8DPSK_MCH_Graphs		
Pref		
Puw		

8DPSK_HCH_Graphs		
Pref		

Puw		

Keysight Spectrum Analyzer - Swept SA
Center Freq 12.515000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 14/100
Ref Offset 19.05 dB
10 dB/div
Ref 10.00 dBm
Log
Mkr1 23.920 GHz
-44.890 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.387 s (8001 pts)
Frequency
Auto Tune
Center Freq
12.515000000 GHz
Start Freq
30.000000 MHz
Stop Freq
25.000000000 GHz
CF Step
2.497000000 GHz
Auto
Man
Freq Offset
0 Hz

Appendix H): Pseudorandom Frequency Hopping Sequence

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

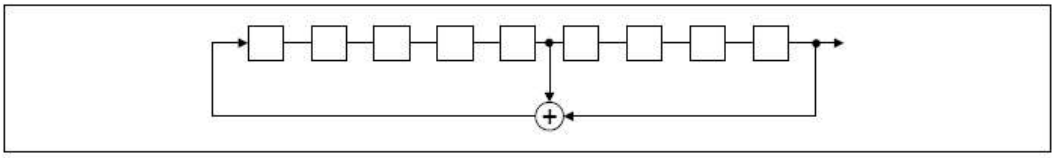
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

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

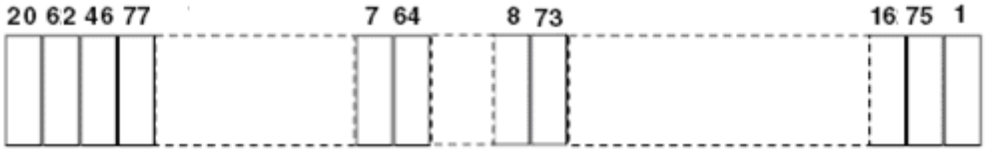
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized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

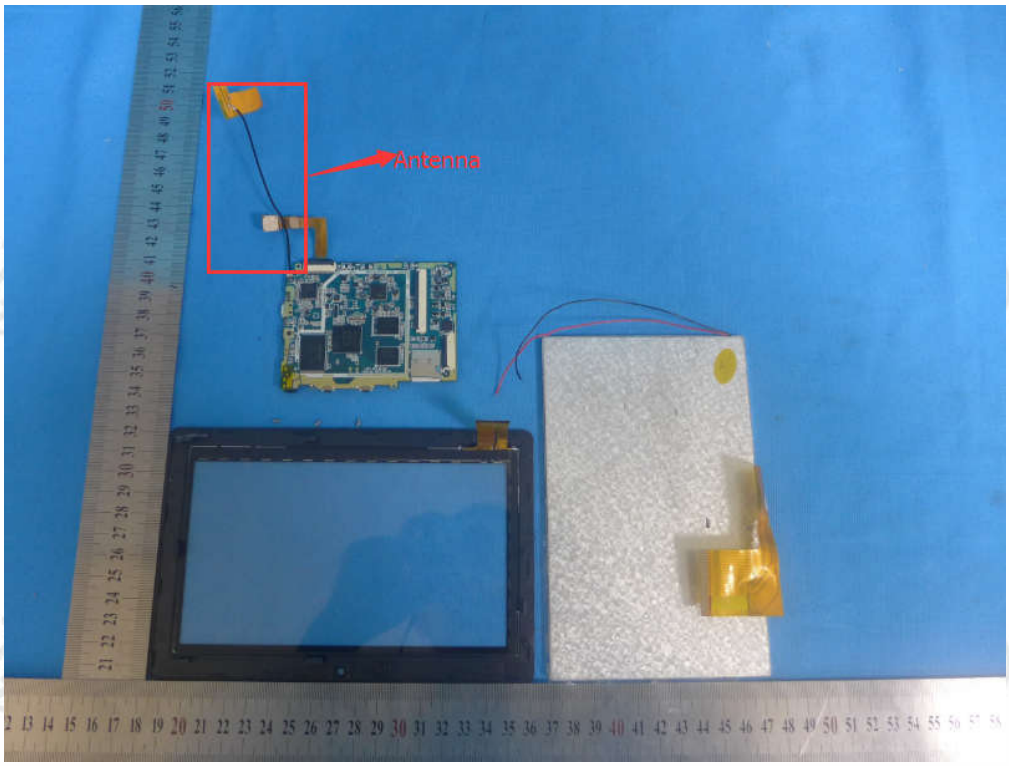
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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 PIFA antenna and no consideration of replacement. The best case gain of the antenna is 0dBi.



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:	

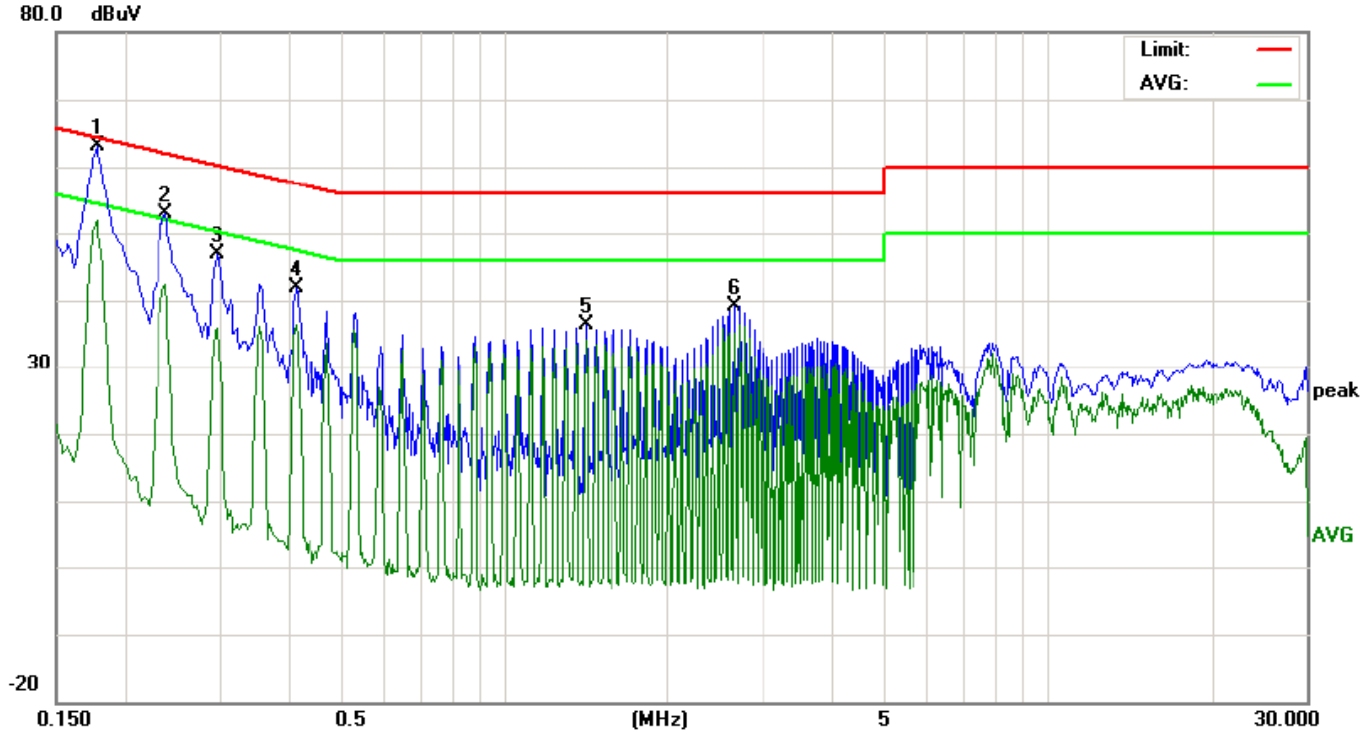
Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* 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.

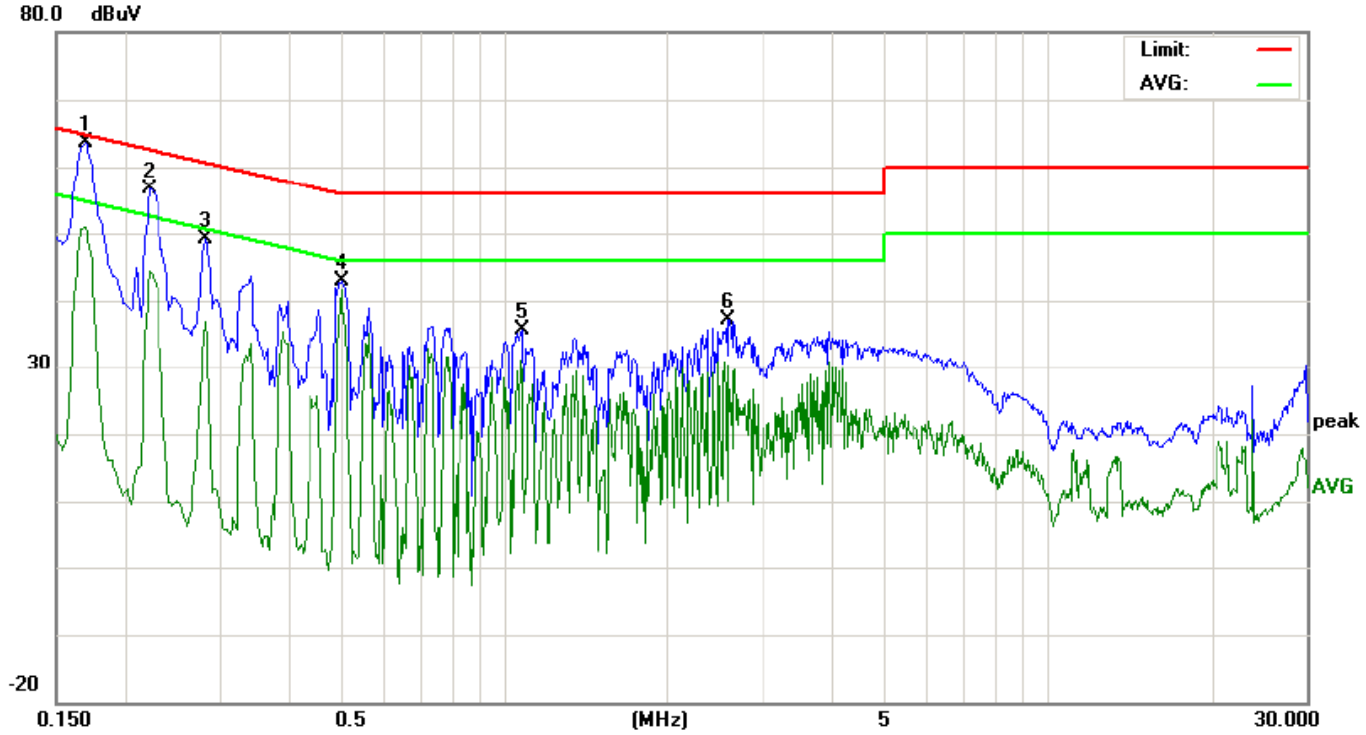
AC 120V/60Hz

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	0.1780	53.28	51.43	38.61	9.80	63.08	61.23	48.41	64.57	54.57	-3.34	-6.16	P	
2	0.2380	43.17		32.55	9.80	52.97		42.35	62.16	52.16	-9.19	-9.81	P	
3	0.2980	37.15		26.16	9.80	46.95		35.96	60.30	50.30	-13.35	-14.34	P	
4	0.4140	31.87		26.48	9.90	41.77		36.38	57.57	47.57	-15.80	-11.19	P	
5	1.4180	26.51		24.19	9.83	36.34		34.02	56.00	46.00	-19.66	-11.98	P	
6	2.6580	29.17		25.16	10.00	39.17		35.16	56.00	46.00	-16.83	-10.84	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	0.1700	53.91	52.01	40.64	9.80	63.71	61.81	50.44	64.96	54.96	-3.15	-4.52	P	
2	0.2220	46.72		34.62	9.80	56.52		44.42	62.74	52.74	-6.22	-8.32	P	
3	0.2819	39.26		27.18	9.80	49.06		36.98	60.76	50.76	-11.70	-13.78	P	
4	0.5060	32.89		28.33	9.90	42.79		38.23	56.00	46.00	-13.21	-7.77	P	
5	1.0780	25.84		19.26	9.72	35.56		28.98	56.00	46.00	-20.44	-17.02	P	
6	2.5900	27.11		20.41	10.00	37.11		30.41	56.00	46.00	-18.89	-15.59	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.

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.

