FCC Test Report (15.247)

Report No.:	RF141219C21
FCC ID:	TE7C5V2
Test Model:	Archer C5
Received Date:	Dec. 19, 2014
Test Date:	Dec. 29, 2014 ~ Feb. 16, 2015
Issued Date:	Mar. 10, 2015
Manufacturer:	TP-LINK TECHNOLOGIES CO., LTD.
Address:	Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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Release Control Record

Issue No.	Description	Date Issued
RF141219C21	Original release.	Mar. 10, 2015

1 Certificate of Conformity

Product:	AC1200 Wireless Dual Band Gigabit Router
Brand:	TP-LINK
Test Model:	Archer C5
Sample Status:	Prototype
Applicant:	TP-LINK TECHNOLOGIES CO., LTD.
Manufacturer:	TP-LINK TECHNOLOGIES CO., LTD.
Test Date:	Dec. 29, 2014 ~ Feb. 16, 2015
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10:2009

The above equipment 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:** Mar. 10, 2015

Suntee Liu / Specialist

Approved by : _____ , **Date:** Mar. 10, 2015

Ken Liu / Senior Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -6.84dB at 0.15391MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.2dB at 2390.00MHz.
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	Antenna connector is SMA reverse not a standard connector.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.63 dB
	200MHz ~1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AC1200 Wireless Dual Band Gigabit Router
Brand	TP-LINK
Test Model	Archer C5
H/W	Archer C5
S/W	AC1200 Wireless Dual Band Gigabit Router
Status of EUT	Prototype
Power Supply Rating	12Vdc (adapter)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b:11/5.5/2/1Mbps 802.11a/g: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.6Mbps
Operating Frequency	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5745 ~ 5825MHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 5.0GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	2.4GHz: 518.369mW 5.0GHz: 570.501mW
Antenna Type	2.4GHz: Omni directional antenna with 2dBi gain 5.0GHz: Omni directional antenna with 3dBi gain
Antenna Connector	SMA reverse
Accessory Device	Adapter
Data Cable Supplied	NA

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers. This device supports chip beamforming.

Modulation Mode	TX Function
802.11b	1TX
802.11g	2TX
802.11a	2TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX
802.11ac (VHT20)	2TX
802.11ac (VHT40)	2TX
802.11ac (VHT80)	2TX

*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)

2. The EUT uses following adapter.

Brand	Ten Pao International Inc.
Model	S040EU1200250
Input Power	100-240Vac, 50/60Hz, 1.2A Max.
Output Power	12.0Vdc, 2500mA
Power Line	1.5m DC cable without core attached on adapter

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

3.2 Description of Test Modes

FOR 2.4GHz

11 channels are provided for 802.11b, 802.11g and 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		

FOR 5.0GHz (5745 ~ 5825MHz)

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

FOR 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	Date Rate (Mbps)	TX Function
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	1TX
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	2TX
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2	2TX
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	15.0	2TX

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	Date Rate (Mbps)	TX Function
-	802.11g	1 to 11	6	OFDM	BPSK	6.0	2TX

Power Line Conducted Emission Test:

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

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Date Rate (Mbps)	TX Function
-	802.11g	1 to 11	6	OFDM	BPSK	6.0	2TX

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	Date Rate (Mbps)	TX Function
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	1TX
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	2TX
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2	2TX
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	15.0	2TX

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25 deg. C, 65% RH	120Vac, 60Hz	Ted Chang
RE<1G	25 deg. C, 65% RH	120Vac, 60Hz	Tank Wu
PLC	19 deg. C, 70% RH	120Vac, 60Hz	Nick Hsu
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Cedric Wu

FOR 5.0 GHz (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	Date Rate (Mbps)	TX Function
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0	2TX
-	802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	7.2	2TX
-	802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	15.0	2TX
-	802.11ac (VHT80)	155	155	OFDM	BPSK	58.5	2TX

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	Date Rate (Mbps)	TX Function
-	802.11n (HT20)	149 to 165	157	OFDM	BPSK	7.2	2TX

Power Line Conducted Emission Test:

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

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Date Rate (Mbps)	TX Function
-	802.11n (HT20)	149 to 165	157	OFDM	BPSK	7.2	2TX

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	Date Rate (Mbps)	TX Function
-	802.11a	149 to 165	149, 165	OFDM	BPSK	6.0	2TX
-	802.11n (HT20)	149 to 165	149, 165	OFDM	BPSK	7.2	2TX
-	802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	15.0	2TX
-	802.11ac (VHT80)	155	155	OFDM	BPSK	58.5	2TX

Test Condition:

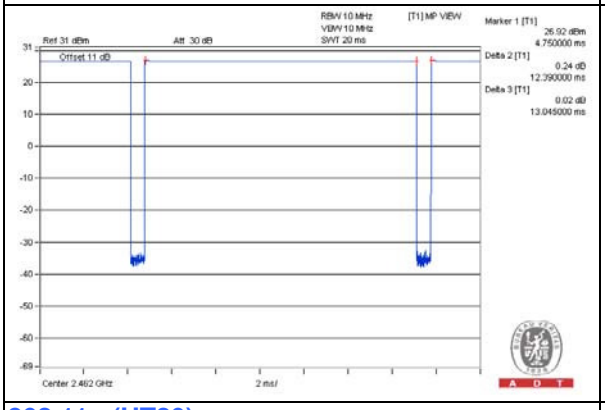
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	18 deg. C, 69% RH	120Vac, 60Hz	Nick Hsu
RE<1G	25 deg. C, 65% RH	120Vac, 60Hz	Tank Wu
PLC	19 deg. C, 70% RH	120Vac, 60Hz	Nick Hsu
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Cedric Wu

3.3 Duty Cycle of Test Signal

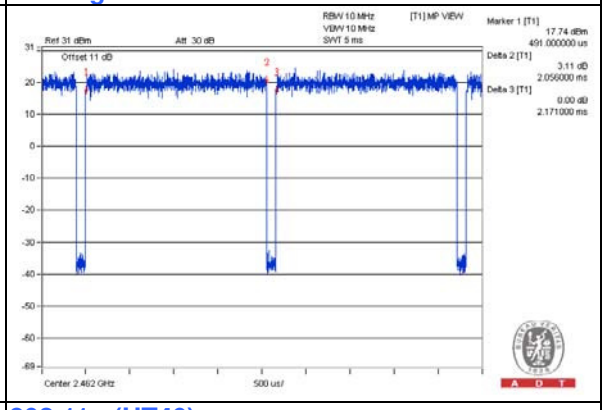
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

FOR 2.4GHz:
802.11b: Duty cycle = 12.39/13.045 = 0.950, Duty factor = 10 * log(1/0.950) = 0.22
802.11g: Duty cycle = 2.056/2.171 = 0.947, Duty factor = 10 * log(1/0.947) = 0.24
802.11n (HT20): Duty cycle = 1.903/2.01 = 0.947, Duty factor = 10 * log(1/0.947) = 0.24
802.11n (HT40): Duty cycle = 0.935/1.046 = 0.894, Duty factor = 10 * log(1/0.894) = 0.49

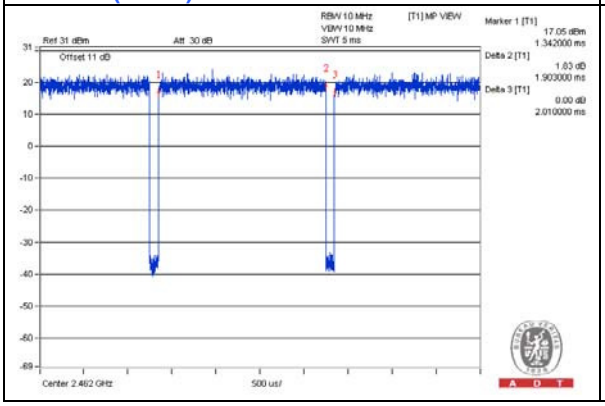
802.11b



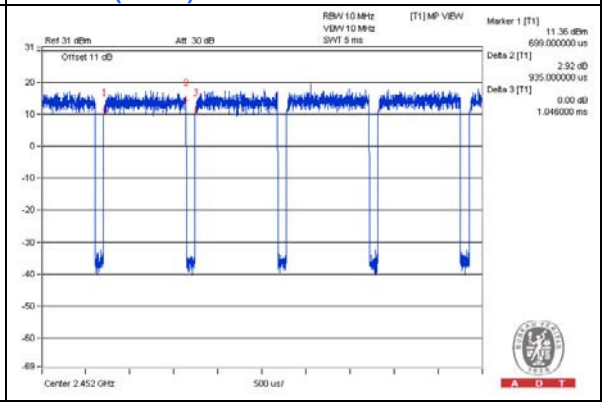
802.11g



802.11n (HT20)



802.11n (HT40)



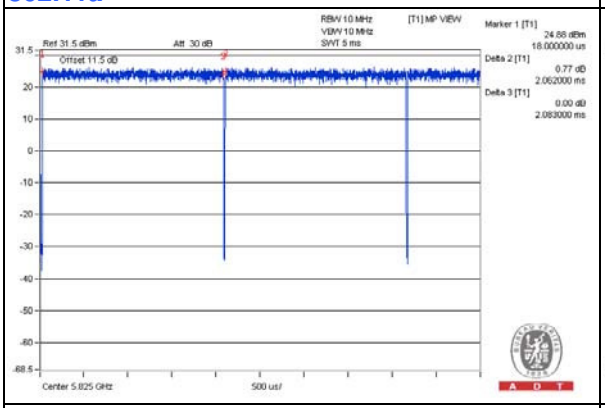
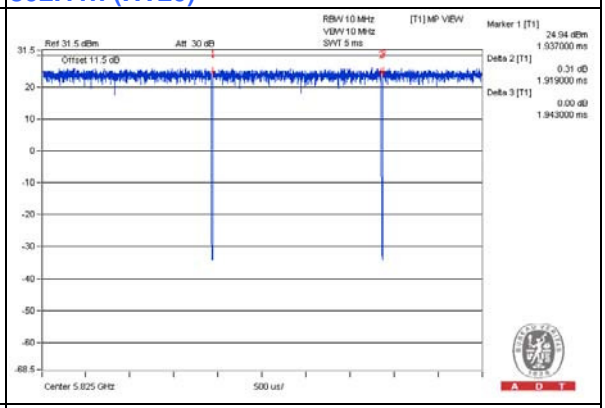
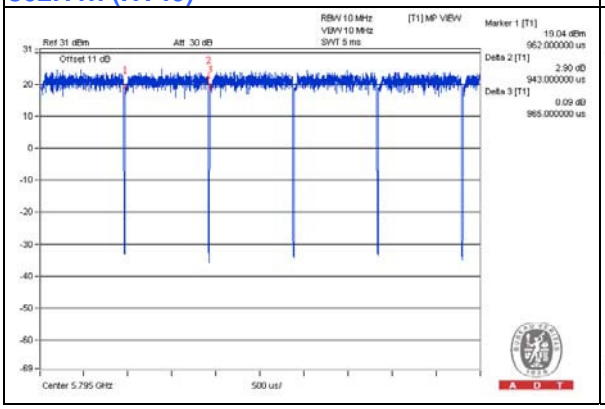
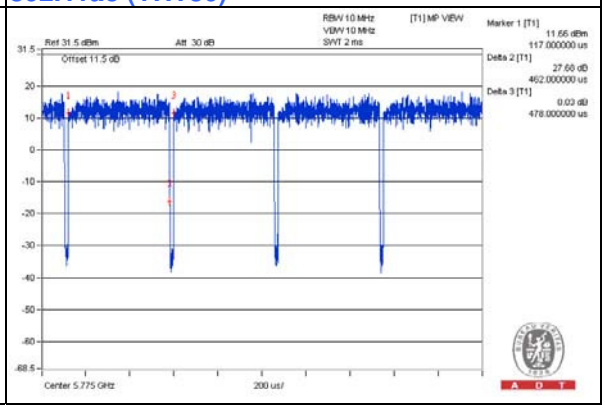
FOR 5GHz (5745 ~ 5825MHz):

802.11a: Duty cycle = 2.062/2.083 = 0.990

802.11n (HT20): Duty cycle = 0.919/1.943 = 0.988

802.11n (HT40): Duty cycle = 0.943/0.965 = 0.977, Duty factor = 10 * log(1/0.977) = 0.10

802.11ac (VHT80): Duty cycle = 0.462/0.478 = 0.967, Duty factor = 10 * log(1/0.967) = 0.15

802.11a	802.11n (HT20)
	
802.11n (HT40)	**802.11ac (VHT80)**
	

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.

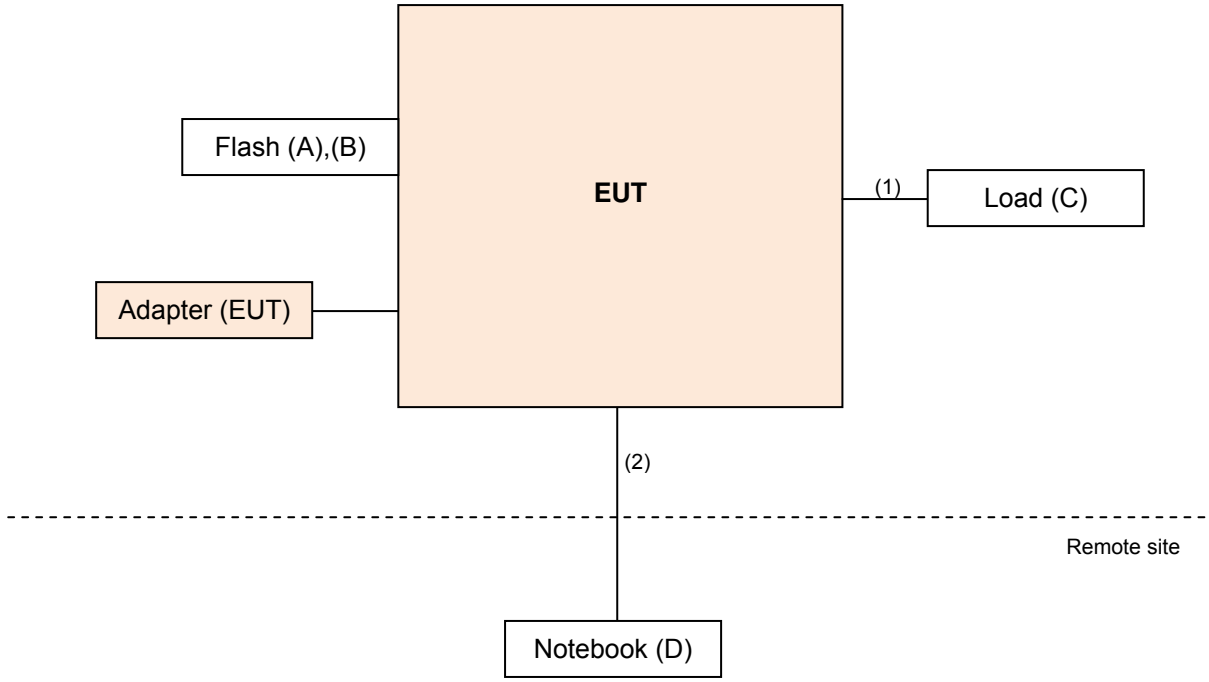
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	USB Flash Drive	Transcend	V85	569992-8209	FCC DoC Approved	-
B.	USB Flash Drive	Transcend	V85	538455 4488	FCC DoC Approved	-
C.	Load	NA	NA	NA	NA	-
D.	Notebook	DELL	D531	CN-0XM006-48643-81 U-2610	QDS-BRCM1020	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item D acted as a communication partner to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45	4	1.8	N	0	-
2.	RJ45	1	3	N	0	-

3.4.1 Configuration of System under Test



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 v03r02

662911 D01 Multiple Transmitter Output v02r01

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 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 30dB under any condition of modulation.

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Dec. 01, 2014	Nov. 30, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Feb. 11, 2014	Feb. 10, 2015
			Feb. 11, 2015	Feb. 10, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Feb. 06, 2014	Feb. 05, 2015
			Feb. 06, 2015	Feb. 05, 2016
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Feb. 09, 2014	Feb. 08, 2015
			Feb. 09, 2015	Feb. 08, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2014	Feb. 08, 2015
			Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2014	Aug. 08, 2015
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	248780/4 309222/4 274092/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable Worken	8D-FB	Cable-CH9-01	Aug. 11, 2014	Aug. 10, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn Table Controller EMCO	2090	NA	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2014	Oct. 17, 2015
High Speed Peak Power Meter	ML2495A	0824011	Jul. 26, 2014	Jul. 25, 2015
Power Sensor	MA2411B	0738171	Jul. 26, 2014	Jul. 25, 2015

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 9.

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 215374.

6. The IC Site Registration No. is IC 7450F-9.

4.1.3 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:

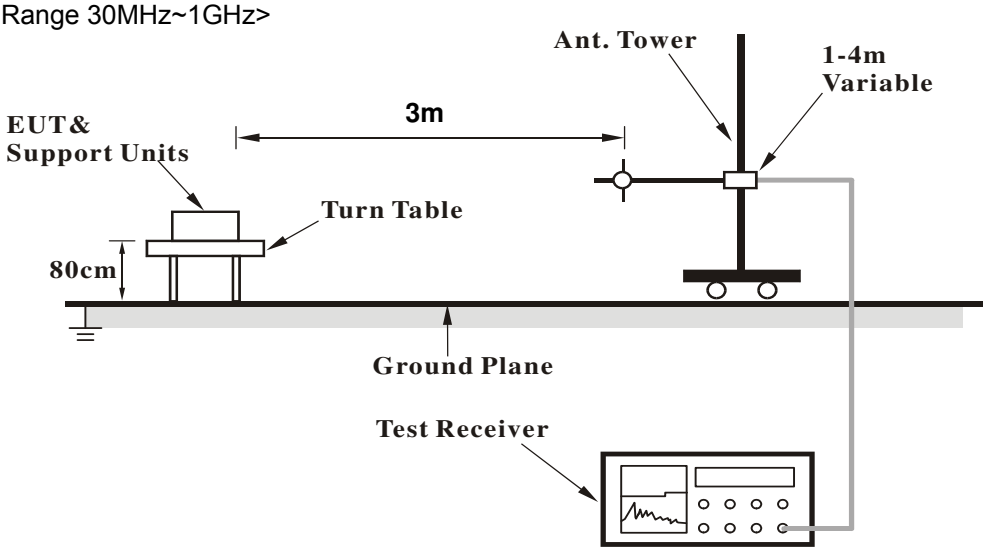
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
6. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

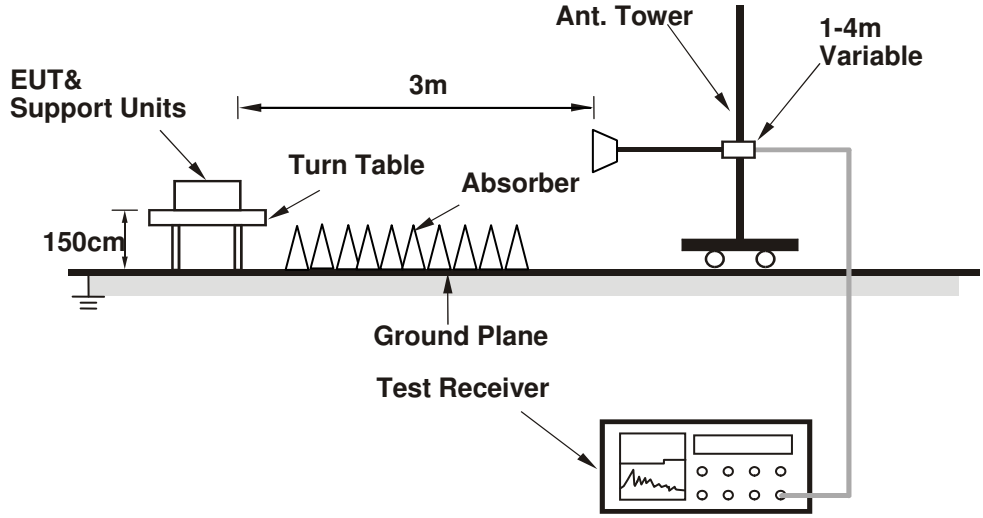
No deviation.

