



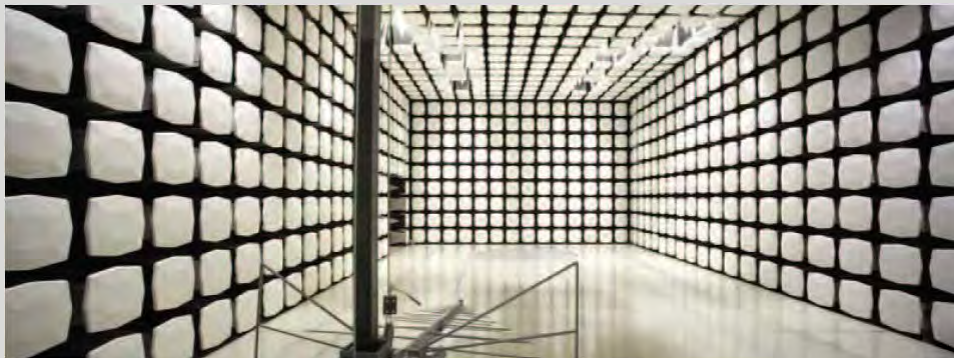
**Microsoft Corporation**

**Model 1631**

**FCC 15.247:2014**

**FCC 15.207:2014**

**Report #: MCSO1698 PART 7 OF 7**



Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – [www.nwemc.com](http://www.nwemc.com)

California – Minnesota – Oregon – New York – Washington

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

#### MODES OF OPERATION

802.11(a) 6Mbps
802.11(a) 36Mbps
802.11(a) 54Mbps
802.11(n) MCS0
802.11(n) MCS7
802.11(n) MCS8
802.11(n) MCS15

#### CHANNELS OF OPERATION

Ch. 1 2412MHz
Ch. 6 2437MHz
Ch. 11 2462MHz

#### POWER SETTINGS INVESTIGATED

110VAC/60Hz
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#### CONFIGURATIONS INVESTIGATED

MCSO1698 - 2
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#### FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz
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#### SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

#### TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable	ESM Cable Corp.	KMKM-72	EVY	9/10/2013	12 mo
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	9/10/2013	12 mo
Antenna, Horn	ETS Lindgren	3160-09	AIV	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2/18/2014	12 mo
Antenna, Horn	ETS	3160-08	AHV	NCR	0 mo
EV01 Cables	N/A	Standard Gain Horns Cables	EVF	2/18/2014	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	2/18/2014	12 mo
Antenna, Horn	ETS	3160-07	AHU	NCR	0 mo
EV01 Cables	N/A	Double Ridge Horn Cables	EVB	2/18/2014	12 mo
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	2/18/2014	12 mo
Antenna, Horn	ETS	3115	AIZ	1/27/2014	36 mo
EV01 Cables	N/A	Bilog Cables	EVA	2/18/2014	12 mo
Pre-Amplifier	Miteq	AM-1616-1000	AOL	2/18/2014	12 mo
Antenna, Biconilog	EMCO	3141	AXG	4/10/2012	36 mo
HP Filter	Micro-Tronics	HPM50111	HFO	7/6/2013	24 mo
Attenuator - 20dB, HF (1000MHz - 18000MHz)	Coaxicom	3910-20	AXZ	6/20/2013	12 mo
LP Filter	Micro-Tronics	LPM50004	LFD	7/6/2012	24 mo
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	24 mo

#### MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

#### TEST DESCRIPTION

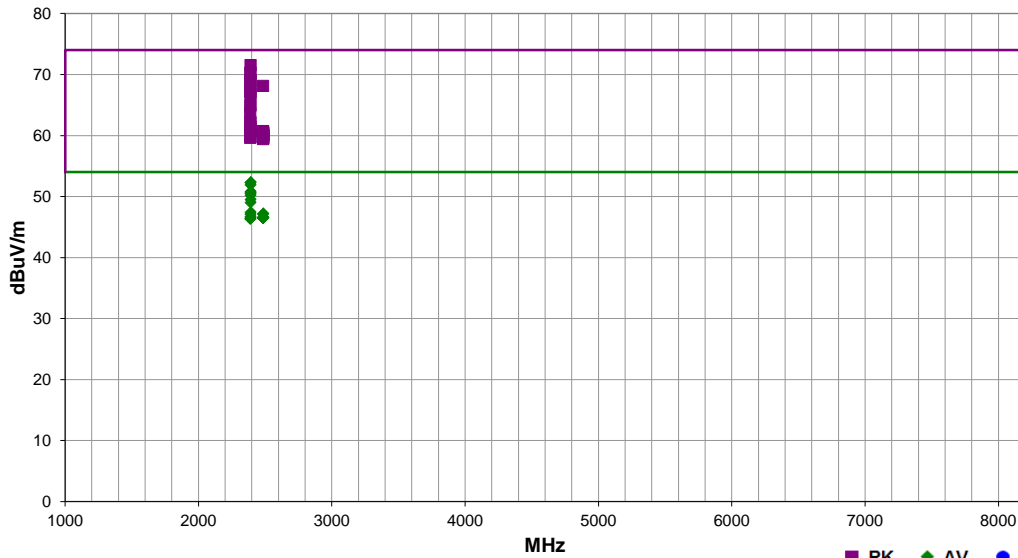
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

## SPURIOUS RADIATED EMISSIONS

Work Order:	MCSO1698	Date:	03/14/14	
Project:	None	Temperature:	22.2 °C	
Job Site:	EV01	Humidity:	40.1% RH	
Serial Number:	41151240753	Barometric Pres.:	1021 mbar	
EUT:	Model 1631			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Tx			
Deviations:	None			
Comments:	Please Reference the data comments for EUT orientation, frequency, modulation and Chain			

<b>Test Specifications</b>	<b>Test Method</b>
FCC 15.247:2014	ANSI C63.10:2009

Run #	125	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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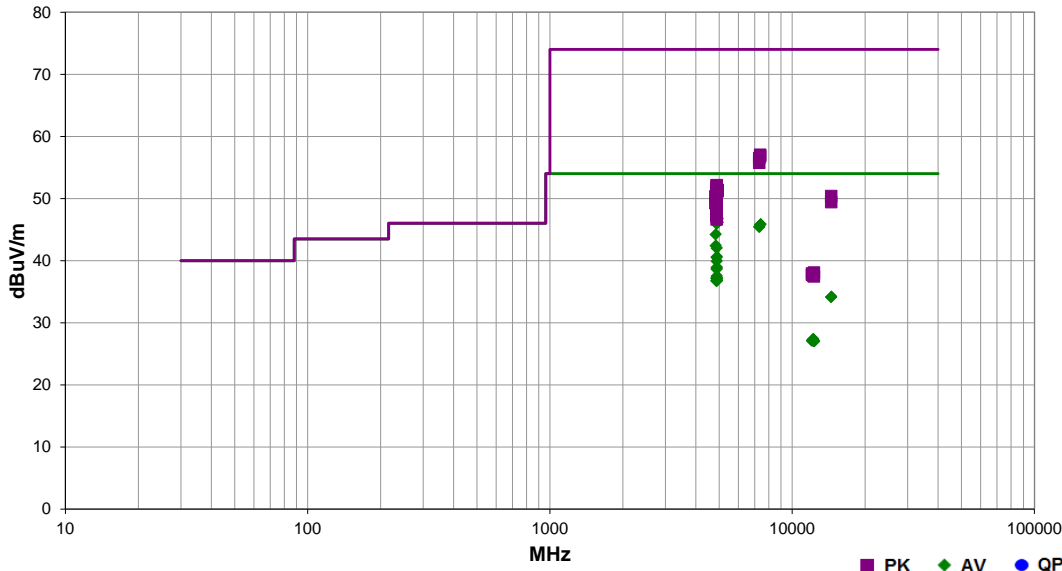
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2389.997	30.1	2.3	1.5	326.0	3.0	20.0	Vert	AV	0.0	52.4	54.0	-1.6	Ch. 2412 MHz, MCS8, Chain AB, EUT On Side
2390.000	30.1	2.3	1.5	324.0	3.0	20.0	Vert	AV	0.0	52.4	54.0	-1.6	Ch. 2412 MHz, 54Mbps, Chain A, EUT On Side
2390.000	29.7	2.3	1.5	324.0	3.0	20.0	Vert	AV	0.0	52.0	54.0	-2.0	Ch. 2412 MHz, MCS0, Chain A, EUT On Side
2389.847	49.3	2.3	1.5	324.0	3.0	20.0	Vert	PK	0.0	71.6	74.0	-2.4	Ch. 2412 MHz, 54Mbps, Chain A, EUT On Side
2390.000	28.6	2.3	1.5	324.0	3.0	20.0	Vert	AV	0.0	50.9	54.0	-3.1	Ch. 2412 MHz, 6Mbps, Chain A, EUT On Side
2389.997	28.4	2.3	1.5	326.0	3.0	20.0	Vert	AV	0.0	50.7	54.0	-3.3	Ch. 2412 MHz, MCS7, Chain A, EUT On Side
2389.963	28.3	2.3	1.5	326.0	3.0	20.0	Vert	AV	0.0	50.6	54.0	-3.4	Ch. 2412 MHz, MCS15, Chain AB, EUT On Side
2389.637	48.0	2.3	1.5	324.0	3.0	20.0	Vert	PK	0.0	70.3	74.0	-3.7	Ch. 2412 MHz, MCS0, Chain A, EUT On Side
2389.990	28.0	2.3	1.5	324.0	3.0	20.0	Vert	AV	0.0	50.3	54.0	-3.7	Ch. 2412 MHz, 36Mbps, Chain A, EUT On Side
2390.000	27.3	2.3	1.0	15.0	3.0	20.0	Horz	AV	0.0	49.6	54.0	-4.4	Ch. 2412 MHz, MCS8, Chain AB, EUT Vert
2389.947	26.8	2.3	1.0	199.0	3.0	20.0	Horz	AV	0.0	49.1	54.0	-4.9	Ch. 2412 MHz, MCS8, Chain AB, EUT Horz
2389.173	46.7	2.3	1.5	326.0	3.0	20.0	Vert	PK	0.0	69.0	74.0	-5.0	Ch. 2412 MHz, MCS8, Chain A, EUT On Side
2389.847	46.7	2.3	1.5	326.0	3.0	20.0	Vert	PK	0.0	69.0	74.0	-5.0	Ch. 2412 MHz, MCS7, Chain A, EUT On Side
2483.507	45.5	2.7	1.0	46.0	3.0	20.0	Horz	PK	0.0	68.2	74.0	-5.8	Ch. 2462 MHz, 6Mbps, Chain A, EUT Vert
2388.787	45.5	2.3	1.5	324.0	3.0	20.0	Vert	PK	0.0	67.8	74.0	-6.2	Ch. 2412 MHz, 6Mbps, Chain A, EUT On Side
2390.000	25.2	2.3	1.6	99.0	3.0	20.0	Vert	AV	0.0	47.5	54.0	-6.5	Ch. 2412 MHz, MCS8, Chain AB, EUT Vert
2483.600	24.6	2.7	1.0	46.0	3.0	20.0	Horz	AV	0.0	47.3	54.0	-6.7	Ch. 2462 MHz, 6Mbps, Chain A, EUT Vert
2389.683	24.9	2.3	1.5	281.0	3.0	20.0	Vert	AV	0.0	47.2	54.0	-6.8	Ch. 2412 MHz, MCS7, Chain B, EUT On Side
2389.643	44.9	2.3	1.5	326.0	3.0	20.0	Vert	PK	0.0	67.2	74.0	-6.8	Ch. 2412 MHz, MCS15, Chain AB, EUT On Side
2483.507	24.5	2.7	1.0	46.0	3.0	20.0	Horz	AV	0.0	47.2	54.0	-6.8	Ch. 2462 MHz, 54Mbps, Chain A, EUT Vert
2389.843	44.6	2.3	1.5	324.0	3.0	20.0	Vert	PK	0.0	66.9	74.0	-7.1	Ch. 2412 MHz, 36Mbps, Chain A, EUT On Side
2389.943	24.5	2.3	1.0	86.0	3.0	20.0	Vert	AV	0.0	46.8	54.0	-7.2	Ch. 2412 MHz, MCS8, Chain AB, EUT Horz
2484.390	24.0	2.7	3.3	268.0	3.0	20.0	Vert	AV	0.0	46.7	54.0	-7.3	Ch. 2462 MHz, 6Mbps, Chain A, EUT Vert
2483.500	24.0	2.7	3.3	268.0	3.0	20.0	Vert	AV	0.0	46.7	54.0	-7.3	Ch. 2462 MHz, MCS0, Chain A, EUT On Side
2389.937	24.3	2.3	1.0	79.0	3.0	20.0	Horz	AV	0.0	46.6	54.0	-7.4	Ch. 2412 MHz, MCS8, Chain AB, EUT On Side
2485.480	23.9	2.7	3.3	268.0	3.0	20.0	Vert	AV	0.0	46.6	54.0	-7.4	Ch. 2462 MHz, 54Mbps, Chain A, EUT On Side
2485.403	23.9	2.7	3.3	268.0	3.0	20.0	Vert	AV	0.0	46.6	54.0	-7.4	Ch. 2462 MHz, 1Mbps, Chain A, EUT On Side
2485.197	23.9	2.7	1.0	220.0	3.0	20.0	Vert	AV	0.0	46.6	54.0	-7.4	Ch. 2462 MHz, MCS8, Chain AB, EUT On Side
2485.207	23.9	2.7	3.3	268.0	3.0	20.0	Vert	AV	0.0	46.6	54.0	-7.4	Ch. 2462 MHz, MCS7, Chain A, EUT On Side
2485.063	23.9	2.7	1.0	245.0	3.0	20.0	Vert	AV	0.0	46.6	54.0	-7.4	Ch. 2462 MHz, 6Mbps, Chain B, EUT On Side
2484.873	23.9	2.7	1.0	235.0	3.0	20.0	Horz	AV	0.0	46.6	54.0	-7.4	Ch. 2462 MHz, MCS8, Chain AB, EUT Vert
2484.467	23.9	2.7	1.0	46.0	3.0	20.0	Horz	AV	0.0	46.6	54.0	-7.4	Ch. 2462 MHz, MCS0, Chain A, EUT Vert
2484.397	23.9	2.7	1.0	46.0	3.0	20.0	Horz	AV	0.0	46.6	54.0	-7.4	Ch. 2462 MHz, 1Mbps, Chain A, EUT Vert
2484.383	23.9	2.7	1.0	46.0	3.0	20.0	Horz	AV	0.0	46.6	54.0	-7.4	Ch. 2462 MHz, MCS7, Chain A, EUT Vert

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2389.323	24.2	2.3	1.5	324.0	3.0	20.0	Vert	AV	0.0	46.5	54.0	-7.5	Ch. 2412 MHz, 1Mbps, Chain A, EUT On Side
2389.043	24.1	2.3	1.5	324.0	3.0	20.0	Vert	AV	0.0	46.4	54.0	-7.6	Ch. 2412 MHz, 11Mbps, Chain A, EUT On Side
2389.453	42.7	2.3	1.0	15.0	3.0	20.0	Horz	PK	0.0	65.0	74.0	-9.0	Ch. 2412 MHz, MCS8, Chain AB, EUT Vert
2388.597	41.4	2.3	1.0	199.0	3.0	20.0	Horz	PK	0.0	63.7	74.0	-10.3	Ch. 2412 MHz, MCS8, Chain AB, EUT Horz
2389.277	39.9	2.3	1.6	99.0	3.0	20.0	Vert	PK	0.0	62.2	74.0	-11.8	Ch. 2412 MHz, MCS8, Chain AB, EUT Vert
2389.767	39.2	2.3	1.5	281.0	3.0	20.0	Vert	PK	0.0	61.5	74.0	-12.5	Ch. 2412 MHz, MCS7, Chain B, EUT On Side
2389.150	38.8	2.3	1.0	86.0	3.0	20.0	Vert	PK	0.0	61.1	74.0	-12.9	Ch. 2412 MHz, MCS8, Chain AB, EUT Horz
2484.000	38.1	2.7	1.0	46.0	3.0	20.0	Horz	PK	0.0	60.8	74.0	-13.2	Ch. 2462 MHz, MCS0, Chain A, EUT Vert
2389.290	38.4	2.3	1.0	79.0	3.0	20.0	Horz	PK	0.0	60.7	74.0	-13.3	Ch. 2412 MHz, MCS8, Chain AB, EUT On Side
2483.657	38.0	2.7	1.0	46.0	3.0	20.0	Horz	PK	0.0	60.7	74.0	-13.3	Ch. 2462 MHz, 54Mbps, Chain A, EUT Vert
2483.830	37.9	2.7	3.3	268.0	3.0	20.0	Vert	PK	0.0	60.6	74.0	-13.4	Ch. 2462 MHz, 6Mbps, Chain A, EUT On Side
2485.280	37.7	2.7	3.3	268.0	3.0	20.0	Vert	PK	0.0	60.4	74.0	-13.6	Ch. 2462 MHz, 1Mbps, Chain A, EUT On Side
2483.977	37.5	2.7	1.0	220.0	3.0	20.0	Vert	PK	0.0	60.2	74.0	-13.8	Ch. 2462 MHz, MCS8, Chain AB, EUT On Side
2485.177	37.4	2.7	3.3	268.0	3.0	20.0	Vert	PK	0.0	60.1	74.0	-13.9	Ch. 2462 MHz, 54Mbps, Chain A, EUT On Side
2485.173	37.4	2.7	3.3	268.0	3.0	20.0	Vert	PK	0.0	60.1	74.0	-13.9	Ch. 2462 MHz, MCS7, Chain A, EUT On Side
2483.563	37.4	2.7	3.3	268.0	3.0	20.0	Vert	PK	0.0	60.1	74.0	-13.9	Ch. 2462 MHz, MCS0, Chain A, EUT On Side
2483.930	37.2	2.7	1.0	46.0	3.0	20.0	Horz	PK	0.0	59.9	74.0	-14.1	Ch. 2462 MHz, MCS7, Chain A, EUT Vert
2389.680	37.5	2.3	1.5	324.0	3.0	20.0	Vert	PK	0.0	59.8	74.0	-14.2	Ch. 2412 MHz, 11Mbps, Chain A, EUT On Side
2485.113	37.1	2.7	1.0	235.0	3.0	20.0	Horz	PK	0.0	59.8	74.0	-14.2	Ch. 2462 MHz, MCS8, Chain AB, EUT Vert
2388.593	37.4	2.3	1.5	324.0	3.0	20.0	Vert	PK	0.0	59.7	74.0	-14.3	Ch. 2412 MHz, 1Mbps, Chain A, EUT On Side
2485.173	36.9	2.7	1.0	46.0	3.0	20.0	Horz	PK	0.0	59.6	74.0	-14.4	Ch. 2462 MHz, 1Mbps, Chain A, EUT Vert
2484.243	36.8	2.7	1.0	245.0	3.0	20.0	Vert	PK	0.0	59.5	74.0	-14.5	Ch. 2462 MHz, 6Mbps, Chain B, EUT On Side

