TEST REPORT

Report Number: R14932101-E12b

Applicant	:	Microsoft Corporation 1 Microsoft Way Redmond, WA 98052-8300
Model	:	2037
FCC ID	:	C3K2037
IC	:	3048A-2037
EUT Description	:	Portable Computing Device
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C: 2024 FCC 47 CFR PART 15 SUBPART E: 2024 ISED RSS-247 ISSUE 3: 2023 ISED RSS-248 ISSUE 2: 2022 ISED RSS-GEN ISSUE 5 + A1 + A2: 2021

Date Of Issue:
2024-04-16

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

ACCREDITED
CERT #0751.06

REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2024-02-28	Initial Review	Charles Moody
V2	2024-04-04	Revised Test Methodology Section 3	Charles Moody
V3	2024-04-16	Updated KDB reference in Section 3.	B. Kiewra

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	Microsoft Corporation 1 Microsoft Way Redmond, WA 98052-8300, USA
EUT DESCRIPTION:	Portable Computing Device
MODEL:	2037
SERIAL NUMBER:	A81245020002335A, 2399649100000116, A81235010007335S, 0F3BV4G23383HJ
SAMPLE RECEIPT DATE:	2023-10-10 TO 2024-01-24
DATE TESTED:	2023-10-11 TO 2024-01-25

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C: 2024	See Section 2
CFR 47 Part 15 Subpart E: 2024	See Section 2
ISED RSS-247 Issue 3: 2023	See Section 2
ISED RSS-248 Issue 2: 2022	See Section 2
ISED RSS-GEN Issue 5 + A1 + A2: 2021	See Section 2

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 A2LA, NIST, or any agency of the U.S. government.

Approved & Released
For UL LLC By:

Michael Antola
Staff Engineer
Consumer, Medical and IT Segment
UL LLC

Prepared By:

Charles Moody
Electrical Engineer
Consumer, Medical and IT Segment
UL LLC

2. TEST RESULTS SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.
Below is a list of the data provided by the customer:

1. Antenna gain and type (see section 6.3)

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
15.209, 15.205, 15.407 (b)	RSS-GEN 8.9, 8.10, RSS-247 6.2, RSS-248 4.6	Radiated Emissions	See Comment	Refer to Note.

Note: The purpose of this report is to show compliance of radios while simultaneously transmitting. These scans were found to be compliant.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC 47 CFR Part 2, FCC 47 CFR Part 15, ANSI C63.10-2013, KDB 558074 D01, KDB 662911 D01 v02r01, KDB 789033 D02 v02r01, KDB 987594 D01 v02r02, RSS-GEN Issue 5 + A1 + A2, RSS-247 Issue 3, RSS-248 Issue 2.

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification # 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☐	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
☒	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A		27265	

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

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

5.2. DECISION RULES

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

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
All emissions, radiated	6.01 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%
Time	3.39%

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

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

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is a Portable Computing Device. This report covers the simultaneous transmission of the 2.4 WLAN, BT/BLE, 5 WLAN, and 6 WLAN radios.

6.2. MAXIMUM OUTPUT POWER

The purpose of this report is to show compliance of radios while simultaneously transmitting. Therefore, power measurements are not covered in this report. For the samples used for this test program, it's the responsibility of the applicant to ensure that the EUT yields the same or higher power levels as recorded in the certification reports of each radio. The power levels of the 2.4/5/6 WLAN radio and BLE radio were measured by the lab and maximum power levels can be found in the following UL reports:

- R14932101-E1b FCC ISED BLE REPORT 2037
- R14932101-E2b FCC ISED BT REPORT 2037
- R14932101-E6b FCC ISED 2.4 WLAN REPORT 2037
- R14932101-E7b FCC ISED 5.2-5.9 WLAN REPORT 2037
- R14932101-E10b FCC ISED 6GHz WLAN REPORT 2037

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) gain and type, as provided by the manufacturer' are as follows:

Chain	Frequency (MHz)	Gain (dBi)	Type
0	2400-2483.5	5.69	PIFA
	5150-5250	8.11	
	5250-5350	8.11	
	5470-5725	7.21	
	5725-5850	6.00	
	5850-5895	6.00	
	5925-6425	7.60	
	6425-6525	6.89	
	6525-6875	7.95	
	6875-7125	7.69	
1	2400-2483.5	4.66	
	5150-5250	5.35	
	5250-5350	6.07	
	5470-5725	5.36	
	5725-5850	5.35	
	5850-5895	5.35	
	5925-6425	5.35	
	6425-6525	2.92	
	6525-6875	3.80	
	6875-7125	3.64	

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 1.0.3808.9500.

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT is intended to operate in only one orientation; therefore, all final radiated testing was performed with the EUT in this intended orientation of operation.

The following scans was performed for simultaneous transmission based on the worst-case data from the manufacturer's report:

1-18 GHz Harmonics and Spurious Emissions:

Mode	Mode	Mode	Scan Number
2.4 WLAN, 11be EHT20 26T, RU8, 2462 MHz, Pset17 MIMO	5 WLAN, 11be EHT20 26T, RU0, 5745 MHz, Pset19, MIMO	N/A	1
2.4 WLAN, 11be EHT20 26T, RU0, 2437 MHz, Pset19.5 MIMO	6 WLAN, 11be EHT20 26T, RU0, 6095 MHz, Pset9, MIMO	N/A	2
5 WLAN, 11be EHT20 26T, RU0, 5745 MHz, Pset19, MIMO	BLE, 125kBps, 2462 MHz, Pset10 C0	2.4 WLAN, 11be EHT20 26T, RU8, 2462 MHz, Pset17 C1	3
6 WLAN, 11be EHT20 26T, RU0, 6095 MHz, Pset9, MIMO	BLE, 125kBps, 2438 MHz, Pset10 C0	2.4 WLAN, 11be EHT20 26T, RU0, 2437 MHz, Pset19.5 C1	4
5 WLAN, 11be EHT20 26T, RU0, 5745 MHz, Pset19, MIMO	2.4 WLAN, 11be EHT20 26T, RU8, 2462 MHz, Pset17 C0	BLE, 125kBps, 2462 MHz, Pset10 C1	5
6 WLAN, 11be EHT20 26T, RU0, 6095 MHz, Pset9, MIMO	2.4 WLAN, 11be EHT20 26T, RU0, 2437 MHz, Pset19.5 C0	BLE, 125kBps, 2438 MHz, Pse10 C1	6
5 WLAN, 11be EHT20 26T, RU0, 5745 MHz, Pset19, MIMO	BLE, 1Mbps, 2462 MHz, Pset11, MIMO	N/A	7
6 WLAN, 11be EHT20 26T, RU0, 6095 MHz, Pset9, MIMO	BLE, 1Mbps, 2438 MHz, Pset11, MIMO	N/A	8

Band Edge:

Mode	Mode	Mode	Scan Number
5 WLAN, 11be EHT20 26T, RU0, 5745 MHz, Pset19, MIMO	BLE, 2Mbps, 2478 MHz, Pset11 C0	2.4 WLAN, 11be EHT20 106T, RU54, 2462 MHz, Pset17.5 C1	9

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Power Supply	Microsoft	PN: M1140030-007	0C130Z08EV337	NA
USB Drive	PNY	16GB	NA	NA
Headphones	Sony	NA	NA	NA
USB C to Ethernet	Tp-link	UE300C	2234082002838	NA
Switch	Linksys	EFAH05WVER.3	RA13048005308 EH1040 MA	NA

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB-C	2	USB-C	Shielded	>3m	EUT to Power Supply
2	Aux	1	Aux	Shielded	<3m	Headphones
3	USB-A	1	USB-A	Shielded	<3m	EUT to USB Drive
4	USB-C	2	USB-C	Shielded	>3m	USB to Ethernet adapter Ethernet is unshielded

TEST SETUP

Test software exercised the radio card.

SETUP DIAGRAM

For all setup diagrams and setup photos, refer to UL report R14932101-EP1b

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 – Chamber 1)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	1-18 GHz				
206211	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-04-06	2024-04-06
	Gain-Loss Chains				
91979	Gain-loss string: 1-18GHz	Various	Various	2023-05-16	2024-05-16
	Receiver & Software				
206496	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-03-24	2024-03-24
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
241205	Environmental Meter	Fisher Scientific	15-077-963	2023-09-05	2025-09-05
77414 (BRF003)	2.4GHz notch filter, 2W, Fhigh =18GHz	Micro-Tronics	BRM50702	2023-02-15	2024-02-29
77837 (BRF004)	5.5GHz notch filter, 2W, Fhigh =18GHz	Micro-Tronics	BRM50716-01	2023-02-15	2024-02-29
216159 (HPF019)	7GHz high-pass filter, 2W, Fhigh =18GHz	Micro-Tronics	HPM50107	2023-02-15	2024-02-29

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8. DUTY CYCLE

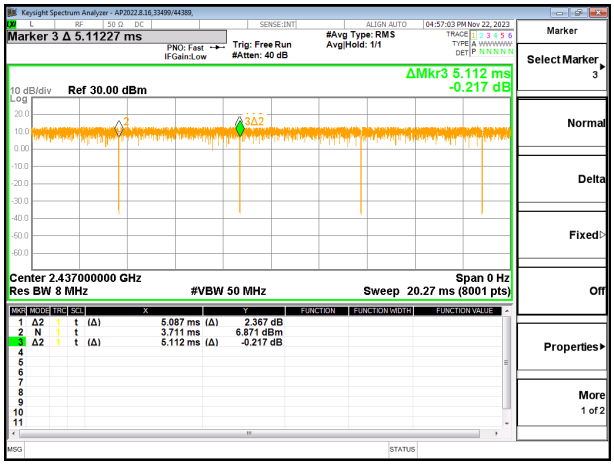
LIMITS

None; for reporting purposes only.

