# TEST REPORT

## Report Number: R13359833-E1

| | | |
|---|---|---|
| **Applicant** | : | Oxford Nanopore Technologies Ltd<br>Gosling Building, Edmund Halley Road<br>Oxford Science Park<br>Oxford, OX4 4DQ<br>United Kingdom |
| **Model** | : | ONT-07-01191-00 |
| **FCC ID** | : | 2ARGS-P3310 |
| **IC** | : | 26200-P3310 |
| **EUT Description** | : | BT/BLE/WLAN (2.4GHz and 5GHz) Radio Module |
| **Test Standard(s)** | : | FCC 47 CFR PART 15 SUBPART C<br>ISED RSS-247 ISSUE 2<br>ISED RSS-GEN ISSUE 5 +A1:2019 |

**Date of Issue:**
2020-08-28

**Prepared by:**
UL LLC
12 Laboratory Dr.
Research Triangle Park, NC 27709 U.S.A.
TEL: (919) 549-1400

NVLAP® TESTING
ilac-MRA
NVLAP Lab code: 200246-0

# REPORT REVISION HISTORY

| Ver. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| 1 | 2020-08-28 | Initial Issue | Brian T. Kiewra |


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

# TABLE OF CONTENTS

**REPORT REVISION HISTORY** ..... **2**

**TABLE OF CONTENTS** ..... **3**

**1. ATTESTATION OF TEST RESULTS** ..... **4**

**2. TEST RESULTS SUMMARY** ..... **5**

**3. TEST METHODOLOGY** ..... **5**

**4. FACILITIES AND ACCREDITATION** ..... **5**

**5. DECISION RULES AND MEASUREMENT UNCERTAINTY** ..... **6**

*5.1. METROLOGICAL TRACEABILITY* ..... *6*

*5.2. DECISION RULES* ..... *6*

*5.3. MEASUREMENT UNCERTAINTY* ..... *6*

*5.4. SAMPLE CALCULATION* ..... *6*

**6. DESCRIPTION OF C2PC** ..... **7**

**7. EQUIPMENT UNDER TEST** ..... **7**

*7.1. EUT DESCRIPTION* ..... *7*

*7.2. MAXIMUM OUTPUT POWER* ..... *7*

*7.3. DESCRIPTION OF AVAILABLE ANTENNAS* ..... *7*

*7.4. SOFTWARE AND FIRMWARE* ..... *7*

*7.5. WORST-CASE CONFIGURATION AND MODE* ..... *7*

*7.6. DESCRIPTION OF TEST SETUP* ..... *8*

**8. TEST AND MEASUREMENT EQUIPMENT** ..... **9**

**9. MEASUREMENT METHOD** ..... **11**

**10. ON TIME AND DUTY CYCLE** ..... **12**

**11. RADIATED TEST RESULTS** ..... **13**

*11.1. TRANSMITTER ABOVE 1 GHz* ..... *14*

*11.2. WORST CASE CONFIGURATION RADIATED* ..... *24*

**12. AC POWER LINE CONDUCTED EMISSIONS** ..... **29**

12.1.1. AC POWER LINE NORM ..... 30

**13. SETUP PHOTOS** ..... **32**

**END OF TEST REPORT** ..... **32**



UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400

*This report shall not be reproduced except in full, without the written approval of UL LLC*

# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Oxford Nanopore Technologies Ltd
Gosling Building, Edmund Halley Road
Oxford Science Park
Oxford, OX4 4DQ
United Kingdom

**EUT DESCRIPTION:** BT/BLE/WLAN (2.4GHz and 5GHz) Radio Module

**MODEL:** ONT-07-01191-00

**SERIAL NUMBER:** 0325117192382

**DATE TESTED:** 2020-08-03 to 2020-08-17

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULTS** |
| CFR 47 Part 15 Subpart C | Complies |
| ISED RSS-247 Issue 2 | Complies |
| ISED RSS-GEN Issue 5 +A1:2019 | Complies |

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. government.

Approved & Released
For UL LLC By:

Frank Ibrahim
Staff Engineer
Consumer Technology Division
UL Verification Services Inc.

Prepared By:

Brian T. Kiewra
Project Engineer
Consumer Technology Division
UL LLC


*This report shall not be reproduced except in full, without the written approval of UL LLC*

# 2. TEST RESULTS SUMMARY

| FCC Clause | ISED Clause | Requirement | Result | Comment |
|---|---|---|---|---|
| See Comment | | Duty Cycle | Reporting purposes only | ANSI C63.10 Section 11.6. |
| - | RSS-GEN 6.7 | 99% OBW | See Comment | Refer to Section 6. |
| 15.247 (a) (2) | RSS-247 5.2 (a) | 6dB BW | | |
| 15.247 (b) (3) | RSS-247 5.4 (d) | Output Power | | |
| See Comment | | Average power | | |
| 15.247 (e) | RSS-247 5.2 (b) | PSD | | |
| 15.247 (d) | RSS-247 5.5 | Conducted Spurious Emissions | | |
| 15.209, 15.205 | RSS-GEN 8.9, 8.10 | Radiated Emissions | Compliant | None |
| 15.207 | RSS-Gen 8.8 | AC Mains Conducted Emissions | | |

# 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5 +A1:2019, and RSS-247 Issue 2.

# 4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Drive, Research Triangle Park, NC 27709, USA and 2800 Perimeter Park Dr., Suite B, Morrisville, NC 27560, USA. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 12 Laboratory Dr. | 2800 Perimeter Park Dr. |
|---|---|
| **Site Code: 2180C** | |
| ☐ Chamber A RTP | ☐ North Chamber |
| ☐ Chamber C RTP | ☒ South Chamber |

The above test sites and facilities are covered under FCC Test Firm Registration # 703469. Chambers above are covered under Industry Canada company address and respective code.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0.


*This report shall not be reproduced except in full, without the written approval of UL LLC*

# 5. DECISION RULES AND MEASUREMENT UNCERTAINTY

## 5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

## 5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

## 5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER | $U_{Lab}$ |
|---|---|
| Worst Case Conducted Disturbance, 0.15 to 30 MHz | ±3.07 dB |
| Worst Case Radiated Disturbance, 9kHz to 26GHz | ±4.88 dB |

Uncertainty figures are valid to a confidence level of 95%.

## 5.4. SAMPLE CALCULATION

**RADIATED EMISSIONS**
Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

**MAINS CONDUCTED EMISSIONS**
Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

# 6. DESCRIPTION OF C2PC

The purpose of this class 2 permission change report is to demonstrate that the radio module maintains compliancy when used with an antenna different from the original submission. Therefore, full radiated and AC mains testing were performed.

# 7. EQUIPMENT UNDER TEST

## 7.1. EUT DESCRIPTION

The EUT is a BT/BLE/WLAN (2.4GHz and 5GHz) Radio Module.
This report covers BLE.

## 7.2. MAXIMUM OUTPUT POWER

The purpose of this class 2 permission change report is to demonstrate that the radio module maintains compliancy when used with an antenna different from the original submission. Therefore, power measurements are not covered in this report. It is the responsibility of the manufacturer to ensure that the power settings used under this evaluation and in the field, yield the same or less maximum power as in the report.

## 7.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes 2 identical PCB patch antennas, with a maximum gain of 3.73 dBi in 2.4GHz band and 5.18 dBi in 5GHz band.

## 7.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was fw_bcmdhd_mfg_7.35.221.18.bin.
The test utility software used during testing was wl for WiFi, hcitool for Bluetooth & Bluetooth Low-Energy.

## 7.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

BT/BLE radio transmits on EUT chain 0 antenna.

The fundamental of the EUT was investigated with the chain 0 antenna in three orthogonal orientations X,Y,Z, it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the chain 0 antenna in Z orientation.


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

## 7.6. DESCRIPTION OF TEST SETUP

**SUPPORT EQUIPMENT**

| Support Equipment List | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **FCC ID** |
| Laptop | Dell | E6330 | 59R7PX1 | NA |
| AC Adapter | FSP | FSP065-10AABA | H9221000252 | NA |

**I/O CABLES**

| I/O Cable List | | | | | | |
|---|---|---|---|---|---|---|
| **Cable No.** | **Port** | **# of Identical Ports** | **Connector Type** | **Cable Type** | **Cable Length (m)** | **Remarks** |
| 1 | Mains | 1 | Barrel | Mains | <3m | Connected to DC power supply |
| 2 | ENET | 1 | RJ45 | I/O | <3m | Connected to laptop outside chamber |

**SETUP DIAGRAMS**

Please refer to R13359833-EP1 for setup diagram


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

# 8. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment were utilized for the tests documented in this report:

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

| Equipment ID | Description | Manufacturer | Model Number | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| **0.009-30MHz (Loop Ant.)** | | | | | |
| AT0059 | Active Loop Antenna | EMCO | 6502 | 2020-08-06 | 2021-08-06 |
| **30-1000 MHz** | | | | | |
| AT0081 | Hybrid Broadband Antenna | Sunol Sciences Corp. | JB3 | 2019-11-20 | 2020-11-20 |
| **1-18 GHz** | | | | | |
| AT0067 | Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz | ETS Lindgren | 3117 | 2020-04-28 | 2021-04-28 |
| **18-40 GHz** | | | | | |
| AT0076 | Horn Antenna, 18-26.5GHz | ARA | MWH-1826/B | 2019-11-07 | 2020-11-07 |
| AT0077 | Horn Antenna, 26-40GHz | ARA | MWH-2640/B | 2019-11-07 | 2020-11-07 |
| **Gain-Loss Chains** | | | | | |
| S-SAC01 | Gain-loss string: 0.009-30MHz | Various | Various | 2020-07-10 | 2021-07-10 |
| S-SAC02 | Gain-loss string: 25-1000MHz | Various | Various | 2020-07-10 | 2021-07-10 |
| S-SAC03 | Gain-loss string: 1-18GHz | Various | Various | 2020-07-06 | 2021-07-06 |
| S-SAC04 | Gain-loss string: 18-40GHz | Various | Various | 2020-07-07 | 2021-07-07 |
| **Receiver & Software** | | | | | |
| SA0025 | Spectrum Analyzer | Agilent | N9030A | 2020-03-17 | 2021-03-17 |
| SA0026 | Spectrum Analyzer | Agilent | N9030A | 2020-06-24 | 2021-06-24 |
| SOFTEMI | EMI Software | UL | Version 9.5 (2019-06-12) | | |
| **Additional Equipment used** | | | | | |
| s/n 200037635 | Environmental Meter | Fisher Scientific | 06-662-4 | 2020-1-22 | 2022-01-22 |
| PS215 | AC Power Source | Elgar | CW2501M (s/n 1523A02397) | NA | NA |
| BRF004 | 5.5GHz notch filter, 2W, $F_{high}$ =18GHz | Micro-Tronics | BRM50716-01 | 2020-02-19 | 2021-02-19 |


