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FCC TEST REPORT

REPORT NO.: RF120813D04
MODEL NO.: XRD-WIM
FCC ID: R48XRD-WIM
RECEIVED: Aug. 13, 2012
TESTED: Aug. 16 ~ 17, 2012
ISSUED: Aug. 20, 2012

APPLICANT: MEILOON INDUSTRIAL CO., LTD

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120813D04	Original release	Aug. 20, 2012



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1. CERTIFICATION

PRODUCT: Roaming
BRAND NAME: 
MODEL NO.: XRD-WIM
APPLICANT: MEILOON INDUSTRIAL CO., LTD
TESTED: Aug. 16 ~ 17, 2012
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

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

PREPARED BY : Annie Chang , **DATE:** Aug. 20. 2012
(Annie Chang / Supervisor)

APPROVED BY : Ken Liu , **DATE:** Aug. 20. 2012
(Ken Liu / Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -13.07dB at 0.51328MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.7dB at 4956.00MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	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:

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz ~ 30MHz	2.41 dB
Radiated emissions	30MHz ~ 1GHz	3.78 dB
	Above 1GHz	3.36 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Roaming
MODEL NO.	XRD-WIM
POWER SUPPLY	5Vdc from AC adapter
MODULATION TYPE	FSK
OPERATING FREQUENCY	2403~2478MHz
NUMBER OF CHANNEL	26
OUTPUT POWER	10.2mW
ANTENNA TYPE	Dipole antenna with 1.53dBi gain
ANTENNA CONNECTOR	N/A
DATA CABLE	N/A
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Refer to note as below

NOTE:

1. The EUT is a Roaming, which including Transmitter and Receiver.
2. The EUT consumes power from the following AC adapters as follows:

For Transmitter:

BRAND	MODEL NO.	SPEC.
Ktec	KSAS0101200100HU	AC I/P: 100-240V, 50/60Hz, 0.4A DC O/P: 12V/1.0A AC 2-pin Non-shielded DC (1.5m) with one ferrite core

For Receiver:

BRAND	MODEL NO.	SPEC.
Ktec	KSAS0060500100VUD	AC I/P: 100-240V, 50/60Hz, 0.18A DC O/P: 5V/1.0A AC 2-pin Non-shielded DC (1.7m) with one ferrite core

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

3.2 DESCRIPTION OF TEST MODES

26 channels are provided to this EUT:

GROUP1:		GROUP2:		GROUP3:	
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2403	1	2406	2	2409
3	2412	4	2415	5	2418
6	2421	7	2424	8	2427
9	2430	10	2433	11	2436
12	2439	13	2442	14	2445
15	2448	16	2451	17	2454
18	2457	19	2460	20	2463
21	2466	22	2469	23	2472
24	2475	25	2478	25	2478

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE ³ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE³1G**: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

RADIATED EMISSION TEST (ABOVE 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

- ☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
0 to 25	0, 12, 25	FSK

RADIATED EMISSION TEST (BELOW 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

- ☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
0 to 25	0	FSK

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
0 to 25	0	FSK

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
0 to 25	0, 25	FSK

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
0 to 25	0, 12, 25	FSK

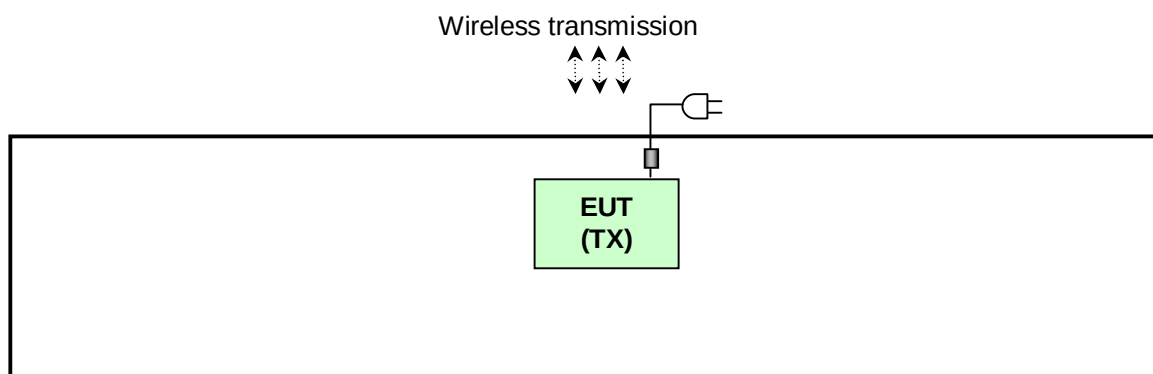
TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE ³ 1G	26deg. C, 85%RH	120Vac, 60Hz	Nick Chen
RE<1G	26deg. C, 85%RH	120Vac, 60Hz	Nick Chen
PLC	26deg. C, 77%RH	120Vac, 60Hz	Jun Wu
APCM	25deg. C, 80%RH	120Vac, 60Hz	Nick Chen

