

FCC TEST REPORT (15.247)

REPORT NO.: RF141024E06

MODEL NO.: AP One AC mini, Pismo AC0, Surf series, AP series, Mesh Connector series, MAX series

FCC ID: U8G-P1AC0

RECEIVED: Oct. 24, 2014

TESTED: Nov. 28 to Dec. 03, 2014

ISSUED: Dec. 16, 2014

APPLICANT: Pismo Labs Technology Limited

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF141024E06	Original release	Dec. 16, 2014

1. CERTIFICATION

PRODUCT: Pepwave / Peplink / Pismo Wireless Product

BRAND NAME: Pepwave / Peplink / Pismo

MODEL NO.: AP One AC mini, Pismo AC0, Surf series, AP series,
Mesh Connector series, MAX series

TEST SAMPLE: ENGINEER SAMPLE

APPLICANT: Pismo Labs Technology Limited

TESTED: Nov. 28 to Dec. 03, 2014

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

The above equipment (Model: AP One AC mini) 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 : Phoenix Huang , **Date:** Dec. 16, 2014
(Phoenix Huang, Specialist)

Approved by : May Chen , **Date:** Dec. 16, 2014
(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -12.96dB at 0.23128MHz
15.205 15.209 15.247(d)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2390.00MHz & 2483.5.00MHz
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	1. For 2.4G WLAN: No antenna connector is used. 2. For 5G WLAN: Antenna connector is i-pex not a standard connector.

NOTE: 1. The EUT was operating in 2.400 ~ 2.4835GHz, 5.15~5.25GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 2.400 ~ 2.4835GHz. For the 5.15~5.25GHz and 5.725~5.850GHz RF parameters was recorded in another test report.

2.1 MEASUREMENT UNCERTAINTY

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

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

Measurement	Value
Conducted emissions	2.86 dB
Radiated emissions (30MHz-1GHz)	5.43 dB
Radiated emissions (1GHz -6GHz)	3.72 dB
Radiated emissions (6GHz -18GHz)	4.00 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Pepwave / Peplink / Pismo Wireless Product
MODEL NO.	AP One AC mini, Pismo AC0, Surf series, AP series, Mesh Connector series, MAX series
POWER SUPPLY	12Vdc from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11a / g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
OPERATING FREQUENCY	For 15.407 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
	For 15.247 2.412 ~ 2.462GHz
NUMBER OF CHANNEL	For 15.407 9 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 4 for 802.11n (HT40), 802.11ac (VHT40) 2 for 802.11ac (VHT80)
	For 15.247 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
MAXIMUM OUTPUT POWER	For 15.407 802.11a: 176.85mW 802.11ac (VHT20): 185.651mW 802.11ac (VHT40): 200.594mW 802.11ac (VHT80): 37.077mW For 15.247 802.11b: 204.326mW 802.11g: 934.394mW 802.11n (HT20): 920.711mW 802.11n (HT40): 781.783mW

ANTENNA TYPE	Please see Note
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x 1

Note:

- The EUT has below model names, which are identical to each other in all aspects except for the following information:

Product Name	Brand Name	Model Name	Difference
Pepwave / Peplink / Pismo Wireless Product	Pepwave / Peplink / Pismo	AP One AC mini	for marketing requirement
		Pismo AC0	
		Surf series	
		AP series	
		Mesh Connector series	
		MAX series	

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

- The antennas provided to the EUT, please refer to the following table:

2.4GHz								
Antenna No	Transmitter Circuit	Brand	Model	Gain (dBi) (Include cable loss)	Antenna Type	Connector Type	Cable Length (cm)	Frequency range (MHz to MHz)
1	Chain (0)	Pulse	W3008C	2.2	Chip	NA	NA	2400~2483.5
2	Chain (1)	Pulse	W3008C	2.2	Chip	NA	NA	2400~2483.5
5GHz								
Antenna No	Transmitter Circuit	Brand	Model	Gain (dBi) (Include cable loss)	Antenna Type	Connector Type	Cable Length (cm)	Frequency range (MHz to MHz)
1	Chain (0)	PSA Walsin Technology Corporation	PEPWAVE (PCB)	2.91	PCB	i-pex	7	5150~5250
				3.70				5725~5850
2	Chain (1)	PSA Walsin Technology Corporation	PEPWAVE (PCB)	3.06	PCB	i-pex	11	5150~5250
				3.20				5725~5850

- The EUT must be supplied with a power adapter as following table:

Brand	Model No.	Spec.
DVE	DSA-12G-12 FUS	AC Input: 120-240V, 0.3A, 50/60Hz DC Output: 12V, 1A DC Output cable: Unshielded, 1.8m

4. The EUT incorporates a MIMO function.

For 2.4G Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	2TX	2RX
802.11g	6 ~ 54Mbps	2TX	2RX
802.11n (HT20) & 802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
For 5G Band			
802.11a	6 ~ 54Mbps	2TX	2RX
802.11n (HT20) & 802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT20)	MCS0~8 Nss=1	2TX	2RX
	MCS0~8 Nss=2	2TX	2RX
802.11ac (VHT40) & 802.11ac (VHT80)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX

Note: The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

5. The emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.
6. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (HT40):

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

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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

POWER LINE CONDUCTED EMISSION TEST:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6

RADIATED EMISSION TEST (BELOW 1 GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

ANTENNA PORT CONDUCTED MEASUREMENT:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

CONDUCTED OUT-BAND EMISSION MEASUREMENT:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5



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TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	24deg. C, 71,%RH	120Vac, 60Hz	Wythe Lin
RE<1G	21deg. C, 64%RH	120Vac, 60Hz	Andy Ho
RE≥1G	23deg. C, 67%RH	120Vac, 60Hz	Robert Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Andy Ho
OB	25deg. C, 60%RH	120Vac, 60Hz	Andy Ho

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance v03r02

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2009

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

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

3.4 DUTY CYCLE OF TEST SIGNAL

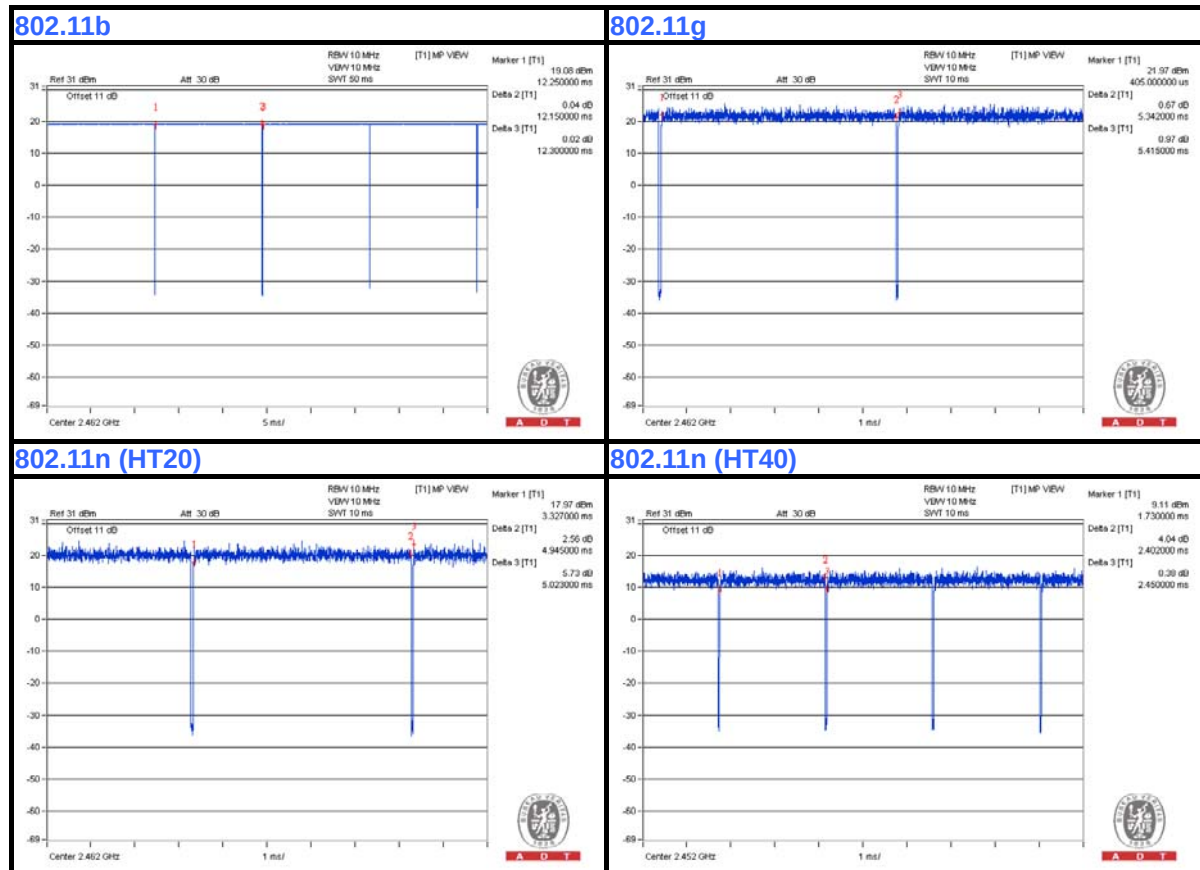
Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11b: Duty cycle = $12.15 \text{ ms} / 12.3 \text{ ms} = 0.988$

802.11g: Duty cycle = $5.342 \text{ ms} / 5.415 \text{ ms} = 0.987$

802.11n (HT20): Duty cycle = $4.945 \text{ ms} / 5.023 \text{ ms} = 0.984$

802.11n (HT40): Duty cycle = $2.402 \text{ ms} / 2.45 \text{ ms} = 0.98$



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3.5 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.

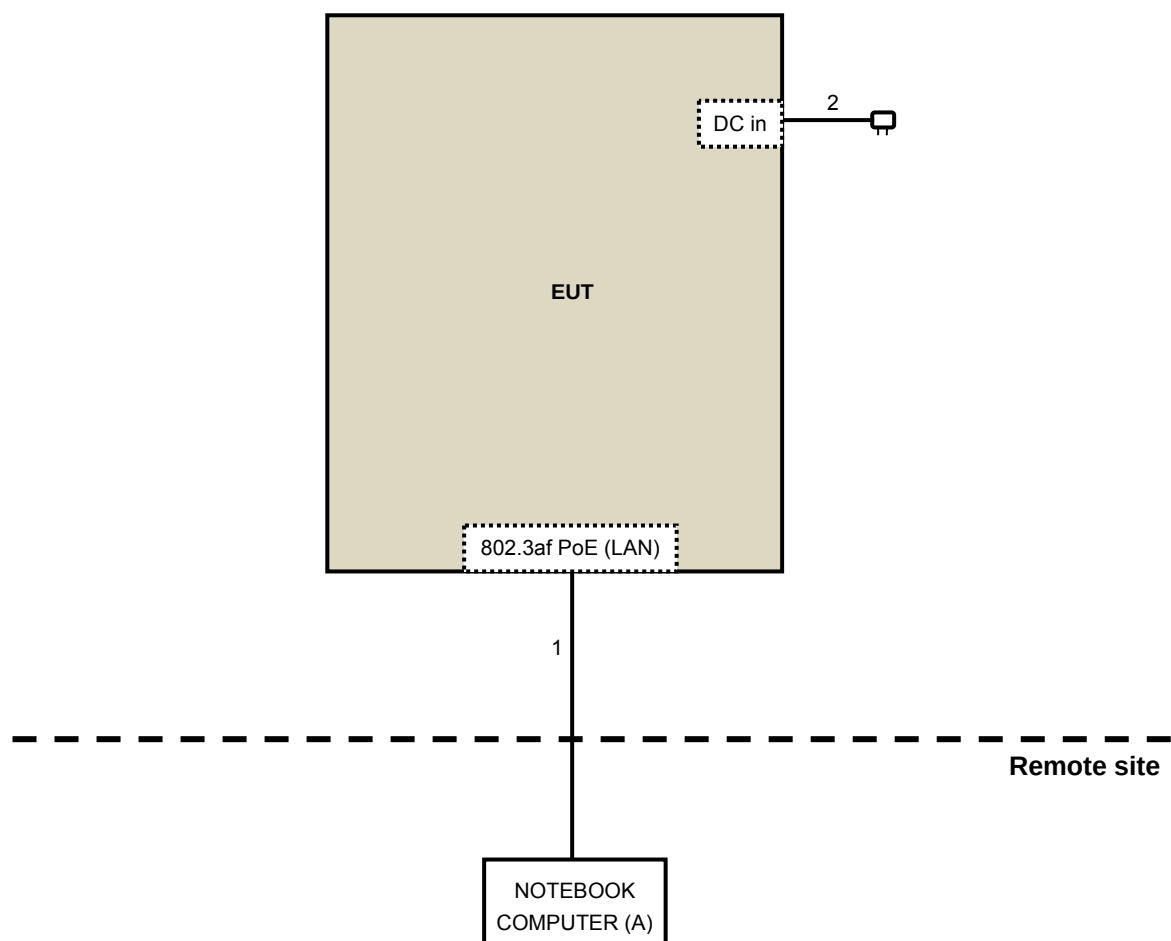
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab

NOTE:

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

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1.	RJ-45	1	10	No	0	Provided by Lab
2.	DC	1	1.8	No	0	Supplied by Client

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10, 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
Software ADT	BV ADT_Cond_V7.3.7. 3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Nov. 28, 2014

4.1.3 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) were not recorded.

