FCC C2PCTest Report

FCC Part15 Subpart C & RSS-247 Issue 2

Product Name	:	Touch All One Computer
Model No.	:	ESY15I4-C
FCC ID	:	RBWESYI4
IC	:	10757B-ESYI4

Applicant	:	Elo Touch Solutions, Inc
Address	:	670 N. McCarthy Blvd., Suite 100, Milpitas, CA 95035, USA.

Date of Receipt	:	Nov. 19, 2021
Test Date	:	Nov. 20, 2021 ~ Dec. 06, 2021
Issued Date	:	Dec. 27, 2021
Report No.	:	21B0716R-RF-CA-P01V01
Report Version	:	V1.0

Test Report Certification

Issued Date: Dec. 27, 2021
Report No. : 21B0716R-RF-US-P06V01

Product Name	:	Touch All One Computer
Applicant	:	Elo Touch Solutions, Inc
Address	:	670 N. McCarthy Blvd., Suite 100, Milpitas, CA 95035, USA.
Manufacturer	:	Elo Touch Solutions, Inc
Address	:	670 N. McCarthy Blvd., Suite 100, Milpitas, CA 95035, USA.
Model No.	:	ESY15I4-C
Brand	:	Elo
FCC ID	:	RBWESYI4
IC	:	10757B-ESYI4
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C ANSI C63.10:2013; KDB 558074 D01v05r02 KDB 662911 D01 Multiple Transmitter Output v02r01 RSS-Gen Issue 5 / RSS-247 Issue 2
Test Result	:	Complied
Performed Location	:	DEKRA Testing and Certification (Suzhou) Co., Ltd. No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098 FCC Designation Number: CN1199 ISED CAB identifier: CN0040

Documented By : Adma Lu

(Project Engineer: Adma Lu)

Approved By : Jack Zhang

(Supervisor: Jack Zhang)

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
21B0716R-RF-US-P06V01	V1.0	Initial Issued Report	Dec. 27, 2021

1. General Information

1.1. EUT Description

Product Name	Touch All One Computer
Model No.	ESY15I4-C
Hardware Version	R04
Software Version	Android10
Firmware Version	9.87.51.11.45
EUT Voltage	I/P: 19Vdc, 3.0A or 24Vdc, 6.25A
Frequency Range	For 2.4GHz Band 802.11b/g/n(20MHz): 2412~2462MHz
Channel Number	For 2.4GHz Band 802.11b/g/n(20MHz): 11
Type of Modulation	802.11b: DSSS-DBPSK, DQPSK, CCK
	802.11g/n: OFDM-BPSK, QPSK, 16QAM, 64QAM
Data Rate	802.11b: 1/2/5.5/11 Mbps
	802.11g: 6/9/12/18/24/36/48/54 Mbps
	802.11n: up to 144.4 Mbps
Channel Control	Auto

1.2. Working Frequency of Each Channel:

802.11b/g/n(20MHz) Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz	04	2427 MHz
05	2432 MHz	06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	10	2457 MHz	11	2462 MHz	N/A	N/A

1.3. Antenna information

Antenna model / type number .. :		N/A			
Antenna serial number ..... :		N/A			
Antenna Delivery ..... :		☒	1TX + 1RX		
		☒	2TX + 2RX		
		☐	Others:……		
Antenna technology ..... :		☒	SISO		
		☒	MIMO	☒	CDD
				☐	Beam-forming
Antenna Type..... :		☐	External	☐	Dipole
				☐	Sectorized
		☒	Internal	☒	PIFA
				☐	PCB
				☐	Metal Antenna
				☐	Others……..
SISO	2.72 dBi	2.72 dBi			
	2.76 dBi	2.76 dBi			
CDD		2.76 dBi for Power; 5.75 dBi for PSD			

1.4. Mode of Operation

Test Modes List
Mode 1: Transmit by 802.11b
Mode 2: Transmit by 802.11g
Mode 3: Transmit by 802.11n(20MHz)

Note 1: Regards to the frequency band operation: the lowest, middle and highest frequency channel were selected to perform the test, then shown on this report.

Note 2: For portable device, radiated tests was verified over X, Y, Z axis, and shown the worst case on this report.

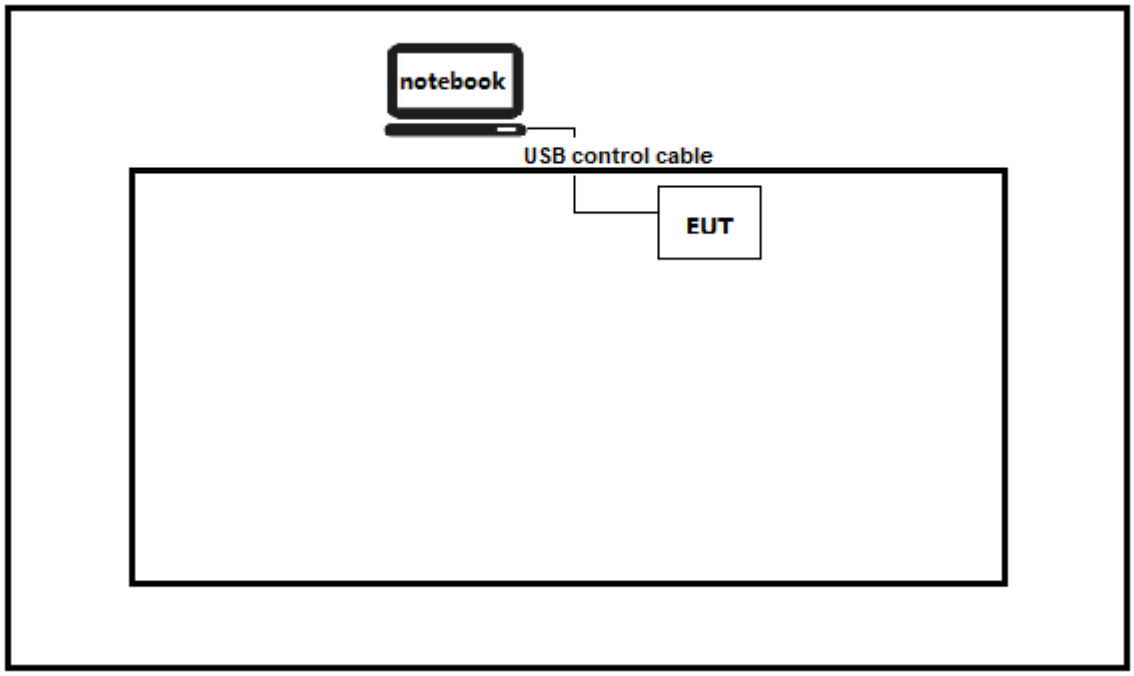
1.5. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

