



FCC TEST REPORT (15.407)

REPORT NO.: RF111219C11-1

MODEL NO.: EA2700

FCC ID: Q87-EA2700

RECEIVED: Dec. 19, 2011

TESTED: Dec. 21, 2011 ~ Jan. 17, 2012

ISSUED: Jan. 18, 2012

APPLICANT: Cisco Consumer Products LLC

ADDRESS: 121 Theory Drive Irvine California 92617 United States

ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)

TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

This test report consists of 57 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval or endorsement by TAF or any government agency. The test results in the report only apply to the tested sample.





TABLE OF CONTENTS

RELEASE CONTROL RECORD.....	4
1. CERTIFICATION.....	5
2. SUMMARY OF TEST RESULTS.....	6
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 CONFIGURATION OF SYSTEM UNDER TEST.....	9
3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL.....	10
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS.....	12
3.4 DESCRIPTION OF SUPPORT UNITS.....	12
4. TEST TYPES AND RESULTS.....	13
4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT.....	13
4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT.....	13
4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS.....	13
4.1.3 TEST INSTRUMENTS.....	14
4.1.4 TEST PROCEDURES.....	15
4.1.5 DEVIATION FROM TEST STANDARD.....	15
4.1.6 TEST SETUP.....	16
4.1.7 EUT OPERATING CONDITION.....	16
4.1.8 TEST RESULTS.....	17
4.2 CONDUCTED EMISSION MEASUREMENT.....	27
4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT.....	27
4.2.2 TEST INSTRUMENTS.....	27
4.2.3 TEST PROCEDURES.....	28
4.2.4 DEVIATION FROM TEST STANDARD.....	28
4.2.5 TEST SETUP.....	29
4.2.6 EUT OPERATING CONDITIONS.....	29
4.2.7 TEST RESULTS.....	30
4.3 PEAK TRANSMIT POWER MEASUREMENT.....	34
4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT.....	34
4.3.2 TEST SETUP.....	34
4.3.3 TEST INSTRUMENTS.....	34
4.3.4 TEST PROCEDURE.....	35
4.3.5 DEVIATION FROM TEST STANDARD.....	35
4.3.6 EUT OPERATING CONDITIONS.....	35
4.3.7 TEST RESULTS.....	36
4.4 PEAK POWER EXCURSION MEASUREMENT.....	38
4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT.....	38



4.4.2	TEST SETUP	38
4.4.3	TEST INSTRUMENTS.....	38
4.4.4	TEST PROCEDURE.....	38
4.4.5	DEVIATION FROM TEST STANDARD.....	38
4.4.6	EUT OPERATING CONDITIONS	38
4.4.7	TEST RESULTS	39
4.5	PEAK POWER SPECTRAL DENSITY MEASUREMENT	45
4.5.1	LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT	45
4.5.2	TEST SETUP.....	45
4.5.3	TEST INSTRUMENTS.....	45
4.5.4	TEST PROCEDURES	45
4.5.5	DEVIATION FROM TEST STANDARD.....	45
4.5.6	EUT OPERATING CONDITIONS	45
4.5.7	TEST RESULTS	46
4.6	FREQUENCY STABILITY.....	52
4.6.1	LIMITS OF FREQUENCY STABILITY MEASUREMENT	52
4.6.2	TEST SETUP.....	52
4.6.3	TEST INSTRUMENTS.....	52
4.6.4	TEST PROCEDURE.....	53
4.6.5	DEVIATION FROM TEST STANDARD.....	53
4.6.6	EUT OPERATING CONDITION.....	53
4.6.7	TEST RESULTS	54
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	55
6.	INFORMATION ON THE TESTING LABORATORIES	56
7.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	57



A D T

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	N/A	Jan. 18, 2012



1. CERTIFICATION

PRODUCT: Linksys EA2700 Dual-Band N600 Router with Gigabit

MODEL: EA2700

BRAND: CISCO

APPLICANT: Cisco Consumer Products LLC

TESTED: Dec. 21, 2011 ~ Jan. 17, 2012

TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: **FCC Part 15, Subpart E (Section 15.407)**

ANSI C63.4-2003

ANSI C63.10-2009

The above equipment (Model: EA2700) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : *Ivy Lin* , DATE: Jan. 18, 2012
Ivy Lin / Specialist

APPROVED BY : *Gary Chang* , DATE: Jan. 18, 2012
Gary Chang / Technical 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 AND LIMIT	RESULT	REMARK
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -10.20dB at 0.463MHz.
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 -1.5dB at 5150.0MHz.
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.
15.203	Antenna Requirement	PASS	Antenna connector is I-PEX not a standard connector.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.19 dB
	200MHz ~1000MHz	3.21 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Linksys EA2700 Dual-Band N600 Router with Gigabit
MODEL NO.	EA2700
FCC ID	Q87-EA2700
POWER SUPPLY	12Vdc (Adapter)
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 450.0Mbps
OPERATING FREQUENCY	5180.0 ~ 5240.0MHz
NUMBER OF CHANNEL	4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
OUTPUT POWER	38.34mW
ANTENNA TYPE	Refer to Note for more details
ANTENNA CONNECTOR	Refer to Note for more details
DATA CABLE	NA
I/O PORTS	RJ45
ACCESSORY DEVICES	Adapter

NOTE:

1. The frequency bands used in this EUT are listed as follows:

Frequency Band (MHz)	2412~2462	5180~5240	5745~5825
802.11b	√		
802.11g	√		
802.11a		√	√
802.11n (20MHz)	√	√	√
802.11n (40MHz)	√	√	√

2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11a	1TX
802.11n (20MHz)	1TX/ 2TX
802.11n (40MHz)	1TX/ 2TX

3. The EUT has main source and second source, the components list as below.

EUT	COMPONENT TYPE	P/N	VENDOR
Main source	DDR SDRAM (U1)	H5DU5162ETR-E3C	Hynix
	Flash (U3)	H27U518S2CTR-BC	Hynix
Second source	DDR SDRAM (U1)	EM6AB160TSD-5G	ETRON
	Flash (U3)	NAND512W3A2SN6F	Micron

4. The following antennas provided to EUT.

ANTENNA	ANTENNA TYPE	ANTENNA GAIN (dBi)	ANTENNA CONNECTOR
Right	Dipole	3.62	NA
Front	Dipole	3.31	NA

* For 802.11a, the right antenna with highest gain was chosen for final test.

5. The EUT was powered by the following adapters:

ADAPTER 1	
BRAND:	SOLYTECH ENTERPRISE CORPORATION
MODEL:	CAD1212C
INPUT:	100-240Vac, 0.5A, 50-60Hz
OUTPUT:	12Vdc, 1.0A Max. 12W
POWER LINE:	1.5m non-shielded cable without core

ADAPTER 2	
BRAND:	LEADER ELECTRONICS INC.
MODEL:	MU12-G120100-A1
INPUT:	100-240Vac, 50/60Hz, 0.5A
OUTPUT:	12Vdc, 1.0A
POWER LINE:	1.5m non-shielded cable without core

ADAPTER 3	
BRAND:	CWT
MODEL:	CAP012121 US
INPUT:	100-240Vac, 47-63Hz, 0.35A
OUTPUT:	12.0Vdc, 1.0A
POWER LINE:	1.5m non-shielded cable without core

*After pre-testing, adapter 1 is the worst case for final test.

6. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 DESCRIPTION OF TEST MODES

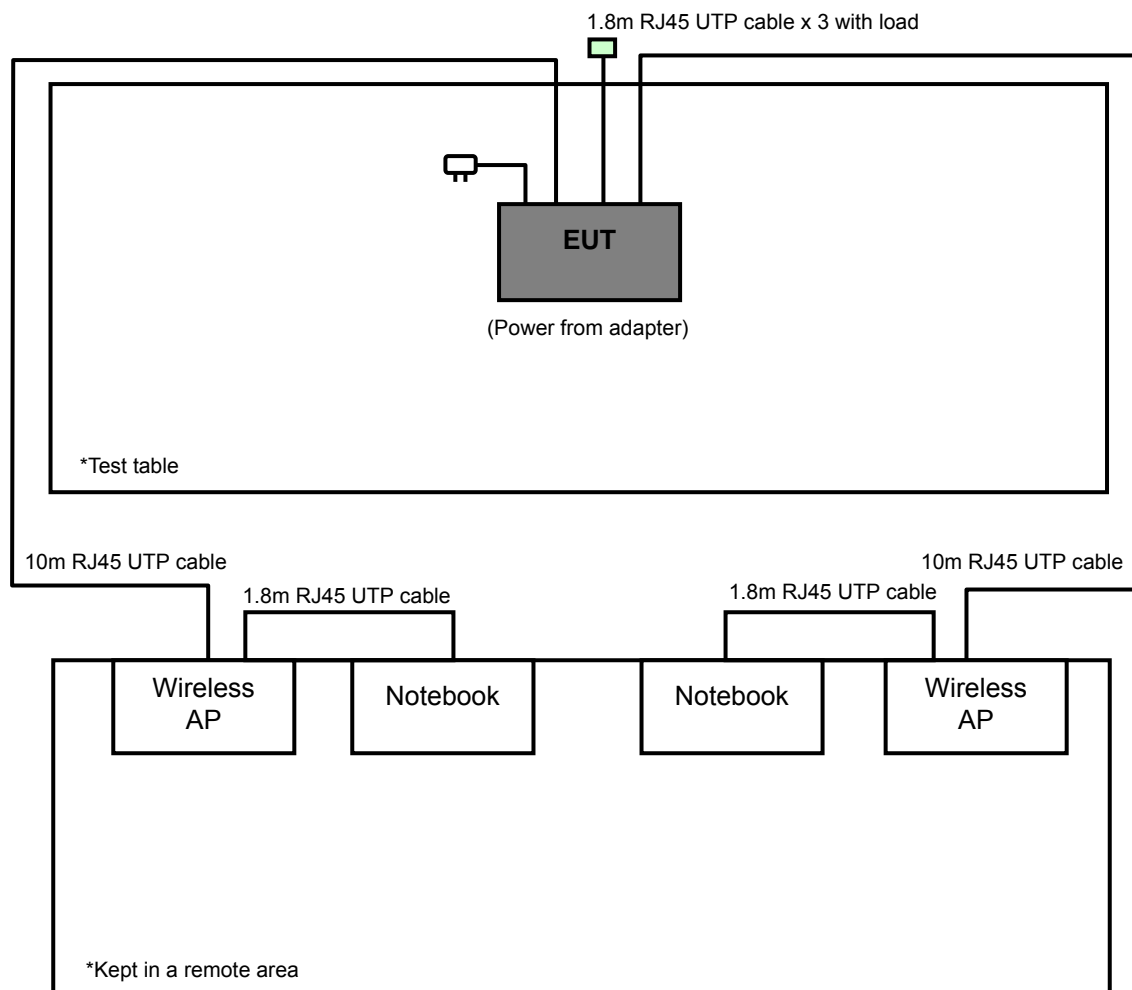
4 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190MHz	46	5230MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE \geq 1G	RE<1G	PLC	APCM	
A	√	√	√	√	EUT: Main source
B	-	√	√	-	EUT: Second source

Where **RE \geq 1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement
NOTE : "-": Means no effect.