# SPURIOUS RADIATED EMISSIONS

Work Order:	MCSO1698	Date:	03/14/14	
Project:	None	Temperature:	22.2 °C	
Job Site:	EV01	Humidity:	40.1% RH	
Serial Number:	41151240753	Barometric Pres.:	1021 mbar	
EUT:	Model 1631			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Tx			
Deviations:	None			
Comments:	Please Reference the data comments for EUT orientation, frequency, modulation and Chain			

Test Specifications	Test Method						
FCC 15.247:2014	ANSI C63.10:2009						
Run #	126	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4873.992	36.6	11.0	1.0	309.0	3.0	0.0	Horz	AV	0.0	47.6	54.0	-6.4	Ch. 2437 MHz, 1Mbps, Chain B, EUT Vert
4874.008	36.0	11.0	1.8	254.0	3.0	0.0	Horz	AV	0.0	47.0	54.0	-7.0	Ch. 2437 MHz, 1Mbps, Chain B, EUT Horz
4873.992	35.9	11.0	1.8	102.0	3.0	0.0	Vert	AV	0.0	46.9	54.0	-7.1	Ch. 2437 MHz, 1Mbps, Chain B, EUT Horz
4924.008	35.5	11.3	2.2	274.0	3.0	0.0	Vert	AV	0.0	46.8	54.0	-7.2	Ch. 2462 MHz, 1Mbps, Chain B, EUT Horz
4924.025	34.9	11.3	1.0	70.0	3.0	0.0	Horz	AV	0.0	46.2	54.0	-7.8	Ch. 2462 MHz, 1Mbps, Chain B, EUT Vert
4874.000	35.0	11.0	1.1	116.0	3.0	0.0	Vert	AV	0.0	46.0	54.0	-8.0	Ch. 2437 MHz, 1Mbps, Chain B, EUT Vert
7386.167	26.0	19.9	1.0	9.0	3.0	0.0	Horz	AV	0.0	45.9	54.0	-8.1	Ch. 2462 MHz, 1Mbps, Chain B, EUT Vert
7384.600	26.0	19.9	1.0	167.0	3.0	0.0	Vert	AV	0.0	45.9	54.0	-8.1	Ch. 2462 MHz, 1Mbps, Chain B, EUT Horz
7309.608	26.2	19.4	1.0	219.0	3.0	0.0	Vert	AV	0.0	45.6	54.0	-8.4	Ch. 2437 MHz, 1Mbps, Chain A, EUT Horz
7309.192	26.1	19.4	1.0	52.0	3.0	0.0	Horz	AV	0.0	45.5	54.0	-8.5	Ch. 2437 MHz, 1Mbps, Chain B, EUT Vert
4823.967	33.6	10.7	1.0	70.0	3.0	0.0	Horz	AV	0.0	44.3	54.0	-9.7	Ch. 2412 MHz, 1Mbps, Chain B, EUT Vert
4824.050	31.8	10.7	2.1	106.0	3.0	0.0	Vert	AV	0.0	42.5	54.0	-11.5	Ch. 2412 MHz, 1Mbps, Chain B, EUT Horz
4874.058	31.1	11.0	1.0	270.0	3.0	0.0	Vert	AV	0.0	42.1	54.0	-11.9	Ch. 2437 MHz, 1Mbps, Chain B, EUT On Side
4874.025	29.7	11.0	1.0	311.0	3.0	0.0	Horz	AV	0.0	40.7	54.0	-13.3	Ch. 2437 MHz, 1Mbps, Chain B, EUT On Side
4874.008	29.6	11.0	1.0	309.0	3.0	0.0	Horz	AV	0.0	40.6	54.0	-13.4	Ch. 2437 MHz, 11Mbps, Chain B, EUT Vert
4873.958	29.0	11.0	1.0	335.0	3.0	0.0	Horz	AV	0.0	40.0	54.0	-14.0	Ch. 2437 MHz, 1Mbps, Chain A, EUT Vert
4874.025	28.0	11.0	1.0	318.0	3.0	0.0	Horz	AV	0.0	39.0	54.0	-15.0	Ch. 2437 MHz, MCS8, Chain AB, EUT Vert
4874.000	27.9	11.0	1.0	318.0	3.0	0.0	Horz	AV	0.0	38.9	54.0	-15.1	Ch. 2437 MHz, MCS15, Chain AB, EUT Vert
4873.950	27.7	11.0	1.8	102.0	3.0	0.0	Vert	AV	0.0	38.7	54.0	-15.3	Ch. 2437 MHz, 11Mbps, Chain B, EUT On Side
4874.058	26.6	11.0	1.4	103.0	3.0	0.0	Vert	AV	0.0	37.6	54.0	-16.4	Ch. 2437 MHz, MCS15, Chain AB, EUT Horz
4874.083	26.3	11.0	1.0	309.0	3.0	0.0	Horz	AV	0.0	37.3	54.0	-16.7	Ch. 2437 MHz, MCS0, Chain B, EUT Vert
4874.050	26.3	11.0	1.0	309.0	3.0	0.0	Horz	AV	0.0	37.3	54.0	-16.7	Ch. 2437 MHz, 6Mbps, Chain B, EUT Vert
4874.158	26.2	11.0	1.0	309.0	3.0	0.0	Horz	AV	0.0	37.2	54.0	-16.8	Ch. 2437 MHz, 54Mbps, Chain B, EUT Vert
4874.008	26.2	11.0	1.0	309.0	3.0	0.0	Horz	AV	0.0	37.2	54.0	-16.8	Ch. 2437 MHz, 36Mbps, Chain B, EUT Vert
4873.900	26.2	11.0	1.0	309.0	3.0	0.0	Horz	AV	0.0	37.2	54.0	-16.8	Ch. 2437 MHz, MCS7, Chain B, EUT Vert
7385.292	37.2	19.9	1.0	9.0	3.0	0.0	Horz	PK	0.0	57.1	74.0	-16.9	Ch. 2462 MHz, 1Mbps, Chain B, EUT Vert
4874.075	25.9	11.0	1.8	102.0	3.0	0.0	Vert	AV	0.0	36.9	54.0	-17.1	Ch. 2437 MHz, MCS0, Chain B, EUT Horz
4874.042	25.9	11.0	1.4	103.0	3.0	0.0	Vert	AV	0.0	36.9	54.0	-17.1	Ch. 2437 MHz, MCS8, Chain AB, EUT Horz
4873.958	25.9	11.0	1.8	102.0	3.0	0.0	Vert	AV	0.0	36.9	54.0	-17.1	Ch. 2437 MHz, 6Mbps, Chain B, EUT On Side
7385.933	36.9	19.9	1.0	167.0	3.0	0.0	Vert	PK	0.0	56.8	74.0	-17.2	Ch. 2462 MHz, 1Mbps, Chain B, EUT Horz
4874.108	25.8	11.0	1.8	102.0	3.0	0.0	Vert	AV	0.0	36.8	54.0	-17.2	Ch. 2437 MHz, 36Mbps, Chain B, EUT On Side
4874.100	25.8	11.0	1.8	102.0	3.0	0.0	Vert	AV	0.0	36.8	54.0	-17.2	Ch. 2437 MHz, 54Mbps, Chain B, EUT Horz

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7310.458	37.1	19.4	1.0	219.0	3.0	0.0	Vert	PK	0.0	56.5	74.0	-17.5	Ch. 2437 MHz, 1Mbps, Chain A, EUT Horz
7310.308	36.4	19.4	1.0	52.0	3.0	0.0	Horz	PK	0.0	55.8	74.0	-18.2	Ch. 2437 MHz, 1Mbps, Chain B, EUT Vert
14472.540	23.2	11.0	1.0	79.0	3.0	0.0	Vert	AV	0.0	34.2	54.0	-19.8	Ch. 2412 MHz, 1Mbps, Chain B, EUT Horz
14470.990	23.2	11.0	1.0	147.0	3.0	0.0	Horz	AV	0.0	34.2	54.0	-19.8	Ch. 2412 MHz, 1Mbps, Chain B, EUT Vert
4873.842	41.2	11.0	1.0	309.0	3.0	0.0	Horz	PK	0.0	52.2	74.0	-21.8	Ch. 2437 MHz, 1Mbps, Chain B, EUT Vert
4873.950	41.1	11.0	1.8	102.0	3.0	0.0	Vert	PK	0.0	52.1	74.0	-21.9	Ch. 2437 MHz, 1Mbps, Chain B, EUT Horz
4874.000	40.7	11.0	1.8	254.0	3.0	0.0	Horz	PK	0.0	51.7	74.0	-22.3	Ch. 2437 MHz, 1Mbps, Chain B, EUT Horz
4923.975	40.1	11.3	2.2	274.0	3.0	0.0	Vert	PK	0.0	51.4	74.0	-22.6	Ch. 2462 MHz, 1Mbps, Chain B, EUT Horz
4923.925	39.9	11.3	1.0	70.0	3.0	0.0	Horz	PK	0.0	51.2	74.0	-22.8	Ch. 2462 MHz, 1Mbps, Chain B, EUT Vert
4873.900	40.2	11.0	1.1	116.0	3.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8	Ch. 2437 MHz, 1Mbps, Chain B, EUT Vert
4872.742	39.9	10.9	1.0	318.0	3.0	0.0	Horz	PK	0.0	50.8	74.0	-23.2	Ch. 2437 MHz, MCS15, Chain AB, EUT Vert
14473.800	39.4	11.0	1.0	79.0	3.0	0.0	Vert	PK	0.0	50.4	74.0	-23.6	Ch. 2412 MHz, 1Mbps, Chain B, EUT Horz
4824.125	39.7	10.7	1.0	70.0	3.0	0.0	Horz	PK	0.0	50.4	74.0	-23.6	Ch. 2412 MHz, 1Mbps, Chain B, EUT Vert
4874.458	39.4	11.0	1.0	309.0	3.0	0.0	Horz	PK	0.0	50.4	74.0	-23.6	Ch. 2437 MHz, 11Mbps, Chain B, EUT Vert
4872.100	38.8	10.9	1.0	318.0	3.0	0.0	Horz	PK	0.0	49.7	74.0	-24.3	Ch. 2437 MHz, MCS8, Chain AB, EUT Vert
4874.158	38.5	11.0	1.0	270.0	3.0	0.0	Vert	PK	0.0	49.5	74.0	-24.5	Ch. 2437 MHz, 1Mbps, Chain B, EUT On Side
4823.958	38.6	10.7	2.1	106.0	3.0	0.0	Vert	PK	0.0	49.3	74.0	-24.7	Ch. 2412 MHz, 1Mbps, Chain B, EUT Horz
4873.950	38.1	11.0	1.0	311.0	3.0	0.0	Horz	PK	0.0	49.1	74.0	-24.9	Ch. 2437 MHz, 1Mbps, Chain B, EUT On Side
4874.158	38.0	11.0	1.8	102.0	3.0	0.0	Vert	PK	0.0	49.0	74.0	-25.0	Ch. 2437 MHz, 11Mbps, Chain B, EUT On Side
4872.825	37.7	10.9	1.4	103.0	3.0	0.0	Vert	PK	0.0	48.6	74.0	-25.4	Ch. 2437 MHz, MCS15, Chain AB, EUT Horz
4873.717	37.4	11.0	1.0	335.0	3.0	0.0	Horz	PK	0.0	48.4	74.0	-25.6	Ch. 2437 MHz, 1Mbps, Chain A, EUT Vert
4873.392	37.3	11.0	1.0	309.0	3.0	0.0	Horz	PK	0.0	48.3	74.0	-25.7	Ch. 2437 MHz, 54Mbps, Chain B, EUT Vert
4874.000	37.0	11.0	1.4	103.0	3.0	0.0	Vert	PK	0.0	48.0	74.0	-26.0	Ch. 2437 MHz, MCS8, Chain AB, EUT Horz
4874.450	36.7	11.0	1.8	102.0	3.0	0.0	Vert	PK	0.0	47.7	74.0	-26.3	Ch. 2437 MHz, 36Mbps, Chain B, EUT On Side
4873.625	36.7	11.0	1.0	309.0	3.0	0.0	Horz	PK	0.0	47.7	74.0	-26.3	Ch. 2437 MHz, MCS7, Chain B, EUT Vert
4873.933	36.6	11.0	1.0	309.0	3.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4	Ch. 2437 MHz, MCS0, Chain B, EUT Vert
4872.608	36.6	10.9	1.0	309.0	3.0	0.0	Horz	PK	0.0	47.5	74.0	-26.5	Ch. 2437 MHz, 6Mbps, Chain B, EUT Vert
12182.580	28.6	-1.2	1.0	74.0	3.0	0.0	Vert	AV	0.0	27.4	54.0	-26.6	Ch. 2437 MHz, 1Mbps, Chain B, EUT Horz
4874.475	36.4	11.0	1.0	309.0	3.0	0.0	Horz	PK	0.0	47.4	74.0	-26.6	Ch. 2437 MHz, 36Mbps, Chain B, EUT Vert
12184.030	28.5	-1.2	1.0	89.0	3.0	0.0	Horz	AV	0.0	27.3	54.0	-26.7	Ch. 2437 MHz, 1Mbps, Chain B, EUT Vert
12059.270	29.1	-1.9	1.0	33.0	3.0	0.0	Horz	AV	0.0	27.2	54.0	-26.8	Ch. 2412 MHz, 1Mbps, Chain B, EUT Vert
4874.883	36.2	11.0	1.8	102.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	Ch. 2437 MHz, 6Mbps, Chain B, EUT On Side
4872.350	36.2	10.9	1.8	102.0	3.0	0.0	Vert	PK	0.0	47.1	74.0	-26.9	Ch. 2437 MHz, 54Mbps, Chain B, EUT Horz
12062.270	29.0	-1.9	1.0	92.0	3.0	0.0	Vert	AV	0.0	27.1	54.0	-26.9	Ch. 2412 MHz, 1Mbps, Chain B, EUT Horz
12309.130	27.9	-0.8	1.0	178.0	3.0	0.0	Vert	AV	0.0	27.1	54.0	-26.9	Ch. 2462 MHz, 1Mbps, Chain B, EUT Horz
12311.030	27.9	-0.8	1.0	89.0	3.0	0.0	Horz	AV	0.0	27.1	54.0	-26.9	Ch. 2462 MHz, 1Mbps, Chain B, EUT Vert
4873.617	35.7	11.0	1.8	102.0	3.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	Ch. 2437 MHz, MCS0, Chain B, EUT Horz
12311.340	38.9	-0.8	1.0	178.0	3.0	0.0	Vert	PK	0.0	38.1	74.0	-35.9	Ch. 2462 MHz, 1Mbps, Chain B, EUT Horz
12059.280	39.8	-1.9	1.0	33.0	3.0	0.0	Horz	PK	0.0	37.9	74.0	-36.1	Ch. 2412 MHz, 1Mbps, Chain B, EUT Vert
12183.660	39.0	-1.2	1.0	89.0	3.0	0.0	Horz	PK	0.0	37.8	74.0	-36.2	Ch. 2437 MHz, 1Mbps, Chain B, EUT Vert
12059.360	39.6	-1.9	1.0	92.0	3.0	0.0	Vert	PK	0.0	37.7	74.0	-36.3	Ch. 2412 MHz, 1Mbps, Chain B, EUT Horz
12183.260	38.8	-1.2	1.0	74.0	3.0	0.0	Vert	PK	0.0	37.6	74.0	-36.4	Ch. 2437 MHz, 1Mbps, Chain B, EUT Horz
12309.630	38.3	-0.8	1.0	89.0	3.0	0.0	Horz	PK	0.0	37.5	74.0	-36.5	Ch. 2462 MHz, 1Mbps, Chain B, EUT Vert
14469.550	38.4	11.0	1.0	147.0	3.0	0.0	Horz	PK	0.0	49.4	200.0	-150.6	Ch. 2412 MHz, 1Mbps, Chain B, EUT Vert