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

| Equipment ID | Description | Manufacturer | Model Number | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| CBL087 | Coax cable, RG223, N-male to BNC-male, 20-ft. | Pasternack | PE3W06143-240 | 2020-03-26 | 2021-03-26 |
| HI0090 | Environmental Meter | Fisher Scientific | 15-077-963 | 2020-06-26 | 2021-06-26 |
| LISN003 | LISN, 50-ohm/50-uH, 2-conductor, 25A | Fischer Custom Com. | FCC-LISN-50-25-2-01-550V | 2019-08-19 | 2020-08-19 |
| 75141 (PRE0101521) | EMI Test Receiver 9kHz-7GHz | Rohde & Schwarz | ESCI 7 | 2019-08-20 | 2020-08-20 |
| ATA222 | Transient Limiter, 0.009-100MHz | Electro-Metrics | EM-7600 | 2020-03-26 | 2021-03-26 |
| PS215 | AC Power Source | Elgar | CW2501M (s/n 1523A02397) | NA | NA |
| SOFTEMI | EMI Software | UL | Version 9.5 (2015-08-20) | | |
| **Miscellaneous (if needed)** | | | | | |
| LISN008 | LISN, 50-ohm/50-uH, 2-conductor, 25A (For support gear only.) | Solar Electronics | 8012-50-R-24-BNC | 2020-08-08 | 2021-08-08 |


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

# 9. MEASUREMENT METHOD

On Time and Duty Cycle: ANSI C63.10 Section 11.6

Out-of-band emissions in non-restricted bands: ANSI C63.10-2013 Section 11.11

Out-of-band emissions in restricted bands: ANSI C63.10-2013 Section 11.12.1 & 6.10.5

General Radiated Emissions: ANSI C63.10:2013 Sections 6.3 through 6.6

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

# 10. ON TIME AND DUTY CYCLE

**LIMITS**

None; for reporting purposes only.

**PROCEDURE**

ANSI C63.10 Zero-Span Spectrum Analyzer Method.

| Mode | ON Time B (msec) | Period (msec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) |
|---|---|---|---|---|---|
| **2.4GHz Band** | | | | | |
| BLE | 0.3884 | 0.6236 | 0.623 | 62.28% | 4.11 |

**DUTY CYCLE – BLE**


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

# 11. RADIATED TEST RESULTS

**LIMITS**

FCC §15.205 and §15.209
RSS-GEN, Section 8.9 and 8.10.

| Frequency Range (MHz) | Field Strength Limit (uV/m) at 3 m | Field Strength Limit (dBuV/m) at 3 m |
|---|---|---|
| 0.009-0.490 | 2400/F(kHz) @ 300 m | - |
| 0.490-1.705 | 24000/F(kHz) @ 30 m | - |
| 1.705 - 30 | 30 @ 30m | - |
| 30 - 88 | 100 | 40 |
| 88 - 216 | 150 | 43.5 |
| 216 - 960 | 200 | 46 |
| Above 960 | 500 | 54 |

**TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak.

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for voltage average measurements.

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

3D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel).

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

**KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification**

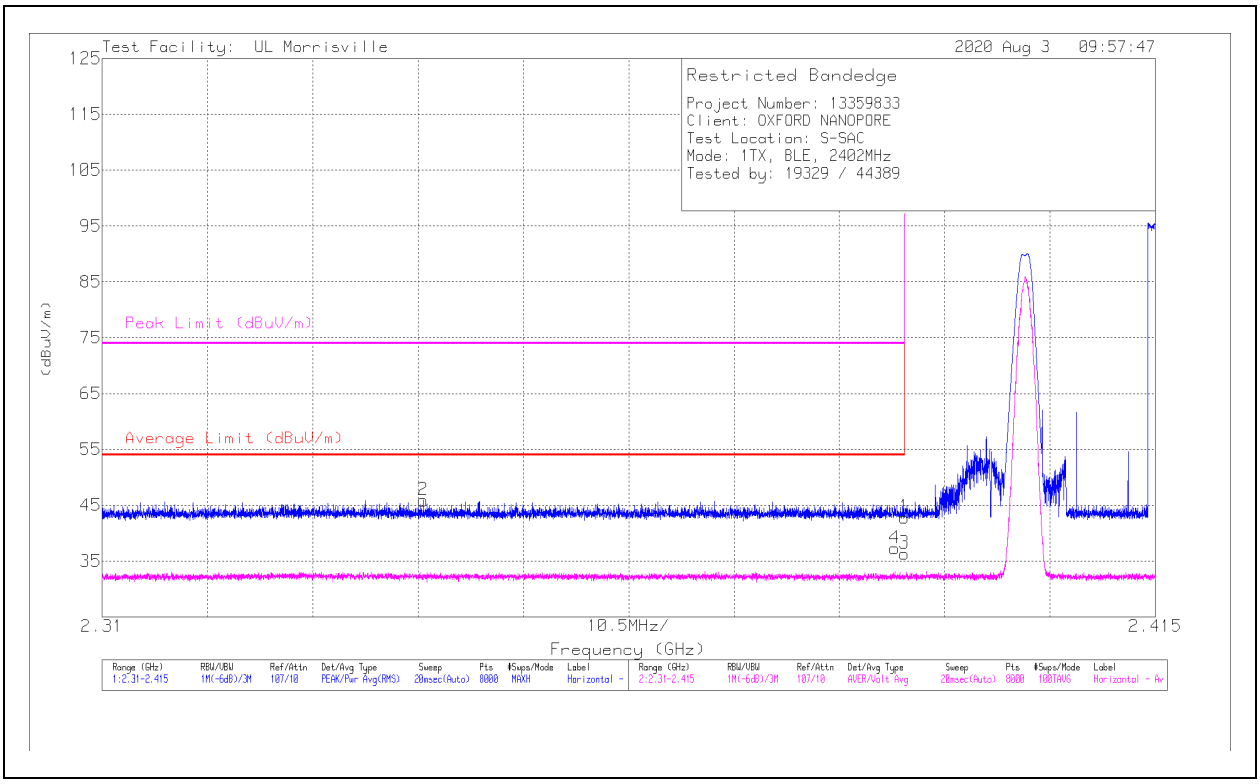
OFS and chamber correlation testing had been performed and chamber measured test result is the worst-case test result.


*This report shall not be reproduced except in full, without the written approval of UL LLC*

## 11.1. TRANSMITTER ABOVE 1 GHz

### BANDEDGE (LOW CHANNEL)

### HORIZONTAL RESULT

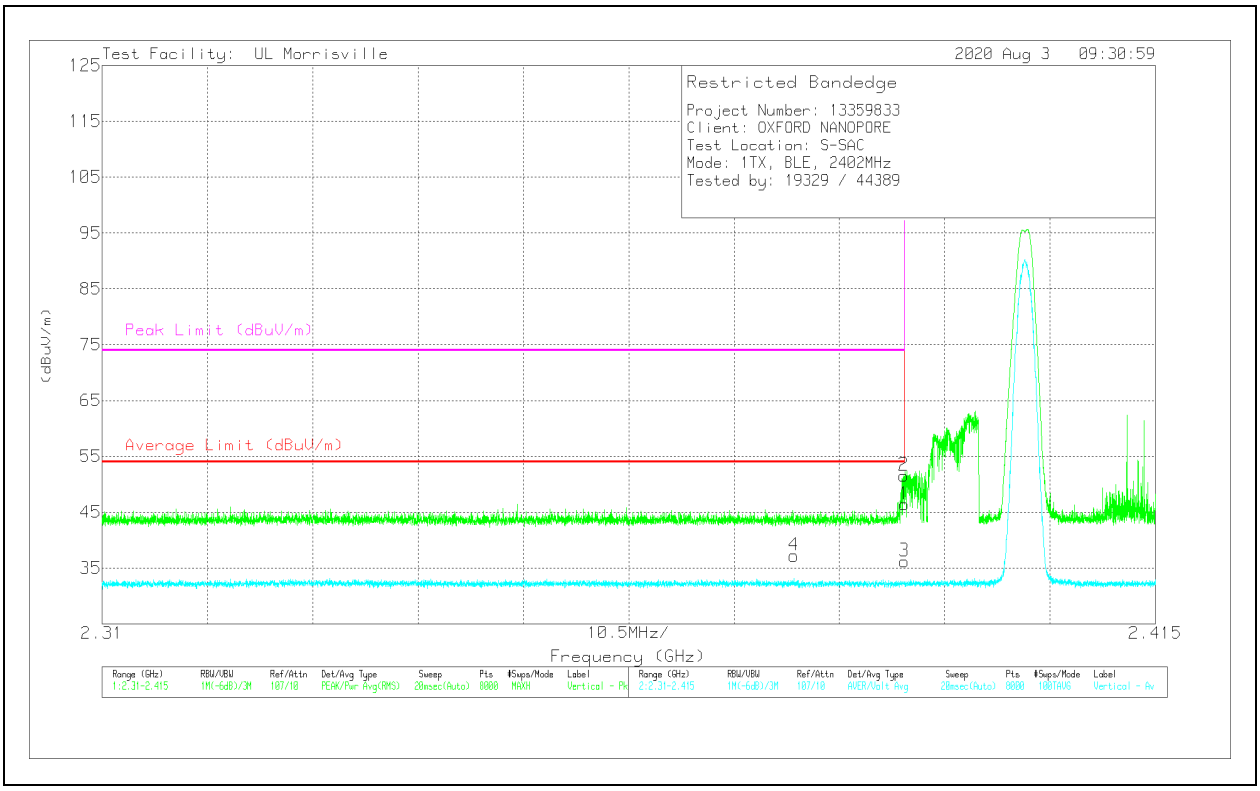



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * ** 2.39 | 34.73 | Pk | 32.1 | -24 | 0 | 42.83 | - | - | 74 | -31.17 | 100 | 345 | H |
| 2 | * ** 2.34199 | 37.49 | Pk | 32.2 | -23.8 | 0 | 45.89 | - | - | 74 | -28.11 | 100 | 345 | H |
| 3 | * ** 2.39 | 24.15 | ADV | 32.1 | -24 | 4.11 | 36.36 | 54 | -17.64 | - | - | 100 | 345 | H |
| 4 | * ** 2.38901 | 25.07 | ADV | 32.1 | -24 | 4.11 | 37.28 | 54 | -16.72 | - | - | 100 | 345 | H |

