FCC Test Report

Report No.:	RF150814E01
FCC ID:	RRK-EA-7HW03AP1
Test Model:	EA-7HW03AP1W
Series Model:	EA-7HW03AP1T
Received Date:	Aug. 14, 2015
Test Date:	Aug. 24 to Nov. 04, 2015
Issued Date:	Dec. 24, 2015
Applicant:	Alpha Networks Inc.
Address:	No.8 Li-shing 7th Rd., Science-based Industrial Park, Hsinchu, Taiwan, R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location (1):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RF150814E01	Original release.	Dec. 24, 2015

1 Certificate of Conformity

Product:	Wireless LAN Access Point
Brand:	Panasonic
Test Model:	EA-7HW03AP1W
Series Model:	EA-7HW03AP1T
Sample Status:	R&D SAMPLE
Applicant:	Alpha Networks Inc.
Test Date:	Aug. 24 to Nov. 04, 2015
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Dec. 24, 2015

Midoli Peng / Specialist

Approved by : _____ , **Date:** Dec. 24, 2015

May Chen / 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 -4.42dB at 0.29844MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is I-PEX not a standard connector.

NOTE: The EUT was operating in 2400 ~ 2483.5MHz, 5150~5250MHz and 5725~5850MHz frequencies band. This report was recorded the RF parameters including 2400 ~ 2483.5MHz. For the 5150~5250MHz and 5725~5850MHz 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:

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.37 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.72 dB
	6GHz ~ 18GHz	4.00 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless LAN Access Point
Brand	Panasonic
Test Model	EA-7HW03AP1W
Series Model	EA-7HW03AP1T
Status of EUT	R&D SAMPLE
Power Supply Rating	DC 24V from power adapter or DC 48V from POE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 800Mbps 802.11ac: up to 1733.3Mbps
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), VHT20 7 for 802.11n (HT40), VHT40
Output Power	**For 15.407(5.18 ~ 5.24GHz)** **CDD Mode** 802.11a: 390.156mW 802.11ac (VHT20): 366.747mW 802.11ac (VHT40): 392.29mW 802.11ac (VHT80): 57.137mW **Beamforming Mode** 802.11ac (VHT20): 358.26mW 802.11ac (VHT40): 384.651mW 802.11ac (VHT80): 54.684mW **For 15.407(5.745 ~ 5.825GHz)** **CDD Mode** 802.11a: 797.673mW 802.11ac (VHT20): 811.076mW 802.11ac (VHT40): 594.859mW 802.11ac (VHT80): 139.783mW **Beamforming Mode** 802.11ac (VHT20): 390.657mW 802.11ac (VHT40): 390.921mW 802.11ac (VHT80): 121.874mW
	For 15.247 802.11b: 973.865mW 802.11g: 851.922mW 802.11n(HT20): 801.309mW 802.11n(HT40): 206.802mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note

Accessory Device	Adapter x1
Data Cable Supplied	NA

Note:

1. There are 2.4GHz and 5GHz technology used for the EUT.
2. 2.4GHz & 5GHz technology can transmit at same time.
3. The EUT has two model names, which are identical to each other in all aspects except for the following table:

Brand	Product Name	Model No.	Difference
Panasonic	Wireless LAN Access Point	EA-7HW03AP1W	1. Different of color : Model: EA-7HW03AP1W (white) Model: EA-7HW03AP1T (brown) 2. For marketing requirement
		EA-7HW03AP1T	

From the above models, model: **EA-7HW03AP1W** was selected as representative model for the test and their data were recorded in this report.

4. The EUT must be supplied with POE or a power adapter as following table:

Adapter		
Brand Name	Model No.	Spec.
TAMURA	DVW2415N	Input: 100-240V, 1.0A, 50/60Hz AC intput cable: 1.3m, unshielded Output: 24V, 1.5A DC output cable: 1.25m, unshielded, with one core
POE (test only, not for sale)		
Brand Name	Model No.	Spec.
SGP	GRT-480125A	Input: 100-240V, 50/60Hz Output: 48V

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

Transmitter Circuit	Brand	Model	Antenna Type	Antenna Gain (dBi)		Connector type
				2.4GHz	5GHz	
Chain (0)	Hong Lin INDUSTRIAL CO.,LTD	290-20211	PIFA	3	4	I-PEX
Chain (1)		290-20211		3	4	
Chain (2)		290-20212		3	4	
Chain (3)		290-20212		3	4	

6. The EUT was pre-tested under following test modes :

Pre-test Mode	Power
Mode A	Adapter mode
Mode B	**POE mode**

From the above modes, the worst radiated emission was found in **Mode B**. Therefore only the test data of the modes were recorded in this report.

7. The EUT incorporates a MIMO function with beamforming.

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	4TX	4RX
802.11g	6 ~ 54Mbps	4TX	4RX
802.11n (HT20)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
VHT20	MCS0~8 Nss=1	4TX	4RX
	MCS0~8 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~8 Nss=4	4TX	4RX
VHT40	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	4TX	4RX
802.11n (HT20)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11ac (VHT20)	MCS0~8 Nss=1	4TX	4RX
	MCS0~8 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~8 Nss=4	4TX	4RX
802.11ac (VHT40)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX
802.11ac (VHT80)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX
Note: 1. 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. 2. All of modulation mode support beamforming function except 2.4GHz & 802.11a/n modulation mode.			

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

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20), VHT20:

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), VHT40:

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	
1	-	-	√	-	With adapter
2	√	√	√	√	With POE

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 had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-plane (below 1GHz) &Y-plane (above 1GHz)**

2. "-"means no effect.

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.

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

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.

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

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)
802.11b	1 to 11	6	OFDM	BPSK	1

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.

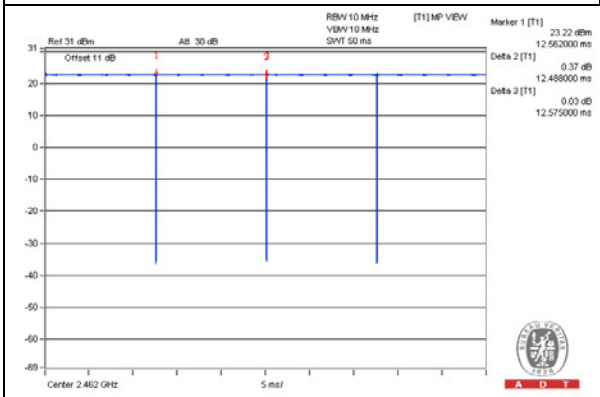
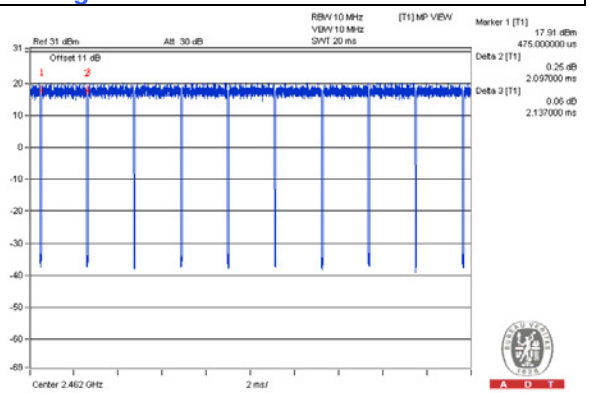
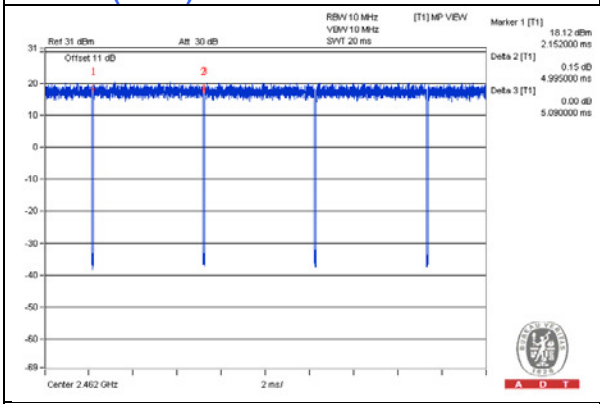
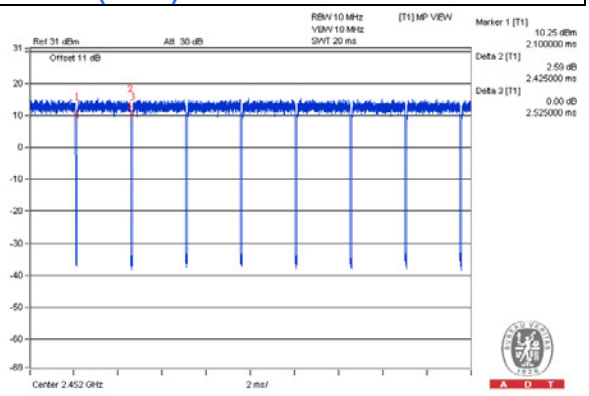
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	24deg. C, 67%RH	120Vac, 60Hz	Robert Cheng
RE<1G	24deg. C, 69%RH	120Vac, 60Hz	Weiwei Lo
PLC	26deg. C, 76%RH	120Vac, 60Hz	Jyunchun Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11b: Duty cycle = 12.488 ms/12.575ms = 0.993
802.11g: Duty cycle = 2.097ms/2.137ms = 0.981
802.11n (HT20): Duty cycle = 4.995 ms/5.09ms = 0.981
802.11n (HT40): Duty cycle = 2.425ms/2.525ms = 0.96, Duty factor = 10 * log(1/0.96) = 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 COMPUTER	DELL	E6440	F9LYQ32	FCC DoC	Provided by Lab
B.	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab
C.	POE	SGP	GRT-480125A	NA	NA	Supplied by Client
D.	USB 3.0 DONGLE	Transcend	NA	NA	NA	Provided by Lab
E.	USB 3.0 DONGLE	Transcend	NA	NA	NA	Provided by Lab

Note:

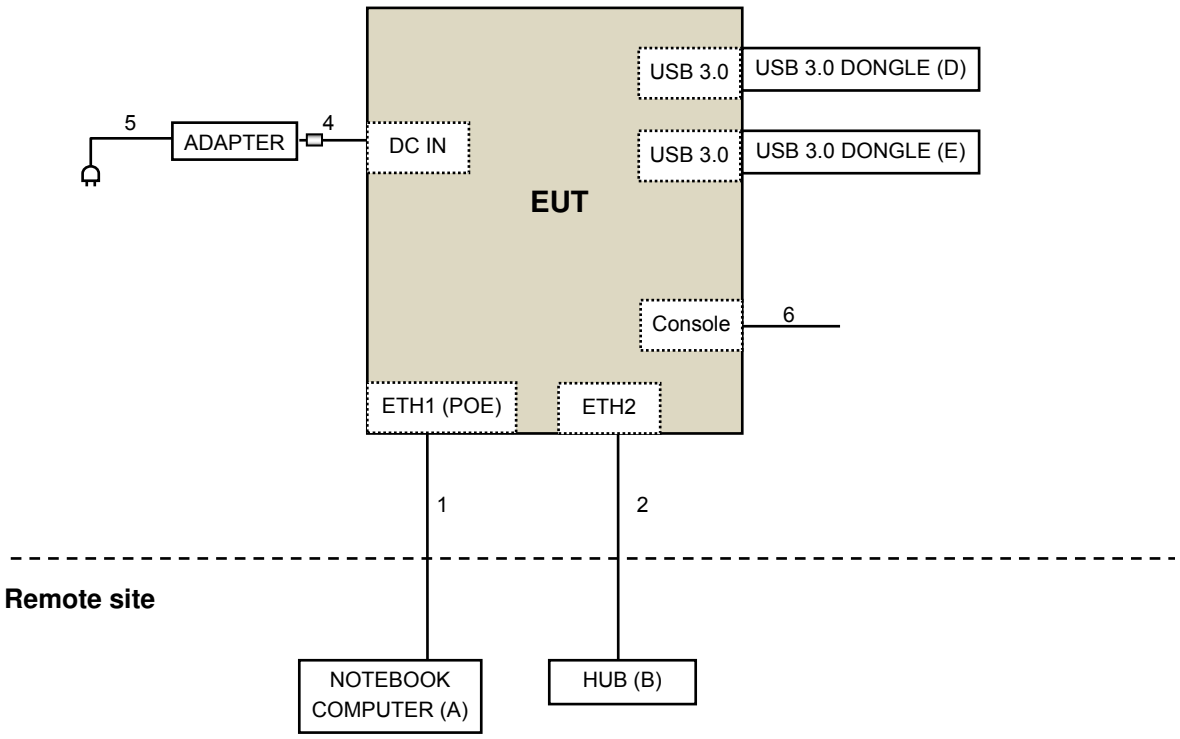
1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45	1	10	No	0	Provided by Lab
2.	RJ45	1	10	No	0	Provided by Lab
3.	RJ45	1	1	No	0	Provided by Lab
4.	DC	1	1.25	No	1	Supplied by client
5.	AC	1	1.3	No	0	Supplied by client
6.	RJ45 to Console	1	1.5	No	0	Provided by Lab

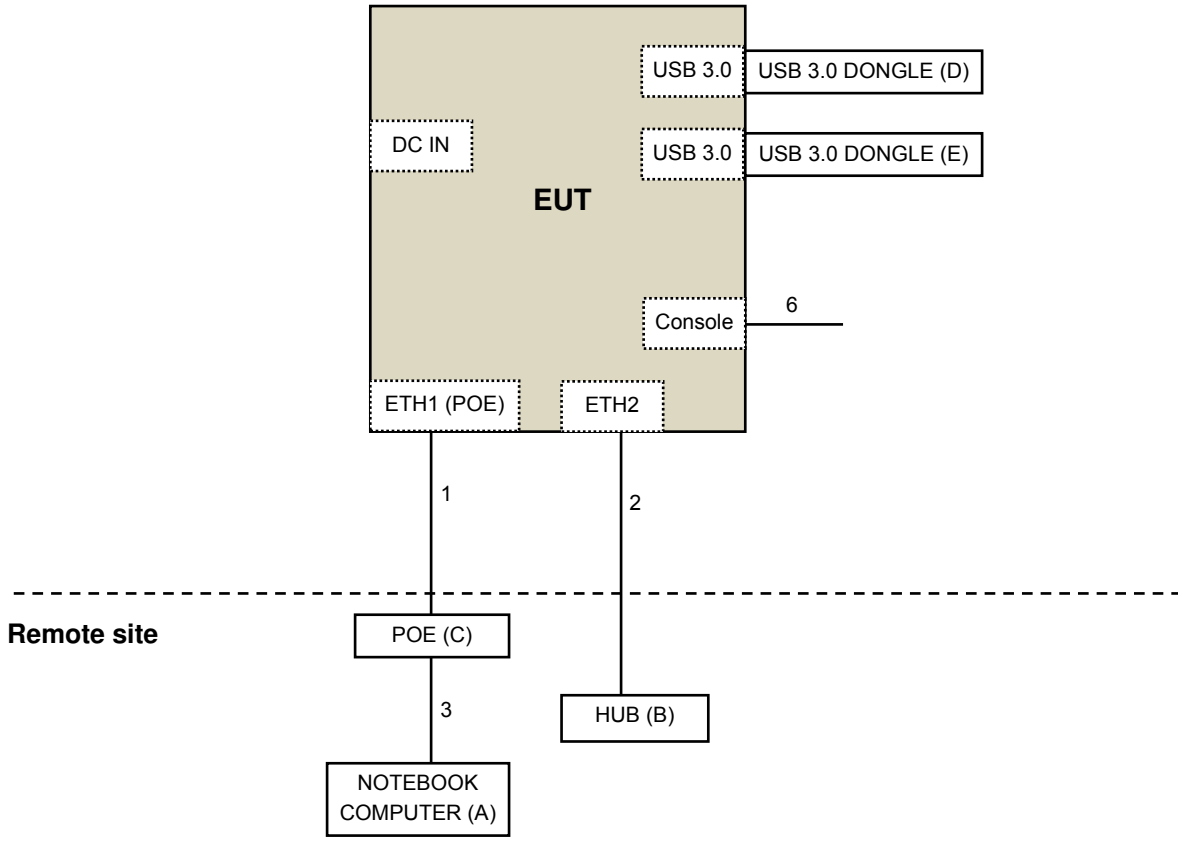
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

Adapter Mode:



POE Mode:


USB 3.0
USB 3.0 DONGLE (D)
DC IN
USB 3.0
USB 3.0 DONGLE (E)
EUT
Console
6
ETH1 (POE)
ETH2
1
2
Remote site
POE (C)
3
HUB (B)
NOTEBOOK
COMPUTER (A)

