



# FCC TEST REPORT (15.247)

**REPORT NO.:** RF140407C14-3  
**MODEL NO.:** AST21,AST21MLA,AST21MPA,AST21MWA  
**FCC ID:** MSQAST21  
**RECEIVED:** Apr. 07, 2014  
**TESTED:** Apr. 22, 2014 ~ Jun. 11, 2014  
**ISSUED:** Jun. 16, 2014

**APPLICANT:** ASUSTek COMPUTER INC.

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**ISSUED BY:** Bureau Veritas Consumer Products Services  
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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140407C14-3	Original release	Jun. 16, 2014



## 1. CERTIFICATION

**PRODUCT:** ASUS Tablet  
**MODEL NO.:** AST21,AST21MLA,AST21MPA,AST21MWA  
**BRAND:** ASUS  
**APPLICANT:** ASUSTek COMPUTER INC.  
**TESTED:** Apr. 22, 2014 ~ Jun. 11, 2014  
**TEST SAMPLE:** Production Unit  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**  
ANSI C63.10-2009

The above equipment (model: AST21,AST21MLA,AST21MPA,AST21MWA) 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** : Evonne Liu , **DATE** : Jun. 16, 2014  
Evonne Liu / Specialist

**APPROVED BY** : Sam Chen , **DATE** : Jun. 16, 2014  
Sam Chen / Senior Project Engineer

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

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 -16.53dB at 0.91172MHz.
15.205 & 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.96dB at 2488MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

### 2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	ASUS Tablet
<b>MODEL NO.</b>	AST21,AST21MLA,AST21MPA,AST21MWA
<b>POWER SUPPLY</b>	5.2Vdc (adapter or host equipment) 3.8Vdc (Li-ion battery)
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>MODULATION TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11a: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to MCS7 802.11ac: up to V9
<b>OPERATING FREQUENCY</b>	<b>2.4GHz:</b> 2412 ~ 2462MHz <b>5.0GHz:</b> 5745 ~ 5825MHz
<b>NUMBER OF CHANNEL</b>	<b>2.4GHz:</b> 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) <b>5.0GHz:</b> 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 1 for 802.11ac (80MHz)
<b>OUTPUT POWER</b>	228.03mW for 2412 ~ 2462MHz 55.21mW for 5745 ~ 5825MHz
<b>ANTENNA TYPE</b>	<b>2.4GHz:</b> PIFA antenna with 0.92dBi gain <b>5.0GHz:</b> PIFA antenna with 1.27dBi gain
<b>ANTENNA CONNECTOR</b>	NA
<b>DATA CABLE</b>	Refer to Note as below
<b>I/O PORTS</b>	Refer to user's manual
<b>ACCESSORY DEVICES</b>	Refer to Note as below

**NOTE:**

1. The EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11a	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	1TX
802.11ac (80MHz)	1TX

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2. The EUT contains following accessory devices.

ITEM	BRAND	MODEL	SPECIFICATION
Adapter 1	ASUS	PA-1070-07	I/P: 100-240Vac, 50/60Hz, 0.25A O/P: 5.2Vdc, 1.35A
Adapter 2	ASUS	PSM06A-050Q	I/P: 100-240Vac, 50-60Hz, 0.25A O/P: 5.2Vdc, 1.35A
Adapter 3	ASUS	AD2005320	I/P: 100-240Vac, 50/60Hz, 0.25A O/P: 5.2Vdc, 1.35A
Battery	SMP	C11P1330 1S1P	3.8Vdc, 4000mAh
USB Cable 1	ASUS	L65U2009-CS-B	0.9m shielded cable
USB Cable 2	ASUS	AA781000	0.9m shielded cable
LCD Panel	AUO	AUO LCD (AUO/B080UAN01.3)	-
Photo Camera	Lite-On	12P2BA535	-
Video Camera	Lite-On	12P2SF181	-
CPU	Intel	MOOREFIELD FBGA-1064	2.3GHz 2MB
MainBoard	ASUS	V1.2	-
LTE Module	Intel	X-GOLD 716G PMB9923	-
BT/WLAN Module	BROADCOM	BCM4339	-

3. The above EUT information is 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

#### FOR 2.4GHz:

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

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 (40MHz):

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

#### FOR 5.0GHz (5745 ~ 5825MHz):

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

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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY
155	5775MHz



### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

#### WLAN 2.4GHz:

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

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

**NOTE:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.

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

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

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

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	1 to 11	11	OFDM	BPSK	MCS0

#### POWER LINE CONDUCTED EMISSION TEST:

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	1 to 11	11	OFDM	BPSK	MCS0



**BANDEDGE MEASUREMENT:**

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

**ANTENNA PORT CONDUCTED MEASUREMENT:**

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

**Test CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	Peter Weng
APCM	25deg. C, 65%RH	120Vac, 60Hz	David Huang



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**WLAN 5.0GHz (5745 ~ 5825MHz):**

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

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

**NOTE:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.

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

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	MCS0
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	MCS0
-	802.11ac (80MHz)	155	155	OFDM	BPSK	V0

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

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	149 to 165	149	OFDM	BPSK	MCS0

**POWER LINE CONDUCTED EMISSION TEST:**

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	149 to 165	149	OFDM	BPSK	MCS0

**BANDEDGE MEASUREMENT:**

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	MCS0
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	MCS0
-	802.11ac (80MHz)	155	155	OFDM	BPSK	V0

**ANTENNA PORT CONDUCTED MEASUREMENT:**

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	MCS0
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	MCS0
-	802.11ac (80MHz)	155	155	OFDM	BPSK	V0

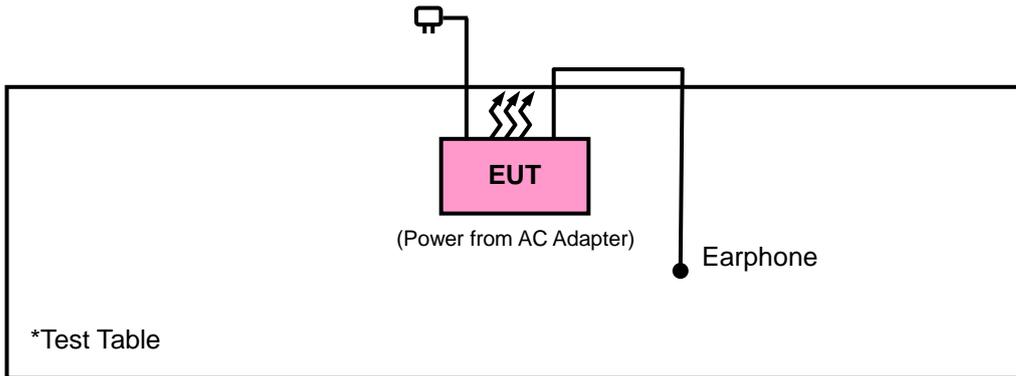
**Test CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	Peter Weng
APCM	25deg. C, 65%RH	120Vac, 60Hz	David Huang

### 3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units.

#### 3.3.1 CONFIGURATION OF SYSTEM UNDER TEST



### 3.4 DUTY CYCLE TEST SIGNAL

#### WLAN 2.4GHz

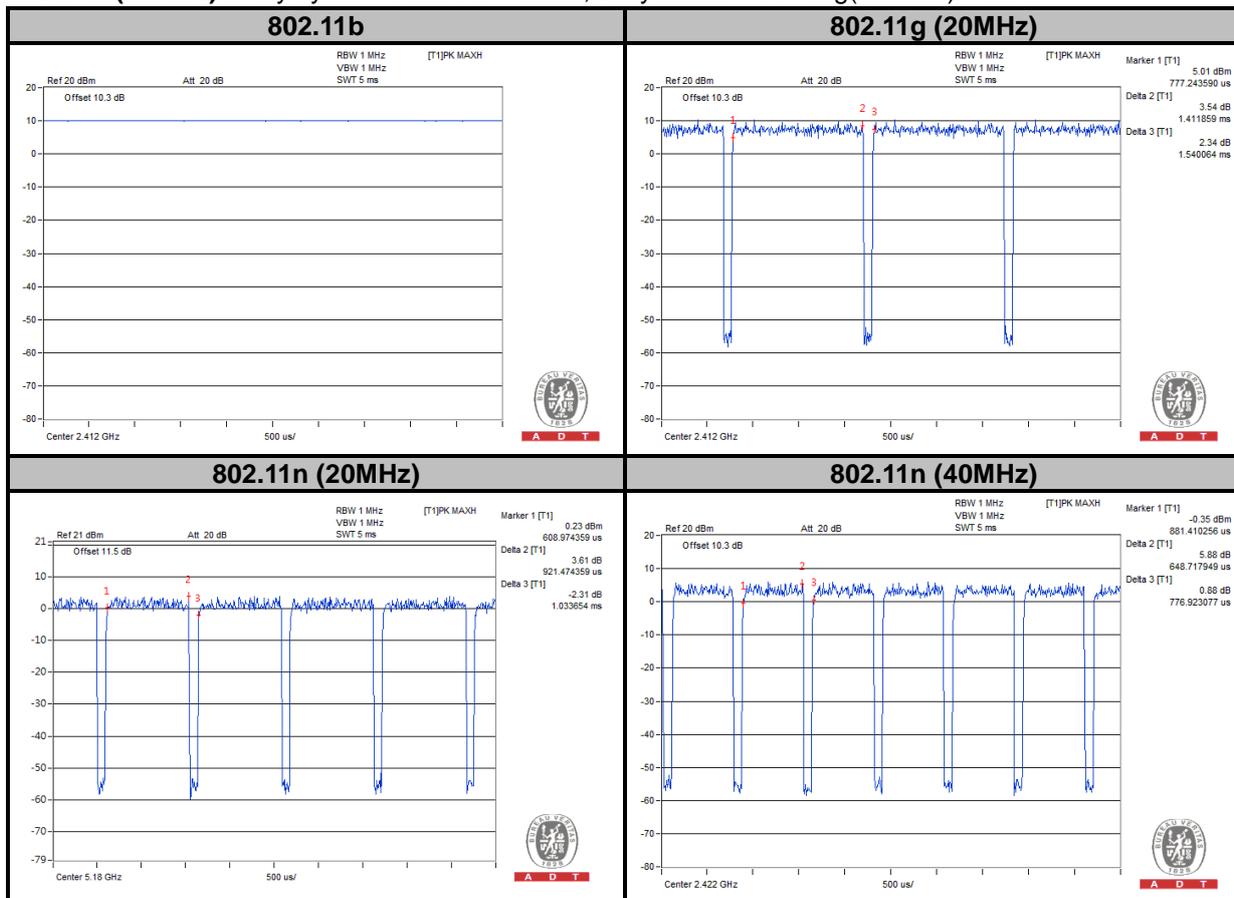
**802.11b:** Duty cycle of test signal is 100 %

