



TEST REPORT

Report No. : **CHTEW21120072** **Report Verification:** 

Project No. : **SHT2111055605EW**

FCC ID : **2ADHNCATOME**

Applicant's name : **MATRIX COMSEC PVT. LTD.**

Address : **394-GIDC, MAKARPURA, VADODARA-390010, GUJARAT, INDIA**

Test item description : **COSEC ATOM RD300**

Trade Mark : 

Product Family : **COSEC ATOM**

Model/Type reference : **COSEC ATOM RD300SFE**

Listed Model(s) : **COSEC ATOM RD300MFE, COSEC ATOM RD200SFE, COSEC ATOM RD200MFE**

Standard : **FCC CFR Title 47 Part 15 Subpart C Section 15.209**

Date of receipt of test sample : **Nov.17, 2021**

Date of testing : **Nov.17, 2021- Dec.09, 2021**

Date of issue : **Dec.10, 2021**

Result : **PASS**

Compiled by
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Kiki Kong

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(Position+Printed name+Signature): **RF Manager Hans Hu**

Hans Hu

Testing Laboratory Name : **Shenzhen Huatongwei International Inspection Co., Ltd.**

Address : **1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China**

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The test report merely correspond to the test sample.

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1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 15.209](#): Radiated emission limits; general requirements

[ANSI C63.10-2013](#): American National Standard for Testing Unlicensed Wireless Devices.

1.2. Report version information

Revision No.	Date of issue	Description
N/A	2021-12-10	Original

2. TEST DESCRIPTION

Report clause	Test Item	Section in CFR 47	Result	Test Engineer
5.1	Antenna requirement	15.203	PASS	-
5.2	AC Power Line Conducted Emissions	15.207	PASS	Jian Li
5.3	20dB Occupied Bandwidth	2.1049	PASS	Hailey Chen
5.4	Spurious Emissions	15.209	PASS	Haoxin Luo

Noted: The measurement uncertainty is not included in the test result.

3. SUMMARY

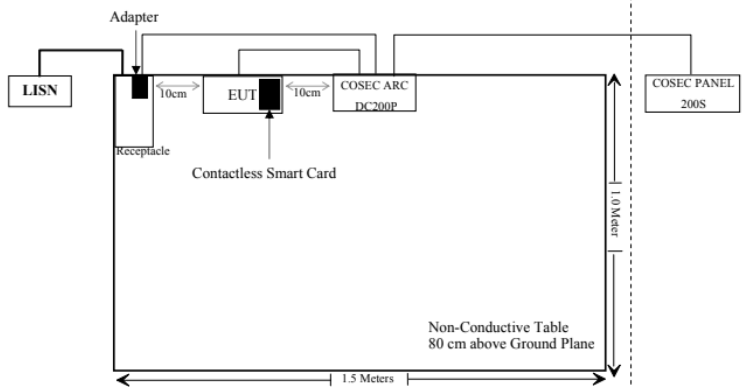
3.1. Client Information

Applicant:	MATRIX COMSEC PVT. LTD.
Address:	394-GIDC, MAKARPURA, VADODARA-390010, GUJARAT, INDIA
Manufacturer:	MATRIX COMSEC PVT. LTD.
Address:	15 & 19-GIDC, WAGHODIA, DIST.VADODARA-391760, GUJARAT, INDIA
Factory:	MATRIX COMSEC PVT. LTD.
Address:	15 & 19-GIDC, WAGHODIA, DIST.VADODARA-391760, GUJARAT, INDIA

3.2. Product Description

Product Family:	COSEC ATOM
Name of EUT:	COSEC ATOM RD300
Trade Mark:	
Model No.:	COSEC ATOM RD300SFE
Listed Model(s):	COSEC ATOM RD300MFE, COSEC ATOM RD200SFE, COSEC ATOM RD200MFE
Power supply:	9.0-14.0 Vdc , 330mA
Hardware version:	V1R1
Software version:	V1R2

3.3. Radio Specification Description

Operation frequency:	125kHz
Channel number:	1
Modulation Type:	ASK
Antenna type:	Coil antenna
Block diagram of the testing	

3.4. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	
Connect information:	Phone: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn	
Qualifications	Type	Accreditation Number
	FCC	762235

4. TEST CONFIGURATION

4.1. EUT operation mode

TEST MODE

For RF test items
The engineering test program was provided and enabled to make EUT continuous transmit.
For AC power line conducted emissions:
The engineering test program was provided and enabled to make EUT continuous transmit.

4.2. Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

Whether support unit is used?			
✓ No			
Item	Equipement	Trade Name	Model No.
1	COSEC PANEL LITE	MATRIX	--
2	COSEC VEGA FAX/COSEC ARC DC 200	MATRIX	--

4.3. Testing environmental condition

Type	Requirement	Actual
Temperature:	15~35°C	25°C
Relative Humidity:	25~75%	50%
Air Pressure:	860~1060mbar	1000mbar

4.4. Measurement uncertainty

Test Items	Measurement Uncertainty
AC Power Conducted Emissions	3.00 dB
Radiated emissions below 1GHz	4.36 dB
Radiated emissions above 1GHz	5.10 dB
Occupied Bandwidth	70Hz for <1GHz 130Hz for >1GHz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

4.5. Equipments Used during the Test

● Conducted Emission							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Shielded Room	Albatross projects	HTWE0114	N/A	N/A	2018/09/28	2023/09/27
●	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2021/9/14	2022/9/13
●	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2021/9/17	2022/9/16
●	Pulse Limiter	R&S	HTWE0033	ESH3-Z2	100499	2021/9/13	2022/9/12
●	RF Connection Cable	HUBER+SUHNER	HTWE0113-02	ENVIROFLEX_142	EF-NM-BNCM-2M	2021/9/17	2022/9/16
●	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

● Radiated emission-6th test site							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0127	SAC-3m-02	C11121	2018/09/30	2022/09/29
●	EMI Test Receiver	R&S	HTWE0099	ESCI	100900	2021/9/14	2022/9/13
●	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2021/04/06	2022/04/05
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0123	VULB9163	538	2021/04/06	2022/04/05
●	Pre-Amplifier	SCHWARZBECK	HTWE0295	BBV 9742	N/A	2021/11/5	2022/11/4
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-01	N/A	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-02	SUCOFLEX104	501184/4	2021/02/26	2022/02/25
●	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