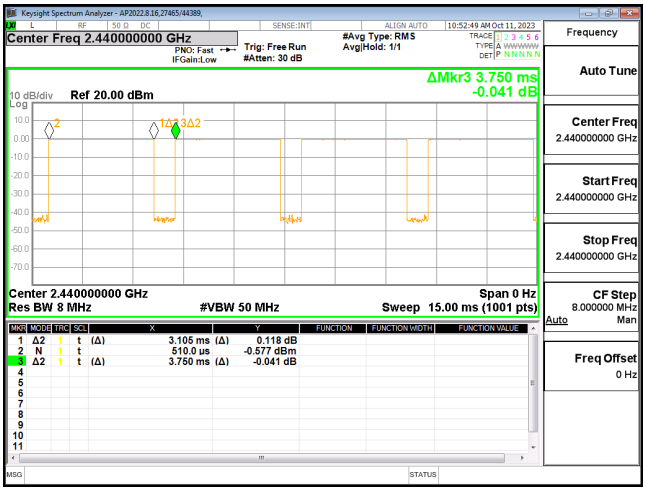
PROCEDURE

ANSI C63.10 Section 11.6

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor RMS (dB)	Duty Cycle Correction Factor Linear (dB)	1/B Minimum VBW (kHz)
2.4 WLAN 26T	5.087	5.112	0.9951	99.51%	0.00	0.00	0.010
BLE 125kBps	3.105	3.750	0.8280	82.80%	0.82	1.64	0.322
BLE 1Mbps	0.392	0.626	0.6262	62.62%	2.03	4.07	2.551
BLE 2Mbps	0.204	0.626	0.3259	32.59%	4.87	9.74	4.902
5/6 WLAN 26T	5.087	5.107	0.9961	99.61%	0.00	0.00	0.010



DUTY CYCLE, 2.4 WLAN, 802.11be EHT20 26T MODE, 2TX



DUTY CYCLE BLE 125 kBps

DUTY CYCLE BLE 1Mbps

DUTY CYCLE BLE 2Mbps

DUTY CYCLE, 5/ WLAN, 802.11be EHT20 26T MODE, 2TX

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9. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209
FCC §15.407 (b)(1-6)
RSS-GEN, Section 8.9 and 8.10
RSS-248 4.6.2 (a)
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 bands)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
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 3 MHz for peak measurements.

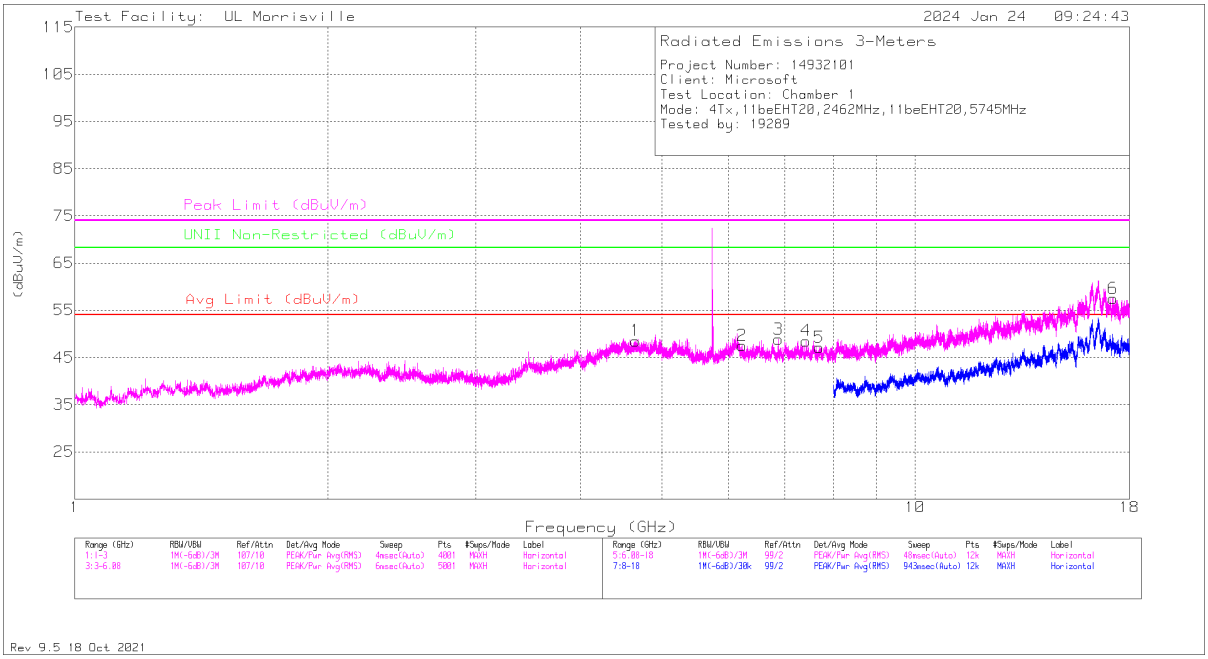
For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements. When 6GHz WLAN is in the testing scan configuration, RMS averaging was used. In every other case in which 6GHz WLAN was not included, linear voltage averaging was used.

The spectrum from 1 GHz to 18 GHz is investigated with the various radios set to their worst-case operational modes. The scans performed were detailed in section 6.5.

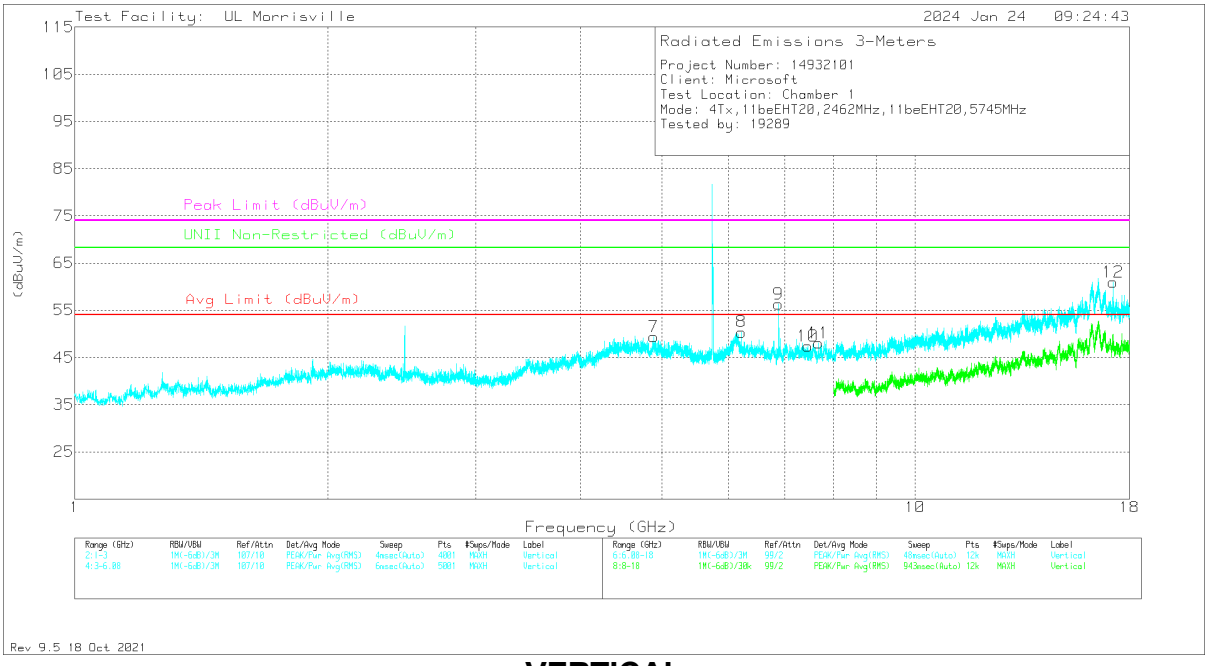
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

