CERTIFICATION TEST REPORT

Report Number: R12935938-E5

Applicant	:	Microsoft Corporation One Microsoft Way Redmond, WA 98052-6399 USA
Model	:	1868
FCC ID	:	C3K1868
IC	:	3048A-1868
EUT Description	:	Portable Computing Device
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART E ISED RSS-247 ISSUE 2 ISED RSS-GEN ISSUE 5

Date Of Issue:
2019-09-16

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

NVLAP TESTING
NVLAP Lab code: 200246-0

REPORT REVISION HISTORY

Ver.	Issue Date	Revisions	Revised By
1	2019-08-29	Initial Issue	Brian T. Kiewra
2	2019-09-06	Added AC power adaptor to support equipment. Added “Intentionally Left Blank” to table on p.18. Added justification for waiving SISO testing to Section 5.5 Added model similiarity explanation to Section 5.1. Revised 802.11n HT40 99%BW results in Section 8.3.	Brian T. Kiewra
3	2019-09-16	Added “Scope of Report” as Section 4	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 **5**

2. TEST METHODOLOGY **6**

3. FACILITIES AND ACCREDITATION **6**

4. SCOPE OF REPORT **6**

5. CALIBRATION AND UNCERTAINTY **7**

5.1. MEASURING INSTRUMENT CALIBRATION *7*

5.2. SAMPLE CALCULATION *7*

5.3. MEASUREMENT UNCERTAINTY *7*

6. EQUIPMENT UNDER TEST **8**

6.1. EUT DESCRIPTION *8*

6.2. MAXIMUM OUTPUT POWER *8*

6.3. DESCRIPTION OF AVAILABLE ANTENNAS *9*

6.4. SOFTWARE AND FIRMWARE *9*

6.5. WORST-CASE CONFIGURATION AND MODE *10*

6.6. DESCRIPTION OF TEST SETUP *10*

7. TEST AND MEASUREMENT EQUIPMENT **12**

8. MEASUREMENT METHOD **15**

9. ANTENNA PORT TEST RESULTS **16**

9.1. ON TIME AND DUTY CYCLE *16*

9.2. 26 dB BANDWIDTH *19*

9.2.1. 802.11a MODE IN THE 5.2 GHz BAND 19
9.2.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND 20
9.2.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND 21
9.2.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND 22
9.2.5. 802.11a MODE IN THE 5.3 GHz BAND 23
9.2.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND 24
9.2.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND 25
9.2.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND 26
9.2.9. 802.11ac VHT160 MODE IN THE 5.2/5.3 GHz BAND 27

9.3. 99% BANDWIDTH *28*

9.3.1. 802.11a MODE IN THE 5.2 GHz BAND 28
9.3.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND 29
9.3.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND 30

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

9.3.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND 31
9.3.5. 802.11a MODE IN THE 5.3 GHz BAND 32
9.3.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND 33
9.3.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND 34
9.3.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND 35
9.3.9. 802.11ac VHT160 MODE IN THE 5.2/5.3 GHz BAND 36

9.4. OUTPUT POWER AND PSD 37
9.4.1. 802.11a MODE IN THE 5.2 GHz BAND 39
9.4.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND 42
9.4.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND 45
9.4.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND 47
9.4.5. 802.11a MODE IN THE 5.3 GHz BAND 49
9.4.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND 55
9.4.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND 61
9.4.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND 65
9.4.9. 802.11ac VHT160 MODE IN THE 5.2/5.3 GHz BAND 67

10. RADIATED TEST RESULTS 69

10.1. TRANSMITTER ABOVE 1 GHz 70
10.1.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND 70
10.1.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND 78
10.1.3. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND 86
10.1.4. TX ABOVE 1 GHz 802.11ac VHT80 MODE IN THE 5.2 GHz BAND 92
10.1.5. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND 96
10.1.6. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND 104
10.1.7. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.3 GHz BAND 112
10.1.8. TX ABOVE 1 GHz 802.11ac VHT80 MODE IN THE 5.3 GHz BAND 118
10.1.9. TX ABOVE 1 GHz 802.11ac VHT160 MODE IN THE 5.2/5.3 GHz BAND 122

10.2. WORST-CASE BELOW 1GHz AND ABOVE 18 GHz 127

12. SETUP PHOTOS 128

END OF TEST REPORT 128

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: Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399
USA

EUT DESCRIPTION: Portable Computing Device

MODEL: 1868

SERIAL NUMBER: See Section 5.4

DATE TESTED: 2019-07-17 to 2019-08-19

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5	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:

Jeffrey Moser
Operations Leader
UL – Consumer Technology Division

Prepared By:

Brian T. Kiewra
Project Engineer
UL – Consumer Technology Division

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

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 14-30, FCC KDB 662911 D01 v02r01, FCC KDB 789033 D02 v02r01, ANSI C63.10-2013, FCC 06-96, RSS-GEN Issue 5, and RSS-247 Issue 2.

3. 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 27590, 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

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

4. SCOPE OF REPORT

This test report covers the radiated emissions and antenna port conducted emissions for model 1868 for 5.2 and 5.3 GHz 802.11a, n HT20, n HT40, ac VHT80, and ac VHT160. Antenna port conducted emissions data in this report is leveraged by model 1867. For model 1867, radiated emissions can be found in UL report number R12922855-E5. For model 1868, AC mains line conducted emissions and worst-case radiated emisisons can be found in UL report number R12935938-E11.

For the antenna port conducted emissons portion of this report, the worst-case antenna gain across both models was used to represent a worst-case scenario. Both models will be implemented with the same power.

Models 1867 and 1868 are electrically and RF equivalent as they use the same motherboard, radio module and on-board RF components. Both models share a common WiFi and BT power table. The radio-related firmware and driver versions are the same for the two models. The peak antenna gains are in the antenna gain section of the report. Antenna port conducted emissions measurements are done on model 1868 (FCC ID: C3K1868, IC: 3048A-1868) and the data is leveraged for model 1867 (FCC ID: C3K1867, IC: 3048A-1867). Highest antenna gain across the two models in each band has been considered while doing the conducted emissions measurements. Separate radiated & SAR measurements are done on each model.

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

5. CALIBRATION AND UNCERTAINTY

5.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

5.2. 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

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	2.00%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
RF output power, radiated (SAC)	4.52 dB
Power Spectral Density, conducted	2.47 dB
All emissions, radiated	5.17 dB
Temperature	2.26°C
Humidity	6.79%
DC Supply voltages	1.70%
Time	3.39%

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

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

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a Portable Computing Device that contains 802.11 a/ac/ax/b/g/n 20/40/80/160MHz 2x2 dual band and BT/BLE radios.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

5.2 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.2 GHz band, 2TX			
5180-5240	802.11a CDD	12.65	18.41
5180-5240	802.11n HT20 SDM	15.66	36.81
5190-5230	802.11n HT40 SDM	17.40	54.95
5210	802.11ac VHT80 SDM	17.40	54.95

SISO and MIMO per chain power are set to the same level.

5.3 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.3 GHz band, 2TX			
5260-5320	802.11a CDD	19.47	88.51
5260-5320	802.11n HT20 SDM	20.85	121.62
5270-5310	802.11n HT40 SDM	16.40	43.65
5290	802.11ac VHT80 SDM	16.39	43.55
5250	802.11ac VHT160 SDM	16.50	44.67

SISO and MIMO per chain power are set to the same level.

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

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Range (GHz)	Antenna Type	Peak Gain (dBi) Antenna 1 (Right)	Peak Gain (dBi) Antenna 2 (Left)
Model 1867			
2.4 to 2.48	PIFA	0.7	2.6
5.15 to 5.25		4.9	4.4
5.25 to 5.35		6.1	5.0
5.47 to 5.72		7.2	5.5
5.725 to 5.85		9.4	5.6
Model 1868			
2.4 to 2.48	PIFA	0.4	1.0
5.15 to 5.25		3.6	2.2
5.25 to 5.35		5.2	3.5
5.47 to 5.72		6.4	4.7
5.725 to 5.85		7.8	4.5

Note –
Antenna 1 = Chain 0
Antenna 2 = Chain 1

6.4. SOFTWARE AND FIRMWARE

EUT	Serial Number	DRTU Version	OS Version	BT Driver Version	WiFi Driver Version	EUT's Power Supply (s/n)
R-557-1868-FCC-CONDUCTED-02	005210692757	11.1916.0-09531	MTEOS 1.652.0	21.0.19157.20088	99.0.43.8	0D130P01P9596
R-557-1868-FCC-CONDUCTED-03	005216792757	11.1916.0-09531	MTEOS 1.652.0	21.0.19157.20088	99.0.43.8	0D130P03GE596
R-557-1868-FCC-RADIATED-10	013886292757	11.1916.0-09531	MTEOS 1.652.0	21.0.19157.20088	99.0.43.8	0D130P02KC596
R-557-1868-FCC-RADIATED-11	013891692757	11.1916.0-09531	MTEOS 1.652.0	21.0.19157.20088	99.0.43.8	0D130P01S7596

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

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emissions were performed in worst-case test report R12935938-E11 (FCC ID: C3K1868, IC: 3048A-1868).

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.

The EUT has one intended orientations, X; therefore, all final radiated testing was performed with the EUT in X orientation.

Worst-case data rates as provided by the client were:

802.11a mode: 6 Mbps
802.11n HT20mode: MCS8
802.11n HT40mode: MCS8
802.11ac VHT80 mode: MCS0 (NSS=2)
802.11ac VHT160 mode: MCS0 (NSS=2)

All radios that can transmit simultaneously have been evaluated for radiated for all possible combinations of transmission and found to be in compliance.

MIMO and SISO power are same setting per chain, therefore MIMO mode tested as worst-case to cover SISO mode.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
USB Hub	J5 Create	JCA374	AY2A1904000477 / AY6A1903004261	N/A
Earbuds	Sony	MDR-EX14AP	Non-Serialized	N/A
USB Flash Drive	Kingston	Data Traveler G4	Non-Serialized	N/A
AC Adaptor	Microsoft	1706	0D130P02KC596	N/A

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Mains	1	12-pin	Mains	<3m	None
2	USB-A	1	USB-A	USB	<3m	None
3	USB-C	1	USB-C	USB	<3m	None
4	Aux	1	Aux	Aux	<3m	None

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 SETUP

The test utility software was located on the EUT during the tests and was used to exercised the radios.

SETUP DIAGRAMS

Please refer to 12935938-EP1 for setup diagrams

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. TEST AND MEASUREMENT EQUIPMENT

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

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

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
1-18 GHz					
AT0067	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2019-03-22	2020-03-22
Gain-Loss Chains					
N-SAC03	Gain-loss string: 1-18GHz	Various	Various	2019-03-15	2020-03-15
Receiver & Software					
SA0026	Spectrum Analyzer	Agilent	N9030A	2019-03-19	2020-03-19
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
Additional Equipment used					
s/n 181474341	Environmental Meter	Fisher Scientific	15-077-963	2018-07-27	2020-07-27

NOTES:
1. For equipment listed above that was calibrated during the testing period, please note the equipment was used for testing after calibration.
2. For equipment listed above that has a calibration due date during the testing period, the testing was completed before the equipment expiration date.

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

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
1-18 GHz					
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2019-04-22	2020-04-22
Gain-Loss Chains					
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2019-03-13	2020-03-13
Receiver & Software					
SA0025	Spectrum Analyzer	Agilent	N9030A	2019-02-28	2020-02-28
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
Additional Equipment used					
s/n 181474409	Environmental Meter	Fisher Scientific	15-077-963	2018-07-27	2020-07-27

NOTES:

1. For equipment listed above that was calibrated during the testing period, please note the equipment was used for testing after calibration.
2. For equipment listed above that has a calibration due date during the testing period, the testing was completed before the equipment expiration date.

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 – Antenna Port Conducted Testing (Morrisville)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SA0027	PXA Signal Analyzer	Keysight Technologies	MY54490254	2019-05-15	2020-05-15
s/n 160938893	Environmental Meter	Fisher Scientific	14-650-118	2019-06-17	2020-06-17
224604-002	Coaxial Testing Cable	Uti-flex	UFA147A-0-0180-200200	NA	NA
Antenna Port	Antenna Port Software	Antenna	Version 10.0.1	NA	NA
126431 (PRE0128068)	RF Power Meter	Anritsu	ML2495A	2019-04-30	2020-04-30
126430 (PRE0128067)	Pulse Power Sensor, 300MHz to 40GHz	Anritsu	MA2411B	2019-04-30	2020-04-30
PWM001 (PRE0136343)	RF Power Meter	Keysight Technologies	N1912A	2019-06-14	2020-06-14
PWS001 (PRE0137347)	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2019-05-06	2020-05-06
T177	PSA Signal Analyzer	Keysight Technologies	E4446A	2019-04-22	2020-04-22
HI0090	Environmental Meter	Fisher Scientific	17-E670X-80-1	2019-06-17	2020-06-17
Antenna Port	Antenna Port Software	Antenna	Version 10.0.1	NA	NA

NOTES:
1. For equipment listed above that was calibrated during the testing period, please note the equipment was used for testing after calibration.
2. For equipment listed above that has a calibration due date during the testing period, the testing was completed before the equipment expiration date.

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. MEASUREMENT METHOD

On Time and Duty Cycle: KDB 789033 D02 v02r01, Section B.

26 dB Emission BW: KDB 789033 D02 v02r01, Section C.1

99% Occupied BW: KDB 789033 D02 v02r01, Section D.

Conducted Output Power: KDB 789033 D02 v02r01, Section E.3.b (Method PM-G)

Power Spectral Density: KDB 789033 D02 v02r01, Section F

Unwanted emissions in restricted bands: KDB 789033 D02 v02r01, Sections G.3, G.5 and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v02r01, Sections G.3 and G.5.

Use of IEEE 802.11 channels that straddle the UNII-1 and UNII-2A bands (5250 MHz): KDB 789033 D02 v02r01, Section III

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. ANTENNA PORT TEST RESULTS

Note – Throughout this section:
Antenna 1 = Chain 0
Antenna 2 = Chain 1

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

5.2 Band

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11a CDD	2.087	2.131	0.979	97.94%	0.09	0.479
802.11n HT20 SDM	3.978	4.024	0.989	98.86%	0.00	0.010
802.11n HT40 SDM	3.9780	4.0240	0.989	98.86%	0.00	0.010
802.11ac VHT80 SDM	3.9660	4.0120	0.989	98.85%	0.00	0.010

5.3 Band

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11a CDD	2.086	2.132	0.978	97.84%	0.09	0.479
802.11n HT20 SDM	3.976	4.022	0.989	98.86%	0.00	0.010
802.11n HT40 SDM	3.9810	4.0320	0.987	98.74%	0.00	0.010
802.11ac VHT80 SDM	3.9710	4.0140	0.989	98.93%	0.00	0.010
802.11ac VHT160 SDM	3.9600	4.0030	0.989	98.93%	0.00	0.010

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

DUTY CYCLE PLOTS – 5.2 Band

DUTY CYCLE 802.11a CDD MODE

DUTY CYCLE 802.11n HT20 SDM MODE

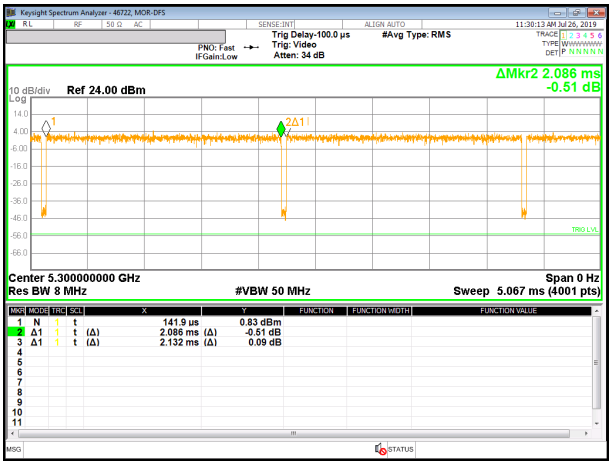
DUTY CYCLE 802.11n HT40 SDM MODE

DUTY CYCLE 802.11ac VHT80 SDM MODE

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

DUTY CYCLE PLOTS – 5.3 Band



DUTY CYCLE 802.11a CDD MODE

DUTY CYCLE 802.11n HT20 SDM MODE

DUTY CYCLE 802.11n HT40 SDM MODE

DUTY CYCLE 802.11ac VHT80 SDM MODE

DUTY CYCLE 802.11ac VHT160 SDM MODE

Intentionally Left Blank

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

9.2. 26 dB BANDWIDTH

LIMITS

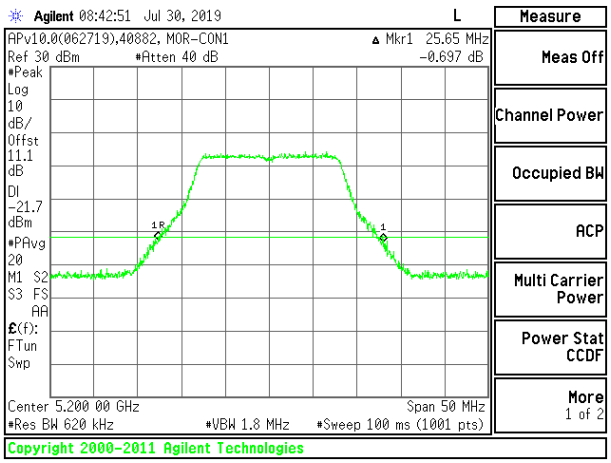
None; for reporting purposes only.

9.2.1. 802.11a MODE IN THE 5.2 GHz BAND

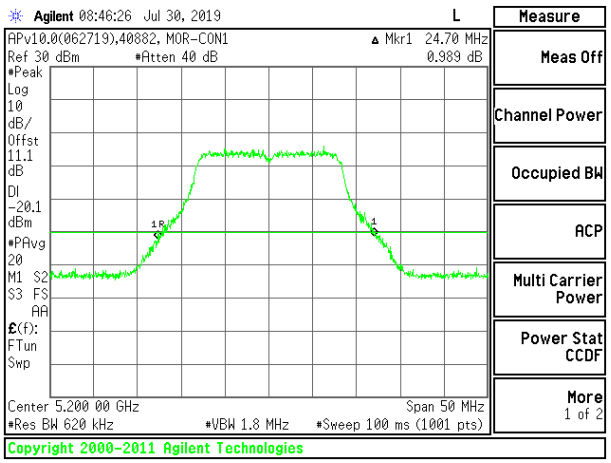
2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 1 (MHz)	26 dB Bandwidth Antenna 2 (MHz)
Low	5180	25.20	25.00
Mid	5200	25.65	24.70
High	5240	25.15	25.60

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 2

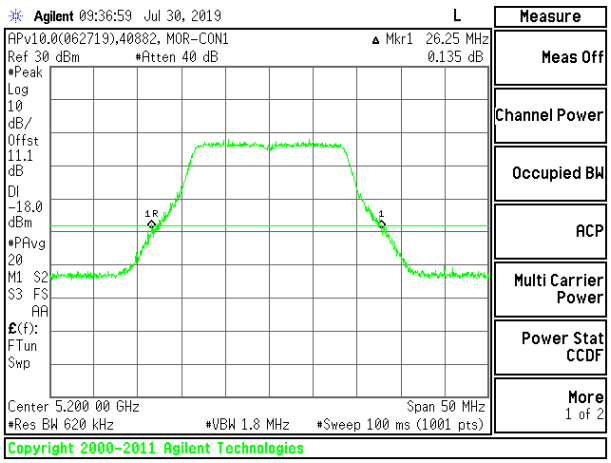
This report shall not be reproduced except in full, without the written approval of UL LLC

9.2.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

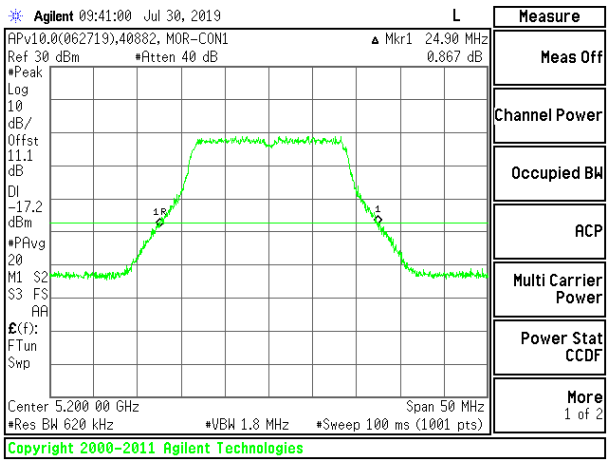
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 1 (MHz)	26 dB Bandwidth Antenna 2 (MHz)
Low	5180	26.05	24.65
Mid	5200	26.25	24.90
High	5240	25.65	25.15

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 2

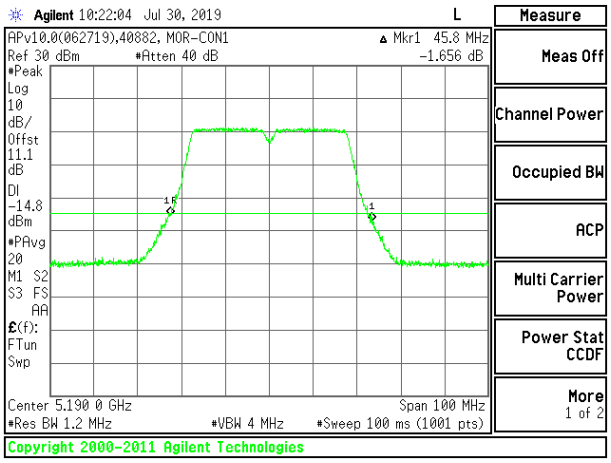
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.2.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

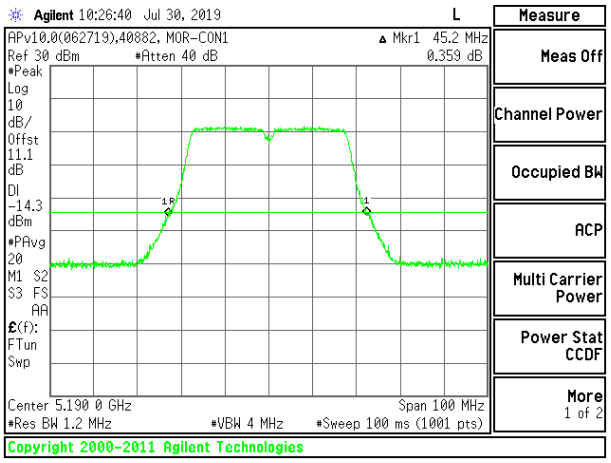
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 1 (MHz)	26 dB Bandwidth Antenna 2 (MHz)
Low	5190	45.80	45.20
High	5230	45.30	44.90

LOW CHANNEL



LOW CHANNEL ANTENNA 1



LOW CHANNEL ANTENNA 2

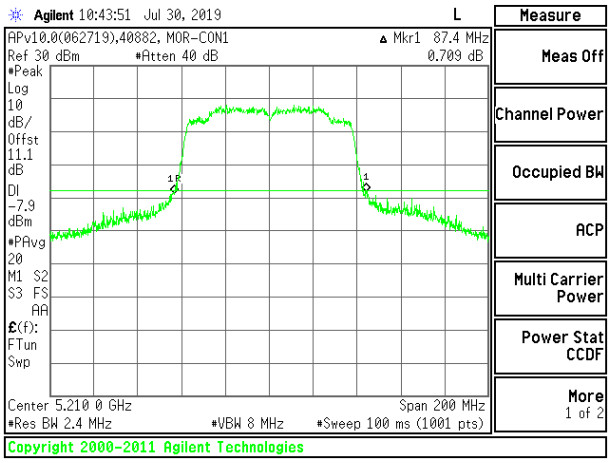
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.2.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

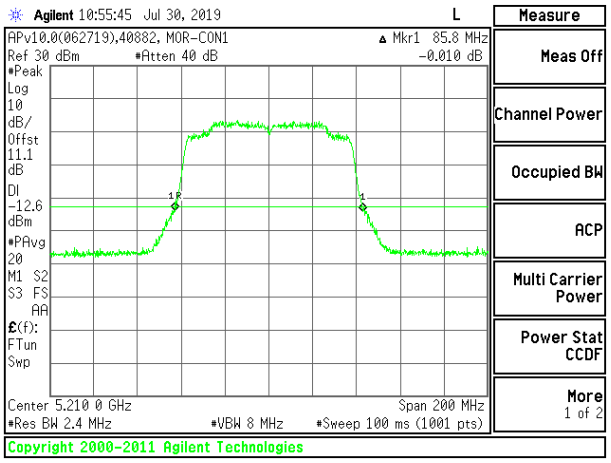
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 1 (MHz)	26 dB Bandwidth Antenna 2 (MHz)
Mid	5210	87.40	85.80

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 2

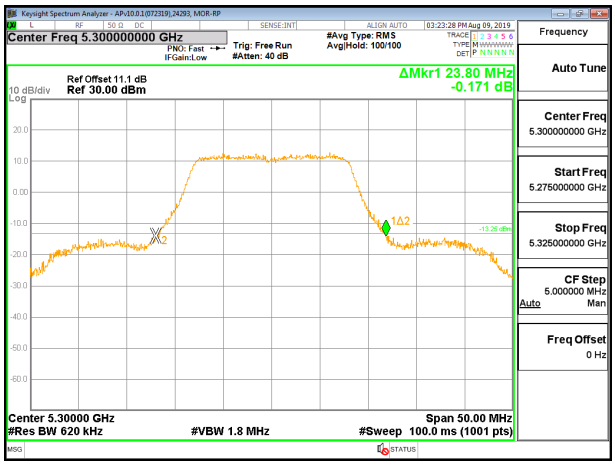
This report shall not be reproduced except in full, without the written approval of UL LLC

9.2.5. 802.11a MODE IN THE 5.3 GHz BAND

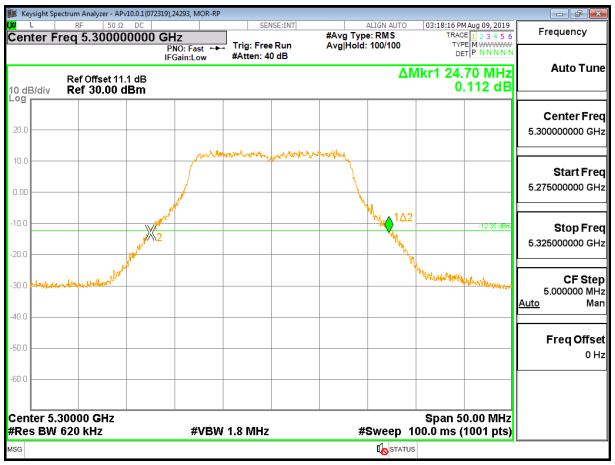
2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 1 (MHz)	26 dB Bandwidth Antenna 2 (MHz)
Low	5260	25.10	24.85
Mid	5300	23.80	24.70
High	5320	25.25	24.90

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 2

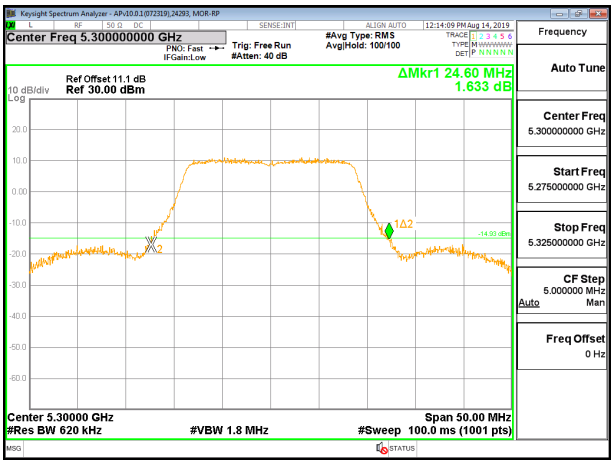
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.2.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

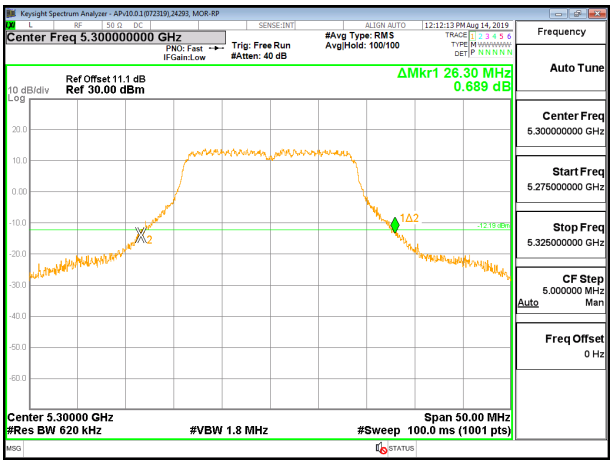
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 1 (MHz)	26 dB Bandwidth Antenna 2 (MHz)
Low	5260	26.30	29.30
Mid	5300	24.60	26.30
High	5320	26.25	28.20

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 2

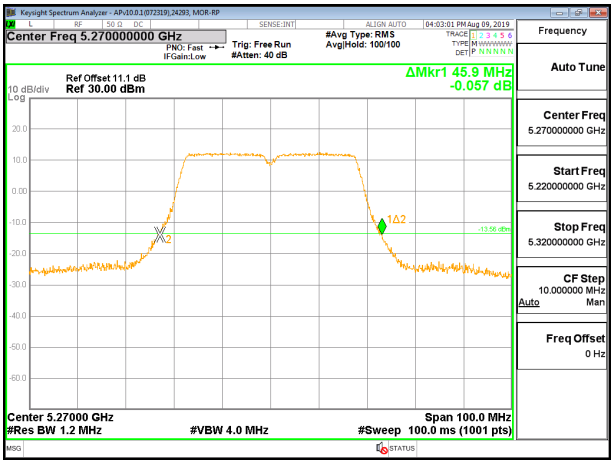
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.2.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

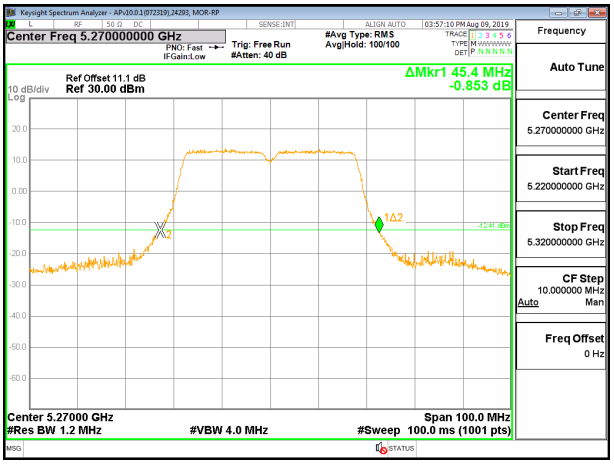
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 1 (MHz)	26 dB Bandwidth Antenna 2 (MHz)
Low	5270	45.90	45.40
High	5310	46.20	46.60

LOW CHANNEL



LOW CHANNEL ANTENNA 1



LOW CHANNEL ANTENNA 2

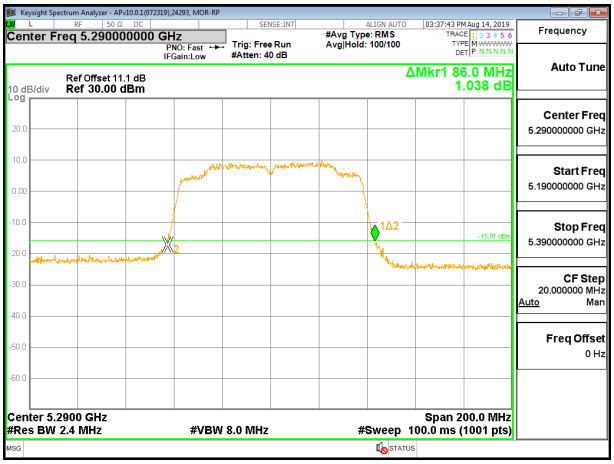
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.2.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

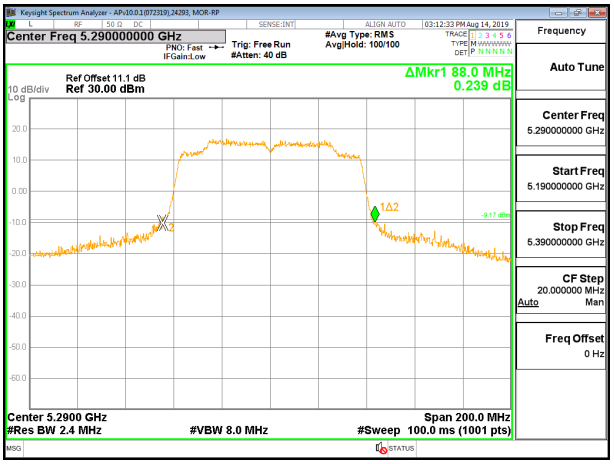
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 1 (MHz)	26 dB Bandwidth Antenna 2 (MHz)
Mid	5290	86.00	88.00

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 2

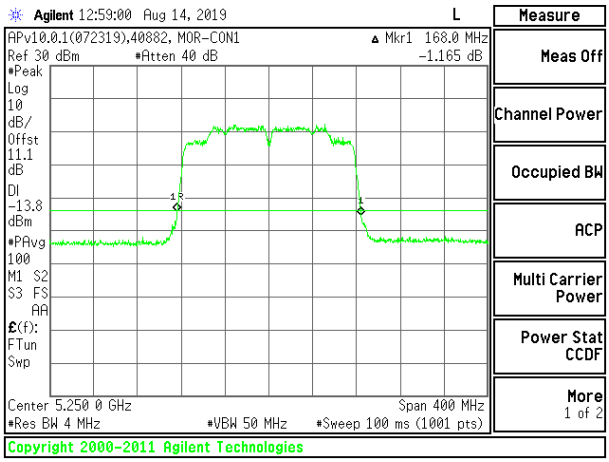
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.2.9. 802.11ac VHT160 MODE IN THE 5.2/5.3 GHz BAND

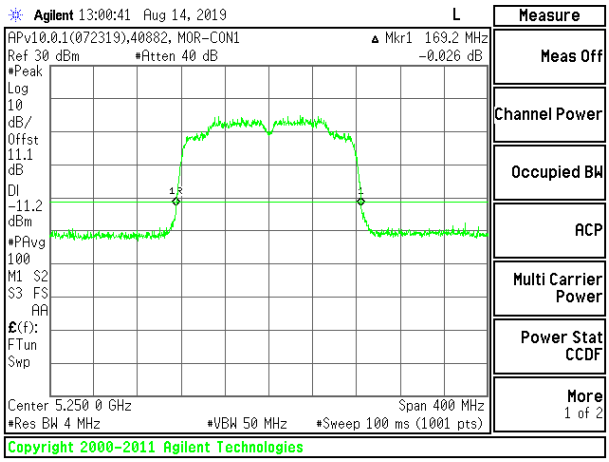
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 1 (MHz)	26 dB Bandwidth Antenna 2 (MHz)
Mid	5250	168.00	169.20

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 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

9.3. 99% BANDWIDTH

LIMITS

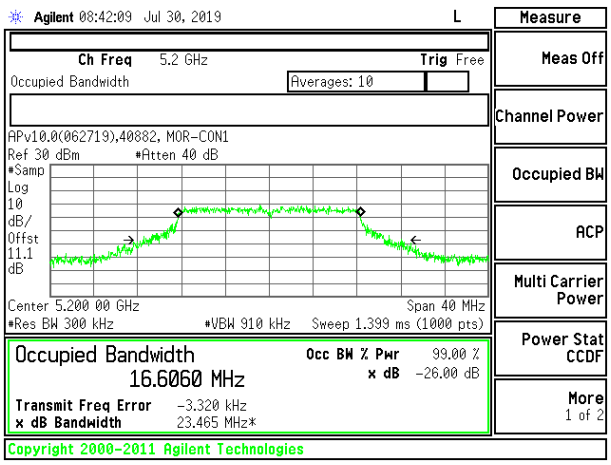
None; for reporting purposes only.