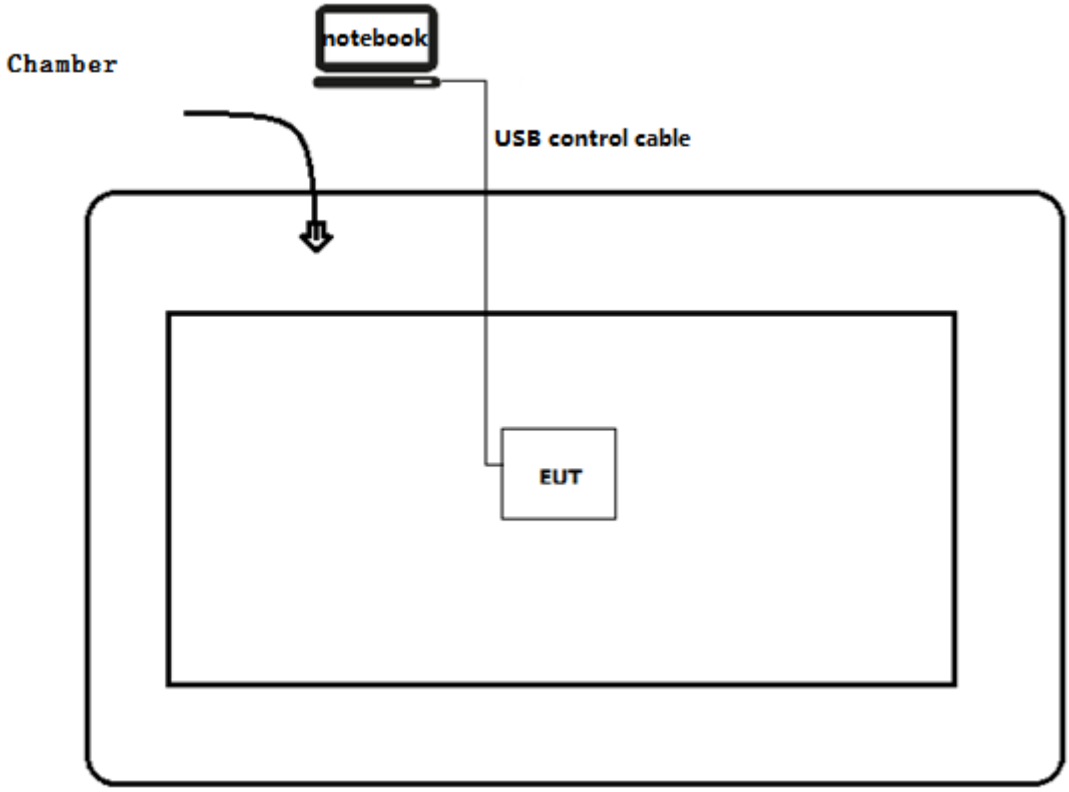
No.	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	Think Pad	2526	LV-A3285	Power by adapter

1.6. Configuration of Tested System

Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Radiated Emission



1.7. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of equipment.
3	Run the ADB command.
4	Select the transmission mode and test channel, then start test.

2. Technical Test

2.1. Summary of Test Result

For FCC

Performed Test Item	Normative References	Limit	Result
AC Power Line Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: Section 15.207	FCC 15.207	PASS
Emissions in restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: Section 15.209	FCC 15.209	PASS
Emissions in non-restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(d)	⩾30dBc	N/A
Band Edge	FCC CFR Title 47 Part 15 Subpart C: Section 15.205	FCC 15.209	N/A
Occupied Bandwidth	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(a)(2)	⩾500kHz	N/A
Fundamental emission output power	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(b)(3)	⩽30dBm	PASS
Power Spectral Density	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(e)	⩽8dBm/3kHz	N/A
Antenna Requirement	FCC CFR Title 47 Part 15 Subpart C: Section 15.203	FCC 15.203	N/A

For ISED

Performed Test Item	Normative References	Limit	Result
AC Power Line Conducted Emission	RSS-Gen Issue 5 Section 8.8	RSS-Gen	PASS
Emissions in restricted frequency bands	RSS-Gen Issue 5 Section 8.9	RSS-Gen	PASS
Emissions in non-restricted frequency bands	RSS-247 Issue 2 Section 5.5	⩾30dBc	N/A
Band Edge	RSS-Gen Issue 5 Section 8.10	RSS-247	N/A
Occupied Bandwidth	RSS-Gen Issue 5 Section 6.7 RSS-247 Issue 2 Section 5.2(a)	Within Band ⩾500kHz	N/A
Fundamental emission output power	RSS-247 Issue 2 Section 5.4(d)	⩽30dBm	PASS
Power Spectral Density	RSS-247 Issue 2 Section 5.2(b)	⩽8dBm/3kHz	N/A
Antenna Requirement	RSS-Gen Issue 5 Section 6.8	RSS-Gen Issue 5	N/A

2.2. Test Frequency configuration:

Modulation Mode	Channel	Frequency	Channel	Frequency	Channel	Frequency
802.11b	01	2412 MHz	06	2437 MHz	11	2462 MHz
802.11g	01	2412 MHz	06	2437 MHz	11	2462 MHz
802.11n(20MHz)	01	2412 MHz	06	2437 MHz	11	2462 MHz

2.3. Power Index

Mode	Frequency(MHz)	Power Index
802.11b	2412	12.0
	2437	12.0
	2462	12.0
802.11g	2412	12.0
	2437	12.0
	2462	12.0
802.11n(20MHz)	2412	12.0
	2437	12.0
	2462	12.0

Note: This power setting is used for both SISO and MIMO mode.

2.4. Power vs Data Rate

MCS Index for 802.11n	Spatial Streams				
		802.11b	802.11g	20MHz Bandwidth	
				800ns GI	400ns GI
0	1	1	6	6.5	7.2
1	1	2	9	13.0	14.4
2	1	5.5	12	19.5	21.7
3	1	11	18	26.0	28.9
4	1	---	24	39.0	43.3
5	1	---	36	52.0	57.8
6	1	---	48	58.5	65.0
7	1	---	54	65.0	72.2
8	2	---	---	13.0	14.4
9	2	---	---	26.0	28.9
10	2	---	---	39.0	43.3
11	2	---	---	52.0	57.8
12	2	---	---	78.0	86.7
13	2	---	---	104.0	115.6
14	2	---	---	117.0	130.0
15	2	---	---	130.0	144.4

Note 1: The blue form is the maximum power data rate.

Note 2: The EUT supports two spatial streams.

2.5. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

2.6. Measurement Uncertainty

Test Items	Uncertainty
AC Power Line Conducted Emission	±2.02 dB
Radiated Emission	Below 1GHz ±3.8 dB
	Above 1GHz ±3.9 dB
RF Antenna Port Conducted Emission	±1.27 dB
Radiated Emission Band Edge	±3.9 dB
Occupied Bandwidth	±1 kHz
Power Spectral Density	±1.27 dB

