



NVLAP LAB CODE 200707-0



FCC PART 15.249 MEASUREMENT AND TEST REPORT

For

Latitude Limited

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Kwai Chung, N.T., Hong Kong

FCC ID: WM4523

| | |
|--|--|
| Report Type: Original Report | Equipment Type: 2.4GHz Full dot ABC |
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| Report No.: | RSZ08081303 |
| Report Date: | 2008-08-29 |
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Shenzhen). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP*, NIST, or any agency of the Federal Government.

* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*" ...

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Latitude Limited*'s product, model number: *D02G12* the "EUT" as referred to in this report is a *2.4GHz Full dot ABC*, which measures approximately 27.5cmL x 5.2cmW x 1.7cmH, rated input voltage: DC 3.0V Battery.

** All measurement and test data in this report was gathered from production sample serial number: 0808020 (Assigned by BACL, Shenzhen). The EUT was received on 2008-08-13.*

Objective

This Type approval report is prepared on behalf of *Latitude Limited* in accordance with Part 2, Subpart J, and Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 rules.

Related Submittal(s)/Grant(s)

No Related Submittals.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



NVLAP LAB CODE 200707-0

The current scope of accreditations can be found at
<http://ts.nist.gov/Standards/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

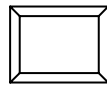
Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

Equipment Modifications

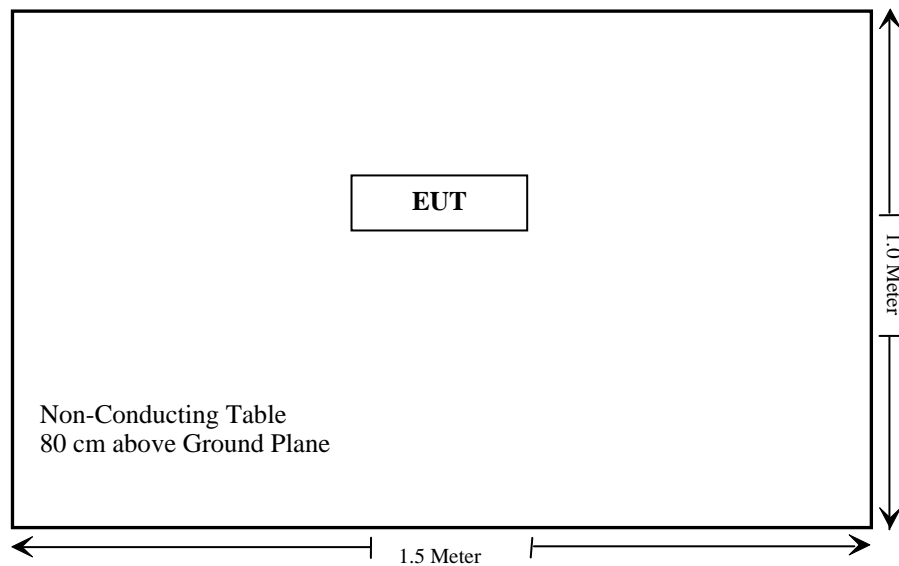
No modifications were made to the unit tested.

Configuration of Test Setup



EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Result |
|--|-----------------------|-----------|
| §15.203 | Antenna Requirement | Compliant |
| §15.207(a) | Conduction Emissions | N/A * |
| §15.205(a), §15.209(a), 15.249(a), §15.249(c) | Radiated Emissions | Compliant |
| §15.249(d) | Out of Band Emissions | Compliant |

Note: * Battery operation.

§15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

Antenna Connector Construction

The EUT antenna is a permanently attached antenna, which in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.

Result: Compliant.

Please refer to the EUT internal photos.

§15.205(a) §15.209(a) §15.249(a) §15.249(d) - RADIATED EMISSIONS

Applicable Standard

As per §15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental frequency | Field strength of fundamental (millivolts/meter) | Field strength of harmonics (microvolts/meter) |
|-----------------------|--|--|
| 902–928 MHz | 50 | 500 |
| 2400–2483.5 MHz | 50 | 500 |
| 5725–5875 MHz | 50 | 500 |
| 24.0–24.25 GHz | 250 | 2500 |

As per §15.249 (c), Field strength limits are specified at a distance of 3 meters.

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is ± 4.0 dB.

