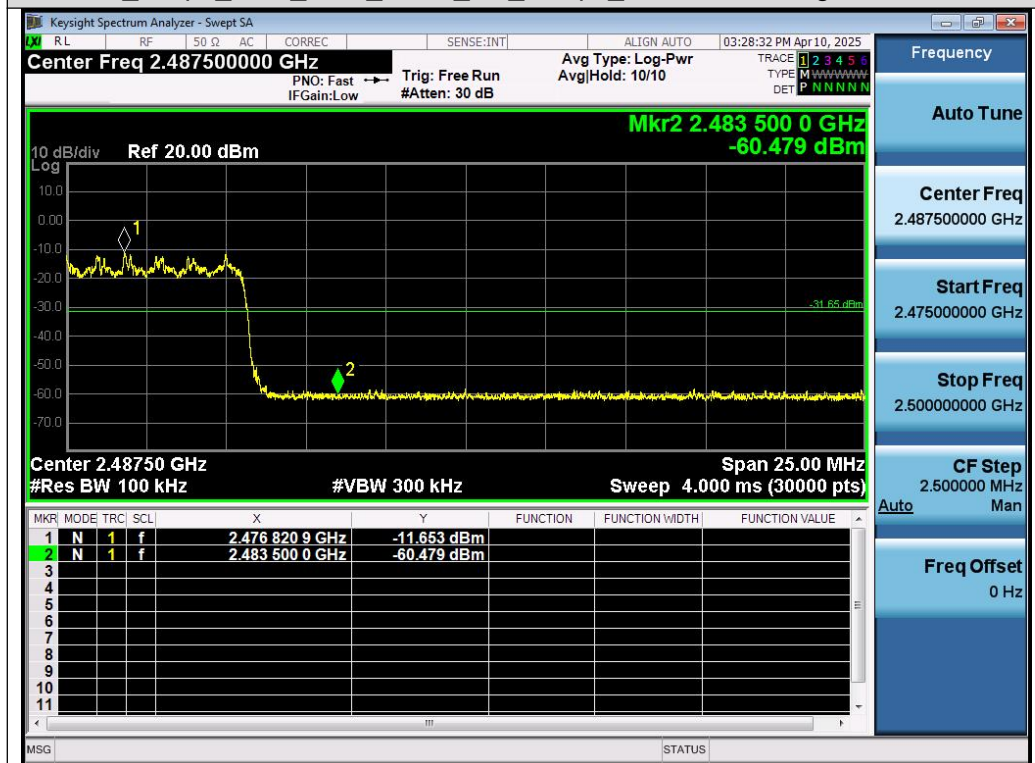


Test\_Graph\_EDR\_HOP\_ANT1\_NA\_2Mbps\_Lower Band Edge Emissions



Test\_Graph\_EDR\_HOP\_ANT1\_NA\_2Mbps\_Higher Band Edge Emissions

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## 9. Radiated Spurious Emission

### 9.1 Measurement Limit

- 15.209 Limit in the below table has 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.

### 9.2 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. 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.

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8. 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.
9. 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.
10. 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**

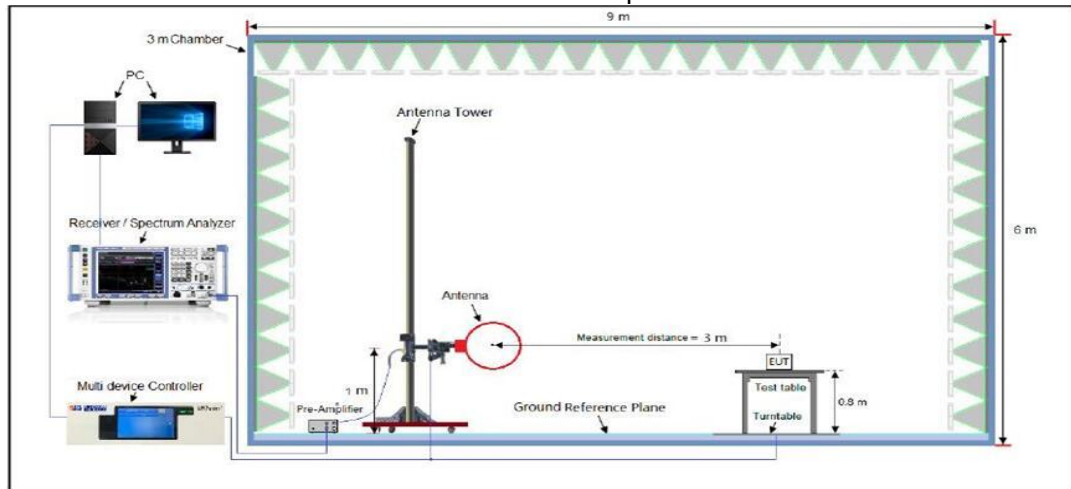
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

- **Average Measurements above 1GHz**

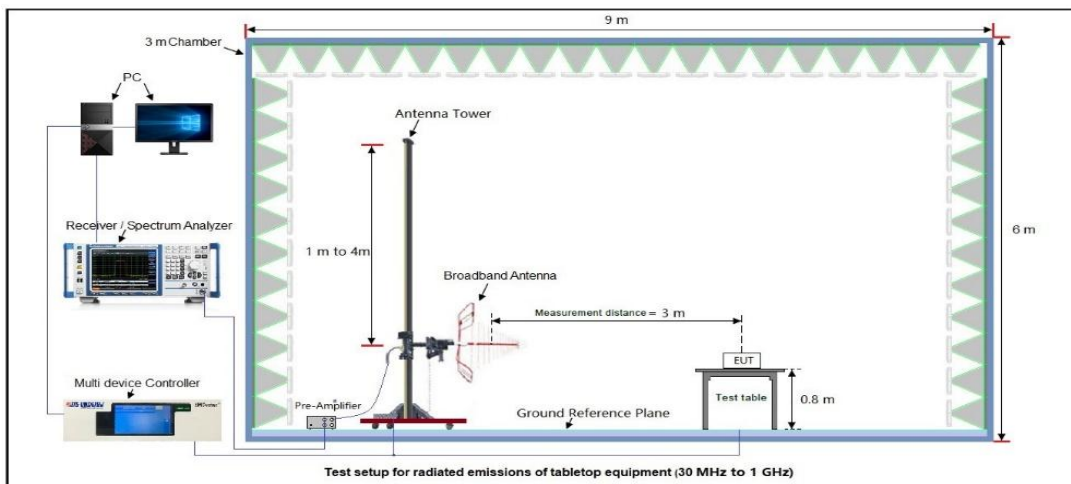
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW  $\geq [3 \times \text{RBW}]$
4. Detector = Power averaging (rms)
5. Averaging type = power (i.e., rms)
6. Sweep time = auto
7. Perform a trace average of at least 100 traces.
8. The 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.

