# 6. UNWANTED EMISSIONS AND BAND EDGE

## 6.1. Limit

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band:All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at 5 MHz above or below the band edge.

The unwanted emissions which fall in Restricted bands shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength(µV/m)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

15.209 Radiated	l emission limits
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MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 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
8.41425 - 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)

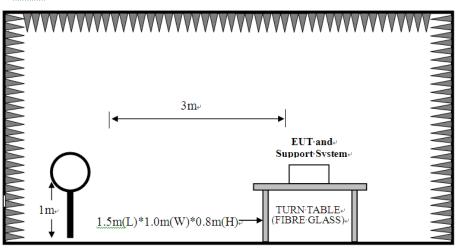


## Note:

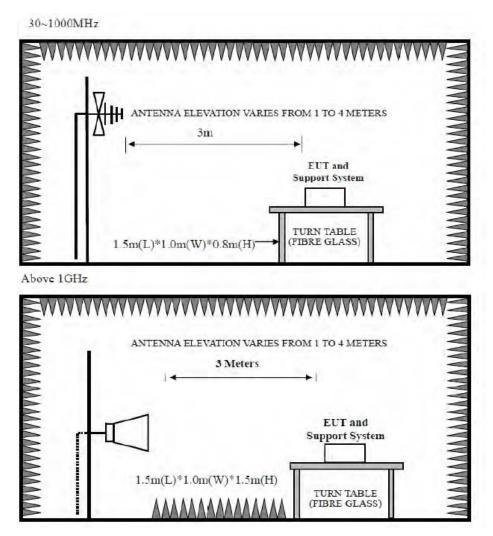
- 1.  $dB\mu V/m=20Log(\mu V/m)$
- 2. Above 1GHz the formula is used to convert the EIRP to field strength *E*[dBμV/m] = EIRP[dBm] - 20 log (*d*[m]) + 104.77, where E is field strength and d is distance at which the field strength limit is specified in the applicable requirements. for example,3m field strength(dBμV/m)=EIRP-20log(3)+104.77=EIRP+95.2

6.2. Test Setup

9kHz~30MHz₊







6.3. Spectrum Analyzer Setting

For 9KHz-150KHz

Spectrum Parameters	Setting
RBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
VBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
Start frequency	9KHz
Stop frequency	150KHz
Sweep Time	Auto
Detector	PEAK/QP/AVG
Trace Mode	Max Hold

Note : For 9KHz-90KHz&110KHz-150KHz,the detector is average,other frequency is CISPR QP detector.

For 150KHz-30MHz						
Spectrum Parameters	Setting					
RBW	9KHz					
VBW	9KHz					
Start frequency	150KHz					
Stop frequency	30MHz					
Sweep Time	Auto					
Detector	QP					
Trace Mode	Max Hold					

Note : For 150KHz-490KHz, the detector is average, other frequency is CISPR QP detector.



Spectrum Parameters	Setting
RBW	120KHz
VBW	300KHz
Start frequency	30MHz
Stop frequency	1GHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

## For 30MHz-1GHz

## For Above 1GHz

Spectrum Parameters	Setting				
RBW		1MHz			
	PEAK Measurement	AVG Measurement			
		Duty cycle≥98%,VBW=10Hz			
VBW	3MHz	Duty cycle<98%,VBW≥1/T			
	SIMITZ	Video bandwidth mode=RMS			
		(power averaging)			
Start frequency		1GHz			
Stop frequency		25GHz			
Sweep Time		Auto			
Detector	PEAK				
Trace Mode	Ν	/lax Hold			

Note : T is the on-time time of the duty cycle, when EUT transmit continuously with maximum output power, unit is seconds. reference section 2.7 for the on-time time.

## 6.4. Test Procedure

- a. EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz test, and which is 1.5 meter high above ground for above 1GHz test.
- b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- c. Set the EUT transmit continuously with maximum output power.
- d. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- e. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
- f. Spectrum analyzer setting parameters in accordance with section 6.3.
- g. Repeat above procedures until all channels were measured.
- h. Record the results in the test report.

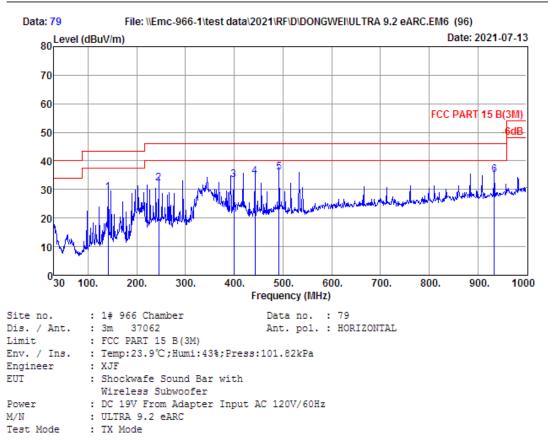


## 6.5. Test Result

## **Radiated Emissions Below 1GHz**

# EST Technology

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	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin ( dB)	Remark
1	141.55	12.23	1.05	15.78	29.06	43.50	14.44	QP
2	245.34	11.60	1.61	19.06	32.27	46.00	13.73	QP
3	399.57	16.20	2.14	15.05	33.39	46.00	12.61	QP
4	442.25	16.98	2.48	15.13	34.59	46.00	11.41	QP
5	491.72	18.14	2.66	15.13	35.93	46.00	10.07	QP
6	934.04	24.22	4.26	6.79	35.27	46.00	10.73	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.

 Margin= Limit - Emission Level.
 The emission levels that are 20dB below the official limit are not reported.



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#### Data: 80 File: \\Emc-966-1\test data\2021\RF\D\DONGWEI\ULTRA 9.2 eARC.EM6 (96) 80 Level (dBuV/m) Date: 2021-07-13 70 60 FCC PART 15 B(3M) 50 6dB 40 30 A subscheduly L.L.L. 20 10 0 30 100. 300 400. 600 700 800. 1000 200. 500. 900. Frequency (MHz) Site no. : 1# 966 Chamber Data no. : 80 Dis. / Ant. : 3m 37062 Ant. pol. : VERTICAL : FCC PART 15 B(3M) Limit Env. / Ins. : Temp:23.9°C;Humi:43%;Press:101.82kPa Engineer : XJF : Shockwafe Sound Bar with EUT Wireless Subwoofer : DC 19V From Adapter Input AC 120V/60Hz Power M/N : ULTRA 9.2 eARC Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin ( dB)	Remark
1	30.97	17.60	0.14	4.78	22.52	40.00	17.48	QP
2	97.90	9.62	0.84	13.10	23.56	43.50	19.94	QP
3	190.05	8.90	1.24	16.83	26.97	43.50	16.53	QP
4	202.66	8.52	1.28	18.09	27.89	43.50	15.61	QP
5	491.72	18.14	2.66	12.39	33.19	46.00	12.81	QP
6	884.57	23.85	3.88	6.98	34.71	46.00	11.29	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.