3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together without any necessary accessory or support unit.

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST



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 (15.247)

558074 D01 DTS Meas Guidance v01

ANSI C63.10-2009

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

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

4. TEST TYPES 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 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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100276	Jan. 04, 2012	Jan. 03, 2013
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100219	Nov. 24, 2011	Nov. 23, 2012
LISN With Adapter (for EUT)	AD10	C10Ada-001	Nov. 24, 2011	Nov. 23, 2012
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100218	Dec. 08, 2011	Dec. 07, 2012
Software	ADT_Cond_V7.3.7	NA	NA	NA
Software	ADT_ISN_V7.3.7	NA	NA	NA
RF cable (JYEBao)	5D-FB	Cable-C10.01	Feb. 20, 2012	Feb. 19, 2013
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Feb. 22, 2012	Feb. 21, 2013

- 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. 10.
 3. The VCCI Site Registration No. C-1852.

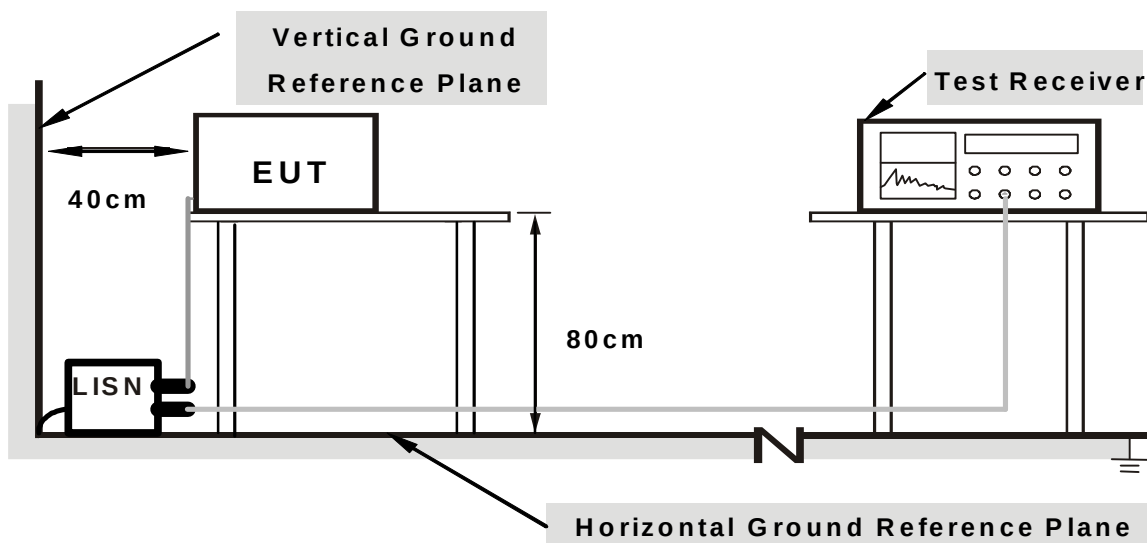
4.1.3 TEST PROCEDURES

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under limit - 20dB was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 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 related item – Photographs of the Test Configuration.



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4.1.6 EUT OPERATING CONDITIONS

- a. Connected the EUT with AC adapter placed on testing table.
- b. Turn on the power of all equipment.
- c. EUT ran a test program (provided by manufacture) to enable it under transmitting condition at specific channel continuously.

