



**FCC 47 CFR PART 15 SUBPART C AND ANSI C63.10:2009
TEST REPORT**

For

Color Tuning Module

Model : CTM0

Data Applies To : CTM012 ; CTM019 ; CTM032 ;

DDM012 ; DDM019 ; DDM032

Trade Name : 

Issued for

Lumenetix inc.

4742 Scotts Valley Drive, Scotts Valley, CA 95066.

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

Issued Date: June 12, 2015



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 | 10/13/2014 | Initial Issue | All Page 33 | Dola Hsieh |
| 01 | 06/12/2015 | Revised FCC ID | All Page 33 | Dola Hsieh |
| | | | | |
| | | | | |
| | | | | |



TABLE OF CONTENTS

| TITLE | PAGE NO. |
|--|-----------------|
| 1. TEST REPORT CERTIFICATION | 4 |
| 2. EUT DESCRIPTION | 5 |
| 3. DESCRIPTION OF TEST MODES | 6 |
| 4. TEST METHODOLOGY | 7 |
| 5. FACILITIES AND ACCREDITATION | 7 |
| 5.1 FACILITIES | 7 |
| 5.2 ACCREDITATIONS..... | 7 |
| 5.3 MEASUREMENT UNCERTAINTY | 8 |
| 6. SETUP OF EQUIPMENT UNDER TEST..... | 9 |
| 7. FCC PART 15.249 REQUIREMENTS | 10 |
| 7.1 20 dB BANDWIDTH | 10 |
| 7.2 RADIATED EMISSION..... | 13 |
| 7.3 CONDUCTED EMISSION | 26 |
| APPENDIX I SETUP PHOTOS | 31 |



1. TEST REPORT CERTIFICATION

Applicant : Lumenetix inc.
Address : 4742 Scotts Valley Drive, Scotts Valley, CA 95066.
Equipment Under Test : Color Tuning Module
Model : CTM0
Data Applies To : CTM012 ; CTM019 ; CTM032 ; DDM012 ; DDM019 ;
DDM032
Trade Name : 
Tested Date : September 05 ~ 19, 2014

| APPLICABLE STANDARD | |
|---|-------------|
| Standard | Test Result |
| FCC Part 15 Subpart C AND ANSI C63.10:2009 | 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

| | |
|----------------------------|---|
| Product Name | Color Tuning Module |
| Model Number | CTM0 |
| Data Applies To | CTM012 ; CTM019 ; CTM032 ; DDM012 ; DDM019 ; DDM032 |
| Identify Number | T140905S03 |
| Received Date | September 05, 2014 |
| Frequency Range | 2405MHz ~ 2480MHz |
| Transmit Power | 67.05 dBuV/m |
| Channel Spacing | 5 MHz |
| Transmit Data Rate | 250 kps |
| Channel Number | 16 Channels |
| Transmit Data Rate | 250 kbps |
| Type of Modulation | DSSS (O-QPSK) |
| Antenna Type | PCB Antenna, Antenna Gain : 0.9 dBi |
| Power Rating | 24 Vdc |
| Test Voltage | 24 Vdc |
| DC Power Cable Type | Non-shielded cable 0.2 m × 2 (Non-detachable) |
| Signal Cable | Non-shielded cable 0.2 m × 4 (Non-detachable) |

The difference of the model :

| Model Number | Difference |
|--------------|--|
| CTM0 | The model is only different in appearance color. |
| CTM012 | |
| CTM019 | |
| CTM032 | |
| DDM012 | |
| DDM019 | |
| DDM032 | |

- 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. The model CTM0 was considered the main model for testing.
 4. This submittal(s) (test report) is intended for FCC ID: Q8A-CTM0-DDM0 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 (CTM0) had been tested under operating condition.

There are three channels have been tested as following :

| Channel | Frequency (MHz) |
|---------|-----------------|
| Low | 2405 |
| Middle | 2440 |
| High | 2480 |

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 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) |
|---------|-----------------|
| Low | 2405 |
| Middle | 2440 |
| High | 2480 |

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) |
|---------|-----------------|
| Low | 2405 |
| High | 2480 |



4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 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 C63.10:2009 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.

| | |
|---------------|-----------------|
| Canada | INDUSTRY CANADA |
| Japan | VCCI |
| Taiwan | BSMI |
| USA | FCC MRA |

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

Remark: FCC Designation Number TW1027.



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. |
|-----|-----------------|--------------|--------------------|------------|
| 1 | DC Power Supply | Agilent | POWER SUPPLYE3631A | MY40007576 |

| No. | Signal Cable Description |
|-----|--|
| 1 | Non-shielded DC power cable, 1 m × 1 |
| 2 | Non-shielded AC power cable, 1.5 m × 1 |

SETUP DIAGRAM FOR TESTS

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

EUT OPERATING CONDITION

RF Mode :

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. Power on all equipments.
TX Mode: Frequency:2405MHz、 2440MHz、 2480MHz
3. All of the functions are under run.
4. Start test.

Normal Mode :

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. EUT Power on.
3. Remote control lighting, color temperature.
4. All of the functions are under run.
5. Start test.



7. FCC PART 15.249 REQUIREMENTS

7.1 20 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST EQUIPMENT

| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
|-------------------|--------------|--------|---------------|-----------------|
| Spectrum Analyzer | Agilent | E4446A | MY43360132 | 06/10/2015 |

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

TEST SETUP



TEST PROCEDURE

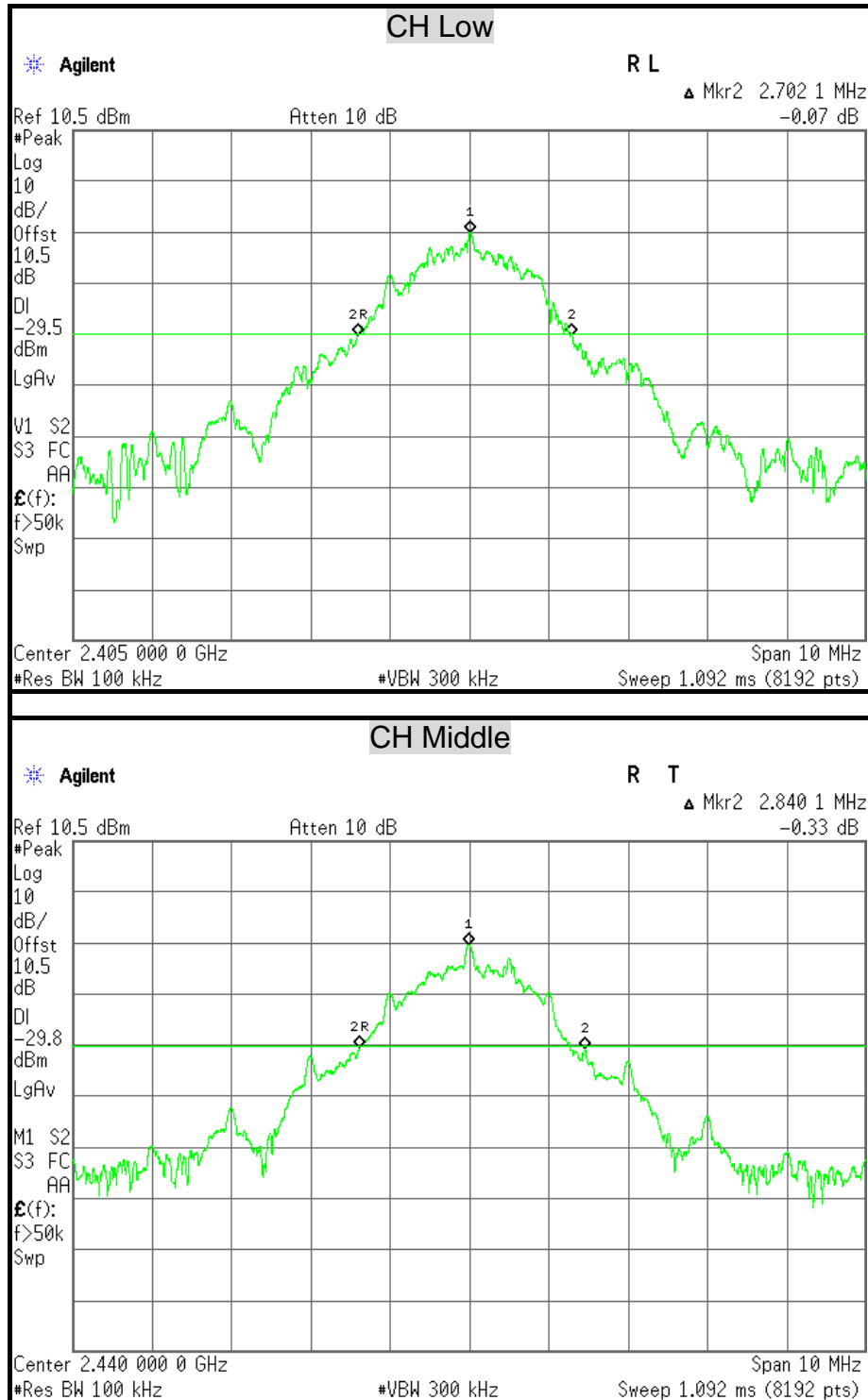
The 20dB band width was measured with a spectrum analyzer connected to RF antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency, using the analyzer. Display Line and Marker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