Duty cycle is < 98%

**802.11g:** Duty cycle = 1.411/1.540 = 0.916, Duty factor =  $10 * \log(1/0.916) = 0.38$

**802.11n (20MHz):** Duty cycle = 1.338/1.450 = 0.835, Duty factor =  $10 * \log(1/0.835) = 0.78$

**802.11n (40MHz):** Duty cycle = 648/776 = 0.835, Duty factor =  $10 * \log(1/0.835) = 0.78$





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### 5725MHz ~ 5850MHz

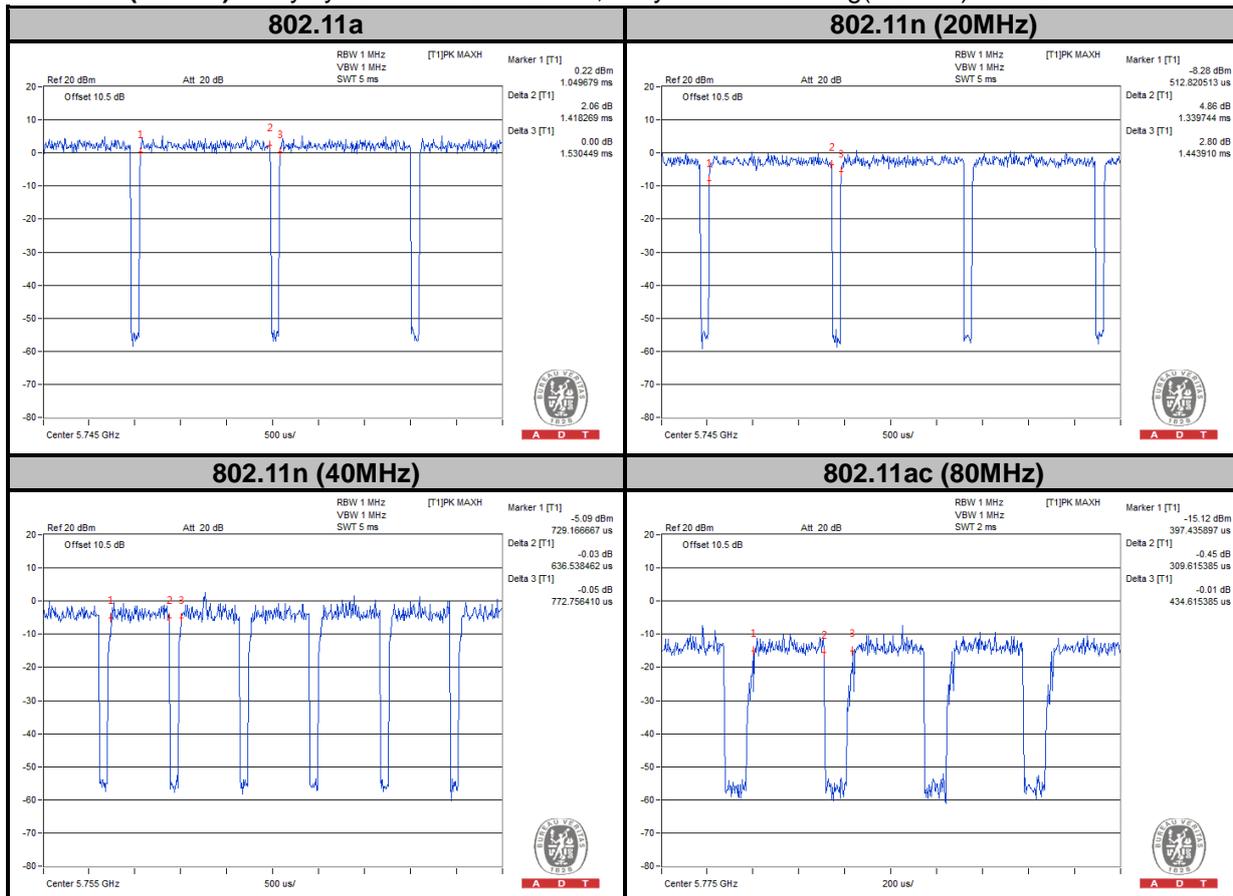
Duty cycle is < 98%

**802.11a:** Duty cycle = 1.418/1.530 = 0.926, Duty factor =  $10 * \log(1/0.926) = 0.33$

**802.11n (20MHz):** Duty cycle = 1.339/1.443 = 0.929, Duty factor =  $10 * \log(1/0.927) = 0.33$

**802.11n (40MHz):** Duty cycle = 636/772 = 0.823, Duty factor =  $10 * \log(1/0.823) = 0.85$

**802.11ac (80MHz):** Duty cycle = 309/434 = 0.712, Duty factor =  $10 * \log(1/0.712) = 1.48$



### 3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

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

**558074 D01 DTS Meas Guidance v03r01**

ANSI C63.10-2009

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

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

## 4. TEST TYPES AND RESULTS (FOR 2.4GHz BAND)

### 4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

#### 4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



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**4.1.2 TEST INSTRUMENTS**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver Agilent	N9038A	MY51210203	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 21, 2013	Dec. 20, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Feb. 27, 2014	Feb. 26, 2015
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Feb. 19, 2014	Feb. 18, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 18, 2013	Dec. 17, 2014
Loop Antenna	HFH2-Z2	100070	Mar. 06, 2014	Mar. 05, 2016
Preamplifier EMCI	EMC 012645	980115	Dec. 26, 2013	Dec. 25, 2014
Preamplifier EMCI	EMC 184045	980116	Jan. 13, 2014	Jan. 12, 2015
Preamplifier EMCI	EMC 330H	980112	Dec. 27, 2013	Dec. 26, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 18, 2013	Oct. 17, 2014
RF signal cable Worken	RG-213	NA	Nov. 07, 2013	Nov. 06, 2014
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Power Meter	ML2495A	1232002	Aug. 23, 2013	Aug. 22, 2014
Power Sensor	MA2411B	1207325	Aug. 23, 2013	Aug. 22, 2014

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
  3. The test was performed in HwaYa Chamber 10.
  4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  5. The FCC Site Registration No. is 690701.
  6. The IC Site Registration No. is IC 7450F-10.

#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Height of receiving 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**NOTE:**

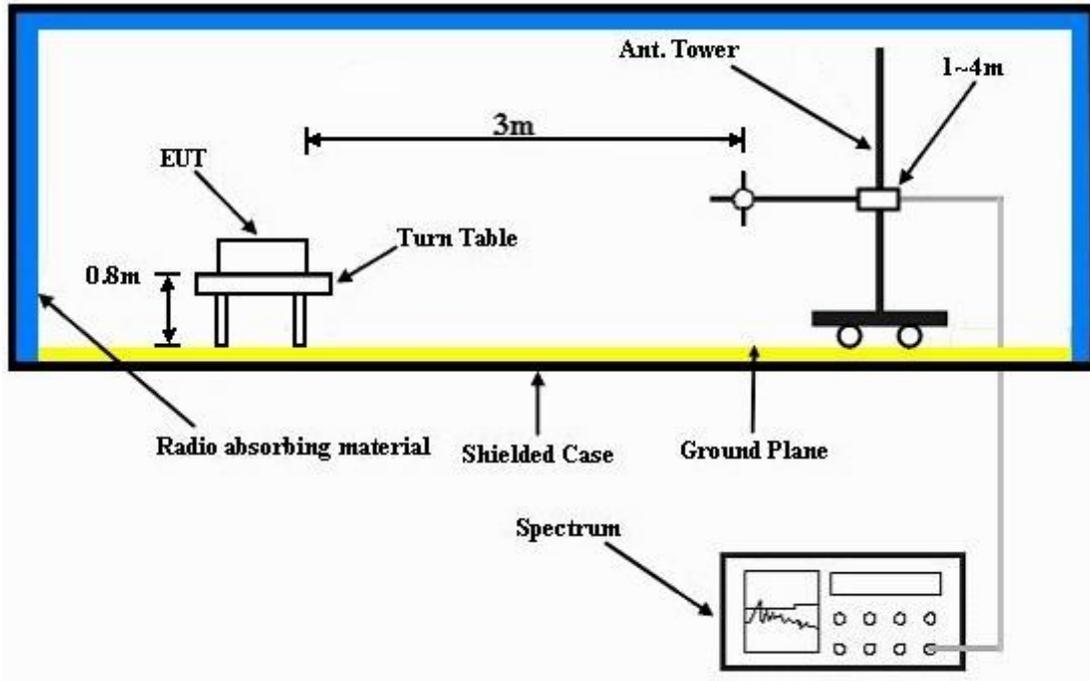
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 1kHz (Duty cycle < 98%) or 10Hz (Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 DEVIATION FROM TEST STANDARD

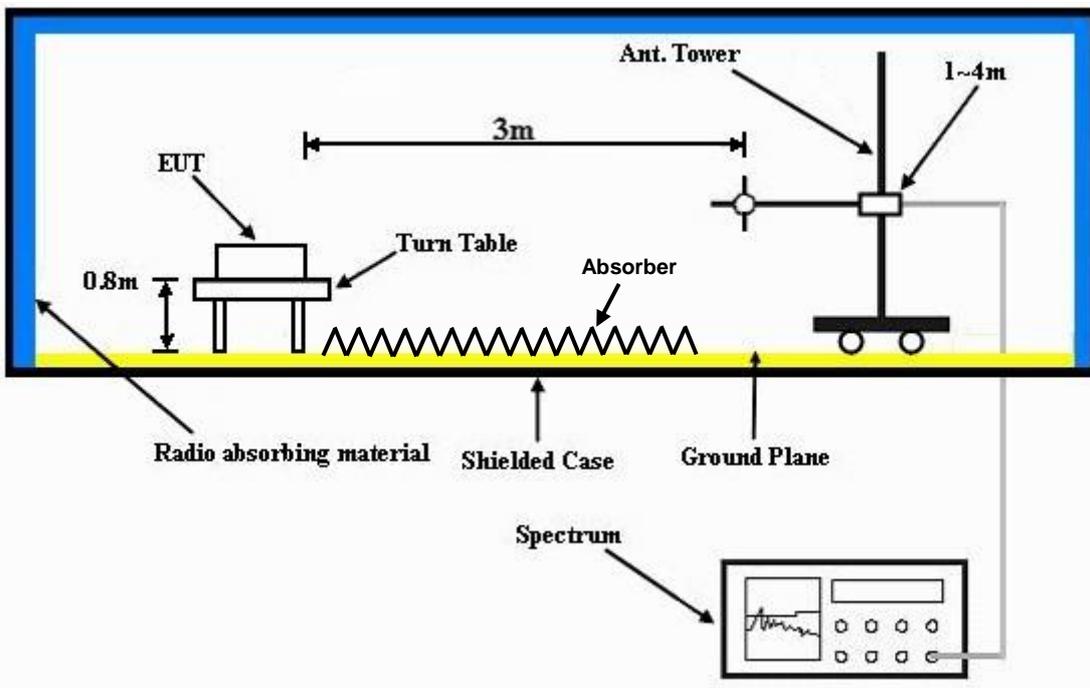
No deviation.

### 4.1.5 TEST SETUP

Frequency Range 30MHz ~ 1GHz



Frequency Range above 1GHz



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



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#### 4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.



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4.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	44.08	42.35	54	-9.92	31.8	5.4	35.47	163	204	Average
2390	55.28	53.55	74	-18.72	31.8	5.4	35.47	163	204	Peak
2412	100.65	98.88			31.81	5.43	35.47	163	204	Average
2412	104.51	102.74			31.81	5.43	35.47	163	204	Peak
2486	52.75	50.76	54	-1.25	31.88	5.53	35.42	163	204	Average
2486	60.63	58.64	74	-13.37	31.88	5.53	35.42	163	204	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2328	40.6	39.09	54	-13.4	31.73	5.3	35.52	103	8	Average
2328	56.76	55.25	74	-17.24	31.73	5.3	35.52	103	8	Peak
2412	96.81	95.04			31.81	5.43	35.47	103	8	Average
2412	100.51	98.74			31.81	5.43	35.47	103	8	Peak
2490	48.4	46.39	54	-5.6	31.9	5.53	35.42	103	8	Average
2490	58.38	56.37	74	-15.62	31.9	5.53	35.42	103	8	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2384	40.75	39.06	54	-13.25	31.78	5.4	35.49	135	234	Average
2384	56.91	55.22	74	-17.09	31.78	5.4	35.49	135	234	Peak
2437	102.41	100.56			31.85	5.46	35.46	135	234	Average
2437	105.95	104.1			31.85	5.46	35.46	135	234	Peak
2496	45	42.98	54	-9	31.9	5.53	35.41	135	234	Average
2496	56.89	54.87	74	-17.11	31.9	5.53	35.41	135	234	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2358	40.65	39.02	54	-13.35	31.76	5.37	35.5	103	8	Average
2358	56.12	54.49	74	-17.88	31.76	5.37	35.5	103	8	Peak
2437	98.78	96.93			31.85	5.46	35.46	103	8	Average
2437	102.22	100.37			31.85	5.46	35.46	103	8	Peak
2486	44	42.01	54	-10	31.88	5.53	35.42	103	8	Average
2486	56.09	54.1	74	-17.91	31.88	5.53	35.42	103	8	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2388	42.76	41.05	54	-11.24	31.8	5.4	35.49	135	234	Average
2388	57.22	55.51	74	-16.78	31.8	5.4	35.49	135	234	Peak
2462	101.89	99.96			31.87	5.5	35.44	135	234	Average
2462	105.57	103.64			31.87	5.5	35.44	135	234	Peak
2483.5	46.25	44.29	54	-7.75	31.88	5.5	35.42	135	234	Average
2483.5	59.21	57.25	74	-14.79	31.88	5.5	35.42	135	234	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2344	40.65	39.08	54	-13.35	31.74	5.33	35.5	107	8	Average
2344	55.77	54.2	74	-18.23	31.74	5.33	35.5	107	8	Peak
2462	99.12	97.19			31.87	5.5	35.44	107	8	Average
2462	102.15	100.22			31.87	5.5	35.44	107	8	Peak
2483.5	43.95	41.99	54	-10.05	31.88	5.5	35.42	107	8	Average
2483.5	56.5	54.54	74	-17.5	31.88	5.5	35.42	107	8	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.



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802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	47.16	45.43	54	-6.84	31.8	5.4	35.47	163	212	Average
2390	67.34	65.61	74	-6.66	31.8	5.4	35.47	163	212	Peak
2412	97.81	96.04			31.81	5.43	35.47	163	212	Average
2412	107.4	105.63			31.81	5.43	35.47	163	212	Peak
2492	50.07	48.05	54	-3.93	31.9	5.53	35.41	163	212	Average
2492	62.16	60.14	74	-11.84	31.9	5.53	35.41	163	212	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	47.88	46.15	54	-6.12	31.8	5.4	35.47	101	7	Average
2390	66.05	64.32	74	-7.95	31.8	5.4	35.47	101	7	Peak
2412	95.44	93.67			31.81	5.43	35.47	101	7	Average
2412	104.48	102.71			31.81	5.43	35.47	101	7	Peak
2490	48	45.99	54	-6	31.9	5.53	35.42	101	7	Average
2490	58.83	56.82	74	-15.17	31.9	5.53	35.42	101	7	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	41.76	40.03	54	-12.24	31.8	5.4	35.47	163	204	Average
2390	56.8	55.07	74	-17.2	31.8	5.4	35.47	163	204	Peak
2437	99.67	97.82			31.85	5.46	35.46	163	204	Average
2437	109.3	107.45			31.85	5.46	35.46	163	204	Peak
2483.5	47.74	45.78	54	-6.26	31.88	5.5	35.42	163	204	Average
2483.5	60.24	58.28	74	-13.76	31.88	5.5	35.42	163	204	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	39.76	38.03	54	-14.24	31.8	5.4	35.47	100	4	Average
2390	55.58	53.85	74	-18.42	31.8	5.4	35.47	100	4	Peak
2437	95.55	93.7			31.85	5.46	35.46	100	4	Average
2437	104.85	103			31.85	5.46	35.46	100	4	Peak
2483.5	42.05	40.09	54	-11.95	31.88	5.5	35.42	100	4	Average
2483.5	57.29	55.33	74	-16.71	31.88	5.5	35.42	100	4	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2388	40.72	39.01	54	-13.28	31.8	5.4	35.49	160	231	Average
2388	57.12	55.41	74	-16.88	31.8	5.4	35.49	160	231	Peak
2462	98.33	96.4			31.87	5.5	35.44	160	231	Average
2462	108.22	106.29			31.87	5.5	35.44	160	231	Peak
2483.5	47.85	45.89	54	-6.15	31.88	5.5	35.42	160	231	Average
2483.5	70.98	69.02	74	-3.02	31.88	5.5	35.42	160	231	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2378	39.67	38.01	54	-14.33	31.78	5.37	35.49	100	8	Average
2378	55.81	54.15	74	-18.19	31.78	5.37	35.49	100	8	Peak
2462	95.22	93.29			31.87	5.5	35.44	100	8	Average
2462	105.14	103.21			31.87	5.5	35.44	100	8	Peak
2483.5	46.95	44.99	54	-7.05	31.88	5.5	35.42	100	8	Average
2483.5	70	68.04	74	-4	31.88	5.5	35.42	100	8	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.



