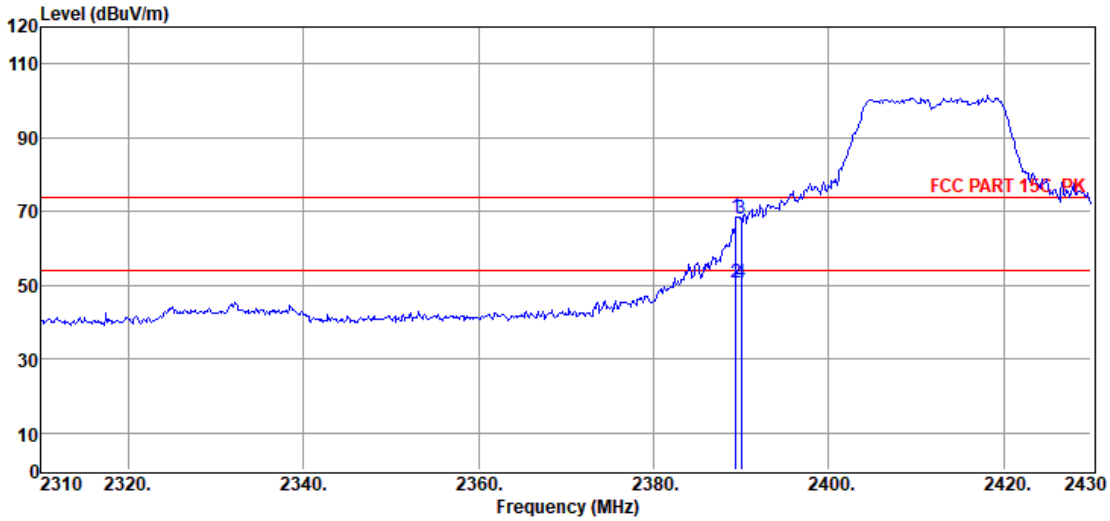
TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6	
Test Date	: 2021-07-18	**Tested By**	: Bairong
EUT	: Car Navigation	**Model Number**	: HA5010
Power Supply	: DC 12V	**Test Mode**	: Tx mode
Condition	: Temp:24.1'C,Humi:56%,Press:100.1kPa	**Antenna/Distance**	: 2020 HF907/3m/HORIZONTAL
Memo	: 11g 2412		

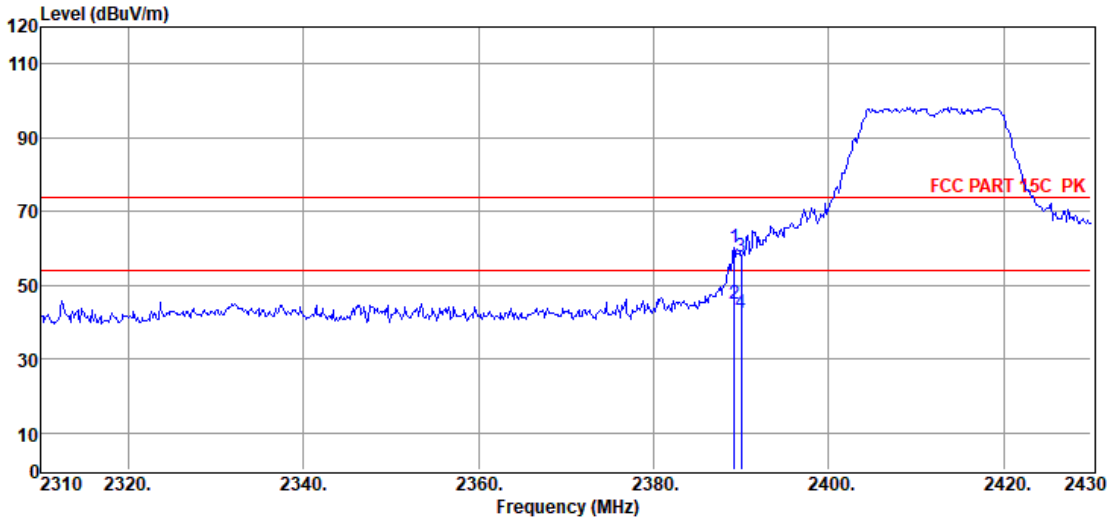


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2389.44	78.16	28.98	42.43	3.86	68.57	74.00	-5.43	Peak	HORIZONTAL
2	2389.44	60.24	28.98	42.43	3.86	50.65	54.00	-3.35	Average	HORIZONTAL
3	2390.00	77.71	28.98	42.43	3.86	68.12	74.00	-5.88	Peak	HORIZONTAL
4	2390.00	60.33	28.98	42.43	3.86	50.74	54.00	-3.26	Average	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6	
Test Date	: 2021-07-18	**Tested By**	: Bairong
EUT	: Car Navigation	**Model Number**	: HA5010
Power Supply	: DC 12V	**Test Mode**	: Tx mode
Condition	: Temp:24.1'C,Humi:56%,Press:100.1kPa	**Antenna/Distance**	: 2020 HF907/3m/VERTICAL
Memo	: 11g 2412		

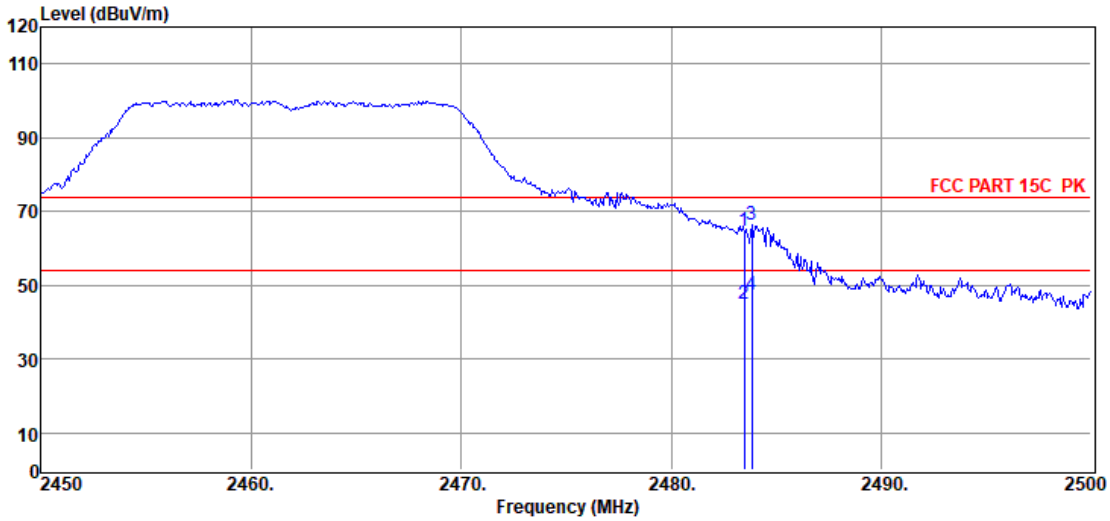


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2389.20	69.87	28.98	42.43	3.86	60.28	74.00	-13.72	Peak	VERTICAL
2	2389.20	54.36	28.98	42.43	3.86	44.77	54.00	-9.23	Average	VERTICAL
3	2390.00	67.34	28.98	42.43	3.86	57.75	74.00	-16.25	Peak	VERTICAL
4	2390.00	52.26	28.98	42.43	3.86	42.67	54.00	-11.33	Average	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6	
Test Date	: 2021-07-18	**Tested By**	: Bairong
EUT	: Car Navigation	**Model Number**	: HA5010
Power Supply	: DC 12V	**Test Mode**	: Tx mode
Condition	: Temp:24.1'C,Humi:56%,Press:100.1kPa	**Antenna/Distance**	: 2020 HF907/3m/HORIZONTAL
Memo	: 11g 2462		

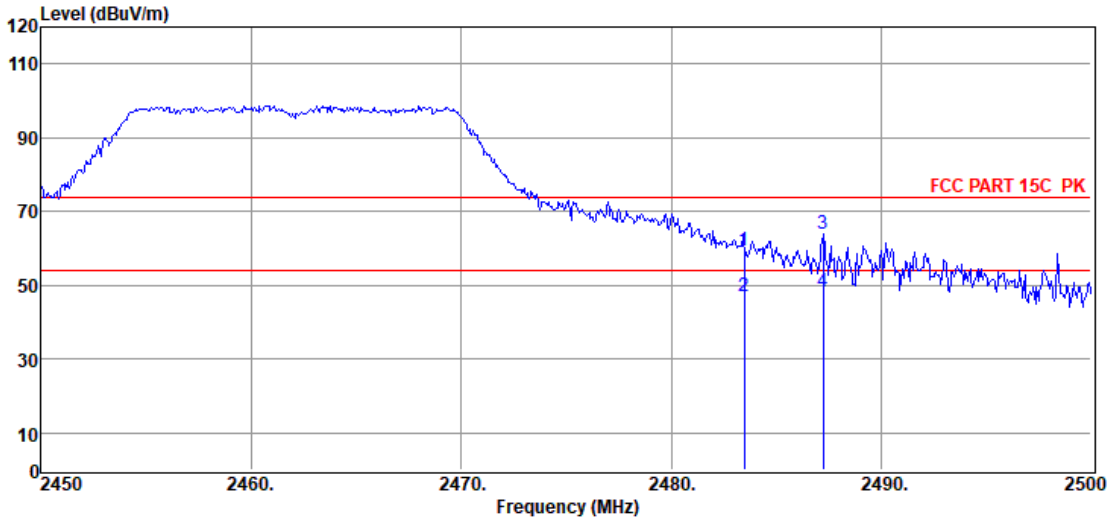


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2483.50	74.21	29.17	42.54	3.93	64.77	74.00	-9.23	Peak	HORIZONTAL
2	2483.50	54.31	29.17	42.54	3.93	44.87	54.00	-9.13	Average	HORIZONTAL
3	2483.85	75.92	29.17	42.54	3.93	66.48	74.00	-7.52	Peak	HORIZONTAL
4	2483.85	56.80	29.17	42.54	3.93	47.36	54.00	-6.64	Average	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6	
Test Date	: 2021-07-18	**Tested By**	: Bairong
EUT	: Car Navigation	**Model Number**	: HA5010
Power Supply	: DC 12V	**Test Mode**	: Tx mode
Condition	: Temp:24.1'C,Humi:56%,Press:100.1kPa	**Antenna/Distance**	: 2020 HF907/3m/VERTICAL
Memo	: 11g 2462		

