

## FCC TEST REPORT

### No. 160401878SHA-001

Applicant : NITG AS.  
Fjosangerveien 21 5073 Bergen.

Manufacturer : SHANGHAI KEWL ELECTRONICS TECHNOLOGY  
CO.,LTD  
NO.88,LANE 2588,QI XIN ROAD,SHANGHAI,  
CHINA

Product Name : Laser Training device

Type/Model : LTS100

**TEST RESULT : PASS**

### SUMMARY

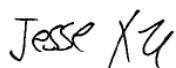
The equipment complies with the requirements according to the following standard(s) or specification:

**47CFR Part 15 (2014):** Radio Frequency Devices (Subpart C)

**ANSI C63.10 (2013):** American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

Date of issue: May 19,2016

Prepared by:



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Reviewed by:



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## Description of Test Facility

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## 1 GENERAL INFORMATION

### 1.1 Description of Client

Applicant : NITG AS.  
Fjosangerveien 21 5073 Bergen.

Name of contact : Rolf Kobbeltvedt  
Tel : +47 91309230  
Fax : -  
Email : rolf@isdaleninvest.no

Manufacturer : SHANGHAI KEWL ELECTRONICS TECHNOLOGY  
CO.,LTD  
NO.88,LANE 2588,QI XIN ROAD,SHANGHAI,  
CHINA

### 1.2 Identification of the EUT

Product Name : Laser Training device  
Type/model : LTS100  
FCC ID : FCC ID: 2AIBOACCURIZE-001

### 1.3 Technical Specification

Operation Frequency : 2402-2480MHz

Band

Type of Modulation : GFSK

Description of EUT : Here is one model.  
We tested the 2402CH , 2440CH and 2480CH and listed  
the worst data in this report.

Antenna Designation : PCB antenna. 3.3dBi

Rating : Battery 3.7V

Category of EUT : Class B

EUT type : ☒ Table top  
☐ Floor standing

Software applied : none

Sample received date : April 18, 2016

Date of test : April 22, 2016 ~May 08, 2016

## 2 TEST SPECIFICATIONS

### 2.1 Standards or specification

47CFR Part 15 (2014)  
ANSI C63.10 (2013)

### 2.2 Mode of operation during the test

While testing transmitting mode of EUT, the internal modulation and continuously transmission was applied and let the EUT hang up for testing.

### 2.3 Test software list

| Test Items         | Software | Manufacturer | Version |
|--------------------|----------|--------------|---------|
| Conducted emission | ESxS-K1  | R&S          | V2.1.0  |
| Radiated emission  | ES-K1    | R&S          | V1.71   |

### 2.4 Test peripherals list

| Item No. | Name      | Band and Model | Description |
|----------|-----------|----------------|-------------|
| 1        | Note book | ProBook 6460b  |             |
|          |           |                |             |

## 2.5 Instrument list

| Equipment                  | Type              | Manu.             | Internal no. | Cal. Date  | Due date   |
|----------------------------|-------------------|-------------------|--------------|------------|------------|
| Test Receiver              | ESCS 30           | R&S               | EC 2107      | 2015-10-21 | 2016-10-20 |
| Test Receiver              | ESIB 26           | R&S               | EC 3045      | 2015-10-20 | 2016-10-19 |
| A.M.N.                     | ESH2-Z5           | R&S               | EC 3119      | 2015-1-9   | 2016-1-8   |
| A.M.N.                     | ENV 216           | R&S               | EC 3393      | 2015-8-9   | 2016-8-8   |
| A.M.N.                     | ENV 216           | R&S               | EC 3394      | 2015-8-9   | 2016-8-8   |
| A.M.N.                     | ENV4200           | R&S               | EC3558       | 2015-8-9   | 2016-8-8   |
| Ultra-broadband antenna    | HL 562            | R&S               | EC 3046-1    | 2015-5-16  | 2016-5-14  |
| Bilog Antenna              | CBL 6112D         | TESEQ             | EC 4206      | 2015-4-28  | 2017-4-27  |
| Horn antenna               | HF 906            | R&S               | EC 3049      | 2015-4-28  | 2017-4-27  |
| Pre-amplifier              | Pre-amp 18        | R&S               | EC 3222      | 2016-4-12  | 2017-4-11  |
| Semi-anechoic chamber      | -                 | Albatross project | EC 3048      | 2016-5-12  | 2017-5-11  |
| High Pass Filter           | WHKX 1.0/15G-10SS | Wainwright        | EC4297-1     | 2016-1-8   | 2017-1-7   |
| Power sensor / Power meter | N1911A/N1921A     | Agilent           | EC4318       | 2016-04-12 | 2017-04-11 |

