TEST REPORT

Report Number. : 13757234-E11V1

Applicant	:	Magic Leap Inc. 7500 West Sunrise Blvd Plantation, FL, 33322, US
Model	:	M1003000, M1004000, M1005000 M1103000, M1104000, M1105000
Brand	:	Magic Leap Inc.
FCC ID	:	2AM5N-ML2M1
IC	:	23045-ML2M1
EUT Description	:	Magic Leap 2 Compute Pack and Headset
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART E ISED RSS-247 ISSUE 2 ISED RSS-GEN ISSUE 5 + A1+A2

Date Of Issue:
May 18, 2022

Prepared by:
UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 319-4000
FAX: (510) 661-0888

ACCREDITED
CERT #0751.05

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	5/18/2022	Initial Issue	---

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

TABLE OF CONTENTS

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	Magic Leap Inc 7500 West Sunrise Blvd Plantation, FL, 33322, US
EUT DESCRIPTION:	Magic Leap 2 Compute Pack and Headset
BRAND:	Magic Leap Inc.
MODEL:	M1003000, M1004000, M1005000 M1103000, M1104000, M1105000
MODEL TESTED:	M1003000
SERIAL NUMBER:	P552X8E0001R (Conducted), P552X8E0001Q(Radiated & Conducted)
SAMPLE RECEIPT DATE:	AUGUST 10, 2021
DATE TESTED:	October 28, 2021 - February 21, 2022 & April 21 - 26, 2022 May 17, 2022

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5 + A1 + A2	Complies

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

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

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

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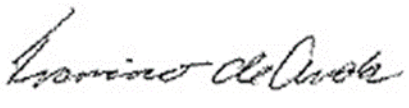
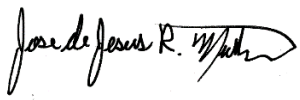
Approved & Released For
UL Verification Services Inc. By:



Francisco de Anda
Staff Engineer
Consumer Technology Division
UL Verification Services Inc.

Prepared By:



Jose Martinez
Test Engineer
Consumer Technology Division
UL Verification Services Inc.

Reviewed By:

Henry Lau
Project Engineer
Consumer Technology Division
UL Verification Services Inc.

2. TEST RESULT SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 12.2.
See Comment	RSS-GEN 6.7	26dB BW/99% OBW	Reporting purposes only	Per ANSI C63.10 Sections 6.9.2 and 6.9.3
15.407 (e)	RSS-247 6.2.4.1	6 dB BW	Complies	None.
15.407 (a) (1-3), (h) (1)	RSS-247 6.2	Output Power	Complies	None.
15.407 (a) (1-3)	RSS-247 6.2	PSD	Complies	None.
15.209, 15.205, 15.407 (b) (1-4)	RSS-GEN 8.9, 8.10, RSS-247 6.2	Radiated Emissions	Complies	None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Complies	None.

For Colocation Test results, please refer to UL Verification Services Inc report number 13757234-E13V1.

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3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with:

- FCC CFR 47 Part 2
- FCC CFR 47 Part 15
- FCC KDB 662911 D01 v02r01
- FCC KDB 905462 D02 v02/D03 v01r02/D06 v02
- FCC KDB 789033 D02 v02r01
- KDB 414788 D01 Radiated Test Site v01r01
- ANSI C63.10-2013
- RSS-GEN Issue 5 + A1 + A2
- RSS-247 Issue 2

The scope of this report covers the 802.11ax modes in the 5GHz band of Models M1003000, M1004000, M1005000, M1103000, M1104000, M1105000.

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, Certificate Number #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building 1: 47173 Benicia Street Fremont, CA 94538, U.S.A	US0104	2324A	550739
☐	Building 2: 47266 Benicia Street Fremont, CA 94538, U.S.A	US0104	22541	550739
☒	Building 4: 47658 Kato Rd Fremont, CA 94538, U.S.A	US0104	2324B	550739

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

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

5.2. DECISION RULES

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

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U_{Lab}
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.84 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB

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

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

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

EUT is a spatial AR computing device consists of compute pack and headset. The compute pack includes BT, BLE, 802.11 a/b/g/n/ac/ax radio transceivers.

6.2. MODEL DIFFERENCES

Models M1003000, M1004000, M1005000, M1103000, M1104000, and M1105000 are electronically identical. The model numbers are to differentiate the markets and regions of sale.

