



BUREAU VERITAS

Test Report No.: RM171129N016

TEST REPORT

Applicant	Particle industries, Inc
Address	126 Post St, 4th floor, San Francisco, CA 94108, USA

Manufacturer or Supplier	Particle industries, Inc	
Address	126 Post St, 4th floor, San Francisco, CA 94108, USA	
Product	E31M	
Brand Name	Particle	
Model	U201	
Additional Model & Model Difference	N/A	
Date of tests	Nov. 29, 2017 ~ Dec. 21, 2017	

The submitted sample of the above equipment has been tested according to the requirements of the following standards:

- EN 55032:2015
- EN 55024:2010
- Draft EN 301 489-1 V2.2.0 (2017-03)
- Draft EN 301 489-2 V1.1.0 (2016-11)

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Tom Chen Project Engineer / EMC Department	Approved by Madison Luo Supervisor / EMC Department

Date: Dec. 25, 2017

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RM171129N016	Original release	Dec. 25, 2017



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications.

EMISSION			
Standard	Test Type	Result	Remarks
EN 55032:2015, Class B	Conducted test	PASS	Minimum passing margin is -29.26 dB at 0.55725 MHz
	Radiated test (30MHz~1GHz)	PASS	Meets limits minimum passing margin is -3.43 dB at 360.04 MHz
	Radiated Test (1GHz~6GHz)	PASS	Meets limits minimum passing margin is -10.58 dB at 4672.00 MHz

IMMUNITY (EN 55024:2010)			
Standard	Test Type	Result	Remarks
IEC 61000-4-2:2008 ED. 2.0	Electrostatic discharge immunity test	PASS	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion A
IEC 61000-4-3:2010 ED. 3.2	Radiated, radio-frequency, electromagnetic field immunity test	PASS	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80-1000 MHz, 3V/m, 80% AM (1kHz), Performance Criterion A

IMMUNITY: Draft EN 301 489-1 V2.2.0 (2017-03) Draft EN 301 489-52 V1.1.0 (2016-11)			
Standard	Test Type	Result	Remarks
EN 61000-4-2:2009	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-3:2006 + A1:2008 + A2:2010	Radiated, radio-frequency, electromagnetic field immunity test	PASS	Meets the requirements of Performance Criterion A



1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Measurement	Frequency	Uncertainty
Conducted emission	150kHz ~ 30MHz	+/- 2.70 dB
Radiated emissions	30MHz~1GHz	+/- 4.03 dB
	1GHz ~ 6GHz	+/- 4.72 dB



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	E31M
TEST MODEL	U201
ADDITIONAL MODEL	N/A
NOMINAL VOLTAGE	DC5V from Host Unit or DC3.7V from Li-ion battery
MODULATION TYPE	GSM&GPRS:GMSK EDGE:8DPSK WCDMA:QPSK
RADIO TECHNOLOGY	GPRS/WCDMA/HSDPA/HSUPA/LTE FDD/LTE TDD
OPERATING FREQUENCY:	E-GSM 900:880~915MHz DCS1800:1710~1785MHz WCDMA Band I: 1920~1980MHz WCDMA Band VIII: 880~915MHz
I/O PORTS:	Refer to user's manual

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: 171129N016) for detailed product photo.



2.2 DESCRIPTION OF TEST MODE

The EUT were tested under the following mode, the final worst mode were marked in boldface and recorded in this report.

FOR EN55032 AND EN55024:

◆ FOR ALL TEST ITEMS:

Test Mode	Test Voltage
Charging	DC5V from adapter

FOR EN301489-1/52:

◆ FOR CONDUCTED EMISSION TEST:

Test Mode	Test Voltage
E-GSM 900 Link+ Charging	DC5V from adapter
DCS 1800 Link+ Charging	
WCDMA Band I Link+ Charging	
WCDMA Band VIII Link+ Charging	

◆ FOR RADIATED EMISSIONS TEST(30MHz-6GHz):

Test Mode	Test Voltage
E-GSM 900 Link+ Charging	DC5V from adapter
DCS 1800 Link+ Charging	
WCDMA Band I Link+ Charging	
WCDMA Band VIII Link+ Charging	
E-GSM 900 Link	DC3.7V from battery
Standby	

◆ FOR IMMUNITY TESTS (ESD,RS):

Test Mode	Test Voltage
E-GSM 900 Link+ Charging	DC5V from adapter
DCS 1800 Link+ Charging	
WCDMA Band I Link+ Charging	
WCDMA Band VIII Link+ Charging	
E-GSM 900 Link	DC3.7V from battery
Standby	



2.3 GENERAL DESCRIPTION OF APPLIED STANDARD

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

EN 55032:2015, CLASS B

EN 55024:2010

IEC 61000-4-2:2008 ED. 2.0

IEC 61000-4-3:2010 ED. 3.2

Draft EN 301 489-1 V2.2.0 (2017-03)

Draft EN 301 489-52 V1.1.0 (2016-11)

EN 61000-4-2:2009

EN 61000-4-3:2006 +A1:2008 +A2:2010

Note: The above EN basic standards are applied with latest version if customer has no special requirement.



2.4 DESCRIPTION OF SUPPORT UNIT

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Adapter 5V/2A	N/A	C-P57	N/A	N/A
2	Adapter 5V/2A	N/A	C5020-C08N	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1-2	USB Line: Shielded, Detachable 1.5m



3 EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: EN 55032

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15-0.5	79	66	66-56	56-46
0.5-5	73	60	56	46
5-30	73	60	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Apr. 05,17	Apr. 04,19
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 06,17	Mar. 05,18
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Apr. 05,17	Apr. 04,18
Voltage probe	SCHWARZBEC K	TK 9421	TK 9421-176	Jan. 04,17	Jan. 03,18
Test software	ADT	ADT_Cond_V 7.3.7	N/A	N/A	N/A
RADIO COMMUNICATION ANALYZER	Annitsu	MT8820C	6201300716	Dec. 02, 17	Dec. 01, 18
Universal Radio Communication Tester	Rohde&Schwarz	CMU 200	123259	Apr. 05,17	Apr. 04,18

- NOTE:**
1. The test was performed at Shielded Room 553.
 2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



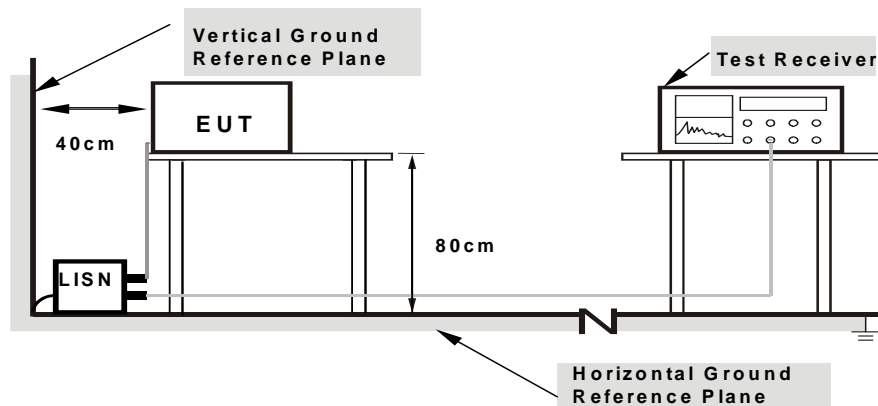
3.1.3 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit - 20dB) were not reported.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

3.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power of all equipment.
- b. EUT was operated according to the type described in manufacturer's specifications or the user's manual.

