CERTIFICATION TEST REPORT

Report Number. : R12922855-E1

Applicant	:	Microsoft Corporation One Microsoft Way Redmond, WA 98052-6399 USA
Model	:	1867
FCC ID	:	C3K1867
IC	:	3048A-1867
EUT Description	:	Portable Computing Device
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C ISED RSS-247 ISSUE 2 ISED RSS-GEN ISSUE 5

Date Of Issue:
2019-08-29

Prepared by:
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NVLAP Lab code: 200246-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	--	Initial Issue	
2	2019-09-06	Added AC power adaptor to support equipment. Added model similarity explanation to Section 4.	Brian T. Kiewra

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: Portable Computing Device

MODEL: 1867

SERIAL NUMBER: See section 6.4

DATE TESTED: 2019-07-18 to 2019-07-23

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	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.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, 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, North Carolina, USA and 2800 Perimeter Park Dr. Suite B, Morrisville, North Carolina, 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. Suite B
ISED Site Code: 2180C	
☐ Chamber A	☒ Chamber North
☐ Chamber C	☒ Chamber South

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

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

4. SCOPE OF REPORT

This test report covers the radiated emissions and AC power line conducted emissions data for model 1867. Antenna port conducted emissions data is leveraged from UL report number R12935938-E1, model 1868 (FCC ID: C3K1868, IC: 3048A-1868).
.
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.

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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
Unwanted Emissions, conducted	2.50 dB
All emissions, radiated	4.88 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%.

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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 peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	2.45	1.76

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Range (GHz)	**Antenna Type**	**Peak Gain (dBi) Chain 0 (Right)**	**Peak Gain (dBi) Chain 1 (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

The BLE radio utilizes Chain 0.

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6.4. SOFTWARE AND FIRMWARE

EUT	Serial Number	Radio Test Tool Version	OS Version	BT Driver Version	WiFi Driver Version	EUT's Power Supply (s/n)
R-557-1867-FCC-RADIATED-08	006438792757	11.1916.0-09531	MTEOS 1.652.0	21.0.19157.20088	99.0.43.8	0D130P028D596
R-557-1867-FCC-RADIATED-09	006439692757	11.1916.0-09531	MTEOS 1.652.0	21.0.19157.20088	99.0.43.8	0D130P01H1596

6.5. WORST-CASE CONFIGURATION AND MODE

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

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

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

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

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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	DataTraveler G4	Non-serialized	N/A
AC Power Adaptor	Microsoft	1706	0D130P01H1596	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	<3	None
2	USB-A	1	USB-A	USB	<3	None
3	USB-C	1	USB-C	USB	<3	None
4	Aux	1	Aux	Aux	<3	None

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 R12922855-EP1 for setup diagrams

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7. MEASUREMENT METHOD

Radiated emissions restricted frequency bands: ANSI C63.10 Subclause -11.12.1, 6.10.5

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

Radiated Emissions Requirements: ANSI C63.10-2013 Section 6.3-6.6

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8. 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 - South Chamber)

Equip. 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
	18-40 GHz				
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2018-11-08	2019-11-08
	Gain-Loss Chains				
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2019-03-13	2020-03-13
S-SAC04	Gain-loss string: 18-40GHz	Various	Various	2018-09-30	2019-09-30
	Receiver & Software				
SA0025	Spectrum Analyzer	Agilent	N9030A	2019-02-28	2020-02-28
SA0027 (18-40GHz RSE)	Spectrum Analyzer	Agilent	N9030A	2019-05-15	2020-05-15
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.

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

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	0.009-30MHz	**(Loop Ant.)**			
AT0059	Active Loop Antenna	ETS-Lindgren	6502	2018-07-20	2019-07-31
	30-1000 MHz				
AT0073	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2018-08-06	2019-08-31
	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-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2019-05-02	2020-05-02
N-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2019-05-02	2020-05-02
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.

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

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2019-05-29	2020-05-29
s/n 161016511	Environmental Meter	Fisher Scientific	14-650-118	2018-09-04	2020-09-04
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2018-08-21	2019-08-21
75141 (PRE0101521)	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2018-08-22	2019-08-22
TL001	Transient Limiter, 0.009-30MHz	Com-Power	LIT-930A	2019-05-29	2020-05-29
PS215	AC Power Source	Elgar	CW2501M (s/n 1523A02397)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5	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.

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9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

RSS-GEN, Section 8.9 and 8.10.

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

TEST PROCEDURE

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

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

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

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements. For average measurements above 1GHz, the resolution bandwidth and video bandwidth are set as described in ANSI C63.10:2013 for the applicable measurement. The particular averaging method used for this test program was RMS.

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

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

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

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

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

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

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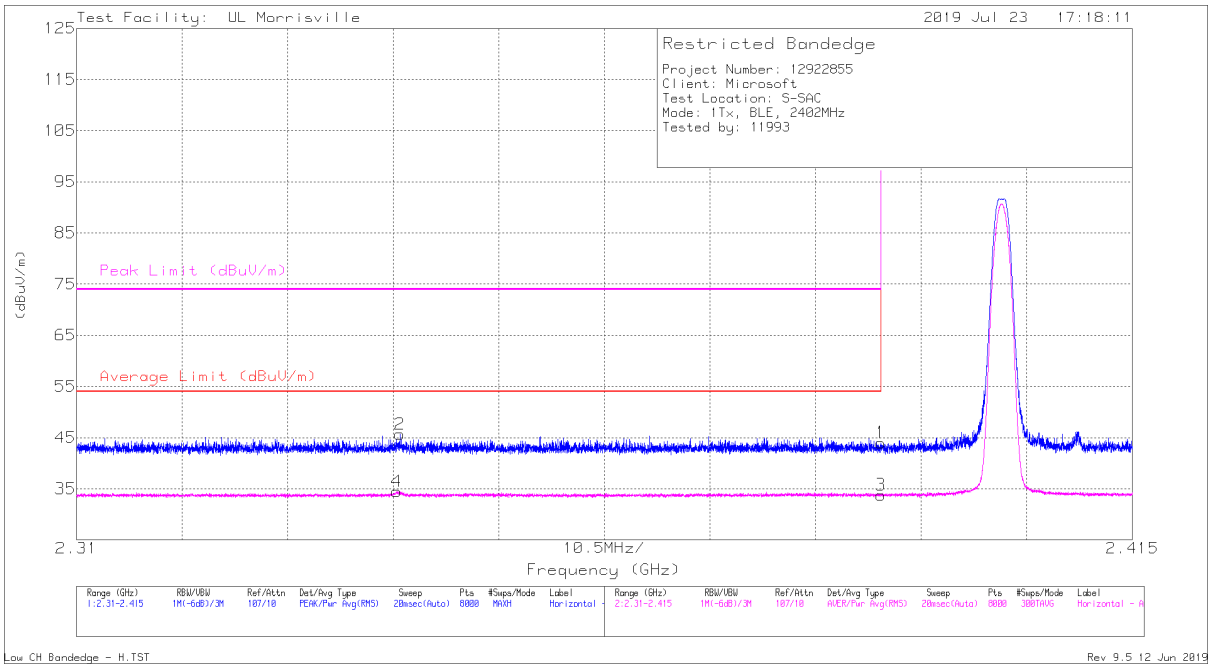
9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. BLE (125 kbps)

Antenna 1

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	* ** 2.39	36.1	Pk	31.9	-24	0	44	-	-	74	-30	257	384	H
2	* ** 2.34215	37.74	Pk	31.6	-23.7	0	45.64	-	-	74	-28.36	257	384	H
3	* ** 2.39	25.07	RMS	31.9	-24	.83	33.8	54	-20.2	-	-	257	384	H
4	* ** 2.34183	25.75	RMS	31.6	-23.7	.83	34.48	54	-19.52	-	-	257	384	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

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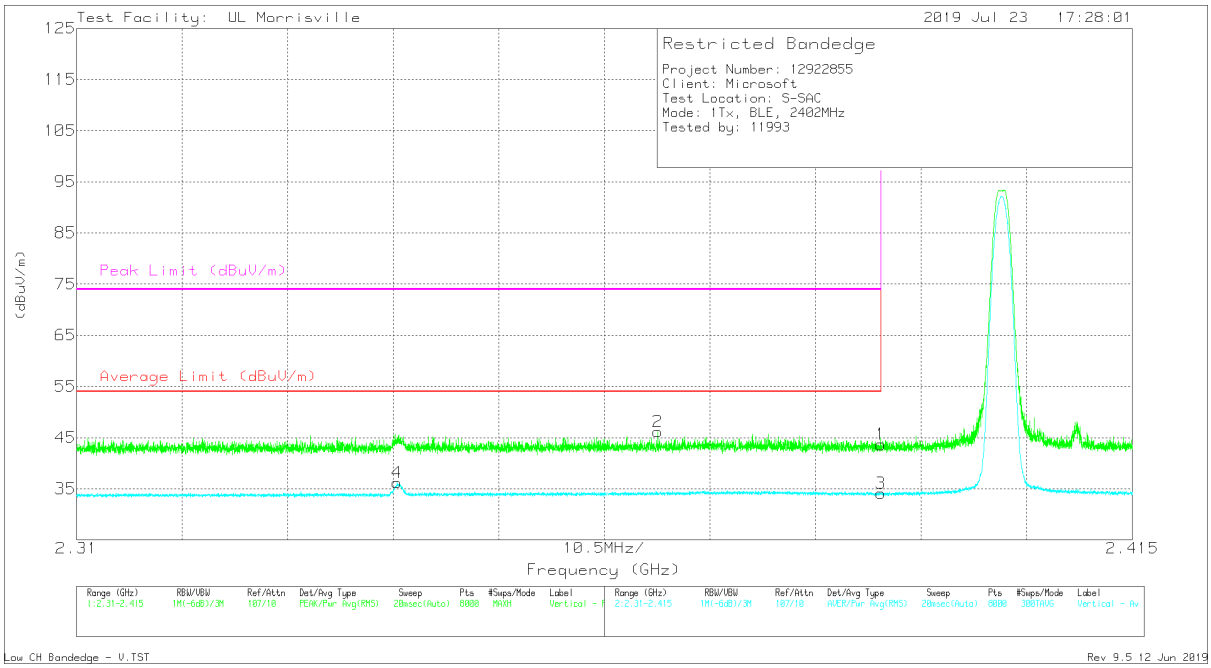
VERTICAL RESULT



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	* ** 2.39	35.76	Pk	31.9	-24	0	43.66	-	-	74	-30.34	250	159	V
2	* ** 2.36781	38.35	Pk	31.8	-24	0	46.15	-	-	74	-27.85	250	159	V
3	* ** 2.39	25.38	RMS	31.9	-24	.83	34.11	54	-19.89	-	-	250	159	V
4	* ** 2.34187	27.46	RMS	31.6	-23.7	.83	36.19	54	-17.81	-	-	250	159	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

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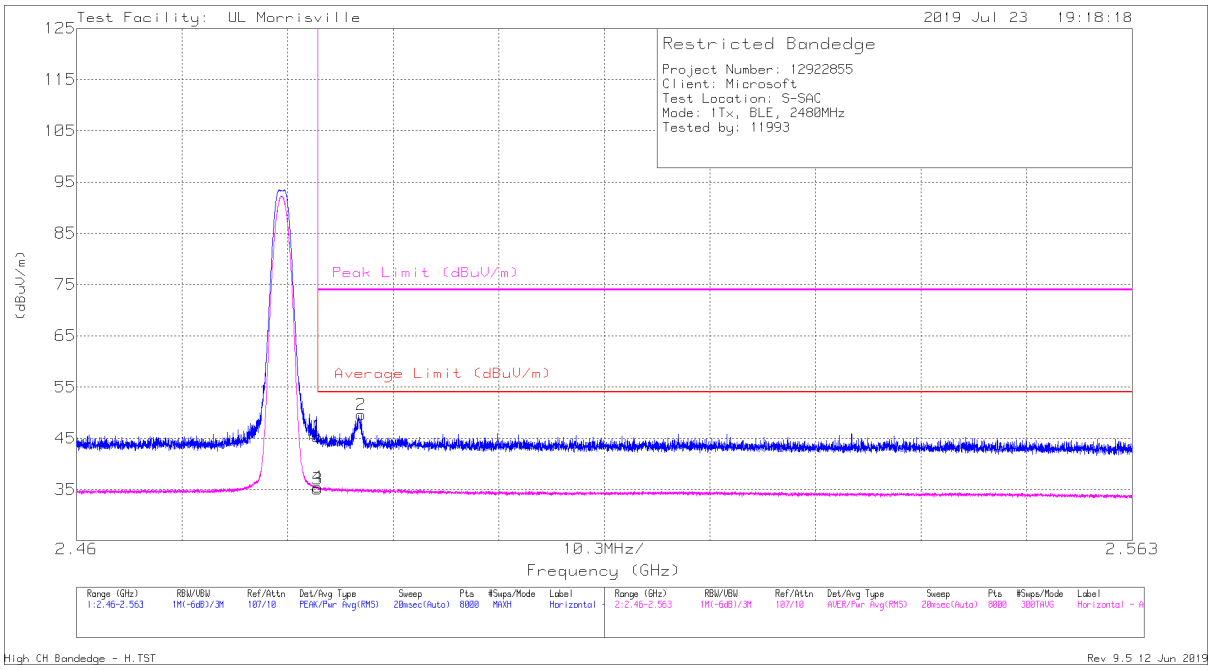
BANDEDGE (HIGH CHANNEL)

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	* ** 2.4835	37.55	Pk	32.3	-24.5	0	45.35	-	-	74	-28.65	342	341	H
2	* ** 2.48776	41.79	Pk	32.3	-24.5	0	49.59	-	-	74	-24.41	342	341	H
3	* ** 2.4835	26.5	RMS	32.3	-24.5	.83	35.13	54	-18.87	-	-	342	341	H
4	* ** 2.48355	26.84	RMS	32.3	-24.5	.83	35.47	54	-18.53	-	-	342	341	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

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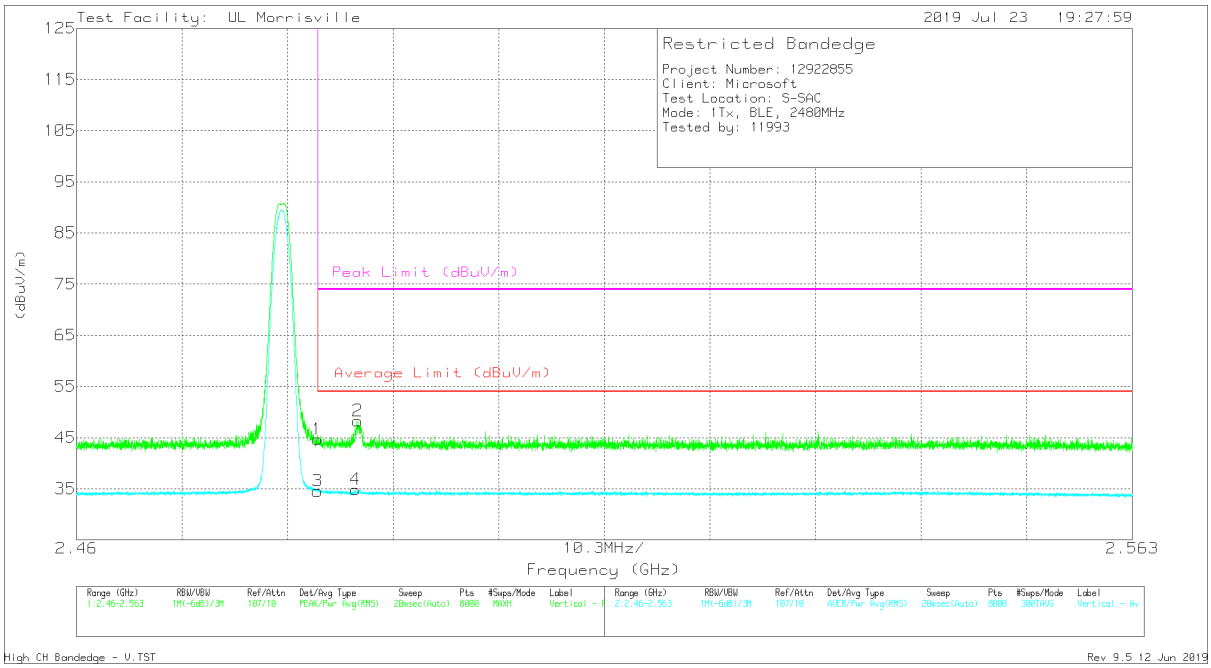
VERTICAL RESULT



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	* ** 2.4835	36.89	Pk	32.3	-24.5	0	44.69	-	-	74	-29.31	339	368	V
2	* ** 2.48743	40.49	Pk	32.3	-24.5	0	48.29	-	-	74	-25.71	339	368	V
3	* ** 2.4835	25.93	RMS	32.3	-24.5	.83	34.56	54	-19.44	-	-	339	368	V
4	* ** 2.48721	26.27	RMS	32.3	-24.5	.83	34.9	54	-19.1	-	-	339	368	V

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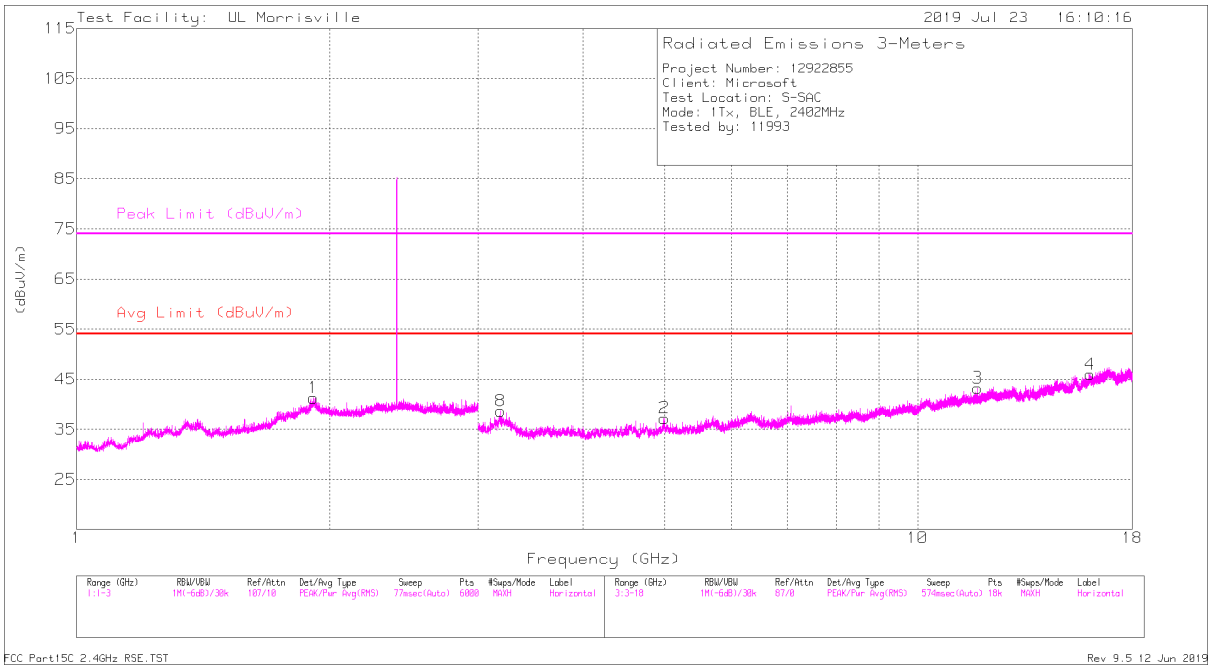
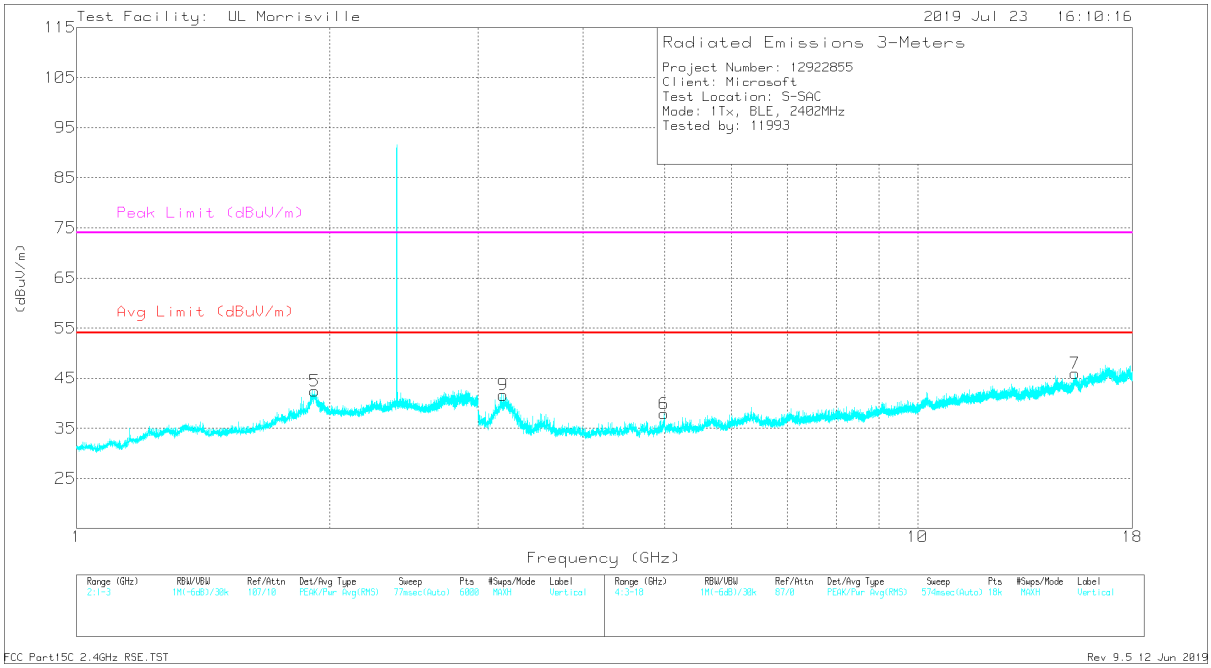
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

