

FCC Test Report

Report No.: RF150402C20

FCC ID: TE7T6E

Test Model: Archer T6E

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Test Date: May 28 ~ Jul. 30, 2015

Issued Date: Aug. 05, 2015

Applicant: TP-LINK TECHNOLOGIES CO., LTD.

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Release Control Record

Issue No.	Description	Date Issued
RF150402C20	Original release	Aug. 05, 2015

1 Certificate of Conformity

Product: AC1300 Wireless Dual Band PCI Express Adapter

Brand: TP-LINK

Test Model: Archer T6E

Sample Status: Prototype

Applicant: TP-LINK TECHNOLOGIES CO., LTD.

Test Date: May 28 ~ Jul. 30, 2015

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2013

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 : Celine Chou , **Date:** Aug. 05, 2015
Celine Chou / Specialist

Approved by : Ken Liu , **Date:** Aug. 05, 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 -9.20dB at 23.85242MHz
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 2390.00 and 2483.50MHz.
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 PR-SMA 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	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~ 1000MHz	3.60 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	AC1300 Wireless Dual Band PCI Express Adapter
Brand	TP-LINK
Test Model	Archer T6E
Status of EUT	Prototype
Power Supply Rating	12Vdc or 3.3Vdc from host equipment
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 400Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	767.752mW
Antenna Type	Omni-Directional antenna with 2dBi gain
Antenna Connector	PR-SMA
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	TX Function
802.11b	2TX
802.11g	2TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX

3.2 Description of Test Modes

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		

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where **RE≥1G**: Radiated Emission above 1GHz & Bandedge Measurement

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Radiated Emission Test (Above 1GHz):

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

Radiated Emission Test (Below 1GHz):

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1	DSSS	DBPSK	1.0

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	DATA RATE (Mbps)
-	802.11b	1 to 11	1	DSSS	DBPSK	1.0

Antenna Port Conducted Measurement:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

Test Condition:

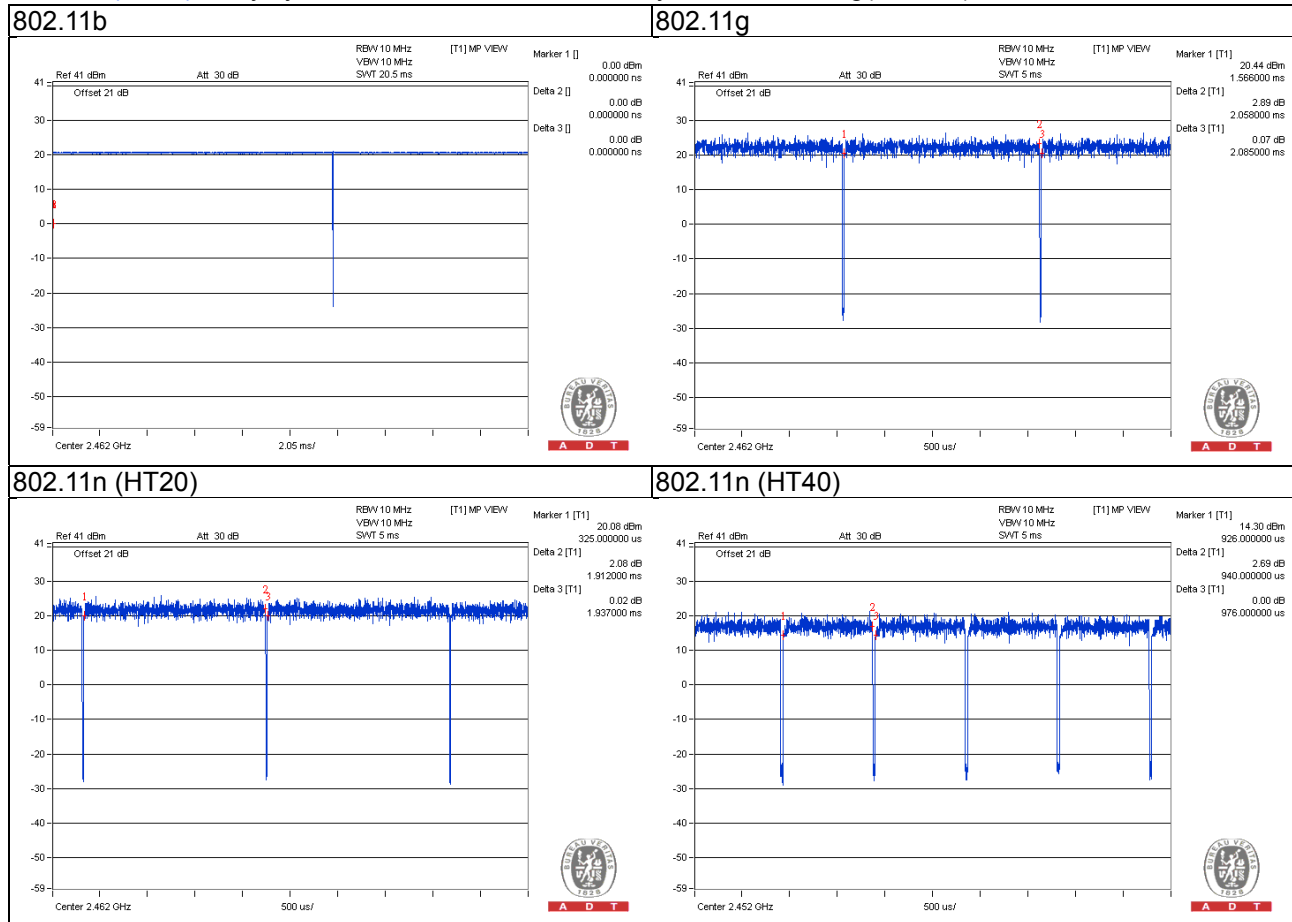
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE $\geq$ 1G	27deg. C, 67%RH	120Vac, 60Hz	Alan Wu
RE<1G	26deg. C, 63%RH	120Vac, 60Hz	Alan Wu
PLC	20deg. C, 70%RH	120Vac, 60Hz	Jones Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Frank Liu

3.3 Duty Cycle of Test Signal

802.11b, 802.11g, 802.11n (HT20): Duty cycle of test signal is > 98%, duty factor is not required.

802.11n (HT40): Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11n (HT40): Duty cycle = $0.940/0.976 = 0.963$, Duty factor = $10 * \log(1/0.963) = 0.16$



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.

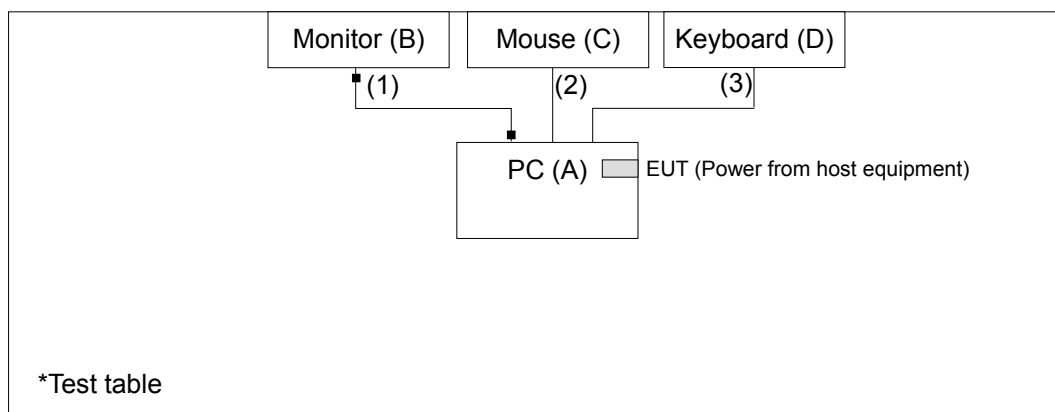
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	PC	HP	PRO6300 MT	SGH237SVPH	FCC DoC Approved	-
B.	Monitor	Samsung	173v	N/A	FCC DoC Approved	-
C.	Mouse	DELL	MS111-P	CN-011D3V-71581-1 CJ-093C	FCC DoC Approved	-
D.	Keyboard	DELL	KB4021	CN-05V23T-71581-1 AK-00IX-A01	FCC DoC Approved	-

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	D-SUB	1	1.8	Y	2	-
2.	USB	1	1.8	Y	0	-
3.	USB	1	1.8	Y	0	-

Note: The core(s) is(are) originally attached to the cable(s).

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 v03r03

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2013

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

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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 06, 2014	Oct. 05, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Jul. 08, 2014	Jul. 07, 2015
			Jul. 08, 2015	Jul. 07, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Feb. 06, 2015	Feb. 05, 2016
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Feb. 05, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8449B	3008A01960	Aug. 09, 2014	Aug. 08, 2015
Preamplifier Agilent	8447D	2944A10631	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 09, 2014	Aug. 08, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021703	NA	NA
High Speed Peak Power Meter	ML2495A	0824011	Jul. 09, 2014	Jul. 08, 2015
			Jul. 09, 2015	Jul. 08, 2016
Power Sensor	MA2411B	0738171	Jul. 09, 2014	Jul. 08, 2015
			Jul. 09, 2015	Jul. 08, 2016

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 4.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 460141.
5. The IC Site Registration No. is IC7450F-4.

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

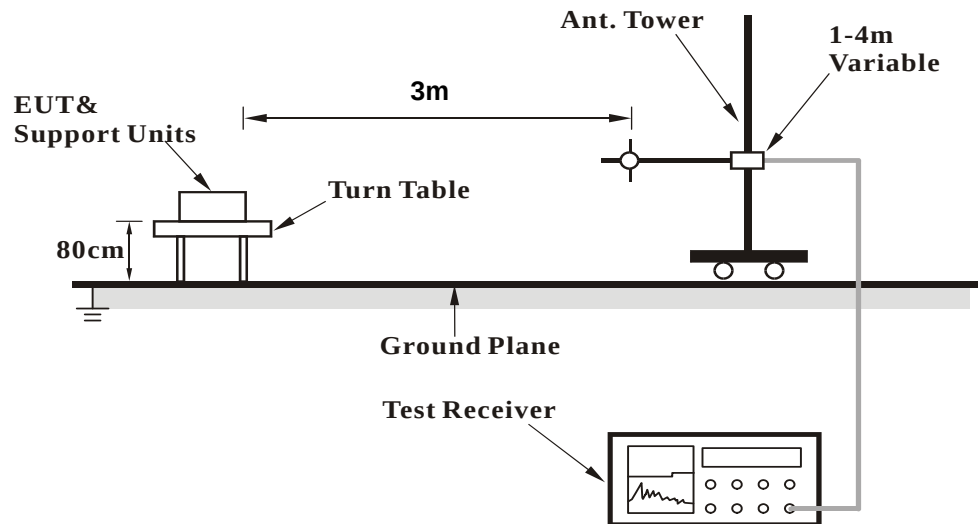
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 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 ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

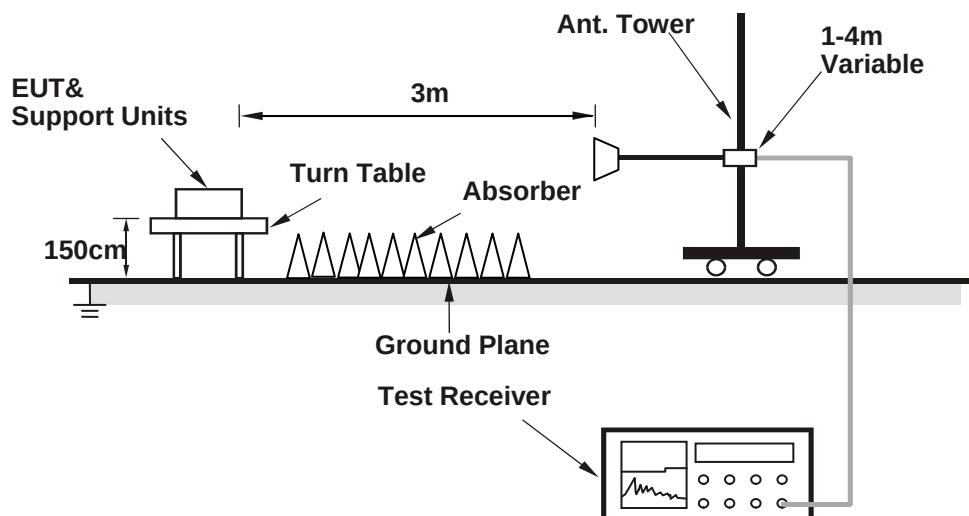
No deviation.

