

11. Radiated Spurious Emission

11.1 Measurement Limit

- FCC Part 15.209 Limit in the below table to be followed

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

11.2 Measurement Procedure

- The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

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8. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
9. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
10. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
11. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9kHz~150kHz/RB 200Hz for QP
Start ~Stop Frequency	150kHz~30MHz/RB 9kHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120kHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

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

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- **Quasi-Peak Measurements below 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as shown in the table above
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

- **Peak Measurements above 1GHz**

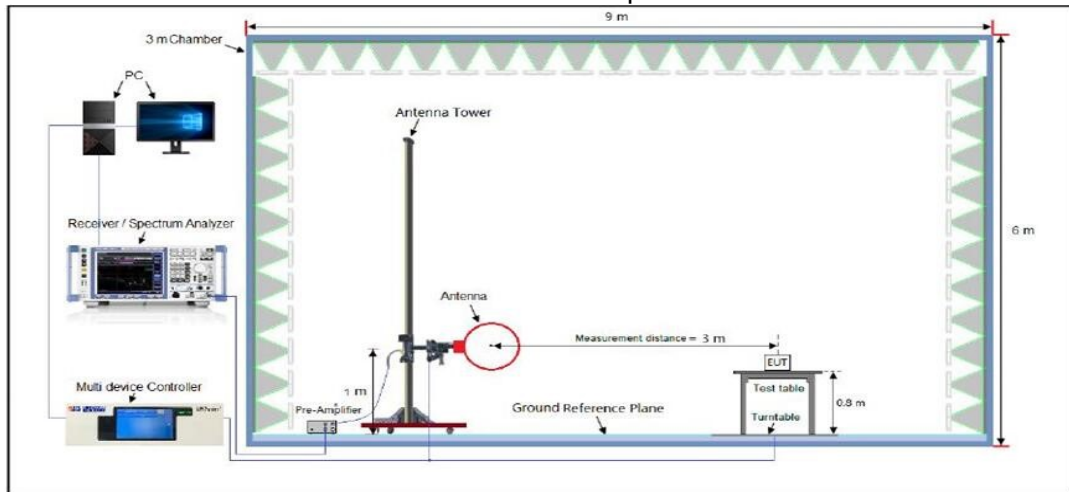
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

- **Average Measurements above 1GHz**

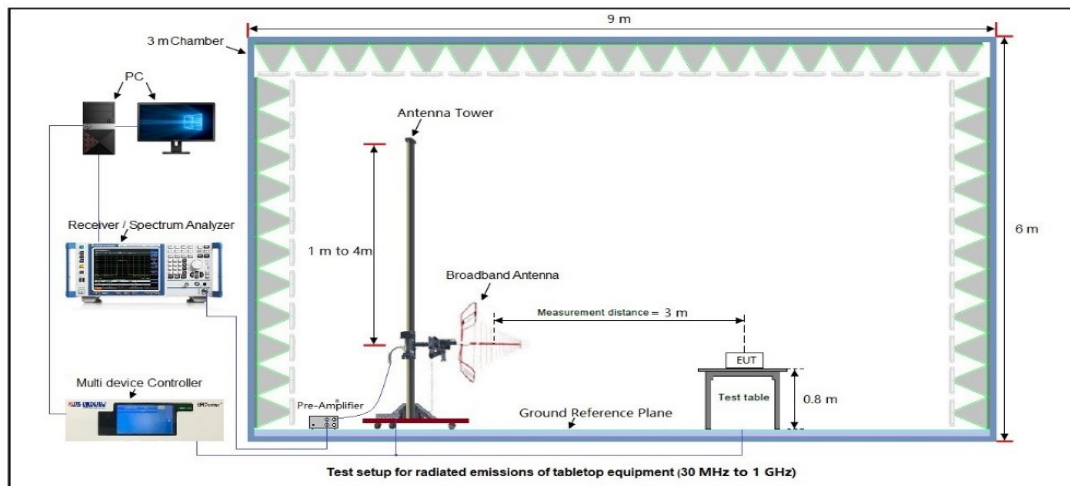
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW $\geq [3 \times \text{RBW}]$
4. Detector = Power averaging (rms)
5. Averaging type = power (i.e., rms)
6. Sweep time = auto
7. Perform a trace average of at least 100 traces.
8. The applicable correction factor is $[10 \cdot \log(1 / D)]$, where D is the duty cycle. The factor had been edited in the "Input Correction" of the Spectrum Analyzer.

