

# FCC TEST REPORT (15.407)

**REPORT NO.:** RF941122H03D-1

**MODEL NO.:** HiveAP 20 ag

**RECEIVED:** April 07, 2008

**TESTED:** April 17 to May 09, 2008

**ISSUED:** June 05, 2008

**APPLICANT:** Accton Technology Corporation

**ADDRESS:** No.1, Creation Rd. III, 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, Chung Lin Hsiang, Hsin Chu Hsien,  
Taiwan, R.O.C.

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## Table of Contents

1.	CERTIFICATION .....	4
2.	SUMMARY OF TEST RESULTS .....	5
2.1	MEASUREMENT UNCERTAINTY .....	6
3.	GENERAL INFORMATION .....	7
3.1	GENERAL DESCRIPTION OF EUT .....	7
3.2	DESCRIPTION OF TEST MODES .....	9
3.2.1	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL: .....	10
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS .....	12
3.4	DESCRIPTION OF SUPPORT UNITS.....	13
3.5	CONFIGURATION OF SYSTEM UNDER TEST .....	14
4.	TEST TYPES AND RESULTS .....	16
4.1	CONDUCTED EMISSION MEASUREMENT .....	16
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	16
4.1.2	TEST INSTRUMENTS.....	16
4.1.3	TEST PROCEDURES .....	17
4.1.4	DEVIATION FROM TEST STANDARD .....	17
4.1.5	TEST SETUP .....	18
4.1.6	EUT OPERATING CONDITIONS .....	18
4.1.7	TEST RESULTS .....	19
4.2	RADIATED EMISSION MEASUREMENT .....	23
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT.....	23
4.2.2	LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS.....	24
4.2.3	TEST INSTRUMENTS.....	25
4.2.4	TEST PROCEDURES .....	26
4.2.5	DEVIATION FROM TEST STANDARD .....	26
4.2.6	TEST SETUP .....	27
4.2.7	EUT OPERATING CONDITION.....	27
4.2.8	TEST RESULTS .....	28
4.3	PEAK TRANSMIT POWER MEASUREMENT .....	36
4.3.1	LIMITS OF PEAK TRANSMIT POWER MEASUREMENT .....	36
4.3.2	TEST INSTRUMENTS.....	36
4.3.3	TEST PROCEDURE.....	37
4.3.4	DEVIATION FROM TEST STANDARD .....	37
4.3.5	TEST SETUP .....	37
4.3.6	EUT OPERATING CONDITIONS .....	37
4.3.7	TEST RESULTS .....	38



4.4	PEAK POWER EXCURSION MEASUREMENT .....	43
4.4.1	LIMITS OF PEAK POWER EXCURSION MEASUREMENT .....	43
4.4.2	TEST INSTRUMENTS.....	43
4.4.3	TEST PROCEDURE.....	44
4.4.4	DEVIATION FROM TEST STANDARD .....	44
4.4.5	TEST SETUP .....	44
4.4.6	EUT OPERATING CONDITIONS .....	44
4.4.7	TEST RESULTS .....	45
4.5	PEAK POWER SPECTRAL DENSITY MEASUREMENT .....	47
4.5.1	LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT .....	47
4.5.2	TEST INSTRUMENTS.....	47
4.5.3	TEST PROCEDURES .....	48
4.5.4	DEVIATION FROM TEST STANDARD .....	48
4.5.5	TEST SETUP .....	48
4.5.6	EUT OPERATING CONDITIONS .....	48
4.5.7	TEST RESULTS .....	49
4.6	FREQUENCY STABILITY.....	51
4.6.1	LIMITS OF FREQUENCY STABILITY MEASUREMENT .....	51
4.6.2	TEST INSTRUMENTS.....	51
4.6.3	TEST PROCEDURE.....	51
4.6.4	DEVIATION FROM TEST STANDARD .....	52
4.6.5	TEST SETUP .....	52
4.6.6	EUT OPERATING CONDITION.....	52
4.6.7	TEST RESULTS .....	53
4.7	BAND EDGES MEASUREMENT.....	54
4.7.1	TEST INSTRUMENTS.....	54
4.7.2	TEST PROCEDURE.....	54
4.7.3	EUT OPERATING CONDITION.....	54
4.7.4	TEST RESULTS .....	55
4.8	ANTENNA REQUIREMENT .....	59
4.8.1	STANDARD APPLICABLE.....	59
4.8.2	ANTENNA CONNECTED CONSTRUCTION.....	59
5.	INFORMATION ON THE TESTING LABORATORIES .....	60
6.	APPENDIX-A- MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB .....	61



## 1. CERTIFICATION

**PRODUCT:** HiveAP 20 ag  
**BRAND NAME:** AEROHIVE  
**MODEL NO.:** HiveAP 20 ag  
**TEST SAMPLE:** R&D SAMPLE  
**TESTED:** April 17 to May 09, 2008  
**APPLICANT:** Accton Technology Corporation  
**STANDARDS:** FCC Part 15, Subpart E (Section 15.407)  
ANSI C63.4-2003

The above equipment (Model: HiveAP 20 ag) 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** : Midoli Peng , **DATE:** June 05, 2008  
( Midoli Peng, Specialist )

**TECHNICAL ACCEPTANCE** : Hank Chung , **DATE:** June 05, 2008  
Responsible for RF ( Hank Chung, Deputy Manager )

**APPROVED BY** : May Chen , **DATE:** June 05, 2008  
( May Chen, Deputy Manager )

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

<b>APPLIED STANDARD: FCC Part 15, Subpart E (Section 15.407)</b>			
<b>Standard Section</b>	<b>Test Type</b>	<b>Result</b>	<b>Remark</b>
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -1.88dB at 0.478MHz
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 -0.67dB at 5150.00MHz
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 2.412 ~ 2.462GHz, 5.180 ~ 5.240GHz and 5.745 ~ 5.825GHz frequencies band. This report was recorded the RF parameters including 5.180 ~ 5.240GHz. For the 2.412 ~ 2.462GHz and 5.745 ~ 5.825GHz 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  $k=2$ .

<b>Measurement</b>	<b>Value</b>
Conducted emissions	2.44 dB
Radiated emissions (30MHz-1GHz)	3.94 dB
Radiated emissions (1GHz -18GHz)	2.33 dB
Radiated emissions (18GHz -40GHz)	2.55 dB

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	HiveAP 20 ag
<b>MODEL NO.</b>	HiveAP 20 ag
<b>FCC ID</b>	HEDHIVEAP20AG
<b>POWER SUPPLY</b>	DC 48V from power adapter or POE (Power over Ethernet)
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>MODULATION TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	802.11b:11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11a: 54/48/36/24/18/12/9/6Mbps
<b>FREQUENCY RANGE</b>	802.11b & 802.11g: 2412 ~ 2462MHz 802.11a: 5.18 ~ 5.24GHz , 5.745 ~ 5.825GHz
<b>NUMBER OF CHANNEL</b>	802.11b & 802.11g: 11 802.11a: 9
<b>CHANNEL SPACING</b>	802.11b & 802.11g: 5MHz 802.11a: 20MHz
<b>OUTPUT POWER</b>	802.11b: 138.038mW 802.11g: 245.471mW 802.11a: 31.696mW (For 5.18 ~ 5.24GHz) 802.11a: 251.189mW (For 5.745 ~ 5.825GHz)
<b>DATA CABLE</b>	NA
<b>ANTENNA TYPE</b>	Please see note 3 (on next page)
<b>I/O PORTS</b>	RS232 Port x 1, POE port x 1, DC power Port x 1
<b>ASSOCIATED DEVICES</b>	NA

#### NOTE:

1. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11b, 802.11g technology.

2. The EUT was operated with the following power adapter or POE(Power Over Ethernet):

<b>ADAPTER</b>	
<b>BRAND:</b>	PHIHONG
<b>MODEL:</b>	PSA 18U-480C
<b>INPUT:</b>	AC 100~240V, 0.5A, 50~60Hz
<b>OUTPUT:</b>	DC 48V, 0.38A , 1.5m/ nonshield/ with one core

<b>POE (for test only)</b>	
<b>BRAND:</b>	3Com
<b>MODEL:</b>	PW130
<b>INPUT:</b>	AC100-250V, 0.5A, 50/60Hz
<b>OUTPUT:</b>	DC 48V, 0.42A

3. There are four antennas provided to this EUT, please refer to the following table:

Model	Antenna Type	Gain (dBi)	Antenna Connector	Note
FDS_2FED01+I3G	Dual Band Antenna, Dipole	For 2.4GHz : 3 dBi	MMCX	Integral antenna
		For 5GHz : 5 dBi		
NA	Dipole	For 2.4GHz : 2 dBi	Reverse SMA	dedicated antenna
W1028	Dipole	For 5GHz : 2 dBi	Reverse SMA	

The model: FDS\_2FED01+I3G, the worse case one was chosen for final test.

4. 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 5150MHz ~ 5250MHz bands:

Four channels are provided to this EUT.

Channel	Frequency
1	5180 MHz
2	5200 MHz
3	5220 MHz
4	5240 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 4	4	OFDM	BPSK	6

- EUT was tested with the following test modes:

Test Mode	Power
Mode 1	With Adapter
Mode 2	With POE

#### **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 4	1	OFDM	BPSK	6

- EUT was pre-tested in chamber as the following test modes:

Test Mode	Power
Mode 1	With Adapter
Mode 2	With POE

**Mode 1**, the worst case one, was chosen for final test.

### **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 4	1, 2, 4	OFDM	BPSK	6

- EUT was pre-tested in chamber as the following test modes:

Test Mode	Power
Mode 1	With Adapter
Mode 2	With POE

**Mode 1**, the worst case one, was chosen for final test.

### **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 4	1, 4	OFDM	BPSK	6

### **Antenna Port Conducted Measurement:**

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	1 to 4	1, 2, 4	OFDM	BPSK	6

### **3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS**

The EUT is a HiveAP 20 ag. 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.