2. Margin= Limit - Emission Level.

3. The emission levels that are 20dB below the official limit are not reported.

Note:

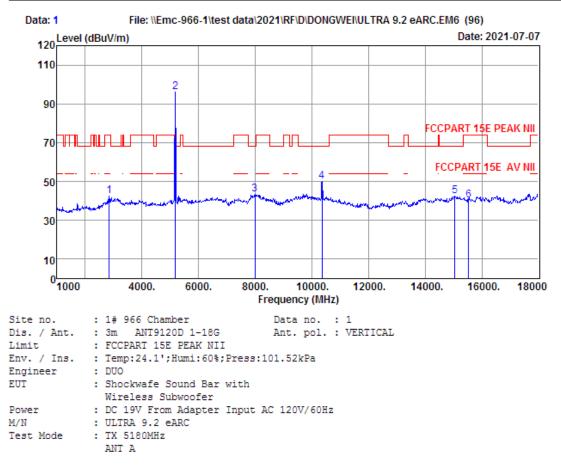
- 1. The amplitude of 9KHz to 30MHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
- 2. All channels had been pre-test, only the worst case was reported.



## **Radiated Emissions Above 1G**

# EST Technology

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	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2836.00	28.20	1.96	34.47	46.76	42.45	74.00	31.55	Peak
2	5180.00	32.20	3.52	34.63	94.88	95.97	68.20	-27.77	Peak
3	7987.00	36.90	5.80	34.90	35.41	43.21	68.20	24.99	Peak
4	10360.00	39.27	5.99	34.31	38.91	49.86	68.20	18.34	Peak
5	15042.00	40.86	6.78	34.59	29.45	42.50	68.20	25.70	Peak
6	15540.00	40.31	6.46	34.39	27.92	40.30	74.00	33.70	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.

3. The emission levels that are 20dB below the official



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#### Data: 2 File: \\Emc-966-1\test data\2021\RF\D\DONGWEI\ULTRA 9.2 eARC.EM6 (96) Date: 2021-07-07 Level (dBuV/m) 120 110 90 FCCPART 15E PEAK NII ····· 70 ΠП Ш FCCPART 15E AV NII 50 4 Б 3 30 10 0<sup>L</sup> 1000 4000. 6000. 12000. 14000. 8000. 10000. 16000. 18000 Frequency (MHz) : 1# 966 Chamber Site no. Data no. : 2 : 3m ANT9120D 1-18G Dis. / Ant. Ant. pol. : HORIZONTAL Limit : FCCPART 15E PEAK NII Env. / Ins. : Temp:24.1';Humi:60%;Press:101.52kPa Engineer : DUO EUT : Shockwafe Sound Bar with Wireless Subwoofer : DC 19V From Adapter Input AC 120V/60Hz Power M/N : ULTRA 9.2 eARC Test Mode : TX 5180MHz ANT A

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5180.00	32.20	3.52	34.63	89.87	90.96	68.20	-22.76	Peak
2	7987.00	36.90	5.80	34.90	33.90	41.70	68.20	26.50	Peak
3	10360.00	39.27	5.99	34.31	29.36	40.31	68.20	27.89	Peak
4	15059.00	40.84	6.77	34.58	30.43	43.46	68.20	24.74	Peak
5	15540.00	40.31	6.46	34.39	28.53	40.91	74.00	33.09	Peak
6	17983.00	48.76	8.23	34.30	17.75	40.44	74.00	33.56	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.



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#### Data: 3 File: \\Emc-966-1\test data\2021\RF\D\DONGWEI\ULTRA 9.2 eARC.EM6 (96) Date: 2021-07-07 Level (dBuV/m) 120 110 90 FCCPART 15E PEAK NII 70 Ш FCCPART 15E AV NII 3 50 5 30 10 0<sup>L</sup> 1000 4000. 6000. 10000. 12000. 14000. 8000. 16000. 18000 Frequency (MHz) : 1# 966 Chamber Site no. Data no. : 3 : 3m ANT9120D 1-18G Ant. pol. : VERTICAL Dis. / Ant. Limit : FCCPART 15E PEAK NII Env. / Ins. : Temp:24.1';Humi:60%;Press:101.52kPa Engineer : DUO EUT : Shockwafe Sound Bar with Wireless Subwoofer : DC 19V From Adapter Input AC 120V/60Hz Power M/N : ULTRA 9.2 eARC Test Mode : TX 5210MHz ANT A

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5210.00	32.28	3.54	34.61	93.88	95.09	68.20	-26.89	Peak
2	7953.00	36.89	5.77	34.89	32.84	40.61	68.20	27.59	Peak
3	10420.00	39.32	6.00	34.33	38.92	49.91	68.20	18.29	Peak
4	13665.00	40.52	6.40	34.33	30.28	42.87	68.20	25.33	Peak
5	15630.00	40.20	6.56	34.34	27.22	39.64	74.00	34.36	Peak
6	18000.00	48.90	8.24	34.30	20.10	42.94	74.00	31.06	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.



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#### Data: 4 File: \\Emc-966-1\test data\2021\RF\D\DONGWEI\ULTRA 9.2 eARC.EM6 (96) 120 Level (dBuV/m) Date: 2021-07-07 110 90 FCCPART 15E PEAK NII 70 Ш FCCPART 15E AV NII 50 4 5 30 10 0<sup>L</sup> 1000 4000. 6000. 12000. 14000. 8000. 10000. 16000. 18000 Frequency (MHz) : 1# 966 Chamber Site no. Data no. : 4 : 3m ANT9120D 1-18G Dis. / Ant. Ant. pol. : HORIZONTAL Limit : FCCPART 15E PEAK NII Env. / Ins. : Temp:24.1';Humi:60%;Press:101.52kPa Engineer : DUO EUT : Shockwafe Sound Bar with Wireless Subwoofer : DC 19V From Adapter Input AC 120V/60Hz Power M/N : ULTRA 9.2 eARC Test Mode : TX 5210MHz ANT A

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5210.00	32.28	3.54	34.61	90.28	91.49	68.20	-23.29	Peak
2	8174.00	36.90	5.60	34.82	34.10	41.78	74.00	32.22	Peak
3	10420.00	39.32	6.00	34.33	34.30	45.29	68.20	22.91	Peak
4	14991.00	40.90	6.81	34.59	30.06	43.18	68.20	25.02	Peak
5	15630.00	40.20	6.56	34.34	29.17	41.59	74.00	32.41	Peak
6	17983.00	48.76	8.23	34.30	22.34	45.03	74.00	28.97	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.



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#### Data: 5 File: \\Emc-966-1\test data\2021\RF\D\DONGWEI\ULTRA 9.2 eARC.EM6 (96) 120 Level (dBuV/m) Date: 2021-07-07 110 90 FCCPART 15E PEAK NII ····· 70 FCCPART 15E AV NII 50 R 5 2 30 10 0<sup>L</sup> 1000 4000. 6000. 8000. 12000. 14000. 10000. 16000. 18000 Frequency (MHz) : 1# 966 Chamber Site no. Data no. : 5 : 3m ANT9120D 1-18G Dis. / Ant. Ant. pol. : HORIZONTAL Limit : FCCPART 15E PEAK NII Env. / Ins. : Temp:24.1';Humi:60%;Press:101.52kPa Engineer : DUO EUT : Shockwafe Sound Bar with Wireless Subwoofer : DC 19V From Adapter Input AC 120V/60Hz Power M/N : ULTRA 9.2 eARC Test Mode : TX 5240MHz ANT A

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5240.00	32.31	3.55	34.61	89.78	91.03	68.20	-22.83	Peak
2	9755.00	38.42	5.70	34.25	32.42	42.29	68.20	25.91	Peak
3	10480.00	39.39	6.02	34.35	36.37	47.43	68.20	20.77	Peak
4	14481.00	41.01	6.89	34.44	30.30	43.76	74.00	30.24	Peak
5	15720.00	40.10	6.65	34.31	29.87	42.31	74.00	31.69	Peak
6	17626.00	45.92	8.00	34.34	26.13	45.71	68.20	22.49	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.



