

FCC RADIO TEST REPORT

FCC ID: 2BFDF-ZERO16

Product : Notebook

Trade Mark : THUNDEROBOT

Model Name : ZERO 16 Pro

Family Model : ZERO 16

Report No. : S25052004402005

Issue Date: Jul. 18, 2025

Prepared for

Qingdao THUNDEROBOT Technology Co.,Ltd.

No. 1, Haier Road, Laoshan District, Qingdao.

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.

No. 24 Xinfu East Road, Xiangshan Community, Xinqiao Street, Baoan District,
Shenzhen, Guangdong, People's Republic of China

Tel. 0755-23200050 Website: <http://www.ntek.org.cn>

TEST RESULT CERTIFICATION

Applicant's name Qingdao THUNDEROBOT Technology Co.,Ltd.

Address No. 1, Haier Road, Laoshan District, Qingdao.

Manufacturer's Name Qingdao THUNDEROBOT Technology Co.,Ltd.

Address No. 1, Haier Road, Laoshan District, Qingdao.

Product description

Product name Notebook

Trade Mark THUNDEROBOT

Model and/or type reference ZERO 16 Pro

Family Model..... ZERO 16

Test Sample Number S250520044002

Standards FCC Part 15 Subpart E

Test procedure ANSI C63.10-2013;
KDB 789033 D02 General UNII Test Procedures New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01
KDB 987594 D02 U-NII 6GHz EMC Measurement v01r01

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements/ the Industry Canada requirements.. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests May 21, 2025 ~ Jul. 18, 2025

Date of Issue..... Jul. 18, 2025

Test Result..... **Pass**

Prepared By : Kieron Luo
Kieron Luo
(Project Engineer)

Reviewed By : Aaron Cheng
Aaron Cheng
(Supervisor)

Approved By : Alex Li
Alex Li
(Manager)

Table of Contents

	Page
1 . SUMMARY OF TEST RESULTS	6
1.1 FACILITIES AND ACCREDITATIONS	7
1.2 MEASUREMENT UNCERTAINTY	7
2 . GENERAL INFORMATION	8
2.1 GENERAL DESCRIPTION OF EUT	8
2.2 DESCRIPTION OF TEST MODES	11
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	13
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	14
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	15
3 . TEST REQUIREMENTS	17
3.1 CONDUCTED EMISSION MEASUREMENT	17
3.1.1 APPLICABLE STANDARD	17
3.1.2 CONFORMANCE LIMIT	17
3.1.3 TEST CONFIGURATION	17
3.1.4 TEST PROCEDURE	17
3.1.5 TEST RESULTS	18
3.2 RADIATED EMISSION MEASUREMENT	22
3.2.1 APPLICABLE STANDARD	22
3.2.2 CONFORMANCE LIMIT	22
3.2.3 MEASURING INSTRUMENTS	22
3.2.4 TEST CONFIGURATION	23
3.2.5 TEST PROCEDURE	24
3.2.6 TEST RESULTS (9KHZ – 30 MHZ)	25
3.2.7 TEST RESULTS (30MHZ – 1GHZ)	26
3.2.8 TEST RESULTS (1GHZ-18GHZ)	30
3.2.9 TEST RESULTS (18GHZ-40GHZ)	35
SPURIOUS EMISSION IN BANDEGE	36
3.3 EIRP POWER SPECTRAL DENSITY TEST	40
3.3.1 APPLIED PROCEDURES / LIMIT	40
3.3.2 TEST PROCEDURE	40
3.3.3 DEVIATION FROM STANDARD	41
3.3.4 TEST SETUP	41
3.3.5 EUT OPERATION CONDITIONS	41
3.3.6 TEST RESULTS	42
3.4 26DB & 99% EMISSION BANDWIDTH	43
3.4.1 APPLIED PROCEDURES / LIMIT	43
3.4.2 TEST PROCEDURE	43

Table of Contents

	Page
3.4.3 EUT OPERATION CONDITIONS	44
3.4.4 TEST RESULTS	44
3.5 IN-BAND EMISSIONS	45
3.5.1 APPLIED PROCEDURES / LIMIT	45
3.5.2 TEST PROCEDURE	45
3.5.3 DEVIATION FROM STANDARD	45
3.5.4 TEST SETUP	45
3.5.5 EUT OPERATION CONDITIONS	45
3.5.6 TEST RESULTS	46
3.6 MAXIMUM EIRP OUTPUT POWER	47
3.6.1 PPLIED PROCEDURES / LIMIT	47
3.6.2 TEST PROCEDURE	47
3.6.3 DEVIATION FROM STANDARD	47
3.6.4 TEST SETUP	47
3.6.5 EUT OPERATION CONDITIONS	47
3.6.6 TEST RESULTS	48
3.7 OPERATIONAL RESTRICTIONS FOR 6 GHZ U-NII DEVICES.	49
3.7.1 APPLICABLE STANDARD	49
3.7.2 TEST RESULTS	49
3.8 CONTENTION BASED PROTOCOL	50
3.8.1 LIMIT OF CONTENTION BASED PROTOCOL	50
3.8.2TEST PROCEDURES	51
3.8.3TEST SETUP	52
3.8.4TEST RESULTS	52
3.9 FREQUENCY STABILITY	52
4. ANTENNA REQUIREMENT	52
4.1 STANDARD REQUIREMENT	52
4.2 EUT ANTENNA	52
5. TEST RESULT	52

Revision History

Report No.	Version	Description	Issued Date
S25052004402005	Rev.02	Initial issue of report	Jul. 18, 2025

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.407(b)(9)	AC Power Line Conducted Emissions	PASS	
15.407(b)(6)	Unwanted Emissions	PASS	
15.407(b)(7)	In-Band Emissions	PASS	
2.1049	99% Occupied Bandwidth	PASS	
15.407(a)(10)	26 dB Emission Bandwidth	PASS	
15.407(a)(8)	Maximum E.I.R.P Output Power	PASS	
15.407(a)(8)	E.I.R.P Power Spectral Density	PASS	
15.407(d)(6)	Contention Based Protocol	PASS	
15.407(g)	Frequency Stability	PASS	
15.203	Antenna Requirement	PASS	

1.1 FACILITIES AND ACCREDITATIONS

FACILITIES

All measurement facilities used to collect the measurement data are located at No. 24 Xinfu East Road, Xiangshan Community, Xinqiao Street, Baoan District, Shenzhen, Guangdong, People's Republic of China.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

CNAS-Lab. : The Certificate Registration Number is L5516.

IC-Registration : The Certificate Registration Number is 9270A.
CAB identifier:CN0074

FCC- Accredited : Test Firm Registration Number: 463705.
Designation Number: CN1184

A2LA-Lab. : The Certificate Registration Number is 4298.01

Name of Firm : Shenzhen NTEK Testing Technology Co., Ltd.

Site Location : No. 24 Xinfu East Road, Xiangshan Community, Xinqiao Street, Baoan District, Shenzhen, Guangdong, People's Republic of China.

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 2.80\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(30MHz~1GHz)	$\pm 2.64\text{dB}$
5	All emissions, radiated(1GHz~6GHz)	$\pm 2.40\text{dB}$
6	All emissions, radiated(> 6GHz)	$\pm 2.52\text{dB}$
7	Temperature	$\pm 0.5^{\circ}\text{C}$
8	Humidity	$\pm 2\%$

2. GENERAL INFORMATION**2.1 GENERAL DESCRIPTION OF EUT**

Equipment	Notebook	
Trade Mark	THUNDEROBOT	
Model Name	ZERO 16 Pro	
Family Model	ZERO 16	
Model Difference	All models are the same antenna and RF module, except for model names and main board. ZERO 16 Pro with A55B1_MB main board while ZERO 16 with R55B2C_MB main board.	
FCC ID	2BFDF-ZERO16	
Product Description	IEEE 802.11 WLAN Mode Supported	☒ 802.11ax (20MHz channel bandwidth); ☒ 802.11ax (40MHz channel bandwidth); ☒ 802.11ax (80MHz channel bandwidth); ☒ 802.11ax (160MHz channel bandwidth);
	Modulation	OFDMA (QPSK/BPSK/16QAM/64QAM/256QAM)
	Operating Frequency Range	☒ 5955-7115MHz for 802.11ax(20MHz); ☒ 5965-7085MHz for 802.11ax(40MHz); ☒ 5985-7025MHz for 802.11ax(80MHz); ☒ 6025-6985MHz for 802.11ax(160MHz);
	Number of Channels	☒ 59 channels for ax 20; ☒ 29 channels for ax 40; ☒ 14 channels for ax 80; ☒ 7 channels for ax 160;
	Function:	☐ Low-power Dual Client ☐ Low-power Indoor Access Point ☐ Subordinate Indoor Device ☒ Low-power Indoor Client ☐ Standard Power Access Point ☐ Standard Client ☐ Fixed Client
	Smart system	☒ MIMO for 802.11ax
	Antenna Type	PIFA Antenna
	Antenna Gain	Antenna 1: 4.9dBi; Antenna 2: 4.81dBi
	Based on the application, features, or specification exhibited in User's Manual, More details of EUT technical specification, please refer to the User's Manual.	
	The EUT is categorized as an Low-power Indoor Client (6XD) operating in the 5.925-7.125 GHz band. It will only operate under the control of a Low-power Indoor (LPI) access point (6ID).	
Ratings	DC 15.56V from battery or DC 20V or DC 19.5V from adapter	
Adapter1	Model: A621-2001400W-B31 Input: 100-240V~50/60Hz 4.0A Output: 20V---14A 280.0W	
Adapter2	Model: A775-195B80W-B31 Input: 100-240V~50/60Hz 3.0A Output: 19.5V---11.8A 230.1W	
Battery	DC 15.56V, 4924mAh, 76.62Wh	
Connecting I/O Port(s)	Please refer to the User's Manual	
HW Version	A55B1_MB, R55B2C_MB	
SW Version	Windows 11	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- 2.

20MHz					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5955	81	6355	161	6755
5	5975	85	6375	165	6775
9	5995	89	6395	169	6795
13	6015	93	6415	173	6815
17	6035	97	6435	177	6835
21	6055	101	6455	181	6855
25	6075	105	6475	185	6875
29	6095	109	6495	189	6895
33	6115	113	6515	193	6915
37	6135	117	6535	197	6935
41	6155	121	6555	201	6955
45	6175	125	6575	205	6975
49	6195	129	6595	209	6995
53	6215	133	6615	213	7015
57	6235	137	6635	217	7035
61	6255	141	6655	221	7055
65	6275	145	6675	225	7075
69	6295	149	6695	229	7095
73	6315	153	6715	233	7115
77	6335	157	6735		

40MHz					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	5965	83	6365	163	6765
11	6005	91	6405	171	6805
19	6045	99	6445	179	6845
27	6085	107	6485	187	6885
35	6125	115	6525	195	6925
43	6165	123	6565	203	6965
51	6205	131	6605	211	7005
59	6245	139	6645	219	7045
67	6285	147	6685	227	7085
75	6325	155	6725		

80MHz					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
7	5985	87	6385	167	6785
23	6065	103	6465	183	6865
39	6145	119	6545	199	6945
55	6225	135	6625	215	7025
71	6305	151	6705		

160MHz					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
15	6025	111	6505	207	6985
47	6185	143	6665		
79	6345	175	6825		

- 1). CH111, CH115, CH119, CH175, CH185, CH187, CH183 is straddle channels.