Test Equipment Setup

The spectrum analyzer or receiver is set as:

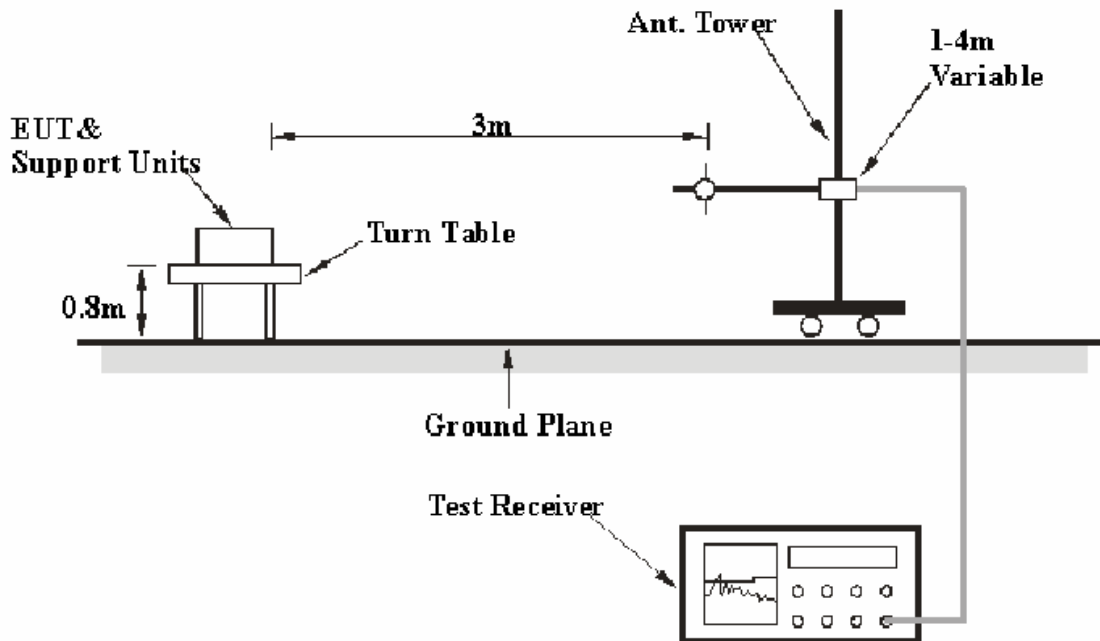
Below 1000MHz:

$$\text{RBW} = 100 \text{ kHz} / \text{VBW} = 300 \text{ kHz} / \text{Sweep} = \text{Auto}$$

Above 1000MHz:

- (1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
- (2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

EUT Setup



The radiated emission and out of band emission tests were performed in the 3 meters chamber B, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.249 limits.

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|---------|---------------|------------------|----------------------|
| HP | Amplifier | 8447E | 1937A01046 | 2007-11-15 | 2008-11-15 |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100224 | 2007-10-16 | 2008-10-16 |
| Sunol Sciences | Bilog Antenna | JB1 | A040904-2 | 2008-08-14 | 2009-08-14 |
| HP | Amplifier | 8449B | 3008A00277 | 2007-09-29 | 2008-09-29 |
| Sunol Sciences | Horn Antenna | DRH-118 | A052604 | 2007-09-25 | 2008-09-25 |
| Rohde & Schwarz | Spectrum Analyzer | FSEM30 | 849720/019 | 2008-05-09 | 2009-05-09 |

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

For the radiated emissions test, the EUT, and all support equipment power cords was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 mete, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 & 15.249, with the worst margin reading of:

30 -1000MHz:

Transmitting Mode: **14.4 dB** at **30.371575 MHz** in the **Vertical** polarization.

Above 1GHz:

Transmitting Mode: **12.66 dB** at **4880 MHz** in the **Vertical** polarization.