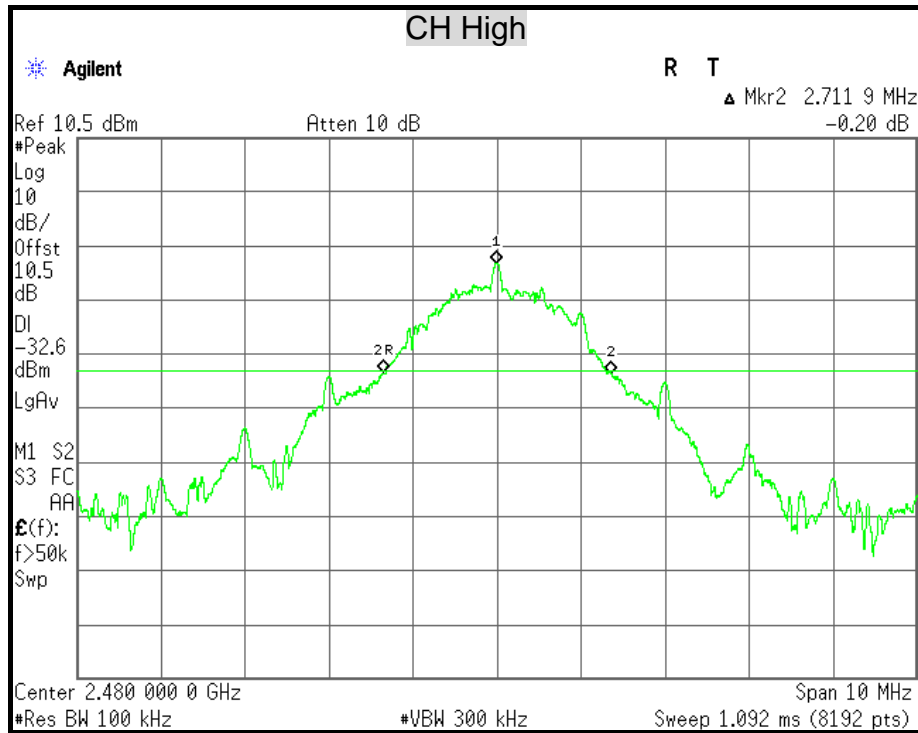
TEST RESULTS

| Channel Frequency (MHz) | 20dB Bandwidth (MHz) |
|-------------------------|----------------------|
| 2405 | 2.7021 |
| 2440 | 2.8401 |
| 2480 | 2.7119 |



20dB BANDWIDTH







7.2 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 |
| ¹ 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 | (²) |
| 13.36 - 13.41 | | | |

Remark:

1. ¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2. ² 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.
- (5) According to § 15.249 (a) Except as provided in paragraph (b) of this section, the field strength of emission from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental Frequency (MHz) | Field Strength of Fundamental (millivolts/meter) | Measurement Distance of Harmonics (microvolts/meter) |
|-----------------------------|--|--|
| 902 - 928 | 50 | 500 |
| 2400 - 2483.5 | 50 | 500 |
| 5725 - 5875 | 50 | 500 |
| 24000 - 24250 | 250 | 2500 |

**TEST EQUIPMENT****966Chamber_B**

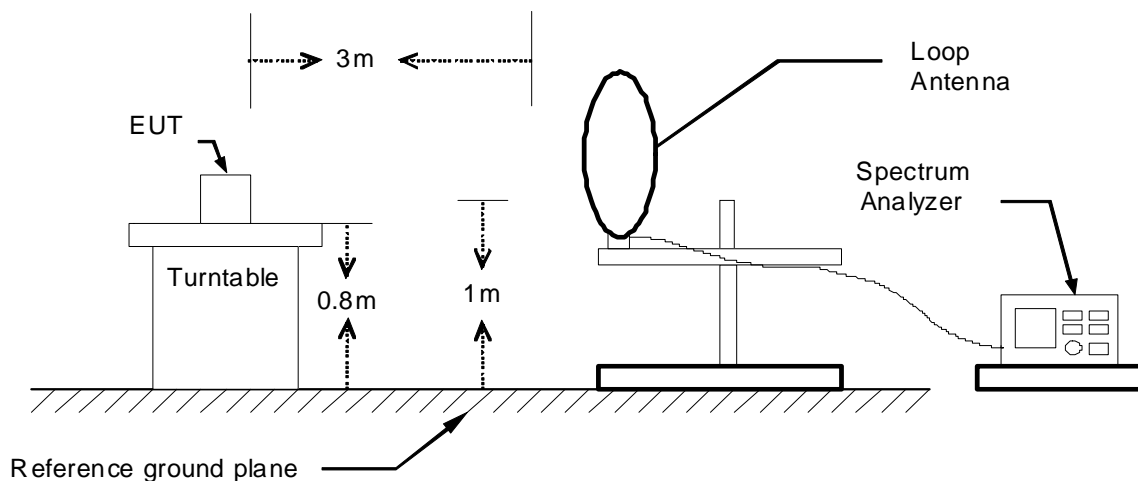
| Name of Equipment | Manufacture | Model | Serial Number | Calibration Due |
|------------------------------|-----------------|-------------|---------------|-----------------|
| Spectrum Analyzer | Agilent | E4446A | MY46180323 | 04/15/2015 |
| EMI Test Receiver | ROHDE & SCHWARZ | ESCS 30 | 835418/008 | 10/16/2014 |
| Bi-log Antenna | SCHWARZBECK | VULB 9168 | 9168-250 | 08/21/2015 |
| Double-Ridged Waveguide Horn | ETS-LINDGREN | 3117 | 00078733 | 12/05/2014 |
| Horn Antenna | COM-POWER | AH-840 | 03077 | 12/18/2014 |
| Pre-Amplifier | Agilent | 8447D | 2944A10052 | 07/15/2015 |
| Pre-Amplifier | Agilent | 8449B | 3008A01916 | 07/15/2015 |
| LOOP Antenna | COM-POWER | AL-130 | 121051 | 01/12/2015 |
| 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