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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)	Azimuth (Degs)	Height (cm)	Polarity
1	** 1.91164	40.8	PK2	31.1	-22.4	0	49.5	-	-	74	-24.5	333	129	H
	** 1.91273	28.78	MAv1	31.1	-22.4	.83	38.31	54	-15.69	-	-	333	129	H
5	** 1.91971	42.16	PK2	31.2	-22.4	0	50.96	-	-	74	-23.04	85	232	V
	** 1.92012	30.29	MAv1	31.2	-22.4	.83	39.92	54	-14.08	-	-	85	232	V
2	* ** 4.99915	42.64	PK2	34.2	-31.1	0	45.74	-	-	74	-28.26	16	102	H
	* ** 4.9988	28.68	MAv1	34.2	-31.1	.83	32.61	54	-21.39	-	-	16	102	H
3	* ** 11.78542	33.67	PK2	38.5	-23.9	0	48.27	-	-	74	-25.73	128	166	H
	* ** 11.78586	21.85	MAv1	38.5	-23.9	.83	37.28	54	-16.72	-	-	128	166	H
4	* ** 16.03359	35.28	PK2	40.8	-23.5	0	52.58	-	-	74	-21.42	272	228	H
	* ** 16.03421	23.4	MAv1	40.8	-23.5	.83	41.53	54	-12.47	-	-	272	228	H
6	* ** 4.99621	42.78	PK2	34.2	-31.1	0	45.88	-	-	74	-28.12	94	117	V
	* ** 4.9962	28.85	MAv1	34.2	-31.1	.83	32.78	54	-21.22	-	-	94	117	V
7	* ** 15.39103	32.94	PK2	39.9	-21.4	0	51.44	-	-	74	-22.56	92	164	V
	* ** 15.39434	21.58	MAv1	39.9	-21.3	.83	41.01	54	-12.99	-	-	92	164	V
8	3.19168	38.03	Pk	33.1	-32.5	0	38.63	-	-	-	-	0-360	101	H
9	3.21335	41.34	Pk	33.1	-32.8	0	41.64	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
MAv1 - Maximum RMS Average
Pk - Peak detector

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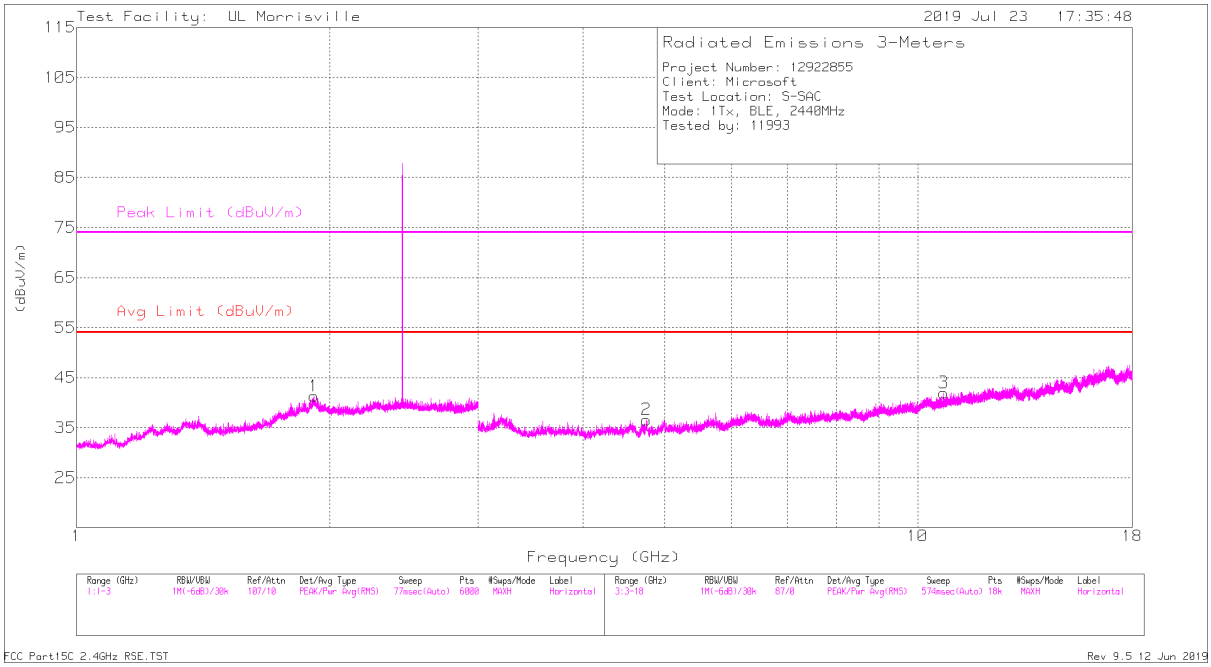
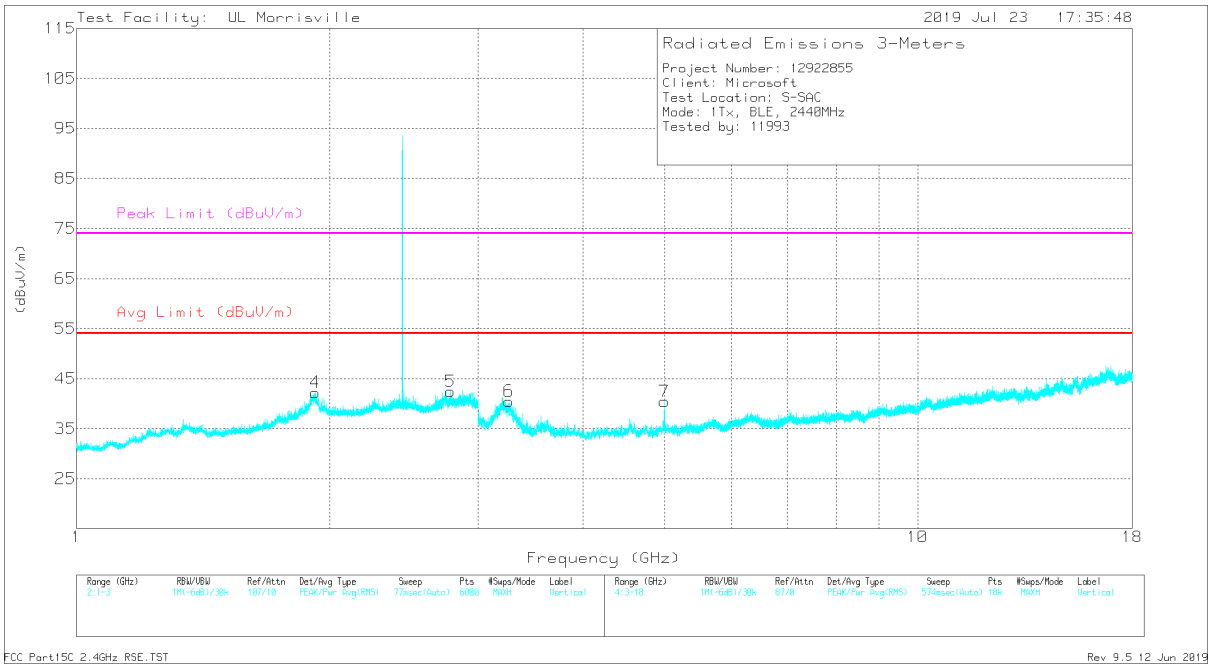
MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

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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)	Azimuth (Degs)	Height (cm)	Polarity
1	** 1.91508	39.92	PK2	31.1	-22.4	0	48.62	-	-	74	-25.38	334	135	H
	** 1.91603	28.31	MAv1	31.1	-22.4	.83	37.84	54	-16.16	-	-	334	135	H
4	** 1.92211	41.5	PK2	31.2	-22.4	0	50.3	-	-	74	-23.7	89	253	V
	** 1.92177	29.33	MAv1	31.2	-22.4	.83	38.96	54	-15.04	-	-	89	253	V
5	* ** 2.78095	42.6	PK2	32.2	-25.9	0	48.9	-	-	74	-25.1	107	241	V
	* ** 2.78042	30.58	MAv1	32.2	-25.9	.83	37.71	54	-16.29	-	-	107	241	V
2	* ** 4.75784	39.81	PK2	34.1	-31.4	0	42.51	-	-	74	-31.49	289	162	H
	* ** 4.75926	27.96	MAv1	34.1	-31.3	.83	31.59	54	-22.41	-	-	289	162	H
3	* ** 10.74445	34.06	PK2	37.7	-24.3	0	47.46	-	-	74	-26.54	249	139	H
	* ** 10.74483	22.18	MAv1	37.7	-24.3	.83	36.41	54	-17.59	-	-	249	139	H
6	* ** 3.26239	48.76	PK2	33.1	-33	0	48.86	-	-	74	-25.14	103	197	V
	* ** 3.26047	36.69	MAv1	33.1	-33	.83	37.62	54	-16.38	-	-	103	197	V
7	* ** 4.99905	42.71	PK2	34.2	-31.1	0	45.81	-	-	74	-28.19	101	102	V
	* ** 4.99919	29.22	MAv1	34.2	-31.1	.83	33.15	54	-20.85	-	-	101	102	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
MAv1 - Maximum RMS Average

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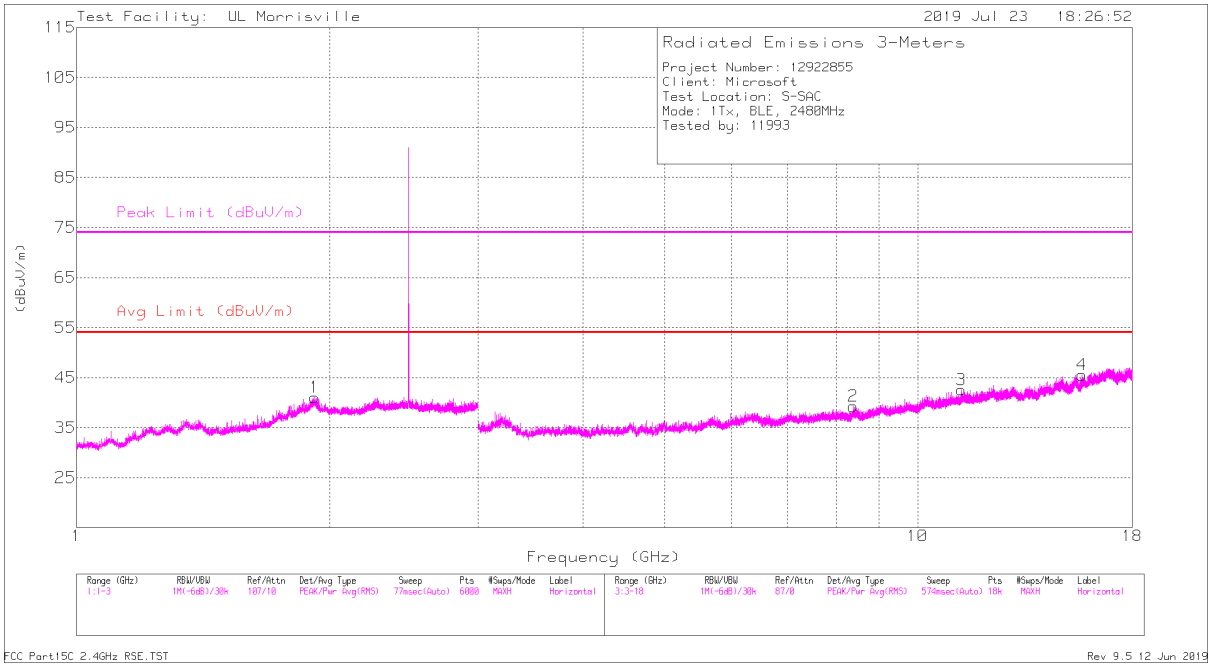
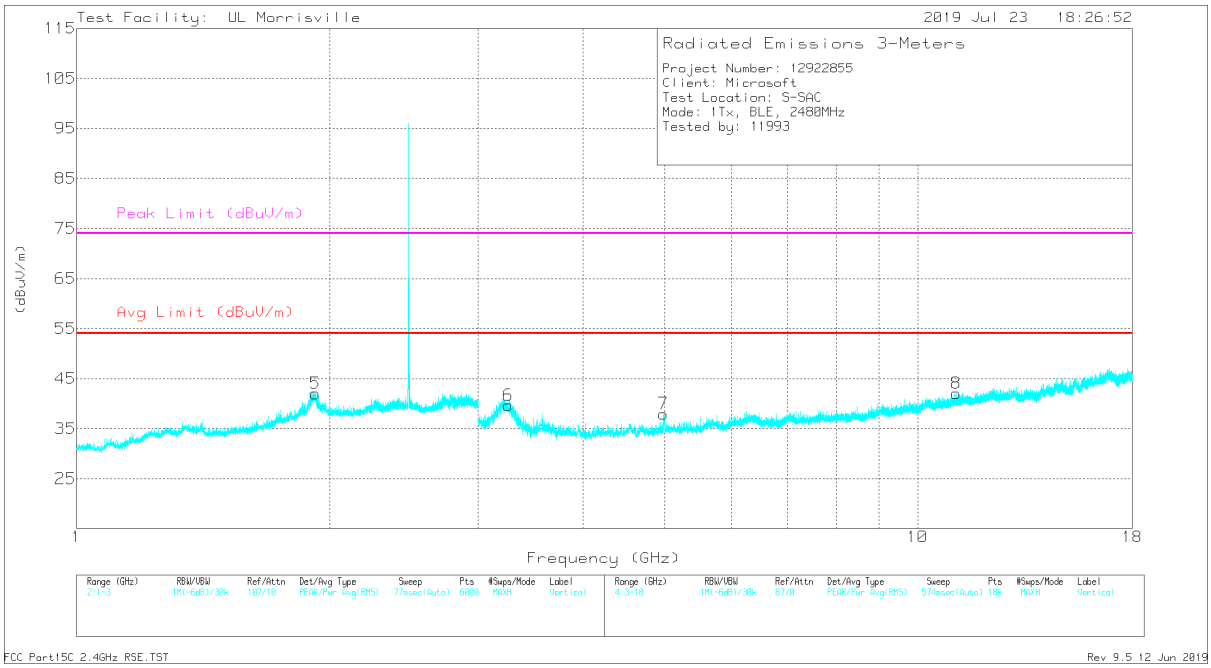
HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

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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)	Azimuth (Degs)	Height (cm)	Polarity
1	** 1.9192	40.25	PK2	31.2	-22.4	0	49.05	-	-	74	-24.95	335	115	H
	** 1.91909	28.31	MAv1	31.2	-22.4	.83	37.94	54	-16.06	-	-	335	115	H
5	** 1.9199	42.55	PK2	31.2	-22.4	0	51.35	-	-	74	-22.65	90	235	V
	** 1.92003	30.31	MAv1	31.2	-22.4	.83	39.94	54	-14.06	-	-	90	235	V
2	* ** 8.38486	35.58	PK2	36.1	-27.1	0	44.58	-	-	74	-29.42	350	253	H
	* ** 8.3855	24.07	MAv1	36.1	-27.1	.83	33.9	54	-20.1	-	-	350	253	H
3	* ** 11.27747	33.4	PK2	38	-23	0	48.4	-	-	74	-25.6	343	180	H
	* ** 11.27702	21.34	MAv1	38	-23	.83	37.17	54	-16.83	-	-	343	180	H
4	* ** 15.68662	33.65	PK2	40.2	-22.6	0	51.25	-	-	74	-22.75	174	216	H
	* ** 15.68704	21.65	MAv1	40.2	-22.6	.83	40.08	54	-13.92	-	-	174	216	H
6	* ** 3.26168	49.06	PK2	33.1	-33	0	49.16	-	-	74	-24.84	108	206	V
	* ** 3.26149	37.02	MAv1	33.1	-33	.83	37.95	54	-16.05	-	-	108	206	V
7	* ** 4.99178	42.97	PK2	34.1	-31.1	0	45.97	-	-	74	-28.03	104	101	V
	* ** 4.98953	28.86	MAv1	34.1	-31.1	.83	32.69	54	-21.31	-	-	104	101	V
8	* ** 11.1242	34.59	PK2	37.9	-24	0	48.49	-	-	74	-25.51	39	386	V
	* ** 11.12457	22.01	MAv1	37.9	-24	.83	36.74	54	-17.26	-	-	39	386	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
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PK2 - Maximum Peak
MAv1 - Maximum RMS Average

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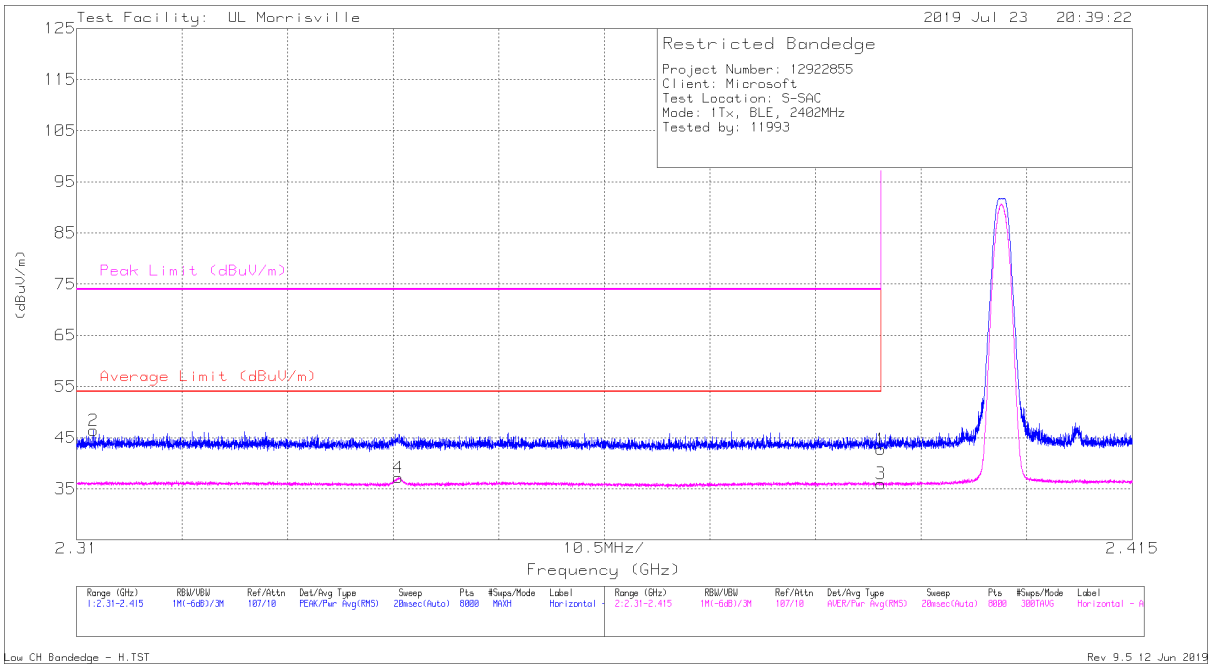
9.2.2. BLE (500 kbps)

Antenna 1

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	* ** 2.39	34.82	Pk	31.9	-24	0	42.72	-	-	74	-31.28	344	357	H
2	* ** 2.31169	38.44	Pk	31.7	-23.7	0	46.44	-	-	74	-27.56	344	357	H
3	* ** 2.39	25.66	RMS	31.9	-24	2.45	36.01	54	-17.99	-	-	344	357	H
4	* ** 2.342	26.87	RMS	31.6	-23.7	2.45	37.22	54	-16.78	-	-	344	357	H