11.3 Measurement Setup (Block Diagram of Configuration)

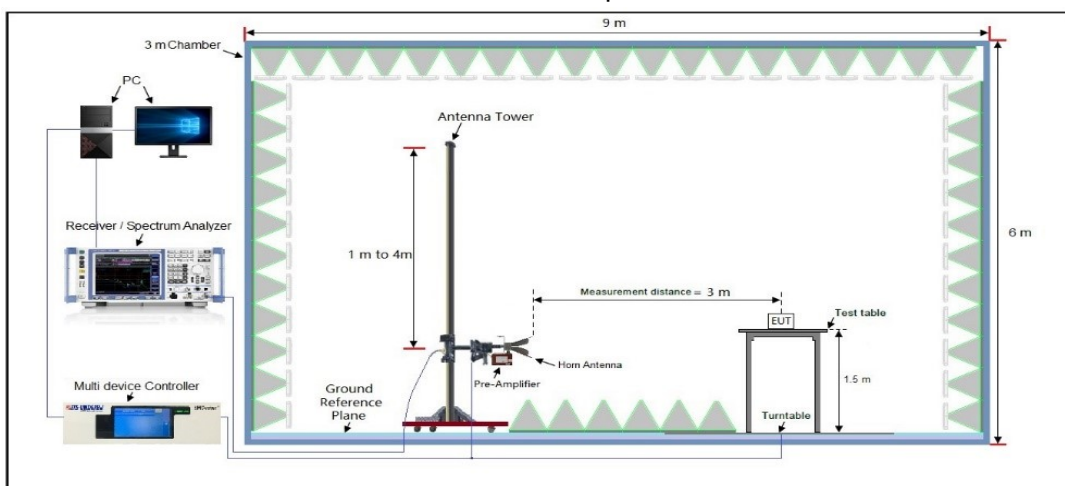
Radiated Emission Test Setup 9kHz-30MHz



Radiated Emission Test Setup 30MHz-1000MHz



Radiated Emission Test Setup Above 1000MHz

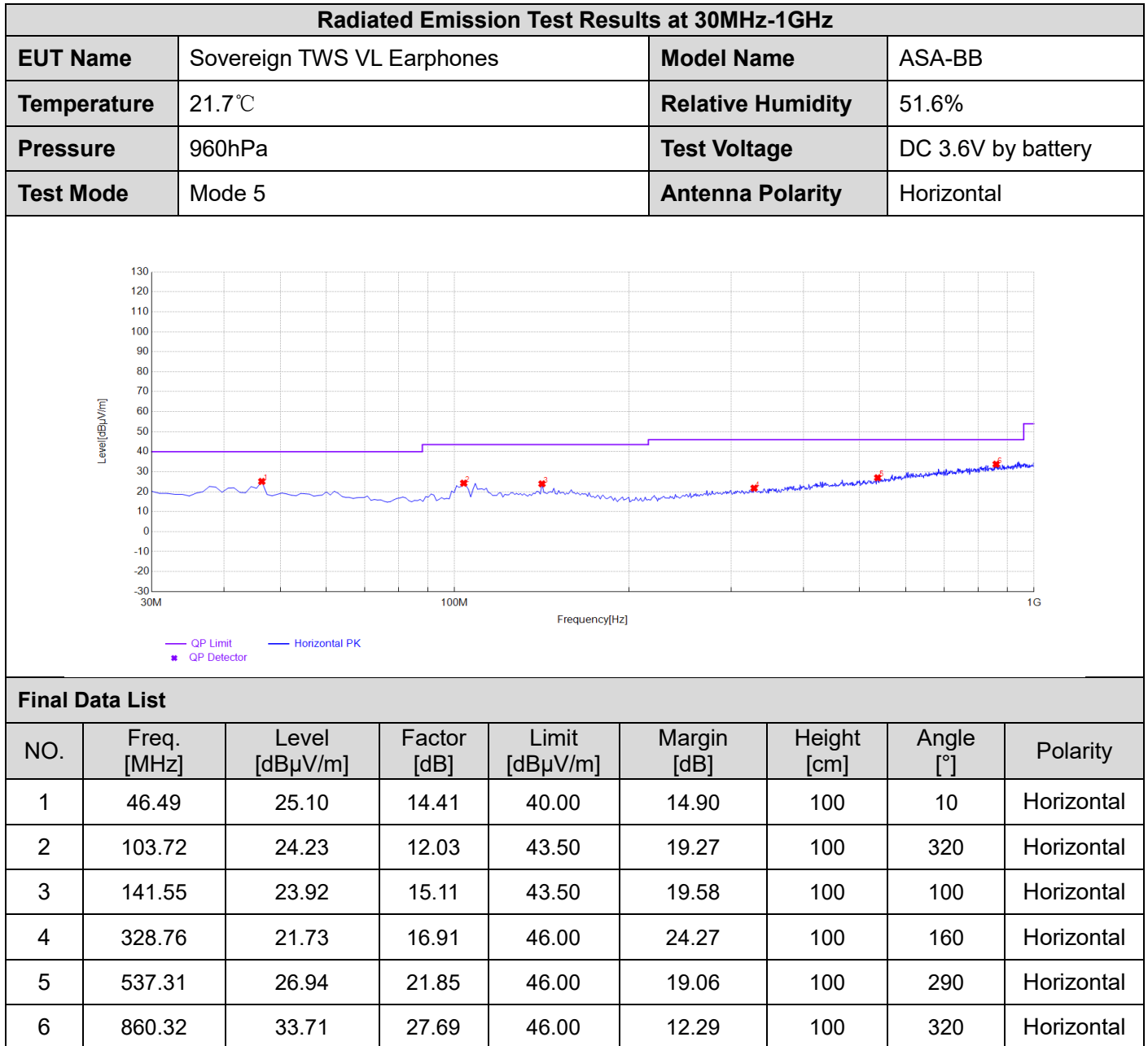


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11.4 Measurement Result

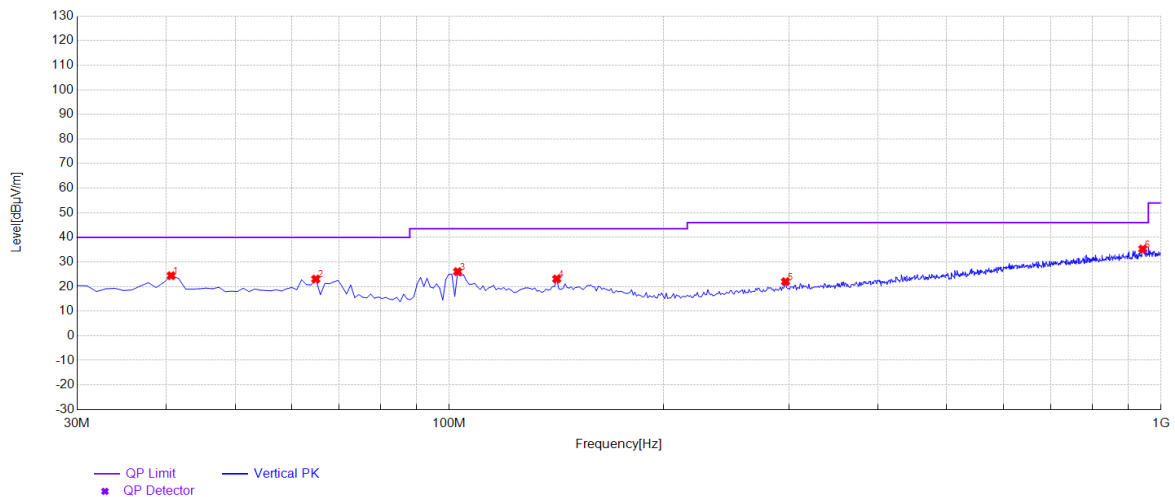
Radiated Emission Below 30MHz-Left earphone:

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.



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Radiated Emission Test Results at 30MHz-1GHz			
EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7°C	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 5	Antenna Polarity	Vertical



Final Data List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	40.67	24.42	14.53	40.00	15.58	100	350	Vertical
2	64.92	23.03	12.84	40.00	16.97	100	20	Vertical
3	102.75	26.05	12.00	43.50	17.45	100	100	Vertical
4	141.55	23.09	15.11	43.50	20.41	100	270	Vertical
5	296.75	21.99	15.88	46.00	24.01	100	200	Vertical
6	942.77	35.27	29.12	46.00	10.73	100	160	Vertical

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss - Pre-amplifier, Margin=Measurement-Limit.

2. All test modes had been pre-tested. The mode 5 is the worst case and recorded in the report.

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Radiated Emissions Test Results for Above 1GHz

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7℃	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 4	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	47.15	0.08	47.23	74	-26.77	peak
4804.000	36.94	0.08	37.02	54	-16.98	AVG
7206.000	42.54	2.21	44.75	74	-29.25	peak
7206.000	31.52	2.21	33.73	54	-20.27	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7℃	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 4	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	48.62	0.08	48.7	74	-25.3	peak
4804.000	37.54	0.08	37.62	54	-16.38	AVG
7206.000	42.61	2.21	44.82	74	-29.18	peak
7206.000	31.53	2.21	33.74	54	-20.26	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

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Radiated Emissions Test Results for Above 1GHz

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7°C	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 5	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4880.000	47.49	0.14	47.63	74	-26.37	peak
4880.000	37.52	0.14	37.66	54	-16.34	AVG
7320.000	42.61	2.36	44.97	74	-29.03	peak
7320.000	31.53	2.36	33.89	54	-20.11	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7°C	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 5	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4880.000	48.61	0.14	48.75	74	-25.25	peak
4880.000	37.54	0.14	37.68	54	-16.32	AVG
7320.000	41.26	2.36	43.62	74	-30.38	peak
7320.000	31.53	2.36	33.89	54	-20.11	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

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Radiated Emissions Test Results for Above 1GHz