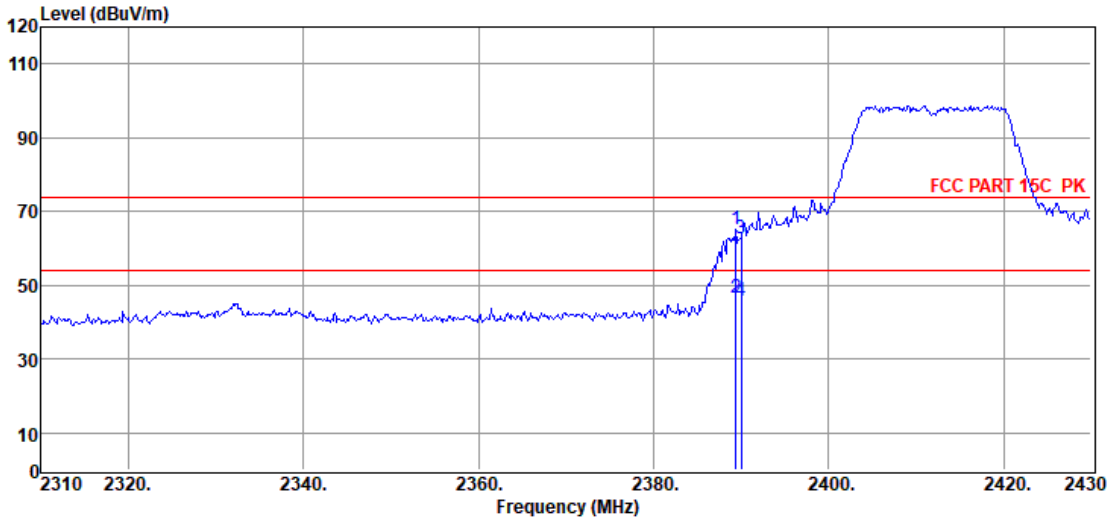


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2483.50	68.69	29.17	42.54	3.93	59.25	74.00	-14.75	Peak	VERTICAL
2	2483.50	56.47	29.17	42.54	3.93	47.03	54.00	-6.97	Average	VERTICAL
3	2487.25	73.21	29.17	42.55	3.93	63.76	74.00	-10.24	Peak	VERTICAL
4	2487.25	57.57	29.17	42.55	3.93	48.12	54.00	-5.88	Average	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6	
Test Date	: 2021-07-18	**Tested By**	: Bairong
EUT	: Car Navigation	**Model Number**	: HA5010
Power Supply	: DC 12V	**Test Mode**	: Tx mode
Condition	: Temp:24.1'C,Humi:56%,Press:100.1kPa	**Antenna/Distance**	: 2020 HF907/3m/HORIZONTAL
Memo	: 11n20 2412		

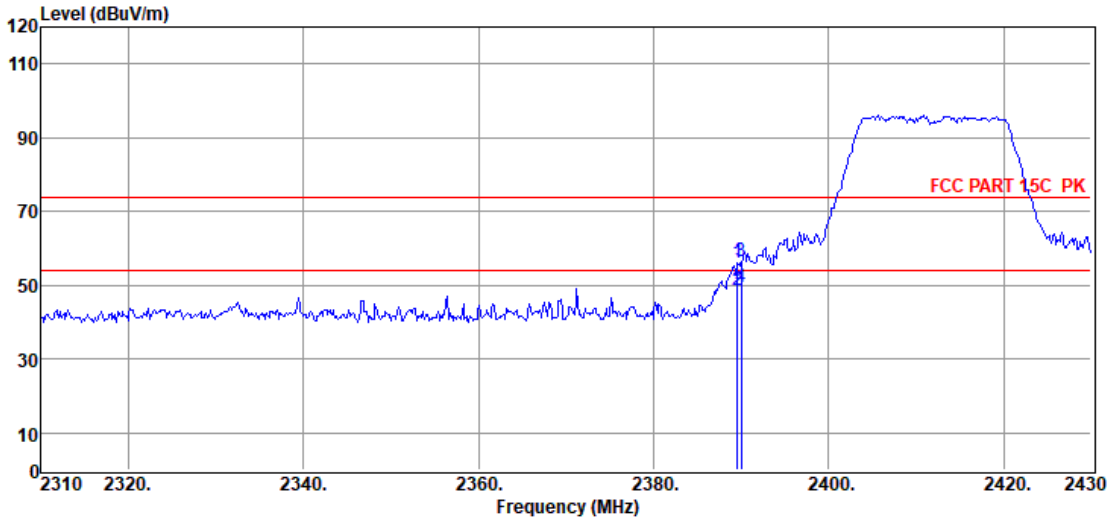


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2389.44	74.95	28.98	42.43	3.86	65.36	74.00	-8.64	Peak	HORIZONTAL
2	2389.44	56.31	28.98	42.43	3.86	46.72	54.00	-7.28	Average	HORIZONTAL
3	2390.00	72.30	28.98	42.43	3.86	62.71	74.00	-11.29	Peak	HORIZONTAL
4	2390.00	55.18	28.98	42.43	3.86	45.59	54.00	-8.41	Average	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6	
Test Date	: 2021-07-18	**Tested By**	: Bairong
EUT	: Car Navigation	**Model Number**	: HA5010
Power Supply	: DC 12V	**Test Mode**	: Tx mode
Condition	: Temp:24.1'C,Humi:56%,Press:100.1kPa	**Antenna/Distance**	: 2020 HF907/3m/VERTICAL
Memo	: 11n20 2412		

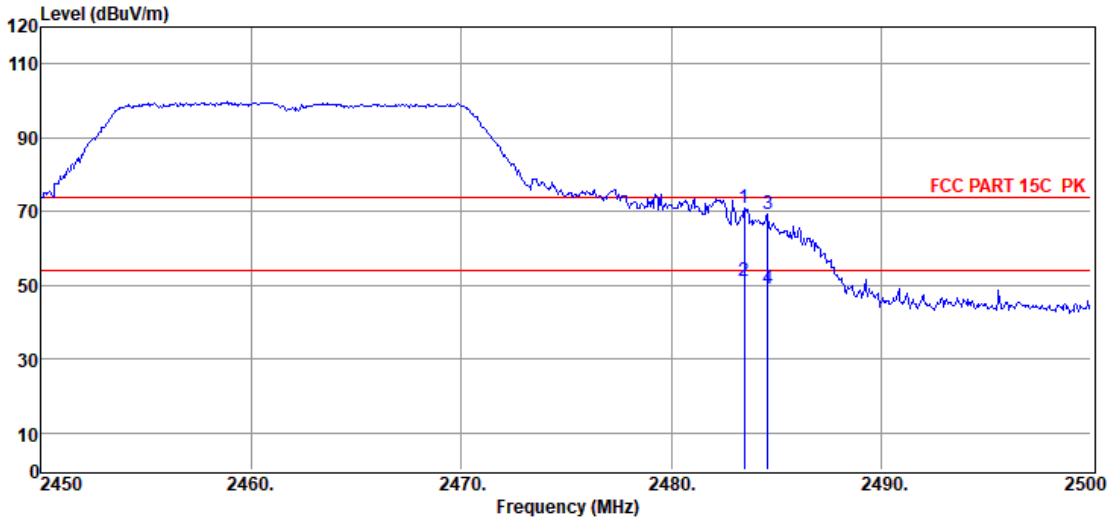


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2389.56	65.61	28.98	42.43	3.86	56.02	74.00	-17.98	Peak	VERTICAL
2	2389.56	58.13	28.98	42.43	3.86	48.54	54.00	-5.46	Average	VERTICAL
3	2390.00	65.99	28.98	42.43	3.86	56.40	74.00	-17.60	Peak	VERTICAL
4	2390.00	59.23	28.98	42.43	3.86	49.64	54.00	-4.36	Average	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6	
Test Date	: 2021-07-18	**Tested By**	: Bairong
EUT	: Car Navigation	**Model Number**	: HA5010
Power Supply	: DC 12V	**Test Mode**	: Tx mode
Condition	: Temp:24.1'C,Humi:56%,Press:100.1kPa	**Antenna/Distance**	: 2020 HF907/3m/HORIZONTAL
Memo	: 11n20 2462		

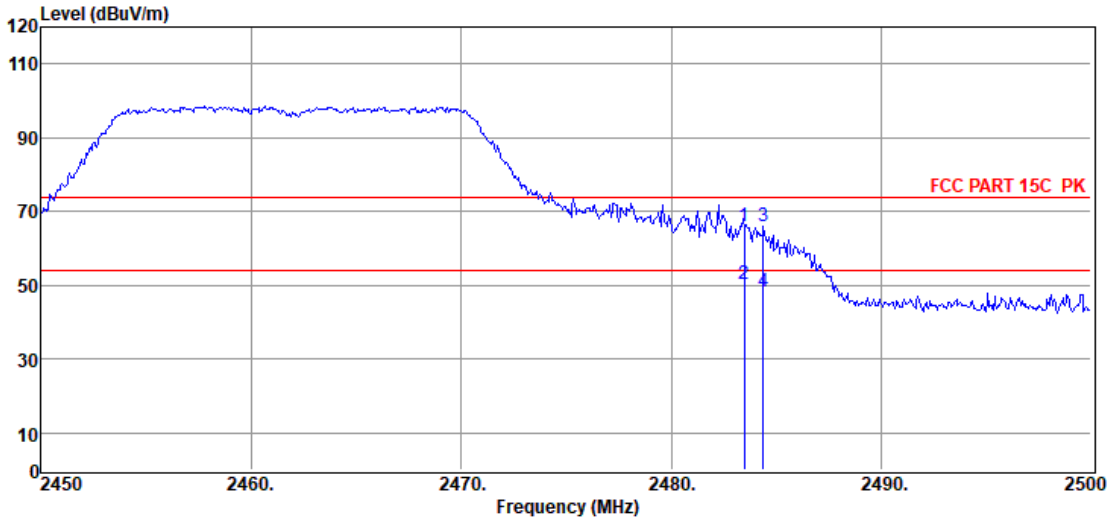


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2483.50	80.32	29.17	42.54	3.93	70.88	74.00	-3.12	Peak	HORIZONTAL
2	2483.50	60.42	29.17	42.54	3.93	50.98	54.00	-3.02	Average	HORIZONTAL
3	2484.60	78.89	29.17	42.54	3.93	69.45	74.00	-4.55	Peak	HORIZONTAL
4	2484.60	58.46	29.17	42.54	3.93	49.02	54.00	-4.98	Average	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6	
Test Date	: 2021-07-18	**Tested By**	: Bairong
EUT	: Car Navigation	**Model Number**	: HA5010
Power Supply	: DC 12V	**Test Mode**	: Tx mode
Condition	: Temp:24.1'C,Humi:56%,Press:100.1kPa	**Antenna/Distance**	: 2020 HF907/3m/VERTICAL
Memo	: 11n20 2462		

