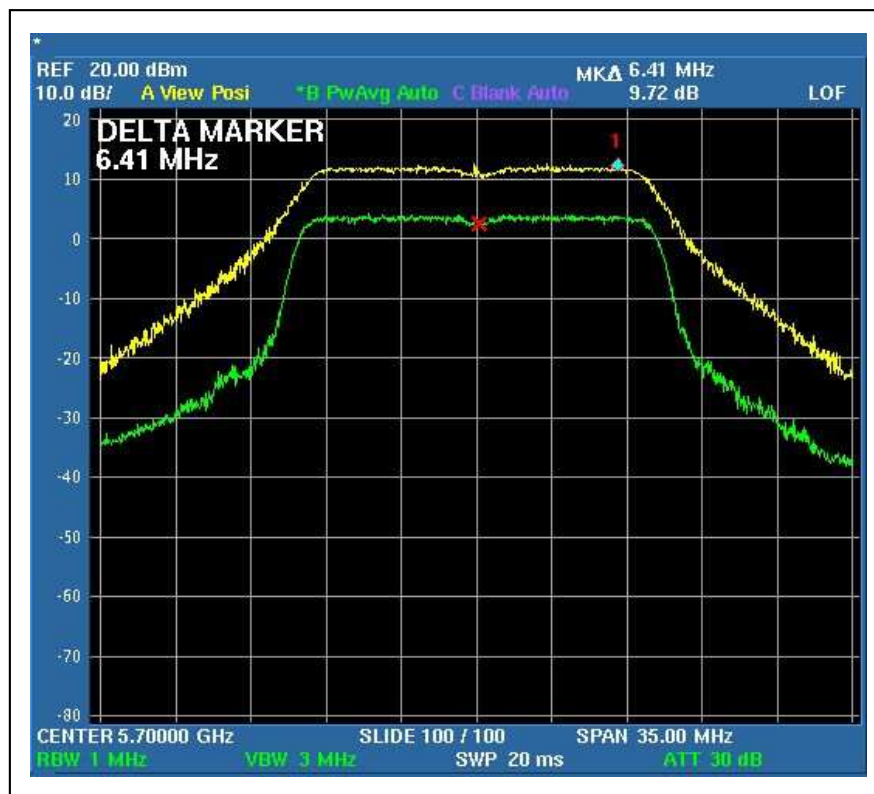
CH5



CH10



CH15



4.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Frequency Band	Limit
5.15 ~ 5.25GHz	4dBm
5.25 ~ 5.35GHz	11dBm
5.47 ~ 5.725GHz	11dBm
5.725 ~ 5.825GHz	17dBm

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ADVANTEST SPECTRUM ANALYZER	U3772	160100280	April. 10.2007

NOTE:

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

4.5.3 TEST PROCEDURES

1. The transmitter output was connected to the spectrum analyzer.
2. Set RBW=1MHz, VBW=3MHz. The PPSD is the highest level found across the emission in any 1MHz band.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

Same as 4.3.6

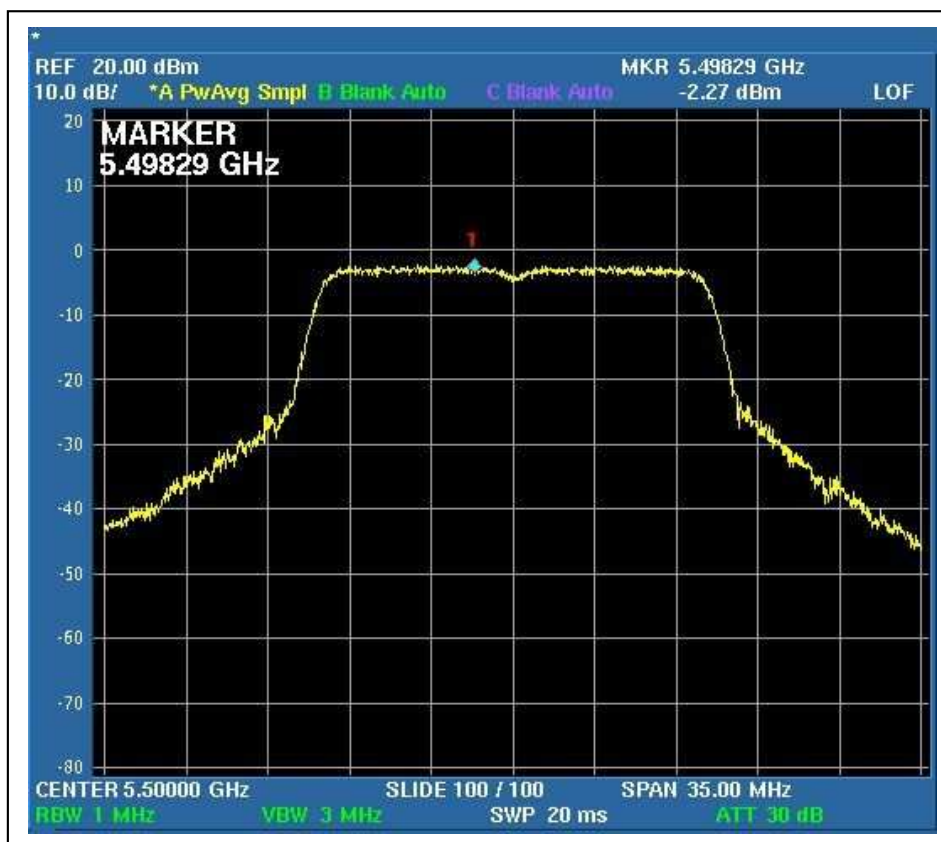
4.5.7 TEST RESULTS –ANTENNA 1

802.11a OFDM modulation

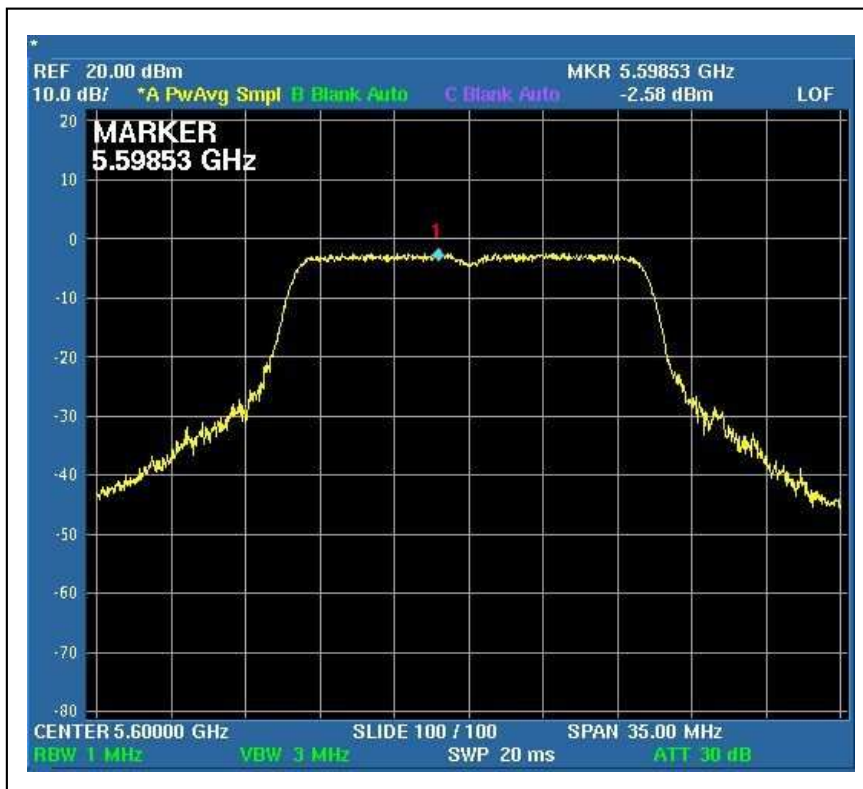
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg.C, 56%RH, 972hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
5	5500	-2.27	0	PASS
10	5600	-2.58	0	PASS
15	5700	-2.65	0	PASS

