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FCC TEST REPORT (15.247)

REPORT NO.: RF110727C21

MODEL NO.: PI39110

FCC ID: NM8PI39110

RECEIVED: Jul. 27, 2011

TESTED: Aug. 06 ~ Aug. 11, 2011

ISSUED: Aug. 15, 2011

APPLICANT: HTC Corporation

ADDRESS: 23, Xinghua Rd., Taoyuan 330, Taiwan, R.O.C.

ISSUED BY: Bureau Veritas Consumer Products Services
(H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou
Hsiang, Taipei Hsien 244, Taiwan, R.O.C.

TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei
Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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TABLE OF CONTENTS

RELEASE CONTROL RECORD	4
1. CERTIFICATION	5
2. SUMMARY OF TEST RESULTS	6
2.1 MEASUREMENT UNCERTAINTY	6
3. GENERAL INFORMATION	7
3.1 GENERAL DESCRIPTION OF EUT	7
3.2 DESCRIPTION OF TEST MODES	8
3.2.1 CONFIGURATION OF SYSTEM UNDER TEST	8
3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	9
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS	11
3.4 DESCRIPTION OF SUPPORT UNITS	11
4. TEST TYPES AND RESULTS	12
4.1 RADIATED EMISSION MEASUREMENT	12
4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT	12
4.1.2 TEST INSTRUMENTS	13
4.1.3 TEST PROCEDURES	14
4.1.4 DEVIATION FROM TEST STANDARD	14
4.1.5 TEST SETUP	15
4.1.6 EUT OPERATING CONDITIONS	15
4.1.7 TEST RESULT	16
4.2 CONDUCTED EMISSION MEASUREMENT	27
4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	27
4.2.2 TEST INSTRUMENTS	27
4.2.3 TEST PROCEDURES	28
4.2.4 DEVIATION FROM TEST STANDARD	28
4.2.5 TEST SETUP	29
4.2.6 EUT OPERATING CONDITIONS	29
4.2.7 TEST RESULTS	30
4.3 6dB BANDWIDTH MEASUREMENT	34
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT	34
4.3.2 TEST INSTRUMENTS	34
4.3.3 TEST PROCEDURE	34
4.3.4 DEVIATION FROM TEST STANDARD	34
4.3.5 TEST SETUP	35
4.3.6 EUT OPERATING CONDITIONS	35
4.3.7 TEST RESULTS	36
4.4 MAXIMUM OUTPUT POWER	39
4.4.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT	39
4.4.2 INSTRUMENTS	39
4.4.3 TEST PROCEDURE	39
4.4.4 DEVIATION FROM TEST STANDARD	40
4.4.5 TEST SETUP	40
4.4.6 EUT OPERATING CONDITIONS	40
4.4.7 TEST RESULTS	41
4.5 POWER SPECTRAL DENSITY MEASUREMENT	42
4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	42
4.5.2 TEST INSTRUMENTS	42
4.5.3 TEST PROCEDURE	42



A D T

4.5.4	DEVIATION FROM TEST STANDARD	43
4.5.5	TEST SETUP	43
4.5.6	EUT OPERATING CONDITION	43
4.5.7	TEST RESULTS	44
4.6	BAND EDGES MEASUREMENT	47
4.6.1	LIMITS OF BAND EDGES MEASUREMENT	47
4.6.2	TEST INSTRUMENTS	47
4.6.3	TEST PROCEDURE	47
4.6.4	DEVIATION FROM TEST STANDARD	47
4.6.5	EUT OPERATING CONDITION	47
4.6.6	TEST RESULTS	48
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	60
6.	INFORMATION ON THE TESTING LABORATORIES	61
7.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	62



A D T

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	N/A	Aug. 15, 2011



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1. CERTIFICATION

PRODUCT: Windows Phone

MODEL: PI39110

BRAND: HTC

APPLICANT: HTC Corporation

TEST SAMPLE: Production Unit

TESTED: Aug. 06 ~ Aug. 11, 2011

STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**

ANSI C63.4-2003

ANSI C63.10-2009

The above equipment (Model: PI39110) 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 : Aug. 15, 2011
Pettie Chen / Specialist

APPROVED BY :  , DATE : Aug. 15, 2011
Gary Chang / Technical Manager



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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 AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -8.77dB at 0.412MHz.
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -3.5dB at 2483.50MHz.
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

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	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Windows Phone
MODEL NO.	PI39110
FCC ID	NM8PI39110
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.8Vdc (battery)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n (20MHz): up to 150.0Mbps
OPERATING FREQUENCY	2412 ~ 2462MHz
NUMBER OF CHANNEL	11
OUTPUT POWER	138.0mW
ANTENNA TYPE	PIFA antenna with 0dBi gain
ANTENNA CONNECTOR	NA
I/O PORTS	Refer to users' manual
DATA CABLE	Refer to Note as below
ACCESSORY DEVICES	Refer to Note as below

NOTE:

1. The EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX

2. The EUT's accessories list refers to Ext Pho_NM8PI39110.pdf.
** Main Sample + Items of 1, 4, 5 and 7 are the worst combination for final test.
3. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

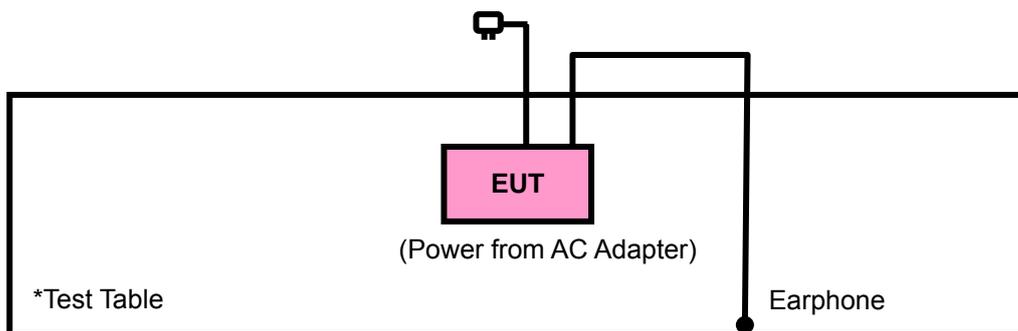
3.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

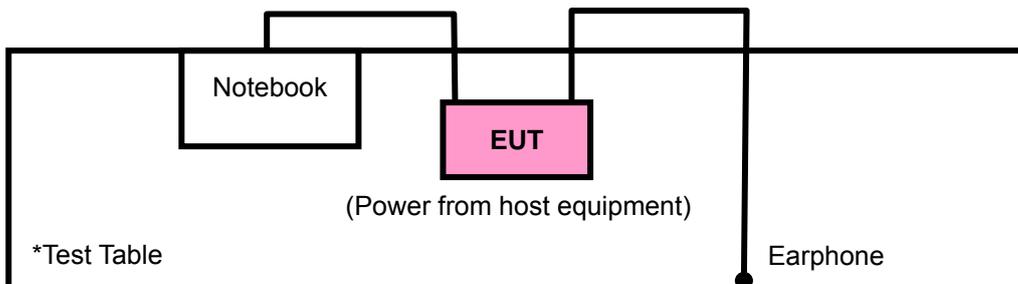
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

TEST MODE A



TEST MODE B





3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Power from adapter
B	-	√	√	-	Power from host equipment

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

NOTE: “-”: 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, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	Y
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	Y
A	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	Y

RADIATED EMISSION TEST (BELOW 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
A & B	802.11n (20MHz)	1 to 11	11	OFDM	BPSK	6.5	Y

POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A & B	802.11n (20MHz)	1 to 11	11	OFDM	BPSK	6.5



BANDEDGE 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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
A	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	6.5

ANTENNA PORT CONDUCTED MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Brad Wu
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Mitch Jen
PLC	25deg. C, 65%RH	120Vac, 60Hz	Mitch Jen
APCM	26deg. C, 68%RH	120Vac, 60Hz	Mitch Jen



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)

ANSI C63.4-2003

ANSI C63.10-2009

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	E5410	1HC2XM1	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

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



4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

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. As shown in 15.35(b), 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.



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4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 19, 2011	Apr. 18, 2012
Spectrum Analyzer Agilent	E4446A	MY43360128	Feb. 22, 2011	Feb. 21, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 13, 2011	Apr. 12, 2012
HORN Antenna SCHWARZBECK	9120D	9120D-405	Feb. 08, 2011	Feb. 07, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8447D	2944A10633	Nov. 02, 2010	Nov. 01, 2011
Preamplifier Agilent	8449B	3008A01964	Nov. 02, 2010	Nov. 01, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295014/4	Sep. 03, 2010	Sep. 02, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	Sep. 03, 2010	Sep. 02, 2011
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100.	TT93021703	NA	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 3.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 988962.
 5. The IC Site Registration No. is IC 7450F-3.



4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. 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 antenna is a broadband antenna, and its height 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

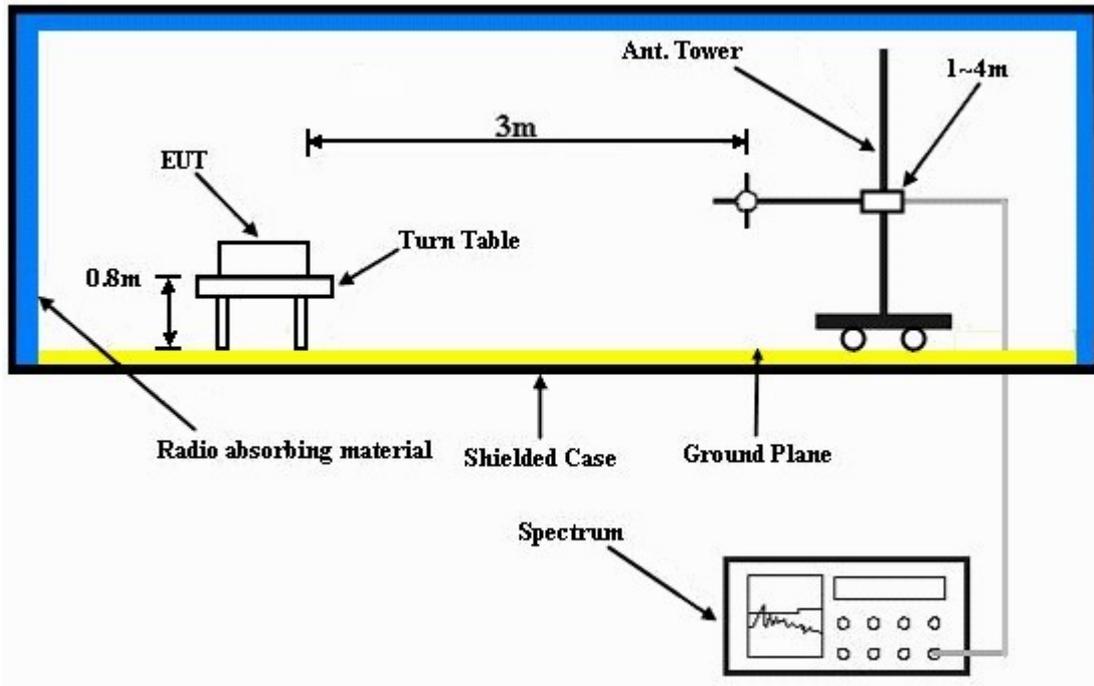
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. 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



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

4.1.6 EUT OPERATING CONDITIONS

TEST MODE A

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

TEST MODE B

- Connected the EUT to notebook and placed on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the system in full functions.



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4.1.7 TEST RESULT

802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Wu

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	2386.00	53.6 PK	74.0	-20.4	1.76 H	285	23.10	30.50
2	2386.00	43.5 AV	54.0	-10.5	1.76 H	285	13.00	30.50
3	*2412.00	100.0 PK			1.76 H	285	69.40	30.60
4	*2412.00	93.2 AV			1.76 H	285	62.60	30.60
5	4824.00	52.1 PK	74.0	-21.9	1.02 H	113	15.50	36.60
6	4824.00	39.4 AV	54.0	-14.6	1.02 H	113	2.80	36.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2386.00	59.0 PK	74.0	-15.0	1.02 V	282	28.50	30.50
2	2386.00	48.8 AV	54.0	-5.2	1.02 V	282	18.30	30.50
3	*2412.00	107.6 PK			1.02 V	282	77.00	30.60
4	*2412.00	102.8 AV			1.02 V	282	72.20	30.60
5	4824.00	47.8 PK	74.0	-26.2	1.02 V	156	11.20	36.60
6	4824.00	34.2 AV	54.0	-19.8	1.02 V	156	-2.40	36.60

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	101.1 PK			1.74 H	282	70.40	30.70
2	*2437.00	96.4 AV			1.74 H	282	65.70	30.70
3	4874.00	46.8 PK	74.0	-27.2	1.03 H	16	10.10	36.70
4	4874.00	33.4 AV	54.0	-20.6	1.03 H	16	-3.30	36.70
5	7311.00	51.6 PK	74.0	-22.4	1.06 H	108	8.80	42.80
6	7311.00	39.0 AV	54.0	-15.0	1.06 H	108	-3.80	42.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	108.8 PK			1.07 V	259	78.10	30.70
2	*2437.00	103.9 AV			1.07 V	259	73.20	30.70
3	4874.00	47.4 PK	74.0	-26.6	1.06 V	112	10.70	36.70
4	4874.00	34.0 AV	54.0	-20.0	1.06 V	112	-2.70	36.70
5	7311.00	52.0 PK	74.0	-22.0	1.05 V	116	9.20	42.80
6	7311.00	39.2 AV	54.0	-14.8	1.05 V	116	-3.60	42.80

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Wu

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	98.0 PK			1.07 H	177	67.20	30.80
2	*2462.00	93.8 AV			1.07 H	177	63.00	30.80
3	2483.50	55.0 PK	74.0	-19.0	1.07 H	177	24.20	30.80
4	2483.50	43.2 AV	54.0	-10.8	1.07 H	177	12.40	30.80
5	4924.00	38.1 PK	74.0	-35.9	1.00 H	20	1.30	36.80
6	4924.00	33.9 AV	54.0	-20.1	1.00 H	20	-2.90	36.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	108.4 PK			1.13 V	9	77.60	30.80
2	*2462.00	103.8 AV			1.13 V	9	73.00	30.80
3	2483.50	58.8 PK	74.0	-15.2	1.13 V	9	28.00	30.80
4	2483.50	50.5 AV	54.0	-3.5	1.13 V	9	19.70	30.80
5	4924.00	46.3 PK	74.0	-27.7	1.06 V	358	9.50	36.80
6	4924.00	33.3 AV	54.0	-20.7	1.06 V	358	-3.50	36.80

