

FCC TEST REPORT

REPORT NO.: RF110117E03A

MODEL NO.: IWB-D1

FCC ID: A3LIWBD1

RECEIVED: Feb. 10, 2011

TESTED: Feb. 15 to 18, 2011

ISSUED: Mar. 18, 2011

APPLICANT: Samsung Electronics Co., Ltd.

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ISSUED BY: Bureau Veritas Consumer Products Services
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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	NA	Mar. 18, 2011



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1 CERTIFICATION

PRODUCT : Communication dongle
BRAND NAME : SAMSUNG
MODEL NO. : IWB-D1
TEST SAMPLE : MASS-PRODUCTION
APPLICANT : Samsung Electronics Co., Ltd.
TESTED : Feb. 15 to 18, 2011
STANDARDS : FCC Part 15, Subpart C (Section 15.249)
ANSI C63.4-2003
ANSI C63.10-2009

The above equipment (Model: IWB-D1) 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 : Carol Liao, **DATE:** Mar. 18, 2011
(Carol Liao, Specialist)

APPROVED BY : May Chen, **DATE:** Mar. 18, 2011
(May Chen, Deputy Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
Standard Paragraph	Test Type	Result	Remark
15.207	Conducted Emission Test	PASS	Minimum passing margin is -11.91dB at 0.205MHz
15.249	Radiated Emission Test	PASS	Minimum passing margin is -0.6dB at 4960.00MHz
15.249	Conducted - Out Band Measurement	PASS	Meet the requirement of limit

2.1 MEASUREMENT UNCERTAINTY

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

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

Measurement	Value
Conducted emission	2.45 dB
Radiated emissions (30MHz-1GHz)	3.3 dB
Radiated emissions (1GHz-18GHz)	2.19 dB
Radiated emissions (18GHz-40GHz)	2.55 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Communication dongle
MODEL NO.	IWB-D1
FCC ID	A3LIWBD1
POWER SUPPLY	DC 5V±10% from host equipment
MODULATION TYPE	O-QPSK
TRANSFER RATE	250kbps
NUMBER OF CHANNEL	16
ANTENNA TYPE	Chip antenna without connector (antenna gain 0dBi)
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. There is ZigBee technology used for the EUT.
2. The EUT was pre-tested under the following modes:

Pre-test Mode	Description
Mode A	X-Y plane
Mode B	Z-X plane
Mode C	Z-Y plane

From the above modes, the worst case was found in **Mode C**. Therefore the test data of the mode was recorded in this report.

3. The above EUT information was declared by the manufacturer and for more detailed feature descriptions, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Sixteen channels are provided to this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	2405	5	2425	9	2445	13	2465
2	2410	6	2430	10	2450	14	2470
3	2415	7	2435	11	2455	15	2475
4	2420	8	2440	12	2460	16	2480

NOTE:

- Below 1 GHz, the channel 1, 8, and 16 were pre-tested in chamber. The channel 1, worst case one, was chosen for final test.
- Above 1 GHz, the channel 1, 8, and 16 were tested individually.

3.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

Where **PLC:** Power Line Conducted Emission

RE < 1G: Radiated Emission below 1GHz

RE ≥ 1G: Radiated Emission above 1GHz

OBE: Conducted Out-Band Emission measurement

POWER LINE CONDUCTED EMISSION TEST:

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 16	1	O-QPSK

RADIATED EMISSION TEST (BELOW 1 GHz):

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 16	1	O-QPSK

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 16	1, 8, 16	O-QPSK

CONDUCTED OUT-BAND EMISSION MEASUREMENT:

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 16	1, 8, 16	O-QPSK

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
PLC	16deg. C, 78%RH, 1022 hPa	120Vac, 60Hz	Timmy Hu
RE ³ 1G	20deg. C, 65%RH, 1022 hPa	120Vac, 60Hz	Rex Huang
RE<1G	19deg. C, 66%RH, 1022 hPa	120Vac, 60Hz	Rex Huang
OBE	20deg. C, 60%RH, 1022 hPa	120Vac, 60Hz	Rex Huang



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3.4 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 (Section 15.249)

ANSI C63.4: 2003

ANSI C63.10: 2009

All tests 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.

3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

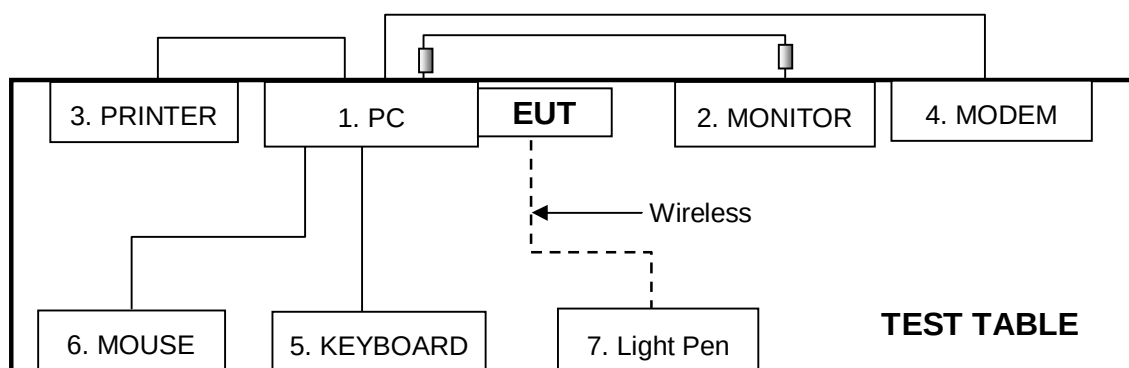
For Conducted test					
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	PERSONAL COMPUTER	DELL	DCSCMF	BKKB32S	FCC DoC
2	MONITOR	DELL	E2210Hc	CN-OG337R-64180-97S-OQNS	FCC DoC
3	PRINTER	EPSON	LQ-300+II	G88Y074083	FCC DoC
4	MODEM	ACEEX	1414	0206026778	IFAXDM1414
5	KEYBOARD	DELL	SK-8115	MY-0DJ325-71619-99B-0476	FCC DoC
6	MOUSE	DELL	MOC5UO	I1401MLU	FCC DoC
7	Light Pen	Alpha	NA	NA	NA
For Radiated test					
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	GSLB32S	FCC DoC
2	iPod	Apple	A1137	6U6078FMUPR	FCC DoC

For Conducted test	
No.	Signal cable description
1	NA
2	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, with two cores.
3	1.8 m braid shielded wire, terminated with DB25 and centronics connector via metallic frame, w/o core
4	1.0 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
5	2.0 m foil shielded wire, terminal by frame, USB Connector, w/o Core.
6	2.0 m foil shielded wire, terminal by frame, USB Connector, w/o Core.
7	NA
For Radiated test	
No.	Signal cable description
1	NA
2	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, with two cores.