RADIATED EMISSION TEST (ABOVE 1GHz):

- 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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	7.2
A	802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	15.0

RADIATED EMISSION TEST (BELOW 1GHz):

- 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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11n (20MHz)	36 to 48	36	OFDM	BPSK	7.2

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11n (20MHz)	36 to 48	36	OFDM	BPSK	7.2

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	36 to 48	36, 48	OFDM	BPSK	6.0
-	802.11n (20MHz)	36 to 48	36, 48	OFDM	BPSK	7.2
-	802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	15.0

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	7.2
-	802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	TEST MODE	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	A	22deg. C, 65%RH	120Vac, 60Hz	Antony Lee
RE<1G	A	21deg. C, 69%RH	120Vac, 60Hz	Antony Lee
	B	22deg. C, 65%RH	120Vac, 60Hz	Antony Lee
PLC	A	23deg. C, 64%RH	120Vac, 60Hz	Antony Lee
	B	23deg. C, 64%RH	120Vac, 60Hz	Antony Lee
APCM	A	22deg. C, 65%RH	120Vac, 60Hz	Antony Lee

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. 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

ANSI C63.10-2009

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	DELL	D531	CN-0XM006-48643-8 1U-2973	QDS-BRCM1020
2	NOTEBOOK	DELL	D531	CN-0XM006-48643-8 1U-2610	QDS-BRCM1020
3	WIRELESS AP	CISCO	EA2700	NA	Q87-EA2700
4	WIRELESS AP	CISCO	EA2700	NA	Q87-EA2700

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.8m RJ45 UTP cable
2	1.8m RJ45 UTP cable
3	10m RJ45 UTP cable
4	10m RJ45 UTP cable

NOTE:

1. All power cords of the above support units are non shielded (1.8m).
2. Item 1 ~ 4 as a communication partner to transfer data.
3. Item 3 ~ 4 are provided by the client.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE 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.

4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

FREQUENCIES (MHz)	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBμV/m) *NOTE 3
	PK	PK
5150 ~ 5250	-27	68.3

NOTE: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Jan. 03, 2012	Jan. 02, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Jan. 05, 2012	Jan. 04, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 20, 2011	Jul. 19, 2012
Preamplifier Agilent	8449B	3008A01961	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8447D	2944A10738	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Nov. 03, 2011	Nov. 02, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Nov. 03, 2011	Nov. 02, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Nov. 03, 2011	Nov. 02, 2012
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table ADT.	TT100.	TT93021704	NA	NA
Turn Table Controller ADT.	SC100.	SC93021704	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 29, 2011	Oct. 28, 2012
High Speed Peak Power Meter	ML2495A	0842014	Apr. 26, 2011	Apr. 25, 2012
Power Sensor	MA2411B	0738404	Apr. 26, 2011	Apr. 25, 2012

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 4.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 460141.
 5. The IC Site Registration No. is IC7450F-4.

4.1.4 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.

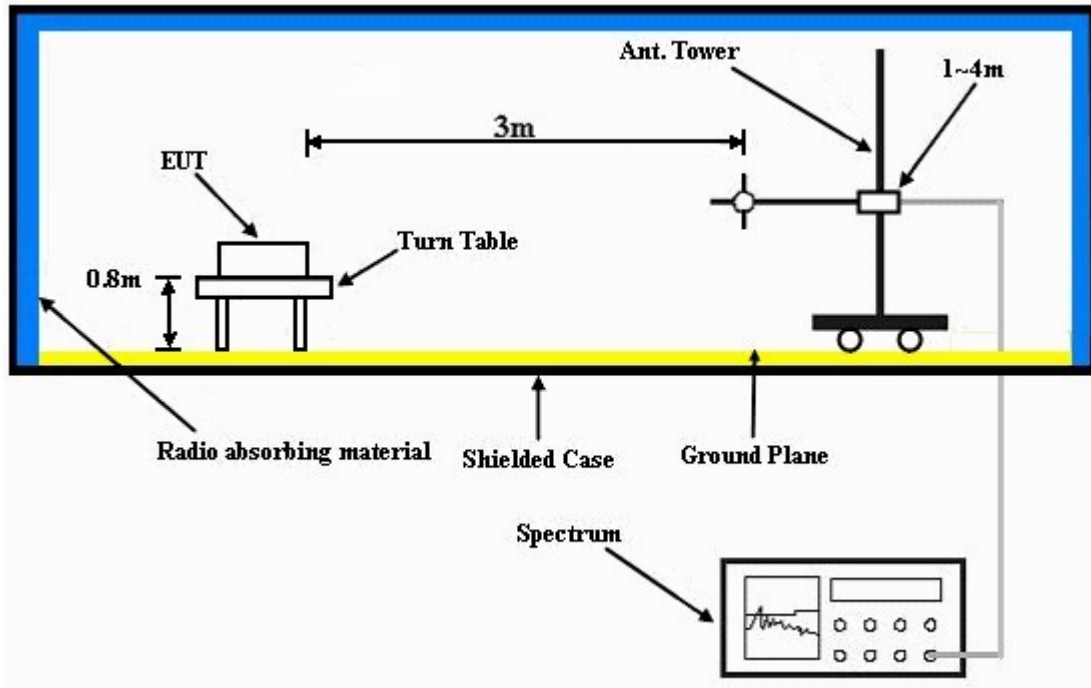
NOTE:

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 of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 1kHz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 DEVIATION FROM TEST STANDARD

No deviation.

4.1.6 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.7 EUT OPERATING CONDITION

- a. Placed the EUT on the testing table.
- b. Prepared notebooks and wireless AP to act as communication partner and placed it outside of testing area.
- c. The communication partner connected with EUT via a RJ45 cable and run a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- d. The communication partner sent data to EUT by command "PING".



4.1.8 TEST RESULTS

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	56.9 PK	74.0	-17.1	1.00 H	321	17.60	39.30
2	5150.00	41.0 AV	54.0	-13.0	1.00 H	321	1.70	39.30
3	*5180.00	96.1 PK			1.01 H	322	56.80	39.30
4	*5180.00	86.0 AV			1.01 H	322	46.70	39.30
5	#10380.00	56.2 PK	68.3	-12.1	1.00 H	25	6.50	49.70
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	5150.00	63.0 PK	74.0	-11.0	1.00 V	320	23.70	39.30
2	5150.00	50.7 AV	54.0	-3.3	1.00 V	320	11.40	39.30
3	*5180.00	105.9 PK			1.00 V	332	66.60	39.30
4	*5180.00	95.4 AV			1.00 V	332	56.10	39.30
5	#10360.00	41.6 PK	68.3	-26.7	1.00 V	26	-8.10	49.70

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. “#”: The radiated frequency is out the restricted band.



A D T

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

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	98.3 PK			1.02 H	321	58.90	39.40
2	*5200.00	88.2 AV			1.02 H	321	48.80	39.40
3	#6933.00	53.4 PK	68.3	-14.9	1.01 H	231	9.40	44.00
4	#10400.00	56.5 PK	68.3	-11.8	1.00 H	27	6.80	49.70
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	*5200.00	106.5 PK			1.00 V	317	67.10	39.40
2	*5200.00	96.6 AV			1.00 V	317	57.20	39.40
3	#6933.00	51.0 PK	68.3	-17.3	1.00 V	251	7.00	44.00
4	#10400.00	56.7 PK	68.3	-11.6	1.00 V	15	7.00	49.70

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. “#”:The radiated frequency is out the restricted band.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	96.3 PK			1.00 H	320	56.90	39.40
2	*5240.00	86.2 AV			1.00 H	320	46.80	39.40
3	5350.00	50.9 PK	74.0	-23.1	1.00 H	265	11.40	39.50
4	5350.00	39.6 AV	54.0	-14.4	1.00 H	265	0.10	39.50
5	#10480.00	57.2 PK	68.3	-11.1	1.00 H	247	7.00	50.20
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	*5240.00	107.4 PK			1.39 V	329	68.00	39.40
2	*5240.00	97.5 AV			1.39 V	329	58.10	39.40
3	5350.00	51.9 PK	74.0	-22.1	1.40 V	331	12.40	39.50
4	5350.00	38.6 AV	54.0	-15.4	1.40 V	331	-0.90	39.50
5	#10480.00	56.3 PK	68.3	-12.0	1.00 V	20	6.10	50.20

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. “#”: The radiated frequency is out the restricted band.

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	62.8 PK	74.0	-11.2	1.20 H	25	23.50	39.30
2	5150.00	44.6 AV	54.0	-9.4	1.20 H	25	5.30	39.30
3	*5180.00	104.7 PK			1.18 H	24	65.40	39.30
4	*5180.00	93.6 AV			1.18 H	24	54.30	39.30
5	#10360.00	57.0 PK	68.3	-11.3	1.05 H	26	7.30	49.70
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	5150.00	65.2 PK	74.0	-8.8	1.06 V	2	25.90	39.30
2	5150.00	45.8 AV	54.0	-8.2	1.06 V	2	6.50	39.30
3	*5180.00	107.7 PK			1.05 V	6	68.40	39.30
4	*5180.00	96.5 AV			1.05 V	6	57.20	39.30
5	#10360.00	58.3 PK	68.3	-10.0	1.00 V	25	8.60	49.70

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



A D T

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

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	#3000.00	50.1 PK	68.3	-18.2	1.00 H	38	15.70	34.40
2	*5200.00	104.2 PK			1.21 H	26	64.80	39.40
3	*5200.00	93.2 AV			1.21 H	26	53.80	39.40
4	#10400.00	56.3 PK	68.3	-12.0	1.00 H	33	6.60	49.70

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	#3000.00	50.4 PK	68.3	-17.9	1.00 V	134	16.00	34.40
2	*5200.00	106.3 PK			1.13 V	330	66.90	39.40
3	*5200.00	95.2 AV			1.13 V	330	55.80	39.40
4	#10400.00	57.4 PK	68.3	-10.9	1.00 V	29	7.70	49.70

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



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	104.5 PK			1.02 H	310	65.10	39.40
2	*5240.00	93.2 AV			1.02 H	310	53.80	39.40
3	5350.00	62.9 PK	74.0	-11.1	1.02 H	309	23.40	39.50
4	5350.00	44.3 AV	54.0	-9.7	1.02 H	309	4.80	39.50
5	#10480.00	57.3 PK	68.3	-11.0	1.02 H	48	7.10	50.20
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	*5240.00	107.3 PK			1.01 V	322	67.90	39.40
2	*5240.00	95.5 AV			1.01 V	322	56.10	39.40
3	5350.00	49.6 PK	74.0	-24.4	1.00 V	325	10.10	39.50
4	5350.00	39.2 AV	54.0	-14.8	1.00 V	325	-0.30	39.50
5	#10480.00	60.3 PK	68.3	-8.0	1.00 V	259	10.10	50.20

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. “#”: The radiated frequency is out the restricted band.