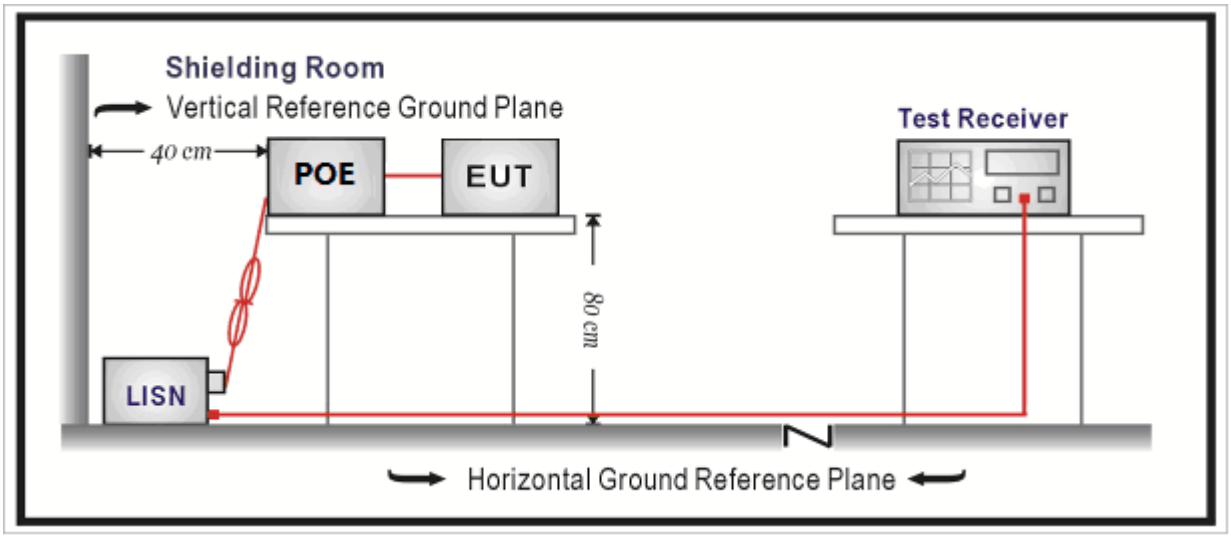
3. AC Power Line Conducted Emission

3.1. Test Equipment

AC Power Line Conducted Emission / TR-1					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100906	2021.04.28	2022.04.27
Two-Line V-Network	R&S	ENV216	101044	2021.03.20	2022.03.19
50ohm Termination	SHX	TF2	7081402	2021.09.04	2022.09.03
50ohm Termination	SHX	TF2	7081403	2021.09.04	2022.09.03
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	TR1-TH	2021.07.09	2022.07.08
Dekra test software	Dekra	-	-	-	-
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

3.2. Test Setup

AC Power Line Conducted Emission test setup



3.3. Limit

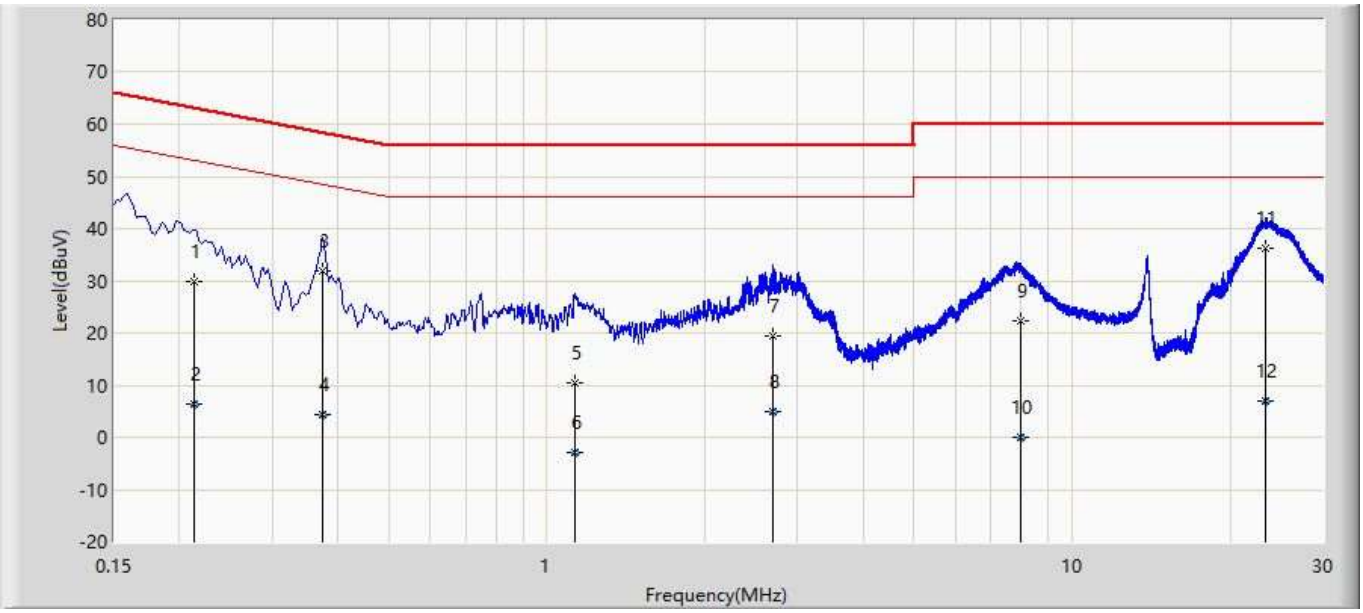
Frequency of Emission (MHz)	Conducted Limit	
	Quasi-peak (dBμV)	Average(dBμV)
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.		

3.4. Test Procedure

Test Method			
	References Rule	Chapter	Item
☒	ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

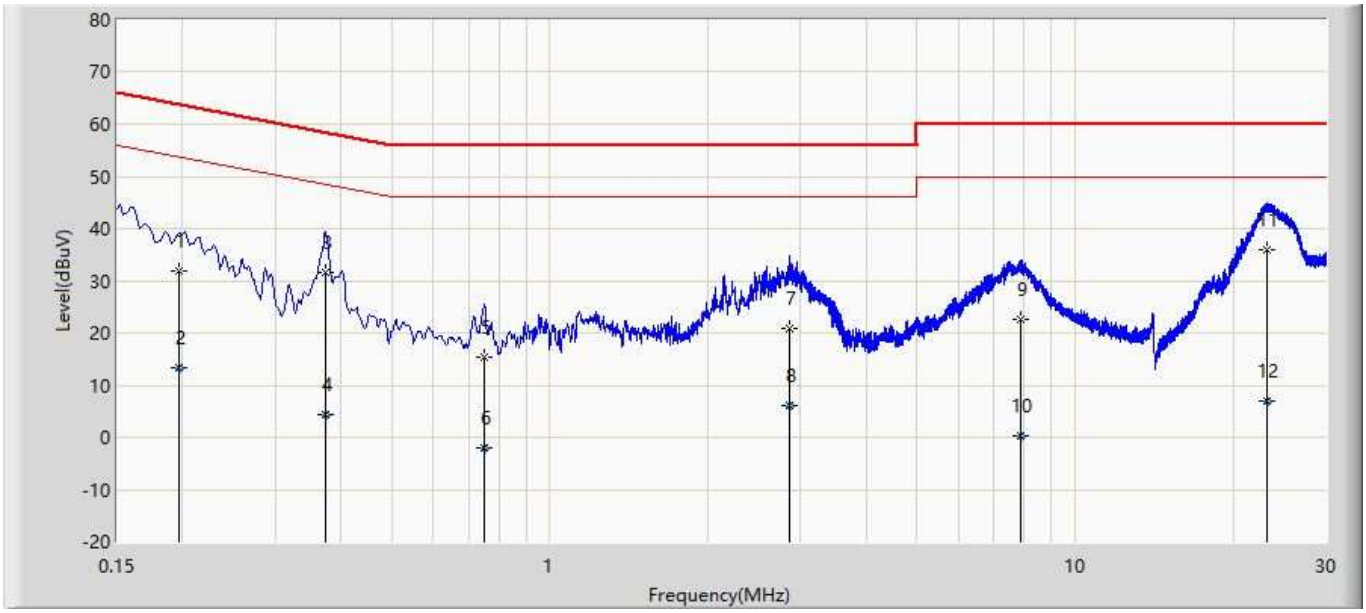
3.5. Test Result

Profile: 21B0716R	Page No.: 13
Engineer: Tim.Cao	
Site: TR1	Time: 2021/12/08 - 02:08
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Line
EUT: TOUCH ALL ONE COMPUTER	Power: AC 120V/60Hz
Note: Mode: N-line	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.213	29.969	20.274	-33.119	63.088	9.695	QP
2		0.213	6.295	-3.399	-46.792	53.088	9.695	AV
3		0.375	31.763	21.990	-26.627	58.389	9.773	QP
4		0.375	4.347	-5.426	-44.042	48.389	9.773	AV
5		1.129	10.301	0.323	-45.699	56.000	9.977	QP
6		1.129	-2.865	-12.843	-48.865	46.000	9.977	AV
7		2.695	19.471	9.408	-36.529	56.000	10.064	QP
8		2.695	4.816	-5.248	-41.184	46.000	10.064	AV
9		7.969	22.394	12.123	-37.606	60.000	10.270	QP
10		7.969	-0.046	-10.317	-50.046	50.000	10.270	AV
11	*	23.359	36.254	25.603	-23.746	60.000	10.651	QP
12		23.359	6.962	-3.689	-43.038	50.000	10.651	AV