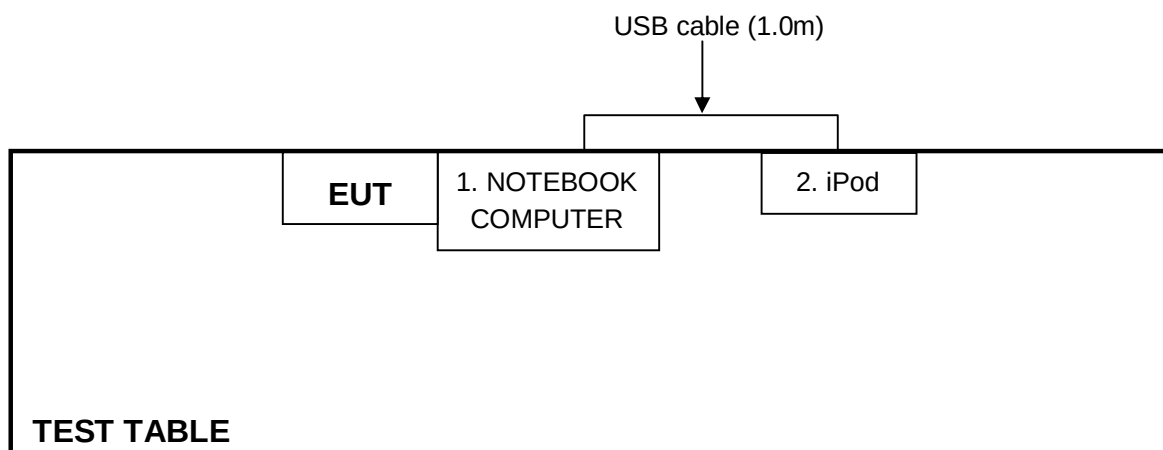
NOTE: All power cords of the above support units are non shielded (1.8m).

3.6 CONFIGURATION OF SYSTEM UNDER TEST

For Conducted test:



For Radiated test:



4 TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	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. All emanations from a class B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 09, 2010	Mar. 08, 2011
Line-Impedance Stabilization Network (for EUT)	NSLK 8127	8127-522	Sep. 08, 2010	Sep. 07, 2011
Line-Impedance Stabilization Network (for Peripheral)	ESH3-Z5	848773/004	Nov. 03, 2010	Nov. 02, 2011
RF Cable (JYEBAO)	5DFB	COCCAB-002	Aug. 30, 2010	Aug. 29, 2011
50 ohms Terminator	50	3	Nov. 03, 2010	Nov. 02, 2011
Software	BV ADT_Cond_V7.3.7	NA	NA	NA

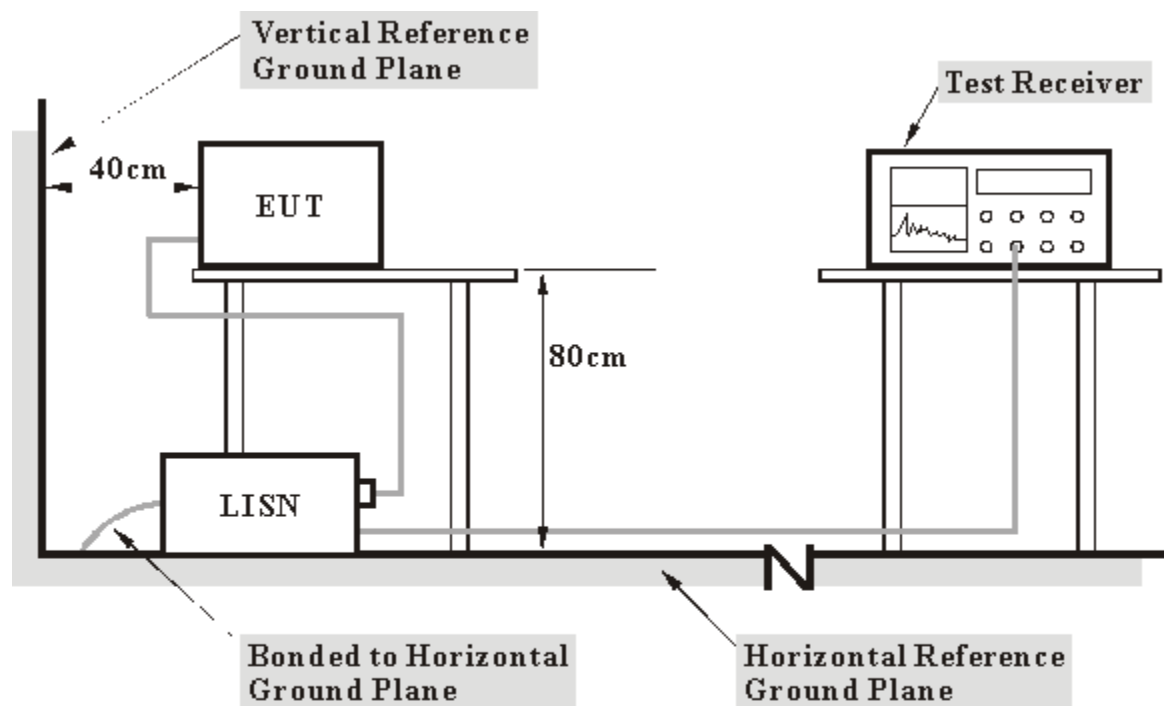
Note:

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 Shielded Room No. C.
- 3 The VCCI Con C Registration No. is C-3611.

