3.2.2 TEST PROCEDURE

a. The measuring distance at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
b. The EUT was placed on the top of a rotating table 0.8 m (above 1GHz is 1.5 m) above the ground at a 3 m anechoic chamber test site. The table was rotated 360 degree to determine the position of the highest radiation.
c. The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarization of the antenna are set to make the measurement.
d. 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 QuasiPeak detector mode will be re-measured.
e. If the Peak Mode measured value is compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and no additional QP Mode measurement was performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

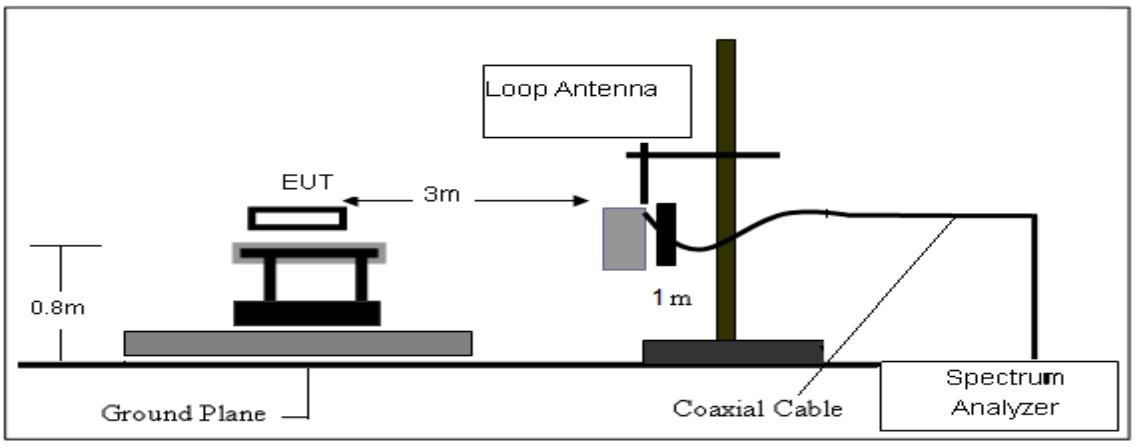
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

3.2.3 DEVIATION FROM TEST STANDARD

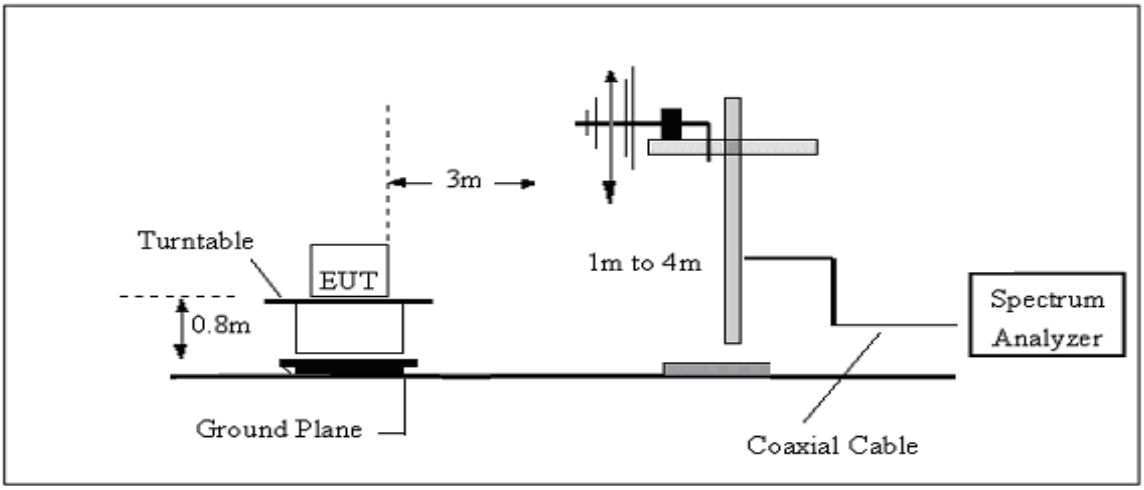
No deviation.