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).

4.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. Prepared a notebook to act as a communication partner and placed it outside of testing area.
c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
d. The communication partner sent data to EUT by command "PING".
e. The necessary accessories enable the system in full functions.

4.1.7 Test Results

Above 1GHz Data

802.11b

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

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	60.9 PK	74.0	-13.1	1.00 H	147	27.90	33.00
2	2390.00	48.2 AV	54.0	-5.8	1.00 H	147	15.20	33.00
3	*2412.00	107.8 PK			1.00 H	147	74.70	33.10
4	*2412.00	104.9 AV			1.00 H	147	71.80	33.10
5	4824.00	49.0 PK	74.0	-25.0	1.00 H	18	47.20	1.80
6	4824.00	39.0 AV	54.0	-15.0	1.00 H	18	37.20	1.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.0 PK	74.0	-9.0	1.00 V	344	32.00	33.00
2	2390.00	53.3 AV	54.0	-0.7	1.00 V	344	20.30	33.00
3	*2412.00	114.3 PK			1.00 V	355	81.20	33.10
4	*2412.00	111.5 AV			1.00 V	355	78.40	33.10
5	4824.00	55.0 PK	74.0	-19.0	1.00 V	7	53.20	1.80
6	4824.00	49.3 AV	54.0	-4.7	1.00 V	7	47.50	1.80

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	109.3 PK			1.00 H	5	76.00	33.30
2	*2437.00	106.9 AV			1.00 H	5	73.60	33.30
3	4874.00	51.7 PK	74.0	-22.3	1.10 H	154	49.80	1.90
4	4874.00	45.6 AV	54.0	-8.4	1.10 H	154	43.70	1.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	114.8 PK			1.00 V	2	81.50	33.30
2	*2437.00	112.2 AV			1.00 V	2	78.90	33.30
3	4874.00	52.9 PK	74.0	-21.1	1.00 V	0	51.00	1.90
4	4874.00	48.1 AV	54.0	-5.9	1.00 V	0	46.20	1.90

REMARKS:

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

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

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	107.2 PK			1.00 H	28	73.80	33.40
2	*2462.00	104.5 AV			1.00 H	28	71.10	33.40
3	2483.50	62.1 PK	74.0	-11.9	1.00 H	28	28.70	33.40
4	2483.50	48.9 AV	54.0	-5.1	1.00 H	28	15.50	33.40
5	4924.00	48.5 PK	74.0	-25.5	1.02 H	63	46.50	2.00
6	4924.00	36.5 AV	54.0	-17.5	1.02 H	63	34.50	2.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	113.1 PK			1.00 V	167	79.70	33.40
2	*2462.00	110.5 AV			1.00 V	167	77.10	33.40
3	2483.50	66.1 PK	74.0	-7.9	1.00 V	167	32.70	33.40
4	2483.50	53.5 AV	54.0	-0.5	1.00 V	167	20.10	33.40
5	4924.00	50.4 PK	74.0	-23.6	1.11 V	20	48.40	2.00
6	4924.00	43.8 AV	54.0	-10.2	1.11 V	20	41.80	2.00

REMARKS:

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

802.11g

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

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	62.4 PK	74.0	-11.6	1.00 H	171	29.40	33.00
2	2390.00	49.5 AV	54.0	-4.5	1.00 H	171	16.50	33.00
3	*2412.00	106.7 PK			1.22 H	174	73.60	33.10
4	*2412.00	96.3 AV			1.22 H	174	63.20	33.10
5	4824.00	50.7 PK	74.0	-23.3	1.15 H	320	48.90	1.80
6	4824.00	37.3 AV	54.0	-16.7	1.15 H	320	35.50	1.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.3 PK	74.0	-1.7	1.00 V	17	39.30	33.00
2	2390.00	53.6 AV	54.0	-0.4	1.00 V	17	20.60	33.00
3	*2412.00	113.7 PK			1.00 V	339	80.60	33.10
4	*2412.00	103.4 AV			1.00 V	339	70.30	33.10
5	4824.00	51.4 PK	74.0	-22.6	1.00 V	16	49.60	1.80
6	4824.00	37.2 AV	54.0	-16.8	1.00 V	16	35.40	1.80

REMARKS:

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

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

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	61.8 PK	74.0	-12.2	1.00 H	173	28.80	33.00
2	2390.00	49.2 AV	54.0	-4.8	1.00 H	173	16.20	33.00
3	*2437.00	113.1 PK			1.00 H	195	79.80	33.30
4	*2437.00	103.6 AV			1.00 H	195	70.30	33.30
5	2483.50	63.6 PK	74.0	-10.4	1.20 H	171	30.20	33.40
6	2483.50	49.2 AV	54.0	-4.8	1.20 H	171	15.80	33.40
7	4874.00	55.5 PK	74.0	-18.5	1.03 H	262	53.60	1.90
8	4874.00	41.5 AV	54.0	-12.5	1.03 H	262	39.60	1.90
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	68.4 PK	74.0	-5.6	1.00 V	19	35.40	33.00
2	2390.00	53.8 AV	54.0	-0.2	1.00 V	19	20.80	33.00
3	*2437.00	120.9 PK			1.00 V	12	87.60	33.30
4	*2437.00	110.7 AV			1.00 V	12	77.40	33.30
5	2483.50	68.9 PK	74.0	-5.1	1.00 V	13	35.50	33.40
6	2483.50	53.1 AV	54.0	-0.9	1.00 V	13	19.70	33.40
7	4874.00	58.3 PK	74.0	-15.7	1.00 V	13	56.40	1.90
8	4874.00	44.4 AV	54.0	-9.6	1.00 V	13	42.50	1.90

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.3 PK			1.00 H	172	72.90	33.40
2	*2462.00	96.4 AV			1.00 H	172	63.00	33.40
3	2483.50	64.3 PK	74.0	-9.7	1.00 H	171	30.90	33.40
4	2483.50	48.8 AV	54.0	-5.2	1.00 H	171	15.40	33.40
5	4924.00	50.2 PK	74.0	-23.8	1.46 H	276	48.20	2.00
6	4924.00	37.4 AV	54.0	-16.6	1.46 H	276	35.40	2.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	114.7 PK			1.00 V	23	81.30	33.40
2	*2462.00	104.4 AV			1.00 V	23	71.00	33.40
3	2483.50	72.3 PK	74.0	-1.7	1.00 V	15	38.90	33.40
4	2483.50	53.5 AV	54.0	-0.5	1.00 V	15	20.10	33.40
5	4924.00	51.9 PK	74.0	-22.1	1.09 V	348	49.90	2.00
6	4924.00	38.1 AV	54.0	-15.9	1.09 V	348	36.10	2.00

REMARKS:

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

802.11n (HT20)

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

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	62.9 PK	74.0	-11.1	1.00 H	171	29.90	33.00
2	2390.00	49.1 AV	54.0	-4.9	1.00 H	171	16.10	33.00
3	*2412.00	105.1 PK			1.00 H	171	72.00	33.10
4	*2412.00	94.7 AV			1.00 H	171	61.60	33.10
5	4824.00	50.6 PK	74.0	-23.4	1.12 H	321	48.80	1.80
6	4824.00	37.0 AV	54.0	-17.0	1.12 H	321	35.20	1.80
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	70.4 PK	74.0	-3.6	1.00 V	29	37.40	33.00
2	2390.00	53.6 AV	54.0	-0.4	1.00 V	29	20.60	33.00
3	*2412.00	113.8 PK			1.00 V	18	80.70	33.10
4	*2412.00	102.5 AV			1.00 V	18	69.40	33.10
5	4824.00	51.6 PK	74.0	-22.4	1.00 V	22	49.80	1.80
6	4824.00	37.3 AV	54.0	-16.7	1.00 V	22	35.50	1.80

REMARKS:

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

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

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	61.9 PK	74.0	-12.1	1.00 H	191	28.90	33.00
2	2390.00	49.6 AV	54.0	-4.4	1.00 H	191	16.60	33.00
3	*2437.00	112.7 PK			1.01 H	170	79.40	33.30
4	*2437.00	102.9 AV			1.01 H	170	69.60	33.30
5	2483.50	63.8 PK	74.0	-10.2	1.18 H	169	30.40	33.40
6	2483.50	49.5 AV	54.0	-4.5	1.18 H	169	16.10	33.40
7	4874.00	55.4 PK	74.0	-18.6	1.00 H	265	53.50	1.90
8	4874.00	41.7 AV	54.0	-12.3	1.00 H	265	39.80	1.90
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	69.0 PK	74.0	-5.0	1.00 V	23	36.00	33.00
2	2390.00	53.5 AV	54.0	-0.5	1.00 V	23	20.50	33.00
3	*2437.00	119.9 PK			1.00 V	45	86.60	33.30
4	*2437.00	108.6 AV			1.00 V	45	75.30	33.30
5	2483.50	68.6 PK	74.0	-5.4	1.00 V	13	35.20	33.40
6	2483.50	53.4 AV	54.0	-0.6	1.00 V	13	20.00	33.40
7	4874.00	58.1 PK	74.0	-15.9	1.00 V	26	56.20	1.90
8	4874.00	44.2 AV	54.0	-9.8	1.00 V	26	42.30	1.90

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.2 PK			1.00 H	170	71.80	33.40
2	*2462.00	94.9 AV			1.00 H	170	61.50	33.40
3	2483.50	64.2 PK	74.0	-9.8	1.00 H	174	30.80	33.40
4	2483.50	48.9 AV	54.0	-5.1	1.00 H	174	15.50	33.40
5	4924.00	50.1 PK	74.0	-23.9	1.43 H	273	48.10	2.00
6	4924.00	37.2 AV	54.0	-16.8	1.43 H	273	35.20	2.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	112.5 PK			1.00 V	46	79.10	33.40
2	*2462.00	102.9 AV			1.00 V	46	69.50	33.40
3	2483.50	70.5 PK	74.0	-3.5	1.00 V	7	37.10	33.40
4	2483.50	53.5 AV	54.0	-0.5	1.00 V	7	20.10	33.40
5	4924.00	51.7 PK	74.0	-22.3	1.03 V	336	49.70	2.00
6	4924.00	37.8 AV	54.0	-16.2	1.03 V	336	35.80	2.00

REMARKS:

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

802.11n (HT40)

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

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	61.9 PK	74.0	-12.1	1.00 H	169	28.90	33.00
2	2390.00	48.5 AV	54.0	-5.5	1.00 H	169	15.50	33.00
3	*2422.00	97.8 PK			1.00 H	172	64.60	33.20
4	*2422.00	87.3 AV			1.00 H	172	54.10	33.20
5	4844.00	48.0 PK	74.0	-26.0	1.00 H	186	46.20	1.80
6	4844.00	34.1 AV	54.0	-19.9	1.00 H	186	32.30	1.80
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	68.9 PK	74.0	-5.1	1.00 V	23	35.90	33.00
2	2390.00	53.4 AV	54.0	-0.6	1.00 V	23	20.40	33.00
3	*2422.00	105.4 PK			1.00 V	16	72.20	33.20
4	*2422.00	95.6 AV			1.00 V	16	62.40	33.20
5	4844.00	47.9 PK	74.0	-26.1	1.00 V	321	46.10	1.80
6	4844.00	34.7 AV	54.0	-19.3	1.00 V	321	32.90	1.80

REMARKS:

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

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

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	62.3 PK	74.0	-11.7	1.00 H	169	29.30	33.00
2	2390.00	48.9 AV	54.0	-5.1	1.00 H	169	15.90	33.00
3	*2437.00	103.0 PK			1.00 H	173	69.70	33.30
4	*2437.00	93.4 AV			1.00 H	173	60.10	33.30
5	2483.50	61.6 PK	74.0	-12.4	1.00 H	171	28.20	33.40
6	2483.50	48.1 AV	54.0	-5.9	1.00 H	171	14.70	33.40
7	4874.00	51.8 PK	74.0	-22.2	1.07 H	261	49.90	1.90
8	4874.00	37.5 AV	54.0	-16.5	1.07 H	261	35.60	1.90
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	68.6 PK	74.0	-5.4	1.00 V	225	35.60	33.00
2	2390.00	53.6 AV	54.0	-0.4	1.00 V	225	20.60	33.00
3	*2437.00	111.3 PK			1.00 V	9	78.00	33.30
4	*2437.00	100.0 AV			1.00 V	9	66.70	33.30
5	2483.50	68.5 PK	74.0	-5.5	1.00 V	11	35.10	33.40
6	2483.50	52.4 AV	54.0	-1.6	1.00 V	11	19.00	33.40
7	4874.00	50.9 PK	74.0	-23.1	1.08 V	349	49.00	1.90
8	4874.00	37.0 AV	54.0	-17.0	1.08 V	349	35.10	1.90

REMARKS:

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

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

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	98.9 PK			1.00 H	20	65.60	33.30
2	*2452.00	89.6 AV			1.00 H	20	56.30	33.30
3	2483.50	61.5 PK	74.0	-12.5	1.00 H	19	28.10	33.40
4	2483.50	48.0 AV	54.0	-6.0	1.00 H	19	14.60	33.40
5	4904.00	49.1 PK	74.0	-24.9	1.01 H	260	47.10	2.00
6	4904.00	35.8 AV	54.0	-18.2	1.01 H	260	33.80	2.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	108.9 PK			1.00 V	18	75.60	33.30
2	*2452.00	98.4 AV			1.00 V	18	65.10	33.30
3	2483.50	68.9 PK	74.0	-5.1	1.00 V	8	35.50	33.40
4	2483.50	53.4 AV	54.0	-0.6	1.00 V	8	20.00	33.40
5	4904.00	48.6 PK	74.0	-25.4	1.00 V	15	46.60	2.00
6	4904.00	35.8 AV	54.0	-18.2	1.00 V	15	33.80	2.00

REMARKS:

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

Below 1GHz Worst-Case Data

802.11g

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	61.10	24.3 QP	40.0	-15.7	1.99 H	334	39.20	-14.90
2	173.85	27.8 QP	43.5	-15.7	1.24 H	286	42.40	-14.60
3	201.06	31.3 QP	43.5	-12.2	1.00 H	142	48.00	-16.70
4	624.83	29.0 QP	46.0	-17.0	1.24 H	234	34.70	-5.70
5	675.37	28.9 QP	46.0	-17.1	1.00 H	219	34.10	-5.20
6	998.06	28.8 QP	54.0	-25.2	1.24 H	108	28.60	0.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	35.83	30.6 QP	40.0	-9.4	1.49 V	34	46.00	-15.40
2	57.95	33.7 QP	40.0	-6.3	1.00 V	0	48.20	-14.50
3	94.15	27.2 QP	43.5	-16.3	1.24 V	285	46.60	-19.40
4	199.12	25.2 QP	43.5	-18.3	1.00 V	294	41.80	-16.60
5	500.42	29.1 QP	46.0	-16.9	1.00 V	277	37.70	-8.60
6	901.37	38.5 QP	46.0	-7.5	1.00 V	19	39.80	-1.30

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	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.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Apr. 24, 2014	Apr. 23, 2015
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 30, 2014	Dec. 29, 2015
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 10, 2014	Jul. 09, 2015
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Notes: 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.

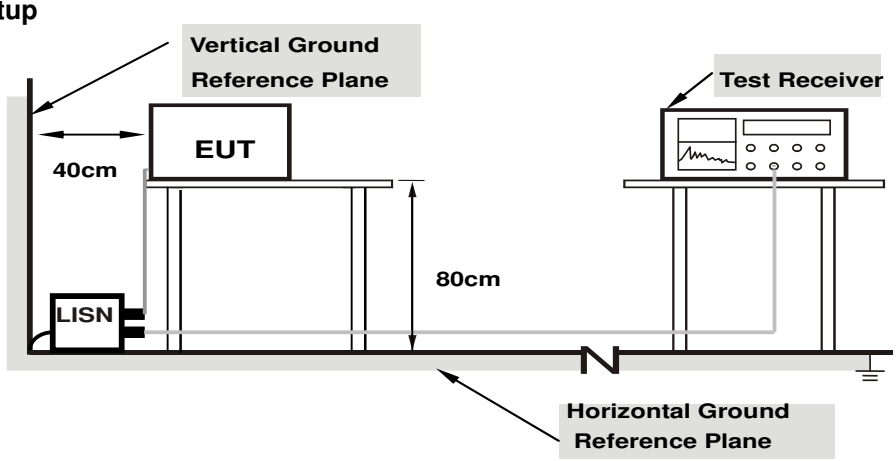
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

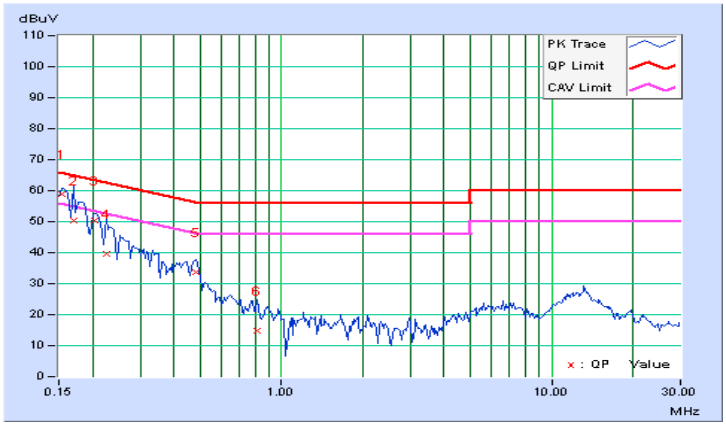
4.2.7 Test Results

PHASE	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15391**	**0.20**	**58.75**	**46.06**	**58.95**	**46.26**	**65.79**	**55.79**	**-6.84**	**-9.53**
2	0.16953	0.20	50.07	24.90	50.27	25.10	64.98	54.98	-14.72	-29.89
3	0.20469	0.20	50.32	36.44	50.52	36.64	63.42	53.42	-12.90	-16.78
4	0.22422	0.20	39.53	20.37	39.73	20.57	62.66	52.66	-22.93	-32.09
5	0.48203	0.21	33.32	24.11	33.53	24.32	56.30	46.30	-22.77	-21.98
6	0.81016	0.27	14.67	5.47	14.94	5.74	56.00	46.00	-41.06	-40.26

REMARKS:

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

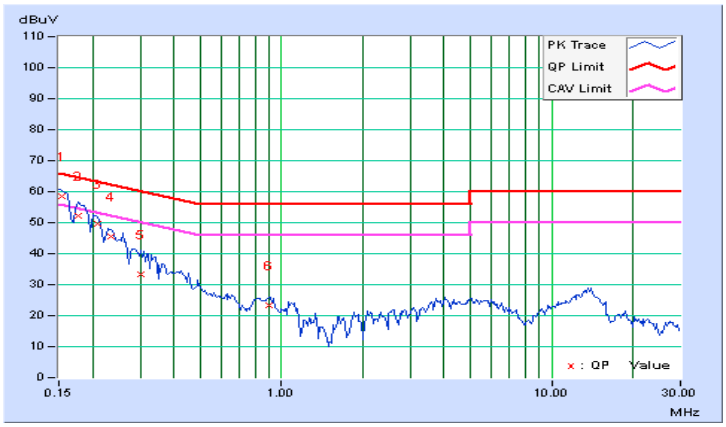


PHASE	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.21	58.20	44.72	58.41	44.93	65.79	55.79	-7.38	-10.86
2	0.17734	0.21	52.18	36.04	52.39	36.25	64.61	54.61	-12.22	-18.36
3	0.20968	0.22	49.33	37.91	49.55	38.13	63.22	53.22	-13.67	-15.09
4	0.23448	0.23	45.36	33.10	45.59	33.33	62.29	52.29	-16.70	-18.96
5	0.30234	0.24	33.16	25.31	33.40	25.55	60.18	50.18	-26.78	-24.63
6	0.89609	0.30	22.89	16.11	23.19	16.41	56.00	46.00	-32.81	-29.59

REMARKS:

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

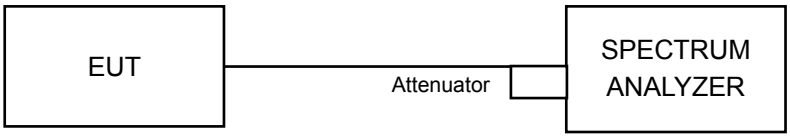


4.3 6dB Bandwidth Measurement

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

558074 D01 DTS Meas Guidance v03r02 section 8.1

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. 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 fromTest 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.