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802.11n (20MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	49.55	47.82	54	-4.45	31.8	5.4	35.47	163	204	Average
2390	72.21	70.48	74	-1.79	31.8	5.4	35.47	163	204	Peak
2412	97.91	96.14			31.81	5.43	35.47	163	204	Average
2412	106.54	104.77			31.81	5.43	35.47	163	204	Peak
2483.5	47.31	45.35	54	-6.69	31.88	5.5	35.42	163	204	Average
2483.5	58.76	56.8	74	-15.24	31.88	5.5	35.42	163	204	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	47.95	46.22	54	-6.05	31.8	5.4	35.47	100	356	Average
2390	65.05	63.32	74	-8.95	31.8	5.4	35.47	100	356	Peak
2412	94.8	93.03			31.81	5.43	35.47	100	356	Average
2412	104.65	102.88			31.81	5.43	35.47	100	356	Peak
2494	48	45.98	54	-6	31.9	5.53	35.41	100	356	Average
2494	58.04	56.02	74	-15.96	31.9	5.53	35.41	100	356	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	44.76	43.03	54	-9.24	31.8	5.4	35.47	163	204	Average
2390	56.14	54.41	74	-17.86	31.8	5.4	35.47	163	204	Peak
2437	97.98	96.13			31.85	5.46	35.46	163	204	Average
2437	106.89	105.04			31.85	5.46	35.46	163	204	Peak
2483.5	46.24	44.28	54	-7.76	31.88	5.5	35.42	163	204	Average
2483.5	57.49	55.53	74	-16.51	31.88	5.5	35.42	163	204	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	43.72	41.99	54	-10.28	31.8	5.4	35.47	100	356	Average
2390	57.09	55.36	74	-16.91	31.8	5.4	35.47	100	356	Peak
2437	95.98	94.13			31.85	5.46	35.46	100	356	Average
2437	104.45	102.6			31.85	5.46	35.46	100	356	Peak
2488	45	42.99	54	-9	31.9	5.53	35.42	100	356	Average
2488	59.29	57.28	74	-14.71	31.9	5.53	35.42	100	356	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2314	42.58	41.09	54	-11.42	31.71	5.3	35.52	163	213	Average
2314	56.81	55.32	74	-17.19	31.71	5.3	35.52	163	213	Peak
2462	94.22	92.29			31.87	5.5	35.44	163	213	Average
2462	103.22	101.29			31.87	5.5	35.44	163	213	Peak
2488	43.68	41.67	54	-10.32	31.9	5.53	35.42	163	213	Average
2488	73.04	71.03	74	-0.96	31.9	5.53	35.42	163	213	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2382	40.75	39.06	54	-13.25	31.78	5.4	35.49	100	355	Average
2382	55.55	53.86	74	-18.45	31.78	5.4	35.49	100	355	Peak
2462	90.23	88.3			31.87	5.5	35.44	100	355	Average
2462	99.32	97.39			31.87	5.5	35.44	100	355	Peak
2488	42.96	40.95	54	-11.04	31.9	5.53	35.42	100	355	Average
2488	57.28	55.27	74	-16.72	31.9	5.53	35.42	100	355	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.



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## 802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.85	51.12	54	-1.15	31.8	5.4	35.47	163	211	Average
2390	66.88	65.15	74	-7.12	31.8	5.4	35.47	163	211	Peak
2422	95.12	93.32			31.83	5.43	35.46	163	211	Average
2422	104	102.2			31.83	5.43	35.46	163	211	Peak
2500	47.29	45.27	54	-6.71	31.9	5.53	35.41	163	211	Average
2500	59.39	57.37	74	-14.61	31.9	5.53	35.41	163	211	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	49.76	48.03	54	-4.24	31.8	5.4	35.47	100	357	Average
2390	63.99	62.26	74	-10.01	31.8	5.4	35.47	100	357	Peak
2422	90.12	88.32			31.83	5.43	35.46	100	357	Average
2422	99.36	97.56			31.83	5.43	35.46	100	357	Peak
2492	43	40.98	54	-11	31.9	5.53	35.41	100	357	Average
2492	57.95	55.93	74	-16.05	31.9	5.53	35.41	100	357	Peak

## REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2422MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	49.53	47.8	54	-4.47	31.8	5.4	35.47	163	210	Average
2390	64.9	63.17	74	-9.1	31.8	5.4	35.47	163	210	Peak
2437	95.42	93.57			31.85	5.46	35.46	163	210	Average
2437	105.32	103.47			31.85	5.46	35.46	163	210	Peak
2486	50.4	48.41	54	-3.6	31.88	5.53	35.42	163	210	Average
2486	72.21	70.22	74	-1.79	31.88	5.53	35.42	163	210	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2388	47.76	46.05	54	-6.24	31.8	5.4	35.49	100	356	Average
2388	63.87	62.16	74	-10.13	31.8	5.4	35.49	100	356	Peak
2437	91.45	89.6			31.85	5.46	35.46	100	356	Average
2437	100.51	98.66			31.85	5.46	35.46	100	356	Peak
2486	48.31	46.32	54	-5.69	31.88	5.53	35.42	100	356	Average
2486	64.93	62.94	74	-9.07	31.88	5.53	35.42	100	356	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	44.06	42.33	54	-9.94	31.8	5.4	35.47	161	212	Average
2390	56.82	55.09	74	-17.18	31.8	5.4	35.47	161	212	Peak
2452	94.28	92.41			31.85	5.46	35.44	161	212	Average
2452	103.88	102.01			31.85	5.46	35.44	161	212	Peak
2490	49.97	47.96	54	-4.03	31.9	5.53	35.42	161	212	Average
2490	72.94	70.93	74	-1.06	31.9	5.53	35.42	161	212	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2378	42.71	41.05	54	-11.29	31.78	5.37	35.49	100	356	Average
2378	56.06	54.4	74	-17.94	31.78	5.37	35.49	100	356	Peak
2452	90.18	88.31			31.85	5.46	35.44	100	356	Average
2452	99.66	97.79			31.85	5.46	35.44	100	356	Peak
2488	48	45.99	54	-6	31.9	5.53	35.42	100	356	Average
2488	68.03	66.02	74	-5.97	31.9	5.53	35.42	100	356	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2452MHz: Fundamental frequency.



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**BELOW 1GHz WORST-CASE DATA:**

**802.11n (20MHz)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
96.42	24	45.34	43.5	-19.5	9.42	1.28	32.04	123	221	Peak
144.21	32.79	54.01	43.5	-10.71	9.67	1.38	32.27	175	54	Peak
175.8	34.94	55.35	43.5	-8.56	10.22	1.61	32.24	125	285	Peak
476.4	29.36	40.02	46	-16.64	18.9	2.56	32.12	100	122	Peak
598.9	25.93	34.15	46	-20.07	21.1	2.87	32.19	100	45	Peak
911.1	28.76	30.91	46	-17.24	25.72	3.53	31.4	100	332	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
31.62	25.58	40.53	40	-14.42	16.57	0.74	32.26	152	323	Peak
75.63	21.41	44.25	40	-18.59	8.27	1.11	32.22	135	175	Peak
175.53	25.75	46.16	43.5	-17.75	10.22	1.61	32.24	125	222	Peak
476.4	26.56	37.22	46	-19.44	18.9	2.56	32.12	100	152	Peak
629	24.65	31.79	46	-21.35	22.1	2.93	32.17	100	253	Peak
711.6	26.36	32.12	46	-19.64	23.23	3.11	32.1	100	166	Peak

**REMARKS:** Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

## 4.2 CONDUCTED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ 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 0.50MHz.
  3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Nov. 17, 2013	Nov. 16, 2014
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 23, 2013	Dec. 22, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 08, 2013	Jul. 07, 2014
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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

#### 4.2.3 TEST PROCEDURES

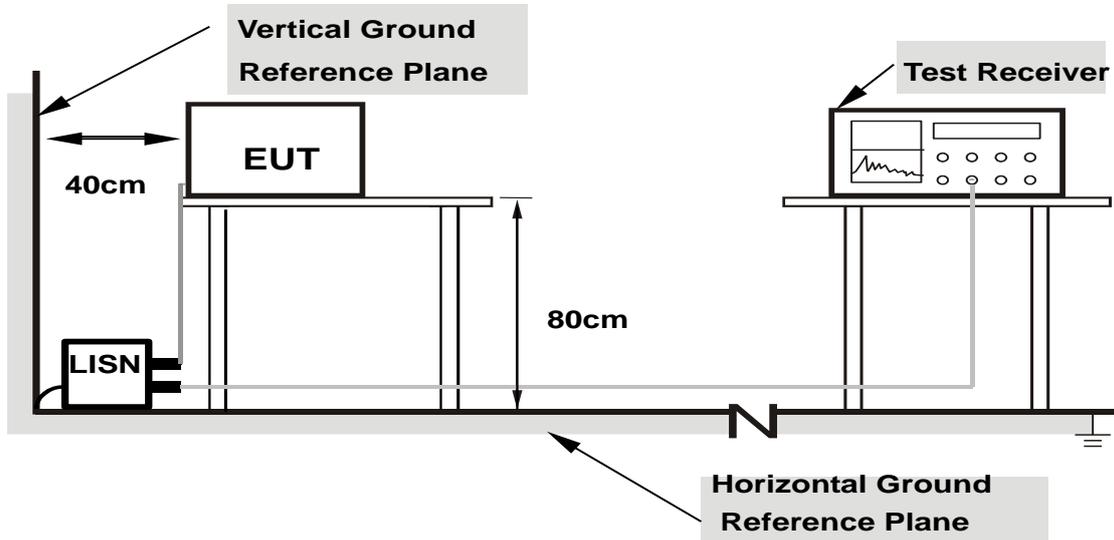
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.2.5 TEST SETUP



- Note:**
- 1.Support units were connected to second LISN.
  - 2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

#### 4.2.6 EUT OPERATING CONDITIONS

Same as section 4.1.6.



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#### 4.2.7 TEST RESULTS

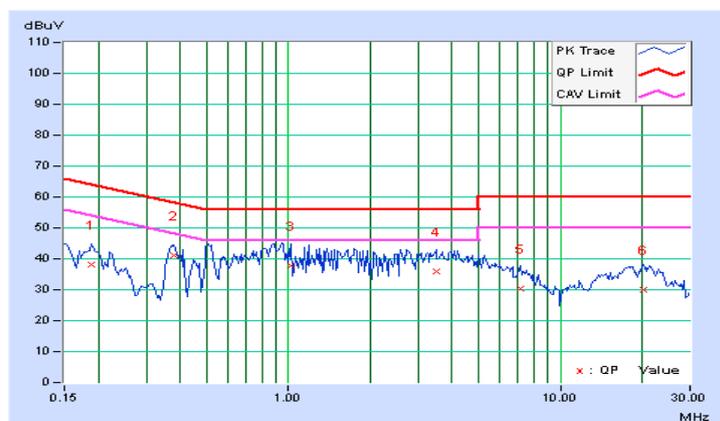
##### CONDUCTED WORST-CASE DATA :

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 9kHz Average (AV), 9kHz
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Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18906	0.28	37.99	24.56	38.27	24.84	64.08	54.08	-25.81	-29.24
2	0.38047	0.30	40.69	29.91	40.99	30.21	58.27	48.27	-17.28	-18.06
3	1.01563	0.34	37.41	24.36	37.75	24.70	56.00	46.00	-18.25	-21.30
4	3.50781	0.41	35.52	24.02	35.93	24.43	56.00	46.00	-20.07	-21.57
5	7.11719	0.47	30.03	16.84	30.50	17.31	60.00	50.00	-29.50	-32.69
6	20.33203	0.59	29.28	19.05	29.87	19.64	60.00	50.00	-30.13	-30.36

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





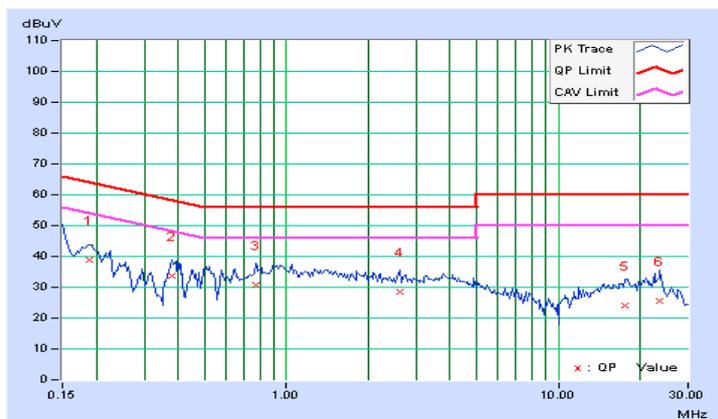
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Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 9kHz Average (AV), 9kHz
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18906	0.28	38.50	22.03	38.78	22.31	64.08	54.08	-25.30	-31.77
2	0.38047	0.30	33.28	24.50	33.58	24.80	58.27	48.27	-24.69	-23.47
3	0.77500	0.33	30.51	21.20	30.84	21.53	56.00	46.00	-25.16	-24.47
4	2.61328	0.39	28.15	19.51	28.54	19.90	56.00	46.00	-27.46	-26.10
5	17.57031	0.60	23.54	21.03	24.14	21.63	60.00	50.00	-35.86	-28.37
6	23.64063	0.59	24.82	14.33	25.41	14.92	60.00	50.00	-34.59	-35.08