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)
KDB 558074 D01 DTS Meas Guidance v03r04
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

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

NOTE:

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

4.1.2 Test Instruments

For below 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 24, 2015	July 23, 2016
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 06, 2015	Feb. 05, 2016
RF Cable	8D-FB	CHGCAB-001-1 CHGCAB-001-2	Oct. 04, 2014	Oct. 03, 2015
	RF-141	CHGCAB-004	Oct. 04, 2014	Oct. 03, 2015
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 test was performed in 966 Chamber No. G.
3. The FCC Site Registration No. is 966073.
4. The VCCI Site Registration No. is G-137.
5. The CANADA Site Registration No. is IC 7450H-2.
6. Tested Date: Sep. 01, 2015

For above 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna AISI	AIH.8018	0000220091110	Feb. 06, 2015	Feb. 05, 2016
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131213 131215 SNMY23685/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	Jun. 26, 2015	Jun. 25, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
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 test was performed in 966 Chamber No. H.
3. The FCC Site Registration No. is 797305.
4. The CANADA Site Registration No. is IC 7450H-3.
5. Tested Date: Aug. 26, 2015

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:

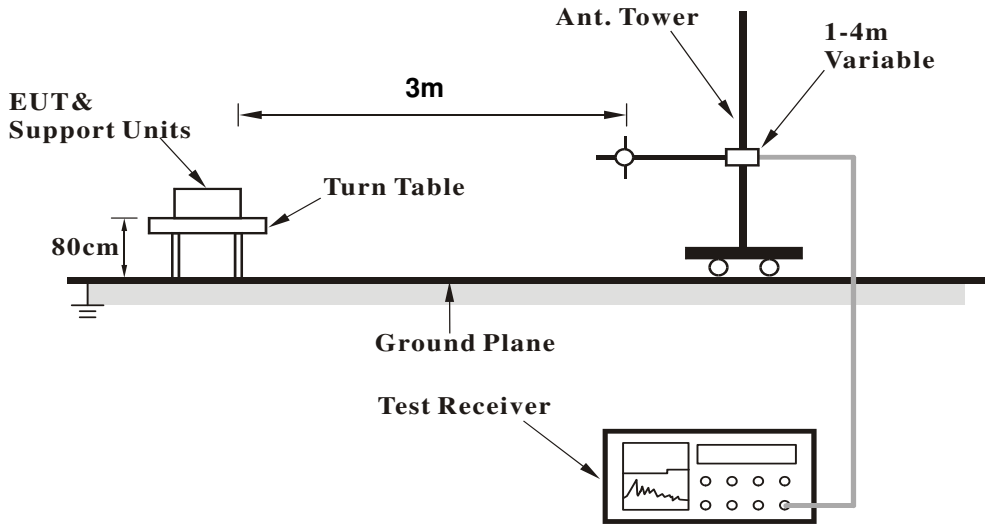
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

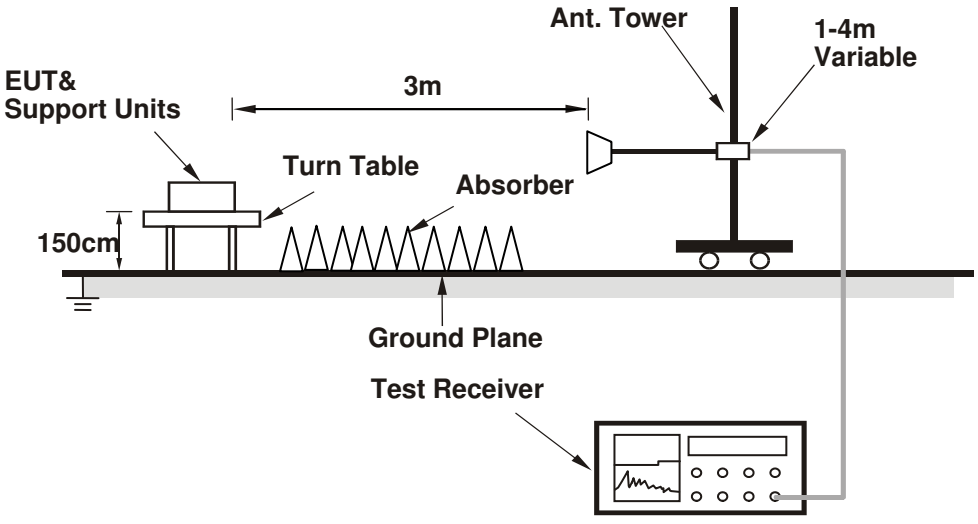
No deviation.

4.1.5 Test Setup

<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

1. Connect the EUT with the support unit A (Notebook Computer) which is placed on remote site.
2. Controlling software (QCART.EXE V3.0.93.0) has been activated to set the EUT on specific status.

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	58.1 PK	74.0	-15.9	1.72 H	324	61.29	-3.19
2	2390.00	53.8 AV	54.0	-0.2	1.72 H	324	56.99	-3.19
3	*2412.00	115.6 PK			1.87 H	37	118.73	-3.13
4	*2412.00	113.3 AV			1.87 H	37	116.43	-3.13
5	4824.00	48.6 PK	74.0	-25.4	2.12 H	44	42.63	5.97
6	4824.00	45.1 AV	54.0	-8.9	2.12 H	44	39.13	5.97
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	54.8 PK	74.0	-19.2	1.91 V	234	57.99	-3.19
2	2390.00	50.6 AV	54.0	-3.4	1.91 V	234	53.79	-3.19
3	*2412.00	113.5 PK			1.82 V	334	116.63	-3.13
4	*2412.00	111.2 AV			1.82 V	334	114.33	-3.13
5	4824.00	45.3 PK	74.0	-28.7	1.91 V	232	39.33	5.97
6	4824.00	40.2 AV	54.0	-13.8	1.91 V	232	34.23	5.97

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	53.6 PK	74.0	-20.4	1.96 H	305	56.79	-3.19
2	2390.00	48.0 AV	54.0	-6.0	1.96 H	305	51.19	-3.19
3	*2437.00	117.6 PK			1.71 H	60	120.64	-3.04
4	*2437.00	115.7 AV			1.71 H	60	118.74	-3.04
5	2483.50	54.2 PK	74.0	-19.8	1.96 H	358	57.07	-2.87
6	2483.50	48.8 AV	54.0	-5.2	1.96 H	358	51.67	-2.87
7	4874.00	50.6 PK	74.0	-23.4	1.22 H	211	44.55	6.05
8	4874.00	48.2 AV	54.0	-5.8	1.22 H	211	42.15	6.05
9	7311.00	48.7 PK	74.0	-25.3	1.52 H	111	37.76	10.94
10	7311.00	43.2 AV	54.0	-10.8	1.52 H	111	32.26	10.94
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	50.1 PK	74.0	-23.9	1.86 V	323	53.29	-3.19
2	2390.00	44.1 AV	54.0	-9.9	1.86 V	323	47.29	-3.19
3	*2437.00	115.7 PK			1.88 V	333	118.74	-3.04
4	*2437.00	113.2 AV			1.88 V	333	116.24	-3.04
5	2483.50	51.1 PK	74.0	-22.9	1.88 V	333	53.97	-2.87
6	2483.50	45.2 AV	54.0	-8.8	1.88 V	333	48.07	-2.87
7	4874.00	45.1 PK	74.0	-28.9	1.94 V	237	39.05	6.05
8	4874.00	39.8 AV	54.0	-14.2	1.94 V	237	33.75	6.05
9	7311.00	52.0 PK	74.0	-22.0	1.79 V	286	41.06	10.94
10	7311.00	38.8 AV	54.0	-15.2	1.79 V	286	27.86	10.94

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	115.3 PK			1.62 H	33	118.24	-2.94
2	*2462.00	113.0 AV			1.62 H	33	115.94	-2.94
3	2483.50	56.6 PK	74.0	-17.4	1.62 H	288	59.47	-2.87
4	2483.50	53.2 AV	54.0	-0.8	1.62 H	288	56.07	-2.87
5	4924.00	50.7 PK	74.0	-23.3	1.17 H	217	44.63	6.07
6	4924.00	48.5 AV	54.0	-5.5	1.17 H	217	42.43	6.07
7	7386.00	48.9 PK	74.0	-25.1	1.55 H	111	37.48	11.42
8	7386.00	43.6 AV	54.0	-10.4	1.55 H	111	32.18	11.42
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	113.7 PK			1.79 V	349	116.64	-2.94
2	*2462.00	111.1 AV			1.79 V	349	114.04	-2.94
3	2483.50	54.2 PK	74.0	-19.8	1.93 V	242	57.07	-2.87
4	2483.50	50.2 AV	54.0	-3.8	1.93 V	242	53.07	-2.87
5	4924.00	45.3 PK	74.0	-28.7	1.88 V	218	39.23	6.07
6	4924.00	40.4 AV	54.0	-13.6	1.88 V	218	34.33	6.07
7	7386.00	52.1 PK	74.0	-21.9	1.79 V	301	40.68	11.42
8	7386.00	38.9 AV	54.0	-15.1	1.79 V	301	27.48	11.42

REMARKS:

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

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.6 PK	74.0	-9.4	1.85 H	324	67.79	-3.19
2	2390.00	53.7 AV	54.0	-0.3	1.85 H	324	56.89	-3.19
3	*2412.00	116.1 PK			1.59 H	38	119.23	-3.13
4	*2412.00	106.7 AV			1.59 H	38	109.83	-3.13
5	4824.00	47.0 PK	74.0	-27.0	1.00 H	202	41.03	5.97
6	4824.00	34.0 AV	54.0	-20.0	1.00 H	202	28.03	5.97
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	54.9 PK	74.0	-19.1	1.94 V	238	58.09	-3.19
2	2390.00	50.9 AV	54.0	-3.1	1.94 V	238	54.09	-3.19
3	*2412.00	112.8 PK			1.74 V	355	115.93	-3.13
4	*2412.00	103.2 AV			1.74 V	355	106.33	-3.13
5	4824.00	46.8 PK	74.0	-27.2	1.19 V	73	40.83	5.97
6	4824.00	33.9 AV	54.0	-20.1	1.19 V	73	27.93	5.97

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.9 PK	74.0	-8.1	1.78 H	305	69.09	-3.19
2	2390.00	53.1 AV	54.0	-0.9	1.78 H	305	56.29	-3.19
3	*2437.00	120.0 PK			1.73 H	287	123.04	-3.04
4	*2437.00	110.9 AV			1.73 H	287	113.94	-3.04
5	2483.50	68.0 PK	74.0	-6.0	1.62 H	324	70.87	-2.87
6	**2483.50**	**53.9 AV**	**54.0**	**-0.1**	**1.62 H**	**324**	**56.77**	**-2.87**
7	4874.00	47.6 PK	74.0	-26.4	1.00 H	190	41.55	6.05
8	4874.00	34.3 AV	54.0	-19.7	1.00 H	190	28.25	6.05
9	7311.00	52.3 PK	74.0	-21.7	1.17 H	95	41.36	10.94
10	7311.00	38.4 AV	54.0	-15.6	1.17 H	95	27.46	10.94
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	53.1 PK	74.0	-20.9	1.70 V	324	56.29	-3.19
2	2390.00	49.8 AV	54.0	-4.2	1.70 V	324	52.99	-3.19
3	*2437.00	116.5 PK			1.80 V	337	119.54	-3.04
4	*2437.00	107.3 AV			1.80 V	337	110.34	-3.04
5	2483.50	54.9 PK	74.0	-19.1	1.86 V	226	57.77	-2.87
6	2483.50	50.8 AV	54.0	-3.2	1.86 V	226	53.67	-2.87
7	4874.00	46.7 PK	74.0	-27.3	1.22 V	82	40.65	6.05
8	4874.00	33.5 AV	54.0	-20.5	1.22 V	82	27.45	6.05
9	7311.00	50.2 PK	74.0	-23.8	1.71 V	296	39.26	10.94
10	7311.00	37.0 AV	54.0	-17.0	1.71 V	296	26.06	10.94

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	114.5 PK			1.61 H	44	117.44	-2.94
2	*2462.00	104.5 AV			1.61 H	44	107.44	-2.94
3	2483.50	64.0 PK	74.0	-10.0	1.40 H	50	66.87	-2.87
4	2483.50	53.5 AV	54.0	-0.5	1.40 H	50	56.37	-2.87
5	4924.00	47.7 PK	74.0	-26.3	1.00 H	217	41.63	6.07
6	4924.00	34.4 AV	54.0	-19.6	1.00 H	217	28.33	6.07
7	7386.00	51.6 PK	74.0	-22.4	1.26 H	114	40.18	11.42
8	7386.00	38.0 AV	54.0	-16.0	1.26 H	114	26.58	11.42
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	111.2 PK			1.80 V	344	114.14	-2.94
2	*2462.00	101.1 AV			1.80 V	344	104.04	-2.94
3	2483.50	55.1 PK	74.0	-18.9	1.87 V	231	57.97	-2.87
4	2483.50	50.8 AV	54.0	-3.2	1.87 V	231	53.67	-2.87
5	4924.00	46.7 PK	74.0	-27.3	1.20 V	90	40.63	6.07
6	4924.00	33.5 AV	54.0	-20.5	1.20 V	90	27.43	6.07
7	7386.00	50.7 PK	74.0	-23.3	1.71 V	296	39.28	11.42
8	7386.00	37.1 AV	54.0	-16.9	1.71 V	296	25.68	11.42

REMARKS:

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.8 PK	74.0	-10.2	1.49 H	261	66.99	-3.19
2	2390.00	53.5 AV	54.0	-0.5	1.49 H	261	56.69	-3.19
3	*2412.00	114.7 PK			1.80 H	301	117.83	-3.13
4	*2412.00	103.0 AV			1.80 H	301	106.13	-3.13
5	4824.00	47.5 PK	74.0	-26.5	1.00 H	204	41.53	5.97
6	4824.00	33.9 AV	54.0	-20.1	1.00 H	204	27.93	5.97
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	54.4 PK	74.0	-19.6	1.86 V	239	57.59	-3.19
2	2390.00	50.1 AV	54.0	-3.9	1.86 V	239	53.29	-3.19
3	*2412.00	111.3 PK			1.81 V	340	114.43	-3.13
4	*2412.00	100.1 AV			1.81 V	340	103.23	-3.13
5	4824.00	47.3 PK	74.0	-26.7	1.26 V	75	41.33	5.97
6	4824.00	34.0 AV	54.0	-20.0	1.26 V	75	28.03	5.97

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.0 PK	74.0	-14.0	1.67 H	296	63.19	-3.19
2	2390.00	45.3 AV	54.0	-8.7	1.67 H	296	48.49	-3.19
3	*2437.00	121.1 PK			1.68 H	44	124.14	-3.04
4	*2437.00	109.8 AV			1.68 H	44	112.84	-3.04
5	2483.50	67.8 PK	74.0	-6.2	1.65 H	327	70.67	-2.87
6	2483.50	53.7 AV	54.0	-0.3	1.65 H	327	56.57	-2.87
7	4874.00	47.0 PK	74.0	-27.0	1.00 H	202	40.95	6.05
8	4874.00	33.9 AV	54.0	-20.1	1.00 H	202	27.85	6.05
9	7311.00	52.0 PK	74.0	-22.0	1.17 H	87	41.06	10.94
10	7311.00	38.2 AV	54.0	-15.8	1.17 H	87	27.26	10.94
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	57.4 PK	74.0	-16.6	1.71 V	331	60.59	-3.19
2	2390.00	43.1 AV	54.0	-10.9	1.71 V	331	46.29	-3.19
3	*2437.00	118.2 PK			1.77 V	343	121.24	-3.04
4	*2437.00	106.2 AV			1.77 V	343	109.24	-3.04
5	2483.50	54.6 PK	74.0	-19.4	1.89 V	249	57.47	-2.87
6	2483.50	50.2 AV	54.0	-3.8	1.89 V	249	53.07	-2.87
7	4874.00	47.3 PK	74.0	-26.7	1.19 V	68	41.25	6.05
8	4874.00	34.1 AV	54.0	-19.9	1.19 V	68	28.05	6.05
9	7311.00	50.9 PK	74.0	-23.1	1.64 V	297	39.96	10.94
10	7311.00	37.3 AV	54.0	-16.7	1.64 V	297	26.36	10.94