4.1.5 Test Set Up

<Frequency Range below 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

Installed the EUT in the PC and set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.4 PK	74.0	-15.6	1.00 H	167	26.30	32.10
2	2390.00	49.8 AV	54.0	-4.2	1.00 H	167	17.70	32.10
3	*2412.00	114.2 PK			1.00 H	168	82.00	32.20
4	*2412.00	110.6 AV			1.00 H	168	78.40	32.20
5	4824.00	48.8 PK	74.0	-25.2	1.08 H	240	43.60	5.20
6	4824.00	42.3 AV	54.0	-11.7	1.08 H	240	37.10	5.20
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	2390.00	62.5 PK	74.0	-11.5	1.03 V	288	30.40	32.10
2	2390.00	53.6 AV	54.0	-0.4	1.03 V	288	21.50	32.10
3	*2412.00	117.5 PK			1.02 V	280	85.30	32.20
4	*2412.00	113.8 AV			1.02 V	280	81.60	32.20
5	4824.00	49.5 PK	74.0	-24.5	1.00 V	230	44.30	5.20
6	4824.00	42.9 AV	54.0	-11.1	1.00 V	230	37.70	5.20

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	109.5 PK			1.00 H	171	77.30	32.20
2	*2437.00	105.6 AV			1.00 H	171	73.40	32.20
3	4874.00	47.2 PK	74.0	-26.8	1.00 H	240	42.00	5.20
4	4874.00	35.3 AV	54.0	-18.7	1.00 H	240	30.10	5.20
5	7311.00	59.8 PK	74.0	-14.2	1.32 H	212	48.10	11.70
6	7311.00	53.5 AV	54.0	-0.5	1.32 H	212	41.80	11.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	111.9 PK			1.00 V	280	79.70	32.20
2	*2437.00	108.0 AV			1.00 V	280	75.80	32.20
3	4874.00	46.5 PK	74.0	-27.5	1.00 V	235	41.30	5.20
4	4874.00	34.7 AV	54.0	-19.3	1.00 V	235	29.50	5.20
5	7311.00	57.0 PK	74.0	-17.0	1.00 V	347	45.30	11.70
6	7311.00	48.9 AV	54.0	-5.1	1.00 V	347	37.20	11.70

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	108.6 PK			1.00 H	170	76.30	32.30
2	*2462.00	105.0 AV			1.00 H	170	72.70	32.30
3	2483.50	56.8 PK	74.0	-17.2	1.00 H	172	24.50	32.30
4	2483.50	43.8 AV	54.0	-10.2	1.00 H	172	11.50	32.30
5	4924.00	47.2 PK	74.0	-26.8	1.00 H	250	41.90	5.30
6	4924.00	35.2 AV	54.0	-18.8	1.00 H	250	29.90	5.30
7	7386.00	60.2 PK	74.0	-13.8	1.30 H	209	48.60	11.60
8	7386.00	53.7 AV	54.0	-0.3	1.30 H	209	42.10	11.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	111.7 PK			1.00 V	280	79.40	32.30
2	*2462.00	107.4 AV			1.00 V	280	75.10	32.30
3	2483.50	57.1 PK	74.0	-16.9	1.00 V	279	24.80	32.30
4	2483.50	44.5 AV	54.0	-9.5	1.00 V	279	12.20	32.30
5	4924.00	46.8 PK	74.0	-27.2	1.00 V	237	41.50	5.30
6	4924.00	35.1 AV	54.0	-18.9	1.00 V	237	29.80	5.30
7	7386.00	57.3 PK	74.0	-16.7	1.00 V	341	45.70	11.60
8	7386.00	49.1 AV	54.0	-4.9	1.00 V	341	37.50	11.60

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.7 PK	74.0	-7.3	1.13 H	164	34.60	32.10
2	2390.00	49.2 AV	54.0	-4.8	1.13 H	164	17.10	32.10
3	*2412.00	111.8 PK			1.17 H	167	79.60	32.20
4	*2412.00	101.2 AV			1.17 H	167	69.00	32.20
5	4824.00	46.9 PK	74.0	-27.1	1.00 H	251	41.70	5.20
6	4824.00	34.3 AV	54.0	-19.7	1.00 H	251	29.10	5.20
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	2390.00	68.5 PK	74.0	-5.5	1.98 V	315	36.40	32.10
2	2390.00	53.8 AV	54.0	-0.2	1.98 V	315	21.70	32.10
3	*2412.00	114.3 PK			1.99 V	317	82.10	32.20
4	*2412.00	104.8 AV			1.99 V	317	72.60	32.20
5	4824.00	47.4 PK	74.0	-26.6	1.00 V	235	42.20	5.20
6	4824.00	34.4 AV	54.0	-19.6	1.00 V	235	29.20	5.20

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	114.8 PK			1.00 H	171	82.60	32.20
2	*2437.00	105.4 AV			1.00 H	171	73.20	32.20
3	4874.00	47.7 PK	74.0	-26.3	1.00 H	254	42.50	5.20
4	4874.00	35.1 AV	54.0	-18.9	1.00 H	254	29.90	5.20
5	7311.00	56.2 PK	74.0	-17.8	2.13 H	198	44.50	11.70
6	7311.00	43.5 AV	54.0	-10.5	2.13 H	198	31.80	11.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	117.2 PK			1.00 V	280	85.00	32.20
2	*2437.00	107.5 AV			1.00 V	280	75.30	32.20
3	4874.00	47.8 PK	74.0	-26.2	1.00 V	239	42.60	5.20
4	4874.00	35.3 AV	54.0	-18.7	1.00 V	239	30.10	5.20
5	7311.00	55.9 PK	74.0	-18.1	1.00 V	346	44.20	11.70
6	7311.00	43.4 AV	54.0	-10.6	1.00 V	346	31.70	11.70

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	111.3 PK			1.00 H	167	79.00	32.30
2	*2462.00	100.7 AV			1.00 H	167	68.40	32.30
3	2483.50	70.2 PK	74.0	-3.8	1.00 H	164	37.90	32.30
4	2483.50	50.4 AV	54.0	-3.6	1.00 H	164	18.10	32.30
5	4924.00	47.3 PK	74.0	-26.7	1.00 H	255	42.00	5.30
6	4924.00	34.7 AV	54.0	-19.3	1.00 H	255	29.40	5.30
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	*2462.00	114.4 PK			1.77 V	314	82.10	32.30
2	*2462.00	104.9 AV			1.77 V	314	72.60	32.30
3	2483.50	72.9 PK	74.0	-1.1	1.77 V	305	40.60	32.30
4	2483.50	53.8 AV	54.0	-0.2	1.77 V	305	21.50	32.30
5	4924.00	47.5 PK	74.0	-26.5	1.00 V	232	42.20	5.30
6	4924.00	34.8 AV	54.0	-19.2	1.00 V	232	29.50	5.30

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)
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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.2 PK	74.0	-7.8	1.00 H	160	34.10	32.10
2	2390.00	51.0 AV	54.0	-3.0	1.00 H	160	18.90	32.10
3	*2412.00	108.9 PK			1.00 H	168	76.70	32.20
4	*2412.00	98.5 AV			1.00 H	168	66.30	32.20
5	4824.00	46.7 PK	74.0	-27.3	1.00 H	259	41.50	5.20
6	4824.00	33.9 AV	54.0	-20.1	1.00 H	259	28.70	5.20
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	2390.00	71.6 PK	74.0	-2.4	1.91 V	312	39.50	32.10
2	2390.00	53.6 AV	54.0	-0.4	1.91 V	312	21.50	32.10
3	*2412.00	112.5 PK			1.97 V	316	80.30	32.20
4	*2412.00	102.7 AV			1.97 V	316	70.50	32.20
5	4824.00	47.3 PK	74.0	-26.7	1.00 V	231	42.10	5.20
6	4824.00	34.2 AV	54.0	-19.8	1.00 V	231	29.00	5.20

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	114.2 PK			1.00 H	170	82.00	32.20
2	*2437.00	104.7 AV			1.00 H	170	72.50	32.20
3	4874.00	47.6 PK	74.0	-26.4	1.00 H	255	42.40	5.20
4	4874.00	35.2 AV	54.0	-18.8	1.00 H	255	30.00	5.20
5	7311.00	56.7 PK	74.0	-17.3	2.14 H	194	45.00	11.70
6	7311.00	43.8 AV	54.0	-10.2	2.14 H	194	32.10	11.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	117.4 PK			1.00 V	280	85.20	32.20
2	*2437.00	108.1 AV			1.00 V	280	75.90	32.20
3	4874.00	48.1 PK	74.0	-25.9	1.00 V	236	42.90	5.20
4	4874.00	35.4 AV	54.0	-18.6	1.00 V	236	30.20	5.20
5	7311.00	56.1 PK	74.0	-17.9	1.00 V	340	44.40	11.70
6	7311.00	43.7 AV	54.0	-10.3	1.00 V	340	32.00	11.70

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	109.5 PK			1.00 H	170	77.20	32.30
2	*2462.00	98.9 AV			1.00 H	170	66.60	32.30
3	2483.50	69.3 PK	74.0	-4.7	1.00 H	172	37.00	32.30
4	2483.50	49.6 AV	54.0	-4.4	1.00 H	172	17.30	32.30
5	4924.00	46.9 PK	74.0	-27.1	1.00 H	250	41.60	5.30
6	4924.00	34.2 AV	54.0	-19.8	1.00 H	250	28.90	5.30
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	*2462.00	112.7 PK			1.78 V	315	80.40	32.30
2	*2462.00	103.0 AV			1.78 V	315	70.70	32.30
3	2483.50	72.7 PK	74.0	-1.3	1.78 V	313	40.40	32.30
4	2483.50	53.7 AV	54.0	-0.3	1.78 V	313	21.40	32.30
5	4924.00	47.4 PK	74.0	-26.6	1.00 V	235	42.10	5.30
6	4924.00	34.5 AV	54.0	-19.5	1.00 V	235	29.20	5.30

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)
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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.2 PK	74.0	-12.8	1.88 H	180	29.10	32.10
2	2390.00	48.8 AV	54.0	-5.2	1.88 H	180	16.70	32.10
3	*2422.00	103.6 PK			1.93 H	220	71.40	32.20
4	*2422.00	94.3 AV			1.93 H	220	62.10	32.20
5	4844.00	47.8 PK	74.0	-26.2	1.39 H	87	42.60	5.20
6	4844.00	33.9 AV	54.0	-20.1	1.39 H	87	28.70	5.20
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	2390.00	66.2 PK	74.0	-7.8	2.07 V	221	34.10	32.10
2	2390.00	53.5 AV	54.0	-0.5	2.07 V	221	21.40	32.10
3	*2422.00	107.7 PK			1.84 V	225	75.50	32.20
4	*2422.00	97.2 AV			1.84 V	225	65.00	32.20
5	4844.00	45.4 PK	74.0	-28.6	1.06 V	52	40.20	5.20
6	4844.00	33.1 AV	54.0	-20.9	1.06 V	52	27.90	5.20

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.2 PK	74.0	-13.8	1.00 H	184	28.10	32.10
2	2390.00	48.8 AV	54.0	-5.2	1.00 H	184	16.70	32.10
3	*2437.00	108.2 PK			2.04 H	185	76.00	32.20
4	*2437.00	98.3 AV			2.04 H	185	66.10	32.20
5	2483.50	66.0 PK	74.0	-8.0	1.00 H	256	33.70	32.30
6	2483.50	49.1 AV	54.0	-4.9	1.00 H	256	16.80	32.30
7	4874.00	48.8 PK	74.0	-25.2	1.26 H	301	43.60	5.20
8	4874.00	33.1 AV	54.0	-20.9	1.26 H	301	27.90	5.20
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	2390.00	68.2 PK	74.0	-5.8	2.12 V	221	36.10	32.10
2	2390.00	53.7 AV	54.0	-0.3	2.12 V	221	21.60	32.10
3	*2437.00	109.7 PK			1.02 V	256	77.50	32.20
4	*2437.00	100.4 AV			1.02 V	256	68.20	32.20
5	2483.50	71.1 PK	74.0	-2.9	1.01 V	260	38.80	32.30
6	2483.50	52.4 AV	54.0	-1.6	1.01 V	260	20.10	32.30
7	4874.00	48.2 PK	74.0	-25.8	1.52 V	96	43.00	5.20
8	4874.00	33.9 AV	54.0	-20.1	1.52 V	96	28.70	5.20