### 9.3 Measurement Setup (Block Diagram of Configuration)

Radiated Emission Test Setup 9KHz-30MHz

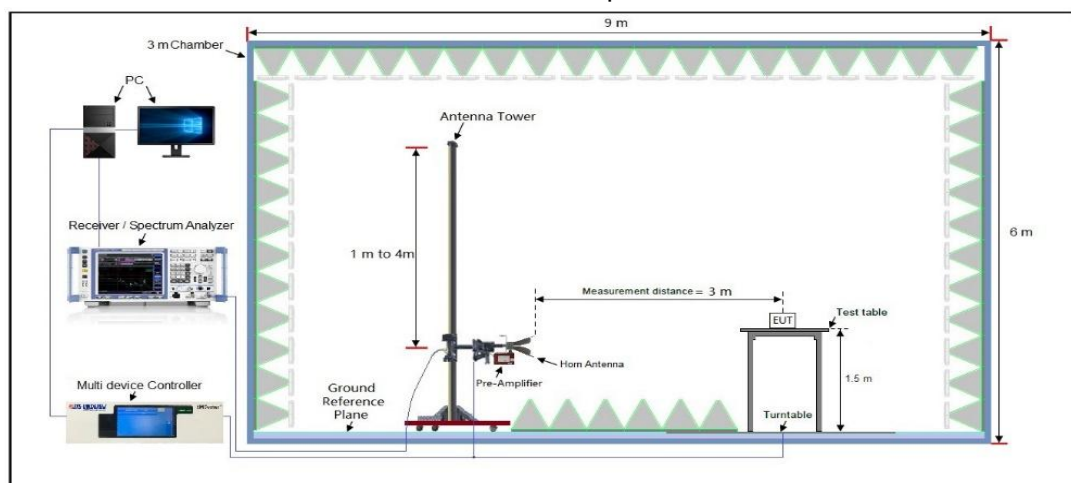


Radiated Emission Test Setup 30MHz-1000MHz



Test setup for radiated emissions of tabletop equipment (30 MHz to 1 GHz)

Radiated Emission Test Setup Above 1000MHz



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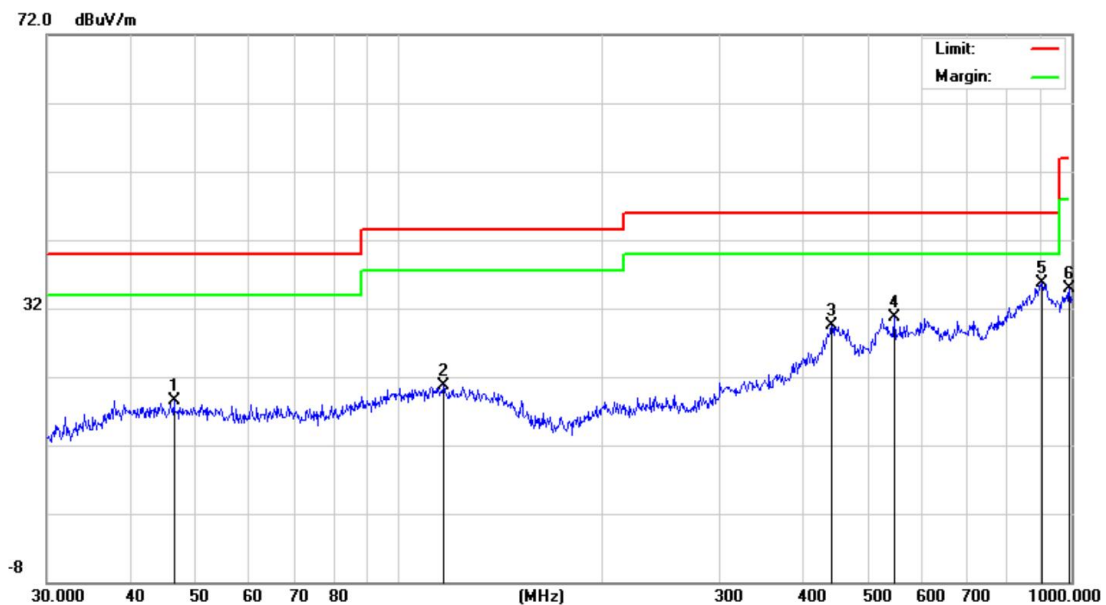
## 9.4 Measurement Result

### Radiated Emission Below 30MHz

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

<b>EUT Name</b>	True Wireless Stereo	<b>Model Name</b>	HTT-17
<b>Temperature</b>	21.2℃	<b>Relative Humidity</b>	65.6 %
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	DC 3.7V
<b>Test Mode</b>	Mode 5	<b>Antenna Polarity</b>	Horizontal



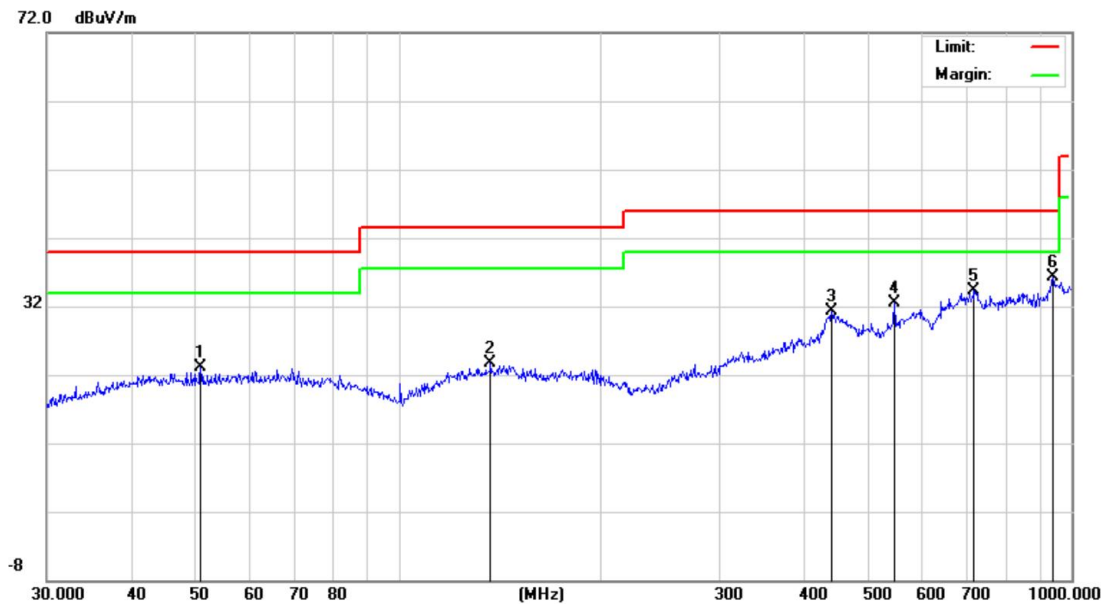
#### Final Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	46.3402	18.52	13.39	40.00	21.48	100	130	Horizontal
2	116.5401	20.77	16.37	43.50	22.73	100	150	Horizontal
3	440.1963	29.42	25.09	46.00	16.58	100	60	Horizontal
4	545.1826	30.70	23.98	46.00	15.3	100	200	Horizontal
5	903.3094	35.77	31.34	46.00	10.23	100	160	Horizontal
6	993.0114	34.85	29.10	54.00	19.15	100	90	Horizontal

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### Radiated Emission Test Results at 30MHz-1GHz

<b>EUT Name</b>	True Wireless Stereo	<b>Model Name</b>	HTT-17
<b>Temperature</b>	21.2℃	<b>Relative Humidity</b>	65.6 %
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	DC 3.7V
<b>Test Mode</b>	Mode 5	<b>Antenna Polarity</b>	Vertical



### Final Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	50.7637	23.18	16.96	40.00	16.82	100	140	Vertical
2	136.9391	23.73	18.12	43.50	19.77	100	180	Vertical
3	440.1963	31.22	26.09	46.00	14.78	100	90	Vertical
4	545.1826	32.54	24.67	46.00	13.46	100	200	Vertical
5	716.6820	34.26	28.68	46.00	11.74	100	120	Vertical
6	938.8326	36.35	30.84	46.00	9.65	100	130	Vertical

### RESULT: Pass

#### Note:

- Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.
- 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 Above 1GHz