6.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted average output power as follows:

5.2GHz BAND 802.11 ax MODE 1TX

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.2 GHz band, 1TX			
5180-5240	802.11ax HE20 SU OFDM	14.60	28.84
5190-5230	802.11ax HE40 SU OFDM	14.52	28.31
5210	802.11ax HE80 SU OFDM	14.63	29.04
5250	802.11ax HE160 SU OFDM	14.66	29.24

5.2GHz & 5.3GHz BAND 802.11 ax MODE 2TX (FCC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.2 GHz band, 2TX CDD			
5250	802.11ax HE160 SU OFDM	16.06	40.36
	802.11ax HE160 OFDMA, 2x996-Tones	14.39	27.48
	802.11ax HE160 OFDMA, 996-Tones	16.26	42.27
	802.11ax HE160 OFDMA, 106-Tones	16.04	40.18
	802.11ax HE160 OFDMA, 52-Tones	15.38	34.51
	802.11ax HE160 OFDMA, 26-Tones	12.48	17.70

5.2GHz & 5.3GHz BAND 802.11 ax MODE 2TX (IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.2 GHz band, 2TX CDD			
5250	802.11ax HE160 SU OFDM	16.06	40.36
	802.11ax HE160 OFDMA, 2x996-Tones	14.39	27.48
	802.11ax HE160 OFDMA, 996-Tones	16.26	42.27
	802.11ax HE160 OFDMA, 484-Tones	16.43	43.95
	802.11ax HE160 OFDMA, 242-Tones	14.44	27.80
	802.11ax HE160 OFDMA, 106-Tones	11.33	13.58
	802.11ax HE160 OFDMA, 52-Tones	8.41	6.93
	802.11ax HE160 OFDMA, 26-Tones	5.47	3.52

5.3GHz BAND 802.11 ax MODE 1TX

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.3 GHz band, 1TX			
5260-5320	802.11ax HE20 SU OFDM	14.92	31.05
5270-5310	802.11ax HE40 SU OFDM	14.80	30.20
5290	802.11ax HE80 SU OFDM	14.70	29.51

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5.6GHz BAND 802.11 ax MODE 1TX

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.6 GHz band, 1TX			
5500-5720	802.11ax HE20 SU OFDM	14.60	28.84
5510-5710	802.11ax HE40 SU OFDM	14.51	28.25
5530-5690	802.11ax HE80 SU OFDM	14.72	29.65
5570	802.11ax HE160 SU OFDM	14.35	27.23

5.6GHz BAND 802.11 ax MODE 2TX

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.6 GHz band, 2TX CDD			
5500-5720	802.11ax HE20 SU OFDM	15.93	39.17
5700	802.11ax HE20 OFDMA, 242-Tones	14.46	27.93
	802.11ax HE20 OFDMA, 106-Tones	16.31	42.76
	802.11ax HE20 OFDMA, 52-Tones	13.73	23.60
	802.11ax HE20 OFDMA, 26-Tones	11.07	12.79
5510-5710	802.11ax HE40 SU OFDM	16.16	41.30
5710	802.11ax HE40 OFDMA, 484-Tones	15.97	39.54
	802.11ax HE40 OFDMA, 106-Tones	15.94	39.26
	802.11ax HE40 OFDMA, 52-Tones	13.67	23.28
	802.11ax HE40 OFDMA, 26-Tones	11.09	12.85
5530-5690	802.11ax HE80 SU OFDM	16.11	40.83
5690	802.11ax HE80 OFDMA, 996-Tones	16.14	41.11
	802.11ax HE80 OFDMA, 106-Tones	16.32	42.85
	802.11ax HE80 OFDMA, 52-Tones	13.97	24.95
	802.11ax HE80 OFDMA, 26-Tones	11.36	13.68
5570	802.11ax HE160 SU OFDM	15.82	38.19
	802.11ax HE160 OFDMA, 2x996-Tones	13.34	21.58
	802.11ax HE160 OFDMA, 996-Tones	13.44	22.08
	802.11ax HE160 OFDMA, 484-Tones	13.96	24.89
	802.11ax HE160 OFDMA, 242-Tones	15.43	34.91
	802.11ax HE160 OFDMA, 106-Tones	15.43	34.91
	802.11ax HE160 OFDMA, 52-Tones	13.28	21.28
	802.11ax HE160 OFDMA, 26-Tones	11.65	14.62