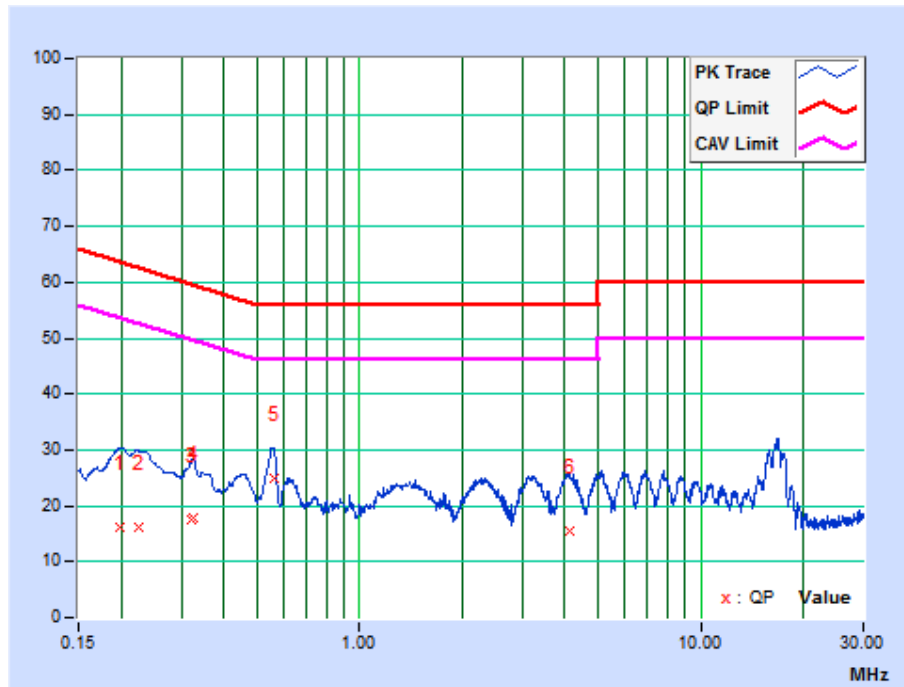


3.1.7 TEST RESULTS

TEST MODE	See section 2.2	6DB BANDWIDTH	9 kHz
TEST VOLTAGE	DC 5V from adapter	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	23deg. C, 48% RH	TESTED BY	Dragon

No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19721	10.22	5.86	-2.40	16.08	7.82	63.73	53.73	-47.65	-45.91
2	0.22425	10.22	5.83	-2.74	16.05	7.48	62.66	52.66	-46.61	-45.18
3	0.32312	10.22	7.27	-2.56	17.49	7.66	59.63	49.63	-42.14	-41.97
4	0.32397	10.22	7.51	-2.37	17.73	7.85	59.60	49.60	-41.87	-41.75
5	0.55950	10.22	14.75	-1.63	24.97	8.59	56.00	46.00	-31.03	-37.41
6	4.11872	10.22	5.22	-4.62	15.44	5.60	56.00	46.00	-40.56	-40.40

REMARKS: The emission levels of other frequencies were very low against the limit.

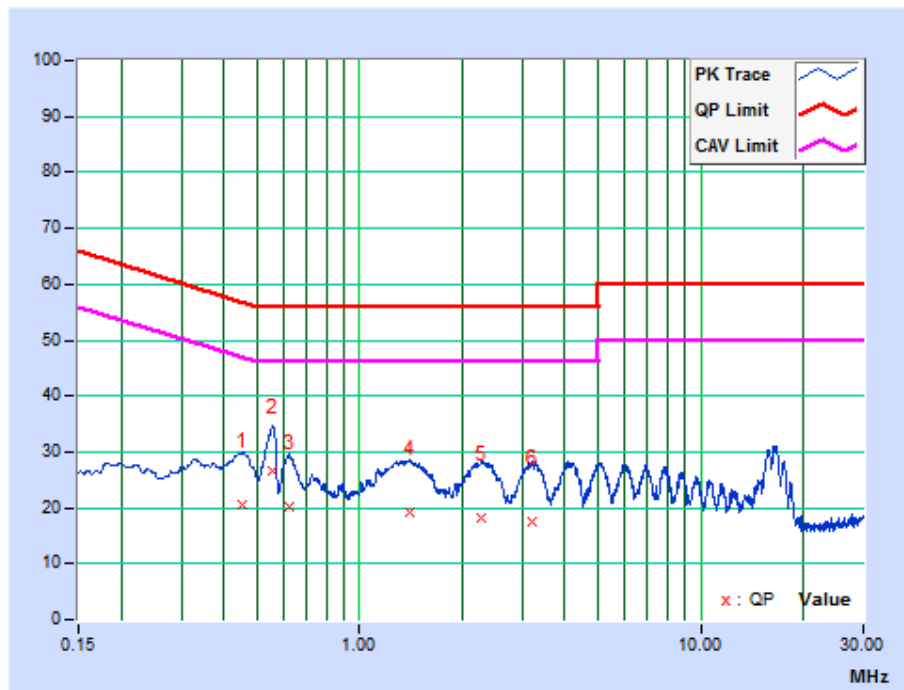




TEST MODE	See section 2.2	6DB BANDWIDTH	9 kHz
TEST VOLTAGE	DC 5V from adapter	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	23deg. C, 48% RH	TESTED BY	Dragon

No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.45185	10.03	10.53	-3.44	20.56	6.59	56.84	46.84	-36.28	-40.25
2	0.55725	10.02	16.72	-1.32	26.74	8.70	56.00	46.00	-29.26	-37.30
3	0.61865	10.02	10.26	-3.93	20.28	6.09	56.00	46.00	-35.72	-39.91
4	1.40254	10.01	9.07	-4.75	19.08	5.26	56.00	46.00	-36.92	-40.74
5	2.26784	10.02	8.33	-4.70	18.35	5.32	56.00	46.00	-37.65	-40.68
6	3.19655	10.03	7.36	-4.36	17.39	5.67	56.00	46.00	-38.61	-40.33

REMARKS: The emission levels of other frequencies were very low against the limit.





