FCC Test Report

Report No.:	RF151229C23
FCC ID:	NDD9576791501
Test Model:	EW-7679OAP
Series Model:	GAP-679OAP, OAP1750
Received Date:	Jan. 11, 2016
Test Date:	Jan. 24 ~ Mar. 18, 2016
Issued Date:	Mar. 24, 2016
Applicant:	EDIMAX TECHNOLOGY CO., LTD.
Address:	No. 3, Wu-Chuan 3rd Road, Wu-Gu, New Taipei City 24891, Taiwan
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, R.O.C.
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF151229C23	Original release	Mar. 24, 2016

1 Certificate of Conformity

Product:	11ac Dual Band Concurrent Outdoor AP
Brand:	EDIMAX
Test Model:	EW-7679OAP
Series Model:	GAP-679OAP, OAP1750
Sample Status:	Engineering sample
Applicant:	EDIMAX TECHNOLOGY CO., LTD.
Test Date:	Jan. 24 ~ Mar. 18, 2016
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 : _____ , **Date:** Mar. 24, 2016

Pettie Chen / Senior Specialist

Approved by : _____ , **Date:** Mar. 24, 2016

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 -13.65dB at 0.42915MHz
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.6dB at 86.59MHz.
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 N plug. (The device is professionally installed)

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	3.86 dB
	200MHz ~1000MHz	3.87 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	11ac Dual Band Concurrent Outdoor AP
Brand	EDIMAX
Test Model	EW-7679OAP
Series Model	GAP-679OAP, OAP1750
Model Difference	Refer to Note
Status of EUT	Engineering sample
Power Supply Rating	48-55Vdc (PoE)
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 450.0Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	917.239mW
Antenna Type	Dipole antenna with 3.56dBi gain
Antenna Connector	N Plug
Accessory Device	Bracket, Lightning protector
Data Cable Supplied	0.4m non-shielded RJ45 cable without core 0.95m non-shielded ground cable without core

Note:

1. All models are listed as below.

Brand	Model	Remark
EDIMAX	EW-7679OAP	Main test model
EDIMAX	GAP-679OAP	Series models, for marketing purpose.
EDIMAX	OAP1750	

2. The EUT incorporates a MIMO function. Physically, the EUT provides 3 completed transmitters and 3 receivers.

Modulation Mode	TX Function
802.11b	1TX (Fixed chain 0)
802.11g	1TX (Fixed chain 0)
802.11n (HT20)	3TX
802.11n (HT40)	3TX

3. The EUT uses following PoE. (Support unit only)

PoE	
Brand	Power Desine
Model	PD-9001GR/AC
Input Power	100-240Vac~50-60Hz, 0.67A
Output Power	55Vdc,0.6A

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		

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

NOTE: 1. The EUT could just position on the Z-plane according to manufacturer's requirement.

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)
-	802.11n (HT20)	1 to 11	6	OFDM	BPSK	7.2

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)
-	802.11n (HT20)	1 to 11	6	OFDM	BPSK	7.2

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≥1G	16deg. C, 70%RH	120Vac, 60Hz	Nick Hsu
RE<1G	16deg. C, 70%RH	120Vac, 60Hz	Nick Hsu
PLC	20deg. C, 70%RH	120Vac, 60Hz	Jones Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Antony Lee

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98 %, duty factor is required

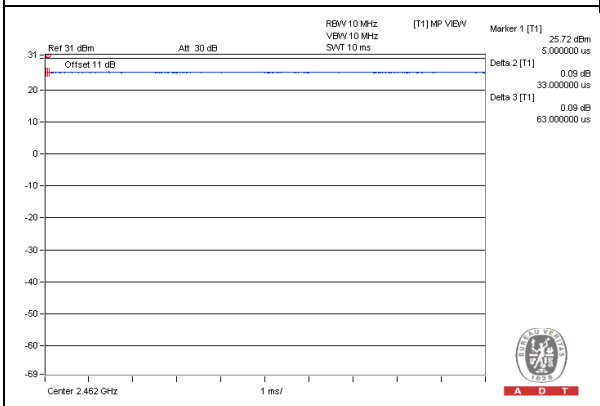
802.11b: Duty cycle = 100%

802.11g: Duty cycle = 2.014/2.067 = 0.974, Duty factor = 10 * log(1/0.974) = 0.11

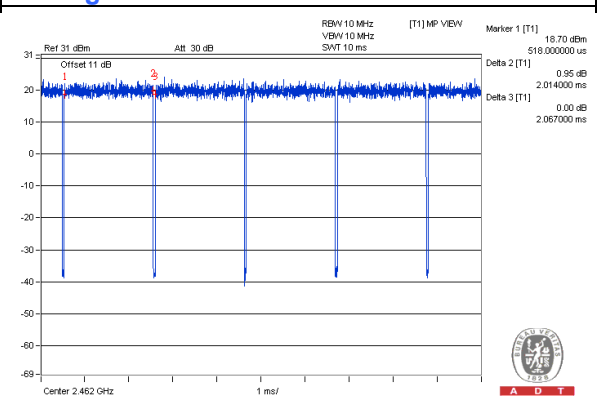
802.11n (HT20): Duty cycle = 1.89/1.96 = 0.964, Duty factor = 10 * log(1/0.964) = 0.16

802.11n (HT40): Duty cycle = 0.927/0.967 = 0.959, Duty factor = 10 * log(1/0.959) = 0.18

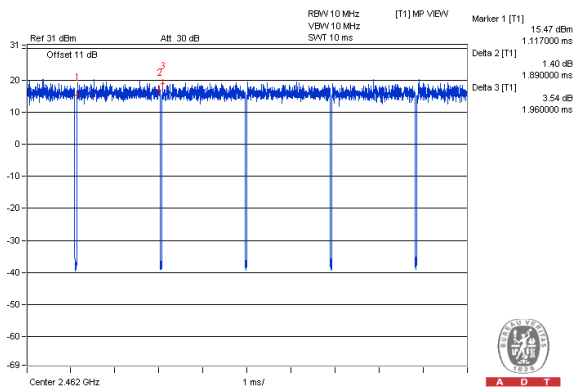
802.11b



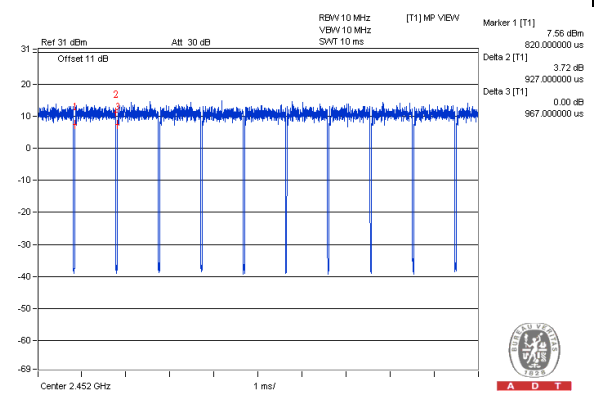
802.11g



802.11n (HT20)



802.11n (HT40)



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.	Notebook	Dell	E5410	1HC2XM1	FCC DoC Approved	-
B.	PoE	Power Desine	PD-9001GR/AC	N/A	N/A	-

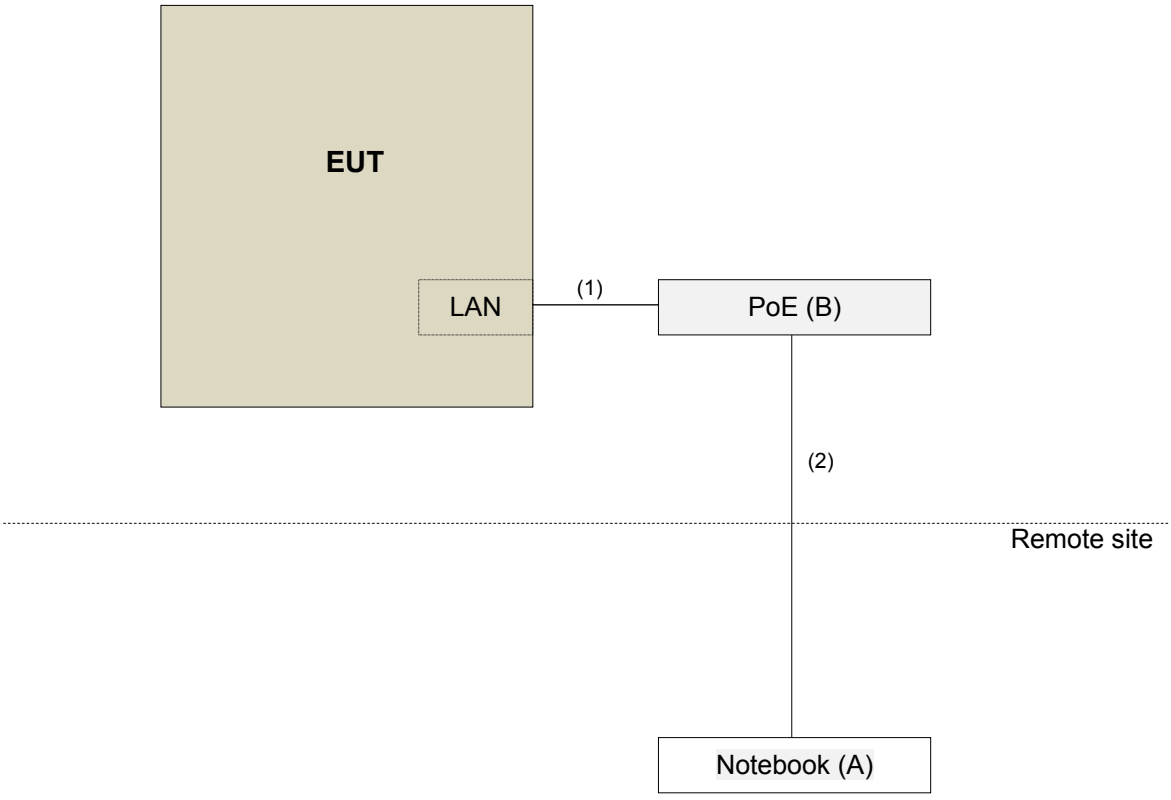
Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items A acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45 cable	1	1.8	N	0	-
2.	RJ45 cable	1	10	N	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 v03r05
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 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 20dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	Apr. 10, 2015	Apr. 09, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Sep. 02, 2015	Sep. 01, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-151	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	9120D	209	Jan. 20, 2016	Jan. 19, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2016	Jan. 17, 2017
Preamplifier Agilent	8447D	2944A10738	Oct. 18, 2015	Oct. 17, 2016
Preamplifier Agilent	8449B	3008A01964	Aug. 22, 2015	Aug. 21, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (214378)	Aug. 22, 2015	Aug. 21, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 106	Cable-CH3-03 (309224+12738)	Aug. 22, 2015	Aug. 21, 2016
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
High Speed Peak Power Meter	ML2495A	0824011	Jul. 09, 2015	Jul. 08, 2016
Power Sensor	MA2411B	0738171	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 3.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 988962.
5. The IC Site Registration No. is IC 7450F-3.

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:

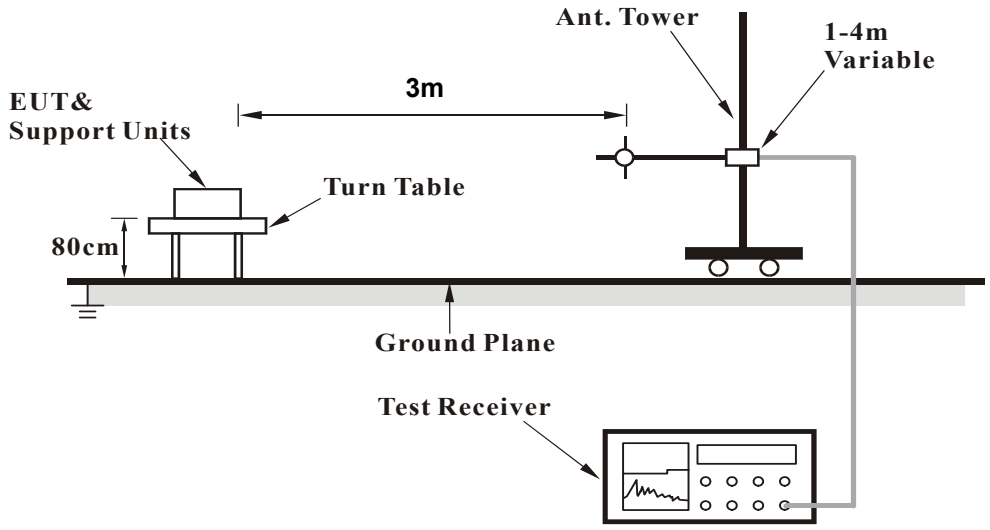
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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/duty cycle)).
4. 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.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

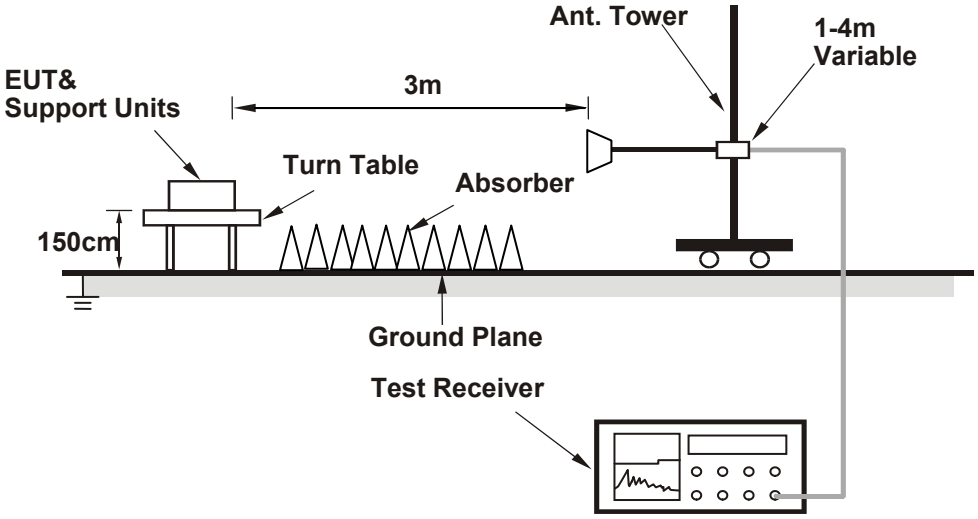
No deviation.

