



# FCC TEST REPORT(15.247)

**REPORT NO.:** RF131111E02

**MODEL NO.:** DIR-518L

**FCC ID:** KA2IR518LA1

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**TESTED:** Nov. 12 to 27, 2013

**ISSUED:** Dec. 05, 2013

**APPLICANT:** D-Link Corporation

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## 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 .....	16
3.4 DUTY CYCLE OF TEST SIGNAL .....	17
3.5 DESCRIPTION OF SUPPORT UNITS .....	19
3.6 CONFIGURATION OF SYSTEM UNDER TEST .....	20
4. TEST TYPES AND RESULTS (FOR 2.4GHz, 2.400 ~ 2.4835GHz Band) .....	21
4.1 CONDUCTED EMISSION MEASUREMENT .....	21
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	21
4.1.2 TEST INSTRUMENTS .....	21
4.1.3 TEST PROCEDURES .....	22
4.1.4 DEVIATION FROM TEST STANDARD .....	22
4.1.5 TEST SETUP .....	22
4.1.6 EUT OPERATING CONDITIONS .....	23
4.1.7 TEST RESULTS .....	24
4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	26
4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	26
4.2.2 TEST INSTRUMENTS .....	27
4.2.3 TEST PROCEDURES .....	28
4.2.4 DEVIATION FROM TEST STANDARD .....	28
4.2.5 TEST SETUP .....	29
4.2.6 EUT OPERATING CONDITIONS .....	29
4.2.7 TEST RESULTS .....	30
4.3 6dB BANDWIDTH MEASUREMENT .....	43
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	43
4.3.2 TEST INSTRUMENTS .....	43
4.3.3 TEST PROCEDURE .....	43
4.3.4 DEVIATION FROM TEST STANDARD .....	43
4.3.5 TEST SETUP .....	43
4.3.6 EUT OPERATING CONDITIONS .....	44
4.3.7 TEST RESULTS .....	45
4.4 CONDUCTED OUTPUT POWER MEASUREMENT .....	47
4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT .....	47
4.4.2 INSTRUMENTS .....	47
4.4.3 TEST PROCEDURES .....	47
4.4.4 DEVIATION FROM TEST STANDARD .....	48
4.4.5 TEST SETUP .....	48
4.4.6 EUT OPERATING CONDITIONS .....	48
4.4.7 TEST RESULTS .....	49
4.5 AVERAGE OUTPUT POWER .....	50
4.5.1 FOR REFERENCE .....	50
4.5.2 TEST INSTRUMENTS .....	50
4.5.3 TEST PROCEDURES .....	50
4.5.4 TEST SETUP .....	50



A D T

4.5.5	EUT OPERATING CONDITIONS .....	50
4.5.6	TEST RESULTS .....	51
4.6	POWER SPECTRAL DENSITY MEASUREMENT .....	52
4.6.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	52
4.6.2	TEST INSTRUMENTS.....	52
4.6.3	TEST PROCEDURE.....	52
4.6.4	DEVIATION FROM TEST STANDARD .....	52
4.6.5	TEST SETUP .....	52
4.6.6	EUT OPERATING CONDITION.....	52
4.6.7	TEST RESULTS .....	53
4.7	CONDUCTED OUT-BAND EMISSION MEASUREMENT .....	55
4.7.1	LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT.....	55
4.7.2	TEST INSTRUMENTS.....	55
4.7.3	TEST PROCEDURE.....	55
4.7.4	DEVIATION FROM TEST STANDARD .....	56
4.7.5	TEST SETUP .....	56
4.7.6	EUT OPERATING CONDITION.....	56
4.7.7	TEST RESULTS .....	56
5.	TEST TYPES AND RESULTS (FOR 5GHz, 5.725~5.850GHz Band).....	61
5.1	CONDUCTED EMISSION MEASUREMENT .....	61
5.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	61
5.1.2	TEST INSTRUMENTS.....	61
5.1.3	TEST PROCEDURES .....	62
5.1.4	DEVIATION FROM TEST STANDARD .....	62
5.1.5	TEST SETUP .....	62
5.1.6	EUT OPERATING CONDITIONS .....	63
5.1.7	TEST RESULTS .....	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 .....	68
5.2.4	DEVIATION FROM TEST STANDARD .....	68
5.2.5	TEST SETUP .....	69
5.2.6	EUT OPERATING CONDITIONS .....	69
5.2.7	TEST RESULTS .....	70
5.3	6dB BANDWIDTH MEASUREMENT .....	80
5.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	80
5.3.2	TEST INSTRUMENTS.....	80
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 .....	83
5.4.1	LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT .....	83
5.4.2	INSTRUMENTS.....	83
5.4.3	TEST PROCEDURES .....	84
5.4.4	DEVIATION FROM TEST STANDARD .....	85
5.4.5	TEST SETUP .....	85
5.4.6	EUT OPERATING CONDITIONS .....	85
5.4.7	TEST RESULTS .....	86
5.5	AVERAGE OUTPUT POWER.....	87



A D T

5.5.1	FOR REFERENCE .....	87
5.5.2	TEST INSTRUMENTS.....	87
5.5.3	TEST PROCEDURES .....	87
5.5.4	TEST SETUP .....	87
5.5.5	EUT OPERATING CONDITIONS .....	87
5.5.6	TEST RESULTS .....	88
5.6	POWER SPECTRAL DENSITY MEASUREMENT.....	89
5.6.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	89
5.6.2	TEST INSTRUMENTS.....	89
5.6.3	TEST PROCEDURE.....	89
5.6.4	DEVIATION FROM TEST STANDARD .....	89
5.6.5	TEST SETUP .....	89
5.6.6	EUT OPERATING CONDITION.....	89
5.6.7	TEST RESULTS .....	90
5.7	CONDUCTED OUT-BAND EMISSION MEASUREMENT.....	92
5.7.1	LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT.....	92
5.7.2	TEST INSTRUMENTS.....	92
5.7.3	TEST PROCEDURE.....	92
5.7.4	DEVIATION FROM TEST STANDARD .....	93
5.7.5	TEST SETUP .....	93
5.7.6	EUT OPERATING CONDITION.....	93
5.7.7	TEST RESULTS .....	93
6.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	98
7.	INFORMATION ON THE TESTING LABORATORIES .....	99
8.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	100



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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF131111E02	Original release	Dec. 05, 2013



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## 1. CERTIFICATION

**PRODUCT:** Wireless AC600 Dual Band Wall-Plug Cloud Router  
**BRAND NAME:** D-Link  
**MODEL NO.:** DIR-518L  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**APPLICANT:** D-Link Corporation  
**TESTED:** Nov. 12 to 27, 2013  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**  
**ANSI C63.10-2009**

The above equipment (Model: DIR-518L) 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. 05, 2013  
( Midoli Peng, Specialist )

**APPROVED BY :**  , **DATE:** Dec. 05, 2013  
( May Chen, Manager )



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## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 2.4GHz, 2400~2483.5MHz 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 - 11.47dB at 13.82813MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is - 0.3dB at 4924.00MHz
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 output 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, 5725~5850MHz 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 -10.91dB at 14.01172MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.7dB at 108.52MHz
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 output 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.



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## 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)	5.46 dB
Radiated emissions (1GHz -6GHz)	3.54 dB
Radiated emissions (6GHz -18GHz)	4.08 dB
Radiated emissions (18GHz -40GHz)	4.11 dB





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### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Wireless AC600 Dual Band Wall-Plug Cloud Router
<b>MODEL NO.</b>	DIR-518L
<b>POWER SUPPLY</b>	Internal Power Supply, Class II
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only.
<b>MODULATION TECHNOLOGY</b>	DSSS,OFDM
<b>TRANSFER RATE</b>	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 150Mbps 802.11ac: up to 433.3Mbps
<b>OPERATING FREQUENCY</b>	<b>For 15.407</b> <b>5GHz:</b> 5.18 ~ 5.24GHz <b>For 15.247</b> <b>2.4GHz:</b> 2.412 ~ 2.462GHz <b>5GHz:</b> 5.745 ~ 5.825GHz
<b>NUMBER OF CHANNEL</b>	<b>For 15.407</b> 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80) <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), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)



<b>MAXIMUM OUTPUT POWER</b>	<p><b>For 15.407</b></p> <p>802.11a: 48.978mW              802.11ac (VHT20): 48.865mW              802.11ac (VHT40): 48.978mW              802.11ac (VHT80): 47.098mW</p> <p><b>For 15.247 (2.4GHz)</b></p> <p>802.11b: 60.395mW              802.11g: 160.325mW              802.11n (HT20): 156.315mW              802.11n (HT40): 131.826mW</p> <p><b>For 15.247 (5GHz)</b></p> <p>802.11a: 172.584mW              802.11ac (VHT20): 158.489mW              802.11ac (VHT40): 147.911mW              802.11ac (VHT80): 874.984mW</p>
<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. The EUT is a 2.4GHz & 5GHz WLAN device.
2. The EUT must be supplied with power as following spec:  
 ⚡ AC 100-240V, 50-60Hz, 0.4A
3. The antenna provided to the EUT, please refer to the following table:

<b>For 5GHz</b>					
Transmitter Circuit	Model	Gain (dBi) (Include cable loss)	Antenna Type	Connector Type	Frequency range (MHz to MHz)
Chain (0)	C037-511297-A (SRF2013149)	1.8	PIFA	NA	4900~5825
<b>For 2.4GHz</b>					
Transmitter Circuit	Model	Gain (dBi) (Include cable loss)	Antenna Type	Connector Type	Frequency range (MHz to MHz)
Chain (0)	290-20074	-0.43	PIFA	NA	2400~2500

4. The EUT incorporates a SISO function.

MODULATION MODE	TX/RX FUNCTION
802.11a	1TX/1RX
802.11b	1TX/1RX
802.11g	1TX/1RX
802.11n (HT20)	1TX/1RX
802.11n (HT40)	1TX/1RX
802.11ac (VHT20)	1TX/1RX
802.11ac (VHT40)	1TX/1RX
802.11ac (VHT80)	1TX/1RX

Note: The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

5. The EUT could be applied with one USB Cellular Modem, therefore emission tests are added for simultaneously transmit between WLAN and USB Cellular Modem. The emission tests have been performed at the worst channel of both WLAN and USB Cellular Modem, the spurious emission of the simultaneous operation (WLAN & USB Cellular Modem) has been evaluated and no non-compliance found. < USB Cellular Modem only for test, not for sale >

Brand name	Model name	FCC ID	Spec.	Testing mode
HUAWEI	E169u	QISE169	3.5G USB WIRELESS DEVICE	GPRS ch128, 824.2MHz

6. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 7.
7. When the EUT operating in 802.11ac, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 9.
8. Spurious emission of the simultaneous operation (WLAN & 3G Device) has been evaluated and no non-compliance was found.
9. 2.4GHz and 5GHz technology cannot transmit at same time.
10. 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), 802.11ac (VHT20):

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), 802.11ac (VHT40):

CHANNEL	FREQUENCY
151	5755 MHz
159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
155	5775 MHz

### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	PLC	RE < 1G	RE ≥ 1G	APCM	OB	
-	√	√	√	√	√	-

Where **PLC**: Power Line Conducted Emission      **RE < 1G**: Radiated Emission below 1GHz  
**RE ≥ 1G**: Radiated Emission above 1GHz      **APCM**: Antenna Port Conducted Measurement  
**OB**: Conducted Out-Band Emission Measurement

**NOTE:** 1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane(below 1GHz) & X-plane(above 1GHz).

#### **POWER LINE CONDUCTED EMISSION TEST:**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6
802.11a	149 to 165	157	OFDM	BPSK	6

#### **RADIATED EMISSION TEST (BELOW 1 GHz):**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6
802.11a	149 to 165	157	OFDM	BPSK	6



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### **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 802.11ac (VHT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11ac (VHT40)	151 to 159	151, 159	OFDM	BPSK	13.5
For 5 GHz 802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

### **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 802.11ac (VHT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11ac (VHT40)	151 to 159	151, 159	OFDM	BPSK	13.5
For 5 GHz 802.11ac (VHT80)	155	155	OFDM	BPSK	29.3



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**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 802.11ac (VHT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11ac (VHT40)	151 to 159	151, 159	OFDM	BPSK	13.5
For 5 GHz 802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	25deg. C, 59%RH	120Vac, 60Hz	Bear Lee
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
RE <sup>3</sup> 1G	23deg. C, 70%RH	120Vac, 60Hz	Tim Ho
	23deg. C, 70%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng
	25deg. C, 60%RH	120Vac, 60Hz	Chilin Lee
OB	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng
	25deg. C, 60%RH	120Vac, 60Hz	Chilin Lee

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C (15.247)**

**558074 D01 DTS Meas Guidance v03r01**

ANSI C63.10-2009

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

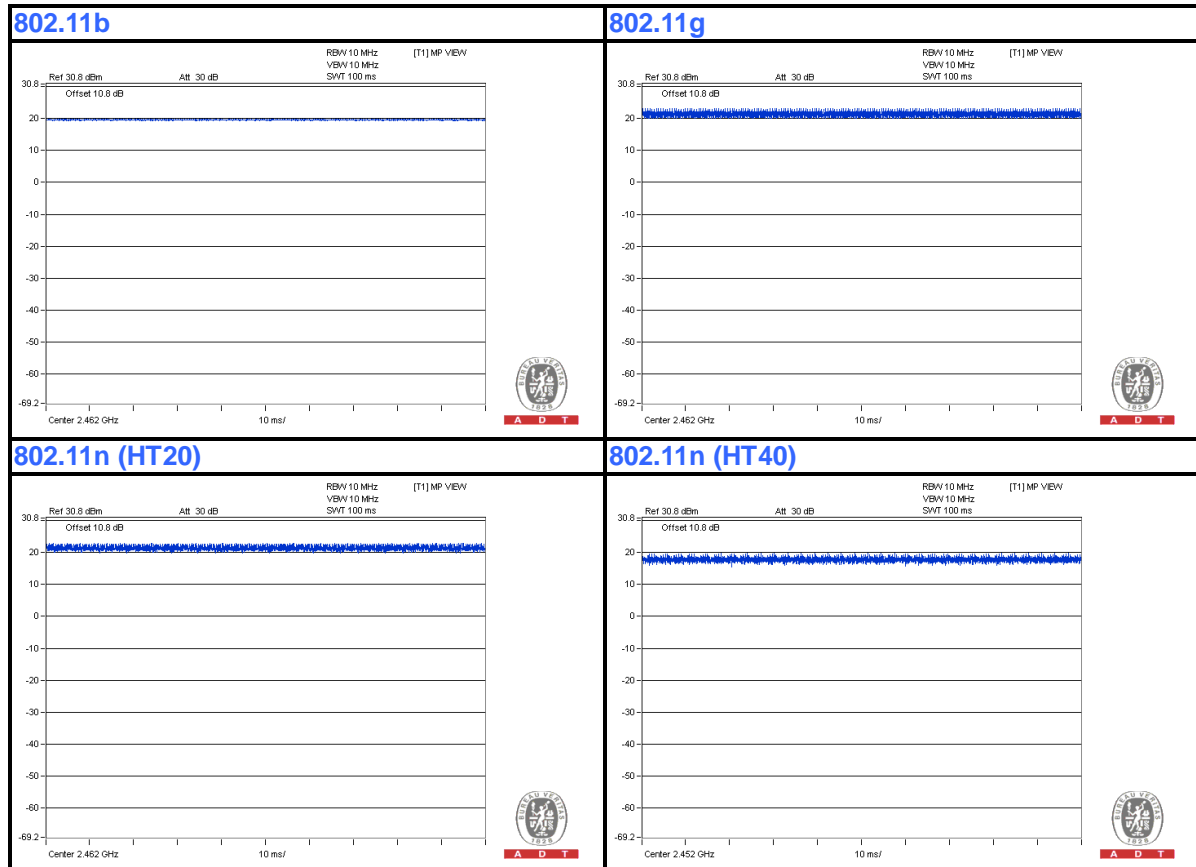
**Note:** The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



### 3.4 DUTY CYCLE OF TEST SIGNAL

For 2.4GHz

Duty cycle of test signal is 100 %, duty factor is not required.

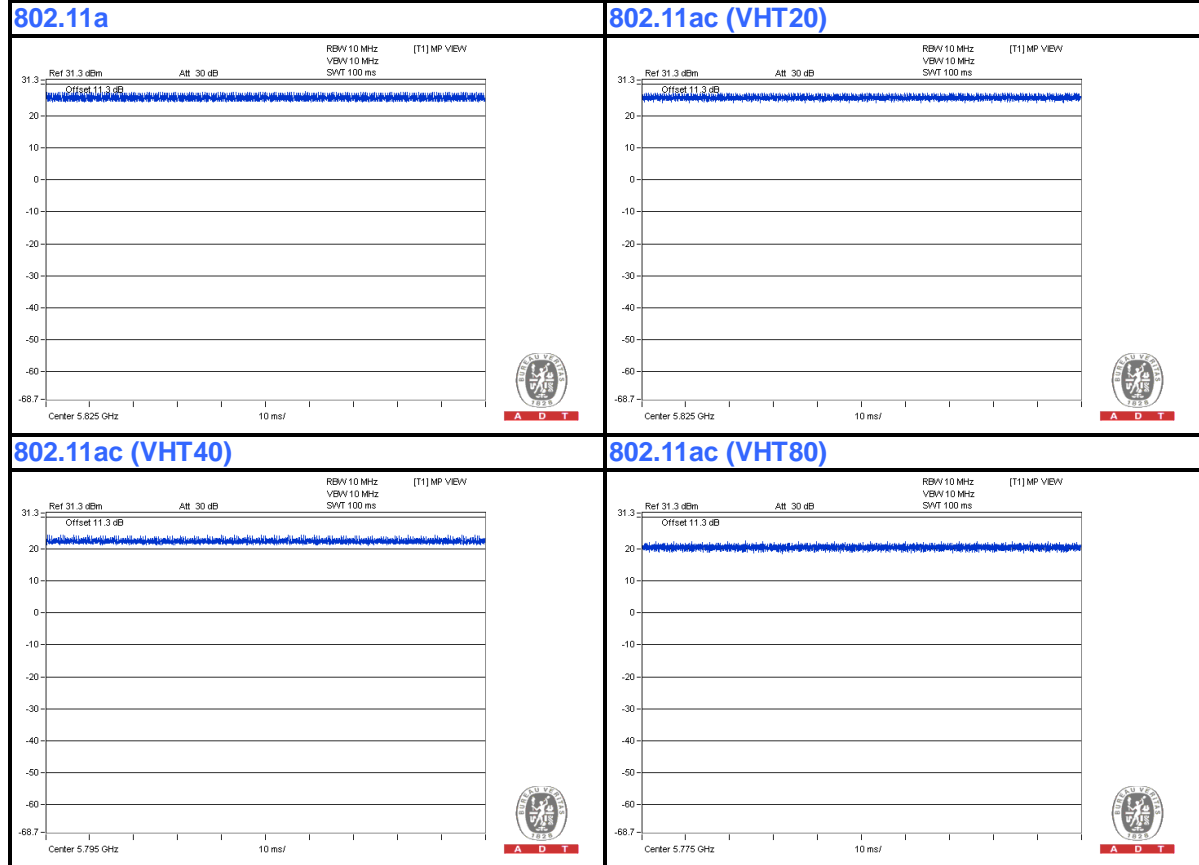




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For 5GHz

Duty cycle of test signal is 100 %, duty factor is not required.





