



FCC TEST REPORT

REPORT NO. : RF980904L02A-1

MODEL NO. : M721R

FCC ID: W5EM721R

RECEIVED : Sep. 02, 2009

TESTED : Sep. 07 ~ Sep. 23, 2009

ISSUED : Apr. 28, 2011

APPLICANT : Apacer Technology Inc.

ADDRESS : 3F, No.83, Kur Wong Rd., Aspire Park, Lung Tan Hsiang, Tao Yuan Hsien, Taiwan

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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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	N/A	Apr. 28, 2011



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1. CERTIFICATION

PRODUCT: Wireless receiver

MODEL NO.: M721R

BRAND: Apacer

APPLICANT: Apacer Technology Inc.

TESTED: Sep. 07 ~ Sep. 23, 2009

TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: FCC Part 15, Subpart C (Section 15.249)

ANSI C63.4-2003

ANSI C63.10-2009

The above equipment (model: M721R) have 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 : *Polly Chien* , **DATE :** Apr. 28, 2011
Polly Chien / Specialist

APPROVED BY : *Gary Chang* , **DATE :** Apr. 28, 2011
Gary Chang / Assistant 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 15.249)			
STANDARD PARAGRAPH	TEST TYPE	RESULT	REMARK
15.207	Conducted Emission Test	PASS	Meet the requirement of limit. Minimum passing margin is -14.61dB at 0.416MHz.
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -2.05dB at 148.50MHz.

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	150kHz~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.



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3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless receiver
MODEL NO.	M721R
FCC ID	W5EM721R
POWER SUPPLY	5Vdc from host equipment
MODULATION TYPE	GFSK
DATA RATE	1M bit/sec.
OPERATING FREQUENCY	2405 ~ 2476MHz
NUMBER OF CHANNEL	64
ANTENNA TYPE	Copper trace antenna with -6.14dBi gain
DATA CABLE	NA
I/O PORT	USB
ACCESSORY DEVICES	NA

NOTE:

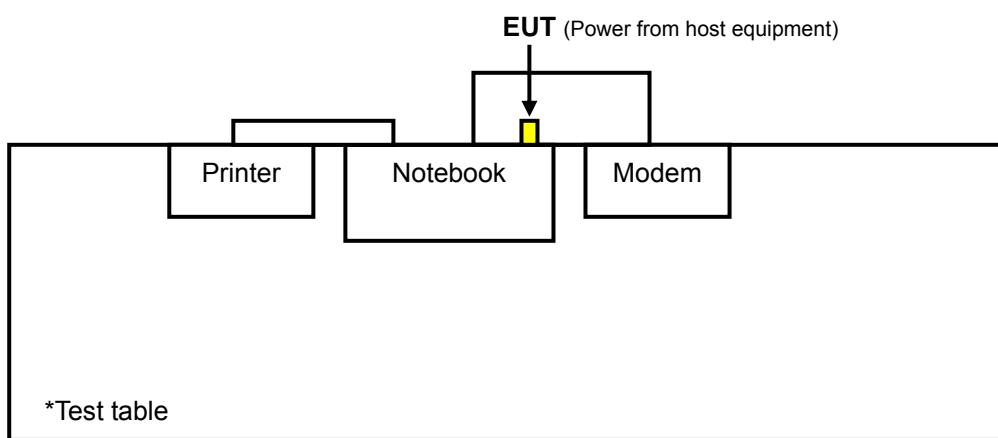
1. This report is issued as a duplicate report to the original BV ADT report no.: RF980904L02. The differences are changing the product name, model name, brand name, FCC ID and applicant.
2. The above EUT information is declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

64 channels are provided to this EUT:

FREQUENCY GROUP 1		FREQUENCY GROUP 2	
FREQ. (MHz)		FREQ. (MHz)	
2407	2442	2405	2443
2408	2447	2406	2444
2412	2451	2409	2446
2414	2452	2410	2448
2417	2457	2411	2449
2420	2458	2413	2453
2421	2459	2415	2455
2422	2460	2416	2456
2427	2461	2418	2462
2428	2465	2419	2463
2431	2468	2423	2464
2435	2469	2425	2466
2436	2472	2429	2467
2437	2473	2430	2470
2438	2475	2432	2471
2439	2476	2434	2474

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST





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3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE \geq 1G	RE $<$ 1G	PLC	BM	
-	✓	✓	✓	✓	-

Where RE \geq 1G: Radiated Emission above 1GHzRE $<$ 1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

BM: Band edge Measurement

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

OPERATING FREQUENCY RANGE (MHz)	TEST FREQUENCY (MHz)	MODULATION TYPE
2405 ~ 2476	2405, 2439, 2476	GFSK

RADIATED EMISSION TEST (BELOW 1 GHz):

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

OPERATING FREQUENCY RANGE (MHz)	TEST FREQUENCY (MHz)	MODULATION TYPE
2405 ~ 2476	2439	GFSK

POWER LINE CONDUCTED EMISSION TEST:

