



# FCC TEST REPORT (15.247)

**REPORT NO.:** RF121114E06

**MODEL NO.:** ZoneFlex 7055

**FCC ID:** S9GZF7055

**RECEIVED:** Nov. 14, 2012

**TESTED:** Nov. 21 to Dec. 03, 2012

**ISSUED:** Dec. 18, 2012

**APPLICANT:** Ruckus Wireless, Inc.

**ADDRESS:** 350 West Java Drive, Sunnyvale, CA 94089

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

**LAB ADDRESS :** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

**TEST LOCATION (1):** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

**TEST LOCATION (2):** No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification



A D T

## Table of Contents

RELEASE CONTROL RECORD .....	5
1. CERTIFICATION .....	6
2. SUMMARY OF TEST RESULTS .....	7
2.1 MEASUREMENT UNCERTAINTY .....	8
3. GENERAL INFORMATION .....	9
3.1 GENERAL DESCRIPTION OF EUT .....	9
3.2 DESCRIPTION OF TEST MODES .....	12
3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL .....	13
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS .....	17
3.4 DESCRIPTION OF SUPPORT UNITS.....	18
3.5 CONFIGURATION OF SYSTEM UNDER TEST .....	19
4. TEST TYPES AND RESULTS (For 2.4GHz, 2412 ~ 2462MHz Band).....	22
4.1 CONDUCTED EMISSION MEASUREMENT .....	22
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	22
4.1.2 TEST INSTRUMENTS.....	22
4.1.3 TEST PROCEDURES .....	23
4.1.4 DEVIATION FROM TEST STANDARD .....	23
4.1.5 TEST SETUP .....	24
4.1.6 EUT OPERATING CONDITIONS .....	24
4.1.7 TEST RESULTS (MODE 1) .....	25
4.1.8 TEST RESULTS (MODE 2) .....	27
4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	29
4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	29
4.2.2 TEST INSTRUMENTS.....	30
4.2.3 TEST PROCEDURES .....	32
4.2.4 DEVIATION FROM TEST STANDARD .....	32
4.2.5 TEST SETUP .....	33
4.2.6 EUT OPERATING CONDITIONS .....	33
4.2.7 TEST RESULTS .....	34
4.3 6dB BANDWIDTH MEASUREMENT .....	47
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	47
4.3.2 TEST INSTRUMENTS.....	47
4.3.3 TEST PROCEDURE.....	47
4.3.4 DEVIATION FROM TEST STANDARD .....	47
4.3.5 TEST SETUP .....	47
4.3.6 EUT OPERATING CONDITIONS .....	47
4.3.7 TEST RESULTS .....	48
4.4 CONDUCTED OUTPUT POWER MEASUREMENT .....	49
4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT .....	49
4.4.2 INSTRUMENTS.....	49



A D T

4.4.3	TEST PROCEDURES .....	49
4.4.4	DEVIATION FROM TEST STANDARD .....	49
4.4.5	TEST SETUP .....	49
4.4.6	EUT OPERATING CONDITIONS .....	49
4.4.7	TEST RESULTS .....	50
4.5	POWER SPECTRAL DENSITY MEASUREMENT .....	51
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	51
4.5.2	TEST INSTRUMENTS.....	51
4.5.3	TEST PROCEDURE.....	51
4.5.4	DEVIATION FROM TEST STANDARD .....	51
4.5.5	TEST SETUP .....	51
4.5.6	EUT OPERATING CONDITION.....	51
4.5.7	TEST RESULTS .....	52
4.6	CONDUCTED OUT-BAND EMISSION MEASUREMENT.....	53
4.6.1	LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT.....	53
4.6.2	TEST INSTRUMENTS.....	53
4.6.3	TEST PROCEDURE.....	53
4.6.4	DEVIATION FROM TEST STANDARD .....	54
4.6.5	TEST SETUP .....	54
4.6.6	EUT OPERATING CONDITION.....	54
4.6.7	TEST RESULTS .....	54
5.	TEST TYPES AND RESULTS (For 5GHz, 5725~5850MHz Band).....	59
5.1	CONDUCTED EMISSION MEASUREMENT .....	59
5.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	59
5.1.2	TEST INSTRUMENTS.....	59
5.1.3	TEST PROCEDURES .....	60
5.1.4	DEVIATION FROM TEST STANDARD .....	60
5.1.5	TEST SETUP .....	61
5.1.6	EUT OPERATING CONDITIONS .....	61
5.1.7	TEST RESULTS (MODE 1) .....	62
5.1.8	TEST RESULTS (MODE 2) .....	64
5.2	RADIATED AND BANDEDGE EMISSION MEASUREMENT .....	66
5.2.1	LIMITS OF RADIATED AND BANDEDGE EMISSION MEASUREMENT .....	66
5.2.2	TEST INSTRUMENTS.....	67
5.2.3	TEST PROCEDURES .....	69
5.2.4	DEVIATION FROM TEST STANDARD .....	69
5.2.5	TEST SETUP .....	70
5.2.6	EUT OPERATING CONDITIONS .....	70
5.2.7	TEST RESULTS .....	71
5.3	6dB BANDWIDTH MEASUREMENT .....	80
5.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	80
5.3.2	TEST INSTRUMENTS.....	80



A D T

5.3.3	TEST PROCEDURE.....	80
5.3.4	DEVIATION FROM TEST STANDARD.....	80
5.3.5	TEST SETUP .....	80
5.3.6	EUT OPERATING CONDITIONS .....	80
5.3.7	TEST RESULTS .....	81
5.4	CONDUCTED OUTPUT POWER MEASUREMENT .....	82
5.4.1	LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT .....	82
5.4.2	INSTRUMENTS.....	82
5.4.3	TEST PROCEDURES .....	82
5.4.4	DEVIATION FROM TEST STANDARD.....	82
5.4.5	TEST SETUP .....	82
5.4.6	EUT OPERATING CONDITIONS .....	82
5.4.7	TEST RESULTS .....	83
5.5	POWER SPECTRAL DENSITY MEASUREMENT.....	84
5.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	84
5.5.2	TEST INSTRUMENTS.....	84
5.5.3	TEST PROCEDURE.....	84
5.5.4	DEVIATION FROM TEST STANDARD.....	84
5.5.5	TEST SETUP .....	84
5.5.6	EUT OPERATING CONDITION.....	84
5.5.7	TEST RESULTS .....	85
5.6	CONDUCTED OUT-BAND EMISSION MEASUREMENT.....	86
5.6.1	LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT.....	86
5.6.2	TEST INSTRUMENTS.....	86
5.6.3	TEST PROCEDURE.....	86
5.6.4	DEVIATION FROM TEST STANDARD.....	87
5.6.5	TEST SETUP .....	87
5.6.6	EUT OPERATING CONDITION.....	87
5.6.7	TEST RESULTS .....	87
6.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	91
7.	INFORMATION ON THE TESTING LABORATORIES .....	92
8.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	93



A D T

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF121114E06	Original release	Dec. 18, 2012



A D T

## 1. CERTIFICATION

**PRODUCT:** ZoneFlex 7055 Access Point  
**BRAND NAME:** Ruckus Wireless  
**MODEL NO.:** ZoneFlex 7055  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**APPLICANT:** Ruckus Wireless, Inc.  
**TESTED:** Nov. 21 to Dec. 03, 2012  
**STANDARDS:** FCC Part 15, Subpart C (Section 15.247)  
ANSI C63.10-2009

The above equipment (Model: ZoneFlex 7055) 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** :  , **DATE:** Dec. 18, 2012  
( Midoli Peng, Specialist )

**APPROVED BY** :  , **DATE:** Dec. 18, 2012  
( May Chen, Deputy Manager )



A D T

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

### For 2.4GHz, 2412~2462MHz Band

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -2.15dB at 0.32969MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2390.00MHz & 2483.5MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

### For 5GHz, 5745~5825MHz Band

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -2.27dB at 0.32578MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.4dB at 250.0MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

**NOTE:** The EUT was operating in 2.400 ~ 2.4835GHz, 5.15~5.25GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 2.400 ~ 2.4835GHz and 5.725~5.850GHz. For the 5.15~5.25GHz RF parameters was recorded in another test report.



A D T

## 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:

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

Measurement	Value
Conducted emissions	2.98 dB
Radiated emissions (30MHz-1GHz)	5.59 dB
Radiated emissions (1GHz -6GHz)	3.84 dB
Radiated emissions (6GHz -18GHz)	4.09 dB
Radiated emissions (18GHz -40GHz)	4.24 dB





A D T

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	ZoneFlex 7055 Access Point
<b>MODEL NO.</b>	ZoneFlex 7055
<b>POWER SUPPLY</b>	DC 48V from power adapter or POE
<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: up to 11Mbps 802.11g/a: up to 54Mbps 802.11n (HT20, 800ns GI): up to 130Mbps 802.11n (HT40, 800ns GI): up to 270Mbps 802.11n (HT20, 400ns GI): up to 144.4Mbps 802.11n (HT40, 400ns GI): up to 300Mbps
<b>OPERATING FREQUENCY</b>	<b>For 15.407</b> 5.18 ~ 5.24GHz <b>For 15.247</b> 2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.745 ~ 5.825GHz
<b>NUMBER OF CHANNEL</b>	<b>For 15.407</b> 4 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40) <b>For 15.247 (2.4GHz)</b> 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40) <b>For 15.247 (5GHz)</b> 5 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40)
<b>MAXIMUM OUTPUT POWER</b>	<b>For 15.407</b> 802.11a: 42.658mW 802.11n (HT20): 47.989mW 802.11n (HT40): 45.927mW <b>For 15.247 (2.4GHz)</b> 802.11b: 134.896mW 802.11g: 229.087mW 802.11n (HT20): 422.726mW 802.11n (HT40): 381.193mW <b>For 15.247 (5GHz)</b> 802.11a: 154.882mW 802.11n (HT20): 313.537mW 802.11n (HT40): 282.807mW



A D T

<b>ANTENNA TYPE</b>	Please see NOTE
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	Refer to user's manual
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

1. There are 2.4GHz and 5GHz WLAN technology used for the EUT. The test report of EUT listed as below table:

Function	Report No.
WLAN	RF121114E06 (15.247) RF121114E06-1(15.407)

2. The EUT must be supplied with a power adapter or POE as below :

Adapter(Only for test not for sale)		
Brand	Model No.	Spec.
UMEC	UP0301U-48PP	AC Input : 100-240V, 0.8A, 50/60Hz AC Input cable(unshielded ,1m) DC Output : 48V, 0.62A DC output cable(unshielded ,1.8m)
POE(Only for test not for sale)		
Brand	Model No.	Spec.
Ruckus Wireless	740-64217-001	AC Input : 100-240V, 1A, 50/60Hz DC Output : 48V, 1250mA DC output cable(unshielded ,1.5m)

For radiated emissions test, the EUT was pre-tested with above adapter & POE, the worst case was found in POE. Therefore only the test data of the POE was recorded in this report.

3. The antennas provided to the EUT, please refer to the following table:

Frequency	Antenna Type	Antenna Gain (dBi)	Connector
2.4GHz	PIFA	3.2	NA
5GHz	PIFA	5.4	NA



A D T

4. The EUT is 2 \* 2 MIMO without 802.11n beam forming function.

<b>MODULATION MODE</b>	<b>Tx/Rx FUNCTION</b>
<b>802.11a</b>	1Tx/2Rx(diversity)
<b>802.11b</b>	1Tx/2Rx(diversity)
<b>802.11g</b>	1Tx/2Rx(diversity)
<b>802.11n (HT20)</b>	2Tx/2Rx
<b>802.11n (HT40)</b>	2Tx/2Rx

5. Spurious emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.
6. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 15.
7. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



### 3.2 DESCRIPTION OF TEST MODES

#### Operated in 2400 ~ 2483.5MHz band:

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20):

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

7 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

#### Operated in 5725 ~ 5850MHz band:

5 channels are provided for 802.11a, 802.11n (HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY
151	5755 MHz
159	5795 MHz





A D T

**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)
For 2.4 GHz 802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5
For 5 GHz 802.11n (HT20)	149 to 165	165	OFDM	BPSK	6.5

**RADIATED EMISSION TEST (ABOVE 1 GHz):**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
For 5 GHz 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5



A D T

### **ANTENNA PORT CONDUCTED MEASUREMENT:**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
For 5 GHz 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5

### **CONDUCTED OUT-BAND EMISSION MEASUREMENT:**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
For 5 GHz 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5



A D T

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	26deg. C, 61%RH	120Vac, 60Hz	JyunChun Lin
RE<1G	23deg. C, 70%RH	120Vac, 60Hz	Robert Cheng
RE <sup>3</sup> 1G	26deg. C, 72%RH	120Vac, 60Hz	Amos Chuang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Amos Chuang
OB	25deg. C, 60%RH	120Vac, 60Hz	Amos Chuang



### 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 C (15.247)**  
**558074 D01 DTS Meas Guidance**  
**662911 D01 Multiple Transmitter Output**  
**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.