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### 3.5 DESCRIPTION OF SUPPORT UNITS

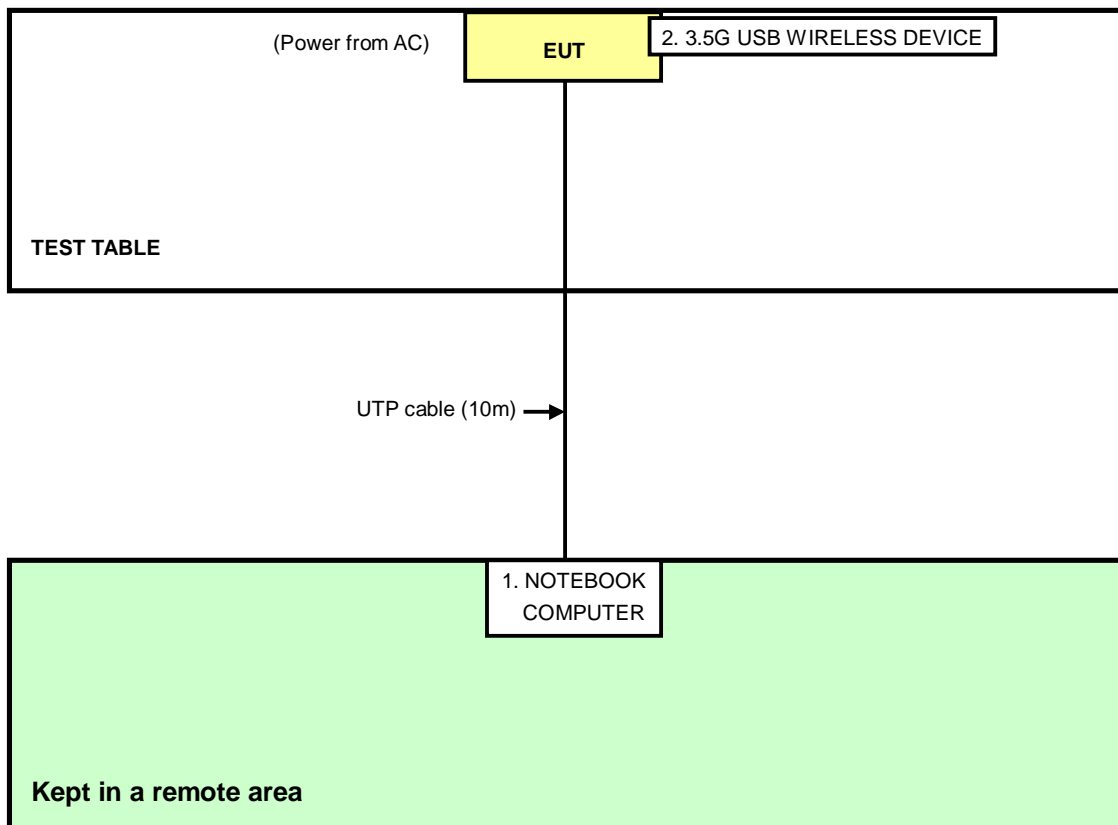
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	3.5G USB WIRELESS DEVICE	HUAWEI	E169u	Q54CAB1042404880	QISE169

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable, 10m
2	NA

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

### 3.6 CONFIGURATION OF SYSTEM UNDER TEST





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## 4. TEST TYPES AND RESULTS (FOR 2.4GHz, 2.400 ~ 2.4835GHz 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	100375	Mar. 08, 2013	Mar. 07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 05, 2013	Sep. 04, 2014
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 06, 2013	June 05, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-03	Sep. 24, 2013	Sep. 23, 2014
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. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Nov. 27, 2013

#### 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.

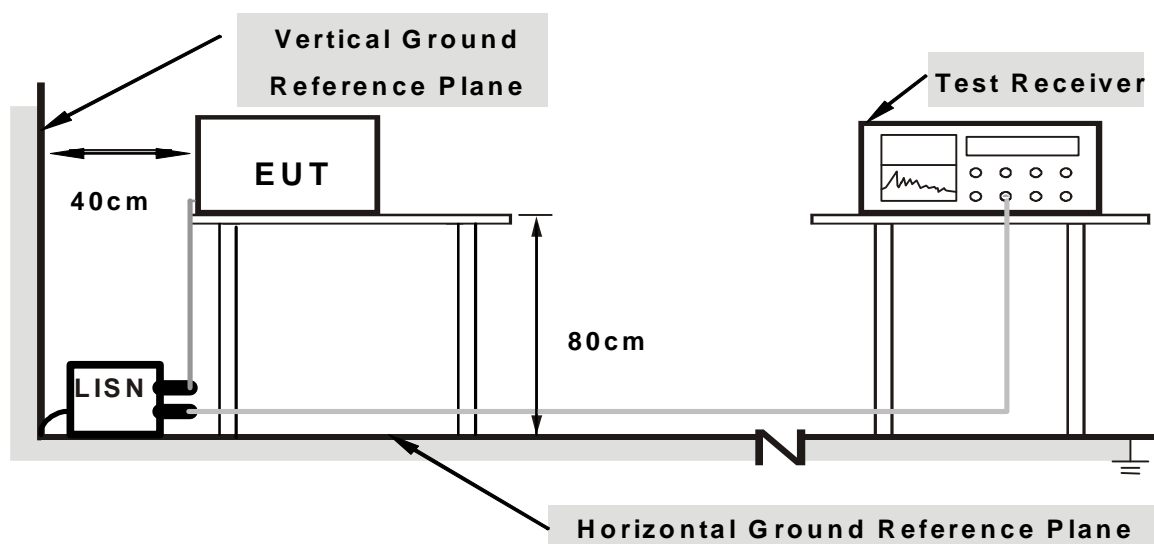
#### NOTE:

1. 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.



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#### 4.1.6 EUT OPERATING CONDITIONS

1. Placed the EUT on testing table.
2. Prepared computer system (support unit 1) to act as communication partner.
3. The communication partner ran test program "MP. TOOL.exe" to enable EUT under transmission/receiving condition continuously.



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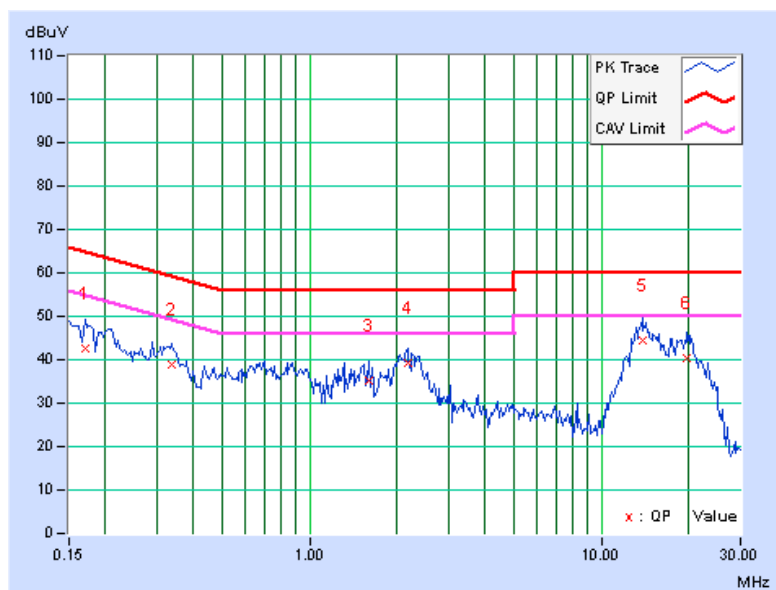
### 4.1.7 TEST RESULTS

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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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	0.16953	0.10	42.31	34.46	42.41	34.56	64.98	54.98	-22.58	-20.43
2	0.33750	0.14	38.70	33.12	38.84	33.26	59.26	49.26	-20.42	-16.00
3	1.59766	0.24	35.11	29.12	35.35	29.36	56.00	46.00	-20.65	-16.64
4	2.17188	0.28	39.13	33.05	39.41	33.33	56.00	46.00	-16.59	-12.67
5	13.85156	0.89	43.67	36.72	44.56	37.61	60.00	50.00	-15.44	-12.39
6	19.65625	1.12	39.28	31.80	40.40	32.92	60.00	50.00	-19.60	-17.08

#### 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







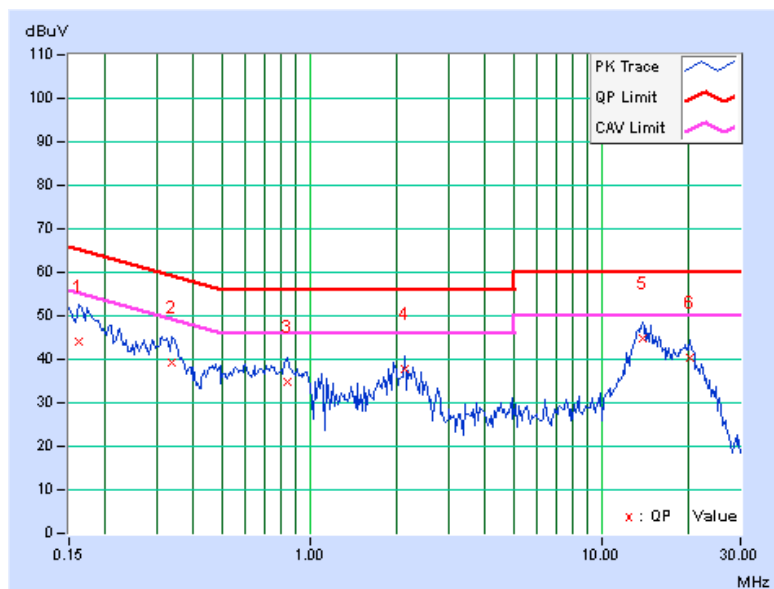
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PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

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	0.16172	0.10	44.11	35.08	44.21	35.18	65.38	55.38	-21.16	-20.19
2	0.33750	0.14	39.30	32.53	39.44	32.67	59.26	49.26	-19.82	-16.59
3	0.83750	0.18	34.61	29.40	34.79	29.58	56.00	46.00	-21.21	-16.42
4	2.11719	0.27	37.55	31.46	37.82	31.73	56.00	46.00	-18.18	-14.27
<b>5</b>	<b>13.82813</b>	<b>0.87</b>	<b>44.03</b>	<b>37.66</b>	<b>44.90</b>	<b>38.53</b>	<b>60.00</b>	<b>50.00</b>	<b>-15.10</b>	<b>-11.47</b>
6	20.18750	1.11	39.35	32.06	40.46	33.17	60.00	50.00	-19.54	-16.83

**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





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## 4.2 RADIATED EMISSION AND BANDEGE MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION AND BANDEGE 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.



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#### 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 16, 2013	Jan. 15, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Mar. 25, 2013	Mar. 24, 2014
RF Cable	NA	CHHCAB_001	Oct. 06, 2013	Oct. 05, 2014
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 27, 2012	Nov. 26, 2013
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 29, 2013	Oct. 28, 2014
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 26, 2012	Dec. 25, 2013
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	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. 14 to 15, 2013

#### 4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. 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:**

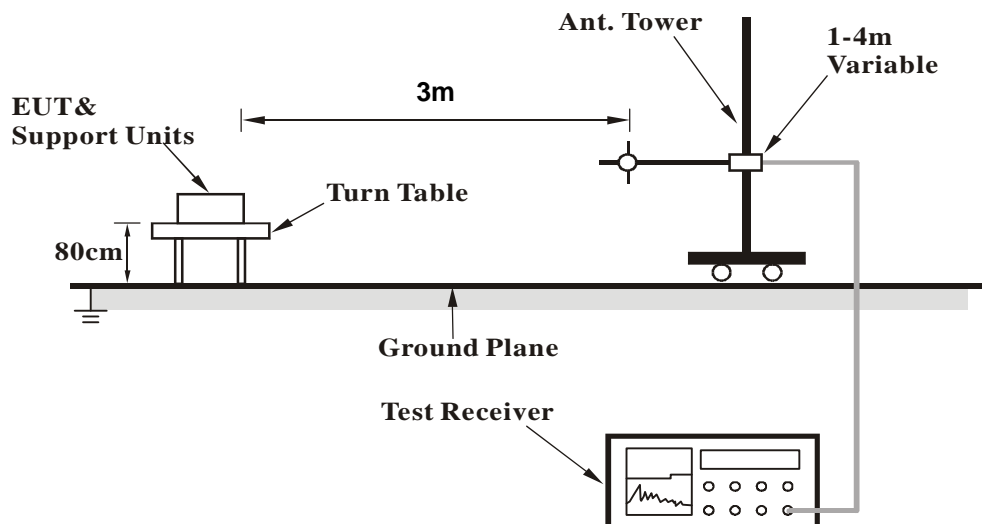
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

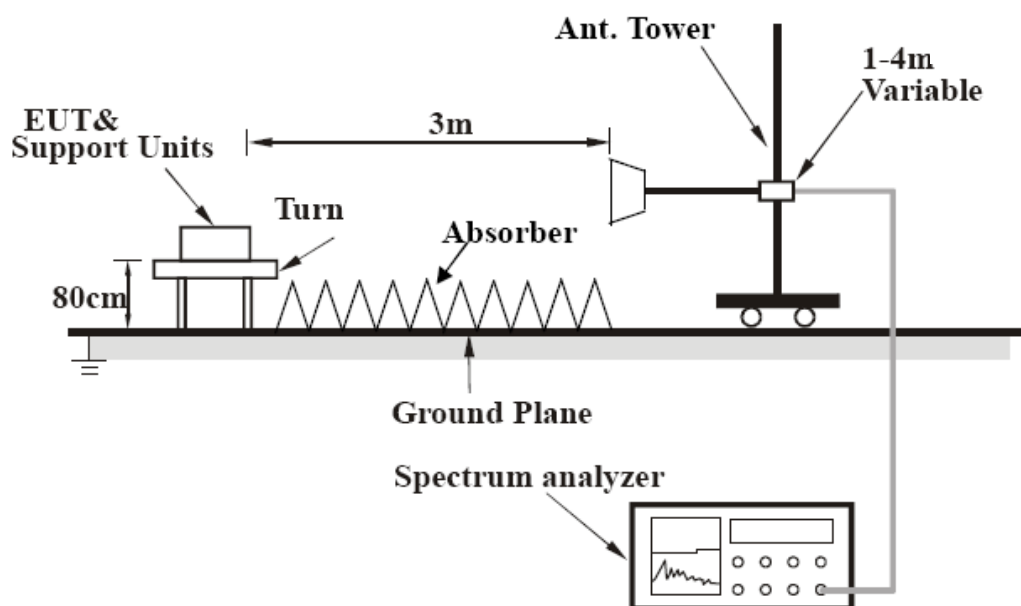
No deviation

#### 4.2.5 TEST SETUP

##### <Frequency Range below 1GHz>



##### <Frequency Range above 1GHz>



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

#### 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

## 4.2.7 TEST RESULTS

### BELOW 1GHz WORST-CASE DATA

#### 802.11g

<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	91.55	33.9 QP	43.5	-9.6	2.00 H	97	52.35	-18.41
2	108.81	40.1 QP	43.5	-3.4	1.50 H	282	55.64	-15.53
3	120.06	38.5 QP	43.5	-5.1	1.50 H	112	53.05	-14.60
4	220.31	28.1 QP	46.0	-17.9	1.00 H	104	43.54	-15.48
5	581.25	35.7 QP	46.0	-10.3	1.50 H	360	40.86	-5.12
6	775.01	34.0 QP	46.0	-12.0	1.00 H	4	35.15	-1.16
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	37.52	36.8 QP	40.0	-3.2	1.00 V	33	50.25	-13.48
2	91.55	37.9 QP	43.5	-5.6	1.50 V	360	56.29	-18.41
3	108.20	40.5 QP	43.5	-3.0	1.00 V	271	56.23	-15.69
4	400.01	31.2 QP	46.0	-14.8	1.00 V	1	40.53	-9.36
5	444.38	35.9 QP	46.0	-10.1	1.00 V	41	43.87	-7.97
6	775.01	33.1 QP	46.0	-12.9	1.00 V	5	34.26	-1.16

#### 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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



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ABOVE 1GHz DATA

802.11b

<b>CHANNEL</b>	TX Channel 1	<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	2387.00	52.7 PK	74.0	-21.3	1.01 H	86	56.18	-3.48
2	2387.00	39.5 AV	54.0	-14.5	1.01 H	86	42.98	-3.48
3	*2412.00	95.1 PK			1.01 H	86	98.49	-3.39
4	*2412.00	91.6 AV			1.01 H	86	94.99	-3.39
5	4824.00	52.8 PK	74.0	-21.2	1.11 H	260	46.31	6.49
6	4824.00	50.1 AV	54.0	-3.9	1.11 H	260	43.61	6.49

**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	2387.00	52.6 PK	74.0	-21.4	1.00 V	197	56.08	-3.48
2	2387.00	39.5 AV	54.0	-14.5	1.00 V	197	42.98	-3.48
3	*2412.00	91.4 PK			1.00 V	197	94.79	-3.39
4	*2412.00	87.6 AV			1.00 V	197	90.99	-3.39
5	4824.00	55.9 PK	74.0	-18.1	1.03 V	261	49.41	6.49
6	4824.00	53.0 AV	54.0	-1.0	1.03 V	261	46.51	6.49

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.



