



# FCC TEST REPORT (15.247)

**REPORT NO.:** RF130103E06

**MODEL NO.:** EA6400, EA6300V1

**FCC ID:** Q87-EA6400

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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130103E06	Original release	Feb. 26, 2013



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## 1. CERTIFICATION

**PRODUCT:** Linksys Smart Wi-Fi Router AC1600,  
Linksys Smart Wi-Fi Router AC1200

**BRAND NAME:** Cisco

**MODEL NO.:** EA6400, EA6300V1

**TEST SAMPLE:** ENGINEERING SAMPLE

**APPLICANT:** Cisco Consumer Products LLC

**TESTED:** Jan. 05 to 15, 2013

**STANDARDS:** FCC Part 15, Subpart C (Section 15.247)  
ANSI C63.10-2009

The above equipment (Model: EA6400) 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:** Feb. 26, 2013  
( Midoli Peng, Specialist )

**APPROVED BY** : , **DATE:** Feb. 26, 2013  
( May Chen, Deputy 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 - 9.01dB at 0.15700MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.5dB at 2483.5MHz & 2390.0MHz & 2389.5MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted 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 -6.95dB at 0.1500MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.9dB at 11650.0MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted 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)	5.69 dB
Radiated emissions (1GHz -6GHz)	3.56 dB
Radiated emissions (6GHz -18GHz)	4.10 dB
Radiated emissions (18GHz -40GHz)	4.24 dB





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### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Linksys Smart Wi-Fi Router AC1600, Linksys Smart Wi-Fi Router AC1200
<b>MODEL NO.</b>	EA6400, EA6300V1
<b>POWER SUPPLY</b>	DC 12V from power adapter
<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 450Mbps 802.11ac: up to 1300Mbps
<b>OPERATING FREQUENCY</b>	<b>For 15.407</b> 802.11a/n/ac: 5.18 ~ 5.24GHz <b>For 15.247</b> 802.11b/g/n: 2.412 ~ 2.462GHz 802.11a/n/ac: 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>	<b>For 15.407</b> 802.11a: 22.856mW 802.11n (HT20): 23.72mW 802.11n (HT40): 28.170mW 802.11ac (VHT80): 20.624mW <b>For 15.247 (2.4GHz)</b> 802.11b: 140.281mW 802.11g: 174.181mW 802.11n (HT20): 195.489mW 802.11n (HT40): 60.227mW <b>For 15.247 (5GHz)</b> 802.11a: 208.449mW 802.11n (HT20): 521.139mW 802.11n (HT40): 368.271mW 802.11ac (VHT80): 165.068mW
<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>	Adapter x1

**NOTE:**

1. The EUT is a 2.4GHz & 5GHz WLAN device.
2. The EUT have two product names and model names, which are identical to each other in all aspects except for the following table:

Product	Model No.	Difference
Linksys Smart Wi-Fi Router AC1600	EA6400	For the different marketing
Linksys Smart Wi-Fi Router AC1200	EA6300V1	

From the above models, model: EA6400 was selected as representative model for the test and its data was recorded in this report.



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3. The EUT has two different RJ45 XFRM Transformers types could be chosen and please refer the below table:

Type 1(Vendor: MINGTEK)			
Vendor P/N	Different	Vendor	Location
HN1875CG	TRANSFORMER VARIABLE COILS,DIP,350UH,HN1875CG	MINGTEK	T1
HN3675CG	TRANSFORMER VARIABLE COILS,DIP,350UH,HN3675CG	MINGTEK	T2, T3
Type 2(Vendor: MYJWD)			
Vendor P/N	Different	Vendor	Location
DG18107-1 G	TRANSFORMER,DIP,350UH,16.8*8.5*1 1.85MM,18PIN,DG18107-1 G	MYJWD	T1
DG36005-1 G	TRANSFORMER,DIP,350UH,32.7*8.5*1 1.85MM,36PIN	MYJWD	T2, T3

From the above types, the worst case was found in **Type 2(Vendor: MYJWD)**. Therefore only the test data of the type were recorded in this report.

4. The EUT must be supplied with a power adapter and following four different models could be chosen as following table:

No	Brand	Model No.	Spec.	Plug
1	Solytech	CAD3612CW-1	Input: 100-240V, 1.5A, 50-60Hz Output: 12V, 3.0A DC output cable (Unshielded, 1.5m)	US
2	Solytech	CAD3612LW-1	Input: 100-240V, 1.5A, 50-60Hz Output: 12V, 3.0A DC output cable (Unshielded, 1.5m)	Universal (US, EU, AU, UK)
3	Leader (LEI)	MU42-1120300-A1	Input: 100-240V, 1.5A, 50-60Hz Output: 12V, 3.0A DC output cable (Unshielded, 1.5m)	US
4	Leader (LEI)	IU42-1120300-WP	Input: 100-240V, 1.5A, 50-60Hz Output: 12V, 3.0A DC output cable (Unshielded, 1.5m)	Universal (US, EU, AU, UK)

Note: 1. Adapter 1 & 2 only different with plug.  
 2. For radiated emissions test, the EUT was pre-tested with above Adapter 2, Adapter 3 & Adapter 4, the worst case was found in Adapter 2. Therefore only the test data of the Adapter 2 was recorded in this report.



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5. The antenna provided to the EUT, please refer to the following table:

<b>For 2.4GHz</b>						
Transmitter Circuit	Brand	Model	Antenna Type	Peak Gain(dBi) (Include cable loss )	Frequency range (MHz to MHz)	Connector Type
Left side Chain (1)	Galtronics	02100073-05389A3	Dipole	1.515	2400~2483.5	NA
Front side Chain (0)	Galtronics	02100073-05389B2	Dipole	3.745	2400~2483.5	NA
<b>For 5GHz (Band 1)</b>						
Transmitter Circuit	Brand	Model	Antenna Type	Peak Gain(dBi) (Include cable loss )	Frequency range (MHz to MHz)	Connector Type
Left side Chain (1)	Galtronics	02102142-05389A4	Dipole	4.339	5150~5250	NA
Right side Chain (0)	Galtronics	02102142-05389A1	Dipole	2.734	5150~5250	NA
Front side Chain (2)	Galtronics	02102142-05389B1	Dipole	3.178	5150~5250	NA
<b>For 5GHz (Band 4)</b>						
Transmitter Circuit	Brand	Model	Antenna Type	Peak Gain(dBi) (Include cable loss )	Frequency range (MHz to MHz)	Connector Type
Left side Chain (1)	Galtronics	02102142-05389A2	Dipole	4.162	5725~5850	NA
Right side Chain (0)	Galtronics	02102142-05389A3	Dipole	5.314	5725~5850	NA
Front side Chain (2)	Galtronics	02102142-05389B1	Dipole	3.463	5725~5850	NA
Note: According to the above antennas, there are three antennas will transmit simultaneously (one is Vertical and the others are Horizontal).						



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6. The EUT incorporates a MIMO function without beam forming.

<b>MODULATION MODE</b>	<b>TX/RX FUNCTION</b>
<b>802.11b</b>	1TX/2RX
<b>802.11g</b>	1TX (Diversity)/2RX
<b>802.11n (HT20) &lt;2.4GHz&gt;</b>	2TX/2RX
<b>802.11n (HT40) &lt;2.4GHz&gt;</b>	2TX/2RX
<b>802.11a</b>	1TX (Diversity)/3Rx
<b>802.11n (HT20) &lt;5GHz&gt;</b>	3TX/3RX
<b>802.11n (HT40) &lt;5GHz&gt;</b>	3TX/3RX
<b>802.11ac (VHT20)</b>	3TX/3RX
<b>802.11ac (VHT40)</b>	3TX/3RX
<b>802.11ac (VHT80)</b>	3TX/3RX

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)

- 7. Spurious emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.
- 8. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 23.
- 9. When the EUT operating in 802.11ac, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 9.
- 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	
1	√	√	√	√	√	Adapter 2
2	√	-	-	-	-	Adapter 3
3	√	-	-	-	-	Adapter 4

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:** The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on Y-plane .

#### **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)
For 2.4 GHz 802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5
For 5 GHz 802.11n (HT20)	149 to 165	157	OFDM	BPSK	6.5

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
For 2.4 GHz 802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5
For 5 GHz 802.11n (HT20)	149 to 165	157	OFDM	BPSK	6.5



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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 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5
For 5 GHz 802.11ac (VHT80)	155	155	OFDM	BPSK	87.8

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
For 5 GHz 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5
For 5 GHz 802.11ac (VHT80)	155	155	OFDM	BPSK	87.8





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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 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5
For 5 GHz 802.11ac (VHT80)	155	155	OFDM	BPSK	87.8

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	24deg. C, 74%RH	120Vac, 60Hz	Scott Chen
RE<1G	23deg. C, 68%RH	120Vac, 60Hz	Robert Cheng
RE <sup>3</sup> 1G	24deg. C, 66%RH	120Vac, 60Hz	Nelson Teng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Amos Chuang
OB	25deg. C, 60%RH	120Vac, 60Hz	Amos Chuang

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

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

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

**558074 D01 DTS Meas Guidance**

**662911 D01 Multiple Transmitter Output**

**ANSI C63.10-2009**

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

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



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### 3.4 DESCRIPTION OF SUPPORT UNITS

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

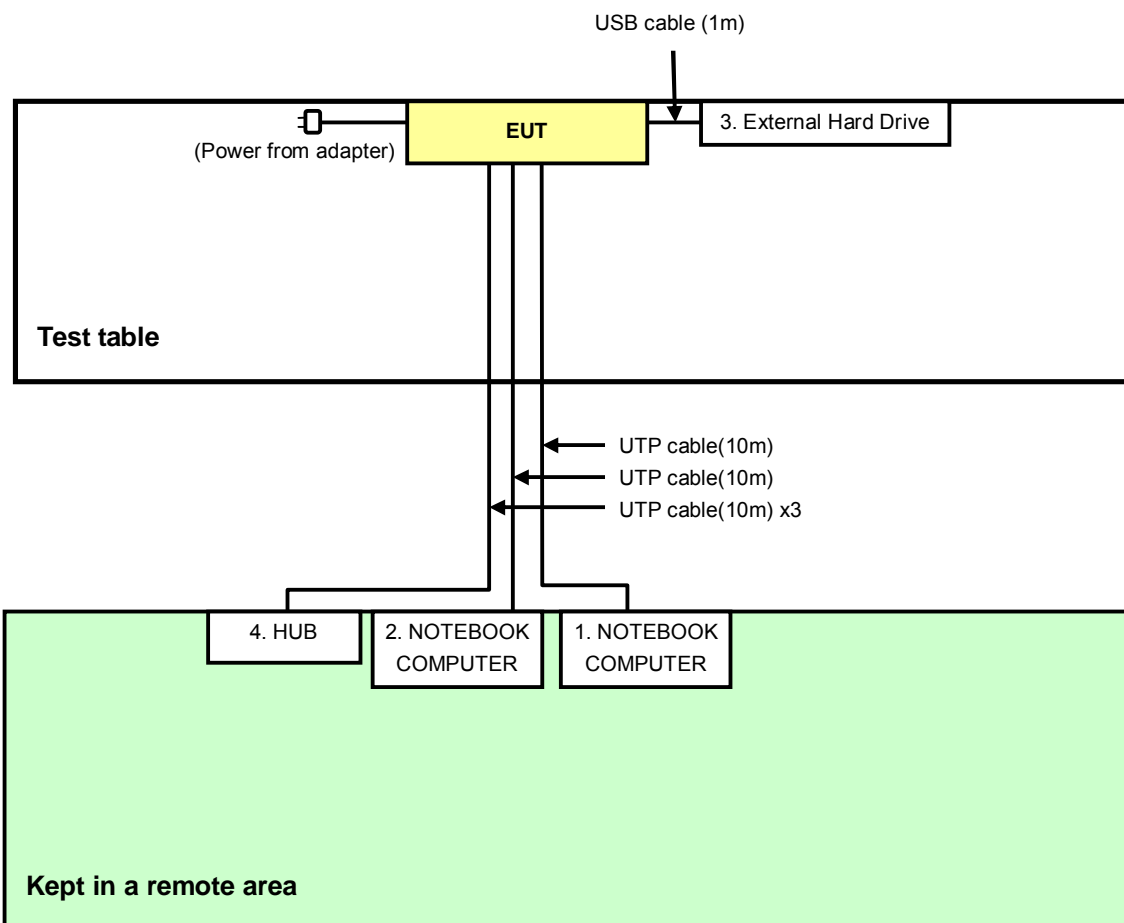
For conducted emission test					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP27L	6YLB32S	FCC DoC
2	NOTEBOOK COMPUTER	DELL	PP27L	7YLB32S	FCC DoC
3	External Hard Drive	WD	WDBACW0010H BK-SESN	WCAV5R678284	FCC DoC
4	HUB	Linksys	SD208	NA	NA
For other test items					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	NOTEBOOK COMPUTER	DELL	PP32LA	GSLB32S	FCC DoC
3	External Hard Drive	WD	WDBACW0010H BK-SESN	WXK1A51E5819	FCC DoC
4	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC

For conducted emission test	
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable, 10m
2	UTP cable, 10m
3	USB cable, 1m
4	UTP cable, 10m
For other test items	
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable, 10m
2	UTP cable, 10m
3	USB cable, 0.45m
4	UTP cable, 10m

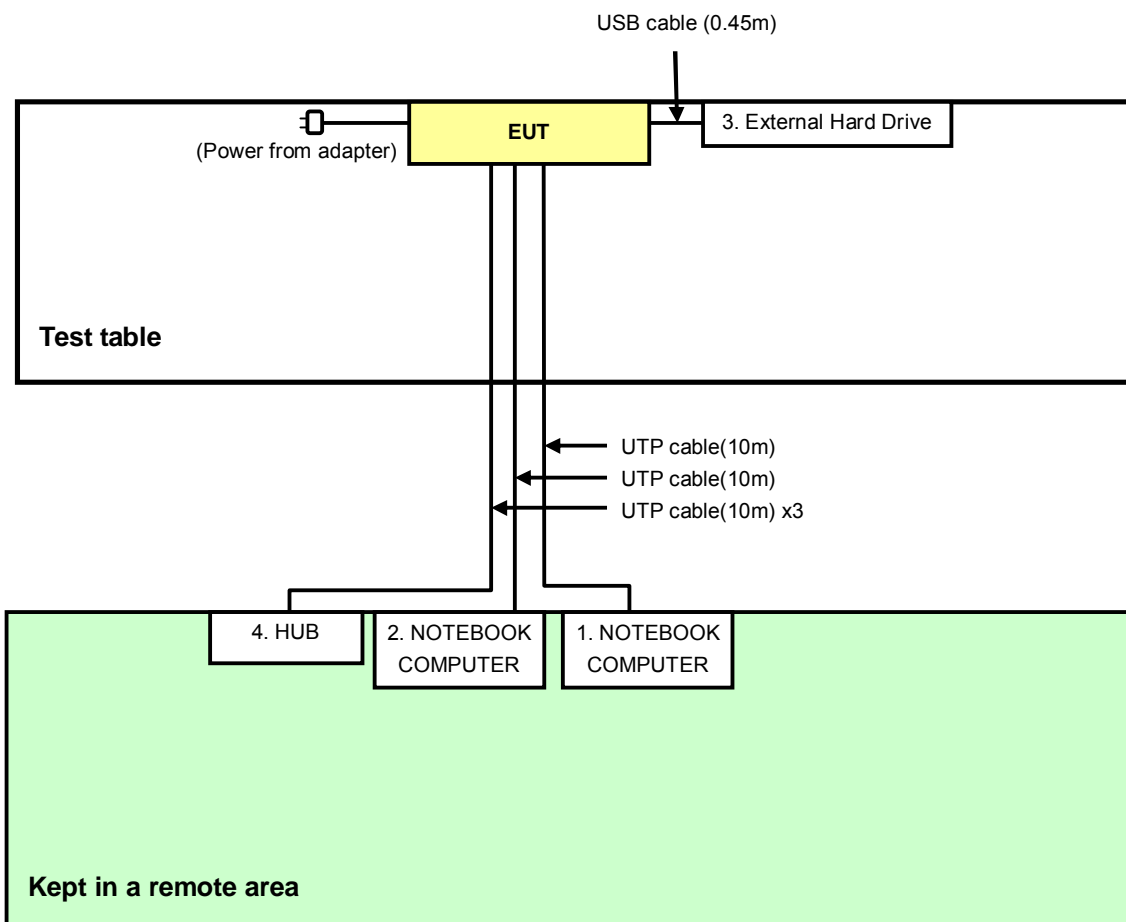
**NOTE:** All power cords of the above support units are non shielded (1.8m).

### 3.5 CONFIGURATION OF SYSTEM UNDER TEST

For Conducted Emission test:



For other test items:





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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	ESCS 30	100375	Mar. 12, 2012	Mar. 11, 2013
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 06, 2012	Sep. 05, 2013
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 08, 2012	June 07, 2013
RF Cable (JYEBAO)	5DFB	COCCAB-001	Aug. 28, 2012	Aug. 27, 2013
50 ohms Terminator	50	EMC-3	Sep. 25, 2012	Sep. 24, 2013
Software ADT	BV ADT_Cond_V7.3.7.3	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Jan. 15, 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.