4.1.7 TEST RESULTS

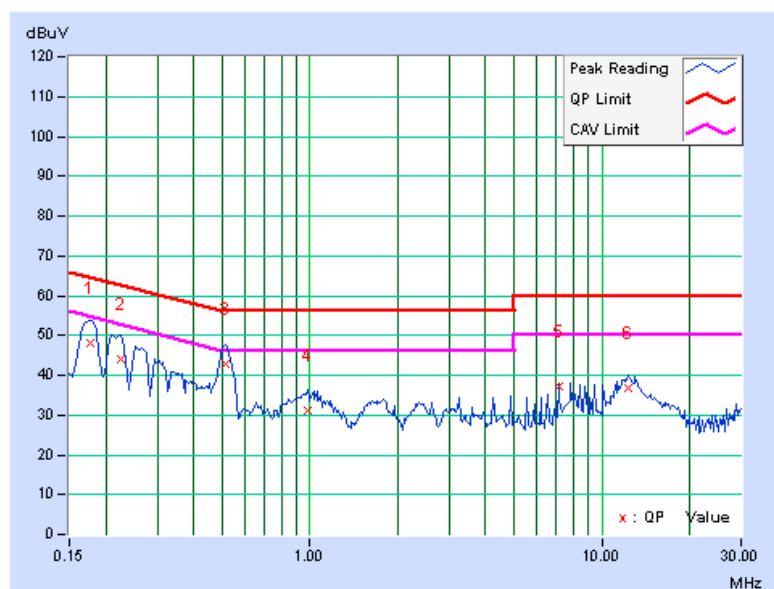
CONDUCTED WORST CASE DATA

PHASE	Line 1	6dB BANDWIDTH	9 kHz
CHANNEL	Channel 0		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	10.16	38.03	-	48.19	-	64.61	54.61	-16.42	-
2	0.22422	10.17	33.68	-	43.85	-	62.66	52.66	-18.82	-
3	0.51328	10.22	32.71	-	42.93	-	56.00	46.00	-13.07	-
4	0.97813	10.26	21.01	-	31.27	-	56.00	46.00	-24.73	-
5	7.16797	10.67	26.33	-	37.00	-	60.00	50.00	-23.00	-
6	12.38281	11.00	25.71	-	36.71	-	60.00	50.00	-23.29	-

REMARKS:

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

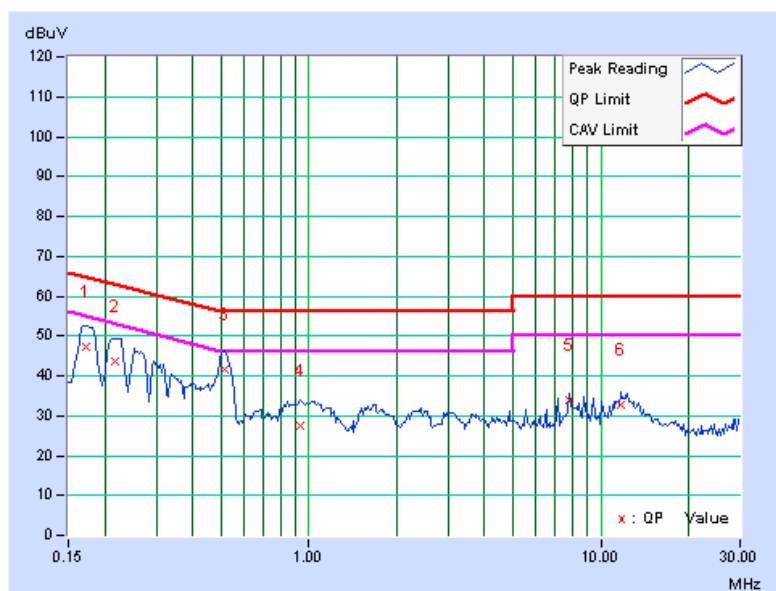


PHASE	Line 2	6dB BANDWIDTH	9 kHz
CHANNEL	Channel 0		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17344	10.16	37.25	-	47.41	-	64.79	54.79	-17.38	-
2	0.21641	10.17	33.49	-	43.66	-	62.96	52.96	-19.29	-
3	0.51328	10.22	31.37	-	41.59	-	56.00	46.00	-14.41	-
4	0.93906	10.25	17.31	-	27.56	-	56.00	46.00	-28.44	-
5	7.81641	10.68	23.09	-	33.77	-	60.00	50.00	-26.23	-
6	11.72656	10.83	21.88	-	32.71	-	60.00	50.00	-27.29	-