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<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	53.1 PK	74.0	-20.9	1.01 H	85	56.55	-3.45
2	2390.00	39.5 AV	54.0	-14.5	1.01 H	85	42.95	-3.45
3	*2437.00	92.5 PK			1.01 H	85	95.81	-3.31
4	*2437.00	89.1 AV			1.01 H	85	92.41	-3.31
5	2483.50	53.1 PK	74.0	-20.9	1.01 H	85	56.26	-3.16
6	2483.50	39.6 AV	54.0	-14.4	1.01 H	85	42.76	-3.16
7	4874.00	51.7 PK	74.0	-22.3	1.11 H	254	45.17	6.53
8	4874.00	49.4 AV	54.0	-4.6	1.11 H	254	42.87	6.53
9	7311.00	56.3 PK	74.0	-17.7	1.00 H	329	45.21	11.09
10	7311.00	43.0 AV	54.0	-11.0	1.00 H	329	31.91	11.09

**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	53.2 PK	74.0	-20.8	1.02 V	205	56.65	-3.45
2	2390.00	40.1 AV	54.0	-13.9	1.02 V	205	43.55	-3.45
3	*2437.00	89.0 PK			1.02 V	205	92.31	-3.31
4	*2437.00	85.1 AV			1.02 V	205	88.41	-3.31
5	2483.50	53.3 PK	74.0	-20.7	1.02 V	205	56.46	-3.16
6	2483.50	40.2 AV	54.0	-13.8	1.02 V	205	43.36	-3.16
7	4874.00	56.1 PK	74.0	-17.9	1.01 V	262	49.57	6.53
8	4874.00	53.1 AV	54.0	-0.9	1.01 V	262	46.57	6.53
9	7311.00	56.6 PK	74.0	-17.4	1.00 V	122	45.51	11.09
10	7311.00	43.1 AV	54.0	-10.9	1.00 V	122	32.01	11.09

**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) – Pre-Amplifier 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	91.4 PK			1.25 H	86	94.63	-3.23
2	*2462.00	87.3 AV			1.25 H	86	90.53	-3.23
3	2483.50	53.2 PK	74.0	-20.8	1.25 H	86	56.36	-3.16
4	2483.50	39.7 AV	54.0	-14.3	1.25 H	86	42.86	-3.16
5	4924.00	51.6 PK	74.0	-22.4	1.00 H	270	45.06	6.54
6	4924.00	49.3 AV	54.0	-4.7	1.00 H	270	42.76	6.54
7	7386.00	55.9 PK	74.0	-18.1	1.00 H	320	44.49	11.41
8	7386.00	42.6 AV	54.0	-11.4	1.00 H	320	31.19	11.41

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	88.2 PK			1.05 V	221	91.43	-3.23
2	*2462.00	84.0 AV			1.05 V	221	87.23	-3.23
3	2483.50	53.4 PK	74.0	-20.6	1.05 V	221	56.56	-3.16
4	2483.50	40.1 AV	54.0	-13.9	1.05 V	221	43.26	-3.16
5	4924.00	56.7 PK	74.0	-17.3	1.13 V	262	50.16	6.54
<b>6</b>	<b>4924.00</b>	<b>53.7 AV</b>	<b>54.0</b>	<b>-0.3</b>	<b>1.13 V</b>	<b>262</b>	<b>47.16</b>	<b>6.54</b>
7	7386.00	56.9 PK	74.0	-17.1	1.00 V	98	45.49	11.41
8	7386.00	43.1 AV	54.0	-10.9	1.00 V	98	31.69	11.41

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.



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802.11g

<b>CHANNEL</b>	TX Channel 1	<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	63.9 PK	74.0	-10.1	1.00 H	87	67.35	-3.45
2	2390.00	45.4 AV	54.0	-8.6	1.00 H	87	48.85	-3.45
3	*2412.00	96.0 PK			1.00 H	87	99.39	-3.39
4	*2412.00	84.6 AV			1.00 H	87	87.99	-3.39
5	4824.00	49.2 PK	74.0	-24.8	1.00 H	188	42.71	6.49
6	4824.00	38.9 AV	54.0	-15.1	1.00 H	188	32.41	6.49

**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	67.7 PK	74.0	-6.3	1.17 V	215	71.15	-3.45
2	2390.00	50.9 AV	54.0	-3.1	1.17 V	215	54.35	-3.45
3	*2412.00	92.8 PK			1.17 V	215	96.19	-3.39
4	*2412.00	83.8 AV			1.17 V	215	87.19	-3.39
5	4824.00	54.0 PK	74.0	-20.0	1.00 V	173	47.51	6.49
6	4824.00	40.6 AV	54.0	-13.4	1.00 V	173	34.11	6.49

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* " : Fundamental frequency.



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<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	53.4 PK	74.0	-20.6	1.00 H	95	56.85	-3.45
2	2390.00	39.7 AV	54.0	-14.3	1.00 H	95	43.15	-3.45
3	*2437.00	94.3 PK			1.00 H	95	97.61	-3.31
4	*2437.00	83.0 AV			1.00 H	95	86.31	-3.31
5	2483.50	53.2 PK	74.0	-20.8	1.00 H	95	56.36	-3.16
6	2483.50	39.8 AV	54.0	-14.2	1.00 H	95	42.96	-3.16
7	4874.00	49.3 PK	74.0	-24.7	1.00 H	173	42.77	6.53
8	4874.00	39.0 AV	54.0	-15.0	1.00 H	173	32.47	6.53
9	7311.00	54.6 PK	74.0	-19.4	1.04 H	220	43.51	11.09
10	7311.00	42.1 AV	54.0	-11.9	1.04 H	220	31.01	11.09

**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	65.4 PK	74.0	-8.6	1.10 V	214	68.85	-3.45
2	2390.00	50.1 AV	54.0	-3.9	1.10 V	214	53.55	-3.45
3	*2437.00	91.9 PK			1.10 V	214	95.21	-3.31
4	*2437.00	82.8 AV			1.10 V	214	86.11	-3.31
5	2483.50	64.6 PK	74.0	-9.4	1.10 V	214	67.76	-3.16
6	2483.50	49.8 AV	54.0	-4.2	1.10 V	214	52.96	-3.16
7	4874.00	53.8 PK	74.0	-20.2	1.05 V	179	47.27	6.53
8	4874.00	40.6 AV	54.0	-13.4	1.05 V	179	34.07	6.53
9	7311.00	54.7 PK	74.0	-19.3	1.00 V	97	43.61	11.09
10	7311.00	42.6 AV	54.0	-11.4	1.00 V	97	31.51	11.09

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.



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<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	93.9 PK			1.00 H	96	97.13	-3.23
2	*2462.00	82.7 AV			1.00 H	96	85.93	-3.23
3	2483.50	57.6 PK	74.0	-16.4	1.00 H	96	60.76	-3.16
4	2483.50	38.4 AV	54.0	-15.6	1.00 H	96	41.56	-3.16
5	4924.00	49.1 PK	74.0	-24.9	1.00 H	184	42.56	6.54
6	4924.00	38.6 AV	54.0	-15.4	1.00 H	184	32.06	6.54
7	7386.00	54.9 PK	74.0	-19.1	1.00 H	205	43.49	11.41
8	7386.00	42.2 AV	54.0	-11.8	1.00 H	205	30.79	11.41

**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	91.8 PK			1.11 V	215	95.03	-3.23
2	*2462.00	82.4 AV			1.11 V	215	85.63	-3.23
3	2483.50	65.1 PK	74.0	-8.9	1.11 V	215	68.26	-3.16
4	2483.50	44.2 AV	54.0	-9.8	1.11 V	215	47.36	-3.16
5	4924.00	53.4 PK	74.0	-20.6	1.02 V	179	46.86	6.54
6	4924.00	40.5 AV	54.0	-13.5	1.02 V	179	33.96	6.54
7	7386.00	54.3 PK	74.0	-19.7	1.00 V	105	42.89	11.41
8	7386.00	42.2 AV	54.0	-11.8	1.00 V	105	30.79	11.41

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.



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## 802.11n (HT20)

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	65.7 PK	74.0	-8.3	1.00 H	86	69.15	-3.45
2	2390.00	46.0 AV	54.0	-8.0	1.00 H	86	49.45	-3.45
3	*2412.00	96.2 PK			1.00 H	86	99.59	-3.39
4	*2412.00	83.9 AV			1.00 H	86	87.29	-3.39
5	4824.00	49.1 PK	74.0	-24.9	1.03 H	167	42.61	6.49
6	4824.00	39.1 AV	54.0	-14.9	1.03 H	167	32.61	6.49
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	61.6 PK	74.0	-12.4	1.11 V	217	65.05	-3.45
2	2390.00	44.9 AV	54.0	-9.1	1.11 V	217	48.35	-3.45
3	*2412.00	92.3 PK			1.11 V	217	95.69	-3.39
4	*2412.00	83.1 AV			1.11 V	217	86.49	-3.39
5	4824.00	54.2 PK	74.0	-19.8	1.02 V	166	47.71	6.49
6	4824.00	40.5 AV	54.0	-13.5	1.02 V	166	34.01	6.49

## 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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* " : Fundamental frequency.



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<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	48.3 PK	74.0	-25.7	1.00 H	97	51.75	-3.45
2	2390.00	34.0 AV	54.0	-20.0	1.00 H	97	37.45	-3.45
3	*2437.00	94.5 PK			1.00 H	97	97.81	-3.31
4	*2437.00	82.7 AV			1.00 H	97	86.01	-3.31
5	2483.50	47.2 PK	74.0	-26.8	1.00 H	97	50.36	-3.16
6	2483.50	33.7 AV	54.0	-20.3	1.00 H	97	36.86	-3.16
7	4874.00	49.1 PK	74.0	-24.9	1.04 H	177	42.57	6.53
8	4874.00	38.9 AV	54.0	-15.1	1.04 H	177	32.37	6.53
9	7311.00	54.3 PK	74.0	-19.7	1.04 H	192	43.21	11.09
10	7311.00	41.6 AV	54.0	-12.4	1.04 H	192	30.51	11.09

**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	44.5 PK	74.0	-29.5	1.11 V	216	47.95	-3.45
2	2390.00	33.6 AV	54.0	-20.4	1.11 V	216	37.05	-3.45
3	*2437.00	90.8 PK			1.11 V	216	94.11	-3.31
4	*2437.00	82.0 AV			1.11 V	216	85.31	-3.31
5	2483.50	43.8 PK	74.0	-30.2	1.11 V	216	46.96	-3.16
6	2483.50	33.5 AV	54.0	-20.5	1.11 V	216	36.66	-3.16
7	4874.00	53.2 PK	74.0	-20.8	1.04 V	178	46.67	6.53
8	4874.00	40.2 AV	54.0	-13.8	1.04 V	178	33.67	6.53
9	7311.00	54.9 PK	74.0	-19.1	1.01 V	112	43.81	11.09
10	7311.00	42.8 AV	54.0	-11.2	1.01 V	112	31.71	11.09

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.



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<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	92.9 PK			1.00 H	94	96.13	-3.23
2	*2462.00	81.2 AV			1.00 H	94	84.43	-3.23
3	2483.50	60.9 PK	74.0	-13.1	1.00 H	94	64.06	-3.16
4	2483.50	40.8 AV	54.0	-13.2	1.00 H	94	43.96	-3.16
5	4924.00	48.9 PK	74.0	-25.1	1.03 H	169	42.36	6.54
6	4924.00	38.6 AV	54.0	-15.4	1.03 H	169	32.06	6.54
7	7386.00	54.8 PK	74.0	-19.2	1.00 H	202	43.39	11.41
8	7386.00	42.0 AV	54.0	-12.0	1.00 H	202	30.59	11.41

**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	89.0 PK			1.10 V	215	92.23	-3.23
2	*2462.00	81.6 AV			1.10 V	215	84.83	-3.23
3	2483.50	57.1 PK	74.0	-16.9	1.10 V	215	60.26	-3.16
4	2483.50	39.7 AV	54.0	-14.3	1.10 V	215	42.86	-3.16
5	4924.00	53.9 PK	74.0	-20.1	1.06 V	171	47.36	6.54
6	4924.00	41.0 AV	54.0	-13.0	1.06 V	171	34.46	6.54
7	7386.00	54.4 PK	74.0	-19.6	1.03 V	115	42.99	11.41
8	7386.00	42.0 AV	54.0	-12.0	1.03 V	115	30.59	11.41

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.



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802.11n (HT40)

<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	64.4 PK	74.0	-9.6	1.01 H	96	67.85	-3.45
2	2390.00	46.7 AV	54.0	-7.3	1.01 H	96	50.15	-3.45
3	*2422.00	92.2 PK			1.01 H	96	95.56	-3.36
4	*2422.00	79.9 AV			1.01 H	96	83.26	-3.36
5	4844.00	48.7 PK	74.0	-25.3	1.54 H	73	42.20	6.50
6	4844.00	38.1 AV	54.0	-15.9	1.54 H	73	31.60	6.50
7	7266.00	53.9 PK	74.0	-20.1	1.00 H	253	42.92	10.98
8	7266.00	41.1 AV	54.0	-12.9	1.00 H	253	30.12	10.98

**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	64.1 PK	74.0	-9.9	1.10 V	214	67.55	-3.45
2	2390.00	46.5 AV	54.0	-7.5	1.10 V	214	49.95	-3.45
3	*2422.00	89.5 PK			1.10 V	214	92.86	-3.36
4	*2422.00	79.8 AV			1.10 V	214	83.16	-3.36
5	4844.00	50.1 PK	74.0	-23.9	1.16 V	254	43.60	6.50
6	4844.00	37.0 AV	54.0	-17.0	1.16 V	254	30.50	6.50
7	7266.00	53.4 PK	74.0	-20.6	1.06 V	226	42.42	10.98
8	7266.00	41.4 AV	54.0	-12.6	1.06 V	226	30.42	10.98

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.





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<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	56.2 PK	74.0	-17.8	1.02 H	86	59.65	-3.45
2	2390.00	41.9 AV	54.0	-12.1	1.02 H	86	45.35	-3.45
3	*2437.00	91.9 PK			1.02 H	86	95.21	-3.31
4	*2437.00	79.3 AV			1.02 H	86	82.61	-3.31
5	2483.50	53.6 PK	74.0	-20.4	1.02 H	86	56.76	-3.16
6	2483.50	40.1 AV	54.0	-13.9	1.02 H	86	43.26	-3.16
7	4874.00	48.0 PK	74.0	-26.0	1.53 H	75	41.47	6.53
8	4874.00	37.6 AV	54.0	-16.4	1.53 H	75	31.07	6.53
9	7311.00	54.8 PK	74.0	-19.2	1.00 H	243	43.71	11.09
10	7311.00	41.7 AV	54.0	-12.3	1.00 H	243	30.61	11.09

**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	55.8 PK	74.0	-18.2	1.05 V	213	59.25	-3.45
2	2390.00	41.5 AV	54.0	-12.5	1.05 V	213	44.95	-3.45
3	*2437.00	89.3 PK			1.05 V	213	92.61	-3.31
4	*2437.00	79.1 AV			1.05 V	213	82.41	-3.31
5	2483.50	53.4 PK	74.0	-20.6	1.05 V	213	56.56	-3.16
6	2483.50	40.1 AV	54.0	-13.9	1.05 V	213	43.26	-3.16
7	4874.00	50.0 PK	74.0	-24.0	1.19 V	248	43.47	6.53
8	4874.00	37.2 AV	54.0	-16.8	1.19 V	248	30.67	6.53
9	7311.00	53.1 PK	74.0	-20.9	1.02 V	214	42.01	11.09
10	7311.00	41.0 AV	54.0	-13.0	1.02 V	214	29.91	11.09

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.



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<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	91.4 PK			1.00 H	85	94.66	-3.26
2	*2452.00	78.5 AV			1.00 H	85	81.76	-3.26
3	2483.50	58.3 PK	74.0	-15.7	1.00 H	85	61.46	-3.16
4	2483.50	42.8 AV	54.0	-11.2	1.00 H	85	45.96	-3.16
5	4904.00	48.4 PK	74.0	-25.6	1.54 H	81	41.85	6.55
6	4904.00	38.0 AV	54.0	-16.0	1.54 H	81	31.45	6.55
7	7356.00	54.3 PK	74.0	-19.7	1.00 H	251	43.01	11.29
8	7356.00	41.3 AV	54.0	-12.7	1.00 H	251	30.01	11.29

**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	88.7 PK			1.12 V	218	91.96	-3.26
2	*2452.00	78.3 AV			1.12 V	218	81.56	-3.26
3	2483.50	57.9 PK	74.0	-16.1	1.12 V	218	61.06	-3.16
4	2483.50	42.5 AV	54.0	-11.5	1.12 V	218	45.66	-3.16
5	4904.00	50.1 PK	74.0	-23.9	1.20 V	263	43.55	6.55
6	4904.00	37.3 AV	54.0	-16.7	1.20 V	263	30.75	6.55
7	7356.00	53.7 PK	74.0	-20.3	1.00 V	220	42.41	11.29
8	7356.00	41.4 AV	54.0	-12.6	1.00 V	220	30.11	11.29

**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) – Pre-Amplifier 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
Spectrum Analyzer R&S	FSP 40	100036	Jan. 21, 2013	Jan. 20, 2014

**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. 12, 2013

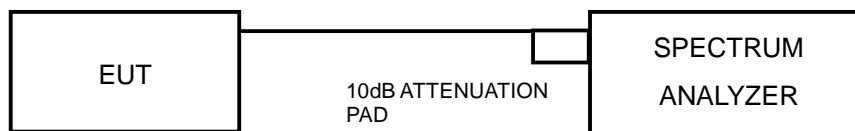
#### 4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz
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.