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

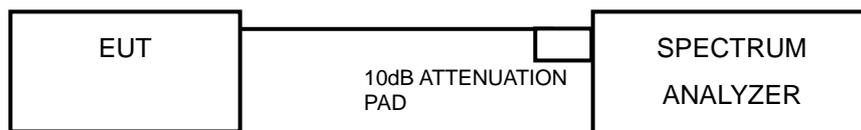


## 4.3 6dB BANDWIDTH MEASUREMENT

### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

### 4.3.2 TEST SETUP



### 4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.3.4 TEST PROCEDURE

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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

### 4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at 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	7.60	0.5	PASS
6	2437	8.06	0.5	PASS
11	2462	8.08	0.5	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.39	0.5	PASS
6	2437	16.42	0.5	PASS
11	2462	16.39	0.5	PASS

##### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.63	0.5	PASS
6	2437	17.65	0.5	PASS
11	2462	17.65	0.5	PASS

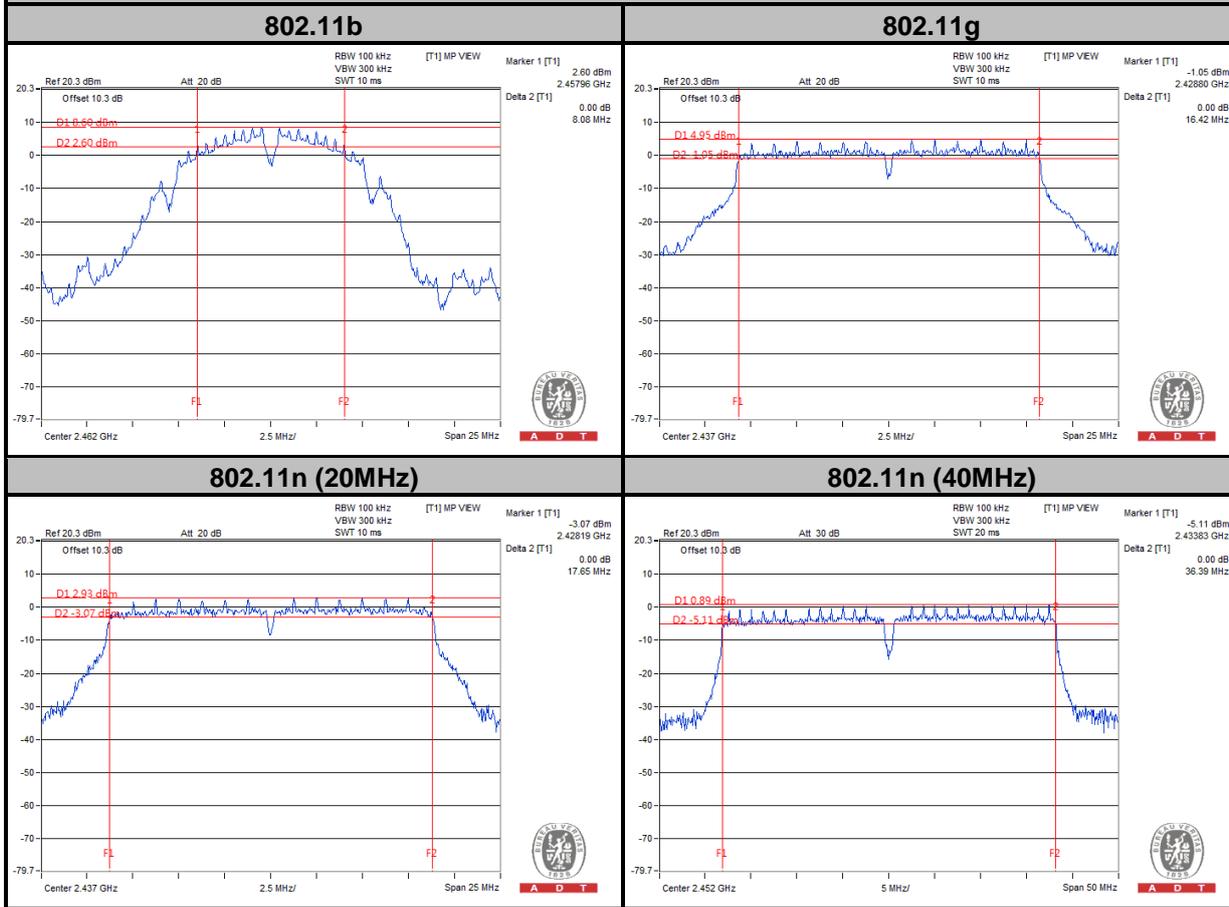
##### 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	36.19	0.5	PASS
6	2437	35.86	0.5	PASS
9	2452	36.39	0.5	PASS



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### SPECTRUM PLOT OF WORST VALUE



## 4.4 CONDUCTED OUTPUT POWER

### 4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

### 4.4.2 TEST SETUP



### 4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.4.4 TEST PROCEDURES

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

### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.4.6 EUT OPERATING CONDITIONS

Same as section 4.3.6.



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#### 4.4.7 TEST RESULTS

##### 802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
1	2412	79.80	19.02	30	PASS
6	2437	84.53	19.27	30	PASS
11	2462	87.30	19.41	30	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
1	2412	214.78	23.32	30	PASS
6	2437	221.82	23.46	30	PASS
11	2462	228.03	23.58	30	PASS

##### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
1	2412	207.49	23.17	30	PASS
6	2437	213.80	23.3	30	PASS
11	2462	217.77	23.38	30	PASS

##### 802.11n (40MHz)

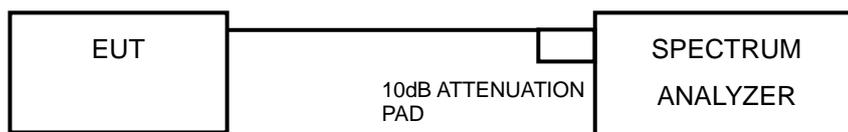
CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
3	2422	209.89	23.22	30	PASS
6	2437	208.45	23.19	30	PASS
9	2452	211.84	23.26	30	PASS

## 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 SETUP



### 4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 TEST PROCEDURE

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

### 4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.5.6 EUT OPERATING CONDITION

Same as section 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	-4.49	8	PASS
6	2437	-5.59	8	PASS
11	2462	-4.70	8	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
1	2412	-8.44	8	PASS
6	2437	-8.67	8	PASS
11	2462	-9.35	8	PASS

##### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
1	2412	-11.49	8	PASS
6	2437	-10.91	8	PASS
11	2462	-9.75	8	PASS

##### 802.11n (40MHz)

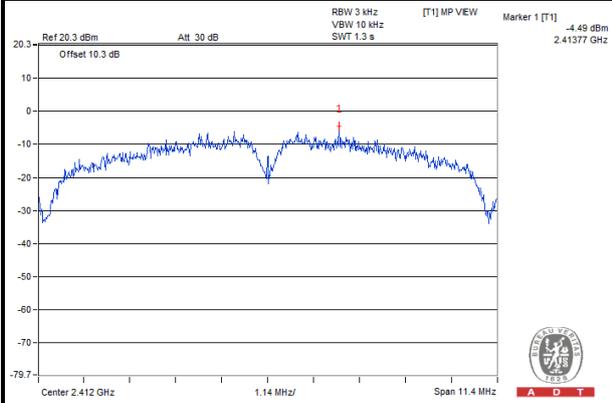
CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
3	2422	-13.83	8	PASS
6	2437	-13.94	8	PASS
9	2452	-13.56	8	PASS



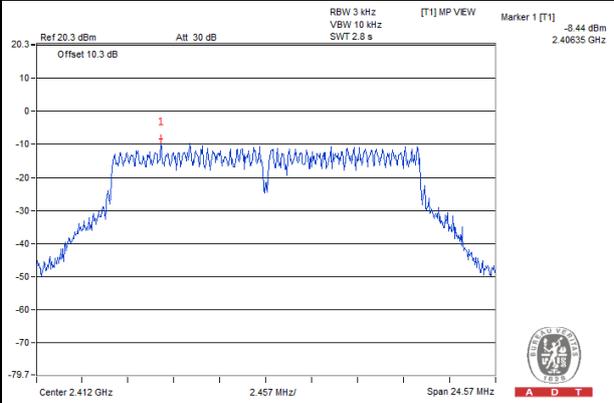
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### SPECTRUM PLOT OF WORST VALUE

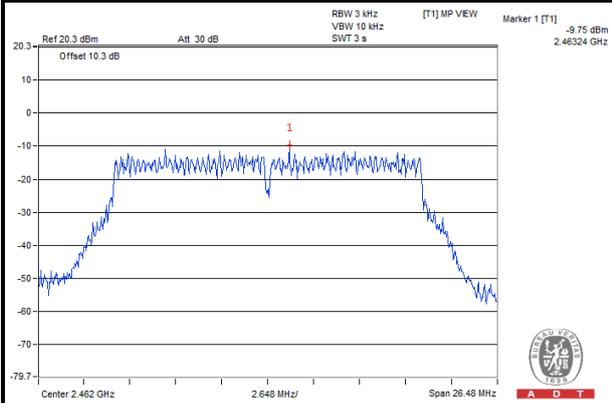
#### 802.11b



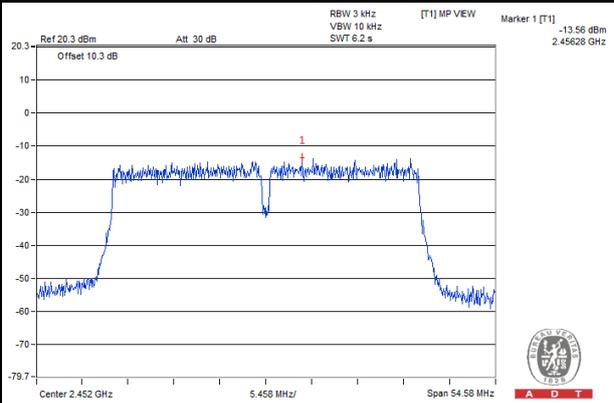
#### 802.11g



#### 802.11n (20MHz)



#### 802.11n (40MHz)

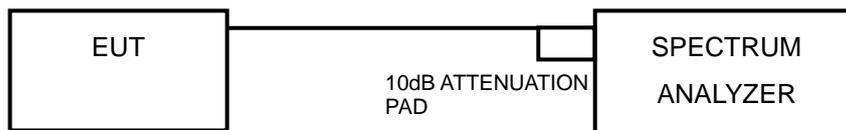


## 4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 TEST SETUP



### 4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 TEST PROCEDURE

#### MEASUREMENT PROCEDURE REF

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 OOB

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Ensure that the number of measurement points  $\geq$  span/RBW
4. According to measurement points to set differ measurement span.
5. Detector = peak.
6. Trace Mode = max hold.
7. Sweep = auto couple.

### 4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

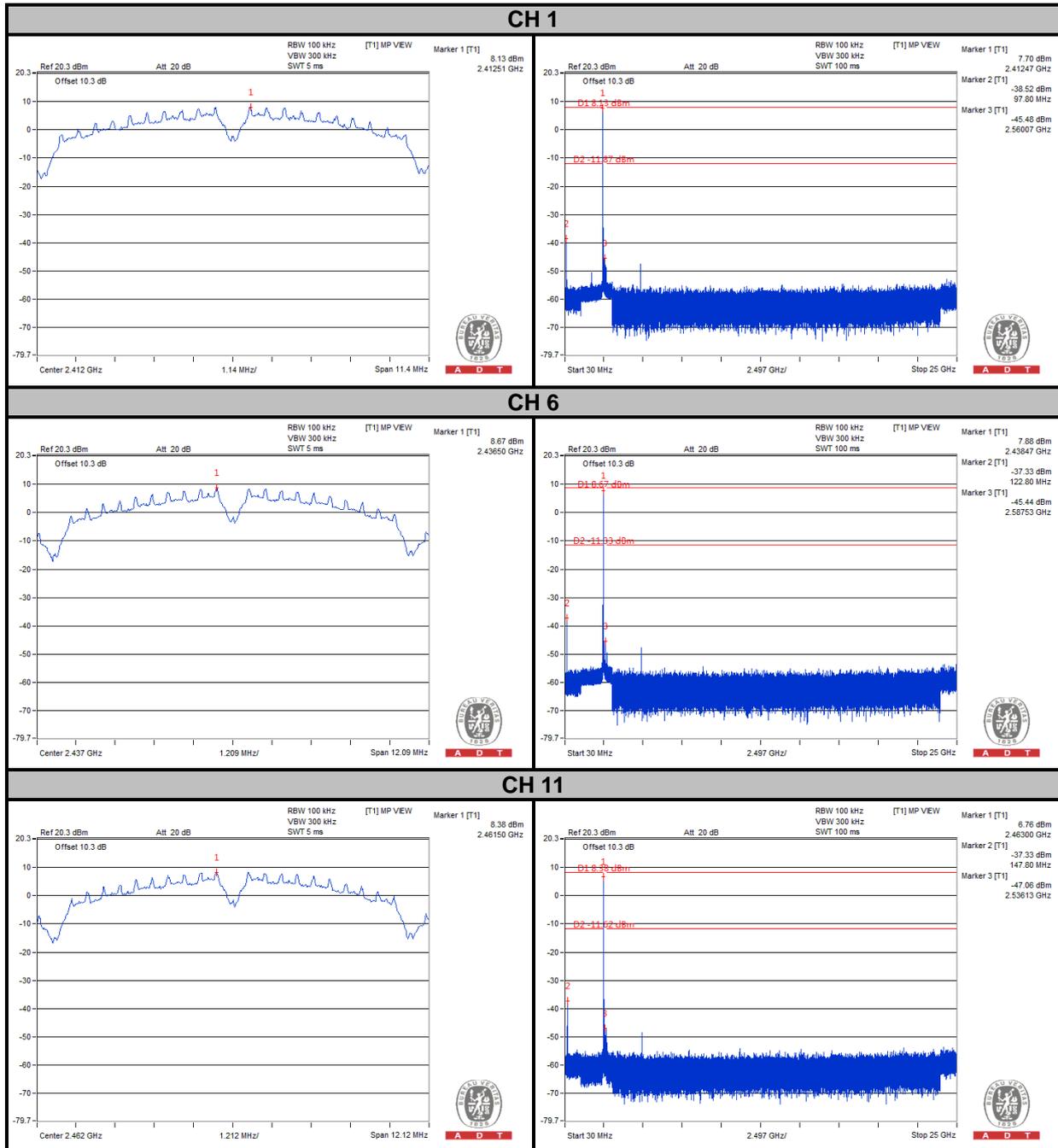
### 4.6.6 EUT OPERATING CONDITION

Same as section 4.3.6.