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	65.2 PK	74.0	-8.8	1.05 H	26	25.90	39.30
2	5150.00	51.2 AV	54.0	-2.8	1.05 H	26	11.90	39.30
3	*5190.00	100.7 PK			1.07 H	25	61.30	39.40
4	*5190.00	90.5 AV			1.07 H	25	51.10	39.40
5	#10380.00	56.9 PK	68.3	-11.4	1.25 H	16	7.20	49.70
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	5150.00	68.0 PK	74.0	-6.0	1.00 V	319	28.70	39.30
2	5150.00	52.5 AV	54.0	-1.5	1.00 V	319	13.20	39.30
3	*5190.00	101.0 PK			1.00 V	309	61.60	39.40
4	*5190.00	90.6 AV			1.00 V	309	51.20	39.40
5	#10380.00	62.6 PK	68.3	-5.7	1.00 V	259	12.90	49.70

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. “#”:The radiated frequency is out the restricted band.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Antony Lee

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	*5230.00	102.3 PK			1.05 H	26	62.90	39.40
2	*5230.00	92.4 AV			1.05 H	26	53.00	39.40
3	5350.00	64.2 PK	74.0	-9.8	1.05 H	26	24.70	39.50
4	5350.00	50.8 AV	54.0	-3.2	1.05 H	26	11.30	39.50
5	#10460.00	57.2 PK	68.3	-11.1	1.22 H	23	7.20	50.00
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	*5230.00	103.7 PK			1.00 V	324	64.30	39.40
2	*5230.00	93.6 AV			1.00 V	324	54.20	39.40
3	5350.00	49.6 PK	74.0	-24.4	1.00 V	325	10.10	39.50
4	5350.00	39.8 AV	54.0	-14.2	1.00 V	325	0.30	39.50
5	#10460.00	57.1 PK	68.3	-11.2	1.00 V	251	7.10	50.00

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.
 6. “#”: The radiated frequency is out the restricted band.

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	21deg. C, 69%RH	TESTED BY	Antony Lee
TEST MODE	A		

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	160.17	39.8 QP	43.5	-3.7	1.75 H	133	24.90	14.90
2	249.60	42.1 QP	46.0	-3.9	1.00 H	283	28.60	13.50
3	375.98	40.0 QP	46.0	-6.0	1.00 H	244	22.20	17.80
4	500.42	41.2 QP	46.0	-4.8	1.75 H	67	19.80	21.40
5	626.80	42.0 QP	46.0	-4.0	1.25 H	217	17.90	24.10
6	877.61	40.5 QP	46.0	-5.5	1.00 H	226	12.10	28.40
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	45.45	36.2 QP	40.0	-3.8	1.25 V	304	21.20	15.00
2	249.60	36.3 QP	46.0	-9.7	1.25 V	13	22.80	13.50
3	375.98	38.1 QP	46.0	-7.9	1.50 V	337	20.30	17.80
4	500.42	35.9 QP	46.0	-10.1	1.00 V	109	14.50	21.40
5	626.80	42.6 QP	46.0	-3.4	1.00 V	352	18.50	24.10
6	877.61	40.1 QP	46.0	-5.9	1.25 V	160	11.70	28.40

- 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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	22deg. C, 65%RH	TESTED BY	Antony Lee
TEST MODE	B		

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	136.84	37.2 QP	43.5	-6.3	1.75 H	112	23.50	13.70
2	249.60	36.5 QP	46.0	-9.5	1.50 H	301	22.80	13.70
3	374.04	40.7 QP	46.0	-5.3	2.00 H	151	22.90	17.80
4	500.42	42.9 QP	46.0	-3.1	1.00 H	169	21.70	21.20
5	624.85	42.6 QP	46.0	-3.4	1.25 H	223	18.80	23.80
6	875.67	36.2 QP	46.0	-9.8	1.75 H	94	8.00	28.20

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	53.23	36.7 QP	40.0	-3.3	1.00 V	88	22.70	14.00
2	76.56	36.6 QP	40.0	-3.4	2.00 V	28	25.60	11.00
3	103.78	39.4 QP	43.5	-4.1	1.00 V	142	29.20	10.20
4	374.04	40.4 QP	46.0	-5.6	1.50 V	103	22.60	17.80
5	500.42	42.8 QP	46.0	-3.2	1.25 V	115	21.60	21.20
6	624.85	39.6 QP	46.0	-6.4	1.00 V	238	15.80	23.80

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

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 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 0.50MHz.
 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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 19, 2011	Nov. 18, 2012
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 22, 2011	Dec. 21, 2012
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Dec. 30, 2011	Dec. 29, 2012
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jul. 07, 2011	Jul. 06, 2012
Software ADT	ADT_Cond_ V7.3.7	NA	NA	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 2.
 3. The VCCI Site Registration No. is C-2047.

4.2.3 TEST PROCEDURES

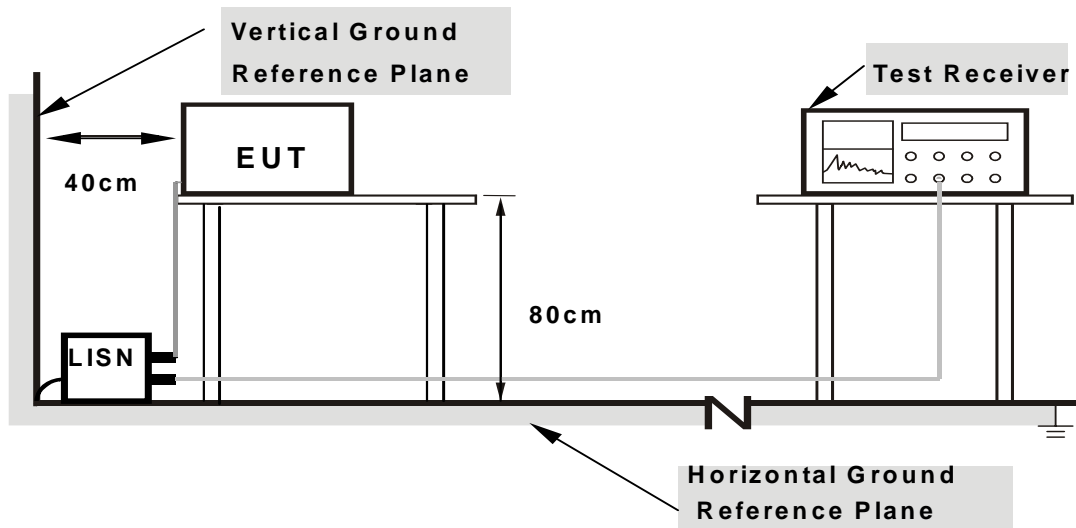
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 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 attached file (Test Setup Photo).

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

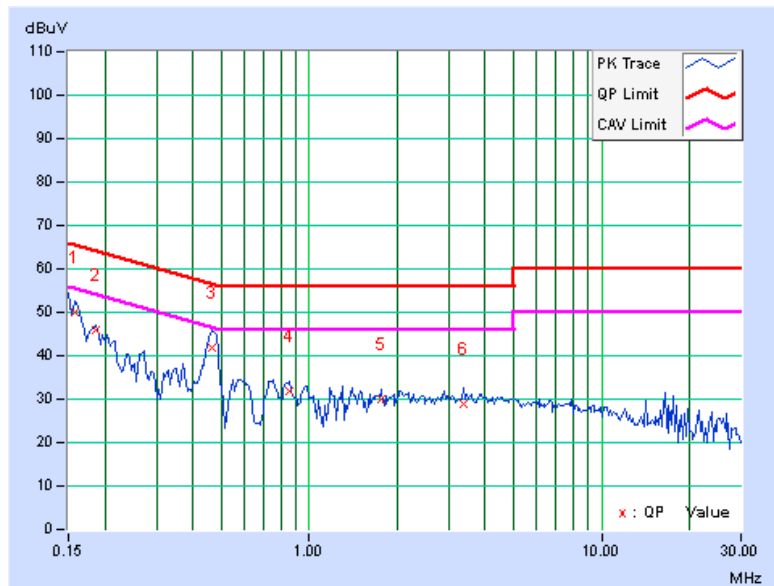
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA : 802.11N (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	A		

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	0.158	0.15	50.01	38.07	50.16	38.22	65.58	55.58	-15.42	-17.36
2	0.185	0.15	45.64	35.11	45.79	35.26	64.25	54.25	-18.46	-18.99
3	0.466	0.17	41.62	31.31	41.79	31.48	56.58	46.58	-14.79	-15.10
4	0.853	0.19	31.50	25.97	31.69	26.16	56.00	46.00	-24.31	-19.84
5	1.754	0.24	29.81	23.26	30.05	23.50	56.00	46.00	-25.95	-22.50
6	3.355	0.31	28.59	23.29	28.90	23.60	56.00	46.00	-27.10	-22.40

- 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.



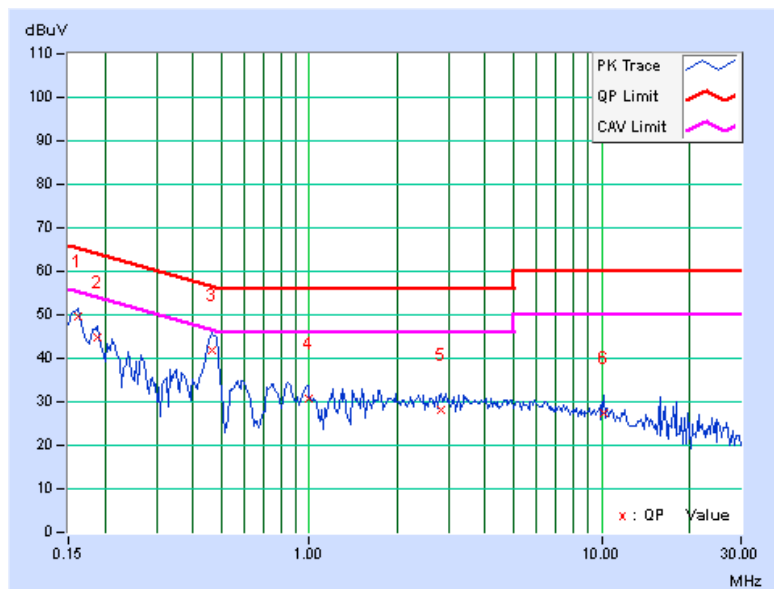


A D T

PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	A		

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	0.162	0.13	49.46	37.85	49.59	37.98	65.38	55.38	-15.78	-17.39
2	0.189	0.14	44.67	33.98	44.81	34.12	64.08	54.08	-19.27	-19.96
3	0.466	0.16	41.80	31.31	41.96	31.47	56.58	46.58	-14.61	-15.10
4	0.990	0.19	30.46	25.33	30.65	25.52	56.00	46.00	-25.35	-20.48
5	2.824	0.30	27.83	22.38	28.13	22.68	56.00	46.00	-27.87	-23.32
6	10.199	0.48	26.95	21.88	27.43	22.36	60.00	50.00	-32.57	-27.64

- 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.



