

RED-EMC Test Report

For

ASBISc Enterprises PLC

Kids Smartwatch

Model No.: CNE-KW21, CNE-KW21XX(XX could be A-Z)

Prepared For : ASBISc Enterprises PLC
Address : 43 Kolonakiou street, Diamond Court, 4103, Ayios Athabasilos, Limassol,
Cyprus

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TEST REPORT

Applicant : ASBISc Enterprises PLC
Manufacturer : ASBISc Enterprises PLC
Product Name : Kids Smartwatch
Model No. : CNE-KW21, CNE-KW21XX (XX could be A-Z)
Trade Mark : Canyon
Rating(s) : Input: DC 3.8V, 500mA (with DC 3.7V, 400 mAh Battery inside)

Test Standard(s) : ETSI EN 301 489-1 V2.2.0 (2017-03)
ETSI EN 301 489-52 V1.1.0 (2016-11)
EN 55032: 2015
EN 55024: 2010+A1: 2015

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN 301 489-1 & EN 301 489-52, EN 55032 and EN 55024 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test

Jan. 03~ 19, 2019

Prepared By



Oliay Yang

(Engineer / Oliay Yang)

Reviewer

Snowy Meng

(Supervisor / Snowy Meng)

Approved & Authorized Signer

Sally Zhang

(Manager / Sally Zhang)

1. General Information

1.1. Client Information

Applicant	:	ASBISc Enterprises PLC
Address	:	43 Kolonakiou street, Diamond Court, 4103, Ayios Athabasilos, Limassol, Cyprius
Manufacturer	:	ASBISc Enterprises PLC
Address	:	43 Kolonakiou street, Diamond Court, 4103, Ayios Athabasilos, Limassol, Cyprius
Factory	:	Jiangsu JinYiDa Energy Technology Co.,Ltd
Address	:	JingKou Industrial Park, JingKou District, Zhenjiang City

1.2. Description of Device (EUT)

Product Name	:	Kids Smartwatch
Model No.	:	CNE-KW21, CNE-KW21XX(XX could be A-Z) (Note: All samples are the same except the appearance, so we prepare "CNE-KW21" for test only.)
Trade Mark	:	Canyon
Test Power Supply	:	AC 110V/50Hz, AC 230V/50Hz, DC 3.7V Battery inside
Test Sample No.	:	S1,S2
Product Description	Operation Frequency:	GSM 900: 880 -915 MHz (TX); 935 - 960 MHz (RX) DCS1800: 1710 -1785 MHz (TX); 1805-1880 MHz (RX)
	Modulation Type:	GSM900/1800: GMSK
	Antenna Type:	GSM900/1800: PIFA Antenna
	Antenna Gain(Peak):	GSM 900: -2.53 dBi DCS1800: 0.72 dBi
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		

1.3. Auxiliary Equipment Used During Test

Adapter	:	Manufacturer: ZTE M/N: STC-A2050I1000USBA-C S/N: 201202102100876 Input: 100-240V~ 50/60Hz, 0.3A Output: DC 5V, 1000mA
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1.4. Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Charge&Normal Mode
Mode 2	GSM900 Mode
Mode 3	DCS1800 Mode

For Conducted Emission	
Final Test Mode	Description
Mode 1	Charge&Normal Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	Charge&Normal Mode
Mode 2	GSM900 Mode
Mode 3	DCS1800 Mode

1.5. Test Equipment List

Conducted Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Nov. 05, 2018	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 05, 2018	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 05, 2018	1 Year
4.	Software Name EZ-EMC	Ferrari Tcchnology	ANB-03A	N/A	N/A	N/A
5.	Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	104209	Nov. 05, 2018	1 Year

Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Nov. 05, 2018	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 19, 2018	1 Year
3.	Pre-amplifier	SONOMA	310N	186860	Nov. 05, 2018	1 Year
4.	Software Name EZ-EMC	Ferrari Tcchnology	ANB-03A	N/A	N/A	N/A
5.	Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	104209	Nov. 05, 2018	1 Year
6.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
7.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 05, 2018	1 Year
8.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	Nov. 05, 2018	1 Year
9.	Horn Antenna	A-INFO	LB-180400-K F	J211060628	Nov. 20, 2018	1 Year

Electrostatic Discharge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Simulators	3Ctest	ESD-30T	ES0131505	Nov. 05, 2018	1 Year
2.	Audio analyzer	keysight	U8903A	MY51130011	Nov. 05, 2018	1 Year
3.	Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	104209	Nov. 05, 2018	1 Year

R/S Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	RF Power Meter. Dual Channel	BOONTON	4232A	10539	Nov. 05, 2018	1 Year
2	50ohm Diode Power Sensor	BOONTON	51011EMC	34236/36164	Nov. 05, 2018	1 Year
3	Broad-Band Horn Antenna	SCHWARZBECK	BBHA9120 L3F	332	Nov. 05, 2018	1 Year
4	Power Amplifier (0.08-1G)	MILMEGA	80RF1000-175	1059345	Nov. 05, 2018	1 Year
5	Power Amplifier (1-2G)	MILMEGA	AS0102-55	1018770	Nov. 05, 2018	1 Year
6	Power Amplifier (2-6G)	MILMEGA	AS1860-50	1059346	Nov. 05, 2018	1 Year
7	Signal Generator	Agilent	N5181A	MY50145187	Nov. 05, 2018	1 Year
8	Field Strength Meter	HOLADAY	HI-6005	N/A	Nov. 05, 2018	1 Year
9	RS232 Fiber Optic Modem	HOLADAY	HI-4413P	N/A	Nov. 05, 2018	1 Year
10	Log.-Per. Antenna	SCHWARZBECK	VULP 9118E	N/A	Nov. 05, 2018	1 Year
11	Audio analyzer	keysight	U8903A	MY51130011	Nov. 05, 2018	1 Year
12	Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	1201.0002K50-104209-JC	Nov. 05, 2018	1 Year

Remark: This test item is subcontracted to Shenzhen EMTEK Co., Ltd

1.6. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 184111, July 31, 2017.

ISED-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A-1, June 13, 2016.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102

1.7. Performance Criteria

1.7.1. For EMS Test:

- √ A: Normal performance within the specification limits;
- √ B: Temporary degradation or loss of function or performance which is self-recoverable;
- √ C: Temporary degradation or loss of function or performance which requires operator intervention or system reset;
- √ D: Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data

Note: The manufacturer's specification may define effects on the EUT which may be considered insignificant, and therefore acceptable.

This classification may be used as a guide in formulating performance criteria, by committees responsible for generic, product and product-family standards, or as a framework for the agreement on performance criteria between the manufacturer and the purchaser, for example where no suitable generic, product or product-family standard exists.

1.7.2. For EN 301 489-52:

1.7.2.1. GSM and DCS Performance Criteria

The equipment shall meet the performance criteria specified in this clause and clauses 6.1.1 to 6.1.4, as appropriate.

Portable equipment intended for use whilst powered by the main battery of a vehicle shall additionally fulfil the applicable requirements set out in ETSI EN 301 489-1 [1], clauses 7.1 and 7.2 for mobile equipment.

Portable or mobile equipment powered by the AC mains shall additionally fulfil the applicable requirements of ETSI EN 301 489-1 [1], clauses 7.1 and 7.2 for radio and ancillary equipment for fixed use.

The establishment and maintenance of a communications link, the assessment of RXQUAL, and the assessment of the audio breakthrough by monitoring the speech output signal level, are used as performance criteria to ensure that all primary functions of the transmitter and receiver are evaluated during the immunity tests. In addition, the test shall also be performed in idle mode to ensure the transmitter does not unintentionally operate.

The maintenance of a communications link shall be assessed using an indicator which may be part of the test system or the EUT.

If an equipment is of a specialized nature, such that the performance criteria described in the following clauses are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in the following clauses.

Performance criteria for Continuous phenomena applied to Transmitters (CT)

A communication link shall be established at the start of the test, and maintained during the test, see clauses 4.2.3 and 4.2.4.

During the test, the uplink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

NOTE: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

Performance criteria for Transient phenomena applied to Transmitters (TT)

A communications link shall be established at the start of the test, see appropriate clauses 4.2 to 4.2.4.

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

Performance criteria for Continuous phenomena applied to Receivers (CR)

A communications link shall be established at the start of the test, see appropriate clauses 4.2 to 4.2.6.

During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence.

During the test, the downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

NOTE: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz. At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained.

Performance criteria for Transient phenomena applied to Receivers (TR)

A communications link shall be established at the start of the test, see appropriate clauses 4.2. to 4.2.6.

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.

1.7.2.2. CDMA Direct Spread (UTRA and E-UTRA) Performance Criteria

The equipment shall meet the performance criteria specified in this clause and clauses 6.2.2 and 6.2.3 as appropriate.

The maintenance of a communications link shall be assessed by using an indicator, which may be part of the test system or the equipment under test. If an equipment is of a specialized nature, that the performance criteria described in the following clauses are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after testing, as required by the present document.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in the following clauses. In addition, the test shall also be performed in idle mode to ensure the transmitter does not unintentionally operate. The requirements apply to all types of UTRA and E-UTRA (FDD or TDD) for the UE.

Performance criteria for continuous phenomena

A communication link shall be established at the start of the test, and maintained during the test, clauses 4.1 and 4.2. In the speech mode, the performance criteria shall be that the Up Link and Down Link speech output levels shall be at least 35 dB less than the recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (annex B).

NOTE: When there is a high level of background audio noise present, the filter bandwidth can be reduced down to a minimum of 40 Hz. At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained. In addition to confirming the above performance in traffic mode, the test shall be performed in idle mode, and the transmitter shall not unintentionally operate.

UTRA

In the data transfer mode, the performance criteria can be one of the following:

- if the BER (as referred in ETSI TS 134 109 [4]) is used, it shall not exceed 0,001 during the test sequence;
- if the BLER (as referred in ETSI TS 134 109 [4]) is used, it shall not exceed 0,01 during the test sequence.

The BLER calculation shall be based on evaluating the CRC on each transport block.

E-UTRA

In the data transfer mode, the performance criteria shall be that the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channel as specified in annex C in ETSI TS 136 101 [9] with parameters specified in tables 7.3.1-1 and 7.3.1-2 in ETSI TS 136 101 [9] during the test sequence.

Performance criteria for Transient phenomena

A communications link shall be established at the start of the test, clauses 4.1 and 4.2.