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



A D T

802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Wu

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	54.7 PK	74.0	-19.3	1.74 H	41	24.20	30.50
2	2390.00	43.4 AV	54.0	-10.6	1.74 H	41	12.90	30.50
3	*2412.00	100.0 PK			1.74 H	41	69.40	30.60
4	*2412.00	86.6 AV			1.74 H	41	56.00	30.60
5	4824.00	46.2 PK	74.0	-27.8	1.03 H	94	9.60	36.60
6	4824.00	32.6 AV	54.0	-21.4	1.03 H	94	-4.00	36.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.4 PK	74.0	-13.6	1.02 V	275	29.90	30.50
2	2390.00	44.6 AV	54.0	-9.4	1.02 V	275	14.10	30.50
3	*2412.00	104.0 PK			1.02 V	275	73.40	30.60
4	*2412.00	90.6 AV			1.02 V	275	60.00	30.60
5	4824.00	46.4 PK	74.0	-27.6	1.05 V	116	9.80	36.60
6	4824.00	32.9 AV	54.0	-21.1	1.05 V	116	-3.70	36.60

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



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	101.0 PK			1.75 H	42	70.30	30.70
2	*2437.00	87.5 AV			1.75 H	42	56.80	30.70
3	4874.00	46.0 PK	74.0	-28.0	1.04 H	103	9.30	36.70
4	4874.00	32.3 AV	54.0	-21.7	1.04 H	103	-4.40	36.70
5	7311.00	51.5 PK	74.0	-22.5	1.06 H	119	8.70	42.80
6	7311.00	38.6 AV	54.0	-15.4	1.06 H	119	-4.20	42.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	104.9 PK			1.29 V	258	74.20	30.70
2	*2437.00	91.5 AV			1.29 V	258	60.80	30.70
3	4874.00	46.8 PK	74.0	-27.2	1.05 V	116	10.10	36.70
4	4874.00	33.4 AV	54.0	-20.6	1.05 V	116	-3.30	36.70
5	7311.00	51.8 PK	74.0	-22.2	1.05 V	112	9.00	42.80
6	7311.00	39.0 AV	54.0	-15.0	1.05 V	112	-3.80	42.80

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



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Wu

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	96.6 PK			1.34 H	198	65.80	30.80
2	*2462.00	84.5 AV			1.34 H	198	53.70	30.80
3	2483.50	52.6 PK	74.0	-21.4	1.34 H	198	21.80	30.80
4	2483.50	42.5 AV	54.0	-11.5	1.34 H	198	11.70	30.80
5	4924.00	45.6 PK	74.0	-28.4	1.00 H	20	8.80	36.80
6	4924.00	32.1 AV	54.0	-21.9	1.00 H	20	-4.70	36.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.9 PK			1.13 V	16	73.10	30.80
2	*2462.00	91.4 AV			1.13 V	16	60.60	30.80
3	2483.50	59.6 PK	74.0	-14.4	1.13 V	16	28.80	30.80
4	2483.50	46.9 AV	54.0	-7.1	1.13 V	16	16.10	30.80
5	4924.00	45.8 PK	74.0	-28.2	1.03 V	24	9.00	36.80
6	4924.00	32.1 AV	54.0	-21.9	1.03 V	24	-4.70	36.80

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



A D T

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Wu

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	54.2 PK	74.0	-19.8	1.75 H	38	23.70	30.50
2	2390.00	42.8 AV	54.0	-11.2	1.75 H	38	12.30	30.50
3	*2412.00	99.4 PK			1.75 H	38	68.80	30.60
4	*2412.00	86.0 AV			1.75 H	38	55.40	30.60
5	4824.00	46.0 PK	74.0	-28.0	1.04 H	113	9.40	36.60
6	4824.00	32.4 AV	54.0	-21.6	1.04 H	113	-4.20	36.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.0 PK	74.0	-14.0	1.03 V	276	29.50	30.50
2	2390.00	44.2 AV	54.0	-9.8	1.03 V	276	13.70	30.50
3	*2412.00	103.5 PK			1.03 V	276	72.90	30.60
4	*2412.00	90.1 AV			1.03 V	276	59.50	30.60
5	4824.00	46.5 PK	74.0	-27.5	1.04 V	111	9.90	36.60
6	4824.00	33.1 AV	54.0	-20.9	1.04 V	111	-3.50	36.60

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



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	100.4 PK			1.71 H	46	69.70	30.70
2	*2437.00	86.9 AV			1.71 H	46	56.20	30.70
3	4874.00	46.3 PK	74.0	-27.7	1.01 H	114	9.60	36.70
4	4874.00	32.6 AV	54.0	-21.4	1.01 H	114	-4.10	36.70
5	7311.00	51.9 PK	74.0	-22.1	1.09 H	55	9.10	42.80
6	7311.00	39.0 AV	54.0	-15.0	1.09 H	55	-3.80	42.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	104.3 PK			1.28 V	260	73.60	30.70
2	*2437.00	91.0 AV			1.28 V	260	60.30	30.70
3	4874.00	47.1 PK	74.0	-26.9	1.05 V	106	10.40	36.70
4	4874.00	33.6 AV	54.0	-20.4	1.05 V	106	-3.10	36.70
5	7311.00	52.1 PK	74.0	-21.9	1.08 V	159	9.30	42.80
6	7311.00	39.4 AV	54.0	-14.6	1.08 V	159	-3.40	42.80

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



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Brad Wu

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	96.4 PK			1.37 H	198	65.60	30.80
2	*2462.00	84.1 AV			1.37 H	198	53.30	30.80
3	2483.50	55.3 PK	74.0	-18.7	1.36 H	198	24.50	30.80
4	2483.50	42.4 AV	54.0	-11.6	1.36 H	198	11.60	30.80
5	4924.00	45.7 PK	74.0	-28.3	1.00 H	24	8.90	36.80
6	4924.00	31.9 AV	54.0	-22.1	1.00 H	24	-4.90	36.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.4 PK			1.17 V	347	73.60	30.80
2	*2462.00	91.0 AV			1.17 V	347	60.20	30.80
3	2483.50	61.8 PK	74.0	-12.2	1.16 V	347	31.00	30.80
4	2483.50	46.9 AV	54.0	-7.1	1.16 V	347	16.10	30.80
5	4924.00	46.4 PK	74.0	-27.6	1.01 V	142	9.60	36.80
6	4924.00	32.9 AV	54.0	-21.1	1.01 V	142	-3.90	36.80

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



A D T

BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Mitch Jen
TEST MODE	A		

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	166.00	27.2 QP	43.5	-16.3	1.50 H	310	13.20	14.00
2	265.16	30.8 QP	46.0	-15.2	1.00 H	178	17.20	13.60
3	290.43	32.5 QP	46.0	-13.5	1.50 H	295	18.00	14.50
4	311.82	31.0 QP	46.0	-15.0	1.00 H	319	15.80	15.20
5	885.39	37.5 QP	46.0	-8.5	1.00 H	121	10.80	26.70
6	955.38	29.9 QP	46.0	-16.1	1.50 H	154	2.30	27.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	31.84	27.2 QP	40.0	-12.8	1.00 V	301	14.70	12.50
2	72.67	30.5 QP	40.0	-9.5	1.00 V	40	19.20	11.30
3	132.95	27.7 QP	43.5	-15.8	1.00 V	277	14.20	13.50
4	166.00	28.2 QP	43.5	-15.3	1.00 V	145	14.20	14.00
5	294.32	29.4 QP	46.0	-16.6	1.50 V	259	14.70	14.70
6	529.58	25.9 QP	46.0	-20.1	1.00 V	319	5.00	20.90
7	885.39	38.3 QP	46.0	-7.7	1.00 V	76	11.60	26.70

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Mitch Jen
TEST MODE	B		

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	148.50	30.1 QP	43.5	-13.4	1.50 H	220	15.70	14.40
2	166.00	33.3 QP	43.5	-10.2	1.50 H	238	19.30	14.00
3	243.77	35.8 QP	46.0	-10.2	1.00 H	151	23.10	12.70
4	325.43	32.3 QP	46.0	-13.7	1.00 H	181	16.70	15.60
5	393.48	32.9 QP	46.0	-13.1	1.00 H	199	15.70	17.20
6	885.39	32.5 QP	46.0	-13.5	1.00 H	10	5.80	26.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	55.18	31.5 QP	40.0	-8.5	1.00 V	46	17.70	13.80
2	132.95	29.6 QP	43.5	-13.9	1.00 V	298	16.10	13.50
3	166.00	29.0 QP	43.5	-14.5	1.00 V	154	15.00	14.00
4	383.76	32.2 QP	46.0	-13.8	1.00 V	298	15.20	17.00
5	482.92	29.9 QP	46.0	-16.1	1.00 V	115	10.20	19.70
6	885.39	37.2 QP	46.0	-8.8	1.50 V	235	10.50	26.70

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



4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 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 0.50MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 30, 2010	Nov. 29, 2011
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 30, 2010	Dec. 29, 2011
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jul. 07, 2011	Jul. 06, 2012
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 06, 2011	Jan. 05, 2012
LISN ROHDE & SCHWARZ	ESH3-Z5	835239/001	Feb. 22, 2011	Feb. 21, 2012
V-LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jun. 30, 2011	Jun. 29, 2012
LISN ROHDE & SCHWARZ	ENV216	100072	Jun. 10, 2011	Jun. 09, 2012
Software ADT	ADT_Cond_ V7.3.7	NA	NA	NA

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



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4.2.3 TEST PROCEDURES

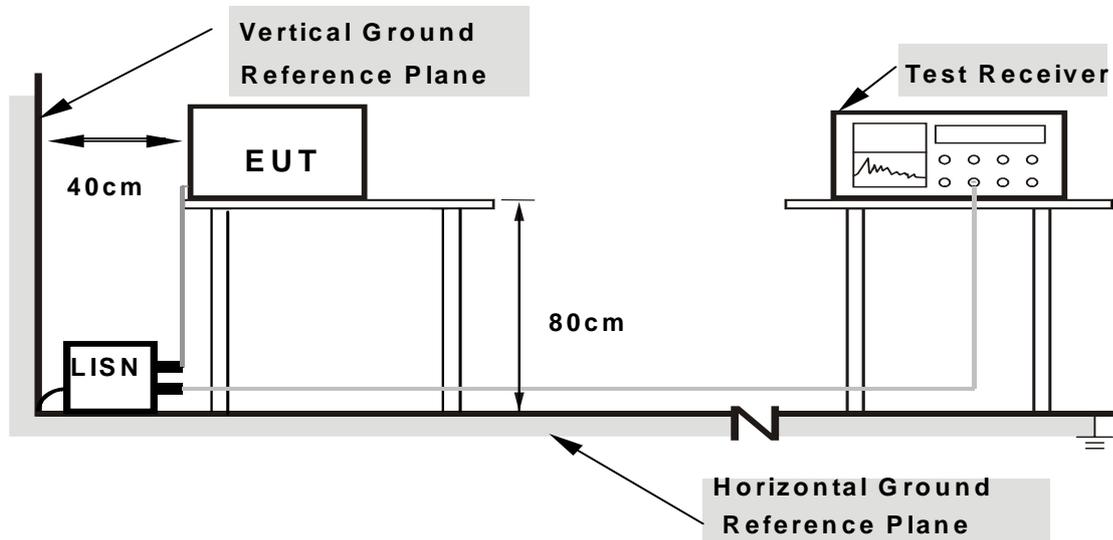
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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



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

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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.

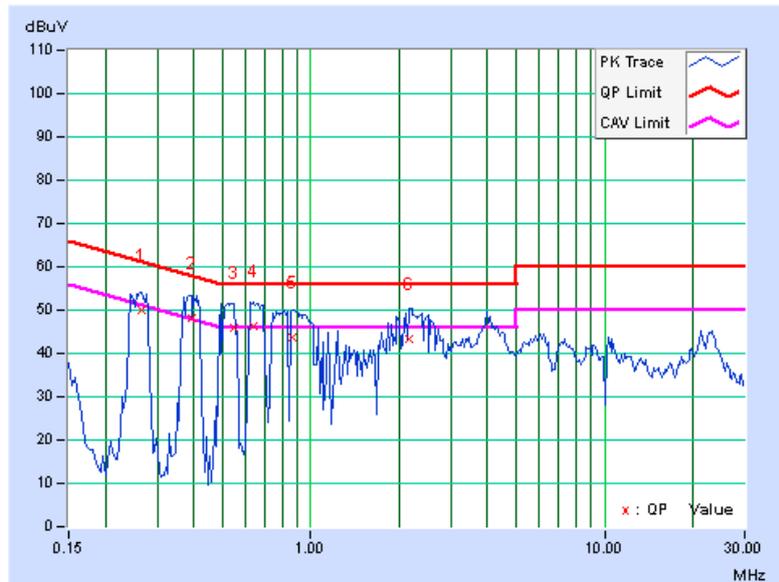
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA : 802.11g

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.267	0.14	49.97	34.03	50.11	34.17	61.20	51.20	-11.09	-17.03
2	0.392	0.14	48.12	29.20	48.26	29.34	58.02	48.02	-9.76	-18.68
3	0.548	0.15	45.79	25.18	45.94	25.33	56.00	46.00	-10.06	-20.67
4	0.638	0.16	46.13	25.18	46.29	25.34	56.00	46.00	-9.71	-20.66
5	0.865	0.17	43.61	19.87	43.78	20.04	56.00	46.00	-12.22	-25.96
6	2.156	0.22	42.96	24.77	43.18	24.99	56.00	46.00	-12.82	-21.01

