

5.4.3. Test Procedure

- a. EUT operating conditions. The EUT tested system was configured as the statements of 3.2 Unless otherwise a special operating condition is specified in the follows during the testing.
- b. 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.
- c. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter shield area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The height of the equipment or of the substitution antenna shall be 0.8 m; 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.
- e. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the floor on a support that is RF transparent for the frequencies of interest. Final measurements for the EUT require a measurement antenna height scan of 1 m to 4 m.
- f. 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.
- g. 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.
- h. For the actual test configuration, please refer to the related Item –EUT Test photos.

Note: Both horizontal and vertical antenna polarities were tested. 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.

5.4.4. Test Results
Below 30MHz

EUT:	Wireless Headphone	Model Name:	A3510
Pressure:	1010 hPa	Test Voltage:	DC 3.7V from battery
Test Mode:	TX	Polarization:	--

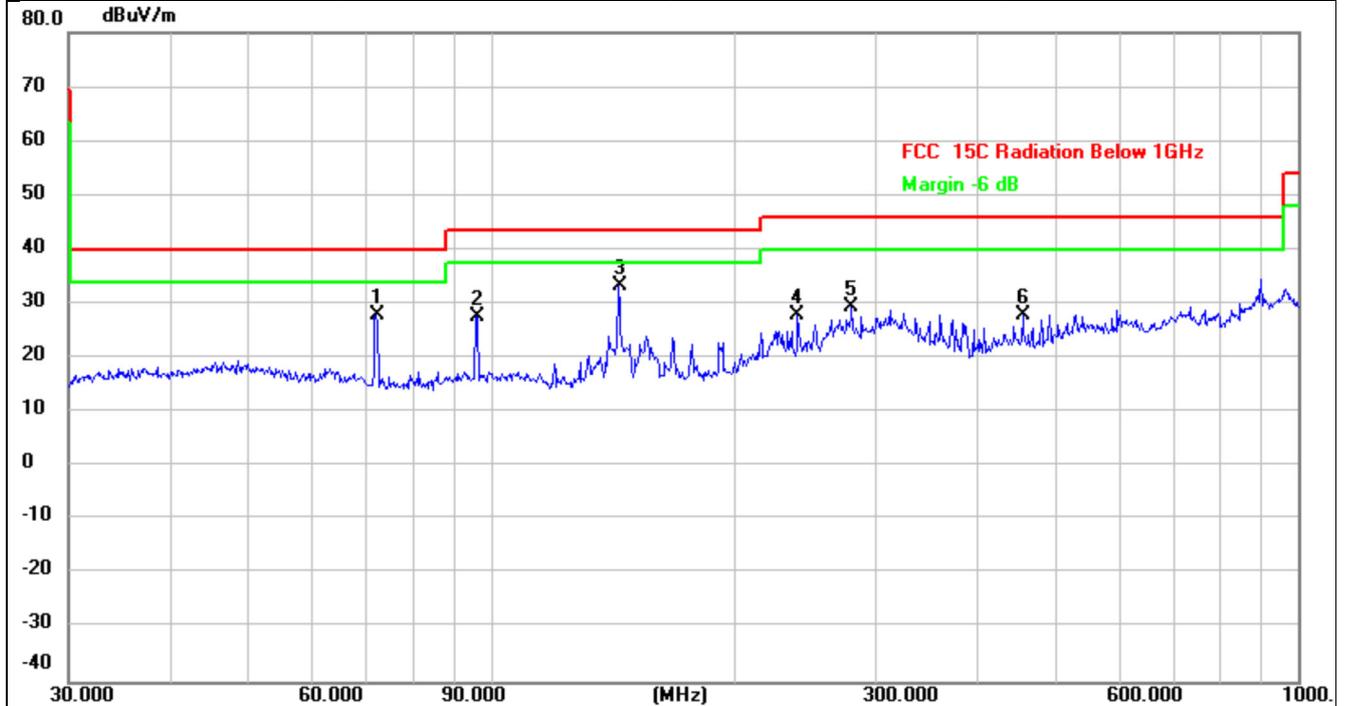
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	Pass
--	--	--	--	Pass

Note:

1. For 9kHz-30MHz, the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Distance extrapolation factor = $40 \log(\text{specific distance}/\text{test distance})$ (dB);
3. Limit line = specific limits (dBuV) + distance extrapolation factor.