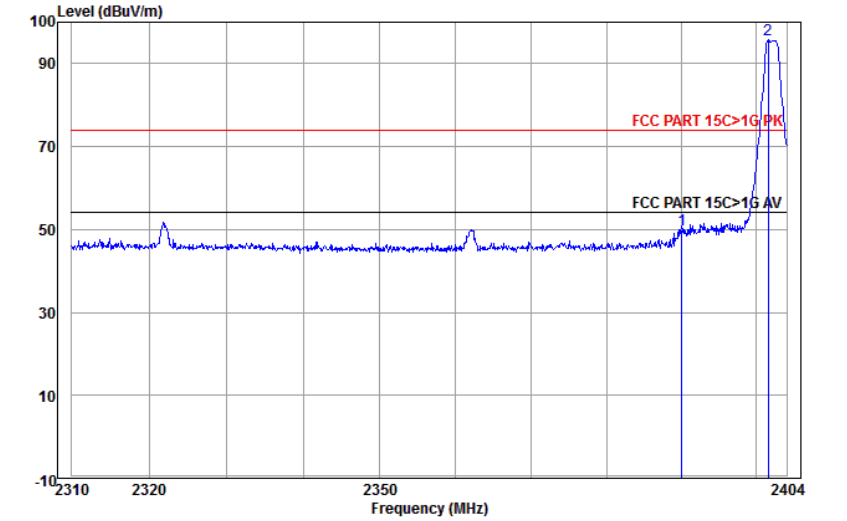
j. Repeat above procedures until all frequencies measured was complete.

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

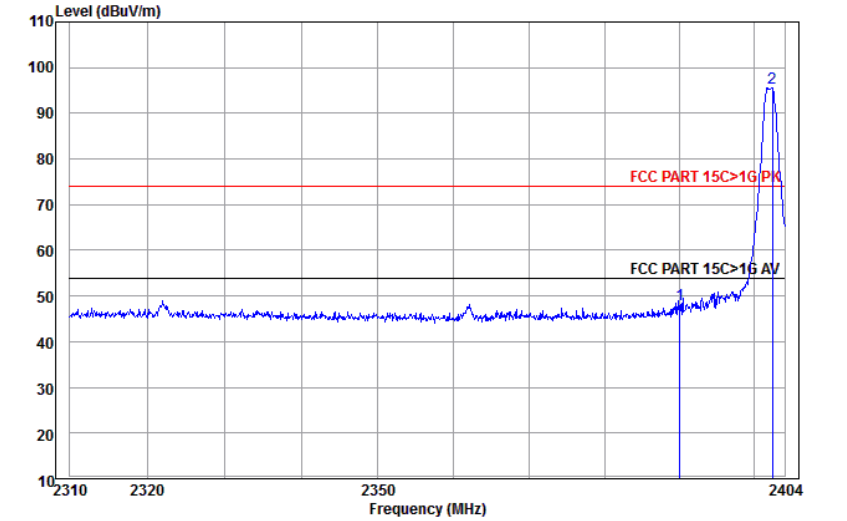
Test plot as follows:

Worse case mode:	GFSK(1-DH5)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



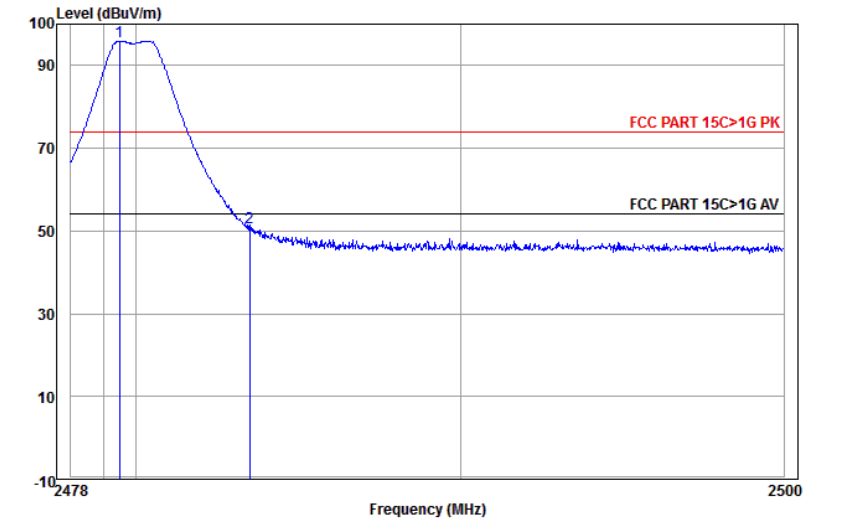
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	47.61	50.03	74.00	-23.97	Horizontal	
2 pp	2401.508	32.56	4.31	34.39	93.30	95.78	74.00	21.78	Horizontal	

Worse case mode:	GFSK(1-DH5)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



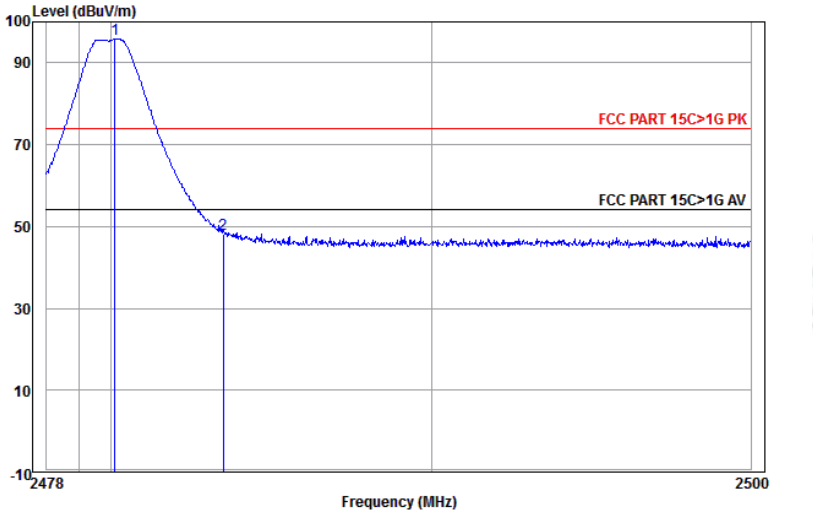
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	45.76	48.18	74.00	-25.82	Vertical	
2 pp	2402.370	32.56	4.31	34.39	93.07	95.55	74.00	21.55	Vertical	

Worse case mode:	GFSK(1-DH5)		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Horizontal	Remark: Peak



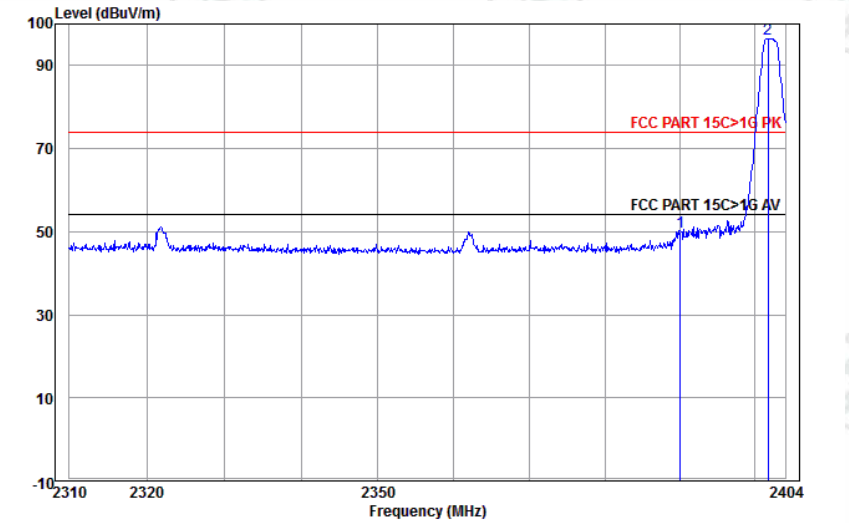
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2479.490	32.71	4.50	34.41	93.05	95.85	74.00	21.85	Horizontal	
2	2483.500	32.71	4.51	34.41	48.16	50.97	74.00	-23.03	Horizontal	

Worse case mode:	GFSK(1-DH5)		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Vertical	Remark: Peak



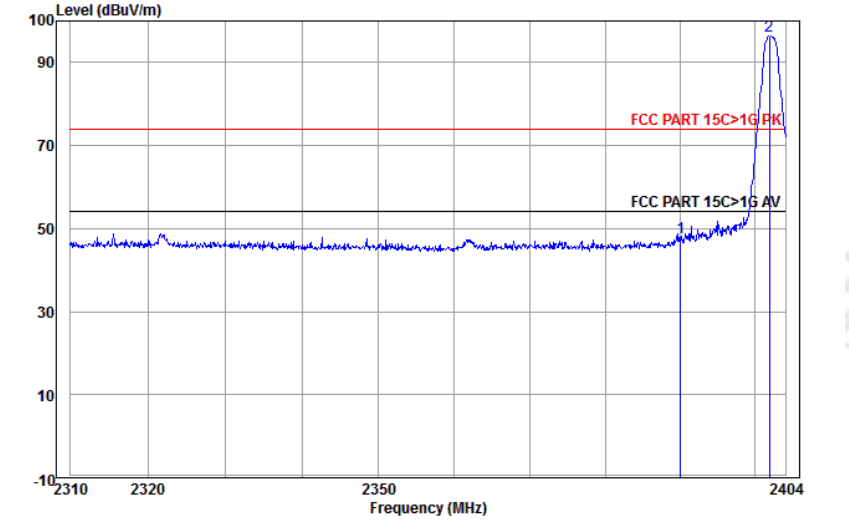
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2480.125	32.71	4.50	34.41	92.95	95.75	74.00	21.75	Vertical	
2	2483.500	32.71	4.51	34.41	45.26	48.07	74.00	-25.93	Vertical	

Worse case mode:	π/4DQPSK(2-DH5)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



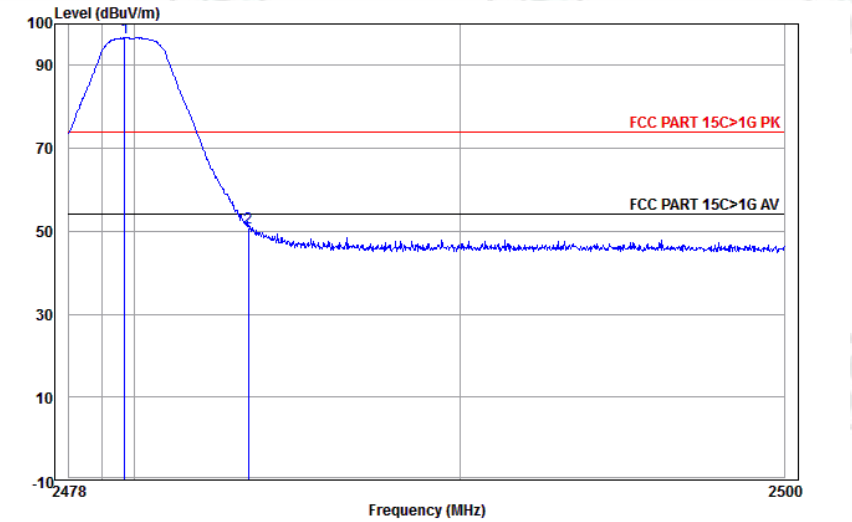
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	47.40	49.82	74.00	-24.18	Horizontal	
2 pp	2401.744	32.56	4.31	34.39	94.05	96.53	74.00	22.53	Horizontal	

Worse case mode:	π/4DQPSK(2-DH5)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



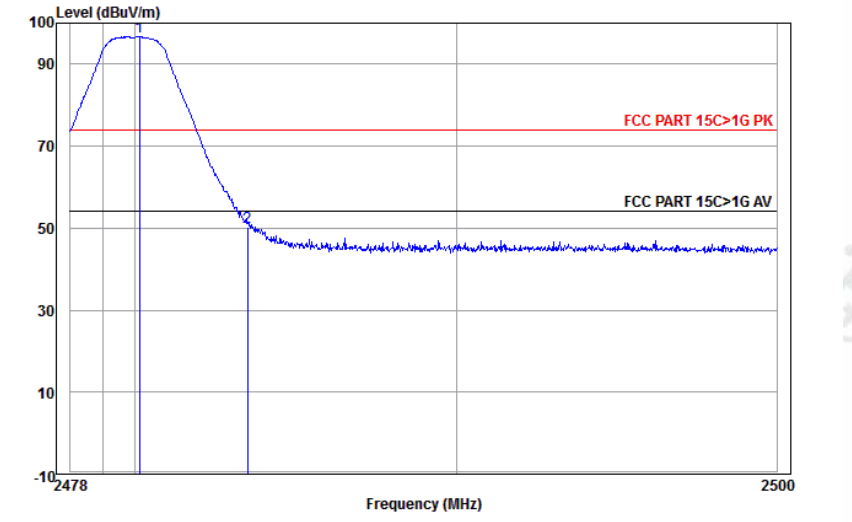
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	45.31	47.73	74.00	-26.27	Vertical	
2 pp	2401.838	32.56	4.31	34.39	93.85	96.33	74.00	22.33	Vertical	