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

# VERTICAL RESULT




| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * ** 2.39 | 38.31 | Pk | 32.1 | -24 | 0 | 46.41 | - | - | 74 | -27.59 | 104 | 305 | V |
| 2 | * ** 2.3899 | 43.48 | Pk | 32.1 | -24 | 0 | 51.58 | - | - | 74 | -22.42 | 104 | 305 | V |
| 3 | * ** 2.39 | 24 | ADV | 32.1 | -24 | 4.11 | 36.21 | 54 | -17.79 | - | - | 104 | 305 | V |
| 4 | * ** 2.37898 | 24.82 | ADV | 32.2 | -23.9 | 4.11 | 37.23 | 54 | -16.77 | - | - | 104 | 305 | V |

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

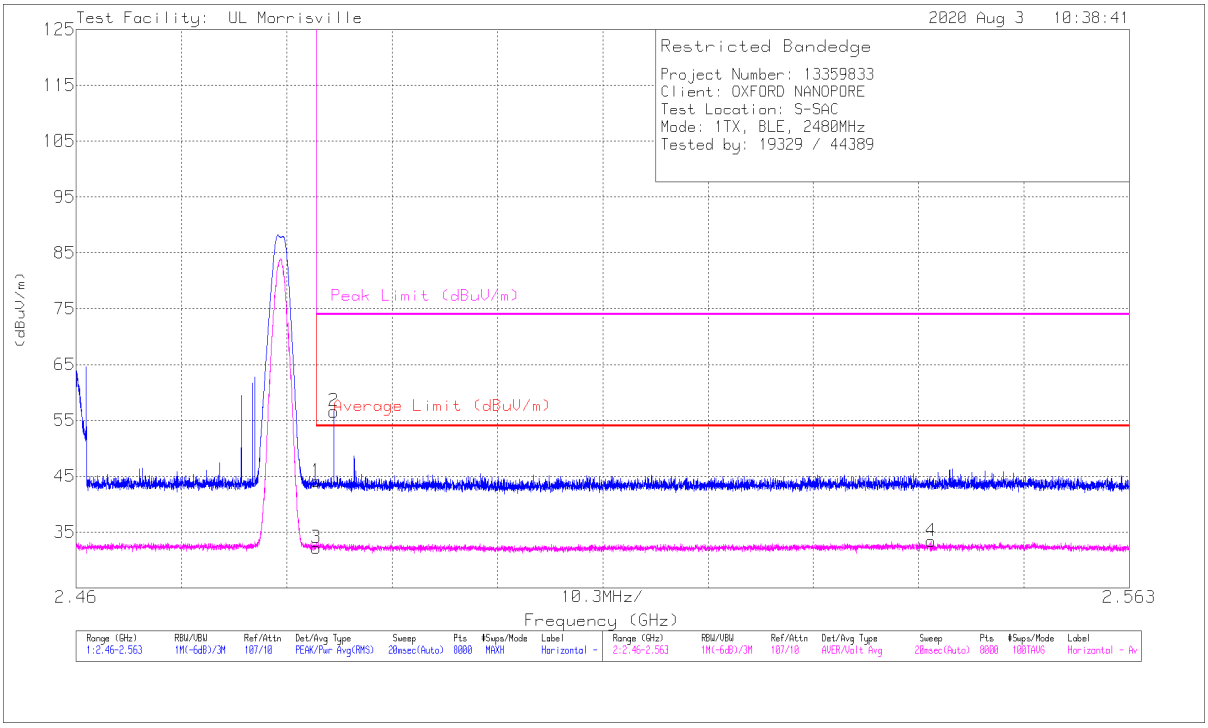


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA
TEL:(919) 549-1400

*This report shall not be reproduced except in full, without the written approval of UL LLC*

## BANDEDGE (HIGH CHANNEL)

### HORIZONTAL RESULT

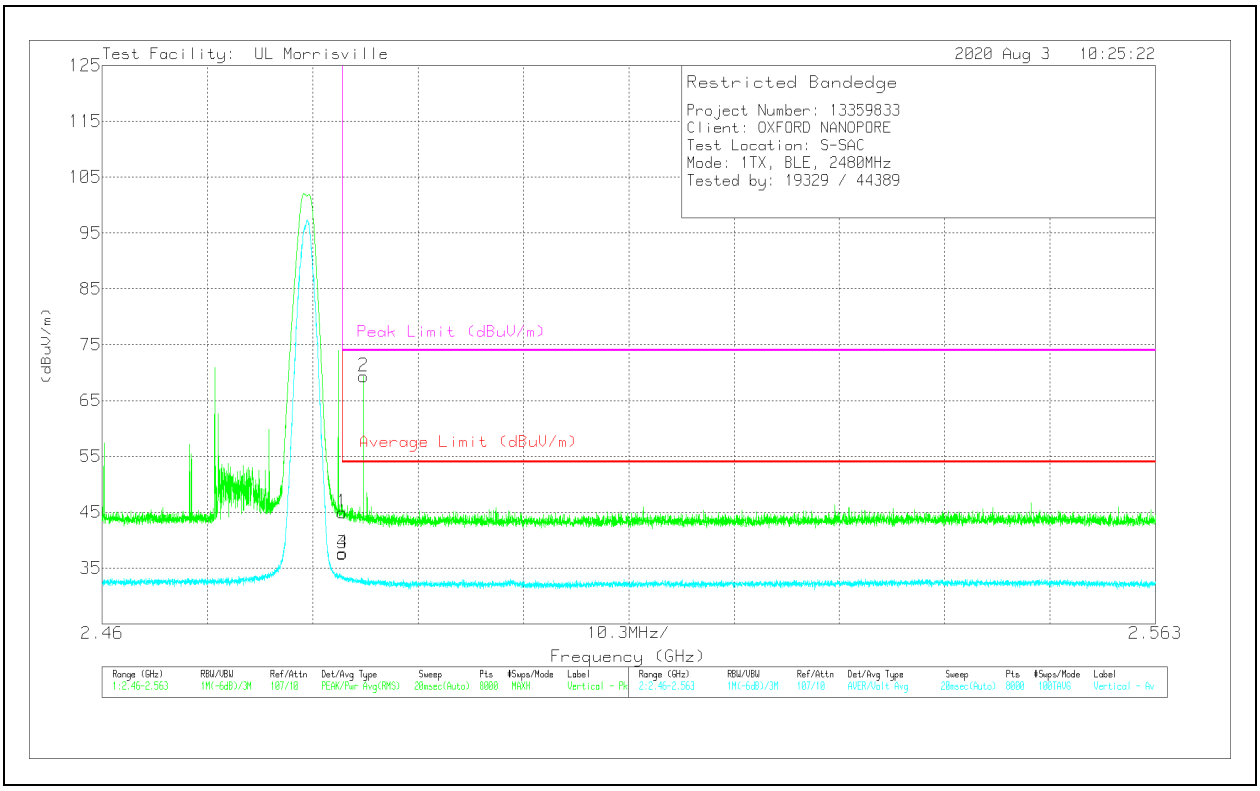



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * ** 2.4835 | 36.11 | Pk | 32.4 | -24.4 | 0 | 44.11 | - | - | 74 | -29.89 | 168 | 217 | H |
| 2 | * ** 2.4852 | 48.71 | Pk | 32.4 | -24.5 | 0 | 56.61 | - | - | 74 | -17.39 | 168 | 217 | H |
| 3 | * ** 2.4835 | 20.04 | ADV | 32.4 | -24.4 | 4.11 | 32.15 | 54 | -21.85 | - | - | 168 | 217 | H |
| 4 | ** 2.5436 | 21.55 | ADV | 32.6 | -24.9 | 4.11 | 33.36 | 54 | -20.64 | - | - | 168 | 217 | H |

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

# VERTICAL RESULT




| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * ** 2.4835 | 37 | Pk | 32.4 | -24.4 | 0 | 45 | - | - | 74 | -29 | 112 | 122 | V |
| 2 | * ** 2.48557 | 61.45 | Pk | 32.4 | -24.5 | 0 | 69.35 | - | - | 74 | -4.65 | 112 | 122 | V |
| 3 | * ** 2.4835 | 25.47 | ADV | 32.4 | -24.4 | 4.11 | 37.58 | 54 | -16.42 | - | - | 112 | 122 | V |
| 4 | * ** 2.48351 | 25.56 | ADV | 32.4 | -24.4 | 4.11 | 37.67 | 54 | -16.33 | - | - | 112 | 122 | V |