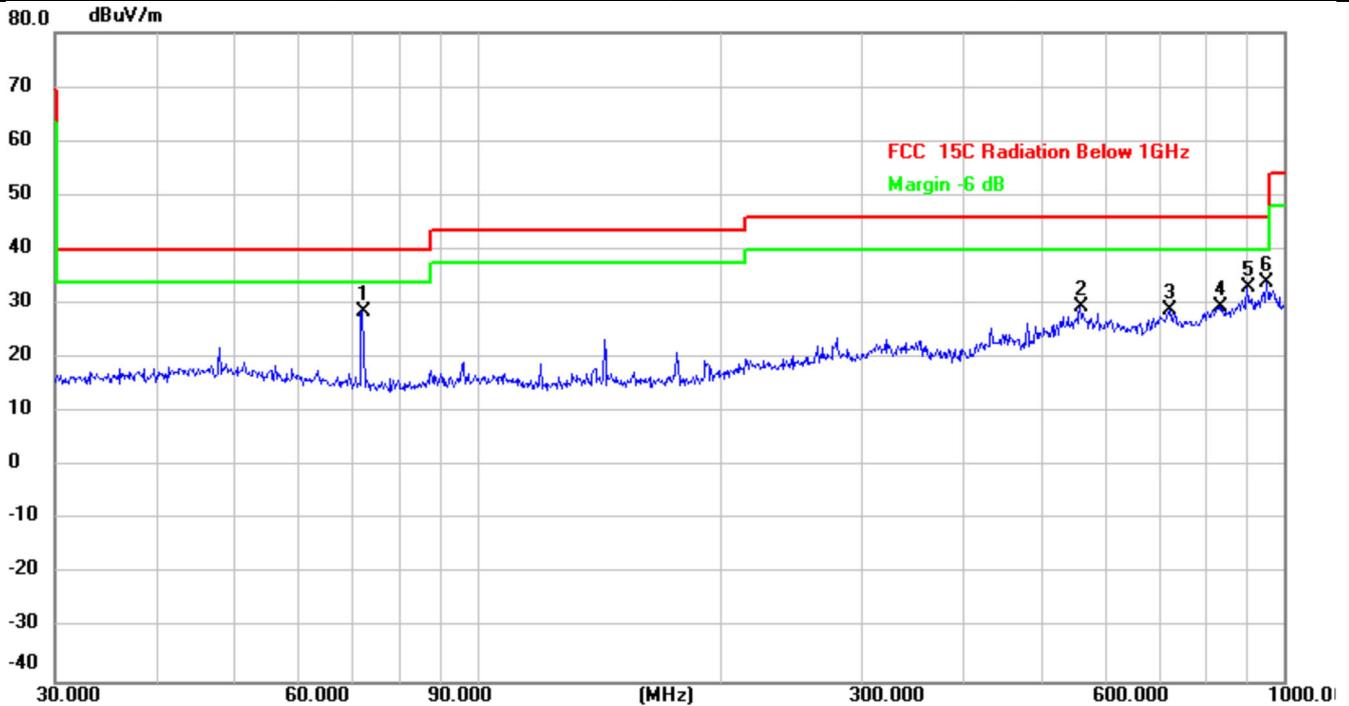
Between 30MHz – 1GHz

EUT:	Wireless Headphone	Model Name:	A3510
Pressure:	1010 hPa	Phase:	H
Test Mode:	TX	Test Voltage:	DC 3.7V from battery



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detecto
1		72.0843	38.08	-10.04	28.04	40.00	-11.96	QP
2		96.0985	36.45	-8.66	27.79	43.50	-15.71	QP
3	*	143.8295	44.17	-10.69	33.48	43.50	-10.02	QP
4		239.9873	34.28	-6.30	27.98	46.00	-18.02	QP
5		280.0237	35.18	-5.67	29.51	46.00	-16.49	QP
6		455.9058	31.56	-3.52	28.04	46.00	-17.96	QP

EUT:	Wireless Headphone	Model Name:	A3510
Pressure:	1010 hPa	Phase:	V
Test Mode:	TX	Test Voltage:	DC 3.7V from battery



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	72.0843	38.63	-10.04	28.59	40.00	-11.41	QP
2		558.7301	30.52	-0.95	29.57	46.00	-16.43	QP
3		721.7258	28.53	0.35	28.88	46.00	-17.12	QP
4		830.4001	27.37	2.22	29.59	46.00	-16.41	QP
5		900.1474	29.56	3.60	33.16	46.00	-12.84	QP
6		952.0937	29.74	4.11	33.85	46.00	-12.15	QP

Note:

1. Emission Level = Meter Reading + Factor, Margin= Emission Level- Limit, Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. The three modulated high, medium and low channels have been tested. The report only shows the worst mode. The worst mode is CH19. _____