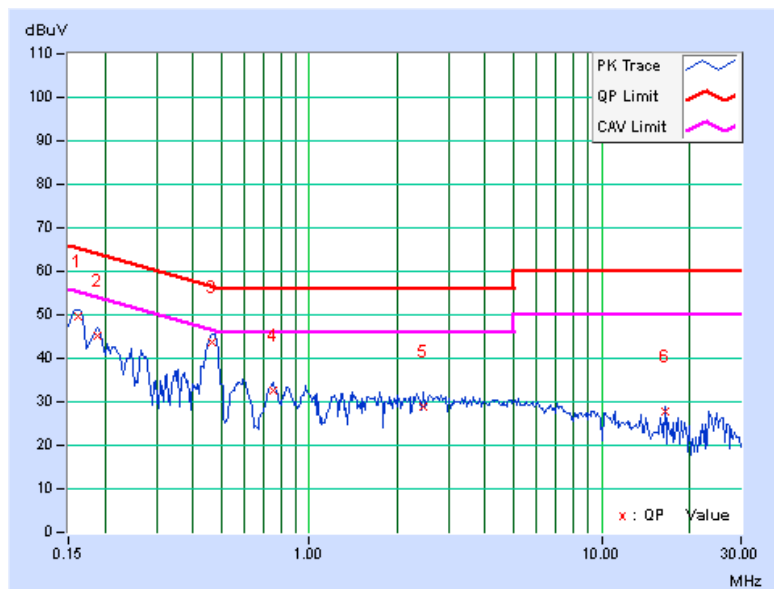


A D T

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	B		

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	Q.P. [dB (uV)]	AV. [dB (uV)]	Q.P. [dB (uV)]	AV. [dB (uV)]	Q.P. [dB (uV)]	AV. [dB (uV)]	Q.P. (dB)	AV. (dB)
1	0.162	0.15	49.61	38.22	49.76	38.37	65.38	55.38	-15.62	-17.01
2	0.189	0.15	45.02	34.73	45.17	34.88	64.08	54.08	-18.91	-19.20
3	0.463	0.17	43.41	36.28	43.58	36.45	56.65	46.65	-13.07	-10.20
4	0.752	0.18	32.55	28.63	32.73	28.81	56.00	46.00	-23.27	-17.19
5	2.453	0.28	28.67	23.47	28.95	23.75	56.00	46.00	-27.05	-22.25
6	16.508	0.56	27.25	23.57	27.81	24.13	60.00	50.00	-32.19	-25.87

- 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.



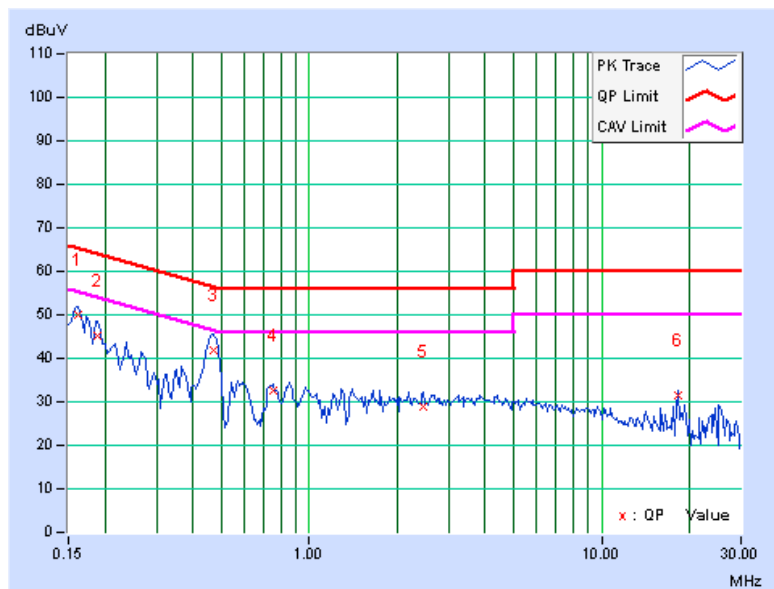


A D T

PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	B		

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	Q.P. [dB (uV)]	AV. [dB (uV)]	Q.P. [dB (uV)]	AV. [dB (uV)]	Q.P. [dB (uV)]	AV. [dB (uV)]	Q.P. (dB)	AV. (dB)
1	0.162	0.13	49.72	38.32	49.85	38.45	65.38	55.38	-15.52	-16.92
2	0.189	0.14	45.12	34.71	45.26	34.85	64.08	54.08	-18.82	-19.23
3	0.470	0.16	41.68	31.31	41.84	31.47	56.51	46.51	-14.66	-15.03
4	0.752	0.18	32.51	28.29	32.69	28.47	56.00	46.00	-23.31	-17.53
5	2.469	0.28	28.68	23.30	28.96	23.58	56.00	46.00	-27.04	-22.42
6	18.213	0.68	30.68	27.66	31.36	28.34	60.00	50.00	-28.64	-21.66

- 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.



4.3 PEAK TRANSMIT POWER MEASUREMENT

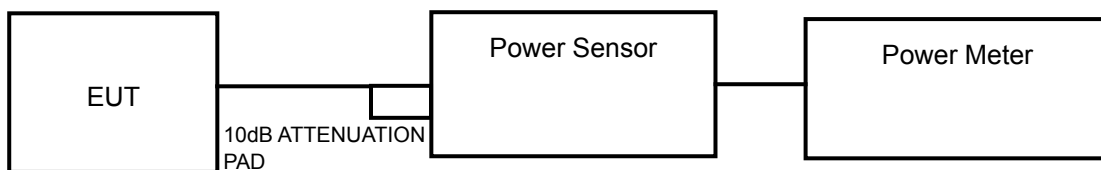
4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

FREQUENCY BAND	LIMIT
5.15 ~ 5.25GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB

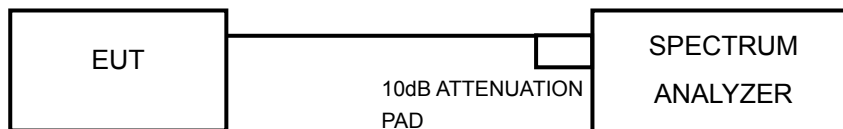
NOTE: Where B is the 26dB emission bandwidth in MHz.

4.3.2 TEST SETUP

FOR POWER OUTPUT MEASUREMENT



FOR 26dB BANDWIDTH



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.3.4 TEST PROCEDURE

FOR AVERAGE POWER MEASUREMENT

A power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

FOR 26dB BANDWIDTH

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = Peak.
- 4) Trace mode = max hold.
- 5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

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

POWER OUTPUT: 802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER OUTPUT (mW)	POWER OUTPUT (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	17.46	12.42	17	PASS
40	5200	20.14	13.04	17	PASS
48	5240	19.54	12.91	17	PASS

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	10.11	9.82	19.85	12.98	17	PASS
40	5200	10.32	10.04	20.86	13.19	17	PASS
48	5240	10.31	9.62	19.90	12.99	17	PASS

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	10.33	9.20	19.11	12.81	17	PASS
46	5230	12.94	12.71	38.34	15.84	17	PASS



26dB OCCUPIED BANDWIDTH: 802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc OCCUPIED BANDWIDTH (MHz)	PASS / FAIL
36	5180	19.68	PASS
40	5200	19.63	PASS
48	5240	20.51	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc OCCUPIED BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	19.91	19.88	PASS
40	5200	19.92	19.73	PASS
48	5240	20.72	19.71	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc OCCUPIED BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	54.72	41.59	PASS
46	5230	52.87	55.03	PASS

4.4 PEAK POWER EXCURSION MEASUREMENT

4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Shall not exceed 13 dB

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.4.4 TEST PROCEDURE

- 1) Set RBW = 1 MHz, VBW \leq 3 MHz, Detector = peak.
- 2) Trace mode = max-hold. Allow the sweeps to continue until the trace stabilizes.
- 3) Use the peak search function to find the peak of the spectrum.
- 4) Measure the PPSD.
- 5) Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as 4.2.6