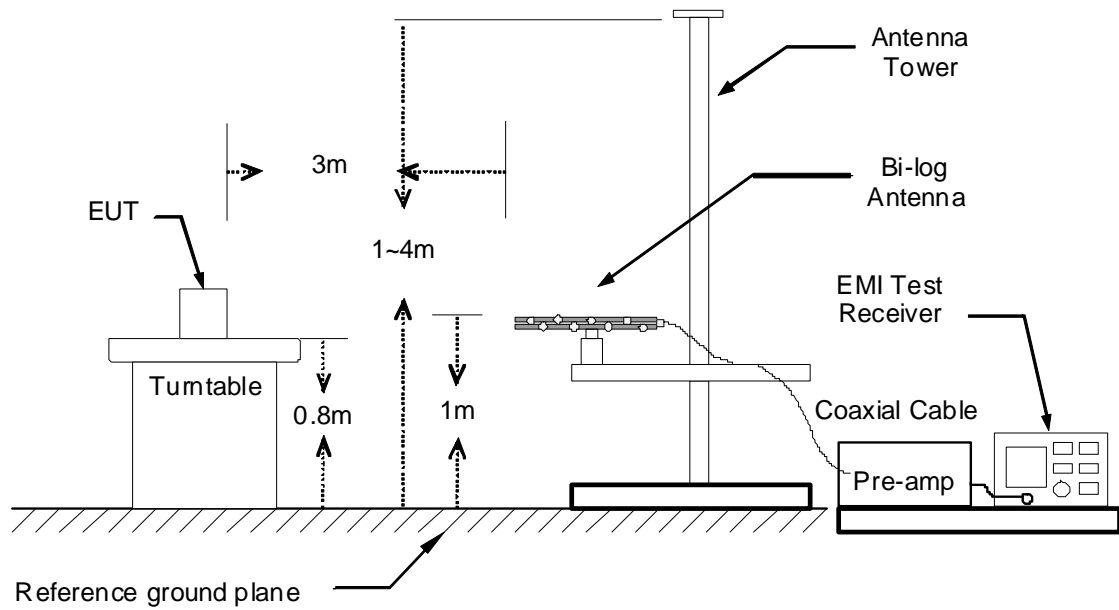
The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.

9kHz ~ 30MHz

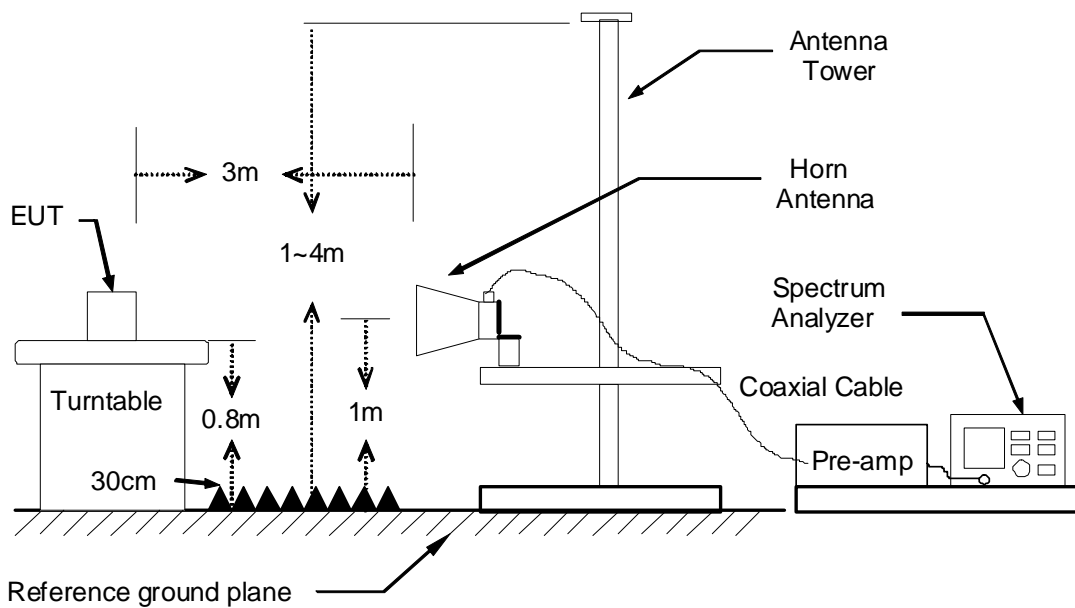




30MHz ~ 1GHz



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)

| | | | |
|---------------------|---------------------|-----------------------------|-------------|
| Product Name | Color Tuning Module | Test By | Rueyyan Lin |
| Test Model | CTM0 | Test Date | 2014/09/13 |
| Test Mode | Normal Operating | Temp. & Humidity | 27°C, 36.3% |

| 966 Chamber_B at 3Meter / Horizontal | | | | | | |
|--------------------------------------|----------------|--------------------------|-----------------|----------------|-------------|--------|
| Frequency (MHz) | Reading (dBμV) | Correction Factor (dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark |
| 42.61 | 44.50 | -14.21 | 30.28 | 40.00 | -9.72 | Peak |
| 52.31 | 45.05 | -13.89 | 31.15 | 40.00 | -8.85 | Peak |
| 120.21 | 44.18 | -16.09 | 28.10 | 43.50 | -15.40 | Peak |
| 142.52 | 38.42 | -13.86 | 24.55 | 43.50 | -18.95 | Peak |
| 246.31 | 46.58 | -13.86 | 32.72 | 46.00 | -13.28 | Peak |
| 338.46 | 45.73 | -11.13 | 34.60 | 46.00 | -11.40 | Peak |
| 595.51 | 28.36 | -6.03 | 22.34 | 46.00 | -23.66 | Peak |
| 966 Chamber_B at 3Meter / Vertical | | | | | | |
| Frequency (MHz) | Reading (dBμV) | Correction Factor (dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark |
| 41.64 | 54.00 | -14.31 | 39.69 | 40.00 | -0.31 | QP |
| 53.28 | 53.80 | -13.91 | 39.89 | 40.00 | -0.11 | QP |
| 122.15 | 56.70 | -15.88 | 40.83 | 43.50 | -2.67 | Peak |
| 191.99 | 45.17 | -15.50 | 29.67 | 43.50 | -13.83 | Peak |
| 247.28 | 44.63 | -13.82 | 30.81 | 46.00 | -15.19 | Peak |
| 346.22 | 45.57 | -10.97 | 34.60 | 46.00 | -11.40 | Peak |
| 556.71 | 32.01 | -7.21 | 24.80 | 46.00 | -21.20 | Peak |
| 721.61 | 27.03 | -4.23 | 22.80 | 46.00 | -23.20 | 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 (dBμV/m) = Reading (dBμV) + Correction Factor (dB/m)
5. Margin (dB) = Remark result (dBμV/m) - Quasi-peak limit (dBμV/m).



Above 1 GHz

| | | | |
|---------------------|---------------------|-----------------------------|-------------|
| Product Name | Color Tuning Module | Test By | Rueyyan Lin |
| Test Model | CTM0 | Test Date | 2014/09/13 |
| Test Mode | TX / CH Low | Temp. & Humidity | 27°C, 36.3% |