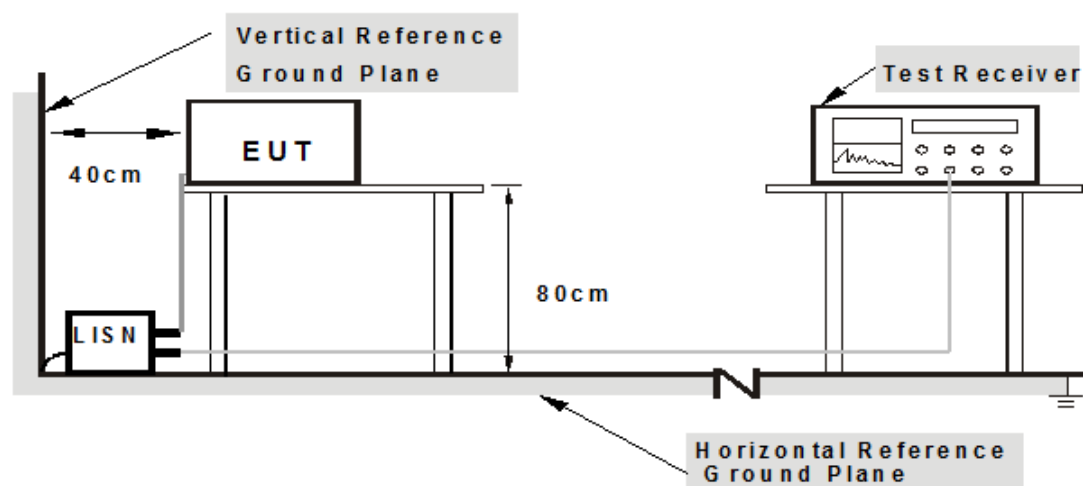
NOTE:

- The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit A (Notebook Computer) which is placed in remote site.
2. Controlling software (artgui.exe) has been activated to set the EUT on specific status.

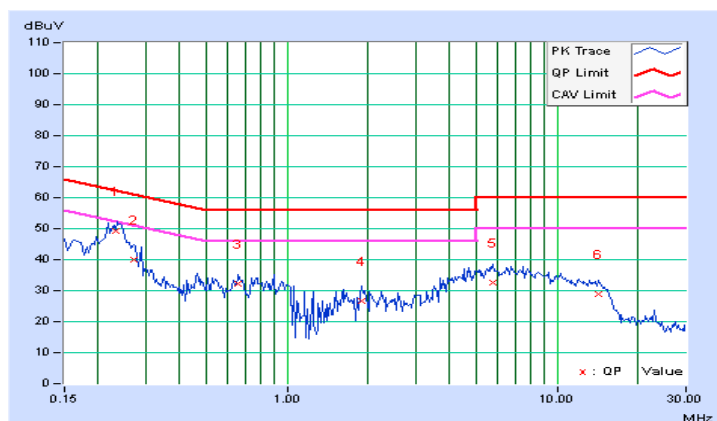
4.1.7 TEST RESULTS

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.23128	0.07	49.37	38.98	49.44	39.05	62.40	52.40	-12.96	-13.35
2	0.27000	0.08	39.98	29.90	40.06	29.98	61.12	51.12	-21.06	-21.14
3	0.66172	0.11	32.24	18.87	32.35	18.98	56.00	46.00	-23.65	-27.02
4	1.89063	0.17	26.39	15.06	26.56	15.23	56.00	46.00	-29.44	-30.77
5	5.79297	0.31	32.19	24.56	32.50	24.87	60.00	50.00	-27.50	-25.13
6	14.19531	0.56	28.47	20.52	29.03	21.08	60.00	50.00	-30.97	-28.92

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

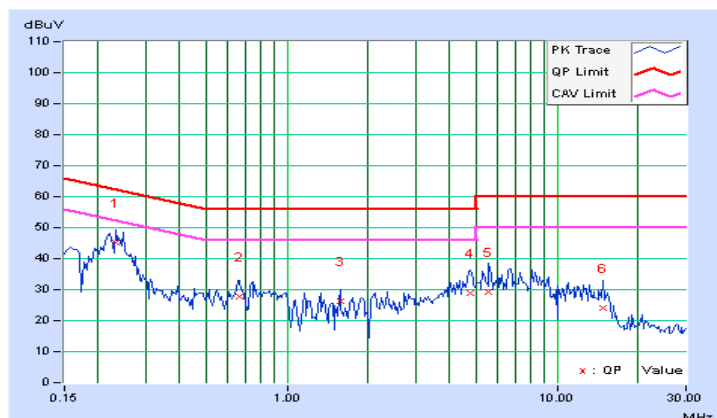


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.23203	0.06	45.30	35.54	45.36	35.60	62.38	52.38	-17.01	-16.77
2	0.66953	0.11	27.80	15.88	27.91	15.99	56.00	46.00	-28.09	-30.01
3	1.57031	0.16	26.00	15.26	26.16	15.42	56.00	46.00	-29.84	-30.58
4	4.76563	0.29	28.68	22.02	28.97	22.31	56.00	46.00	-27.03	-23.69
5	5.59766	0.31	28.91	22.02	29.22	22.33	60.00	50.00	-30.78	-27.67
6	14.82031	0.60	23.38	16.07	23.98	16.67	60.00	50.00	-36.02	-33.33

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



4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.2.1 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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Aug. 11, 2014	Aug. 10, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 27, 2014	Feb. 26, 2015
RF Cable	NA	CHHCAB_001	Oct. 05, 2014	Oct. 04, 2015
Horn_Antenna AISl	AIH.8018	0000220091110	Aug. 26, 2014	Aug. 25, 2015
Pre-Amplifier Agilent	8449B	300801923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131215 SNMY23685/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCl	EMC184045	980143	Jan. 17, 2014	Jan. 16, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5. The CANADA Site Registration No. is IC 7450H-3.
6. Tested Date: Nov. 28 to 29, 2014

4.2.3 TEST PROCEDURES

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

Note:

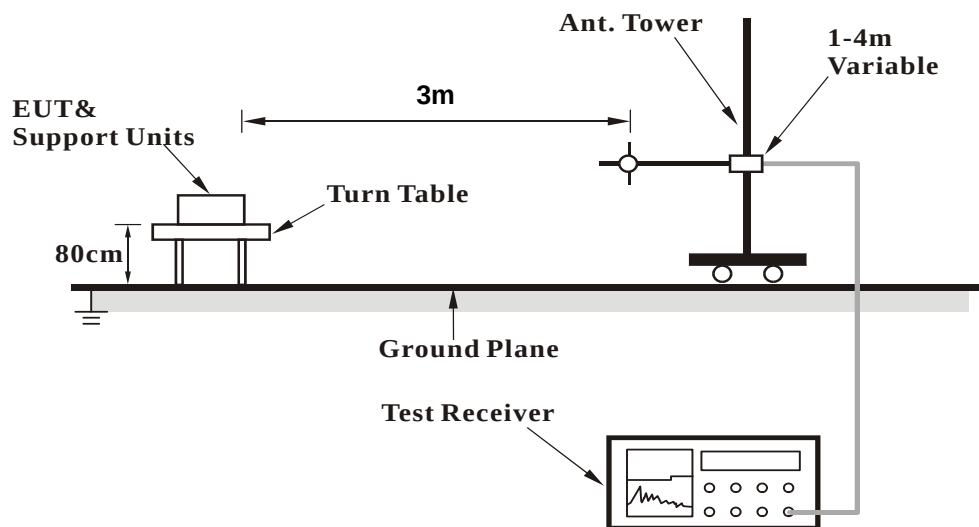
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 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.

4.2.4 DEVIATION FROM TEST STANDARD

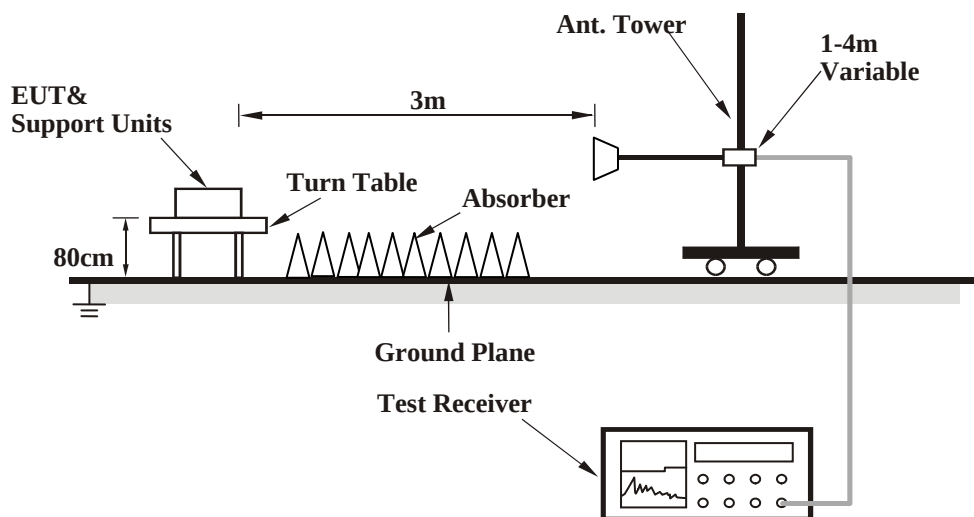
No deviation

4.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	63.42	29.1 QP	40.0	-10.9	1.50 H	91	43.41	-14.33
2	250.00	39.2 QP	46.0	-6.8	1.00 H	86	53.09	-13.91
3	300.00	41.2 QP	46.0	-4.8	1.00 H	29	53.11	-11.88
4	570.19	36.6 QP	46.0	-9.5	2.00 H	360	42.46	-5.91
5	600.02	41.9 QP	46.0	-4.2	1.50 H	315	46.64	-4.79
6	899.99	36.3 QP	46.0	-9.7	1.00 H	322	36.14	0.18
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	75.48	33.6 QP	40.0	-6.4	1.00 V	360	50.24	-16.66
2	144.65	37.3 QP	43.5	-6.2	1.00 V	244	50.33	-13.02
3	250.00	33.6 QP	46.0	-12.5	1.50 V	20	47.46	-13.91
4	500.01	32.6 QP	46.0	-13.4	1.00 V	39	39.81	-7.19
5	600.02	38.3 QP	46.0	-7.7	1.50 V	340	43.08	-4.79
6	956.98	33.4 QP	46.0	-12.6	2.00 V	75	32.26	1.17

REMARKS:

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

ABOVE 1GHz DATA

802.11b

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	2360.00	49.1 PK	74.0	-24.9	1.10 H	57	54.75	-5.65
2	2360.00	40.4 AV	54.0	-13.6	1.10 H	57	46.05	-5.65
3	*2412.00	104.2 PK			1.13 H	44	109.73	-5.53
4	*2412.00	101.1 AV			1.13 H	44	106.63	-5.53
5	4824.00	56.2 PK	74.0	-17.8	1.58 H	86	52.34	3.86
6	4824.00	53.7 AV	54.0	-0.3	1.58 H	86	49.84	3.86
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	2360.00	49.9 PK	74.0	-24.1	1.31 V	297	55.55	-5.65
2	2360.00	40.1 AV	54.0	-13.9	1.31 V	297	45.75	-5.65
3	*2412.00	99.1 PK			1.31 V	297	104.63	-5.53
4	*2412.00	96.4 AV			1.31 V	297	101.93	-5.53
5	4824.00	57.1 PK	74.0	-16.9	1.00 V	84	53.24	3.86
6	4824.00	50.3 AV	54.0	-3.7	1.00 V	84	46.44	3.86