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



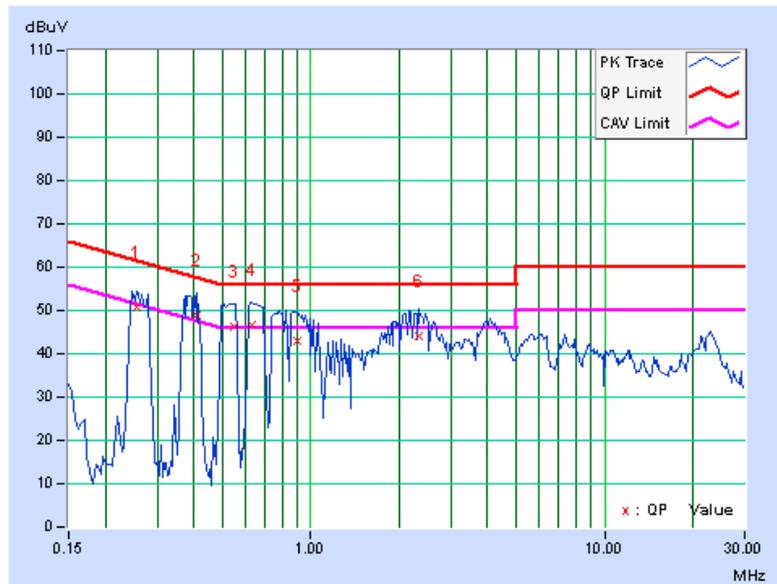


A D T

PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.255	0.16	50.64	35.63	50.80	35.79	61.58	51.58	-10.78	-15.79
2	0.412	0.16	48.68	27.89	48.84	28.05	57.61	47.61	-8.77	-19.56
3	0.548	0.17	45.99	25.12	46.16	25.29	56.00	46.00	-9.84	-20.71
4	0.630	0.18	46.31	25.20	46.49	25.38	56.00	46.00	-9.51	-20.62
5	0.900	0.19	42.85	19.52	43.04	19.71	56.00	46.00	-12.96	-26.29
6	2.332	0.24	43.89	26.54	44.13	26.78	56.00	46.00	-11.87	-19.22

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



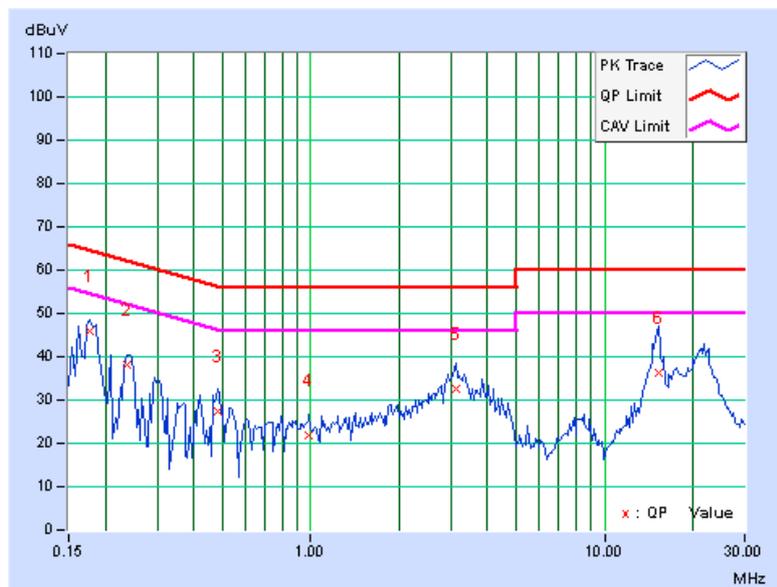


A D T

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.177	0.14	45.84	33.18	45.98	33.32	64.61	54.61	-18.63	-21.29
2	0.236	0.14	37.96	24.87	38.10	25.01	62.24	52.24	-24.14	-27.23
3	0.482	0.15	27.44	19.24	27.59	19.39	56.30	46.30	-28.72	-26.92
4	0.986	0.18	21.53	12.14	21.71	12.32	56.00	46.00	-34.29	-33.68
5	3.113	0.28	32.16	25.31	32.44	25.59	56.00	46.00	-23.56	-20.41
6	15.230	0.90	35.49	24.16	36.39	25.06	60.00	50.00	-23.61	-24.94

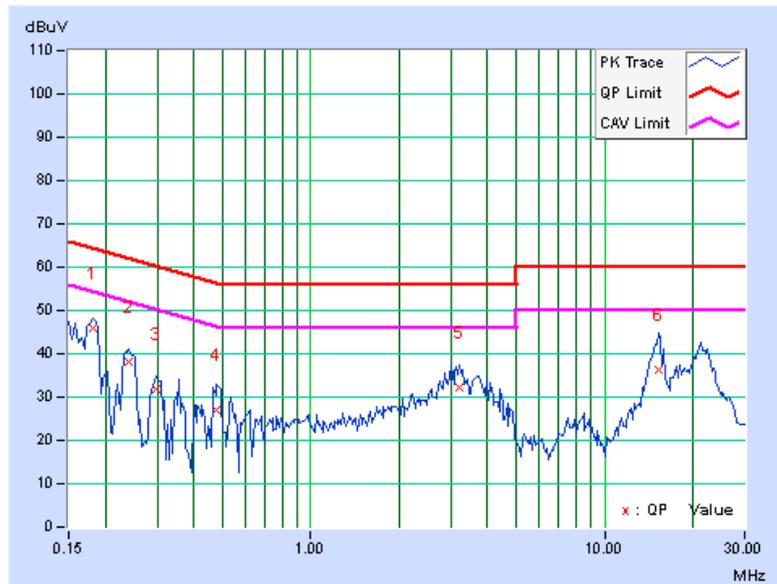
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.15	45.86	34.71	46.01	34.86	64.43	54.43	-18.41	-19.56
2	0.240	0.16	37.88	26.88	38.04	27.04	62.10	52.10	-24.06	-25.06
3	0.298	0.16	31.78	21.47	31.94	21.63	60.29	50.29	-28.35	-28.66
4	0.478	0.17	27.00	18.39	27.17	18.56	56.37	46.37	-29.21	-27.82
5	3.207	0.29	31.85	25.75	32.14	26.04	56.00	46.00	-23.86	-19.96
6	15.219	0.76	35.69	24.24	36.45	25.00	60.00	50.00	-23.55	-25.00

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. 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 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

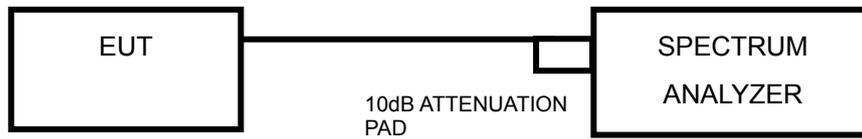
4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

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.



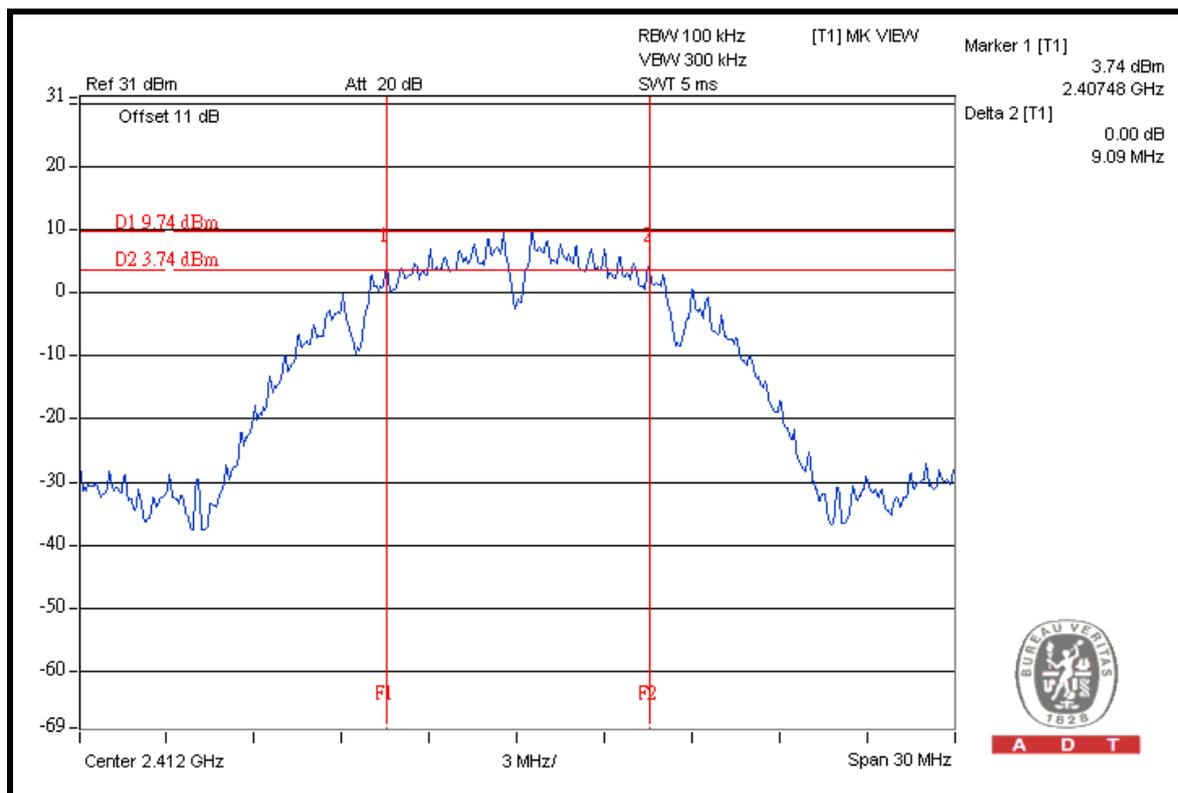
A D T

4.3.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	9.09	0.5	PASS
6	2437	9.09	0.5	PASS
11	2462	8.61	0.5	PASS

CH 1



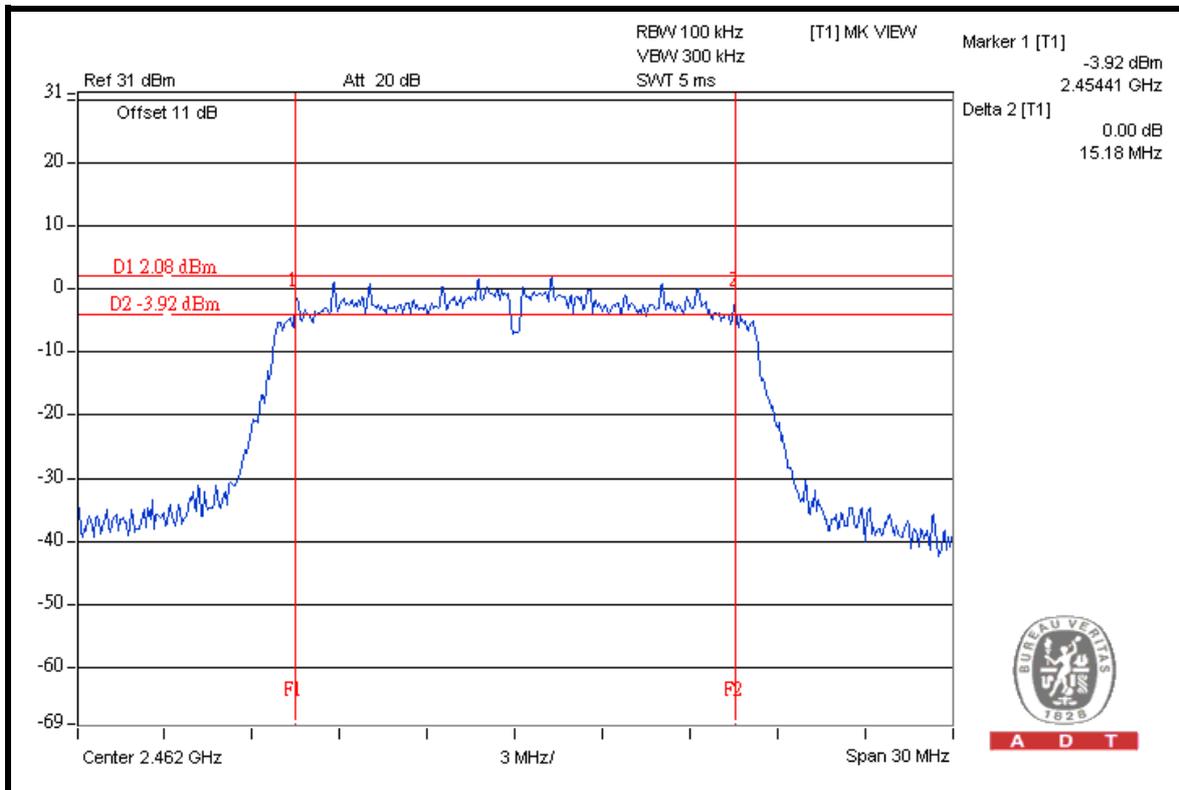


A D T

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	13.83	0.5	PASS
6	2437	15.14	0.5	PASS
11	2462	15.18	0.5	PASS

