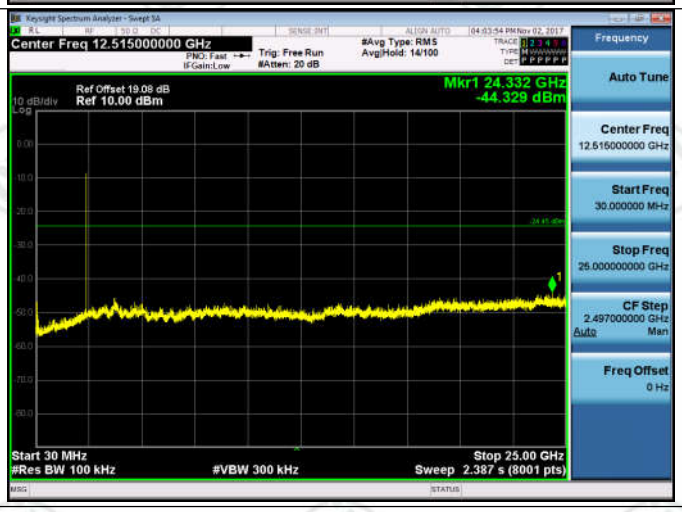
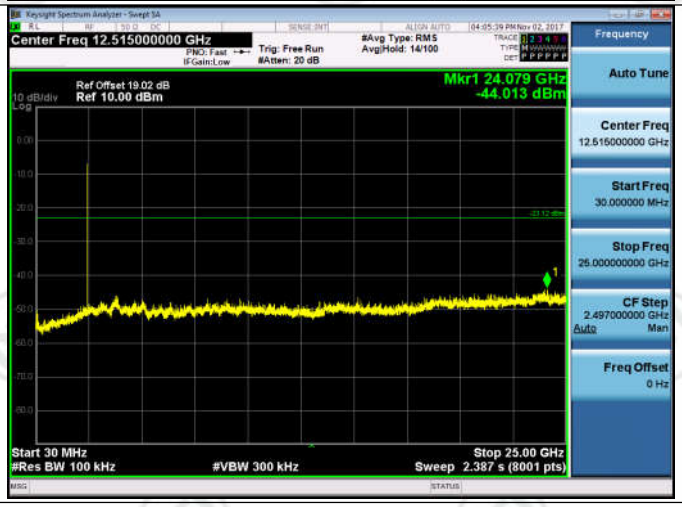
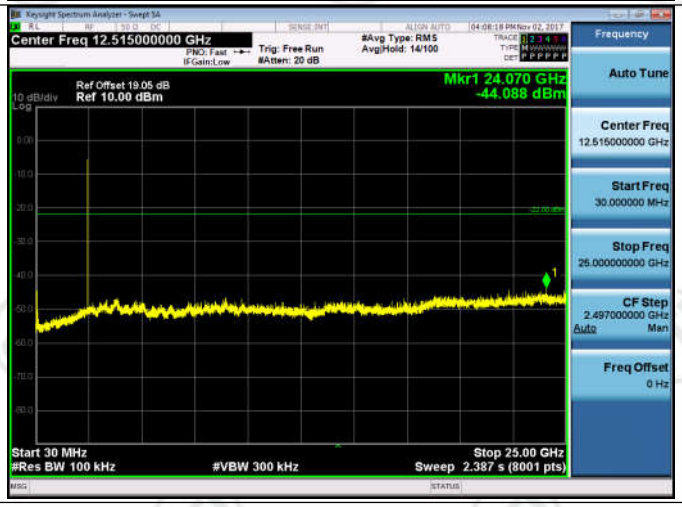
Puw	

8DPSK_LCH_Graphs	
Pref	
Puw	

8DPSK_MCH_Graphs		
Pref		
Puw		

8DPSK_HCH_Graphs		
Pref		
Puw		

Appendix H): Pseudorandom Frequency Hopping Sequence

Test Requirement:	47 CFR Part 15**C Section 15.247 (a)(1) requirement:**

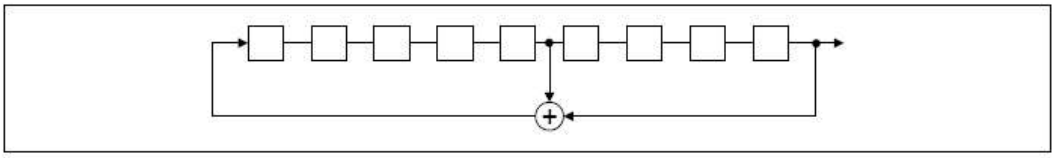
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

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. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

EUT Pseudorandom Frequency Hopping Sequence

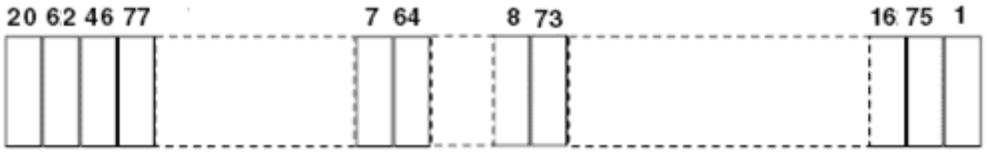
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence: 2^9 -1 = 511 bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.

The system receivers have input bandwidths that match the hopping channel bandwidths of their Corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

The device does not have the ability to be coordinated with other FHSS systems in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

Appendix I): Antenna Requirement

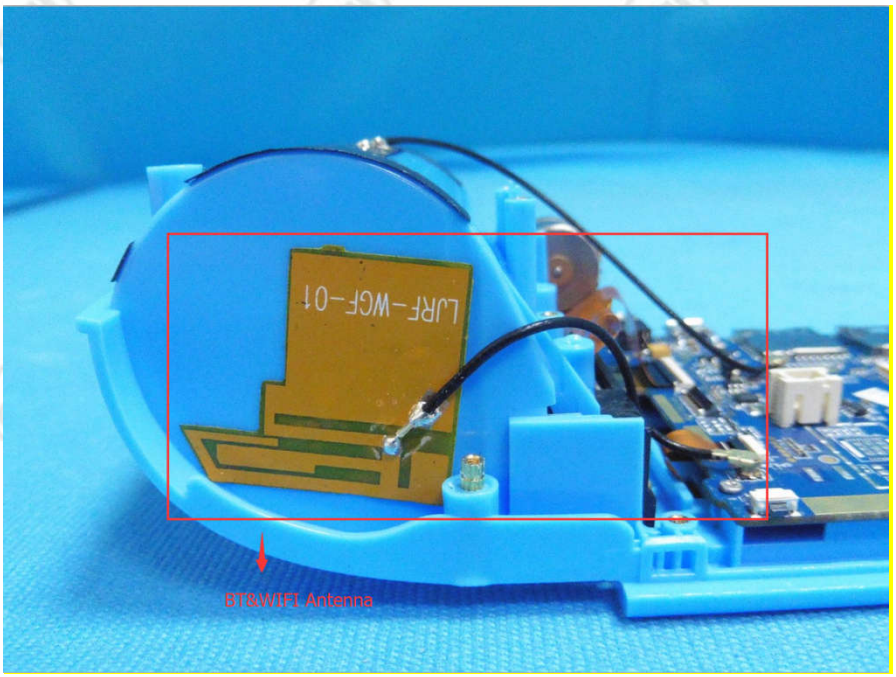
15.203 requirement:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:



The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.95dBi.

Appendix J): AC Power Line Conducted Emission

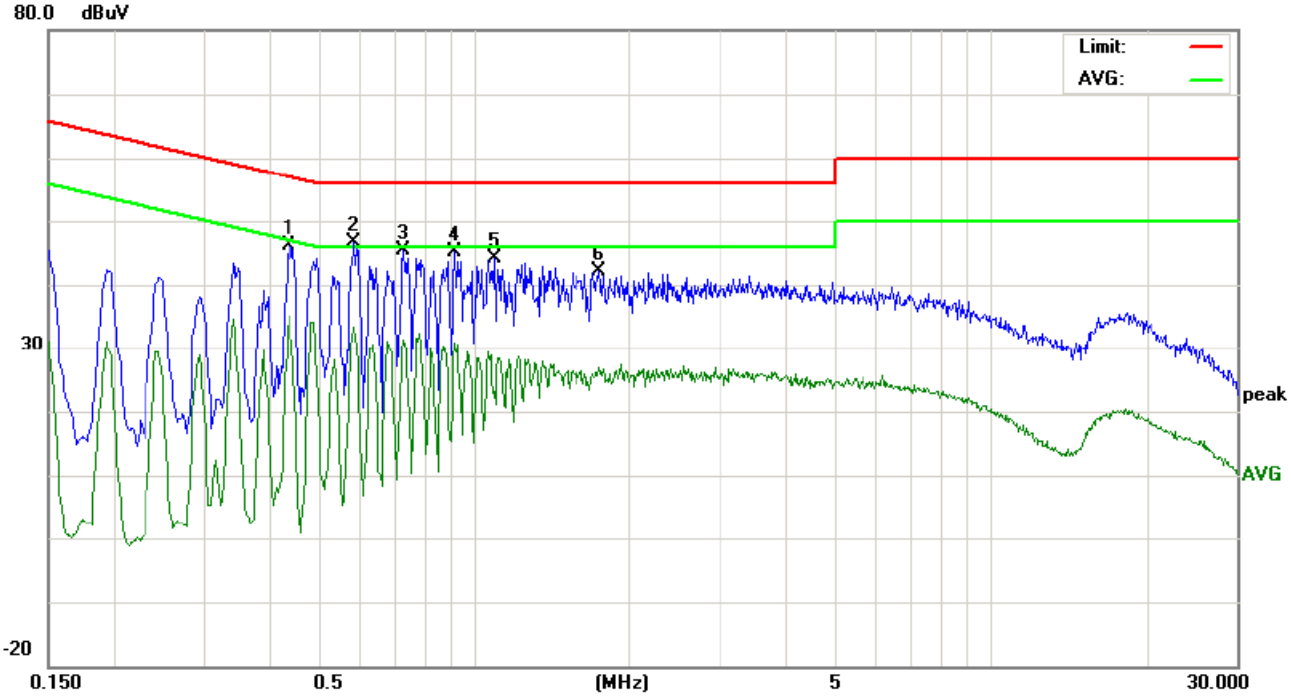
Test Procedure:	Test frequency range :150KHz-30MHz 1)The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3)The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Limit:	

Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.
NOTE : The lower limit is applicable at the transition frequency

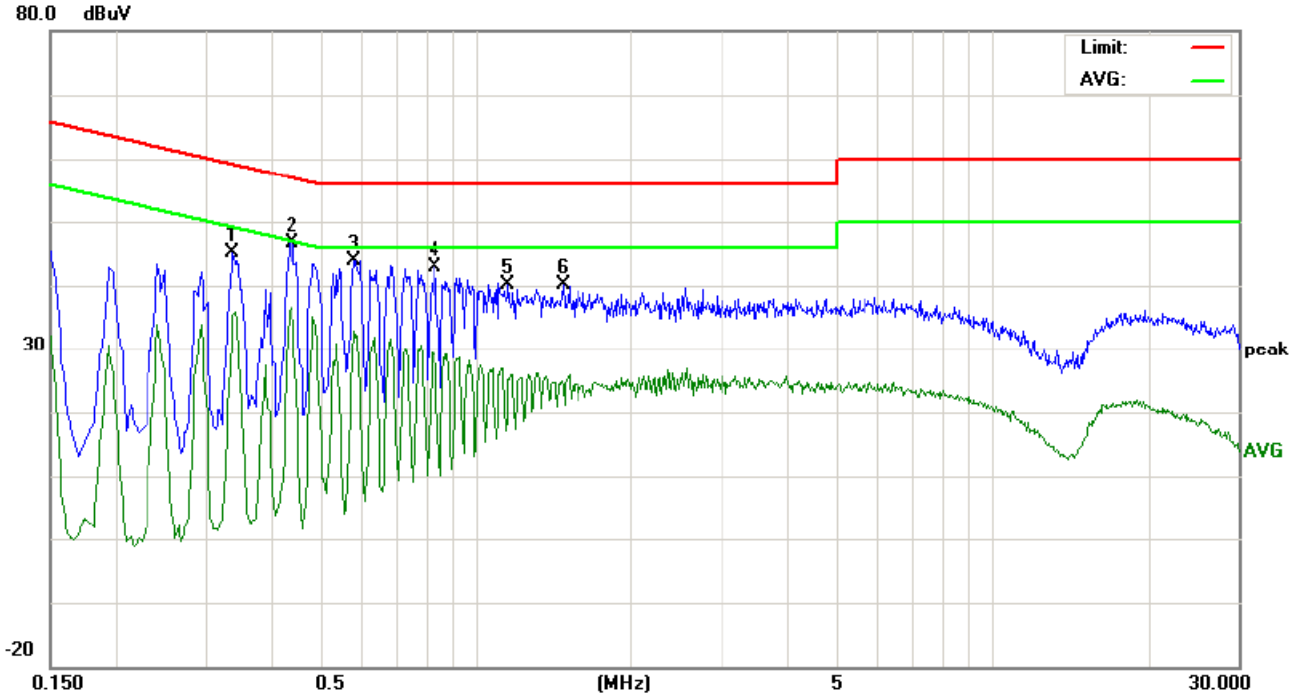
Measurement Data
An initial pre-scan was performed on the live and neutral lines with peak detector.
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live line:



No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.4380	36.31	34.05	25.42	9.73	46.04	43.78	35.15	57.10	47.10	-13.32	-11.95	P	
2	0.5860	36.87	35.15	23.76	9.74	46.61	44.89	33.50	56.00	46.00	-11.11	-12.50	P	
3	0.7300	35.64	33.62	21.70	9.75	45.39	43.37	31.45	56.00	46.00	-12.63	-14.55	P	
4	0.9220	35.41	32.23	21.13	9.74	45.15	41.97	30.87	56.00	46.00	-14.03	-15.13	P	
5	1.0940	34.40	31.84	13.31	9.72	44.12	41.56	23.03	56.00	46.00	-14.44	-22.97	P	
6	1.7460	32.29	30.37	17.18	9.72	42.01	40.09	26.90	56.00	46.00	-15.91	-19.10	P	

Neutral line:



No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.3379	35.35	33.21	25.52	9.77	45.12	42.98	35.29	59.25	49.25	-16.27	-13.96	P	
2	0.4420	36.82	34.41	26.82	9.73	46.55	44.14	36.55	57.02	47.02	-12.88	-10.47	P	
3	0.5820	34.14	30.25	23.21	9.74	43.88	39.99	32.95	56.00	46.00	-16.01	-13.05	P	
4	0.8340	33.18	30.16	19.76	9.74	42.92	39.90	29.50	56.00	46.00	-16.10	-16.50	P	
5	1.1580	30.31	26.47	15.50	9.72	40.03	36.19	25.22	56.00	46.00	-19.81	-20.78	P	
6	1.4740	30.37	26.15	14.28	9.72	40.09	35.87	24.00	56.00	46.00	-20.13	-22.00	P	

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

3. AC120V and 240V are tested and found the worst case is 120V, So only the 120V data were shown in the above.

Appendix K): Restricted bands around fundamental frequency (Radiated)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Procedure:

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. 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.

d. 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).

h. b. Test the EUT in the lowest channel , the Highest channel

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.