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

OPERATING FREQUENCY RANGE (MHz)	TEST FREQUENCY (MHz)	MODULATION TYPE
2405 ~ 2476	2439	GFSK

BANDEdge MEASUREMENT:

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

OPERATING FREQUENCY RANGE (MHz)	TEST FREQUENCY (MHz)	MODULATION TYPE
2405 ~ 2476	2405, 2476	GFSK



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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 (Section 15.249)

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	PP05L	12130898320	E2K24CLNS
2	PRINTER	EPSON	LQ-300+	DCGY054146	FCC DoC Approved
3	MODEM	ACEEX	1414V/3	0401008260	IFAXDM1414

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.8m braid shielded wire, DB25 connector, w/o core.
3	1.2m braid shielded wire, DB25 & DB9 connector, w/o core.

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



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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, 15.249 as following:

15.209 Limit		
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

15.249 Limit		
Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 ~ 928 MHz	50	500
2400 ~ 2483.5 MHz	50	500
5725 ~ 5875 MHz	50	500
24 ~ 24.25 GHz	250	2500

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB_uV/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	ESI7	100033	Jul. 06, 2009	Jul. 05, 2010
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100076	May. 26, 2009	May. 25, 2010
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 27, 2009	Apr. 26, 2010
HORN Antenna SCHWARZBECK	9120D	9120D-209	Jul. 01, 2009	Jun. 30, 2010
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 25, 2008	Dec. 24, 2009
Preamplifier Agilent	8447D	2944A10633	Nov. 03, 2008	Nov. 02, 2009
Preamplifier Agilent	8449B	3008A01964	Oct. 23, 2008	Oct. 22, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	238141/4	May 13, 2009	May 12, 2010
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	May 13, 2009	May 12, 2010
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.



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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 meter 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.

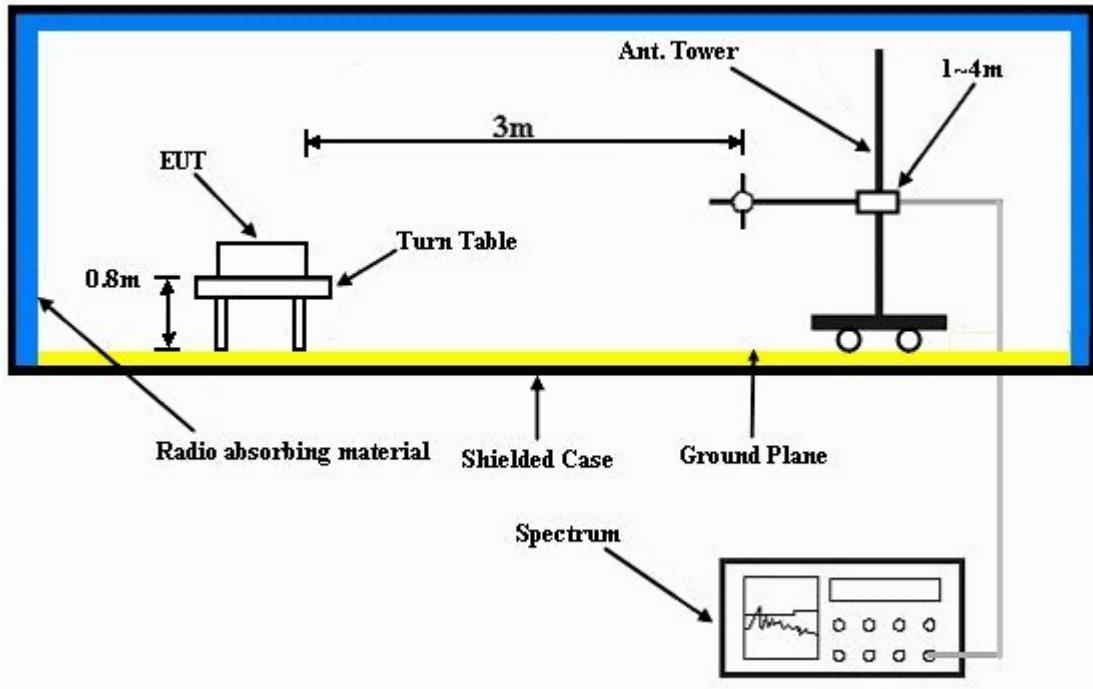
NOTE:

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 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. 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

- Plugged the EUT to the notebook and placed on a testing table.
- Set the EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the EUT in full functions.