Profile: 21B0716R	Page No.: 14
Engineer: Tim.Cao	
Site: TR1	Time: 2021/12/08 - 02:11
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Line
EUT: TOUCH ALL ONE COMPUTER	Power: AC 120V/60Hz
Note: Mode: N-line	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.197	31.893	22.208	-31.833	63.726	9.685	QP
2		0.197	13.473	3.788	-40.253	53.726	9.685	AV
3		0.375	31.520	21.747	-26.869	58.389	9.773	QP
4		0.375	4.384	-5.389	-44.006	48.389	9.773	AV
5		0.751	15.267	5.348	-40.733	56.000	9.919	QP
6		0.751	-1.931	-11.850	-47.931	46.000	9.919	AV
7		2.857	20.979	10.909	-35.021	56.000	10.070	QP
8		2.857	6.156	-3.913	-39.844	46.000	10.070	AV
9		7.863	22.734	12.469	-37.266	60.000	10.265	QP
10		7.863	0.188	-10.077	-49.812	50.000	10.265	AV
11	*	23.131	35.814	25.167	-24.186	60.000	10.647	QP
12		23.131	6.974	-3.673	-43.026	50.000	10.647	AV

4. Emissions in restricted frequency bands

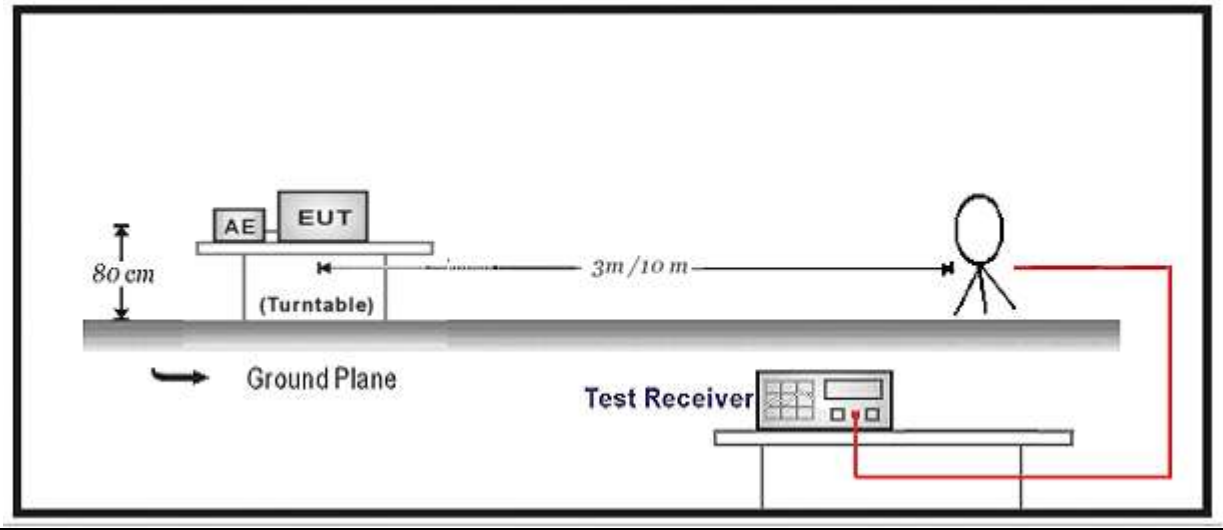
4.1. Test Equipment

Radiated Emission(Below 1GHz) / AC-3					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100176	2021.08.15	2022.08.14
Loop Antenna	R&S	HFH2-Z2	833799/003	2021.03.04	2022.03.03
Bilog Antenna	Teseq GmbH	CBL6112D	27613	2021.08.23	2022.08.22
Coaxial Cable	Huber+Suhner	RG 214	AC3-C	2021.03.31	2022.03.30
Temperature/Humidity Meter	RTS	RTS-8S	AC3-TH	2021.08.12	2022.08.11
Dekra test software	Dekra	-	-	-	-
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

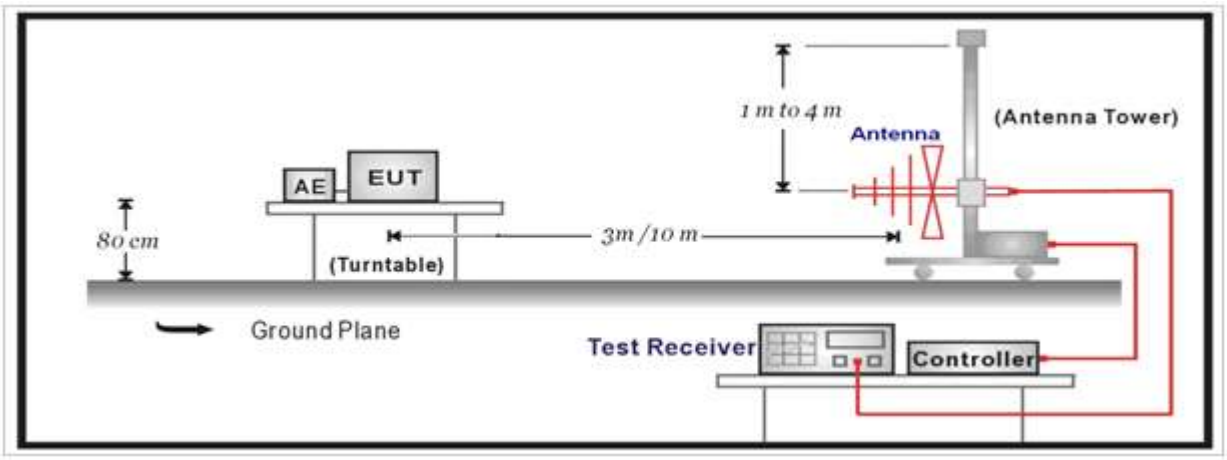
Radiated Emission(Above 1GHz) / AC-5					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2021.03.20	2022.03.19
Amplifier	Keleto	LNPA	SK20190225	2021.09.24	2022.09.23
Preamplifier	EMCI	EMC184045SE	980263	2021.05.22	2022.05.21
DRG Horn Antenna	ETS-Lindgren	3117	00167055	2021.08.23	2022.08.22
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2021.04.14	2023.04.13
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2021.03.31	2022.03.30
Coaxial Cable	ROSENBERGER	LA1-C011-2000/3000	AC5-40G	2021.03.20	2022.03.19
Temperature/Humidity Meter	RTS	RTS-8S	AC5-TH	2021.07.09	2022.07.08
Dekra test software	Dekra	-	-	-	-
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