9.3.1. 802.11a MODE IN THE 5.2 GHz BAND

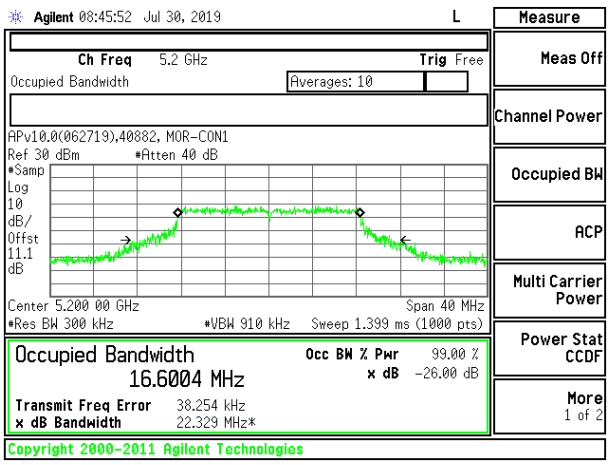
2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 1 (MHz)	99% Bandwidth Antenna 2 (MHz)
Low	5180	16.6236	16.6444
Mid	5200	16.6060	16.6004
High	5240	16.6598	16.7548

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 2

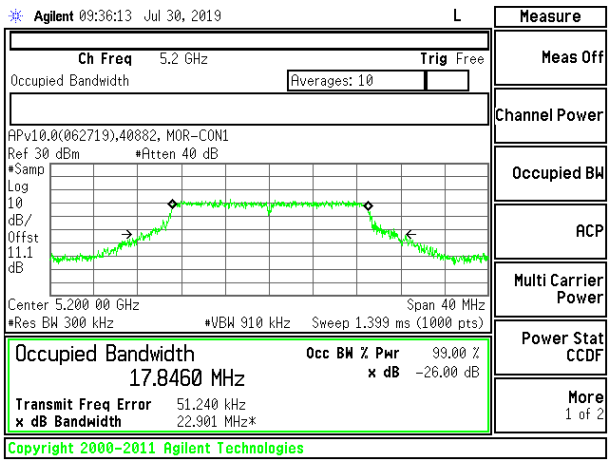
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.3.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

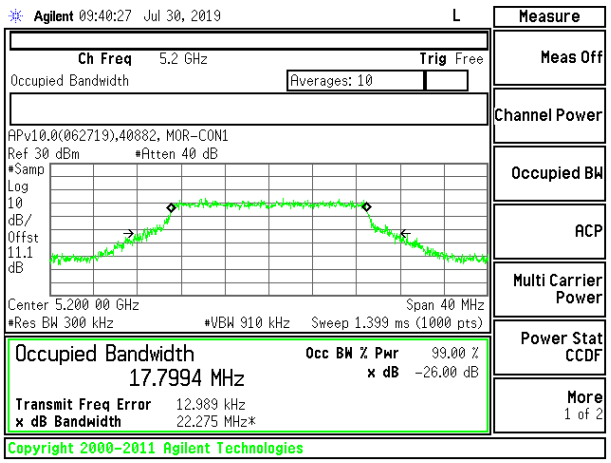
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 1 (MHz)	99% Bandwidth Antenna 2 (MHz)
Low	5180	17.8413	17.8006
Mid	5200	17.8460	17.7994
High	5240	17.8015	17.8714

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 2

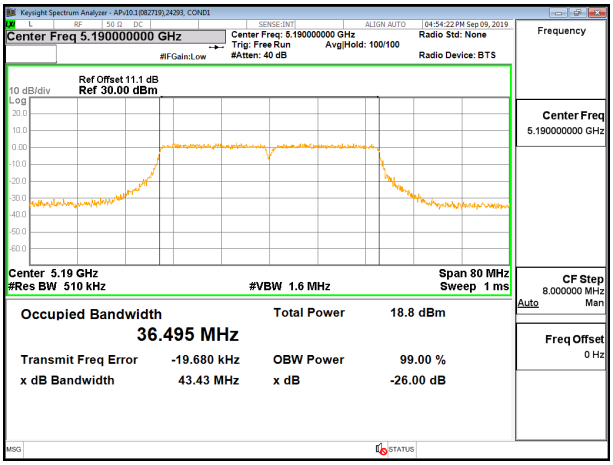
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.3.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

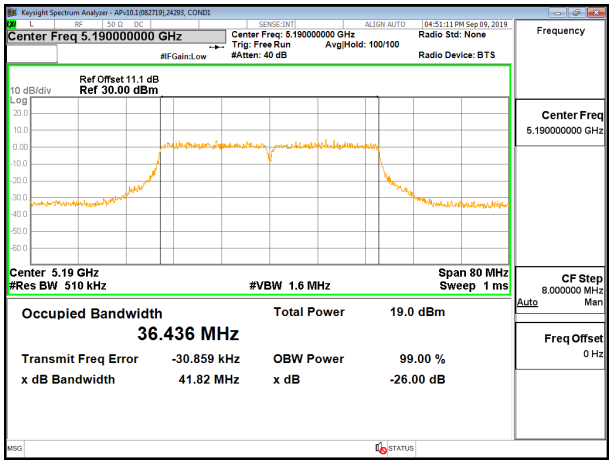
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 1 (MHz)	99% Bandwidth Antenna 2 (MHz)
Low	5190	36.495	36.436
High	5230	36.443	36.493

LOW CHANNEL



LOW CHANNEL ANTENNA 1



LOW CHANNEL ANTENNA 2

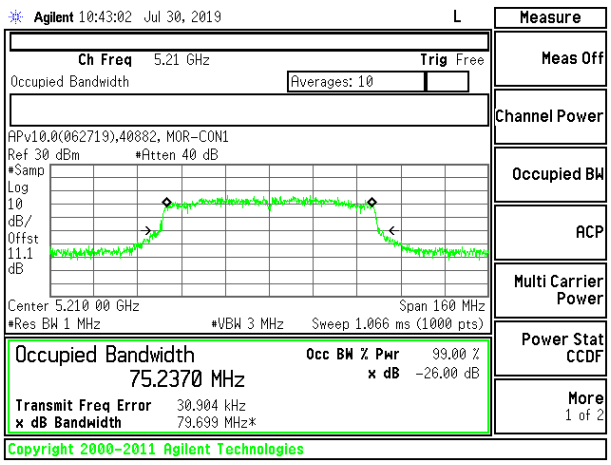
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.3.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

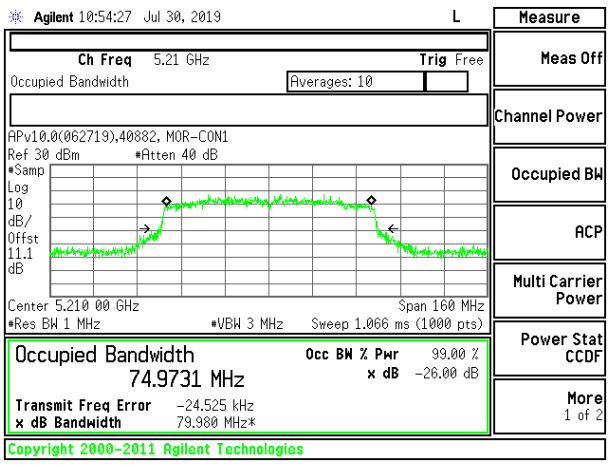
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 1 (MHz)	99% Bandwidth Antenna 2 (MHz)
Mid	5210	75.2370	74.9731

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 2

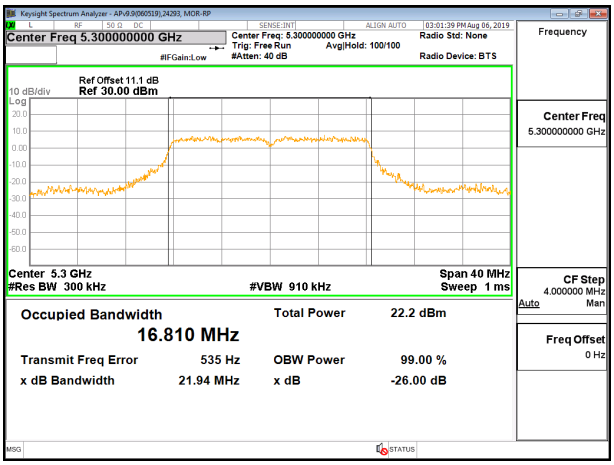
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.3.5. 802.11a MODE IN THE 5.3 GHz BAND

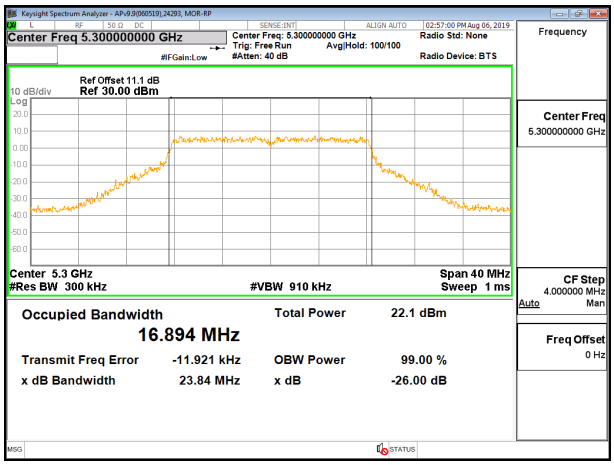
2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 1 (MHz)	99% Bandwidth Antenna 2 (MHz)
Low	5260	16.9160	16.8400
Mid	5300	16.8100	16.8940
High	5320	16.9480	16.8930

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 2

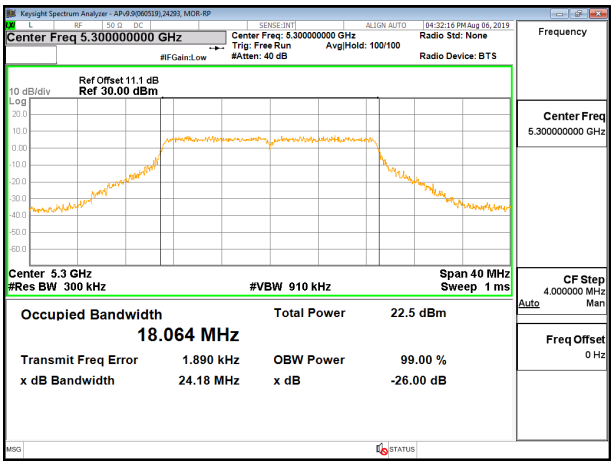
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.3.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

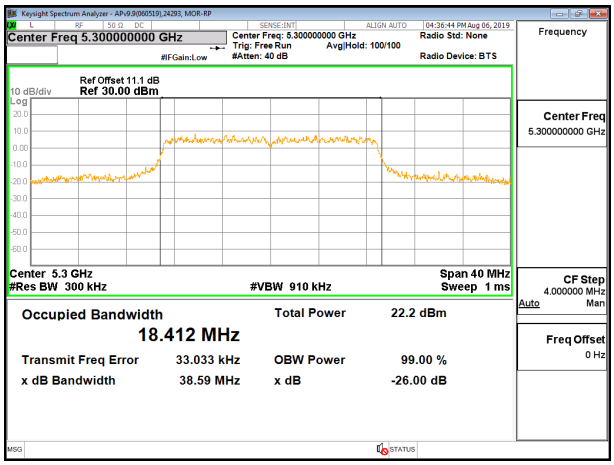
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 1 (MHz)	99% Bandwidth Antenna 2 (MHz)
Low	5260	18.1300	17.9830
Mid	5300	18.0640	18.4120
High	5320	17.9800	17.9120

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 2

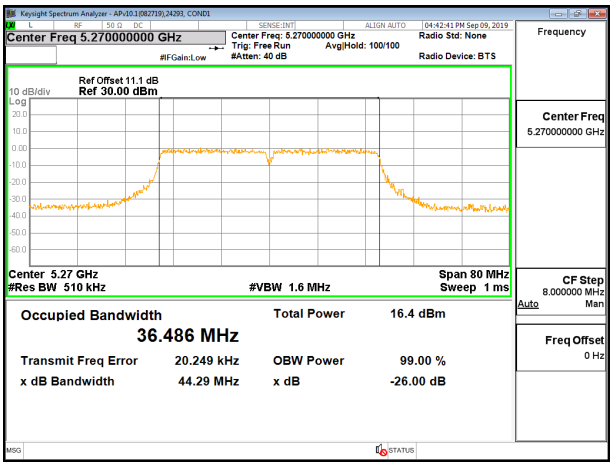
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.3.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

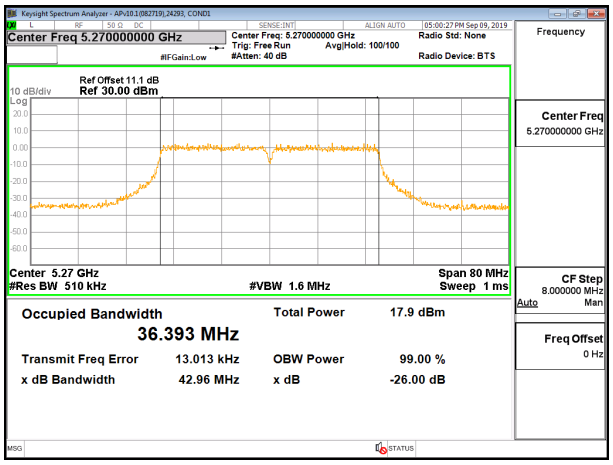
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 1 (MHz)	99% Bandwidth Antenna 2 (MHz)
Low	5270	36.486	36.393
High	5310	36.451	36.603

LOW CHANNEL



LOW CHANNEL ANTENNA 1



LOW CHANNEL ANTENNA 2

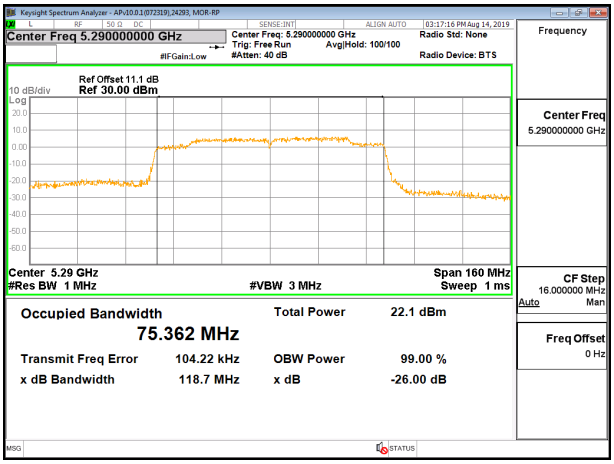
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.3.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

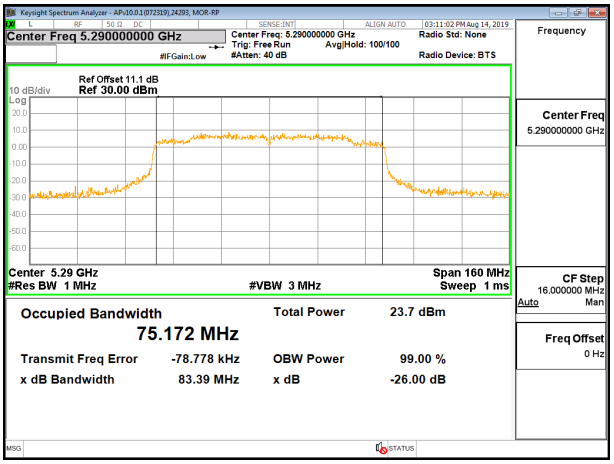
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 1 (MHz)	99% Bandwidth Antenna 2 (MHz)
Mid	5290	75.3620	75.1720

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 2

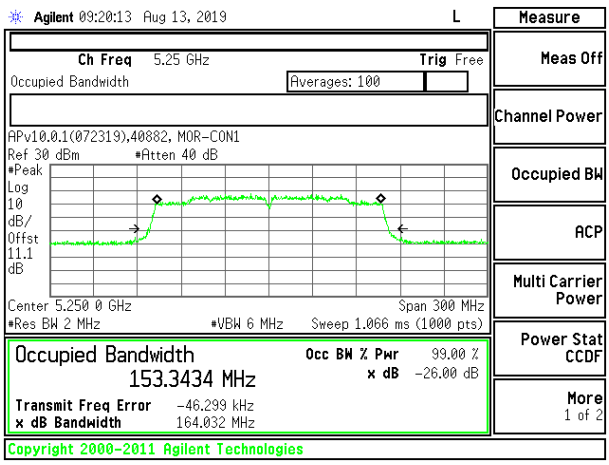
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

9.3.9. 802.11ac VHT160 MODE IN THE 5.2/5.3 GHz BAND

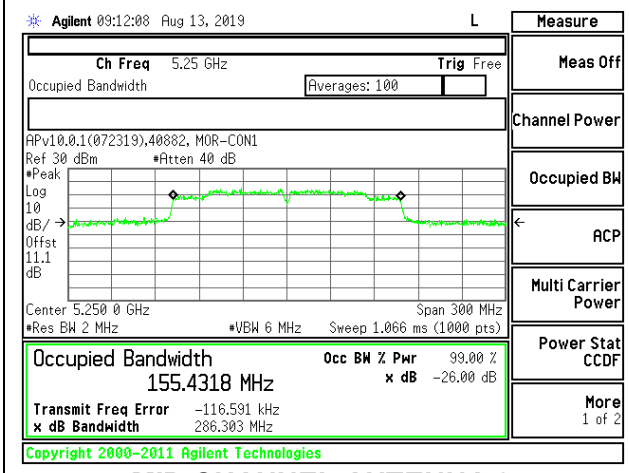
2TX Antenna 1 + Antenna 2 SDM MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 1 (MHz)	99% Bandwidth Antenna 2 (MHz)
Mid	5250	153.3434	155.4318

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 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

9.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407

Band 5.15–5.25 GHz

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Bands 5.25-5.35 GHz and 5.47-5.725 GHz
The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Band 5.725-5.85 GHz

The maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

RSS-247

Band 5.15-5.25 GHz
The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

Band 5.25-5.35 GHz
The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

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

Bands 5.47-5.6 GHz and 5.65-5.725 GHz
The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Band 5.725-5.85 GHz
The maximum conducted output power shall not exceed 1 W. The power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

TEST PROCEDURE

The measurement method used for output power is KDB 789033 D02 v02r01, Section E.3.b (Method PM-G).

The measurement method used for power spectral density is KDB 789033 D02 v02r01, Section F.

Note - SISO and MIMO per chain power are set to the same level.

DIRECTIONAL ANTENNA GAIN

For 2 TX:

Tx chains are uncorrelated for power and correlated for PSD for CDD MIMO mode and uncorrelated for both power and PSD for SDM MIMO mode. The directional gains are as follows:

Band (GHz)	Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
1868				
5.2	3.6	2.2	2.96	5.94
5.3	5.2	3.5	4.43	7.40
1867				
5.2	4.9	4.4	4.66	7.66
5.3	6.1	5.0	5.58	8.58

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

9.4.1. 802.11a MODE IN THE 5.2 GHz BAND

2TX Antenna 1 + Antenna 2 CDD MODE (FCC+IC)

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)
Low	5180	16.6236	4.66	7.66
Mid	5200	16.6004	4.66	7.66
High	5240	16.6598	4.66	7.66

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	ISED EIRP Limit (dBm)	Max ISED Power (dBm)	Power Limit (dBm)	FCC PSD Limit (dBm/1MHz)	ISED eirp PSD Limit (dBm/1MHz)	PSD Limit (dBm/1MHz)
Low	5180	24.00	22.21	17.55	17.55	9.34	10.00	2.34
Mid	5200	24.00	22.20	17.54	17.54	9.34	10.00	2.34
High	5240	24.00	22.22	17.56	17.56	9.34	10.00	2.34

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd PSD

Output Power Results

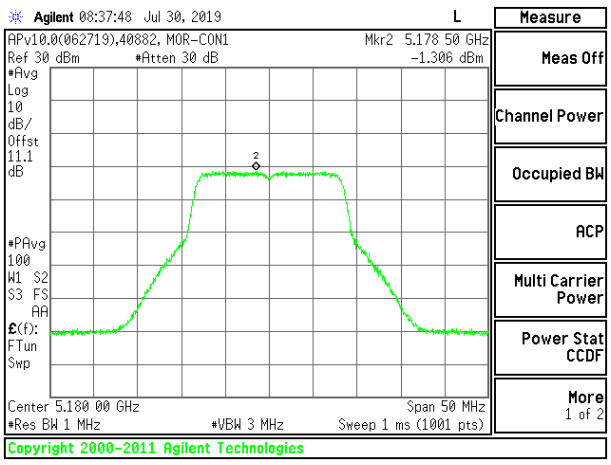
Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	9.46	9.64	12.56	17.55	-4.99
Mid	5200	9.64	9.64	12.65	17.54	-4.89
High	5240	9.58	9.52	12.56	17.56	-5.00

PSD Results

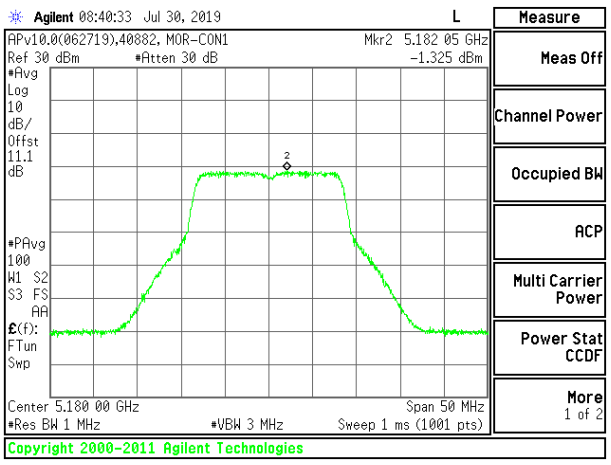
Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/1MHz)	Antenna 2 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5180	-1.31	-1.33	1.78	2.34	-0.56
Mid	5200	-1.20	-1.21	1.89	2.34	-0.45
High	5240	-1.25	-1.35	1.80	2.34	-0.54

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

LOW CHANNEL

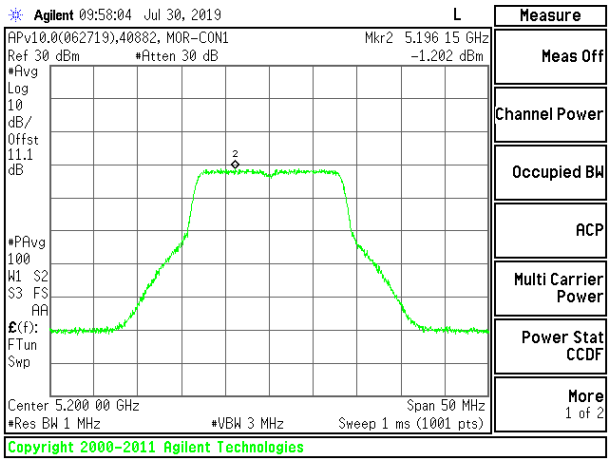


LOW CHANNEL ANTENNA 1

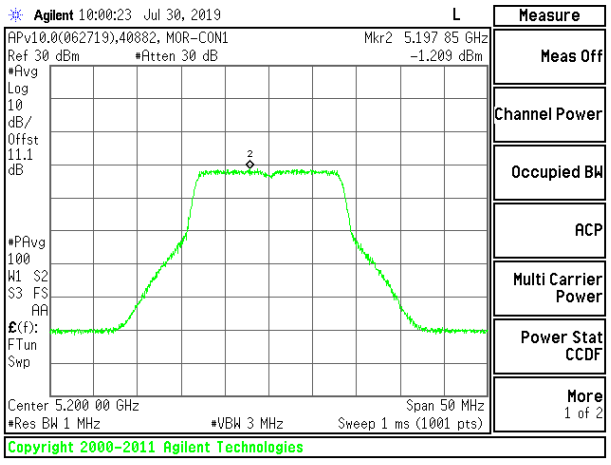


LOW CHANNEL ANTENNA 2

MID CHANNEL



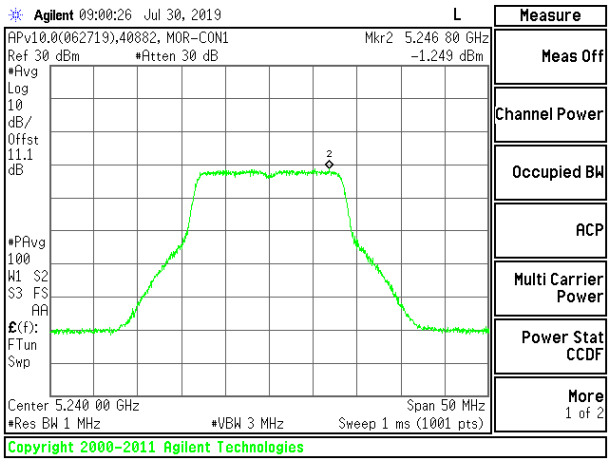
MID CHANNEL ANTENNA 1



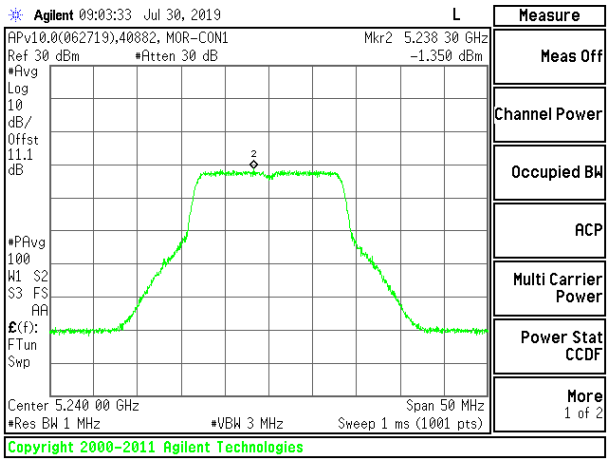
MID CHANNEL ANTENNA 2

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

HIGH CHANNEL



HIGH CHANNEL ANTENNA 1



HIGH CHANNEL ANTENNA 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

9.4.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE (FCC+IC)

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)
Low	5180	17.8006	4.66	4.66
Mid	5200	17.7994	4.66	4.66
High	5240	17.8015	4.66	4.66

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	ISED EIRP Limit (dBm)	Max ISED Power (dBm)	Power Limit (dBm)	FCC PSD Limit (dBm/ 1MHz)	ISED eirp PSD Limit (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)
Low	5180	24.00	22.50	17.84	17.84	11.00	10.00	5.34
Mid	5200	24.00	22.50	17.84	17.84	11.00	10.00	5.34
High	5240	24.00	22.50	17.84	17.84	11.00	10.00	5.34

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

Output Power Results

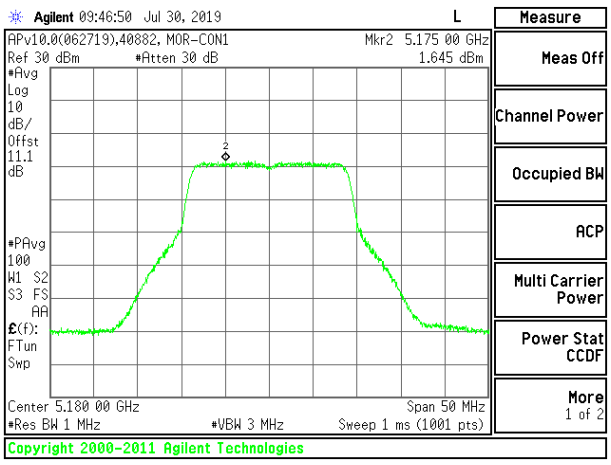
Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	12.60	12.66	15.64	17.84	-2.20
Mid	5200	12.65	12.64	15.66	17.84	-2.19
High	5240	12.62	12.57	15.61	17.84	-2.24

PSD Results

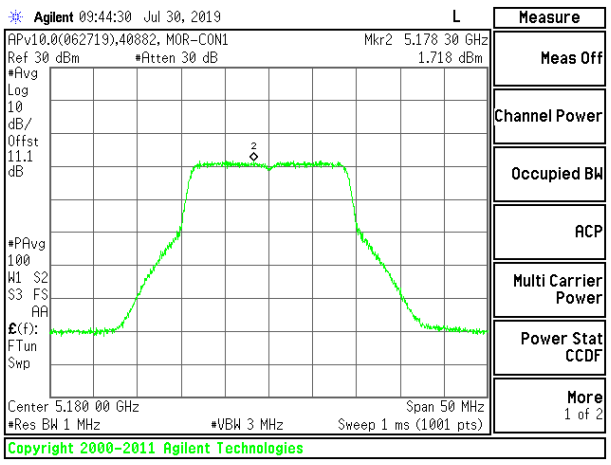
Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/ 1MHz)	Antenna 2 Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	1.65	1.72	4.69	5.34	-0.65
Mid	5200	1.66	1.70	4.69	5.34	-0.65
High	5240	1.52	1.50	4.52	5.34	-0.82

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

LOW CHANNEL

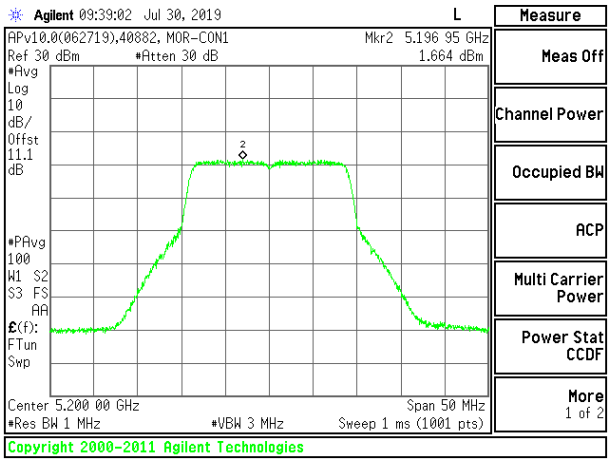


LOW CHANNEL ANTENNA 1

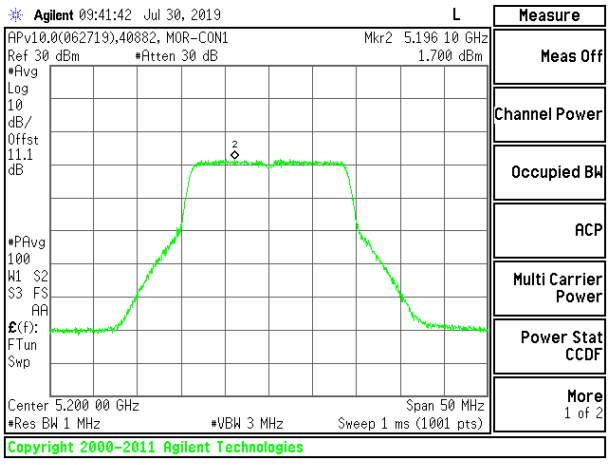


LOW CHANNEL ANTENNA 2

MID CHANNEL



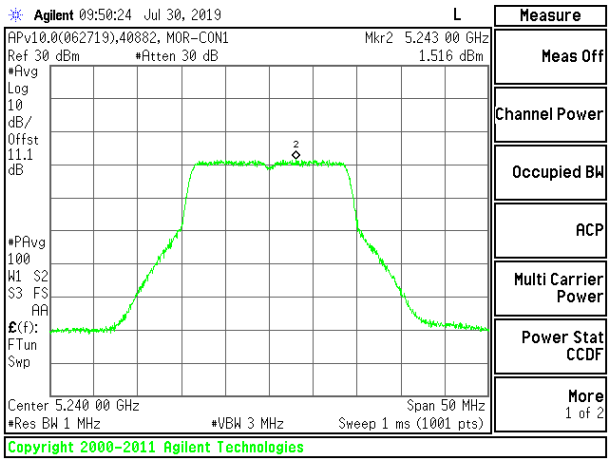
MID CHANNEL ANTENNA 1



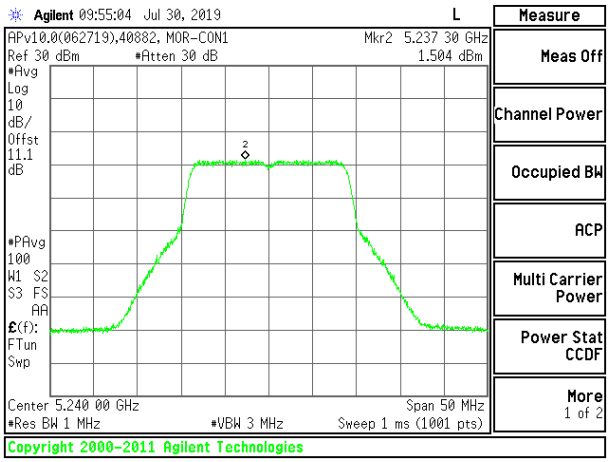
MID CHANNEL ANTENNA 2

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

HIGH CHANNEL



HIGH CHANNEL ANTENNA 1



HIGH CHANNEL ANTENNA 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

9.4.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE (FCC+IC)

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)
Low	5190	36.436	4.66	4.66
High	5230	36.443	4.66	4.66

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	ISED EIRP Limit (dBm)	Max ISED Power (dBm)	Power Limit (dBm)	FCC PSD Limit (dBm/ 1MHz)	ISED eirp PSD Limit (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)
Low	5190	24.00	23.00	18.34	18.34	11.00	10.00	5.34
High	5230	24.00	23.00	18.34	18.34	11.00	10.00	5.34

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

Output Power Results

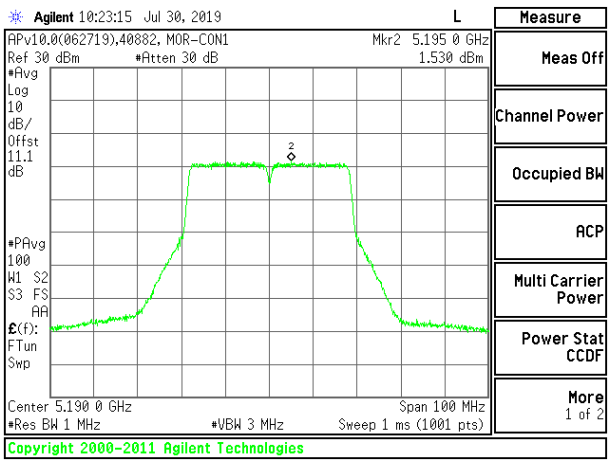
Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	14.40	14.38	17.40	18.34	-0.94
High	5230	14.38	14.33	17.37	18.34	-0.97

PSD Results

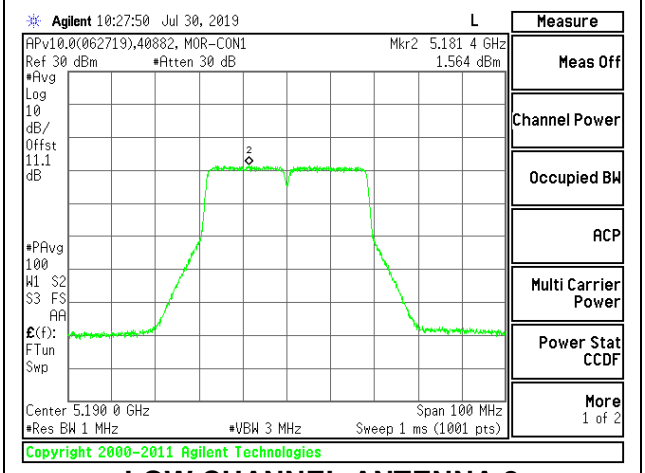
Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/ 1MHz)	Antenna 2 Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5190	1.53	1.56	4.56	5.34	-0.78
High	5230	1.50	1.48	4.50	5.34	-0.84

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

LOW CHANNEL

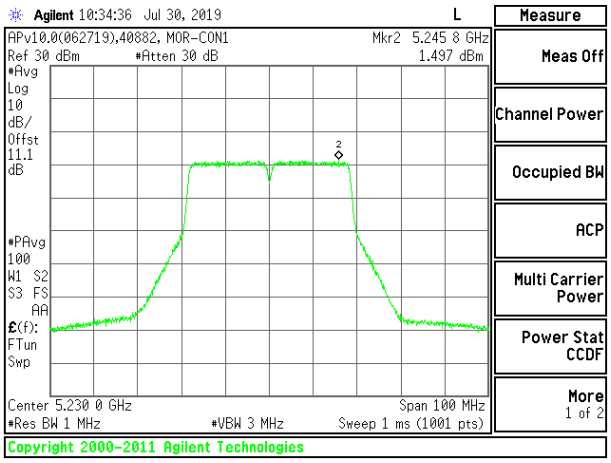


LOW CHANNEL ANTENNA 1

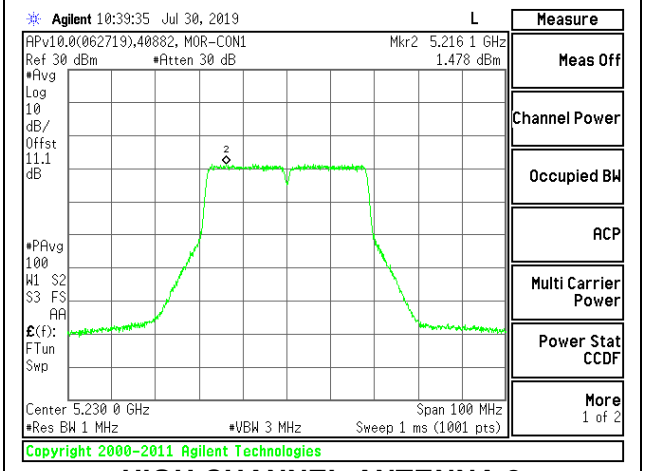


LOW CHANNEL ANTENNA 2

HIGH CHANNEL



HIGH CHANNEL ANTENNA 1



HIGH CHANNEL ANTENNA 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

9.4.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE (FCC+IC)

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)
Mid	5210	74.9731	4.66	4.66

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	ISED EIRP Limit (dBm)	Max ISED Power (dBm)	Power Limit (dBm)	FCC PSD Limit (dBm/ 1MHz)	ISED eirp PSD Limit (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)
Mid	5210	24.00	23.00	18.34	18.34	11.00	10.00	5.34

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD

Output Power Results

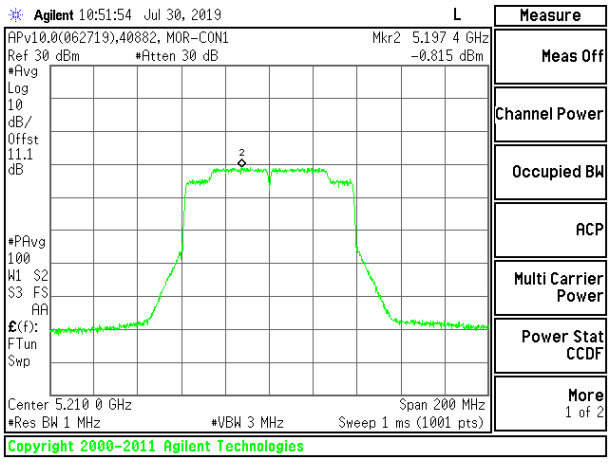
Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	14.46	14.32	17.40	18.34	-0.94

PSD Results

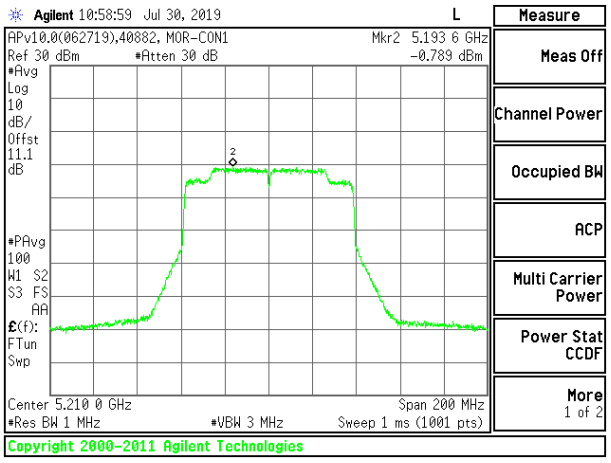
Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/ 1MHz)	Antenna 2 Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Mid	5210	-0.82	-0.79	2.21	5.34	-3.13

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



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 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

9.4.5. 802.11a MODE IN THE 5.3 GHz BAND

2TX Antenna 1 + Antenna 2 CDD MODE (FCC)

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5260	24.85	5.58	8.58	24.00	8.42
Mid	5300	23.80	5.58	8.58	24.00	8.42
High	5320	24.90	5.58	8.58	24.00	8.42

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd PSD

Output Power Results

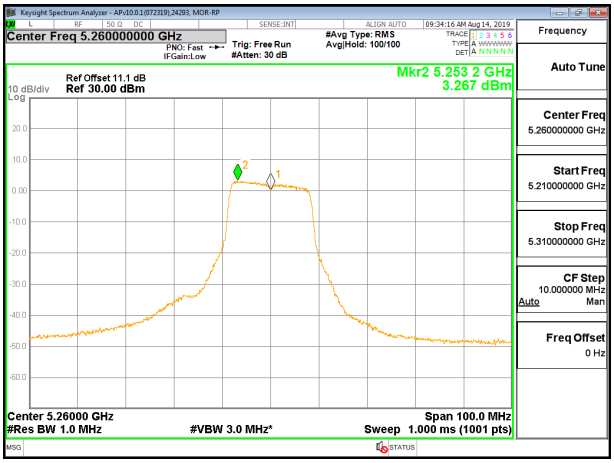
Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	16.35	16.36	19.37	24.00	-4.63
Mid	5300	16.39	16.37	19.39	24.00	-4.61
High	5320	16.51	16.40	19.47	24.00	-4.53

PSD Results

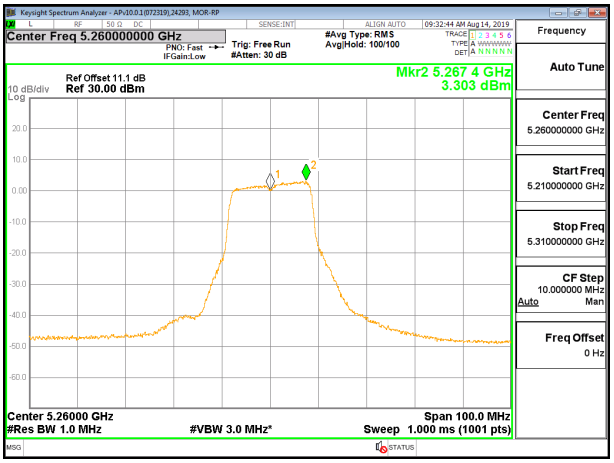
Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/1MHz)	Antenna 2 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5260	3.27	3.30	6.39	8.42	-2.03
Mid	5300	1.19	1.61	4.51	8.42	-3.91
High	5320	0.26	0.32	3.39	8.42	-5.03

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

LOW CHANNEL

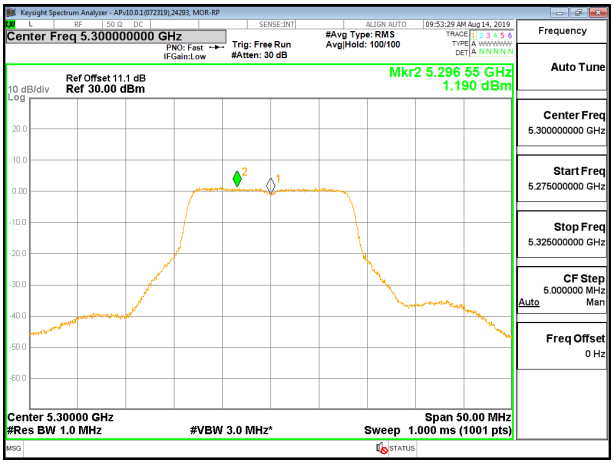


LOW CHANNEL ANTENNA 1

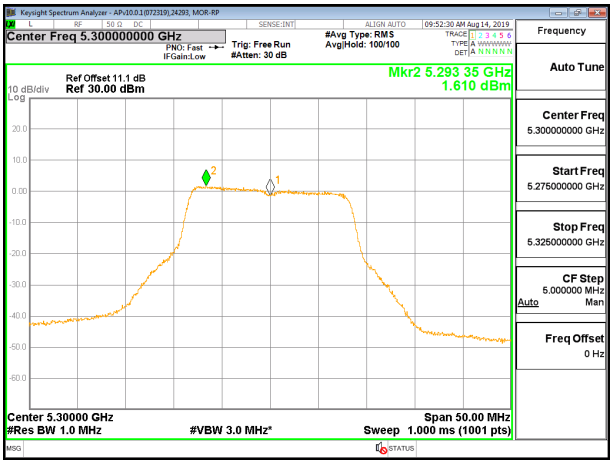


LOW CHANNEL ANTENNA 2

MID CHANNEL



MID CHANNEL ANTENNA 1

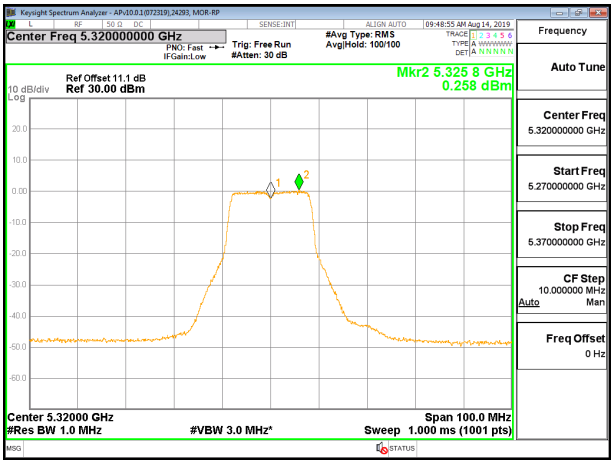


MID CHANNEL ANTENNA 2

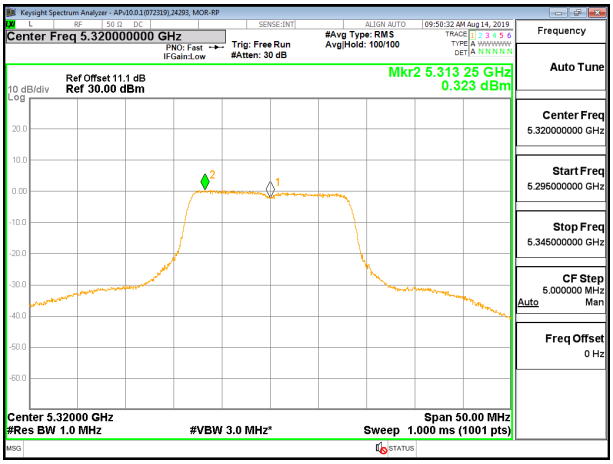
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA
TEL:(919) 549-1400