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4.1.7 TEST RESULTS

ABOVE 1GHz DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
TEST FREQUENCY	2405MHz	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1000 hPa	TESTED BY	Kevin Liang

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	60.03 PK	74.00	-13.97	1.36 H	213	29.28	30.75
2	2390.00	27.51 AV	54.00	-26.49	1.36 H	213	-3.24	30.75
3	2394.00	71.90 PK	74.00	-2.10	1.36 H	213	41.13	30.77
4	2394.00	27.63 AV	54.00	-26.37	1.36 H	213	-3.14	30.77
5	2400.00	53.78 PK	74.00	-20.22	1.36 H	213	22.99	30.79
6	2400.00	9.46 AV	54.00	-44.54	1.36 H	213	-21.33	30.79
7	*2405.00	91.01 PK	114.00	-22.99	1.36 H	213	60.20	30.81
8	*2405.00	46.69 AV	94.00	-47.31	1.36 H	213	15.88	30.81
9	4810.00	55.75 PK	74.00	-18.25	1.00 H	321	19.12	36.63
10	4810.00	11.43 AV	54.00	-42.57	1.00 H	321	-25.20	36.63

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:
$$20 \log (\text{Duty cycle}) = 20 \log (0.608 \text{ ms} / 100 \text{ ms}) = -44.32 \text{ dB}$$

Please see page 18 for plotted duty.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
TEST FREQUENCY	2405MHz	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1000 hPa	TESTED BY	Kevin Liang

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	58.01 PK	74.00	-15.99	1.10 V	207	27.26	30.75
2	2390.00	27.42 AV	54.00	-26.58	1.10 V	207	-3.33	30.75
3	2394.00	68.38 PK	74.00	-5.62	1.11 V	180	37.61	30.77
4	2394.00	25.84 AV	54.00	-28.16	1.11 V	180	-4.93	30.77
5	2400.00	63.38 PK	74.00	-10.62	1.10 V	207	32.59	30.79
6	2400.00	19.06 AV	54.00	-34.94	1.10 V	207	-11.73	30.79
7	*2405.00	87.40 PK	114.00	-26.60	1.10 V	207	56.59	30.81
8	*2405.00	43.08 AV	94.00	-50.92	1.10 V	207	12.27	30.81
9	4810.00	54.82 PK	74.00	-19.18	1.03 V	157	18.19	36.63
10	4810.00	10.50 AV	54.00	-43.50	1.03 V	157	-26.13	36.63

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:
 $20 \log (\text{Duty cycle}) = 20 \log (0.608 \text{ ms} / 100 \text{ ms}) = -44.32 \text{ dB}$
Please see page 18 for plotted duty.



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EUT TEST CONDITION		MEASUREMENT DETAIL		
TEST FREQUENCY		2439MHz		FREQUENCY RANGE 1 ~ 25GHz
INPUT POWER (SYSTEM)		120Vac, 60 Hz		DETECTOR FUNCTION Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS		25deg. C, 65%RH 1000 hPa		TESTED BY Kevin Liang

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	*2439.00	91.40 PK	114.00	-22.60	1.36 H	213	60.49	30.91
2	*2439.00	47.08 AV	94.00	-46.92	1.36 H	213	16.17	30.91
3	4878.00	55.99 PK	74.00	-18.01	1.02 H	326	19.27	36.72
4	4878.00	11.67 AV	54.00	-42.33	1.02 H	326	-25.05	36.72
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	*2439.00	87.03 PK	114.00	-26.97	1.08 V	177	56.12	30.91
2	*2439.00	42.71 AV	94.00	-51.29	1.08 V	177	11.80	30.91
3	4878.00	54.93 PK	74.00	-19.07	1.04 V	152	18.21	36.72
4	4878.00	10.61 AV	54.00	-43.39	1.04 V	152	-26.11	36.72

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:

$$20 \log (\text{Duty cycle}) = 20 \log (0.608 \text{ ms} / 100 \text{ ms}) = -44.32 \text{ dB}$$
Please see page 18 for plotted duty.



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EUT TEST CONDITION		MEASUREMENT DETAIL		
TEST FREQUENCY		2476MHz		FREQUENCY RANGE 1 ~ 25GHz
INPUT POWER (SYSTEM)		120Vac, 60 Hz		DETECTOR FUNCTION Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS		25deg. C, 65%RH 1000 hPa		TESTED BY Mark Liao

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	*2476.00	91.14 PK	114.00	-22.86	1.38 H	227	60.11	31.03
2	*2476.00	44.82 AV	94.00	-49.18	1.38 H	227	13.79	31.03
3	2483.50	49.86 PK	74.00	-24.14	1.38 H	227	18.80	31.06
4	2483.50	5.54 AV	54.00	-48.46	1.38 H	227	-25.52	31.06
5	4952.00	64.70 PK	74.00	-9.30	1.09 H	19	27.73	36.97
6	4952.00	20.38 AV	54.00	-33.62	1.09 H	19	-16.59	36.97
7	7428.00	69.90 PK	74.00	-4.10	1.25 H	20	26.91	42.98
8	7428.00	25.58 AV	54.00	-28.42	1.25 H	20	-17.41	42.98