<b>EUT Name</b>	True Wireless Stereo	<b>Model Name</b>	HTT-17
<b>Temperature</b>	21.2℃	<b>Relative Humidity</b>	65.6 %
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	DC 3.7V
<b>Test Mode</b>	Mode 4	<b>Antenna Polarity</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	46.22	0.08	46.30	74	-27.70	peak
4804.000	37.40	0.08	37.48	54	-16.52	AVG
7206.000	41.65	2.21	43.86	74	-30.14	peak
7206.000	32.31	2.21	34.52	54	-19.48	AVG

Remark:

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

<b>EUT Name</b>	True Wireless Stereo	<b>Model Name</b>	HTT-17
<b>Temperature</b>	21.2℃	<b>Relative Humidity</b>	65.6 %
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	DC 3.7V
<b>Test Mode</b>	Mode 4	<b>Antenna Polarity</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	46.74	0.08	46.82	74	-27.18	peak
4804.000	37.42	0.08	37.50	54	-16.50	AVG
7206.000	41.26	2.21	43.47	74	-30.53	peak
7206.000	32.10	2.21	34.31	54	-19.69	AVG

Remark:

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

**RESULT: PASS**

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### Radiated Emissions Test Results for Above 1GHz

<b>EUT Name</b>	True Wireless Stereo	<b>Model Name</b>	HTT-17
<b>Temperature</b>	21.2℃	<b>Relative Humidity</b>	65.6 %
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	DC 3.7V
<b>Test Mode</b>	Mode 5	<b>Antenna Polarity</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.000	46.36	0.08	46.44	74	-27.56	peak
4882.000	37.13	0.08	37.21	54	-16.79	AVG
7323.000	41.24	2.21	43.45	74	-30.55	peak
7323.000	32.15	2.21	34.36	54	-19.64	AVG

Remark:

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

<b>EUT Name</b>	True Wireless Stereo	<b>Model Name</b>	HTT-17
<b>Temperature</b>	21.2℃	<b>Relative Humidity</b>	65.6 %
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	DC 3.7V
<b>Test Mode</b>	Mode 5	<b>Antenna Polarity</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.000	46.95	0.08	47.03	74	-26.97	peak
4882.000	37.53	0.08	37.61	54	-16.39	AVG
7323.000	41.43	2.21	43.64	74	-30.36	peak
7323.000	32.18	2.21	34.39	54	-19.61	AVG

Remark:

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

**RESULT: PASS**

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### Radiated Emissions Test Results for Above 1GHz

<b>EUT Name</b>	True Wireless Stereo	<b>Model Name</b>	HTT-17
<b>Temperature</b>	21.2℃	<b>Relative Humidity</b>	65.6 %
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	DC 3.7V
<b>Test Mode</b>	Mode 6	<b>Antenna Polarity</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	46.18	0.08	46.26	74	-27.74	peak
4960.000	37.37	0.08	37.45	54	-16.55	AVG
7440.000	41.04	2.21	43.25	74	-30.75	peak
7440.000	32.01	2.21	34.22	54	-19.78	AVG

Remark:

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

<b>EUT Name</b>	True Wireless Stereo	<b>Model Name</b>	HTT-17
<b>Temperature</b>	21.2℃	<b>Relative Humidity</b>	65.6 %
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	DC 3.7V
<b>Test Mode</b>	Mode 6	<b>Antenna Polarity</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	46.33	0.08	46.41	74	-27.59	peak
4960.000	37.92	0.08	38.00	54	-16.00	AVG
7440.000	41.51	2.21	43.72	74	-30.28	peak
7440.000	32.00	2.21	34.21	54	-19.79	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.

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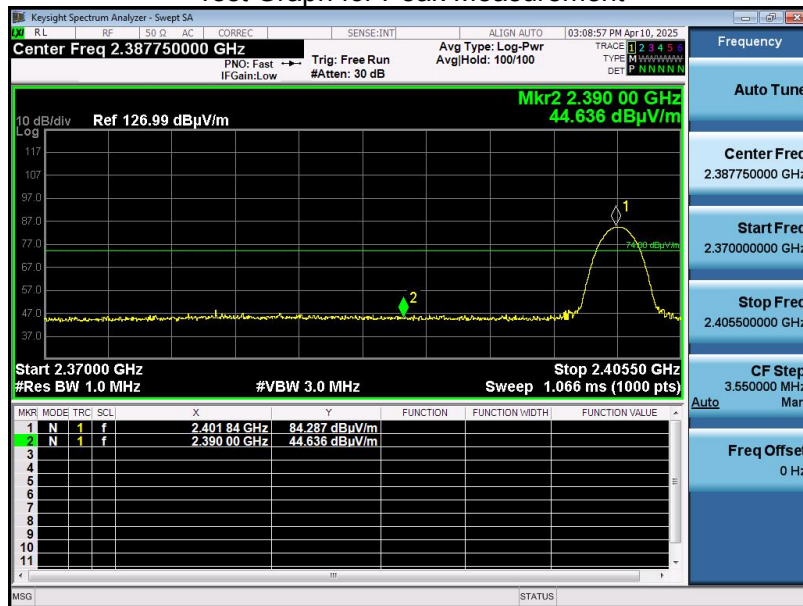
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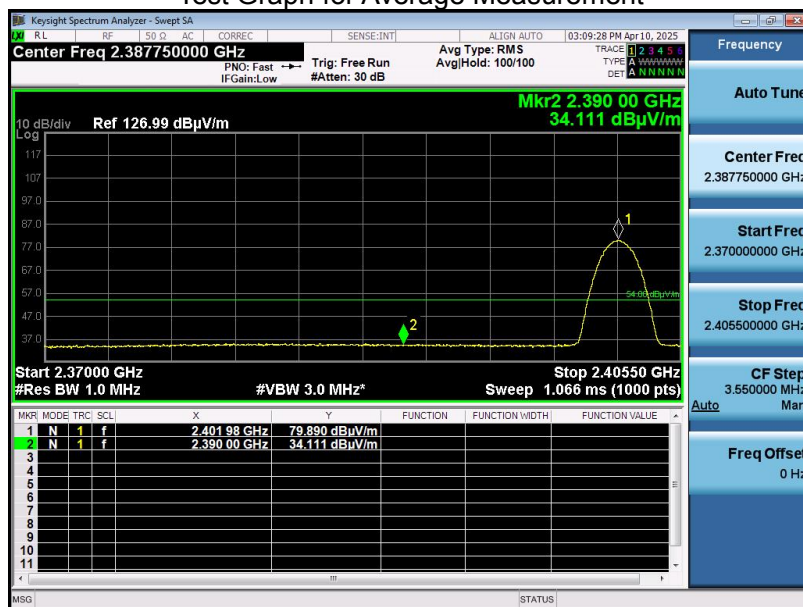
### Band Edge Emission Test Results for Restricted Bands

EUT Name	True Wireless Stereo	Model Name	HTT-17
Temperature	25.5°C	Relative Humidity	52%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 4	Antenna Polarity	Horizontal

