



**FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4:2009  
TEST REPORT**

**For**

**Much Link**

**Model : MLD-AB1**

Trade Name : **much>in**

**Issued for**

**Much-in International Inc.**

**17F, No.144, Sec.3, Minquan E. Rd. Taipei 10542, Taiwan R.O.C**

**Issued by**

**Compliance Certification Services Inc.**

**Hsinchu Lab.**

**NO. 989-1 Wen Shan Rd., Shang Shan Village,  
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C**

**TEL: +886-3-5921698**

**FAX: +886-3-5921108**

**<http://www.ccsrf.com>**

**E-Mail : [service@ccsrf.com](mailto:service@ccsrf.com)**

**Issued Date: November 04, 2013**



**Note:** This report shall not be reproduced except in full, without the written approval of Compliance Certification Services Inc. This document may be altered or revised by Compliance Certification Services Inc. personnel only, and shall be noted in the revision section of the document. The client should not use it to claim product endorsement by TAF or any government agencies. The test results of this report relate only to the tested sample identified in this report.



## Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	11/04/2013	Initial Issue	All Page 31	Gloria Chang

**TABLE OF CONTENTS**

<b>TITLE</b>	<b>PAGE NO.</b>
<b>1. TEST REPORT CERTIFICATION .....</b>	<b>4</b>
<b>2. EUT DESCRIPTION .....</b>	<b>5</b>
<b>3. DESCRIPTION OF TEST MODES .....</b>	<b>6</b>
<b>4. TEST METHODOLOGY .....</b>	<b>7</b>
<b>5. FACILITIES AND ACCREDITATION .....</b>	<b>7</b>
5.1 FACILITIES .....	7
5.2 ACCREDITATIONS.....	7
5.3 MEASUREMENT UNCERTAINTY .....	8
<b>6. SETUP OF EQUIPMENT UNDER TEST.....</b>	<b>9</b>
<b>7. FCC PART 15.249 REQUIREMENTS .....</b>	<b>10</b>
7.1 DUTY CYCLE CORRECTION FACTOR.....	10-11
7.2 20 dB BANDWIDTH .....	12-13
7.3 RADIATED EMISSION.....	14-26
7.4 CONDUCTED EMISSION.....	27-31



## 1. TEST REPORT CERTIFICATION

**Applicant** : Much-in International Inc.  
**Address** : 17F, No.144, Sec.3, Minquan E. Rd. Taipei 10542,  
Taiwan R.O.C  
**Equipment Under Test** : Much Link  
**Model** : MLD-AB1  
**Trade Name** : **much>in**  
**Tested Date** : October 08 ~ November 01, 2013

APPLICABLE STANDARD	
Standard	Test Result
FCC Part 15 Subpart C AND ANSI C63.4:2009	PASS

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

*Approved by:*

Sb. Lu  
Sr. Engineer

*Reviewed by:*

Gundam Lin  
Sr. Engineer



## 2. EUT DESCRIPTION

<b>Product Name</b>	Much Link
<b>Model Number</b>	MLD-AB1
<b>Identify Number</b>	T131008S02
<b>Received Date</b>	October 08, 2013
<b>Frequency Range</b>	2401MHz ~ 2479MHz, $f = 2400 + n\text{MHz}$ , $n = 1, 3, 5, 7, 9, 15, 27, 31, 35, 41, 45, 51, 55, 59, 70, 73, 75, 77, 79$
<b>Transmit Power</b>	94.31 dB $\mu$ V/m
<b>Channel Number</b>	19 Channels
<b>Type of Modulation</b>	GFSK
<b>Antenna Type</b>	PIFA Antenna, Antenna Gain: 3 dBi
<b>Power Rating</b>	Remote Control : 3Vdc (Form Batter) Receiver : 5Vdc (Form Power Adapter)
<b>Test Voltage</b>	120Vac/60Hz
<b>Signal Cable</b>	Shielded micro HDMI cable 1m x 1
<b>I/O Port</b>	Micro USB Port x 1, HDMI Port x 2

**Remark :**

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. For more details, please refer to the User's manual of the EUT.
3. This submittal(s) (test report) is intended for FCC ID: 2AAZVMLDAB0113JCN filing to comply with Section 15.207, 15.209 and 15.249 of the FCC Part 15, Subpart C Rules.



### 3. DESCRIPTION OF TEST MODES

The EUT (MLD-AB1) had been tested under operating condition.

#### Radiated Emission (Below 1 GHz) and Conducted Emission Test:

1. The following test modes were scanned during the preliminary test:

No.	Pre-Test Mode
1	Normal Operating

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode		
Emission	Radiated Emission	Normal Operating
	Conducted Emission	Normal Operating

**Remark :** Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

#### Radiated / Conducted 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.

Channel	Frequency (MHz)
1	2401
2	2403
10	2441
18	2477
19	2479

#### 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.

Channel	Frequency (MHz)
2	2403
18	2477

**Remark :** The field strength of spurious emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X, Y axis). The worst emission was found in lie-down position(X axis) and the worst case was recorded.



## 4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2009 and FCC CFR 47, 15.207, 15.209 and 15.249.

## 5. FACILITIES AND ACCREDITATION

### 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

NO. 989-1 Wen Shan Rd., Shang Shan Village,  
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.4:2009 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

### 5.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

**Taiwan**      TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

<b>Canada</b>	INDUSTRY CANADA
<b>Japan</b>	VCCI
<b>Taiwan</b>	BSMI
<b>USA</b>	FCC MRA

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>



## 5.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 2.48

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

Consistent with industry standard (e.g. CISPR 22, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than  $U_{CISPR}$  which is 3.6dB and 5.2dB respectively. CCS values (called  $U_{Lab}$  in CISPR 16-4-2) is less than  $U_{CISPR}$  as shown in the table above. Therefore, MU need not be considered for compliance.



## 6. SETUP OF EQUIPMENT UNDER TEST

### SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.	FCC ID
1	Mobile phone	Sony	C6502 SI	1270-6396	PY7PM-0340
2	TV	SONY	KDL-22EX420	3712071	---
3	DC Power Supply	R&S	NGSM 32/10	4962	---

### Power Adapter :

No.	Manufacturer	Model No.	Serial No.	Power Input	Power Output
1	Samsung	ETA-U90JWS	DK4D522VS/B-E	100-240Vac, 50-60Hz, 0.35A	5.0Vdc, 2.0A

No.	Signal Cable Description
1	Shielded USB cable, 1m x 1
2	Shielded HDMI cable, 1.5m x 1

### SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

### EUT OPERATING CONDITION

#### Normal Operating:

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. Mobile phone play video.
3. Remote control to confirm the connection with the receiving end.
4. All functions are running.
5. Start test.

#### TX Mode:

1. Setup all computers like the setup diagram.
2. TX mode sample power on.
3. Set frequency 2401MHz / 2403MHz / 2441MHz / 2477MHz / 2479MHz.
4. All of the functions are under run.
5. Start test.



## 7. FCC PART 15.249 REQUIREMENTS

### 7.1 DUTY CYCLE CORRECTION FACTOR

#### LIMITS

Limit : N/A

#### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2014

*Remark:* Each piece of equipment is scheduled for calibration once a year.

#### TEST SETUP



#### TEST PROCEDURE

1. Set center frequency of spectrum analyzer = operating frequency.
2. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz.
3. Repeat above procedures until all frequency measured were complete.