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: EN 55032

FOR FREQUENCY BELOW 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	Quasi-Peak dBuV/m	Quasi-Peak dBuV/m
30 – 230	40	30
230 – 1000	47	37

FREQUENCY (MHz)	Class A (at 3m)	Class B (at 3m)
	Quasi-Peak dBuV/m	Quasi-Peak dBuV/m
30 – 230	50	40
230 – 1000	57	47

For FM receivers

Distance (m)	Source	Frequency Range (MHz)	Limits dB (uV/m)	
			Quasi-peak	
10	Local oscillator	≤1000	Fundamental	50
		30 to 300	Harmonics	42
		300 to 1000	Harmonics	46
	Other	30 to 230		30
		230 to 1000		37
3	Local oscillator	≤1000	Fundamental	60
		30 to 300	Harmonics	52
		300 to 1000	Harmonics	56
	Other	30 to 230		40
		230 to 1000		47



**FREQUENCY RANGE OF RADIATED MEASUREMENT
(For unintentional radiators)**

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	Up to 5 times of the highest frequency or 6 GHz, whichever is less

FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (GHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
1 to 3	76	56	70	50
3 to 6	80	60	74	54

- NOTE:** (1) The lower limit shall apply at the transition frequencies.
(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

**3.2.2 TEST INSTRUMENTS****FREQUENCY RANGE BELOW 1GHz**

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU26	100005	Jun. 05,17	Jun. 04,18
EMI Test Receiver	Rohde&Schwarz	ESR7	101564	Feb. 27,17	Feb. 26,18
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-555	Nov. 10, 17	Nov. 09, 18
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-554	Dec. 10, 17	Dec. 09, 18
Preamplifier	EMCI	EMC1135	980378	Mar. 20,17	Mar. 19,18
Preamplifier	EMCI	EMC1135	980423	Mar. 20,17	Mar. 19,18
10m Semi-anechoic Chamber	CHANGLING	21.4m*12.1m* 8.8m	NSEMC006	Mar. 06,17	Mar. 05,18
Test Software	ADT	ADT_Radiated_V8.7.07	N/A	N/A	N/A
RADIO COMMUNICATION ANALYZER	Annitsu	MT8820C	6201300716	Dec. 02, 17	Dec. 01, 18
Universal Radio Communication Tester	Rohde&Schwarz	CMU 200	123259	Apr. 05,17	Apr. 04,18

- NOTES:** 1. The test was performed in 966 Chamber (a 3m Semi-anechoic chamber).
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

FREQUENCY RANGE ABOVE 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101003	Apr. 05,17	Apr. 04,18
Broadband Preamplifier	SCHWARZBEC K	BBV9718	266	Mar. 21,17	Mar. 20,18
Pre-Amplifier (100MHz-26.5GHz)	EMCI	EMC 012645	980077	May 19,17	May 18,18
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 08,17	Nov. 07,18
Test Software	ADT	ADT_Radiated_V8.7.07	N/A	N/A	N/A

- NOTES:** 1. The test was performed in 10m Chamber.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	ETS-Lindgren	3117	00085519	Dec. 10, 17	Dec. 09, 18

- NOTES:** 1. The test was performed in 10m Chamber.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170242	Mar. 15,17	Mar. 14,18

- NOTES:** 1. The test was performed in 10m Chamber.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



3.2.3 TEST PROCEDURE

<Frequency Range below 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground in a 10 meter Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna 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 turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier).
5. Margin value = Emission level – Limit value.



<Frequency Range above 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter Semi-anechoic chamber room. 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 height of antenna can be varied from one meter-to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. The bore sight should be used during the test above 1GHz.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights 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 and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

NOTE:

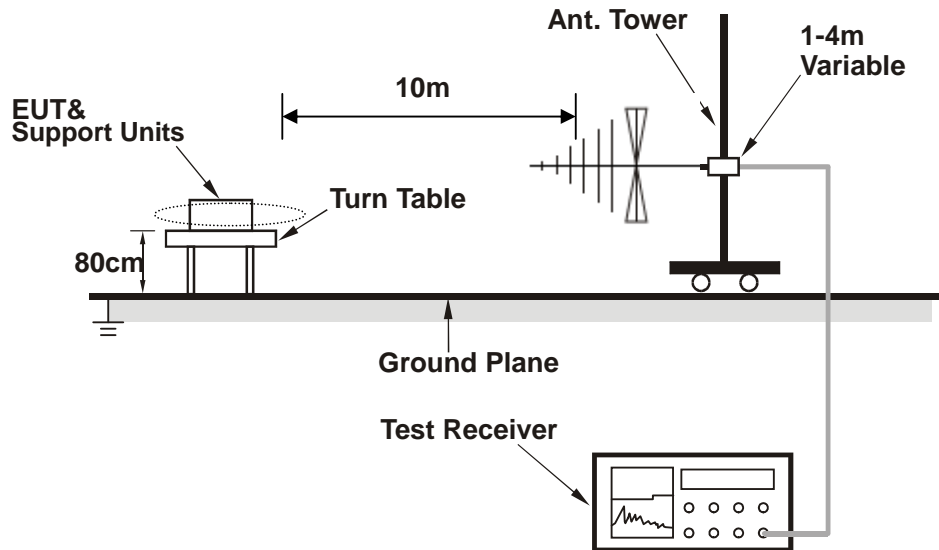
1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
2. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
3. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
5. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier).
6. Margin value = Emission level – Limit value.

3.2.4 DEVIATION FROM TEST STANDARD

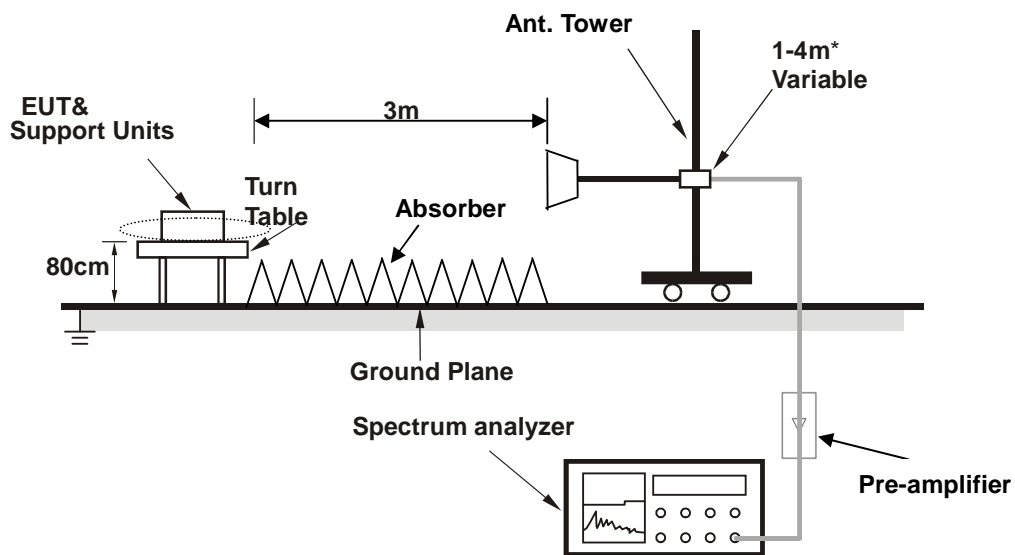
No deviation.