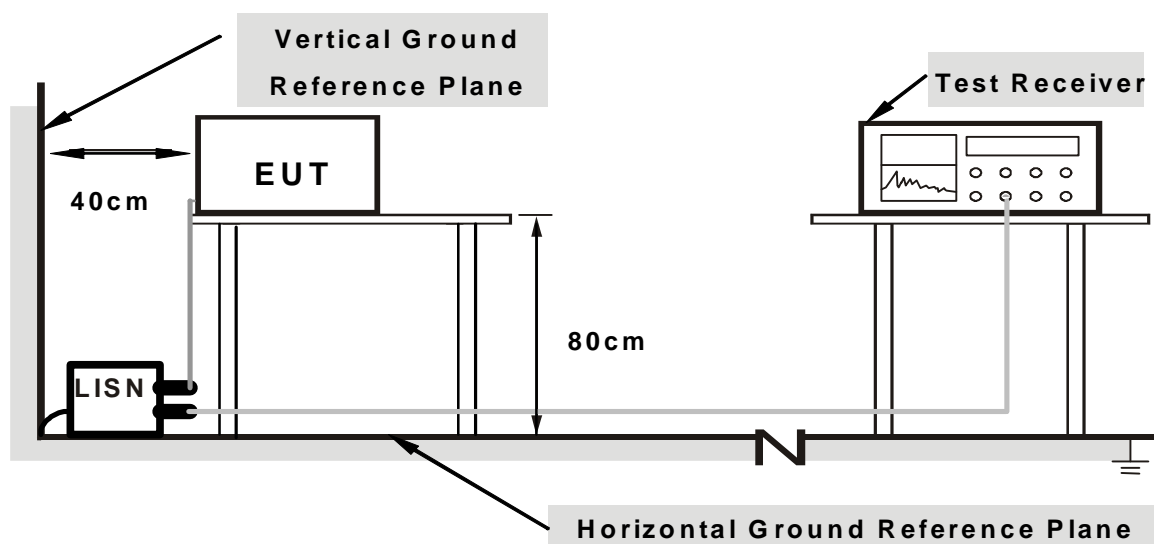
#### NOTE:

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.

#### 4.1.6 EUT OPERATING CONDITIONS

1. Turn on the power of EUT.
2. The communication partner run test program “MTool V1.0.0.10” to enable EUT under transmission/receiving condition continuously at specific channel frequency.





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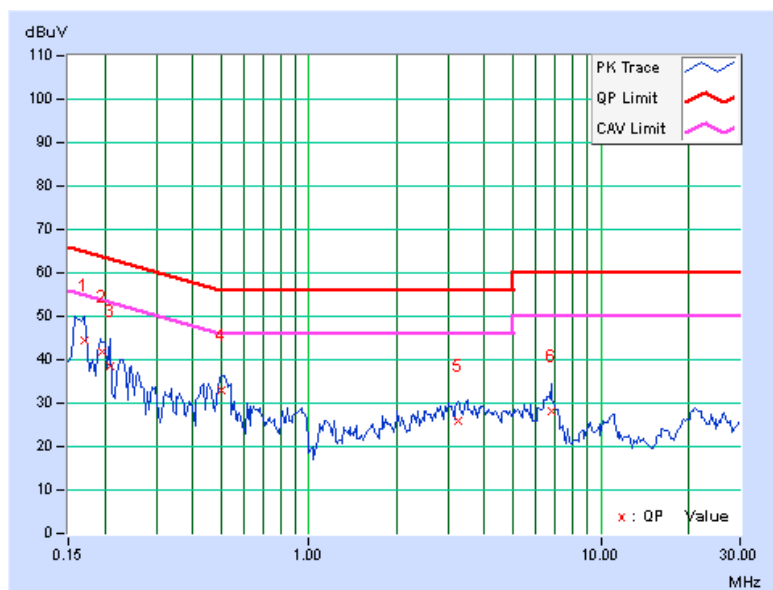
### 4.1.7 TEST RESULTS(MODE 1)

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

No	Freq. [MHz]	Corr. Factor [dB]	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.11	44.42	30.56	44.53	30.67	64.98	54.98	-20.45	-24.31
2	0.19709	0.13	41.70	32.84	41.83	32.97	63.73	53.73	-21.90	-20.76
3	0.20859	0.13	38.32	17.54	38.45	17.67	63.26	53.26	-24.81	-35.59
4	0.50156	0.19	32.88	18.92	33.07	19.11	56.00	46.00	-22.93	-26.89
5	3.23438	0.31	25.64	19.98	25.95	20.29	56.00	46.00	-30.05	-25.71
6	6.76172	0.53	27.48	22.62	28.01	23.15	60.00	50.00	-31.99	-26.85

**REMARKS:**

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

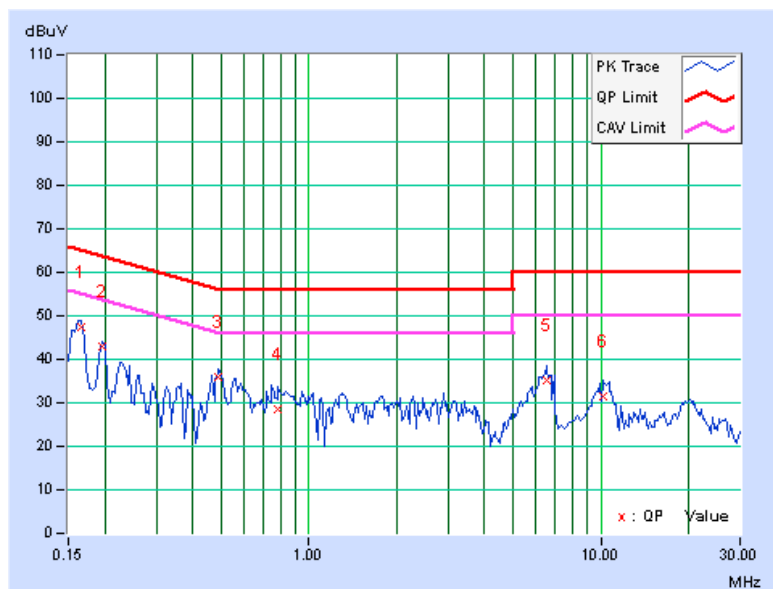


<b>PHASE</b>	Neutral (N)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
--------------	-------------	--------------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	0.10	47.28	38.96	47.38	39.06	65.18	55.18	-17.79	-16.11
2	0.19687	0.12	42.70	35.08	42.82	35.20	63.74	53.74	-20.92	-18.54
3	0.48984	0.17	35.76	32.72	35.93	32.89	56.17	46.17	-20.24	-13.28
4	0.78672	0.19	28.44	22.62	28.63	22.81	56.00	46.00	-27.37	-23.19
5	6.53516	0.48	34.54	29.72	35.02	30.20	60.00	50.00	-24.98	-19.80
6	10.20313	0.67	30.66	25.36	31.33	26.03	60.00	50.00	-28.67	-23.97

**REMARKS:**

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



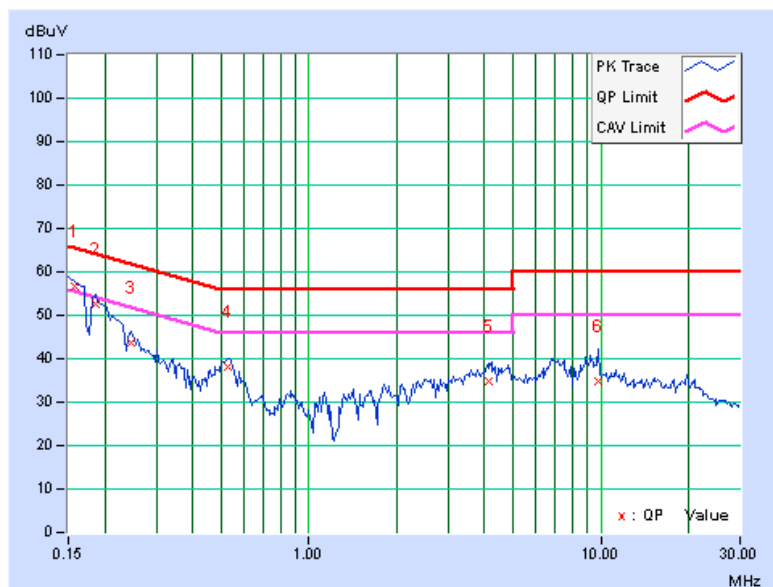
### 4.1.8 TEST RESULTS(MODE 2)

<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	0.15700	0.11	56.50	44.98	56.61	45.09	65.62	55.62	-9.01	-10.53
2	0.18516	0.12	52.40	40.92	52.52	41.04	64.25	54.25	-11.73	-13.21
3	0.24766	0.14	43.44	31.98	43.58	32.12	61.84	51.84	-18.25	-19.71
4	0.52500	0.19	37.92	32.92	38.11	33.11	56.00	46.00	-17.89	-12.89
5	4.10938	0.35	34.60	27.76	34.95	28.11	56.00	46.00	-21.05	-17.89
6	9.78125	0.74	33.94	28.28	34.68	29.02	60.00	50.00	-25.32	-20.98

**REMARKS:**

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

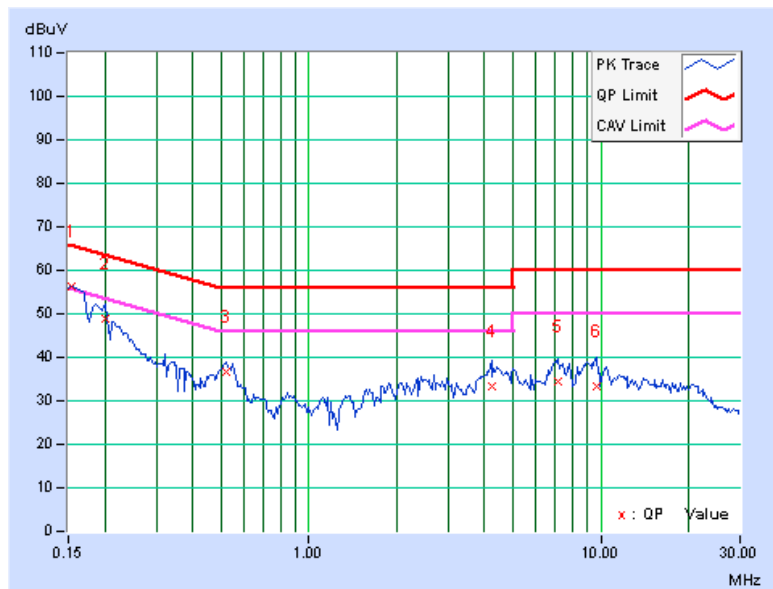


<b>PHASE</b>	Neutral (N)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
--------------	-------------	--------------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.10	56.20	44.72	56.30	44.82	65.79	55.79	-9.49	-10.97
2	0.20078	0.12	48.64	29.82	48.76	29.94	63.58	53.58	-14.82	-23.64
3	0.52109	0.18	36.62	30.32	36.80	30.50	56.00	46.00	-19.20	-15.50
4	4.21484	0.36	33.08	26.42	33.44	26.78	56.00	46.00	-22.56	-19.22
5	7.13281	0.51	33.82	28.58	34.33	29.09	60.00	50.00	-25.67	-20.91
6	9.65625	0.64	32.54	27.36	33.18	28.00	60.00	50.00	-26.82	-22.00

**REMARKS:**

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



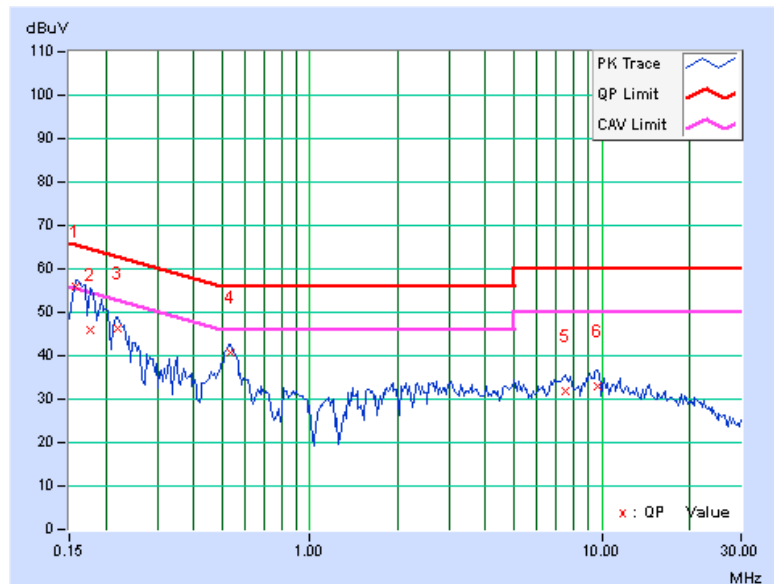
### 4.1.9 TEST RESULTS(MODE 3)

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	0.15781	0.11	55.96	45.34	56.07	45.45	65.58	55.58	-9.51	-10.13
2	0.17734	0.12	45.90	28.94	46.02	29.06	64.61	54.61	-18.59	-25.55
3	0.22031	0.14	46.02	35.18	46.16	35.32	62.81	52.81	-16.65	-17.49
4	0.53672	0.19	40.68	36.16	40.87	36.35	56.00	46.00	-15.13	-9.65
5	7.48828	0.58	31.22	26.44	31.80	27.02	60.00	50.00	-28.20	-22.98
6	9.67578	0.74	32.36	27.30	33.10	28.04	60.00	50.00	-26.90	-21.96

**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.





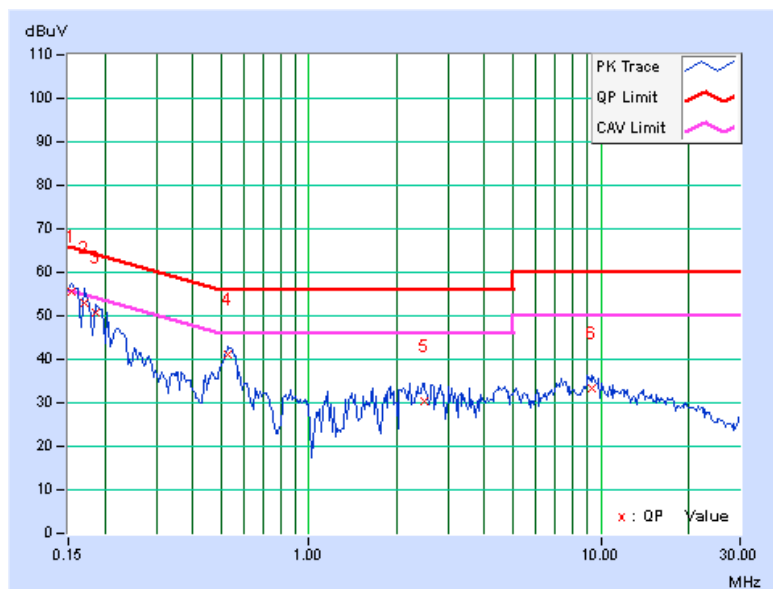
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PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.10	55.58	43.14	55.68	43.24	65.79	55.79	-10.11	-12.55
2	0.16953	0.10	52.82	35.36	52.92	35.46	64.98	54.98	-12.06	-19.52
3	0.18516	0.11	50.54	38.18	50.65	38.29	64.25	54.25	-13.60	-15.96
4	0.52891	0.18	41.04	35.22	41.22	35.40	56.00	46.00	-14.78	-10.60
5	2.48047	0.28	30.12	22.98	30.40	23.26	56.00	46.00	-25.60	-22.74
6	9.31641	0.62	32.72	27.62	33.34	28.24	60.00	50.00	-26.66	-21.76

**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 30dB 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

### Below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
Pre-Selector Agilent	N9039A	MY46520310	Sep. 03, 2012	Sep. 02, 2013
Signal Generator Agilent	N5181A	MY49060347	July 24, 2012	July 23, 2013
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02465	Feb. 27, 2012	Feb. 26, 2013
SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Apr. 06, 2012	Apr. 05, 2013
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 27, 2012	Nov. 26, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 25, 2012	Dec. 24, 2013
RF Cable	NA	CHHCAB_001	Oct. 07, 2012	Oct. 06, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

### Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
- 5 The CANADA Site Registration No. is IC 7450H-3.
- 6 Tested Date: Jan. 08, 2013





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**Above 1GHz test:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250254	July 09, 2012	July 08, 2013
Pre-Selector Agilent	N9039A	MY46520311	July 09, 2012	July 08, 2013
Signal Generator Agilent	N5181A	MY49060517	July 09, 2012	July 08, 2013
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 26, 2012	June 25, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Apr. 09, 2012	Apr. 08, 2013
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
- 5 The VCCI Site Registration No. is G-137.
- 6 The CANADA Site Registration No. is IC 7450H-2.
- 7 Tested Date: Jan. 08, 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.