CH 11



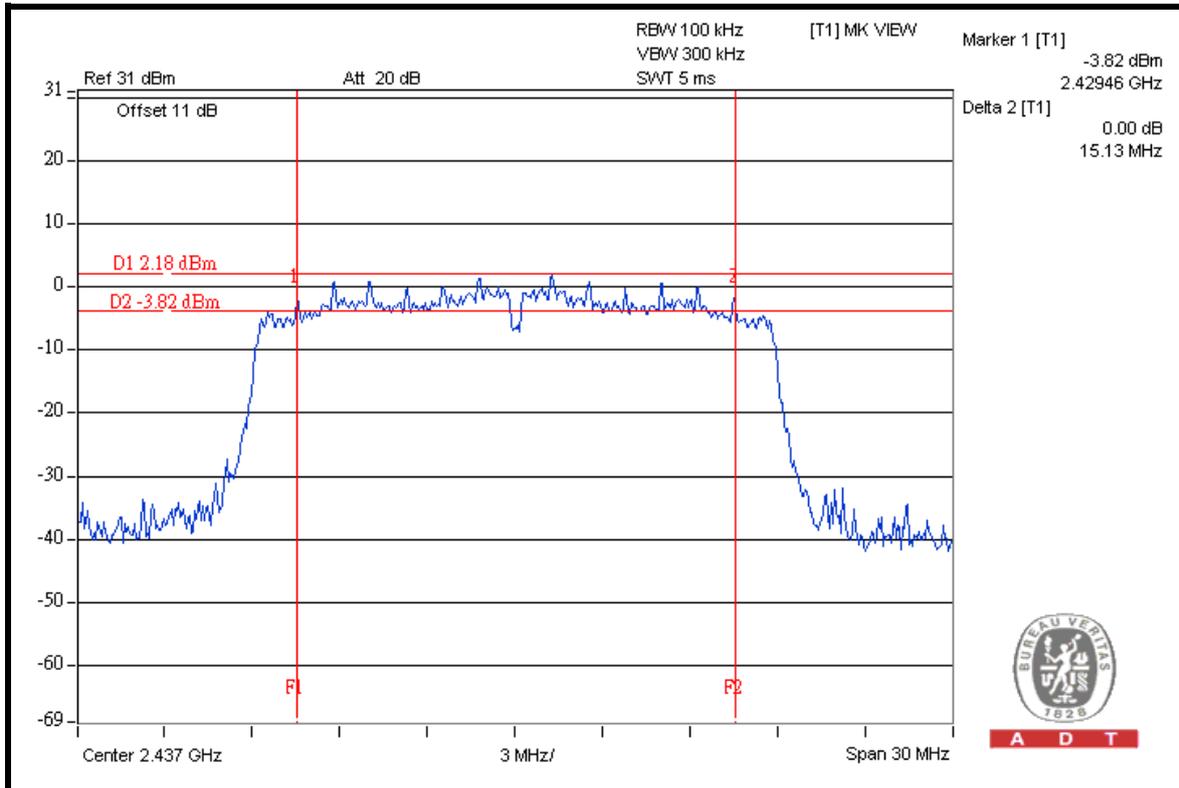


A D T

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	13.92	0.5	PASS
6	2437	15.13	0.5	PASS
11	2462	15.12	0.5	PASS

CH 6





A D T

4.4 MAXIMUM OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

The Maximum Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
High Speed Peak Power Meter	ML2495A	0842014	Apr. 26, 2011	Apr. 25, 2012
Power Sensor	MA2411B	0738404	Apr. 26, 2011	Apr. 25, 2012

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. Measurement Bandwidth of ML2495A is 65MHz greater than 6dB bandwidth of emission.

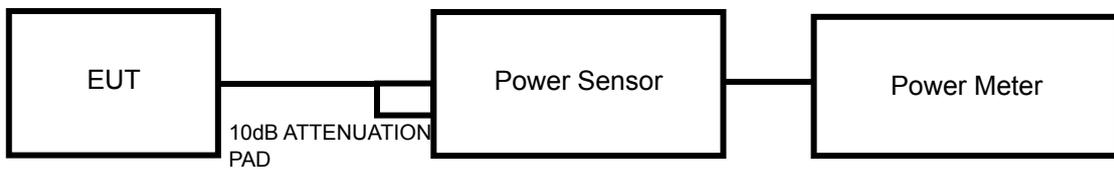
4.4.3 TEST PROCEDURE

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

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER OUTPUT (mW)	POWER OUTPUT (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	114.8	20.6	30	PASS
6	2437	117.5	20.7	30	PASS
11	2462	112.2	20.5	30	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER OUTPUT (mW)	POWER OUTPUT (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	134.9	21.3	30	PASS
6	2437	138.0	21.4	30	PASS
11	2462	134.9	21.3	30	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER OUTPUT (mW)	POWER OUTPUT (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	131.8	21.2	30	PASS
6	2437	134.9	21.3	30	PASS
11	2462	138.0	21.4	30	PASS



A D T

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.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.5.3 TEST PROCEDURE

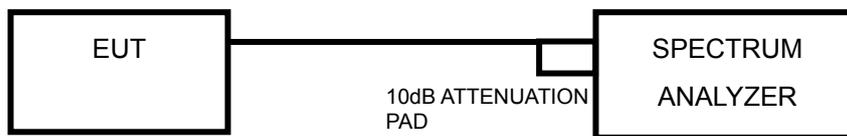
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 10kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

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.



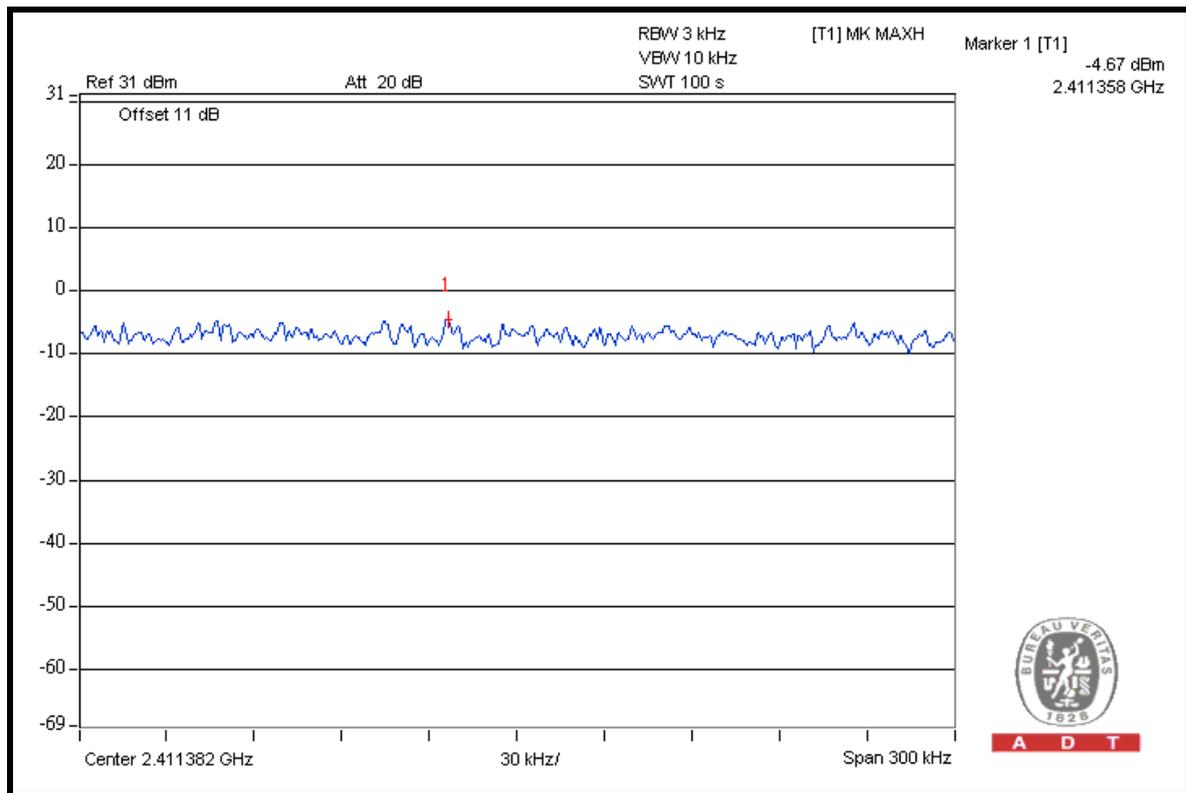
A D T

4.5.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-4.7	8	PASS
6	2437	-4.8	8	PASS
11	2462	-4.9	8	PASS

CH 1



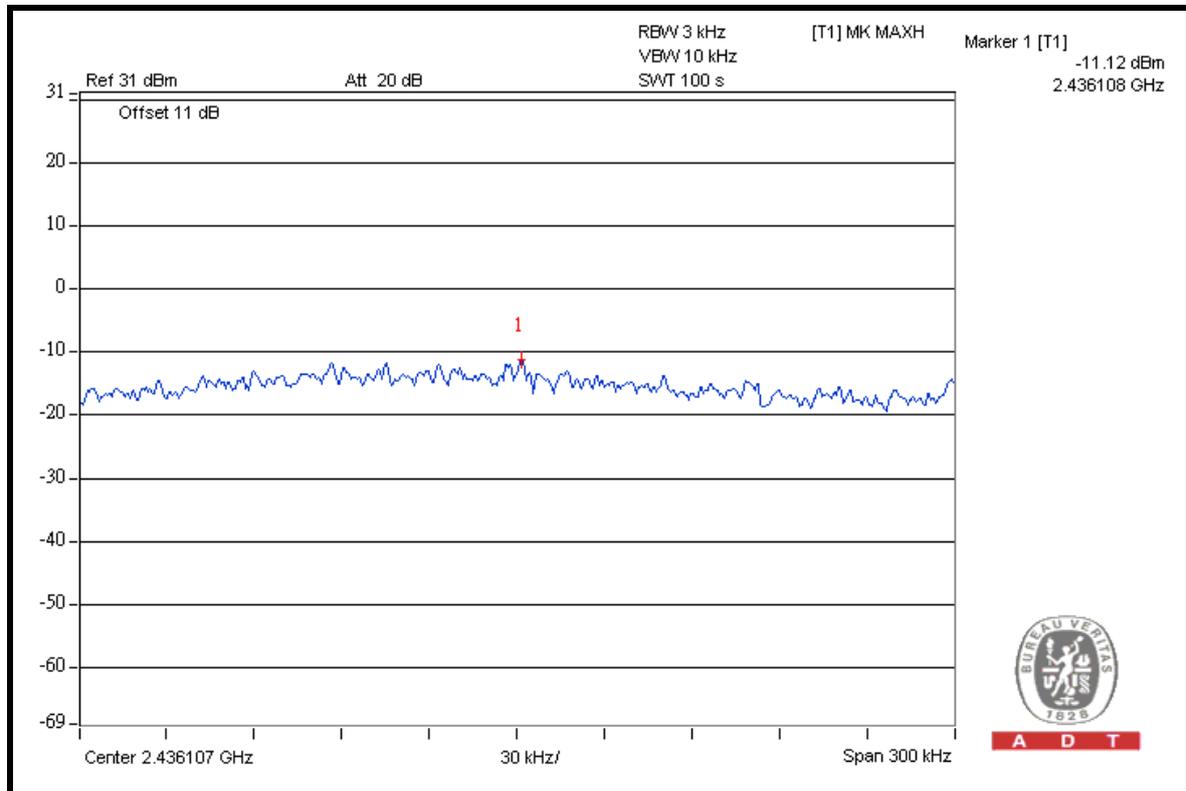


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802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-11.3	8	PASS
6	2437	-11.1	8	PASS
11	2462	-11.5	8	PASS

CH 6



A D T

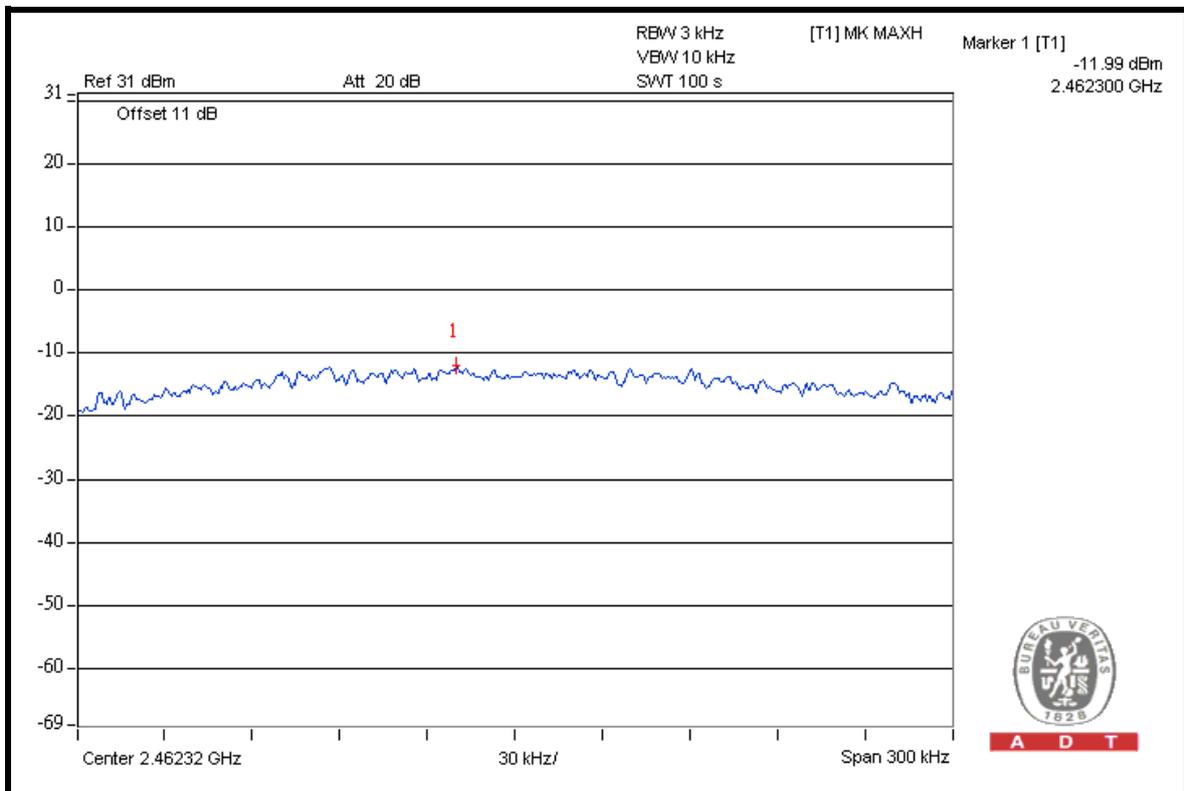


A D T

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-12.4	8	PASS
6	2437	-12.2	8	PASS
11	2462	-12.0	8	PASS

CH 11



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4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

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

Note: Follow DTS measurement, If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set both RBW and VBW of spectrum analyzer to 100kHz and 300kHz with suitable frequency span including 100MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW = 100kHz, VBW = 300kHz; Average RBW = 1MHz, VBW = 10Hz) are attached on the following pages.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6.



4.6.6 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 in part 15.247(d).