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

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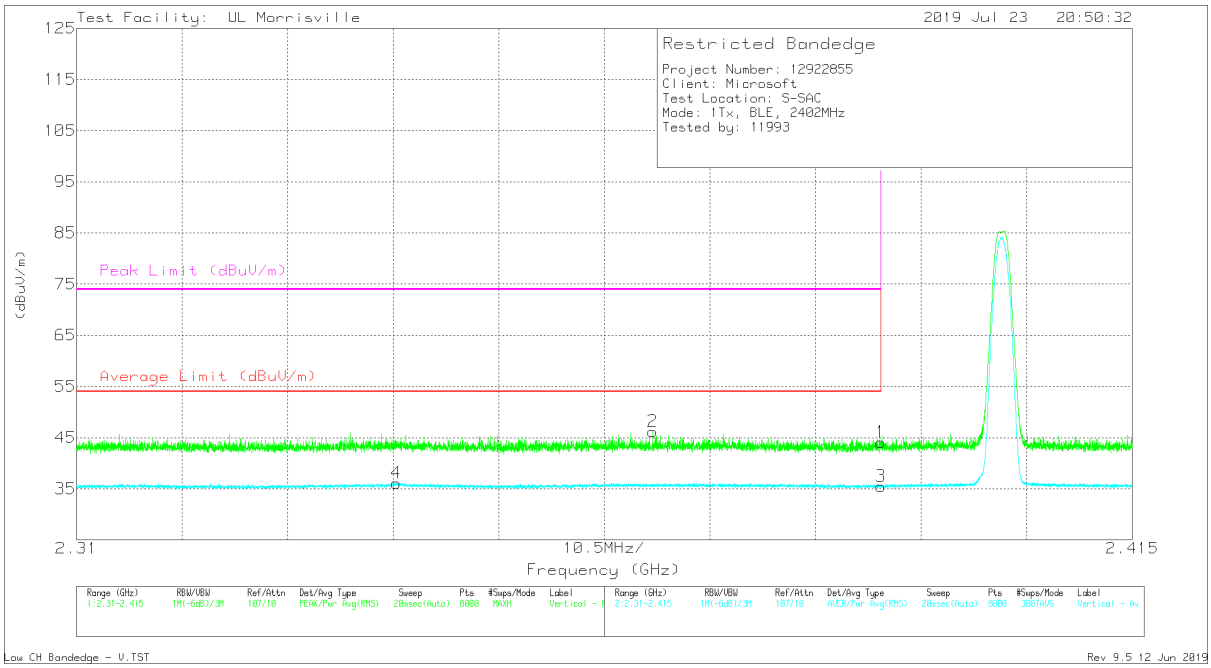
VERTICAL RESULT



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	* ** 2.39	36.22	Pk	31.9	-24	0	44.12	-	-	74	-29.88	344	100	V
2	* ** 2.3673	38.41	Pk	31.8	-24	0	46.21	-	-	74	-27.79	344	100	V
3	* ** 2.39	25.17	RMS	31.9	-24	2.45	35.52	54	-18.48	-	-	344	100	V
4	* ** 2.34181	25.79	RMS	31.6	-23.7	2.45	36.14	54	-17.86	-	-	344	100	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

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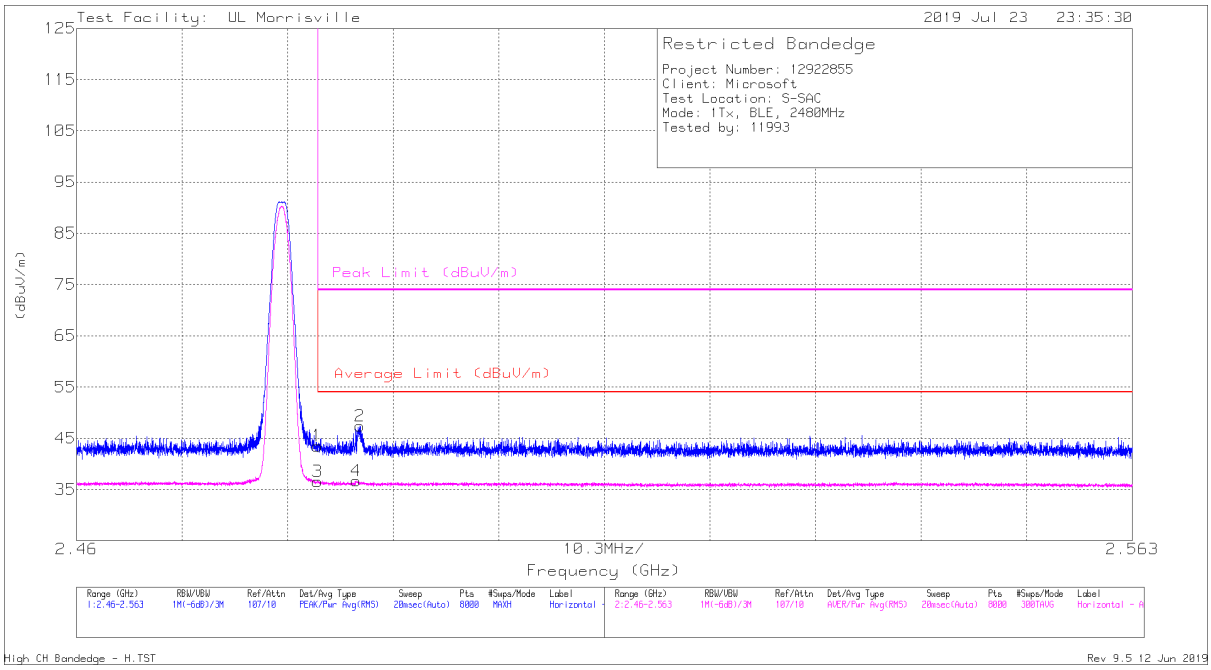
BANDEDGE (HIGH CHANNEL)

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	* ** 2.4835	35.7	Pk	32.3	-24.5	0	43.5	-	-	74	-30.5	84	108	H
2	* ** 2.48765	39.58	Pk	32.3	-24.5	0	47.38	-	-	74	-26.62	84	108	H
3	* ** 2.4835	26.33	RMS	32.3	-24.5	2.45	36.58	54	-17.42	-	-	84	108	H
4	* ** 2.48725	26.43	RMS	32.3	-24.5	2.45	36.68	54	-17.32	-	-	84	108	H

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Pk - Peak detector
RMS - RMS detection

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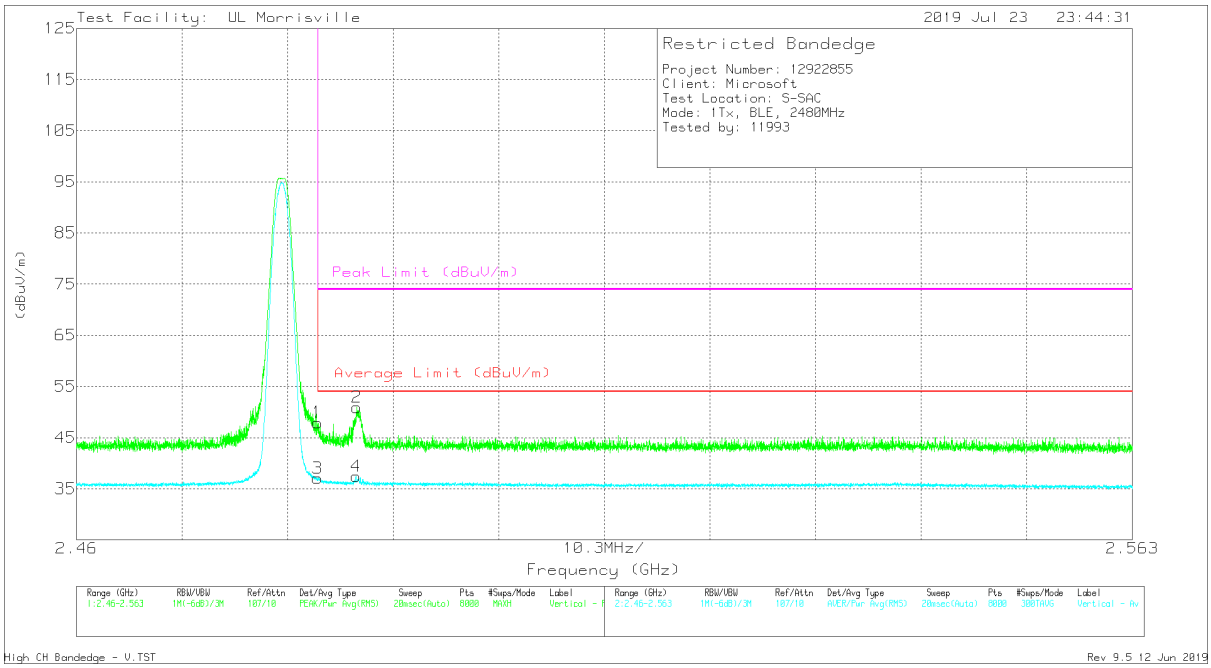
VERTICAL RESULT



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	* ** 2.4835	40.14	Pk	32.3	-24.5	0	47.94	-	-	74	-26.06	235	225	V
2	* ** 2.48731	43.11	Pk	32.3	-24.5	0	50.91	-	-	74	-23.09	235	225	V
3	* ** 2.4835	26.83	RMS	32.3	-24.5	2.45	37.08	54	-16.92	-	-	235	225	V
4	* ** 2.48726	27.17	RMS	32.3	-24.5	2.45	37.42	54	-16.58	-	-	235	225	V

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Pk - Peak detector
RMS - RMS detection

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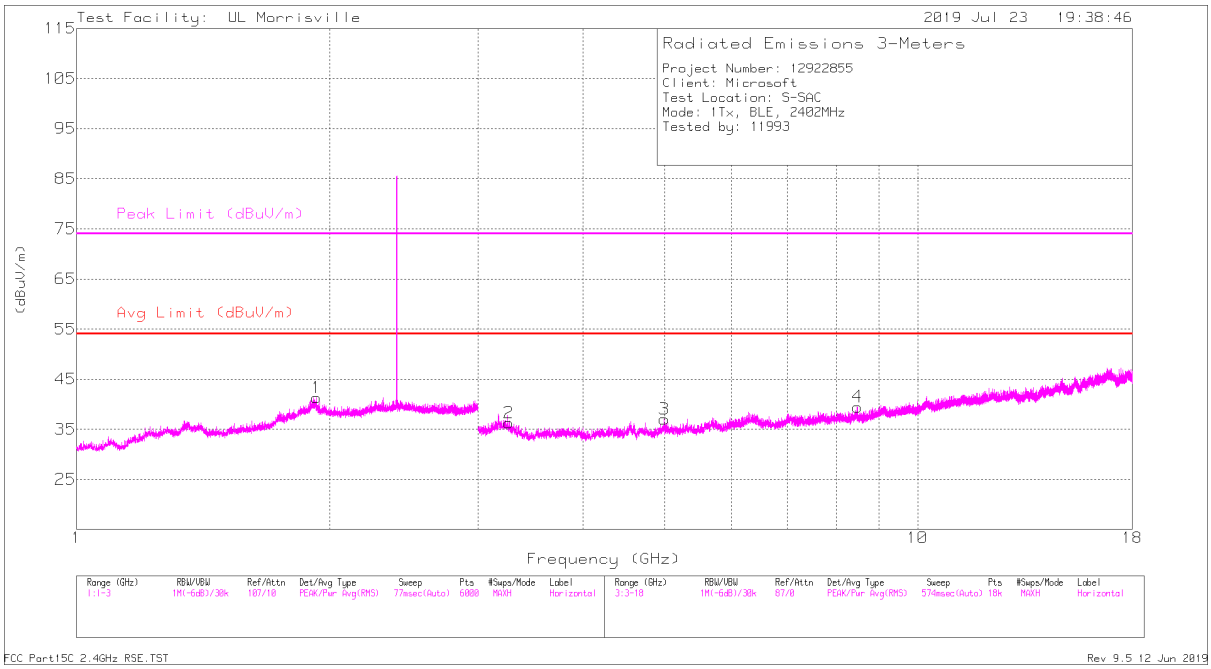
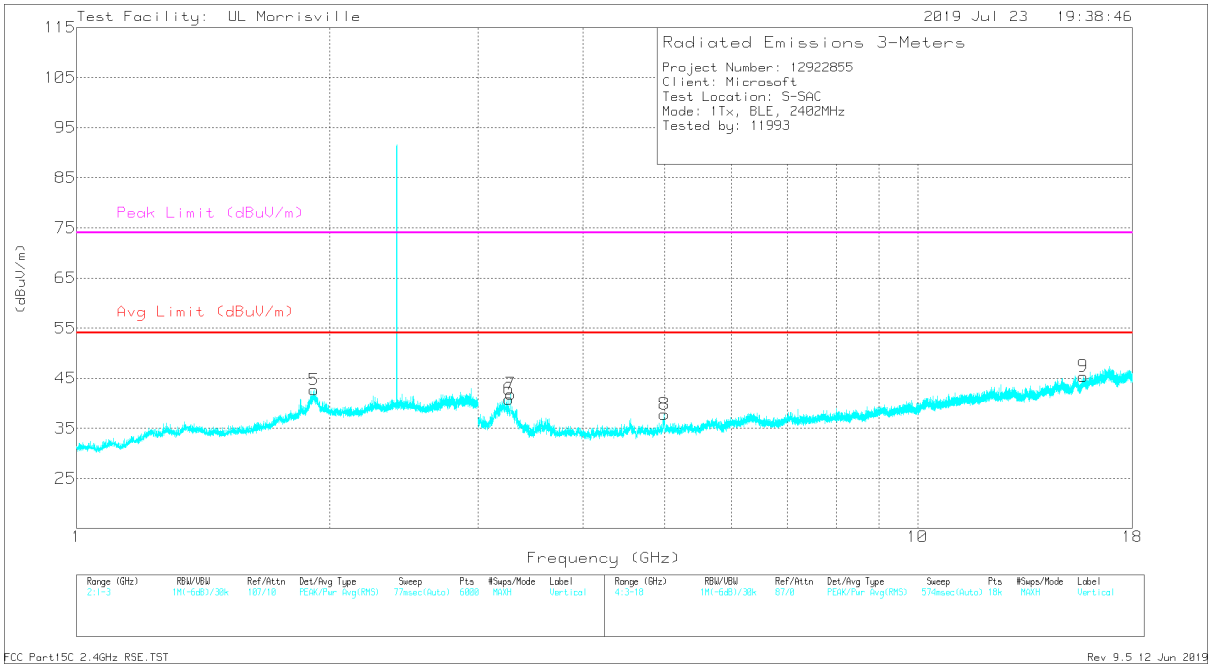
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



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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)	Azimuth (Degs)	Height (cm)	Polarity
1	** 1.92958	38.91	PK2	31.2	-22.4	0	47.71	-	-	74	-26.29	337	152	H
	** 1.92945	26.79	MAv1	31.2	-22.4	2.45	38.04	54	-15.96	-	-	337	152	H
5	** 1.91281	41.88	PK2	31.1	-22.4	0	50.58	-	-	74	-23.42	93	235	V
	** 1.91581	30.1	MAv1	31.1	-22.4	2.45	41.25	54	-12.75	-	-	93	235	V
2	* ** 3.26261	44.16	PK2	33.1	-33	0	44.26	-	-	74	-29.74	77	242	H
	* ** 3.2615	32.22	MAv1	33.1	-33	2.45	34.77	54	-19.23	-	-	77	242	H
3	* ** 4.99756	42.48	PK2	34.2	-31.1	0	45.58	-	-	74	-28.42	337	118	H
	* ** 4.99732	28.72	MAv1	34.2	-31.1	2.45	34.27	54	-19.73	-	-	337	118	H
4	* ** 8.48001	35.23	PK2	36	-26.8	0	44.43	-	-	74	-29.57	112	122	H
	* ** 8.47997	23.83	MAv1	36	-26.8	2.45	35.48	54	-18.52	-	-	112	122	H
6	* ** 3.26292	49.25	PK2	33.1	-33	0	49.35	-	-	74	-24.65	105	209	V
	* ** 3.26116	37.16	MAv1	33.1	-33	2.45	39.71	54	-14.29	-	-	105	209	V
8	* ** 4.99922	43.68	PK2	34.2	-31.1	0	46.78	-	-	74	-27.22	99	108	V
	* ** 4.99925	29.55	MAv1	34.2	-31.1	2.45	35.1	54	-18.9	-	-	99	108	V
9	* ** 15.7279	33.71	PK2	40.3	-22.2	0	51.81	-	-	74	-22.19	11	249	V
	* ** 15.7284	21.72	MAv1	40.3	-22.2	2.45	42.27	54	-11.73	-	-	11	249	V
7	3.28335	41.77	Pk	33	-32.9	0	41.87	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
MAv1 - Maximum RMS Average
Pk - Peak detector

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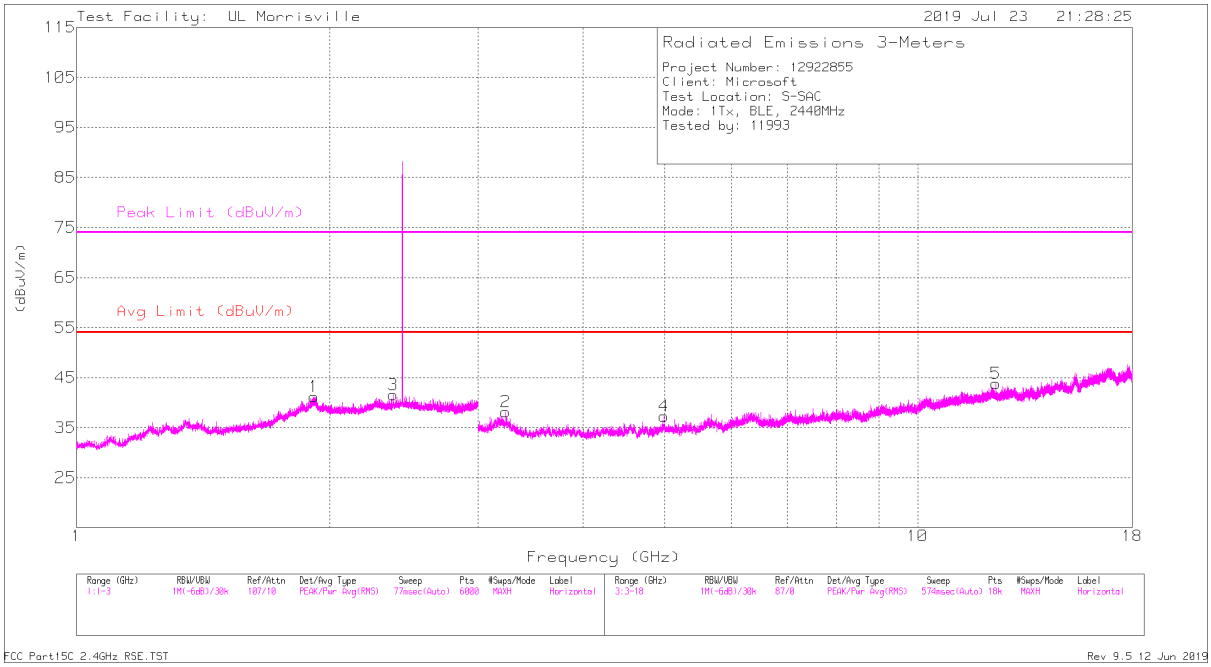
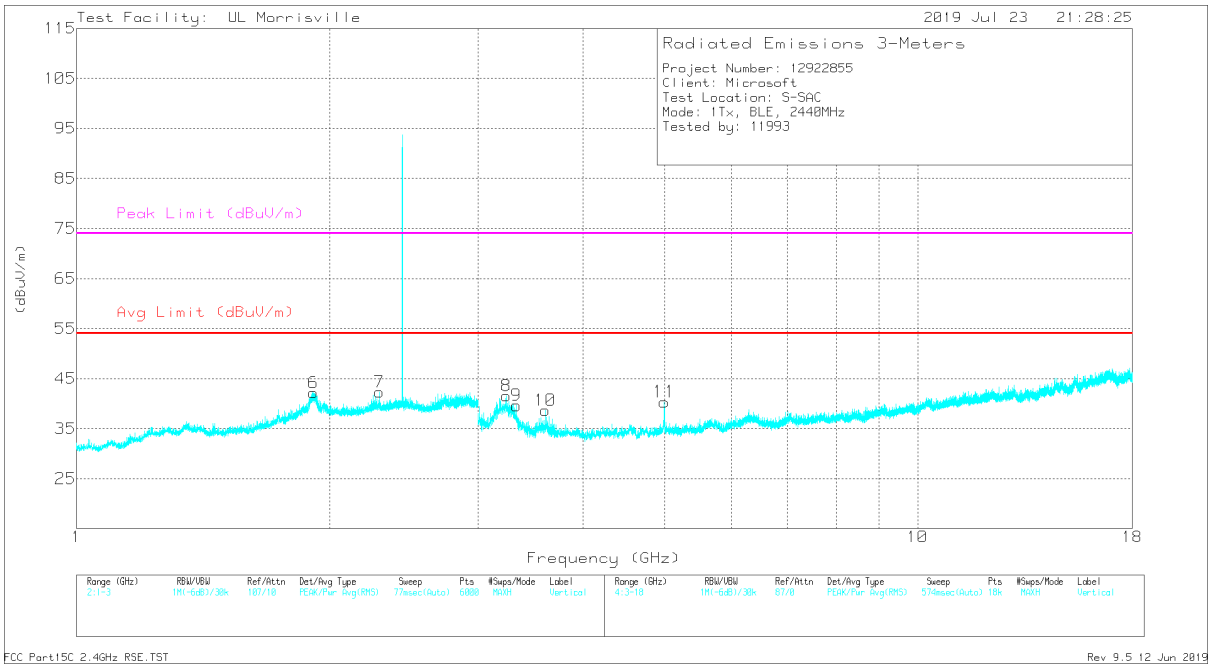
MID CHANNEL RESULTS