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

a. Placed the EUT on the testing table.
b. Prepared notebook to act as 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	59.3 PK	74.0	-14.7	1.66 H	250	25.10	34.20
2	2390.00	47.3 AV	54.0	-6.7	1.66 H	250	13.10	34.20
3	*2412.00	100.6 PK			1.64 H	252	66.30	34.30
4	*2412.00	96.9 AV			1.64 H	252	62.60	34.30
5	4824.00	52.4 PK	74.0	-21.6	1.79 H	279	44.40	8.00
6	4824.00	39.1 AV	54.0	-14.9	1.79 H	279	31.10	8.00
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	2390.00	60.5 PK	74.0	-13.5	1.49 V	110	26.30	34.20
2	2390.00	51.9 AV	54.0	-2.1	1.49 V	110	17.70	34.20
3	*2412.00	114.9 PK			1.01 V	292	80.60	34.30
4	*2412.00	111.5 AV			1.01 V	292	77.20	34.30
5	4824.00	56.3 PK	74.0	-17.7	1.58 V	325	48.30	8.00
6	4824.00	52.6 AV	54.0	-1.4	1.58 V	325	44.60	8.00

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)
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	96.6 PK			1.73 H	244	63.70	32.90
2	*2437.00	93.2 AV			1.73 H	244	60.30	32.90
3	4874.00	49.5 PK	74.0	-24.5	1.80 H	269	43.50	6.00
4	4874.00	36.6 AV	54.0	-17.4	1.80 H	269	30.60	6.00
5	7311.00	55.4 PK	74.0	-18.6	2.19 H	39	42.10	13.30
6	7311.00	44.5 AV	54.0	-9.5	2.19 H	39	31.20	13.30
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	*2437.00	117.6 PK			1.80 V	177	84.70	32.90
2	*2437.00	114.1 AV			1.80 V	177	81.20	32.90
3	4874.00	52.7 PK	74.0	-21.3	1.72 V	318	46.70	6.00
4	4874.00	45.4 AV	54.0	-8.6	1.72 V	318	39.40	6.00
5	7311.00	61.0 PK	74.0	-13.0	2.46 V	337	47.70	13.30
6	7311.00	53.0 AV	54.0	-1.0	2.46 V	337	39.70	13.30

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.

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	97.7 PK			1.64 H	256	64.80	32.90
2	*2462.00	94.1 AV			1.64 H	256	61.20	32.90
3	2483.50	56.3 PK	74.0	-17.7	1.64 H	255	23.30	33.00
4	2483.50	45.8 AV	54.0	-8.2	1.64 H	255	12.80	33.00
5	4924.00	45.0 PK	74.0	-29.0	1.79 H	288	39.00	6.00
6	4924.00	37.0 AV	54.0	-17.0	1.79 H	288	31.00	6.00
7	7386.00	56.5 PK	74.0	-17.5	2.16 H	39	43.30	13.20
8	7386.00	45.2 AV	54.0	-8.8	2.16 H	39	32.00	13.20
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	*2462.00	116.2 PK			1.88 V	198	83.30	32.90
2	*2462.00	112.4 AV			1.88 V	198	79.50	32.90
3	2483.50	61.9 PK	74.0	-12.1	1.54 V	172	28.90	33.00
4	2483.50	50.1 AV	54.0	-3.9	1.54 V	172	17.10	33.00
5	4924.00	49.6 PK	74.0	-24.4	1.84 V	314	43.60	6.00
6	4924.00	36.5 AV	54.0	-17.5	1.84 V	314	30.50	6.00
7	7386.00	61.1 PK	74.0	-12.9	2.49 V	321	47.90	13.20
8	7386.00	52.9 AV	54.0	-1.1	2.49 V	321	39.70	13.20

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.

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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	58.0 PK	74.0	-16.0	1.48 H	29	25.20	32.80
2	2390.00	46.0 AV	54.0	-8.0	1.48 H	29	13.20	32.80
3	*2412.00	95.2 PK			1.48 H	29	62.30	32.90
4	*2412.00	86.2 AV			1.48 H	29	53.30	32.90
5	4824.00	47.7 PK	74.0	-26.3	1.97 H	333	41.80	5.90
6	4824.00	34.8 AV	54.0	-19.2	1.97 H	333	28.90	5.90
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	72.5 PK	74.0	-1.5	1.62 V	123	39.70	32.80
2	2390.00	50.8 AV	54.0	-3.2	1.62 V	123	18.00	32.80
3	*2412.00	109.6 PK			1.61 V	241	76.70	32.90
4	*2412.00	100.4 AV			1.61 V	241	67.50	32.90
5	4824.00	48.7 PK	74.0	-25.3	1.80 V	328	42.80	5.90
6	4824.00	35.6 AV	54.0	-18.4	1.80 V	328	29.70	5.90

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)
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	57.6 PK	74.0	-16.4	1.67 H	29	24.80	32.80
2	2390.00	45.3 AV	54.0	-8.7	1.67 H	29	12.50	32.80
3	*2437.00	102.8 PK			1.67 H	29	69.90	32.90
4	*2437.00	93.4 AV			1.67 H	29	60.50	32.90
5	2483.50	58.1 PK	74.0	-15.9	1.70 H	350	25.10	33.00
6	2483.50	46.0 AV	54.0	-8.0	1.70 H	350	13.00	33.00
7	4874.00	49.0 PK	74.0	-25.0	1.79 H	290	43.00	6.00
8	4874.00	35.8 AV	54.0	-18.2	1.79 H	290	29.80	6.00
9	7311.00	56.4 PK	74.0	-17.6	2.11 H	320	43.10	13.30
10	7311.00	43.3 AV	54.0	-10.7	2.11 H	320	30.00	13.30
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	2390.00	70.1 PK	74.0	-3.9	1.67 V	321	37.30	32.80
2	2390.00	50.9 AV	54.0	-3.1	1.67 V	321	18.10	32.80
3	*2437.00	116.4 PK			1.67 V	300	83.50	32.90
4	*2437.00	107.2 AV			1.67 V	300	74.30	32.90
5	2483.50	70.9 PK	74.0	-3.1	1.67 V	206	37.90	33.00
6	2483.50	52.4 AV	54.0	-1.6	1.67 V	206	19.40	33.00
7	4874.00	52.0 PK	74.0	-22.0	2.04 V	201	46.00	6.00
8	4874.00	37.3 AV	54.0	-16.7	2.04 V	201	31.30	6.00
9	7311.00	58.7 PK	74.0	-15.3	2.45 V	189	45.40	13.30
10	7311.00	46.0 AV	54.0	-8.0	2.45 V	189	32.70	13.30

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.

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	97.4 PK			1.45 H	33	64.50	32.90
2	*2462.00	86.8 AV			1.45 H	33	53.90	32.90
3	2483.50	58.6 PK	74.0	-15.4	1.45 H	42	25.60	33.00
4	2483.50	46.4 AV	54.0	-7.6	1.45 H	42	13.40	33.00
5	4924.00	49.0 PK	74.0	-25.0	2.01 H	343	43.00	6.00
6	4924.00	35.7 AV	54.0	-18.3	2.01 H	343	29.70	6.00
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	110.7 PK			1.63 V	194	77.80	32.90
2	*2462.00	101.4 AV			1.63 V	194	68.50	32.90
3	2483.50	72.3 PK	74.0	-1.7	1.67 V	172	39.30	33.00
4	2483.50	52.5 AV	54.0	-1.5	1.67 V	172	19.50	33.00
5	4924.00	50.0 PK	74.0	-24.0	1.78 V	126	44.00	6.00
6	4924.00	36.3 AV	54.0	-17.7	1.78 V	126	30.30	6.00

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)
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) 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	57.3 PK	74.0	-16.7	1.34 H	216	24.50	32.80
2	2390.00	45.5 AV	54.0	-8.5	1.34 H	216	12.70	32.80
3	*2412.00	91.8 PK			1.34 H	216	58.90	32.90
4	*2412.00	82.7 AV			1.34 H	216	49.80	32.90
5	4824.00	48.5 PK	74.0	-25.5	1.95 H	280	42.60	5.90
6	4824.00	35.5 AV	54.0	-18.5	1.95 H	280	29.60	5.90
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	71.4 PK	74.0	-2.6	1.96 V	3	38.60	32.80
2	2390.00	53.0 AV	54.0	-1.0	1.96 V	3	20.20	32.80
3	*2412.00	114.8 PK			2.31 V	175	81.90	32.90
4	*2412.00	104.9 AV			2.31 V	175	72.00	32.90
5	4824.00	56.2 PK	74.0	-17.8	1.87 V	19	50.30	5.90
6	4824.00	42.5 AV	54.0	-11.5	1.87 V	19	36.60	5.90

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)
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	58.0 PK	74.0	-16.0	1.18 H	243	25.20	32.80
2	2390.00	45.7 AV	54.0	-8.3	1.18 H	243	12.90	32.80
3	*2437.00	96.6 PK			1.08 H	231	63.70	32.90
4	*2437.00	88.1 AV			1.08 H	231	55.20	32.90
5	2483.50	56.0 PK	74.0	-18.0	1.08 H	231	23.00	33.00
6	2483.50	45.1 AV	54.0	-8.9	1.08 H	231	12.10	33.00
7	4874.00	54.4 PK	74.0	-19.6	2.00 H	277	48.40	6.00
8	4874.00	40.9 AV	54.0	-13.1	2.00 H	277	34.90	6.00
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	2390.00	72.1 PK	74.0	-1.9	2.00 V	292	39.30	32.80
2	2390.00	51.1 AV	54.0	-2.9	2.00 V	292	18.30	32.80
3	*2437.00	118.3 PK			1.59 V	174	85.40	32.90
4	*2437.00	109.4 AV			1.59 V	174	76.50	32.90
5	2483.50	68.3 PK	74.0	-5.7	1.57 V	173	35.30	33.00
6	2483.50	52.4 AV	54.0	-1.6	1.57 V	173	19.40	33.00
7	4874.00	67.3 PK	74.0	-6.7	2.13 V	311	61.30	6.00
8	4874.00	52.5 AV	54.0	-1.5	2.13 V	311	46.50	6.00

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)
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	92.5 PK			2.01 H	309	59.60	32.90
2	*2462.00	82.5 AV			2.01 H	309	49.60	32.90
3	2483.50	57.2 PK	74.0	-16.8	2.01 H	309	24.20	33.00
4	2483.50	45.4 AV	54.0	-8.6	2.01 H	309	12.40	33.00
5	4924.00	49.4 PK	74.0	-24.6	2.00 H	267	43.40	6.00
6	4924.00	36.8 AV	54.0	-17.2	2.00 H	267	30.80	6.00
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	115.0 PK			1.79 V	180	82.10	32.90
2	*2462.00	105.0 AV			1.79 V	180	72.10	32.90
3	2483.50	70.8 PK	74.0	-3.2	1.98 V	349	37.80	33.00
4	2483.50	52.7 AV	54.0	-1.3	1.98 V	349	19.70	33.00
5	4924.00	59.9 PK	74.0	-14.1	2.18 V	28	53.90	6.00
6	4924.00	43.7 AV	54.0	-10.3	2.18 V	28	37.70	6.00

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)
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 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	55.9 PK	74.0	-18.1	1.31 H	125	23.10	32.80
2	2390.00	44.8 AV	54.0	-9.2	1.31 H	125	12.00	32.80
3	*2422.00	86.0 PK			1.31 H	125	53.10	32.90
4	*2422.00	77.3 AV			1.31 H	125	44.40	32.90
5	4844.00	47.8 PK	74.0	-26.2	1.69 H	321	42.00	5.80
6	4844.00	34.6 AV	54.0	-19.4	1.69 H	321	28.80	5.80
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	69.4 PK	74.0	-4.6	1.85 V	326	36.60	32.80
2	2390.00	52.6 AV	54.0	-1.4	1.85 V	326	19.80	32.80
3	*2422.00	108.6 PK			2.08 V	172	75.70	32.90
4	*2422.00	99.5 AV			2.08 V	172	66.60	32.90
5	4844.00	50.9 PK	74.0	-23.1	1.75 V	245	45.10	5.80
6	4844.00	37.5 AV	54.0	-16.5	1.75 V	245	31.70	5.80