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### 4.3.7 TEST RESULTS

#### 802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.10	0.5	PASS
6	2437	10.12	0.5	PASS
11	2462	10.14	0.5	PASS

#### 802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.62	0.5	PASS
6	2437	16.62	0.5	PASS
11	2462	16.61	0.5	PASS

#### 802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.83	0.5	PASS
6	2437	17.86	0.5	PASS
11	2462	17.85	0.5	PASS

#### 802.11n (HT40)

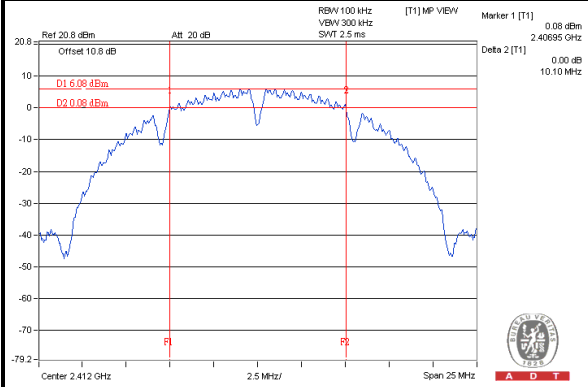
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	36.46	0.5	PASS
6	2437	36.48	0.5	PASS
9	2452	36.49	0.5	PASS



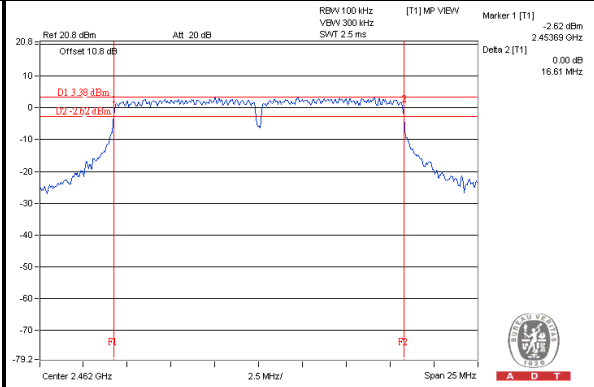
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### SPECTRUM PLOT OF WORST VALUE

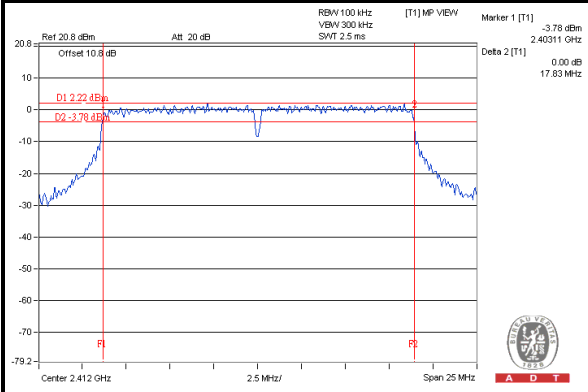
#### 802.11b / CH1



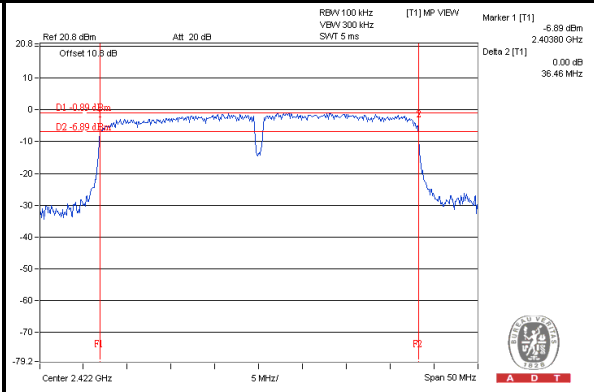
#### 802.11g / CH11



#### 802.11n (HT20) / CH1



#### 802.11n (HT40) / CH3



## 4.4 CONDUCTED OUTPUT POWER MEASUREMENT

### 4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

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

### 4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	1014008	Apr. 23, 2013	Apr. 22, 2014
Power Sensor	MA2411B	0917122	Apr. 23, 2013	Apr. 22, 2014

**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. 12, 2013

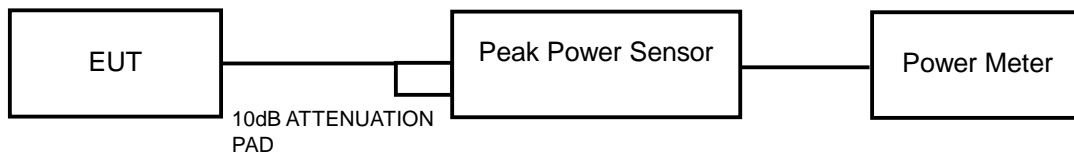
### 4.4.3 TEST PROCEDURES

The 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





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#### 4.4.7 TEST RESULTS

##### 802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	58.749	17.69	30	PASS
6	2437	50.933	17.07	30	PASS
11	2462	60.395	17.81	30	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	155.955	21.93	30	PASS
6	2437	160.325	22.05	30	PASS
11	2462	157.398	21.97	30	PASS

##### 802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	142.233	21.53	30	PASS
6	2437	156.315	21.94	30	PASS
11	2462	139.637	21.45	30	PASS

##### 802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
3	2422	131.826	21.20	30	PASS
6	2437	129.122	21.11	30	PASS
9	2452	131.826	21.20	30	PASS



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## 4.5 AVERAGE OUTPUT POWER

### 4.5.1 FOR REFERENCE.

### 4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	1014008	Apr. 23, 2013	Apr. 22, 2014
Power Sensor	MA2411B	0917122	Apr. 23, 2013	Apr. 22, 2014

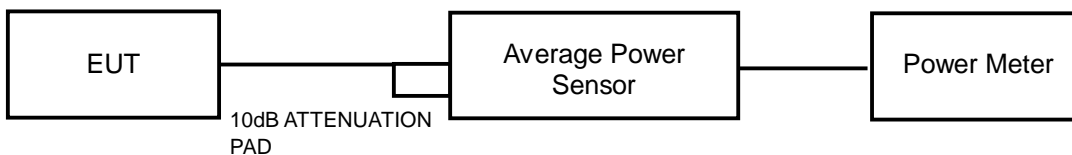
**Note:**

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. 12, 2013

### 4.5.3 TEST PROCEDURES

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

### 4.5.4 TEST SETUP



### 4.5.5 EUT OPERATING CONDITIONS

Same as Item 4.3.6



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#### 4.5.6 TEST RESULTS

##### 802.11b

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	33.497	15.25
6	2437	31.405	14.97
11	2462	37.154	15.70

##### 802.11g

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	28.510	14.55
6	2437	36.141	15.58
11	2462	39.446	15.96

##### 802.11n (HT20)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	27.353	14.37
6	2437	33.963	15.31
11	2462	35.645	15.52

##### 802.11n (HT40)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
3	2422	26.915	14.30
6	2437	30.200	14.80
9	2452	32.063	15.06

## 4.6 POWER SPECTRAL DENSITY MEASUREMENT

### 4.6.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100036	Jan. 21, 2013	Jan. 20, 2014

**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. 12, 2013

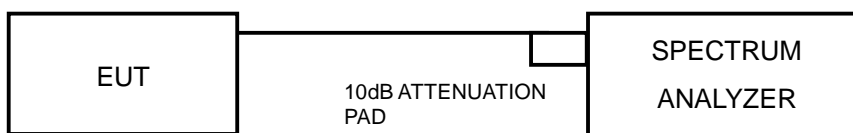
### 4.6.3 TEST PROCEDURE

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 amplitude level.

### 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



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## 4.6.7 TEST RESULTS

### 802.11b

Channel	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-14.00	8	PASS
6	2437	-14.46	8	PASS
11	2462	-13.01	8	PASS

### 802.11g

Channel	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-12.53	8	PASS
6	2437	-11.81	8	PASS
11	2462	-11.46	8	PASS

### 802.11n (HT20)

Channel	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-12.21	8	PASS
6	2437	-11.31	8	PASS
11	2462	-10.72	8	PASS

### 802.11n (HT40)

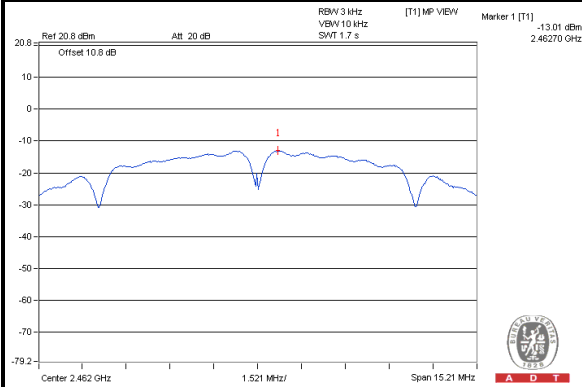
Channel	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
3	2422	-13.43	8	PASS
6	2437	-13.72	8	PASS
9	2452	-13.02	8	PASS



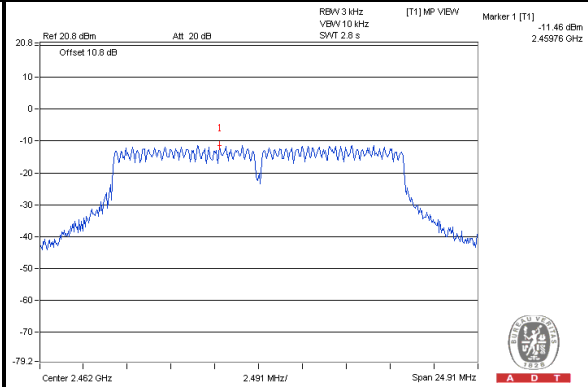
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### SPECTRUM PLOT OF WORST VALUE

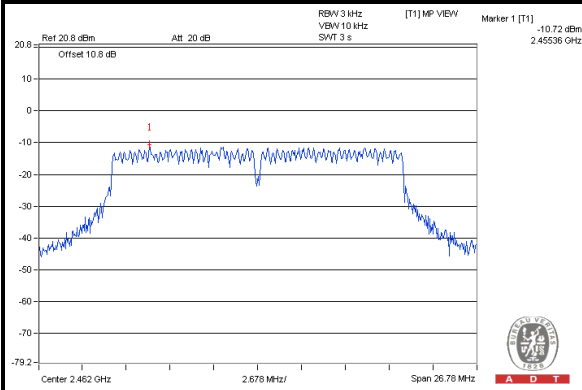
#### 802.11b / CH11



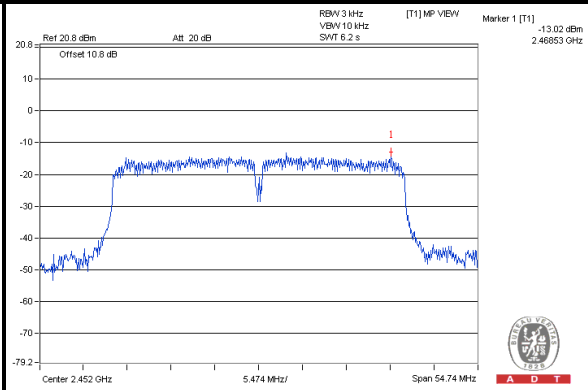
#### 802.11g / CH 11



#### 802.11n (HT20) / CH11



#### 802.11n (HT40) / CH9





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## 4.7 CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

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

### 4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100036	Jan. 21, 2013	Jan. 20, 2014

**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. 12, 2013

### 4.7.3 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.

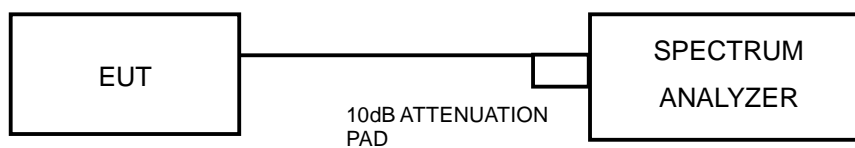
#### Measurement Procedure –Unwanted Emission Level

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.

#### 4.7.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.7.5 TEST SETUP



#### 4.7.6 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 4.7.7 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.

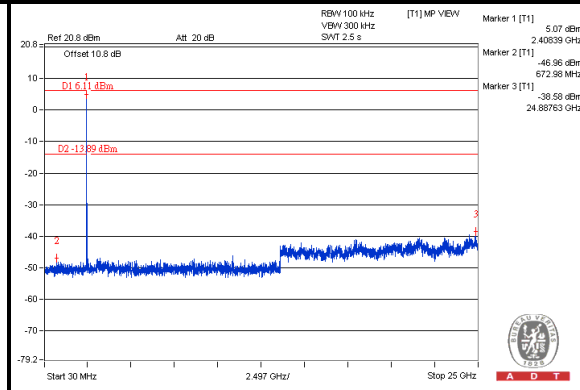
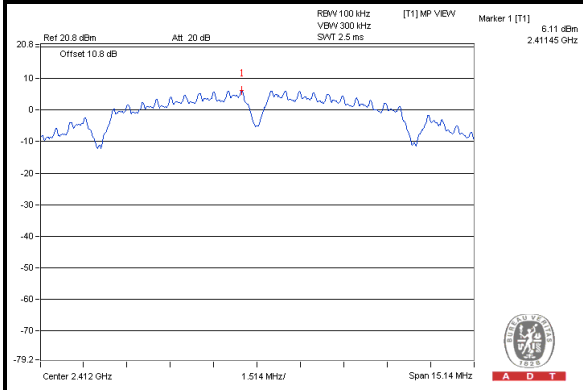




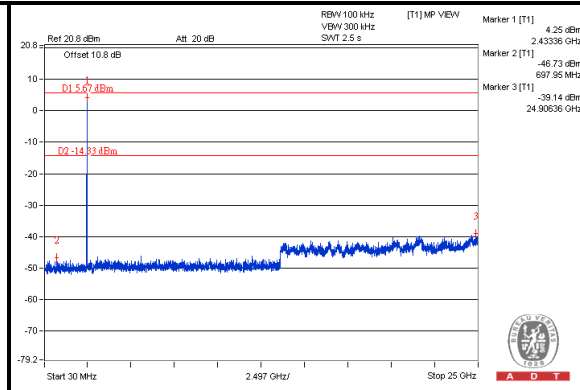
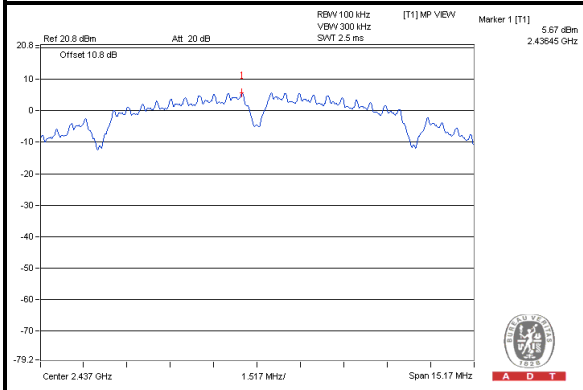
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### 802.11b:

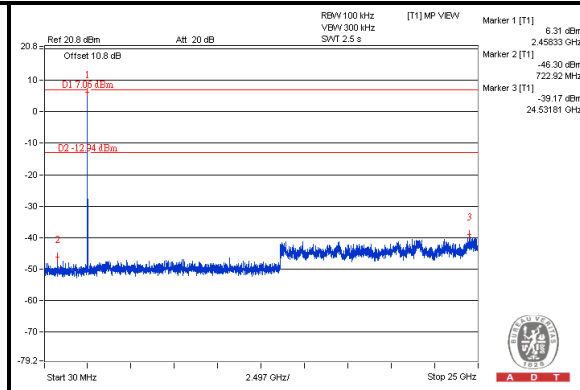
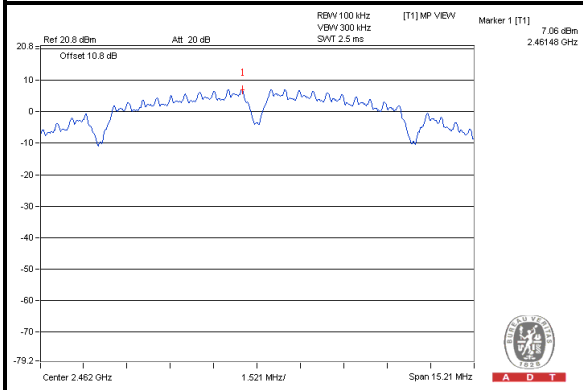
#### CH 1