HORIZONTAL



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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)	Azimuth (Degs)	Height (cm)	Polarity
1	** 1.91695	40.34	PK2	31.2	-22.4	0	49.14	-	-	74	-24.86	334	116	H
	** 1.91702	28.31	MAv1	31.2	-22.4	2.45	39.56	54	-14.44	-	-	334	116	H
3	* ** 2.3786	39.63	PK2	31.8	-24	0	47.43	-	-	74	-26.57	352	131	H
	* ** 2.37837	27.33	MAv1	31.8	-24	2.45	37.58	54	-16.42	-	-	352	131	H
6	** 1.91206	42.51	PK2	31.1	-22.4	0	51.21	-	-	74	-22.79	92	232	V
	** 1.91293	30.17	MAv1	31.1	-22.4	2.45	41.32	54	-12.68	-	-	92	232	V
7	* ** 2.28958	37.21	PK2	31.8	-23.5	0	45.51	-	-	74	-28.49	118	217	V
	* ** 2.29163	25.56	MAv1	31.7	-23.5	2.45	36.21	54	-17.79	-	-	118	217	V
4	* ** 4.99528	41.44	PK2	34.2	-31.1	0	44.54	-	-	74	-29.46	339	140	H
	* ** 4.99686	28.38	MAv1	34.2	-31.1	2.45	33.93	54	-20.07	-	-	339	140	H
5	* ** 12.38236	34.05	PK2	38.8	-23.7	0	49.15	-	-	74	-24.85	161	238	H
	* ** 12.38245	21.92	MAv1	38.8	-23.7	2.45	39.47	54	-14.53	-	-	161	238	H
9	* ** 3.33695	45.85	PK2	32.9	-32.4	0	46.35	-	-	74	-27.65	102	220	V
	* ** 3.33724	33.89	MAv1	32.9	-32.4	2.45	36.84	54	-17.16	-	-	102	220	V
10	* ** 3.61089	43.93	PK2	32.9	-31.8	0	45.03	-	-	74	-28.97	110	209	V
	* ** 3.61109	31.58	MAv1	32.9	-31.8	2.45	35.13	54	-18.87	-	-	110	209	V
11	* ** 4.99933	44.23	PK2	34.2	-31.1	0	47.33	-	-	74	-26.67	97	101	V
	* ** 4.9989	29.81	MAv1	34.2	-31.1	2.45	35.36	54	-18.64	-	-	97	101	V
2	3.23668	37.96	Pk	33.1	-32.9	0	38.16	-	-	-	-	0-360	199	H
8	3.24251	41.38	Pk	33.1	-32.9	0	41.58	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
MAv1 - Maximum RMS Average
Pk - Peak detector

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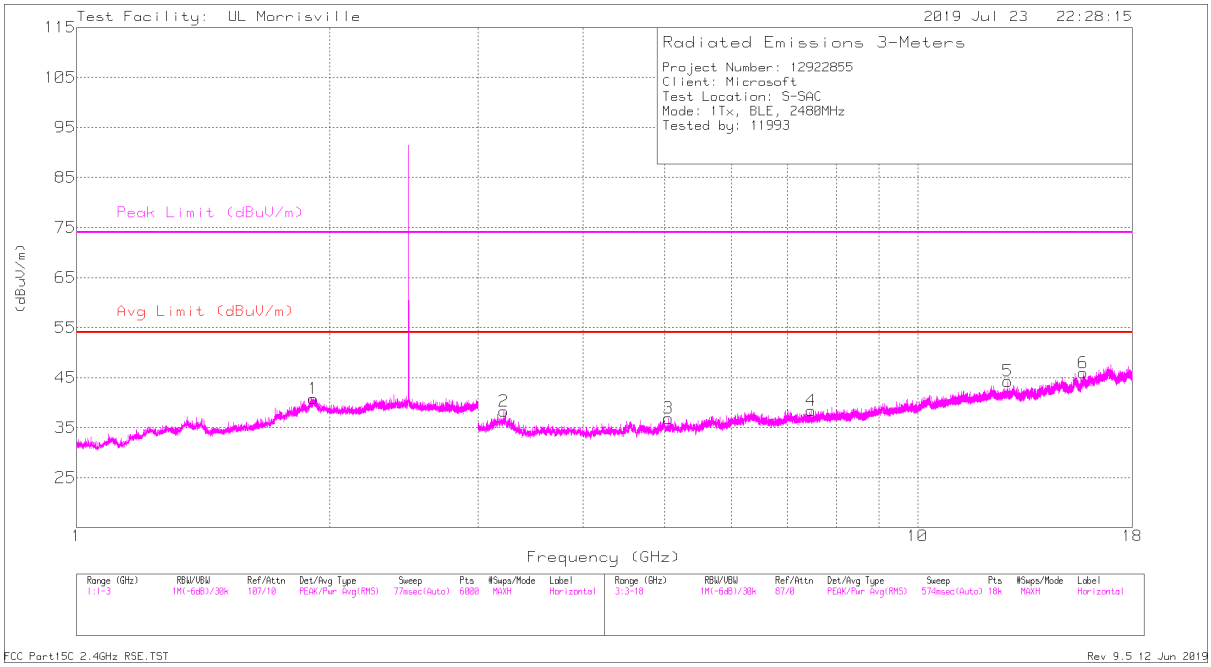
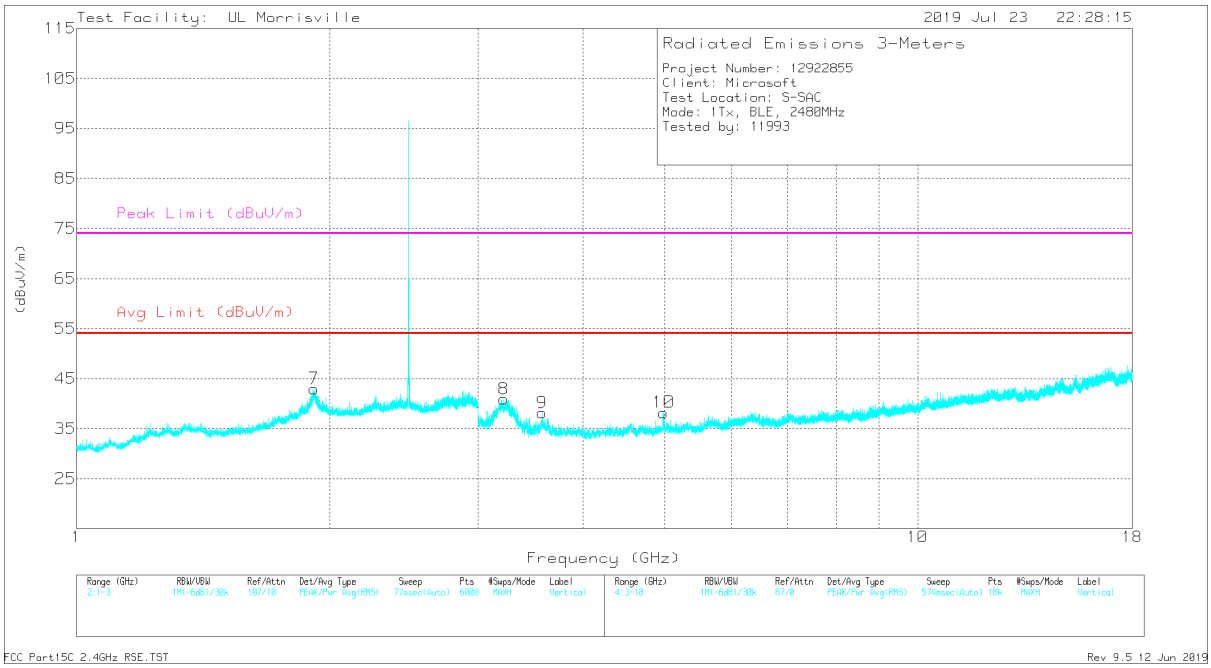
HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

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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)	Azimuth (Degs)	Height (cm)	Polarity
1	** 1.91327	39.34	PK2	31.1	-22.4	0	48.04	-	-	74	-25.96	274	169	H
	** 1.91394	26.94	MAv1	31.1	-22.4	2.45	38.09	54	-15.91	-	-	274	169	H
7	** 1.91651	41.96	PK2	31.2	-22.4	0	50.76	-	-	74	-23.24	92	236	V
	** 1.91511	29.99	MAv1	31.1	-22.4	2.45	41.14	54	-12.86	-	-	92	236	V
3	* ** 5.0534	39.36	PK2	34.2	-31.1	0	42.46	-	-	74	-31.54	191	319	H
	* ** 5.05175	27.4	MAv1	34.2	-31.1	2.45	32.95	54	-21.05	-	-	191	319	H
4	* ** 7.47033	36.12	PK2	35.8	-27.9	0	44.02	-	-	74	-29.98	112	272	H
	* ** 7.46978	24.1	MAv1	35.8	-27.9	2.45	34.45	54	-19.55	-	-	112	272	H
6	* ** 15.73386	32.9	PK2	40.3	-22.2	0	51	-	-	74	-23	1	201	H
	* ** 15.73198	21.37	MAv1	40.3	-22.2	2.45	41.92	54	-12.08	-	-	1	201	H
9	* ** 3.57953	44.48	PK2	32.9	-31.9	0	45.48	-	-	74	-28.52	108	211	V
	* ** 3.57899	32.15	MAv1	32.9	-31.9	2.45	35.6	54	-18.4	-	-	108	211	V
10	* ** 4.99165	43.65	PK2	34.1	-31.1	0	46.65	-	-	74	-27.35	97	101	V
	* ** 4.99081	29.46	MAv1	34.1	-31.1	2.45	34.91	54	-19.09	-	-	97	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
MAv1 - Maximum RMS Average
Pk - Peak detector

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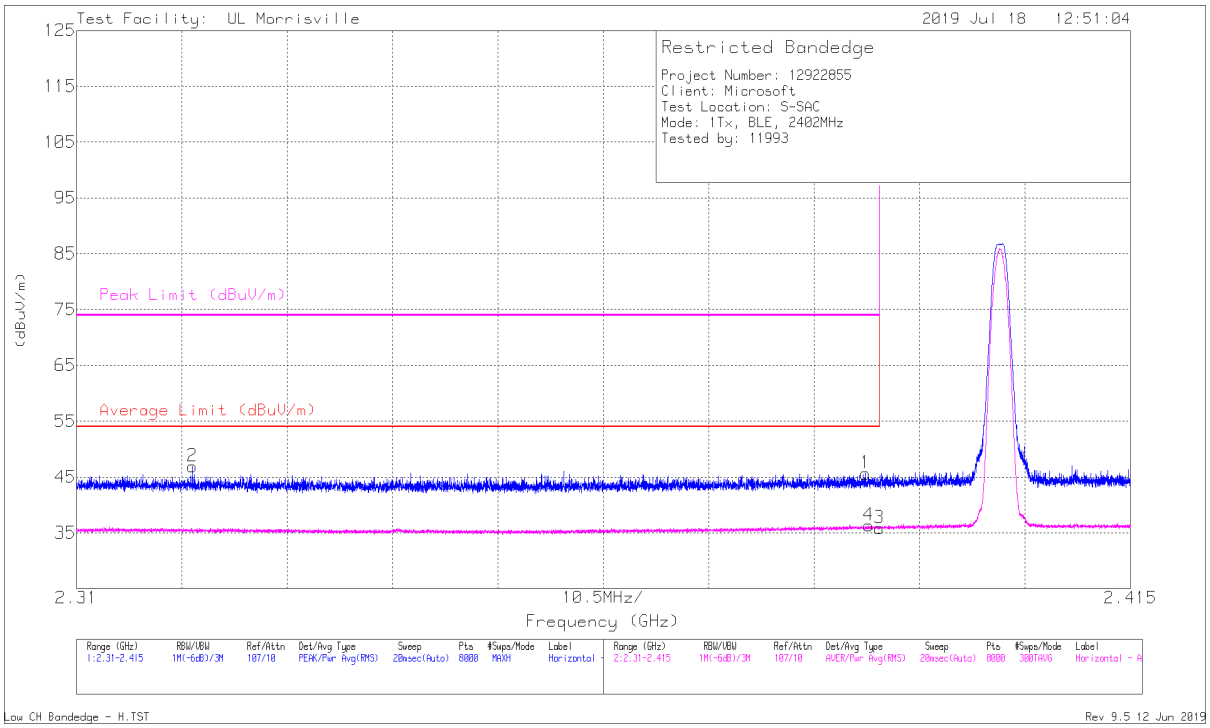
9.2.3. BLE (1Mbps)

Antenna 1

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	* ** 2.38859	37.72	Pk	31.9	-24	0	45.62	-	-	74	-28.38	212	273	H
2	* ** 2.32153	38.9	Pk	31.7	-23.7	0	46.9	-	-	74	-27.1	212	273	H
3	* ** 2.39	25.9	RMS	31.9	-24	2.07	35.87	54	-18.13	-	-	212	273	H
4	* ** 2.38895	26.32	RMS	31.9	-24	2.07	36.29	54	-17.71	-	-	212	273	H

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Pk - Peak detector
RMS - RMS detection

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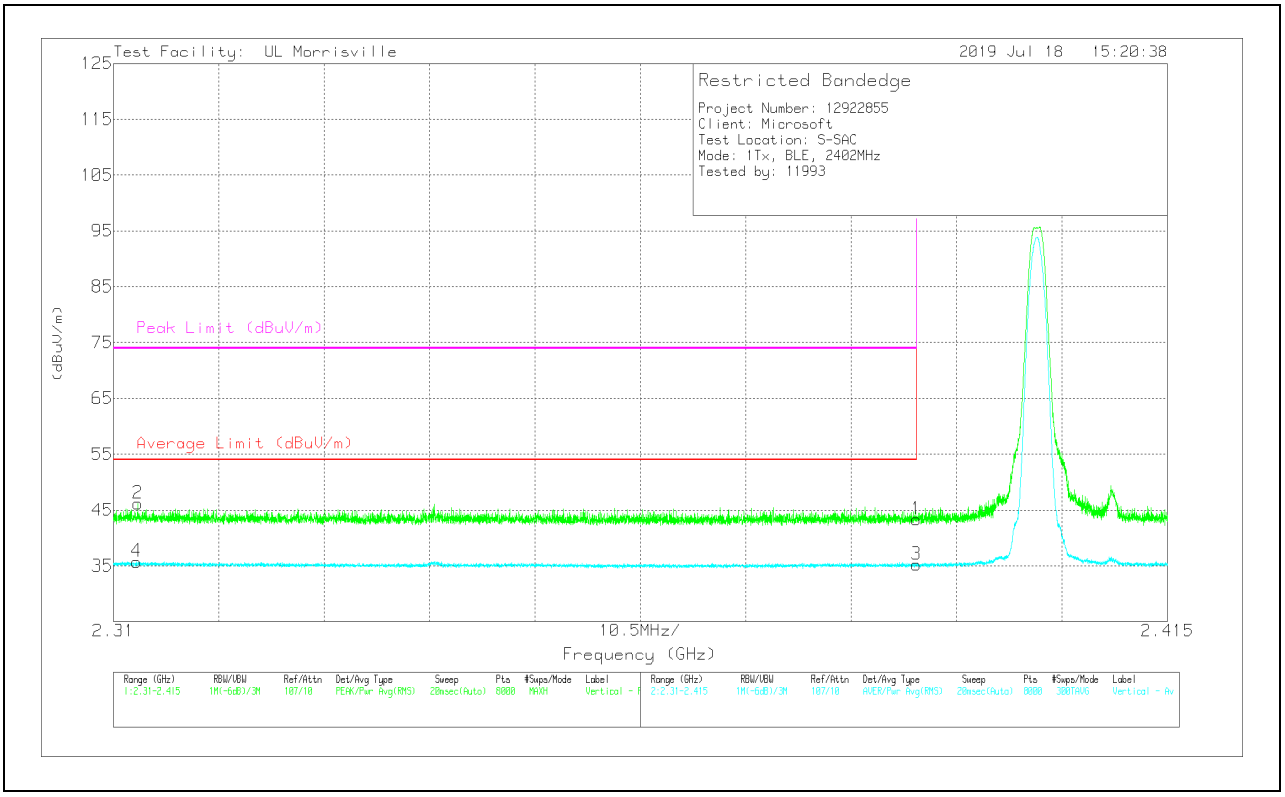
VERTICAL RESULT



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	* ** 2.39	35.46	Pk	31.9	-24	0	43.36	-	-	74	-30.64	241	378	V
2	* ** 2.31243	38.15	Pk	31.7	-23.7	0	46.15	-	-	74	-27.85	241	378	V
3	* ** 2.39	25.24	RMS	31.9	-24	2.07	35.21	54	-18.79	-	-	241	378	V
4	* ** 2.31231	25.69	RMS	31.7	-23.7	2.07	35.76	54	-18.24	-	-	241	378	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

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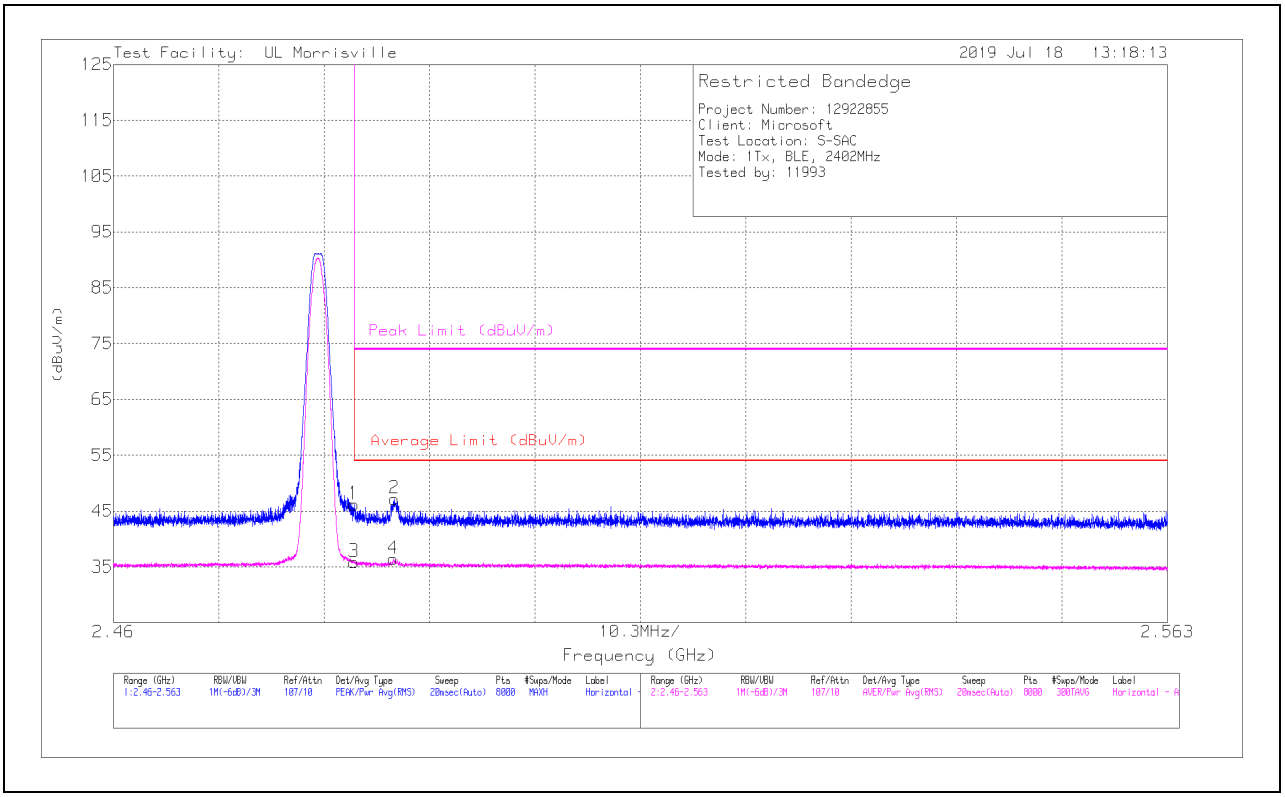
BANDEDGE (HIGH CHANNEL)

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	* ** 2.4835	38.41	Pk	32.3	-24.5	0	46.21	-	-	74	-27.79	236	397	H
2	* ** 2.48748	39.41	Pk	32.3	-24.5	0	47.21	-	-	74	-26.79	236	397	H
3	* ** 2.4835	26.01	RMS	32.3	-24.5	2.07	35.88	54	-18.12	-	-	236	397	H
4	* ** 2.48735	26.6	RMS	32.3	-24.5	2.07	36.47	54	-17.53	-	-	236	397	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