| 966 Chamber_B at 3Meter / Horizontal | | | | | | | | | |
|--------------------------------------|-------------------|-------------------|--------------------------|--------------------|--------------------|-------------------|-------------------|-------------|--------|
| Frequency (MHz) | Reading-PK (dBuV) | Reading-AV (dBuV) | Correction Factor (dB/m) | Result-PK (dBuV/m) | Result-AV (dBuV/m) | Limit-PK (dBuV/m) | Limit-AV (dBuV/m) | Margin (dB) | Remark |
| 1178.00 | 45.67 | --- | -2.89 | 42.79 | --- | 74.00 | 54.00 | -11.21 | Peak |
| 1986.00 | 43.81 | --- | 1.69 | 45.50 | --- | 74.00 | 54.00 | -8.50 | Peak |
| 2404.00 | 63.85 | --- | 2.62 | 66.47 | --- | 114.00 | 94.00 | -27.53 | Peak |
| 2854.00 | 43.06 | --- | 3.71 | 46.77 | --- | 74.00 | 54.00 | -7.23 | Peak |
| 3345.00 | 42.61 | --- | 4.36 | 46.98 | --- | 74.00 | 54.00 | -7.02 | Peak |
| 4815.00 | 39.95 | --- | 8.06 | 48.01 | --- | 74.00 | 54.00 | -5.99 | Peak |
| 6420.00 | 39.26 | --- | 12.03 | 51.29 | --- | 74.00 | 54.00 | -2.71 | Peak |
| 966 Chamber_B at 3Meter / Vertical | | | | | | | | | |
| Frequency (MHz) | Reading-PK (dBuV) | Reading-AV (dBuV) | Correction Factor (dB/m) | Result-PK (dBuV/m) | Result-AV (dBuV/m) | Limit-PK (dBuV/m) | Limit-AV (dBuV/m) | Margin (dB) | Remark |
| 1286.00 | 47.47 | --- | -2.89 | 44.58 | --- | 74.00 | 54.00 | -9.42 | Peak |
| 1954.00 | 43.53 | --- | 1.39 | 44.92 | --- | 74.00 | 54.00 | -9.08 | Peak |
| 2404.00 | 64.43 | --- | 2.62 | 67.05 | --- | 114.00 | 94.00 | -26.95 | Peak |
| 2678.00 | 42.77 | --- | 3.26 | 46.04 | --- | 74.00 | 54.00 | -7.96 | Peak |
| 3210.00 | 42.18 | --- | 4.25 | 46.43 | --- | 74.00 | 54.00 | -7.57 | Peak |
| 4785.00 | 41.31 | --- | 8.00 | 49.30 | --- | 74.00 | 54.00 | -4.70 | Peak |
| 6480.00 | 38.55 | --- | 12.21 | 50.76 | --- | 74.00 | 54.00 | -3.24 | 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)



| | | | |
|---------------------|---------------------|-----------------------------|-------------|
| Product Name | Color Tuning Module | Test By | Rueyyan Lin |
| Test Model | CTM0 | Test Date | 2014/09/13 |
| Test Mode | TX / CH Middle | Temp. & Humidity | 27°C, 36.3% |

| 966 Chamber_B at 3Meter / Horizontal | | | | | | | | | |
|--------------------------------------|-------------------|-------------------|--------------------------|--------------------|--------------------|-------------------|-------------------|-------------|--------|
| Frequency (MHz) | Reading-PK (dBuV) | Reading-AV (dBuV) | Correction Factor (dB/m) | Result-PK (dBuV/m) | Result-AV (dBuV/m) | Limit-PK (dBuV/m) | Limit-AV (dBuV/m) | Margin (dB) | Remark |
| 1164.00 | 46.10 | --- | -2.89 | 43.22 | --- | 74.00 | 54.00 | -10.78 | Peak |
| 2018.00 | 43.34 | --- | 1.86 | 45.20 | --- | 74.00 | 54.00 | -8.80 | Peak |
| 2440.00 | 62.84 | --- | 2.69 | 65.53 | --- | 114.00 | 94.00 | -28.47 | Peak |
| 2802.00 | 42.46 | --- | 3.58 | 46.04 | --- | 74.00 | 54.00 | -7.96 | Peak |
| 3420.00 | 42.12 | --- | 4.42 | 46.54 | --- | 74.00 | 54.00 | -7.46 | Peak |
| 4875.00 | 40.05 | --- | 8.18 | 48.23 | --- | 74.00 | 54.00 | -5.77 | Peak |
| 5655.00 | 41.03 | --- | 9.77 | 50.80 | --- | 74.00 | 54.00 | -3.20 | Peak |
| 966 Chamber_B at 3Meter / Vertical | | | | | | | | | |
| Frequency (MHz) | Reading-PK (dBuV) | Reading-AV (dBuV) | Correction Factor (dB/m) | Result-PK (dBuV/m) | Result-AV (dBuV/m) | Limit-PK (dBuV/m) | Limit-AV (dBuV/m) | Margin (dB) | Remark |
| 1224.00 | 45.53 | --- | -2.89 | 42.64 | --- | 74.00 | 54.00 | -11.36 | Peak |
| 2158.00 | 44.63 | --- | 2.13 | 46.76 | --- | 74.00 | 54.00 | -7.24 | Peak |
| 2440.00 | 64.08 | --- | 2.69 | 66.77 | --- | 114.00 | 94.00 | -27.23 | Peak |
| 2840.00 | 42.65 | --- | 3.67 | 46.32 | --- | 74.00 | 54.00 | -7.68 | Peak |
| 3195.00 | 42.63 | --- | 4.24 | 46.87 | --- | 74.00 | 54.00 | -7.13 | Peak |
| 4890.00 | 40.07 | --- | 8.21 | 48.28 | --- | 74.00 | 54.00 | -5.72 | Peak |
| 6375.00 | 38.95 | --- | 11.90 | 50.86 | --- | 74.00 | 54.00 | -3.14 | 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)



| | | | |
|---------------------|---------------------|-----------------------------|-------------|
| Product Name | Color Tuning Module | Test By | Rueyyan Lin |
| Test Model | CTM0 | Test Date | 2014/09/13 |
| Test Mode | TX / CH High | Temp. & Humidity | 27°C, 36.3% |

| 966 Chamber_B at 3Meter / Horizontal | | | | | | | | | |
|--------------------------------------|-------------------|-------------------|--------------------------|--------------------|--------------------|-------------------|-------------------|-------------|--------|
| Frequency (MHz) | Reading-PK (dBuV) | Reading-AV (dBuV) | Correction Factor (dB/m) | Result-PK (dBuV/m) | Result-AV (dBuV/m) | Limit-PK (dBuV/m) | Limit-AV (dBuV/m) | Margin (dB) | Remark |
| 1256.00 | 45.46 | --- | -2.89 | 42.57 | --- | 74.00 | 54.00 | -11.43 | Peak |
| 1906.00 | 43.74 | --- | 0.93 | 44.67 | --- | 74.00 | 54.00 | -9.33 | Peak |
| 2480.00 | 61.86 | --- | 2.77 | 64.63 | --- | 114.00 | 94.00 | -29.37 | Peak |
| 2712.00 | 42.63 | --- | 3.35 | 45.98 | --- | 74.00 | 54.00 | -8.02 | Peak |
| 3210.00 | 42.24 | --- | 4.25 | 46.49 | --- | 74.00 | 54.00 | -7.51 | Peak |
| 4965.00 | 39.25 | --- | 8.37 | 47.62 | --- | 74.00 | 54.00 | -6.38 | Peak |
| 6435.00 | 39.52 | --- | 12.08 | 51.60 | --- | 74.00 | 54.00 | -2.40 | Peak |
| 966 Chamber_B at 3Meter / Vertical | | | | | | | | | |
| Frequency (MHz) | Reading-PK (dBuV) | Reading-AV (dBuV) | Correction Factor (dB/m) | Result-PK (dBuV/m) | Result-AV (dBuV/m) | Limit-PK (dBuV/m) | Limit-AV (dBuV/m) | Margin (dB) | Remark |
| 1068.00 | 45.43 | --- | -2.88 | 42.55 | --- | 74.00 | 54.00 | -11.45 | Peak |
| 1828.00 | 43.31 | --- | 0.20 | 43.51 | --- | 74.00 | 54.00 | -10.49 | Peak |
| 2480.00 | 62.70 | --- | 2.77 | 65.47 | --- | 114.00 | 94.00 | -28.53 | Peak |
| 2760.00 | 42.60 | --- | 3.47 | 46.08 | --- | 74.00 | 54.00 | -7.92 | Peak |
| 3225.00 | 43.47 | --- | 4.26 | 47.74 | --- | 74.00 | 54.00 | -6.26 | Peak |
| 4950.00 | 39.22 | --- | 8.34 | 47.56 | --- | 74.00 | 54.00 | -6.44 | Peak |
| 6420.00 | 39.16 | --- | 12.03 | 51.20 | --- | 74.00 | 54.00 | -2.80 | Peak |