## 2.6 Test Summary

**This report applies to tested sample only. The test results have been compared directly with the limits, and the measurement uncertainty is recorded. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.**

| TEST ITEM                              | FCC REFERENCE   | RESULT |
|----------------------------------------|-----------------|--------|
| Radiated emission                      | 15.249 & 15.209 | Pass   |
| Assigned bandwidth<br>(20dB bandwidth) | 15.215(c)       | Pass   |

Notes: 1: NA =Not Applicable

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### 3 Radiated emission

**Test result:** Pass

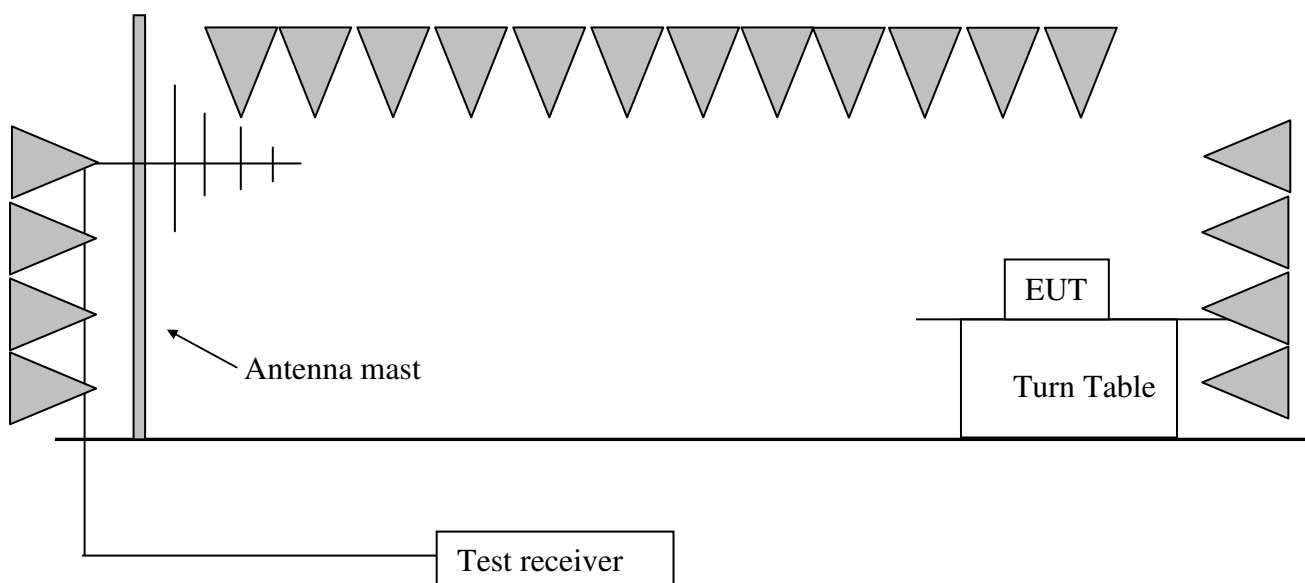
#### 3.1 Test limit

| Fundamental Frequency<br>(MHz)                    | Fundamental limit<br>(dBuV/m) | Harmonic limit<br>(dBuV/m) |
|---------------------------------------------------|-------------------------------|----------------------------|
| <input type="checkbox"/> 902 - 928                | 94                            | 54                         |
| <input checked="" type="checkbox"/> 2400 - 2483.5 | 94                            | 54                         |
| <input type="checkbox"/> 5725 - 5875              | 94                            | 54                         |
| <input type="checkbox"/> 24000 - 24250            | 108                           | 68                         |

The radiated emissions which fall outside allocated band (2400-2483.5MHz), must also comply with the radiated emission limits specified in §15.209(a) showed as below:

| Frequency<br>(MHz) | Field Strength<br>(dBuV/m) | Measurement Distance<br>(m) |
|--------------------|----------------------------|-----------------------------|
| 30 - 88            | 40.0                       | 3                           |
| 88 - 216           | 43.5                       | 3                           |
| 216 - 960          | 46.0                       | 3                           |
| Above 960          | 54.0                       | 3                           |

#### 3.2 Test Configuration



### 3.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna.

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m.