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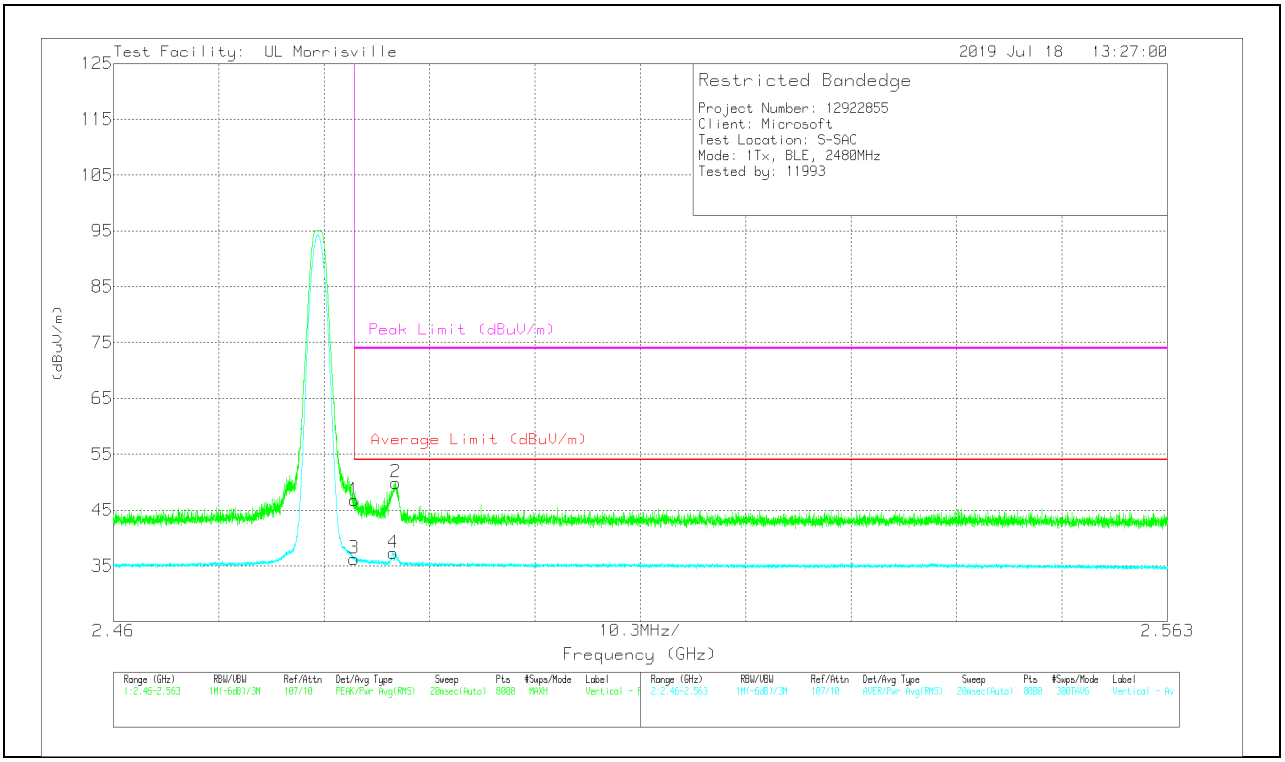
VERTICAL RESULT



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	* ** 2.48351	38.99	Pk	32.3	-24.5	0	46.79	-	-	74	-27.21	243	398	V
2	* ** 2.48756	42.11	Pk	32.3	-24.5	0	49.91	-	-	74	-24.09	243	398	V
3	* ** 2.4835	26.4	RMS	32.3	-24.5	2.07	36.27	54	-17.73	-	-	243	398	V
4	* ** 2.48734	27.47	RMS	32.3	-24.5	2.07	37.34	54	-16.66	-	-	243	398	V

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

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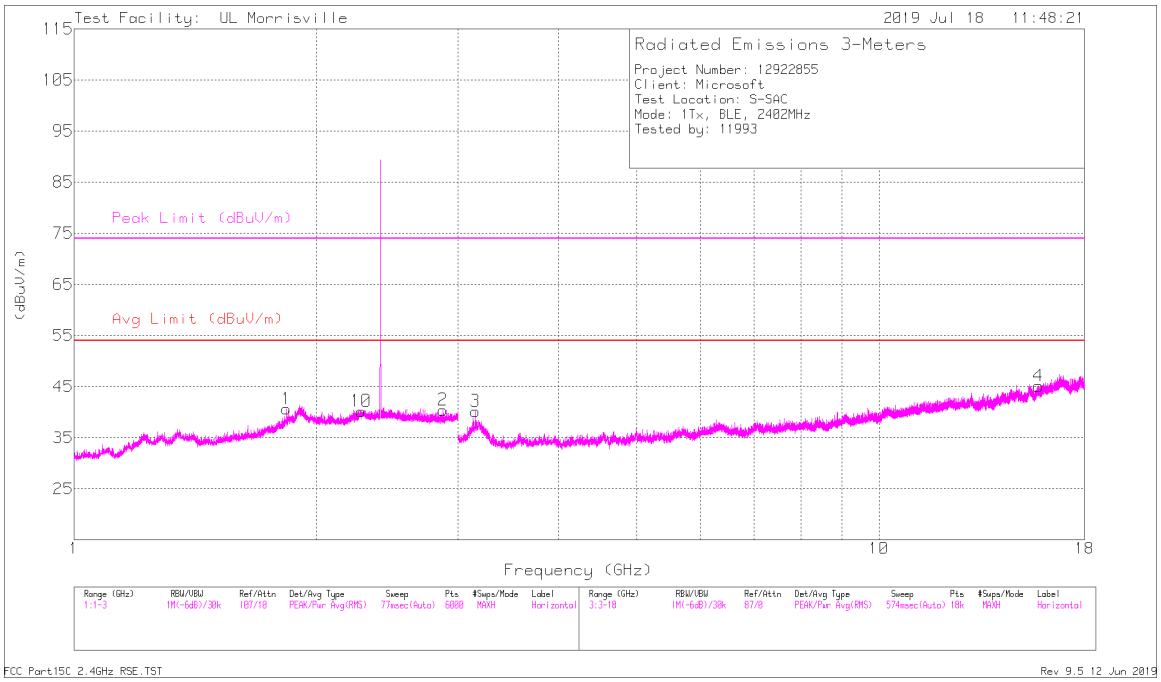
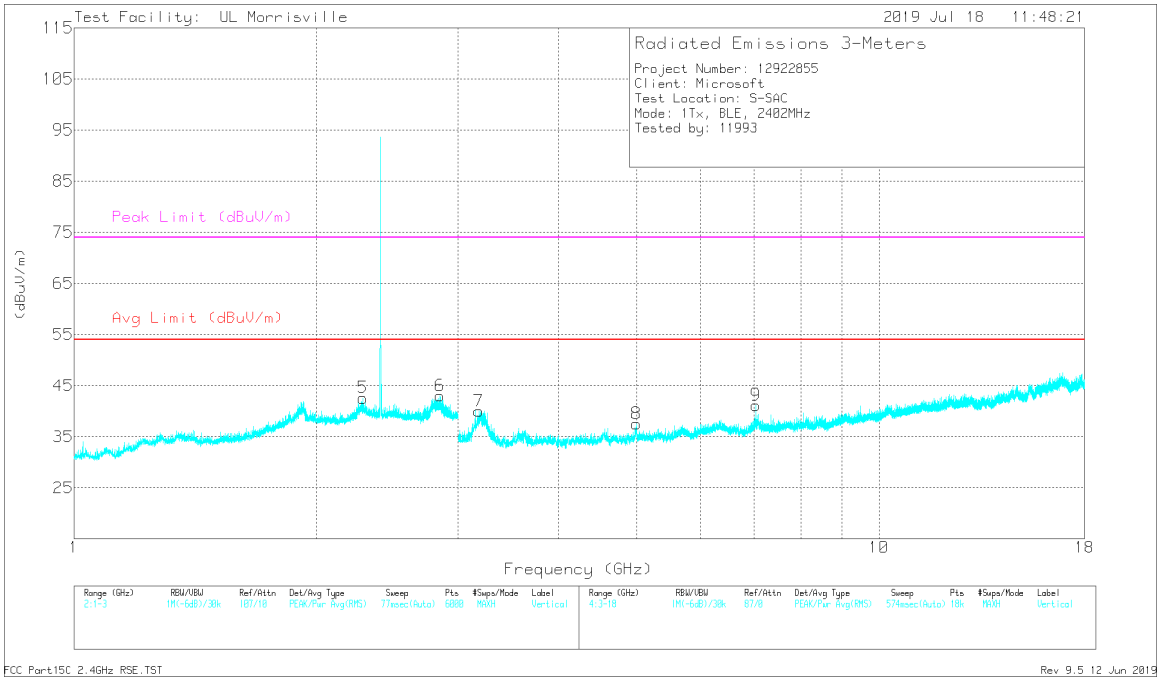
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

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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)	Azimuth (Degs)	Height (cm)	Polarity
1	** 1.83763	36.15	PK2	30.7	-22.3	0	44.55	-	-	74	-29.45	208	219	H
	** 1.83774	23.96	MAv1	30.7	-22.3	2.07	34.43	54	-19.57	-	-	208	219	H
2	* ** 2.87241	39.06	PK2	32.4	-25.9	0	45.56	-	-	74	-28.44	248	145	H
	* ** 2.87439	27.35	MAv1	32.4	-25.9	2.07	35.92	54	-18.08	-	-	248	145	H
10	* ** 2.27475	38.65	PK2	31.8	-23.5	0	46.95	-	-	74	-27.05	231	242	H
	* ** 2.27468	26.76	MAv1	31.8	-23.5	2.07	37.13	54	-16.87	-	-	231	242	H
5	* ** 2.2855	40.9	PK2	31.8	-23.5	0	49.2	-	-	74	-24.8	100	205	V
	* ** 2.28487	29.06	MAv1	31.8	-23.5	2.07	39.43	54	-14.57	-	-	100	205	V
6	* ** 2.84858	45	PK2	32.2	-25.9	0	51.3	-	-	74	-22.7	101	250	V
	* ** 2.8477	32.61	MAv1	32.2	-25.9	2.07	40.98	54	-13.02	-	-	101	250	V
4	* ** 15.77707	33.73	PK2	40.3	-22.3	0	51.73	-	-	74	-22.27	0	113	H
	* ** 15.77648	21.74	MAv1	40.3	-22.3	2.07	41.81	54	-12.19	-	-	0	113	H
8	* ** 4.99878	42.94	PK2	34.2	-31.1	0	46.04	-	-	74	-27.96	301	105	V
	* ** 4.99909	29.27	MAv1	34.2	-31.1	2.07	34.44	54	-19.56	-	-	301	105	V
3	3.15334	39.49	Pk	33.2	-32.5	0	40.19	-	-	-	-	0-360	101	H
7	3.18334	39.44	Pk	33.1	-32.5	0	40.04	-	-	-	-	0-360	199	V
9	7.02773	32.87	Pk	35.8	-27.5	0	41.17	-	-	-	-	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
MAv1 - Maximum RMS Average
Pk - Peak detector

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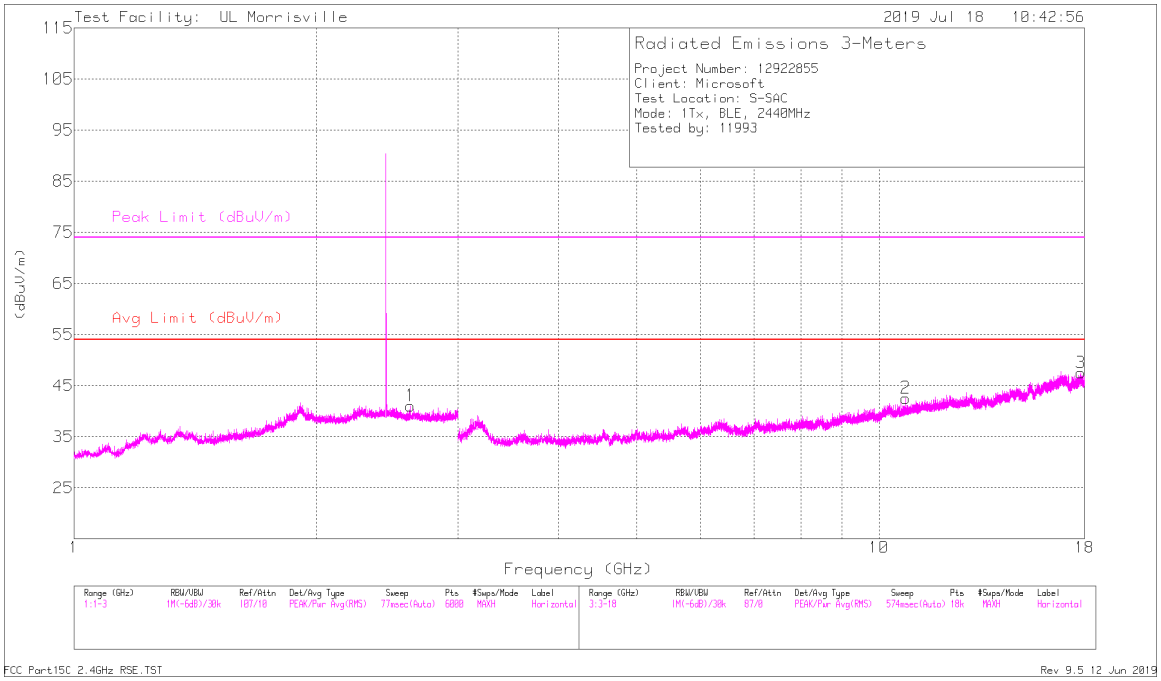
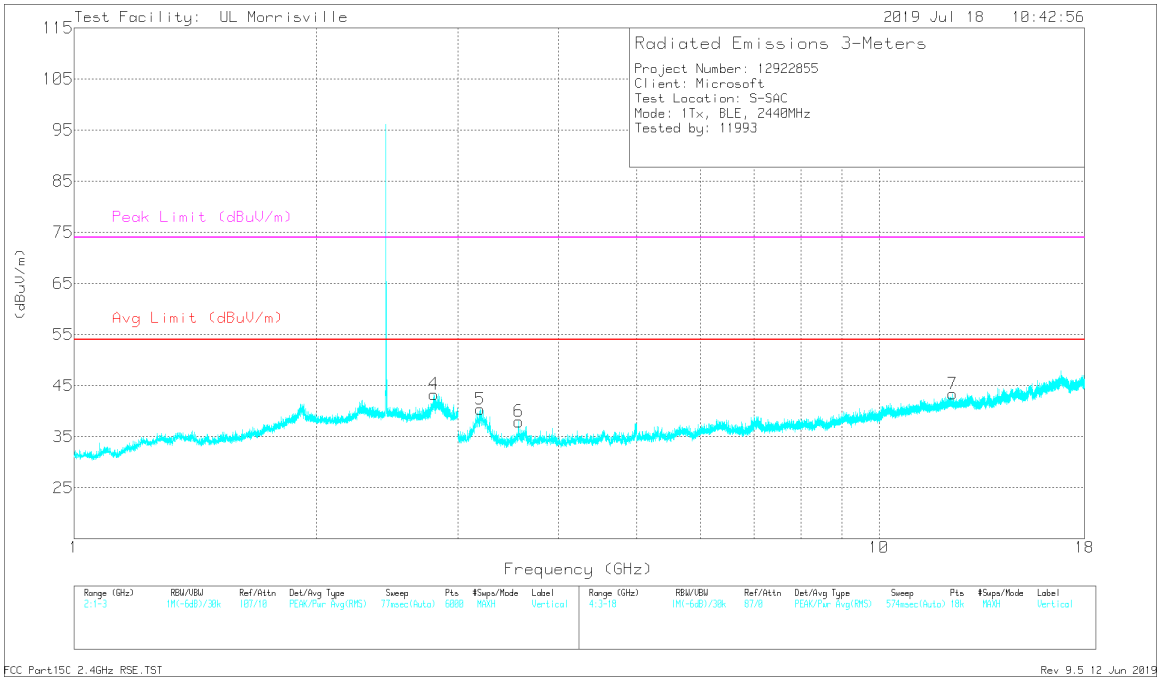
MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

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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)	Azimuth (Degs)	Height (cm)	Polarity
1	** 2.62039	39.11	PK2	32.3	-25.3	0	46.11	-	-	74	-27.89	331	185	H
	** 2.62017	26.71	MAv1	32.3	-25.3	2.07	35.78	54	-18.22	-	-	331	185	H
4	* ** 2.80325	44.75	PK2	32.2	-25.9	0	51.05	-	-	74	-22.95	99	240	V
	* ** 2.80504	33.12	MAv1	32.2	-25.9	2.07	41.49	54	-12.51	-	-	99	240	V
2	* ** 10.79812	34.44	PK2	37.8	-24.5	0	47.74	-	-	74	-26.26	78	266	H
	* ** 10.79791	22.22	MAv1	37.8	-24.5	2.07	37.59	54	-16.41	-	-	78	266	H
3	* ** 17.80682	33.41	PK2	41.2	-20.8	0	53.81	-	-	74	-20.19	83	251	H
	* ** 17.80713	21.88	MAv1	41.2	-20.8	2.07	44.35	54	-9.65	-	-	83	251	H
6	* ** 3.56699	43.21	PK2	33	-32.1	0	44.11	-	-	74	-29.89	111	217	V
	* ** 3.56631	31.28	MAv1	33	-32.2	2.07	34.15	54	-19.85	-	-	111	217	V
7	* ** 12.33951	33.64	PK2	38.8	-23.8	0	48.64	-	-	74	-25.36	145	300	V
	* ** 12.34021	22.2	MAv1	38.8	-23.8	2.07	39.27	54	-14.73	-	-	145	300	V
5	3.19668	39.79	Pk	33.1	-32.5	0	40.39	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
MAv1 - Maximum RMS Average
Pk - Peak detector

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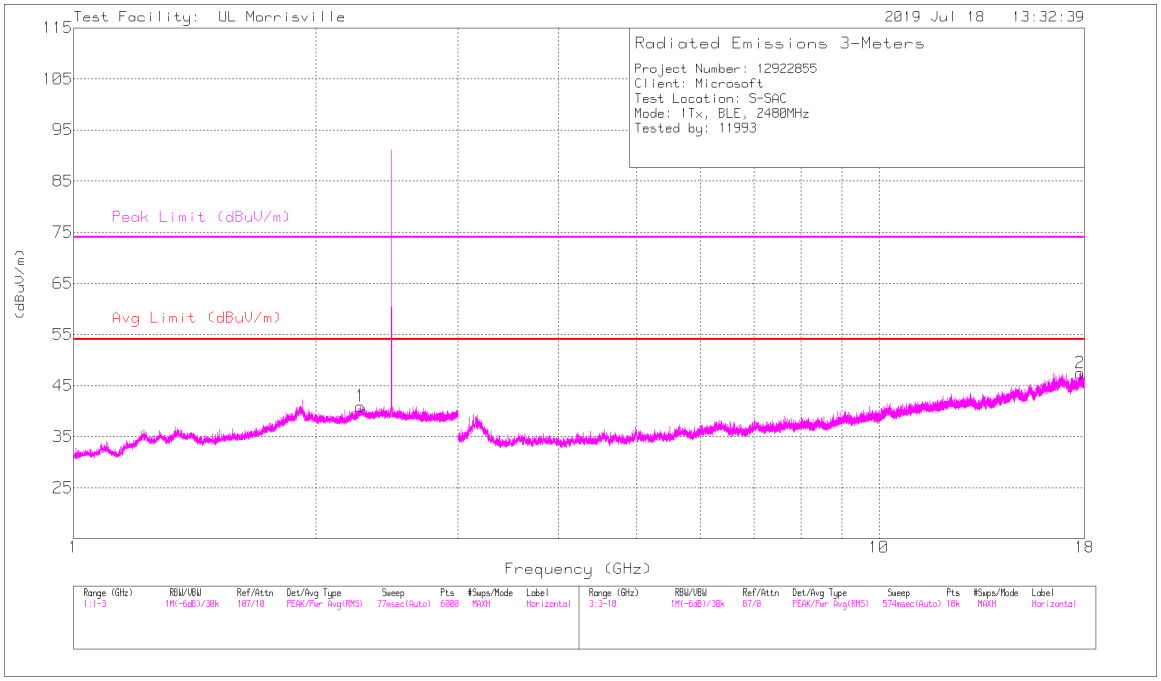
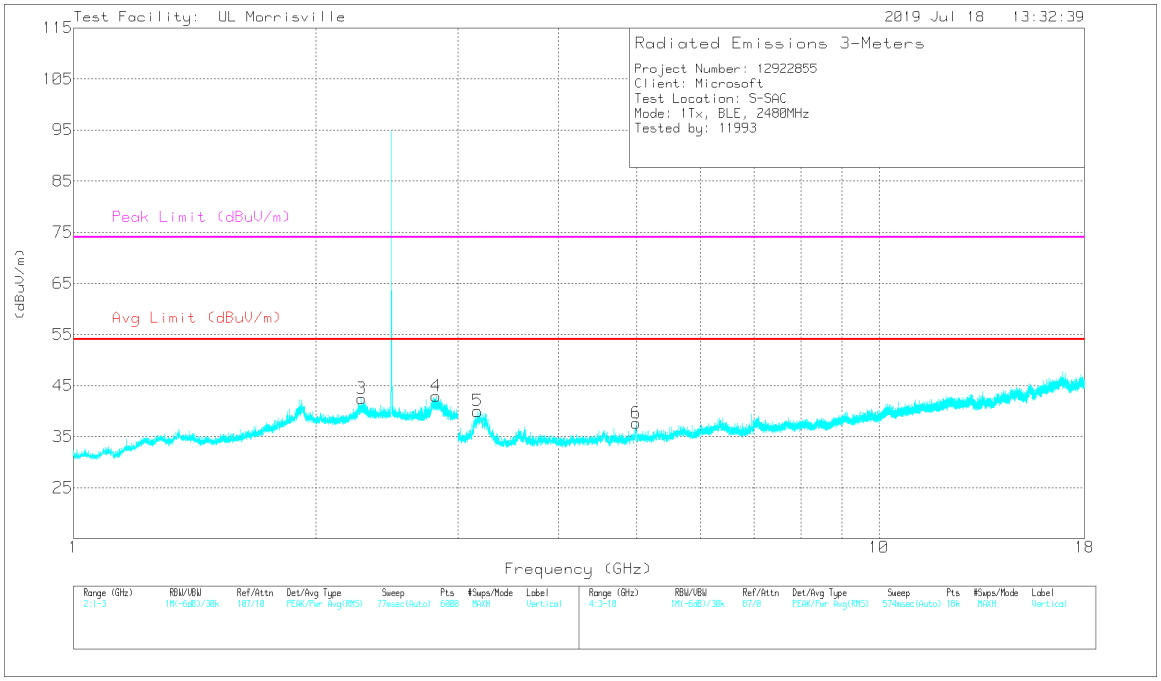
HIGH CHANNEL RESULTS