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained. In addition to confirming the above performance in traffic mode, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

2. Summary of Test Results

EMC Emission				
Test Items	Standard	Basic Standard	Limit	Results
Conducted Emission	ETSI EN 301 489-1 V2.2.0 Clause 8.3 & 8.4	EN 55032: 2015	Class B	PASS
Radiated Emission	ETSI EN 301 489-1 V2.2.0 Clause 8.2	EN 55032: 2015	Class B	PASS
Harmonic Current Emission	ETSI EN 301 489-1 V2.2.0 Clause 8.5	EN 61000-3-2:2014	Class A	N/A
Voltage Fluctuations& Flicker	ETSI EN 301 489-1 V2.2.0 Clause 8.6	EN 6000-3-3:2013	/	N/A
EMC Immunity				
Test Items	Standard	Basic Standard	Performance Criteria	Results
Electrostatic Discharge	ETSI EN 301 489-1 V2.2.0 Clause 9.3	EN 61000-4-2:2009	B	PASS
RF Electromagnetic Field	ETSI EN 301 489-1 V2.2.0 Clause 9.2	EN 61000-4-3:2006 +A1:2008+A2:2010	A	PASS
Fast transients, common mode	ETSI EN 301 489-1 V2.2.0 Clause 9.4	EN 61000-4-4:2012	B	N/A
Surges	ETSI EN 301 489-1 V2.2.0 Clause 9.8	EN 61000-4-5:2014	B	N/A
Radio frequency, common mode	ETSI EN 301 489-1 V2.2.0 Clause 9.5	EN 61000-4-6:2014	A	N/A
Volt. Interruptions Volt. Dips	ETSI EN 301 489-1 V2.2.0 Clause 9.7	EN 61000-4-11:2004	B / C / C NOTE (3)	N/A
NOTE:				
	(1) "N/A" denotes test is not applicable in this Test Report			
	(2) Alternatively, for equipment intended to be used exclusively in an industrial environment or a telecommunicationcentre, the class A limits may be used.			
	(3) Voltage dip: 100% reduction – Performance Criteria B			
	Voltage dip: 100% reduction – Performance Criteria B			
	Voltage dip: 70% reduction – Performance Criteria C			
	Voltage Interruption: 0% Interruption – Performance Criteria C			

3. Emission Test

3.1. Conducted Emission Test at Main Ports

3.1.1. Test Standard and Limit

Test Standard	Draft ETSI EN 301 489-1 V2.2.0 Clause 8.3 & 8.4
Basic Standard	EN 55032: 2015

Limits for conducted emissions

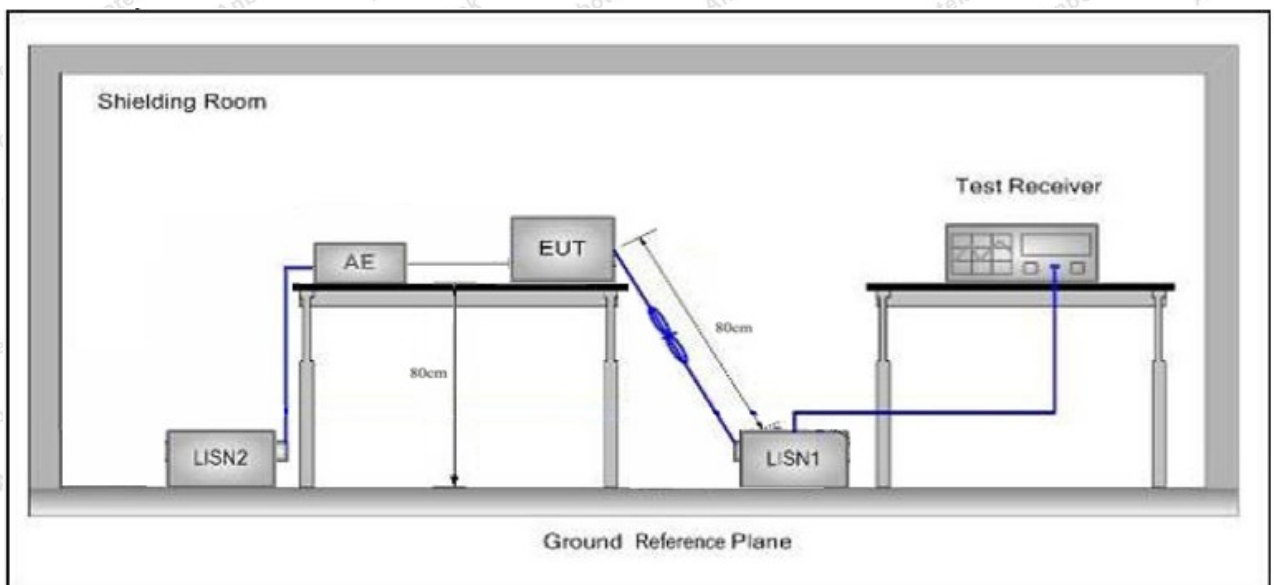
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50

Remark: *Decreasing linearly with logarithm of the frequency.

Limits for conducted emissions of equipment
intended to be used in telecommunication centres and industrial environment

Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	79	66
	500kHz~30MHz	73	60

3.1.2. Test Setup



3.1.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ETSI EN 301 489-1 V2.2.0 & EN55032: 2015 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

For the actual test configuration, please refer to the related Item EUT Test Photos.

3.1.4. Test Data

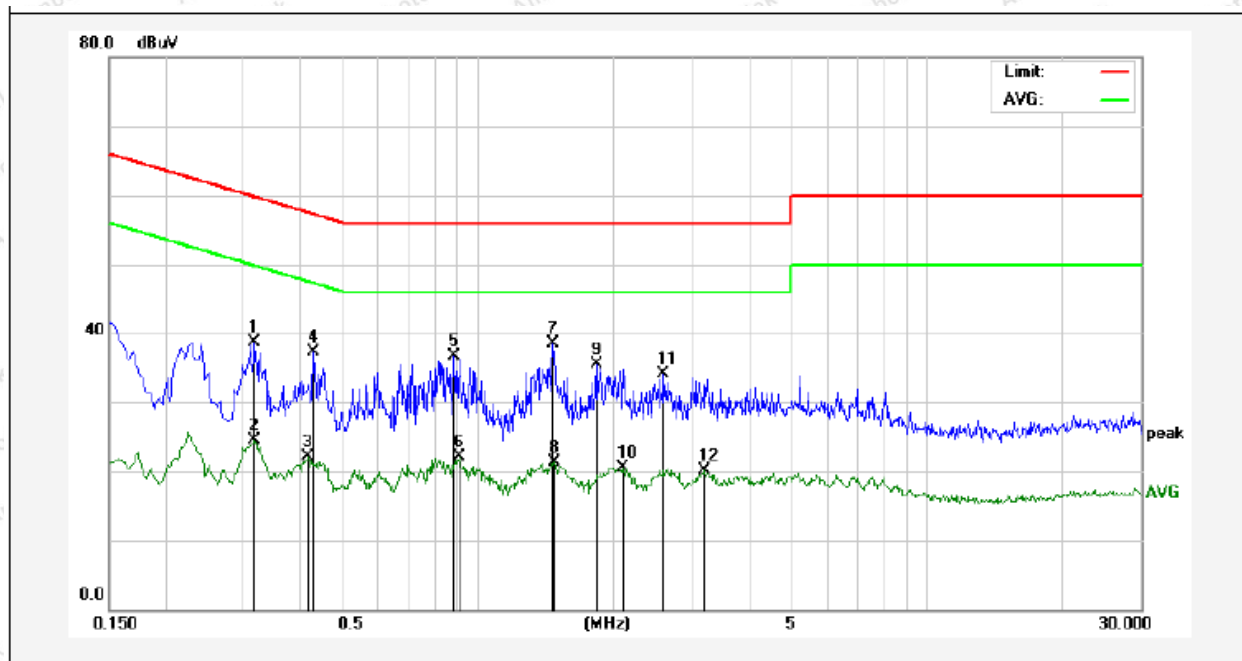
PASS

The EUT should be compliance to the limit of Class B

Only the worst case data was showed in the report, please to see the following pages

Conducted Emission Test Data

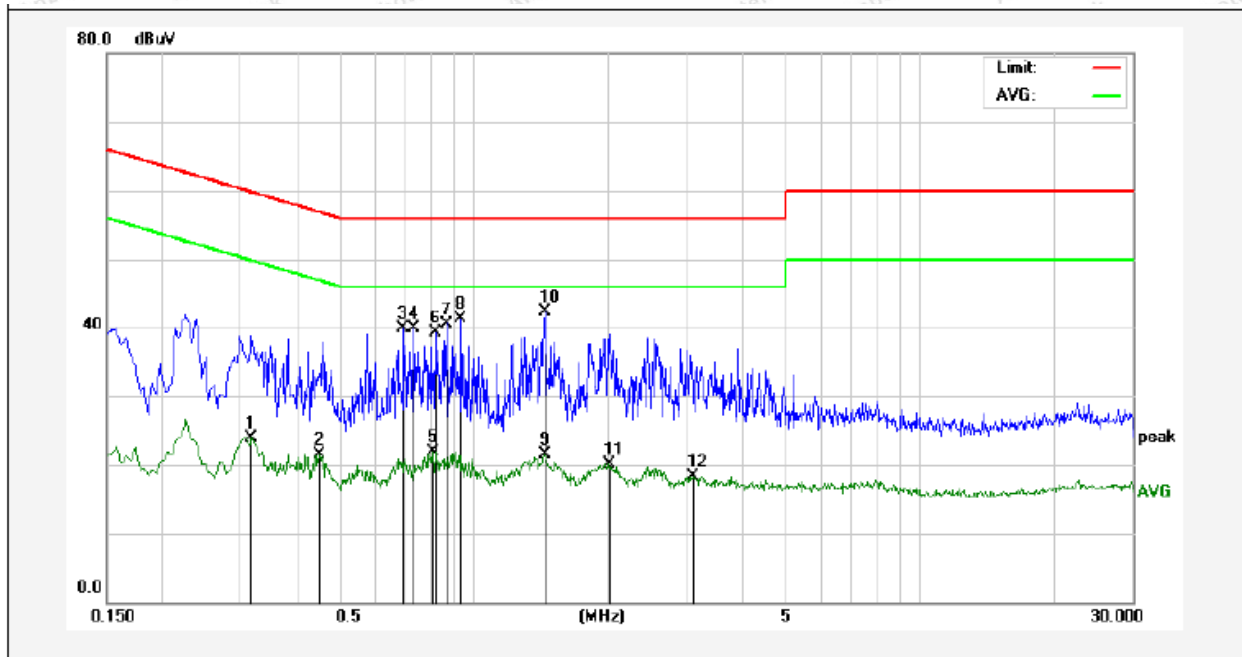
Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 110V/50Hz
Comment: Live Line
Tem.:22.6℃ Hum.:42%



No.	Freq. (MHz)	Reading (dBμV)	Factor (dB)	Result (dBμV)	Limit dBμV	Over Limit (dB)	Detector	Remark
1	0.3180	18.72	19.90	38.62	59.76	-21.14	QP	
2	0.3180	4.60	19.90	24.50	49.76	-25.26	AVG	
3	0.4180	2.24	19.94	22.18	47.49	-25.31	AVG	
4	0.4300	17.44	19.95	37.39	57.25	-19.86	QP	
5	0.8820	16.54	20.09	36.63	56.00	-19.37	QP	
6	0.9060	1.95	20.09	22.04	46.00	-23.96	AVG	
7	1.4660	18.28	20.13	38.41	56.00	-17.59	QP	
8	1.4740	1.13	20.13	21.26	46.00	-24.74	AVG	
9	1.8340	15.32	20.14	35.46	56.00	-20.54	QP	
10	2.1060	0.45	20.14	20.59	46.00	-25.41	AVG	
11	2.5900	13.91	20.15	34.06	56.00	-21.94	QP	
12	3.2060	-0.08	20.16	20.08	46.00	-25.92	AVG	