9.1. TRANSMITTER ABOVE 1 GHz

9.1.1. HARMONICS AND SPURIOUS EMISSIONS (Scan 1)



HORIZONTAL



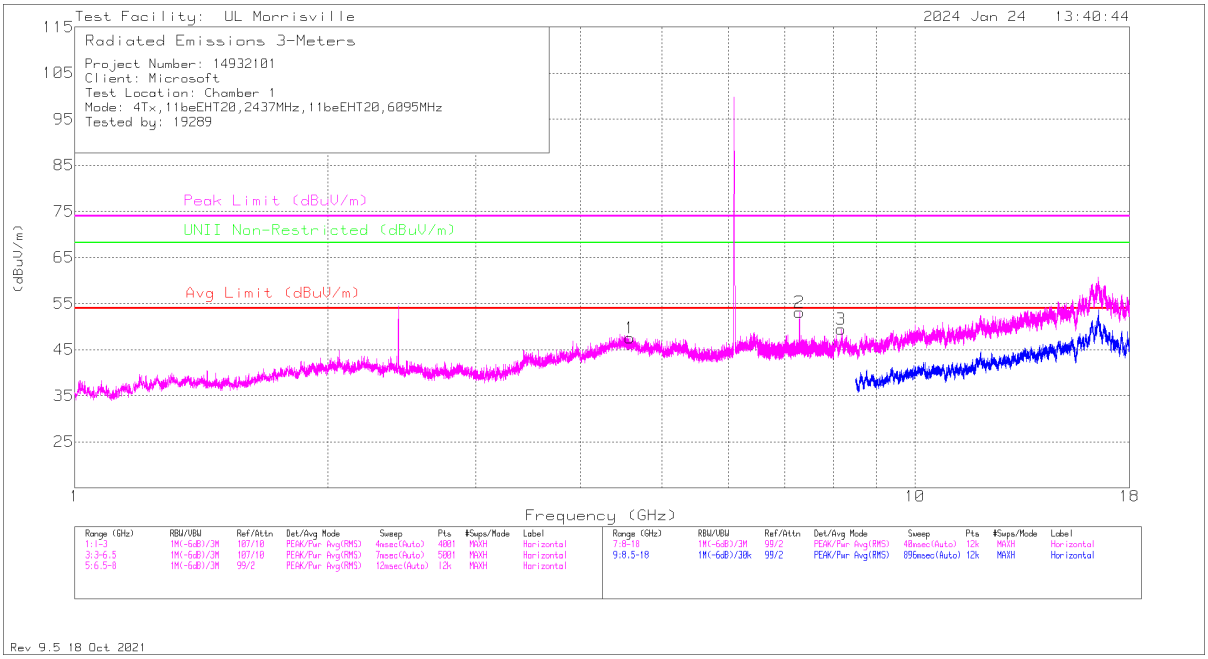
VERTICAL

RADIATED EMISSIONS

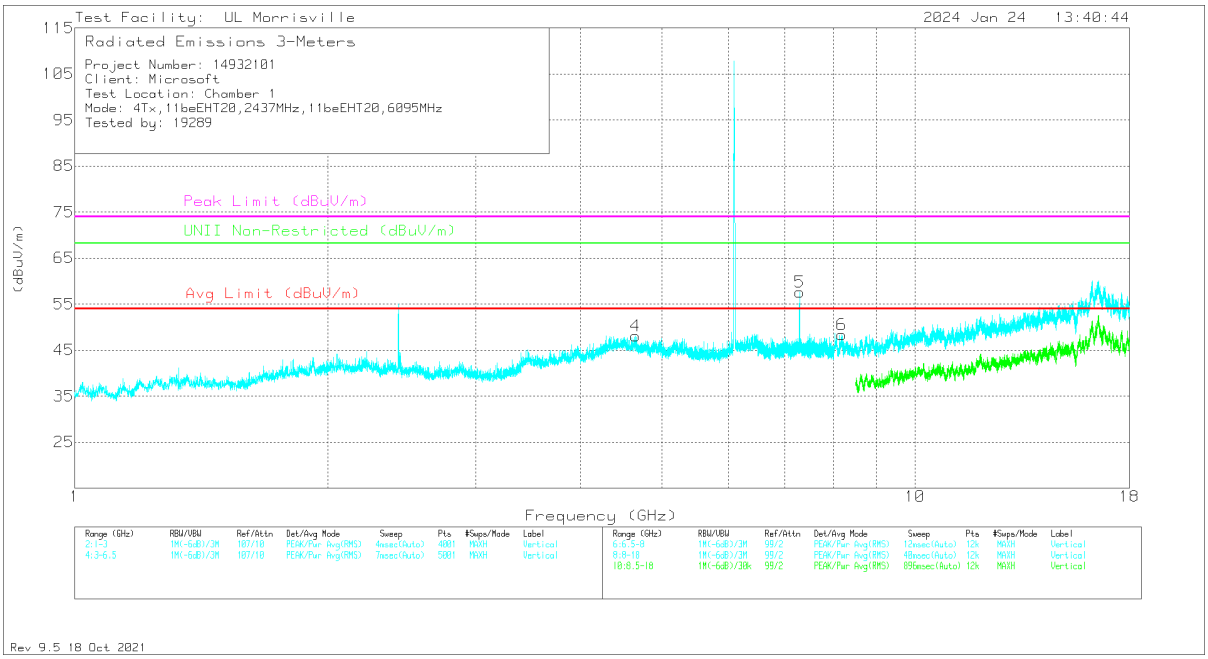
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	Filter (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.64875	34.22	PK-U	34.2	-20.7	.5	1	49.22	-	-	74	-24.78	-	-	344	171	H
	* ** 4.648	22.09	ADV	34.2	-20.6	.5	1	37.19	54	-16.81	-	-	-	-	344	171	H
7	* ** 4.88503	35.36	PK-U	34	-21.3	.4	1.7	50.16	-	-	74	-23.84	-	-	291	303	V
	* ** 4.88298	22.54	ADV	34	-21.3	.4	1.7	37.34	54	-16.66	-	-	-	-	291	303	V
4	* ** 7.41853	39.93	PK-U	35.7	-27.3	.5	.7	49.53	-	-	74	-24.47	-	-	255	389	H
	* ** 7.41852	26.53	ADV	35.7	-27.3	.5	.7	36.13	54	-17.87	-	-	-	-	255	389	H
5	* ** 7.69417	37.55	Pk	35.8	-27.5	.5	.8	47.15	54	-6.85	74	-26.85	-	-	0-360	101	H
10	* ** 7.45378	37.75	Pk	35.7	-27.2	.6	.6	47.45	54	-6.55	74	-26.55	-	-	0-360	101	V
11	* ** 7.6825	39.9	PK-U	35.8	-27.2	.5	.7	49.7	-	-	74	-24.3	-	-	241	281	V
	* ** 7.68197	26.59	ADV	35.8	-27.2	.5	.7	36.39	54	-17.61	-	-	-	-	241	281	V
8	6.21609	41.99	Pk	35.4	-28.6	.4	1.2	50.39	-	-	-	-	68.2	-17.81	0-360	200	V
2	6.22304	39.08	Pk	35.4	-28.6	.4	1.2	47.48	-	-	-	-	68.2	-20.72	0-360	200	H
3	6.87665	40.11	Pk	35.6	-27.9	.3	.8	48.91	-	-	-	-	68.2	-19.29	0-360	200	H
9	6.87765	47.59	Pk	35.6	-28	.3	.8	56.29	-	-	-	-	68.2	-11.91	0-360	200	V
6	17.2093	35.34	Pk	41.3	-20.9	.8	.9	57.44	-	-	-	-	68.2	-10.76	0-360	200	H
12	17.2093	38.85	Pk	41.3	-20.9	.8	.9	60.95	-	-	-	-	68.2	-7.25	0-360	200	V