Test Graph for Peak Measurement



Test Graph for Average Measurement



**RESULT: PASS**

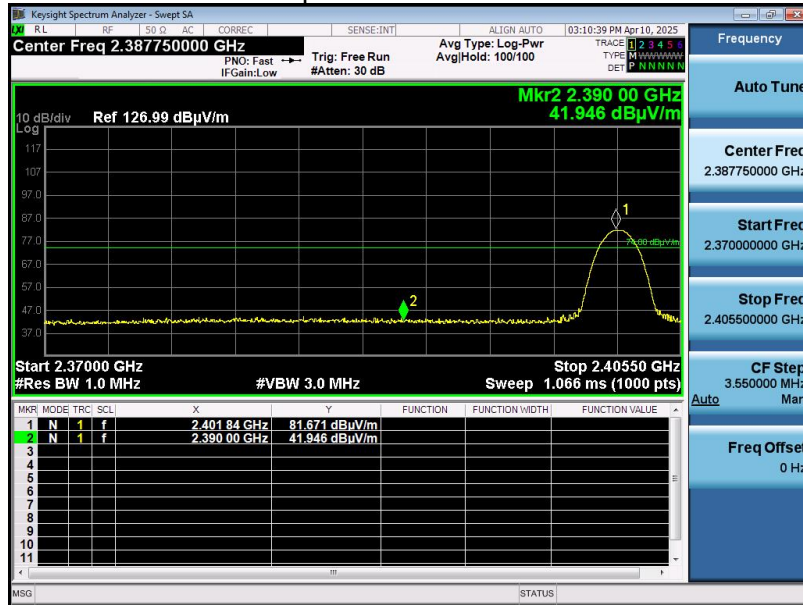
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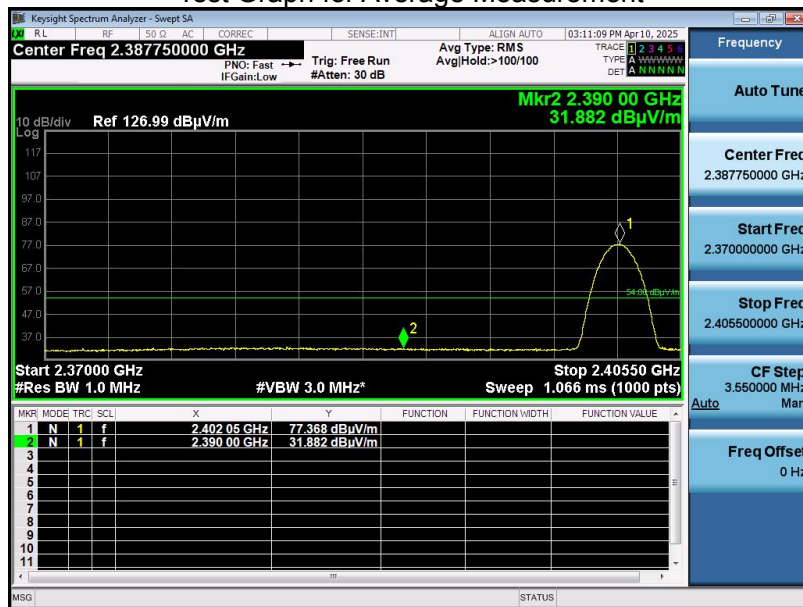
### Band Edge Emission Test Results for Restricted Bands

EUT Name	True Wireless Stereo	Model Name	HTT-17
Temperature	25.5°C	Relative Humidity	52%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 4	Antenna Polarity	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement



**RESULT: PASS**

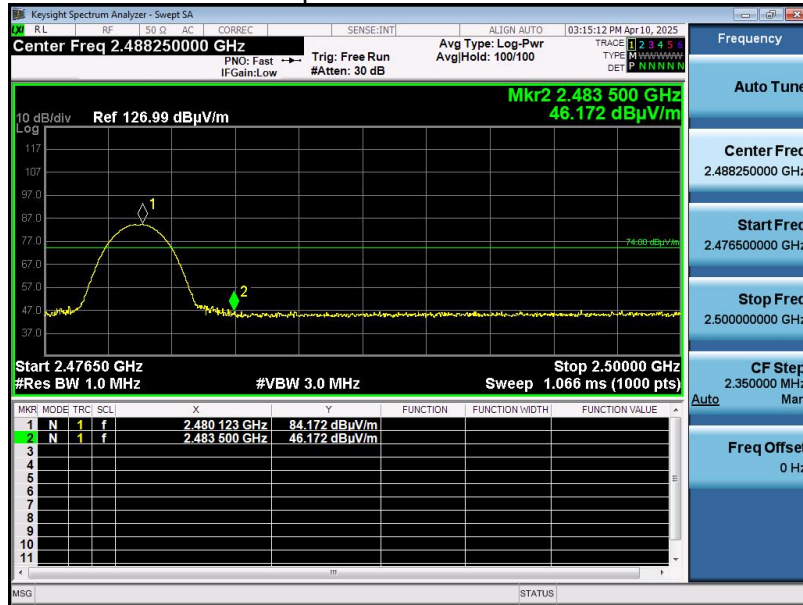
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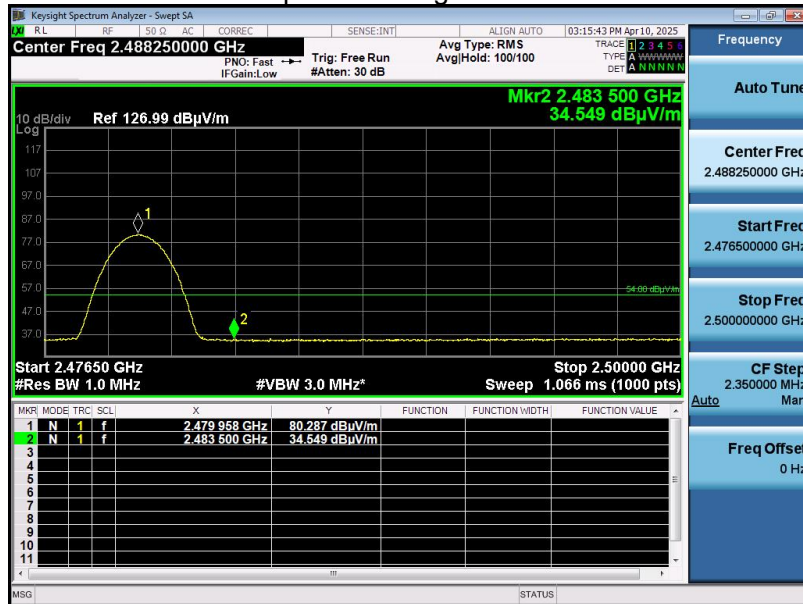
### Band Edge Emission Test Results for Restricted Bands

EUT Name	True Wireless Stereo	Model Name	HTT-17
Temperature	25.5°C	Relative Humidity	52%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 6	Antenna Polarity	Horizontal