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	111.5 PK			1.79 H	296	114.44	-2.94
2	*2462.00	101.5 AV			1.79 H	296	104.44	-2.94
3	2483.50	67.9 PK	74.0	-6.1	1.79 H	291	70.77	-2.87
4	2483.50	53.8 AV	54.0	-0.2	1.79 H	291	56.67	-2.87
5	4924.00	47.4 PK	74.0	-26.6	1.02 H	219	41.33	6.07
6	4924.00	34.0 AV	54.0	-20.0	1.02 H	219	27.93	6.07
7	7386.00	52.4 PK	74.0	-21.6	1.15 H	85	40.98	11.42
8	7386.00	38.8 AV	54.0	-15.2	1.15 H	85	27.38	11.42
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	108.2 PK			1.82 V	360	111.14	-2.94
2	*2462.00	98.3 AV			1.82 V	360	101.24	-2.94
3	2483.50	54.4 PK	74.0	-19.6	1.94 V	244	57.27	-2.87
4	2483.50	50.2 AV	54.0	-3.8	1.94 V	244	53.07	-2.87
5	4924.00	47.3 PK	74.0	-26.7	1.18 V	78	41.23	6.07
6	4924.00	34.2 AV	54.0	-19.8	1.18 V	78	28.13	6.07
7	7386.00	49.6 PK	74.0	-24.4	1.65 V	296	38.18	11.42
8	7386.00	36.5 AV	54.0	-17.5	1.65 V	296	25.08	11.42

REMARKS:

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

802.11n (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.9 PK	74.0	-6.1	1.95 H	288	71.09	-3.19
2	2390.00	53.7 AV	54.0	-0.3	1.95 H	288	56.89	-3.19
3	*2422.00	110.6 PK			1.80 H	41	113.69	-3.09
4	*2422.00	98.8 AV			1.80 H	41	101.89	-3.09
5	4844.00	48.0 PK	74.0	-26.0	1.00 H	195	42.01	5.99
6	4844.00	34.6 AV	54.0	-19.4	1.00 H	195	28.61	5.99
7	7266.00	52.6 PK	74.0	-21.4	1.23 H	86	41.71	10.89
8	7266.00	38.8 AV	54.0	-15.2	1.23 H	86	27.91	10.89
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	55.4 PK	74.0	-18.6	1.92 V	239	58.59	-3.19
2	2390.00	51.0 AV	54.0	-3.0	1.92 V	239	54.19	-3.19
3	*2422.00	107.6 PK			1.76 V	360	110.69	-3.09
4	*2422.00	95.8 AV			1.76 V	360	98.89	-3.09
5	4844.00	47.7 PK	74.0	-26.3	1.18 V	72	41.71	5.99
6	4844.00	34.4 AV	54.0	-19.6	1.18 V	72	28.41	5.99
7	7266.00	50.5 PK	74.0	-23.5	1.60 V	295	39.61	10.89
8	7266.00	37.2 AV	54.0	-16.8	1.60 V	295	26.31	10.89

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.5 PK	74.0	-10.5	2.15 H	52	66.69	-3.19
2	2390.00	51.0 AV	54.0	-3.0	2.15 H	52	54.19	-3.19
3	*2437.00	111.4 PK			1.26 H	39	114.44	-3.04
4	*2437.00	99.2 AV			1.26 H	39	102.24	-3.04
5	2483.50	66.9 PK	74.0	-7.1	2.24 H	303	69.77	-2.87
6	2483.50	53.6 AV	54.0	-0.4	2.24 H	303	56.47	-2.87
7	4874.00	48.0 PK	74.0	-26.0	1.01 H	213	41.95	6.05
8	4874.00	34.6 AV	54.0	-19.4	1.01 H	213	28.55	6.05
9	7311.00	52.2 PK	74.0	-21.8	1.20 H	87	41.26	10.94
10	7311.00	38.5 AV	54.0	-15.5	1.20 H	87	27.56	10.94
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	52.1 PK	74.0	-21.9	1.95 V	226	55.29	-3.19
2	2390.00	47.8 AV	54.0	-6.2	1.95 V	226	50.99	-3.19
3	*2437.00	107.6 PK			1.75 V	360	110.64	-3.04
4	*2437.00	96.0 AV			1.75 V	360	99.04	-3.04
5	2483.50	54.8 PK	74.0	-19.2	1.94 V	249	57.67	-2.87
6	2483.50	50.7 AV	54.0	-3.3	1.94 V	249	53.57	-2.87
7	4874.00	47.5 PK	74.0	-26.5	1.26 V	87	41.45	6.05
8	4874.00	34.5 AV	54.0	-19.5	1.26 V	87	28.45	6.05
9	7311.00	50.1 PK	74.0	-23.9	1.60 V	279	39.16	10.94
10	7311.00	36.9 AV	54.0	-17.1	1.60 V	279	25.96	10.94

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	108.9 PK			1.57 H	294	111.88	-2.98
2	*2452.00	97.7 AV			1.57 H	294	100.68	-2.98
3	2483.50	68.1 PK	74.0	-5.9	1.40 H	45	70.97	-2.87
4	2483.50	53.8 AV	54.0	-0.2	1.40 H	45	56.67	-2.87
5	4904.00	47.3 PK	74.0	-26.7	1.03 H	202	41.22	6.08
6	4904.00	34.0 AV	54.0	-20.0	1.03 H	202	27.92	6.08
7	7356.00	51.7 PK	74.0	-22.3	1.27 H	105	40.48	11.22
8	7356.00	38.2 AV	54.0	-15.8	1.27 H	105	26.98	11.22
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	107.1 PK			1.83 V	334	110.08	-2.98
2	*2452.00	95.1 AV			1.83 V	334	98.08	-2.98
3	2483.50	54.5 PK	74.0	-19.5	1.96 V	233	57.37	-2.87
4	2483.50	50.5 AV	54.0	-3.5	1.96 V	233	53.37	-2.87
5	4904.00	47.3 PK	74.0	-26.7	1.24 V	70	41.22	6.08
6	4904.00	34.0 AV	54.0	-20.0	1.24 V	70	27.92	6.08
7	7356.00	50.2 PK	74.0	-23.8	1.60 V	287	38.98	11.22
8	7356.00	36.8 AV	54.0	-17.2	1.60 V	287	25.58	11.22

REMARKS:

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

Below 1GHz Data

802.11b

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	103.14	30.4 QP	43.5	-13.1	1.50 H	77	47.37	-17.01
2	147.32	31.5 QP	43.5	-12.1	2.00 H	56	44.45	-13.00
3	271.92	36.6 QP	46.0	-9.4	1.00 H	52	49.59	-13.01
4	600.02	32.3 QP	46.0	-13.7	1.50 H	24	36.59	-4.30
5	625.00	34.1 QP	46.0	-11.9	1.50 H	19	37.82	-3.74
6	749.98	30.1 QP	46.0	-15.9	1.00 H	360	31.32	-1.21
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	146.55	29.9 QP	43.5	-13.6	1.00 V	275	42.97	-13.05
2	245.34	33.4 QP	46.0	-12.6	2.00 V	109	47.54	-14.17
3	375.03	27.6 QP	46.0	-18.4	1.50 V	255	37.61	-9.97
4	625.00	35.0 QP	46.0	-11.0	1.00 V	48	38.74	-3.74
5	749.98	33.1 QP	46.0	-12.9	1.50 V	17	34.27	-1.21
6	875.02	33.4 QP	46.0	-12.6	1.50 V	360	33.14	0.24

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	100287	Apr. 17, 2015	Apr. 16, 2016
Line-Impedance Stabilization Network (for EUT) R&S	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable	5D-FB	COACAB-001	May 25, 2015	May 24, 2016
50 ohms Terminator	50	3	Oct. 17, 2014	Oct. 16, 2015
50 ohms Terminator	N/A	EMC-04	Oct. 21, 2014	Oct. 20, 2015
Software BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 11, 2015	June 10, 2016

Note:
1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. A.
3. The VCCI Con A Registration No. is C-817.
4. Tested Date: Aug. 24, 2015

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.

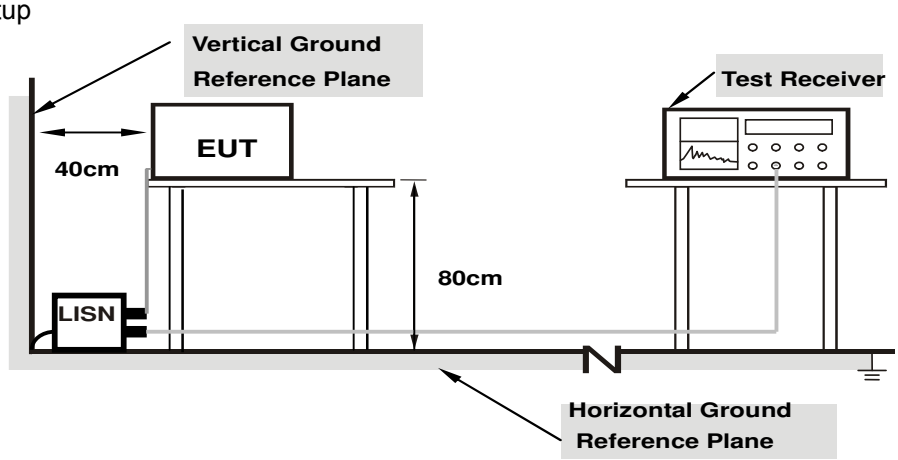
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

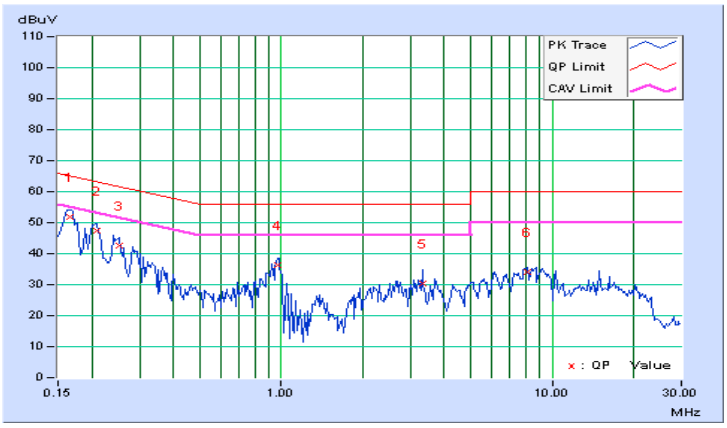
4.2.7 Test Results (Mode 1)

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

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	0.10	51.76	40.35	51.86	40.45	65.18	55.18	-13.32	-14.73
2	0.20859	0.10	47.19	33.47	47.29	33.57	63.26	53.26	-15.97	-19.69
3	0.25156	0.12	42.40	28.28	42.52	28.40	61.71	51.71	-19.19	-23.31
4	0.96681	0.23	36.09	35.52	36.32	35.75	56.00	46.00	-19.68	-10.25
5	3.31250	0.32	29.93	22.90	30.25	23.22	56.00	46.00	-25.75	-22.78
6	8.06641	0.48	33.53	28.64	34.01	29.12	60.00	50.00	-25.99	-20.88

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

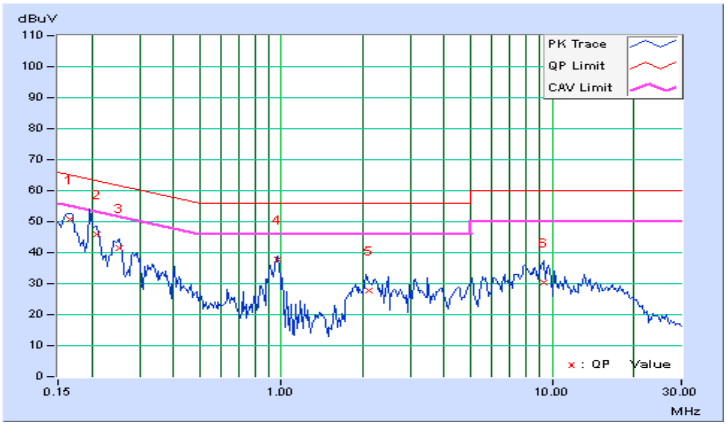


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16697	0.09	50.48	39.85	50.57	39.94	65.11	55.11	-14.54	-15.17
2	0.20938	0.10	46.01	33.37	46.11	33.47	63.23	53.23	-17.12	-19.76
3	0.25156	0.11	41.41	27.78	41.52	27.89	61.71	51.71	-20.18	-23.81
4	0.96641	0.21	37.62	37.56	37.83	37.77	56.00	46.00	-18.17	-8.23
5	2.10141	0.26	27.63	25.16	27.89	25.42	56.00	46.00	-28.11	-20.58
6	9.30859	0.49	29.74	23.51	30.23	24.00	60.00	50.00	-29.77	-26.00

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



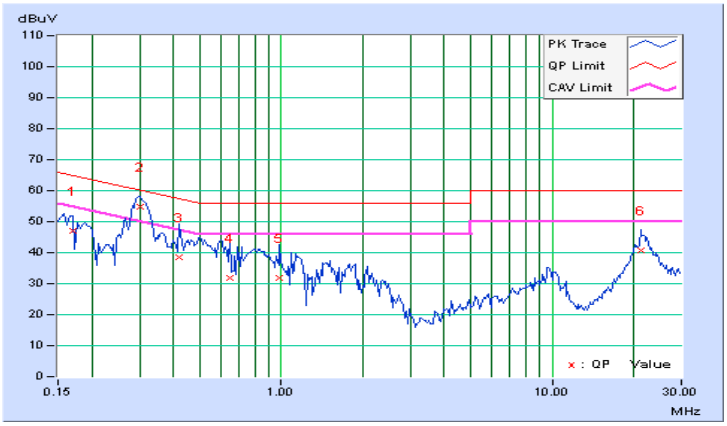
4.2.8 Test Results (Mode 2)

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

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.10	47.11	33.27	47.21	33.37	64.98	54.98	-17.78	-21.62
2	0.30234	0.13	54.58	40.09	54.71	40.22	60.18	50.18	-5.47	-9.96
3	0.41953	0.16	38.32	27.69	38.48	27.85	57.46	47.46	-18.98	-19.61
4	0.65000	0.19	31.62	22.44	31.81	22.63	56.00	46.00	-24.19	-23.37
5	0.98594	0.23	31.52	21.28	31.75	21.51	56.00	46.00	-24.25	-24.49
6	21.25391	0.79	39.94	34.71	40.73	35.50	60.00	50.00	-19.27	-14.50

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

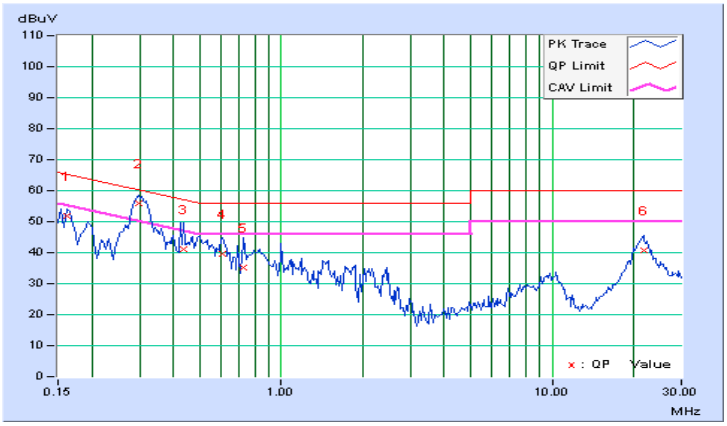


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.09	51.72	40.27	51.81	40.36	65.38	55.38	-13.57	-15.02
2	**0.29844**	**0.12**	**55.71**	**45.74**	**55.83**	**45.86**	**60.29**	**50.29**	**-4.45**	**-4.42**
3	0.43516	0.15	40.86	30.75	41.01	30.90	57.15	47.15	-16.14	-16.25
4	0.60313	0.17	39.39	28.55	39.56	28.72	56.00	46.00	-16.44	-17.28
5	0.72813	0.18	35.04	26.13	35.22	26.31	56.00	46.00	-20.78	-19.69
6	21.76953	0.79	39.80	34.53	40.59	35.32	60.00	50.00	-19.41	-14.68

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

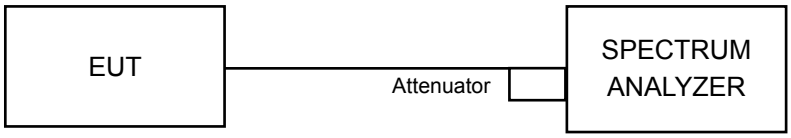


4.3 6dB Bandwidth Measurement

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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP40	100036	Jan. 22, 2015	Jan. 21, 2016