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

**MODES OF OPERATION**

802.11(a) 6Mbps
802.11(a) 36Mbps
802.11(a) 54Mbps
802.11(n) MCS7
802.11(n) MCS8
802.11(n) MCS15
802.11(ac) MCS0 (SISO)
802.11(ac) MCS8 (SISO)
802.11(ac) MCS9 (SISO)
802.11(ac) MCS0 (MIMO)
802.11(ac) MCS8 (MIMO)
802.11(ac) MCS9 (MIMO)

**CHANNELS OF OPERATION**

Ch. 149, 5745MHz (20MHz)
Ch. 157, 5785MHz (20MHz)
Ch. 165, 5825MHz (20MHz)
Ch. 149/153, 5755MHz (40MHz)
Ch. 157/161, 5795MHz (40MHz)
Ch. 155, 5775MHz (80MHz)

**POWER SETTINGS INVESTIGATED**

110VAC/60Hz
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**CONFIGURATIONS INVESTIGATED**

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**FREQUENCY RANGE INVESTIGATED**

Start Frequency	30 MHz	Stop Frequency	40000 MHz
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**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

**TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo.)
5.725-5.875 Notch Filter	Micro-Tronics	BRC50705	HGJ	2/18/2014	24 mo
BP Filter	Micro-Tronics	BRC50703	HHJ	6/20/2013	36 mo
5.47-5.725 Notch Filter	Micro-Tronics	BRC50704	HGI	10/4/2012	24 mo
EV01 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	ECC	8/26/2013	12 mo
OC Cable	ESM Cable Corp.	KMKM-72	OCV	6/24/2013	12 mo
Cable	ESM Cable Corp.	KMKM-72	EVY	9/10/2013	12 mo
Power Meter	Gigatronics	8651A	SPM	11/26/2013	24 mo
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	36 mo
Attenuator, 6dB	S.M. Electronics	18N-06	AWN	2/3/2014	12 mo
MXG Analog Signal Generator	Agilent	N5181A	TIG	NCR	0 mo
Antenna, Horn	EMCO	3115	AHC	6/20/2012	24 mo
LP Filter	Micro-Tronics	LPM50004	LFD	7/6/2012	24 mo
EV01 Cables	N/A	Standard Gain Horns Cables	EVF	2/18/2014	12 mo
EV01 Cables	N/A	Double Ridge Horn Cables	EVB	2/18/2014	12 mo
EV01 Cables	N/A	Bilog Cables	EVA	2/18/2014	12 mo
Pre-Amplifier	Miteq	JSW45-26004000-40-5P	AVR	6/24/2013	12 mo
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	9/10/2013	12 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2/18/2014	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	2/18/2014	12 mo
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	2/18/2014	12 mo
Pre-Amplifier	Miteq	AM-1616-1000	AOL	2/18/2014	12 mo
Antenna, Horn	EMCO	3115	AHC	6/20/2012	24 mo
Antenna, Horn	ETS Lindgren	3160-10	AIW	NCR	0 mo
Antenna, Horn	ETS Lindgren	3160-09	AIV	NCR	0 mo
Antenna, Horn	ETS	3160-08	AHV	NCR	0 mo
Antenna, Horn	ETS	3160-07	AHU	NCR	0 mo
Antenna, Horn	ETS	3115	AIZ	1/27/2014	36 mo
Antenna, Biconilog	EMCO	3141	AXG	4/10/2012	36 mo
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	24 mo
Spectrum Analyzer	Agilent	E4440	AFE	11/4/2013	24 mo

**MEASUREMENT BANDWIDTHS**

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

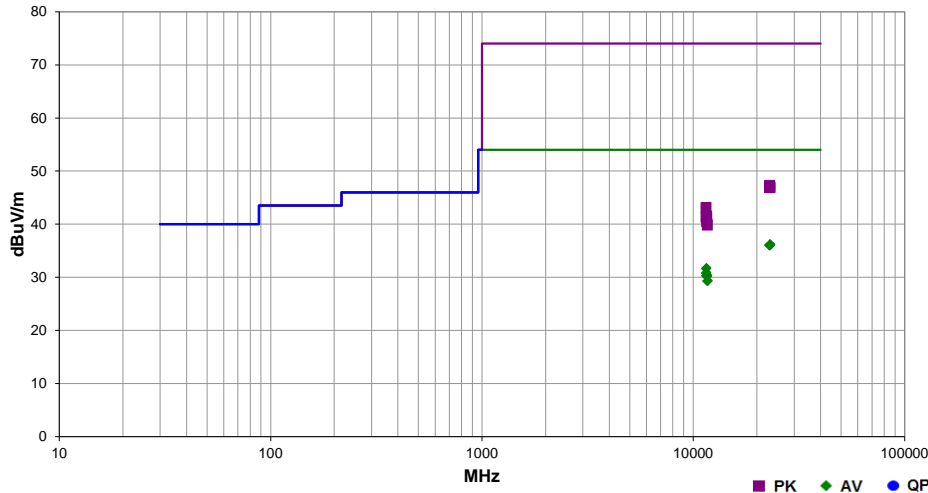
**TEST DESCRIPTION**

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axes, and adjusting measurement antenna height and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

<b>Work Order:</b>	MCSO1698	<b>Date:</b>	03/19/14	
<b>Project:</b>	None	<b>Temperature:</b>	21.5 °C	
<b>Job Site:</b>	EV01	<b>Humidity:</b>	36% RH	
<b>Serial Number:</b>	41148340753	<b>Barometric Pres.:</b>	1021.4 mbar	
<b>EUT:</b>	Model 1631			
<b>Configuration:</b>	4			
<b>Customer:</b>	Microsoft Corporation			
<b>Attendees:</b>	None			
<b>EUT Power:</b>	110VAC/60Hz			
<b>Operating Mode:</b>	Continuous Tx. See comments for modes of operation.			
<b>Deviations:</b>	None			
<b>Comments:</b>	Please reference the data comments for EUT orientation, frequency, modulation and antenna chain			

<b>Test Specifications</b>	N/A	<b>Test Method</b>	ANSI C63.10:2009
FCC 15.247:2014			

<b>Run #</b>	159	<b>Test Distance (m)</b>	3	<b>Antenna Height(s)</b>	1-4m	<b>Results</b>	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
22978.550	36.2	0.0	1.0	78.0	3.0	0.0	Horz	AV	0.0	36.2	54.0	-17.8	Ch. 149, 5745MHz, 20MHz wide, MIMO 802.11n, MCS8, EUT on side
23020.200	36.1	0.0	1.0	324.0	3.0	0.0	Horz	AV	0.0	36.1	54.0	-17.9	Ch. 149/153, 5755MHz, 40MHz wide, MIMO 802.11n, MCS15, EUT on side
22979.530	36.1	0.0	1.0	9.0	3.0	0.0	Horz	AV	0.0	36.1	54.0	-17.9	Ch. 149, 5745MHz, 20MHz wide, SISO Port A 802.11a, EUT on side
22980.800	36.1	0.0	1.0	48.0	3.0	0.0	Horz	AV	0.0	36.1	54.0	-17.9	Ch. 149, 5745MHz, 20MHz wide, SISO Port B 802.11a, EUT on side
11489.940	35.8	-4.1	1.0	25.0	3.0	0.0	Horz	AV	0.0	31.7	54.0	-22.3	Ch. 149, 5745 MHz, 20 MHz wide, MIMO 802.11n, MCS8, EUT on side
11485.330	35.0	-4.1	1.0	22.0	3.0	0.0	Horz	AV	0.0	30.9	54.0	-23.1	Ch. 149/153, 5755MHz, 40MHz wide, MIMO 802.11n, MCS15, EUT on side
11550.000	34.1	-3.8	1.0	45.0	3.0	0.0	Horz	AV	0.0	30.4	54.0	-23.7	Ch. 155, 5775MHz, 12dBm, 80MHz wide, MIMO 802.11ac, MCS9, EUT on side
11568.520	34.0	-3.7	3.3	147.0	3.0	0.0	Horz	AV	0.0	30.3	54.0	-23.7	Ch. 157, 5785 MHz, 20 MHz wide, MIMO 802.11n, MCS8, EUT on side
11565.330	34.0	-3.7	1.0	203.0	3.0	0.0	Horz	AV	0.0	30.3	54.0	-23.7	Ch. 157/161, 5795MHz, 40MHz wide, MIMO 802.11n, MCS15, EUT on side
11649.370	32.7	-3.3	1.0	101.0	3.0	0.0	Horz	AV	0.0	29.4	54.0	-24.6	Ch. 165, 5825 MHz, 20 MHz wide, MIMO 802.11n, MCS8, EUT on side
22980.730	47.3	0.0	1.0	78.0	3.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7	Ch. 149, 5745MHz, 20MHz wide, SISO Port A 802.11a, EUT on side
22979.380	47.1	0.0	1.0	9.0	3.0	0.0	Horz	PK	0.0	47.1	74.0	-26.9	Ch. 149, 5745MHz, 20MHz wide, SISO Port B 802.11a, EUT on side
23018.750	46.9	0.0	1.0	324.0	3.0	0.0	Horz	PK	0.0	46.9	74.0	-27.1	Ch. 149/153, 5755MHz, 40MHz wide, MIMO 802.11n, MCS15, EUT on side
22978.700	46.9	0.0	1.0	48.0	3.0	0.0	Horz	PK	0.0	46.9	74.0	-27.1	Ch. 149, 5745MHz, 20MHz wide, SISO Port B 802.11a, EUT on side
11489.290	47.2	-4.1	1.0	25.0	3.0	0.0	Horz	PK	0.0	43.1	74.0	-30.9	Ch. 149, 5745 MHz, 20 MHz wide, MIMO 802.11n, MCS8, EUT on side
11570.190	45.2	-3.7	3.3	147.0	3.0	0.0	Horz	PK	0.0	41.5	74.0	-32.5	Ch. 157, 5785 MHz, 20 MHz wide, MIMO 802.11n, MCS8, EUT on side
11550.960	45.1	-3.7	1.0	45.0	3.0	0.0	Horz	PK	0.0	41.4	74.0	-32.6	Ch. 155, 5775MHz, 12dBm, 80MHz wide, MIMO 802.11ac, MCS9, EUT on side
11496.080	45.3	-4.0	1.0	22.0	3.0	0.0	Horz	PK	0.0	41.3	74.0	-32.7	Ch. 149/153, 5755MHz, 40MHz wide, MIMO 802.11n, MCS15, EUT on side
11567.250	44.2	-3.7	1.0	203.0	3.0	0.0	Horz	PK	0.0	40.5	74.0	-33.5	Ch. 157/161, 5795MHz, 40MHz wide, MIMO 802.11n, MCS15, EUT on side
11651.200	43.2	-3.3	1.0	101.0	3.0	0.0	Horz	PK	0.0	39.9	74.0	-34.1	Ch. 165, 5825 MHz, 20 MHz wide, MIMO 802.11n, MCS8, EUT on side



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

## MODES OF OPERATION

802.11(N) MCS0  
 802.11(N) MCS7  
 802.11(N) MCS8  
 802.11(N) MCS15

## CHANNELS OF OPERATION

Ch. 1/5 2422MHz  
 Ch. 4/8 2437MHz  
 Ch. 7/11 2452MHz

## POWER SETTINGS INVESTIGATED

110VAC/60Hz

## CONFIGURATIONS INVESTIGATED

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## FREQUENCY RANGE INVESTIGATED

Start Frequency | 30 MHz | Stop Frequency | 26500 MHz

## SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440	AFE	11/4/2013	24 mo
LP Filter	Micro-Tronics	LPM50004	LFD	7/6/2012	24 mo
Attenuator - 20dB, HF (1000MHz - 18000MHz)	Coaxicom	3910-20	AXZ	6/20/2013	12 mo
HP Filter	Micro-Tronics	HPM50111	HFO	7/6/2013	24 mo
Antenna, Biconilog	EMCO	3141	AXG	4/10/2012	36 mo
Pre-Amplifier	Miteq	AM-1616-1000	AOL	2/18/2014	12 mo
EV01 Cables	N/A	Bilog Cables	EVA	2/18/2014	12 mo
Antenna, Horn	ETS	3115	AIZ	1/27/2014	36 mo
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	2/18/2014	12 mo
EV01 Cables	N/A	Double Ridge Horn Cables	EVB	2/18/2014	12 mo
Antenna, Horn	ETS	3160-07	AHU	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	2/18/2014	12 mo
EV01 Cables	N/A	Standard Gain Horns Cables	EVF	2/18/2014	12 mo
Antenna, Horn	ETS	3160-08	AHV	NCR	0 mo
Antenna, Horn	ETS Lindgren	3160-09	AIV	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	9/10/2013	12 mo
Cable	ESM Cable Corp.	KMKM-72	EVY	9/10/2013	12 mo

## MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

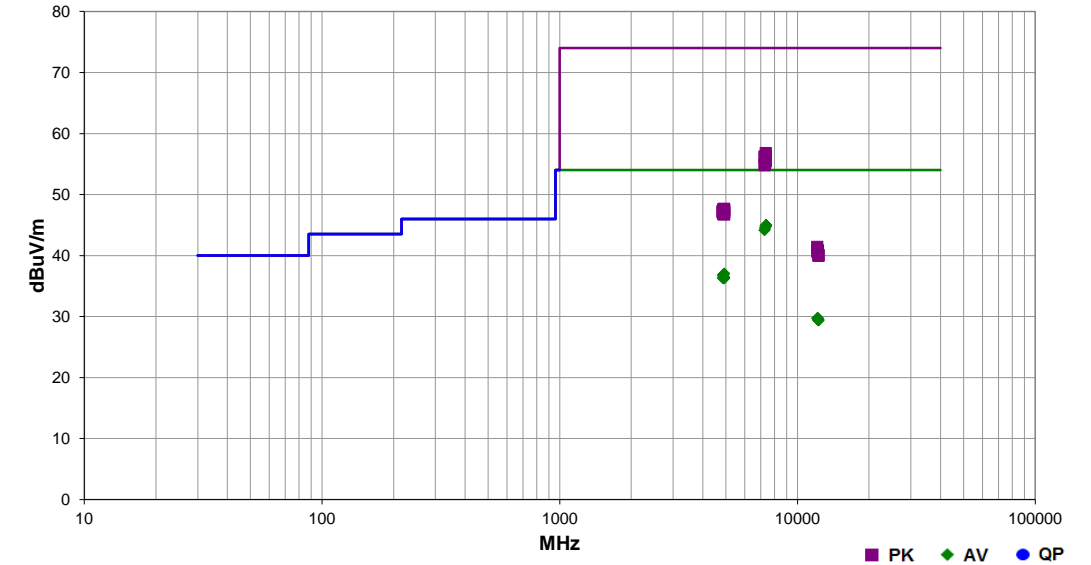
## TEST DESCRIPTION

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

<b>Work Order:</b>	MCSO1698	<b>Date:</b>	04/16/14	
<b>Project:</b>	1631	<b>Temperature:</b>	22 °C	
<b>Job Site:</b>	EV01	<b>Humidity:</b>	40% RH	
<b>Serial Number:</b>	006840341053	<b>Barometric Pres.:</b>	1018 mbar	
<b>EUT:</b>	Model 1631			
<b>Configuration:</b>	6			
<b>Customer:</b>	Microsoft Corporation			
<b>Attendees:</b>	None			
<b>EUT Power:</b>	110VAC/60Hz			
<b>Operating Mode:</b>	Tx			
<b>Deviations:</b>	None			
<b>Comments:</b>	Reference the data comments for EUT oreination, frequency, modulation and chain.			