### 4.6.7 TEST RESULTS

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

#### 802.11b

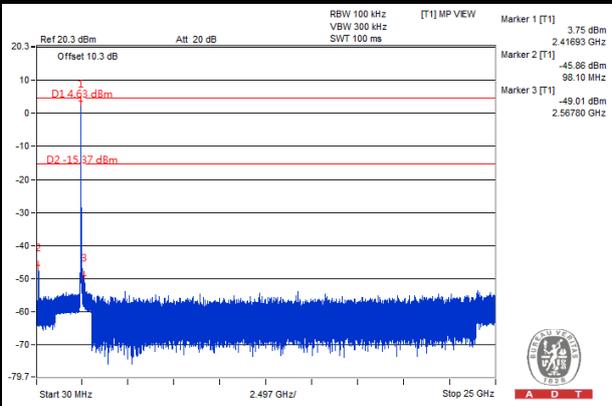
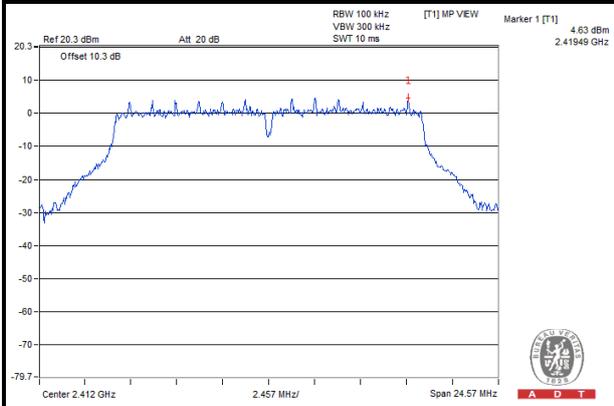




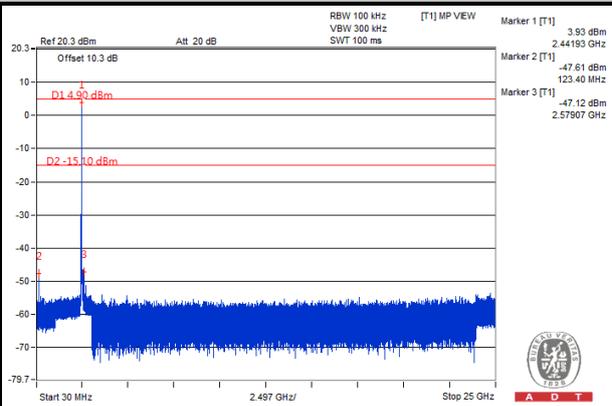
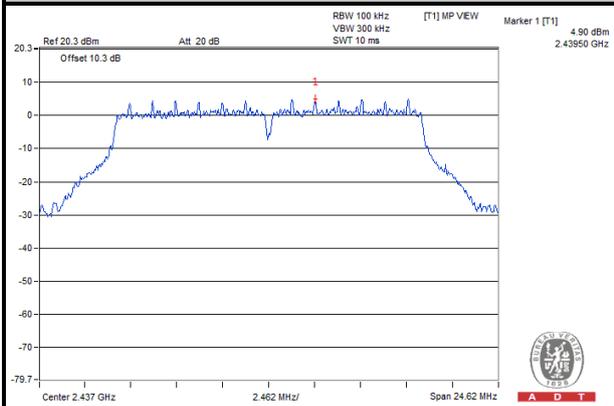
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# 802.11g

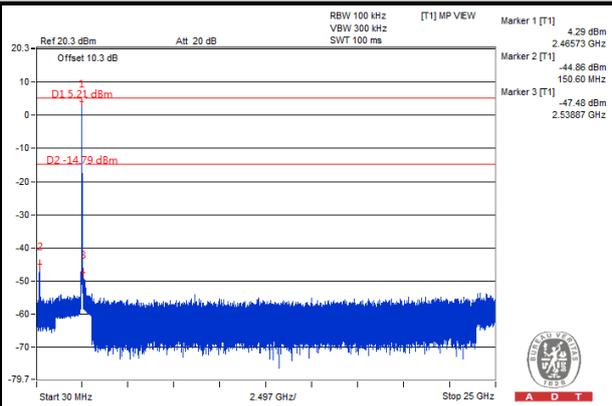
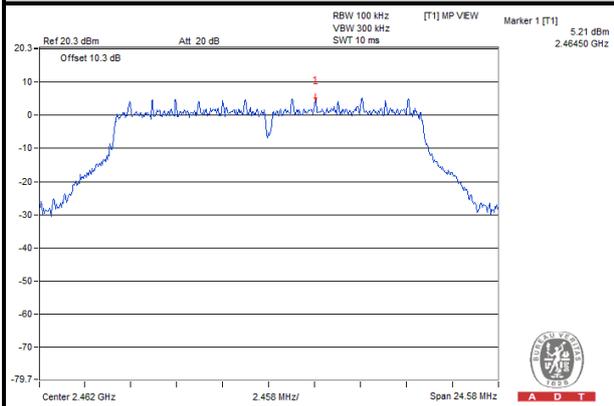
## CH 1



## CH 6



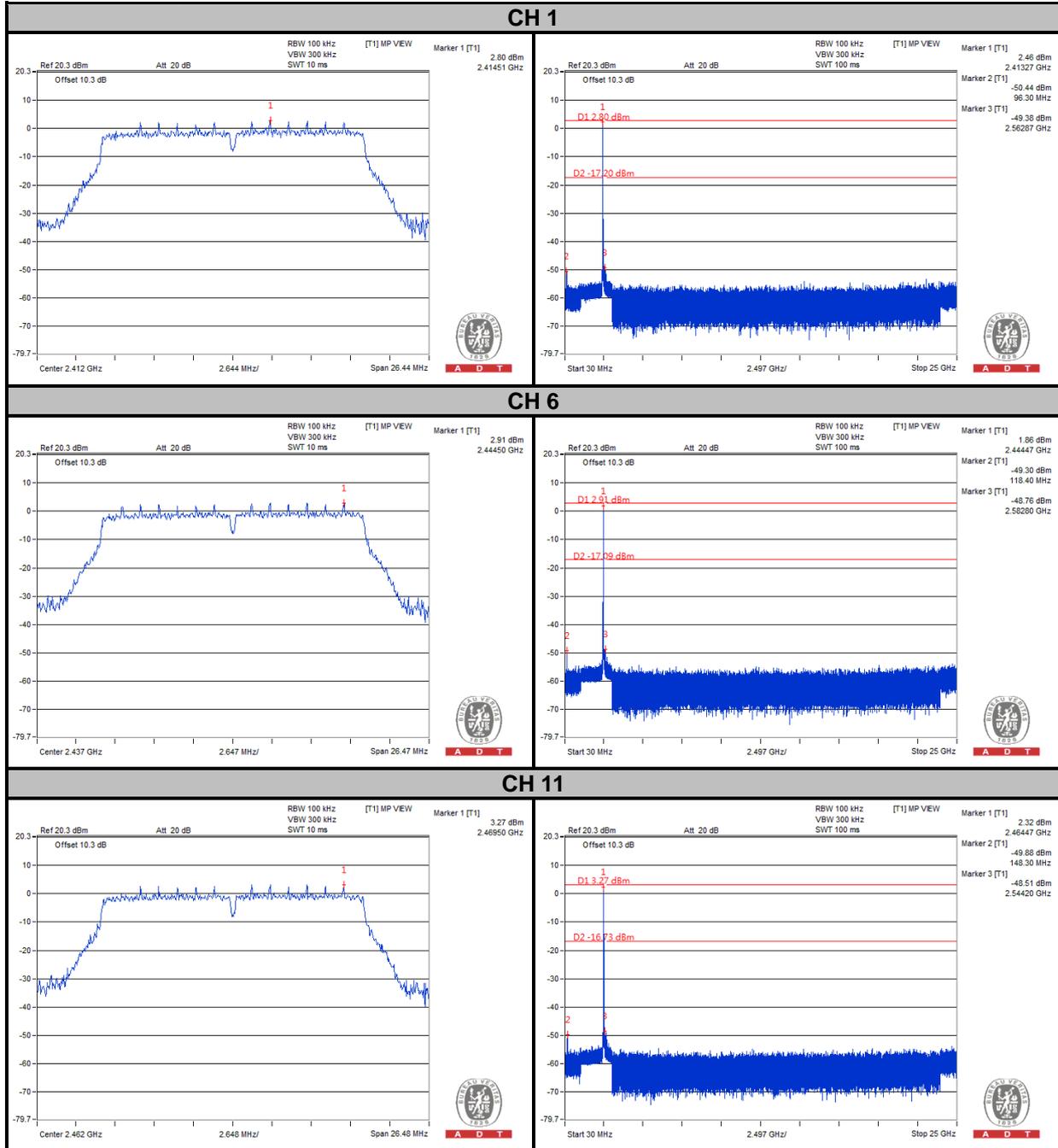
## CH 11





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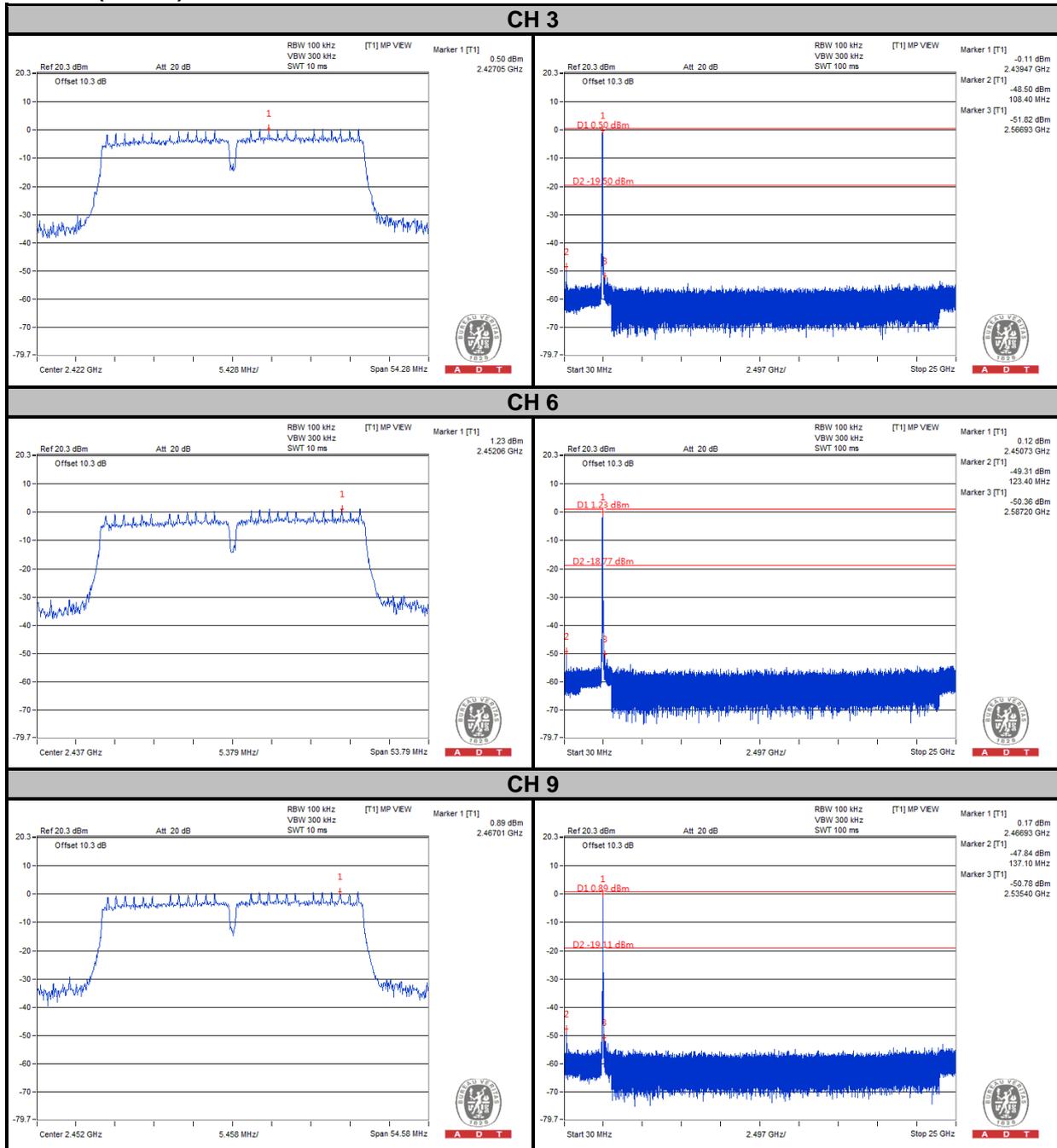
### 802.11n (20MHz)





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### 802.11n (40MHz)



## 5. TEST TYPES AND RESULTS (FOR 5.0GHz BAND)

### 5.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

#### 5.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



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### **5.1.2 TEST INSTRUMENTS**

Same as section 4.1.2.

### **5.1.3 TEST PROCEDURES**

Same as section 4.1.3.

### **5.1.4 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.1.5 TEST SETUP**

Same as section 4.1.5.

### **5.1.6 EUT OPERATING CONDITIONS**

Same as section 4.1.6.