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7℃	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 6	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	48.94	0.22	49.16	74	-24.84	peak
4960.000	37.52	0.22	37.74	54	-16.26	AVG
7440.000	42.61	2.64	45.25	74	-28.75	peak
7440.000	31.53	2.64	34.17	54	-19.83	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7℃	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 6	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	48.94	0.22	49.16	74	-24.84	peak
4960.000	37.53	0.22	37.75	54	-16.25	AVG
7440.000	42.61	2.64	45.25	74	-28.75	peak
7440.000	32.36	2.64	35	54	-19	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: PASS

Note:

- The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.
- Factor = Antenna Factor + Cable loss – Pre-amplifier gain, Margin = Emission Level - Limit.
- The "Factor" value can be calculated automatically by software of measurement system.
- All mode rates are tested and evaluated, BLE 2Mbps mode is the worst case and documented in the report.

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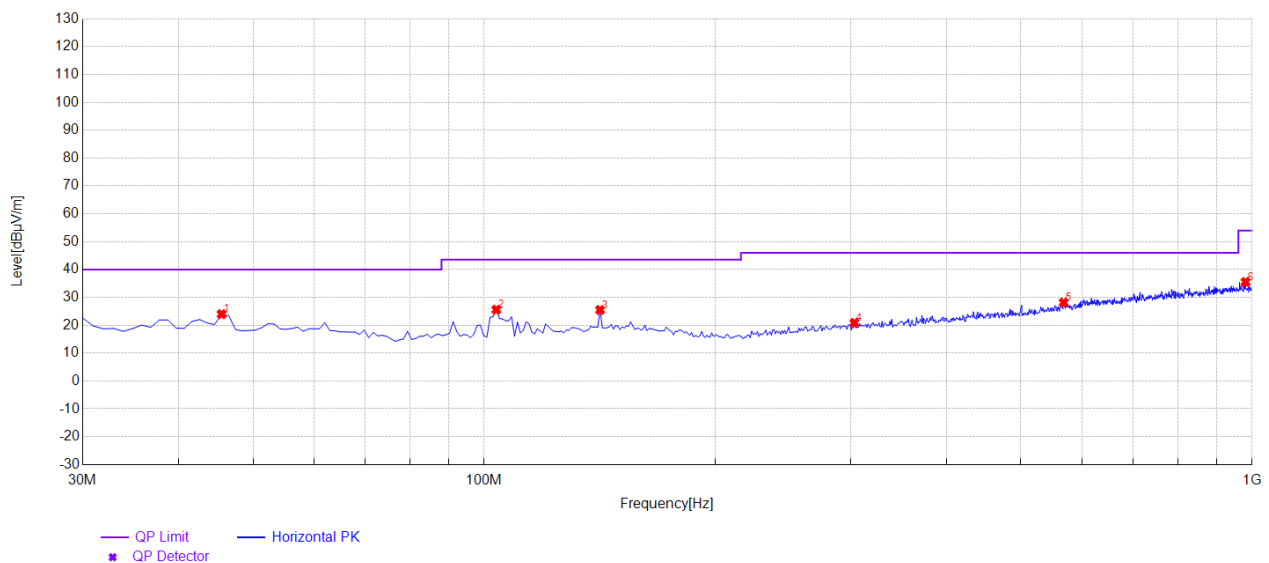
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Radiated Emission Below 30MHz-Right earphone

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

Radiated Emission Test Results at 30MHz-1GHz

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7℃	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 5	Antenna Polarity	Horizontal

