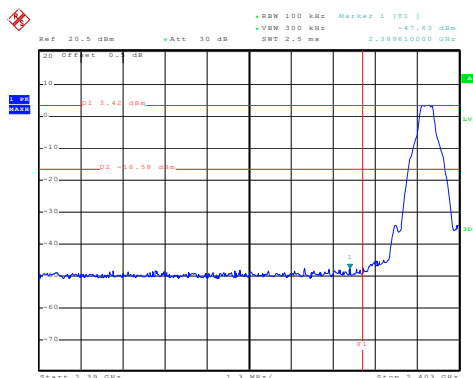


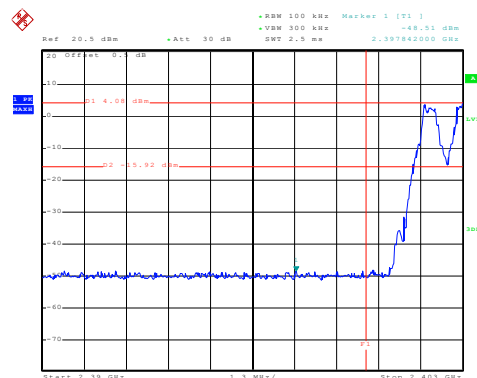
GFSK Mode:

Test channel:	Lowest channel
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Date: 10.JAN.2019 11:03:54

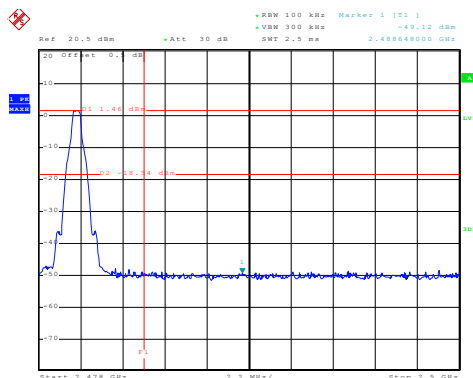
No-hopping mode



Date: 10.JAN.2019 11:05:01

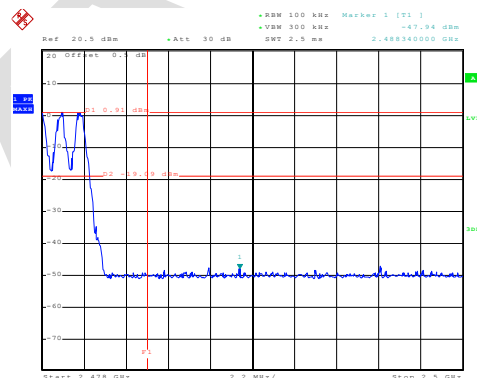
Hopping mode

Test channel:	Highest channel
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Date: 10.JAN.2019 11:20:35

No-hopping mode

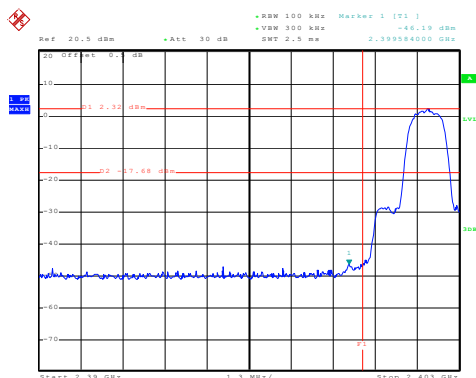


Date: 10.JAN.2019 11:19:46

Hopping mode

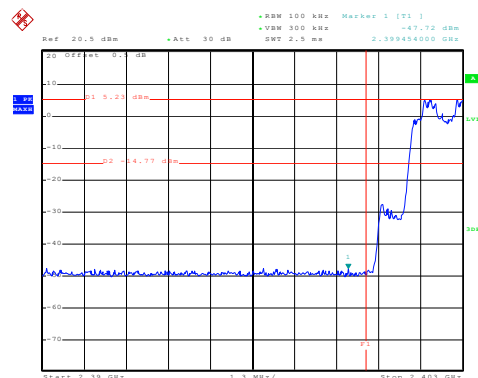
Pi/4QPSK Mode:

Test channel:	Lowest channel
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Date: 10.JAN.2019 11:10:19

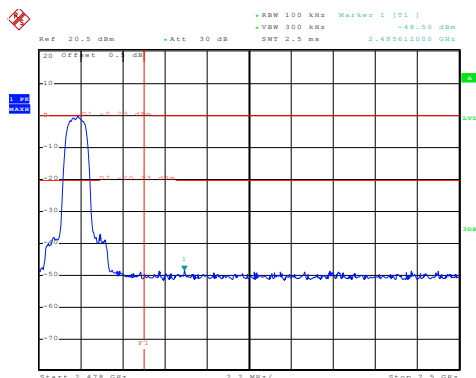
No-hopping mode



Date: 10.JAN.2019 11:09:33

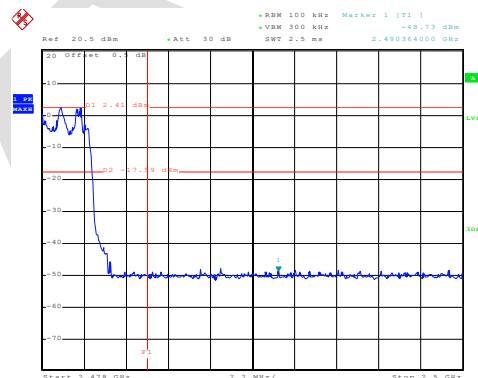
Hopping mode

Test channel:	Highest channel
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Date: 10.JAN.2019 11:17:33

No-hopping mode

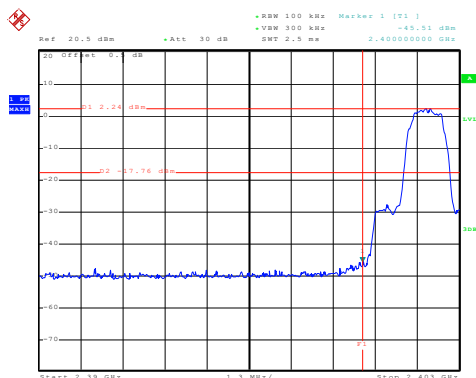


Date: 10.JAN.2019 11:18:34

Hopping mode

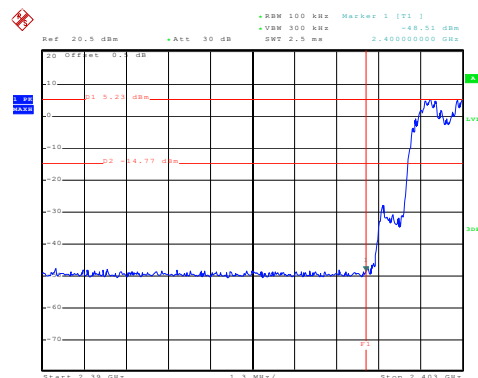
8-DPSK Mode:

Test channel:	Lowest channel
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Date: 10.JAN.2019 11:11:10

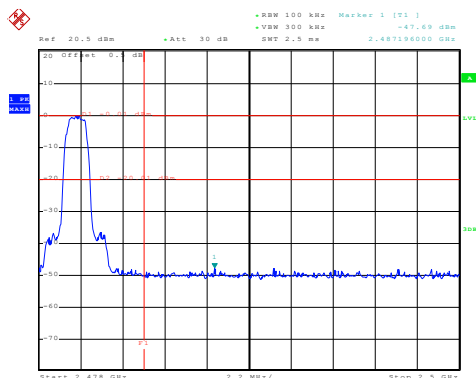
No-hopping mode



Date: 10.JAN.2019 11:13:51

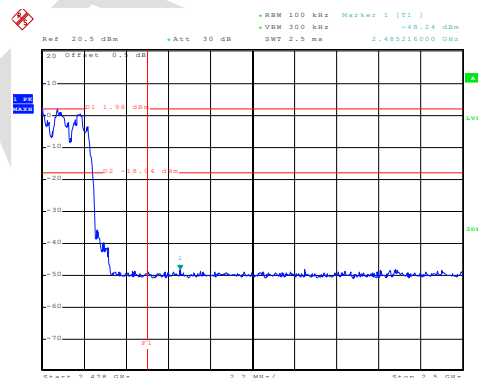
Hopping mode

Test channel:	Highest channel
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Date: 10.JAN.2019 11:16:55