Note:

NOTE: 1. The test was performed in Oven room 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: Nov. 04, 2015

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
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	8.58	7.63	9.15	8.13	0.5	Pass
6	2437	9.57	9.10	9.12	8.66	0.5	Pass
11	2462	8.15	8.15	7.12	8.60	0.5	Pass

802.11g

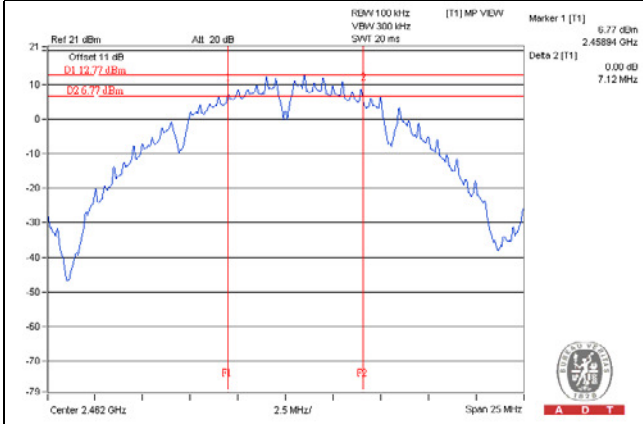
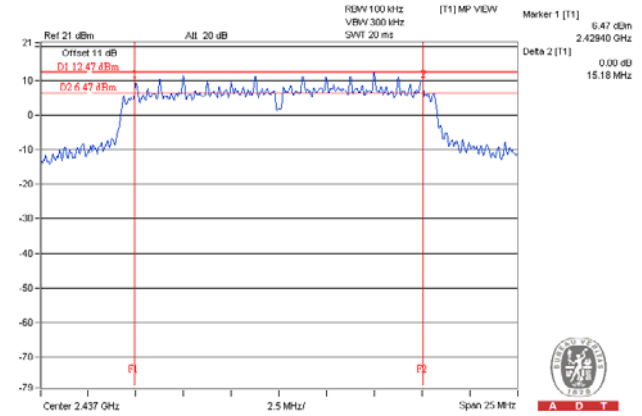
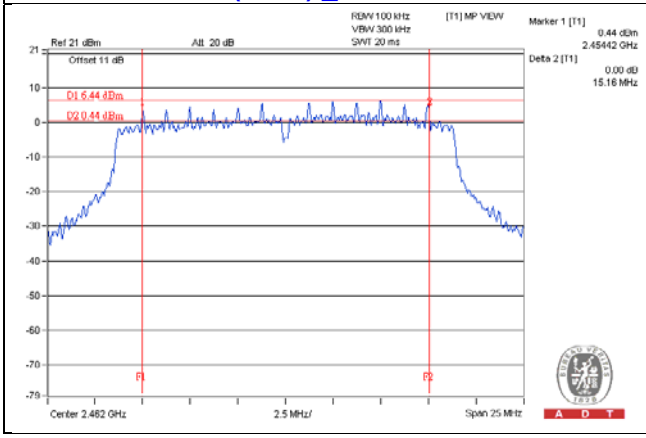
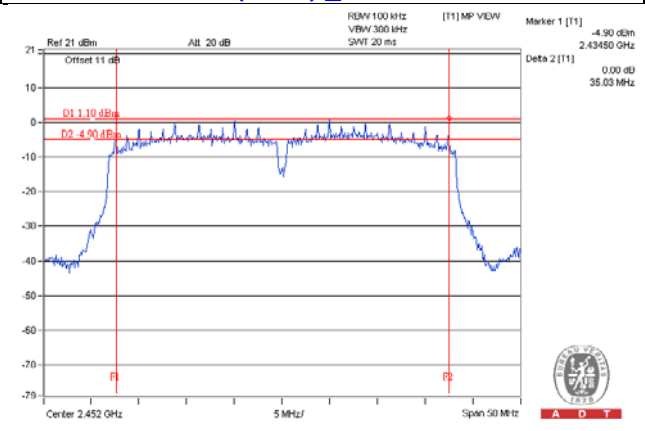
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	16.06	16.06	15.47	15.94	0.5	Pass
6	2437	16.34	15.79	15.18	15.97	0.5	Pass
11	2462	16.09	16.37	15.20	16.37	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	16.84	17.59	16.57	16.98	0.5	Pass
6	2437	17.23	17.57	17.21	16.92	0.5	Pass
11	2462	16.62	17.31	15.16	16.63	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
3	2422	35.23	35.26	35.22	35.17	0.5	Pass
6	2437	35.24	35.24	35.16	35.11	0.5	Pass
9	2452	35.20	35.16	35.13	35.03	0.5	Pass

Spectrum Plot of Worst Value	
802.11b_Chain 2 / CH1	**802.11g_Chain 2 / CH6**
	
802.11n (HT20) _Chain 2 / CH11	**802.11n (HT40) _Chain 3 / CH9**
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

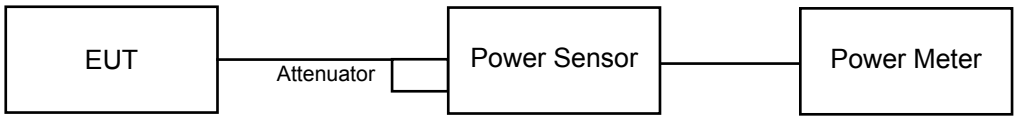
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;
Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT ≥ 5.

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

4.4.2 Test Setup



4.4.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	0824006	May 25, 2015	May 24, 2016
Power sensor Anritsu	MA2411B	0738172	May 25, 2015	May 24, 2016

Note:

NOTE: 1. The test was performed in Oven room 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: Nov. 04, 2015

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

802.11b

Chan.	Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	23.02	22.14	22.30	22.47	710.557	28.52	30	Pass
6	2437	24.02	23.95	23.78	23.70	973.865	29.88	30	Pass
11	2462	21.62	21.45	21.56	21.43	567.062	27.54	30	Pass

802.11g

Chan.	Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	18.78	18.24	18.28	18.21	275.71	24.40	30	Pass
6	2437	23.47	23.03	23.61	22.99	851.922	29.30	30	Pass
11	2462	16.92	16.17	16.87	16.13	180.265	22.56	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	18.14	17.61	17.54	17.49	235.699	23.72	30	Pass
6	2437	23.37	22.75	23.22	22.69	801.309	29.04	30	Pass
11	2462	16.53	15.99	16.82	15.98	172.409	22.37	30	Pass

802.11n (HT40)

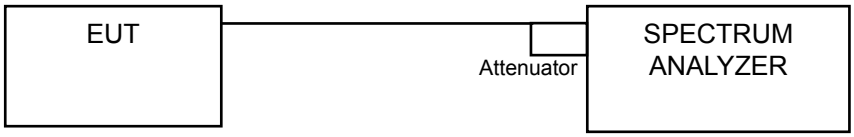
Chan.	Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	15.99	15.32	15.73	15.14	143.83	21.58	30	Pass
6	2437	17.34	16.92	17.53	16.70	206.802	23.16	30	Pass
9	2452	14.78	14.52	14.87	14.14	115.007	20.61	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP40	100036	Jan. 22, 2015	Jan. 21, 2016

Note:

NOTE:
1. The test was performed in Oven room 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: Nov. 04, 2015

4.5.4 Test Procedure

For 802.11b/g/n(HT20)

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

For 802.11n(HT40)

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=4) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-5.91	6.02	0.11	4.98	Pass
	6	2437	-5.47	6.02	0.55	4.98	Pass
	11	2462	-6.39	6.02	-0.37	4.98	Pass
1	1	2412	-6.25	6.02	-0.23	4.98	Pass
	6	2437	-5.19	6.02	0.83	4.98	Pass
	11	2462	-6.31	6.02	-0.29	4.98	Pass
2	1	2412	-5.55	6.02	0.47	4.98	Pass
	6	2437	-4.40	6.02	1.62	4.98	Pass
	11	2462	-6.54	6.02	-0.52	4.98	Pass
3	1	2412	-5.27	6.02	0.75	4.98	Pass
	6	2437	-4.67	6.02	1.35	4.98	Pass
	11	2462	-7.33	6.02	-1.31	4.98	Pass

NOTE: Directional gain = 3dBi + 10log(4) = 9.02dBi > 6dBi , so the power density limit shall be reduced to 8-(9.02-6) = 4.98dBm.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=4) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-12.57	6.02	-6.39	4.98	Pass
	6	2437	-7.29	6.02	-1.11	4.98	Pass
	11	2462	-14.20	6.02	-8.02	4.98	Pass
1	1	2412	-12.05	6.02	-5.87	4.98	Pass
	6	2437	-7.88	6.02	-1.70	4.98	Pass
	11	2462	-14.27	6.02	-8.09	4.98	Pass
2	1	2412	-11.57	6.02	-5.39	4.98	Pass
	6	2437	-7.96	6.02	-1.78	4.98	Pass
	11	2462	-12.99	6.02	-6.81	4.98	Pass
3	1	2412	-12.62	6.02	-6.44	4.98	Pass
	6	2437	-8.67	6.02	-2.49	4.98	Pass
	11	2462	-13.90	6.02	-7.72	4.98	Pass

NOTE: Directional gain = 3dBi + 10log(4) = 9.02dBi > 6dBi , so the power density limit shall be reduced to 8-(9.02-6) = 4.98dBm.

802.11n (HT20)

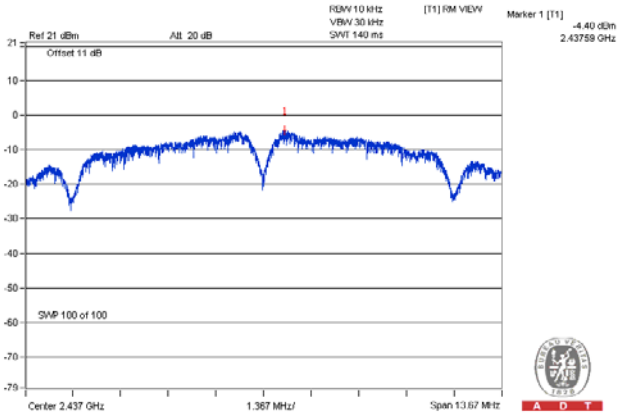
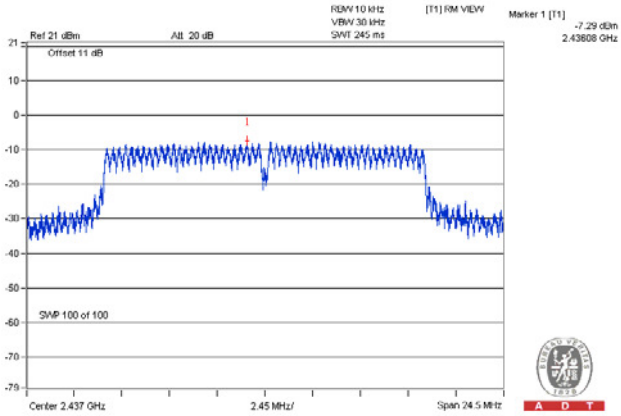
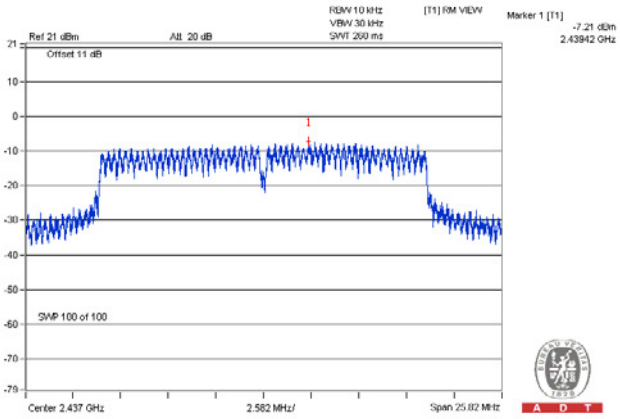
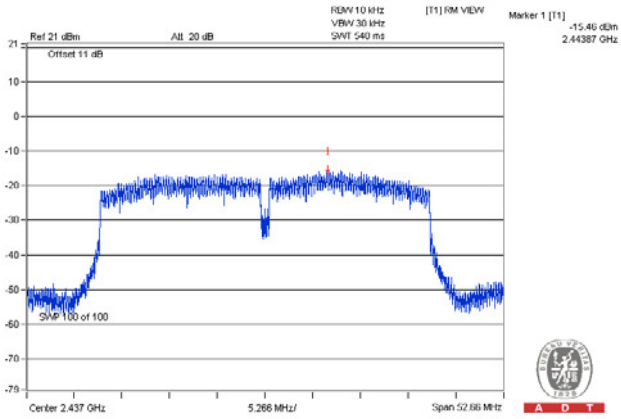
TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=4) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-12.42	6.02	-6.40	4.98	Pass
	6	2437	-7.51	6.02	-1.49	4.98	Pass
	11	2462	-14.19	6.02	-8.17	4.98	Pass
1	1	2412	-12.71	6.02	-6.69	4.98	Pass
	6	2437	-7.87	6.02	-1.85	4.98	Pass
	11	2462	-14.45	6.02	-8.43	4.98	Pass
2	1	2412	-11.65	6.02	-5.63	4.98	Pass
	6	2437	-7.21	6.02	-1.19	4.98	Pass
	11	2462	-12.86	6.02	-6.84	4.98	Pass
3	1	2412	-12.80	6.02	-6.78	4.98	Pass
	6	2437	-7.89	6.02	-1.87	4.98	Pass
	11	2462	-13.62	6.02	-7.60	4.98	Pass

NOTE: Directional gain = 3dBi + 10log(4) = 9.02dBi > 6dBi , so the power density limit shall be reduced to 8-(9.02-6) = 4.98dBm.

802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor(dBm)	10 log (N=4) dB	Duty Factor (dB)	TOTAL PSDWith Duty Factor (dBm)	Limit (dBm)	Pass /Fail
0	3	2422	-18.06	6.02	0.18	-11.86	4.98	Pass
	6	2437	-16.23	6.02	0.18	-10.03	4.98	Pass
	9	2452	-18.64	6.02	0.18	-12.44	4.98	Pass
1	3	2422	-17.23	6.02	0.18	-11.03	4.98	Pass
	6	2437	-15.56	6.02	0.18	-9.36	4.98	Pass
	9	2452	-18.38	6.02	0.18	-12.18	4.98	Pass
2	3	2422	-17.46	6.02	0.18	-11.26	4.98	Pass
	6	2437	-15.70	6.02	0.18	-9.50	4.98	Pass
	9	2452	-17.89	6.02	0.18	-11.69	4.98	Pass
3	3	2422	-17.15	6.02	0.18	-10.95	4.98	Pass
	6	2437	-15.46	6.02	0.18	-9.26	4.98	Pass
	9	2452	-18.30	6.02	0.18	-12.10	4.98	Pass

NOTE: Directional gain = 3dBi + 10log(4) = 9.02dBi > 6dBi , so the power density limit shall be reduced to 8-(9.02-6) = 4.98dBm.