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
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	2360.00	49.7 PK	74.0	-24.3	1.13 H	39	55.35	-5.65
2	2360.00	39.8 AV	54.0	-14.2	1.13 H	39	45.45	-5.65
3	*2437.00	103.4 PK			1.13 H	39	108.82	-5.42
4	*2437.00	100.6 AV			1.13 H	39	106.02	-5.42
5	2500.00	49.6 PK	74.0	-24.4	1.13 H	39	54.74	-5.14
6	2500.00	37.5 AV	54.0	-16.5	1.13 H	39	42.64	-5.14
7	4874.00	56.4 PK	74.0	-17.6	1.56 H	124	52.59	3.81
8	4874.00	53.6 AV	54.0	-0.4	1.56 H	124	49.79	3.81
9	7311.00	54.5 PK	74.0	-19.5	1.00 H	173	46.27	8.23
10	7311.00	41.0 AV	54.0	-13.0	1.00 H	173	32.77	8.23

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	2360.00	49.9 PK	74.0	-24.1	1.33 V	301	55.55	-5.65
2	2360.00	40.0 AV	54.0	-14.0	1.33 V	301	45.65	-5.65
3	*2437.00	98.5 PK			1.33 V	301	103.92	-5.42
4	*2437.00	95.6 AV			1.33 V	301	101.02	-5.42
5	2500.00	49.5 PK	74.0	-24.5	1.33 V	301	54.64	-5.14
6	2500.00	37.1 AV	54.0	-16.9	1.33 V	301	42.24	-5.14
7	4874.00	56.9 PK	74.0	-17.1	1.06 V	82	53.09	3.81
8	4874.00	49.9 AV	54.0	-4.1	1.06 V	82	46.09	3.81
9	7311.00	54.1 PK	74.0	-19.9	1.00 V	201	45.87	8.23
10	7311.00	40.8 AV	54.0	-13.2	1.00 V	201	32.57	8.23

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
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	*2462.00	103.9 PK			1.14 H	53	109.21	-5.31
2	*2462.00	100.9 AV			1.14 H	53	106.21	-5.31
3	2488.00	50.2 PK	74.0	-23.8	1.14 H	53	55.40	-5.20
4	2488.00	40.0 AV	54.0	-14.0	1.14 H	53	45.20	-5.20
5	4924.00	55.4 PK	74.0	-18.6	1.06 H	178	51.60	3.80
6	4924.00	53.5 AV	54.0	-0.5	1.06 H	178	49.70	3.80
7	7386.00	54.5 PK	74.0	-19.5	1.00 H	171	45.95	8.55
8	7386.00	41.3 AV	54.0	-12.7	1.00 H	171	32.75	8.55
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	98.2 PK			1.35 V	311	103.51	-5.31
2	*2462.00	95.4 AV			1.35 V	311	100.71	-5.31
3	2488.00	49.8 PK	74.0	-24.2	1.35 V	311	55.00	-5.20
4	2488.00	40.1 AV	54.0	-13.9	1.35 V	311	45.30	-5.20
5	4924.00	56.7 PK	74.0	-17.3	1.02 V	80	52.90	3.80
6	4924.00	50.0 AV	54.0	-4.0	1.02 V	80	46.20	3.80
7	7386.00	54.0 PK	74.0	-20.0	1.00 V	192	45.45	8.55
8	7386.00	40.6 AV	54.0	-13.4	1.00 V	192	32.05	8.55

REMARKS:

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

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
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	73.6 PK	74.0	-0.4	1.20 H	360	79.20	-5.60
2	2390.00	53.2 AV	54.0	-0.8	1.20 H	360	58.80	-5.60
3	*2412.00	111.8 PK			1.37 H	124	117.33	-5.53
4	*2412.00	99.9 AV			1.37 H	124	105.43	-5.53
5	4824.00	64.5 PK	74.0	-9.5	1.10 H	165	60.64	3.86
6	4824.00	52.7 AV	54.0	-1.3	1.10 H	165	48.84	3.86
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	69.1 PK	74.0	-4.9	1.35 V	311	74.70	-5.60
2	2390.00	48.7 AV	54.0	-5.3	1.35 V	311	54.30	-5.60
3	*2412.00	106.4 PK			1.35 V	311	111.93	-5.53
4	*2412.00	94.3 AV			1.35 V	311	99.83	-5.53
5	4824.00	56.4 PK	74.0	-17.6	1.00 V	83	52.54	3.86
6	4824.00	49.6 AV	54.0	-4.4	1.00 V	83	45.74	3.86

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
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	65.5 PK	74.0	-8.5	1.36 H	47	71.10	-5.60
2	2390.00	44.6 AV	54.0	-9.4	1.36 H	47	50.20	-5.60
3	*2437.00	115.1 PK			1.33 H	53	120.52	-5.42
4	*2437.00	104.1 AV			1.33 H	53	109.52	-5.42
5	2483.50	65.0 PK	74.0	-9.0	1.31 H	44	70.20	-5.20
6	2483.50	48.0 AV	54.0	-6.0	1.31 H	44	53.20	-5.20
7	4874.00	68.2 PK	74.0	-5.8	1.08 H	164	64.39	3.81
8	4874.00	53.5 AV	54.0	-0.5	1.08 H	164	49.69	3.81
9	7311.00	54.6 PK	74.0	-19.4	1.02 H	165	46.37	8.23
10	7311.00	41.4 AV	54.0	-12.6	1.02 H	165	33.17	8.23
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	110.2 PK			1.40 V	300	115.62	-5.42
2	*2437.00	99.1 AV			1.40 V	300	104.52	-5.42
3	2483.50	61.2 PK	74.0	-12.8	1.40 V	300	66.40	-5.20
4	2483.50	45.7 AV	54.0	-8.3	1.40 V	300	50.90	-5.20
5	4874.00	57.0 PK	74.0	-17.0	1.00 V	76	53.19	3.81
6	4874.00	50.1 AV	54.0	-3.9	1.00 V	76	46.29	3.81
7	7311.00	54.0 PK	74.0	-20.0	1.00 V	187	45.77	8.23
8	7311.00	40.8 AV	54.0	-13.2	1.00 V	187	32.57	8.23

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
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	*2462.00	111.6 PK			1.29 H	123	116.91	-5.31
2	*2462.00	99.7 AV			1.29 H	123	105.01	-5.31
3	2483.50	73.2 PK	74.0	-0.8	1.29 H	123	78.40	-5.20
4	2483.50	53.1 AV	54.0	-0.9	1.29 H	123	58.30	-5.20
5	4924.00	66.2 PK	74.0	-7.8	1.08 H	169	62.40	3.80
6	4924.00	52.5 AV	54.0	-1.5	1.08 H	169	48.70	3.80
7	7386.00	53.5 PK	74.0	-20.5	1.00 H	165	44.95	8.55
8	7386.00	40.5 AV	54.0	-13.5	1.00 H	165	31.95	8.55
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	106.5 PK			1.41 V	309	111.81	-5.31
2	*2462.00	94.4 AV			1.41 V	309	99.71	-5.31
3	2483.50	69.2 PK	74.0	-4.8	1.41 V	309	74.40	-5.20
4	2483.50	48.6 AV	54.0	-5.4	1.41 V	309	53.80	-5.20
5	4924.00	57.0 PK	74.0	-17.0	1.06 V	71	53.20	3.80
6	4924.00	50.5 AV	54.0	-3.5	1.06 V	71	46.70	3.80
7	7386.00	53.8 PK	74.0	-20.2	1.00 V	183	45.25	8.55
8	7386.00	40.6 AV	54.0	-13.4	1.00 V	183	32.05	8.55

REMARKS:

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

802.11n (HT20)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
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	73.8 PK	74.0	-0.2	1.37 H	65	79.40	-5.60
2	2390.00	53.9 AV	54.0	-0.1	1.37 H	65	59.50	-5.60
3	*2412.00	110.6 PK			1.37 H	65	116.13	-5.53
4	*2412.00	101.0 AV			1.37 H	65	106.53	-5.53
5	4824.00	67.0 PK	74.0	-7.0	1.10 H	166	63.14	3.86
6	4824.00	50.6 AV	54.0	-3.4	1.10 H	166	46.74	3.86
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	69.5 PK	74.0	-4.5	1.32 V	313	75.10	-5.60
2	2390.00	49.1 AV	54.0	-4.9	1.32 V	313	54.70	-5.60
3	*2412.00	107.2 PK			1.32 V	313	112.73	-5.53
4	*2412.00	95.3 AV			1.32 V	313	100.83	-5.53
5	4824.00	56.8 PK	74.0	-17.2	1.00 V	86	52.94	3.86
6	4824.00	49.9 AV	54.0	-4.1	1.00 V	86	46.04	3.86

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
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	65.7 PK	74.0	-8.3	1.33 H	60	71.30	-5.60
2	2390.00	44.8 AV	54.0	-9.2	1.33 H	60	50.40	-5.60
3	*2437.00	115.5 PK			1.29 H	41	120.92	-5.42
4	*2437.00	104.3 AV			1.29 H	41	109.72	-5.42
5	2483.50	65.0 PK	74.0	-9.0	1.33 H	60	70.20	-5.20
6	2483.50	47.9 AV	54.0	-6.1	1.33 H	60	53.10	-5.20
7	4874.00	66.2 PK	74.0	-7.8	1.08 H	176	62.39	3.81
8	4874.00	53.6 AV	54.0	-0.4	1.08 H	176	49.79	3.81
9	7311.00	54.7 PK	74.0	-19.3	1.00 H	153	46.47	8.23
10	7311.00	41.4 AV	54.0	-12.6	1.00 H	153	33.17	8.23

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	60.2 PK	74.0	-13.8	1.43 V	305	65.80	-5.60
2	2390.00	40.2 AV	54.0	-13.8	1.43 V	305	45.80	-5.60
3	*2437.00	110.2 PK			1.43 V	305	115.62	-5.42
4	*2437.00	99.3 AV			1.43 V	305	104.72	-5.42
5	2483.50	61.4 PK	74.0	-12.6	1.43 V	305	66.60	-5.20
6	2483.50	43.2 AV	54.0	-10.8	1.43 V	305	48.40	-5.20
7	4874.00	56.6 PK	74.0	-17.4	1.08 V	92	52.79	3.81
8	4874.00	49.7 AV	54.0	-4.3	1.08 V	92	45.89	3.81
9	7311.00	54.5 PK	74.0	-19.5	1.00 V	202	46.27	8.23
10	7311.00	41.0 AV	54.0	-13.0	1.00 V	202	32.77	8.23

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
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	*2462.00	110.3 PK			1.33 H	61	115.61	-5.31
2	*2462.00	99.1 AV			1.33 H	61	104.41	-5.31
3	2483.50	72.9 PK	74.0	-1.1	1.33 H	61	78.10	-5.20
4	2483.50	53.9 AV	54.0	-0.1	1.33 H	61	59.10	-5.20
5	4924.00	66.6 PK	74.0	-7.4	1.14 H	155	62.80	3.80
6	4924.00	50.4 AV	54.0	-3.6	1.14 H	155	46.60	3.80
7	7386.00	54.5 PK	74.0	-19.5	1.00 H	166	45.95	8.55
8	7386.00	41.2 AV	54.0	-12.8	1.00 H	166	32.65	8.55
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	106.2 PK			1.38 V	311	111.51	-5.31
2	*2462.00	94.3 AV			1.38 V	311	99.61	-5.31
3	2483.50	69.1 PK	74.0	-4.9	1.38 V	311	74.30	-5.20
4	2483.50	48.6 AV	54.0	-5.4	1.38 V	311	53.80	-5.20
5	4924.00	56.4 PK	74.0	-17.6	1.00 V	86	52.60	3.80
6	4924.00	49.7 AV	54.0	-4.3	1.00 V	86	45.90	3.80
7	7386.00	54.1 PK	74.0	-19.9	1.00 V	191	45.55	8.55
8	7386.00	41.0 AV	54.0	-13.0	1.00 V	191	32.45	8.55

REMARKS:

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

802.11n (HT40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
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	66.4 PK	74.0	-7.6	1.17 H	53	72.00	-5.60
2	2390.00	52.8 AV	54.0	-1.2	1.17 H	53	58.40	-5.60
3	*2422.00	104.7 PK			1.47 H	40	110.19	-5.49
4	*2422.00	94.5 AV			1.47 H	40	99.99	-5.49
5	4844.00	56.5 PK	74.0	-17.5	1.14 H	153	52.66	3.84
6	4844.00	43.2 AV	54.0	-10.8	1.14 H	153	39.36	3.84
7	7266.00	54.1 PK	74.0	-19.9	1.00 H	179	46.04	8.06
8	7266.00	41.0 AV	54.0	-13.0	1.00 H	179	32.94	8.06
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.0 PK	74.0	-5.0	1.32 V	300	74.60	-5.60
2	2390.00	48.7 AV	54.0	-5.3	1.32 V	300	54.30	-5.60
3	*2422.00	99.6 PK			1.32 V	300	105.09	-5.49
4	*2422.00	89.5 AV			1.32 V	300	94.99	-5.49
5	4844.00	53.9 PK	74.0	-20.1	1.00 V	85	50.06	3.84
6	4844.00	40.6 AV	54.0	-13.4	1.00 V	85	36.76	3.84
7	7266.00	54.6 PK	74.0	-19.4	1.07 V	193	46.54	8.06
8	7266.00	40.9 AV	54.0	-13.1	1.07 V	193	32.84	8.06