Remark:

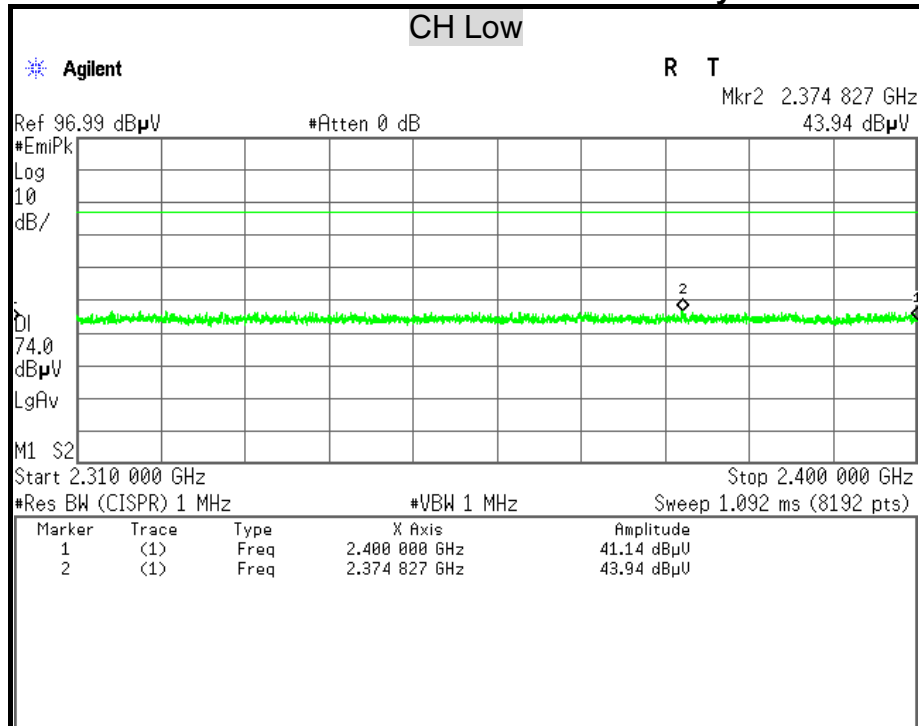
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are 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. $Result = Reading + Correction\ Factor$
 $Margin = Result - Limit$
 $Remark\ Peak = Result(PK) - Limit(AV)$
 $Remark\ AVG = Result(AV) - Limit(AV)$