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

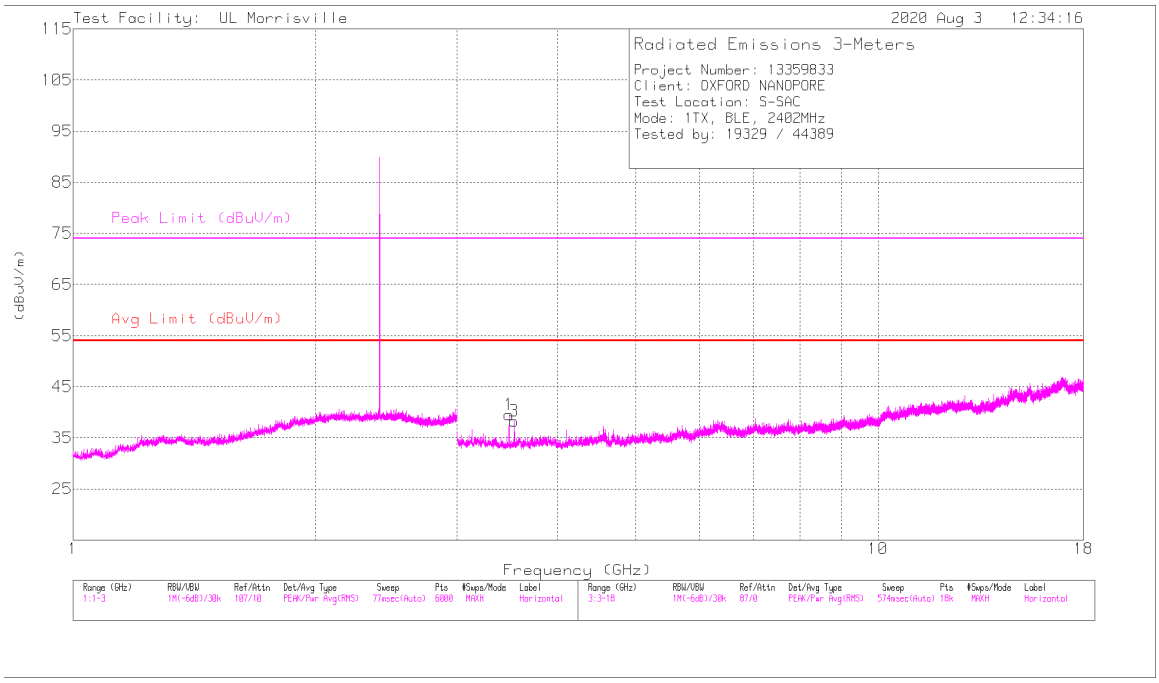


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA
TEL:(919) 549-1400

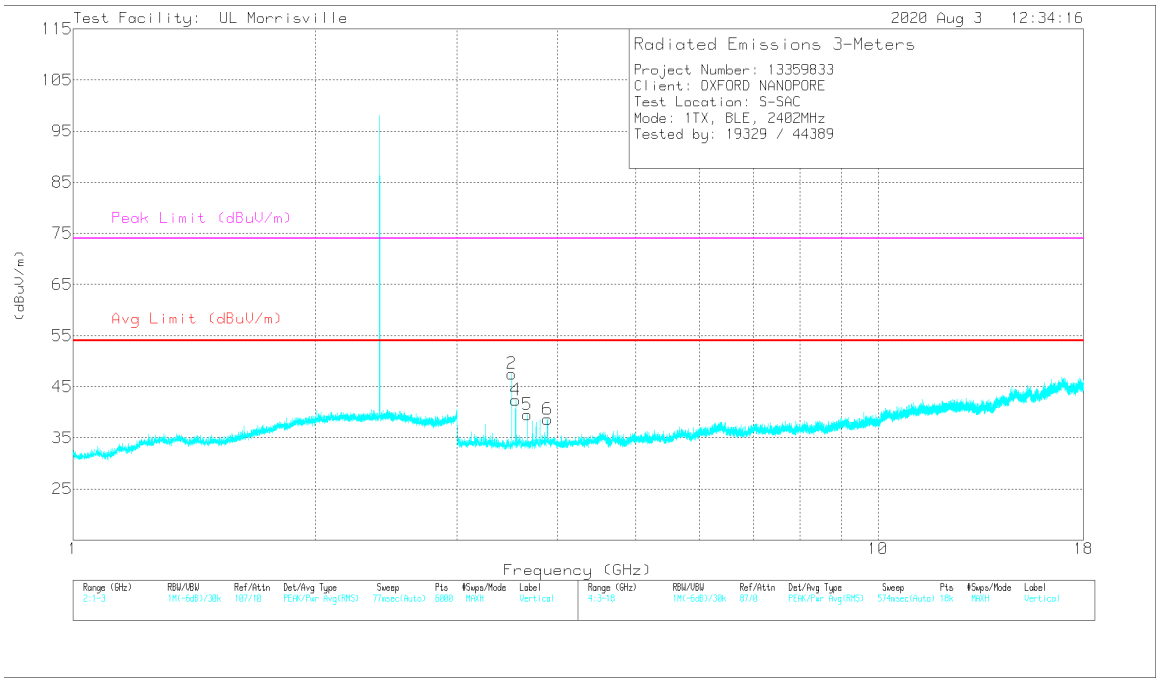
*This report shall not be reproduced except in full, without the written approval of UL LLC*

## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL RESULTS




**HORIZONTAL**




**VERTICAL**



UL LLC
12 Laboratory Dr., RTP, NC 27709; USA
TEL:(919) 549-1400

*This report shall not be reproduced except in full, without the written approval of UL LLC*

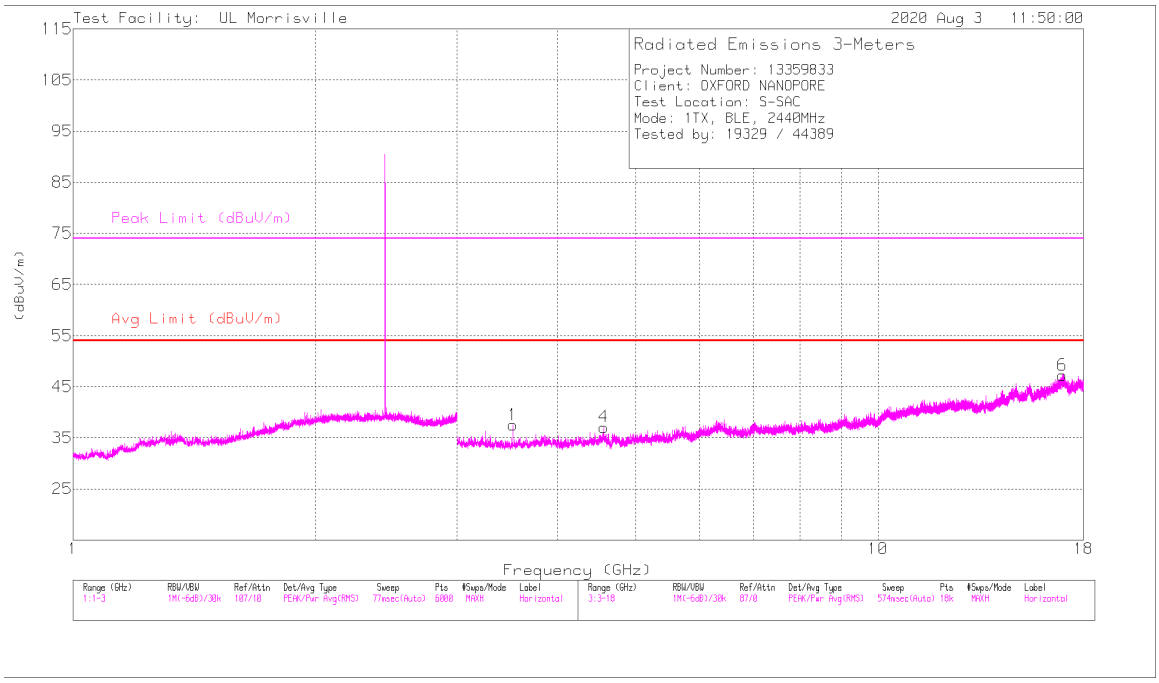
## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | * ** 3.53341 | 41.18 | PK2 | 32.8 | -32.6 | 0 | 41.38 | - | - | 74 | -32.62 | 339 | 192 | H |
| | * ** 3.53415 | 28.1 | ADV | 32.8 | -32.6 | 4.11 | 32.41 | 54 | -21.59 | - | - | 339 | 192 | H |
| 2 | * ** 3.50693 | 41.16 | PK2 | 32.8 | -32.9 | 0 | 41.06 | - | - | 74 | -32.94 | 16 | 145 | V |
| | * ** 3.50671 | 29.23 | ADV | 32.8 | -32.9 | 4.11 | 33.24 | 54 | -20.76 | - | - | 16 | 145 | V |
| 4 | * ** 3.54644 | 41.15 | PK2 | 32.9 | -32.4 | 0 | 41.65 | - | - | 74 | -32.35 | 154 | 318 | V |
| | * ** 3.54677 | 27.79 | ADV | 32.9 | -32.4 | 4.11 | 32.4 | 54 | -21.6 | - | - | 154 | 318 | V |
| 5 | * ** 3.66675 | 42.56 | PK2 | 33.1 | -32.2 | 0 | 43.46 | - | - | 74 | -30.54 | 145 | 283 | V |
| | * ** 3.6669 | 27.43 | ADV | 33.1 | -32.2 | 4.11 | 32.44 | 54 | -21.56 | - | - | 145 | 283 | V |
| 6 | * ** 3.88444 | 40.53 | PK2 | 33.4 | -32 | 0 | 41.93 | - | - | 74 | -32.07 | 0 | 217 | V |
| | * ** 3.88465 | 27.14 | ADV | 33.4 | -32 | 4.11 | 32.65 | 54 | -21.35 | - | - | 0 | 217 | V |
| 1 | 3.48003 | 39.6 | Pk | 32.8 | -32.9 | 0 | 39.5 | - | - | - | - | 0-360 | 101 | H |