Conducted Emission Test Data

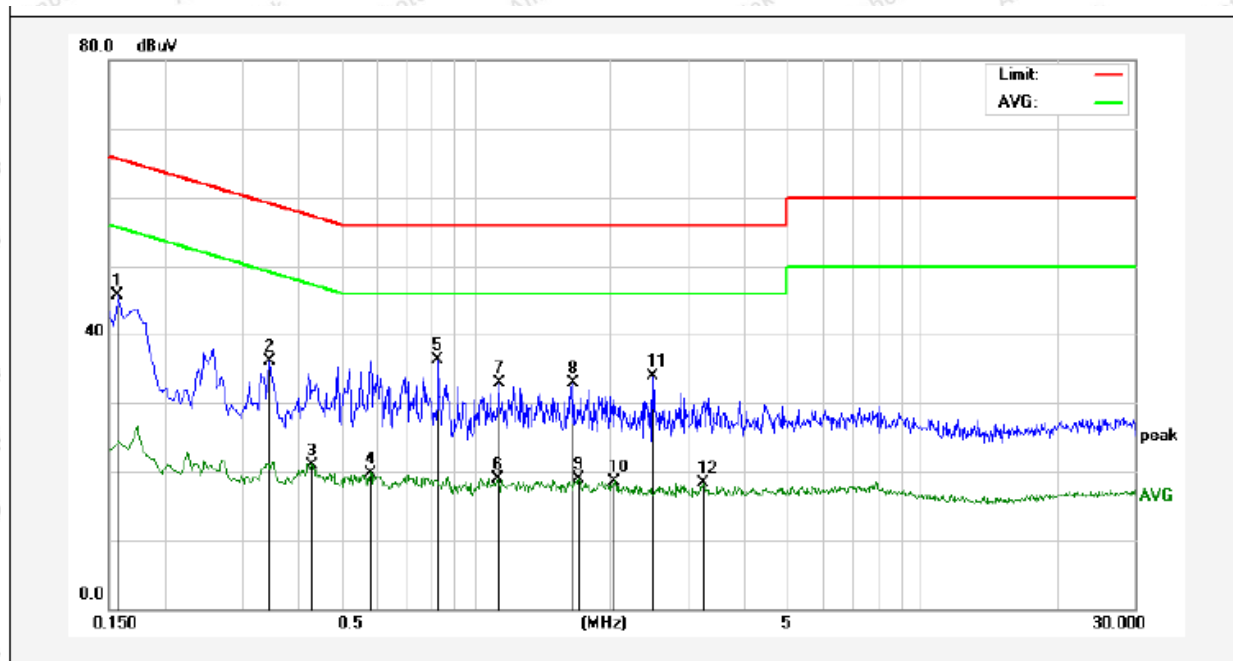
Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 110V/50Hz
Comment: Neutral Line
Tem.:22.6℃ Hum.:42%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.3180	4.05	19.90	23.95	49.76	-25.81	AVG	
2	0.4500	1.56	19.96	21.52	46.87	-25.35	AVG	
3	0.6940	19.87	20.04	39.91	56.00	-16.09	QP	
4	0.7340	19.79	20.05	39.84	56.00	-16.16	QP	
5	0.8100	1.82	20.07	21.89	46.00	-24.11	AVG	
6	0.8180	19.24	20.07	39.31	56.00	-16.69	QP	
7	0.8700	20.51	20.09	40.60	56.00	-15.40	QP	
8	0.9340	21.11	20.10	41.21	56.00	-14.79	QP	
9	1.4380	1.34	20.13	21.47	46.00	-24.53	AVG	
10	1.4460	22.23	20.13	42.36	56.00	-13.64	QP	
11	2.0020	-0.08	20.14	20.06	46.00	-25.94	AVG	
12	3.0980	-1.77	20.16	18.39	46.00	-27.61	AVG	

Conducted Emission Test Data

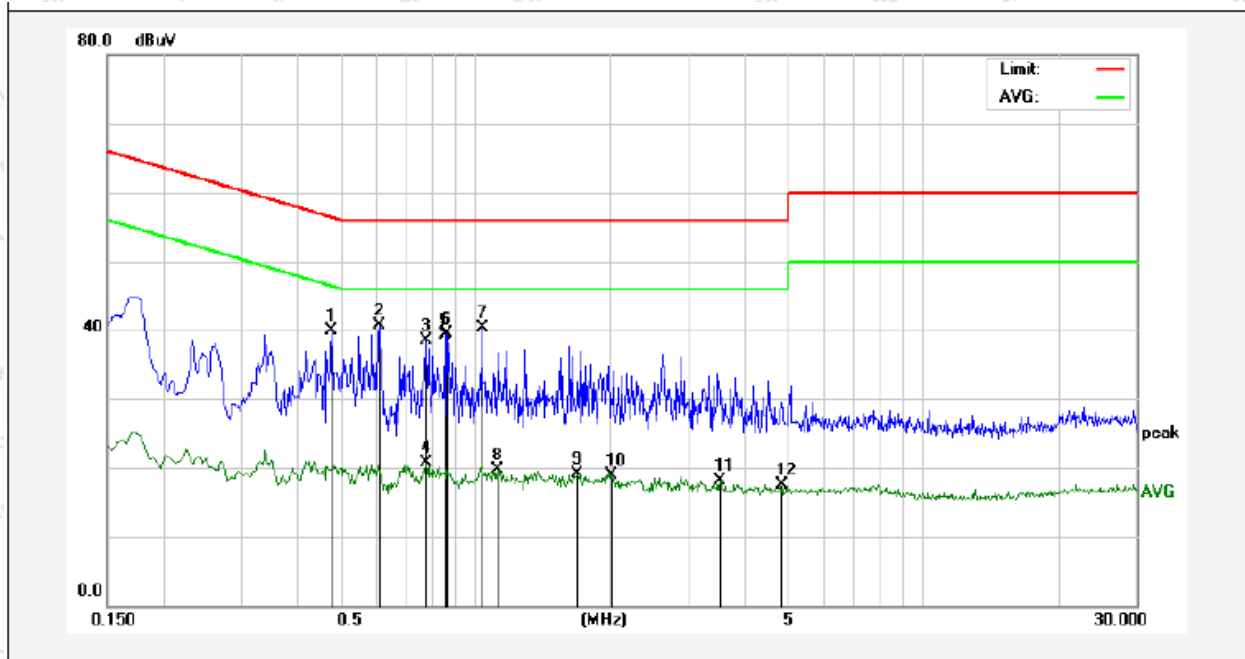
Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 230V/50Hz
Comment: Live Line
Tem.:22.6℃ Hum.:42%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1580	25.79	19.90	45.69	65.56	-19.87	QP	
2	0.3460	16.11	19.91	36.02	59.06	-23.04	QP	
3	0.4300	1.05	19.95	21.00	47.25	-26.25	AVG	
4	0.5820	-0.20	20.00	19.80	46.00	-26.20	AVG	
5	0.8260	16.31	20.07	36.38	56.00	-19.62	QP	
6	1.1180	-1.20	20.12	18.92	46.00	-27.08	AVG	
7	1.1260	12.80	20.12	32.92	56.00	-23.08	QP	
8	1.6580	12.72	20.13	32.85	56.00	-23.15	QP	
9	1.7020	-1.21	20.13	18.92	46.00	-27.08	AVG	
10	2.0579	-1.54	20.14	18.60	46.00	-27.40	AVG	
11	2.4940	13.66	20.15	33.81	56.00	-22.19	QP	
12	3.2260	-1.93	20.16	18.23	46.00	-27.77	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 230V/50Hz
Comment: Neutral Line
Tem.:22.6℃ Hum.:42%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.4780	19.86	19.97	39.83	56.37	-16.54	QP	
2	0.6100	20.73	20.01	40.74	56.00	-15.26	QP	
3	0.7780	18.53	20.06	38.59	56.00	-17.41	QP	
4	0.7780	0.57	20.06	20.63	46.00	-25.37	AVG	
5	0.8540	19.28	20.08	39.36	56.00	-16.64	QP	
6	0.8620	19.33	20.08	39.41	56.00	-16.59	QP	
7	1.0339	20.20	20.12	40.32	56.00	-15.68	QP	
8	1.1180	-0.32	20.12	19.80	46.00	-26.20	AVG	
9	1.6900	-0.97	20.13	19.16	46.00	-26.84	AVG	
10	2.0180	-1.17	20.14	18.97	46.00	-27.03	AVG	
11	3.5100	-2.00	20.17	18.17	46.00	-27.83	AVG	
12	4.7980	-2.65	20.20	17.55	46.00	-28.45	AVG	

3.2. Radiated Emission Test

3.2.1. Test Standard and Limit

Test Standard	Draft Draft Draft ETSI EN 301 489-1 V2.2.0 Clause 8.2
Basic Standard	EN 55032: 2015

Radiated Emission Test Limit (Below 1000MHz)

Frequency (MHz)	Limit (dB μ V/m)	
	Quasi-peak Level	
	Class B	Class A
30MHz~230MHz	40	50
230MHz~1000MHz	47	57
Remark: 1. The lower limit shall apply at the transition frequency. 2. The test distance is 3m.		

Radiated Emission Test Limit (Above 1000MHz)

Frequency (MHz)	Limit (dB μ V/m)			
	Class B		Class A	
	Peak	Average	Peak	Average
1000 MHz -3000 MHz	70	50	76	56
3000 MHz -6000 MHz	74	54	80	60
Remark: 1. The lower limit applies at the transition frequency. 2. The test distance is 3m.				

Radiated Emission Test Limit for FM Receivers

Frequency (MHz)	Limit (dB μ V/m)	
	Quasi-peak Level	
	Fundamental	Harmonics
30MHz~230MHz	60	52
230MHz~300MHz	60	52
300MHz~1000MHz	60	56
Remark: 1. The lower limit shall apply at the transition frequency. 2. The test distance is 3m.		