Test Graph for Peak Measurement



Test Graph for Average Measurement



**RESULT: PASS**

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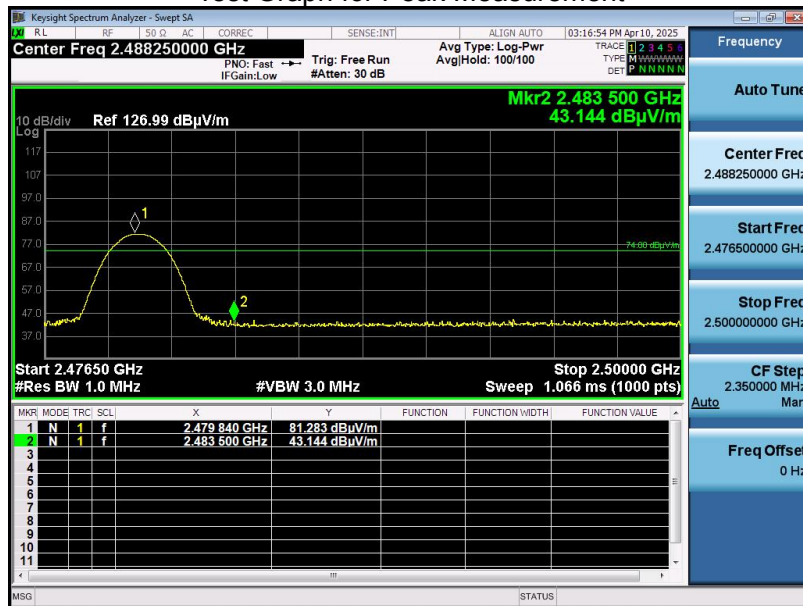
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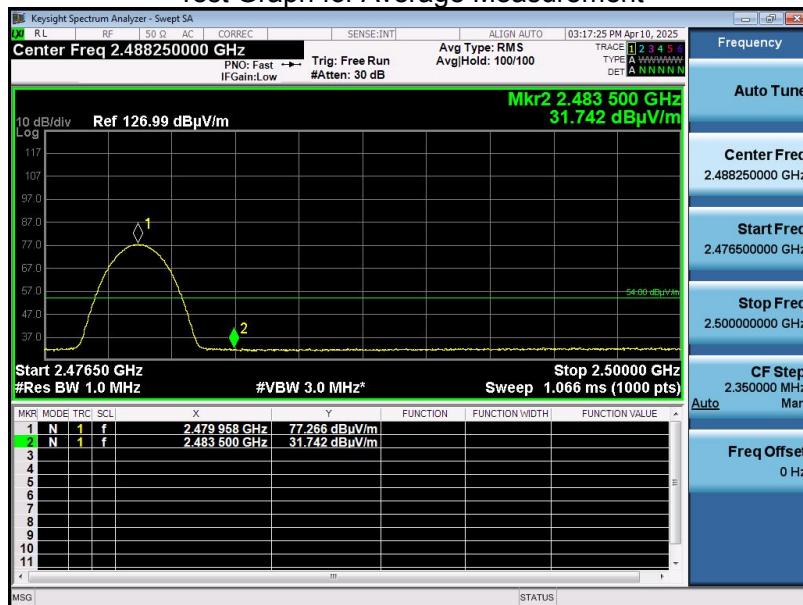
### Band Edge Emission Test Results for Restricted Bands

EUT Name	True Wireless Stereo	Model Name	HTT-17
Temperature	25.5°C	Relative Humidity	52%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 6	Antenna Polarity	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement



### RESULT: PASS

Note: The factor had been edited in the “Input Correction” of the Spectrum Analyzer.

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## 10. Number of Hopping Frequency Measurement

### 10.1 Provisions Applicable

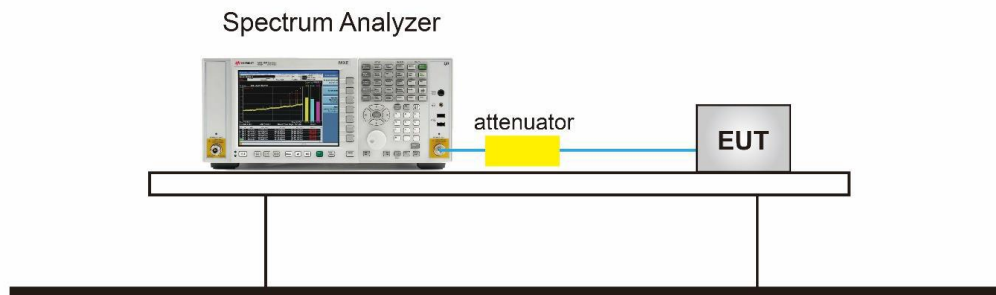
This frequency hopping system must employ a minimum of 15 hopping channels.

### 10.2 Measurement Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span = The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
2. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
3. VBW  $\geq$  RBW
4. Sweep time = Auto couple
5. Detector = Peak
6. Trace mode = Max hold
7. Allow the trace to stabilize

### 10.3 Measurement Setup (Block Diagram of Configuration)



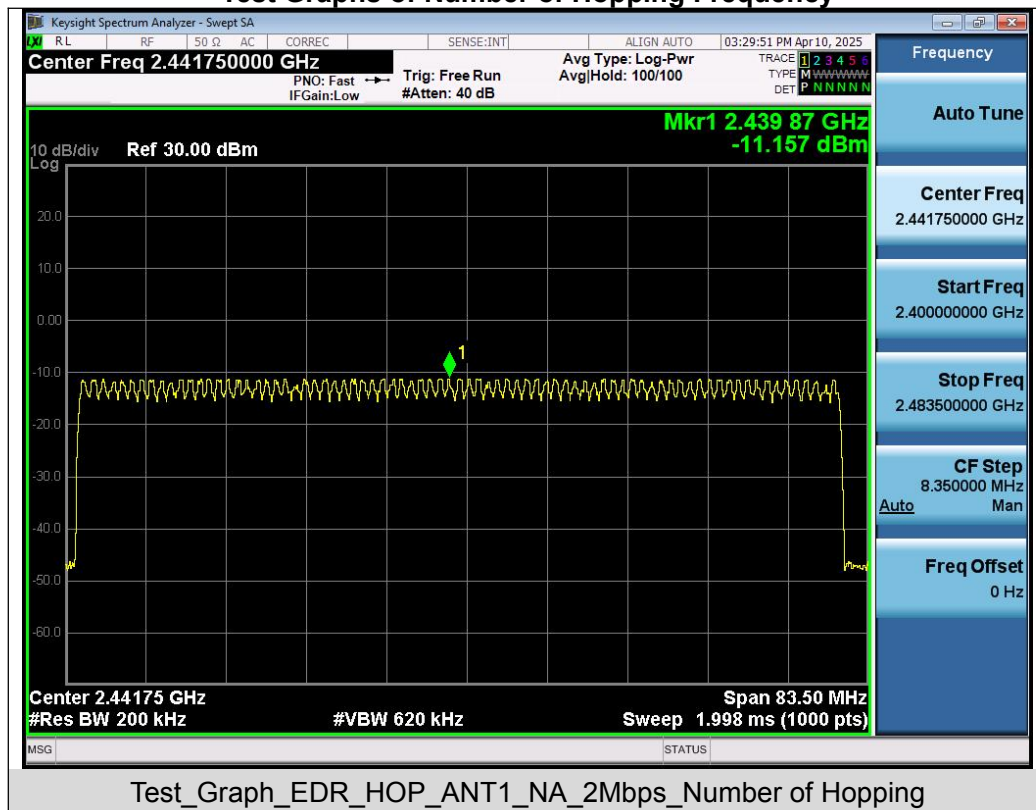
### 10.4 Measurement Result

Test Data of Number of Hopping Frequency			
Test Mode	Number of Hopping Frequency	Limits	Pass or Fail
$\pi/4$ -DQPSK Hopping	79	$\geq 15$	Pass

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### Test Graphs of Number of Hopping Frequency



Note: All mode rates are tested and evaluated,  $\pi/4$ -DQPSK modulated 2DH5 mode is the worst case and documented in the report.

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## 11. Time of Occupancy (Dwell Time) Measurement

### 11.1 Provisions Applicable

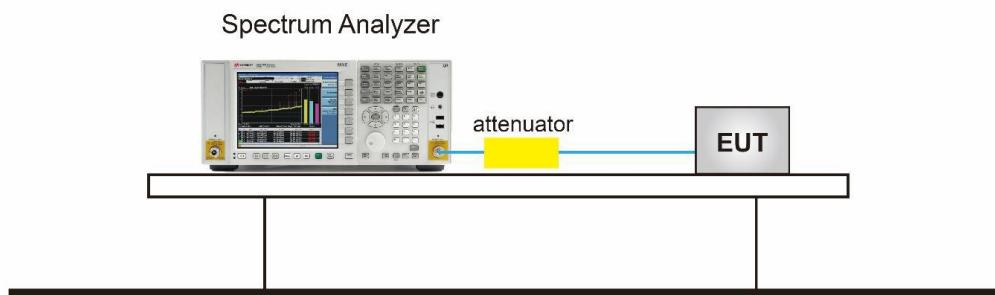
The maximum permissible time of occupancy is 400ms within a period of 400ms multiplied by the number of hopping channels employed.