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.04	0.5	PASS
6	2437	9.03	0.5	PASS
11	2462	8.55	0.5	PASS

802.11g

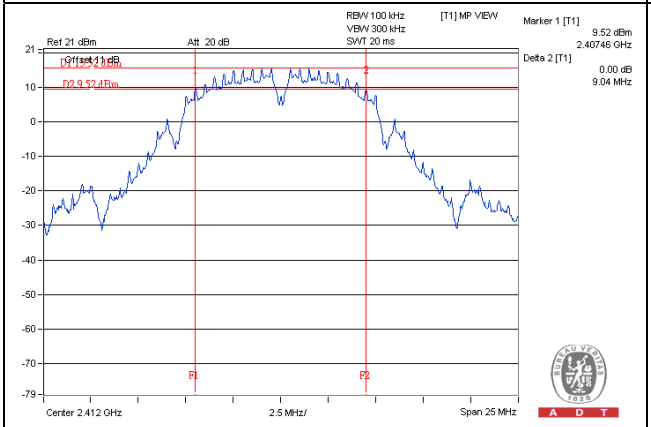
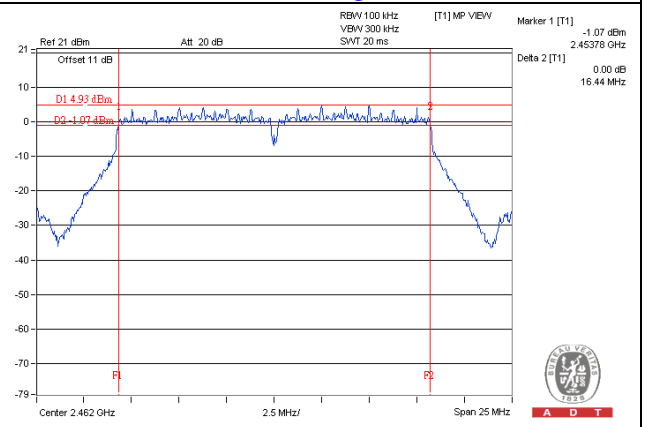
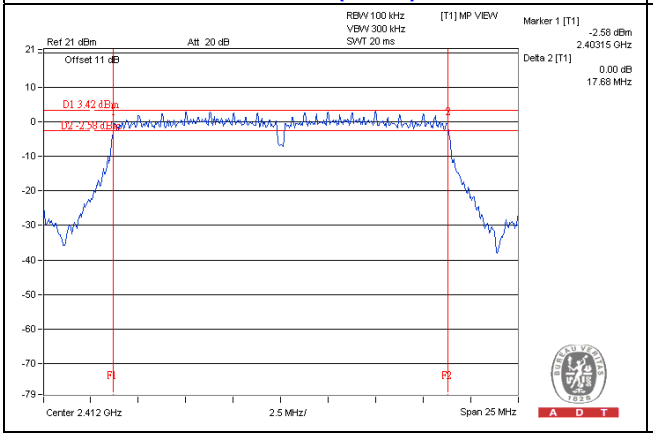
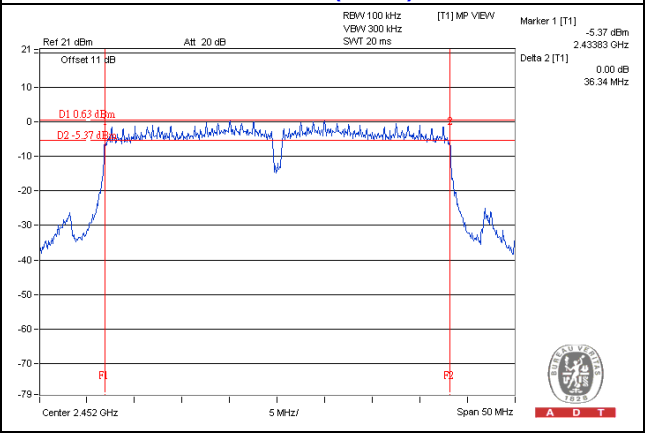
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
1	2412	16.43	16.43	0.5	PASS
6	2437	16.41	16.41	0.5	PASS
11	2462	16.43	16.44	0.5	PASS

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
1	2412	17.66	17.68	0.5	PASS
6	2437	17.62	17.64	0.5	PASS
11	2462	17.64	17.65	0.5	PASS

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1		
3	2422	35.81	35.69	0.5	PASS
6	2437	35.84	36.10	0.5	PASS
9	2452	35.40	36.34	0.5	PASS

Spectrum Plot of Worst Value	
802.11b	**802.11g**
	
802.11n (HT20)	**802.11n (HT40)**
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

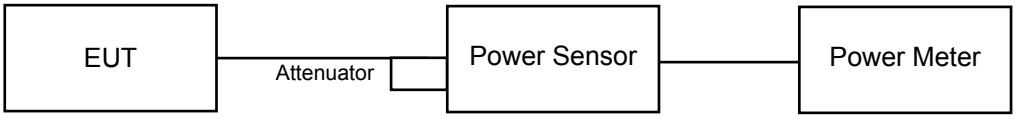
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 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 ≥ 5.

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

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

558074 D01 DTS Meas Guidance v03r02 section 9.2.3.2
An average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor. Record the power level.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as item 4.3.6.

4.4.7 Test Results

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	329.610	25.18	30	Pass
6	2437	365.595	25.63	30	Pass
11	2462	285.759	24.56	30	Pass

802.11g

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
1	2412	16.45	16.17	85.557	19.32	30	Pass
6	2437	23.90	24.36	**518.369**	27.15	30	Pass
11	2462	17.17	17.20	104.600	20.20	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
1	2412	15.86	15.84	76.919	18.86	30	Pass
6	2437	22.60	23.18	389.940	25.91	30	Pass
11	2462	16.82	16.72	95.073	19.78	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
3	2422	11.02	11.94	28.278	14.51	30	Pass
6	2437	16.97	17.92	111.718	20.48	30	Pass
9	2452	14.54	15.66	65.258	18.15	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

Same as item 4.3.2

4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

558074 D01 DTS Meas Guidance v03r02 section 10.3
For AVG. power (duty cycle ≥ 98%)
a) Set instrument center frequency to DTS channel center frequency.
b) Set span to at least 1.5 times the OBW.
c) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz. .
d) Set VBW ≥3 x RBW.
e) Detector = power averaging (RMS) or sample detector (when RMS not available).
f) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g) Sweep time = auto couple.
h) Employ trace averaging (RMS) mode over a minimum of 100 traces.
i) Use the peak marker function to determine the maximum amplitude level.

For AVG. power (duty cycle < 98%)
a) Measure the duty cycle (x).
b) Set instrument center frequency to DTS channel center frequency.
c) Set span to at least 1.5 times the OBW.
d) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
e) Set VBW ≥3 x RBW.
f) Detector = power averaging (RMS) or sample detector (when RMS not available).
g) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
h) Sweep time = auto couple.
i) Do not use sweep triggering. Allow sweep to “free run”.
j) Employ trace averaging (RMS) mode over a minimum of 100 traces.
k) Use the peak marker function to determine the maximum amplitude level.
l) Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as item 4.3.6

4.5.7 Test Results

802.11b

Chan.	Freq. (MHz)	PSD (dBm/10kHz)	Duty Factor	PSD with Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-4.78	0.22	-4.56	8	PASS
6	2437	-4.40	0.22	-4.18	8	PASS
11	2462	-5.12	0.22	-4.90	8	PASS

802.11g

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Total PSD w/o Duty Factor (dBm/10kHz)	Duty Factor	Total PSD with Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-15.67	3.01	-12.66	0.24	-12.42	8	PASS
	6	2437	-7.58	3.01	-4.57	0.24	-4.33	8	PASS
	11	2462	-14.55	3.01	-11.54	0.24	-11.30	8	PASS
1	1	2412	-15.49	3.01	-12.48	0.24	-12.24	8	PASS
	6	2437	-7.06	3.01	-4.05	0.24	-3.81	8	PASS
	11	2462	-15.04	3.01	-12.03	0.24	-11.79	8	PASS

NOTE:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

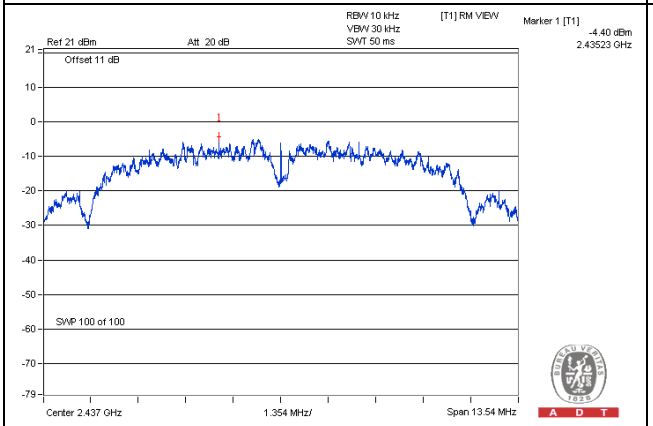
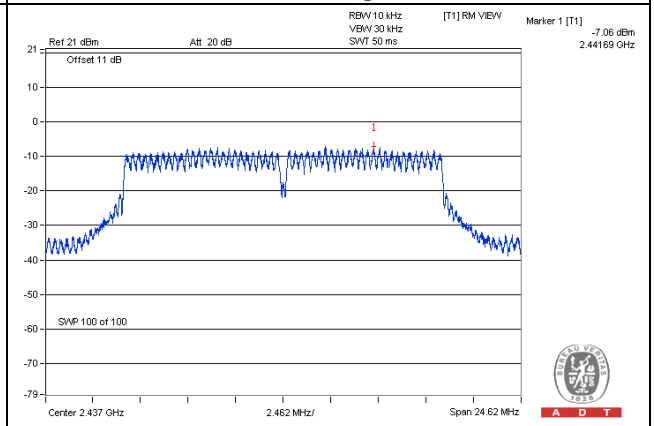
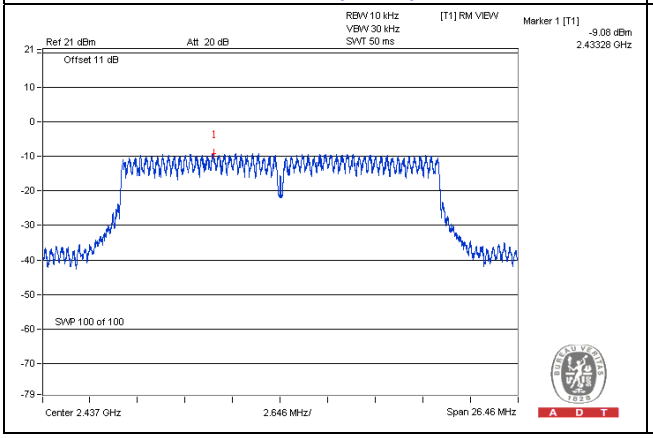
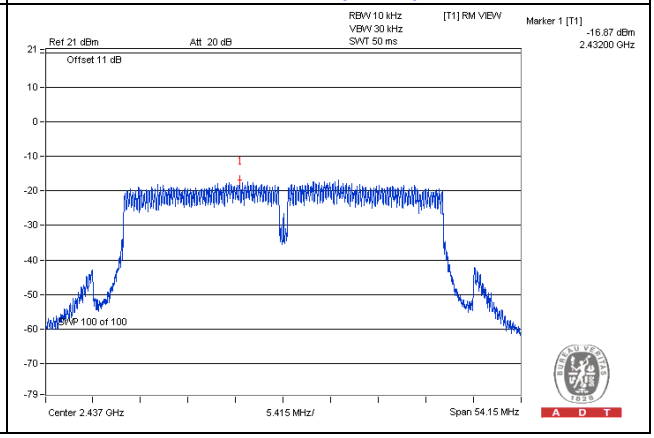
TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Total PSD w/o Duty Factor (dBm/10kHz)	Duty Factor	Total PSD with Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-15.88	3.01	-12.87	0.24	-12.63	8	PASS
	6	2437	-9.27	3.01	-6.26	0.24	-6.02	8	PASS
	11	2462	-15.60	3.01	-12.59	0.24	-12.35	8	PASS
1	1	2412	-16.49	3.01	-13.48	0.24	-13.24	8	PASS
	6	2437	-9.08	3.01	-6.07	0.24	-5.83	8	PASS
	11	2462	-15.56	3.01	-12.55	0.24	-12.31	8	PASS

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Total PSD w/o Duty Factor (dBm/10kHz)	Duty Factor	Total PSD with Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-25.12	3.01	-22.11	0.49	-21.62	8	PASS
	6	2437	-17.42	3.01	-14.41	0.49	-13.92	8	PASS
	9	2452	-20.08	3.01	-17.07	0.49	-16.58	8	PASS
1	3	2422	-22.85	3.01	-19.84	0.49	-19.35	8	PASS
	6	2437	-16.87	3.01	-13.86	0.49	-13.37	8	PASS
	9	2452	-19.29	3.01	-16.28	0.49	-15.79	8	PASS

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11b	**802.11g**
	
802.11n (HT20)	**802.11n (HT40)**
	

4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup

Same as item 4.3.2

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
558074 D01 DTS Meas Guidance v03r02 section 11.2
1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = average.
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 OOBE
558074 D01 DTS Meas Guidance v03r02 section 11.3
1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Ensure that the number of measurement points (30001 points) ≥ span/RBW.
4. According to measurement points to set differ measurement span of test plot and combined all data to a complete plot.
5. Detector = peak.
6. Sweep = auto couple.
7. Trace Mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

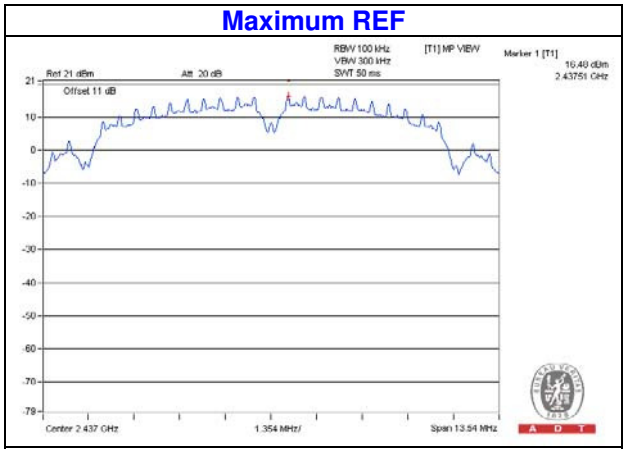
Same as item 4.3.6

4.6.7 Test Results

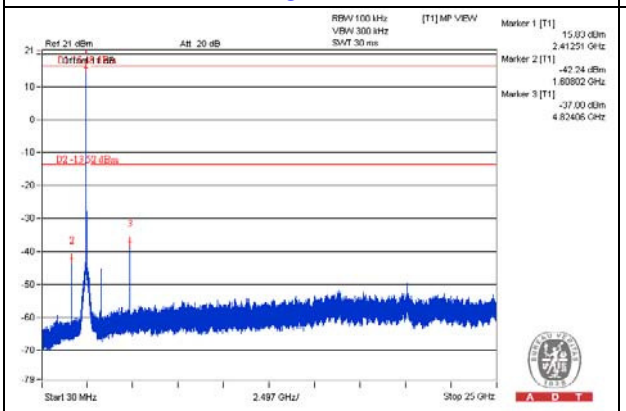
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b