802.11b

RESTRICT BAND (2310 ~ 2390 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2412.00 (PK)	107.6	51.77	55.83	74.00
2412.00 (AV)	102.8	53.42	49.38	54.00

RESTRICT BAND (2483.5 ~ 2500 MHz)

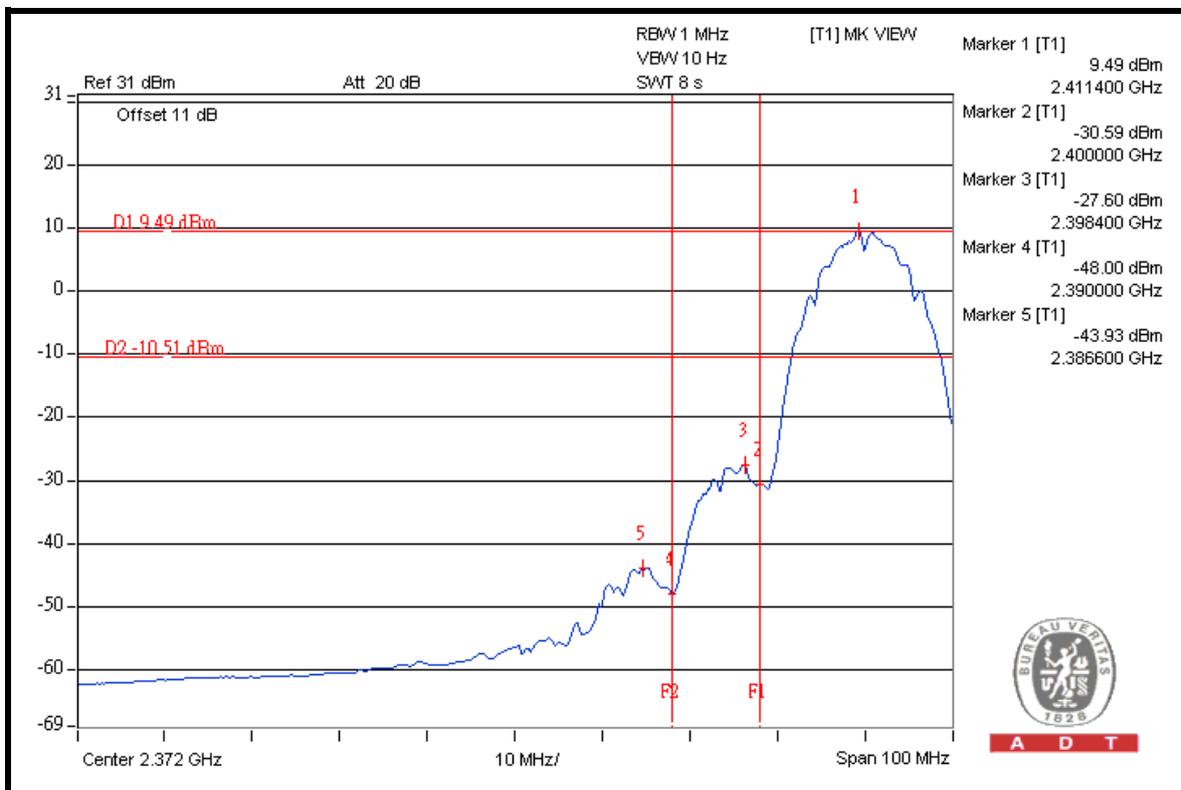
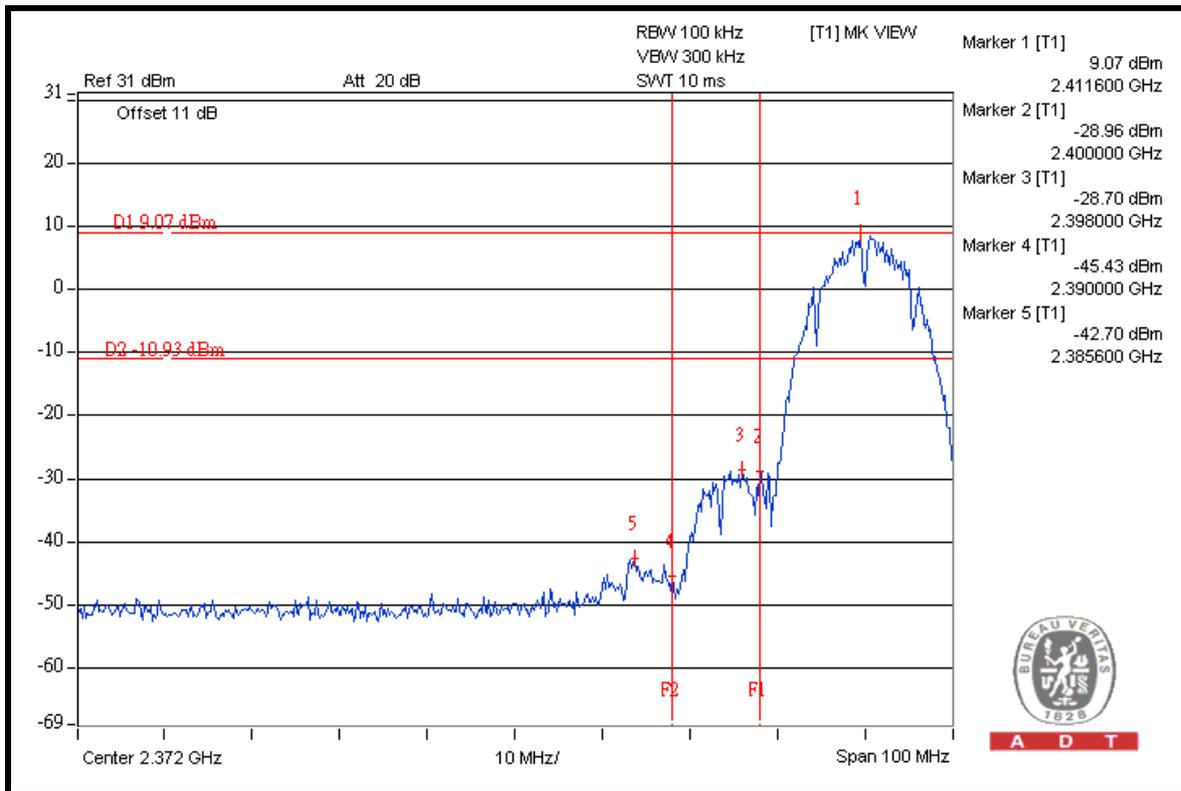
FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2462.00 (PK)	108.4	49.37	59.03	74.00
2462.00 (AV)	103.8	50.89	52.91	54.00

NOTE:

1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 3 pages.
2. Maximum field strength in restrict band = Fundamental emission – Delta.

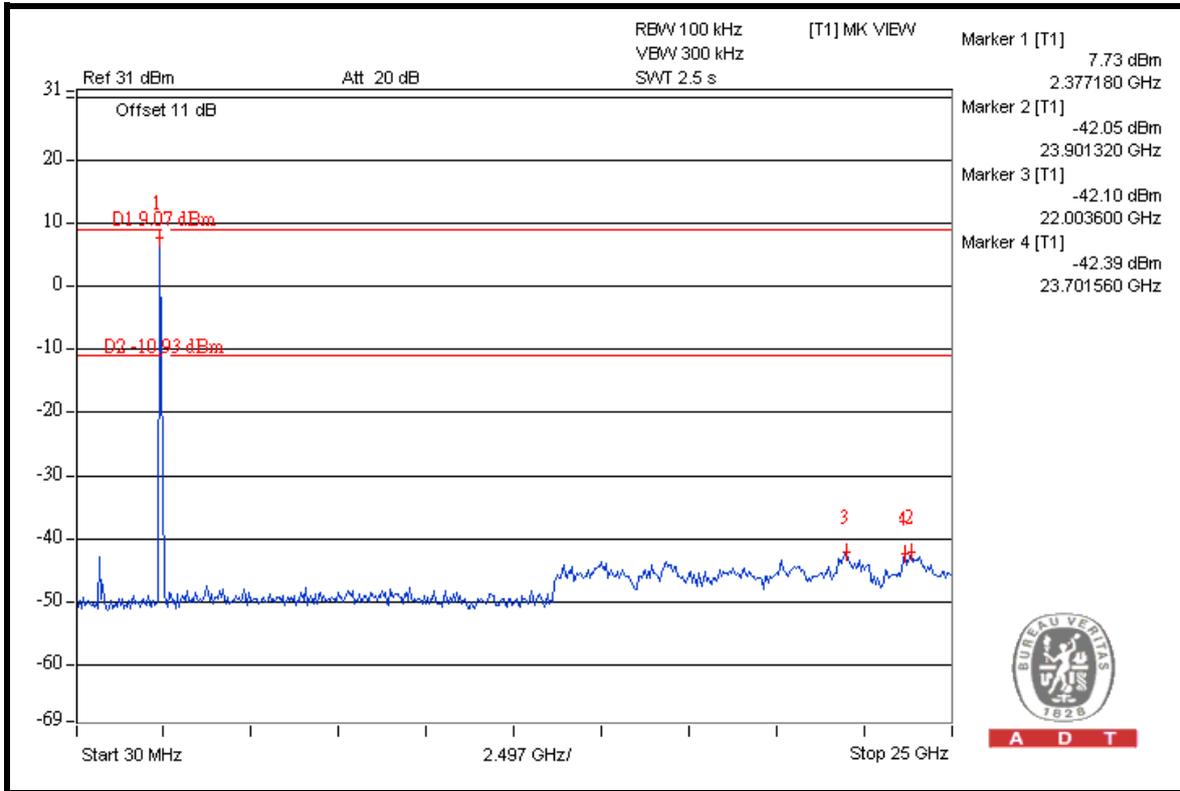


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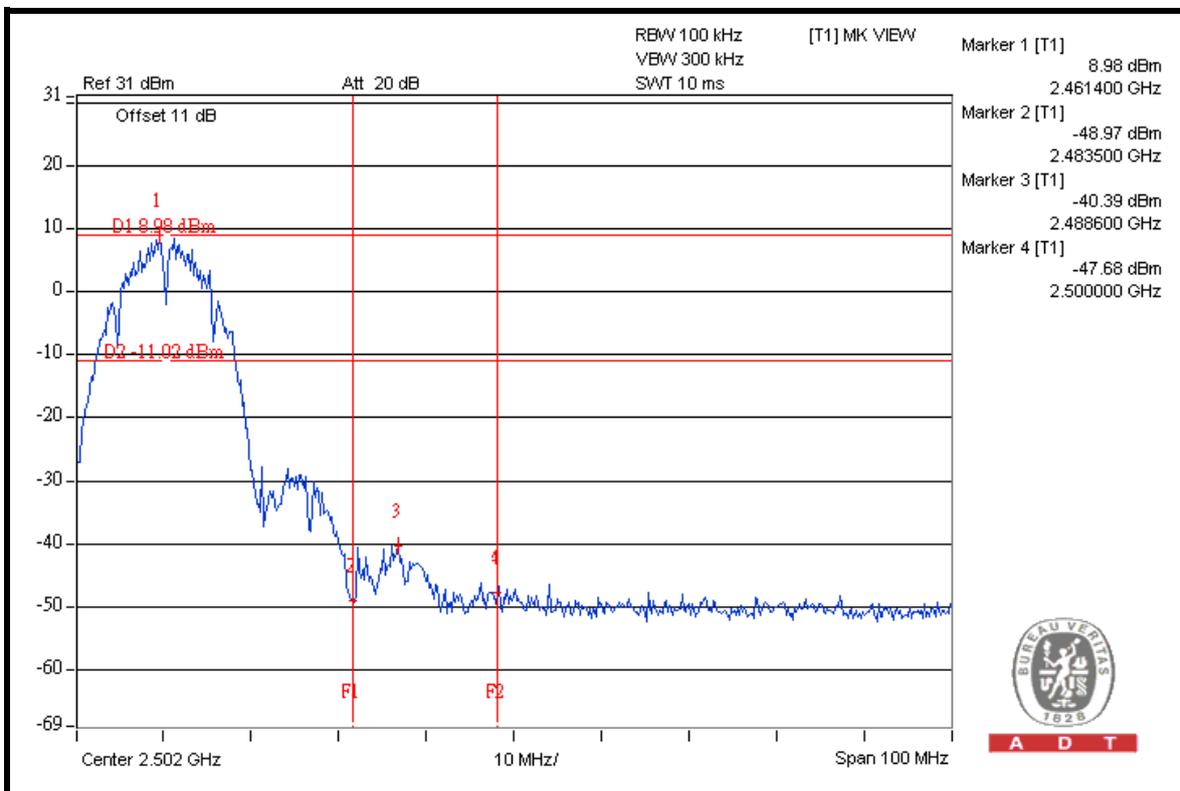