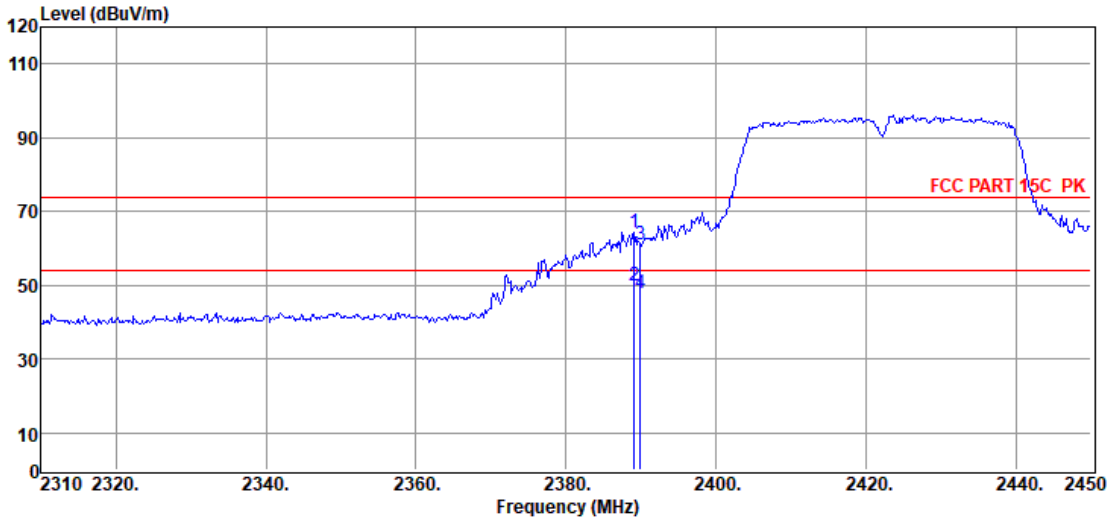


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2483.50	75.51	29.17	42.54	3.93	66.07	74.00	-7.93	Peak	VERTICAL
2	2483.50	59.78	29.17	42.54	3.93	50.34	54.00	-3.66	Average	VERTICAL
3	2484.40	75.51	29.17	42.54	3.93	66.07	74.00	-7.93	Peak	VERTICAL
4	2484.40	57.60	29.17	42.54	3.93	48.16	54.00	-5.84	Average	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6	
Test Date	: 2021-07-18	**Tested By**	: Bairong
EUT	: Car Navigation	**Model Number**	: HA5010
Power Supply	: DC 12V	**Test Mode**	: Tx mode
Condition	: Temp:24.1'C,Humi:56%,Press:100.1kPa	**Antenna/Distance**	: 2020 HF907/3m/HORIZONTAL
Memo	: 11n40 2422		

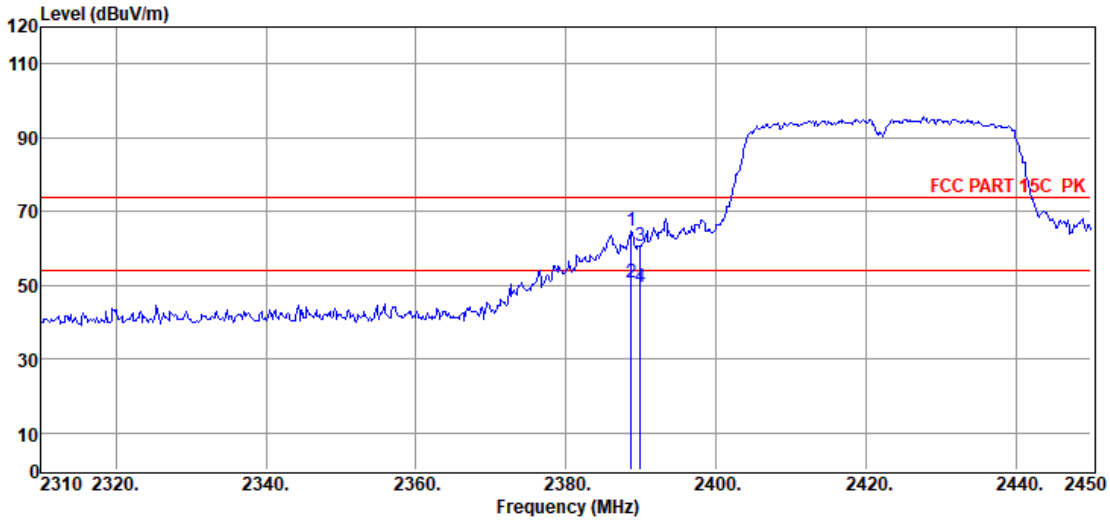


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2389.10	74.09	28.98	42.43	3.86	64.50	74.00	-9.50	Peak	HORIZONTAL
2	2389.10	59.59	28.98	42.43	3.86	50.00	54.00	-4.00	Average	HORIZONTAL
3	2390.00	70.58	28.98	42.43	3.86	60.99	74.00	-13.01	Peak	HORIZONTAL
4	2390.00	57.23	28.98	42.43	3.86	47.64	54.00	-6.36	Average	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6	
Test Date	: 2021-07-18	**Tested By**	: Bairong
EUT	: Car Navigation	**Model Number**	: HA5010
Power Supply	: DC 12V	**Test Mode**	: Tx mode
Condition	: Temp:24.1'C,Humi:56%,Press:100.1kPa	**Antenna/Distance**	: 2020 HF907/3m/VERTICAL
Memo	: 11n40 2422		

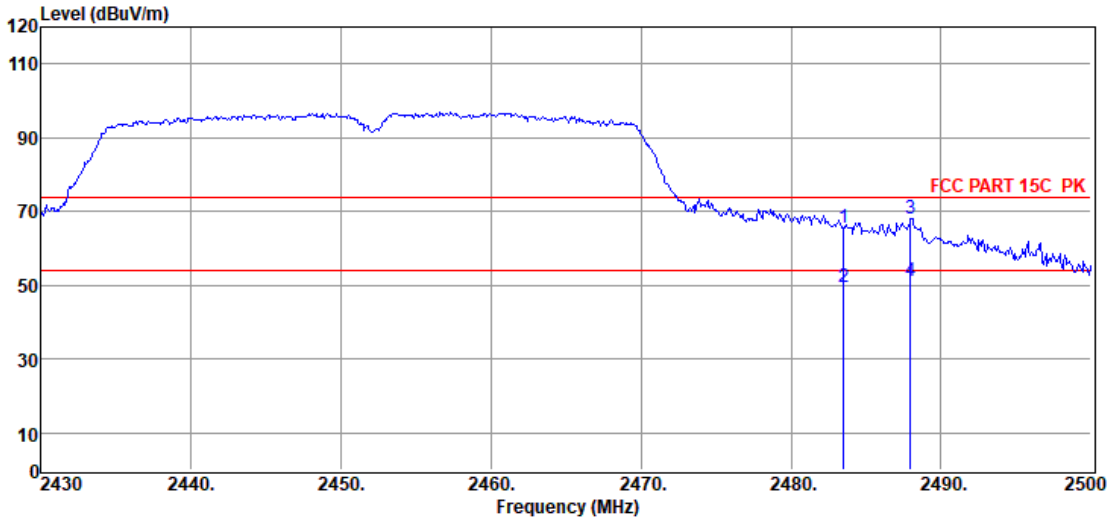


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2388.68	74.25	28.98	42.43	3.86	64.66	74.00	-9.34	Peak	VERTICAL
2	2388.68	60.48	28.98	42.43	3.86	50.89	54.00	-3.11	Average	VERTICAL
3	2390.00	70.10	28.98	42.43	3.86	60.51	74.00	-13.49	Peak	VERTICAL
4	2390.00	58.97	28.98	42.43	3.86	49.38	54.00	-4.62	Average	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6	
Test Date	: 2021-07-18	**Tested By**	: Bairong
EUT	: Car Navigation	**Model Number**	: HA5010
Power Supply	: DC 12V	**Test Mode**	: Tx mode
Condition	: Temp:24.1'C,Humi:56%,Press:100.1kPa	**Antenna/Distance**	: 2020 HF907/3m/HORIZONTAL
Memo	: 11n40 2452		

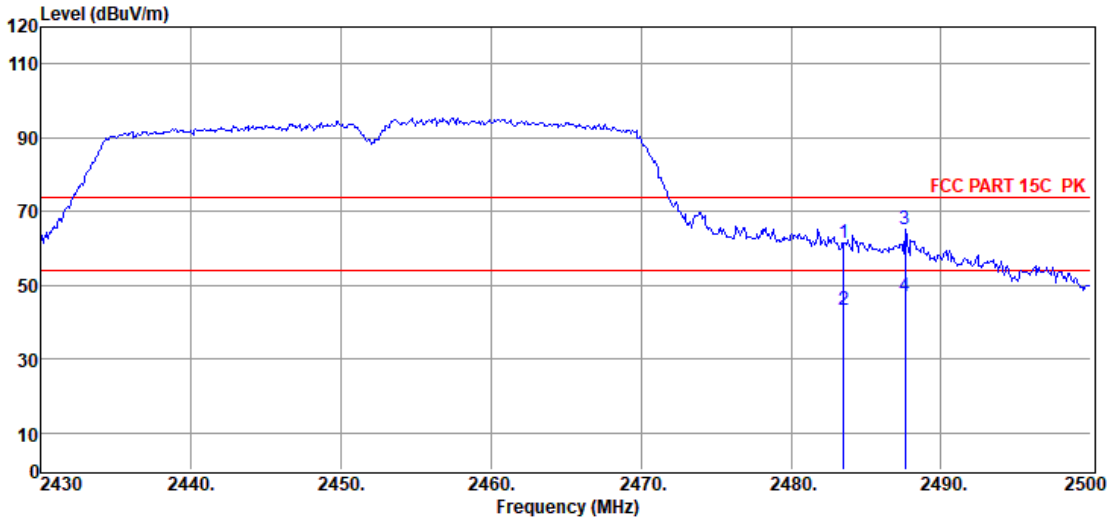


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2483.50	74.85	29.17	42.54	3.93	65.41	74.00	-8.59	Peak	HORIZONTAL
2	2483.50	58.74	29.17	42.54	3.93	49.30	54.00	-4.70	Average	HORIZONTAL
3	2487.96	77.63	29.18	42.55	3.93	68.19	74.00	-5.81	Peak	HORIZONTAL
4	2487.96	60.63	29.18	42.55	3.93	51.19	54.00	-2.81	Average	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2021 RE 1# Report data\Q21061703-2E HA5010\FCC ABOVE1G 2.4gwifi.EM6	
Test Date	: 2021-07-18	**Tested By**	: Bairong
EUT	: Car Navigation	**Model Number**	: HA5010
Power Supply	: DC 12V	**Test Mode**	: Tx mode
Condition	: Temp:24.1'C,Humi:56%,Press:100.1kPa	**Antenna/Distance**	: 2020 HF907/3m/VERTICAL
Memo	: 11n40 2452		