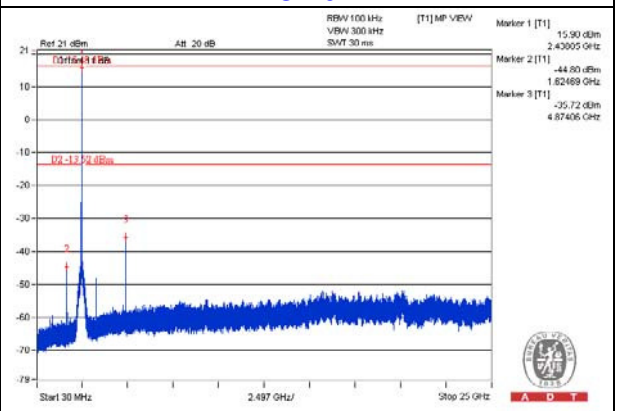
Maximum REF



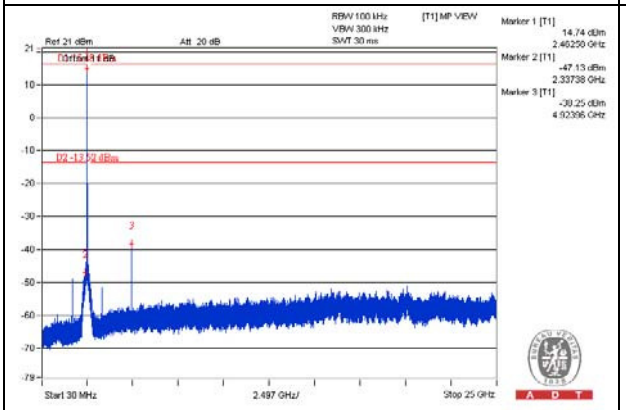
CH 1



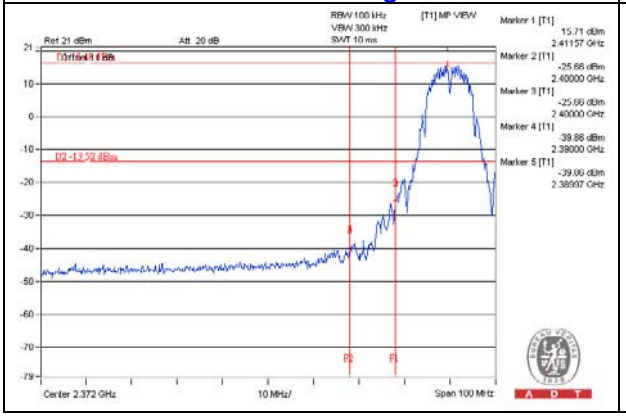
CH 6



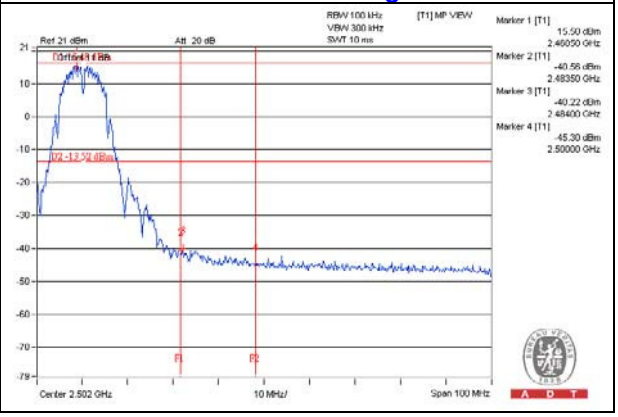
CH 11



CH 1 Band edge

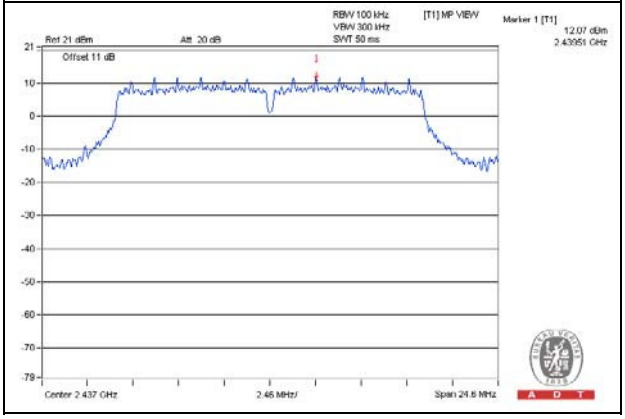


CH 11 Band edge

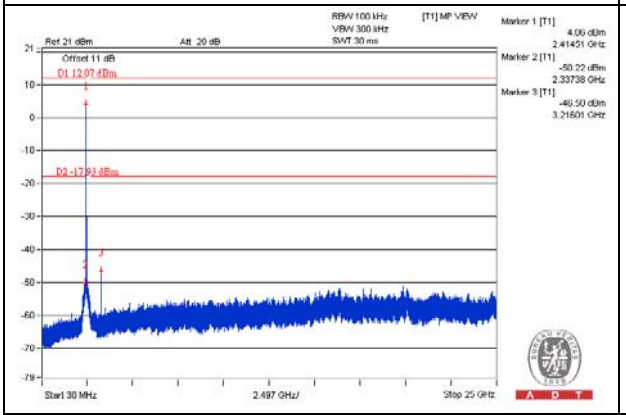


802.11g
CHAIN 0

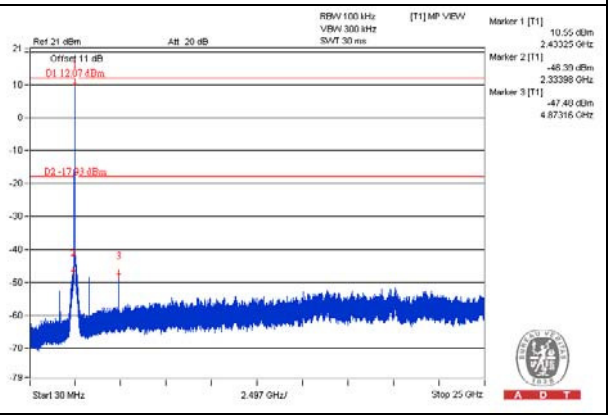
Maximum REF



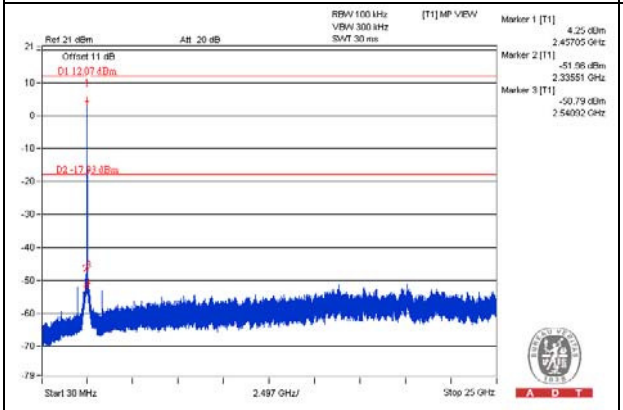
CH 1



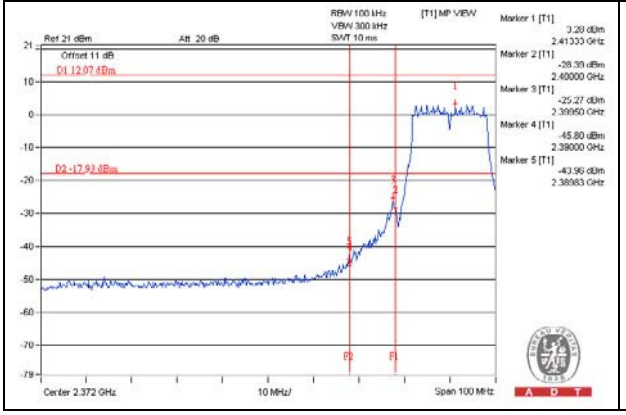
CH 6



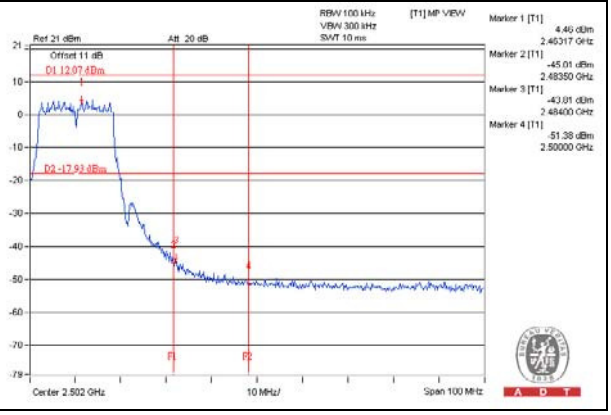
CH 11



CH 1 Band edge

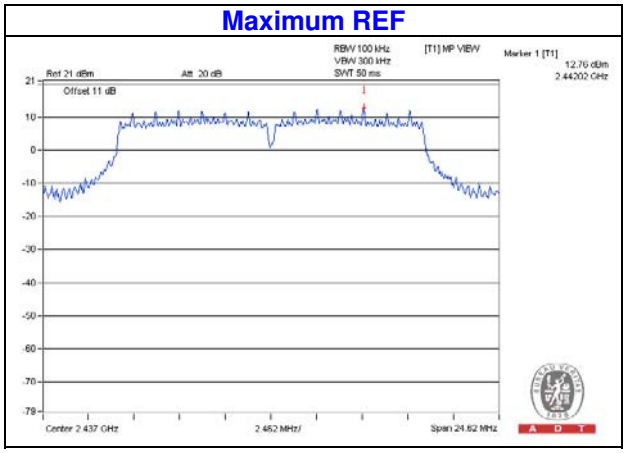


CH 11 Band edge

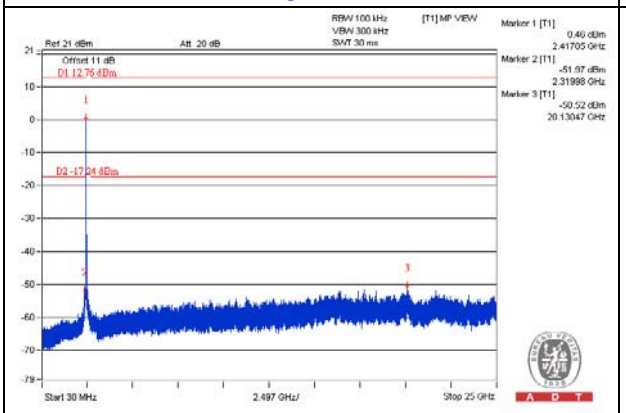


CHAIN 1

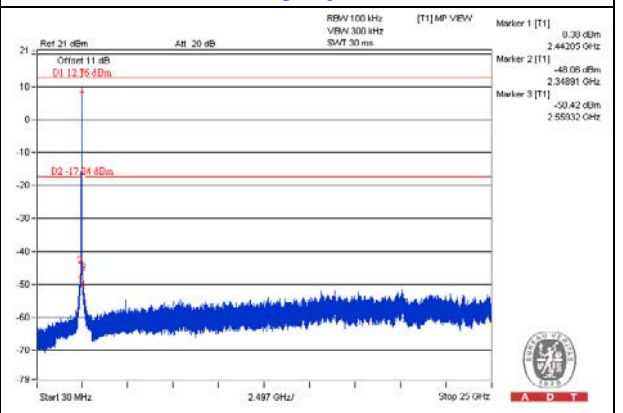
Maximum REF



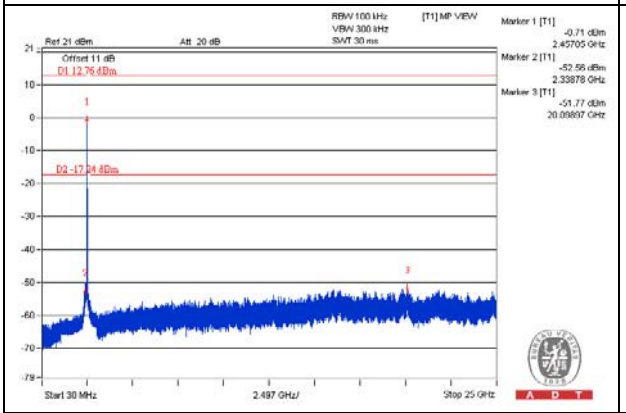
CH 1



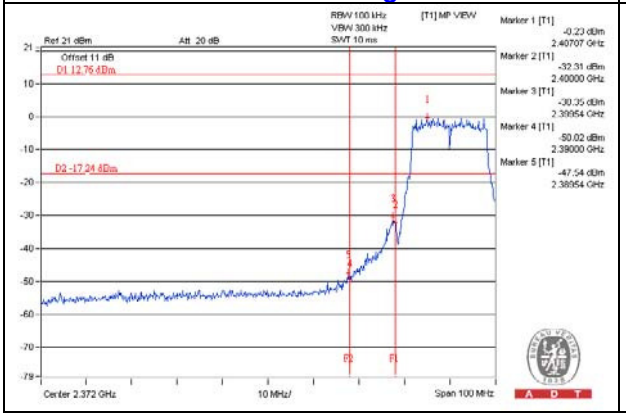
CH 6



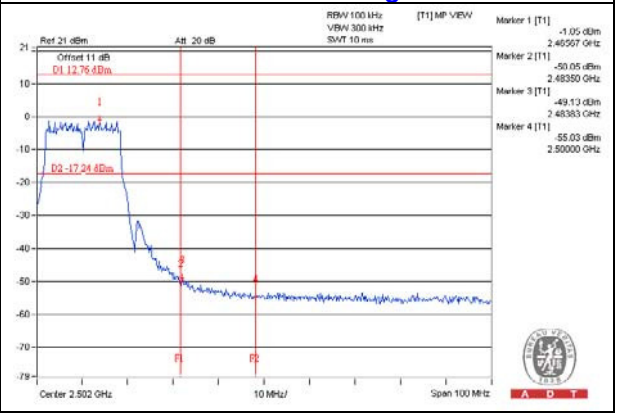
CH 11



CH 1 Band edge

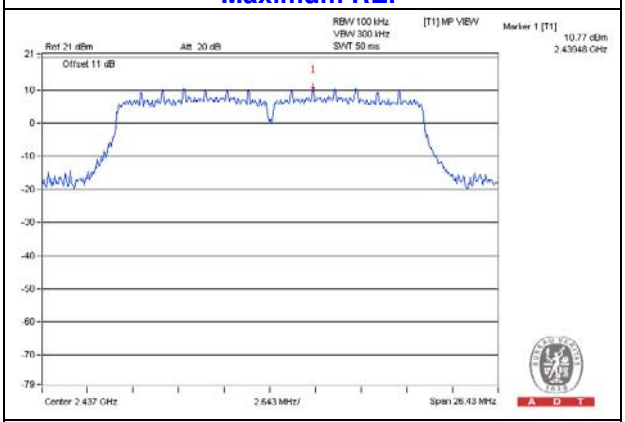


CH 11 Band edge

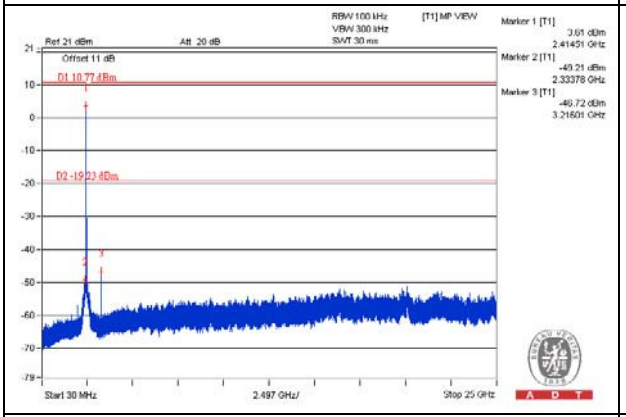


802.11n (HT20)
CHAIN 0

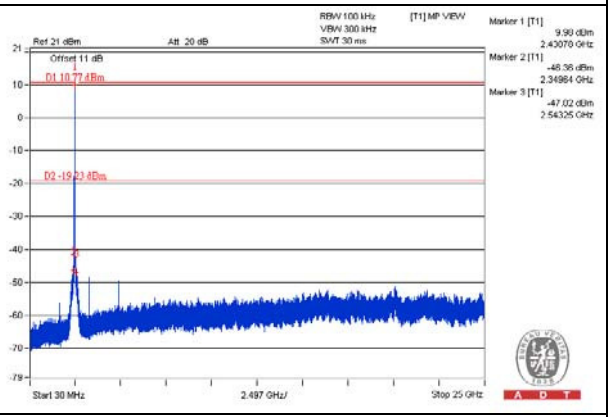
Maximum REF



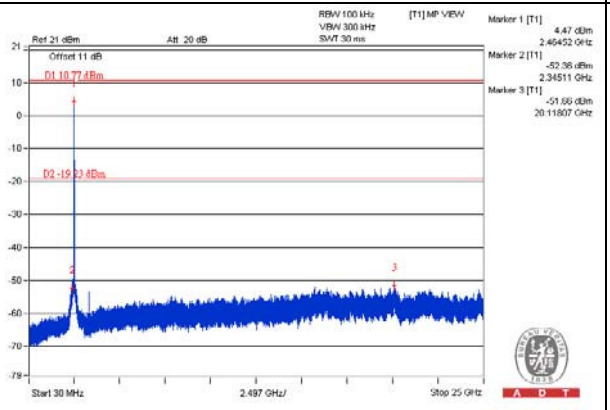
CH 1



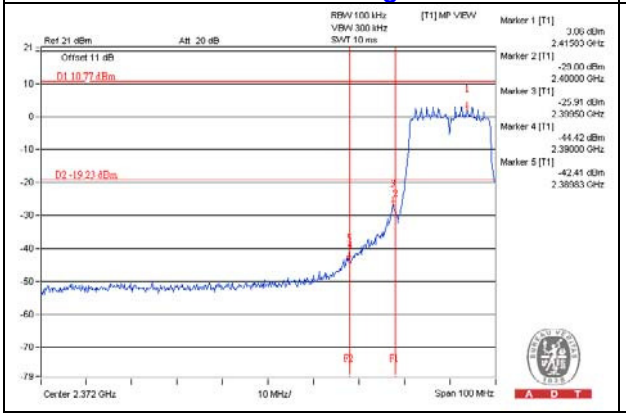
CH 6



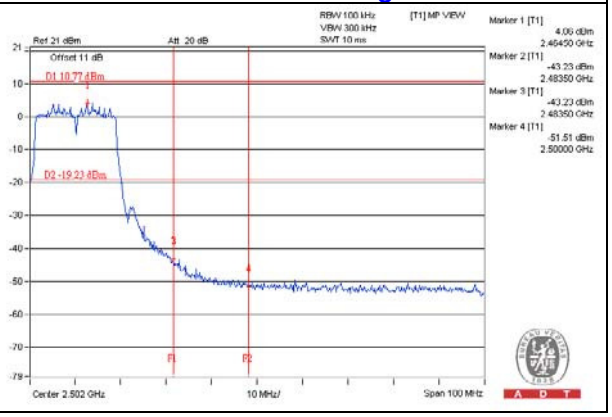
CH 11



CH 1 Band edge

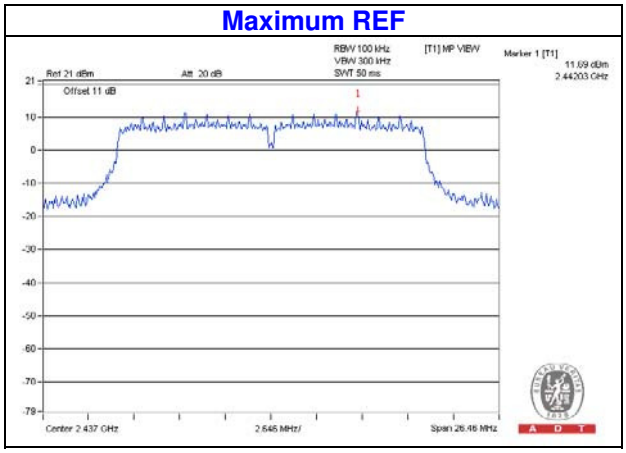


CH 11 Band edge

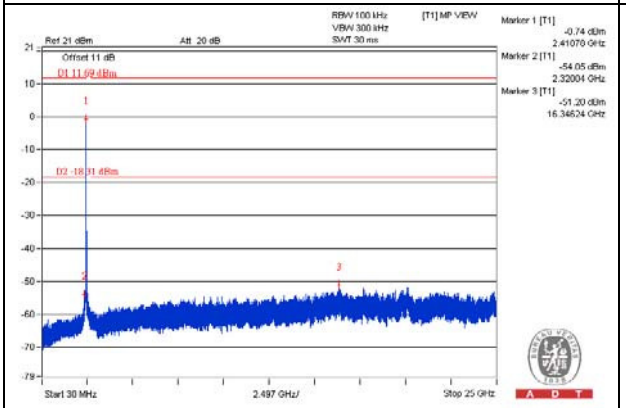


CHAIN 1

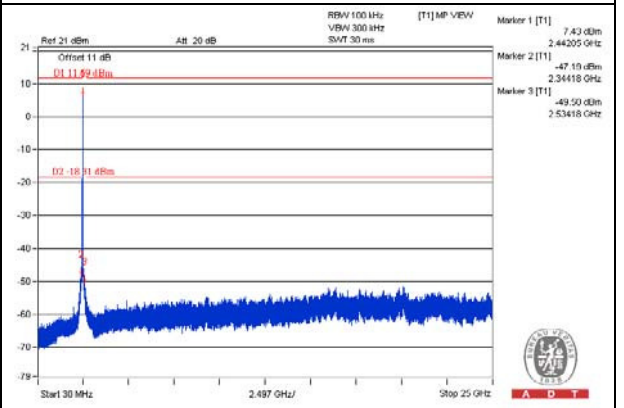
Maximum REF



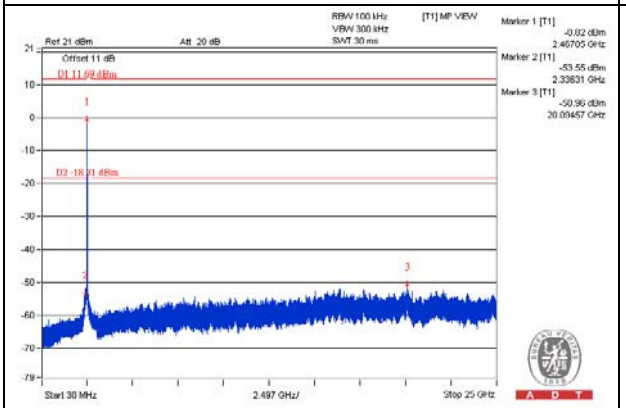
CH 1



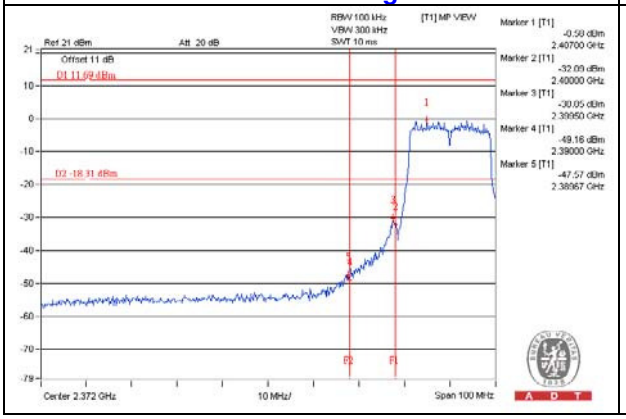
CH 6



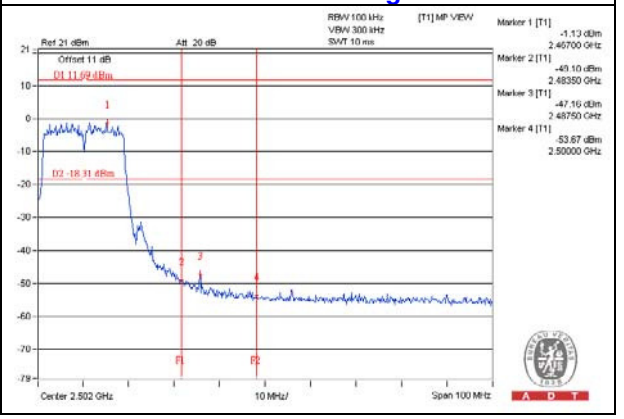
CH 11



CH 1 Band edge

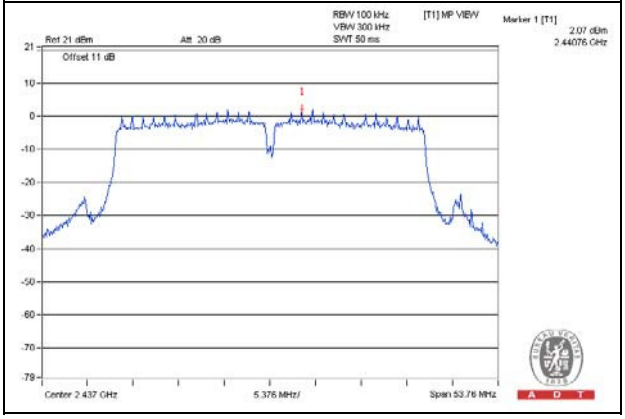


CH 11 Band edge

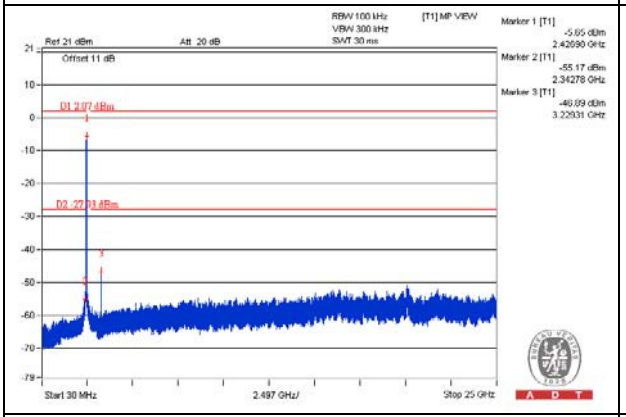


802.11n (HT40)
CHAIN 0

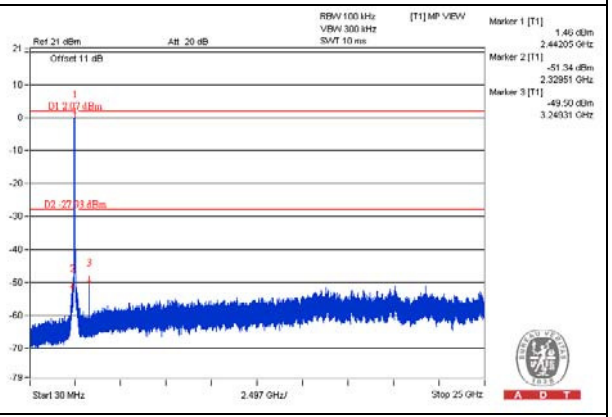
Maximum REF



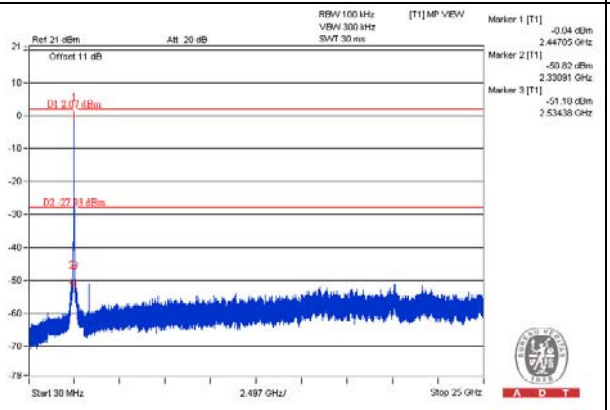
CH 3



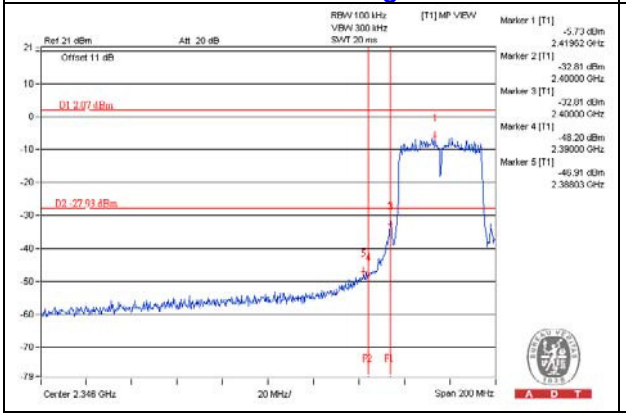
CH 6



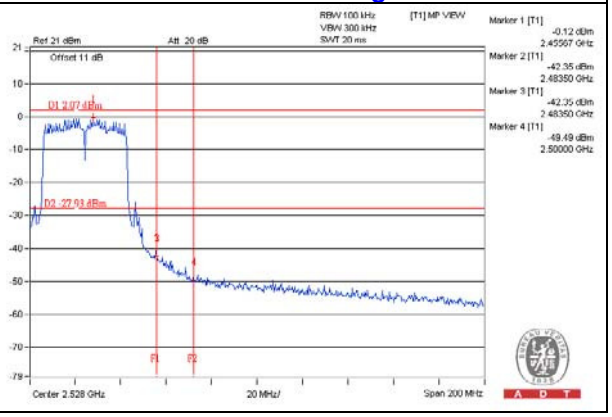
CH 9



CH 3 Band edge

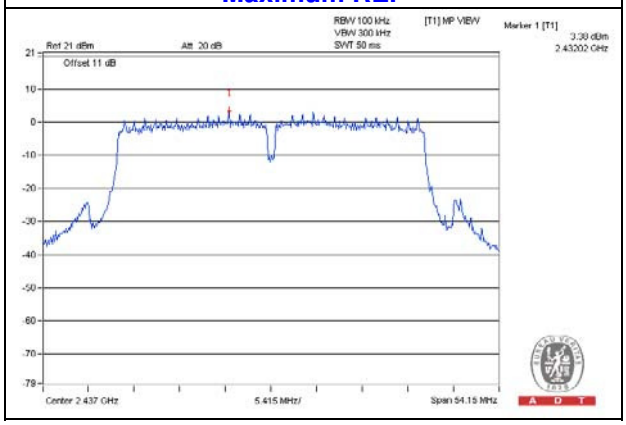


CH 9 Band edge

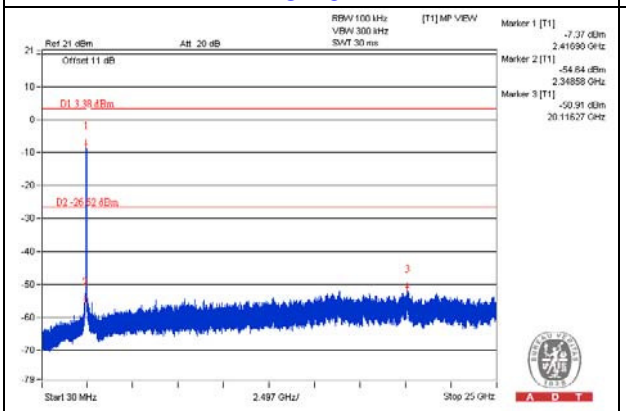


CHAIN 1

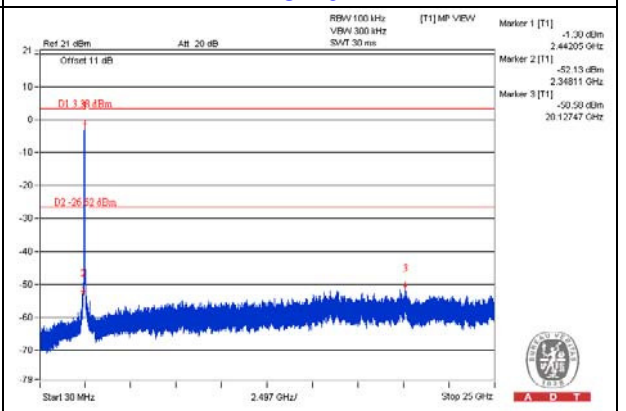
Maximum REF



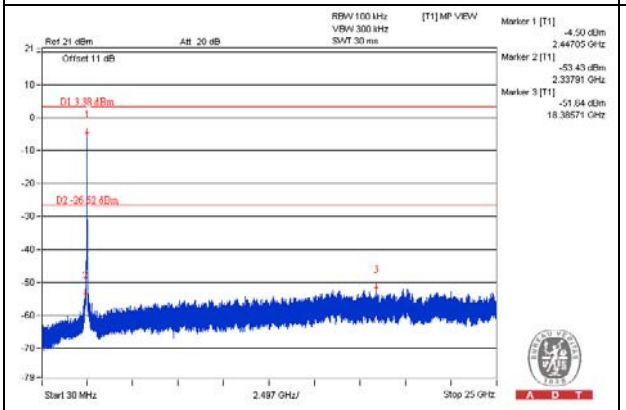
CH 3



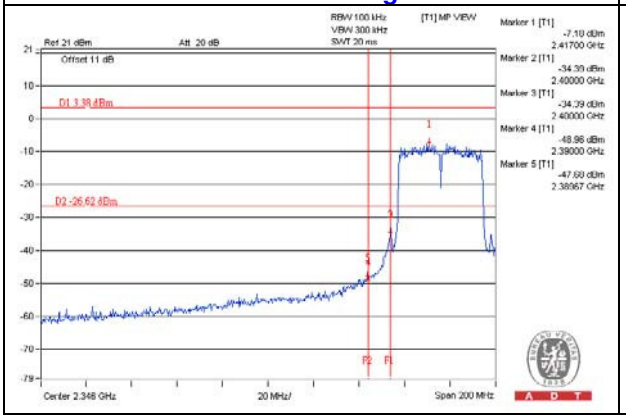
CH 6



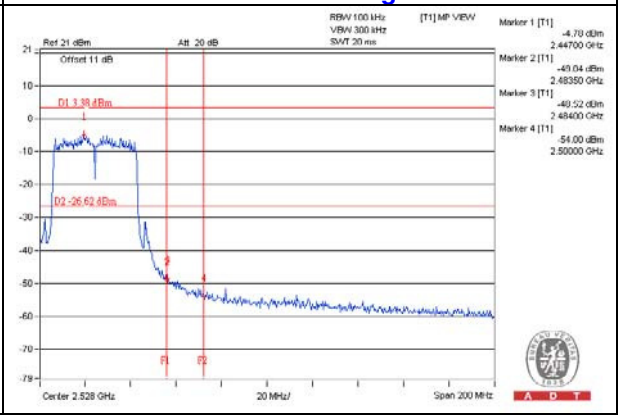
CH 9



CH 3 Band edge



CH 9 Band edge



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 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 30dB under any condition of modulation.

5.1.2 Test Instruments

Same as item 4.1.2.

5.1.3 Test Procedures

Same as item 4.1.3.

5.1.4 Deviation from Test Standard

No deviation.

5.1.5 Test Setup

Same as item 4.1.5.

5.1.6 EUT Operating Conditions

Same as item 4.1.6.

5.1.7 Test Results

Above 1GHz Data

802.11a

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

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	108.3 PK			1.00 H	188	67.70	40.60
2	*5745.00	97.7 AV			1.00 H	188	57.10	40.60
3	11490.00	61.3 PK	74.0	-12.7	1.00 H	288	42.50	18.80
4	11490.00	49.1 AV	54.0	-4.9	1.00 H	288	30.30	18.80
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	122.3 PK			1.00 V	5	81.70	40.60
2	*5745.00	112.9 AV			1.00 V	5	72.30	40.60
3	11490.00	64.7 PK	74.0	-9.3	1.36 V	309	45.90	18.80
4	11490.00	51.8 AV	54.0	-2.2	1.36 V	309	33.00	18.80

REMARKS:

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

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

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	106.6 PK			1.47 H	233	65.90	40.70
2	*5785.00	96.6 AV			1.47 H	233	55.90	40.70
3	11570.00	65.5 PK	74.0	-8.5	1.47 H	32	46.60	18.90
4	11570.00	52.3 AV	54.0	-1.7	1.47 H	32	33.40	18.90
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	122.2 PK			1.16 V	150	81.50	40.70
2	*5785.00	112.3 AV			1.16 V	150	71.60	40.70
3	11570.00	64.7 PK	74.0	-9.3	1.49 V	304	45.80	18.90
4	11570.00	51.5 AV	54.0	-2.5	1.49 V	304	32.60	18.90

REMARKS:

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

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

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	107.5 PK			1.02 H	234	66.80	40.70
2	*5825.00	97.6 AV			1.02 H	234	56.90	40.70
3	11650.00	65.8 PK	74.0	-8.2	1.59 H	35	46.40	19.40
4	11650.00	52.8 AV	54.0	-1.2	1.59 H	35	33.40	19.40
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	*5825.00	121.4 PK			1.00 V	134	80.70	40.70
2	*5825.00	111.7 AV			1.00 V	134	71.00	40.70
3	11650.00	66.4 PK	74.0	-7.6	1.05 V	307	47.00	19.40
4	11650.00	53.0 AV	54.0	-1.0	1.05 V	307	33.60	19.40

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

802.11n (HT20)

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