## TEST RESULTS

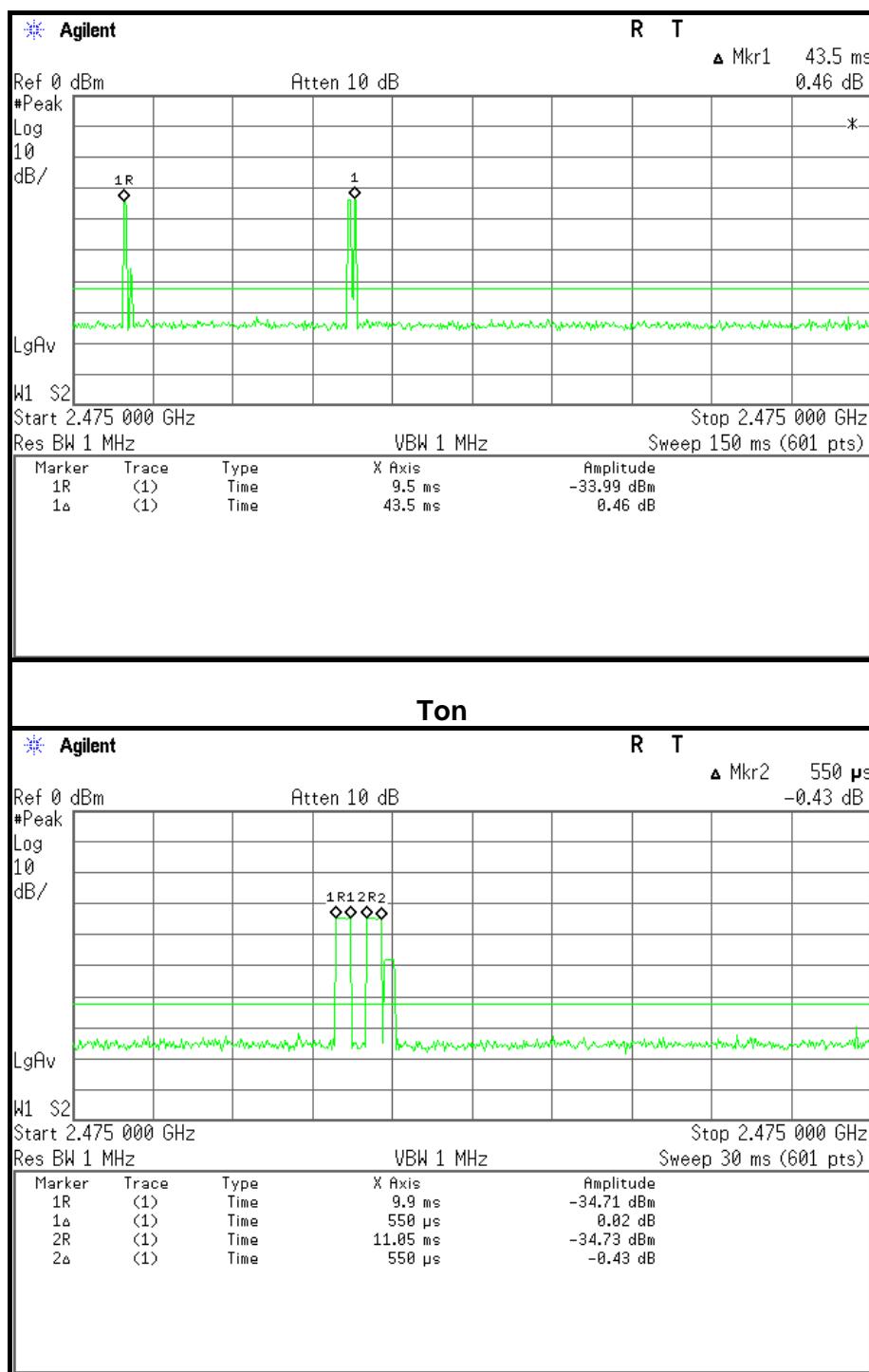
Tp = 100(ms)

Ton =  $2 \times 0.55 \text{ ms} + 2 \times 0.55 \text{ ms} = 2.2 \text{ (ms)}$

Duty Cycle Correction Factor =  $20 \times \log (\text{Ton} / \text{Tp})$

$$= 20 \times \log (2.2 / 100) = -33.15 < -20$$

$$= -20$$





## 7.2 20 dB BANDWIDTH

### LIMIT

None; for reporting purposes only.

### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2014

*Remark:* Each piece of equipment is scheduled for calibration once a year.

### TEST SETUP

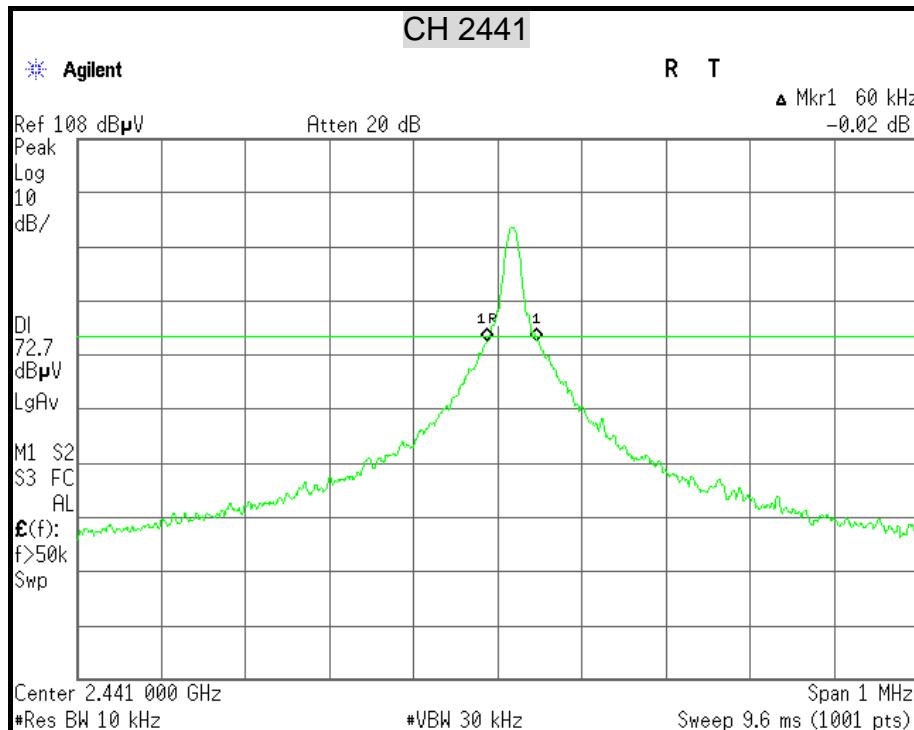


### TEST PROCEDURE

The 20dB band width was measured with a spectrum analyzer connected to RF antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency, using the analyzer. Display Line and Marker Delta functions, the 20dB band width of the emission was determined.