1GHz-25GHz

Frequency	Read Level	Correct Factor	Emission Level	Limits	Margin	Detector	Polarization
(MHz)	(dB μ V)	(dB/m)	(dB μ V/m)	(dB μ V/m)	(dB)	Peak/AVG	H/V
Low Channel (2402 MHz)							
4804	44.82	1.52	46.34	74.00	-27.66	Peak	V
7206	40.05	5.46	45.51	74.00	-28.49	Peak	V
9608	42.09	6.33	48.42	74.00	-25.58	Peak	V
4804	44.89	1.52	46.41	74.00	-27.59	peak	H
7206	40.24	5.46	45.70	74.00	-28.30	peak	H
9608	42.12	6.33	48.45	74.00	-25.55	peak	H
Mid Channel (2440 MHz)							
4880	42.11	1.68	43.79	74.00	-30.21	Peak	V
7320	42.29	5.45	47.74	74.00	-26.26	Peak	V
9760	42.61	6.37	48.98	74.00	-25.02	Peak	V
4880	41.37	1.68	43.05	74.00	-30.95	Peak	H
7320	40.74	5.45	46.19	74.00	-27.81	Peak	H
9760	42.18	6.37	48.55	74.00	-25.45	Peak	H
High Channel (2480 MHz)- Above 1G							
4960	41.23	1.83	43.06	74.00	-30.94	Peak	V
7440	41.92	5.43	47.35	74.00	-26.65	Peak	V
9920	41.02	6.41	47.43	74.00	-26.57	Peak	V
4960	41.64	1.83	43.47	74.00	-30.53	Peak	H
7440	40.55	5.43	45.98	74.00	-28.02	Peak	H
9920	41.35	6.41	47.76	74.00	-26.24	Peak	H

Note:

1. All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
2. Emission Level= Read Level + Correct Factor.
3. All the modulation modes have been tested, and the worst results are reflected in the report.

Band EDGE-RADIATED

Frequency	Read Level	Correct Factor	Emission Level	Limits	Margin	Detector	Polarization
(MHz)	(dB μ V)	(dB/m)	(dB μ V/m)	(dB μ V/m)	(dB)	Peak/AVG	H/V
2310.000	23.89	26.94	50.83	74.00	-23.17	peak	V
2310.000	16.81	26.94	43.75	54.00	-10.25	AVG	V
2390.000	24.88	27.29	52.17	74.00	-21.83	peak	V
2390.000	16.90	27.29	44.19	54.00	-9.81	AVG	V
2310.000	25.62	26.94	52.56	74.00	-21.44	peak	H
2310.000	16.43	26.94	43.37	54.00	-10.63	AVG	H
2390.000	26.02	27.29	53.31	74.00	-20.69	peak	H
2390.000	16.74	27.29	44.03	54.00	-9.97	AVG	H
2483.500	27.73	27.71	55.44	74.00	-18.56	peak	V
2483.500	17.80	27.71	45.51	54.00	-8.49	AVG	V
2500.000	26.44	27.78	54.22	74.00	-19.78	peak	V
2500.000	17.17	27.78	44.95	54.00	-9.05	AVG	V
2483.500	27.26	27.71	54.97	74.00	-19.03	peak	H
2483.500	17.17	27.71	44.88	54.00	-9.12	AVG	H
2500.000	28.74	27.78	56.52	74.00	-17.48	peak	H
2500.000	17.06	27.78	44.84	54.00	-9.16	AVG	H

Note:

1. All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
2. Emission Level= Read Level + Correct Factor.
3. All the modulation modes have been tested, and the worst results are reflected in the report.

5.5. Power spectral density test

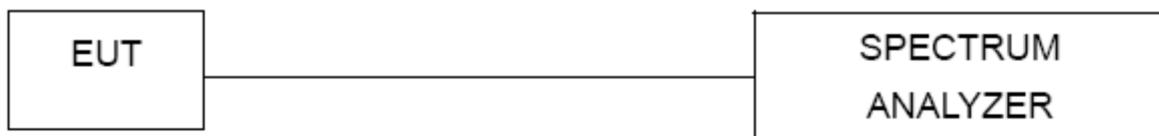
5.5.1. Limit

FCC Part15 (15.247), Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247	Power Spectral Density	8 dBm (in any 3kHz)	2400-2483.5

5.5.2. Test Procedure

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW \geq 3 kHz.
4. Set the VBW \geq 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