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	106.3 PK			1.00 H	107	65.70	40.60
2	*5745.00	96.1 AV			1.00 H	107	55.50	40.60
3	11490.00	59.6 PK	74.0	-14.4	1.12 H	289	40.80	18.80
4	11490.00	47.0 AV	54.0	-7.0	1.12 H	289	28.20	18.80
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	121.5 PK			1.00 V	150	80.90	40.60
2	*5745.00	111.9 AV			1.00 V	150	71.30	40.60
3	11490.00	61.6 PK	74.0	-12.4	1.48 V	23	42.80	18.80
4	11490.00	49.4 AV	54.0	-4.6	1.48 V	23	30.60	18.80

REMARKS:

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

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

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	106.2 PK			1.00 H	234	65.50	40.70
2	*5785.00	95.9 AV			1.00 H	234	55.20	40.70
3	11570.00	65.2 PK	74.0	-8.8	1.49 H	32	46.30	18.90
4	11570.00	52.0 AV	54.0	-2.0	1.49 H	32	33.10	18.90
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	122.7 PK			1.08 V	168	82.00	40.70
2	*5785.00	112.1 AV			1.08 V	168	71.40	40.70
3	11570.00	65.2 PK	74.0	-8.8	1.48 V	307	46.30	18.90
4	11570.00	51.8 AV	54.0	-2.2	1.48 V	307	32.90	18.90

REMARKS:

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

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

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	107.7 PK			1.23 H	232	67.00	40.70
2	*5825.00	96.3 AV			1.23 H	232	55.60	40.70
3	11650.00	65.7 PK	74.0	-8.3	1.60 H	34	46.30	19.40
4	11650.00	52.0 AV	54.0	-2.0	1.60 H	34	32.60	19.40
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	*5825.00	120.8 PK			1.00 V	136	80.10	40.70
2	*5825.00	111.1 AV			1.00 V	136	70.40	40.70
3	11650.00	66.7 PK	74.0	-7.3	1.44 V	21	47.30	19.40
4	11650.00	53.1 AV	54.0	-0.9	1.44 V	21	33.70	19.40

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

802.11n (HT40)

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

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	103.5 PK			1.00 H	106	62.80	40.70
2	*5755.00	93.0 AV			1.00 H	106	52.30	40.70
3	11510.00	58.2 PK	74.0	-15.8	1.12 H	72	39.40	18.80
4	11510.00	45.9 AV	54.0	-8.1	1.12 H	72	27.10	18.80
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	118.5 PK			1.00 V	184	77.80	40.70
2	*5755.00	108.8 AV			1.00 V	184	68.10	40.70
3	11510.00	61.6 PK	74.0	-12.4	1.41 V	307	42.80	18.80
4	11510.00	48.7 AV	54.0	-5.3	1.41 V	307	29.90	18.80

REMARKS:

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

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

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	103.3 PK			1.41 H	235	62.60	40.70
2	*5795.00	94.0 AV			1.41 H	235	53.30	40.70
3	11590.00	61.1 PK	74.0	-12.9	1.63 H	80	42.10	19.00
4	11590.00	48.4 AV	54.0	-5.6	1.63 H	80	29.40	19.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	118.1 PK			1.00 V	135	77.40	40.70
2	*5795.00	108.0 AV			1.00 V	135	67.30	40.70
3	11590.00	63.9 PK	74.0	-10.1	1.75 V	307	44.90	19.00
4	11590.00	50.3 AV	54.0	-3.7	1.75 V	307	31.30	19.00

REMARKS:

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

802.11ac (VHT80)

CHANNEL	TX Channel 155	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5775.00	101.1 PK			1.00 H	233	60.40	40.70
2	*5775.00	90.0 AV			1.00 H	233	49.30	40.70
3	11550.00	59.8 PK	74.0	-14.2	1.48 H	33	41.00	18.80
4	11550.00	47.1 AV	54.0	-6.9	1.48 H	33	28.30	18.80
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	*5775.00	114.8 PK			1.00 V	4	74.10	40.70
2	*5775.00	104.6 AV			1.00 V	4	63.90	40.70
3	11550.00	61.0 PK	74.0	-13.0	1.55 V	307	42.20	18.80
4	11550.00	47.7 AV	54.0	-6.3	1.55 V	307	28.90	18.80

REMARKS:

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

Below 1GHz Worst-Case Data

802.11n (HT20)

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	57.21	25.6 QP	40.0	-14.4	2.00 H	283	39.90	-14.30
2	162.18	26.2 QP	43.5	-17.3	1.51 H	261	40.20	-14.00
3	199.12	30.7 QP	43.5	-12.8	2.00 H	133	47.30	-16.60
4	624.83	27.9 QP	46.0	-18.1	1.26 H	235	33.60	-5.70
5	675.37	30.6 QP	46.0	-15.4	1.01 H	229	35.80	-5.20
6	947.52	29.4 QP	46.0	-16.6	2.00 H	298	29.70	-0.30
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	35.83	31.8 QP	40.0	-8.2	1.24 V	281	47.20	-15.40
2	57.21	34.2 QP	40.0	-5.8	1.00 V	296	48.50	-14.30
3	152.46	24.3 QP	43.5	-19.2	1.00 V	139	38.00	-13.70
4	203.01	25.8 QP	43.5	-17.7	1.00 V	158	42.50	-16.70
5	500.42	28.6 QP	46.0	-17.4	1.00 V	33	37.20	-8.60
6	924.19	29.0 QP	46.0	-17.0	1.49 V	15	29.50	-0.50

REMARKS:

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

5.2 Conducted Emission Measurement

5.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	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.