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
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	68.1 PK	74.0	-5.9	1.40 H	42	73.70	-5.60
2	2390.00	52.8 AV	54.0	-1.2	1.40 H	42	58.40	-5.60
3	*2437.00	109.8 PK			1.39 H	120	115.22	-5.42
4	*2437.00	99.4 AV			1.39 H	120	104.82	-5.42
5	2483.50	68.0 PK	74.0	-6.0	1.11 H	208	73.20	-5.20
6	2483.50	53.3 AV	54.0	-0.7	1.11 H	208	58.50	-5.20
7	4874.00	57.3 PK	74.0	-16.7	1.13 H	151	53.49	3.81
8	4874.00	45.2 AV	54.0	-8.8	1.13 H	151	41.39	3.81
9	7311.00	54.4 PK	74.0	-19.6	1.00 H	185	46.17	8.23
10	7311.00	41.1 AV	54.0	-12.9	1.00 H	185	32.87	8.23
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	104.3 PK			1.27 V	300	109.72	-5.42
2	*2437.00	94.2 AV			1.27 V	300	99.62	-5.42
3	2483.50	69.4 PK	74.0	-4.6	1.27 V	300	74.60	-5.20
4	2483.50	49.1 AV	54.0	-4.9	1.27 V	300	54.30	-5.20
5	4874.00	55.2 PK	74.0	-18.8	1.00 V	72	51.39	3.81
6	4874.00	41.2 AV	54.0	-12.8	1.00 V	72	37.39	3.81
7	7311.00	54.3 PK	74.0	-19.7	1.02 V	178	46.07	8.23
8	7311.00	40.5 AV	54.0	-13.5	1.02 V	178	32.27	8.23

REMARKS:

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

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
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	*2452.00	104.2 PK			1.34 H	123	109.56	-5.36
2	*2452.00	93.8 AV			1.34 H	123	99.16	-5.36
3	2483.50	67.2 PK	74.0	-6.8	1.33 H	133	72.40	-5.20
4	2483.50	52.8 AV	54.0	-1.2	1.33 H	133	58.00	-5.20
5	4904.00	56.9 PK	74.0	-17.1	1.15 H	164	53.11	3.79
6	4904.00	43.7 AV	54.0	-10.3	1.15 H	164	39.91	3.79
7	7356.00	54.0 PK	74.0	-20.0	1.00 H	169	45.57	8.43
8	7356.00	41.1 AV	54.0	-12.9	1.00 H	169	32.67	8.43
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	99.9 PK			1.29 V	310	105.26	-5.36
2	*2452.00	89.8 AV			1.29 V	310	95.16	-5.36
3	2483.50	69.2 PK	74.0	-4.8	1.29 V	310	74.40	-5.20
4	2483.50	49.0 AV	54.0	-5.0	1.29 V	310	54.20	-5.20
5	4904.00	53.8 PK	74.0	-20.2	1.00 V	97	50.01	3.79
6	4904.00	40.3 AV	54.0	-13.7	1.00 V	97	36.51	3.79
7	7356.00	54.7 PK	74.0	-19.3	1.09 V	209	46.27	8.43
8	7356.00	40.8 AV	54.0	-13.2	1.09 V	209	32.37	8.43

REMARKS:

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

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Dec. 03, 2014

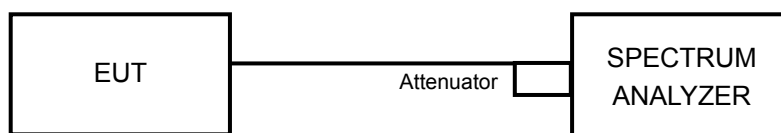
4.3.3 TEST PROCEDURE

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	7.12	7.09	0.5	PASS
6	2437	7.13	7.13	0.5	PASS
11	2462	6.63	7.10	0.5	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.46	16.42	0.5	PASS
6	2437	16.42	16.44	0.5	PASS
11	2462	16.42	16.42	0.5	PASS

802.11n (HT20)

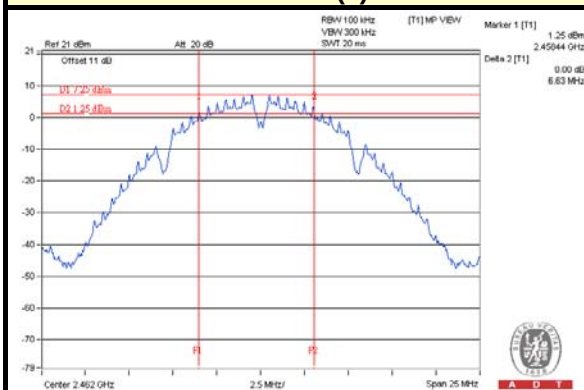
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.63	17.65	0.5	PASS
6	2437	17.63	17.66	0.5	PASS
11	2462	17.65	17.62	0.5	PASS

802.11n (HT40)

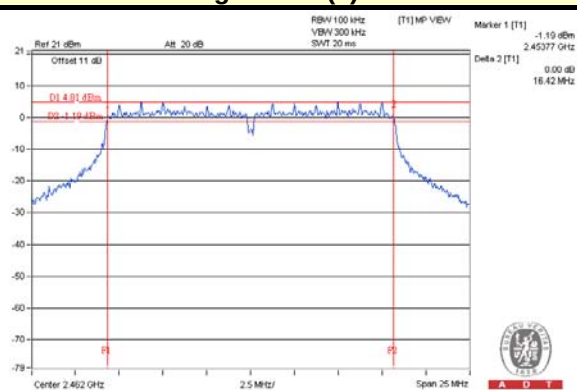
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	36.45	36.44	0.5	PASS
6	2437	36.46	36.45	0.5	PASS
9	2452	36.45	36.45	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

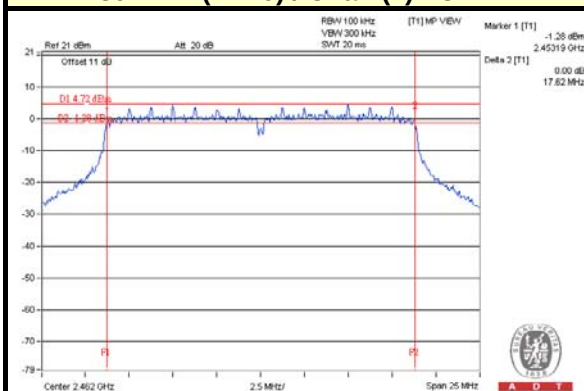
802.11b / Chain(0) : CH11



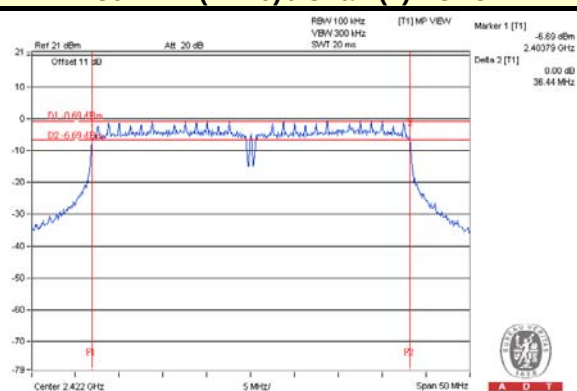
802.11g / Chain(0) : CH11



802.11n (HT20) / Chain(1) : CH11



802.11n (HT40) / Chain(1) : CH3



4.4 CONDUCTED OUTPUT POWER MEASUREMENT

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

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

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

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

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

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

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Dec. 03, 2014

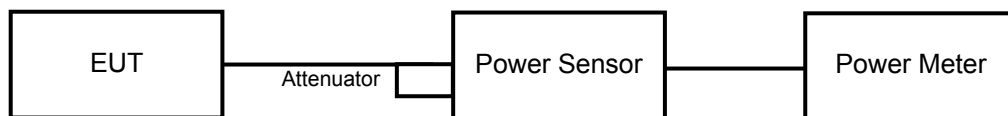
4.4.3 TEST PROCEDURES

The 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 peak power level.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS

FOR PEAK POWER

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	19.68	20.47	204.326	23.10	30	PASS
6	2437	19.29	19.00	164.351	22.16	30	PASS
11	2462	18.61	18.92	150.594	21.78	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	26.02	25.67	768.923	28.86	30	PASS
6	2437	26.69	26.70	934.394	29.71	30	PASS
11	2462	26.24	25.64	787.165	28.96	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	26.42	25.43	787.671	28.96	30	PASS
6	2437	26.54	26.72	920.711	29.64	30	PASS
11	2462	25.92	24.82	694.23	28.42	30	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	25.44	22.91	545.379	27.37	30	PASS
6	2437	26.72	24.94	781.783	28.93	30	PASS
9	2452	22.84	20.89	315.053	24.98	30	PASS



A D T

FOR AVERAGE POWER

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
1	2412	16.69	17.06	97.482	19.89
6	2437	16.12	15.92	80.010	19.03
11	2462	15.28	15.76	71.399	18.54

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
1	2412	17.56	17.51	113.380	20.55
6	2437	21.58	21.38	281.284	24.49
11	2462	17.51	17.52	112.858	20.53

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
1	2412	17.68	17.79	118.731	20.75
6	2437	21.42	21.22	271.110	24.33
11	2462	16.69	16.67	93.118	19.69

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
3	2422	15.66	15.71	74.052	18.70
6	2437	18.31	18.61	140.375	21.47
9	2452	12.21	12.31	33.656	15.27

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Dec. 03, 2014

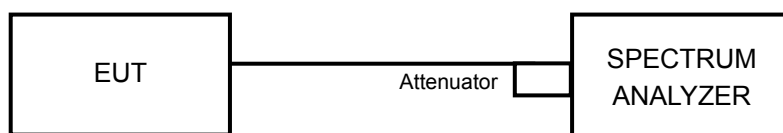
4.5.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum amplitude level.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	1	2412	-7.19	3.01	-4.18	8.00	PASS
	6	2437	-7.32	3.01	-4.31	8.00	PASS
	11	2462	-8.09	3.01	-5.08	8.00	PASS
1	1	2412	-6.14	3.01	-3.13	8.00	PASS
	6	2437	-6.62	3.01	-3.61	8.00	PASS
	11	2462	-8.44	3.01	-5.43	8.00	PASS

NOTE: Directional gain = 2.2dBi + 10log(2) = 5.21dBi < 6dBi , so the power density limit shall not be reduced.

802.11g

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	1	2412	-10.18	3.01	-7.17	8.00	PASS
	6	2437	-6.33	3.01	-3.32	8.00	PASS
	11	2462	-10.39	3.01	-7.38	8.00	PASS
1	1	2412	-10.96	3.01	-7.95	8.00	PASS
	6	2437	-7.23	3.01	-4.22	8.00	PASS
	11	2462	-10.49	3.01	-7.48	8.00	PASS

NOTE: Directional gain = 2.2dBi + 10log(2) = 5.21dBi < 6dBi , so the power density limit shall not be reduced.