3.2.4 TESTSETUP

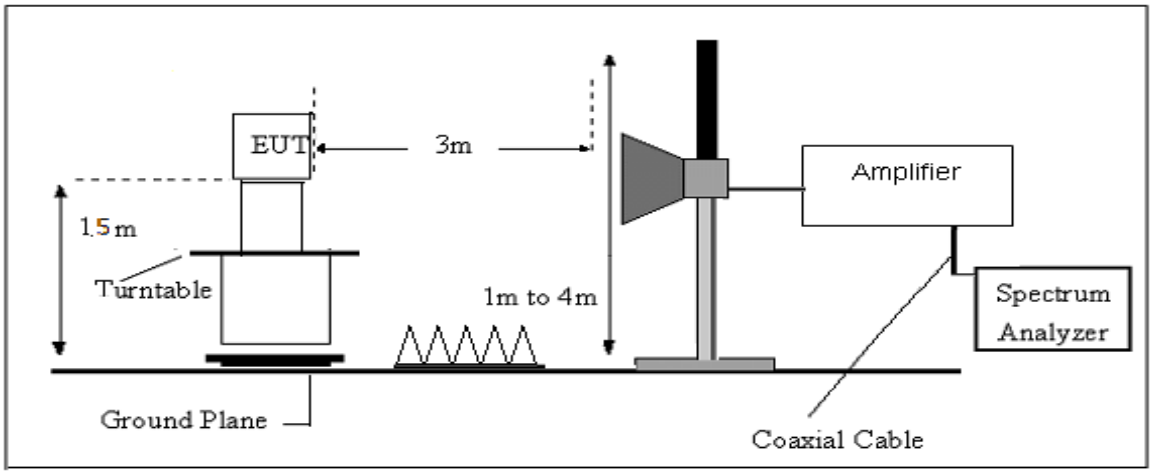
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

Please refer to section 3.1.4 of this report.

3.2.6 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

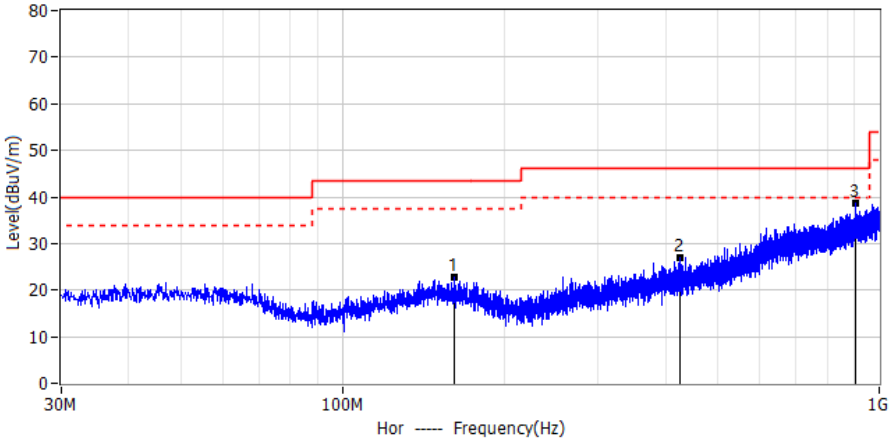
For example

Frequency	FS	RA	AF	CL	AG	Factor
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

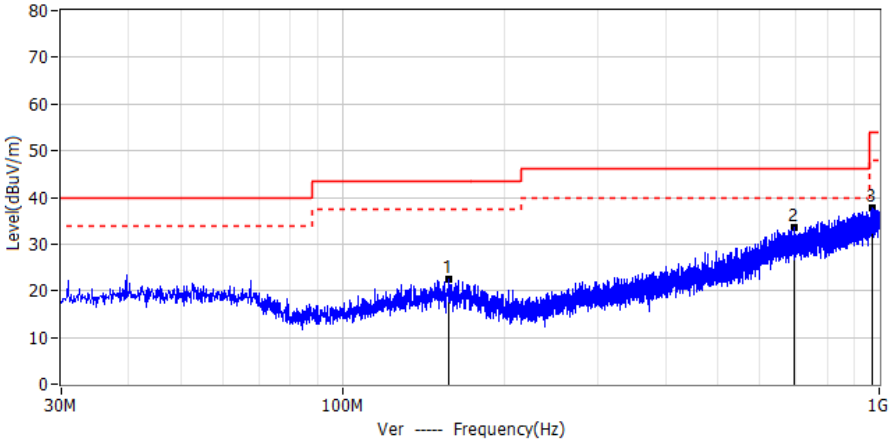
Factor=AF+CL-AG

3.2.7 TEST RESULTS

Project: LGT23B071	Test Engineer: Dylan.shi
EUT: Smart Phone	Temperature: 25.7℃
M/N: CP12t	Humidity: 45%RH
Test Voltage: Battery	Test Data: 2023-03-02
Test Mode: TX BT	
Note:	