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	*2476.00	86.95 PK	114.00	-27.05	1.12 V	193	55.92	31.03
2	*2476.00	42.63 AV	94.00	-51.37	1.12 V	193	11.60	31.03
3	2483.50	45.67 PK	74.00	-28.33	1.12 V	193	14.61	31.06
4	2483.50	1.35 AV	54.00	-52.65	1.12 V	193	-29.71	31.06
5	4952.00	59.35 PK	74.00	-14.65	1.05 V	14	22.38	36.97
6	4952.00	15.03 AV	54.00	-38.97	1.05 V	14	-21.94	36.97
7	7428.00	62.31 PK	74.00	-11.69	1.16 V	321	19.32	42.98
8	7428.00	17.99 AV	54.00	-36.01	1.16 V	321	-25.00	42.98

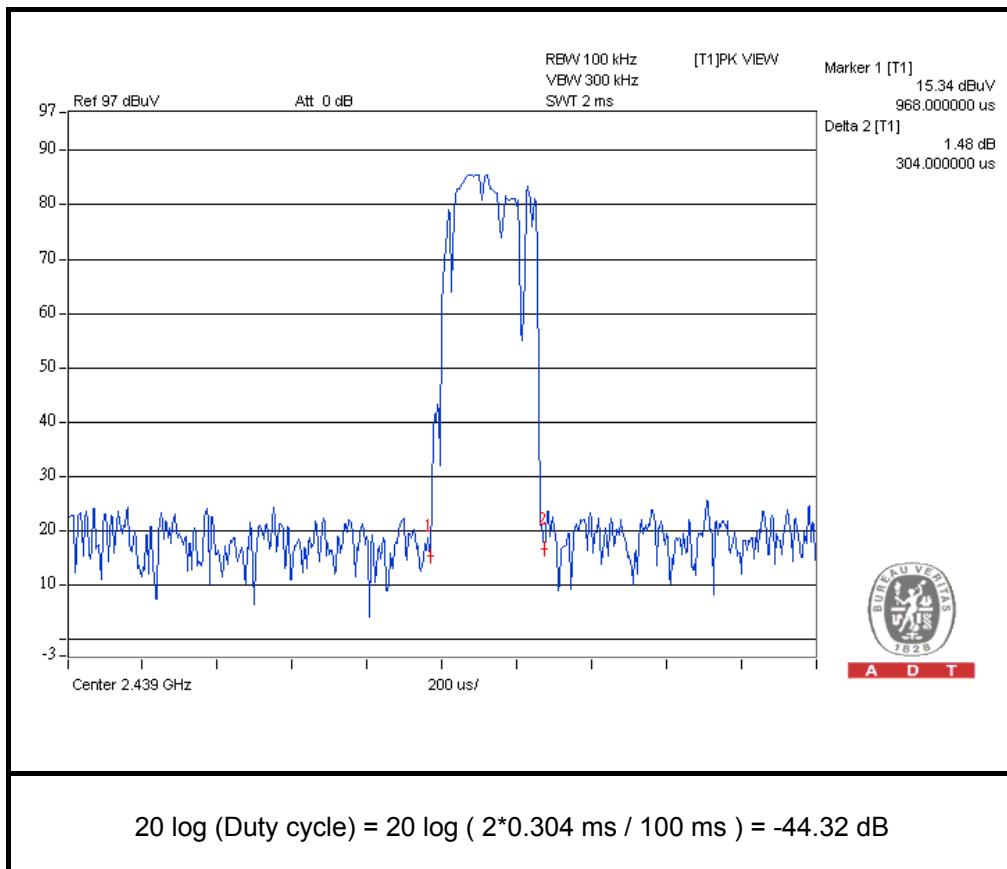
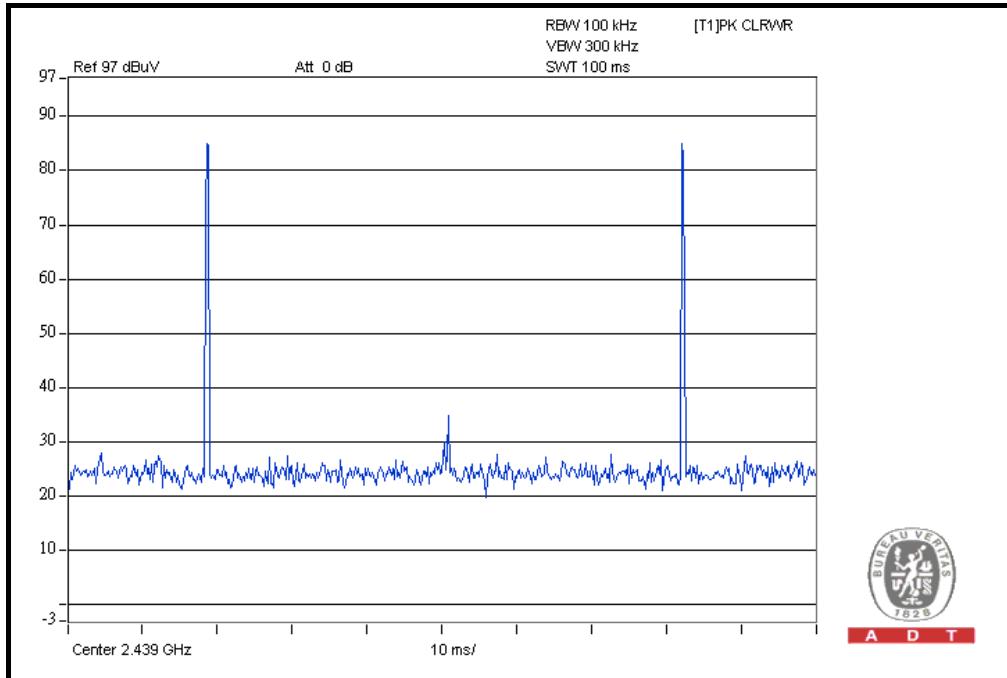
REMARKS:

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:

$$20 \log (\text{Duty cycle}) = 20 \log (0.608 \text{ ms} / 100 \text{ ms}) = -44.32 \text{ dB}$$
Please see page 18 for plotted duty.



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BELOW 1GHZ WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL		
TEST FREQUENCY		2439MHz		FREQUENCY RANGE
INPUT POWER (SYSTEM)		120Vac, 60 Hz		DETECTOR FUNCTION
ENVIRONMENTAL CONDITIONS		25deg. C, 65%RH 999 hPa		TESTED BY
				Kevin Liang

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	144.61	40.76 QP	43.50	-2.74	2.00 H	127	27.33	13.43
2	162.11	37.78 QP	43.50	-5.72	1.50 H	298	23.59	14.19
3	354.60	28.35 QP	46.00	-17.65	1.00 H	289	12.21	16.14
4	422.65	30.75 QP	46.00	-15.25	2.00 H	19	12.14	18.62
5	630.69	36.78 QP	46.00	-9.22	1.50 H	334	13.52	23.26
6	731.79	33.77 QP	46.00	-12.23	1.00 H	319	8.44	25.33

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	39.62	37.65 QP	40.00	-2.35	1.00 V	130	22.56	15.09
2	121.28	40.18 QP	43.50	-3.32	1.00 V	259	28.76	11.42
3	148.50	41.45 QP	43.50	-2.05	1.00 V	190	27.59	13.86
4	162.11	39.63 QP	43.50	-3.87	1.00 V	133	25.44	14.19
5	500.42	28.42 QP	46.00	-17.58	1.00 V	55	7.99	20.44
6	702.62	41.37 QP	46.00	-4.63	1.50 V	136	16.31	25.06

REMARKS:

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



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4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
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. 19, 2008	Nov. 18, 2009
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 31, 2008	Dec. 30, 2009
LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jun. 03, 2009	Jun. 02, 2010
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Dec. 04, 2008	Dec. 03, 2009
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

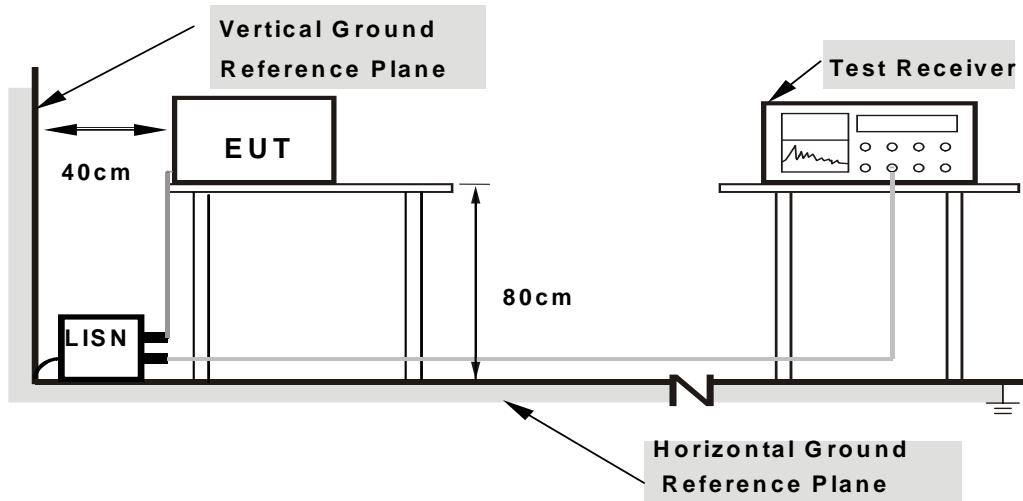
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