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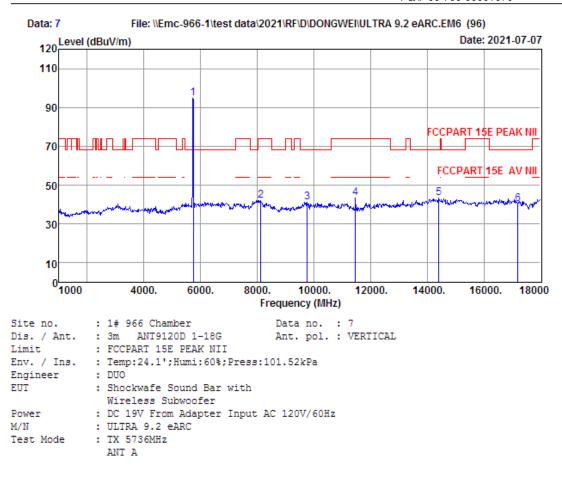
#### Data: 6 File: \\Emc-966-1\test data\2021\RF\D\DONGWEI\ULTRA 9.2 eARC.EM6 (96) 120 Level (dBuV/m) Date: 2021-07-07 110 90 FCCPART 15E PEAK NII 70 ΠП Ш FCCPART 15E AV NII 50 л 5 30 10 0<sup>L</sup> 1000 10000. 4000. 6000. 12000. 14000. 8000. 16000. 18000 Frequency (MHz) : 1# 966 Chamber Site no. Data no. : 6 : 3m ANT9120D 1-18G Ant. pol. : VERTICAL Dis. / Ant. Limit : FCCPART 15E PEAK NII Env. / Ins. : Temp:24.1';Humi:60%;Press:101.52kPa Engineer : DUO EUT : Shockwafe Sound Bar with Wireless Subwoofer : DC 19V From Adapter Input AC 120V/60Hz Power M/N : ULTRA 9.2 eARC Test Mode : TX 5240MHz ANT A

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5240.00	32.31	3.55	34.61	96.60	97.85	68.20	-29.65	Peak
2	8004.00	36.90	5.82	34.90	33.43	41.25	68.20	26.95	Peak
3	10480.00	39.39	6.02	34.35	35.98	47.04	68.20	21.16	Peak
4	15059.00	40.84	6.77	34.58	30.47	43.50	68.20	24.70	Peak
5	15720.00	40.10	6.65	34.31	28.60	41.04	74.00	32.96	Peak
6	17847.00	47.68	8.14	34.32	23.87	45.37	74.00	28.63	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.



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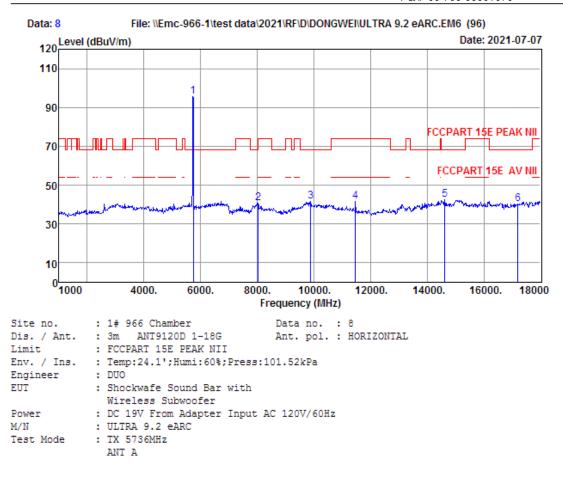


	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5736.00	32.85	4.00	34.40	92.53	94.98	68.20	-26.78	Peak
2	8123.00	36.90	5.67	34.84	34.32	42.05	74.00	31.95	Peak
3	9772.00	38.45	5.72	34.24	31.34	41.27	68.20	26.93	Peak
4	11472.00	39.90	6.15	34.64	31.85	43.26	74.00	30.74	Peak
5	14413.00	41.02	6.84	34.42	29.83	43.27	68.20	24.93	Peak
6	17208.00	42.53	7.62	34.38	24.59	40.36	68.20	27.84	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.



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		Ant.	Cable	Amp		Emission			
	Freq. (MHz)	Factor (dB/m)	Loss (dB)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5736.00	32.85	4.00	34.40	93.07	95.52	68.20	-27.32	Peak
2	8038.00	36.90	5.78	34.88	32.83	40.63	74.00	33.37	Peak
3	9891.00	38.69	5.81	34.22	31.19	41.47	68.20	26.73	Peak
4	11472.00	39.90	6.15	34.64	30.08	41.49	74.00	32.51	Peak
5	14617.00	40.98	6.88	34.48	29.17	42.55	68.20	25.65	Peak
6	17208.00	42.53	7.62	34.38	24.51	40.28	68.20	27.92	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.



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#### Data: 9 File: \\Emc-966-1\test data\2021\RF\D\DONGWEI\ULTRA 9.2 eARC.EM6 (96) 120 Level (dBuV/m) Date: 2021-07-07 110 90 FCCPART 15E PEAK NII ЛП 11 70 ΠП FCCPART 15E AV NII 50 2 3 6 4 5 30 10 0<sup>L</sup> 1000 10000. 4000. 8000. 14000. 6000. 12000. 16000. 18000 Frequency (MHz) : 1# 966 Chamber Site no. Data no. : 9 : 3m ANT9120D 1-18G Dis. / Ant. Ant. pol. : HORIZONTAL Limit : FCCPART 15E PEAK NII Env. / Ins. : Temp:24.1';Humi:60%;Press:101.52kPa Engineer : DUO EUT : Shockwafe Sound Bar with Wireless Subwoofer : DC 19V From Adapter Input AC 120V/60Hz Power M/N : ULTRA 9.2 eARC Test Mode : TX 5762MHz ANT A

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5762.00	32.85	4.03	34.39	92.51	95.00	68.20	-26.80	Peak
2	9806.00	38.52	5.74	34.24	31.30	41.32	68.20	26.88	Peak
3	11524.00	39.90	6.14	34.66	30.27	41.65	74.00	32.35	Peak
4	15705.00	40.12	6.63	34.32	28.17	40.60	74.00	33.40	Peak
5	17286.00	43.21	7.70	34.37	23.54	40.08	68.20	28.12	Peak
6	17677.00	46.32	8.03	34.33	21.74	41.76	68.20	26.44	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.