Frequency Range of Radiated Measurement

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 6 GHz, whichever is lower

3.2.2. Test Setup

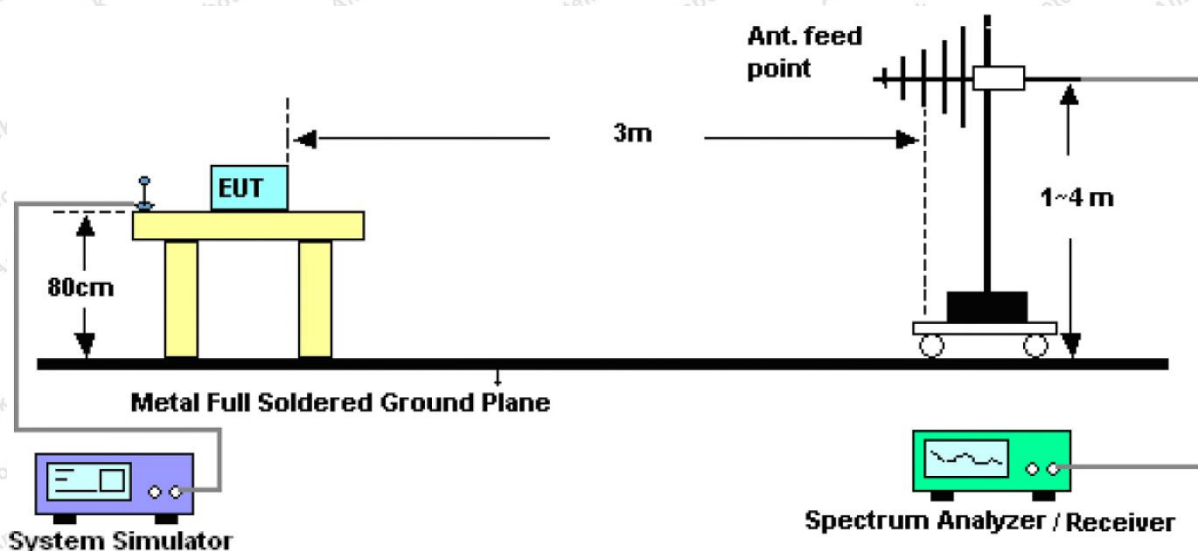


Figure 1. 30MHz to 1GHz

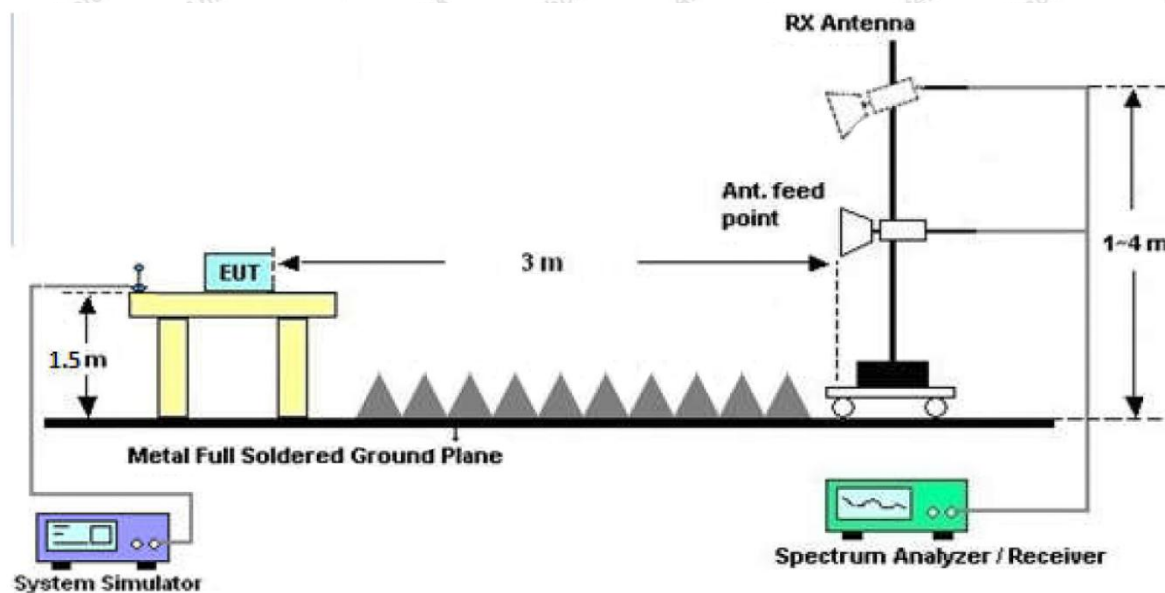


Figure 2. Above 1 GHz

3.2.3. Test Procedure

- 1) The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- 2) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- 3) The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4) The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- 5) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold

mode when the test frequency is below 1GHz.

The test receiver/spectrum was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.

6) For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak/Average detection at frequency above 1GHz.

3.2.4. Test Data

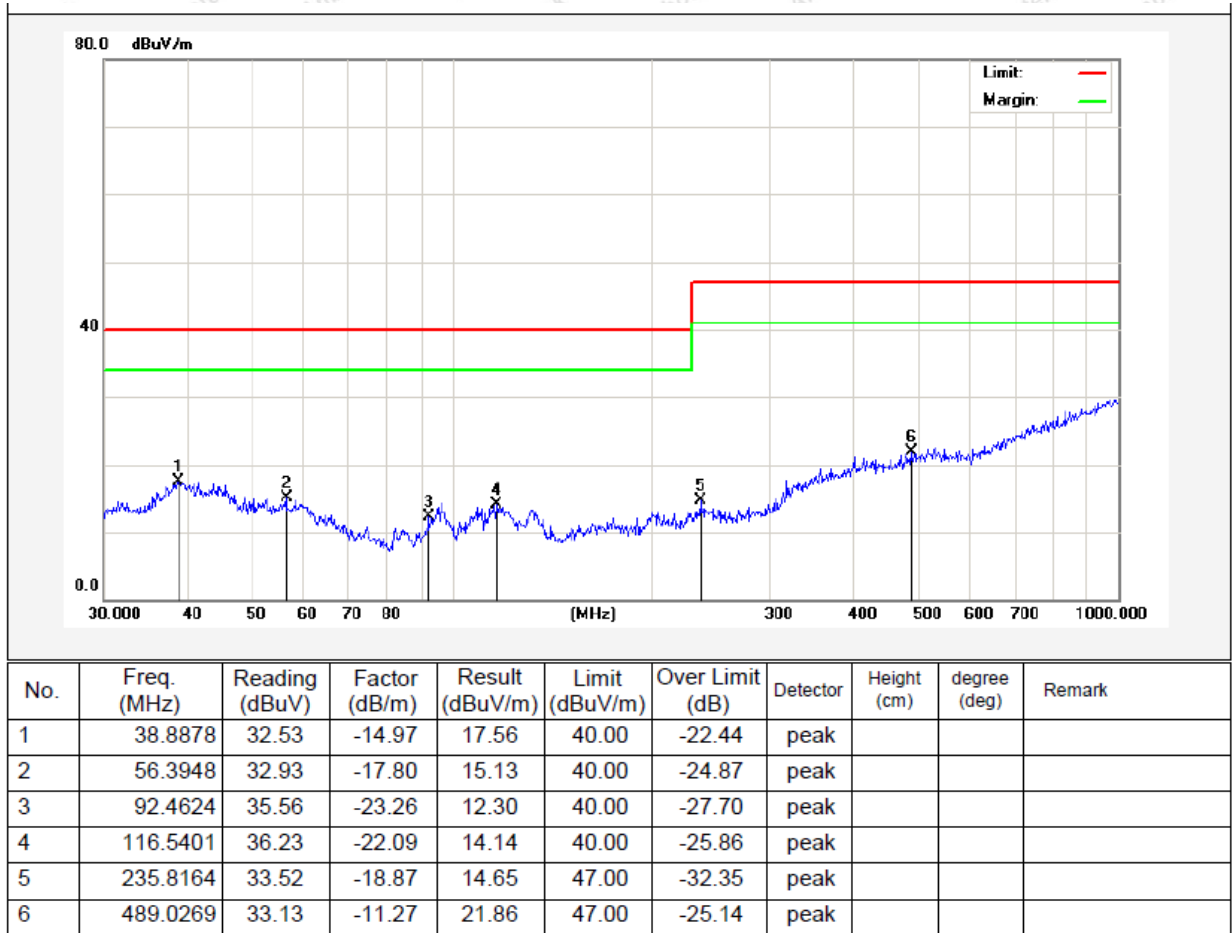
PASS

The EUT should be compliance to the limit of Class B

Only the worst case data was showed in the report, please to see the following pages

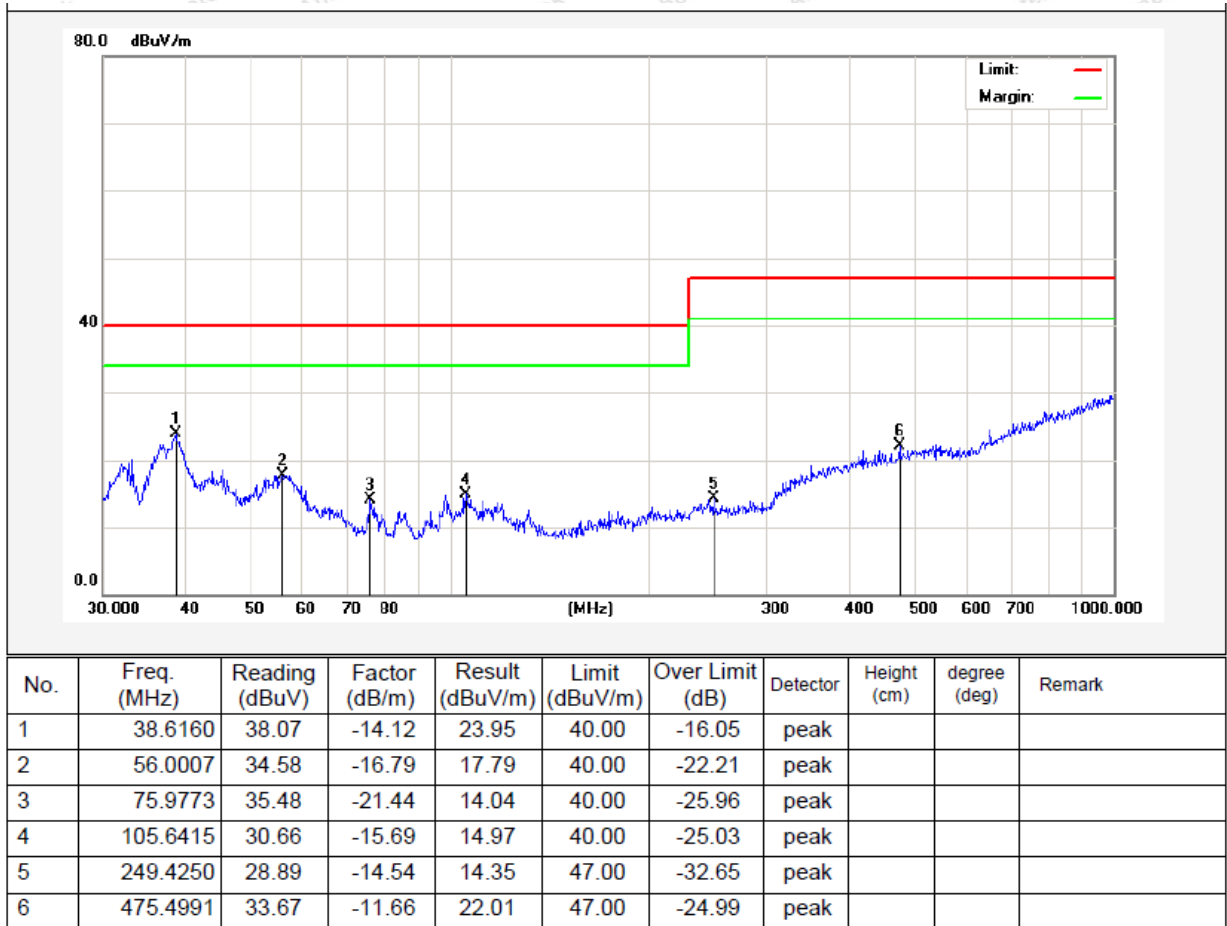
Test Results (30~1000MHz)

Job No.: SZAWW190103001 Temp.(°C)/Hum.(%RH) 24.1°C/50%RH
Standard: EN301489_Class B_3m Power Source: AC 230V/50Hz
Test Mode: Mode 1 Polarization: Horizontal