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	103.9 PK			1.17 H	152	71.70	32.20
2	*2452.00	94.3 AV			1.17 H	152	62.10	32.20
3	2483.50	69.8 PK	74.0	-4.2	1.22 H	223	37.50	32.30
4	2483.50	51.7 AV	54.0	-2.3	1.22 H	223	19.40	32.30
5	4904.00	47.8 PK	74.0	-26.2	1.62 H	58	42.60	5.20
6	4904.00	34.0 AV	54.0	-20.0	1.62 H	58	28.80	5.20
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	*2452.00	110.5 PK			2.15 V	224	78.30	32.20
2	*2452.00	100.8 AV			2.15 V	224	68.60	32.20
3	2483.50	71.3 PK	74.0	-2.7	1.01 V	261	39.00	32.30
4	2483.50	53.5 AV	54.0	-0.5	1.01 V	261	21.20	32.30
5	4904.00	48.1 PK	74.0	-25.9	1.65 V	98	42.90	5.20
6	4904.00	33.9 AV	54.0	-20.1	1.65 V	98	28.70	5.20

Remarks:

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

Below 1GHz worst-case data: 802.11b

CHANNEL	TX Channel 1	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	57.07	30.2 QP	40.0	-9.8	1.24 H	304	44.60	-14.40
2	84.23	25.5 QP	40.0	-14.5	1.99 H	106	44.50	-19.00
3	233.64	29.4 QP	46.0	-16.6	1.00 H	13	45.00	-15.60
4	299.62	33.5 QP	46.0	-12.5	1.00 H	136	46.10	-12.60
5	328.72	39.3 QP	46.0	-6.7	1.00 H	140	51.10	-11.80
6	487.83	28.8 QP	46.0	-17.2	1.24 H	119	38.10	-9.30
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	60.95	30.7 QP	40.0	-9.3	1.99 V	6	45.50	-14.80
2	159.91	22.7 QP	43.5	-20.8	1.00 V	261	36.40	-13.70
3	299.62	31.9 QP	46.0	-14.1	1.49 V	12	44.50	-12.60
4	328.72	33.2 QP	46.0	-12.8	1.24 V	85	45.00	-11.80
5	497.54	27.0 QP	46.0	-19.0	1.00 V	291	36.00	-9.00
6	796.36	28.4 QP	46.0	-17.6	1.49 V	12	31.60	-3.20

Remarks:

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

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	ESCI	100613	Nov. 11, 2014	Nov. 10, 2015
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2015	Feb. 25, 2016
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2014	Jul. 23, 2015
			Jul. 24, 2015	Jul. 23, 2016
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 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

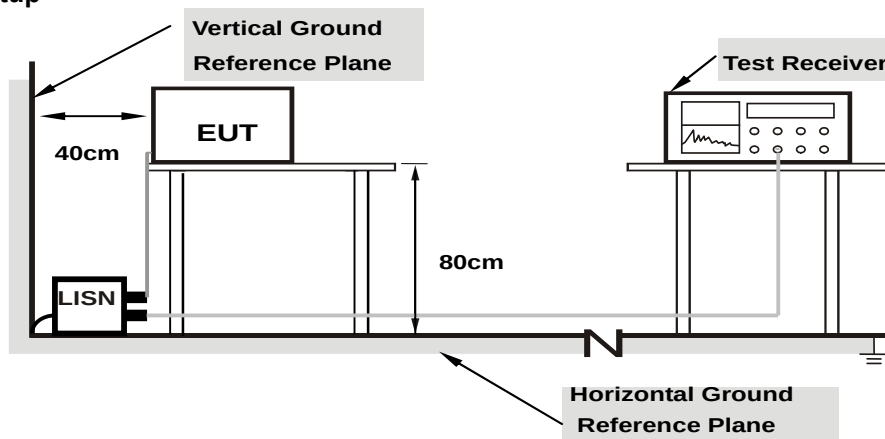
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 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

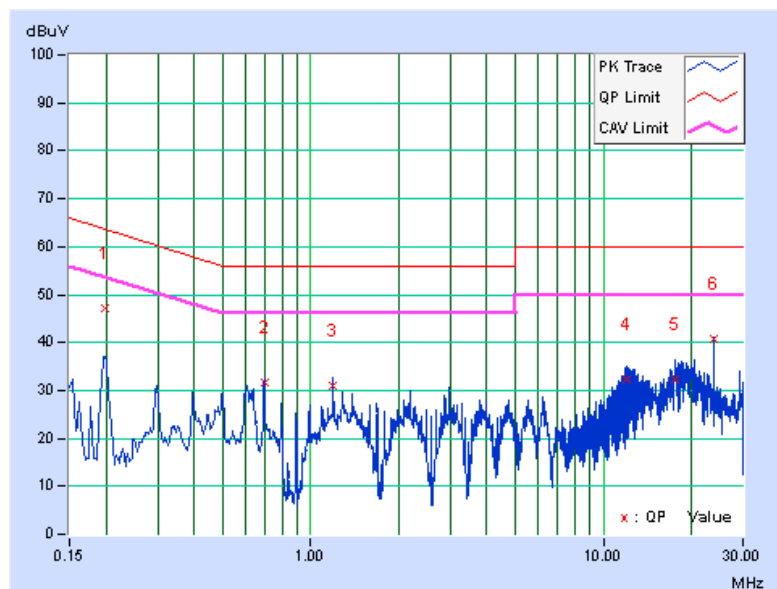
Same as 4.1.6.

4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)							
No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19717	0.06	46.94	39.70	47.00	39.76	63.73	53.73	-16.73	-13.97
2	0.69349	0.07	31.68	27.36	31.75	27.43	56.00	46.00	-24.25	-18.57
3	1.19006	0.09	30.72	22.16	30.81	22.25	56.00	46.00	-25.19	-23.75
4	12.00903	0.54	31.93	22.64	32.47	23.18	60.00	50.00	-27.53	-26.82
5	17.65116	0.79	31.49	24.05	32.28	24.84	60.00	50.00	-27.72	-25.16
6	23.85242	1.01	39.84	39.79	40.85	40.80	60.00	50.00	-19.15	-9.20

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.

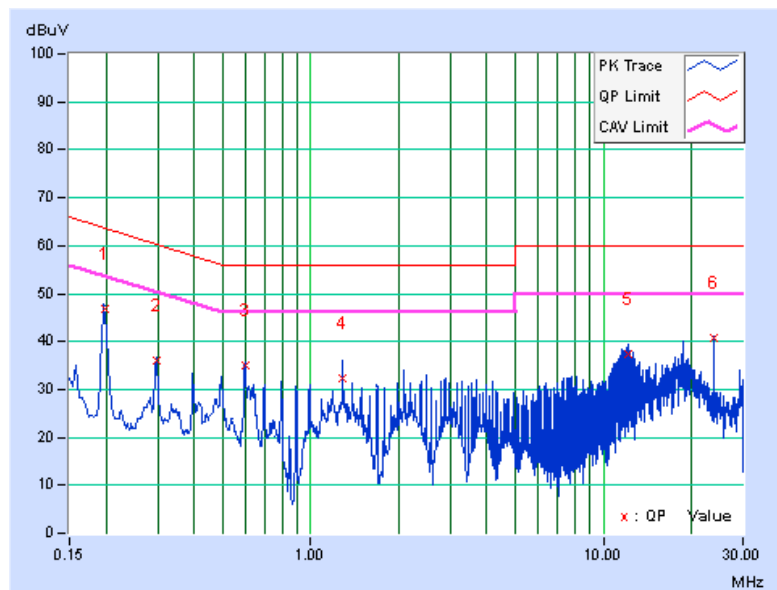


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19717	0.05	46.84	40.68	46.89	40.73	63.73	53.73	-16.84	-13.00
2	0.29858	0.05	35.81	32.46	35.86	32.51	60.28	50.28	-24.42	-17.77
3	0.59574	0.07	34.89	29.48	34.96	29.55	56.00	46.00	-21.04	-16.45
4	1.28781	0.09	32.36	27.62	32.45	27.71	56.00	46.00	-23.55	-18.29
5	12.10287	0.49	36.78	32.37	37.27	32.86	60.00	50.00	-22.73	-17.14
6	23.85242	0.78	39.80	39.75	40.58	40.53	60.00	50.00	-19.42	-9.47

Remarks:

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

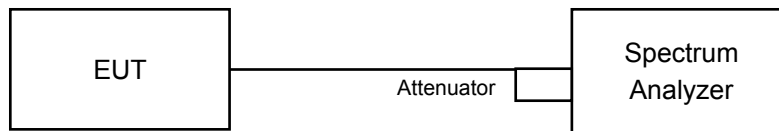


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	9.05	9.08	0.5	Pass
6	2437	8.59	8.57	0.5	Pass
11	2462	9.07	8.11	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.39	16.44	0.5	Pass
6	2437	16.38	16.39	0.5	Pass
11	2462	16.38	16.40	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.64	17.66	0.5	Pass
6	2437	17.62	17.63	0.5	Pass
11	2462	17.62	17.64	0.5	Pass

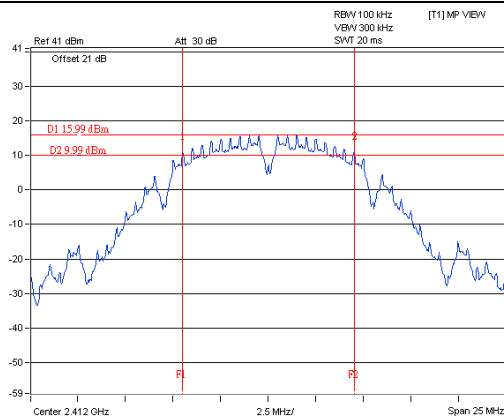
802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.90	36.12	0.5	Pass
6	2437	35.83	35.89	0.5	Pass
9	2452	35.83	36.39	0.5	Pass

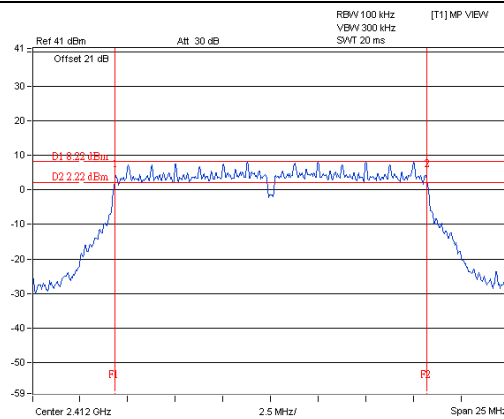
Spectrum Plot of Worst Value

802.11b

802.11g



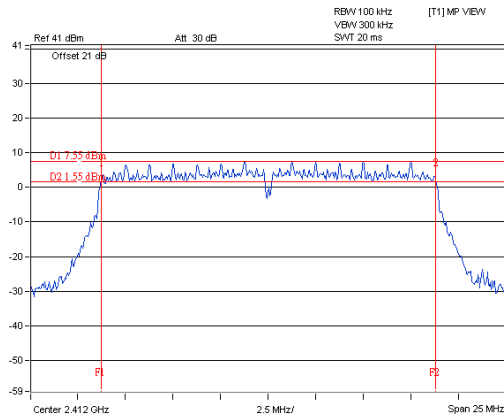
A D T



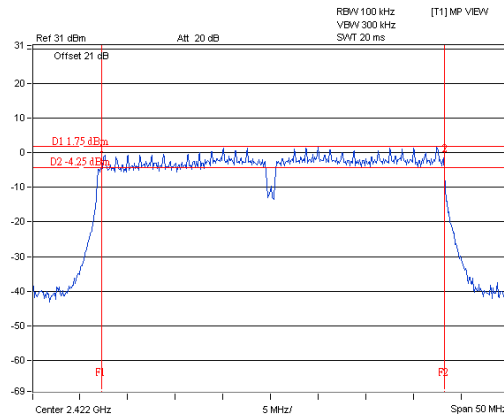
A D T

802.11n (HT20)

802.11n (HT40)



A D T



A D T

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,

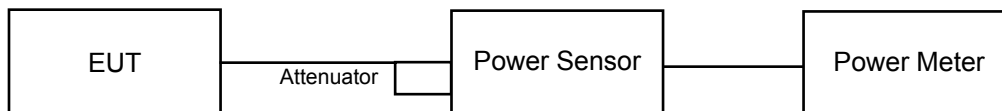
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ 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

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

802.11b

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	25.59	26.08	767.752	28.85	30	Pass
6	2437	19.31	20.28	191.970	22.83	30	Pass
11	2462	19.01	19.68	172.513	22.37	30	Pass

802.11g

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	20.37	20.75	227.743	23.57	30	Pass
6	2437	24.86	25.22	638.856	28.05	30	Pass
11	2462	20.58	21.11	243.410	23.86	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.54	20.27	196.364	22.93	30	Pass
6	2437	25.01	25.30	655.801	28.17	30	Pass
11	2462	19.95	20.39	208.251	23.19	30	Pass

802.11n (HT40)

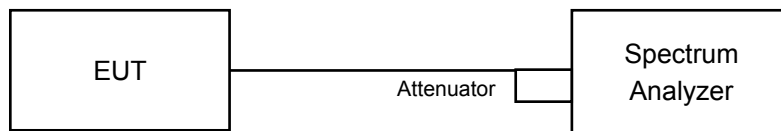
Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	15.82	16.83	86.389	19.36	30	Pass
6	2437	20.82	21.21	252.911	24.03	30	Pass
9	2452	18.24	18.83	143.065	21.56	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For duty cycle $\geq 98\%$

- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq 3 \times \text{RBW}$.
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.
- Sweep time = auto couple.
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.