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**5.1.7 TEST RESULTS**

**ABOVE 1GHz WORST-CASE DATA :**

**802.11a**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	45.84	36.68	66.87	-21.03	34.62	8.65	34.11	102	128	Average
5725	55.59	46.43	73.75	-18.16	34.62	8.65	34.11	102	128	Peak
5745	86.87	77.68			34.64	8.66	34.11	102	128	Average
5745	93.75	84.56			34.64	8.66	34.11	102	128	Peak
5850	45.55	36.25	66.87	-21.32	34.74	8.7	34.14	102	128	Average
5850	55.16	45.86	73.75	-18.59	34.74	8.7	34.14	102	128	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	48.84	39.68	75.94	-27.1	34.62	8.65	34.11	100	94	Average
5725	60.72	51.56	83.9	-23.18	34.62	8.65	34.11	100	94	Peak
5745	95.94	86.75			34.64	8.66	34.11	100	94	Average
5745	103.9	94.71			34.64	8.66	34.11	100	94	Peak
5850	46.97	37.67	75.94	-28.97	34.74	8.7	34.14	100	94	Average
5850	57.62	48.32	83.9	-26.28	34.74	8.7	34.14	100	94	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 5745MHz: Fundamental frequency.
- 5725MHz & 5850MHz: Out of restricted band



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	45.4	36.24	65.92	-20.52	34.62	8.65	34.11	102	128	Average
5725	56.21	47.05	73.09	-16.88	34.62	8.65	34.11	102	128	Peak
5785	85.92	76.69			34.68	8.68	34.13	102	128	Average
5785	93.09	83.86			34.68	8.68	34.13	102	128	Peak
5850	45.96	36.66	65.92	-19.96	34.74	8.7	34.14	102	128	Average
5850	56.13	46.83	73.09	-16.96	34.74	8.7	34.14	102	128	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	44.84	35.68	75.48	-30.64	34.62	8.65	34.11	100	94	Average
5725	56.62	47.46	82.9	-26.28	34.62	8.65	34.11	100	94	Peak
5785	95.48	86.25			34.68	8.68	34.13	100	94	Average
5785	102.9	93.67			34.68	8.68	34.13	100	94	Peak
5850	45.66	36.36	75.48	-29.82	34.74	8.7	34.14	100	94	Average
5850	57.36	48.06	82.9	-25.54	34.74	8.7	34.14	100	94	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 5785MHz: Fundamental frequency.
- 5725MHz & 5850MHz: Out of restricted band



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	45.51	36.35	65.94	-20.43	34.62	8.65	34.11	102	127	Average
5725	55.71	46.55	74.09	-18.38	34.62	8.65	34.11	102	127	Peak
5825	85.94	76.65			34.73	8.69	34.13	102	127	Average
5825	94.09	84.8			34.73	8.69	34.13	102	127	Peak
5850	45.57	36.27	65.94	-20.37	34.74	8.7	34.14	102	127	Average
5850	55.25	45.95	74.09	-18.84	34.74	8.7	34.14	102	127	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	45.8	36.64	74.99	-29.19	34.62	8.65	34.11	145	86	Average
5725	55.27	46.11	82.47	-27.2	34.62	8.65	34.11	145	86	Peak
5825	94.99	85.7			34.73	8.69	34.13	145	86	Average
5825	102.47	93.18			34.73	8.69	34.13	145	86	Peak
5850	48.96	39.66	74.99	-26.03	34.74	8.7	34.14	145	86	Average
5850	59.44	50.14	82.47	-23.03	34.74	8.7	34.14	145	86	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 5825MHz: Fundamental frequency.
- 5725MHz & 5850MHz: Out of restricted band



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802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	47.8	38.64	70.6	-22.8	34.62	8.65	34.11	103	140	Average
5725	62.95	53.79	78.32	-15.37	34.62	8.65	34.11	103	140	Peak
5745	90.6	81.41			34.64	8.66	34.11	103	140	Average
5745	98.32	89.13			34.64	8.66	34.11	103	140	Peak
5850	43.7	34.4	70.6	-26.9	34.74	8.7	34.14	103	140	Average
5850	56.36	47.06	78.32	-21.96	34.74	8.7	34.14	103	140	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	54.8	45.64	80.59	-25.79	34.62	8.65	34.11	100	94	Average
5725	78.01	68.85	87.68	-9.67	34.62	8.65	34.11	100	94	Peak
5745	100.59	91.4			34.64	8.66	34.11	100	94	Average
5745	107.68	98.49			34.64	8.66	34.11	100	94	Peak
5850	44.09	34.79	80.59	-36.5	34.74	8.7	34.14	100	94	Average
5850	56.54	47.24	87.68	-31.14	34.74	8.7	34.14	100	94	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 5745MHz: Fundamental frequency.
- 5725MHz & 5850MHz: Out of restricted band



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	46.15	36.99	66.07	-19.92	34.62	8.65	34.11	102	129	Average
5725	57.34	48.18	73.33	-15.99	34.62	8.65	34.11	102	129	Peak
5785	86.07	76.84			34.68	8.68	34.13	102	129	Average
5785	93.33	84.1			34.68	8.68	34.13	102	129	Peak
5850	45.76	36.46	66.07	-20.31	34.74	8.7	34.14	102	129	Average
5850	56.35	47.05	73.33	-16.98	34.74	8.7	34.14	102	129	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	45.84	36.68	74.92	-29.08	34.62	8.65	34.11	100	94	Average
5725	56.63	47.47	82.33	-25.7	34.62	8.65	34.11	100	94	Peak
5785	94.92	85.69			34.68	8.68	34.13	100	94	Average
5785	102.33	93.1			34.68	8.68	34.13	100	94	Peak
5850	45.57	36.27	74.92	-29.35	34.74	8.7	34.14	100	94	Average
5850	57.94	48.64	82.33	-24.39	34.74	8.7	34.14	100	94	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 5785MHz: Fundamental frequency.
- 5725MHz & 5850MHz: Out of restricted band



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	45.4	2.13	64.99	-19.59	34.62	8.65	0	102	127	Average
5725	54.39	11.12	71.96	-17.57	34.62	8.65	0	102	127	Peak
5825	84.99	41.57			34.73	8.69	0	102	127	Average
5825	91.96	48.54			34.73	8.69	0	102	127	Peak
5850	45.57	2.13	64.99	-19.42	34.74	8.7	0	102	127	Average
5850	55.37	11.93	71.96	-16.59	34.74	8.7	0	102	127	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	45.53	36.37	75.65	-30.12	34.62	8.65	34.11	100	94	Average
5725	56.59	47.43	81.27	-24.68	34.62	8.65	34.11	100	94	Peak
5825	95.65	86.36			34.73	8.69	34.13	100	94	Average
5825	101.27	91.98			34.73	8.69	34.13	100	94	Peak
5850	46.01	36.71	75.65	-29.64	34.74	8.7	34.14	100	94	Average
5850	57.91	48.61	81.27	-23.36	34.74	8.7	34.14	100	94	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 5825MHz: Fundamental frequency.
- 5725MHz & 5850MHz: Out of restricted band



A D T

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	43.83	34.67	63.11	-19.28	34.62	8.65	34.11	103	138	Average
5725	57.27	48.11	71.22	-13.95	34.62	8.65	34.11	103	138	Peak
5755	83.11	73.9			34.66	8.66	34.11	103	138	Average
5755	91.22	82.01			34.66	8.66	34.11	103	138	Peak
5850	43.75	34.45	63.11	-19.36	34.74	8.7	34.14	103	138	Average
5850	56.58	47.28	71.22	-14.64	34.74	8.7	34.14	103	138	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	48.5	39.34	73.68	-25.18	34.62	8.65	34.11	100	94	Average
5725	67.85	58.69	82.02	-14.17	34.62	8.65	34.11	100	94	Peak
5755	93.68	84.47			34.66	8.66	34.11	100	94	Average
5755	102.02	92.81			34.66	8.66	34.11	100	94	Peak
5850	43.96	34.66	73.68	-29.72	34.74	8.7	34.14	100	94	Average
5850	57.85	48.55	82.02	-24.17	34.74	8.7	34.14	100	94	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 5755MHz: Fundamental frequency.
- 5725MHz & 5850MHz: Out of restricted band



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	43.76	34.6	64.61	-20.85	34.62	8.65	34.11	103	140	Average
5725	58.15	48.99	72.68	-14.53	34.62	8.65	34.11	103	140	Peak
5795	84.61	75.37			34.69	8.68	34.13	103	140	Average
5795	92.68	83.44			34.69	8.68	34.13	103	140	Peak
5850	43.67	34.37	64.61	-20.94	34.74	8.7	34.14	103	140	Average
5850	56.66	47.36	72.68	-16.02	34.74	8.7	34.14	103	140	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	45.68	36.52	74.52	-28.84	34.62	8.65	34.11	100	94	Average
5725	56.61	47.45	82.62	-26.01	34.62	8.65	34.11	100	94	Peak
5795	94.52	85.28			34.69	8.68	34.13	100	94	Average
5795	102.62	93.38			34.69	8.68	34.13	100	94	Peak
5850	44.55	35.25	74.52	-29.97	34.74	8.7	34.14	100	94	Average
5850	57.56	48.26	82.62	-25.06	34.74	8.7	34.14	100	94	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 5795MHz: Fundamental frequency.
- 5725MHz & 5850MHz: Out of restricted band



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## 802.11ac (80MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 155	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	45.3	36.14	62.96	-17.66	34.62	8.65	34.11	183	138	Average
5725	56.96	47.8	71.52	-14.56	34.62	8.65	34.11	183	138	Peak
5775	82.96	73.73			34.68	8.67	34.12	183	138	Average
5775	91.52	82.29			34.68	8.67	34.12	183	138	Peak
5850	44.58	35.28	62.96	-18.38	34.74	8.7	34.14	183	138	Average
5850	57.68	48.38	71.52	-13.84	34.74	8.7	34.14	183	138	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	51.01	41.85	72.59	-21.58	34.62	8.65	34.11	100	94	Average
5725	60.78	51.62	81.11	-20.33	34.62	8.65	34.11	100	94	Peak
5775	92.59	83.36			34.68	8.67	34.12	100	94	Average
5775	101.11	91.88			34.68	8.67	34.12	100	94	Peak
5850	47.87	38.57	72.59	-24.72	34.74	8.7	34.14	100	94	Average
5850	58.46	49.16	81.11	-22.65	34.74	8.7	34.14	100	94	Peak

## REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 5775MHz: Fundamental frequency.
- 5725MHz & 5850MHz: Out of restricted band



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**BELOW 1GHz WORST-CASE DATA :**

**802.11n (20MHz)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
97.23	25.31	46.67	43.5	-18.19	9.46	1.28	32.1	134	107	Peak
180.93	28.08	48.31	43.5	-15.42	10.4	1.61	32.24	101	175	Peak
205.23	30.12	49.61	43.5	-13.38	11.13	1.65	32.27	103	77	Peak
476.4	29.74	40.4	46	-16.26	18.9	2.56	32.12	128	95	Peak
715.8	25.67	31.4	46	-20.33	23.27	3.11	32.11	201	67	Peak
953.8	28.93	30.19	46	-17.07	26.12	3.67	31.05	154	312	Peak

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

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
61.59	27.79	52.13	40	-12.21	6.99	0.9	32.23	118	207	Peak
142.59	20.61	41.95	43.5	-22.89	9.55	1.38	32.27	114	38	Peak
204.42	25.85	45.4	43.5	-17.65	11.08	1.65	32.28	176	135	Peak
476.4	38.46	49.12	46	-7.54	18.9	2.56	32.12	167	352	Peak
673.8	25.21	30.88	46	-20.79	23.4	3.05	32.12	195	206	Peak
953.8	29.43	30.69	46	-16.57	26.12	3.67	31.05	142	138	Peak

**REMARKS:** Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

## 5.2 CONDUCTED EMISSION MEASUREMENT

### 5.2.1 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 0.50MHz.
  3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### 5.2.2 TEST INSTRUMENTS

Same as section 4.2.2.

### 5.2.3 TEST PROCEDURES

Same as section 4.2.3.

### 5.2.4 DEVIATION FROM TEST STANDARD

No deviation.

### 5.2.5 TEST SETUP

Same as section 4.2.5.

### 5.2.6 EUT OPERATING CONDITIONS

Same as section 4.1.6.