802.11n (HT20)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	1	2412	-10.54	3.01	-7.53	8.00	PASS
	6	2437	-6.49	3.01	-3.48	8.00	PASS
	11	2462	-10.93	3.01	-7.92	8.00	PASS
1	1	2412	-11.47	3.01	-8.46	8.00	PASS
	6	2437	-7.39	3.01	-4.38	8.00	PASS
	11	2462	-10.02	3.01	-7.01	8.00	PASS

NOTE: Directional gain = $2.2\text{dBi} + 10\log(2) = 5.21\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

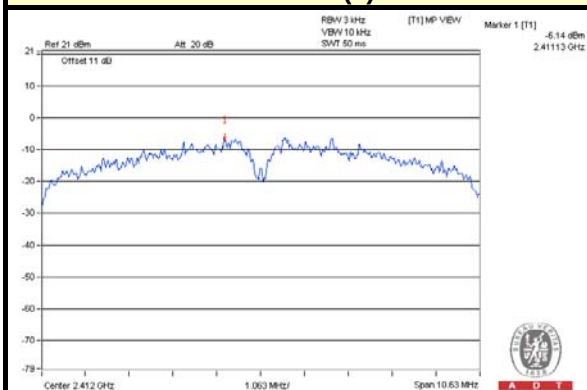
802.11n (HT40)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	3	2422	-14.66	3.01	-11.65	8.00	PASS
	6	2437	-12.42	3.01	-9.41	8.00	PASS
	9	2452	-18.55	3.01	-15.54	8.00	PASS
1	3	2422	-15.97	3.01	-12.96	8.00	PASS
	6	2437	-14.30	3.01	-11.29	8.00	PASS
	9	2452	-19.25	3.01	-16.24	8.00	PASS

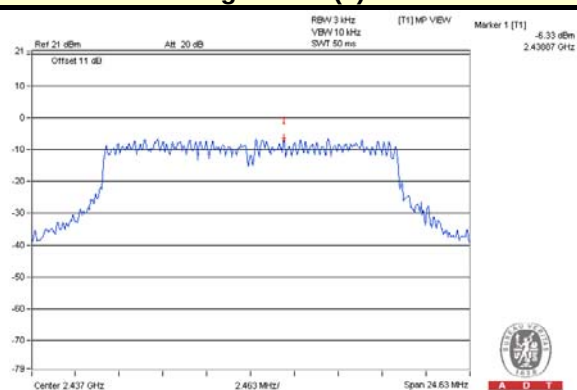
NOTE: Directional gain = $2.2\text{dBi} + 10\log(2) = 5.21\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

SPECTRUM PLOT OF WORST VALUE

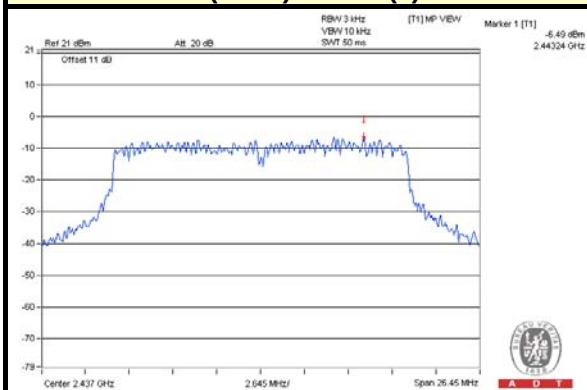
802.11b / Chain(1) : CH1



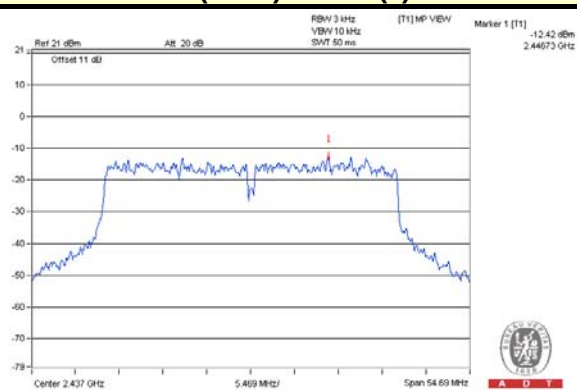
802.11g / Chain(0) : CH6



802.11n (HT20) / Chain(0) : CH6



802.11n (HT40) / Chain(0) : CH6



4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below 20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Dec. 03, 2014

4.6.3 TEST PROCEDURE

Measurement Procedure - Reference Level

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

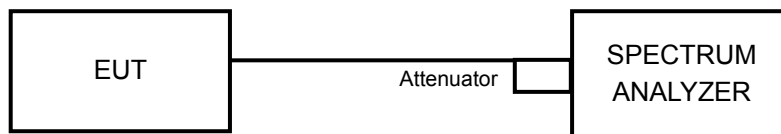
Measurement Procedure –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.7 TEST RESULTS

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

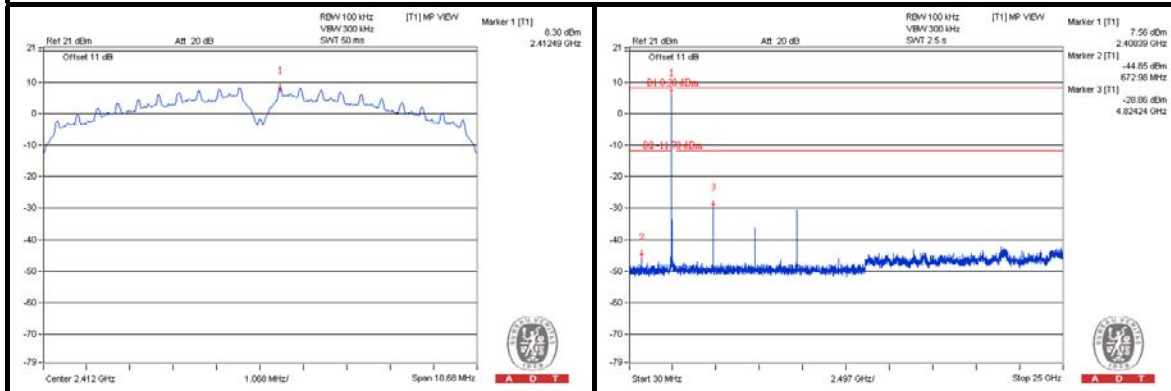


A D T

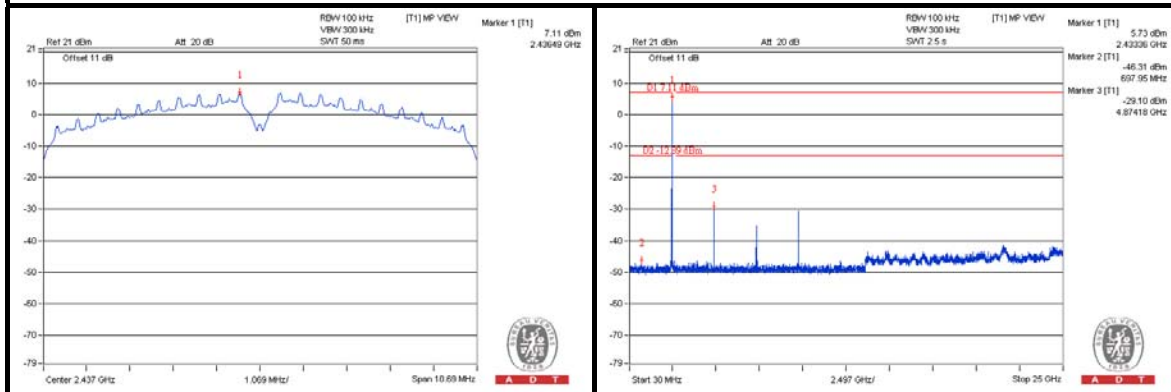
802.11b

Chain (0)

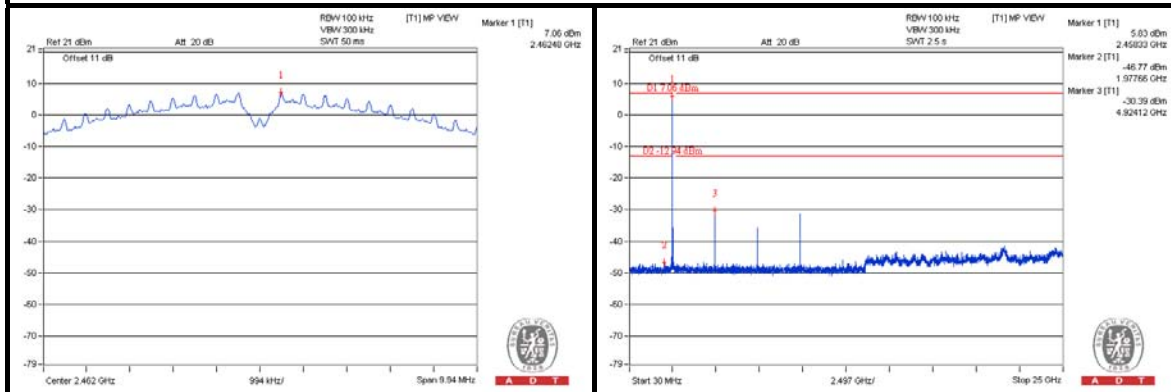
CH 1



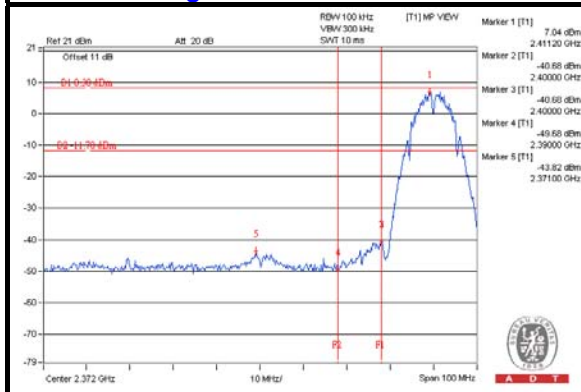
CH 6



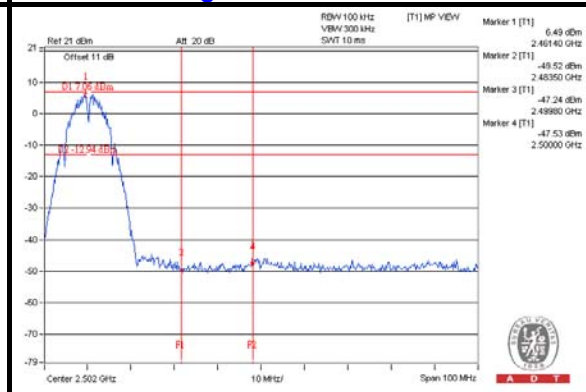
CH 11



CH 1 Band edge

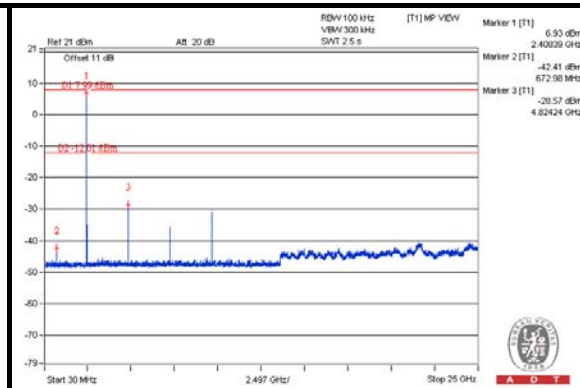
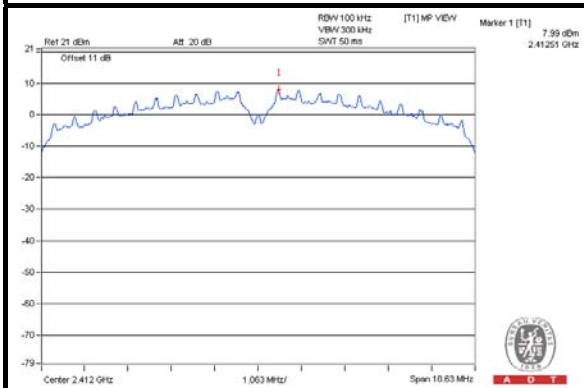
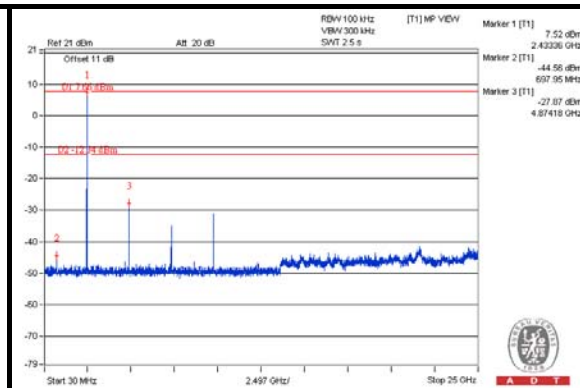
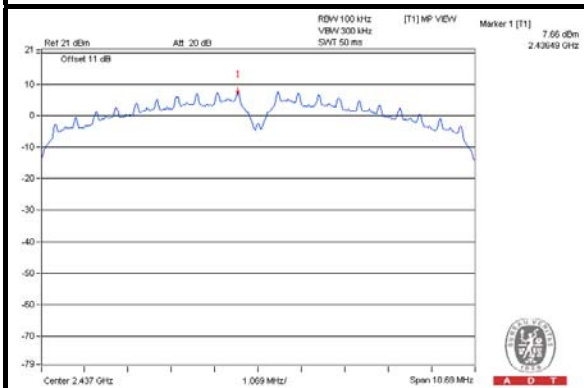
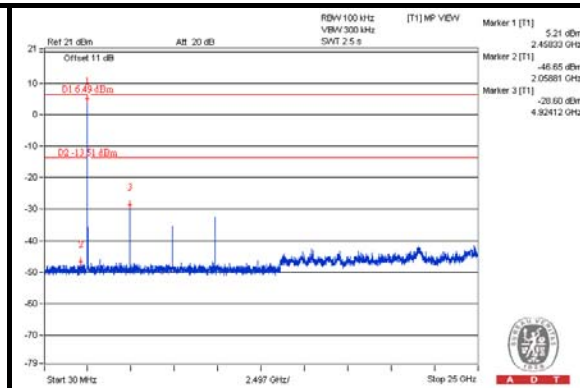
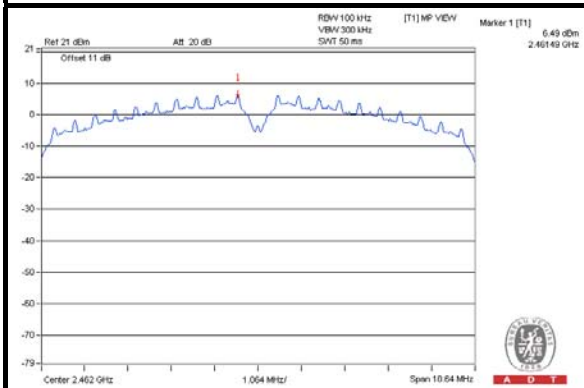
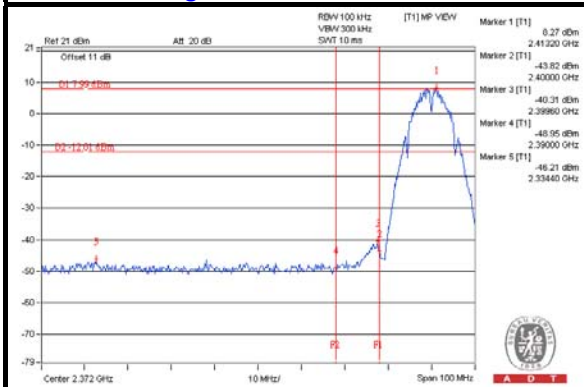
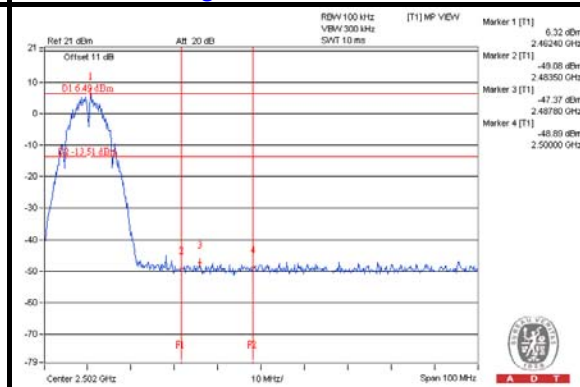