4.1.3 TEST PROCEDURES

- The EUT/HOST was placed 0.4 meters from the conducting wall of the shielded room with EUT/HOST being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT/HOST were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

4.1.4 TEST SETUP



- Note:**
- Support units were connected to second LISN.
 - Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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



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4.1.5 EUT OPERATING CONDITIONS

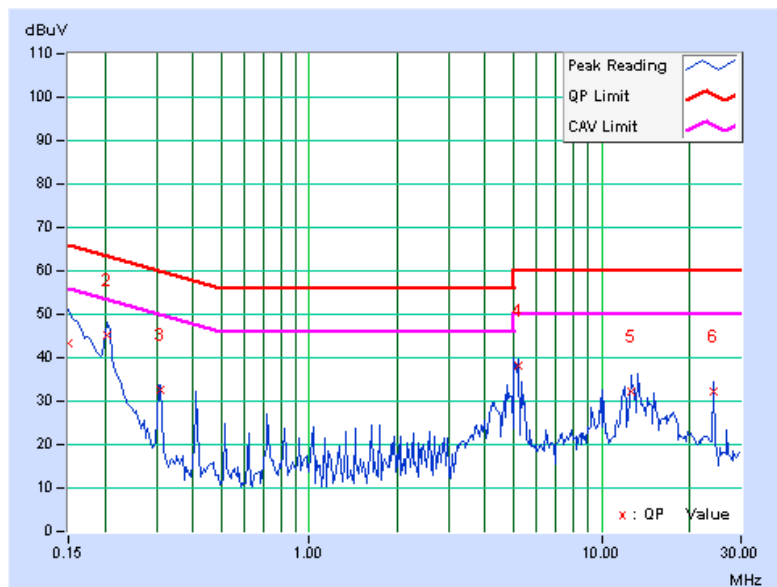
1. Plug the EUT into the support unit 1 (Personal Computer) which is placed on the test table.
2. The EUT communicated with support unit 7 (Light Pen) continuously via wireless transmission.

4.1.6 TEST RESULTS

PHASE	Line (L)	6DB BANDWIDTH	9 kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.10	43.07	30.15	43.17	30.25	66.00	56.00	-22.83	-25.75
2	0.205	0.13	44.97	41.38	45.10	41.51	63.42	53.42	-18.32	-11.91
3	0.310	0.13	32.45	31.99	32.58	32.12	59.97	49.97	-27.39	-17.85
4	5.203	0.26	38.06	25.39	38.32	25.65	60.00	50.00	-21.68	-24.35
5	12.633	0.52	31.81	27.81	32.33	28.33	60.00	50.00	-27.67	-21.67
6	24.020	0.79	31.59	29.98	32.38	30.77	60.00	50.00	-27.62	-19.23

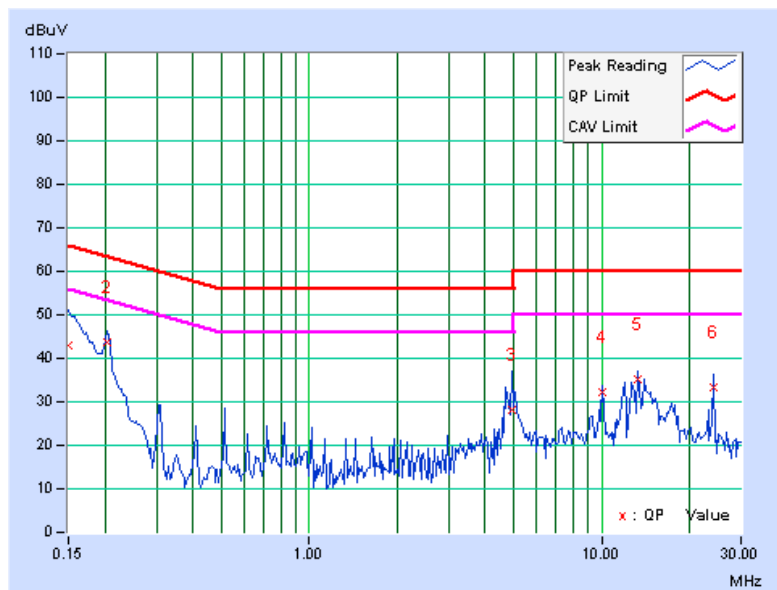
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value =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



PHASE	Neutral (N)	6DB BANDWIDTH	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.12	42.75	28.93	42.87	29.05	66.00	56.00	-23.13	-26.95
2	0.205	0.14	43.64	35.99	43.78	36.13	63.42	53.42	-19.64	-17.29
3	4.914	0.36	27.62	14.67	27.98	15.03	56.00	46.00	-28.02	-30.97
4	10.070	0.83	31.47	29.86	32.30	30.69	60.00	50.00	-27.70	-19.31
5	13.297	1.02	34.17	30.39	35.19	31.41	60.00	50.00	-24.81	-18.59
6	24.020	1.73	31.67	30.04	33.40	31.77	60.00	50.00	-26.60	-18.23

- 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.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

According to 15.249 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m)	
	Peak	Average
2400 ~ 2483.5	114	94
	Field Strength of Harmonics (dBuV/m)	
	74	54

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

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	$2400/F(\text{kHz})$	300
0.490-1.705	$24000/F(\text{kHz})$	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