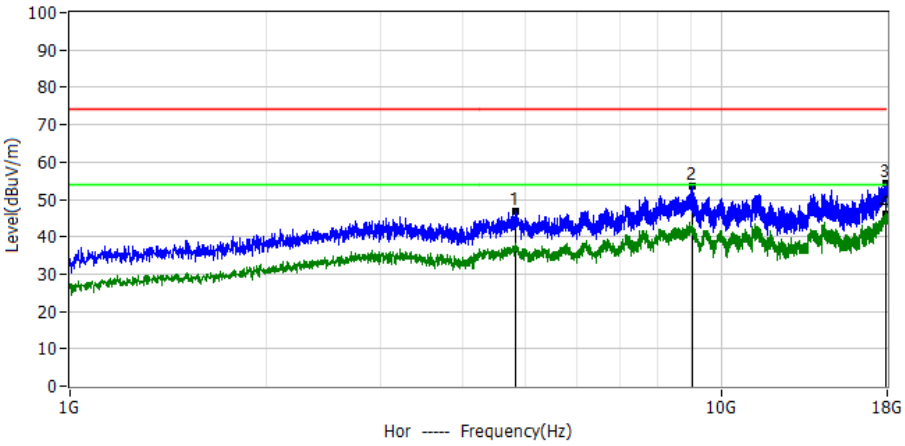


No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	161.314MHz	2.83	19.83	22.66	43.50	-20.84	PK	Hor
2*	425.518MHz	3.83	23.23	27.06	46.00	-18.94	PK	Hor
3*	901.545MHz	5.29	33.24	38.53	46.00	-7.47	PK	Hor

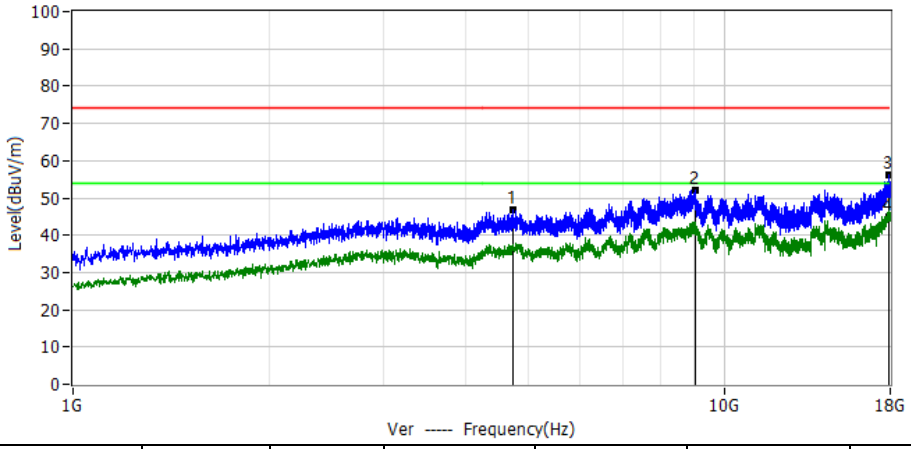


No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	158.040MHz	2.49	19.87	22.36	43.50	-21.14	PK	Ver
2*	693.238MHz	3.71	29.78	33.49	46.00	-12.51	PK	Ver
3*	973.446MHz	3.40	34.41	37.81	54.00	-16.19	PK	Ver

Project: LGT23B071	Test Engineer: Dylan.shi
EUT: Smart Phone	Temperature: 26.7℃
M/N: CP12t	Humidity: 52%RH
Test Voltage: Battery	Test Data: 2023-03-12
Test Mode: 3DH5 2402	
Note:	

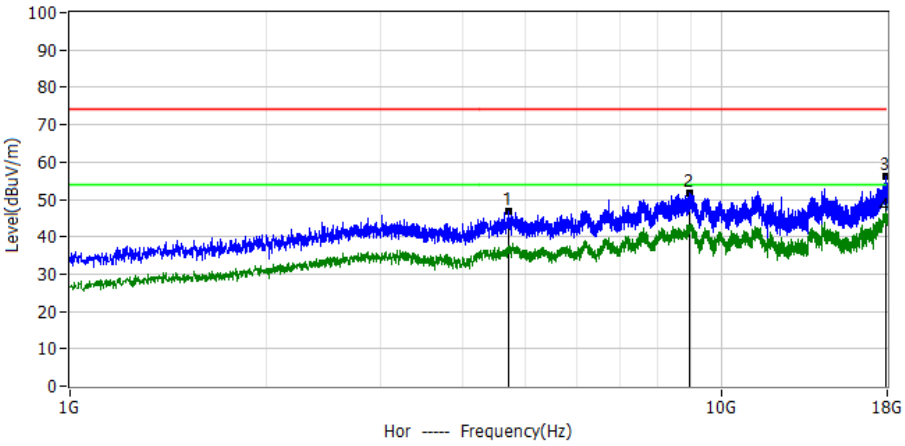


No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	4.823GHz	52.81	-6.00	46.81	74.00	-27.19	PK	Hor
2*	9.016GHz	54.80	-1.17	53.63	74.00	-20.37	PK	Hor
3*	17.904GHz	45.78	8.45	54.23	74.00	-19.77	PK	Hor
4*	17.904GHz	37.55	8.45	46.00	54.00	-8.00	AV	Hor