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

HIGH CHANNEL



HIGH CHANNEL ANTENNA 1



HIGH CHANNEL ANTENNA 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

2TX Antenna 1 + Antenna 2 CDD MODE (IC)

Power

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5260	16.8400	5.58	8.58	23.26	11.00
Mid	5300	16.8100	5.58	8.58	23.26	11.00
High	5320	16.8930	5.58	8.58	23.28	11.00

Duty Cycle CF (dB)	0.09	**Included in Calculations of Corr'd PSD**

Output Power Results

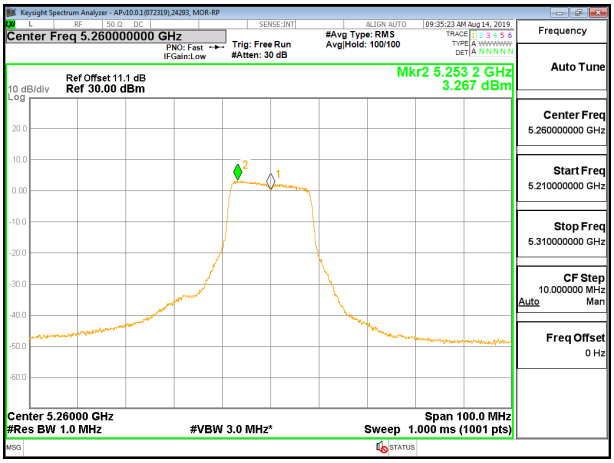
Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	16.35	16.36	19.37	23.26	-3.90
Mid	5300	16.39	16.37	19.39	23.26	-3.87
High	5320	16.51	16.40	19.47	23.28	-3.81

PSD Results

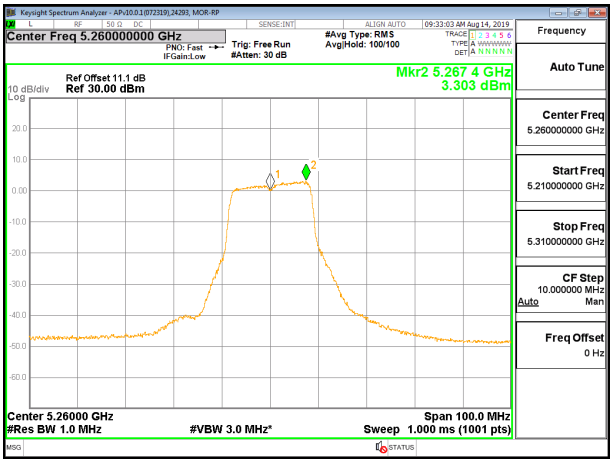
Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/1MHz)	Antenna 2 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5260	3.27	3.30	6.39	11.00	-4.61
Mid	5300	1.19	1.61	4.51	11.00	-6.49
High	5320	0.26	0.32	3.39	11.00	-7.61

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

LOW CHANNEL

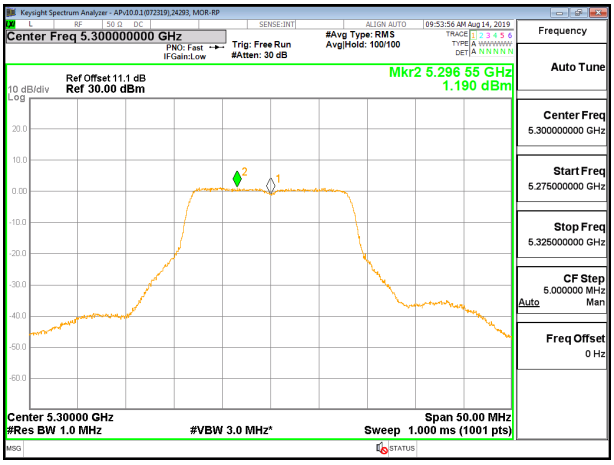


LOW CHANNEL ANTENNA 1

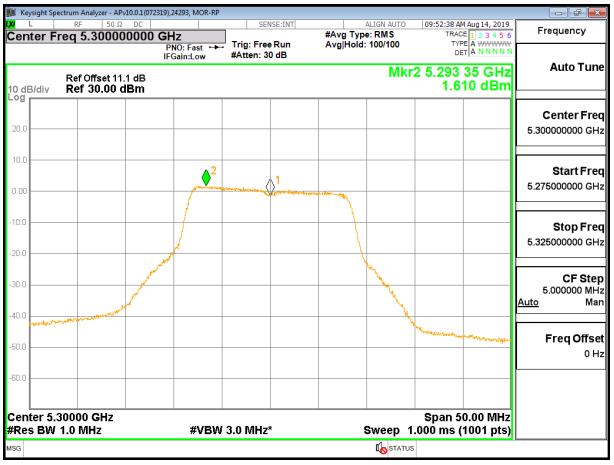


LOW CHANNEL ANTENNA 2

MID CHANNEL



MID CHANNEL ANTENNA 1

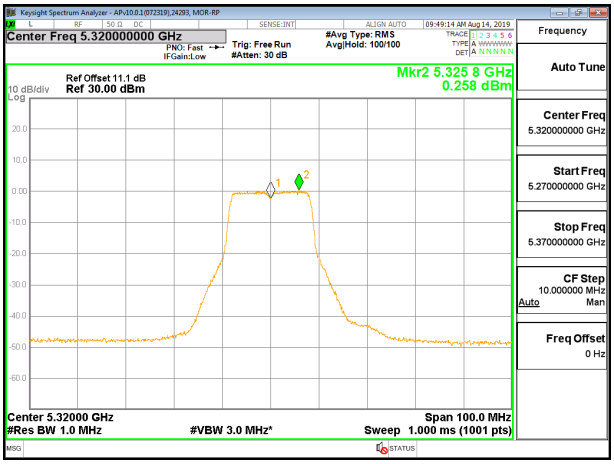


MID CHANNEL ANTENNA 2

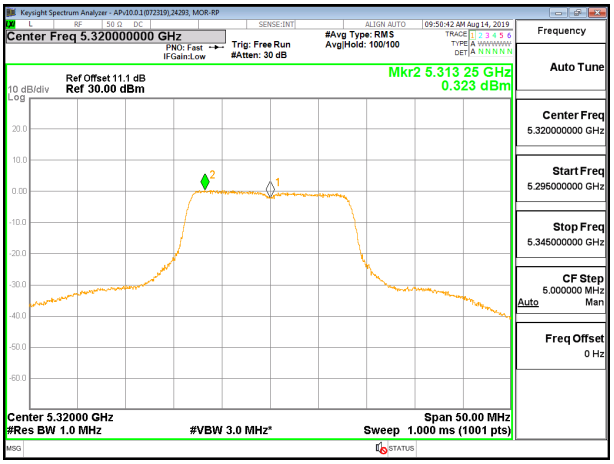
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA
TEL:(919) 549-1400

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

HIGH CHANNEL



HIGH CHANNEL ANTENNA 1



HIGH CHANNEL ANTENNA 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

9.4.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE (FCC)

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5260	26.30	5.58	5.58	24.00	11.00
Mid	5300	24.60	5.58	5.58	24.00	11.00
High	5320	26.25	5.58	5.58	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

Output Power Results

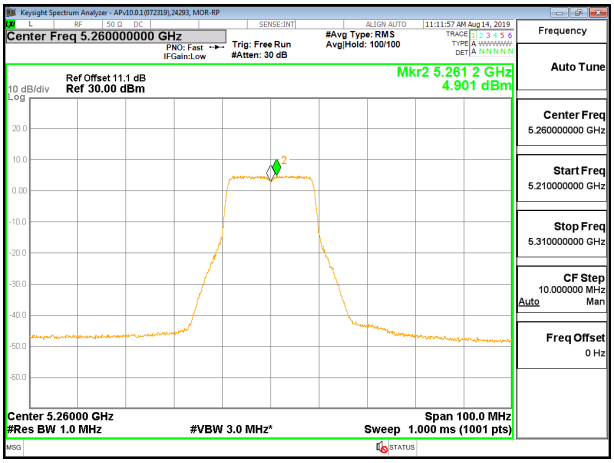
Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	17.86	17.82	20.85	24.00	-3.15
Mid	5300	17.73	17.80	20.78	24.00	-3.22
High	5320	17.84	17.84	20.85	24.00	-3.15

PSD Results

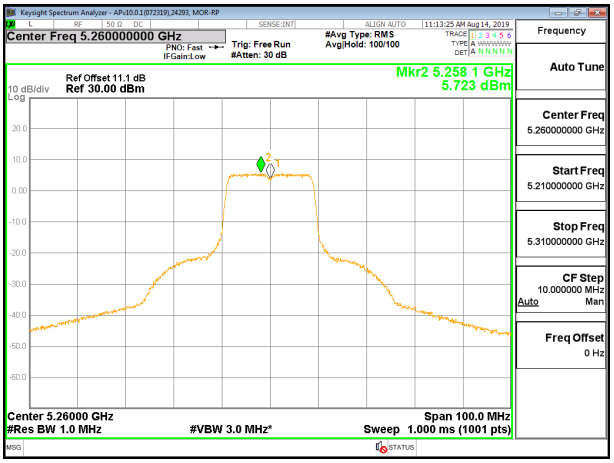
Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/1MHz)	Antenna 2 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5260	4.90	5.72	8.34	11.00	-2.66
Mid	5300	5.06	6.77	9.01	11.00	-1.99
High	5320	4.63	4.76	7.71	11.00	-3.29

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

LOW CHANNEL

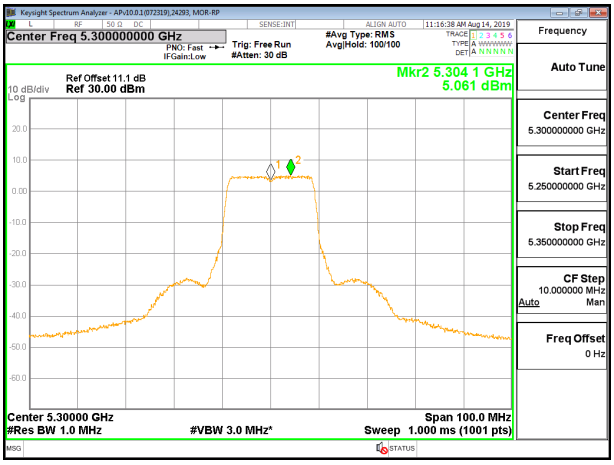


LOW CHANNEL ANTENNA 1

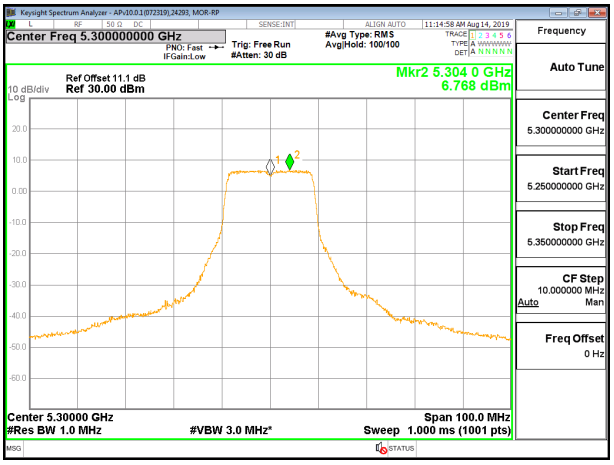


LOW CHANNEL ANTENNA 2

MID CHANNEL



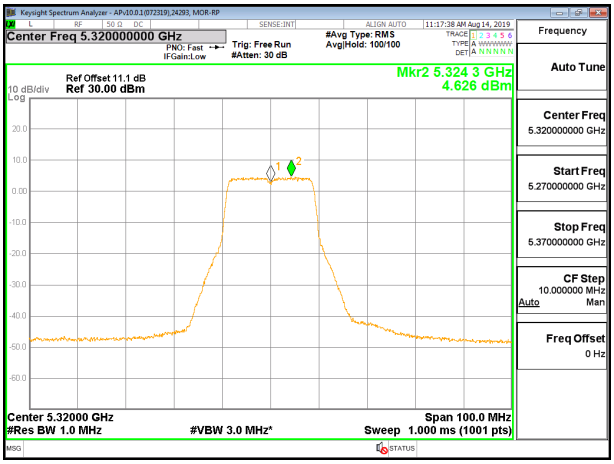
MID CHANNEL ANTENNA 1



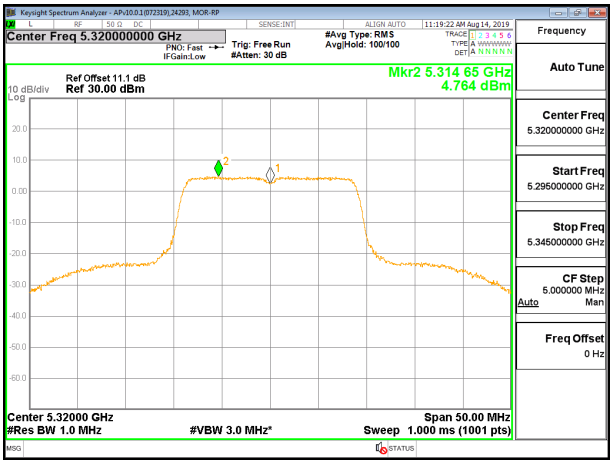
MID CHANNEL ANTENNA 2

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

HIGH CHANNEL



HIGH CHANNEL ANTENNA 1



HIGH CHANNEL ANTENNA 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

2TX Antenna 1 + Antenna 2 SDM MODE (IC)

Power

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5260	17.9830	5.58	5.58	23.55	11.00
Mid	5300	18.0640	5.58	5.58	23.57	11.00
High	5320	17.9120	5.58	5.58	23.53	11.00

Duty Cycle CF (dB)	0.00	**Included in Calculations of Corr'd PSD**

Output Power Results

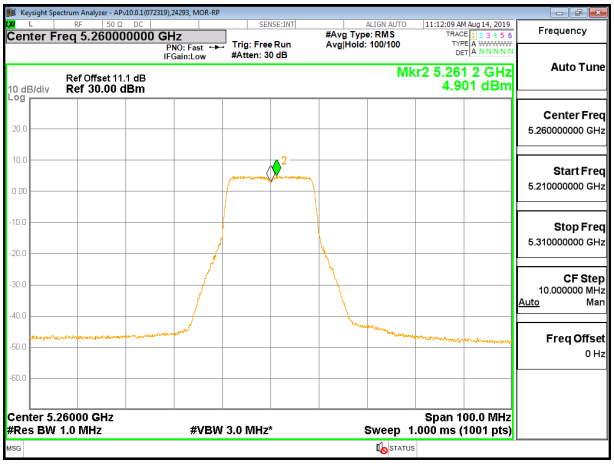
Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	17.86	17.82	20.85	23.55	-2.70
Mid	5300	17.73	17.80	20.78	23.57	-2.79
High	5320	17.84	17.84	20.85	23.53	-2.68

PSD Results

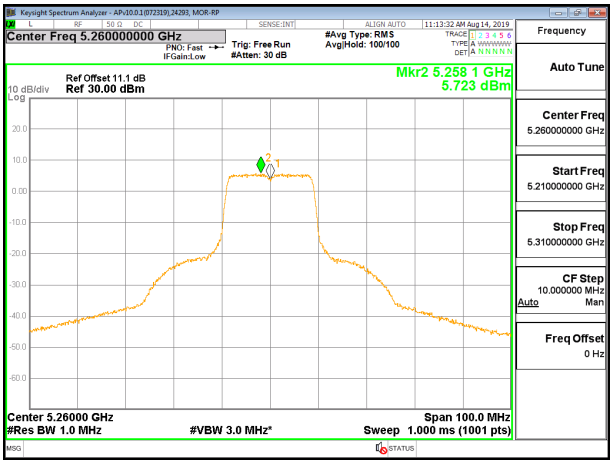
Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/1MHz)	Antenna 2 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5260	4.90	5.72	8.34	11.00	-2.66
Mid	5300	5.06	6.77	9.01	11.00	-1.99
High	5320	4.63	4.76	7.71	11.00	-3.29

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

LOW CHANNEL

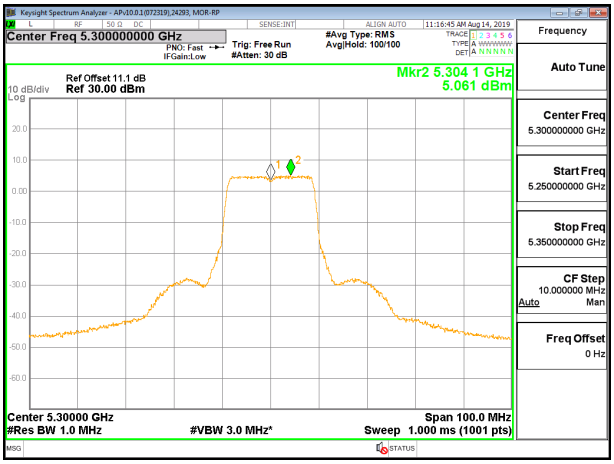


LOW CHANNEL ANTENNA 1

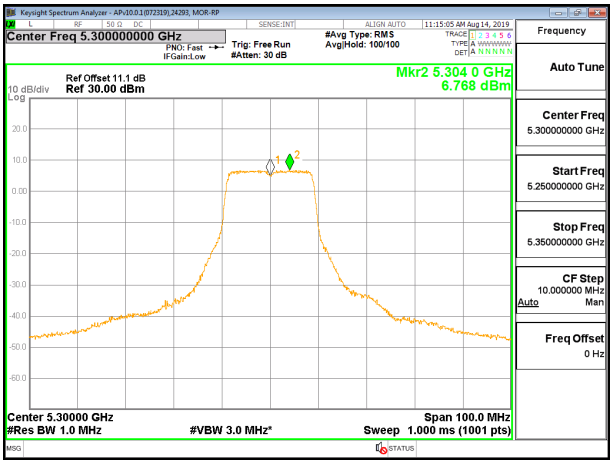


LOW CHANNEL ANTENNA 2

MID CHANNEL



MID CHANNEL ANTENNA 1

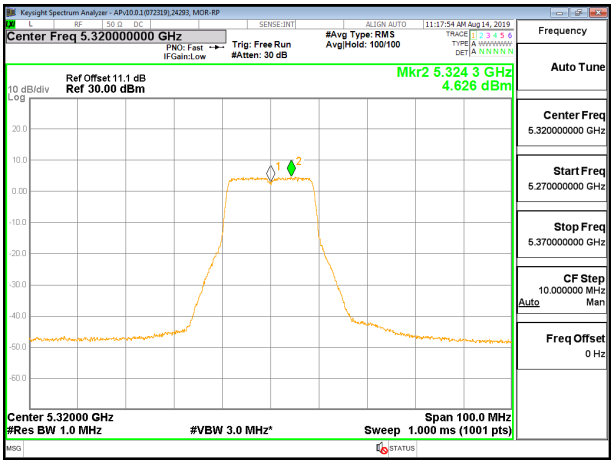


MID CHANNEL ANTENNA 2

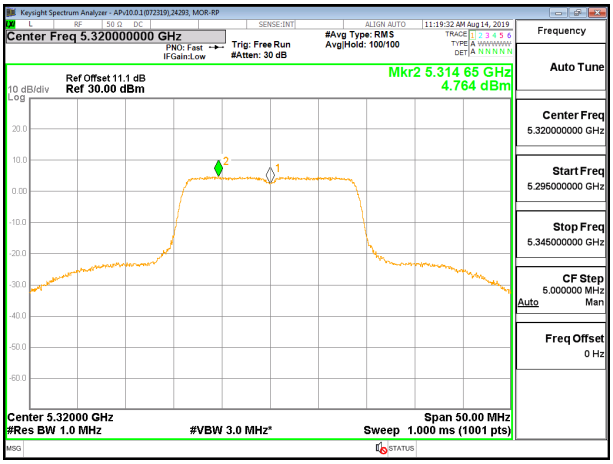
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400

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

HIGH CHANNEL



HIGH CHANNEL ANTENNA 1



HIGH CHANNEL ANTENNA 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

9.4.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE (FCC)

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5270	36.393	5.58	5.58	24.00	11.00
High	5310	36.451	5.58	5.58	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

Output Power Results

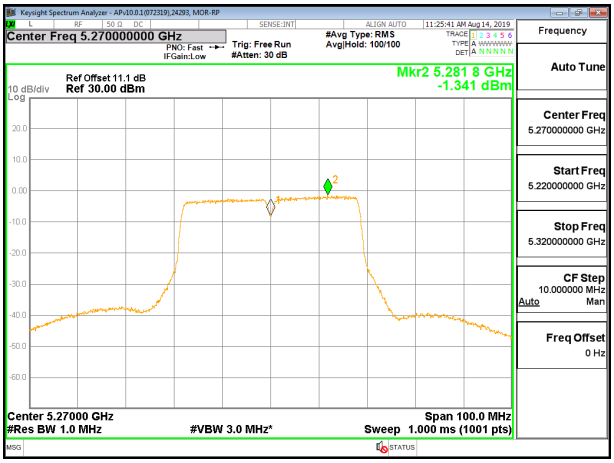
Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	13.34	13.44	16.40	24.00	-7.60
High	5310	13.44	13.34	16.40	24.00	-7.60

PSD Results

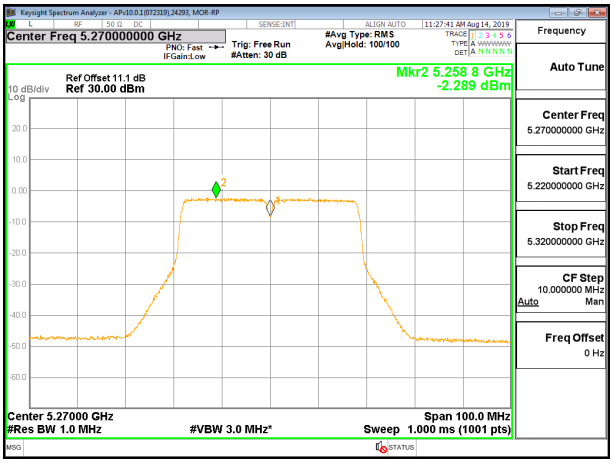
Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/1MHz)	Antenna 2 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5270	-1.34	-2.29	1.22	11.00	-9.78
High	5310	-2.61	-2.50	0.45	11.00	-10.55

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

LOW CHANNEL

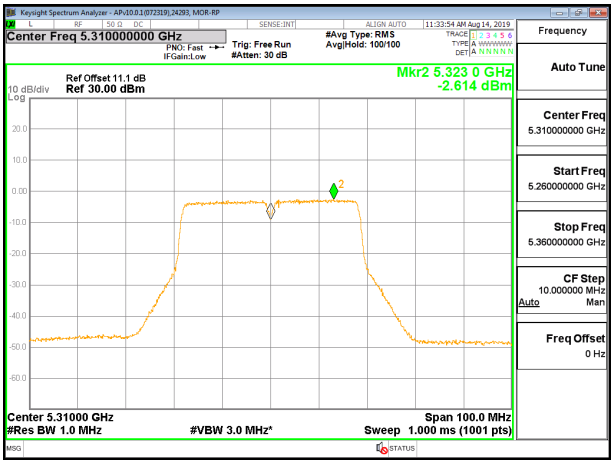


LOW CHANNEL ANTENNA 1

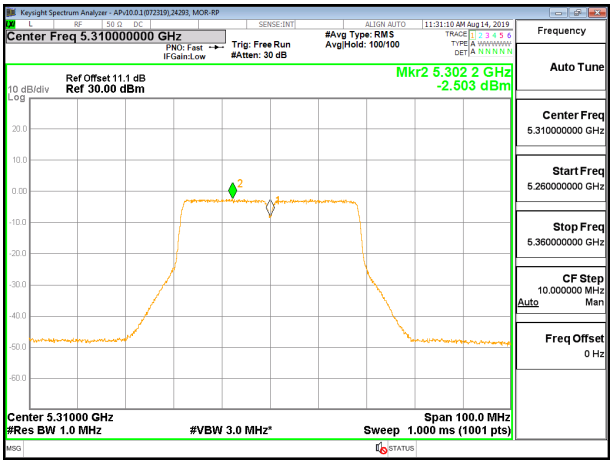


LOW CHANNEL ANTENNA 2

HIGH CHANNEL



HIGH CHANNEL ANTENNA 1



HIGH CHANNEL ANTENNA 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

2TX Antenna 1 + Antenna 2 SDM MODE (IC)

Power

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5270	36.393	5.58	5.58	24.00	11.00
High	5310	36.451	5.58	5.58	24.00	11.00

Duty Cycle CF (dB)	0.00	**Included in Calculations of Corr'd PSD**

Output Power Results

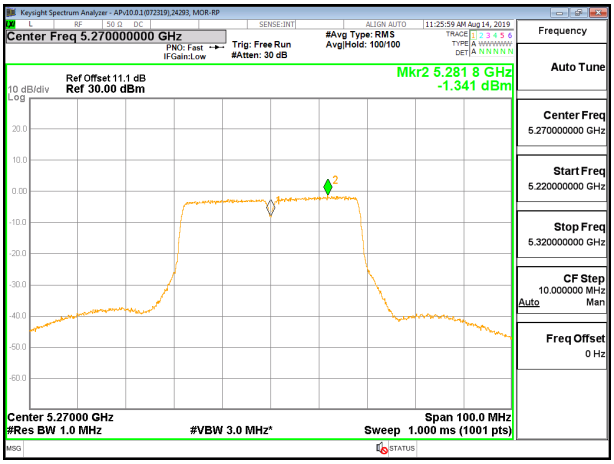
Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	13.34	13.44	16.40	24.00	-7.60
High	5310	13.44	13.34	16.40	24.00	-7.60

PSD Results

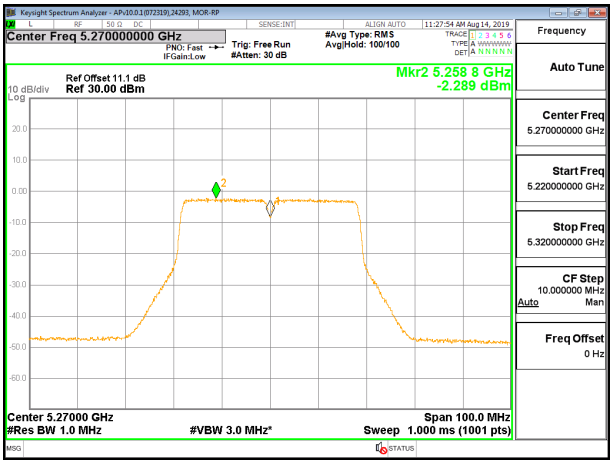
Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/1MHz)	Antenna 2 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5270	-1.34	-2.29	1.22	11.00	-9.78
High	5310	-2.61	-2.50	0.45	11.00	-10.55

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

LOW CHANNEL

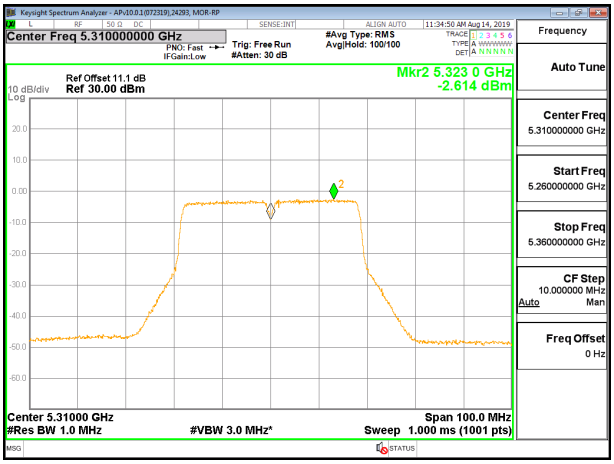


LOW CHANNEL ANTENNA 1

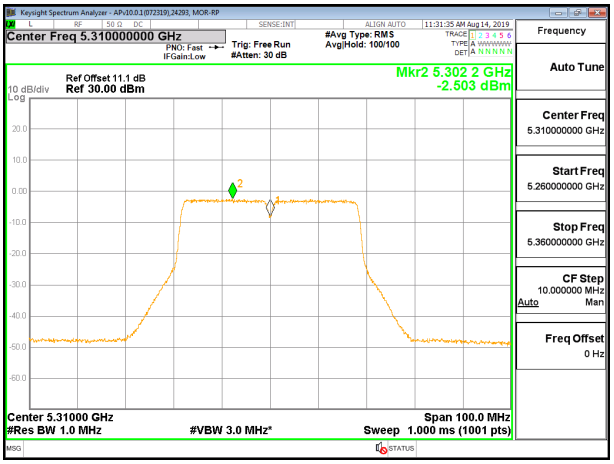


LOW CHANNEL ANTENNA 2

HIGH CHANNEL



HIGH CHANNEL ANTENNA 1



HIGH CHANNEL ANTENNA 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

9.4.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE (FCC)

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Mid	5290	86.00	5.58	5.58	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

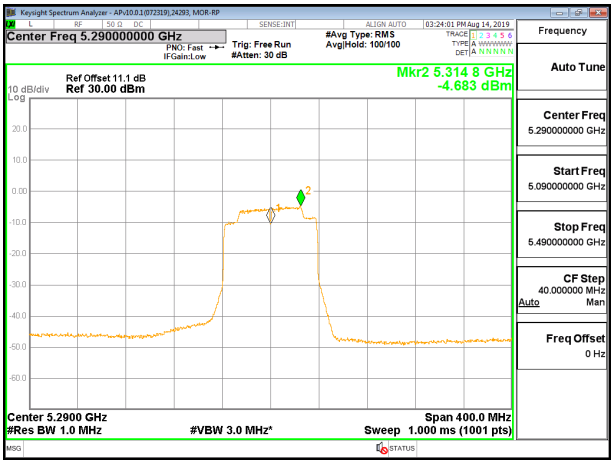
Output Power Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5290	13.32	13.43	16.39	24.00	-7.61

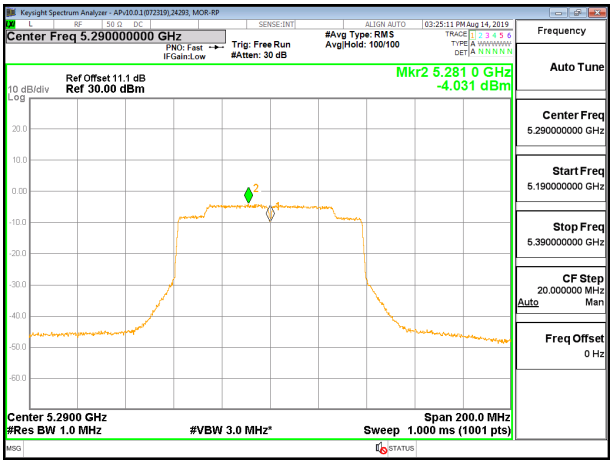
PSD Results

Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/1MHz)	Antenna 2 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Mid	5290	-4.68	-4.03	-1.33	11.00	-12.33

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 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

2TX Antenna 1 + Antenna 2 SDM MODE (IC)

Power

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Mid	5290	75.1720	5.58	5.58	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

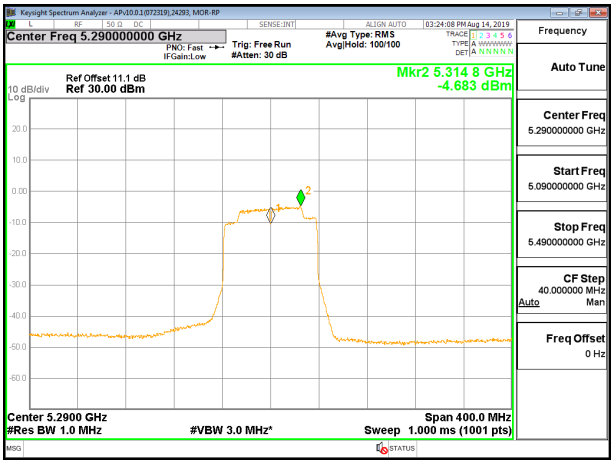
Output Power Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5290	13.32	13.43	16.39	24.00	-7.61

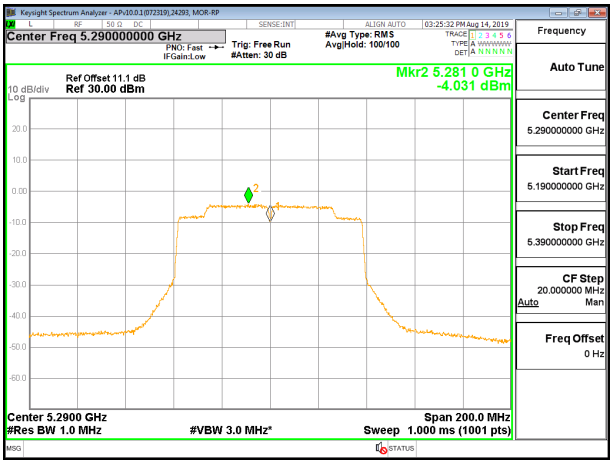
PSD Results

Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/1MHz)	Antenna 2 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Mid	5290	-4.68	-4.03	-1.33	11.00	-12.33

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 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

9.4.9. 802.11ac VHT160 MODE IN THE 5.2/5.3 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE (FCC)

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Mid	5250	168.00	5.58	5.58	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

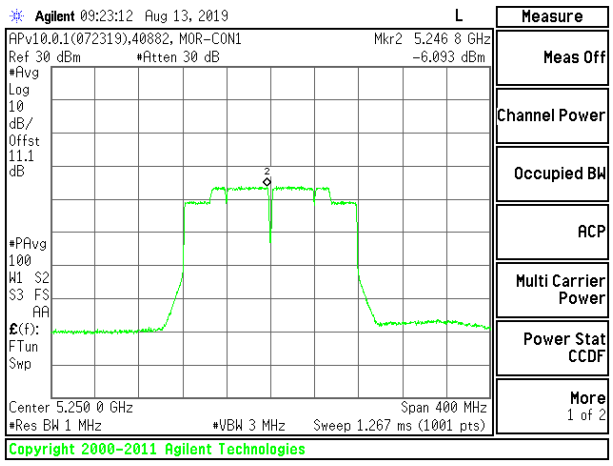
Output Power Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5250	13.44	13.54	16.50	24.00	-7.50

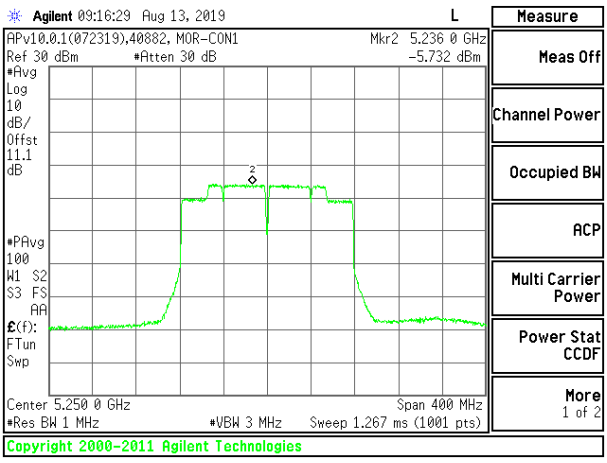
PSD Results

Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/1MHz)	Antenna 2 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Mid	5290	-6.09	-5.73	-2.90	11.00	-13.90

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 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

2TX Antenna 1 + Antenna 2 SDM MODE (IC)

Power

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Mid	5250	153.3430	5.58	5.58	17.42	4.42

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

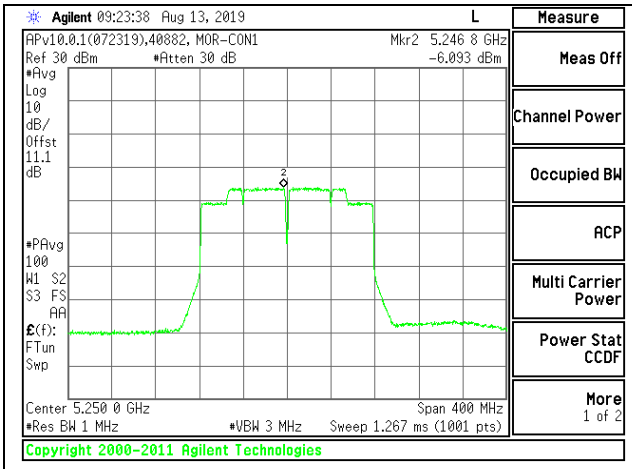
Output Power Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5250	13.44	13.54	16.50	17.42	-0.92

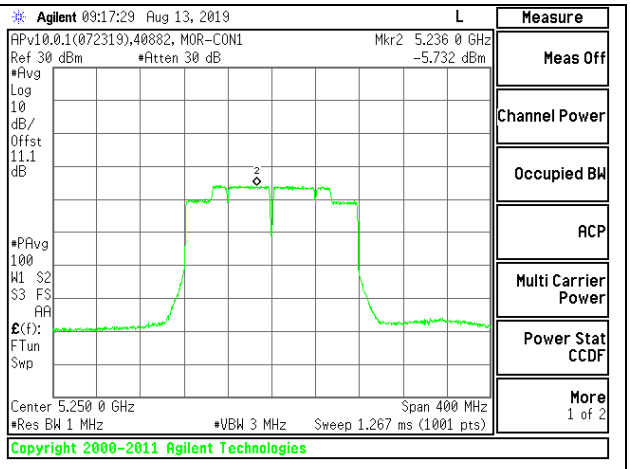
PSD Results

Channel	Frequency (MHz)	Antenna 1 Meas PSD (dBm/1MHz)	Antenna 2 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Mid	5250	-6.09	-5.73	-2.90	4.42	-7.32

MID CHANNEL



MID CHANNEL ANTENNA 1



MID CHANNEL ANTENNA 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. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209 - Restricted bands
FCC §15.407(b)(1-4) - Non-Restricted bands

After January 01, 2019 for Outside of the Restricted Bands Emissions

RSS 247 Issue 2 Sections
6.2.1.2 (for 5150-5250 MHz band)
6.2.2.2 (for 5250-5350 MHz band)
6.2.3.2 (for 5470-5600 MHz and 5650-5725 MHz bands)
6.2.4.2 (for 5725-5850 MHz band)

NCC LP0002 §2.7 and §2.8

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
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 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 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 average measurements. Detector used was RMS average detector.

The spectrum from 1GHz to 18GHz was investigated with the transmitter set to transmit the lowest, middle, and highest channels in the 5 GHz bands.

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.

Note: All frequencies were marked at the maximum emissions within the restricted band. This was due to the observed margins of the emissions to the non-restricted limit.