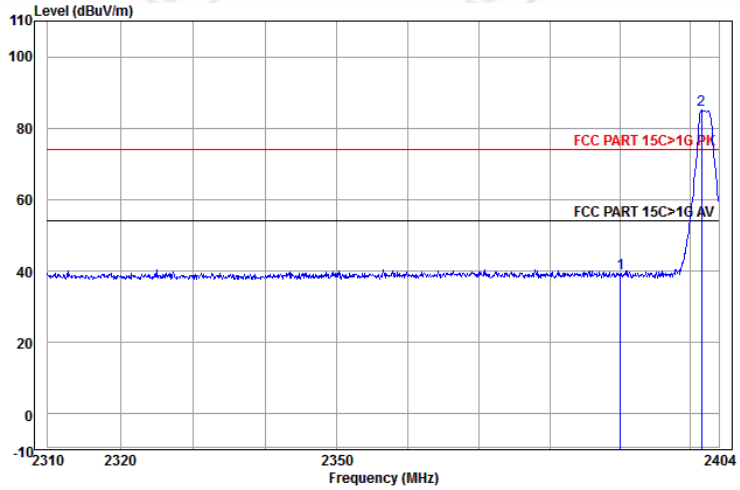
j. Repeat above procedures until all frequencies measured was complete.

Limit:

Frequency	Limit (dBμV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

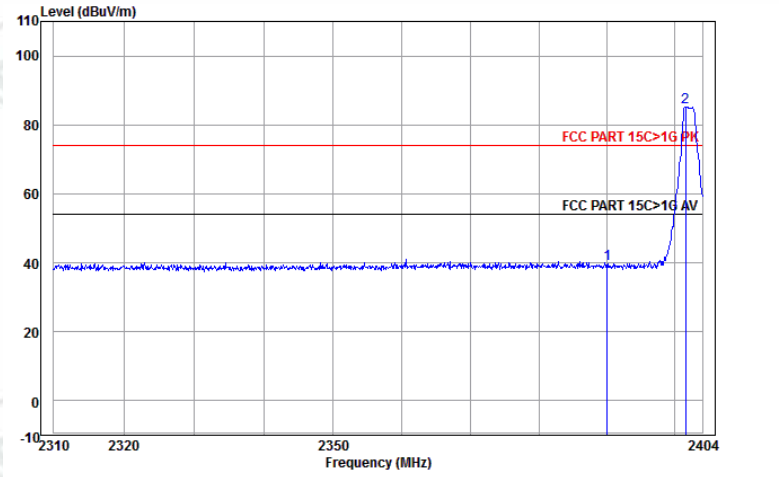
Test plot as follows:

Worse case mode:	GFSK(1-DH5)		
Frequency: 2402MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



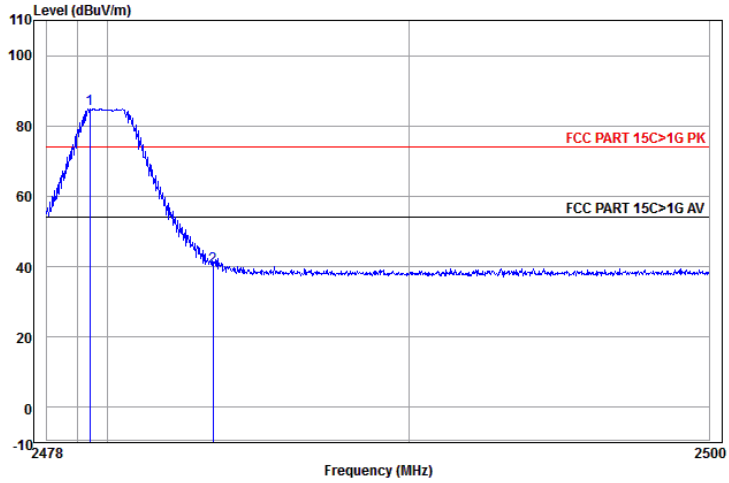
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	44.03	47.88	39.45	74.00	-34.55	Horizontal	Peak
2 pp	2401.508	32.56	3.07	44.04	93.41	85.00	74.00	11.00	Horizontal	Peak

Worse case mode:	GFSK(1-DH5)		
Frequency: 2402MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



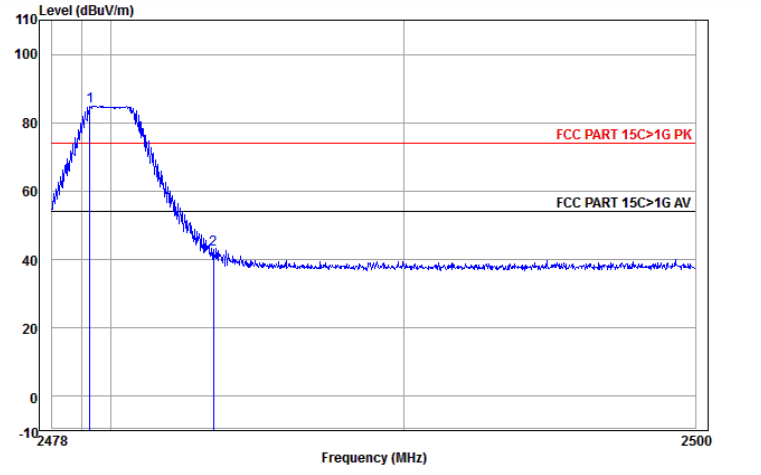
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	44.03	48.11	39.68	74.00	-34.32	Vertical	Peak
2 pp	2401.508	32.56	3.07	44.04	93.59	85.18	74.00	11.18	Vertical	Peak

Worse case mode:	GFSK(1-DH5)		
Frequency: 2480MHz	Test channel: Highest	Polarization: Horizontal	Remark: Peak



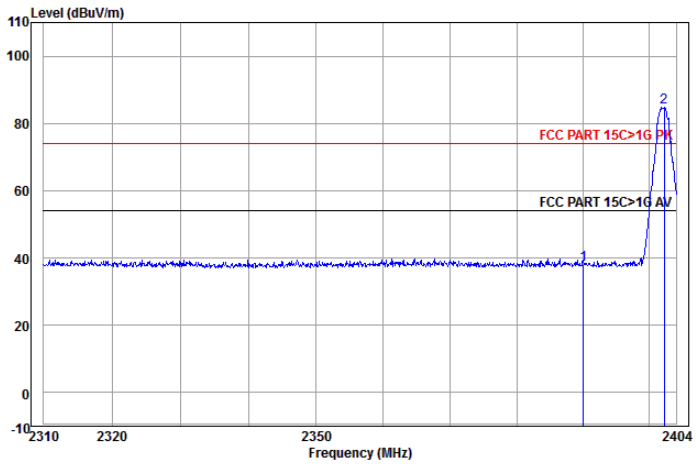
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2479.424	32.71	3.12	44.14	93.15	84.84	74.00	10.84	Horizontal	Peak
2	2483.500	32.71	3.12	44.14	48.36	40.05	74.00	-33.95	Horizontal	Peak

Worse case mode:	GFSK(1-DH5)		
Frequency: 2480MHz	Test channel: Highest	Polarization: Vertical	Remark: Peak



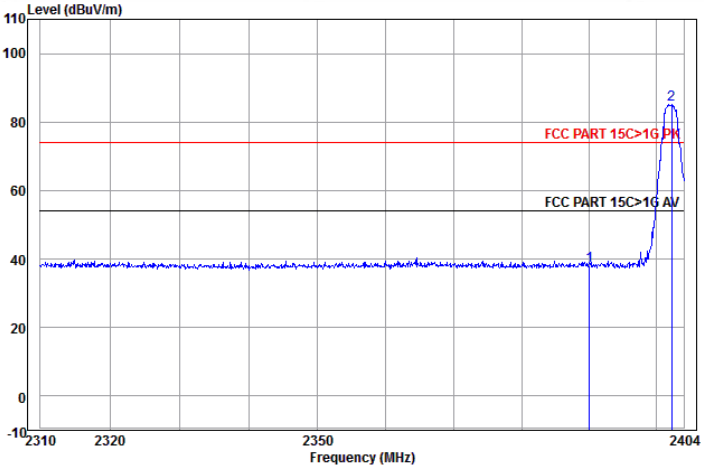
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2479.293	32.71	3.12	44.14	93.12	84.81	74.00	10.81	Vertical	Peak
2	2483.500	32.71	3.12	44.14	51.42	43.11	74.00	-30.89	Vertical	Peak

Worse case mode:	π/4DQPSK(2-DH5)		
Frequency: 2402MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



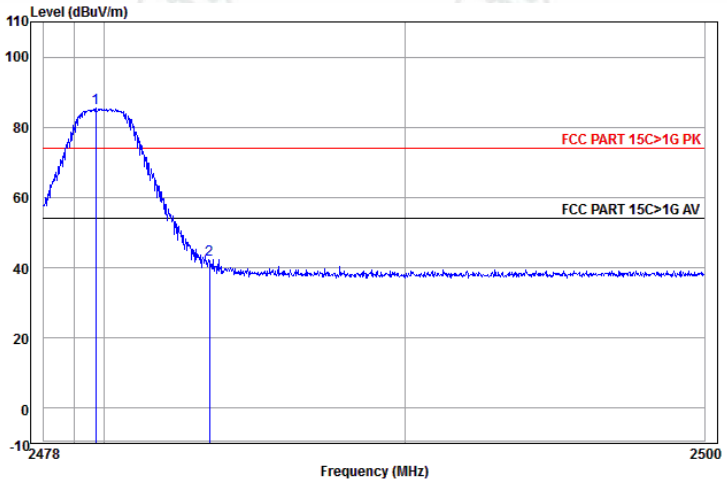
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	44.03	46.44	38.01	74.00	-35.99	Horizontal	Peak
2 pp	2402.179	32.56	3.07	44.04	93.14	84.73	74.00	10.73	Horizontal	Peak

Worse case mode:	π/4DQPSK(2-DH5)		
Frequency: 2402MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



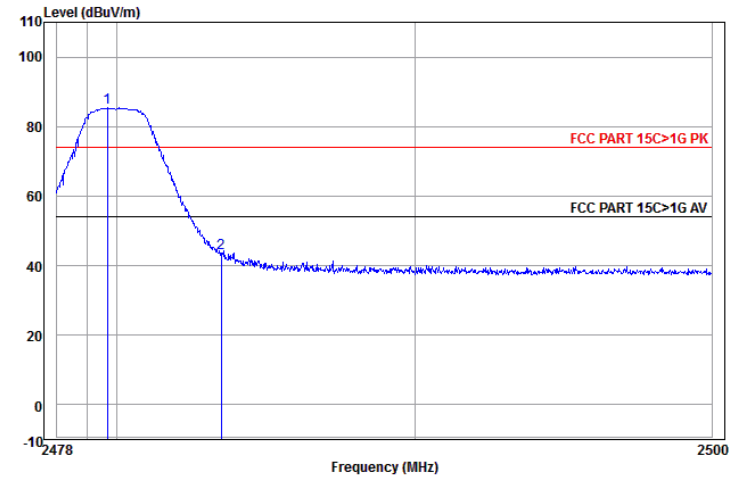
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	44.03	46.57	38.14	74.00	-35.86	Vertical	Peak
2 pp	2402.179	32.56	3.07	44.04	93.41	85.00	74.00	11.00	Vertical	Peak

Worse case mode:	π/4DQPSK(2-DH5)		
Frequency: 2480MHz	Test channel: Highest	Polarization: Horizontal	Remark: Peak



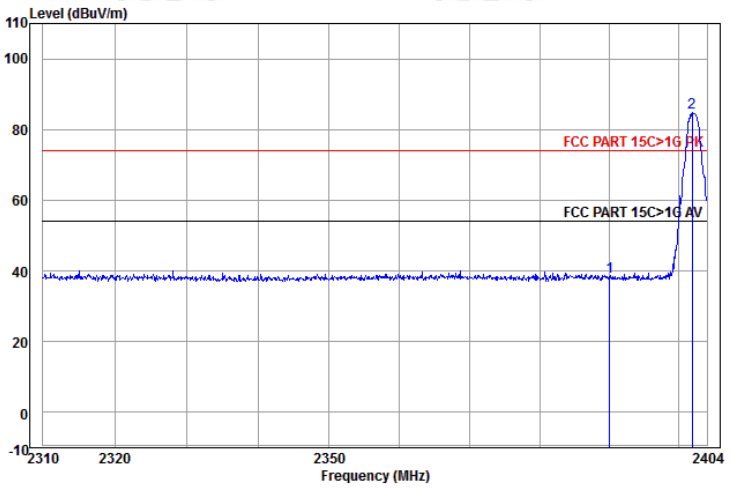
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2479.731	32.71	3.12	44.14	93.65	85.34	74.00	11.34	Horizontal	Peak
2	2483.500	32.71	3.12	44.14	50.56	42.25	74.00	-31.75	Horizontal	Peak

Worse case mode:	π/4DQPSK(2-DH5)		
Frequency: 2480MHz	Test channel: Highest	Polarization: Vertical	Remark: Peak