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



### 3.4 DESCRIPTION OF SUPPORT UNITS

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

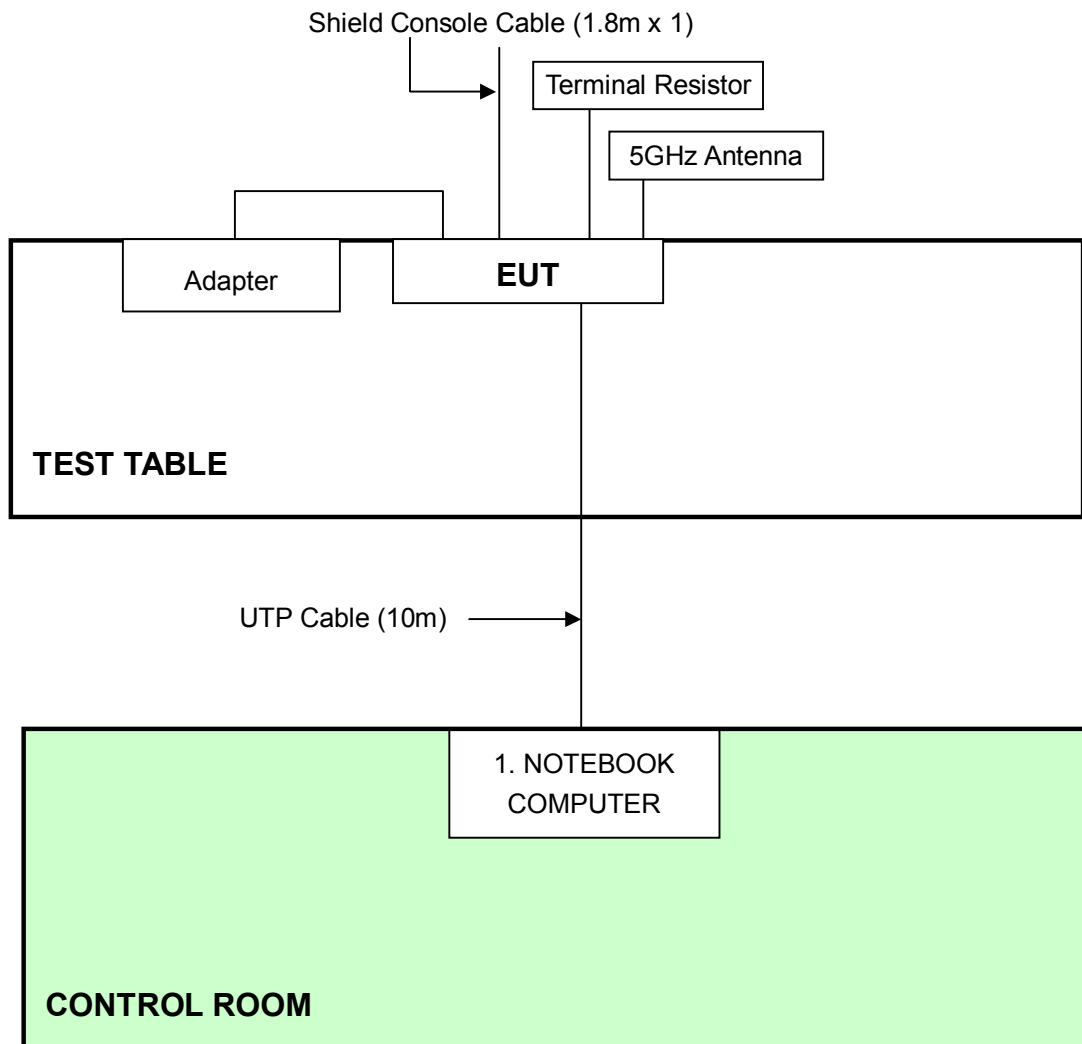
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP01L	TW-09c748-12800 -165-3171	FCC DoC
2	Terminal Resistor	SUHNER	50 Ohm	NA	NA

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

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

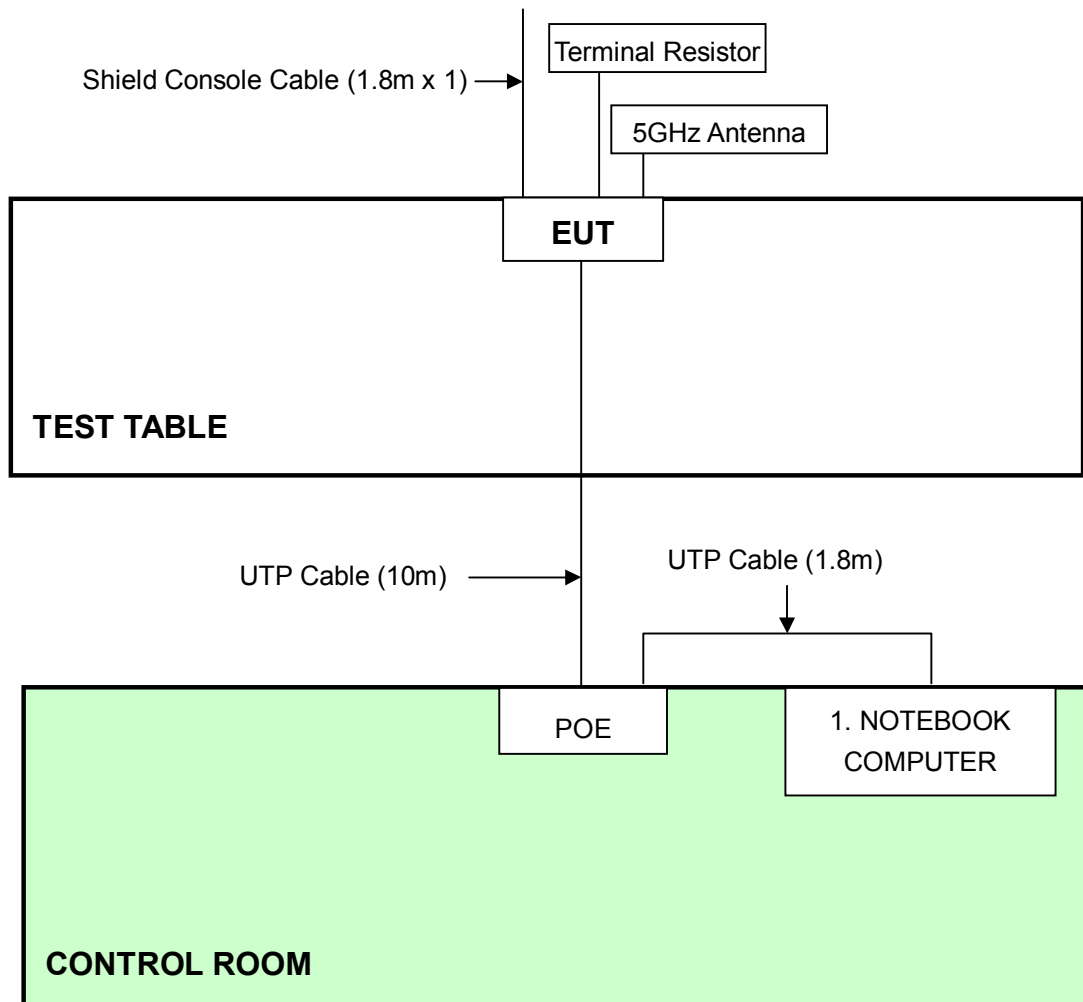
### 3.5 CONFIGURATION OF SYSTEM UNDER TEST

With ADAPTER: (5GHz Band)



**NOTE:** 1. Support unit 1 was kept in the control room during the test.

**With POE : (5GHz Band)**



**NOTE:** 1. Support unit 1 was kept in the control room during the test.

## 4. TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ 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. 10, 2009
Line-Impedance Stabilization Network(for EUT)	KNW-407	8-1395-12	Aug. 19, 2008
Line-Impedance Stabilization Network(for Peripheral)	ENV-216	100072	Nov. 08, 2008
RF Cable (JETBAO)	RG5B/U-6m	COACAB-9KHz-3 0MHz	Aug. 15, 2008
50 ohms Terminator	50	3	Nov. 15, 2008
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.



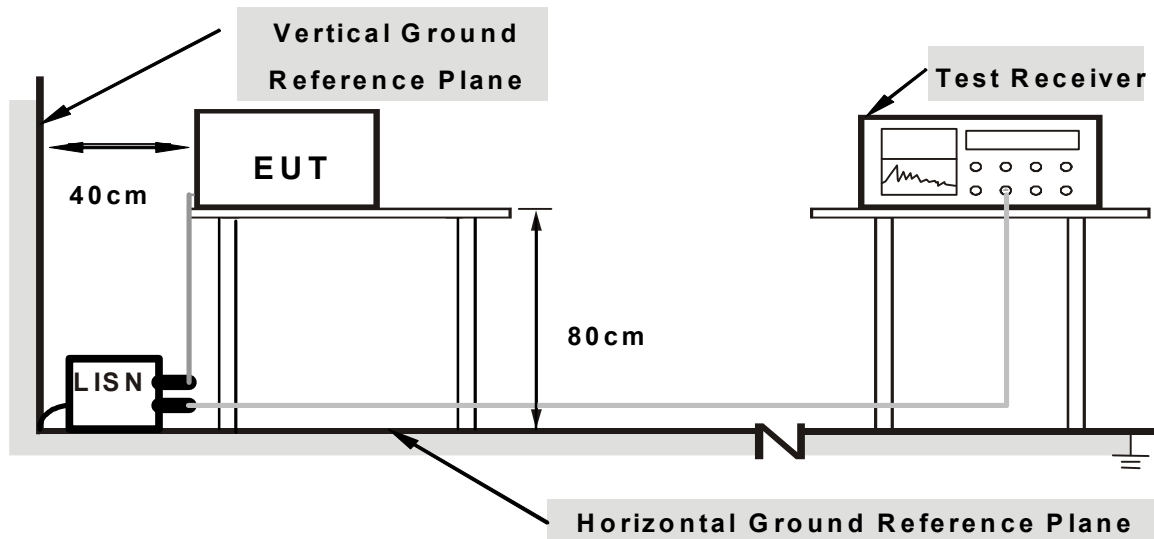
#### 4.1.3 TEST PROCEDURES

- 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 provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission 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 other computer systems to act as a communication partner and placed them outside of testing area.
- c. The communication partner run test program “ART48 Build 10” to enable EUT under transmission/receiving condition continuously at specific channel frequency via UTP cable.

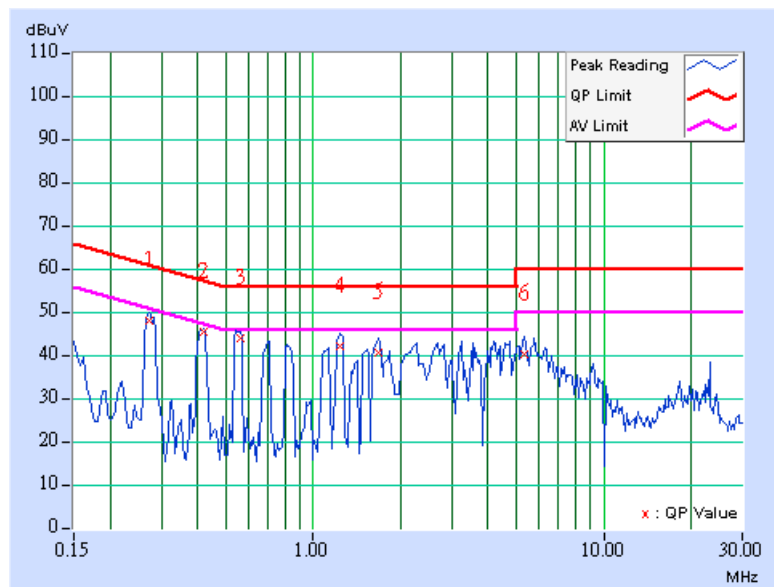
#### 4.1.7 TEST RESULTS

##### Conducted Worst-Case Data

<b>TEST MODE</b>	With Adapter	<b>6dB BANDWIDTH</b>	9 kHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120VAC, 60 HZ	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 980hPa	<b>TESTED BY</b>	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	0.271	0.60	47.17	-	47.77	-	61.08	51.08	-13.31	-
2	0.420	0.60	44.63	-	45.23	-	57.46	47.46	-12.22	-
3	0.560	0.63	43.18	-	43.81	-	56.00	46.00	-12.19	-
4	1.236	0.70	41.45	-	42.15	-	56.00	46.00	-13.85	-
5	1.677	0.70	39.75	-	40.45	-	56.00	46.00	-15.55	-
6	5.316	0.94	39.54	-	40.48	-	60.00	50.00	-19.52	-