The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1 meter to 4 meters to find out the maximum emission level.

The radiated emission was measured using the Spectrum Analyzer with the resolutions bandwidth set as:

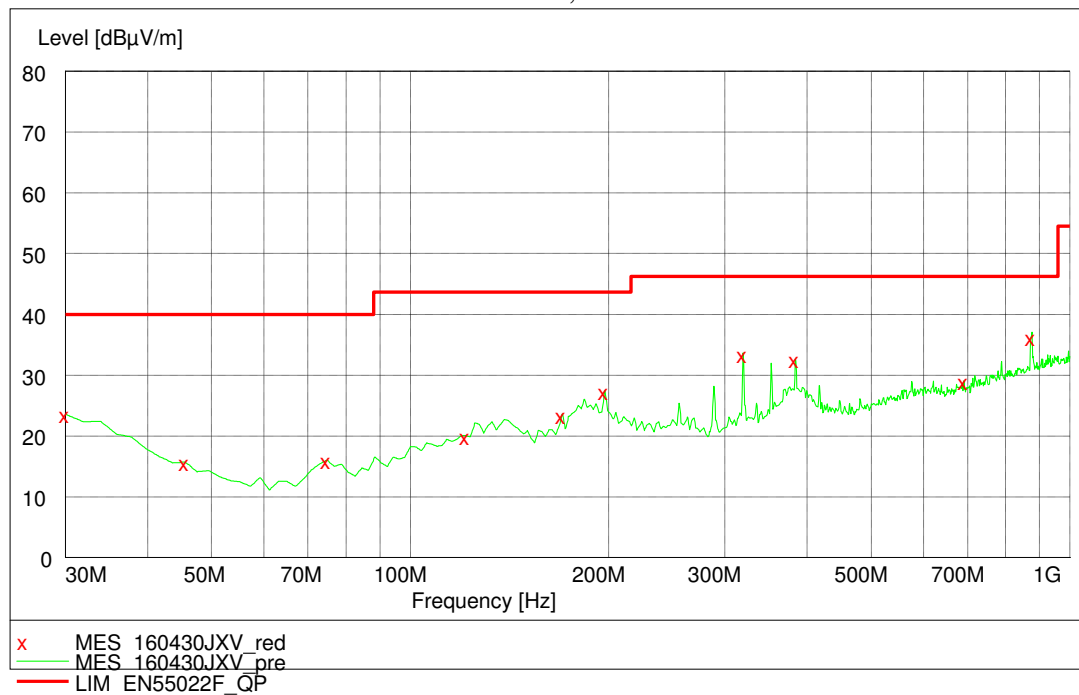
RBW = 300 Hz, VBW = 1 kHz (9 kHz~150 kHz);  
RBW = 10 kHz, VBW = 30 kHz (150 kHz~30MHz);  
RBW = 100 kHz, VBW = 300 kHz (30MHz~1GHz for PK)  
RBW = 1MHz, VBW = 3MHz (>1GHz for PK);  
RBW = 1MHz, VBW = 10Hz (>1GHz for AV);