3.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



*: depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

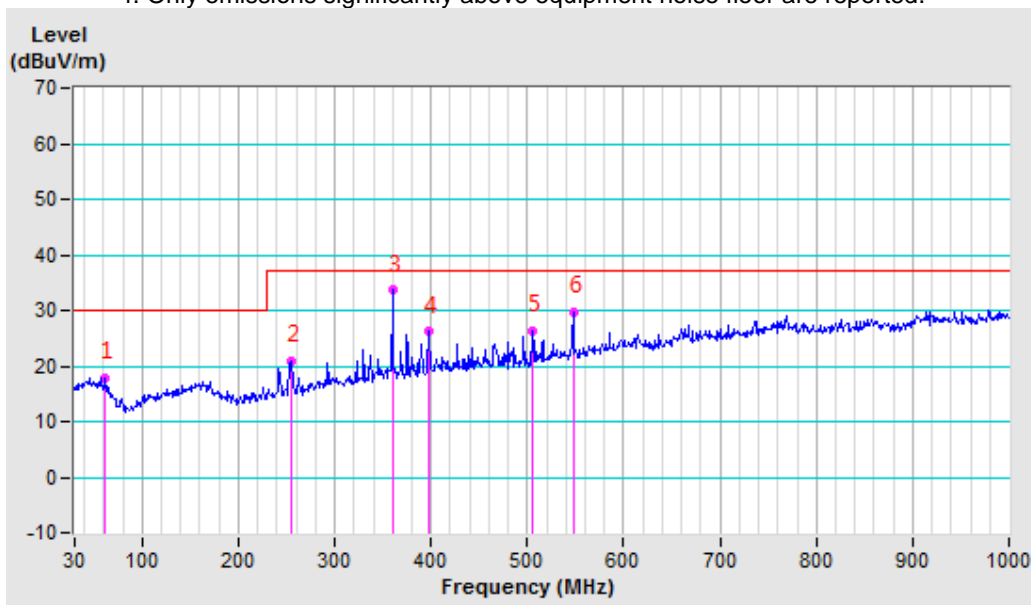


3.2.6 TEST RESULTS (BELOW 1GHz)

TEST MODE	See section 2.2	FREQUENCY RANGE	30-1000 MHz
TEST VOLTAGE	DC3.7V from battery	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	22deg. C, 58% RH	TESTED BY: Xin Peng	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	61.16	-10.15	27.87	17.72	30.00	-12.28	200	353
2	255.04	-8.99	29.82	20.83	37.00	-16.17	400	92
3	360.04	-6.06	39.63	33.57	37.00	-3.43	200	28
4	397.51	-5.27	31.41	26.14	37.00	-10.86	400	23
5	505.66	-4.08	30.43	26.35	37.00	-10.65	200	97
6	547.62	-2.68	32.38	29.70	37.00	-7.30	200	39

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.

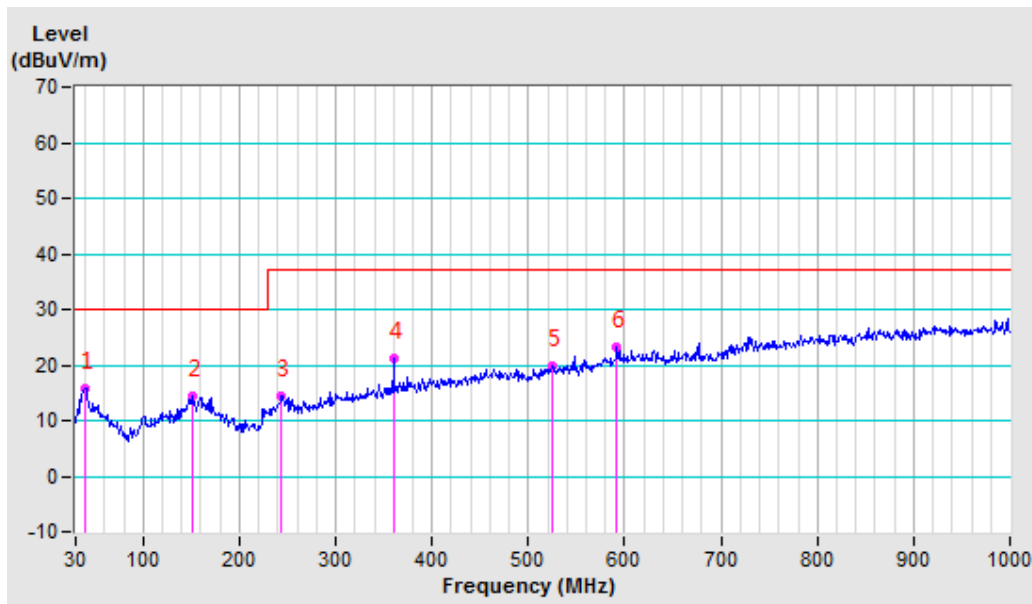




TEST MODE	See section 2.2	FREQUENCY RANGE	30-1000 MHz
TEST VOLTAGE	DC3.7V from battery	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	22deg. C, 58% RH	TESTED BY: Xin Peng	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	38.92	-16.60	32.44	15.84	30.00	-14.16	100	117
2	151.06	-15.81	30.14	14.33	30.00	-15.67	100	338
3	243.51	-16.02	30.59	14.57	37.00	-22.43	100	106
4	359.91	-12.91	34.07	21.16	37.00	-15.84	300	54
5	525.60	-9.40	29.40	20.00	37.00	-17.00	100	298
6	591.71	-7.26	30.59	23.33	37.00	-13.67	100	338

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.





3.2.7 TEST RESULTS (ABOVE 1GHz)

TEST MODE		See section 2.2						
TEST VOLTAGE		DC 3.7V from battery			FREQUENCY RANGE		1-6 GHz	
ENVIRONMENTAL CONDITIONS		22deg. C, 58% RH			TESTED BY: Xin Peng			
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	3216.00 PK	3.82	58.31	62.13	74.00	-11.87	100	153
2	3216.00 AV	3.82	38.75	42.57	54.00	-11.43	100	153
3	3946.00 PK	5.20	57.81	63.01	74.00	-10.99	100	278
4	3946.00 AV	5.20	37.67	42.87	54.00	-11.13	100	278
5	4672.00 PK	6.77	56.65	63.42	74.00	-10.58	100	2
6	4672.00 AV	6.77	35.01	41.78	54.00	-12.22	100	2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	3462.48 PK	5.06	55.29	60.35	74.00	-13.65	100	124
2	3462.48 AV	5.06	36.49	41.55	54.00	-12.45	100	124
3	3976.45 PK	5.21	54.74	59.95	74.00	-14.05	100	257
4	3976.45 AV	5.21	35.06	40.27	54.00	-13.73	100	257
5	4673.58 PK	6.78	53.19	59.97	74.00	-14.03	100	23
6	4673.58 AV	6.78	33.68	40.46	54.00	-13.54	100	23

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 1GHz to 6GHz.
 4. Only emissions significantly above equipment noise floor are reported.