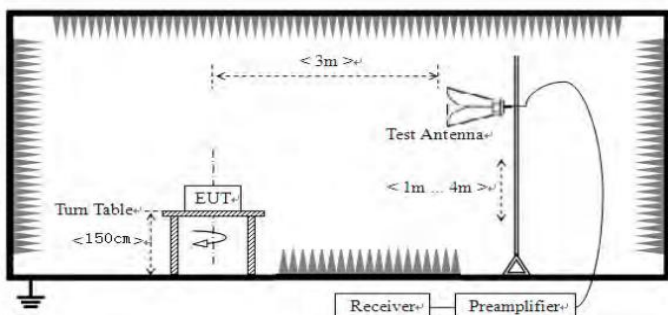
No-hopping mode



Date: 10.JAN.2019 11:15:44

Hopping mode

7.9.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	All restriction band have been tested, and 2310MHz to 2390MHz, 2483.5MHz to 2500MHz band is the worse case				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	Above 1GHz		54.00		Average Value
			74.00		Peak Value
Test setup:					
Test Procedure:	1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.2 for details				
Test results:	Pass				

Remark:

- During the test, pre-scan the GFSK, Pi/4QPSK, 8-DPSK modulation, and found the 8-DPSK modulation which it is worse case.

Test channel:	Lowest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	54.36	-14.56	39.80	74.00	-34.20	Horizontal
2390.00	53.17	-14.19	38.98	74.00	-35.02	Horizontal
2310.00	55.59	-14.85	40.74	74.00	-33.26	Vertical
2390.00	56.64	-14.52	42.12	74.00	-31.88	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	44.03	-14.56	39.47	54.00	-24.53	Horizontal
2390.00	43.26	-14.19	29.07	54.00	-24.98	Horizontal
2310.00	42.58	-14.85	27.73	54.00	-26.27	Vertical
2390.00	48.23	-14.52	33.71	54.00	-20.29	Vertical

Test channel:	Highest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	55.07	-13.66	41.41	74.00	-32.59	Horizontal
2500.00	57.71	-13.57	44.14	74.00	-29.86	Horizontal
2483.50	56.03	-14.05	41.98	74.00	-32.02	Vertical
2500.00	58.64	-13.97	44.67	74.00	-29.33	Vertical

Average value:

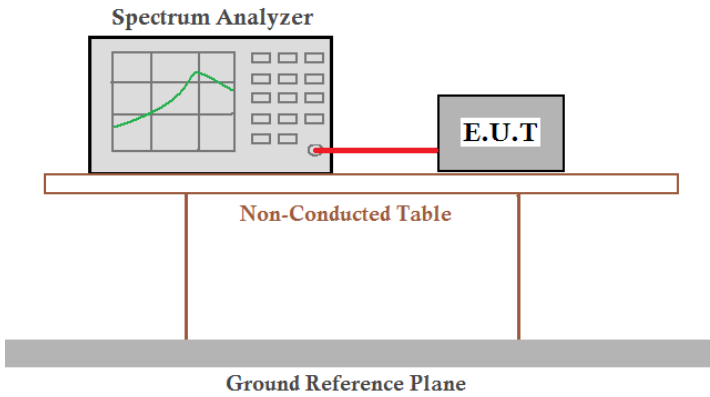
Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	46.06	-13.66	32.40	54.00	-21.60	Horizontal
2500.00	45.51	-13.57	31.94	54.00	-22.06	Horizontal
2483.50	46.03	-14.05	31.98	54.00	-22.02	Vertical
2500.00	47.15	-13.97	33.18	54.00	-20.82	Vertical

Remark:

- Final Level = Receiver Read level + Correct factor
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor

7.10 Spurious Emission

7.10.1 Conducted Emission Method

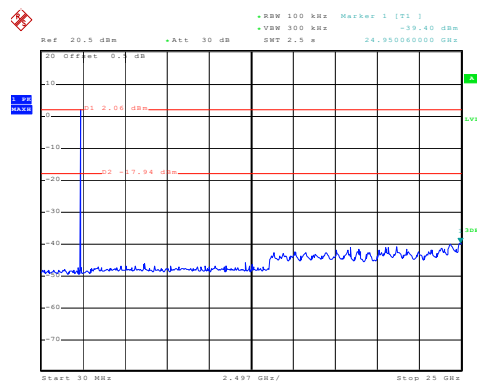
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below 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.
Test setup:	 The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remark:

During the test, pre-scan the GFSK, Pi/4QPSK, 8-DPSK modulation, and found the 8-DPSK modulation which it is worse case.

Test channel:

Lowest channel

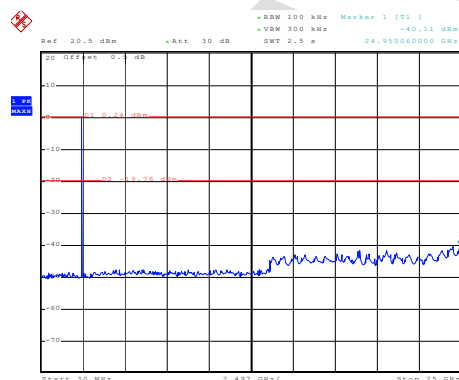


Date: 10.JAN.2019 10:31:08

30MHz~25GHz

Test channel:

Middle channel

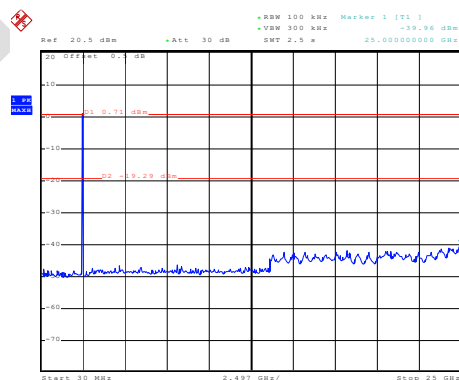


Date: 10.JAN.2019 10:32:16

30MHz~25GHz

Test channel:

Highest channel

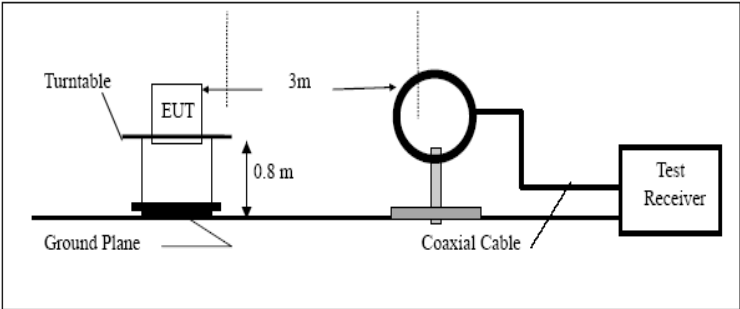
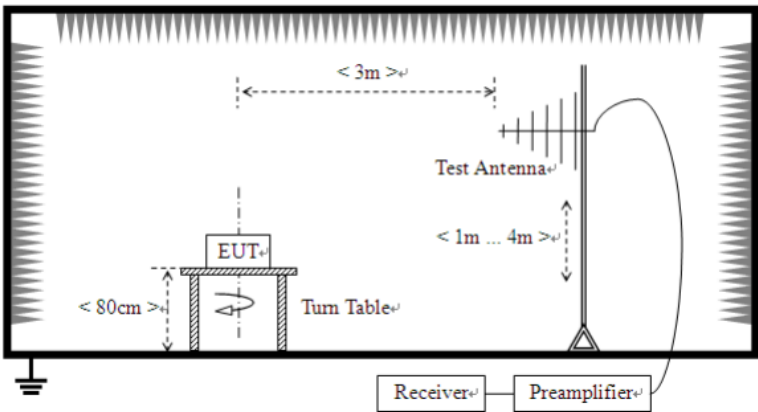
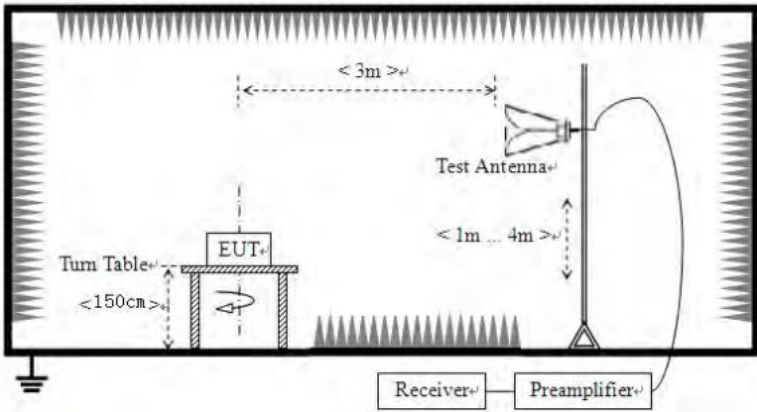