Note – Throughout this section:
Antenna 1 = Chain 0
Antenna 2 = Chain 1

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

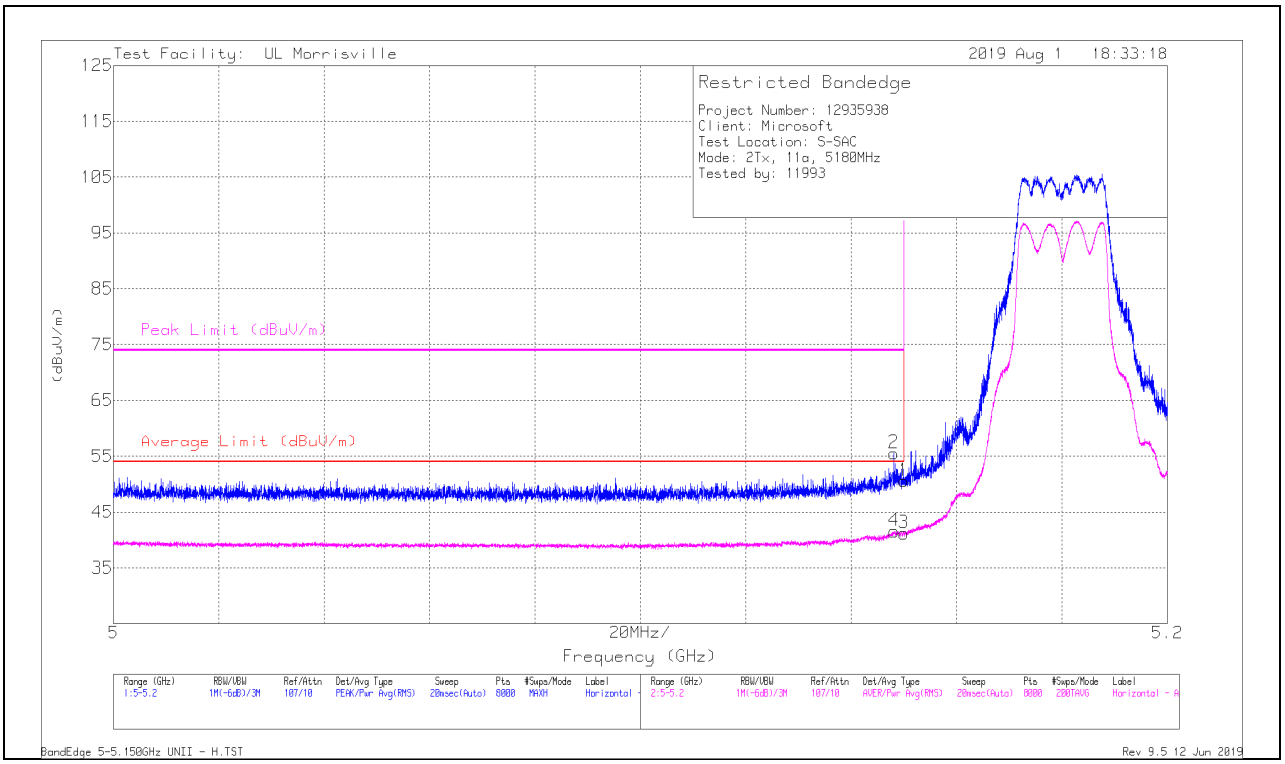
10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

2TX Antenna 1 + Antenna 2 CDD MODE

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT

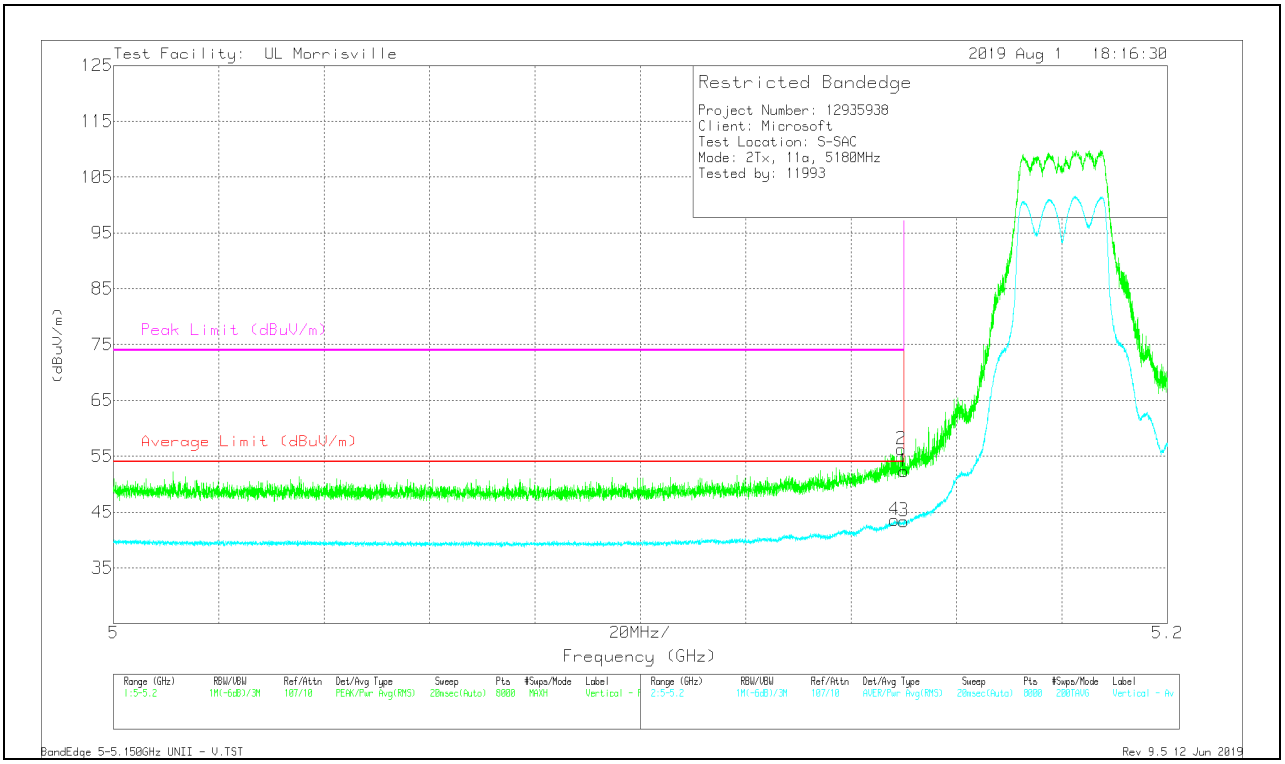


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.14999	38.89	Pk	34.3	-22.6	0	50.59	-	-	74	-23.41	49	390	H
2	* ** 5.14807	43.85	Pk	34.3	-22.6	0	55.55	-	-	74	-18.45	49	390	H
3	* ** 5.14999	29.41	RMS	34.3	-22.6	.09	41.2	54	-12.8	-	-	49	390	H
4	* ** 5.14814	29.77	RMS	34.3	-22.6	.09	41.56	54	-12.44	-	-	49	390	H

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

VERTICAL RESULT



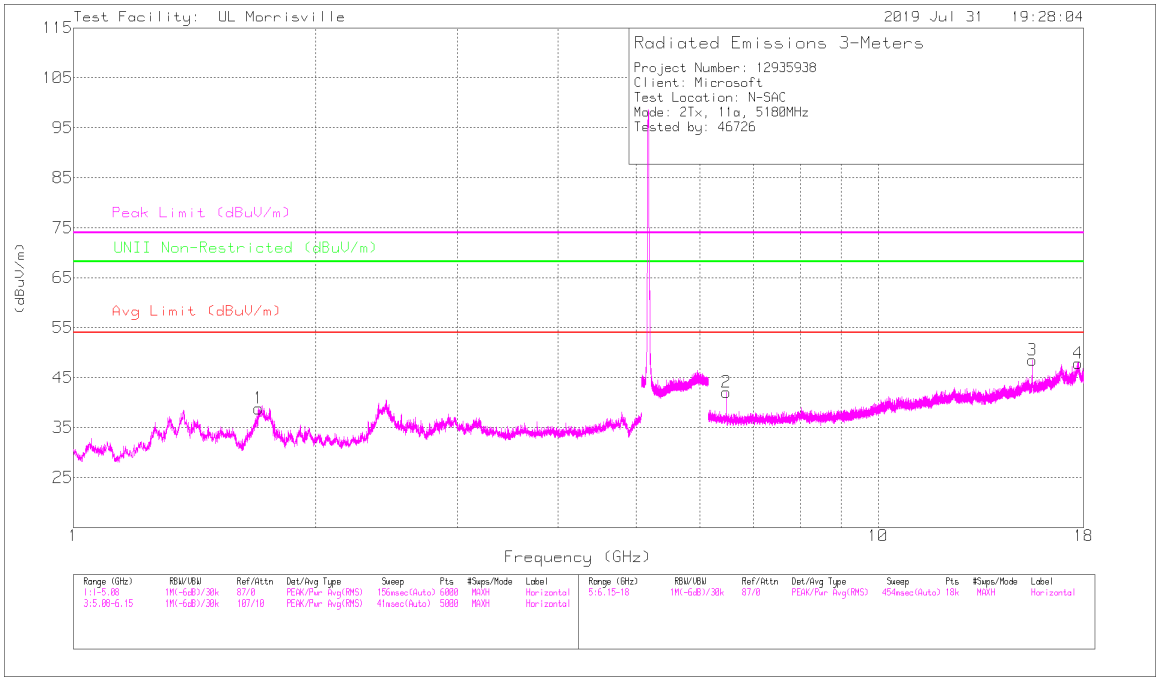
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.14999	40.61	Pk	34.3	-22.6	0	52.31	-	-	74	-21.69	38	252	V
2	* ** 5.14947	44.56	Pk	34.3	-22.6	0	56.26	-	-	74	-17.74	38	252	V
3	* ** 5.14999	31.6	RMS	34.3	-22.6	.09	43.39	54	-10.61	-	-	38	252	V
4	* ** 5.14817	31.8	RMS	34.3	-22.6	.09	43.59	54	-10.41	-	-	38	252	V

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

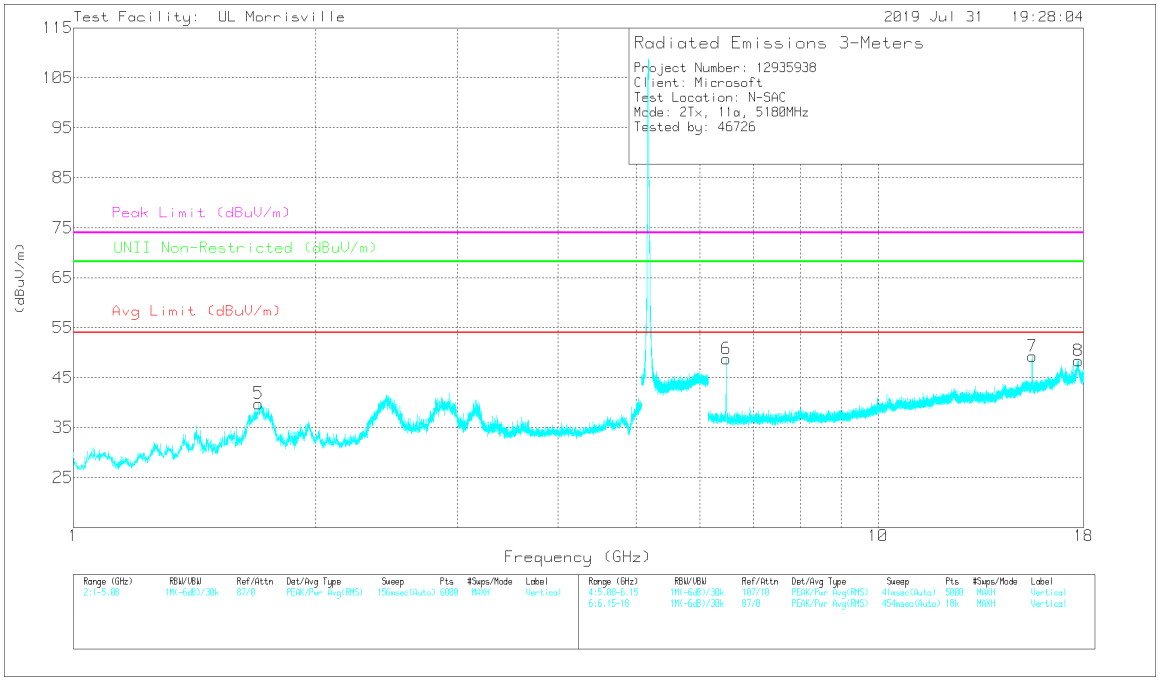
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

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

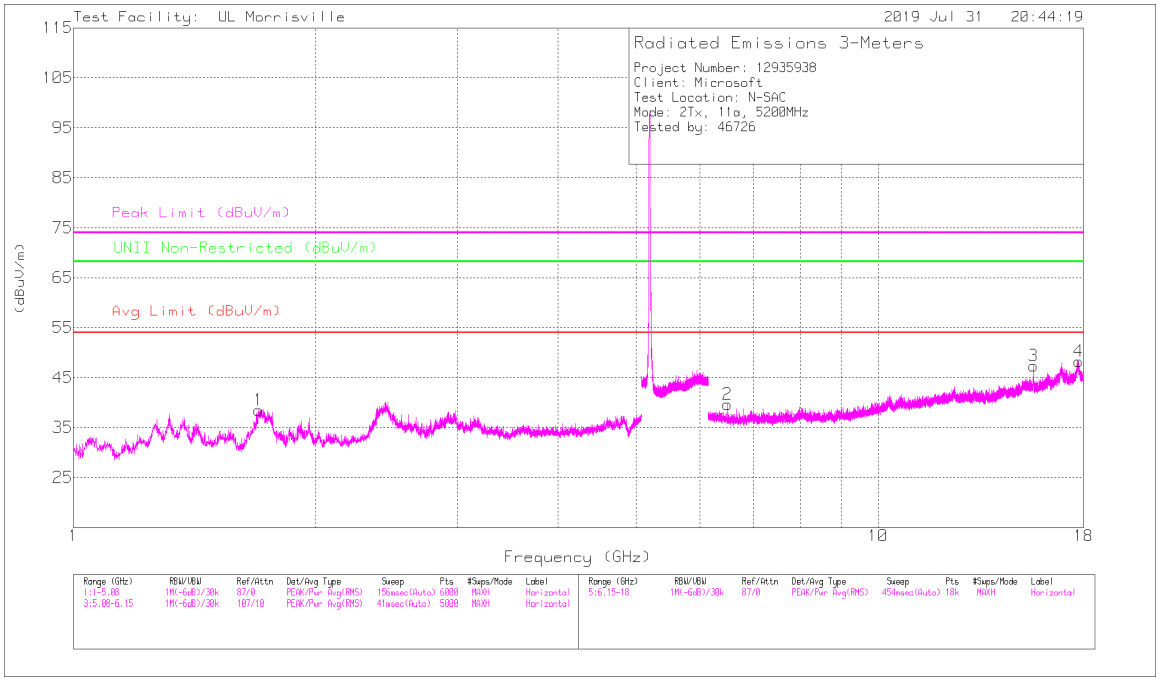
RADIATED EMISSIONS

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.70871	53.85	PK-U	29.2	-35.4	0	47.65	-	-	74	-26.35	-	-	289	148	H
	* ** 1.70843	42.15	ADR	29.2	-35.4	.09	36.04	54	-17.96	-	-	-	-	289	148	H
5	* ** 1.69812	54.49	PK-U	29	-35.3	0	48.19	-	-	74	-25.81	-	-	25	244	V
	* ** 1.69808	41.39	ADR	29	-35.3	.09	35.18	54	-18.82	-	-	-	-	25	244	V
3	* ** 15.54388	47.4	PK-U	40.2	-25.3	0	62.3	-	-	74	-11.7	-	-	262	300	H
	* ** 15.54386	32.61	ADR	40.2	-25.3	.09	47.6	54	-6.4	-	-	-	-	262	300	H
4	* ** 17.7202	34.26	PK-U	41.1	-20.5	0	54.86	-	-	74	-19.14	-	-	360	114	H
	* ** 17.72015	21.96	ADR	41.1	-20.5	.09	42.65	54	-11.35	-	-	-	-	360	114	H
7	* ** 15.54323	47.27	PK-U	40.2	-25.2	0	62.27	-	-	74	-11.73	-	-	308	298	V
	* ** 15.54324	32.28	ADR	40.2	-25.2	.09	47.37	54	-6.63	-	-	-	-	308	298	V
8	* ** 17.73676	34.64	PK-U	41.1	-20.3	0	55.44	-	-	74	-18.56	-	-	15	183	V
	* ** 17.73677	22.09	ADR	41.1	-20.3	.09	42.98	54	-11.02	-	-	-	-	15	183	V
2	6.47499	43.3	PK-U	35.5	-30	0	48.8	-	-	-	-	68.2	-19.4	216	215	H
6	6.47499	49.81	PK-U	35.5	-30	0	55.31	-	-	-	-	68.2	-12.89	323	271	V

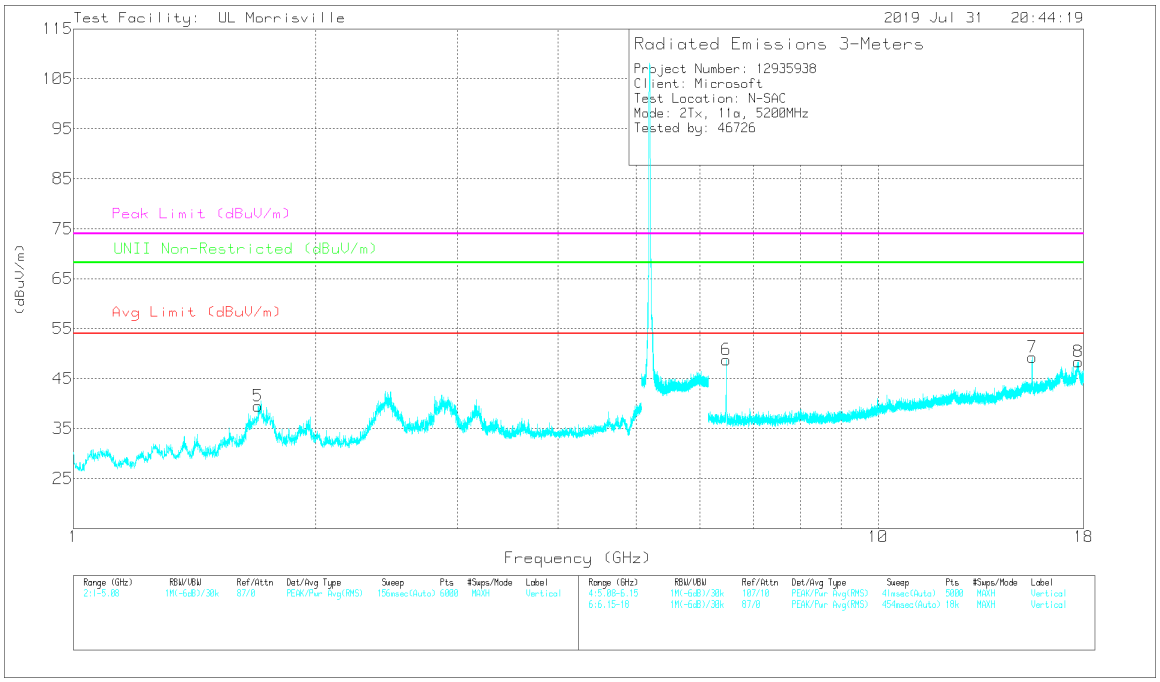
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

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

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

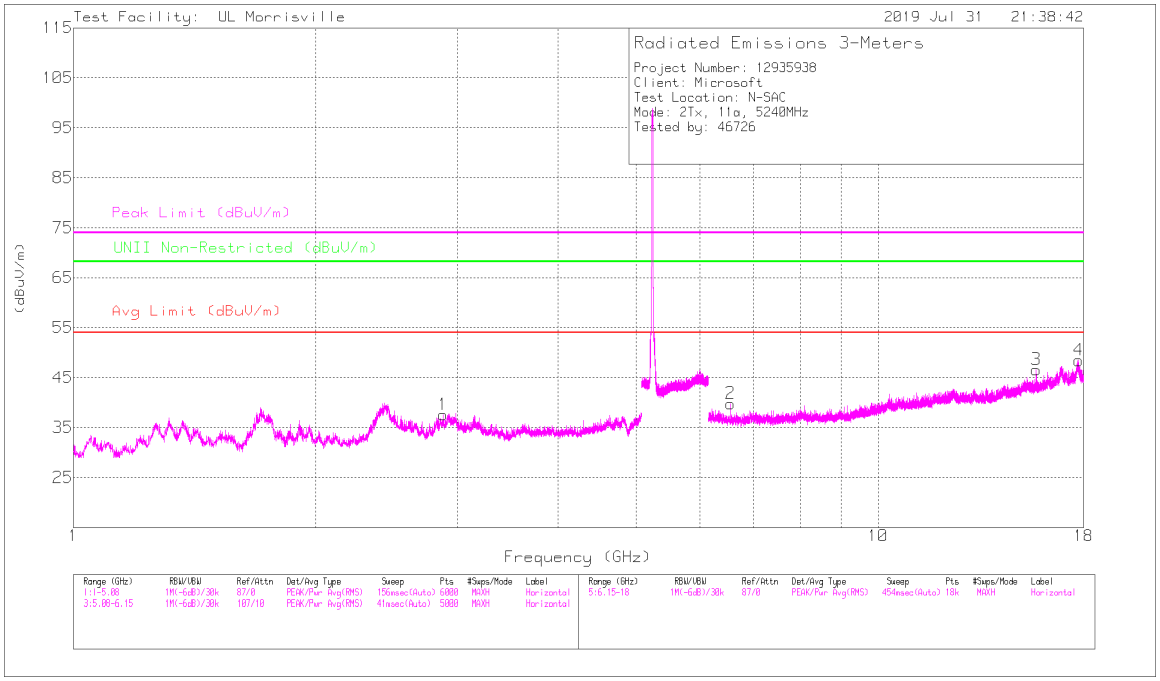
RADIATED EMISSIONS

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.7083	53.37	PK-U	29.2	-35.4	0	47.17	-	-	74	-26.83	-	-	287	196	H
	* ** 1.70829	41.88	ADR	29.2	-35.4	.09	35.77	54	-18.23	-	-	-	-	287	196	H
5	* ** 1.70008	54.2	PK-U	29	-35.3	0	47.9	-	-	74	-26.1	-	-	27	236	V
	* ** 1.70007	41.8	ADR	29	-35.3	.09	35.59	54	-18.41	-	-	-	-	27	236	V
3	* ** 15.60071	47.37	PK-U	40.2	-26.6	0	60.97	-	-	74	-13.03	-	-	268	315	H
	* ** 15.60077	33.82	ADR	40.2	-26.6	.09	47.51	54	-6.49	-	-	-	-	268	315	H
4	* ** 17.74314	34.46	PK-U	41.1	-20.4	0	55.16	-	-	74	-18.84	-	-	250	204	H
	* ** 17.74312	22.31	ADR	41.1	-20.4	.09	43.1	54	-10.9	-	-	-	-	250	204	H
7	* ** 15.53426	35.59	PK-U	40.2	-24.8	0	50.99	-	-	74	-23.01	-	-	165	176	V
	* ** 15.53422	23.31	ADR	40.2	-24.8	.09	38.8	54	-15.2	-	-	-	-	165	176	V
8	* ** 17.73305	34.09	PK-U	41.1	-20.3	0	54.89	-	-	74	-19.11	-	-	210	198	V
	* ** 17.73305	22.1	ADR	41.1	-20.3	.09	42.99	54	-11.01	-	-	-	-	210	198	V
2	6.49996	42.95	PK-U	35.5	-30.1	0	48.35	-	-	-	-	68.2	-19.85	69	192	H
6	6.49999	48.39	PK-U	35.5	-30.1	0	53.79	-	-	-	-	68.2	-14.41	324	233	V

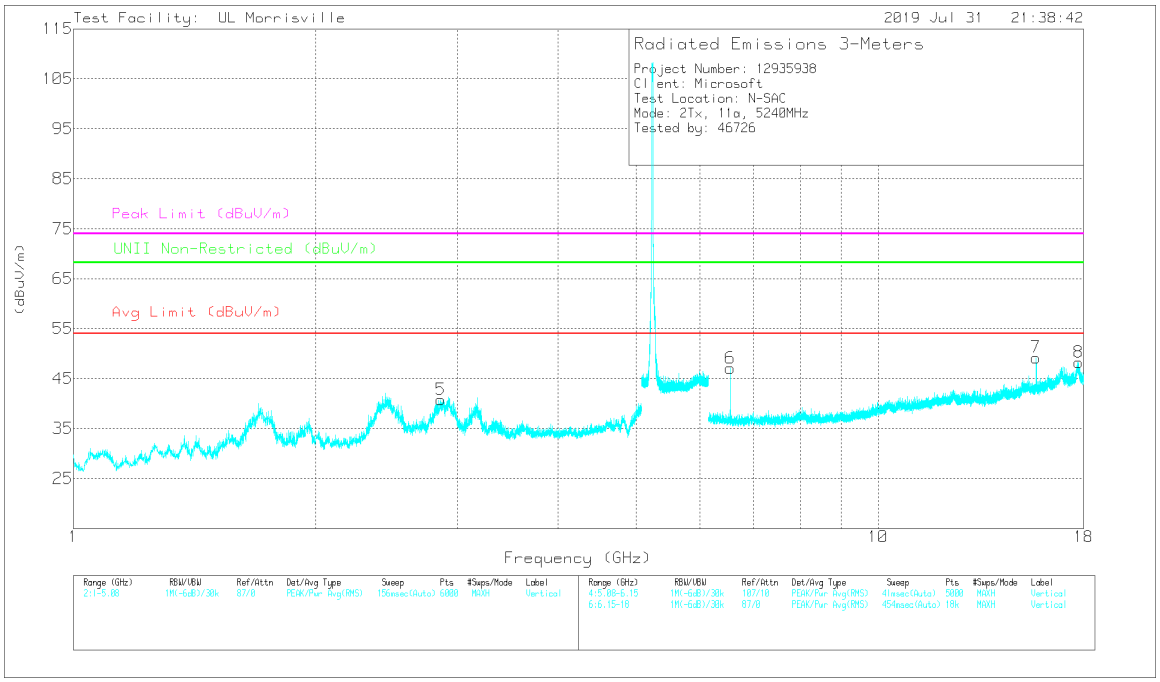
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

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

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

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.87043	47.3	PK-U	32.5	-33.9	0	45.9	-	-	74	-28.1	-	-	76	137	H
	* ** 2.8704	34.68	ADR	32.5	-33.9	.09	33.37	54	-20.63	-	-	-	-	76	137	H
5	* ** 2.8376	51.28	PK-U	32.4	-33.9	0	49.78	-	-	74	-24.22	-	-	32	234	V
	* ** 2.83745	39.09	ADR	32.4	-33.9	.09	37.68	54	-16.32	-	-	-	-	32	234	V
3	* ** 15.72005	45.47	PK-U	40.1	-25.4	0	60.17	-	-	74	-13.83	-	-	263	286	H
	* ** 15.72009	31.73	ADR	40.1	-25.4	.09	46.52	54	-7.48	-	-	-	-	263	286	H
4	* ** 17.72652	34.38	PK-U	41.1	-20.3	0	55.18	-	-	74	-18.82	-	-	128	277	H
	* ** 17.72642	21.96	ADR	41.1	-20.3	.09	42.85	54	-11.15	-	-	-	-	128	277	H
7	* ** 15.72189	43.27	PK-U	40.1	-25.4	0	57.97	-	-	74	-16.03	-	-	310	310	V
	* ** 15.72175	29.01	ADR	40.1	-25.4	.09	43.8	54	-10.2	-	-	-	-	310	310	V
8	* ** 17.7324	34.13	PK-U	41.1	-20.3	0	54.93	-	-	74	-19.07	-	-	268	249	V
	* ** 17.73251	22.06	ADR	41.1	-20.3	.09	42.95	54	-11.05	-	-	-	-	268	249	V
2	6.55	42.61	PK-U	35.5	-30.6	0	47.51	-	-	-	-	68.2	-20.69	220	219	H
6	6.55	48.73	PK-U	35.5	-30.6	0	53.63	-	-	-	-	68.2	-14.57	330	290	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

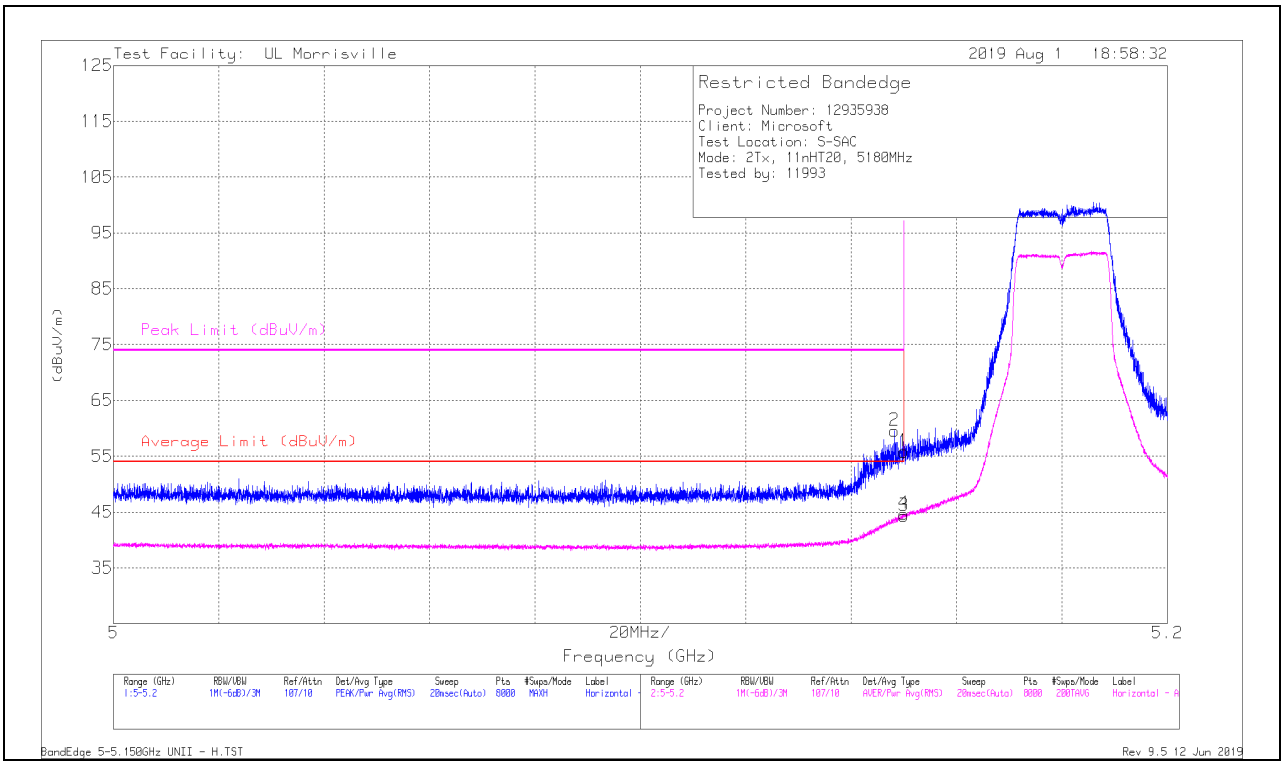
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

10.1.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT

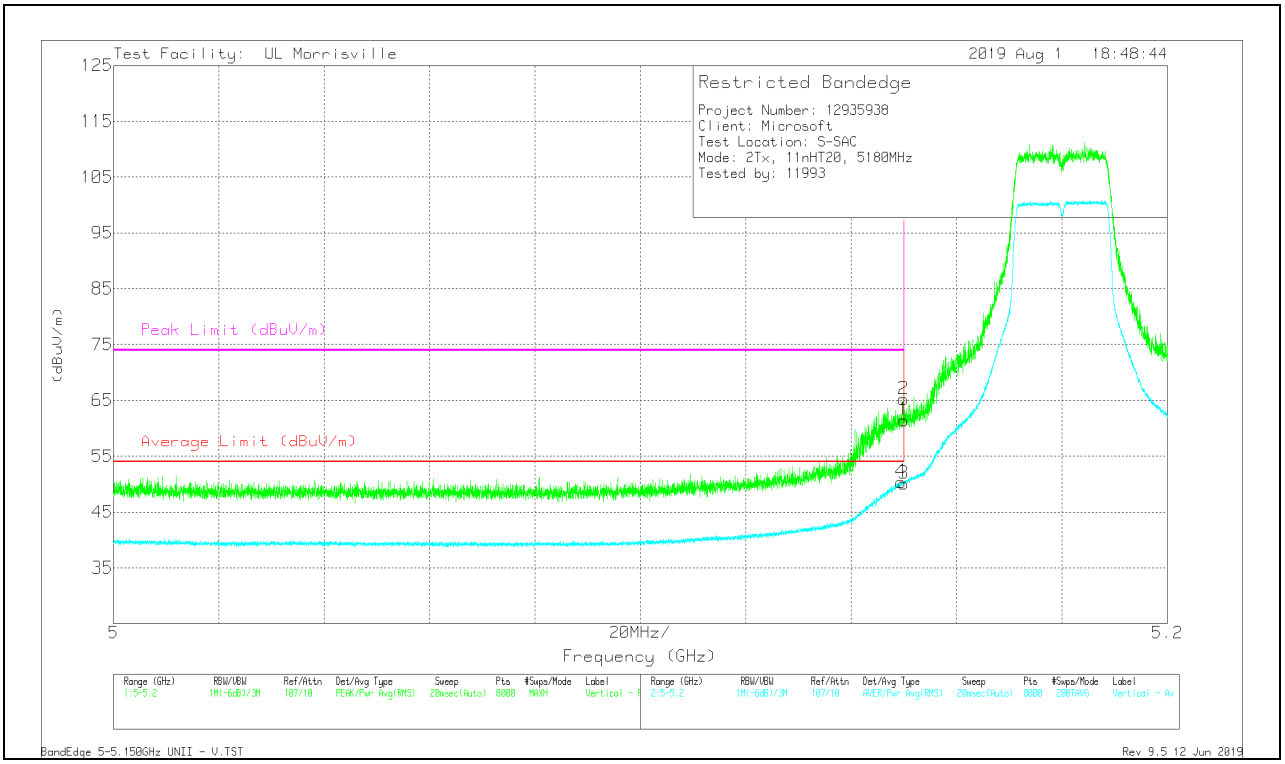


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.14999	44.13	Pk	34.3	-22.6	55.83	-	-	74	-18.17	63	246	H
2	* ** 5.14817	47.88	Pk	34.3	-22.6	59.58	-	-	74	-14.42	63	246	H
3	* ** 5.14999	32.6	RMS	34.3	-22.6	44.3	54	-9.7	-	-	63	246	H
4	* ** 5.14997	33	RMS	34.3	-22.6	44.7	54	-9.3	-	-	63	246	H

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

VERTICAL RESULT



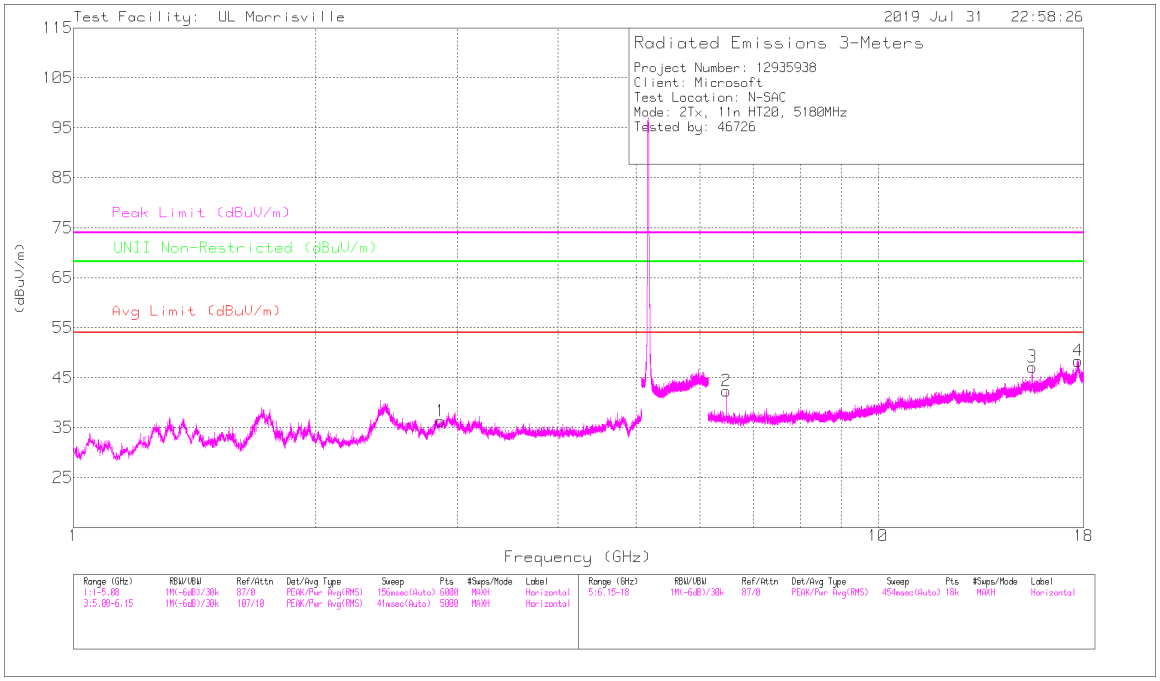
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.14999	49.77	Pk	34.3	-22.6	61.47	-	-	74	-12.53	40	255	V
2	* ** 5.14992	53.5	Pk	34.3	-22.6	65.2	-	-	74	-8.8	40	255	V
3	* ** 5.14999	38.37	RMS	34.3	-22.6	50.07	54	-3.93	-	-	40	255	V
4	* ** 5.14944	38.68	RMS	34.3	-22.6	50.38	54	-3.62	-	-	40	255	V

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

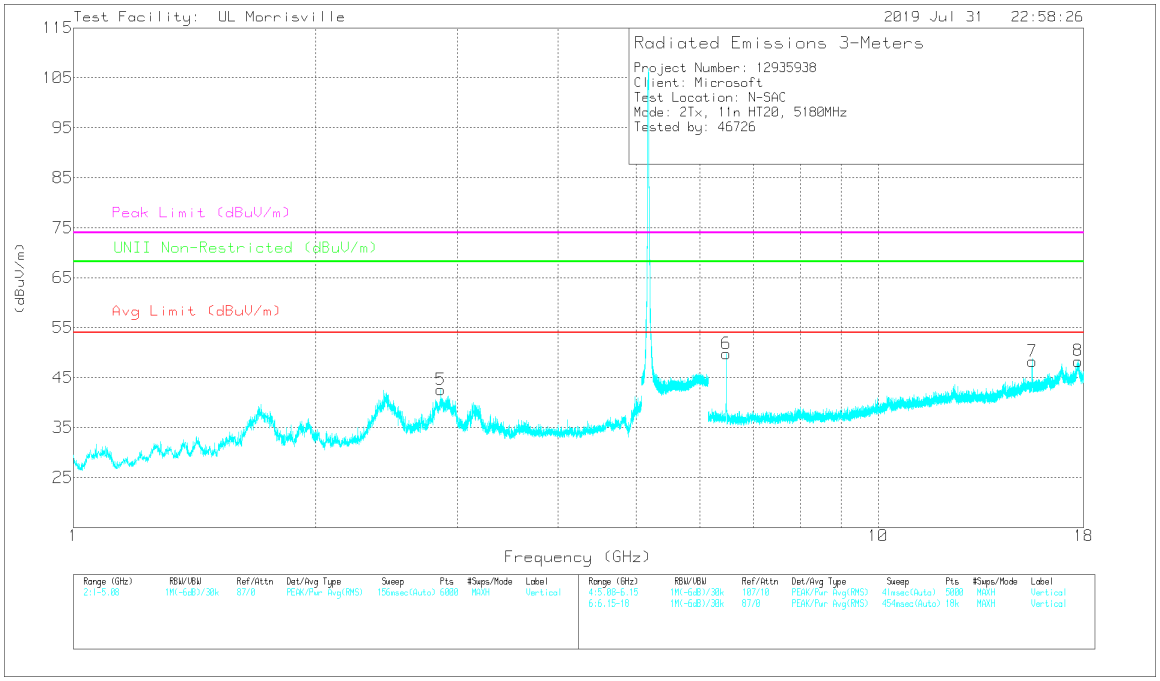
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