Test Specifications	Test Method
FCC 15.247:2014	ANSI C63.10:2009

Run #	200	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7355.350	25.3	19.7	1.0	322.0	3.0	0.0	Horz	AV	0.0	45.0	54.0	-9.0	Ch. 7/11 2452MHz, MCS7, Chain A, EUT Vert
7355.245	25.3	19.7	1.0	226.0	3.0	0.0	Horz	AV	0.0	45.0	54.0	-9.0	Ch. 7/11 2452MHz, MCS8, Chain AB, EUT Vert
7355.080	25.3	19.7	1.0	187.0	3.0	0.0	Horz	AV	0.0	45.0	54.0	-9.0	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
7355.070	25.3	19.7	2.8	291.0	3.0	0.0	Vert	AV	0.0	45.0	54.0	-9.0	Ch. 7/11 2452MHz, MCS7, Chain B, EUT Vert
7354.820	25.3	19.7	1.0	256.0	3.0	0.0	Horz	AV	0.0	45.0	54.0	-9.0	Ch. 7/11 2452MHz, MCS7, Chain B, EUT Vert
7354.810	25.3	19.7	1.0	222.0	3.0	0.0	Vert	AV	0.0	45.0	54.0	-9.0	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
7354.790	25.3	19.7	1.0	21.0	3.0	0.0	Vert	AV	0.0	45.0	54.0	-9.0	Ch. 7/11 2452MHz, MCS15, Chain AB, EUT Vert
7354.765	25.3	19.7	1.0	322.0	3.0	0.0	Horz	AV	0.0	45.0	54.0	-9.0	Ch. 7/11 2452MHz, MCS0, Chain A, EUT Vert
7354.935	25.2	19.7	3.2	69.0	3.0	0.0	Vert	AV	0.0	44.9	54.0	-9.1	Ch. 7/11 2452MHz, MCS8, Chain AB, EUT Vert
7354.605	25.2	19.7	3.0	349.0	3.0	0.0	Horz	AV	0.0	44.9	54.0	-9.1	Ch. 7/11 2452MHz, MCS15, Chain AB, EUT Vert
7309.920	25.3	19.4	1.0	194.0	3.0	0.0	Horz	AV	0.0	44.7	54.0	-9.3	Ch. 4/8 2437MHz, MCS0, Chain B, EUT Vert
7311.330	25.2	19.4	1.0	141.0	3.0	0.0	Vert	AV	0.0	44.6	54.0	-9.4	Ch. 4/8 2437MHz, MCS0, Chain B, EUT Vert
7264.855	25.2	19.0	1.0	313.0	3.0	0.0	Horz	AV	0.0	44.2	54.0	-9.8	Ch. 1/4 2422MHz, MCS0, Chain B, EUT Vert
7264.845	25.2	19.0	2.0	257.0	3.0	0.0	Vert	AV	0.0	44.2	54.0	-9.8	Ch. 1/4 2422MHz, MCS0, Chain B, EUT Vert
4903.992	25.9	11.1	1.0	320.0	3.0	0.0	Horz	AV	0.0	37.0	54.0	-17.0	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
4903.945	25.9	11.1	1.0	314.0	3.0	0.0	Horz	AV	0.0	37.0	54.0	-17.0	Ch. 7/11 2452MHz, MCS8, Chain AB, EUT Vert
4843.915	26.1	10.8	1.0	61.0	3.0	0.0	Horz	AV	0.0	36.9	54.0	-17.1	Ch. 1/4 2422MHz, MCS0, Chain B, EUT Vert
7356.940	37.1	19.7	1.0	322.0	3.0	0.0	Horz	PK	0.0	56.8	74.0	-17.2	Ch. 7/11 2452MHz, MCS0, Chain A, EUT Vert
4874.417	25.6	11.0	1.0	46.0	3.0	0.0	Vert	AV	0.0	36.6	54.0	-17.4	Ch. 4/8 2437MHz, MCS0, Chain B, EUT Vert
4906.217	25.3	11.2	2.2	360.0	3.0	0.0	Vert	AV	0.0	36.5	54.0	-17.5	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
4902.925	25.3	11.1	1.0	97.0	3.0	0.0	Vert	AV	0.0	36.4	54.0	-17.6	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
4843.865	25.6	10.8	1.0	4.0	3.0	0.0	Vert	AV	0.0	36.4	54.0	-17.6	Ch. 1/4 2422MHz, MCS0, Chain B, EUT Vert
4874.125	25.4	11.0	1.0	196.0	3.0	0.0	Horz	AV	0.0	36.4	54.0	-17.6	Ch. 4/8 2437MHz, MCS0, Chain B, EUT Vert
4904.242	25.2	11.1	1.0	215.0	3.0	0.0	Vert	AV	0.0	36.3	54.0	-17.7	Ch. 7/11 2452MHz, MCS0, Chain B, EUT On Side
4903.575	25.2	11.1	1.0	54.0	3.0	0.0	Horz	AV	0.0	36.3	54.0	-17.7	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
7356.935	36.6	19.7	3.0	349.0	3.0	0.0	Horz	PK	0.0	56.3	74.0	-17.7	Ch. 7/11 2452MHz, MCS15, Chain AB, EUT Vert
4906.258	25.1	11.2	2.4	288.0	3.0	0.0	Horz	AV	0.0	36.3	54.0	-17.7	Ch. 7/11 2452MHz, MCS0, Chain B, EUT On Side
7266.305	37.2	19.0	2.0	257.0	3.0	0.0	Vert	PK	0.0	56.2	74.0	-17.8	Ch. 1/4 2422MHz, MCS0, Chain B, EUT Vert
7355.765	36.5	19.7	1.0	256.0	3.0	0.0	Horz	PK	0.0	56.2	74.0	-17.8	Ch. 7/11 2452MHz, MCS7, Chain B, EUT Vert
7354.880	36.5	19.7	1.0	222.0	3.0	0.0	Vert	PK	0.0	56.2	74.0	-17.8	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
7355.750	36.3	19.7	1.0	322.0	3.0	0.0	Horz	PK	0.0	56.0	74.0	-18.0	Ch. 7/11 2452MHz, MCS7, Chain A, EUT Vert
7356.305	36.2	19.7	1.0	21.0	3.0	0.0	Vert	PK	0.0	55.9	74.0	-18.1	Ch. 7/11 2452MHz, MCS15, Chain AB, EUT Vert
7309.840	36.5	19.4	1.0	194.0	3.0	0.0	Horz	PK	0.0	55.9	74.0	-18.1	Ch. 4/8 2437MHz, MCS0, Chain B, EUT Vert
7354.545	36.1	19.7	1.0	187.0	3.0	0.0	Horz	PK	0.0	55.8	74.0	-18.2	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert

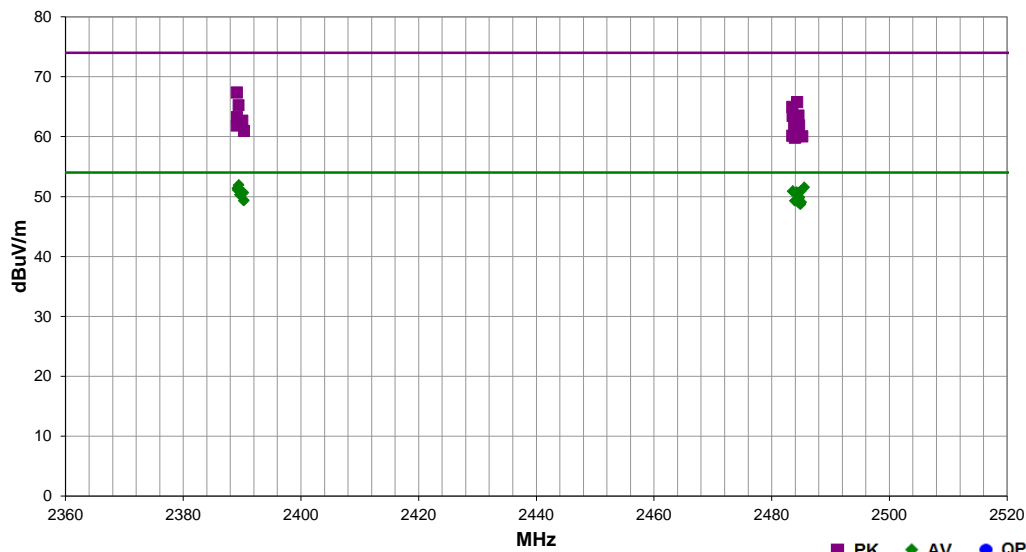
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7357.125	36.0	19.7	2.8	291.0	3.0	0.0	Vert	PK	0.0	55.7	74.0	-18.3	Ch. 7/11 2452MHz, MCS7, Chain B, EUT Vert
7356.295	36.0	19.7	1.0	226.0	3.0	0.0	Horz	PK	0.0	55.7	74.0	-18.3	Ch. 7/11 2452MHz, MCS8, Chain AB, EUT Vert
7354.645	35.8	19.7	3.2	69.0	3.0	0.0	Vert	PK	0.0	55.5	74.0	-18.5	Ch. 7/11 2452MHz, MCS8, Chain AB, EUT Vert
7310.745	35.7	19.4	1.0	141.0	3.0	0.0	Vert	PK	0.0	55.1	74.0	-18.9	Ch. 4/8 2437MHz, MCS0, Chain B, EUT Vert
7264.985	35.8	19.0	1.0	313.0	3.0	0.0	Horz	PK	0.0	54.8	74.0	-19.2	Ch. 1/4 2422MHz, MCS0, Chain B, EUT Vert
12109.720	31.4	-1.6	1.0	126.0	3.0	0.0	Horz	AV	0.0	29.8	54.0	-24.2	Ch. 1/5 2422MHz, MCS0, Chain B, EUT Vert
12108.570	31.4	-1.6	1.0	46.0	3.0	0.0	Vert	AV	0.0	29.8	54.0	-24.2	Ch. 1/5 2422MHz, MCS0, Chain B, EUT Vert
12182.890	30.9	-1.2	1.0	188.0	3.0	0.0	Horz	AV	0.0	29.7	54.0	-24.3	Ch. 4/8 2437MHz, MCS0, Chain B, EUT Vert
12183.050	30.7	-1.2	1.0	173.0	3.0	0.0	Vert	AV	0.0	29.5	54.0	-24.5	Ch. 4/8 2437MHz, MCS0, Chain B, EUT Vert
12258.630	30.3	-0.8	1.0	70.0	3.0	0.0	Vert	AV	0.0	29.5	54.0	-24.5	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
12258.900	30.2	-0.8	1.0	102.0	3.0	0.0	Horz	AV	0.0	29.4	54.0	-24.6	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
4904.360	36.5	11.1	1.0	314.0	3.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4	Ch. 7/11 2452MHz, MCS8, Chain AB, EUT Vert
4873.617	36.6	11.0	1.0	46.0	3.0	0.0	Vert	PK	0.0	47.6	74.0	-26.4	Ch. 4/8 2437MHz, MCS0, Chain B, EUT Vert
4906.492	36.3	11.2	1.0	320.0	3.0	0.0	Horz	PK	0.0	47.5	74.0	-26.5	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
4904.417	36.2	11.1	1.0	54.0	3.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Horz
4842.815	36.5	10.8	1.0	4.0	3.0	0.0	Vert	PK	0.0	47.3	74.0	-26.7	Ch. 1/4 2422MHz, MCS0, Chain B, EUT Vert
4905.750	36.0	11.2	2.2	360.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
4901.608	36.0	11.1	2.4	288.0	3.0	0.0	Horz	PK	0.0	47.1	74.0	-26.9	Ch. 7/11 2452MHz, MCS0, Chain B, EUT On Side
4844.040	36.3	10.8	1.0	61.0	3.0	0.0	Horz	PK	0.0	47.1	74.0	-26.9	Ch. 1/4 2422MHz, MCS0, Chain B, EUT Vert
4906.100	35.8	11.2	1.0	97.0	3.0	0.0	Vert	PK	0.0	47.0	74.0	-27.0	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Horz
4872.033	35.9	10.9	1.0	196.0	3.0	0.0	Horz	PK	0.0	46.8	74.0	-27.2	Ch. 4/8 2437MHz, MCS0, Chain B, EUT Vert
4904.767	35.6	11.1	1.0	215.0	3.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	Ch. 7/11 2452MHz, MCS0, Chain B, EUT On Side
12110.540	43.0	-1.6	1.0	126.0	3.0	0.0	Horz	PK	0.0	41.4	74.0	-32.6	Ch. 1/5 2422MHz, MCS0, Chain B, EUT Vert
12187.200	42.0	-1.2	1.0	173.0	3.0	0.0	Vert	PK	0.0	40.8	74.0	-33.2	Ch. 4/8 2437MHz, MCS0, Chain B, EUT Vert
12110.000	42.3	-1.6	1.0	46.0	3.0	0.0	Vert	PK	0.0	40.7	74.0	-33.3	Ch. 1/5 2422MHz, MCS0, Chain B, EUT Vert
12183.270	41.6	-1.2	1.0	188.0	3.0	0.0	Horz	PK	0.0	40.4	74.0	-33.6	Ch. 4/8 2437MHz, MCS0, Chain B, EUT Vert
12259.000	40.9	-0.8	1.0	70.0	3.0	0.0	Vert	PK	0.0	40.1	74.0	-33.9	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
12259.510	40.8	-0.8	1.0	102.0	3.0	0.0	Horz	PK	0.0	40.0	74.0	-34.0	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert

## SPURIOUS RADIATED EMISSIONS

Work Order:	MCSO1698	Date:	04/16/14	
Project:	1631	Temperature:	22 °C	
Job Site:	EV01	Humidity:	40% RH	
Serial Number:	006840341053	Barometric Pres.:	1018 mbar	
EUT:	Model 1631			
Configuration:	6			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Tx			
Deviations:	None			
Comments:	Reference the data comments for EUT orination, frequency, modulation and chain.			

Test Specifications	Test Method
FCC 15.247:2014	ANSI C63.10:2009

Run #	203	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2389.377	29.7	2.3	1.0	10.0	3.0	20.0	Horz	AV	0.0	52.0	54.0	-2.0	Ch. 1/5 2422MHz, MCS7, Chain B, EUT Vert
2485.473	28.9	2.7	1.0	23.0	3.0	20.0	Horz	AV	0.0	51.6	54.0	-2.4	Ch. 7/11 2452MHz, MCS7, Chain A, EUT Vert
2389.187	29.2	2.3	1.0	8.0	3.0	20.0	Horz	AV	0.0	51.5	54.0	-2.5	Ch. 1/5 2422MHz, MCS8, Chain AB, EUT Vert
2389.237	28.9	2.3	1.0	8.0	3.0	20.0	Horz	AV	0.0	51.2	54.0	-2.8	Ch. 1/5 2422MHz, MCS15, Chain AB, EUT Vert
2484.927	28.3	2.7	1.0	326.0	3.0	20.0	Horz	AV	0.0	51.0	54.0	-3.0	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
2483.527	28.3	2.7	1.0	314.0	3.0	20.0	Horz	AV	0.0	51.0	54.0	-3.0	Ch. 7/11 2452MHz, MCS7, Chain B, EUT Vert
2484.190	28.1	2.7	1.0	29.0	3.0	20.0	Horz	AV	0.0	50.8	54.0	-3.2	Ch. 7/11 2452MHz, MCS8, Chain AB, EUT Vert
2390.173	28.4	2.3	1.0	10.0	3.0	20.0	Horz	AV	0.0	50.7	54.0	-3.3	Ch. 1/5 2422MHz, MCS0, Chain B, EUT Vert
2484.477	28.0	2.7	1.0	29.0	3.0	20.0	Horz	AV	0.0	50.7	54.0	-3.3	Ch. 7/11 2452MHz, MCS15, Chain AB, EUT Vert
2389.610	28.1	2.3	1.0	35.0	3.0	20.0	Horz	AV	0.0	50.4	54.0	-3.6	Ch. 1/5 2422MHz, MCS7, Chain A, EUT Vert
2484.680	27.2	2.7	1.0	37.0	3.0	20.0	Horz	AV	0.0	49.9	54.0	-4.1	Ch. 7/11 2452MHz, MCS0, Chain A, EUT Vert
2390.270	27.1	2.3	1.0	35.0	3.0	20.0	Horz	AV	0.0	49.4	54.0	-4.6	Ch. 1/5 2422MHz, MCS0, Chain A, EUT Vert
2483.910	26.7	2.7	1.6	307.0	3.0	20.0	Vert	AV	0.0	49.4	54.0	-4.6	Ch. 7/11 2452MHz, MCS0, Chain B, EUT On Side
2484.963	26.4	2.7	1.0	157.0	3.0	20.0	Horz	AV	0.0	49.1	54.0	-4.9	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Horz
2484.573	26.4	2.7	1.0	308.0	3.0	20.0	Horz	AV	0.0	49.1	54.0	-4.9	Ch. 7/11 2452MHz, MCS0, Chain B, EUT On Side
2484.737	26.3	2.7	2.8	345.0	3.0	20.0	Vert	AV	0.0	49.0	54.0	-5.0	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
2484.870	26.1	2.7	1.0	143.0	3.0	20.0	Vert	AV	0.0	48.8	54.0	-5.2	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
2389.077	45.1	2.3	1.0	10.0	3.0	20.0	Horz	PK	0.0	67.4	74.0	-6.6	Ch. 1/5 2422MHz, MCS7, Chain B, EUT Vert
2484.333	43.1	2.7	1.0	326.0	3.0	20.0	Horz	PK	0.0	65.8	74.0	-8.2	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert
2389.397	43.0	2.3	1.0	8.0	3.0	20.0	Horz	PK	0.0	65.3	74.0	-8.7	Ch. 1/5 2422MHz, MCS8, Chain AB, EUT Vert
2483.513	42.3	2.7	1.0	314.0	3.0	20.0	Horz	PK	0.0	65.0	74.0	-9.0	Ch. 7/11 2452MHz, MCS7, Chain B, EUT Vert
2484.537	40.9	2.7	1.0	37.0	3.0	20.0	Horz	PK	0.0	63.6	74.0	-10.4	Ch. 7/11 2452MHz, MCS0, Chain A, EUT Vert
2483.567	40.8	2.7	1.0	23.0	3.0	20.0	Horz	PK	0.0	63.5	74.0	-10.5	Ch. 7/11 2452MHz, MCS7, Chain A, EUT Vert
2389.120	41.0	2.3	1.0	8.0	3.0	20.0	Horz	PK	0.0	63.3	74.0	-10.7	Ch. 1/5 2422MHz, MCS15, Chain AB, EUT Vert
2390.033	40.4	2.3	1.0	10.0	3.0	20.0	Horz	PK	0.0	62.7	74.0	-11.3	Ch. 1/5 2422MHz, MCS0, Chain B, EUT Vert
2483.843	39.4	2.7	1.0	29.0	3.0	20.0	Horz	PK	0.0	62.1	74.0	-11.9	Ch. 7/11 2452MHz, MCS15, Chain AB, EUT Vert
2389.060	39.6	2.3	1.0	35.0	3.0	20.0	Horz	PK	0.0	61.9	74.0	-12.1	Ch. 1/5 2422MHz, MCS7, Chain A, EUT Vert
2484.663	39.2	2.7	1.0	29.0	3.0	20.0	Horz	PK	0.0	61.9	74.0	-12.1	Ch. 7/11 2452MHz, MCS8, Chain AB, EUT Vert
2484.043	38.6	2.7	1.6	307.0	3.0	20.0	Vert	PK	0.0	61.3	74.0	-12.7	Ch. 7/11 2452MHz, MCS0, Chain B, EUT On Side
2390.323	38.7	2.3	1.0	35.0	3.0	20.0	Horz	PK	0.0	61.0	74.0	-13.0	Ch. 1/5 2422MHz, MCS0, Chain A, EUT Vert
2483.507	37.5	2.7	1.0	157.0	3.0	20.0	Horz	PK	0.0	60.2	74.0	-13.8	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Horz
2485.203	37.4	2.7	1.0	308.0	3.0	20.0	Horz	PK	0.0	60.1	74.0	-13.9	Ch. 7/11 2452MHz, MCS0, Chain B, EUT On Side
2484.067	37.3	2.7	1.0	143.0	3.0	20.0	Vert	PK	0.0	60.0	74.0	-14.0	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Horz
2483.937	37.2	2.7	2.8	345.0	3.0	20.0	Vert	PK	0.0	59.9	74.0	-14.1	Ch. 7/11 2452MHz, MCS0, Chain B, EUT Vert

## TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50 Ω measuring port is terminated by a 50 Ω EMI meter or a 50 Ω resistive load. All 50 Ω measuring ports of the LISN are terminated by 50Ω.