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)
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	55.8 PK	74.0	-18.2	1.14 H	126	23.00	32.80
2	2390.00	45.4 AV	54.0	-8.6	1.14 H	126	12.60	32.80
3	*2437.00	92.6 PK			1.14 H	126	59.70	32.90
4	*2437.00	83.5 AV			1.14 H	126	50.60	32.90
5	2483.50	55.5 PK	74.0	-18.5	1.20 H	133	22.50	33.00
6	2483.50	45.1 AV	54.0	-8.9	1.20 H	133	12.10	33.00
7	4874.00	52.3 PK	74.0	-21.7	1.82 H	320	46.30	6.00
8	4874.00	38.2 AV	54.0	-15.8	1.82 H	320	32.20	6.00
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	2390.00	70.8 PK	74.0	-3.2	1.79 V	339	38.00	32.80
2	2390.00	53.0 AV	54.0	-1.0	1.79 V	339	20.20	32.80
3	*2437.00	112.4 PK			2.10 V	332	79.50	32.90
4	*2437.00	103.0 AV			2.10 V	332	70.10	32.90
5	2483.50	72.5 PK	74.0	-1.5	1.82 V	305	39.50	33.00
6	2483.50	51.9 AV	54.0	-2.1	1.82 V	305	18.90	33.00
7	4874.00	60.0 PK	74.0	-14.0	2.30 V	22	54.00	6.00
8	4874.00	45.8 AV	54.0	-8.2	2.30 V	22	39.80	6.00

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)
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	87.9 PK			1.28 H	124	54.90	33.00
2	*2452.00	79.0 AV			1.28 H	124	46.00	33.00
3	#2462.00	57.0 PK	74.0	-17.0	1.28 H	124	24.10	32.90
4	#2462.00	45.3 AV	54.0	-8.7	1.28 H	124	12.40	32.90
5	4904.00	48.3 PK	74.0	-25.7	1.41 H	224	42.40	5.90
6	4904.00	35.4 AV	54.0	-18.6	1.41 H	224	29.50	5.90
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	*2452.00	109.0 PK			2.04 V	162	76.00	33.00
2	*2452.00	99.9 AV			2.04 V	162	66.90	33.00
3	2483.50	68.7 PK	74.0	-5.3	1.82 V	208	35.70	33.00
4	2483.50	52.3 AV	54.0	-1.7	1.82 V	208	19.30	33.00
5	4904.00	52.5 PK	74.0	-21.5	1.80 V	259	46.60	5.90
6	4904.00	37.9 AV	54.0	-16.1	1.80 V	259	32.00	5.90

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)
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	92.12	40.2 QP	43.5	-3.3	2.00 H	243	59.80	-19.60
2	158.22	36.9 QP	43.5	-6.6	1.50 H	275	50.40	-13.50
3	249.60	34.4 QP	46.0	-11.6	1.00 H	130	48.50	-14.10
4	300.16	36.0 QP	46.0	-10.0	1.00 H	91	48.10	-12.10
5	624.85	35.1 QP	46.0	-10.9	1.00 H	218	40.20	-5.10
6	751.23	39.8 QP	46.0	-6.2	1.00 H	131	42.60	-2.80
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	63.00	38.7 QP	40.0	-1.3	1.53 V	21	53.80	-15.10
2	**86.59**	**39.4 QP**	**40.0**	**-0.6**	**1.57 V**	**150**	**59.00**	**-19.60**
3	160.17	38.3 QP	43.5	-5.2	1.00 V	134	51.90	-13.60
4	247.66	36.4 QP	46.0	-9.6	1.00 V	37	50.60	-14.20
5	286.55	36.4 QP	46.0	-9.6	1.99 V	249	48.80	-12.40
6	751.23	39.7 QP	46.0	-6.3	1.00 V	202	42.50	-2.80

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)
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. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2015	Jul. 23, 2016
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

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.

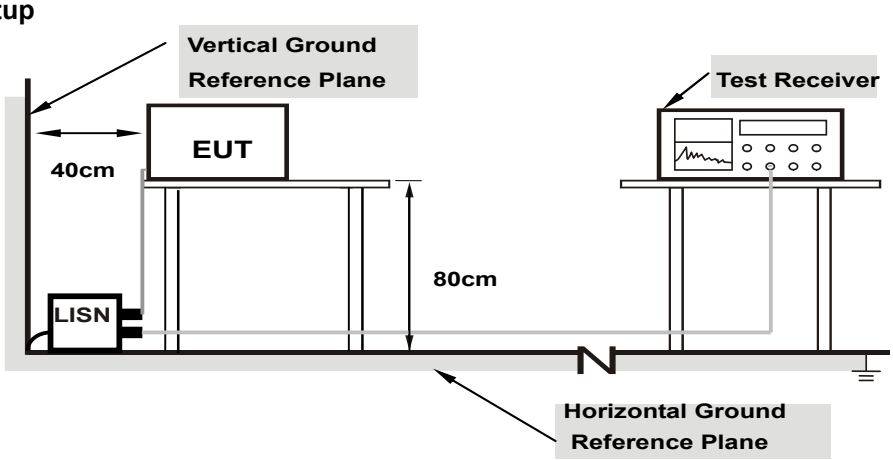
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

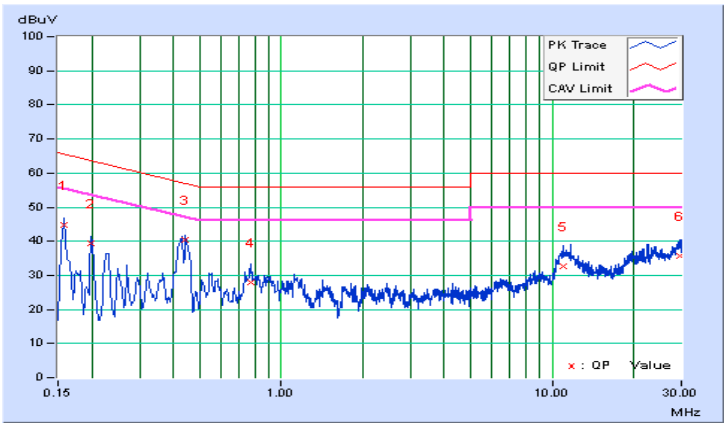
4.2.7 Test Results

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	0.15800	10.08	34.59	22.53	44.67	32.61	65.57	55.57	-20.90	-22.96
2	0.19832	10.08	29.48	17.30	39.56	27.38	63.68	53.68	-24.12	-26.30
3	0.44200	10.18	30.11	20.35	40.29	30.53	57.02	47.02	-16.74	-16.50
4	0.77023	10.24	17.78	11.00	28.02	21.24	56.00	46.00	-27.98	-24.76
5	10.92600	10.82	21.85	16.53	32.67	27.35	60.00	50.00	-27.33	-22.65
6	29.73400	12.05	23.80	18.52	35.85	30.57	60.00	50.00	-24.15	-19.43

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.

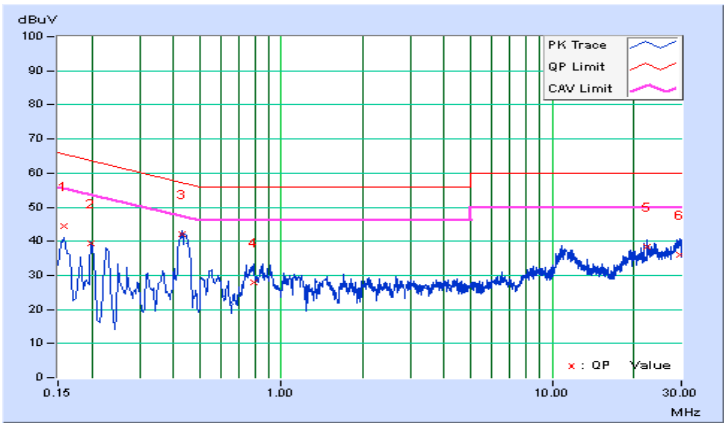


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value		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	0.15800	10.08	34.47	22.99	44.55	33.07	65.57	55.57	-21.01	-22.49
2	0.19832	10.08	29.38	18.10	39.46	28.18	63.68	53.68	-24.22	-25.50
3	**0.42915**	**10.24**	**31.92**	**23.38**	**42.16**	**33.62**	**57.27**	**47.27**	**-15.11**	**-13.65**
4	0.79000	10.27	17.57	10.00	27.84	20.27	56.00	46.00	-28.16	-25.73
5	22.45800	11.75	26.69	24.01	38.44	35.76	60.00	50.00	-21.56	-14.24
6	29.51800	12.25	23.76	18.36	36.01	30.61	60.00	50.00	-23.99	-19.39

REMARKS:

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

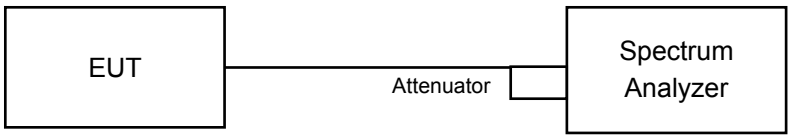


4.3 6dB Bandwidth Measurement

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

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	7.12	0.5	Pass
6	2437	7.10	0.5	Pass
11	2462	7.10	0.5	Pass

802.11g

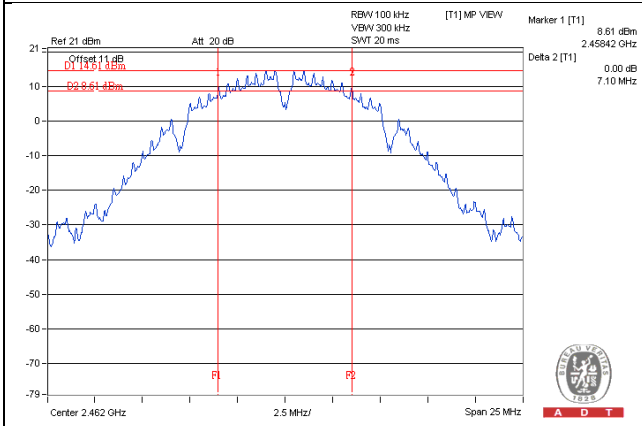
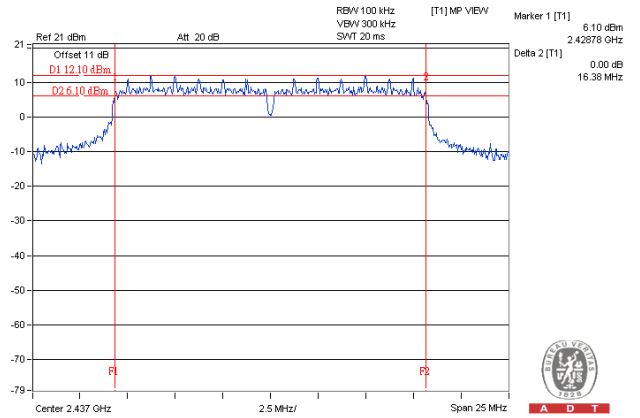
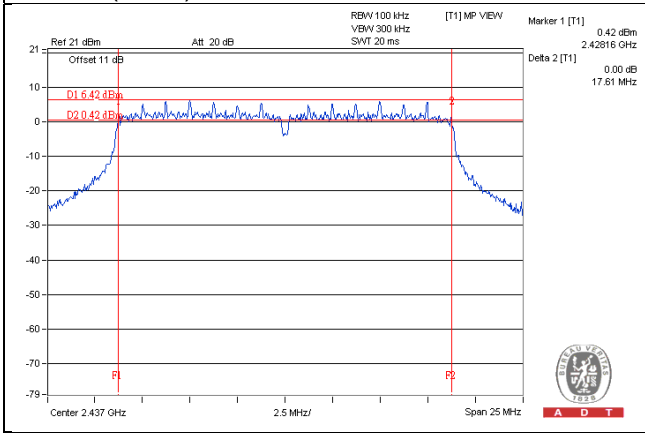
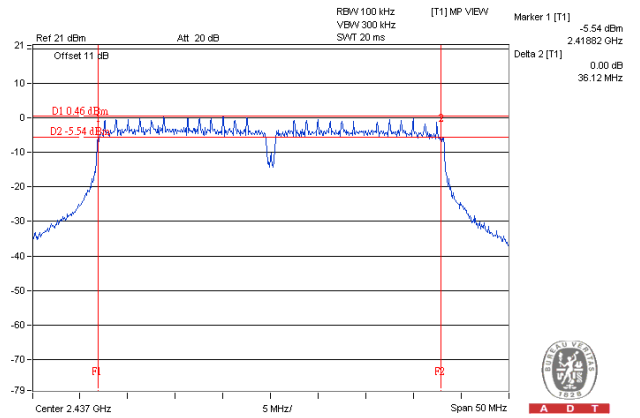
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.42	0.5	Pass
6	2437	16.38	0.5	Pass
11	2462	16.42	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	17.64	17.64	17.63	0.5	Pass
6	2437	17.62	17.61	17.62	0.5	Pass
11	2462	17.62	17.62	17.63	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
3	2422	36.43	36.39	36.16	0.5	Pass
6	2437	36.37	36.12	36.37	0.5	Pass
9	2452	36.37	35.98	36.37	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

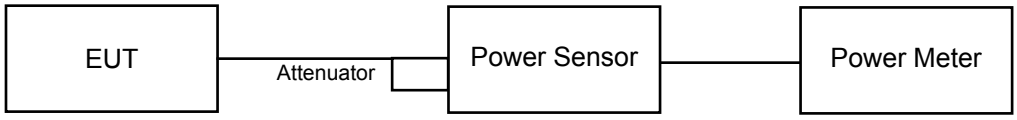
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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 $N_{ANT} \leq 4$;
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