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

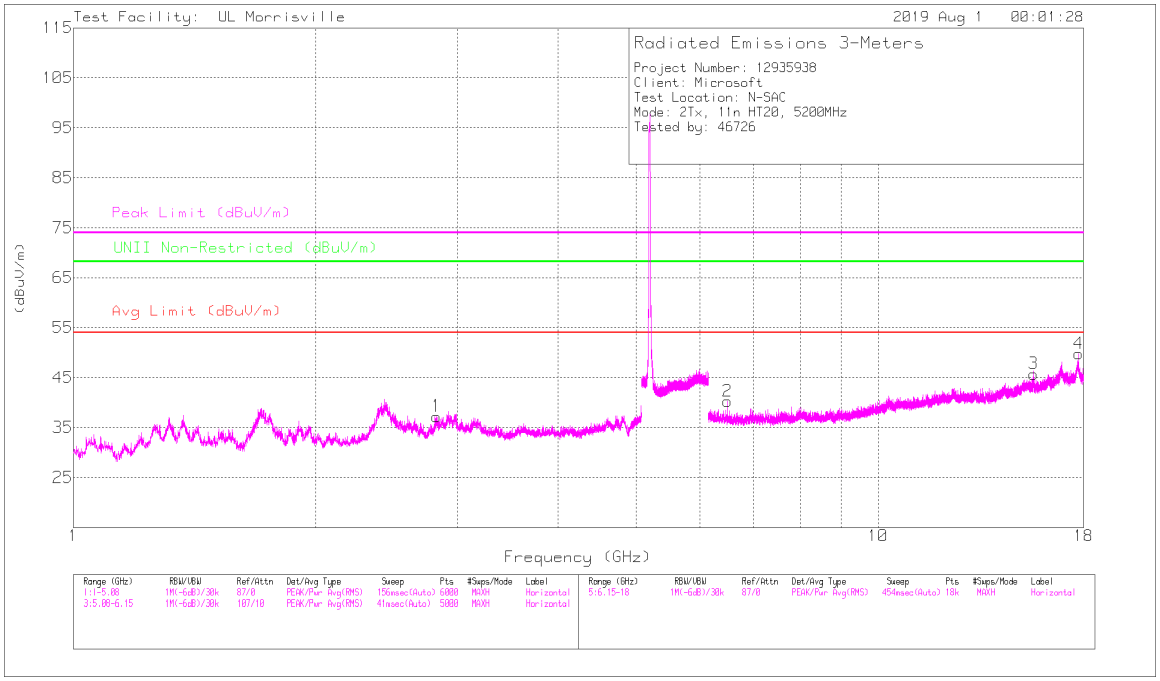
RADIATED EMISSIONS

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.83972	47.05	PK-U	32.4	-33.9	45.55	-	-	74	-28.45	-	-	72	172	H
	* ** 2.83969	34.93	ADR	32.4	-33.9	33.43	54	-20.57	-	-	-	-	72	172	H
5	* ** 2.86441	51.38	PK-U	32.5	-33.8	50.08	-	-	74	-23.92	-	-	33	225	V
	* ** 2.86437	39.38	ADR	32.5	-33.8	38.08	54	-15.92	-	-	-	-	33	225	V
3	* ** 15.54377	44.98	PK-U	40.2	-25.2	59.98	-	-	74	-14.02	-	-	267	301	H
	* ** 15.54377	31.77	ADR	40.2	-25.2	46.77	54	-7.23	-	-	-	-	267	301	H
4	* ** 17.7148	34.12	PK-U	41.1	-20.8	54.42	-	-	74	-19.58	-	-	196	292	H
	* ** 17.71495	22.12	ADR	41.1	-20.8	42.42	54	-11.58	-	-	-	-	196	292	H
7	* ** 15.54326	42.66	PK-U	40.2	-25.2	57.66	-	-	74	-16.34	-	-	310	297	V
	* ** 15.54328	30.24	ADR	40.2	-25.2	45.24	54	-8.76	-	-	-	-	310	297	V
8	* ** 17.73098	34.75	PK-U	41.1	-20.3	55.55	-	-	74	-18.45	-	-	232	257	V
	* ** 17.73092	22.02	ADR	41.1	-20.3	42.82	54	-11.18	-	-	-	-	232	257	V
6	6.47502	49.01	PK-U	35.5	-30	54.51	-	-	-	-	68.2	-13.69	322	274	V
2	6.47506	44.02	PK-U	35.5	-30	49.52	-	-	-	-	68.2	-18.68	70	186	H

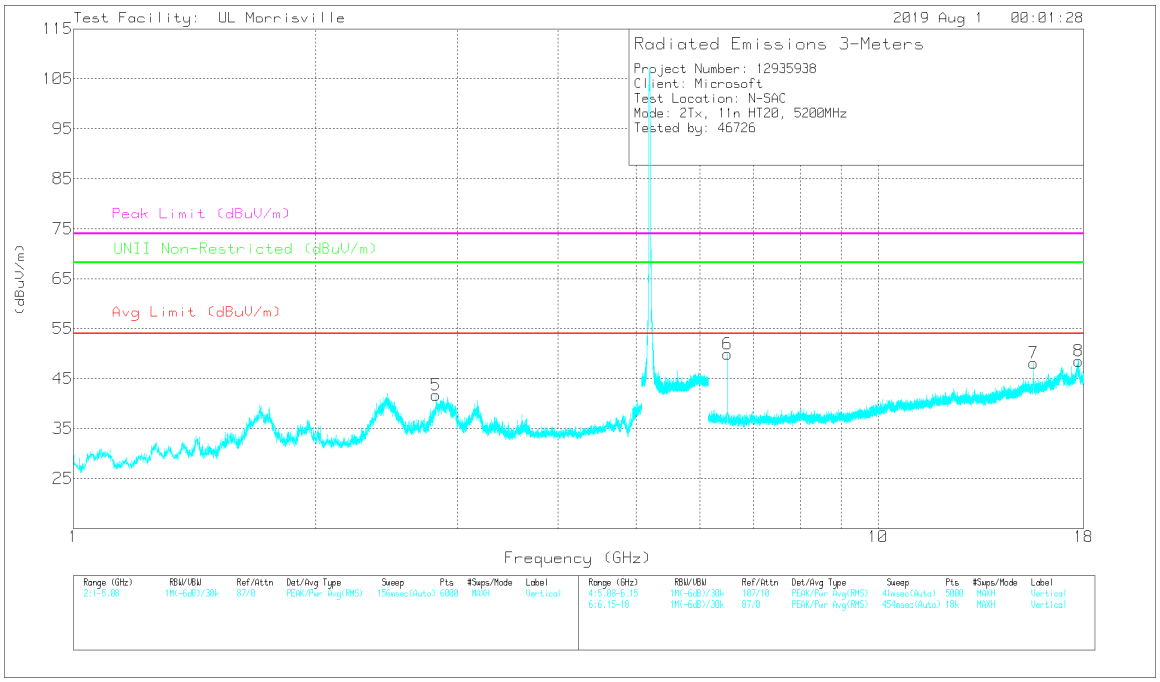
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

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

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

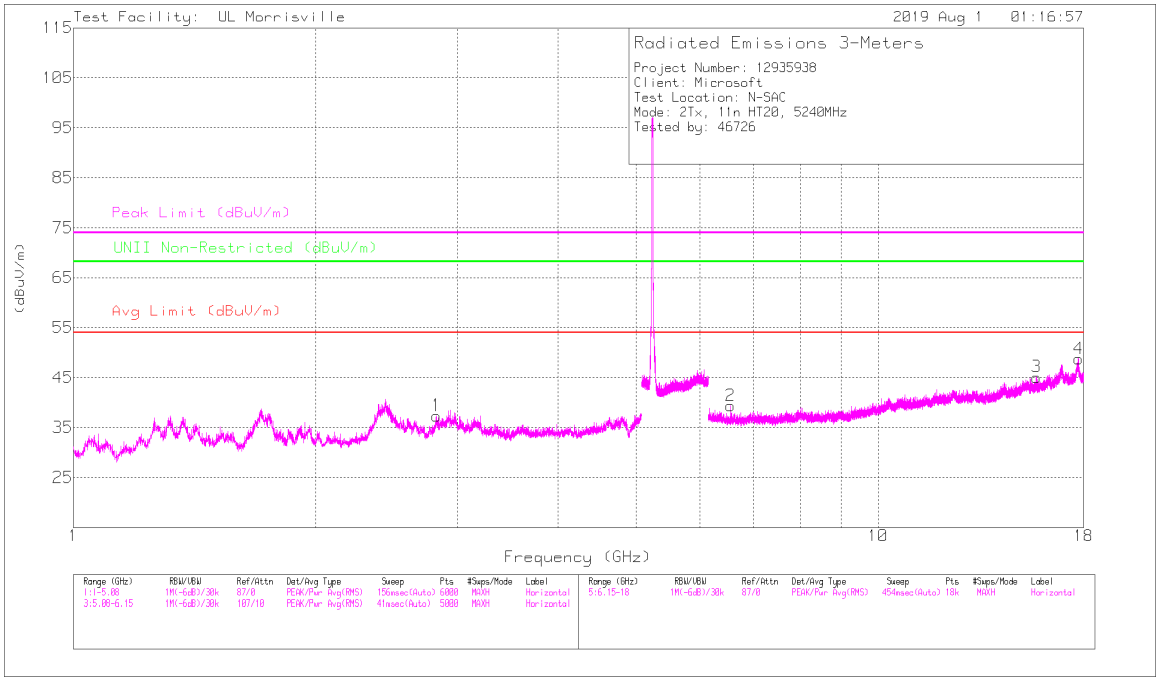
RADIATED EMISSIONS

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.83401	46.86	PK-U	32.4	-33.9	45.36	-	-	74	-28.64	-	-	73	166	H
	* ** 2.83414	35	ADR	32.4	-33.9	33.5	54	-20.5	-	-	-	-	73	166	H
5	* ** 2.81461	50.43	PK-U	32.4	-33.9	48.93	-	-	74	-25.07	-	-	38	232	V
	* ** 2.81457	38.9	ADR	32.4	-33.9	37.4	54	-16.6	-	-	-	-	38	232	V
3	* ** 15.60019	46.33	PK-U	40.2	-26.6	59.93	-	-	74	-14.07	-	-	263	285	H
	* ** 15.60005	33.4	ADR	40.2	-26.6	47	54	-7	-	-	-	-	263	285	H
4	* ** 17.7434	34.13	PK-U	41.1	-20.4	54.83	-	-	74	-19.17	-	-	343	123	H
	* ** 17.74335	21.94	ADR	41.1	-20.4	42.64	54	-11.36	-	-	-	-	343	123	H
7	* ** 15.60292	43.86	PK-U	40.2	-26.6	57.46	-	-	74	-16.54	-	-	306	313	V
	* ** 15.60291	31.21	ADR	40.2	-26.6	44.81	54	-9.19	-	-	-	-	306	313	V
8	* ** 17.74286	34.13	PK-U	41.1	-20.4	54.83	-	-	74	-19.17	-	-	174	102	V
	* ** 17.74285	22.04	ADR	41.1	-20.4	42.74	54	-11.26	-	-	-	-	174	102	V
6	6.49998	47.8	PK-U	35.5	-30.1	53.2	-	-	-	-	68.2	-15	323	293	V
2	6.50004	41.55	PK-U	35.5	-30.1	46.95	-	-	-	-	68.2	-21.25	242	233	H

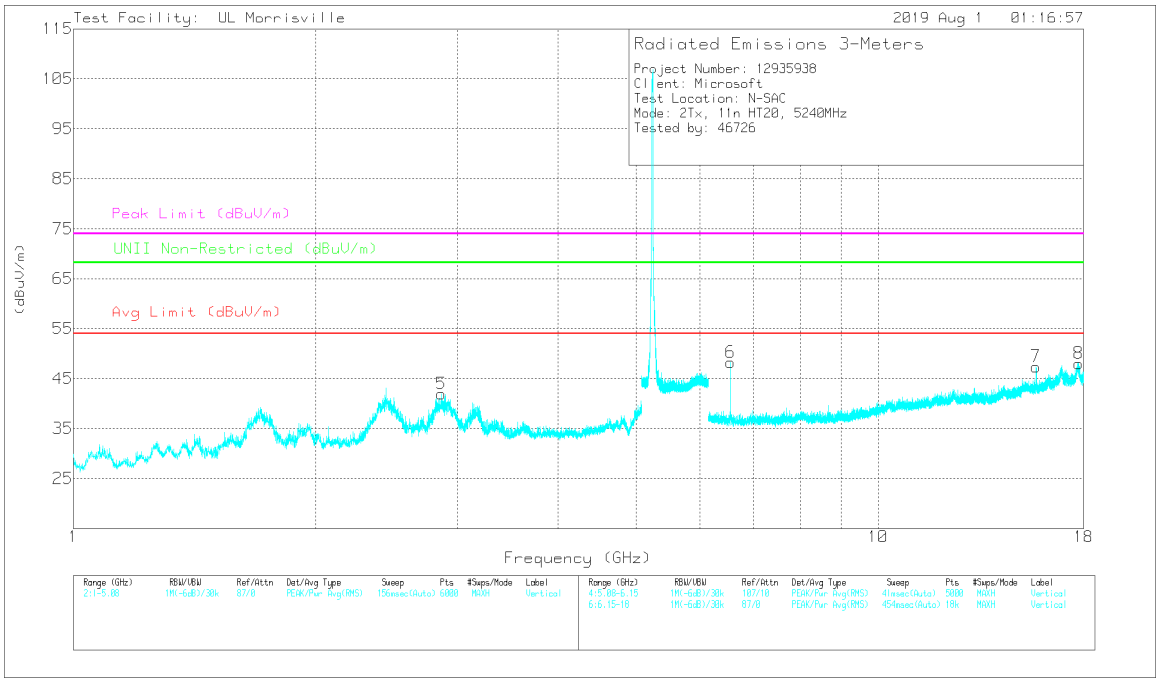
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

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

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

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.83127	47.44	PK-U	32.4	-33.9	45.94	-	-	74	-28.06	-	-	75	160	H
	* ** 2.83089	34.95	ADR	32.4	-33.9	33.45	54	-20.55	-	-	-	-	75	160	H
5	* ** 2.85753	50.75	PK-U	32.4	-33.8	49.35	-	-	74	-24.65	-	-	37	228	V
	* ** 2.85748	39.12	ADR	32.4	-33.8	37.72	54	-16.28	-	-	-	-	37	228	V
3	* ** 15.7164	43.69	PK-U	40.1	-25.4	58.39	-	-	74	-15.61	-	-	262	291	H
	* ** 15.71635	30.64	ADR	40.1	-25.4	45.34	54	-8.66	-	-	-	-	262	291	H
4	* ** 17.73657	33.91	PK-U	41.1	-20.3	54.71	-	-	74	-19.29	-	-	179	208	H
	* ** 17.73649	22.14	ADR	41.1	-20.3	42.94	54	-11.06	-	-	-	-	179	208	H
7	* ** 15.71995	40.69	PK-U	40.1	-25.4	55.39	-	-	74	-18.61	-	-	310	297	V
	* ** 15.71993	28.42	ADR	40.1	-25.4	43.12	54	-10.88	-	-	-	-	310	297	V
8	* ** 17.74578	34.51	PK-U	41.1	-20.5	55.11	-	-	74	-18.89	-	-	250	182	V
	* ** 17.74577	22.06	ADR	41.1	-20.5	42.66	54	-11.34	-	-	-	-	250	182	V
2	6.54999	42.14	PK-U	35.5	-30.6	47.04	-	-	-	-	68.2	-21.16	293	293	H
6	6.55006	48.69	PK-U	35.5	-30.6	53.59	-	-	-	-	68.2	-14.61	345	253	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

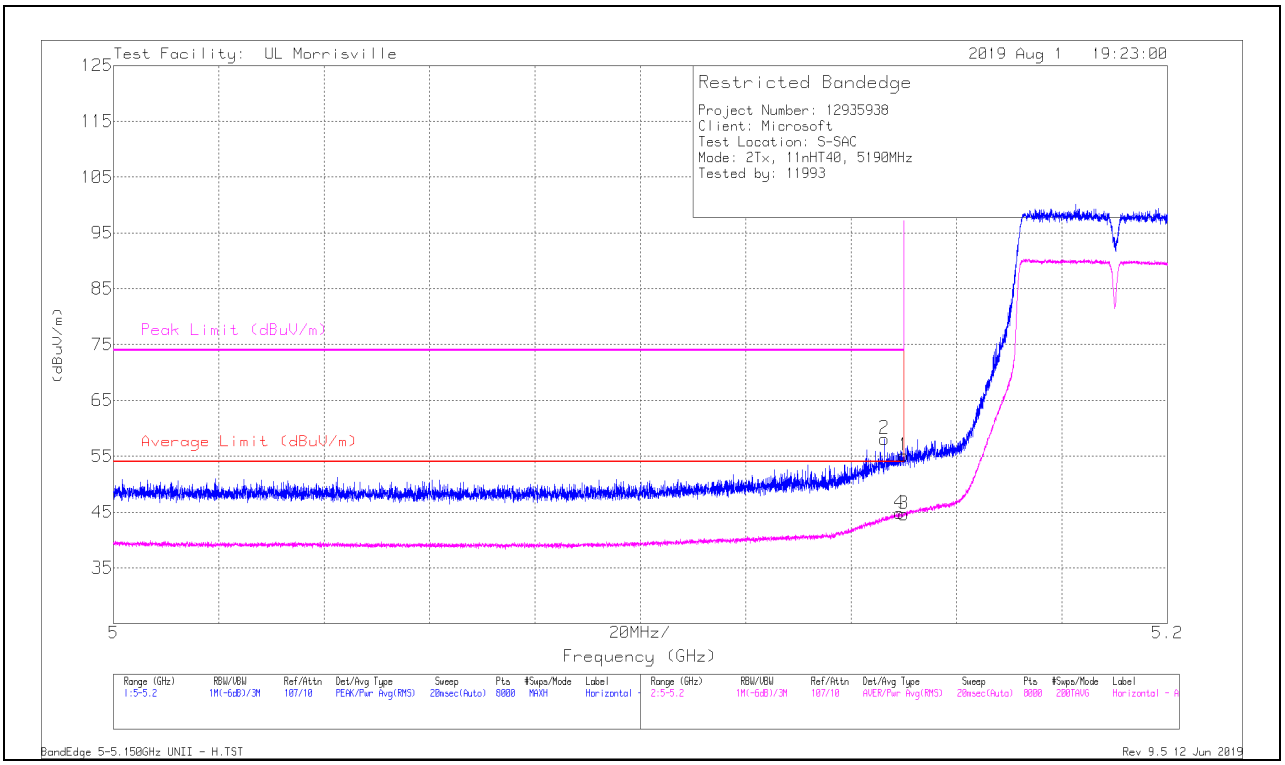
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

10.1.3. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT

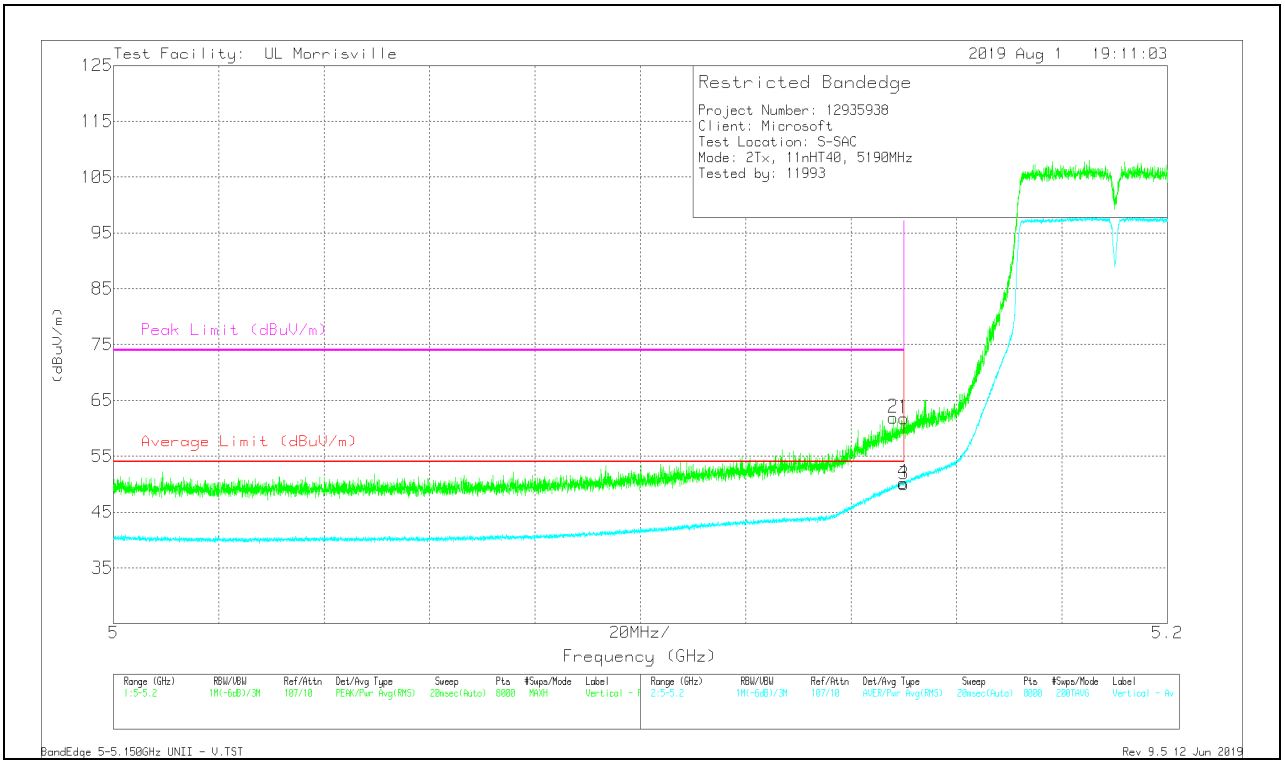


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.14999	43.4	Pk	34.3	-22.6	55.1	-	-	74	-18.9	48	345	H
2	* ** 5.14632	46.43	Pk	34.3	-22.6	58.13	-	-	74	-15.87	48	345	H
3	* ** 5.14999	32.94	RMS	34.3	-22.6	44.64	54	-9.36	-	-	48	345	H
4	* ** 5.14912	33.14	RMS	34.3	-22.6	44.84	54	-9.16	-	-	48	345	H

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

VERTICAL RESULT



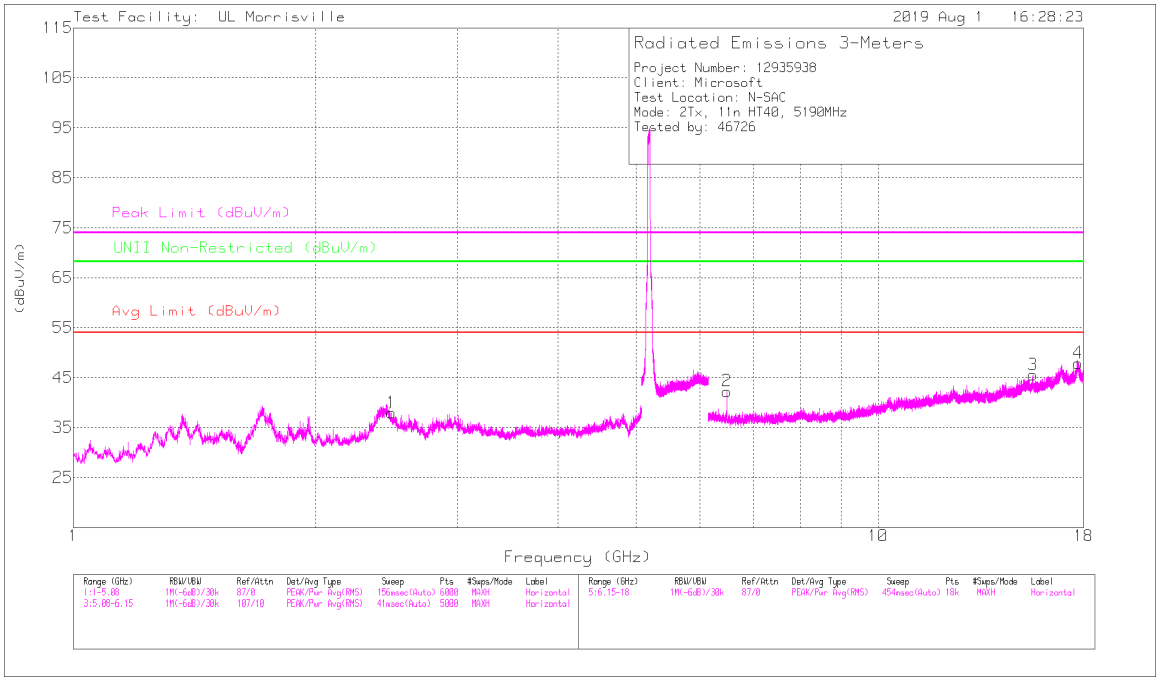
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.14999	50.13	Pk	34.3	-22.6	61.83	-	-	74	-12.17	52	238	V
2	* ** 5.14794	50.23	Pk	34.3	-22.6	61.93	-	-	74	-12.07	52	238	V
3	* ** 5.14999	38.27	RMS	34.3	-22.6	49.97	54	-4.03	-	-	52	238	V
4	* ** 5.14984	38.58	RMS	34.3	-22.6	50.28	54	-3.72	-	-	52	238	V

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

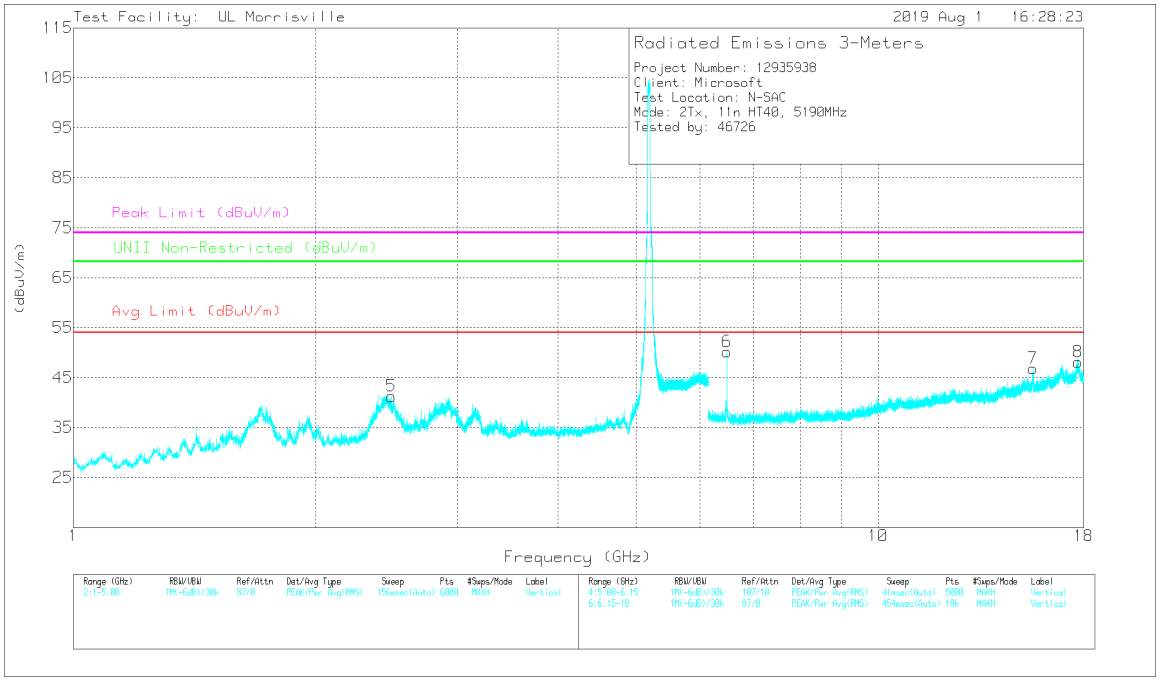
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

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

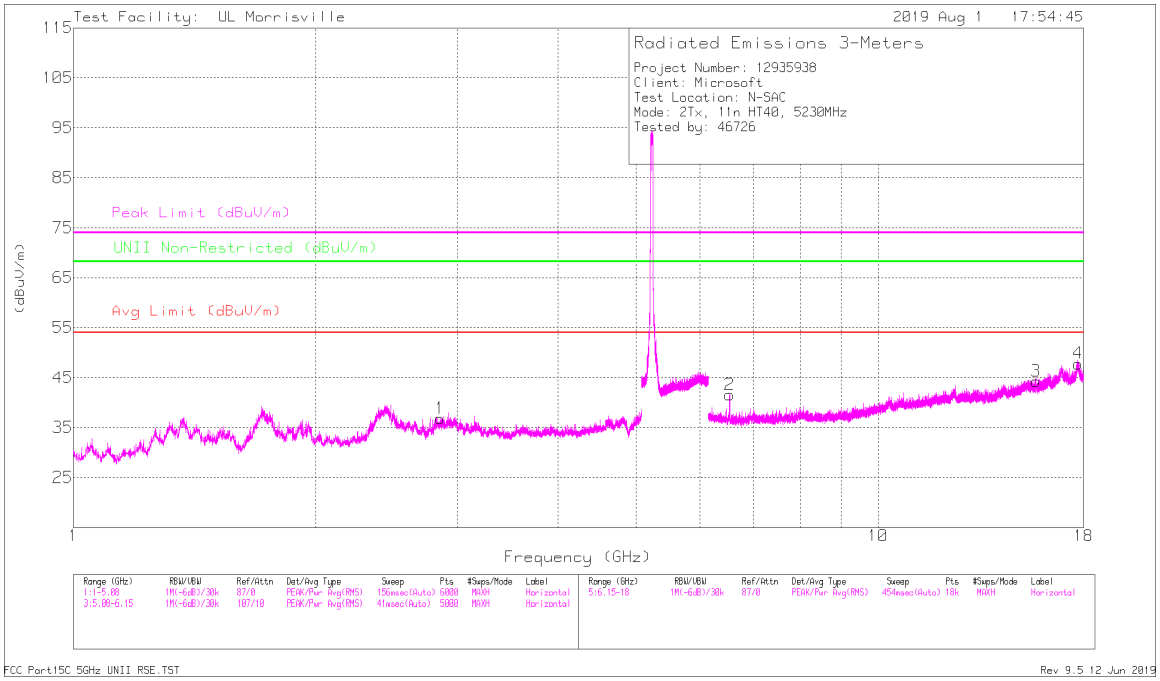
RADIATED EMISSIONS

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48876	44.98	PK-U	32.4	-34.2	43.18	-	-	74	-30.82	-	-	282	227	H
	* ** 2.48875	32.59	ADR	32.4	-34.2	30.79	54	-23.21	-	-	-	-	282	227	H
5	* ** 2.48461	50.54	PK-U	32.4	-34.2	48.74	-	-	74	-25.26	-	-	29	228	V
	* ** 2.48468	38.95	ADR	32.4	-34.2	37.15	54	-16.85	-	-	-	-	29	228	V
3	* ** 15.56	43.29	PK-U	40.2	-25.6	57.89	-	-	74	-16.11	-	-	262	284	H
	* ** 15.56011	30.48	ADR	40.2	-25.6	45.08	54	-8.92	-	-	-	-	262	284	H
4	* ** 17.73406	34.07	PK-U	41.1	-20.3	54.87	-	-	74	-19.13	-	-	246	329	H
	* ** 17.73398	22.03	ADR	41.1	-20.3	42.83	54	-11.17	-	-	-	-	246	329	H
7	* ** 15.58002	41.75	PK-U	40.2	-25.9	56.05	-	-	74	-17.95	-	-	310	302	V
	* ** 15.58	29.29	ADR	40.2	-25.9	43.59	54	-10.41	-	-	-	-	310	302	V
8	* ** 17.73629	35.45	PK-U	41.1	-20.3	56.25	-	-	74	-17.75	-	-	35	321	V
	* ** 17.73626	22.07	ADR	41.1	-20.3	42.87	54	-11.13	-	-	-	-	35	321	V
6	6.48748	48.19	PK-U	35.5	-30.1	53.59	-	-	-	-	68.2	-14.61	308	236	V
2	6.48749	41.95	PK-U	35.5	-30.1	47.35	-	-	-	-	68.2	-20.85	291	366	H

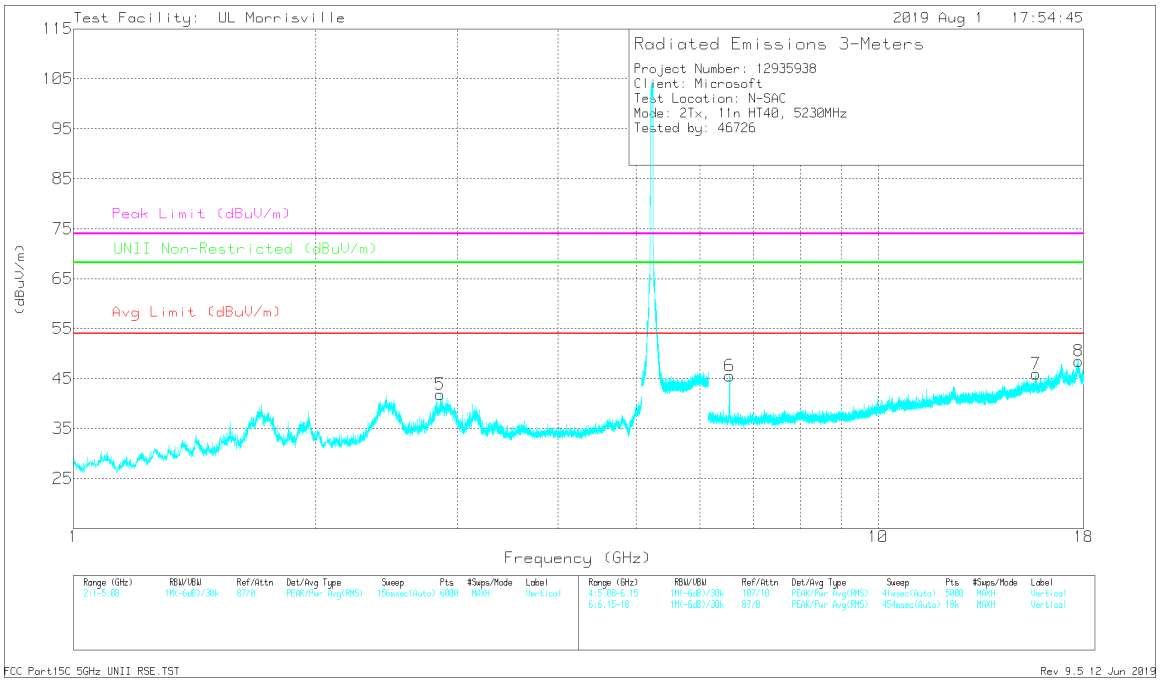
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

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

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

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.83135	45.53	PK-U	32.4	-33.9	44.03	-	-	74	-29.97	-	-	3	227	H
	* ** 2.83154	33.33	ADR	32.4	-33.9	31.83	54	-22.17	-	-	-	-	3	227	H
5	* ** 2.85664	51.03	PK-U	32.4	-33.8	49.63	-	-	74	-24.37	-	-	34	208	V
	* ** 2.85658	38.97	ADR	32.4	-33.8	37.57	54	-16.43	-	-	-	-	34	208	V
3	* ** 15.71637	36.12	PK-U	40.1	-25.4	50.82	-	-	74	-23.18	-	-	340	376	H
	* ** 15.7164	24.02	ADR	40.1	-25.4	38.72	54	-15.28	-	-	-	-	340	376	H
4	* ** 17.73076	34.27	PK-U	41.1	-20.3	55.07	-	-	74	-18.93	-	-	358	217	H
	* ** 17.73078	22.17	ADR	41.1	-20.3	42.97	54	-11.03	-	-	-	-	358	217	H
7	* ** 15.70908	36.89	PK-U	40.1	-25.6	51.39	-	-	74	-22.61	-	-	311	324	V
	* ** 15.70906	24.24	ADR	40.1	-25.6	38.74	54	-15.26	-	-	-	-	311	324	V
8	* ** 17.74623	34.49	PK-U	41.1	-20.5	55.09	-	-	74	-18.91	-	-	239	220	V
	* ** 17.74624	22.23	ADR	41.1	-20.5	42.83	54	-11.17	-	-	-	-	239	220	V
2	6.51151	40.02	PK-U	35.5	-30.2	45.32	-	-	-	-	68.2	-22.88	346	309	H
6	6.53069	39.67	PK-U	35.5	-30.5	44.67	-	-	-	-	68.2	-23.53	35	119	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

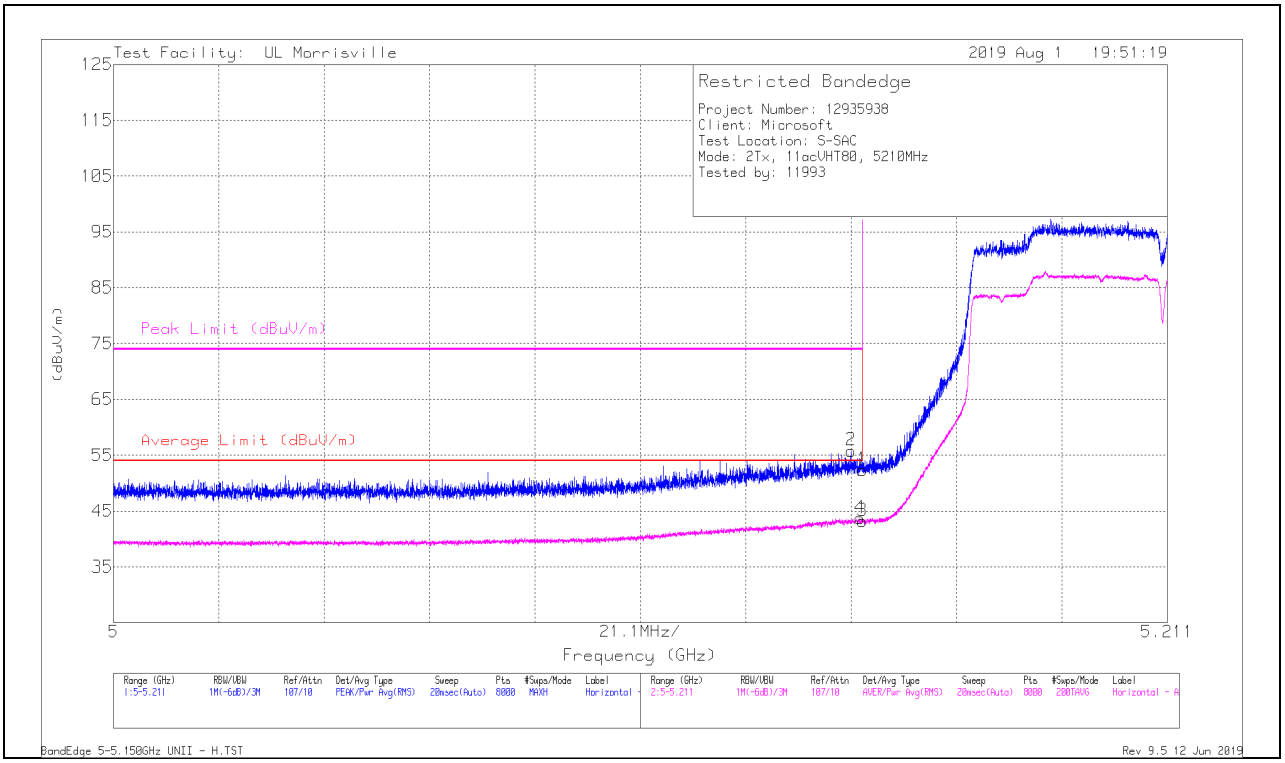
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

10.1.4. TX ABOVE 1 GHz 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE

BANDEDGE (MID CHANNEL)

HORIZONTAL RESULT

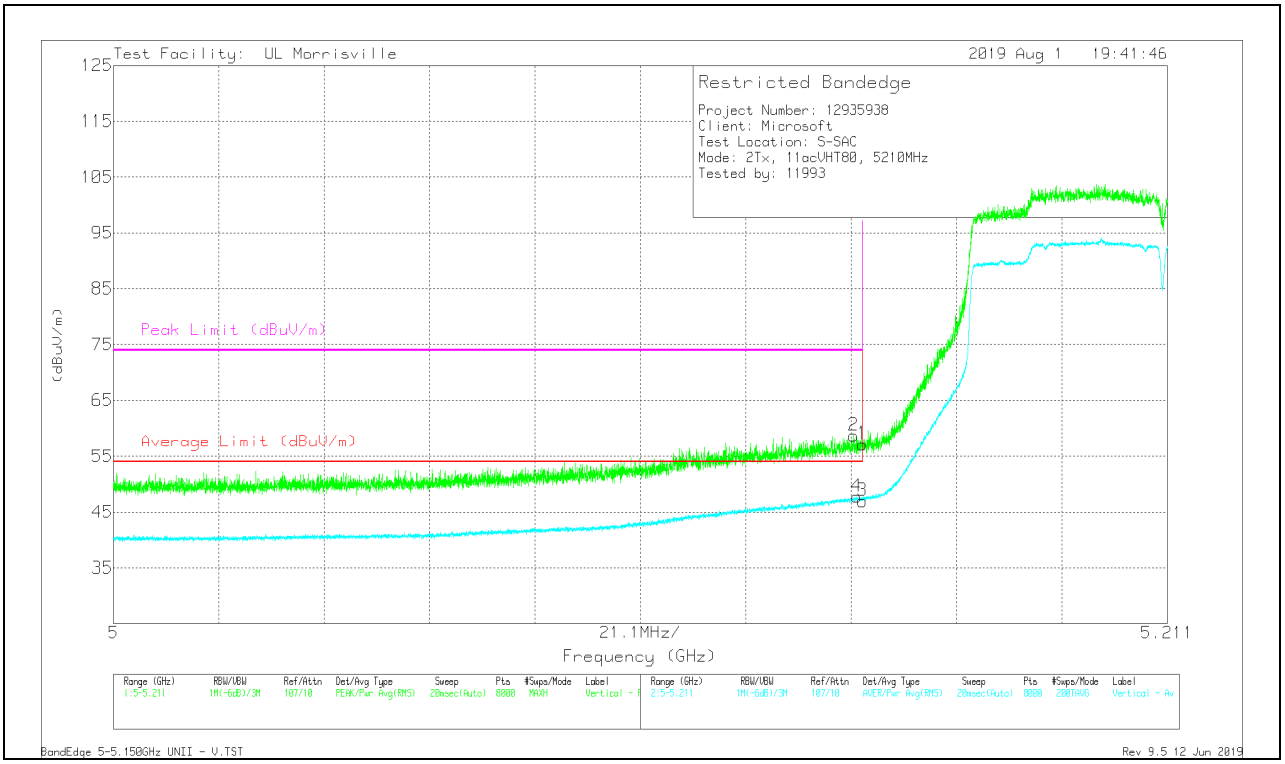


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.14999	40.65	Pk	34.3	-22.6	52.35	-	-	74	-21.65	48	394	H
2	* ** 5.14769	44.11	Pk	34.3	-22.6	55.81	-	-	74	-18.19	48	394	H
3	* ** 5.14999	31.5	RMS	34.3	-22.6	43.2	54	-10.8	-	-	48	394	H
4	* ** 5.14943	31.97	RMS	34.3	-22.6	43.67	54	-10.33	-	-	48	394	H