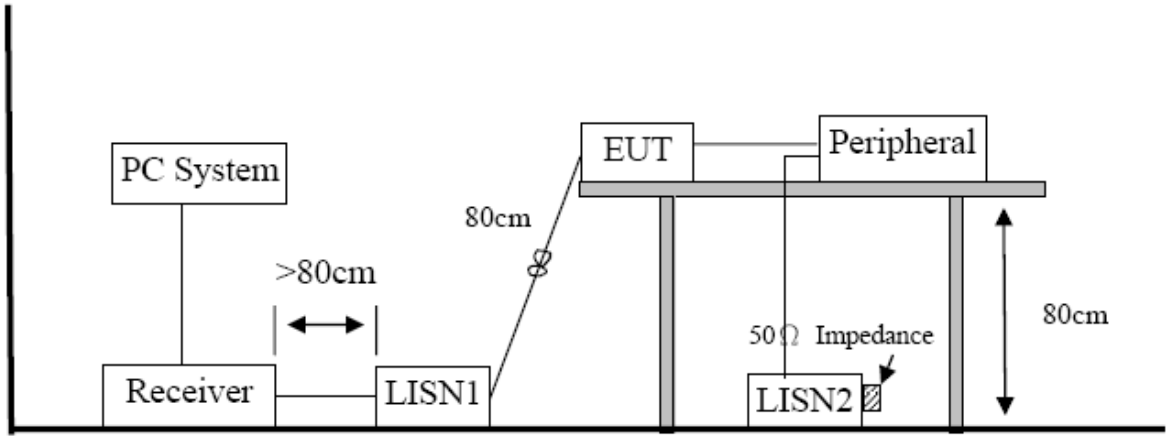


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2483.50	70.88	29.17	42.54	3.93	61.44	74.00	-12.56	Peak	VERTICAL
2	2483.50	52.89	29.17	42.54	3.93	43.45	54.00	-10.55	Average	VERTICAL
3	2487.61	74.42	29.18	42.55	3.93	64.98	74.00	-9.02	Peak	VERTICAL
4	2487.61	56.64	29.18	42.55	3.93	47.20	54.00	-6.80	Average	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

10. Power Line Conducted Emission

10.1. Block diagram of test setup



10.2. Power Line Conducted Emission Limits (Class B)

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150 kHz ~ 500 kHz	66 ~ 56*	56 ~ 46*
500 kHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

10.3. Test procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest

emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 kHz.

10.4. Test result

N/A
The EUT is powered by DC.

11. Antenna Requirements

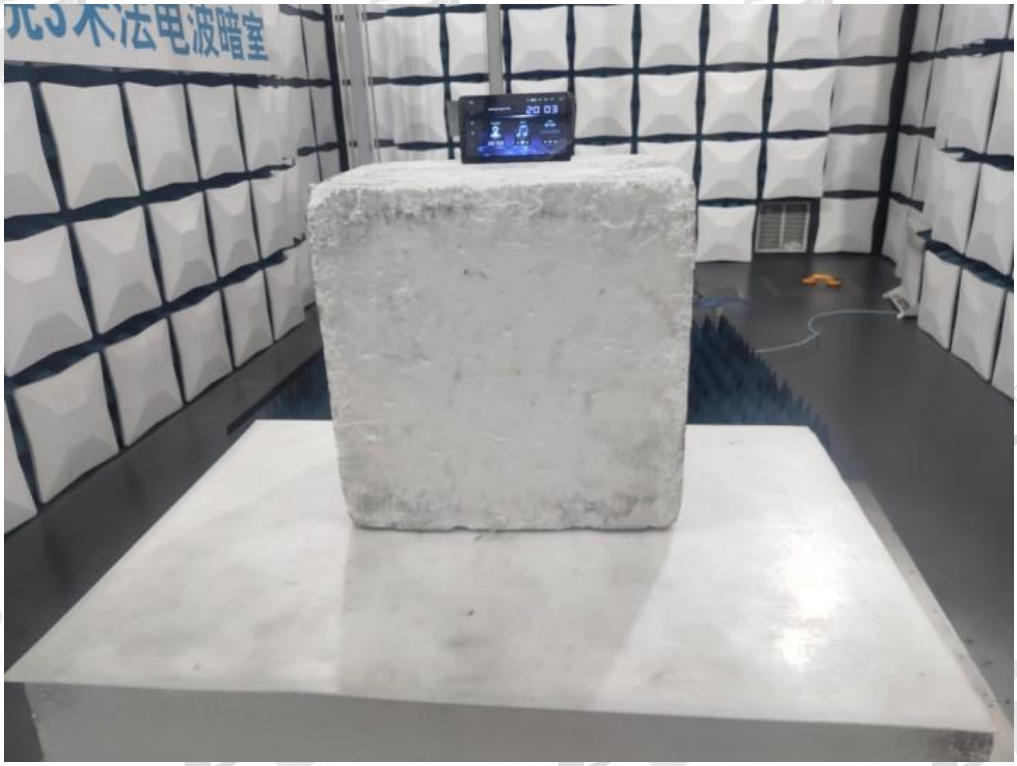
11.1. Limit

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

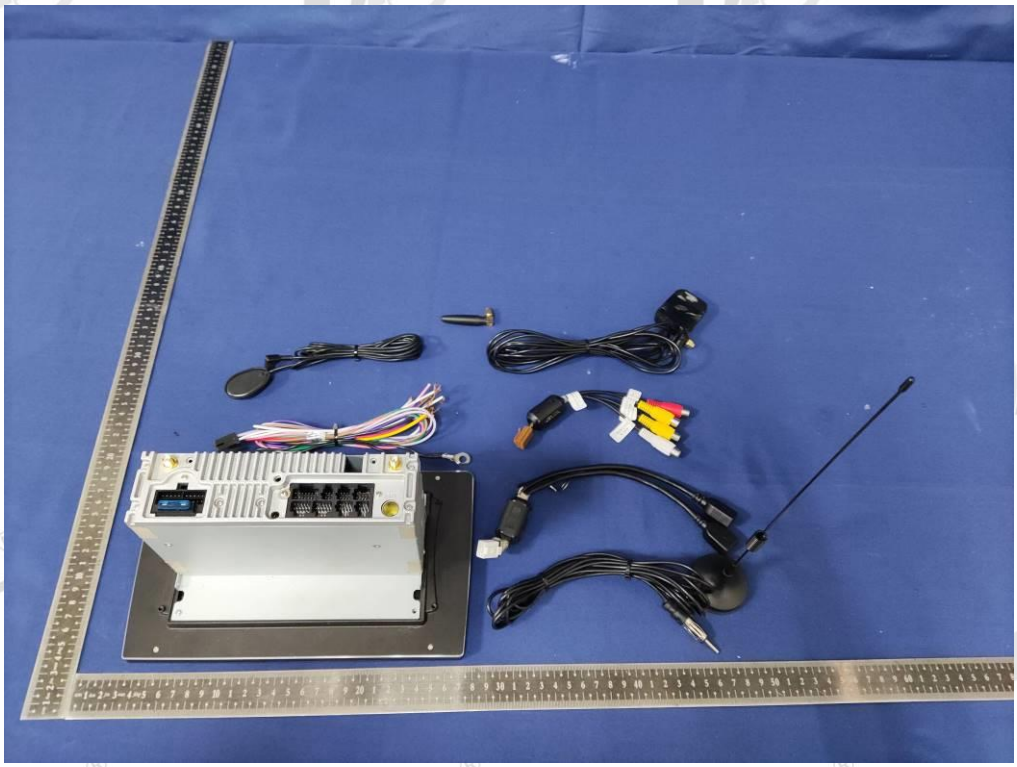
11.2. Result

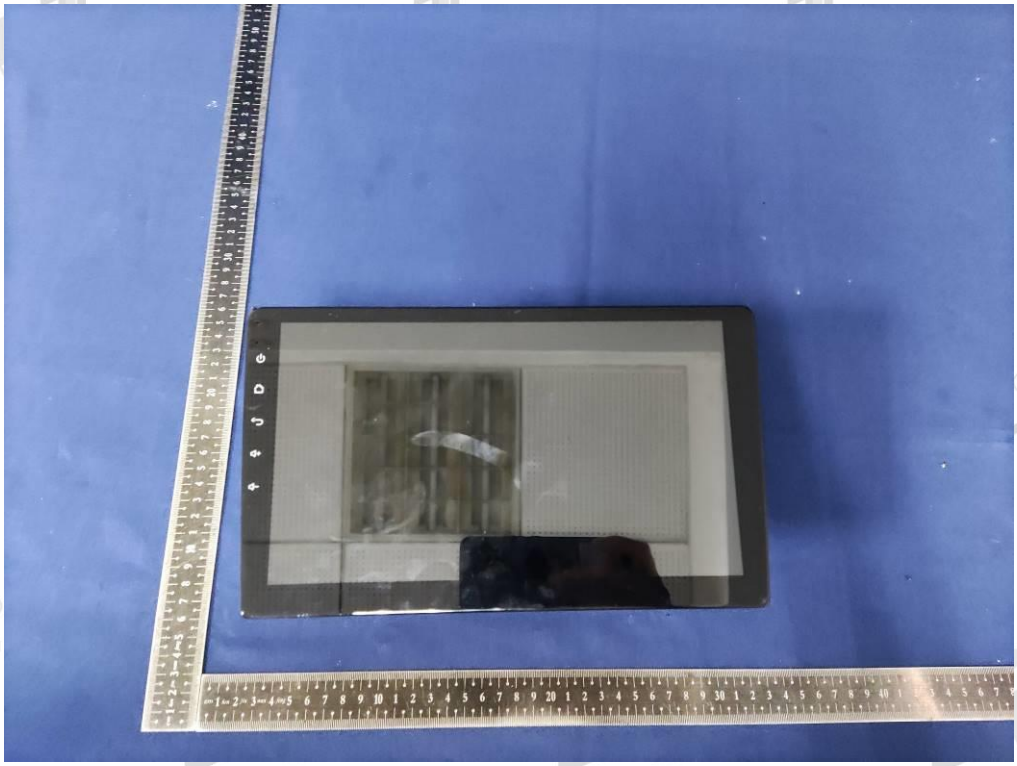
The antenna used for this product and no antenna other than that furnished by the responsible party shall be used with the device, maximum antenna gain is 0 dBi.