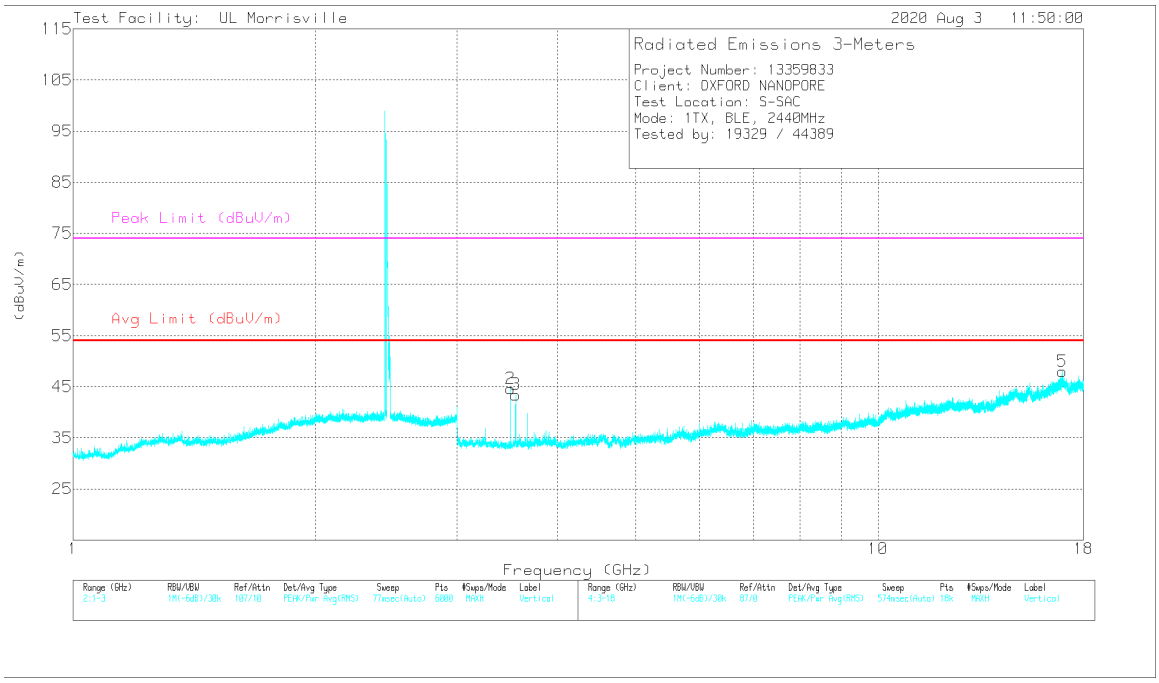
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
ADV - Linear Voltage Average
Pk - Peak detector


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

## MID CHANNEL RESULTS




**HORIZONTAL**




**VERTICAL**



UL LLC
12 Laboratory Dr., RTP, NC 27709; USA
TEL:(919) 549-1400

*This report shall not be reproduced except in full, without the written approval of UL LLC*

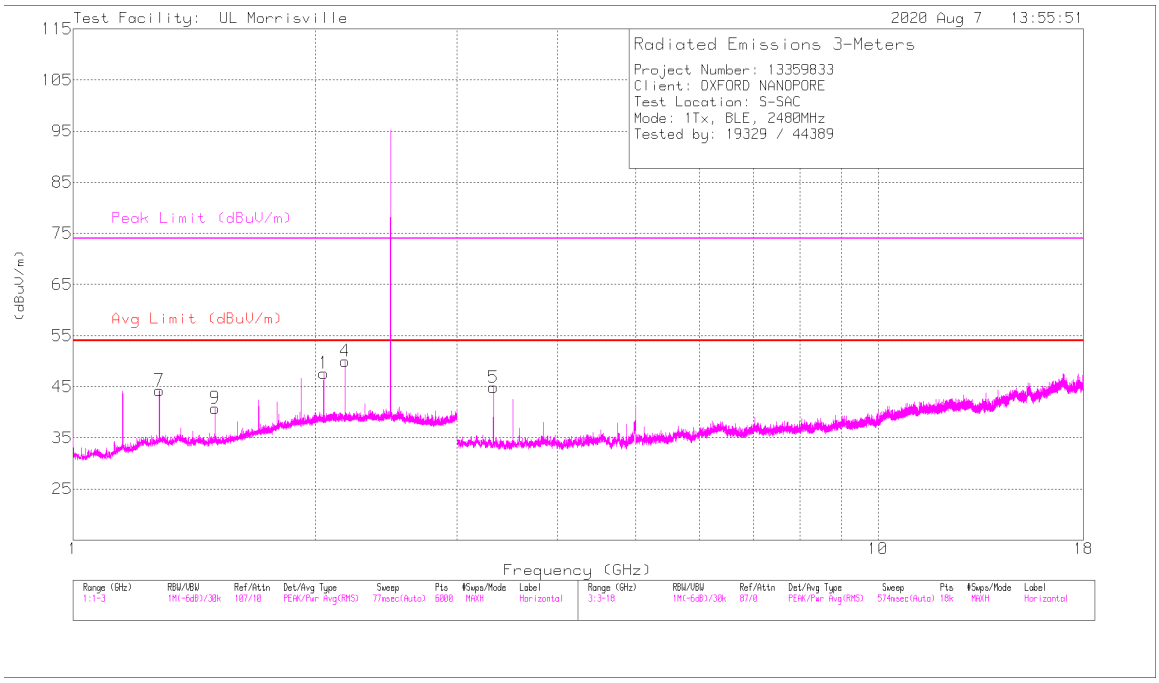
## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * ** 3.51903 | 42.4 | PK2 | 32.8 | -32.8 | 0 | 42.4 | - | - | 74 | -31.6 | 165 | 348 | H |
| | * ** 3.5193 | 28.2 | ADV | 32.8 | -32.8 | 4.11 | 32.31 | 54 | -21.69 | - | - | 165 | 348 | H |
| 4 | * ** 4.56054 | 40.45 | PK2 | 34 | -31.3 | 0 | 43.15 | - | - | 74 | -30.85 | 269 | 368 | H |
| | * ** 4.56003 | 26.8 | ADV | 34 | -31.3 | 4.11 | 33.61 | 54 | -20.39 | - | - | 269 | 368 | H |
| 3 | * ** 3.54712 | 40.49 | PK2 | 32.9 | -32.4 | 0 | 40.99 | - | - | 74 | -33.01 | 287 | 364 | V |
| | * ** 3.54624 | 27.7 | ADV | 32.9 | -32.4 | 4.11 | 32.31 | 54 | -21.69 | - | - | 287 | 364 | V |
| 2 | 3.49336 | 44.7 | Pk | 32.8 | -32.9 | 0 | 44.6 | - | - | - | - | 0-360 | 200 | V |
| 5 | 16.94661 | 29.86 | Pk | 42 | -23.9 | 0 | 47.96 | - | - | - | - | 0-360 | 200 | V |
| 6 | 16.95161 | 29.13 | Pk | 42 | -23.9 | 0 | 47.23 | - | - | - | - | 0-360 | 101 | H |

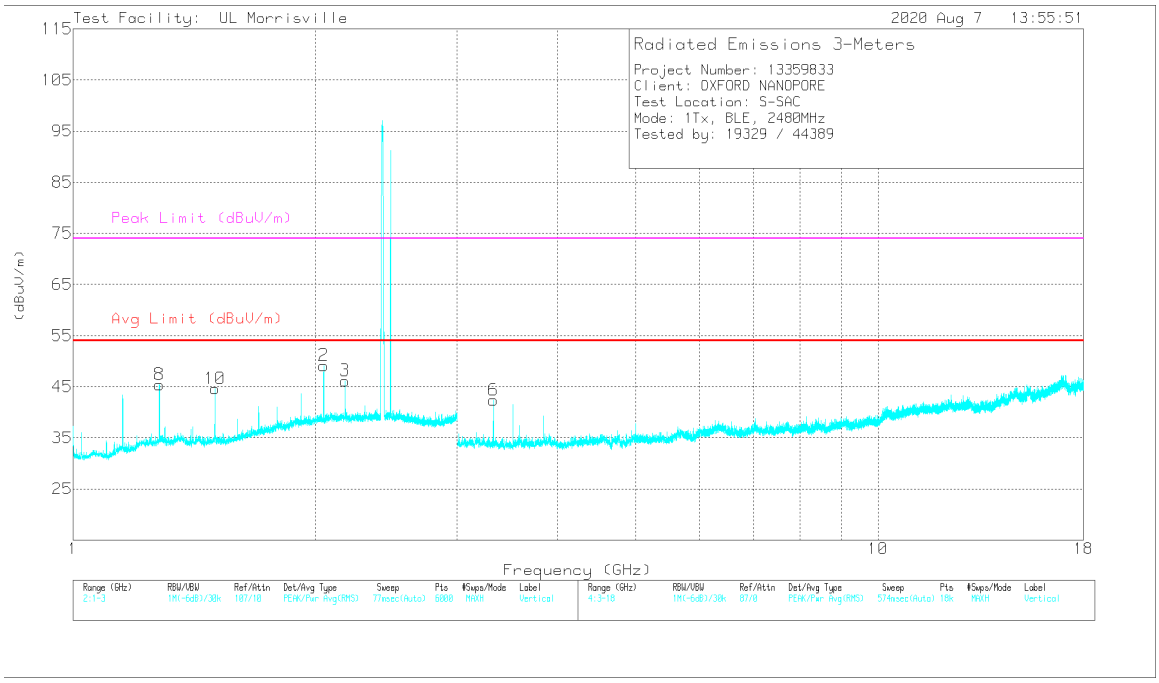
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
ADV - Linear Voltage Average
Pk - Peak detector


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

## HIGH CHANNEL RESULTS




**HORIZONTAL**




**VERTICAL**



UL LLC
12 Laboratory Dr., RTP, NC 27709; USA
TEL:(919) 549-1400

*This report shall not be reproduced except in full, without the written approval of UL LLC*

## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | * 1.28003 | 42.73 | PK2 | 29.1 | -23.2 | 0 | 48.63 | - | - | 74 | -25.37 | 191 | 161 | H |
| | * 1.28 | 38.38 | ADV | 29.1 | -23.2 | 4.11 | 48.39 | 54 | -5.61 | - | - | 191 | 161 | H |
| 9 | * ** 1.50004 | 40.57 | PK2 | 28 | -22.4 | 0 | 46.17 | - | - | 74 | -27.83 | 194 | 108 | H |
| | * ** 1.49996 | 33.6 | ADV | 28 | -22.4 | 4.11 | 43.31 | 54 | -10.69 | - | - | 194 | 108 | H |
| 8 | * 1.27998 | 42.87 | PK2 | 29.1 | -23.2 | 0 | 48.77 | - | - | 74 | -25.23 | 219 | 238 | V |
| | * 1.28001 | 38.7 | ADV | 29.1 | -23.2 | 4.11 | 48.71 | 54 | -5.29 | - | - | 219 | 238 | V |
| 10 | * ** 1.50005 | 42.59 | PK2 | 28 | -22.4 | 0 | 48.19 | - | - | 74 | -25.81 | 191 | 103 | V |
| | * ** 1.50001 | 36.57 | ADV | 28 | -22.4 | 4.11 | 46.28 | 54 | -7.72 | - | - | 191 | 103 | V |
| 2 | 2.04784 | 40.24 | Pk | 31.7 | -22.8 | 0 | 49.14 | - | - | - | - | 0-360 | 200 | V |
| 1 | 2.04818 | 38.75 | Pk | 31.7 | -22.8 | 0 | 47.65 | - | - | - | - | 0-360 | 200 | H |
| 3 | 2.17586 | 37.27 | Pk | 32 | -23.1 | 0 | 46.17 | - | - | - | - | 0-360 | 200 | V |
| 4 | 2.1762 | 41.09 | Pk | 32 | -23.1 | 0 | 49.99 | - | - | - | - | 0-360 | 200 | H |
| 5 | 3.32752 | 44.46 | Pk | 32.9 | -32.5 | 0 | 44.86 | - | - | - | - | 0-360 | 101 | H |
| 6 | 3.32752 | 41.96 | Pk | 32.9 | -32.5 | 0 | 42.36 | - | - | - | - | 0-360 | 200 | V |

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
ADV - Linear Voltage Average
Pk - Peak detector

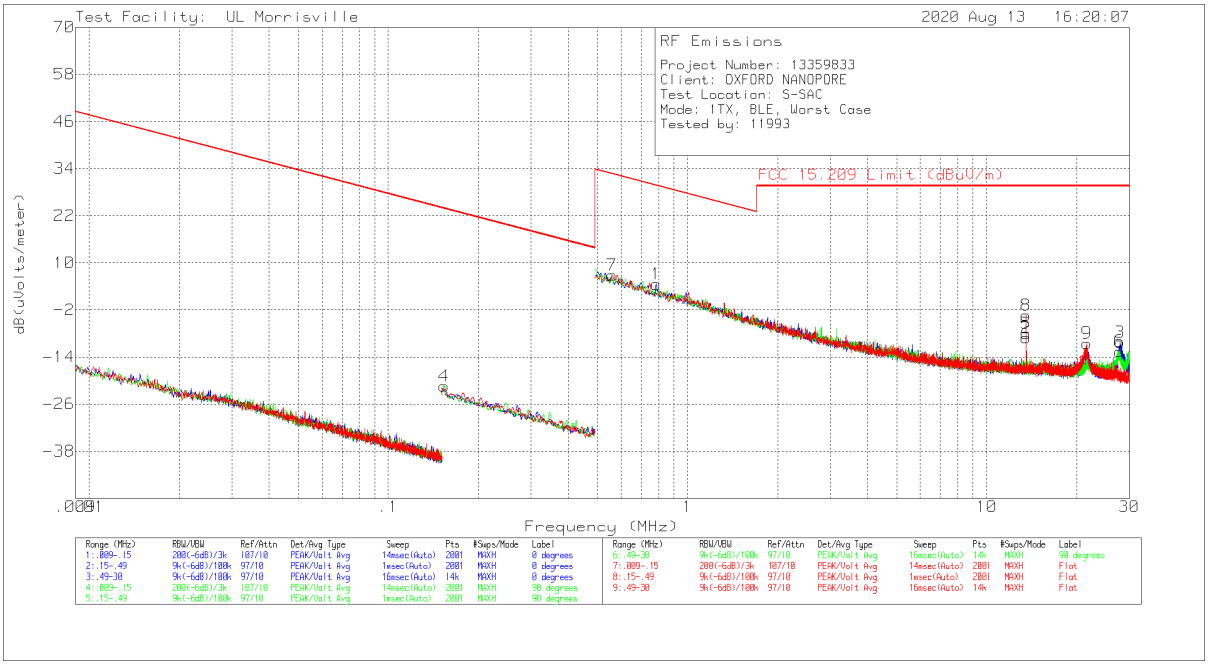

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

## 11.2. WORST CASE CONFIGURATION RADIATED

**SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)**

Note for below 30 MHz scans: All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were 40*Log (test distance / specification distance).

The below 30 MHz limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω. For example, the measurement frequency 153.66 kHz resulted in a level of -21.47 dBuV/m, which is equivalent to -21.47 - 51.5 = -72.97 dBuA/m, which has the same margin, -45.34 dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.



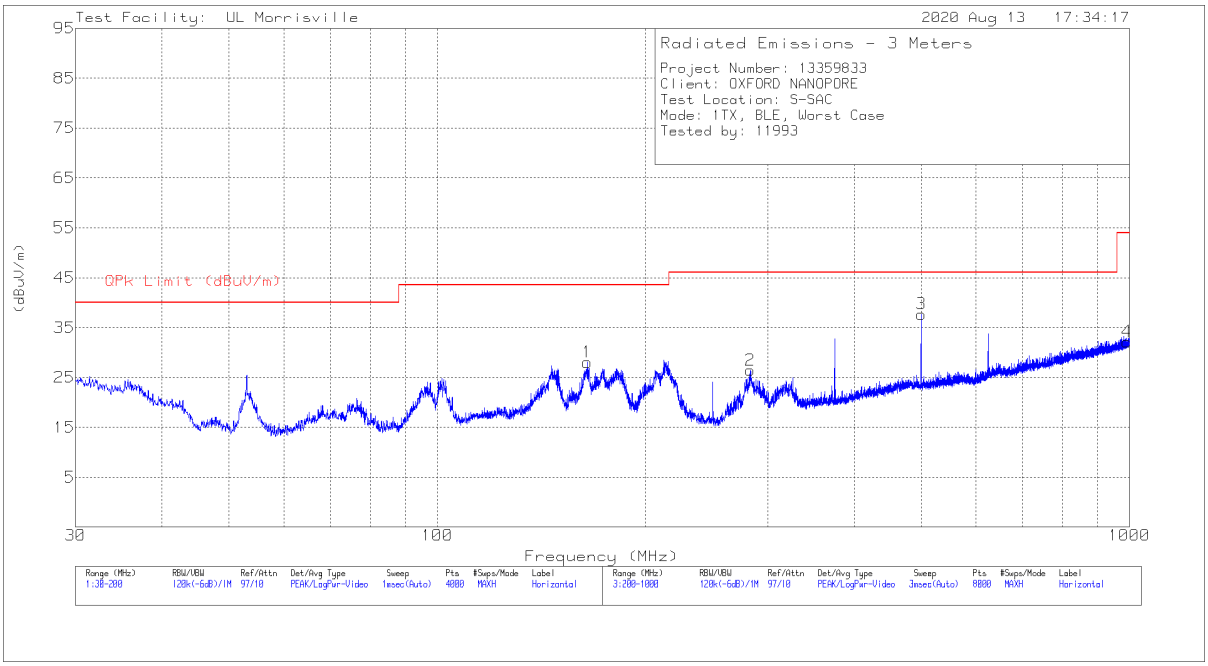

**ANTENNA- THREE ORIENTATIONS**

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AT0059 (dB/m) | Cbl (dB) | Dist. Corr. Factor (dB) | Corrected Reading dB(uVolts/meter) | FCC 15.209 QP/AV Limit (dBuV/m) | FCC 15.209 PK Limit (dBuV/m) | Worst-Case Margin (dB) | Azimuth (Degs) | Antenna Facw |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | .15366 | 48.03 | Pk | 10.4 | .1 | -80 | -21.47 | 23.87 | 43.87 | -45.34 | 0-360 | Off |
| 7 | .55956 | 36.36 | Pk | 10.4 | .1 | -40 | 6.86 | 32.65 | - | -25.79 | 0-360 | Flat |
| 1 | .78512 | 34.04 | Pk | 10.3 | .2 | -40 | 4.54 | 29.71 | - | -25.17 | 0-360 | On |
| 8 | 13.5596 | 25.1 | Pk | 10.8 | .7 | -40 | -3.4 | 29.54 | - | -32.94 | 0-360 | Flat |
| 2 | 13.56065 | 19.33 | Pk | 10.8 | .7 | -40 | -9.17 | 29.54 | - | -38.71 | 0-360 | On |
| 5 | 13.56065 | 20.49 | Pk | 10.8 | .7 | -40 | -8.01 | 29.54 | - | -37.55 | 0-360 | Off |
| 9 | 21.648 | 18.48 | Pk | 10.1 | .9 | -40 | -10.52 | 29.54 | - | -40.06 | 0-360 | Flat |
| 6 | 27.81811 | 17.83 | Pk | 8.5 | 1.1 | -40 | -12.57 | 29.54 | - | -42.11 | 0-360 | Off |
| 3 | 27.8687 | 20.21 | Pk | 8.4 | 1.1 | -40 | -10.29 | 29.54 | - | -39.83 | 0-360 | On |