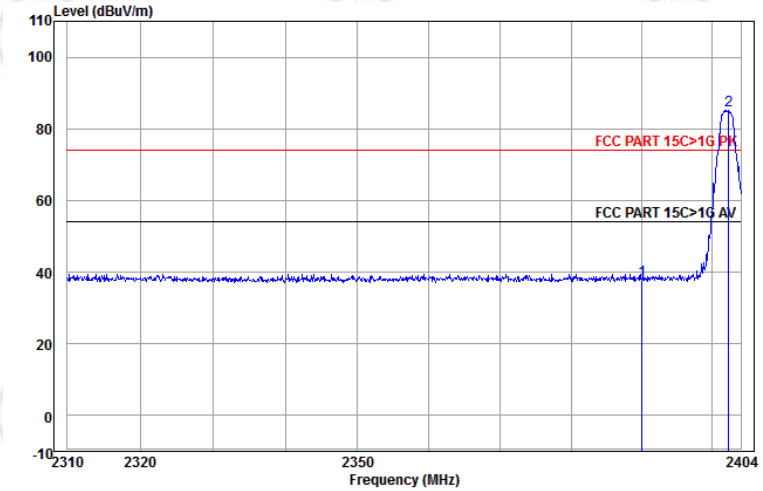
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2479.687	32.71	3.12	44.14	93.72	85.41	74.00	11.41	Vertical	Peak
2	2483.500	32.71	3.12	44.14	51.95	43.64	74.00	-30.36	Vertical	Peak

Worse case mode:	8DPSK(3-DH5)		
Frequency: 2402MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



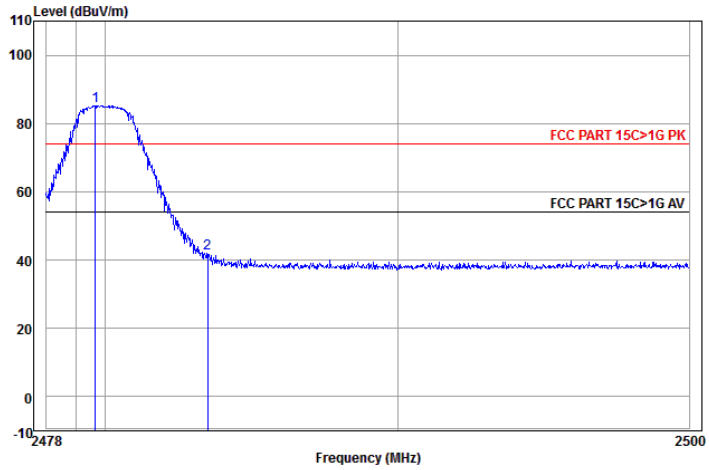
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	44.03	46.75	38.32	74.00	-35.68	Horizontal	Peak
2 pp	2401.891	32.56	3.07	44.04	93.19	84.78	74.00	10.78	Horizontal	Peak

Worse case mode:	8DPSK(3-DH5)		
Frequency: 2402MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



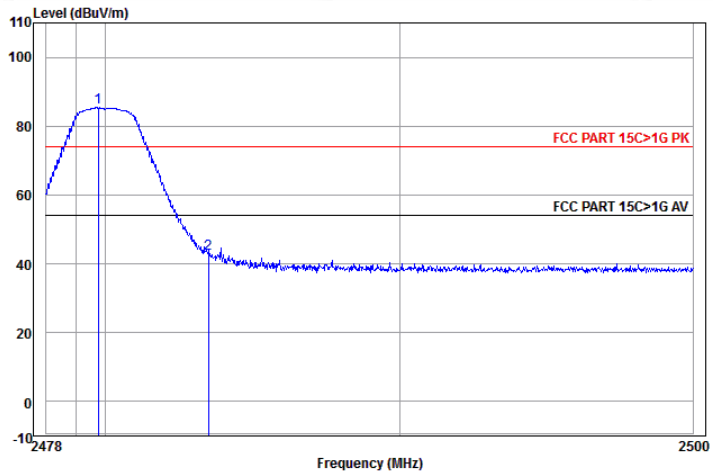
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	44.03	46.19	37.76	74.00	-36.24	Vertical	Peak
2 pp	2402.275	32.56	3.08	44.04	93.63	85.23	74.00	11.23	Vertical	Peak

Worse case mode:	8DPSK(3-DH5)		
Frequency: 2480MHz	Test channel: Highest	Polarization: Horizontal	Remark: Peak



	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2479.665	32.71	3.12	44.14	93.50	85.19	74.00	11.19	Horizontal	Peak
2	2483.500	32.71	3.12	44.14	50.25	41.94	74.00	-32.06	Horizontal	Peak

Worse case mode:	8DPSK(3-DH5)		
Frequency: 2480MHz	Test channel: Highest	Polarization: Vertical	Remark: Peak



	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2479.753	32.71	3.12	44.14	93.65	85.34	74.00	11.34	Vertical	Peak
2	2483.500	32.71	3.12	44.14	51.28	42.97	74.00	-31.03	Vertical	Peak

Note:

1) Through Pre-scan Non-hopping transmitting mode and charge+transmitter mode with all kind of modulation and all kind of data type, find the 1-DH5 of data type is the worse case of GFSK modulation type, the 2-DH5 of data type is the worse case of π/4DQPSK modulation type, the 3-DH5 of data type is the worse case of 8DPSKmodulation type in charge + transmitter mode.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading -Correct Factor

Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

Appendix L): Radiated Spurious Emissions

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Procedure:

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower.
c. 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.
d. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. 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.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

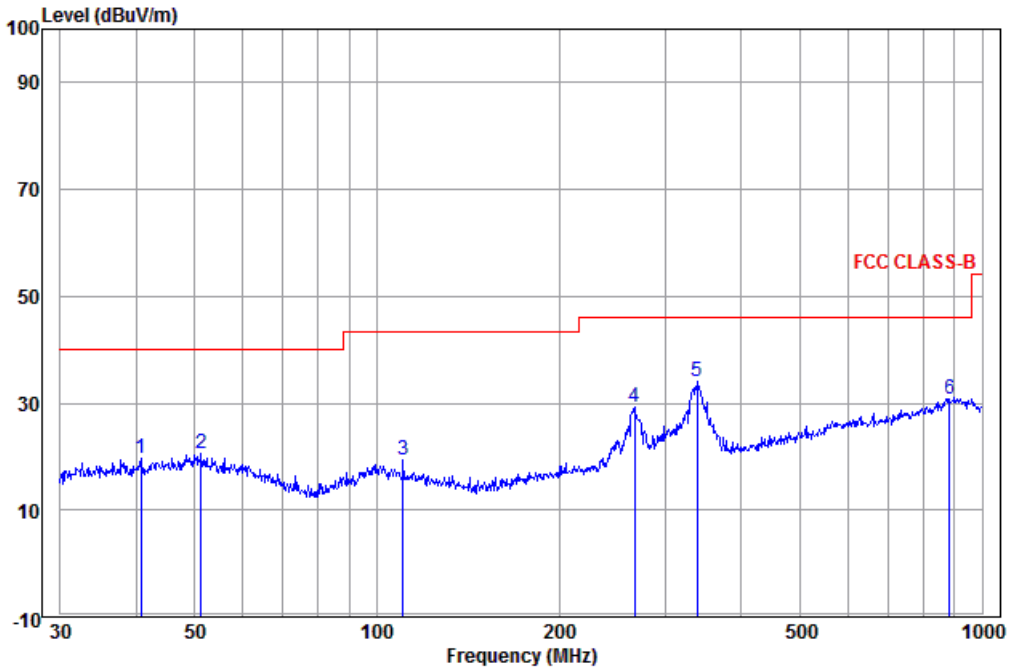
Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Radiated Spurious Emissions test Data:

Radiated Emission below 1GHz

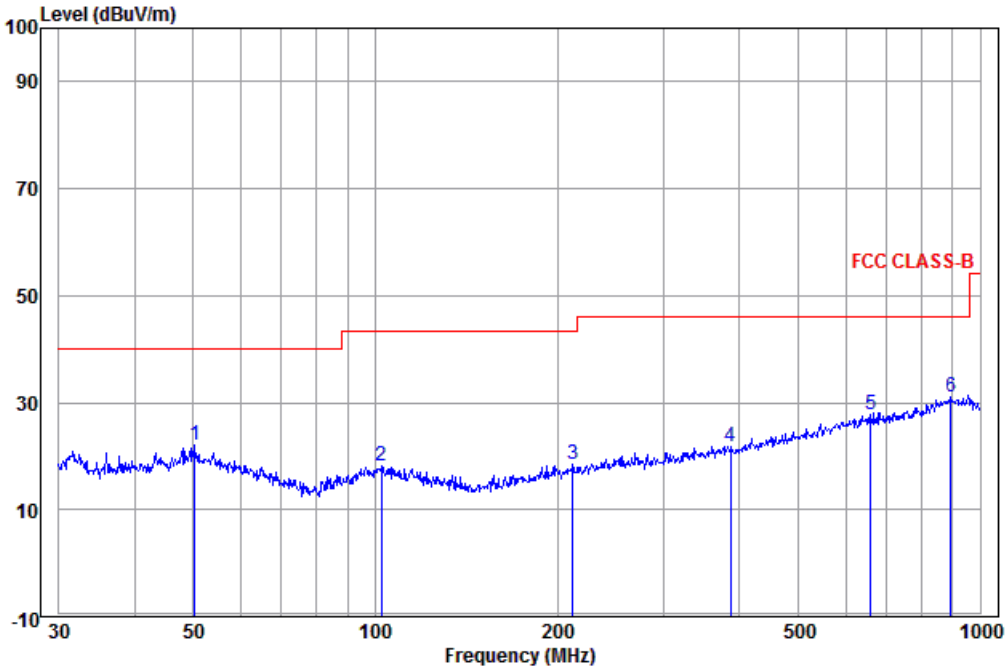
30MHz~1GHz (QP)

Horizontal



	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	40.702	13.86	0.05	5.72	19.63	40.00	-20.37	Horizontal	QP
2	51.301	14.39	0.12	6.02	20.53	40.00	-19.47	Horizontal	QP
3	110.569	11.58	0.59	7.25	19.42	43.50	-24.08	Horizontal	QP
4	266.609	12.88	1.24	15.07	29.19	46.00	-16.81	Horizontal	QP
5 pp	338.400	14.18	1.27	18.62	34.07	46.00	-11.93	Horizontal	QP
6	884.503	21.86	2.48	6.55	30.89	46.00	-15.11	Horizontal	QP

Vertical



	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	50.232	14.56	0.11	7.46	22.13	40.00	-17.87	Vertical	QP
2	102.360	12.29	0.59	5.20	18.08	43.50	-25.42	Vertical	QP
3	212.270	11.79	1.16	5.42	18.37	43.50	-25.13	Vertical	QP
4	386.634	15.00	1.32	5.43	21.75	46.00	-24.25	Vertical	QP
5	658.836	18.94	1.86	6.99	27.79	46.00	-18.21	Vertical	QP
6 pp	893.857	22.00	2.49	6.71	31.20	46.00	-14.80	Vertical	QP

Transmitter Emission above 1GHz

Worse case mode:		GFSK(1-DH5)		Test channel:		Lowest			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1219.635	30.27	1.89	44.36	47.44	35.24	74.00	-38.76	Pass	Horizontal
1549.344	30.96	2.35	43.94	47.15	36.52	74.00	-37.48	Pass	Horizontal
4804.000	34.69	5.98	44.60	43.60	39.67	74.00	-34.33	Pass	Horizontal
5674.896	35.66	7.11	44.53	46.21	44.45	74.00	-29.55	Pass	Horizontal
7206.000	36.42	6.97	44.77	42.49	41.11	74.00	-32.89	Pass	Horizontal
9608.000	37.88	6.98	45.58	42.09	41.37	74.00	-32.63	Pass	Horizontal
1270.334	30.39	1.97	44.29	47.23	35.30	74.00	-38.70	Pass	Vertical
1561.221	30.99	2.36	43.93	46.70	36.12	74.00	-37.88	Pass	Vertical
4804.000	34.69	5.98	44.60	43.17	39.24	74.00	-34.76	Pass	Vertical
5880.782	35.81	7.32	44.51	45.11	43.73	74.00	-30.27	Pass	Vertical
7206.000	36.42	6.97	44.77	44.64	43.26	74.00	-30.74	Pass	Vertical
9608.000	37.88	6.98	45.58	42.61	41.89	74.00	-32.11	Pass	Vertical

Worse case mode:		GFSK(1-DH5)		Test channel:		Middle			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1316.422	30.49	2.04	44.22	46.71	35.02	74.00	-38.98	Pass	Horizontal
1828.125	31.44	2.67	43.66	45.60	36.05	74.00	-37.95	Pass	Horizontal
4882.000	34.85	6.14	44.60	43.81	40.20	74.00	-33.80	Pass	Horizontal
5791.646	35.74	7.23	44.52	45.47	43.92	74.00	-30.08	Pass	Horizontal
7323.000	36.43	6.85	44.87	42.36	40.77	74.00	-33.23	Pass	Horizontal
9764.000	38.05	7.12	45.55	41.14	40.76	74.00	-33.24	Pass	Horizontal
1323.141	30.51	2.05	44.22	46.46	34.80	74.00	-39.20	Pass	Vertical
1894.450	31.54	2.74	43.59	45.95	36.64	74.00	-37.36	Pass	Vertical
4882.000	34.85	6.14	44.60	45.58	41.97	74.00	-32.03	Pass	Vertical
5880.782	35.81	7.32	44.51	45.28	43.90	74.00	-30.10	Pass	Vertical
7323.000	36.43	6.85	44.87	43.16	41.57	74.00	-32.43	Pass	Vertical
9764.000	38.05	7.12	45.55	40.99	40.61	74.00	-33.39	Pass	Vertical

Worse case mode:		GFSK(1-DH5)		Test channel:		Highest			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1201.149	30.23	1.86	44.38	47.46	35.17	74.00	-38.83	Pass	Horizontal
1777.646	31.36	2.61	43.70	46.81	37.08	74.00	-36.92	Pass	Horizontal
4960.000	35.02	6.29	44.60	42.63	39.34	74.00	-34.66	Pass	Horizontal
6267.190	36.04	7.37	44.53	45.29	44.17	74.00	-29.83	Pass	Horizontal
7440.000	36.45	6.73	44.97	43.39	41.60	74.00	-32.40	Pass	Horizontal
9920.000	38.22	7.26	45.52	41.96	41.92	74.00	-32.08	Pass	Horizontal
1201.149	30.23	1.86	44.38	47.46	35.17	74.00	-38.83	Pass	Vertical
1605.554	31.07	2.42	43.88	46.41	36.02	74.00	-37.98	Pass	Vertical
4960.000	35.02	6.29	44.60	42.44	39.15	74.00	-34.85	Pass	Vertical
5865.832	35.80	7.31	44.51	45.20	43.80	74.00	-30.20	Pass	Vertical
7440.000	36.45	6.73	44.97	43.02	41.23	74.00	-32.77	Pass	Vertical
9920.000	38.22	7.26	45.52	41.82	41.78	74.00	-32.22	Pass	Vertical