4.4.7 TEST RESULTS

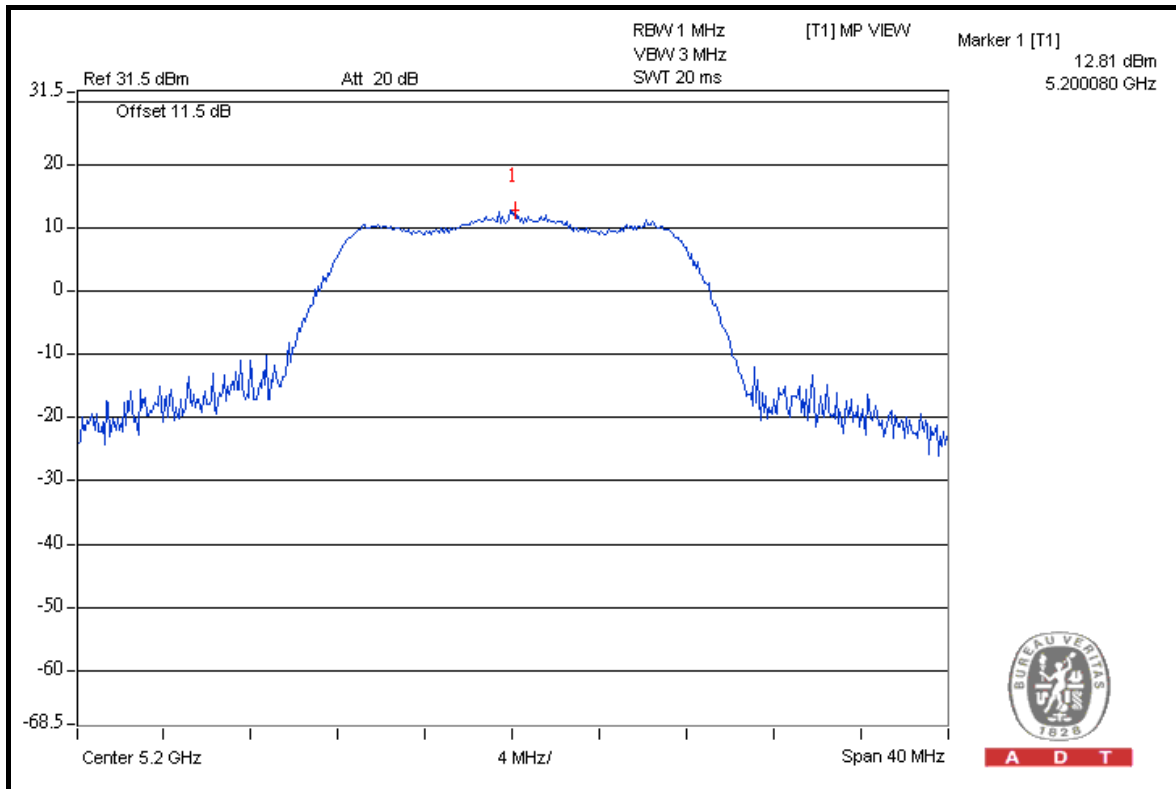
802.11a

CHAN.	CHANNEL FREQUENCY (MHz)	PEAK VALUE (dBm)	PPSD WITHOUT DUTY FACTOR (dBm)	PPSD WITH DUTY FACTOR (dBm)	PEAK EXCURSION (dB)	PEAK EXCURSION LIMIT (dB)	PASS /FAIL
36	5180	11.97	2.09	2.41	9.56	13	PASS
40	5200	12.81	2.75	3.07	9.74	13	PASS
48	5240	12.58	2.54	2.86	9.72	13	PASS

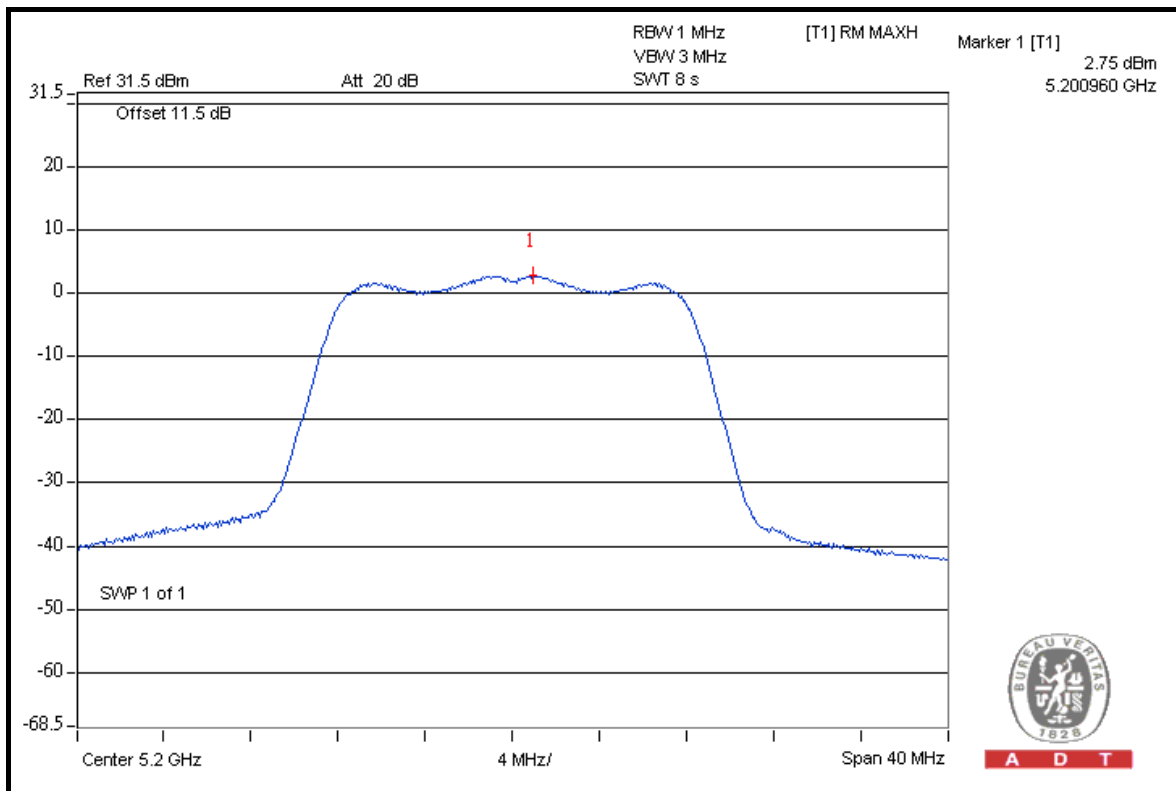
Duty cycle = 1.448/1.556 = 0.931, Duty factor = 10 * log(1/0.931) = 0.32



A D T



A D T



A D T



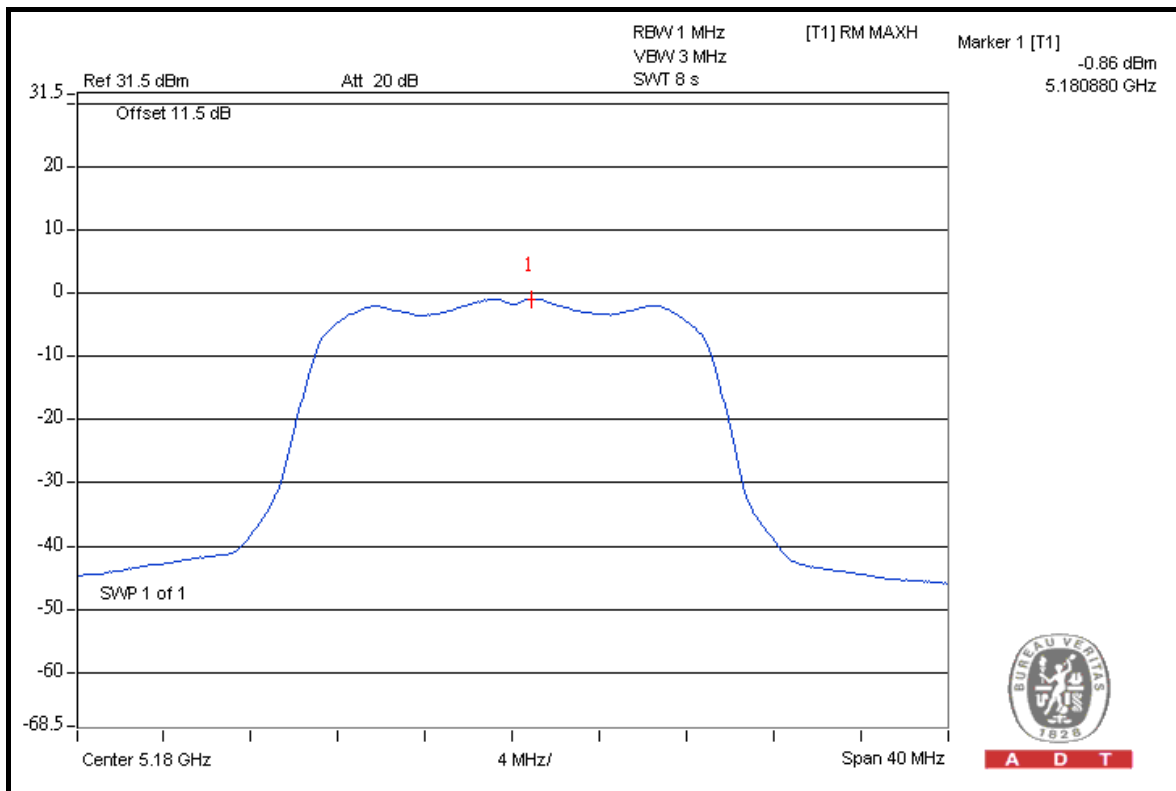
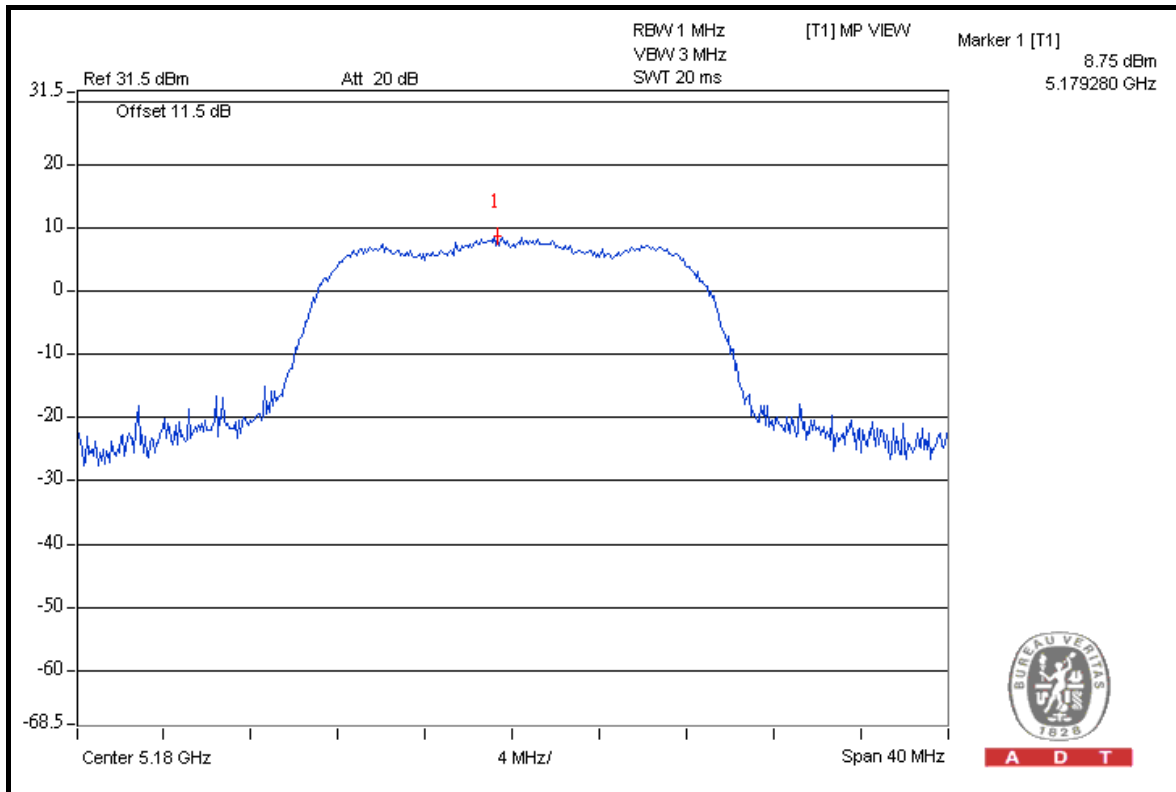
802.11n (20MHz)