5.2.2 Test Instruments

Same as item 4.2.2.

5.2.3 Test Procedures

Same as item 4.2.3.

5.2.4 Deviation from Test Standard

No deviation.

5.2.5 Test Setup

Same as item 4.2.5.

5.2.6 EUT Operating Conditions

Same as item 4.1.6.

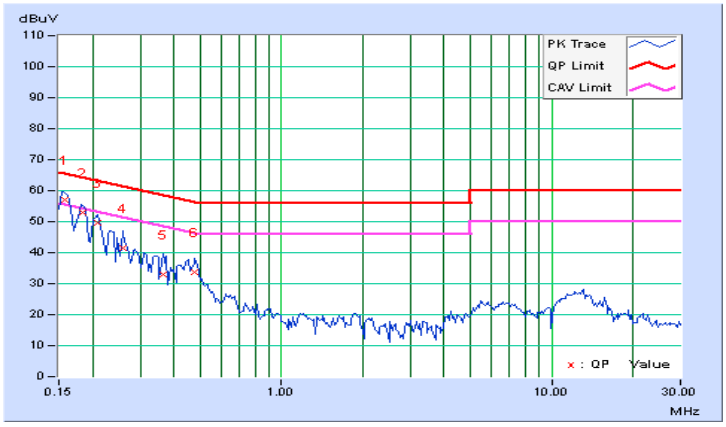
5.2.7 Test Results

PHASE	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.20	56.83	45.15	57.03	45.35	65.58	55.58	-8.55	-10.23
2	0.18380	0.20	52.85	41.42	53.05	41.62	64.31	54.31	-11.26	-12.69
3	0.20987	0.20	49.42	37.52	49.62	37.72	63.21	53.21	-13.59	-15.49
4	0.26066	0.20	41.22	27.46	41.42	27.66	61.41	51.41	-19.99	-23.75
5	0.36484	0.20	32.84	20.82	33.04	21.02	58.62	48.62	-25.58	-27.60
6	0.47813	0.21	33.56	26.29	33.77	26.50	56.37	46.37	-22.60	-19.87

REMARKS:

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

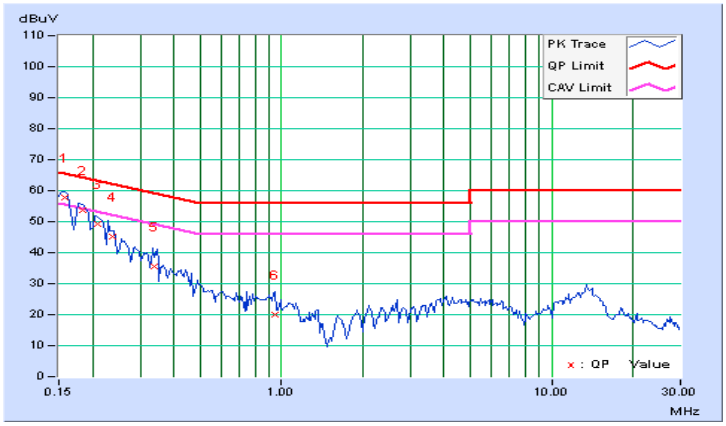


PHASE	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15773	0.21	57.63	45.93	57.84	46.14	65.58	55.58	-7.75	-9.45
2	0.18370	0.22	53.30	41.91	53.52	42.13	64.32	54.32	-10.80	-12.19
3	0.20978	0.22	49.07	37.52	49.29	37.74	63.21	53.21	-13.92	-15.47
4	0.23575	0.23	44.86	32.82	45.09	33.05	62.24	52.24	-17.16	-19.20
5	0.33868	0.24	35.19	24.85	35.43	25.09	59.24	49.24	-23.80	-24.14
6	0.95078	0.31	19.79	12.32	20.10	12.63	56.00	46.00	-35.90	-33.37

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.



5.3 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 Setup

Same as item 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 item 4.3.4.

5.3.5 Deviation fromTest Standard

No deviation.

5.3.6 EUT Operating Conditions

Same as item 4.3.6.

5.3.7 Test Result

802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	16.41	16.42	0.5	PASS
157	5785	16.42	16.42	0.5	PASS
165	5825	16.40	16.41	0.5	PASS

802.11n (HT20)

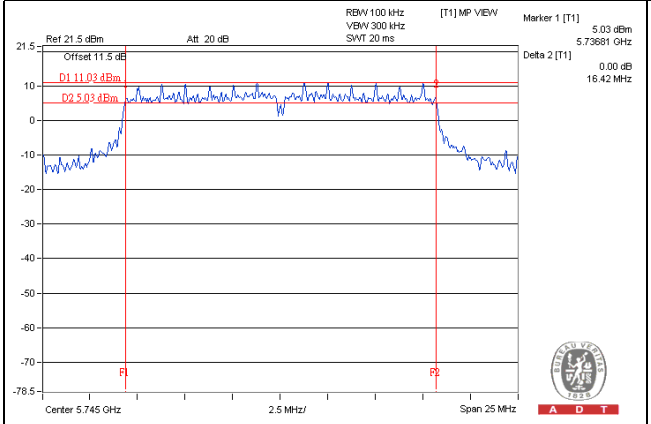
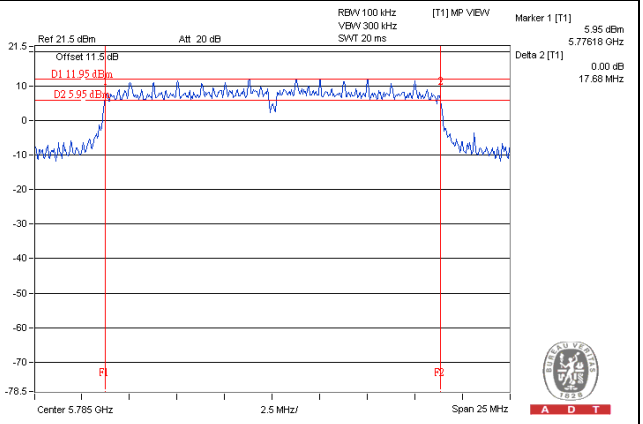
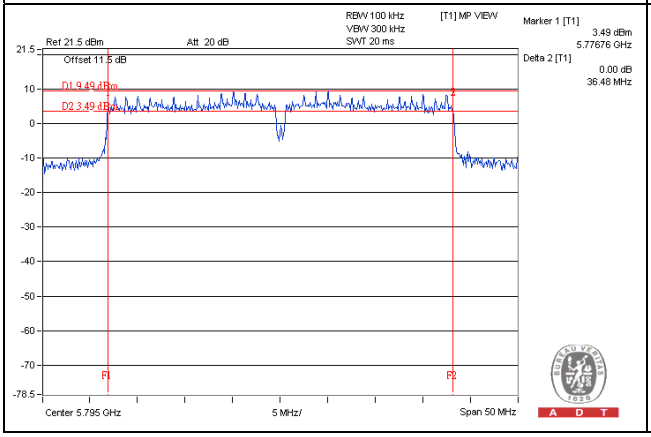
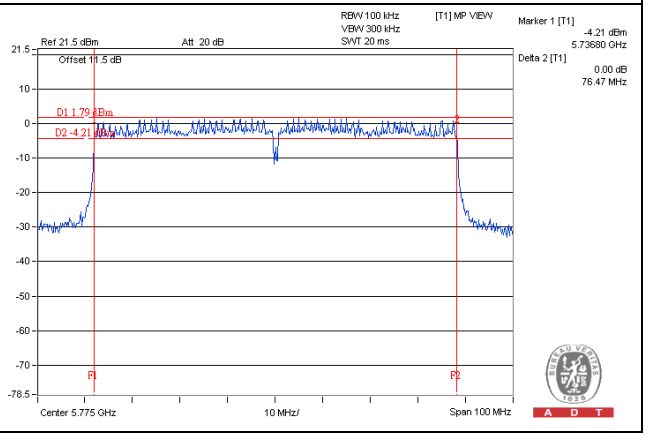
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	17.64	17.67	0.5	PASS
157	5785	17.62	17.68	0.5	PASS
165	5825	17.62	17.67	0.5	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
151	5755	36.43	36.44	0.5	PASS
159	5795	36.47	36.48	0.5	PASS

802.11ac (VHT80)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
155	5775	76.07	76.47	0.5	PASS

Spectrum Plot of Worst Value	
802.11a	**802.11n (HT20)**
	
802.11n (HT40)	**802.11ac (HT80)**
	

5.4 Conducted Output Power

5.4.1 Limits OF Conducted Output Power Measurement

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

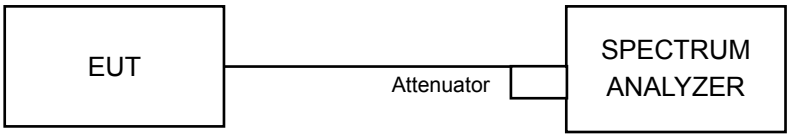
Per KDB 662911 D01 Multiple Transmitter Output v02r01 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 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 ≥ 5.

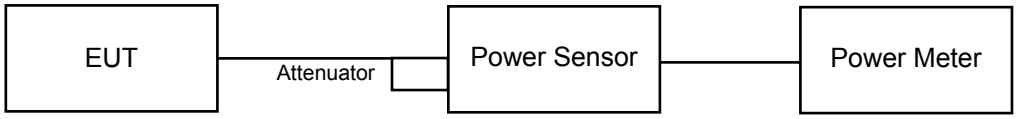
For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

5.4.2 Test Setup

For 802.11a, 802.11n (HT20), 802.11n (HT40)



For 802.11ac (VHT80)



5.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

5.4.4 Test Procedures

For 802.11a, 802.11n (HT20), 802.11n (HT40)

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

For 802.11ac (VHT80)

This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.

1) Set the RBW = 1 MHz.
2) Set the VBW ≥ 3 RBW.
3) Set the span ≥ 1.5 x DTS bandwidth.
4) Detector = peak.
5) Sweep time = auto couple.
6) Trace mode = max hold.
7) Allow trace to fully stabilize.
8) Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.

5.4.5 Deviation from Test Standard

No deviation.

5.4.6 EUT Operating Conditions

Same as item 4.3.6.

5.4.7 Test Results

FOR AVERAGE POWER

802.11a

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
149	5745	23.12	22.97	403.269	26.06	30	Pass
157	5785	24.84	23.95	553.102	27.43	30	Pass
165	5825	25.01	23.87	560.738	27.49	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
149	5745	23.12	22.87	398.758	26.01	30	Pass
157	5785	25.05	23.99	**570.501**	27.56	30	Pass
165	5825	25.19	23.80	570.253	27.56	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
151	5755	21.59	21.07	272.15	24.35	30	Pass
159	5795	24.99	23.71	550.463	27.41	30	Pass

802.11ac (HT80)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
155	5775	19.44	19.63	179.735	22.55	30	Pass

5.5 Power Spectral Density Measurement

5.5.1 Limits OF Power Spectral Density Measurement

Same as item 4.5.1.

5.5.2 Test Setup

Same as item 4.3.2

5.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

5.5.4 Test Procedure

Same as item 4.5.4.

5.5.5 Deviation from Test Standard

No deviation.

5.5.6 EUT Operating Condition

Same as item 4.3.6.

5.5.7 Test Results

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-8.36	3.01	-5.31	7.99	PASS
	157	5785	-6.57	3.01	-3.52	7.99	PASS
	165	5825	-7.88	3.01	-4.83	7.99	PASS
1	149	5745	-7.97	3.01	-4.92	7.99	PASS
	157	5785	-7.35	3.01	-4.30	7.99	PASS
	165	5825	-7.93	3.01	-4.88	7.99	PASS

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 3dBi + 10log(2) = 6.01dBi > 6dBi, so the power density limit shall be reduced to 8-(6.01-6) = 7.99dBm.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-8.83	3.01	-5.77	7.99	PASS
	157	5785	-7.87	3.01	-4.81	7.99	PASS
	165	5825	-8.66	3.01	-5.60	7.99	PASS
1	149	5745	-9.40	3.01	-6.34	7.99	PASS
	157	5785	-8.70	3.01	-5.64	7.99	PASS
	165	5825	-8.61	3.01	-5.55	7.99	PASS

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 3dBi + 10log(2) = 6.01dBi > 6dBi, so the power density limit shall be reduced to 8-(6.01-6) = 7.99dBm.

802.11n (HT40)

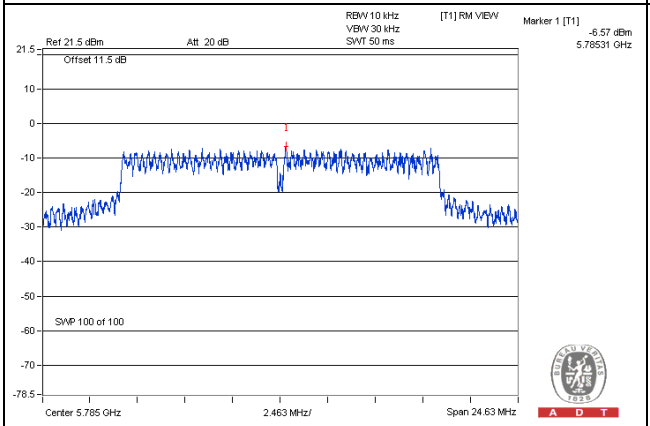
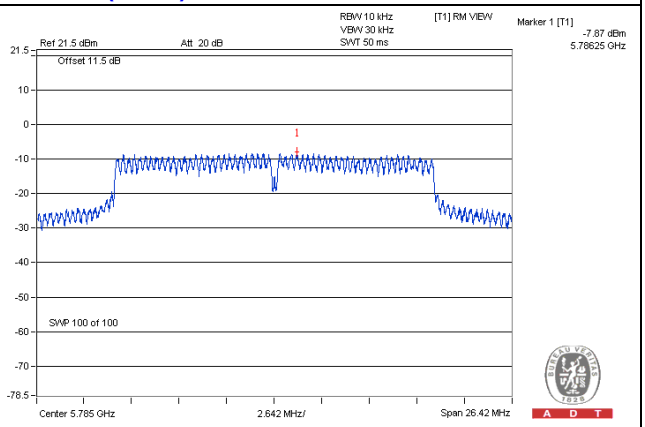
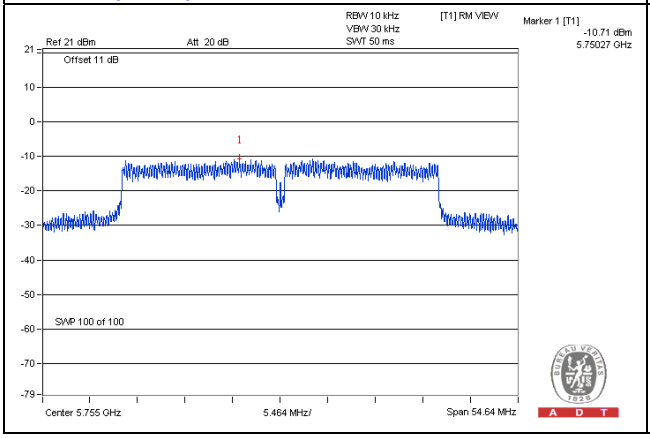
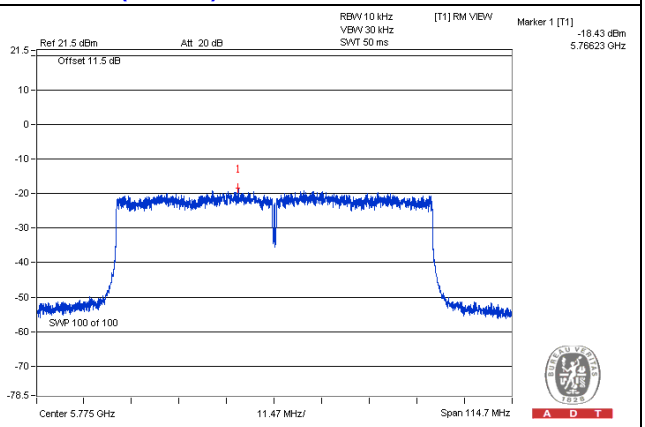
TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Total PSD w/o Duty Factor (dBm/10kHz)	Duty Factor	Total PSD with Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	151	5755	-10.71	3.01	-7.70	0.10	-7.60	7.99	PASS
	159	5795	-10.97	3.01	-7.96	0.10	-7.86	7.99	PASS
1	151	5755	-11.35	3.01	-8.34	0.10	-8.24	7.99	PASS
	159	5795	-11.48	3.01	-8.47	0.10	-8.37	7.99	PASS

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 3dBi + 10log(2) = 6.01dBi > 6dBi, so the power density limit shall be reduced to 8-(6.01-6) = 7.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Total PSD w/o Duty Factor (dBm/10kHz)	Duty Factor	Total PSD with Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	155	5775	-19.02	3.01	-16.01	0.15	-15.86	7.99	PASS
1	155	5775	-18.43	3.01	-15.42	0.15	-15.27	7.99	PASS

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 3dBi + 10log(2) = 6.01dBi > 6dBi, so the power density limit shall be reduced to 8-(6.01-6) = 7.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a	**802.11n (HT20)**
	
802.11n (HT40)	**802.11ac (VHT80)**
	

5.6 Conducted Out of Band Emission Measurement

5.6.1 Limits of Conducted Out of Band Emission Measurement

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

5.6.2 Test Setup

Same as item 4.3.2

5.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

5.6.4 Test Procedure

Same as item 4.6.4

5.6.5 Deviation from Test Standard

No deviation.