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 AND BANDEDGE MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2944A10505	Feb. 29, 2012	Feb. 28, 2013
HP Preamplifier	8449B	3008A01886	Feb. 29, 2012	Feb. 28, 2013
HP Preamplifier	8449B	3008A01887	Feb. 29, 2012	Feb. 28, 2013
ROHDE & SCHWARZ Spectrum Analyzer	FSP 40	100036	May. 09, 2012	May. 08, 2013
SPECTRUM ANALYZER	E4446A	MY51100050	Oct. 25, 2011	Oct. 24, 2012
ROHDE & SCHWARZ Signal Generator	SMR 40	100231	Apr. 09, 2012	Apr. 08, 2013
Agilent Power Meter	E4416A	GB41292289	Oct. 24, 2011	Oct. 23, 2012
Agilent E-Series Power Sensor	E9304A	MY41495784	Nov. 10, 2011	Nov. 09, 2012
Tektronix Oscilloscope	TDS1012	C019167	Jan. 20, 2012	Jan. 19, 2013
Anritsu Peak Power meter	ML2495A	0842014	Apr. 28, 2012	Apr. 27, 2013
Anritsu Pulse Power Sensor	MA2411B	0738404	Apr. 28, 2012	Apr. 27, 2013
Schwarzbeck Antenna	VULB9168	139	Apr. 03, 2012	Apr. 02, 2013
EMCO Horn Antenna	3117	00034127	Jan. 20, 2012	Jan. 19, 2013
EMCO Horn Antenna	3115	00027024	Oct. 24, 2011	Oct. 23, 2012
Temperature & Humidity Chamber	MHU-225AU	920409	May 24, 2012	May 23, 2013
ADT. Controll	ADT100	0301	NA	NA
ADT. Turn Table	TT100	0301	NA	NA
ADT. Tower	AT100	0301	NA	NA
Software	ADT_Radiated V7.6.15.9.2	NA	NA	NA
TIMES RF cable	LMR-600	CABLE-RF-01	Mar. 22, 2012	Mar. 21, 2013
SUHNER RF cable	SF 106-18	CABLE-RF-01	Aug. 19, 2011	Aug. 18, 2012
Anritsu Power Sensor	MA2411B	0738404	Apr. 28, 2012	Apr. 27, 2013
Anritsu Power Meter	ML2495A	0842014	Apr. 28, 2012	Apr. 27, 2013

- 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 and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chia Pau RF Chamber

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 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. Height of receiving antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to 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.

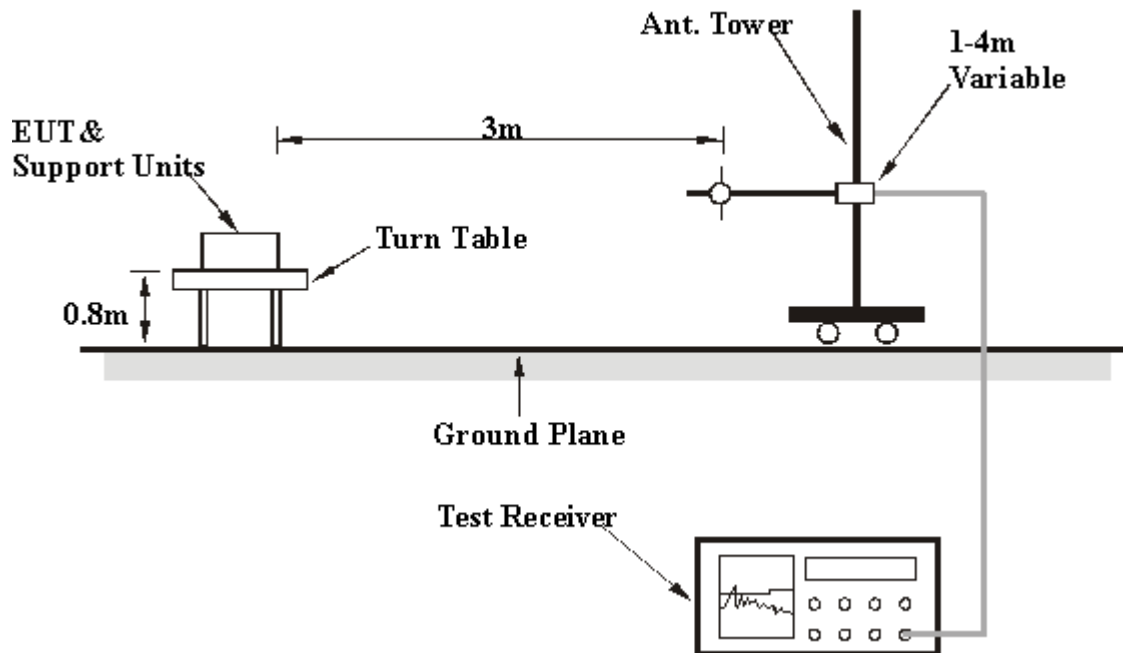
NOTE:

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 3kHz for Average detection (AV) at frequency above 1GHz.
4. 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



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

4.2.6 EUT OPERATING CONDITIONS

Set the EUT under transmission condition continuously at specific channel frequency.

4.2.7 TEST RESULTS

ABOVE 1GHz DATA

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	54.8 PK	74.0	-19.2	1.02 H	109	24.52	30.24
2	2390.00	44.5 AV	54.0	-9.5	1.02 H	109	14.22	30.24
3	#2400.00	61.3 PK	70.6	-9.3	1.02 H	109	30.97	30.29
4	#2400.00	60.2 AV	69.5	-9.3	1.02 H	109	29.94	30.29
5	*2403.00	90.6 PK			1.02 H	109	60.26	30.30
6	*2403.00	89.5 AV			1.02 H	109	59.23	30.30
7	4806.00	48.0 PK	74.0	-26.0	1.00 H	138	11.42	36.60
8	4806.00	43.7 AV	54.0	-10.3	1.00 H	138	7.07	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	56.0 PK	74.0	-18.0	1.00 V	87	25.80	30.24
2	2390.00	45.2 AV	54.0	-8.8	1.00 V	87	14.93	30.24
3	#2400.00	65.1 PK	74.4	-9.3	1.00 V	87	34.83	30.29
4	#2400.00	64.3 AV	73.6	-9.3	1.00 V	87	34.00	30.29
5	*2403.00	94.4 PK			1.00 V	87	64.12	30.30
6	*2403.00	93.6 AV			1.00 V	87	63.29	30.30
7	4806.00	58.1 PK	74.0	-15.9	1.00 V	275	21.51	36.60
8	4806.00	49.9 AV	54.0	-4.1	1.00 V	275	13.27	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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	Channel 12	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2439.00	88.9 PK			1.01 H	98	58.51	30.42
2	*2439.00	88.0 AV			1.01 H	98	57.56	30.42
3	4878.00	49.2 PK	74.0	-24.8	1.00 H	127	12.43	36.78
4	4878.00	44.3 AV	54.0	-9.7	1.00 H	127	7.51	36.78
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	93.2 PK			1.00 V	94	62.82	30.42
2	*2439.00	92.2 AV			1.00 V	94	61.80	30.42
3	4878.00	59.2 PK	74.0	-14.8	1.00 V	261	22.43	36.78
4	4878.00	50.7 AV	54.0	-3.3	1.00 V	261	13.95	36.78

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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2478.00	87.2 PK			1.00 H	128	56.65	30.56
2	*2478.00	86.6 AV			1.00 H	128	56.05	30.56
3	2483.50	41.0 PK	74.0	-33.0	1.00 H	128	10.44	30.57
4	2483.50	39.6 AV	54.0	-14.4	1.00 H	128	9.04	30.57
5	4956.00	50.8 PK	74.0	-23.2	1.00 H	142	13.84	36.98
6	4956.00	45.7 AV	54.0	-8.3	1.00 H	142	8.68	36.98
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	*2478.00	92.2 PK			1.00 V	75	61.66	30.56
2	*2478.00	91.2 AV			1.00 V	75	60.62	30.56
3	2483.50	46.0 PK	74.0	-28.0	1.00 V	75	15.45	30.57
4	2483.50	45.0 AV	54.0	-9.0	1.00 V	75	14.41	30.57
5	4956.00	60.2 PK	74.0	-13.8	1.00 V	261	23.24	36.98
6	4956.00	51.3 AV	54.0	-2.7	1.00 V	261	14.36	36.98

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.