A D T

### 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.

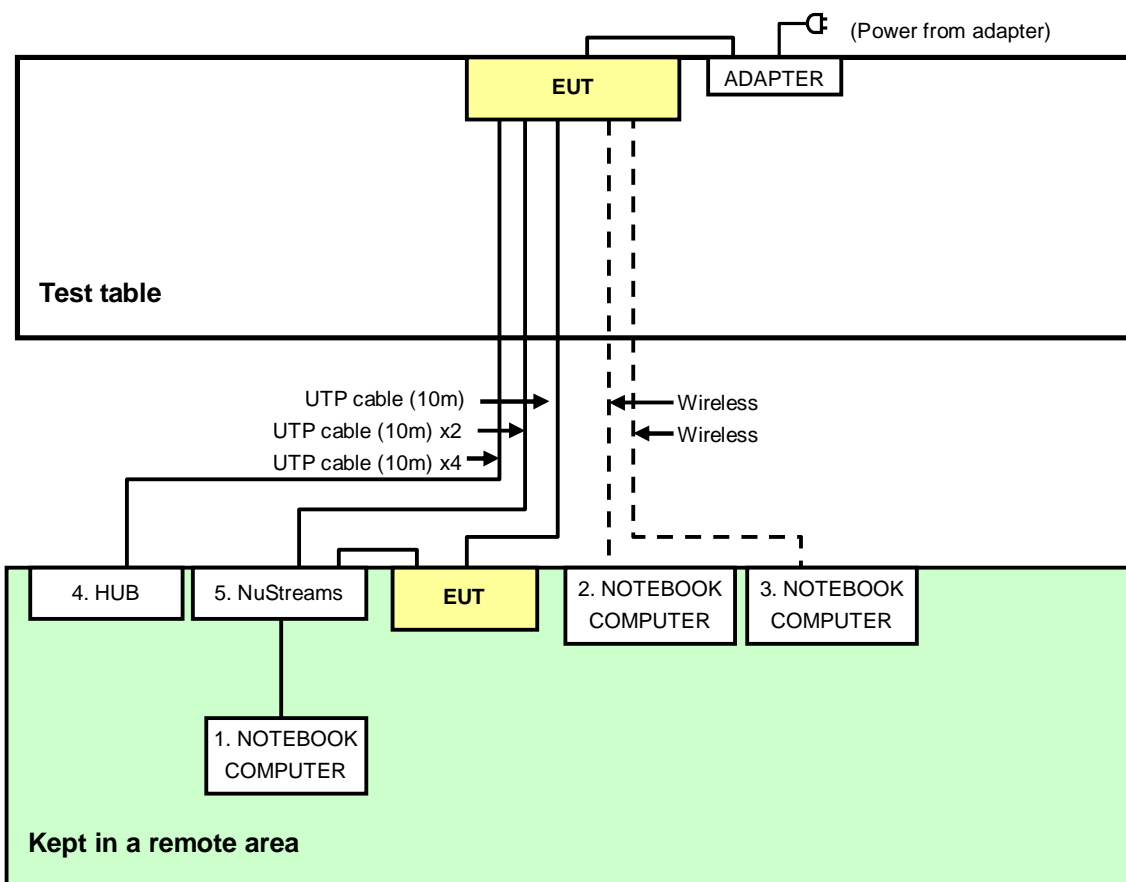
For conducted emission test					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	E6420	B92T3R1	FCC DoC
2	NOTEBOOK COMPUTER	DELL	PP32LA	HSLB32S	FCC DoC
3	NOTEBOOK COMPUTER	DELL	PP27L	6YLB32S	FCC DoC
4	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC
5	NuStreams	XTRAMUS	NuStreams-600i	0JNS06C00047	NA
For other test items					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	NOTEBOOK COMPUTER	DELL	PP32LA	GSLB32S	FCC DoC
3	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC

For conducted emission test	
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable, 3m
2	NA
3	NA
4	UTP cable, 10m
5	UTP cable, 10m
For other test items	
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable, 10m
2	UTP cable, 10m
3	UTP cable, 10m

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

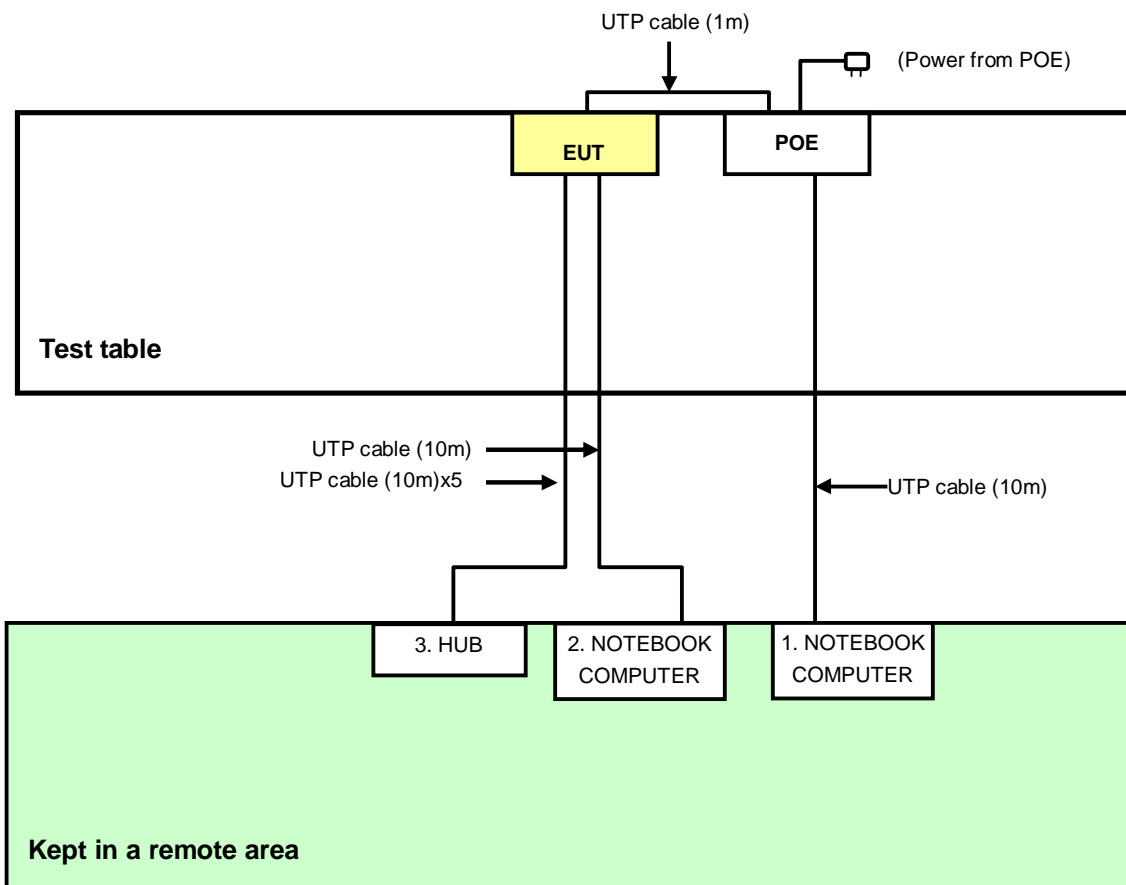
### 3.5 CONFIGURATION OF SYSTEM UNDER TEST

For conducted emission (Adapter mode) test





**For other test items**





A D T

## 4. TEST TYPES AND RESULTS (FOR 2.4GHz, 2412 ~ 2462MHz Band)

### 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.

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100287	Feb. 29, 2012	Feb. 28, 2013
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK 8127	8127-523	Sep. 19, 2012	Sep. 20, 2013
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ESH3-Z5	848773/004	Oct. 29, 2012	Oct. 28, 2013
RF Cable (JYEBAO)	5DFB	COACAB-002	Aug. 05, 2012	Aug. 04, 2013
50 ohms Terminator	50	3	Oct. 23, 2012	Oct. 22, 2013
Software ADT	BV ADT_Cond_V7.3.7 .3	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 Shielded Room No. A.
3. The VCCI Con A Registration No. is C-817.
4. Tested Date: Dec. 03, 2012



A D T

#### 4.1.3 TEST PROCEDURES

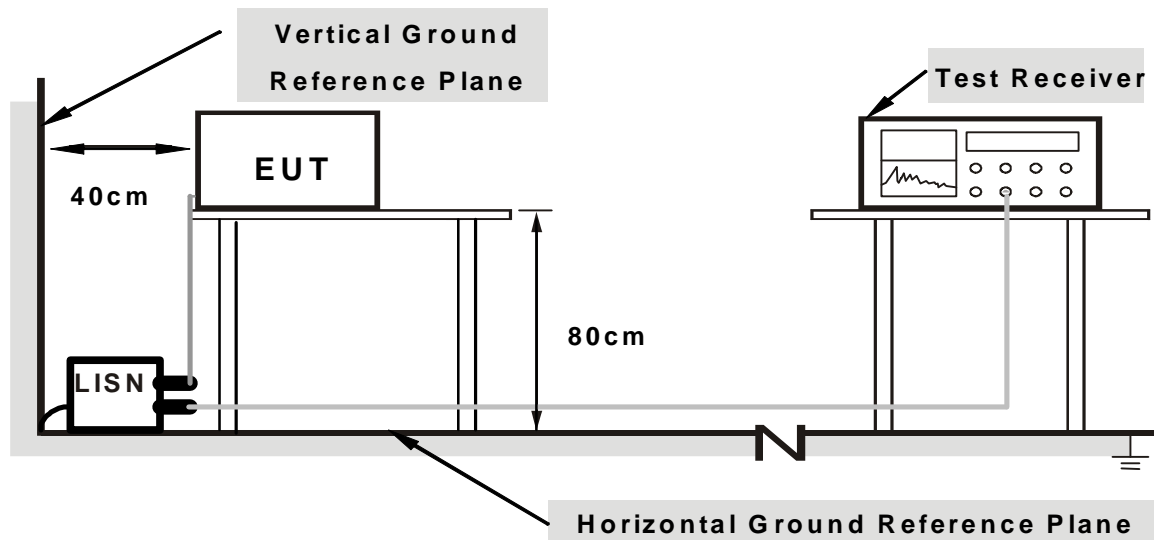
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.
- b. The two LISNs provide 50 ohm/ 50uH of coupling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

**NOTE:** The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 TEST SETUP



**Note: 1.Support units were connected to second LISN.**

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

#### 4.1.6 EUT OPERATING CONDITIONS

1. Turn on the power of all equipment.
2. Support unit 1 (NB) runs “Nu-Lite XM-23L4 .exe” program to enable of EUT via support unit 5 (NuStreams).
3. Support unit 5 (NuStreams) transmits messages to and receives messages of EUT via UTP cables.
4. Support units 2~3 (NB) run “Ping.exe” program to enable EUT under transmission/receiving condition continuously via wireless.



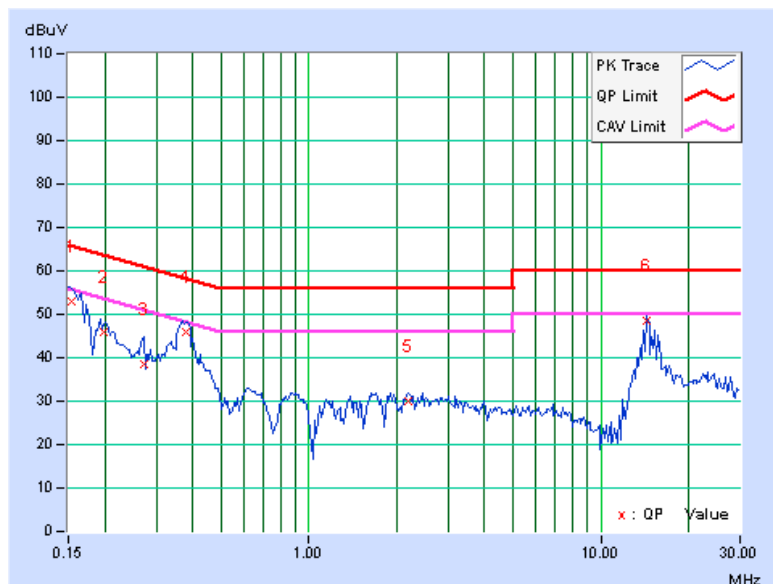
#### 4.1.7 TEST RESULTS (MODE 1)

<b>PHASE</b>	Line (L)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
--------------	----------	--------------------------	--------------------------------

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	0.15391	0.09	52.83	39.45	52.92	39.54	65.79	55.79	-12.87	-16.25
2	0.19847	0.10	45.98	32.98	46.08	33.08	63.67	53.67	-17.59	-20.59
3	0.27109	0.12	38.47	26.29	38.59	26.41	61.08	51.08	-22.50	-24.68
4	0.38047	0.15	45.60	36.88	45.75	37.03	58.27	48.27	-12.52	-11.24
5	2.18359	0.26	29.58	23.55	29.84	23.81	56.00	46.00	-26.16	-22.19
6	14.29688	0.61	47.97	46.74	48.58	47.35	60.00	50.00	-11.42	-2.65

#### REMARKS:

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

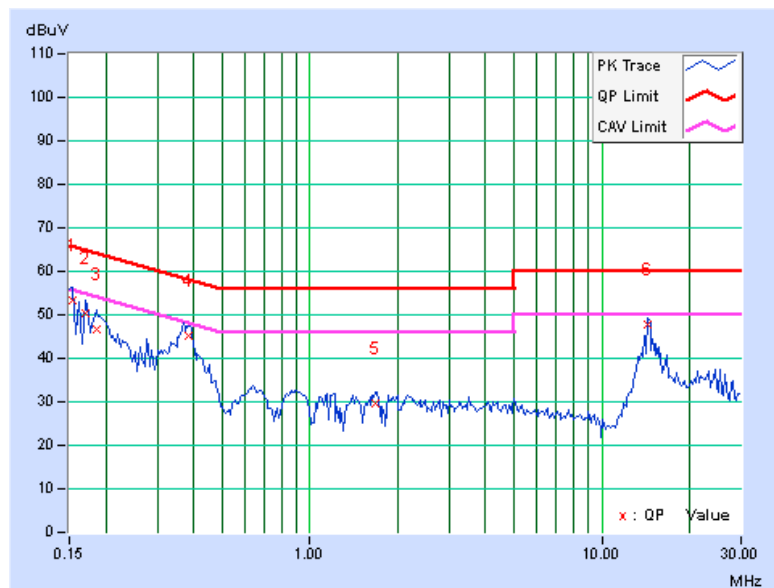


<b>PHASE</b>	Neutral (N)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
--------------	-------------	--------------------------	--------------------------------

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	0.15391	0.10	53.19	39.30	53.29	39.40	65.79	55.79	-12.50	-16.39
2	0.16953	0.10	50.30	37.93	50.40	38.03	64.98	54.98	-14.58	-16.95
3	0.18516	0.11	46.49	32.32	46.60	32.43	64.25	54.25	-17.66	-21.83
4	0.38650	0.16	45.07	36.88	45.23	37.04	58.14	48.14	-12.91	-11.10
5	1.68750	0.22	29.48	22.36	29.70	22.58	56.00	46.00	-26.30	-23.42
6	14.29688	0.59	47.28	46.01	47.87	46.60	60.00	50.00	-12.13	-3.40

**REMARKS:**

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



#### 4.1.8 TEST RESULTS (MODE 2)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

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	0.16562	0.09	48.77	45.03	48.86	45.12	65.18	55.18	-16.32	-10.06
2	0.32969	0.13	51.44	46.89	51.57	47.02	59.46	49.46	-7.89	-2.44
3	0.59922	0.16	38.39	33.17	38.55	33.33	56.00	46.00	-17.45	-12.67
4	0.92344	0.18	32.62	26.78	32.80	26.96	56.00	46.00	-23.20	-19.04
5	13.54297	0.60	36.25	31.01	36.85	31.61	60.00	50.00	-23.15	-18.39
6	22.42188	0.77	34.94	29.62	35.71	30.39	60.00	50.00	-24.29	-19.61

#### REMARKS:

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

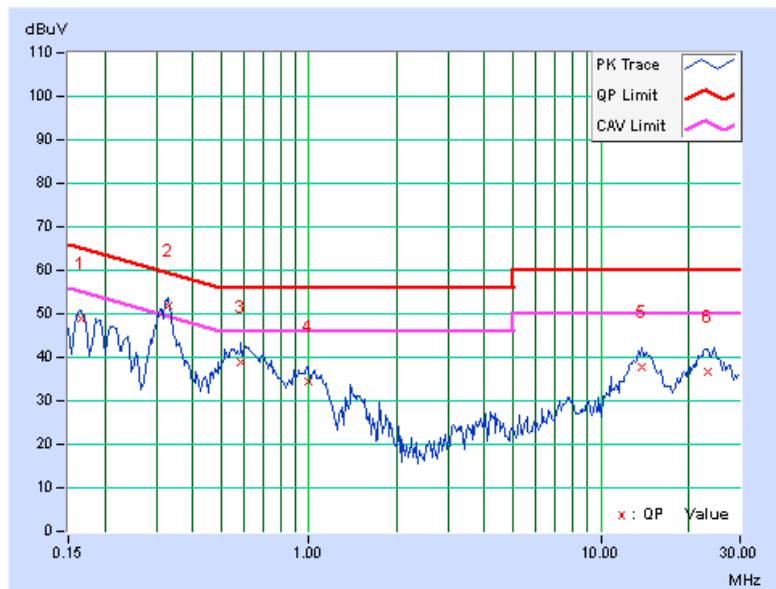


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

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	0.16562	0.10	48.75	45.21	48.85	45.31	65.18	55.18	-16.33	-9.87
<b>2</b>	<b>0.32969</b>	<b>0.14</b>	<b>51.60</b>	<b>47.17</b>	<b>51.74</b>	<b>47.31</b>	<b>59.46</b>	<b>49.46</b>	<b>-7.72</b>	<b>-2.15</b>
3	0.58750	0.17	38.77	32.74	38.94	32.91	56.00	46.00	-17.06	-13.09
4	0.99766	0.18	34.20	28.71	34.38	28.89	56.00	46.00	-21.62	-17.11
5	13.81641	0.58	37.27	32.09	37.85	32.67	60.00	50.00	-22.15	-17.33
6	23.14844	0.78	35.91	30.63	36.69	31.41	60.00	50.00	-23.31	-18.59

**REMARKS:**

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



## 4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

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. 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.