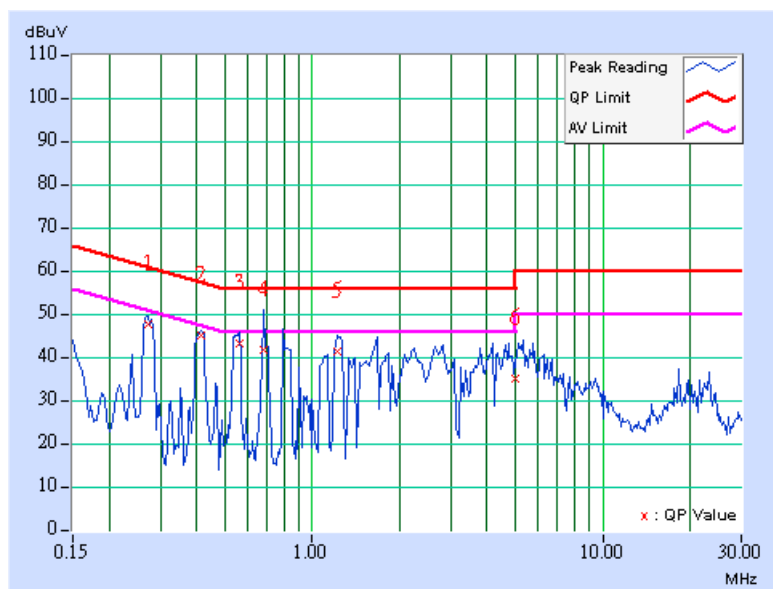
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>TEST MODE</b>	With Adapter	<b>6dB BANDWIDTH</b>	9 kHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 980hPa	<b>TESTED BY</b>	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	0.271	0.40	46.89	-	47.29	-	61.08	51.08	-13.79	-
2	0.416	0.41	44.43	-	44.84	-	57.54	47.54	-12.70	-
3	0.564	0.45	42.60	-	43.05	-	56.00	46.00	-12.95	-
4	0.681	0.49	41.05	-	41.54	-	56.00	46.00	-14.46	-
5	1.228	0.60	40.69	-	41.29	-	56.00	46.00	-14.71	-
6	5.000	0.87	34.46	-	35.33	-	56.00	46.00	-20.67	-

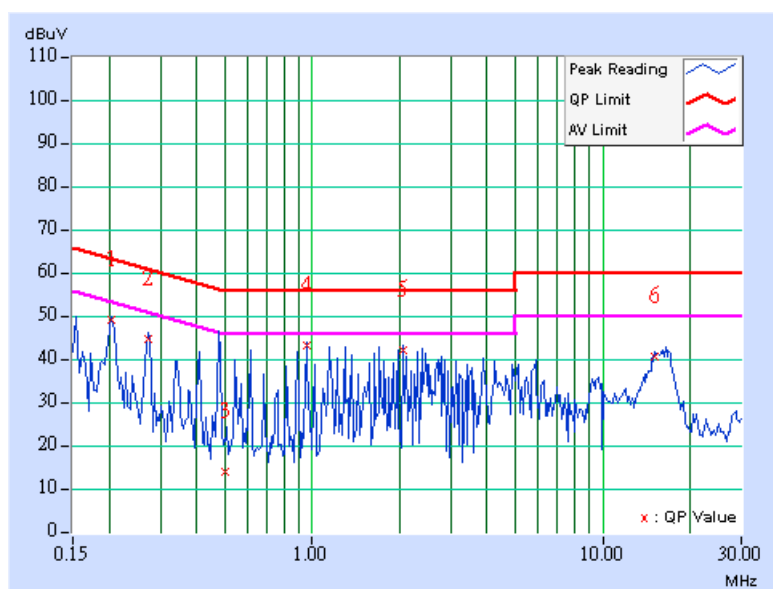
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>TEST MODE</b>	With POE	<b>6dB BANDWIDTH</b>	9 kHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120VAC, 60 HZ	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 980hPa	<b>TESTED BY</b>	Eric Lee

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	0.205	9.80	39.08	-	48.88	-	63.42
2	0.271	9.80	34.87	-	44.67	-	61.08	51.08	-16.41	-
3	0.500	9.82	3.84	-	13.66	-	56.00	46.00	-42.34	-
4	0.955	9.89	33.08	-	42.97	-	56.00	46.00	-13.03	-
5	2.045	9.90	32.13	-	42.03	-	56.00	46.00	-13.97	-
6	15.141	10.10	30.73	-	40.83	-	60.00	50.00	-19.17	-

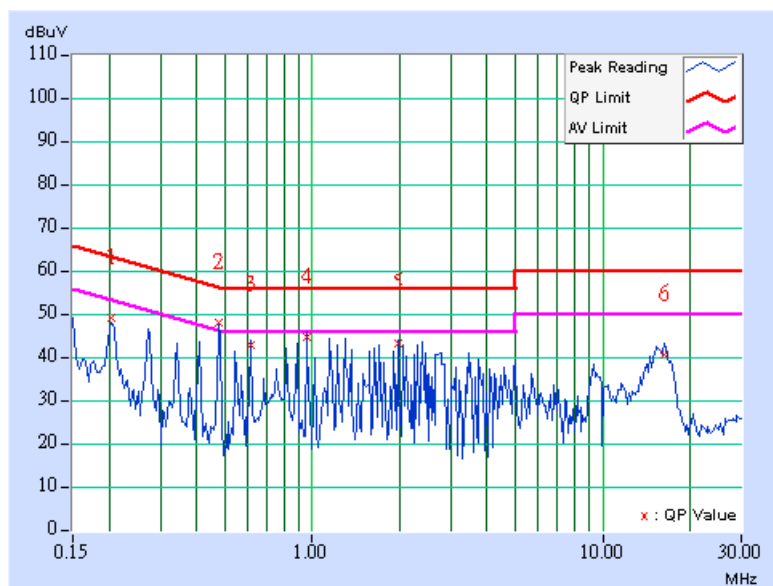
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>TEST MODE</b>	With POE	<b>6dB BANDWIDTH</b>	9 kHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 980hPa	<b>TESTED BY</b>	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	0.205	9.80	38.91	-	48.71	-	63.42	53.42	-14.71	-
2	0.478	9.81	37.75	34.68	47.56	44.49	56.37	46.37	-8.81	-1.88
3	0.615	9.84	32.53	-	42.37	-	56.00	46.00	-13.63	-
4	0.955	9.89	34.41	-	44.30	-	56.00	46.00	-11.70	-
5	1.978	10.00	32.91	-	42.91	-	56.00	46.00	-13.09	-
6	16.383	10.26	30.34	-	40.60	-	60.00	50.00	-19.40	-

- 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 $\mu$ V/m) *note 3
5150~5250	-27	68.3
5250~5350	-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 15, 2008
HP Pre_Amplifier	8449B	3008A01922	Oct. 04, 2008
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Mar. 31, 2009
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	July 26, 2008
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 16, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 27, 2009
RF Switches (ARNITSU)	CS-201	1565157	Aug. 13, 2008
RF CABLE (Chaintek)	SF102	22054-2	Dec. 06. 2008
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Aug. 13, 2008
Software	ADT_Radiated_V 7.6.15.8	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 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 3789C-3.

#### 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 10-meter open field site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB 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 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

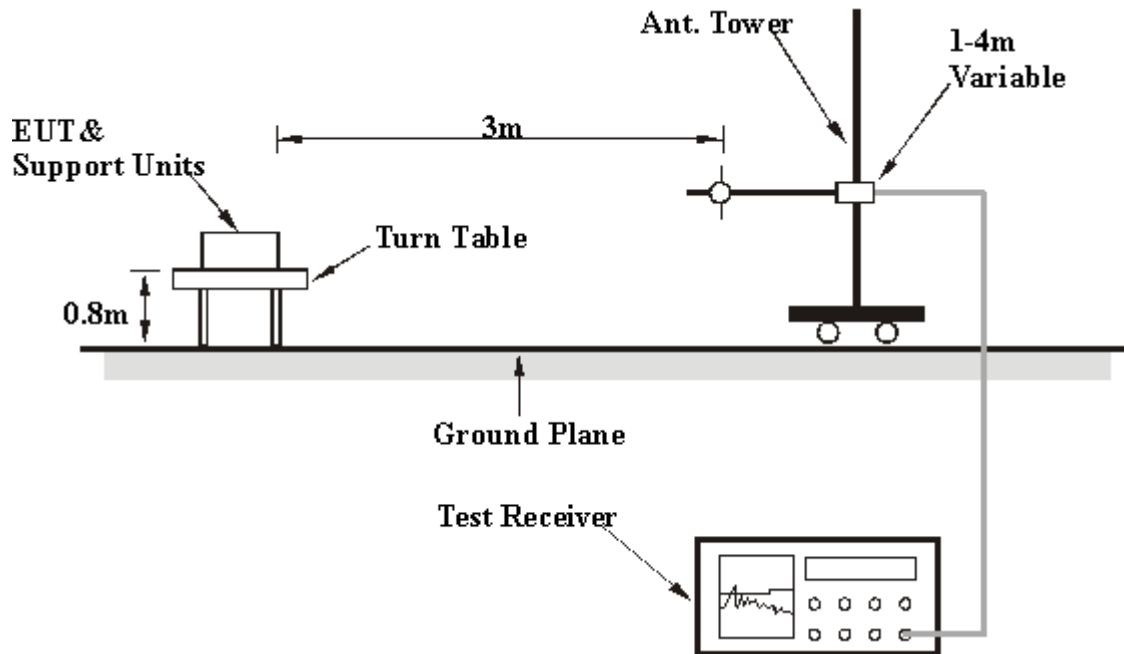
**NOTE:**

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.

#### 4.2.5 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

Same as 4.1.6

#### 4.2.8 TEST RESULTS

##### Below 1GHz Worst-Case Data

<b>TEST MODE</b>	With Adapter	<b>FREQUENCY RANGE</b>	Below 1000MHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 72%RH, 980hPa	<b>TESTED BY</b>	Sky Liao

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	109.99	24.68 QP	43.50	-18.82	1.83 H	54	12.69	11.99
2	125.00	28.04 QP	43.50	-15.46	1.31 H	273	14.81	13.23
3	144.71	27.67 QP	43.50	-15.83	1.57 H	316	13.14	14.53
4	200.00	25.86 QP	43.50	-17.64	1.62 H	306	13.83	12.03
5	300.00	27.50 QP	46.00	-18.50	1.00 H	314	10.91	16.59
6	450.00	28.10 QP	46.00	-17.90	1.00 H	82	8.22	19.88
7	500.00	32.21 QP	46.00	-13.79	1.64 H	296	11.16	21.05
8	600.00	32.30 QP	46.00	-13.70	1.30 H	183	8.76	23.54
9	800.00	36.39 QP	46.00	-9.61	1.74 H	334	8.34	28.05
10	900.00	37.27 QP	46.00	-8.73	1.47 H	7	7.60	29.67

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	110.00	26.19 QP	43.50	-17.31	1.00 V	312	14.20	12.00
2	125.00	30.60 QP	43.50	-12.90	1.00 V	149	17.37	13.23
3	144.71	29.41 QP	43.50	-14.09	1.00 V	128	14.88	14.53
4	200.00	26.10 QP	43.50	-17.40	1.00 V	228	14.07	12.03
5	300.00	26.94 QP	46.00	-19.06	1.00 V	197	10.35	16.59
6	450.00	27.28 QP	46.00	-18.72	1.12 V	79	7.40	19.88
7	500.00	32.15 QP	46.00	-13.85	1.00 V	0	11.10	21.05
8	600.00	30.86 QP	46.00	-15.14	1.00 V	190	7.32	23.54
9	800.00	35.45 QP	46.00	-10.55	1.19 V	1	7.40	28.05
10	899.99	39.69 QP	46.00	-6.31	1.05 V	205	10.02	29.67