5.8GHz BAND 802.11 ax MODE 1TX

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.8 GHz band, 1TX			
5745-5825	802.11ax HE20 SU OFDM	14.65	29.17
5755-5795	802.11ax HE40 SU OFDM	14.02	25.23
5775	802.11ax HE80 SU OFDM	14.54	28.44

5.8GHz BAND 802.11 ax MODE 2TX

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.8 GHz band, 2TX CDD			
5825	802.11ax HE20 SU OFDM	Covered by 802.11ax HE20 OFDMA 2Tx	
	802.11ax HE20 OFDMA, 242-Tones	16.30	42.66
	802.11ax HE20 OFDMA, 26-Tones	16.16	41.30
5775	802.11ax HE80 SU OFDM	Covered by 802.11ax HE80 OFDMA 2Tx	
	802.11ax HE80 OFDMA, 996-Tones	16.12	40.93
	802.11ax HE80 OFDMA, 26-Tones	16.35	43.15

6.4. DESCRIPTION OF AVAILABLE ANTENNAS

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

The radio utilizes two Dual Band PCB Printed antennas, with a maximum gain as below table:

Frequency (MHz)	Peak Antenna Gain (dBi)	
	Antenna 1	Antenna 2
5150-5250	3.3	2.5
5250-5350	3.3	2.9
5500-5725	3.5	4.5
5725-5850	3.9	4.5

Note
Chain 0 = Antenna 1
Chain 1 = Antenna 2

6.5. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version PEQ3B.

For OFDM Mode
The test utility software used during testing was ML Connectivity Test Tool v012 & v005.

For OFDMA Mode
The test utility software used during testing was Qualcomm Radio Control Toolkit V4.0, Version: 4.0.00194.0.

6.6. WORST-CASE CONFIGURATION AND MODE

WORST-CASE CONFIGURATION AND MODE FOR FINAL TEST

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.

For SISO (Antenna 1), the fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that **Y** orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

For SISO (Antenna 2), the fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that **X** orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

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

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

802.11ax HE20mode: MCS0
802.11ax HE40mode: MCS0
802.11ax HE80mode: MCS0
802.11ax HE160mode: MCS0

6.7. TEST REDUCTIONS CASES;

As per manufacturer specification all RU Index within a tone are the same power.
All tones are the same power across bandwidths.
1Tx OFDMA mode is the same power as 2Tx OFDMA mode.

6dB bandwidth:

- For OFDMA, the narrowest (26T) tone was tested as worst case.
- For all tones with multiple RU indexes, each Low, Mid, High RU allocation is tested to their respective Low, Mid and High channel.

Output Power & Power spectral density:

- For all tones with multiple RU indexes, each Low, Mid, High RU allocation is tested to their respective Low, Mid and High channel.

For 5.2 and 5.3 GHz band

- For OFDMA, HE20/HE40/HE80 26T, 52T, 106T, 242T, 484T, & 996T are the same power as HE160 26T, 52T, 106T, 242T, 484T, 996T therefore tones 2x996T, 996T, 106T, 52T, 26T at HE160 were tested to cover HE20/HE40/HE80.
- HE20, HE40 and HE80 OFDM SU 2Tx mode is covered by respective full tones 242T. 484T, and 996T in HE160 as they are same power
- For FCC, 484T and 242T is same power as 106T therefore PSD is leveraged from 106T as worst case.

For 5.6GHz band

- For OFDMA, HE20/HE40/HE80 26T, 52T, 106T, 242T, 484T, & 996T are the same power as HE160 26T, 52T, 106T, 242T, 484T, 996T therefore all tones at HE160 were tested to cover HE20/HE40/HE80 for low and mid channel
    - HE20/HE40 at channels 5700, .and 5670 was tested to cover the high channel side
    - Because HE20/HE40 HE80 26T, 52T, 106T, 242T, 484T are the same power as HE80 26T, 52T, 106T, 242T, 484T, HE80 at channel 5690 was tested to cover the straddle channel of 5720 and 5710.

For 5.8GHz band

- For OFDMA, HE20/HE40 26T, 52T, 106T, 242T, and 484T are the same power as HE80 26T, 52T, 106T, 242T, & 484T, therefore 996T and 26T at HE80 were tested to cover HE20/HE40 for low and mid channel
    - 26T is worst case psd therefore covers all other tones at all bandwidths.
    - HE20 at channel 5825 cover the high channel side
- OFDM SU Mode 2Tx is covered by OFDMA 996T mode as they are same power.