A D T

## 4.2.2 TEST INSTRUMENTS

### Below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
Pre-Selector Agilent	N9039A	MY46520310	Sep. 03, 2012	Sep. 02, 2013
Signal Generator Agilent	N5181A	MY49060347	July 24, 2012	July 23, 2013
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02465	Feb. 27, 2012	Feb. 26, 2013
SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Apr. 06, 2012	Apr. 05, 2013
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 23, 2011	Nov. 22, 2012
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 27, 2011	Dec. 26, 2012
RF Cable	NA	CHHCAB_001	Oct. 07, 2012	Oct. 06, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5. The CANADA Site Registration No. is IC 7450H-3.
6. Tested Date: Nov. 21, 2012



A D T

**Above 1GHz test:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250254	July 09, 2012	July 08, 2013
Pre-Selector Agilent	N9039A	MY46520311	July 09, 2012	July 08, 2013
Signal Generator Agilent	N5181A	MY49060517	July 09, 2012	July 08, 2013
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 26, 2012	June 25, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Apr. 09, 2012	Apr. 08, 2013
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 26, 2011	Dec. 25, 2012
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
- 5 The VCCI Site Registration No. is G-137.
- 6 The CANADA Site Registration No. is IC 7450H-2.
- 7 Tested Date: Nov. 22, 2012

#### 4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters 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 height of antenna 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**NOTE:**

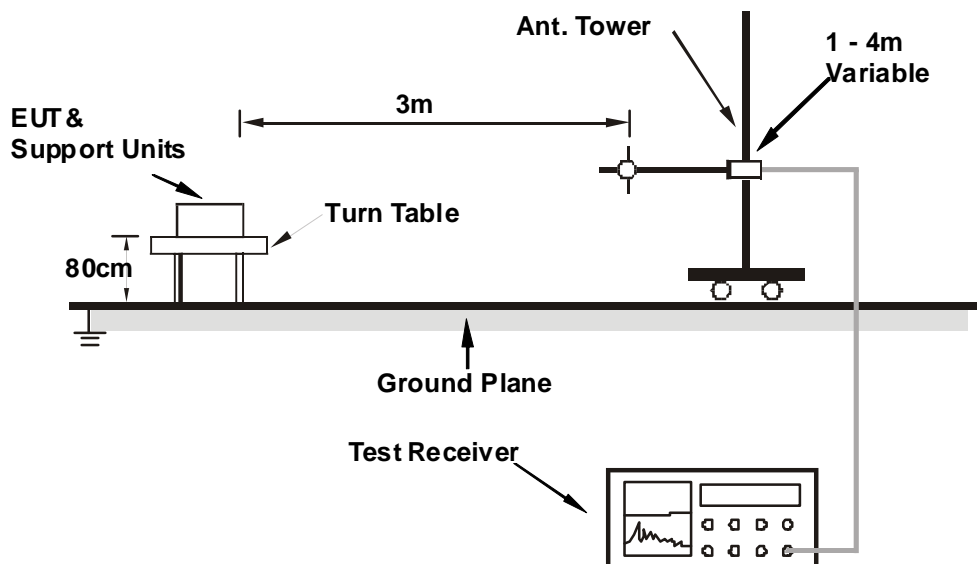
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.
4. 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



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

#### 4.2.6 EUT OPERATING CONDITIONS

1. Turn on the power of EUT.
2. The communication partner run test program “artgui.exe” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

## 4.2.7 TEST RESULTS

### BELOW 1GHz WORST-CASE DATA

#### 802.11n (20MHz)

<b>CHANNEL</b>	TX Channel 6	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	Below 1GHz		

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	36.16	31.6 QP	40.0	-8.4	2.00 H	234	18.33	13.24
2	62.45	34.1 QP	40.0	-5.9	2.00 H	164	20.72	13.40
3	249.99	44.9 QP	46.0	-1.1	1.35 H	15	31.53	13.35
4	323.10	40.9 QP	46.0	-5.1	1.00 H	360	25.04	15.89
5	375.08	35.8 QP	46.0	-10.2	1.00 H	44	18.57	17.22
6	875.06	38.5 QP	46.0	-7.5	1.50 H	217	11.37	27.12
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	38.24	37.9 QP	40.0	-2.1	1.35 V	137	24.33	13.57
2	250.03	36.4 QP	46.0	-9.6	1.50 V	127	23.01	13.35
3	374.97	34.1 QP	46.0	-12.0	1.50 V	0	16.83	17.22
4	500.02	36.4 QP	46.0	-9.6	1.00 V	260	16.04	20.39
5	624.96	37.7 QP	46.0	-8.3	1.50 V	0	14.69	22.97
6	875.06	37.1 QP	46.0	-8.9	1.00 V	68	9.94	27.12

#### 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

ABOVE 1GHz DATA

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz~25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.1 PK	74.0	-15.9	1.00 H	269	26.12	31.98
2	2390.00	48.1 AV	54.0	-5.9	1.00 H	269	16.12	31.98
3	*2412.00	106.1 PK			1.00 H	269	74.05	32.05
4	*2412.00	103.7 AV			1.00 H	269	71.65	32.05
5	4824.00	46.1 PK	74.0	-27.9	1.00 H	343	6.52	39.58
6	4824.00	35.7 AV	54.0	-18.3	1.00 H	343	-3.88	39.58

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.4 PK	74.0	-14.6	1.06 V	294	27.42	31.98
2	2390.00	48.3 AV	54.0	-5.7	1.06 V	294	16.32	31.98
3	*2412.00	107.3 PK			1.06 V	294	75.25	32.05
4	*2412.00	104.8 AV			1.06 V	294	72.75	32.05
5	4824.00	47.3 PK	74.0	-26.7	1.01 V	8	7.72	39.58
6	4824.00	38.8 AV	54.0	-15.2	1.01 V	8	-0.78	39.58

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.



A D T

<b>CHANNEL</b>	TX Channel 6	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz~25GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	105.9 PK			1.00 H	294	73.78	32.12
2	*2437.00	103.5 AV			1.00 H	294	71.38	32.12
3	4874.00	46.3 PK	74.0	-27.7	1.00 H	349	6.60	39.70
4	4874.00	36.1 AV	54.0	-17.9	1.00 H	349	-3.60	39.70
5	7311.00	51.5 PK	74.0	-22.5	1.00 H	156	3.91	47.59
6	7311.00	40.3 AV	54.0	-13.7	1.00 H	156	-7.29	47.59

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	106.5 PK			1.06 V	296	74.38	32.12
2	*2437.00	103.5 AV			1.06 V	296	71.38	32.12
3	4874.00	47.1 PK	74.0	-26.9	1.00 V	10	7.40	39.70
4	4874.00	39.3 AV	54.0	-14.7	1.00 V	10	-0.40	39.70
5	7311.00	51.8 PK	74.0	-22.2	1.00 V	123	4.21	47.59
6	7311.00	40.9 AV	54.0	-13.1	1.00 V	123	-6.69	47.59

**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.



A D T

<b>CHANNEL</b>	TX Channel 11	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz~25GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.8 PK			1.01 H	293	73.62	32.18
2	*2462.00	103.6 AV			1.01 H	293	71.42	32.18
3	2483.50	57.6 PK	74.0	-16.4	1.01 H	293	25.36	32.24
4	2483.50	46.4 AV	54.0	-7.6	1.01 H	293	14.16	32.24
5	4924.00	47.5 PK	74.0	-26.5	1.00 H	346	7.66	39.84
6	4924.00	36.3 AV	54.0	-17.7	1.00 H	346	-3.54	39.84
7	7386.00	52.7 PK	74.0	-21.3	1.00 H	153	5.18	47.52
8	7386.00	40.5 AV	54.0	-13.5	1.00 H	153	-7.02	47.52

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.2 PK			1.03 V	296	73.02	32.18
2	*2462.00	102.8 AV			1.03 V	296	70.62	32.18
3	2483.50	57.5 PK	74.0	-16.5	1.03 V	296	25.26	32.24
4	2483.50	46.3 AV	54.0	-7.7	1.03 V	296	14.06	32.24
5	4924.00	47.9 PK	74.0	-26.1	1.00 V	11	8.06	39.84
6	4924.00	41.1 AV	54.0	-12.9	1.00 V	11	1.26	39.84
7	7386.00	51.7 PK	74.0	-22.3	1.00 V	125	4.18	47.52
8	7386.00	40.8 AV	54.0	-13.2	1.00 V	125	-6.72	47.52

**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.

**802.11g**

<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz~25GHz		Average (AV)

<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	2390.00	68.6 PK	74.0	-5.4	1.00 H	268	36.62	31.98
2	2390.00	52.6 AV	54.0	-1.4	1.00 H	268	20.62	31.98
3	*2412.00	105.9 PK			1.00 H	268	73.85	32.05
4	*2412.00	95.3 AV			1.00 H	268	63.25	32.05
5	4824.00	46.7 PK	74.0	-27.3	1.00 H	222	7.12	39.58
6	4824.00	38.8 AV	54.0	-15.2	1.00 H	222	-0.78	39.58
<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	2390.00	72.6 PK	74.0	-1.4	1.06 V	296	40.62	31.98
2	2390.00	52.5 AV	54.0	-1.5	1.06 V	296	20.52	31.98
3	*2412.00	108.1 PK			1.06 V	296	76.05	32.05
4	*2412.00	96.4 AV			1.06 V	296	64.35	32.05
5	4824.00	48.9 PK	74.0	-25.1	1.00 V	155	9.32	39.58
6	4824.00	38.5 AV	54.0	-15.5	1.00 V	155	-1.08	39.58

**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.



A D T

<b>CHANNEL</b>	TX Channel 6	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz~25GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.9 PK	74.0	-17.1	1.00 H	270	24.92	31.98
2	2390.00	45.6 AV	54.0	-8.4	1.00 H	270	13.62	31.98
3	*2437.00	106.2 PK			1.00 H	270	74.08	32.12
4	*2437.00	95.4 AV			1.00 H	270	63.28	32.12
5	2483.50	57.9 PK	74.0	-16.1	1.00 H	270	25.66	32.24
6	2483.50	45.3 AV	54.0	-8.7	1.00 H	270	13.06	32.24
7	4874.00	48.6 PK	74.0	-25.4	1.00 H	220	8.90	39.70
8	4874.00	38.5 AV	54.0	-15.5	1.00 H	220	-1.20	39.70
9	7311.00	53.6 PK	74.0	-20.4	1.00 H	153	6.01	47.59
10	7311.00	41.5 AV	54.0	-12.5	1.00 H	153	-6.09	47.59

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.6 PK	74.0	-16.4	1.04 V	294	25.62	31.98
2	2390.00	45.6 AV	54.0	-8.4	1.04 V	294	13.62	31.98
3	*2437.00	106.8 PK			1.04 V	294	74.68	32.12
4	*2437.00	95.4 AV			1.04 V	294	63.28	32.12
5	2483.50	57.2 PK	74.0	-16.8	1.04 V	294	24.96	32.24
6	2483.50	45.3 AV	54.0	-8.7	1.04 V	294	13.06	32.24
7	4874.00	48.5 PK	74.0	-25.5	1.00 V	153	8.80	39.70
8	4874.00	38.3 AV	54.0	-15.7	1.00 V	153	-1.40	39.70
9	7311.00	54.3 PK	74.0	-19.7	1.00 V	121	6.71	47.59
10	7311.00	41.4 AV	54.0	-12.6	1.00 V	121	-6.19	47.59

**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.

<b>CHANNEL</b>	TX Channel 11	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz~25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.3 PK			1.01 H	293	74.12	32.18
2	*2462.00	96.2 AV			1.01 H	293	64.02	32.18
3	2483.50	72.8 PK	74.0	-1.2	1.01 H	293	40.56	32.24
4	2483.50	52.9 AV	54.0	-1.1	1.01 H	293	20.66	32.24
5	4924.00	48.5 PK	74.0	-25.5	1.00 H	221	8.66	39.84
6	4924.00	38.3 AV	54.0	-15.7	1.00 H	221	-1.54	39.84
7	7386.00	53.6 PK	74.0	-20.4	1.00 H	156	6.08	47.52
8	7386.00	41.3 AV	54.0	-12.7	1.00 H	156	-6.22	47.52

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.4 PK			1.02 V	304	73.22	32.18
2	*2462.00	95.6 AV			1.02 V	304	63.42	32.18
3	2483.50	71.7 PK	74.0	-2.3	1.02 V	304	39.46	32.24
4	2483.50	52.1 AV	54.0	-1.9	1.02 V	304	19.86	32.24
5	4924.00	48.6 PK	74.0	-25.4	1.00 V	155	8.76	39.84
6	4924.00	38.5 AV	54.0	-15.5	1.00 V	155	-1.34	39.84
7	7386.00	54.6 PK	74.0	-19.4	1.00 V	123	7.08	47.52
8	7386.00	41.5 AV	54.0	-12.5	1.00 V	123	-6.02	47.52

**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.



**802.11n (20MHz)**

<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz~25GHz		Average (AV)

<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	2390.00	70.6 PK	74.0	-3.4	1.00 H	54	38.62	31.98
2	2390.00	53.0 AV	54.0	-1.0	1.00 H	54	21.02	31.98
3	*2412.00	108.2 PK			1.00 H	54	76.15	32.05
4	*2412.00	96.9 AV			1.00 H	54	64.85	32.05
5	4824.00	49.3 PK	74.0	-24.7	1.00 H	231	9.72	39.58
6	4824.00	36.3 AV	54.0	-17.7	1.00 H	231	-3.28	39.58
<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	2390.00	68.1 PK	74.0	-5.9	1.09 V	306	36.12	31.98
2	2390.00	51.4 AV	54.0	-2.6	1.09 V	306	19.42	31.98
3	*2412.00	109.9 PK			1.09 V	306	77.85	32.05
4	*2412.00	98.9 AV			1.09 V	306	66.85	32.05
5	4824.00	49.9 PK	74.0	-24.1	1.00 V	159	10.32	39.58
6	4824.00	36.5 AV	54.0	-17.5	1.00 V	159	-3.08	39.58

