



Shenzhen Global Test Service Co.,Ltd.

1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong

TEST REPORT

47 CFR FCC Part 15 Subpart B (Class B)

Radio Frequency Devices – Unintentional Radiators – Limits and methods of measurement

ANSI C63.4: 2014

American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

Report Reference No.....: GTSR16060154

FCC ID.....: 2AIS5-ARKJ01

Compiled by

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Date of issue.....: Jun. 24, 2016

Testing Laboratory Name **Shenzhen Global Test Service Co.,Ltd.**

Address.....: 1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong

Applicant's name **Beijing Palo Alto Tech Co.,Ltd.**

Address.....: T3-A-31,Wangjing Soho,Chaoyang District,Beijing,China

Test specification:

Standard: **47 CFR FCC Part 15 Subpart B (Class B)**
ANSI C63.4: 2014

TRF Originator: Shenzhen Global Test Service Co.,Ltd.

Master TRF.....: Dated 2014-12

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Test item description CoolGlass

Trade Mark: /

Manufacturer..... **Beijing Palo Alto Tech Co.,Ltd.**

Model/Type reference.....: ARKJ01

Listed Models: /

Ratings.....: DC 3.80V

Result.....: **Pass**

TEST REPORT

Test Report No. : GTSR16060154	Jun. 24, 2016 Date of issue
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Equipment under Test : CoolGlass

Model /Type : ARKJ01

Listed Models : /

Applicant : **Beijing Palo Alto Tech Co.,Ltd.**

Address : T3-A-31,Wangjing Soho,Chaoyang District,Beijing,China

Manufacturer **Beijing Palo Alto Tech Co.,Ltd.**

Address T3-A-31,Wangjing Soho,Chaoyang District,Beijing,China

Test Result	Pass
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

[47 CFR FCC Part 15 Subpart B \(Class B\)](#) Radio Frequency Devices – Unintentional Radiators – Limits and methods of measurement

[ANSI C63.4: 2014](#) American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Jun. 12, 2016
Testing commenced on	:	Jun. 12, 2016
Testing concluded on	:	Jun. 24, 2016

2.2. Equipment under Test

Power supply system utilised

Power supply voltage	:	☐ 120V / 60 Hz	☐ 230V / 50Hz
		☐ 12 V DC	☐ 24 V DC
		☒ Other (specified in blank below)	

USB 5V From PC

2.3. Short description of the Equipment under Test (EUT)

This is a CoolGlass.

For more details, refer to the user's manual of the EUT.

2.4. EUT operation mode

Operation mode	
Mode 1	Data transmission

2.5. EUT configuration

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

● - supplied by the manufacturer

○ - Supplied by the lab

☐	COMPUTER	M/N:	P5240
		Manufacturer:	DELL
☐	LCD	M/N:	E177FPB
		Manufacturer:	DELL
☐	Mouse	M/N:	M230
		Manufacturer:	DELL
☐	LASER PRINTER	M/N:	HP LASERJET 1020 PLUS
		Manufacturer:	HP

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Test Site 1: Shenzhen Global Test Service Co.,Ltd.

1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong

Test Site 2: Shenzhen CTL Testing Technology Co.,Ltd.

1/F.-A, Baisha Technology Park, No.3011, Shaheji Road, Nanshan District, Shenzhen, Guangdong, China

3.2. Test Facility

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

FCC-Registration No.: 964637

Shenzhen Global Test Service Co.,Ltd 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 964637, Jul 24, 2015.

CNAS-Lab Code: L8169

Shenzhen Global Test Service Co.,Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. Date of Registration: Dec. 11, 2015. Valid time is until Dec. 10, 2018.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. 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 970318, December 19, 2013.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

3.4. Test Description

FCC Part § 15B			
FCC Rules	Description of Test	Results	Test Site
§15.107	Conducted Disturbance	PASS	Site 1
§15.109	Radiated Emission	PASS	Site 2

Remark: N/A means “not applicable”.