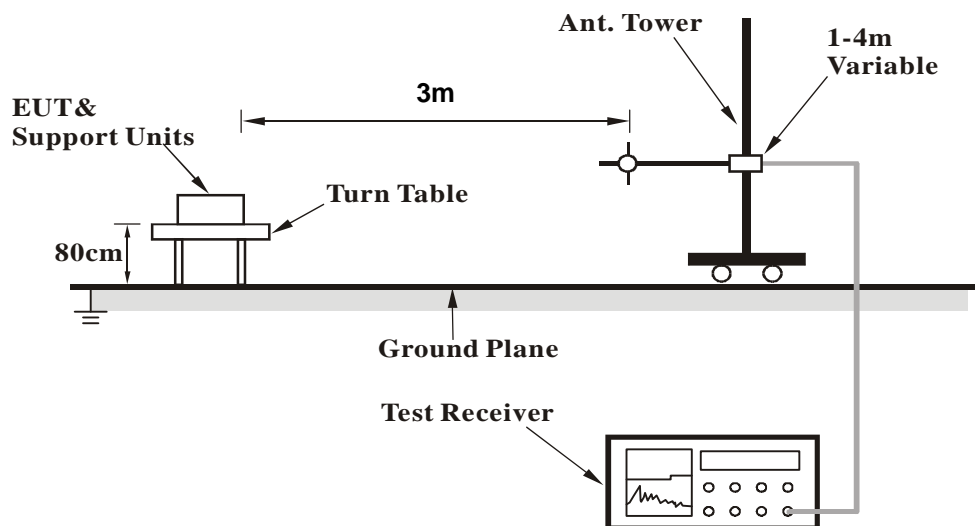
**NOTE:**

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



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

#### 802.11n (HT20)

<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	55.58	32.0 QP	40.0	-8.0	1.47 H	333	18.30	13.68
2	193.90	32.6 QP	43.5	-10.9	1.24 H	301	20.97	11.61
3	323.81	35.8 QP	46.0	-10.2	1.45 H	245	19.86	15.90
4	500.02	36.4 QP	46.0	-9.6	1.77 H	245	16.30	20.10
5	833.38	32.8 QP	46.0	-13.2	1.74 H	268	6.64	26.13
6	997.63	28.4 QP	54.0	-25.6	1.64 H	345	-0.35	28.77
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	96.55	36.9 QP	43.5	-6.6	1.00 V	41	27.65	9.27
2	106.50	35.3 QP	43.5	-8.2	1.00 V	360	24.75	10.56
3	193.19	35.1 QP	43.5	-8.4	1.00 V	116	23.39	11.68
4	323.33	36.4 QP	46.0	-9.7	1.50 V	0	20.47	15.88
5	427.78	35.7 QP	46.0	-10.3	1.00 V	317	17.29	18.39
6	997.51	43.3 QP	54.0	-10.7	1.00 V	273	14.52	28.77

#### REMARKS:

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



A D T

ABOVE 1GHz DATA

802.11b

<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	59.9 PK	74.0	-14.1	1.00 H	19	27.52	32.38
2	2390.00	47.1 AV	54.0	-6.9	1.00 H	19	14.72	32.38
3	*2412.00	106.0 PK			1.00 H	19	73.56	32.44
4	*2412.00	103.9 AV			1.00 H	19	71.46	32.44
5	2483.78	59.5 PK	74.0	-14.5	1.00 H	9	26.87	32.63
6	2483.78	46.6 AV	54.0	-7.4	1.00 H	9	13.97	32.63
7	4824.00	53.3 PK	74.0	-20.7	1.00 H	325	11.40	41.94
8	4824.00	48.7 AV	54.0	-5.3	1.00 H	325	6.76	41.94

**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	64.8 PK	74.0	-9.2	1.00 V	327	32.42	32.38
2	2390.00	52.3 AV	54.0	-1.7	1.00 V	327	19.92	32.38
3	*2412.00	114.9 PK			1.00 V	247	82.46	32.44
4	*2412.00	112.6 AV			1.00 V	247	80.16	32.44
5	2483.78	65.2 PK	74.0	-8.8	1.00 V	337	32.57	32.63
6	2483.78	52.9 AV	54.0	-1.1	1.00 V	337	20.27	32.63
7	4824.00	56.4 PK	74.0	-17.6	1.01 V	173	14.46	41.94
8	4824.00	51.7 AV	54.0	-2.3	1.01 V	173	9.76	41.94

**REMARKS:**

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



A D T

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.8 PK	74.0	-14.2	1.00 H	30	27.42	32.38
2	2390.00	47.1 AV	54.0	-6.9	1.00 H	30	14.72	32.38
3	*2437.00	114.7 PK			1.01 H	18	82.19	32.51
4	*2437.00	109.7 AV			1.01 H	18	77.19	32.51
5	2483.50	59.6 PK	74.0	-14.4	1.00 H	24	26.97	32.63
6	2483.50	46.4 AV	54.0	-7.6	1.00 H	24	13.77	32.63
7	4874.00	53.1 PK	74.0	-20.9	1.03 H	325	11.11	41.99
8	4874.00	48.3 AV	54.0	-5.7	1.03 H	325	6.31	41.99
9	7311.00	53.4 PK	74.0	-20.6	1.04 H	293	6.87	46.53
10	7311.00	48.6 AV	54.0	-5.4	1.04 H	293	2.07	46.53

**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	62.1 PK	74.0	-11.9	1.00 V	347	29.72	32.38
2	2390.00	50.1 AV	54.0	-3.9	1.00 V	347	17.72	32.38
3	*2437.00	117.2 PK			1.00 V	347	84.69	32.51
4	*2437.00	115.0 AV			1.00 V	347	82.49	32.51
5	2483.50	64.9 PK	74.0	-9.1	1.00 V	347	32.27	32.63
6	2483.50	53.0 AV	54.0	-1.0	1.00 V	347	20.37	32.63
7	4874.00	58.8 PK	74.0	-15.2	1.00 V	173	16.81	41.99
8	4874.00	51.9 AV	54.0	-2.1	1.00 V	173	9.91	41.99
9	7311.00	57.0 PK	74.0	-17.0	1.23 V	178	10.47	46.53
10	7311.00	46.1 AV	54.0	-7.9	1.23 V	178	-0.43	46.53

**REMARKS:**

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



A D T

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.1 PK			1.00 H	17	77.53	32.57
2	*2462.00	104.8 AV			1.00 H	17	72.23	32.57
3	2483.50	59.6 PK	74.0	-14.4	1.00 H	40	26.97	32.63
4	2483.50	47.3 AV	54.0	-6.7	1.00 H	40	14.67	32.63
5	4924.00	52.8 PK	74.0	-21.2	1.00 H	292	10.79	42.01
6	4924.00	48.1 AV	54.0	-5.9	1.00 H	292	6.09	42.01
7	7386.00	53.1 PK	74.0	-20.9	1.04 H	305	6.37	46.73
8	7386.00	48.6 AV	54.0	-5.4	1.04 H	305	1.87	46.73

**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	112.2 PK			1.00 V	329	79.63	32.57
2	*2462.00	110.1 AV			1.00 V	329	77.53	32.57
3	2483.50	64.8 PK	74.0	-9.2	1.00 V	351	32.17	32.63
4	2483.50	52.4 AV	54.0	-1.6	1.00 V	351	19.77	32.63
5	4924.00	55.7 PK	74.0	-18.3	1.04 V	196	13.69	42.01
6	4924.00	51.6 AV	54.0	-2.4	1.04 V	196	9.59	42.01
7	7386.00	57.1 PK	74.0	-16.9	1.14 V	167	10.37	46.73
8	7386.00	46.3 AV	54.0	-7.7	1.14 V	167	-0.43	46.73

**REMARKS:**

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



A D T

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	58.6 PK	74.0	-15.4	1.00 H	43	26.22	32.38
2	2390.00	46.8 AV	54.0	-7.2	1.00 H	43	14.42	32.38
3	*2412.00	102.3 PK			1.00 H	18	69.86	32.44
4	*2412.00	92.0 AV			1.00 H	18	59.56	32.44
5	4824.00	52.0 PK	74.0	-22.0	1.01 H	293	10.06	41.94
6	4824.00	47.5 AV	54.0	-6.5	1.01 H	293	5.56	41.94

**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	67.9 PK	74.0	-6.1	1.00 V	349	35.52	32.38
2	2390.00	52.9 AV	54.0	-1.1	1.00 V	349	20.52	32.38
3	*2412.00	113.3 PK			1.00 V	349	80.86	32.44
4	*2412.00	102.9 AV			1.00 V	349	70.46	32.44
5	4824.00	52.9 PK	74.0	-21.1	1.00 V	321	10.96	41.94
6	4824.00	48.2 AV	54.0	-5.8	1.00 V	321	6.26	41.94

**REMARKS:**

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





A D T

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.8 PK	74.0	-14.2	1.04 H	8	27.42	32.38
2	2390.00	47.3 AV	54.0	-6.7	1.04 H	8	14.92	32.38
3	*2437.00	109.2 PK			1.00 H	17	76.69	32.51
4	*2437.00	100.2 AV			1.00 H	17	67.69	32.51
5	2483.50	59.8 PK	74.0	-14.2	1.00 H	3	27.17	32.63
6	2483.50	46.8 AV	54.0	-7.2	1.00 H	3	14.17	32.63
7	4874.00	52.2 PK	74.0	-21.8	1.00 H	327	10.21	41.99
8	4874.00	47.8 AV	54.0	-6.2	1.00 H	327	5.81	41.99
9	7311.00	52.6 PK	74.0	-21.4	1.06 H	301	6.07	46.53
10	7311.00	47.9 AV	54.0	-6.1	1.06 H	301	1.37	46.53

**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	61.0 PK	74.0	-13.0	1.00 V	356	28.62	32.38
2	2390.00	50.8 AV	54.0	-3.2	1.00 V	356	18.42	32.38
3	*2437.00	119.2 PK			1.00 V	353	86.69	32.51
4	*2437.00	110.1 AV			1.00 V	353	77.59	32.51
5	2483.50	64.7 PK	74.0	-9.3	1.00 V	356	32.07	32.63
6	<b>2483.50</b>	<b>53.5 AV</b>	<b>54.0</b>	<b>-0.5</b>	<b>1.00 V</b>	<b>356</b>	<b>20.87</b>	<b>32.63</b>
7	4874.00	52.3 PK	74.0	-21.7	1.00 V	312	10.31	41.99
8	4874.00	47.9 AV	54.0	-6.1	1.00 V	312	5.91	41.99
9	7311.00	53.2 PK	74.0	-20.8	1.06 V	287	6.67	46.53
10	7311.00	48.4 AV	54.0	-5.6	1.06 V	287	1.87	46.53

**REMARKS:**

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



A D T

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	109.3 PK			1.00 H	18	76.73	32.57
2	*2462.00	100.2 AV			1.00 H	18	67.63	32.57
3	2483.50	59.2 PK	74.0	-14.8	1.06 H	18	26.57	32.63
4	2483.50	47.4 AV	54.0	-6.6	1.06 H	18	14.77	32.63
5	4924.00	52.2 PK	74.0	-21.8	1.00 H	304	10.19	42.01
6	4924.00	48.1 AV	54.0	-5.9	1.00 H	304	6.09	42.01
7	7386.00	51.8 PK	74.0	-22.2	1.09 H	285	5.07	46.73
8	7386.00	47.5 AV	54.0	-6.5	1.09 H	285	0.77	46.73

**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	112.8 PK			1.00 V	353	80.23	32.57
2	*2462.00	103.1 AV			1.00 V	353	70.53	32.57
3	2483.50	72.5 PK	74.0	-1.5	1.00 V	353	39.87	32.63
4	2483.50	53.2 AV	54.0	-0.8	1.00 V	353	20.57	32.63
5	4924.00	51.3 PK	74.0	-22.7	1.00 V	300	9.29	42.01
6	4924.00	47.1 AV	54.0	-6.9	1.00 V	300	5.09	42.01
7	7386.00	52.5 PK	74.0	-21.5	1.08 V	258	5.77	46.73
8	7386.00	47.9 AV	54.0	-6.1	1.08 V	258	1.17	46.73

**REMARKS:**

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



A D T

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	58.2 PK	74.0	-15.8	1.04 H	29	25.82	32.38
2	2390.00	46.7 AV	54.0	-7.3	1.04 H	29	14.32	32.38
3	*2412.00	102.7 PK			1.00 H	7	70.26	32.44
4	*2412.00	92.8 AV			1.00 H	7	60.36	32.44
5	4824.00	52.0 PK	74.0	-22.0	1.00 H	311	10.06	41.94
6	4824.00	47.9 AV	54.0	-6.1	1.00 H	311	5.96	41.94

**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	68.8 PK	74.0	-5.2	1.00 V	350	36.42	32.38
2	<b>2390.00</b>	<b>53.5 AV</b>	<b>54.0</b>	<b>-0.5</b>	<b>1.00 V</b>	<b>350</b>	<b>21.12</b>	<b>32.38</b>
3	*2412.00	111.4 PK			1.00 V	350	78.96	32.44
4	*2412.00	102.2 AV			1.00 V	350	69.76	32.44
5	4824.00	50.3 PK	74.0	-23.7	1.00 V	291	8.36	41.94
6	4824.00	46.3 AV	54.0	-7.7	1.00 V	291	4.36	41.94

**REMARKS:**

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



A D T

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.5 PK	74.0	-14.5	1.01 H	5	27.12	32.38
2	2390.00	47.1 AV	54.0	-6.9	1.01 H	5	14.72	32.38
3	*2437.00	106.7 PK			1.00 H	5	74.19	32.51
4	*2437.00	96.5 AV			1.00 H	5	63.99	32.51
5	2485.18	58.4 PK	74.0	-15.6	1.00 H	15	25.77	32.63
6	2485.18	45.8 AV	54.0	-8.2	1.00 H	15	13.17	32.63
7	4874.00	51.1 PK	74.0	-22.9	1.00 H	314	9.11	41.99
8	4874.00	47.2 AV	54.0	-6.8	1.00 H	314	5.21	41.99
9	7311.00	52.9 PK	74.0	-21.1	1.05 H	316	6.37	46.53
10	7311.00	48.0 AV	54.0	-6.0	1.05 H	316	1.47	46.53

**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	62.8 PK	74.0	-11.2	1.00 V	360	30.42	32.38
2	2390.00	49.9 AV	54.0	-4.1	1.00 V	360	17.52	32.38
3	*2437.00	117.4 PK			1.00 V	337	84.89	32.51
4	*2437.00	107.0 AV			1.00 V	337	74.49	32.51
5	2485.18	64.5 PK	74.0	-9.5	1.00 V	342	31.87	32.63
6	2485.18	52.5 AV	54.0	-1.5	1.00 V	342	19.87	32.63
7	4874.00	50.9 PK	74.0	-23.1	1.00 V	314	8.91	41.99
8	4874.00	46.9 AV	54.0	-7.1	1.00 V	314	4.91	41.99
9	7311.00	52.8 PK	74.0	-21.2	1.02 V	259	6.27	46.53
10	7311.00	48.1 AV	54.0	-5.9	1.02 V	259	1.57	46.53

**REMARKS:**

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



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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	102.7 PK			1.00 H	10	70.13	32.57
2	*2462.00	92.5 AV			1.00 H	10	59.93	32.57
3	2484.43	58.6 PK	74.0	-15.4	1.00 H	4	25.97	32.63
4	2484.43	46.8 AV	54.0	-7.2	1.00 H	4	14.17	32.63
5	2500.00	58.3 PK	74.0	-15.7	1.00 H	9	25.63	32.67
6	2500.00	46.0 AV	54.0	-8.0	1.00 H	9	13.33	32.67
7	4924.00	50.9 PK	74.0	-23.1	1.00 H	315	8.89	42.01
8	4924.00	47.2 AV	54.0	-6.8	1.00 H	315	5.19	42.01
9	7386.00	51.9 PK	74.0	-22.1	1.02 H	329	5.17	46.73
10	7386.00	47.3 AV	54.0	-6.7	1.02 H	329	0.57	46.73

**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	112.8 PK			1.02 V	348	80.23	32.57
2	*2462.00	102.6 AV			1.02 V	348	70.03	32.57
3	2484.43	71.5 PK	74.0	-2.5	1.02 V	349	38.87	32.63
4	2484.43	53.1 AV	54.0	-0.9	1.02 V	349	20.47	32.63
5	2500.00	59.8 PK	74.0	-14.2	1.20 V	19	27.13	32.67
6	2500.00	48.7 AV	54.0	-5.3	1.20 V	19	16.03	32.67
7	4924.00	50.9 PK	74.0	-23.1	1.00 V	313	8.89	42.01
8	4924.00	47.0 AV	54.0	-7.0	1.00 V	313	4.99	42.01
9	7386.00	52.0 PK	74.0	-22.0	1.00 V	247	5.27	46.73
10	7386.00	47.7 AV	54.0	-6.3	1.00 V	247	0.97	46.73

**REMARKS:**

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



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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	2389.20	58.1 PK	74.0	-15.9	1.00 H	125	25.72	32.38
2	2389.20	46.4 AV	54.0	-7.6	1.00 H	125	14.02	32.38
3	*2422.00	98.2 PK			1.00 H	125	65.73	32.47
4	*2422.00	88.7 AV			1.00 H	125	56.23	32.47
5	2500.00	60.2 PK	74.0	-13.8	1.45 H	45	27.53	32.67
6	2500.00	49.1 AV	54.0	-4.9	1.45 H	45	16.43	32.67
7	4844.00	50.3 PK	74.0	-23.7	1.00 H	320	8.34	41.96
8	4844.00	46.7 AV	54.0	-7.3	1.00 H	320	4.74	41.96
9	7266.00	51.1 PK	74.0	-22.9	1.06 H	340	4.70	46.40
10	7266.00	46.8 AV	54.0	-7.2	1.06 H	340	0.40	46.40