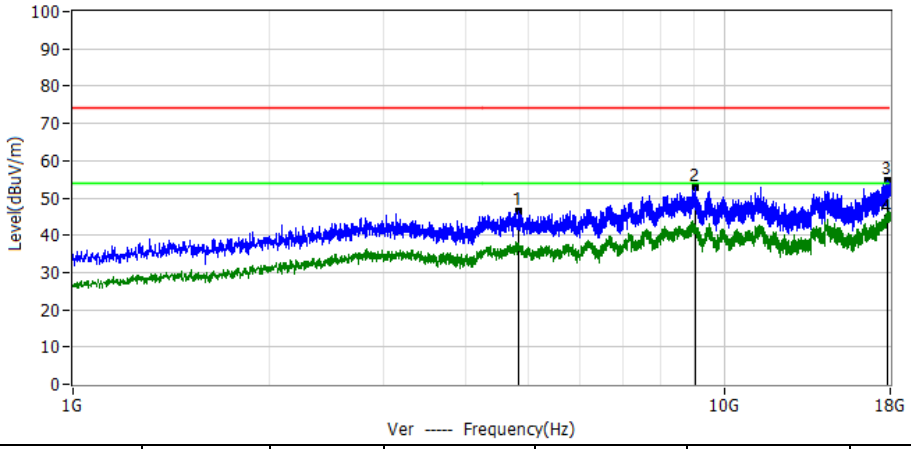


No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	4.744GHz	52.91	-5.94	46.97	74.00	-27.03	PK	Ver
2*	9.022GHz	53.18	-1.17	52.01	74.00	-21.99	PK	Ver
3*	17.902GHz	47.56	8.45	56.01	74.00	-17.99	PK	Ver
4*	17.902GHz	36.45	8.45	44.90	54.00	-9.10	AV	Ver

Project: LGT23B071	Test Engineer: Dylan.shi
EUT: Smart Phone	Temperature: 26.7℃
M/N: CP12t	Humidity: 52%RH
Test Voltage: Battery	Test Data: 2023-03-12
Test Mode: 3DH5 2441	
Note:	

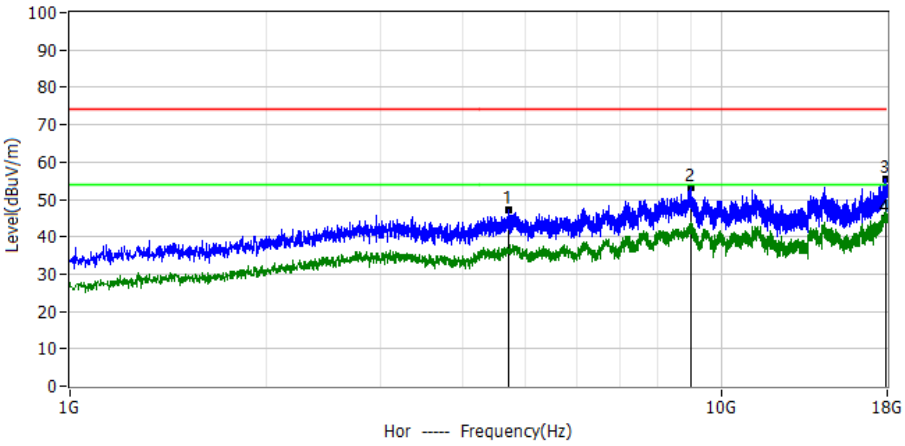


No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	4.712GHz	52.69	-5.92	46.77	74.00	-27.23	PK	Hor
2*	8.967GHz	53.05	-1.26	51.79	74.00	-22.21	PK	Hor
3*	17.930GHz	47.86	8.47	56.33	74.00	-17.67	PK	Hor
4*	17.930GHz	36.73	8.47	45.20	54.00	-8.80	AV	Hor