Date: 10.JAN.2019 11:02:14

30MHz~25GHz

7.10.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	PK/AV	200Hz	600Hz	PK/AV
	150KHz-30MHz	PK/AV/QP	9KHz	30KHz	PK/AV/QP
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit: (Spurious Emissions)	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	300m	
	1.705MHz-30MHz	30	QP	30m	
	30MHz-88MHz	100	QP	3m	
	88MHz-216MHz	150	QP		
	216MHz-960MHz	200	QP		
	960MHz-1GHz	500	QP		
	Above 1GHz	500	Average		
		5000	Peak		
Limit: (band edge)	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.				

Test setup:	Below 30MHz  Below 1GHz  Above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

	3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

Remark:

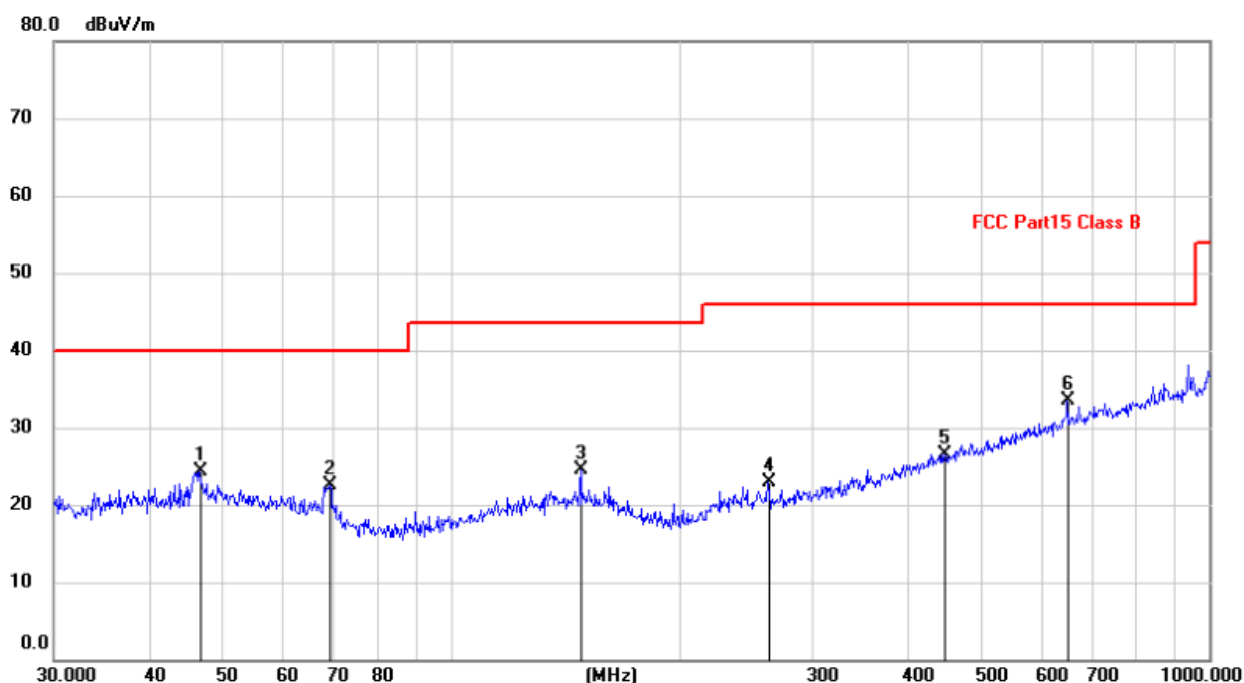
1. During the test, pre-scan the GFSK, Pi/4QPSK, 8-DPSK modulation, and found the 8-DPSK modulation which it is worse case.
2. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

■ 9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

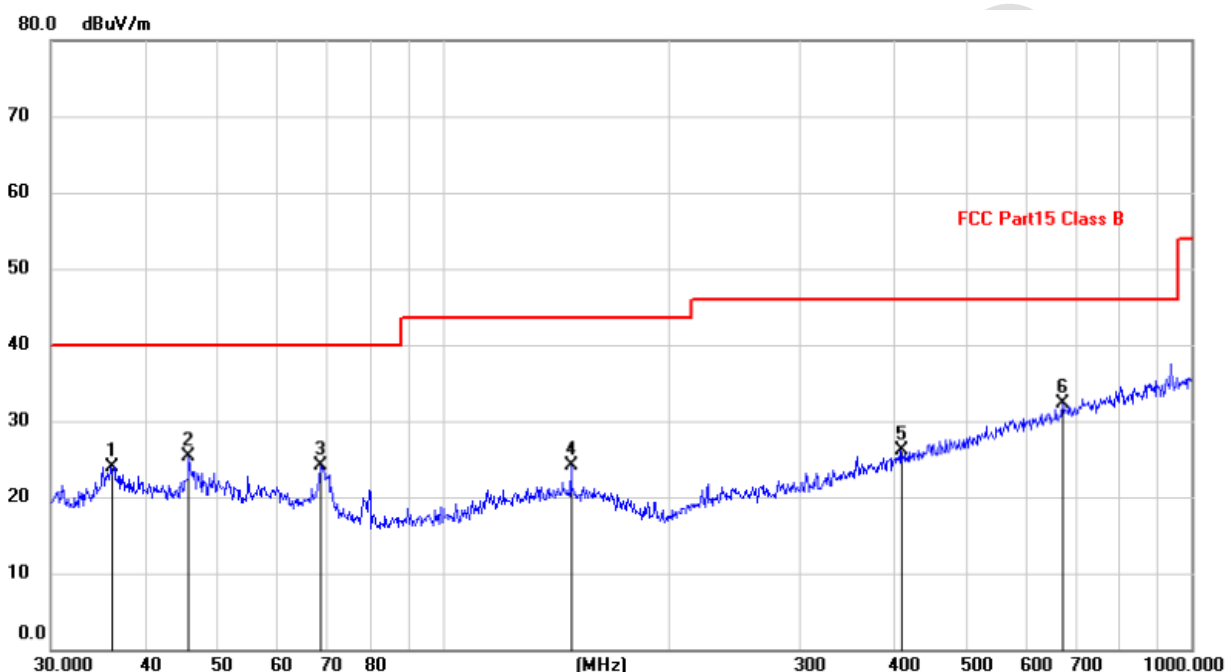
Below 1GHz

EUT:	BlueTooth Earphone	Polarization:	Horizontal
Model:	TWS-598	Power Source:	AC120V/60Hz
Mode:	BT mode	Test by:	Alex
Temp./Hum.(%RH):	26°C/60%RH		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		46.6664	10.48	13.88	24.36	40.00	-15.64	QP
2		69.3568	11.63	10.95	22.58	40.00	-17.42	QP
3		148.4410	11.39	13.04	24.43	43.50	-19.07	QP
4		261.9753	10.16	12.70	22.86	46.00	-23.14	QP
5		447.9821	8.90	17.65	26.55	46.00	-19.45	QP
6	*	649.6597	11.92	21.64	33.56	46.00	-12.44	QP