- 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.
- Section 15.205 restricted bands of operation shall compliance with the limits in Section 15.209.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250254	July 14, 2010	July 13, 2011
Agilent Pre-Selector	N9039A	MY46520311	July 14, 2010	July 13, 2011
Agilent Signal Generator	N5181A	MY49060517	July 14, 2010	July 13, 2011
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-03	Nov. 16, 2010	Nov. 15, 2011
Agilent Pre-Amplifier	8449B	3008A02578	July 05, 2010	July 04, 2011
Miteq Pre-Amplifier	AFS33-1800265 0-30-8P-44	881786	NA	NA
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-360	Apr. 29, 2010	Apr. 28, 2011
AISI Horn_Antenna	AIH.8018	0000320091110	Nov. 12, 2010	Nov. 11, 2011
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Oct. 08, 2010	Oct. 07, 2011
RF CABLE	NA	RF104-201 RF104-203 RF104-204	Dec. 27, 2010	Dec. 26, 2011
RF Cable	NA	CHGCAB_001	NA	NA
Software	ADT_Radiated_ V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters chamber room. 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 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 detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

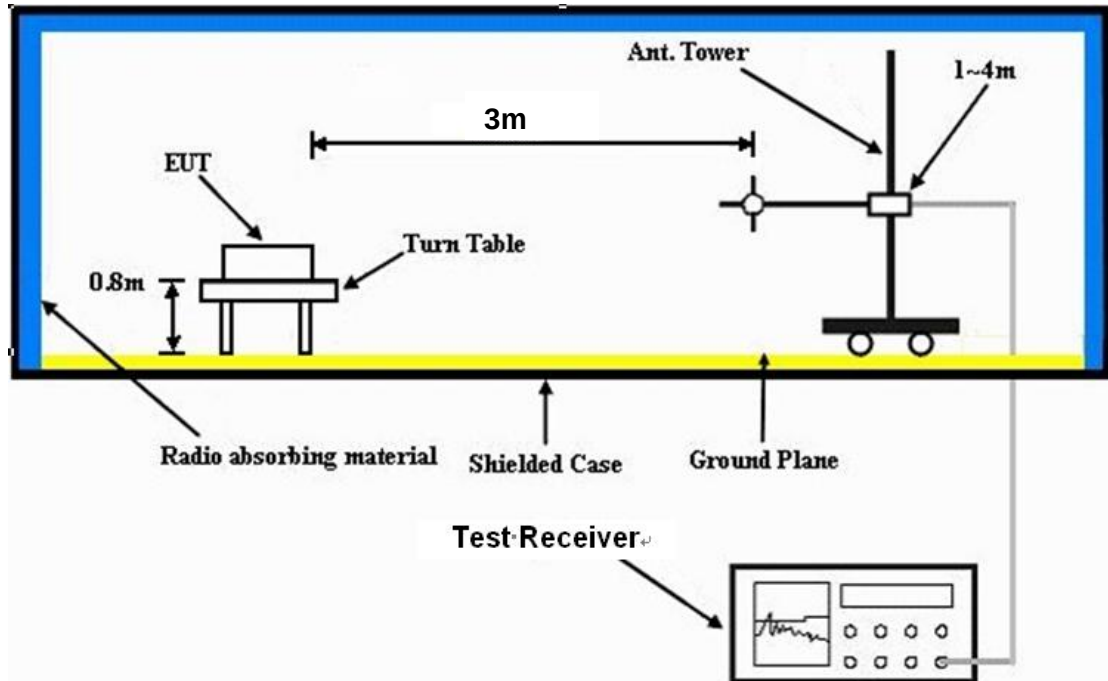
NOTE:

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 is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

1. Plug the EUT with the support unit 1 (Notebook Computer) which is placed in test table.
2. The support unit 1 (Notebook Computer) runs test program “Console command” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	19deg. C, 66%RH 1022 hPa	TESTED BY	Rex Huang

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	149.96	32.2 QP	43.5	-11.3	1.50 H	311	18.21	13.99
2	239.96	31.0 QP	46.0	-15.0	1.00 H	338	18.13	12.90
3	360.04	37.2 QP	46.0	-8.8	1.00 H	344	20.38	16.78
4	480.01	32.3 QP	46.0	-13.7	1.75 H	38	12.70	19.61
5	849.01	33.9 QP	46.0	-12.1	1.75 H	313	7.97	25.92
6	959.97	43.0 QP	46.0	-3.0	1.50 H	141	15.69	27.31
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	38.41	31.9 QP	40.0	-8.2	1.00 V	35	18.07	13.78
2	312.08	32.2 QP	46.0	-13.8	1.75 V	58	16.52	15.72
3	360.04	32.9 QP	46.0	-13.1	2.00 V	315	16.16	16.78
4	480.01	31.1 QP	46.0	-14.9	1.25 V	295	11.50	19.61
5	846.29	33.4 QP	46.0	-12.6	1.25 V	160	7.55	25.87
6	959.97	38.7 QP	46.0	-7.3	1.00 V	229	11.37	27.31

- 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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ABOVE 1GHz DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH 1023 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.0 PK	74.0	-19.0	1.00 H	68	23.34	31.66
2	2390.00	48.2 AV	54.0	-5.8	1.00 H	68	16.54	31.66
3	*2405.00	98.6 PK	114.0	-15.4	1.00 H	68	66.89	31.71
4	*2405.00	91.8 AV	94.0	-2.2	1.00 H	68	60.09	31.71
5	4810.00	57.2 PK	74.0	-16.8	1.53 H	40	18.28	38.92
6	4810.00	50.4 AV	54.0	-3.6	1.53 H	40	11.48	38.92
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	55.7 PK	74.0	-18.3	1.00 V	271	24.04	31.66
2	2390.00	48.9 AV	54.0	-5.1	1.00 V	271	17.24	31.66
3	*2405.00	99.7 PK	114.0	-14.3	1.00 V	271	67.99	31.71
4	*2405.00	92.9 AV	94.0	-1.1	1.00 V	271	61.19	31.71
5	4810.00	59.2 PK	74.0	-14.8	1.20 V	97	20.28	38.92
6	4810.00	52.4 AV	54.0	-1.6	1.20 V	97	13.48	38.92

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
6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
 $20 \log (\text{Duty cycle}) = 20 \log (17.32 \text{ ms} / 38 \text{ ms}) = -6.8 \text{ dB}$
Please see page 25 for plotted duty.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 8	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH 1023 hPa	TESTED BY	Rex Huang