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

9.1.2. HARMONICS AND SPURIOUS EMISSIONS (Scan 2)



HORIZONTAL



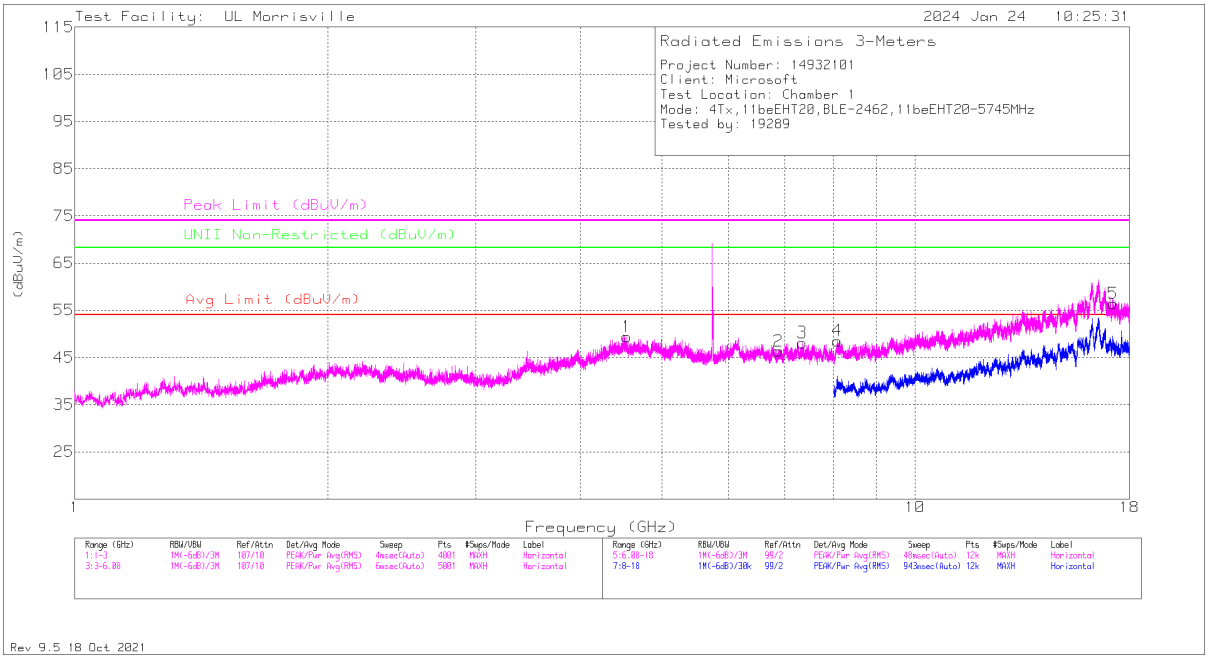
VERTICAL

RADIATED EMISSIONS

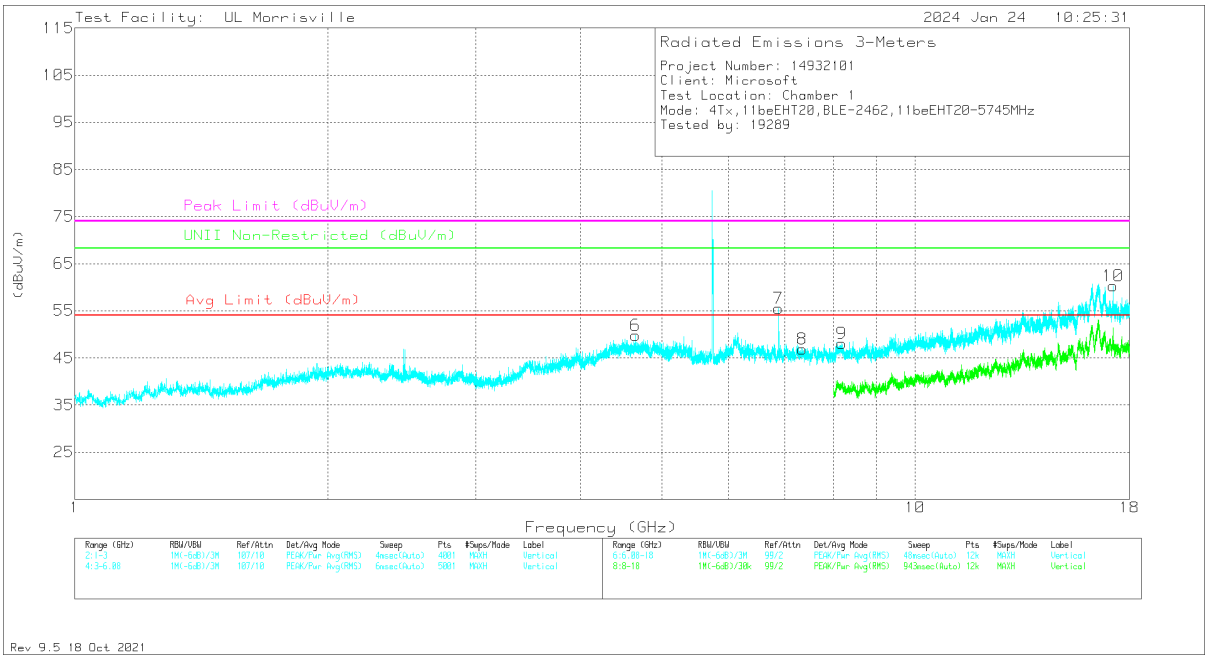
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	Filter (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.5771	33.99	Pk	34.1	-20.7	.2	0	47.59	54	-6.41	74	-26.41	-	-	0-360	199	H
4	* ** 4.64812	34.64	PK-U	34.2	-20.7	.5	0	48.64	-	-	74	-25.36	-	-	314	388	V
	* ** 4.64837	23.02	ADR	34.2	-20.7	.5	0	37.02	54	-16.98	-	-	-	-	314	388	V
2	* ** 7.28735	44.27	PK-U	35.6	-27.1	.5	0	53.27	-	-	74	-20.73	-	-	0	327	H
	* ** 7.28528	29.27	ADR	35.6	-27.1	.5	0	38.27	54	-15.73	-	-	-	-	0	327	H
5	* ** 7.2872	55.36	PK-U	35.6	-27.1	.5	0	64.36	-	-	74	-9.64	-	-	0	232	V
	* ** 7.28607	37.41	ADR	35.6	-27.1	.5	0	46.41	54	-7.59	-	-	-	-	0	232	V
3	* ** 8.17235	38.5	PK-U	35.8	-27	.5	.9	48.7	-	-	74	-25.3	-	-	266	284	H
	* ** 8.17455	26.79	ADR	35.8	-27	.5	.9	36.99	54	-17.01	-	-	-	-	266	284	H
6	* ** 8.17754	39.11	PK-U	35.8	-26.9	.5	.9	49.41	-	-	74	-24.59	-	-	17	296	V
	* ** 8.17742	26.84	ADR	35.8	-26.9	.5	.9	37.14	54	-16.86	-	-	-	-	17	296	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk – Peak detector
PK-U - Maximum Peak
ADR - RMS average

9.1.3. HARMONICS AND SPURIOUS EMISSIONS (Scan 3)



HORIZONTAL



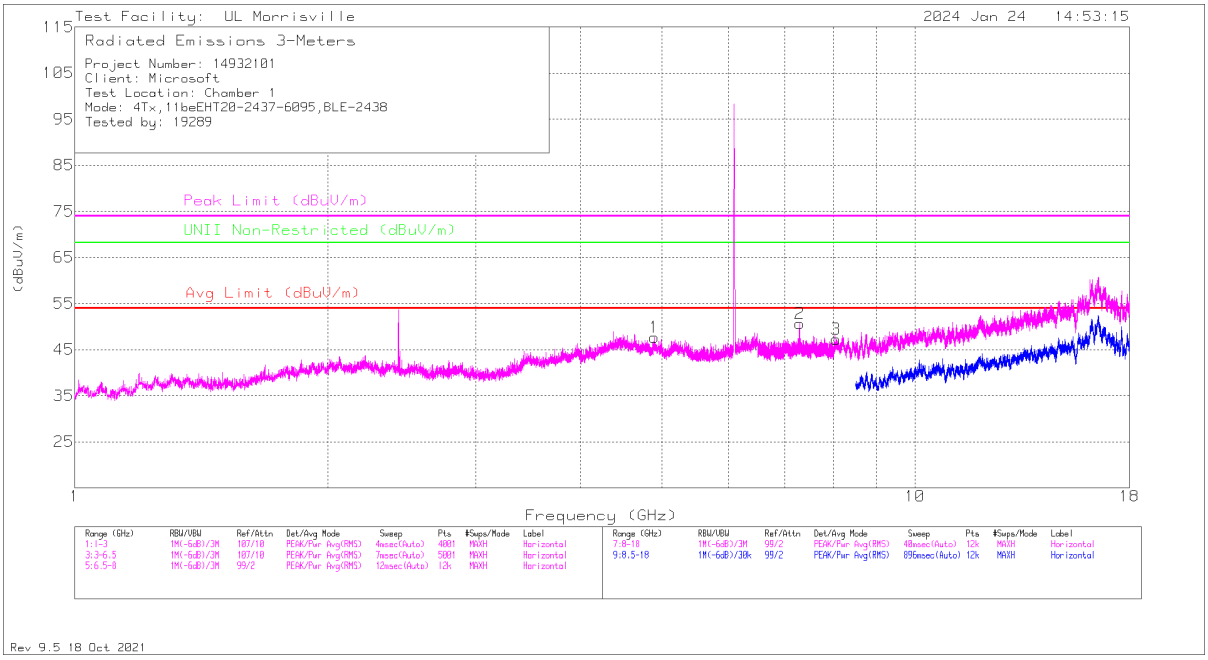
VERTICAL

RADIATED EMISSIONS

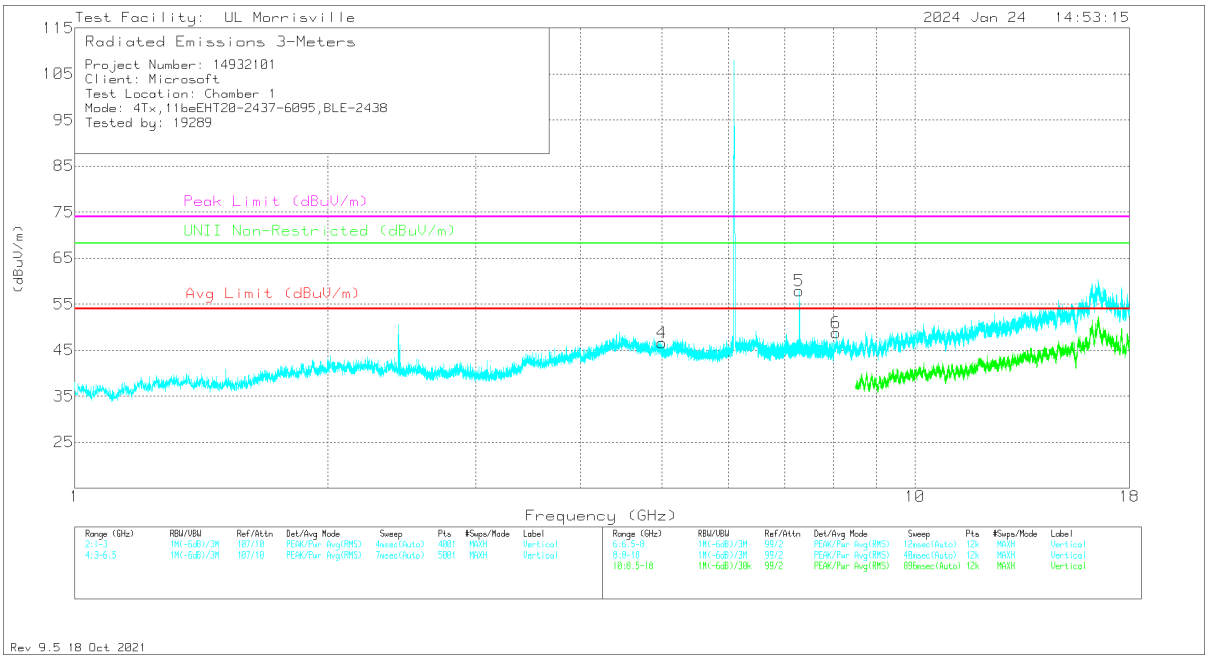
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	Filter (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.54386	35.01	PK-U	34	-20.5	.4	.7	0	49.61	-	-	74	-24.39	-	-	48	224	H
	* ** 4.54215	22.17	ADV	34	-20.6	.4	.7	1.64	38.31	54	-15.69	-	-	-	-	48	224	H
6	* ** 4.65025	34.68	PK-U	34.2	-20.8	.6	1.1	0	49.78	-	-	74	-24.22	-	-	328	139	V
	* ** 4.65005	21.92	ADV	34.2	-20.7	.5	1	1.64	38.56	54	-15.44	-	-	-	-	328	139	V
3	* ** 7.34346	39.55	PK-U	35.6	-27.3	.6	.6	0	49.05	-	-	74	-24.95	-	-	143	116	H
	* ** 7.34213	26.97	ADV	35.6	-27.3	.6	.6	1.64	38.11	54	-15.89	-	-	-	-	143	116	H
4	* ** 8.07857	39.38	PK-U	35.8	-26.8	.5	.7	0	49.58	-	-	74	-24.42	-	-	269	108	H
	* ** 8.07807	26.69	ADV	35.8	-26.8	.5	.7	1.64	38.53	54	-15.47	-	-	-	-	269	108	H
8	* ** 7.3465	37.22	Pk	35.6	-27.2	.6	.6	0	46.82	54	-7.18	74	-27.18	-	-	0-360	101	V
9	* ** 8.18213	38.72	PK-U	35.8	-26.8	.5	.9	0	49.12	-	-	74	-24.88	-	-	185	129	V
	* ** 8.18208	26.72	ADV	35.8	-26.8	.5	.9	1.64	38.76	54	-15.24	-	-	-	-	185	129	V
7	6.87665	46.66	Pk	35.6	-27.9	.3	.8	0	55.46	-	-	-	-	68.2	-12.74	0-360	200	V
2	6.8846	37.7	Pk	35.6	-28.1	.3	.8	0	46.3	-	-	-	-	68.2	-21.9	0-360	101	H
5	17.21129	34.28	Pk	41.3	-20.9	.8	.9	0	56.38	-	-	-	-	68.2	-11.82	0-360	199	H
10	17.21129	38.24	Pk	41.3	-20.9	.8	.9	0	60.34	-	-	-	-	68.2	-7.86	0-360	101	V