● Radiated emission-7th test site							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	N/A	2018/09/27	2022/09/26
●	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2021/9/13	2022/9/12
●	Horn Antenna	SCHWARZBECK	HTWE0126	9120D	1011	2020/04/01	2023/03/31
●	Broadband Horn Antenna	SCHWARZBECK	HTWE0103	BBHA9170	BBHA9170472	2020/4/27	2023/4/27
●	Pre-amplifier	CD	HTWE0071	PAP-0102	12004	2021/11/5	2022/11/4
●	Broadband Pre-amplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2021/03/05	2022/03/04
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-01	6m 18GHz S Serisa	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-02	6m 3GHz RG Serisa	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0119-05	6m 3GHz RG Serisa	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-04	6m 3GHz RG Serisa	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0121-01	6m 18GHz S Serisa	N/A	2021/02/26	2022/02/25
●	Test Software	Audix	N/A	E3	N/A	N/A	N/A

● RF Conducted Method						
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Signal and spectrum Analyzer	R&S	FSV40	100048	2021/9/13	2022/9/12
●	Spectrum Analyzer	Agilent	N9020A	MY50510187	2021/9/13	2022/9/12
●	Power Meter	Anritsu	ML249A	N/A	2021/9/13	2022/9/12
○	Radio communication tester	R&S	CMW500	137688-Lv	2021/9/13	2022/9/12

5. TEST CONDITIONS AND RESULTS

5.1. Antenna requirement

Requirement

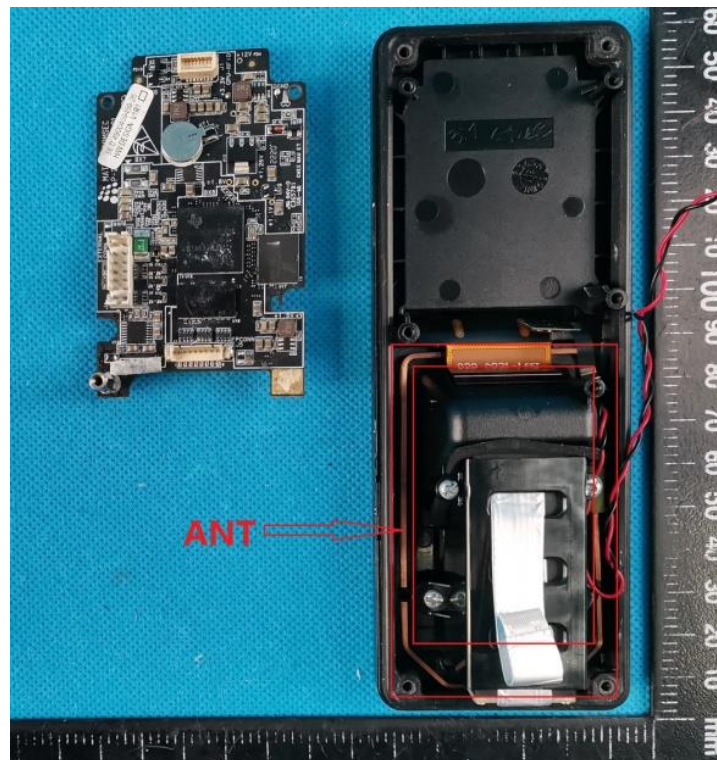
FCC CFR Title 47 Part 15 Subpart C Section 15.203:

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. 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.

TEST RESULTS

☒ Passed ☐ Not Applicable

The antenna type is a Coil antenna, please refer to the below antenna photo.



5.2. AC Power Conducted Emissions

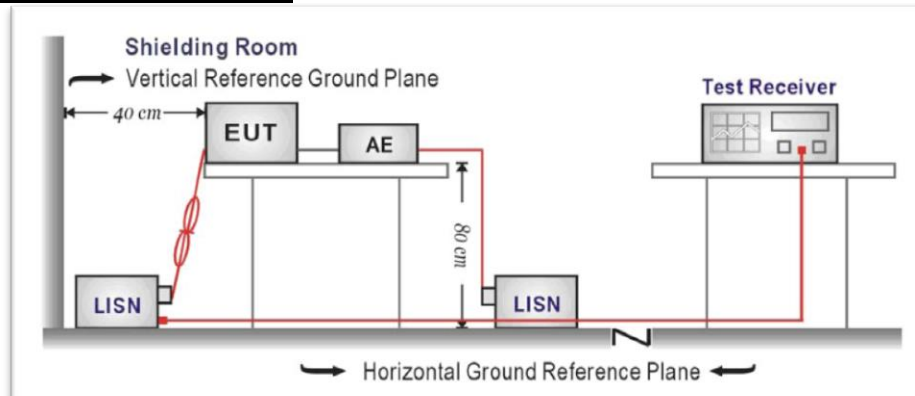
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207:

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

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was setup according to ANSI C63.10
2. The EUT was placed on a plat form of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50ohm / 50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST MODE:

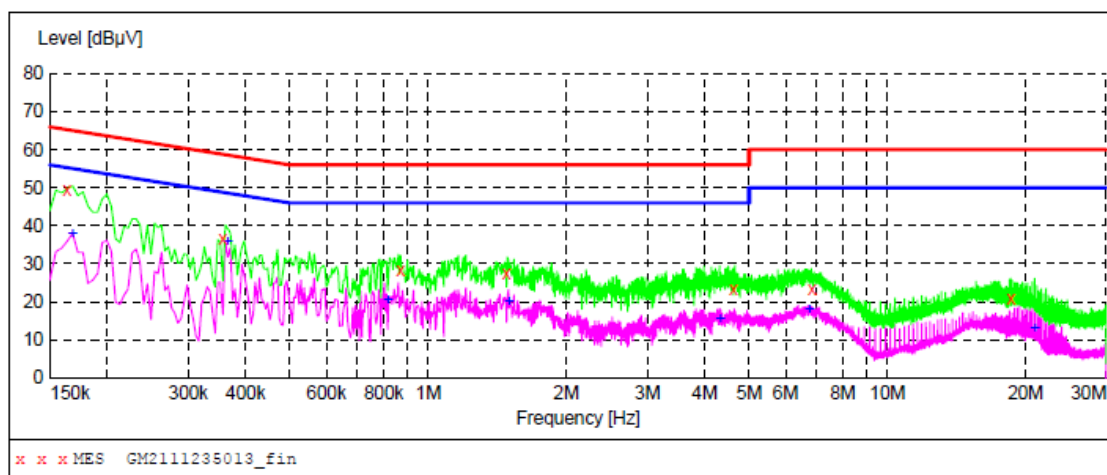
Please refer to the clause 4.1

TEST RESULTS

☒ Passed ☐ Not Applicable

Test Line:

L

**MEASUREMENT RESULT: "GM2111235013_fin"**

11/23/2021 9:59AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.163500	49.60	10.1	65	15.7	QP	L1	GND
0.357000	36.80	10.1	59	22.0	QP	L1	GND
0.870000	28.20	10.1	56	27.8	QP	L1	GND
1.477500	27.40	10.1	56	28.6	QP	L1	GND
4.614000	23.20	10.3	56	32.8	QP	L1	GND
6.841500	23.30	10.4	60	36.7	QP	L1	GND
18.568500	20.80	10.7	60	39.2	QP	L1	GND

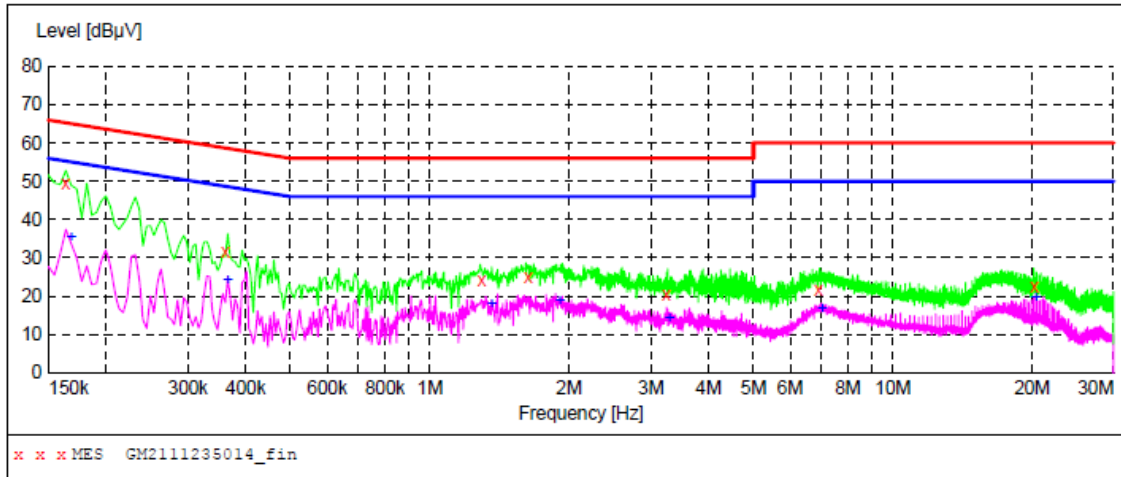
MEASUREMENT RESULT: "GM2111235013_fin2"

11/23/2021 9:59AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.168000	37.90	10.1	55	17.2	AV	L1	GND
0.366000	35.60	10.1	49	13.0	AV	L1	GND
0.816000	20.30	10.1	46	25.7	AV	L1	GND
1.500000	20.10	10.1	46	25.9	AV	L1	GND
4.326000	15.50	10.3	46	30.5	AV	L1	GND
6.756000	18.00	10.4	50	32.0	AV	L1	GND
20.926500	12.80	10.7	50	37.2	AV	L1	GND

Test Line:

N

**MEASUREMENT RESULT: "GM2111235014_fin"**

11/23/2021 10:03AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.163500	49.60	10.1	65	15.7	QP	N	GND
0.361500	31.70	10.1	59	27.0	QP	N	GND
1.293000	24.30	10.1	56	31.7	QP	N	GND
1.630500	25.10	10.1	56	30.9	QP	N	GND
3.241500	20.50	10.2	56	35.5	QP	N	GND
6.909000	21.80	10.4	60	38.2	QP	N	GND
20.175000	22.40	10.7	60	37.6	QP	N	GND

MEASUREMENT RESULT: "GM2111235014_fin2"

11/23/2021 10:03AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.168000	35.40	10.1	55	19.7	AV	N	GND
0.366000	24.30	10.1	49	24.3	AV	N	GND
1.360500	17.80	10.1	46	28.2	AV	N	GND
1.909500	18.60	10.1	46	27.4	AV	N	GND
3.286500	14.20	10.2	46	31.8	AV	N	GND
7.030500	16.80	10.4	50	33.2	AV	N	GND
20.418000	19.70	10.7	50	30.3	AV	N	GND

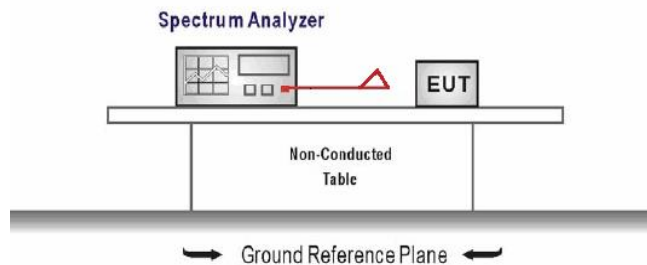
5.3. 20dB Bandwidth

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.215

Intentional radiators must be designed to ensure that the 20dB emission bandwidth in the specific band.

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
RBW $\geq$ 1% of the 20 dB bandwidth, VBW $\geq$ RBW
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

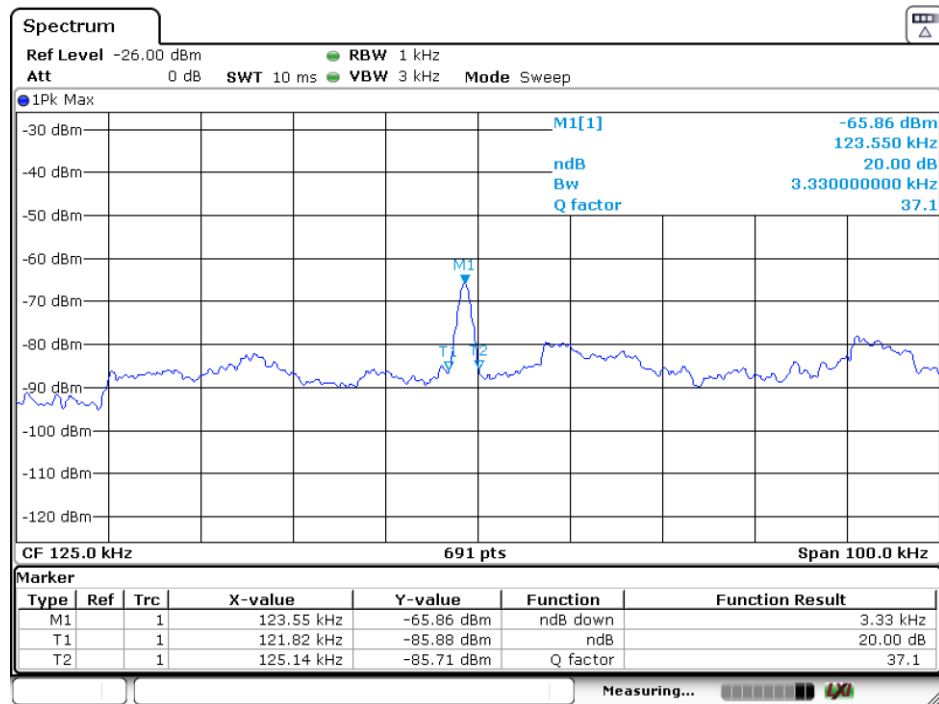
TEST MODE:

Please refer to the clause 4.1

TEST RESULTS

☒ Passed ☐ Not Applicable

Test Channel	20dB Bandwidth (KHz)	Limit (KHz)	Result
00	3.33	-	Pass



Date: 24.NOV.2021 16:14:59

5.4. Radiated Emission

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

Limit for frequency below 30MHz:

Frequency	Limit (uV/m)	Measurement Distance(m)	Remark
0.009~0.490	2400/F(kHz)	300	Quasi-peak
0.490~1.705	24000/F(kHz)	30	Quasi-peak
1.705~30.0	30	30	Quasi-peak

Note: Limit dBuV/m @3m = Limit dBuV/m @300m + 40*log(300/3)= Limit dBuV/m @300m +80,

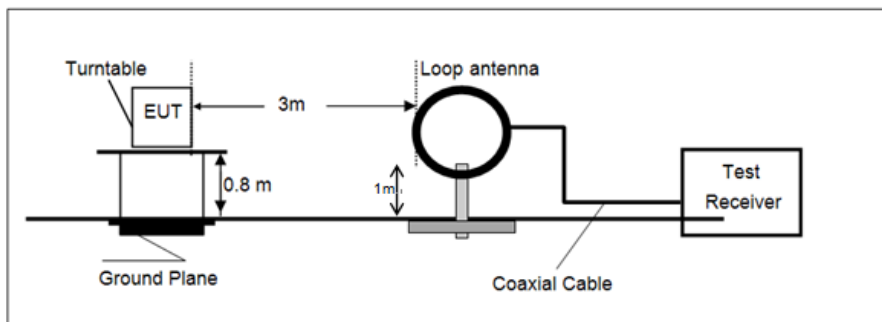
Limit dBuV/m @3m = Limit dBuV/m @30m +40*log(30/3)= Limit dBuV/m @30m + 40.

Limit for frequency above 30MHz:

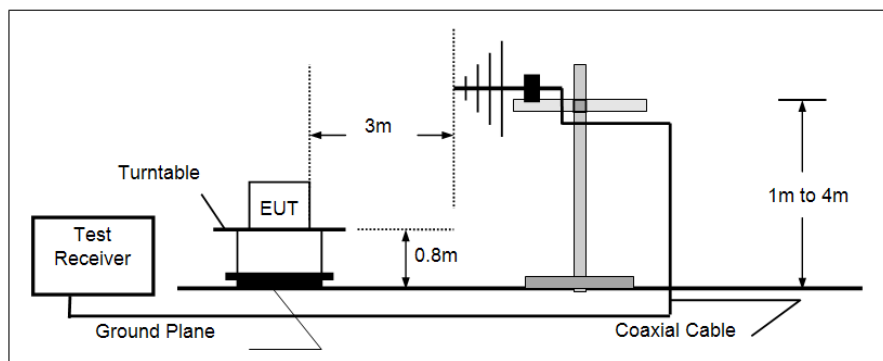
Frequency	Limit (dBuV/m@3m)	Remark
30MHz~88MHz	40.00	Quasi-peak
88MHz~216MHz	43.50	Quasi-peak
216MHz~960MHz	46.00	Quasi-peak
960MHz~1GHz	54.00	Quasi-peak

TEST CONFIGURATION

- 9 kHz ~ 30 MHz



- 30 MHz ~ 1 GHz



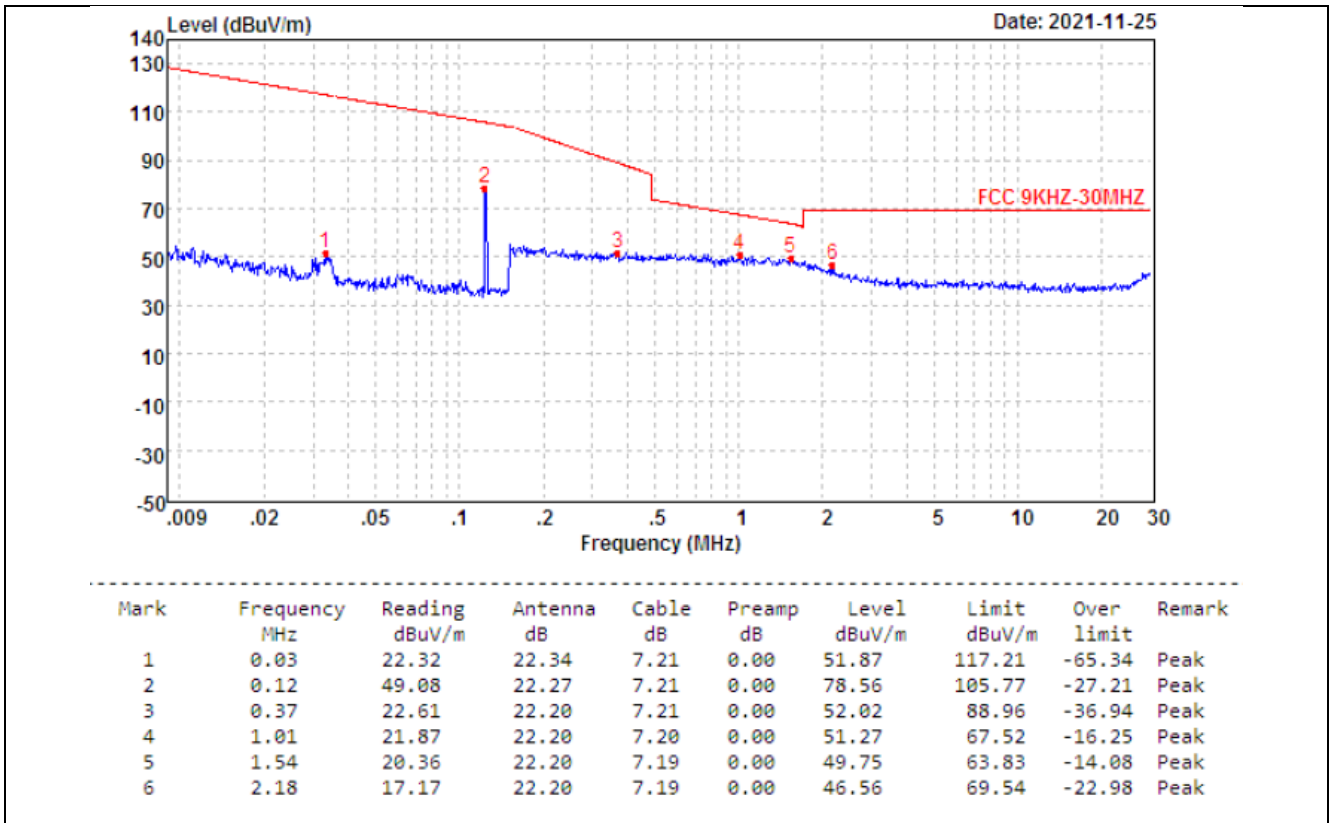
TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10 requirements.
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 30MHz:
RBW=10 kHz, VBW=30 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
 - (3) 30MHz to 1 GHz:
RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
 - (4) From 1 GHz to 10th harmonic:
RBW=1MHz, VBW=3MHz Peak detector for Peak value.
RBW=1MHz, VBW=3MHz RMS detector for Average value.