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	*2440.00	98.2 PK	114.0	-15.8	1.00 H	68	66.38	31.82
2	*2440.00	91.4 AV	94.0	-2.6	1.00 H	68	59.58	31.82
3	4880.00	56.7 PK	74.0	-17.3	1.47 H	41	17.54	39.16
4	4880.00	49.9 AV	54.0	-4.1	1.47 H	41	10.74	39.16
5	7320.00	55.1 PK	74.0	-18.9	1.12 H	104	8.47	46.63
6	7320.00	48.3 AV	54.0	-5.7	1.12 H	104	1.67	46.63
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	*2440.00	99.2 PK	114.0	-14.8	1.01 V	273	67.38	31.82
2	*2440.00	92.4 AV	94.0	-1.6	1.01 V	273	60.58	31.82
3	4880.00	59.3 PK	74.0	-14.7	1.19 V	97	20.14	39.16
4	4880.00	52.5 AV	54.0	-1.5	1.19 V	97	13.34	39.16
5	7320.00	54.1 PK	74.0	-19.9	1.06 V	121	7.47	46.63
6	7320.00	47.3 AV	54.0	-6.7	1.06 V	121	0.67	46.63

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
 6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
 $20 \log (\text{Duty cycle}) = 20 \log (17.32 \text{ ms} / 38 \text{ ms}) = -6.8 \text{ dB}$
 Please see page 25 for plotted duty.

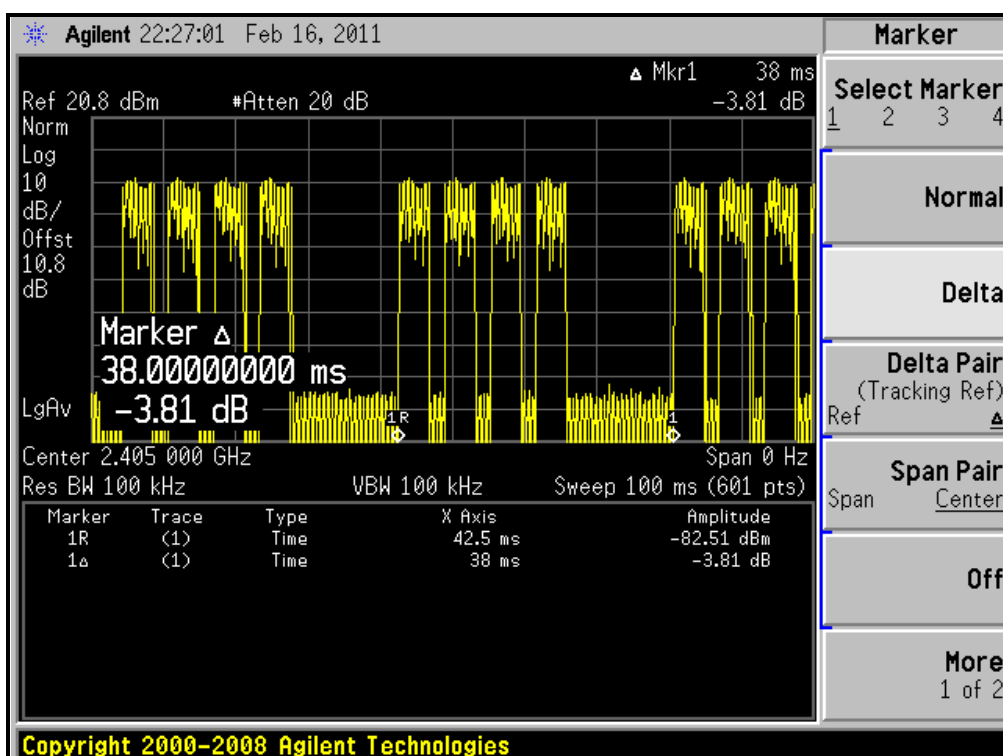
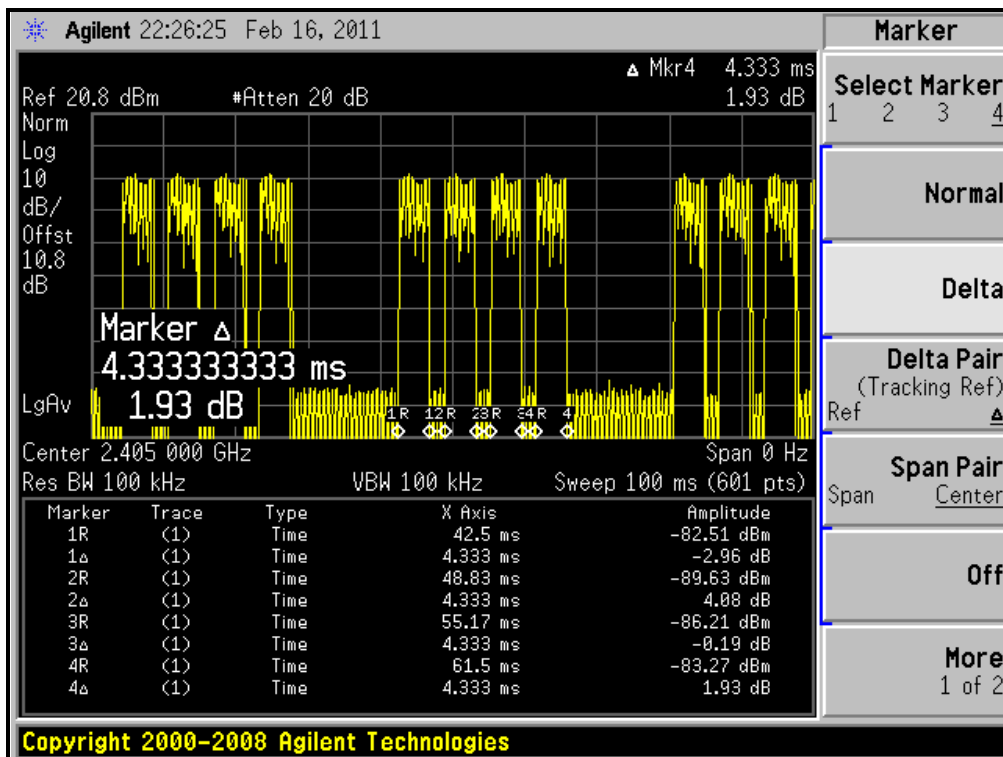