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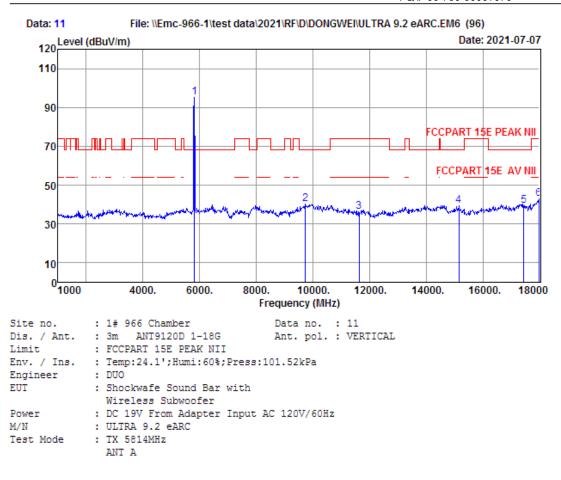
#### Data: 10 File: \\Emc-966-1\test data\2021\RF\D\DONGWEI\ULTRA 9.2 eARC.EM6 (96) Date: 2021-07-07 Level (dBuV/m) 120 110 90 FCCPART 15E PEAK NII ЛП 70 FCCPART 15E AV NII 50 4 2 3 5 30 10 0<sup>L</sup> 1000 4000. 8000. 10000. 14000. 6000. 12000. 16000. 18000 Frequency (MHz) : 1# 966 Chamber Site no. Data no. : 10 : 3m ANT9120D 1-18G Dis. / Ant. Ant. pol. : VERTICAL Limit : FCCPART 15E PEAK NII Env. / Ins. : Temp:24.1';Humi:60%;Press:101.52kPa Engineer : DUO EUT : Shockwafe Sound Bar with Wireless Subwoofer : DC 19V From Adapter Input AC 120V/60Hz Power M/N : ULTRA 9.2 eARC Test Mode : TX 5762MHz ANT A

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5762.00	32.85	4.03	34.39	90.92	93.41	68.20	-25.21	Peak
2	9687.00	38.28	5.65	34.26	32.37	42.04	68.20	26.16	Peak
3	11524.00	39.90	6.14	34.66	30.01	41.39	74.00	32.61	Peak
4	14481.00	41.01	6.89	34.44	28.91	42.37	74.00	31.63	Peak
5	17286.00	43.21	7.70	34.37	22.99	39.53	68.20	28.67	Peak
6	17966.00	48.63	8.22	34.30	20.35	42.90	74.00	31.10	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.



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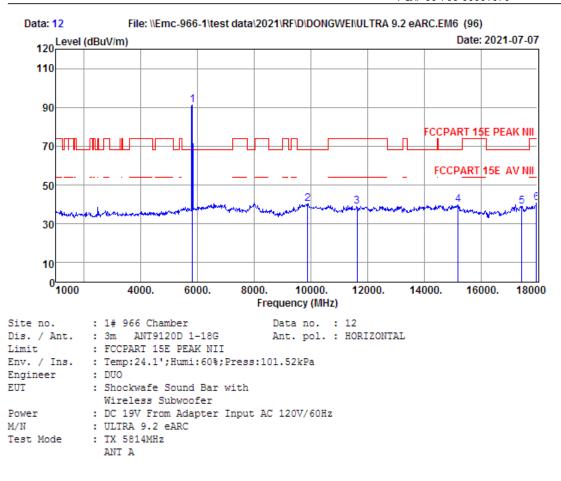


	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5814.00	32.84	4.09	34.37	92.59	95.15	68.20	-26.95	Peak
2	9738.00	38.38	5.69	34.25	30.37	40.19	68.20	28.01	Peak
3	11628.00	39.90	6.09	34.69	24.82	36.12	74.00	37.88	Peak
4	15161.00	40.73	6.69	34.54	26.59	39.47	68.20	28.73	Peak
5	17442.00	44.43	7.85	34.36	21.29	39.21	68.20	28.99	Peak
6	17983.00	48.76	8.23	34.30	20.18	42.87	74.00	31.13	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.



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	Freq. (MHz)	Ant. Factor (dB/m)			-	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5814.00	32.84	4.09	34.37	88.71	91.27	68.20	-23.07	Peak
2	9891.00	38.69	5.81	34.22	30.23	40.51	68.20	27.69	Peak
3	11628.00	39.90	6.09	34.69	27.54	38.84	74.00	35.16	Peak
4	15195.00	40.69	6.67	34.52	27.14	39.98	68.20	28.22	Peak
5	17442.00	44.43	7.85	34.36	21.17	39.09	68.20	29.11	Peak
6	17966.00	48.63	8.22	34.30	18.01	40.56	74.00	33.44	Peak
Remai	2. Mar 3. The	gin= Lim	nit - Em on level	ission I s that a	evel.	ole Loss - Am clow the offi	-	Reading.	

Note:

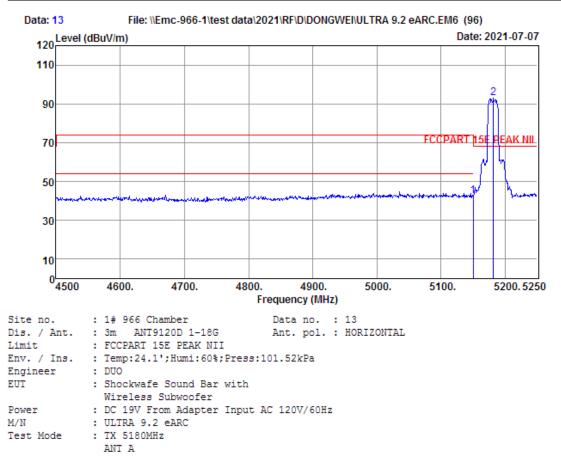
- 1. The amplitude of 18GHz to 40GHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
- 2. All antenna had been pre-test, only the worst case was reported.



## **Radiated Band Edge**

# EST Technology

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	Freq. (MHz)	Factor	Loss	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
_	5150.00 5181.75			 41.65 91.77	42.64 92.86	68.20 68.20	25.56 -24.66	Peak Peak

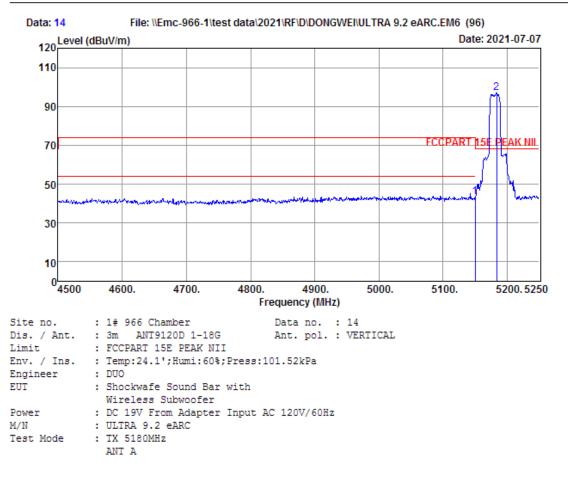
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.

2. Margin= Limit - Emission Level.

3. The emission levels that are 20dB below the official



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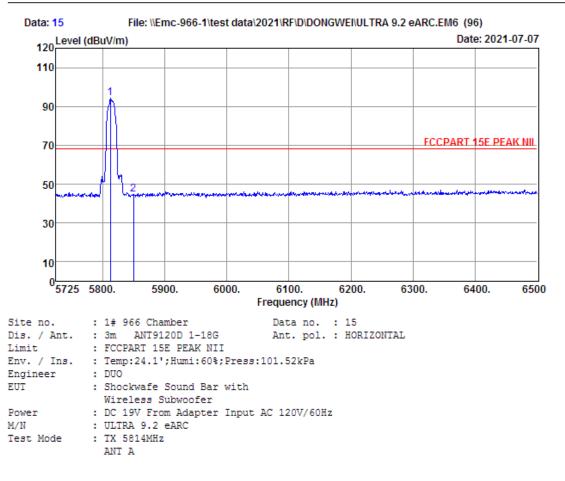
Freq. (MHz)		-	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1 5150.00 2 5183.25			42.53 95.84	43.52 96.93	68.20 68.20	24.68 -28.73	Peak Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.

3. The emission levels that are 20dB below the official



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Fre (Mi		-	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
	2.58 32.84 ).00 32.83		91.91 42.22	94.47 44.82	68.20 68.20	-26.27 23.38	Peak Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.