- 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

<b>CHANNEL</b>	Channel 1	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	18deg. C, 60%RH, 980hPa	<b>TESTED BY</b>	Rex Huang

### 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	58.42 PK	74.00	-15.58	1.40 H	325	22.18	36.24
2	#5150.00	44.87 AV	54.00	-9.13	1.40 H	325	8.63	36.24
3	*5180.00	100.50 PK			1.40 H	305	64.22	36.28
4	*5180.00	89.20 AV			1.40 H	305	52.92	36.28
5	10360.00	56.50 PK	88.30	-31.80	1.32 H	302	10.60	45.90
6	10360.00	42.50 AV	68.30	-25.80	1.32 H	302	-3.40	45.90

### 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	#5150.00	71.50 PK	74.00	-2.50	1.15 V	125	35.26	36.24
<b>2</b>	<b>#5150.00</b>	<b>53.33 AV</b>	<b>54.00</b>	<b>-0.67</b>	<b>1.15 V</b>	<b>125</b>	<b>17.09</b>	<b>36.24</b>
3	*5180.00	113.20 PK			1.13 V	122	76.92	36.28
4	*5180.00	101.50 AV			1.13 V	122	65.22	36.28
5	10360.00	56.20 PK	88.30	-32.10	1.18 V	118	10.30	45.90
6	10360.00	42.40 AV	68.30	-25.90	1.18 V	118	-3.50	45.90

- 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.

<b>CHANNEL</b>	Channel 2	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	18deg. C, 60%RH, 980hPa	<b>TESTED BY</b>	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	*5200.00	103.80 PK			1.30 H	306	67.50	36.30
2	*5200.00	92.20 AV			1.30 H	306	55.90	36.30
3	10400.00	57.40 PK	88.30	-30.90	1.28 H	312	11.43	45.97
4	10400.00	43.20 AV	68.30	-25.10	1.28 H	312	-2.77	45.97

#### 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	*5200.00	115.50 PK			1.10 V	75	79.20	36.30
2	*5200.00	104.00 AV			1.10 V	75	67.70	36.30
3	10400.00	57.00 PK	88.30	-31.30	1.25 V	20	11.03	45.97
4	10400.00	43.00 AV	68.30	-25.30	1.25 V	20	-2.97	45.97

- 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.

<b>CHANNEL</b>	Channel 4	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	18deg. C, 60%RH, 980hPa	<b>TESTED BY</b>	Rex Huang

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

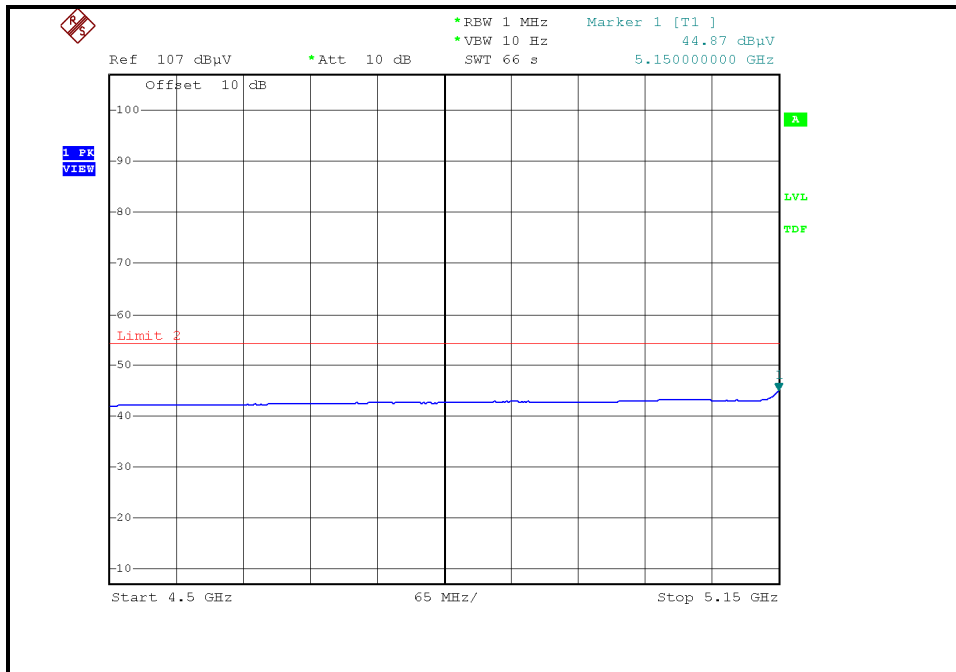
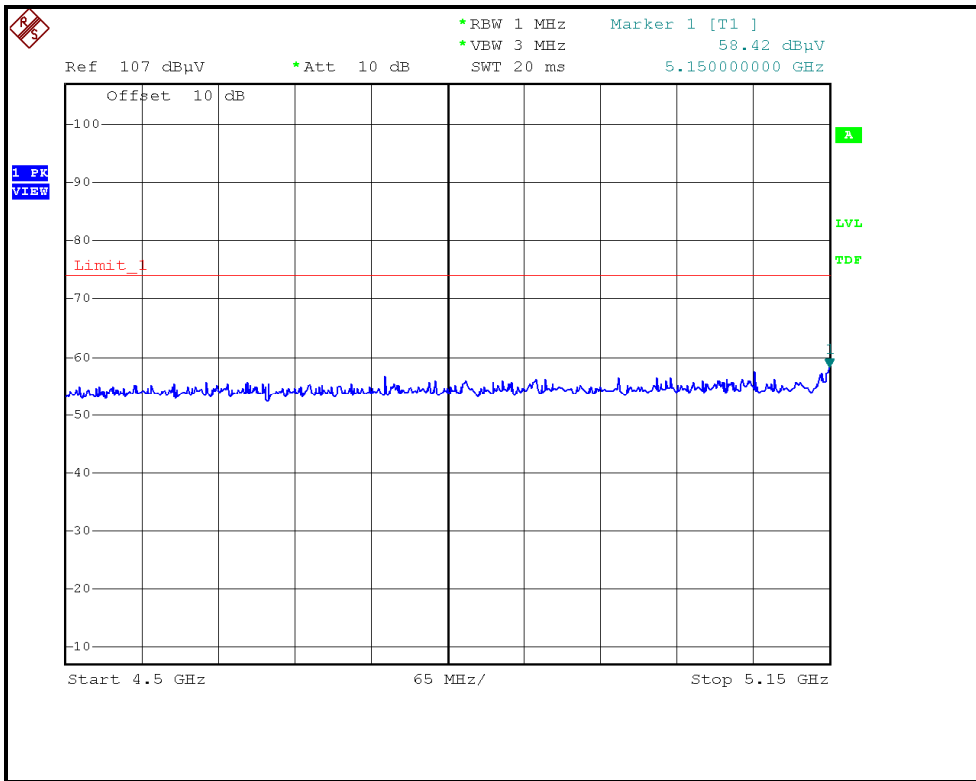
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	103.50 PK			1.27 H	305	67.15	36.35
2	*5240.00	91.80 AV			1.27 H	305	55.45	36.35
3	#5350.00	56.06 PK	74.00	-17.94	1.27 H	305	19.58	36.48
4	#5350.00	43.17 AV	54.00	-10.83	1.27 H	305	6.69	36.48
5	10480.00	57.50 PK	88.30	-30.80	1.22 H	308	11.39	46.11
6	10480.00	43.00 AV	68.30	-25.30	1.22 H	308	-3.11	46.11

#### 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	*5240.00	115.00 PK			1.10 V	72	78.65	36.35
2	*5240.00	103.70 AV			1.10 V	72	67.35	36.35
3	#5350.00	57.46 PK	74.00	-16.54	1.10 V	72	20.98	36.48
4	#5350.00	45.36 AV	54.00	-8.64	1.10 V	72	8.88	36.48
5	10480.00	57.20 PK	88.30	-31.10	1.06 V	75	11.09	46.11
6	10480.00	42.80 AV	68.30	-25.50	1.06 V	75	-3.31	46.11

- 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.

RESTRICTED BANDEDGE (802.11a MODE, CH1, HORIZONTAL)











### 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
5.725 – 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	July 11, 2008

**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.

### 4.3.3 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:**

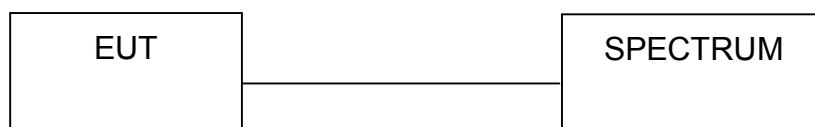
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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

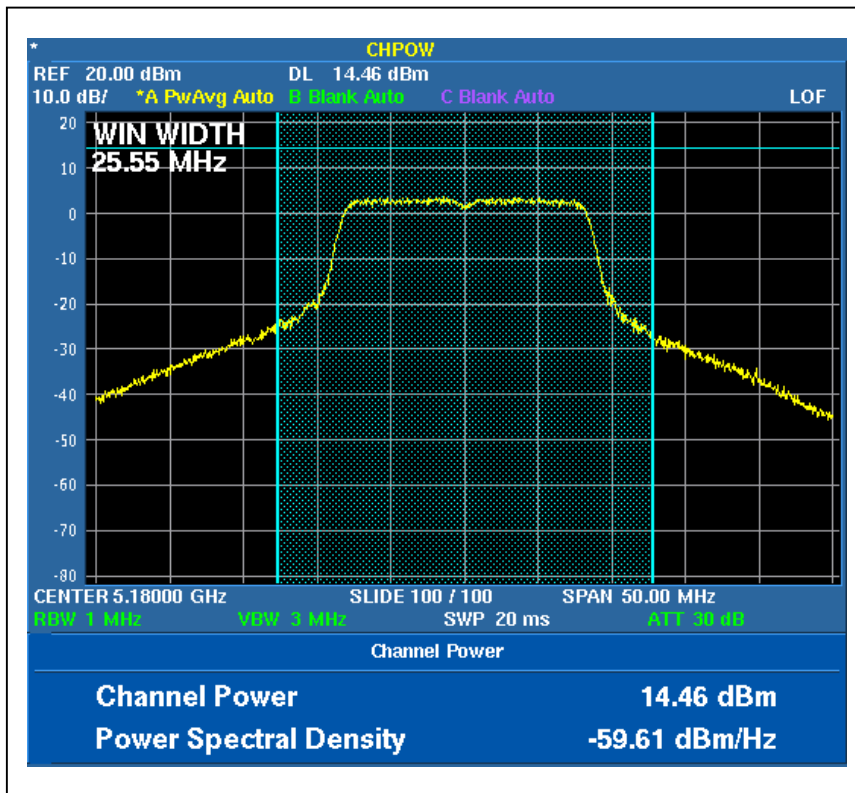
##### 802.11a OFDM modulation

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 60%RH, 980hPa
<b>TESTED BY</b>	Rex Huang		