### 5.2.7 TEST RESULTS

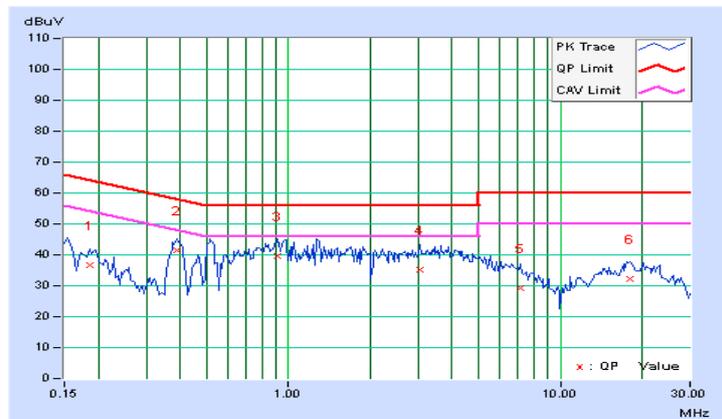
#### CONDUCTED WORST-CASE DATA :

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 9kHz Average (AV), 9kHz
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Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	0.28	36.23	23.18	36.51	23.46	64.25	54.25	-27.75	-30.80
2	0.38828	0.30	41.19	29.59	41.49	29.89	58.10	48.10	-16.61	-18.21
<b>3</b>	<b>0.91172</b>	<b>0.33</b>	<b>39.14</b>	<b>24.96</b>	<b>39.47</b>	<b>25.29</b>	<b>56.00</b>	<b>46.00</b>	<b>-16.53</b>	<b>-20.71</b>
4	3.05469	0.40	34.83	23.01	35.23	23.41	56.00	46.00	-20.77	-22.59
5	7.15625	0.47	28.61	16.05	29.08	16.52	60.00	50.00	-30.92	-33.48
6	18.02734	0.57	31.69	21.35	32.26	21.92	60.00	50.00	-27.74	-28.08

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





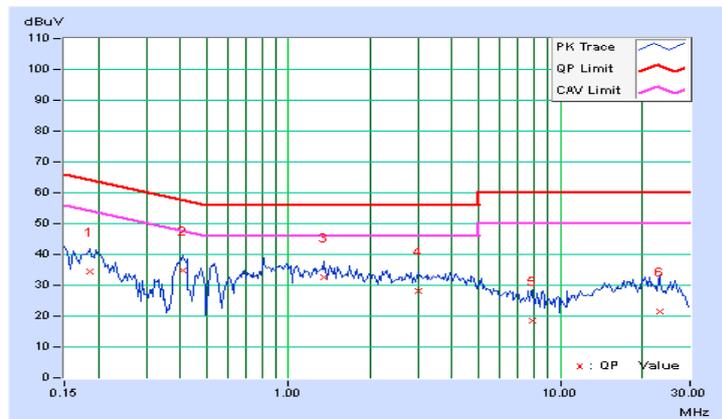
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Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 9kHz Average (AV), 9kHz
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	0.28	34.31	18.30	34.59	18.58	64.25	54.25	-29.67	-35.68
2	0.40781	0.30	34.45	26.97	34.75	27.27	57.69	47.69	-22.94	-20.42
3	1.35156	0.35	32.39	22.77	32.74	23.12	56.00	46.00	-23.26	-22.88
4	3.00781	0.41	27.88	19.96	28.29	20.37	56.00	46.00	-27.71	-25.63
5	7.94141	0.49	17.90	10.73	18.39	11.22	60.00	50.00	-41.61	-38.78
6	23.31641	0.59	21.04	10.38	21.63	10.97	60.00	50.00	-38.37	-39.03

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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## **5.3 6dB BANDWIDTH MEASUREMENT**

### **5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT**

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

### **5.3.2 TEST SETUP**

Same as section 4.3.2.

### **5.3.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.3.4 TEST PROCEDURE**

Same as section 4.3.4.

### **5.3.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.3.6 EUT OPERATING CONDITIONS**

Same as section 4.3.6.

### 5.3.7 TEST RESULTS

#### 802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	16.40	0.5	PASS
157	5785	16.41	0.5	PASS
165	5825	16.39	0.5	PASS

#### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	17.66	0.5	PASS
157	5785	17.63	0.5	PASS
165	5825	17.66	0.5	PASS

#### 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
151	5755	36.44	0.5	PASS
159	5795	36.47	0.5	PASS

#### 802.11ac (80MHz)

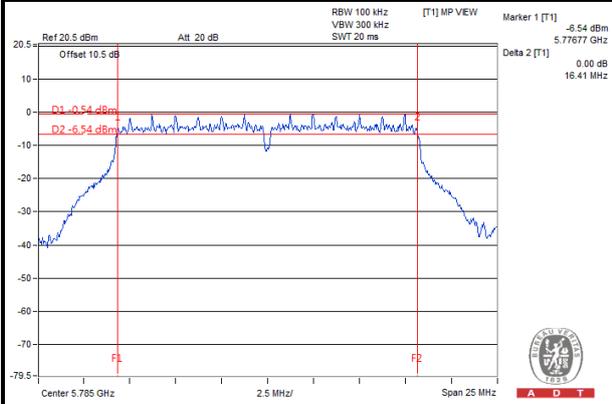
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
155	5775	76.05	0.5	PASS



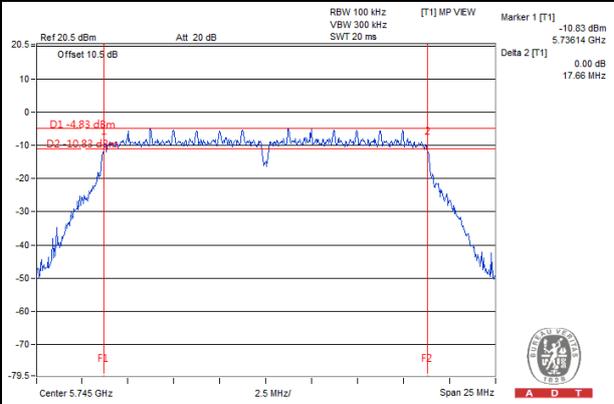
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### SPECTRUM PLOT OF WORST VALUE

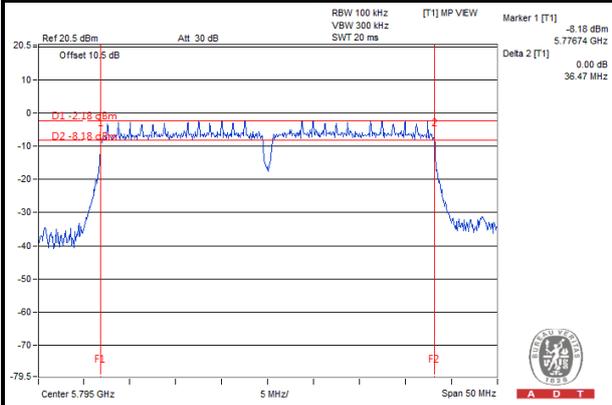
#### 802.11a



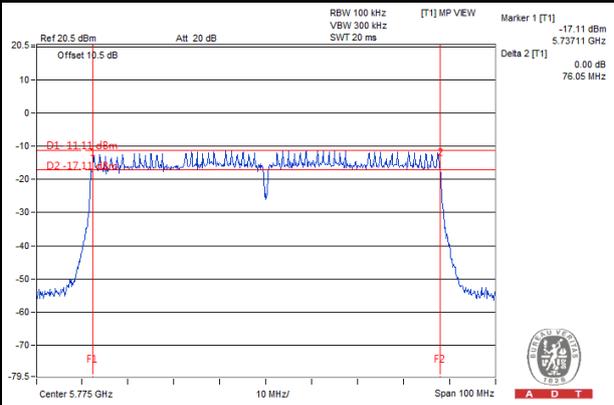
#### 802.11n (20MHz)



#### 802.11n (40MHz)



#### 802.11ac (80MHz)





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## **5.4 MAXIMUM OUTPUT POWER**

### **5.4.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT**

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

### **5.4.2 TEST SETUP**

Same as section 4.4.2.

### **5.4.3 INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.4.4 TEST PROCEDURES**

Same as section 4.4.4.

### **5.4.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.4.6 EUT OPERATING CONDITIONS**

Same as section 4.3.6.



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## 5.4.7 TEST RESULTS

### 802.11a

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
149	5745	48.53	16.86	30	PASS
157	5785	50.82	17.06	30	PASS
165	5825	48.64	16.87	30	PASS

### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
149	5745	49.89	16.98	30	PASS
157	5785	54.33	17.35	30	PASS
165	5825	53.09	17.25	30	PASS

### 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
151	5755	55.21	17.42	30	PASS
159	5795	52.72	17.22	30	PASS

### 802.11ac (80MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
155	5775	40.93	16.12	30	PASS



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## **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 SETUP**

Same as section 4.5.2.

### **5.5.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.5.4 TEST PROCEDURE.**

Same as section 4.5.4.

### **5.5.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.5.6 EUT OPERATING CONDITION**

Same as section 4.3.6.

### 5.5.7 TEST RESULTS

#### 802.11a

CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
149	5745	-14.41	8	PASS
157	5785	-14.65	8	PASS
165	5825	-13.19	8	PASS

#### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
149	5745	-18.67	8	PASS
157	5785	-18.12	8	PASS
165	5825	-18.66	8	PASS

#### 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
151	5755	-16.45	8	PASS
159	5795	-16.14	8	PASS

#### 802.11ac (80MHz)

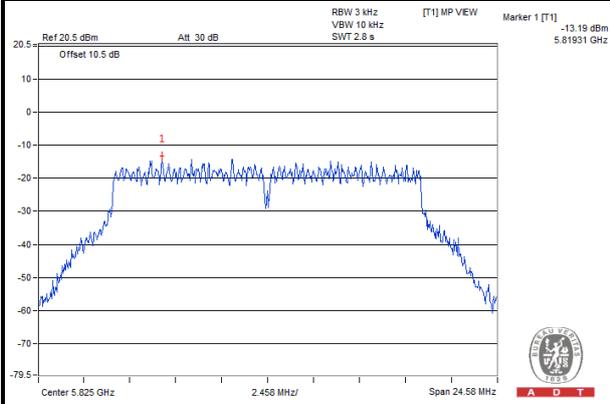
CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
155	5775	-25.20	8	PASS



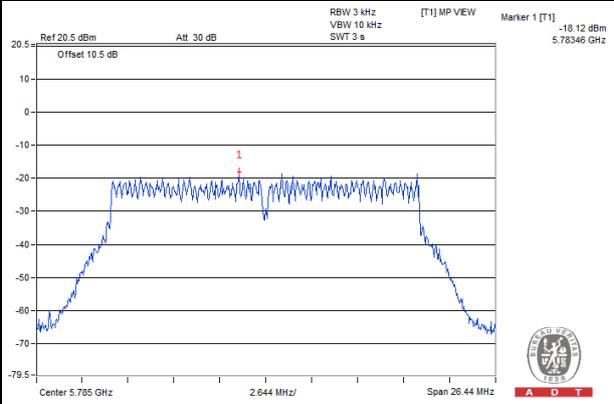
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### SPECTRUM PLOT OF WORST VALUE

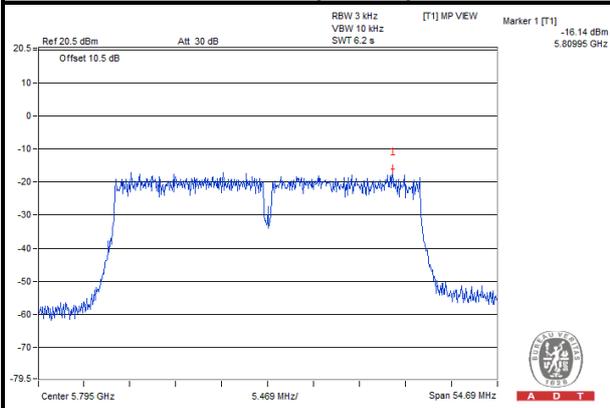
#### 802.11a



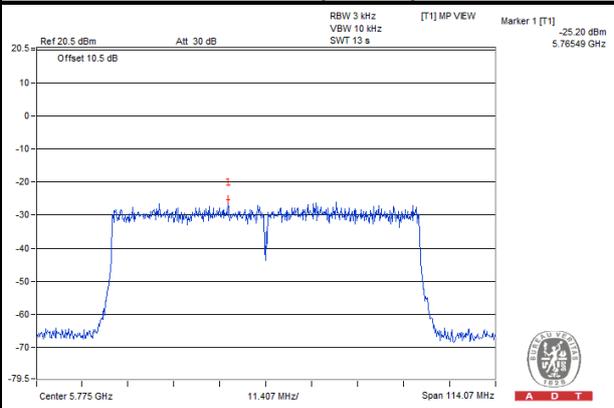
#### 802.11n (20MHz)



#### 802.11n (40MHz)



#### 802.11ac (80MHz)



## **5.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT**

### **5.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT**

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### **5.6.2 TEST SETUP**

Same as section 4.6.2.

### **5.6.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.6.4 TEST PROCEDURE**

Same as section 4.6.4

### **5.6.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.6.6 EUT OPERATING CONDITION**

Same as section 4.3.6

### **5.6.7 TEST RESULTS**

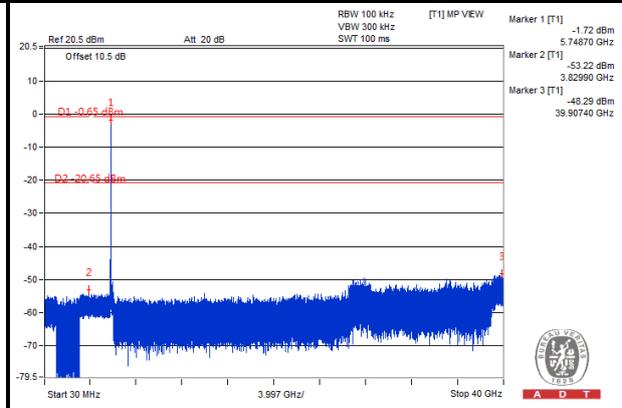
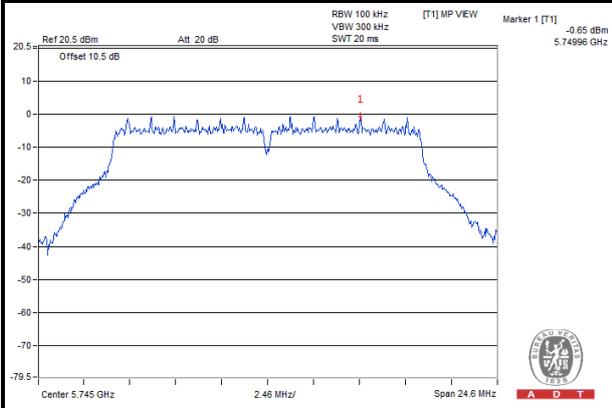
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