Worse case mode:	π/4DQPSK(2-DH5)		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Horizontal	Remark: Peak



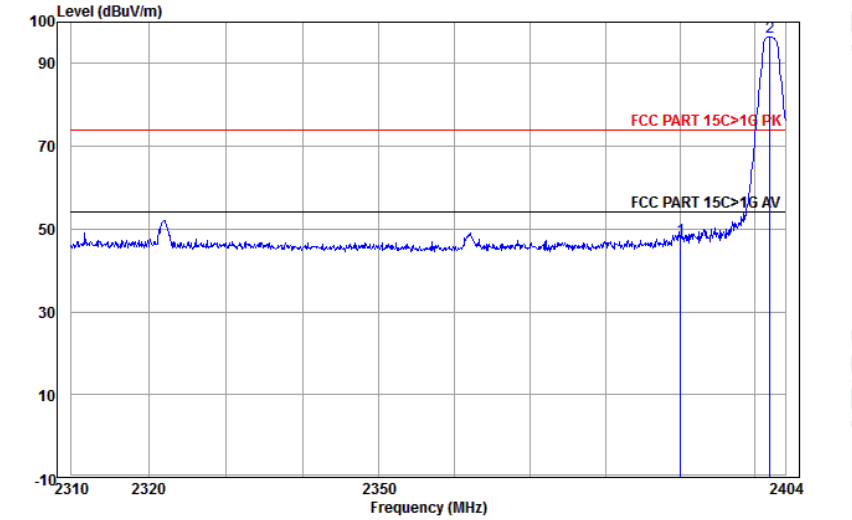
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2479.709	32.71	4.50	34.41	93.95	96.75	74.00	22.75	Horizontal	
2	2483.500	32.71	4.51	34.41	48.10	50.91	74.00	-23.09	Horizontal	

Worse case mode:	π/4DQPSK(2-DH5)		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Vertical	Remark: Peak



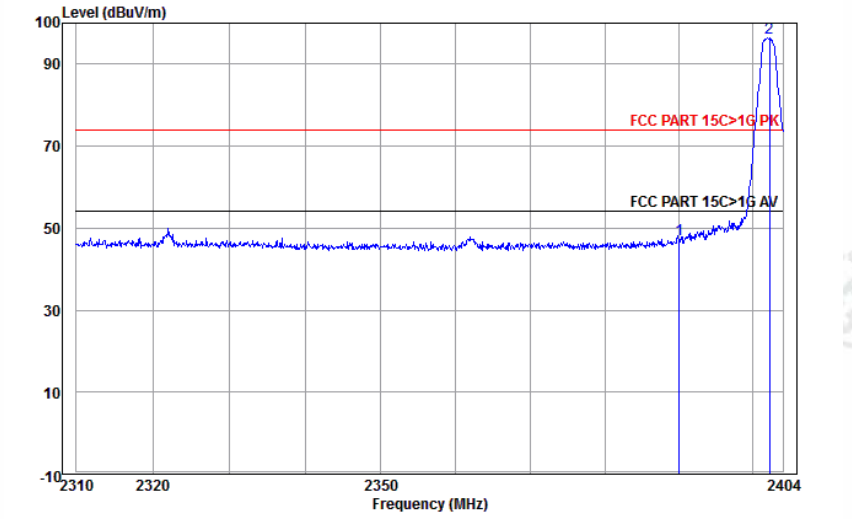
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2480.147	32.71	4.50	34.41	93.84	96.64	74.00	22.64	Vertical	
2	2483.500	32.71	4.51	34.41	47.36	50.17	74.00	-23.83	Vertical	

Worse case mode:	8DPSK(3-DH5)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



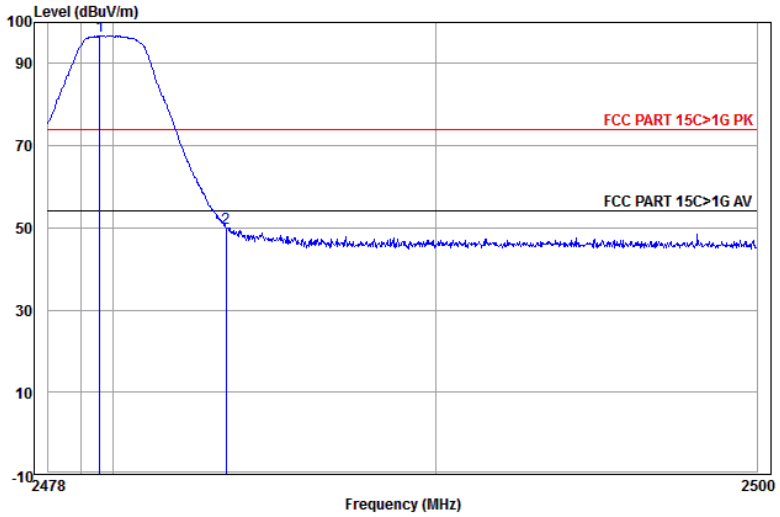
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	45.26	47.68	74.00	-26.32	Horizontal	
2 pp	2401.987	32.56	4.31	34.39	93.89	96.37	74.00	22.37	Horizontal	

Worse case mode:	8DPSK(3-DH5)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



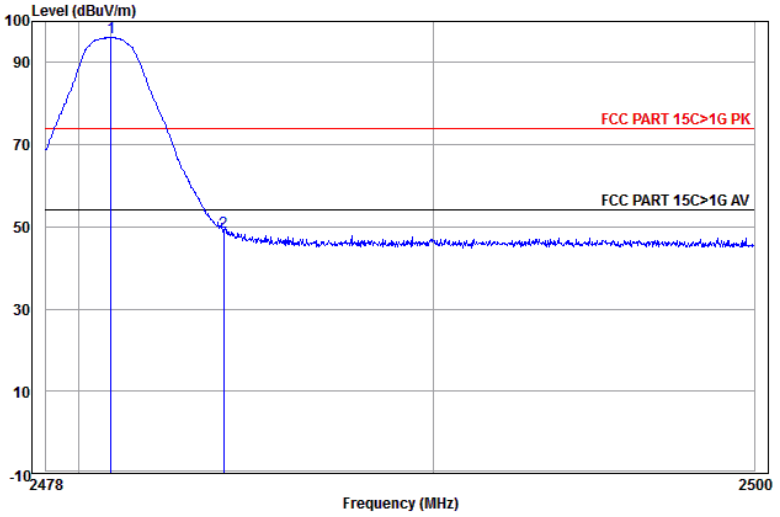
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	44.95	47.37	74.00	-26.63	Vertical	
2 pp	2402.214	32.56	4.31	34.39	93.89	96.37	74.00	22.37	Vertical	

Worse case mode:	8DPSK(3-DH5)		
Frequency: 2483.5MHz	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	2479.584	32.71	4.50	34.41	93.92	96.72	74.00	22.72	Horizontal	
2	2483.500	32.71	4.51	34.41	47.28	50.09	74.00	-23.91	Horizontal	

Worse case mode:	8DPSK(3-DH5)		
Frequency: 2483.5MHz	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	2480.002	32.71	4.50	34.41	93.30	96.10	74.00	22.10	Vertical	
2	2483.500	32.71	4.51	34.41	45.95	48.76	74.00	-25.24	Vertical	

Note:

1) Pre-scan transmitting 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 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:

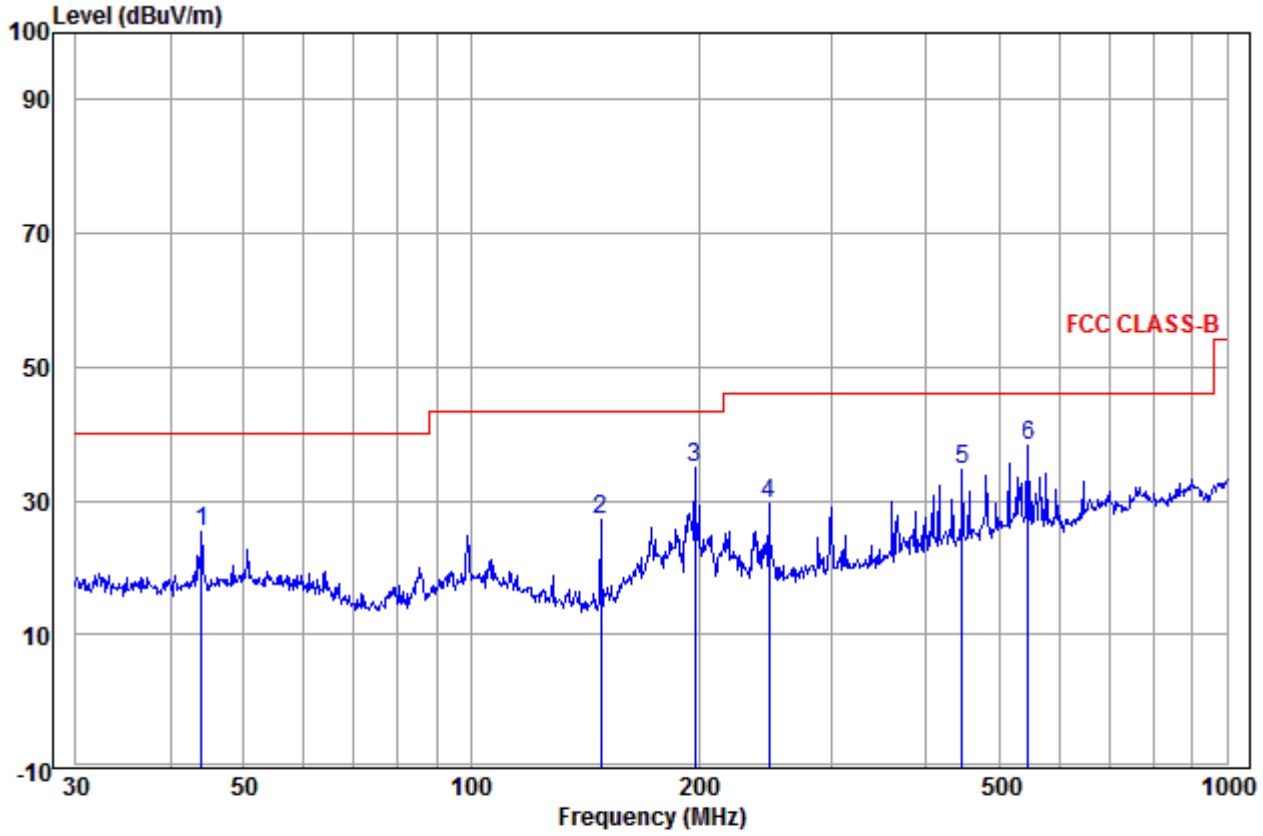
Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz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