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

VERTICAL RESULT



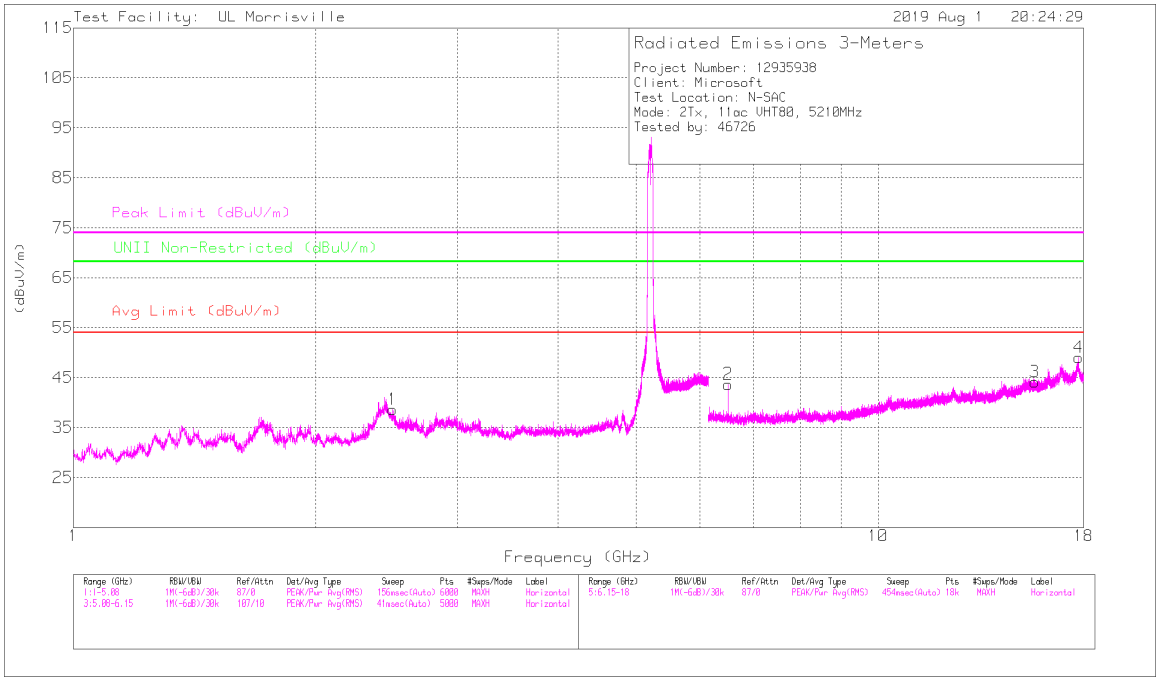
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.14999	45.44	Pk	34.3	-22.6	57.14	-	-	74	-16.86	54	243	V
2	* ** 5.14822	46.99	Pk	34.3	-22.6	58.69	-	-	74	-15.31	54	243	V
3	* ** 5.14999	35.28	RMS	34.3	-22.6	46.98	54	-7.02	-	-	54	243	V
4	* ** 5.1488	36.08	RMS	34.3	-22.6	47.78	54	-6.22	-	-	54	243	V

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

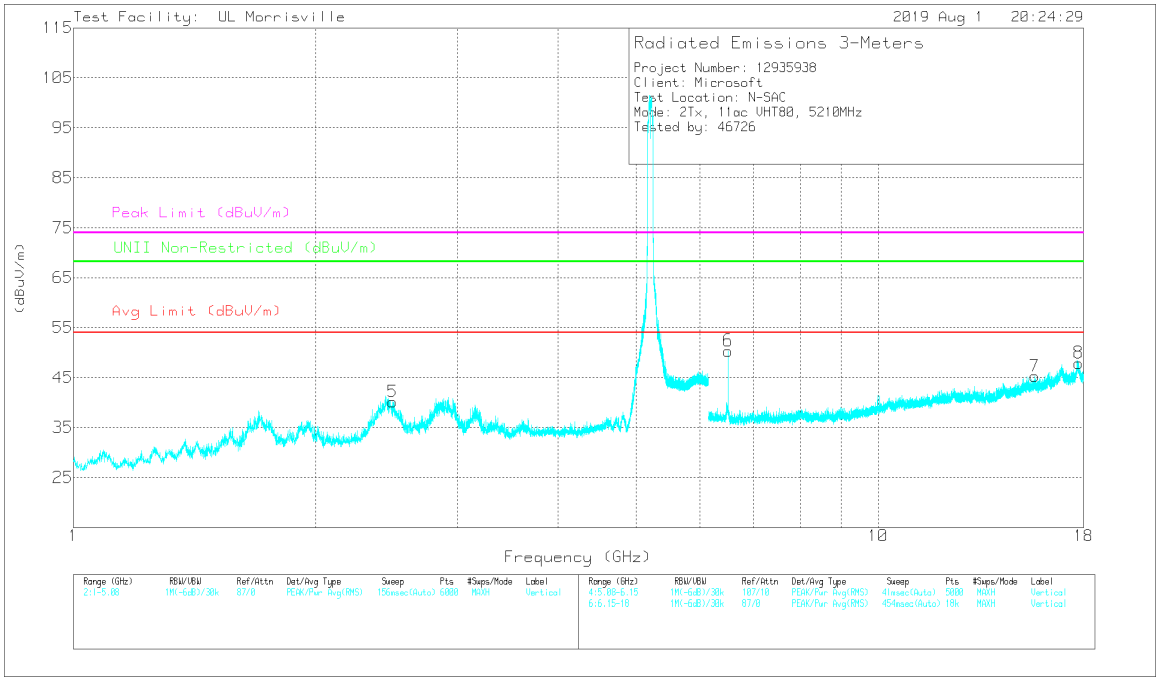
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

HARMONICS AND SPURIOUS EMISSIONS

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

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.49613	45.56	PK-U	32.5	-34.2	43.86	-	-	74	-30.14	-	-	211	268	H
	* ** 2.49617	33.52	ADR	32.5	-34.2	31.82	54	-22.18	-	-	-	-	211	268	H
5	* ** 2.49611	51.37	PK-U	32.5	-34.2	49.67	-	-	74	-24.33	-	-	31	224	V
	* ** 2.49617	38.79	ADR	32.5	-34.2	37.09	54	-16.91	-	-	-	-	31	224	V
3	* ** 15.66277	42.37	PK-U	40.1	-26.3	56.17	-	-	74	-17.83	-	-	264	286	H
	* ** 15.66275	28.66	ADR	40.1	-26.3	42.46	54	-11.54	-	-	-	-	264	286	H
4	* ** 17.73778	34.18	PK-U	41.1	-20.3	54.98	-	-	74	-19.02	-	-	35	213	H
	* ** 17.7378	22.07	ADR	41.1	-20.3	42.87	54	-11.13	-	-	-	-	35	213	H
7	* ** 15.66248	38.96	PK-U	40.1	-26.3	52.76	-	-	74	-21.24	-	-	285	270	V
	* ** 15.66249	25.44	ADR	40.1	-26.3	39.24	54	-14.76	-	-	-	-	285	270	V
8	* ** 17.73041	34.19	PK-U	41.1	-20.3	54.99	-	-	74	-19.01	-	-	164	368	V
	* ** 17.73047	22.09	ADR	41.1	-20.3	42.89	54	-11.11	-	-	-	-	164	368	V
2	6.51249	43.48	PK-U	35.5	-30.3	48.68	-	-	-	-	68.2	-19.52	219	218	H
6	6.51259	49.3	PK-U	35.5	-30.3	54.5	-	-	-	-	68.2	-13.7	299	217	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

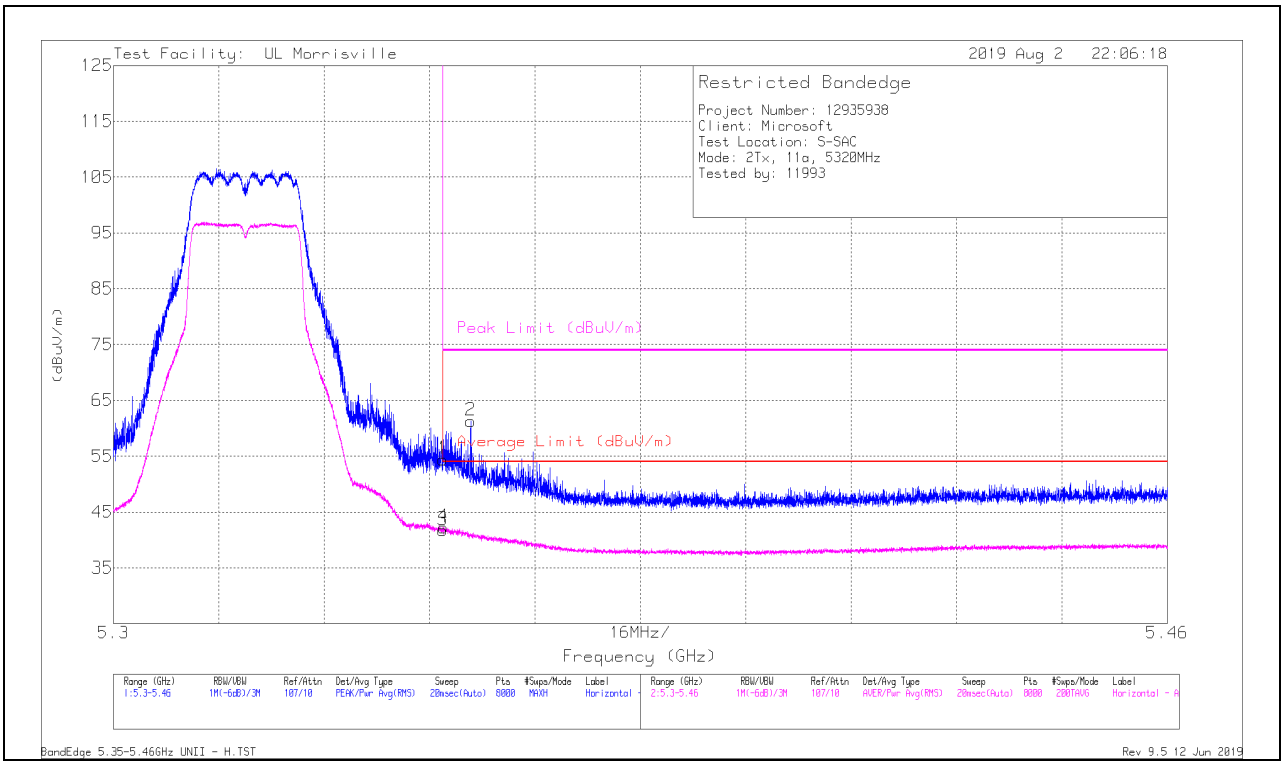
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

10.1.5. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND

2TX Antenna 1 + Antenna 2 CDD MODE

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

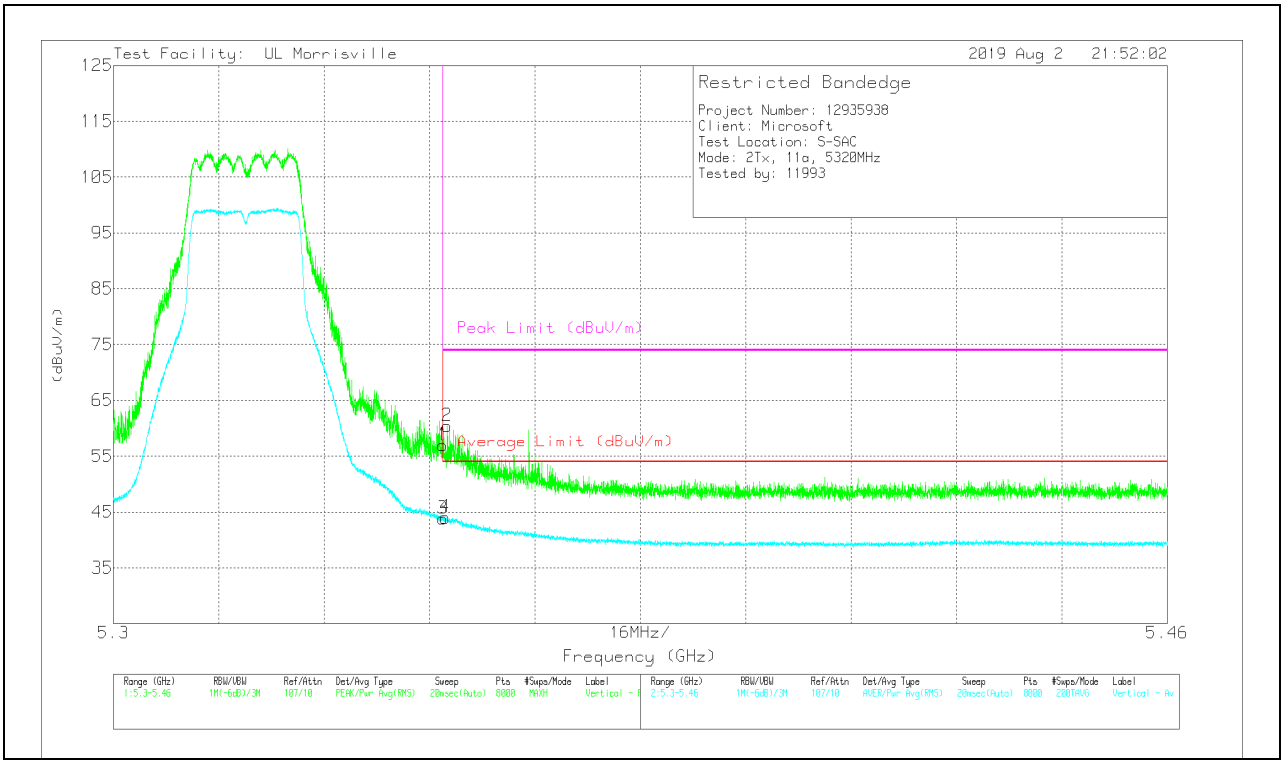


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.35001	43.26	Pk	34.4	-23.2	0	54.46	-	-	74	-19.54	61	396	H
2	* ** 5.35423	50.14	Pk	34.4	-23.2	0	61.34	-	-	74	-12.66	61	396	H
3	* ** 5.35001	30.48	RMS	34.4	-23.2	.09	41.77	54	-12.23	-	-	61	396	H
4	* ** 5.35007	30.99	RMS	34.4	-23.2	.09	42.28	54	-11.72	-	-	61	396	H

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

VERTICAL RESULT



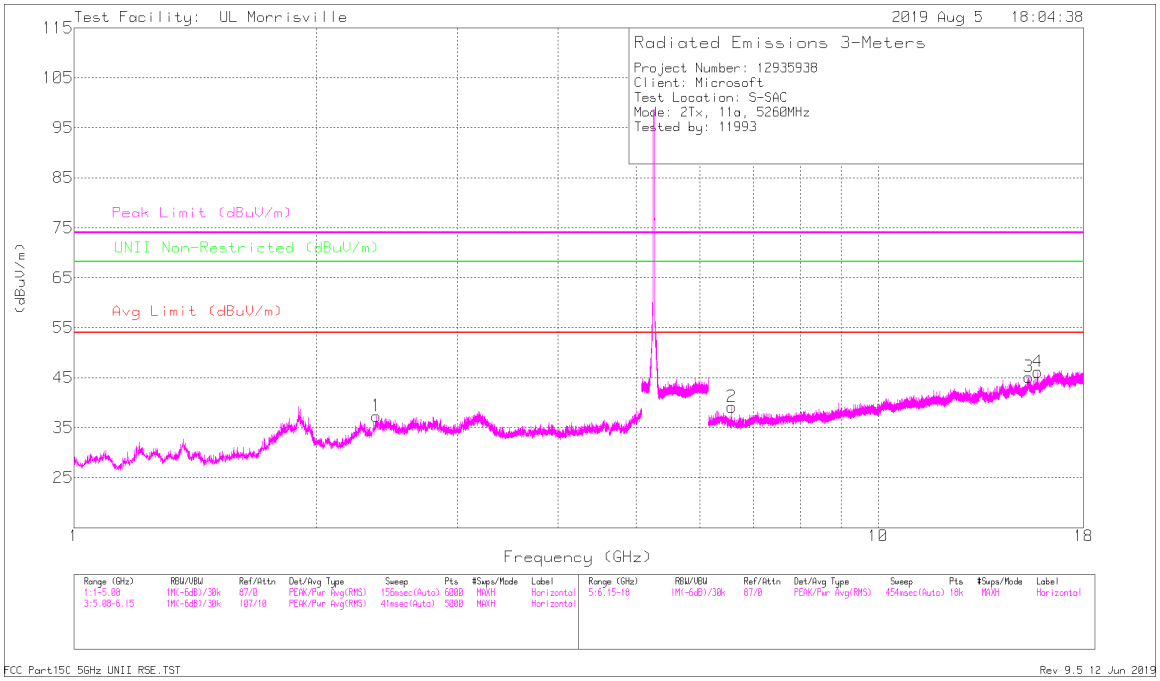
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.35001	45.74	Pk	34.4	-23.2	0	56.94	-	-	74	-17.06	5	279	V
2	* ** 5.35069	49.19	Pk	34.4	-23.2	0	60.39	-	-	74	-13.61	5	279	V
3	* ** 5.35001	32.5	RMS	34.4	-23.2	.09	43.79	54	-10.21	-	-	5	279	V
4	* ** 5.35035	32.73	RMS	34.4	-23.2	.09	44.02	54	-9.98	-	-	5	279	V

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

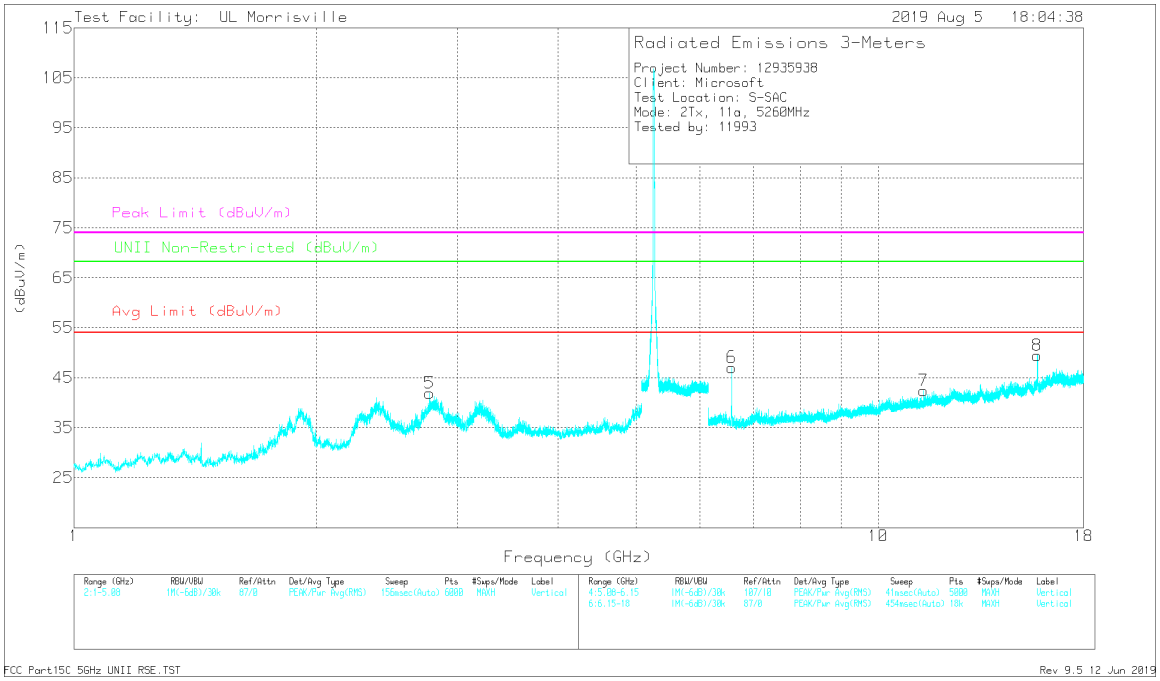
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

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

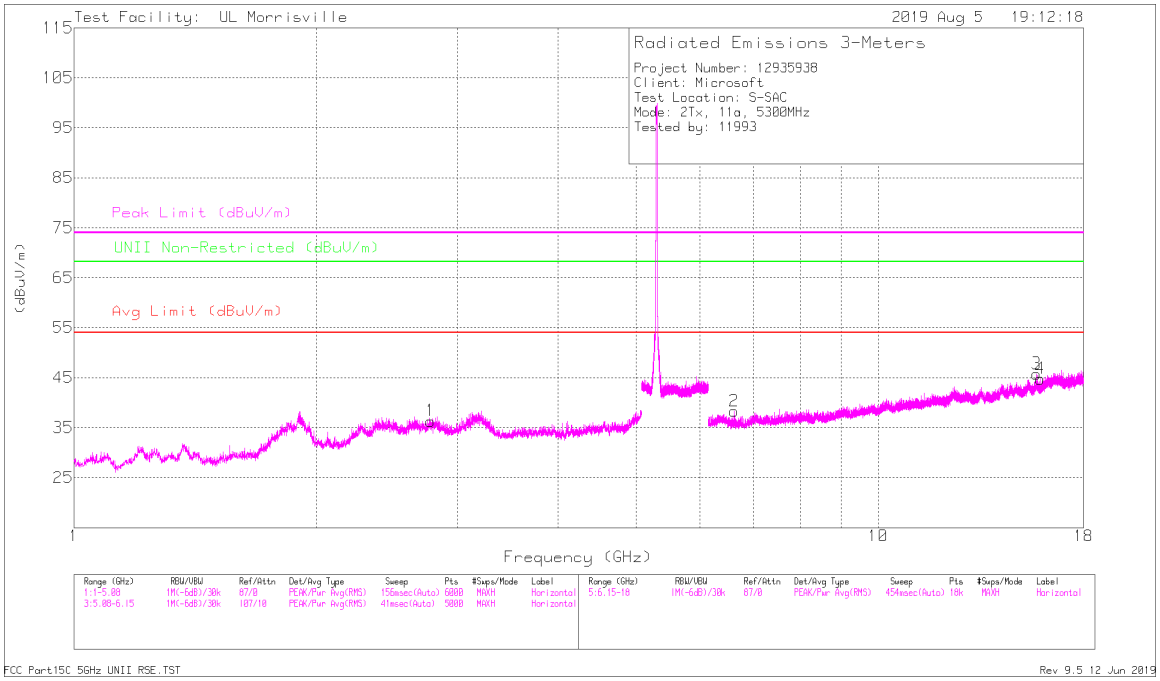
RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.37493	46.42	PK-U	31.8	-33.9	0	44.32	-	-	74	-29.68	-	-	352	276	H
	* ** 2.37514	34.42	ADR	31.8	-33.9	.09	32.41	54	-21.59	-	-	-	-	352	276	H
5	* ** 2.7703	50.84	PK-U	32.2	-33.5	0	49.54	-	-	74	-24.46	-	-	101	234	V
	* ** 2.77035	39.22	ADR	32.2	-33.5	.09	38.01	54	-15.99	-	-	-	-	101	234	V
3	* ** 15.37743	34.16	PK-U	39.9	-22.3	0	51.76	-	-	74	-22.24	-	-	325	280	H
	* ** 15.37773	21.68	ADR	39.9	-22.3	.09	39.37	54	-14.63	-	-	-	-	325	280	H
4	* ** 15.78122	42.96	PK-U	40.4	-22.8	0	60.56	-	-	74	-13.44	-	-	333	297	H
	* ** 15.7792	29.7	ADR	40.3	-22.7	.09	47.39	54	-6.61	-	-	-	-	333	297	H
7	* ** 11.38887	33.66	PK-U	38.1	-24.5	0	47.26	-	-	74	-26.74	-	-	104	115	V
	* ** 11.39276	21.89	ADR	38.1	-24.5	.09	35.58	54	-18.42	-	-	-	-	104	115	V
8	* ** 15.77405	41.74	PK-U	40.3	-22.7	0	59.34	-	-	74	-14.66	-	-	30	278	V
	* ** 15.77213	29.21	ADR	40.3	-22.7	.09	46.9	54	-7.1	-	-	-	-	30	278	V
2	6.57483	39.19	PK-U	35.5	-28.9	0	45.79	-	-	-	-	68.2	-22.41	254	400	H
6	6.575	46.16	PK-U	35.5	-28.9	0	52.76	-	-	-	-	68.2	-15.44	28	250	V

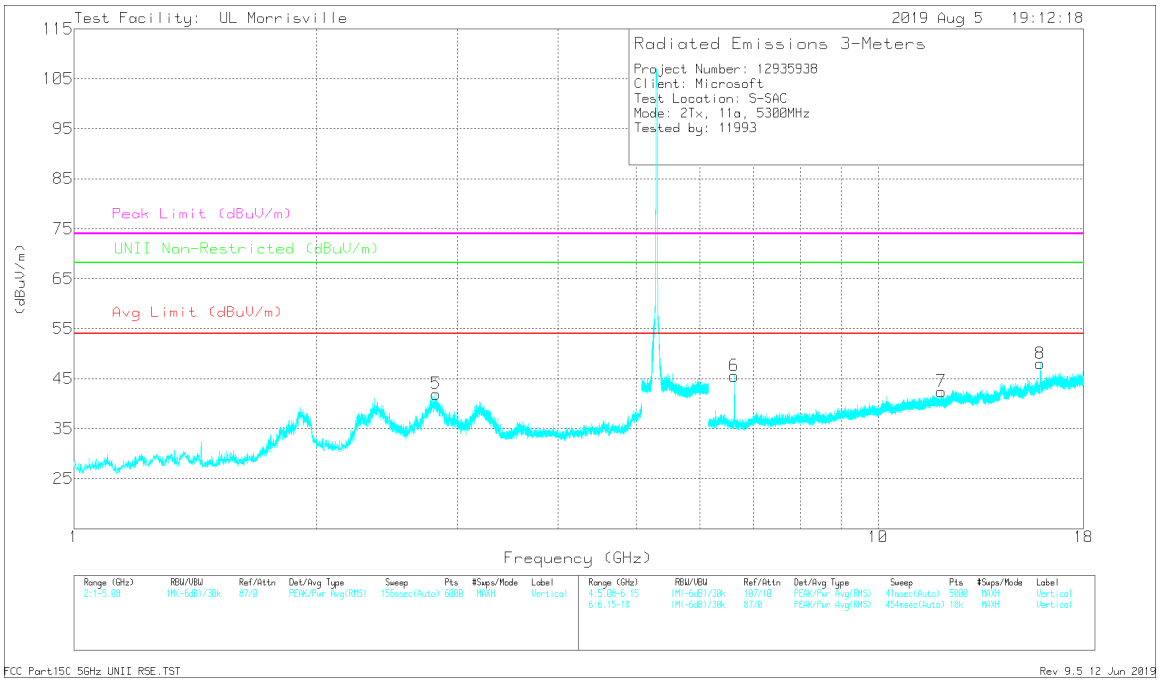
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average
Pk - Peak detector

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

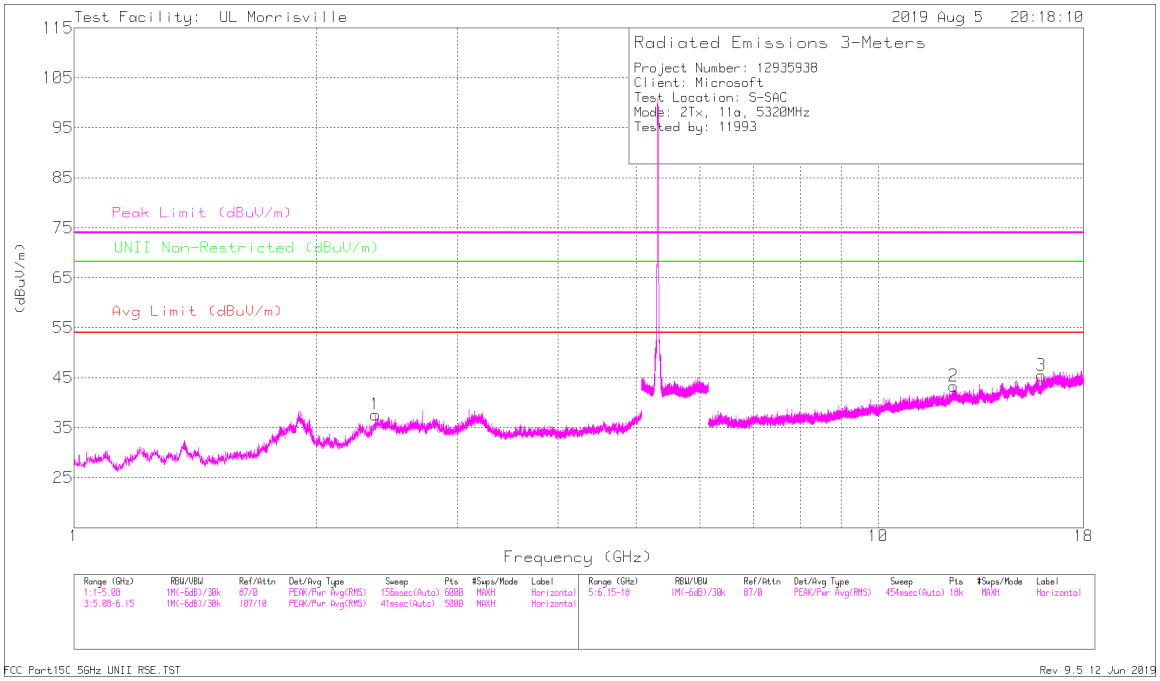
RADIATED EMISSIONS

Marekr	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.77664	46.26	PK-U	32.2	-33.5	0	44.96	-	-	74	-29.04	-	-	142	139	H
	* ** 2.77756	34.84	ADR	32.2	-33.5	.09	33.63	54	-20.37	-	-	-	-	142	139	H
5	* ** 2.82027	52.35	PK-U	32.1	-33.6	0	50.85	-	-	74	-23.15	-	-	103	237	V
	* ** 2.81825	40.69	ADR	32.1	-33.6	.09	39.28	54	-14.72	-	-	-	-	103	237	V
3	* ** 15.73802	33.83	PK-U	40.3	-22.8	0	51.33	-	-	74	-22.67	-	-	352	289	H
	* ** 15.74018	21.78	ADR	40.3	-22.7	.09	39.47	54	-14.53	-	-	-	-	352	289	H
4	* ** 15.89887	42.05	PK-U	40.5	-24.5	0	58.05	-	-	74	-15.95	-	-	327	360	H
	* ** 15.89861	28.67	ADR	40.5	-24.5	.09	44.76	54	-9.24	-	-	-	-	327	360	H
7	* ** 11.97979	33.74	PK-U	38.7	-24.5	0	47.94	-	-	74	-26.06	-	-	30	329	V
	* ** 11.97975	21.73	ADR	38.7	-24.5	.09	36.02	54	-17.98	-	-	-	-	30	329	V
8	* ** 15.90311	44.87	PK-U	40.5	-24.5	0	60.87	-	-	74	-13.13	-	-	24	282	V
	* ** 15.90408	30.65	ADR	40.5	-24.5	.09	46.74	54	-7.26	-	-	-	-	24	282	V
2	6.62511	37.27	PK-U	35.5	-29	0	43.77	-	-	-	-	68.2	-24.43	283	377	H
6	6.62514	43.52	PK-U	35.5	-29	0	50.02	-	-	-	-	68.2	-18.18	14	250	V

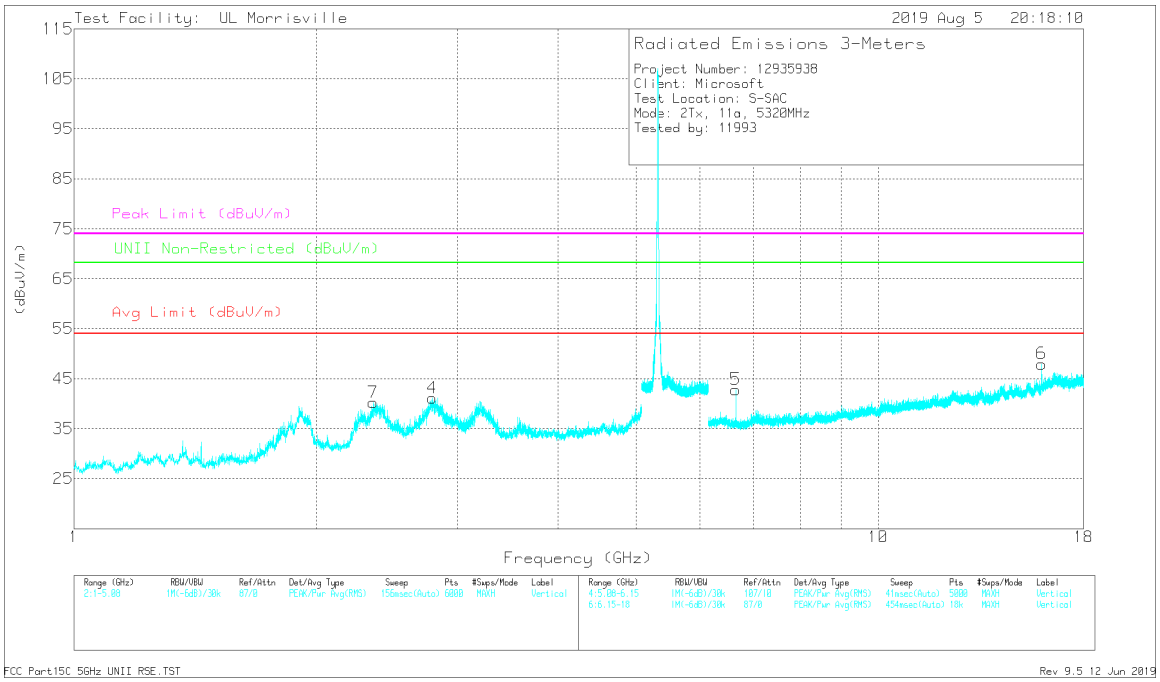
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average
Pk - Peak detector

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	AT0072 (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.36996	46.97	PK-U	31.8	-33.9	0	44.87	-	-	74	-29.13	-	-	354	121	H
	* ** 2.37127	35.22	ADR	31.8	-33.9	.09	33.21	54	-20.79	-	-	-	-	354	121	H
4	* ** 2.78983	52.15	PK-U	32.2	-33.5	0	50.85	-	-	74	-23.15	-	-	102	238	V
	* ** 2.79002	40.15	ADR	32.2	-33.5	.09	38.94	54	-15.06	-	-	-	-	102	238	V
7	* ** 2.35436	50.77	PK-U	31.7	-34	0	48.47	-	-	74	-25.53	-	-	93	262	V
	* ** 2.35481	39.02	ADR	31.7	-34	.09	36.81	54	-17.19	-	-	-	-	93	262	V
2	* ** 12.4026	34.5	PK-U	38.8	-23.4	0	49.9	-	-	74	-24.1	-	-	23	294	H
	* ** 12.40259	21.9	ADR	38.8	-23.4	.09	37.39	54	-16.61	-	-	-	-	23	294	H
3	* ** 15.96117	42.27	PK-U	40.6	-24.2	0	58.67	-	-	74	-15.33	-	-	324	377	H
	* ** 15.96088	28.47	ADR	40.6	-24.2	.09	44.96	54	-9.04	-	-	-	-	324	377	H
6	* ** 15.96312	44.53	PK-U	40.6	-24.2	0	60.93	-	-	74	-13.07	-	-	23	281	V
	* ** 15.96351	30.65	ADR	40.6	-24.2	.09	47.14	54	-6.86	-	-	-	-	23	281	V
5	6.65006	42.07	PK-U	35.5	-29	0	48.57	-	-	-	-	68.2	-19.63	13	236	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average
Pk - Peak detector

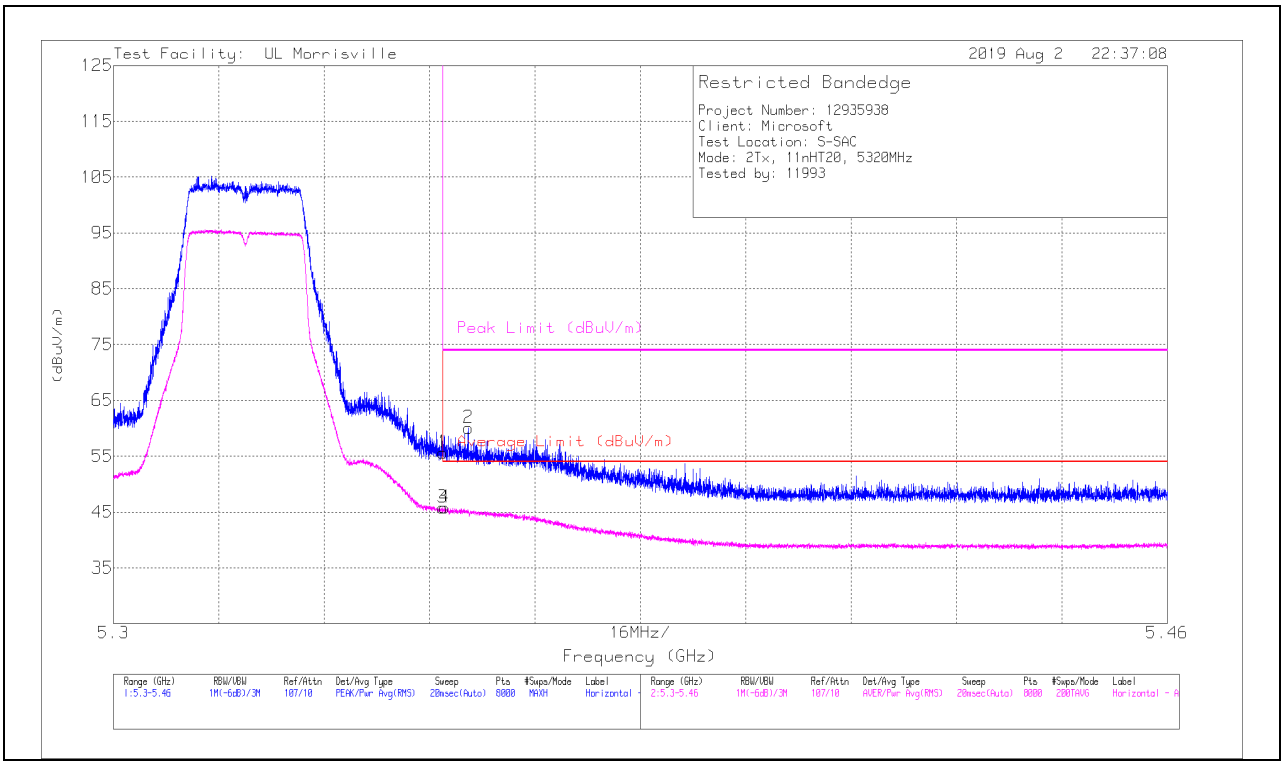
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