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Normal Link Mode
Mode 2	802.11ax 20 CH1/ CH45/ CH 93/ CH97/ CH105/ CH 113/ CH117/ CH149/ CH 181/ CH185/ CH189/ CH 209/ CH233 For SISO&MIMO
Mode 3	802.11ax 40 CH3/ CH 43/ CH 91/ CH99/ CH 107/ CH 115/ CH123/ CH 147/ CH 179/ CH187/ CH 195/ CH 211/ CH227 For SISO&MIMO
Mode 4	802.11ax 80 CH 7/ CH 39/ CH 87/ CH 103/ CH 119/ CH 135/ CH 151/ CH 167/ CH 183/ CH 199/ CH 215 For SISO&MIMO
Mode 5	802.11ax 160 CH 15/ CH 47/ CH 79/ CH 111/ CH 143/ CH 175/ CH 207 For SISO&MIMO

For Radiated Emission	
Final Test Mode	Description
Mode 1	Normal Link Mode
Mode 2	802.11ax 20 CH1/ CH45/ CH 93/ CH97/ CH105/ CH 113/ CH117/ CH149/ CH 181/ CH185/ CH189/ CH 209/ CH233 For SISO&MIMO
Mode 3	802.11ax 40 CH3/ CH 43/ CH 91/ CH99/ CH 107/ CH 115/ CH123/ CH 147/ CH 179/ CH187/ CH 195/ CH 211/ CH227 For SISO&MIMO
Mode 4	802.11ax 80 CH 7/ CH 39/ CH 87/ CH 103/ CH 119/ CH 135/ CH 151/ CH 167/ CH 183/ CH 199/ CH 215 For SISO&MIMO
Mode 5	802.11ax 160 CH 15/ CH 47/ CH 79/ CH 111/ CH 143/ CH 175/ CH 207 For SISO&MIMO

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported
- (3) In ax mode, RU allocation is not supported and it is a full carrier. Only the HE SU PPDU format operational mode.
- (4) CH111, CH115, CH119, CH175, CH185, CH187, CH183 is straddle channels.

The EUT support MIMO modes, transmit mode what describe as following:

Mode	Tx / Rx
802.11ax (20MHz,40MHz,80MHz,160MHz)	2TX, 2RX

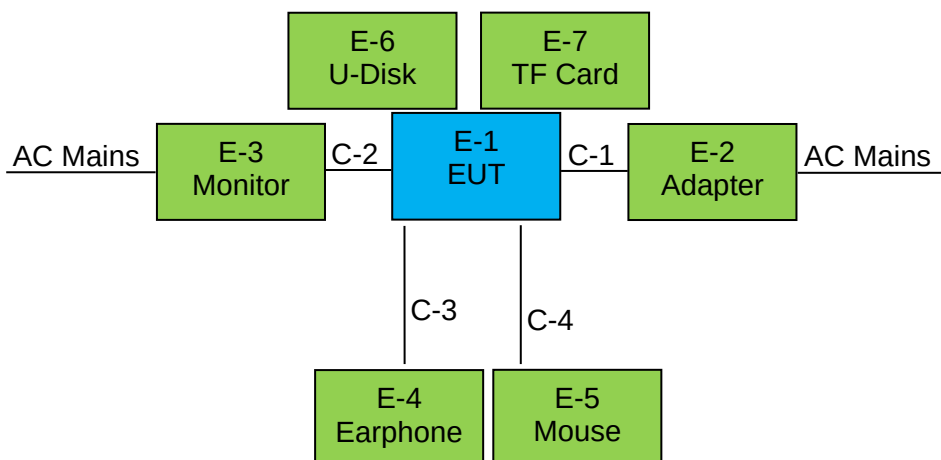
For 6GHz band, 802.11ax(20/40/80/160) has MIMO mode, Antenna 1,2 are simultaneous transmissions.
Note: Most devices can operate with one spatial stream ($NSS = 1$, where NSS is the number of spatial streams) even if they also are capable of more spatial streams. The worst case directional gain will occur when $NSS = 1$; therefore, it is especially important to ensure that the device complies with all emission limits for the case of $NSS = 1$ (or with the lowest possible value of NSS , if the device always uses spatial multiplexing).

Note:

1. There are a total of two motherboards, namely A55B1_MB motherboard and A55B1_MB motherboard. Both motherboards have undergone testing and evaluation. But the report will only show the worst data.
2. 802.11ax only support full RU.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

For AC Conducted Emission Mode



For Radiated Test Cases

AE-1
EUT

For Conducted Test Cases



Note: 1. The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

2. EUT built-in battery-powered, the battery is fully-charged.

2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Manufacturer	Model/Type No.	Series No.	Note
E-1	Notebook	Qingdao THUNDERBOT Technology Co.,Ltd.	ZERO 16 Pro	N/A	EUT
			ZERO 16	N/A	
E-2	Adapter	Dongguan Aohai Technology Co., Ltd.	A621-2001400W-B31	N/A	Peripherals
E-2	Adapter	Dongguan Aohai Technology Co., Ltd.	A775-195B80W-B31	N/A	Peripherals
E-3	Monitor	PHIIPS	32PFF6899/T3	N/A	Peripherals
E-4	Earphone	N/A	N/A	N/A	Peripherals
E-5	Mouse	DELL	MS116c	N/A	Peripherals
E-6	U-Disk	SONY	SF-8C4	MMCTF08GWA CA-MM	Peripherals
E-7	TF Card	Kingston	CO8G	N/A	Peripherals

Item	Cable Type	Shielded Type	Ferrite Core	Length
C-1	Power Cable	YES	NO	1.1m
C-2	HDMI Cable	YES	YES	1.2m
C-3	Audio cable	NO	NO	0.8m
C-4	USB Cable	NO	NO	0.8m
C-5	RF Cable	YES	NO	0.1m

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation& Conducted Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4440A	MY41000130	2025.04.24	2026.04.23	1 year
2	Spectrum Analyzer	Agilent	N9020A	MY49100060	2025.04.17	2026.04.16	1 year
3	Spectrum Analyzer	R&S	FSV40	101417	2025.04.17	2026.04.16	1 year
4	Test Receiver	R&S	ESPI7	101318	2025.04.17	2026.04.16	1 year
5	Bilog Antenna	TESEQ	CBL6111D	31216	2025.05.11	2026.05.10	1 year
6	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2024.04.26	2027.04.25	3 year
7	Horn Antenna	EM	EM-AH-10180	2011071402	2024.05.12	2027.05.11	3 year
8	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	803	2024.05.12	2027.05.11	3 year
9	Amplifier	EMC	EMC051835SE	980246	2025.04.17	2026.04.16	1 year
10	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	055	2024.05.17	2027.05.16	3 year
11	Power Meter	MWRFTest	MW100-PD	MW2021043	2024.12.15	2025.12.14	1 year
12	Test Cable (9KHz-30MHz)	N/A	R-01	N/A	2023.05.06	2026.05.05	3 year
13	Test Cable (30MHz-1GHz)	N/A	R-02	N/A	2023.05.06	2026.05.05	3 year
14	High Test Cable(1G-40GHz)	N/A	R-03	N/A	2023.05.06	2026.05.05	3 year
15	Filter	TRILTHIC	2400MHz	29	2024.04.26	2027.04.25	3 year
16	temporary antenna connector (Note)	NTS	R001	N/A	N/A	N/A	N/A

Note:

We will use the temporary antenna connector (soldered on the PCB board) When conducted test
And this temporary antenna connector is listed within the instrument list

AC Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2024.04.26 2025.04.17	2025.04.25 2026.04.16	1 year
2	LISN	R&S	ENV216	101313	2024.04.25 2025.04.17	2025.04.24 2026.04.16	1 year
3	LISN	SCHWARZBECK	NNLK 8129	8129245	2024.04.25 2025.04.17	2025.04.24 2026.04.16	1 year
4	50Ω Coaxial Switch	ANRITSU CORP	MP59B	6200983704	2024.04.26	2027.04.25	3 year
5	Test Cable (9KHz-30MHz)	N/A	C01	N/A	2023.05.06	2026.05.05	3 year
6	Test Cable (9KHz-30MHz)	N/A	C02	N/A	2023.05.06	2026.05.05	3 year
7	Test Cable (9KHz-30MHz)	N/A	C03	N/A	2023.05.06	2026.05.05	3 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable& Aux Equipment which is scheduled for calibration every 3 years.

Measurement Software

Item	Manufacturer	Software Name	Software Version	Description
1	MWRFTest	MTS 8310 2.4GHz/5GHz	2.0	RF Conducted Test
2	Farad	EZ-EMC_RE	AIT-03A	RadiatedTest
3	Farad	EZ-EMC_CE	AIT-03A	AC Conducted Test

3. TEST REQUIREMENTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 APPLICABLE STANDARD

According to FCC Part 15.207(a)

3.1.2 CONFORMANCE LIMIT

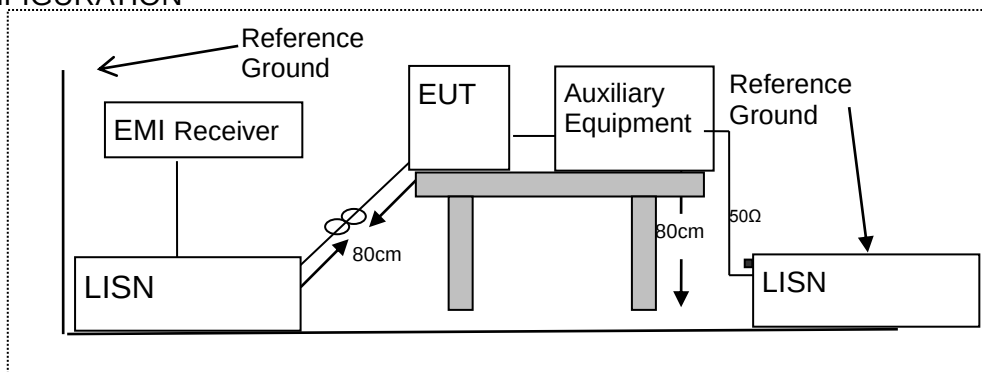
Frequency(MHz)	Conducted Emission Limit	
	Quasi-peak	Average
0.15-0.5	66-56*	56-46*
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. *Decreases with the logarithm of the frequency

2. The lower limit shall apply at the transition frequencies

3. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3.1.3 TEST CONFIGURATION



3.1.4 TEST PROCEDURE

According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room.
2. The EUT was placed on a table which is 0.8m above ground plane.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
4. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40cm long.
5. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
6. LISN at least 80 cm from nearest part of EUT chassis.
7. The frequency range from 150KHz to 30MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth(IF bandwidth=9KHz) with Maximum Hold Mode
9. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.5 TEST RESULTS