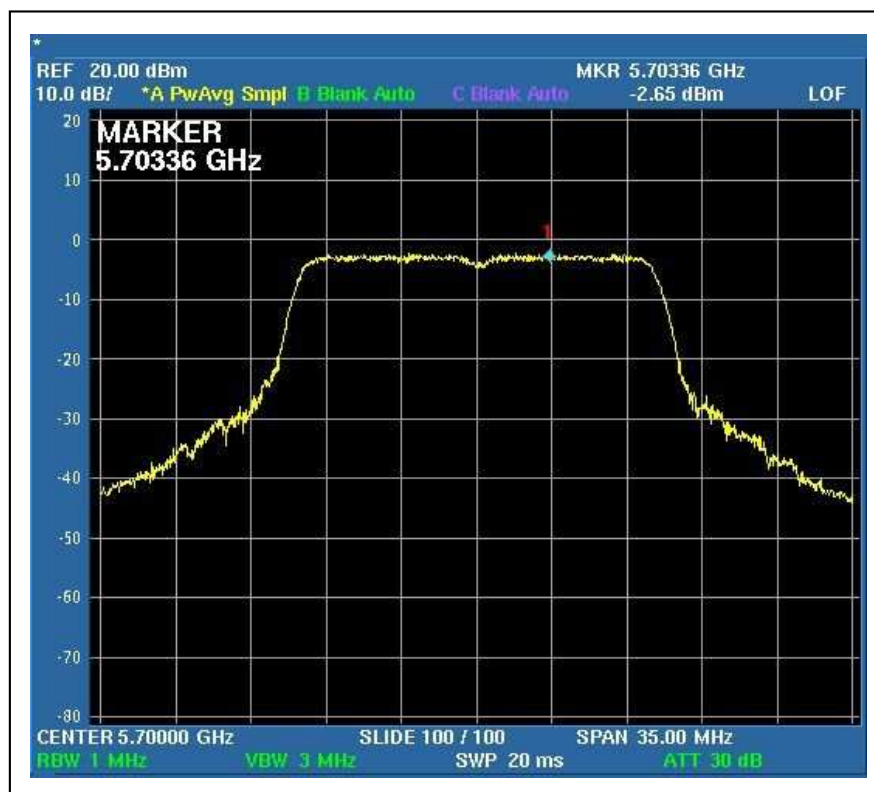
CH5



CH10



CH15



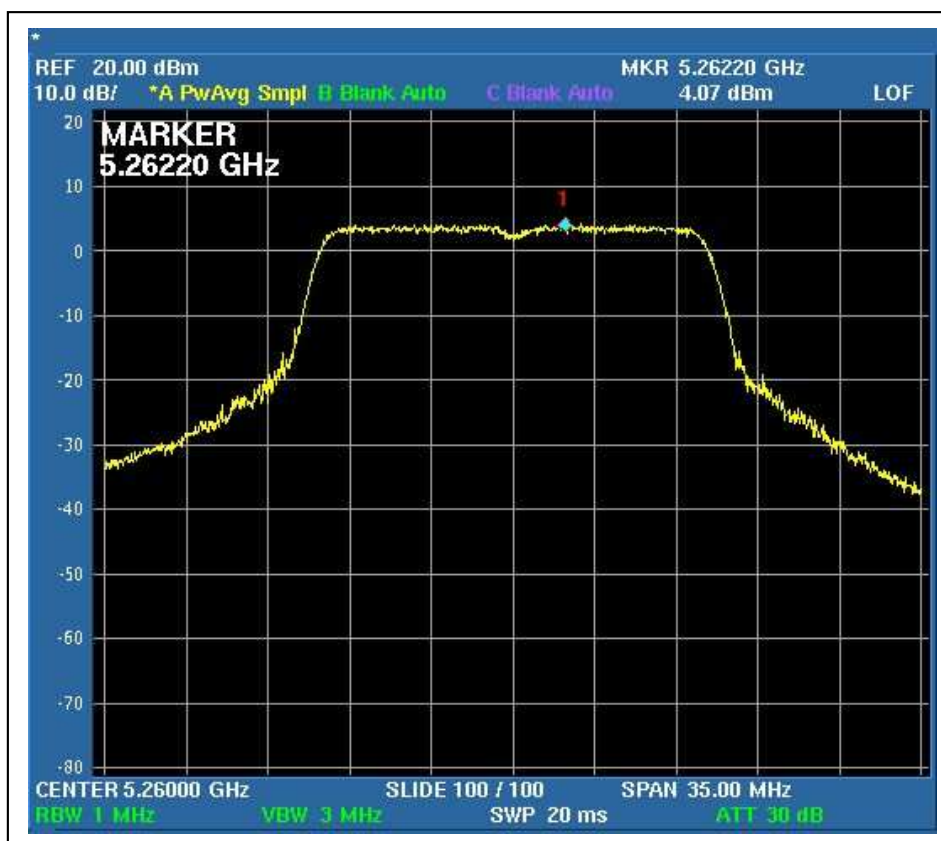
4.5.8 TEST RESULTS –ANTENNA A

802.11a OFDM modulation

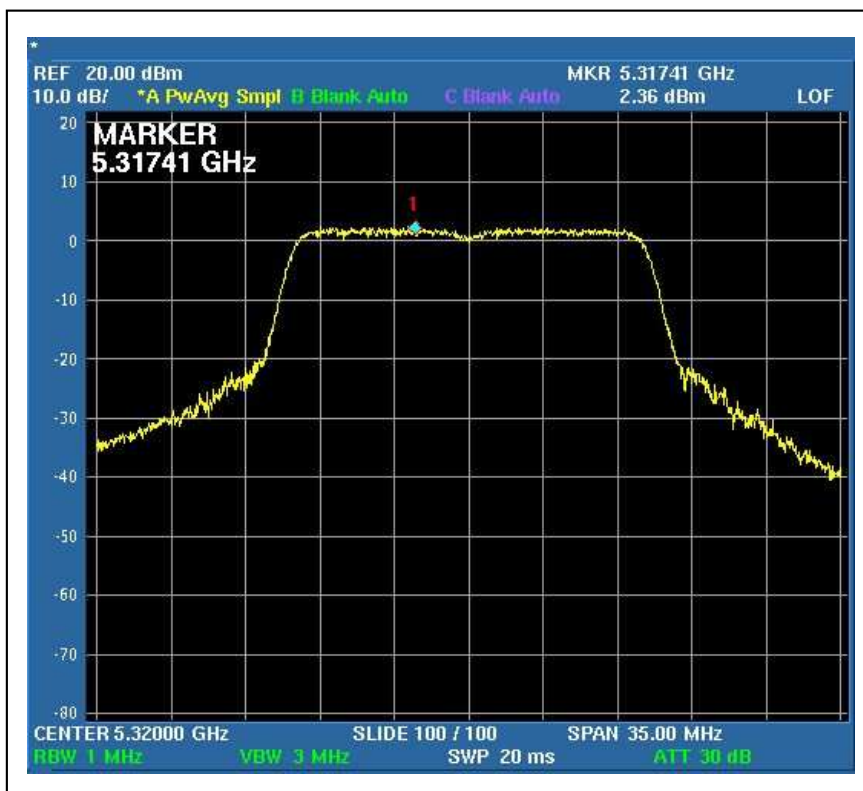
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg.C, 56%RH, 972hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5260	4.07	8	PASS
4	5320	2.36	8	PASS
5	5500	4.24	8	PASS
10	5600	6.35	8	PASS
15	5700	4.33	8	PASS