For duty cycle $< 98\%$

- Measure the duty cycle (x).
- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq 3 \times \text{RBW}$.
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.
- Sweep time = auto couple.
- Do not use sweep triggering. Allow sweep to "free run".
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.
- 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

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	1	2412	-3.54	3.01	-0.53	8.00	Pass
	6	2437	-10.12	3.01	-7.11	8.00	Pass
	11	2462	-9.84	3.01	-6.83	8.00	Pass
1	1	2412	-3.91	3.01	-0.90	8.00	Pass
	6	2437	-9.70	3.01	-6.69	8.00	Pass
	11	2462	-9.47	3.01	-6.46	8.00	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 = $2\text{dBi} + 10\log(2) = 5.01\text{dBi} < 6\text{dBi}$, so the power density limit no need to reduce.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	1	2412	-10.39	3.01	-7.38	8.00	Pass
	6	2437	-5.95	3.01	-2.94	8.00	Pass
	11	2462	-9.45	3.01	-6.44	8.00	Pass
1	1	2412	-10.51	3.01	-7.50	8.00	Pass
	6	2437	-4.46	3.01	-1.45	8.00	Pass
	11	2462	-10.09	3.01	-7.08	8.00	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 = $2\text{dBi} + 10\log(2) = 5.01\text{dBi} < 6\text{dBi}$, so the power density limit no need to reduce.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	1	2412	-12.74	3.01	-9.73	8.00	Pass
	6	2437	-6.99	3.01	-3.98	8.00	Pass
	11	2462	-12.27	3.01	-9.26	8.00	Pass
1	1	2412	-12.41	3.01	-9.40	8.00	Pass
	6	2437	-6.84	3.01	-3.83	8.00	Pass
	11	2462	-11.41	3.01	-8.40	8.00	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 = $2\text{dBi} + 10\log(2) = 5.01\text{dBi} < 6\text{dBi}$, so the power density limit no need to reduce.

802.11n (HT40)

TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=2) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	3	2422	-18.01	3.01	0.16	-14.84	8.00	Pass
	6	2437	-13.80	3.01	0.16	-10.63	8.00	Pass
	9	2452	-16.27	3.01	0.16	-13.10	8.00	Pass
1	3	2422	-18.52	3.01	0.16	-15.35	8.00	Pass
	6	2437	-13.81	3.01	0.16	-10.64	8.00	Pass
	9	2452	-15.76	3.01	0.16	-12.59	8.00	Pass

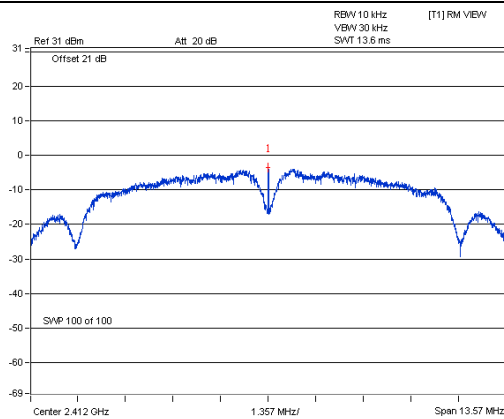
Note:

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 = $2\text{dBi} + 10\log(2) = 5.01\text{dBi} < 6\text{dBi}$, so the power density limit no need to reduce.
3. Refer to section 3.3 for duty cycle spectrum plot.

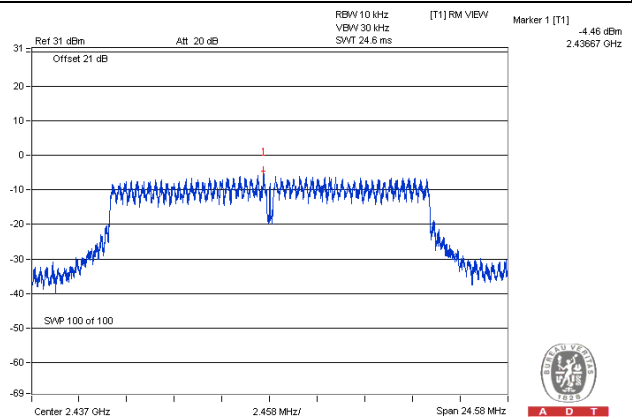
Spectrum Plot of Worst Value

802.11b

802.11g



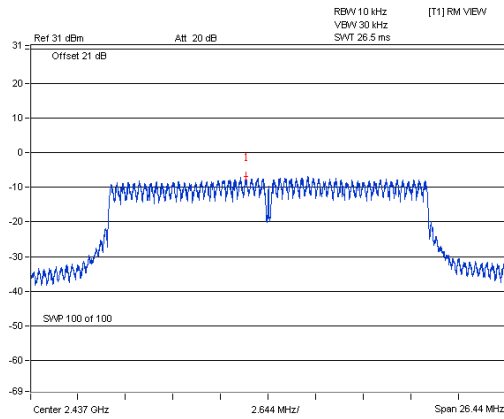
A D T



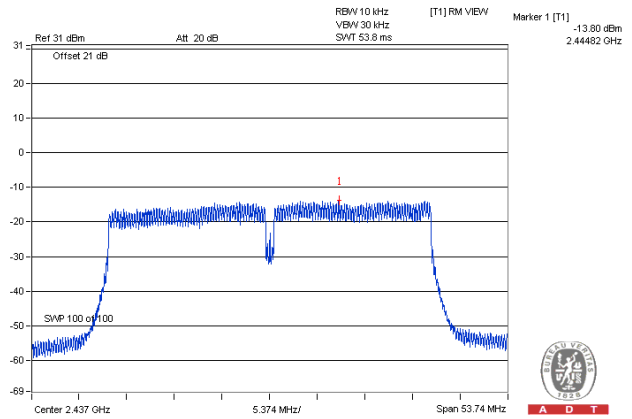
A D T

802.11n (HT20)

802.11n (HT40)



A D T



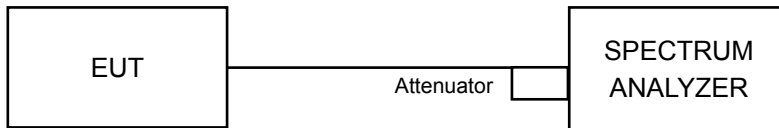
A D T

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



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

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

MEASUREMENT PROCEDURE OOB

- Set RBW = 100 kHz.
- Set VBW $\geq$ 300 kHz.
- Ensure that the number of measurement points $\geq$ span/RBW
- According to measurement points to set differ measurement span.
- Detector = average.
- Trace Mode = max hold.
- Sweep = auto couple.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

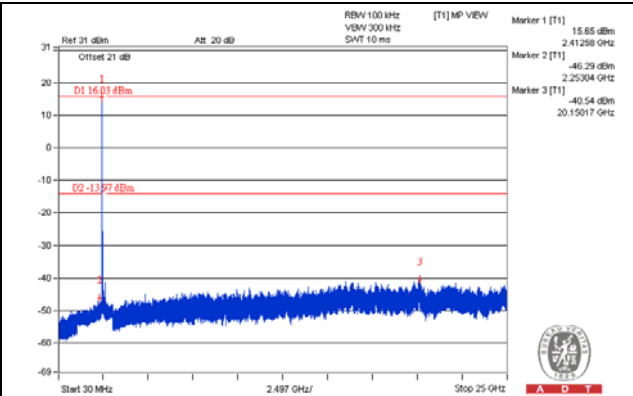
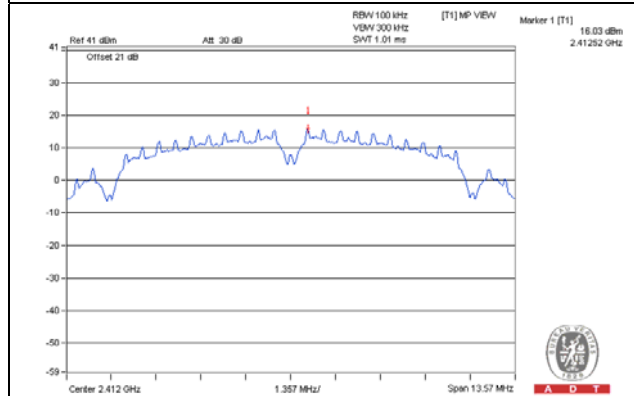
Same as Item 4.3.6

4.6.7 Test Results

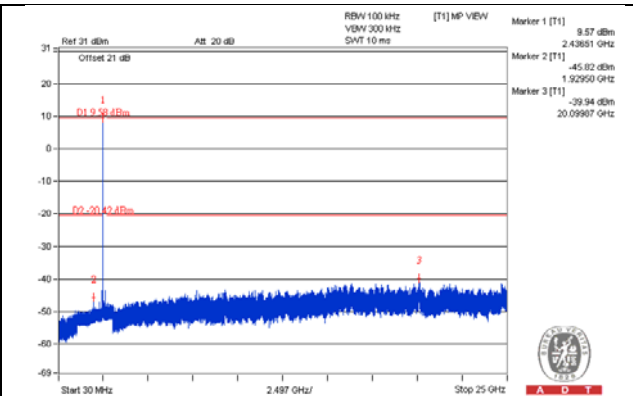
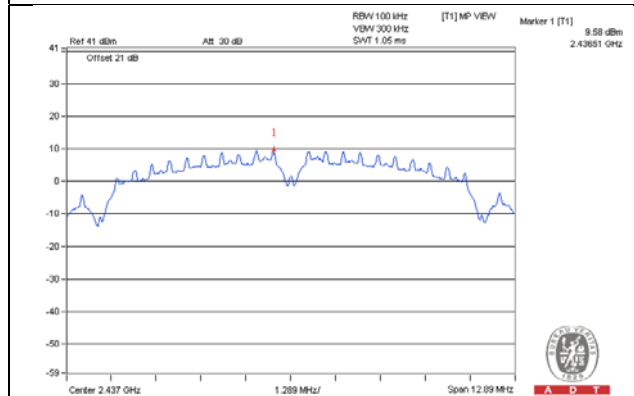
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b_CHAIN 0

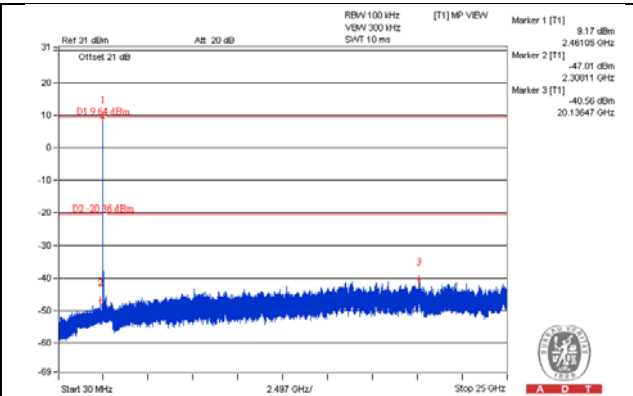
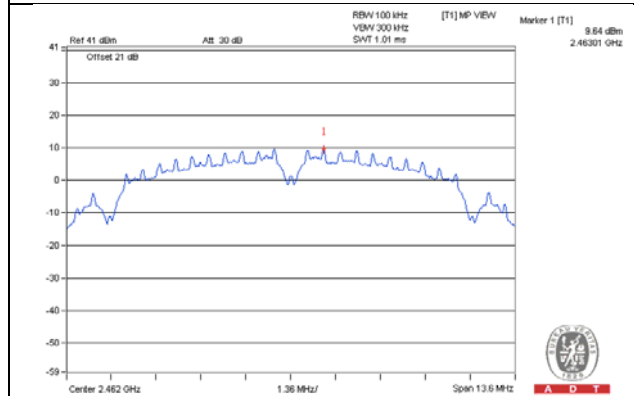
CH 1