EUT:	BlueTooth Earphone	Polarziation:	Vertical
Model:	TWS-598	Power Source:	AC120V/60Hz
Mode:	BT mode	Test by:	Alex
Temp./Hum.(%RH):	26℃/60%RH		
Note:			



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		36.1272	11.11	12.85	23.96	40.00	-16.04	QP
2		45.8551	11.39	13.87	25.26	40.00	-14.74	QP
3		68.8721	13.10	11.04	24.14	40.00	-15.86	QP
4		148.4410	11.00	13.04	24.04	43.50	-19.46	QP
5		408.9460	9.41	16.72	26.13	46.00	-19.87	QP
6	*	672.8444	10.42	21.98	32.40	46.00	-13.60	QP

■ Above 1GHz

Test channel:	Lowest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	60.28	-7.43	52.85	74.00	-21.15	Vertical
7206.00	58.87	-2.42	56.45	74.00	-17.55	Vertical
9608.00	57.45	-2.38	55.07	74.00	-18.93	Vertical
12010.00	*			74.00		Vertical
14412.00	*			74.00		Vertical
4804.00	63.20	-7.43	55.77	74.00	-18.23	Horizontal
7206.00	58.16	-2.42	55.74	74.00	-18.23	Horizontal
9608.00	58.47	-2.38	56.09	74.00	-17.91	Horizontal
12010.00	*			74.00		Horizontal
14412.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	52.41	-7.43	44.98	54.00	-9.02	Vertical
7206.00	49.62	-2.42	47.20	54.00	-6.80	Vertical
9608.00	48.84	-2.38	46.46	54.00	-7.54	Vertical
12010.00	*			54.00		Vertical
14412.00	*			54.00		Vertical
4804.00	55.74	-7.43	48.31	54.00	-5.69	Horizontal
7206.00	47.74	-2.42	45.32	54.00	-8.68	Horizontal
9608.00	48.08	-2.38	45.70	54.00	-8.30	Horizontal
12010.00	*			54.00		Horizontal
14412.00	*			54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Correct factor
2. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor
3. “*”, means this data is the too weak instrument of signal is unable to test.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test channel:	Middle
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4882.00	60.32	-7.49	52.83	74.00	-21.17	Vertical
7323.00	58.55	-2.40	56.15	74.00	-17.85	Vertical
9764.00	58.14	-2.38	55.76	74.00	-18.24	Vertical
12205.00	*			74.00		Vertical
14646.00	*			74.00		Vertical
4882.00	61.51	-7.49	54.02	74.00	-19.98	Horizontal
7323.00	58.37	-2.40	55.97	74.00	-18.03	Horizontal
9764.00	59.63	-2.38	57.25	74.00	-16.75	Horizontal
12205.00	*			74.00		Horizontal
14646.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4882.00	49.83	-7.49	42.34	54.00	-11.66	Vertical
7323.00	48.26	-2.40	45.86	54.00	-8.14	Vertical
9764.00	48.13	-2.38	45.75	54.00	-8.25	Vertical
12205.00	*			54.00		Vertical
14646.00	*			54.00		Vertical
4882.00	48.03	-7.49	40.54	54.00	-13.46	Horizontal
7323.00	47.26	-2.40	44.85	54.00	-9.14	Horizontal
9764.00	49.03	-2.38	46.65	54.00	-7.35	Horizontal
12205.00	*			54.00		Horizontal
14646.00	*			54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Correct factor
2. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor
3. “*”, means this data is too weak instrument of signal is unable to test.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test channel:	Highest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	53.23	-7.47	45.76	74.00	-28.24	Vertical
7440.00	56.03	-2.45	53.58	74.00	-20.42	Vertical
9920.00	58.14	-2.37	55.77	74.00	-18.23	Vertical
12400.00	*			74.00		Vertical
14880.00	*			74.00		Vertical
4960.00	56.53	-7.47	49.06	74.00	-24.94	Horizontal
7440.00	57.47	-2.45	55.02	74.00	-18.98	Horizontal
9920.00	58.23	-2.37	55.86	74.00	-18.14	Horizontal
12400.00	*			74.00		Horizontal
14880.00	*			74.00		Horizontal

Average value:

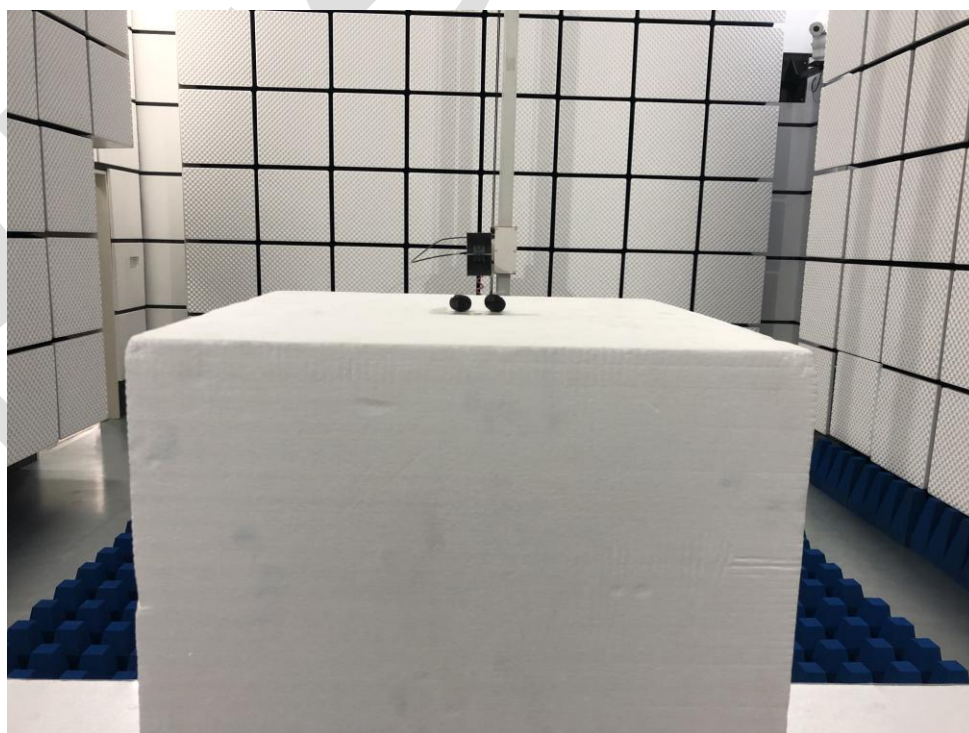
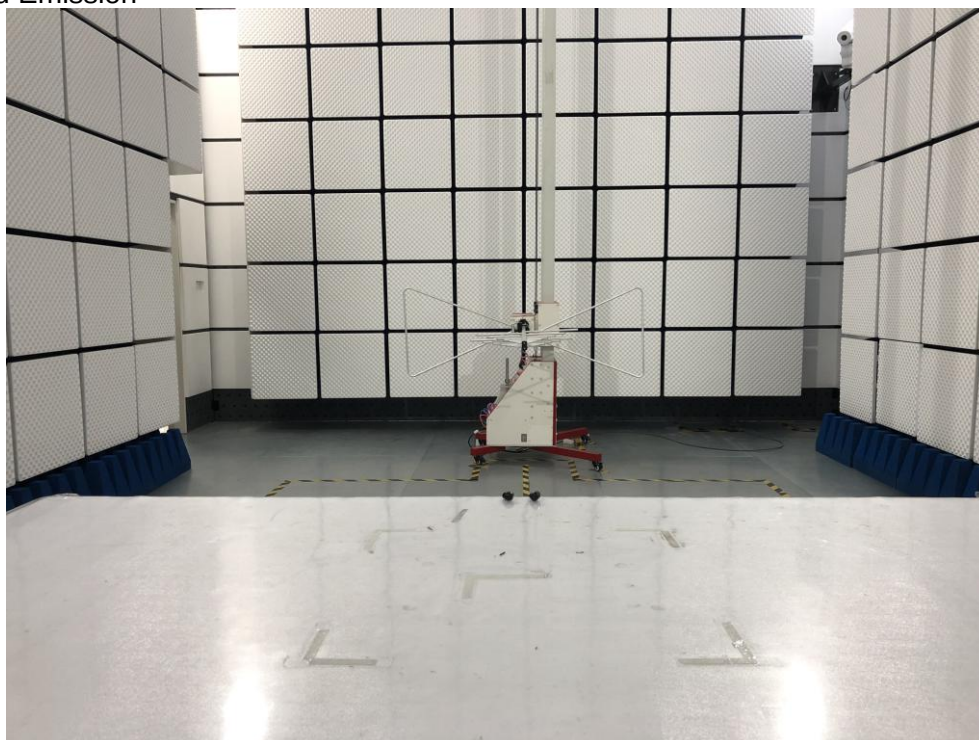
Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	44.03	-7.47	36.56	54.00	-17.44	Vertical
7440.00	45.61	-2.45	43.16	54.00	-10.84	Vertical
9920.00	47.29	-2.37	44.92	54.00	-9.08	Vertical
12400.00	*			54.00		Vertical
14880.00	*			54.00		Vertical
4960.00	46.34	-7.47	38.87	54.00	-15.13	Horizontal
7440.00	45.71	-2.45	43.36	54.00	-10.74	Horizontal
9920.00	47.03	-2.37	44.66	54.00	-9.34	Horizontal
12400.00	*			54.00		Horizontal
14880.00	*			54.00		Horizontal