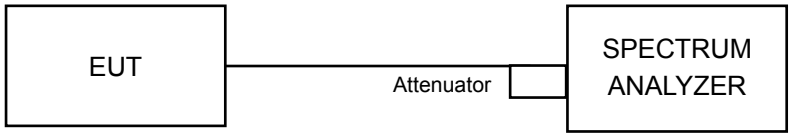
Spectrum Plot of Worst Value	
802.11b_Chain 2 / CH6	**802.11g_Chain 0 / CH6**
	
802.11n (HT20) _Chain 2 / CH6	**802.11n (HT40) _Chain 3 / CH6**
	

4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP40	100036	Jan. 22, 2015	Jan. 21, 2016

Note:

NOTE: 1. The test was performed in Oven room 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: Nov. 04, 2015

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 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 OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 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.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

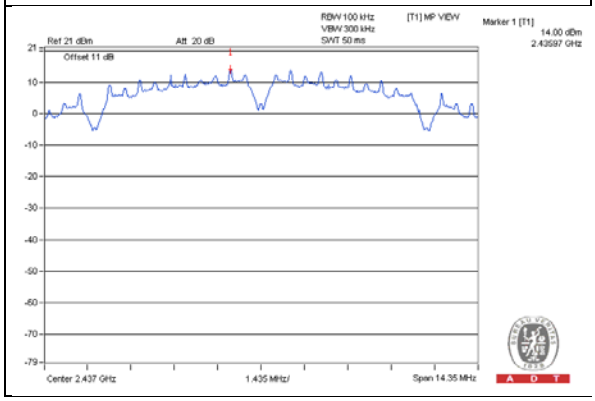
Same as Item 4.3.6

4.6.7 Test Results

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

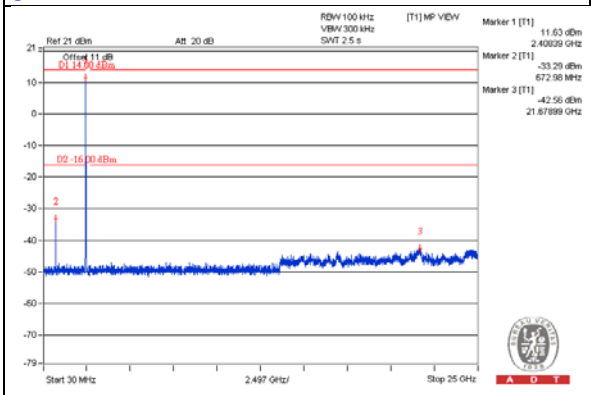
802.11b

Maximum REF

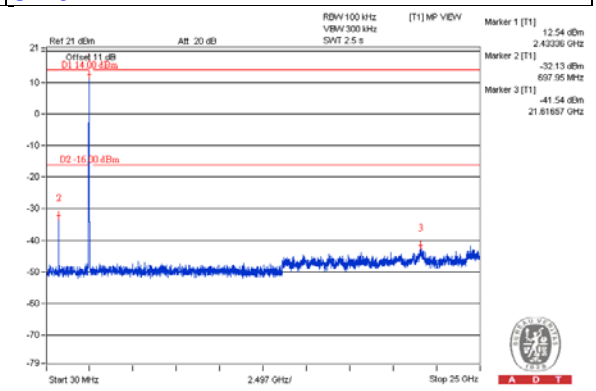


Chain 0

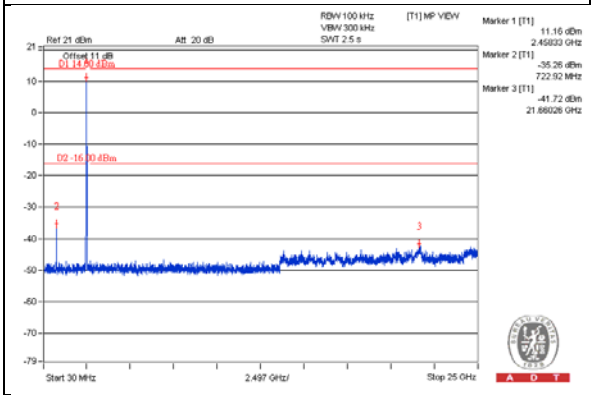
CH 1



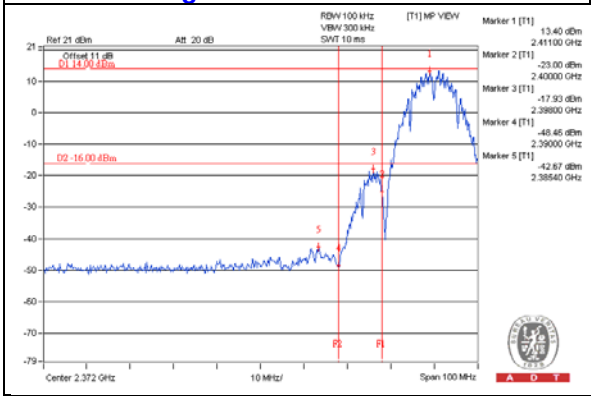
CH 6



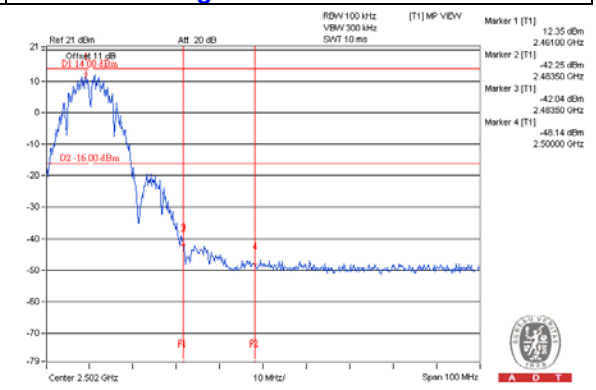
CH 11



CH 1 Band edge

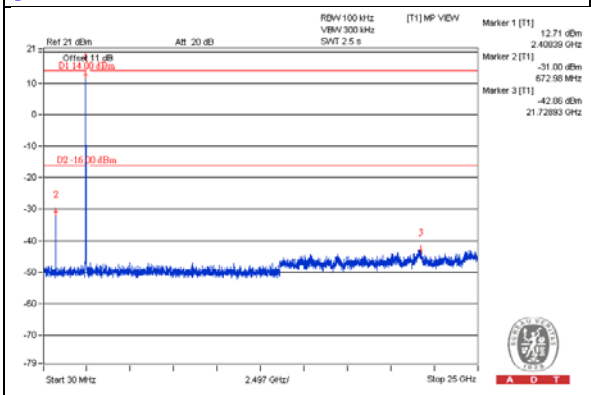


CH 11 Band edge

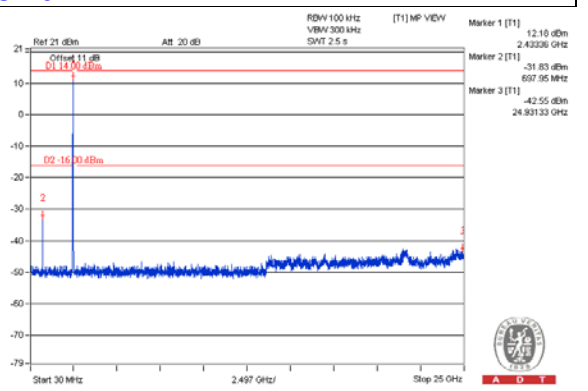


Chain 1

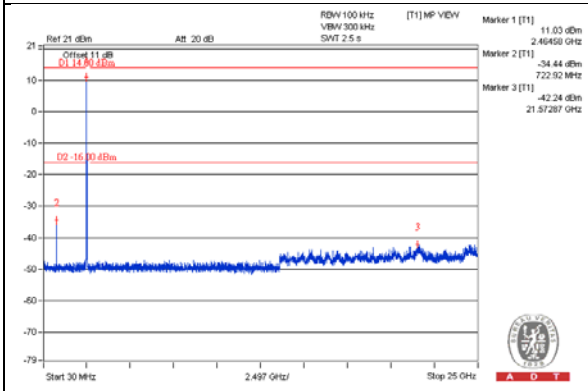
CH 1



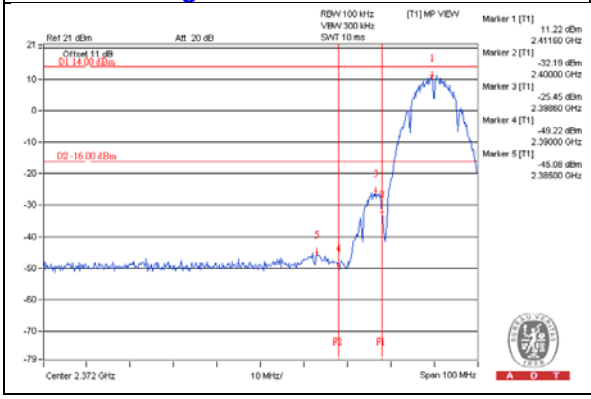
CH 6



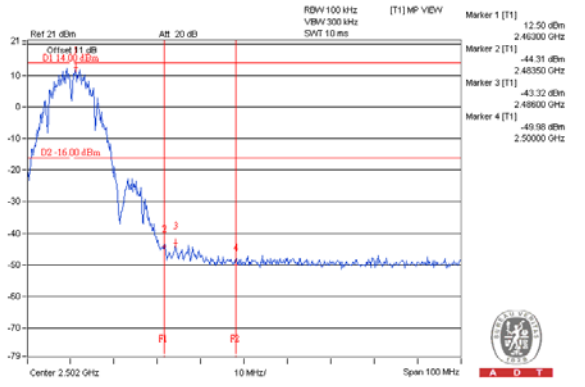
CH 11



CH 1 Band edge

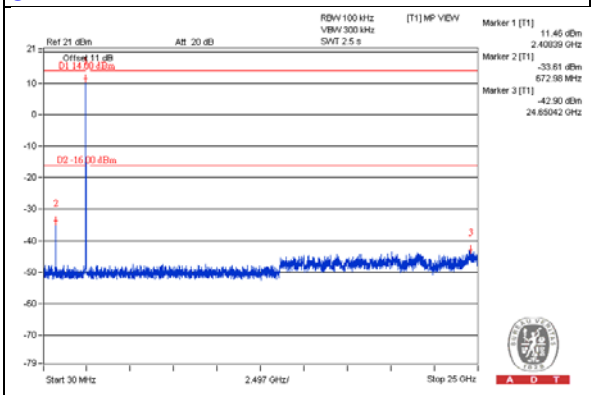


CH 11 Band edge

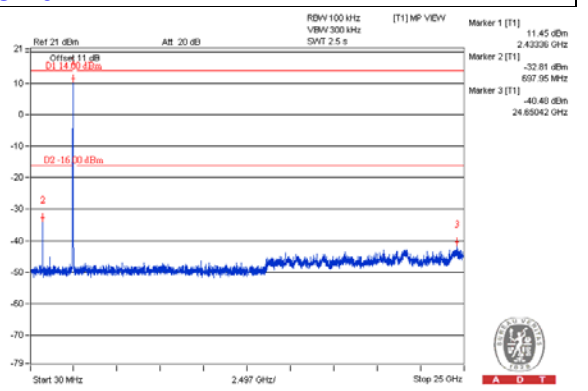


Chain 2

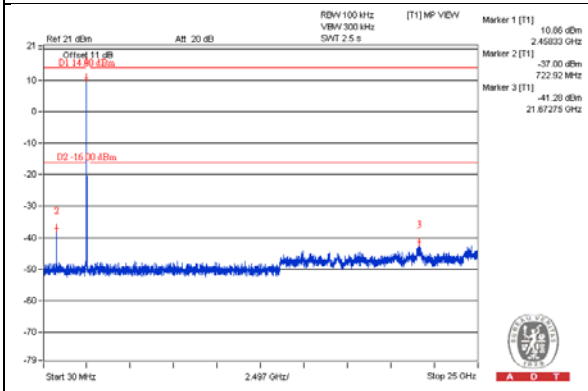
CH 1



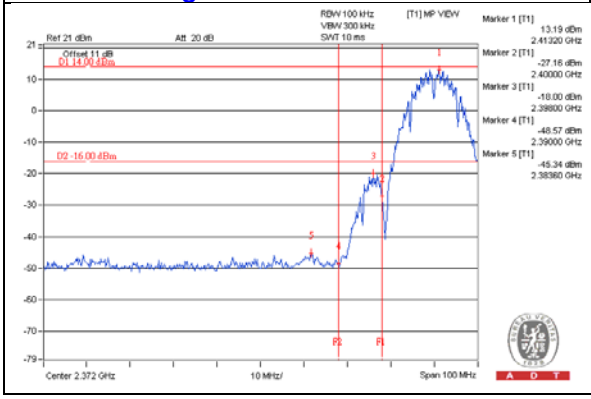
CH 6



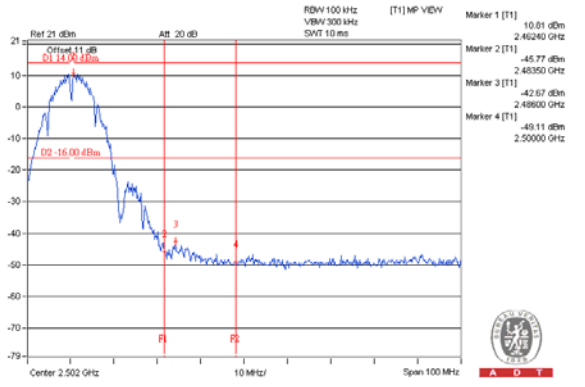
CH 11



CH 1 Band edge

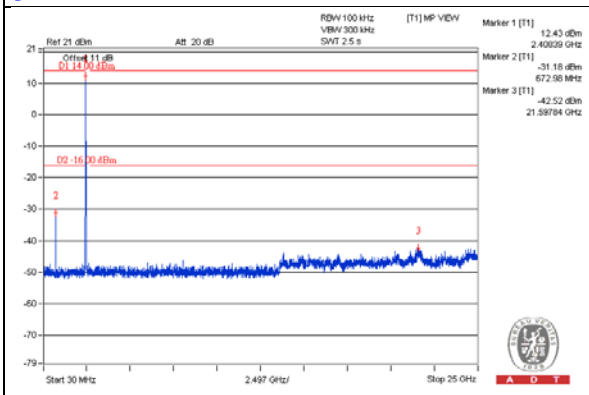


CH 11 Band edge

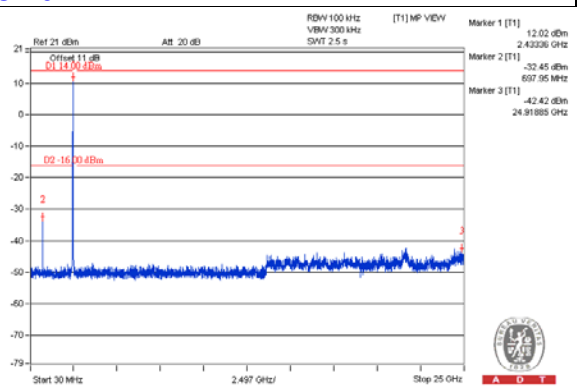


Chain 3

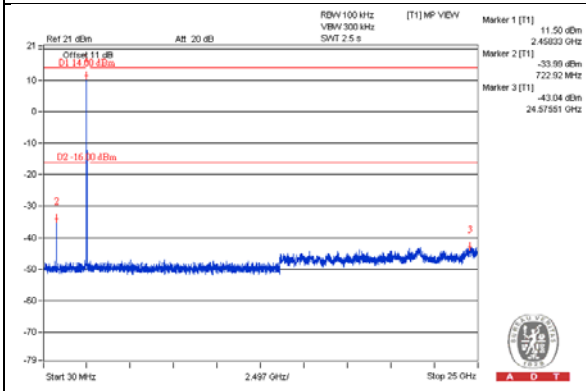
CH 1



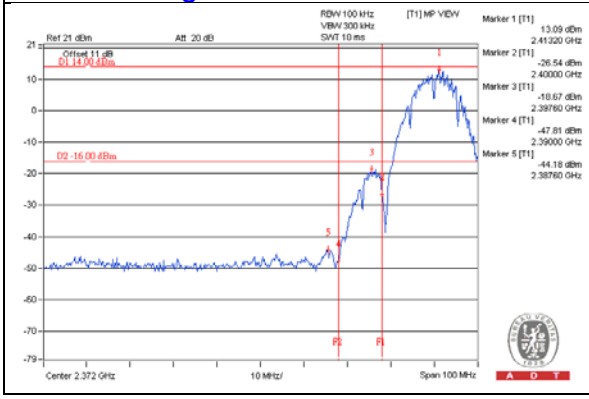
CH 6



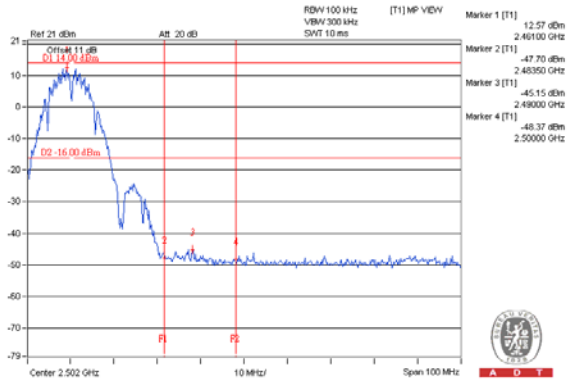
CH 11



CH 1 Band edge



CH 11 Band edge



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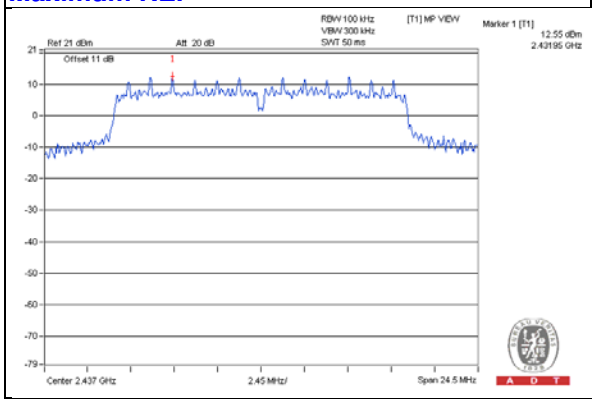
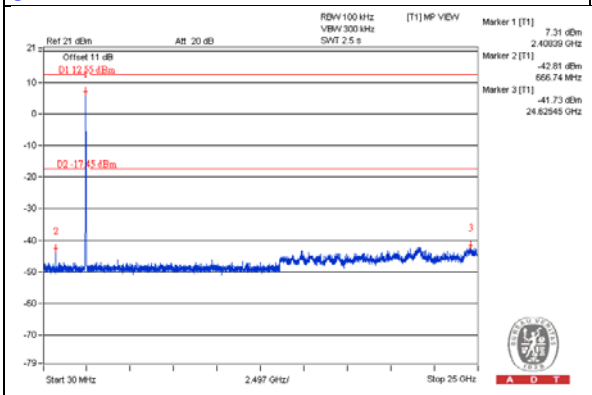
Maximum REF