**TEST RESULTS**

Channel Frequency (MHz)	20dB Bandwidth (kHz)
2441	60





## 7.3 RADIATED EMISSION

### LIMITS

(1) According to § 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

**Remark:**

- <sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
- <sup>2</sup> Above 38.6

(2) According to § 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



(3) According to § 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (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

**Remark:** \*\*Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(4) According to § 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

## TEST EQUIPMENT

### 966Chamber\_B

Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY46180323	04/15/2014
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	101131	01/14/2014
Bi-log Antenna	SCHWARZBECK	VULB 9168	9168-250	09/12/2014
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078733	12/11/2013
Horn Antenna	COM-POWER	AH-840	03077	12/20/2013
Pre-Amplifier	Agilent	8447D	2944A10052	07/16/2014
Pre-Amplifier	Agilent	8449B	3008A01916	07/16/2014
LOOP Antenna	EMCO	6502	8905-2356	08/20/2014
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	026	N.C.R

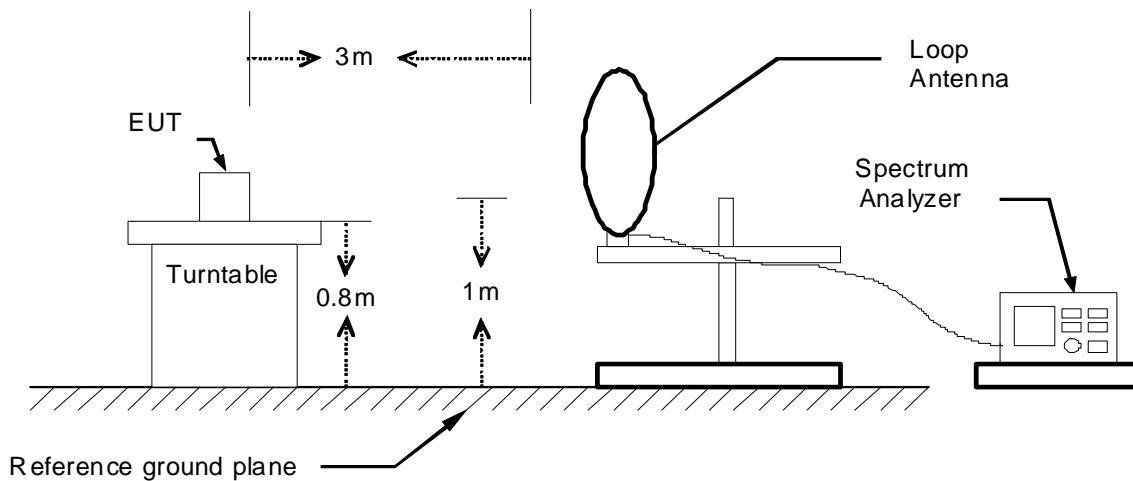
**Remark:** 1. Each piece of equipment is scheduled for calibration once a year.  
2. N.C.R = No Calibration Request.



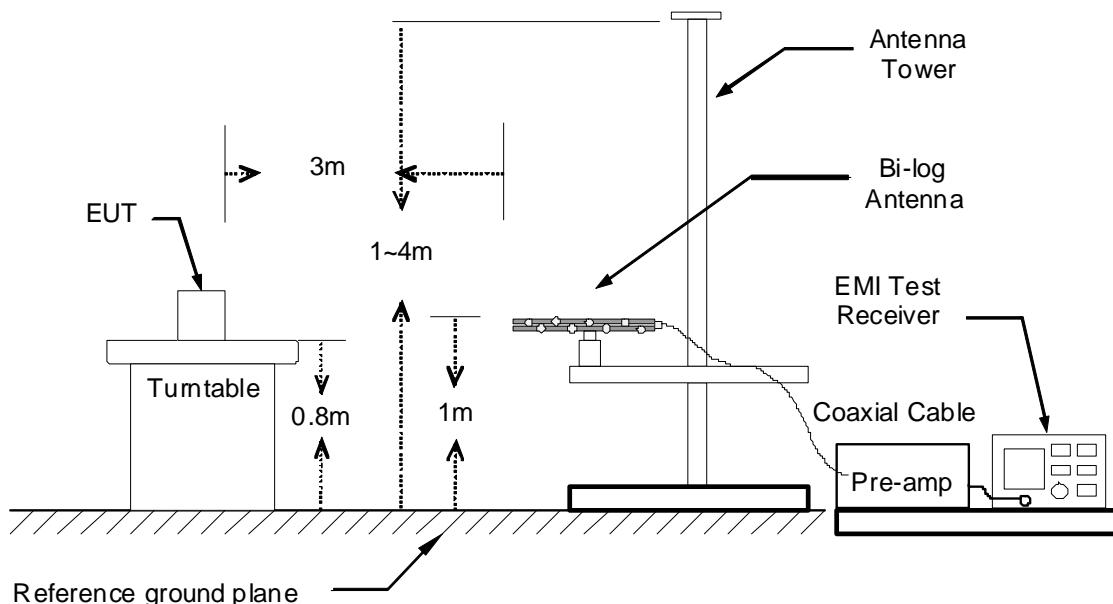
## TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.

### 9kHz ~ 30MHz

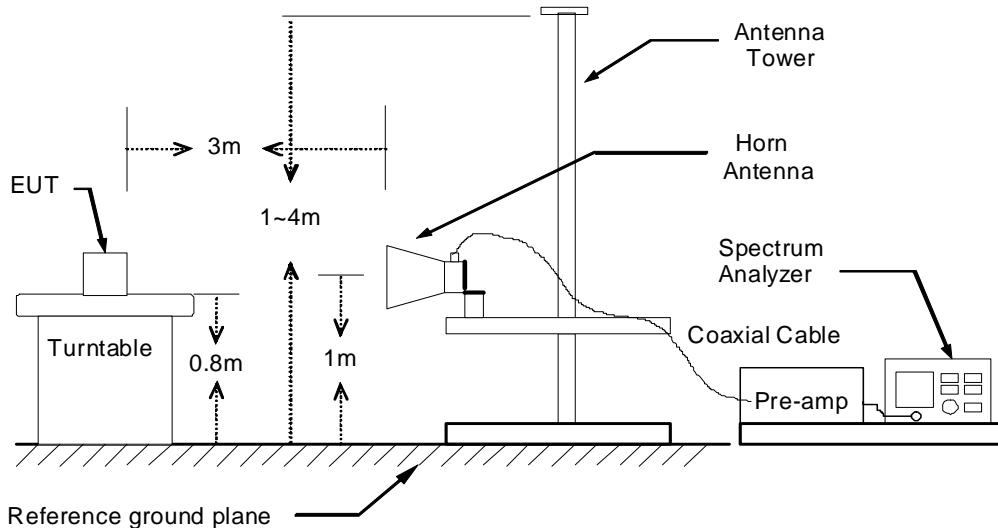


### 30MHz ~ 1GHz





The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



## **TEST PROCEDURE**

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
2. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
3. 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 polarization of the antenna are set to make the measurement.
4. 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 table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

### ***Remark :***

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

**TEST RESULTS****Below 1 GHz (9kHz ~ 30MHz)**

No emission found between lowest internal used/generated frequency to 30MHz.