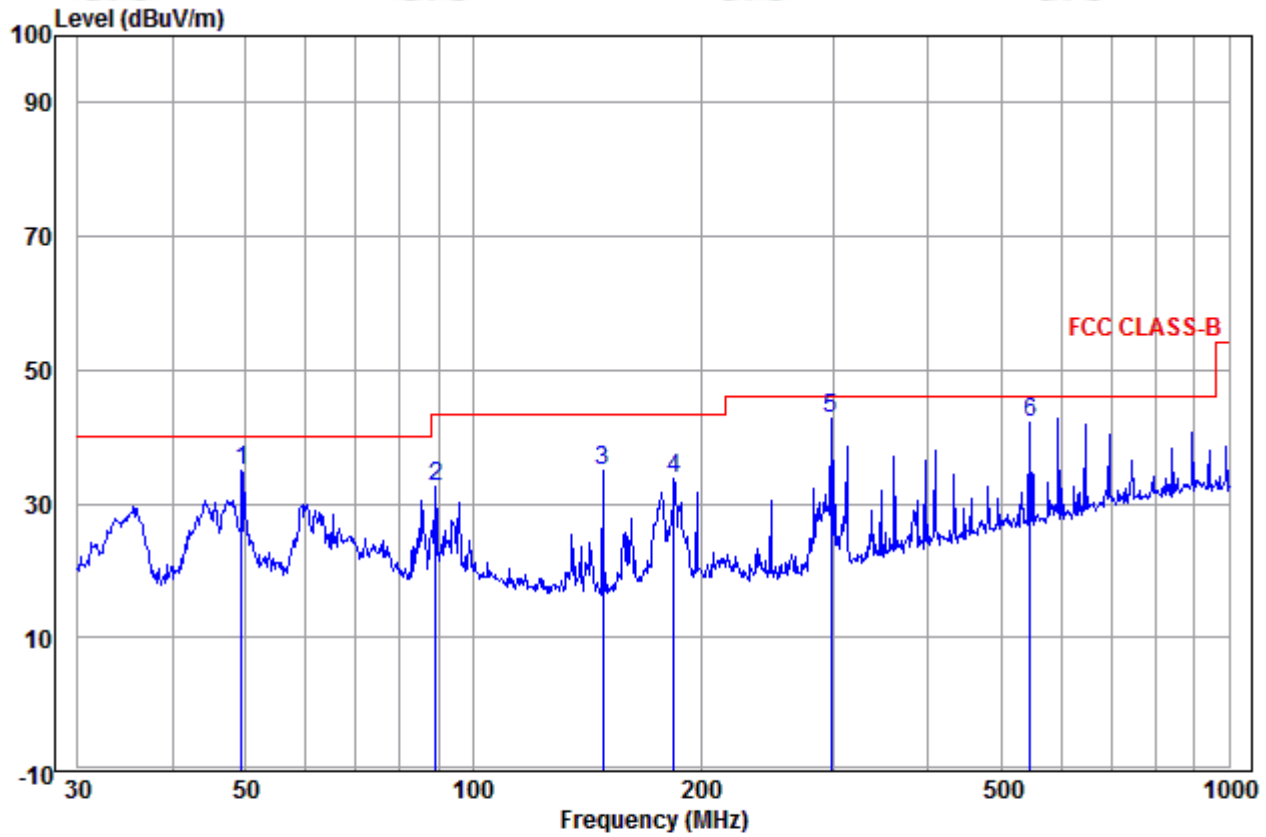
Radiated Emission below 1GHz

30MHz~1GHz (QP)		
Test mode:	Transmitting	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	43.966	14.58	0.90	9.89	25.37	40.00	-14.63	Horizontal	
2	148.441	9.79	1.58	15.93	27.30	43.50	-16.20	Horizontal	
3	197.893	11.53	2.19	21.22	34.94	43.50	-8.56	Horizontal	
4	247.682	12.37	2.34	14.72	29.43	46.00	-16.57	Horizontal	
5	446.414	17.05	2.98	14.59	34.62	46.00	-11.38	Horizontal	
6 pp	545.183	18.58	3.20	16.47	38.25	46.00	-7.75	Horizontal	

Test mode:	Transmitting	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	49.359	15.05	1.35	18.60	35.00	40.00	-5.00	Vertical	
2	89.276	11.02	1.59	20.08	32.69	43.50	-10.81	Vertical	
3	148.441	9.79	1.58	23.44	34.81	43.50	-8.69	Vertical	
4	184.490	11.07	2.03	20.57	33.67	43.50	-9.83	Vertical	
5 pp	297.224	13.44	2.38	26.91	42.73	46.00	-3.27	Vertical	
6	545.183	18.58	3.20	20.40	42.18	46.00	-3.82	Vertical	

Transmitter Emission above 1GHz

Worse case mode:		GFSK(1-DH5)		Test channel:		Lowest	Remark: Peak		
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
1198.095	30.22	2.51	34.97	48.53	46.29	74.00	-27.71	Pass	H
1918.716	31.58	3.17	34.35	45.21	45.61	74.00	-28.39	Pass	H
4804.000	34.69	5.11	34.35	42.30	47.75	74.00	-26.25	Pass	H
5718.399	35.69	6.80	34.30	41.40	49.59	74.00	-24.41	Pass	H
7206.000	36.42	6.66	34.90	39.23	47.41	74.00	-26.59	Pass	H
9608.000	37.88	7.73	35.08	37.73	48.26	74.00	-25.74	Pass	H
1238.405	30.32	2.56	34.92	45.94	43.90	74.00	-30.10	Pass	V
1680.831	31.20	2.99	34.53	44.46	44.12	74.00	-29.88	Pass	V
4804.000	34.69	5.11	34.35	40.12	45.57	74.00	-28.43	Pass	V
4809.499	34.70	5.11	34.35	40.41	45.87	74.00	-28.13	Pass	V
5747.586	35.71	6.87	34.30	41.20	49.48	74.00	-24.52	Pass	V
9608.000	37.88	7.73	35.08	38.68	49.21	74.00	-24.79	Pass	V

Worse case mode:		GFSK(1-DH5)		Test channel:		Middle	Remark: Peak		
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
1198.095	30.22	2.51	34.97	46.97	44.73	74.00	-29.27	Pass	H
1597.401	31.05	2.92	34.59	44.69	44.07	74.00	-29.93	Pass	H
4882.000	34.85	5.08	34.33	45.60	51.20	74.00	-22.80	Pass	H
6032.401	35.92	7.40	34.32	40.35	49.35	74.00	-24.65	Pass	H
7323.000	36.43	6.77	34.90	38.24	46.54	74.00	-27.46	Pass	H
9764.000	38.05	7.60	35.05	36.56	47.16	74.00	-26.84	Pass	H
1198.095	30.22	2.51	34.97	49.82	47.58	74.00	-26.42	Pass	V
1842.139	31.46	3.11	34.41	45.29	45.45	74.00	-28.55	Pass	V
4882.000	34.85	5.08	34.33	41.23	46.83	74.00	-27.17	Pass	V
5865.832	35.80	7.13	34.30	40.23	48.86	74.00	-25.14	Pass	V
7323.000	36.43	6.77	34.90	37.33	45.63	74.00	-28.37	Pass	V
9764.000	38.05	7.60	35.05	36.84	47.44	74.00	-26.56	Pass	V

Worse case mode:		GFSK(1-DH5)		Test channel:		Highest	Remark: Peak		
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	2.54	34.94	45.81	43.68	74.00	-30.32	Pass	H
1899.278	31.55	3.16	34.37	46.65	46.99	74.00	-27.01	Pass	H
4960.000	35.02	5.05	34.31	40.13	45.89	74.00	-28.11	Pass	H
6331.329	36.07	7.10	34.51	40.55	49.21	74.00	-24.79	Pass	H
7440.000	36.45	6.88	34.90	37.86	46.29	74.00	-27.71	Pass	H
9920.000	38.22	7.47	35.02	38.11	48.78	74.00	-25.22	Pass	H
1257.465	30.36	2.58	34.90	46.21	44.25	74.00	-29.75	Pass	V
1719.783	31.26	3.02	34.50	43.55	43.33	74.00	-30.67	Pass	V
4960.000	35.02	5.05	34.31	40.14	45.90	74.00	-28.10	Pass	V
5821.207	35.77	7.03	34.30	38.68	47.18	74.00	-26.82	Pass	V
7440.000	36.45	6.88	34.90	38.60	47.03	74.00	-26.97	Pass	V
9920.000	38.22	7.47	35.02	37.21	47.88	74.00	-26.12	Pass	V

Worse case mode:		π/4DQPSK(2-DH5)		Test channel:		Lowest	Remark: Peak		
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	2.52	34.96	45.80	43.59	74.00	-30.41	Pass	H
1865.735	31.50	3.13	34.39	44.57	44.81	74.00	-29.19	Pass	H
4804.000	34.69	5.11	34.35	44.27	49.72	74.00	-24.28	Pass	H
5895.771	35.82	7.20	34.30	40.27	48.99	74.00	-25.01	Pass	H
7206.000	36.42	6.66	34.90	39.33	47.51	74.00	-26.49	Pass	H
9608.000	37.88	7.73	35.08	37.93	48.46	74.00	-25.54	Pass	H
1198.095	30.22	2.51	34.97	48.99	46.75	74.00	-27.25	Pass	V
3805.334	32.94	5.47	34.58	44.01	47.84	74.00	-26.16	Pass	V
4804.000	34.69	5.11	34.35	41.07	46.52	74.00	-27.48	Pass	V
6331.329	36.07	7.10	34.51	40.86	49.52	74.00	-24.48	Pass	V
7206.000	36.42	6.66	34.90	37.99	46.17	74.00	-27.83	Pass	V
9608.000	37.88	7.73	35.08	37.27	47.80	74.00	-26.20	Pass	V

Worse case mode:		π/4DQPSK(2-DH5)		Test channel:		Middle	Remark: Peak		
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
1257.465	30.36	2.58	34.90	45.79	43.83	74.00	-30.17	Pass	H
1634.419	31.12	2.95	34.56	44.96	44.47	74.00	-29.53	Pass	H
4882.000	34.85	5.08	34.33	44.88	50.48	74.00	-23.52	Pass	H
5925.863	35.85	7.27	34.30	39.94	48.76	74.00	-25.24	Pass	H
7323.000	36.43	6.77	34.90	37.25	45.55	74.00	-28.45	Pass	H
9764.000	38.05	7.60	35.05	37.37	47.97	74.00	-26.03	Pass	H
1198.095	30.22	2.51	34.97	48.34	46.10	74.00	-27.90	Pass	V
1846.834	31.47	3.12	34.40	44.61	44.80	74.00	-29.20	Pass	V
4882.000	34.85	5.08	34.33	41.73	47.33	74.00	-26.67	Pass	V
6156.505	35.98	7.27	34.40	39.09	47.94	74.00	-26.06	Pass	V
7323.000	36.43	6.77	34.90	37.97	46.27	74.00	-27.73	Pass	V
9764.000	38.05	7.60	35.05	38.98	49.58	74.00	-24.42	Pass	V

Worse case mode:		π/4DQPSK(2-DH5)		Test channel:		Highest	Remark: Peak		
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
1198.095	30.22	2.51	34.97	45.66	43.42	74.00	-30.58	Pass	H
1737.384	31.29	3.03	34.48	44.87	44.71	74.00	-29.29	Pass	H
4960.000	35.02	5.05	34.31	39.64	45.40	74.00	-28.60	Pass	H
5865.832	35.80	7.13	34.30	40.86	49.49	74.00	-24.51	Pass	H
7440.000	36.45	6.88	34.90	39.07	47.50	74.00	-26.50	Pass	H
9920.000	38.22	7.47	35.02	38.37	49.04	74.00	-24.96	Pass	H
1597.401	31.05	2.92	34.59	45.67	45.05	74.00	-28.95	Pass	V
4960.000	35.02	5.05	34.31	39.79	45.55	74.00	-28.45	Pass	V
5660.469	35.64	6.67	34.30	41.15	49.16	74.00	-24.84	Pass	V
7440.000	36.45	6.88	34.90	39.42	47.85	74.00	-26.15	Pass	V
8187.502	36.64	7.54	34.96	40.24	49.46	74.00	-24.54	Pass	V
9920.000	38.22	7.47	35.02	38.28	48.95	74.00	-25.05	Pass	V

Worse case mode:		8DPSK(3-DH5)		Test channel:		Lowest	Remark: Peak		
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
1238.405	30.32	2.56	34.92	45.42	43.38	74.00	-30.62	Pass	H
1597.401	31.05	2.92	34.59	45.35	44.73	74.00	-29.27	Pass	H
1913.838	31.57	3.17	34.36	45.57	45.95	74.00	-28.05	Pass	H
4804.000	34.69	5.11	34.35	44.19	49.64	74.00	-24.36	Pass	H
7206.000	36.42	6.66	34.90	39.79	47.97	74.00	-26.03	Pass	H
9608.000	37.88	7.73	35.08	37.84	48.37	74.00	-25.63	Pass	H
1195.049	30.21	2.51	34.97	48.72	46.47	74.00	-27.53	Pass	V
1746.251	31.31	3.04	34.48	44.43	44.30	74.00	-29.70	Pass	V
4804.000	34.69	5.11	34.35	40.92	46.37	74.00	-27.63	Pass	V
5925.863	35.85	7.27	34.30	41.06	49.88	74.00	-24.12	Pass	V
7206.000	36.42	6.66	34.90	38.74	46.92	74.00	-27.08	Pass	V
9608.000	37.88	7.73	35.08	37.31	47.84	74.00	-26.16	Pass	V

Worse case mode:		8DPSK(3-DH5)		Test channel:		Middle	Remark: Peak		
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
1195.049	30.21	2.51	34.97	47.52	45.27	74.00	-28.73	Pass	H
1737.384	31.29	3.03	34.48	45.10	44.94	74.00	-29.06	Pass	H
3844.279	32.91	5.46	34.59	43.91	47.69	74.00	-26.31	Pass	H
4882.000	34.85	5.08	34.33	41.42	47.02	74.00	-26.98	Pass	H
7323.000	36.43	6.77	34.90	37.89	46.19	74.00	-27.81	Pass	H
9764.000	38.05	7.60	35.05	37.18	47.78	74.00	-26.22	Pass	H
1135.731	30.07	2.44	35.03	50.82	48.30	74.00	-25.70	Pass	V
1676.558	31.19	2.98	34.53	45.87	45.51	74.00	-28.49	Pass	V
4882.000	34.85	5.08	34.33	42.31	47.91	74.00	-26.09	Pass	V
6412.427	36.12	7.02	34.56	40.08	48.66	74.00	-25.34	Pass	V
7323.000	36.43	6.77	34.90	36.54	44.84	74.00	-29.16	Pass	V
9764.000	38.05	7.60	35.05	38.42	49.02	74.00	-24.98	Pass	V