10.1.6. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

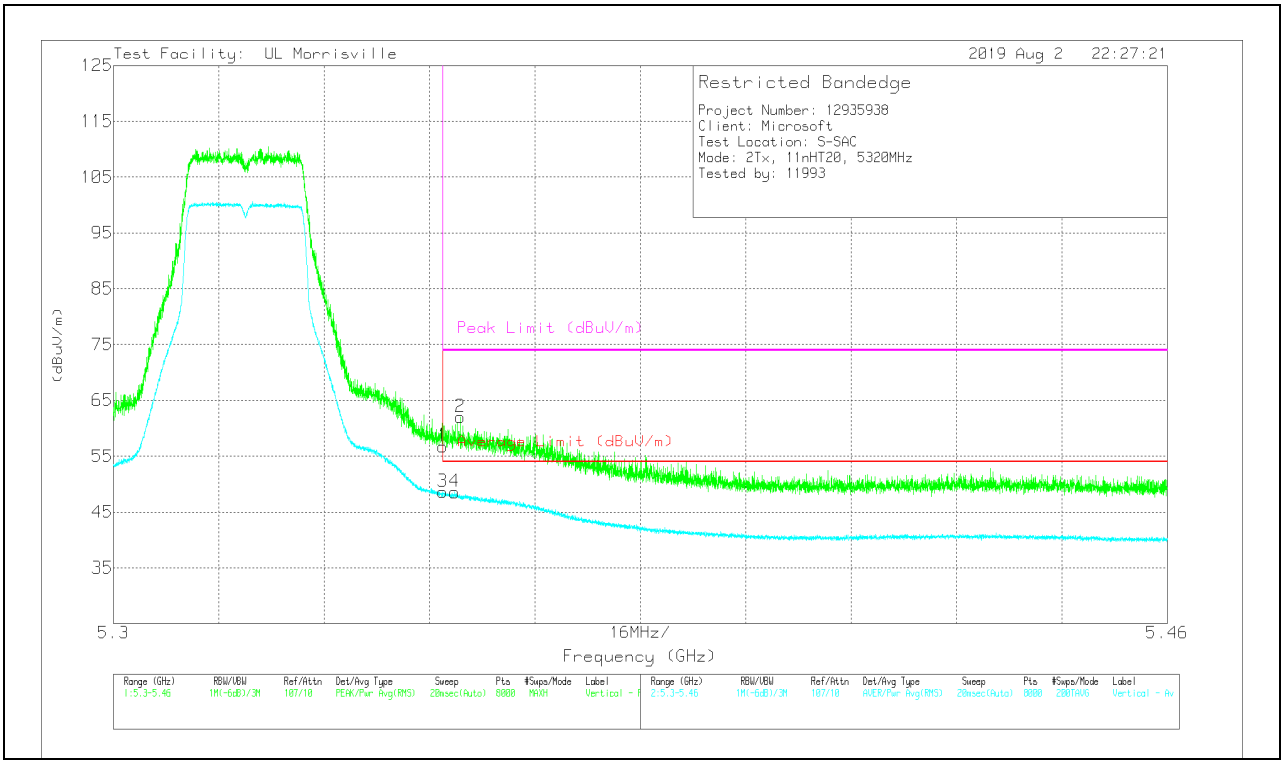


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.35001	44.4	Pk	34.4	-23.2	55.6	-	-	74	-18.4	56	386	H
2	* ** 5.35385	48.88	Pk	34.4	-23.2	60.08	-	-	74	-13.92	56	386	H
3	* ** 5.35001	34.61	RMS	34.4	-23.2	45.81	54	-8.19	-	-	56	386	H
4	* ** 5.35031	34.56	RMS	34.4	-23.2	45.76	54	-8.24	-	-	56	386	H

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

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.35001	45.59	Pk	34.4	-23.2	56.79	-	-	74	-17.21	5	243	V
2	* ** 5.35267	50.81	Pk	34.4	-23.2	62.01	-	-	74	-11.99	5	243	V
3	* ** 5.35001	37.43	RMS	34.4	-23.2	48.63	54	-5.37	-	-	5	243	V
4	* ** 5.35181	37.37	RMS	34.4	-23.2	48.57	54	-5.43	-	-	5	243	V

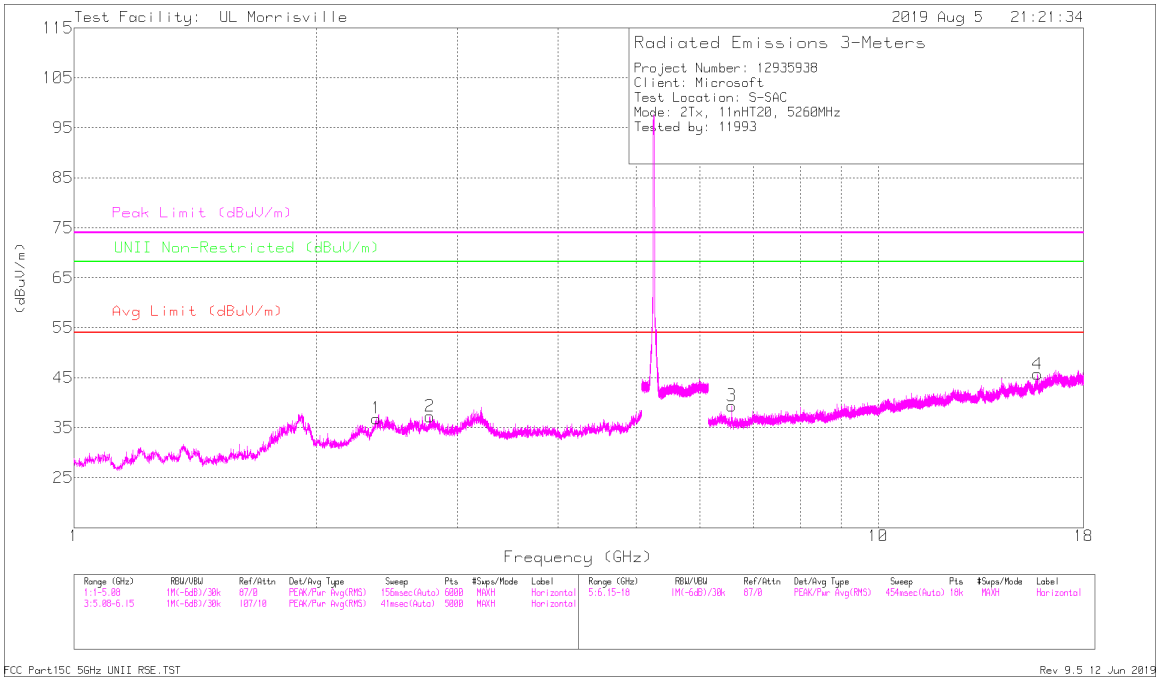
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
RMS - RMS detection

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

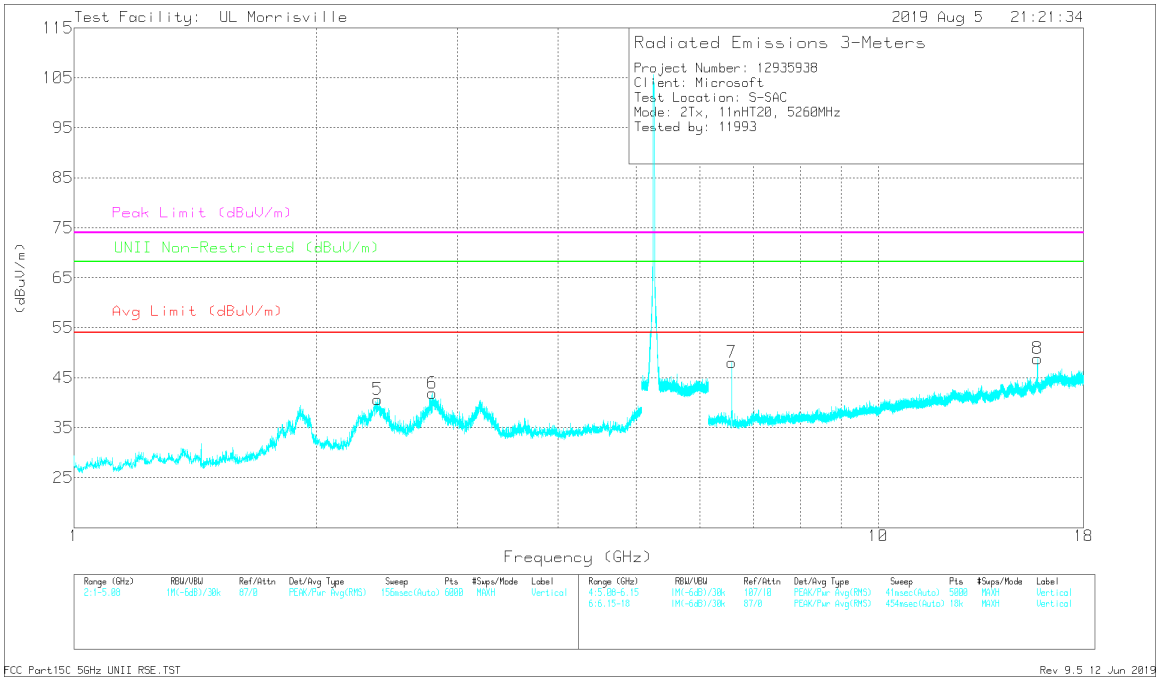
This report shall not be reproduced except in full, without the written approval of UL LLC

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

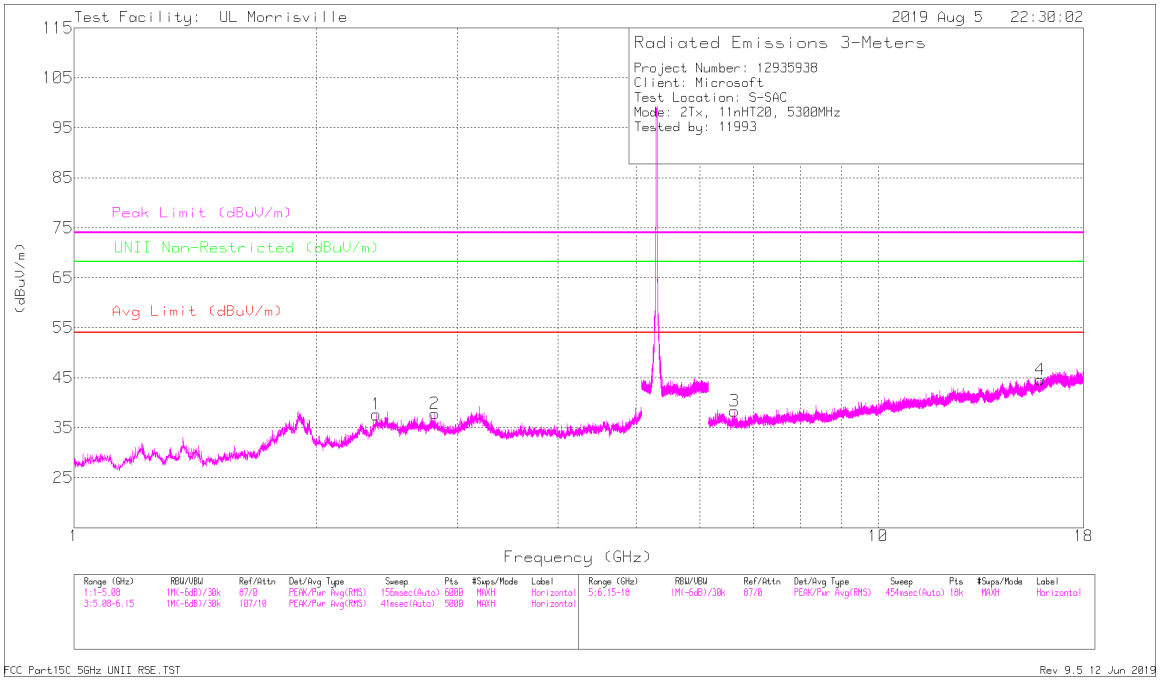
RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.37761	47.21	PK-U	31.8	-33.9	45.11	-	-	74	-28.89	-	-	355	110	H
	* ** 2.37706	35.13	ADR	31.8	-33.9	33.03	54	-20.97	-	-	-	-	355	110	H
2	* ** 2.7691	46.52	PK-U	32.2	-33.5	45.22	-	-	74	-28.78	-	-	140	133	H
	* ** 2.77278	34.45	ADR	32.2	-33.5	33.15	54	-20.85	-	-	-	-	140	133	H
5	* ** 2.38731	51.67	PK-U	31.9	-33.9	49.67	-	-	74	-24.33	-	-	95	244	V
	* ** 2.38433	39.58	ADR	31.9	-33.9	37.58	54	-16.42	-	-	-	-	95	244	V
6	* ** 2.78715	51.78	PK-U	32.2	-33.5	50.48	-	-	74	-23.52	-	-	101	239	V
	* ** 2.79	40.08	ADR	32.2	-33.5	38.78	54	-15.22	-	-	-	-	101	239	V
4	* ** 15.77604	39.58	PK-U	40.3	-22.7	57.18	-	-	74	-16.82	-	-	327	347	H
	* ** 15.77633	26.45	ADR	40.3	-22.7	44.05	54	-9.95	-	-	-	-	327	347	H
8	* ** 15.77599	41.47	PK-U	40.3	-22.7	59.07	-	-	74	-14.93	-	-	24	293	V
	* ** 15.77739	29.3	ADR	40.3	-22.7	46.9	54	-7.1	-	-	-	-	24	293	V
3	6.57502	40.22	PK-U	35.5	-28.9	46.82	-	-	-	-	68.2	-21.38	330	390	H
7	6.57511	44.75	PK-U	35.5	-28.9	51.35	-	-	-	-	68.2	-16.85	14	256	V

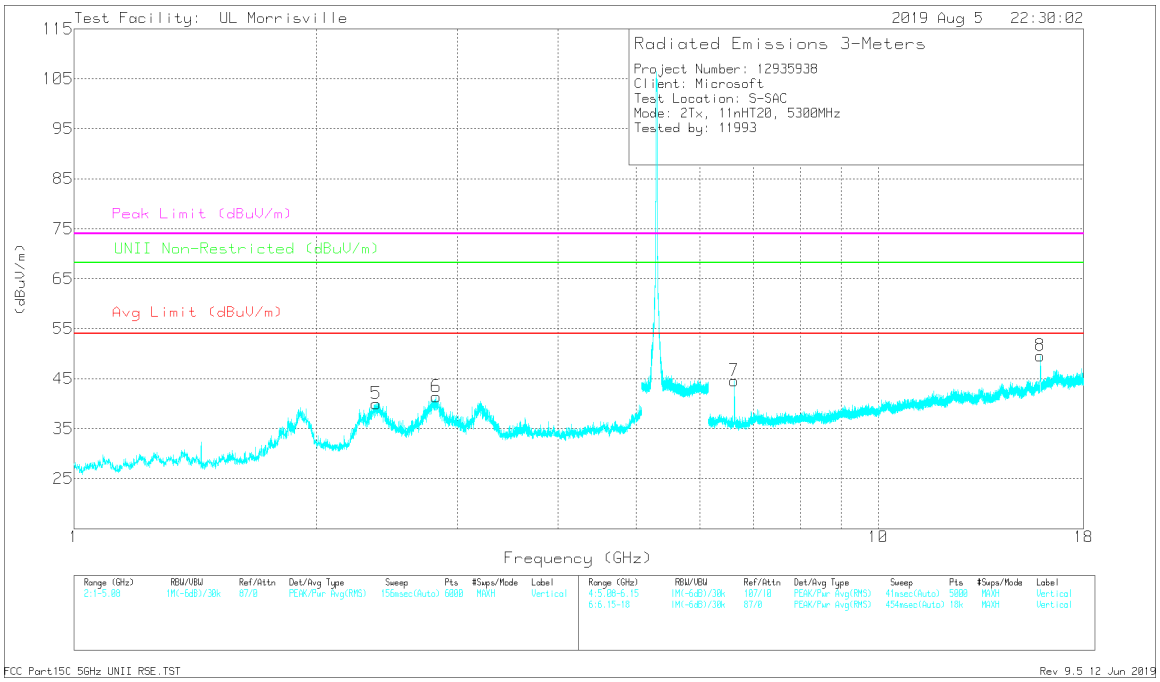
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average
Pk - Peak detector

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

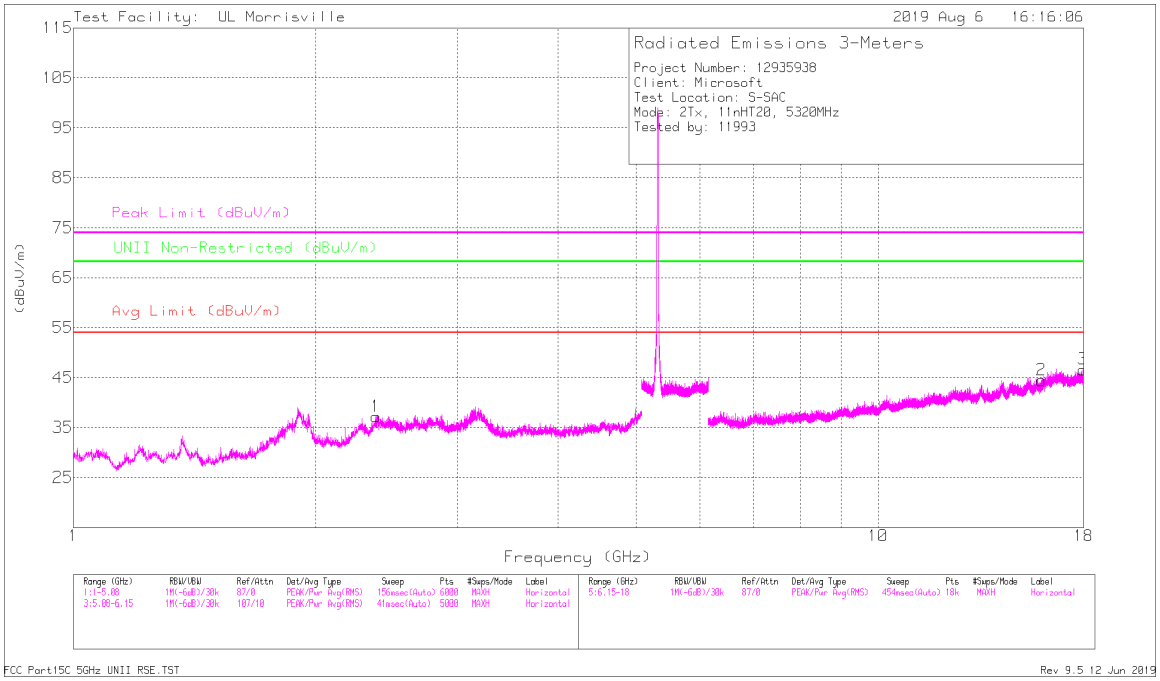
RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.37954	47.21	PK-U	31.9	-33.9	45.21	-	-	74	-28.79	-	-	352	103	H
	* ** 2.3795	35.21	ADR	31.9	-33.9	33.21	54	-20.79	-	-	-	-	352	103	H
2	* ** 2.81144	45.94	PK-U	32.1	-33.5	44.54	-	-	74	-29.46	-	-	168	194	H
	* ** 2.81137	33.71	ADR	32.1	-33.5	32.31	54	-21.69	-	-	-	-	168	194	H
5	* ** 2.37697	52.08	PK-U	31.8	-33.9	49.98	-	-	74	-24.02	-	-	95	229	V
	* ** 2.37662	39.73	ADR	31.8	-33.9	37.63	54	-16.37	-	-	-	-	95	229	V
6	* ** 2.81966	51.85	PK-U	32.1	-33.6	50.35	-	-	74	-23.65	-	-	100	263	V
	* ** 2.81935	40.41	ADR	32.1	-33.6	38.91	54	-15.09	-	-	-	-	100	263	V
4	* ** 15.90387	40.75	PK-U	40.5	-24.5	56.75	-	-	74	-17.25	-	-	12	352	H
	* ** 15.90381	27.59	ADR	40.5	-24.5	43.59	54	-10.41	-	-	-	-	12	352	H
8	* ** 15.90014	46.04	PK-U	40.5	-24.5	62.04	-	-	74	-11.96	-	-	30	289	V
	* ** 15.9002	32.31	ADR	40.5	-24.5	48.31	54	-5.69	-	-	-	-	30	289	V
7	6.6249	43.85	PK-U	35.5	-29	50.35	-	-	-	-	68.2	-17.85	54	227	V
3	6.62542	37.6	PK-U	35.5	-29	44.1	-	-	-	-	68.2	-24.1	140	194	H

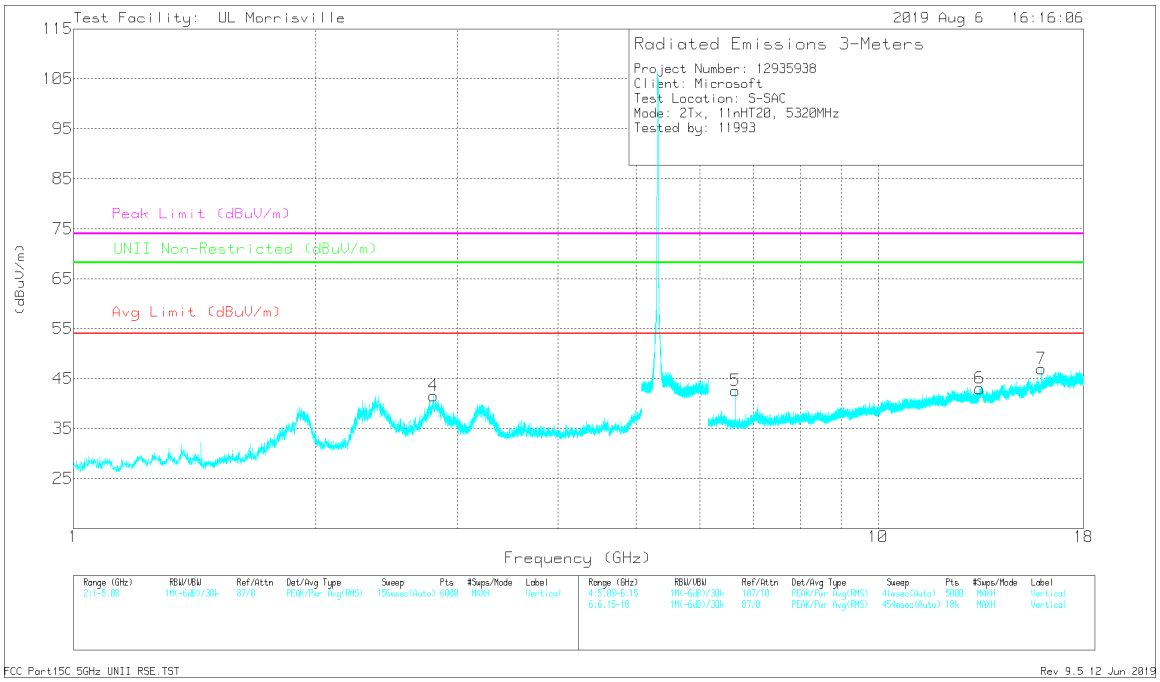
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average
Pk - Peak detector

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	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.37775	46.5	PK-U	31.8	-33.9	44.4	-	-	74	-29.6	-	-	354	112	H
	* ** 2.37541	34.54	ADR	31.8	-33.9	32.44	54	-21.56	-	-	-	-	354	112	H
4	* ** 2.80272	51.13	PK-U	32.2	-33.5	49.83	-	-	74	-24.17	-	-	105	244	V
	* ** 2.80036	40.09	ADR	32.2	-33.5	38.79	54	-15.21	-	-	-	-	105	244	V
2	* ** 15.95993	38.85	PK-U	40.6	-24.2	55.25	-	-	74	-18.75	-	-	330	370	H
	* ** 15.96013	26.33	ADR	40.6	-24.2	42.73	54	-11.27	-	-	-	-	330	370	H
3	* ** 17.97838	33.52	PK-U	41.2	-22	52.72	-	-	74	-21.28	-	-	197	376	H
	* ** 17.97862	21.03	ADR	41.2	-22	40.23	54	-13.77	-	-	-	-	197	376	H
6	* ** 13.37363	33.38	PK-U	39	-23.9	48.48	-	-	74	-25.52	-	-	73	165	V
	* ** 13.37613	22.44	ADR	39	-23.9	37.54	54	-16.46	-	-	-	-	73	165	V
7	* ** 15.95933	42.07	PK-U	40.6	-24.2	58.47	-	-	74	-15.53	-	-	25	292	V
	* ** 15.95978	28.69	ADR	40.6	-24.2	45.09	54	-8.91	-	-	-	-	25	292	V
5	6.65009	41.75	PK-U	35.5	-29	48.25	-	-	-	-	68.2	-19.95	30	232	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average
Pk - Peak detector

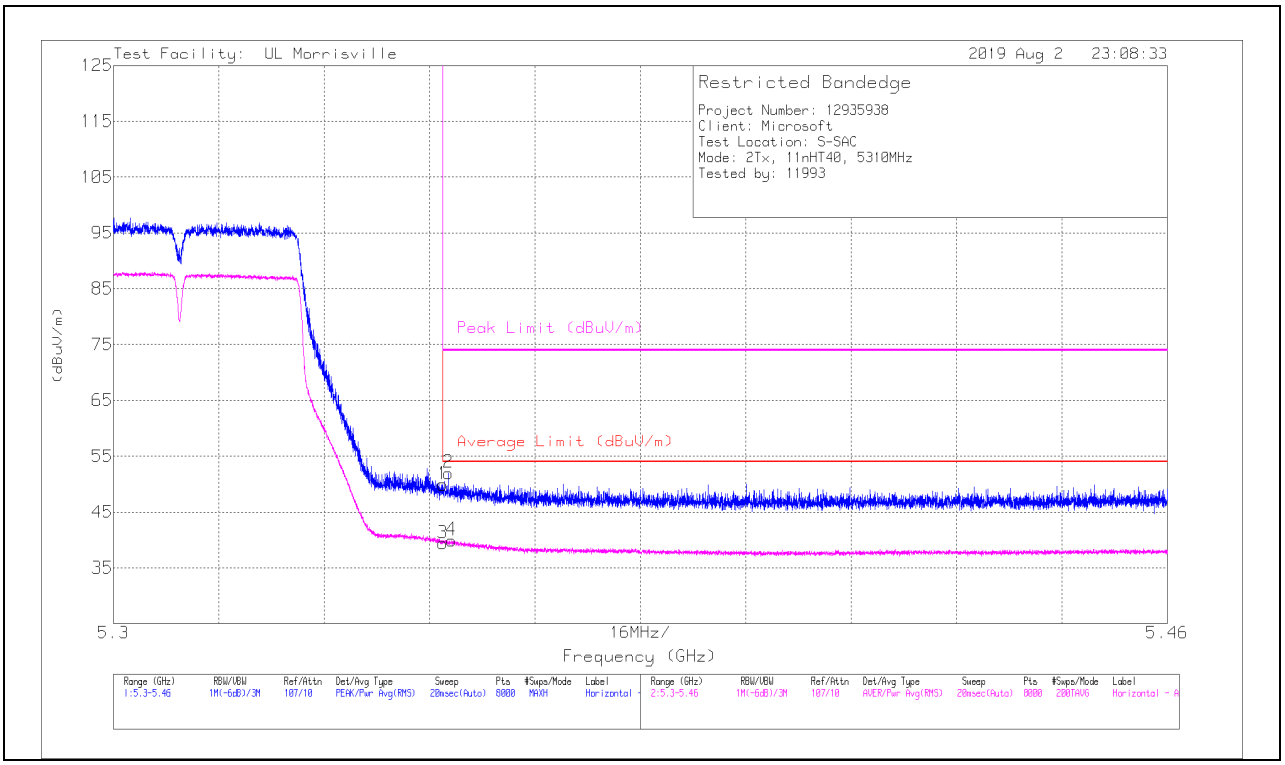
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

10.1.7. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.3 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

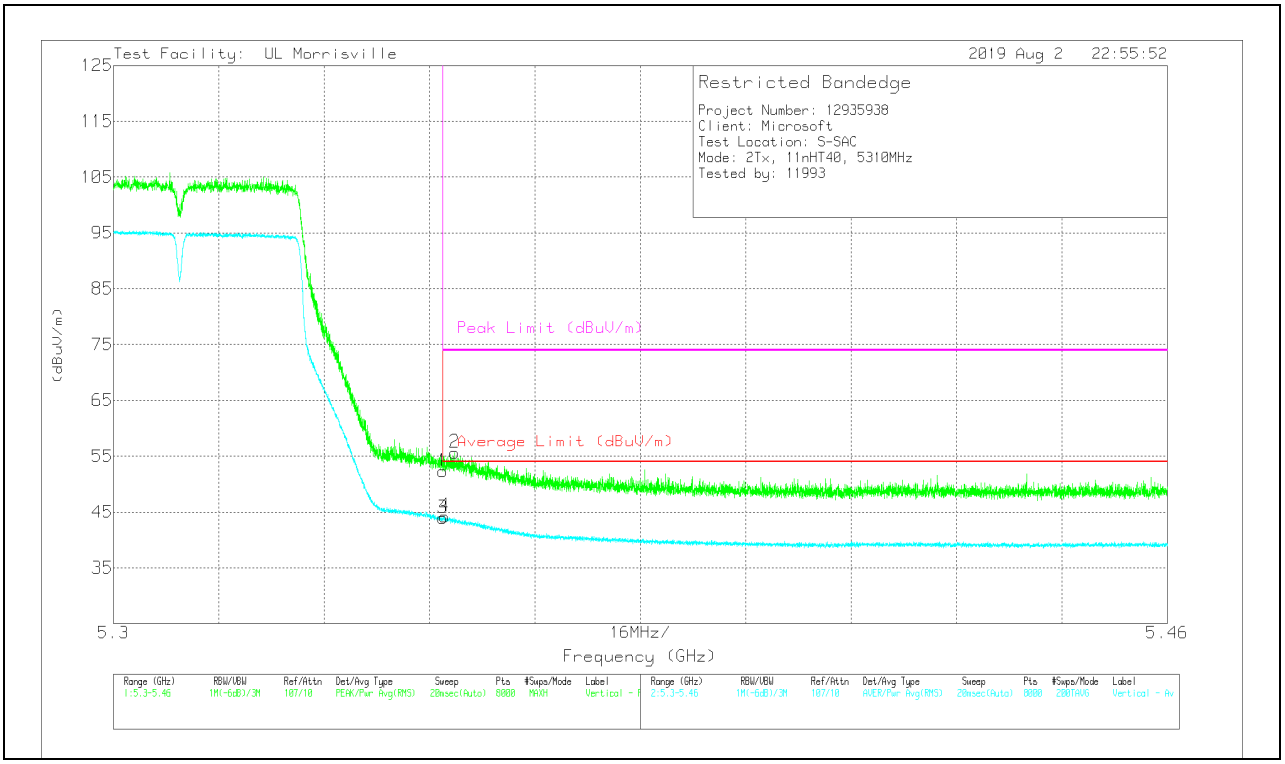


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.35001	38.73	Pk	34.4	-23.2	49.93	-	-	74	-24.07	55	230	H
2	* ** 5.35083	40.8	Pk	34.4	-23.2	52	-	-	74	-22	55	230	H
3	* ** 5.35001	28.23	RMS	34.4	-23.2	39.43	54	-14.57	-	-	55	230	H
4	* ** 5.35135	28.73	RMS	34.4	-23.2	39.93	54	-14.07	-	-	55	230	H

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

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.35001	41.12	Pk	34.4	-23.2	52.32	-	-	74	-21.68	45	230	V
2	* ** 5.35177	44.46	Pk	34.4	-23.2	55.66	-	-	74	-18.34	45	230	V
3	* ** 5.35001	32.77	RMS	34.4	-23.2	43.97	54	-10.03	-	-	45	230	V
4	* ** 5.35029	33.03	RMS	34.4	-23.2	44.23	54	-9.77	-	-	45	230	V

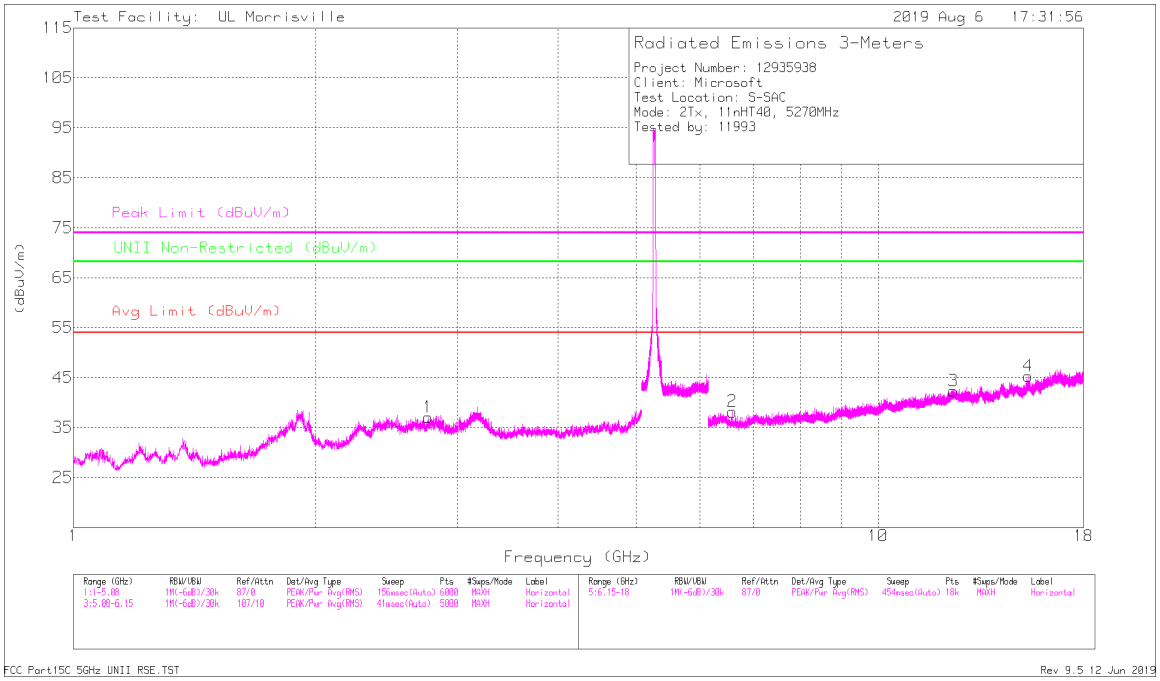
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
RMS - RMS detection

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

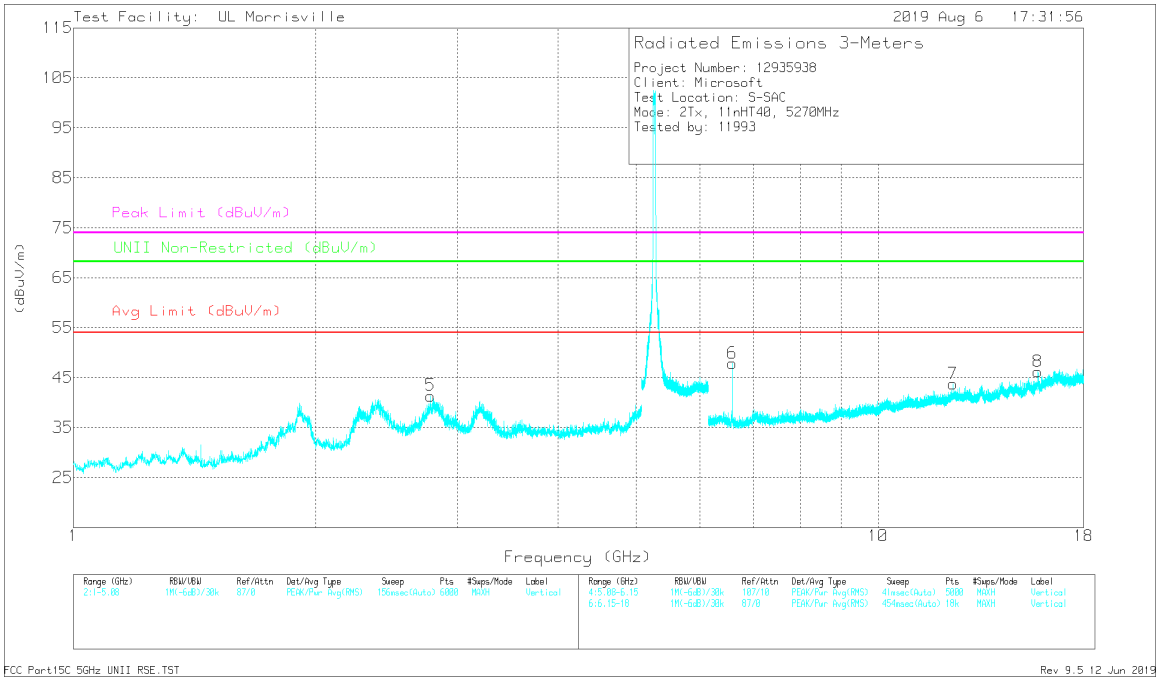
This report shall not be reproduced except in full, without the written approval of UL LLC

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

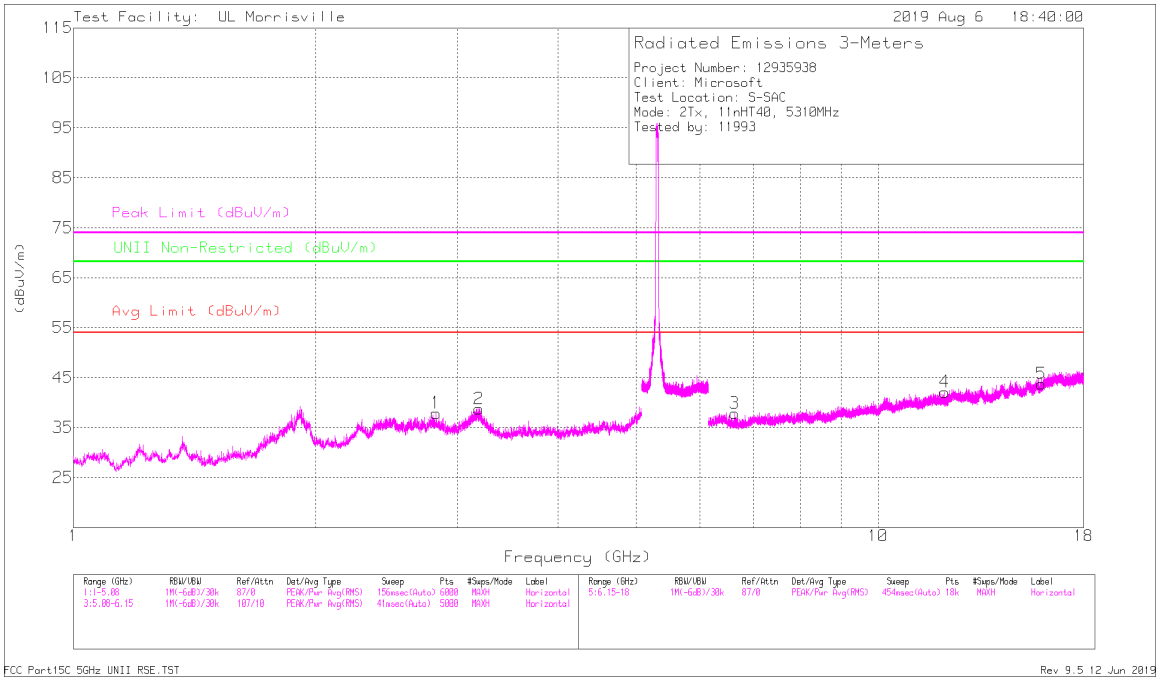
RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.76054	45.49	PK-U	32.3	-33.5	44.29	-	-	74	-29.71	-	-	172	181	H
	* ** 2.75998	33.77	ADR	32.3	-33.5	32.57	54	-21.43	-	-	-	-	172	181	H
5	* ** 2.77631	51.26	PK-U	32.2	-33.5	49.96	-	-	74	-24.04	-	-	107	242	V
	* ** 2.77629	39.6	ADR	32.2	-33.5	38.3	54	-15.7	-	-	-	-	107	242	V
3	* ** 12.40019	33.19	PK-U	38.8	-23.4	48.59	-	-	74	-25.41	-	-	313	319	H
	* ** 12.40056	21.92	ADR	38.8	-23.4	37.32	54	-16.68	-	-	-	-	313	319	H
4	* ** 15.3678	33.39	PK-U	39.9	-22.5	50.79	-	-	74	-23.21	-	-	157	393	H
	* ** 15.3679	21.29	ADR	39.9	-22.5	38.69	54	-15.31	-	-	-	-	157	393	H
7	* ** 12.39118	34.06	PK-U	38.8	-23.5	49.36	-	-	74	-24.64	-	-	226	185	V
	* ** 12.39107	22.44	ADR	38.8	-23.5	37.74	54	-16.26	-	-	-	-	226	185	V
8	* ** 15.79484	39.99	PK-U	40.4	-23.2	57.19	-	-	74	-16.81	-	-	21	286	V
	* ** 15.79485	27.27	ADR	40.4	-23.2	44.47	54	-9.53	-	-	-	-	21	286	V
2	6.58742	40.35	PK-U	35.5	-29	46.85	-	-	-	-	68.2	-21.35	292	396	H
6	6.58763	44.64	PK-U	35.5	-29	51.14	-	-	-	-	68.2	-17.06	33	254	V