**Below 1 GHz (30MHz ~ 1GHz)**

<b>Product Name</b>	Much Link	<b>Test By</b>	Waternal Guan
<b>Test Model</b>	MLD-AB1	<b>Test Date</b>	2013/10/23
<b>Test Mode</b>	Normal Operating	<b>TEMP &amp; Humidity</b>	24°C, 45%

966 Chamber_B at 3Meter / Horizontal						
Frequency (MHz)	Reading (dB $\mu$ V)	Correction Factor (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Remark
223.03	58.00	-15.27	42.73	46.00	-3.27	QP
371.44	53.40	-10.48	42.92	46.00	-3.08	QP
445.16	50.36	-8.95	41.40	46.00	-4.60	Peak
519.85	50.10	-7.89	42.21	46.00	-3.79	Peak
593.57	48.01	-6.09	41.92	46.00	-4.08	Peak
668.26	48.30	-5.36	42.94	46.00	-3.06	QP
816.67	44.03	-2.77	41.27	46.00	-4.73	Peak
891.36	44.21	-1.32	42.89	46.00	-3.11	QP

966 Chamber_B at 3Meter / Vertical						
Frequency (MHz)	Reading (dB $\mu$ V)	Correction Factor (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Remark
48.43	48.38	-13.90	34.48	40.00	-5.52	Peak
74.62	52.25	-17.42	34.83	40.00	-5.17	Peak
148.34	49.41	-13.71	35.70	43.50	-7.80	Peak
318.09	52.41	-11.54	40.87	46.00	-5.13	Peak
371.44	53.43	-10.48	42.95	46.00	-3.05	Peak
445.16	49.55	-8.95	40.59	46.00	-5.41	Peak
519.85	50.80	-7.89	42.91	46.00	-3.09	QP
668.26	47.83	-5.36	42.47	46.00	-3.53	Peak

**Remark:**

1. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.
2. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)
4. Result (dB $\mu$ V/m) = Reading (dB $\mu$ V) + Correction Factor (dB/m)
5. Margin (dB) = Remark result (dB $\mu$ V/m) - Quasi-peak limit (dB $\mu$ V/m).



## Above 1 GHz

<b>Product Name</b>	Much Link	<b>Test By</b>	Rueyyan Lin
<b>Test Model</b>	MLD-AB1	<b>Test Date</b>	2013/10/28
<b>Test Mode</b>	TX / CH1 / 2401MHz	<b>Temp. &amp; Humidity</b>	25°C, 41%

966 Chamber_B at 3Meter / Horizontal										
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Duty Cycle Correction Factor (dB)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1064.00	46.16	---	-4.33		41.83	---	74.00	54.00	-12.17	Peak
1366.00	44.36	---	-3.62		40.74	---	74.00	54.00	-13.26	Peak
1748.00	42.83	---	-0.56		42.26	---	74.00	54.00	-11.74	Peak
2000.00	42.75	---	2.22		44.97	---	74.00	54.00	-9.03	Peak
*2401.00	60.03	---	2.93	-20	62.96	42.96	114.00	94.00	-51.04	AVG
2728.00	42.08	---	3.87		45.95	---	74.00	54.00	-8.05	Peak
3180.00	41.28	---	4.93		46.21	---	74.00	54.00	-7.79	Peak
4290.00	40.66	---	7.37		48.02	---	74.00	54.00	-5.98	Peak
4860.00	38.66	---	8.84		47.50	---	74.00	54.00	-6.50	Peak
6165.00	38.42	---	11.55		49.97	---	74.00	54.00	-4.03	Peak

966 Chamber_B at 3Meter / Vertical										
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Duty Cycle Correction Factor (dB)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1034.00	45.29	---	-4.40		40.89	---	74.00	54.00	-13.11	Peak
1240.00	44.86	---	-3.91		40.94	---	74.00	54.00	-13.06	Peak
1508.00	44.87	---	-3.21		41.66	---	74.00	54.00	-12.34	Peak
1998.00	43.66	---	2.20		45.85	---	74.00	54.00	-8.15	Peak
*2401.00	58.92	---	2.93	-20	61.85	41.85	114.00	94.00	-52.15	AVG
2798.00	42.84	---	4.11		46.95	---	74.00	54.00	-7.05	Peak
3105.00	41.47	---	4.87		46.33	---	74.00	54.00	-7.67	Peak
3735.00	40.40	---	5.93		46.33	---	74.00	54.00	-7.67	Peak
4890.00	40.24	---	8.93		49.17	---	74.00	54.00	-4.83	Peak
6570.00	38.06	---	12.45		50.51	---	74.00	54.00	-3.49	Peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)
6. " \* " For Fundamental & Harmonics: Result-AV = Result(PK) + Duty Cycle Correction Factor



<b>Product Name</b>	Much Link			<b>Test By</b>		Rueyyan Lin		
<b>Test Model</b>	MLD-AB1			<b>Test Date</b>		2013/10/28		
<b>Test Mode</b>	TX / CH2 / 2403MHz			<b>Temp. &amp; Humidity</b>		25°C, 41%		

966 Chamber_B at 3Meter / Horizontal										
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Duty Cycle Correction Factor (dB)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1082.00	45.51	---	-4.29		41.23	---	74.00	54.00	-12.77	Peak
1368.00	44.81	---	-3.61		41.20	---	74.00	54.00	-12.80	Peak
1730.00	43.20	---	-0.76		42.44	---	74.00	54.00	-11.56	Peak
1984.00	42.78	---	2.04		44.82	---	74.00	54.00	-9.18	Peak
*2403.00	87.62	---	2.94	-20	90.56	70.56	114.00	94.00	-23.44	AVG
2824.00	42.77	---	4.19		46.96	---	74.00	54.00	-7.04	Peak
3390.00	41.12	---	5.10		46.22	---	74.00	54.00	-7.78	Peak
4035.00	40.28	35.58	6.83		47.12	42.41	74.00	54.00	-6.88	AVG
4800.00	46.58	35.58	8.67		55.25	44.25	74.00	54.00	-9.75	AVG
5790.00	40.71	---	10.60		51.31	---	74.00	54.00	-2.69	Peak

966 Chamber_B at 3Meter / Vertical										
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Duty Cycle Correction Factor (dB)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1286.00	45.53	---	-3.81		41.73	---	74.00	54.00	-12.27	Peak
1732.00	43.10	---	-0.74		42.37	---	74.00	54.00	-11.63	Peak
2012.00	42.90	---	2.24		45.15	---	74.00	54.00	-8.85	Peak
*2403.00	87.96	---	2.94	-20	90.90	70.90	114.00	94.00	-23.10	AVG
2810.00	42.48	---	4.15		46.63	---	74.00	54.00	-7.37	Peak
3375.00	41.03	---	5.09		46.11	---	74.00	54.00	-7.89	Peak
4200.00	40.31	---	7.18		47.49	---	74.00	54.00	-6.51	Peak
4800.00	46.05	35.31	8.67		54.72	43.98	74.00	54.00	-10.02	AVG
6510.00	38.79	---	12.47		51.26	---	74.00	54.00	-2.74	Peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)
6. " \* " For Fundamental & Harmonics: Result-AV = Result(PK) + Duty Cycle Correction Factor



<b>Product Name</b>	Much Link			<b>Test By</b>		Rueyyan Lin		
<b>Test Model</b>	MLD-AB1			<b>Test Date</b>		2013/10/28		
<b>Test Mode</b>	TX / CH10 / 2441MHz			<b>Temp. &amp; Humidity</b>		25°C, 41%		

966 Chamber_B at 3Meter / Horizontal										
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Duty Cycle Correction Factor (dB)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1098.00	45.46	---	-4.25		41.21	---	74.00	54.00	-12.79	Peak
1382.00	44.72	---	-3.58		41.14	---	74.00	54.00	-12.86	Peak
1768.00	43.69	---	-0.34		43.35	---	74.00	54.00	-10.65	Peak
2066.00	42.87	---	2.34		45.21	---	74.00	54.00	-8.79	Peak
*2441.00	89.19	---	3.00	-20	92.19	72.19	114.00	94.00	-21.81	AVG
2760.00	42.39	---	3.98		46.37	---	74.00	54.00	-7.63	Peak
3180.00	41.48	---	4.93		46.41	---	74.00	54.00	-7.59	Peak
4020.00	41.01	---	6.80		47.81	---	74.00	54.00	-6.19	Peak
4875.00	46.72	36.05	8.88		55.60	44.93	74.00	54.00	-9.07	AVG
5970.00	38.49	---	11.03		49.52	---	74.00	54.00	-4.48	Peak