### 3.4 Test protocol

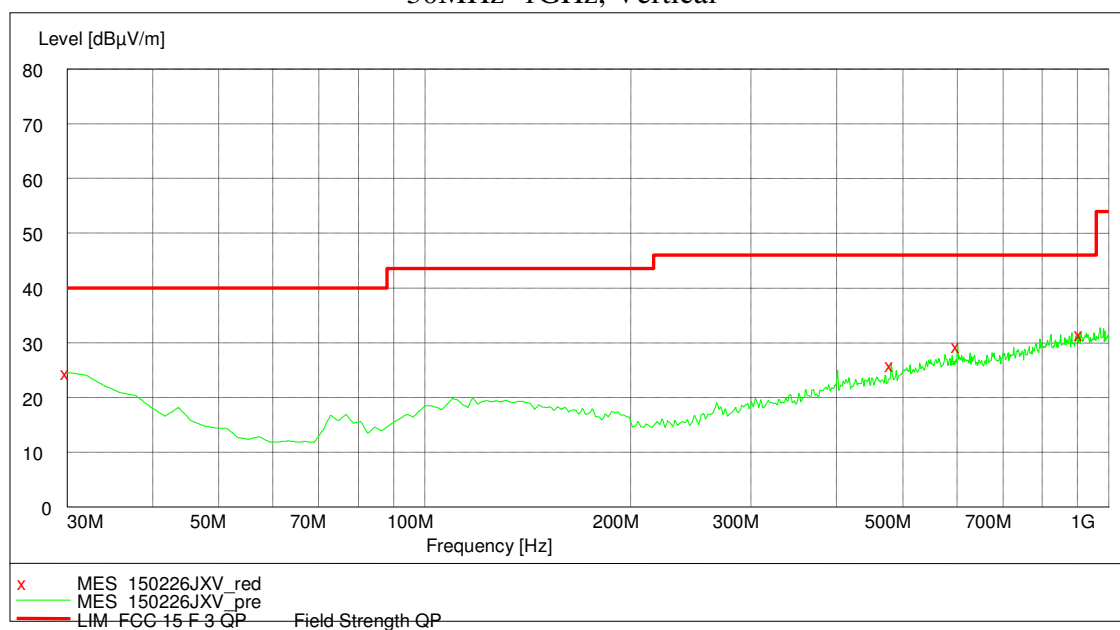
Temperature : 23 °C  
Relative Humidity : 56 %