Test Data

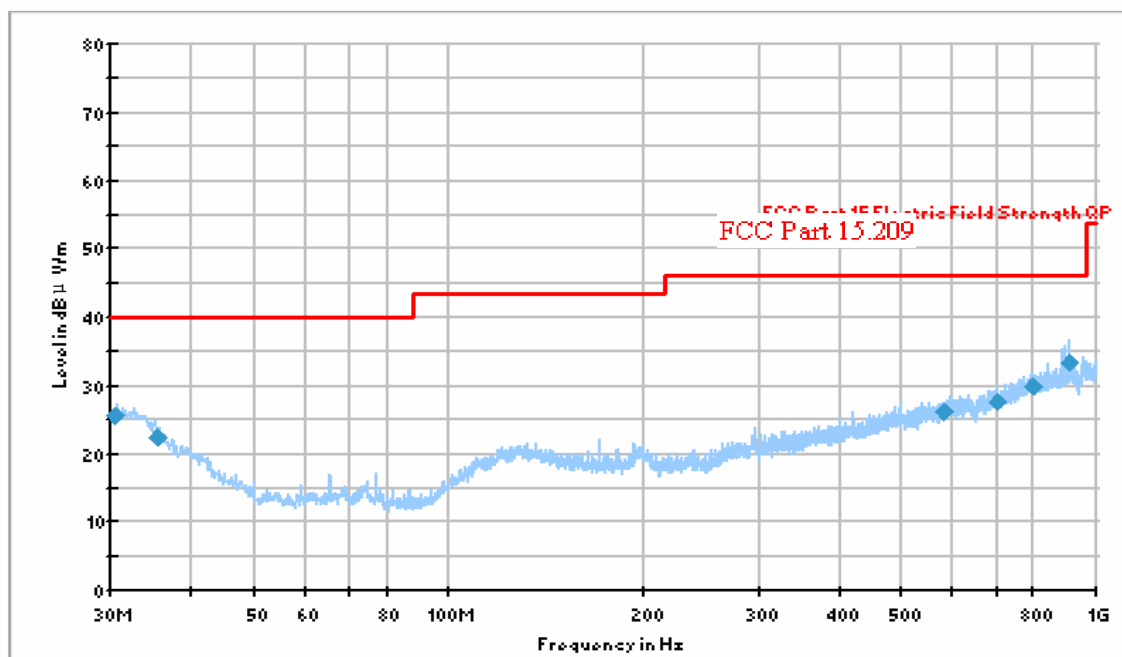
Environmental Conditions

| | |
|---------------------------|-----------|
| Temperature: | 25 ° C |
| Relative Humidity: | 56% |
| ATM Pressure: | 100.2 kPa |

The testing was performed by Herith Shi on 2008-08-22.

30-1000 MHz:

Test Mode: Transmitting



| Frequency (MHz) | Corrected Amplitude (dBμV/m) | Antenna Height (cm) | Ant. Polarity (H/V) | Turntable Position (deg) | Correction Factor (dB) | Limit (dBμV/m) | Margin (dB) |
|-----------------|------------------------------|---------------------|---------------------|--------------------------|------------------------|----------------|-------------|
| 30.371575 | 25.6 | 354.0 | V | 214.0 | -8.8 | 40.0 | 14.4 |
| 797.588525 | 30.0 | 159.0 | H | 335.0 | -1.7 | 46.0 | 16.0 |
| 35.521725 | 22.5 | 401.0 | H | 195.0 | -12.5 | 40.0 | 17.5 |
| 699.814675 | 27.7 | 187.0 | H | 0.0 | -6.0 | 46.0 | 18.3 |
| 580.584350 | 26.1 | 198.0 | H | 137.0 | -9.9 | 46.0 | 19.9 |

Above 1GHz:

The testing was performed by Herith Shi on 2008-08-26.