Worse case mode:		π/4DQPSK(2-DH5)		Test channel:		Lowest			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1309.737	30.48	2.03	44.23	46.55	34.83	74.00	-39.17	Pass	Horizontal
1702.361	31.24	2.53	43.78	45.87	35.86	74.00	-38.14	Pass	Horizontal
4804.000	34.69	5.98	44.60	43.22	39.29	74.00	-34.71	Pass	Horizontal
5836.044	35.78	7.28	44.52	44.94	43.48	74.00	-30.52	Pass	Horizontal
7206.000	36.42	6.97	44.77	42.05	40.67	74.00	-33.33	Pass	Horizontal
9608.000	37.88	6.98	45.58	41.98	41.26	74.00	-32.74	Pass	Horizontal
1286.606	30.43	1.99	44.26	47.20	35.36	74.00	-38.64	Pass	Vertical
1948.245	31.62	2.79	43.55	45.84	36.70	74.00	-37.30	Pass	Vertical
4804.000	34.69	5.98	44.60	42.67	38.74	74.00	-35.26	Pass	Vertical
6412.427	36.12	7.33	44.54	45.71	44.62	74.00	-29.38	Pass	Vertical
7206.000	36.42	6.97	44.77	43.11	41.73	74.00	-32.27	Pass	Vertical
9608.000	37.88	6.98	45.58	42.49	41.77	74.00	-32.23	Pass	Vertical

Worse case mode:		π/4DQPSK(2-DH5)		Test channel:		Middle			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1254.268	30.35	1.94	44.31	46.75	34.73	74.00	-39.27	Pass	Horizontal
1605.554	31.07	2.42	43.88	46.78	36.39	74.00	-37.61	Pass	Horizontal
4882.000	34.85	6.14	44.60	43.55	39.94	74.00	-34.06	Pass	Horizontal
6445.156	36.13	7.32	44.55	44.83	43.73	74.00	-30.27	Pass	Horizontal
7323.000	36.43	6.85	44.87	42.43	40.84	74.00	-33.16	Pass	Horizontal
9764.000	38.05	7.12	45.55	40.00	39.62	74.00	-34.38	Pass	Horizontal
1270.334	30.39	1.97	44.29	46.57	34.64	74.00	-39.36	Pass	Vertical
1715.411	31.26	2.55	43.77	46.54	36.58	74.00	-37.42	Pass	Vertical
4882.000	34.85	6.14	44.60	43.30	39.69	74.00	-34.31	Pass	Vertical
5821.207	35.77	7.26	44.52	45.31	43.82	74.00	-30.18	Pass	Vertical
7323.000	36.43	6.85	44.87	42.80	41.21	74.00	-32.79	Pass	Vertical
9764.000	38.05	7.12	45.55	40.94	40.56	74.00	-33.44	Pass	Vertical

Worse case mode:		π/4DQPSK(2-DH5)		Test channel:		Highest			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1273.572	30.40	1.97	44.28	46.44	34.53	74.00	-39.47	Pass	Horizontal
1837.456	31.46	2.68	43.65	46.51	37.00	74.00	-37.00	Pass	Horizontal
4960.000	35.02	6.29	44.60	42.64	39.35	74.00	-34.65	Pass	Horizontal
6428.771	36.12	7.33	44.54	45.90	44.81	74.00	-29.19	Pass	Horizontal
7440.000	36.45	6.73	44.97	43.21	41.42	74.00	-32.58	Pass	Horizontal
9920.000	38.22	7.26	45.52	42.10	42.06	74.00	-31.94	Pass	Horizontal
1257.465	30.36	1.95	44.30	47.00	35.01	74.00	-38.99	Pass	Vertical
1828.125	31.44	2.67	43.66	46.46	36.91	74.00	-37.09	Pass	Vertical
4960.000	35.02	6.29	44.60	42.96	39.67	74.00	-34.33	Pass	Vertical
6063.190	35.93	7.42	44.51	44.72	43.56	74.00	-30.44	Pass	Vertical
7440.000	36.45	6.73	44.97	42.85	41.06	74.00	-32.94	Pass	Vertical
9920.000	38.22	7.26	45.52	40.85	40.81	74.00	-33.19	Pass	Vertical

Worse case mode:		8DPSK(3-DH5)		Test channel:		Lowest			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1121.367	30.03	1.73	44.50	47.26	34.52	74.00	-39.48	Pass	Horizontal
1510.402	30.89	2.30	43.99	46.87	36.07	74.00	-37.93	Pass	Horizontal
4804.000	34.69	5.98	44.60	43.20	39.27	74.00	-34.73	Pass	Horizontal
5865.832	35.80	7.31	44.51	45.64	44.24	74.00	-29.76	Pass	Horizontal
7206.000	36.42	6.97	44.77	41.71	40.33	74.00	-33.67	Pass	Horizontal
9608.000	37.88	6.98	45.58	41.31	40.59	74.00	-33.41	Pass	Horizontal
1329.894	30.52	2.06	44.21	46.53	34.90	74.00	-39.10	Pass	Vertical
1746.251	31.31	2.58	43.73	46.52	36.68	74.00	-37.32	Pass	Vertical
4804.000	34.69	5.98	44.60	42.78	38.85	74.00	-35.15	Pass	Vertical
6412.427	36.12	7.33	44.54	45.28	44.19	74.00	-29.81	Pass	Vertical
7206.000	36.42	6.97	44.77	42.52	41.14	74.00	-32.86	Pass	Vertical
9608.000	37.88	6.98	45.58	42.14	41.42	74.00	-32.58	Pass	Vertical

Worse case mode:		8DPSK(3-DH5)		Test channel:		Middle			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1360.714	30.59	2.10	44.17	46.23	34.75	74.00	-39.25	Pass	Horizontal
1832.785	31.45	2.67	43.65	46.90	37.37	74.00	-36.63	Pass	Horizontal
4882.000	34.85	6.14	44.60	44.13	40.52	74.00	-33.48	Pass	Horizontal
5850.919	35.79	7.29	44.51	45.85	44.42	74.00	-29.58	Pass	Horizontal
7323.000	36.43	6.85	44.87	42.10	40.51	74.00	-33.49	Pass	Horizontal
9764.000	38.05	7.12	45.55	40.87	40.49	74.00	-33.51	Pass	Horizontal
1280.072	30.41	1.98	44.27	46.51	34.63	74.00	-39.37	Pass	Vertical
1837.456	31.46	2.68	43.65	46.22	36.71	74.00	-37.29	Pass	Vertical
4882.000	34.85	6.14	44.60	43.61	40.00	74.00	-34.00	Pass	Vertical
5850.919	35.79	7.29	44.51	46.08	44.65	74.00	-29.35	Pass	Vertical
7323.000	36.43	6.85	44.87	44.11	42.52	74.00	-31.48	Pass	Vertical
9764.000	38.05	7.12	45.55	40.55	40.17	74.00	-33.83	Pass	Vertical

Worse case mode:	8DPSK(3-DH5)	Test channel:	Highest

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1319.777	30.50	2.04	44.22	46.44	34.76	74.00	-39.24	Pass	Horizontal
1693.716	31.22	2.52	43.79	46.88	36.83	74.00	-37.17	Pass	Horizontal
1856.261	31.48	2.70	43.63	46.67	37.22	74.00	-36.78	Pass	Horizontal
4960.000	35.02	6.29	44.60	43.10	39.81	74.00	-34.19	Pass	Horizontal
7440.000	36.45	6.73	44.97	43.35	41.56	74.00	-32.44	Pass	Horizontal
9920.000	38.22	7.26	45.52	43.48	43.44	74.00	-30.56	Pass	Horizontal
1222.743	30.28	1.90	44.35	46.62	34.45	74.00	-39.55	Pass	Vertical
1851.542	31.48	2.69	43.63	45.88	36.42	74.00	-37.58	Pass	Vertical
4960.000	35.02	6.29	44.60	42.66	39.37	74.00	-34.63	Pass	Vertical
5880.782	35.81	7.32	44.51	45.67	44.29	74.00	-29.71	Pass	Vertical
7440.000	36.45	6.73	44.97	43.69	41.90	74.00	-32.10	Pass	Vertical
9920.000	38.22	7.26	45.52	43.23	43.19	74.00	-30.81	Pass	Vertical

Note:

1) Through Pre-scan transmitting mode with all kind of modulation and all kind of data type, find the DH5 of data type is the worse case of GFSK modulation type in charge + transmitter mode.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

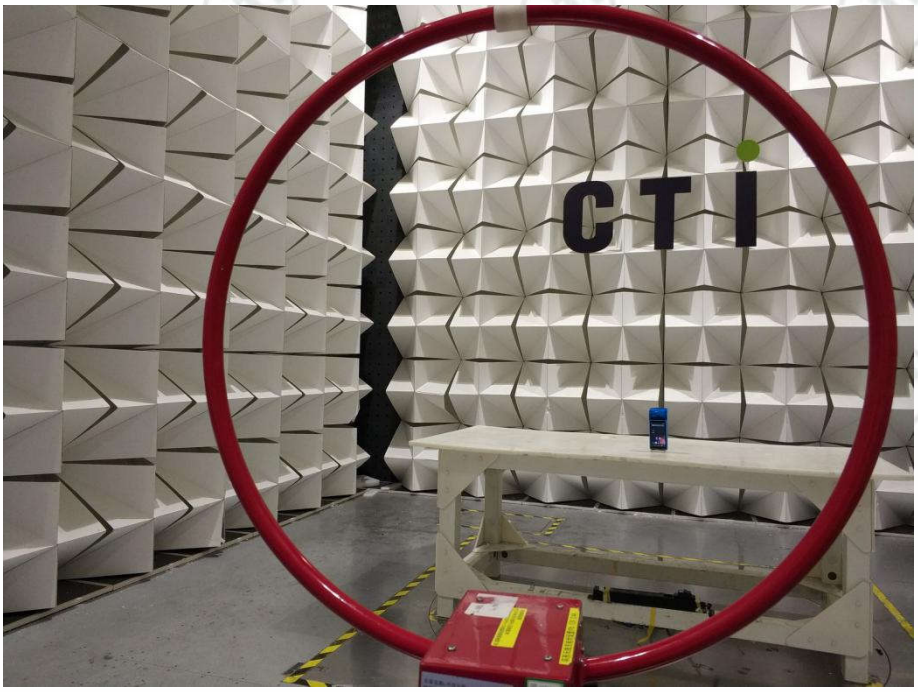
Final Test Level =Receiver Reading -Correct Factor

Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

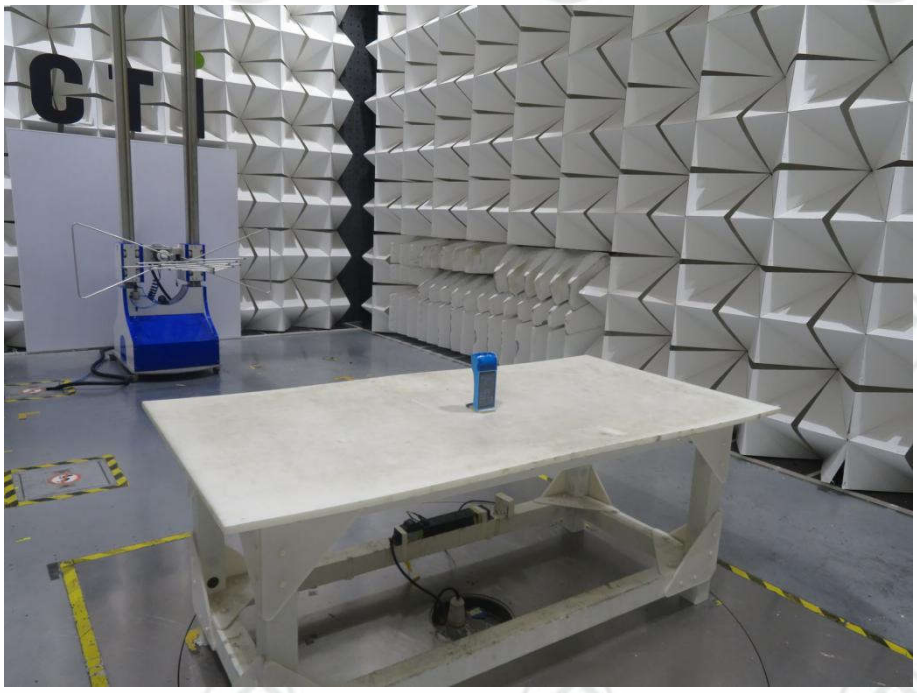
3) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Test model No.: AP02



Radiated spurious emission Test Setup-1(Below 30MHz)



Radiated spurious emission Test Setup-2(Below 1G)

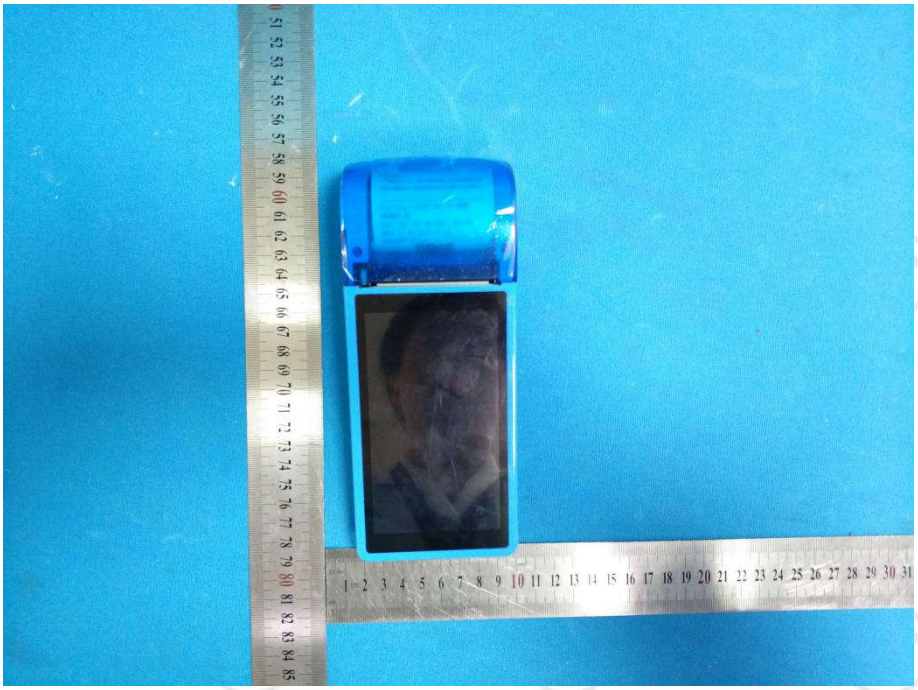
Radiated spurious emission Test Setup-3(Above 1G)