BELOW 1GHz WORST-CASE DATA

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak
FREQUENCY RANGE	Below 1000MHz		

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	46.17	19.4 QP	40.0	-20.6	1.18 H	10	5.20	14.24
2	519.85	25.5 QP	46.0	-20.5	1.24 H	10	3.93	21.53
3	799.53	25.1 QP	46.0	-20.9	1.03 H	10	-1.43	26.50
4	817.32	26.0 QP	46.0	-20.0	1.18 H	9	-0.77	26.78
5	869.05	26.5 QP	46.0	-19.5	1.26 H	10	-1.01	27.53
6	891.68	26.3 QP	46.0	-19.7	1.02 H	10	-1.57	27.83
7	914.32	27.1 QP	46.0	-18.9	1.25 H	9	-1.01	28.07

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	30.00	27.2 QP	40.0	-12.8	1.05 V	135	15.44	11.72
2	73.65	27.4 QP	40.0	-12.6	1.11 V	143	15.92	11.48
3	104.37	26.8 QP	43.5	-16.7	1.34 V	351	16.83	9.97
4	736.48	25.1 QP	46.0	-20.9	1.02 V	10	-0.13	25.24
5	844.80	26.0 QP	46.0	-20.0	1.08 V	9	-1.22	27.20
6	930.48	27.9 QP	46.0	-18.1	1.22 V	10	-0.33	28.22
7	957.97	27.6 QP	46.0	-18.4	1.00 V	9	-0.89	28.49

REMARKS:

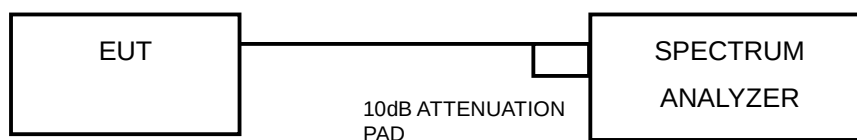
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.2.2 to get information of above instrument.

4.3.4 TEST PROCEDURE

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

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

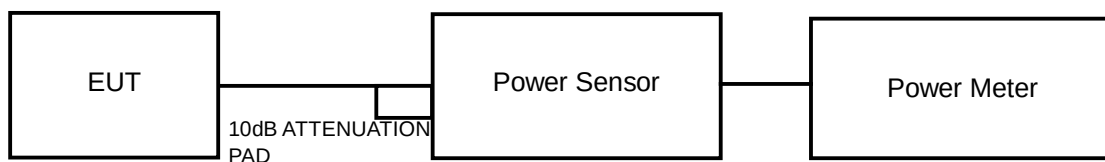
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2403	1.13	0.5	PASS
12	2439	1.26	0.5	PASS
25	2478	1.13	0.5	PASS

4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.2.2 to get information of above instrument.

4.4.4 TEST PROCEDURES

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

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.



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4.4.7 TEST RESULTS

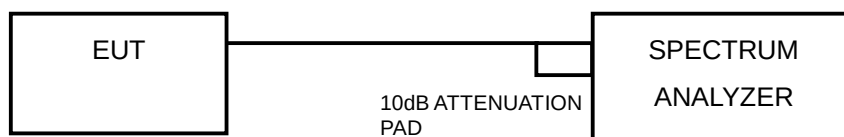
CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
0	2403	10.2	10.1	30	PASS
12	2439	9.8	9.9	30	PASS
25	2478	9.3	9.7	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.2.2 to get information of above instrument.

4.5.4 TEST PROCEDURE

- Set the RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
- Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10 \log(3 \text{ kHz}/100 \text{ kHz})$

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



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4.5.7 TEST RESULTS

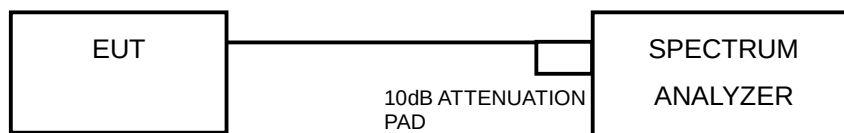
Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	2403	9.98	-5.22	8	PASS
12	2439	9.53	-5.67	8	PASS
25	2478	9.72	-5.48	8	PASS

4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.2.2 to get information of above instrument.