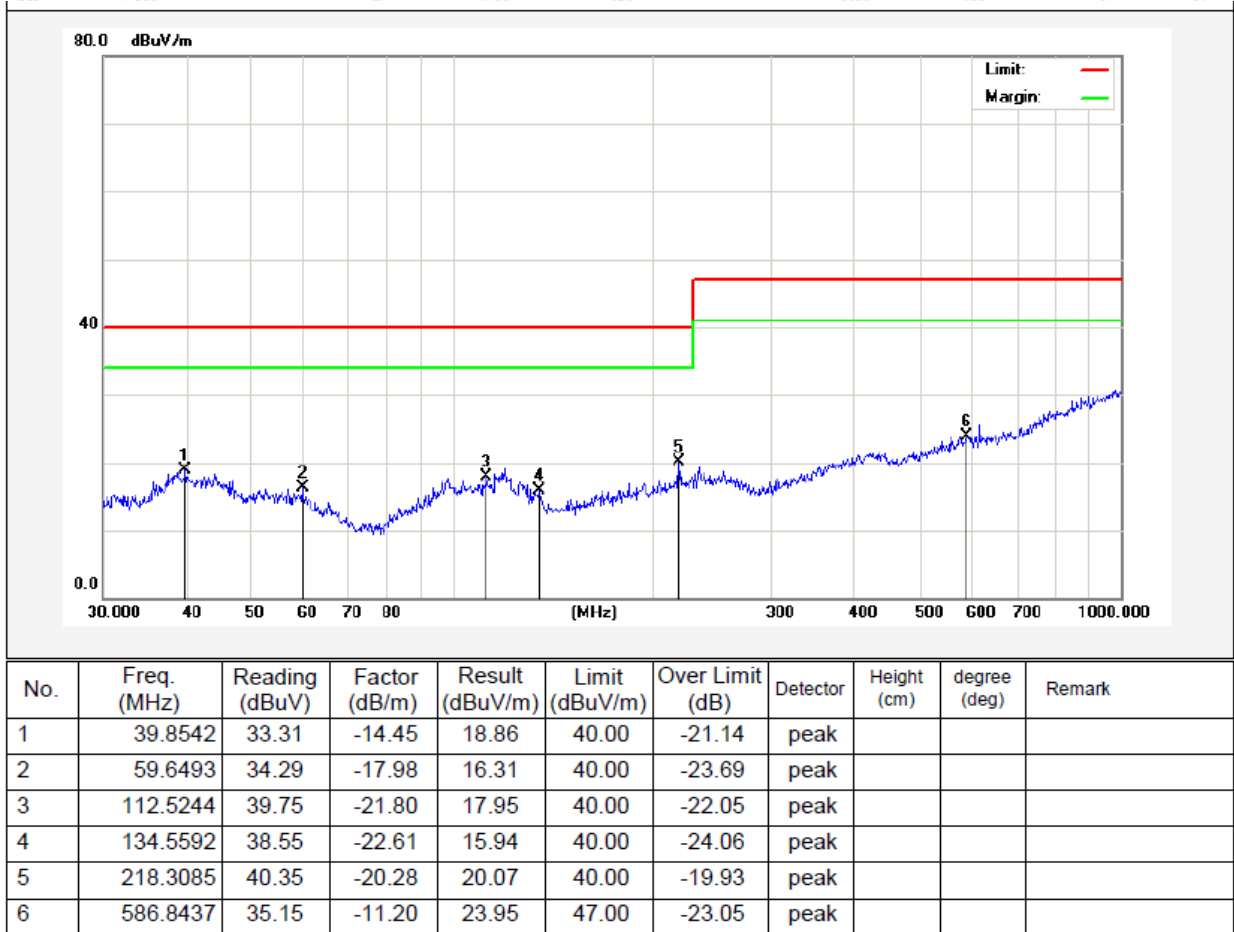
Test Results (30~1000MHz)

Job No.: SZAWW190103001 Temp.(°C)/Hum.(%RH) 24.1°C/50%RH
Standard: EN301489_Class B_3m Power Source: AC 230V/50Hz
Test Mode: Mode 1 Polarization: Vertical



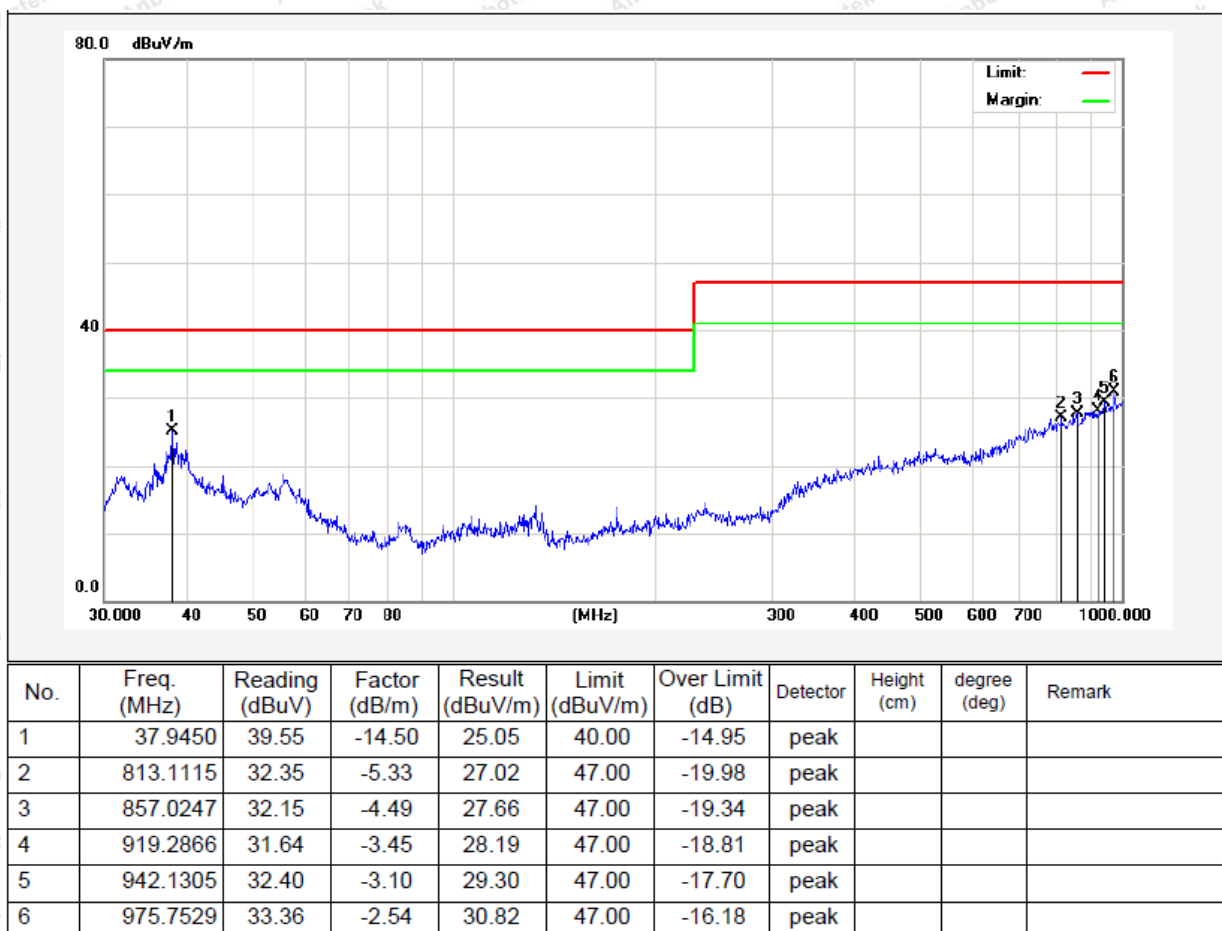
Test Results (30~1000MHz)

Job No.: SZAWW190103001 Temp.(°C)/Hum.(%RH): 24.1°C/50%RH
Standard: EN301489_Class B_3m Power Source: AC 110V/50Hz
Test Mode: Mode 1 Polarization: Horizontal



Test Results (30~1000MHz)

Job No.: SZAWW190103001 Temp.(°C)/Hum.(%RH): 24.1°C/50%RH
Standard: EN301489_Class B_3m Power Source: AC 110V/50Hz
Test Mode: Mode 1 Polarization: Vertical



Test Results (1GHz~6GHz)

Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.	Detector
1374.56	55.00	-2.72	52.28	70.00	-17.72	H	PEAK
1816.73	49.53	-3.01	46.52	70.00	-23.48	H	PEAK
1951.85	47.86	-4.43	43.43	70.00	-26.57	H	PEAK
4044.99	52.93	-4.96	47.97	74.00	-26.03	H	PEAK
4579.00	52.41	-4.97	47.44	74.00	-26.56	H	PEAK
5071.37	55.76	-5.29	50.47	74.00	-23.53	H	PEAK
1374.56	39.75	-2.72	37.03	50.00	-12.97	H	AVG
1816.73	44.17	-3.01	41.16	50.00	-8.84	H	AVG
1951.85	38.01	-4.43	33.58	50.00	-16.42	H	AVG
4044.99	40.04	-4.96	35.08	54.00	-18.92	H	AVG
4579.00	40.07	-4.97	35.10	54.00	-18.90	H	AVG
5071.37	37.67	-5.29	32.38	54.00	-21.62	H	AVG
1527.09	54.65	-2.53	52.12	70.00	-17.88	V	PEAK
2010.40	46.26	-2.57	43.70	70.00	-26.30	V	PEAK
1925.90	54.09	-3.73	50.36	70.00	-19.64	V	PEAK
4045.94	45.65	-5.37	40.29	74.00	-33.71	V	PEAK
4411.00	50.71	-4.72	45.98	74.00	-28.02	V	PEAK
4934.31	55.24	-6.07	49.17	74.00	-24.83	V	PEAK
1527.09	41.68	-2.53	39.15	50.00	-10.85	V	AVG
2010.40	40.97	-2.57	38.40	50.00	-11.60	V	AVG
1925.90	41.57	-3.73	37.85	50.00	-12.15	V	AVG
4045.94	41.31	-5.37	35.94	54.00	-18.06	V	AVG
4411.00	38.21	-4.72	33.49	54.00	-20.51	V	AVG
4934.31	40.40	-6.07	34.33	54.00	-19.67	V	AVG

Remark:

1. Level = Receiver Read level + Antenna Factor

4. Immunity Test

General Performance Criteria

◆ Performance criteria for continuous phenomena applied to transmitters and receivers (CT/CR)

During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

◆ Performance criteria for transient phenomena applied to transmitters and receivers (TT/TR)

After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

◆ Performance criteria for equipment which does not provide a continuous communication link

For radio equipment which does not provide a continuous communication link, the performance criteria described in CT/CR and TT/TR are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in CT/CR and TT/TR.

◆ Performance criteria for ancillary equipment tested on a stand alone basis

If ancillary equipment is intended to be tested on a stand alone basis, the performance criteria described in CT/CR and TT/TR are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests.

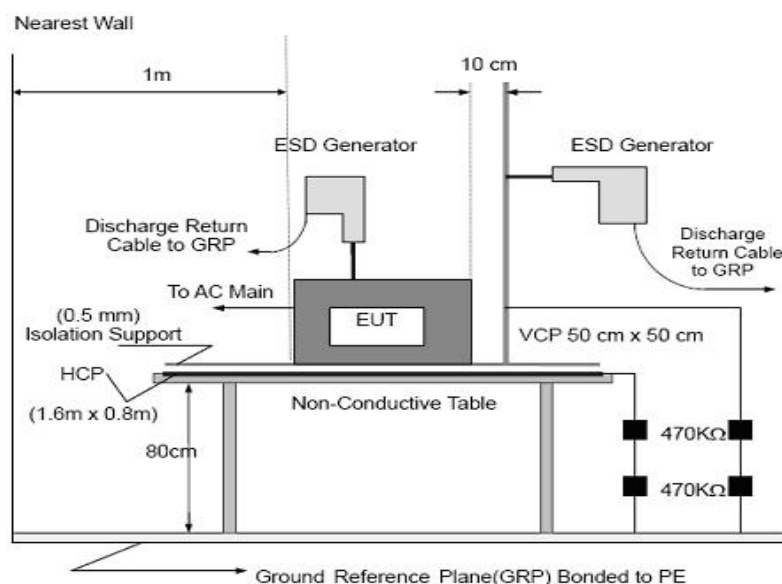
The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in CT/CR and TT/TR.