Restricted Band Edges

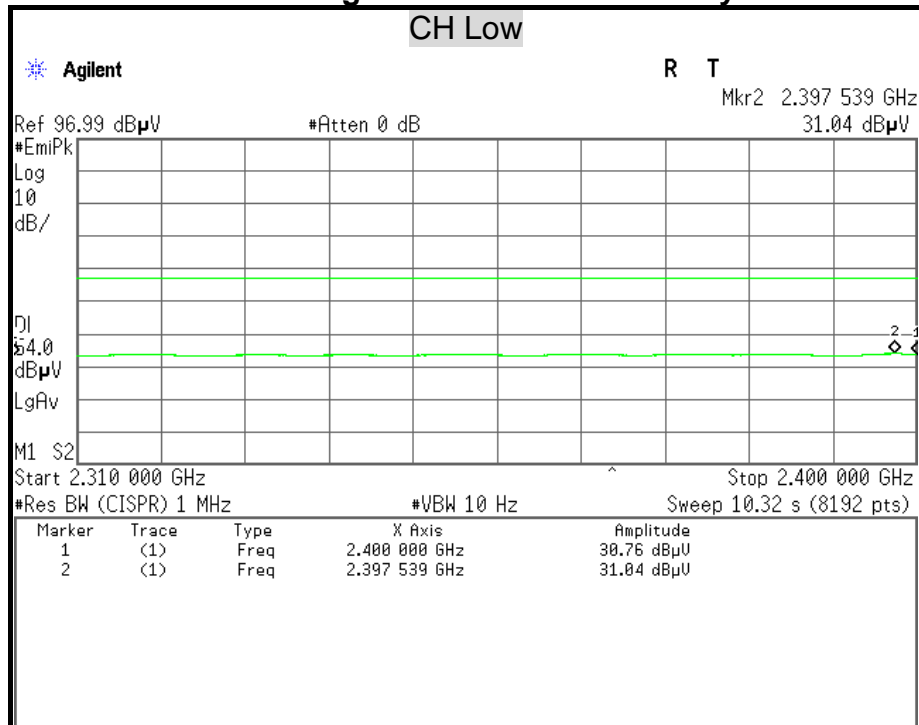
Detector Mode : Peak

Polarity : Horizontal



Detector Mode : Average

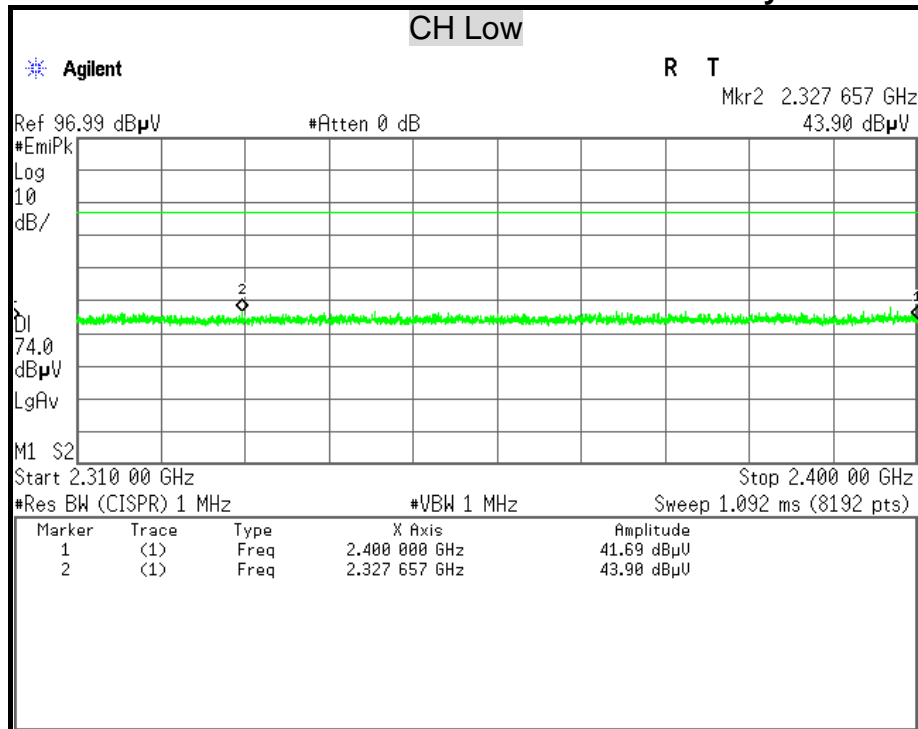
Polarity : Horizontal





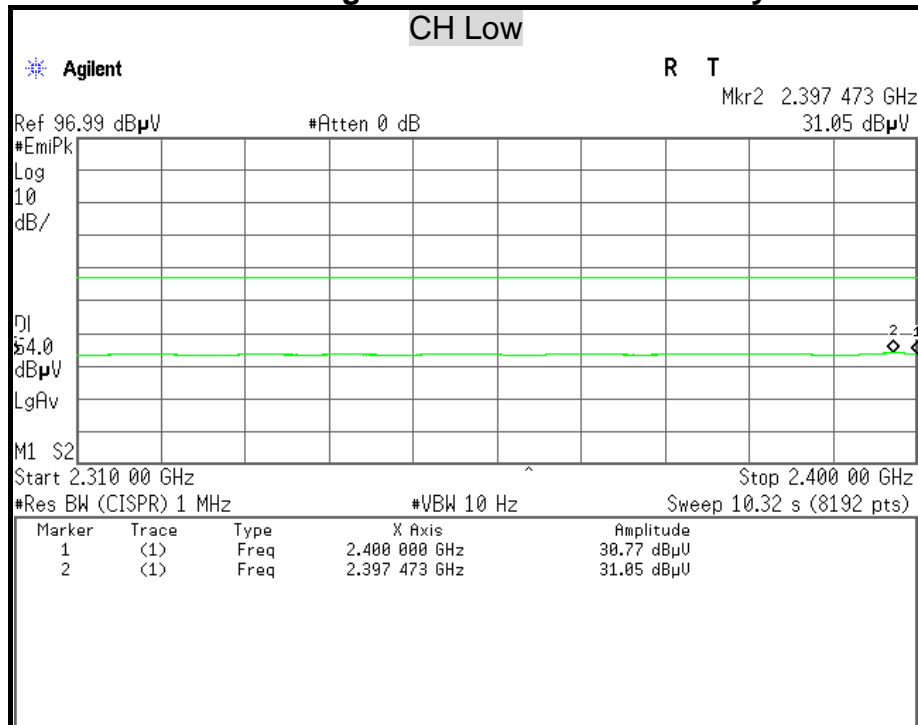
Detector Mode : Peak

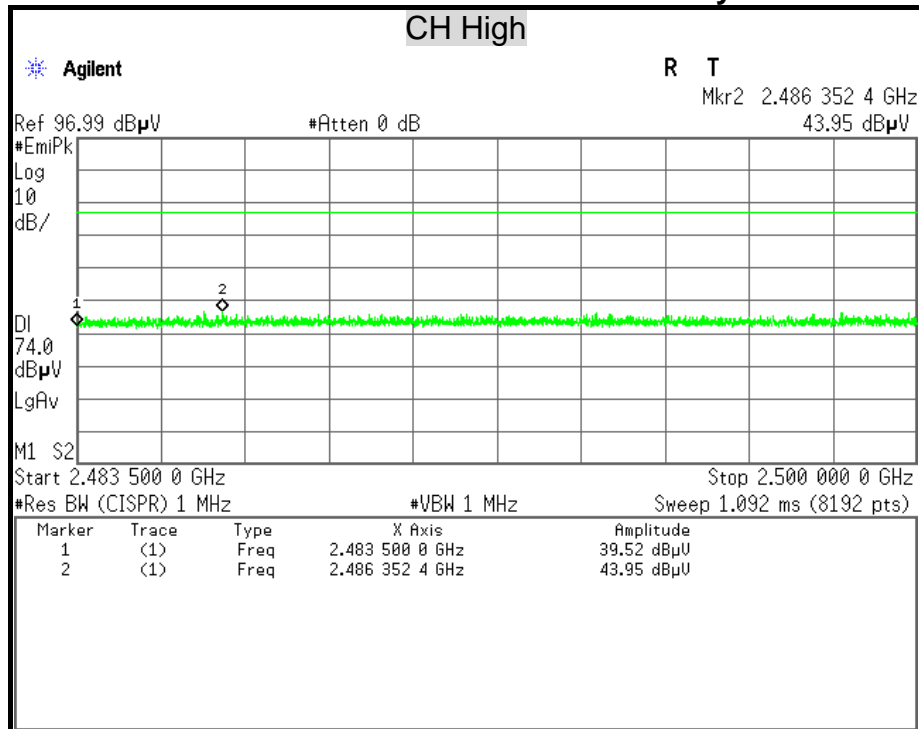
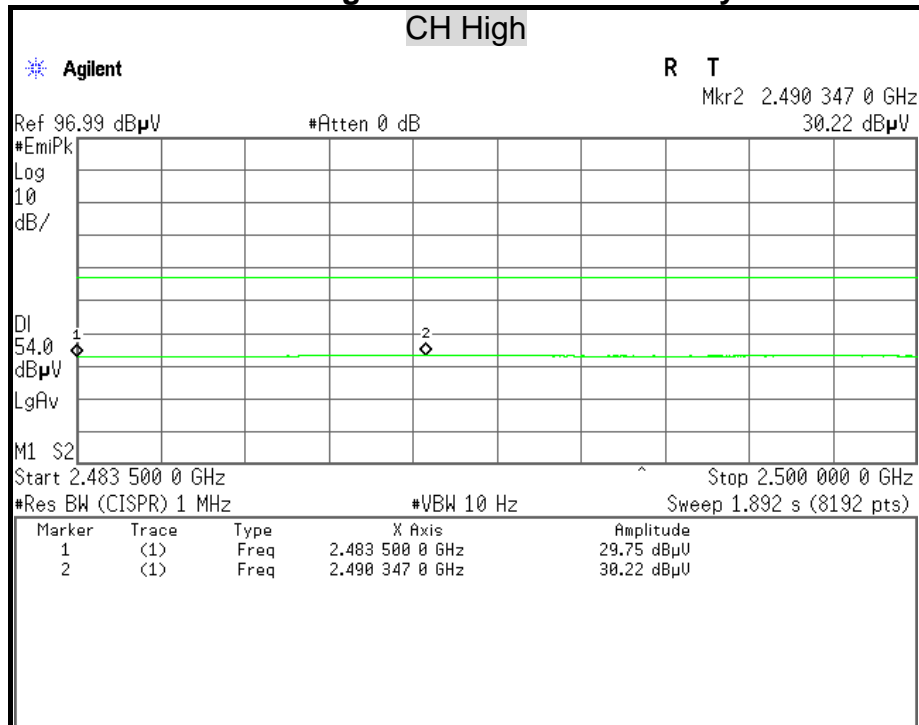
Polarity : Vertical