4 IMMUNITY TEST

4.1 GENERAL DESCRIPTION

Product Standard	Draft EN 301 489-1 V2.2.0 (2017-03) Draft EN 301 489-52 V1.1.0 (2016-11)	
Basic Standard, Specification, and Performance Criterion required	EN 61000-4-2	Electrostatic Discharge – ESD: 2, 4, 8 kV air discharge, 4 kV contact discharge, Performance Criterion B
	EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80 ~ 6000 MHz, 3 V/m, 80% AM (1 kHz), Performance Criterion A
Product Standard	EN 55024:2010	
Basic Standard, specification requirement, and Performance Criteria:	IEC 61000-4-2	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	IEC 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80-1000 MHz, 3V/m, 80% AM (1kHz), Performance Criterion A



4.1.1 GENERAL PERFORMANCE CRITERIA DESCRIPTION

For EN 301 489-52

EN 301 489-52, GSM and DCS

The equipment shall meet the performance criteria specified in this clause.

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

Portable or mobile equipment powered by the AC mains shall additionally fulfill the applicable requirements of

EN 301 489-1, 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.



The phenomena allowed during and after test are stated in the following table.

Special conditions for EN301489-52	
Criteria	During / After Test
CT	<p>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.</p> <p>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.</p> <p>Note: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.</p> <p>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.</p>
TT	<p>A communications link shall be established at the start of the test, see clauses 4.2 to 4.2.4.</p> <p>At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.</p> <p>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.</p> <p>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.</p>
CR	<p>A communications link shall be established at the start of the test, clauses 4.2 to 4.2.6.</p> <p>During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence.</p> <p>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.</p> <p>Note: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.</p> <p>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.</p>
TR	<p>A communications link shall be established at the start of the test, clauses 4.2 to 4.2.6.</p> <p>At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.</p> <p>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.</p>
Ancillary equipment tested on a stand alone bases	The provision of EN 301 489-1, clause 6.4 shall apply.



EN 301 489-52, UTRA, Mobile and Portable UE

The equipment shall meet the performance criteria specified in this clause.

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 for the UE.

Special conditions for EN301489-52	
Criteria	During / After Test
CT/CR	<p>A communication link shall be established at the start of the test, and maintained during the test. 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.</p> <p>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.</p> <p>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.</p> <ul style="list-style-type: none"> • UTRA <p>In the data transfer mode, the performance criteria can be one of the following:</p> <ul style="list-style-type: none"> • if the BER (as referred in TS 134 109) is used, it shall not exceed 0,001 during the test sequence; • if the BLER (as referred in TS 134 109) is used, it shall not exceed 0,01 during the test sequence. <p>The BLER calculation shall be based on evaluating the CRC on each transport block.</p>
TT/TR	<p>A communications link shall be established at the start of the test.</p> <p>At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.</p> <p>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.</p> <p>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.</p>



FOR EN 55024

According to Clause 7.1 of EN 55024:2010 standard, the following describes the general performance criteria.

CRITERION A	During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.
CRITERION B	After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.
CRITERION C	During and after testing, a temporary loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.



4.2 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD) EN 30 1489

4.2.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge: 2, 4, 8 kV (Direct) Contact Discharge: 4 kV (Indirect & Direct)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: 20 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second

4.2.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
ESD Generator	TESEQ	NSG 437	279	Mar. 07,17	Mar. 06,18
Test Software	TESEQ	V03.03	N/A	N/A	N/A
ESD Generator	EM TEST	Dito	V1211112265	Feb. 25,17	Feb. 24,18
Test Software	EM TEST	V 2.31	N/A	N/A	N/A
RADIO COMMUNICATION ANALYZER	Annitsu	MT8820C	6201300716	Dec. 02, 17	Dec. 01, 18
Universal Radio Communication Tester	Rohde&Schwarz	CMU 200	123259	Apr. 05,17	Apr. 04,18

- NOTE:**
1. The test was performed in ESD Room.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



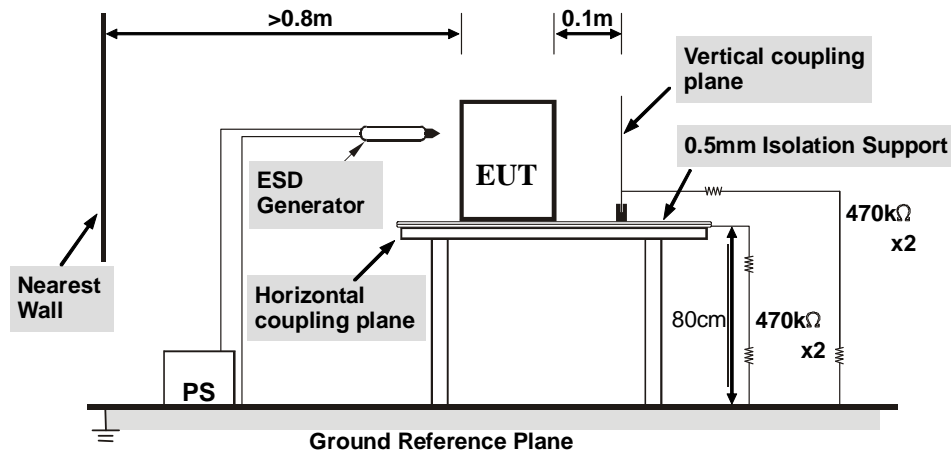
4.2.3 TEST PROCEDURE

- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. The discharge return cable of the generator shall be kept at a distance of at least 0.2 m from the EUT whilst the discharge is being applied and should not be held by the operator.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- g. At least ten single discharges (in the most sensitive polarity) were applied to the **Horizontal Coupling Plane** at points on each side of the EUT. The ESD generator was positioned horizontally at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP**.
- h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **Vertical Coupling Plane** in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 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 or copper 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 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 0.8-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 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 or copper that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.



4.2.6 TEST RESULTS

TEST VOLTAGE	DC5V from adapter DC3.7V from battery	ENVIRONMENTAL CONDITIONS	24deg. C, 53% RH, 101.3kPa
TESTED BY	Daniel		

Direct Discharge Application				
Test Level (kV)	Polarity	Test Point	Test Result of Contact Discharge	Test Result of Air Discharge
4	+/-	All metal parts	N/A	N/A
2, 4, 8	+/-	All non-metal parts	N/A	N/A

Indirect Discharge Application				
Discharge Level (kV)	Polarity	Test Point	Test Result of HCP	Test Result of VCP
4	+ /-	HCP	A	N/A
4	+ /-	VCP	N/A	A

NOTE: A: There was no change compared with initial operation during the test.



4.3 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD) (EN55024)

4.3.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge: 8kV (Direct) Contact Discharge: 4kV (Indirect & Direct)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: 20 times at each test point Contact Discharge: 200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1 second

4.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
ESD Generator	TESEQ	NSG 437	279	Mar. 07,17	Mar. 06,18
Test Software	TESEQ	V03.03	N/A	N/A	N/A
ESD Generator	EM TEST	Dito	V1211112265	Feb. 25,17	Feb. 24,18
Test Software	EM TEST	V 2.31	N/A	N/A	N/A

- NOTE:** 1. The test was performed in ESD Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

4.3.3 TEST PROCEDURE

The discharges shall be applied in two ways:

a. Contact discharges to the conductive surfaces and coupling planes:

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

b. Air discharges at slots and apertures and insulating surfaces:

On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.