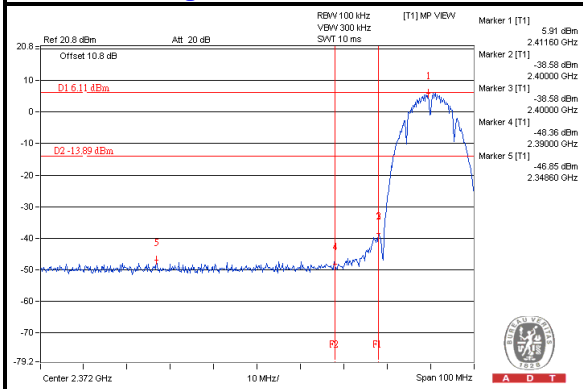
#### CH 6



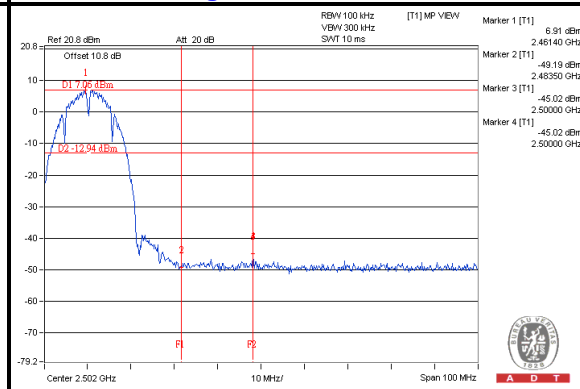
#### CH 11



#### CH 1 Band edge



#### CH 11 Band edge

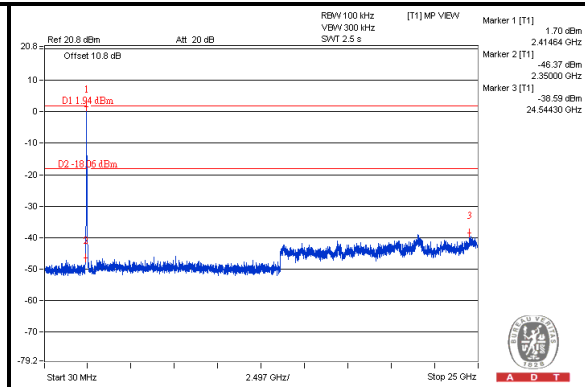
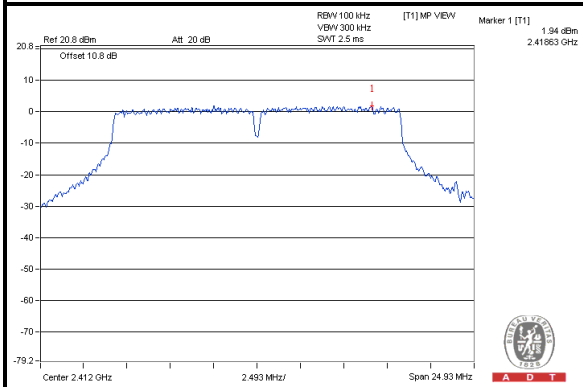




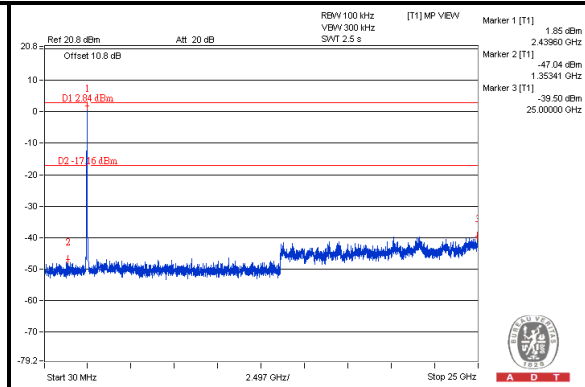
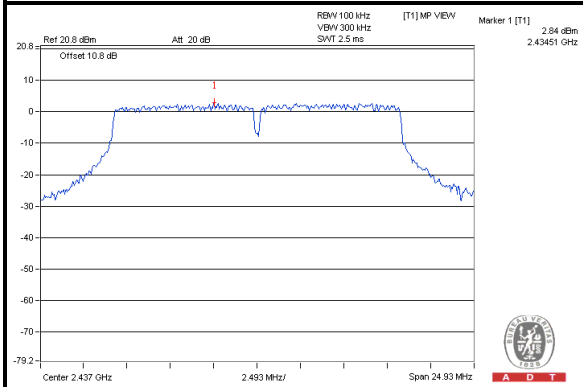
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### 802.11g:

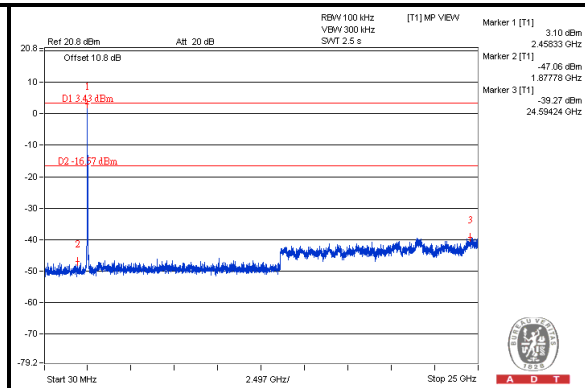
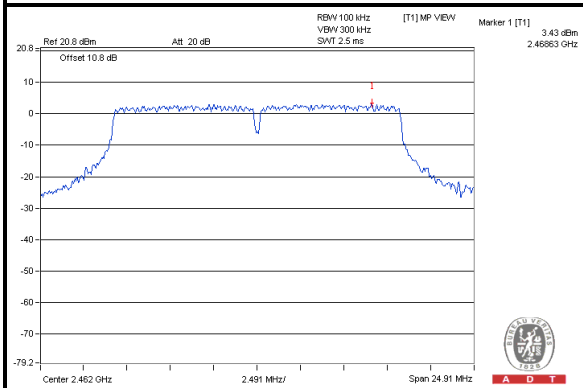
#### CH 1



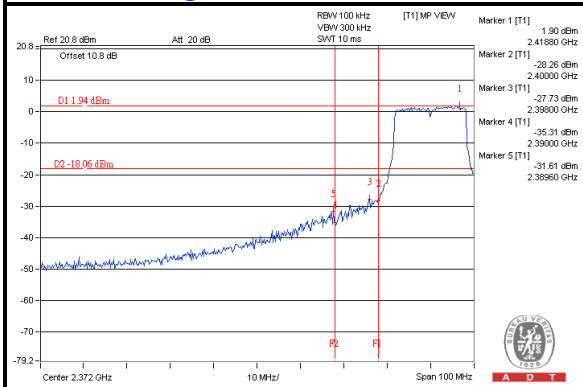
#### CH 6



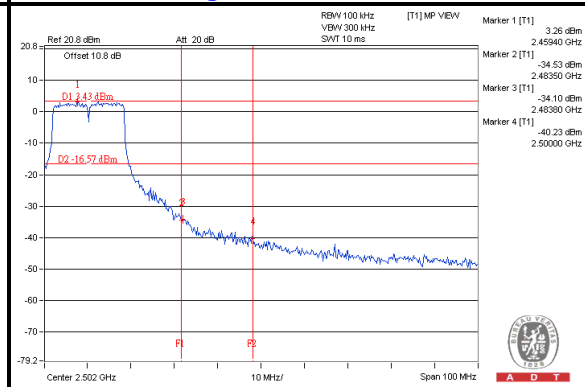
#### CH 11



#### CH 1 Band edge



#### CH 11 Band edge

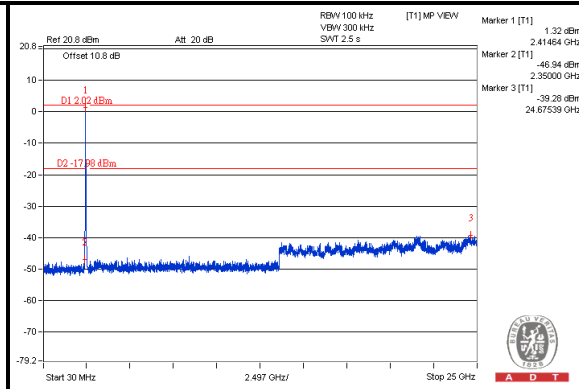
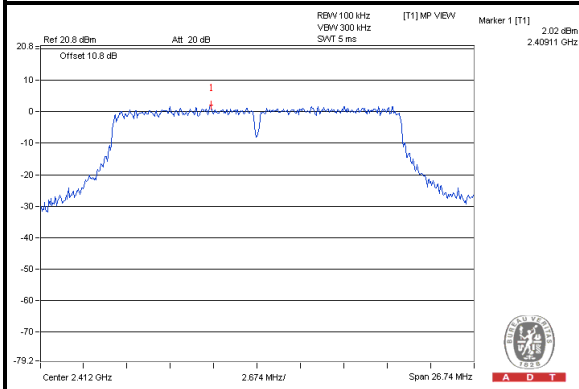




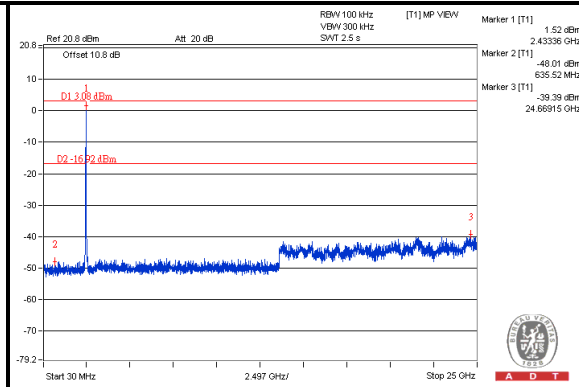
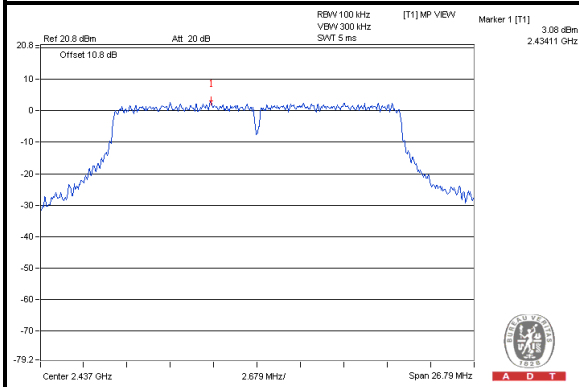
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### 802.11n (HT20):

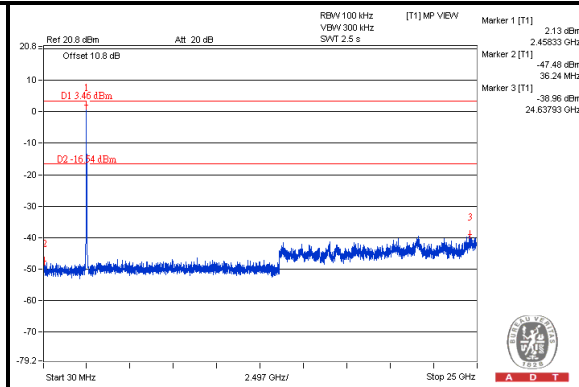
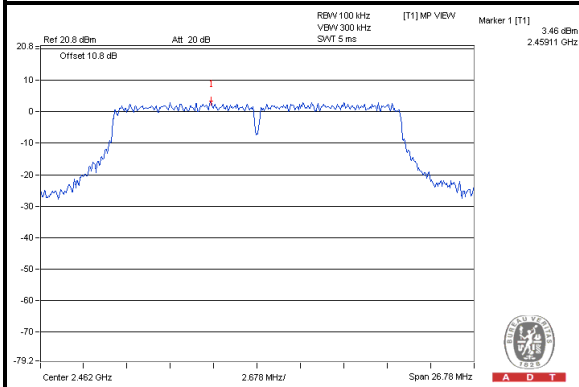
#### CH 1



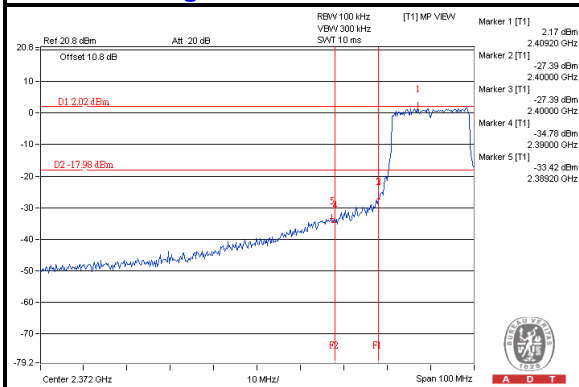
#### CH 6



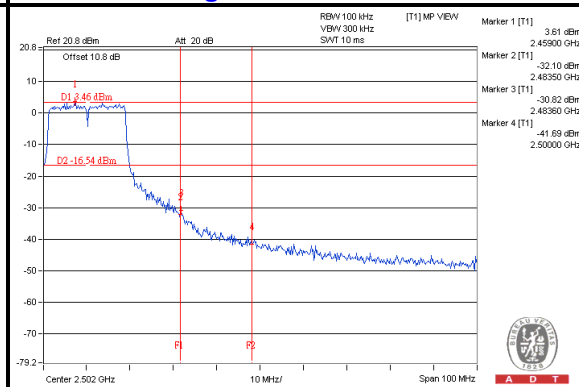
#### CH 11



#### CH 1 Band edge



#### CH 11 Band edge

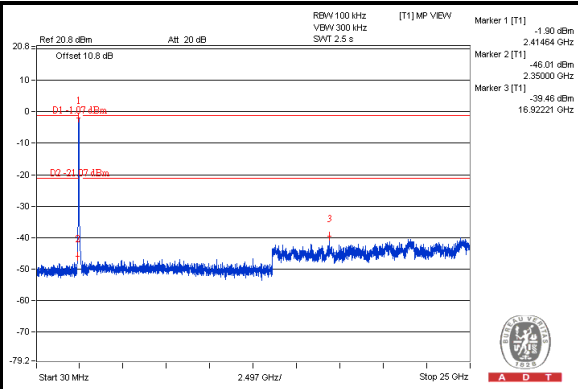
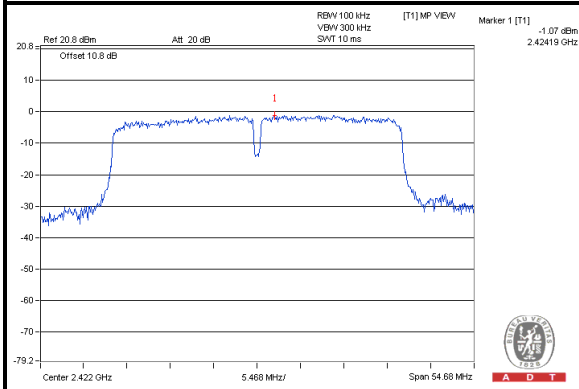




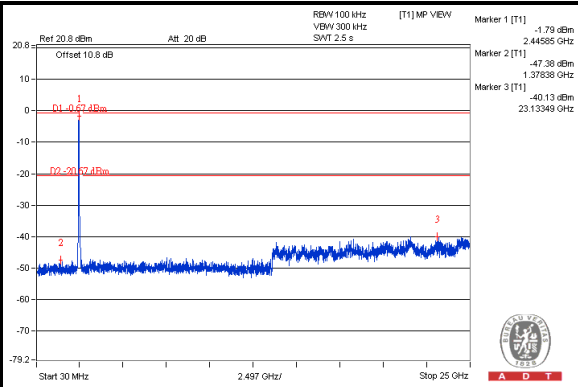
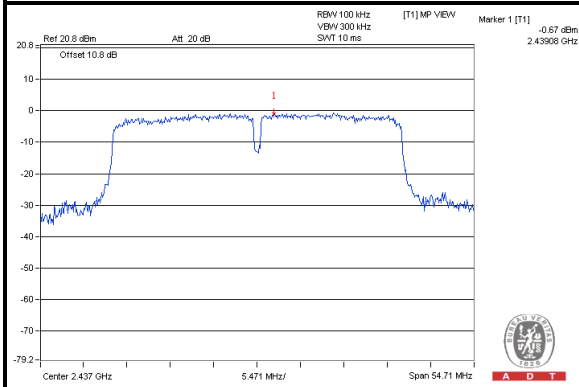
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### 802.11n (HT40):

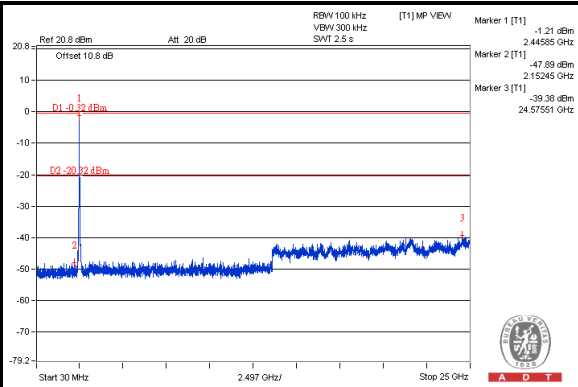
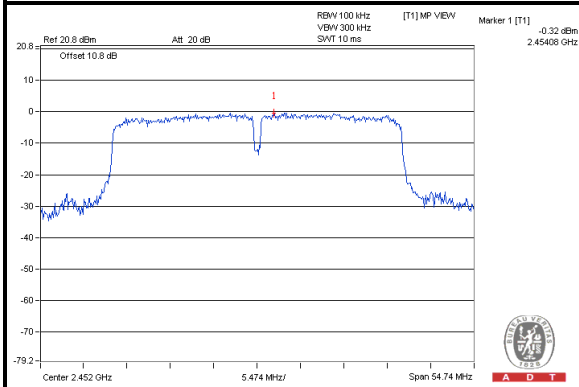
#### CH 3



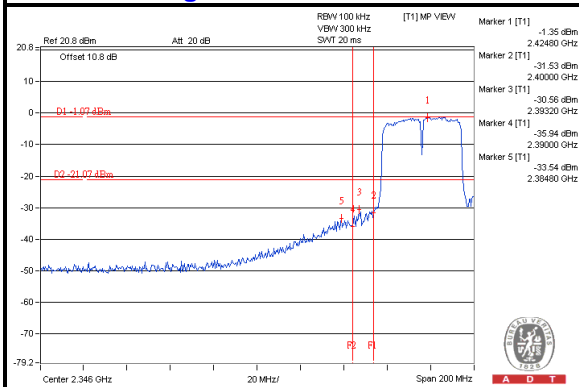
#### CH 6



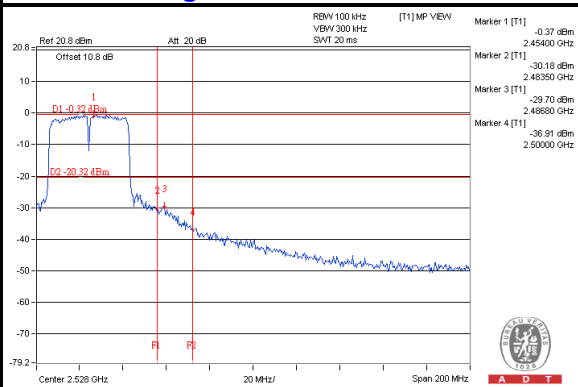
#### CH 9



#### CH 3 Band edge



#### CH 9 Band edge



## 5. TEST TYPES AND RESULTS (FOR 5GHz, 5.725~5.850GHz Band)

### 5.1 CONDUCTED EMISSION MEASUREMENT

#### 5.1.1 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.

#### 5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Mar. 08, 2013	Mar. 07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 05, 2013	Sep. 04, 2014
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 06, 2013	June 05, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-03	Sep. 24, 2013	Sep. 23, 2014
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. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Nov. 27, 2013