**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.



A D T

<b>CHANNEL</b>	TX Channel 6	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz~25GHz		Average (AV)

**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	2360.00	59.4 PK	74.0	-14.6	1.01 H	50	27.54	31.86
2	2360.00	48.7 AV	54.0	-5.3	1.01 H	50	16.84	31.86
3	*2437.00	109.0 PK			1.01 H	50	76.88	32.12
4	*2437.00	98.5 AV			1.01 H	50	66.38	32.12
5	2483.50	57.5 PK	74.0	-16.5	1.01 H	50	25.26	32.24
6	2483.50	45.5 AV	54.0	-8.5	1.01 H	50	13.26	32.24
7	4874.00	49.5 PK	74.0	-24.5	1.00 H	229	9.80	39.70
8	4874.00	36.5 AV	54.0	-17.5	1.00 H	229	-3.20	39.70
9	7311.00	51.8 PK	74.0	-22.2	1.00 H	311	4.21	47.59
10	7311.00	40.1 AV	54.0	-13.9	1.00 H	311	-7.49	47.59

**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	2360.00	58.4 PK	74.0	-15.6	1.88 V	306	26.54	31.86
2	2360.00	49.0 AV	54.0	-5.0	1.88 V	306	17.14	31.86
3	*2437.00	111.1 PK			1.10 V	306	78.98	32.12
4	*2437.00	100.0 AV			1.10 V	306	67.88	32.12
5	2483.50	58.2 PK	74.0	-15.8	1.10 V	306	25.96	32.24
6	2483.50	45.7 AV	54.0	-8.3	1.10 V	306	13.46	32.24
7	4874.00	49.3 PK	74.0	-24.7	1.00 V	154	9.60	39.70
8	4874.00	36.3 AV	54.0	-17.7	1.00 V	154	-3.40	39.70
9	7311.00	51.8 PK	74.0	-22.2	1.00 V	126	4.21	47.59
10	7311.00	40.5 AV	54.0	-13.5	1.00 V	126	-7.09	47.59

**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.



<b>CHANNEL</b>	TX Channel 11	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz~25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	108.3 PK			1.00 H	50	76.12	32.18
2	*2462.00	97.8 AV			1.00 H	50	65.62	32.18
3	2483.50	68.3 PK	74.0	-5.7	1.00 H	50	36.06	32.24
4	2483.50	48.4 AV	54.0	-5.6	1.00 H	50	16.16	32.24
5	4924.00	49.3 PK	74.0	-24.7	1.00 H	223	9.46	39.84
6	4924.00	36.7 AV	54.0	-17.3	1.00 H	223	-3.14	39.84
7	7386.00	53.3 PK	74.0	-20.7	1.00 H	333	5.78	47.52
8	7386.00	40.3 AV	54.0	-13.7	1.00 H	333	-7.22	47.52

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	108.6 PK			1.10 V	314	76.42	32.18
2	*2462.00	98.1 AV			1.10 V	314	65.92	32.18
<b>3</b>	<b>2483.50</b>	<b>73.0 PK</b>	<b>74.0</b>	<b>-1.0</b>	<b>1.10 V</b>	<b>314</b>	<b>40.76</b>	<b>32.24</b>
4	2483.50	51.0 AV	54.0	-3.0	1.10 V	314	18.76	32.24
5	4924.00	49.1 PK	74.0	-24.9	1.00 V	153	9.26	39.84
6	4924.00	36.9 AV	54.0	-17.1	1.00 V	153	-2.94	39.84
7	7386.00	53.7 PK	74.0	-20.3	1.00 V	121	6.18	47.52
8	7386.00	40.6 AV	54.0	-13.4	1.00 V	121	-6.92	47.52

**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.

**802.11n (40MHz)**

<b>CHANNEL</b>	TX Channel 3	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz~25GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.3 PK	74.0	-1.7	1.00 H	54	40.32	31.98
2	2390.00	53.0 AV	54.0	-1.0	1.00 H	54	21.02	31.98
3	*2422.00	103.1 PK			1.00 H	54	71.02	32.08
4	*2422.00	92.0 AV			1.00 H	54	59.92	32.08
5	4844.00	49.5 PK	74.0	-24.5	1.00 H	221	9.87	39.63
6	4844.00	36.4 AV	54.0	-17.6	1.00 H	221	-3.23	39.63
7	7266.00	53.9 PK	74.0	-20.1	1.00 H	321	6.30	47.60
8	7266.00	41.3 AV	54.0	-12.7	1.00 H	321	-6.30	47.60

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.8 PK	74.0	-1.2	1.11 V	302	40.82	31.98
2	2390.00	51.8 AV	54.0	-2.2	1.11 V	302	19.82	31.98
3	*2422.00	104.8 PK			1.11 V	302	72.72	32.08
4	*2422.00	93.2 AV			1.11 V	302	61.12	32.08
5	4844.00	48.9 PK	74.0	-25.1	1.00 V	155	9.27	39.63
6	4844.00	37.3 AV	54.0	-16.7	1.00 V	155	-2.33	39.63
7	7266.00	54.3 PK	74.0	-19.7	1.00 V	121	6.70	47.60
8	7266.00	42.5 AV	54.0	-11.5	1.00 V	121	-5.10	47.60

**REMARKS:**

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



A D T

<b>CHANNEL</b>	TX Channel 6	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz~25GHz		Average (AV)

**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	2360.00	60.6 PK	74.0	-13.4	1.00 H	55	28.74	31.86
2	2360.00	49.8 AV	54.0	-4.2	1.00 H	55	17.94	31.86
3	2390.00	65.9 PK	74.0	-8.1	1.00 H	56	33.92	31.98
4	2390.00	50.7 AV	54.0	-3.3	1.00 H	56	18.72	31.98
5	*2437.00	104.9 PK			1.00 H	56	72.78	32.12
6	*2437.00	94.4 AV			1.00 H	56	62.28	32.12
7	2483.50	64.9 PK	74.0	-9.1	1.00 H	56	32.66	32.24
8	2483.50	46.7 AV	54.0	-7.3	1.00 H	56	14.46	32.24
9	4874.00	49.5 PK	74.0	-24.5	1.00 H	221	9.80	39.70
10	4874.00	37.3 AV	54.0	-16.7	1.00 H	221	-2.40	39.70
11	7311.00	53.9 PK	74.0	-20.1	1.00 H	332	6.31	47.59
12	7311.00	41.5 AV	54.0	-12.5	1.00 H	332	-6.09	47.59

**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	2360.00	60.8 PK	74.0	-13.2	1.11 V	300	28.94	31.86
2	2360.00	49.1 AV	54.0	-4.9	1.11 V	300	17.24	31.86
3	2390.00	69.1 PK	74.0	-4.9	1.10 V	300	37.12	31.98
4	2390.00	52.3 AV	54.0	-1.7	1.10 V	300	20.32	31.98
5	*2437.00	106.9 PK			1.10 V	300	74.78	32.12
6	*2437.00	96.3 AV			1.10 V	300	64.18	32.12
7	2483.50	69.5 PK	74.0	-4.5	1.10 V	300	37.26	32.24
8	2483.50	49.6 AV	54.0	-4.4	1.10 V	300	17.36	32.24
9	4874.00	48.6 PK	74.0	-25.4	1.00 V	151	8.90	39.70
10	4874.00	38.1 AV	54.0	-15.9	1.00 V	151	-1.60	39.70
11	7311.00	53.6 PK	74.0	-20.4	1.00 V	123	6.01	47.59
12	7311.00	42.5 AV	54.0	-11.5	1.00 V	123	-5.09	47.59

**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.



A D T

<b>CHANNEL</b>	TX Channel 9	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz~25GHz		Average (AV)

**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	*2452.00	103.5 PK			1.00 H	51	71.34	32.16
2	*2452.00	92.5 AV			1.00 H	51	60.34	32.16
3	2483.50	72.8 PK	74.0	-1.2	1.00 H	51	40.56	32.24
4	2483.50	48.4 AV	54.0	-5.6	1.00 H	51	16.16	32.24
5	4904.00	49.5 PK	74.0	-24.5	1.00 H	223	9.73	39.77
6	4904.00	37.1 AV	54.0	-16.9	1.00 H	223	-2.67	39.77
7	7356.00	53.6 PK	74.0	-20.4	1.00 H	326	6.05	47.55
8	7356.00	41.5 AV	54.0	-12.5	1.00 H	326	-6.05	47.55

**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	*2452.00	105.0 PK			1.10 V	301	72.84	32.16
2	*2452.00	93.4 AV			1.10 V	301	61.24	32.16
3	2483.50	72.1 PK	74.0	-1.9	1.10 V	301	39.86	32.24
4	2483.50	50.5 AV	54.0	-3.5	1.10 V	301	18.26	32.24
5	4904.00	39.5 PK	74.0	-34.5	1.00 V	159	-0.27	39.77
6	4904.00	36.9 AV	54.0	-17.1	1.00 V	159	-2.87	39.77
7	7356.00	53.6 PK	74.0	-20.4	1.00 V	129	6.05	47.55
8	7356.00	42.3 AV	54.0	-11.7	1.00 V	129	-5.25	47.55

**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.

### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 14, 2011	Dec. 13, 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. Tested date : Nov. 22, 2012

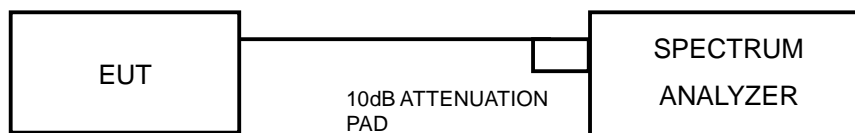
#### 4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.3.5 TEST SETUP



#### 4.3.6 EUT OPERATING CONDITIONS

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



A D T

#### 4.3.7 TEST RESULTS

##### 802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.08	0.5	PASS
6	2437	10.12	0.5	PASS
11	2462	10.11	0.5	PASS

##### 802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.40	0.5	PASS
6	2437	16.45	0.5	PASS
11	2462	16.44	0.5	PASS

##### 802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.64	17.68	0.5	PASS
6	2437	17.69	17.66	0.5	PASS
11	2462	17.64	17.65	0.5	PASS

##### 802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	36.52	36.51	0.5	PASS
6	2437	36.52	36.51	0.5	PASS
9	2452	36.53	36.48	0.5	PASS



## 4.4 CONDUCTED OUTPUT POWER MEASUREMENT

### 4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for  $NANT \leq 4$ ;  
 Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any NANT;  
 Array Gain =  $5 \log(NANT/NSS)$  dB or 3 dB, whichever is less for 20-MHz channel widths with  $NANT \geq 5$ .

For power measurements on all other devices: Array Gain =  $10 \log(NANT/NSS)$  dB.

### 4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 10, 2012	May 09, 2013
Power Sensor	MA2411B	0738172	May 10, 2012	May 09, 2013

- 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. Tested date : Nov. 22, 2012

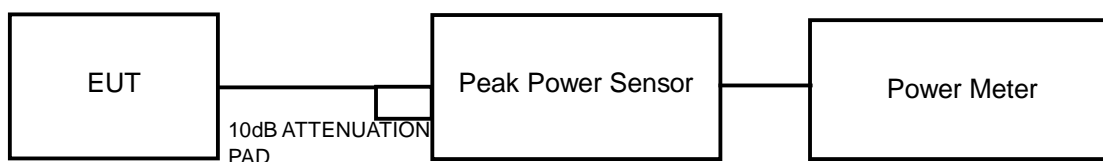
### 4.4.3 TEST PROCEDURES

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

### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.4.5 TEST SETUP



### 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6



A D T

#### 4.4.7 TEST RESULTS

##### 802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	134.896	21.3	30	PASS
6	2437	131.826	21.2	30	PASS
11	2462	131.826	21.2	30	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	223.872	23.5	30	PASS
6	2437	229.087	23.6	30	PASS
11	2462	218.776	23.4	30	PASS

##### 802.11n (HT20)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	23.2	23.1	413.104	26.16	30	PASS
6	2437	23.2	23.3	422.726	26.26	30	PASS
11	2462	23.1	23.2	413.104	26.16	30	PASS

##### 802.11n (HT40)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	23.3	21.0	339.689	25.31	30	PASS
6	2437	22.9	22.7	381.193	25.81	30	PASS
9	2452	21.9	20.9	277.909	24.44	30	PASS

## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Dec. 14, 2011	Dec. 13, 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. Tested date : Nov. 22, 2012

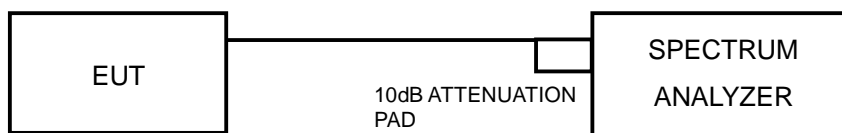
### 4.5.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.5.5 TEST SETUP



### 4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



A D T

## 4.5.7 TEST RESULTS

### 802.11b

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-5.51	8	PASS
6	2437	-5.91	8	PASS
11	2462	-6.02	8	PASS

### 802.11g

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-8.32	8	PASS
6	2437	-9.17	8	PASS
11	2462	-8.53	8	PASS

### 802.11n (HT20)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-11.56	3.01	-8.55	8	PASS
	6	2437	-10.74	3.01	-7.73	8	PASS
	11	2462	-12.29	3.01	-9.28	8	PASS
1	1	2412	-11.77	3.01	-8.76	8	PASS
	6	2437	-10.58	3.01	-7.57	8	PASS
	11	2462	-11.37	3.01	-8.36	8	PASS

### 802.11n (HT40)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-17.16	3.01	-14.15	8	PASS
	6	2437	-14.91	3.01	-11.90	8	PASS
	9	2452	-16.32	3.01	-13.31	8	PASS
1	3	2422	-14.25	3.01	-11.24	8	PASS
	6	2437	-13.46	3.01	-10.45	8	PASS
	9	2452	-16.61	3.01	-13.60	8	PASS



A D T

## 4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

### 4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

### 4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Dec. 14, 2011	Dec. 13, 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. Tested date : Nov. 22, 2012

### 4.6.3 TEST PROCEDURE

#### Measurement Procedure - Reference Level

1. Set the RBW = 100 kHz.
2. Set the VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

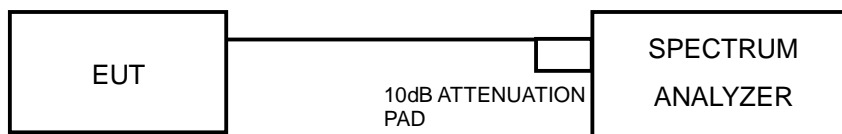
#### Measurement Procedure –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

#### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.6.5 TEST SETUP



#### 4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 4.6.7 TEST RESULTS

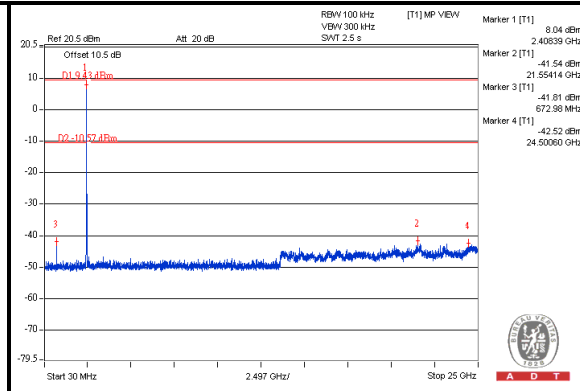
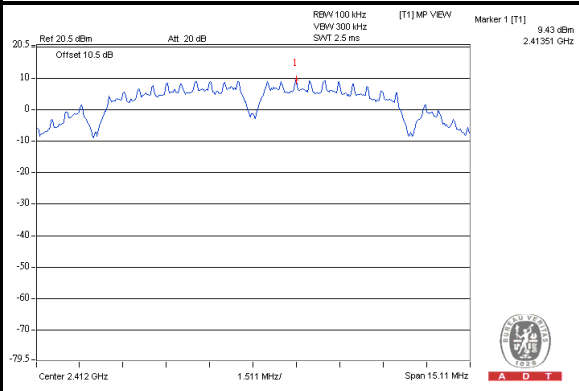
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement



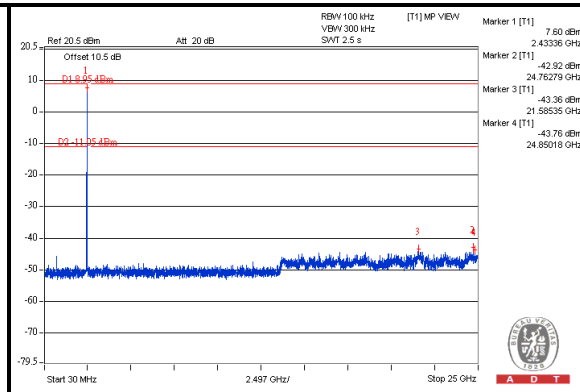
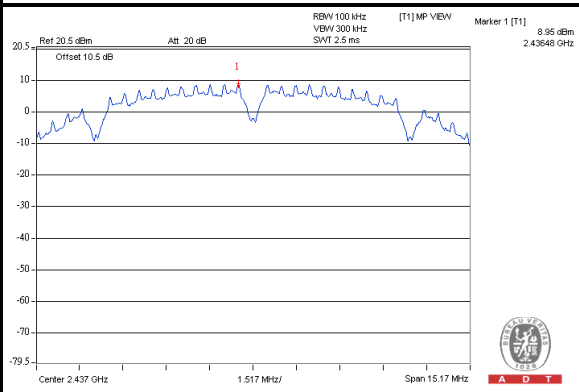
A D T

### 802.11b:

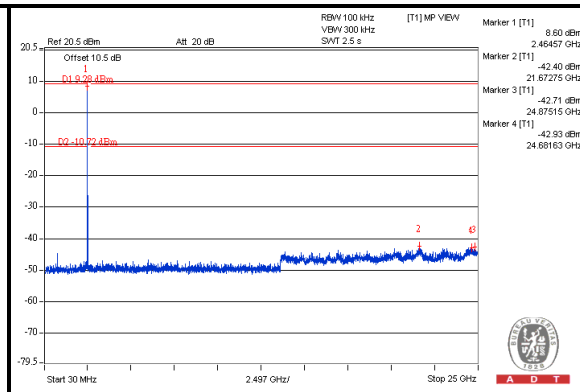
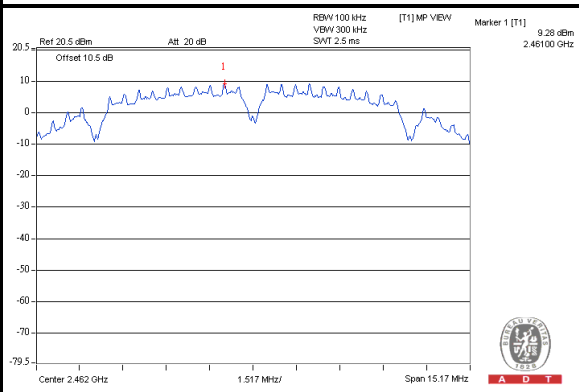
#### CH 1



#### CH 6



#### CH 11

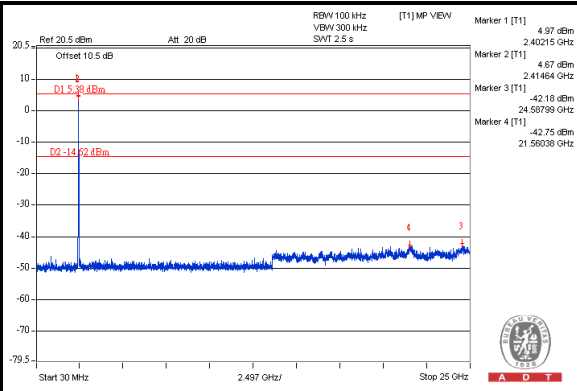
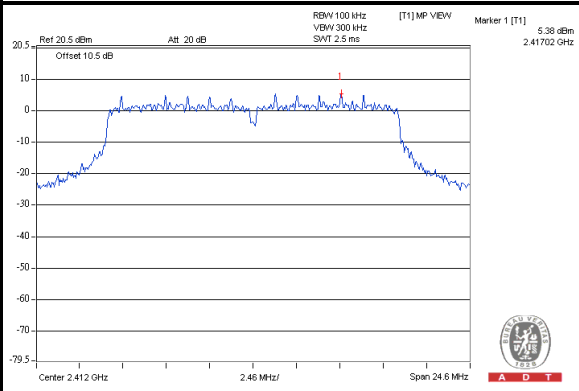




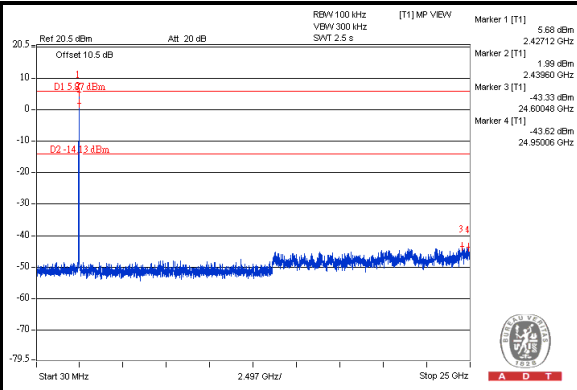
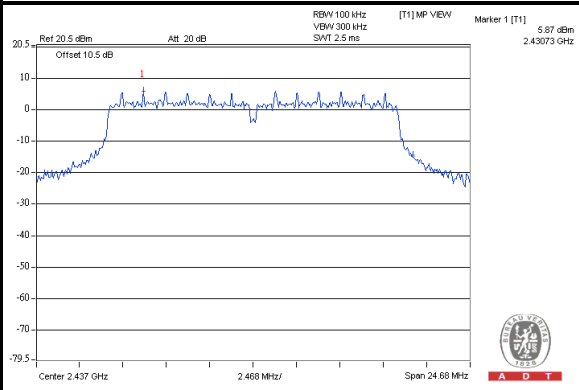
A D T

### 802.11g:

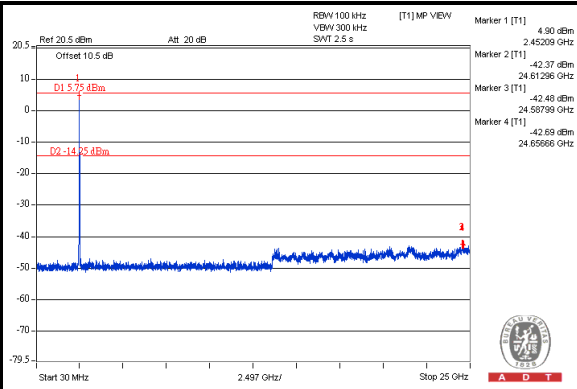
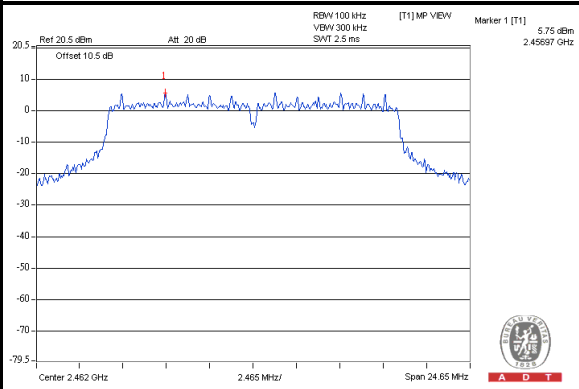
#### CH 1



#### CH 6



#### CH 11



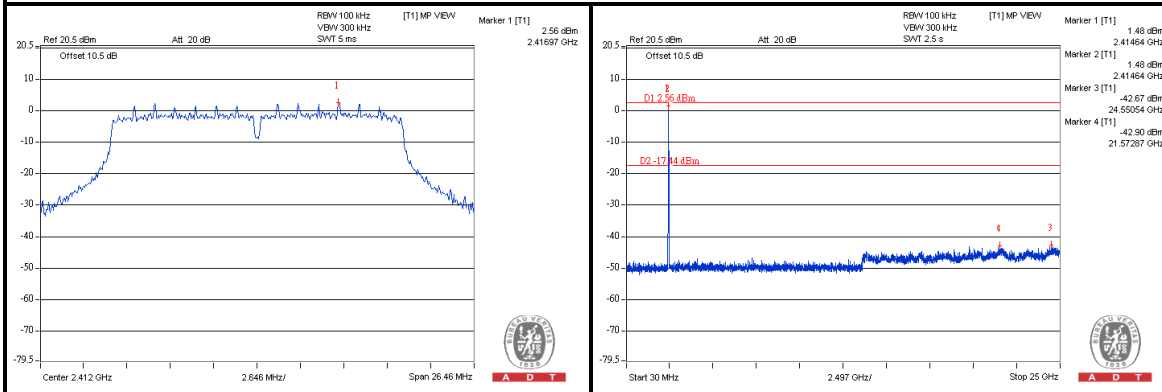




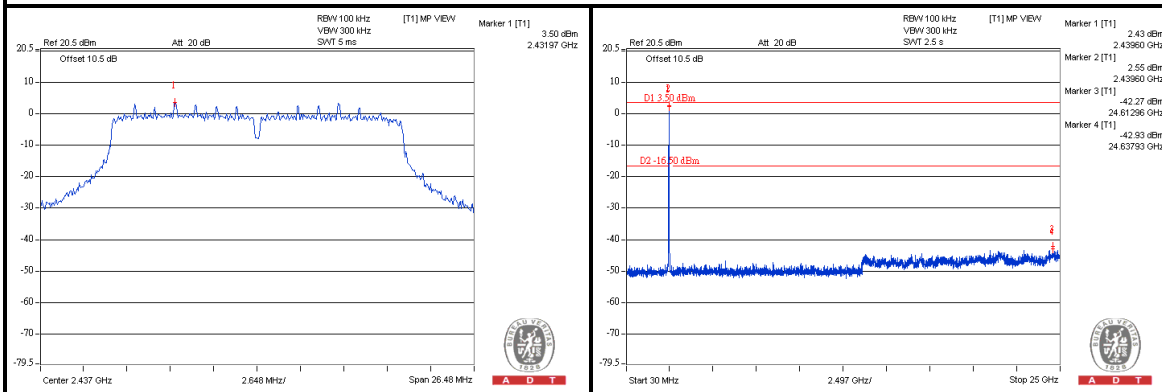
A D T

### 802.11n (HT20):

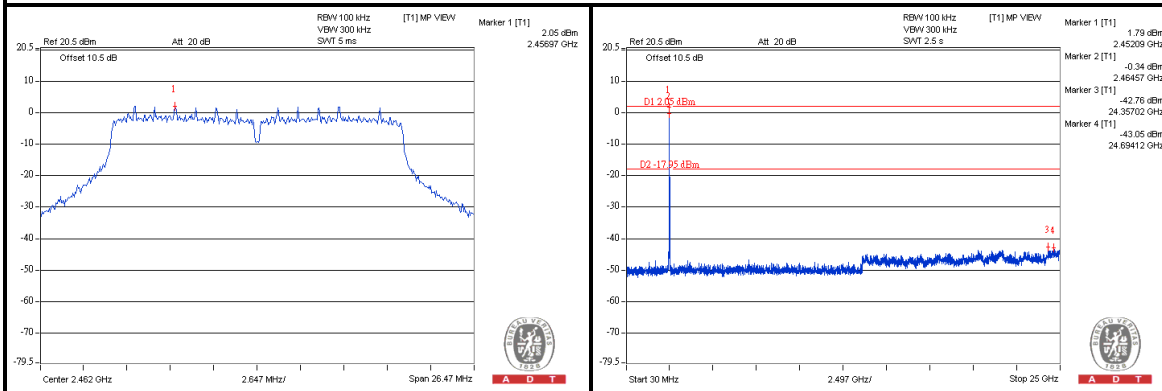
#### CH 1



#### CH 6



#### CH 11

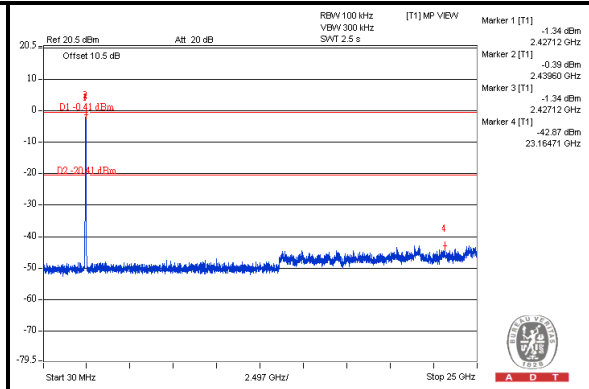
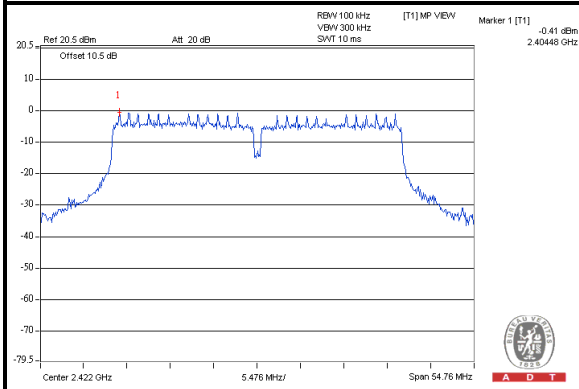