The measurement uncertainty is not included in the test result.

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen Global Test Service Co.,Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	1~18GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.12dB	(1)

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

3.6. Equipments Used during the Test

Test Site 1

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Spectrum Analyzer	Agilent	N9020A	MY48010425	2016/06/17	2017/06/16
LISN	R&S	ENV216	3560.6550.08	2016/05/28	2017/05/27
LISN	R&S	ESH2-Z5	893606/008	2016/05/27	2017/05/26
EMI Test Receiver	R&S	ESCI	101102	2015/06/26	2016/06/25
EMC Test Software	R&S	ES-K1	N/A	N/A	N/A
RF Cable	H&S	N/A	N/A	2015/06/26	2016/06/25

Test Site 2

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2016/06/02	2019/06/01
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2016/05/19	2019/05/18
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170219	2016/05/19	2019/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2016/05/19	2019/05/18
EMC Test Software	R&S	ES-K1	N/A	N/A	N/A
Amplifier	Agilent	8349B	3008A02306	2016/05/19	2017/05/18
Amplifier	Agilent	8447D	2944A10176	2016/05/19	2017/05/18
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2016/05/20	2017/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2016/05/20	2017/05/19
Data acquisition card	Agilent	U2531A	TW53323507	2016/05/20	2017/05/19
Power Sensor	Agilent	U2021XA	MY5365004	2016/05/20	2017/05/19
RF Cable	H&S	RG214	N/A	2016/05/20	2017/05/19
EMI Test Receiver	R&S	ESCI	103710	2016/05/20	2017/05/19
Spectrum Analyzer	Agilent	N9020A	MY49100067	2016/05/20	2017/05/19

4. TEST CONDITIONS AND RESULTS

4.1. Radiated Emission

4.1.1. LIMITS OF DISTURBANCE (Class B)

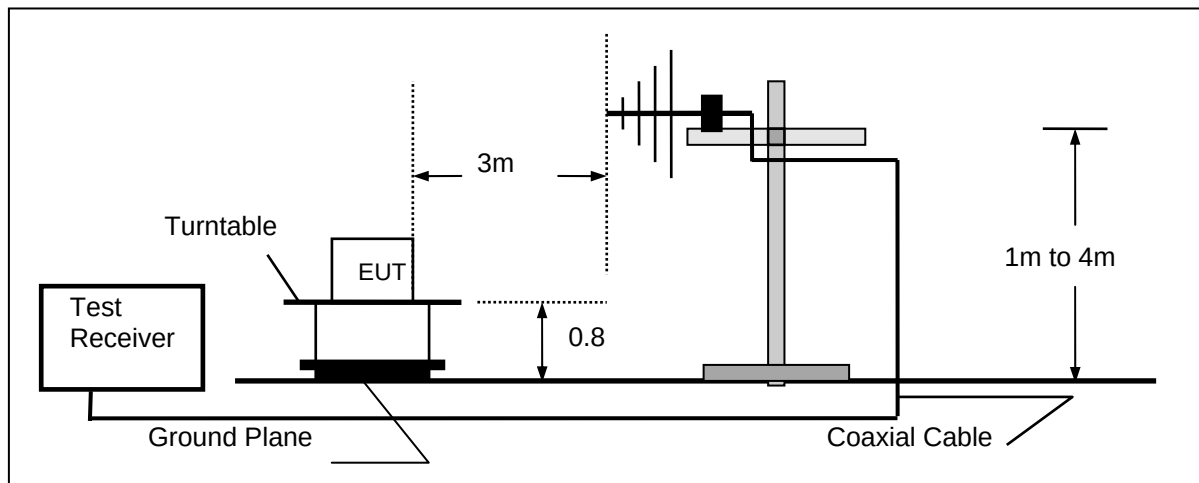
Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 88	3	40
88~216	3	43.5
216 ~ 960	3	46
Above 960 PK	3	74
Above 960 AV	3	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