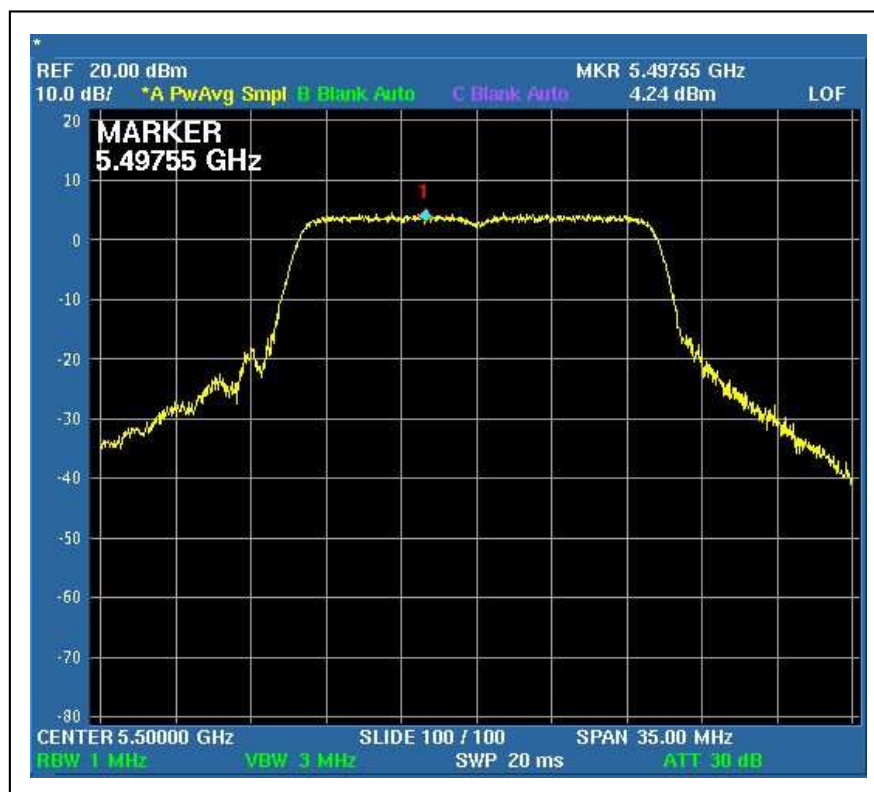
CH1



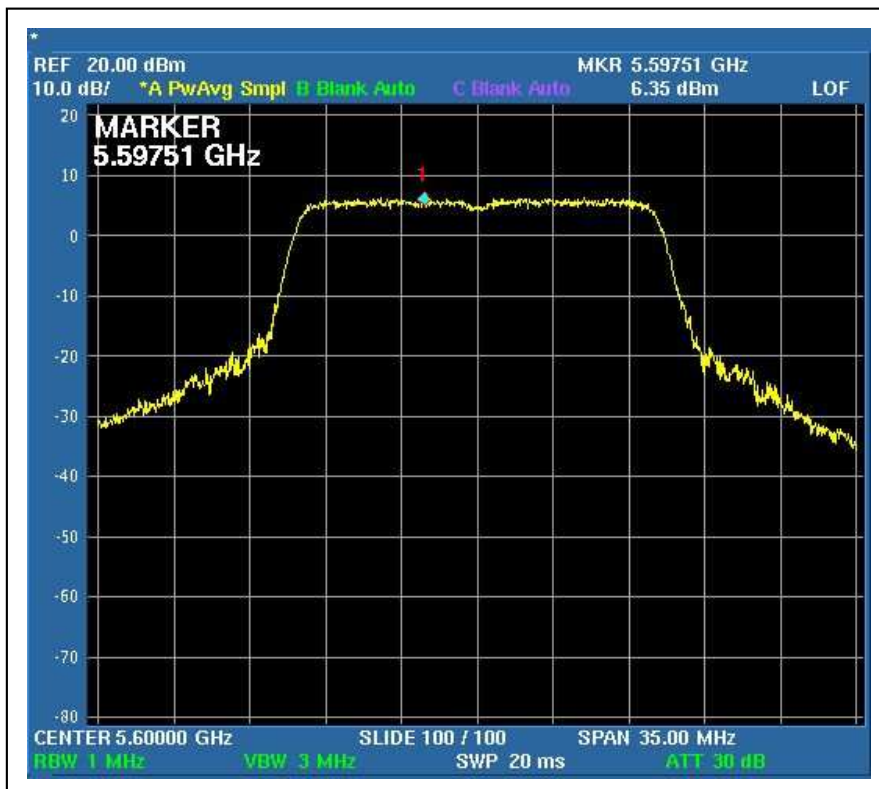
CH4



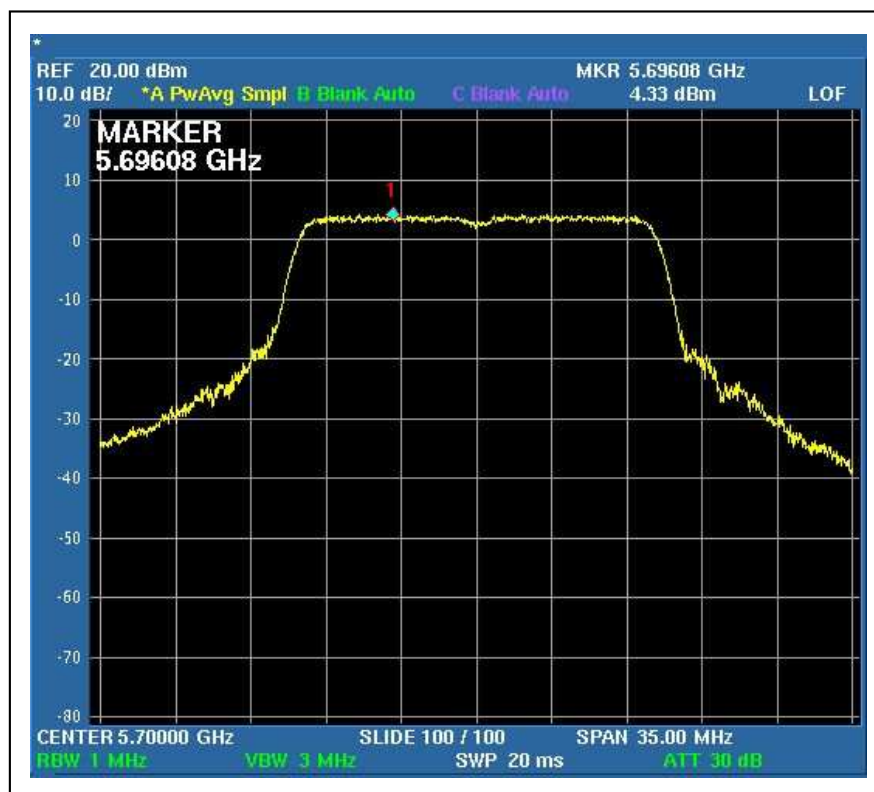
CH5



CH10



CH15



4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within +/- 0.02% of the operating frequency over a temperature variation of -30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007

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.

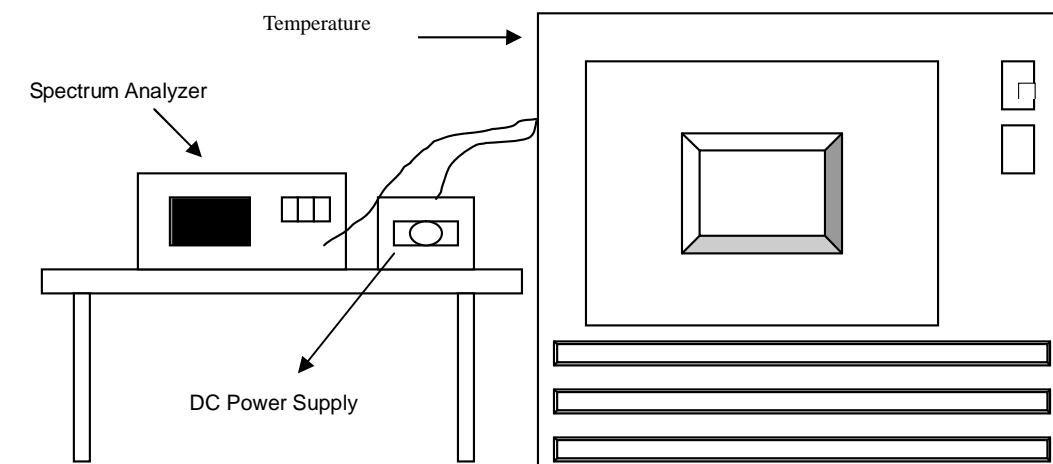
4.6.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

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

4.6.7 TEST RESULTS

		Operating frequency: 5320MHz				Limit : $\pm 0.02\%$	
Temp. (°C)	Power supply (VAC)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	126.5	5320.0364	0.000684	5320.0367	0.000690	5320.0368	0.000692
	110	5320.0364	0.000684	5320.0366	0.000688	5320.0368	0.000692
	93.5	5320.0366	0.000688	5320.0364	0.000684	5320.0368	0.000692
40	126.5	5319.9881	0.000224	5319.9976	0.000045	5319.9973	0.000051
	110	5319.9882	0.000222	5319.9976	0.000045	5319.9975	0.000047
	93.5	5319.9981	0.000036	5319.9979	0.000039	5319.9972	0.000053
30	126.5	5319.9922	0.000147	5319.9919	0.000152	5319.9917	0.000156
	110	5319.9922	0.000147	5319.9921	0.000148	5319.9918	0.000154
	93.5	5319.9922	0.000147	5319.9919	0.000152	5319.9916	0.000158
20	126.5	5320.0071	0.000133	5320.0068	0.000128	5320.0065	0.000122
	110	5320.0072	0.000135	5320.0072	0.000135	5320.0069	0.000130
	93.5	5320.0071	0.000133	5320.0068	0.000128	5320.0065	0.000122