TX chain	CHAN.	CHANNEL FREQUENCY (MHz)	PEAK VALUE (dBm)	PPSD WITHOUT DUTY FACTOR (dBm)	PPSD WITH DUTY FACTOR (dBm)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS /FAIL
0	36	5180	8.65	-0.59	0.00	8.65	13	PASS
	40	5200	8.99	-0.31	0.28	8.71	13	PASS
	48	5240	8.89	-0.36	0.23	8.66	13	PASS
1	36	5180	8.75	-0.86	-0.27	9.02	13	PASS
	40	5200	8.80	-0.63	-0.04	8.84	13	PASS
	48	5240	8.57	-0.99	-0.40	8.97	13	PASS

Duty cycle = 0.708/0.812 = 0.872, Duty factor = $10 * \log(1/0.872) = 0.59$



A D T





A D T

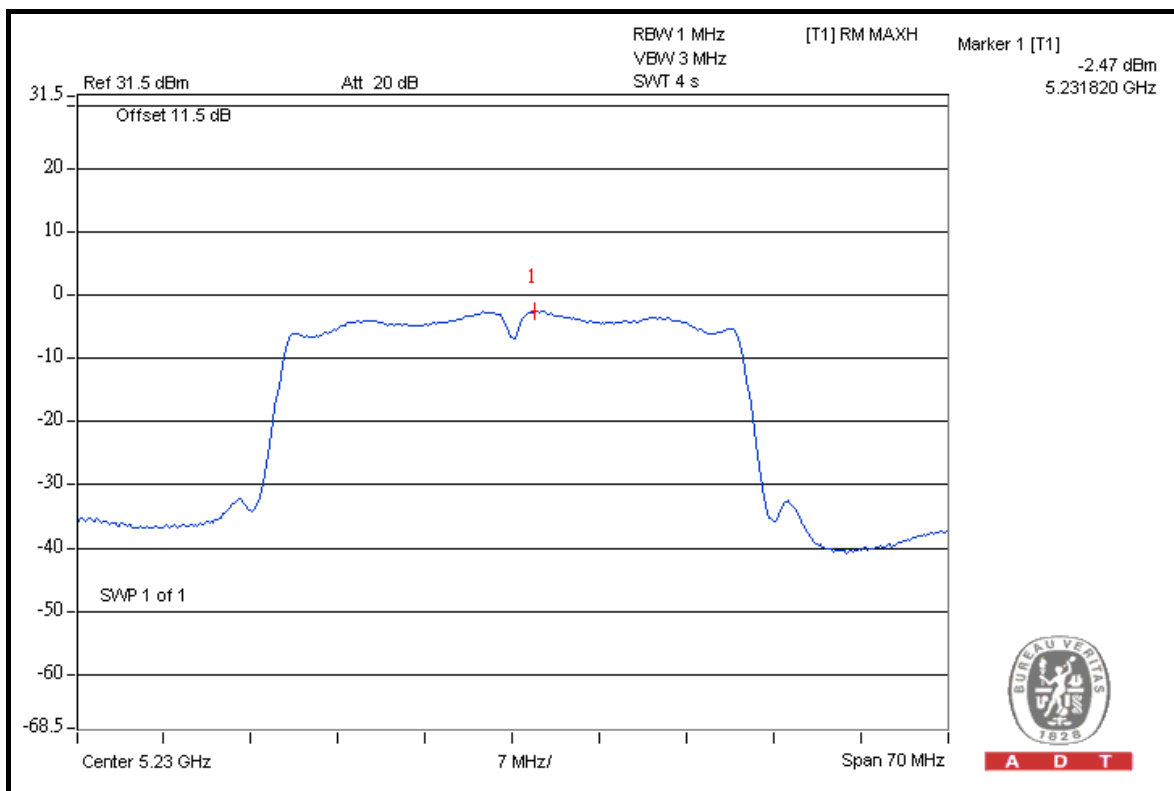
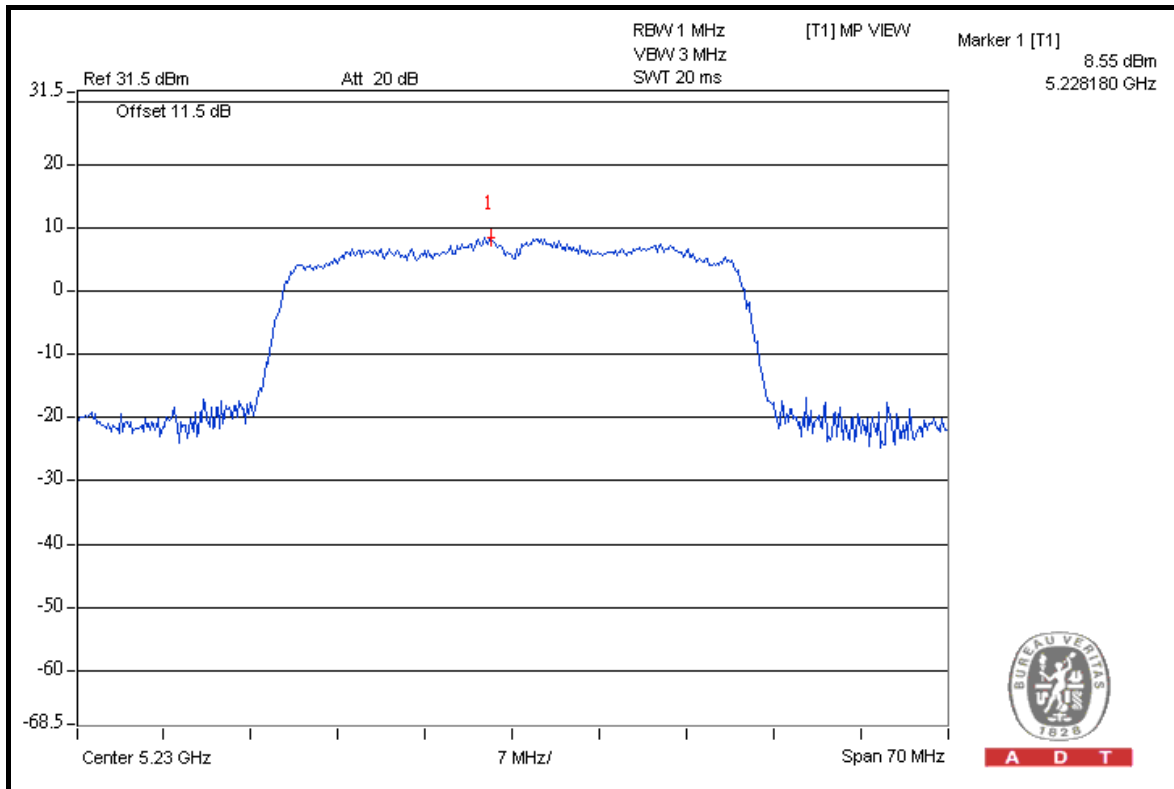
802.11n (40MHz)

TX chain	CHAN.	CHANNEL FREQUENCY (MHz)	PEAK VALUE (dBm)	PPSD WITHOUT DUTY FACTOR (dBm)	PPSD WITH DUTY FACTOR (dBm)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS /FAIL
0	38	5190	5.26	-4.71	-3.68	8.94	13	PASS
	46	5230	7.72	-2.22	-1.19	8.91	13	PASS
1	38	5190	5.04	-5.44	-4.41	9.45	13	PASS
	46	5230	8.55	-2.47	-1.44	9.99	13	PASS

Duty cycle = $0.381/0.483 = 0.789$, Duty factor = $10 * \log(1/0.789) = 1.03$



A D T

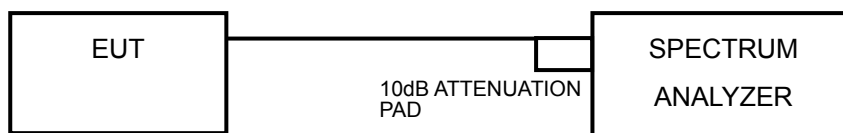


4.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

FREQUENCY BAND	LIMIT
5.15 ~ 5.25GHz	4dBm

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.5.4 TEST PROCEDURES

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 1 MHz, Set VBW \geq 3 MHz, Detector = RMS
- 3) Sweep time = 4 second.
- 4) Perform a single sweep.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITIONS

Same as 4.3.6.

4.5.7 TEST RESULTS

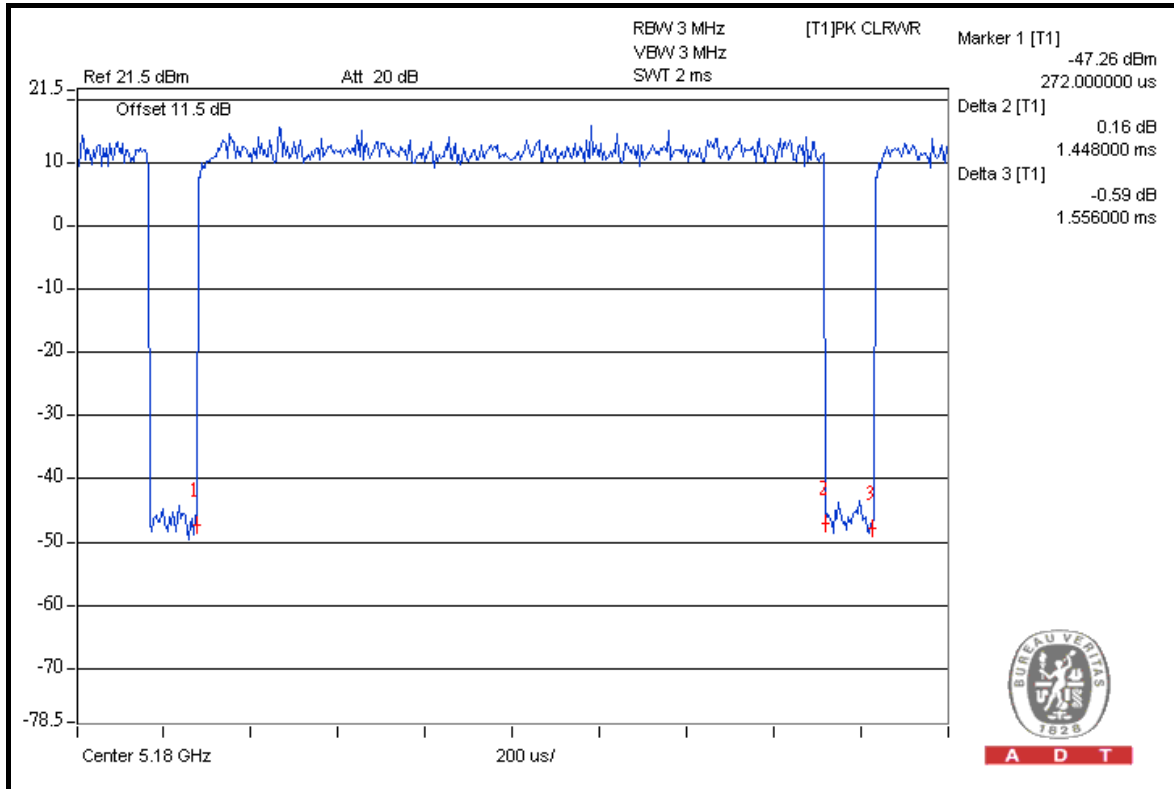
802.11a

CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 1MHz BW WITHOUT DUTY FACTOR (dBm)	DUTY FACTOR	RF POWER LEVEL IN 1MHz BW WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
36	5180	2.09	0.32	2.41	4	PASS
40	5200	2.75	0.32	3.07	4	PASS
48	5240	2.54	0.32	2.86	4	PASS