A peak / average power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak / 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 PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	382.825	25.83	30	Pass
6	2437	347.536	25.41	30	Pass
11	2462	295.121	24.70	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	344.350	25.37	30	Pass
6	2437	468.813	26.71	30	Pass
11	2462	311.889	24.94	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Peak Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	23.26	23.70	23.63	676.934	28.31	30.00	Pass
6	2437	24.86	24.91	24.79	**917.239**	29.62	30.00	Pass
11	2462	23.21	23.19	22.76	606.659	27.83	30.00	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Peak Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
3	2422	20.39	20.16	20.73	331.453	25.20	30.00	Pass
6	2437	24.42	24.03	24.39	804.413	29.05	30.00	Pass
9	2452	21.51	21.16	21.44	411.512	26.14	30.00	Pass

FOR AVERAGE POWER

802.11b

Chan.	Frequency (MHz)	Avg. Power (mW)	Avg. Power (dBm)
1	2412	201.837	23.05
6	2437	188.365	22.75
11	2462	166.341	22.21

802.11g

Chan.	Frequency (MHz)	Avg. Power (mW)	Avg. Power (dBm)
1	2412	44.566	16.49
6	2437	179.473	22.54
11	2462	45.814	16.61

802.11n (HT20)

Chan.	Frequency (MHz)	Avg. Power (dBm)			Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1	Chain 2		
1	2412	14.05	13.81	13.99	74.515	18.72
6	2437	18.60	17.98	17.61	192.927	22.85
11	2462	13.21	13.15	12.71	60.259	17.80

802.11n (HT40)

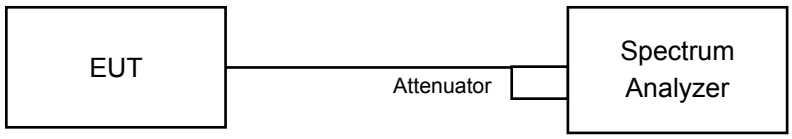
Chan.	Frequency (MHz)	Avg. Power (dBm)			Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1	Chain 2		
3	2422	11.23	10.16	10.68	35.344	15.48
6	2437	16.07	15.04	15.31	106.336	20.27
9	2452	11.89	11.07	11.12	41.189	16.15

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

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.

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

Channel	Freq.(MHz)	PSD(dBm)	Limit(dBm)	Pass/Fail
1	2412	1.12	8	Pass
6	2437	1.84	8	Pass
11	2462	0.59	8	Pass

802.11g

Channel	Freq.(MHz)	PSD(dBm)	Limit(dBm)	Pass/Fail
1	2412	-10.10	8	Pass
6	2437	-3.64	8	Pass
11	2462	-9.22	8	Pass

802.11n (HT20)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=3) dB	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-12.71	4.77	-7.94	5.67	Pass
	6	2437	-9.15	4.77	-4.38	5.67	Pass
	11	2462	-13.29	4.77	-8.52	5.67	Pass
1	1	2412	-12.97	4.77	-8.20	5.67	Pass
	6	2437	-9.07	4.77	-4.30	5.67	Pass
	11	2462	-13.61	4.77	-8.84	5.67	Pass
2	1	2412	-12.87	4.77	-8.10	5.67	Pass
	6	2437	-8.42	4.77	-3.65	5.67	Pass
	11	2462	-14.46	4.77	-9.69	5.67	Pass

Note:

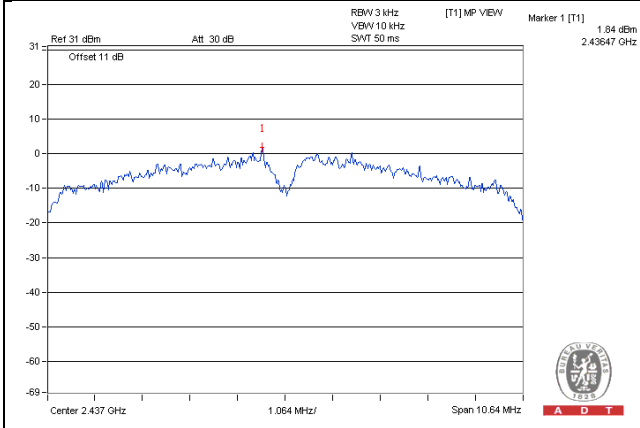
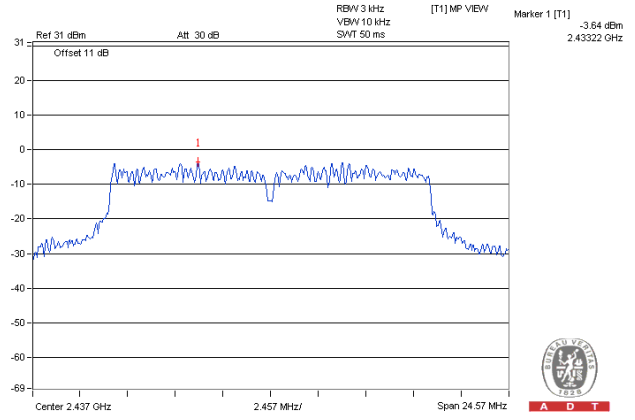
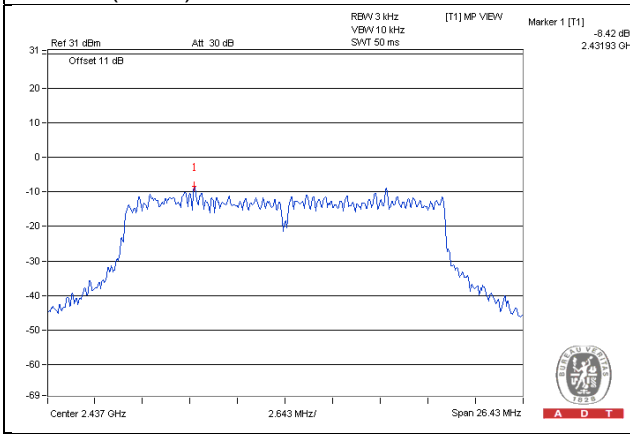
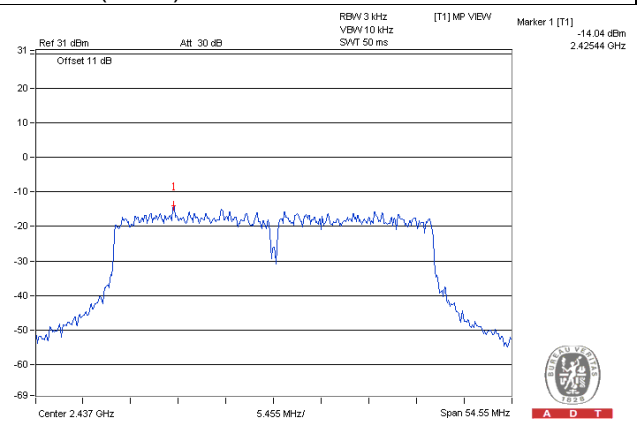
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 3.56dBi + 10log(3) = 8.33dBi > 6dBi, so the power density limit shall be reduced to 8-(8.33-6) = 5.67dBm.

802.11n (HT40)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=3) dB	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	3	2422	-19.78	4.77	-15.01	5.67	Pass
	6	2437	-14.04	4.77	-9.27	5.67	Pass
	9	2452	-18.74	4.77	-13.97	5.67	Pass
1	3	2422	-20.62	4.77	-15.85	5.67	Pass
	6	2437	-15.80	4.77	-11.03	5.67	Pass
	9	2452	-18.39	4.77	-13.62	5.67	Pass
2	3	2422	-19.65	4.77	-14.88	5.67	Pass
	6	2437	-16.36	4.77	-11.59	5.67	Pass
	9	2452	-20.22	4.77	-15.45	5.67	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 = 3.56dBi + 10log(3) = 8.33dBi > 6dBi, so the power density limit shall be reduced to 8-(8.33-6) = 5.67dBm.

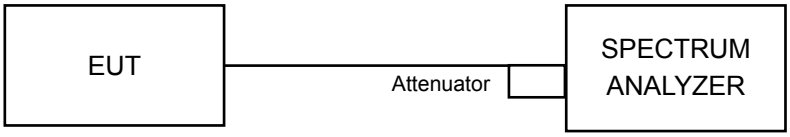
Spectrum Plot of Worst Value	
802.11b	802.11g
	
802.11n (HT20)	802.11n (HT40)
	

4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 20dB 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

a. Set the RBW = 100 kHz.

b. Set the VBW ≥ 300 kHz.

c. Detector = average.

d. Sweep time = auto couple.

e. Trace mode = max hold.

f. Allow trace to fully stabilize.

g. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

a. Set RBW = 100 kHz.

b. Set VBW ≥ 300 kHz.

c. Ensure that the number of measurement points ≥ span/RBW

d. According to measurement points to set differ measurement span.

e. Detector = average.

f. Trace Mode = max hold.