Remark:

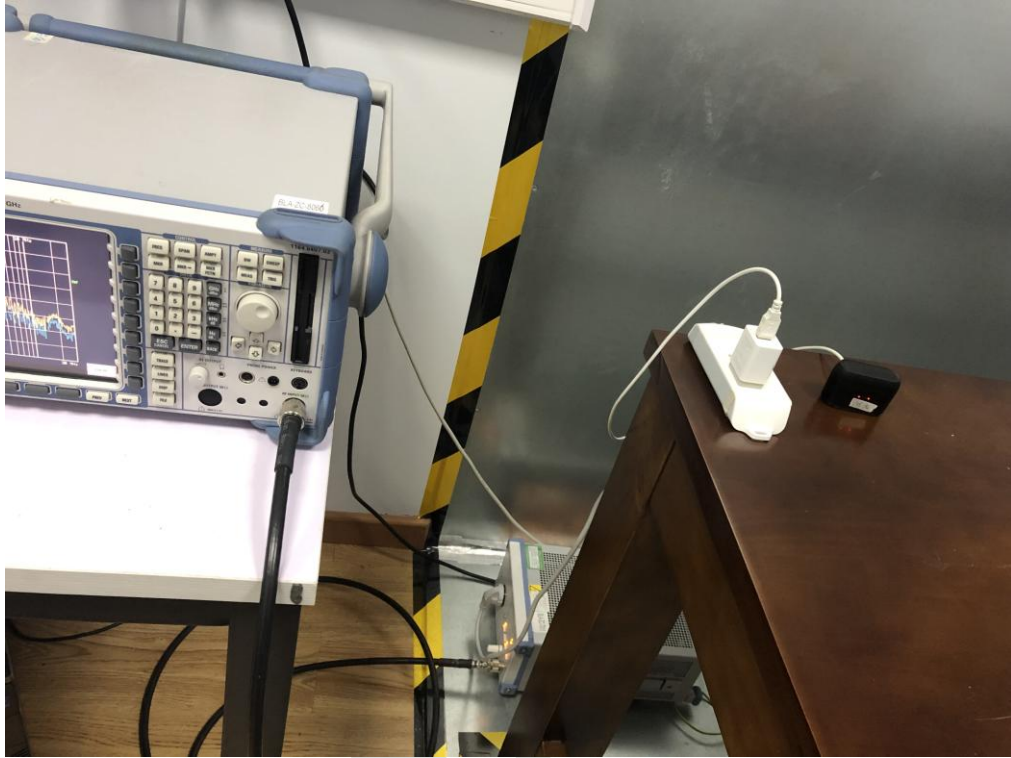
1. Final Level = Receiver Read level + Correct factor
2. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor
3. “*”, means this data is the too weak instrument of signal is unable to test.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