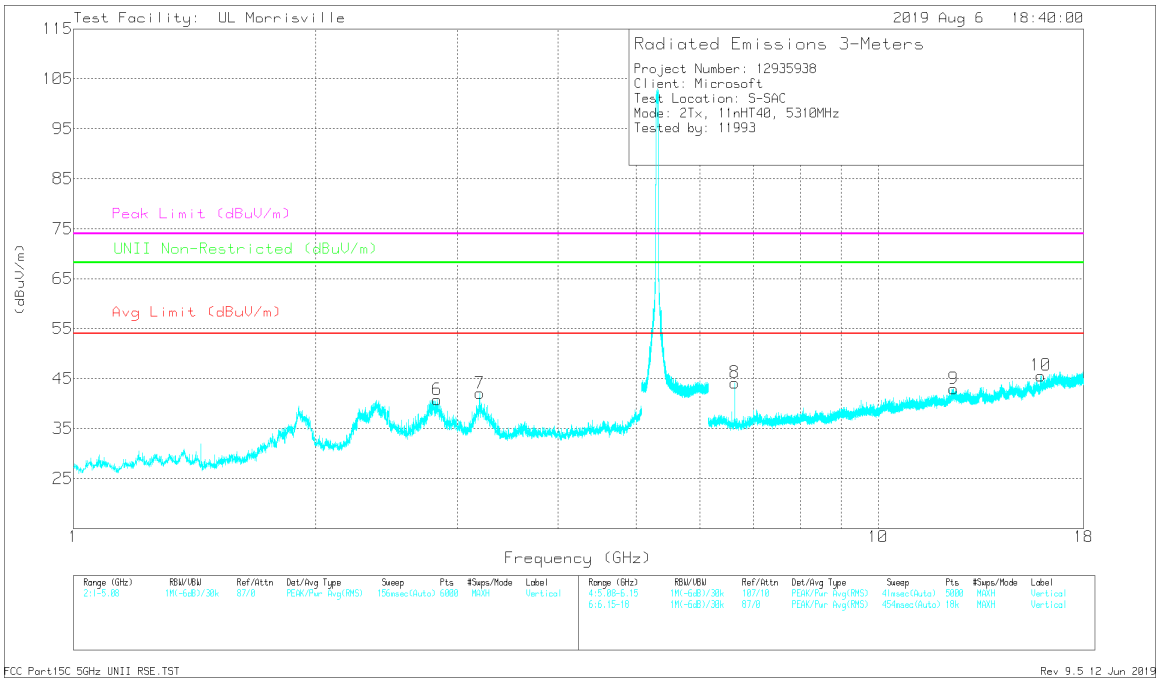
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average
Pk - Peak detector

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	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	** 2.82467	47.31	PK-U	32.1	-33.6	45.81	-	-	74	-28.19	-	-	6	107	H
	** 2.82428	35.25	ADR	32.1	-33.6	33.75	54	-20.25	-	-	-	-	6	107	H
6	** 2.83104	45	PK-U	32.1	-33.6	43.5	-	-	74	-30.5	-	-	352	117	V
	** 2.83087	32.85	ADR	32.1	-33.6	31.35	54	-22.65	-	-	-	-	352	117	V
4	** 12.10329	34.19	PK-U	38.8	-24.7	48.29	-	-	74	-25.71	-	-	156	294	H
	** 12.10315	22.13	ADR	38.8	-24.7	36.23	54	-17.77	-	-	-	-	156	294	H
5	** 15.9439	37.64	PK-U	40.6	-24.5	53.74	-	-	74	-20.26	-	-	333	297	H
	** 15.9435	25.1	ADR	40.6	-24.5	41.2	54	-12.8	-	-	-	-	333	297	H
9	** 12.40108	34.1	PK-U	38.8	-23.4	49.5	-	-	74	-24.5	-	-	109	211	V
	** 12.40112	21.94	ADR	38.8	-23.4	37.34	54	-16.66	-	-	-	-	109	211	V
10	** 15.9227	39.41	PK-U	40.6	-24.5	55.51	-	-	74	-18.49	-	-	24	286	V
	** 15.92287	27.37	ADR	40.6	-24.5	43.47	54	-10.53	-	-	-	-	24	286	V
2	3.19249	46.76	PK-U	33.1	-33.3	46.56	-	-	-	-	68.2	-21.64	283	132	H
7	3.19849	46.15	PK-U	33.1	-33.3	45.95	-	-	-	-	68.2	-22.25	127	288	V
3	6.6376	38.99	PK-U	35.5	-29	45.49	-	-	-	-	68.2	-22.71	318	382	H
8	6.63768	42.76	PK-U	35.5	-29	49.26	-	-	-	-	68.2	-18.94	16	287	V

** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average
Pk - Peak detector

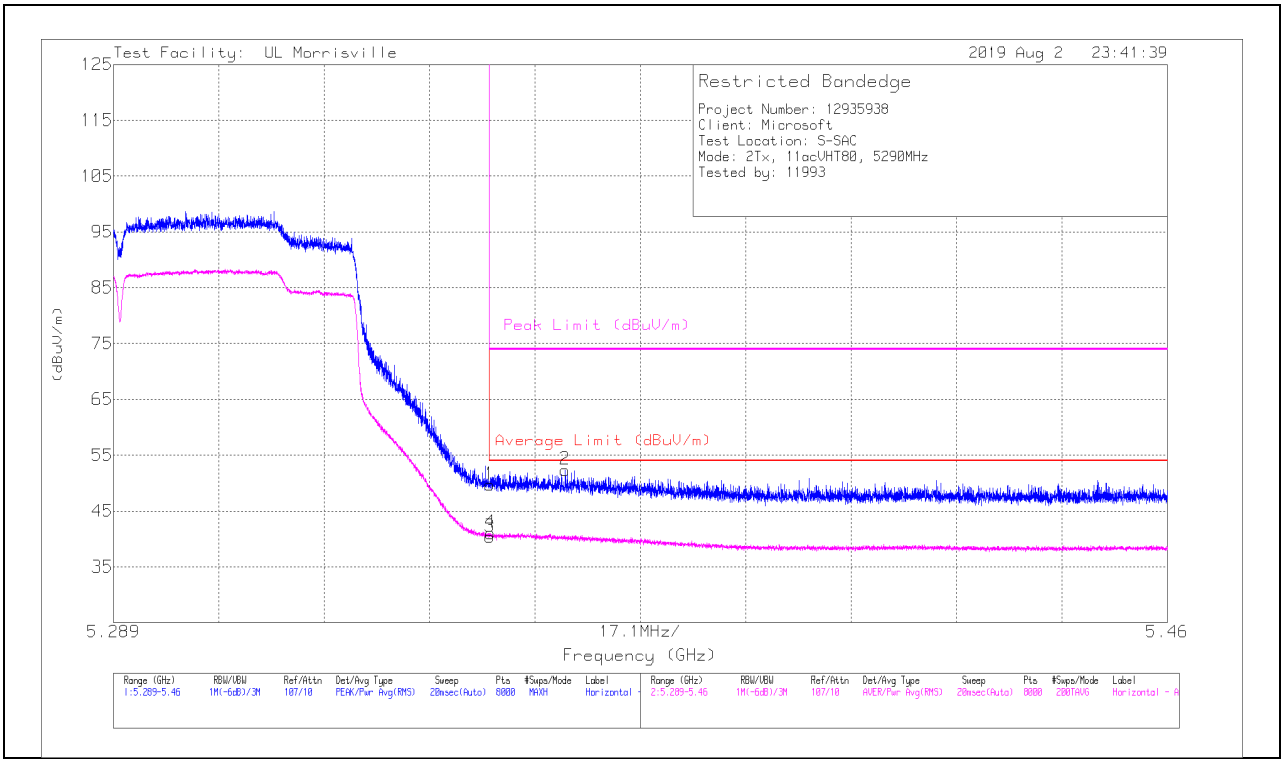
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

10.1.8. TX ABOVE 1 GHz 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE

BANDEDGE (MID CHANNEL)

HORIZONTAL RESULT

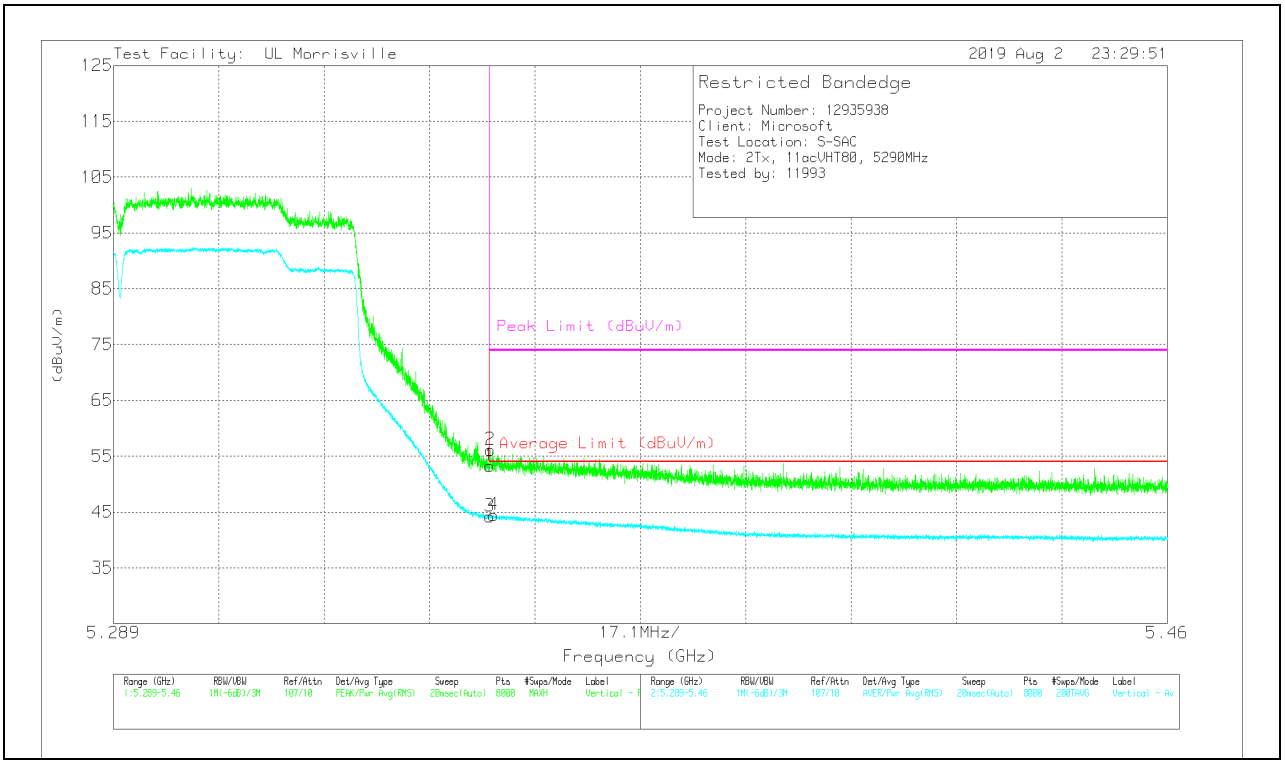


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.35001	38.52	Pk	34.4	-23.2	49.72	-	-	74	-24.28	23	393	H
2	* ** 5.36228	41.17	Pk	34.4	-23.2	52.37	-	-	74	-21.63	23	393	H
3	* ** 5.35001	29.16	RMS	34.4	-23.2	40.36	54	-13.64	-	-	23	393	H
4	* ** 5.35018	29.87	RMS	34.4	-23.2	41.07	54	-12.93	-	-	23	393	H

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

VERTICAL RESULT



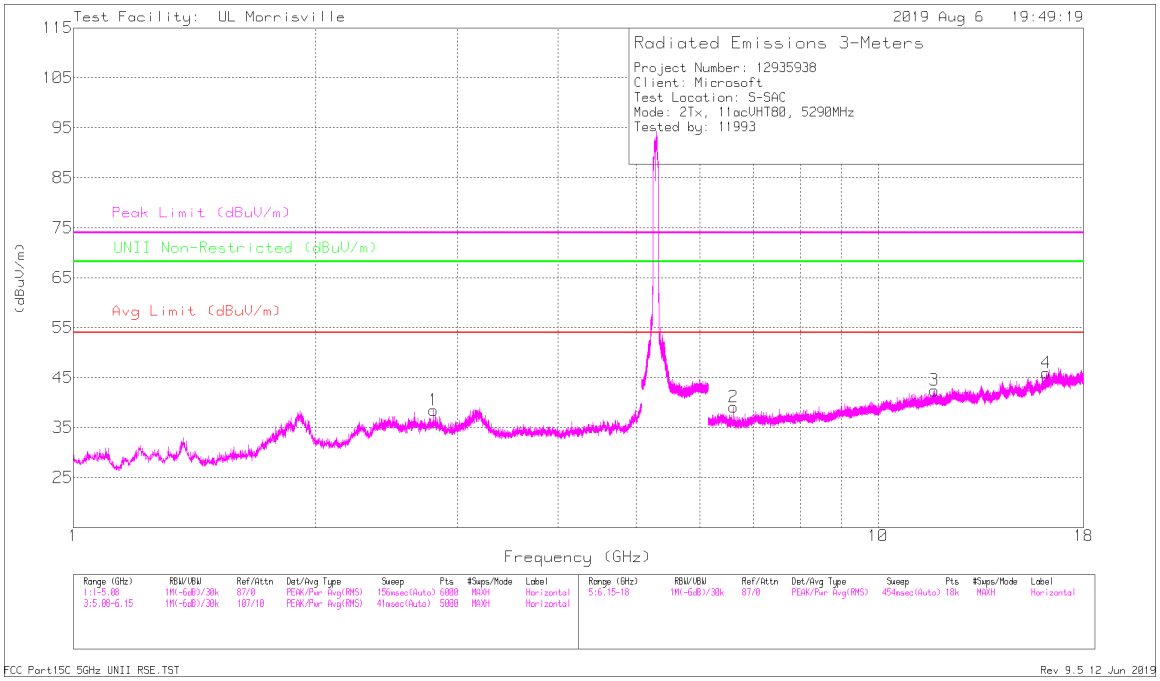
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.35001	42.12	Pk	34.4	-23.2	53.32	-	-	74	-20.68	14	253	V
2	* ** 5.35018	44.9	Pk	34.4	-23.2	56.1	-	-	74	-17.9	14	253	V
3	* ** 5.35001	32.99	RMS	34.4	-23.2	44.19	54	-9.81	-	-	14	253	V
4	* ** 5.35063	33.22	RMS	34.4	-23.2	44.42	54	-9.58	-	-	14	253	V

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

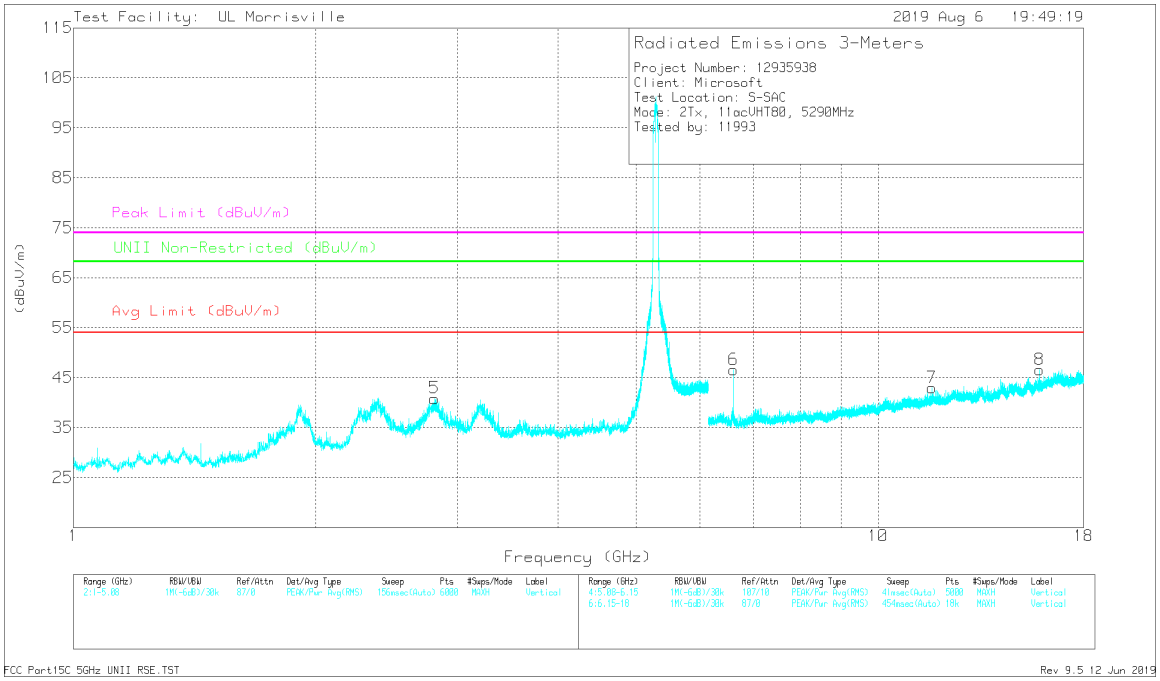
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

HARMONICS AND SPURIOUS EMISSIONS

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	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.80343	46.48	PK-U	32.2	-33.5	45.18	-	-	74	-28.82	-	-	143	131	H
	* ** 2.8033	35.14	ADR	32.2	-33.5	33.84	54	-20.16	-	-	-	-	143	131	H
5	* ** 2.81029	44.19	PK-U	32.1	-33.5	42.79	-	-	74	-31.21	-	-	356	108	V
	* ** 2.81007	32.3	ADR	32.1	-33.5	30.9	54	-23.1	-	-	-	-	356	108	V
3	* ** 11.75053	33.36	PK-U	38.5	-24.1	47.76	-	-	74	-26.24	-	-	209	294	H
	* ** 11.75178	21.84	ADR	38.5	-24.1	36.24	54	-17.76	-	-	-	-	209	294	H
4	* ** 16.18308	34.17	PK-U	40.9	-23.5	51.57	-	-	74	-22.43	-	-	235	119	H
	* ** 16.18344	22.28	ADR	40.9	-23.5	39.68	54	-14.32	-	-	-	-	235	119	H
7	* ** 11.67327	33.51	PK-U	38.4	-24.3	47.61	-	-	74	-26.39	-	-	225	106	V
	* ** 11.67432	22.09	ADR	38.4	-24.3	36.19	54	-17.81	-	-	-	-	225	106	V
8	* ** 15.86205	39.47	PK-U	40.5	-24.2	55.77	-	-	74	-18.23	-	-	17	289	V
	* ** 15.86142	26.57	ADR	40.5	-24.2	42.87	54	-11.13	-	-	-	-	17	289	V
2	6.61249	39.76	PK-U	35.5	-29	46.26	-	-	-	-	68.2	-21.94	354	369	H
6	6.61259	43.82	PK-U	35.5	-29	50.32	-	-	-	-	68.2	-17.88	55	222	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average
Pk - Peak detector

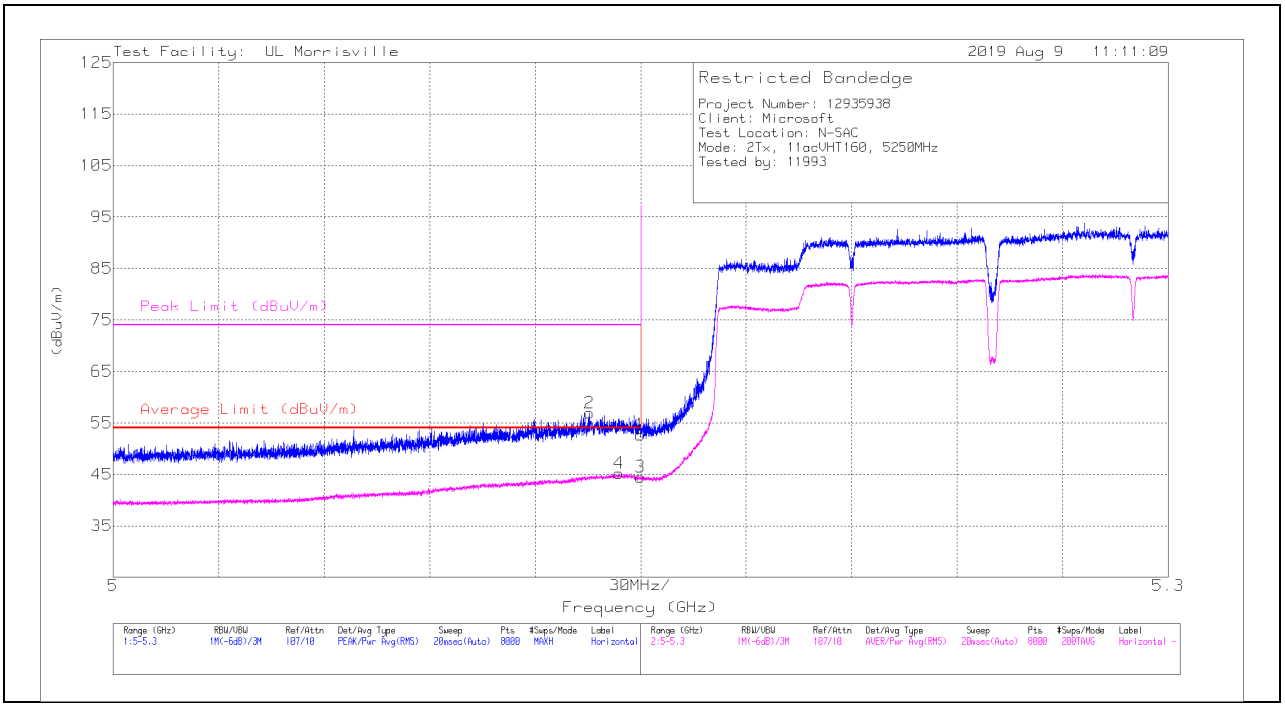
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400
This report shall not be reproduced except in full, without the written approval of UL LLC

10.1.9. TX ABOVE 1 GHz 802.11ac VHT160 MODE IN THE 5.2/5.3 GHz BAND

2TX Antenna 1 + Antenna 2 SDM MODE

BANDEDGE (LOW)

HORIZONTAL RESULT

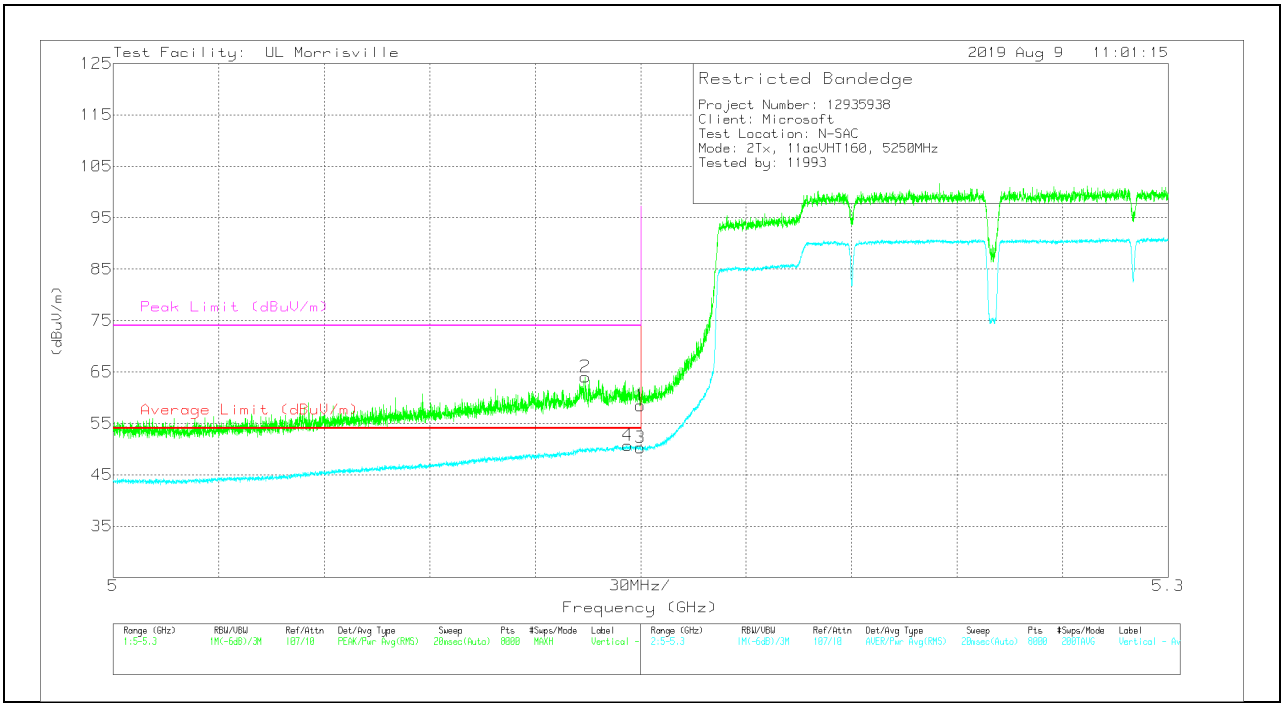


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.14998	41.21	Pk	34.1	-22.6	52.71	-	-	74	-21.29	346	308	H
2	* ** 5.13551	45.52	Pk	34.1	-22.7	56.92	-	-	74	-17.08	346	308	H
3	* ** 5.14998	32.99	RMS	34.1	-22.6	44.49	54	-9.51	-	-	346	308	H
4	* ** 5.14379	33.63	RMS	34.1	-22.5	45.23	54	-8.77	-	-	346	308	H

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

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.14998	46.96	Pk	34.1	-22.6	58.46	-	-	74	-15.54	299	225	V
2	* ** 5.13427	52.64	Pk	34.1	-22.7	64.04	-	-	74	-9.96	299	225	V
3	* ** 5.14998	38.77	RMS	34.1	-22.6	50.27	54	-3.73	-	-	299	225	V
4	* ** 5.14638	39.23	RMS	34.1	-22.6	50.73	54	-3.27	-	-	299	225	V

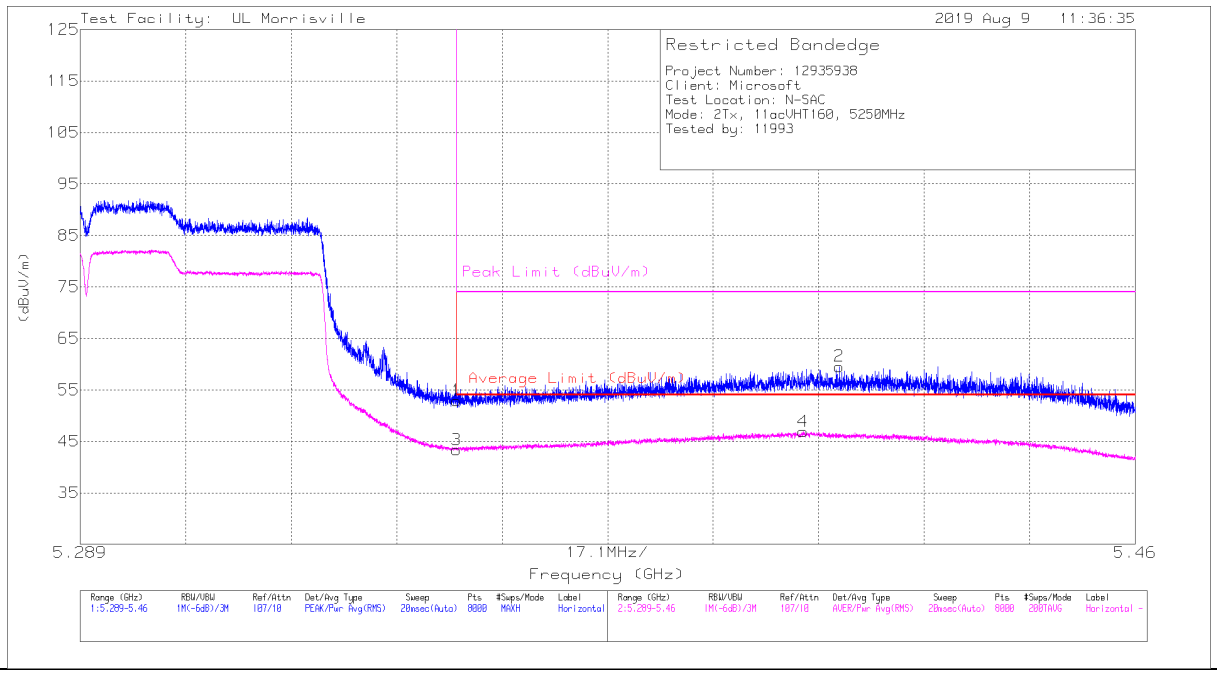
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
RMS - RMS detection

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

BANDEDGE (HIGH)

HORIZONTAL RESULT

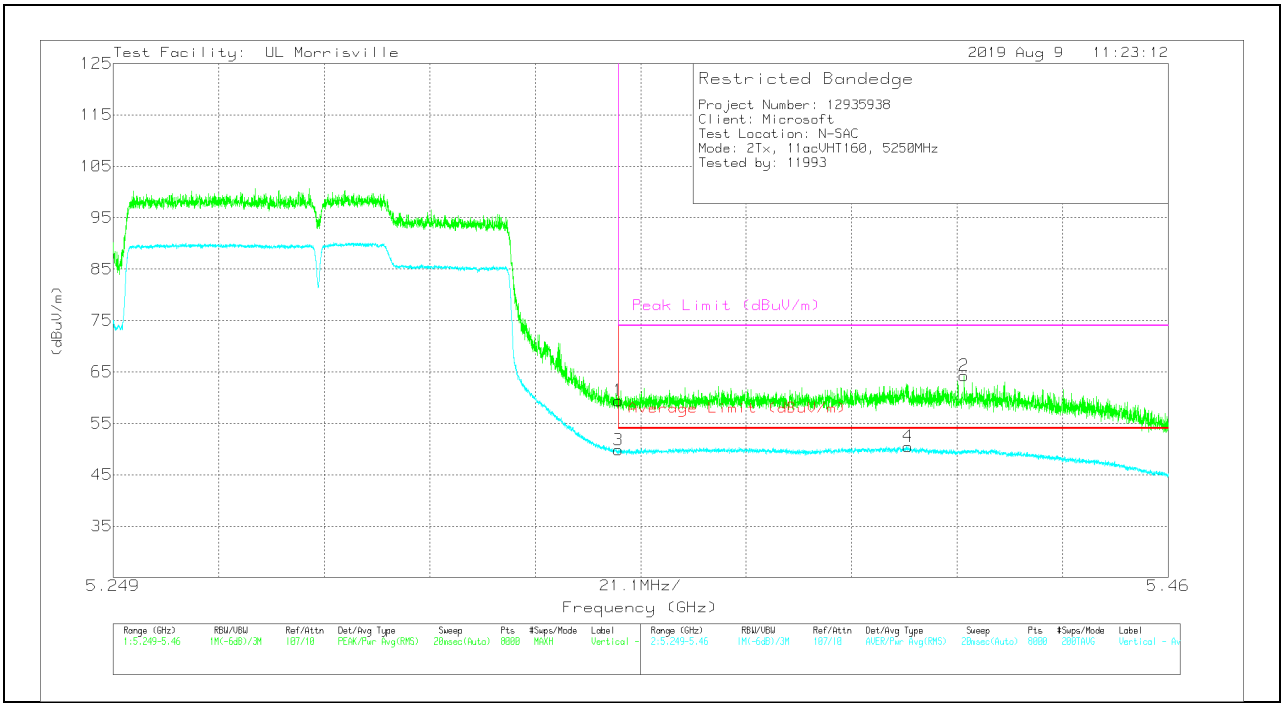


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.35001	41.51	Pk	34.4	-23	52.91	-	-	74	-21.09	239	277	H
2	* ** 5.41205	48.05	Pk	34.4	-22.9	59.55	-	-	74	-14.45	239	277	H
3	* ** 5.35001	31.97	RMS	34.4	-23	43.37	54	-10.63	-	-	239	277	H
4	* ** 5.40617	35.51	RMS	34.4	-23	46.91	54	-7.09	-	-	239	277	H

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

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.35	48	Pk	34.4	-23	59.4	-	-	74	-14.6	344	233	V
2	* ** 5.41919	52.87	Pk	34.4	-23	64.27	-	-	74	-9.73	344	233	V
3	* ** 5.35	38.42	RMS	34.4	-23	49.82	54	-4.18	-	-	344	233	V
4	* ** 5.40793	39.1	RMS	34.4	-23	50.5	54	-3.5	-	-	344	233	V

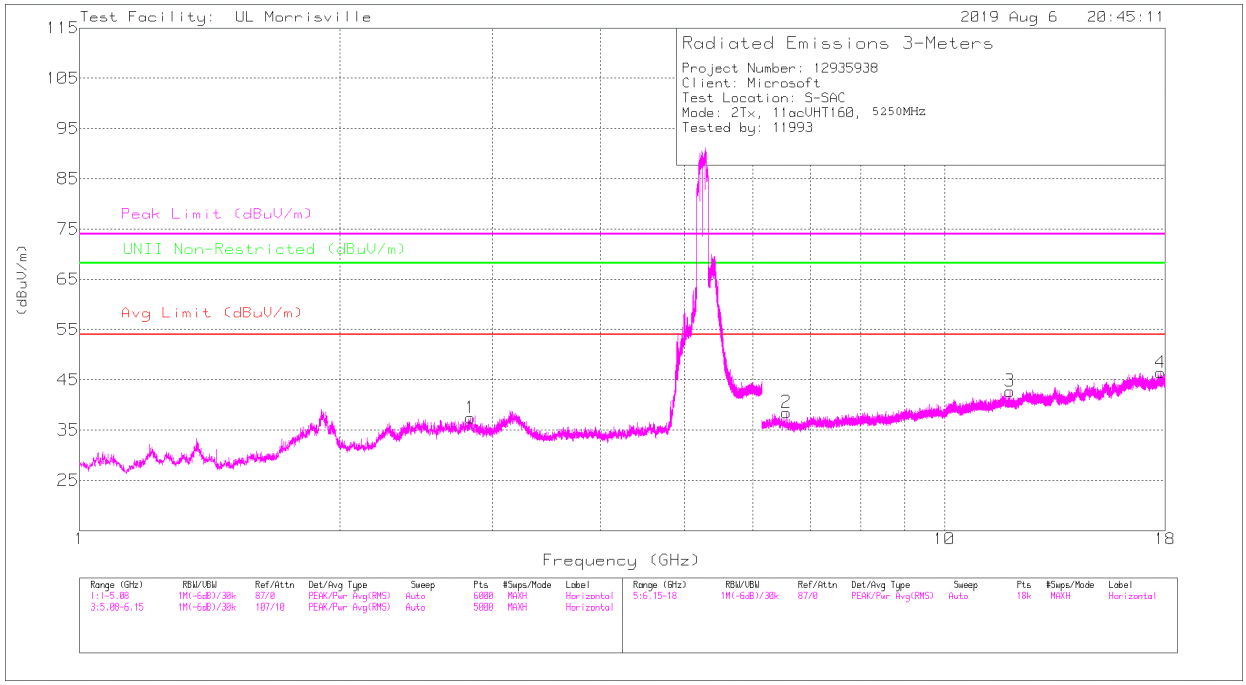
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
RMS - RMS detection

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

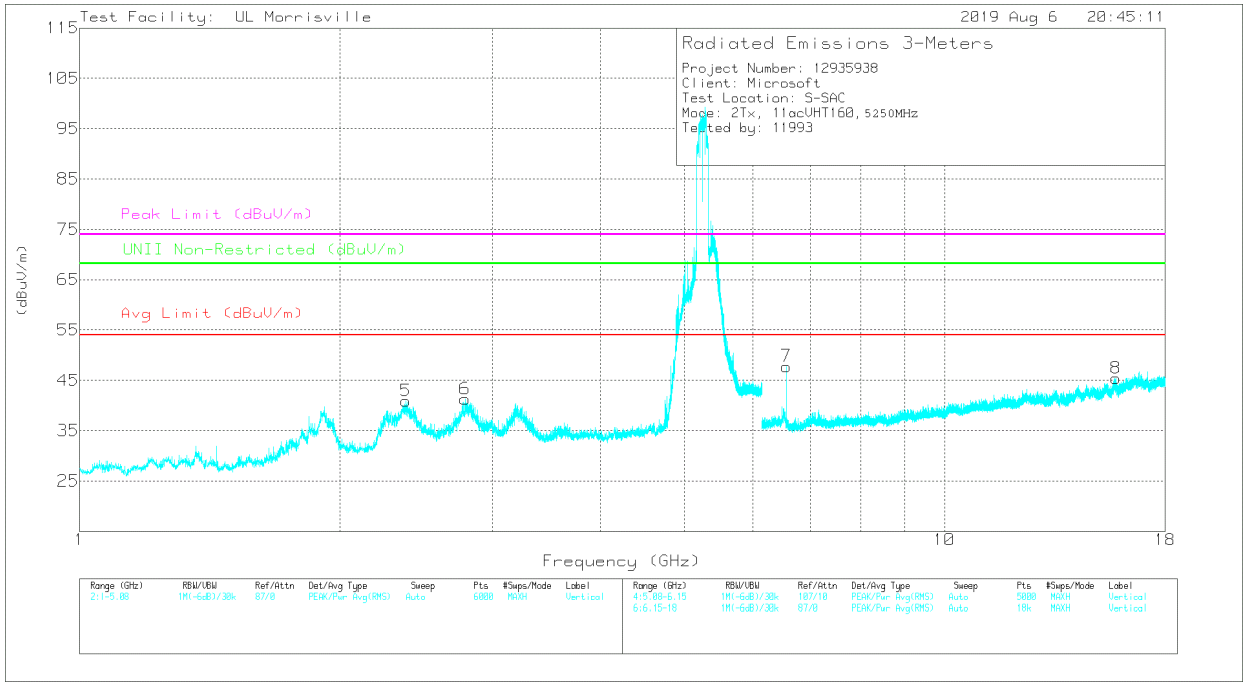
This report shall not be reproduced except in full, without the written approval of UL LLC

HARMONICS AND SPURIOUS EMISSIONS

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	AT0072 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.82823	45.21	PK-U	32.1	-33.6	43.71	-	-	74	-30.29	-	-	2	127	H
	* ** 2.8282	33.61	ADR	32.1	-33.6	32.11	54	-21.89	-	-	-	-	2	127	H
5	* ** 2.38136	45.37	PK-U	31.9	-33.9	43.37	-	-	74	-30.63	-	-	174	172	V
	* ** 2.38036	33.32	ADR	31.9	-33.9	31.32	54	-22.68	-	-	-	-	174	172	V
6	* ** 2.79102	50.22	PK-U	32.2	-33.5	48.92	-	-	74	-25.08	-	-	112	244	V
	* ** 2.79145	38.46	ADR	32.2	-33.5	37.16	54	-16.84	-	-	-	-	112	244	V
3	* ** 11.90965	33.92	PK-U	38.6	-24.6	47.92	-	-	74	-26.08	-	-	78	158	H
	* ** 11.90941	22.03	ADR	38.6	-24.6	36.03	54	-17.97	-	-	-	-	78	158	H
4	* ** 17.79177	34.08	PK-U	41.2	-22.2	53.08	-	-	74	-20.92	-	-	125	133	H
	* ** 17.79193	21.64	ADR	41.2	-22.2	40.64	54	-13.36	-	-	-	-	125	133	H
8	* ** 15.78172	37.54	PK-U	40.4	-22.8	55.14	-	-	74	-18.86	-	-	24	306	V
	* ** 15.78086	24.79	ADR	40.3	-22.8	42.29	54	-11.71	-	-	-	-	24	306	V
7	6.56248	46.04	PK-U	35.5	-28.9	52.64	-	-	-	-	68.2	-15.56	37	264	V
2	6.56254	40.13	PK-U	35.5	-28.9	46.73	-	-	-	-	68.2	-21.47	5	253	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average
Pk - Peak detector

10.2. WORST-CASE BELOW 1GHz AND ABOVE 18 GHz

Radiated emissions below 1GHz, above 18GHz, and power line conducted emissions were performed in worst-case test report R12935938-E11 (FCC ID: C3K1868, IC: 3048A-1868)

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. AC LINE CONDUCTED EMISSIONS

Radiated emissions below 1GHz, above 18GHz, and power line conducted emissions were performed in worst-case test report R12935938-E11 (FCC ID: C3K1868, IC: 3048A-1868).

12. SETUP PHOTOS

Please refer to R12935938-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