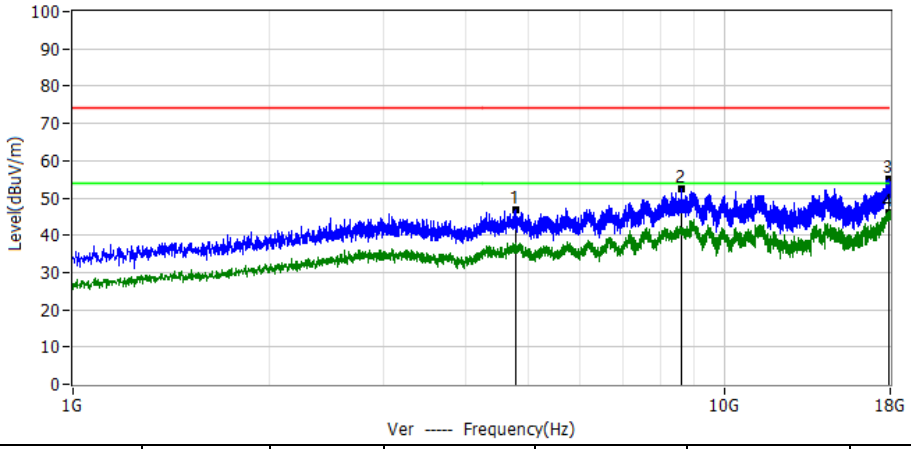


No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	4.842GHz	52.30	-6.02	46.28	74.00	-27.72	PK	Ver
2*	9.026GHz	53.84	-1.17	52.67	74.00	-21.33	PK	Ver
3*	17.824GHz	46.32	8.40	54.72	74.00	-19.28	PK	Ver
4*	17.824GHz	36.30	8.40	44.70	54.00	-9.30	AV	Ver

Project: LGT23B071	Test Engineer: Dylan.shi
EUT: Smart Phone	Temperature: 26.7℃
M/N: CP12t	Humidity: 52%RH
Test Voltage: Battery	Test Data: 2023-03-12
Test Mode: 3DH5 2480	
Note:	



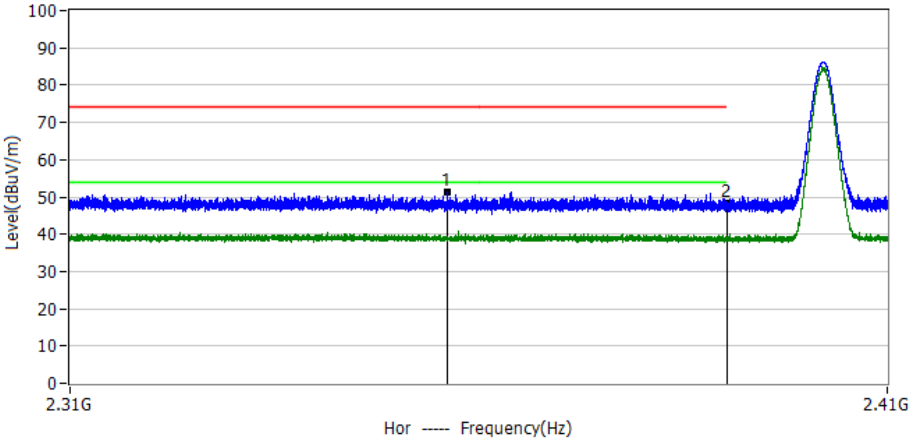
No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	4.727GHz	53.30	-5.93	47.37	74.00	-26.63	PK	Hor
2*	8.992GHz	54.34	-1.19	53.15	74.00	-20.85	PK	Hor
3*	17.900GHz	46.97	8.45	55.42	74.00	-18.58	PK	Hor
4*	17.900GHz	36.45	8.45	44.90	54.00	-9.10	AV	Hor



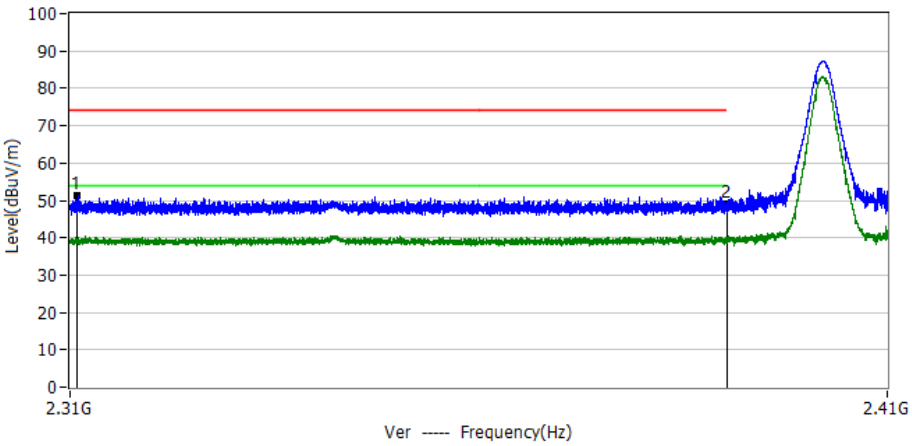
No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	4.785GHz	52.74	-5.97	46.77	74.00	-27.23	PK	Ver
2*	8.595GHz	54.61	-2.32	52.29	74.00	-21.71	PK	Ver
3*	17.902GHz	46.67	8.45	55.12	74.00	-18.88	PK	Ver
4*	17.902GHz	37.65	8.45	46.10	54.00	-7.90	AV	Ver