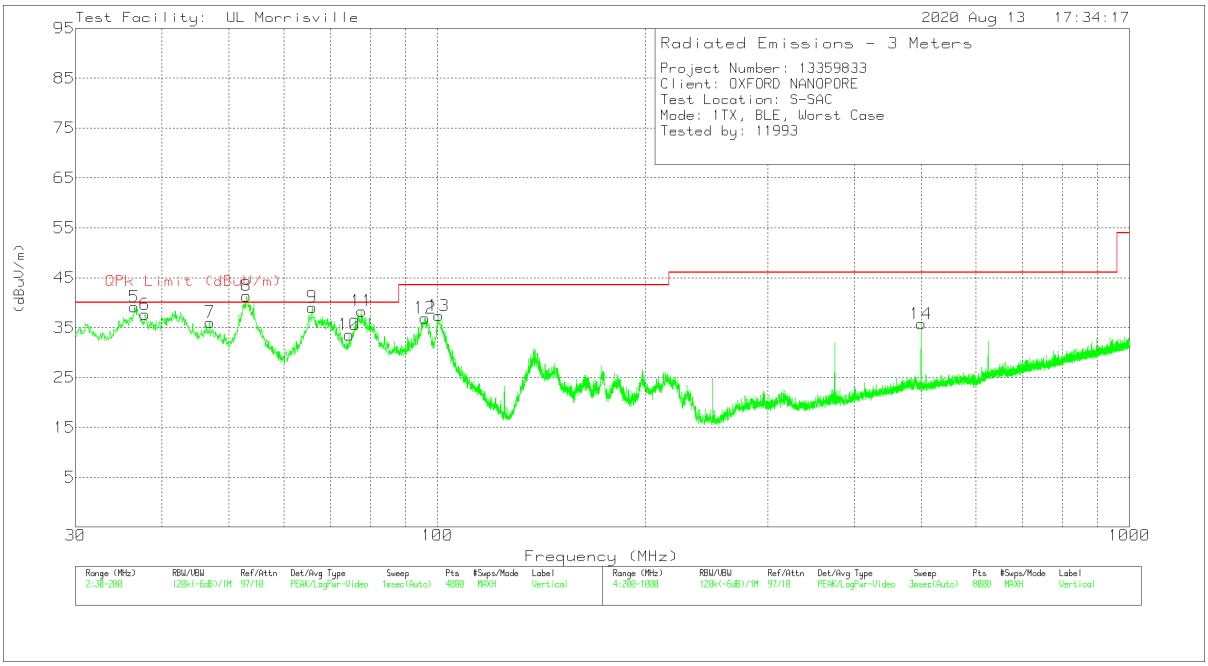
Pk - Peak detector


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)**




**HORIZONTAL**




**VERTICAL**



UL LLC
12 Laboratory Dr., RTP, NC 27709; USA
TEL:(919) 549-1400

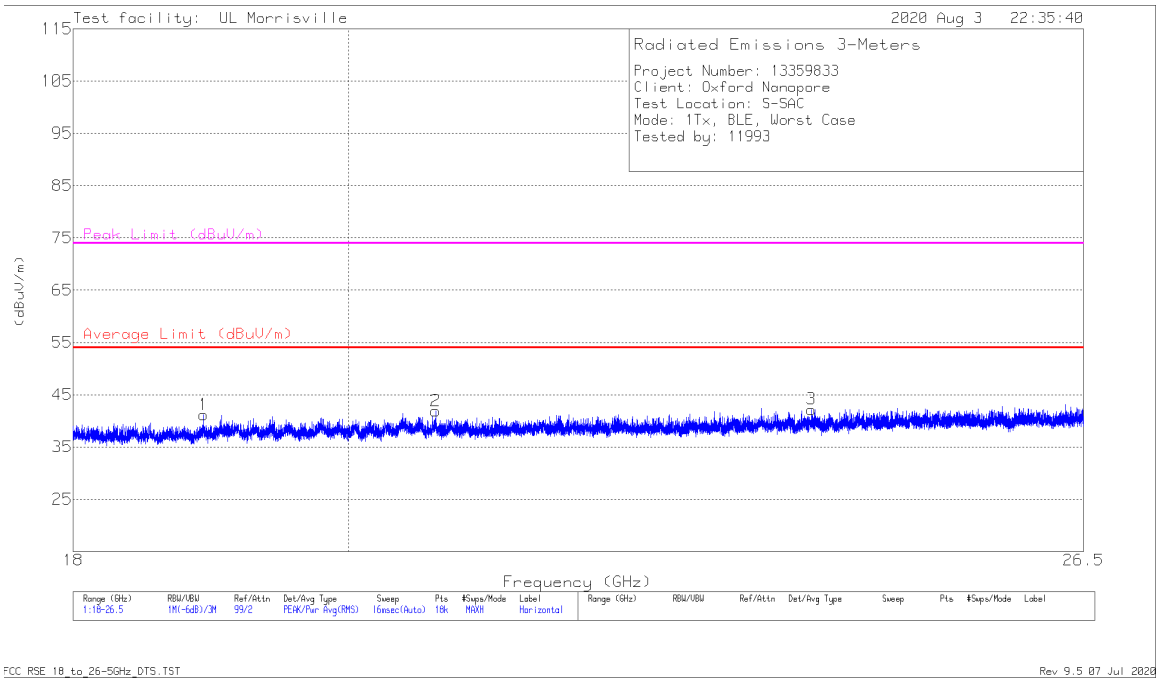
*This report shall not be reproduced except in full, without the written approval of UL LLC*

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AT0081 AF (dB/m) | Amp/Cbl (dB) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * ** 164.7599 | 39.75 | Pk | 18.2 | -29.9 | 28.05 | 43.52 | -15.47 | 0-360 | 199 | H |
| 6 | * ** 37.8287 | 40.55 | Qp | 21.7 | -31.4 | 30.85 | 40 | -9.15 | 153 | 117 | V |
| 10 | * ** 74.594 | 50.17 | Pk | 14.3 | -30.9 | 33.57 | 40 | -6.43 | 0-360 | 101 | V |
| 2 | * ** 283.3108 | 35.94 | Pk | 19.4 | -28.9 | 26.44 | 46.02 | -19.58 | 0-360 | 101 | H |
| 3 | ** 500.039 | 41.71 | Pk | 23.7 | -27.7 | 37.71 | 46.02 | -8.31 | 0-360 | 200 | H |
| 4 | * ** 992.103 | 27.15 | Pk | 29.3 | -24.3 | 32.15 | 53.97 | -21.82 | 0-360 | 300 | H |
| 14 | ** 500.039 | 39.74 | Pk | 23.7 | -27.7 | 35.74 | 46.02 | -10.28 | 0-360 | 101 | V |
| 5 | 36.5042 | 47.83 | Pk | 22.7 | -31.4 | 39.13 | - | - | 0-360 | 101 | V |
| 7 | 46.9194 | 51.95 | Pk | 15.4 | -31.3 | 36.05 | - | - | 0-360 | 101 | V |
| 8 | 52.9985 | 59.06 | Pk | 13.5 | -31.2 | 41.36 | - | - | 0-360 | 101 | V |
| 9 | 66.0068 | 55.78 | Pk | 14.3 | -31 | 39.08 | - | - | 0-360 | 101 | V |
| 11 | 77.7399 | 55.14 | Pk | 14.1 | -30.9 | 38.34 | - | - | 0-360 | 101 | V |
| 12 | 96.0621 | 52.14 | Pk | 15.4 | -30.6 | 36.94 | - | - | 0-360 | 101 | V |
| 13 | 100.5257 | 51.41 | Pk | 16.6 | -30.6 | 37.41 | - | - | 0-360 | 101 | V |

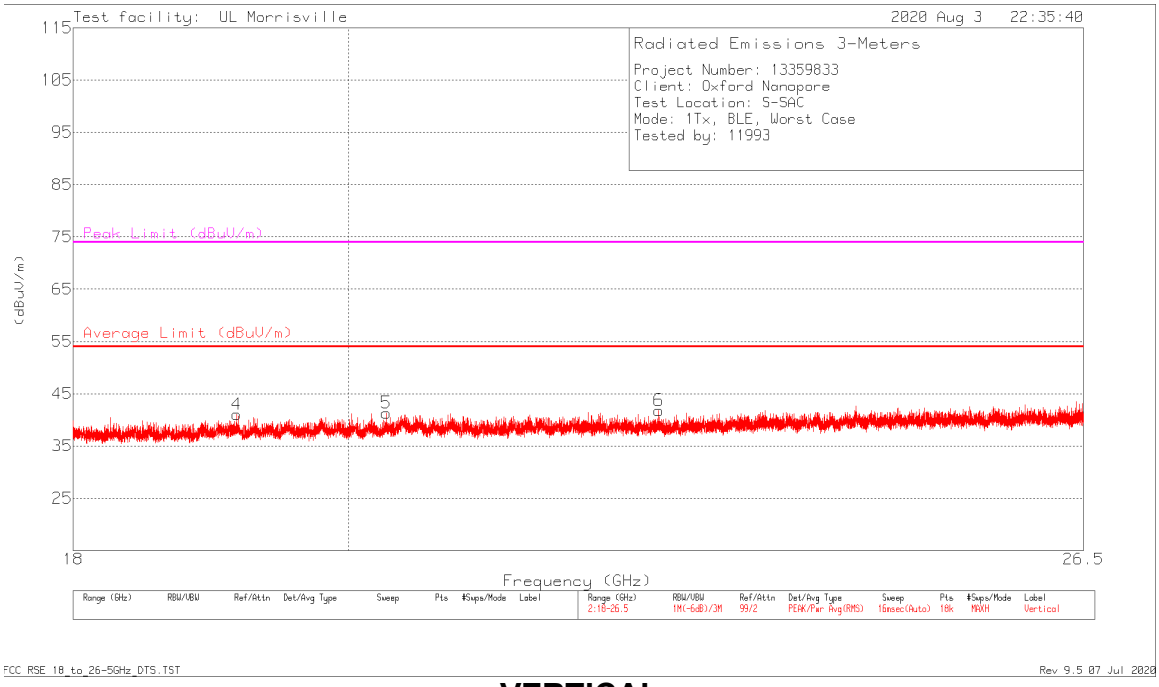
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
Qp - Quasi-Peak detector


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

**SPURIOUS EMISSIONS 18-26 GHz (WORST-CASE CONFIGURATION)**




**HORIZONTAL**




**VERTICAL**



UL LLC
12 Laboratory Dr., RTP, NC 27709; USA
TEL:(919) 549-1400

*This report shall not be reproduced except in full, without the written approval of UL LLC*

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0076 AF (dB/m) | Amp/Cbl (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * ** 18.92041 | 47.76 | Pk | 32.7 | -39.3 | 41.16 | 54 | -12.84 | 74 | -32.84 | 0-360 | 101 | H |
| 2 | * ** 20.67954 | 47.6 | Pk | 33 | -38.7 | 41.9 | 54 | -12.1 | 74 | -32.1 | 0-360 | 149 | H |
| 3 | * ** 23.87854 | 46.7 | Pk | 34.1 | -38.6 | 42.2 | 54 | -11.8 | 74 | -31.8 | 0-360 | 200 | H |
| 4 | * ** 19.16173 | 47.44 | Pk | 32.7 | -39.1 | 41.04 | 54 | -12.96 | 74 | -32.96 | 0-360 | 251 | V |
| 5 | * ** 20.29276 | 46.8 | Pk | 33.1 | -38.6 | 41.3 | 54 | -12.7 | 74 | -32.7 | 0-360 | 150 | V |
| 6 | * ** 22.52414 | 47.39 | Pk | 33.6 | -39.2 | 41.79 | 54 | -12.21 | 74 | -32.21 | 0-360 | 101 | V |