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

9.1.4. HARMONICS AND SPURIOUS EMISSIONS (Scan 4)



HORIZONTAL



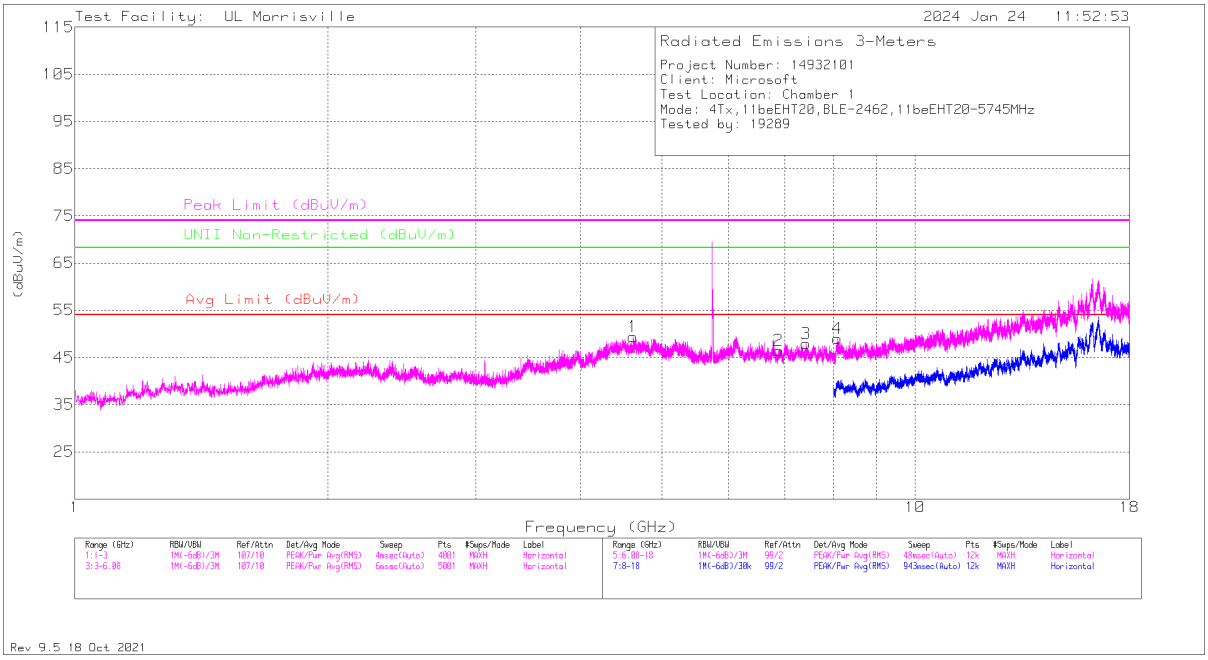
VERTICAL

RADIATED EMISSIONS

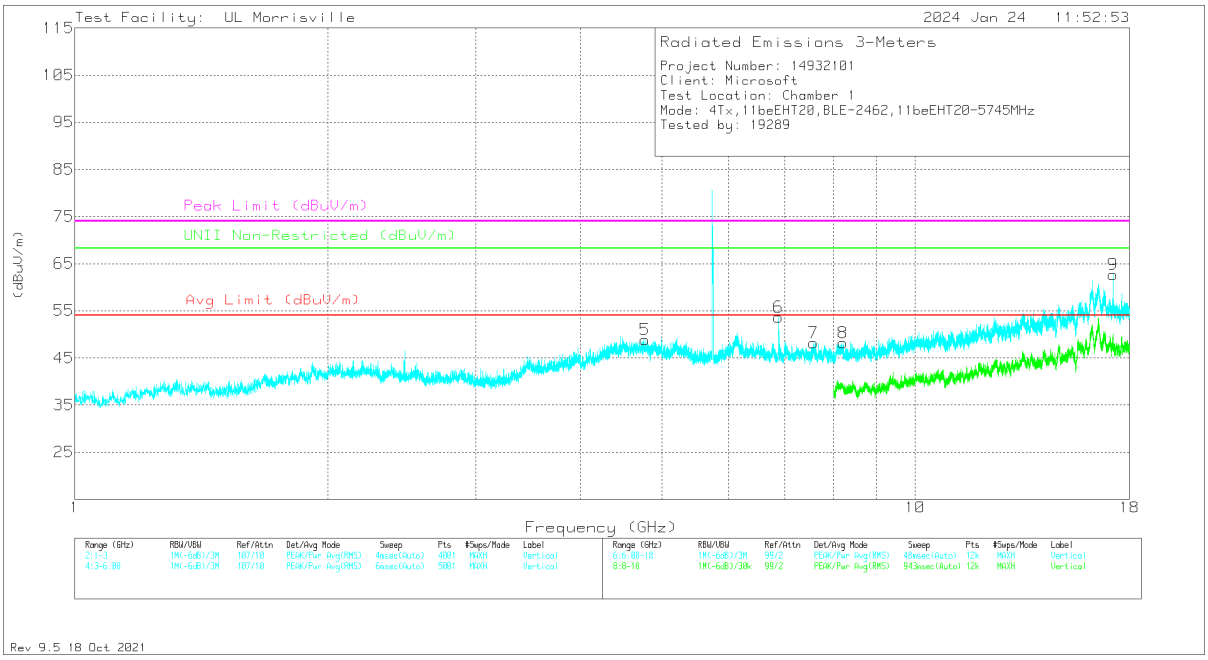
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	Filter (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.8942	34.53	Pk	34	-21.3	.5	0	0	47.73	54	-6.27	74	-26.27	-	-	0-360	200	H
4	* ** 4.9971	34.12	Pk	34.1	-21.9	.3	0	0	46.62	54	-7.38	74	-27.38	-	-	0-360	101	V
2	* ** 7.28742	47.32	PK-U	35.6	-27.1	.5	0	0	56.32	-	-	74	-17.68	-	-	275	103	H
	* ** 7.28666	29.6	ADR	35.6	-27.1	.5	0	.82	39.42	54	-14.58	-	-	-	-	275	103	H
5	* ** 7.28709	49.75	PK-U	35.6	-27.1	.5	0	0	58.75	-	-	74	-15.25	-	-	126	203	V
	* ** 7.28505	32.58	ADR	35.6	-27.1	.5	0	.82	42.4	54	-11.6	-	-	-	-	126	203	V
3	* ** 8.06	36.82	Pk	35.8	-26.9	.6	.9	0	47.22	54	-6.78	74	-26.78	-	-	0-360	101	H
6	* ** 8.06085	39.82	PK-U	35.8	-26.9	.6	.9	0	50.22	-	-	74	-23.78	-	-	164	295	V
	* ** 8.0609	27.78	ADR	35.8	-27	.5	.9	.82	38.8	54	-15.2	-	-	-	-	164	295	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk – Peak detector
PK-U -Maximum Peak
ADR - RMS average