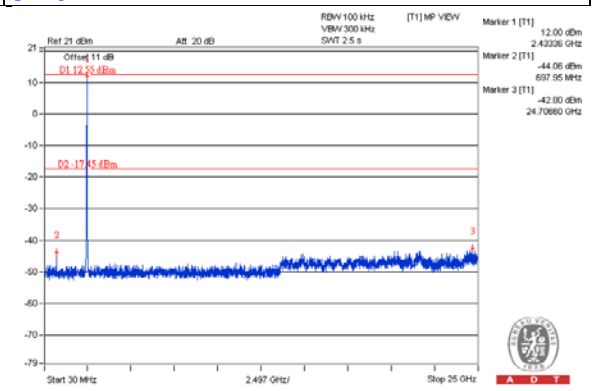


Chain 0

CH 1



CH 6



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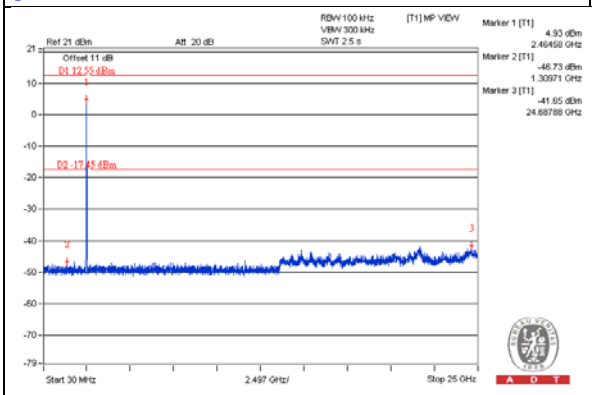
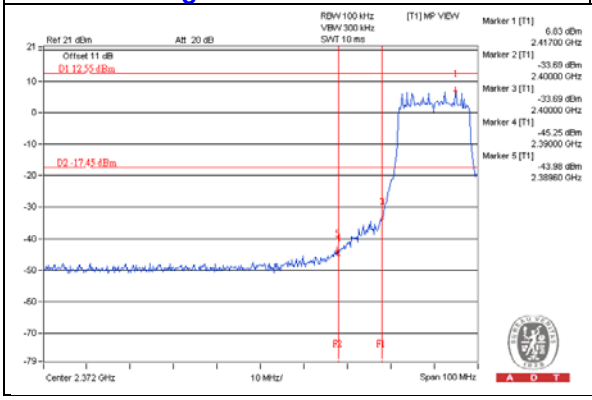
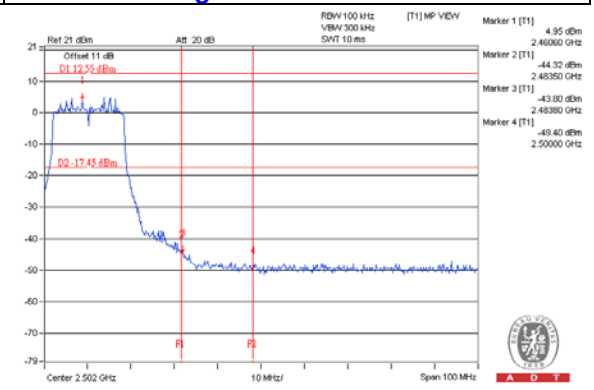


CH 1 Band edge

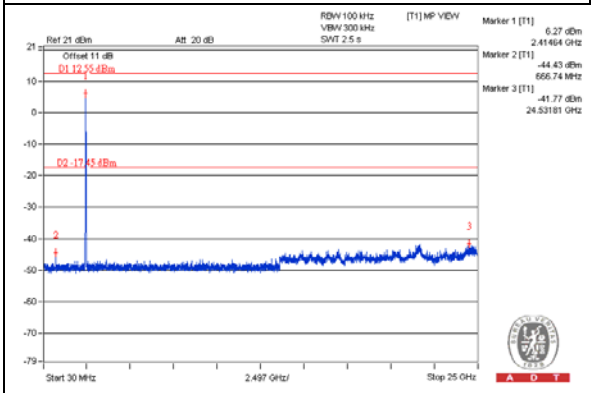


CH 11 Band edge



Chain 1

CH 1



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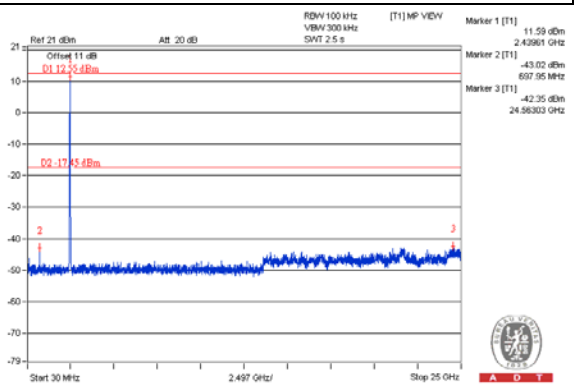

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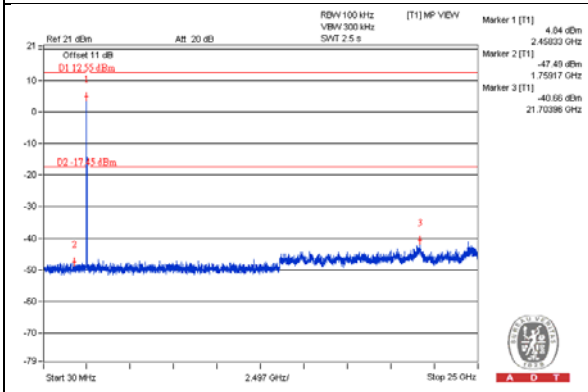
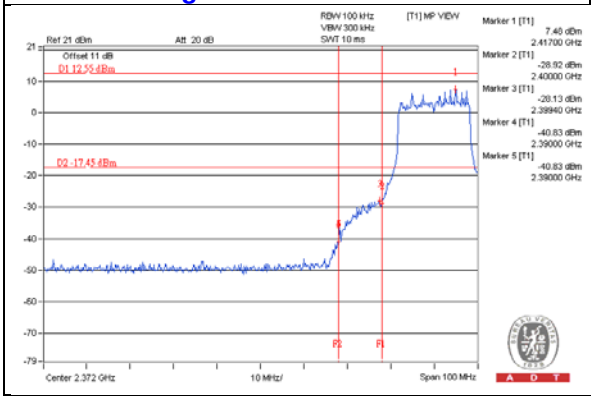


CH 1 Band edge



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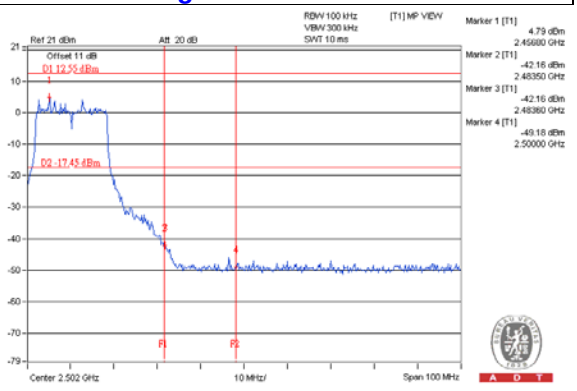
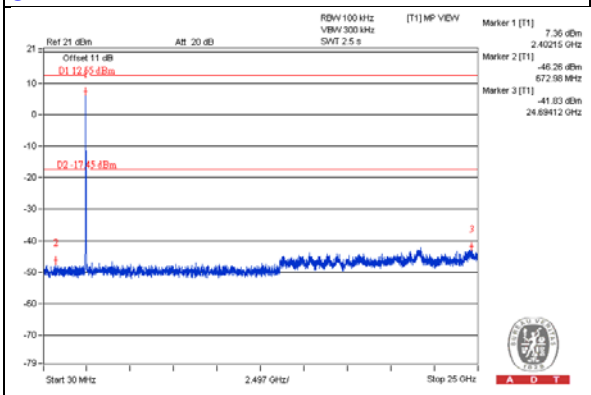
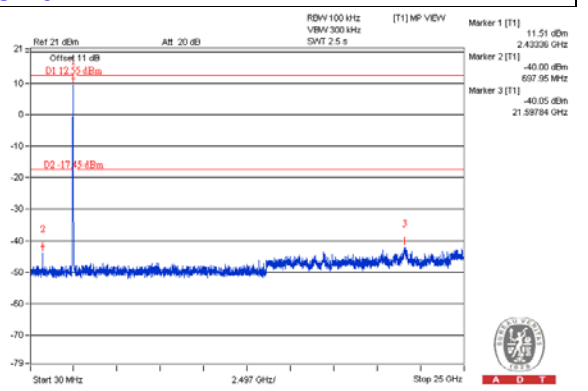


Chain 2

CH 1



CH 6



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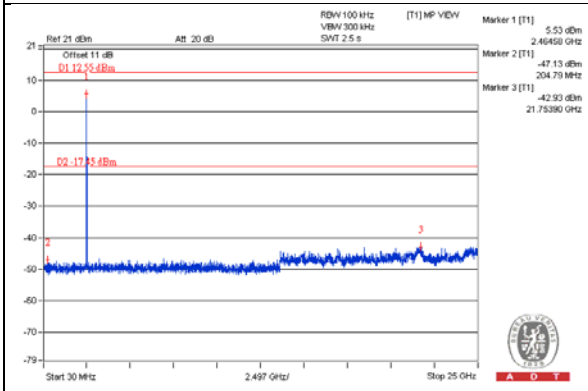
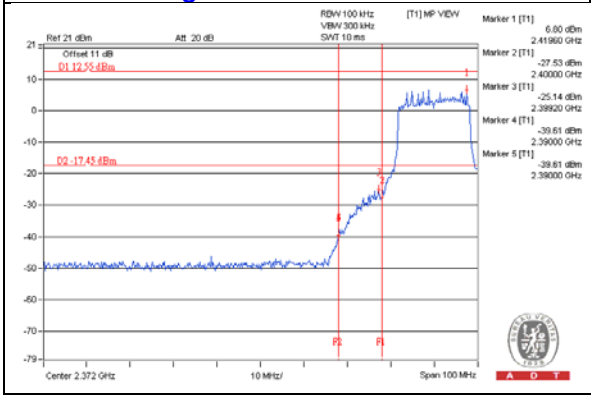
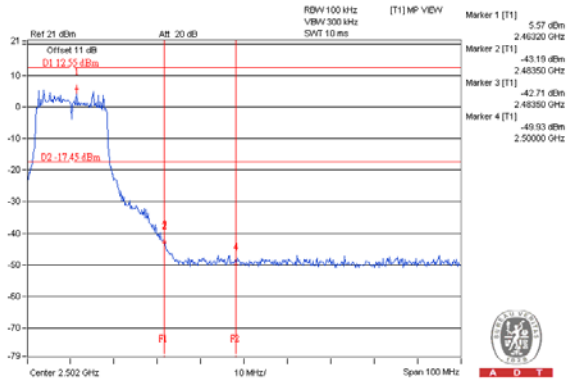


CH 1 Band edge

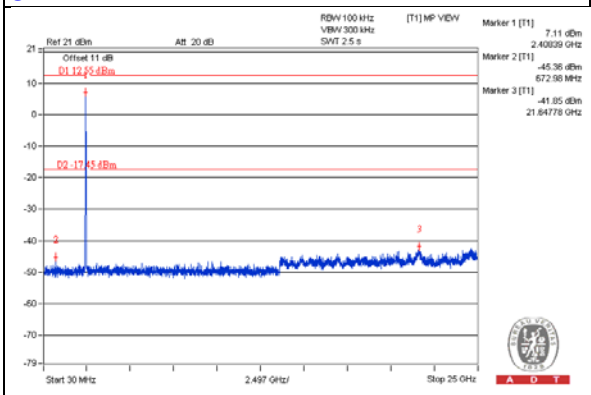


CH 11 Band edge

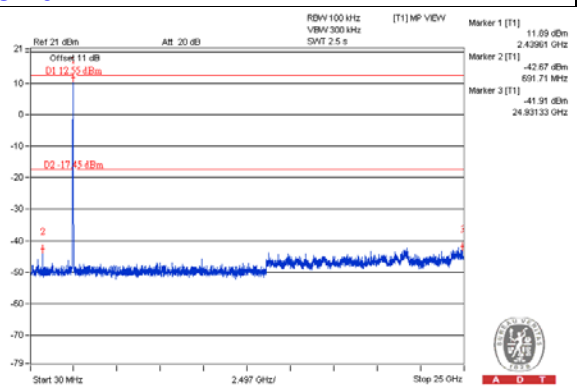


Chain 3

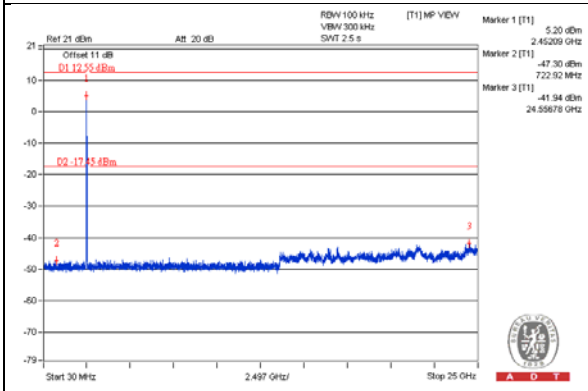
CH 1



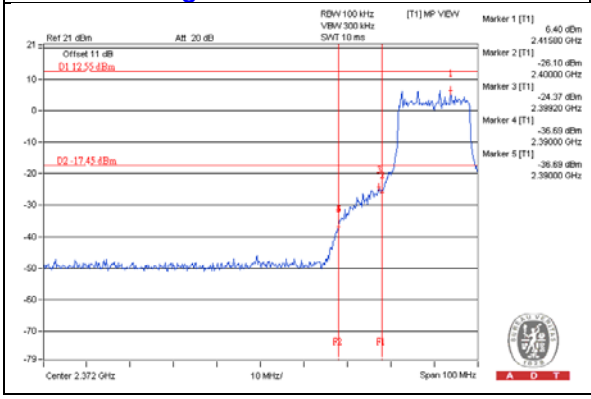
CH 6



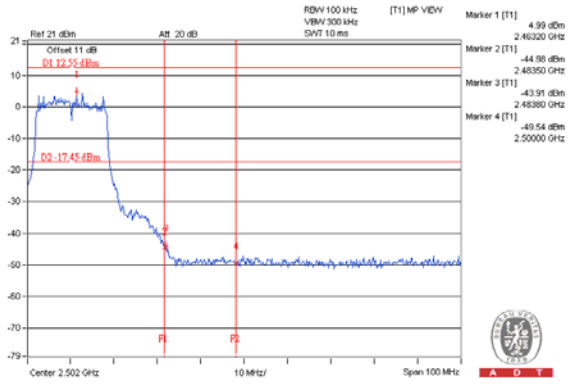
CH 11



CH 1 Band edge



CH 11 Band edge



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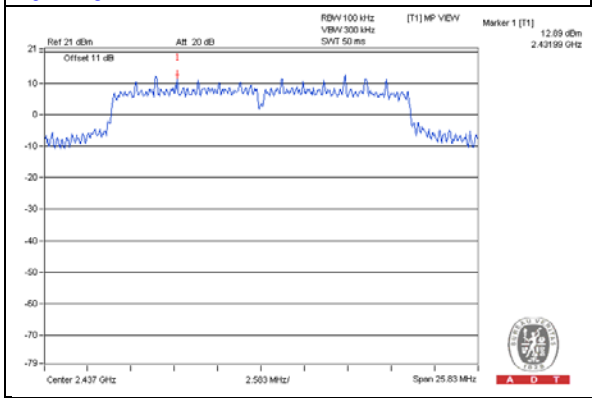
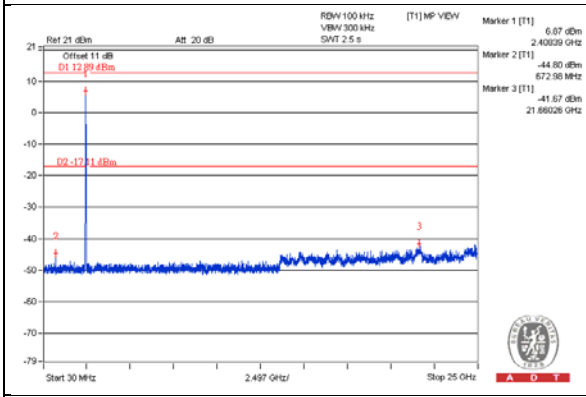
Maximum REF