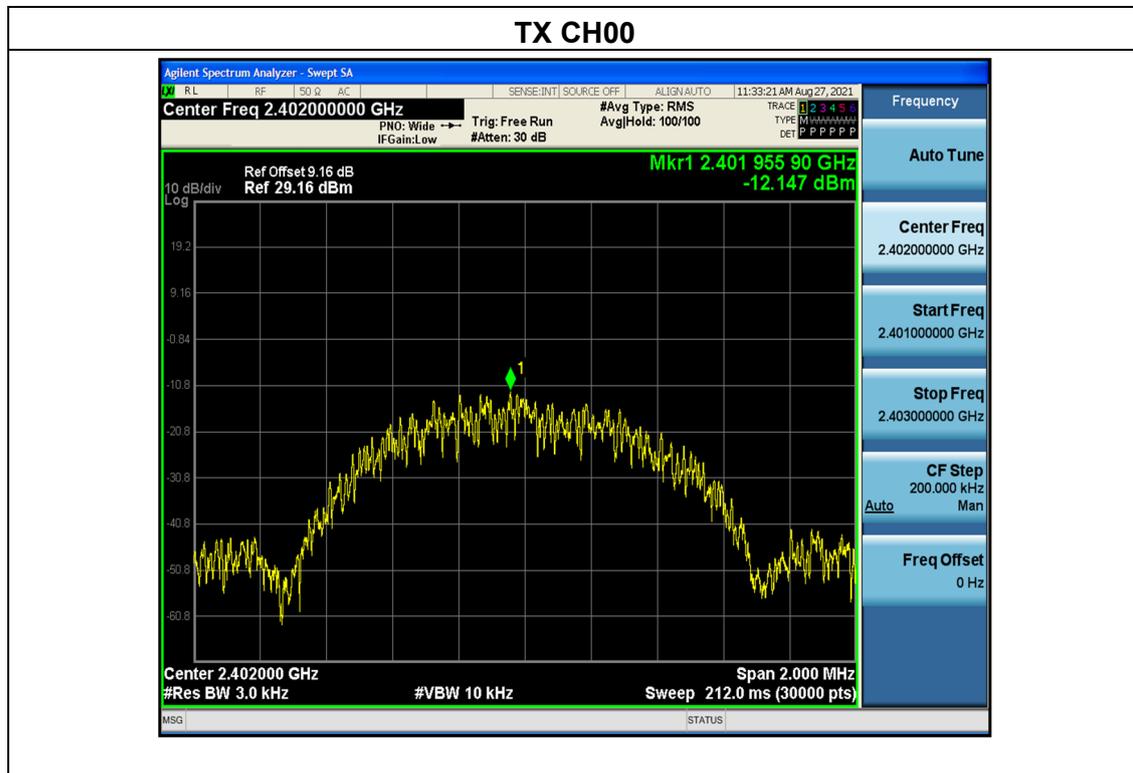
5.5.3. Test Setup



5.5.4. Test Results

EUT:	Wireless Headphone	Model Name:	A3510
Pressure:	1015 hPa	Test Voltage:	DC 3.7V from battery
Test Mode:	TX Mode /CH00, CH19, CH39		

Frequency	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2402 MHz	-12.147	8	PASS
2440 MHz	-11.429	8	PASS
2480 MHz	-12.191	8	PASS



TX CH19

TX CH39


5.6. 6dB bandwidth

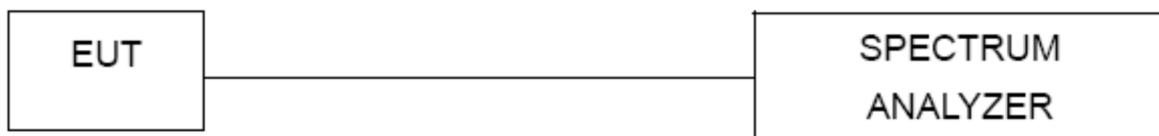
5.6.1.Limit

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247(a)(2)	Bandwidth	$\geq 500\text{kHz}$ (6dB bandwidth)	2400-2483.5