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

# 12. AC POWER LINE CONDUCTED EMISSIONS

**LIMITS**

FCC §15.207 (a)
RSS-Gen 8.8

| Frequency of Emission (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 * | 56 to 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

**TEST PROCEDURE**

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

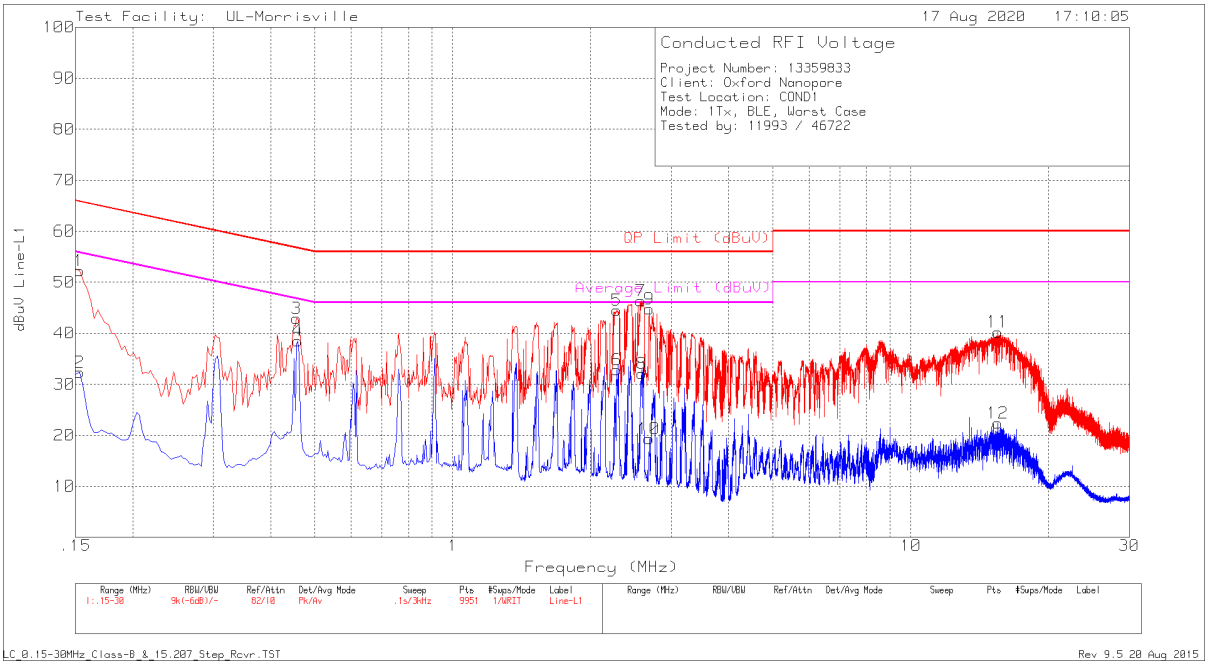
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both lines.


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

### 12.1.1. AC POWER LINE NORM

## LINE 1 RESULTS

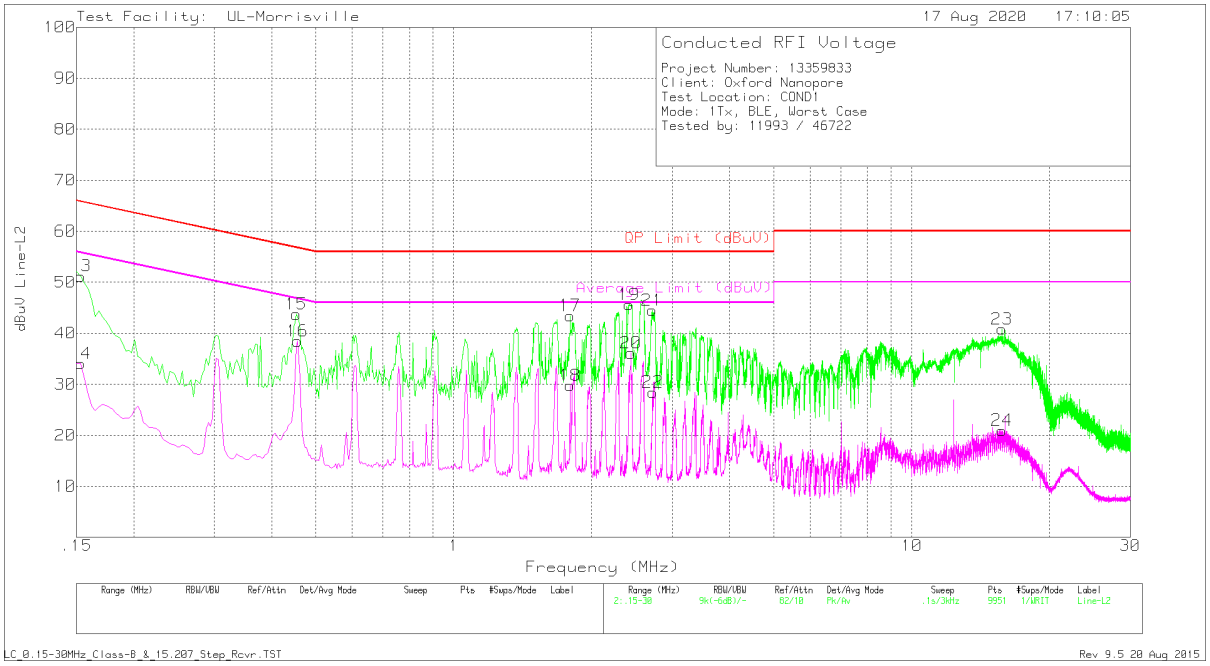



| Range 1: Line-L1 .15 - 30MHz | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | LISN VCF (dB) | Cbl/Limiter (dB) | Corrected Reading dBuV | QP Limit (dBuV) | Margin (dB) | Average Limit (dBuV) | Margin (dB) |
| 1 | .153 | 42.32 | Pk | .2 | 9.7 | 52.22 | 65.84 | -13.62 | - | - |
| 2 | .153 | 22.45 | Av | .2 | 9.7 | 32.35 | - | - | 55.84 | -23.49 |
| 3 | .456 | 32.99 | Pk | .1 | 9.8 | 42.89 | 56.77 | -13.88 | - | - |
| 4 | .459 | 28.64 | Av | .1 | 9.8 | 38.54 | - | - | 46.71 | -8.17 |
| 5 | 2.28 | 34.72 | Pk | 0 | 9.8 | 44.52 | 56 | -11.48 | - | - |
| 6 | 2.28 | 23.04 | Av | 0 | 9.8 | 32.84 | - | - | 46 | -13.16 |
| 7 | 2.574 | 36.52 | Pk | 0 | 9.8 | 46.32 | 56 | -9.68 | - | - |
| 8 | 2.583 | 22.32 | Av | 0 | 9.8 | 32.12 | - | - | 46 | -13.88 |
| 9 | 2.688 | 34.98 | Pk | 0 | 9.8 | 44.78 | 56 | -11.22 | - | - |
| 10 | 2.682 | 9.49 | Av | 0 | 9.8 | 19.29 | - | - | 46 | -26.71 |
| 11 | 15.48 | 30.07 | Pk | .1 | 10.1 | 40.27 | 60 | -19.73 | - | - |
| 12 | 15.477 | 12.21 | Av | .1 | 10.1 | 22.41 | - | - | 50 | -27.59 |

Pk - Peak detector
Av - Average detection


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*

# LINE 2 RESULTS




| Range 2: Line-L2 .15 - 30MHz | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | LISN VCF (dB) | Cbl/Limiter (dB) | Corrected Reading dBuV | QP Limit (dBuV) | Margin (dB) | Average Limit (dBuV) | Margin (dB) |
| 13 | .153 | 41.32 | Pk | .2 | 9.7 | 51.22 | 65.84 | -14.62 | - | - |
| 14 | .153 | 24.13 | Av | .2 | 9.7 | 34.03 | - | - | 55.84 | -21.81 |
| 15 | .453 | 33.83 | Pk | .1 | 9.8 | 43.73 | 56.82 | -13.09 | - | - |
| 16 | .456 | 28.55 | Av | .1 | 9.8 | 38.45 | - | - | 46.77 | -8.32 |
| 17 | 1.794 | 33.66 | Pk | 0 | 9.8 | 43.46 | 56 | -12.54 | - | - |
| 18 | 1.794 | 19.98 | Av | 0 | 9.8 | 29.78 | - | - | 46 | -16.22 |
| 19 | 2.415 | 35.85 | Pk | 0 | 9.8 | 45.65 | 56 | -10.35 | - | - |
| 20 | 2.436 | 26.31 | Av | 0 | 9.8 | 36.11 | - | - | 46 | -9.89 |
| 21 | 2.709 | 34.68 | Pk | 0 | 9.8 | 44.48 | 56 | -11.52 | - | - |
| 22 | 2.721 | 18.67 | Av | 0 | 9.8 | 28.47 | - | - | 46 | -17.53 |
| 23 | 15.735 | 30.62 | Pk | .1 | 10.1 | 40.82 | 60 | -19.18 | - | - |
| 24 | 15.738 | 10.76 | Av | .1 | 10.1 | 20.96 | - | - | 50 | -29.04 |

Pk - Peak detector
Av - Average detection



UL LLC
12 Laboratory Dr., RTP, NC 27709; USA
TEL:(919) 549-1400

*This report shall not be reproduced except in full, without the written approval of UL LLC*

# 13. SETUP PHOTOS

Please refer to R13359833-EP1 for setup photos

## END OF TEST REPORT


UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
*This report shall not be reproduced except in full, without the written approval of UL LLC*