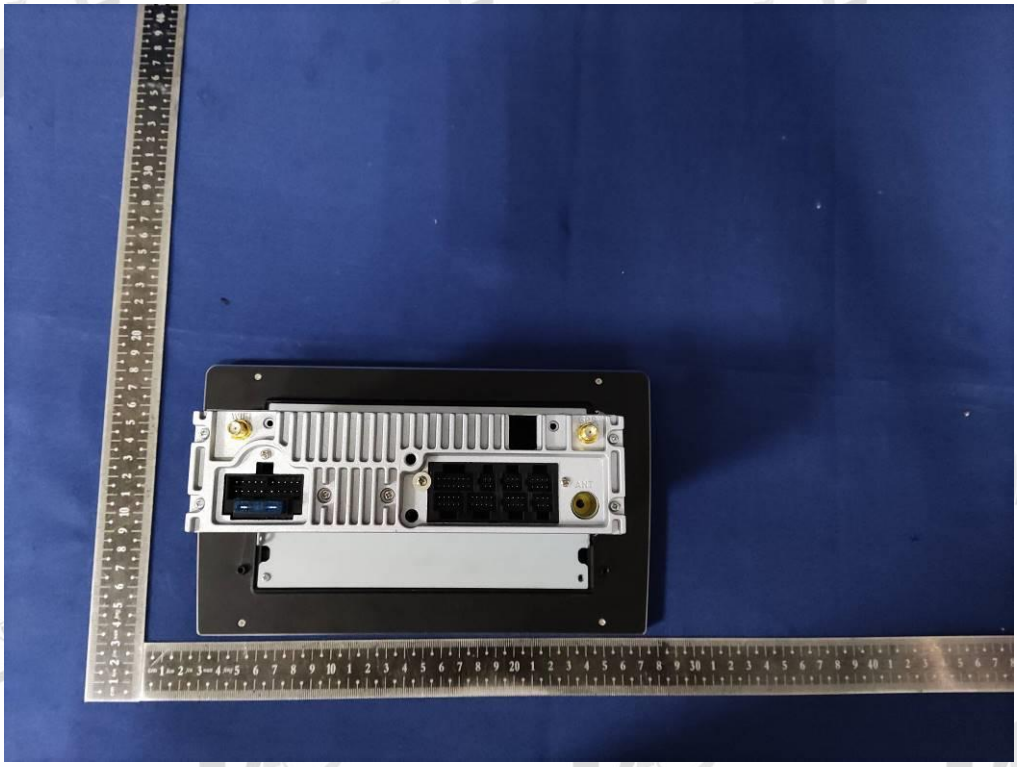
12. Test Setup Photograph

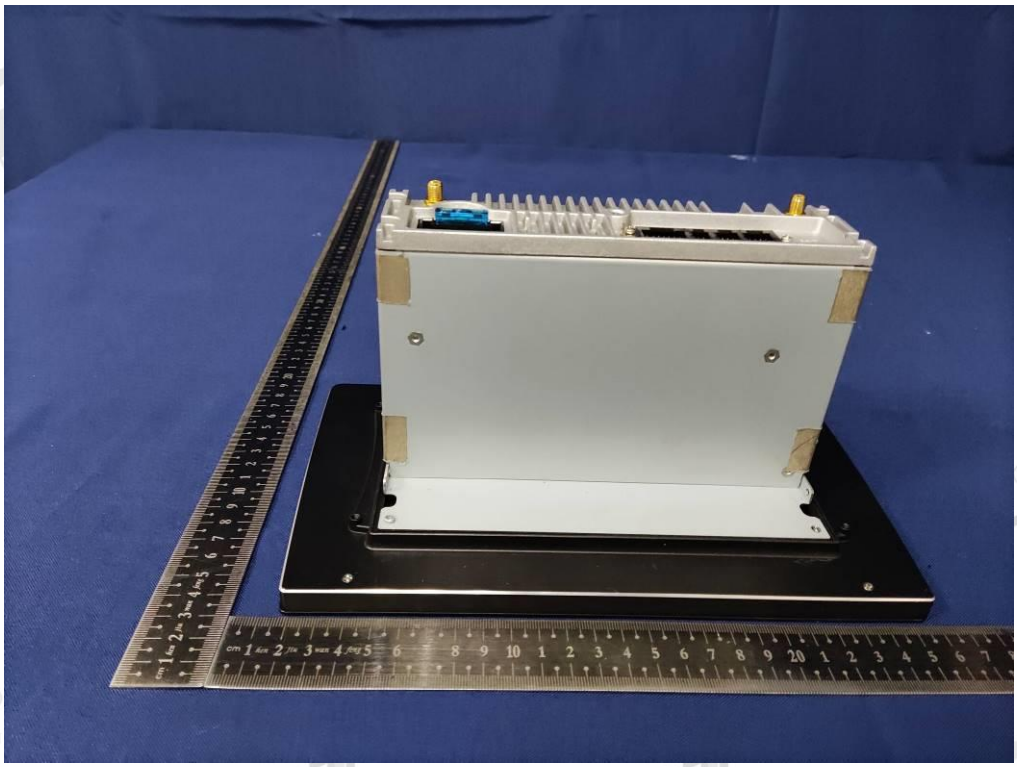


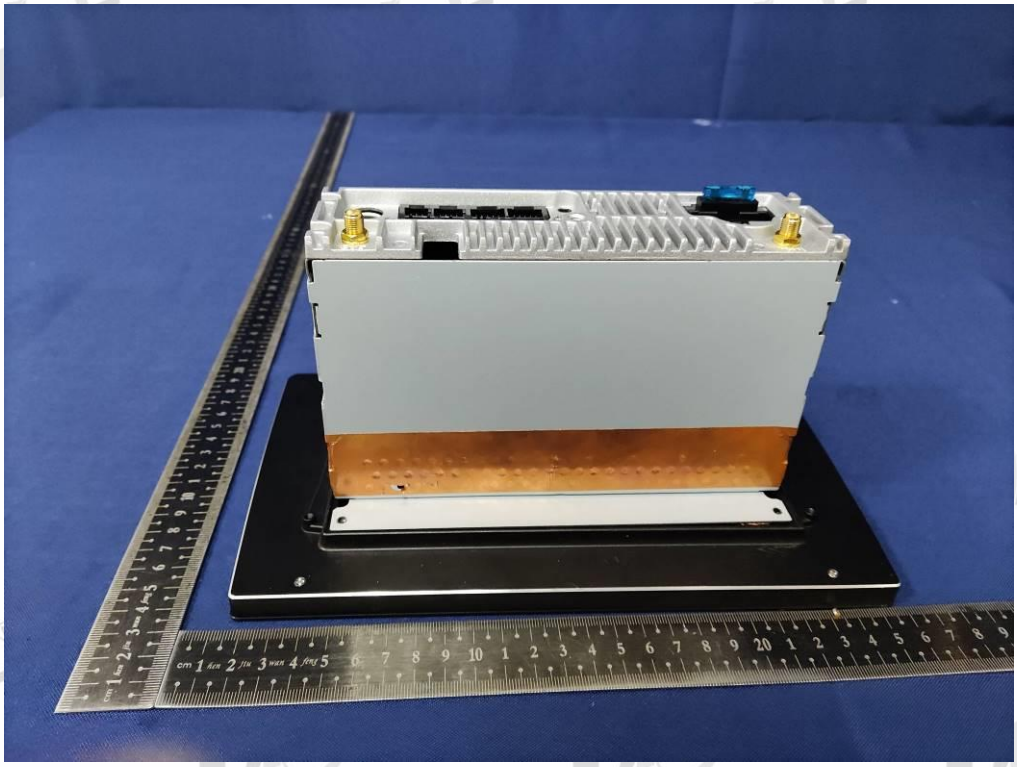
13. Photos of the EUT

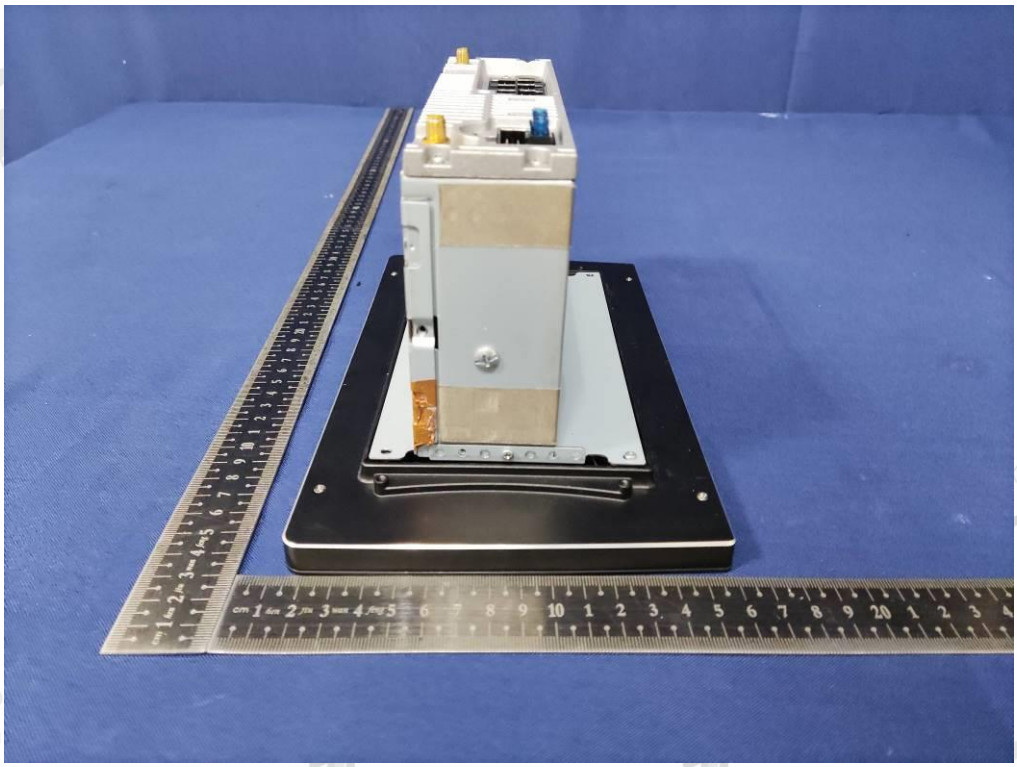