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

30MHz~1GHz, Horizontal



30MHz~1GHz, Vertical

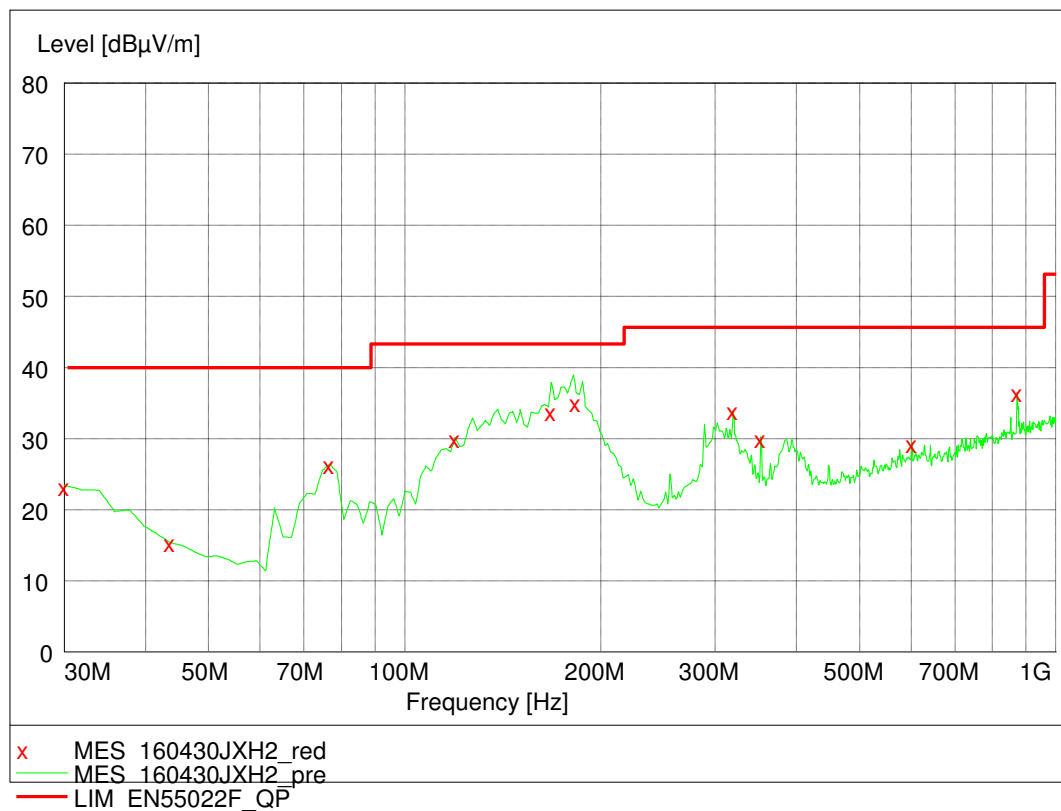


**Test data at 30MHz~1GHz:**

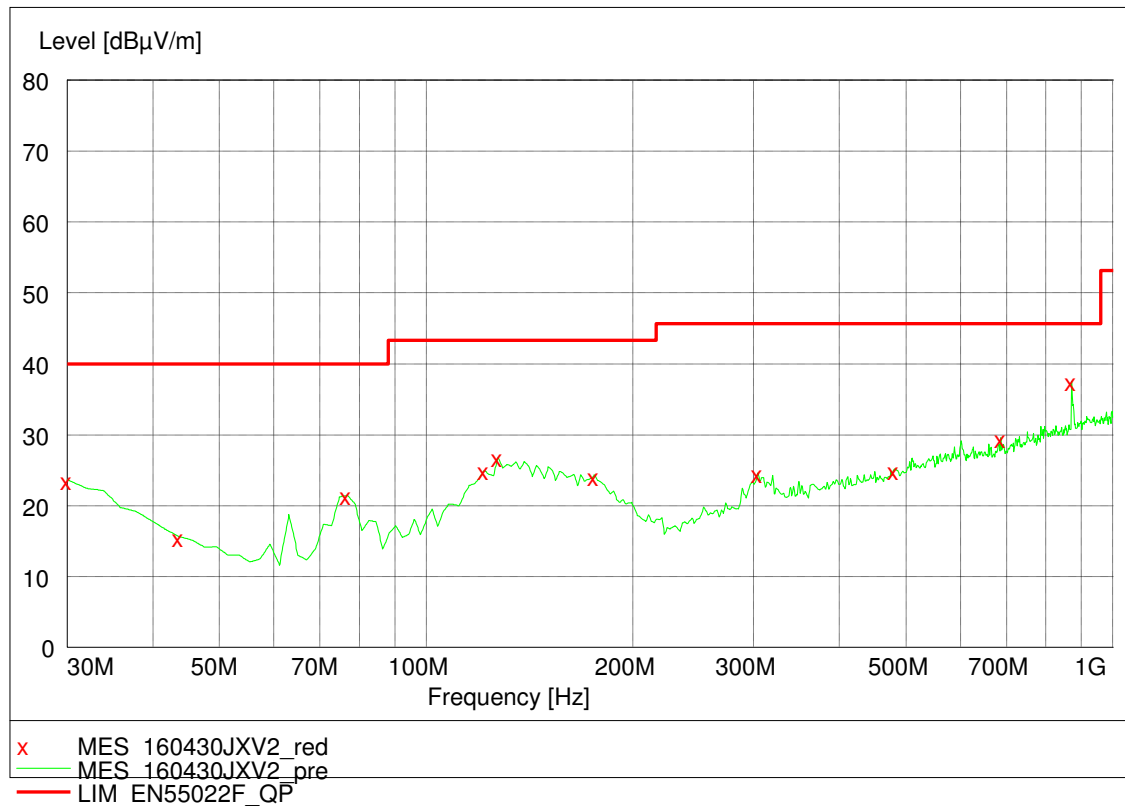
| Polarization | Frequency (MHz) | Measured level (dB $\mu$ V/m) | Limits (dB $\mu$ V/m) | Margin (dB) | Detector |
|--------------|-----------------|-------------------------------|-----------------------|-------------|----------|
| H            | 30.0            | 25.0                          | 40.0                  | 15.0        | PK       |
|              | 133.0           | 25.7                          | 43.5                  | 17.8        | PK       |
|              | 316.3           | 30.6                          | 46.0                  | 15.4        | PK       |
|              | 669.5           | 30.0                          | 46.0                  | 16.0        | PK       |
|              | 893.1           | 35.4                          | 46.0                  | 10.6        | PK       |
| V            | 30.0            | 25.3                          | 40.0                  | 14.7        | PK       |
|              | 43.6            | 20.8                          | 40.0                  | 19.2        | PK       |
|              | 133.0           | 26.3                          | 43.5                  | 17.2        | PK       |
|              | 222.4           | 29.2                          | 46.0                  | 16.8        | PK       |
|              | 311.9           | 26.7                          | 46.0                  | 19.3        | PK       |
|              | 490.7           | 32.3                          | 46.0                  | 13.7        | PK       |
|              | 580.1           | 35.9                          | 46.0                  | 10.1        | PK       |
|              | 937.8           | 34.0                          | 46.0                  | 12.0        | PK       |