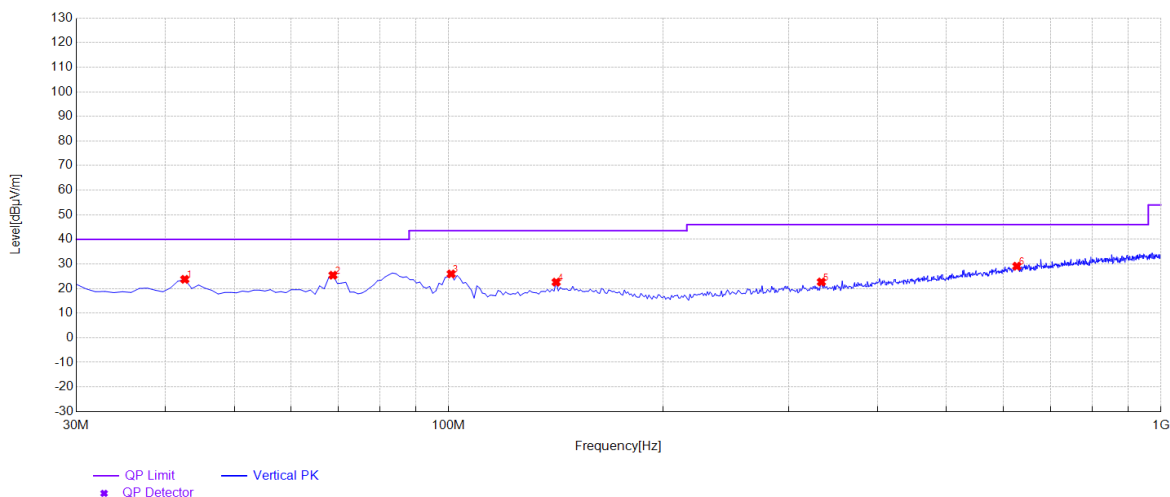


Final Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	45.52	23.97	14.45	40.00	16.03	100	10	Horizontal
2	103.72	25.57	12.03	43.50	17.93	100	50	Horizontal
3	141.55	25.48	15.11	43.50	18.02	100	160	Horizontal
4	303.54	20.86	16.19	46.00	25.14	100	170	Horizontal
5	568.35	28.13	22.75	46.00	17.87	100	320	Horizontal
6	980.6	35.53	29.39	54.00	18.47	100	320	Horizontal

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Radiated Emission Test Results at 30MHz-1GHz			
EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7℃	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 5	Antenna Polarity	Vertical



Final Data List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	42.61	23.74	14.56	40.00	16.26	100	100	Vertical
2	68.8	25.41	12.20	40.00	14.59	100	30	Vertical
3	100.81	25.94	11.77	43.50	17.56	100	270	Vertical
4	141.55	22.59	15.11	43.50	20.91	100	350	Vertical
5	333.61	22.67	16.95	46.00	23.33	100	190	Vertical
6	627.52	29.08	24.28	46.00	16.92	100	30	Vertical

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss - Pre-amplifier, Margin=Measurement-Limit.

2. All test modes had been pre-tested. The mode 5 is the worst case and recorded in the report.

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Radiated Emissions Test Results for Above 1GHz

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7°C	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 4	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	48.51	0.08	48.59	74	-25.41	peak
4804.000	37.55	0.08	37.63	54	-16.37	AVG
7206.000	43.67	2.21	45.88	74	-28.12	peak
7206.000	32.49	2.21	34.7	54	-19.3	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7°C	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 4	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	47.62	0.08	47.7	74	-26.3	peak
4804.000	36.54	0.08	36.62	54	-17.38	AVG
7206.000	43.11	2.21	45.32	74	-28.68	peak
7206.000	33.65	2.21	35.86	54	-18.14	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

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Radiated Emissions Test Results for Above 1GHz

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7°C	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 5	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4880.000	48.65	0.14	48.79	74	-25.21	peak
4880.000	35.16	0.14	35.3	54	-18.7	AVG
7320.000	43.66	2.36	46.02	74	-27.98	peak
7320.000	33.08	2.36	35.44	54	-18.56	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7°C	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 5	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4880.000	47.13	0.14	47.27	74	-26.73	peak
4880.000	32.62	0.14	32.76	54	-21.24	AVG
7320.000	42.22	2.36	44.58	74	-29.42	peak
7320.000	32.53	2.36	34.89	54	-19.11	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

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Radiated Emissions Test Results for Above 1GHz

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7℃	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 6	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	47.65	0.22	47.87	74	-26.13	peak
4960.000	36.52	0.22	36.74	54	-17.26	AVG
7440.000	43.65	2.64	46.29	74	-27.71	peak
7440.000	33.74	2.64	36.38	54	-17.62	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	21.7℃	Relative Humidity	51.6%
Pressure	960hPa	Test Voltage	DC 3.6V by battery
Test Mode	Mode 6	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	48.35	0.22	48.57	74	-25.43	peak
4960.000	36.89	0.22	37.11	54	-16.89	AVG
7440.000	42.61	2.64	45.25	74	-28.75	peak
7440.000	32.84	2.64	35.48	54	-18.52	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: PASS

Note:

1. The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.
2. Factor = Antenna Factor + Cable loss – Pre-amplifier gain, Margin =Emission Level-Limit.
3. The “Factor” value can be calculated automatically by software of measurement system.
4. All mode rates are tested and evaluated, BLE 2Mbps mode is the worst case and documented in the report.

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Band Edge Emission Test Results for Restricted Bands-Left earphone

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Dc 3.6V by battery

Bluetooth Tx CH00 2402 MHz 1Mbps

Item (Mark)	Freq. MHz	Reading dBμV	Ant. Fac. dB/m	PRM Factor dB	Cable Loss dB	Level dBμV/m	Limit dBμV/m	Margin dB	Detector	Pol.
1	2390.00	37.60	29.99	30.21	8.35	45.728	74	-28.27	Peak	Horizontal
2	2390.00	28.34	29.99	30.21	8.35	36.469	54	-17.53	AV	Horizontal
3	2390.00	35.47	29.99	30.21	8.35	43.604	74	-30.40	Peak	Vertical
4	2390.00	25.61	29.99	30.21	8.35	33.739	54	-20.26	AV	Vertical