3.2.8 TEST RESULTS (BAND EDGE REQUIREMENTS)

Project: LGT23B071	Test Engineer: Dylan.shi
EUT: Smart Phone	Temperature: 24.8℃
M/N: CP12t	Humidity: 45%RH
Test Voltage: Battery	Test Data: 2023-03-11
Test Mode: 3DH5 2402	
Note:	

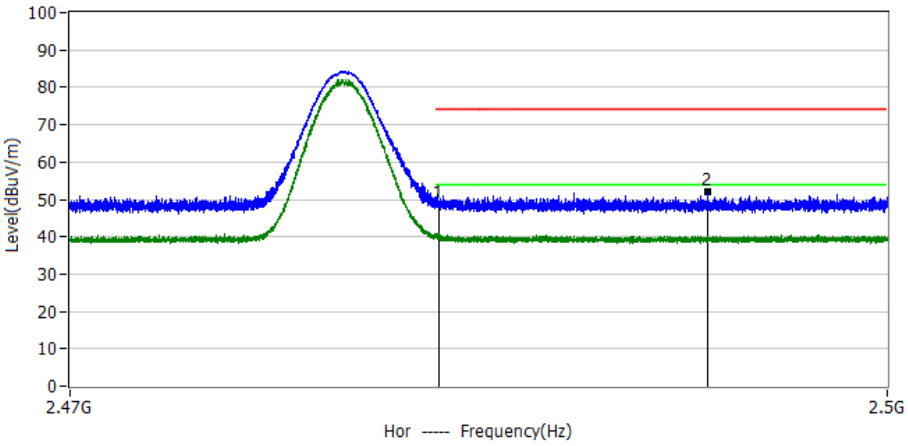


No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.3557GHz	17.27	34.03	51.30	74.00	-22.70	PK	Hor
2*	2.3900GHz	14.45	33.95	48.40	74.00	-25.60	PK	Hor

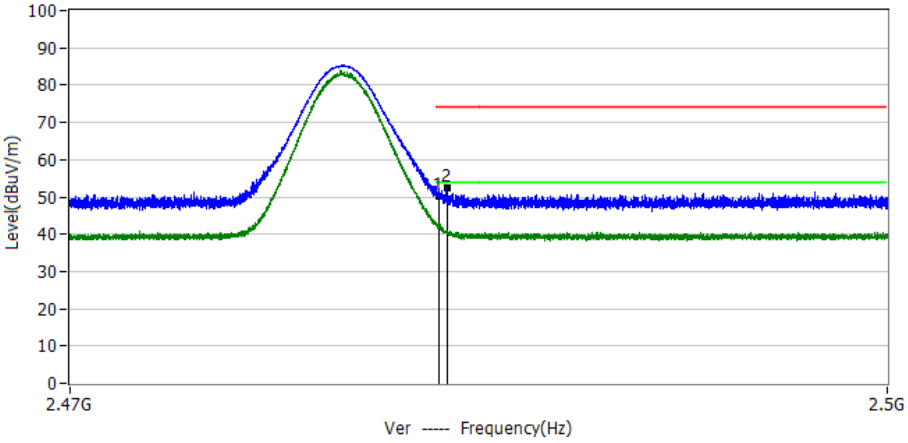


No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.3109GHz	17.03	34.14	51.17	74.00	-22.83	PK	Ver
2*	2.3900GHz	15.05	33.95	49.00	74.00	-25.00	PK	Ver

Project: LGT23B071	Test Engineer: Dylan.shi
EUT: Smart Phone	Temperature: 24.8℃
M/N: CP12t	Humidity: 45%RH
Test Voltage: Battery	Test Data: 2023-03-11
Test Mode: 3DH5 2480	
Note:	



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.4835GHz	14.47	34.13	48.60	74.00	-25.40	PK	Hor
2*	2.4934GHz	17.83	34.15	51.98	74.00	-22.02	PK	Hor



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.4835GHz	15.97	34.13	50.10	74.00	-23.90	PK	Ver
2*	2.4838GHz	18.18	34.13	52.31	74.00	-21.69	PK	Ver

4. CONDUCTED SPURIOUS & BAND EDGE EMISSION

4.1 LIMIT

According to FCC section 15.247(d), in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

4.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 2300 – 2407 MHz Upper Band Edge: 2475 – 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

For Hopping Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 2300– 2403 MHz Upper Band Edge: 2479 – 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

4.3 TEST SETUP

The EUT is connected to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. Tune the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, the span is set to be greater than RBW.

4.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

4.5 TEST RESULTS

For the measurement records，refer to the appendix I.