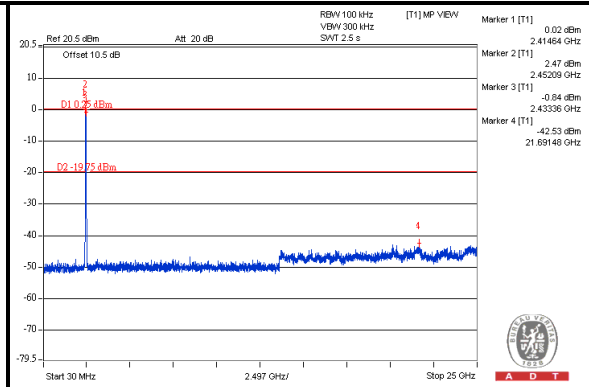
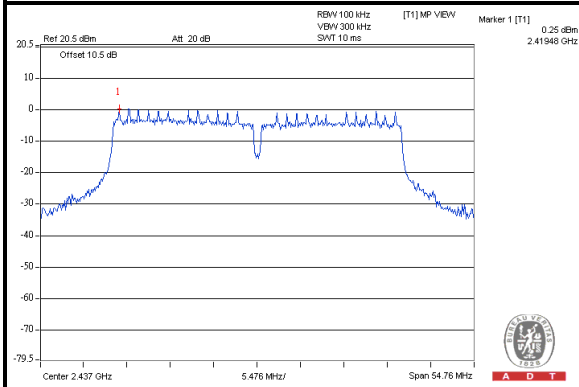
A D T

### 802.11n (HT40):

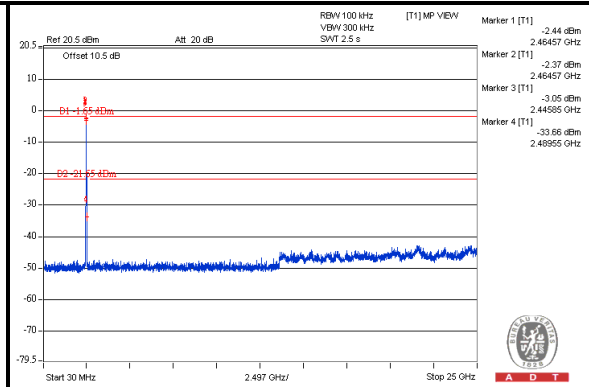
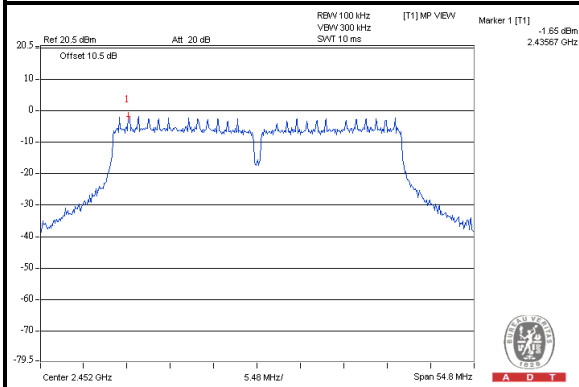
#### CH 3



#### CH 6



#### CH 9





A D T

## 5. TEST TYPES AND RESULTS (FOR 5GHz, 5725~5850MHz Band)

### 5.1 CONDUCTED EMISSION MEASUREMENT

#### 5.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBµV)	
	Quasi-peak	Average
0.15-0.5	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.

#### 5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100287	Feb. 29, 2012	Feb. 28, 2013
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK 8127	8127-523	Sep. 19, 2012	Sep. 20, 2013
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ESH3-Z5	848773/004	Oct. 29, 2012	Oct. 28, 2013
RF Cable (JYEBAO)	5DFB	COACAB-002	Aug. 05, 2012	Aug. 04, 2013
50 ohms Terminator	50	3	Oct. 23, 2012	Oct. 22, 2013
Software ADT	BV ADT_Cond_V7.3.7 .3	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 Shielded Room No. A.
3. The VCCI Con A Registration No. is C-817.
4. Tested Date: Dec. 03, 2012

### 5.1.3 TEST PROCEDURES

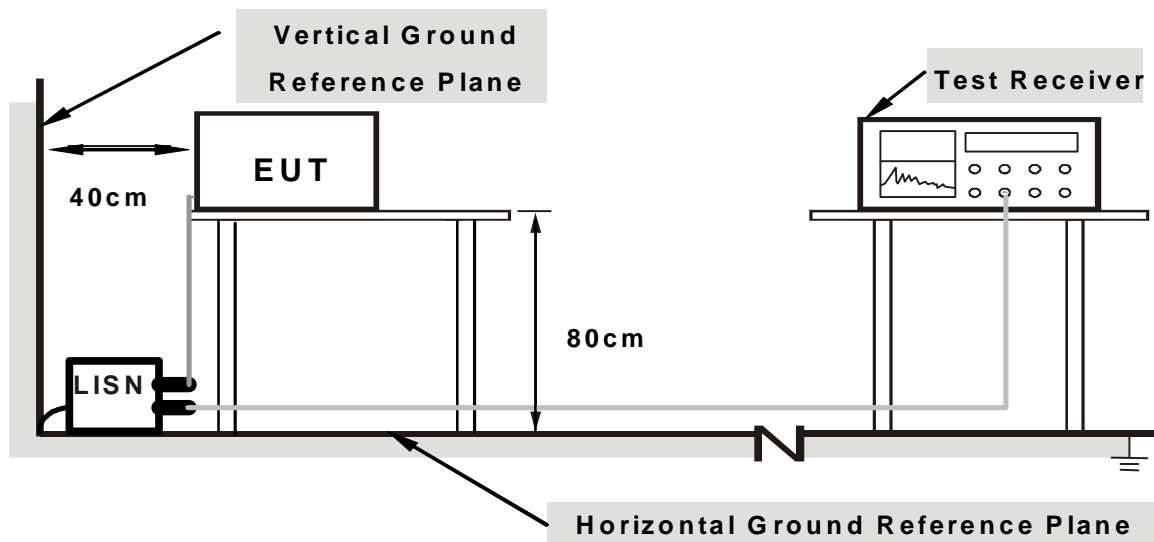
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.
- b. The two LISNs provide 50 ohm/ 50uH of coupling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

**NOTE:** The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

### 5.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.1.5 TEST SETUP



**Note: 1.Support units were connected to second LISN.**

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

### 5.1.6 EUT OPERATING CONDITIONS

Same as the 4.1.6

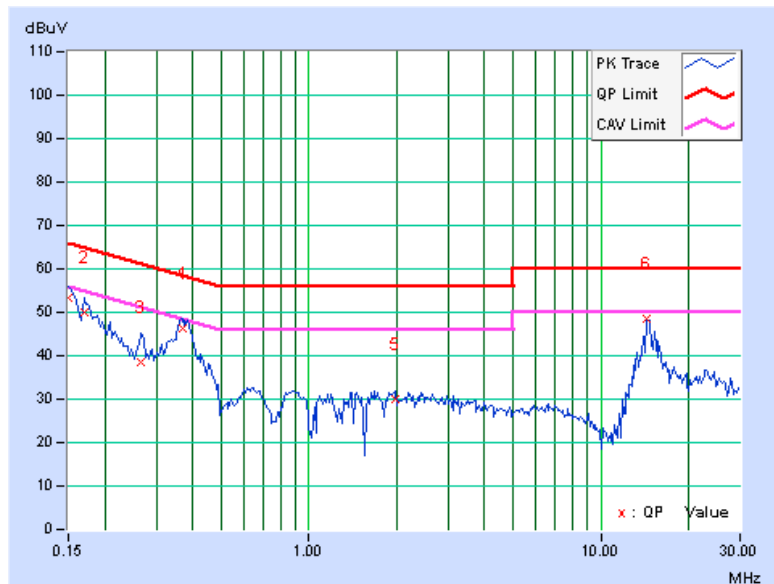
### 5.1.7 TEST RESULTS (MODE 1)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

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	0.15000	0.09	53.17	41.15	53.26	41.24	66.00
2	0.16953	0.09	49.80	37.91	49.89	38.00	64.98	54.98	-15.09	-16.98
3	0.26719	0.12	38.31	27.31	38.43	27.43	61.20	51.20	-22.78	-23.78
4	0.36875	0.14	46.08	35.71	46.22	35.85	58.53	48.53	-12.31	-12.68
5	1.96875	0.25	29.81	22.62	30.06	22.87	56.00	46.00	-25.94	-23.13
6	14.29688	0.61	47.85	46.80	48.46	47.41	60.00	50.00	-11.54	-2.59

#### REMARKS:

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

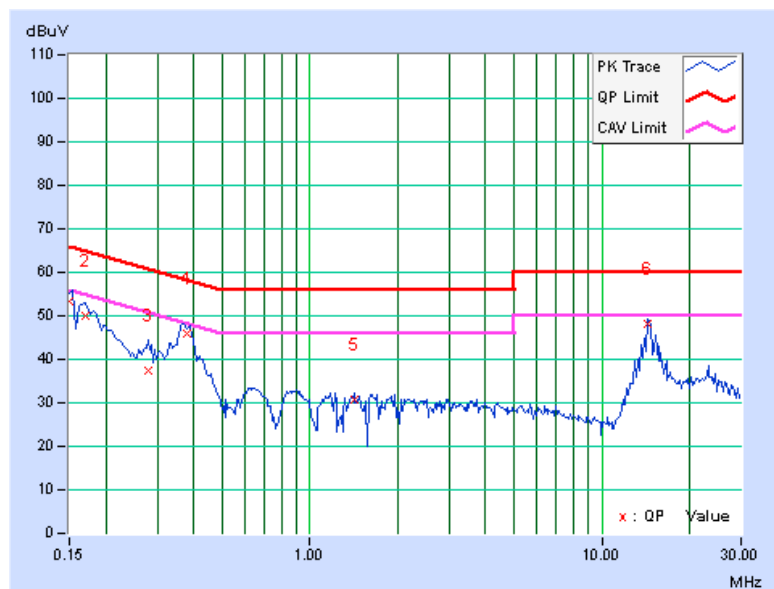


<b>PHASE</b>	Neutral (N)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
--------------	-------------	--------------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.10	53.19	40.87	53.29	40.97	66.00	56.00	-12.71	-15.03
2	0.16953	0.10	49.76	37.67	49.86	37.77	64.98	54.98	-15.12	-17.21
3	0.27891	0.13	37.26	26.73	37.39	26.86	60.85	50.85	-23.46	-23.99
4	0.38034	0.16	45.68	37.67	45.84	37.83	58.27	48.27	-12.44	-10.45
5	1.41406	0.20	30.54	24.22	30.74	24.42	56.00	46.00	-25.26	-21.58
6	14.29688	0.59	47.69	46.31	48.28	46.90	60.00	50.00	-11.72	-3.10

**REMARKS:**

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



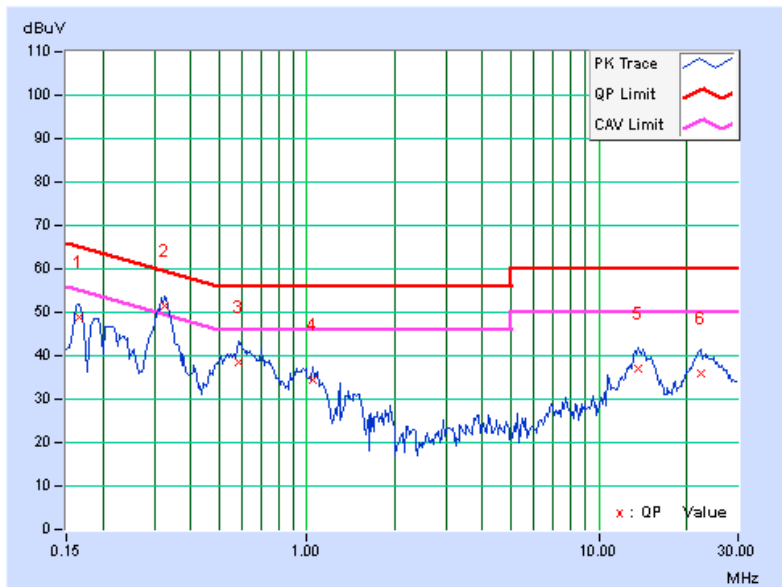
### 5.1.8 TEST RESULTS (MODE 2)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

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	0.16562	0.09	48.79	45.07	48.88	45.16	65.18	55.18	-16.30	-10.02
2	0.32578	0.13	51.40	46.69	51.53	46.82	59.56	49.56	-8.03	-2.74
3	0.58750	0.16	38.29	32.44	38.45	32.60	56.00	46.00	-17.55	-13.40
4	1.05078	0.18	34.33	29.56	34.51	29.74	56.00	46.00	-21.49	-16.26
5	13.56250	0.60	36.58	31.17	37.18	31.77	60.00	50.00	-22.82	-18.23
6	22.30469	0.77	35.01	29.71	35.78	30.48	60.00	50.00	-24.22	-19.52

#### REMARKS:

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



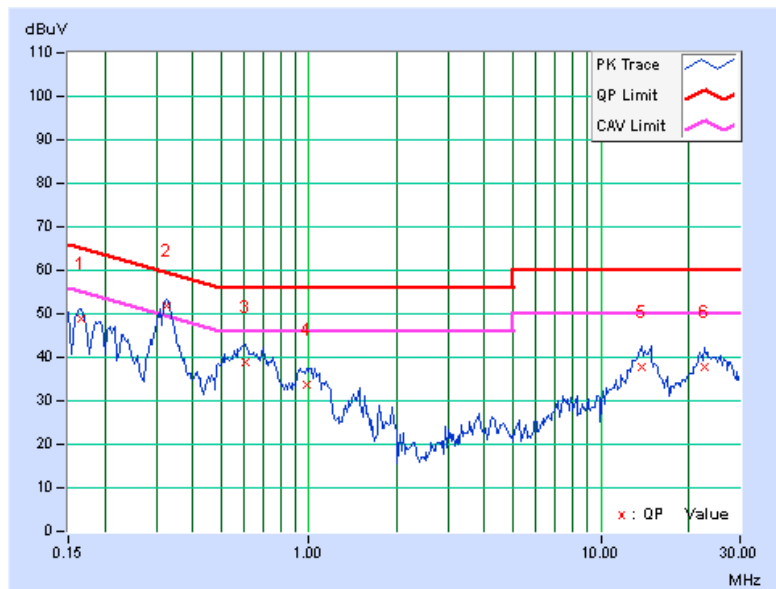


<b>PHASE</b>	Neutral (N)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
--------------	-------------	--------------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	0.10	48.62	45.07	48.72	45.17	65.18	55.18	-16.46	-10.01
<b>2</b>	<b>0.32578</b>	<b>0.14</b>	<b>51.60</b>	<b>47.15</b>	<b>51.74</b>	<b>47.29</b>	<b>59.56</b>	<b>49.56</b>	<b>-7.82</b>	<b>-2.27</b>
3	0.60313	0.17	38.85	33.55	39.02	33.72	56.00	46.00	-16.98	-12.28
4	0.97813	0.18	33.54	28.67	33.72	28.85	56.00	46.00	-22.28	-17.15
5	13.74609	0.58	37.16	31.94	37.74	32.52	60.00	50.00	-22.26	-17.48
6	22.66797	0.76	37.18	32.38	37.94	33.14	60.00	50.00	-22.06	-16.86