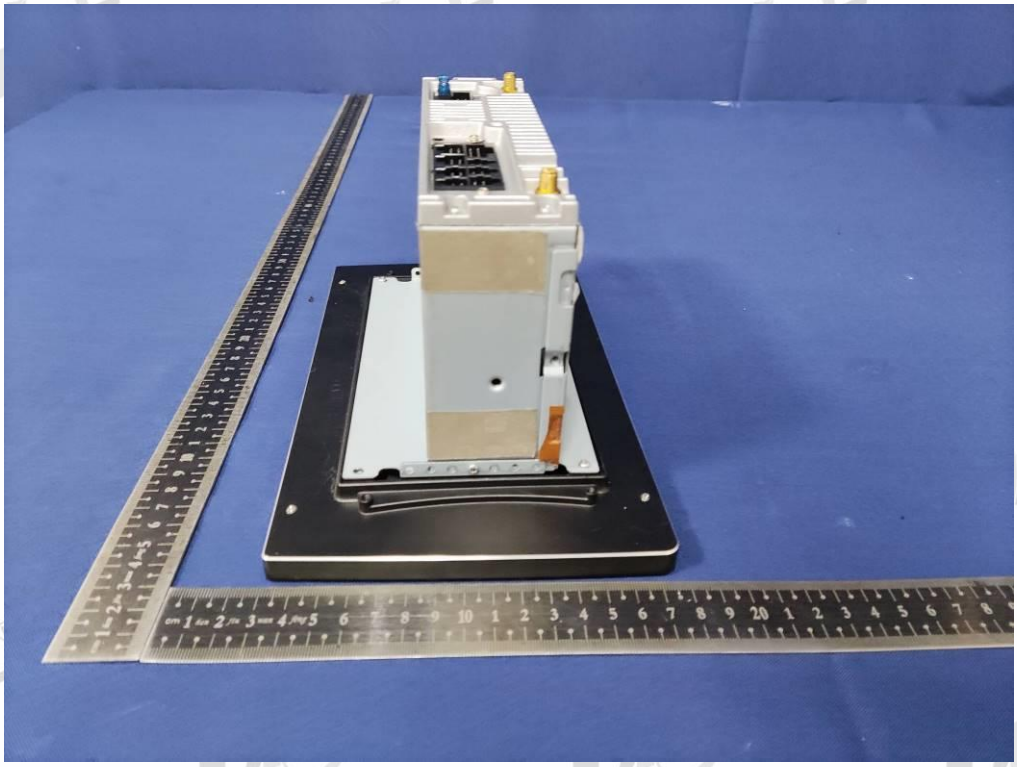


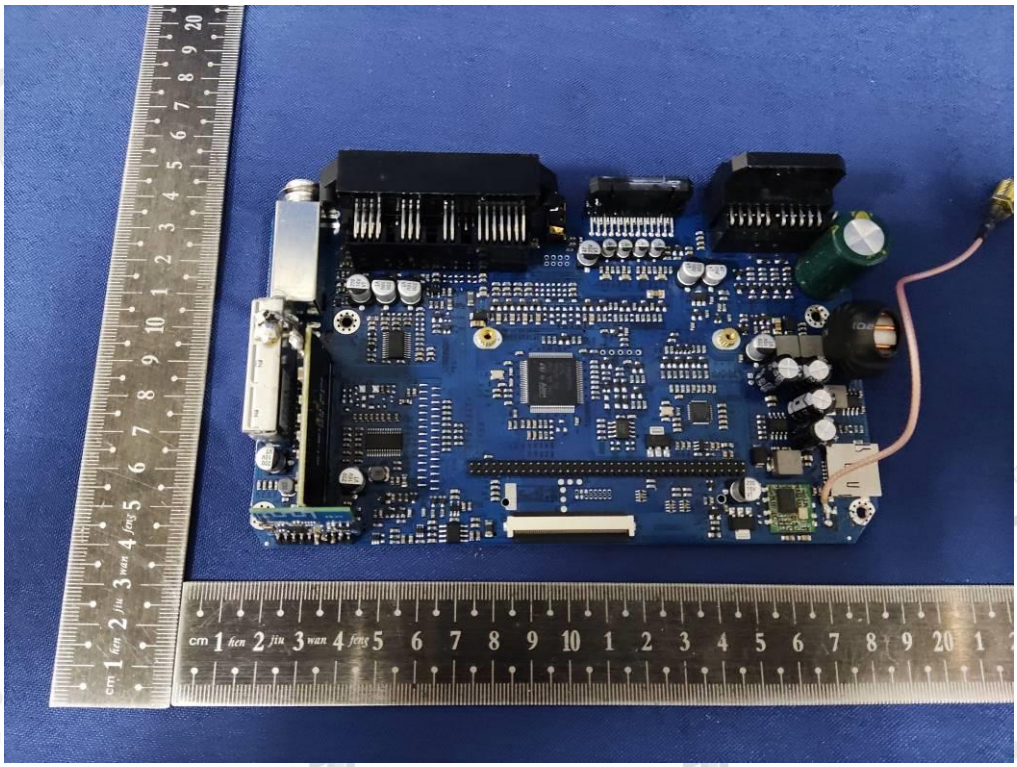


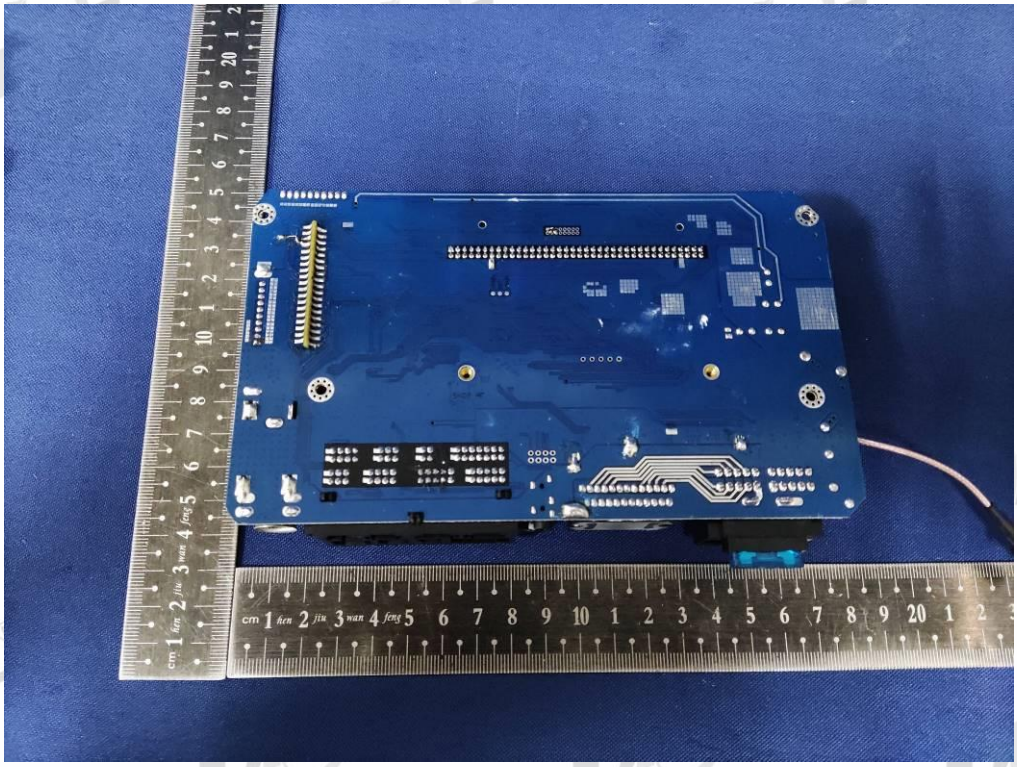












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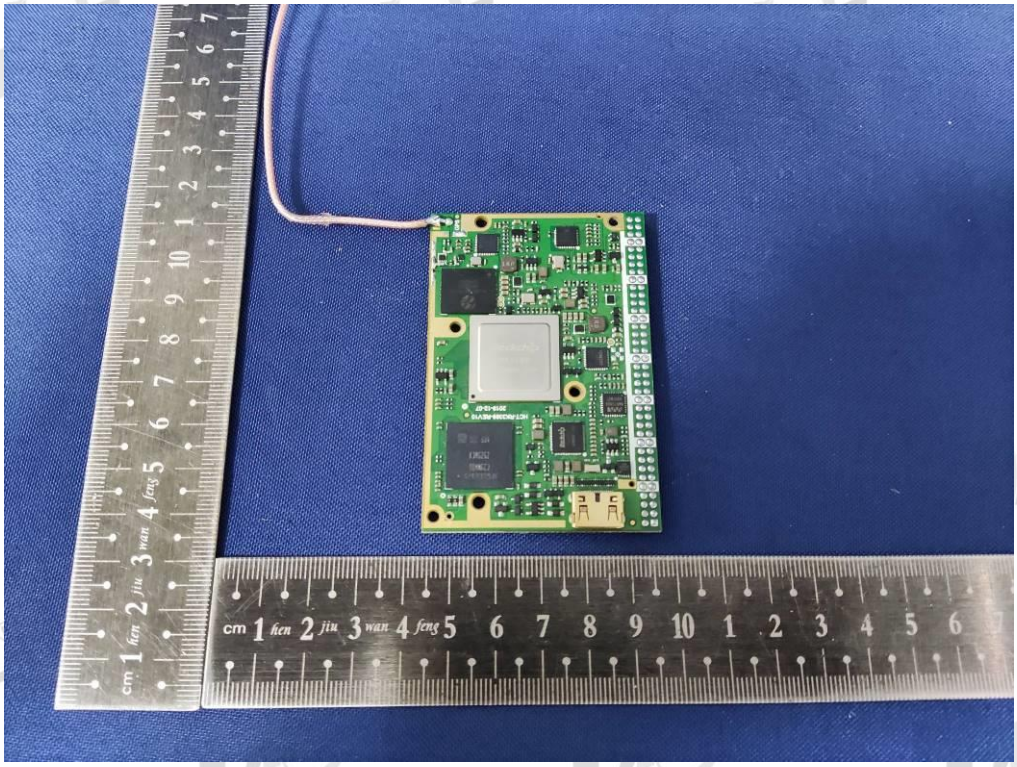