TEST MODE:

Please refer to the clause 4.1

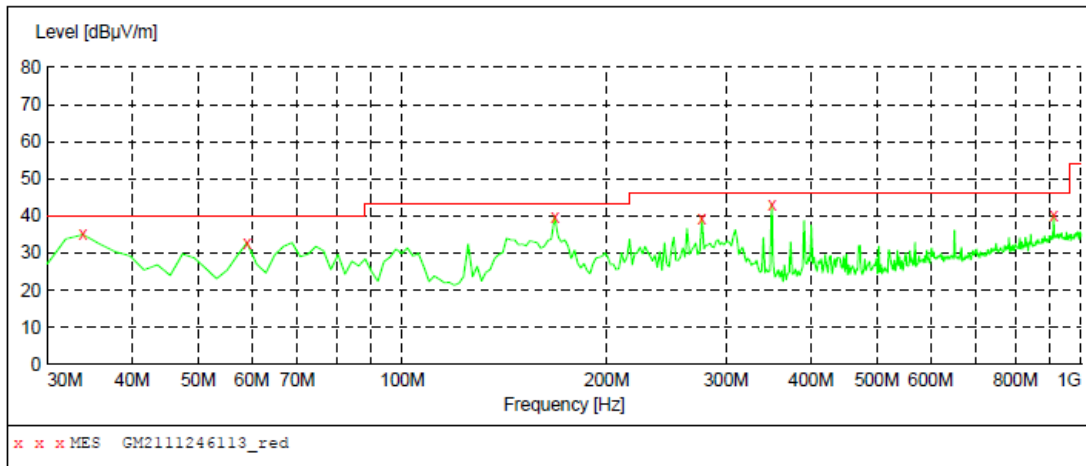
TEST RESULTS
☒ Passed

 ☐ Not Applicable
Below 30MHz:

Above 30MHz:

Polarization:

Vertical

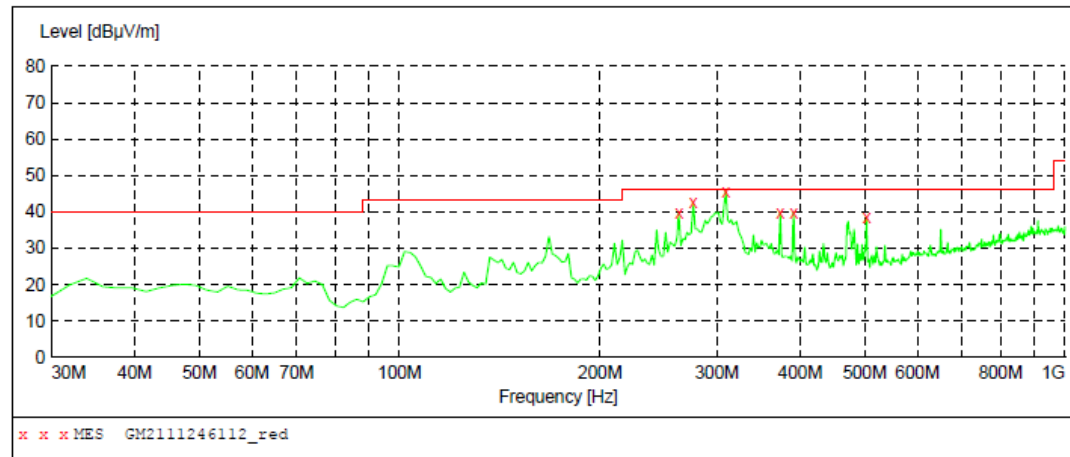
**MEASUREMENT RESULT: "GM2111246113_red"**

11/24/2021 9:41PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
33.880000	35.00	-11.9	40.0	5.0	QP	100.0	220.00	VERTICAL
59.100000	32.80	-9.7	40.0	7.2	QP	100.0	40.00	VERTICAL
167.740000	39.80	-13.0	43.5	3.7	QP	100.0	161.00	VERTICAL
276.380000	39.40	-7.8	46.0	6.6	QP	100.0	161.00	VERTICAL
350.100000	43.20	-5.0	46.0	2.8	QP	100.0	151.00	VERTICAL
910.760000	40.00	7.5	46.0	6.0	QP	100.0	304.00	VERTICAL

Polarization:

Horizontal

**MEASUREMENT RESULT: "GM2111246112_red"**

11/24/2021 9:39PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
262.800000	39.60	-8.1	46.0	6.4	QP	100.0	111.00	HORIZONTAL
276.380000	42.50	-7.8	46.0	3.5	QP	100.0	317.00	HORIZONTAL
309.360000	45.50	-6.9	46.0	0.5	QP	100.0	317.00	HORIZONTAL
373.380000	39.60	-4.9	46.0	6.4	QP	100.0	317.00	HORIZONTAL
390.840000	39.90	-4.2	46.0	6.1	QP	100.0	301.00	HORIZONTAL
503.360000	38.30	-1.4	46.0	7.7	QP	100.0	0.00	HORIZONTAL

6. TEST SETUP PHOTOS

Conducted Emissions (AC Mains)