Bluetooth Tx CH39 2480 MHz 1Mbps

Item (Mark)	Freq. MHz	Reading dBμV	Ant. Fac. dB/m	PRM Factor dB	Cable Loss dB	Level dBμV/m	Limit dBμV/m	Margin dB	Detector	Pol.
1	2483.50	41.96	30.25	30.25	8.5	50.456	74	-23.54	Peak	Horizontal
2	2483.50	33.83	30.25	30.25	8.5	42.334	54	-11.67	AV	Horizontal
3	2483.50	37.91	30.25	30.25	8.5	46.414	74	-27.59	Peak	Vertical
4	2483.50	30.74	30.25	30.25	8.5	39.244	54	-14.76	AV	Vertical

Bluetooth Tx CH00 2402 MHz 2Mbps

Item (Mark)	Freq. MHz	Reading dBμV	Ant. Fac. dB/m	PRM Factor dB	Cable Loss dB	Level dBμV/m	Limit dBμV/m	Margin dB	Detector	Pol.
1	2390.00	38.98	29.99	30.21	8.35	47.108	74	-26.89	Peak	Horizontal
2	2390.00	27.51	29.99	30.21	8.35	35.644	54	-18.36	AV	Horizontal
3	2390.00	36.19	29.99	30.21	8.35	44.321	74	-29.68	Peak	Vertical
4	2390.00	25.82	29.99	30.21	8.35	33.948	54	-20.05	AV	Vertical

Bluetooth Tx CH39 2480 MHz 2Mbps

Item (Mark)	Freq. MHz	Reading dBμV	Ant. Fac. dB/m	PRM Factor dB	Cable Loss dB	Level dBμV/m	Limit dBμV/m	Margin dB	Detector	Pol.
1	2483.50	49.62	30.25	30.25	8.5	58.115	74	-15.89	Peak	Horizontal
2	2483.50	38.73	30.25	30.25	8.5	47.234	54	-6.77	AV	Horizontal
3	2483.50	46.73	30.25	30.25	8.5	55.231	74	-18.77	Peak	Vertical
4	2483.50	36.02	30.25	30.25	8.5	44.516	54	-9.48	AV	Vertical

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Band Edge Emission Test Results for Restricted Bands-Left earphone

EUT Name	Sovereign TWS VL Earphones	Model Name	ASA-BB
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Dc 3.6V by battery

Bluetooth Tx CH00_2402 MHz_1Mbps

Item (Mark)	Freq. MHz	Reading dBμV	Ant. Fac. dB/m	PRM Factor dB	Cable Loss dB	Level dBμV/m	Limit dBμV/m	Margin dB	Detector	Pol.
1	2390.00	40.65	29.99	30.21	8.35	48.78	74	25.22	Peak	Horizontal
2	2390.00	31.16	29.99	30.21	8.35	39.29	54	14.71	AV	Horizontal
3	2390.00	39.00	29.99	30.21	8.35	47.13	74	26.87	Peak	Vertical
4	2390.00	28.90	29.99	30.21	8.35	37.03	54	16.97	AV	Vertical

Bluetooth Tx CH39_2480 MHz_1Mbps

Item (Mark)	Freq. MHz	Reading dBμV	Ant. Fac. dB/m	PRM Factor dB	Cable Loss dB	Level dBμV/m	Limit dBμV/m	Margin dB	Detector	Pol.
1	2483.50	41.31	30.25	30.25	8.5	49.81	74	24.19	Peak	Horizontal
2	2483.50	30.86	30.25	30.25	8.5	39.36	54	14.64	AV	Horizontal
3	2483.50	38.53	30.25	30.25	8.5	47.03	74	26.97	Peak	Vertical
4	2483.50	29.37	30.25	30.25	8.5	37.87	54	16.13	AV	Vertical

Bluetooth Tx CH00_2402 MHz_2Mbps

Item (Mark)	Freq. MHz	Reading dBμV	Ant. Fac. dB/m	PRM Factor dB	Cable Loss dB	Level dBμV/m	Limit dBμV/m	Margin dB	Detector	Pol.
1	2390.00	40.49	29.99	30.21	8.35	48.62	74	25.38	Peak	Horizontal
2	2390.00	30.87	29.99	30.21	8.35	39	54	15.00	AV	Horizontal
3	2390.00	37.05	29.99	30.21	8.35	45.18	74	28.82	Peak	Vertical
4	2390.00	27.38	29.99	30.21	8.35	35.51	54	18.49	AV	Vertical

Bluetooth Tx CH39_2480 MHz_2Mbps

Item (Mark)	Freq. MHz	Reading dBμV	Ant. Fac. dB/m	PRM Factor dB	Cable Loss dB	Level dBμV/m	Limit dBμV/m	Margin dB	Detector	Pol.
1	2483.50	2390.00	40.49	29.99	30.21	8.35	48.62	74	Peak	Horizontal
2	2483.50	2390.00	30.87	29.99	30.21	8.35	39	54	AV	Horizontal
3	2483.50	2390.00	37.05	29.99	30.21	8.35	45.18	74	Peak	Vertical
4	2483.50	2390.00	27.38	29.99	30.21	8.35	35.51	54	AV	Vertical

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Remark:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. The other emission levels were very low against the limit.
3. Margin = Emission Level - Limit.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=3MHz/Sweep time=Auto/Detector=Average.