5.6.2.Test Procedure

1. Set RBW= 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

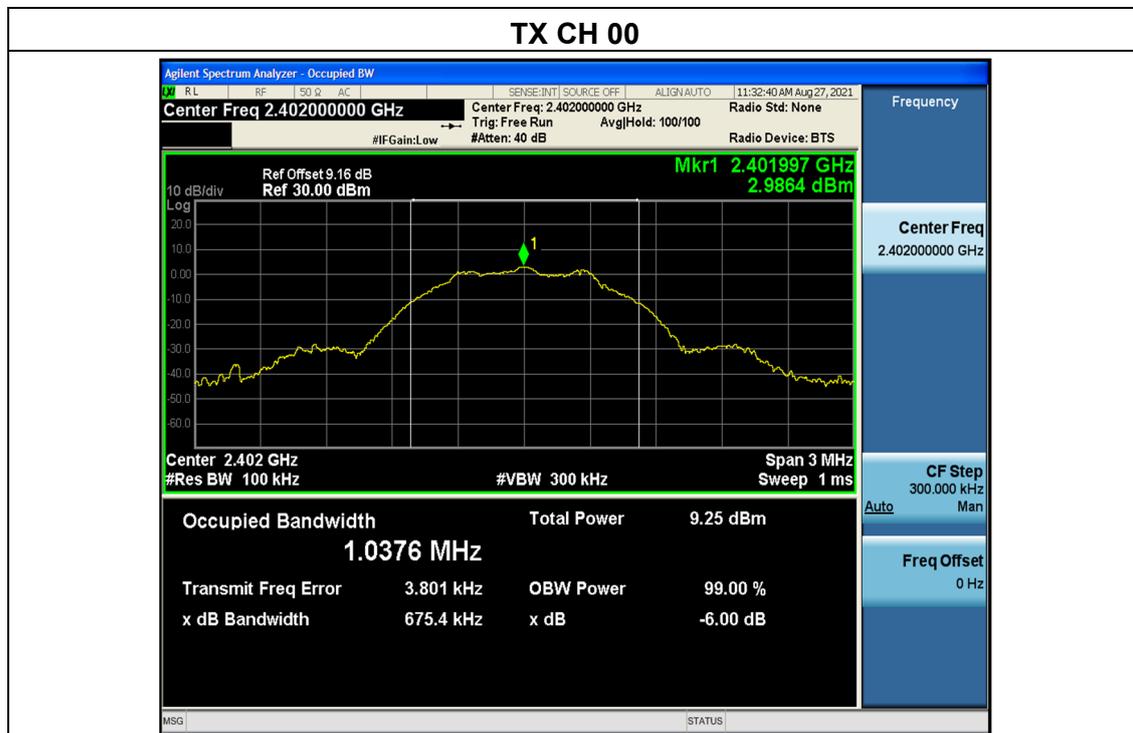
5.6.3.Test Setup



5.6.4.Test Result

EUT:	Wireless Headphone	Model Name:	A3510
Pressure:	1012 hPa	Test Voltage:	DC 3.7V from battery
Test Mode:	TX Mode /CH00, CH19, CH39		

Channel	Frequency (MHz)	6dB bandwidth (kHz)	Limit (kHz)	Result
Low	2402	675.4	500	Pass
Middle	2440	675.6	500	Pass
High	2480	682.2	500	Pass



TX CH 19

TX CH 39


5.7. Duty Cycle

5.7.1. Conformance Limit

No limit requirement.

5.7.2. Measuring Instruments

The Measuring equipment is listed in the section 4 of this test report.

5.7.3. Test Setup



5.7.4. Test Procedure

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, 6.0(b) in KDB 558074 D01 DTS Meas Guidance v05r02.

The largest available value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if $T \leq 6.25$ microseconds. ($50/6.25 = 8$)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are $> 50/T$.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

Use the following spectrum analyzer settings:

Span = Zero Span

RBW = 8MHz (the largest available value)