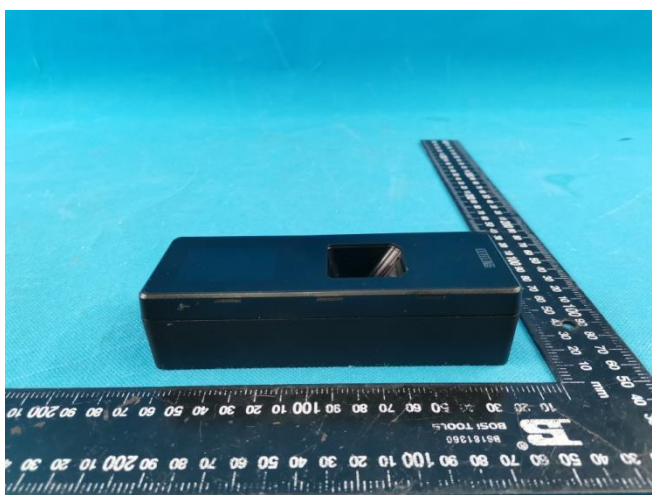
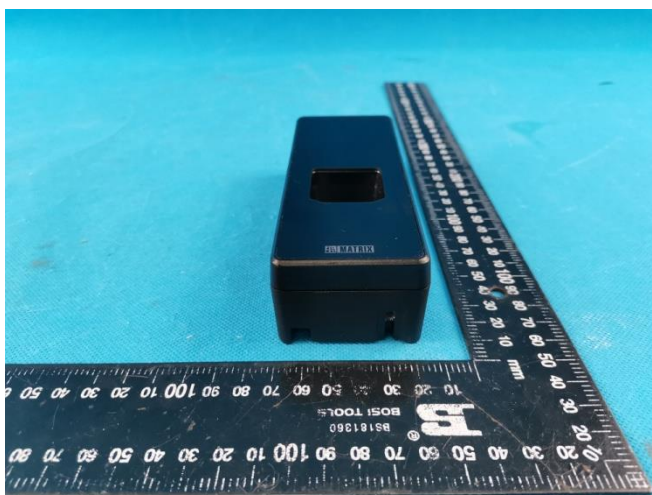
Radiated Emissions

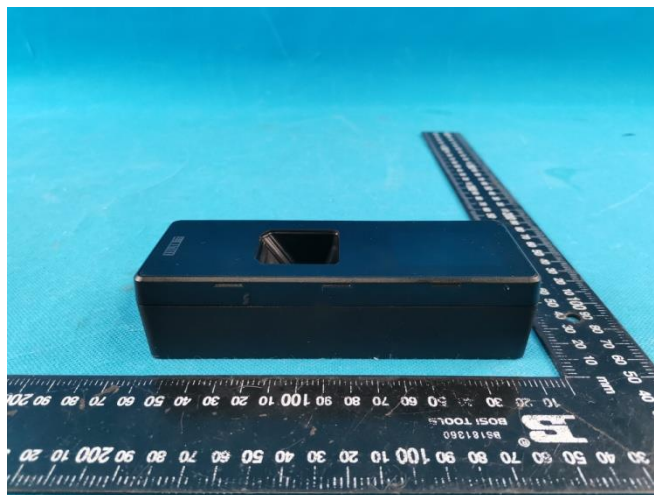
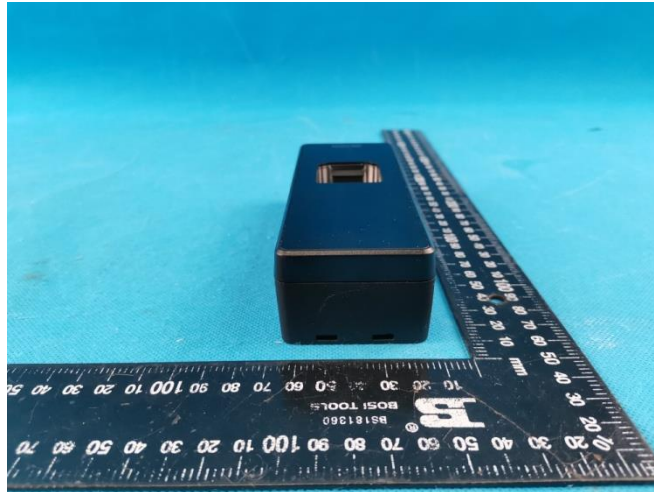


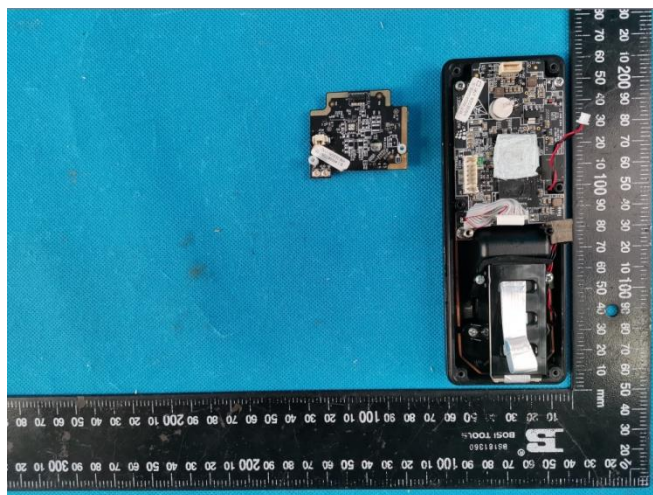
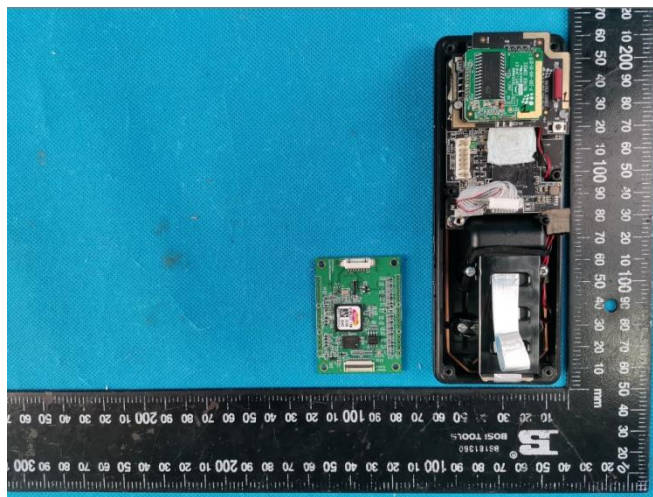