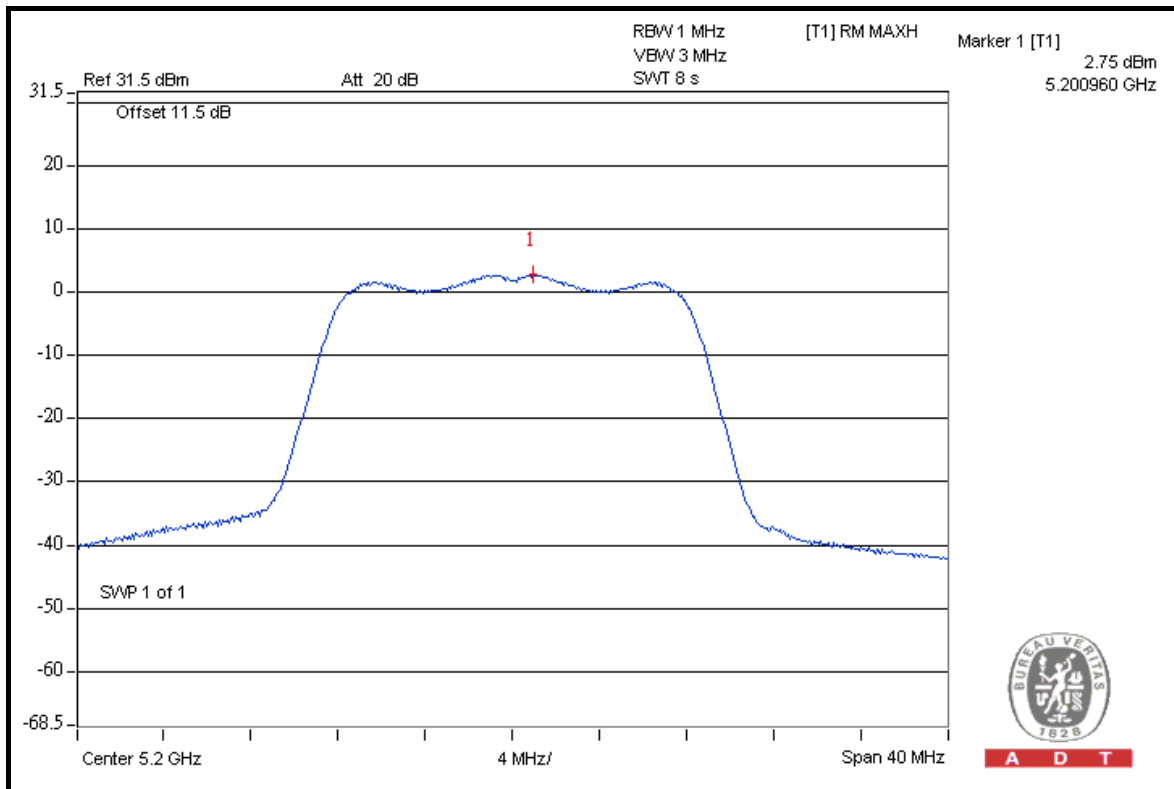
Duty cycle = $1.448/1.556 = 0.931$, Duty factor = $10 * \log(1/0.931) = 0.32$



A D T



A D T



A D T



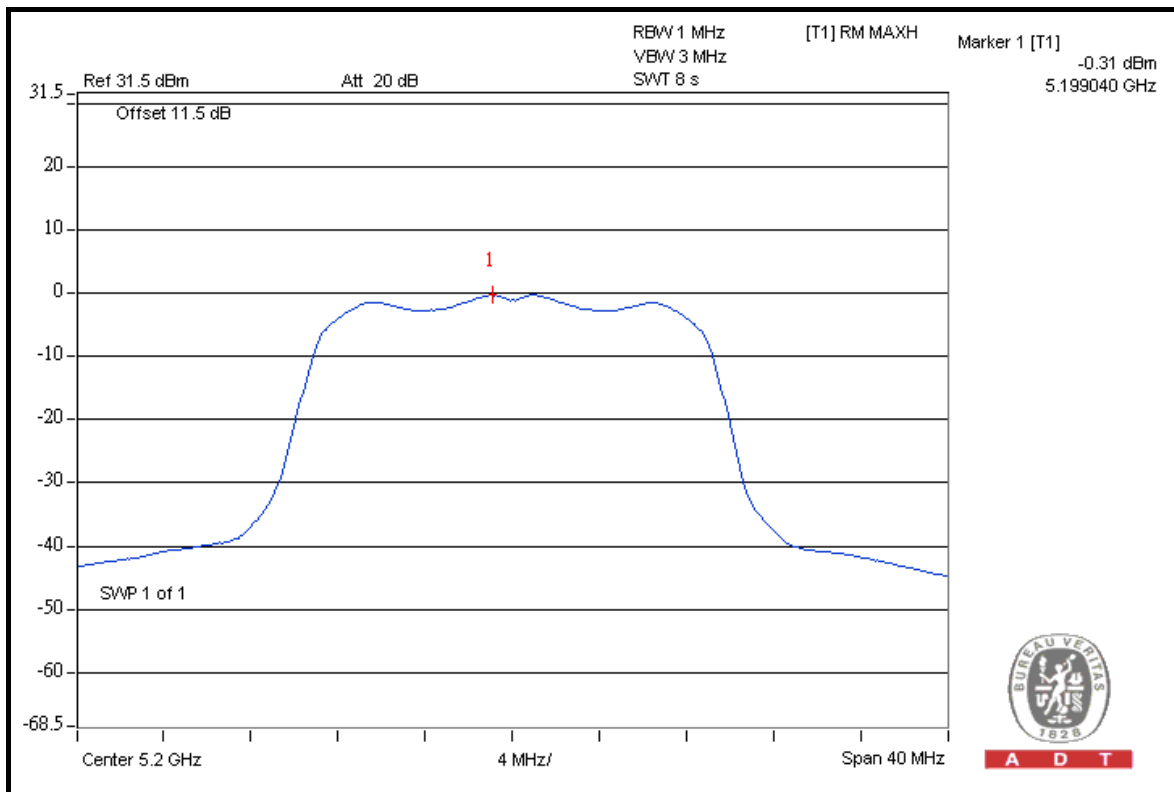
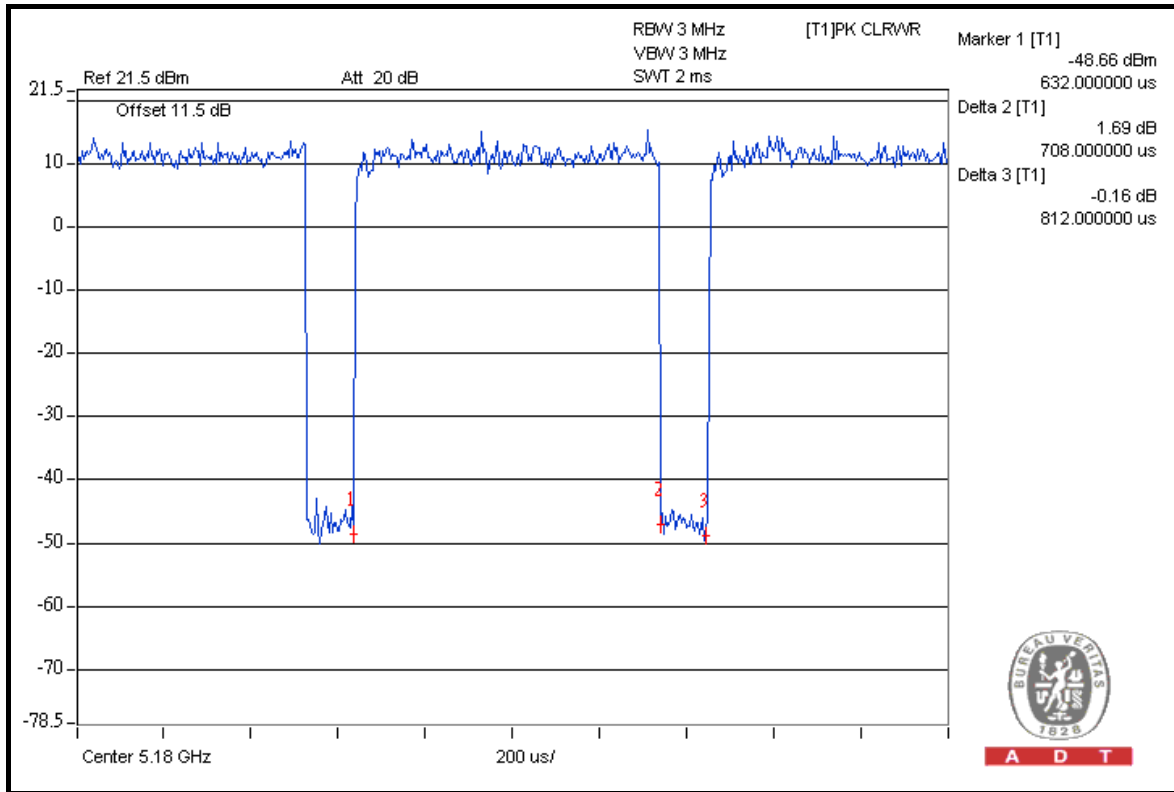
802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)		TOTAL POWER DENSITY WITHOUT DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL POWER DENSITY WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
36	5180	-0.59	-0.86	2.29	0.59	2.88	4	PASS
40	5200	-0.31	-0.63	2.54	0.59	3.13	4	PASS
48	5240	-0.36	-0.99	2.34	0.59	2.93	4	PASS