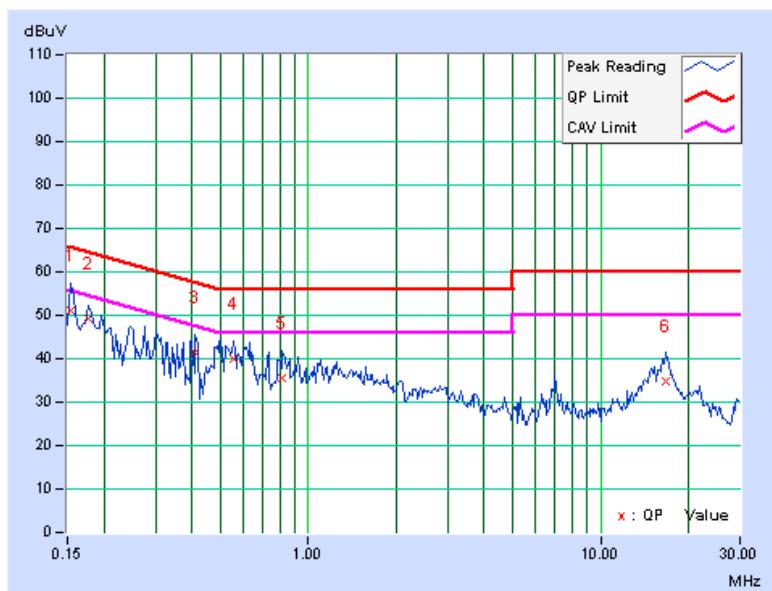
CONDUCTED WORST-CASE DATA

EUT TEST CONDITION			MEASUREMENT DETAIL		
TEST FREQUENCY		2439MHz	PHASE		Line 1
MODULATION TYPE		GFSK	INPUT POWER (STSTEM)		120Vac, 60Hz
ENVIRONMENTAL CONDITIONS		23deg. C, 65%RH, 1013hPa	6dB BANDWIDTH		9kHz
TESTED BY		Eason Chen			

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
			Factor	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	(dB)	
		[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.
1	0.154	0.13	50.85	-	50.98	-	65.79	55.79	-14.81	-
2	0.177	0.13	49.18	-	49.31	-	64.61	54.61	-15.30	-
3	0.412	0.14	41.28	-	41.42	-	57.61	47.61	-16.19	-
4	0.552	0.15	39.70	-	39.85	-	56.00	46.00	-16.15	-
5	0.818	0.17	35.34	-	35.51	-	56.00	46.00	-20.49	-
6	16.699	0.99	33.84	-	34.83	-	60.00	50.00	-25.17	-

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.

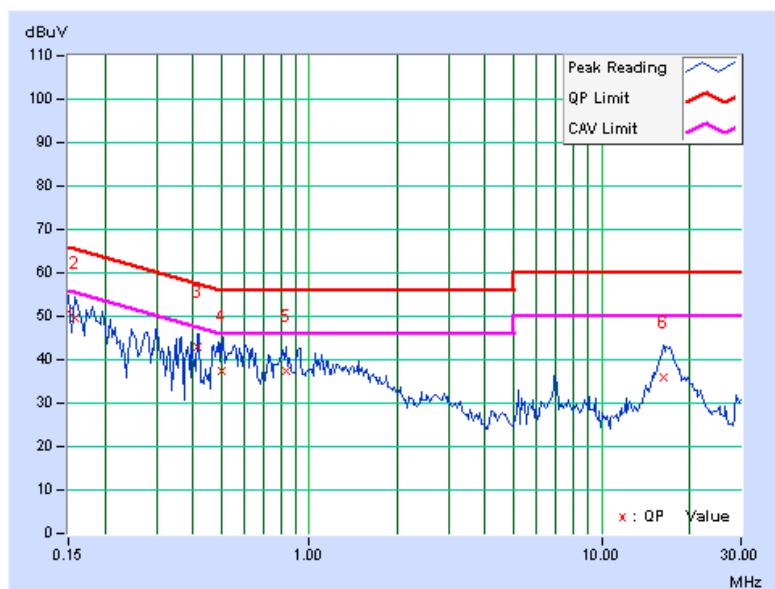


EUT TEST CONDITION		MEASUREMENT DETAIL	
TEST FREQUENCY	2439MHz	PHASE	Line 2
MODULATION TYPE	GFSK	INPUT POWER (STSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 1013hPa	6dB BANDWIDTH	9kHz
TESTED BY	Eason Chen		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
			Factor	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	(dB)	
		[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.
1	0.150	0.14	51.08	-	51.22	-	66.00	56.00	-14.78	-
2	0.158	0.14	49.62	-	49.76	-	65.58	55.58	-15.82	-
3	0.416	0.16	42.76	-	42.92	-	57.54	47.54	-14.61	-
4	0.500	0.17	37.29	-	37.46	-	56.00	46.00	-18.54	-
5	0.834	0.19	37.39	-	37.58	-	56.00	46.00	-18.42	-
6	16.281	0.86	35.09	-	35.95	-	60.00	50.00	-24.05	-

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.