10	126.5	5320.0124	0.000233	5320.0122	0.000229	5320.0119	0.000224
	110	5320.0124	0.000233	5320.0122	0.000229	5320.0121	0.000227
	93.5	5320.0124	0.000233	5320.0121	0.000227	5320.0118	0.000222
0	126.5	5320.023	0.000432	5320.0180	0.000338	5320.0180	0.000338
	110	5320.023	0.000432	5320.0210	0.000395	5320.0190	0.000357
	93.5	5320.021	0.000395	5320.0180	0.000338	5320.0180	0.000338
-10	126.5	5320.0306	0.000575	5320.0290	0.000545	5320.0270	0.000508
	110	5320.0304	0.000571	5320.0310	0.000583	5320.0290	0.000545
	93.5	5320.0304	0.000571	5320.0280	0.000526	5320.0270	0.000508
-20	126.5	5320.0300	0.000564	5320.0250	0.000470	5320.0210	0.000395
	110	5320.0300	0.000564	5320.0280	0.000526	5320.0240	0.000451
	93.5	5320.0300	0.000564	5320.0240	0.000451	5320.0220	0.000414
-30	126.5	5320.0116	0.000218	5320.0111	0.000209	5320.0108	0.000203
	110	5320.0116	0.000218	5320.0113	0.000212	5320.0111	0.000209
	93.5	5320.0116	0.000218	5320.0111	0.000209	5320.0108	0.000203

4.7 BAND EDGES MEASUREMENT

4.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007

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.

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

4.7.3 EUT OPERATING CONDITION

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



4.7.4 TEST RESULTS –ANTENNA 1

For signals in the restricted bands above and below the 5.47 to 5.725GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak field strength of the intentional signal made on the OATS to calculate the field strength of the unintentional signals.