8 Test Setup Photo

Radiated Emission



Conducted Emission

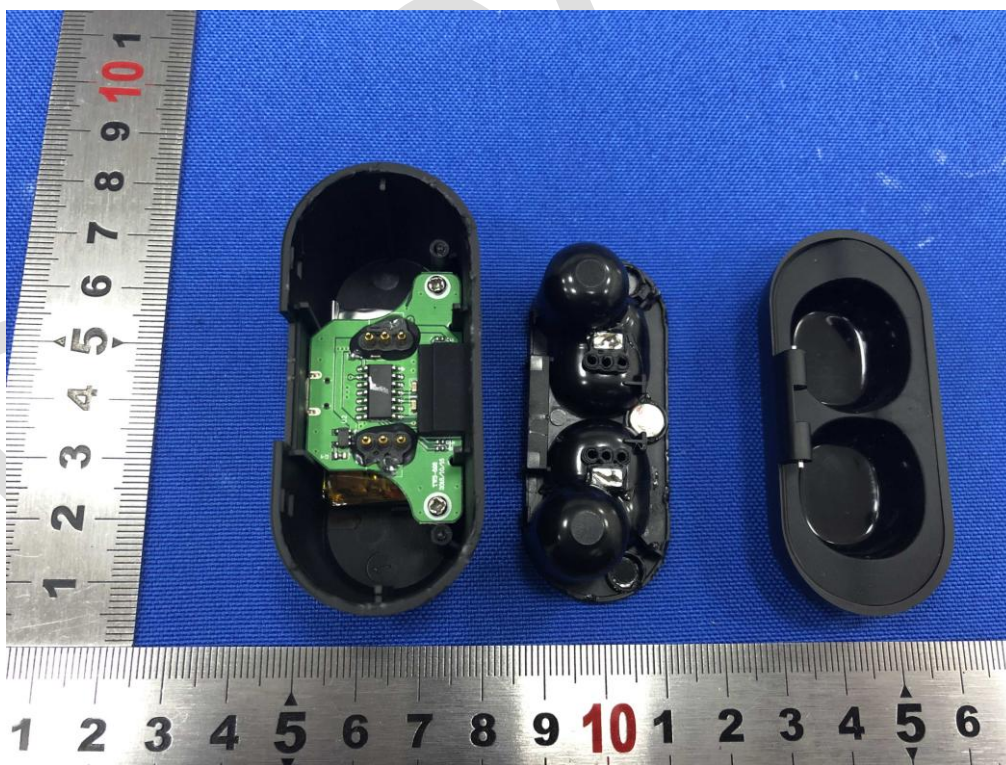


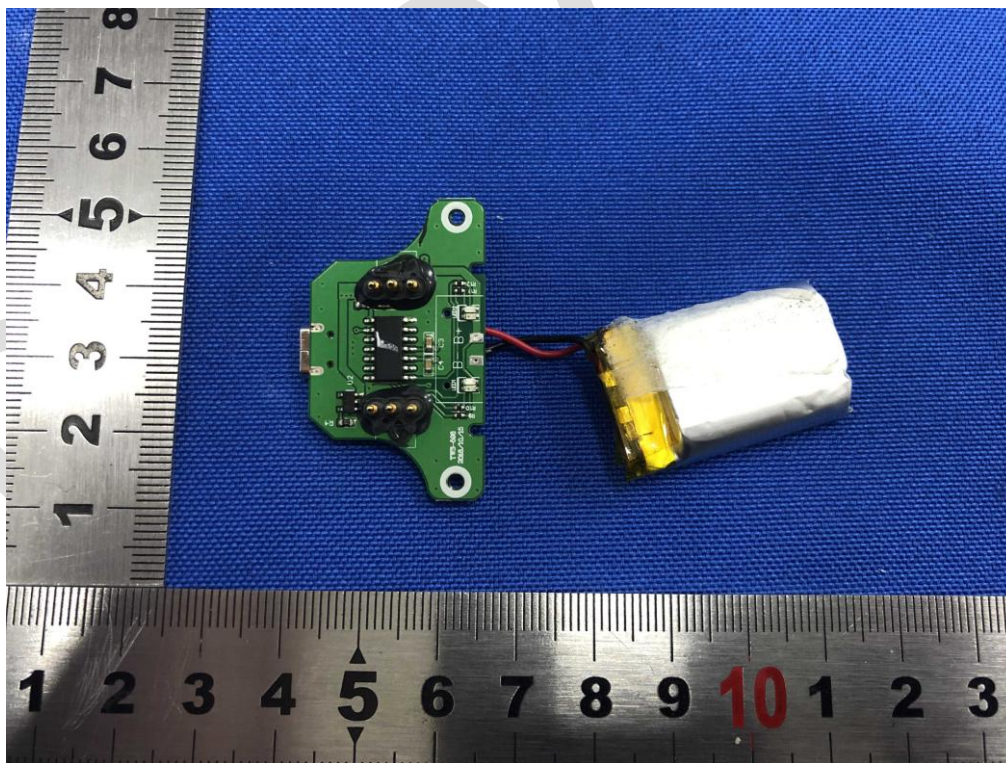
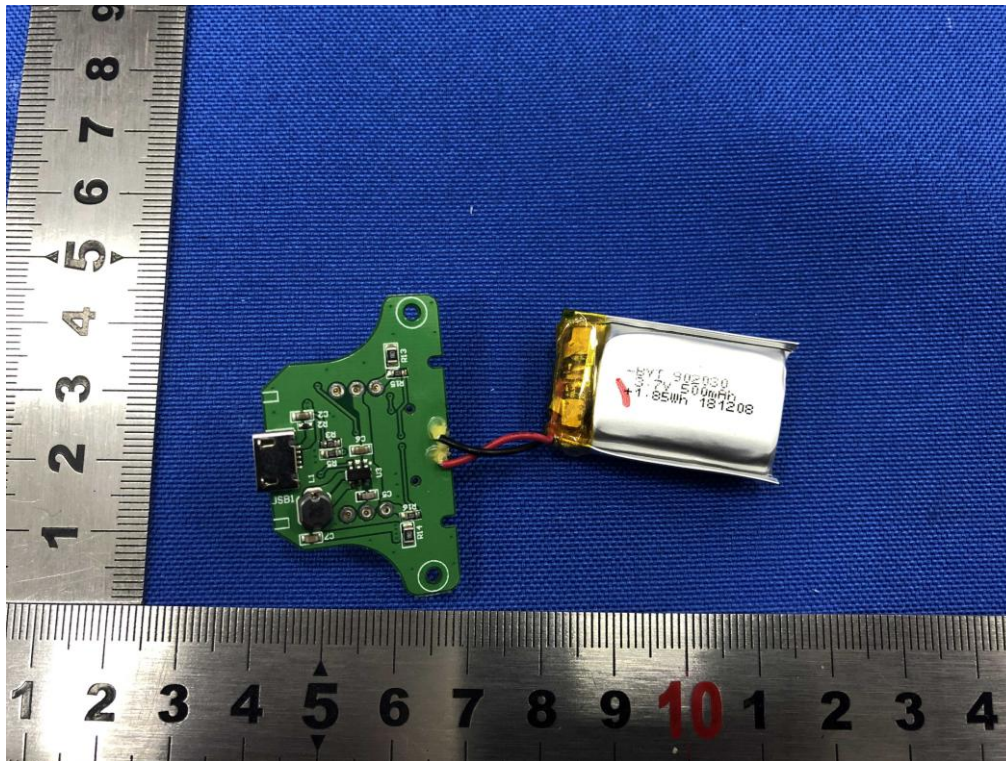
9 EUT Constructional Details







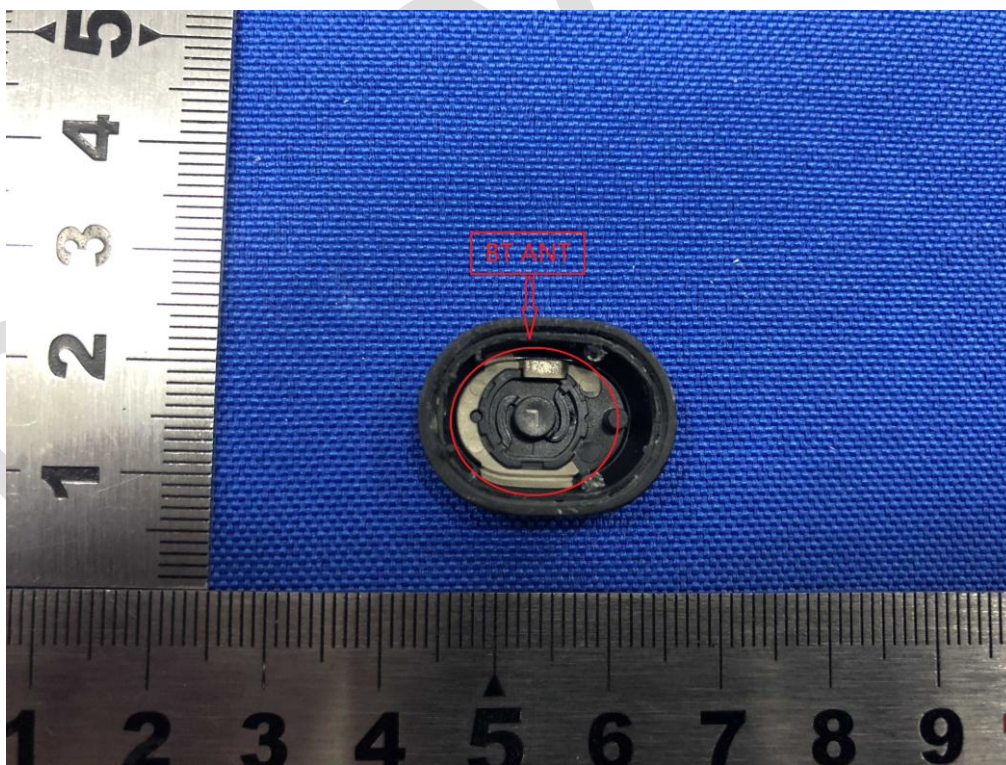
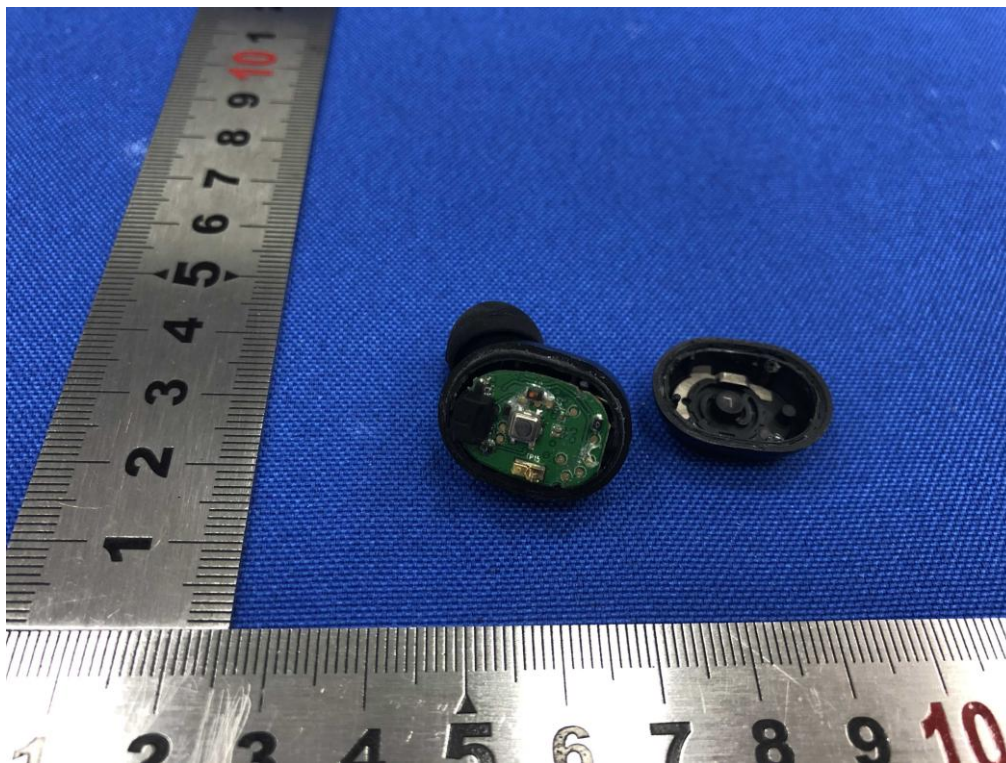