9.1.5. HARMONICS AND SPURIOUS EMISSIONS (Scan 5)



HORIZONTAL



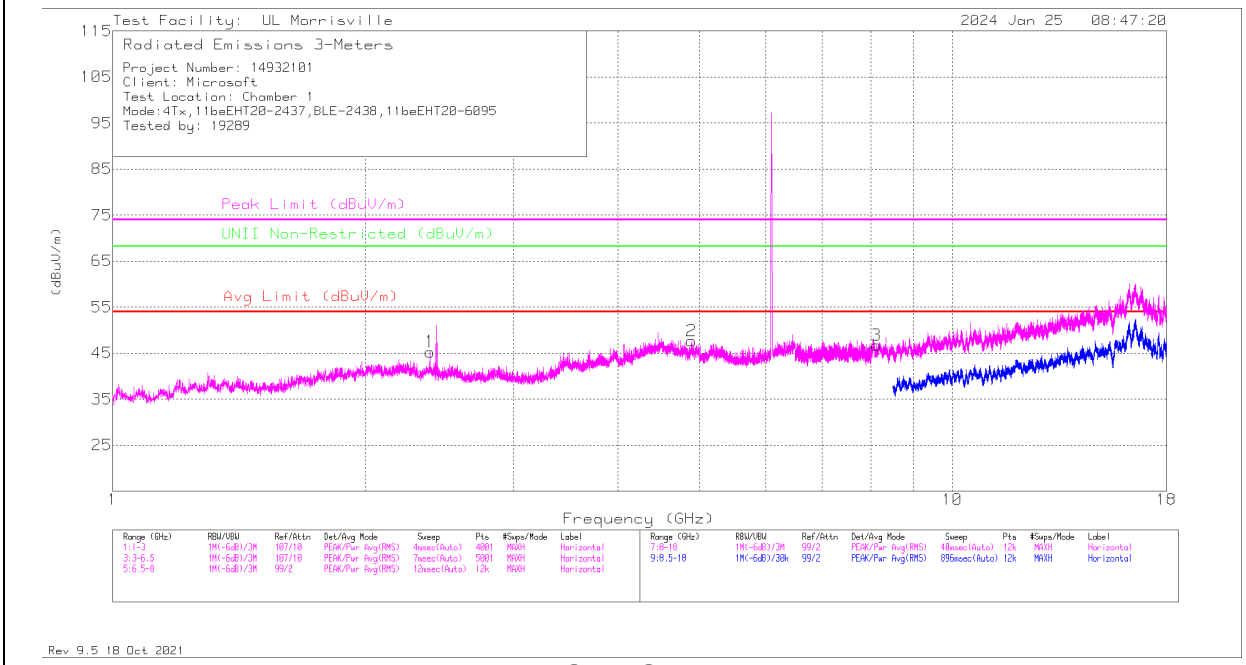
VERTICAL

RADIATED EMISSIONS

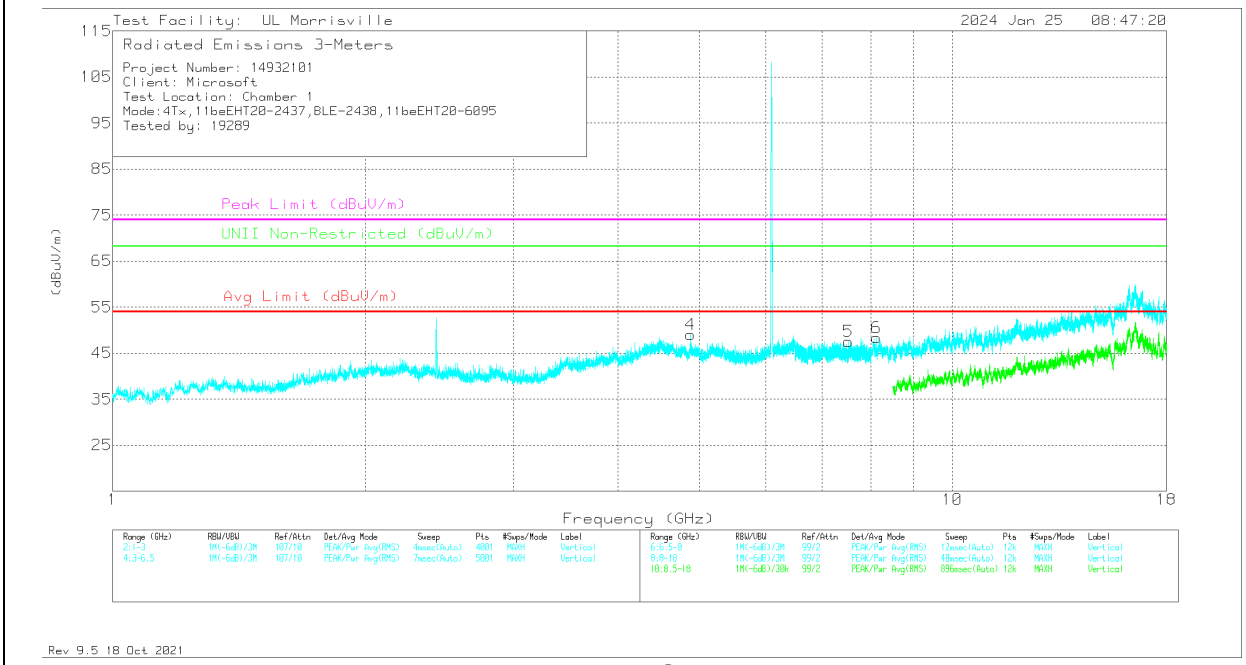
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	Filter (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.61753	34.86	PK-U	34.2	-20.8	.4	.9	0	49.56	-	-	74	-24.44	-	-	308	351	H
	* ** 4.62066	22.14	ADV	34.2	-20.8	.4	.9	1.64	38.48	54	-15.52	-	-	-	-	308	351	H
5	* ** 4.76979	34.31	PK-U	34.1	-21	.5	1.7	0	49.61	-	-	74	-24.39	-	-	11	206	V
	* ** 4.77	22.12	ADV	34.1	-21	.5	1.7	1.64	39.06	54	-14.94	-	-	-	-	11	206	V
3	* ** 7.42199	38.23	Pk	35.7	-27.2	.6	.6	0	47.93	54	-6.07	74	-26.07	-	-	0-360	101	H
4	* ** 8.08008	39.64	PK-U	35.8	-26.9	.5	.7	0	49.74	-	-	74	-24.26	-	-	294	365	H
	* ** 8.07897	27.01	ADV	35.8	-26.8	.5	.7	1.64	38.85	54	-15.15	-	-	-	-	294	365	H
7	* ** 7.56895	39.27	PK-U	35.7	-26.7	.6	.7	0	49.57	-	-	74	-24.43	-	-	125	141	V
	* ** 7.56809	26.85	ADV	35.7	-26.7	.6	.7	1.64	38.79	54	-15.21	-	-	-	-	125	141	V
8	* ** 8.20516	39.12	PK-U	35.9	-27.1	.6	.8	0	49.32	-	-	74	-24.68	-	-	200	263	V
	* ** 8.20404	26.74	ADV	35.9	-27.1	.6	.8	1.64	38.58	54	-15.42	-	-	-	-	200	263	V
6	6.87665	44.9	Pk	35.6	-27.9	.3	.8	0	53.7	-	-	-	-	68.2	-14.5	0-360	200	V
2	6.88063	37.81	Pk	35.6	-28.1	.3	.8	0	46.41	-	-	-	-	68.2	-21.79	0-360	101	H
9	17.20908	41.57	PK-U	41.3	-20.9	.8	.9	0	63.67	-	-	-	-	68.2	-4.53	325	303	V