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4.3 BAND EDGES MEASUREMENT

4.3.1 LIMITS OF BAND EDGES MEASUREMENT

Below –50dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
R&S SPECTRUM ANALYZER	FSP40	100040	Jul. 07, 2009	Jul. 06, 2010

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

The spectrum plots are attached on the following pages.

4.3.4 DEVIATION FROM TEST STANDARD

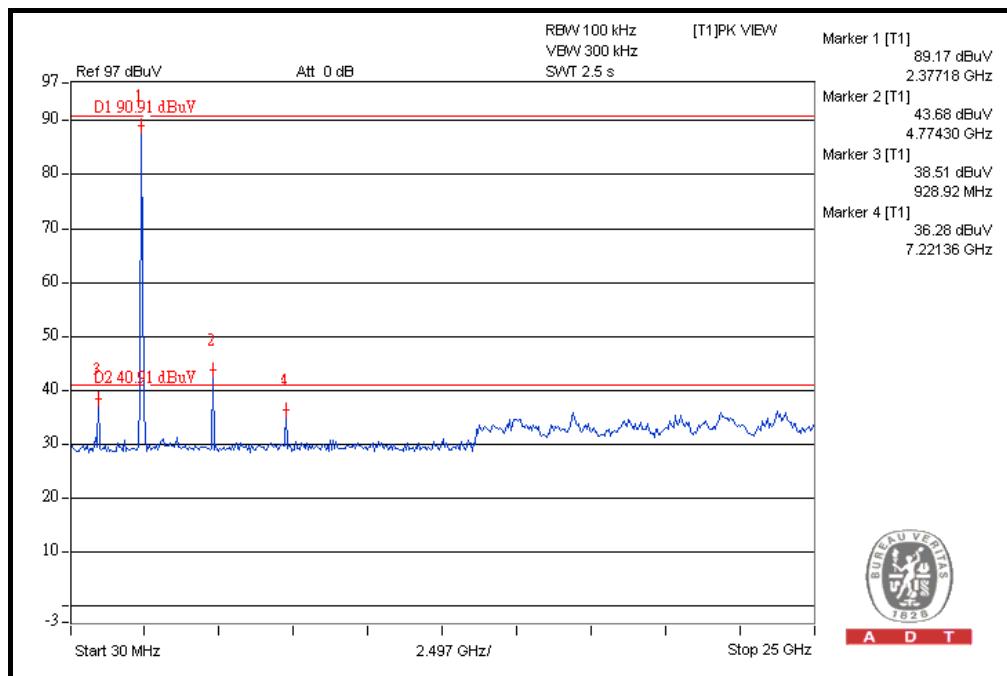
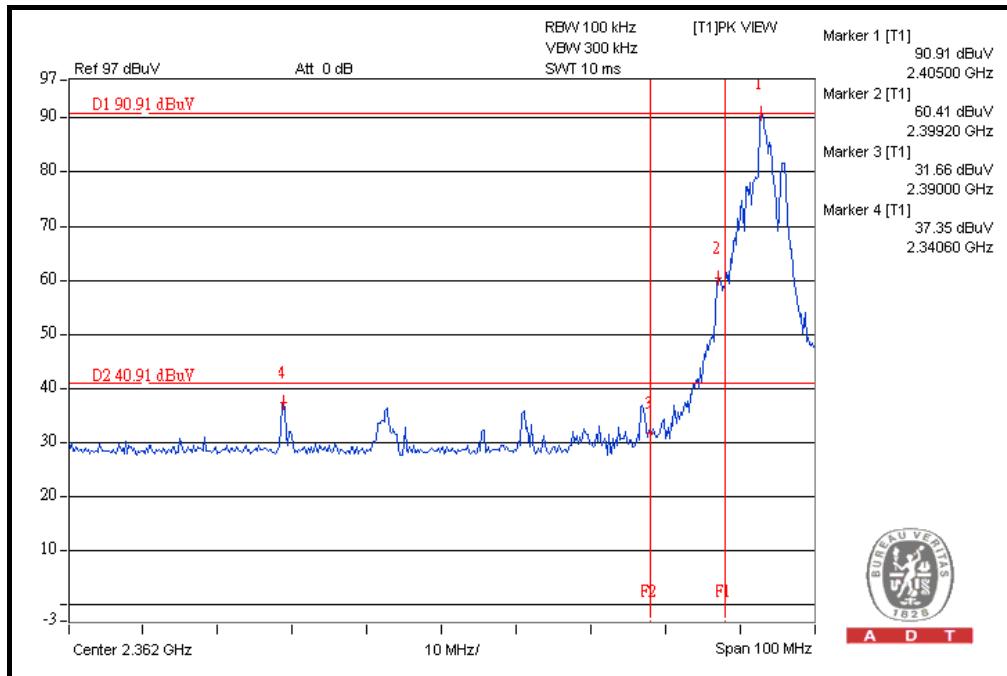
No deviation.