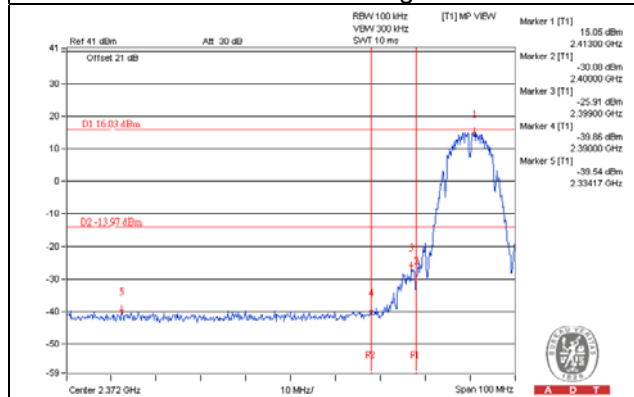
CH 6



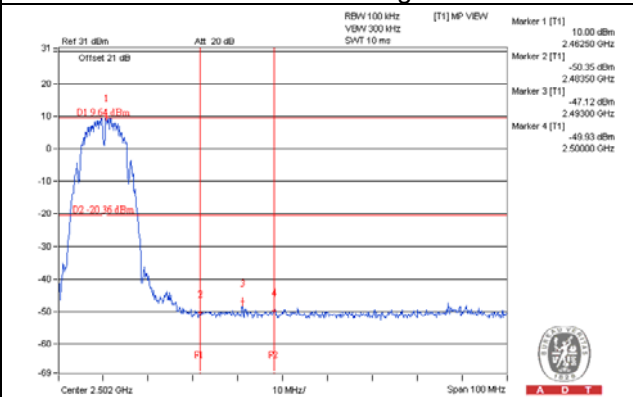
CH 11



CH 1 Band edge

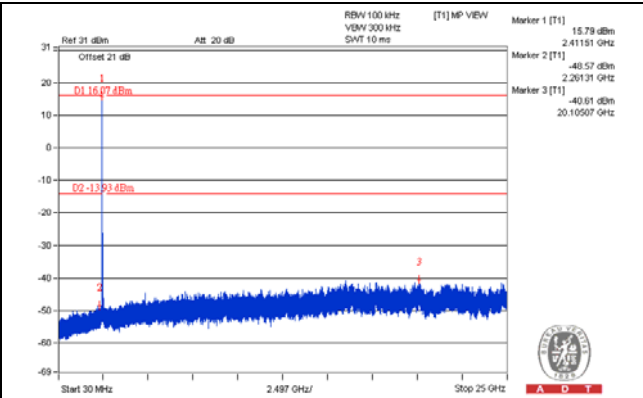
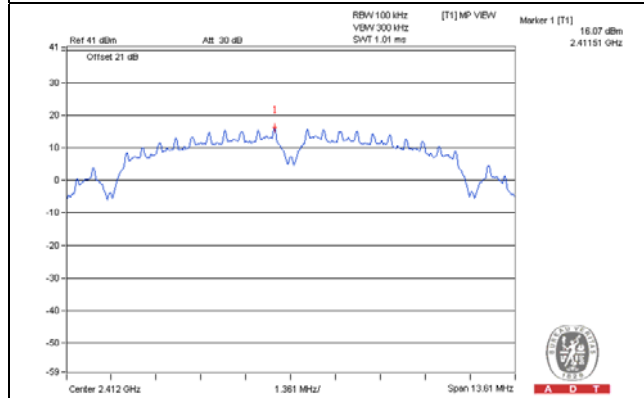


CH 11 Band edge

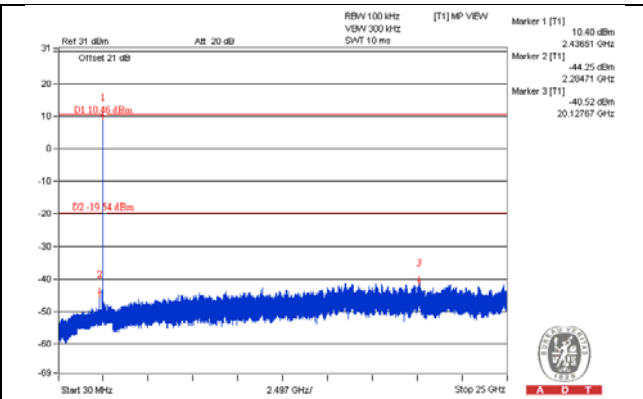
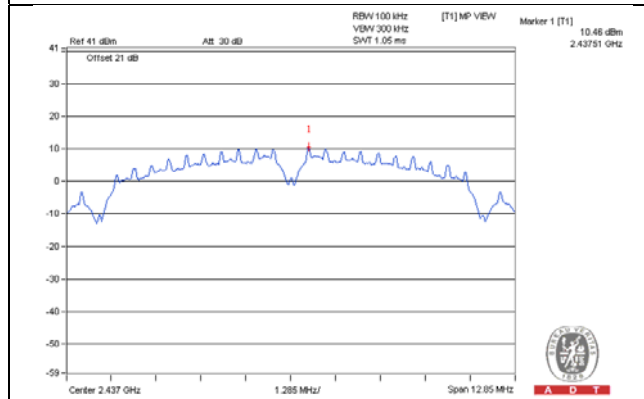


802.11b_CHAIN 1

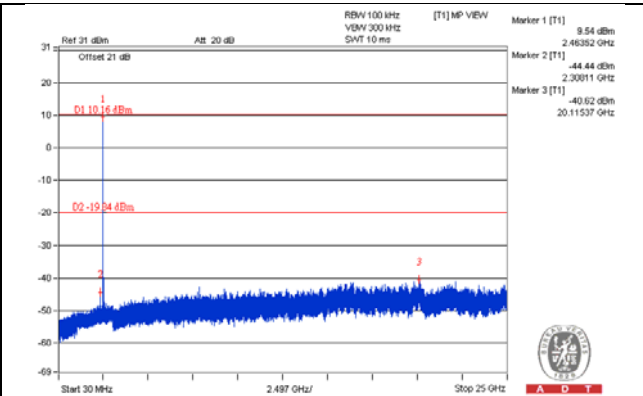
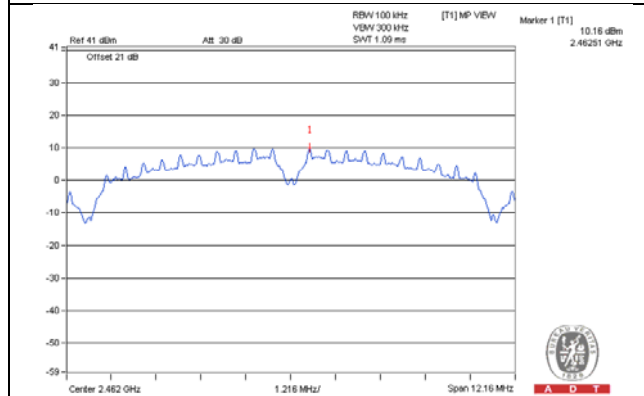
CH 1



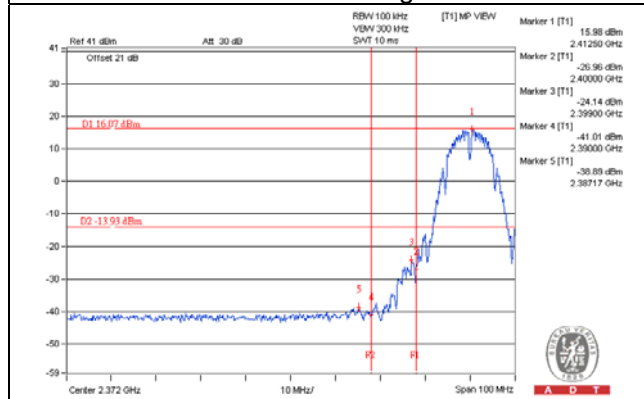
CH 6



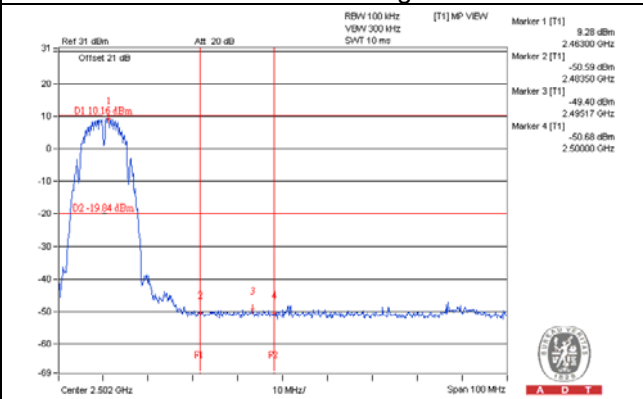
CH 11



CH 1 Band edge

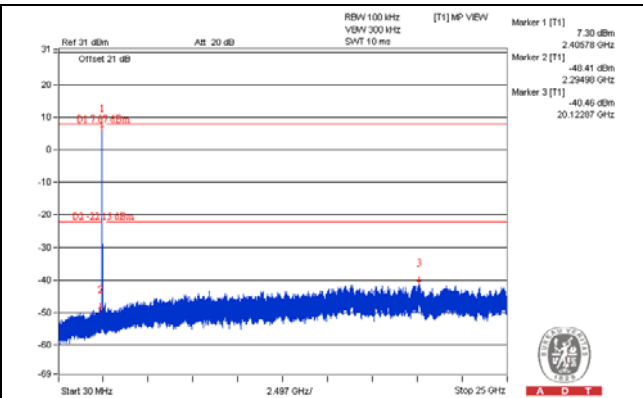
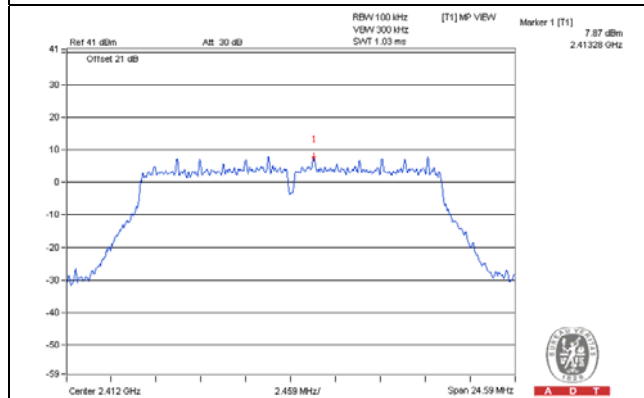


CH 11 Band edge

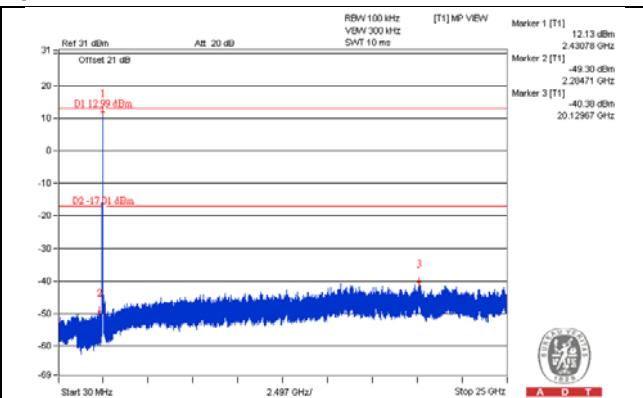
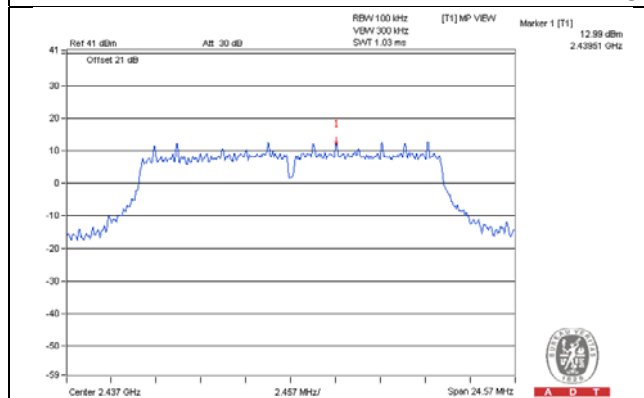