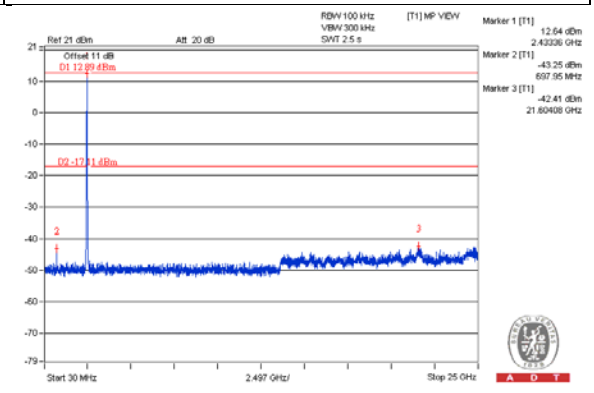


Chain 0

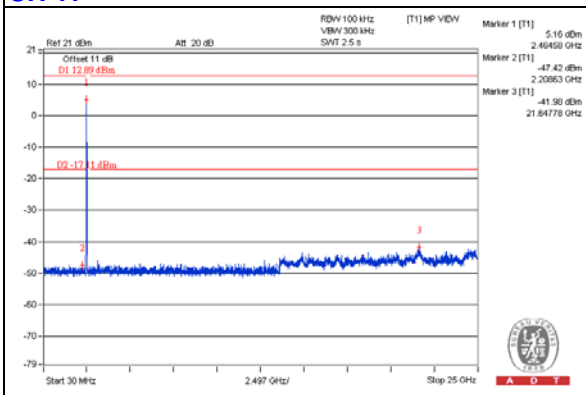
CH 1



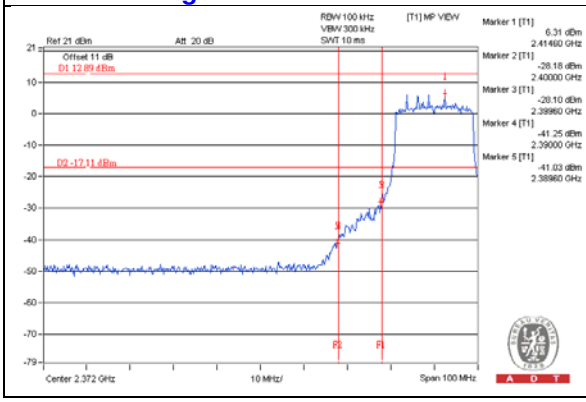
CH 6



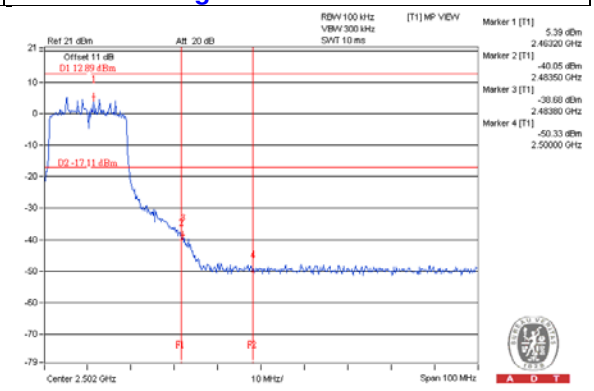
CH 11



CH 1 Band edge

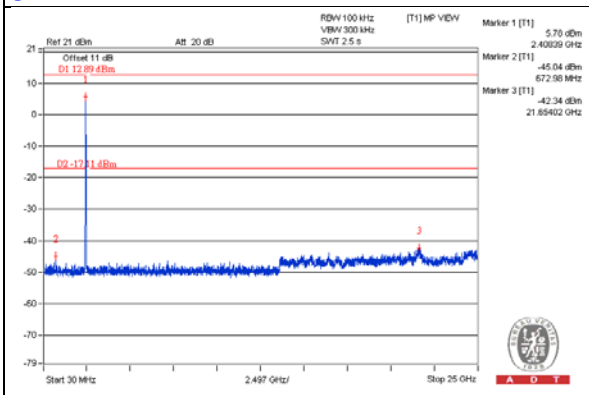


CH 11 Band edge

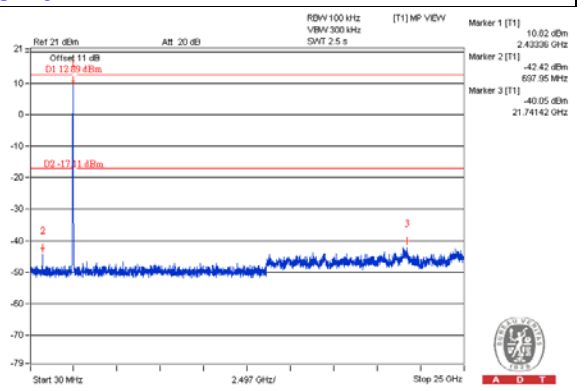


Chain 1

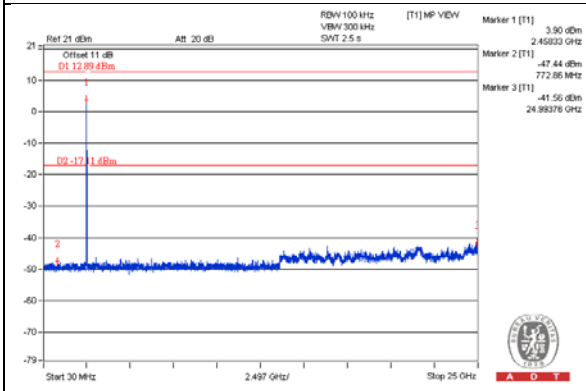
CH 1



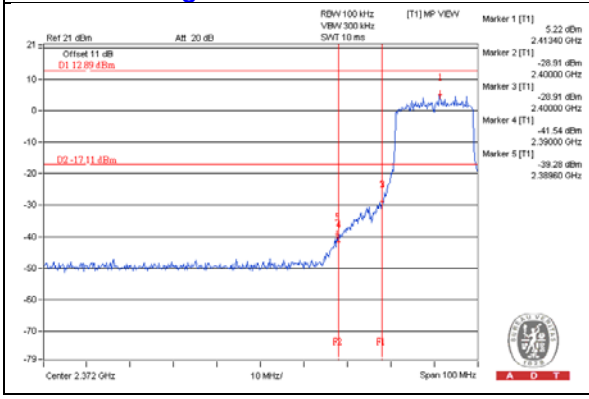
CH 6



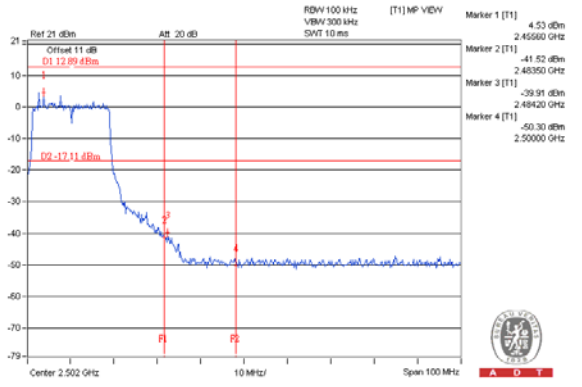
CH 11



CH 1 Band edge

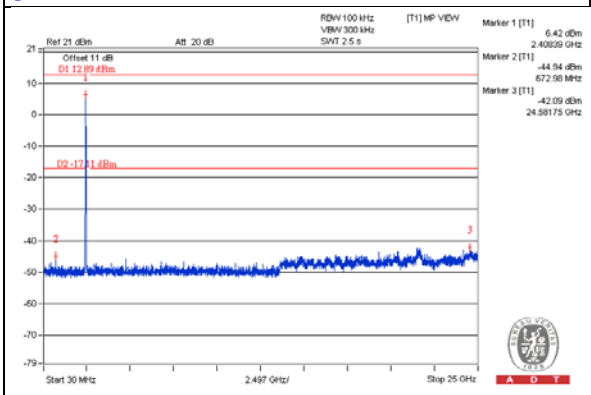


CH 11 Band edge

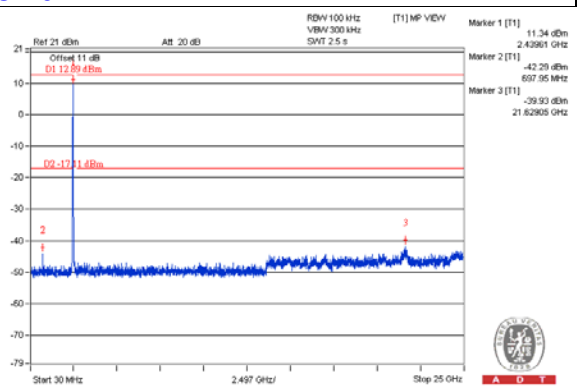


Chain 2

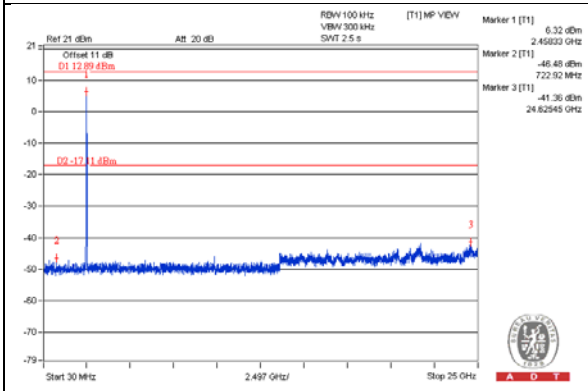
CH 1



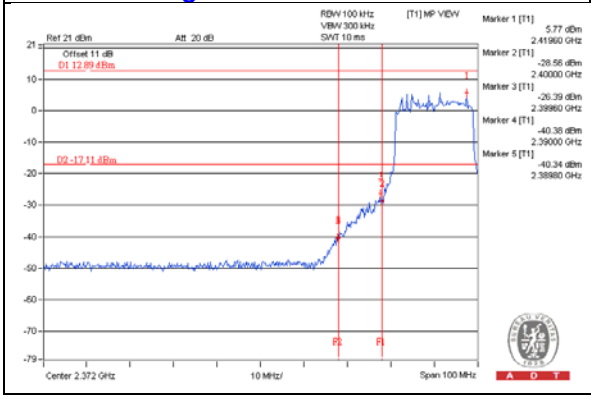
CH 6



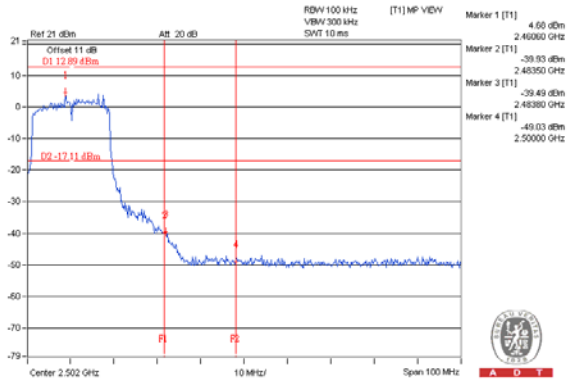
CH 11



CH 1 Band edge

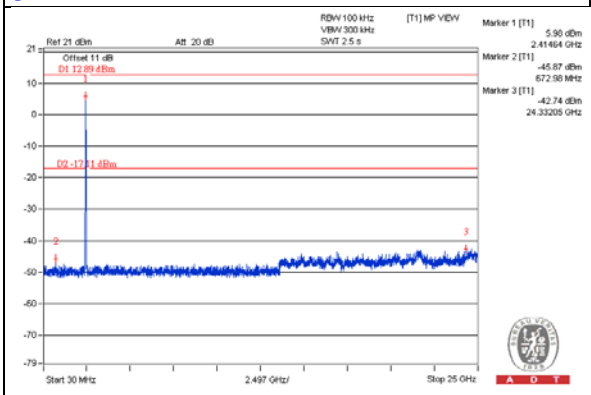


CH 11 Band edge

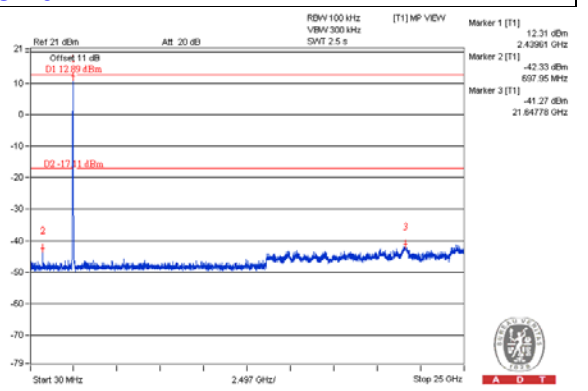


Chain 3

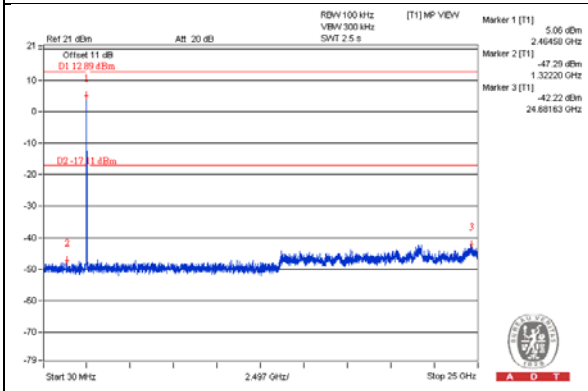
CH 1



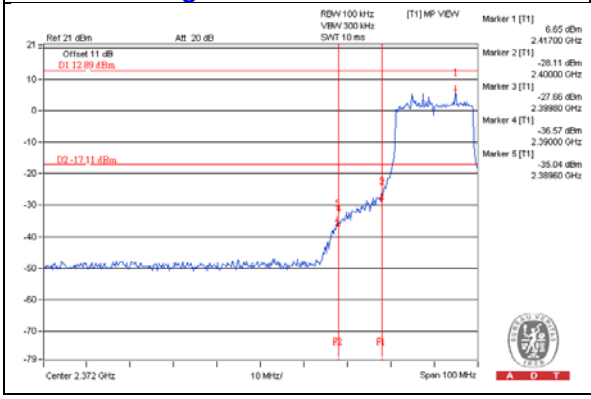
CH 6



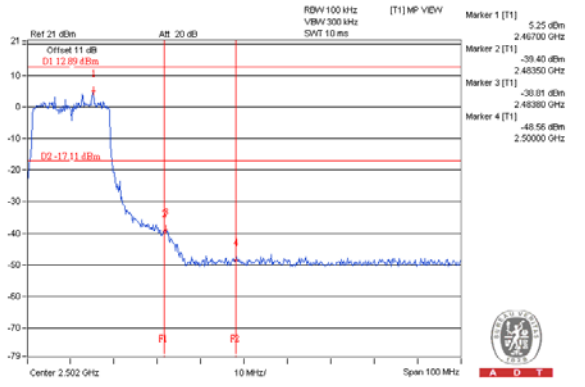
CH 11



CH 1 Band edge

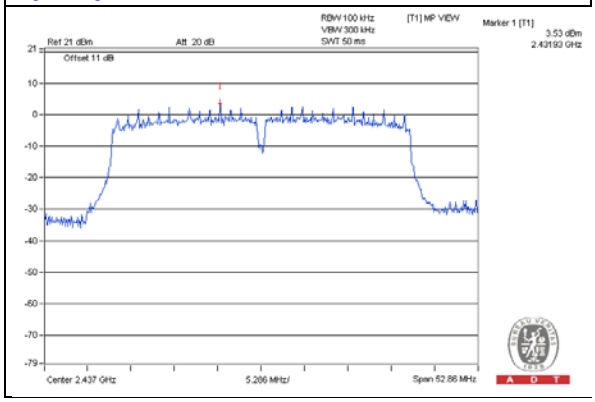


CH 11 Band edge



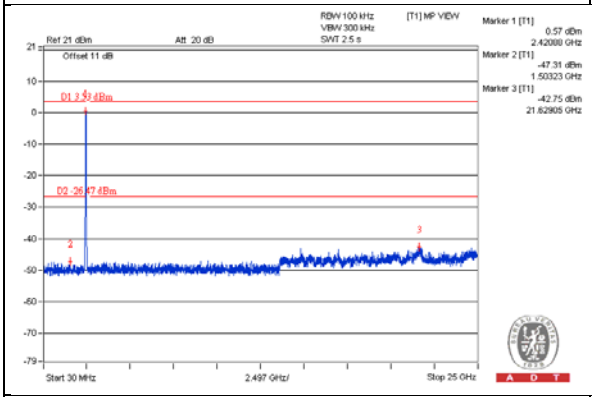
802.11n(HT40)