Conducted Emissions Test Setup

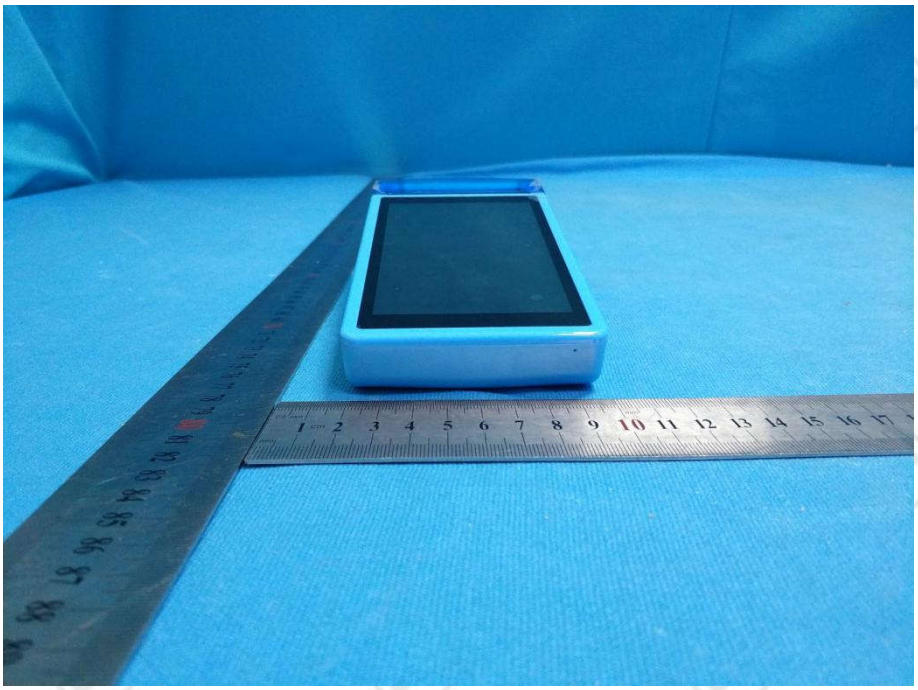
PHOTOGRAPHS OF EUT Constructional Details