5. NUMBER OF HOPPING CHANNEL

5.1 LIMIT

FCC Part 15.247, Subpart C				
Section	Test Item	Limit	FrequencyRange (MHz)	Result
15.247 (a)(1)(iii)	Number of Hopping Channel	≥15	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating FrequencyRange
RB	300KHz
VB	300KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting: RBW= 300KHz, VBW=300KHz, Sweep time = Auto.

5.3 TEST SETUP

5.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

5.5 TEST RESULTS

For the measurement records，refer to the appendix I.

6. AVERAGE TIME OF OCCUPANCY

6.1 LIMIT

FCC Part 15.247,Subpart C				
Section	Test Item	Limit	FrequencyRange (MHz)	Result
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

6.2 TEST PROCEDURE

a. The transmitter output (antenna port) was connected to the spectrum analyzer.
b. Set RBW =1MHz/VBW =3MHz.
c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
d. Sweep Time is more than once pulse time.
e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
f. Measure the maximum time duration of one single pulse.
g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
h. Measure the maximum time duration of one single pulse.
i. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is 3.37 x 31.6 = 106.6.
j. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is 5.06 x 31.6 = 160.
k. DH1 Packet permit maximum 1600 / 79 / 2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is 10.12 x 31.6 = 320.

6.3 TEST SETUP

6.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

6.5 TEST RESULTS

For the measurement records，refer to the appendix I.

7. HOPPING CHANNEL SEPARATION MEASUREMEN

7.1 LIMIT

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> 20 dB Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.2 TEST PROCEDURE

a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
b. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
c. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for channel separation measurement.

7.3 TEST SETUP

7.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.5 TEST RESULTS

For the measurement records，refer to the appendix I.

8. BANDWIDTH TEST

8.1 LIMIT

FCC Part15 15.247, Subpart C				
Section	Test Item	Limit	FrequencyRange (MHz)	Result
15.247 (a)(1)	Bandwidth	N/A	2400-2483.5	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting: RBW= 30KHz, VBW=100KHz, Sweep time = Auto.

8.3 TEST SETUP

8.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

8.5 TEST RESULTS

For the measurement records，refer to the appendix I.

9. OUTPUT POWER TEST

9.1 LIMIT

FCC Part 15.247,Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)&(b)(1)	Output Power	1 W or 0.125W if channel separation > 2/3 bandwidthprovided thesystems operatewith an output power no greater than125 mW(20.97dBm)	2400-2483.5	PASS

9.2 TEST PROCEDURE

This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test:

a) Use the following spectrum analyzer settings:

1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.

2) RBW > 20 dB bandwidth of the emission being measured.

3) VBW ≥ RBW.

4) Sweep: Auto.

5) Detector function: Peak.

6) Trace: Max hold.

b) Allow trace to stabilize.

c) Use the marker-to-peak function to set the marker to the peak of the emission.

d) The indicated level is the peak output power, after any corrections for external attenuators and cables.

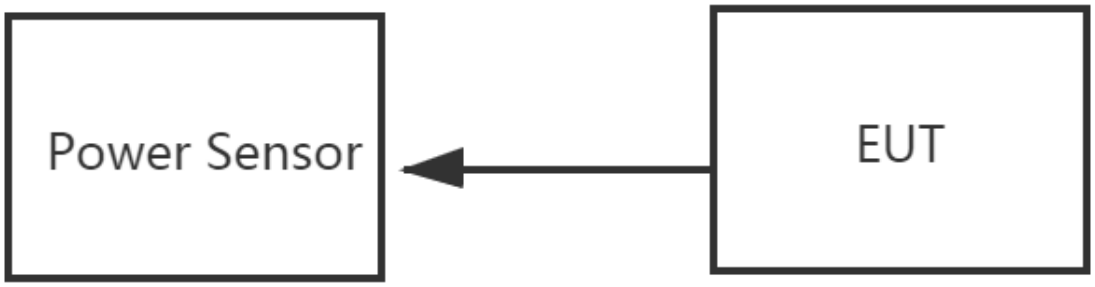
e) A plot of the test results and setup description shall be included in the test report.

NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

PKPM1 Peak power meter method:

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DSS bandwidth and shall use a fast-responding diode detector.

9.3 TEST SETUP



9.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

9.5 TEST RESULTS

For the measurement records，refer to the appendix I.

10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: 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.

10.2 EUT ANTENNA

The EUT antenna is FPC antenna. It comply with the standard requirement.