Maximum REF

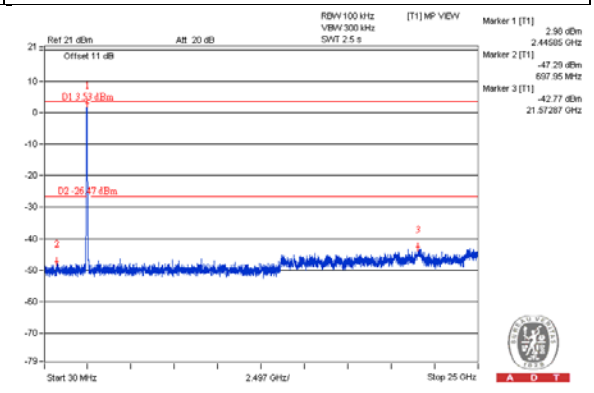


Chain 0

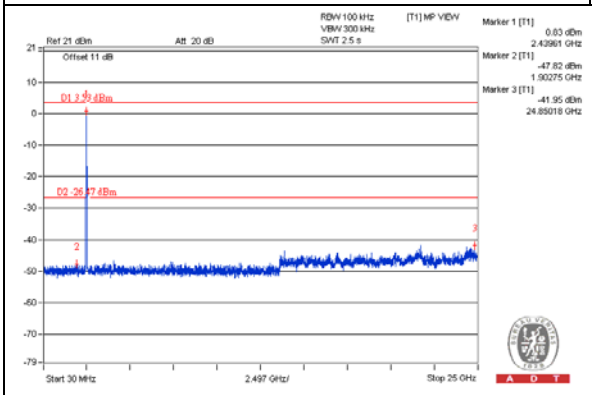
CH 3



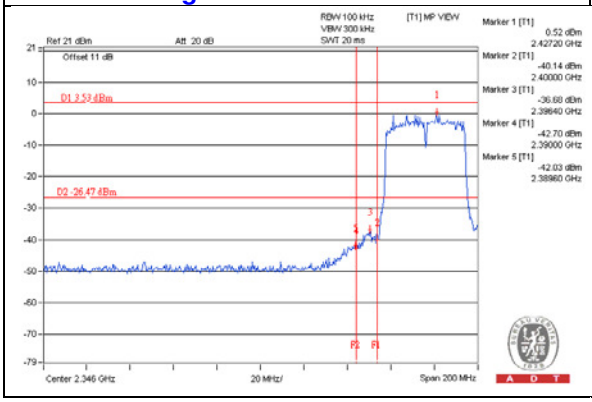
CH 6



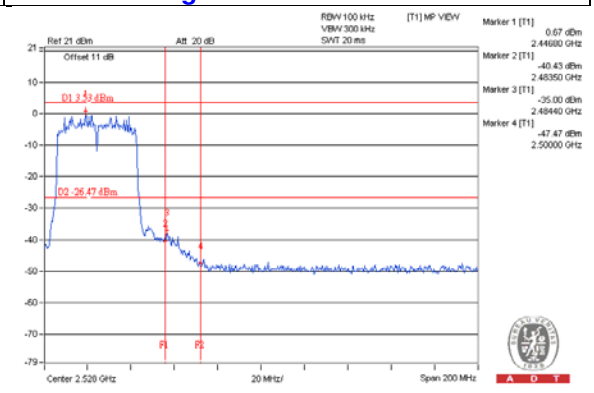
CH 9



CH 3 Band edge

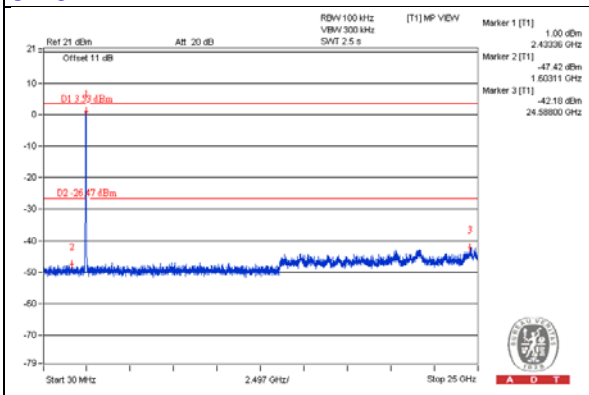


CH 9 Band edge

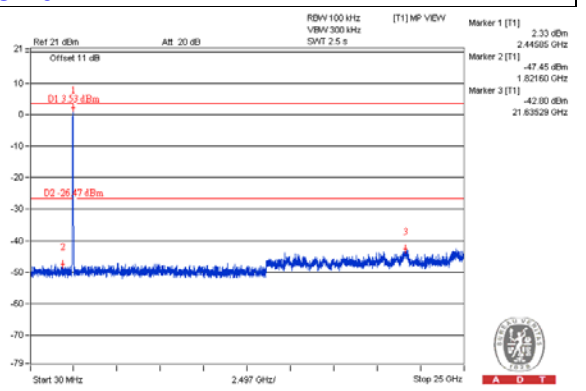


Chain 1

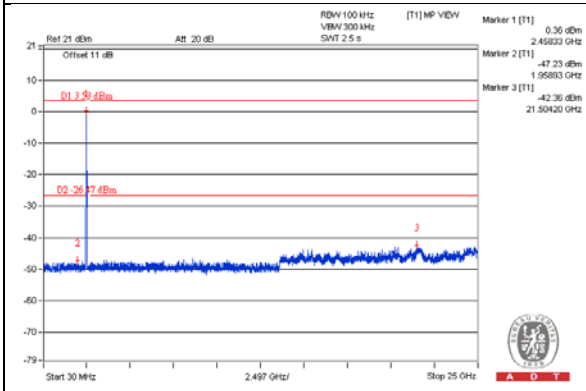
CH 3



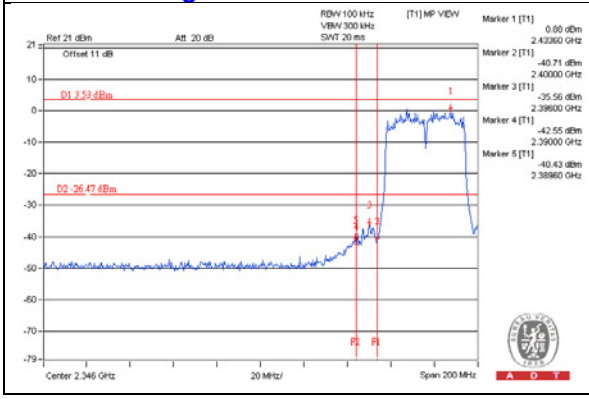
CH 6



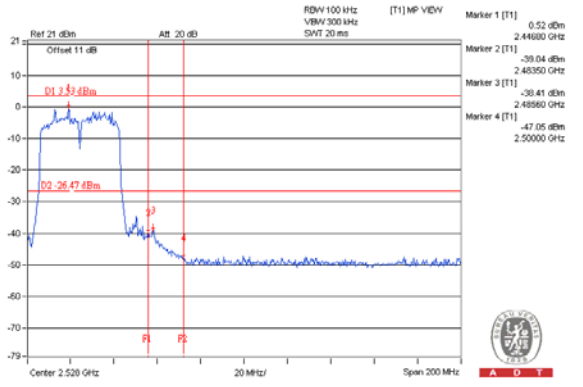
CH 9



CH 3 Band edge

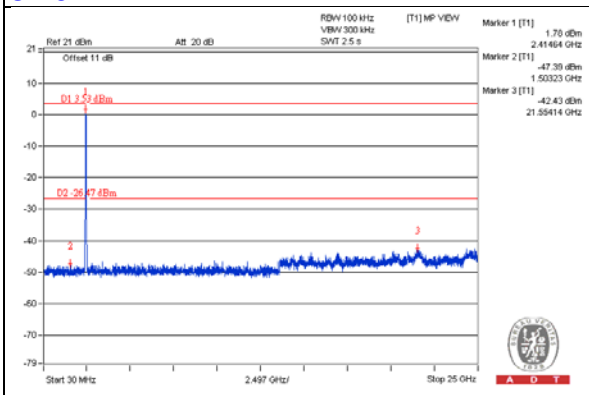


CH 9 Band edge

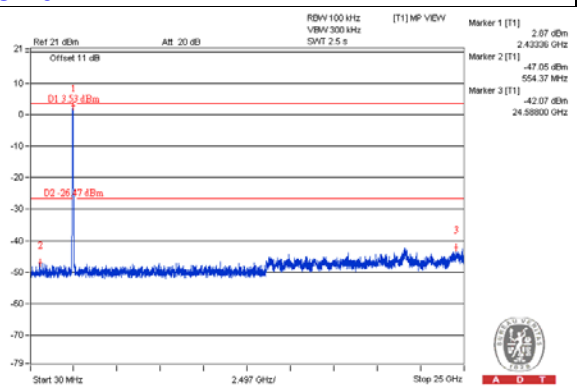


Chain 2

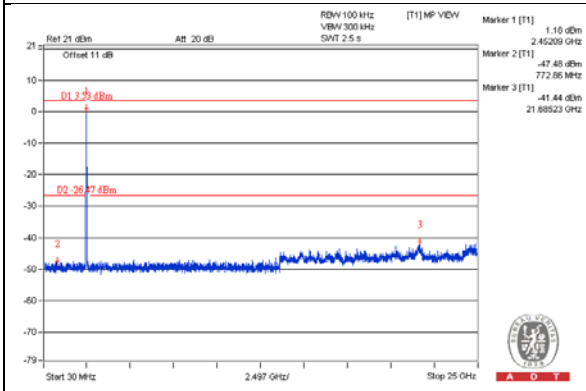
CH 3



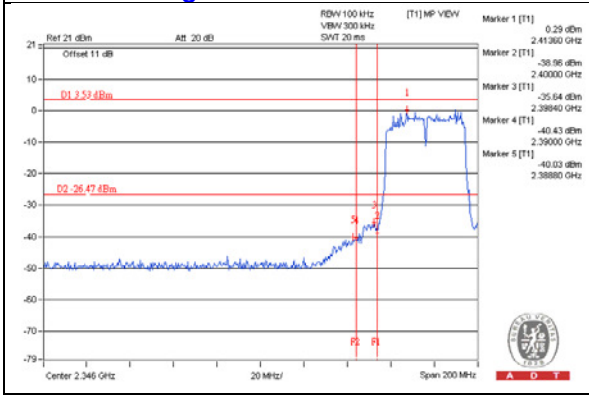
CH 6



CH 9



CH 3 Band edge



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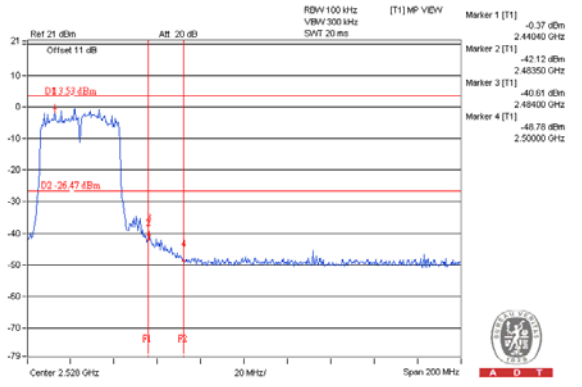
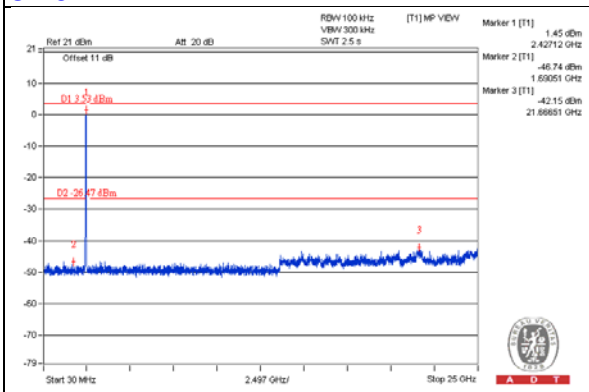
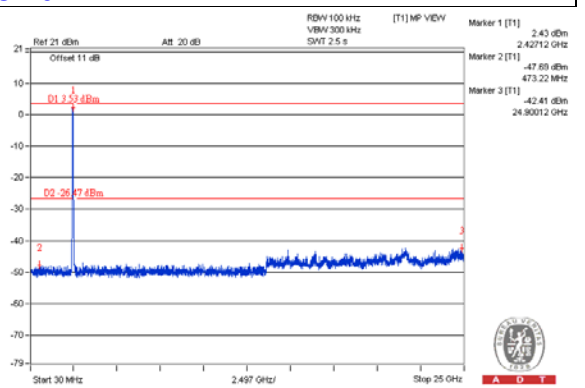


Chain 3

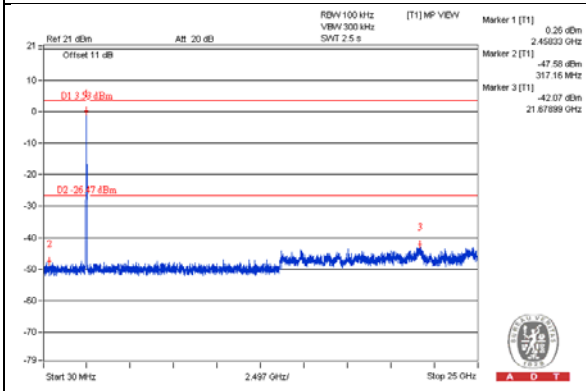
CH 3



CH 6



CH 9



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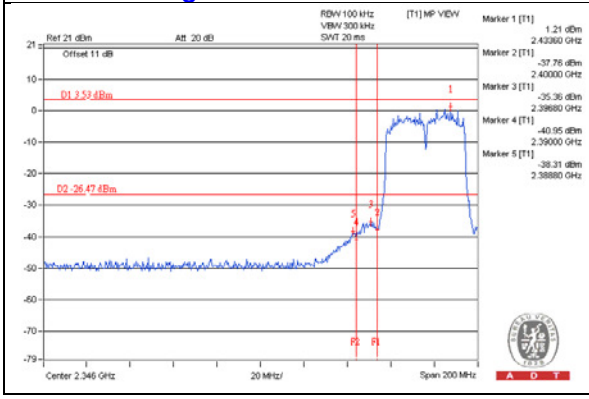

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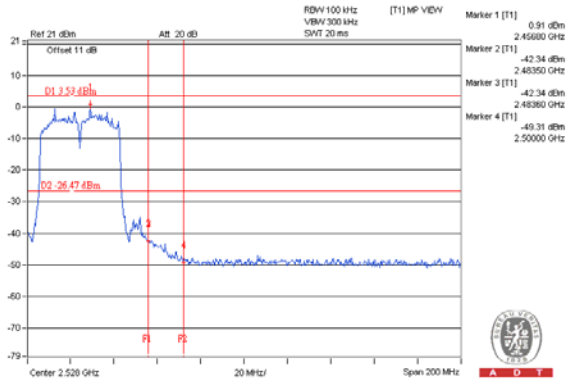

5 Pictures of Test Arrangements

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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Web Site: www.bureauveritas-adt.com

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

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