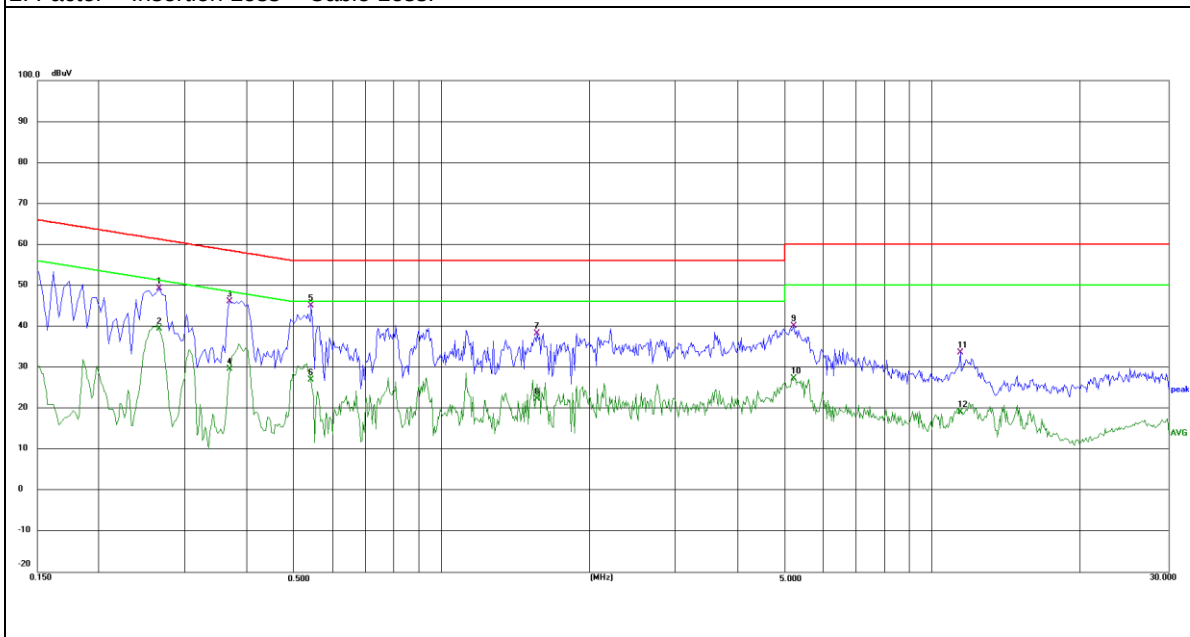
EUT :	Notebook	Model Name :	ZERO 16 Pro
Temperature :	24℃	Relative Humidity :	46%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 20V from Adapter AC 120V/60Hz	Test Mode :	Mode 1

Adapter1:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.2660	39.06	10.19	49.25	61.24	-11.99	QP
0.2660	29.22	10.19	39.41	51.24	-11.83	AVG
0.3700	35.61	10.43	46.04	58.50	-12.46	QP
0.3700	19.21	10.43	29.64	48.50	-18.86	AVG
0.5420	34.31	10.81	45.12	56.00	-10.88	QP
0.5420	16.15	10.81	26.96	46.00	-19.04	AVG
1.5660	25.34	12.96	38.30	56.00	-17.70	QP
1.5660	9.39	12.96	22.35	46.00	-23.65	AVG
5.2100	30.22	9.92	40.14	60.00	-19.86	QP
5.2100	17.44	9.92	27.36	50.00	-22.64	AVG
11.3740	23.43	10.10	33.53	60.00	-26.47	QP
11.3740	9.01	10.10	19.11	50.00	-30.89	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



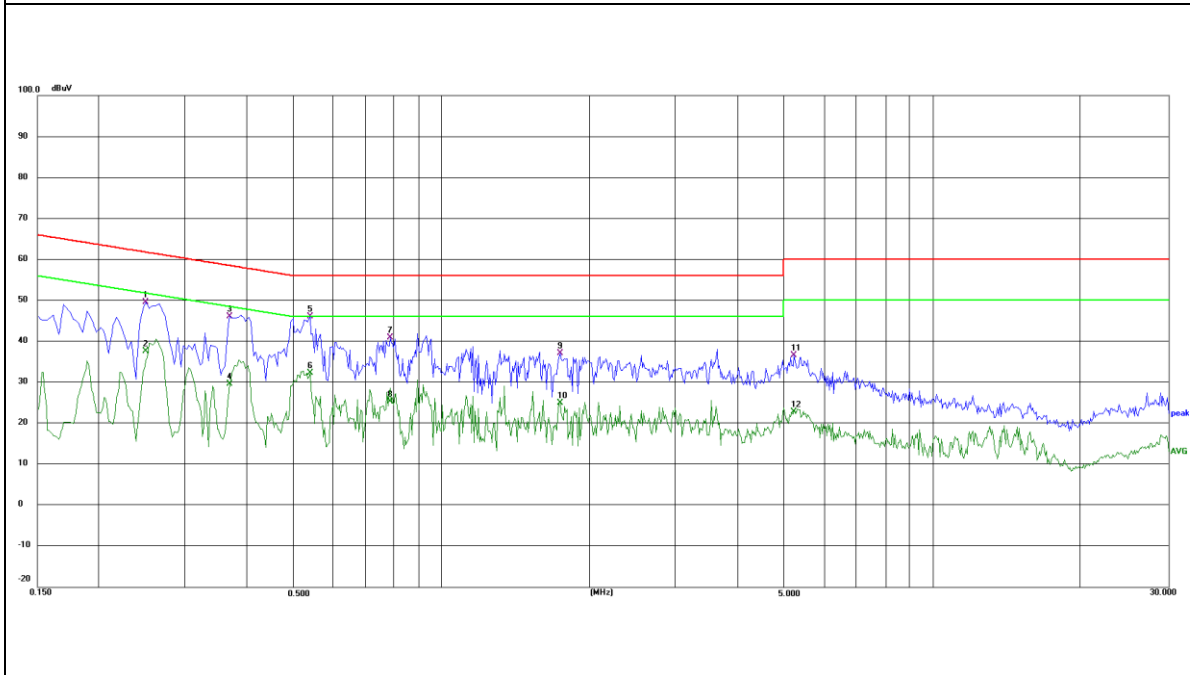
Note: The test report records only the worst-case test values.

EUT :	Notebook	Model Name :	ZERO 16 Pro
Temperature :	24°C	Relative Humidity :	46%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 20V from Adapter AC 120V/60Hz	Test Mode :	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.2500	39.40	10.18	49.58	61.76	-12.18	QP
0.2500	27.34	10.18	37.52	51.76	-14.24	AVG
0.3700	35.71	10.43	46.14	58.50	-12.36	QP
0.3700	19.11	10.43	29.54	48.50	-18.96	AVG
0.5380	35.28	10.78	46.06	56.00	-9.94	QP
0.5380	21.41	10.78	32.19	46.00	-13.81	AVG
0.7860	29.58	11.29	40.87	56.00	-15.13	QP
0.7860	14.04	11.29	25.33	46.00	-20.67	AVG
1.7420	23.94	13.22	37.16	56.00	-18.84	QP
1.7420	11.81	13.22	25.03	46.00	-20.97	AVG
5.2140	26.73	9.81	36.54	60.00	-23.46	QP
5.2140	13.06	9.81	22.87	50.00	-27.13	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



Note: The test report records only the worst-case test values.

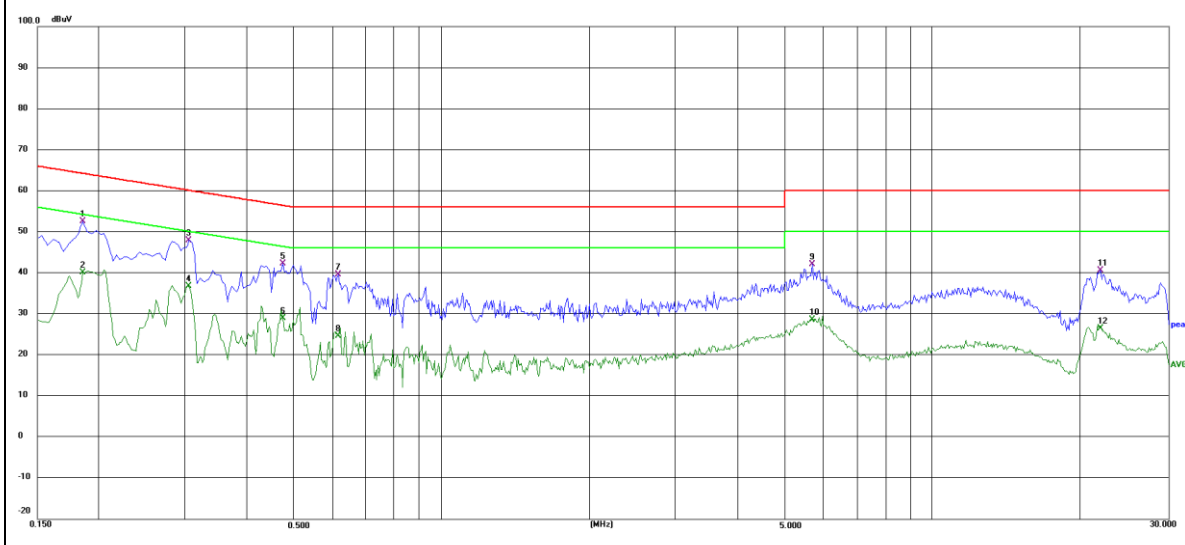
EUT :	Notebook	Model Name :	ZERO 16
Temperature :	24℃	Relative Humidity :	46%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 19.5V from Adapter AC 120V/60Hz	Test Mode :	Mode 1

Adapter2:

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1860	42.46	10.09	52.55	64.21	-11.66	QP
0.1860	30.03	10.09	40.12	54.21	-14.09	AVG
0.3060	37.66	10.25	47.91	60.08	-12.17	QP
0.3060	26.58	10.25	36.83	50.08	-13.25	AVG
0.4740	31.51	10.69	42.20	56.44	-14.24	QP
0.4740	18.20	10.69	28.89	46.44	-17.55	AVG
0.6140	28.61	10.91	39.52	56.00	-16.48	QP
0.6140	13.78	10.91	24.69	46.00	-21.31	AVG
5.6540	32.17	9.90	42.07	60.00	-17.93	QP
5.6540	18.68	9.90	28.58	50.00	-21.42	AVG
21.8660	30.34	10.29	40.63	60.00	-19.37	QP
21.8660	16.17	10.29	26.46	50.00	-23.54	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



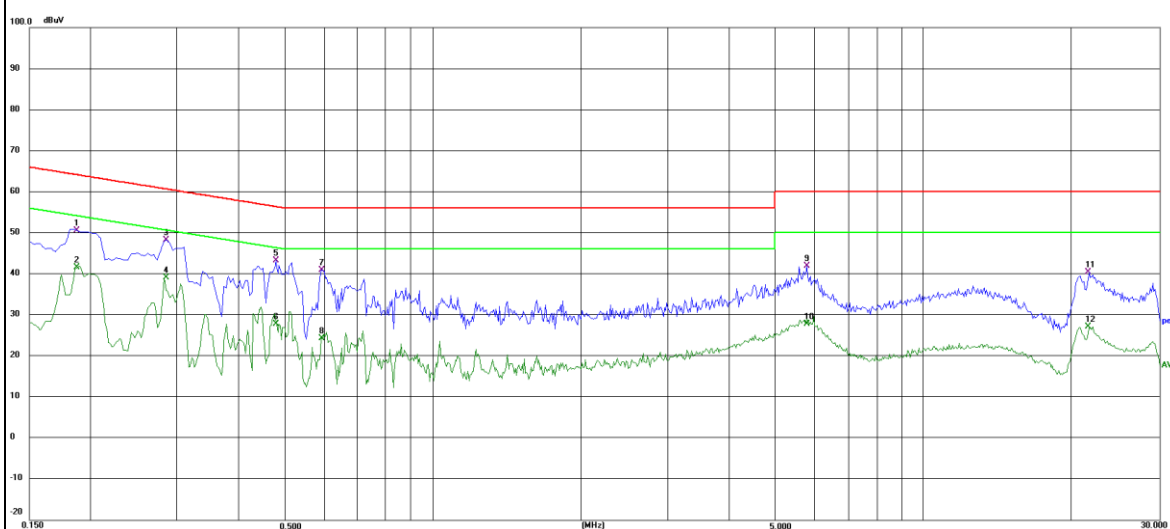
Note: The test report records only the worst-case test values.