VBW = 8MHz

Number of points in Sweep > 100

Detector function = peak

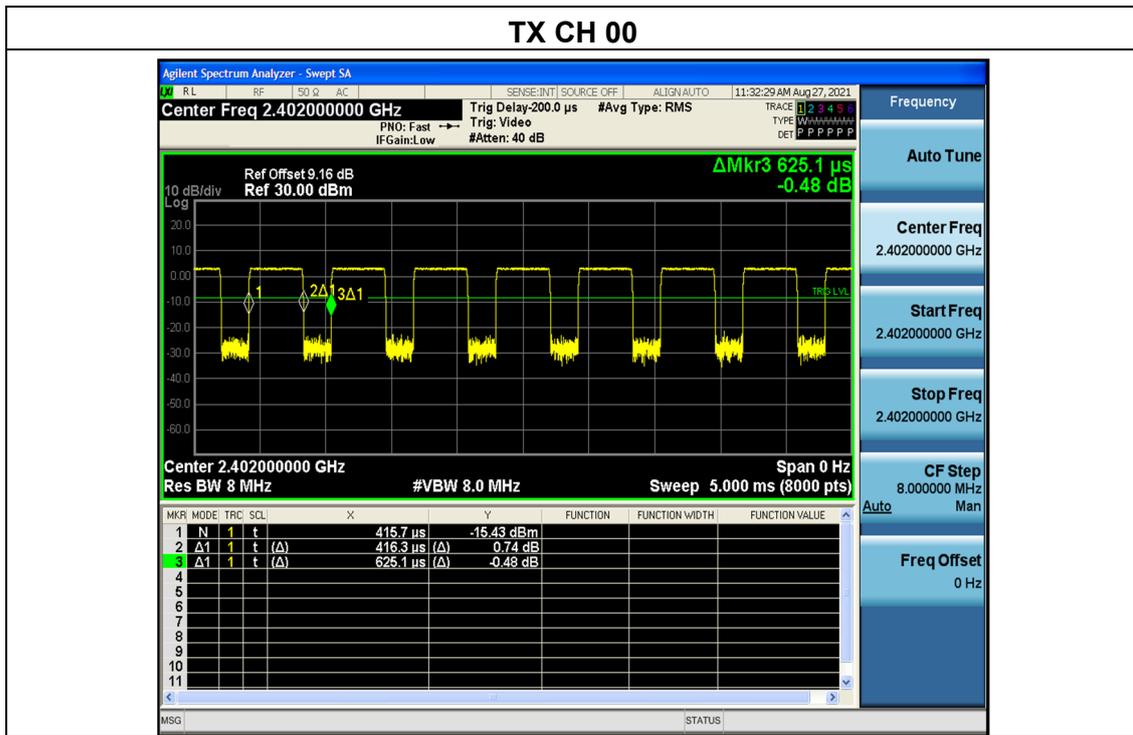
Trace = Clear write

Measure Total and Ton

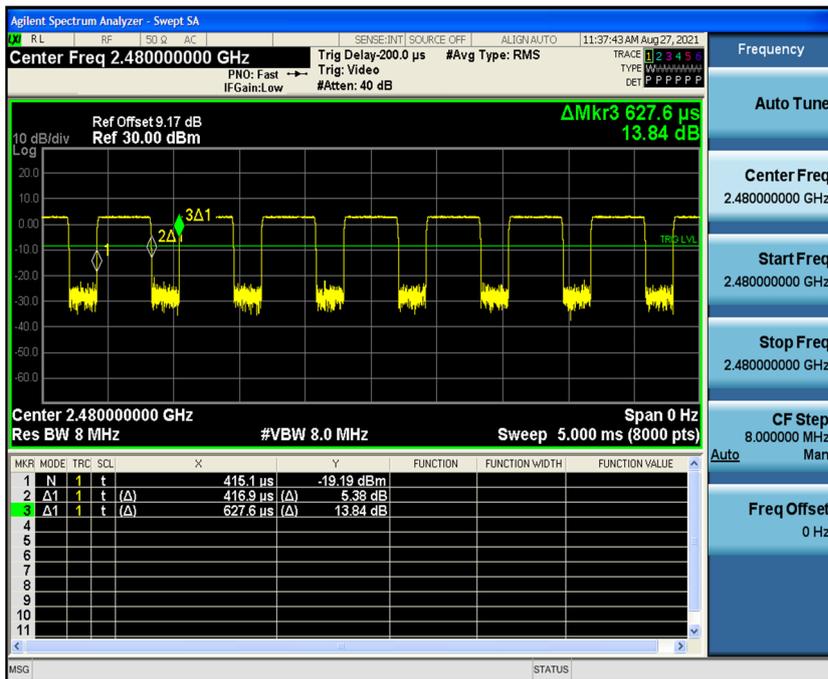
Calculate Duty Cycle = $Ton / Total$

5.7.5. Test Results

EUT:	Wireless Headphone	Model Name:	A3510
Pressure:	1012 hPa	Test Voltage:	DC 3.7V from battery
Test Mode:	TX Mode /CH00, CH19, CH39		



TX CH 19

TX CH 39


5.8. Conducted band edge

5.8.1. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, 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)).