A D T



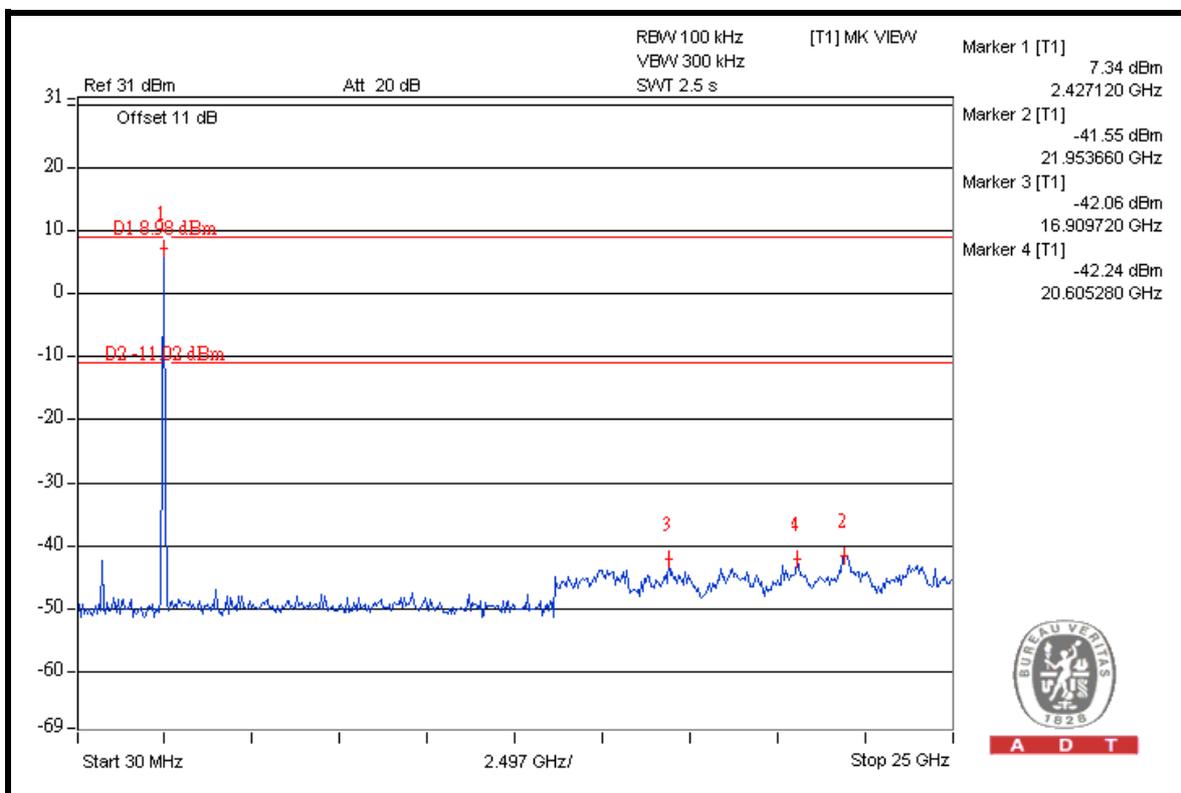
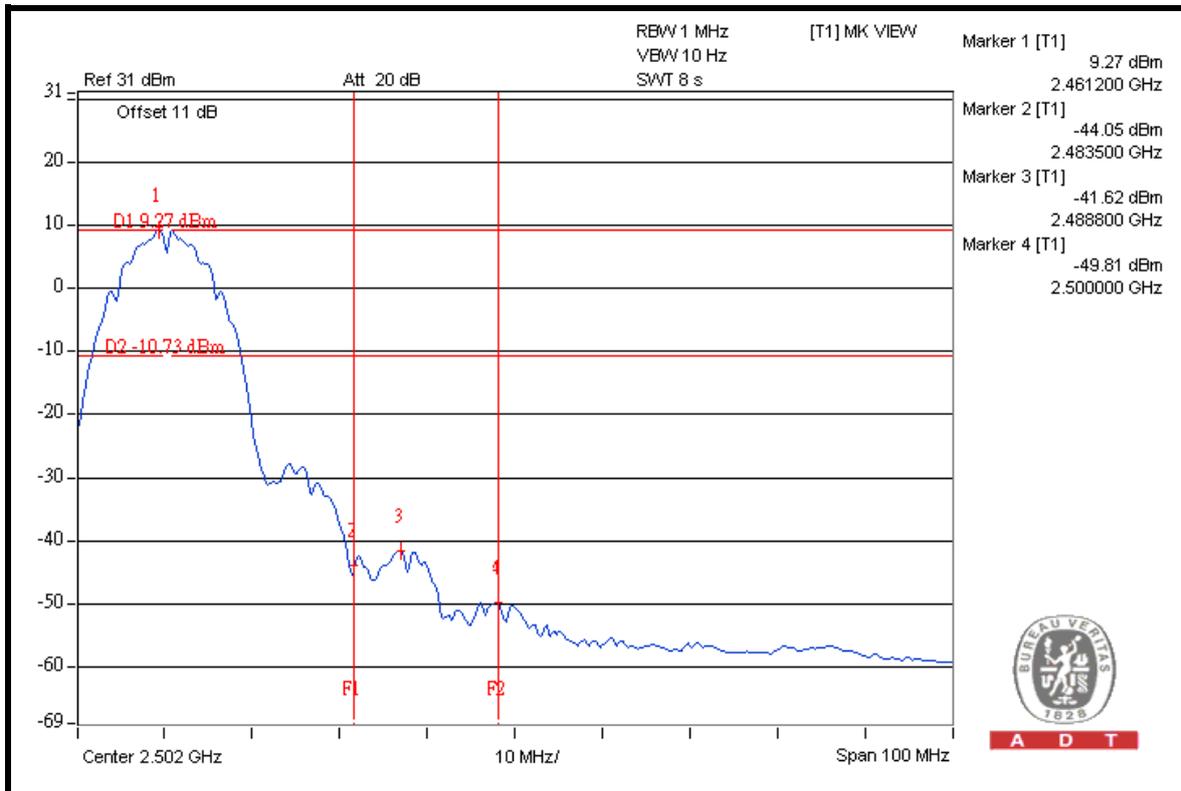
A D T



A D T



A D T





A D T

802.11g

RESTRICT BAND (2310 ~ 2390 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2412.00 (PK)	104.0	46.92	57.08	74.00
2412.00 (AV)	90.6	51.41	39.19	54.00

RESTRICT BAND (2483.5 ~ 2500 MHz)

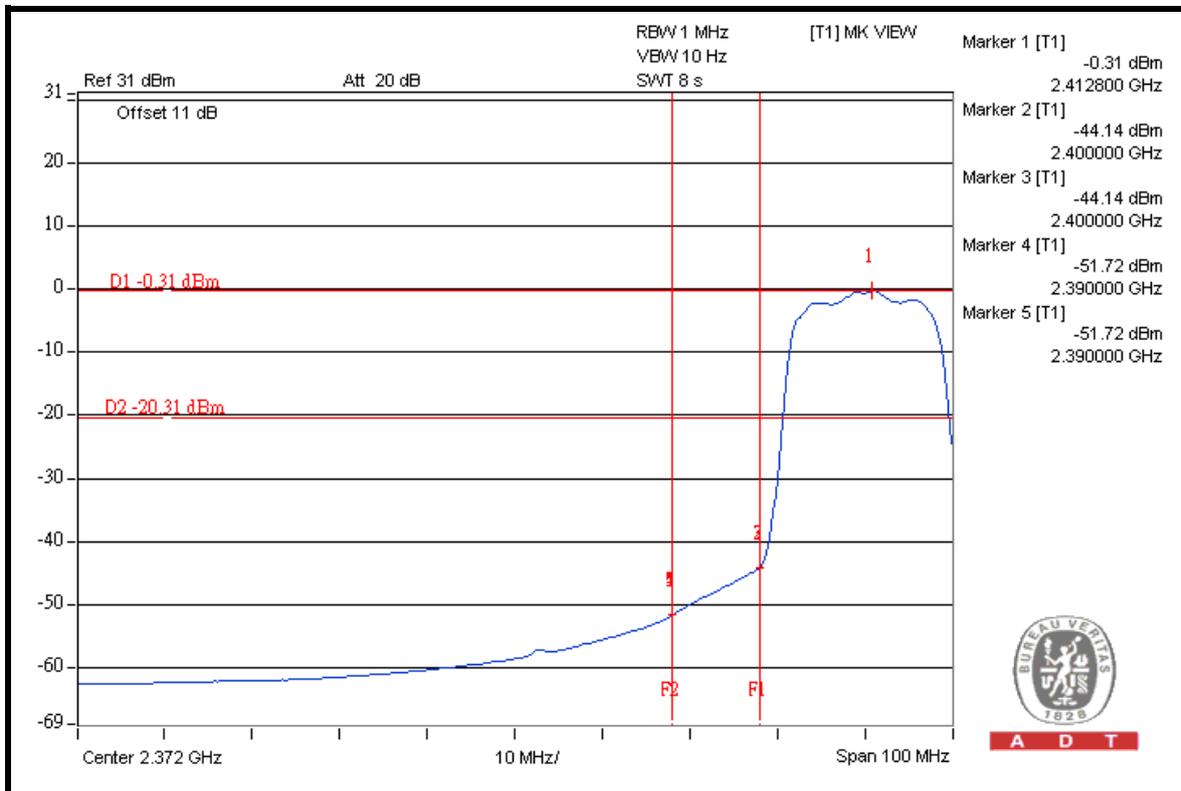
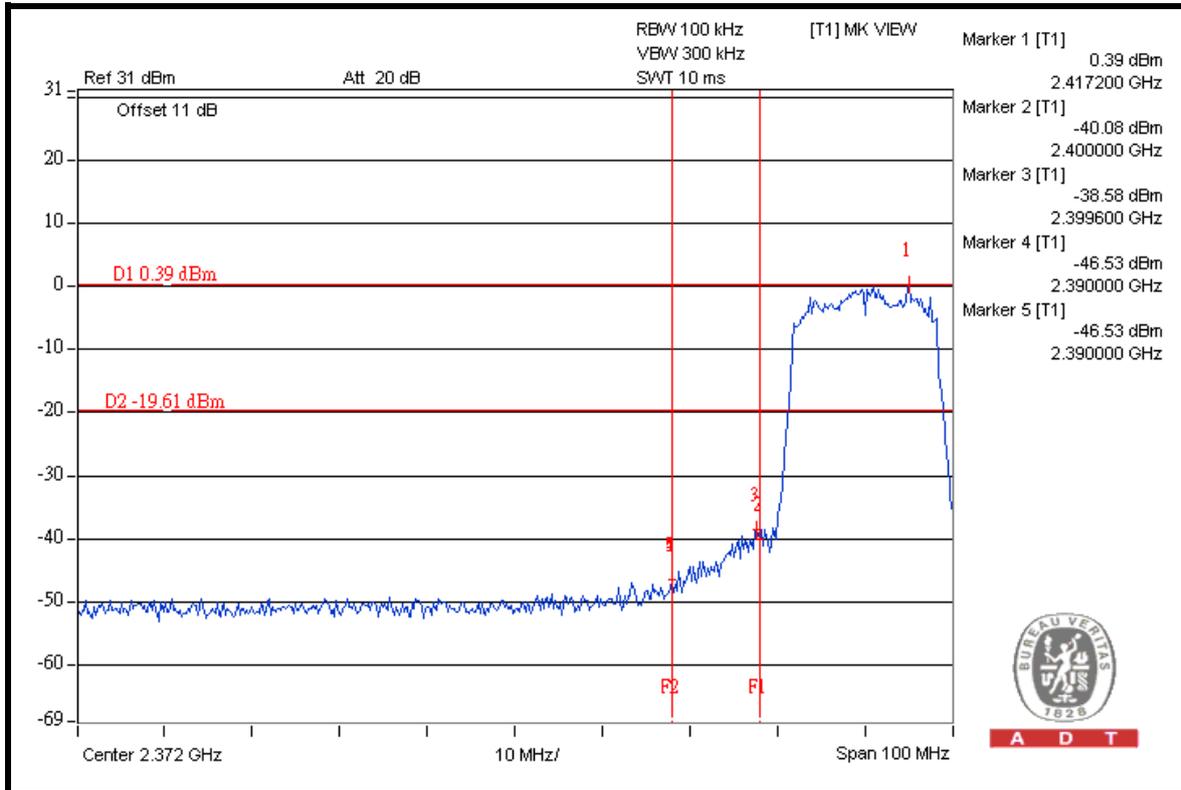
FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2462.00 (PK)	103.9	44.88	59.02	74.00
2462.00 (AV)	91.4	48.94	42.46	54.00

NOTE:

1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 3 pages.
2. Maximum field strength in restrict band = Fundamental emission – Delta.