The basic test procedure was in accordance with IEC 61000-4-2:

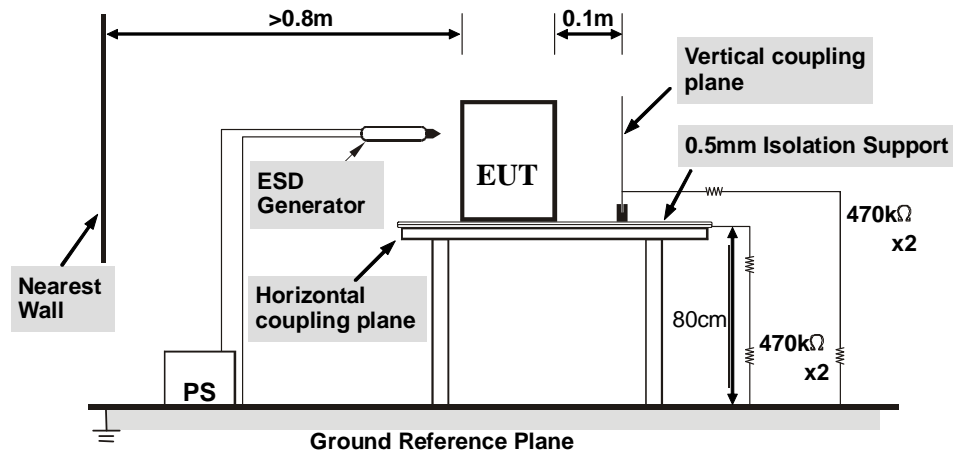
- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. The discharge return cable of the generator shall be kept at a distance of at least 0.2 m from the EUT whilst the discharge is being applied and should not be held by the operator.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned horizontal at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
- h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.



4.3.5 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 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 0.8-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 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 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.



4.3.6 TEST RESULTS

TEST MODE	See section 2.2	TEST VOLTAGE	DC 5V from adapter
ENVIRONMENTAL CONDITIONS	23.0deg. C, 54.0% RH 101.3kPa	TESTED BY: Daniel	

Direct Discharge Application				
Test Level (kV)	Polarity	Test Point	Test Result of Contact Discharge	Test Result of Air Discharge
4	+/-	All metal Part	N/A	N/A
8	+/-	All Non-metal Part	N/A	N/A

Indirect Discharge Application				
Discharge Level (kV)	Polarity	Test Point	Test Result of HCP	Test Result of VCP
4	+/-	HCP&VCP	A	A

NOTE: A: There was no change compared with initial operation during the test.



4.4 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS) FOR EN 301489

4.4.1 TEST SPECIFICATION

Table with test specifications: Basic Standard: EN 61000-4-3, Frequency Range: 80 MHz ~ 6000 MHz, Field Strength: 3 V/m, Modulation: 1 kHz Sine Wave, 80%, AM Modulation, Frequency Step: 1 % of preceding frequency value, Polarity of Antenna: Horizontal and Vertical, Antenna Height: 1.5 m, Dwell Time: 3 seconds

4.4.2 TEST INSTRUMENT

Table with 6 columns: Equipment, Manufacturer, Model No., Serial No., Last Cal., Next Cal. listing various test instruments like Signal Generator, Bilog Antenna, Antenna Log-Periodic, etc.

- NOTE: 1. The test was performed in RS chamber. 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



4.4.3 TEST PROCEDURE

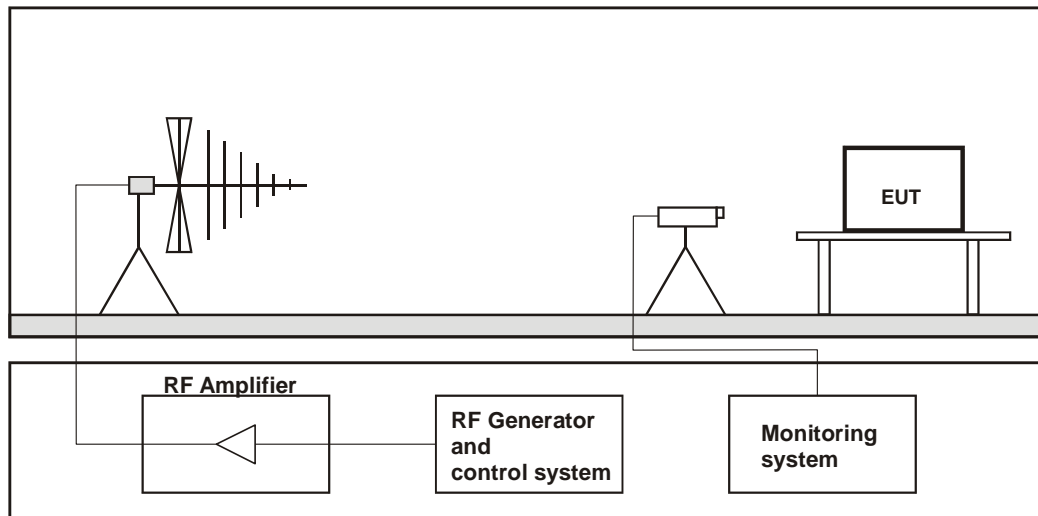
The test procedure was in accordance with EN 61000-4-3.

- The testing was performed in a fully-anechoic chamber.
- The frequency range is swept from 80 MHz to 6000 MHz with the signal 80% amplitude modulated with a 1 kHz sine wave.
- The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0.5s.
- The field strength level was 3 V/m.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.



4.4.6 TEST RESULTS

TEST VOLTAGE	DC 5V from adapter DC3.7V battery	ENVIRONMENTAL CONDITIONS	25.0deg., 49.0% RH
TESTED BY	Daniel		

Field Strength (V/m)	Test Frequency Note ^{#1} (MHz)	Polarization of antenna (Horizontal / Vertical)	Test Distance (m)	Test Result	Remark
3	80-6000	H/ V	3	A	N/A

Note^{#1}:Tested Israel SII Frequencies 89,100,107,144,163,196,244,315,434,460,600,825,845,880
MHz

NOTE: A: There was no change compared with initial operation during the test.