Worse case mode:		8DPSK(3-DH5)		Test channel:		Highest	Remark: Peak		
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
1195.049	30.21	2.51	34.97	46.72	44.47	74.00	-29.53	Pass	H
1818.842	31.43	3.10	34.42	44.69	44.80	74.00	-29.20	Pass	H
4960.000	35.02	5.05	34.31	41.05	46.81	74.00	-27.19	Pass	H
6283.164	36.05	7.14	34.48	40.68	49.39	74.00	-24.61	Pass	H
7440.000	36.45	6.88	34.90	38.66	47.09	74.00	-26.91	Pass	H
9920.000	38.22	7.47	35.02	37.08	47.75	74.00	-26.25	Pass	H
1195.049	30.21	2.51	34.97	50.17	47.92	74.00	-26.08	Pass	V
1431.782	30.74	2.76	34.73	50.31	49.08	74.00	-24.92	Pass	V
1948.245	31.62	3.19	34.33	45.74	46.22	74.00	-27.78	Pass	V
4960.000	35.02	5.05	34.31	40.12	45.88	74.00	-28.12	Pass	V
7440.000	36.45	6.88	34.90	37.51	45.94	74.00	-28.06	Pass	V
9920.000	38.22	7.47	35.02	37.40	48.07	74.00	-25.93	Pass	V

Note:

1) Pre-scan transmitting 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 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:

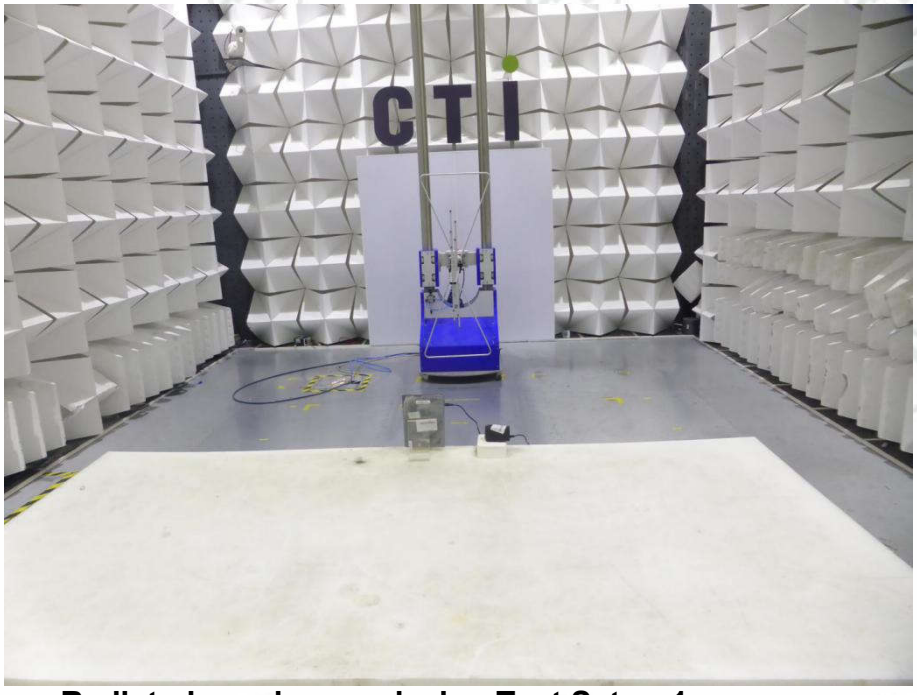
Final Test Level =Receiver Reading -Correct Factor

Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

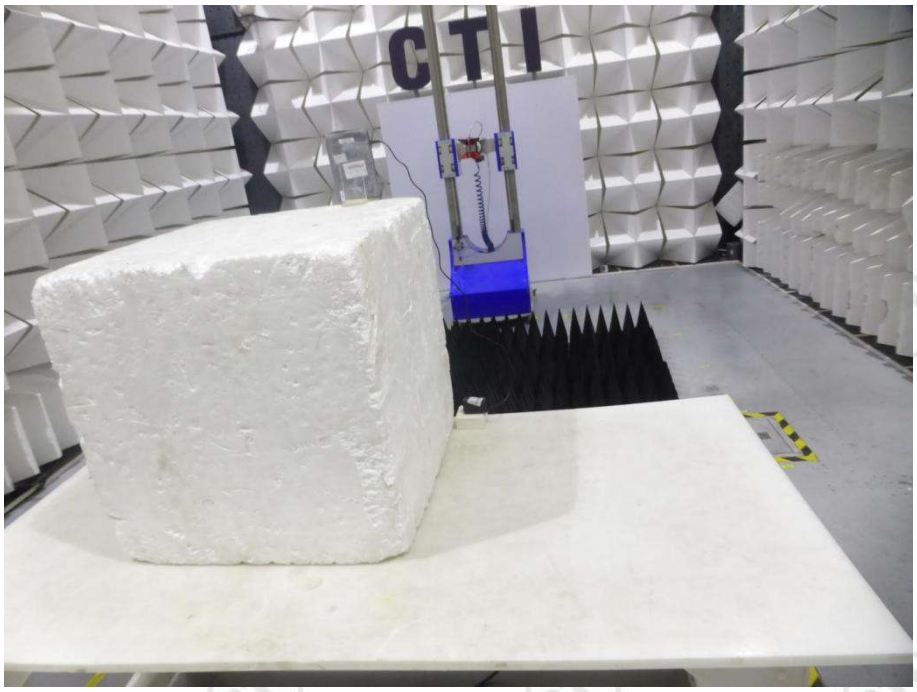
3) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below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

PHOTOGRAPHS OF TEST SETUP

Test Model No.: Y88X PLUS



Radiated spurious emission Test Setup-1(Below 1GHz)



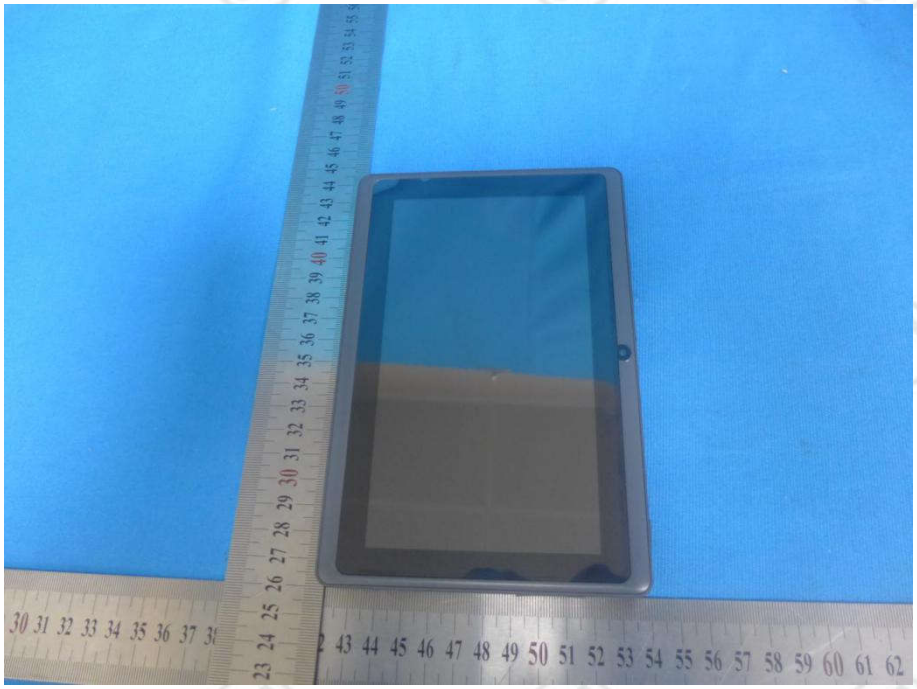
Radiated spurious emission Test Setup-2(Above 1GHz)