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

9.1.6. HARMONICS AND SPURIOUS EMISSIONS (Scan 6)



HORIZONTAL



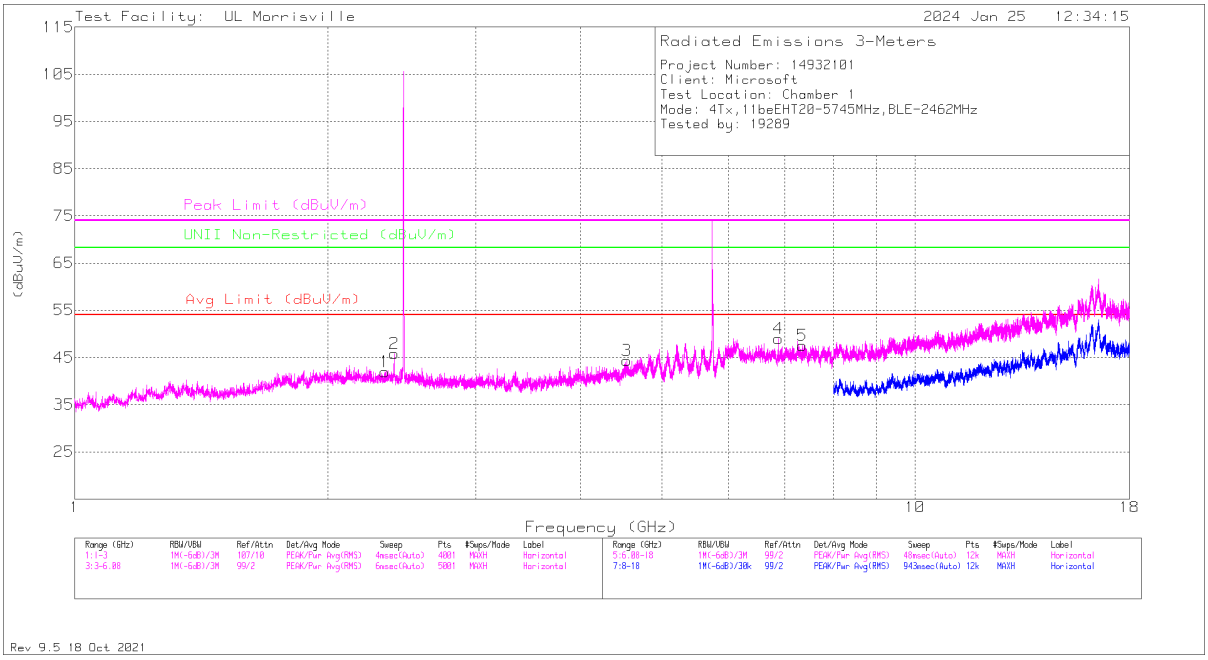
VERTICAL

RADIATED EMISSIONS

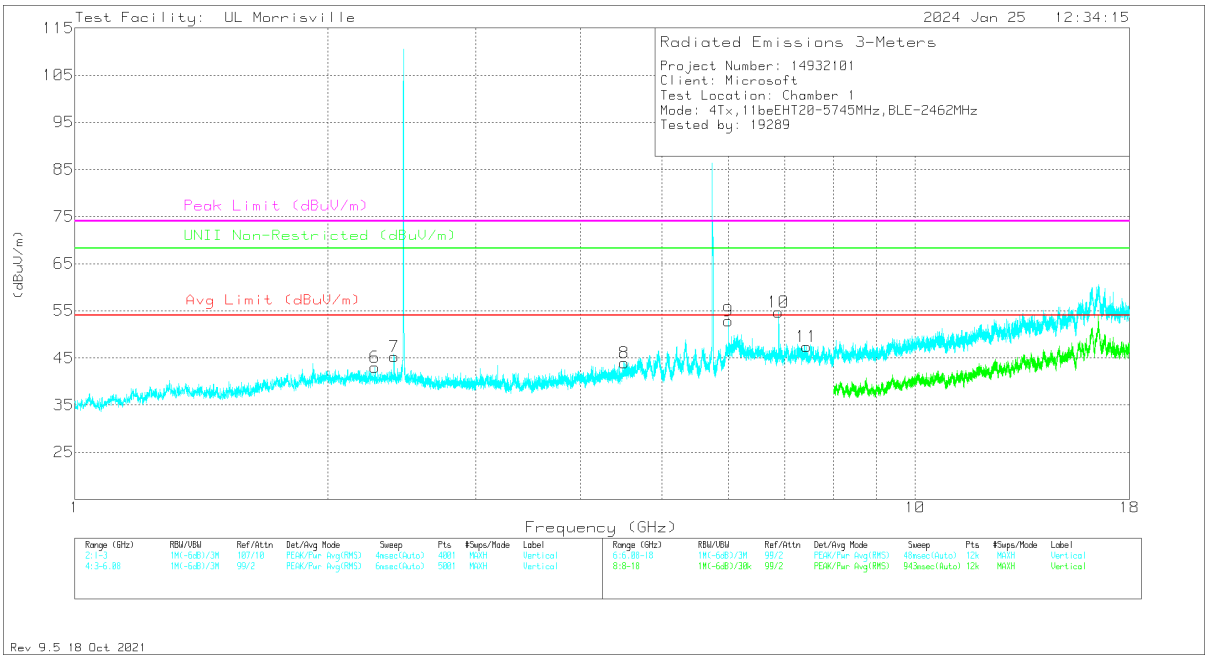
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	Filter (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.388	36.2	Pk	32.1	-24.2	1.2	0	0	45.3	54	-8.7	74	-28.7	-	-	0-360	199	H
2	* ** 4.8921	34.4	Pk	34	-21.2	.5	0	0	47.7	54	-6.3	74	-26.3	-	-	0-360	200	H
4	* ** 4.87554	38.73	PK-U	34	-21.4	.4	0	0	51.73	-	-	74	-22.27	-	-	5	276	V
	* ** 4.87628	29.78	ADR	34	-21.4	.4	0	.82	43.6	54	-10.4	-	-	-	-	5	276	V
5	* ** 7.5225	38.39	Pk	35.6	-27	.5	0	0	47.49	54	-6.51	74	-26.51	-	-	0-360	101	V
3	* ** 8.1225	36.89	Pk	35.8	-27.1	.4	.7	0	46.69	54	-7.31	74	-27.31	-	-	0-360	101	H
6	* ** 8.12651	28.41	ADR	35.8	-27	.4	.7	.82	39.13	54	-14.87	-	-	-	-	91	138	V
	* ** 8.12662	39.02	PK-U	35.8	-27	.4	.7	0	48.92	-	-	74	-25.08	-	-	91	138	V

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

9.1.7. HARMONICS AND SPURIOUS EMISSIONS (Scan 7)



HORIZONTAL



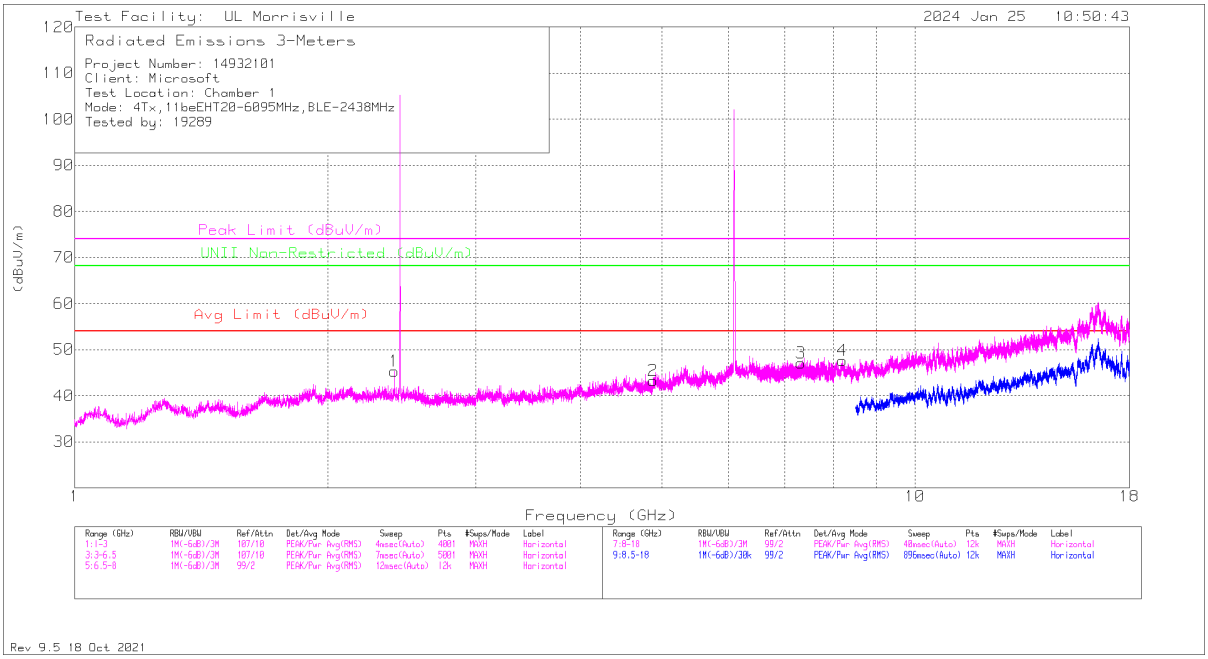
VERTICAL

RADIATED EMISSIONS

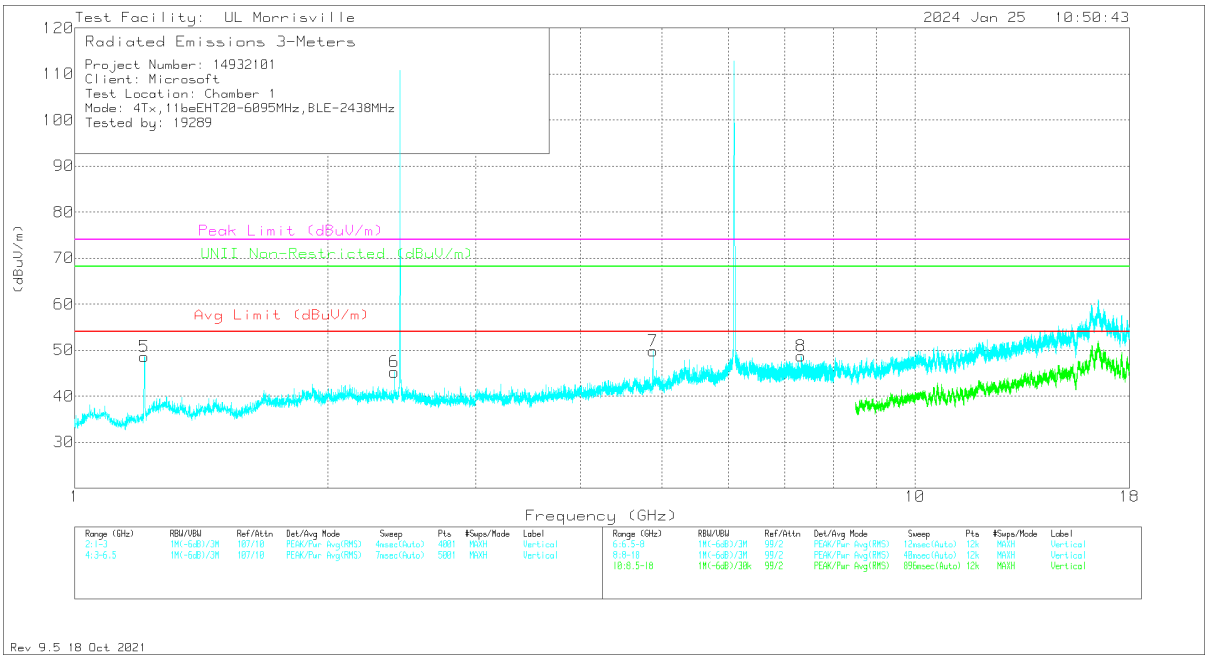
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	Filter (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.3405	33.4	Pk	32	-24	.5	0	41.9	54	-12.1	74	-32.1	-	-	0-360	101	H
6	* ** 2.2765	34.13	Pk	31.8	-23.6	.7	0	43.03	54	-10.97	74	-30.97	-	-	0-360	101	V
2	2.4005	37.35	Pk	32.1	-24.3	.7	0	45.85	-	-	-	-	68.2	-22.35	0-360	101	H
7	2.4005	36.81	Pk	32.1	-24.3	.7	0	45.31	-	-	-	-	68.2	-22.89	0-360	200	V
8	* ** 4.50858	39.22	Pk	34	-30.6	.8	.5	43.92	54	-10.08	74	-30.08	-	-	0-360	101	V
3	* ** 4.54123	40.1	Pk	34	-30.8	.7	.4	44.4	54	-9.6	74	-29.6	-	-	0-360	101	H
5	* ** 7.34749	37.95	Pk	35.6	-27.2	.6	.6	47.55	54	-6.45	74	-26.45	-	-	0-360	200	H
11	* ** 7.43292	37.4	Pk	35.7	-27	.7	.6	47.4	54	-6.6	74	-26.6	-	-	0-360	200	V
9	5.99314	43.1	Pk	35.2	-27.5	1.7	.4	52.9	-	-	-	-	68.2	-15.3	0-360	200	V
4	6.87765	40.25	Pk	35.6	-28	.8	.3	48.95	-	-	-	-	68.2	-19.25	0-360	101	H
10	6.87765	46.05	Pk	35.6	-28	.8	.3	54.75	-	-	-	-	68.2	-13.45	0-360	200	V