### 11.2 Measurement Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span = Zero span, centered on a hopping channel.
2. RBW shall be  $\leq$  channel spacing and where possible RBW should be set  $\gg 1 / T$ , where T is the expected dwell time per channel.
3. VBW  $\geq$  RBW
4. Sweep time = As necessary to capture the entire dwell time per hopping channel
5. Detector = Peak
6. Trace mode = Free Run
7. Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time. An oscilloscope may be used instead of a spectrum analyzer. The EUT shall show compliance with the appropriate regulatory limit for the number of hopping channels. A plot of the data shall be included in the test report.

### 11.3 Measurement Setup (Block Diagram of Configuration)

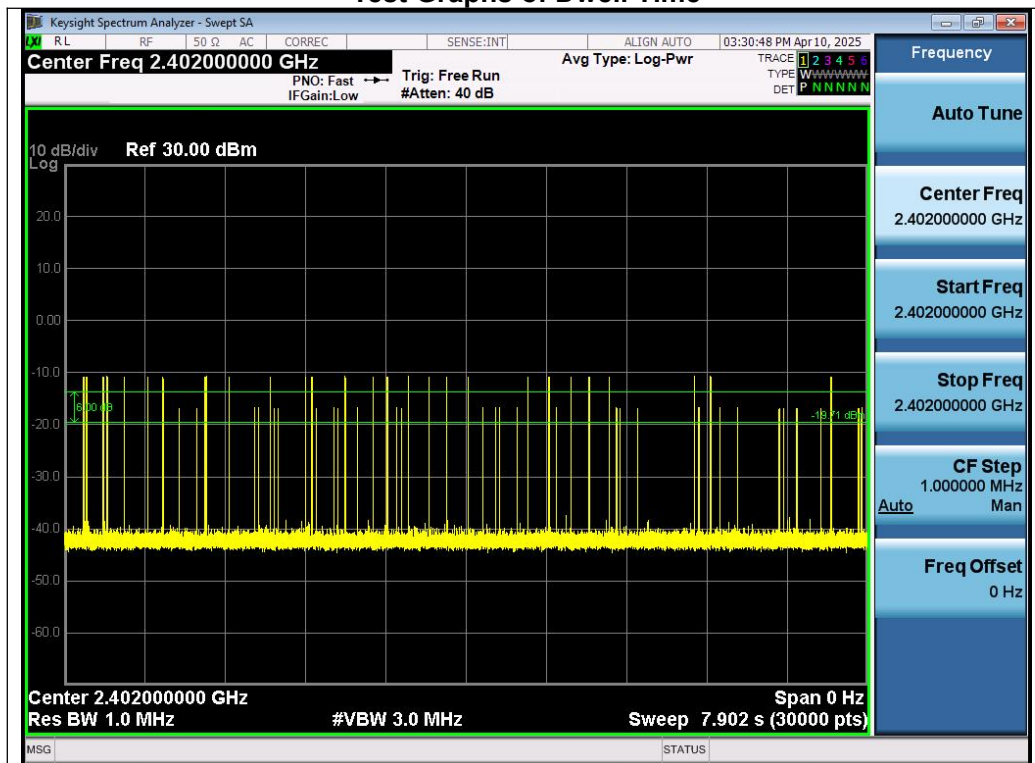


### 11.4 Measurement Result

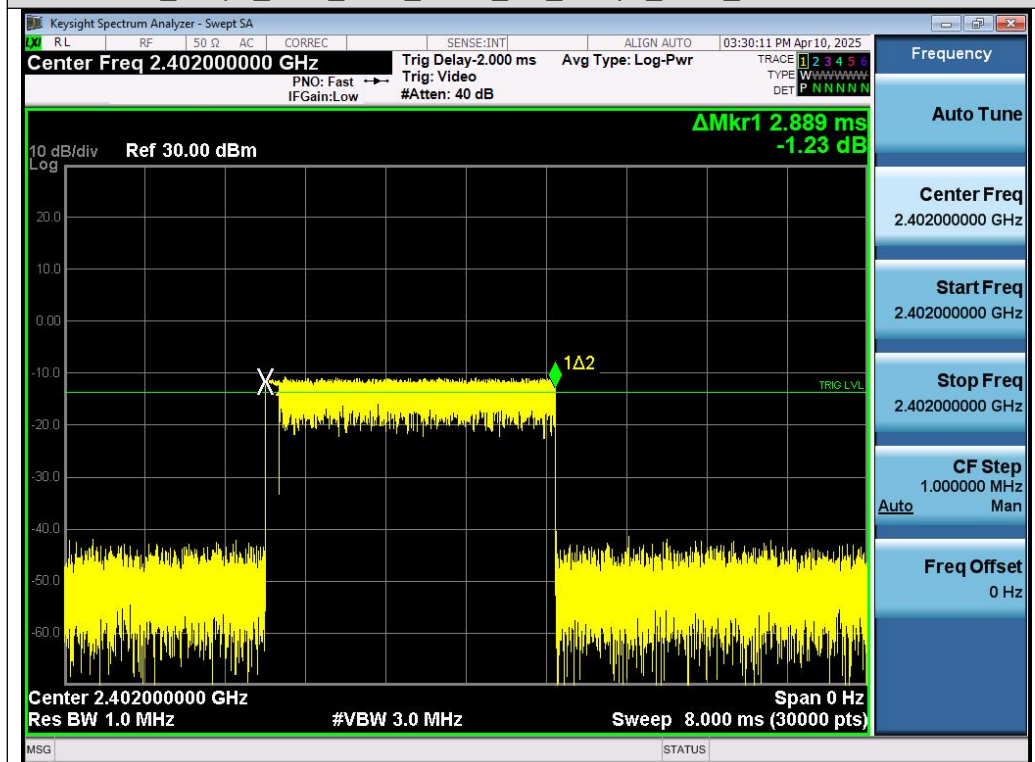
Test Data of Dwell Time					
Channel	Time of Pulse for 2DH5 (ms)	Number of hops in the period specified in the requirements	Dwell Time (ms)	Limit (ms)	Pass or Fail
2402	2.889	28.0*4	323.568	400	Pass
2441	2.889	28.0*4	323.568	400	Pass
2480	2.889	22.0*4	254.232	400	Pass

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### Test Graphs of Dwell Time