4.2. Test Setup

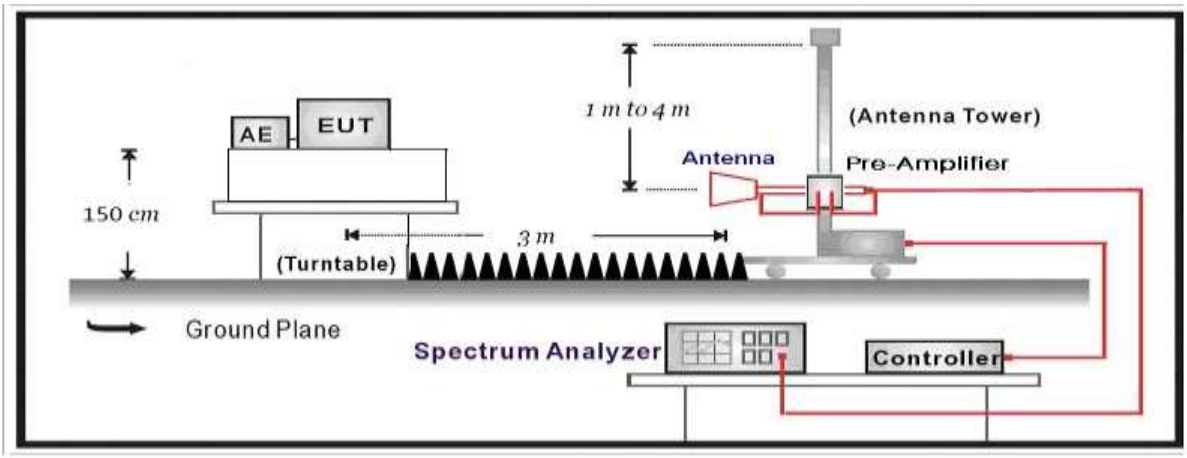
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limit

For FCC

Restricted Bands of operation			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (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	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	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
8.81425 – 8.81475	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	
13.36 – 13.41			

For ISED:

MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 – 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 – 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 – 8500	
108 – 138		

Restricted Band Emissions Limit			
Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30(Note 1)
1.705 - 30	30	29.5	30(Note 1)
30 - 88	100	40	3(Note 2)
88 - 216	150	43.5	3(Note 2)
216 - 960	200	46	3(Note 2)
Above 960	500	54	3(Note 2)

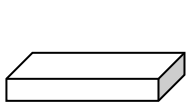
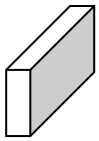
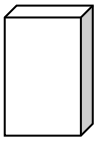
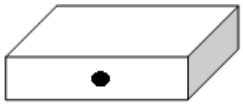
Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

4.4. Test Procedure

Test Method								
	References Rule						Chapter	Description
☐	ANSI C63.10						11.11	Emissions in non-restricted frequency bands
	☐	ANSI C63.10					11.11.2	Reference level measurement
	☐	ANSI C63.10					11.11.3	Emission level measurement
☒	ANSI C63.10						11.12	Emissions in restricted frequency bands
	☒	ANSI C63.10					11.12.1	Radiated emission measurements
	☒	ANSI C63.10					11.12.2.7	Radiated spurious emission test
		☒	ANSI C63.10				6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
		☒	ANSI C63.10				6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
		☒	ANSI C63.10				6.6	Radiated emissions from unlicensed wireless devices above 1 GHz
	☐	ANSI C63.10					11.12.2	Antenna-port conducted measurements
		☐	ANSI C63.10				11.12.2.3	Quasi-peak measurement procedure
		☐	ANSI C63.10				11.12.2.4	Peak power measurement procedure
		☐	ANSI C63.10				11.12.2.5	Average power measurement procedures
			☐	ANSI C63.10			11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
			☐	ANSI C63.10			11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
			☐	ANSI C63.10			11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

4.5. EUT test Axis definition

<table>
<tr><th>Item</th><th colspan="4">Emissions in restricted frequency bands</th></tr>
<tr><td rowspan="3">Device Category</td><td>☐</td><td colspan="3">Fixed point-to-point</td></tr>
<tr><td>☐</td><td colspan="3">Emit multiple directional beams, simultaneously or sequentially</td></tr>
<tr><td>☒</td><td colspan="3">Other cases</td></tr>
<tr><td>Test mode</td><td colspan="4">Mode 1~3</td></tr>
<tr><td rowspan="11">Test method</td><td>☒</td><td colspan="3">Radiated</td></tr>
<tr><td rowspan="3"></td><td>X Axis</td><td>Y Axis</td><td>Z Axis</td></tr>
<tr><td>  </td><td>  </td><td>  </td></tr>
<tr><td>Worst Axis ☒</td><td>Worst Axis ☐</td><td>Worst Axis ☐</td></tr>
<tr><td>☐</td><td colspan="3">Conducted</td></tr>
<tr><td>☐</td><td colspan="3">Chain 1</td></tr>
<tr><td></td><td colspan="3">  </td></tr>
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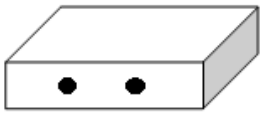
<tr><td></td><td colspan="3">  </td></tr>
<tr><td>☐</td><td>Chain 1</td><td>Chain 2</td><td>Chain 3</td></tr>
<tr><td></td><td colspan="3">  </td></tr>
</table>

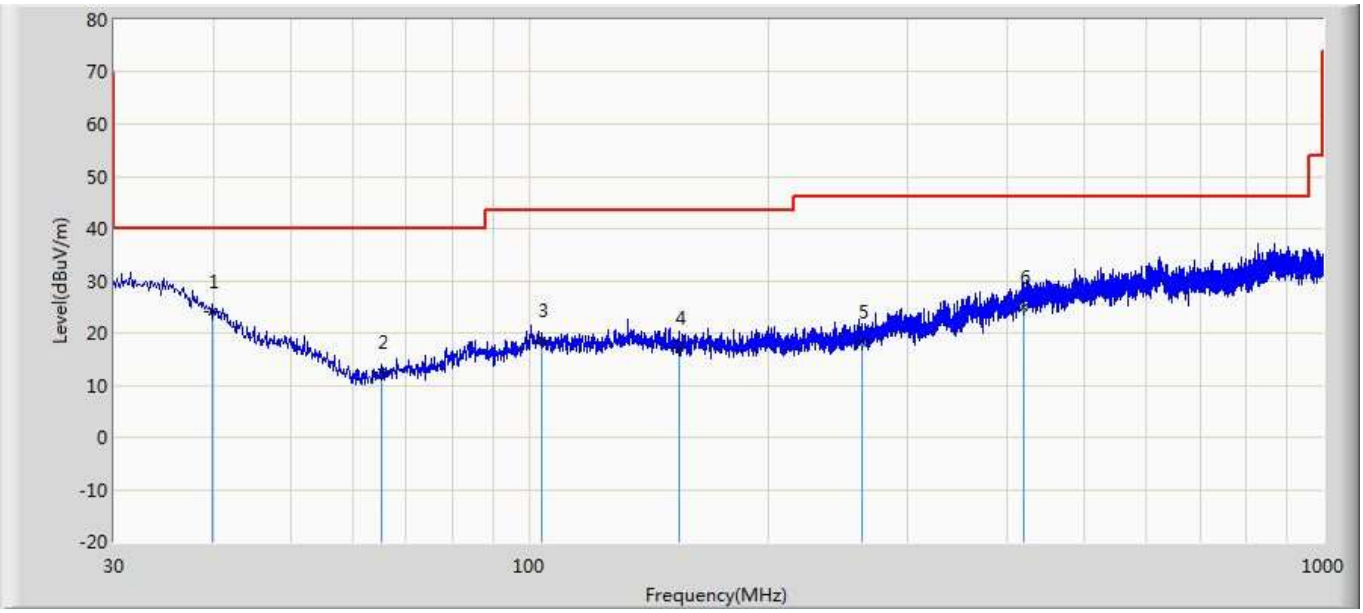
4.6. Test Result

Note:

1. We have evaluated both SISO and CDD mode, shown in the report is the worst data.
2. Measure Level = Reading Level + Factor.
3. The test frequency range, 9kHz~30MHz, 18GHz~25GHz, both of the worst case are at least 6dB below the limits, therefore no data appear in the report.
4. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.
5. As the radiated emission was performed, so conducted emission was not tested.