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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 16	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH 1023 hPa	TESTED BY	Rex Huang

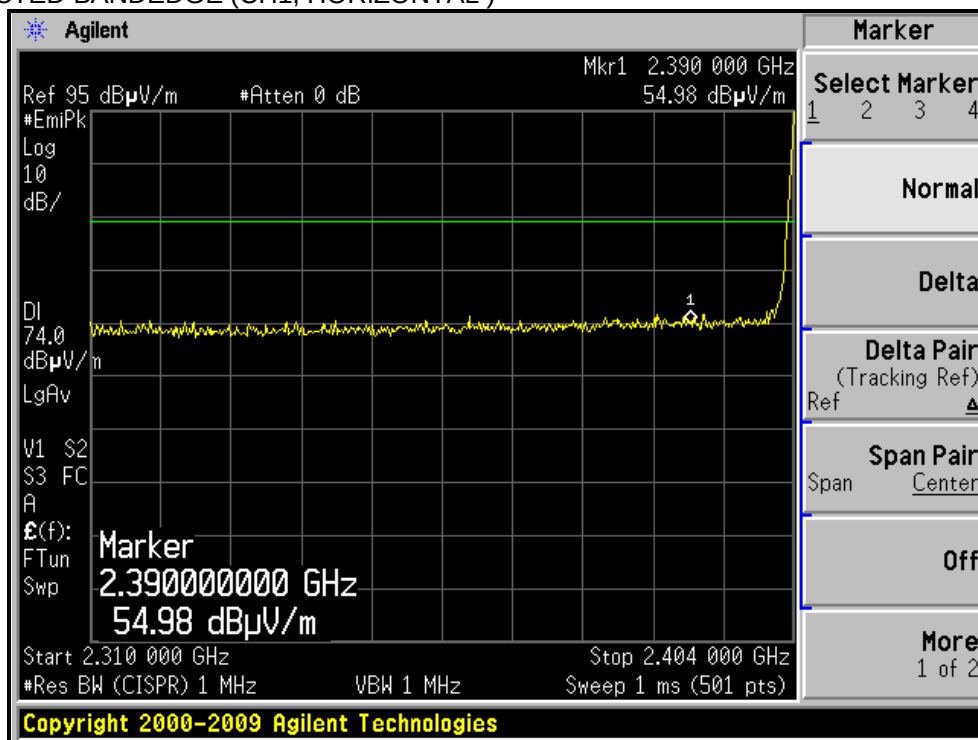
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	97.0 PK	114.0	-17.0	1.00 H	69	65.05	31.95
2	*2480.00	90.2 AV	94.0	-3.8	1.00 H	69	58.25	31.95
3	2483.50	56.6 PK	74.0	-17.4	1.00 H	69	24.63	31.97
4	2483.50	49.8 AV	54.0	-4.2	1.00 H	69	17.83	31.97
5	4960.00	56.3 PK	74.0	-17.7	1.31 H	50	16.88	39.42
6	4960.00	49.5 AV	54.0	-4.5	1.31 H	50	10.08	39.42
7	7440.00	55.5 PK	74.0	-18.5	1.09 H	110	8.94	46.56
8	7440.00	48.7 AV	54.0	-5.3	1.09 H	110	2.14	46.56
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	*2480.00	98.2 PK	114.0	-15.8	1.00 V	332	66.25	31.95
2	*2480.00	91.4 AV	94.0	-2.6	1.00 V	332	59.45	31.95
3	2483.50	57.1 PK	74.0	-16.9	1.00 V	332	25.13	31.97
4	2483.50	50.3 AV	54.0	-3.7	1.00 V	332	18.33	31.97
5	4960.00	60.2 PK	74.0	-13.8	1.16 V	97	20.78	39.42
6	4960.00	53.4 AV	54.0	-0.6	1.16 V	97	13.98	39.42
7	7440.00	54.6 PK	74.0	-19.4	1.05 V	88	8.04	46.56
8	7440.00	47.8 AV	54.0	-6.2	1.05 V	88	1.24	46.56

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
6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
20 log (Duty cycle) = 20 log (17.32 ms / 38 ms) = -6.8 dB
Please see page 25 for plotted duty.