RESULT: PASS

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12. AC Power Line Conducted Emission Test

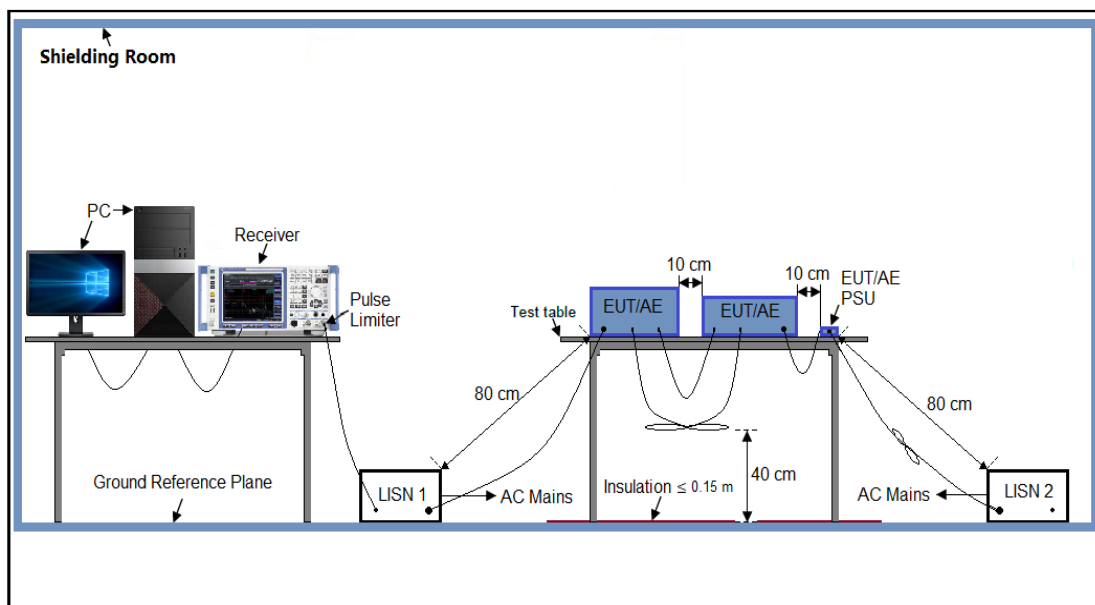
12.1 Measurement Limit

Frequency	Maximum RF Line Voltage	
	Q.P. (dB μ V)	Average (dB μ V)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

12.2 Measurement Setup (Block Diagram of Configuration)



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12.3 Preliminary Procedure of Line Conducted Emission Test

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 5V power from adapter which received AC120V/60Hz power from a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side).
7. Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
8. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
9. During the above scans, the emissions were maximized by cable manipulation.
10. The test mode(s) were scanned during the preliminary test.
11. Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

12.4 Final Procedure of Line Conducted Emission Test

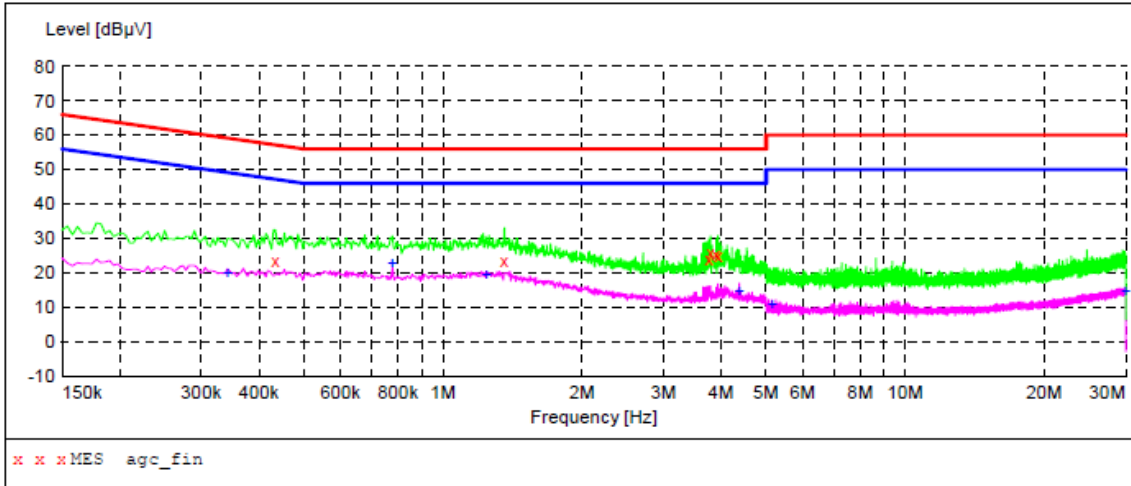
1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
3. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
4. The test data of the worst case condition(s) was reported on the Summary Data page.
5. A conducted emission is calculated by the following equation:
 - Measurement Level (dB μ V) = Receiver reading (dB μ V) + Transd (dB)
 - Transd (dB) = AMN Factor(dB)+Cable Loss(dB)+Attenuation(dB)
 - Margin = Limit-Level