g. Sweep = auto couple.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

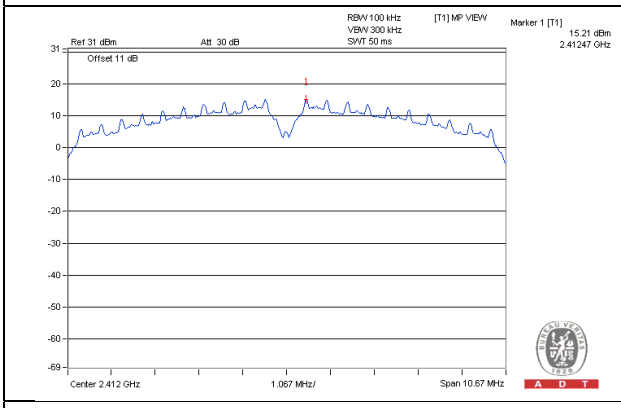
Same as Item 4.3.6

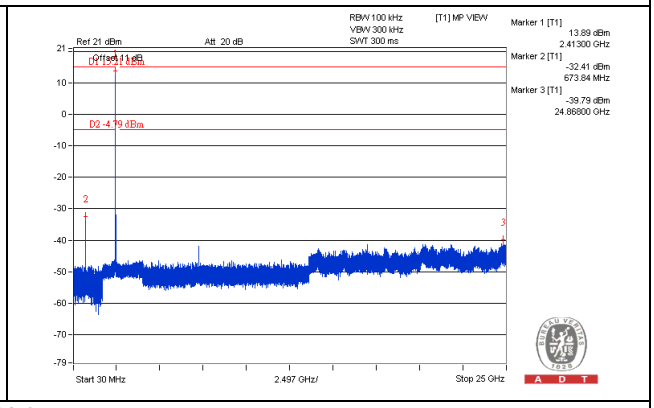
4.6.7 Test Results

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

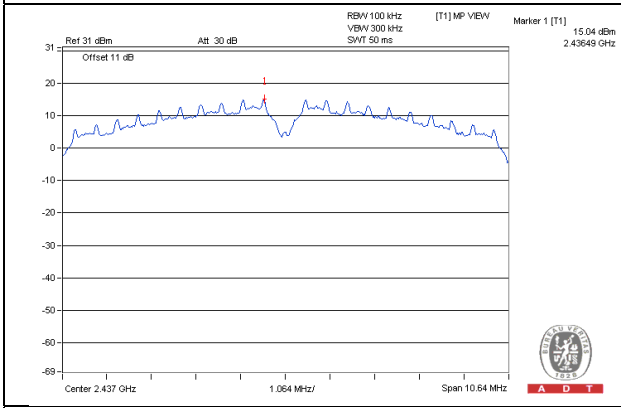
802.11b

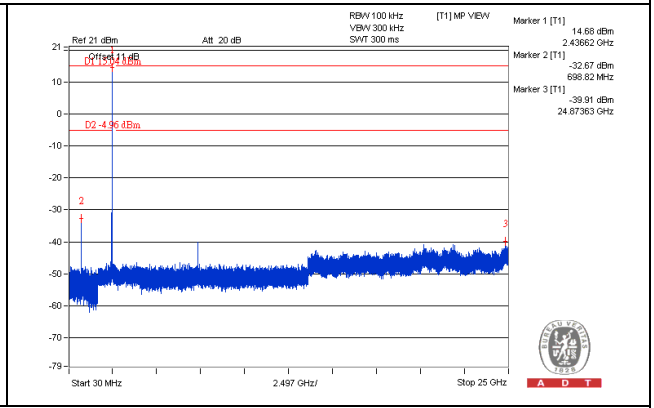
CH 1



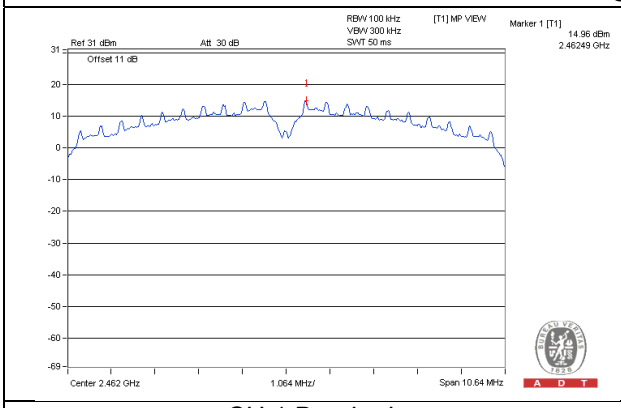


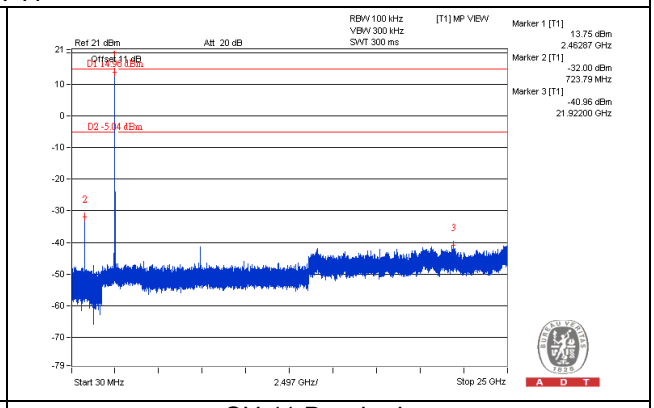
CH 6



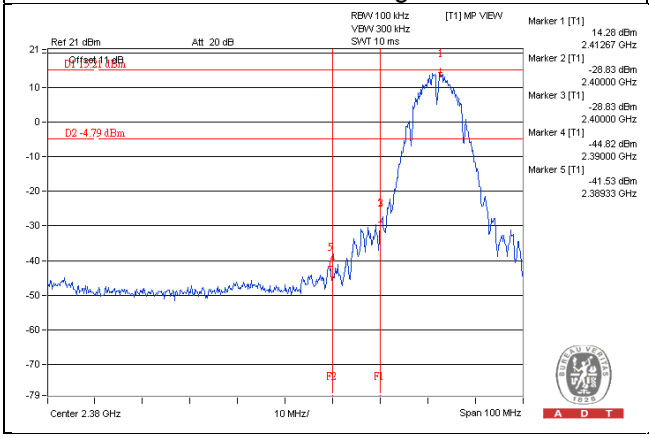


CH 11

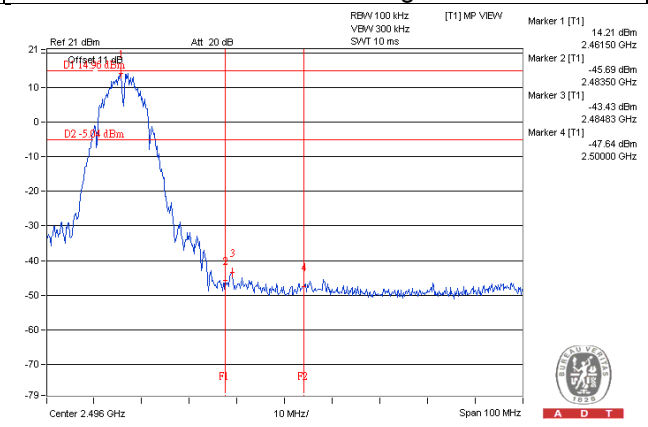




CH 1 Band edge

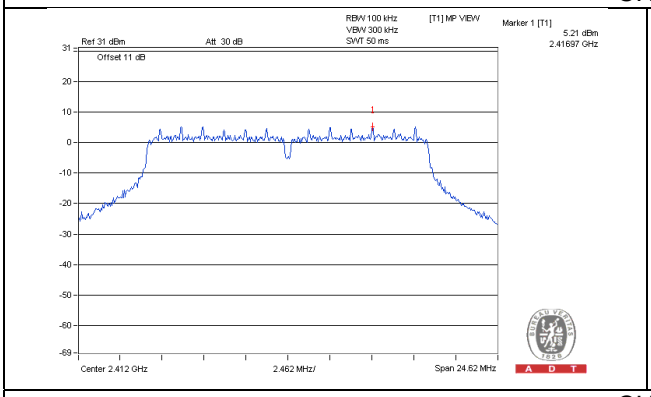


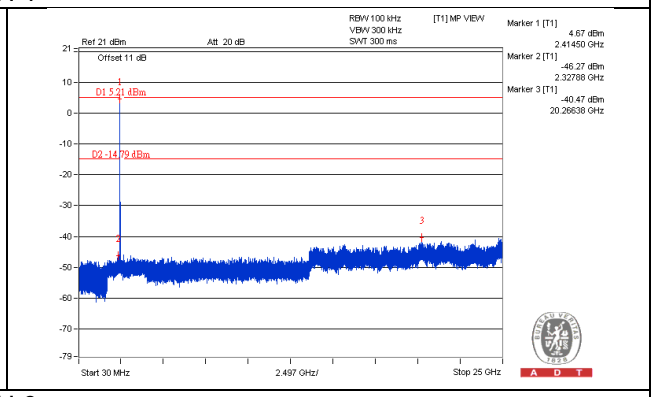
CH 11 Band edge



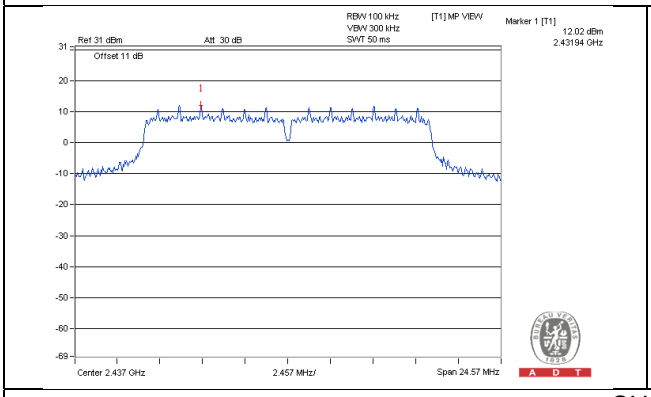
802.11g

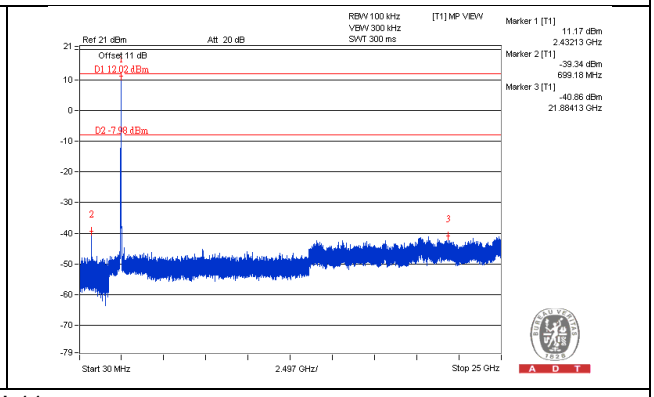
CH 1



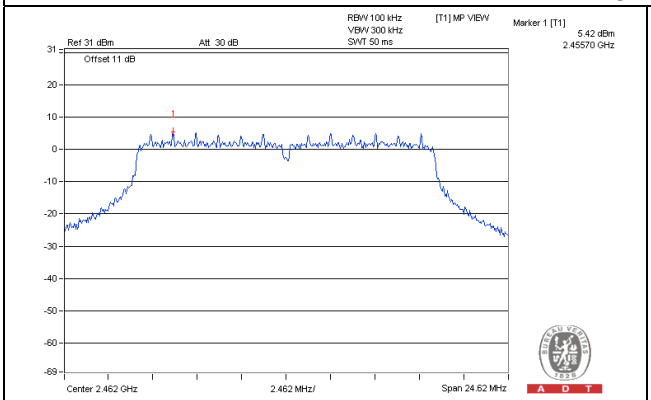


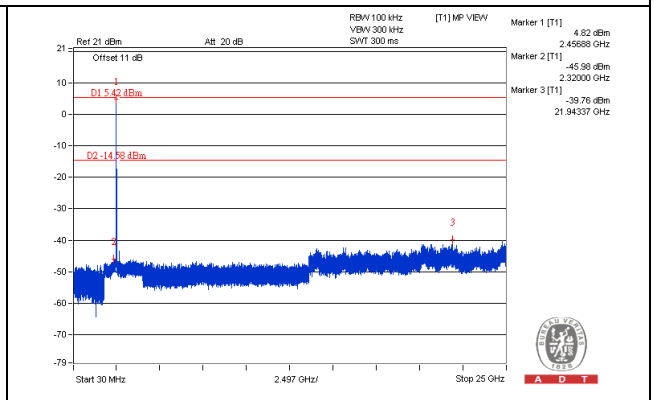
CH 6



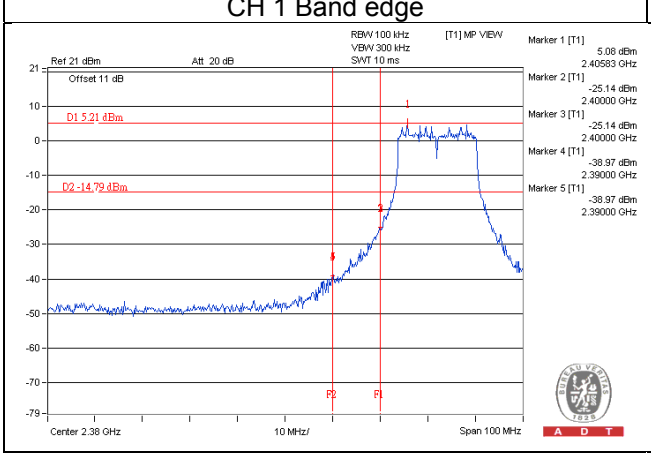