802.11g_CHAIN 0

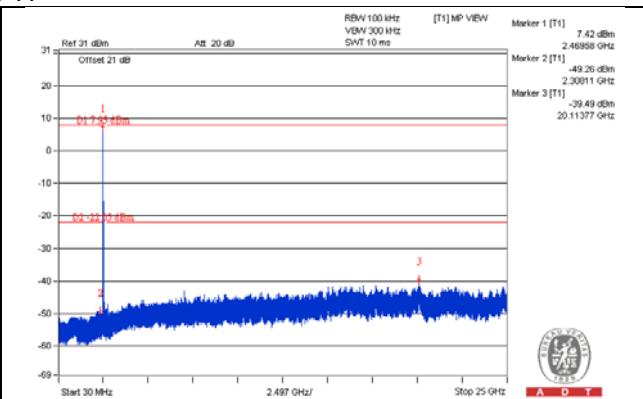
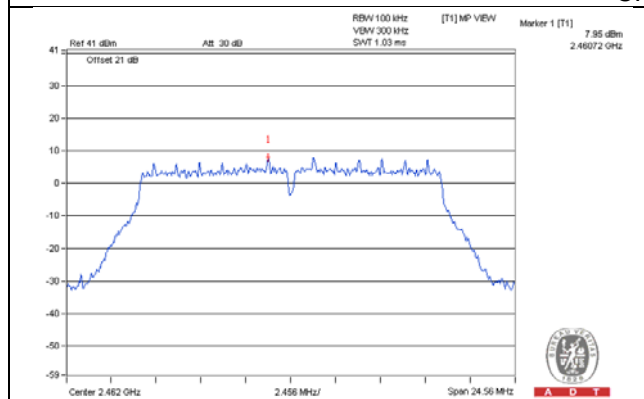
CH 1



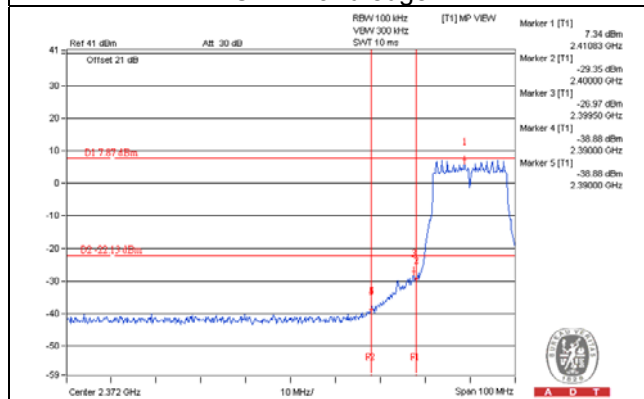
CH 6



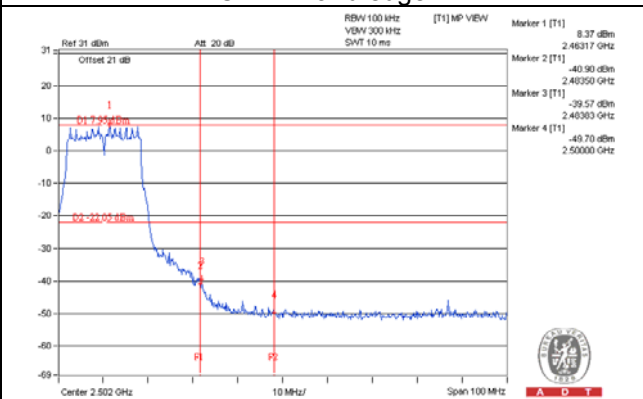
CH 11



CH 1 Band edge

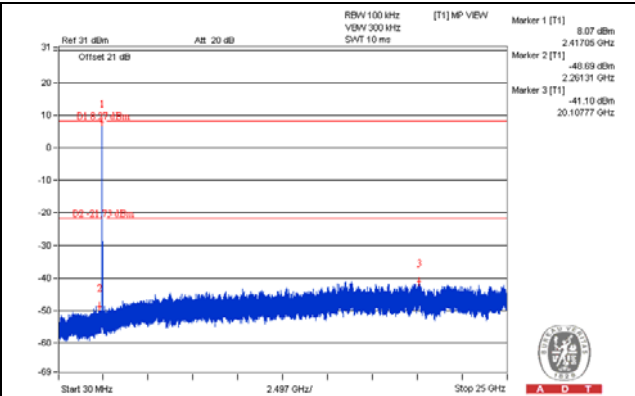
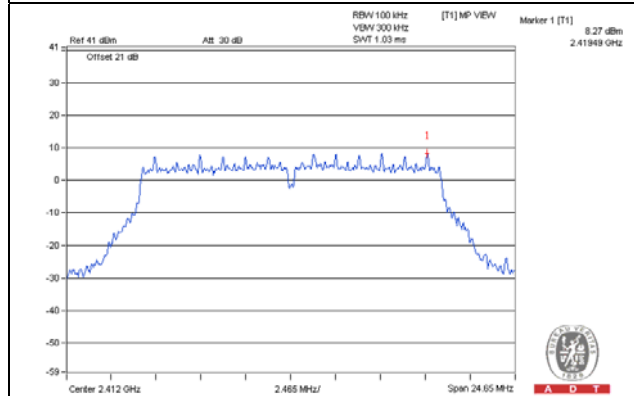


CH 11 Band edge

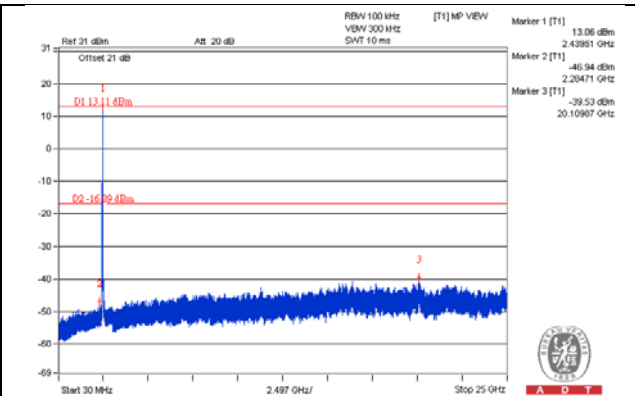
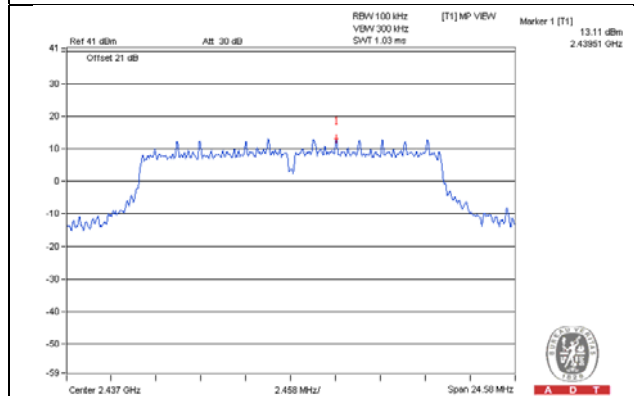


802.11g_CHAIN 1

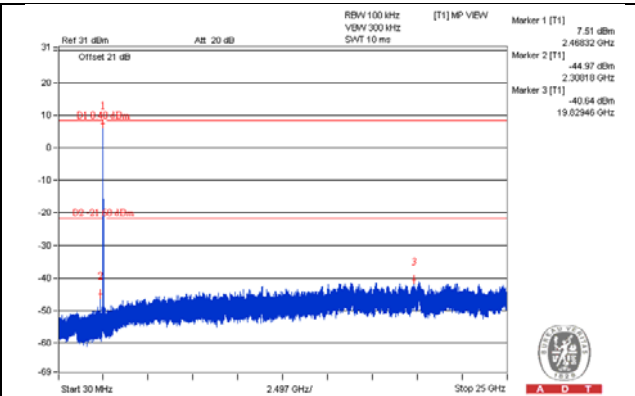
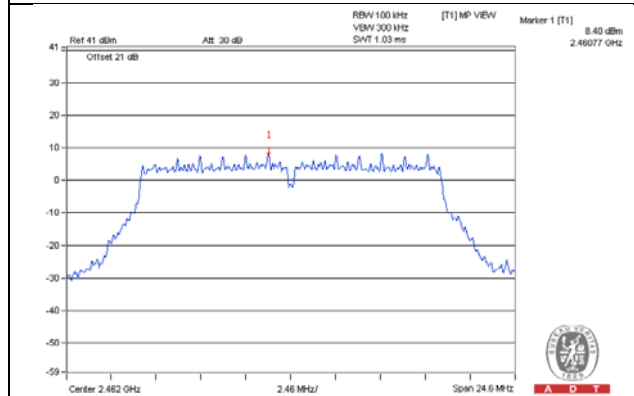
CH 1