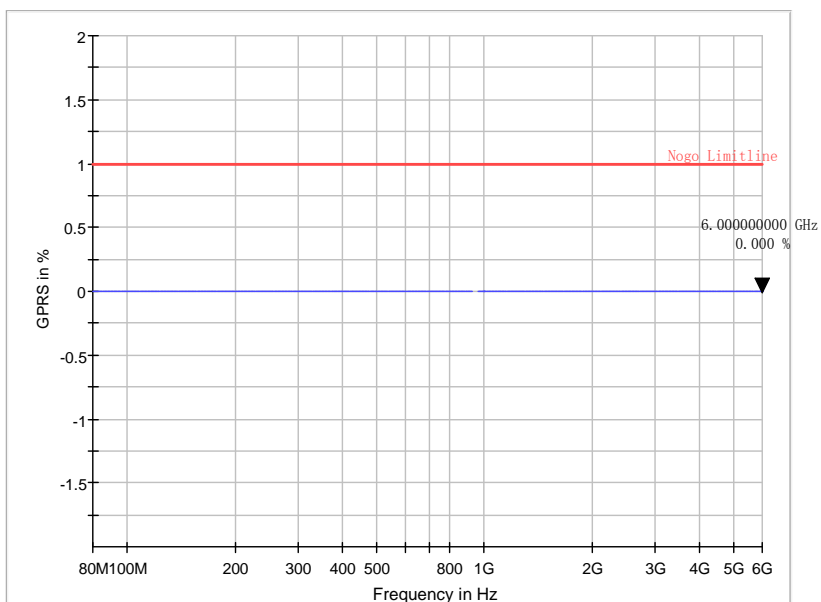


4.4.7 DATA TRANSFER MEASUREMENT RESULTS

Worst case of the test modes: GPRS 900 link

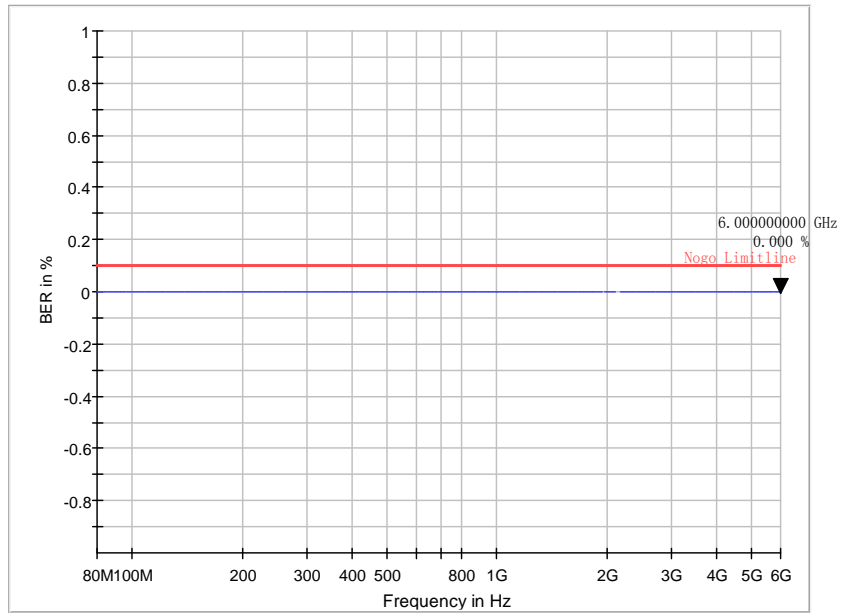
For BLER

Horizontal (0 degree)





**Worst case of the test modes: WCDMA Band I RCM Link
For BER
Horizontal (0 degree)**





4.5 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS) FOR EN 55024

4.5.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-3
Frequency Range:	80 MHz ~ 1000 MHz
Field Strength:	3 V/m
Modulation:	1 kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.5 m
Dwell Time:	3 seconds

4.5.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal Generator	Agilent	N5181A	MY50142530	Oct. 20,17	Oct. 19,18
Bilog Antenna	Teseq	CBL 6111D	25757	N/A	N/A
Antenna Log-Periodic	AR	ATR80M6G	0337307	N/A	N/A
Antenna Log-Periodic	AR	ATS700M11G	0336821	N/A	N/A
Switch Controller	AR	SC1000	0337343	N/A	N/A
RF Power Meter	ESE	4242	13984	Nov. 04,17	Nov. 03,18
Power Sensor	ESE	51011EMC	35716	Nov. 04,17	Nov. 03,18
Power Sensor	ESE	51011EMC	35715	Nov. 04,17	Nov. 03,18
E-Field probe	Narda	NBM-520	2403/01B	Sep. 28,17	Sep. 27,18
Power Amplifier	TESEQ	CBA 1G-150	T44029	N/A	N/A
Power Amplifier	TESEQ	CBA 3G-100	T44030	N/A	N/A
Power Amplifier	TESEQ	CBA 6G-050	1041204	N/A	N/A
Dual Directional Coupler	TESEQ	C5982	95208	Nov. 08,17	Nov. 07,18
Dual Directional Coupler	TESEQ	C6187	95175	Nov. 08,17	Nov. 07,18
Dual Directional Coupler	TESEQ	CPH-274F	M251304-01	Nov. 08,17	Nov. 07,18
Test Software	ADT	BVADT_RS_V 7.6.4-DG	N/A	N/A	N/A
RADIO COMMUNICATION ANALYZER	Annitsu	MT8820C	6201300716	Dec. 02, 17	Dec. 01, 18
Universal Radio Communication Tester	Rohde&Schwarz	CMU 200	123259	Apr. 05,17	Apr. 04,18
EAR SIMULATOR	B&K	4192	2764719	Aug. 08,17	Aug.07,18
Audio analyzer	Rohde&Schwarz	UPV	101397	Sep. 18,17	Sep. 17,18
Software	ADT	ADT_ABMS_T ELE_V7.5.2	N/A	N/A	N/A

NOTE: 1. The test was performed in RS chamber.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



4.5.3 TEST PROCEDURE

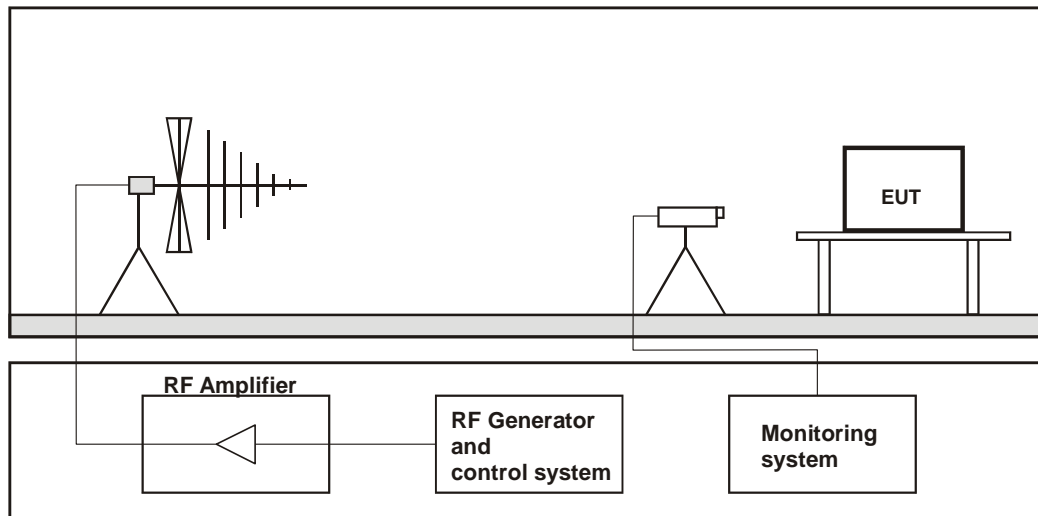
The test procedure was in accordance with EN 61000-4-3.

- The testing was performed in a fully-anechoic chamber.
- The frequency range is swept from 80 MHz to 1000 MHz with the signal 80% amplitude modulated with a 1 kHz sine wave.
- The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0.5s.
- The field strength level was 3 V/m.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.