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2389.20	70.9 PK	74.0	-3.1	1.03 V	342	38.52	32.38
2	2389.20	53.5 AV	54.0	-0.5	1.03 V	342	21.12	32.38
3	*2422.00	107.8 PK			1.03 V	342	75.33	32.47
4	*2422.00	98.0 AV			1.03 V	342	65.53	32.47
5	2500.00	62.2 PK	74.0	-11.8	1.00 V	5	29.53	32.67
6	2500.00	49.1 AV	54.0	-4.9	1.00 V	5	16.43	32.67
7	4844.00	51.0 PK	74.0	-23.0	1.00 V	315	9.04	41.96
8	4844.00	47.3 AV	54.0	-6.7	1.00 V	315	5.34	41.96
9	7266.00	51.0 PK	74.0	-23.0	1.00 V	238	4.60	46.40
10	7266.00	46.9 AV	54.0	-7.1	1.00 V	238	0.50	46.40

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
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	58.5 PK	74.0	-15.5	1.00 H	133	26.12	32.38
2	2390.00	46.8 AV	54.0	-7.2	1.00 H	133	14.42	32.38
3	*2437.00	100.2 PK			1.00 H	115	67.69	32.51
4	*2437.00	90.6 AV			1.00 H	115	58.09	32.51
5	2483.50	59.6 PK	74.0	-14.4	1.41 H	42	26.97	32.63
6	2483.50	48.9 AV	54.0	-5.1	1.41 H	42	16.27	32.63
7	4874.00	50.0 PK	74.0	-24.0	1.00 H	333	8.01	41.99
8	4874.00	46.8 AV	54.0	-7.2	1.00 H	333	4.81	41.99
9	7311.00	50.9 PK	74.0	-23.1	1.00 H	342	4.37	46.53
10	7311.00	46.6 AV	54.0	-7.4	1.00 H	342	0.07	46.53

**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	64.9 PK	74.0	-9.1	1.00 V	349	32.52	32.38
2	2390.00	51.3 AV	54.0	-2.7	1.00 V	349	18.92	32.38
3	*2437.00	110.4 PK			1.00 V	349	77.89	32.51
4	*2437.00	100.8 AV			1.00 V	349	68.29	32.51
5	2483.50	68.7 PK	74.0	-5.3	1.00 V	349	36.07	32.63
6	2483.50	53.3 AV	54.0	-0.7	1.00 V	349	20.67	32.63
7	4874.00	51.1 PK	74.0	-22.9	1.00 V	324	9.11	41.99
8	4874.00	47.6 AV	54.0	-6.4	1.00 V	324	5.61	41.99
9	7311.00	50.3 PK	74.0	-23.7	1.00 V	214	3.77	46.53
10	7311.00	46.2 AV	54.0	-7.8	1.00 V	214	-0.33	46.53

**REMARKS:**

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



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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	97.4 PK			1.00 H	120	64.85	32.55
2	*2452.00	87.1 AV			1.00 H	120	54.55	32.55
3	2483.50	58.1 PK	74.0	-15.9	1.00 H	130	25.47	32.63
4	2483.50	46.5 AV	54.0	-7.5	1.00 H	130	13.87	32.63
5	2500.00	60.6 PK	74.0	-13.4	1.67 H	62	27.93	32.67
6	2500.00	48.6 AV	54.0	-5.4	1.67 H	62	15.93	32.67
7	4904.00	50.4 PK	74.0	-23.6	1.00 H	321	8.38	42.02
8	4904.00	47.3 AV	54.0	-6.7	1.00 H	321	5.28	42.02
9	7356.00	50.1 PK	74.0	-23.9	1.00 H	357	3.45	46.65
10	7356.00	46.0 AV	54.0	-8.0	1.00 H	357	-0.65	46.65

**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	106.6 PK			1.00 V	348	74.05	32.55
2	*2452.00	96.7 AV			1.00 V	348	64.15	32.55
3	2483.50	68.1 PK	74.0	-5.9	1.00 V	348	35.47	32.63
4	2483.50	53.2 AV	54.0	-0.8	1.00 V	348	20.57	32.63
5	2500.00	60.2 PK	74.0	-13.8	1.64 V	46	27.53	32.67
6	2500.00	48.1 AV	54.0	-5.9	1.64 V	46	15.43	32.67
7	4904.00	50.4 PK	74.0	-23.6	1.00 V	312	8.38	42.02
8	4904.00	47.1 AV	54.0	-6.9	1.00 V	312	5.08	42.02
9	7356.00	49.2 PK	74.0	-24.8	1.00 V	202	2.55	46.65
10	7356.00	45.0 AV	54.0	-9.0	1.00 V	202	-1.65	46.65

**REMARKS:**

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



### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Jan. 07, 2013

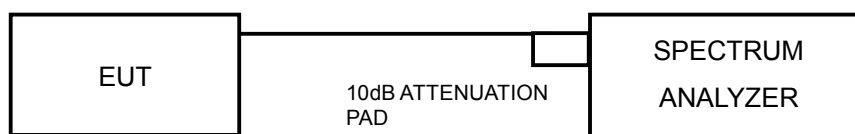
#### 4.3.3 TEST PROCEDURE

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

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.3.5 TEST SETUP



#### 4.3.6 EUT OPERATING CONDITIONS

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



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### 4.3.7 TEST RESULTS

#### 802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	7.72	0.5	PASS
6	2437	7.69	0.5	PASS
11	2462	7.57	0.5	PASS

#### 802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.48	0.5	PASS
6	2437	16.50	0.5	PASS
11	2462	16.49	0.5	PASS

#### 802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.67	17.70	0.5	PASS
6	2437	17.71	17.70	0.5	PASS
11	2462	17.67	17.68	0.5	PASS

#### 802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	35.84	35.84	0.5	PASS
6	2437	35.84	35.90	0.5	PASS
9	2452	35.53	36.07	0.5	PASS

## 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 band: 1 Watt (30dBm)

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

Array Gain = 0 dB (i.e., no array gain) for NANT  $\leq$  4;

Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq$  40 MHz for any NANT;

Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT  $\geq$  5.

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

### 4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Jan. 07, 2013

#### 4.4.3 TEST PROCEDURES

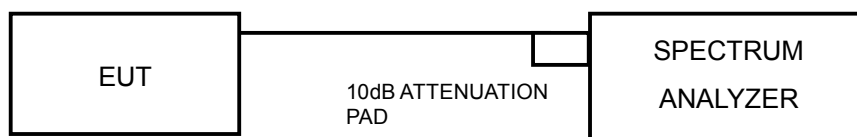
Follow FCC KDB 558074 DTS test procedure:  
Measurement Procedure AVG1

1. Set the analyzer span to a minimum of 1.5 times the EBW.
2. Set RBW =1MHz.
3. Set the VBW  $\geq 3 \times$  RBW.
4. Number of measurement points in the sweep  $\geq 2 \times$  (span/RBW).
5. Sweep time = auto couple.
6. Detector = power averaging (RMS) or sample.
7. Employ trace averaging in power averaging (RMS) mode over a minimum of 100 traces.
8. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges.

#### 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)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	105.682	20.24	30	PASS
6	2437	140.281	21.47	30	PASS
11	2462	80.168	19.04	30	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	48.529	16.86	30	PASS
6	2437	174.181	22.41	30	PASS
11	2462	40.272	16.05	30	PASS

##### 802.11n (HT20)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	15.17	15.15	65.619	18.17	30	PASS
6	2437	19.99	19.81	195.489	22.91	30	PASS
11	2462	12.86	15.12	51.829	17.15	30	PASS

##### 802.11n (HT40)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	12.56	12.76	36.910	15.67	30	PASS
6	2437	14.27	15.25	60.227	17.80	30	PASS
9	2452	11.80	12.24	31.885	15.04	30	PASS

## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Jan. 07, 2013

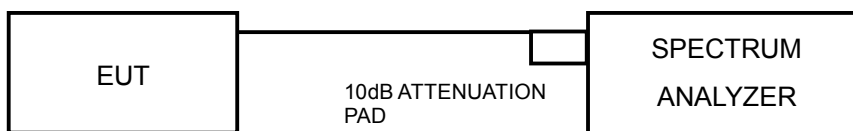
### 4.5.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW =10 kHz, Detector = power averaging (RMS) .
2. Ensure that the number of measurement points in the sweep  $\geq 2 \times$  span/RBW
3. Sweep time = auto couple,
4. Employ trace averaging (RMS) mode over a minimum of 100 traces.
5. Use the peak marker function to determine the maximum amplitude level.

### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.5.5 TEST SETUP



### 4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



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## 4.5.7 TEST RESULTS

## 802.11b

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-3.51	8	PASS
6	2437	-1.49	8	PASS
11	2462	-4.20	8	PASS

## 802.11g

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-8.91	8	PASS
6	2437	-3.42	8	PASS
11	2462	-9.62	8	PASS

## 802.11n (HT20)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-9.72	3.01	-6.71	8	PASS
	6	2437	-5.77	3.01	-2.76	8	PASS
	11	2462	-10.75	3.01	-7.74	8	PASS
1	1	2412	-8.49	3.01	-5.48	8	PASS
	6	2437	-5.64	3.01	-2.63	8	PASS
	11	2462	-10.24	3.01	-7.23	8	PASS

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.72\text{dBi} < 6\text{dBi}$ , so the power density limit shall not be reduced.

## 802.11n (HT40)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-15.43	3.01	-12.42	8	PASS
	6	2437	-12.54	3.01	-9.53	8	PASS
	9	2452	-16.35	3.01	-13.34	8	PASS
1	3	2422	-13.86	3.01	-10.85	8	PASS
	6	2437	-10.68	3.01	-7.67	8	PASS
	9	2452	-14.81	3.01	-11.80	8	PASS

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.72\text{dBi} < 6\text{dBi}$ , so the power density limit shall not be reduced.





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## 4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Jan. 07, 2013

### 4.6.3 TEST PROCEDURE

#### Measurement Procedure - Reference Level

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

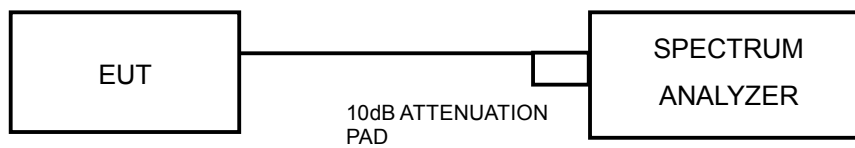
#### Measurement Procedure –Unwanted Emission Level

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

#### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.6.5 TEST SETUP



#### 4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 4.6.7 TEST RESULTS

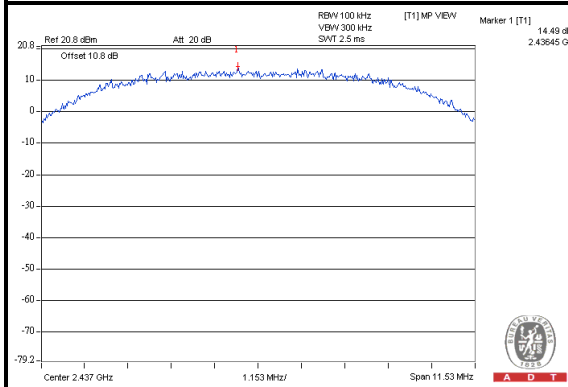
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.



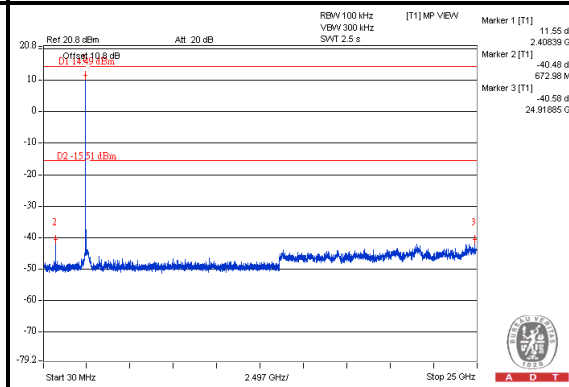
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### 802.11b:

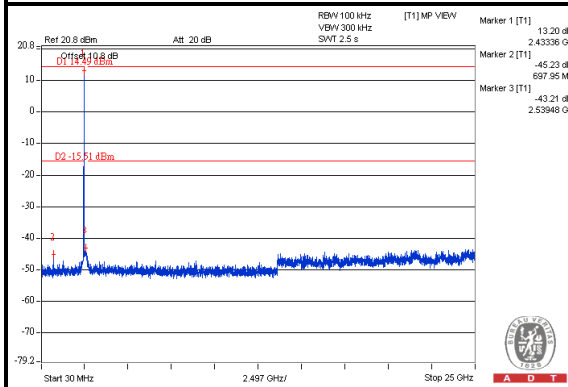
#### Maximum REF



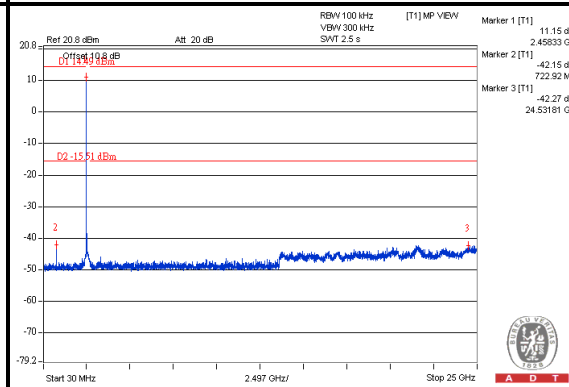
#### CH 1



#### CH 6



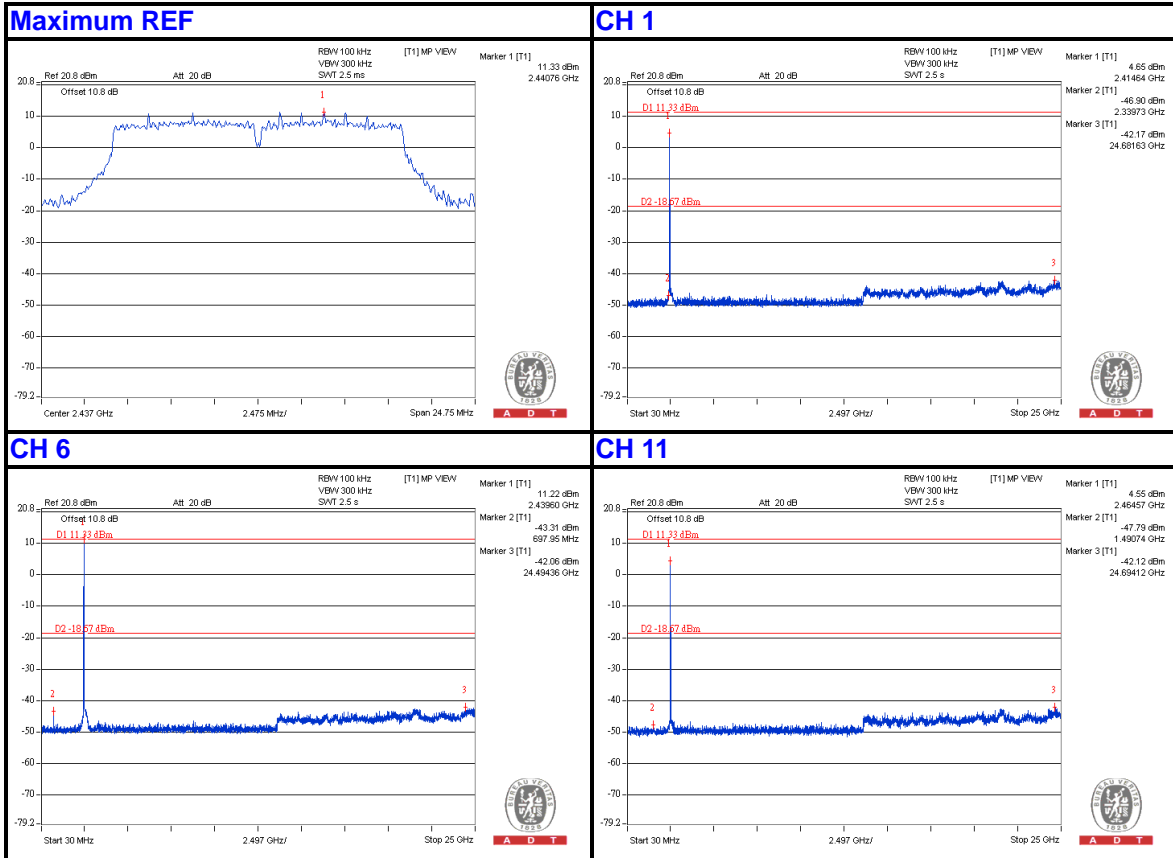
#### CH 11





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802.11g:



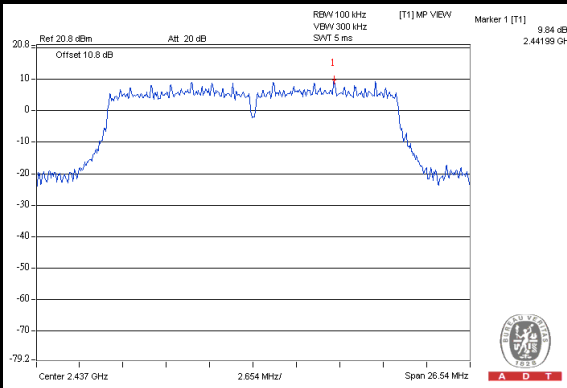


A D T

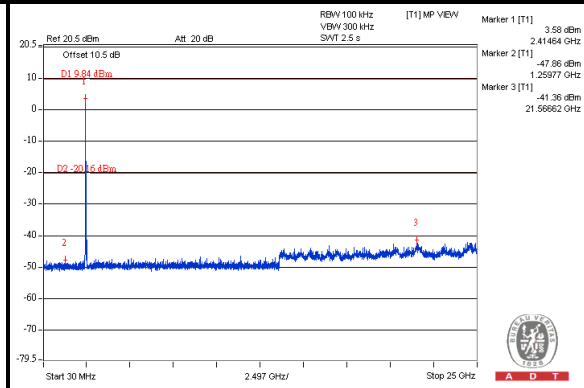
### 802.11n (HT20):

#### Chain(0)

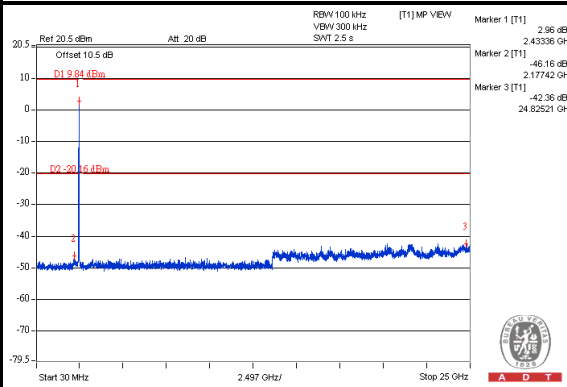
#### Maximum REF



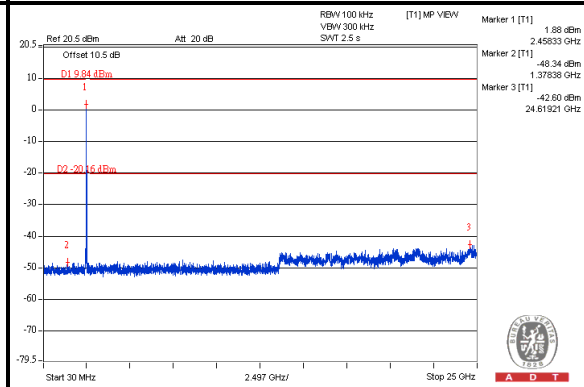
#### CH 1



#### CH 6



#### CH 11

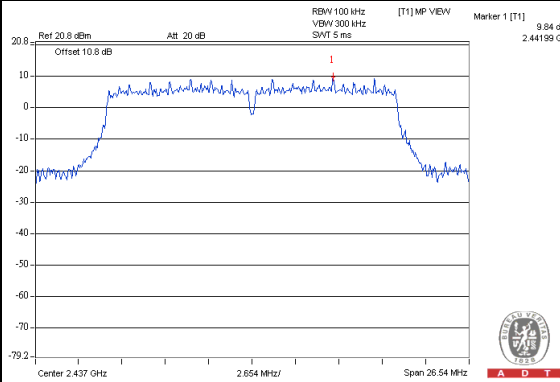




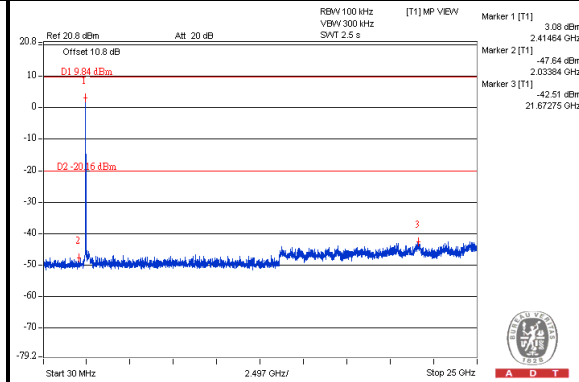
A D T

### Chain(1)

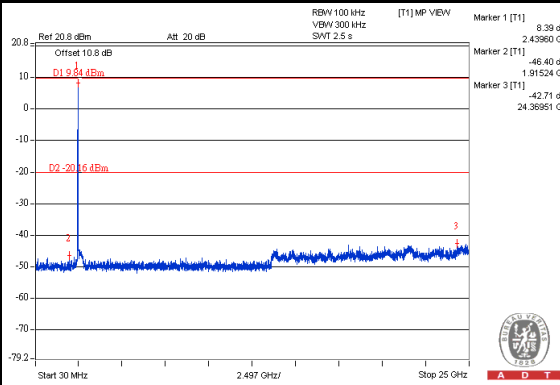
#### Maximum REF



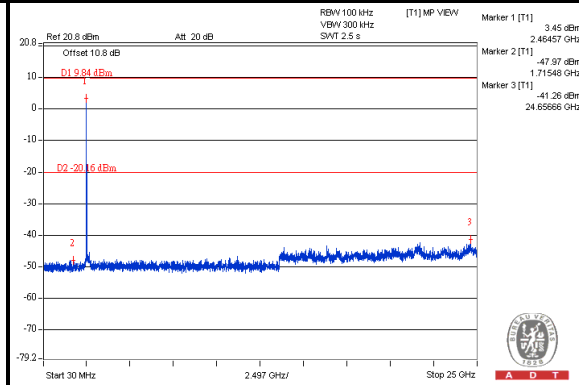
#### CH 1



#### CH 6



#### CH 11



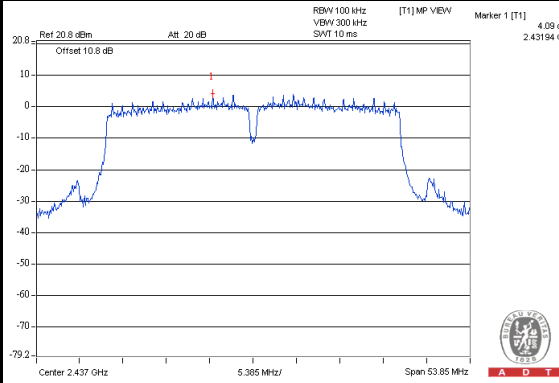


A D T

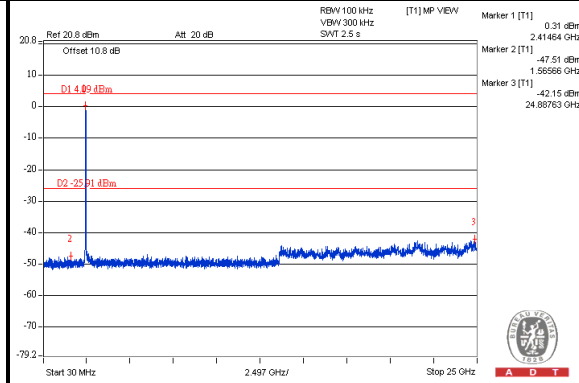
### 802.11n (HT40):

#### Chain(0)

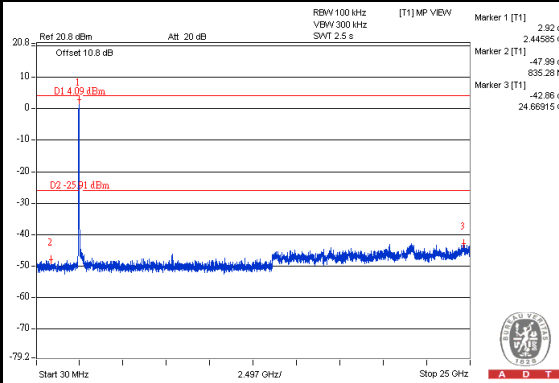
#### Maximum REF



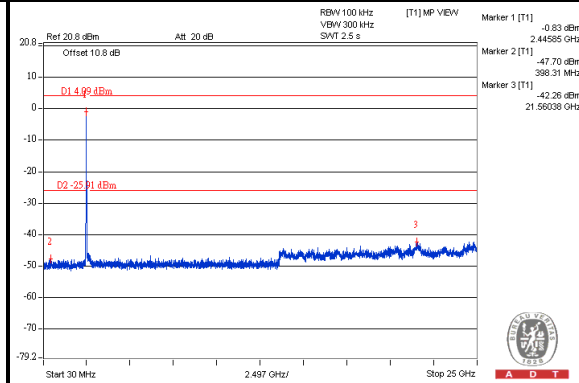
#### CH 3



#### CH 6



#### CH 9

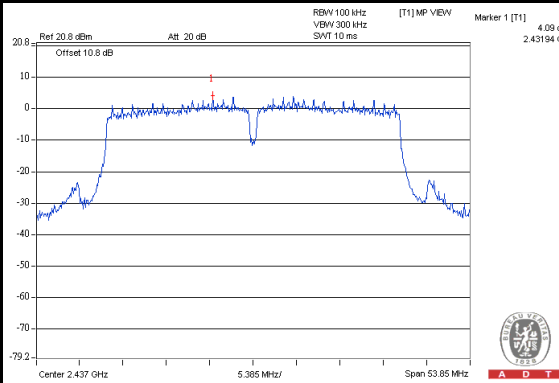




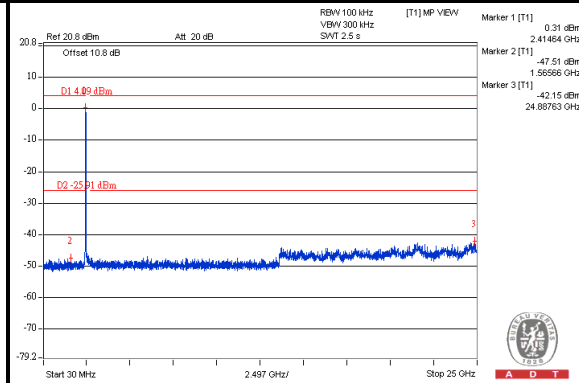
A D T

### Chain(1)

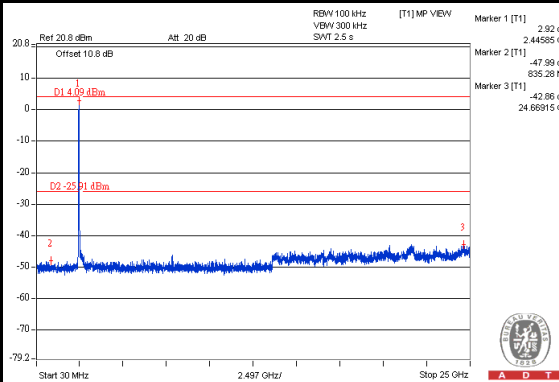
#### Maximum REF



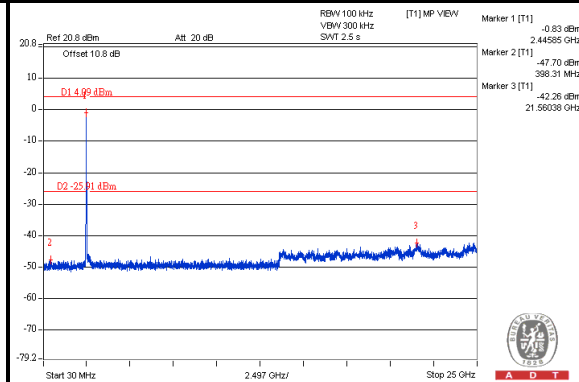
#### CH 3



#### CH 6



#### CH 9





## 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	ESCS 30	100375	Mar. 12, 2012	Mar.11, 2013
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 06, 2012	Sep. 05, 2013
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 08,2012	June 07,2013
RF Cable (JYEBAO)	5DFB	COCCAB-001	Aug. 28, 2012	Aug. 27, 2013
50 ohms Terminator	50	EMC-3	Sep. 25, 2012	Sep. 24, 2013
Software ADT	BV ADT_Cond_V7.3.7.3	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Jan.15, 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.

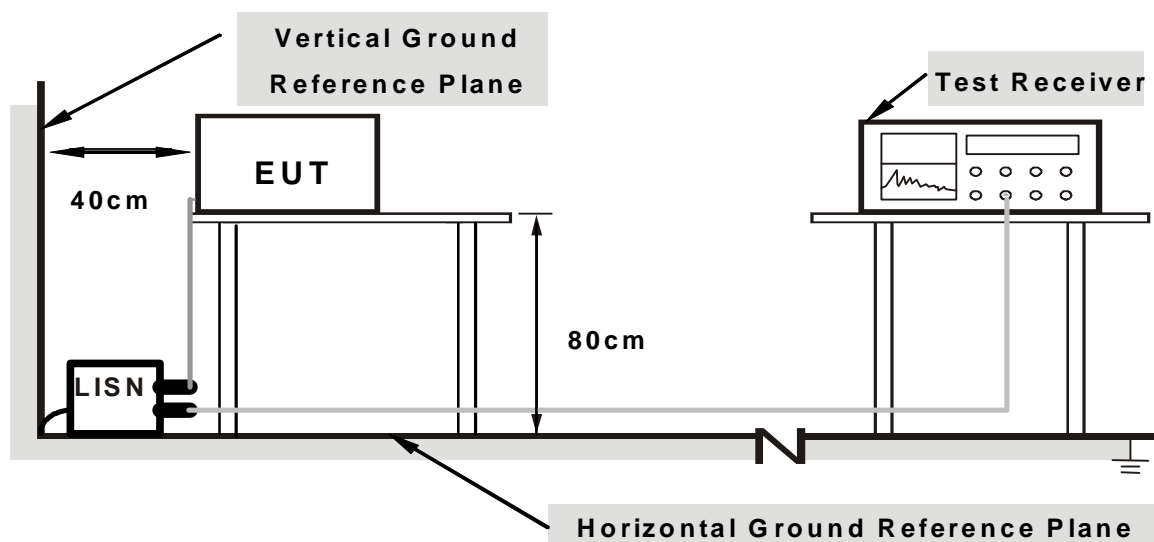
#### NOTE:

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

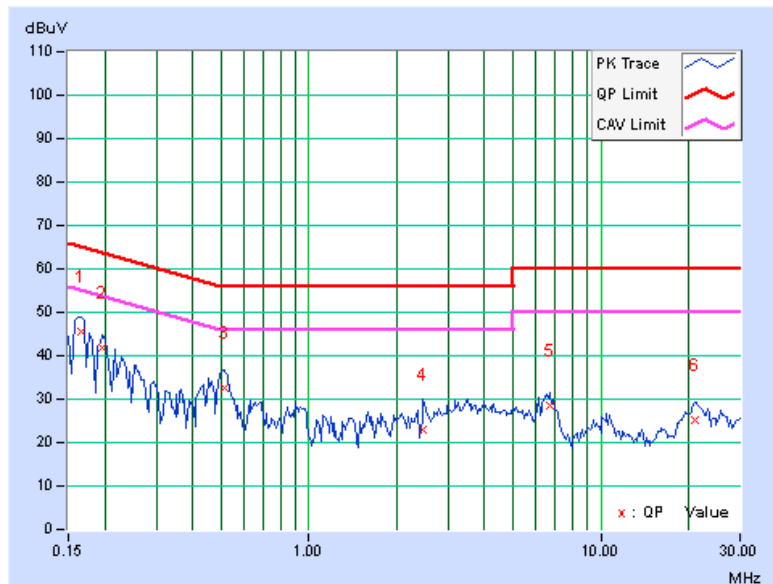
### 5.1.7 TEST RESULTS(MODE 1)

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	0.11	45.36	36.18	45.47	36.29	65.18	55.18	-19.70	-18.88
2	0.19687	0.13	41.74	32.60	41.87	32.73	63.74	53.74	-21.87	-21.01
3	0.51328	0.19	32.36	21.14	32.55	21.33	56.00	46.00	-23.45	-24.67
4	2.45703	0.29	22.50	15.70	22.79	15.99	56.00	46.00	-33.21	-30.01
5	6.68359	0.53	27.82	23.00	28.35	23.53	60.00	50.00	-31.65	-26.47
6	20.94531	1.32	23.84	19.14	25.16	20.46	60.00	50.00	-34.84	-29.54

**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.





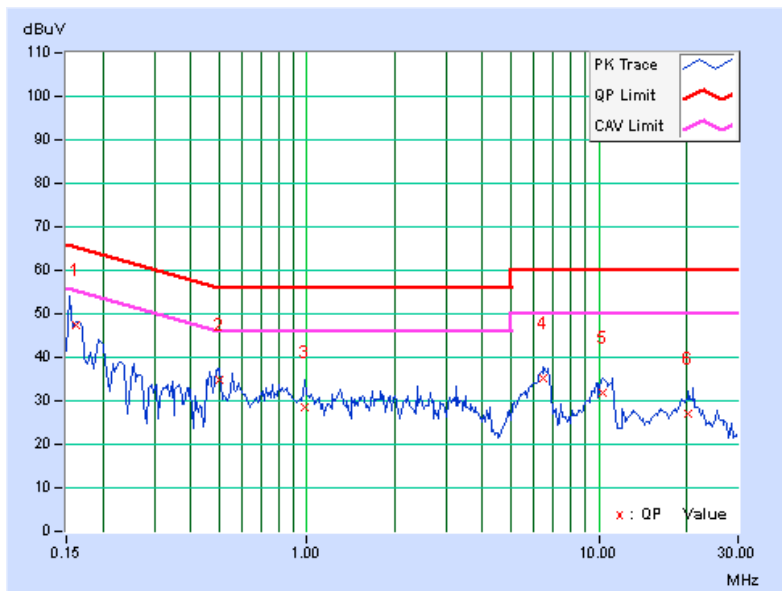
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PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.10	47.18	37.94	47.28	38.04	65.38	55.38	-18.09	-17.33
2	0.50156	0.18	34.74	24.22	34.92	24.40	56.00	46.00	-21.08	-21.60
3	0.98594	0.20	28.42	21.50	28.62	21.70	56.00	46.00	-27.38	-24.30
4	6.48047	0.48	34.62	29.84	35.10	30.32	60.00	50.00	-24.90	-19.68
5	10.26953	0.67	31.04	25.92	31.71	26.59	60.00	50.00	-28.29	-23.41
6	20.35547	0.98	25.98	21.44	26.96	22.42	60.00	50.00	-33.04	-27.58