Radiated band edge:

- For all band edges, OFDMA mode full tones is worst case than the OFDM SU mode
- The RU allocations closest to the band edge was tested to cover all other RU allocations.

For 5.2 and 5.3 GHz band

- After preliminary evaluation, HE160 was determined to be worst case with all final testing performed on this bandwidth to cover all other bandwidths HE20, HE40, and HE80.
- For IC
    - For 26T, 52T, 106T & 242T, RBE passed at higher power than specified in the Output power and PSD section.
    - For 484T, 996T and 2*996T, RBE passed at same power specified in the Output power and PSD section.
- For FCC
    - For 26T & 52T, RBE passed at higher power than specified in the Output power and PSD section.
    - For 106T, 242T, 484T, 996T & 2*996T, RBE passed at same power specified in the Output power and PSD section.
- HE20, HE40 and HE80 OFDM SU mode is covered by respective full tones 242T. 484T, and 996T in HE160 as they are same power

For 5.6 GHz band

- After preliminary evaluation, HE160 was determined to be worst case with all final testing performed on this bandwidth to cover all other bandwidths HE20, HE40, and HE80 at low and mid channel excluding the following bandwidth/tones
    - 11ax HE80 996T for low edge
    - 11ax HE80 484T for low edge
- For high side, channels 140 and 134 were tested at HE20 and HE40 respectively.
- The RU allocations closest to the band edge was tested to cover all other RU allocations.
- For 26T & 52T, RBE passed at higher power than specified in the Output power and PSD section.
- For 106T, 242T, 484T, 996T & 2*996T, RBE passed at same power specified in the Output power and PSD section.

For 5.8 GHz band

- After preliminary evaluation, HE80 was determined to be worst case with all final testing performed on this bandwidth to cover all other bandwidths HE20 & HE40 at low and mid channel.
- For high side, channels 165 was tested at HE20 to cover high side.
- The RU allocations closest to the band edge was tested to cover all other RU allocations.
- For for all tones, RBE passed at higher power than specified in the Output power and PSD section.
- OFDM SU Mode is covered by OFDMA mode as they are same power.

Radiated spurious emissions

For 5.2 and 5.3 GHz band

- The narrowest (26T) and widest (2*996T) tones were tested for OFDMA mode at the highest SISO power as worst case.

For 5.6 band

- For the narrowest (26T) tone at HE160, RSE passed at higher power than specified in the Output power and PSD section as worst case for the low and mid channel.
- For the widest (2*996T) at HE160, RSE passed at same power specified in the Output power and PSD section.
- The narrowest (26T), widest for HE20 (242T) & widest for HE40(484T) tones were tested for OFDMA mode at the highest SISO power for the high channel

For 5.8 band

- The narrowest (26T) and widest (996T) tones were tested for OFDMA mode at the highest SISO power for HE80 for the Low and mid channel at 2Tx as worst case
- The narrowest (26T) & widest for HE20 (242T) tones were tested for OFDMA mode at the highest SISO power for the high channel at 2Tx as worst case.

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6.8. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID/ DoC**
Laptop (Radiated)	HP	EliteBook 840 G3	5CG6253DNC	DoC
Laptop AC Adapter (Radiated)	HP	709986-003	WDHKR0AAR8U467	DoC
Charger	Magic Leap	M3013	E135498	DoC
Laptop (Conducted)	HP	EliteBook 840 G4	5CG7515YRN	DoC
Laptop AC Adapter (Conducted)	HP	PPP012D-S	WDHKR0AAR8U467	DoC

I/O CABLES (CONDUCTED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC Power	1	AC (3-prong)	Un-shielded	1.25	AC Mains to DC Power Adapter
2	DC	1	3-pin	Un-shielded	1	Power Adapter to laptop
3	USB-C	1	USB Type C	Shielded	0.9	USB-C to EUT USB-C
4	Antenna	1	SMA	Un-shielded	.5	EUT to Coupler
5	A/V, Data	1	Permanent	Shielded	1.25	EUT to headset