EUT :	Notebook	Model Name :	ZERO 16
Temperature :	24℃	Relative Humidity :	46%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 19.5V from Adapter AC 120V/60Hz	Test Mode :	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1874	40.55	10.05	50.60	64.15	-13.55	QP
0.1874	31.56	10.05	41.61	54.15	-12.54	AVG
0.2860	37.96	10.26	48.22	60.64	-12.42	QP
0.2860	28.79	10.26	39.05	50.64	-11.59	AVG
0.4780	32.55	10.66	43.21	56.37	-13.16	QP
0.4780	17.06	10.66	27.72	46.37	-18.65	AVG
0.5940	30.02	10.88	40.90	56.00	-15.10	QP
0.5940	13.34	10.88	24.22	46.00	-21.78	AVG
5.7500	32.04	9.83	41.87	60.00	-18.13	QP
5.7500	17.94	9.83	27.77	50.00	-22.23	AVG
21.7099	30.10	10.28	40.38	60.00	-19.62	QP
21.7099	16.80	10.28	27.08	50.00	-22.92	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



Note: The test report records only the worst-case test values.

3.2 RADIATED EMISSION MEASUREMENT**3.2.1 APPLICABLE STANDARD**

According to FCC Part 15.407(b) and 15.209

3.2.2 CONFORMANCE LIMIT

According to FCC Part 15.407(b)(10): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

According to FCC Part 15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009-0.490	2400/F(KHz)	20 log (uV/m)	300
0.490-1.705	24000/F(KHz)	20 log (uV/m)	30
1.705-30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Limits of Radiated Emission Measurement(Above 1000MHz)

Frequency(MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Remark :1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

3. For Frequency 9kHz~30MHz:

Distance extrapolation factor =40log(Specific distance/ test distance)(dB);

Limit line=Specific limits(dBuV) + distance extrapolation factor.

For Frequency above 30MHz:

Distance extrapolation factor =20log(Specific distance/ test distance)(dB);

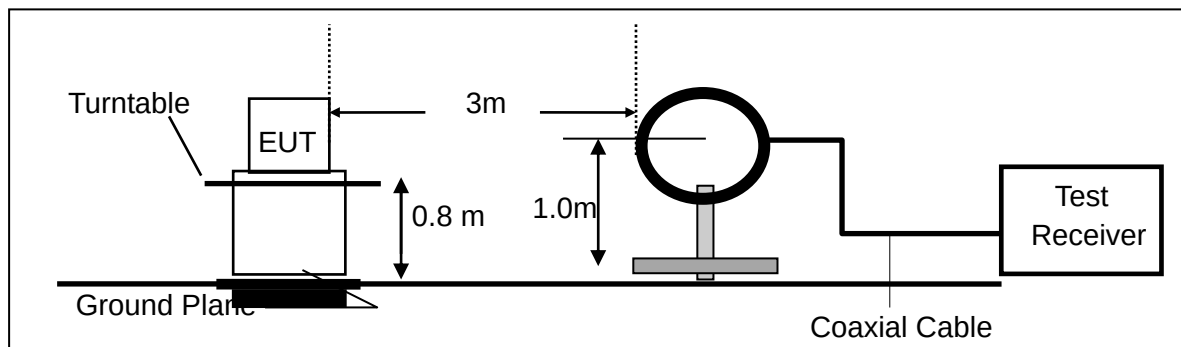
Limit line=Specific limits(dBuV) + distance extrapolation factor.

3.2.3 MEASURING INSTRUMENTS

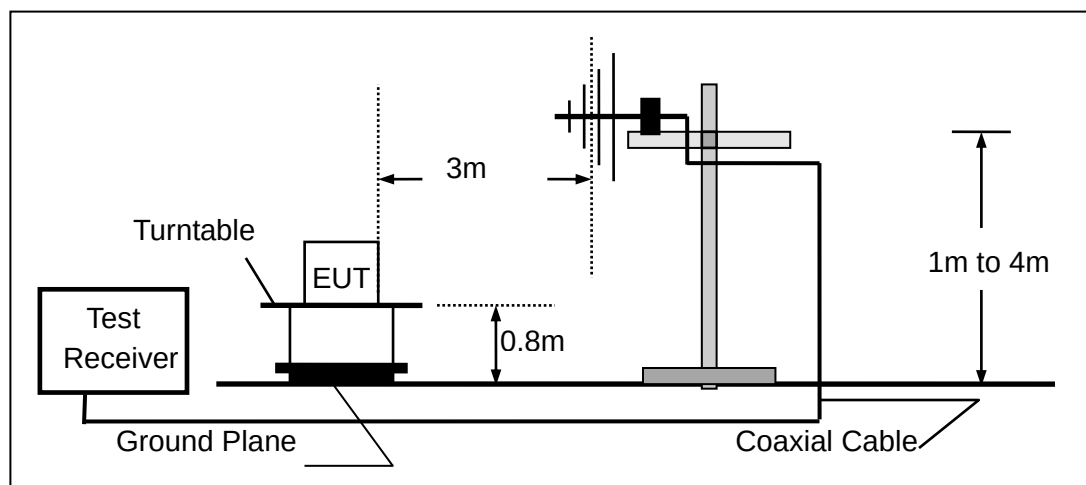
The Measuring equipment is listed in the section 6.3 of this test report.

3.2.4 TEST CONFIGURATION

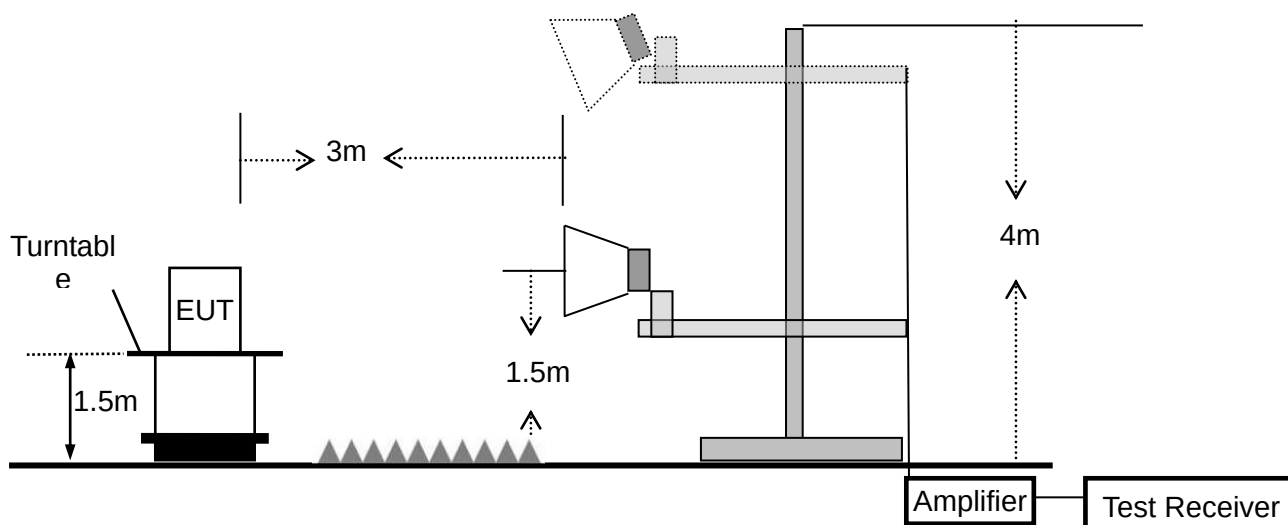
(a) For radiated emissions below 30MHz



(b) For radiated emissions from 30MHz to 1000MHz



(c) For radiated emissions above 1000MHz



3.2.5 TEST PROCEDURE

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT.

Use the following spectrum analyzer settings:

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

Note: for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where $RBWCF [dB] = 10 \cdot \lg(100 [kHz] / \text{narrower RBW [kHz]})$. , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

3.2.6 TEST RESULTS (9KHZ – 30 MHZ)

EUT:	Notebook	Model Name. :	ZERO 16 Pro
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 15.56V
Test Mode :	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	N/A
--	--	--	--	N/A

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

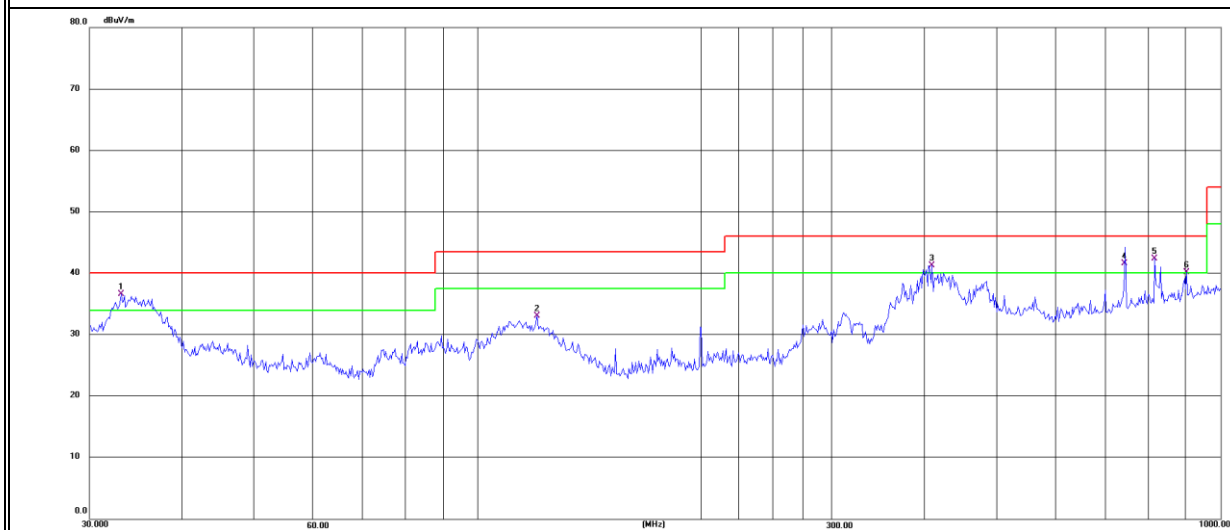
3.2.7 TEST RESULTS (30MHZ – 1GHZ)

EUT :	Notebook	Model Name. :	ZERO 16 Pro
Temperature :	24 °C	Relative Humidity :	53%
Pressure :	1010 hPa	Test Voltage :	DC 15.56V
Test Mode :	Mode 4 (802.11ax80 MIMO CH119)		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	33.0950	19.60	17.01	36.61	40.00	-3.39	QP
V	120.2766	17.11	16.00	33.11	43.50	-10.39	QP
V	408.9460	18.15	23.09	41.24	46.00	-4.76	QP
V	744.3210	12.86	28.78	41.64	46.00	-4.36	QP
V	815.9678	12.51	29.88	42.39	46.00	-3.61	QP
V	900.1474	9.14	31.00	40.14	46.00	-5.86	QP

Remark:

Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit

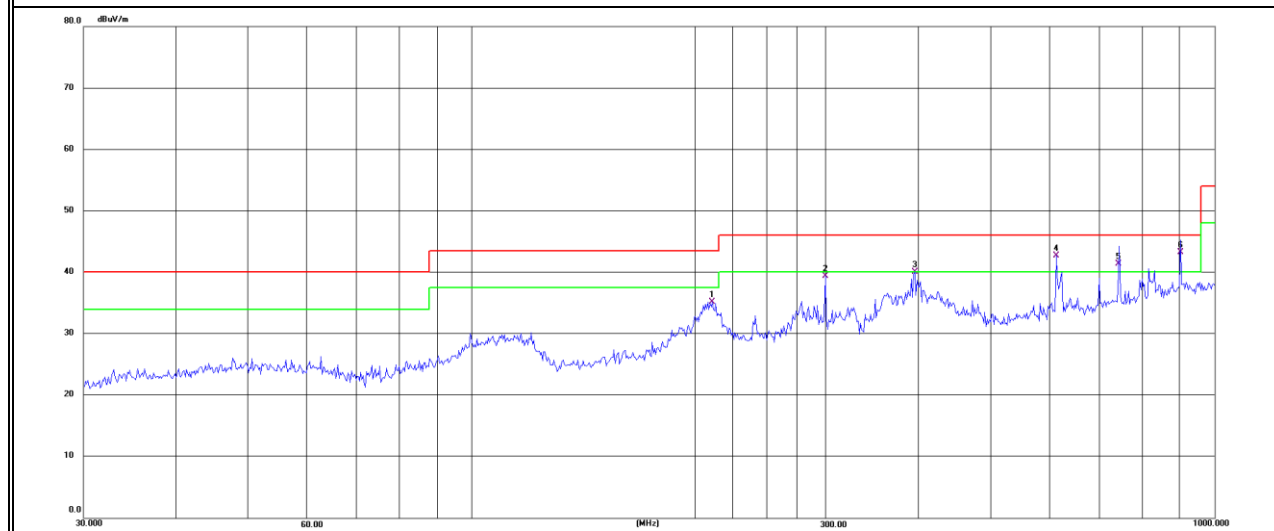


Note: The test report records only the worst-case test values.

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	210.7860	16.96	18.23	35.19	43.50	-8.31	QP
H	299.3158	18.96	20.43	39.39	46.00	-6.61	QP
H	394.8545	17.20	22.85	40.05	46.00	-5.95	QP
H	612.0642	16.30	26.47	42.77	46.00	-3.23	QP
H	744.1530	12.65	28.78	41.43	46.00	-4.57	QP
H	900.2340	12.32	31.00	43.32	46.00	-2.68	QP

Remark:

Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit



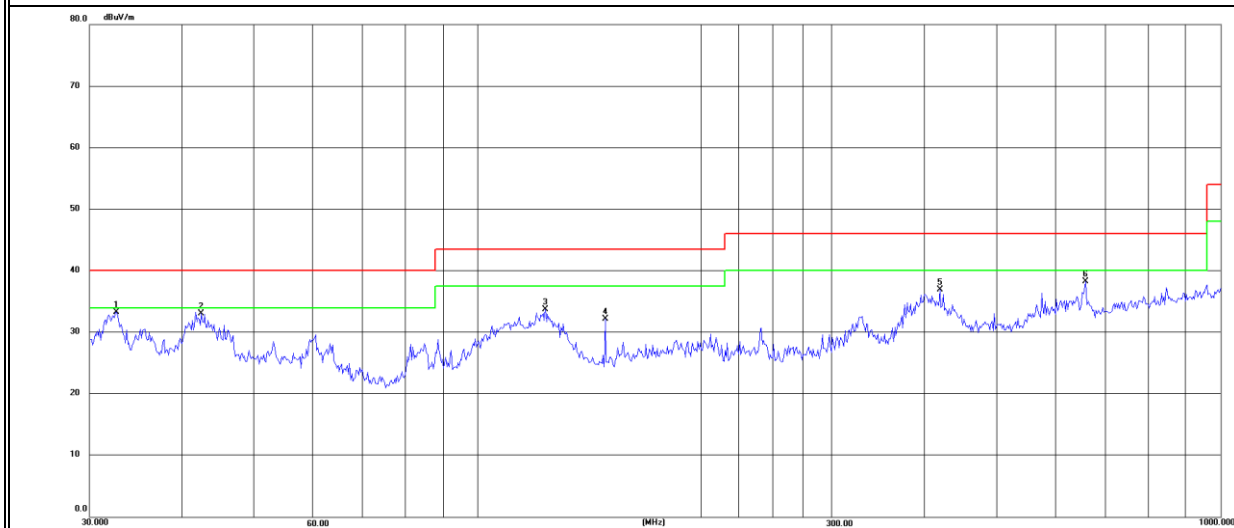
Note: The test report records only the worst-case test values.

EUT :	Notebook	Model Name. :	ZERO 16
Temperature :	24 °C	Relative Humidity :	53%
Pressure :	1010 hPa	Test Voltage :	DC 15.56V
Test Mode :	Mode 4 (802.11ax80 MIMO CH119)		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	32.6340	16.55	16.75	33.30	40.00	-6.70	QP
V	42.4508	13.93	19.19	33.12	40.00	-6.88	QP
V	123.2655	18.20	15.51	33.71	43.50	-9.79	QP
V	148.4410	18.00	14.24	32.24	43.50	-11.26	QP
V	419.1081	13.93	22.97	36.90	46.00	-9.10	QP
V	658.8362	11.17	27.16	38.33	46.00	-7.67	QP

Remark:

Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit

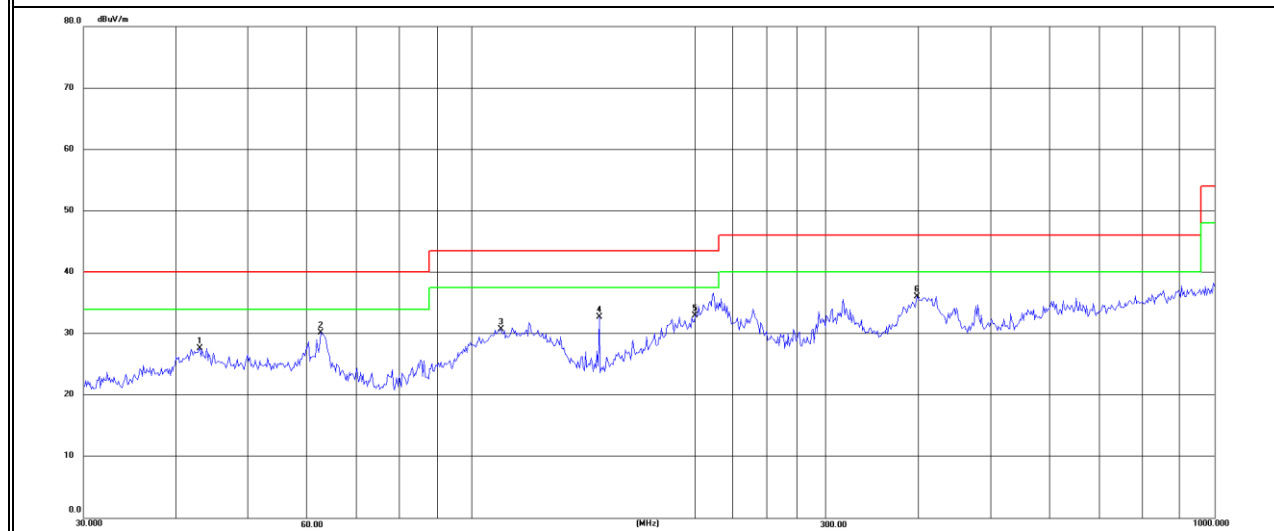


Note: The test report records only the worst-case test values.

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	43.0505	8.51	19.18	27.69	40.00	-12.31	QP
H	62.6507	11.92	18.24	30.16	40.00	-9.84	QP
H	109.4116	12.25	18.45	30.70	43.50	-12.80	QP
H	148.4410	18.47	14.24	32.71	43.50	-10.79	QP
H	199.9856	15.52	17.41	32.93	43.50	-10.57	QP
H	397.6334	13.47	22.61	36.08	46.00	-9.92	QP

Remark:

Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit



Note: The test report records only the worst-case test values.

3.2.8 TEST RESULTS (1GHZ-18GHZ)

EUT :	Notebook	Model Name. :	ZERO 16 Pro
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 15.56V
Test Mode :	Mode 2/3/4/5 MIMO		

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5955 MHz)-Above 1G									
Vertical	7189	51.26	5.43	36.59	37.14	56.14	68.2	-12.06	Pk
Vertical	10142	51.61	6.06	37.98	34.79	60.86	68.2	-7.34	Pk
Vertical	11910	58.49	6.77	37.7	32.33	70.63	74	-3.37	Pk
Vertical	11910	35.53	6.77	37.7	32.33	47.67	54	-6.33	AV
Horizontal	7188	49.28	5.43	36.59	37.14	54.16	68.2	-14.04	Pk
Horizontal	10141	49.73	6.06	37.98	34.77	59.00	68.2	-9.20	Pk
Horizontal	11910	52.64	6.77	37.7	32.33	64.78	74	-9.22	Pk
Horizontal	11910	35.62	6.77	37.7	32.33	47.76	54	-6.24	AV
middle Channel (6175 MHz)-Above 1G									
Vertical	7165	55.27	5.42	37.11	36.94	60.86	68.2	-7.34	Pk
Vertical	10400	50.81	6.14	38.3	32.45	62.80	68.2	-5.40	Pk
Vertical	12350	55.20	6.92	38.6	30.88	69.84	74	-4.16	Pk
Vertical	12350	31.13	6.92	38.6	30.88	45.77	54	-8.23	AV
Horizontal	7163	54.18	5.42	37.06	36.96	59.70	68.2	-8.50	Pk
Horizontal	10400	47.79	6.14	38.3	32.45	59.78	68.2	-8.42	Pk
Horizontal	12350	54.77	6.92	38.6	30.88	69.41	74	-4.59	Pk
Horizontal	12350	34.27	6.92	38.6	30.88	48.91	54	-5.09	AV
High Channel (6415 MHz)-Above 1G									
Vertical	7268	47.25	5.45	36.12	35.84	52.98	74	-21.02	Pk
Vertical	7268	35.74	5.45	36.12	35.84	41.47	54	-12.53	AV
Vertical	12830	43.48	7.06	40.25	28.91	61.88	68.2	-6.32	Pk
Vertical	15720	44.88	7.65	38.76	32.22	59.07	74	-14.93	Pk
Vertical	15720	33.72	7.65	38.76	32.22	47.91	54	-6.09	AV
Horizontal	7268	51.02	5.45	36.15	35.77	56.85	74	-17.15	Pk
Horizontal	7268	41.26	5.45	36.15	35.77	47.09	54	-6.91	AV
Horizontal	12830	43.51	7.06	40.25	28.91	61.91	68.2	-6.29	Pk
Horizontal	15720	49.65	7.65	38.76	32.22	63.84	74	-10.16	Pk
Horizontal	15720	35.29	7.65	38.76	32.22	49.48	54	-4.52	AV

Note: "802.11ax20 MIMO" mode is the worst mode.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

All modes have been test, just the 802.11ax20 MIMO worst mode has been recorded in the report.