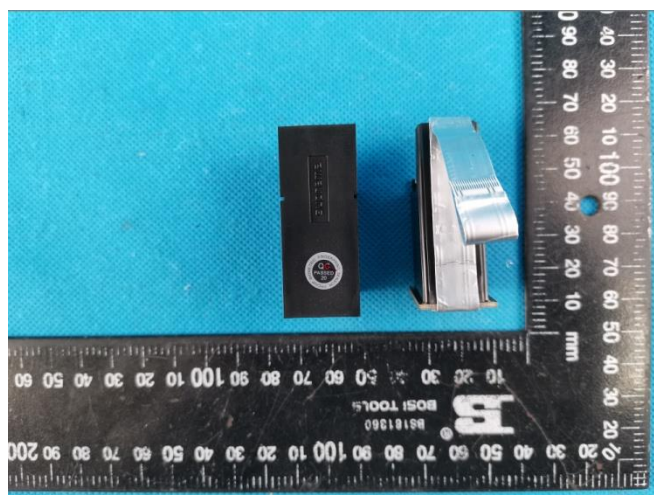
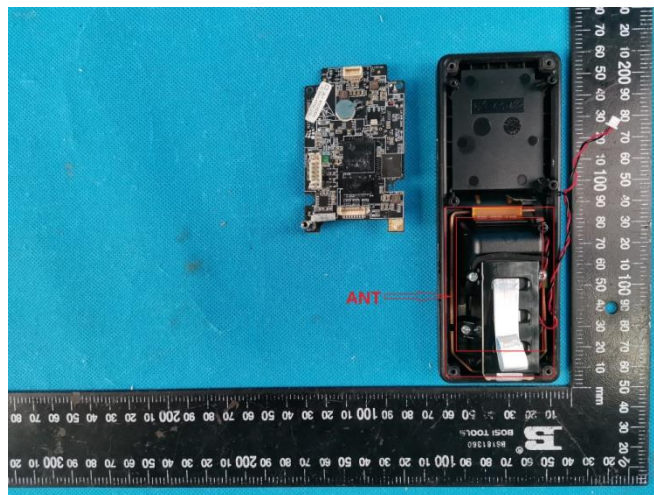
7. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

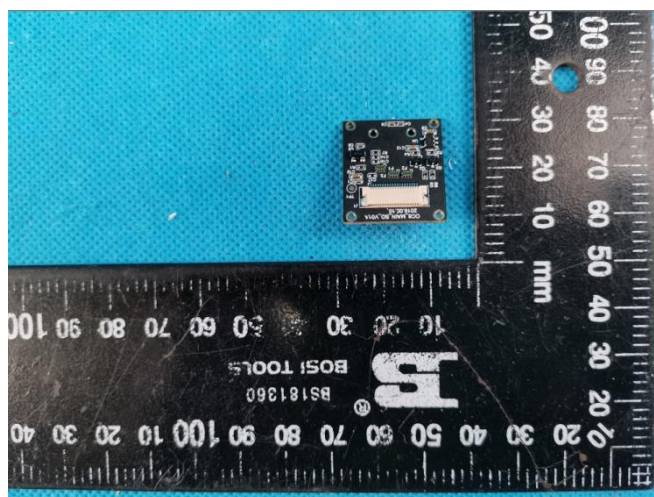
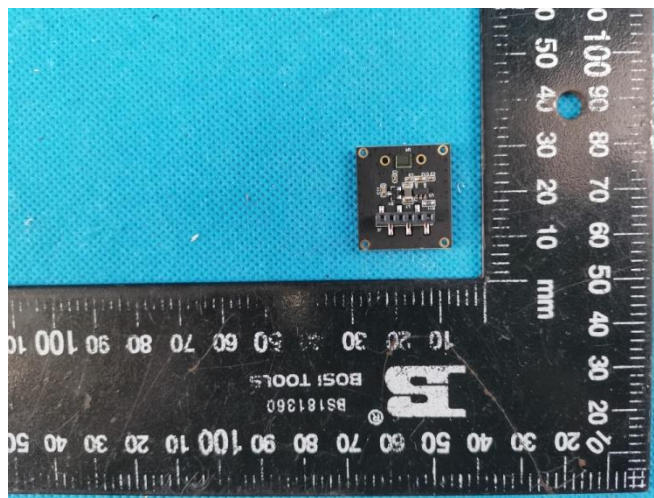
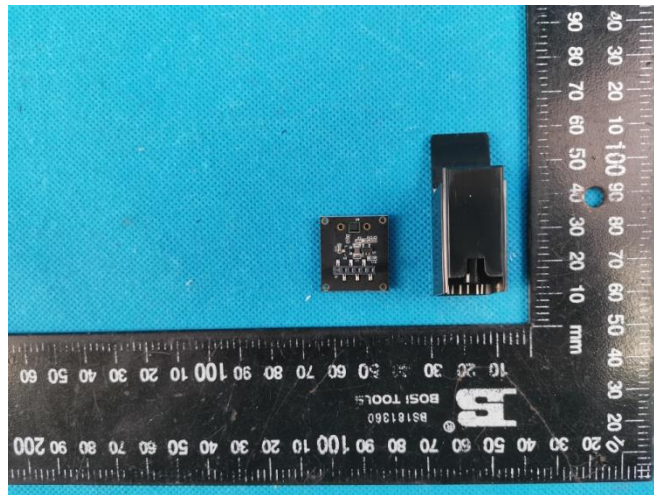
External Photos