Test Mode: Transmitting

| Freq. (MHz) | Meter Reading (dBμV) | Detector PK/QP/AV | Direction Degree | Ant. Height (m) | Ant. Polar (H/V) | Ant. Factor (dB/m) | Cable Loss (dB) | Pre- Amp. Gain (dB) | Cord. Amp. (dBμV/m) | Part 15.209 & 15.249 | |
|--------------------|----------------------------|----------------------|---------------------|-----------------------|------------------------|--------------------------|-----------------------|------------------------------|---------------------------|----------------------|----------------|
| | | | | | | | | | | Limit (dBμV/m) | Margin (dB) |
| Fundamental | | | | | | | | | | | |
| 2440 | 76.25 | AV | 180 | 1.0 | V | 30.30 | 7.90 | 33.90 | 80.55 | 94 | 13.45 |
| 2440 | 71.72 | AV | 170 | 1.5 | H | 30.90 | 7.90 | 33.90 | 76.62 | 94 | 17.38 |
| 2440 | 79.36 | PK | 180 | 1.0 | V | 30.30 | 7.90 | 33.90 | 83.66 | 114 | 30.34 |
| 2440 | 75.06 | PK | 170 | 1.5 | H | 30.90 | 7.90 | 33.90 | 79.96 | 114 | 34.04 |
| Harmonics/Spurious | | | | | | | | | | | |
| 4880 | 35.08 | AV | 130 | 1.5 | V | 33.70 | 7.56 | 35.00 | 41.34 | 54 | 12.66 |
| 7320 | 36.15 | AV | 350 | 1.3 | V | 33.60 | 9.12 | 38.00 | 40.87 | 54 | 13.13 |
| 4880 | 34.86 | AV | 60 | 1.6 | H | 33.70 | 7.56 | 36.30 | 39.82 | 54 | 14.18 |
| 7320 | 34.67 | AV | 180 | 1.8 | H | 33.60 | 9.12 | 39.20 | 38.19 | 54 | 15.81 |
| 4880 | 45.69 | PK | 130 | 1.5 | V | 33.70 | 7.56 | 35.00 | 51.95 | 74 | 22.05 |
| 7320 | 46.35 | PK | 350 | 1.3 | V | 33.60 | 9.12 | 38.00 | 51.07 | 74 | 22.93 |
| 4880 | 44.88 | PK | 60 | 1.6 | H | 33.70 | 7.56 | 36.30 | 49.84 | 74 | 24.16 |
| 7320 | 44.59 | PK | 180 | 1.8 | H | 33.60 | 9.12 | 39.20 | 48.11 | 74 | 25.89 |

§15.249(d) – OUT OF BAND EMISSIONS

Applicable Standard

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Test Procedure

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 mete, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission at the band edge. The receiving antenna should be changed the polarization both of horizontal and vertical.

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|---------|---------------|------------------|----------------------|
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100224 | 2007-10-16 | 2008-10-16 |
| HP | Amplifier | 8449B | 3008A00277 | 2007-09-29 | 2008-09-29 |
| Sunol Sciences | Horn Antenna | DRH-118 | A052604 | 2007-09-25 | 2008-09-25 |

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) Corp. attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

| | |
|--------------------|-----------|
| Temperature: | 25 ° C |
| Relative Humidity: | 56% |
| ATM Pressure: | 100.2 kPa |

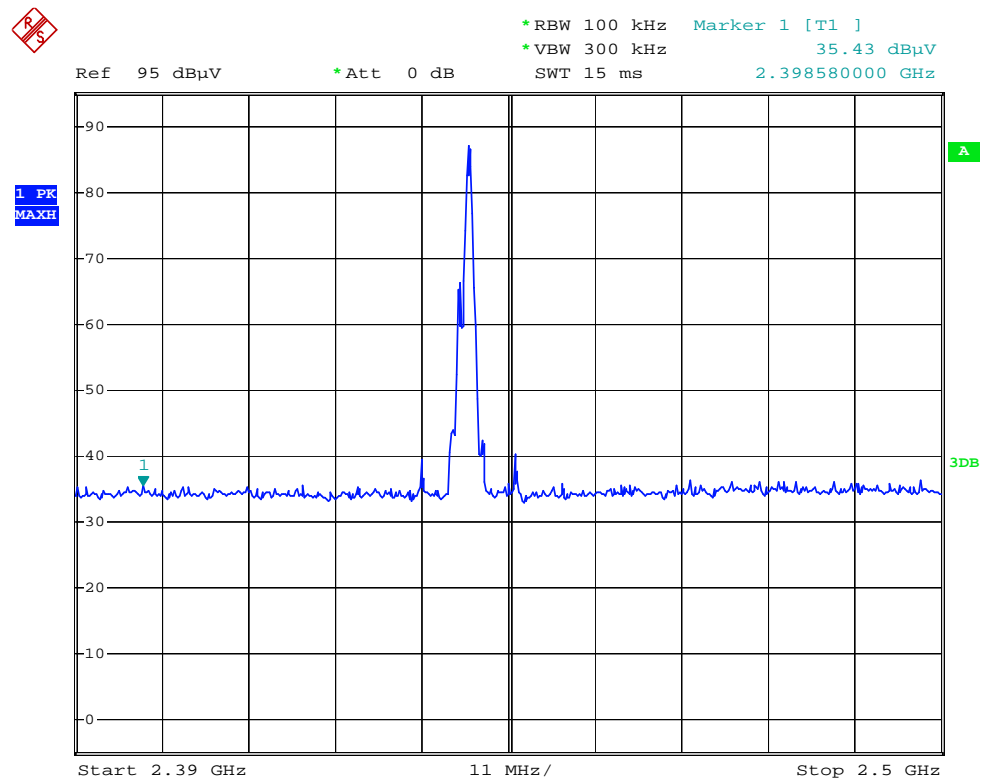
The testing was performed by Herith Shi on 2008-08-25.