I/O CABLES (RADIATED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC Power	1	AC (2-prong)	Un-shielded	1.25	AC Mains to Power Adapter
2	USB-C	1	USB Type C	Shielded	0.9	Power Adapter to EUT
3	A/V Data	1	Permanent	Shielded	1.25	EUT to headset

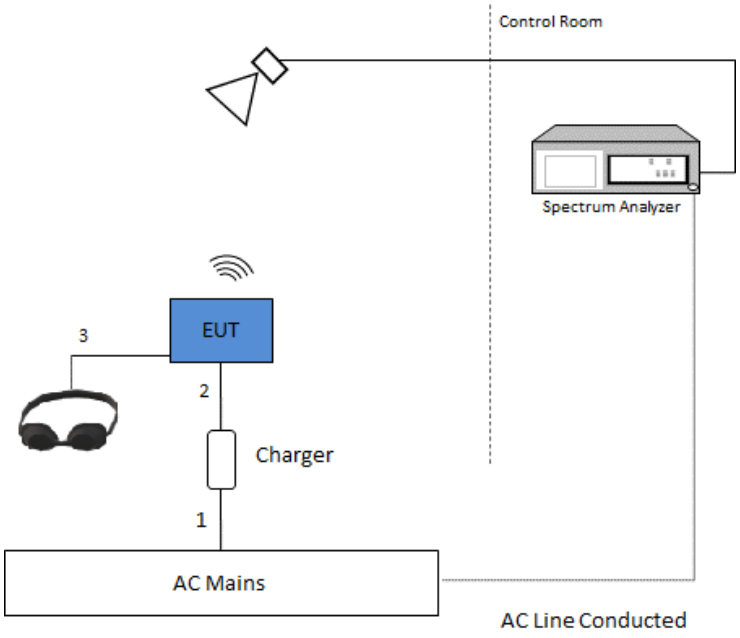
TEST SETUP

A test laptop is used to program the EUTs and then removed during radiated tests. Test software exercised the radio card. For radiated emissions, EUT was powered by AC/DC adapter and for conducted tests the EUT was connected to laptop via USB.

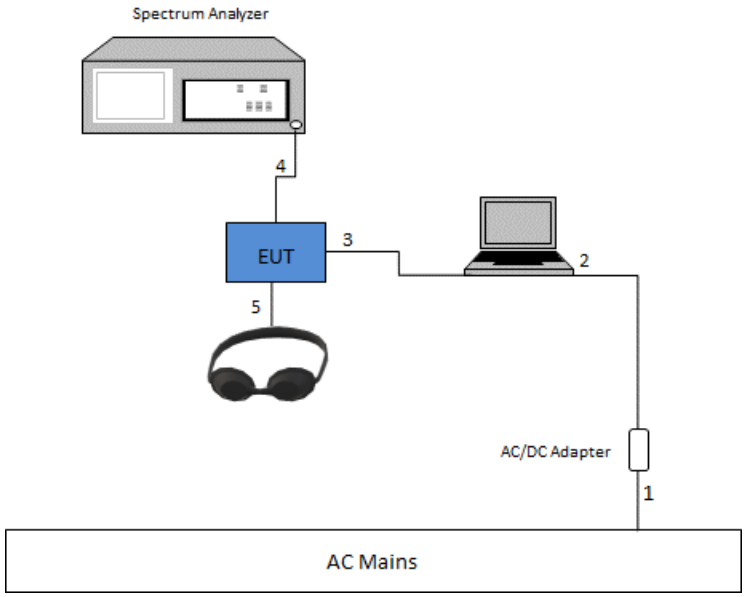
The computer pack and headset are permanently connected.

SETUP DIAGRAMS

Radiated Configuration



Conducted Configuration



7. MEASUREMENT METHOD

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

6 dB Emission BW: KDB 789033 D02 v02r01, Section C.2

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

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

Conducted Output Power: KDB 789033 D02 v02r01, Section E.3.b (Method PM-G) and KDB 789033 D02 v02r01, Section E.2.b (Method SA-1)

Power Spectral Density: KDB 789033 D02 v02r01, Section F

Unwanted emissions in restricted bands: KDB 789033 D02 v02r01, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v02r01, Sections G.3, G.4, and G.5.