The worst case of Radiated Emission below 1GHz:

Profile: 1	Page No.: 19
Engineer: Carlos shen	
Site: AC2	Time: 2021/11/27 - 06:10
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Horizontal
EUT: Touch All One Computer	Power: AC 120V/60Hz
Note: Mode1	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	39.821	24.133	1.788	-15.867	40.000	22.345	QP
2		65.041	12.598	2.585	-27.402	40.000	10.013	QP
3		103.599	18.594	1.757	-24.906	43.500	16.837	QP
4		154.645	17.025	0.148	-26.475	43.500	16.877	QP
5		262.194	18.301	-0.527	-27.699	46.000	18.829	QP
6		420.668	25.014	-2.070	-20.986	46.000	27.084	QP

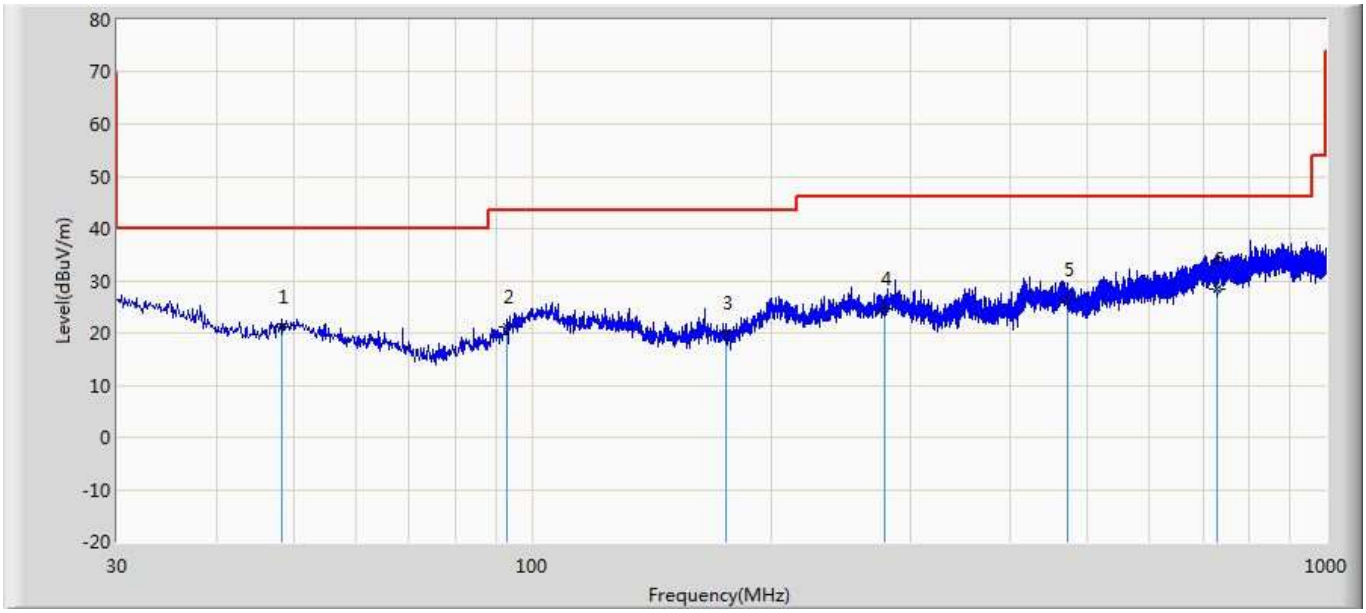
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.

2. " * ", means this data is the worst emission level.

3. Measurement Level = Reading Level + Factor(Probe+Cable-Amp)

Profile: 1	Page No.: 20
Engineer: Carlos shen	
Site: AC2	Time: 2021/11/27 - 06:13
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Vertical
EUT: Touch All One Computer	Power: AC 120V/60Hz
Note: Mode1	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		48.309	21.021	2.048	-18.979	40.000	18.973	QP
2		92.929	21.036	2.482	-22.464	43.500	18.554	QP
3		175.500	20.124	2.020	-23.376	43.500	18.104	QP
4		277.714	24.541	0.043	-21.459	46.000	24.497	QP
5		473.533	26.310	-0.032	-19.690	46.000	26.342	QP
6	*	730.825	28.546	-2.214	-17.454	46.000	30.761	QP

Note:

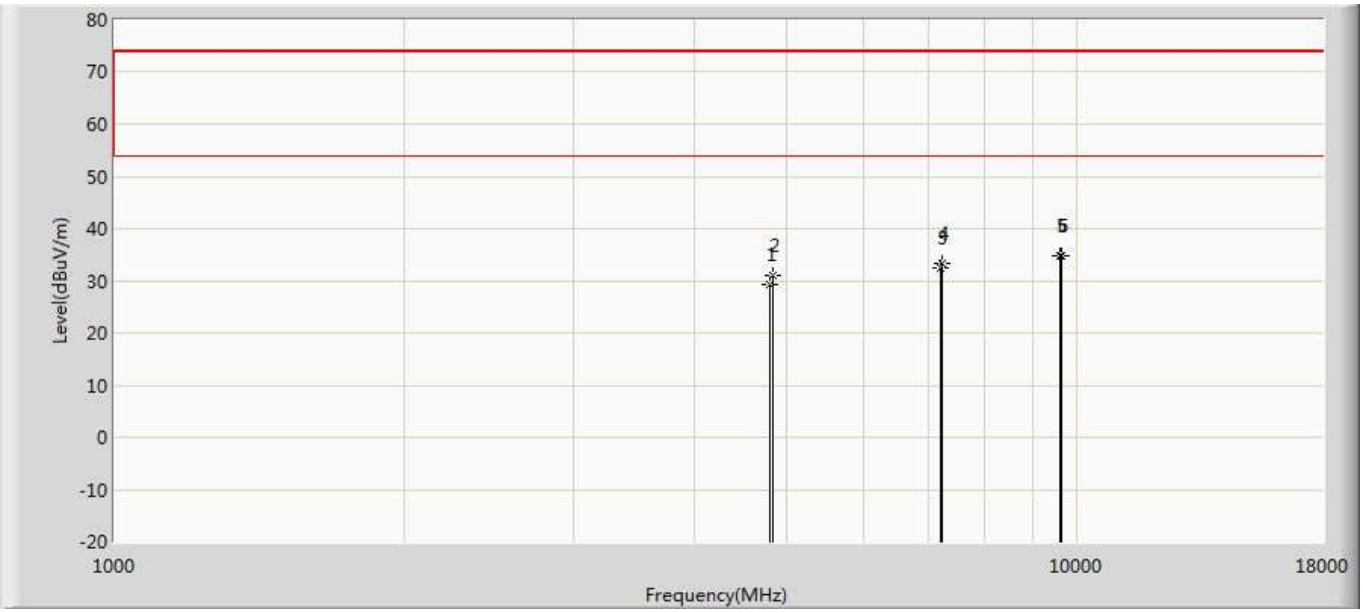
1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.