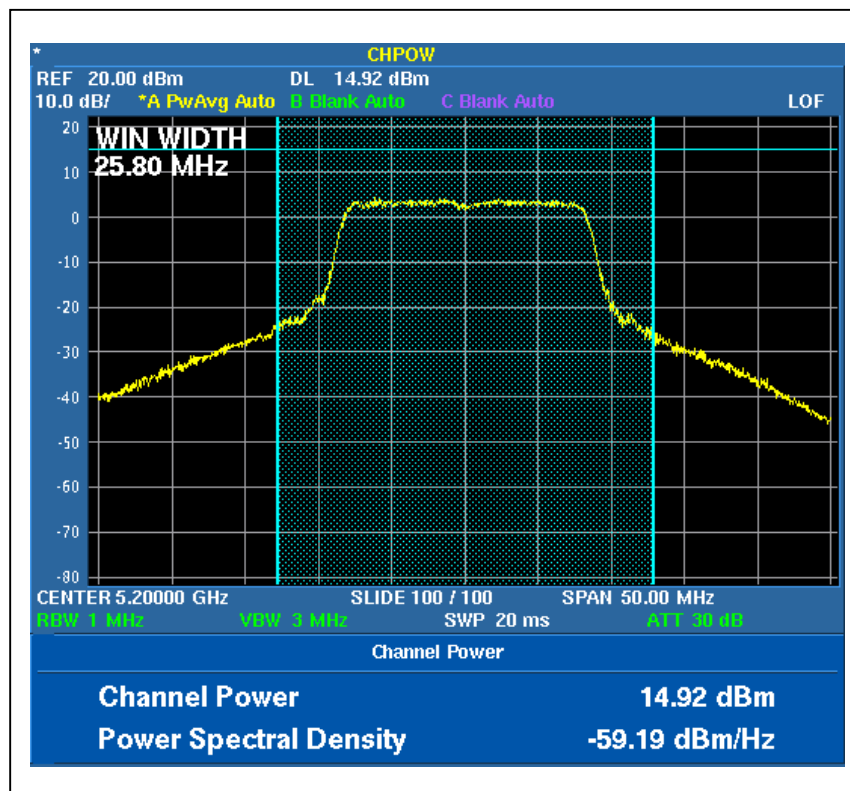
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	14.46	27.925	17	25.55	PASS
2	5200	14.92	31.046	17	25.80	PASS
4	5240	15.01	31.696	17	26.26	PASS

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

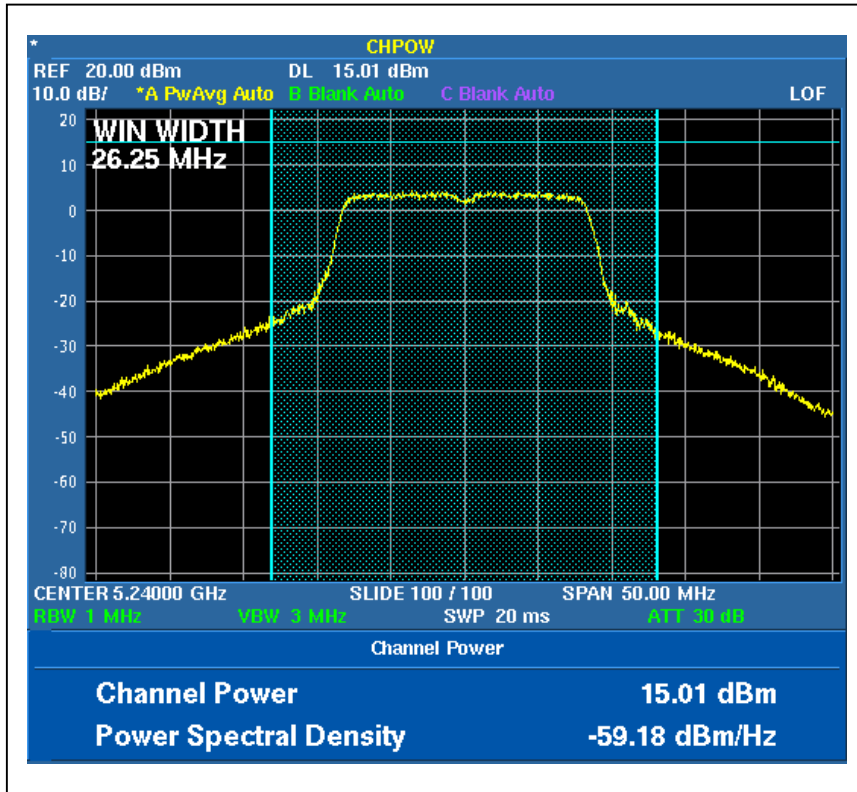
Peak Power Output:  
CH1



CH2

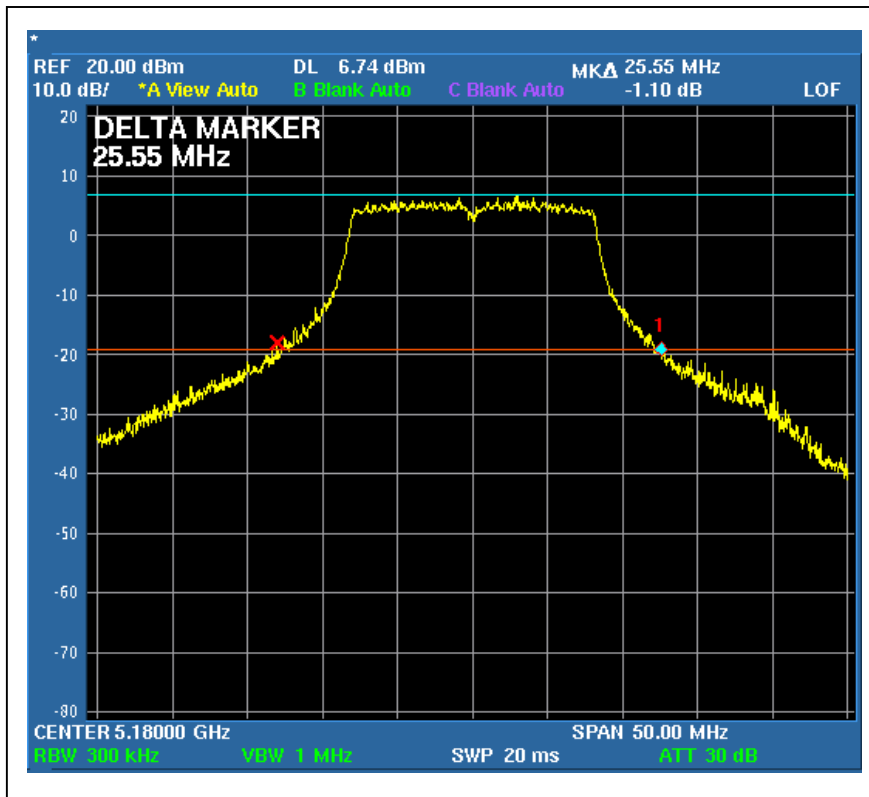


CH4

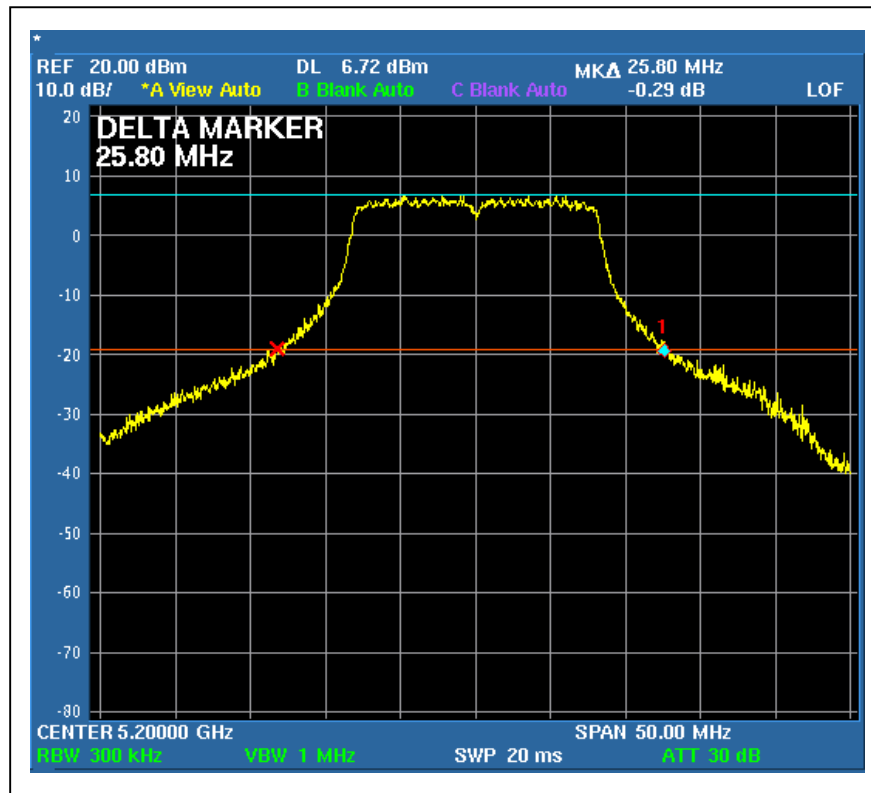




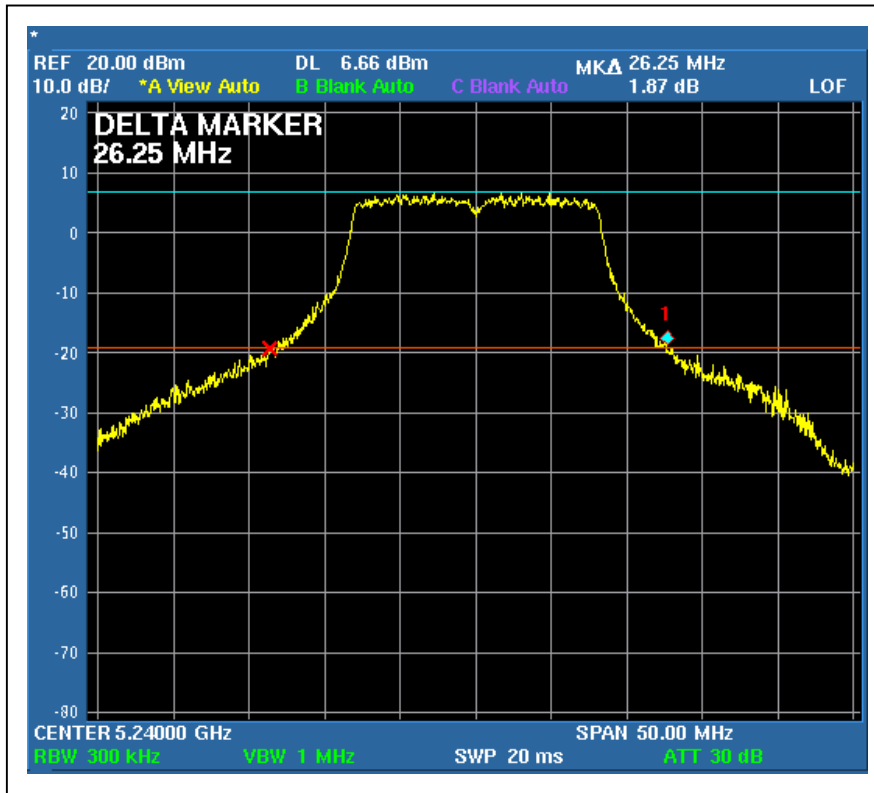
26dB Occupied Bandwidth:  
CH1



CH2



CH4



#### 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
5.725 – 5.825 GHz	13dB

##### 4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ADVANTEST SPECTRUM ANALYZER	U3772	160100280	July 11, 2008

**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.

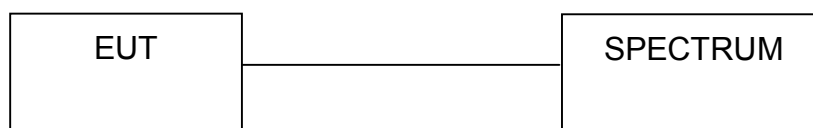
#### 4.4.3 TEST PROCEDURE

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.