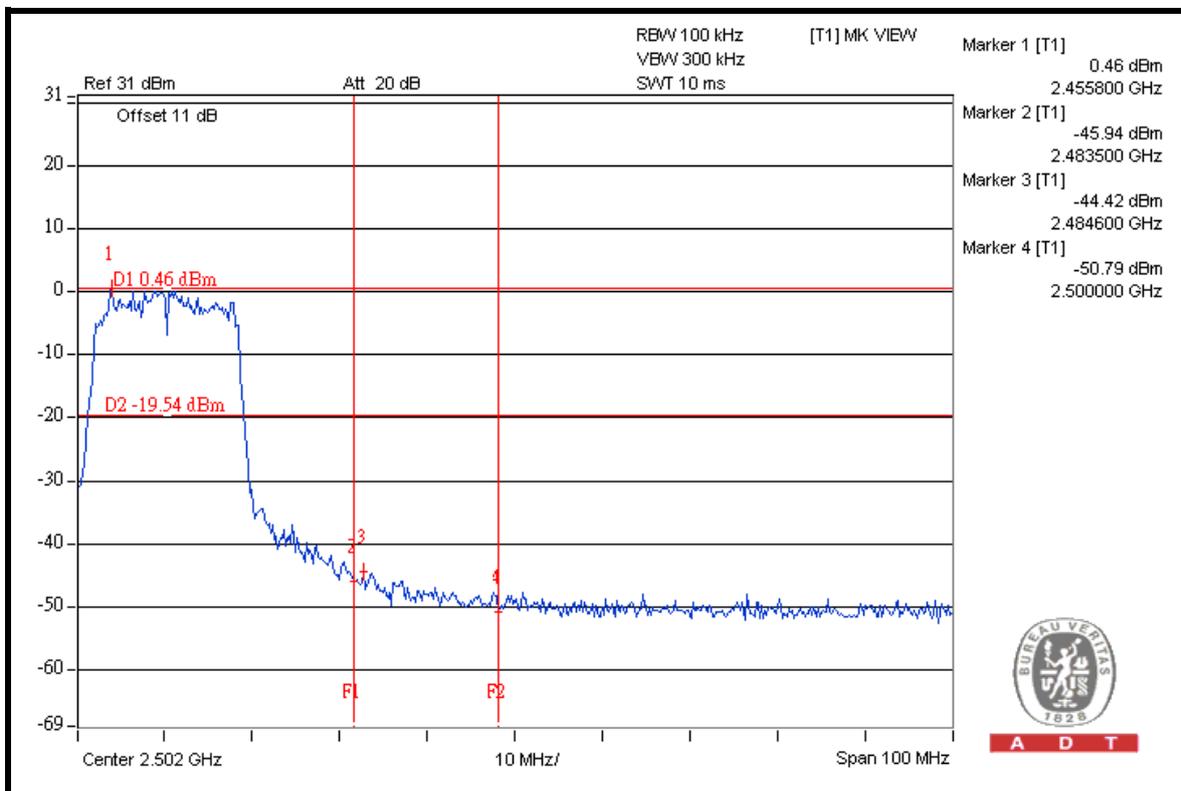
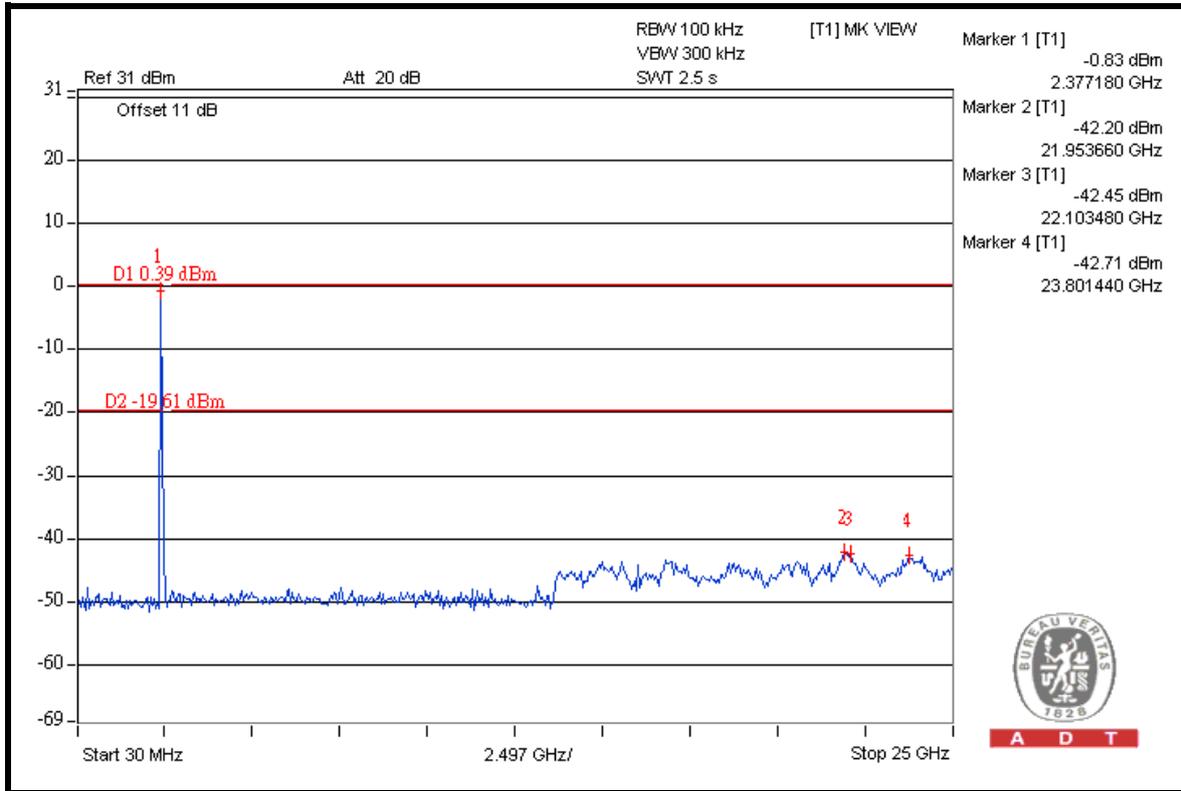


A D T



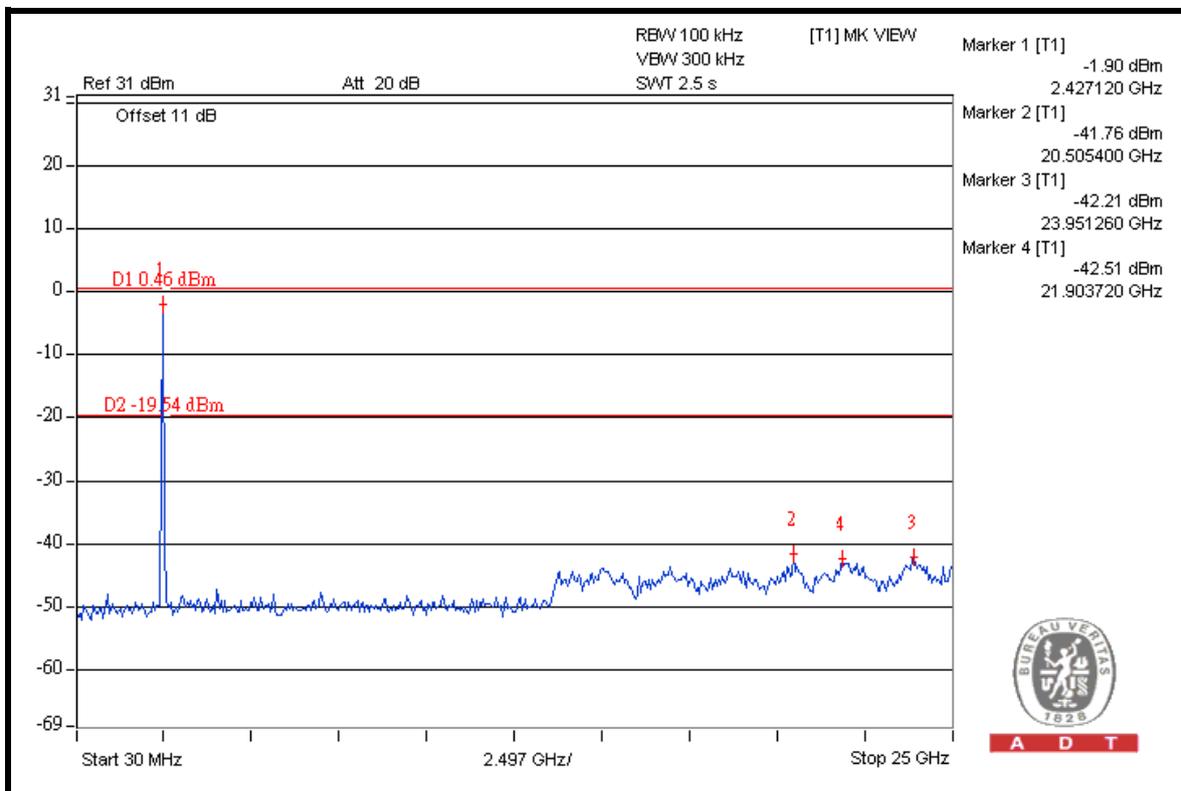
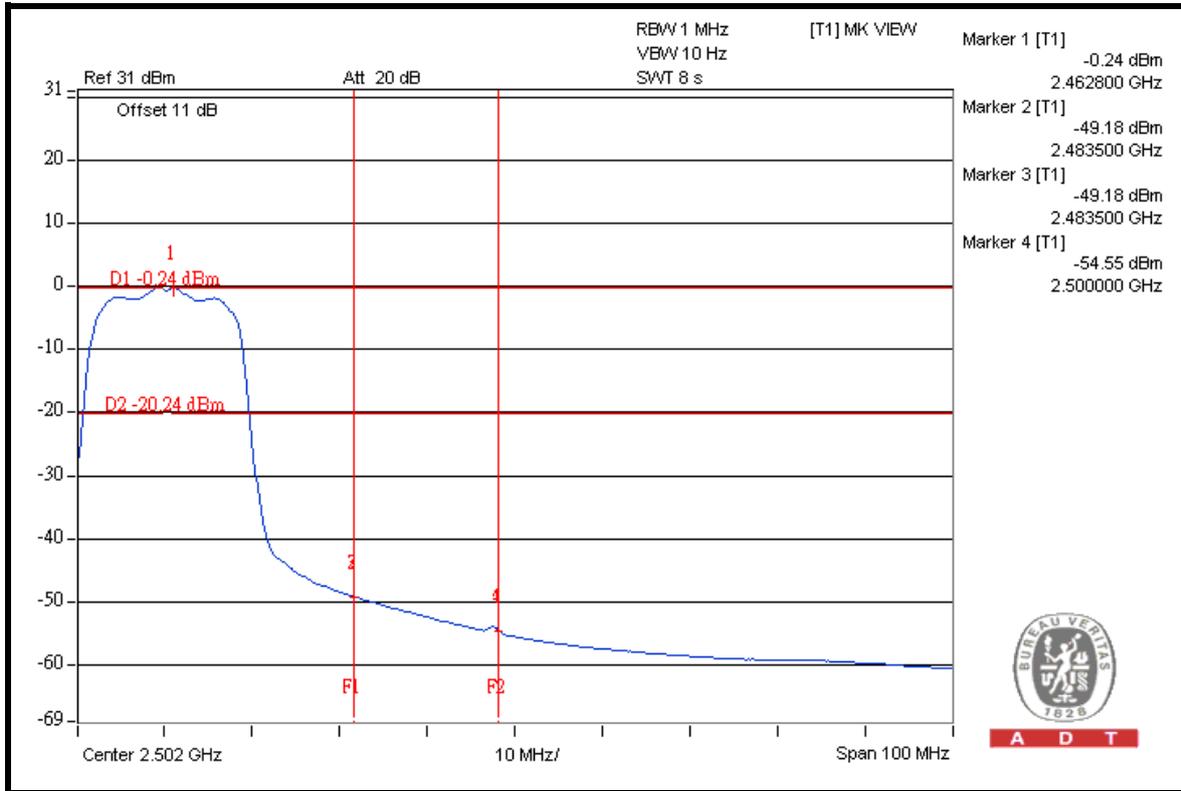


A D T





A D T





A D T

802.11n (20MHz)

RESTRICT BAND (2310 ~ 2390 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2412.00 (PK)	103.5	46.75	56.75	74.00
2412.00 (AV)	90.1	50.14	39.96	54.00

RESTRICT BAND (2483.5 ~ 2500 MHz)

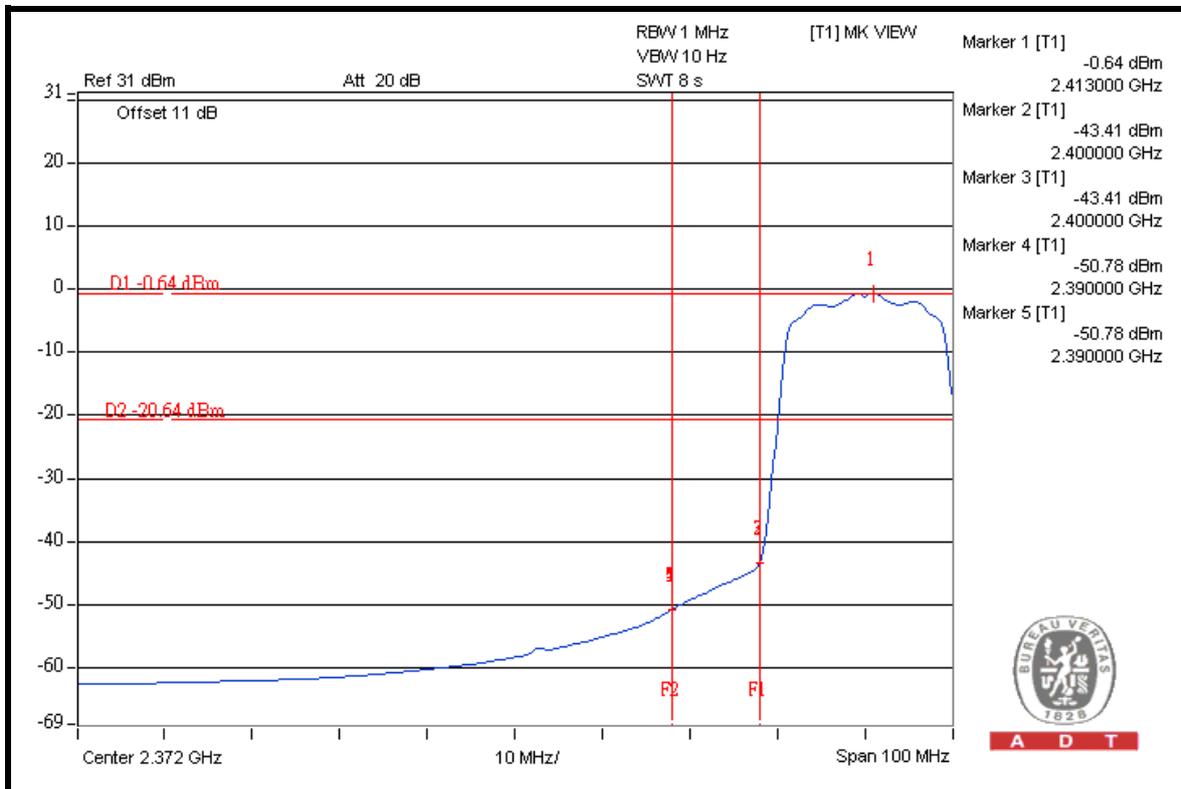
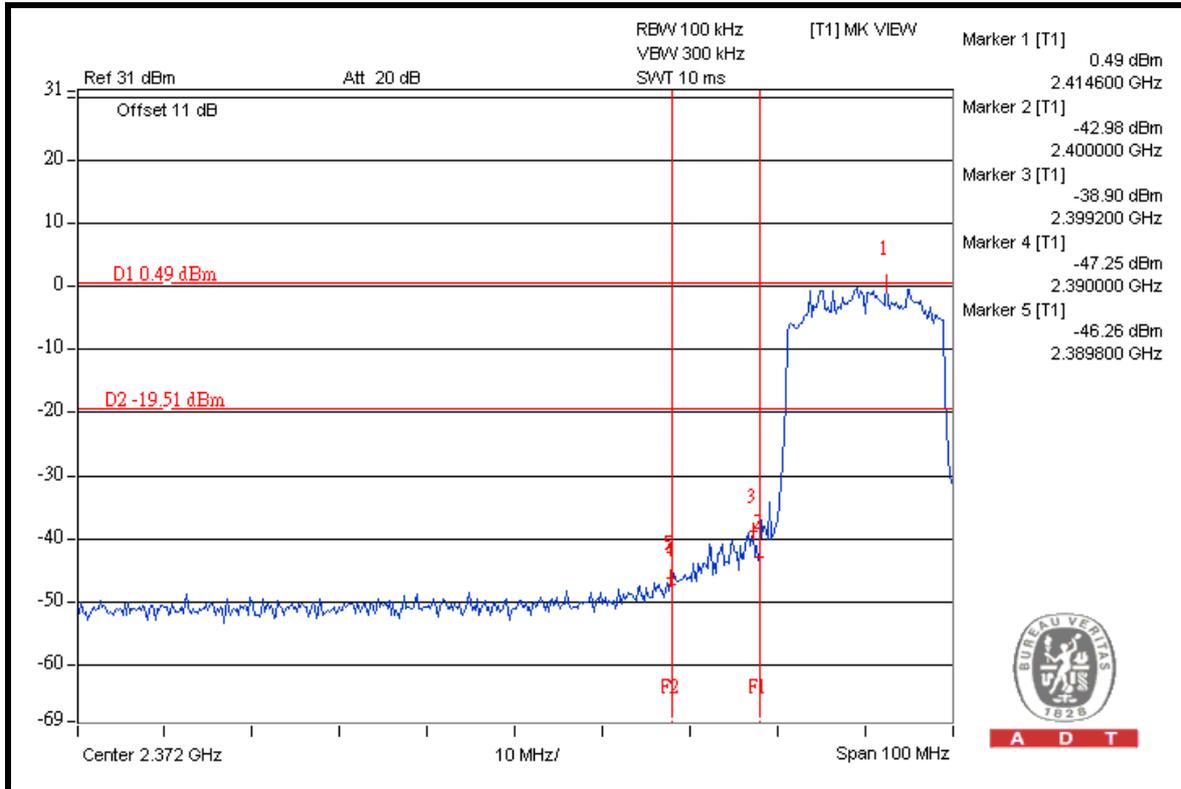
FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2462.00 (PK)	104.4	44.60	59.80	74.00
2462.00 (AV)	91.0	48.16	42.84	54.00

NOTE:

1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 3 pages.
2. Maximum field strength in restrict band = Fundamental emission – Delta.