### 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.

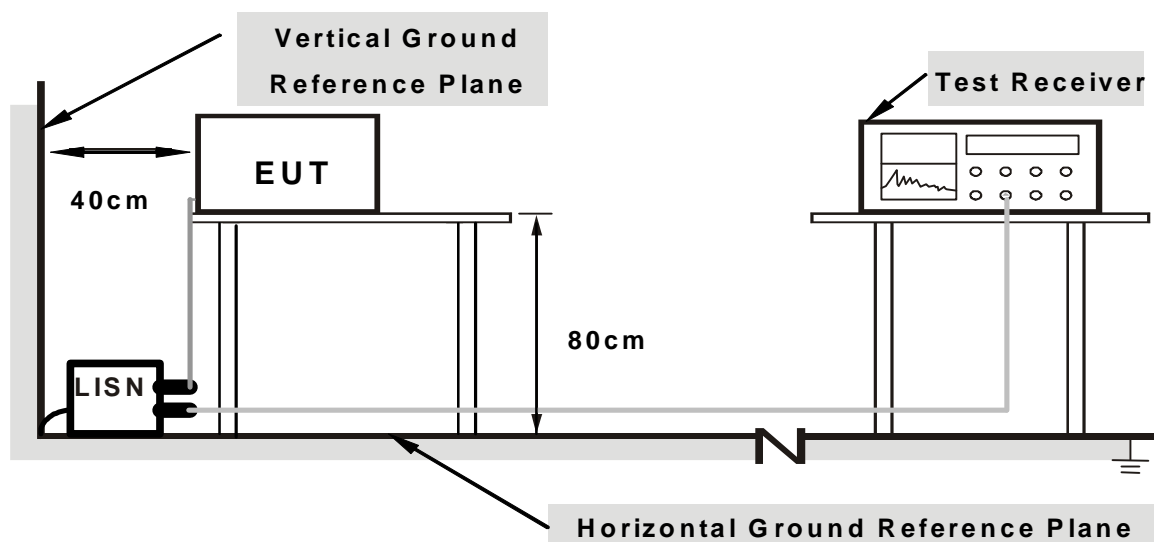
#### NOTE:

1. 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

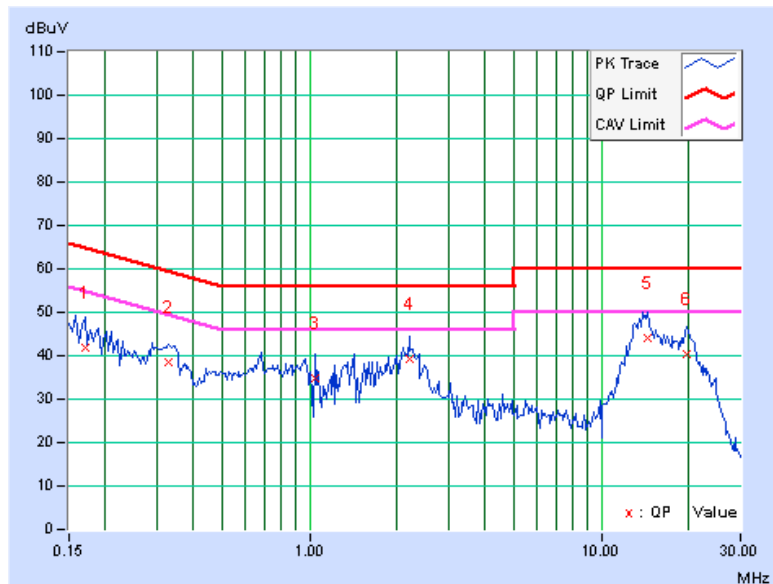
### 5.1.7 TEST RESULTS

<b>PHASE</b>	Line (L)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
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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	0.16953	0.10	41.82	34.52	41.92	34.62	64.98
2	0.32969	0.14	38.26	33.47	38.40	33.61	59.46	49.46	-21.06	-15.85
3	1.04688	0.20	34.66	27.95	34.86	28.15	56.00	46.00	-21.14	-17.85
4	2.19922	0.28	39.14	33.04	39.42	33.32	56.00	46.00	-16.58	-12.68
5	14.37109	0.92	43.09	36.65	44.01	37.57	60.00	50.00	-15.99	-12.43
6	19.63672	1.12	39.42	31.96	40.54	33.08	60.00	50.00	-19.46	-16.92

#### 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







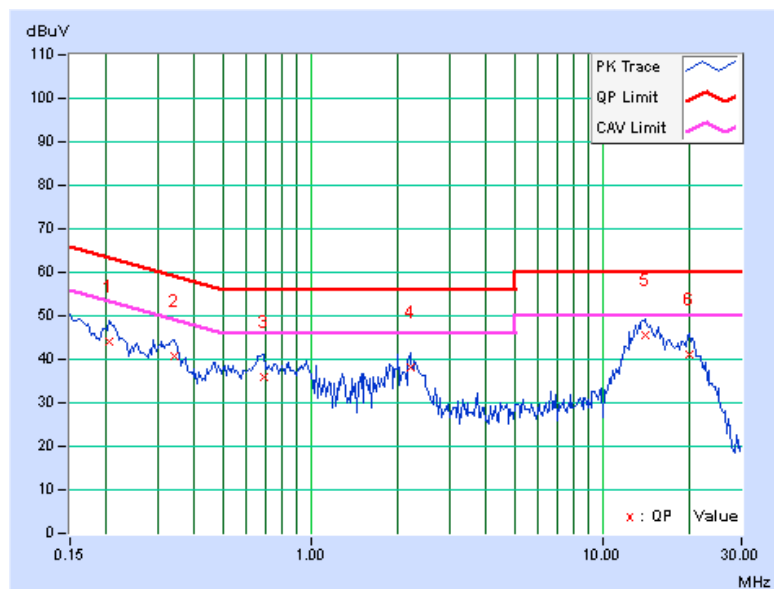
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<b>PHASE</b>	Neutral (N)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.20469	0.11	44.09	36.77	44.20	36.88	63.42	53.42	-19.22	-16.54
2	0.34141	0.15	40.70	35.12	40.85	35.27	59.17	49.17	-18.32	-13.90
3	0.68906	0.17	35.60	28.90	35.77	29.07	56.00	46.00	-20.23	-16.93
4	2.19141	0.27	37.70	31.53	37.97	31.80	56.00	46.00	-18.03	-14.20
<b>5</b>	<b>14.01172</b>	<b>0.88</b>	<b>44.62</b>	<b>38.21</b>	<b>45.50</b>	<b>39.09</b>	<b>60.00</b>	<b>50.00</b>	<b>-14.50</b>	<b>-10.91</b>
6	19.77734	1.09	40.06	32.52	41.15	33.61	60.00	50.00	-18.85	-16.39

**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





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## 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.



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## 5.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 16, 2013	Jan. 15, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Mar. 25, 2013	Mar. 24, 2014
RF Cable	NA	CHHCAB_001	Oct. 06, 2013	Oct. 05, 2014
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 27, 2012	Nov. 26, 2013
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 29, 2013	Oct. 28, 2014
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 26, 2012	Dec. 25, 2013
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	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. 14 to 15, 2013

### 5.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. 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:**

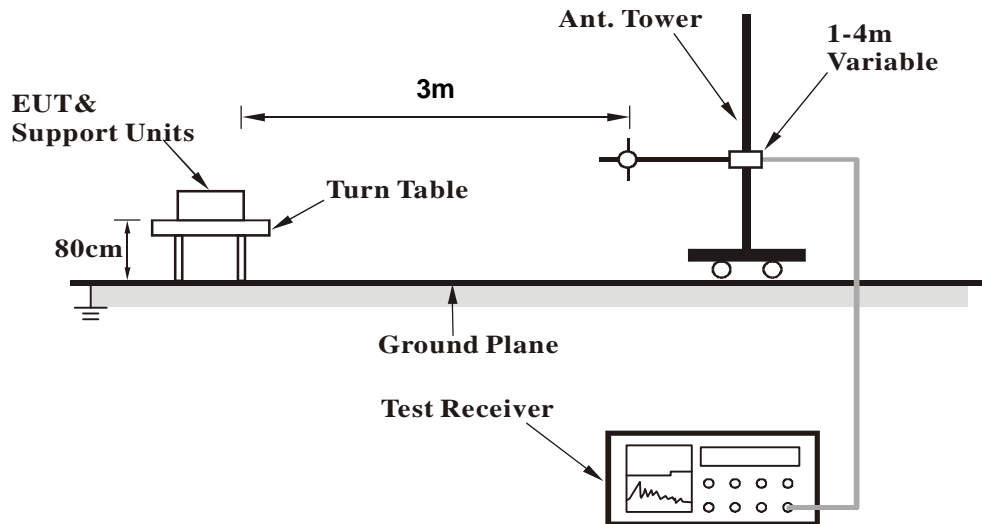
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

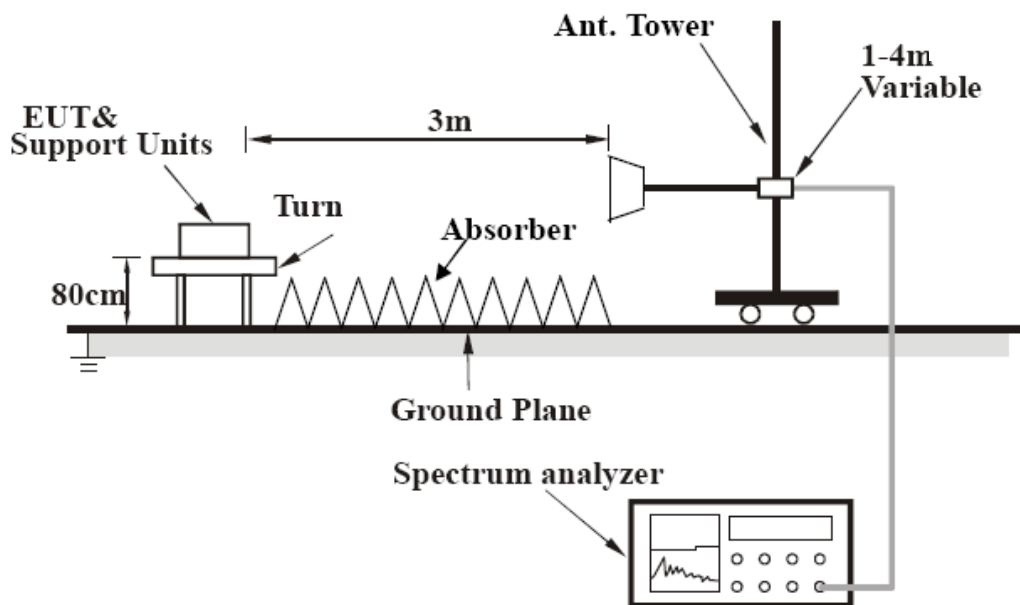
No deviation

### 5.2.5 TEST SETUP

#### <Frequency Range below 1GHz>



#### <Frequency Range above 1GHz>



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 4.1.6



## 5.2.7 TEST RESULTS

### BELOW 1GHz WORST-CASE DATA

#### 802.11a

<b>CHANNEL</b>	TX Channel 157	<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	91.58	34.3 QP	43.5	-9.2	1.87 H	97	52.66	-18.40
2	108.85	40.3 QP	43.5	-3.2	1.55 H	288	55.86	-15.52
3	120.11	38.8 QP	43.5	-4.7	1.50 H	110	53.38	-14.61
4	220.35	28.5 QP	46.0	-17.5	1.25 H	104	43.95	-15.47
5	581.29	36.1 QP	46.0	-9.9	1.75 H	360	41.19	-5.12
6	775.05	35.0 QP	46.0	-11.0	1.00 H	5	36.16	-1.16

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	37.54	37.0 QP	40.0	-3.0	1.00 V	55	50.48	-13.48
2	91.58	38.1 QP	43.5	-5.4	1.25 V	360	56.51	-18.40
3	<b>108.52</b>	<b>40.8 QP</b>	<b>43.5</b>	<b>-2.7</b>	<b>1.00 V</b>	<b>275</b>	<b>56.38</b>	<b>-15.61</b>
4	400.04	31.5 QP	46.0	-14.5	1.00 V	0	40.85	-9.36
5	444.71	36.2 QP	46.0	-9.8	1.00 V	55	44.18	-7.96
6	775.05	33.5 QP	46.0	-12.5	1.00 V	13	34.68	-1.16

#### 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) – Pre-Amplifier 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	102.3 PK			1.37 H	62	94.44	7.86
2	*5745.00	93.9 AV			1.37 H	62	86.04	7.86
3	11490.00	57.3 PK	74.0	-16.7	1.38 H	67	42.55	14.75
4	11490.00	46.2 AV	54.0	-7.8	1.38 H	67	31.45	14.75
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	110.0 PK			1.00 V	184	102.14	7.86
2	*5745.00	98.7 AV			1.00 V	184	90.84	7.86
3	11490.00	60.7 PK	74.0	-13.3	1.17 V	302	45.95	14.75
4	11490.00	47.9 AV	54.0	-6.1	1.17 V	302	33.15	14.75

#### 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) – Pre-Amplifier 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.

<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	103.5 PK			1.37 H	54	95.57	7.93
2	*5785.00	94.7 AV			1.37 H	54	86.77	7.93
3	11570.00	56.1 PK	74.0	-17.9	1.32 H	74	41.21	14.89
4	11570.00	45.4 AV	54.0	-8.6	1.32 H	74	30.51	14.89

**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	107.9 PK			1.12 V	181	99.97	7.93
2	*5785.00	99.1 AV			1.12 V	181	91.17	7.93
3	11570.00	60.0 PK	74.0	-14.0	1.14 V	305	45.11	14.89
4	11570.00	47.0 AV	54.0	-7.0	1.14 V	305	32.11	14.89

**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) – Pre-Amplifier 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.



<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	102.6 PK			1.38 H	57	94.58	8.02
2	*5825.00	94.0 AV			1.38 H	57	85.98	8.02
3	11650.00	55.1 PK	74.0	-18.9	1.33 H	52	40.29	14.81
4	11650.00	44.2 AV	54.0	-9.8	1.33 H	52	29.39	14.81

**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	107.3 PK			1.36 V	202	99.28	8.02
2	*5825.00	98.6 AV			1.36 V	202	90.58	8.02
3	11650.00	58.3 PK	74.0	-15.7	1.20 V	297	43.49	14.81
4	11650.00	45.6 AV	54.0	-8.4	1.20 V	297	30.79	14.81

**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) – Pre-Amplifier 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.



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### 802.11ac (VHT20)

<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	104.2 PK			1.28 H	46	96.34	7.86
2	*5745.00	93.4 AV			1.28 H	46	85.54	7.86
3	11490.00	57.4 PK	74.0	-16.6	1.32 H	77	42.65	14.75
4	11490.00	46.4 AV	54.0	-7.6	1.32 H	77	31.65	14.75
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	109.0 PK			1.00 V	189	101.14	7.86
2	*5745.00	98.0 AV			1.00 V	189	90.14	7.86
3	11490.00	60.6 PK	74.0	-13.4	1.13 V	289	45.85	14.75
4	11490.00	47.7 AV	54.0	-6.3	1.13 V	289	32.95	14.75

#### 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) – Pre-Amplifier 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.



<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	102.9 PK			1.35 H	45	94.97	7.93
2	*5785.00	94.2 AV			1.35 H	45	86.27	7.93
3	11570.00	56.2 PK	74.0	-17.8	1.35 H	78	41.31	14.89
4	11570.00	45.3 AV	54.0	-8.7	1.35 H	78	30.41	14.89

**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	107.7 PK			1.14 V	187	99.77	7.93
2	*5785.00	98.8 AV			1.14 V	187	90.87	7.93
3	11570.00	59.4 PK	74.0	-14.6	1.16 V	304	44.51	14.89
4	11570.00	46.6 AV	54.0	-7.4	1.16 V	304	31.71	14.89

**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) – Pre-Amplifier 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.



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<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	102.4 PK			1.37 H	47	94.38	8.02
2	*5825.00	93.7 AV			1.37 H	47	85.68	8.02
3	11650.00	55.4 PK	74.0	-18.6	1.38 H	64	40.59	14.81
4	11650.00	44.2 AV	54.0	-9.8	1.38 H	64	29.39	14.81

**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	107.2 PK			1.37 V	191	99.18	8.02
2	*5825.00	98.3 AV			1.37 V	191	90.28	8.02
3	11650.00	58.6 PK	74.0	-15.4	1.23 V	308	43.79	14.81
4	11650.00	45.7 AV	54.0	-8.3	1.23 V	308	30.89	14.81

**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) – Pre-Amplifier 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.



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802.11ac (VHT40)

<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	5460.00	51.7 PK	74.0	-22.3	1.35 H	43	44.21	7.49
2	5460.00	38.6 AV	54.0	-15.4	1.35 H	43	31.11	7.49
3	*5755.00	99.8 PK			1.35 H	43	91.92	7.88
4	*5755.00	90.4 AV			1.35 H	43	82.52	7.88
5	11510.00	55.2 PK	74.0	-18.8	1.42 H	67	40.44	14.76
6	11510.00	43.9 AV	54.0	-10.1	1.42 H	67	29.14	14.76

**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	5460.00	53.9 PK	74.0	-20.1	1.00 V	184	46.41	7.49
2	5460.00	40.5 AV	54.0	-13.5	1.00 V	184	33.01	7.49
3	*5755.00	109.3 PK			1.00 V	184	101.42	7.88
4	*5755.00	96.1 AV			1.00 V	184	88.22	7.88
5	11510.00	58.7 PK	74.0	-15.3	1.17 V	307	43.94	14.76
6	11510.00	46.0 AV	54.0	-8.0	1.17 V	307	31.24	14.76

**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) – Pre-Amplifier 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.