Duty cycle = 0.708/0.812 = 0.872, Duty factor = $10 * \log(1/0.872) = 0.59$



A D T





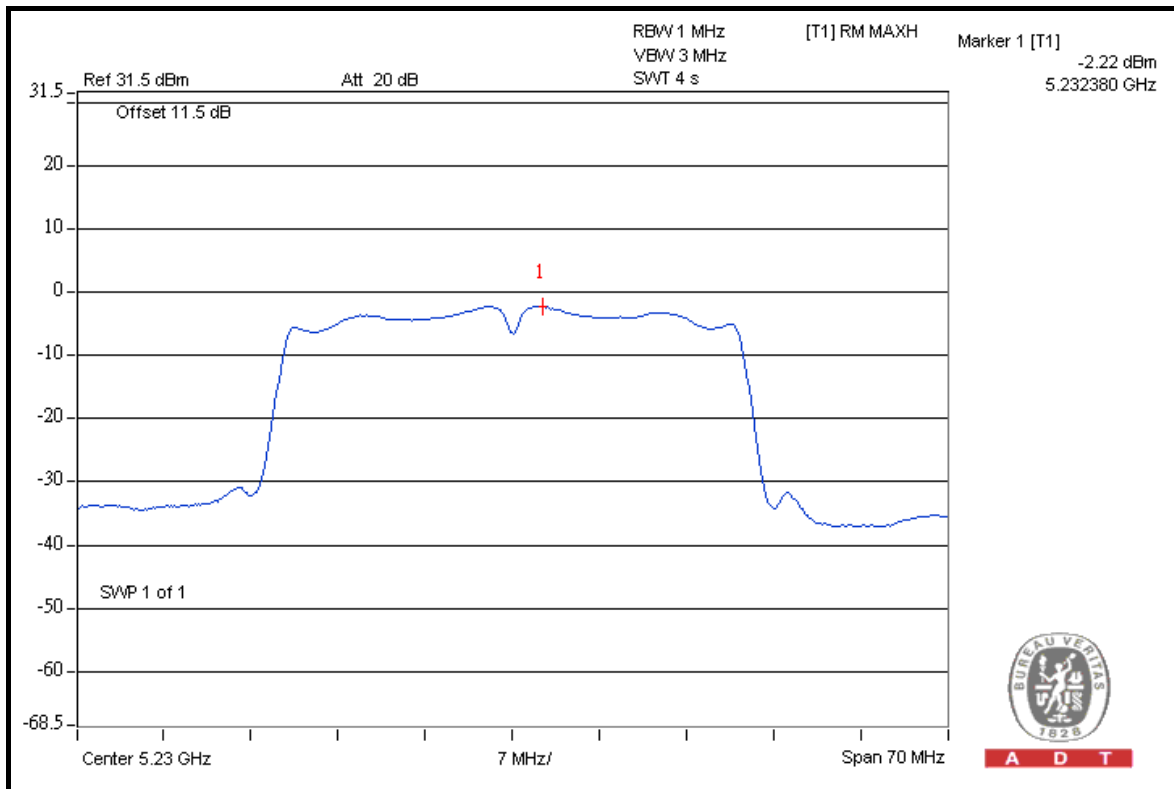
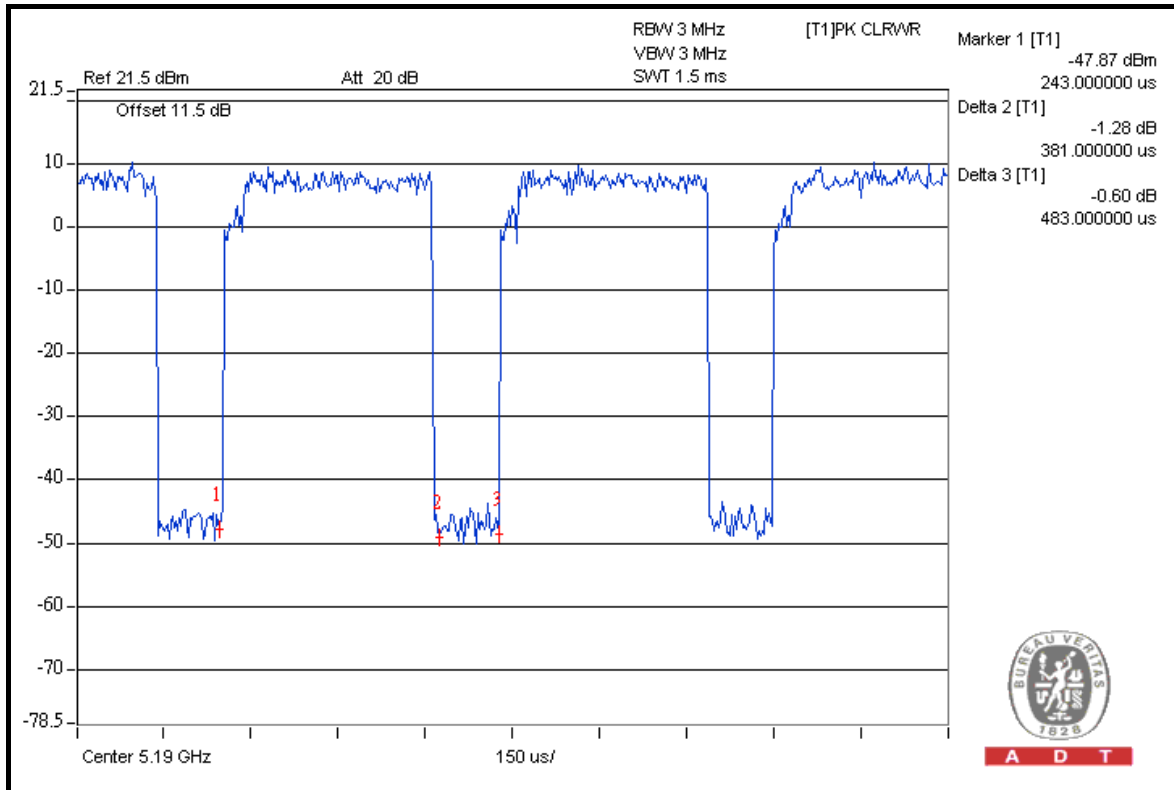
802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)		TOTAL POWER DENSITY WITHOUT DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL POWER DENSITY WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
38	5190	-4.71	-5.44	-2.11	1.03	-1.08	4	PASS
46	5230	-2.22	-2.47	0.60	1.03	1.63	4	PASS

Duty cycle = $0.381/0.483 = 0.789$, Duty factor = $10 * \log(1/0.789) = 1.03$



A D T

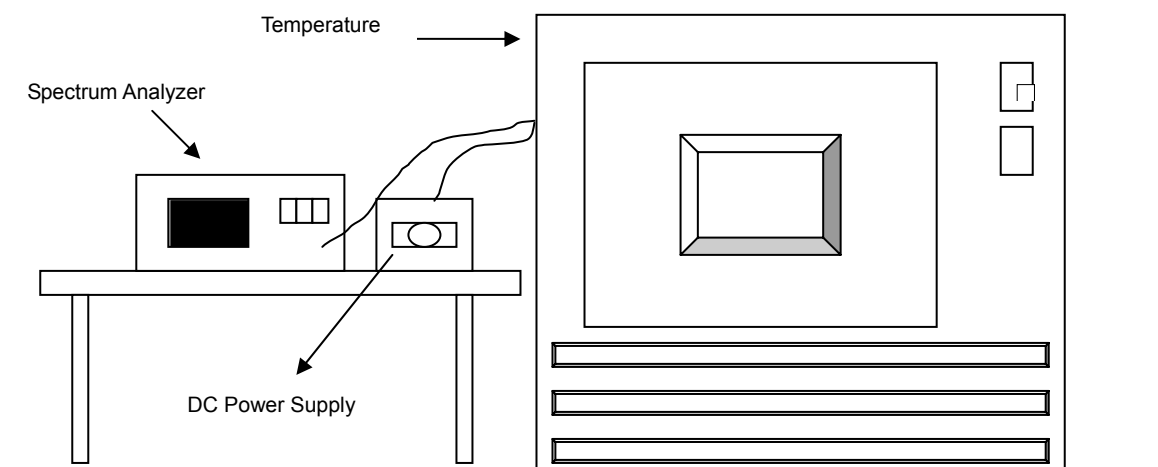


4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency of the carrier signal shall be maintained within band of operation

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.6.4 TEST PROCEDURE

- a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- b. Turn the EUT on and couple its output to a spectrum analyzer.
- c. Turn the EUT off and set the chamber to the highest temperature specified.
- d. 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.
- e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- f. 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.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Set the EUT transmit at un-modulation mode to test frequency stability.

4.6.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5200MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
55	110.0	5199.988685	-2.176	5199.988190	-2.271	5199.988266	-2.257	5199.988653	-2.182
50	110.0	5199.988092	-2.290	5199.988284	-2.253	5199.988844	-2.145	5199.988337	-2.243
40	110.0	5199.989764	-1.968	5199.990350	-1.856	5199.989883	-1.946	5199.989877	-1.947
30	110.0	5199.990837	-1.762	5199.991170	-1.698	5199.991186	-1.695	5199.990856	-1.758
20	110.0	5199.992649	-1.414	5199.992924	-1.361	5199.992610	-1.421	5199.992343	-1.473
10	110.0	5199.990564	-1.815	5199.990924	-1.745	5199.991075	-1.716	5199.990599	-1.808
0	110.0	5199.990143	-1.896	5199.989962	-1.930	5199.989739	-1.973	5199.989732	-1.975
-10	110.0	5199.988911	-2.132	5199.988672	-2.178	5199.989210	-2.075	5199.989114	-2.093
-20	110.0	5199.987843	-2.338	5199.987945	-2.318	5199.987496	-2.405	5199.987579	-2.389
-30	110.0	5199.988058	-2.297	5199.988191	-2.271	5199.987690	-2.367	5199.987734	-2.359

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5200MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	93.5	5199.991162	-1.700	5199.991357	-1.662	5199.991354	-1.663	5199.991177	-1.697
	110.0	5199.992649	-1.414	5199.992924	-1.361	5199.992610	-1.421	5199.992343	-1.473
	126.5	5199.990585	-1.811	5199.990573	-1.813	5199.990517	-1.824	5199.990622	-1.803

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



6. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

Copies of accreditation and authorization 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: 886-2-26051924

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

Email: service.adt@tw.bureauveritas.com

Web Site: www.adt.com.tw

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

7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---