3. The emission levels that are 20dB below the official



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#### File: \\Emc-966-1\test data\2021\RF\D\DONGWEI\ULTRA 9.2 eARC.EM6 (96) Data: 16 Date: 2021-07-07 Level (dBuV/m) 120 110 90 FCCPART 15E PEAK NII 70 50 30 10 0 5725 5800. 5900. 6000. 6100. 6200. 6300. 6400. 6500 Frequency (MHz) Site no. : 1# 966 Chamber Data no. : 16 Dis. / Ant. : 3m ANT9120D 1-18G Ant. pol. : VERTICAL : FCCPART 15E PEAK NII Limit Env. / Ins. : Temp:24.1';Humi:60%;Press:101.52kPa : DUO Engineer EUT : Shockwafe Sound Bar with Wireless Subwoofer : DC 19V From Adapter Input AC 120V/60Hz Power M/N : ULTRA 9.2 eARC Test Mode : TX 5814MHz ANT A

1 5813.35 32.84 4.09 34.37 92.76 95.32 68.20 -27.12	Peak
2 5850.00 32.83 4.13 34.36 41.21 43.81 68.20 24.39	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading. 2. Margin= Limit - Emission Level.

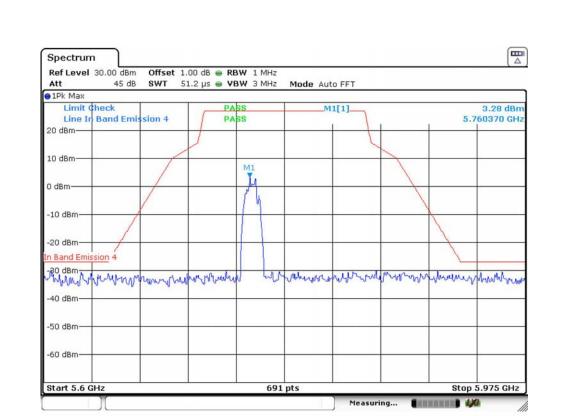
 The emission levels that are 20dB below the official limit are not reported.

Note:

- 1. The amplitude of 18GHz to 40GHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
- 2. All test mode had been pre-test, only Low/Middle/High Channel of the worst case modulation mode was reported



	Band	Edge	
	1.00 dB 👄 RBW 1 MHz		
Att 45 dB SWT	51.2 µs 🝙 <b>VBW</b> 3 MHz	Mode Auto FFT	
Limit Check Line Ir Band Emission 4 20 dBm	PASS	M1[1]	2.44 dBn 5.734860 GH
10 dBm	M1		
0 dBm	M		
-10 dBm			
-20 dBm			
-30 dBm Augurty Maria ang Ang Maria -40 dBm	dimens pour more		warman
-50 dBm			
-60 dBm			
Start 5.6 GHz	691	pts	Stop 5.975 GHz
	071	Measuring	

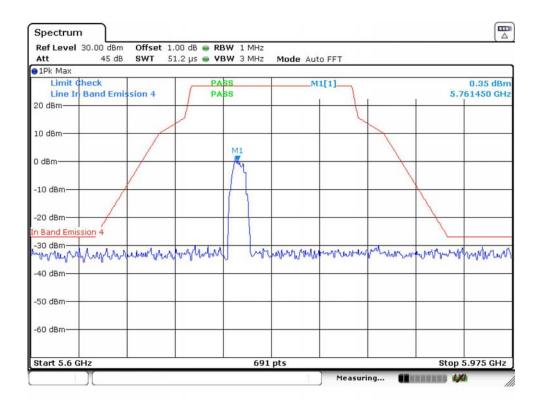




Ref Level 30.00 dB		1.00 dB 👄 RBW				
Att 45 c	IB SWT S	51.2 µs 🖷 VBW	3 MHz Mode	Auto FFT		
Limit Check		PASS		_M1[1]		0.51 dBn
Line In Band Er	nission 4	PASS			L	5.817350 GH
10 dBm						
				M1		
0 dBm			P	Y I		
-10 dBm	1		P			
1						
-20 dBm		×				
-30 dBm						
Maynowhan	mound	mound	montant	Munhah	radrandury	manun
-40 dBm						
50 dBm						
60. ID						
60 dBm						
			691 pts			



Spectrum			
Ref Level 30.00 dBm Offse Att 45 dB SWT	t 1.00 dB • RBW 1 MHz 51.2 µs • VBW 3 MHz	Mode Auto FFT	
1Pk Max			
Limit Check Line In Band Emission 4	PASS	M1[1]	0.36 dBm 5.734860 GHz
20 dBm			
10 dBm			
0 dBm	M1 F4		
-10 dBm			
-20 dBm			
-30 dBm Wyfwrthalloneurhyfunna -40 dBm	many hourser	monument	a ship was a
-50 dBm			
-60 dBm			
Start 5.6 GHz	691	pts	Stop 5.975 GHz
		Measuri	ing 🚺 🗰 👔 🚧





Spectrum				
Ref Level 30.00 dBm Offset Att 45 dB SWT	1.00 dB 👄 RBW 1 MHz 51.2 μs 👄 VBW 3 MHz	Mode Auto FFT		
1Pk Max				
Limit Check Line In Band Emission 4	PASS	M1[1]	5.8	0.49 dBm 11920 GHz
20 dBm				
10 dBm				
0 dBm		M1		
-10 dBm				-
-20 dBm				
In Band Emission 4 -30 dBm Mr. John Mun Jun Marhar M	warden and and the second	wind form	Mannaperandaria	manufu
-40 dBm-				
-50 dBm				
-60 dBm				
Start 5.6 GHz	69	1 pts	Stop 5	i.975 GHz
		Measi	uring 🚺 🚺 🚧	

All modulations are all tested ,only worse case is reported



## 18000MHz-40000MHz

Pass

Note: The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.



# 7. FREQUENCY STABILITY

## 7.1. Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the operational description.

## 7.2. Test Setup

# Spectrum analyzer EUT Att.

Variable Power Supply

**Temperature Chamber** 

## 7.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting		
RBW	10KHz		
VBW	10KHz		
Span	200KHz		
Sweep Time	Auto		
Detector	PEAK		
Trace Mode	Max Hold		



## 7.4. Test Procedure

## For measurement frequency stability under temperature variation :

- a. Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT.
- b. Turn the EUT OFF and place it inside the environmental temperature chamber.
- c. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- d. Spectrum analyzer setting parameters in accordance with section 7.3.
- e. Set the temperature control on the chamber to the Specified temperature and allow the oscillator heater and the chamber temperature to stabilize.
- f. Turn the EUT ON with the rated voltage, and the EUT transmit continuously with maximum output power.
- g. Record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized.
- h. Repeat step d through step f to measured the temperature form  $-20^{\circ}$ C to  $+50^{\circ}$ C in  $10^{\circ}$ C steps.

## For frequency stability under voltage variation:

- a. Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT.
- b. Turn the EUT OFF and place it inside the environmental temperature chamber.
- c. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- d. Spectrum analyzer setting parameters in accordance with section 7.3.
- e. Unless otherwise specified, set the temperature control on the chamber to the ambient room temperature (+15°C to +25°C) and allow the oscillator heater and the chamber temperature to stabilize.
- f. Turn the EUT ON with the rated voltage, and the EUT transmit continuously with maximum output power.
- g. Record the operating frequency.
- h. Repeat step d through step f to measured the varied from 85% to 115% of the rated voltage.