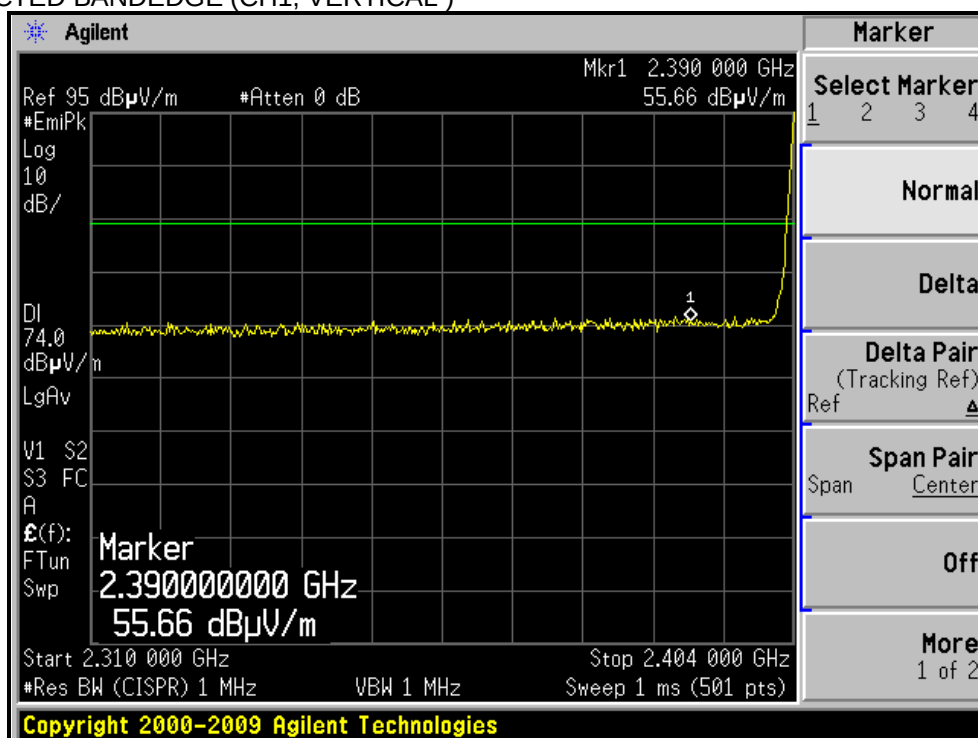


$$20 \log (\text{Duty cycle}) = 20 \log (17.32 \text{ ms} / 38 \text{ ms}) = -6.8 \text{ dB}$$

RESTRICTED BANDEDGE (CH1, HORIZONTAL)

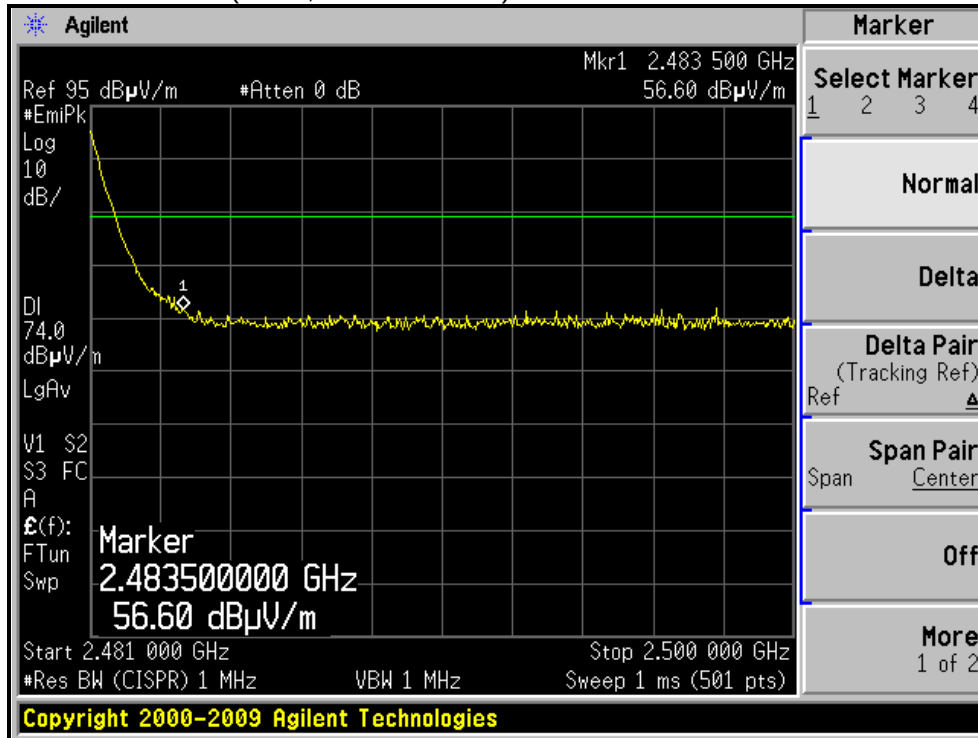


RESTRICTED BANDEDGE (CH1, VERTICAL)

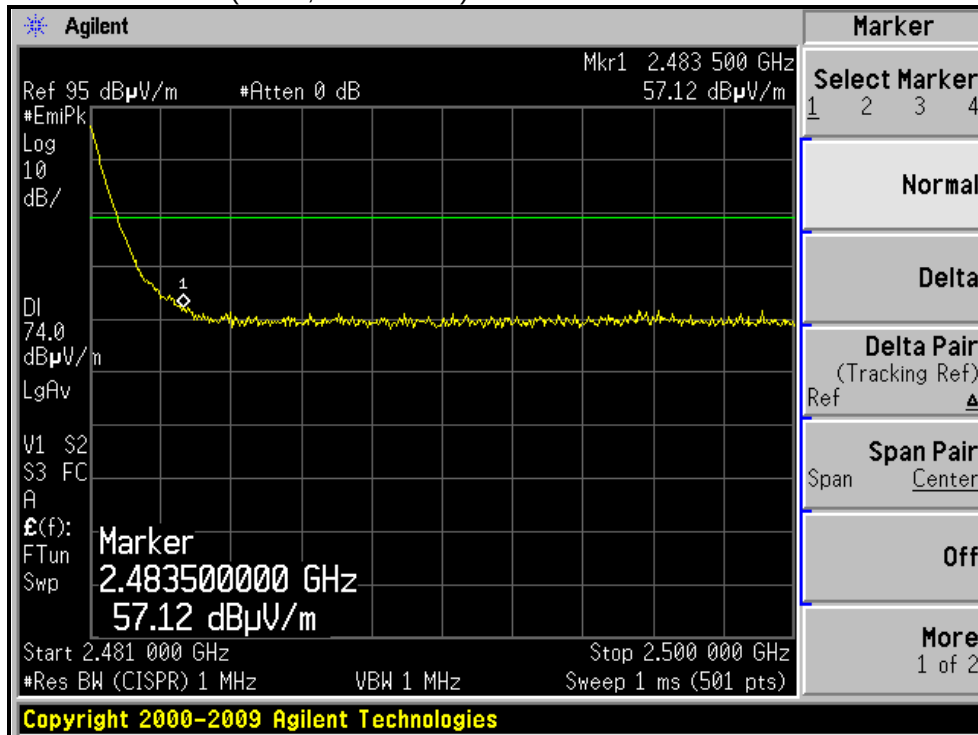


* The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle). And it meets the requirement of limit.

RESTRICTED BANDEDGE (CH16, HORIZONTAL)



RESTRICTED BANDEDGE (CH16, VERTICAL)



* The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle). And it meets the requirement of limit.