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
LISN	Solar	9252-50-R-24-BNC	LIP	02/16/2014	12 mo
Receiver	Rohde & Schwarz	ESCI	ARH	02/05/2014	12 mo
High Pass Filter	TTE	H97-100K-50-720B	HHD	01/22/2014	12 mo
Attenuator	Fairview Microwave	SA6B10W-20	RKA	10/24/2013	12 mo

## MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.94 dB	-2.94 dB

## CONFIGURATIONS INVESTIGATED

MCSO1698-3

## MODES INVESTIGATED

Tx Ch.1, 2412MHz 802.11(b) 1Mbps Chain B  
 Tx Ch.11, 2462MHz 802.11(b) 1Mbps Chain B  
 Tx Ch.149, 5745MHz 802.11(a) 6Mbps Chain B  
 Tx Ch.157, 5785MHz 802.11(a) 6Mbps Chain B  
 Tx Ch.165, 5825MHz 802.11(a) 6Mbps Chain B  
 Tx Ch.6, 2437MHz 802.11(b) 1Mbps Chain B

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	41151240753	Date:	03/23/2014
Customer:	Microsoft Corporation	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	31.2%
Customer Project:	None	Bar. Pressure:	1023.9 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-3

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

## TEST PARAMETERS

Run #:	19	Line:	High Line	Ext. Attenuation (dB):	20
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## COMMENTS

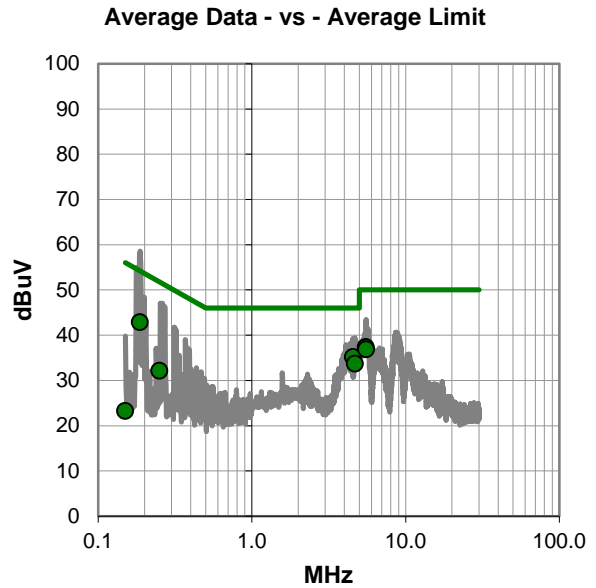
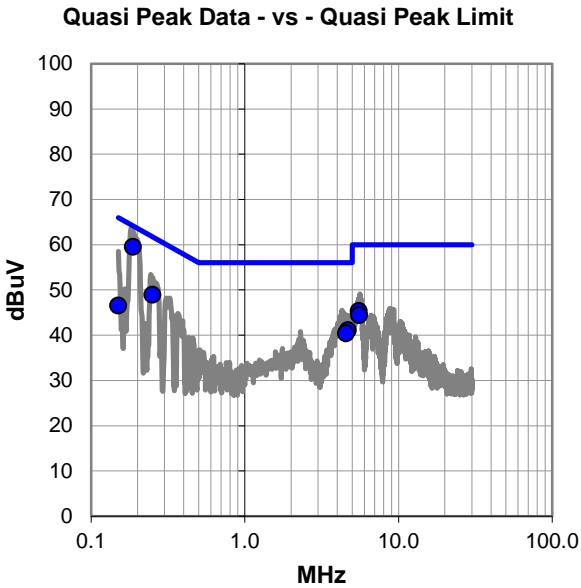
None

## EUT OPERATING MODES

Tx Ch.1 2412MHz 802.11(b) 1Mbps Chain B

## DEVIATIONS FROM TEST STANDARD

None



## RESULTS - Run #19

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.187	39.8	19.7	59.5	64.2	-4.6
0.250	29.2	19.8	49.0	61.8	-12.8
5.528	25.8	19.5	45.3	60.0	-14.7
4.692	21.5	19.6	41.1	56.0	-14.9
5.548	24.9	19.5	44.4	60.0	-15.6
4.560	20.8	19.6	40.4	56.0	-15.6
0.150	26.9	19.6	46.5	66.0	-19.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.560	15.6	19.6	35.2	46.0	-10.8
0.187	23.1	19.7	42.8	54.2	-11.3
4.692	14.1	19.6	33.7	46.0	-12.3
5.528	17.8	19.5	37.3	50.0	-12.7
5.548	17.3	19.5	36.8	50.0	-13.2
0.250	12.4	19.8	32.2	51.8	-19.6
0.150	3.6	19.6	23.2	56.0	-32.8

## CONCLUSION

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	41151240753	Date:	03/23/2014
Customer:	Microsoft Corporation	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	31.2%
Customer Project:	None	Bar. Pressure:	1023.9 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-3

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

## TEST PARAMETERS

Run #:	20	Line:	Neutral	Ext. Attenuation (dB):	20
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## COMMENTS

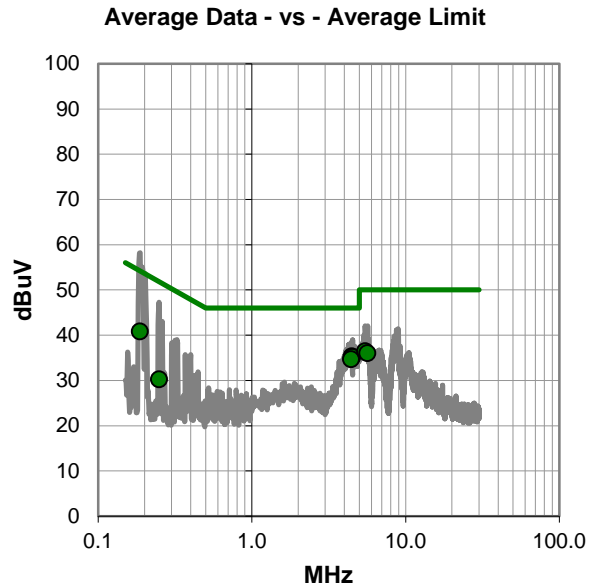
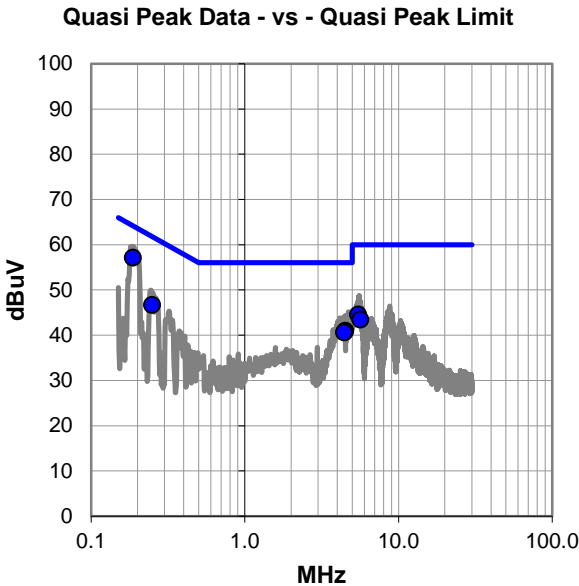
None

## EUT OPERATING MODES

Tx Ch.1 2412MHz 802.11(b) 1Mbps Chain B

## DEVIATIONS FROM TEST STANDARD

None





## RESULTS - Run #20

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.187	37.4	19.7	57.1	64.2	-7.0
4.512	21.4	19.6	41.0	56.0	-15.0
0.249	26.9	19.7	46.6	61.8	-15.1
4.476	21.1	19.6	40.7	56.0	-15.3
4.416	21.0	19.6	40.6	56.0	-15.4
5.472	25.0	19.5	44.5	60.0	-15.5
5.658	23.9	19.5	43.4	60.0	-16.6

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.476	15.7	19.6	35.3	46.0	-10.7
4.512	15.6	19.6	35.2	46.0	-10.8
4.416	15.1	19.6	34.7	46.0	-11.3
0.187	21.1	19.7	40.8	54.2	-13.3
5.472	16.9	19.5	36.4	50.0	-13.6
5.658	16.5	19.5	36.0	50.0	-14.0
0.249	10.5	19.7	30.2	51.8	-21.5

## CONCLUSION

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	41151240753	Date:	03/23/2014
Customer:	Microsoft Corporation	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	31.2%
Customer Project:	None	Bar. Pressure:	1023.9 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-3

**TEST SPECIFICATIONS**

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

**TEST PARAMETERS**

Run #:	21	Line:	Neutral	Ext. Attenuation (dB):	20
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**COMMENTS**

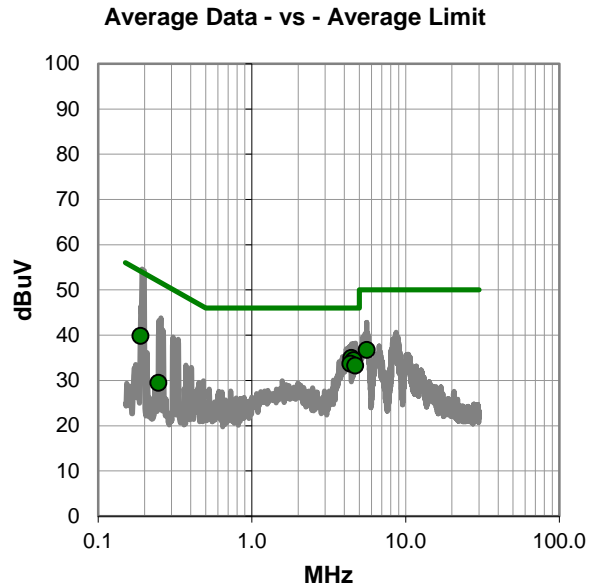
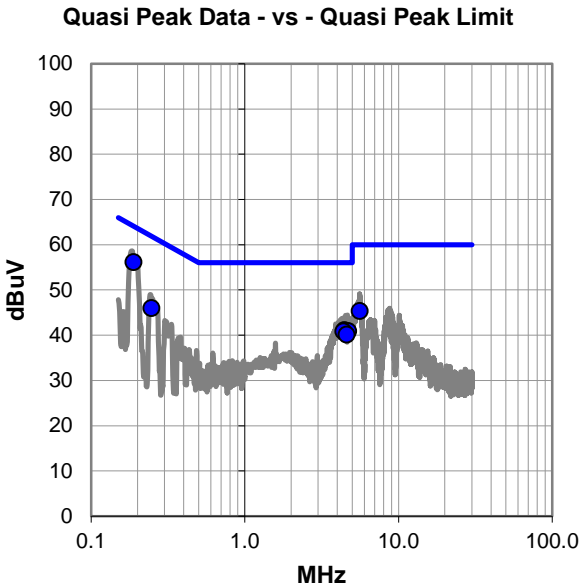
None

**EUT OPERATING MODES**

Tx Ch.6 2437MHz 802.11(b) 1Mbps Chain B

**DEVIATIONS FROM TEST STANDARD**

None



## RESULTS - Run #21

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.189	36.4	19.7	56.1	64.1	-7.9
5.584	25.8	19.5	45.3	60.0	-14.7
4.440	21.5	19.6	41.1	56.0	-14.9
4.700	21.3	19.6	40.9	56.0	-15.1
4.380	21.2	19.6	40.8	56.0	-15.2
0.247	26.2	19.7	45.9	61.9	-15.9
4.600	20.5	19.6	40.1	56.0	-15.9

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.440	15.4	19.6	35.0	46.0	-11.0
4.600	14.9	19.6	34.5	46.0	-11.5
4.380	14.1	19.6	33.7	46.0	-12.3
4.700	13.7	19.6	33.3	46.0	-12.7
5.584	17.2	19.5	36.7	50.0	-13.3
0.189	20.1	19.7	39.8	54.1	-14.2
0.247	9.7	19.7	29.4	51.9	-22.4

## CONCLUSION

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	41151240753	Date:	03/23/2014
Customer:	Microsoft Corporation	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	31.2%
Customer Project:	None	Bar. Pressure:	1023.9 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-3

**TEST SPECIFICATIONS**

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

**TEST PARAMETERS**

Run #:	22	Line:	High Line	Ext. Attenuation (dB):	20
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**COMMENTS**

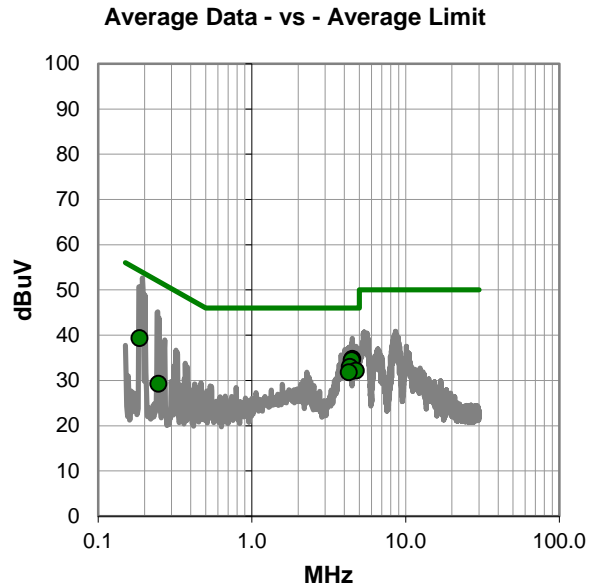
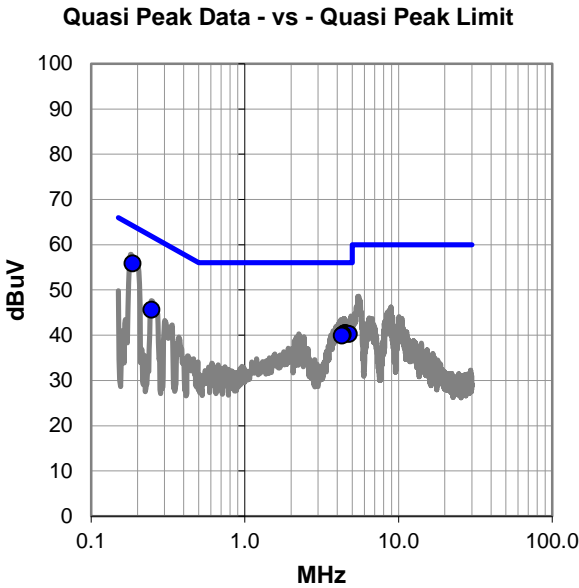
None

**EUT OPERATING MODES**

Tx Ch.6 2437MHz 802.11(b) 1Mbps Chain B

**DEVIATIONS FROM TEST STANDARD**

None



## RESULTS - Run #22

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.186	36.1	19.7	55.8	64.2	-8.4
4.500	20.9	19.6	40.5	56.0	-15.5
4.468	20.8	19.6	40.4	56.0	-15.6
4.764	20.7	19.6	40.3	56.0	-15.7
4.340	20.5	19.6	40.1	56.0	-15.9
4.280	20.3	19.6	39.9	56.0	-16.1
0.247	25.9	19.7	45.6	61.9	-16.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.500	15.2	19.6	34.8	46.0	-11.2
4.468	14.9	19.6	34.5	46.0	-11.5
4.340	13.4	19.6	33.0	46.0	-13.0
4.764	12.6	19.6	32.2	46.0	-13.8
4.280	12.2	19.6	31.8	46.0	-14.2
0.186	19.6	19.7	39.3	54.2	-14.9
0.247	9.5	19.7	29.2	51.9	-22.6

## CONCLUSION

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	41151240753	Date:	03/23/2014
Customer:	Microsoft Corporation	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	31.2%
Customer Project:	None	Bar. Pressure:	1023.9 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-3