See Annex 5.7 for test data at the antenna port

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (6435 MHz)-Above 1G									
Vertical	7189	48.89	5.43	36.49	37.18	53.63	68.2	-14.57	Pk
Vertical	12870	45.67	7.07	40.05	28.89	63.90	68.2	-4.30	Pk
Vertical	15543	53.92	7.62	38.73	30.4	69.87	74	-4.13	Pk
Vertical	15543	33.66	7.62	38.73	30.4	49.61	54	-4.39	AV
Horizontal	7184	49.23	5.43	36.59	37.14	54.11	68.2	-14.09	Pk
Horizontal	12870	43.62	7.07	40.05	28.89	61.85	68.2	-6.35	Pk
Horizontal	15544	49.81	7.62	38.72	30.42	65.73	74	-8.27	Pk
Horizontal	15544	33.57	7.62	38.72	30.42	49.49	54	-4.51	AV
middle Channel (6475 MHz)-Above 1G									
Vertical	7166	51.08	5.42	37.11	36.94	56.67	68.2	-11.53	Pk
Vertical	12950	45.53	7.1	39.65	28.85	63.43	68.2	-4.77	Pk
Vertical	15651	48.77	7.64	38.46	31.59	63.28	74	-10.72	Pk
Vertical	15651	35.99	7.64	38.46	31.59	50.50	54	-3.50	AV
Horizontal	7163	48.40	5.42	37.06	36.96	53.92	68.2	-14.28	Pk
Horizontal	12950	44.98	7.1	39.65	28.85	62.88	68.2	-5.32	Pk
Horizontal	15660	49.10	7.64	38.52	31.67	63.59	74	-10.41	Pk
Horizontal	15660	35.45	7.64	38.52	31.67	49.94	54	-4.06	AV
High Channel (6515 MHz)-Above 1G									
Vertical	7291	50.16	5.45	36.46	35.02	57.05	74	-16.95	Pk
Vertical	7291	34.69	5.45	36.46	35.02	41.58	54	-12.42	AV
Vertical	13030	45.82	7.12	39.58	29.06	63.46	68.2	-4.74	Pk
Vertical	17720	45.92	8.15	45.08	28.93	70.22	74	-3.78	Pk
Vertical	17720	24.87	8.15	45.08	28.93	49.17	54	-4.83	AV
Horizontal	7288	51.33	5.45	36.35	35.29	57.84	74	-16.16	Pk
Horizontal	7288	35.27	5.45	36.35	35.29	41.78	54	-12.22	AV
Horizontal	13030	45.68	7.12	39.58	29.06	63.32	68.2	-4.88	Pk
Horizontal	17720	43.44	8.15	45.08	28.93	67.74	74	-6.26	Pk
Horizontal	17720	25.56	8.15	45.08	28.93	49.86	54	-4.14	AV

Note:"802.11ax20 MIMO" mode is the worst mode.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

All modes have been test, just the 802.11ax20 MIMO worst mode has been recorded in the report.

See Annex 5.7 for test data at the antenna port

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (6535 MHz)-Above 1G									
Vertical	7174	48.76	5.42	36.75	37.08	53.85	68.2	-14.35	Pk
Vertical	13070	44.80	7.12	39.82	29.38	62.36	68.2	-5.84	Pk
Vertical	16140	50.21	7.75	38.92	30.81	66.07	74	-7.93	Pk
Vertical	16140	32.57	7.75	38.92	30.81	48.43	54	-5.57	AV
Horizontal	7173	47.43	5.43	36.59	37.14	52.31	68.2	-15.89	Pk
Horizontal	13070	45.89	7.12	39.82	29.38	63.45	68.2	-4.75	Pk
Horizontal	16140	49.29	7.75	38.92	30.81	65.15	74	-8.85	Pk
Horizontal	16140	33.12	7.75	38.92	30.81	48.98	54	-5.02	AV
middle Channel (6695 MHz)-Above 1G									
Vertical	7165	57.86	5.42	37.11	36.94	63.45	68.2	-4.75	Pk
Vertical	10413	50.97	6.15	38.33	32.41	63.04	68.2	-5.16	Pk
Vertical	13390	50.42	7.19	40.76	30.03	68.34	74	-5.66	Pk
Vertical	13390	30.90	7.19	40.76	30.03	48.82	54	-5.18	AV
Horizontal	7163	57.65	5.42	37.06	36.96	63.17	68.2	-5.03	Pk
Horizontal	10414	50.13	6.15	38.33	32.41	62.20	68.2	-6.00	Pk
Horizontal	13390	50.57	7.19	40.76	30.03	68.49	74	-5.51	Pk
Horizontal	13390	30.30	7.19	40.76	30.03	48.22	54	-5.78	AV
High Channel (6855 MHz)-Above 1G									
Vertical	7523	48.33	5.51	36.76	34.13	56.47	74	-17.53	Pk
Vertical	7523	37.93	5.51	36.76	34.13	46.07	54	-7.93	AV
Vertical	13710	45.26	7.25	40.56	29.66	63.41	68.2	-4.79	Pk
Vertical	15739	48.53	7.66	38.72	32.4	62.51	74	-11.49	Pk
Vertical	15740	35.33	7.66	38.72	32.41	49.30	54	-4.70	AV
Horizontal	7527	48.64	5.51	36.75	34.11	56.79	74	-17.21	Pk
Horizontal	7527	38.20	5.51	36.75	34.11	46.35	54	-7.65	AV
Horizontal	13710	45.37	7.25	40.56	29.66	63.52	68.2	-4.68	Pk
Horizontal	15740	49.08	7.66	38.72	32.41	63.05	74	-10.95	Pk
Horizontal	15742	33.84	7.66	38.72	32.43	47.79	54	-6.21	AV

Note:"802.11ax20 MIMO" mode is the worst mode.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

All modes have been test, just the 802.11ax20 MIMO worst mode has been recorded in the report.

See Annex 5.7 for test data at the antenna port

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (6895 MHz)-Above 1G									
Vertical	7152	49.43	5.42	37.17	36.92	55.10	68.2	-13.10	Pk
Vertical	13790	47.16	7.27	41.04	30.91	64.56	68.2	-3.64	Pk
Vertical	15841	49.39	7.67	38.11	31.89	63.28	74	-10.72	Pk
Vertical	15840	34.29	7.67	38.12	31.92	48.16	54	-5.84	AV
Horizontal	7186	49.92	5.43	36.59	37.14	54.80	68.2	-13.40	Pk
Horizontal	13790	45.71	7.27	41.04	30.91	63.11	68.2	-5.09	Pk
Horizontal	15840	52.12	7.67	38.12	31.92	65.99	74	-8.01	Pk
Horizontal	15840	35.99	7.67	38.12	31.92	49.86	54	-4.14	AV
middle Channel (6995 MHz)-Above 1G									
Vertical	7167	48.95	5.42	37.11	36.94	54.54	68.2	-13.66	Pk
Vertical	13990	44.90	7.31	40.75	29.2	63.76	68.2	-4.44	Pk
Vertical	15963	47.23	7.69	37.65	28.72	63.85	74	-10.15	Pk
Vertical	15961	32.42	7.69	37.64	28.77	48.98	54	-5.02	AV
Horizontal	7165	49.63	5.42	37.06	36.96	55.15	68.2	-13.05	Pk
Horizontal	13990	43.53	7.31	40.75	29.2	62.39	68.2	-5.81	Pk
Horizontal	15960	46.90	7.69	37.64	28.8	63.43	74	-10.57	Pk
Horizontal	15961	32.36	7.69	37.64	28.77	48.92	54	-5.08	AV
High Channel (7115 MHz)-Above 1G									
Vertical	7633	45.18	5.54	36.86	35.55	52.03	74	-21.97	Pk
Vertical	7633	34.50	5.54	36.86	35.55	41.35	54	-12.65	AV
Vertical	14190	44.00	7.35	40.19	27.82	63.72	68.2	-4.48	Pk
Vertical	15472	50.73	7.61	39.14	29.51	67.97	74	-6.03	Pk
Vertical	15472	32.01	7.61	39.14	29.51	49.25	54	-4.75	AV
Horizontal	7686	48.55	5.55	37.24	36.63	54.71	74	-19.29	Pk
Horizontal	7686	35.68	5.55	37.24	36.63	41.84	54	-12.16	AV
Horizontal	14190	44.76	7.35	40.19	27.82	64.48	68.2	-3.72	Pk
Horizontal	15471	47.08	7.61	39.14	29.5	64.33	74	-9.67	Pk
Horizontal	15470	32.33	7.61	39.14	29.49	49.59	54	-4.41	AV

Note:"802.11ax20 MIMO" mode is the worst mode.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

All modes have been test, just the 802.11ax20 MIMO worst mode has been recorded in the report.

See Annex 5.7 for test data at the antenna port

3.2.9 TEST RESULTS (18GHz-40GHz)

EUT :	Notebook	Model Name. :	ZERO 16 Pro
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	N/A
Test Mode :	N/A		

Note: The test data will not be recorded because the margin is greater than 20dB.

SPURIOUS EMISSION IN BANDEDGE

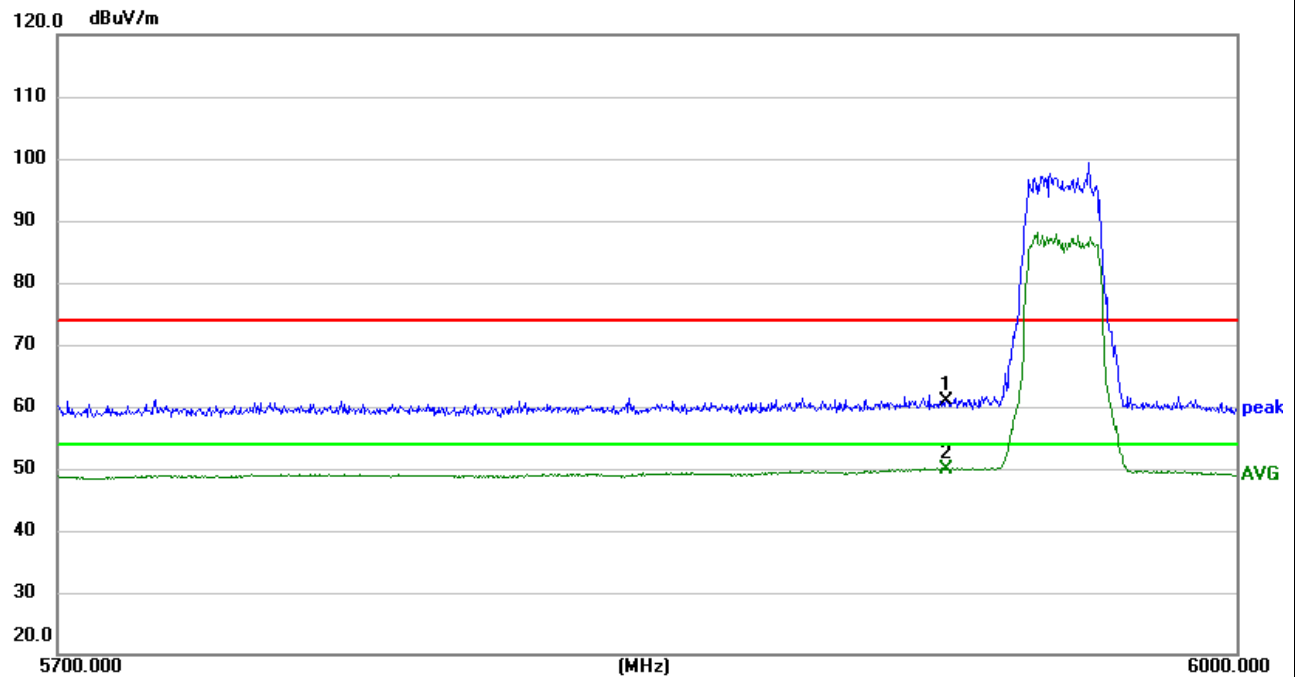
EUT :	Notebook	Model Name. :	ZERO 16 Pro
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 15.56V
Test Mode :	Mode 2/3/4/5(MIMO Mode)		