5.6.6 EUT Operating Condition

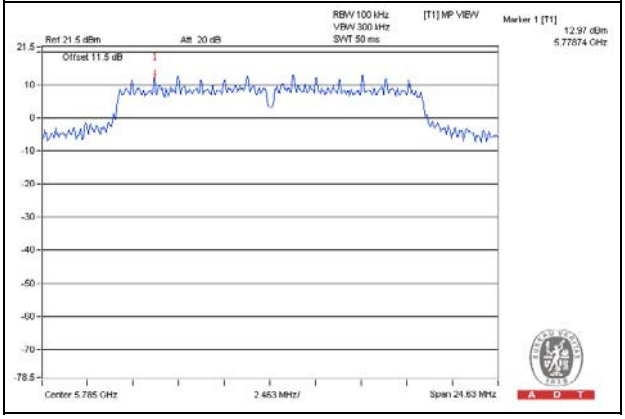
Same as item 4.3.6

5.6.7 TEST RESULTS

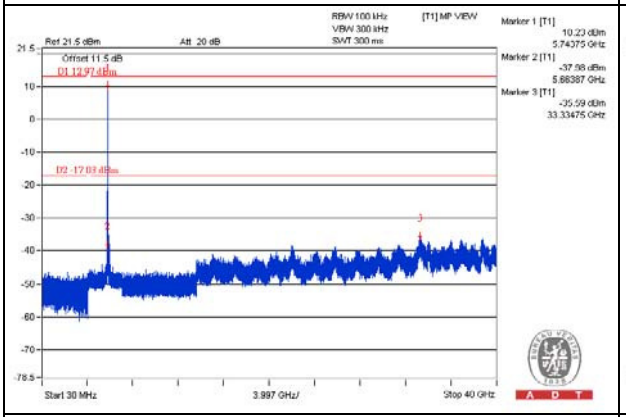
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11a
CHAIN 0