4.5.6 TEST RESULTS

TEST VOLTAGE	DC 5V from adapter	ENVIRONMENTAL CONDITIONS	25.0deg., 49.0% RH
TESTED BY	Daniel		

Field Strength (V/m)	Test Frequency Note ^{#1} (MHz)	Polarization of antenna (Horizontal / Vertical)	Test Distance (m)	Test Result	Remark
3	80-1000	H/ V	3	A	N/A

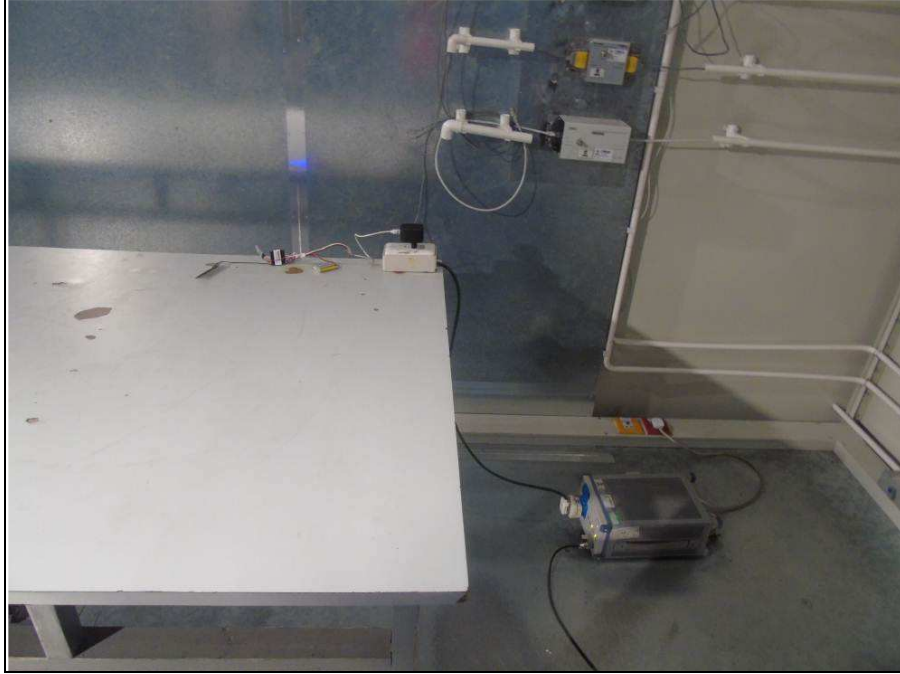
Note^{#1}: Tested Israel SII Frequencies 89,100,107,144,163,196,244,315,434,460,600,825,845,880 MHz.

Note: A: There was no change compared with initial operation during the test.



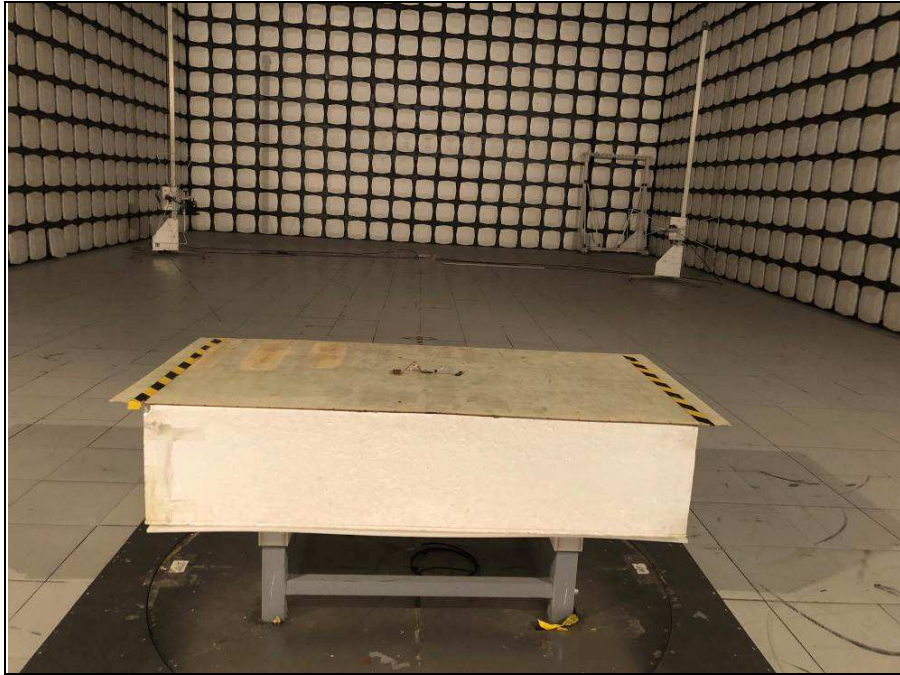
5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

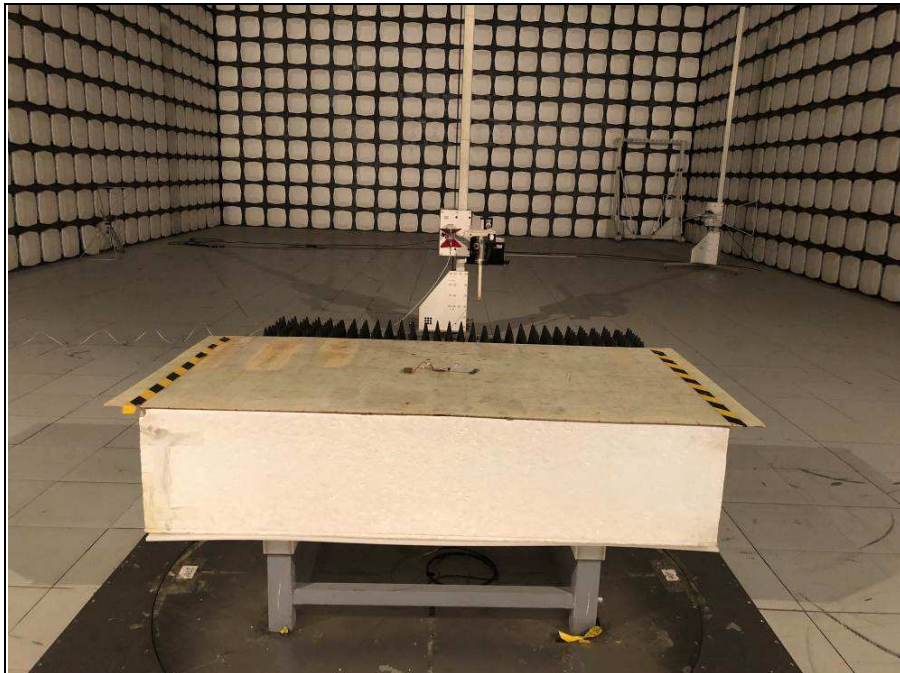




RADIATED EMISSION TEST <30MHz~1GHz>



RADIATED EMISSION TEST <Above 1GHz>





ESD TEST



R/S TEST





6 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

---END---