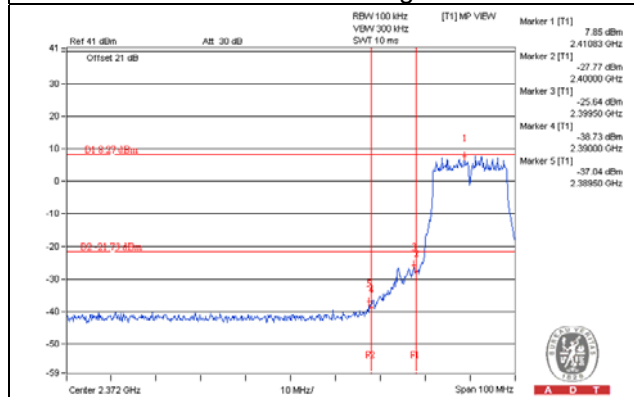
CH 6



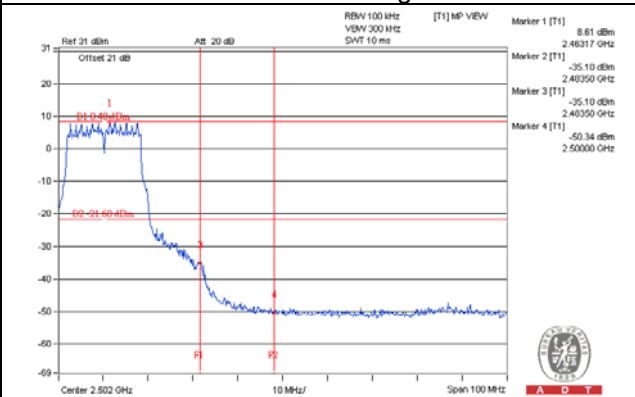
CH 11



CH 1 Band edge

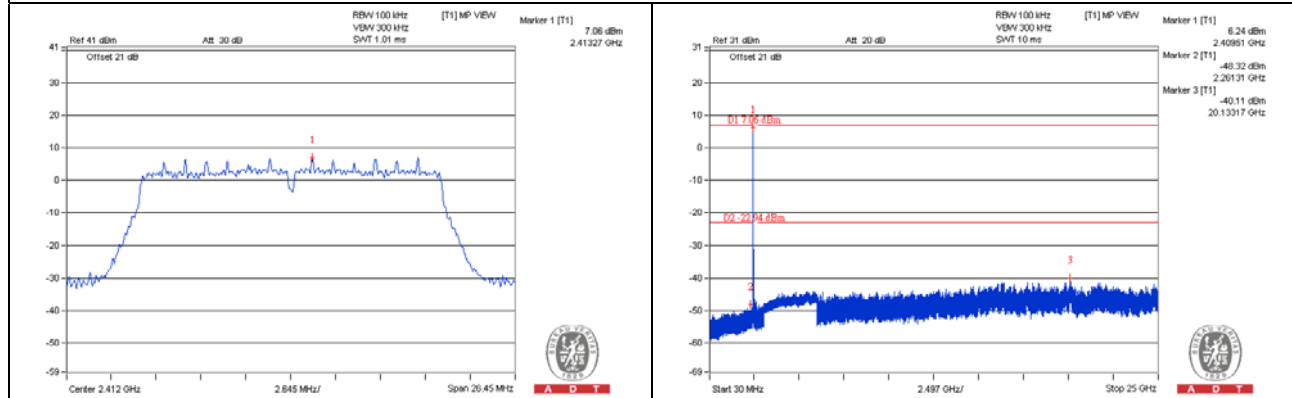


CH 11 Band edge

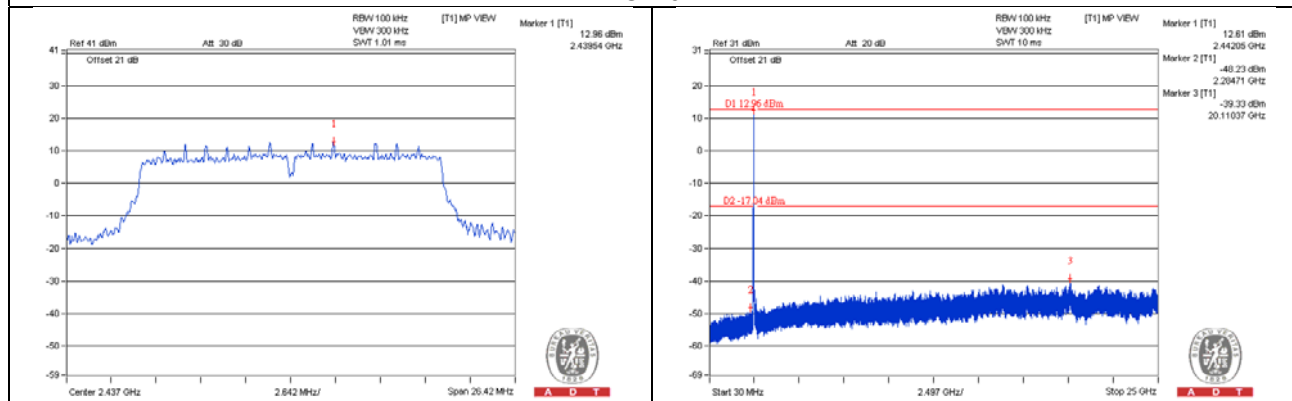


802.11n (HT20)_CHAIN 0

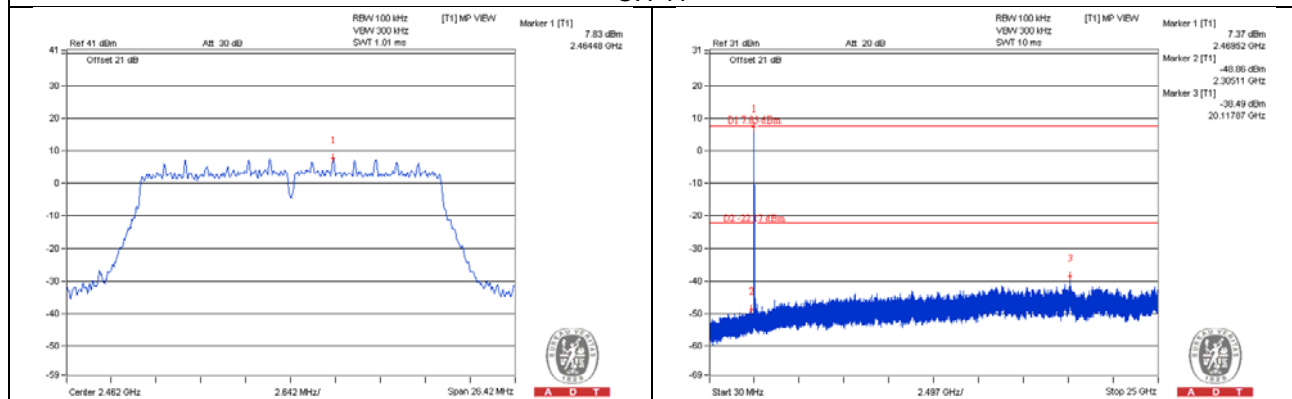
CH 1



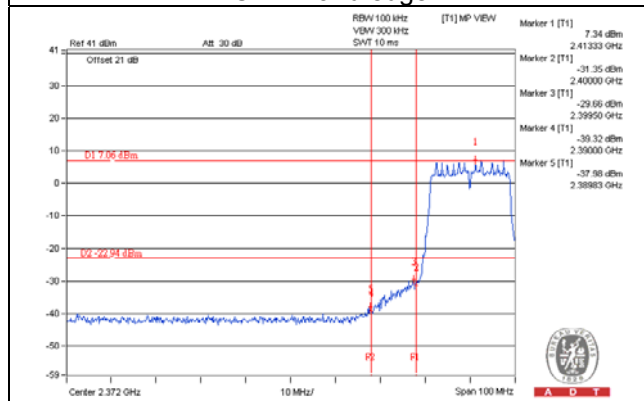
CH 6



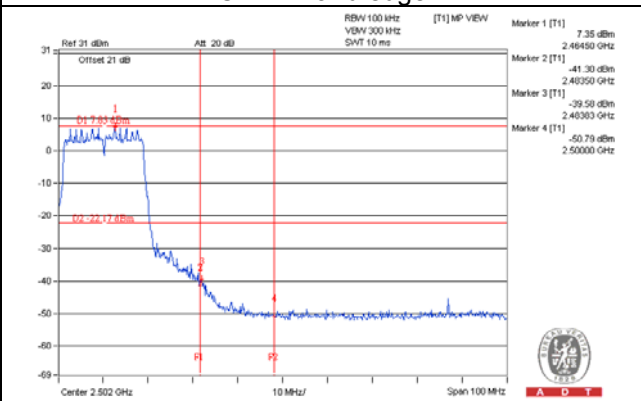
CH 11



CH 1 Band edge

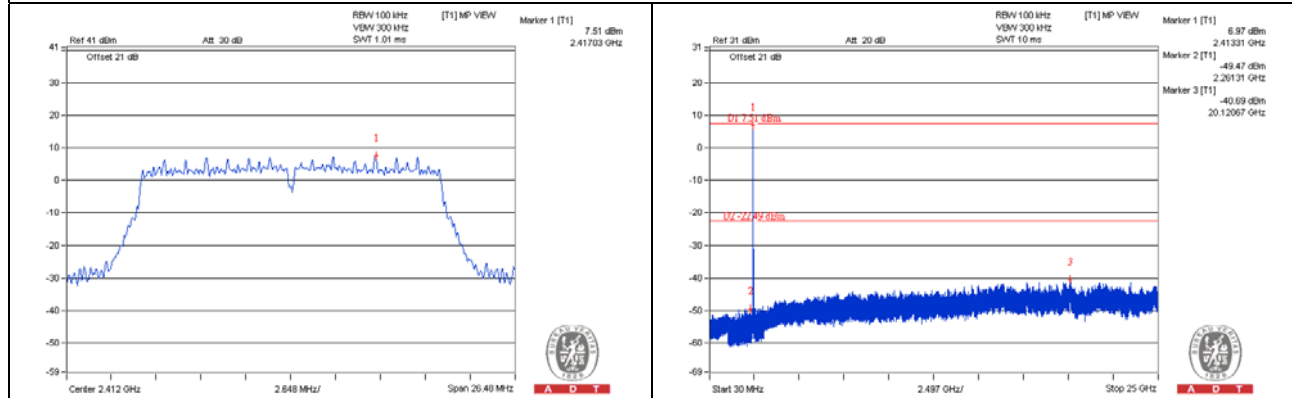


CH 11 Band edge

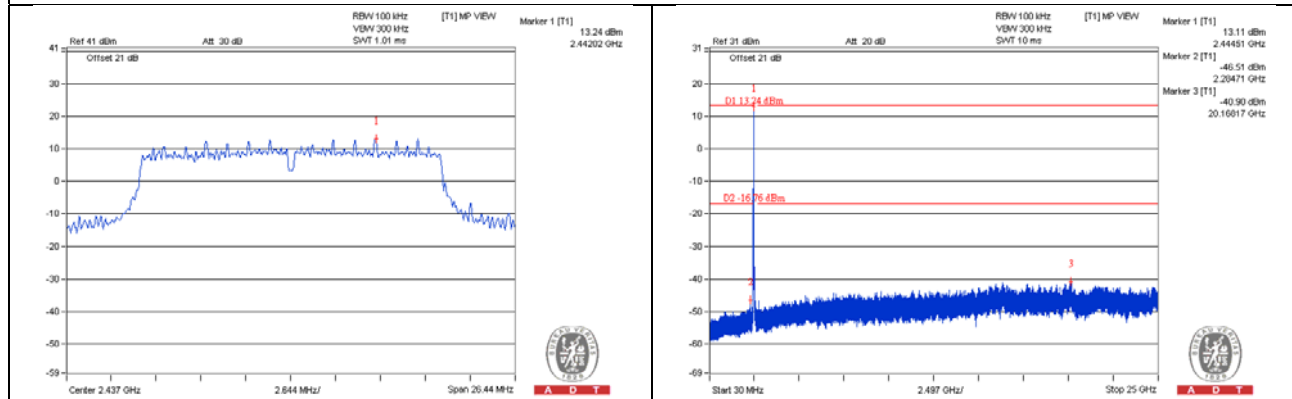


802.11n (HT20)_CHAIN 1

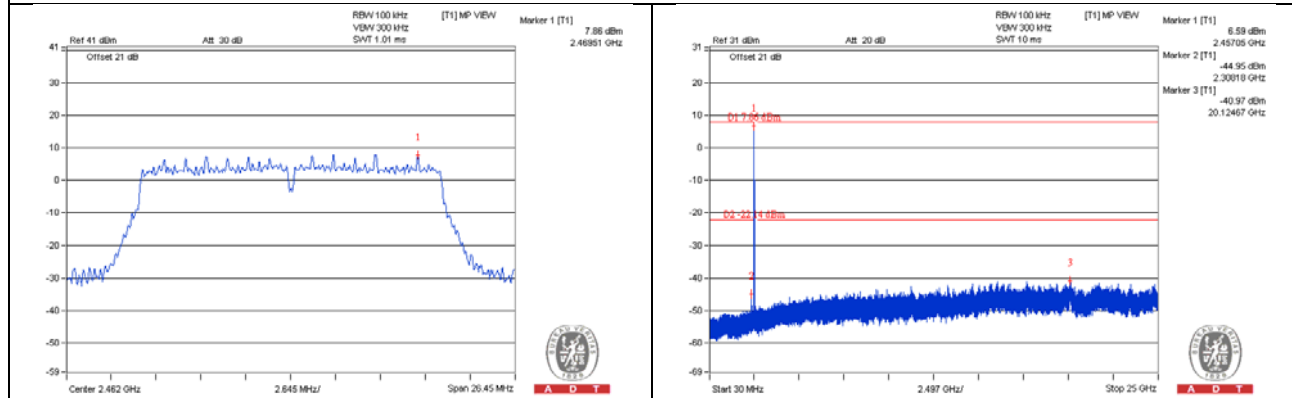
CH 1



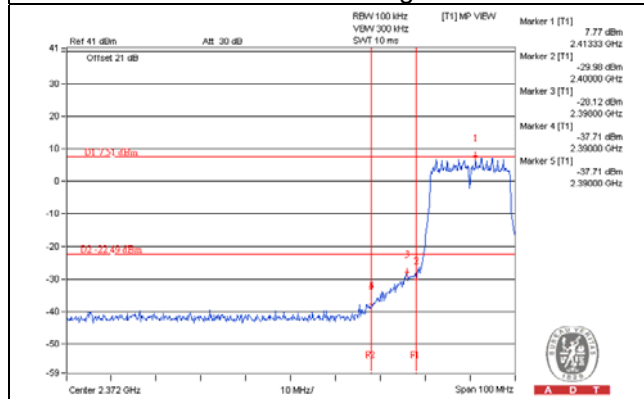
CH 6



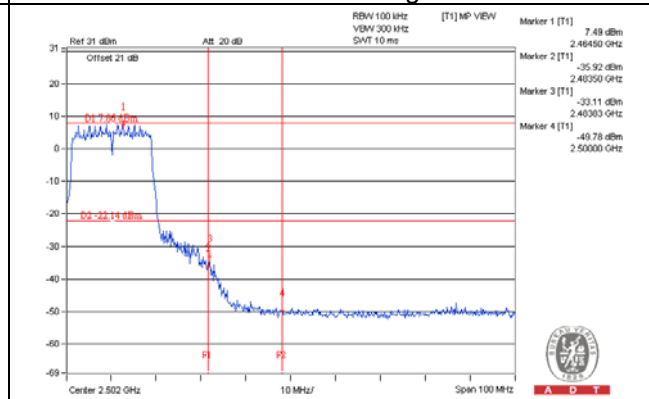
CH 11



CH 1 Band edge

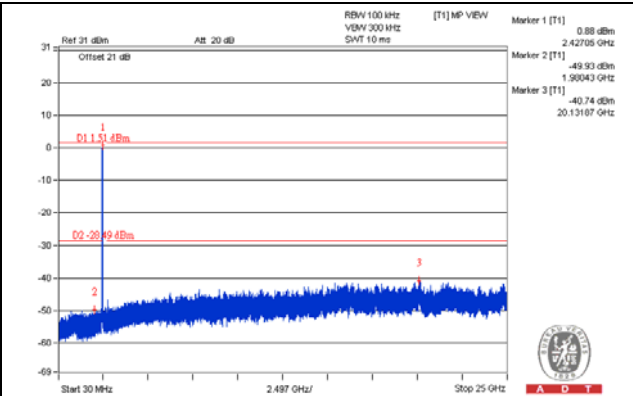
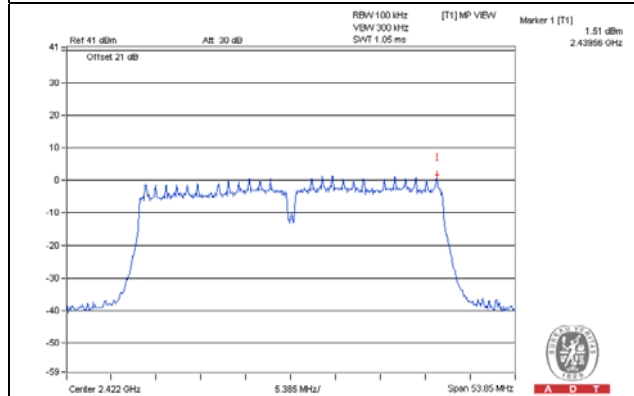