4.1. Electrostatic Discharge Test

4.1.1. Test Standard and Specification

Test Standard	Draft ETSI EN 301 489-1 V2.2.0 Clause 9.3
Basic Standard	EN 61000-4-2:2009
Discharge Impedance:	330 ohm / 150 pF
Performance Criterion:	CT/CR
Discharge Voltage:	Air Discharge: 2kV/4kV/8kV
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

4.1.2. Test Setup



Note:

TABLE-TOP EQUIPMENT:

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940kohm total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT:

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2,

and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

4.1.3. Test Procedure

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

- 1) Contact discharge was applied to conductive surfaces and coupling planes of the EUT.

During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second.

Vertical Coupling Plane (VCP):

The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge.

Horizontal Coupling Plane (HCP):

The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge.

- 2) Air discharges at insulation surfaces of the EUT.

It was at least ten single discharges with positive and negative at the same selected point.

- 3) When applying direct discharges to a portable or handheld battery-powered EUT with a display screen, it may not be possible to observe the screen for a given EUT orientation. If observation of the screen is necessary during this test, the EUT may be mounted vertically using non-metallic supports.

- 4) For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.4. Test Data

Job No.:	SZAWW190103001	Temp.(°C)/Hum.(%RH):	24.3°C/55%RH
Standard:	EN61000-4-2	Power Source:	AC 230V/50Hz DC 3.7V Battery inside
Test Mode:	Mode 1, Mode 2, Mode 3		

Item	Contact Discharge to conducted surfaces and to coupling planes		Air Discharge at insulating surfaces
	Direct Contact Discharge	Indirect Contact Discharge	
Test Voltage	Reaction of EUT / Result	Reaction of EUT / Result	Reaction of EUT / Result
+2kV	n.r.r. PASS	n.r.r. PASS	n.r.r. PASS
-2kV	n.r.r. PASS	n.r.r. PASS	n.r.r. PASS
+4kV	n.r.r. PASS	n.r.r. PASS	n.r.r. PASS
-4kV	n.r.r. PASS	n.r.r. PASS	n.r.r. PASS
+6kV	-	-	n.r.r. PASS
-6kV	-	-	n.r.r. PASS
+8kV	-	-	n.r.r. PASS
-8kV	-	-	n.r.r. PASS

Remarks: n.r.r. = no reaction recognized

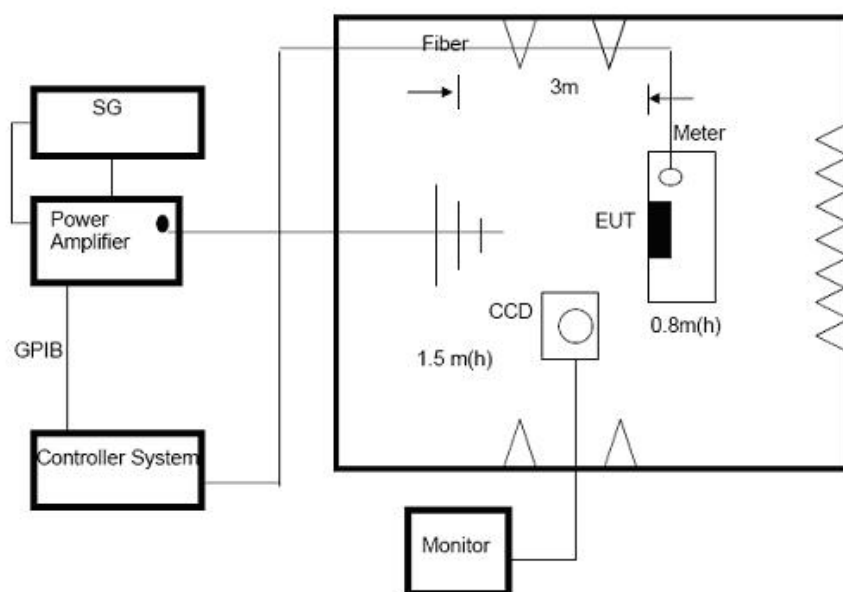
Performance Criteria A observed and No any function degraded during the tests.

4.2. Radiated, RF Electromagnetic Fields Test

4.2.1. Test Standard and Specification

Test Standard	Draft ETSI EN 301 489-1 V2.2.0 Clause 9.2
Basic Standard	EN 61000-4-3: 2006+A1:2008+A2:2010
Required Performance	A
Frequency Range	80MHz to 6GHz
Field Strength	3 V/m
Modulation	1kHz Sine Wave, 80%, AM Modulation
Frequency Step	1 % of preceding frequency value
Polarity of Antenna	Horizontal and Vertical
Test Distance	3 m
Antenna Height	1.5 m
Dwell Time	at least 3 seconds

4.2.2. Test Setup



4.2.3. Test Procedure

The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber. The testing distance from antenna to the EUT was 3 meters.

- 1) The field strength level was 3V/m
- 2) The frequency range is swept from 80 MHz to 6000 MHz with the signal 80%amplitude modulated with a 1kHz sine wave.
- 3) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond, but shall in no case be less than 0.5s.

4) The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.2.4. Test Data

Job No.: SZAWW190103001 Temp.(°C)/Hum.(%RH): 23.2°C/56%RH
Standard: EN61000-4-3 Power Source: AC 230V/50Hz
DC 3.7V Battery inside
Test Mode: Mode 1

	Antenna Polarity	R.F. Field Strength	Azimuth	Result
80~6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
			Rear	
			Left	
			Right	

Remark:

This test item is subcontracted to Shenzhen EMTEK Co., Ltd.
Bldg. 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, 518052 P.R.China

Equipment Used:

- Signal generator: Agilent;N5181A;
- Power Amplifier: MILMEGA;80RF1000-175;
MILMEGA: AS0102-55;
MILMEGA: AS1860-50;
- Log.-Per.Antenna: SCHWARZBECK: VULP 9118E;
Broad-Band Hom Antenna: SCHWARZBECK; BBHA9120 L3F.

Job No.: SZAWW190103001

Temp.(°C)/Hum.(%RH): 23.2°C/56%RH

Standard: EN61000-4-3

Power Source: DC 5V from PC with AC
230V/50Hz
DC3.7V Battery inside

Test Mode: Mode 2

	Antenna Polarity	R.F. Field Strength	Azimuth	Result
80~6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
			Rear	
			Left	
			Right	

Remark:

This test item is subcontracted to Shenzhen EMTEK Co., Ltd.
Bldg. 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, 518052 P.R.China

Equipment Used:

- Signal generator: Agilent;N5181A;
- Power Amplifier: MILMEGA;80RF1000-175;
MILMEGA: AS0102-55;
MILMEGA: AS1860-50;
- Log.-Per.Antenna: SCHWARZBECK: VULP 9118E;
Broad-Band Hom Antenna: SCHWARZBECK; BBHA9120 L3F.

Job No.: SZAWW190103001

Temp.(°C)/Hum.(%RH): 23.2°C/56%RH

Standard: EN61000-4-3

Power Source: DC 5V from PC with AC
230V/50Hz

DC 3.7V Battery inside

Test Mode: Mode 3

	Antenna Polarity	R.F. Field Strength	Azimuth	Result
80~6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
			Rear	
			Left	
			Right	
Remark: This test item is subcontracted to Shenzhen EMTEK Co., Ltd. Bldg. 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, 518052 P.R.China				
Equipment Used: 1.Signal generator: Agilent;N5181A; 2.Power Amplifier: MILMEGA;80RF1000-175; MILMEGA: AS0102-55; MILMEGA: AS1860-50; 3.Log.-Per.Antenna: SCHWARZBECK: VULP 9118E; Broad-Band Hom Antenna: SCHWARZBECK; BBHA9120 L3F.				

Job No.: SZAWW190103001

Temp.(°C)/Hum.(%RH): 23.2°C/56%RH

EUT operating Mode		Polarity	Position (°)	Max. value	Frequency (MHz)
Call Mode(GSM900)	Uplink	H	Front	-42.85	372.18
		V	Front	-40.99	757.06
	Downlink	H	Front	-85.36	864.64
		V	Front	-77.63	876.04
	RX Quality	H	Front	0	80.00
		V	Front	0	80.00

Note: DownLink SPL = 0 dBPa at 1KHz at the input of acoustic coupler
Uplink SPL = -5 dBPa at 1KHz at the Mouth Reference Point

All supported band has been tested, only worst data listed.

APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Conducted Emission Test

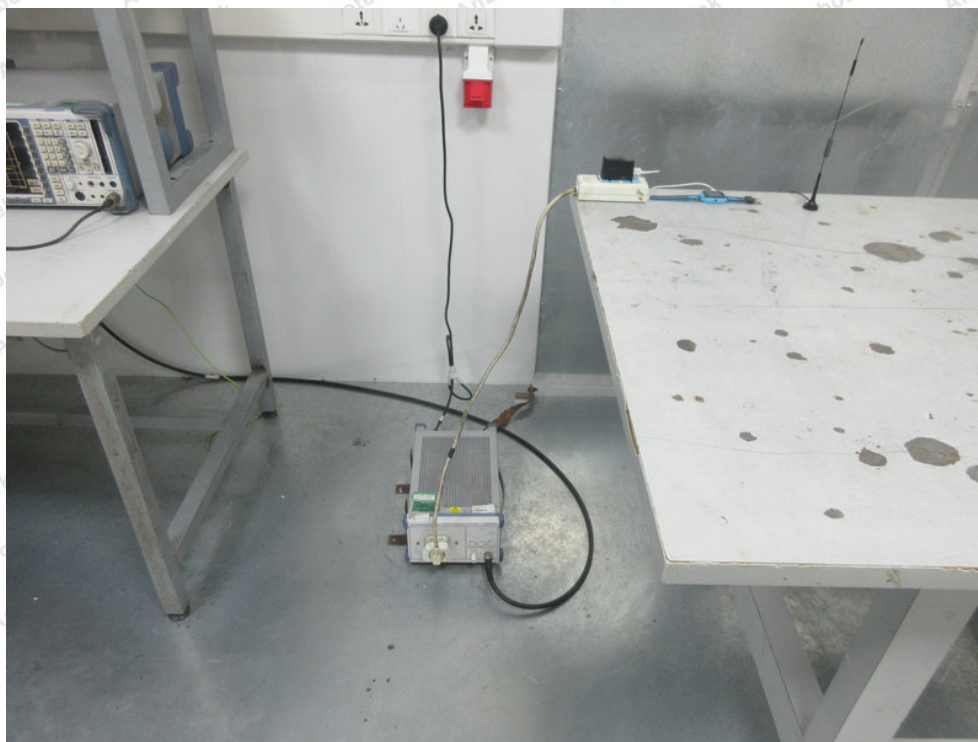


Photo of Radiation Emission Test

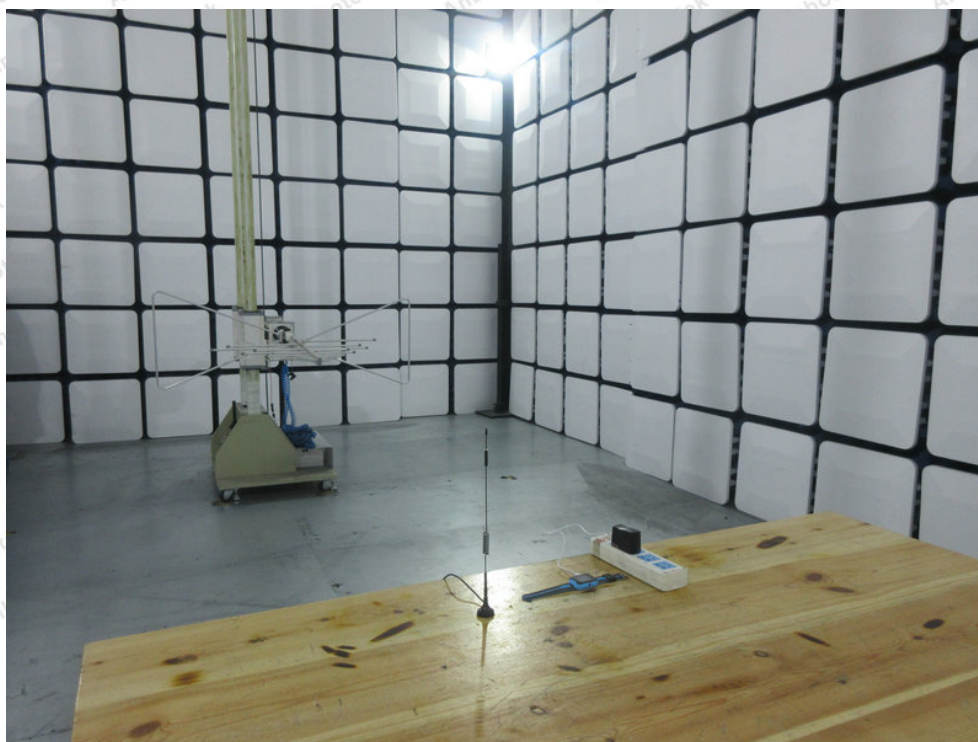
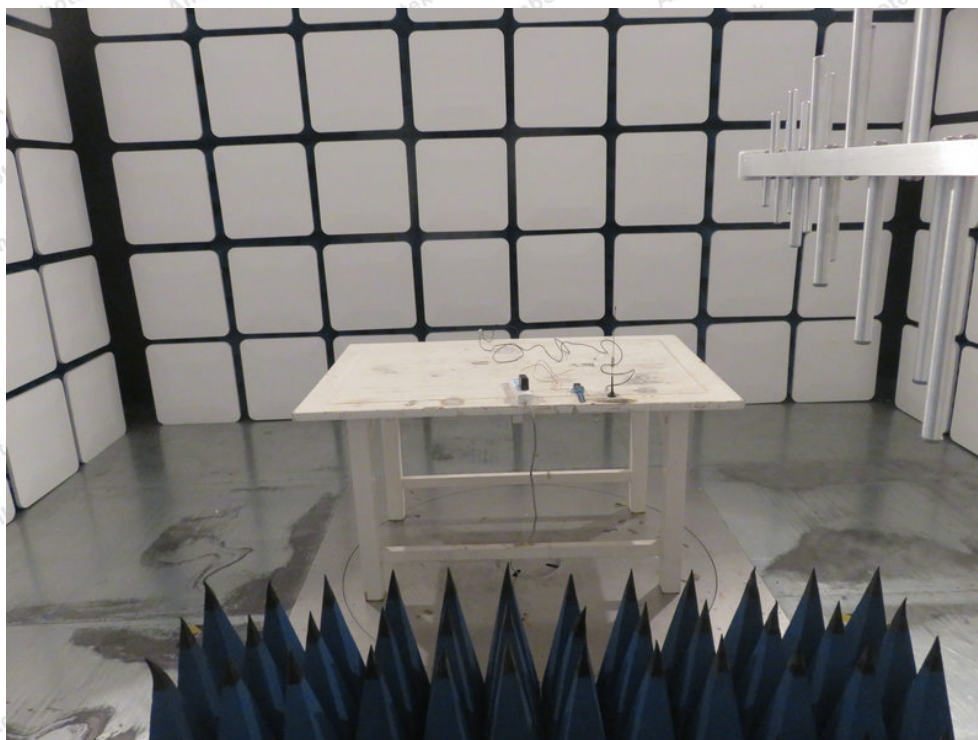


Photo of Electrostatic Discharge Test

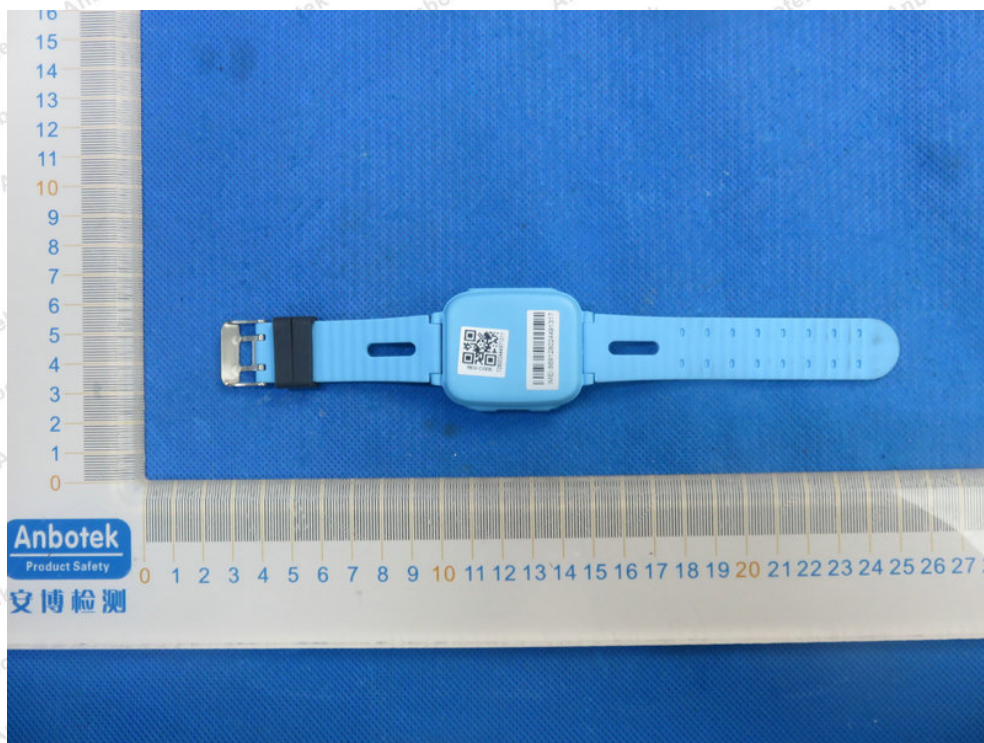


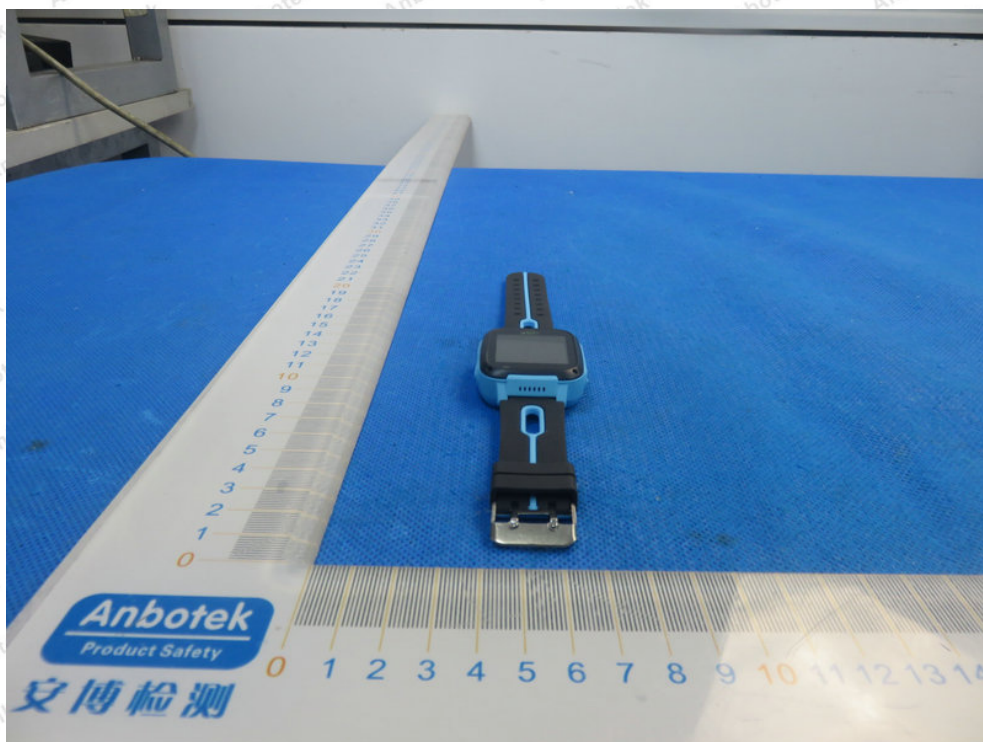
Photo of RF Field Strength Susceptibility Test