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

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

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47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

8. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST (8/28/2021 – 2/21/2022)					
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**	**Last Cal**
Antenna, BroadBand Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB1	82258	10/01/2022	10/01/2021
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	29654	02/08/2023	02/08/2022
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	169927	02/16/2023	02/16/2022
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	T119	05/07/2022	05/07/2021
Amplifier, 1 - 18GHz	MITEQ	AFS42-00101800-25-S-42	T1568	04/09/2022	04/09/2021
EMI TEST RECEIVER, with B8 option	Rohde & Schwarz	ESW44	PRE0179377	02/23/2022	02/23/2021
EMI TEST RECEIVER, with B8 option	Rohde & Schwarz	ESW44	PRE0179377	02/20/2023	02/20/2022
Antenna, Horn 18 to 26.5GHz	A.R.A.	MWH-1826/B	81139	05/25/2022	05/25/2021
Rf Amplifier, 18-26.5GHz, 60dB gain	AMPLICAL	AMP18G26.5-60	171590	05/21/2022	05/21/2021
Antenna, Horn 26.5 to 40GHz	A.R.A.	MWH-2640/B	81105	05/25/2022	05/25/2021
Rf Amplifier, 26-40GHz, 60dB gain	AMPLICAL	AMP26G40-60	171591	05/21/2022	05/21/2021
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	SC-8015	05/24/2022	05/24/2021
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO METRICS	EM-6872	SC-8014	05/24/2022	05/24/2021
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	80396	02/01/2023	02/01/2022
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	80397	01/28/2022*	01/28/2021
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	T1269	01/25/2022*	01/25/2021
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	90719	01/24/2023	01/24/2022
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	T1223	06/17/2022	06/17/2021
AC Line Conducted					
LISN	Fischer Custom Communications, Inc	FCC-LISN-50/250-25-2-01-480V	175765	01/23/2023	01/23/2022
EMI TEST RECEIVER	Rohde & Schwarz	ESR	93091	02/21/2023	02/21/2022
Transient Limiter	TE	TBFL1	207996	06/01/2022	06/01/2021
UL TEST SOFTWARE LIST					
Radiated Software	UL	UL EMC	Rev 9.5, Jan 03, 2020		
Antenna Port Software	UL	UL RF	2021.10.27, 2021.10.13, 2021.12.17,		
AC Line Conducted Software	UL	UL EMC	Rev 9.5, 07 Jul 2020		

*Testing was performed within calibration dates.

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TEST EQUIPMENT LIST (4-21-22 to 4-26-22)					
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**	**Last Cal**
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	85214	02/02/2023	02/02/2022
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	200897	02/24/2023	02/24/2022
RF Filter Box	UL-FR1	N/A	PRE0182865	04/13/2023	04/13/2022
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	125188	01/30/2023	01/30/2022
EMI Test Receiver	Rohde & Schwarz	ESW44	169935	02/19/2023	02/19/2022
RF Filter Box	UL-FR1	N/A	PRE0211790	06/15/2022	06/15/2021
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	200784	01/12/2023	01/12/2022
UL TEST SOFTWARE LIST					
Radiated Software	UL	UL EMC	Rev 9.5, Jan 03, 2020		
Antenna Port Software	UL	UL RF	Ver 2021.08.27		

TEST EQUIPMENT LIST (5-17-22)					
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**	**Last Cal**
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	125178	01/24/2023	01/24/2022
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	90733	01/24/2023	01/24/2022
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	90388	01/24/2023	01/24/2022
UL TEST SOFTWARE LIST					
Antenna Port Software	UL	UL RF	Ver 2022.2.17		

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 D01 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11ax HE20 OFDM, SU	5.444	5.462	0.997	99.67%	0.00	0.010
802.11ax HE20 OFDMA, RU size 242T	2.755	2.771	0.994	99.42%	0.00	0.010
802.11ax HE40 OFDM, SU	5.444	5.462	0.997	99.67%	0.00	0.010
802.11ax HE40 OFDMA, RU size 484T	2.755	2.773	0.994	99.35%	0.00	0.010
802.11ax HE80 OFDM, SU	5.444	5.462	0.997	99.67%	0.00	0.010
802.11ax HE80 OFDMA, RU size 996T	1.371	1.388	0.988	98.78%	0.00	0.010
802.11ax HE160 OFDM, SU	5.444	5.459	0.997	99.73%	0.00	0.010
802.11ax HE160 OFDMA, RU size 2x996T	0.724	0.740	0.978	97.80%	0.10	1.382

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