Charging model:

30MHz~1GHz, Horizontal



### 30MHz~1GHz, Vertical



Note: The worst test result (30MHz to 1GHz) of channel L (2402MHz) chosen to list in the report as representative.

#### Test data at 30MHz~1GHz:

| Polarization | Frequency (MHz) | Measured level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|--------------|-----------------|-------------------------|-----------------|-------------|----------|
| H            | 30.0            | 25.0                    | 40.0            | 15.0        | PK       |
|              | 133.0           | 30.0                    | 43.5            | 13.5        | PK       |
|              | 181.9           | 36.6                    | 43.5            | 6.9         | PK       |
|              | 319.61          | 34.0                    | 46.0            | 12.0        | PK       |
|              | 893.1           | 35.4                    | 46.0            | 10.6        | PK       |
| V            | 30.0            | 25.3                    | 40.0            | 14.7        | PK       |
|              | 43.6            | 20.8                    | 40.0            | 19.2        | PK       |
|              | 133.0           | 26.3                    | 43.5            | 17.2        | PK       |
|              | 222.4           | 29.2                    | 46.0            | 16.8        | PK       |
|              | 300.0           | 26.7                    | 46.0            | 19.3        | PK       |
|              | 490.7           | 32.3                    | 46.0            | 13.7        | PK       |
|              | 580.1           | 35.9                    | 46.0            | 10.1        | PK       |
|              | 892.8           | 36.4                    | 46.0            | 9.6         | PK       |

**Test result above 1GHz:**

| CH | Antenna | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|----|---------|-----------------|-----------------------|----------------------------|----------------|-------------|----------|
| L  | H       | 2402.00         | 30.70                 | 90.70                      | 94.00          | 3.30        | PK       |
|    | H       | 2398.00         | 30.30                 | 36.50                      | 54.00          | 17.50       | PK       |
|    | H       | 2400.00         | 30.31                 | 42.88                      | 54.00          | 11.12       | PK       |
|    | H       | 4804.00         | -1.50                 | 44.30                      | 54.00          | 9.70        | PK       |
|    | V       | 2402.00         | 30.70                 | 87.40                      | 94.00          | 6.60        | PK       |
|    | V       | 4804.00         | -1.50                 | 40.02                      | 54.00          | 13.98       | PK       |
| M  | H       | 2440.00         | 30.70                 | 90.40                      | 94.00          | 3.60        | PK       |
|    | H       | 4880.00         | -1.10                 | 43.37                      | 54.00          | 10.63       | PK       |
|    | V       | 2440.00         | 30.70                 | 83.80                      | 94.00          | 10.20       | PK       |
|    | V       | 4880.00         | -1.10                 | 41.05                      | 54.00          | 12.95       | PK       |
| H  | H       | 2480.00         | 30.70                 | 92.40                      | 94.00          | 1.60        | PK       |
|    | H       | 2483.50         | 30.80                 | 42.20                      | 54.00          | 11.80       | PK       |
|    | H       | 4960.00         | -0.80                 | 41.60                      | 54.00          | 14.40       | PK       |
|    | V       | 2480.00         | 30.70                 | 87.45                      | 94.00          | 6.55        | PK       |
|    | V       | 2485.05         | 29.45                 | 38.19                      | 54.00          | 15.81       | PK       |
|    | V       | 4960.00         | -0.80                 | 40.38                      | 54.00          | 13.62       | PK       |

**Remark:**

1. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed);
2. Corrected Reading = Original Receiver Reading + Correct Factor;
3. Margin = Limit – Corrected Reading;
4. If the PK Corrected reading is lower than AV limit, the AV test can be elided;

**Example:**

Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,  
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV,  
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m,  
Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m,  
Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m,  
Then Margin = 54 - 10.20 = 43.80dBuV/m.