## FCC ID: 2AGB6-SWEARC

## 7.5. Test Result

Frequency (MHz)	Voltage (V)	Temperature (°C)	Time (minutes)	Measurement Value (MHz)	Frequency Error (ppm)
			0	5180.0129962	2.51
	100	50	2	5180.0129730	2.50
	120	50	5	5180.0124082	2.40
			10	5180.0124712	2.41
			0	5180.0127600	2.46
			2	5180.0120966	2.34
	120	40	5	5180.0125033	2.41
			10	5180.0126319	2.44
			0	5180.0121624	2.35
	120	20	2	5180.0125547	2.42
	120	30	5	5180.0125205	2.42
			10	5180.0123538	2.38
	120	20	0	5180.0120842	2.33
			2	5180.0125721	2.43
	120		5	5180.0125465	2.42
			10	5180.0124080	2.40
	120	10	0	5180.0121244	2.34
5180			2	5180.0125453	2.42
5100			5	5180.0120780	2.33
			10	5180.0123646	2.39
	120		0	5180.0124484	2.40
		0	2	5180.0124612	2.41
		0	5	5180.0123180	2.38
			10	5180.0128102	2.47
			0	5180.0122151	2.36
	100	10	2	5180.0123349	2.38
	120	-10	5	5180.0128869	2.49
			10	5180.0126224	2.44
			0	5180.0129104	2.49
	100	20	2	5180.0120782	2.33
	120	-20	5	5180.0126984	2.45
			10	5180.0128713	2.48
	120	20	/	5180.0120131	2.32
	102	20	/	5180.0122909	2.37
	138	20	/	5180.0125190	2.42
		MAX Frque	ncy Error(pp	om)	2.51



Frequency (MHz)	Voltage (V)	Temperature (°C)	Time (minutes)	Measurement Value (MHz)	Frequency Error (ppm)
			0	5736.0199920	3.49
	100	-0	2	5736.0194134	3.38
	120	50	5	5736.0199460	3.48
			10	5736.0190398	3.32
			0	5736.0190624	3.32
			2	5736.0196127	3.42
	120	40	5	5736.0198222	3.46
			10	5736.0196082	3.42
			0	5736.0193576	3.37
	100	20	2	5736.0192475	3.36
	120	30	5	5736.0197840	3.45
			10	5736.0191775	3.34
	120	20	0	5736.0192828	3.36
			2	5736.0198085	3.45
	120		5	5736.0191608	3.34
			10	5736.0194870	3.40
	120	10	0	5736.0196389	3.42
5736			2	5736.0199562	3.48
5750			5	5736.0193985	3.38
			10	5736.0193745	3.38
	120		0	5736.0192186	3.35
		0	2	5736.0192982	3.36
		0	5	5736.0196765	3.43
			10	5736.0192591	3.36
			0	5736.0194612	3.39
	120	10	2	5736.0197958	3.45
	120	-10	5	5736.0191974	3.35
			10	5736.0196066	3.42
			0	5736.0196305	3.42
	100	20	2	5736.0191376	3.34
	120	-20	5	5736.0190770	3.33
			10	5736.0191420	3.34
	120	20	/	5736.0192604	3.36
	102	20	/	5736.0193330	3.37
	138	20	/	5736.0195382	3.41
		MAX Frque	ncy Error(pp	om)	3.49



# 8. AC POWER LINE CONDUCTED EMISSIONS

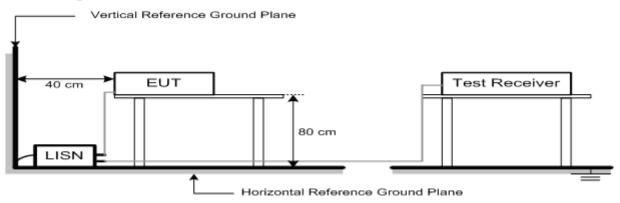
## 8.1. Limit

	Maximum RF Line Voltage			
Frequency	Quasi-Peak Level	Average Level		
	dB(µV)	dB(µV)		
150kHz ~ 500kHz	$66 \sim 56*$	$56 \sim 46*$		
$500 \text{kHz} \sim 5 \text{MHz}$	56	46		
$5MHz \sim 30MHz$	60	50		

Notes:

- 1. \* Decreasing linearly with logarithm of frequency.
- 2. The lower limit shall apply at the transition frequencies.

## 8.2. Test Setup



## 8.3. Spectrum Analyzer Setting

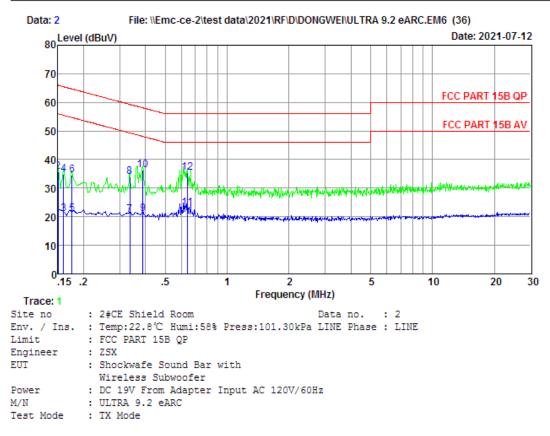
Spectrum Parameters	Setting		
RBW	9KHz		
VBW	9KHz		
Start frequency	150KHz		
Stop frequency	30MHz		
Sweep Time	Auto		
Detector	QP/AVG		
Trace Mode	Max Hold		

## 8.4. Test Procedure

- a. The EUT was placed on a non-metallic table, 80cm above the ground plane.
- b. The EUT Power connected to the power mains through a line impedance stabilization network.
- c. Provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs).
- d. Set the EUT transmit continuously with maximum output power.
- e. Spectrum analyzer setting parameters in accordance with section 8.3.
- f. The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Test.
- g. Record the results in the test report.



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	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.1500	9.68	9.69	1.29	20.66	56.00	35.34	Average
2	0.1500	9.68	9.69	16.35	35.72	66.00	30.28	QP
3	0.1598	9.68	9.69	1.59	20.96	55.47	34.51	Average
4	0.1598	9.68	9.69	15.48	34.85	65.47	30.62	QP
5	0.1758	9.69	9.77	1.43	20.89	54.68	33.79	Average
6	0.1758	9.69	9.77	15.14	34.60	64.68	30.08	QP
7	0.3356	9.74	9.92	1.07	20.73	49.31	28.58	Average
8	0.3356	9.74	9.92	14.35	34.01	59.31	25.30	QP
9	0.3893	9.76	9.92	1.27	20.95	48.08	27.13	Average
10	0.3893	9.76	9.92	16.52	36.20	58.08	21.88	QP
11	0.6406	9.82	9.92	3.37	23.11	46.00	22.89	Average
12	0.6406	9.82	9.92	15.62	35.36	56.00	20.64	QP

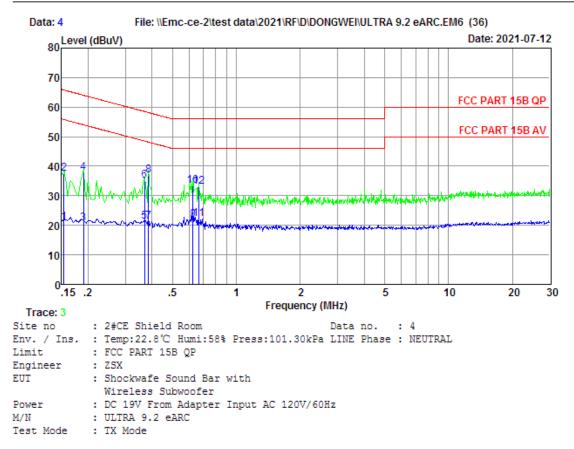
Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.