966 Chamber_B at 3Meter / Vertical										
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Duty Cycle Correction Factor (dB)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1118.00	45.16	---	-4.20		40.96	---	74.00	54.00	-13.04	Peak
1568.00	43.58	---	-2.55		41.03	---	74.00	54.00	-12.97	Peak
1886.00	43.75	---	0.96		44.71	---	74.00	54.00	-9.29	Peak
2174.00	42.98	---	2.53		45.51	---	74.00	54.00	-8.49	Peak
*2441.00	89.74	---	3.00	-20	92.74	72.74	114.00	94.00	-21.26	AVG
2714.00	43.22	---	3.82		47.05	---	74.00	54.00	-6.95	Peak
3180.00	41.91	---	4.93		46.84	---	74.00	54.00	-7.16	Peak
3870.00	40.59	---	6.35		46.95	---	74.00	54.00	-7.05	Peak
4875.00	47.25	36.29	8.88		56.13	45.17	74.00	54.00	-8.83	AVG
6495.00	38.73	---	12.46		51.18	---	74.00	54.00	-2.82	Peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)
6. " \* " For Fundamental & Harmonics: Result-AV = Result(PK) + Duty Cycle Correction Factor



<b>Product Name</b>	Much Link		<b>Test By</b>	Rueyyan Lin
<b>Test Model</b>	MLD-AB1		<b>Test Date</b>	2013/10/28
<b>Test Mode</b>	TX / CH18 / 2477MHz		<b>Temp. &amp; Humidity</b>	25°C, 41%

966 Chamber_B at 3Meter / Horizontal										
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Duty Cycle Correction Factor (dB)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1052.00	45.21	---	-4.36		40.85	---	74.00	54.00	-13.15	Peak
1568.00	44.09	---	-2.55		41.54	---	74.00	54.00	-12.46	Peak
1952.00	43.07	---	1.69		44.76	---	74.00	54.00	-9.24	Peak
2186.00	42.04	---	2.55		44.60	---	74.00	54.00	-9.40	Peak
*2477.00	91.24	---	3.07	-20	94.31	74.31	114.00	94.00	-19.69	AVG
2932.00	42.26	---	4.55		46.81	---	74.00	54.00	-7.19	Peak
3120.00	41.55	---	4.88		46.43	---	74.00	54.00	-7.57	Peak
4350.00	41.44	---	7.49		48.94	---	74.00	54.00	-5.06	Peak
4950.00	47.62	36.70	9.10		56.72	45.80	74.00	54.00	-8.20	AVG
5865.00	39.76	---	10.78		50.54	---	74.00	54.00	-3.46	Peak

966 Chamber_B at 3Meter / Vertical										
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Duty Cycle Correction Factor (dB)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1066.00	45.22	---	-4.32		40.90	---	74.00	54.00	-13.10	Peak
1368.00	45.91	---	-3.61		42.30	---	74.00	54.00	-11.70	Peak
1748.00	43.62	---	-0.56		43.06	---	74.00	54.00	-10.94	Peak
2092.00	42.24	---	2.38		44.62	---	74.00	54.00	-9.38	Peak
*2477.00	89.59	---	3.07	-20	92.66	72.66	114.00	94.00	-21.34	AVG
2796.00	42.27	---	4.10		46.37	---	74.00	54.00	-7.63	Peak
3120.00	40.94	---	4.88		45.82	---	74.00	54.00	-8.18	Peak
3750.00	40.31	---	5.98		46.28	---	74.00	54.00	-7.72	Peak
4950.00	47.16	36.09	9.10		56.26	45.19	74.00	54.00	-8.81	AVG
6705.00	38.07	---	12.41		50.48	---	74.00	54.00	-3.52	Peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)
6. “ \* ” For Fundamental & Harmonics: Result-AV = Result(PK) + Duty Cycle Correction Factor



<b>Product Name</b>	Much Link	<b>Test By</b>	Rueyyan Lin
<b>Test Model</b>	MLD-AB1	<b>Test Date</b>	2013/10/28
<b>Test Mode</b>	TX / CH19 / 2479MHz	<b>Temp. &amp; Humidity</b>	25°C, 41%

**966 Chamber\_B at 3Meter / Horizontal**

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Duty Cycle Correction Factor (dB)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1054.00	45.54	---	-4.35		41.19	---	74.00	54.00	-12.81	Peak
1368.00	44.55	---	-3.61		40.94	---	74.00	54.00	-13.06	Peak
1702.00	44.45	---	-1.07		43.38	---	74.00	54.00	-10.62	Peak
2032.00	43.44	---	2.28		45.71	---	74.00	54.00	-8.29	Peak
*2479.00	61.87	---	3.07	-20	64.94	44.94	114.00	94.00	-49.06	AVG
3135.00	41.27	---	4.89		46.17	---	74.00	54.00	-7.83	Peak
4245.00	39.72	---	7.27		46.99	---	74.00	54.00	-7.01	Peak
4920.00	39.16	---	9.01		48.17	---	74.00	54.00	-5.83	Peak
6105.00	37.97	---	11.39		49.36	---	74.00	54.00	-4.64	Peak

**966 Chamber\_B at 3Meter / Vertical**

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Duty Cycle Correction Factor (dB)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1020.00	45.79	---	-4.43		41.36	---	74.00	54.00	-12.64	Peak
1256.00	45.78	---	-3.88		41.90	---	74.00	54.00	-12.10	Peak
1626.00	43.49	---	-1.91		41.58	---	74.00	54.00	-12.42	Peak
2012.00	43.76	---	2.24		46.00	---	74.00	54.00	-8.00	Peak
*2479.00	59.19	---	3.07	-20	62.26	42.26	114.00	94.00	-51.74	AVG
2710.00	42.59	---	3.81		46.40	---	74.00	54.00	-7.60	Peak
3225.00	41.25	---	4.96		46.22	---	74.00	54.00	-7.78	Peak
3855.00	40.29	---	6.30		46.59	---	74.00	54.00	-7.41	Peak
4950.00	38.92	---	9.10		48.01	---	74.00	54.00	-5.99	Peak
5880.00	38.31	---	10.81		49.12	---	74.00	54.00	-4.88	Peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)
6. " \* " For Fundamental & Harmonics: Result-AV = Result(PK) + Duty Cycle Correction Factor