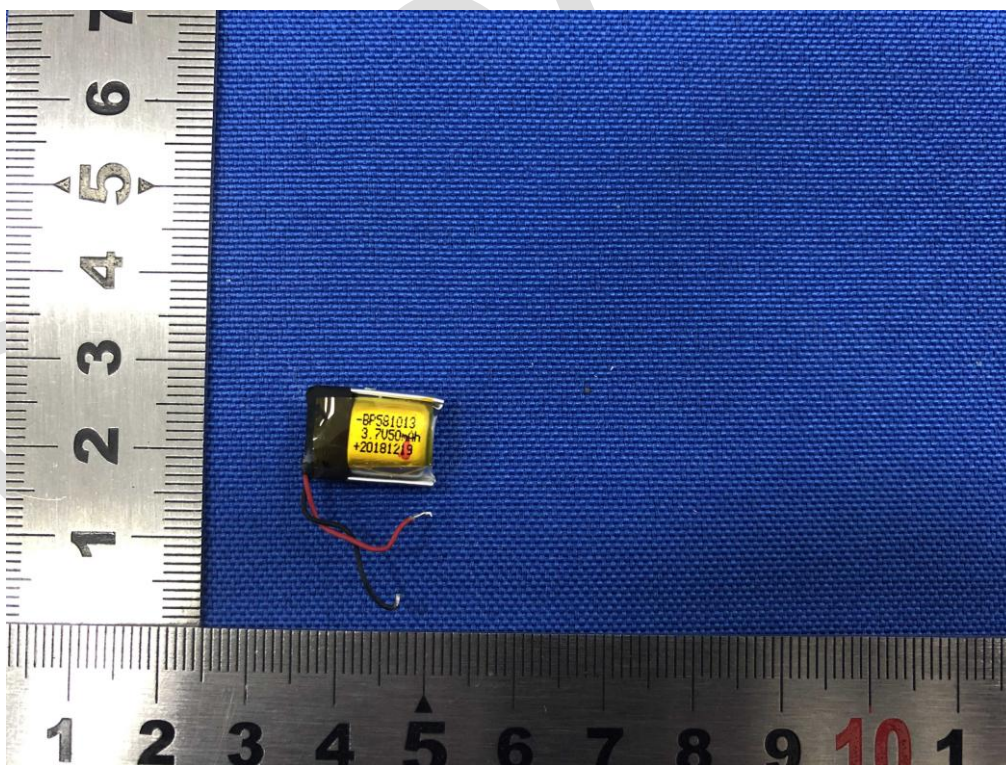
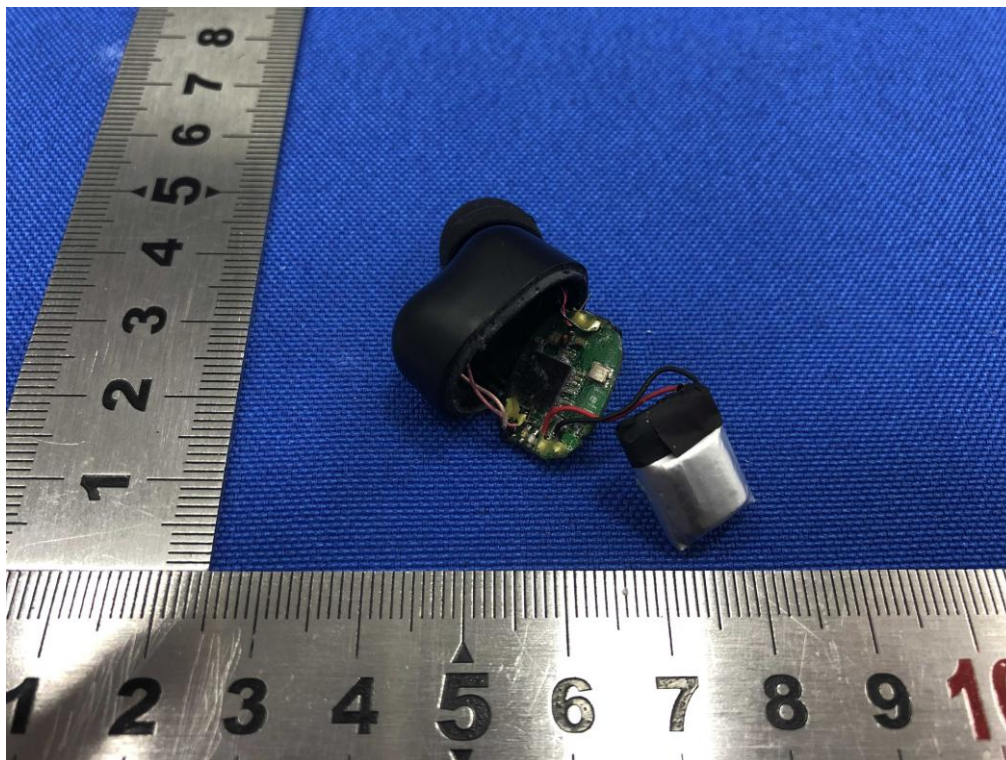