**A D T**

4.3 CONDUCTED - OUT BAND MEASUREMENT

4.3.1 LIMITS OF CONDUCTED - OUT BAND MEASUREMENT

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 08, 2010	Dec. 07, 2011

NOTE:

1. 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 via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz and 300 kHz with suitable frequency span from band edge. The band edges was measured and recorded.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

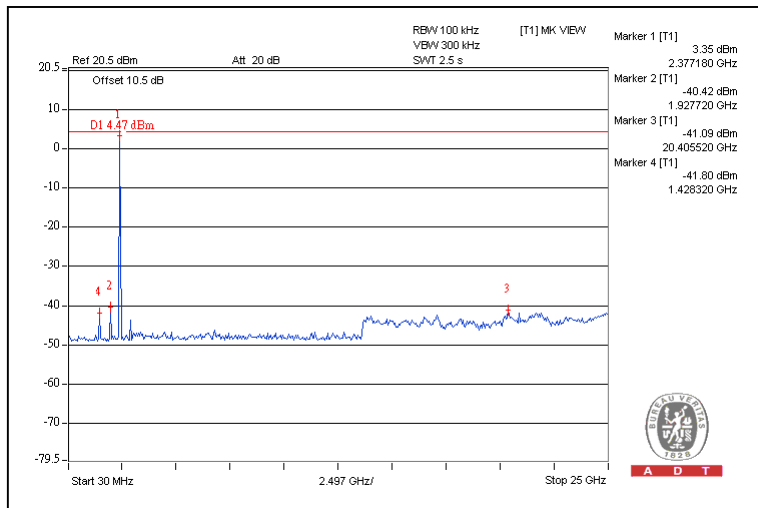
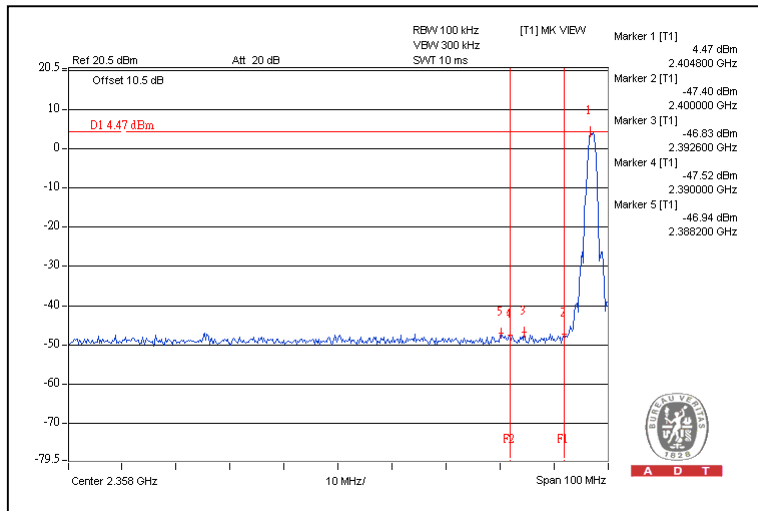
4.3.5 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

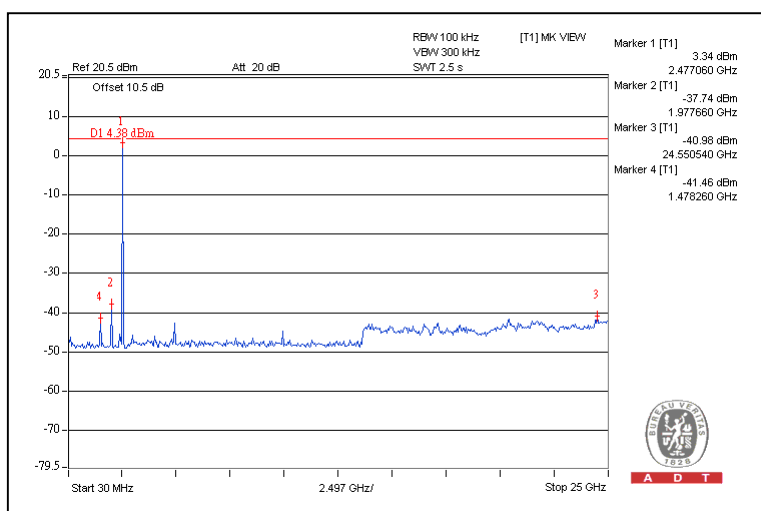
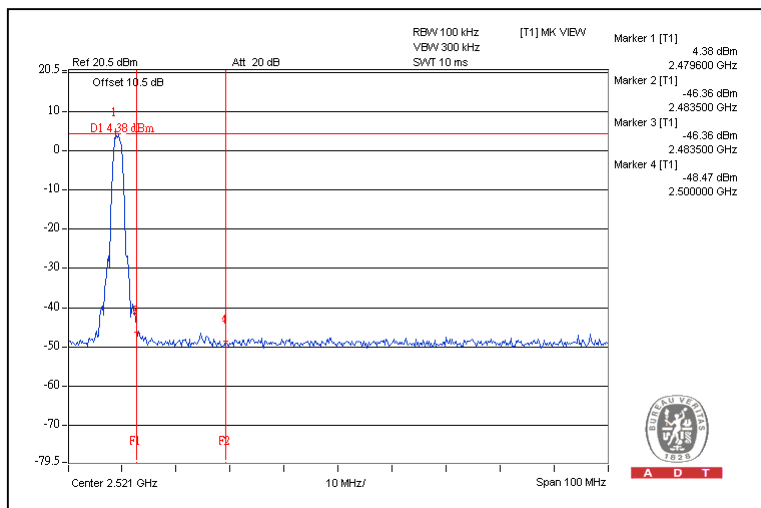
4.3.6 TEST RESULTS

Emissions radiated outside of the specified frequency bands, please refer below pages for met the requirement of the general radiated emission limits in § 15.209.

CH1



CH16



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5 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: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

Email: service@adt.com.tw

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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6 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.

--- END ---