**TEST SPECIFICATIONS**

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

**TEST PARAMETERS**

Run #:	23	Line:	High Line	Ext. Attenuation (dB):	20
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**COMMENTS**

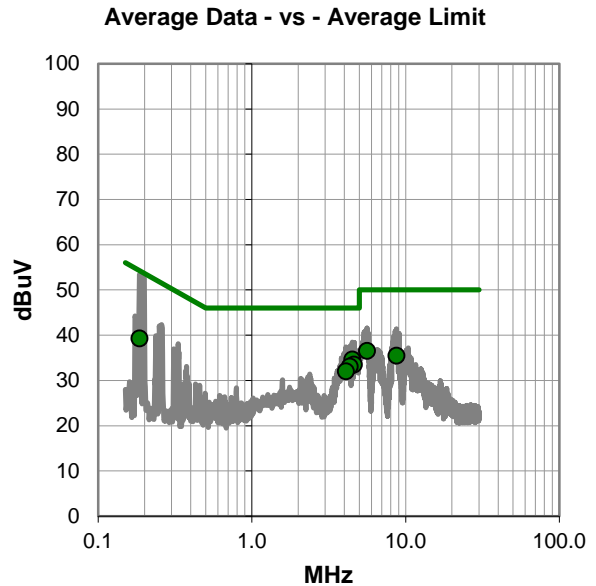
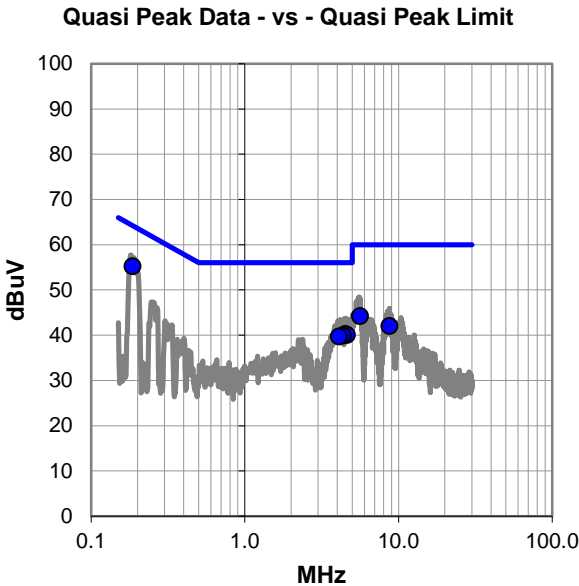
None

**EUT OPERATING MODES**

Tx Ch.11 2462MHz 802.11(b) 1Mbps Chain B

**DEVIATIONS FROM TEST STANDARD**

None



## RESULTS - Run #23

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.186	35.5	19.7	55.2	64.2	-9.0
4.500	20.7	19.6	40.3	56.0	-15.7
5.610	24.7	19.5	44.2	60.0	-15.8
4.628	20.5	19.6	40.1	56.0	-15.9
4.340	20.3	19.6	39.9	56.0	-16.1
4.096	20.1	19.6	39.7	56.0	-16.3
8.742	22.5	19.5	42.0	60.0	-18.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.500	15.0	19.6	34.6	46.0	-11.4
4.628	13.9	19.6	33.5	46.0	-12.5
4.340	13.5	19.6	33.1	46.0	-12.9
5.610	17.0	19.5	36.5	50.0	-13.5
4.096	12.4	19.6	32.0	46.0	-14.0
8.742	15.9	19.5	35.4	50.0	-14.6
0.186	19.5	19.7	39.2	54.2	-15.0

## CONCLUSION

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	41151240753	Date:	03/23/2014
Customer:	Microsoft Corporation	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	31.2%
Customer Project:	None	Bar. Pressure:	1023.9 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-3

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

## TEST PARAMETERS

Run #:	24	Line:	Neutral	Ext. Attenuation (dB):	20
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## COMMENTS

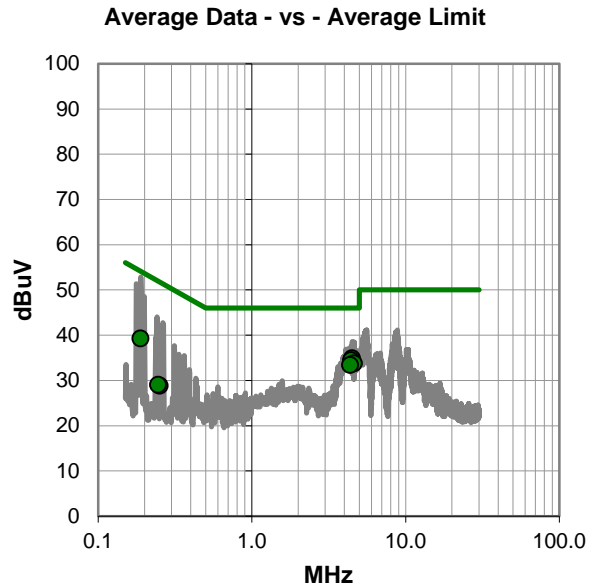
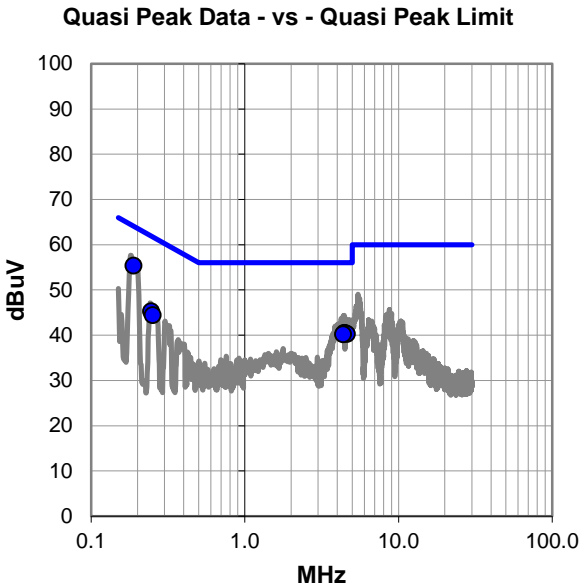
None

## EUT OPERATING MODES

Tx Ch.11 2462MHz 802.11(b) 1Mbps Chain B

## DEVIATIONS FROM TEST STANDARD

None





## RESULTS - Run #24

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.189	35.6	19.7	55.3	64.1	-8.7
4.432	20.9	19.6	40.5	56.0	-15.5
4.496	20.9	19.6	40.5	56.0	-15.5
4.624	20.7	19.6	40.3	56.0	-15.7
4.368	20.6	19.6	40.2	56.0	-15.8
0.246	25.5	19.7	45.2	61.9	-16.6
0.252	24.7	19.8	44.5	61.7	-17.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.496	15.3	19.6	34.9	46.0	-11.1
4.432	14.9	19.6	34.5	46.0	-11.5
4.624	14.2	19.6	33.8	46.0	-12.2
4.368	13.8	19.6	33.4	46.0	-12.6
0.189	19.5	19.7	39.2	54.1	-14.8
0.252	9.1	19.8	28.9	51.7	-22.8
0.246	9.3	19.7	29.0	51.9	-22.8

## CONCLUSION

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	41151240753	Date:	03/23/2014
Customer:	Microsoft Corporation	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	31.2%
Customer Project:	None	Bar. Pressure:	1023.9 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-3

**TEST SPECIFICATIONS**

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

**TEST PARAMETERS**

Run #:	25	Line:	Neutral	Ext. Attenuation (dB):	20
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**COMMENTS**

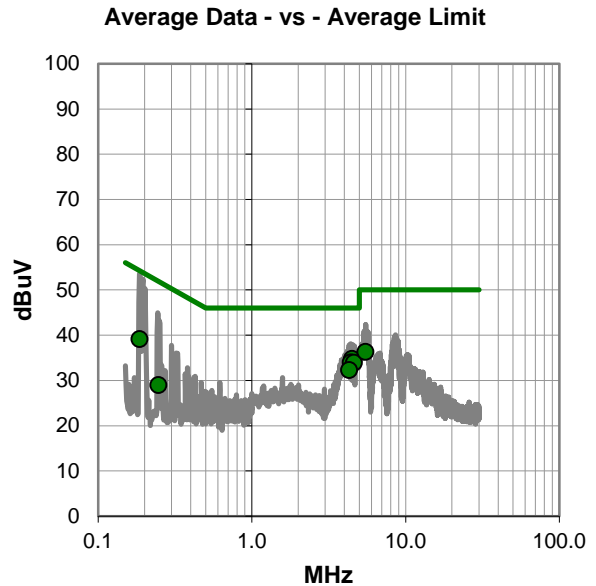
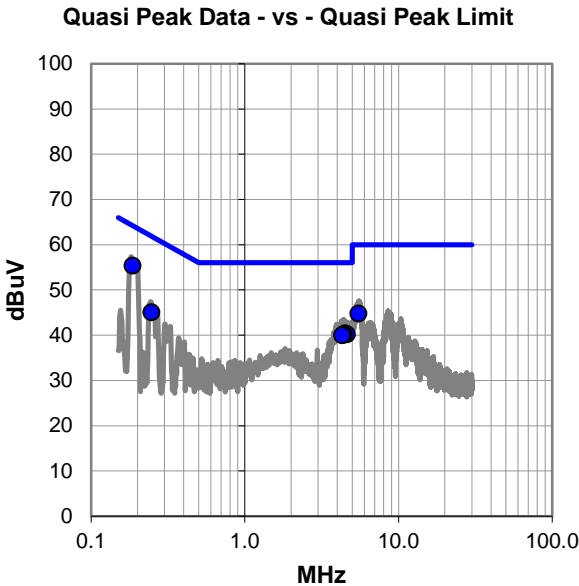
None

**EUT OPERATING MODES**

Tx Ch.149 5745MHz 802.11(a) 6Mbps Chain B

**DEVIATIONS FROM TEST STANDARD**

None



## RESULTS - Run #25

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.186	35.6	19.7	55.3	64.2	-8.9
5.500	25.2	19.5	44.7	60.0	-15.3
4.496	20.8	19.6	40.4	56.0	-15.6
4.624	20.6	19.6	40.2	56.0	-15.8
4.396	20.5	19.6	40.1	56.0	-15.9
4.308	20.4	19.6	40.0	56.0	-16.0
0.247	25.3	19.7	45.0	61.9	-16.8

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.496	15.2	19.6	34.8	46.0	-11.2
4.396	14.4	19.6	34.0	46.0	-12.0
4.624	14.3	19.6	33.9	46.0	-12.1
5.500	16.8	19.5	36.3	50.0	-13.7
4.308	12.7	19.6	32.3	46.0	-13.7
0.186	19.4	19.7	39.1	54.2	-15.1
0.247	9.2	19.7	28.9	51.9	-22.9

## CONCLUSION

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	41151240753	Date:	03/23/2014
Customer:	Microsoft Corporation	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	31.2%
Customer Project:	None	Bar. Pressure:	1023.9 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-3

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

## TEST PARAMETERS

Run #:	26	Line:	High Line	Ext. Attenuation (dB):	20
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## COMMENTS

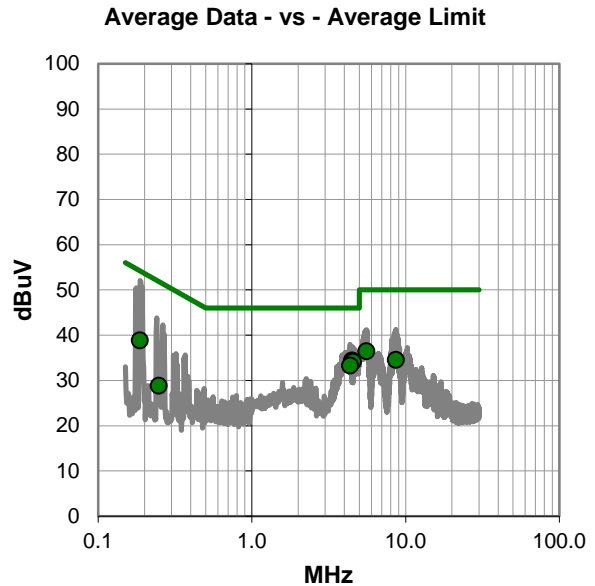
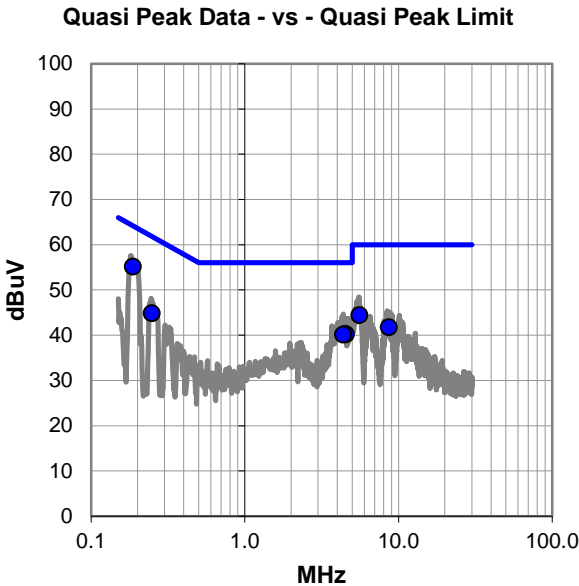
None

## EUT OPERATING MODES

Tx Ch.149 5745MHz 802.11(a) 6Mbps Chain B

## DEVIATIONS FROM TEST STANDARD

None



## RESULTS - Run #26

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.187	35.4	19.7	55.1	64.2	-9.0
5.568	24.9	19.5	44.4	60.0	-15.6
4.492	20.7	19.6	40.3	56.0	-15.7
4.560	20.6	19.6	40.2	56.0	-15.8
4.368	20.5	19.6	40.1	56.0	-15.9
0.248	25.1	19.7	44.8	61.8	-17.0
8.654	22.2	19.5	41.7	60.0	-18.3

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.492	14.8	19.6	34.4	46.0	-11.6
4.560	14.5	19.6	34.1	46.0	-11.9
4.368	13.7	19.6	33.3	46.0	-12.7
5.568	16.9	19.5	36.4	50.0	-13.6
0.187	19.1	19.7	38.8	54.2	-15.3
8.654	15.0	19.5	34.5	50.0	-15.5
0.248	9.1	19.7	28.8	51.8	-23.0

## CONCLUSION

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	41151240753	Date:	03/23/2014
Customer:	Microsoft Corporation	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	31.2%
Customer Project:	None	Bar. Pressure:	1023.9 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-3

**TEST SPECIFICATIONS**

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

**TEST PARAMETERS**

Run #:	27	Line:	High Line	Ext. Attenuation (dB):	20
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**COMMENTS**

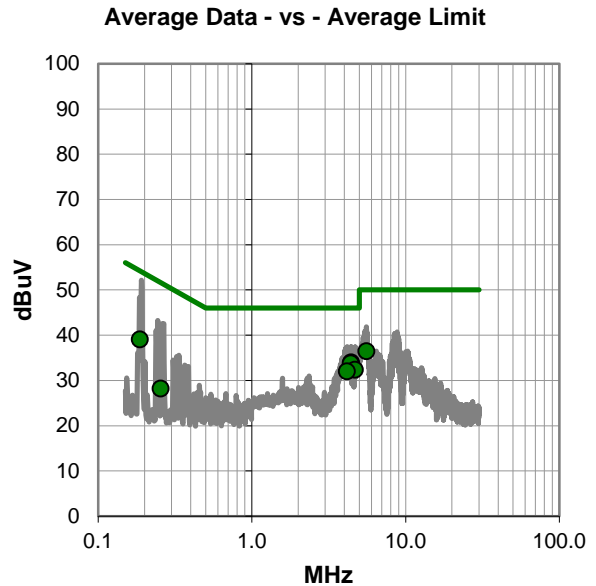
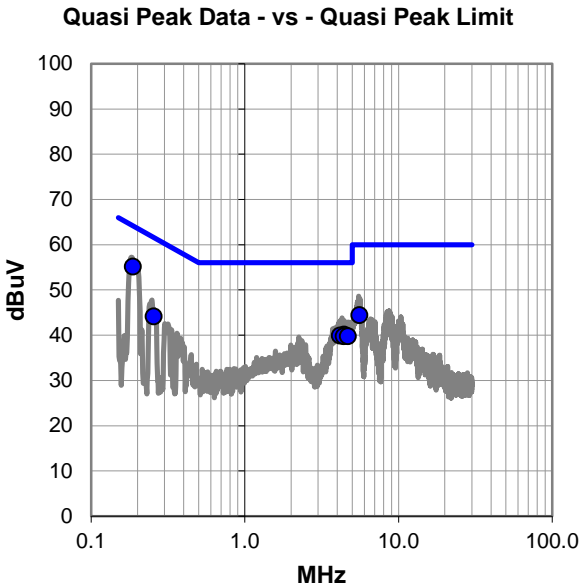
None