Test model No.: AP02

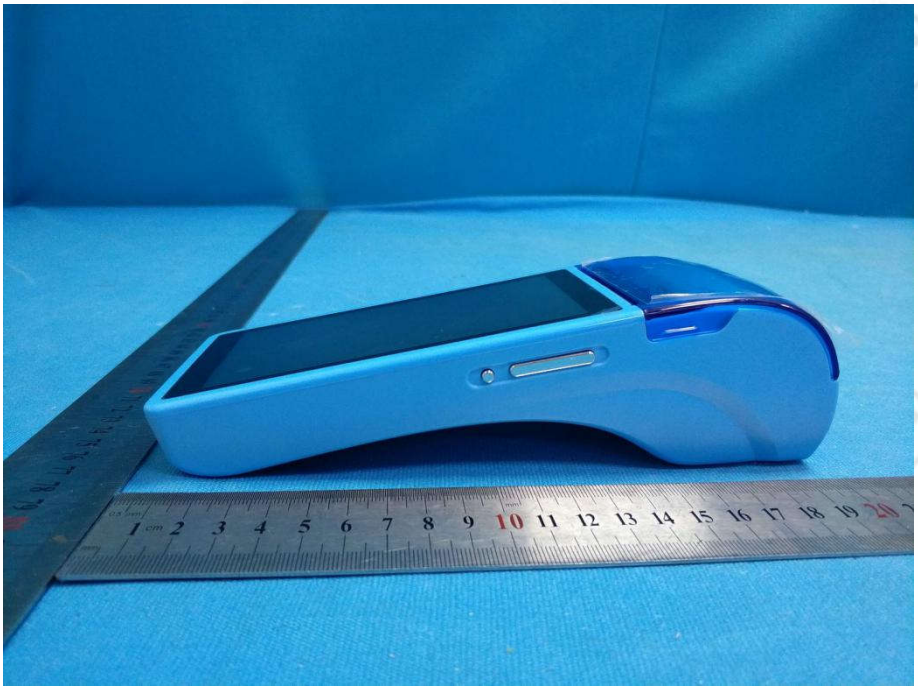
View of Product-1



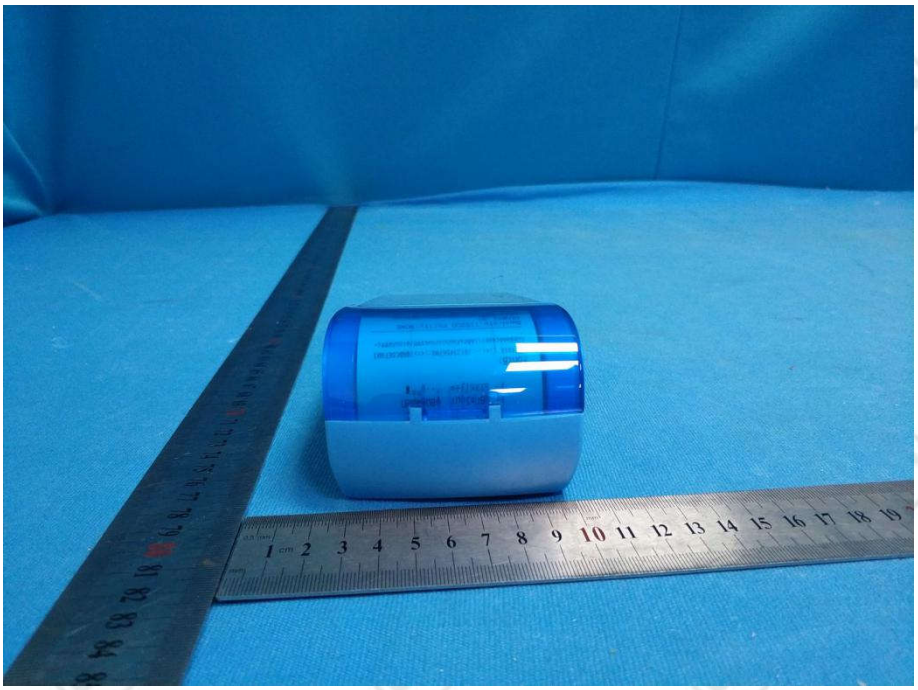
View of Product-2



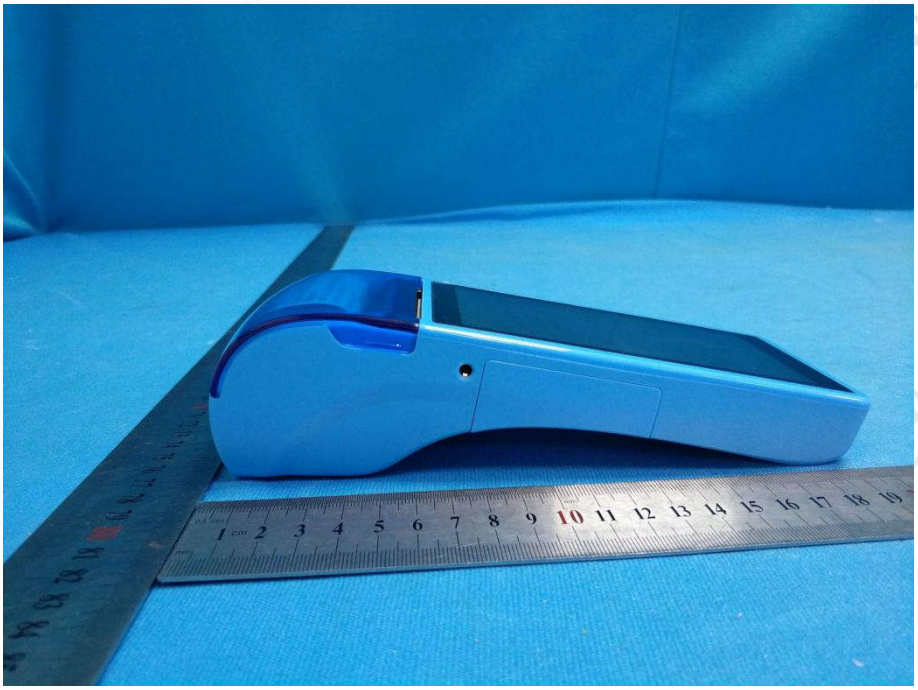
View of Product-3



View of Product-4



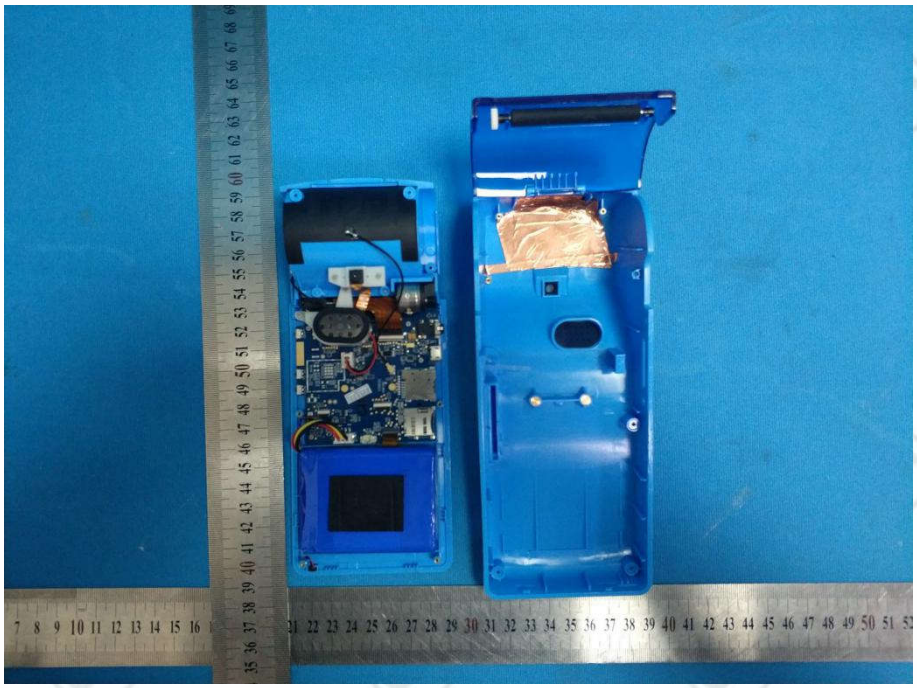
View of Product-5



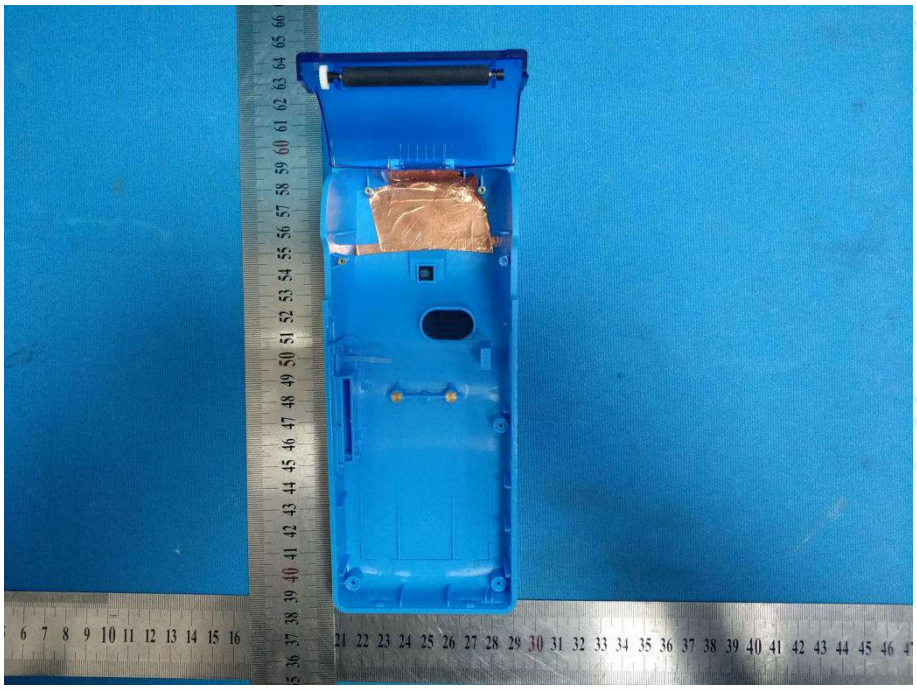
View of Product-6

View of Product-7

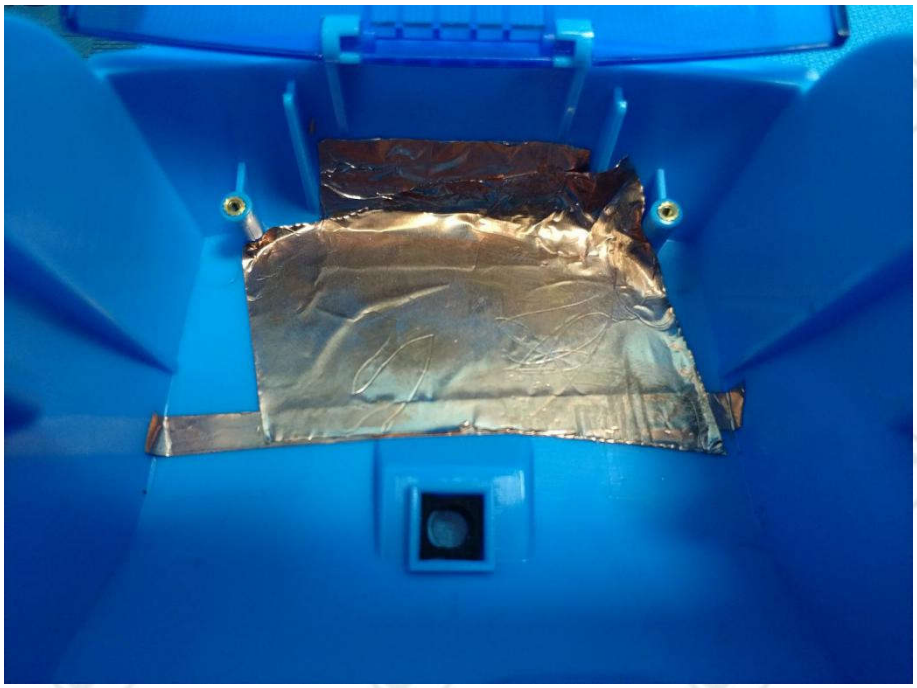
View of Product-8



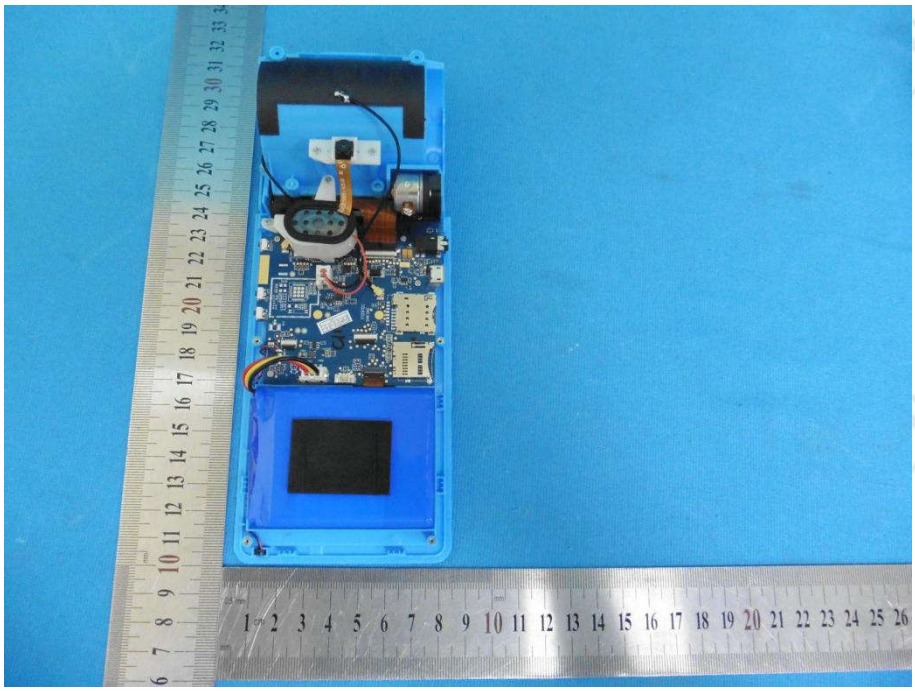
View of Product-9



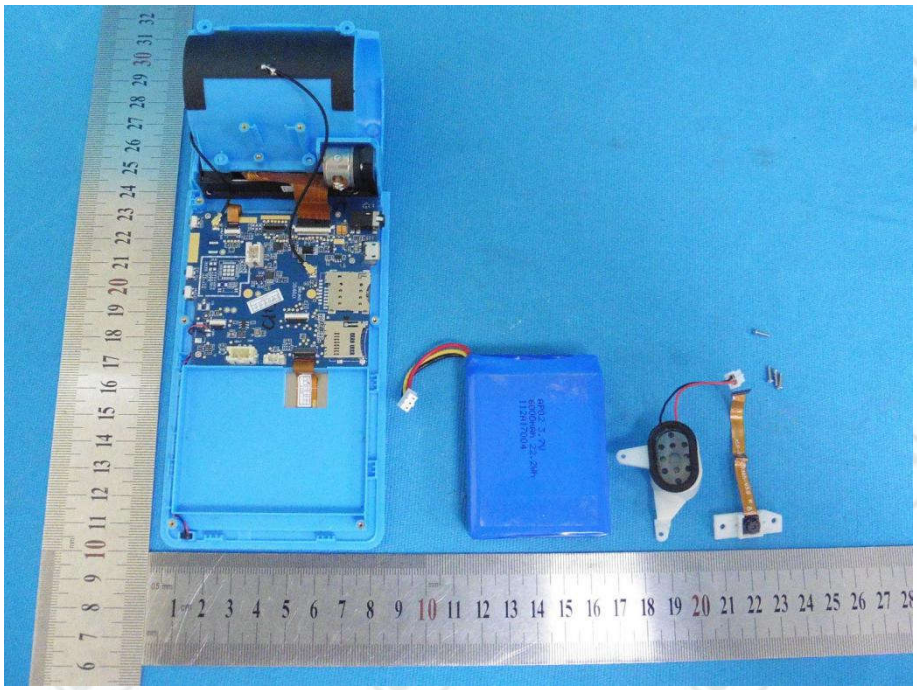
View of Product-10



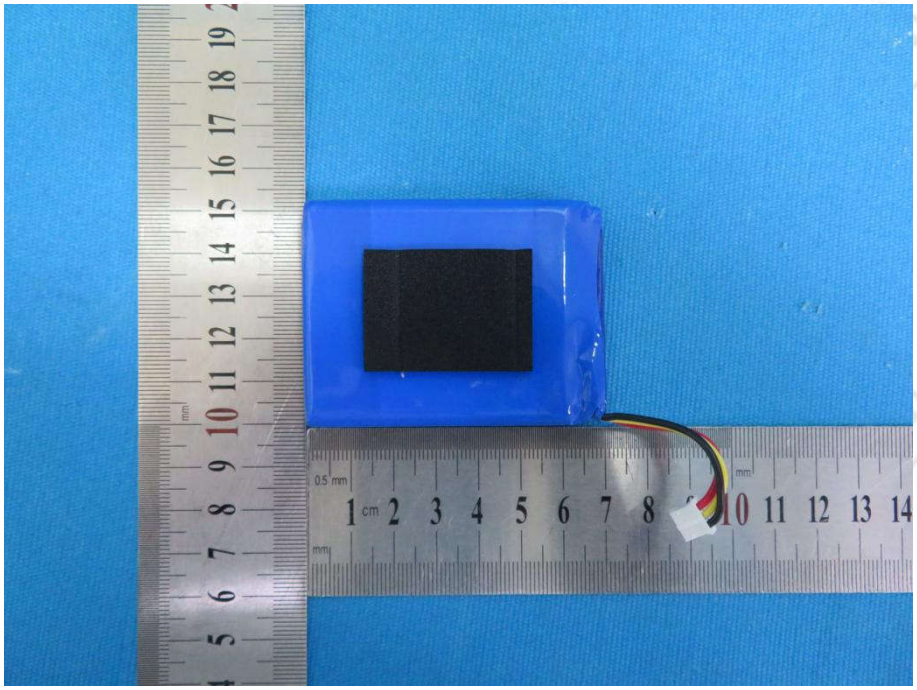
View of Product-11



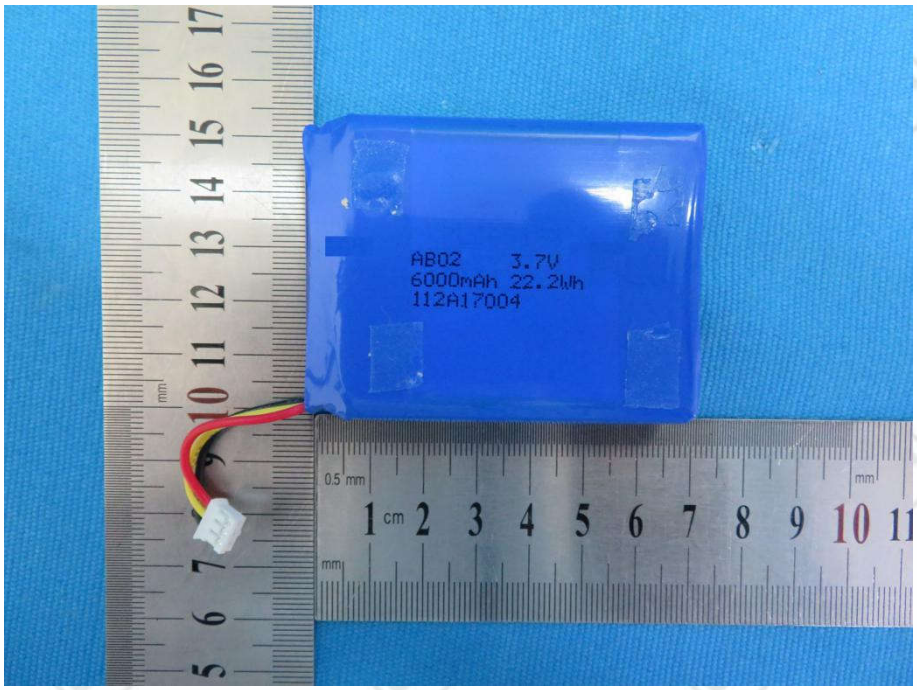