CH 11

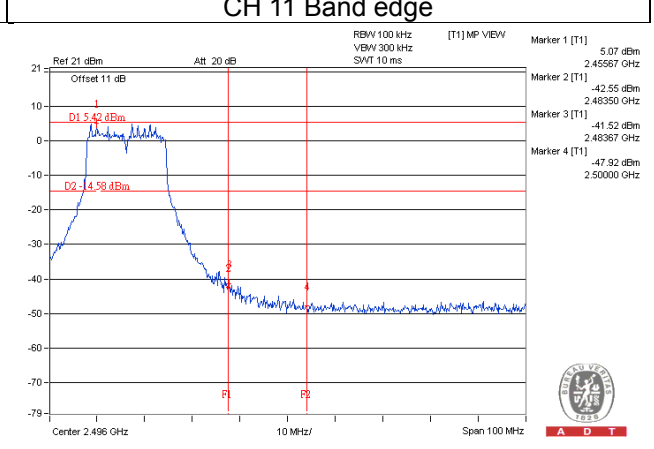




CH 1 Band edge

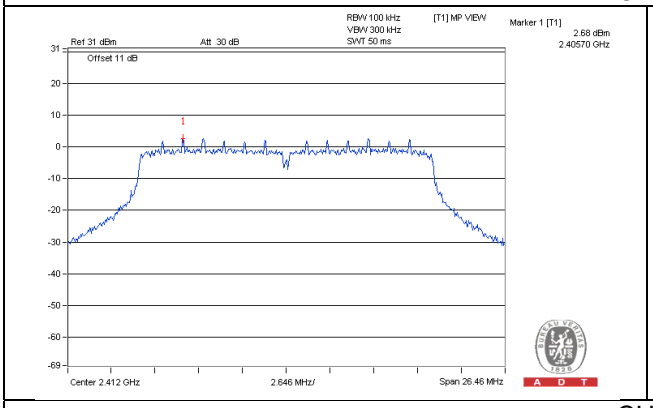


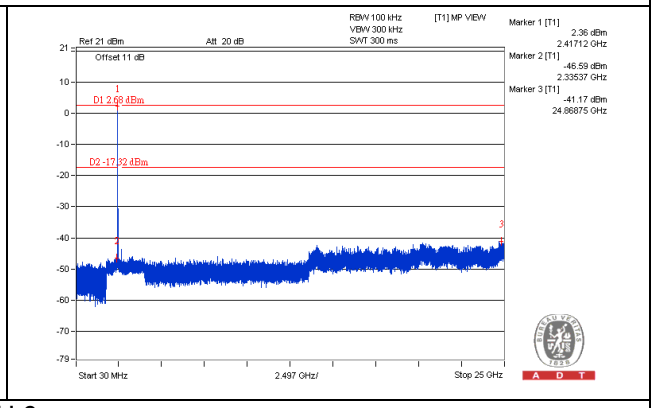
CH 11 Band edge



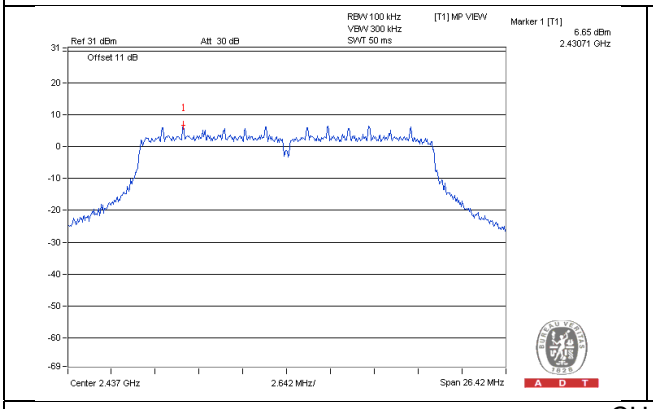
802.11n (HT20)_Chain 0

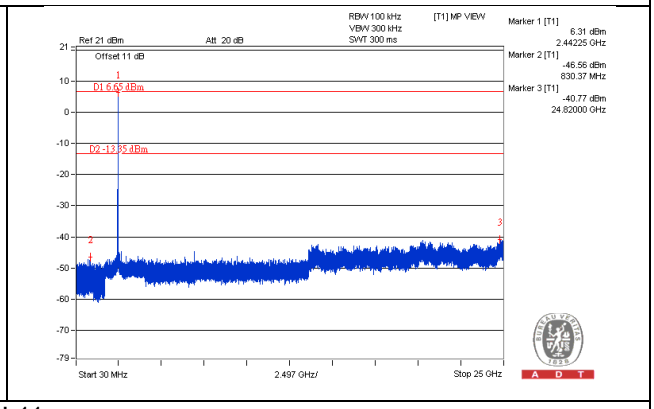
CH 1



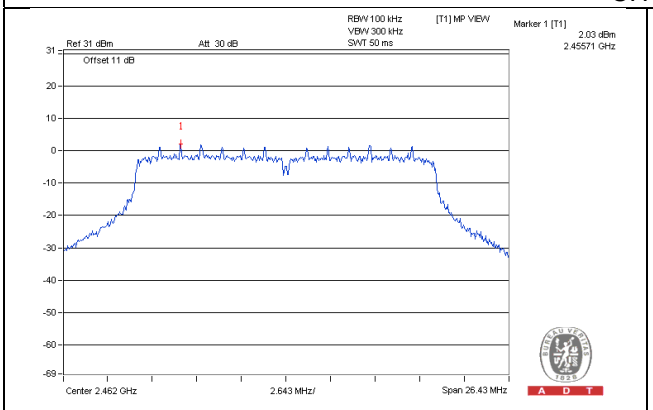


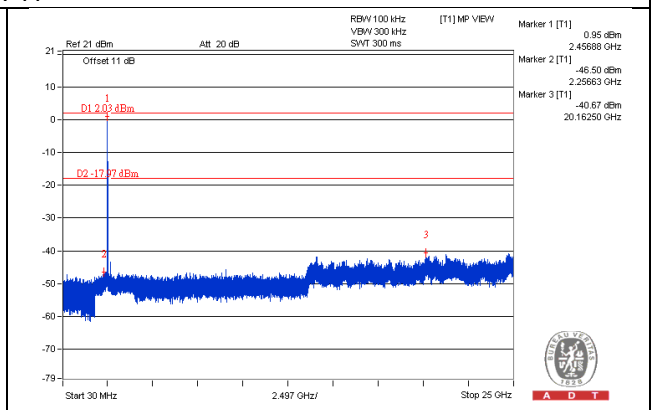
CH 6



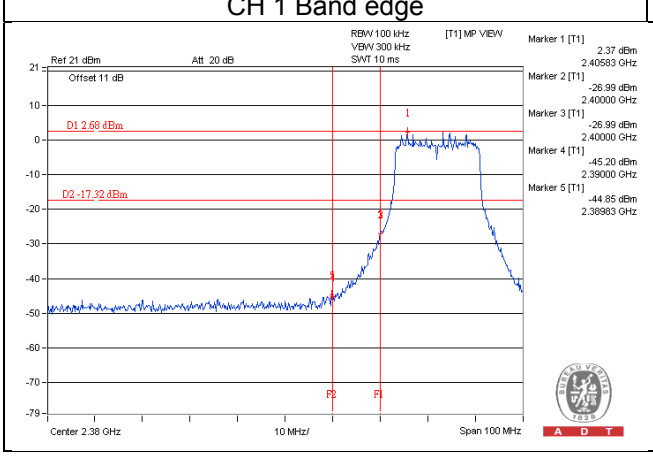


CH 11

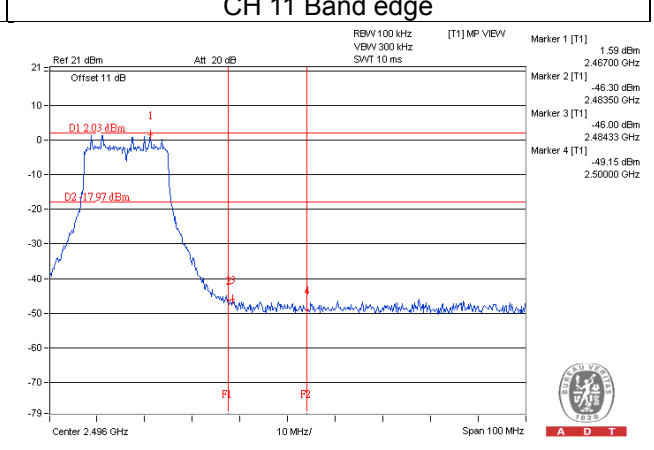




CH 1 Band edge

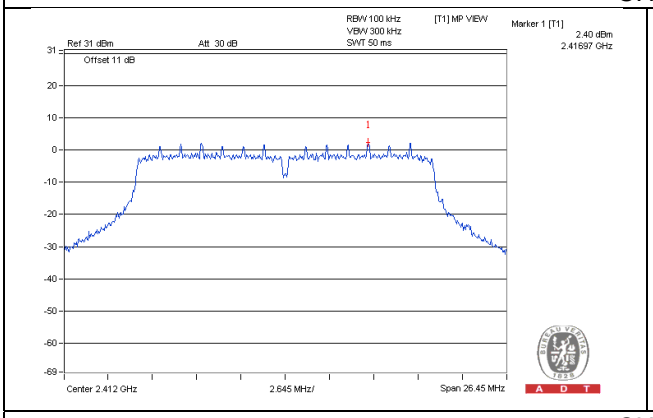


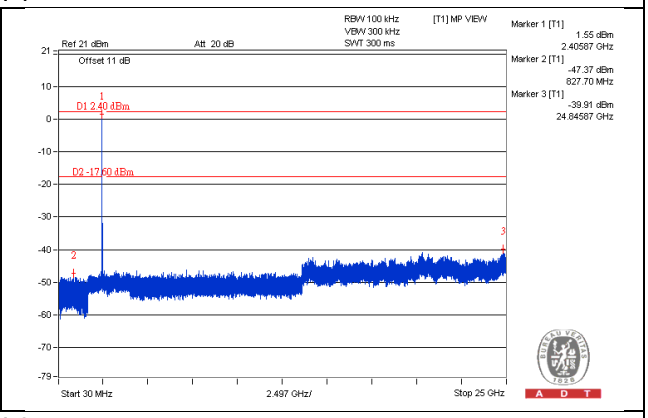
CH 11 Band edge



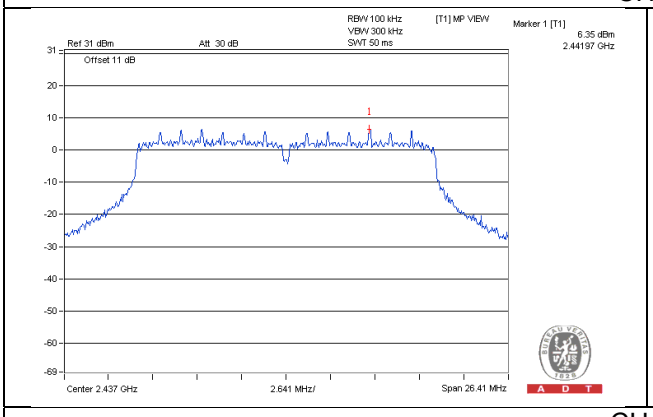
802.11n (HT20)_Chain 1

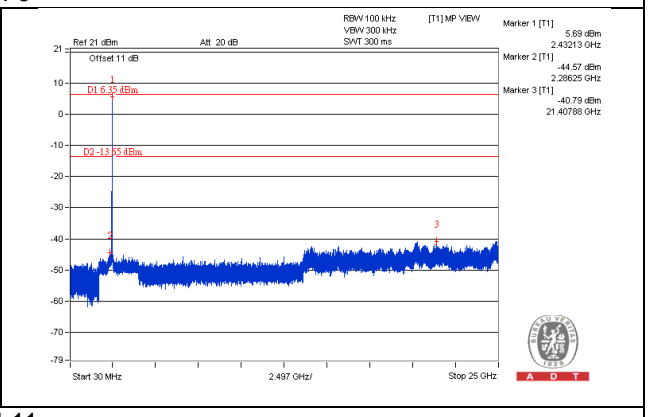
CH 1



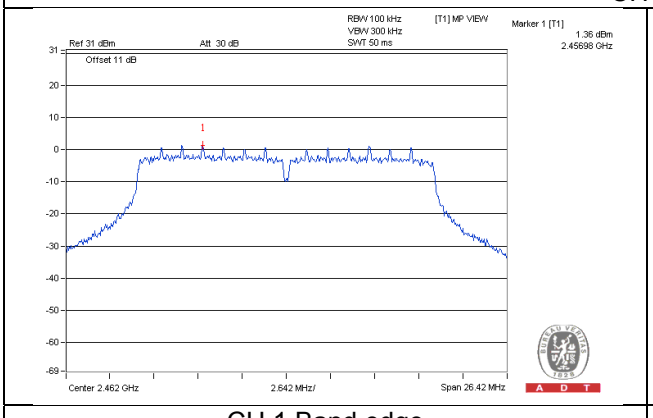


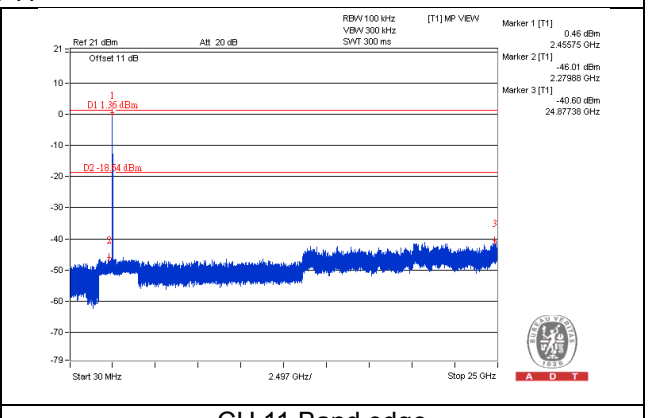
CH 6



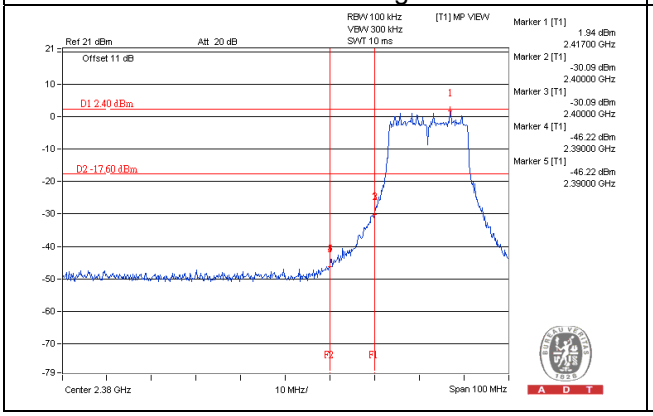


CH 11

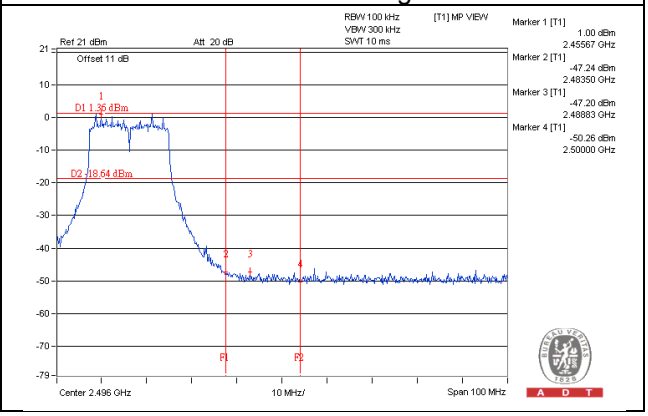