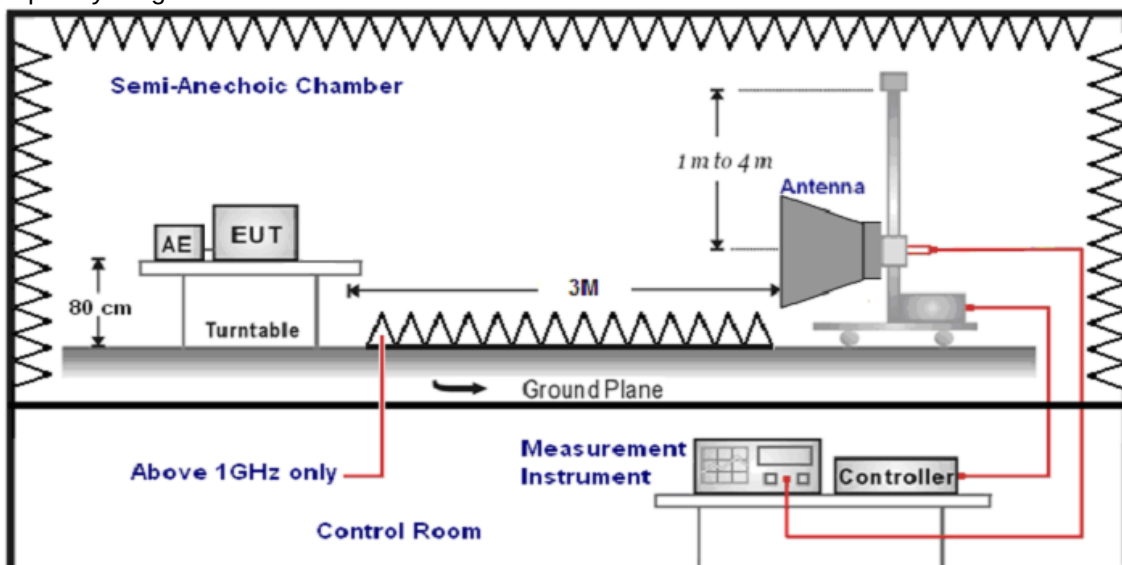
(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

4.1.2. TEST CONFIGURATION

Frequency range 30MHz – 1000MHz



Frequency range above 1GHz



4.1.3. TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz;the EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 1GHz – 40GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
 - a) The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-40GHz	Horn Antennna	1

- b) Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

4.1.4. CLIMATIC CONDITIONS

- ambient temperature : 24 °C
- relative humidity: 48%
- atmospheric pressure: 960 mbar

4.1.5. TEST RESULTS

Remark:

1. According to FCC part 15.33(b) require <if highest frequency generated or used in the device or on which the device operates or tunes, the highest measure frequency up to 5th harmonic of the highest frequency or 40 GHz, whichever is lower>, the sample highest operate frequency is 5.85GHz, need meaused highest frequency up to 29.65GHz, we measured frequency range up to 30GHz;
2. Mesured at data exchange with PC mode.
3. Over Limit = Emission level - Limit value
4. “---” states emission level at least lower than limit 20dB, so without recorded any values;