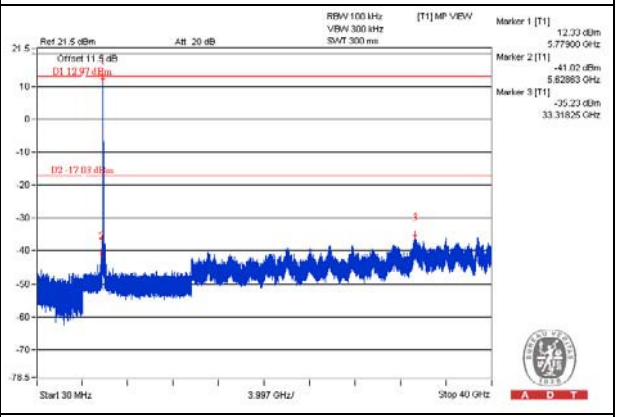
Maximum REF



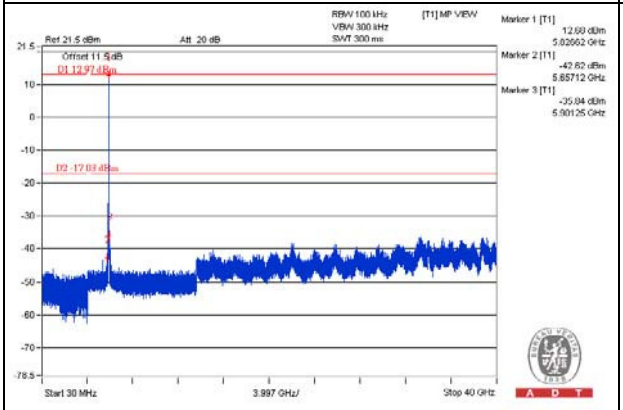
CH 149



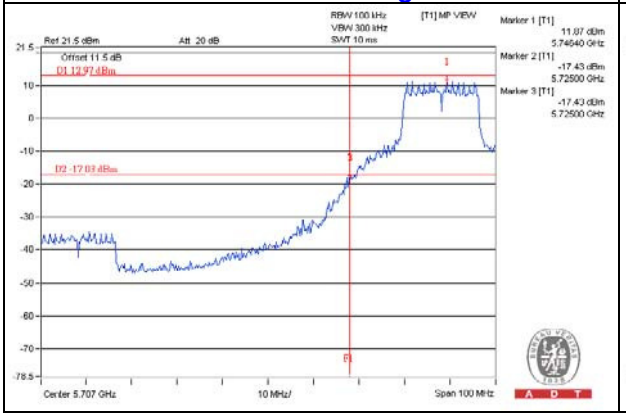
CH 157



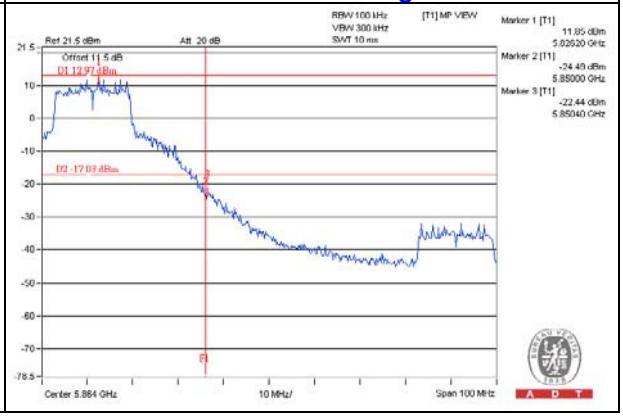
CH 165



CH 149 Band edge

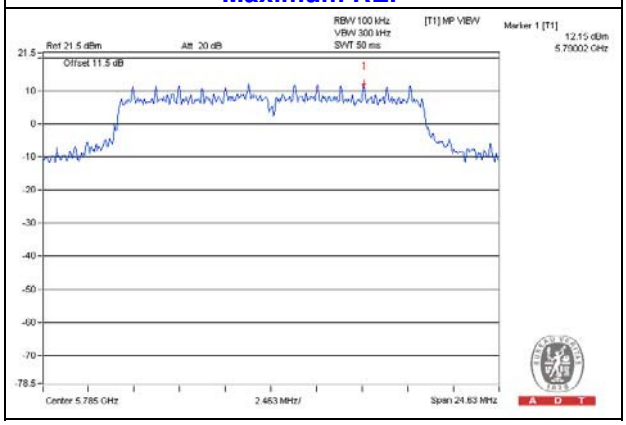


CH 165 Band edge

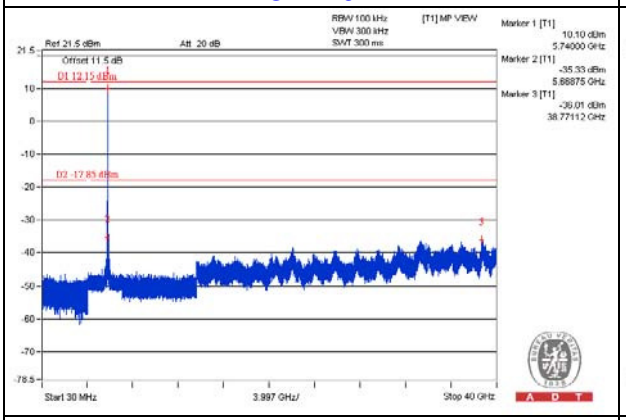


CHAIN 1

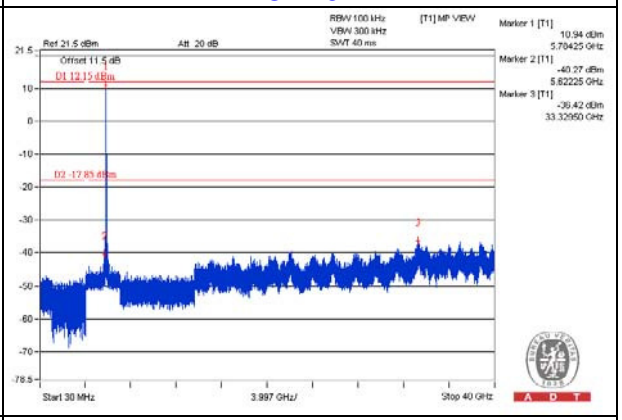
Maximum REF



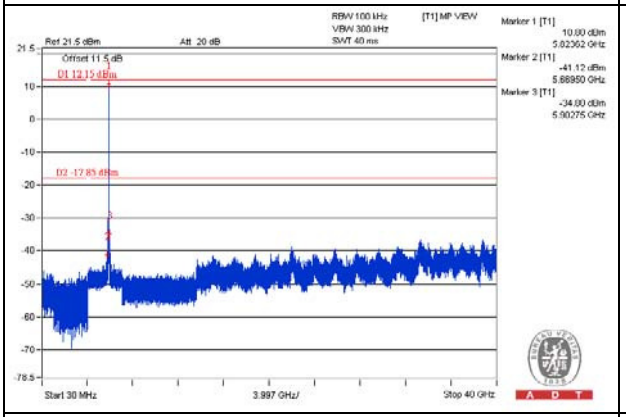
CH 149



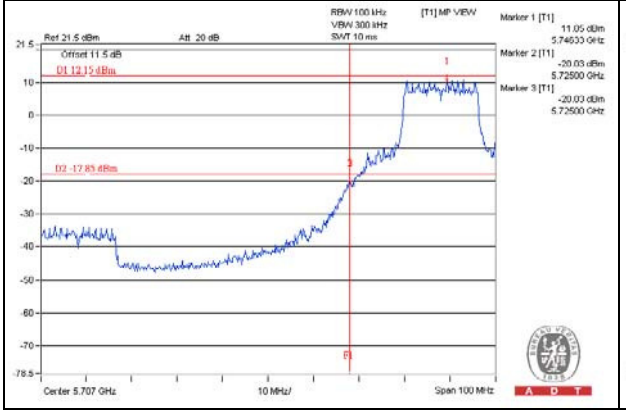
CH 157



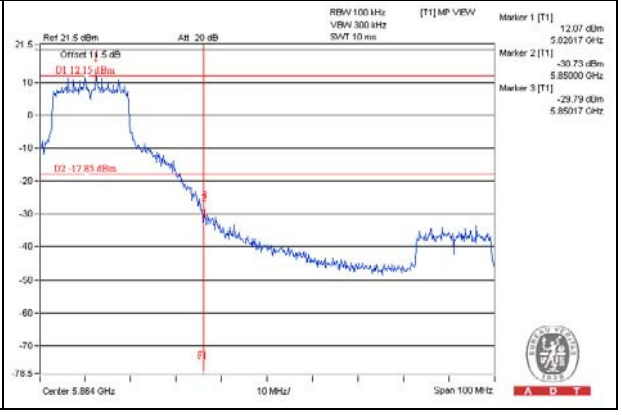
CH 165



CH 149 Band edge

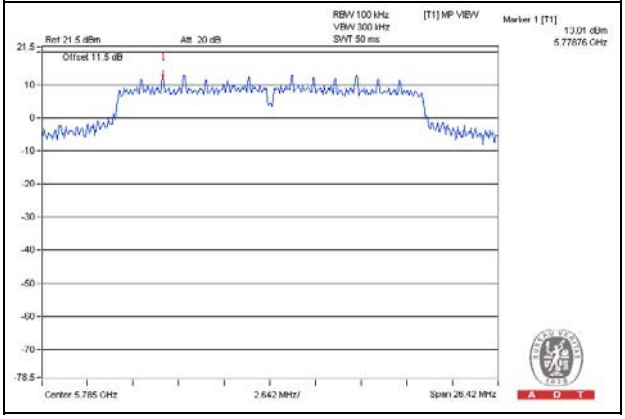


CH 165 Band edge

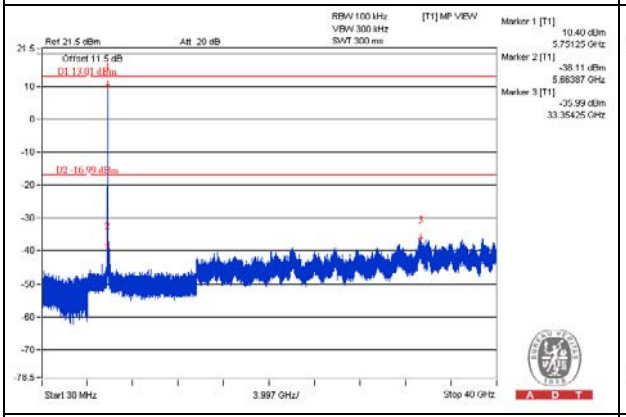


802.11n (HT20)
CHAIN 0

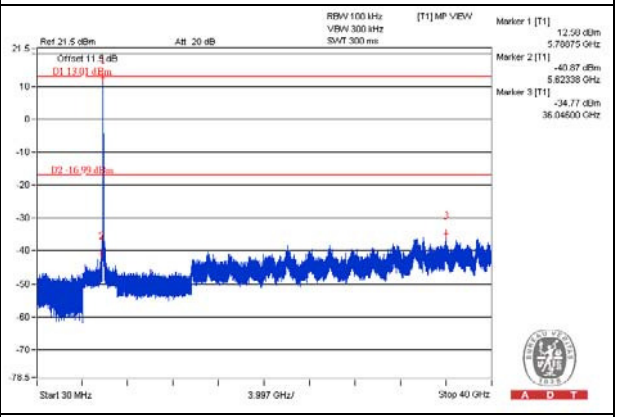
Maximum REF



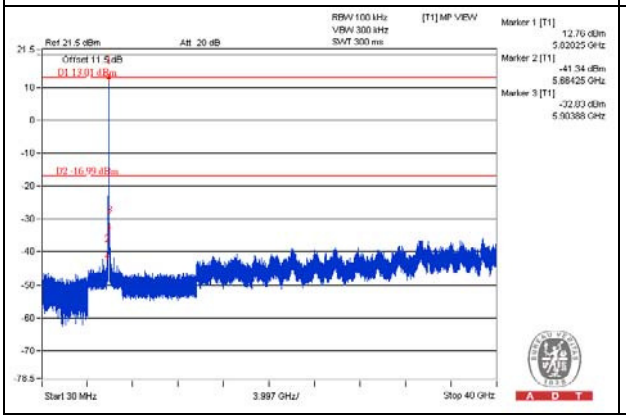
CH 149



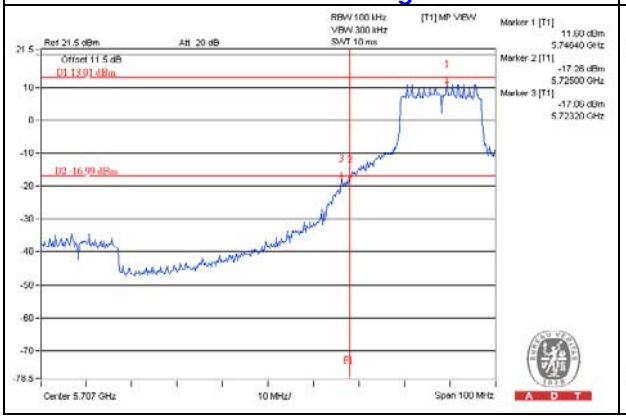
CH 157



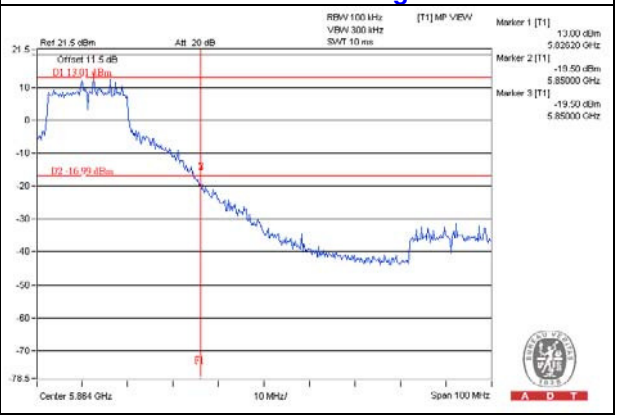
CH 165



CH 149 Band edge

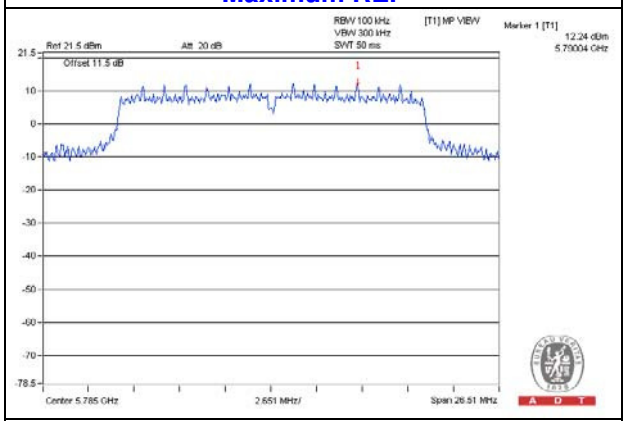


CH 165 Band edge

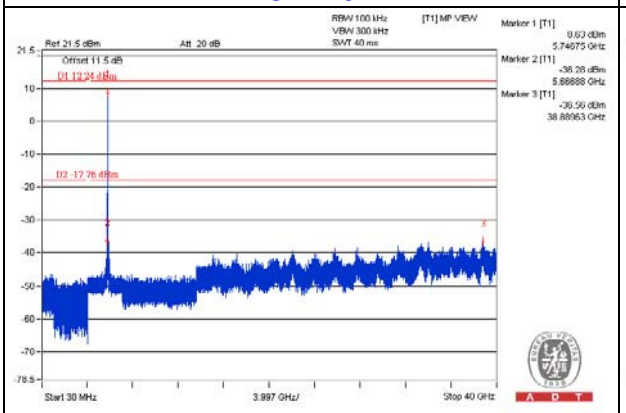


CHAIN 1

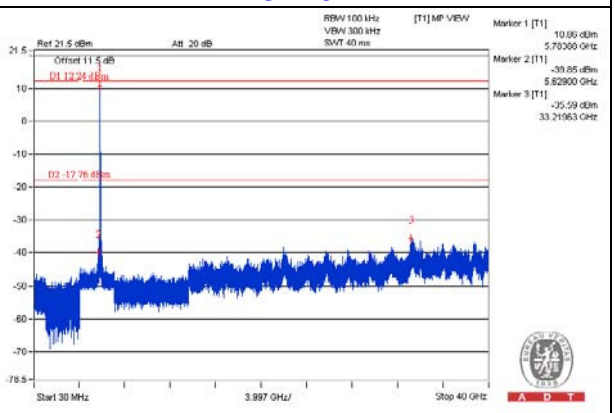
Maximum REF



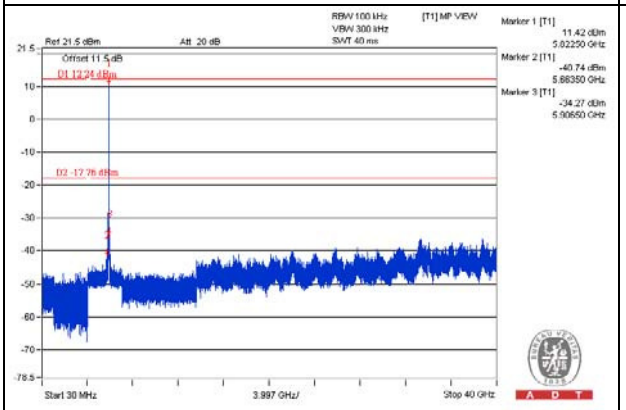
CH 149



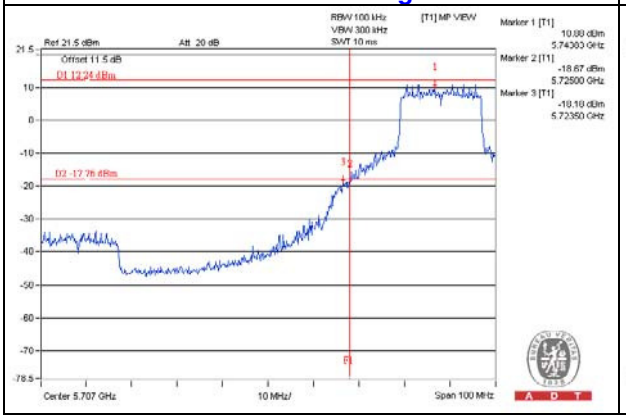
CH 157



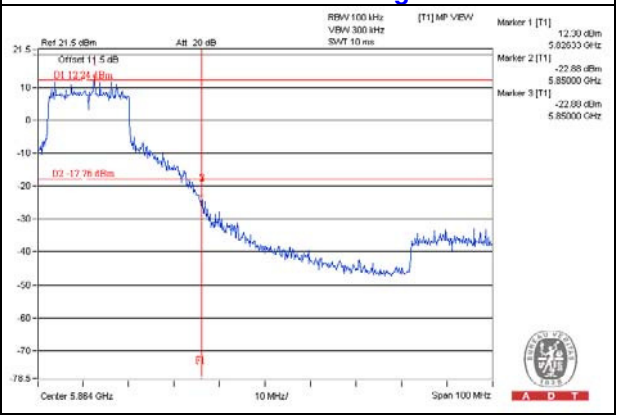
CH 165



CH 149 Band edge

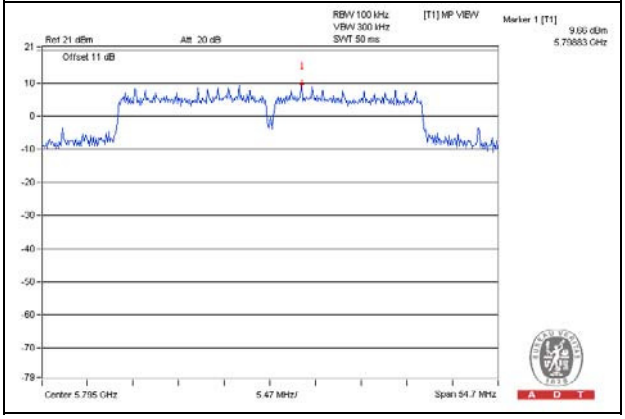


CH 165 Band edge

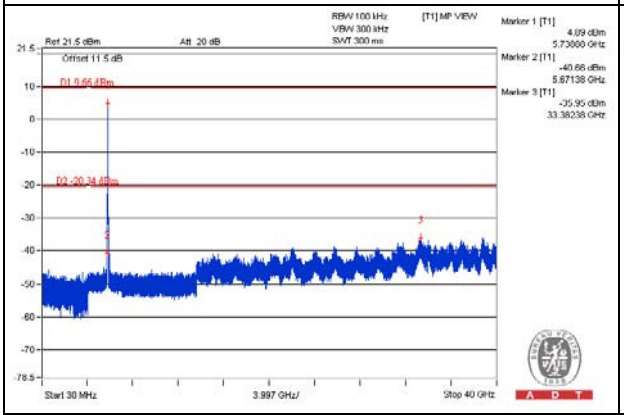


802.11n (HT40)
CHAIN 0

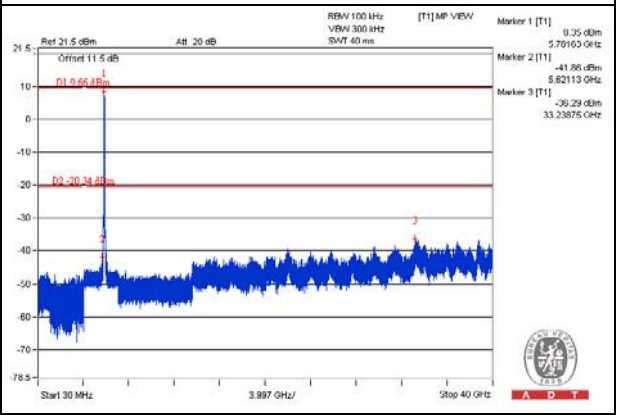
Maximum REF



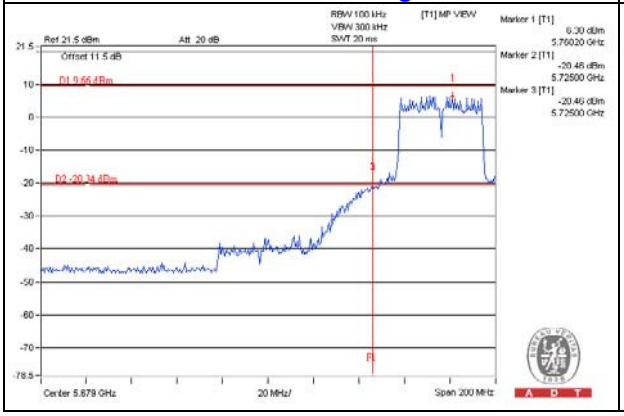
CH 151



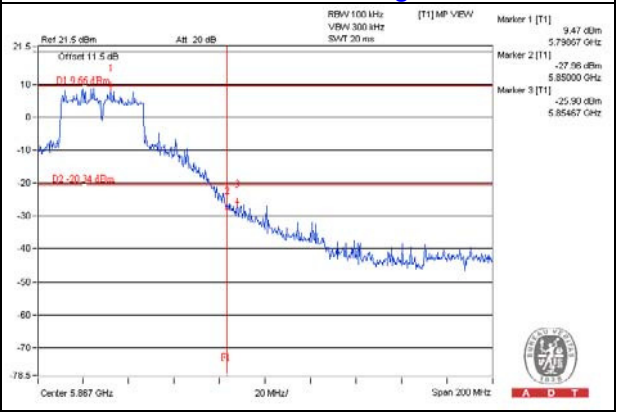
CH 159



CH 151 Band edge

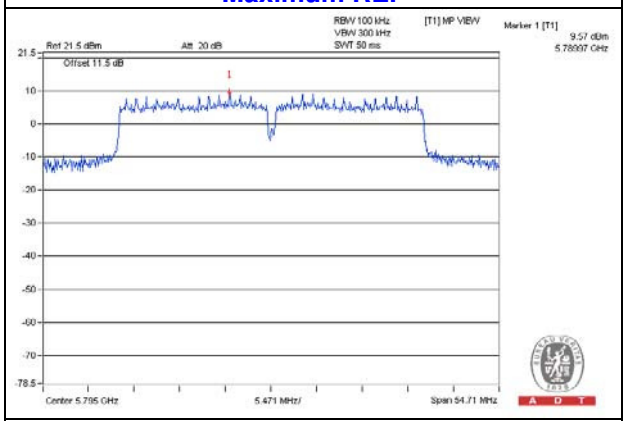


CH 159 Band edge

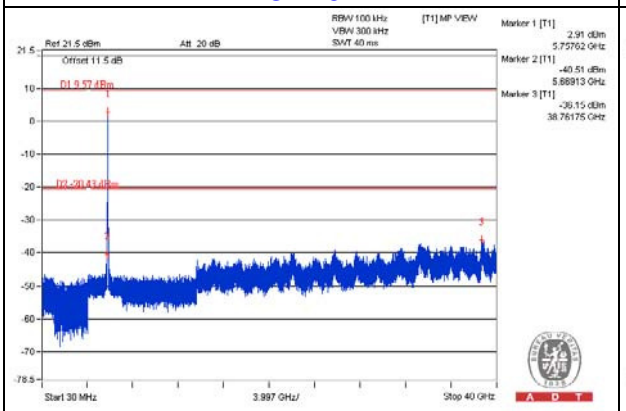


CHAIN 1

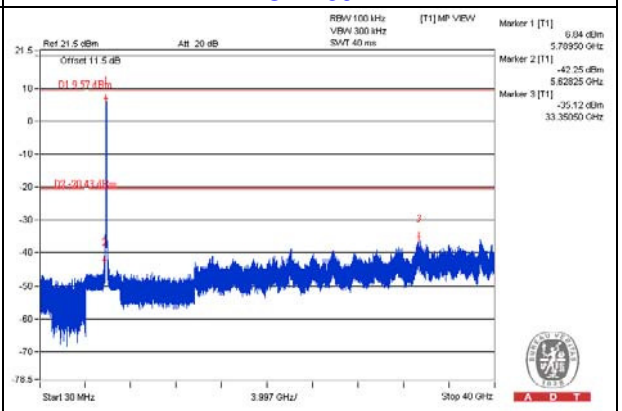
Maximum REF



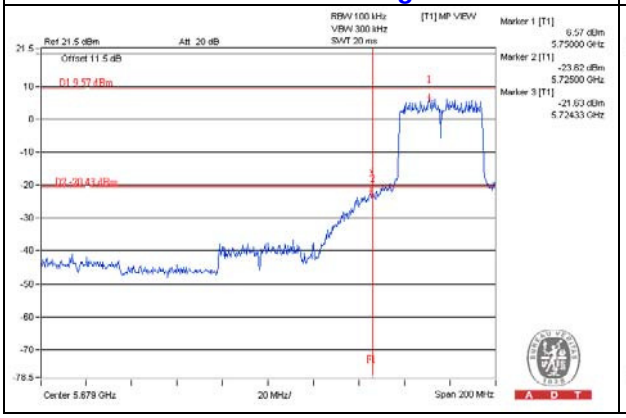
CH 151



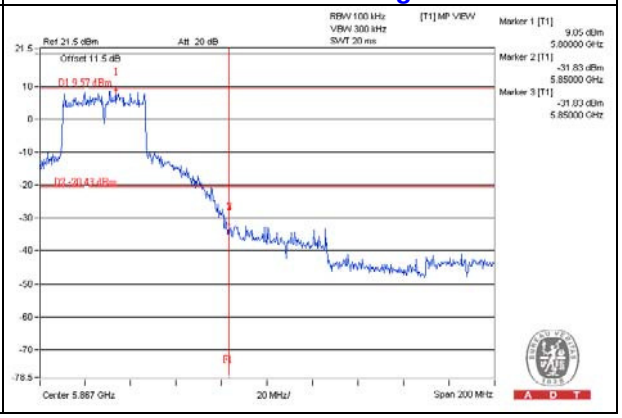
CH 159



CH 151 Band edge

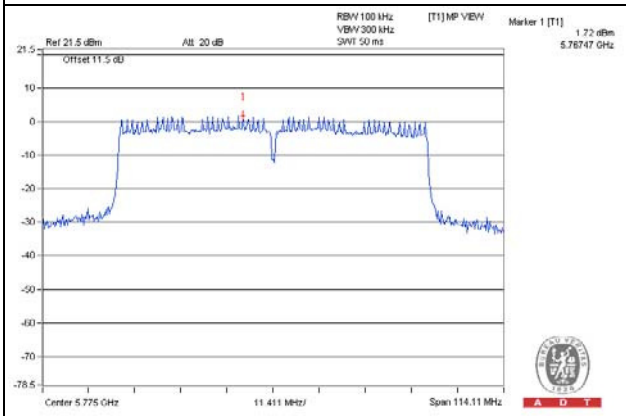


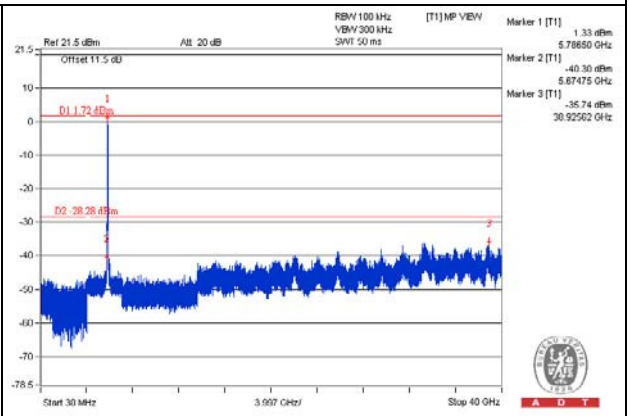
CH 159 Band edge



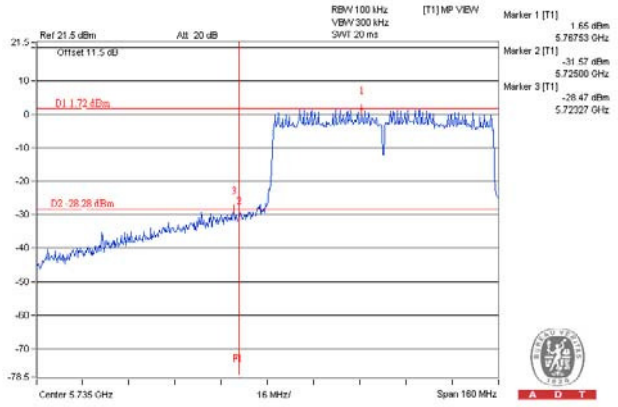
802.11ac (VHT80)
CHAIN 0

CH 155

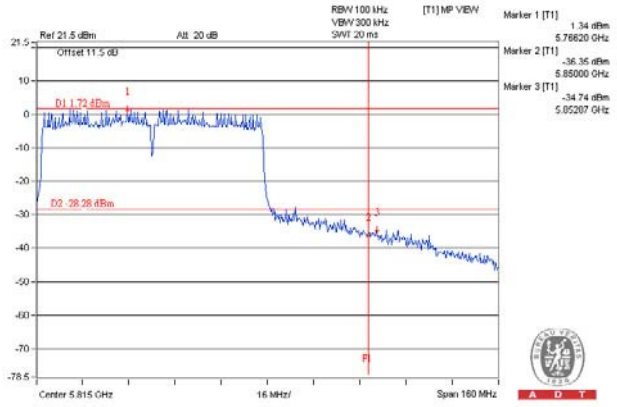




CH 155 Band edge

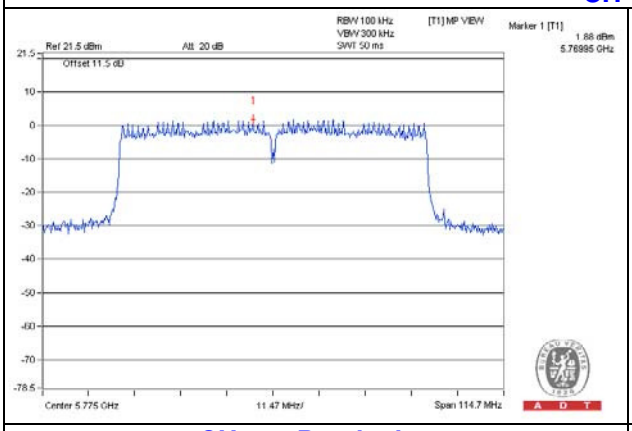


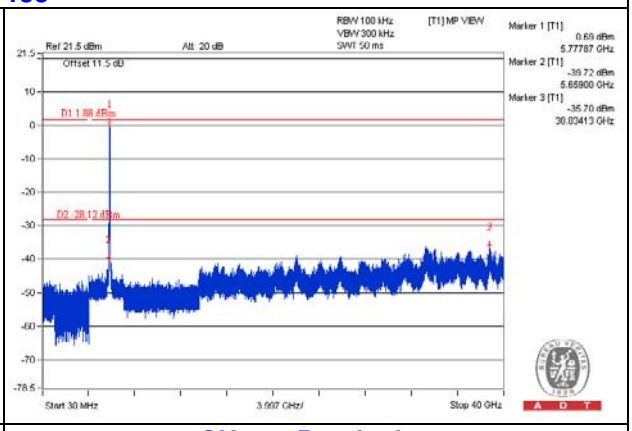
CH 155 Band edge



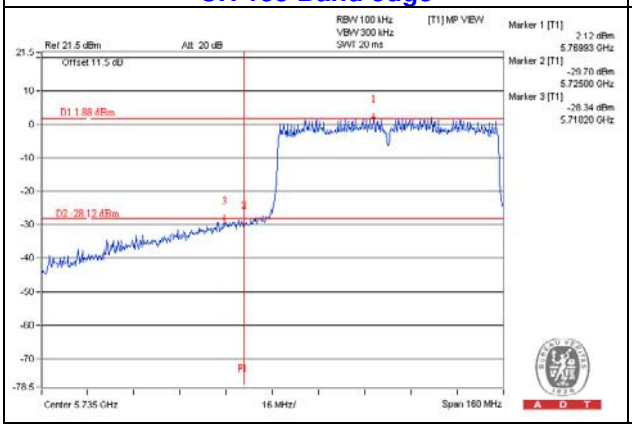
CHAIN 1

CH 155

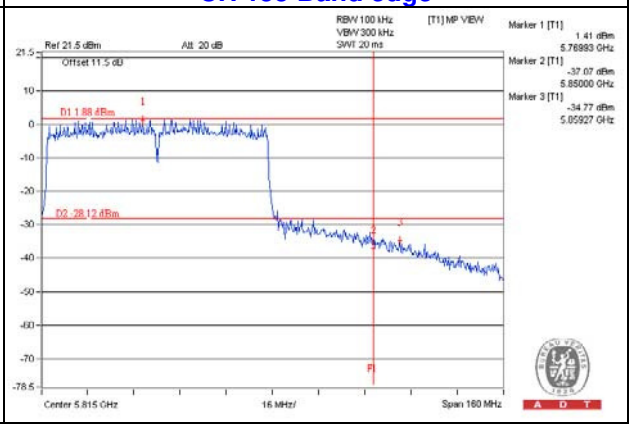




CH 155 Band edge



CH 155 Band edge



6 Pictures of Test Arrangements

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

Appendix – 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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Email: service.adt@tw.bureauveritas.com
Web Site: 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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