**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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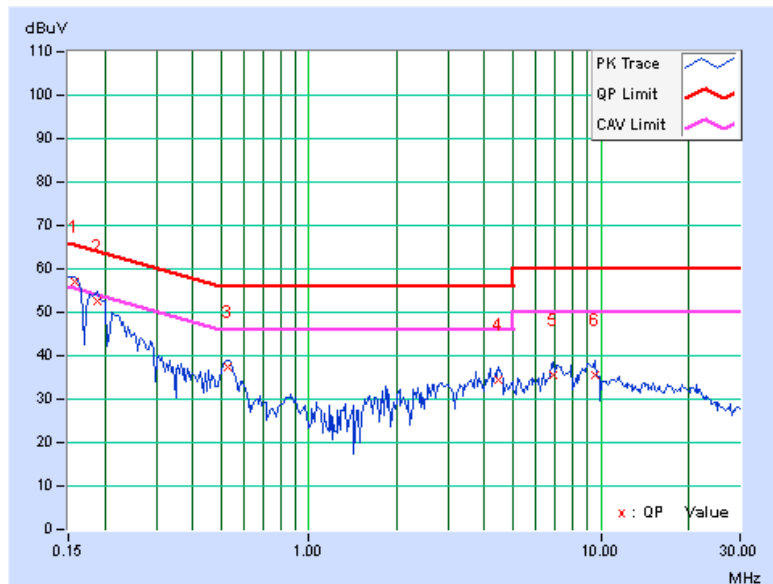
5.1.8 TEST RESULTS(MODE 2)

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	0.15781	0.11	57.10	44.40	57.21	44.51	65.58	55.58	-8.37	-11.07
2	0.18906	0.12	52.42	39.16	52.54	39.28	64.08	54.08	-11.53	-14.79
3	0.52891	0.19	37.14	29.32	37.33	29.51	56.00	46.00	-18.67	-16.49
4	4.47656	0.37	34.04	27.92	34.41	28.29	56.00	46.00	-21.59	-17.71
5	6.87109	0.54	34.86	29.18	35.40	29.72	60.00	50.00	-24.60	-20.28
6	9.50781	0.73	34.88	30.10	35.61	30.83	60.00	50.00	-24.39	-19.17

REMARKS:

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

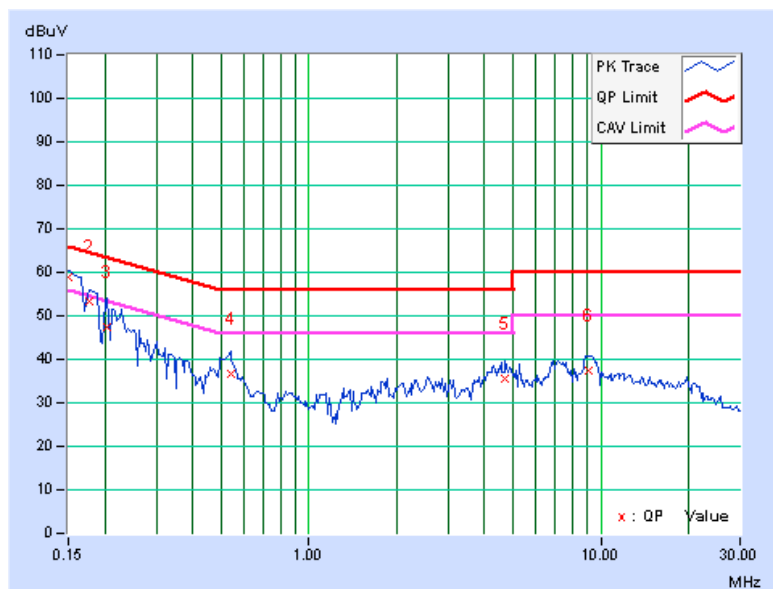


<b>PHASE</b>	Neutral (N)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.09	58.96	45.88	59.05	45.97	66.00	56.00	-6.95	-10.03
2	0.17734	0.11	53.22	36.80	53.33	36.91	64.61	54.61	-11.28	-17.70
3	0.20469	0.12	47.42	29.66	47.54	29.78	63.42	53.42	-15.88	-23.64
4	0.54063	0.18	36.56	27.08	36.74	27.26	56.00	46.00	-19.26	-18.74
5	4.71875	0.39	35.16	29.16	35.55	29.55	56.00	46.00	-20.45	-16.45
6	9.13281	0.62	36.68	31.44	37.30	32.06	60.00	50.00	-22.70	-17.94

**REMARKS:**

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



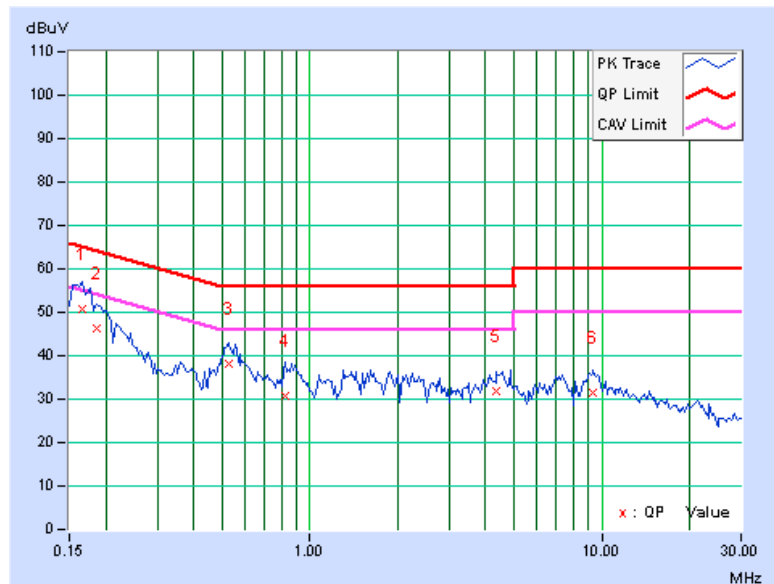
### 5.1.9 TEST RESULTS(MODE 3)

<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	0.16562	0.11	50.70	37.68	50.81	37.79	65.18	55.18	-14.36	-17.38
2	0.18516	0.12	46.24	32.32	46.36	32.44	64.25	54.25	-17.89	-21.81
3	0.52500	0.19	38.08	31.78	38.27	31.97	56.00	46.00	-17.73	-14.03
4	0.82188	0.21	30.62	24.56	30.83	24.77	56.00	46.00	-25.17	-21.23
5	4.37500	0.37	31.40	25.88	31.77	26.25	56.00	46.00	-24.23	-19.75
6	9.37891	0.72	30.62	26.20	31.34	26.92	60.00	50.00	-28.66	-23.08

**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.







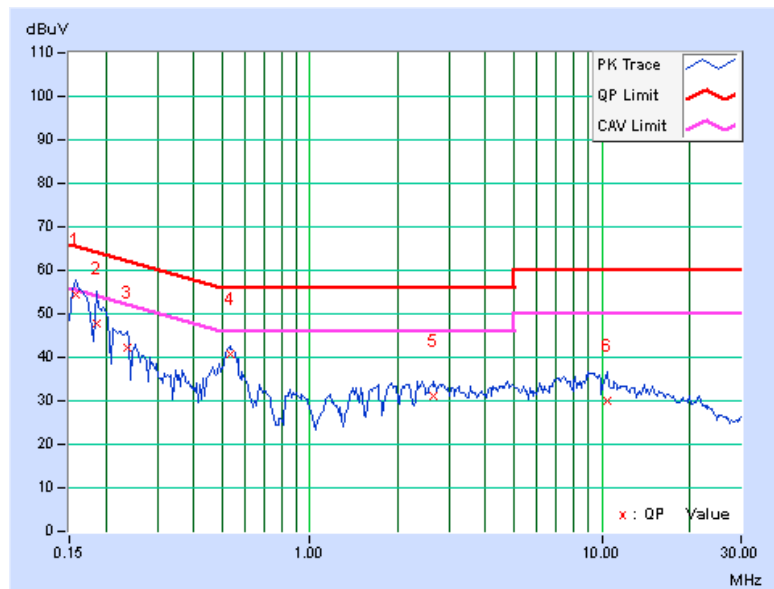
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<b>PHASE</b>	Neutral (N)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
--------------	-------------	--------------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		[dB]	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.10	54.52	43.12	54.62	43.22	65.58	55.58	-10.96	-12.36
2	0.18516	0.11	47.56	33.58	47.67	33.69	64.25	54.25	-16.58	-20.56
3	0.23594	0.13	42.12	27.94	42.25	28.07	62.24	52.24	-19.99	-24.17
4	0.53281	0.18	40.40	34.12	40.58	34.30	56.00	46.00	-15.42	-11.70
5	2.66016	0.29	30.96	25.76	31.25	26.05	56.00	46.00	-24.75	-19.95
6	10.40625	0.67	29.38	23.84	30.05	24.51	60.00	50.00	-29.95	-25.49

**REMARKS:**

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



## 5.2 RADIATED AND BANDEGE EMISSION MEASUREMENT

### 5.2.1 LIMITS OF RADIATED AND BANDEGE 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 30dB 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

### Below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
Pre-Selector Agilent	N9039A	MY46520310	Sep. 03, 2012	Sep. 02, 2013
Signal Generator Agilent	N5181A	MY49060347	July 24, 2012	July 23, 2013
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02465	Feb. 27, 2012	Feb. 26, 2013
SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Apr. 06, 2012	Apr. 05, 2013
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 27, 2012	Nov. 26, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 25, 2012	Dec. 24, 2013
RF Cable	NA	CHHCAB_001	Oct. 07, 2012	Oct. 06, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

### Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
- 5 The CANADA Site Registration No. is IC 7450H-3.
- 6 Tested Date: Jan. 08, 2013



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**Above 1GHz test:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250254	July 09, 2012	July 08, 2013
Pre-Selector Agilent	N9039A	MY46520311	July 09, 2012	July 08, 2013
Signal Generator Agilent	N5181A	MY49060517	July 09, 2012	July 08, 2013
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 26, 2012	June 25, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Apr. 09, 2012	Apr. 08, 2013
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
- 5 The VCCI Site Registration No. is G-137.
- 6 The CANADA Site Registration No. is IC 7450H-2.
- 7 Tested Date: Jan. 08, 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.

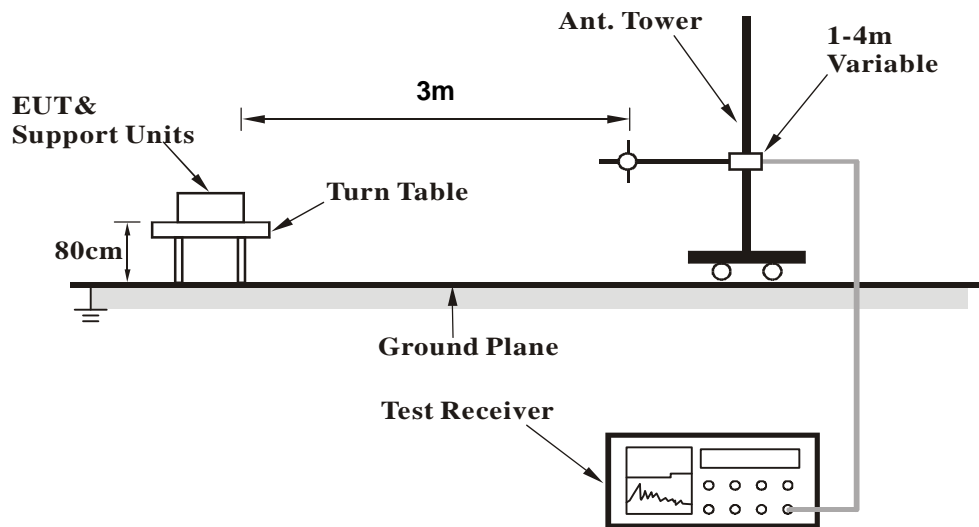
**NOTE:**

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



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

#### 802.11n (HT20)

<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	55.58	32.0 QP	40.0	-8.1	1.50 H	360	18.27	13.68
2	193.90	32.6 QP	43.5	-10.9	1.00 H	252	21.00	11.61
3	323.81	35.8 QP	46.0	-10.2	1.00 H	136	19.89	15.90
4	500.02	36.4 QP	46.0	-9.6	1.50 H	299	16.33	20.10
5	833.38	32.8 QP	46.0	-13.2	1.50 H	294	6.67	26.13
6	997.63	28.5 QP	54.0	-25.6	1.50 H	308	-0.32	28.77
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	96.55	36.9 QP	43.5	-6.6	1.11 V	24	27.61	9.27
2	106.30	35.3 QP	43.5	-8.2	1.10 V	278	24.75	10.53
3	193.18	35.0 QP	43.5	-8.5	1.24 V	111	23.35	11.68
4	323.32	36.3 QP	46.0	-9.7	1.35 V	24	20.43	15.88
5	427.77	35.7 QP	46.0	-10.4	1.47 V	247	17.27	18.38
6	997.51	43.3 QP	54.0	-10.7	1.34 V	245	14.49	28.77

#### REMARKS:

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



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**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	117.1 PK			1.26 H	286	73.62	43.48
2	*5745.00	107.4 AV			1.26 H	286	63.92	43.48
3	11490.00	57.6 PK	74.0	-16.4	1.03 H	37	7.42	50.18
4	11490.00	46.9 AV	54.0	-7.1	1.03 H	37	-3.28	50.18

**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	105.9 PK			1.05 V	190	62.42	43.48
2	*5745.00	95.6 AV			1.05 V	190	52.12	43.48
3	11490.00	56.2 PK	74.0	-17.8	1.10 V	356	6.02	50.18
4	11490.00	45.3 AV	54.0	-8.7	1.10 V	356	-4.88	50.18

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. The limit value is defined as per 15.247.





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<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	116.5 PK			1.25 H	287	72.98	43.52
2	*5785.00	106.9 AV			1.25 H	287	63.38	43.52
3	11570.00	57.8 PK	74.0	-16.2	1.00 H	37	7.62	50.18
4	11570.00	46.9 AV	54.0	-7.1	1.00 H	37	-3.28	50.18

**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	105.6 PK			1.03 V	186	62.08	43.52
2	*5785.00	95.4 AV			1.03 V	186	51.88	43.52
3	11570.00	62.8 PK	74.0	-11.2	1.10 V	341	12.62	50.18
4	11570.00	49.6 AV	54.0	-4.4	1.10 V	341	-0.58	50.18

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. The limit value is defined as per 15.247.



A D T

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	116.3 PK			1.25 H	286	72.69	43.61
2	*5825.00	106.5 AV			1.25 H	286	62.89	43.61
3	11650.00	57.8 PK	74.0	-16.2	1.08 H	22	7.38	50.42
4	11650.00	47.0 AV	54.0	-7.0	1.08 H	22	-3.42	50.42

**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	105.4 PK			1.04 V	188	61.79	43.61
2	*5825.00	95.1 AV			1.04 V	188	51.49	43.61
3	11650.00	63.0 PK	74.0	-11.0	1.15 V	331	12.58	50.42
4	11650.00	50.3 AV	54.0	-3.7	1.15 V	331	-0.12	50.42

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. The limit value is defined as per 15.247.



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### 802.11n (HT20)

<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	114.8 PK			1.64 H	194	71.32	43.48
2	*5745.00	106.3 AV			1.64 H	194	62.82	43.48
3	11490.00	62.5 PK	74.0	-11.5	1.32 H	241	12.32	50.18
4	11490.00	48.3 AV	54.0	-5.7	1.32 H	241	-1.88	50.18
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	114.9 PK			1.10 V	272	71.42	43.48
2	*5745.00	106.5 AV			1.10 V	272	63.02	43.48
3	11490.00	63.0 PK	74.0	-11.0	1.17 V	349	12.82	50.18
4	11490.00	49.7 AV	54.0	-4.3	1.17 V	349	-0.48	50.18

#### REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. The limit value is defined as per 15.247.



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<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	115.1 PK			1.59 H	201	71.58	43.52
2	*5785.00	106.4 AV			1.59 H	201	62.88	43.52
3	11570.00	62.3 PK	74.0	-11.7	1.37 H	247	12.12	50.18
4	11570.00	47.9 AV	54.0	-6.1	1.37 H	247	-2.28	50.18

**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	114.3 PK			1.09 V	286	70.78	43.52
2	*5785.00	106.2 AV			1.09 V	286	62.68	43.52
3	11570.00	62.9 PK	74.0	-11.1	1.04 V	338	12.72	50.18
4	11570.00	49.8 AV	54.0	-4.2	1.04 V	338	-0.38	50.18

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. The limit value is defined as per 15.247.