**EUT OPERATING MODES**

Tx Ch.157 5785MHz 802.11(a) 6Mbps Chain B

**DEVIATIONS FROM TEST STANDARD**

None



## RESULTS - Run #27

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.187	35.4	19.7	55.1	64.2	-9.0
5.568	24.9	19.5	44.4	60.0	-15.6
4.428	20.5	19.6	40.1	56.0	-15.9
4.156	20.3	19.6	39.9	56.0	-16.1
4.396	20.2	19.6	39.8	56.0	-16.2
4.688	20.2	19.6	39.8	56.0	-16.2
0.255	24.4	19.8	44.2	61.6	-17.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.428	14.4	19.6	34.0	46.0	-12.0
4.396	14.2	19.6	33.8	46.0	-12.2
5.568	16.9	19.5	36.4	50.0	-13.6
4.688	12.8	19.6	32.4	46.0	-13.6
4.156	12.4	19.6	32.0	46.0	-14.0
0.187	19.3	19.7	39.0	54.2	-15.1
0.255	8.4	19.8	28.2	51.6	-23.4

## CONCLUSION

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	41151240753	Date:	03/23/2014
Customer:	Microsoft Corporation	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	31.2%
Customer Project:	None	Bar. Pressure:	1023.9 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-3

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

## TEST PARAMETERS

Run #:	28	Line:	Neutral	Ext. Attenuation (dB):	20
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## COMMENTS

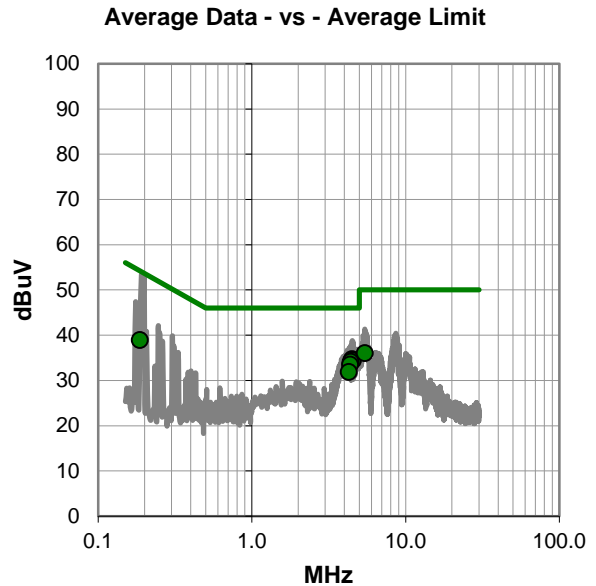
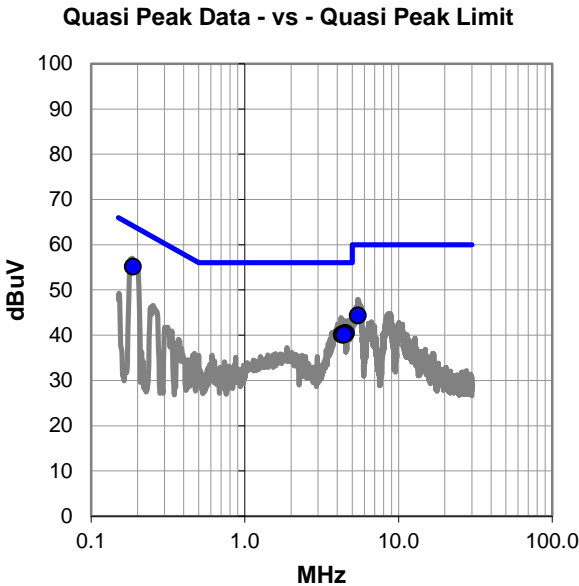
None

## EUT OPERATING MODES

Tx Ch.157 5785MHz 802.11(a) 6Mbps Chain B

## DEVIATIONS FROM TEST STANDARD

None





**RESULTS - Run #28**

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.187	35.4	19.7	55.1	64.2	-9.0
4.496	20.9	19.6	40.5	56.0	-15.5
4.556	20.8	19.6	40.4	56.0	-15.6
5.430	24.8	19.5	44.3	60.0	-15.7
4.368	20.7	19.6	40.3	56.0	-15.7
4.276	20.5	19.6	40.1	56.0	-15.9
4.396	20.5	19.6	40.1	56.0	-15.9

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.496	15.1	19.6	34.7	46.0	-11.3
4.556	14.8	19.6	34.4	46.0	-11.6
4.396	14.5	19.6	34.1	46.0	-11.9
4.368	13.9	19.6	33.5	46.0	-12.5
5.430	16.5	19.5	36.0	50.0	-14.0
4.276	12.3	19.6	31.9	46.0	-14.1
0.187	19.2	19.7	38.9	54.2	-15.2

**CONCLUSION**

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	41151240753	Date:	03/23/2014
Customer:	Microsoft Corporation	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	31.2%
Customer Project:	None	Bar. Pressure:	1023.9 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-3

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

## TEST PARAMETERS

Run #:	29	Line:	Neutral	Ext. Attenuation (dB):	20
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## COMMENTS

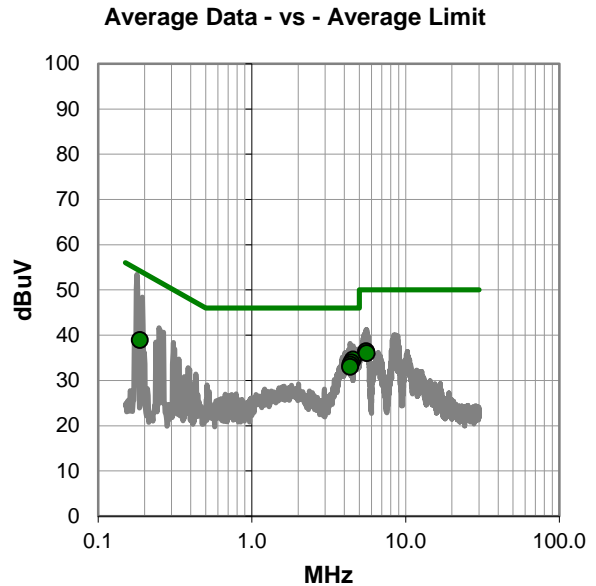
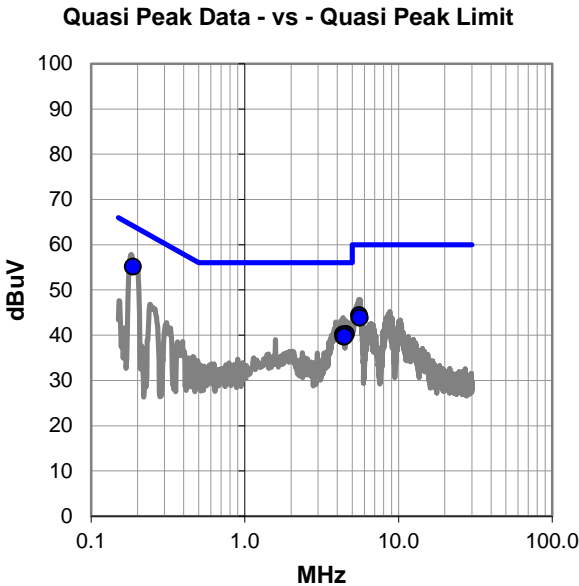
None

## EUT OPERATING MODES

Tx Ch.165 5825MHz 802.11(a) 6Mbps Chain B

## DEVIATIONS FROM TEST STANDARD

None



## RESULTS - Run #29

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.187	35.4	19.7	55.1	64.2	-9.0
5.536	24.9	19.5	44.4	60.0	-15.6
4.556	20.7	19.6	40.3	56.0	-15.7
4.368	20.6	19.6	40.2	56.0	-15.8
5.590	24.3	19.5	43.8	60.0	-16.2
4.392	20.1	19.6	39.7	56.0	-16.3
4.456	20.1	19.6	39.7	56.0	-16.3

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.556	15.0	19.6	34.6	46.0	-11.4
4.456	14.4	19.6	34.0	46.0	-12.0
4.392	13.9	19.6	33.5	46.0	-12.5
4.368	13.4	19.6	33.0	46.0	-13.0
5.536	16.9	19.5	36.4	50.0	-13.6
5.590	16.5	19.5	36.0	50.0	-14.0
0.187	19.2	19.7	38.9	54.2	-15.2

## CONCLUSION

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	41151240753	Date:	03/23/2014
Customer:	Microsoft Corporation	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	31.2%
Customer Project:	None	Bar. Pressure:	1023.9 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-3

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

## TEST PARAMETERS

Run #:	30	Line:	High Line	Ext. Attenuation (dB):	20
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## COMMENTS

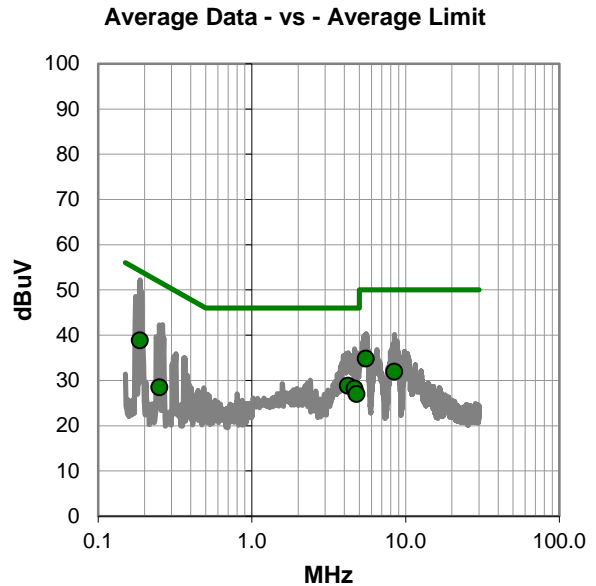
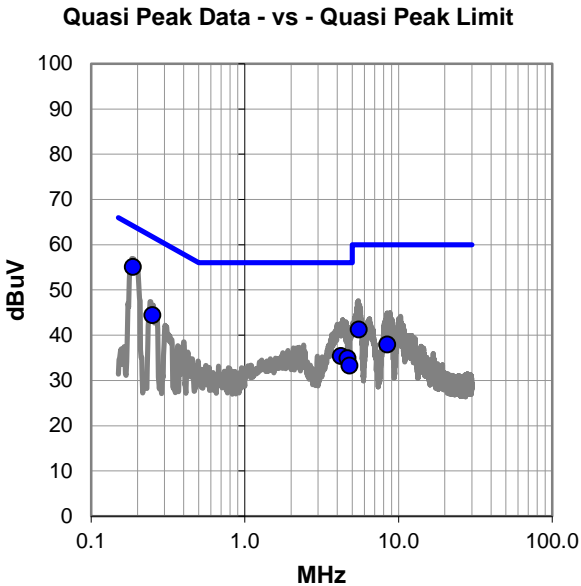
None

## EUT OPERATING MODES

Tx Ch.165 5825MHz 802.11(a) 6Mbps Chain B

## DEVIATIONS FROM TEST STANDARD

None



## RESULTS - Run #30

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.187	35.3	19.7	55.0	64.2	-9.1
0.250	24.7	19.8	44.5	61.8	-17.3
5.528	21.7	19.5	41.2	60.0	-18.8
4.216	15.8	19.6	35.4	56.0	-20.6
4.664	15.3	19.6	34.9	56.0	-21.1
8.448	18.4	19.6	38.0	60.0	-22.0
4.804	13.7	19.6	33.3	56.0	-22.7

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
5.528	15.3	19.5	34.8	50.0	-15.2
0.187	19.1	19.7	38.8	54.2	-15.3
4.216	9.2	19.6	28.8	46.0	-17.2
4.664	8.6	19.6	28.2	46.0	-17.8
8.448	12.4	19.6	32.0	50.0	-18.0
4.804	7.4	19.6	27.0	46.0	-19.0
0.250	8.7	19.8	28.5	51.8	-23.3

## CONCLUSION

Pass



Tested By

## TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50 Ω measuring port is terminated by a 50 Ω EMI meter or a 50 Ω resistive load. All 50 Ω measuring ports of the LISN are terminated by 50Ω.

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
LISN	Solar	9252-50-R-24-BNC	LIP	02/16/2014	12 mo
Attenuator	Fairview Microwave	SA6B10W-20	RKA	10/24/2013	12 mo
EV07 Cables	N/A	Conducted Cables	EVG	03/07/2014	12 mo
High Pass Filter	TTE	H97-100K-50-720B	HHD	01/22/2014	12 mo
Receiver	Rohde & Schwarz	ESCI	ARH	02/05/2014	12 mo

## MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.94 dB	-2.94 dB

## CONFIGURATIONS INVESTIGATED

MCSO1698-6

## MODES INVESTIGATED

Tx, Channel 1/5 2422MHz 802.11(n) MCS0 Chain B  
 Tx, Channel 4/8 2437MHz 802.11(n) MCS0 Chain B  
 Tx, Channel 7/11 2452MHz 802.11(n) MCS0 Chain B

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	006840341053	Date:	04/15/2014
Customer:	Microsoft Corporation	Temperature:	22°C
Attendees:	None	Relative Humidity:	31.6%
Customer Project:	None	Bar. Pressure:	1018 mb
Tested By:	Jared Ison	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-6

**TEST SPECIFICATIONS**

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

**TEST PARAMETERS**

Run #:	1	Line:	Neutral	Ext. Attenuation (dB):	20
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**COMMENTS**

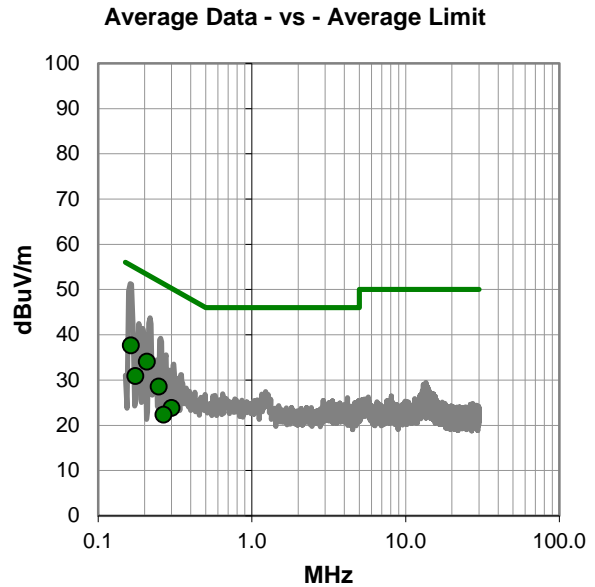
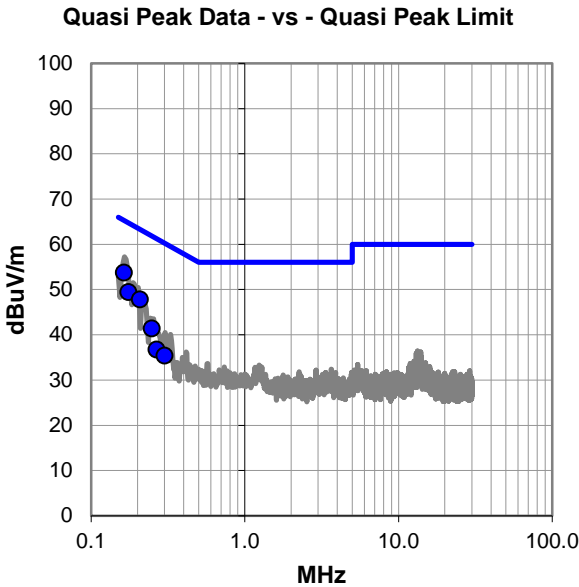
None

**EUT OPERATING MODES**

Tx, Channel 1/5 2422MHz 802.11(n) MCS0 Chain B

**DEVIATIONS FROM TEST STANDARD**

None



## RESULTS - Run #1

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
0.163	34.0	19.7	53.7	65.3	-11.6
0.175	29.7	19.7	49.4	64.7	-15.3
0.208	28.1	19.7	47.8	63.3	-15.5
0.248	21.6	19.7	41.3	61.8	-20.5
0.267	17.0	19.8	36.8	61.2	-24.4
0.301	15.6	19.8	35.4	60.2	-24.8

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
0.163	17.9	19.7	37.6	55.3	-17.7
0.208	14.3	19.7	34.0	53.3	-19.3
0.248	8.8	19.7	28.5	51.8	-23.3
0.175	11.1	19.7	30.8	54.7	-23.9
0.301	4.0	19.8	23.8	50.2	-26.4
0.267	2.6	19.8	22.4	51.2	-28.8

## CONCLUSION

Pass



Tested By



EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	006840341053	Date:	04/15/2014
Customer:	Microsoft Corporation	Temperature:	22°C
Attendees:	None	Relative Humidity:	31.6%
Customer Project:	None	Bar. Pressure:	1018 mb
Tested By:	Jared Ison	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-6

**TEST SPECIFICATIONS**

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

**TEST PARAMETERS**

Run #:	2	Line:	High Line	Ext. Attenuation (dB):	20
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**COMMENTS**