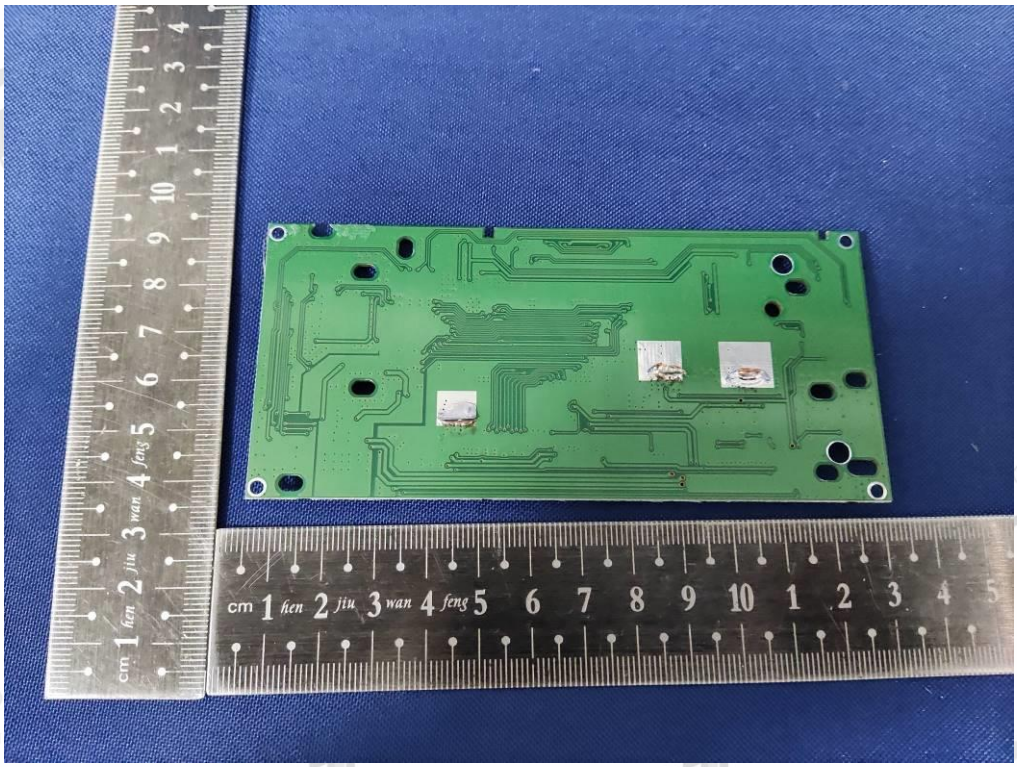

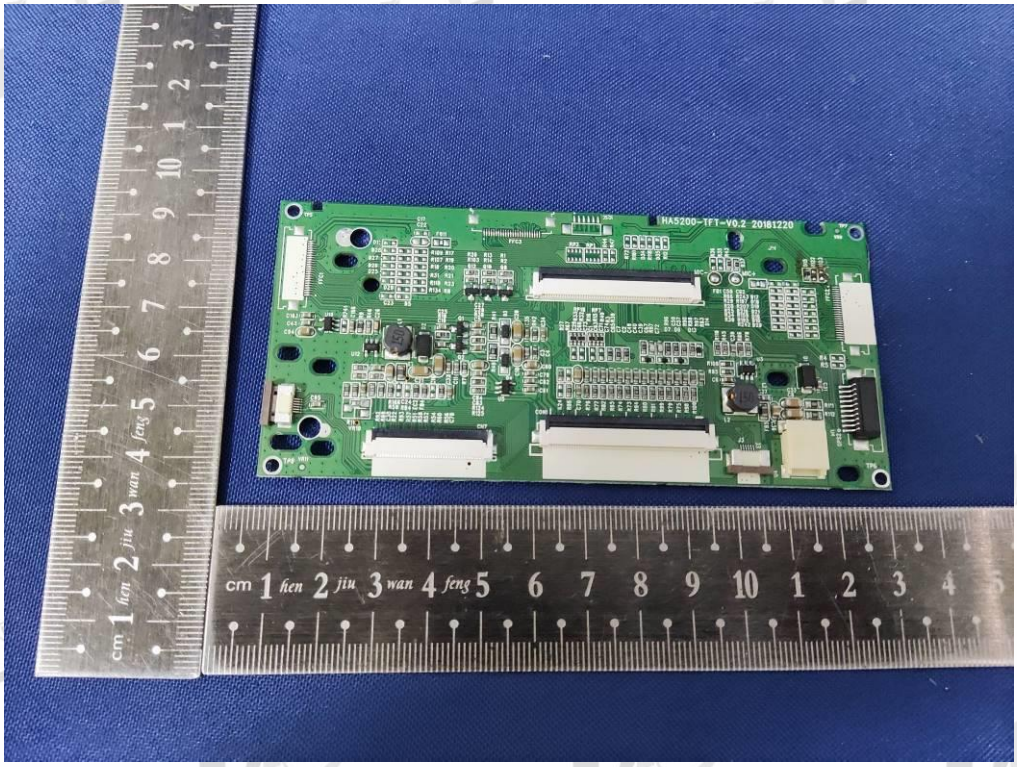
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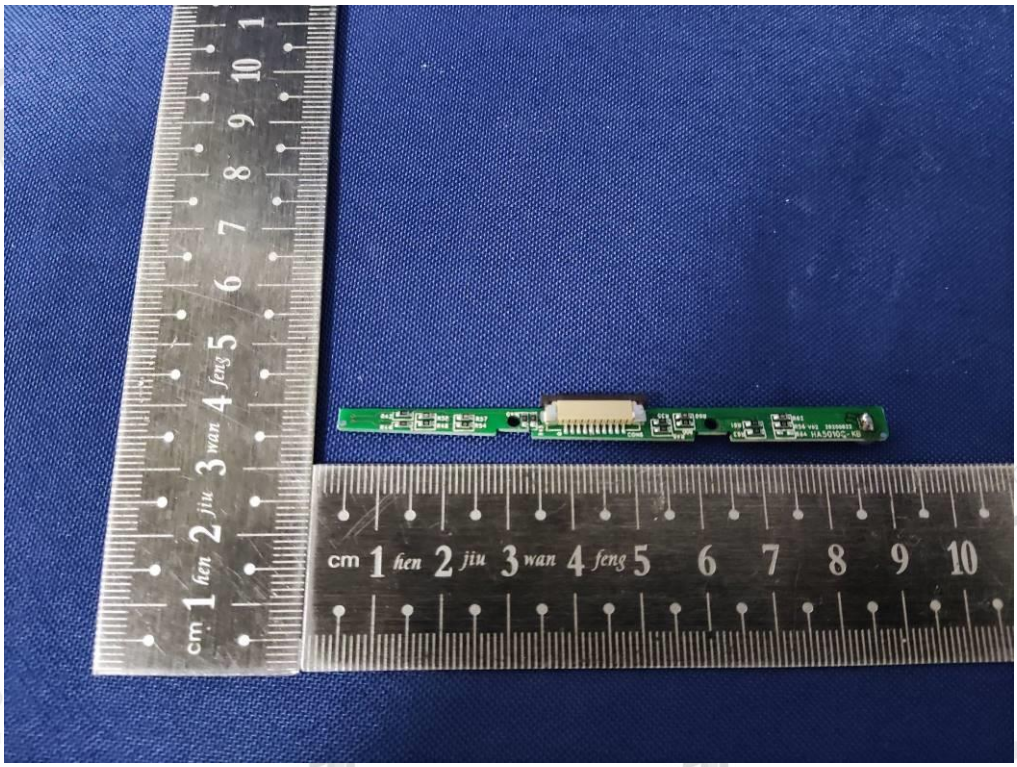