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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	115.0 PK			1.56 H	200	71.39	43.61
2	*5825.00	106.9 AV			1.56 H	200	63.29	43.61
3	11650.00	62.5 PK	74.0	-11.5	1.38 H	231	12.08	50.42
4	11650.00	48.2 AV	54.0	-5.8	1.38 H	231	-2.22	50.42

**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	114.3 PK			1.08 V	272	70.69	43.61
2	*5825.00	106.4 AV			1.08 V	272	62.79	43.61
3	11650.00	64.2 PK	74.0	-9.8	1.08 V	331	13.78	50.42
4	11650.00	51.1 AV	54.0	-2.9	1.08 V	331	0.68	50.42

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. The limit value is defined as per 15.247.



802.11n (HT40)

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5755.00	113.9 PK			1.57 H	201	70.42	43.48
2	*5755.00	104.1 AV			1.57 H	201	60.62	43.48
3	11510.00	62.1 PK	74.0	-11.9	1.34 H	243	11.93	50.17
4	11510.00	47.3 AV	54.0	-6.7	1.34 H	243	-2.87	50.17

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5755.00	114.3 PK			1.07 V	263	70.82	43.48
2	*5755.00	103.7 AV			1.07 V	263	60.22	43.48
3	11510.00	63.4 PK	74.0	-10.6	1.15 V	342	13.23	50.17
4	11510.00	49.9 AV	54.0	-4.1	1.15 V	342	-0.27	50.17

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. The limit value is defined as per 15.247.



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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	114.1 PK			1.44 H	185	70.57	43.53
2	*5795.00	103.9 AV			1.44 H	185	60.37	43.53
3	11590.00	62.3 PK	74.0	-11.7	1.35 H	257	12.11	50.19
4	11590.00	47.3 AV	54.0	-6.7	1.35 H	257	-2.89	50.19

**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	113.9 PK			1.00 V	250	70.37	43.53
2	*5795.00	103.8 AV			1.00 V	250	60.27	43.53
3	11590.00	62.4 PK	74.0	-11.6	1.05 V	327	12.21	50.19
4	11590.00	49.4 AV	54.0	-4.6	1.05 V	327	-0.79	50.19

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. The limit value is defined as per 15.247.

**802.11ac (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	3850.04	56.2 PK	74.0	-17.8	1.27 H	96	18.67	37.53
2	3850.04	44.1 AV	54.0	-9.9	1.27 H	96	6.57	37.53
3	5133.34	60.1 PK	74.0	-13.9	1.23 H	192	17.58	42.52
4	5133.34	47.4 AV	54.0	-6.6	1.23 H	192	4.88	42.52
5	*5775.00	108.9 PK			1.25 H	264	65.39	43.51
6	*5775.00	96.8 AV			1.25 H	264	53.29	43.51
7	11550.00	58.1 PK	74.0	-15.9	1.40 H	84	7.92	50.18
8	11550.00	45.6 AV	54.0	-8.4	1.40 H	84	-4.58	50.18

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	3850.04	56.0 PK	74.0	-18.0	1.11 V	178	18.47	37.53
2	3850.04	44.6 AV	54.0	-9.4	1.11 V	178	7.07	37.53
3	5133.34	60.6 PK	74.0	-13.4	1.26 V	176	18.08	42.52
4	5133.34	47.6 AV	54.0	-6.4	1.26 V	176	5.08	42.52
5	*5775.00	108.7 PK			1.07 V	318	65.19	43.51
6	*5775.00	96.5 AV			1.07 V	318	52.99	43.51
7	11550.00	57.7 PK	74.0	-16.3	1.05 V	333	7.52	50.18
8	11550.00	46.2 AV	54.0	-7.8	1.05 V	333	-3.98	50.18

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. The limit value is defined as per 15.247.



### 5.3 6dB BANDWIDTH MEASUREMENT

#### 5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 5.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Jan. 07, 2013

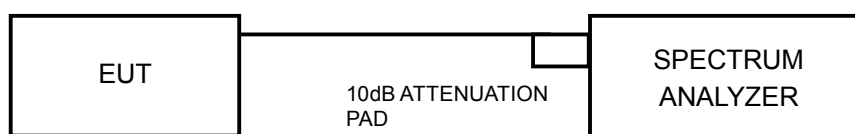
#### 5.3.3 TEST PROCEDURE

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

#### 5.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 5.3.5 TEST SETUP



#### 5.3.6 EUT OPERATING CONDITIONS

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



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### 5.3.7 TEST RESULTS

#### 802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	16.39	0.5	PASS
157	5785	16.37	0.5	PASS
165	5825	16.39	0.5	PASS

#### 802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	17.63	17.63	16.97	0.5	PASS
157	5785	17.61	17.66	17.60	0.5	PASS
165	5825	17.61	17.60	17.62	0.5	PASS

#### 802.11n (HT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	36.34	36.44	36.37	0.5	PASS
159	5795	36.25	36.46	36.43	0.5	PASS

#### 802.11ac (VHT80)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
155	5775	76.08	75.77	75.68	0.5	PASS

## 5.4 CONDUCTED OUTPUT POWER MEASUREMENT

### 5.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

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

Array Gain = 0 dB (i.e., no array gain) for  $NANT \leq 4$ ;

Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any NANT;

Array Gain =  $5 \log(NANT/NSS)$  dB or 3 dB, whichever is less for 20-MHz channel widths with  $NANT \geq 5$ .

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

### 5.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Jan. 07, 2013

### 5.4.3 TEST PROCEDURES

Follow FCC KDB 558074 DTS test procedure:  
Measurement Procedure AVG1

1. Set the analyzer span to a minimum of 1.5 times the EBW.
2. Set RBW =1MHz.
3. Set the VBW  $\geq 3 \times$  RBW.
4. Number of measurement points in the sweep  $\geq 2 \times$  (span/RBW).
5. Sweep time = auto couple.
6. Detector = power averaging (RMS) or sample.
7. Employ trace averaging in power averaging (RMS) mode over a minimum of 100 traces.
8. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges.

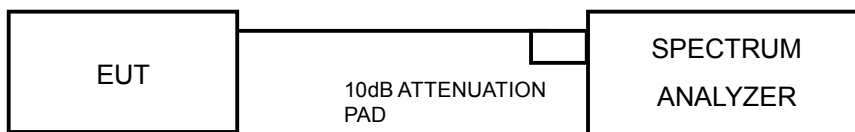


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#### 5.4.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 5.4.5 TEST SETUP



#### 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)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	121.060	20.83	30	PASS
157	5785	208.449	23.19	30	PASS
165	5825	160.694	22.06	30	PASS

### 802.11n (HT20)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	19.80	21.40	21.32	369.056	25.67	30	PASS
157	5785	22.94	22.54	21.61	521.139	27.17	30	PASS
165	5825	22.58	21.83	20.94	457.704	26.61	30	PASS

### 802.11n (HT40)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
151	5755	18.55	18.86	19.32	234.034	23.69	30	PASS
159	5795	20.94	20.93	20.80	368.271	25.66	30	PASS

### 802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
155	5775	16.97	17.34	17.86	165.068	22.18	30	PASS

## 5.5 POWER SPECTRAL DENSITY MEASUREMENT

### 5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Jan. 07, 2013

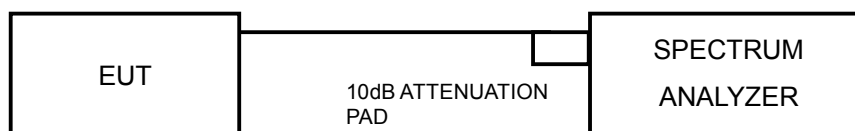
### 5.5.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW =10 kHz, Detector = power averaging (RMS) .
2. Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span/RBW}$
3. Sweep time = auto couple,
4. Employ trace averaging (RMS) mode over a minimum of 100 traces.
5. Use the peak marker function to determine the maximum amplitude level.

### 5.5.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.5.5 TEST SETUP



### 5.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



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## 5.5.7 TEST RESULTS

### 802.11a

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
149	5745	-4.32	8	PASS
157	5785	-1.80	8	PASS
165	5825	-2.95	8	PASS

### 802.11n (HT20)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-6.08	4.77	-1.31	6.24	PASS
	157	5785	-2.91	4.77	1.86	6.24	PASS
	165	5825	-3.32	4.77	1.45	6.24	PASS
1	149	5745	-3.92	4.77	0.85	6.24	PASS
	157	5785	-2.96	4.77	1.81	6.24	PASS
	165	5825	-3.52	4.77	1.25	6.24	PASS
2	149	5745	-4.07	4.77	0.70	6.24	PASS
	157	5785	-3.59	4.77	1.18	6.24	PASS
	165	5825	-4.40	4.77	0.37	6.24	PASS

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})/2] = 7.76 > 6\text{dBi}$ , so the power density limit shall be reduced to  $8 - (7.76 - 6) = 6.24$

### 802.11n (HT40)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	151	5755	-9.69	4.77	-4.92	6.24	PASS
	159	5795	-7.14	4.77	-2.37	6.24	PASS
1	151	5755	-9.52	4.77	-4.75	6.24	PASS
	159	5795	-7.16	4.77	-2.39	6.24	PASS
2	151	5755	-8.83	4.77	-4.06	6.24	PASS
	159	5795	-6.54	4.77	-1.77	6.24	PASS

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})/2] = 7.76 > 6\text{dBi}$ , so the power density limit shall be reduced to  $8 - (7.76 - 6) = 6.24$





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### 802.11ac (VHT80)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	155	5775	-13.67	4.77	-8.90	6.24	PASS
1	155	5775	-13.39	4.77	-8.62	6.24	PASS
2	155	5775	-12.93	4.77	-8.16	6.24	PASS

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 7.76 > 6\text{dBi}$  , so the power density limit shall be reduced to  $8 - (7.76 - 6) = 6.24$

## 5.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Jan. 07, 2013

### 5.6.3 TEST PROCEDURE

#### Measurement Procedure - Reference Level

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

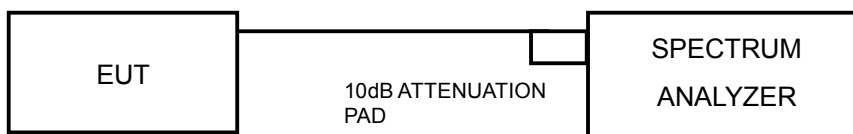
#### Measurement Procedure –Unwanted Emission Level

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

#### 5.6.4 DEVIATION FROM TEST STANDARD

No deviation

#### 5.6.5 TEST SETUP



#### 5.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 5.6.7 TEST RESULTS

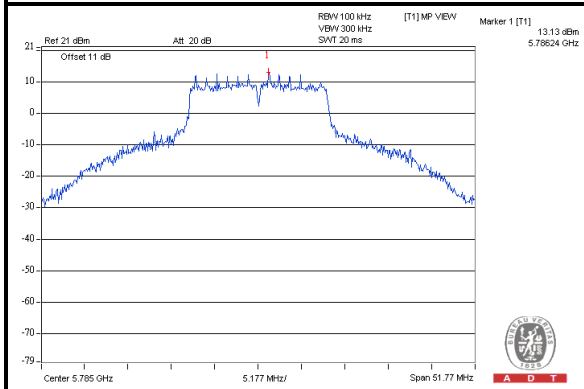
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.



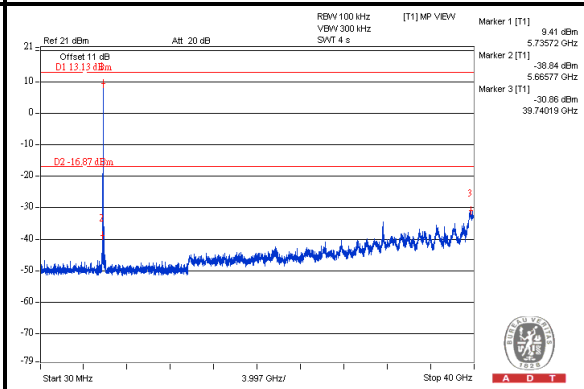
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### 802.11a

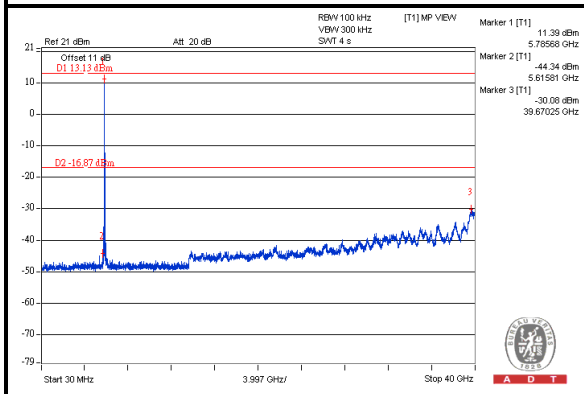
#### Maximum REF



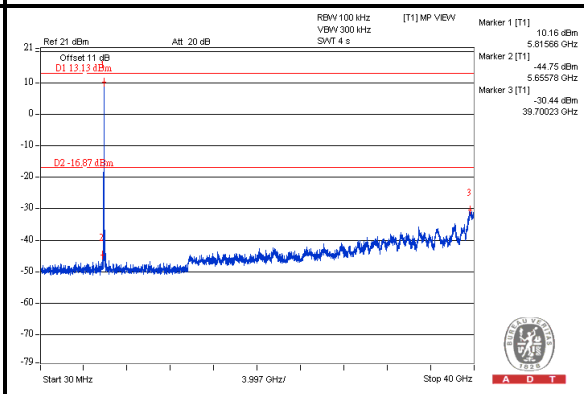
#### CH 149



#### CH 157



#### CH 165



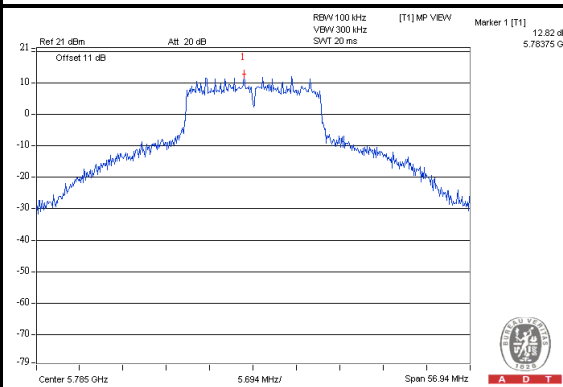


A D T

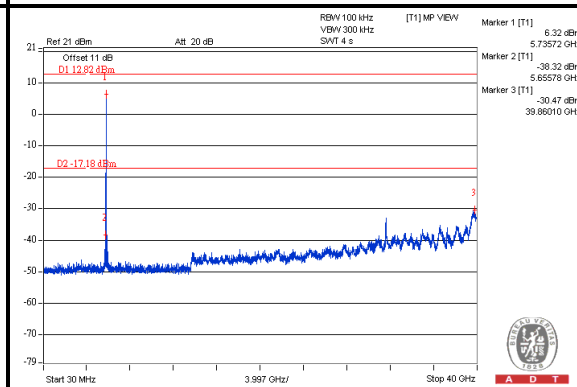
### 802.11n (HT20)

#### Chain(0)

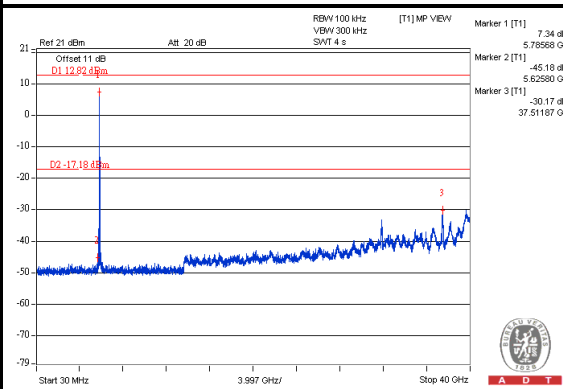
#### Maximum REF



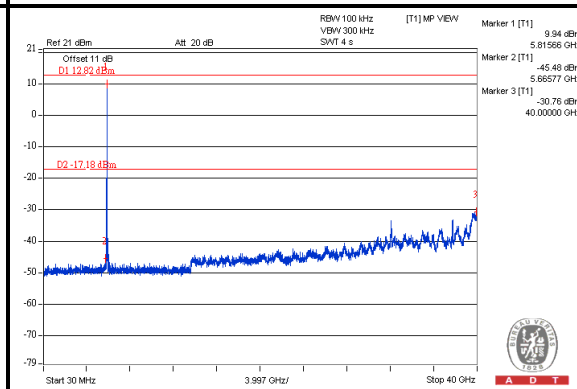
#### CH 149



#### CH 157



#### CH 165

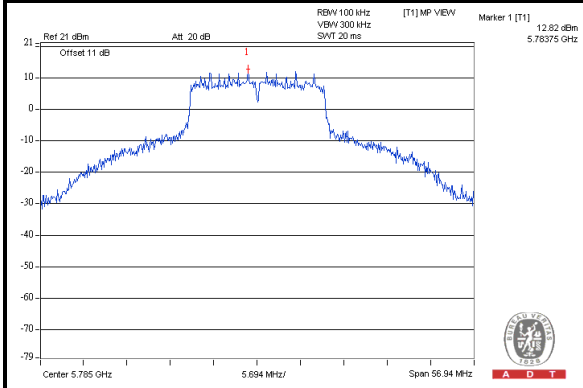




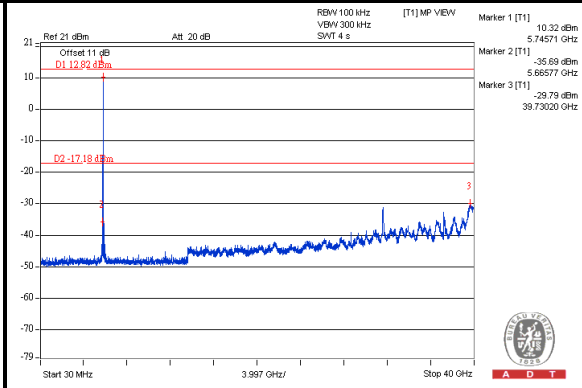
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### Chain(1)