**REMARKS:**

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





A D T

## 5.2 RADIATED AND BANDEDGE EMISSION MEASUREMENT

### 5.2.1 LIMITS OF RADIATED AND BANDEDGE EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

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. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



## 5.2.2 TEST INSTRUMENTS

### Below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
Pre-Selector Agilent	N9039A	MY46520310	Sep. 03, 2012	Sep. 02, 2013
Signal Generator Agilent	N5181A	MY49060347	July 24, 2012	July 23, 2013
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02465	Feb. 27, 2012	Feb. 26, 2013
SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Apr. 06, 2012	Apr. 05, 2013
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 23, 2011	Nov. 22, 2012
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 27, 2011	Dec. 26, 2012
RF Cable	NA	CHHCAB_001	Oct. 07, 2012	Oct. 06, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5. The CANADA Site Registration No. is IC 7450H-3.
6. Tested Date: Nov. 21, 2012



A D T

**Above 1GHz test:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250254	July 09, 2012	July 08, 2013
Pre-Selector Agilent	N9039A	MY46520311	July 09, 2012	July 08, 2013
Signal Generator Agilent	N5181A	MY49060517	July 09, 2012	July 08, 2013
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 26, 2012	June 25, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Apr. 09, 2012	Apr. 08, 2013
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 26, 2011	Dec. 25, 2012
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
- 5 The VCCI Site Registration No. is G-137.
- 6 The CANADA Site Registration No. is IC 7450H-2.
- 7 Tested Date: Nov. 22, 2012

### 5.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters 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 height of antenna 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

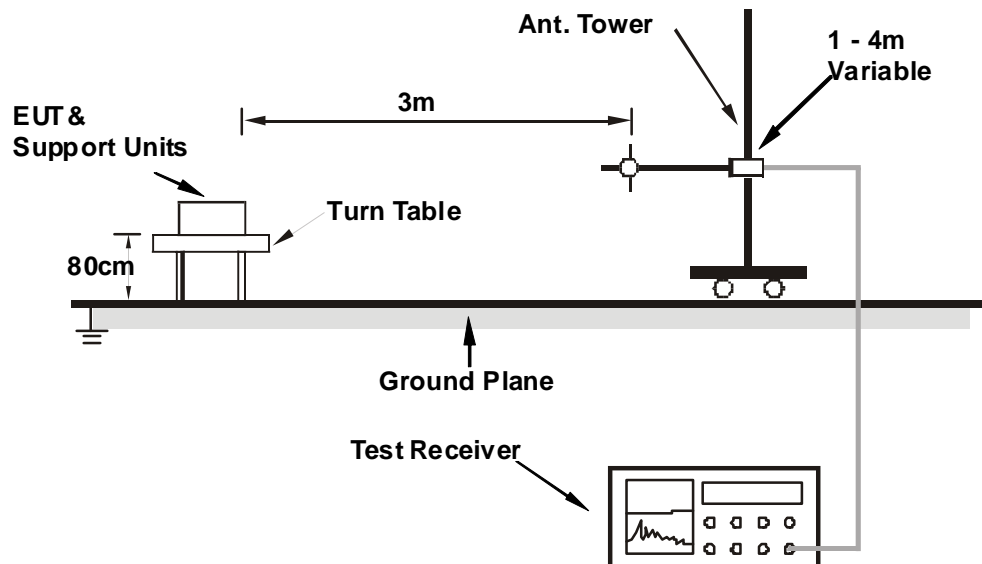
#### **NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

### 5.2.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.2.5 TEST SETUP



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

### 5.2.6 EUT OPERATING CONDITIONS

Same as the 4.2.6

## 5.2.7 TEST RESULTS

### BELOW 1GHz WORST-CASE DATA

#### 802.11n (20MHz)

<b>CHANNEL</b>	TX Channel 165	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	30MHz ~ 1GHz		

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	35.90	30.5 QP	40.0	-9.5	1.78 H	190	17.28	13.19
2	61.10	34.0 QP	40.0	-6.0	1.87 H	79	20.43	13.54
3	<b>250.00</b>	<b>44.6 QP</b>	<b>46.0</b>	<b>-1.4</b>	<b>1.13 H</b>	<b>21</b>	<b>31.22</b>	<b>13.35</b>
4	321.00	40.8 QP	46.0	-5.2	1.00 H	125	24.96	15.83
5	375.04	35.5 QP	46.0	-10.5	1.44 H	53	18.26	17.22
6	874.50	38.4 QP	46.0	-7.6	1.31 H	171	11.29	27.11
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	37.90	37.6 QP	40.0	-2.4	1.07 V	124	24.13	13.51
2	250.00	35.6 QP	46.0	-10.4	1.57 V	147	22.26	13.35
3	374.98	33.7 QP	46.0	-12.3	1.24 V	38	16.45	17.22
4	500.00	35.0 QP	46.0	-11.0	1.24 V	210	14.59	20.39
5	624.90	37.9 QP	46.0	-8.1	1.35 V	58	14.92	22.97
6	875.00	36.9 QP	46.0	-9.1	1.08 V	98	9.77	27.12

#### 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.

**ABOVE 1GHz DATA**

**802.11a**

<b>CHANNEL</b>	TX Channel 149	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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	*5745.00	111.5 PK			1.35 H	39	69.13	42.37
2	*5745.00	99.8 AV			1.35 H	39	57.43	42.37
3	11490.00	57.8 PK	74.0	-16.2	1.00 H	231	9.04	48.76
4	11490.00	46.9 AV	54.0	-7.1	1.00 H	231	-1.86	48.76

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	*5745.00	110.4 PK			1.21 V	90	68.03	42.37
2	*5745.00	99.6 AV			1.21 V	90	57.23	42.37
3	11490.00	58.2 PK	74.0	-15.8	1.00 V	151	9.44	48.76
4	11490.00	47.1 AV	54.0	-6.9	1.00 V	151	-1.66	48.76

**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 limit value is defined as per 15.247.





A D T

<b>CHANNEL</b>	TX Channel 157	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	110.9 PK			1.33 H	41	68.46	42.44
2	*5785.00	99.5 AV			1.33 H	41	57.06	42.44
3	11570.00	58.3 PK	74.0	-15.7	1.00 H	235	9.59	48.71
4	11570.00	47.3 AV	54.0	-6.7	1.00 H	235	-1.41	48.71

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	110.3 PK			1.22 V	90	67.86	42.44
2	*5785.00	98.9 AV			1.22 V	90	56.46	42.44
3	11570.00	58.3 PK	74.0	-15.7	1.00 V	152	9.59	48.71
4	11570.00	47.5 AV	54.0	-6.5	1.00 V	152	-1.21	48.71

**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 limit value is defined as per 15.247.



A D T

<b>CHANNEL</b>	TX Channel 165	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

**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	*5825.00	110.8 PK			1.32 H	43	68.23	42.57
2	*5825.00	99.3 AV			1.32 H	43	56.73	42.57
3	11650.00	58.4 PK	74.0	-15.6	1.00 H	233	9.48	48.92
4	11650.00	47.2 AV	54.0	-6.8	1.00 H	233	-1.72	48.92

**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	*5825.00	111.6 PK			1.20 V	88	69.03	42.57
2	*5825.00	99.1 AV			1.20 V	88	56.53	42.57
3	11650.00	58.4 PK	74.0	-15.6	1.00 V	147	9.48	48.92
4	11650.00	46.9 AV	54.0	-7.1	1.00 V	147	-2.02	48.92

**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 limit value is defined as per 15.247.

**802.11n (20MHz)**

<b>CHANNEL</b>	TX Channel 149	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
<b>NO.</b>	<b>FREQ. (MHz)</b>	<b>EMISSION LEVEL (dBuV/m)</b>	<b>LIMIT (dBuV/m)</b>	<b>MARGIN (dB)</b>	<b>ANTENNA HEIGHT (m)</b>	<b>TABLE ANGLE (Degree)</b>	<b>RAW VALUE (dBuV)</b>	<b>CORRECTION FACTOR (dB/m)</b>
1	*5745.00	112.5 PK			1.10 H	335	70.13	42.37
2	*5745.00	100.5 AV			1.10 H	335	58.13	42.37
3	11490.00	58.3 PK	74.0	-15.7	1.00 H	236	9.54	48.76
4	11490.00	47.5 AV	54.0	-6.5	1.00 H	236	-1.26	48.76
<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
<b>NO.</b>	<b>FREQ. (MHz)</b>	<b>EMISSION LEVEL (dBuV/m)</b>	<b>LIMIT (dBuV/m)</b>	<b>MARGIN (dB)</b>	<b>ANTENNA HEIGHT (m)</b>	<b>TABLE ANGLE (Degree)</b>	<b>RAW VALUE (dBuV)</b>	<b>CORRECTION FACTOR (dB/m)</b>
1	*5745.00	110.5 PK			1.15 V	50	68.13	42.37
2	*5745.00	98.8 AV			1.15 V	50	56.43	42.37
3	11490.00	58.8 PK	74.0	-15.2	1.00 V	153	10.04	48.76
4	11490.00	47.5 AV	54.0	-6.5	1.00 V	153	-1.26	48.76

**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 limit value is defined as per 15.247.



A D T

<b>CHANNEL</b>	TX Channel 157	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	112.1 PK			1.10 H	331	69.66	42.44
2	*5785.00	100.1 AV			1.10 H	331	57.66	42.44
3	11570.00	57.9 PK	74.0	-16.1	1.00 H	231	9.19	48.71
4	11570.00	47.4 AV	54.0	-6.6	1.00 H	231	-1.31	48.71

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	110.3 PK			1.16 V	52	67.86	42.44
2	*5785.00	98.6 AV			1.16 V	52	56.16	42.44
3	11570.00	59.1 PK	74.0	-14.9	1.00 V	152	10.39	48.71
4	11570.00	47.3 AV	54.0	-6.7	1.00 V	152	-1.41	48.71

**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 limit value is defined as per 15.247.



A D T

<b>CHANNEL</b>	TX Channel 165	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

**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	*5825.00	113.2 PK			1.08 H	333	70.63	42.57
2	*5825.00	100.8 AV			1.08 H	333	58.23	42.57
3	11650.00	58.5 PK	74.0	-15.5	1.00 H	234	9.58	48.92
4	11650.00	47.1 AV	54.0	-6.9	1.00 H	234	-1.82	48.92

**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	*5825.00	110.9 PK			1.13 V	49	68.33	42.57
2	*5825.00	98.3 AV			1.13 V	49	55.73	42.57
3	11650.00	58.1 PK	74.0	-15.9	1.00 V	155	9.18	48.92
4	11650.00	47.3 AV	54.0	-6.7	1.00 V	155	-1.62	48.92

**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 limit value is defined as per 15.247.

**802.11n (40MHz)**

<b>CHANNEL</b>	TX Channel 151	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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	*5755.00	109.6 PK			1.08 H	332	67.21	42.39
2	*5755.00	98.2 AV			1.08 H	332	55.81	42.39
3	11510.00	58.8 PK	74.0	-15.2	1.00 H	231	10.06	48.74
4	11510.00	47.3 AV	54.0	-6.7	1.00 H	231	-1.44	48.74
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	*5755.00	106.3 PK			1.15 V	62	63.91	42.39
2	*5755.00	94.4 AV			1.15 V	62	52.01	42.39
3	11510.00	58.7 PK	74.0	-15.3	1.00 V	153	9.96	48.74
4	11510.00	47.1 AV	54.0	-6.9	1.00 V	153	-1.64	48.74

**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 limit value is defined as per 15.247.



A D T

<b>CHANNEL</b>	TX Channel 159	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

**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	*5795.00	111.1 PK			1.09 H	331	68.65	42.45
2	*5795.00	98.5 AV			1.09 H	331	56.05	42.45
3	11590.00	59.3 PK	74.0	-14.7	1.00 H	245	10.60	48.70
4	11590.00	47.1 AV	54.0	-6.9	1.00 H	245	-1.60	48.70

**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	*5795.00	106.1 PK			1.11 V	53	63.65	42.45
2	*5795.00	94.9 AV			1.11 V	53	52.45	42.45
3	11590.00	58.7 PK	74.0	-15.3	1.00 V	155	10.00	48.70
4	11590.00	47.2 AV	54.0	-6.8	1.00 V	155	-1.50	48.70

**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 limit value is defined as per 15.247.



A D T

### 5.3 6dB BANDWIDTH MEASUREMENT

#### 5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 5.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Dec. 14, 2011	Dec. 13, 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. Tested date : Nov. 22, 2012

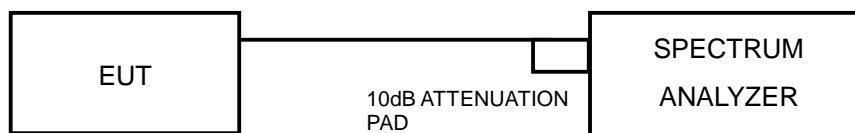
#### 5.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

#### 5.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 5.3.5 TEST SETUP



#### 5.3.6 EUT OPERATING CONDITIONS

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





A D T

### 5.3.7 TEST RESULTS

#### 802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	16.35	0.5	PASS
157	5785	16.00	0.5	PASS
165	5825	16.07	0.5	PASS

#### 802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	17.08	15.78	0.5	PASS
157	5785	16.42	16.68	0.5	PASS
165	5825	16.08	16.28	0.5	PASS

#### 802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
151	5755	36.03	36.12	0.5	PASS
159	5795	35.87	35.79	0.5	PASS

## 5.4 CONDUCTED OUTPUT POWER MEASUREMENT

### 5.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 5725 –5850 MHz band: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT  $\leq$  4;  
 Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq$  40 MHz for any NANT;  
 Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT  $\geq$  5.