2. " * ", means this data is the worst emission level.

3. Measurement Level = Reading Level + Factor(Probe+Cable-Amp)

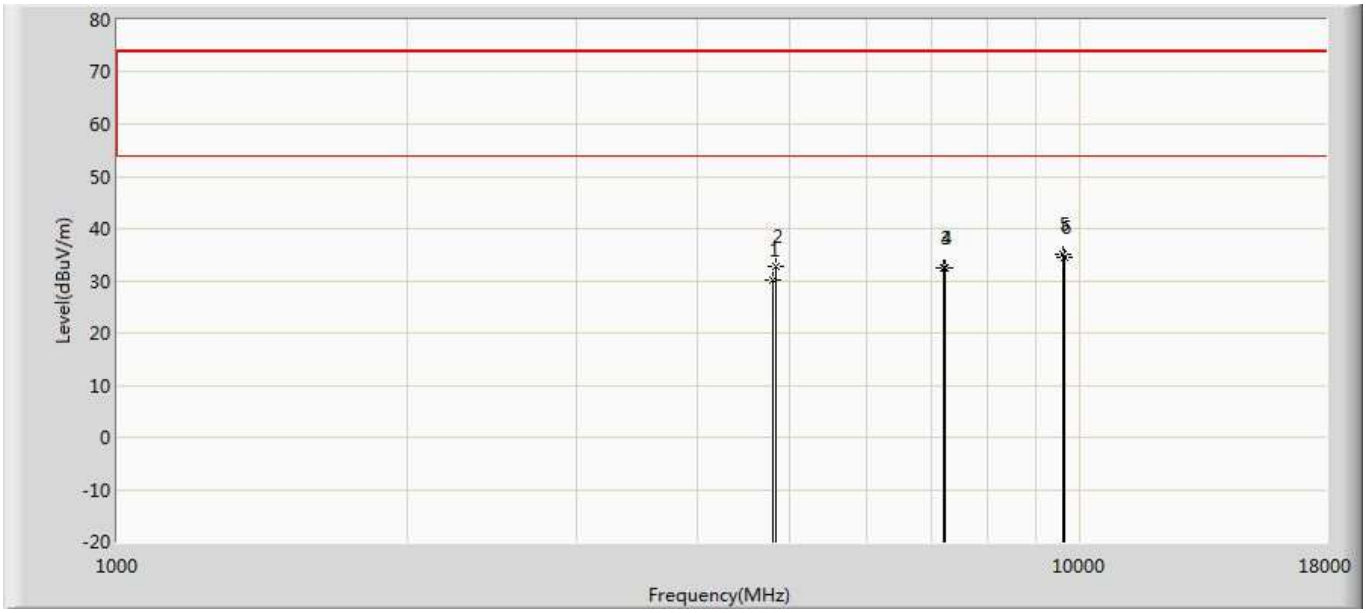
The worst case of Simultaneous Radiated Emission:

Profile: 21B0716	Page No.: 334
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/10 - 05:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00123988_(1-18GHz)	Polarity: Horizontal
EUT: Touch All One Computer	Power: AC 120V/60Hz
Note: Simultaneous transmission with BT + 2.4G Wi-Fi	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	29.267	36.658	-44.733	74.000	-7.391	PK
2		4824.000	30.901	37.047	-43.099	74.000	-6.146	PK
3		7206.000	32.346	36.347	-41.654	74.000	-4.001	PK
4		7236.000	33.341	37.003	-40.659	74.000	-3.662	PK
5		9608.000	34.661	35.765	-39.339	74.000	-1.104	PK
6	*	9648.000	34.798	35.350	-39.202	74.000	-0.551	PK

Profile: 21B0716	Page No.: 335
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/10 - 05:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00123988_(1-18GHz)	Polarity: Vertical
EUT: Touch All One Computer	Power: AC 120V/60Hz
Note: Simultaneous transmission with BT + 2.4G Wi-Fi	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	30.276	37.667	-43.724	74.000	-7.391	PK
2		4824.000	32.662	38.808	-41.338	74.000	-6.146	PK
3		7206.000	32.425	36.426	-41.575	74.000	-4.001	PK
4		7236.000	32.463	36.125	-41.537	74.000	-3.662	PK
5	*	9608.000	34.930	36.034	-39.070	74.000	-1.104	PK
6		9648.000	34.483	35.035	-39.517	74.000	-0.551	PK

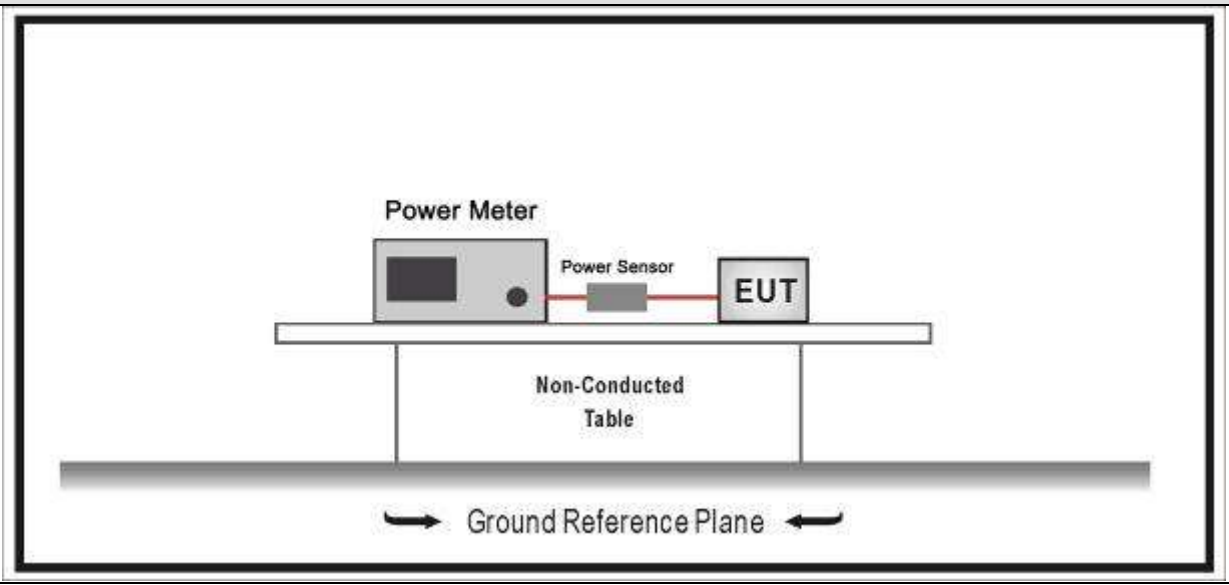
5. Fundamental emission output power

5.1. Test Equipment

Fundamental Emission output power / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2021.07.11	2022.07.10
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2021.03.20	2022.03.19
MXA Signal Anlyzer	Keysight	N9020A	MY56060147	2021.07.11	2022.07.10
4TX MIMO Power Sensor	Keysight	X8750A	MY59400102	2021.02.11	2022.02.10
Coaxial Cable	Woken	SFL402	F02-150410-044	2021.01.01	2021.12.31
Temperature/Humidity Meter	RTS	RTS-8S	RF08	2021.07.09	2022.07.08
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