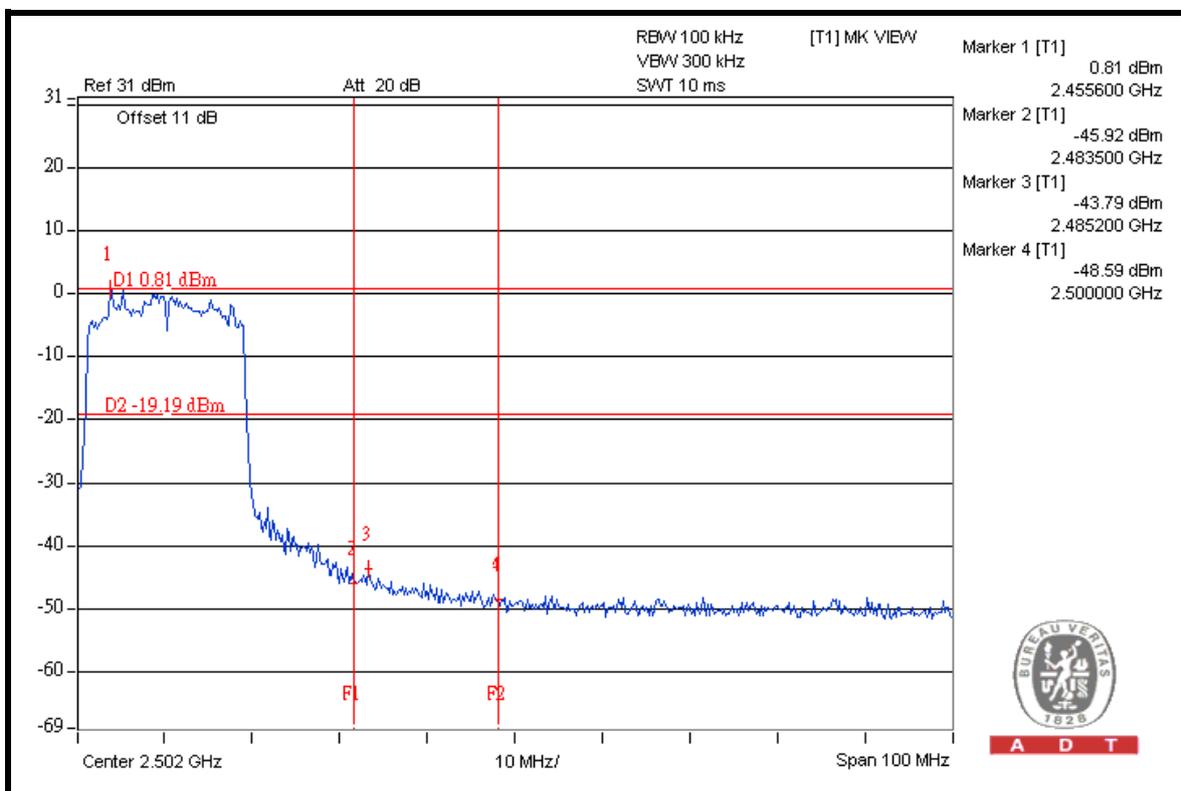
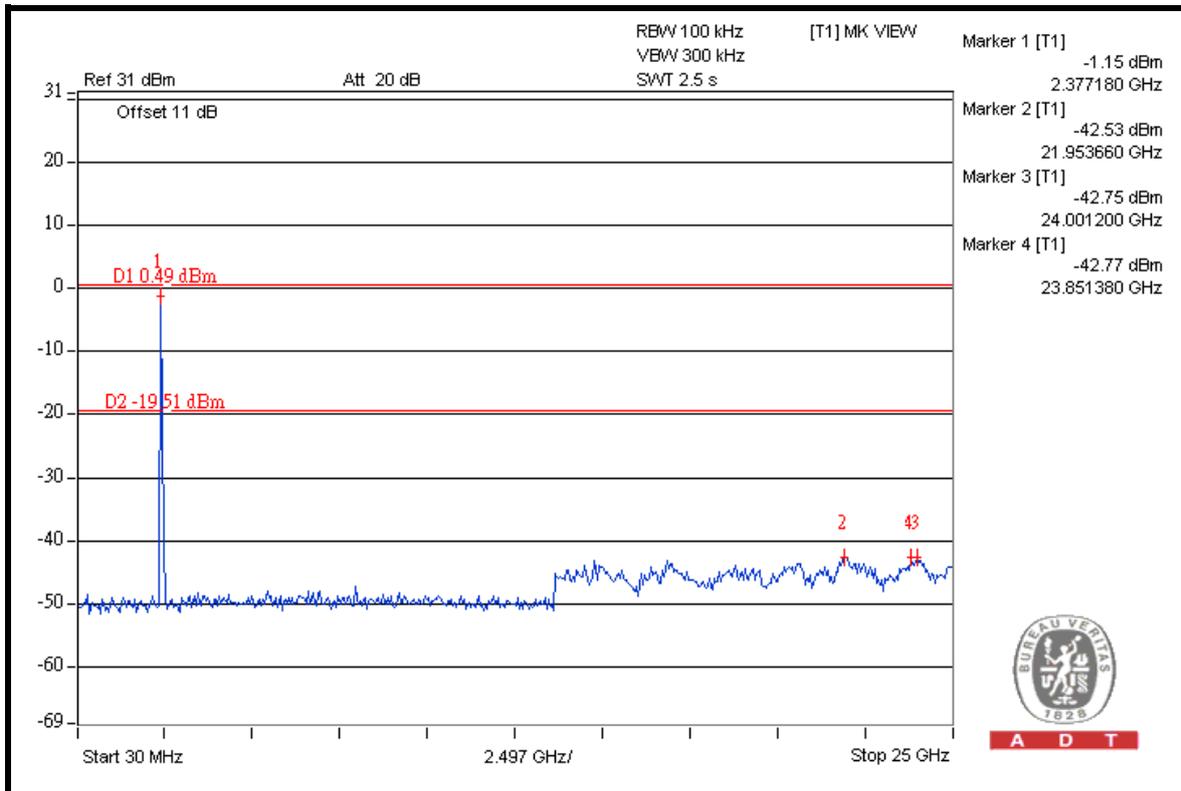


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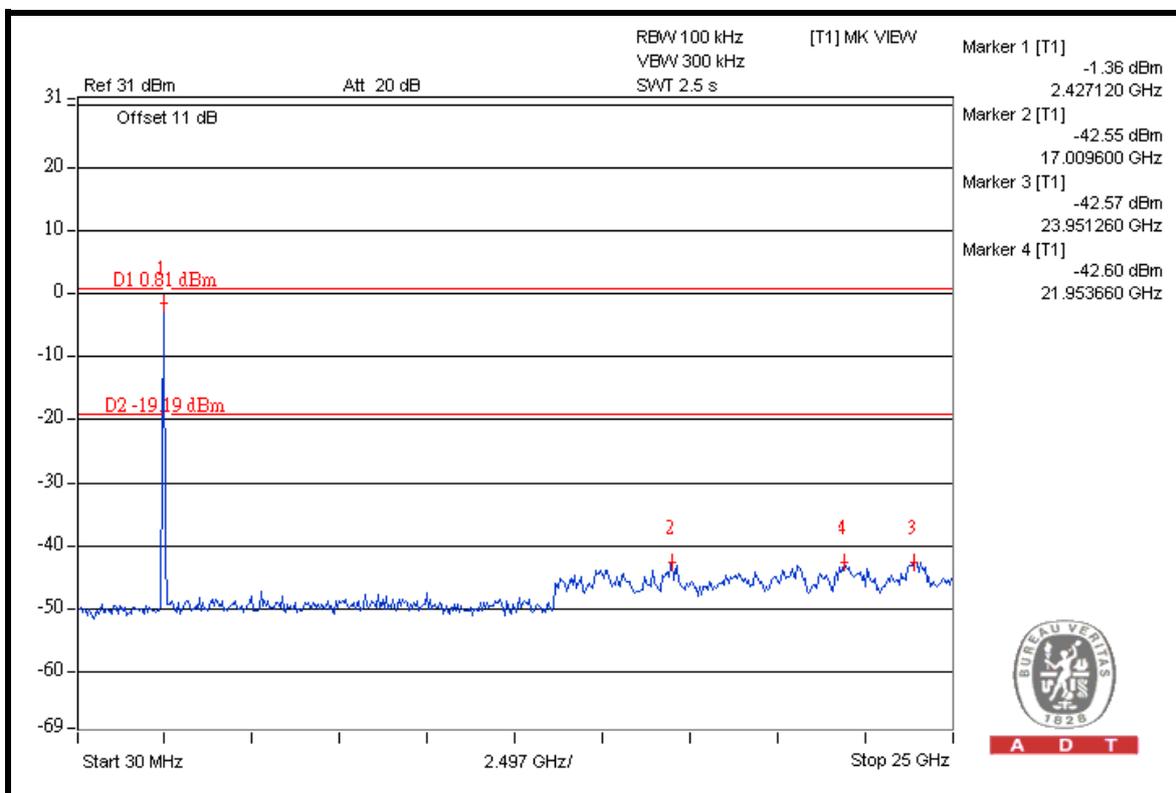
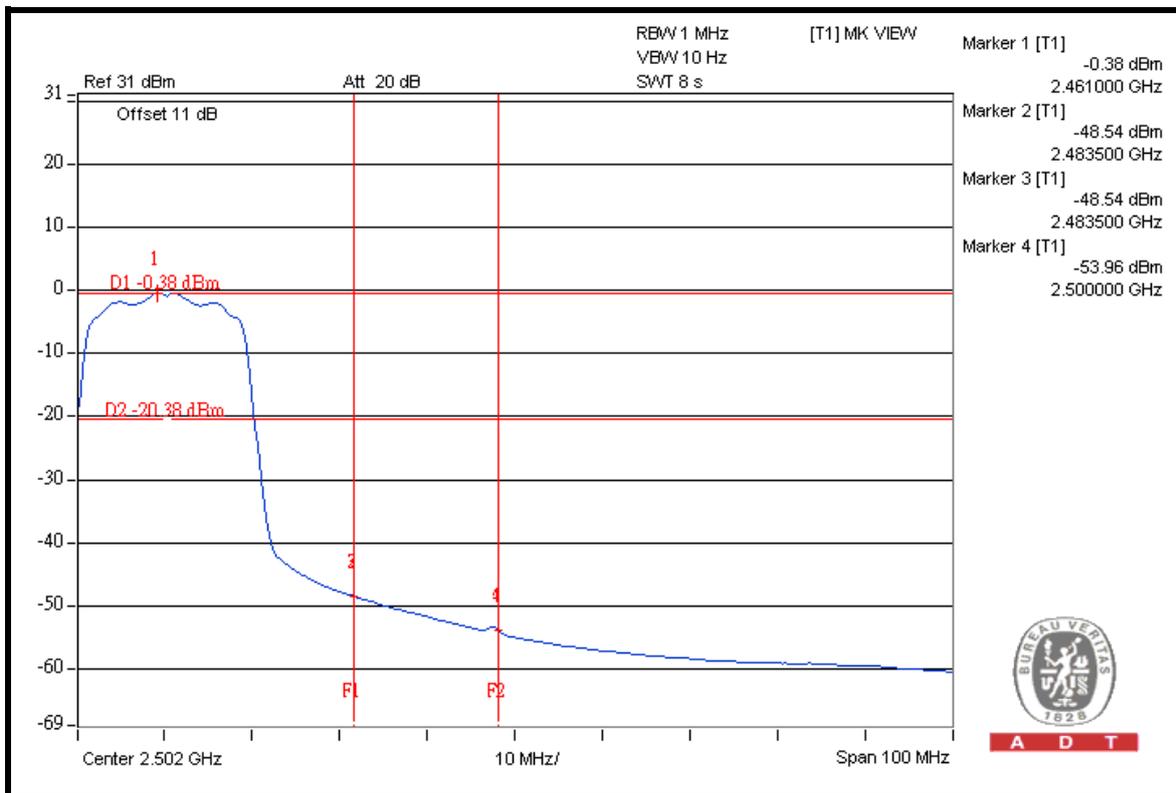


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A D T





A D T

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



A D T

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.

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

www.adt.com.tw/index.5.phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/TPCI Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

Email: service.adt@tw.bureauveritas.com

Web Site: www.adt.com.tw

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



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

No any modifications are made to the EUT by the lab during the test.

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