802.11ax20 MIMO Mode 5955MHz

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	5925.000	53.46	7.38	60.84	74	-13.16	peak
V	5925.000	42.42	7.38	49.8	54	-4.2	AVG

Remark:

Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit

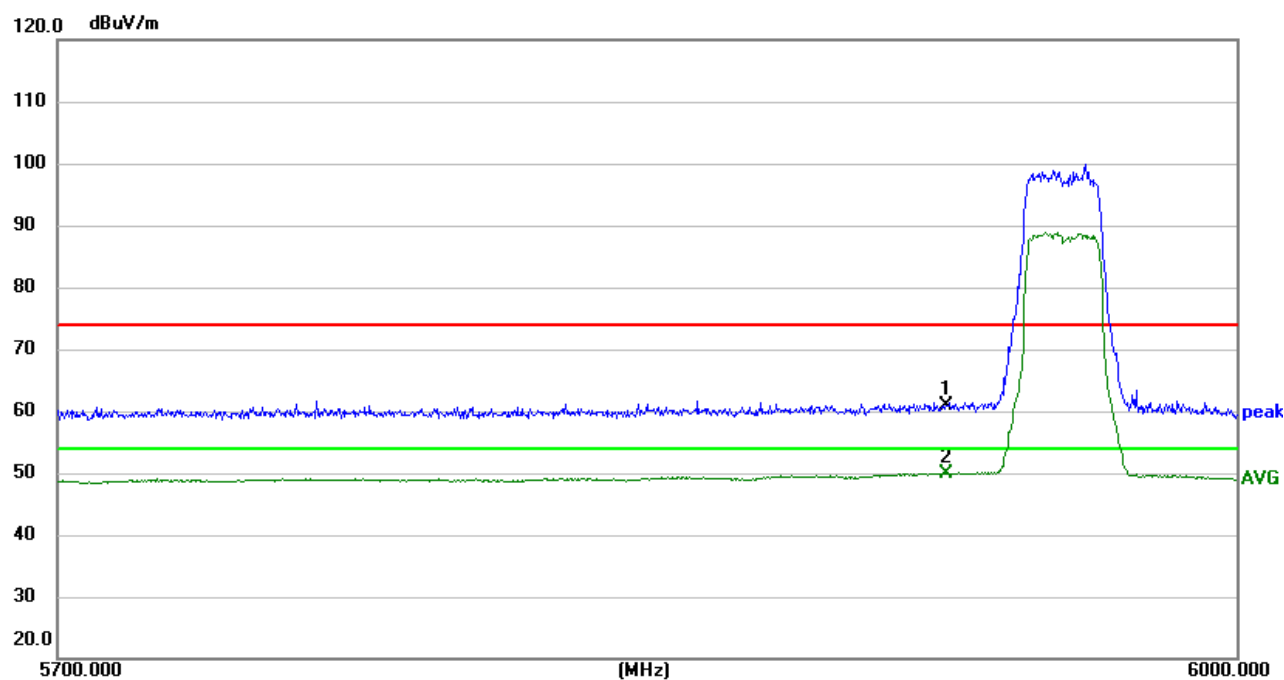


Note: The test report records only the worst-case test values.
See Annex 5.7 for test data at the antenna port

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	5925.000	53.45	7.38	60.83	74	-13.17	peak
H	5925.000	42.51	7.38	49.89	54	-4.11	AVG

Remark:

Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit



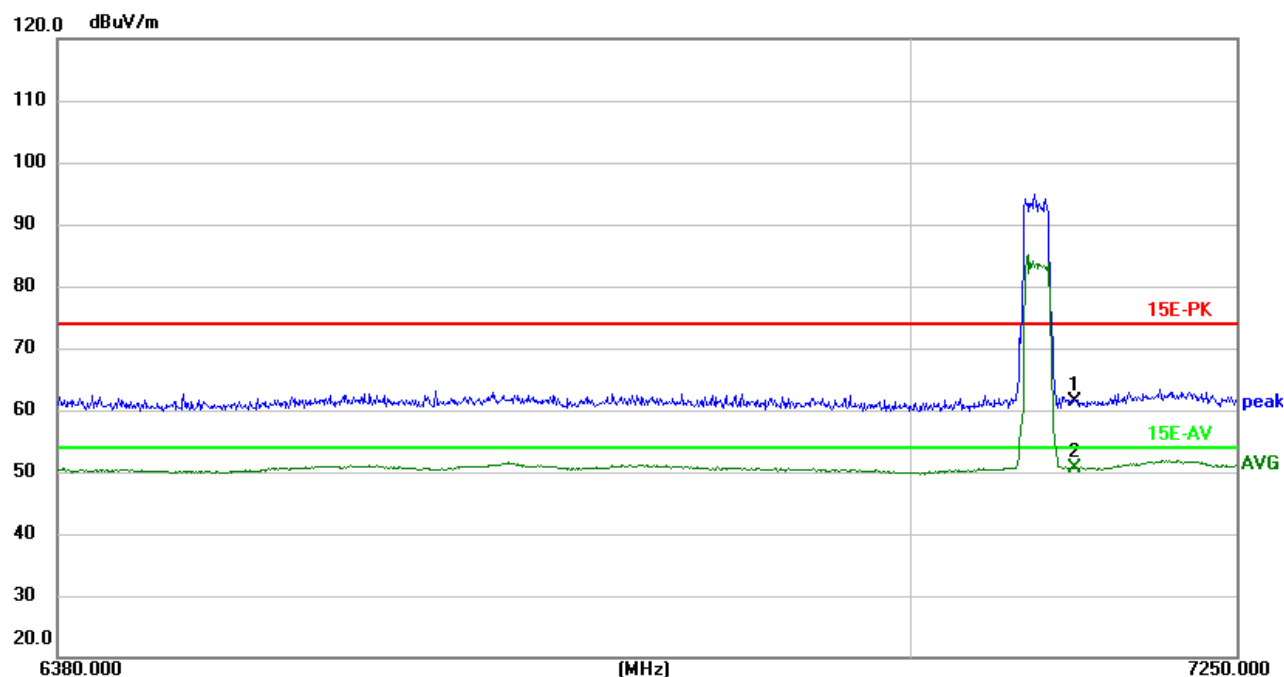
Note: The test report records only the worst-case test values.
See Annex 5.7 for test data at the antenna port

802.11ax20 MIMO Mode 7095MHz

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	7125.000	52.43	8.85	61.28	74	-12.72	peak
V	7125.000	41.72	8.85	50.57	54	-3.43	AVG

Remark:

Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit

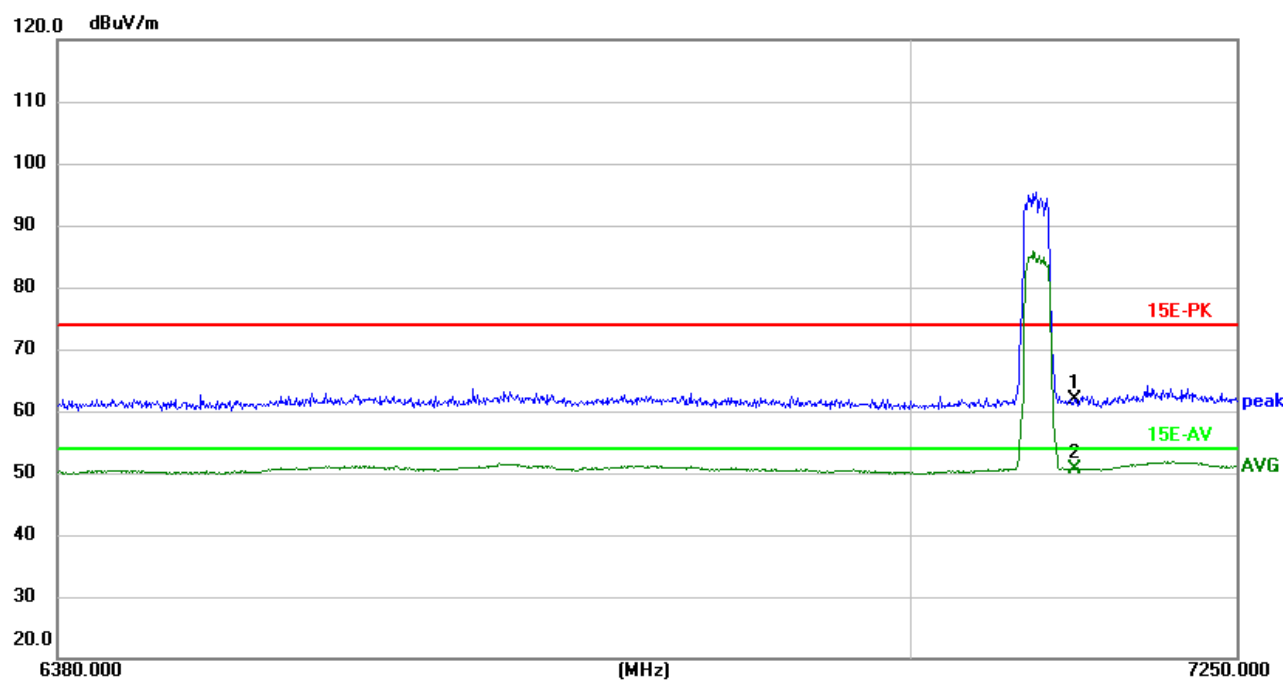


Note: The test report records only the worst-case test values.
See Annex 5.7 for test data at the antenna port

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	7125.000	52.95	8.85	61.8	74	-12.2	peak
H	7125.000	41.75	8.85	50.6	54	-3.4	AVG

Remark:

Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit



Note: The test report records only the worst-case test values.
See Annex 5.7 for test data at the antenna port

3.3 EIRP POWER SPECTRAL DENSITY TEST

3.3.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(a)(8)

For client devices operating under the control of an indoor access point in the 5.925–7.125 GHz bands, the maximum power spectral density must not exceed -1 dBm e.i.r.p. in any 1-megahertz band, and the maximum e.i.r.p. over the frequency band of operation must not exceed 24 dBm.

3.3.2 TEST PROCEDURE

For devices operating in the bands 5.925–7.125 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(8).

The following test procedures apply:

1. Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
2. Set RBW = 1MHz
3. Set VBW ≥ 3 RBW.
4. Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$.
5. Sweep time = auto.
6. Detector = power averaging (rms)
7. Trace average at least 100 traces in power averaging (rms) mode;
8. Add $10 \log (1/x)$, where x is the duty cycle

3.3.3 DEVIATION FROM STANDARD

No deviation.

3.3.4 TEST SETUP

Refer to section 3.2.4 of this report.

3.3.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

3.3.6 TEST RESULTS

EUT :	Notebook	Model Name. :	ZERO 16 Pro
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1015 hPa	Test Voltage :	DC 15.56V
Test Mode :	Mode 2/3/4/5(MIMO Mode)		

Test data reference attachment.

3.4 26DB & 99% EMISSION BANDWIDTH

3.4.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(a)(10)

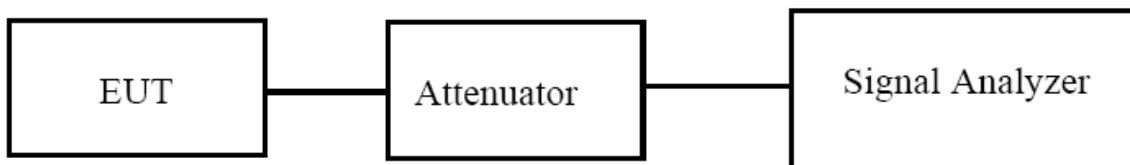
The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 megahertz.