HORIZONTAL



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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)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.27146	39.06	PK2	31.8	-23.4	0	47.46	-	-	74	-26.54	238	178	H
	* ** 2.27143	27.01	MAv1	31.8	-23.4	2.07	37.48	54	-16.52	-	-	238	178	H
3	* ** 2.28103	37.31	PK2	31.8	-23.5	0	45.61	-	-	74	-28.39	238	198	V
	* ** 2.28233	25.53	MAv1	31.8	-23.5	2.07	35.9	54	-18.1	-	-	238	198	V
4	* ** 2.81975	45.42	PK2	32.1	-25.9	0	51.62	-	-	74	-22.38	98	224	V
	* ** 2.81861	32.81	MAv1	32.1	-25.9	2.07	41.08	54	-12.92	-	-	98	224	V
2	* ** 17.77736	33.96	PK2	41.2	-21.3	0	53.86	-	-	74	-20.14	146	249	H
	* ** 17.77687	21.82	MAv1	41.2	-21.3	2.07	43.79	54	-10.21	-	-	146	249	H
6	* ** 4.99479	42.76	PK2	34.2	-31.1	0	45.86	-	-	74	-28.14	297	108	V
	* ** 4.99477	29.05	MAv1	34.2	-31.1	2.07	34.22	54	-19.78	-	-	297	108	V
5	3.17418	39.3	Pk	33.2	-32.5	0	40	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
MAv1 - Maximum RMS Average
Pk - Peak detector

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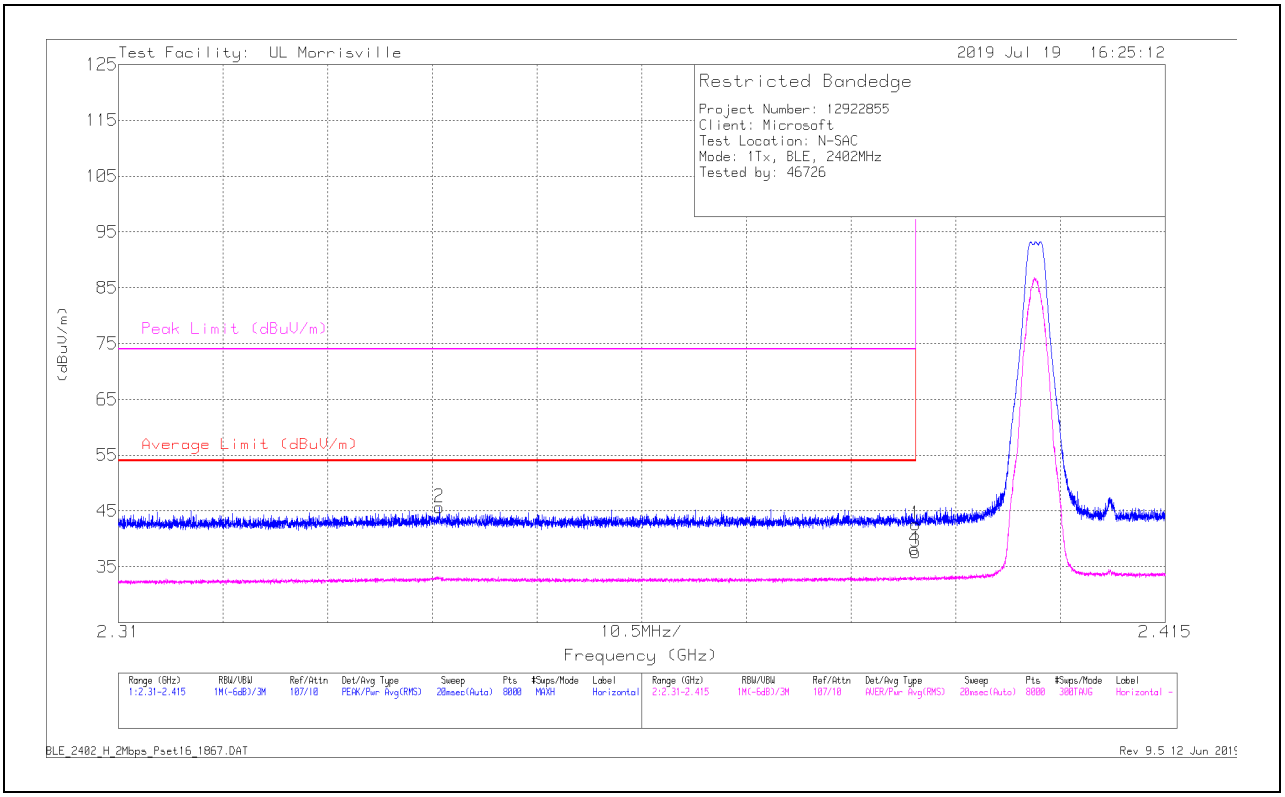
9.2.4. BLE (2Mbps)

Antenna 1

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.39	35.07	Pk	32	-24.4	0	42.67	-	-	74	-31.33	197	345	H
2	* ** 2.3422	38.31	Pk	31.8	-24.4	0	45.71	-	-	74	-28.29	197	345	H
3	* ** 2.39	25.24	RMS	32	-24.4	4.83	37.67	54	-16.33	-	-	197	345	H
4	* ** 2.38984	25.78	RMS	32	-24.4	4.83	38.21	54	-15.79	-	-	197	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

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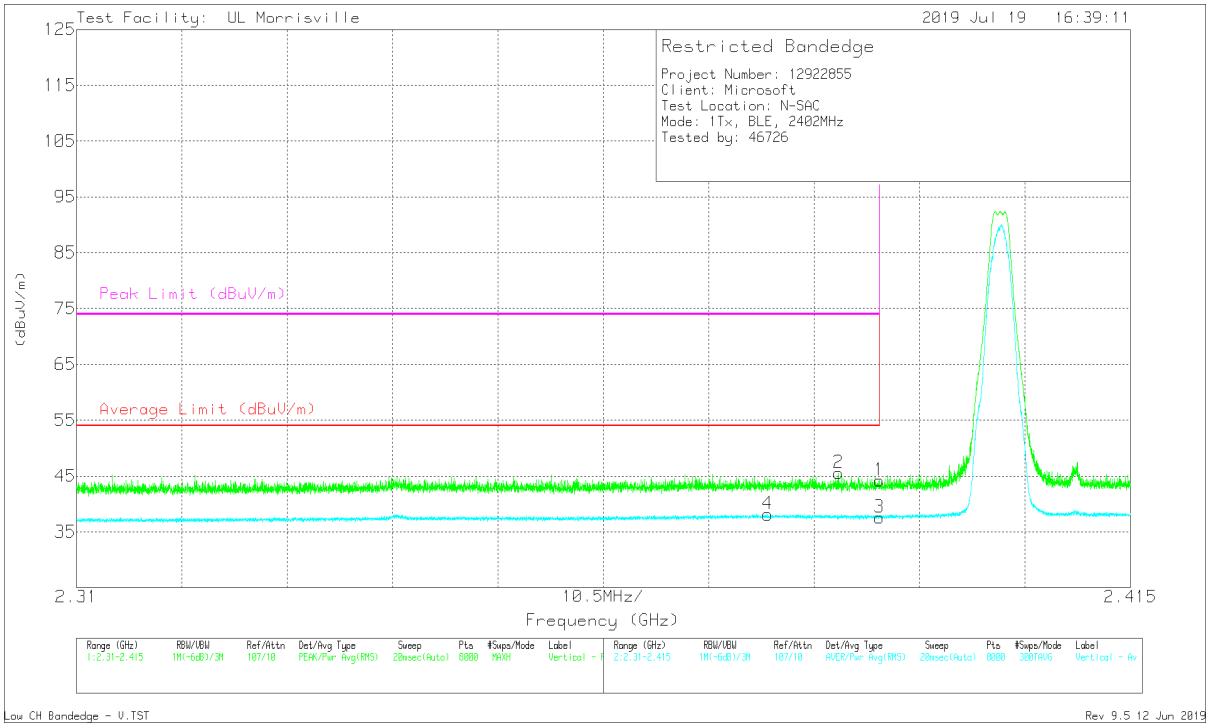
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.39	36.6	Pk	32	-24.4	0	44.2	-	-	74	-29.8	184	395	V
2	* ** 2.38591	37.98	Pk	32	-24.4	0	45.58	-	-	74	-28.42	184	395	V
3	* ** 2.39	25.12	RMS	32	-24.4	4.83	37.55	54	-16.45	-	-	184	395	V
4	* ** 2.37886	25.7	RMS	32	-24.4	4.83	38.13	54	-15.87	-	-	184	395	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

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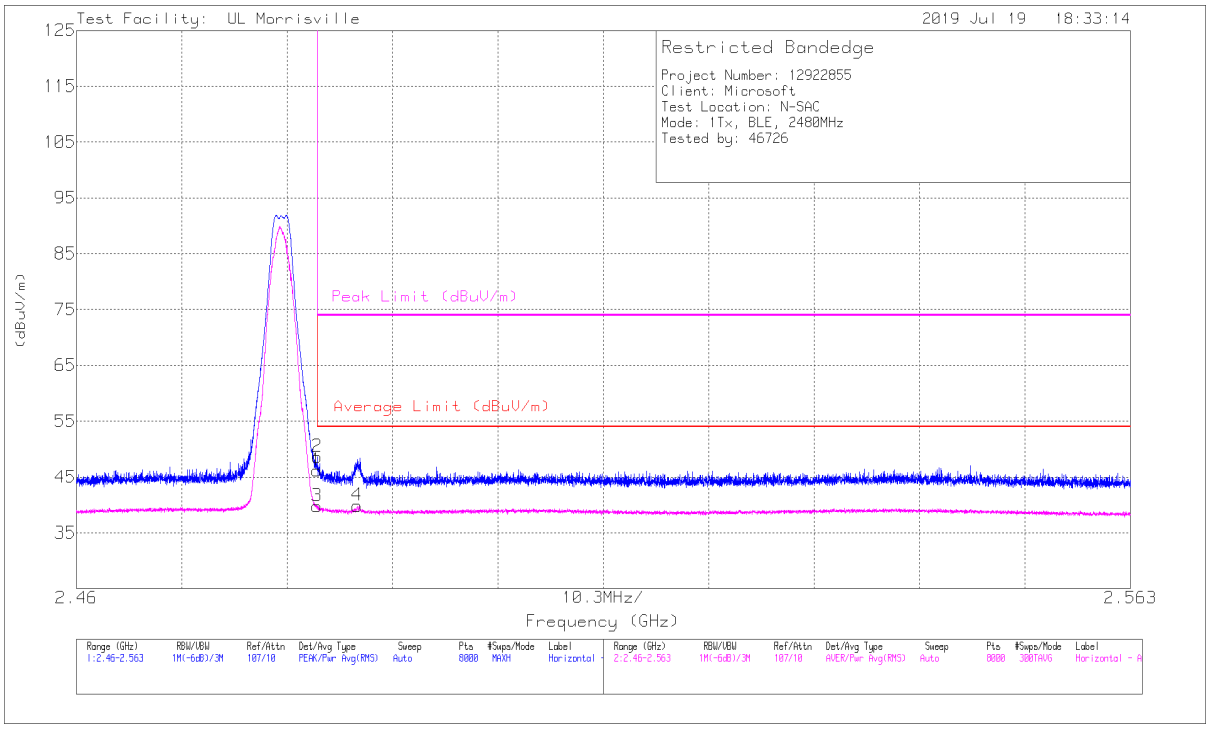
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.4835	38.05	Pk	32.4	-24.3	0	46.15	-	-	74	-27.85	187	353	H
2	* ** 2.48351	40.55	Pk	32.4	-24.3	0	48.65	-	-	74	-25.35	187	353	H
3	* ** 2.4835	26.84	RMS	32.4	-24.3	4.83	39.77	54	-14.23	-	-	187	353	H
4	* ** 2.48743	26.91	RMS	32.4	-24.3	4.83	39.84	54	-14.16	-	-	187	353	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

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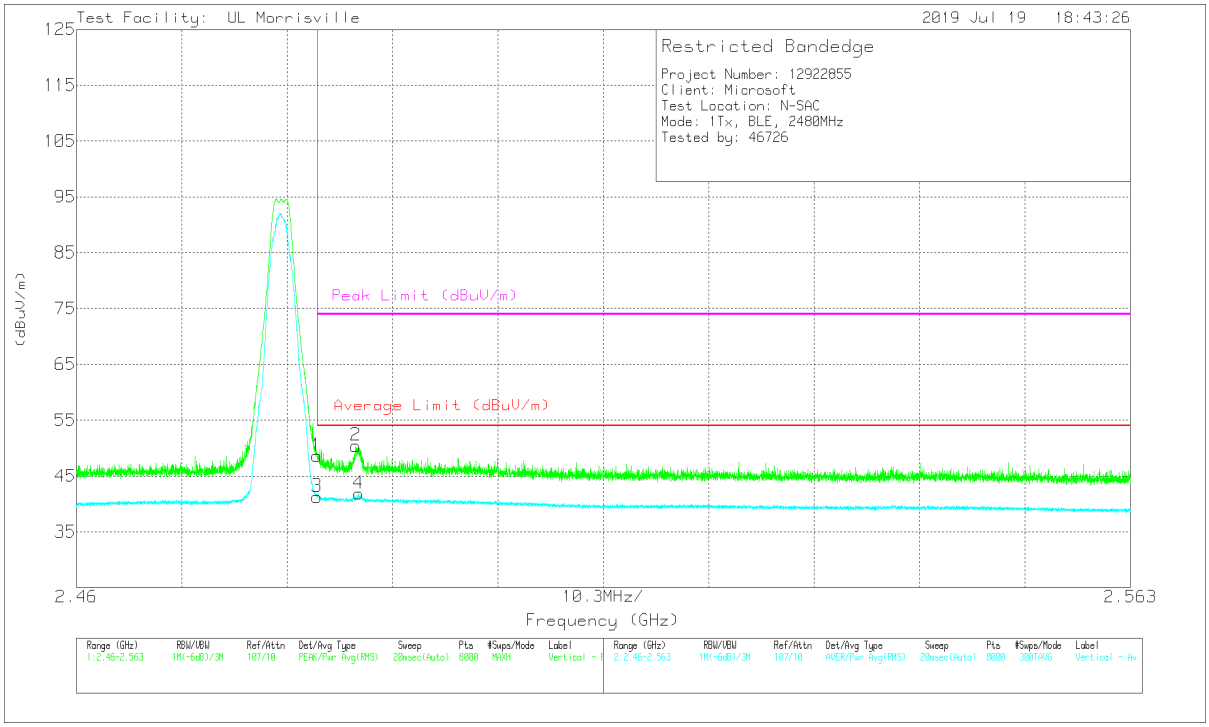
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.4835	40.54	Pk	32.4	-24.3	0	48.64	-	-	74	-25.36	0	301	V
2	* ** 2.4873	42.31	Pk	32.4	-24.3	0	50.41	-	-	74	-23.59	0	301	V
3	* ** 2.4835	28.36	RMS	32.4	-24.3	4.83	41.29	54	-12.71	-	-	0	301	V
4	* ** 2.48758	28.95	RMS	32.4	-24.3	4.83	41.88	54	-12.12	-	-	0	301	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

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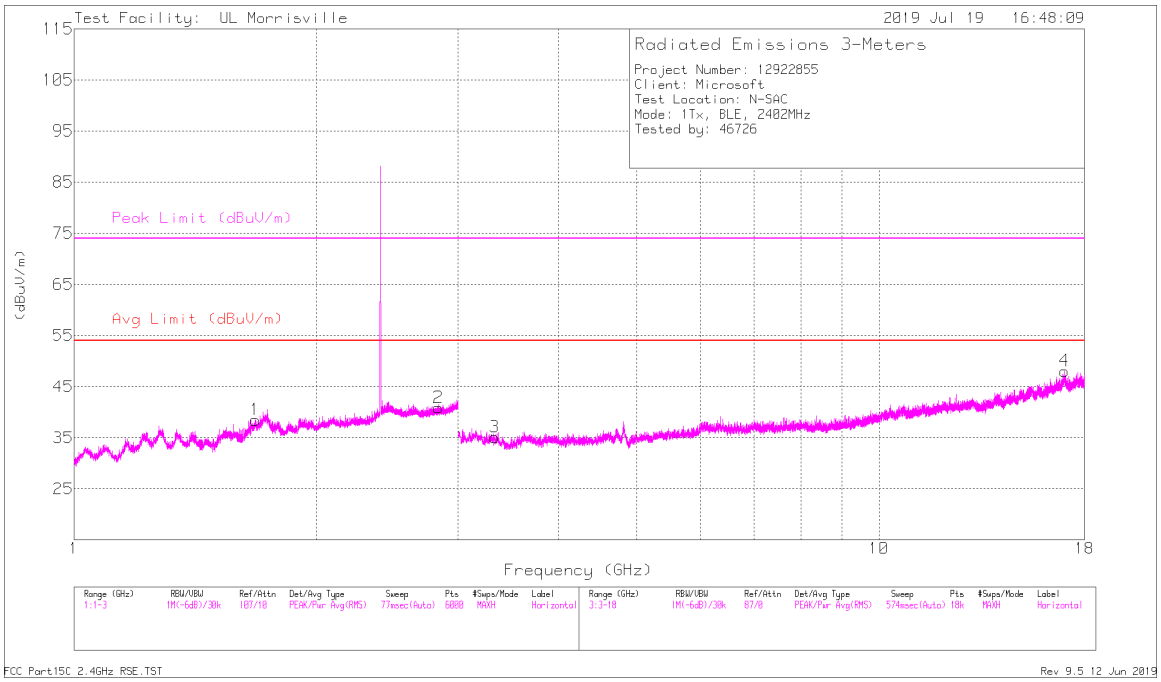
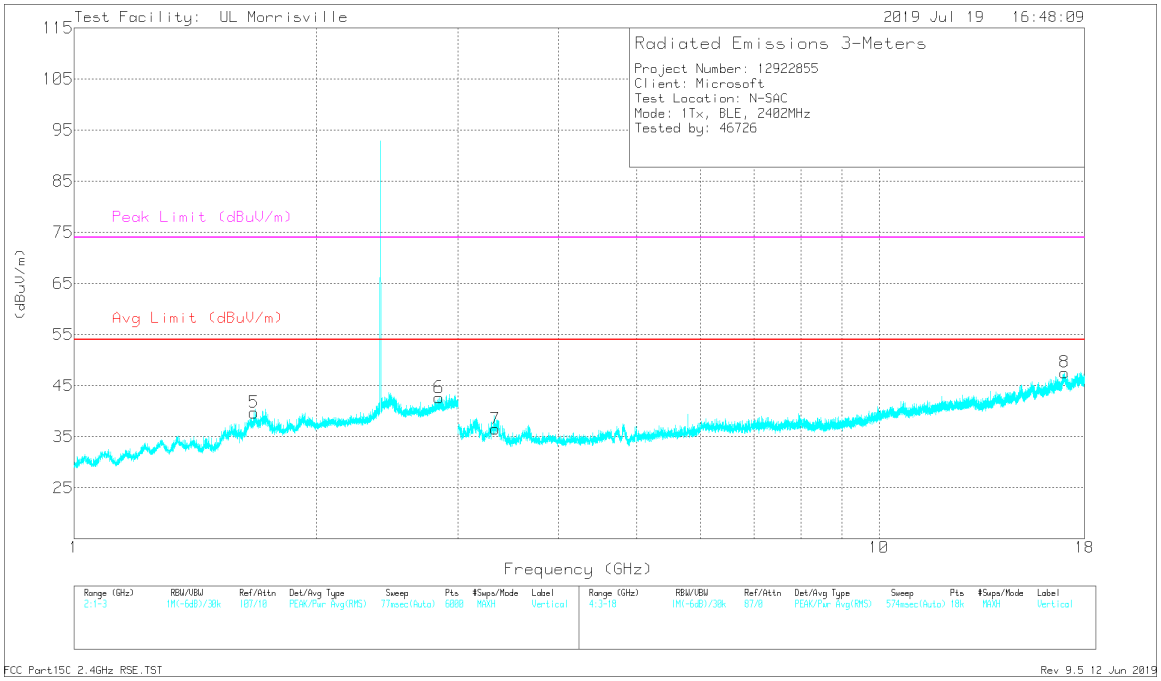
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