Conducted Emissions Test Setup

PHOTOGRAPHS OF EUT Constructional Details

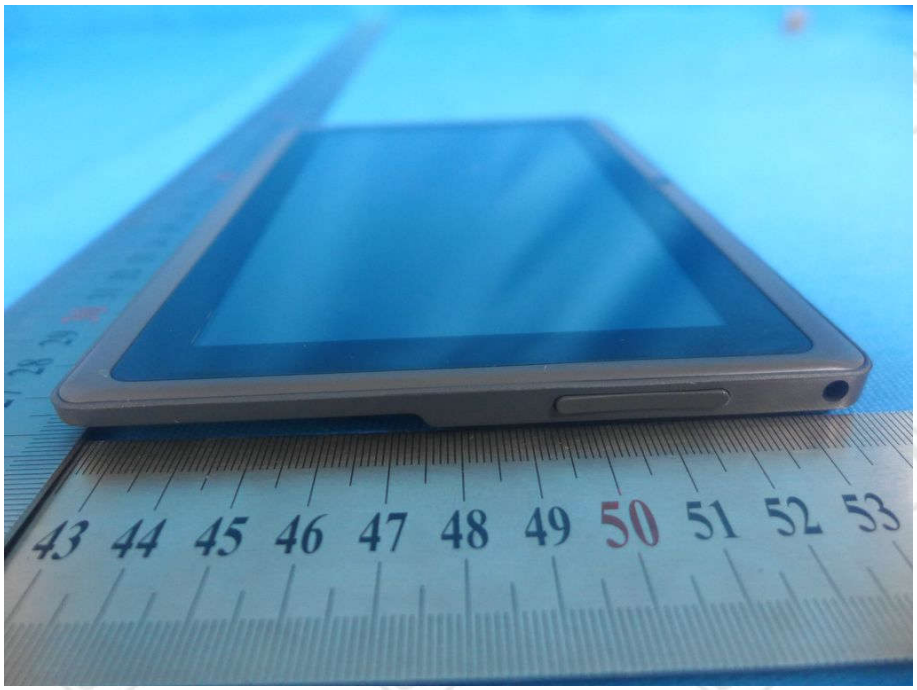
Test Model No.: Y88X PLUS

View of Product-1

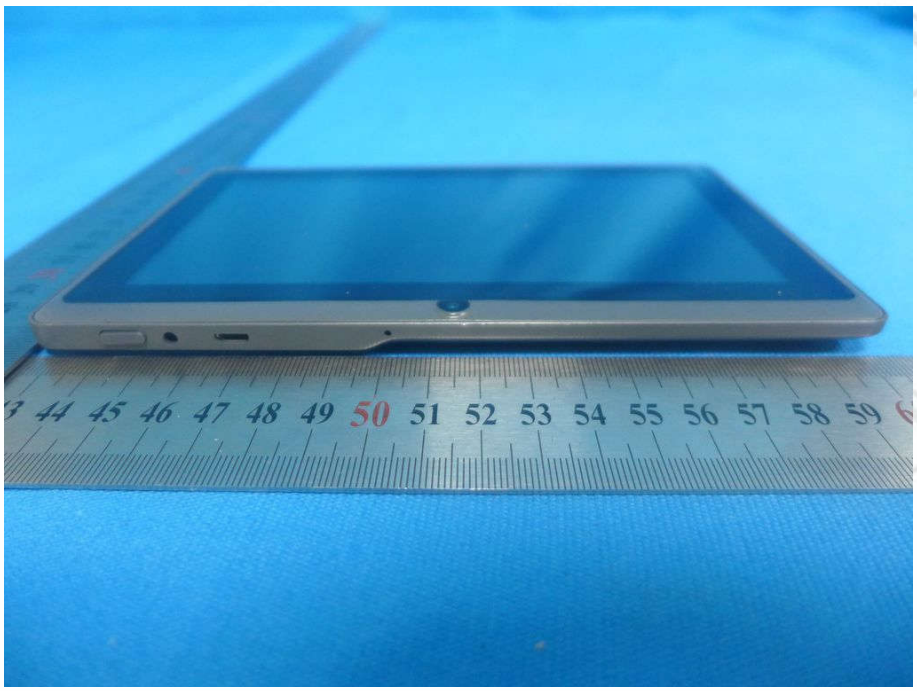


View of Product-2

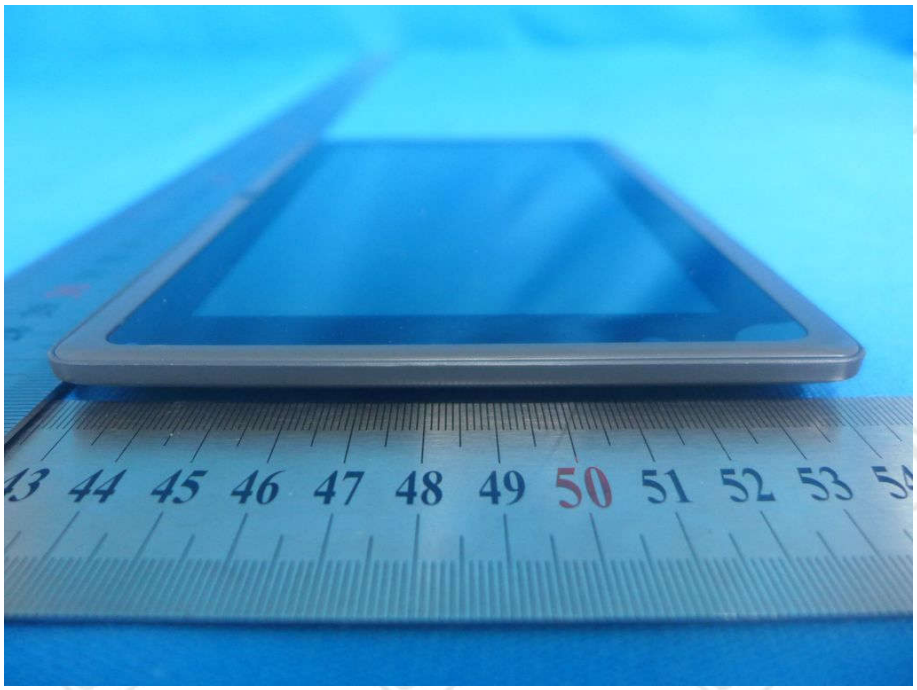
View of Product-3



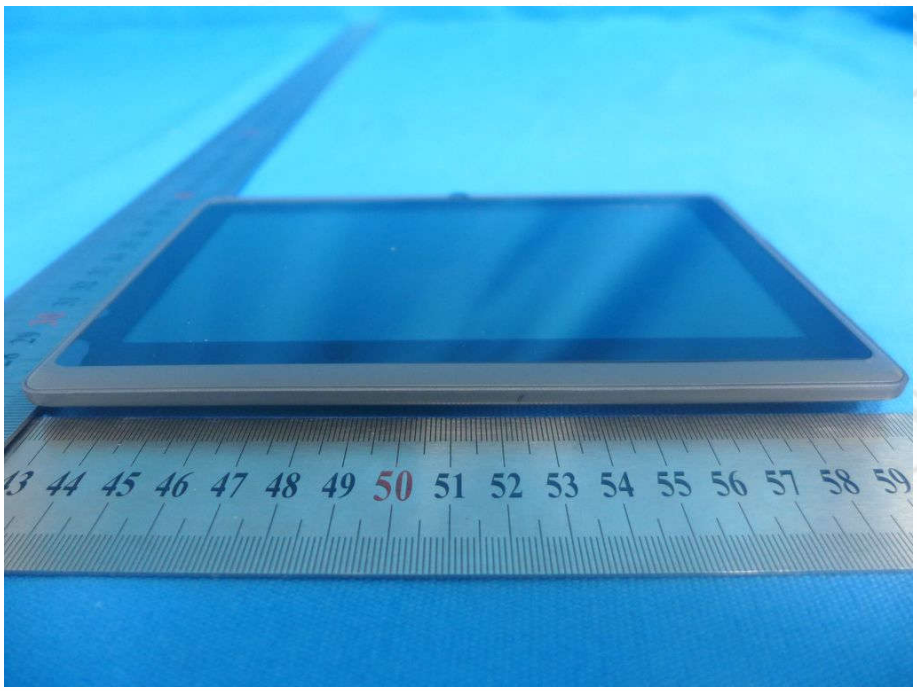
View of Product-4



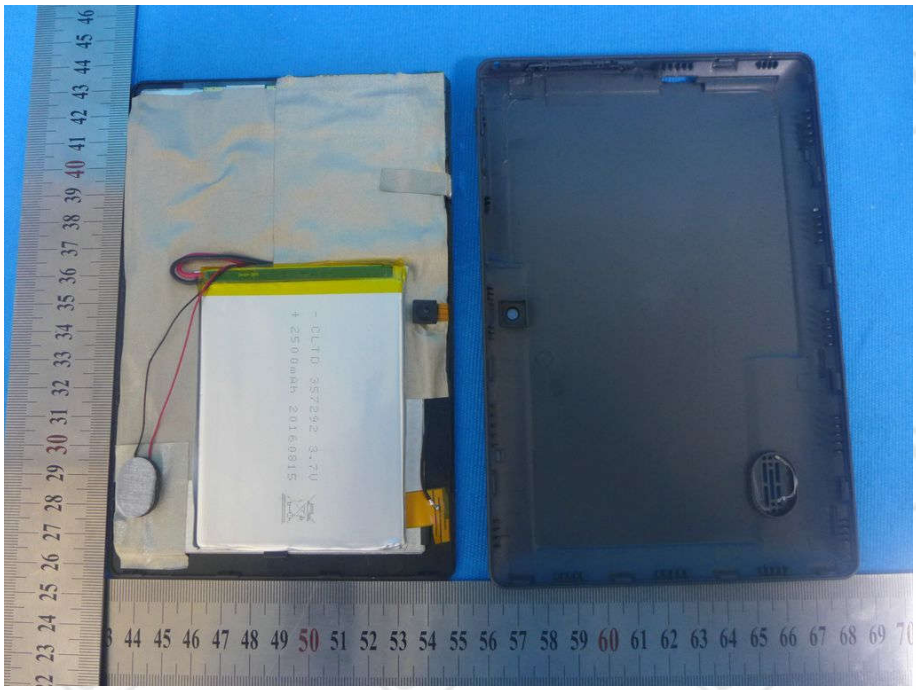
View of Product-5



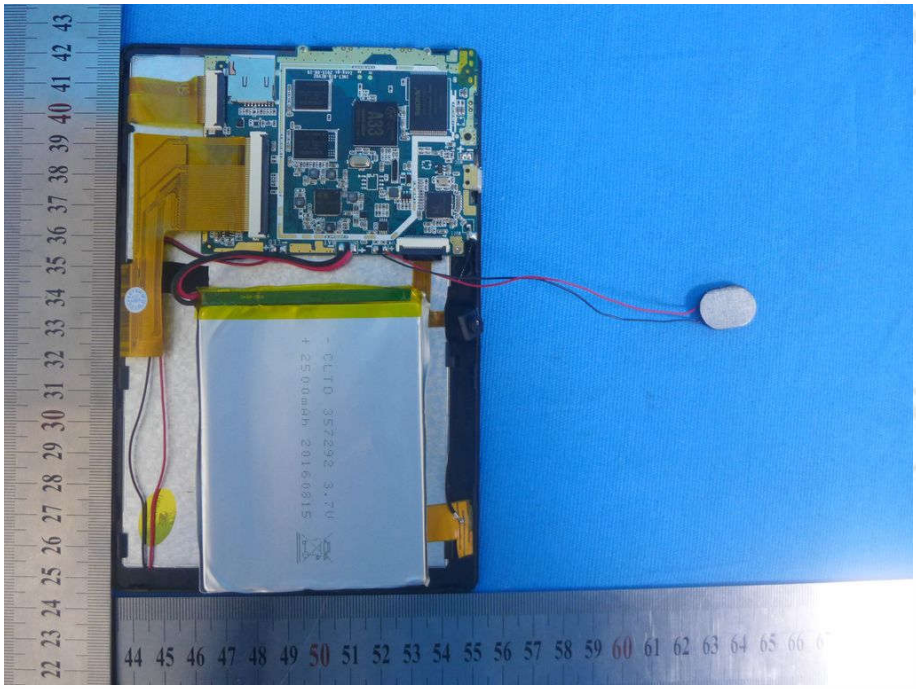
View of Product-6



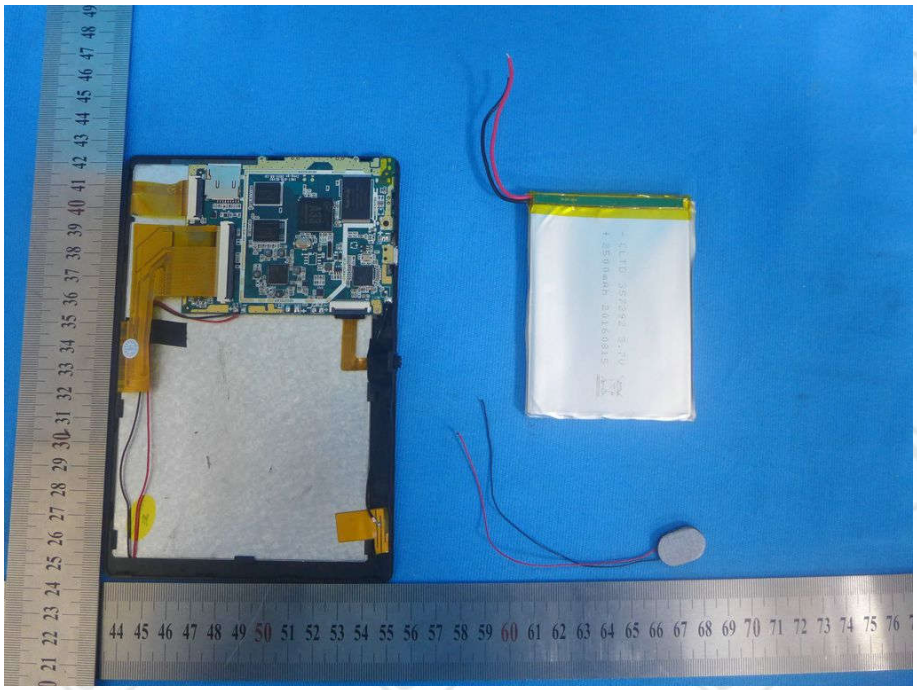
View of Product-7