The spectrum plots (Peak RBW=1MHz, VBW=3MHz; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

802.11a OFDM modulation

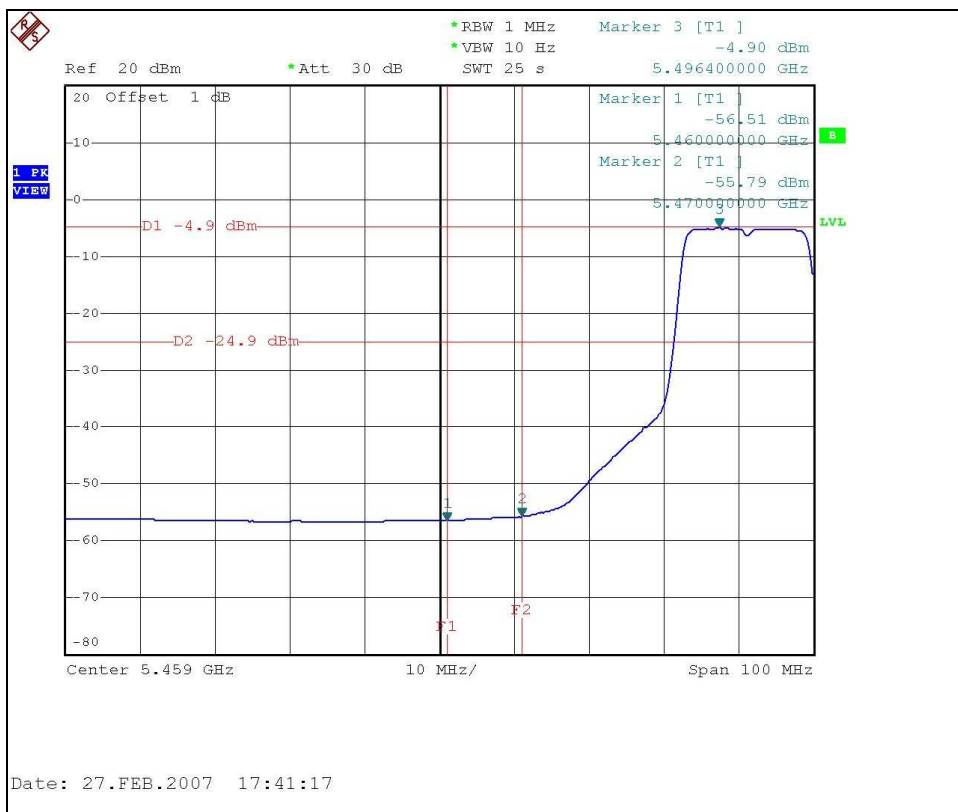
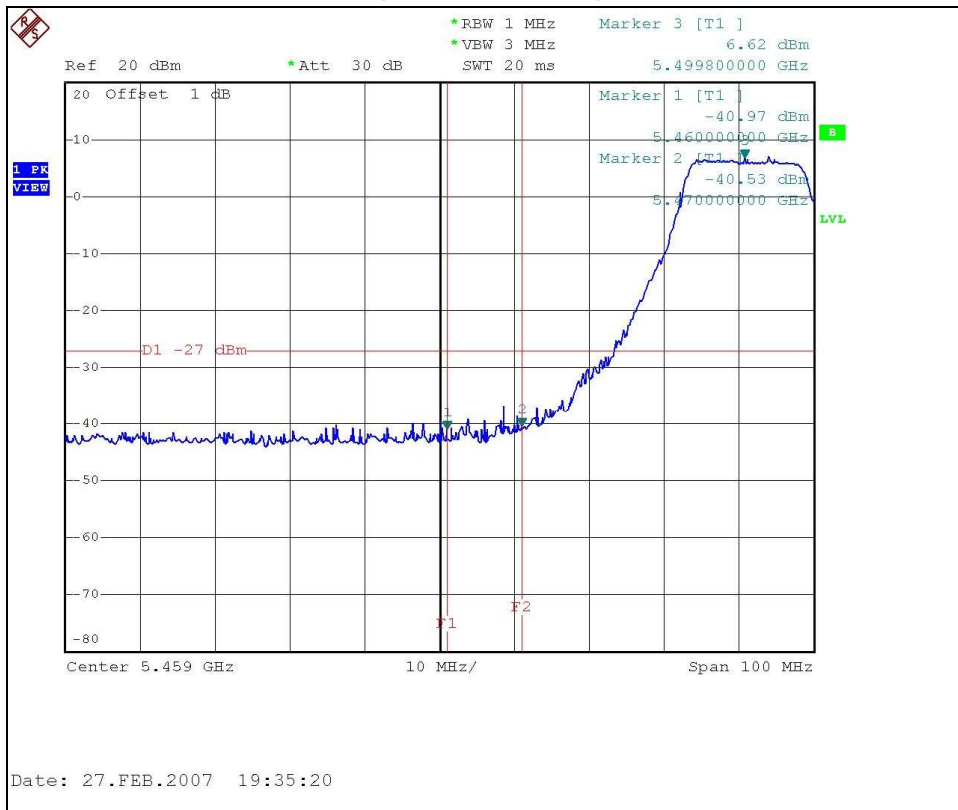
NOTE (Peak):

The band edge emission plot on the following first page shows 47.56dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 5 is 115.7dBuV/m (Peak), so the maximum field strength in restrict band is $115.7-47.56=68.14$ dBuV/m which is under 74dBuV/m limit.

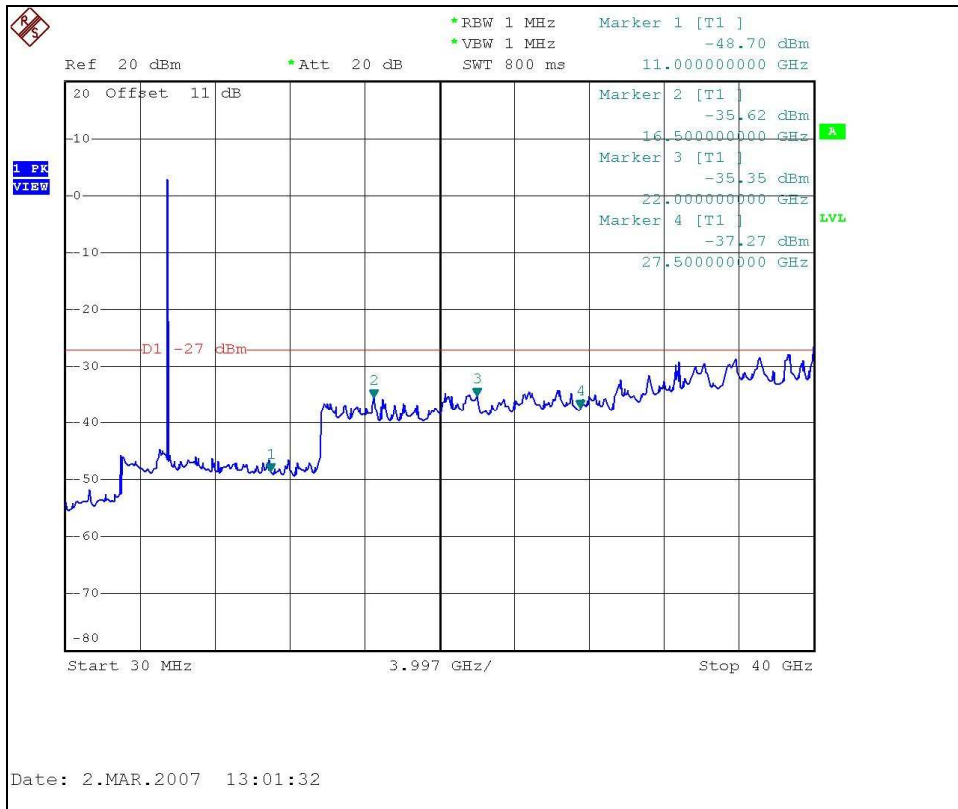
NOTE (Average):

The band edge emission plot on the following first page shows 51.61dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 5 is 105.0dBuV/m (Average), so the maximum field strength in restrict band is $105.0-51.61=53.39$ dBuV/m which is under 54dBuV/m limit.