5.2. Test Setup

Fundamental emission output power test setup



5.3. Limit

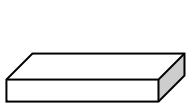
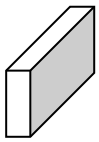
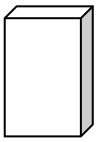
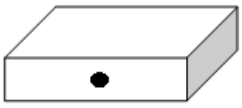
Fundamental emission output power Limit			
☒	G_{TX} ＜6dBi		P_{out}≤30dBm
☐	G_{TX} ＞6dBi		
	☐	Non-Fix point-point	P_{out}≤30-(G_{TX} -6)
	☐	Fix point-point	P_{out}≤30-[(G_{TX}-6)]/3
	☐	Point-to-multipoint	Pout≤30-(GTX-6)
	☐	Overlap Beams	P_{out}≤30-[(G_{TX}-6)]/3
	☐	Aggregate power transmitted simultaneously on all beams	P_{out}≤30-[(G_{TX}-6)]/3
	☐	single directional beam	P_{out}≤30-[(G_{TX}-6)]/3+8dB
Note 1 : G_{TX} directional gain of transmitting antennas. Note 2 : P_{out} is maximum peak conducted output power .			

5.4. Test Procedure

Fundamental emission output power Test Method						
	References Rule				Chapter	Description
☒	ANSI C63.10				11.9	Fundamental emission output power
	☐	ANSI C63.10			11.9.1	Maximum peak conducted output power
		☐	ANSI C63.10		11.9.1.1	RBW ≥ DTS bandwidth
		☐	ANSI C63.10		11.9.1.2	Integrated band power method
		☐	ANSI C63.10		11.9.1.3	PKPM1 Peak power meter method
	☒	ANSI C63.10			11.9.2	Maximum conducted (average) output power
		☐	ANSI C63.10		11.9.2.2	Measurement using a spectrum analyzer (SA)
			☐	ANSI C63.10	11.9.2.2.2	Method AVGSA-1(Duty cycle≥98%)
			☐	ANSI C63.10	11.9.2.2.3	Method AVGSA-1A(Duty cycle≥98%)
			☐	ANSI C63.10	11.9.2.2.4	Method AVGSA-2(Duty cycle≤98%)
			☐	ANSI C63.10	11.9.2.2.5	Method AVGSA-2A(Duty cycle≤98%)
			☐	ANSI C63.10	11.9.2.2.4	Method AVGSA-3
			☐	ANSI C63.10	11.9.2.2.5	Method AVGSA-3A
		☒	ANSI C63.10		11.9.2.3	Measurement using a power meter (PM)
			☒	ANSI C63.10	11.9.2.3.1	Method AVGPM
			☐	ANSI C63.10	11.9.2.3.2	Method AVGPM-G

Directional Gain Calculations for In-Band test method				
	References Rule		Chapter	Description
☐	KDB 662911		F2)a)	Basic methodology
	☐	KDB 662911	F2)a) (i)	transmit signals are correlated
	☐	KDB 662911	F2)a) (ii)	transmit signals are uncorrelated
☐	KDB 662911		F2)b)	Sectorized antenna systems.
☐	KDB 662911		F2)c)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (i)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (ii)	Multiple antennas
☐	KDB 662911		F2)e)	Spatial Multiplexing
	☐	KDB 662911	F2)e) (i)	Antennas have the same gain
	☐	KDB 662911	F2)e) (ii)	Antenna have the different gain with one spatial stream
	☐	KDB 662911	F2)e) (iii)	Antenna have the different gain with more than one spatial stream
☒	KDB 662911		F2)f)	Cyclic Delay Diversity (CDD)
	☐	KDB 662911	F2)f) (i)	Antennas have the same gain
	☐	KDB 662911	F2)f) (ii)	Antenna have the different gain with one spatial stream
	☒	KDB 662911	F2)f) (iii)	Antenna have the different gain with more than one spatial stream

5.5. EUT test definition

<table>
<tr><th>Item</th><th colspan="4">Fundamental emission output power</th></tr>
<tr><td rowspan="3">Device Category</td><td>☐</td><td colspan="3">Fixed point-to-point</td></tr>
<tr><td>☐</td><td colspan="3">Emit multiple directional beams, simultaneously or sequentially</td></tr>
<tr><td>☒</td><td colspan="3">Other cases</td></tr>
<tr><td>Test mode</td><td colspan="4">Mode 1~3</td></tr>
<tr><td rowspan="12">Test method</td><td>☐</td><td colspan="3">Radiated</td></tr>
<tr><td rowspan="3"></td><td>X Axis</td><td>Y Axis</td><td>Z Axis</td></tr>
<tr><td>  </td><td>  </td><td>  </td></tr>
<tr><td>Worst Axis ☐</td><td>Worst Axis ☐</td><td>Worst Axis ☐</td></tr>
<tr><td>☒</td><td colspan="3">Conducted</td></tr>
<tr><td>☒</td><td colspan="3">Chain 1</td></tr>
<tr><td></td><td colspan="3">  </td></tr>
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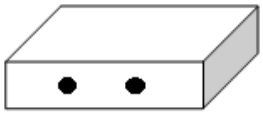
<tr><td></td><td colspan="3">  </td></tr>
<tr><td>☐</td><td>Chain 1</td><td>Chain 2</td><td>Chain 3</td></tr>
<tr><td></td><td colspan="3">  </td></tr>
</table>

5.6. Test Result

Product Name	:	Touch All One Computer
Test Mode	:	Mode 1~3

SISO:

Mode	Channel	Test Frequency (MHz)	Conducted Power Output (dBm)		EIRP (dBm)		Conducted Power Limit (dBm)	EIRP Limit (dBm)	Result
			Ant 1	Ant 2	Ant 1	Ant 2			
1	01	2412	12.35	12.62	14.82	13.56	30	36	Pass
1	06	2437	12.47	12.73	14.93	13.64	30	36	Pass
1	11	2462	11.88	12.45	14.35	13.15	30	36	Pass
2	01	2412	12.61	12.88	14.98	13.75	30	36	Pass
2	06	2437	12.43	12.82	14.85	13.59	30	36	Pass
2	11	2462	11.82	12.34	14.31	13.02	30	36	Pass
3	01	2412	12.65	13.01	14.55	13.29	30	36	Pass
3	06	2437	12.50	12.91	14.15	12.99	30	36	Pass
3	11	2462	12.00	12.32	13.93	12.67	30	36	Pass

CDD

Mode	Channel	Test Frequency (MHz)	Conducted Power Output (dBm)		Total Conducted Power (dBm)	Total EIRP (dBm)	Conducted Power Limit (dBm)	EIRP Limit (dBm)	Result
			Ant 1	Ant 2					
2	01	2412	12.65	13.01	15.84	18.6	30	36	Pass
2	06	2437	12.50	12.91	15.72	18.48	30	36	Pass
2	11	2462	12.00	12.32	15.17	17.93	30	36	Pass
3	01	2412	12.19	12.58	15.32	18.08	30	36	Pass
3	06	2437	11.96	12.27	15.11	17.87	30	36	Pass
3	11	2462	11.64	11.95	14.74	17.5	30	36	Pass

The End