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<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	100.1 PK			1.35 H	46	92.13	7.97
2	*5795.00	90.4 AV			1.35 H	46	82.43	7.97
3	11590.00	54.9 PK	74.0	-19.1	1.46 H	64	39.98	14.92
4	11590.00	43.6 AV	54.0	-10.4	1.46 H	64	28.68	14.92

**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	*5795.00	105.5 PK			1.03 V	191	97.53	7.97
2	*5795.00	96.3 AV			1.03 V	191	88.33	7.97
3	11590.00	58.5 PK	74.0	-15.5	1.12 V	299	43.58	14.92
4	11590.00	45.8 AV	54.0	-8.2	1.12 V	299	30.88	14.92

**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) – Pre-Amplifier 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.



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802.11ac (VHT80)

<b>CHANNEL</b>	TX Channel 155	<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	5460.00	50.9 PK	74.0	-23.1	1.35 H	45	43.41	7.49
2	5460.00	38.4 AV	54.0	-15.6	1.35 H	45	30.91	7.49
3	*5775.00	97.7 PK			1.35 H	45	89.77	7.93
4	*5775.00	88.4 AV			1.35 H	45	80.47	7.93
5	11550.00	54.6 PK	74.0	-19.4	1.46 H	55	39.77	14.83
6	11550.00	43.6 AV	54.0	-10.4	1.46 H	55	28.77	14.83
7	#17325.00	56.1 PK	77.7	-21.6	1.00 H	211	30.04	26.06
8	#17325.00	43.7 AV	68.4	-24.7	1.00 H	211	17.64	26.06

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	52.8 PK	74.0	-21.2	1.00 V	184	45.31	7.49
2	5460.00	40.4 AV	54.0	-13.6	1.00 V	184	32.91	7.49
3	*5775.00	104.8 PK			1.00 V	184	96.87	7.93
4	*5775.00	90.0 AV			1.00 V	184	82.07	7.93
5	11550.00	57.7 PK	74.0	-16.3	1.16 V	291	42.87	14.83
6	11550.00	45.3 AV	54.0	-8.7	1.16 V	291	30.47	14.83
7	#17325.00	55.9 PK	84.8	-28.9	1.00 V	145	29.84	26.06
8	#17325.00	43.7 AV	70.0	-26.3	1.00 V	145	17.64	26.06

**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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.



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### 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
Spectrum Analyzer R&S	FSP 40	100036	Jan. 21, 2013	Jan. 20, 2014

**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. 12, 2013

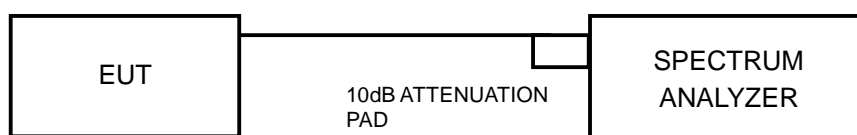
#### 5.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz
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.





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### 5.3.7 TEST RESULTS

#### 802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	16.61	0.5	PASS
157	5785	16.58	0.5	PASS
165	5825	16.58	0.5	PASS

#### 802.11ac (VHT20)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	17.81	0.5	PASS
157	5785	17.83	0.5	PASS
165	5825	17.84	0.5	PASS

#### 802.11ac (VHT40)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
151	5755	36.62	0.5	PASS
159	5795	36.61	0.5	PASS

#### 802.11ac (VHT80)

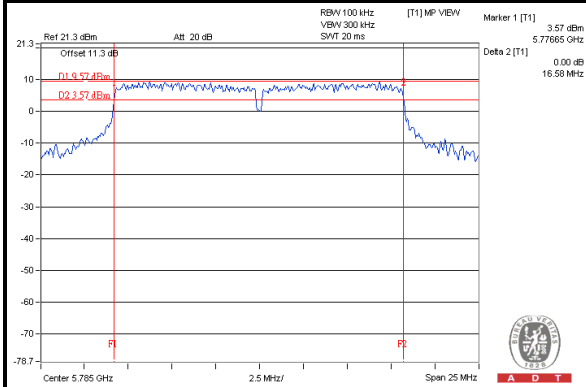
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
155	5775	76.61	0.5	PASS



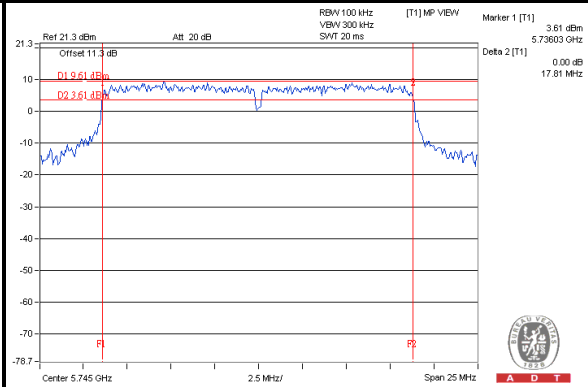
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### SPECTRUM PLOT OF WORST VALUE

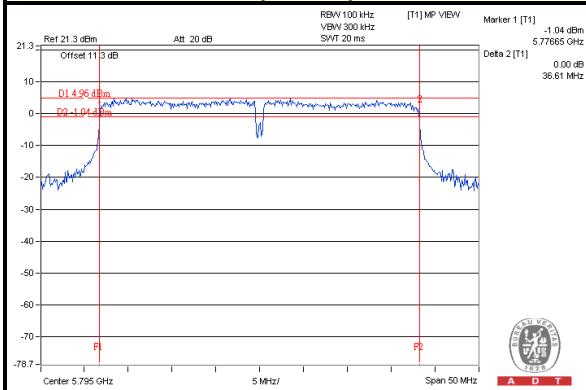
#### 802.11a / CH157



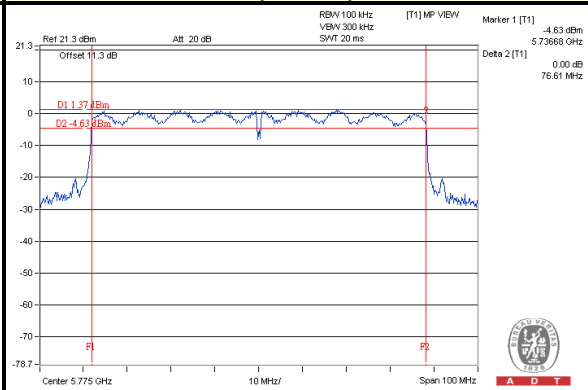
#### 802.11ac (VHT20) / CH149



#### 802.11ac (VHT40) / CH159



#### 802.11ac (VHT80) / CH155





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## 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)

### 5.4.2 INSTRUMENTS

For 11ac (VHT80) test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100036	Jan. 21, 2013	Jan. 20, 2014

**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. 12, 2013

For other test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	1014008	Apr. 23, 2013	Apr. 22, 2014
Power Sensor	MA2411B	0917122	Apr. 23, 2013	Apr. 22, 2014

**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. 12, 2013

### 5.4.3 TEST PROCEDURES

#### **For 11ac (VHT80) test:**

Follow FCC KDB 558074 DTS test procedure:

Measurement Procedure Peak 2

1. Set the RBW = 1 MHz.
2. Set the VBW  $\geq$  3 RBW.
3. Set the span  $\geq$  1.5 x DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the DTS bandwidth edges.

#### **For other test:**

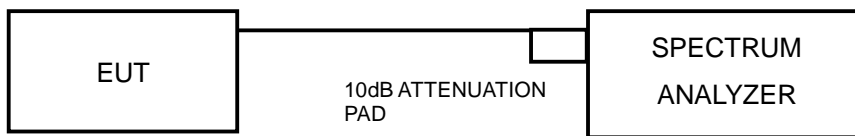
The peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the peak power level.

#### 5.4.4 DEVIATION FROM TEST STANDARD

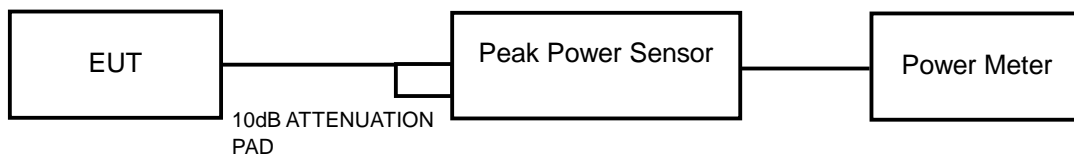
No deviation.

#### 5.4.5 TEST SETUP

**For 11ac (VHT80) test:**



**For other test:**



#### 5.4.6 EUT OPERATING CONDITIONS

Same as Item 5.3.6



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## 5.4.7 TEST RESULTS

### 802.11a

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	171.396	22.34	30	PASS
157	5785	172.584	22.37	30	PASS
165	5825	140.281	21.47	30	PASS

### 802.11ac (VHT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	157.761	21.98	30	PASS
157	5785	149.279	21.74	30	PASS
165	5825	158.489	22.00	30	PASS

### 802.11ac (VHT40)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
151	5755	145.881	21.64	30	PASS
159	5795	147.911	21.70	30	PASS

### 802.11ac (VHT80)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
155	5775	874.984	29.42	30	PASS



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## 5.5 AVERAGE OUTPUT POWER

### 5.5.1 FOR REFERENCE.

### 5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	1014008	Apr. 23, 2013	Apr. 22, 2014
Power Sensor	MA2411B	0917122	Apr. 23, 2013	Apr. 22, 2014

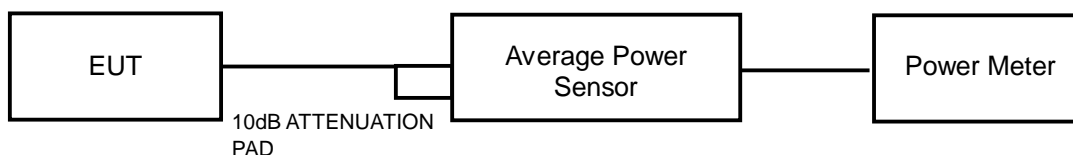
**Note:**

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. 12, 2013

### 5.5.3 TEST PROCEDURES

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

### 5.5.4 TEST SETUP



### 5.5.5 EUT OPERATING CONDITIONS

Same as Item 4.3.6



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## 5.5.6 TEST RESULTS

### 802.11a

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
149	5745	103.039	20.13
157	5785	101.391	20.06
165	5825	83.176	19.20

### 802.11ac (VHT20)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
149	5745	89.331	19.51
157	5785	82.985	19.19
165	5825	86.099	19.35

### 802.11ac (VHT40)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
151	5755	84.333	19.26
159	5795	77.090	18.87

### 802.11ac (VHT80)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
155	5775	81.283	19.10



## 5.6 POWER SPECTRAL DENSITY MEASUREMENT

### 5.6.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100036	Jan. 21, 2013	Jan. 20, 2014

**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. 12, 2013

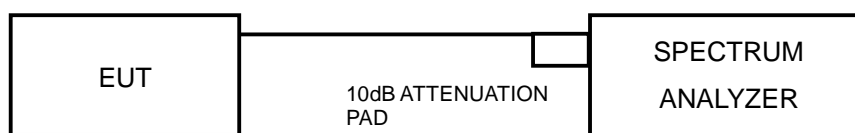
### 5.6.3 TEST PROCEDURE

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 amplitude level.

### 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



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## 5.6.7 TEST RESULTS

### 802.11a

Channel	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
149	5745	-4.78	8	PASS
157	5785	-5.42	8	PASS
165	5825	-5.99	8	PASS

### 802.11ac (VHT20)

Channel	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
149	5745	-5.03	8	PASS
157	5785	-5.05	8	PASS
165	5825	-4.93	8	PASS

### 802.11ac (VHT40)

Channel	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
151	5755	-6.65	8	PASS
159	5795	-6.93	8	PASS

### 802.11ac (VHT80)

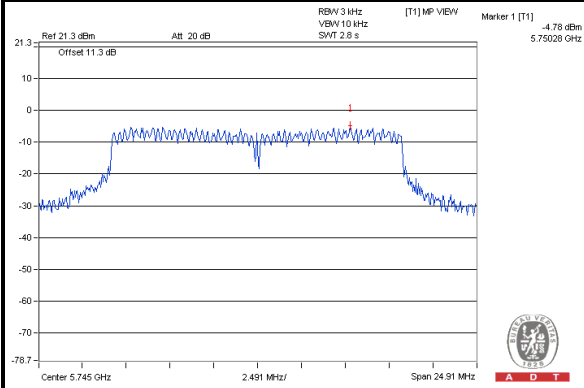
Channel	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
155	5775	-8.52	8	PASS



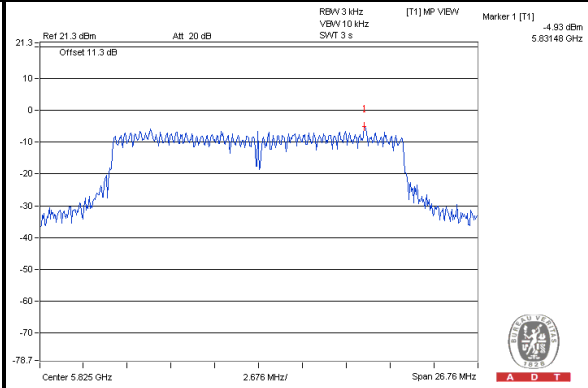
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### SPECTRUM PLOT OF WORST VALUE

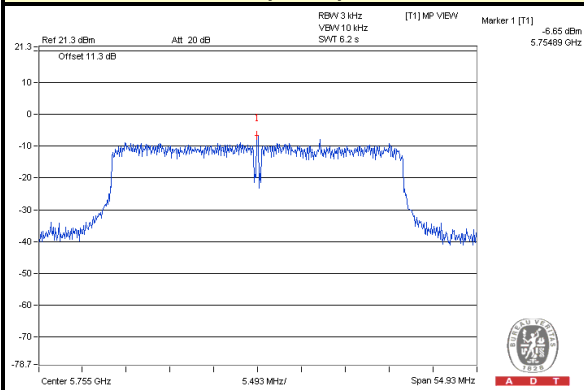
#### 802.11a / CH149



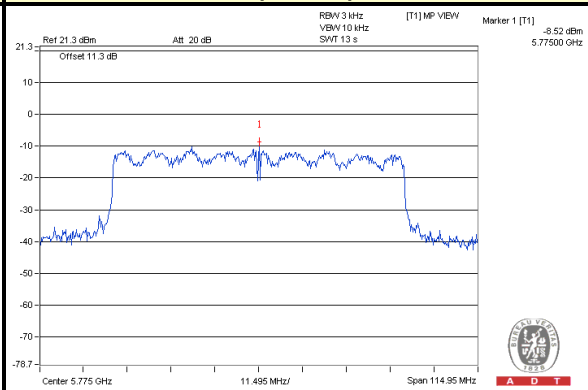
#### 802.11ac (HT20) / CH165



#### 802.11ac (HT40) / CH151



#### 802.11ac (VHT80) / CH155





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## 5.7 CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

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

### 5.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100036	Jan. 21, 2013	Jan. 20, 2014

**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. 12, 2013

### 5.7.3 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.

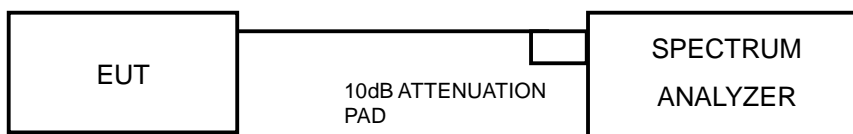
#### Measurement Procedure –Unwanted Emission Level

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.