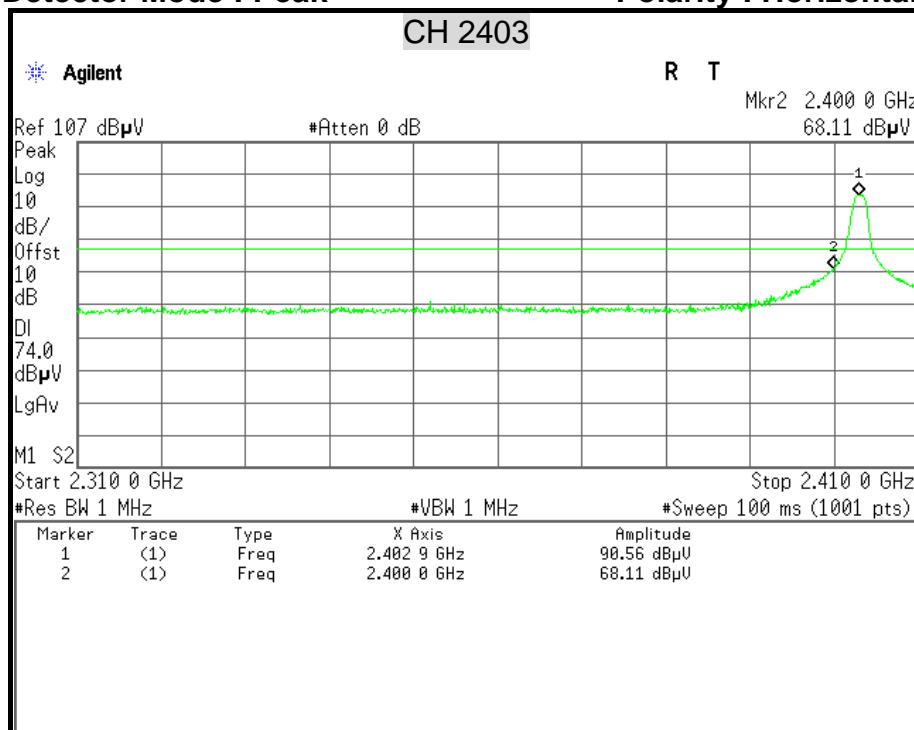
## Restricted Band Edges

Channel	Fundamental / Restricted Band Edges (MHz)	Polarity	Detector	Duty Cycle Correction Factor (dB)	Field Strength (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
CH Low	2403	Horizontal	Peak	---	90.56	114.00	-23.44
			AVG	-20.00	70.56	94.00	-23.44
		Vertical	Peak	---	90.90	114.00	-23.10
			AVG	-20.00	70.90	94.00	-23.10
	2310-2400	Horizontal	Peak	---	68.11	74.00	-5.89
			AVG	-20.00	48.11	54.00	-5.89
		Vertical	Peak	---	68.29	74.00	-5.71
			AVG	-20.00	48.29	54.00	-5.71
CH High	2477	Horizontal	Peak	---	94.31	114.00	-19.69
			AVG	-20.00	74.31	94.00	-19.69
		Vertical	Peak	---	92.66	114.00	-21.34
			AVG	-20.00	72.66	94.00	-21.34
	2483.5-2500	Horizontal	Peak	---	64.63	74.00	-9.37
			AVG	-20.00	44.63	54.00	-9.37
		Vertical	Peak	---	61.95	74.00	-12.05
			AVG	-20.00	41.95	54.00	-12.05