Detector Mode : Average

Polarity : Vertical

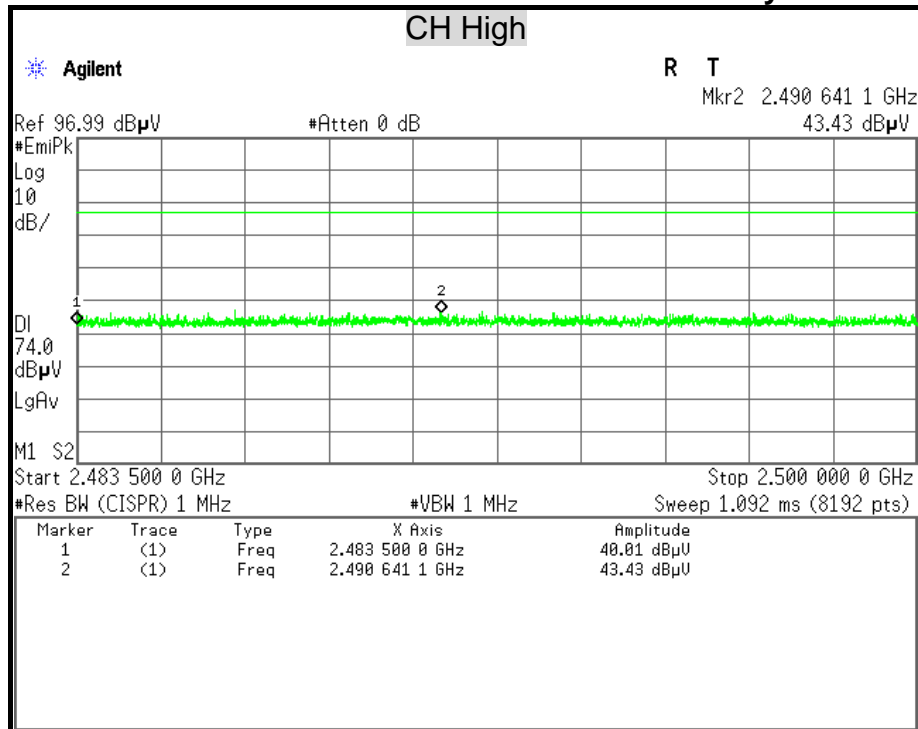


**Detector Mode : Peak****Polarity : Horizontal****Detector Mode : Average****Polarity : Horizontal**



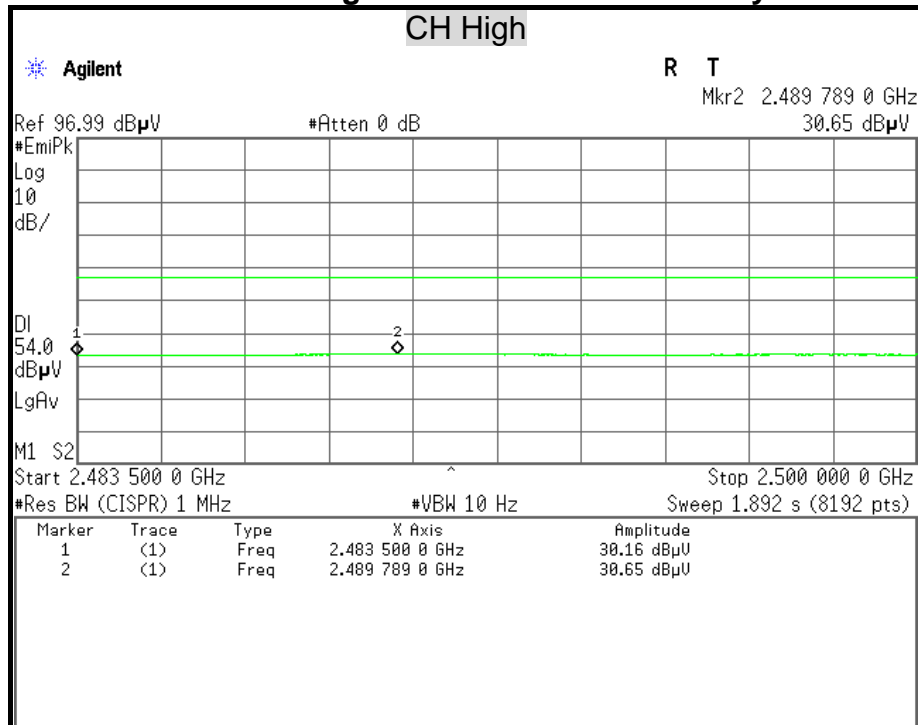
Detector Mode : Peak

Polarity : Vertical



Detector Mode : Average

Polarity : Vertical





7.3 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 μ 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 μ 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 |

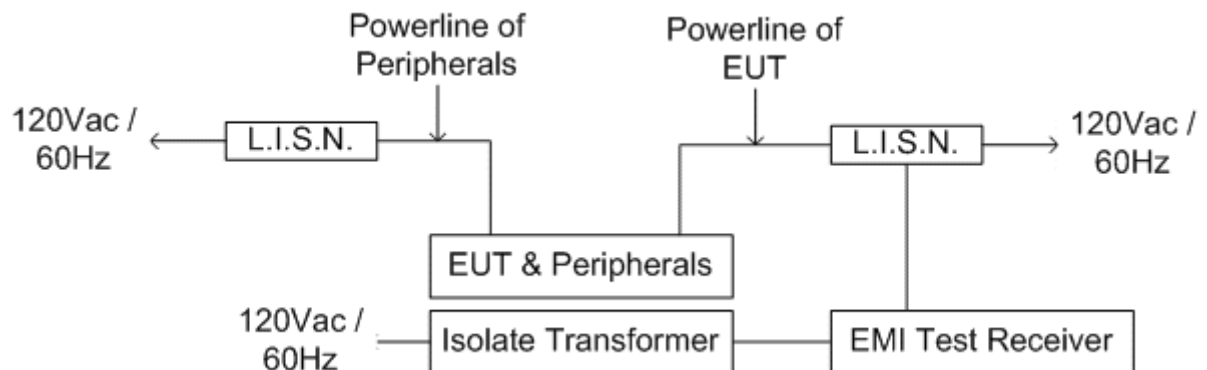
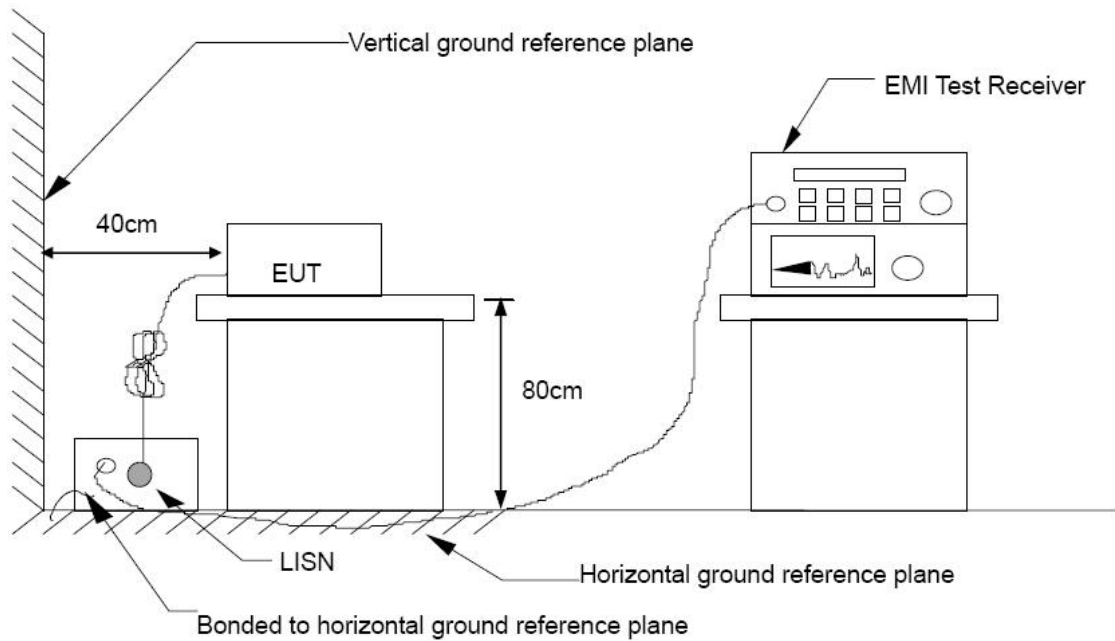
TEST EQUIPMENT

| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
|-------------------|-----------------|-----------|---------------|-----------------|
| L.I.S.N | SCHWARZBECK | NSLK 8127 | 8127-465 | 08/06/2015 |
| L.I.S.N | SCHWARZBECK | NSLK 8127 | 8127-473 | 03/10/2015 |
| EMI Test Receiver | ROHDE & SCHWARZ | ESHS 30 | 838550/003 | 11/07/2014 |
| Pulse Limiter | ROHDE & SCHWARZ | ESH3-Z2 | 100111 | 06/30/2015 |

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 C63.10:2009.

The test procedure is performed in a 4m × 3m × 2.4m (L×W×H) shielded room.