2. Margin=Limit - Emission Level.

3. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



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	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.1540	9.64	9.69	1.62	20.95	55.78	34.83	Average
2	0.1540	9.64	9.69	18.24	37.57	65.78	28.21	QP
3	0.1904	9.65	9.77	1.34	20.76	54.02	33.26	Average
4	0.1904	9.65	9.77	18.48	37.90	64.02	26.12	QP
5	0.3692	9.67	9.92	1.71	21.30	48.52	27.22	Average
6	0.3692	9.67	9.92	15.57	35.16	58.52	23.36	QP
7	0.3852	9.68	9.92	1.65	21.25	48.17	26.92	Average
8	0.3852	9.68	9.92	17.44	37.04	58.17	21.13	QP
9	0.6238	9.71	9.92	2.17	21.80	46.00	24.20	Average
10	0.6238	9.71	9.92	13.72	33.35	56.00	22.65	QP
11	0.6648	9.71	9.92	2.37	22.00	46.00	24.00	Average
12	0.6648	9.71	9.92	13.32	32.95	56.00	23.05	QP

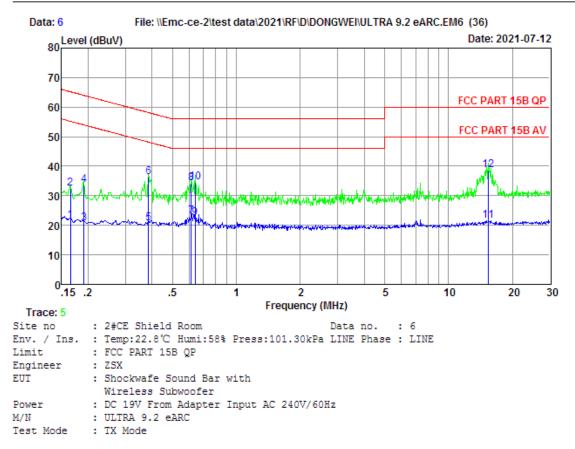
Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.

2. Margin=Limit - Emission Level.

 If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



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	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.1650	9.68	9.69	2.26	21.63	55.21	33.58	Average
2	0.1650	9.68	9.69	13.24	32.61	65.21	32.60	QP
3	0.1914	9.69	9.77	1.17	20.63	53.98	33.35	Average
4	0.1914	9.69	9.77	14.05	33.51	63.98	30.47	QP
5	0.3852	9.76	9.92	1.03	20.71	48.17	27.46	Average
6	0.3852	9.76	9.92	16.52	36.20	58.17	21.97	QP
7	0.6140	9.81	9.92	3.26	22.99	46.00	23.01	Average
8	0.6140	9.81	9.92	14.48	34.21	56.00	21.79	QP
9	0.6406	9.82	9.92	2.56	22.30	46.00	23.70	Average
10	0.6406	9.82	9.92	14.75	34.49	56.00	21.51	QP
11	15.4701	9.98	10.13	1.36	21.47	50.00	28.53	Average
12	15.4701	9.98	10.13	18.52	38.63	60.00	21.37	QP

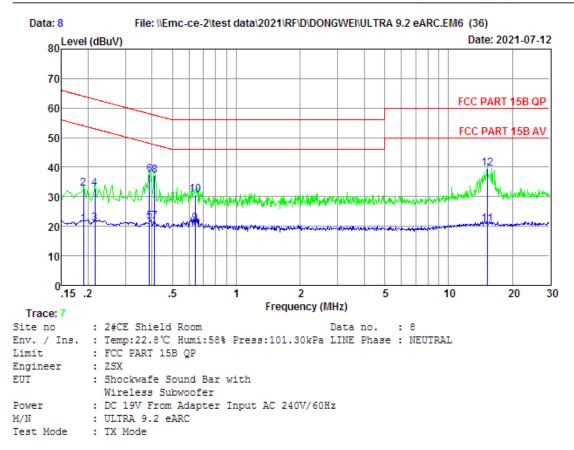
Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.

2. Margin=Limit - Emission Level.

 If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



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	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.1904	9.65	9.77	1.35	20.77	54.02	33.25	Average
2	0.1904	9.65	9.77	13.24	32.66	64.02	31.36	QP
3	0.2151	9.65	9.84	1.43	20.92	53.01	32.09	Average
4	0.2151	9.65	9.84	13.18	32.67	63.01	30.34	QP
5	0.3893	9.68	9.92	1.93	21.53	48.08	26.55	Average
6	0.3893	9.68	9.92	17.85	37.45	58.08	20.63	QP
7	0.4127	9.68	9.92	1.95	21.55	47.59	26.04	Average
8	0.4127	9.68	9.92	17.74	37.34	57.59	20.25	QP
9	0.6406	9.71	9.92	1.32	20.95	46.00	25.05	Average
10	0.6406	9.71	9.92	11.22	30.85	56.00	25.15	QP
11	15.3070	10.10	10.12	0.47	20.69	50.00	29.31	Average
12	15.3070	10.10	10.12	19.33	39.55	60.00	20.45	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.

2. Margin=Limit - Emission Level.

 If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



# 9. ANTENNA REQUIREMENTS

# 9.1. Limit

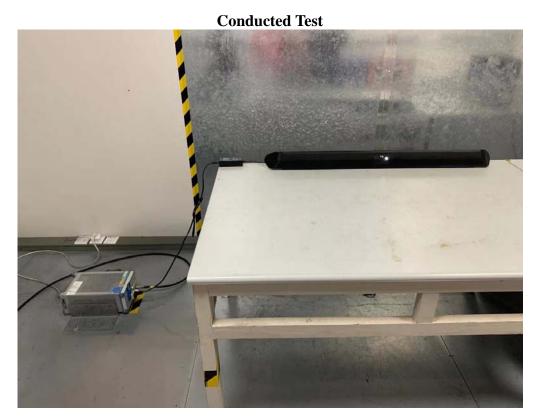
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

# 9.2. Test Result

The antennas used for this product is PCB antenna ,so compliance with antenna requirements. (Please refer to the EUT photo for details)