3.4.2 TEST PROCEDURE

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW $\geq 3 \cdot$ RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).



3.4.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.4.4 TEST RESULTS

EUT :	Notebook	Model Name. :	ZERO 16 Pro
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 15.56V
Test Mode :	Mode 2/3/4/5(MIMO Mode)		

Test data reference attachment.

3.5 IN-BAND EMISSIONS

3.5.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(b)(7)

For transmitters operating within the 5.925-7.125 GHz bands: Power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB.

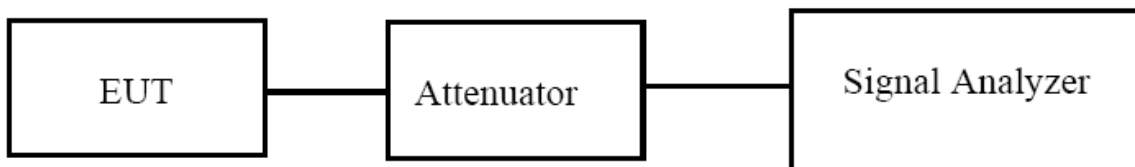
3.5.2 TEST PROCEDURE

- a) Set the span to encompass the entire 26 dB EBW of the signal.
- b) Set RBW = same RBW used for 26 dB EBW measurement.
- c) Set VBW $\geq 3 \times$ RBW
- d) Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$
- e) Detector = RMS (i.e., power averaging).
- f) Trace mode = max hold.
- g) Sweep = auto couple.
- h) Trace average at least 100 traces in power averaging (rms) mode.

3.5.3 DEVIATION FROM STANDARD

No deviation.

3.5.4 TEST SETUP



3.5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.5.6 TEST RESULTS

EUT :	Notebook	Model Name. :	ZERO 16 Pro
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 15.56V
Test Mode :	Mode 2/3/4/5(MIMO Mode)		

Test data reference attachment.

3.6 MAXIMUM EIRP OUTPUT POWER

3.6.1 PPLIED PROCEDURES / LIMIT

According to FCC §15.407(a)(8)

For client devices operating under the control of an indoor access point in the 5.925–7.125 GHz bands, the maximum power spectral density must not exceed -1 dBm e.i.r.p. in any 1-megahertz band, and the maximum e.i.r.p. over the frequency band of operation must not exceed 24 dBm.

3.6.2 TEST PROCEDURE

For devices operating in the bands 5.925–7.125 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(4)(8).

The following test procedures apply:

1. Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
2. Set RBW = 1MHz
3. Set VBW $\geq$ 3 RBW.
4. Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$.
5. Sweep time = auto.
6. Detector = power averaging (rms)
7. Trace average at least 100 traces in power averaging (rms) mode;
8. Add $10 \log (1/x)$, where x is the duty cycle

3.6.3 DEVIATION FROM STANDARD

No deviation.

3.6.4 TEST SETUP

Refer to section 3.2.4 of this report.

3.6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.6.6 TEST RESULTS

EUT :	Notebook	Model Name. :	ZERO 16 Pro
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 15.56V
Test Mode :	Mode 2/3/4/5(MIMO Mode)		

Test data reference attachment.

3.7 OPERATIONAL RESTRICTIONS FOR 6 GHZ U-NII DEVICES.

3.7.1 APPLICABLE STANDARD

According to FCC §15.407(d)(2)(3)(5)(6)

Operation of transmitters in the 5.925–7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

Transmitters operating under the provisions of paragraphs (a)(5), (a)(6), and (a)(8) of this section are limited to indoor locations.

In the 5.925–7.125 GHz band, client devices, except fixed client devices, must operate under the control of a standard power access point, indoor access point or subordinate devices; Subordinate devices must operate under the control of an indoor access point. In all cases, an exception exists for transmitting brief messages to an access point when attempting to join its network after detecting a signal that confirms that an access point is operating on a particular channel. Access points and subordinate devices may connect to other access points or subordinate devices. Client devices are prohibited from connecting directly to another client device.

Indoor access points, subordinate devices and client devices operating in the 5.925–7.125 GHz band must employ a contention-based protocol.

3.7.2 TEST RESULTS

EUT :	VR All-in-one-Headset	Model Name. :	Crystal
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 48V

Declaration by applicant all restrictions are meet the FCC §15.407(d)(2)(3)(5)(6) requirements.

3.8 CONTENTION BASED PROTOCOL

3.8.1 LIMIT OF CONTENTION BASED PROTOCOL

According to FCC §15.407(d)(6)

Indoor access points, subordinate devices and client devices operating in the 5.925-7.125 GHz band must employ a contention-based protocol.

FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01r01

Unlicensed low-power indoor devices must detect co-channel radio frequency power that is at least -62 dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel and stay off the channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm). The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain. To ensure incumbent operations are reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel. For example, an 802.11 device that plans to transmit a 40 MHz- wide signal (on a primary 20 MHz channel and a secondary 20 MHz channel) must detect energy throughout the entire 40 MHz channel. Additionally, low-power indoor devices must detect co-channel energy with 90% or greater certainty.

Table 1. Criteria to determine number of times detection threshold test may be performed

If	Number of Tests	Placement of Incumbent Transmission
$BW_{EUT} \leq BW_{Inc}$	Once	Tune incumbent and EUT transmissions ($f_{c1} = f_{c2}$)
$BW_{Inc} < BW_{EUT} \leq 2BW_{Inc}$	Once	Incumbent transmission is contained within BW_{EUT}
$2BW_{Inc} < BW_{EUT} \leq 4BW_{Inc}$	Twice. Incumbent transmission is contained within BW_{EUT}	Incumbent transmission is located as closely as possible to the lower edge and upper edge, respectively, of the EUT channel
$BW_{EUT} > 4BW_{Inc}$	Three times	Incumbent transmission is located as closely as possible to the lower edge of the EUT channel, in the middle of EUT channel, and as closely as possible to the upper edge of the EUT channel

where:

BW_{EUT} : Transmission bandwidth of EUT signal

BW_{Inc} : Transmission bandwidth of the simulated incumbent signal (10 MHz wide AWGN signal)

f_{c1} : Center frequency of EUT transmission

f_{c2} : Center frequency of simulated incumbent signal

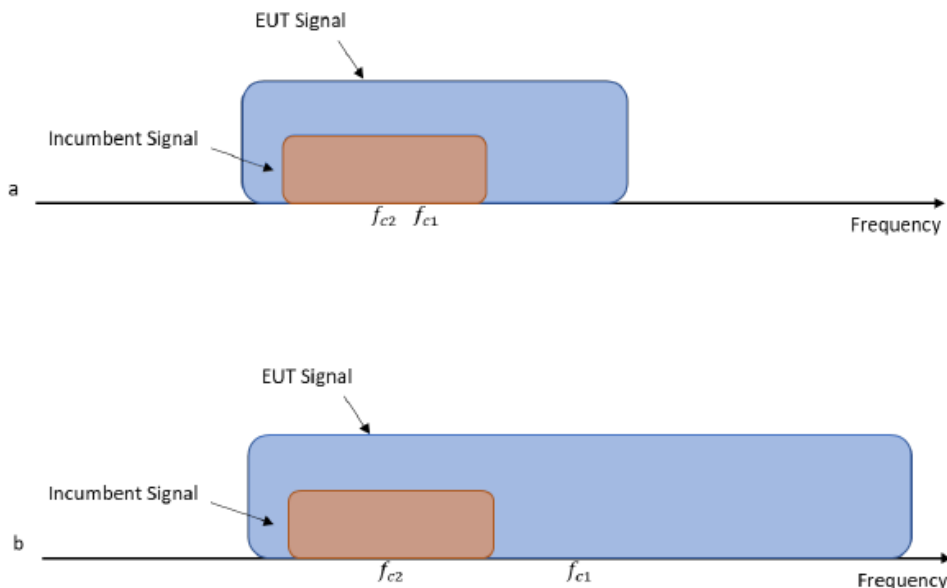


Figure 1. Two possible scenarios where a) center frequency of EUT transmission falls within incumbent's bandwidth, or b) outside of it

3.8.2 TEST PROCEDURES

The testing follows FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01r01.

Section I) Contention Based Protocol

Conducted method Step-by-Step Procedure, Conducted Setup

1. Configure the EUT to transmit with a constant duty cycle.

2. Set the operating parameters of the EUT including power level, operating frequency, modulation and bandwidth.

3. Set the signal analyzer center frequency to the nominal EUT channel center frequency. The span range of the signal analyzer shall be between two times and five times the OBW of the EUT.

4. Connect the output port of the EUT to the signal analyzer 2, as shown in test setup Figure 2. Ensure that the attenuator 2 provides enough attenuation to not overload the signal analyzer 2 receiver.

5. Monitoring the signal analyzer 2, verify the EUT is operating and transmitting with the parameters set at step two.

6. Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use Table 1 to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.

7. Set the AWGN signal power to an extremely low level (more than 20 dB below the -62 dBm threshold). Connect the AWGN signal source, via a 3-dB splitter, to the signal analyzer 1 and the EUT as shown in test setup Figure 2.

8. Transmit the AWGN signal (RF ON) and verify its characteristics on the signal analyzer 1.

9. Monitor the signal analyzer 2 to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.

10. (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.

11. Refer to Table 1 to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step 5, choose a different center frequency for the AWGN signal and repeat the process.

12. For the contention-based protocol test where only one channel in each supported sub-band needs to be tested. The narrowest and widest bandwidth in each channel shall be measured EUT was driven in MIMO mode, the interferer level was injected to both chains to monitor the performance, while the interferer level is determined according the lowest antenna gain among both antennas (i.e, lower interferer level)

3.8.3 TEST SETUP

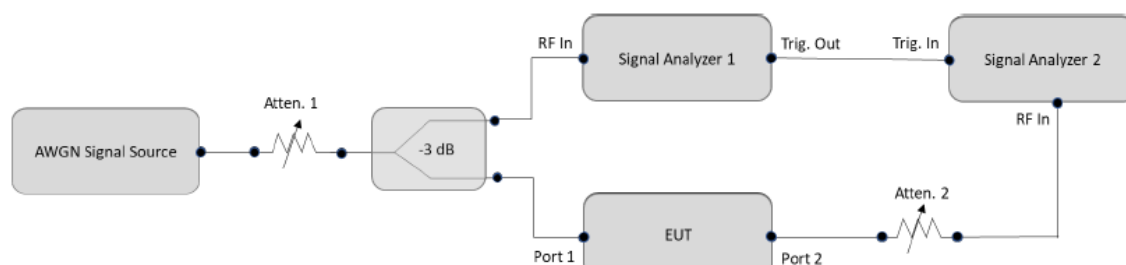


Figure 2. Contention-based protocol test setup, conducted method Step-by-Step Procedure, Conducted Setup

3.8.4 TEST RESULTS

Test data reference attachment.

3.9 FREQUENCY STABILITY

Section 15.407(g) specifies that U-NII devices are required to ensure frequency stability. It is required that that the emissions are maintained within the band of operation under all conditions of normal operation as specified in the user's manual. The grantee is responsible for ensuring that the EUT meets Section 15.407(g) requirements; however, the applications for equipment certification are not required to include test reports with explicit demonstration of compliance.

Test data reference attachment.

4. ANTENNA REQUIREMENT

4.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

4.2 EUT ANTENNA

The EUT have a permanent attached PIFA antenna. It comply with the standard requirement.

5. TEST RESULT

Refer to attachment

END OF REPORT