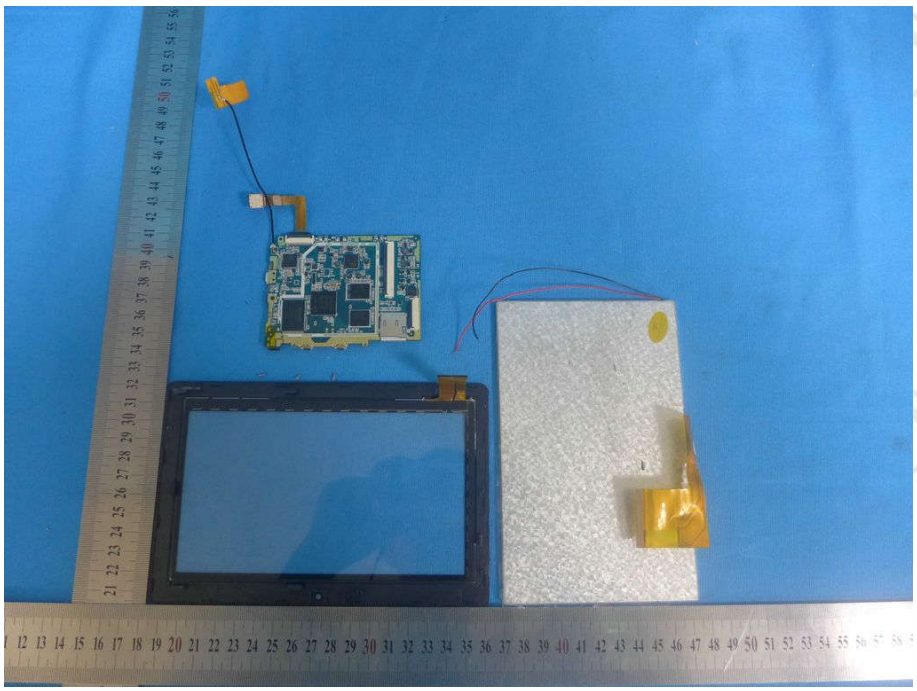
View of Product-8



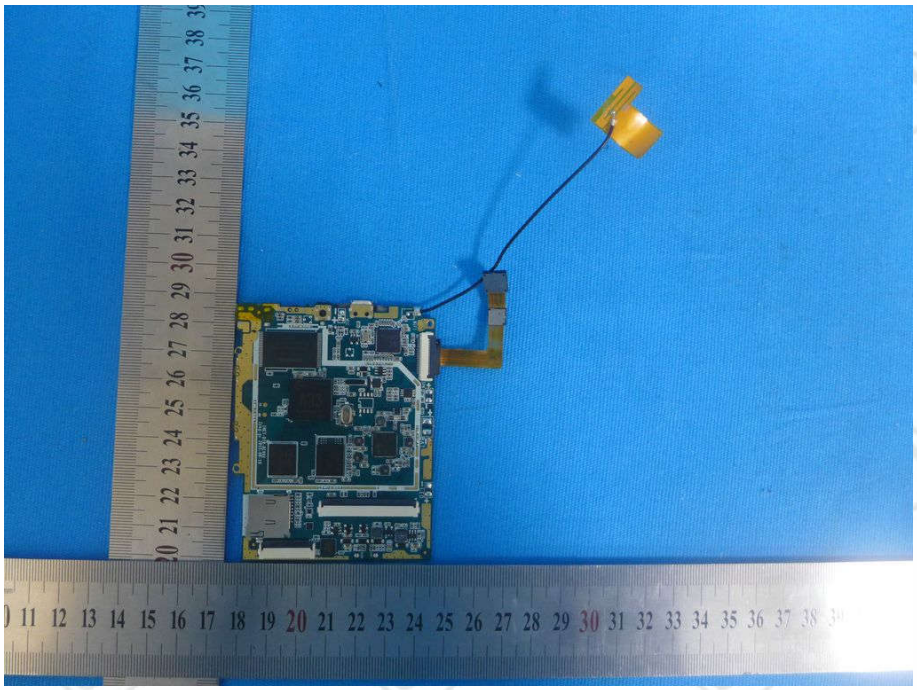
View of Product-9



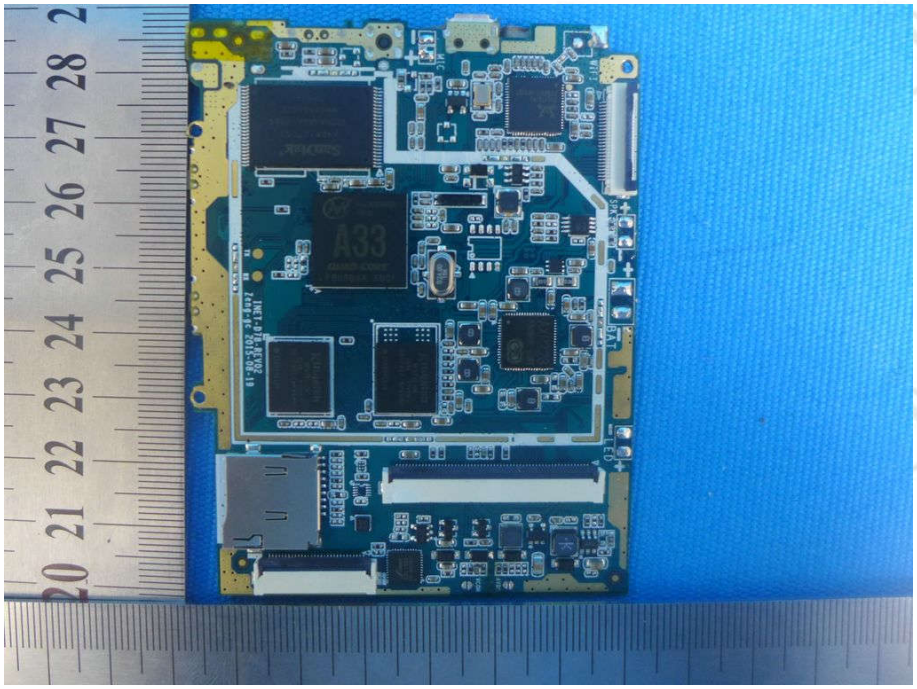
View of Product-10



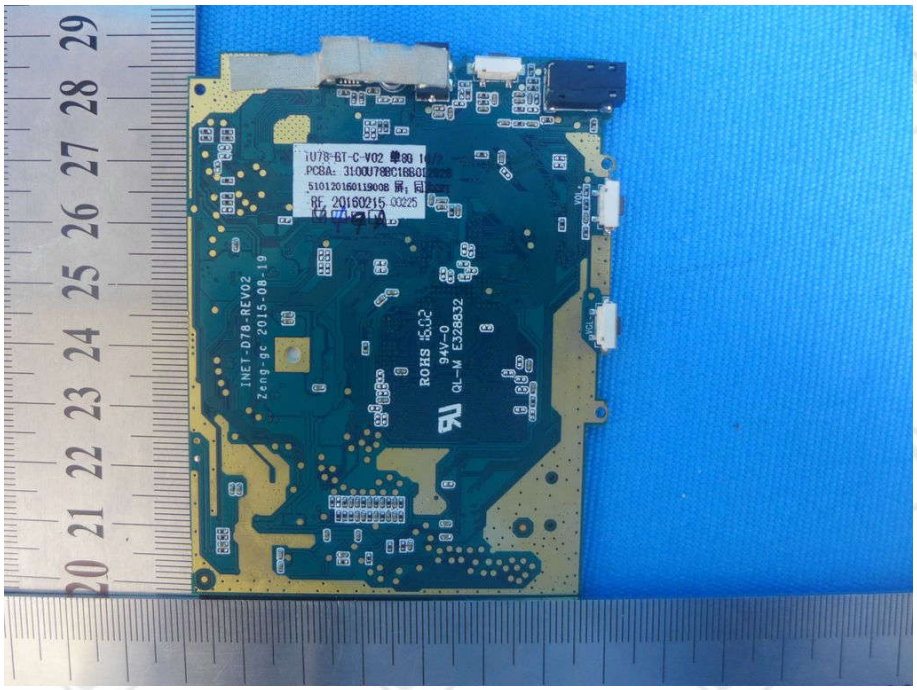
View of Product-11



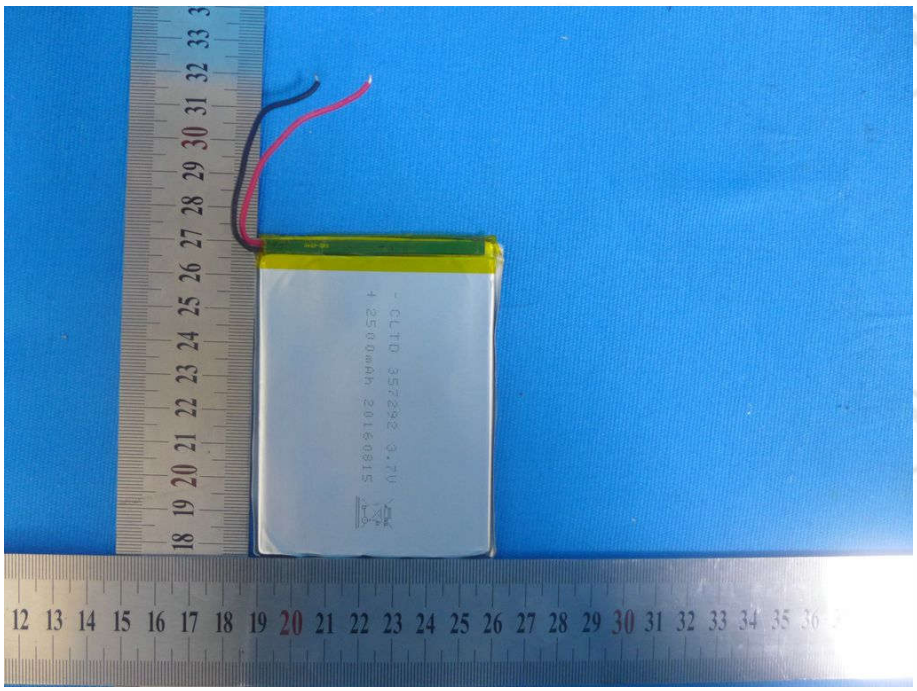
View of Product-12



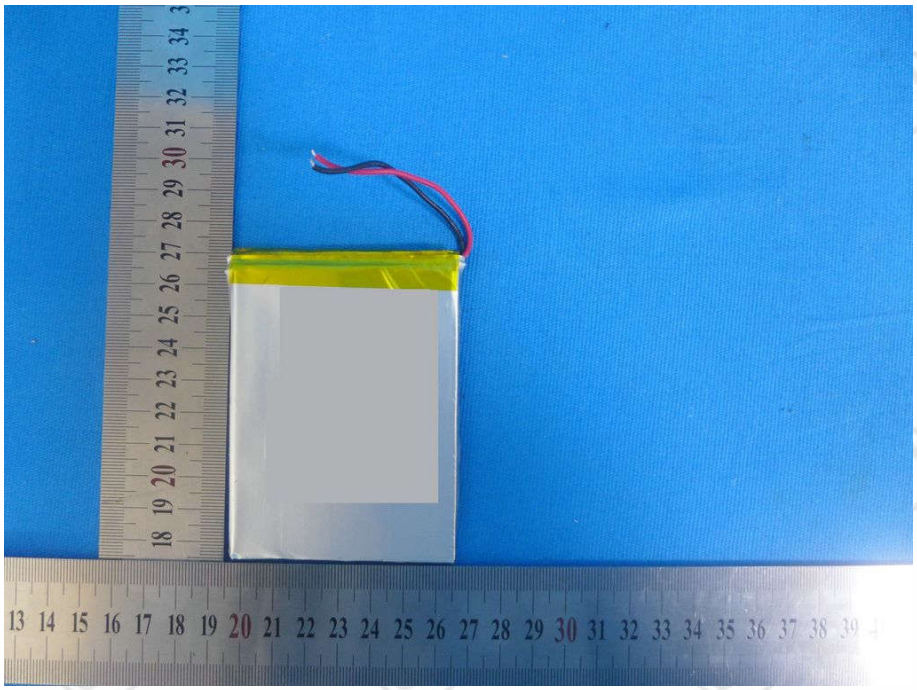
View of Product-13



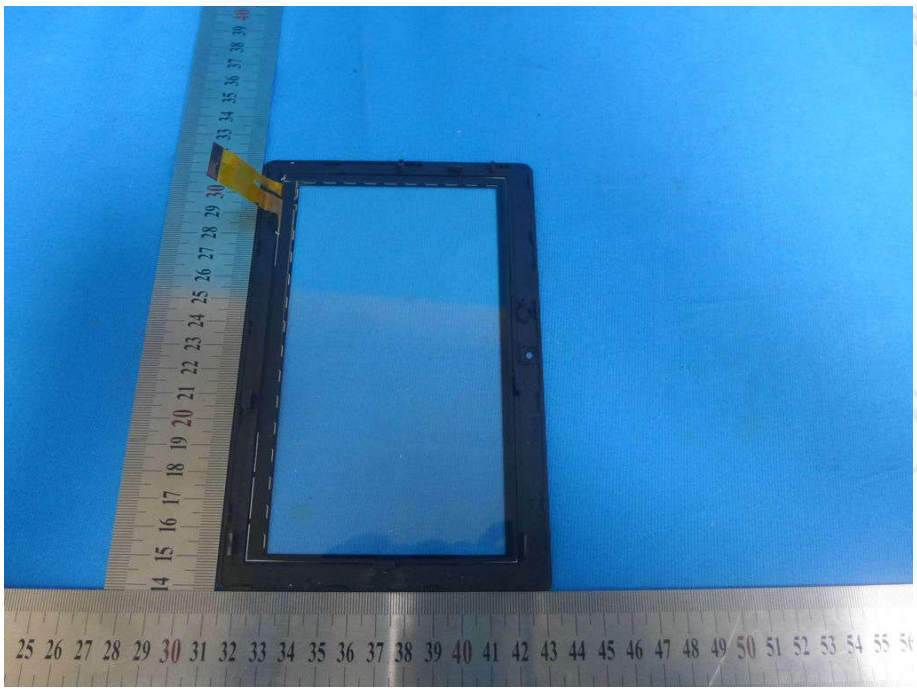
View of Product-14



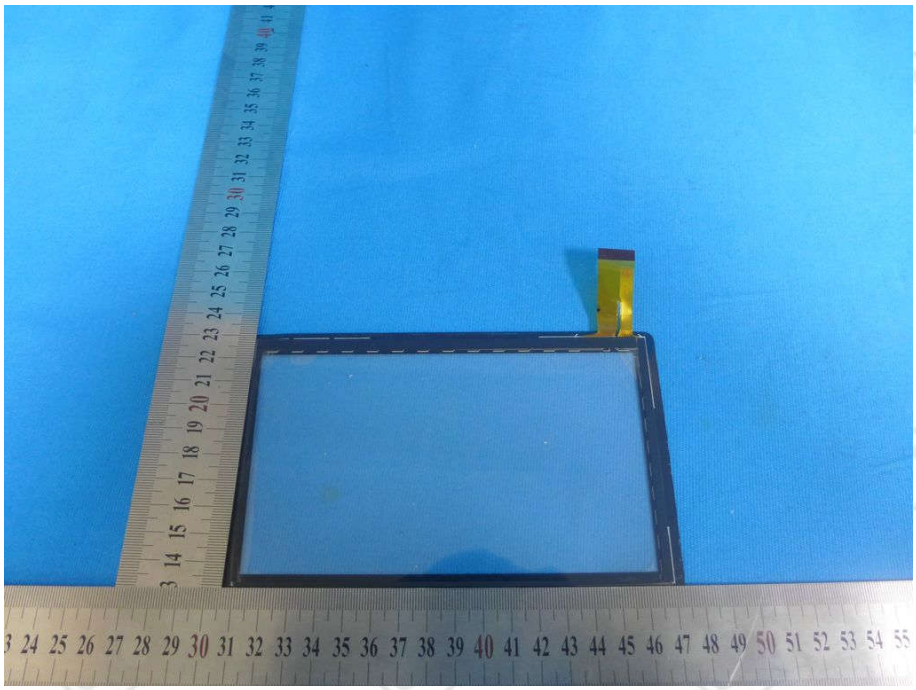
View of Product-15



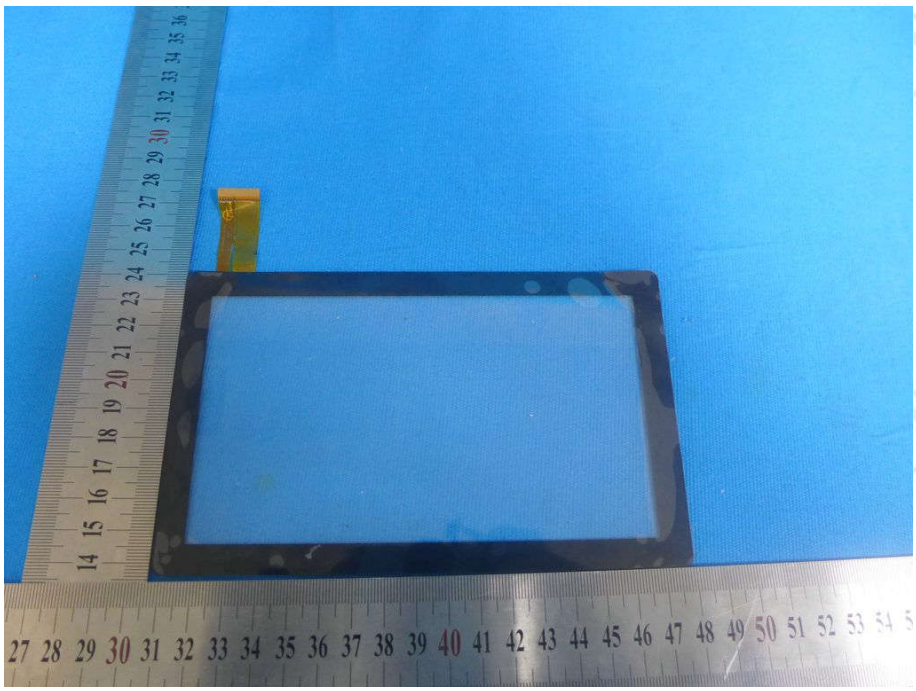