5.8.2. Test Setup

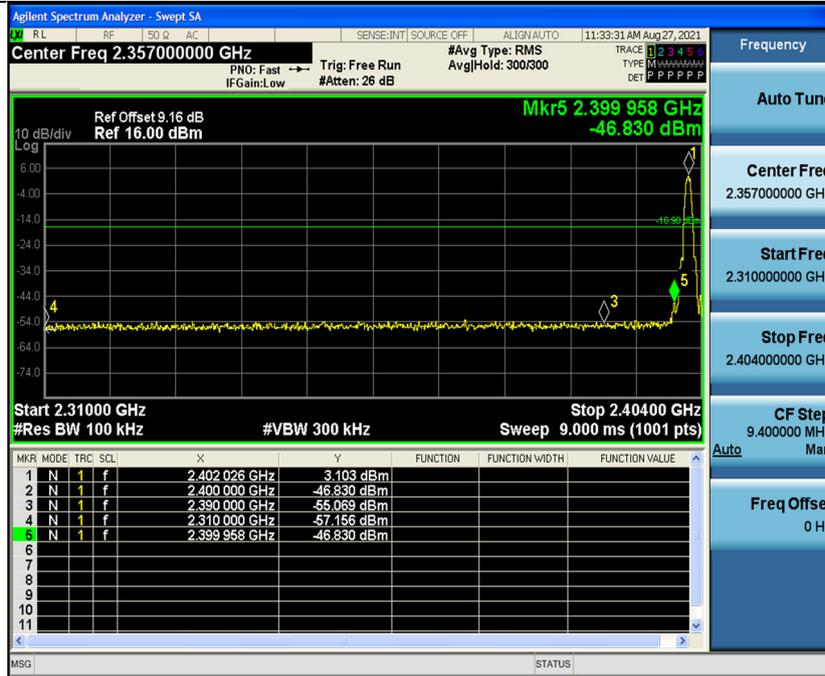
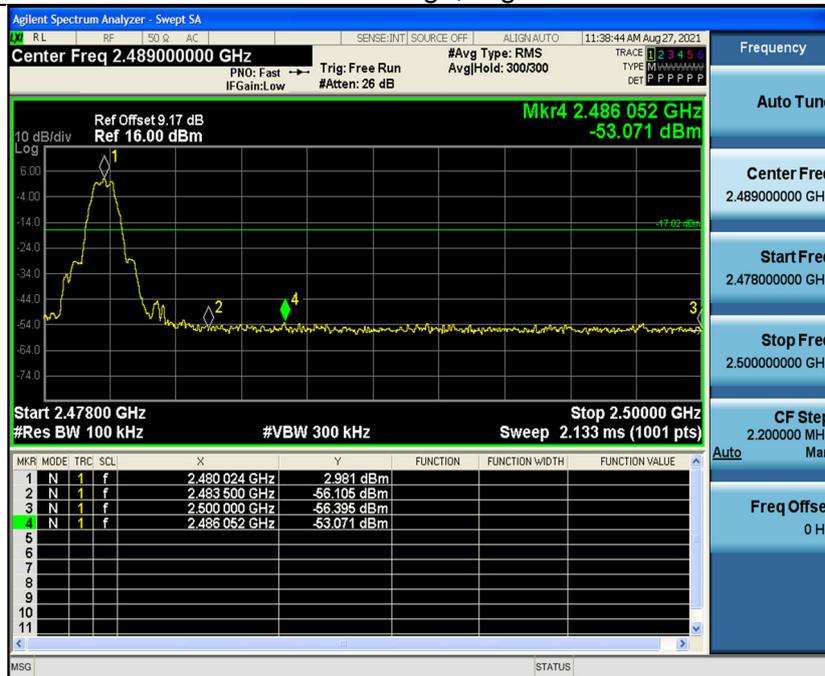


5.8.3. Test Procedure

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

5.8.4. Test Result

EUT:	Wireless Headphone	Model Name:	A3510
Pressure:	1012 hPa	Test Voltage:	DC 3.7V from battery
Test Mode:	TX Mode /CH00, CH39		

BLE: Band Edge, Left Side

BLE: Band Edge, Right Side


5.9. Spurious RF Conducted Emissions

5.9.1. Conformance Limit

Below -20dB of the highest emission level in operating band.

5.9.2. Measuring Instruments

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

5.9.3. Test Setup

Please refer to Section 6.1 of this test report.