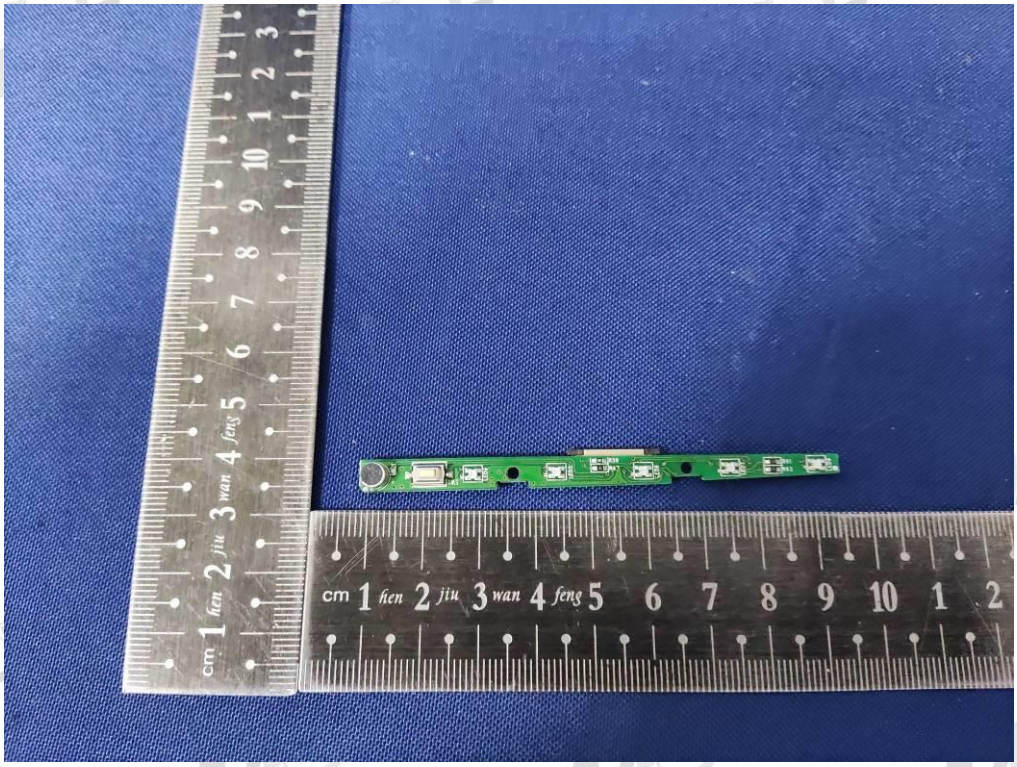

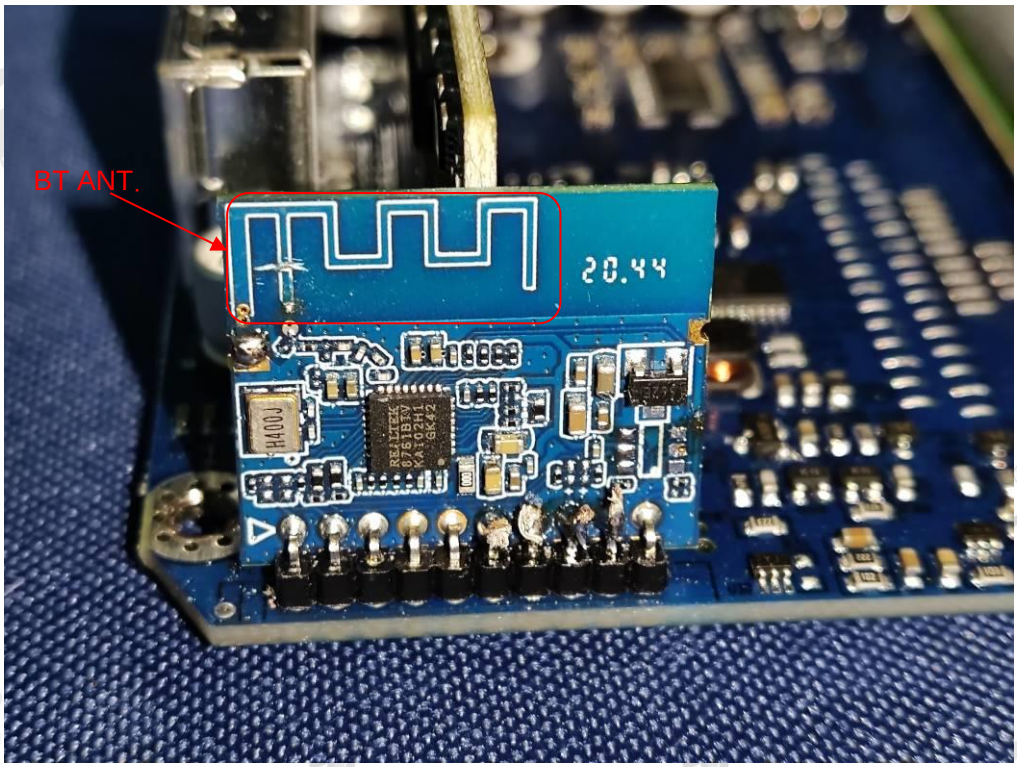
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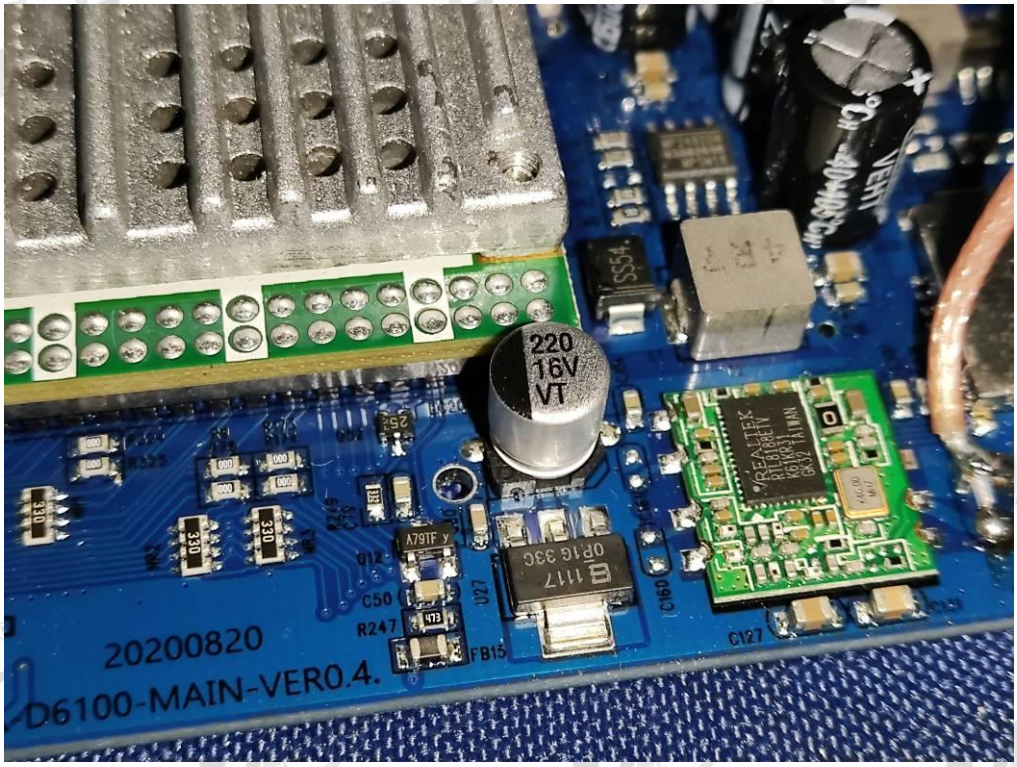
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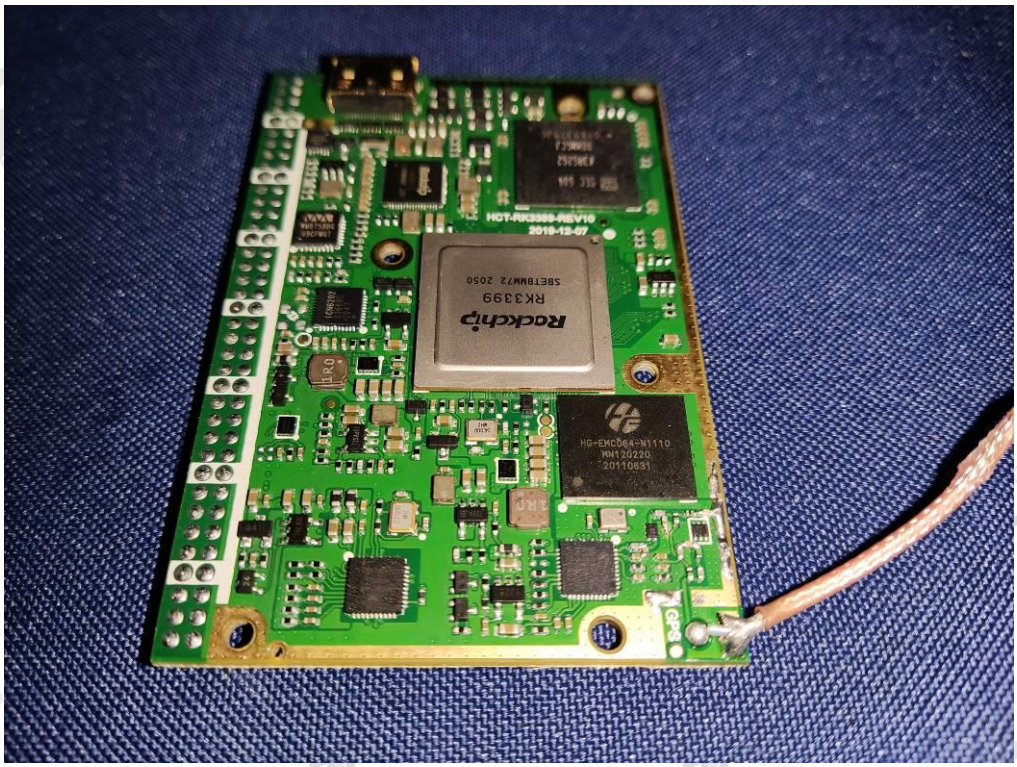
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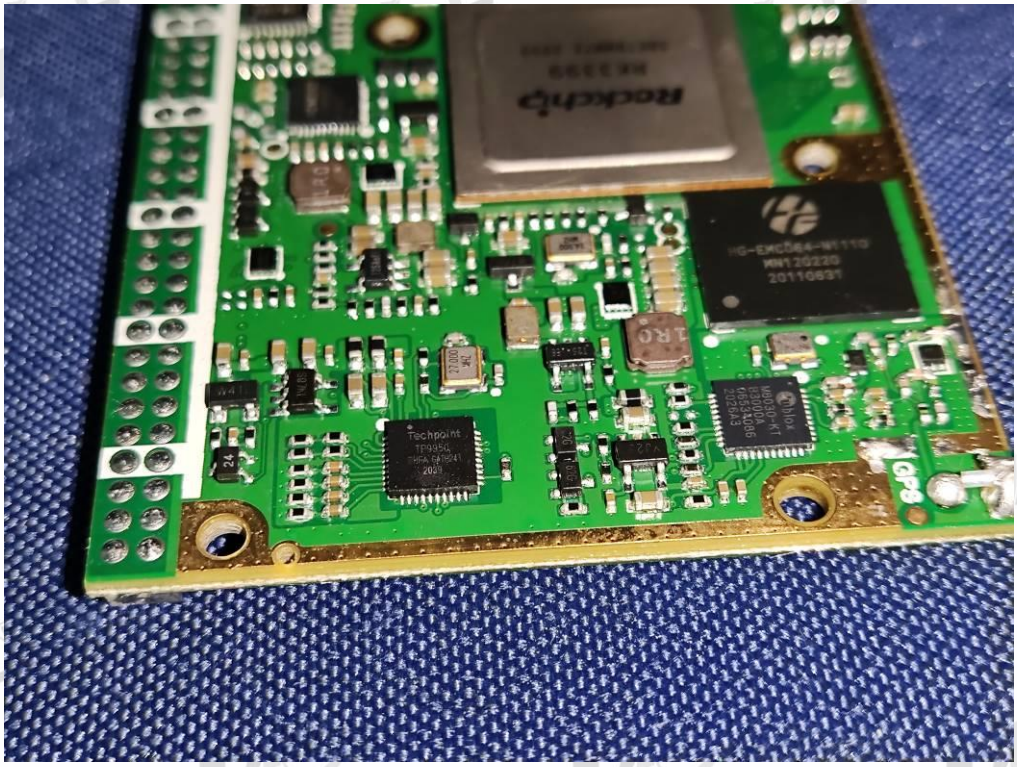
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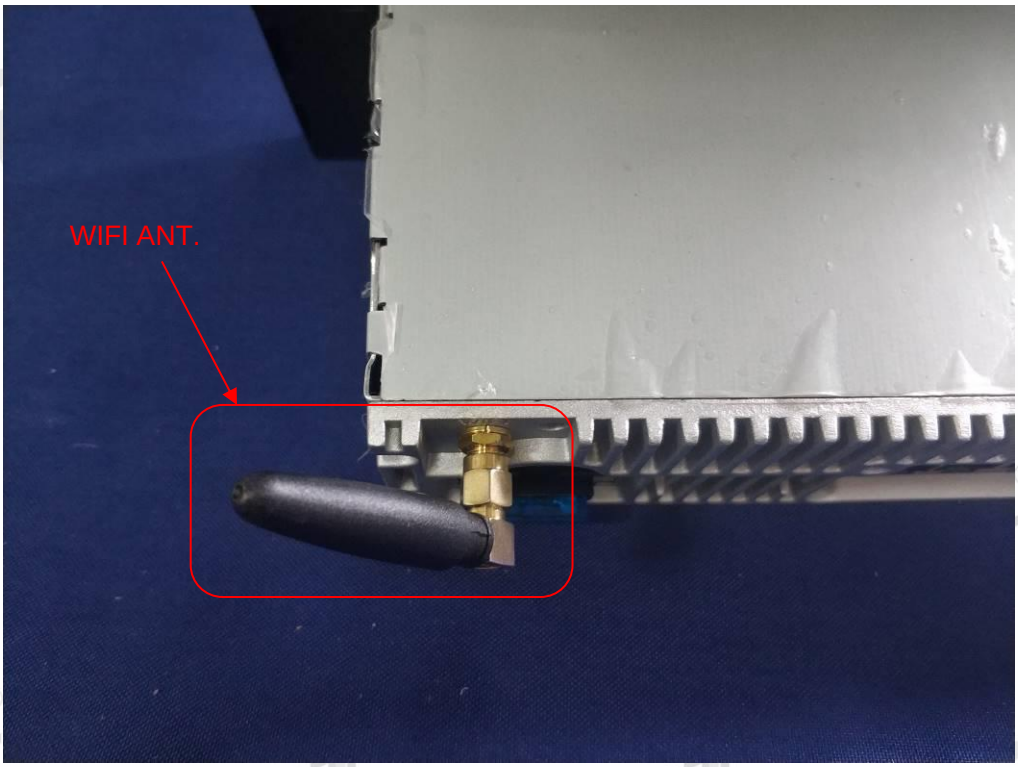
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END OF REPORT