CH 1 Band edge

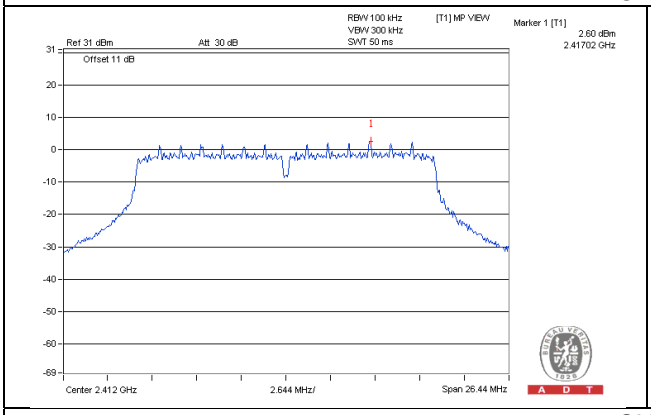


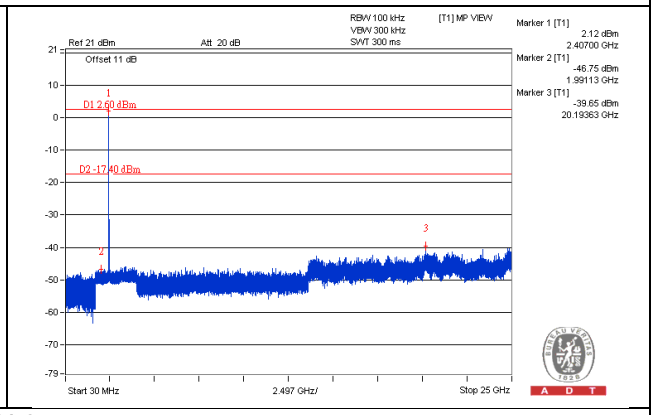
CH 11 Band edge



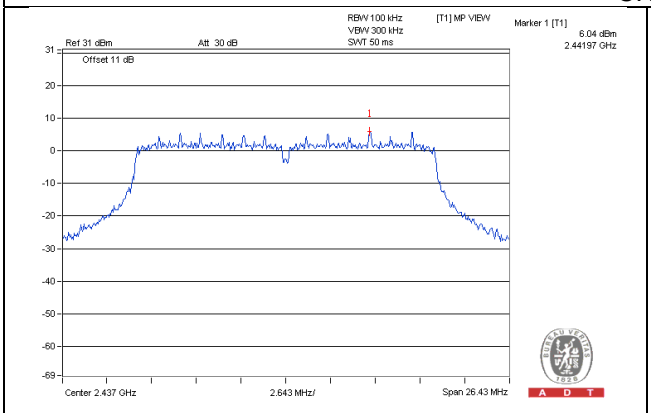
802.11n (HT20)_Chain 2

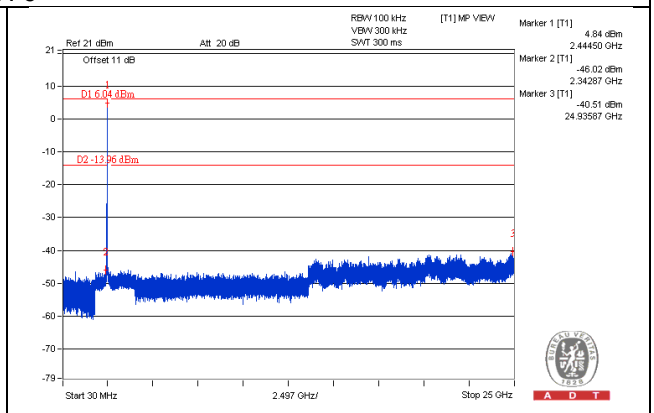
CH 1



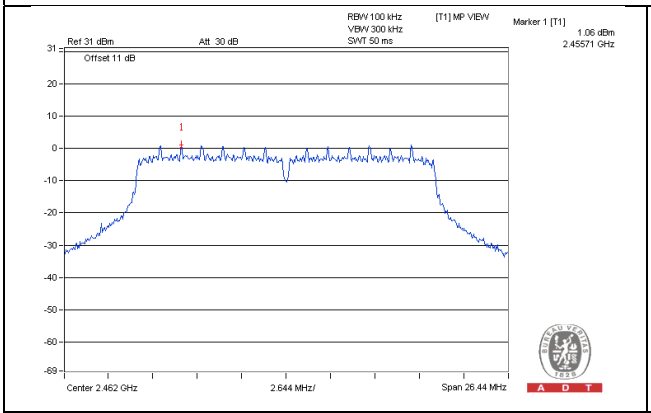


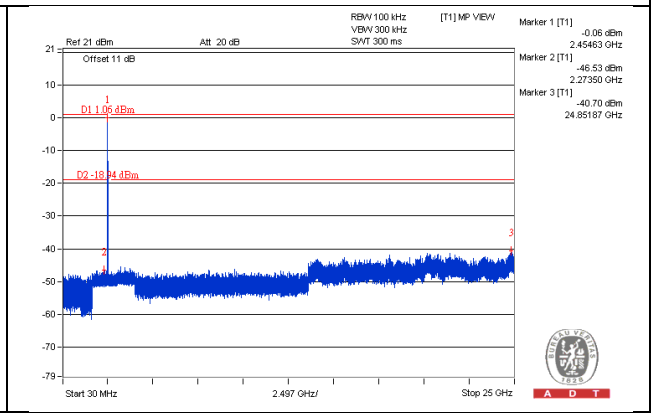
CH 6



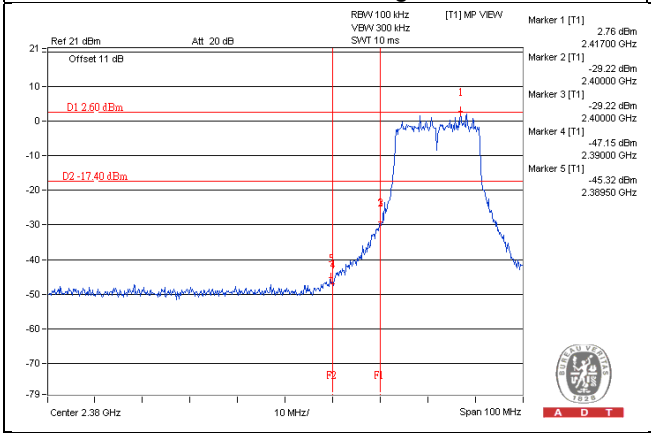


CH 11

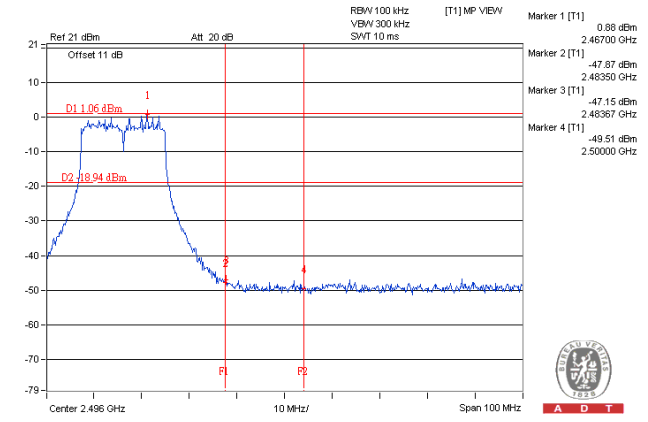




CH 1 Band edge

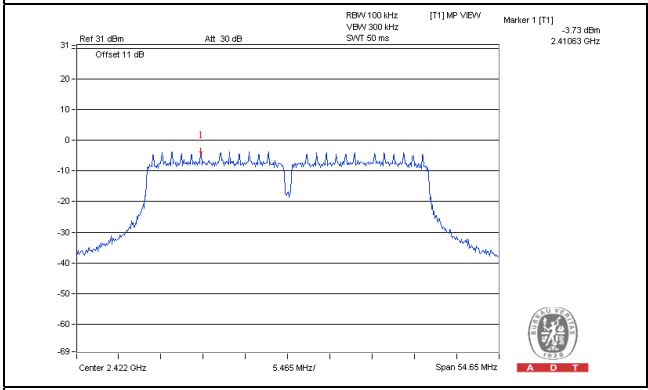


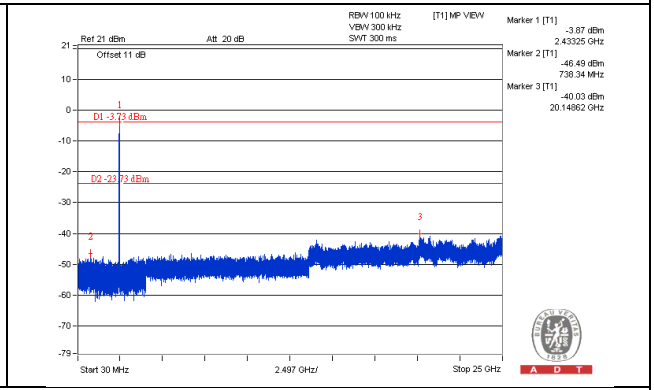
CH 11 Band edge



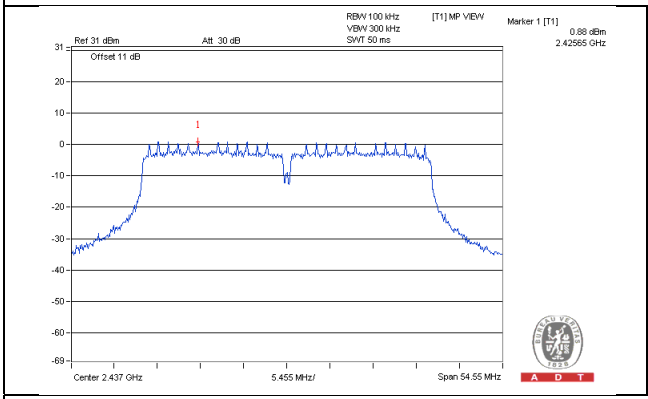
802.11n (HT40)_Chain 0

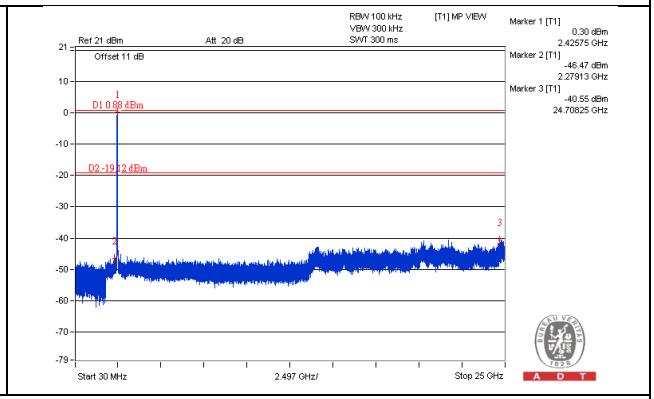
CH 3



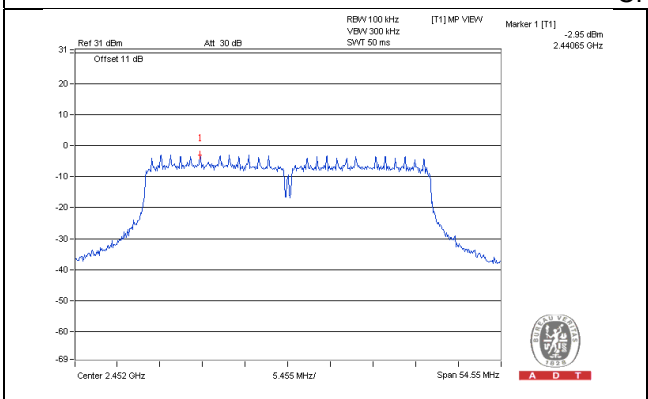


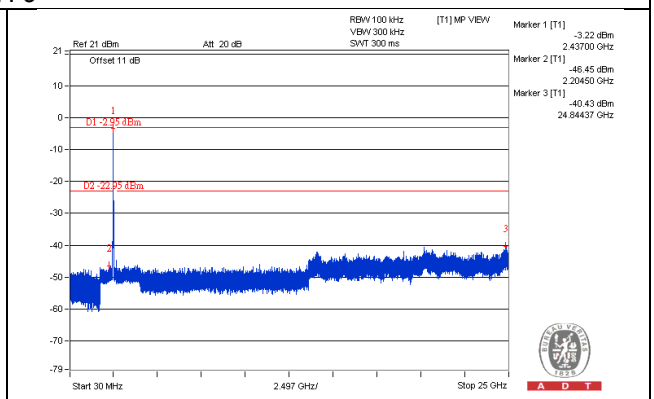
CH 6



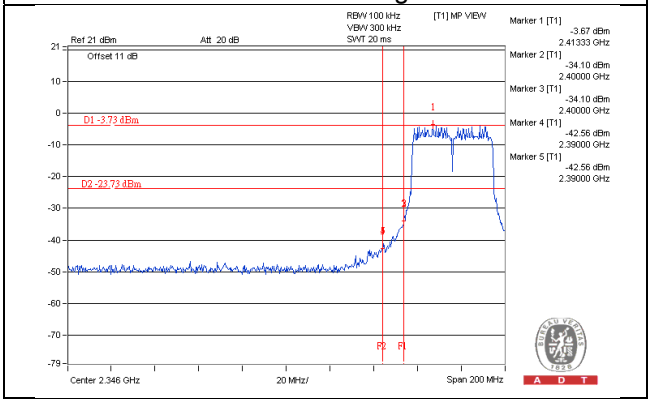


CH 9

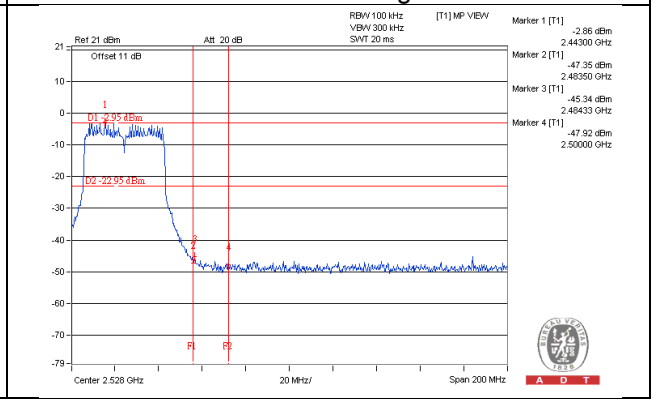




CH 3 Band edge

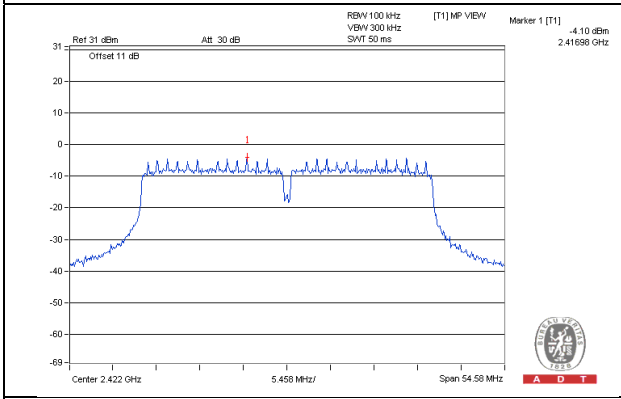