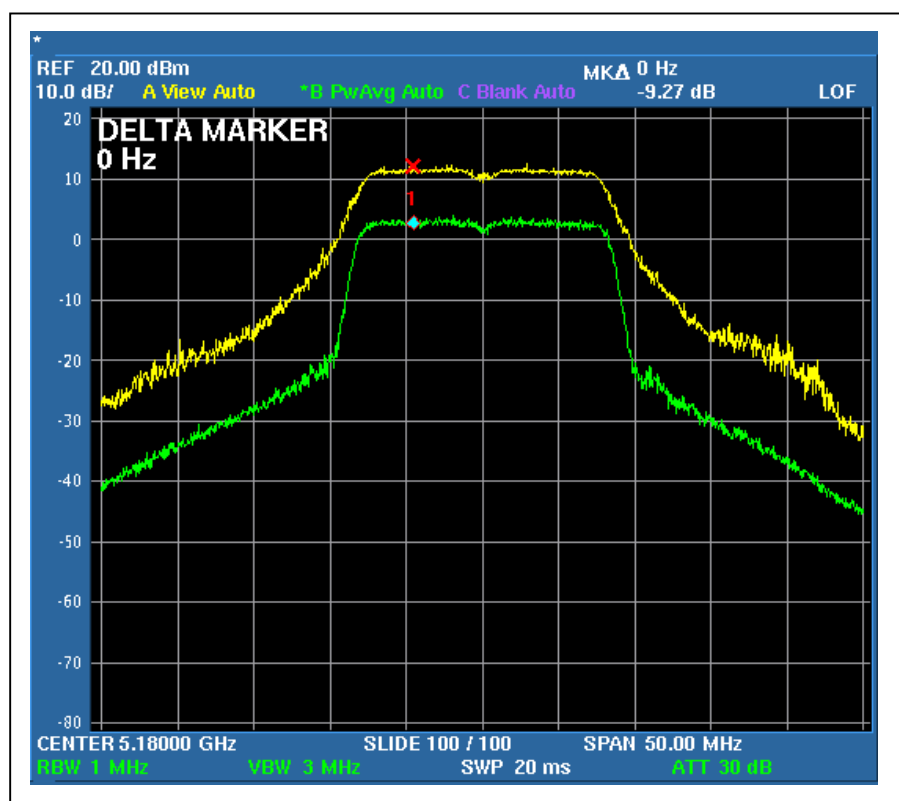
#### 4.4.7 TEST RESULTS

##### 802.11a OFDM modulation

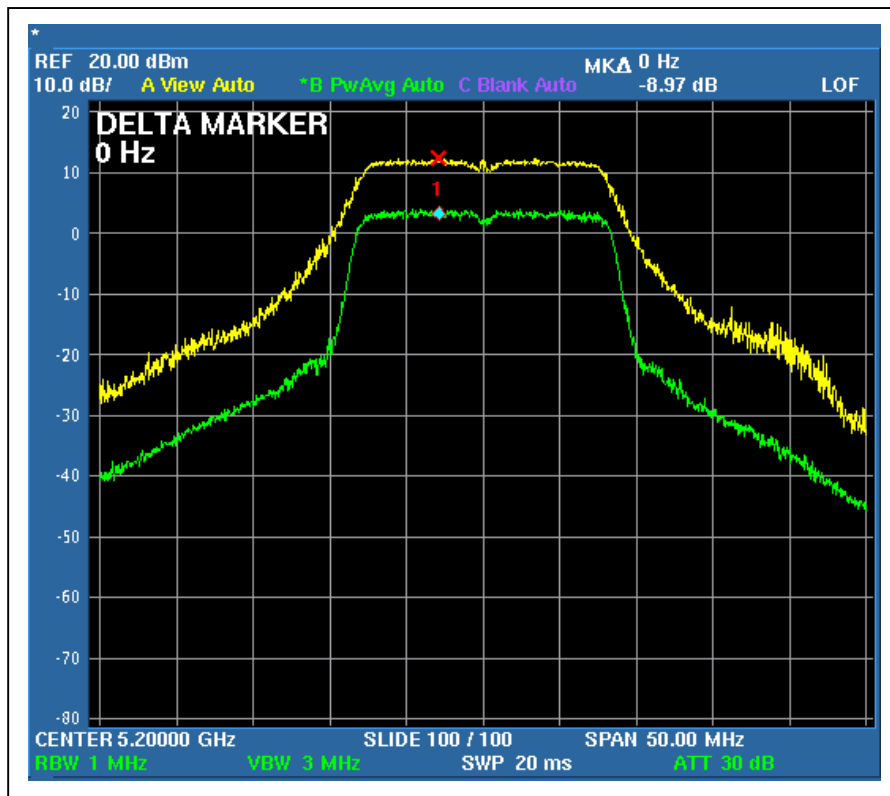
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	20deg.C, 60%RH, 980hPa
<b>TESTED BY</b>	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5180	-9.27	13	PASS
2	5200	-8.97	13	PASS
4	5240	-9.87	13	PASS