CH 11 Band edge

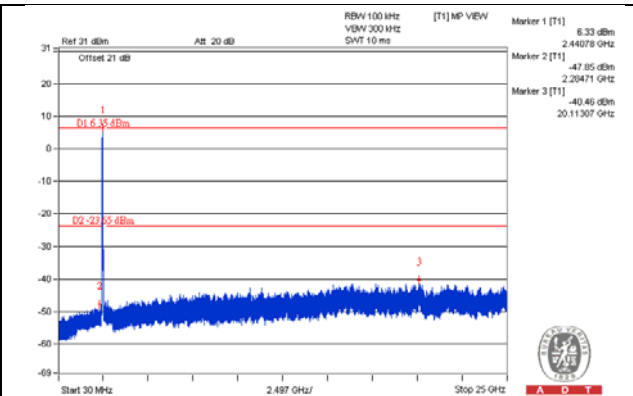
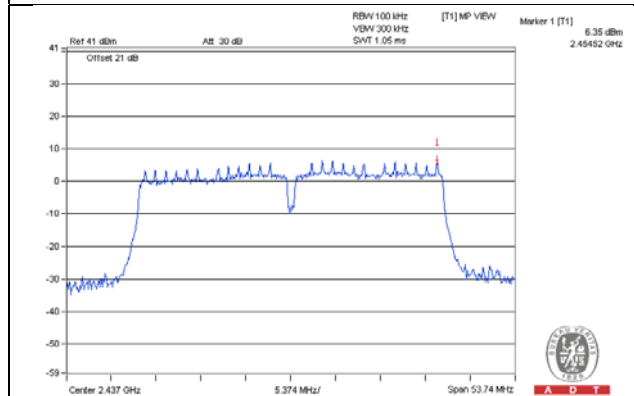


802.11n (HT40)_ CHAIN 0

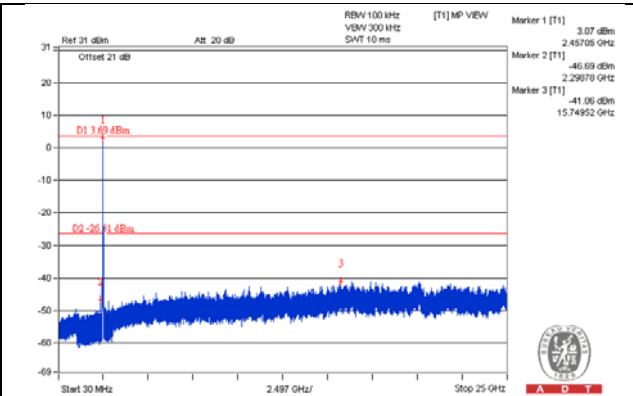
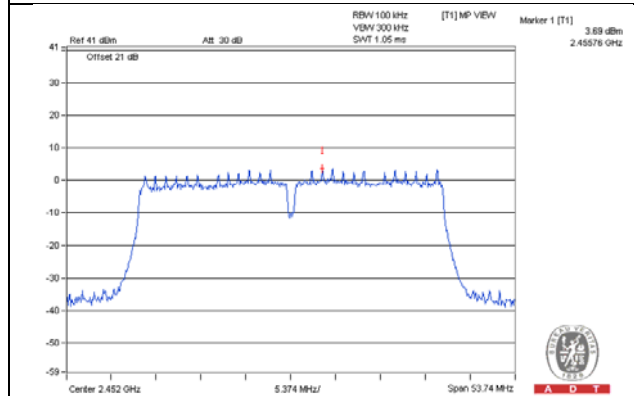
CH 3



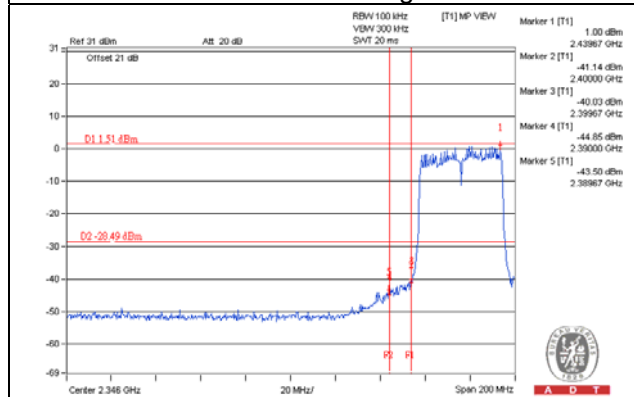
CH 6



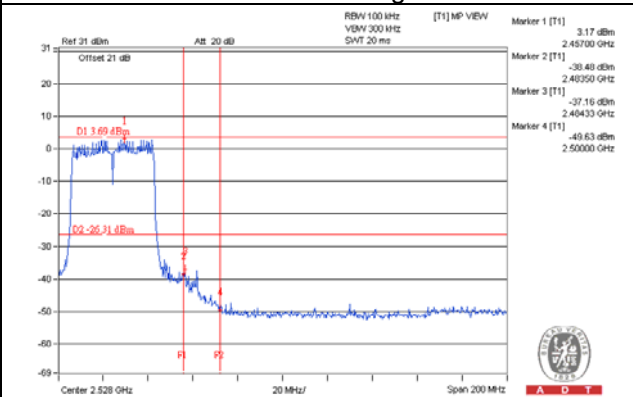
CH 9



CH 3 Band edge

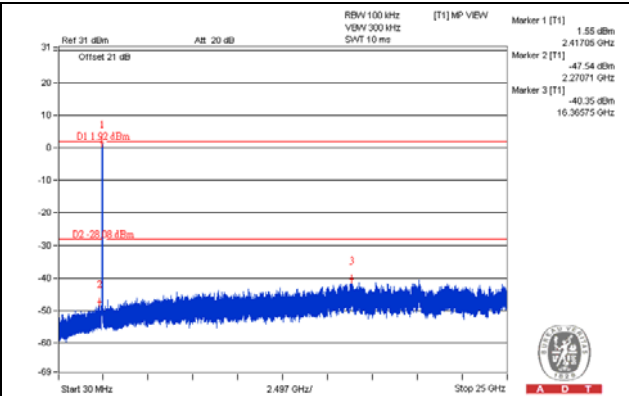
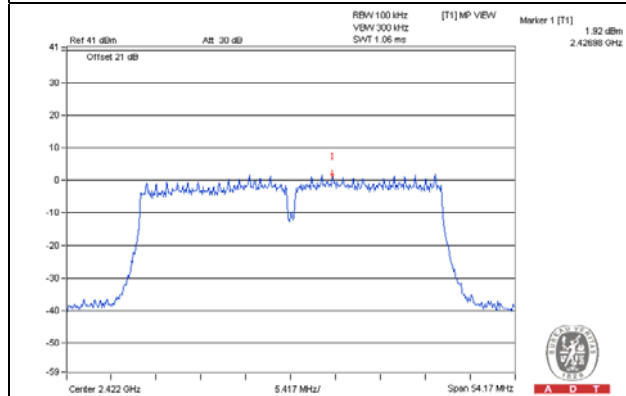


CH 9 Band edge

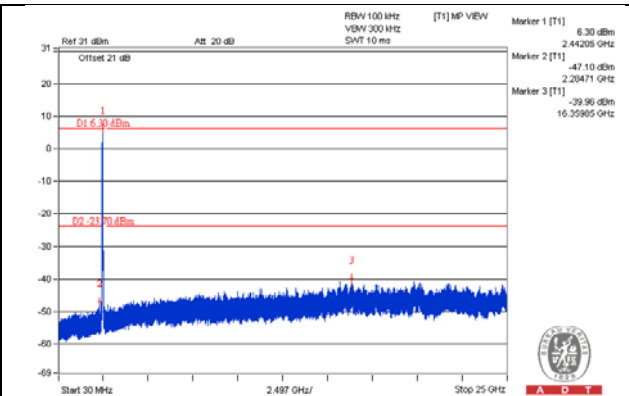
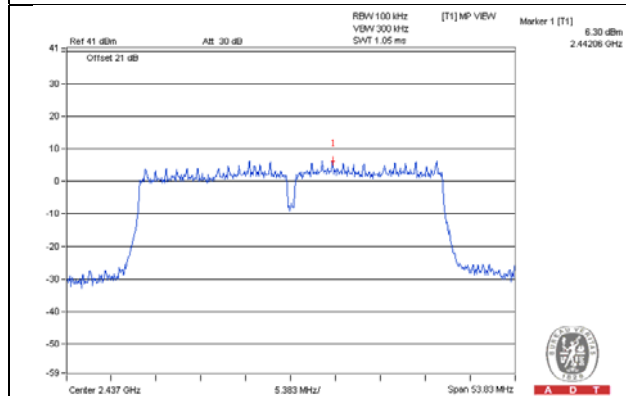


802.11n (HT40)_ CHAIN 1

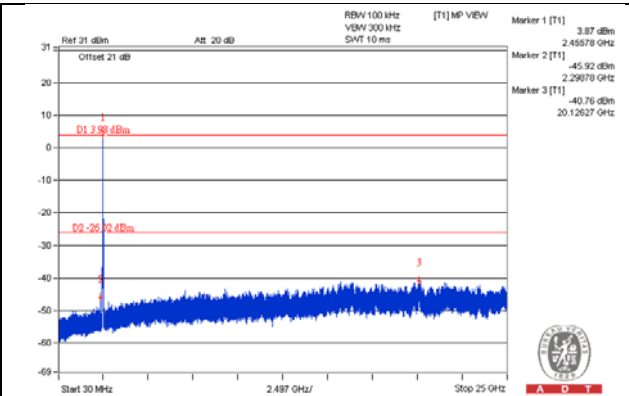
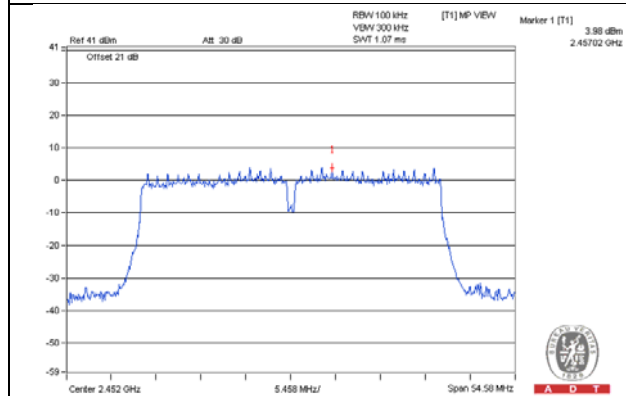
CH 3



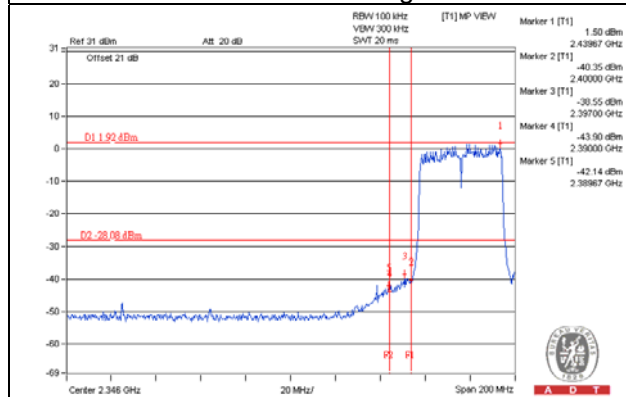
CH 6



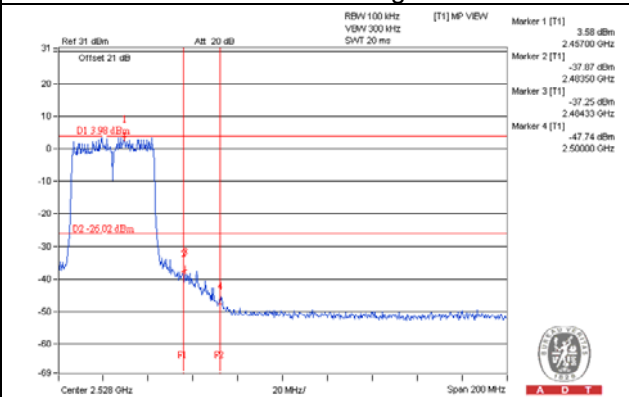
CH 9



CH 3 Band edge



CH 9 Band edge



5 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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