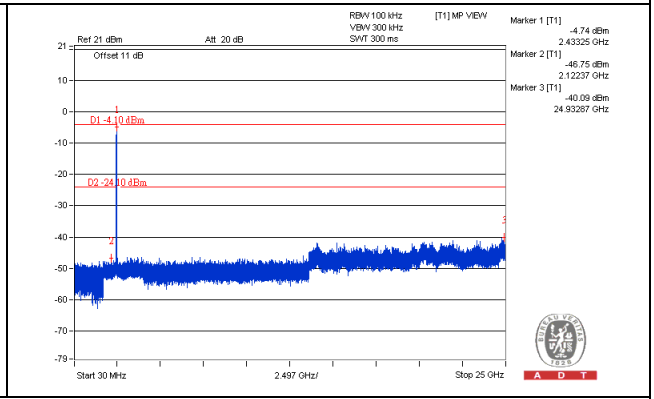
CH 9 Band edge



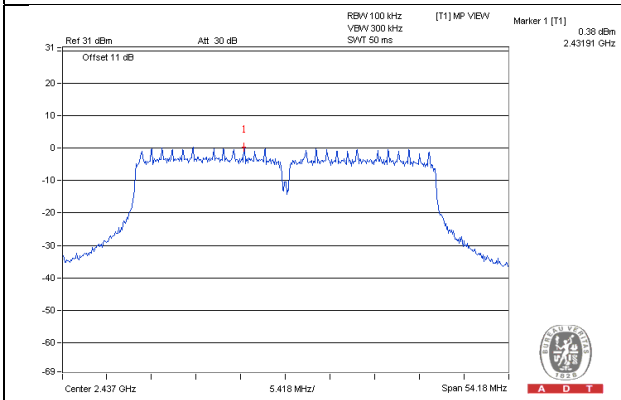
802.11n (HT40)_Chain 1

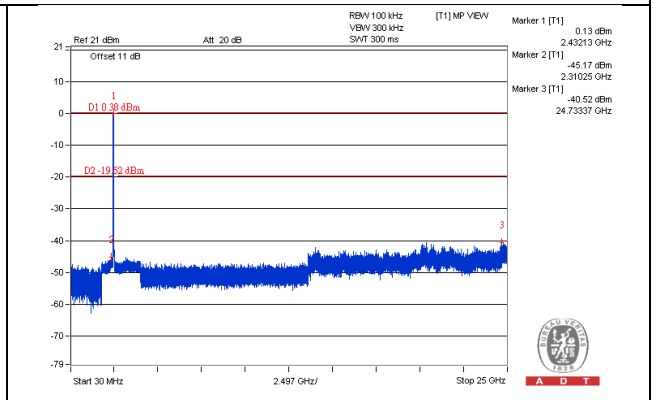
CH 3



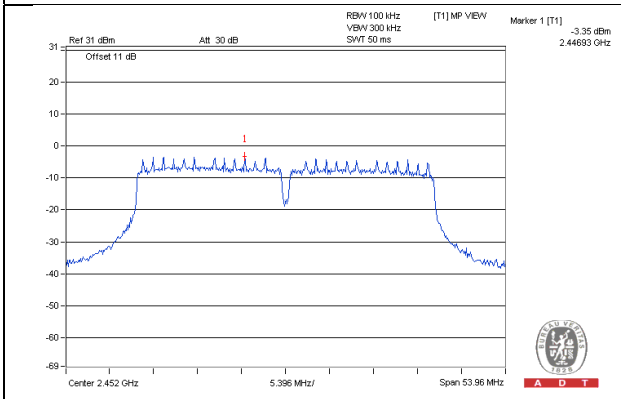


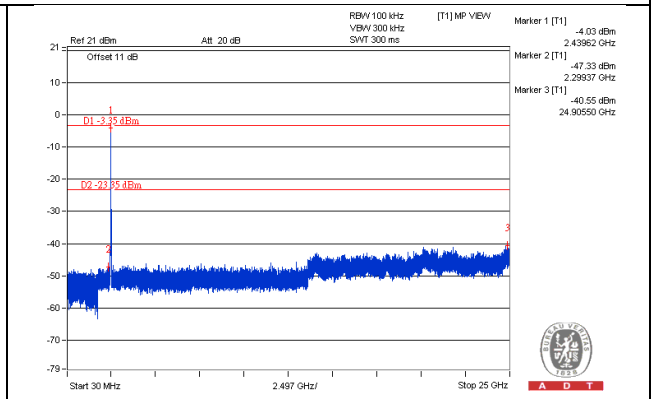
CH 6



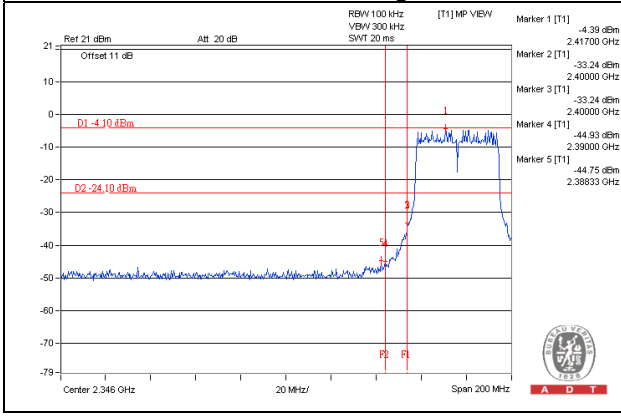


CH 9

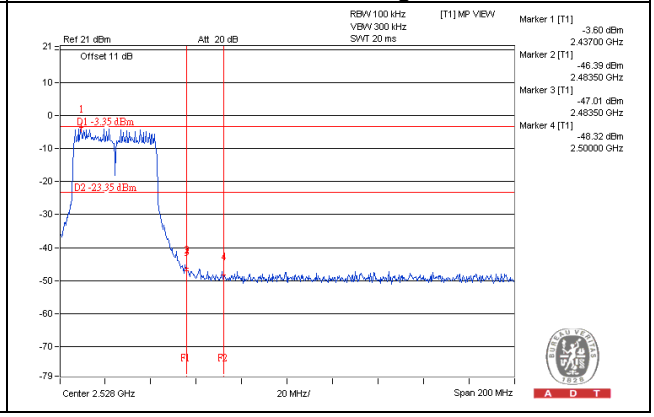




CH 3 Band edge

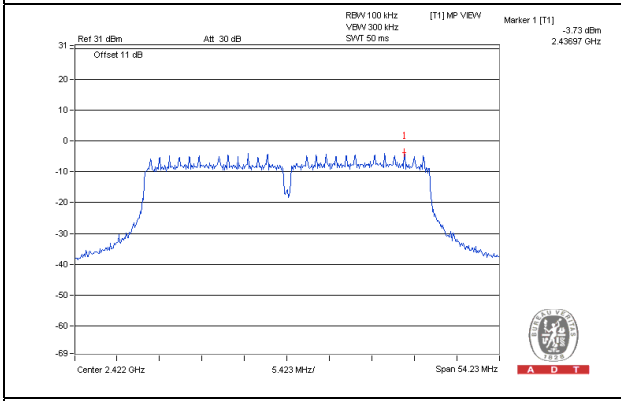


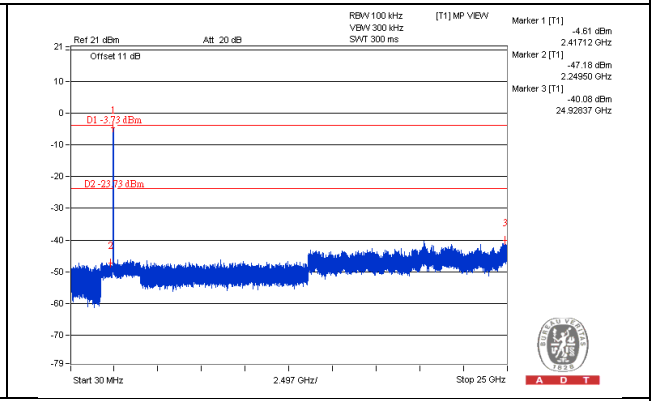
CH 9 Band edge



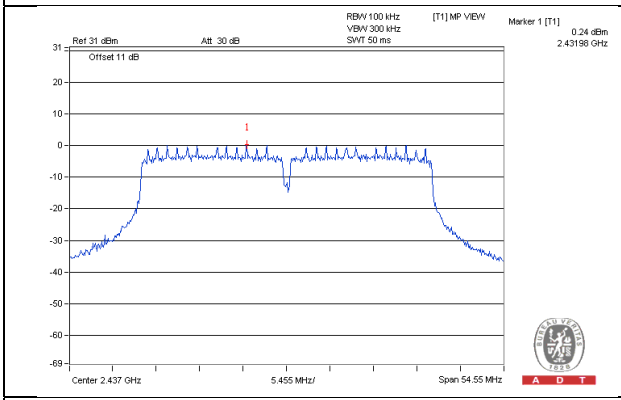
802.11n (HT40)_Chain 2

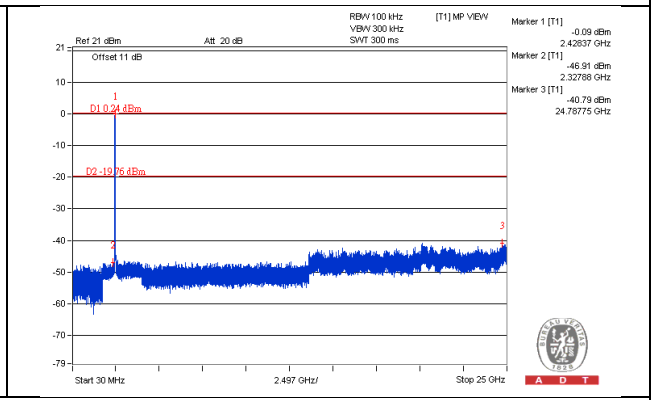
CH 3



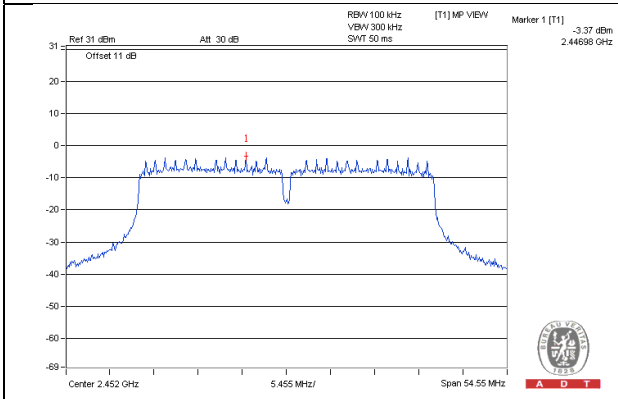


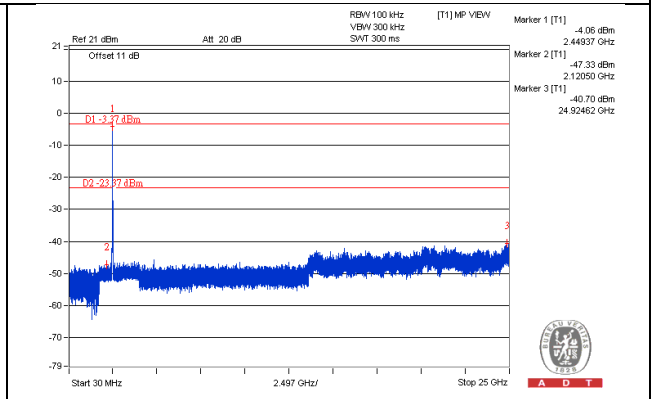
CH 6



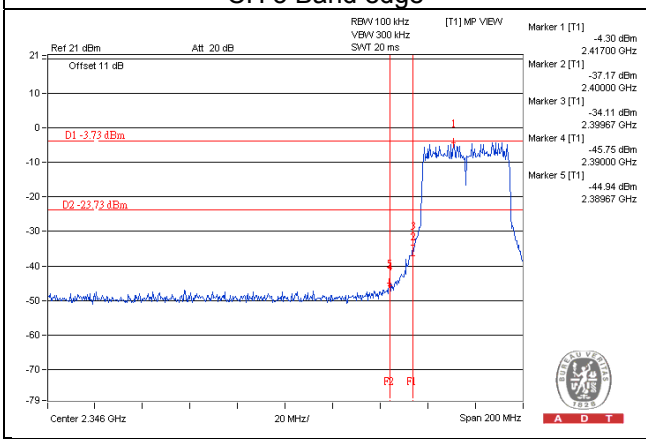


CH 9

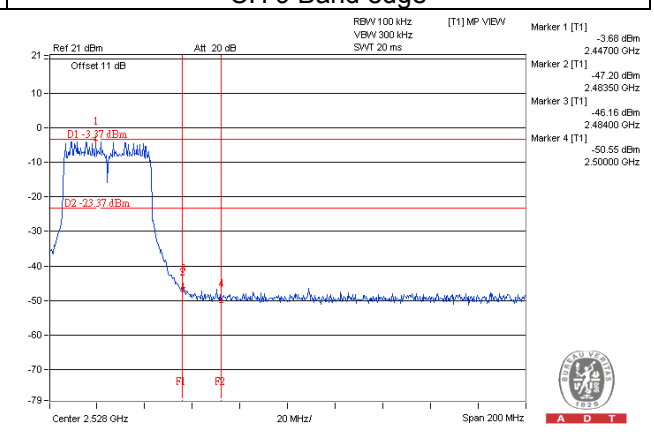




CH 3 Band edge



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

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