#### 5.7.4 DEVIATION FROM TEST STANDARD

No deviation

#### 5.7.5 TEST SETUP



#### 5.7.6 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 5.7.7 TEST RESULTS

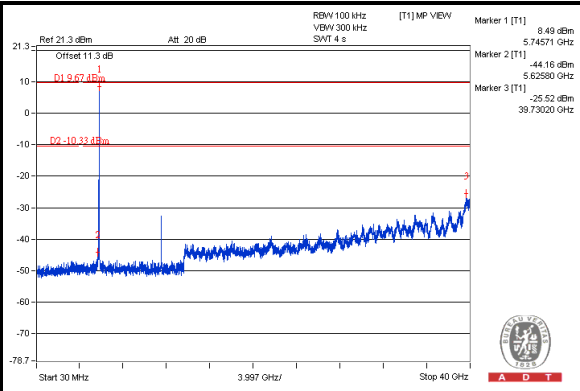
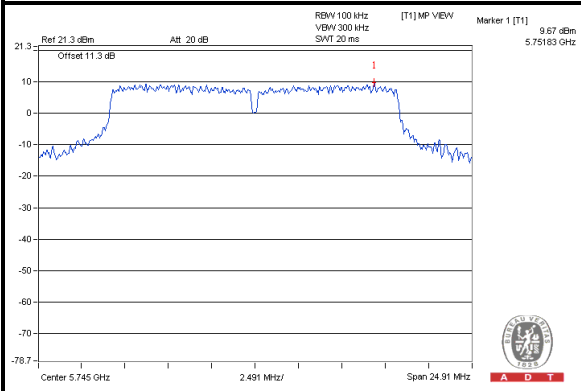
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



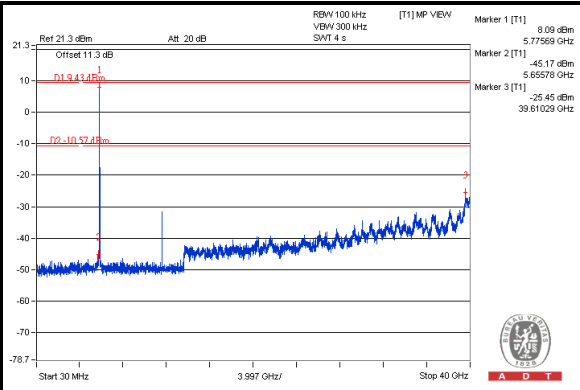
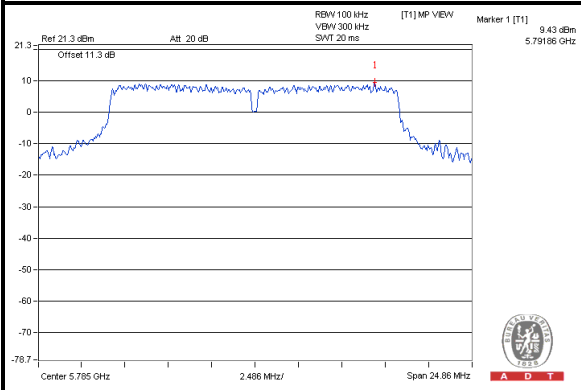
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### 802.11a

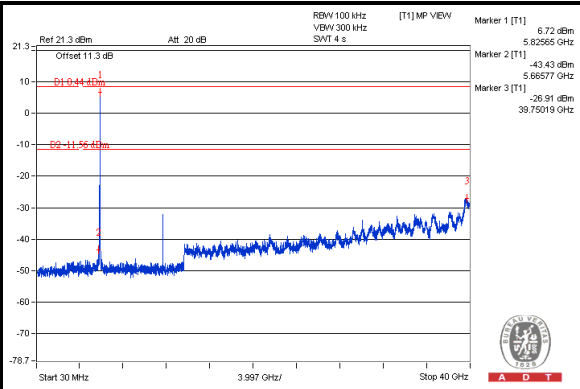
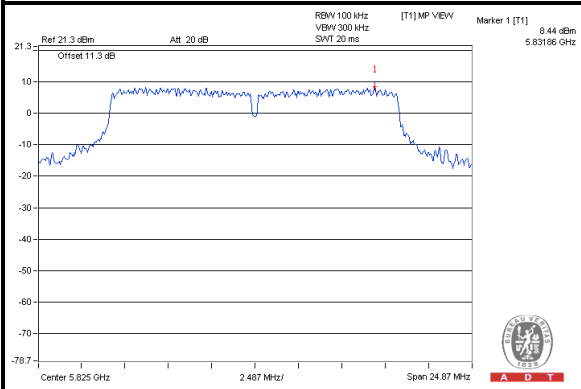
### CH 149



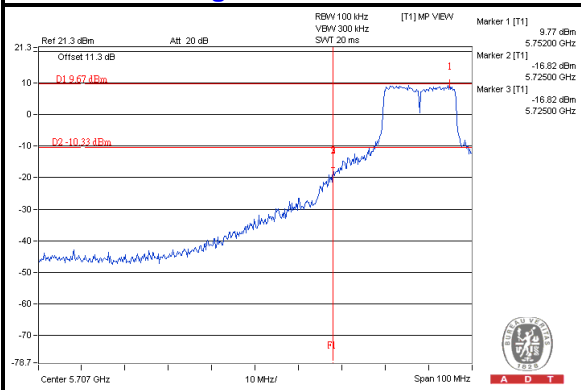
### CH 157



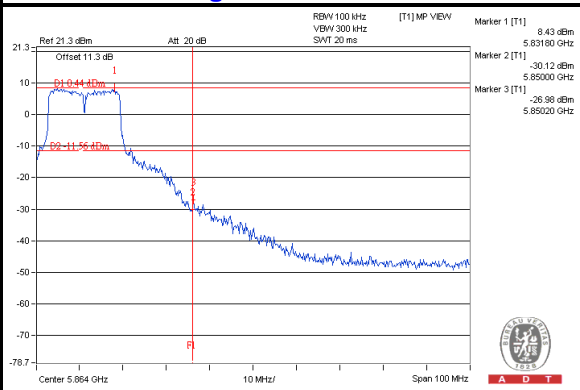
### CH 165



### CH 149 Band edge



### CH 165 Band edge

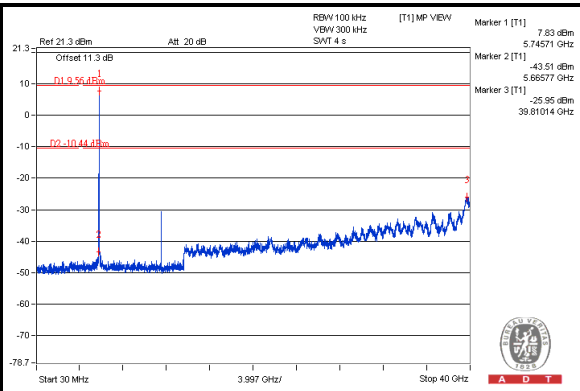
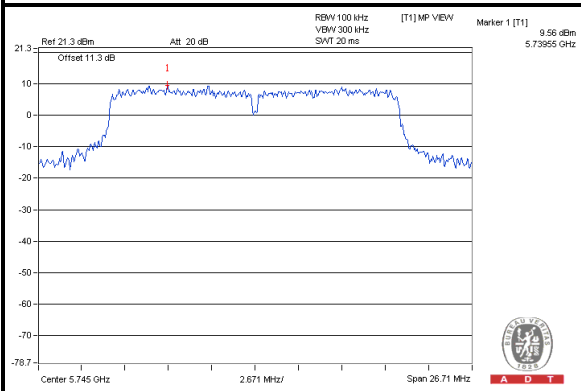




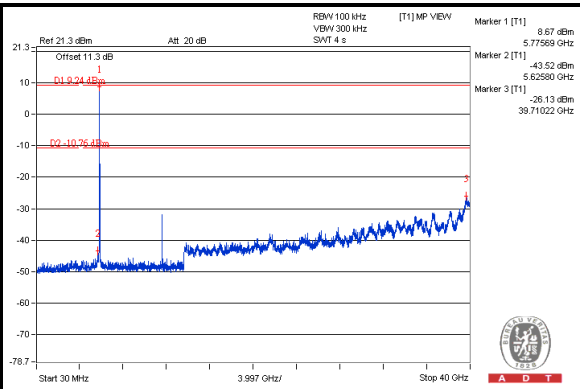
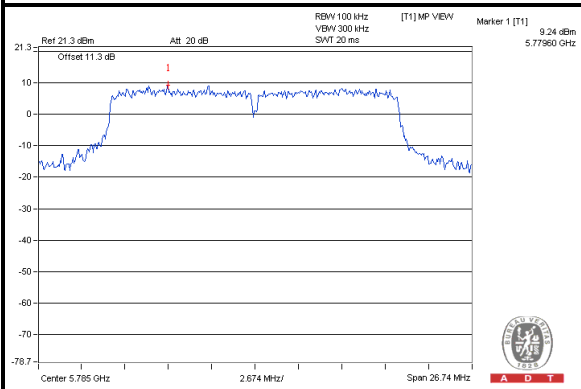
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### 802.11ac (VHT20):

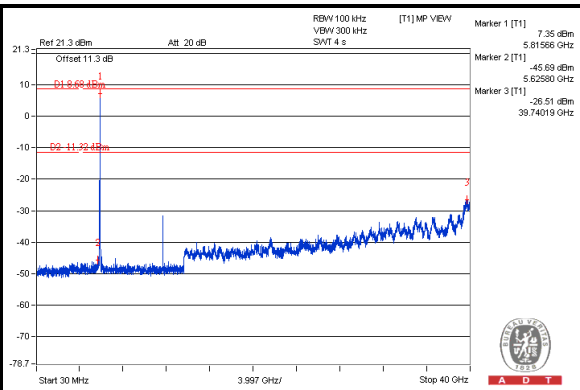
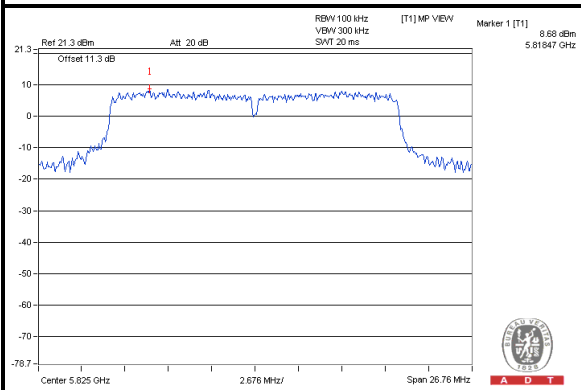
#### CH 149



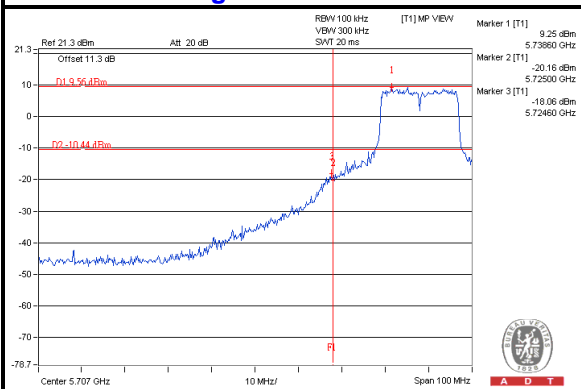
#### CH 157



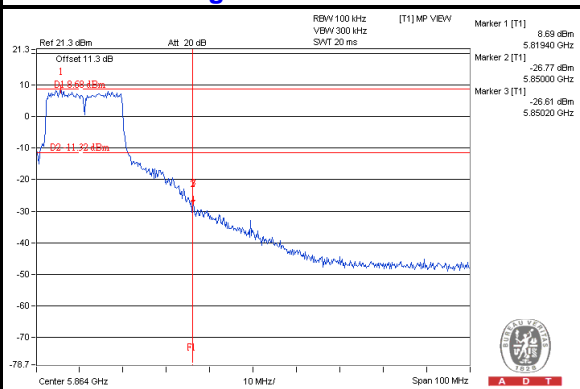
#### CH 165



#### CH 149 Band edge



#### CH 165 Band edge

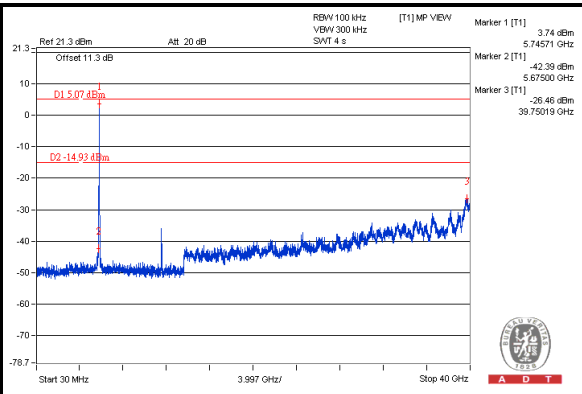
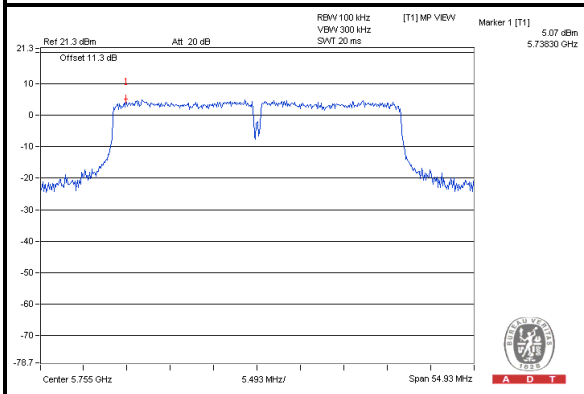




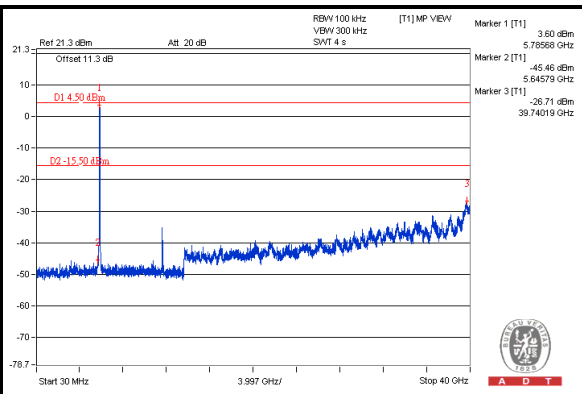
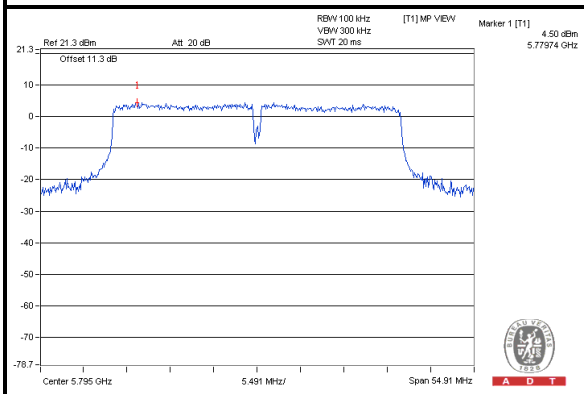
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### 802.11ac (VHT40):

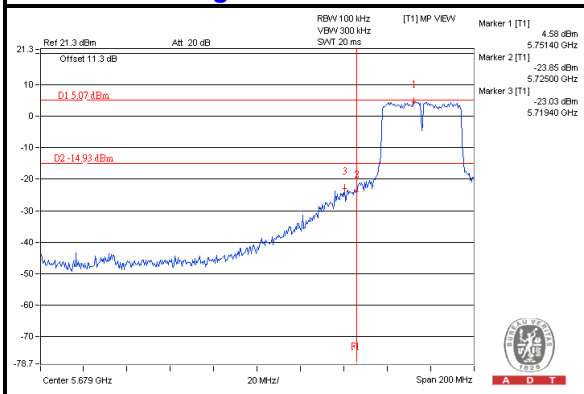
#### CH 151



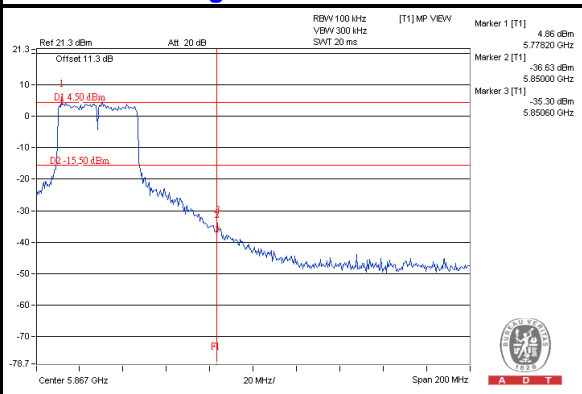
#### CH 159



#### CH 151 Band edge



#### CH 159 Band edge



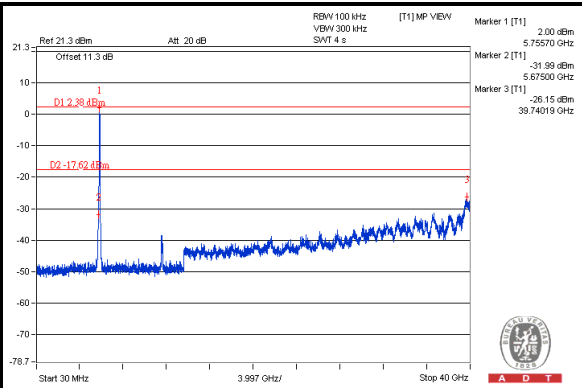
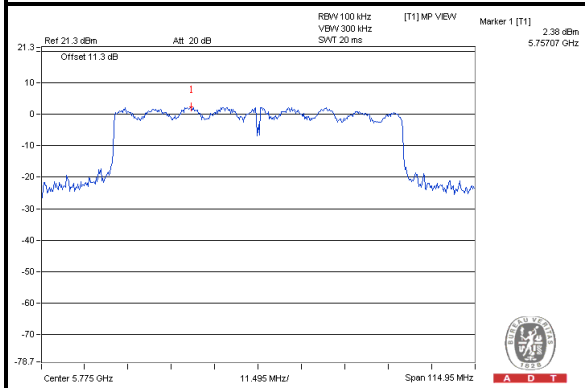




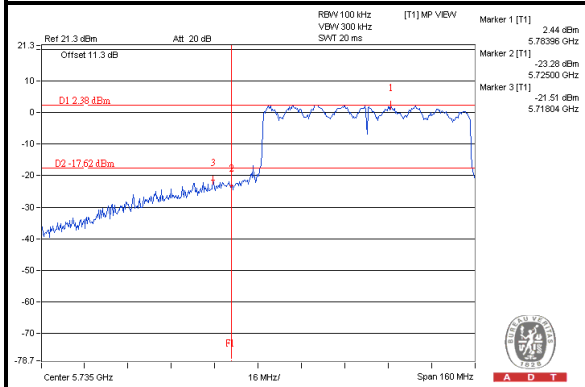
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### 802.11ac (VHT80):

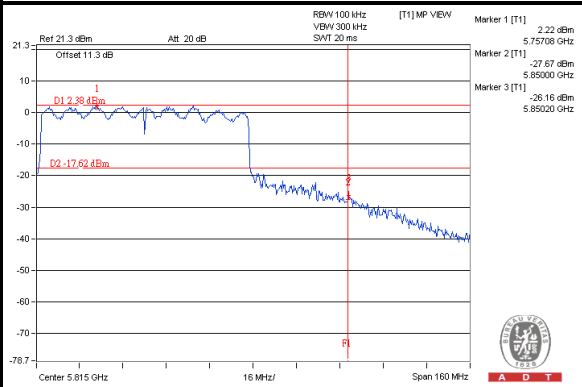
#### CH 155



#### CH 155 Band edge



#### CH 155 Band edge





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## 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:

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**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.



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## 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 ---