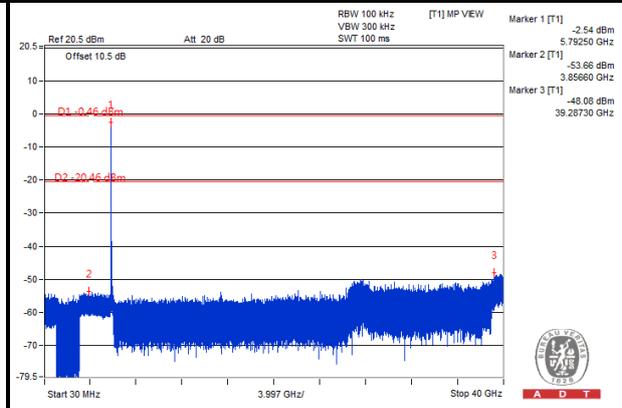
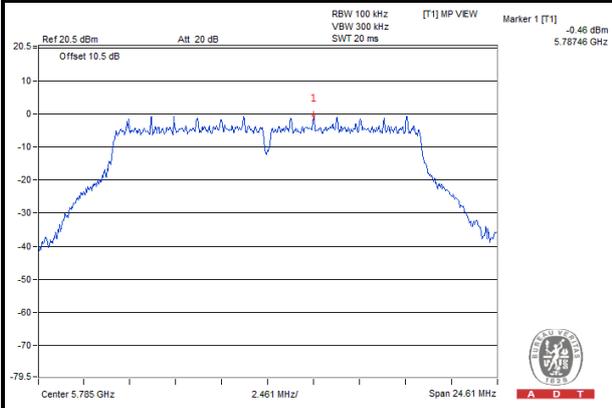
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### 802.11a

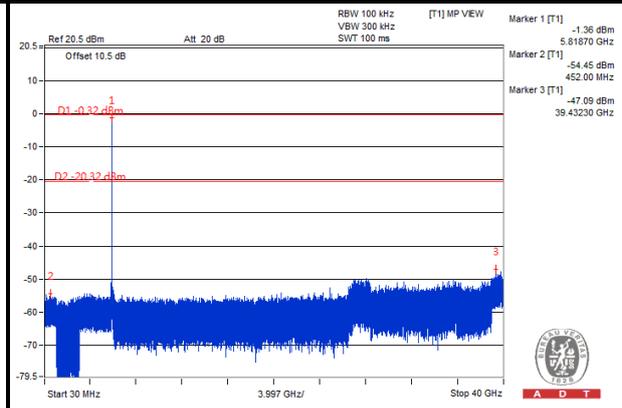
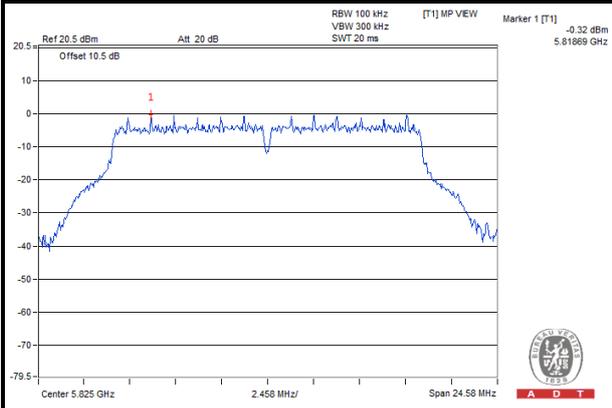
#### CH 149



#### CH 157



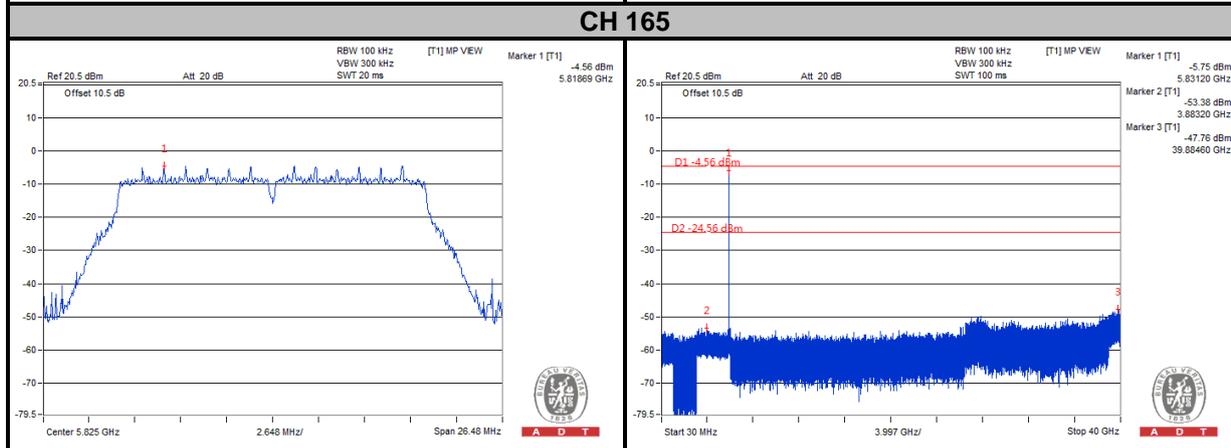
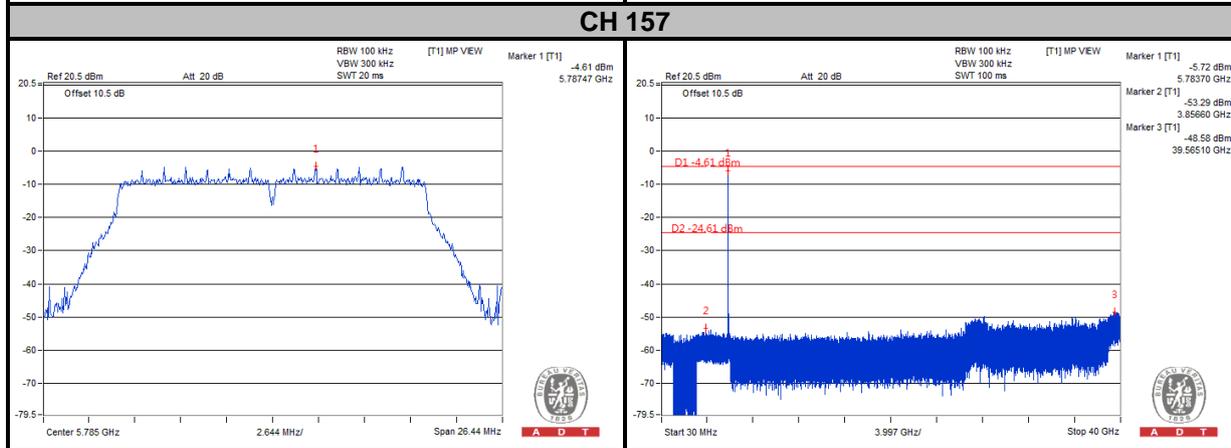
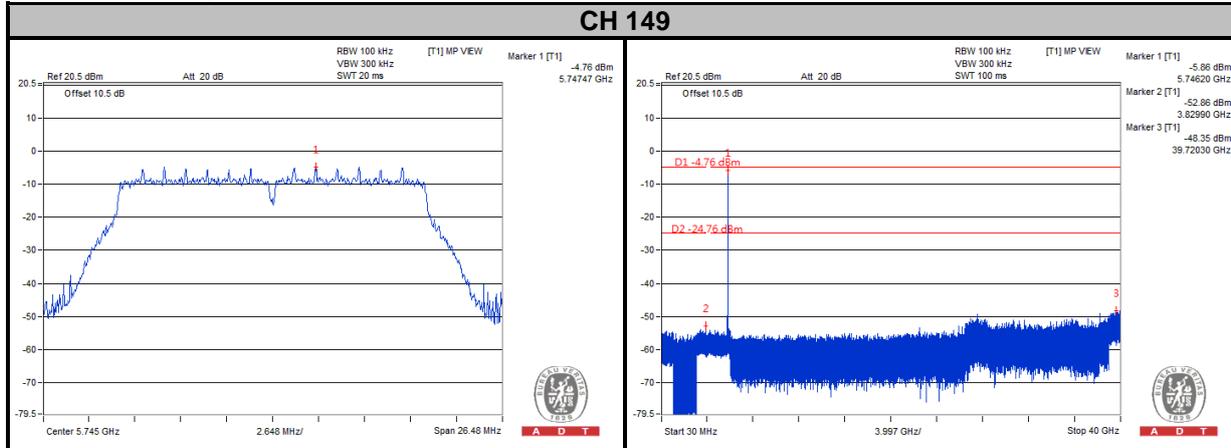
#### CH 165





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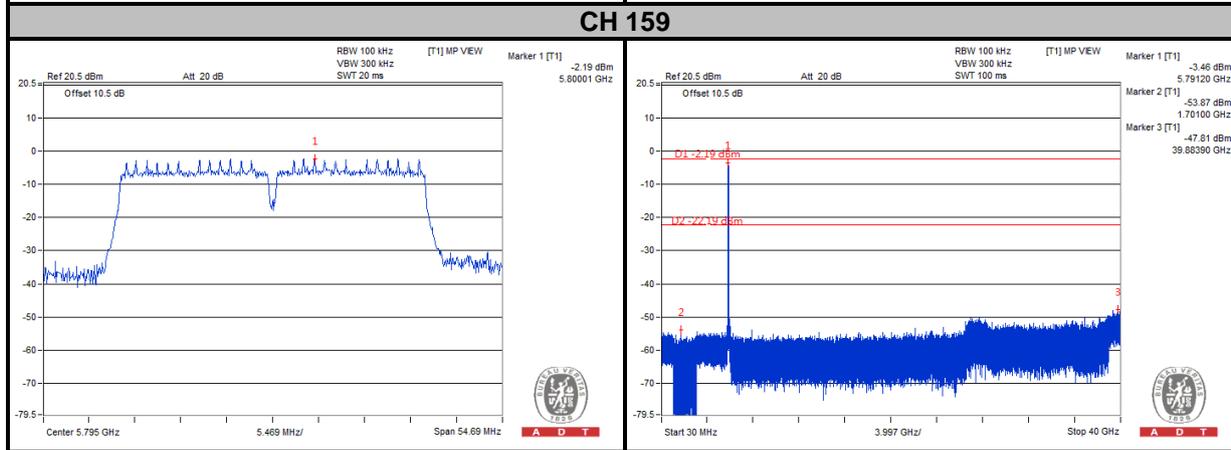
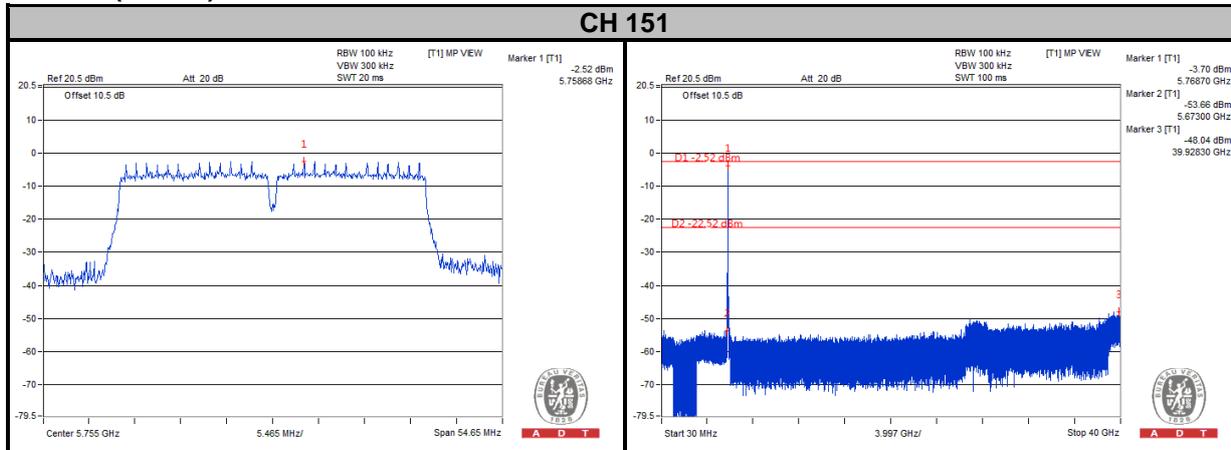
### 802.11n (20MHz)



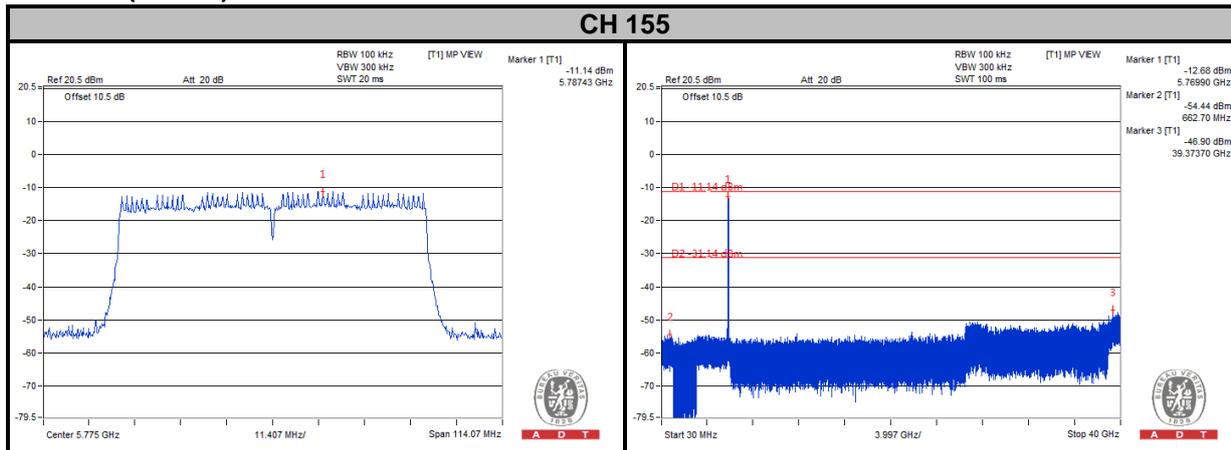


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### 802.11n (40MHz)



### 802.11ac (80MHz)





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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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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 any modifications are made to the EUT by the lab during the test.

---END---