View of Product-16



View of Product-17

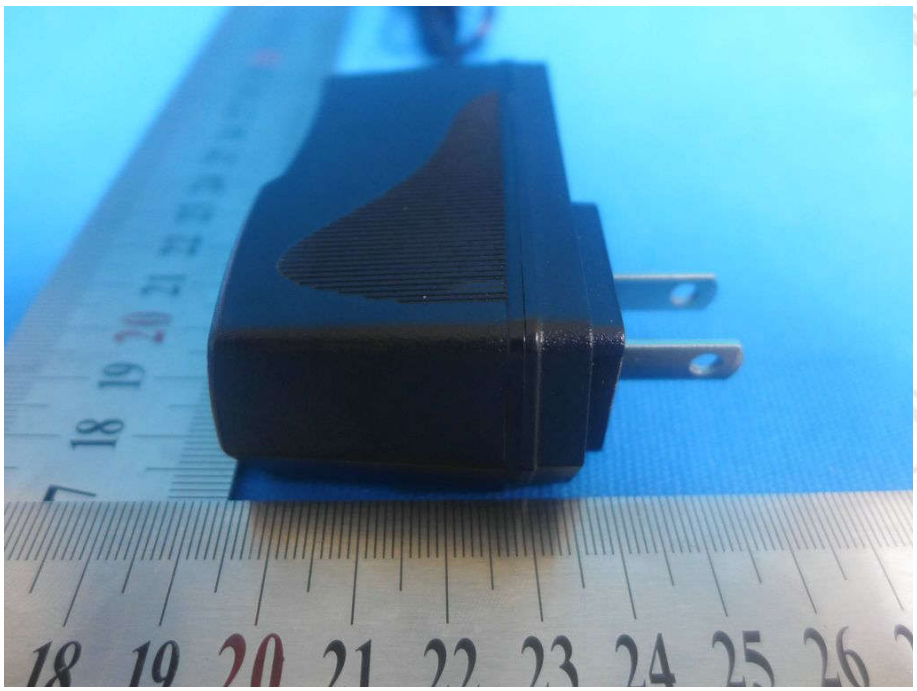


View of Product-18

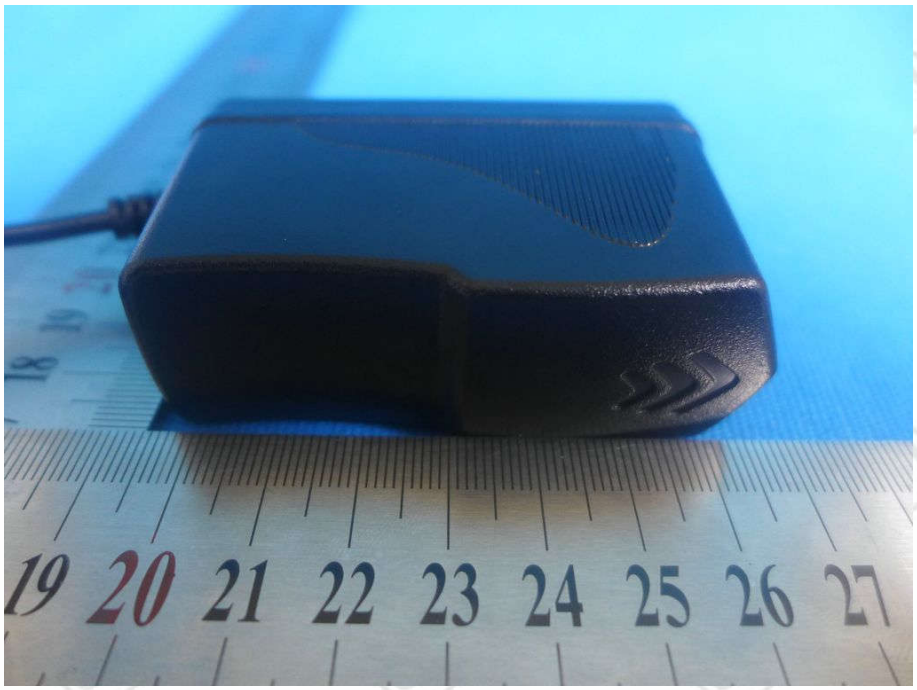


View of Product-19

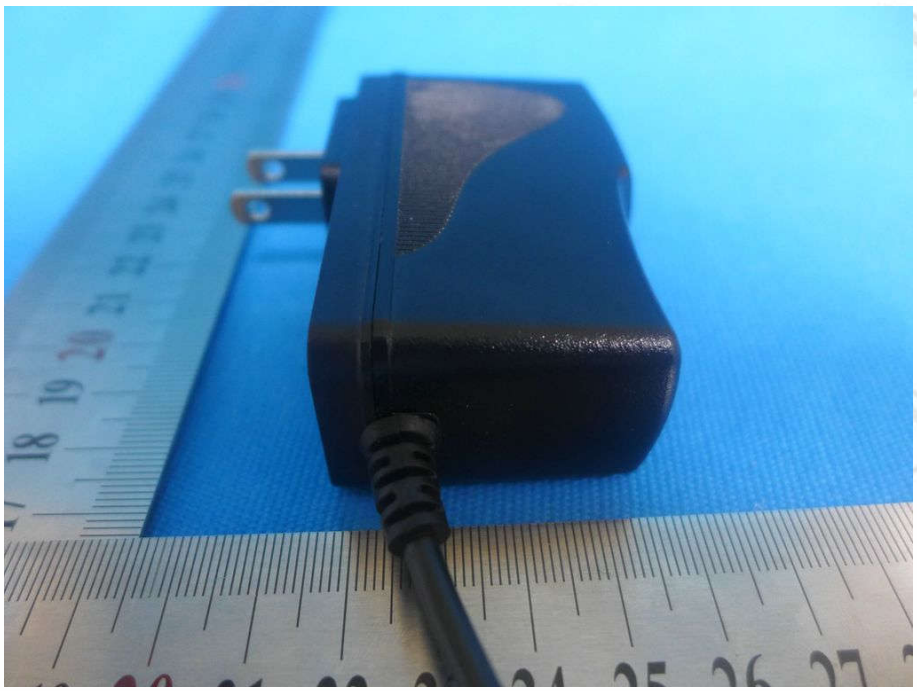
View of Product-20



View of Product-21

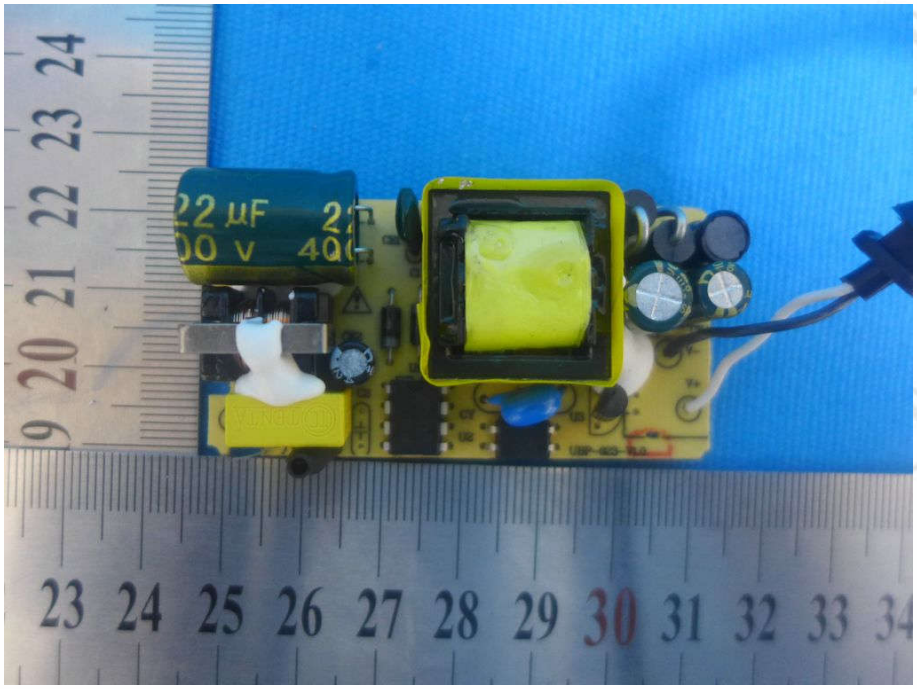


View of Product-22

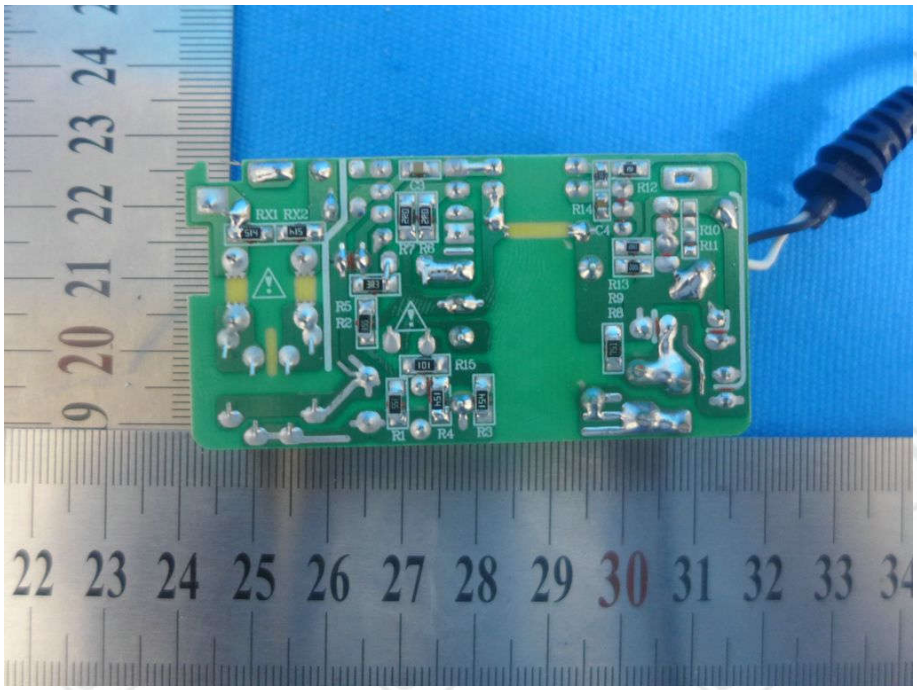


View of Product-23

View of Product-24



View of Product-25



View of Product-26

*** End of Report ***

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.