CH 11 Band edge





A D T

Chain (1)**CH 1****CH 6****CH 11****CH 1 Band edge****CH 11 Band edge**

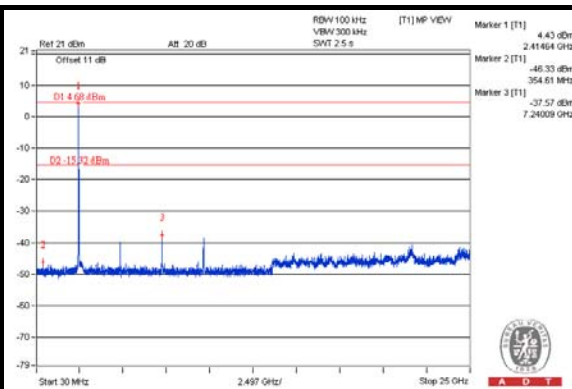
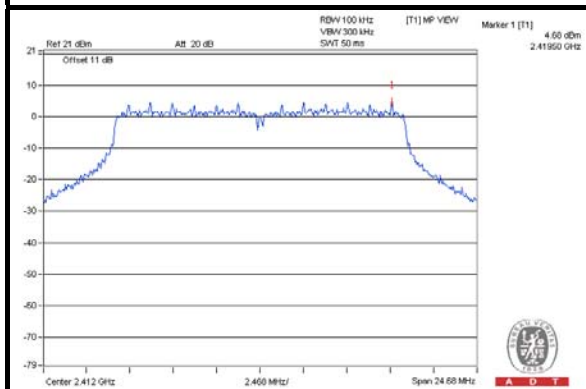


A D T

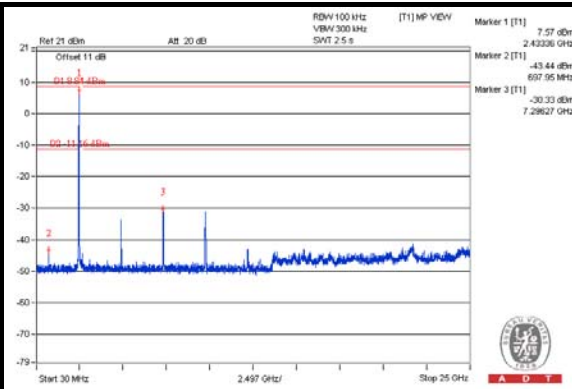
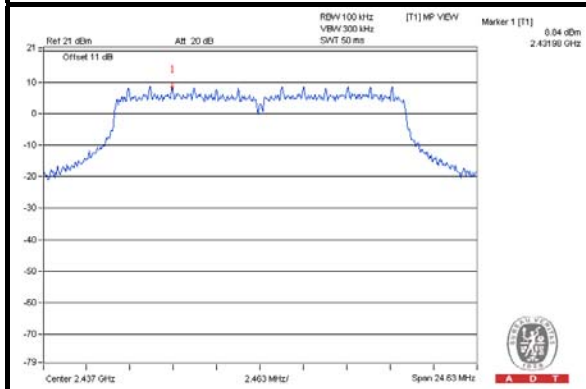
802.11g

Chain (0)

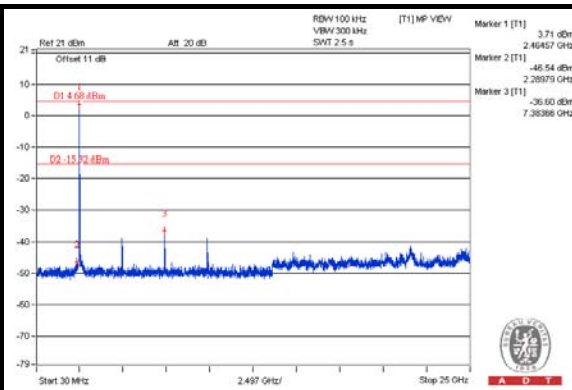
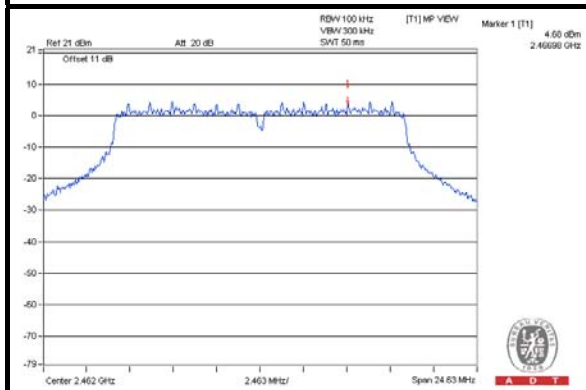
CH 1



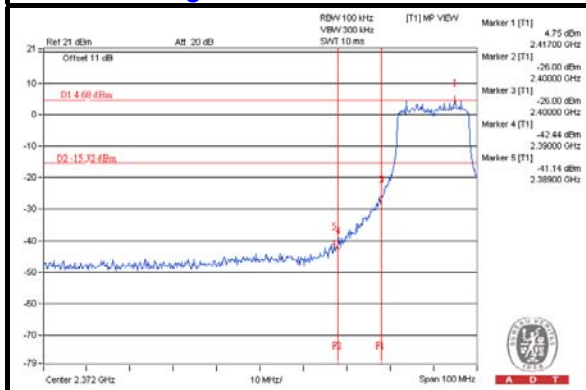
CH 6



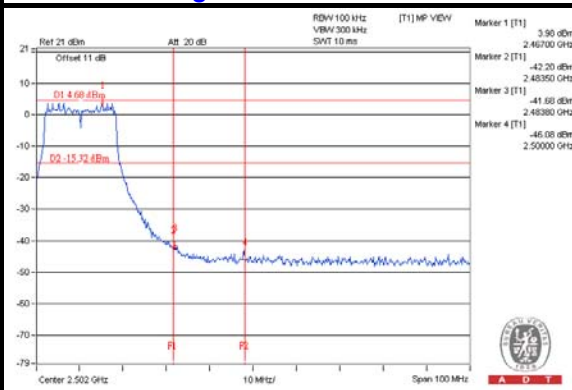
CH 11



CH 1 Band edge

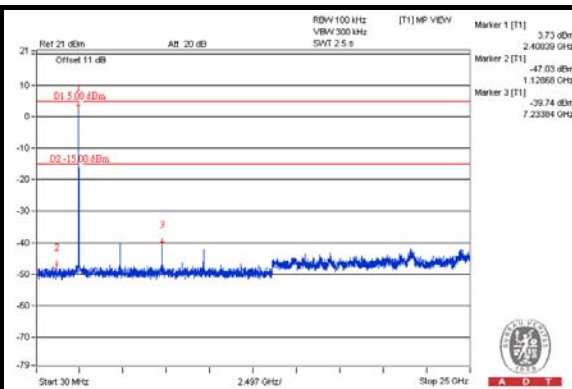
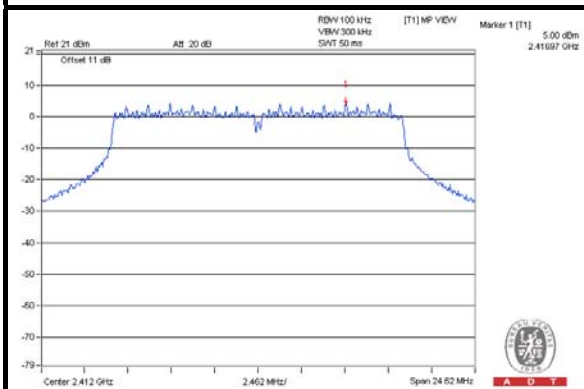
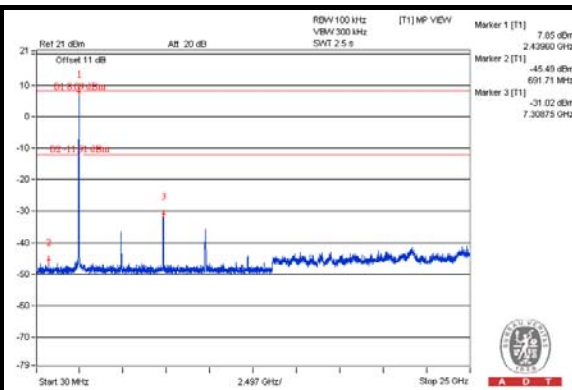
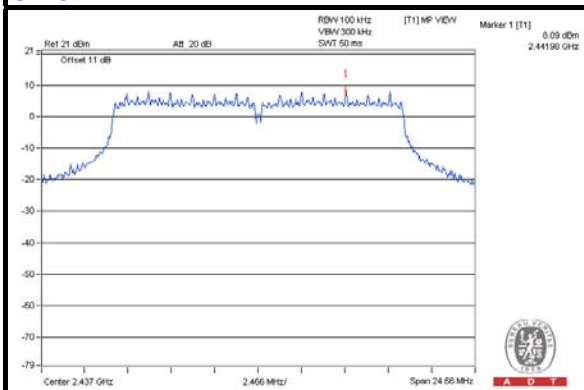
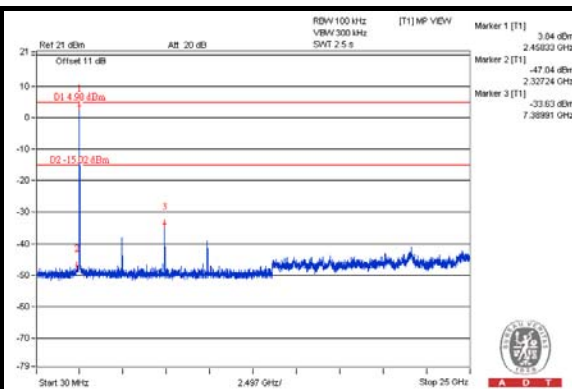
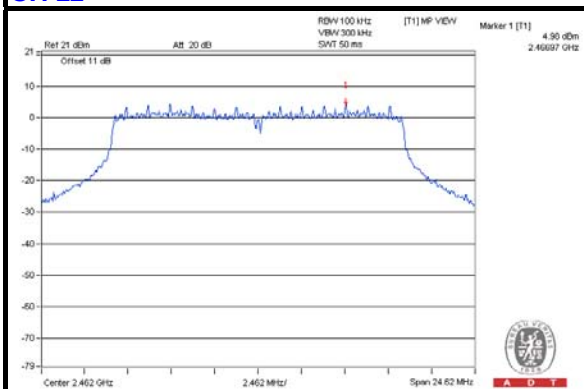
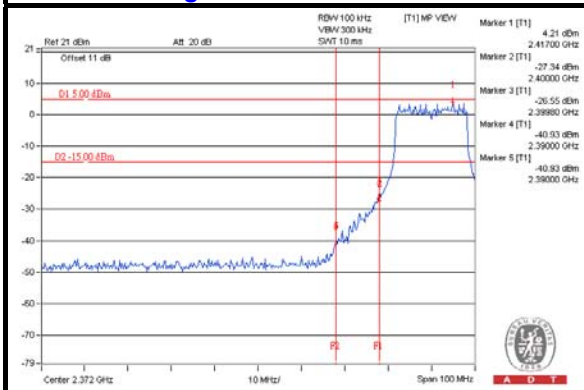
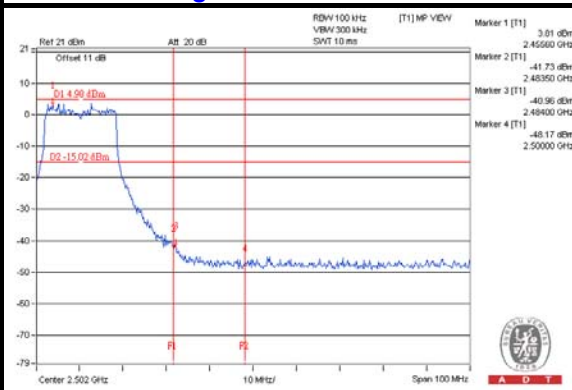