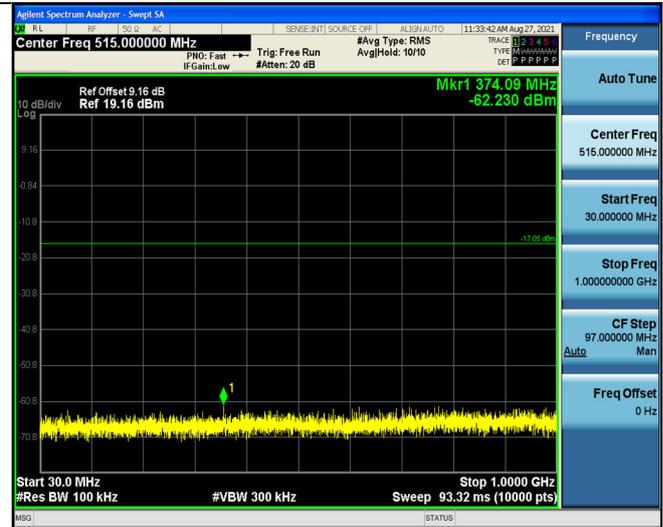
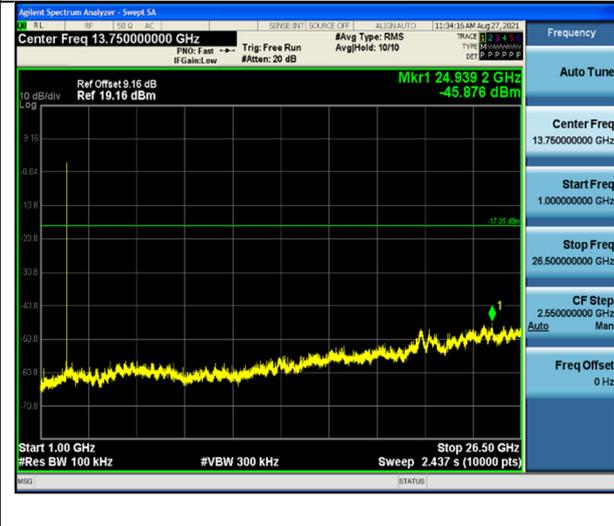
5.9.4. Test Procedure

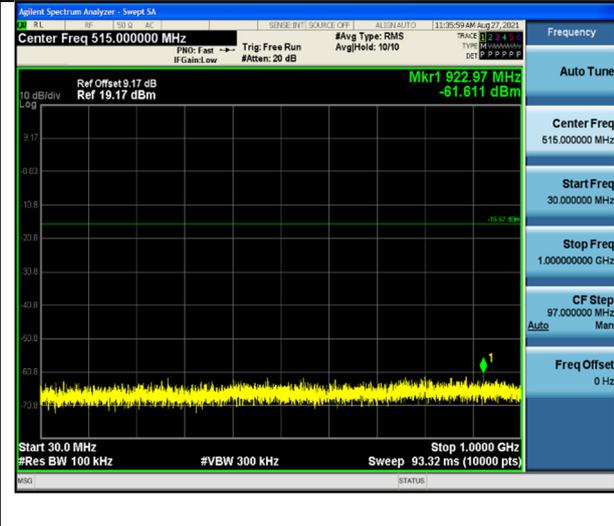
The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW=300kHz to measure the peak field strength, and measure frequency range from 9kHz to 26.5GHz.

5.9.5. Test Results

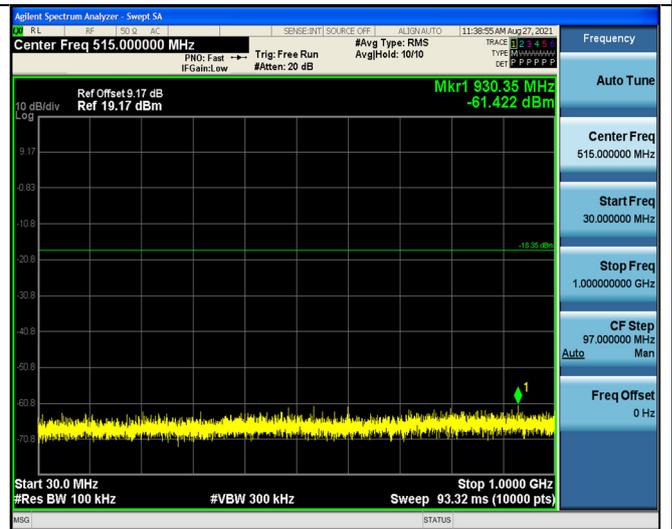
Note: The measurement frequency range is from 9kHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data.

GFSK on Channel 00

GFSK on Channel 00

GFSK on Channel 00

GFSK on Channel 19

GFSK on Channel 19

GFSK on Channel 19


GFSK on Channel 39

GFSK on Channel 39

GFSK on Channel 39


Photographs of the Test Setup

See the APPENDIX – Test Setup Photos.

Photographs of the EUT

See the APPENDIX 1- EUT PHOTO.

----END OF REPORT----