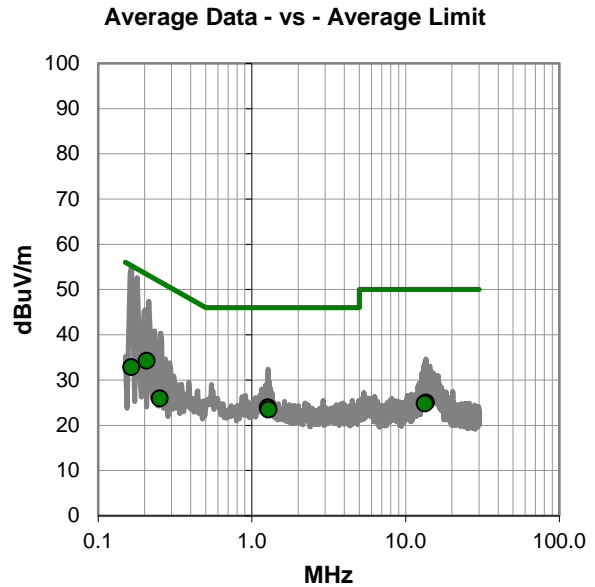
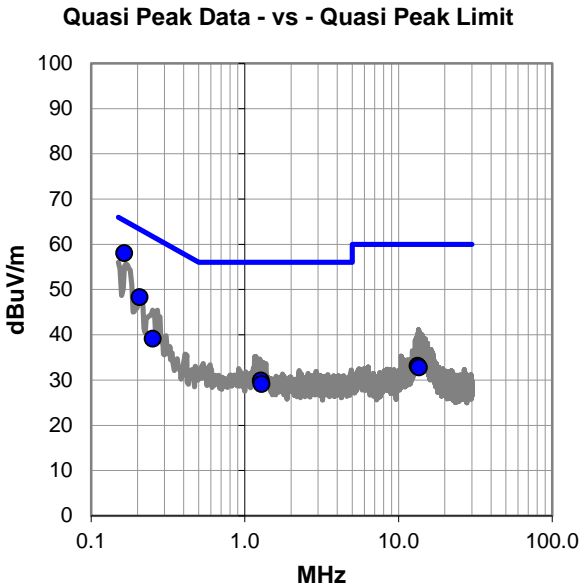
None

**EUT OPERATING MODES**

Tx, Channel 1/5 2422MHz 802.11(n) MCS0 Chain B

**DEVIATIONS FROM TEST STANDARD**

None



## RESULTS - Run #2

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
0.164	38.3	19.7	58.0	65.2	-7.2
0.207	28.6	19.7	48.3	63.3	-15.0
0.251	19.4	19.8	39.2	61.7	-22.6
1.272	10.2	19.7	29.9	56.0	-26.1
13.304	13.6	19.5	33.1	60.0	-26.9
1.286	9.4	19.7	29.1	56.0	-26.9
13.592	13.3	19.5	32.8	60.0	-27.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
0.207	14.5	19.7	34.2	53.3	-19.1
1.272	4.3	19.7	24.0	46.0	-22.0
0.164	13.1	19.7	32.8	55.2	-22.4
1.286	3.8	19.7	23.5	46.0	-22.5
13.592	5.5	19.5	25.0	50.0	-25.0
13.304	5.3	19.5	24.8	50.0	-25.2
0.251	6.2	19.8	26.0	51.7	-25.8

## CONCLUSION

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	006840341053	Date:	04/15/2014
Customer:	Microsoft Corporation	Temperature:	22°C
Attendees:	None	Relative Humidity:	31.6%
Customer Project:	None	Bar. Pressure:	1018 mb
Tested By:	Jared Ison	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-6

**TEST SPECIFICATIONS**

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

**TEST PARAMETERS**

Run #:	3	Line:	Neutral	Ext. Attenuation (dB):	20
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**COMMENTS**

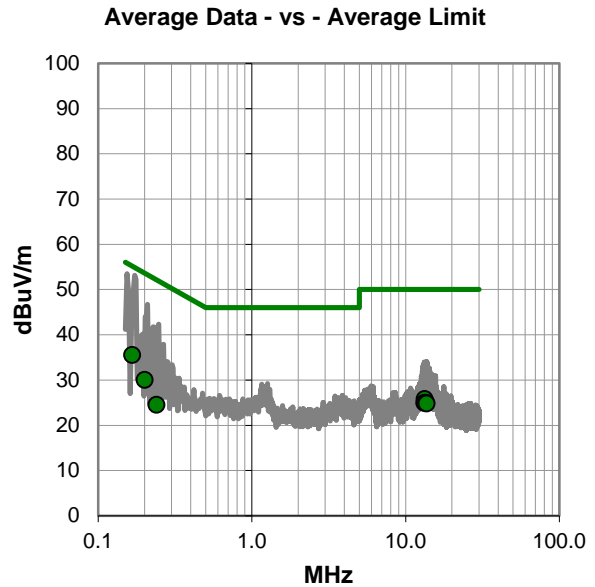
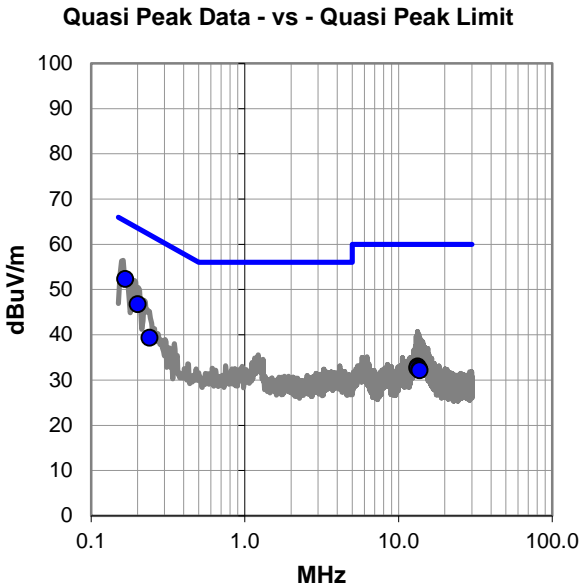
None

**EUT OPERATING MODES**

Tx, Channel 4/8 2437MHz 802.11(n) MCS0 Chain B

**DEVIATIONS FROM TEST STANDARD**

None



## RESULTS - Run #3

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
0.167	32.6	19.7	52.3	65.1	-12.8
0.201	27.0	19.7	46.7	63.6	-16.8
0.240	19.6	19.7	39.3	62.1	-22.7
13.352	13.5	19.5	33.0	60.0	-27.0
13.238	13.1	19.5	32.6	60.0	-27.4
13.680	12.9	19.5	32.4	60.0	-27.6
13.721	12.6	19.5	32.1	60.0	-27.9

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
0.167	15.8	19.7	35.5	55.1	-19.6
0.201	10.3	19.7	30.0	53.6	-23.5
13.352	6.3	19.5	25.8	50.0	-24.2
13.238	5.4	19.5	24.9	50.0	-25.1
13.680	5.4	19.5	24.9	50.0	-25.1
13.721	5.3	19.5	24.8	50.0	-25.2
0.240	4.8	19.7	24.5	52.1	-27.5

## CONCLUSION

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	006840341053	Date:	04/15/2014
Customer:	Microsoft Corporation	Temperature:	22°C
Attendees:	None	Relative Humidity:	31.6%
Customer Project:	None	Bar. Pressure:	1018 mb
Tested By:	Jared Ison	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-6

**TEST SPECIFICATIONS**

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

**TEST PARAMETERS**

Run #:	4	Line:	High Line	Ext. Attenuation (dB):	20
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**COMMENTS**

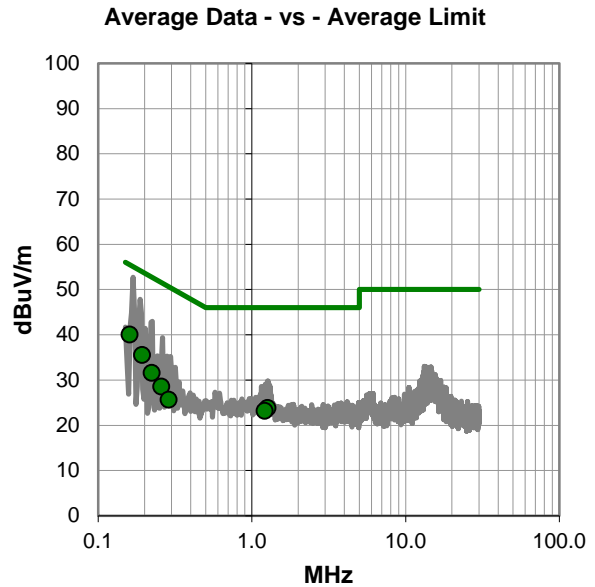
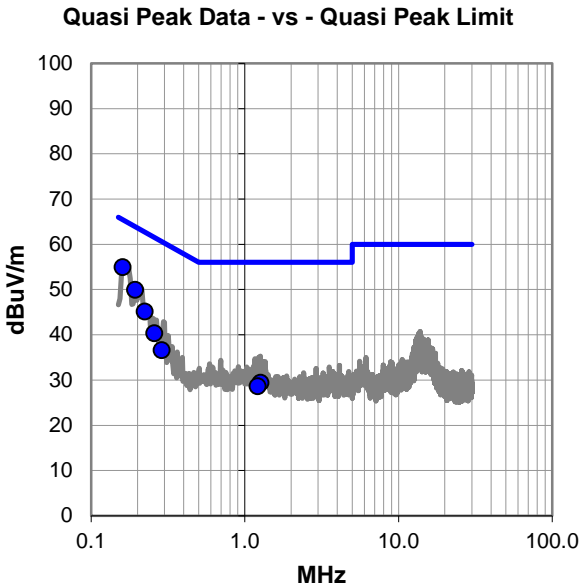
None

**EUT OPERATING MODES**

Tx, Channel 4/8 2437MHz 802.11(n) MCS0 Chain B

**DEVIATIONS FROM TEST STANDARD**

None



## RESULTS - Run #4

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
0.160	35.2	19.7	54.9	65.5	-10.5
0.193	30.2	19.7	49.9	63.9	-14.0
0.223	25.4	19.7	45.1	62.7	-17.6
0.258	20.6	19.8	40.4	61.5	-21.1
0.288	16.8	19.8	36.6	60.6	-24.0
1.269	9.7	19.7	29.4	56.0	-26.6
1.214	8.9	19.7	28.6	56.0	-27.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
0.160	20.3	19.7	40.0	55.5	-15.4
0.193	15.8	19.7	35.5	53.9	-18.4
0.223	11.8	19.7	31.5	52.7	-21.2
1.269	4.1	19.7	23.8	46.0	-22.2
1.214	3.5	19.7	23.2	46.0	-22.8
0.258	8.8	19.8	28.6	51.5	-22.9
0.288	5.9	19.8	25.7	50.6	-24.9

## CONCLUSION

Pass



Tested By

EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	006840341053	Date:	04/15/2014
Customer:	Microsoft Corporation	Temperature:	22°C
Attendees:	None	Relative Humidity:	31.6%
Customer Project:	None	Bar. Pressure:	1018 mb
Tested By:	Jared Ison	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-6

**TEST SPECIFICATIONS**

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

**TEST PARAMETERS**

Run #:	5	Line:	Neutral	Ext. Attenuation (dB):	20
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**COMMENTS**

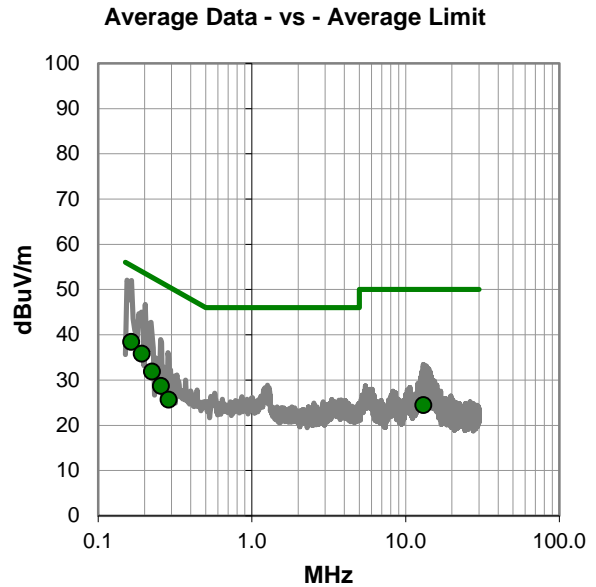
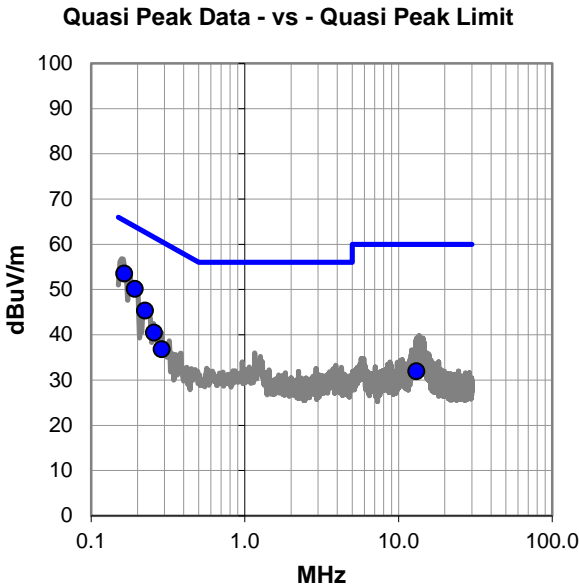
None

**EUT OPERATING MODES**

Tx, Channel 7/11 2452MHz 802.11(n) MCS0 Chain B

**DEVIATIONS FROM TEST STANDARD**

None



## RESULTS - Run #5

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
0.165	33.8	19.7	53.5	65.2	-11.7
0.193	30.4	19.7	50.1	63.9	-13.8
0.224	25.6	19.7	45.3	62.7	-17.3
0.256	20.7	19.8	40.5	61.5	-21.1
0.288	17.0	19.8	36.8	60.6	-23.8
13.046	12.4	19.5	31.9	60.0	-28.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
0.165	18.7	19.7	38.4	55.2	-16.8
0.193	16.1	19.7	35.8	53.9	-18.1
0.224	12.1	19.7	31.8	52.7	-20.8
0.256	8.9	19.8	28.7	51.5	-22.9
0.288	5.9	19.8	25.7	50.6	-24.9
13.046	4.9	19.5	24.4	50.0	-25.6

## CONCLUSION

Pass



Tested By



EUT:	Model 1631	Work Order:	MCSO1698
Serial Number:	006840341053	Date:	04/15/2014
Customer:	Microsoft Corporation	Temperature:	22°C
Attendees:	None	Relative Humidity:	31.6%
Customer Project:	None	Bar. Pressure:	1018 mb
Tested By:	Jared Ison	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	MCSO1698-6

**TEST SPECIFICATIONS**

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

**TEST PARAMETERS**

Run #:	6	Line:	High Line	Ext. Attenuation (dB):	20
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**COMMENTS**

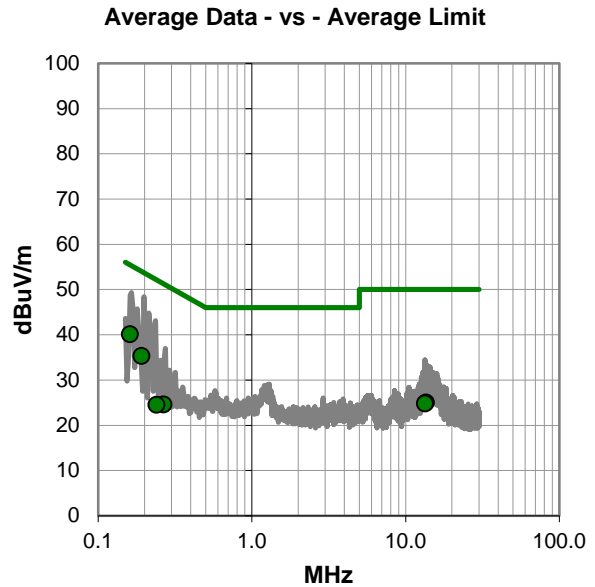
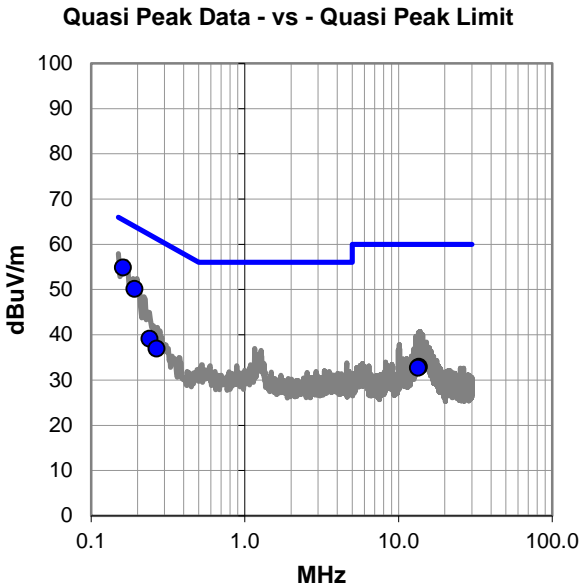
None

**EUT OPERATING MODES**

Tx, Channel 7/11 2452MHz 802.11(n) MCS0 Chain B

**DEVIATIONS FROM TEST STANDARD**

None



## RESULTS - Run #6

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
0.161	35.1	19.7	54.8	65.4	-10.6
0.192	30.4	19.7	50.1	64.0	-13.8
0.240	19.4	19.7	39.1	62.1	-22.9
0.266	17.2	19.8	37.0	61.2	-24.3
13.573	13.4	19.5	32.9	60.0	-27.1
13.379	13.2	19.5	32.7	60.0	-27.3

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
0.161	20.4	19.7	40.1	55.4	-15.3
0.192	15.6	19.7	35.3	54.0	-18.6
13.573	5.5	19.5	25.0	50.0	-25.0
13.379	5.3	19.5	24.8	50.0	-25.2
0.266	4.8	19.8	24.6	51.2	-26.7
0.240	4.8	19.7	24.5	52.1	-27.5

## CONCLUSION

Pass



Tested By