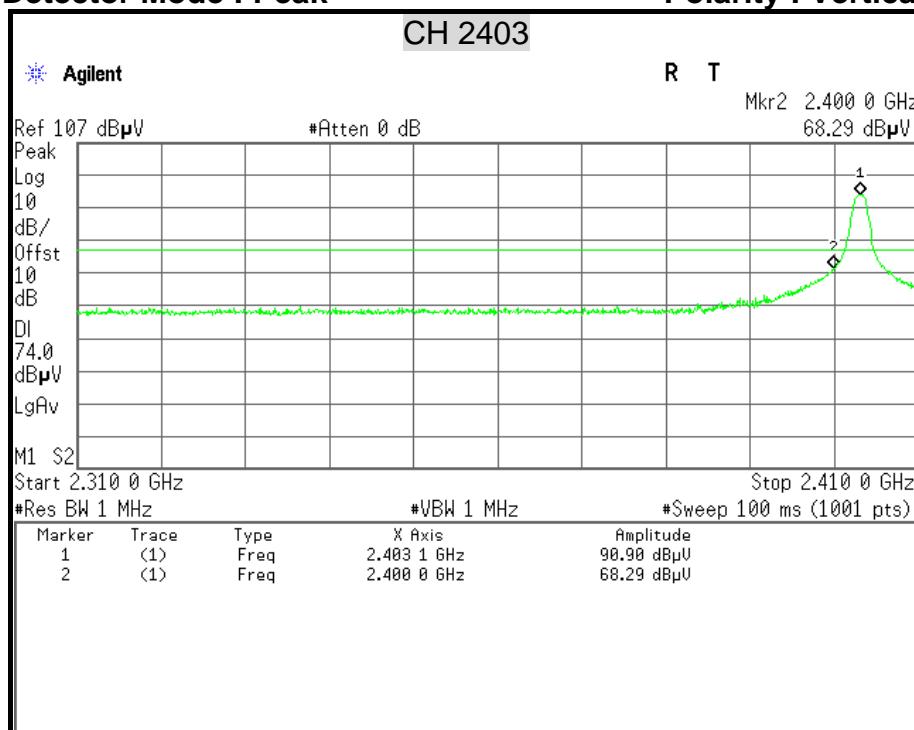
## Detector Mode : Peak

## Polarity : Horizontal



## Detector Mode : Peak

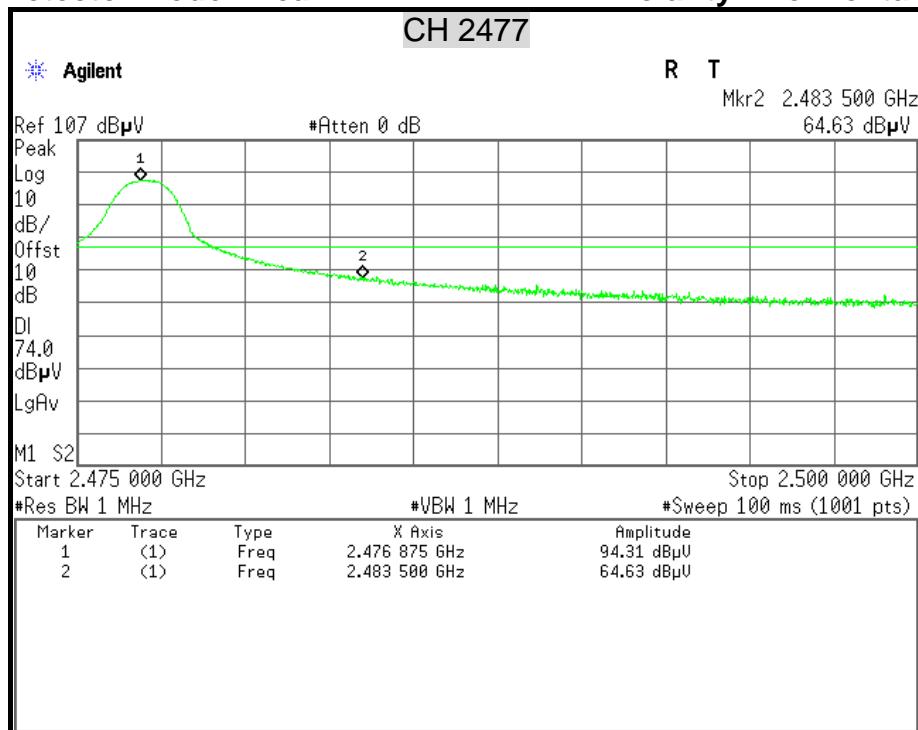
## Polarity : Vertical





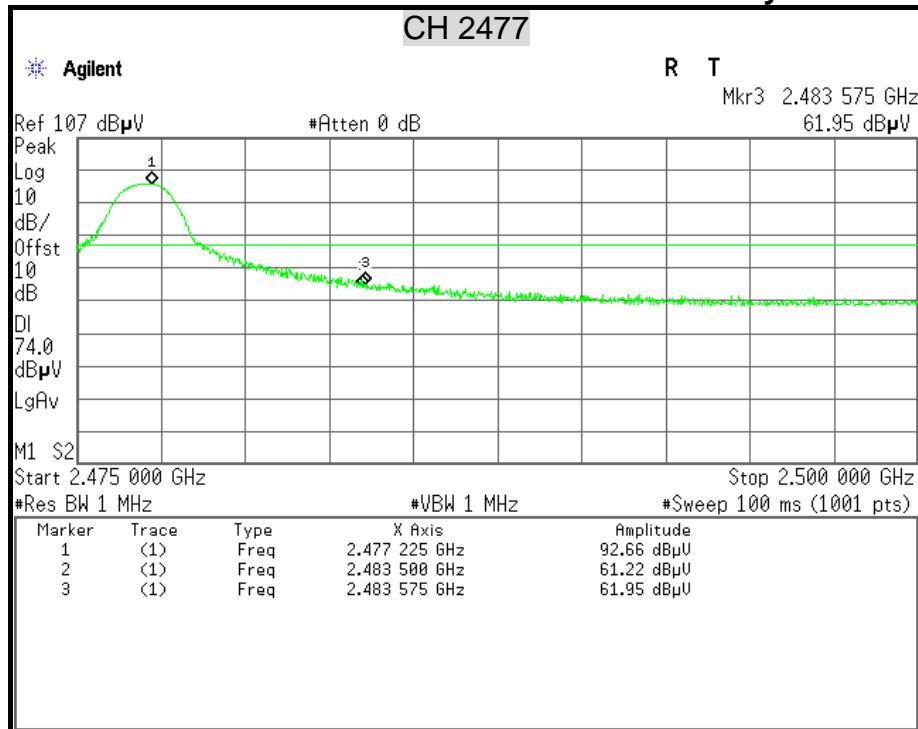
## Detector Mode : Peak

## Polarity : Horizontal



## Detector Mode : Peak

## Polarity : Vertical





## 7.4 CONDUCTED EMISSION

### LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5.00	56	46
5.00 - 30.0	60	50

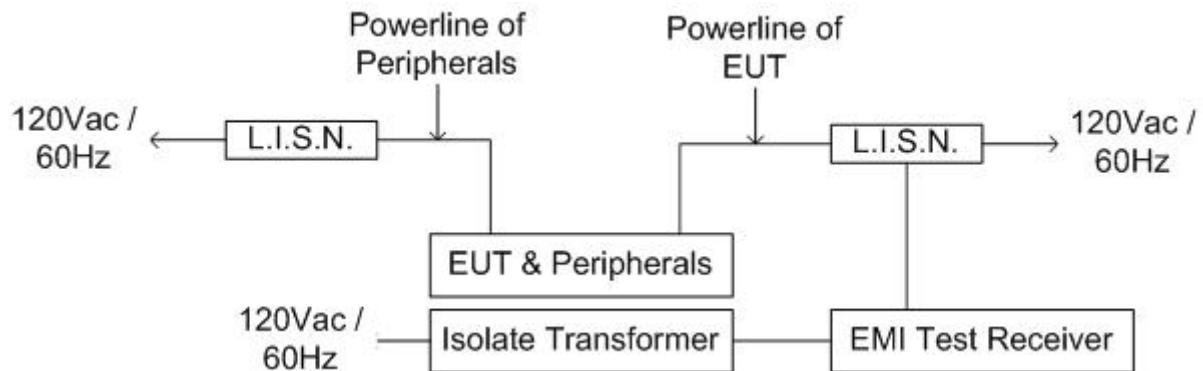
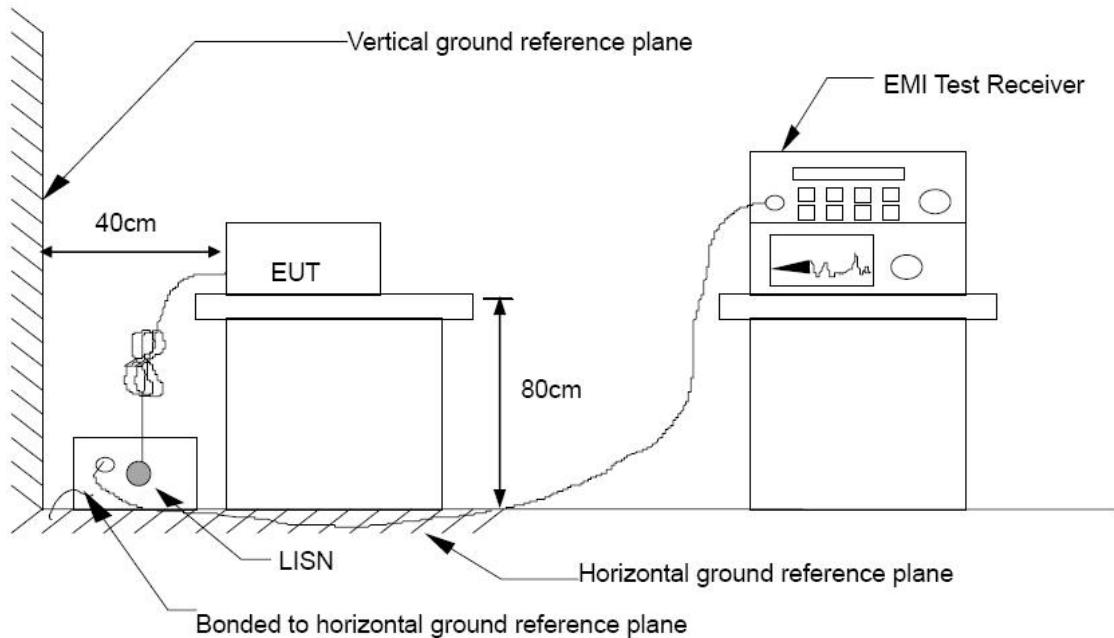
### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/11/2014
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	03/07/2014
EMI Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/16/2014
Pulse Limiter	ROHDE & SCHWARZ	ESH3-Z2	100117	07/01/2014

*Remark:* Each piece of equipment is scheduled for calibration once a year.



## TEST SETUP





## **TEST PROCEDURE**

The basic test procedure was in accordance with ANSI C63.4:2009.

The test procedure is performed in a 4m x 3m x 2.4m (LxWxH) shielded room.