4.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Set span to encompass the spectrum to be examined.
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

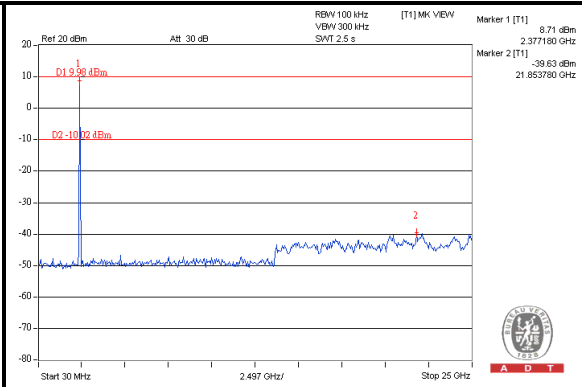
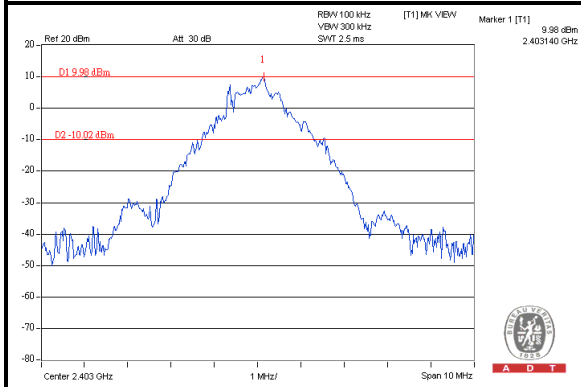
4.6.7 TEST RESULTS

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

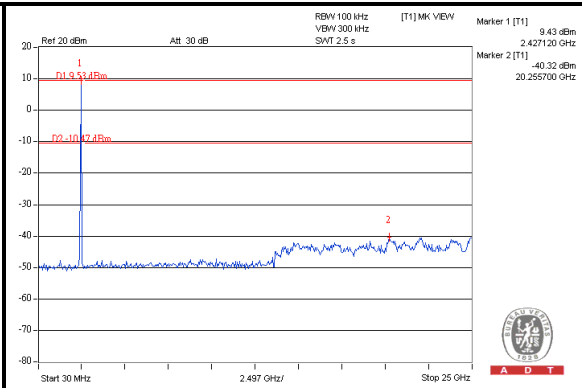
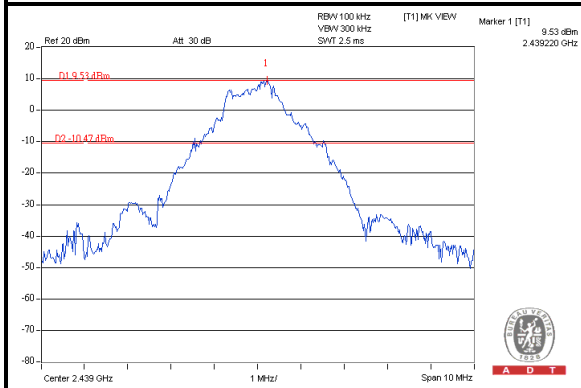


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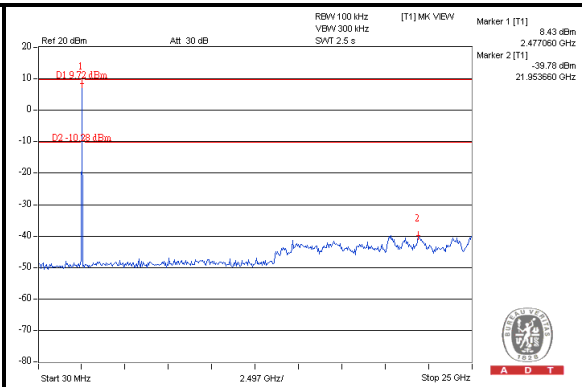
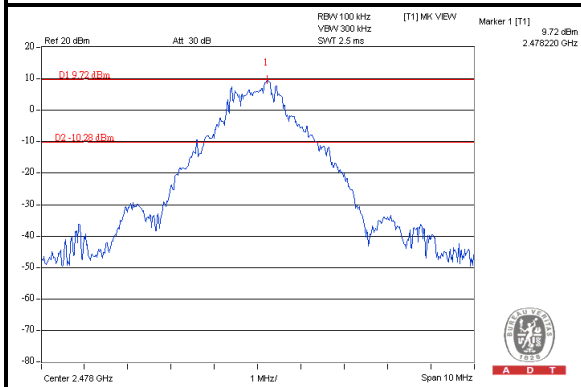
CH 0



CH 12



CH 25





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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.

If you have any comments, please feel free to contact us at the following:

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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 modifications were made to the EUT by the lab during the test.

---END---