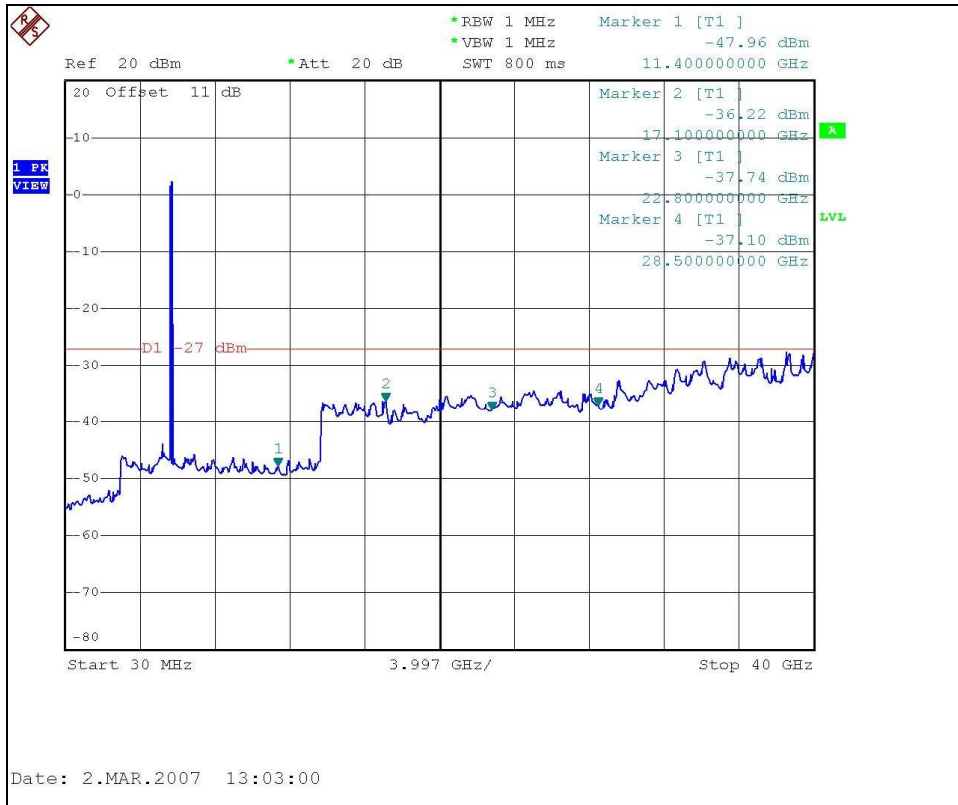
802.11a OFDM modulation(CH 5: 5500MHz)



CH 5



CH15



4.7.5 TEST RESULTS –ANTENNA A

For signals in the restricted bands above and below the 5.15 to 5.35GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak field strength of the intentional signal made on the OATS to calculate the field strength of the unintentional signals.

The spectrum plots (Peak RBW=1MHz, VBW=3MHz; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

802.11a OFDM modulation

NOTE (Peak):

The band edge emission plot on the following first page shows 54.38dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 117.3dBuV/m (Peak), so the maximum field strength in restrict band is $117.3-54.38=62.92$ dBuV/m which is under 74dBuV/m limit.

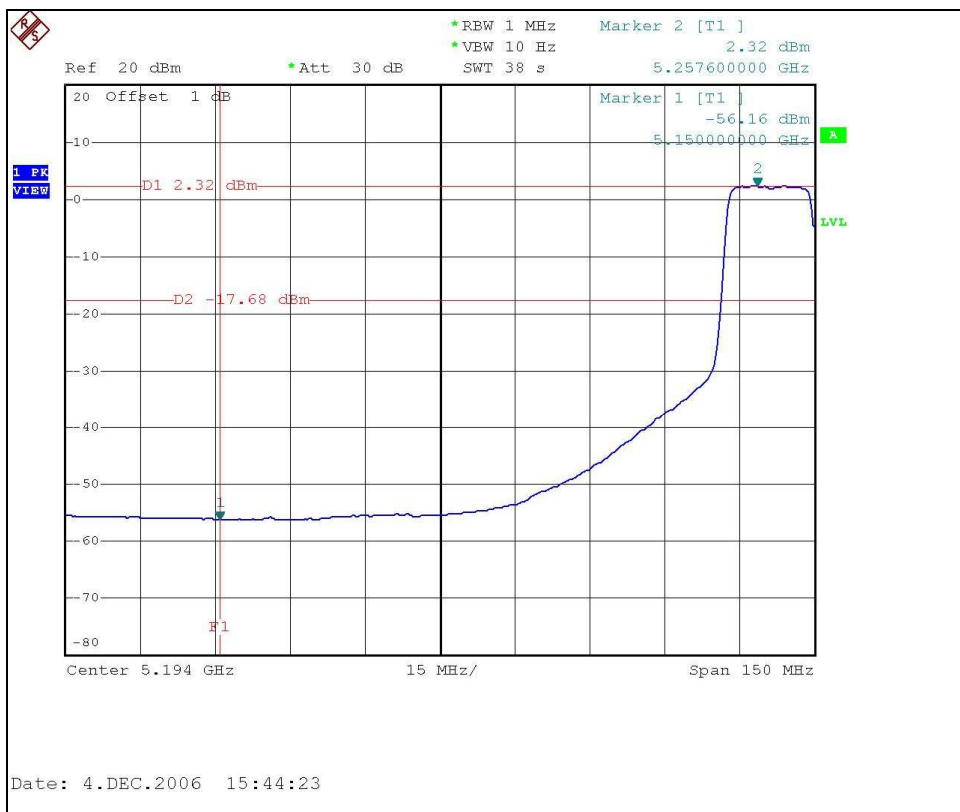
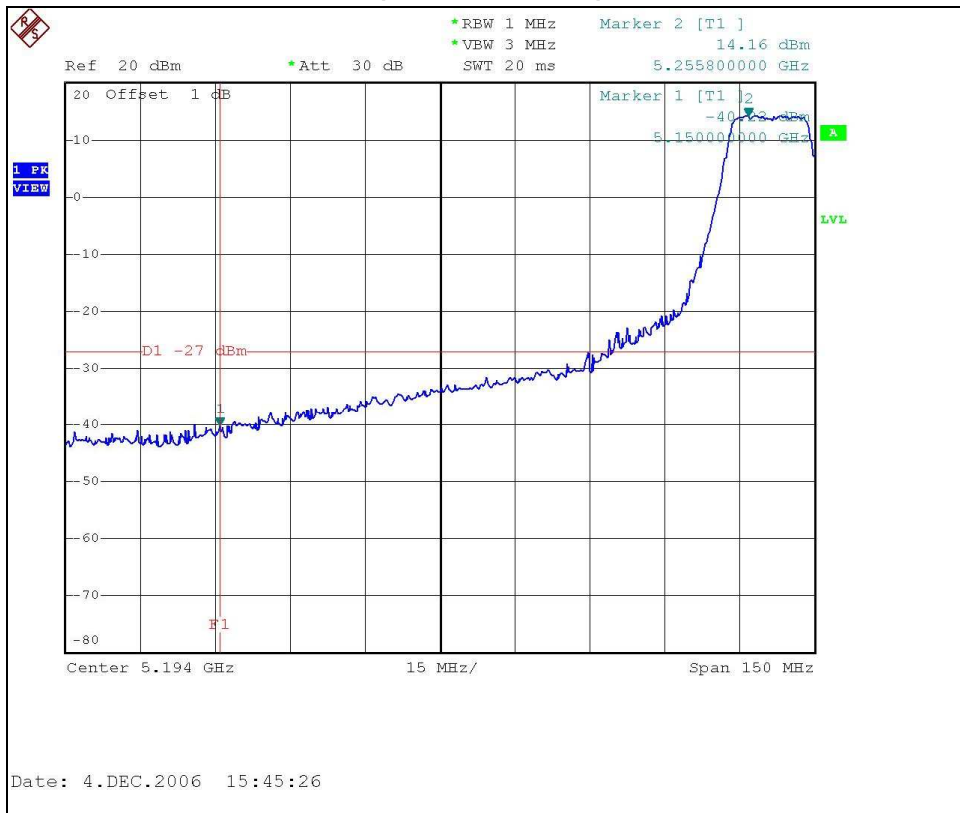
The band edge emission plot on the following first page shows 47.21dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 4 is 113.8dBuV/m (Peak), so the maximum field strength in restrict band is $113.8-47.21=66.59$ dBuV/m which is under 74dBuV/m limit.