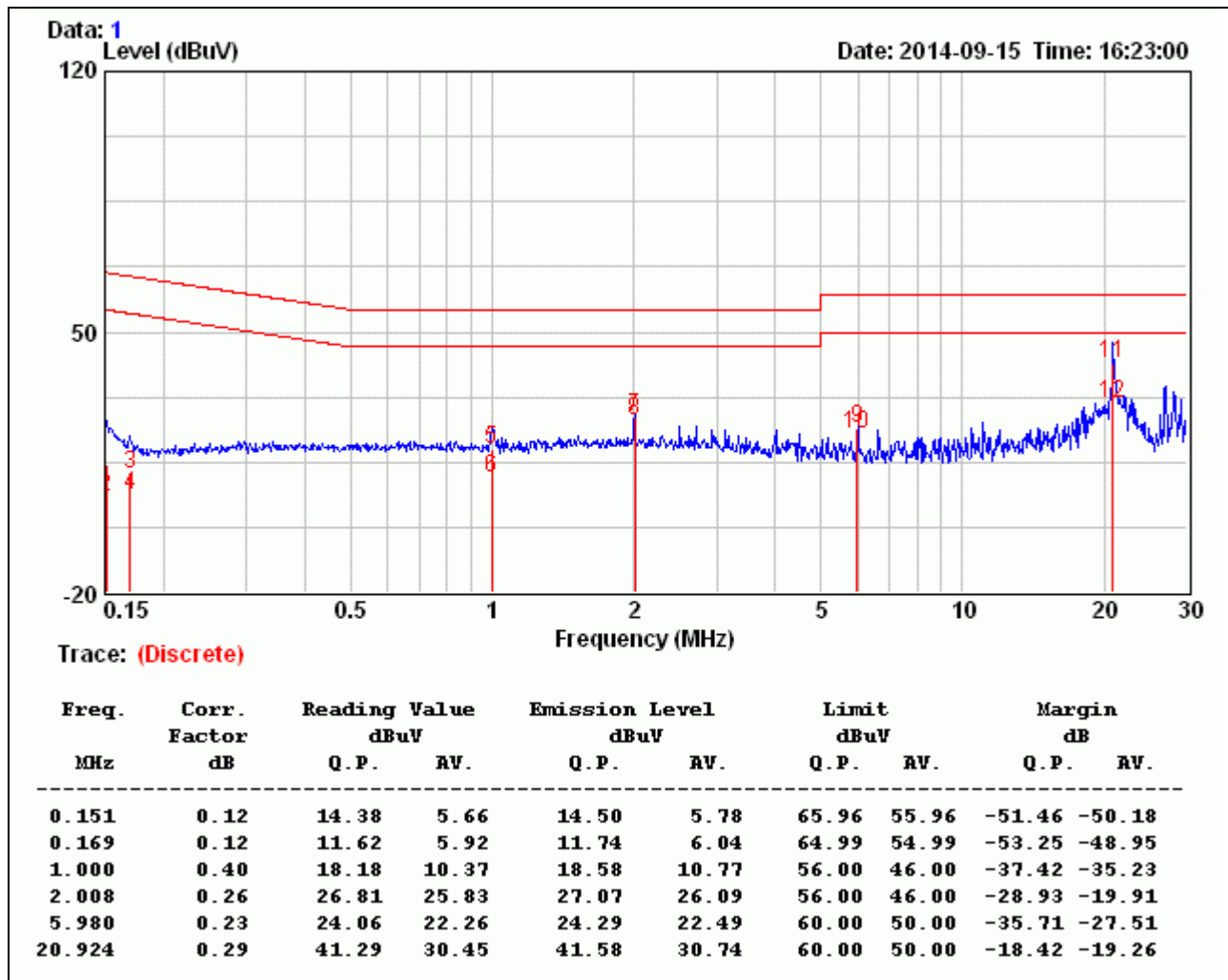
The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

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 | Color Tuning Module | Test By | Jey Li |
| Test Model | CTM0 | Test Date | 2014/09/15 |
| Test Mode | Normal Operating | Temp. & Humidity | 19°C, 48% |

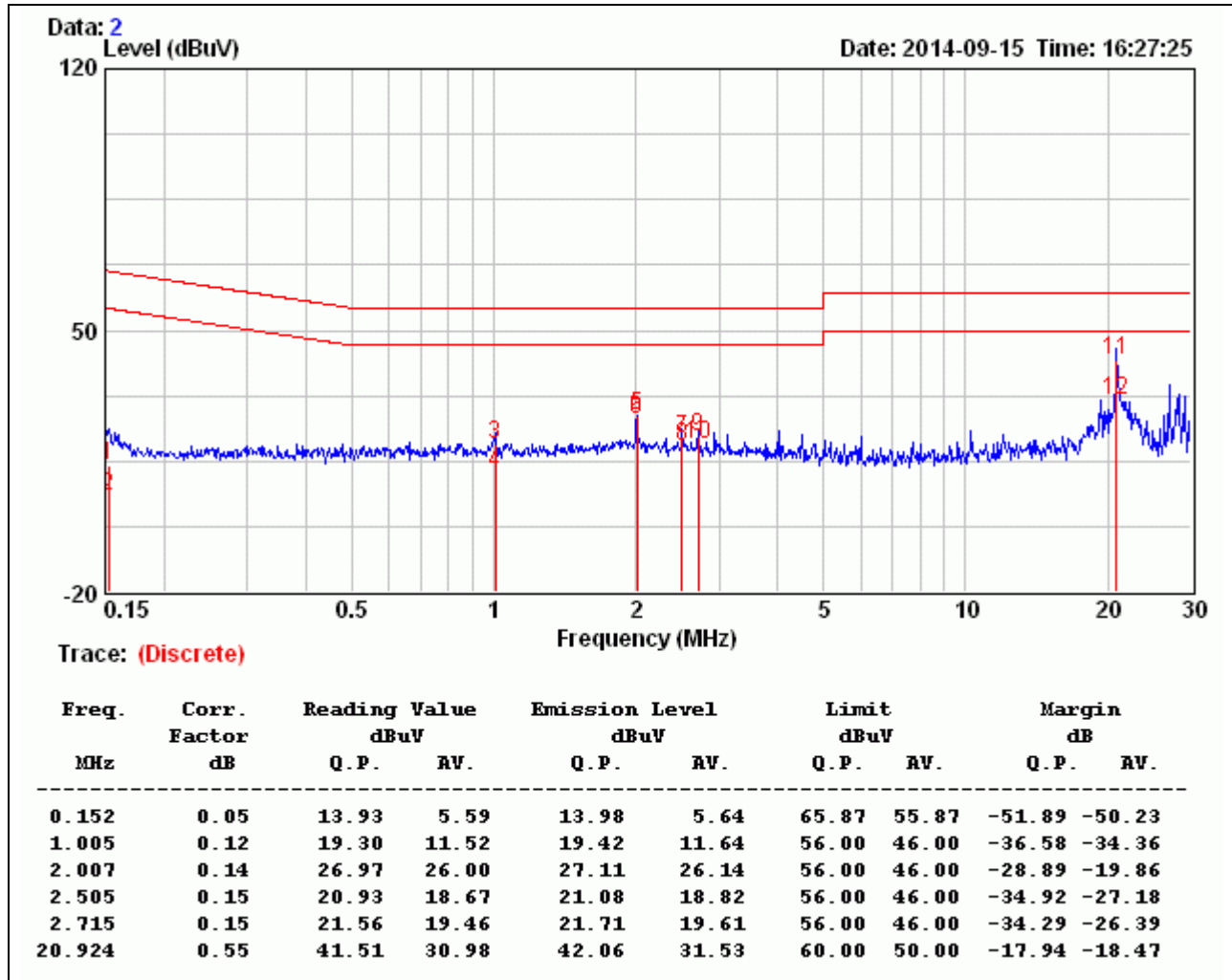
LINE**Remark:**

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



| | | | |
|--------------|---------------------|------------------|------------|
| Product Name | Color Tuning Module | Test By | Jey Li |
| Test Model | CTM0 | Test Date | 2014/09/15 |
| Test Mode | Normal Operating | Temp. & Humidity | 19°C, 48% |

NEUTRAL



Remark:

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