12.5 Measurement Result

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AC Power Line Conducted Emission Test

Test Mode	Mode 1	LISN Line	Hot Side
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MEASUREMENT RESULT: "agc_fin"

2025/10/9 15:26

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.434000	23.40	10.3	57	33.8	QP	L1
1.358000	23.70	10.4	56	32.3	QP	L1
3.758000	23.80	10.6	56	32.2	QP	L1
3.790000	26.00	10.6	56	30.0	QP	L1
3.902000	25.50	10.7	56	30.5	QP	L1
3.934000	25.10	10.7	56	30.9	QP	L1

MEASUREMENT RESULT: "agc_fin2"

2025/10/9 15:26

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.342000	20.30	10.3	49	28.9	AV	L1
0.778000	22.80	10.3	46	23.2	AV	L1
1.242000	19.60	10.4	46	26.4	AV	L1
4.374000	14.80	10.7	46	31.2	AV	L1
5.154000	11.20	10.8	50	38.8	AV	L1
29.986000	15.00	18.1	50	35.0	AV	L1

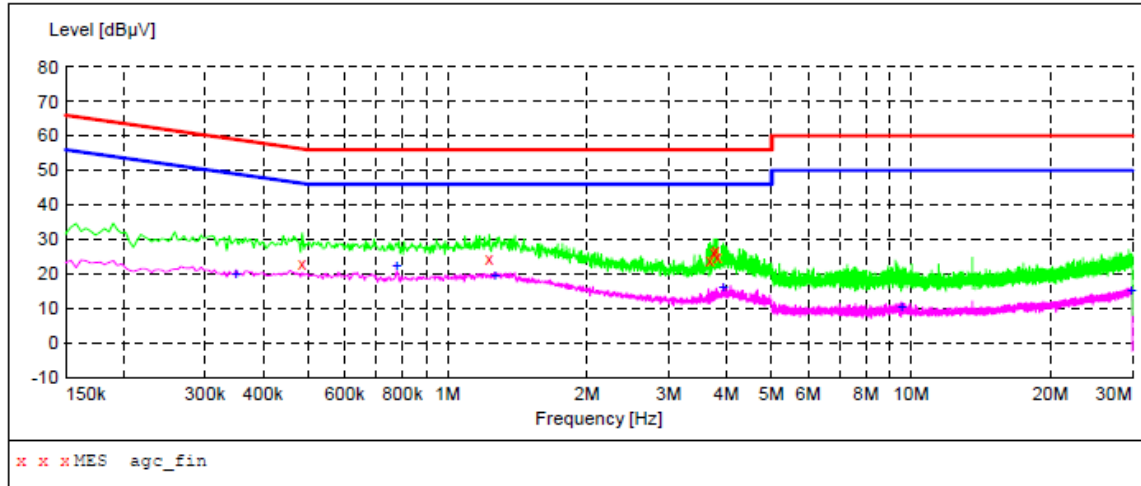
RESULT: PASS

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AC Power Line Conducted Emission Test

Test Mode	Mode 1	LISN Line	Neutral Side
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MEASUREMENT RESULT: "agc_fin"

2025/10/9 15:30

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.486000	23.30	10.3	56	32.9	QP	N
1.230000	24.70	10.4	56	31.3	QP	N
3.686000	24.10	10.6	56	31.9	QP	N
3.754000	26.40	10.6	56	29.6	QP	N
3.790000	26.90	10.6	56	29.1	QP	N
3.822000	24.90	10.7	56	31.1	QP	N

MEASUREMENT RESULT: "agc_fin2"

2025/10/9 15:30

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.350000	20.40	10.3	49	28.6	AV	N
0.778000	22.70	10.3	46	23.3	AV	N
1.266000	19.70	10.4	46	26.3	AV	N
3.938000	16.50	10.7	46	29.5	AV	N
9.530000	10.60	12.1	50	39.4	AV	N
29.902000	15.30	18.1	50	34.7	AV	N

RESULT: PASS

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Appendix I: Photographs of Test Setup

Refer to the Report No.: AGC17143250903AP01

Appendix II: Photographs of Test EUT

Refer to the Report No.: AGC17143250903AP02

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3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.
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8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.
9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

-----End of Report-----

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