NOTE (Average):

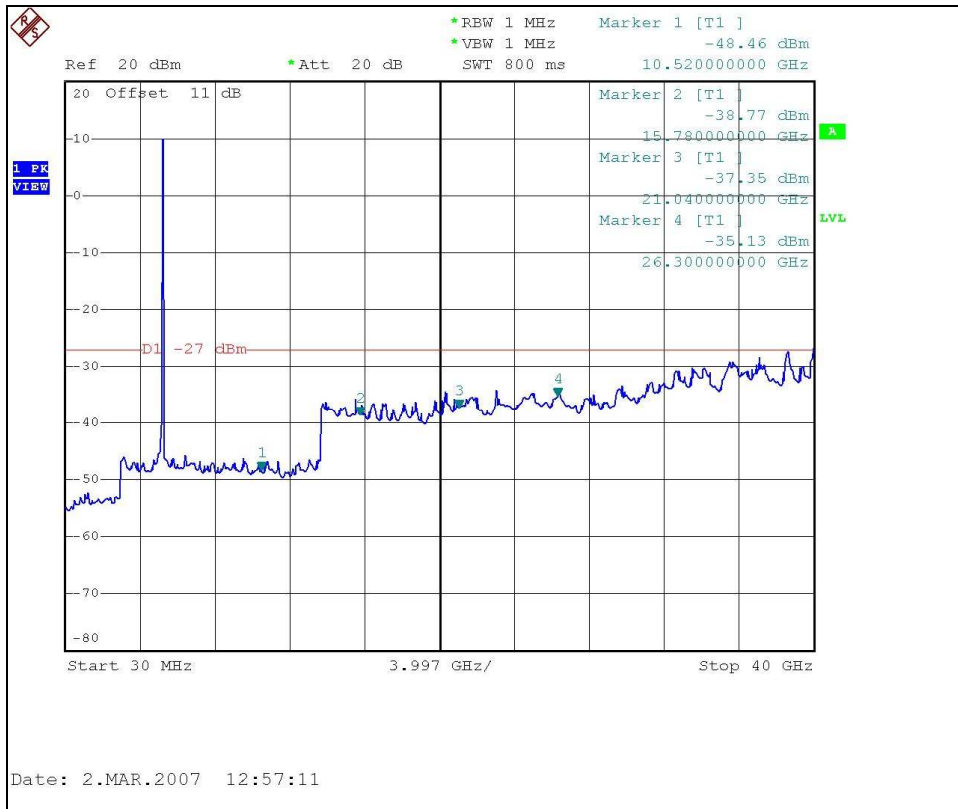
The band edge emission plot on the following second page shows 58.48dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 106.8dBuV/m (Average), so the maximum field strength in restrict band is $106.8-58.48=48.32$ dBuV/m which is under 54dBuV/m limit.

The band edge emission plot on the following second page shows 50.48dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 4 is 103.1dBuV/m (Average), so the maximum field strength in restrict band is $103.1-50.48=52.62$ dBuV/m which is under 54dBuV/m limit.

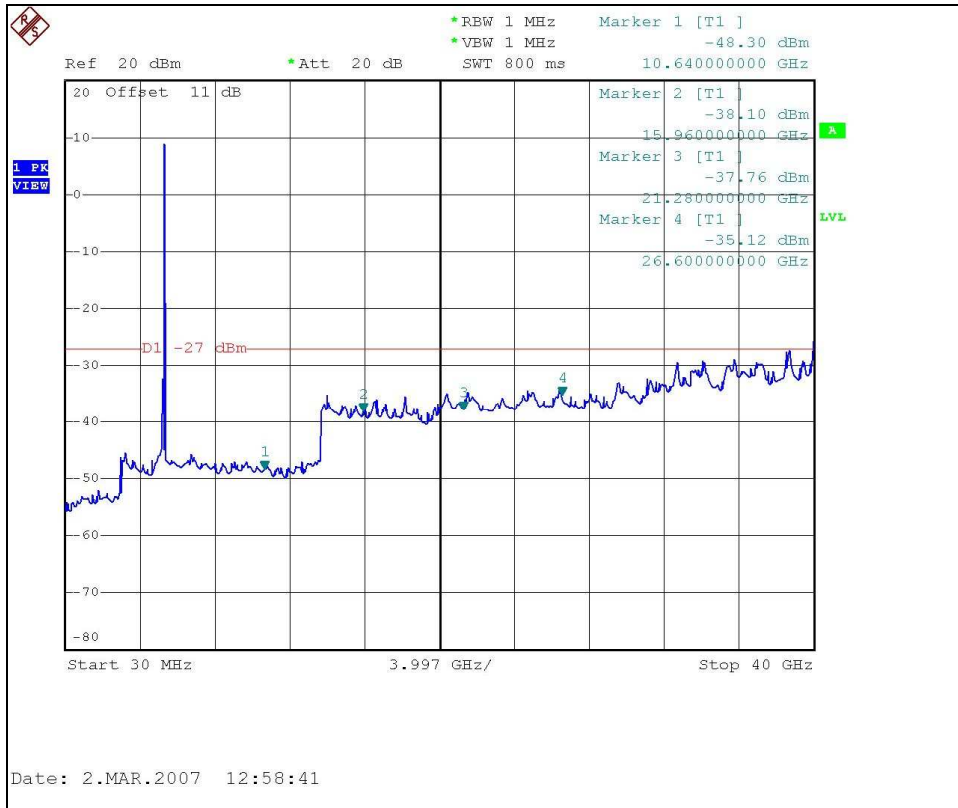
802.11a OFDM modulation(CH 1: 5260MHz)



CH 1



CH 4



For signals in the restricted bands above and below the 5.47 to 5.725GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak field strength of the intentional signal made on the OATS to calculate the field strength of the unintentional signals.