4.3.5 EUT OPERATING CONDITION

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

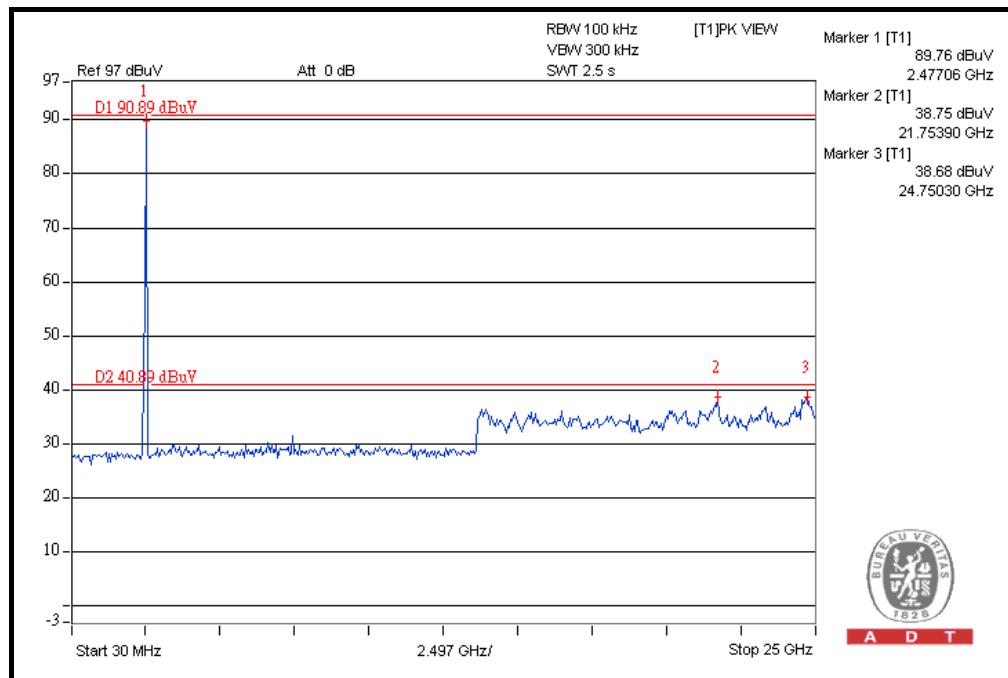
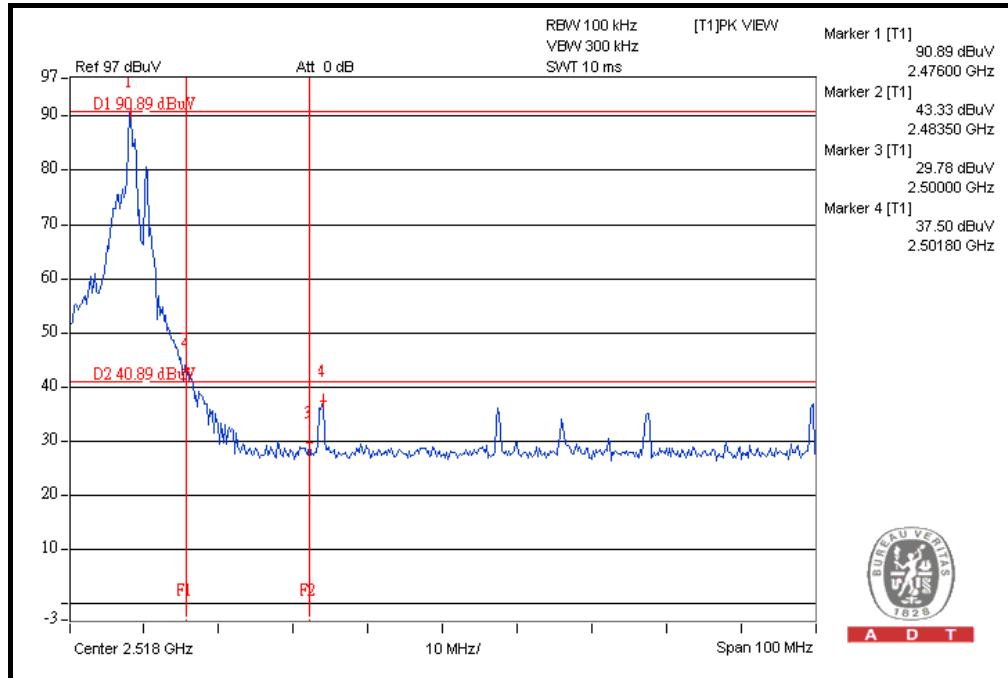
4.3.6 TEST RESULTS

The spectrum plots are attached on the following 4 images. D1 line indicates the highest level, and D2 line indicates the 50dB offset below D1. It shows compliance with the requirement in part 15.249 (d).





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5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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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 Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

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.

--- END ---