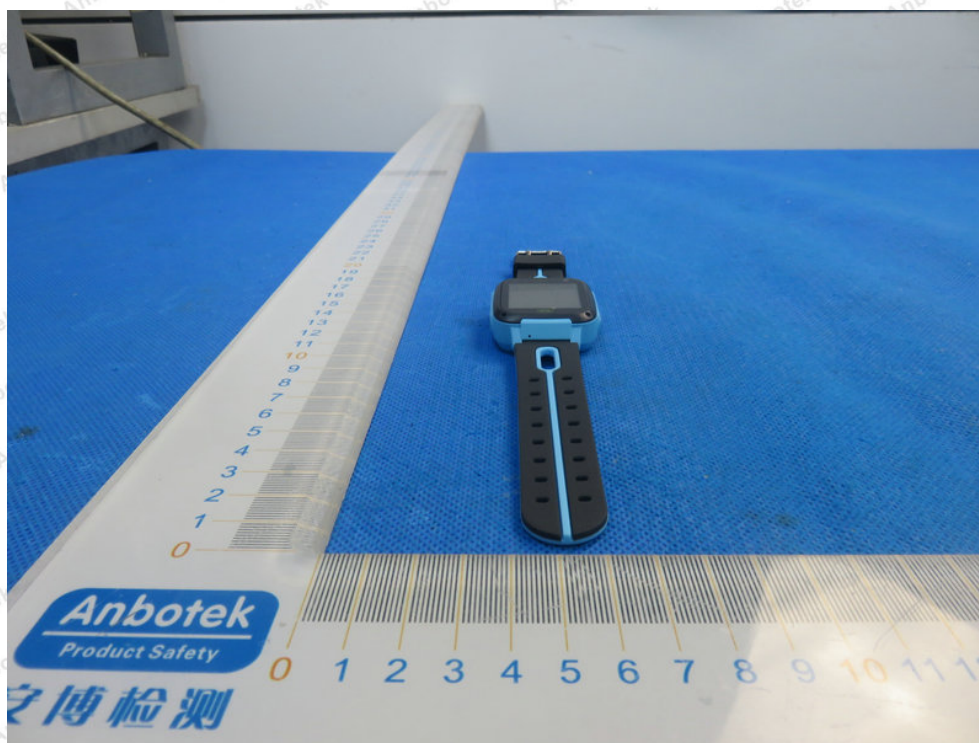


APPENDIX II -- EXTERNAL PHOTOGRAPH

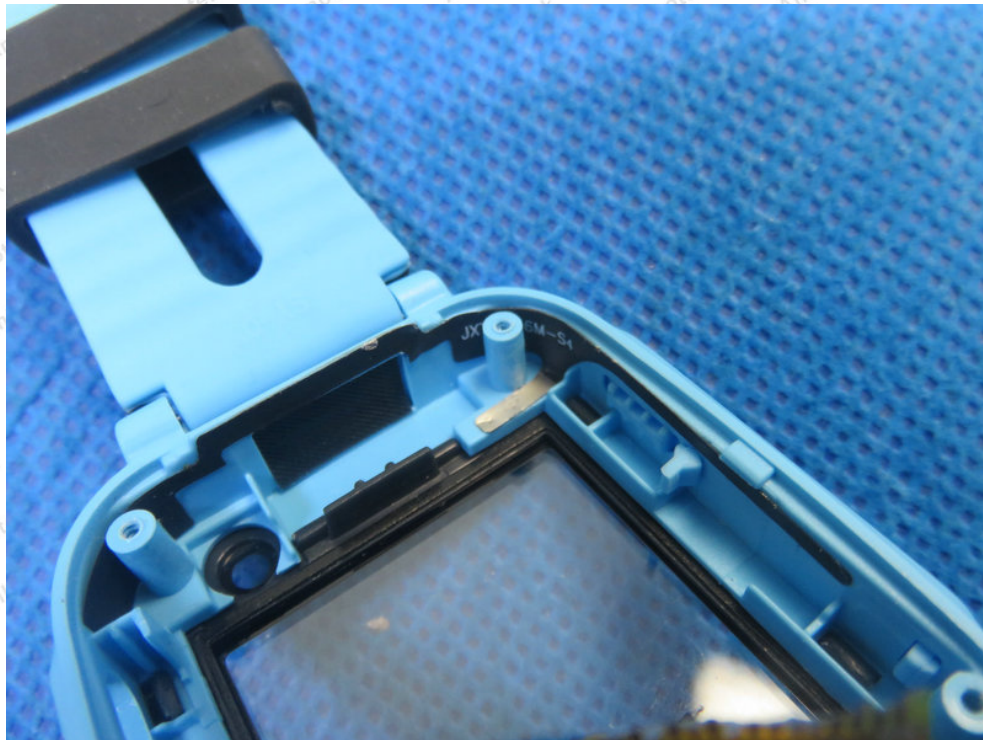


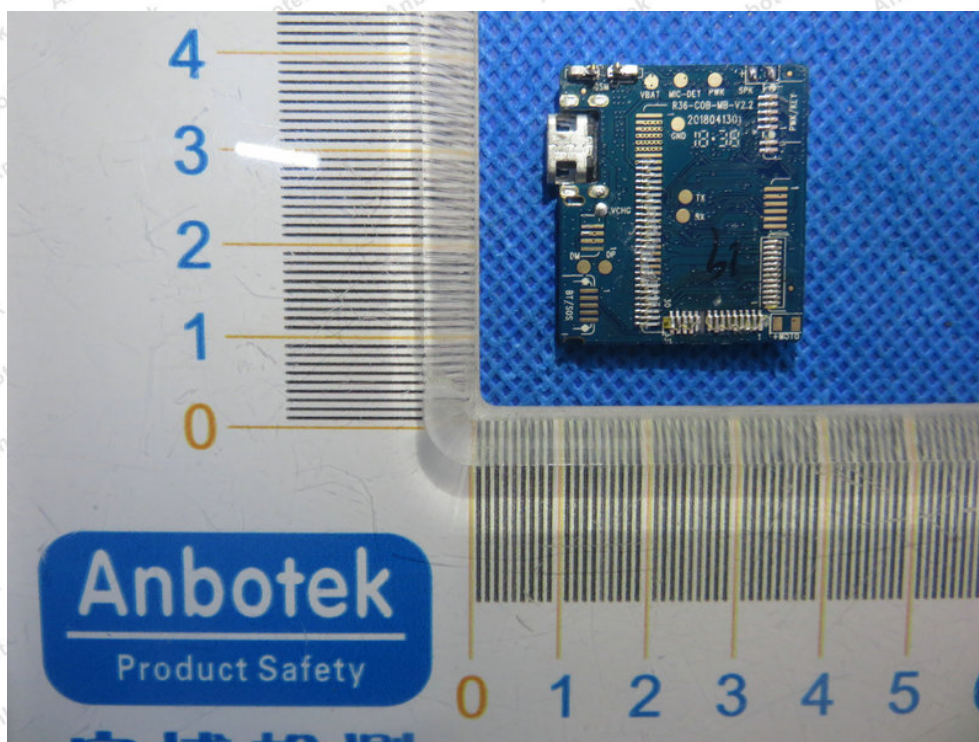


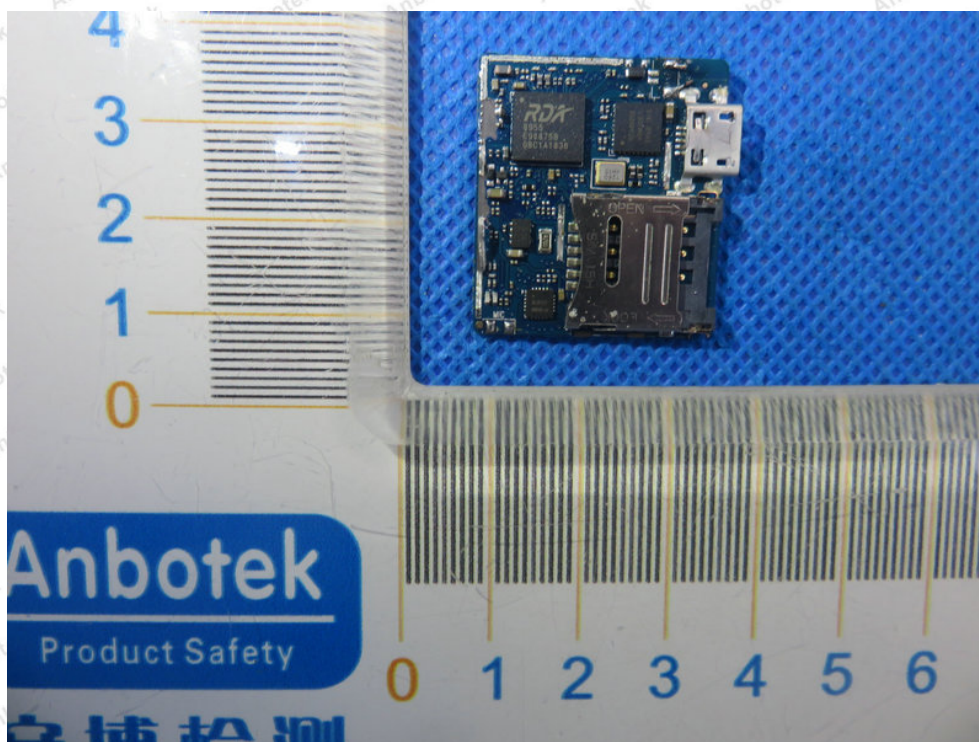
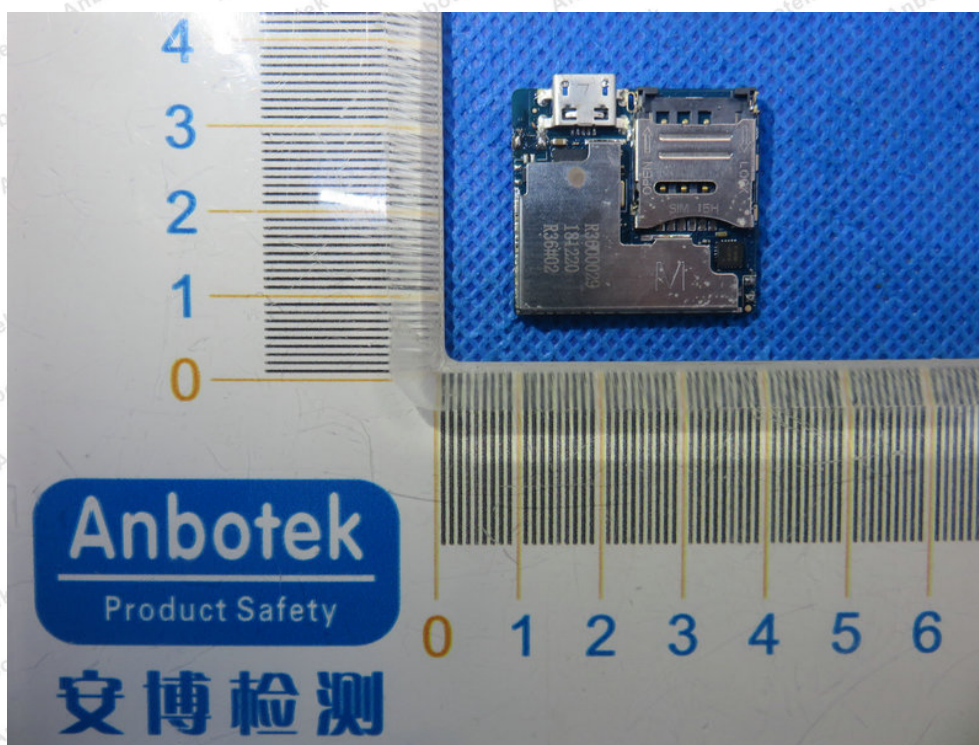


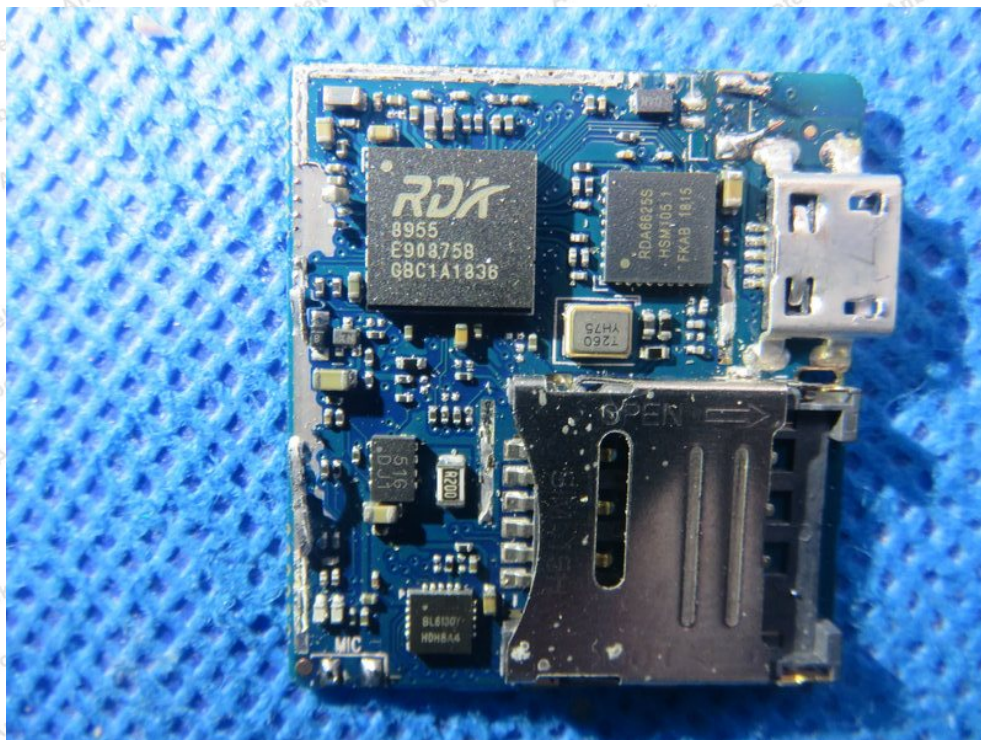


APPENDIX III -- INTERNAL PHOTOGRAPH









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