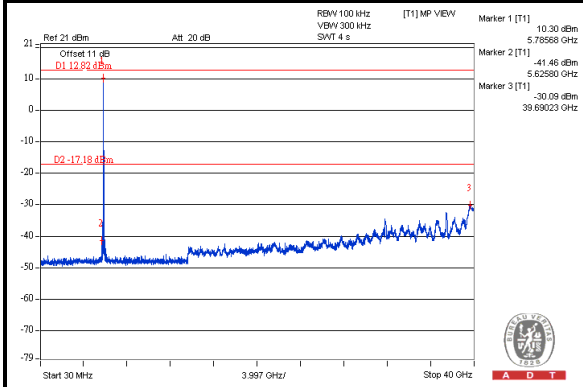
### Maximum REF



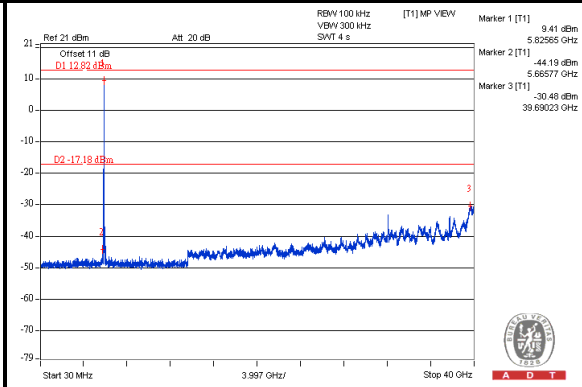
### CH 149



### CH 157



### CH 165

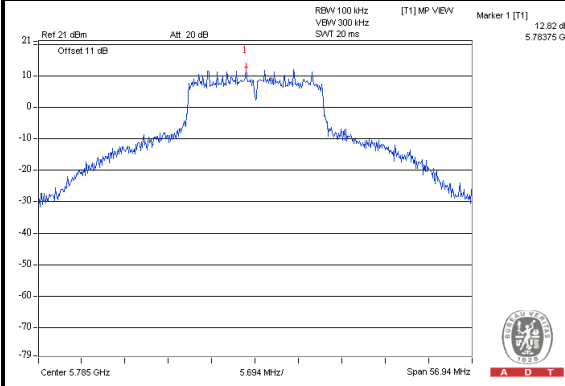




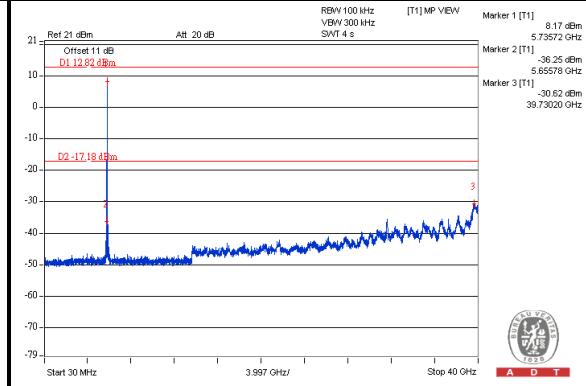
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### Chain(2)

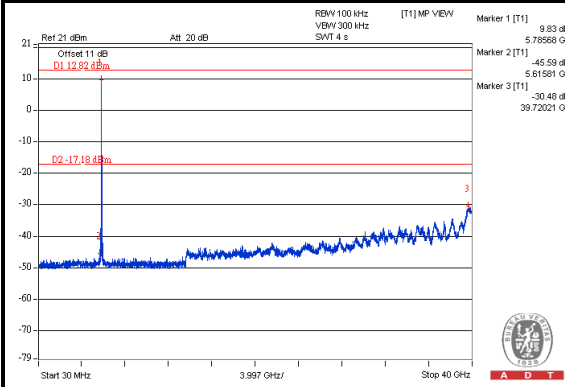
### Maximum REF



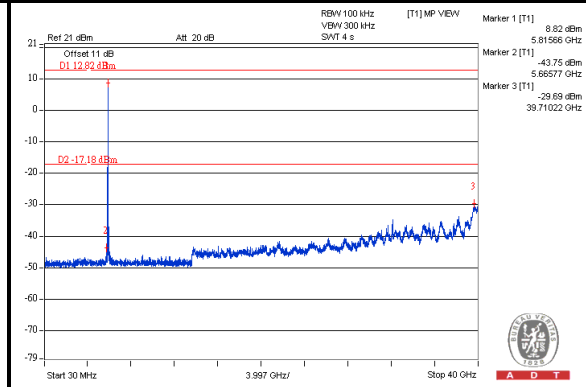
### CH 149



### CH 157



### CH 165



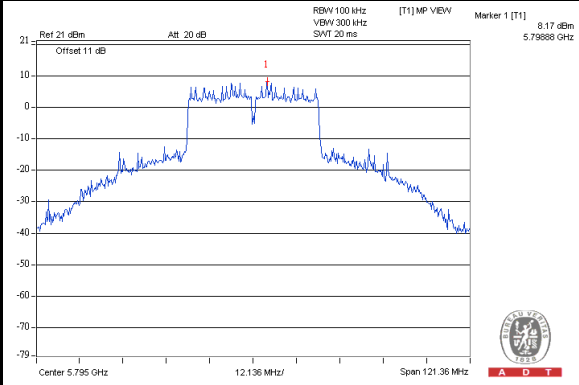


A D T

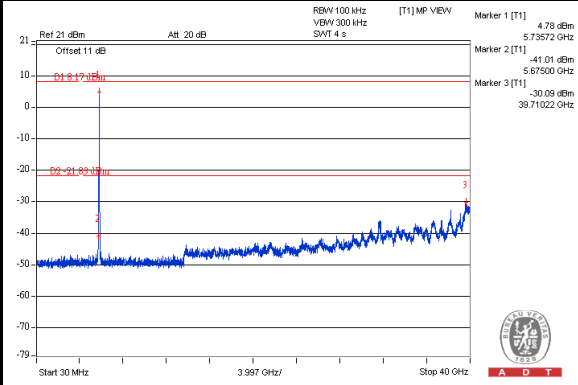
### 802.11n (HT40)

#### Chain(0)

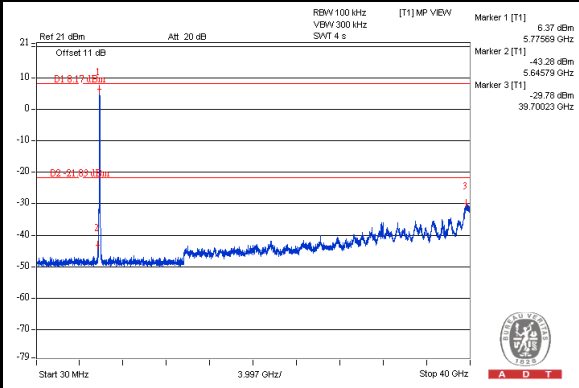
#### Maximum REF



#### CH 151



#### CH 159



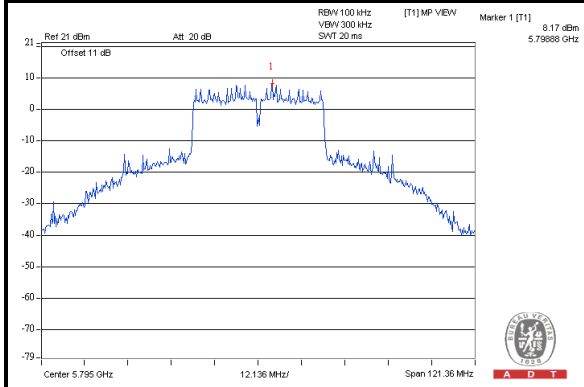




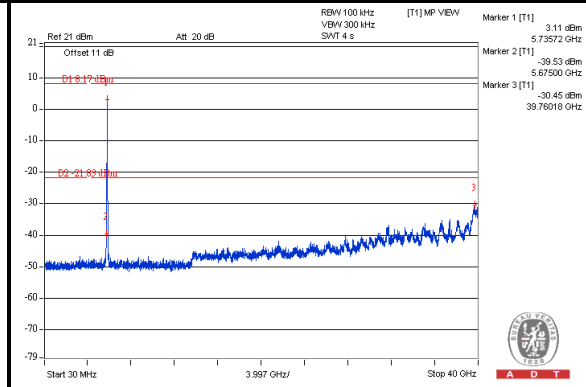
A D T

### Chain(1)

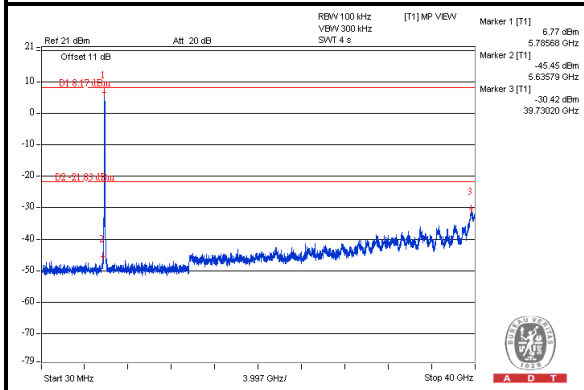
#### Maximum REF



#### CH 151



#### CH 159

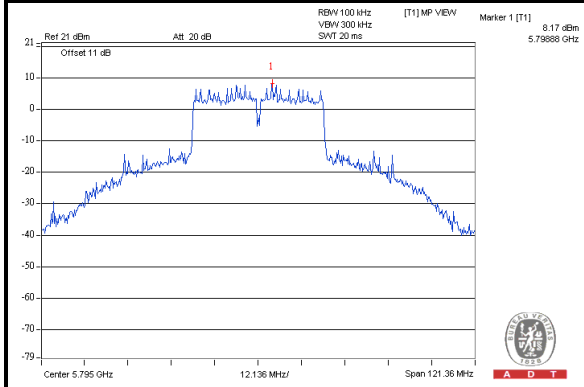




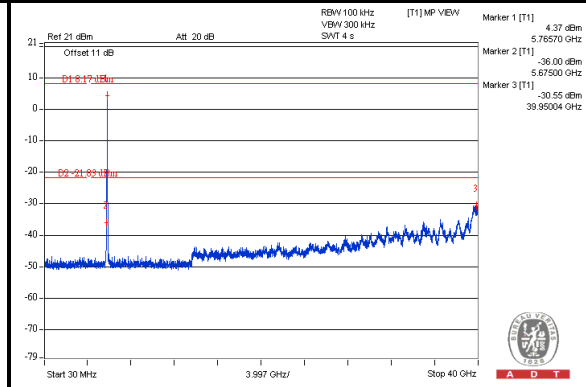
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### Chain(2)

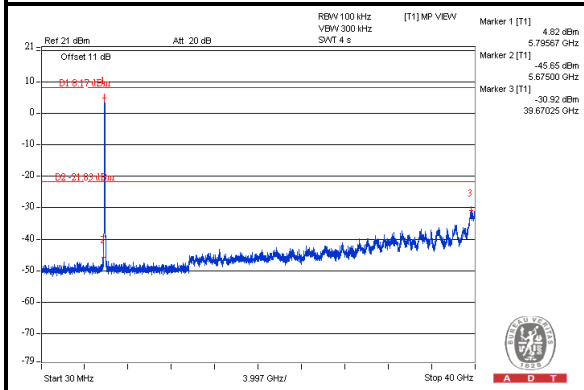
#### Maximum REF



#### CH 151



#### CH 159



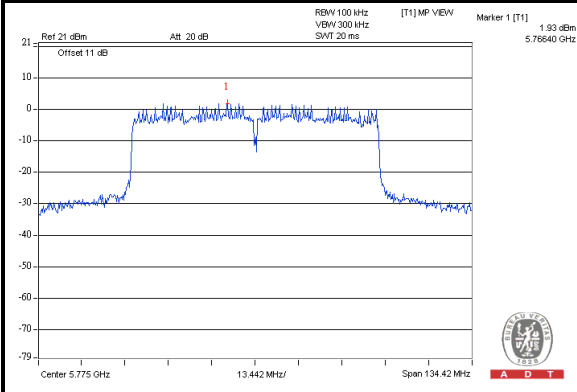


A D T

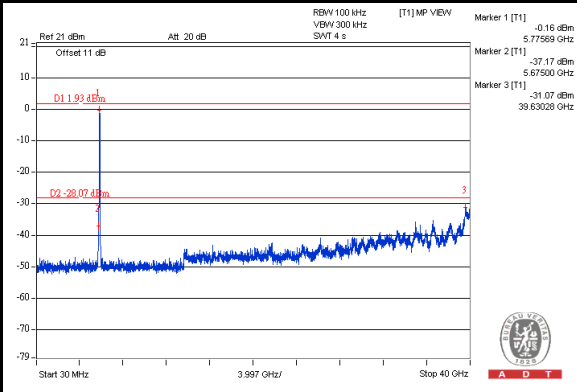
### 802.11ac (VHT80)

#### Chain(0)

##### Maximum REF

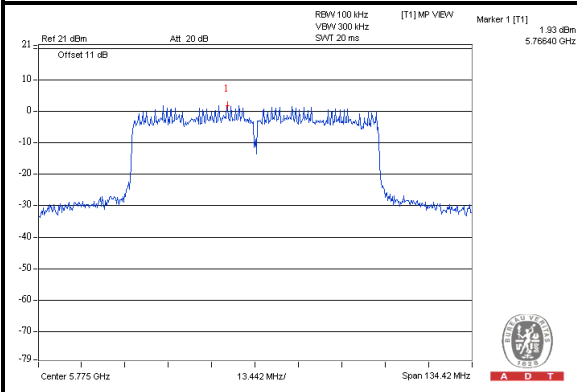


##### CH 155

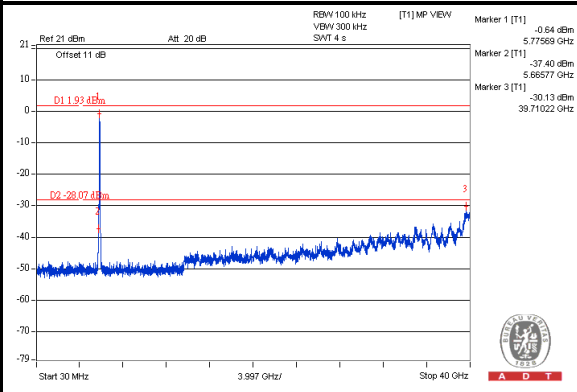


#### Chain(1)

##### Maximum REF

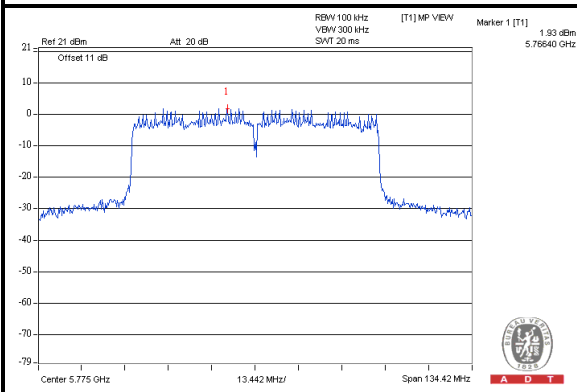


##### CH 155

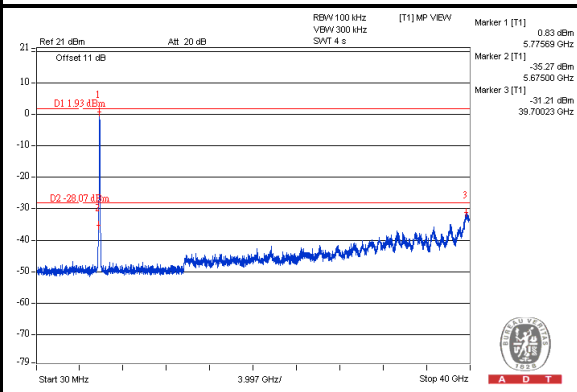


#### Chain(2)

##### Maximum REF



##### CH 155





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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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Tel: 886-2-26052180

Fax: 886-2-26052943

**Hsin Chu EMC/RF Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety/Telecom Lab:**

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

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

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



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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 ---