View of Product-12



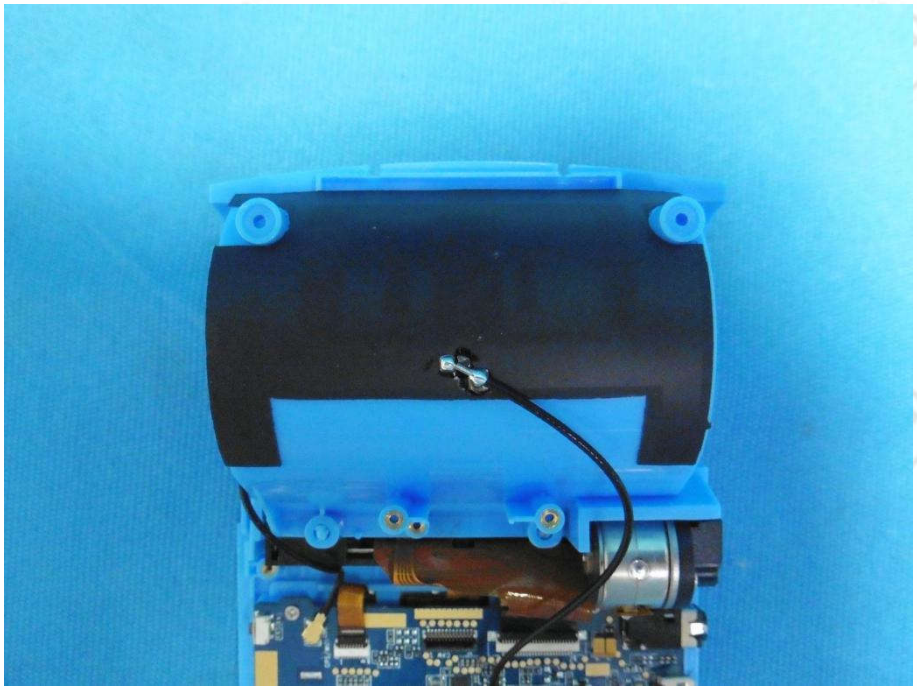
View of Product-13



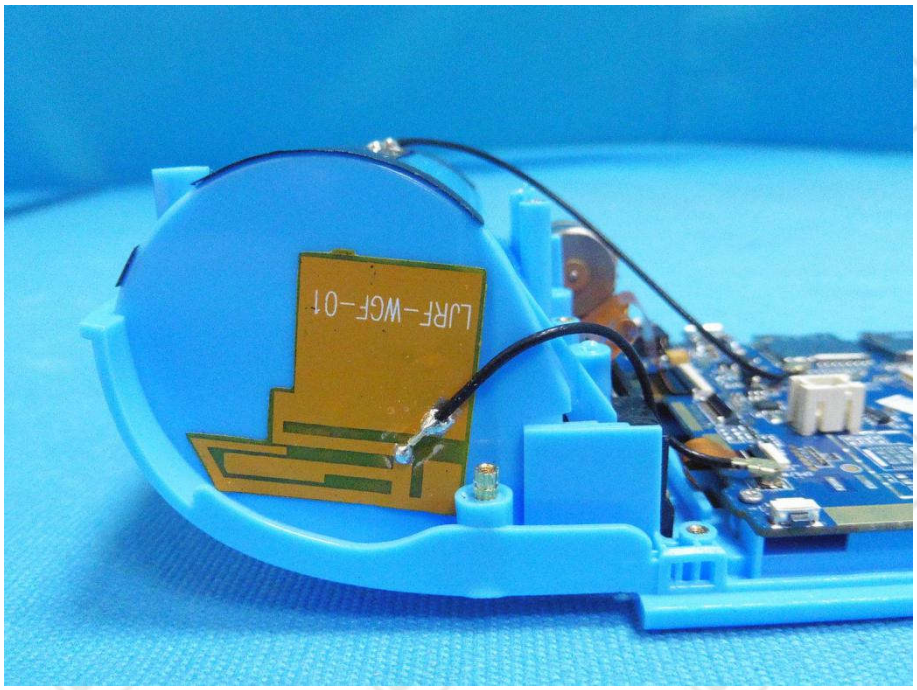
View of Product-14



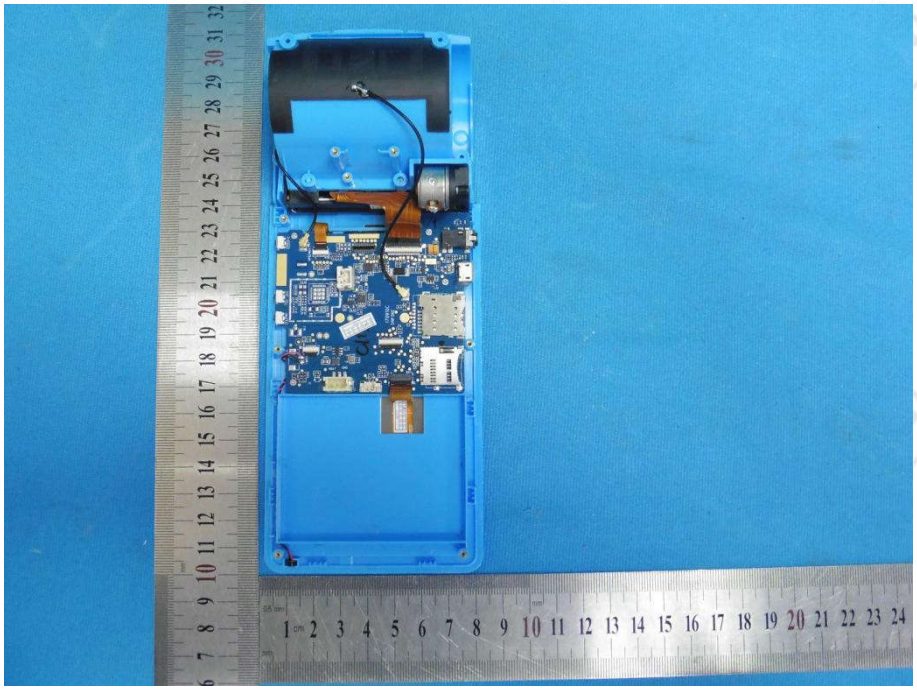
View of Product-15



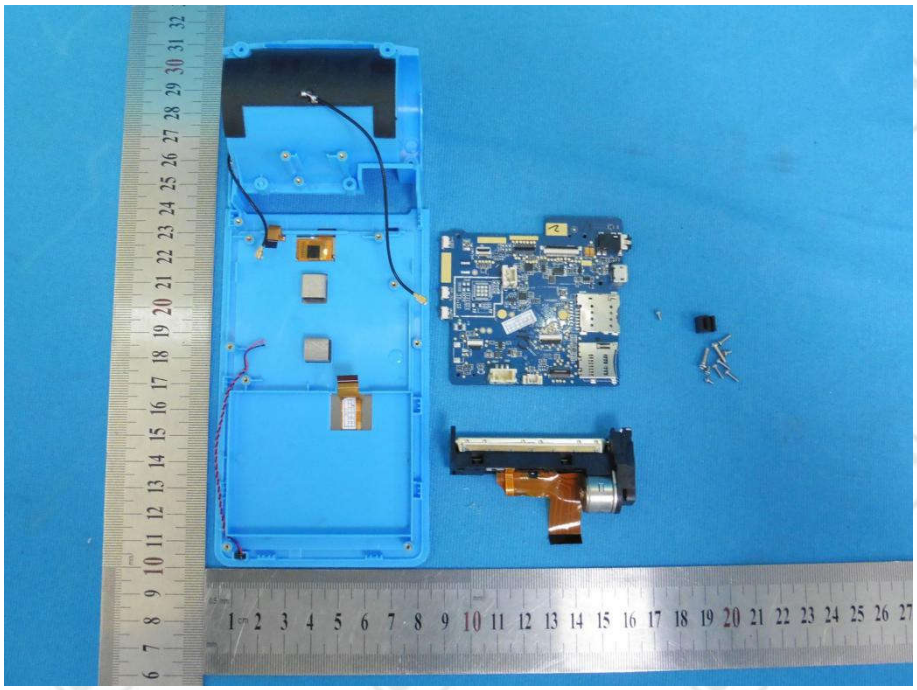
View of Product-16



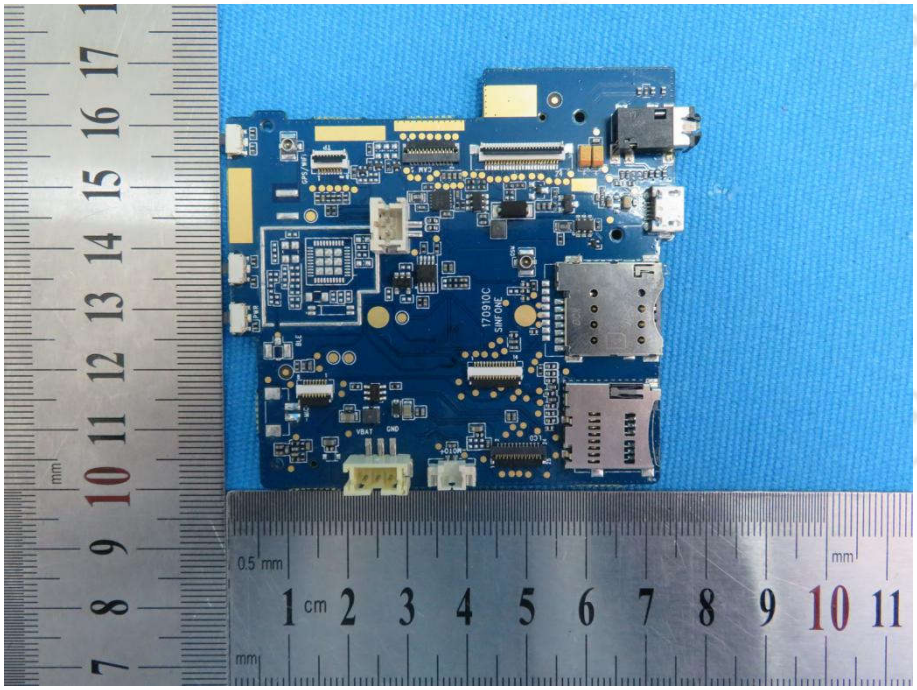
View of Product-17



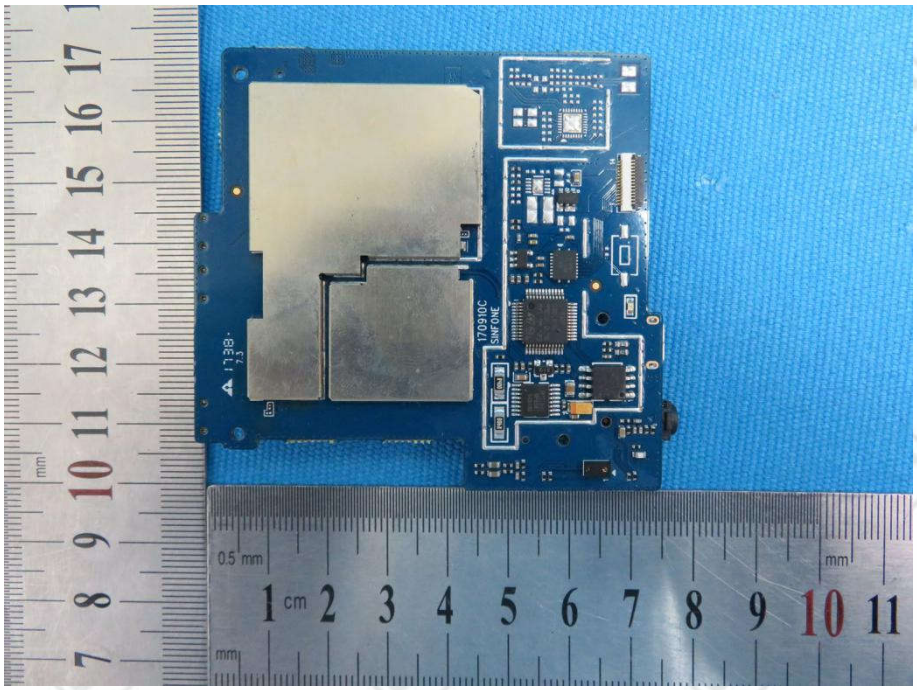
View of Product-18



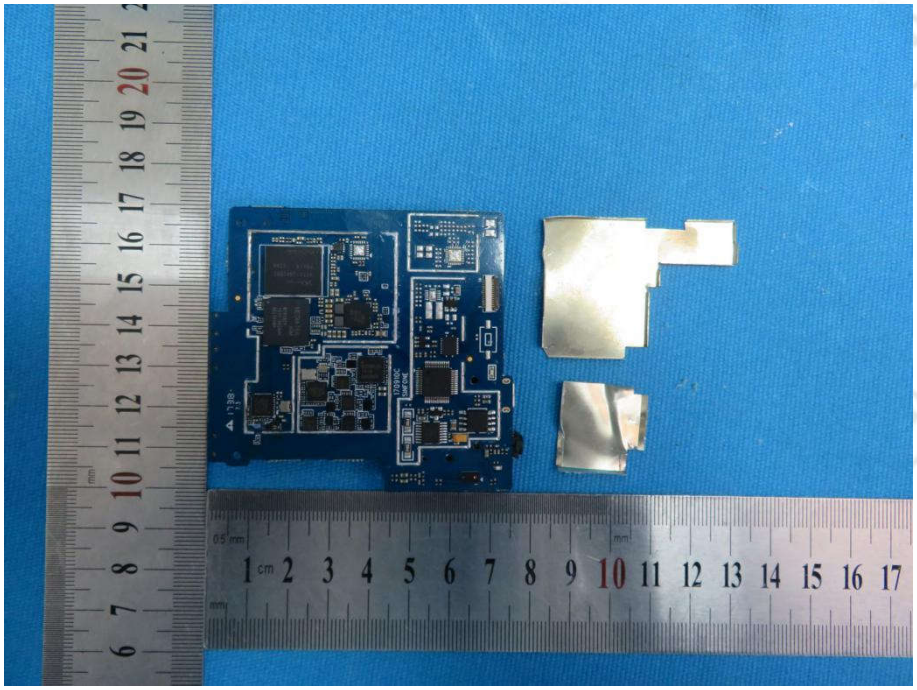
View of Product-19



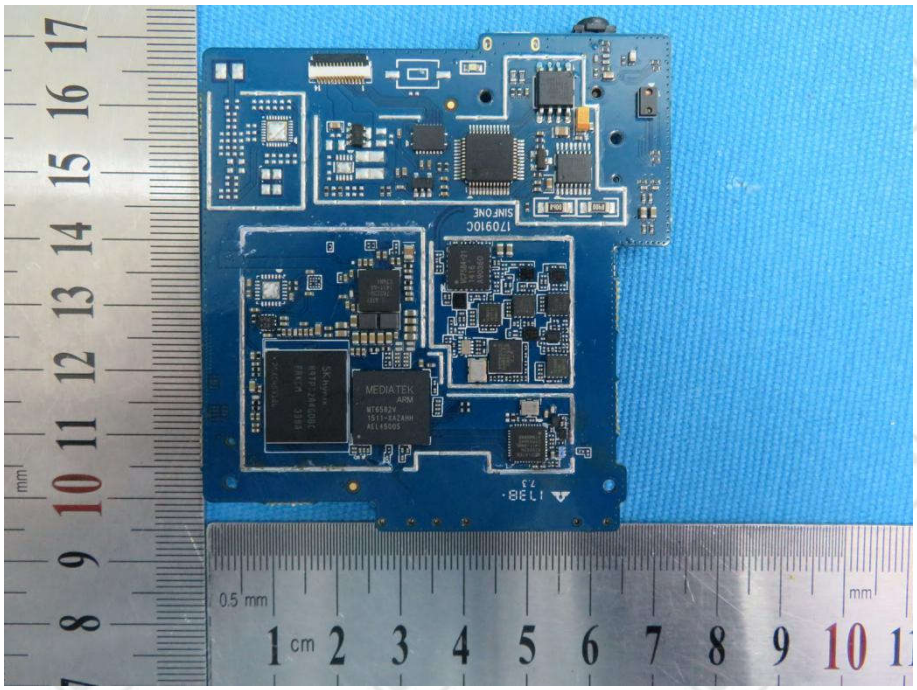
View of Product-20



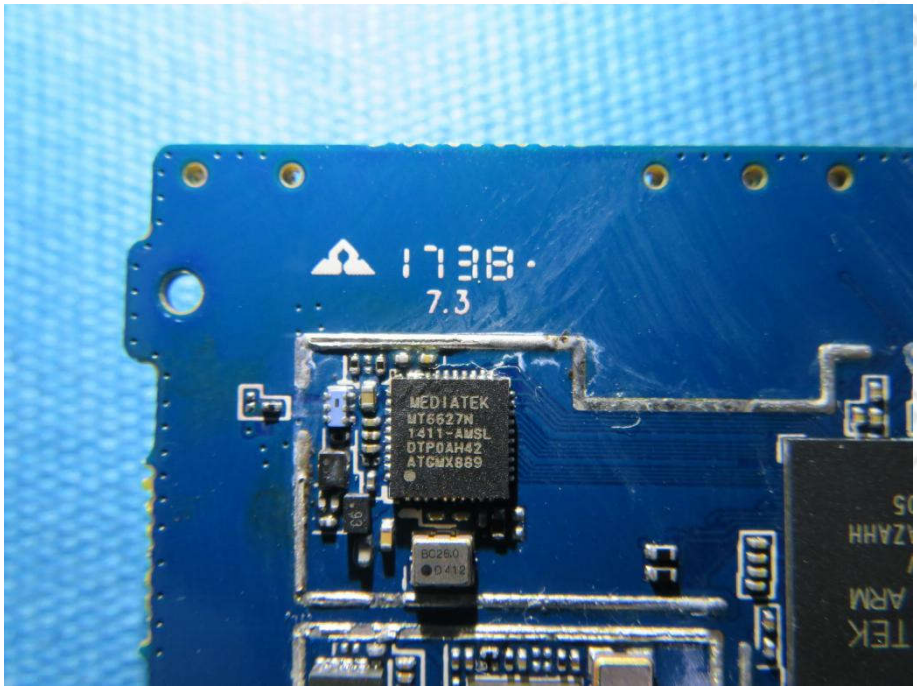
View of Product-21



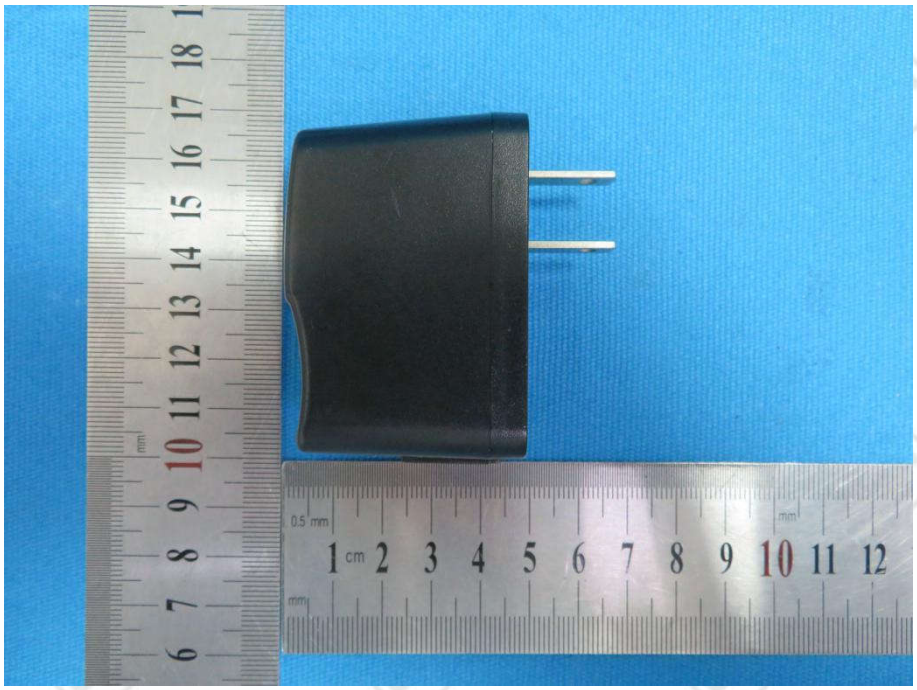