CH 11 Band edge





A D T

Chain (1)**CH 1****CH 6****CH 11****CH 1 Band edge****CH 11 Band edge**

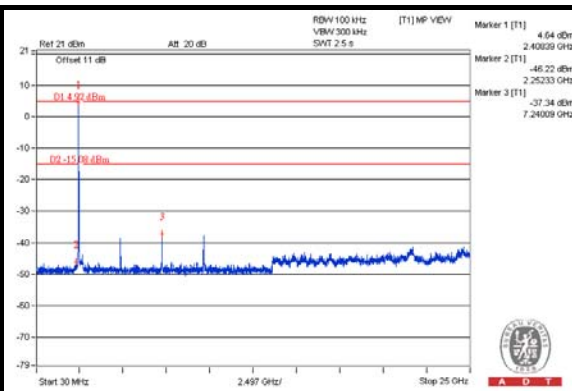
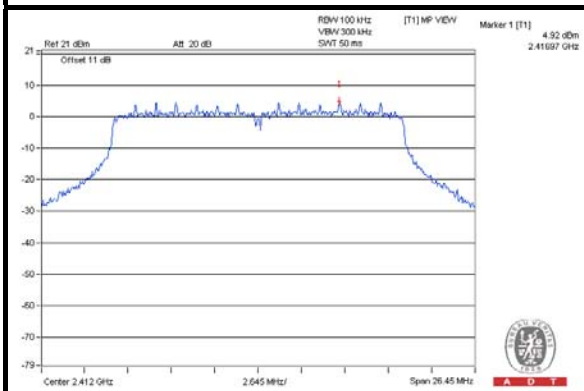


A D T

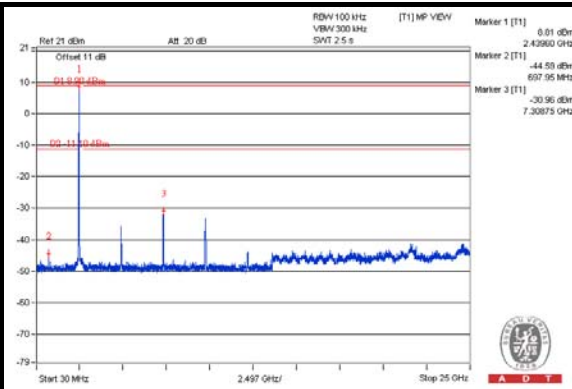
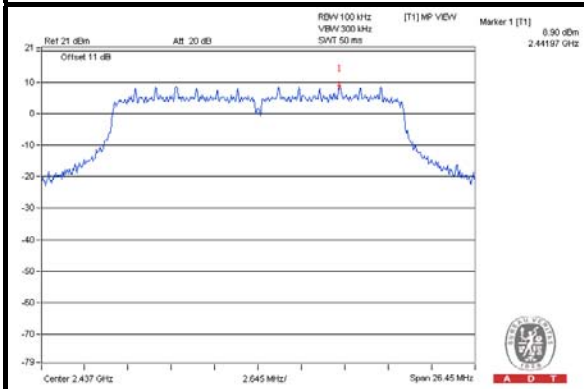
802.11n (HT20)

Chain (0)

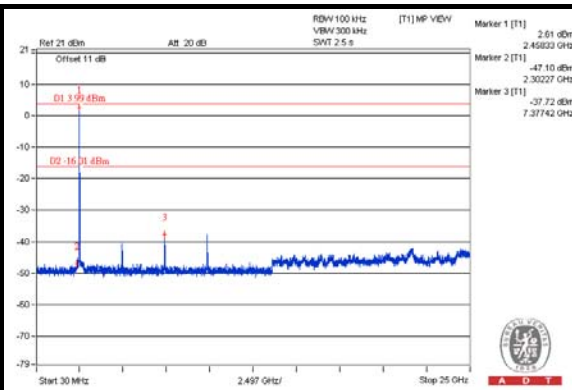
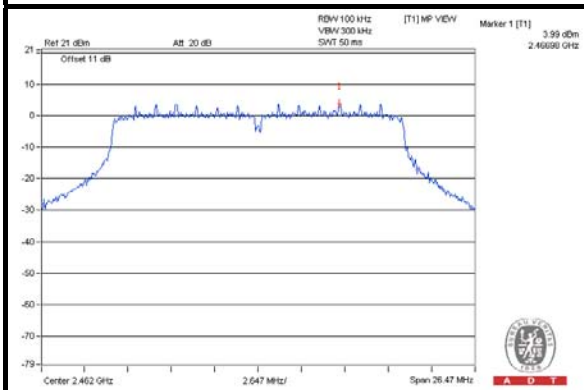
CH 1



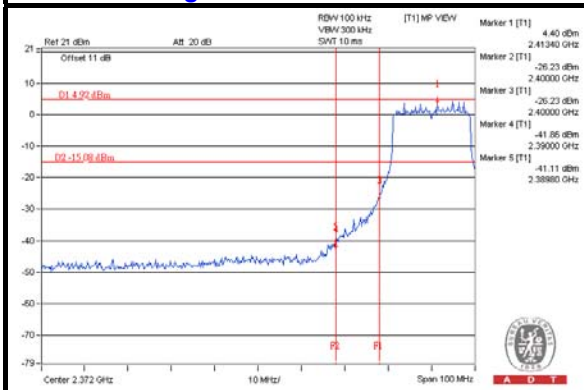
CH 6



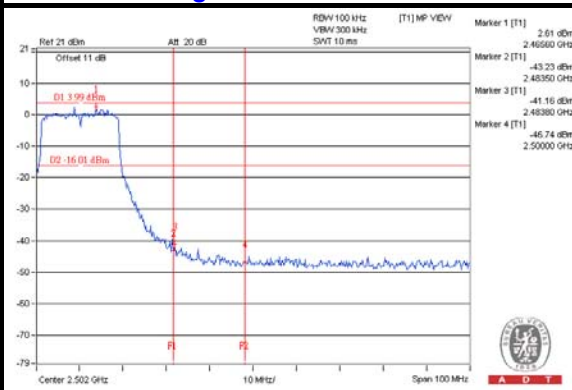
CH 11



CH 1 Band edge

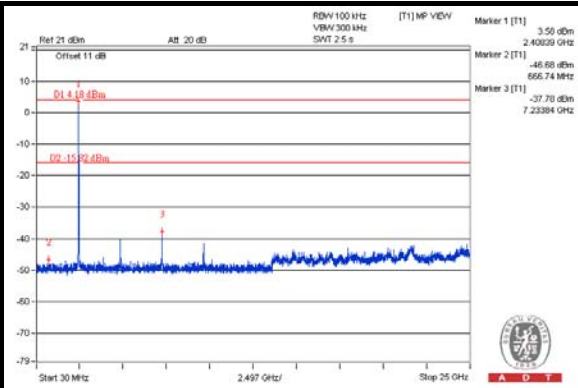
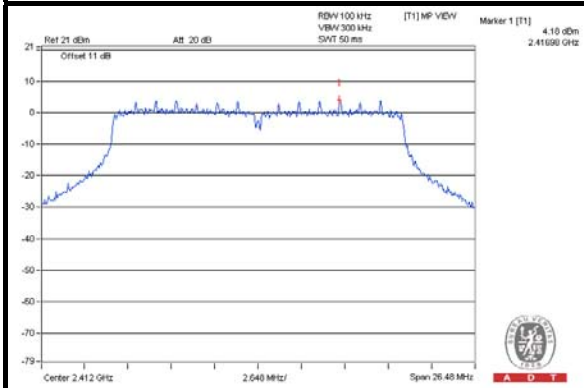


CH 11 Band edge

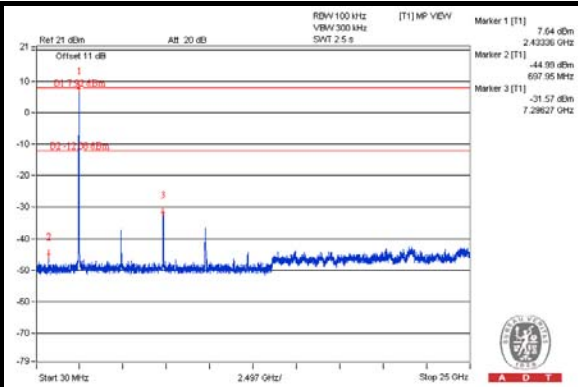
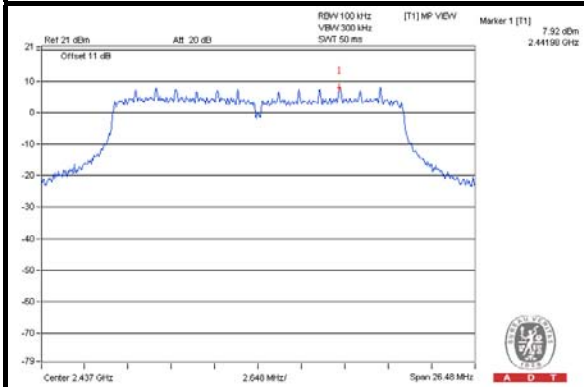


Chain (1)

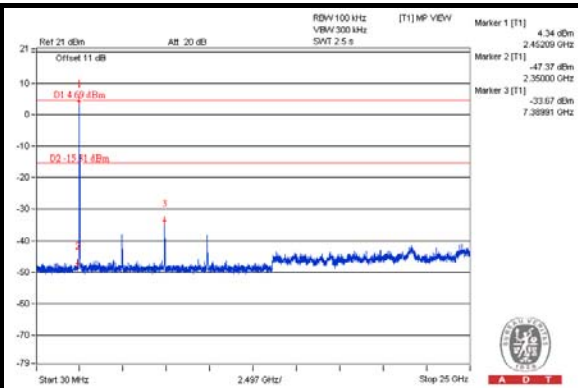
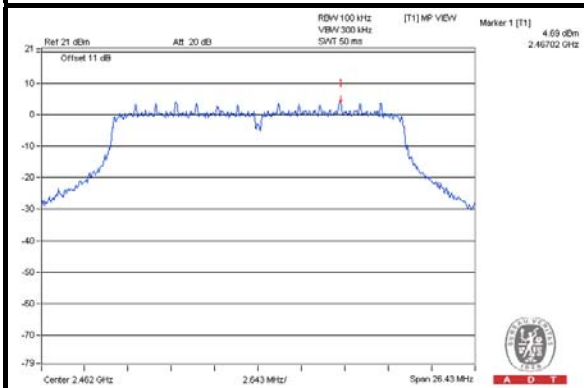
CH 1