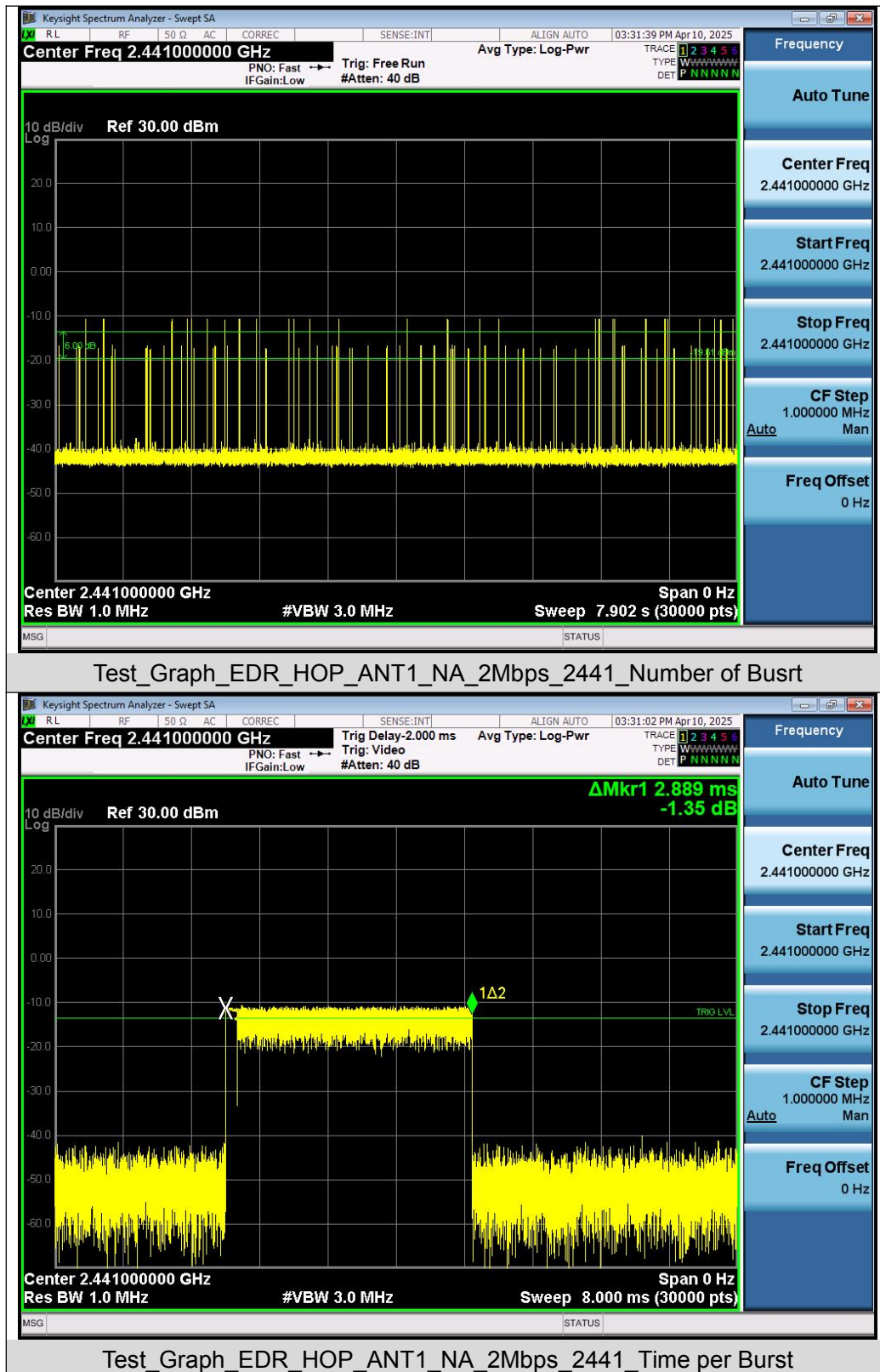
Test\_Graph\_EDR\_HOP\_ANT1\_NA\_2Mbps\_2402\_Number of Burst



Test\_Graph\_EDR\_HOP\_ANT1\_NA\_2Mbps\_2402\_Time per Burst

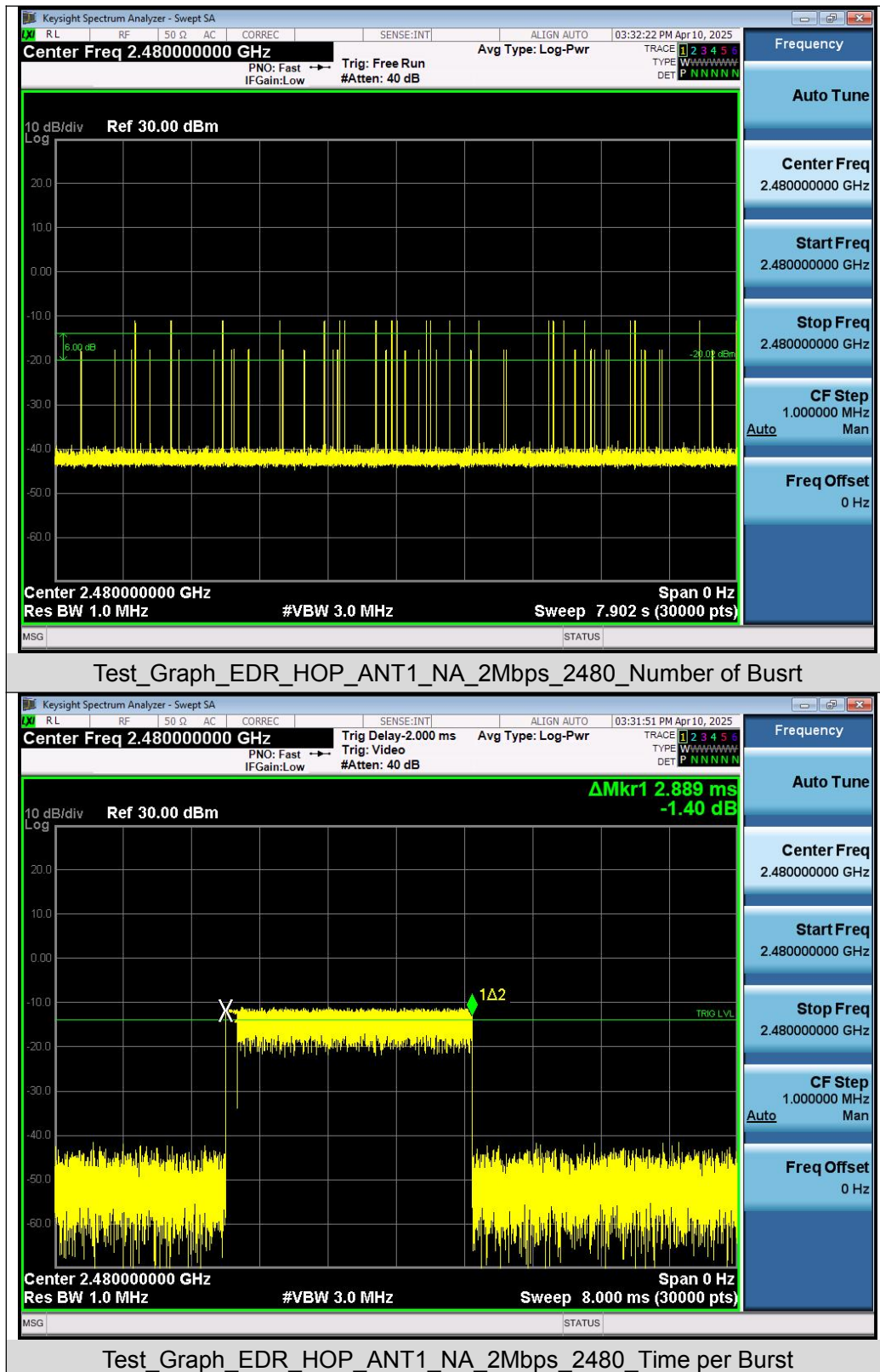
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Note: All mode rates are tested and evaluated,  $\pi/4$ -DQPSK modulated 2DH5 mode is the worst case and documented in the report.

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## 12. Frequency Separation Measurement

### 12.1 Provisions Applicable

When the power is less than 0.125W: The minimum permissible channel separation for this system is 2/3 the value of the 20dB BW.