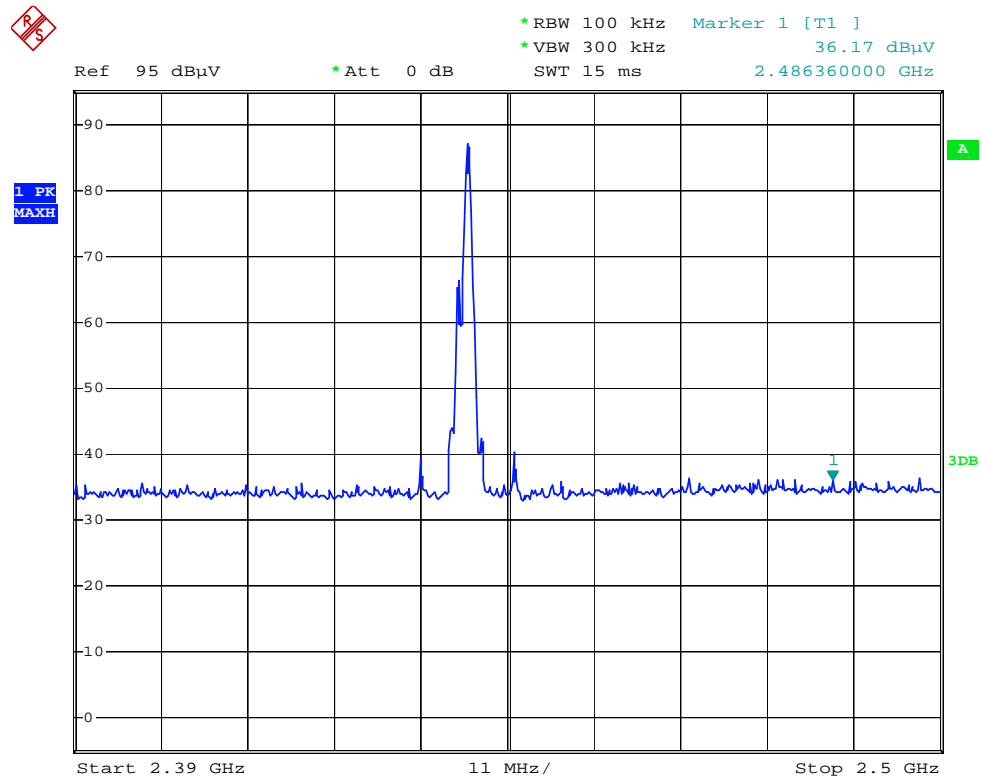
Test Mode: Transmitting

| Freq. (MHz) | Reading (dB μ V) | Detector (PK/AV) | Direction (Degree) | Ant. Height (m) | Ant. Polar (H/V) | Ant. Factor (dB) | Cable Loss (dB) | Pre- Amp. Gain (dB) | Cord. Reading (dB μ V/m) | FCC 15.209 | |
|----------------|-------------------------|---------------------|-----------------------|-----------------------|------------------------|------------------------|-----------------------|------------------------------|------------------------------------|-------------------------|----------------|
| | | | | | | | | | | Limit (dB μ V/m) | Margin (dB) |
| 2486 | 36.17 | PK | 280 | 1.4 | H | 30.30 | 7.90 | 33.90 | 40.47 | 54 | 13.53 |
| 2398 | 35.43 | PK | 270 | 1.5 | V | 30.90 | 7.90 | 33.90 | 40.33 | 54 | 13.67 |

Note: Above test result is the worse case in all polarity direction (horizontal and vertical).

Please refer to below plots.

Left Band Edge

Right Band Edge

***** END OF REPORT *****