View of Product-22



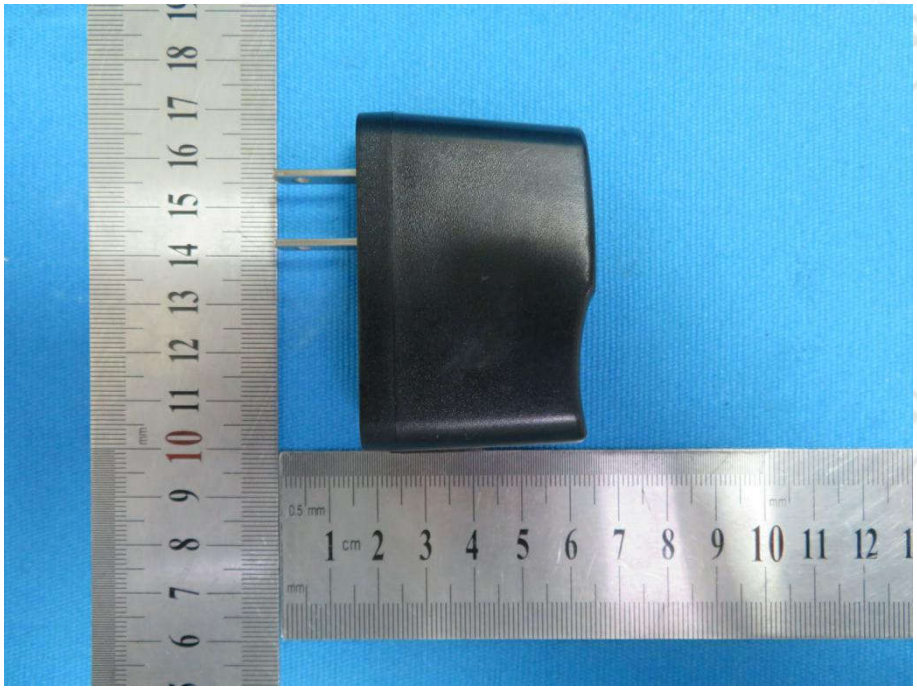
View of Product-23



View of Product-24

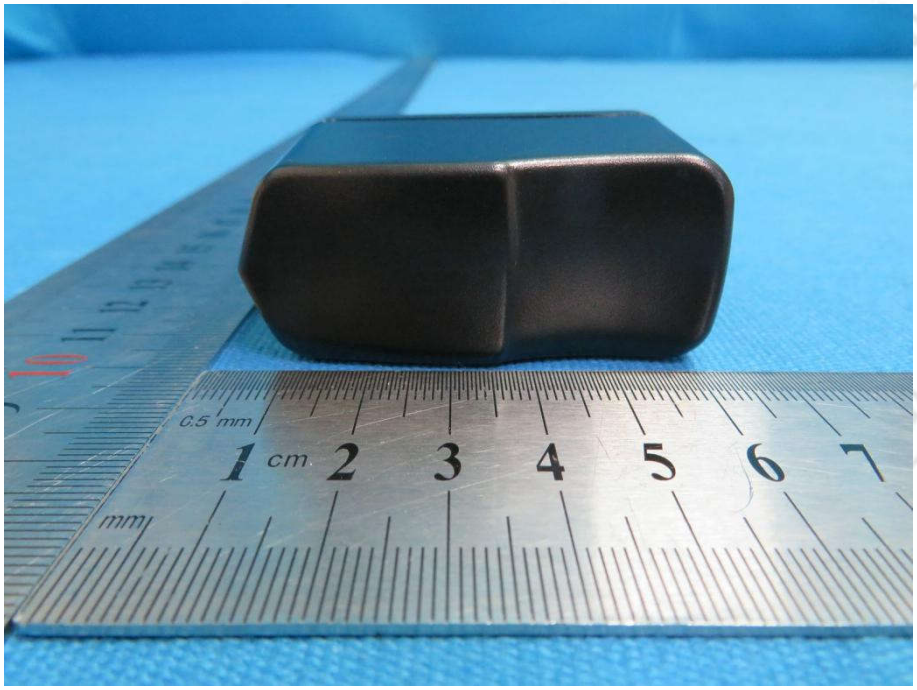


View of Product-25

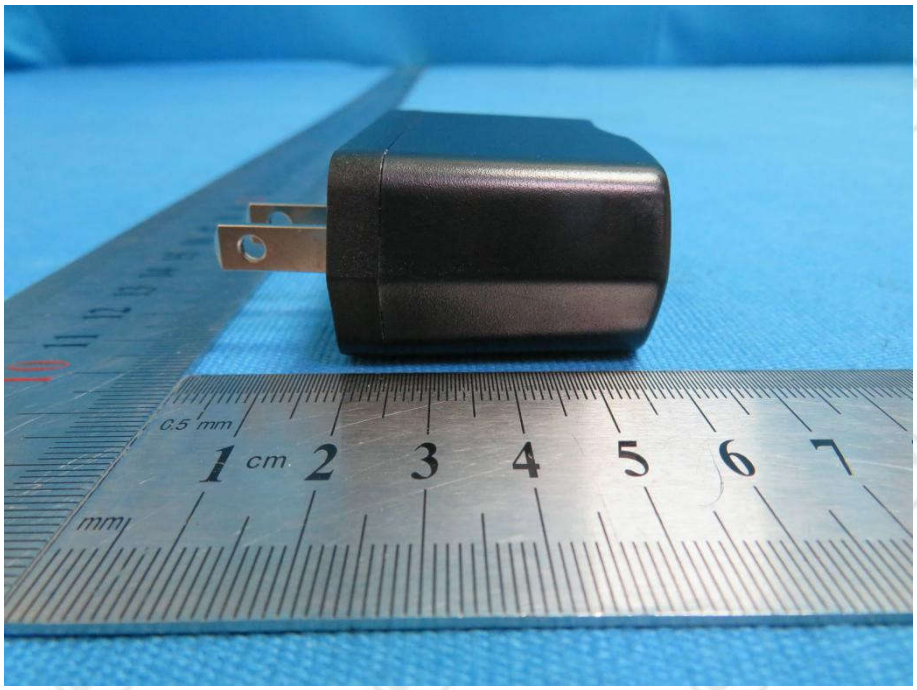


View of Product-26

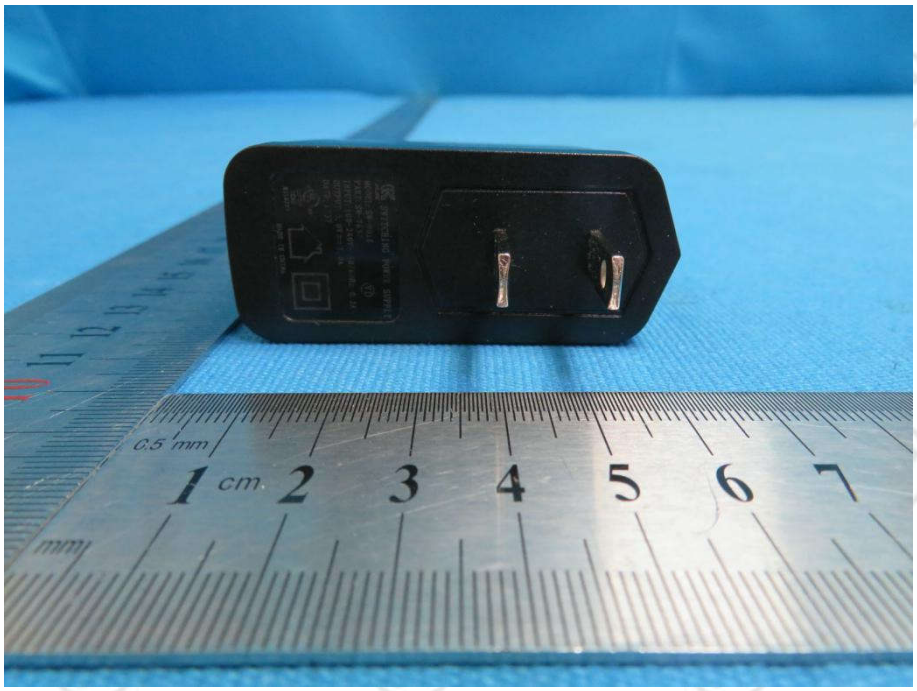
View of Product-27



View of Product-28

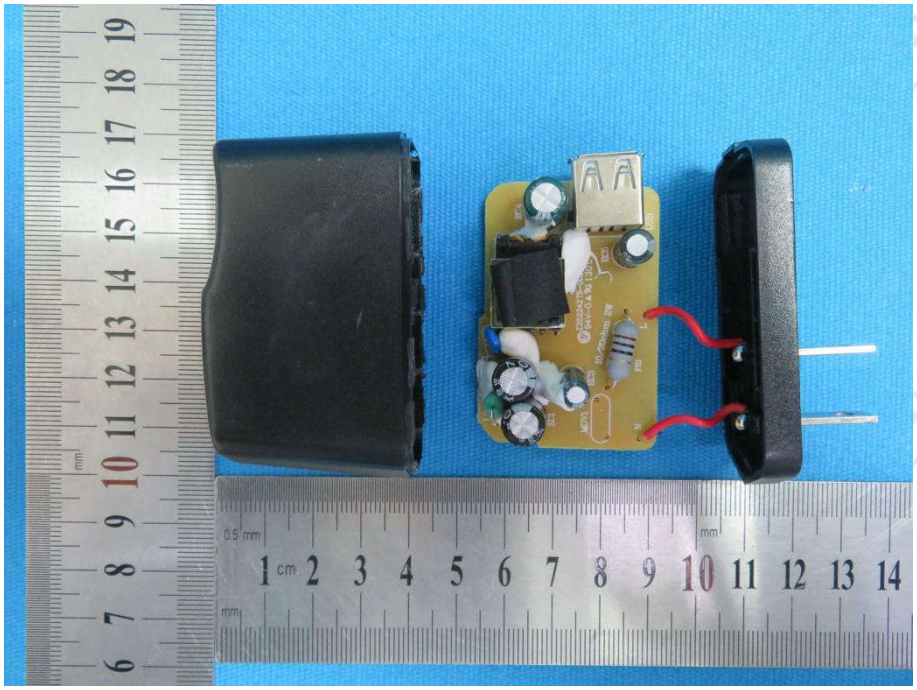


View of Product-29

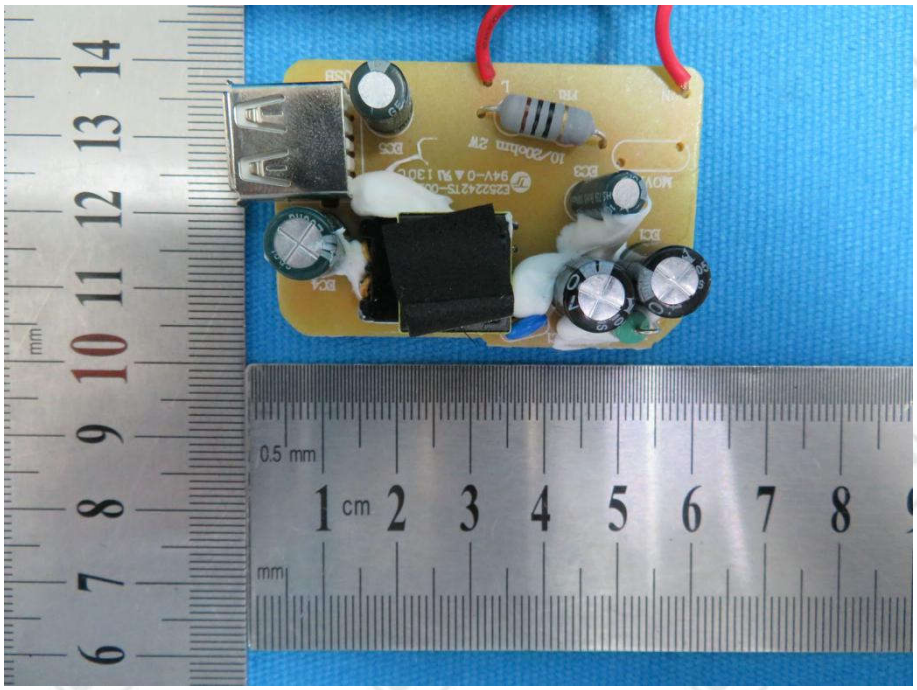


View of Product-30

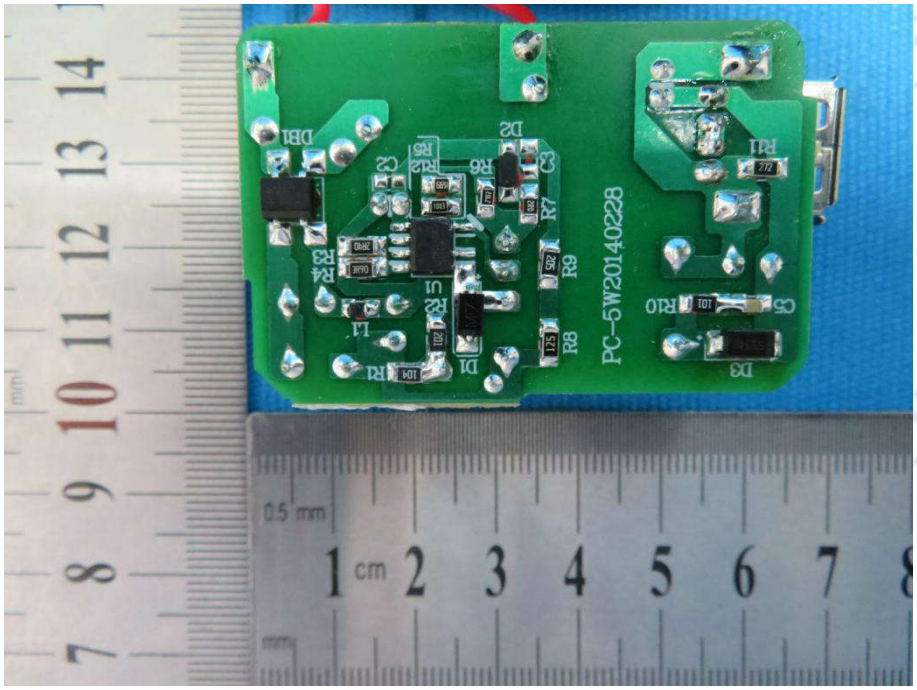
View of Product-31



View of Product-32



View of Product-33



View of Product-34

*** End of Report ***

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