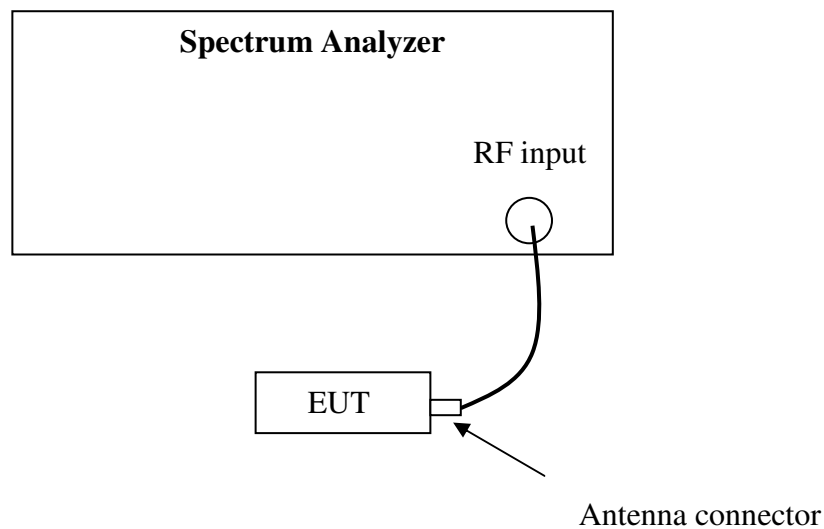
## 4 Assigned bandwidth (20dB bandwidth)