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

9.1.8. HARMONICS AND SPURIOUS EMISSIONS (Scan 8)



HORIZONTAL



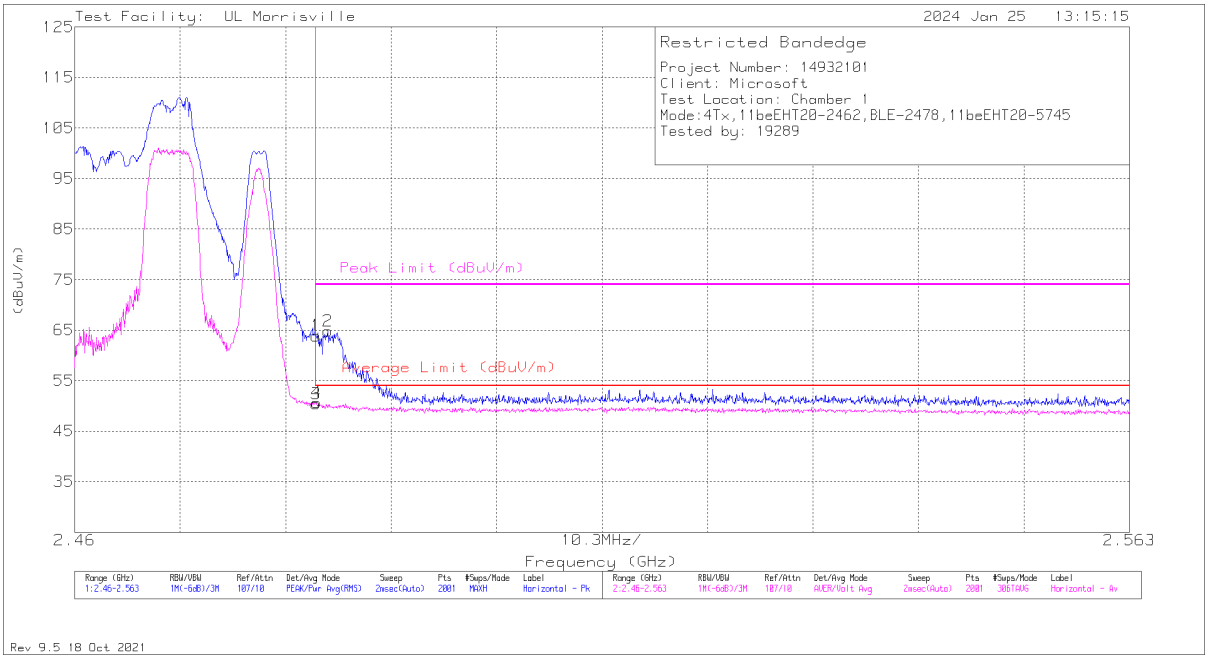
VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	Filter (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
5	* ** 1.21091	56.27	PK-U	28.5	-24.1	0	0	0	60.67	-	-	74	-13.33	-	-	345	244	V
	* ** 1.21037	44.81	ADR	28.5	-24.1	0	0	2.03	51.24	54	-2.76	-	-	-	-	345	244	V
1	2.4	37.58	Pk	32.1	-24.3	0	0	0	45.38	-	-	-	-	68.2	-22.82	0-360	200	H
6	2.4	37.47	Pk	32.1	-24.3	0	0	0	45.27	-	-	-	-	68.2	-22.93	0-360	200	V
2	* ** 4.876	39.33	Pk	34	-30.4	.4	0	0	43.33	54	-10.67	74	-30.67	-	-	0-360	199	H
7	* ** 4.8757	35.73	ADR	34	-30.4	.4	0	2.03	41.76	54	-12.24	-	-	-	-	0	382	V
	* ** 4.87645	46.15	PK-U	34	-30.4	.4	0	0	50.15	-	-	74	-23.85	-	-	0	382	V
3	* ** 7.31213	37.58	Pk	35.6	-26.6	.5	0	0	47.08	54	-6.92	74	-26.92	-	-	0-360	200	H
8	* ** 7.31278	38.64	PK-U	35.6	-26.7	.5	0	0	48.04	-	-	74	-25.96	-	-	238	363	V
	* ** 7.31377	26.78	ADR	35.6	-26.7	.5	0	2.03	38.21	54	-15.79	-	-	-	-	238	363	V
4	* ** 8.2	37.33	Pk	35.9	-27	.6	.8	0	47.63	54	-6.37	74	-26.37	-	-	0-360	199	H

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

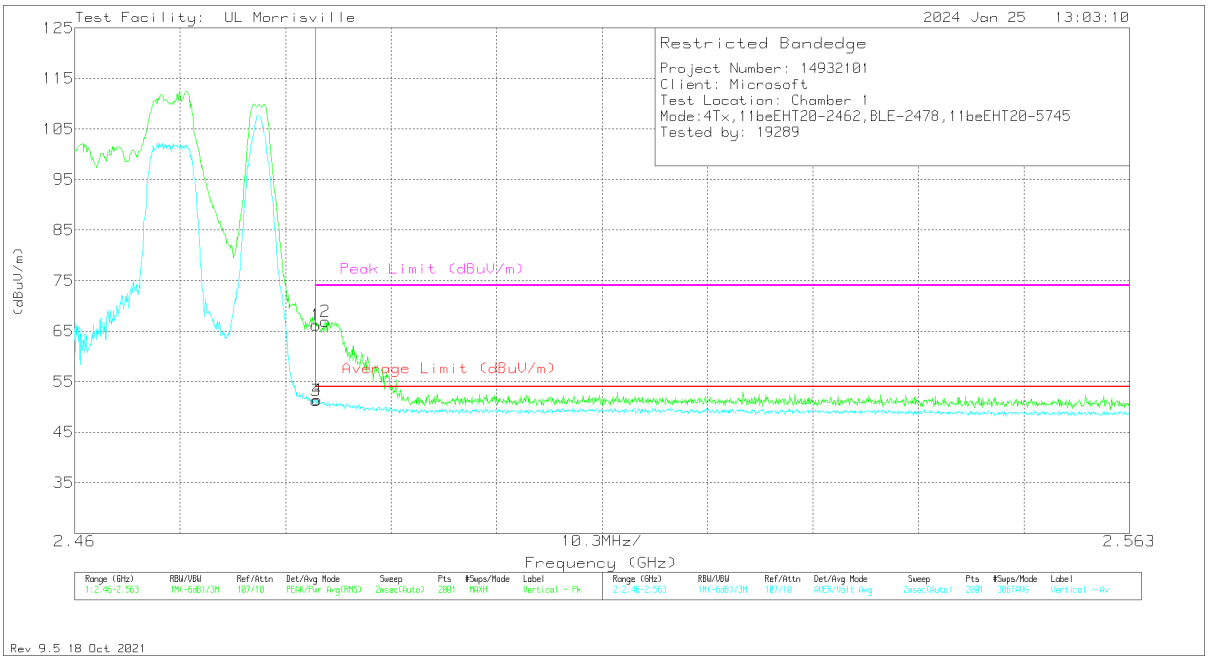
9.1.9. BAND EDGE EMISSIONS (Scan 9)



HORIZONTAL

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Gain/Loss (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	46.09	Pk	32.3	-24.5	10	0	63.89	-	-	74	-10.11	268	348	H
2	* ** 2.48472	47	Pk	32.3	-24.5	10	0	64.8	-	-	74	-9.2	268	348	H
3	* ** 2.48354	22.92	ADV	32.3	-24.5	10	9.74	50.46	54	-3.54	-	-	268	348	H
4	* ** 2.48364	23.13	ADV	32.3	-24.5	10	9.74	50.67	54	-3.33	-	-	268	348	H

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



VERTICAL

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Gain/Loss (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	48.44	Pk	32.3	-24.5	10	0	66.24	-	-	74	-7.76	313	388	V
2	* ** 2.48446	49.09	Pk	32.3	-24.5	10	0	66.89	-	-	74	-7.11	313	388	V
3	* ** 2.48354	23.71	ADV	32.3	-24.5	10	9.74	51.25	54	-2.75	-	-	313	388	V
4	* ** 2.48369	23.85	ADV	32.3	-24.5	10	9.74	51.39	54	-2.61	-	-	313	388	V

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

10. SETUP PHOTOS

For all setup diagrams and setup photos, refer to UL report R14932101-EP1b

END OF REPORT

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