The spectrum plots (Peak RBW=1MHz, VBW=3MHz; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

802.11a OFDM modulation

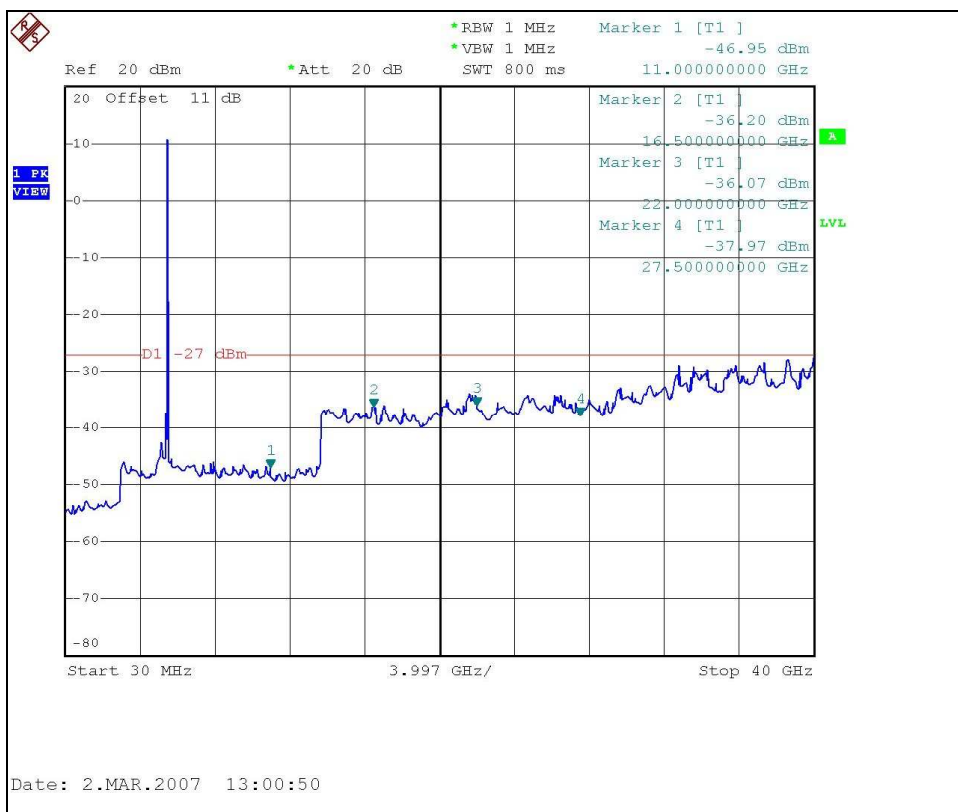
NOTE (Peak):

The band edge emission plot on the following first page shows 46.05dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 5 is 116.9dBuV/m (Peak), so the maximum field strength in restrict band is $116.9-46.05=70.85$ dBuV/m which is under 74dBuV/m limit.

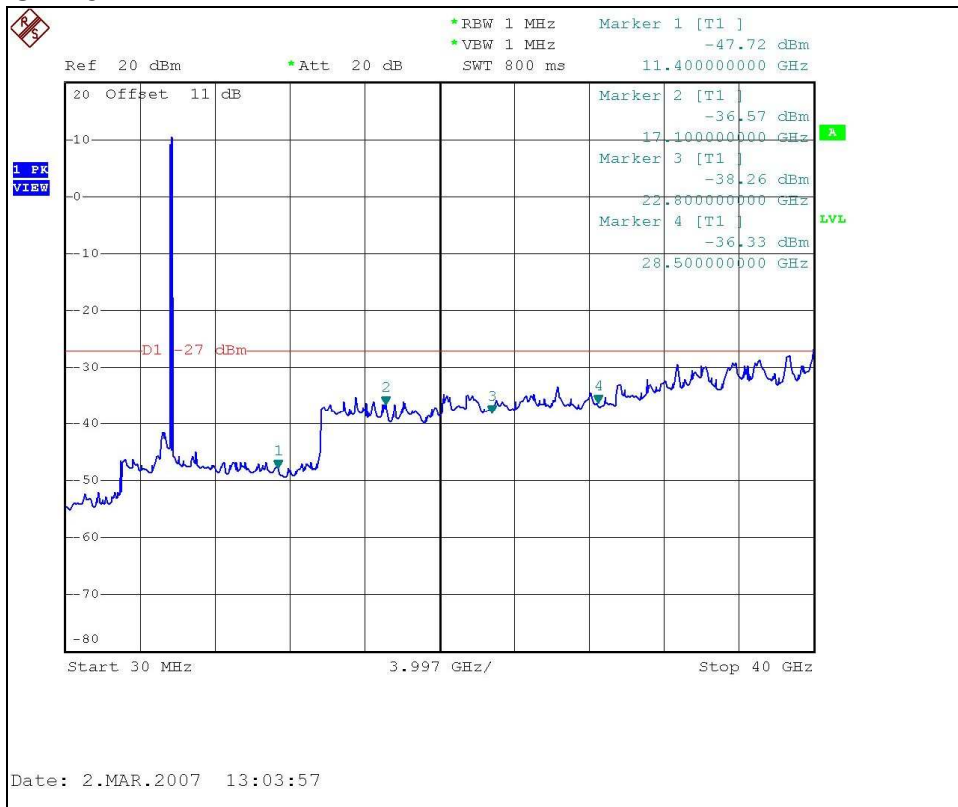
NOTE (Average):

The band edge emission plot on the following second page shows 54.88dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 5 is 105.2dBuV/m (Average), so the maximum field strength in restrict band is $105.2-54.88=50.32$ dBuV/m which is under 54dBuV/m limit.

CH 5



CH 15



4.8 ANTENNA REQUIREMENT

4.8.1 STANDARD APPLICABLE

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

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

4.8.2 ANTENNA CONNECTED CONSTRUCTION

The antennas used in this product are as following:

No.	Model No.	Gain (dBi)	Antenna Type	Antenna Connector
1	ANT05535	17.0dBi	Directional, Patch Panel (Internal Antenna)	Probe Pin
A	1GP-51809	9.0dBi	Dipole, Omni (External Antenna)	N female(Plug)



5. 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, NCC
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.