**Test result:**      **Pass**

### 4.1 Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission is contained within the allocated frequency band.

### 4.2 Test Configuration



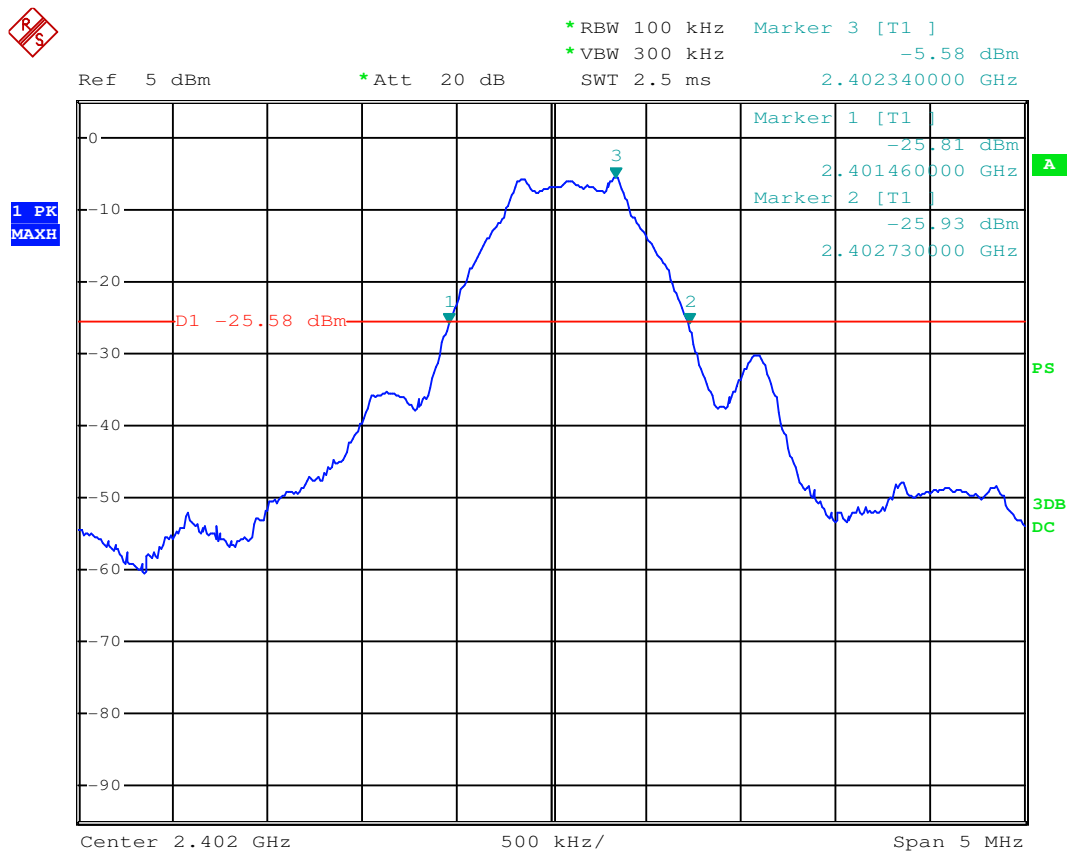
### 4.3 Test procedure and test setup

The 20dB Bandwidth per FCC § 15.215(c) is measured using the Spectrum Analyzer. Set Span = 2 to 3 times the 20 dB bandwidth, RBW = approximately 1% of the 20 dB bandwidth, VBW > RBW, Sweep = auto, Detector = peak, Trace = max hold. The test was performed at 3 channels (lowest, middle and highest channel).

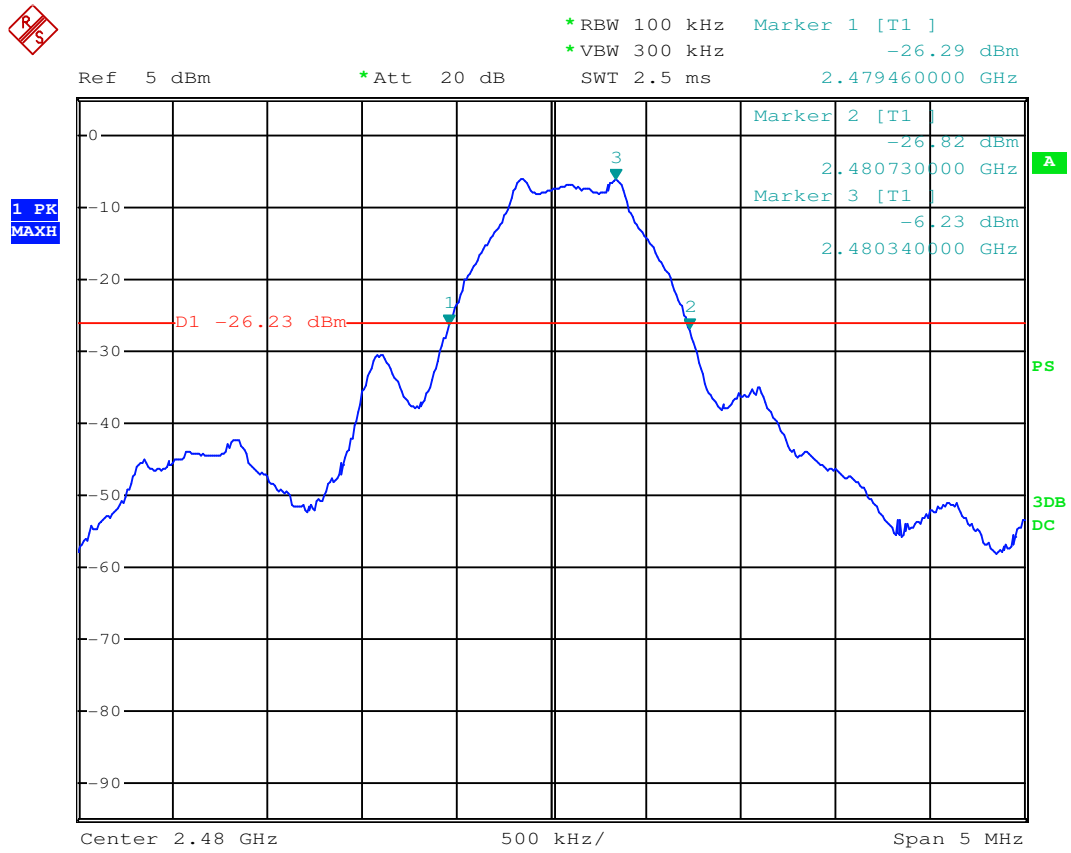
#### 4.4 Test protocol

Temperature : 24 °C  
Relative Humidity : 56 %

| 20dB bandwidth<br>(MHz) | permitted band<br>(MHz) | Result |
|-------------------------|-------------------------|--------|
| 2401.46 ~ 2480.73       | 2400 ~ 2483.5           | Pass   |



Date: 28.APR.2016 09:53:41



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