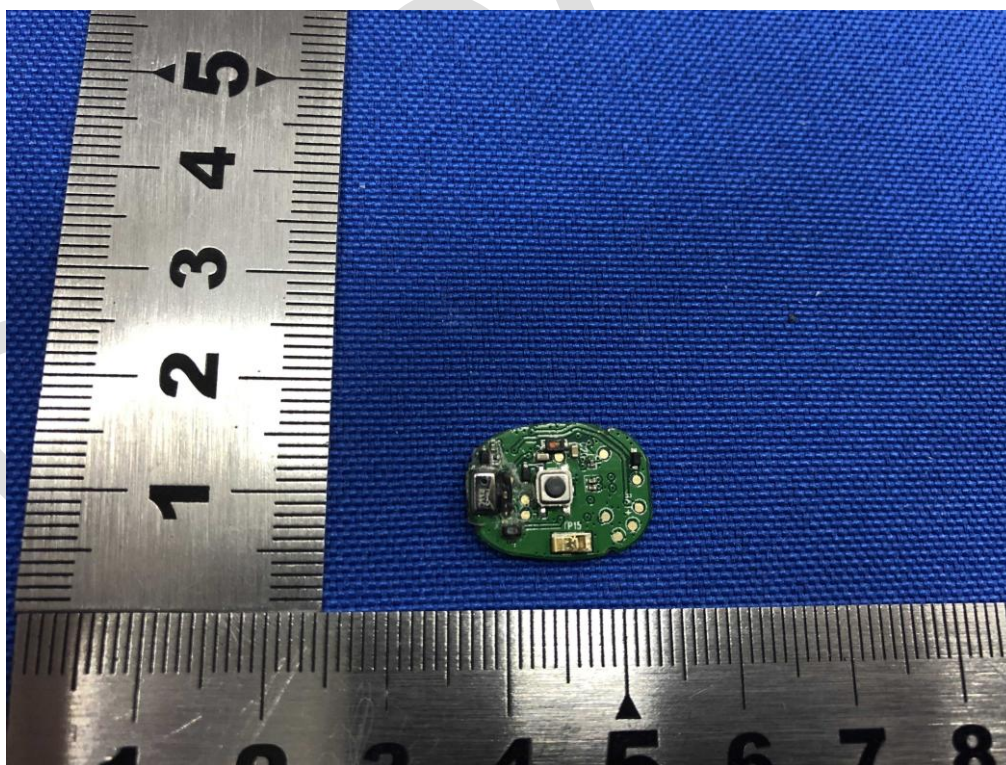
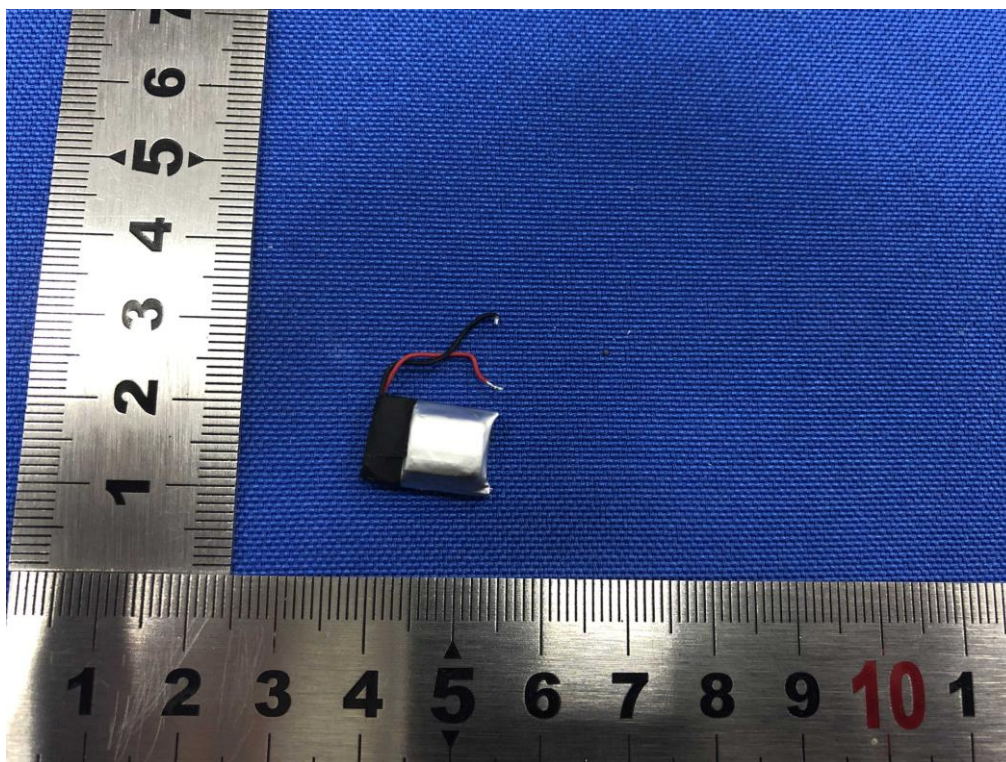


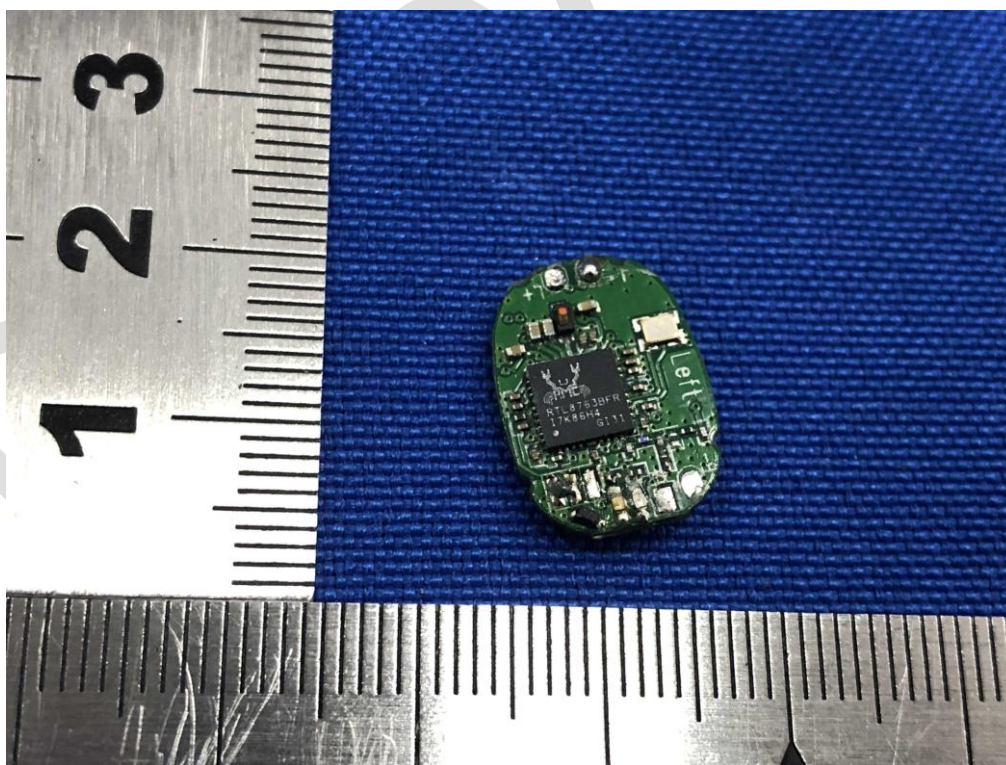
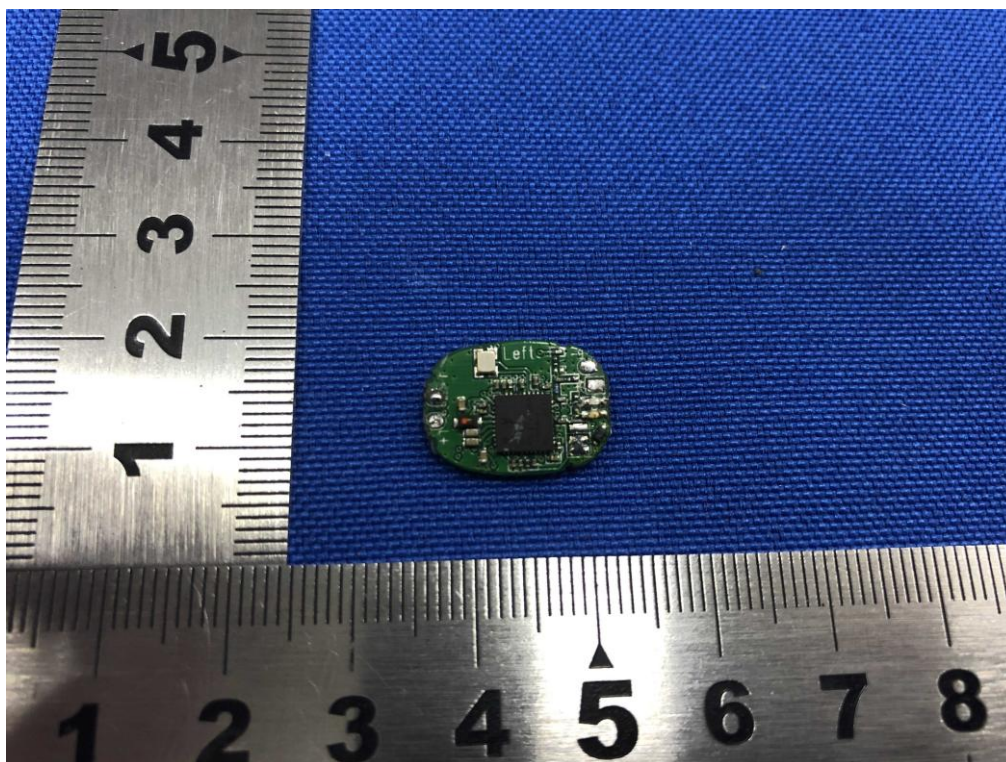












*** End of Report ***

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