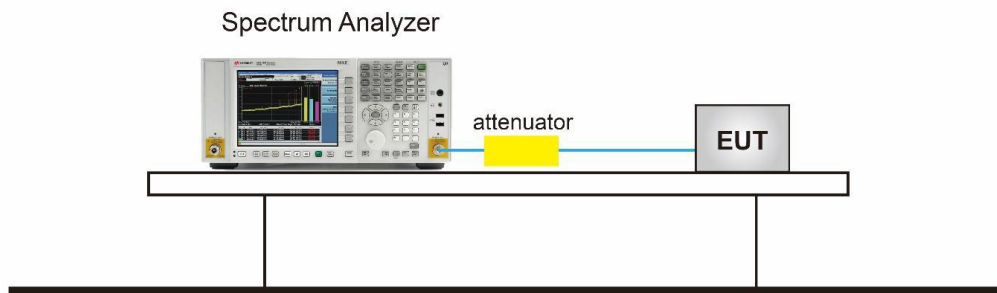
When the power is less than 1W: The minimum permissible channel separation for this system is 20dB BW.

### 12.2 Measurement Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Wide enough to capture the peaks of two adjacent channels.
2. RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3. Video (or average) bandwidth (VBW)  $\geq$  RBW.
4. Sweep: Auto.
5. Detector function: Peak.
6. Trace: Max hold. g) Allow the trace to stabilize.
7. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

### 12.3 Measurement Setup (Block Diagram of Configuration)



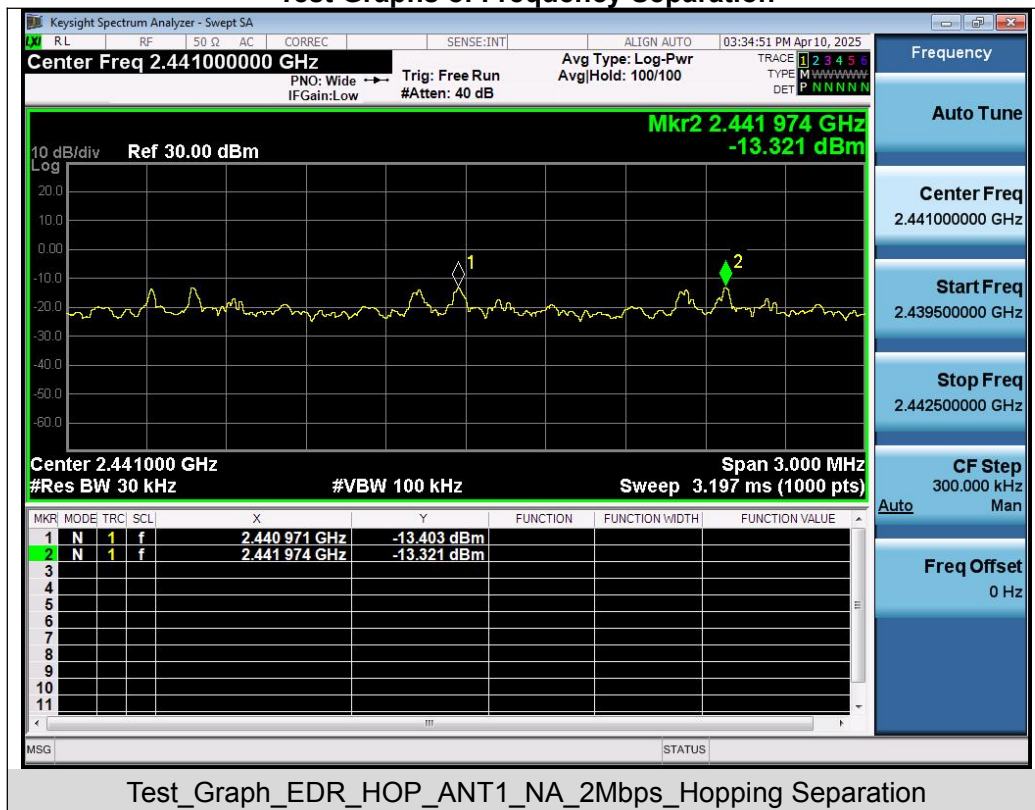
### 12.4 Measurement Result

Test Data of Frequency Separation			
Test Mode	Channel Separation (MHz)	Limits (MHz)	Pass or Fail
$\pi$ /4-DQPSK	1.003	$\geq 0.853$	Pass

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### Test Graphs of Frequency Separation



Note: All mode rates are tested and evaluated,  $\pi/4$ -DQPSK modulated 2DH5 mode is the worst case and documented in the report.

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### 13. AC Power Line Conducted Emission Test

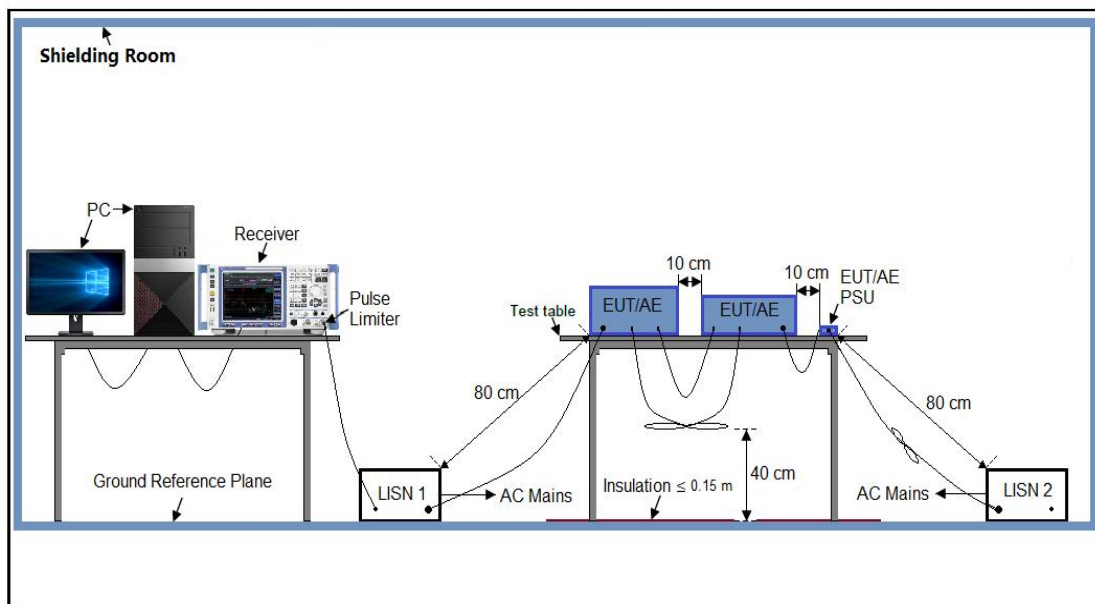
#### 13.1 Measurement Limit

Frequency	Maximum RF Line Voltage	
	Q.P. (dBμV)	Average (dBμV)
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.

#### 13.2 Measurement Setup (Block Diagram of Configuration)



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### 13.3 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 3.7V by battery.
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.

### 13.4 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 $\mu$ V) = Receiver reading (dB $\mu$ V) + Transd (dB)
  - Transd (dB)= AMN Factor(dB)+Cable Loss(dB)+Attenuation(dB)
  - Margin= Limit-Level

### 13.5 Measurement Result

N/A

Note: The BT function cannot transmit when charging

### **Appendix I: Photographs of Test Setup**

Refer to the Report No.: AGC00727250403AP01

### **Appendix II: Photographs of Test EUT**

Refer to the Report No.: AGC00727250403AP02

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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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