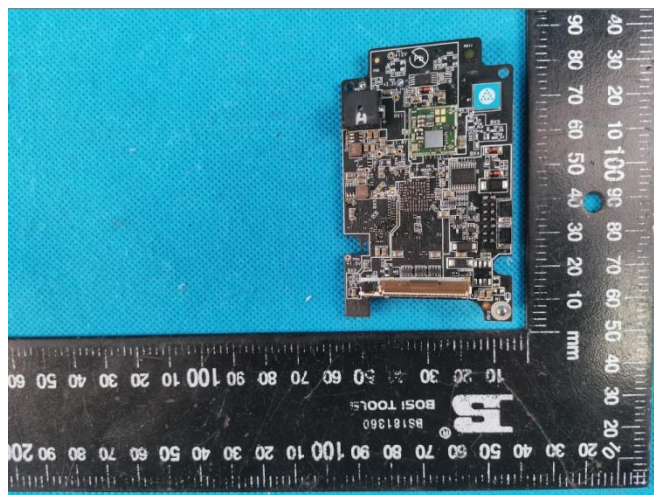
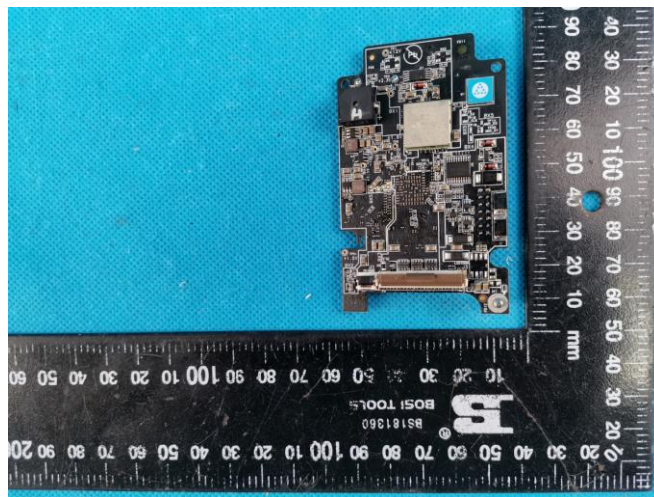
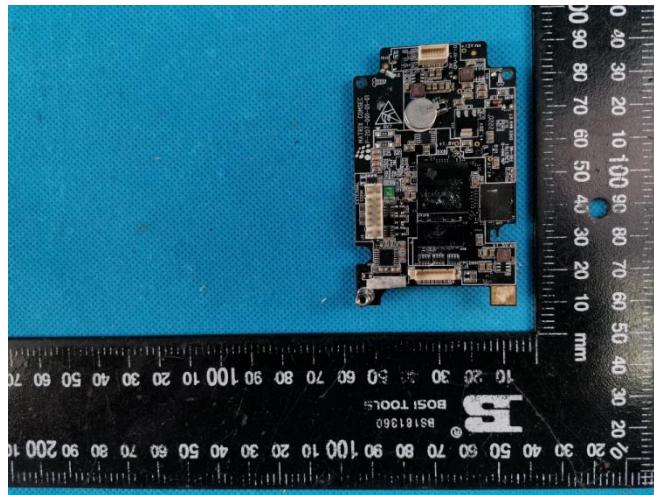


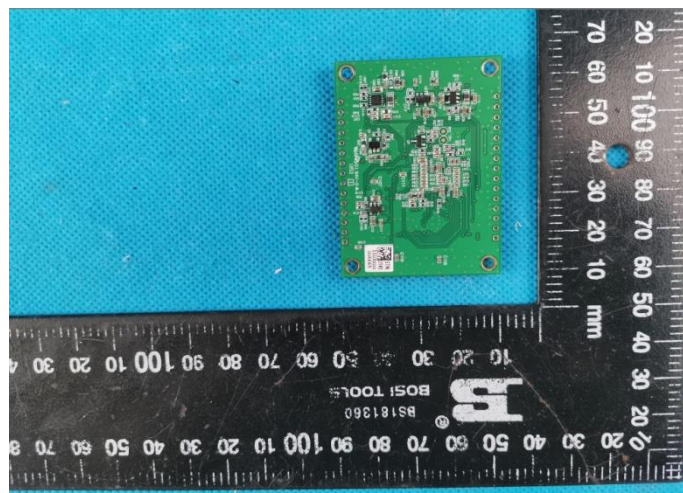
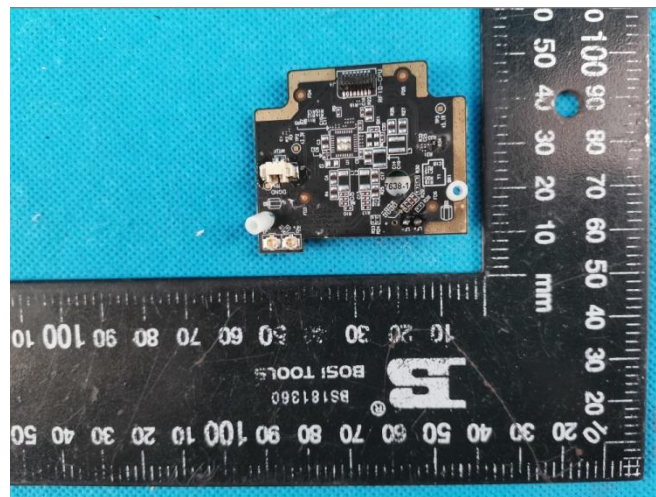
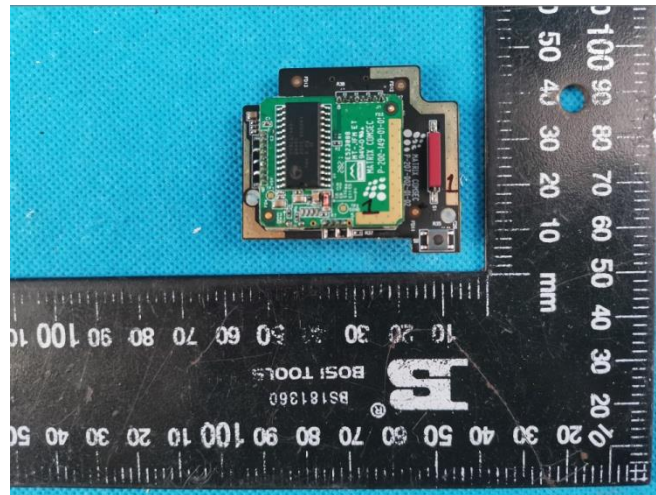


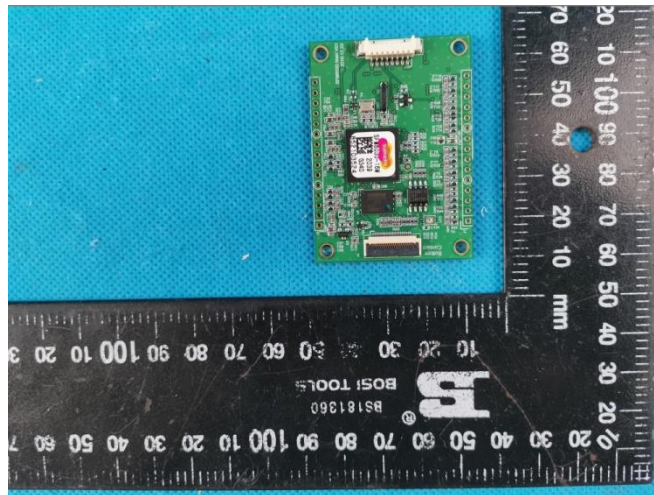
Internal Photos











-----End of Report-----