The EUT along with its peripherals were placed on a 1.0m (W) x 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

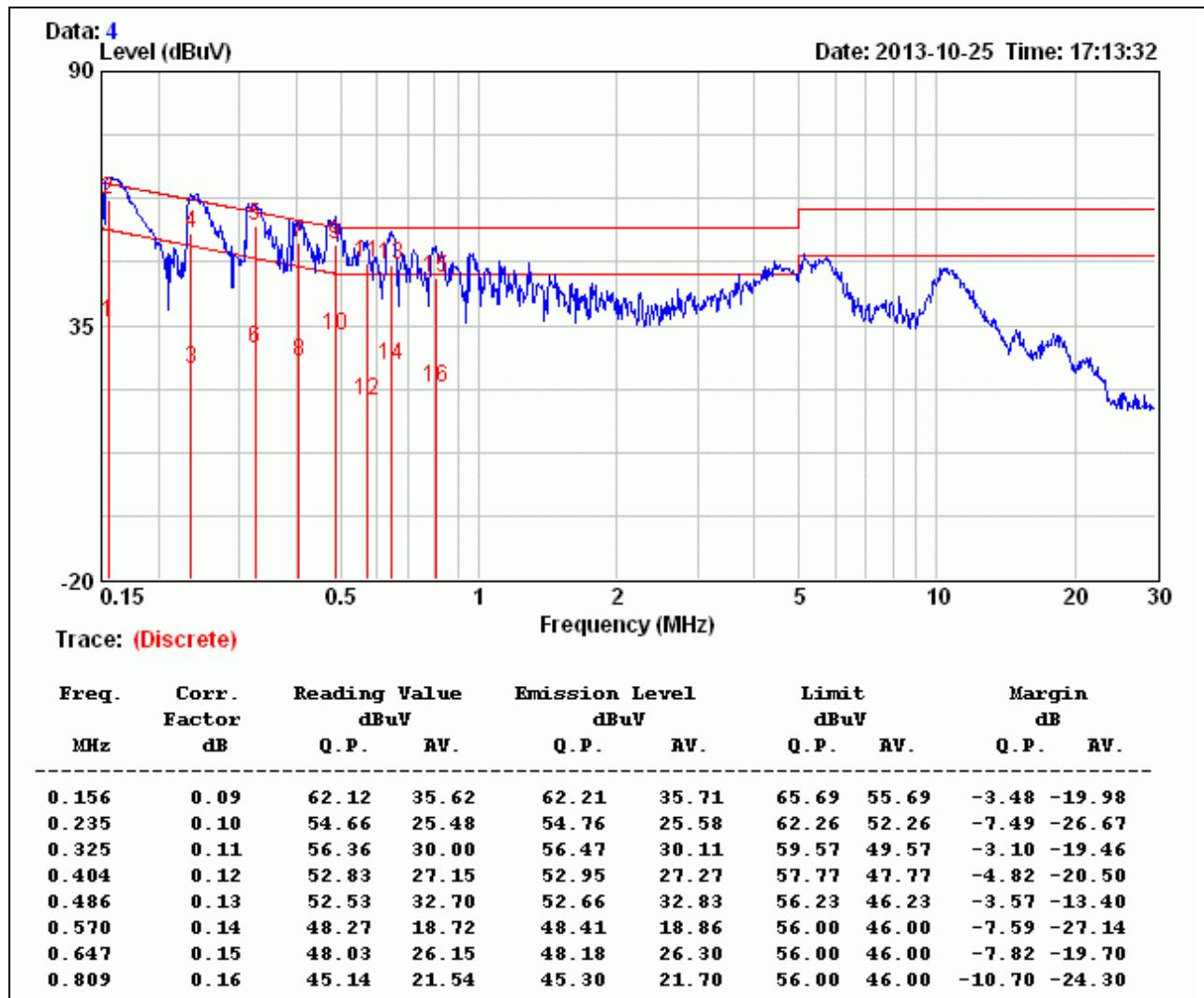
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.

The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

TEST RESULTS

Product Name	Much Link	Test By	Waternil Guan
Test Model	MLD-AB1	Test Date	2013/10/25
Test Mode	Normal Operating	Temp. & Humidity	24°C, 46%

## LINE



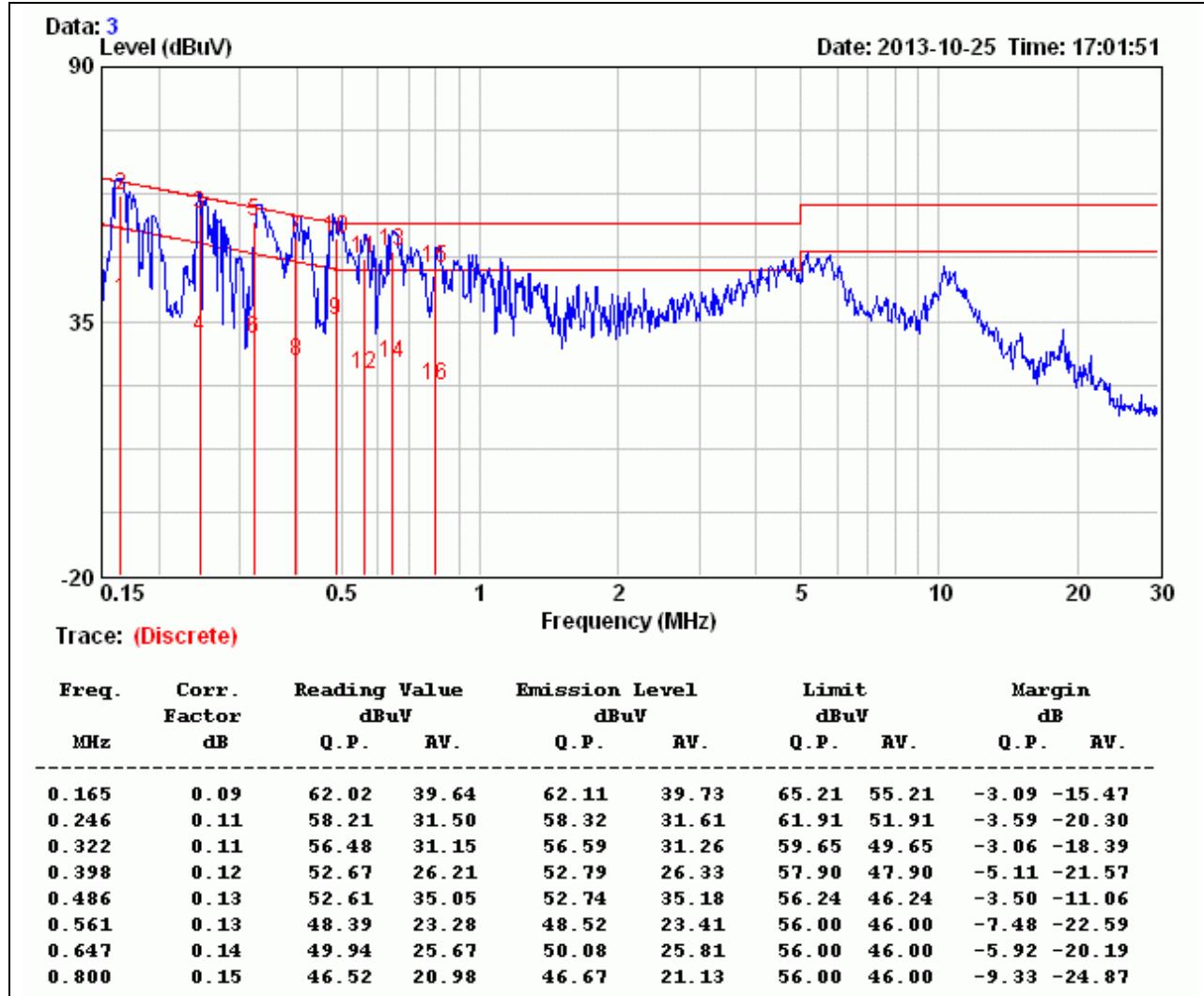
## Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level - Limit value



Product Name	Much Link	Test By	Waternal Guan
Test Model	MLD-AB1	Test Date	2013/10/25
Test Mode	Normal Operating	Temp. & Humidity	24°C, 46%

## NEUTRAL



## Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level – Limit value