For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

### 5.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 10, 2012	May 09, 2013
Power Sensor	MA2411B	0738172	May 10, 2012	May 09, 2013

- Note:**
- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  - Tested date : Nov. 22, 2012

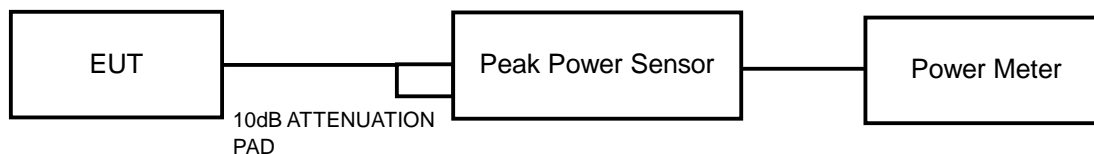
### 5.4.3 TEST PROCEDURES

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

### 5.4.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.4.5 TEST SETUP



### 5.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6



A D T

### 5.4.7 TEST RESULTS

#### 802.11a

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	138.038	21.4	30	PASS
157	5785	141.254	21.5	30	PASS
165	5825	154.882	21.9	30	PASS

#### 802.11n (HT20)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	21.2	21.5	273.080	24.36	30	PASS
157	5785	21.5	22.0	299.743	24.77	30	PASS
165	5825	21.8	22.1	313.537	24.96	30	PASS

#### 802.11n (HT40)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
151	5755	21.2	21.3	266.722	24.26	30	PASS
159	5795	21.3	21.7	282.807	24.51	30	PASS

## 5.5 POWER SPECTRAL DENSITY MEASUREMENT

### 5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP 40	100036	Dec. 14, 2011	Dec. 13, 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. Tested date : Nov. 22, 2012

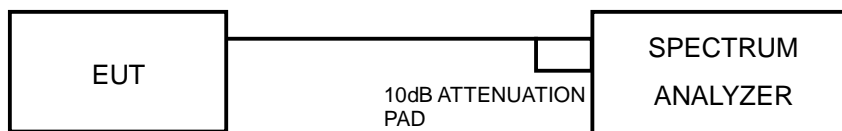
### 5.5.3 TEST PROCEDURE

- a. Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
- b. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- c. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

### 5.5.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.5.5 TEST SETUP



### 5.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



A D T

## 5.5.7 TEST RESULTS

### 802.11a

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
149	5745	-9.40	8	PASS
157	5785	-9.28	8	PASS
165	5825	-8.78	8	PASS

### 802.11n (HT20)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-10.55	3.01	-7.54	8	PASS
	157	5785	-8.60	3.01	-5.59	8	PASS
	165	5825	-9.96	3.01	-6.95	8	PASS
1	149	5745	-9.25	3.01	-6.24	8	PASS
	157	5785	-9.81	3.01	-6.80	8	PASS
	165	5825	-9.29	3.01	-6.28	8	PASS

### 802.11n (HT40)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	151	5755	-14.51	3.01	-11.50	8	PASS
	159	5795	-10.41	3.01	-7.40	8	PASS
1	151	5755	-14.05	3.01	-11.04	8	PASS
	159	5795	-12.14	3.01	-9.13	8	PASS

## 5.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

### 5.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

### 5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Dec. 14, 2011	Dec. 13, 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. Tested date : Nov. 22, 2012

### 5.6.3 TEST PROCEDURE

#### Measurement Procedure - Reference Level

1. Set the RBW = 100 kHz.
2. Set the VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

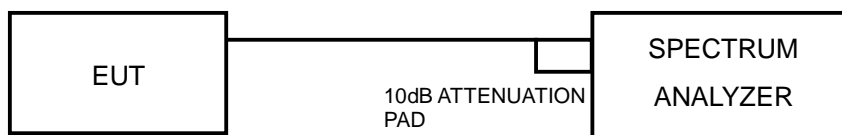
### Measurement Procedure –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Set span to encompass the spectrum to be examined.
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

#### 5.6.4 DEVIATION FROM TEST STANDARD

No deviation

#### 5.6.5 TEST SETUP



#### 5.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 5.6.7 TEST RESULTS

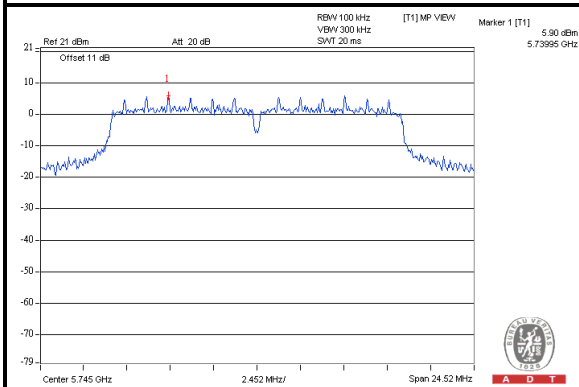
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



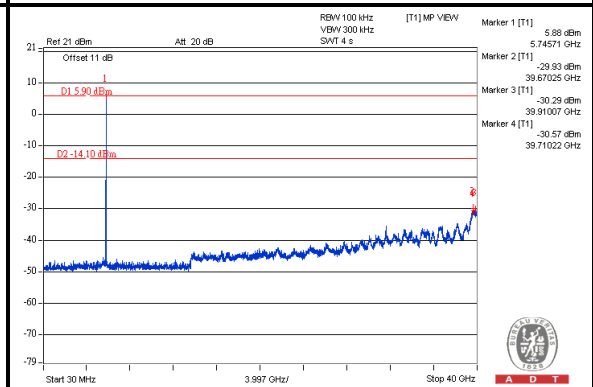
A D T

### 802.11a

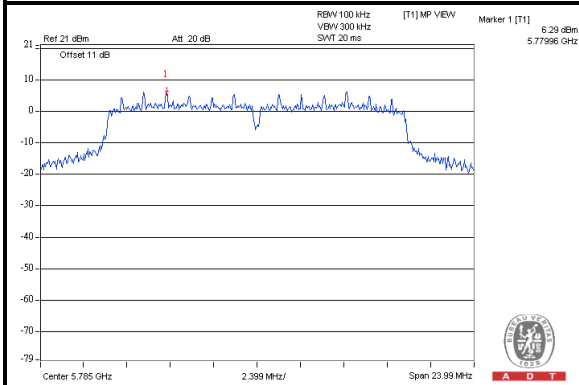
#### CH 149



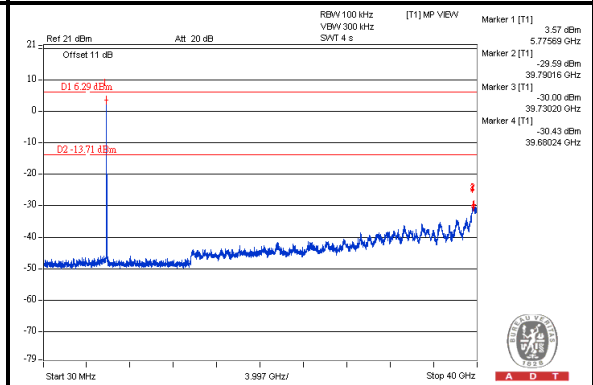
#### CH 149



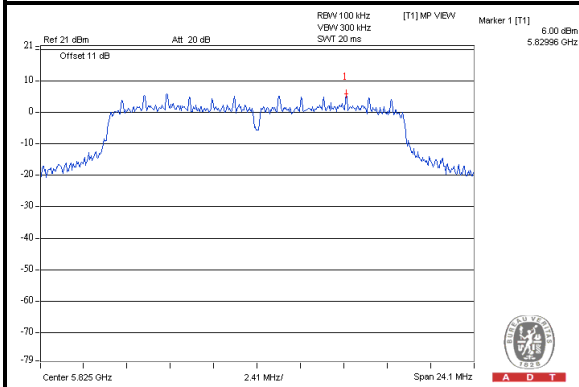
#### CH 157



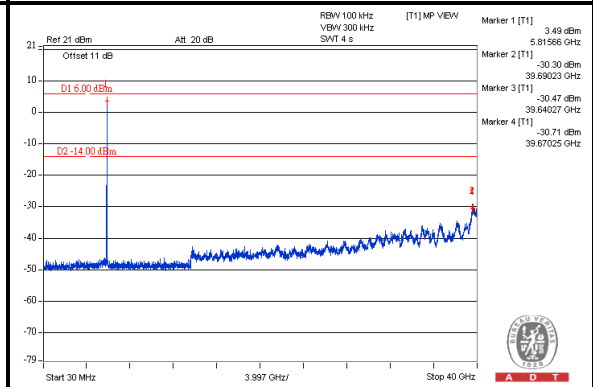
#### CH 157



#### CH 165



#### CH 165



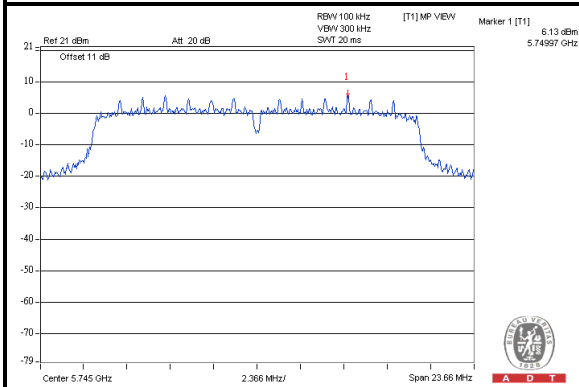




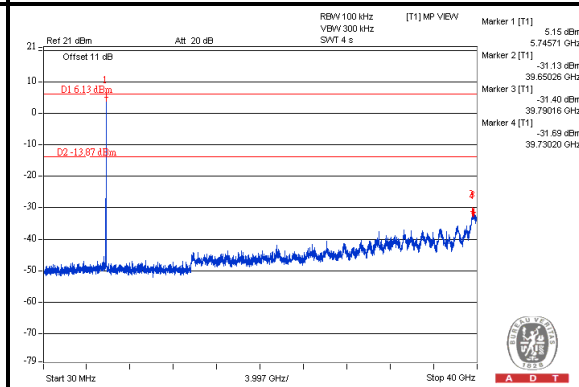
A D T

### 802.11n (HT20)

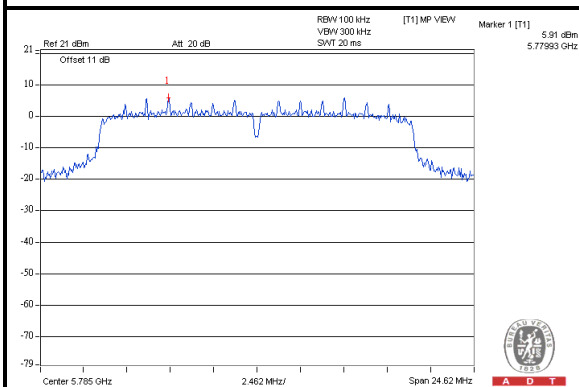
#### CH 149



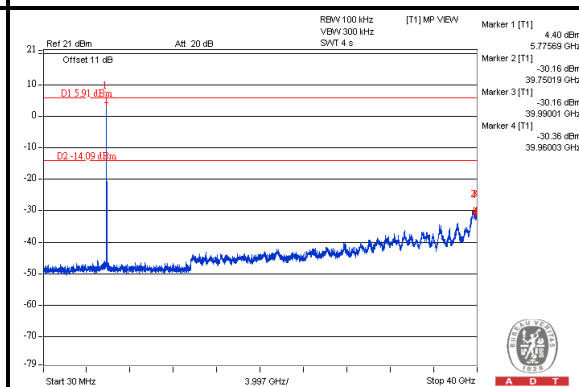
#### CH 149



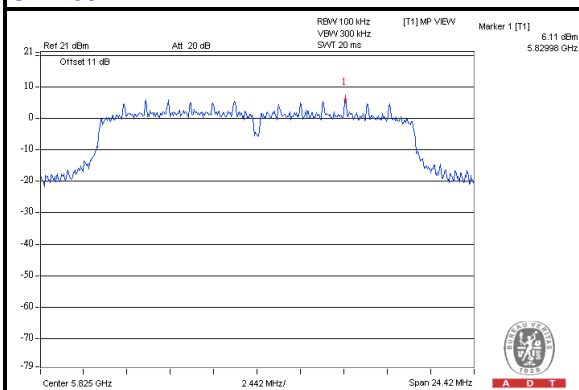
#### CH 157



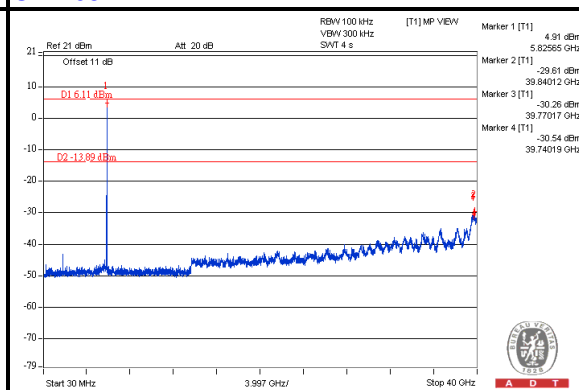
#### CH 157



#### CH 165



#### CH 165

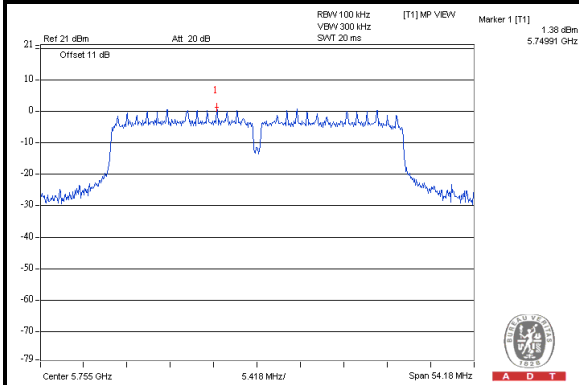




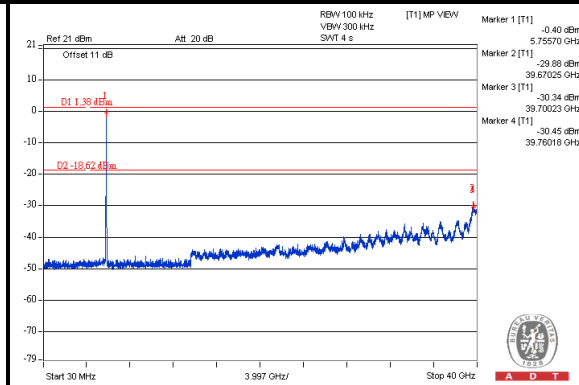
A D T

### 802.11n (HT40)

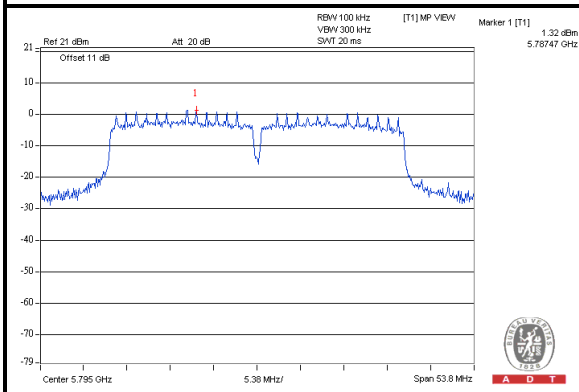
#### CH 151



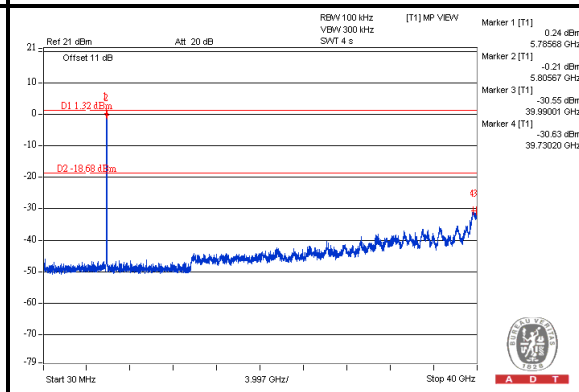
#### CH 151



#### CH 159



#### CH 159





A D T

## 6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



## 7. 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.

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: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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



A D T

## 8. 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 ---