# **10. TEST SETUP PHOTO**









**Radiated Test (Above 1GHz)** 





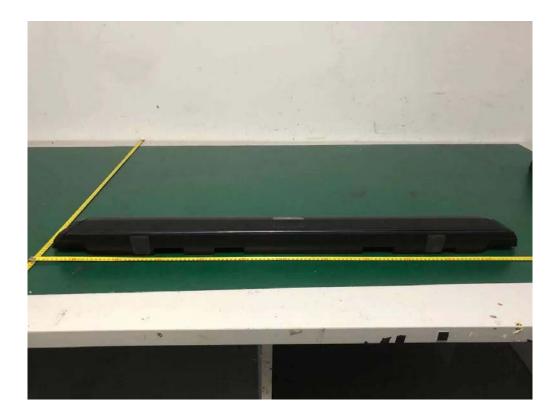
# **11.EUT PHOTO**































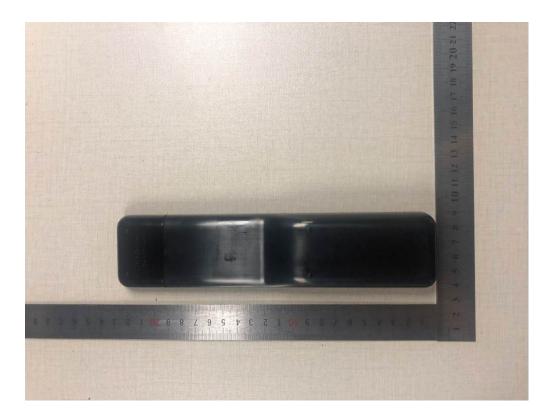






**External Photos** M/N: ULTRA 9.2 eARC



















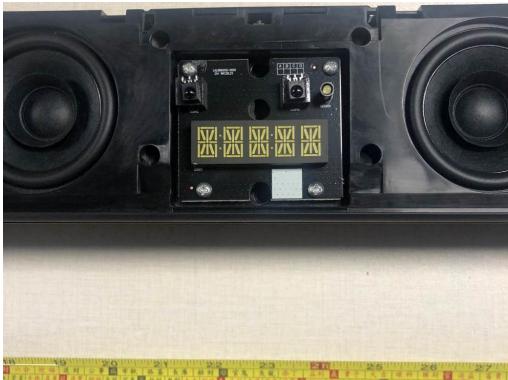


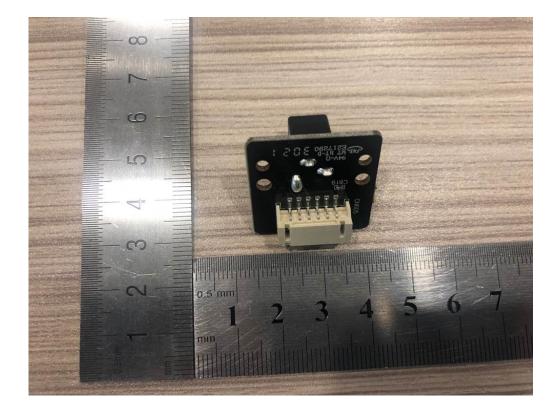














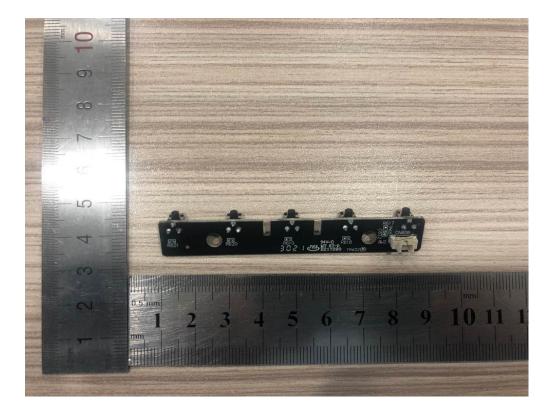






**Internal Photos** M/N: ULTRA 9.2 eARC







**Internal Photos** M/N: ULTRA 9.2 eARC







**Internal Photos** M/N: ULTRA 9.2 eARC

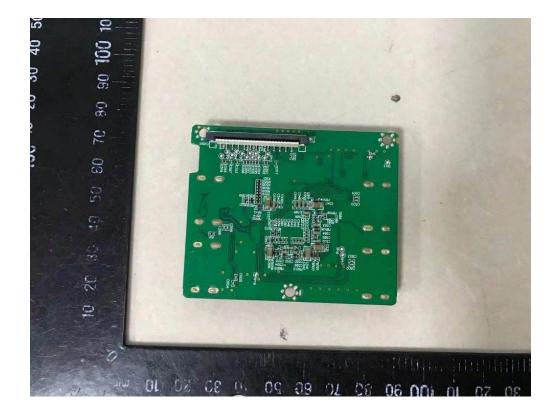






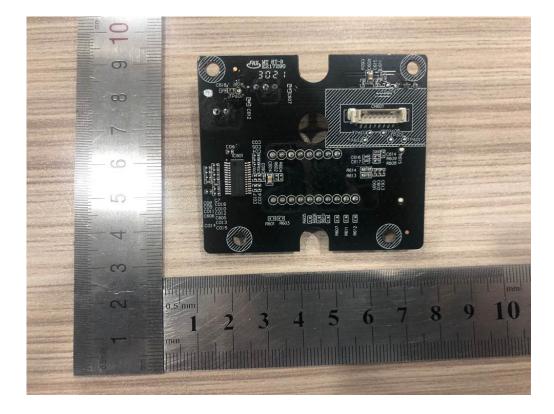
**Internal Photos** M/N: ULTRA 9.2 eARC





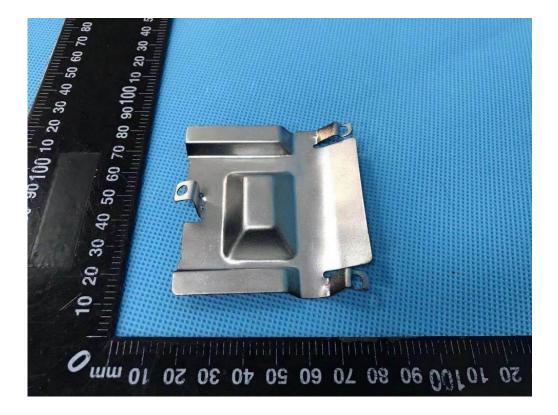






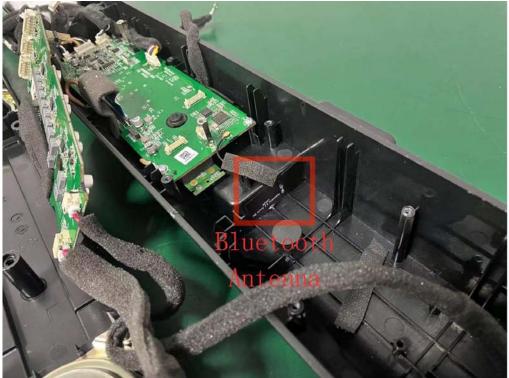


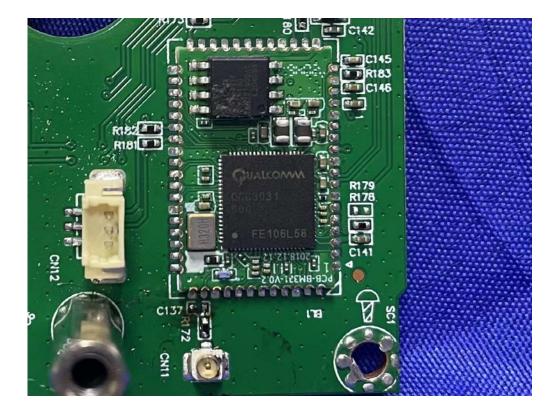




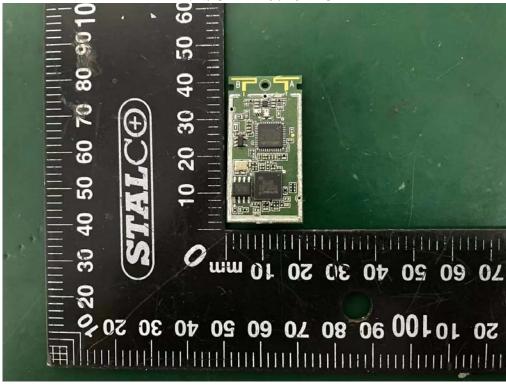


**Internal Photos** M/N: ULTRA 9.2 eARC











**End of Test Report** 