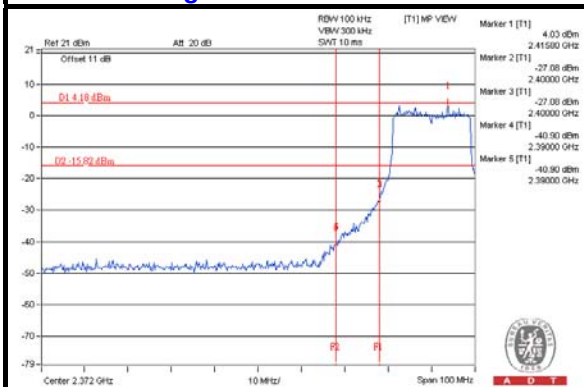
CH 6



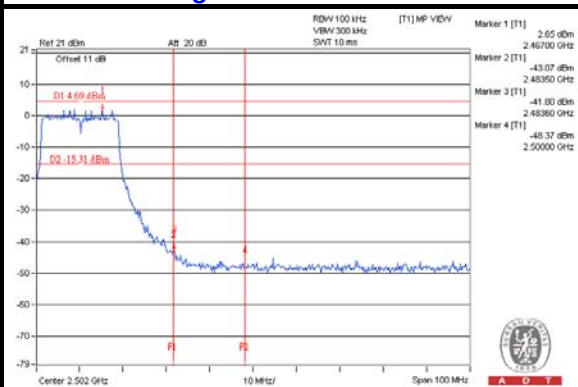
CH 11



CH 1 Band edge



CH 11 Band edge



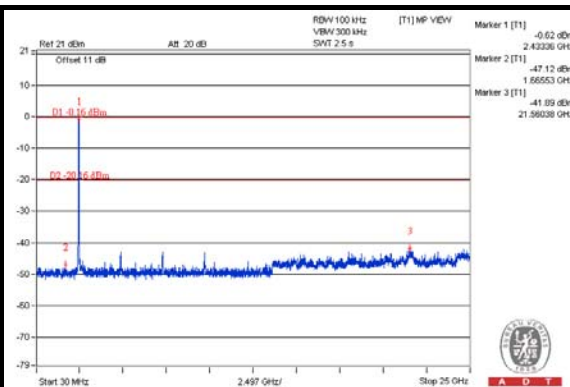
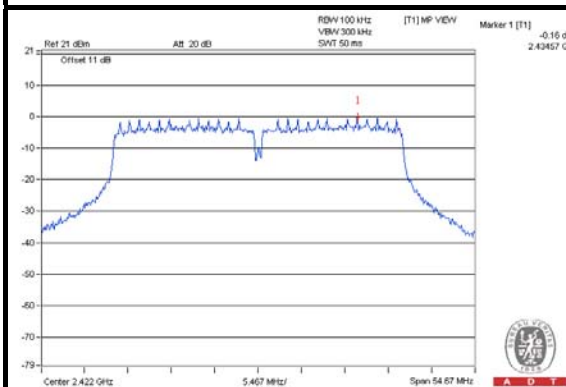


A D T

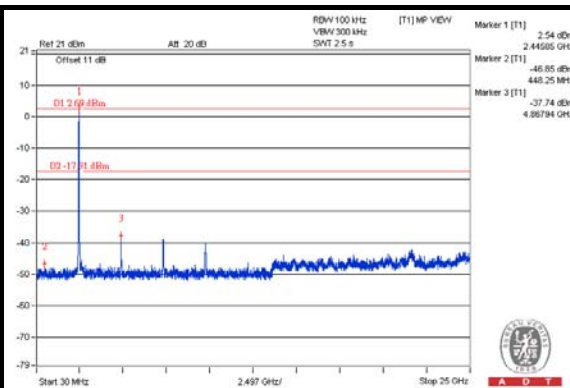
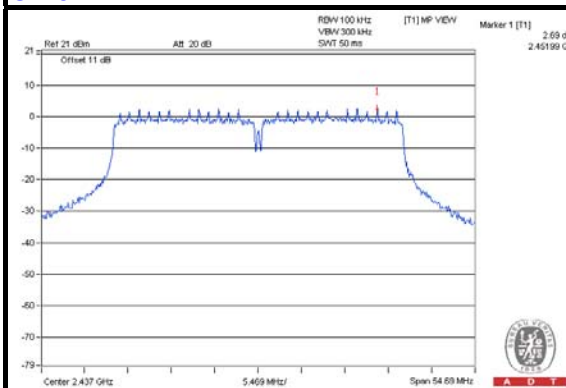
802.11n (HT40)

Chain (0)

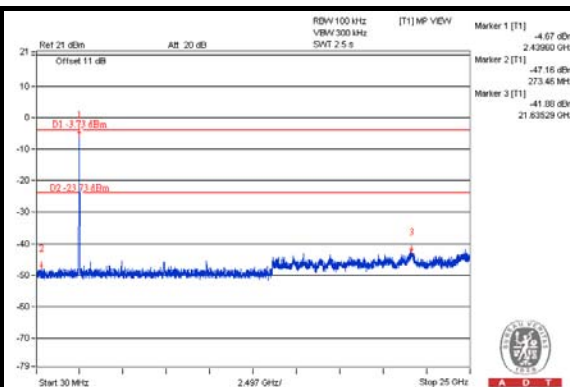
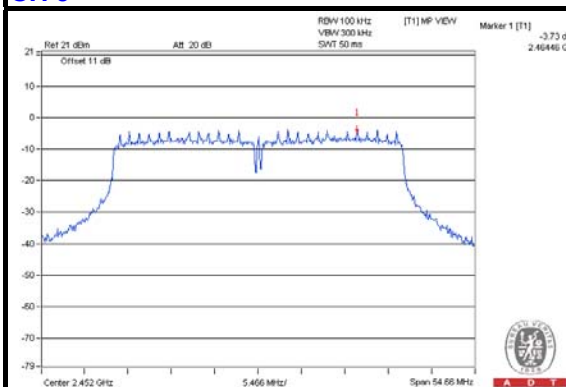
CH 3



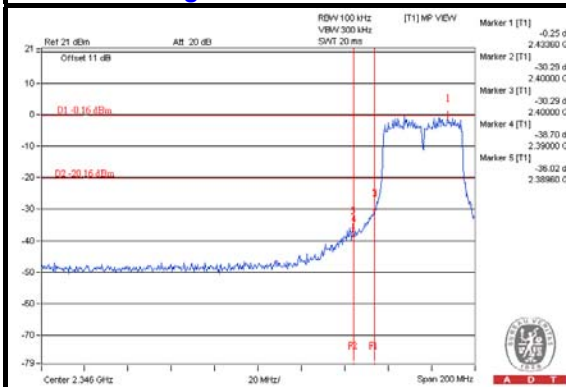
CH 6



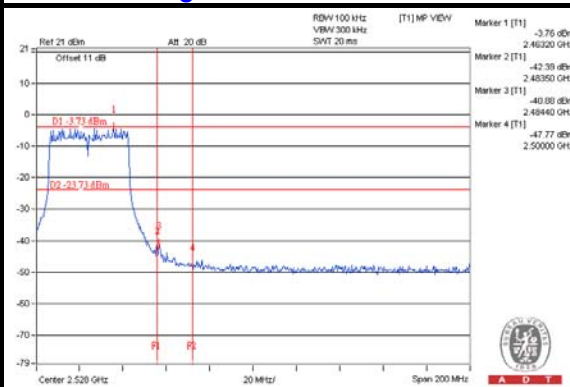
CH 9



CH 3 Band edge

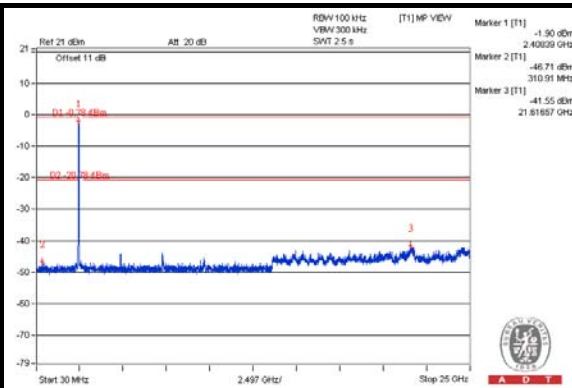
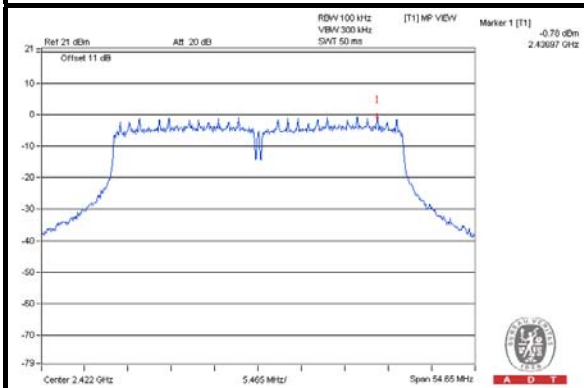


CH 9 Band edge

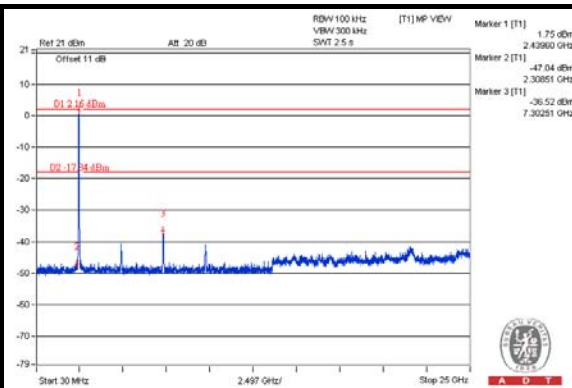
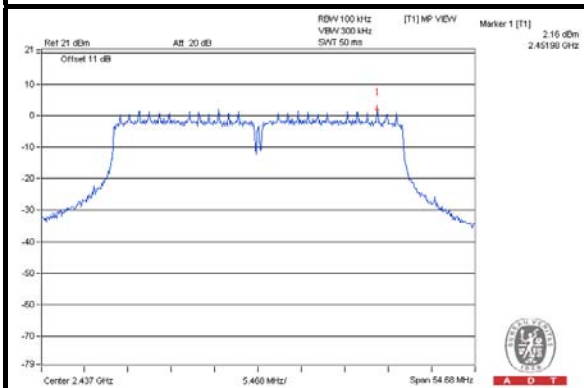


Chain (1)

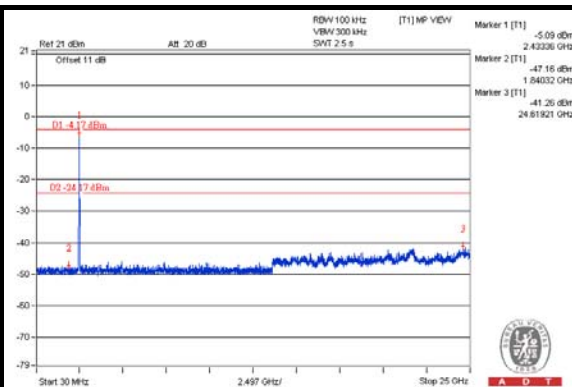
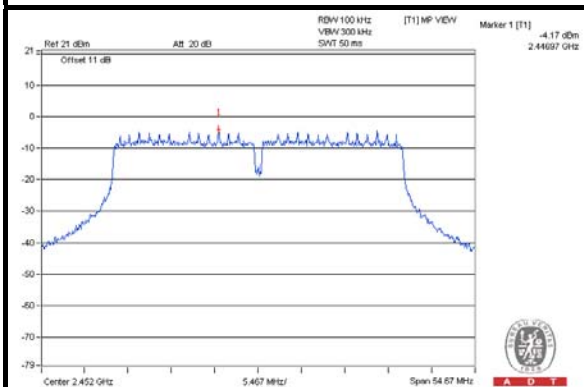
CH 3



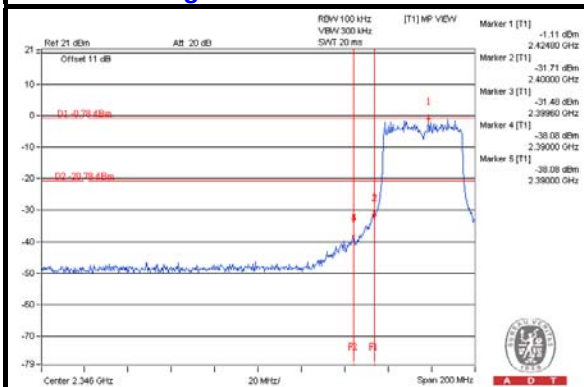
CH 6



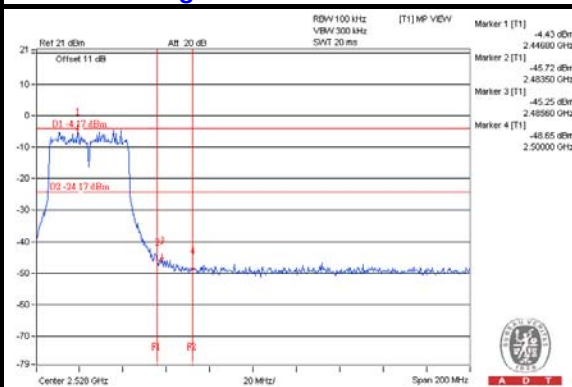
CH 9



CH 3 Band edge



CH 9 Band edge



5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6. 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.



A D T

7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

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