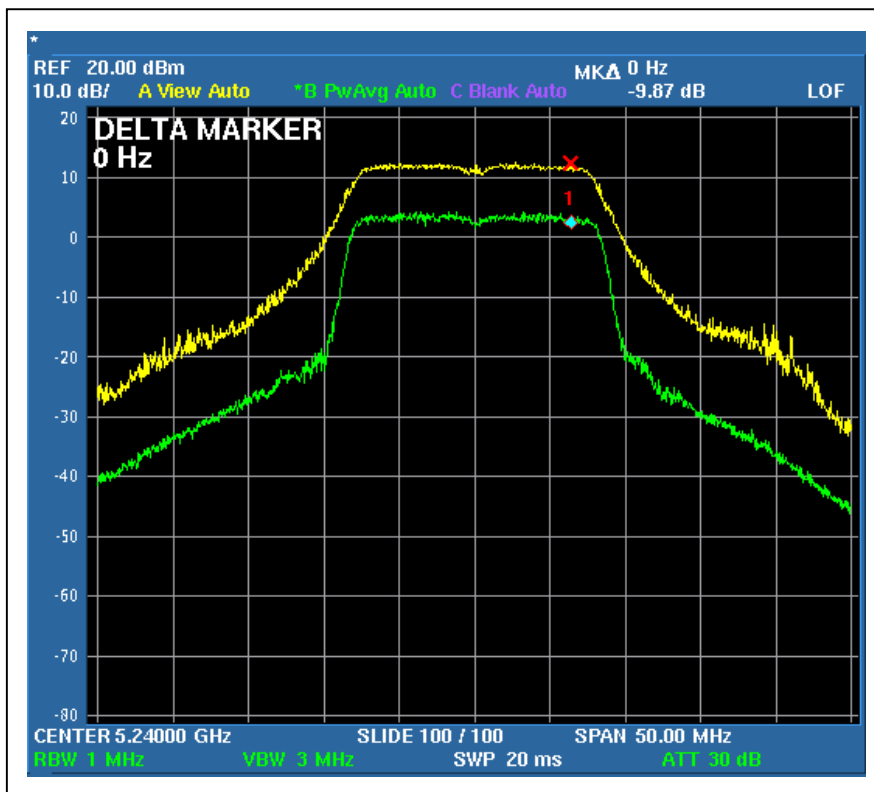
CH1



CH2



CH4



## 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
5.725 ~ 5.825GHz	17dBm

### 4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ADVANTEST SPECTRUM ANALYZER	U3772	160100280	July 11, 2008

**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.

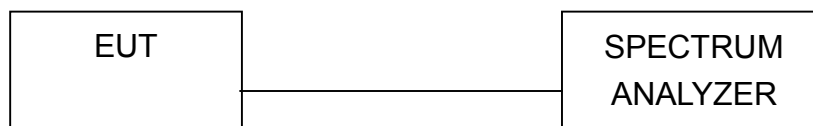
#### 4.5.3 TEST PROCEDURES

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



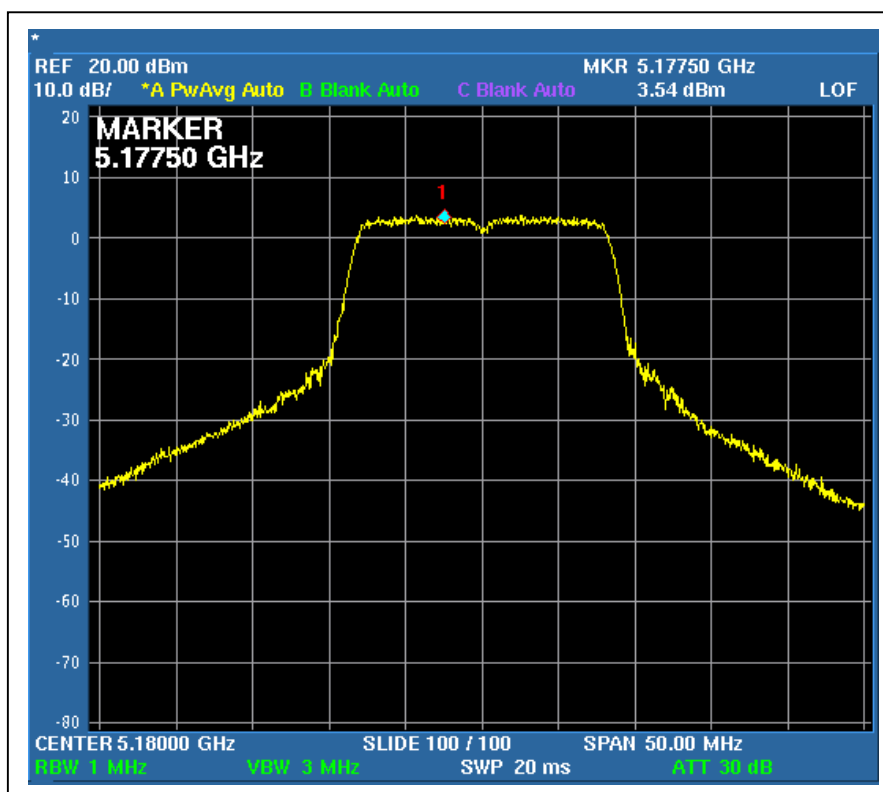
## 4.5.7 TEST RESULTS

### 802.11a OFDM modulation

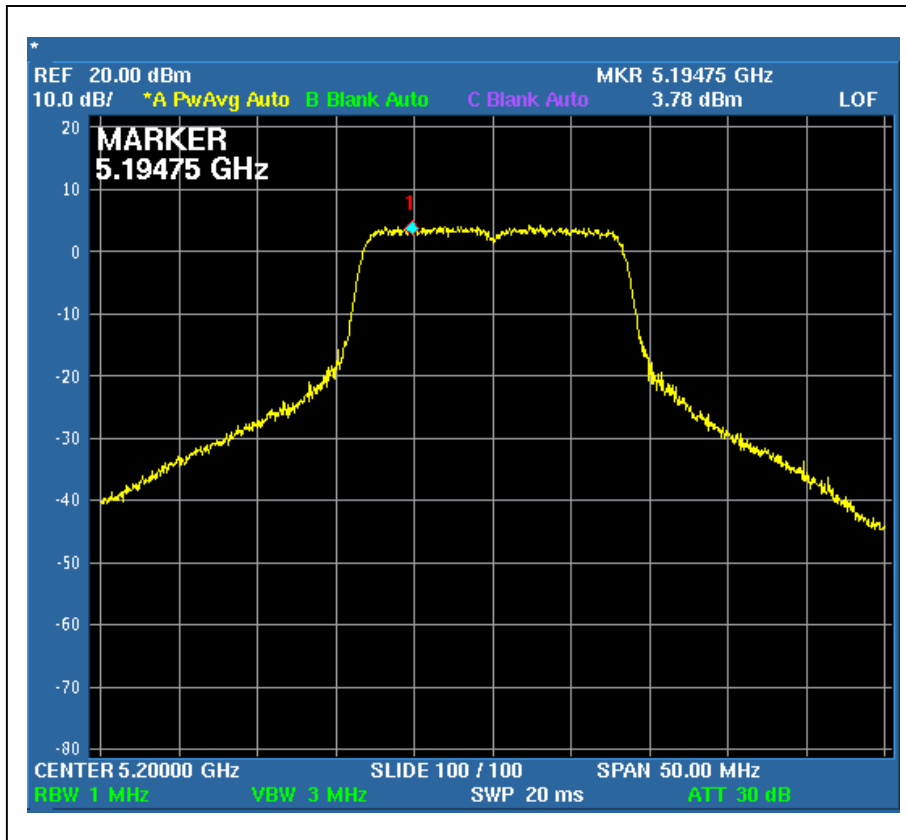
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 60%RH, 980hPa
<b>TESTED BY</b>	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	3.54	4	PASS
2	5200	3.78	4	PASS
4	5240	3.80	4	PASS

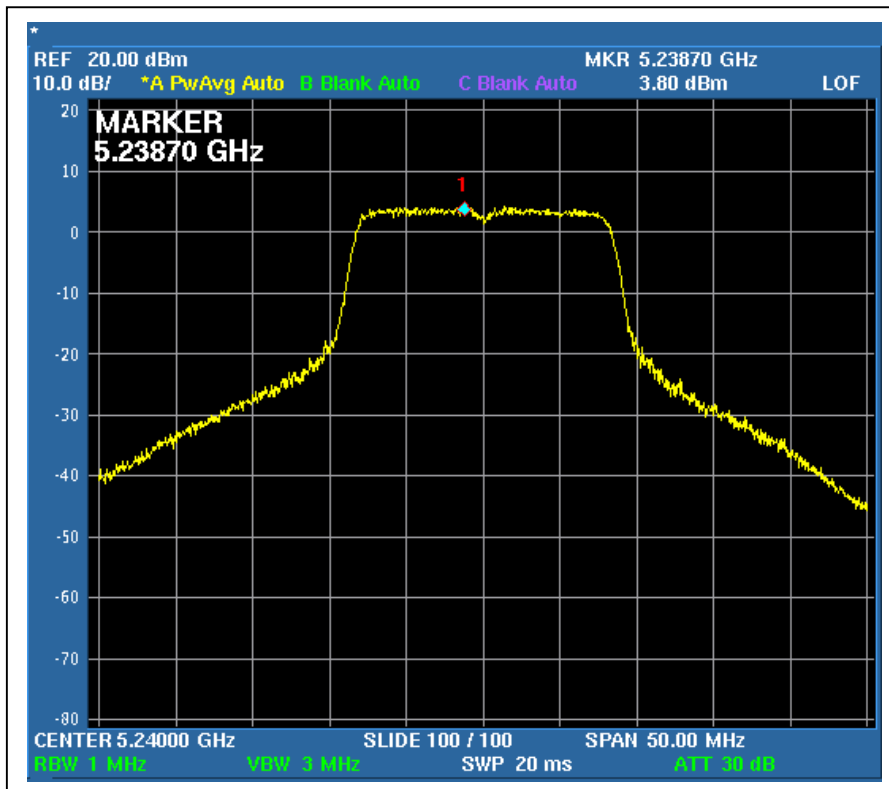
CH1



CH2



CH4



## 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	100036	Dec. 17, 2008

#### 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.

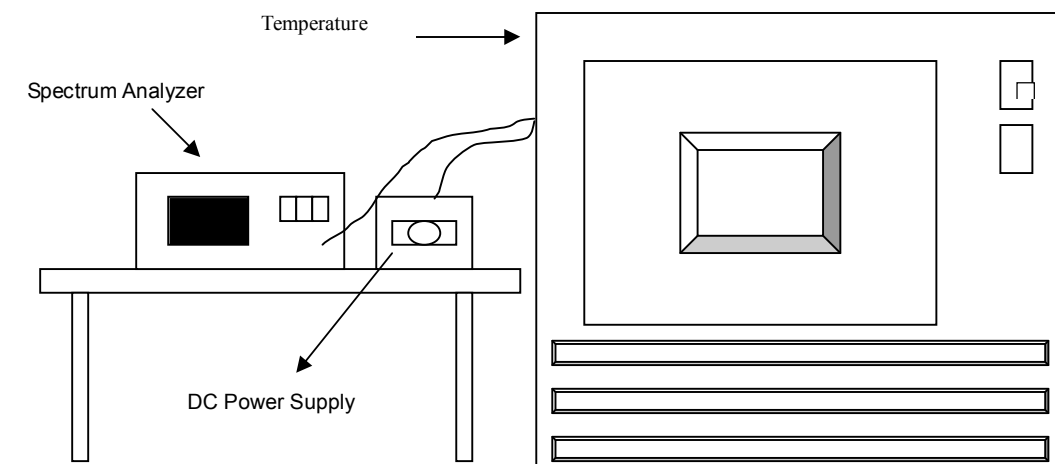
### 4.6.3 TEST PROCEDURE

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	5180.0143	0.000276	5180.0138	0.000266	5180.0086	0.000166
	110	5180.0147	0.000284	5180.0138	0.000266	5180.0116	0.000224
	93.5	5180.0150	0.000290	5180.0138	0.000266	5180.0076	0.000147
40	126.5	5179.9763	0.000458	5179.976	0.000463	5179.9755	0.000473
	110	5179.9761	0.000461	5179.976	0.000463	5179.9757	0.000469
	93.5	5179.9762	0.000459	5179.976	0.000463	5179.9755	0.000473
30	126.5	5179.9913	0.000168	5179.9909	0.000176	5179.9904	0.000185
	110	5179.9916	0.000162	5179.991	0.000174	5179.9908	0.000178
	93.5	5179.9915	0.000164	5179.9909	0.000176	5179.9904	0.000185
20	126.5	5179.9962	0.000073	5179.9962	0.000073	5179.9958	0.000081
	110	5179.9964	0.000069	5179.9962	0.000073	5179.9958	0.000081
	93.5	5179.9963	0.000071	5179.9962	0.000073	5179.9957	0.000083
10	126.5	5179.9724	0.000533	5179.9719	0.000542	5179.9812	0.000363
	110	5179.9725	0.000531	5179.972	0.000541	5179.9812	0.000363
	93.5	5179.9822	0.000344	5179.9819	0.000349	5179.9815	0.000357
0	126.5	5180.0071	0.000137	5180.0068	0.000131	5180.0016	0.000031
	110	5180.0072	0.000139	5180.0068	0.000131	5180.0046	0.000089
	93.5	5180.0054	0.000104	5180.0048	0.000093	5180.0016	0.000031
-10	126.5	5180.0144	0.000278	5180.0144	0.000278	5180.0126	0.000243
	110	5180.0142	0.000274	5180.0142	0.000274	5180.0146	0.000282
	93.5	5180.014	0.000270	5180.0142	0.000274	5180.0116	0.000224
-20	126.5	5179.9956	0.000085	5179.9954	0.000089	5179.9947	0.000102
	110	5179.9957	0.000083	5179.9954	0.000089	5179.9949	0.000098
	93.5	5179.9958	0.000081	5179.9954	0.000089	5179.9947	0.000102
-30	126.5	5180.0205	0.000396	5180.0202	0.000390	5180.0203	0.000392
	110	5180.0204	0.000394	5180.0202	0.000390	5180.0202	0.000390
	93.5	5180.0207	0.000400	5180.0204	0.000394	5180.02	0.000386

## 4.7 BAND EDGES MEASUREMENT

### 4.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 17, 2008

**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.

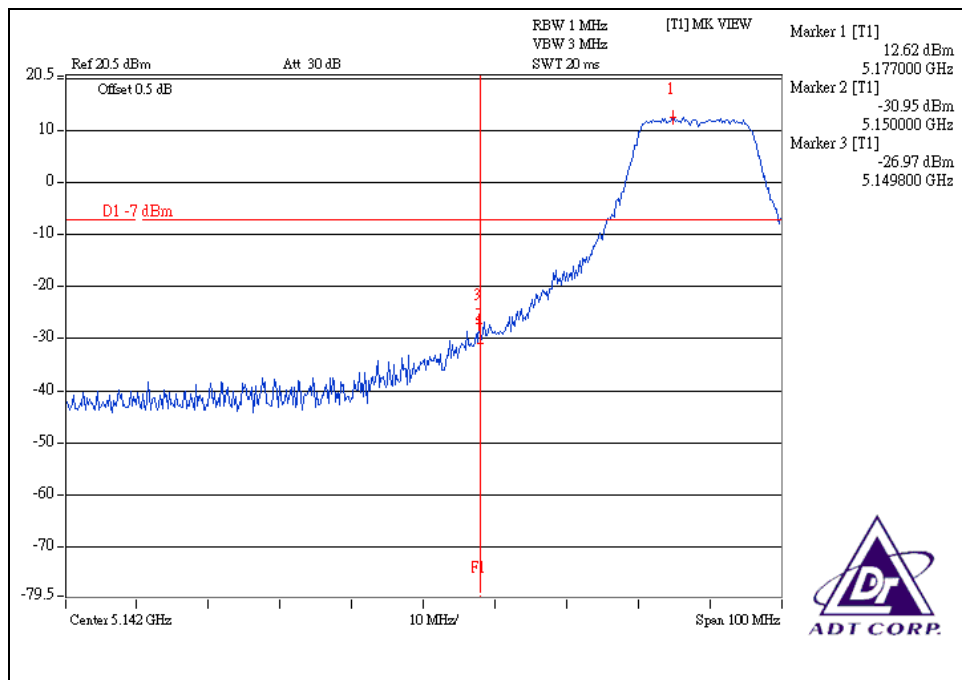
#### 4.7.4 TEST RESULTS

For 5.15 to 5.25GHz band:

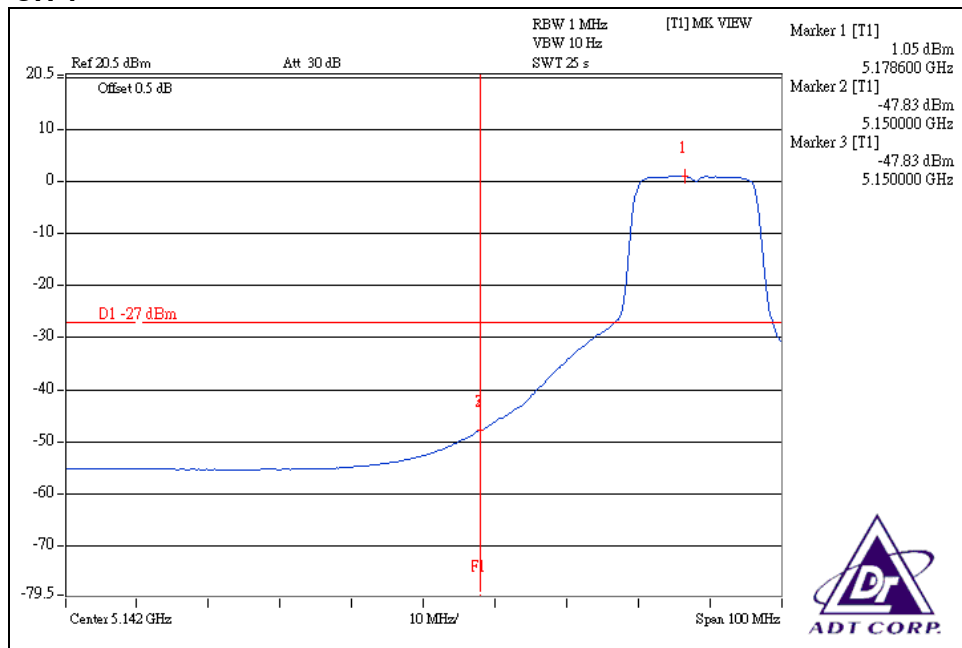
The spectrum plots (Peak RBW=1MHz, VBW=3MHz; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

## 802.11a OFDM modulation

### CH 1

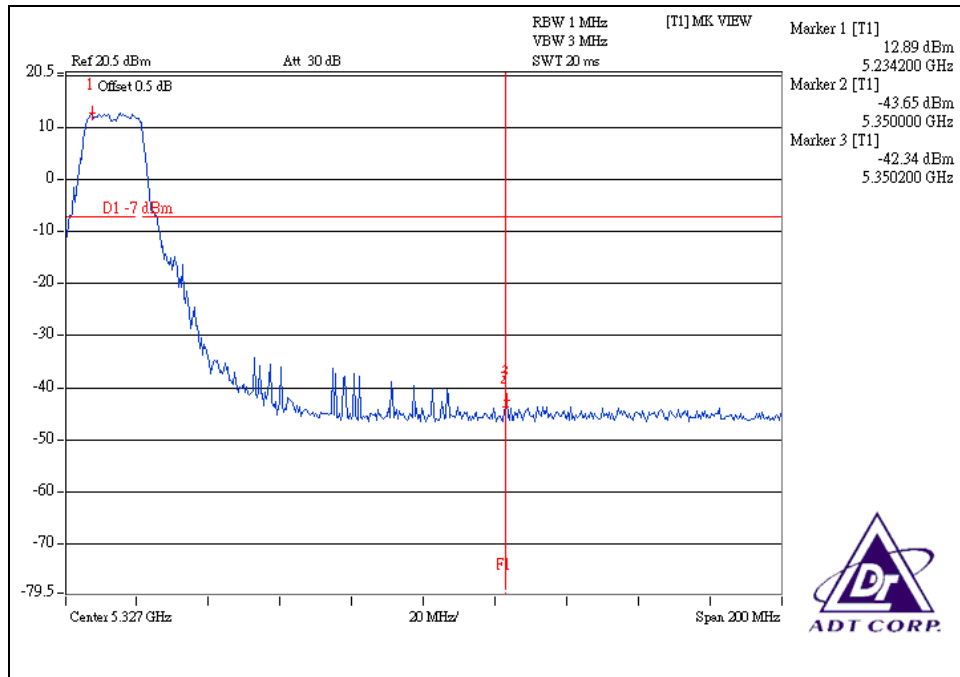


### CH 1

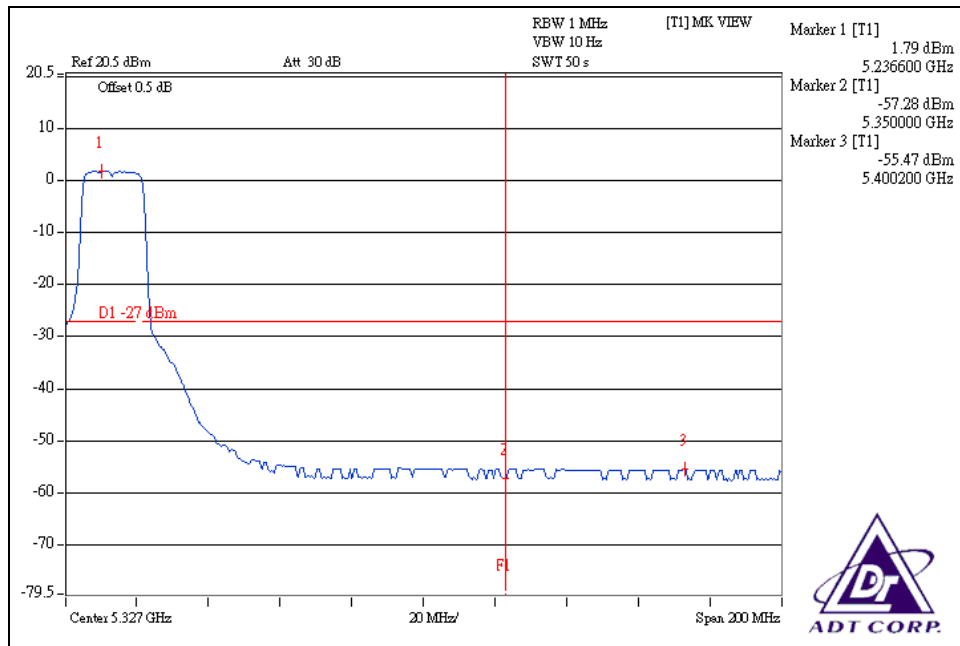




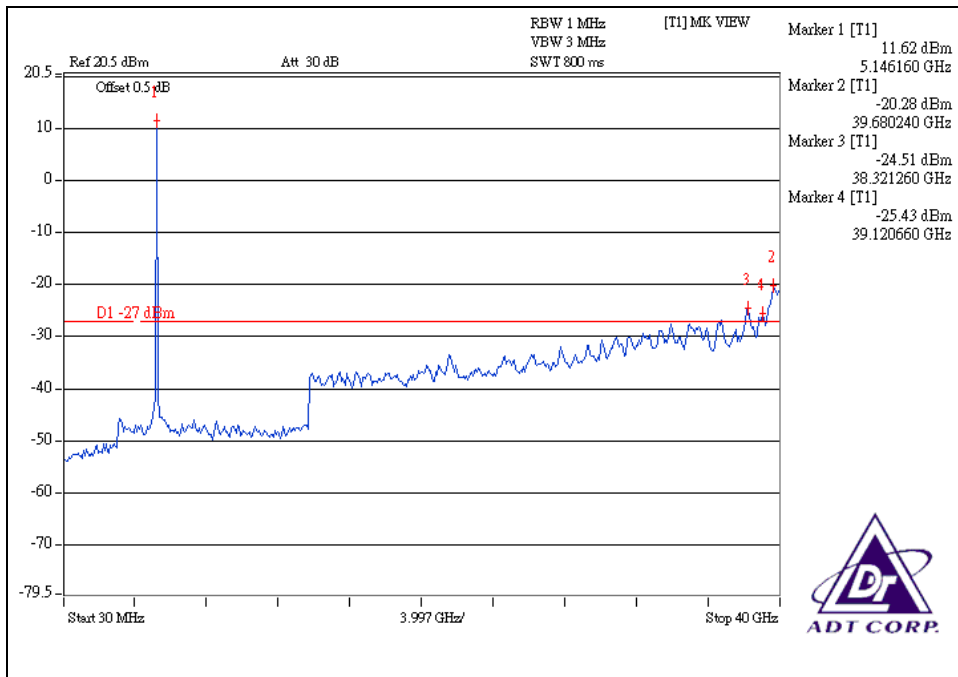
### CH 4



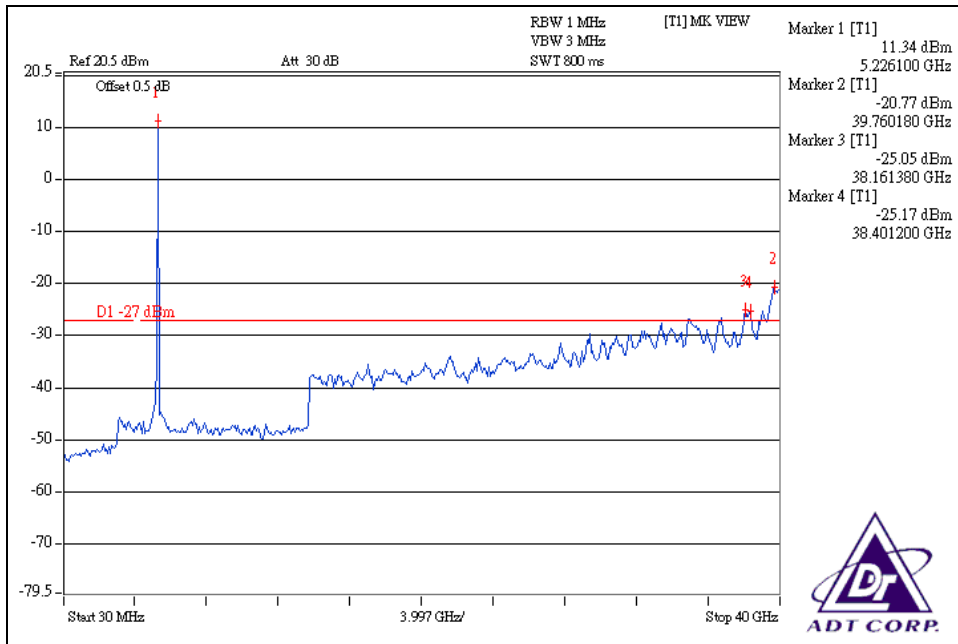
### CH 4



### CH 1



### CH 4



## 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

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

Model	Antenna Type	Gain (dBi)	Antenna Connector	Note
FDS_2FED01+I3G	Dual Band Antenna, Dipole	For 2.4GHz : 3 dBi	MMCX	Integral antenna
		For 5GHz : 5 dBi		
NA	Dipole	For 2.4GHz : 2 dBi	Reverse SMA	dedicated antenna
W1028	Dipole	For 5GHz : 2 dBi	Reverse SMA	

The model: FDS\_2FED01+I3G, the worse case one was chosen for final test.



## 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:

<b>USA</b>	FCC , UL, A2LA
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA , CSA
<b>R.O.C.</b>	TAF, BSMI, NCC
<b>Netherlands</b>	Telefication
<b>Singapore</b>	GOST-ASIA(MOU)
<b>Russia</b>	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](http://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](http://www.adt.com.tw)

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

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

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