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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)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.67742	41.74	PK2	28.8	-24.4	0	46.14	-	-	74	-27.86	286	157	H
	* ** 1.67731	29.04	MAv1	28.8	-24.4	4.83	38.27	54	-15.73	-	-	286	157	H
2	* ** 2.8363	38.28	PK2	32.4	-23.7	0	46.98	-	-	74	-27.02	103	132	H
	* ** 2.83644	26.64	MAv1	32.4	-23.7	4.83	40.17	54	-13.83	-	-	103	132	H
5	* ** 1.67282	42.76	PK2	28.7	-24.4	0	47.06	-	-	74	-26.94	25	194	V
	* ** 1.67295	30.41	MAv1	28.7	-24.4	4.83	39.54	54	-14.46	-	-	25	194	V
6	* ** 2.84106	40.92	PK2	32.4	-23.6	0	49.72	-	-	74	-24.28	38	232	V
	* ** 2.84099	28.9	MAv1	32.4	-23.6	4.83	42.53	54	-11.47	-	-	38	232	V
3	* ** 3.33446	42.61	PK2	32.9	-32.5	0	43.01	-	-	74	-30.99	100	222	H
	* ** 3.3345	30.9	MAv1	32.9	-32.5	4.83	36.13	54	-17.87	-	-	100	222	H
7	* ** 3.33387	46.38	PK2	32.9	-32.5	0	46.78	-	-	74	-27.22	44	218	V
	* ** 3.33398	33.56	MAv1	32.9	-32.5	4.83	38.79	54	-15.21	-	-	44	218	V
4	16.99328	30.77	Pk	41.4	-24.1	0	48.07	-	-	-	-	0-360	199	H
8	17.00912	30.49	Pk	41.4	-24.3	0	47.59	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
MAv1 - Maximum RMS Average
Pk - Peak detector

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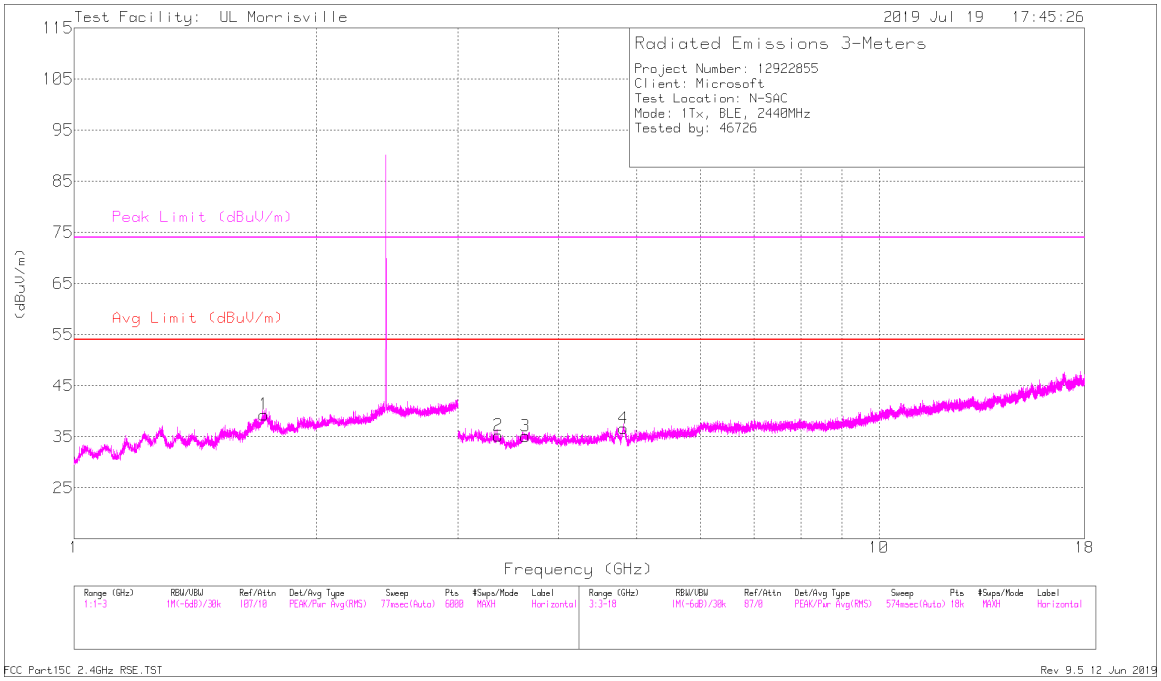
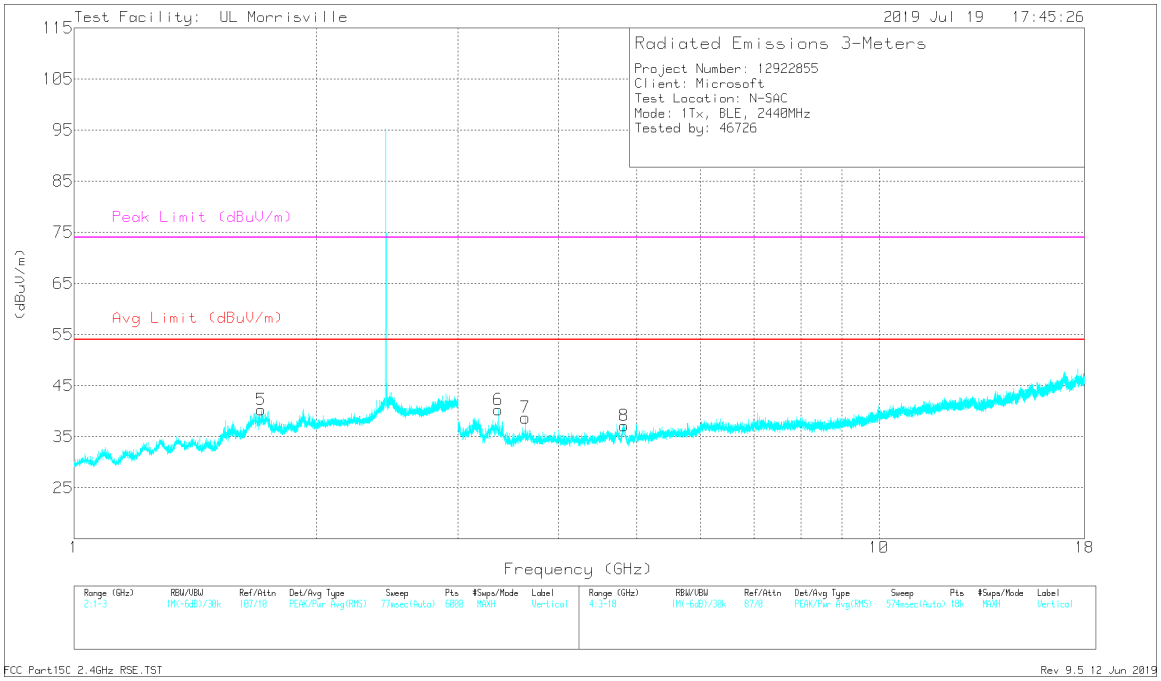
MID CHANNEL RESULTS



HORIZONTAL



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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)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.72179	42.97	PK2	29.4	-24.4	0	47.97	-	-	74	-26.03	293	103	H
	* ** 1.72188	30.77	MAv1	29.4	-24.4	4.83	40.6	54	-13.4	-	-	293	103	H
5	* ** 1.70759	41.73	PK2	29.2	-24.4	0	46.53	-	-	74	-27.47	26	198	V
	* ** 1.70761	30.21	MAv1	29.2	-24.4	4.83	39.84	54	-14.16	-	-	26	198	V
3	* ** 3.63705	41.88	PK2	33.1	-31.5	0	43.48	-	-	74	-30.52	198	102	H
	* ** 3.63706	29.19	MAv1	33.1	-31.5	4.83	35.62	54	-18.38	-	-	198	102	H
4	* ** 4.81462	41.11	PK2	34.1	-31.6	0	43.61	-	-	74	-30.39	25	353	H
	* ** 4.81462	29.05	MAv1	34.1	-31.6	4.83	36.38	54	-17.62	-	-	25	353	H
7	* ** 3.6373	42.48	PK2	33.1	-31.5	0	44.08	-	-	74	-29.92	38	208	V
	* ** 3.63714	30.49	MAv1	33.1	-31.5	4.83	36.92	54	-17.08	-	-	38	208	V
8	* ** 4.82256	41.45	PK2	34.1	-31.5	0	44.05	-	-	74	-29.95	43	300	V
	* ** 4.82248	29.06	MAv1	34.1	-31.5	4.83	36.49	54	-17.51	-	-	43	300	V
6	3.36585	39.96	Pk	32.8	-32.5	0	40.26	-	-	-	-	0-360	199	V
2	3.36752	34.94	Pk	32.8	-32.5	0	35.24	-	-	-	-	0-360	199	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
MAv1 - Maximum RMS Average
Pk - Peak detector

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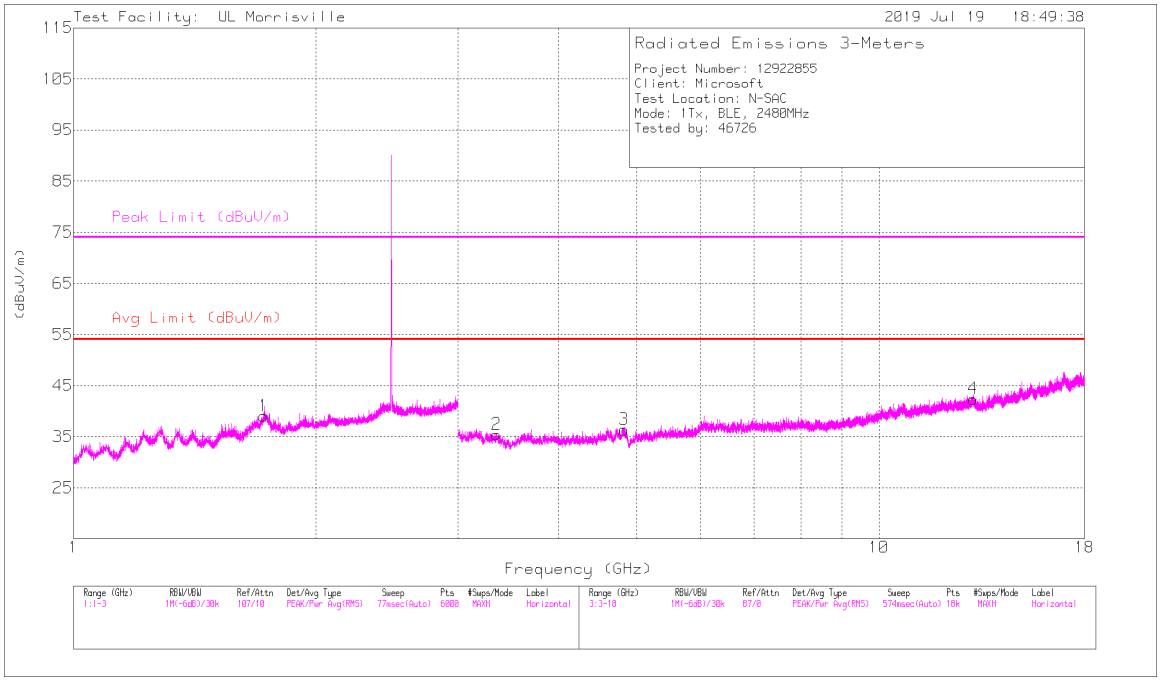
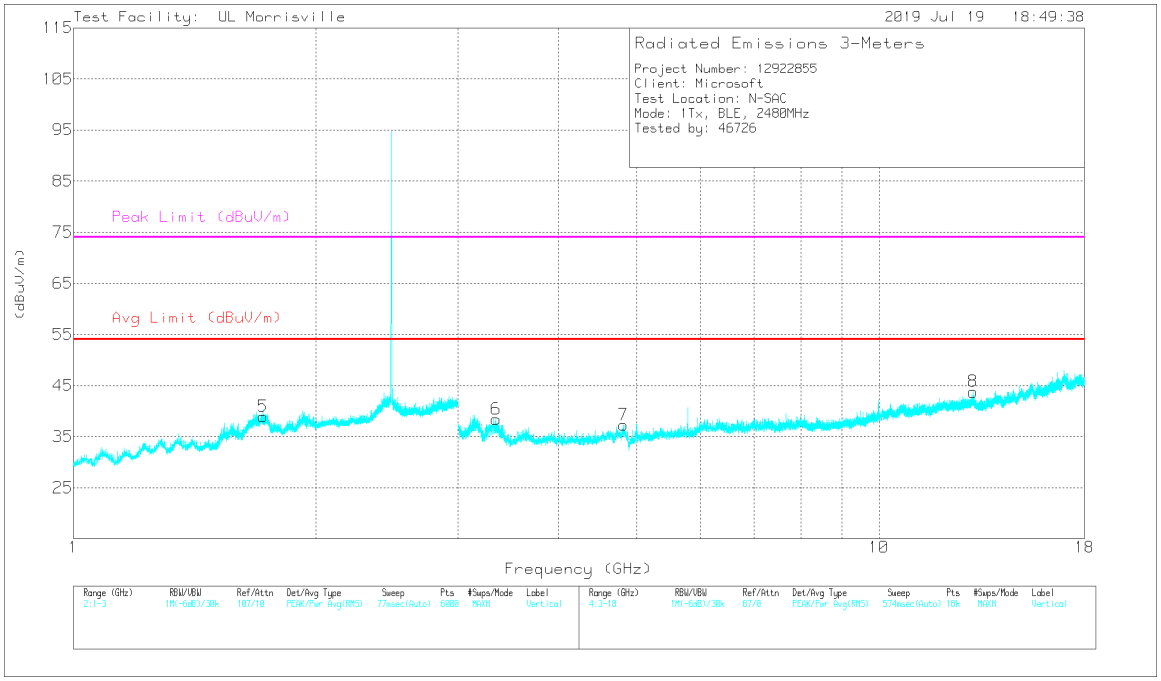
HIGH CHANNEL RESULTS



HORIZONTAL



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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)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.72174	42.81	PK2	29.4	-24.4	0	47.81	-	-	74	-26.19	290	182	H
	* ** 1.72157	30.51	MAv1	29.4	-24.4	4.83	40.34	54	-13.66	-	-	290	182	H
5	* ** 1.71976	42.77	PK2	29.4	-24.4	0	47.77	-	-	74	-26.23	29	194	V
	* ** 1.71982	30.42	MAv1	29.4	-24.4	4.83	40.25	54	-13.75	-	-	29	194	V
2	* ** 3.35177	43.21	PK2	32.9	-32.5	0	43.61	-	-	74	-30.39	69	242	H
	* ** 3.35172	30.73	MAv1	32.9	-32.5	4.83	35.96	54	-18.04	-	-	69	242	H
3	* ** 4.82342	41.57	PK2	34.1	-31.4	0	44.27	-	-	74	-29.73	272	360	H
	* ** 4.8234	29.41	MAv1	34.1	-31.4	4.83	36.94	54	-17.06	-	-	272	360	H
6	* ** 3.34874	46.06	PK2	32.9	-32.5	0	46.46	-	-	74	-27.54	41	183	V
	* ** 3.34865	33.87	MAv1	32.9	-32.5	4.83	39.1	54	-14.9	-	-	41	183	V
7	* ** 4.81499	42.25	PK2	34.1	-31.6	0	44.75	-	-	74	-29.25	44	107	V
	* ** 4.81509	29.95	MAv1	34.1	-31.6	4.83	37.28	54	-16.72	-	-	44	107	V
4	13.09473	29.28	Pk	38.9	-25.8	0	42.38	-	-	-	-	0-360	199	H
8	13.09723	30.68	Pk	38.9	-25.8	0	43.78	-	-	-	-	0-360	102	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
MAv1 - Maximum RMS Average
Pk - Peak detector

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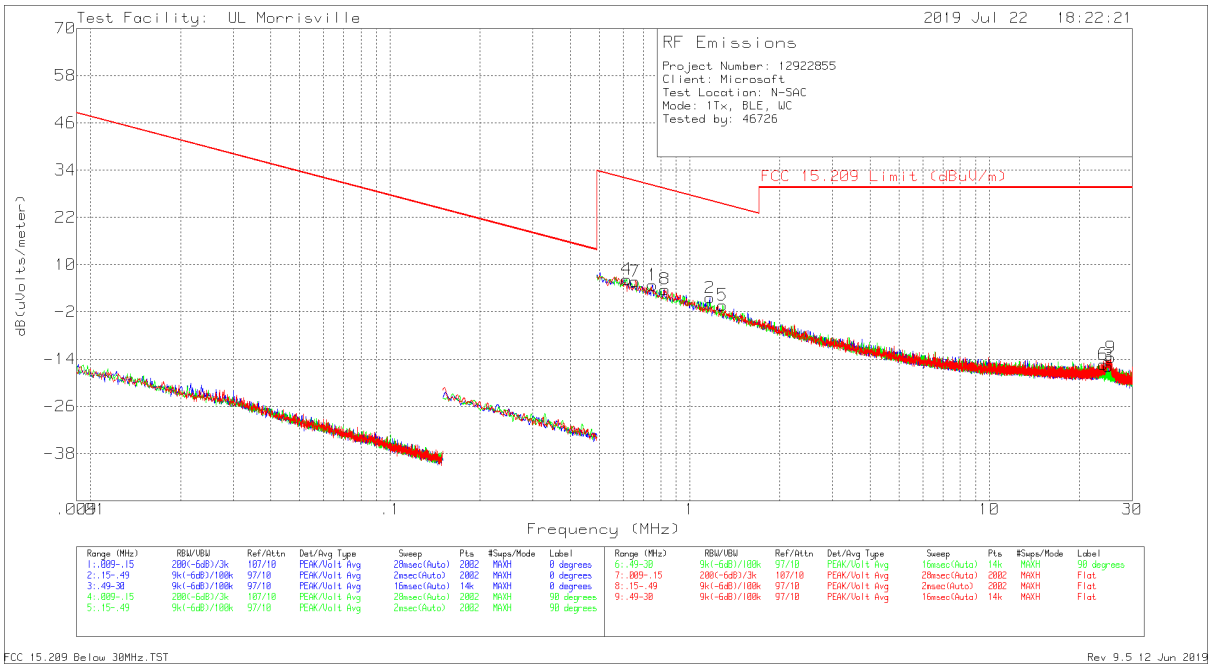
9.3. WORST CASE BELOW 30MHZ

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)

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



ANTENNA- THREE ORIENTATIONS

Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0059 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.209 Avg/Qp Limit (dBuV/m)	FCC 15.209 Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
4	.61648	35.77	Pk	10.4	.1	-40	6.27	31.81	-	-25.54	0-360
7	.65864	35.23	Pk	10.4	.1	-40	5.73	31.23	-	-25.5	0-360
1	.75139	34.41	Pk	10.3	.1	-40	4.81	30.09	-	-25.28	0-360
8	.82728	33.33	Pk	10.3	.1	-40	3.73	29.25	-	-25.52	0-360
2	1.16878	30.74	Pk	10.6	.2	-40	1.54	26.25	-	-24.71	0-360
5	1.28893	28.91	Pk	10.6	.2	-40	-.29	25.4	-	-25.69	0-360
6	23.99209	14.29	Pk	9.6	.8	-40	-15.31	29.54	-	-44.85	0-360
3	24.99234	14.04	Pk	9.3	.9	-40	-15.76	29.54	-	-45.3	0-360
9	25.40445	16.26	Pk	9.2	.9	-40	-13.64	29.54	-	-43.18	0-360