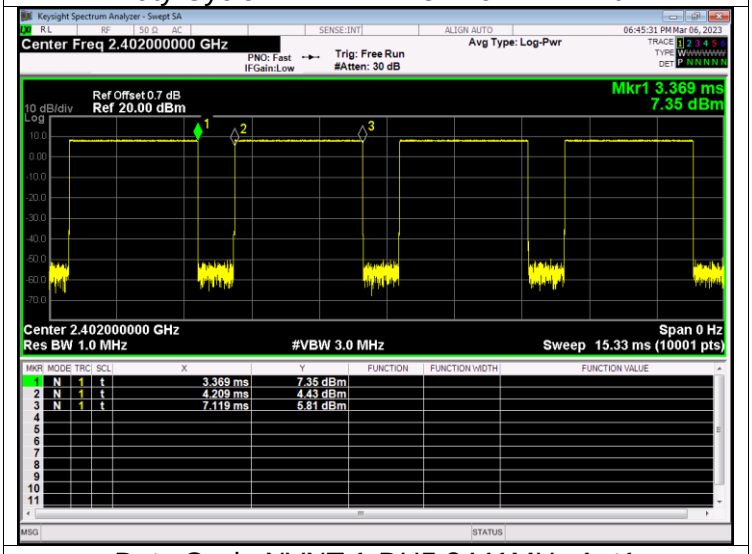
APPENDIX I:TEST RESULTS

Duty Cycle

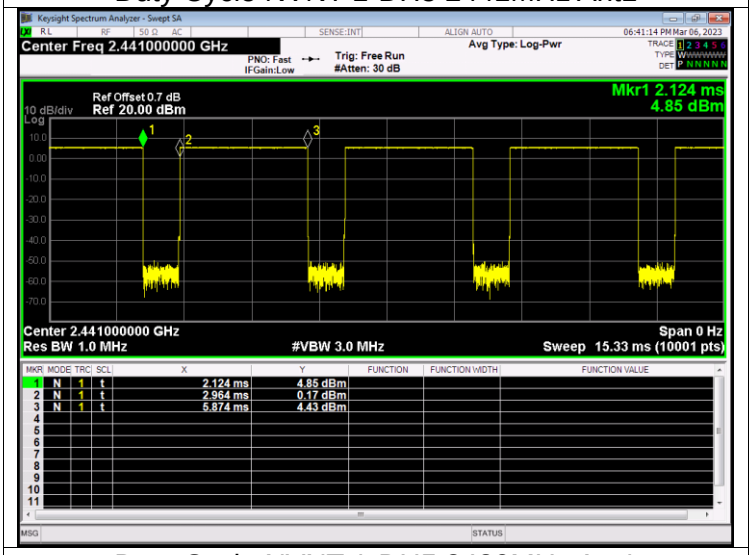
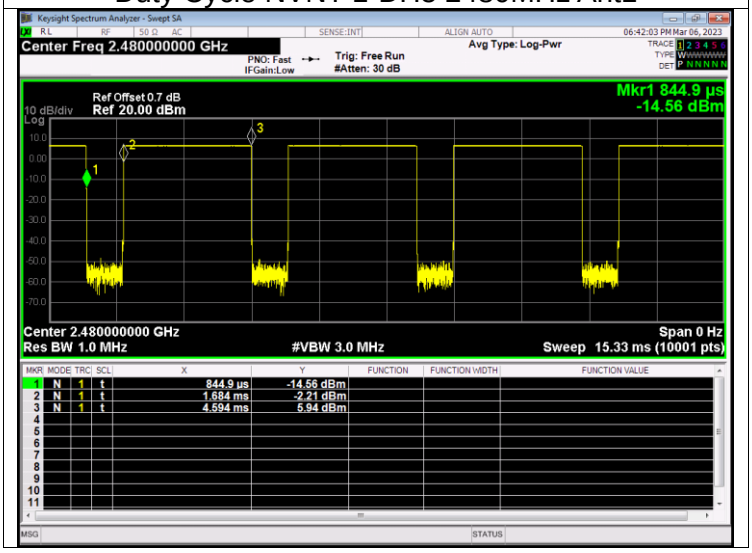
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	1-DH5	2402	Ant1	77.6	1.1	0.34
NVNT	1-DH5	2441	Ant1	77.6	1.1	0.34
NVNT	1-DH5	2480	Ant1	77.63	1.1	0.34
NVNT	2-DH5	2402	Ant1	77.35	1.12	0.34
NVNT	2-DH5	2441	Ant1	77.31	1.12	0.34
NVNT	2-DH5	2480	Ant1	77.34	1.12	0.34
NVNT	3-DH5	2402	Ant1	77.31	1.12	0.34
NVNT	3-DH5	2441	Ant1	77.31	1.12	0.34
NVNT	3-DH5	2480	Ant1	77.3	1.12	0.35

Test Graphs

Duty Cycle NVNT 1-DH5 2402MHz Ant1



Duty Cycle NVNT 1-DH5 2441MHz Ant1



Duty Cycle NVNT 1-DH5 2480MHz Ant1