Pk - Peak detector

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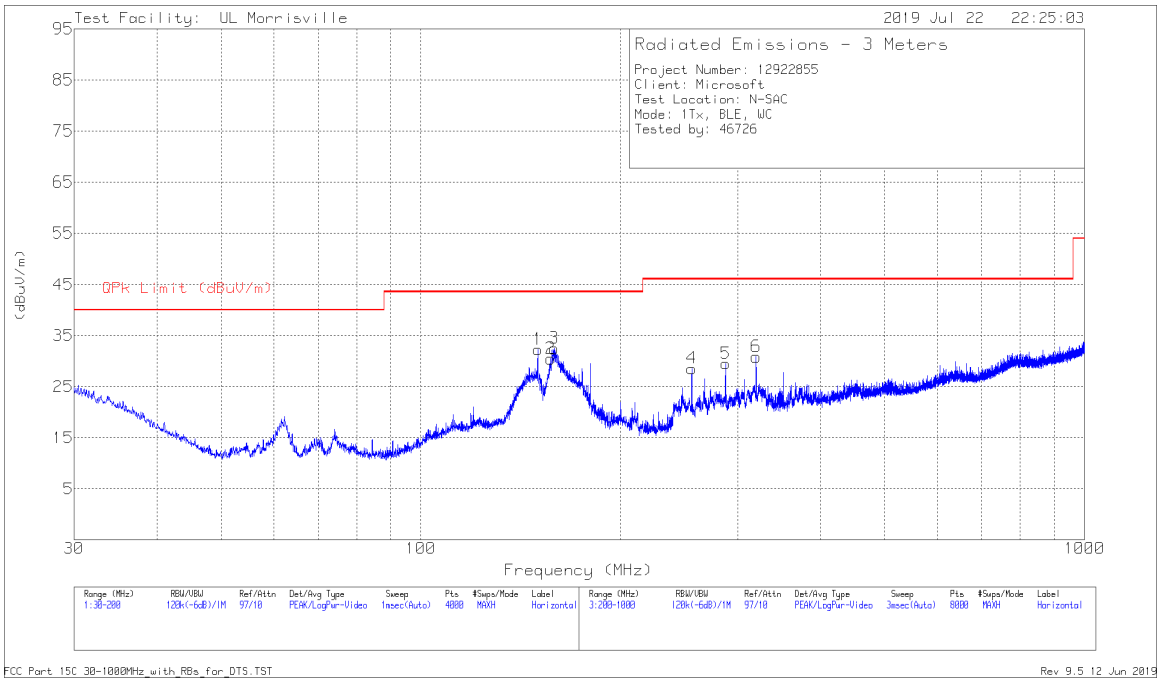
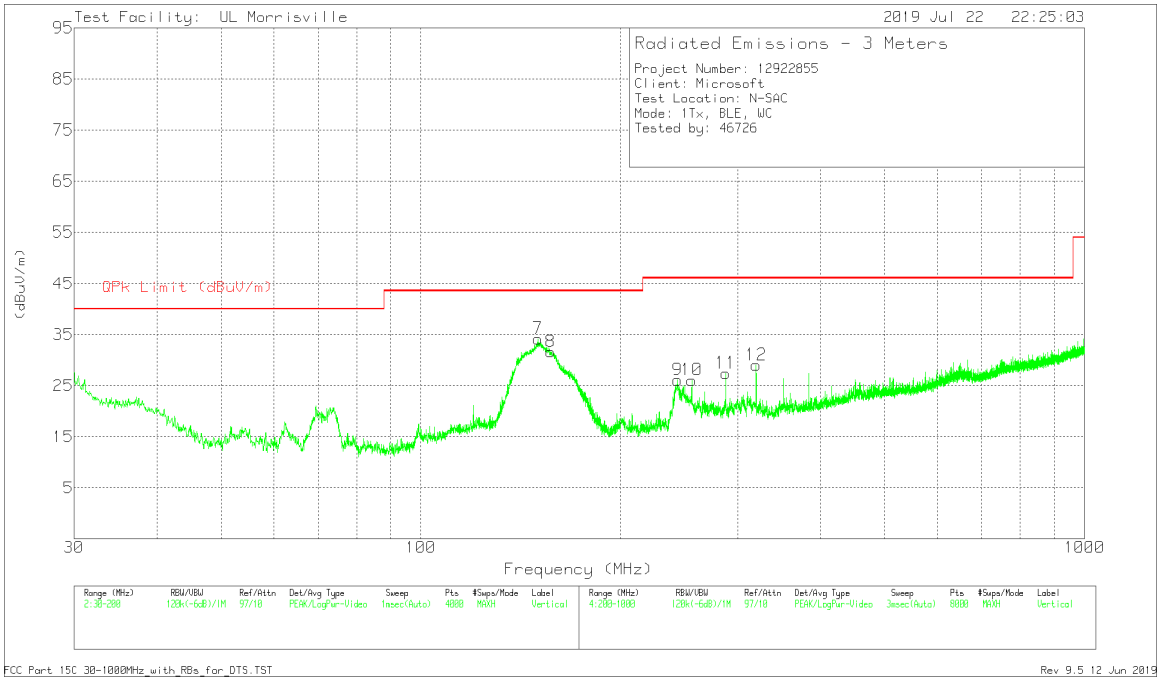
9.4. WORST CASE BELOW 1 GHZ

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



HORIZONTAL



VERTICAL

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Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0073 ACF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 150.0086	43.79	Pk	19	-30.5	32.29	43.52	-11.23	0-360	199	H
2	* ** 156.8528	42.08	Pk	18.8	-30.4	30.48	43.52	-13.04	0-360	199	H
7	* ** 150.0086	45.67	Pk	19	-30.5	34.17	43.52	-9.35	0-360	102	V
8	* ** 156.8953	43.23	Pk	18.8	-30.4	31.63	43.52	-11.89	0-360	102	V
4	* ** 256.0073	39.88	Pk	18.4	-29.7	28.58	46.02	-17.44	0-360	102	H
9	* ** 243.6057	37.7	Pk	18.2	-29.8	26.1	46.02	-19.92	0-360	102	V
10	* ** 256.0073	37.38	Pk	18.4	-29.7	26.08	46.02	-19.94	0-360	199	V
3	158.8934	44.18	Pk	18.8	-30.5	32.48	43.52	-11.04	0-360	199	H
5	288.0114	39.2	Pk	19.8	-29.5	29.5	46.02	-16.52	0-360	102	H
11	288.0114	37.14	Pk	19.8	-29.5	27.44	46.02	-18.58	0-360	199	V
6	320.0156	39.66	Pk	20.6	-29.4	30.86	46.02	-15.16	0-360	102	H
12	320.0156	37.84	Pk	20.6	-29.4	29.04	46.02	-16.98	0-360	199	V

Pk - Peak detector

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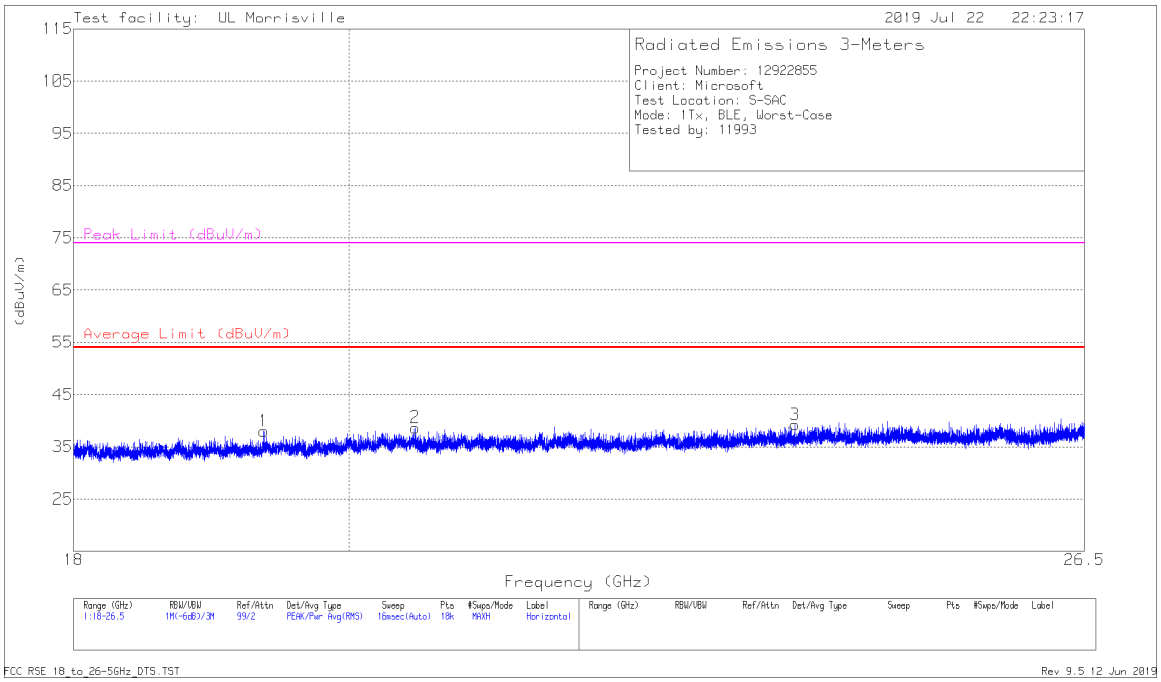
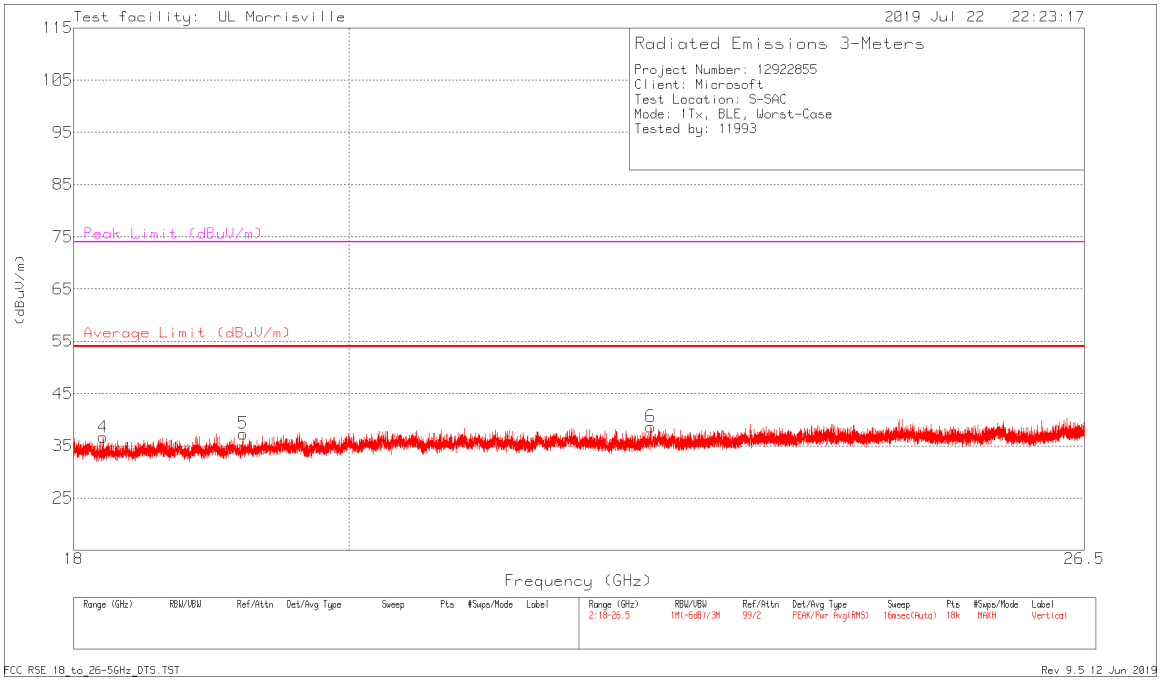
9.5. WORST CASE 18-26 GHZ

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



HORIZONTAL



VERTICAL

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18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0076 AF (dB/m)	Cbl/Amp (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 19.3596	44.1	Pk	32.7	-38.8	38	54	-16	74	-36	0-360	299	H
2	* ** 20.51283	43.57	Pk	33.2	-38.1	38.67	54	-15.33	74	-35.33	0-360	149	H
3	* ** 23.72034	42.62	Pk	34	-37.4	39.22	54	-14.78	74	-34.78	0-360	101	H
4	* ** 18.20496	43.57	Pk	32.2	-39.1	36.67	54	-17.33	74	-37.33	0-360	151	V
5	* ** 19.20612	43.53	Pk	32.6	-38.8	37.33	54	-16.67	74	-36.67	0-360	201	V
6	* ** 22.44858	43.16	Pk	33.5	-38	38.66	54	-15.34	74	-35.34	0-360	201	V

Pk - Peak detector

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10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

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

* Decreases with the logarithm of the frequency.

RESULTS

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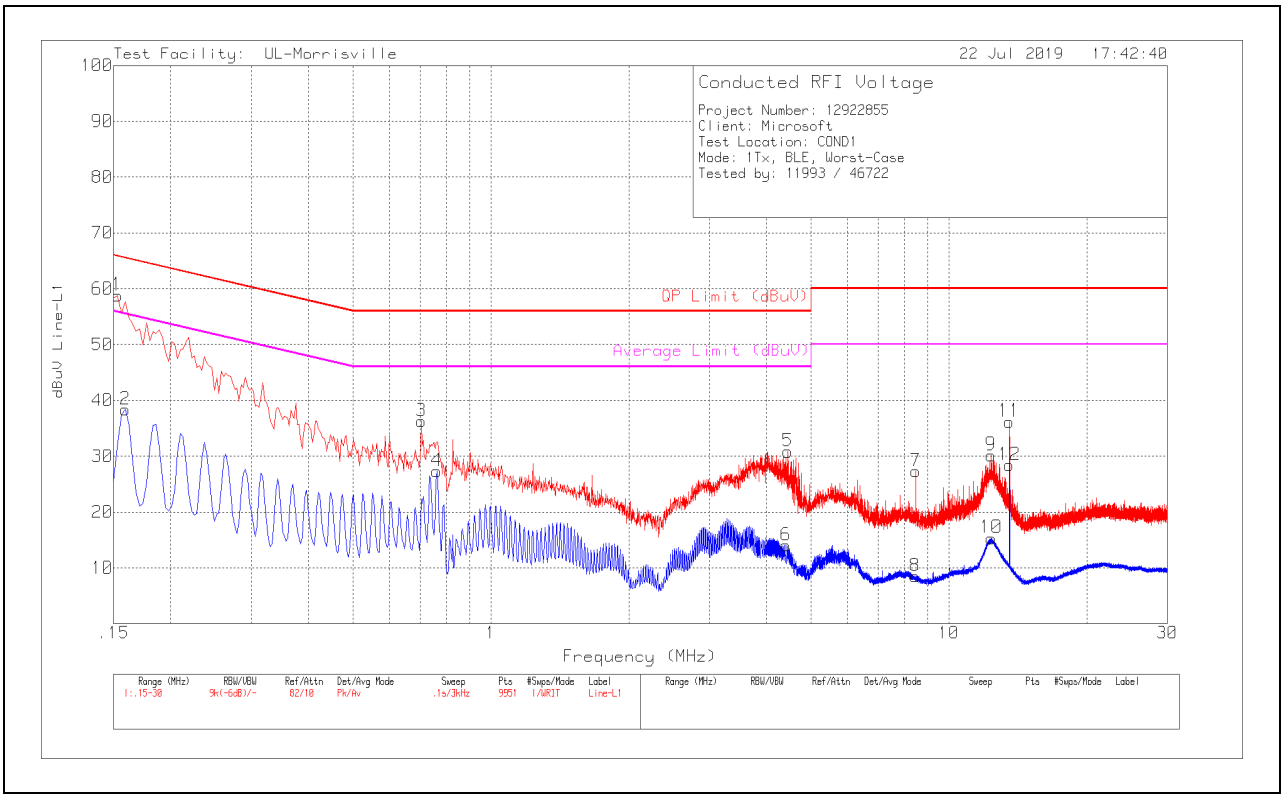
10.1.1. AC Power Line Host

LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
1	.153	48.63	Pk	.2	10	58.83	65.84	-7.01	-	-
2	.159	28.13	Av	.2	10	38.33	-	-	55.52	-17.19
3	.705	26.28	Pk	0	10	36.28	56	-19.72	-	-
4	.762	17.33	Av	0	10	27.33	-	-	46	-18.67
5	4.455	20.63	Pk	0	10.2	30.83	56	-25.17	-	-
6	4.407	3.8	Av	0	10.2	14	-	-	46	-32
7	8.457	16.93	Pk	.1	10.3	27.33	60	-32.67	-	-
8	8.442	-1.88	Av	.1	10.3	8.52	-	-	50	-41.48
9	12.375	19.68	Pk	.1	10.4	30.18	60	-29.82	-	-
10	12.378	4.83	Av	.1	10.4	15.33	-	-	50	-34.67
11	13.56	25.7	Pk	.1	10.4	36.2	60	-23.8	-	-
12	13.56	17.93	Av	.1	10.4	28.43	-	-	50	-21.57

Pk - Peak detector
Av – Average detector

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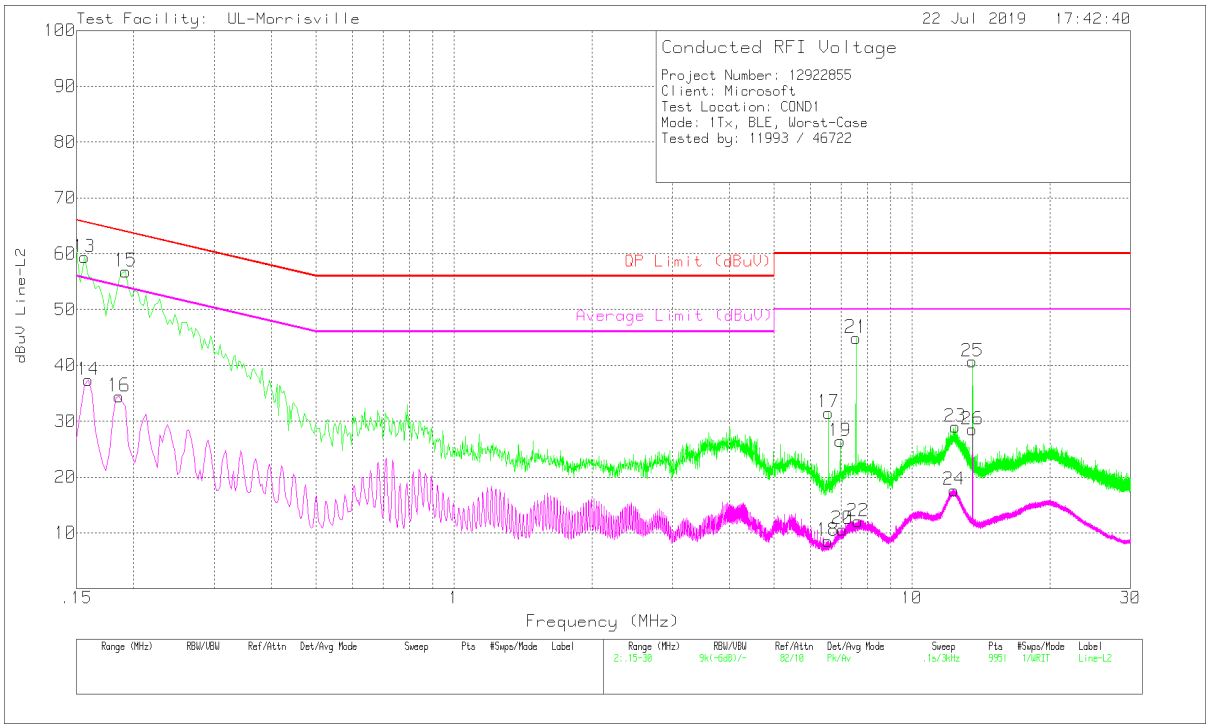
LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
13	.156	49.16	Pk	.2	10	59.36	65.67	-6.31	-	-
14	.159	27.2	Av	.2	10	37.4	-	-	55.52	-18.12
15	.192	46.66	Pk	.2	10	56.86	63.95	-7.09	-	-
16	.186	24.28	Av	.2	10	34.48	-	-	54.21	-19.73
17	6.582	21.25	Pk	.1	10.2	31.55	60	-28.45	-	-
18	6.558	-1.74	Av	.1	10.2	8.56	-	-	50	-41.44
19	6.975	16.14	Pk	.1	10.2	26.44	60	-33.56	-	-
20	7.056	.36	Av	.1	10.2	10.66	-	-	50	-39.34
21	7.548	34.52	Pk	.1	10.3	44.92	60	-15.08	-	-
22	7.6365	1.69	Av	.1	10.3	12.09	-	-	50	-37.91
23	12.444	18.54	Pk	.1	10.4	29.04	60	-30.96	-	-
24	12.354	7.16	Av	.1	10.4	17.66	-	-	50	-32.34
25	13.56	30.19	Pk	.1	10.4	40.69	60	-19.31	-	-
26	13.56	18.06	Av	.1	10.4	28.56	-	-	50	-21.44

Pk - Peak detector
Av – Average detector

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11. SETUP PHOTOS

Please refer to R12922855-EP1 for setup photos

END OF TEST REPORT

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