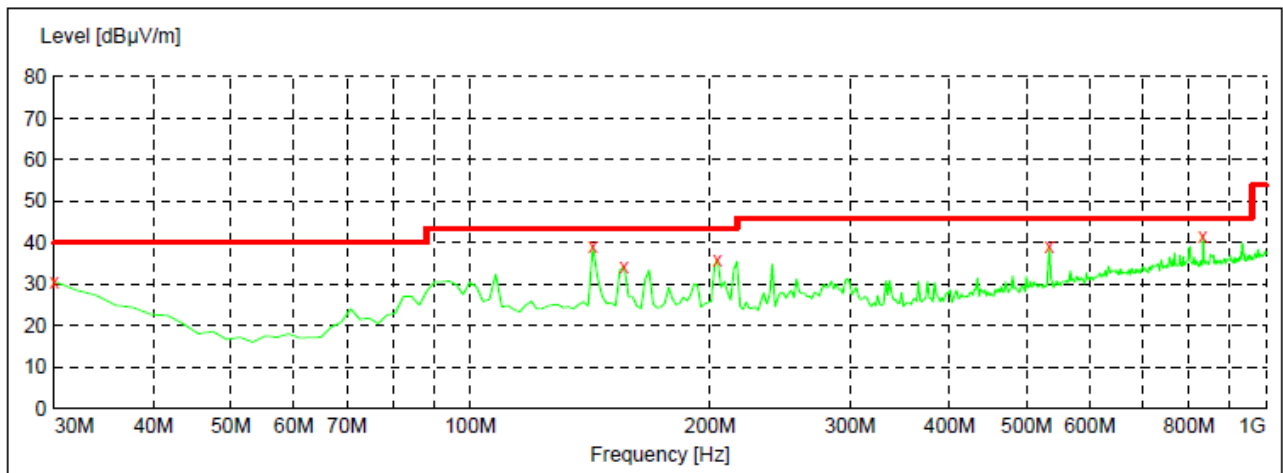
For 30 MHz – 1 GHz

Power supply:

USB 5V From PC

Polarization

Horizontal



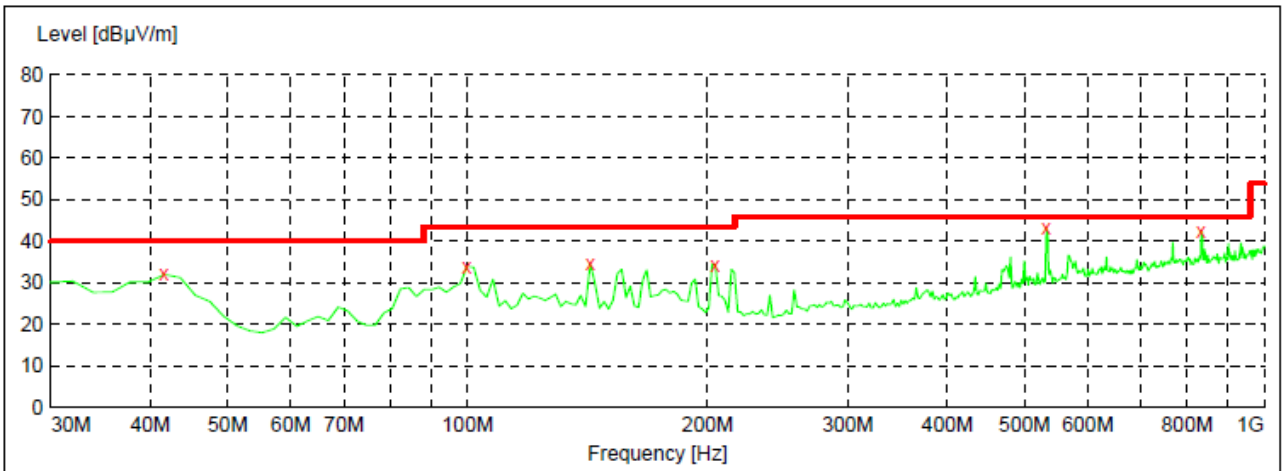
Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	30.60	20.8	40.0	9.4	PK	100	77.0	HORIZONTAL
142.520000	39.00	14.2	43.5	4.5	PK	100	123.0	HORIZONTAL
156.100000	34.10	13.7	43.5	9.4	PK	100	146.0	HORIZONTAL
204.600000	35.90	14.1	43.5	7.6	PK	300	179.0	HORIZONTAL
534.400000	39.00	20.5	46.0	7.0	PK	300	215.0	HORIZONTAL
833.160000	41.70	25.0	46.0	4.3	PK	300	266.0	HORIZONTAL

Power supply:

USB 5V From PC

Polarization

Vertical



Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
41.640000	32.00	12.0	40.0	8.0	PK	100	117.0	VERTICAL
99.840000	33.90	11.1	43.5	9.6	PK	100	163.0	VERTICAL
142.520000	34.70	14.2	43.5	8.8	PK	100	201.0	VERTICAL
204.600000	34.40	14.1	43.5	9.1	PK	300	244.0	VERTICAL
532.460000	43.30	20.5	46.0	2.7	PK	300	298.0	VERTICAL
833.160000	42.60	25.0	46.0	3.4	PK	300	305.0	VERTICAL

For 1000 MHz – 30 GHz

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	2400.85	54.16	27.49	36.12	3.32	48.85	74.00	25.15	Peak	Vertical
1	2402.16	41.60	27.49	36.12	3.32	36.29	54.00	17.71	AV	Vertical
2	12256.25	41.38	38.91	35.06	11.92	57.15	74.00	16.85	Peak	Horizontal
2	12260.71	28.46	38.91	35.06	11.92	44.23	54.00	9.77	AV	Horizontal
3	17786.16	44.14	38.46	33.92	11.59	60.27	74.00	13.73	Peak	Horizontal
3	17717.55	29.38	38.46	33.92	11.59	45.06	54.00	8.94	AV	Horizontal
4	25564.70	39.25	48.16	50.89	15.64	52.16	74.00	21.84	Peak	Horizontal
4	25564.70	27.41	48.16	50.89	15.64	40.32	54.00	13.68	AV	Horizontal

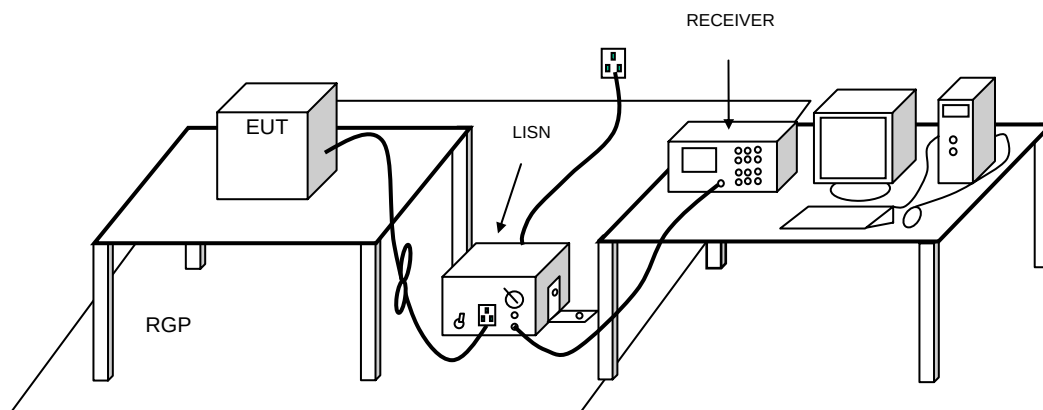
4.2. Conducted disturbance

4.2.1. LIMITS OF DISTURBANCE (Class B)

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.000	60	50

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

4.2.2. TEST CONFIGURATION



4.2.3. TEST PROCEDURE

EUT is placed on a nonmetal table which is 0.8 meter (or 0.1 meter for floor-stood equipments) above the grounded reference plane. Connect the power line of the EUT to the LISN. Voltage of the power supply is varied over a range of 0.9 to 1.1 times of the rated voltage in order to check whether the level of disturbance varies considerably with the supply voltage at the selected frequency about 160KHz. Perform an initial measurement on each line with peak detector to identify the frequencies where the maximum disturbances may occur. Then measure and record the maximum disturbances with quasi-peak and average detector.

4.2.4. CLIMATIC CONDITIONS

- ambient temperature : 25 °C
- relative humidity: 52%
- atmospheric pressure: 960 mbar

4.2.5. TEST RESULTS

Remark

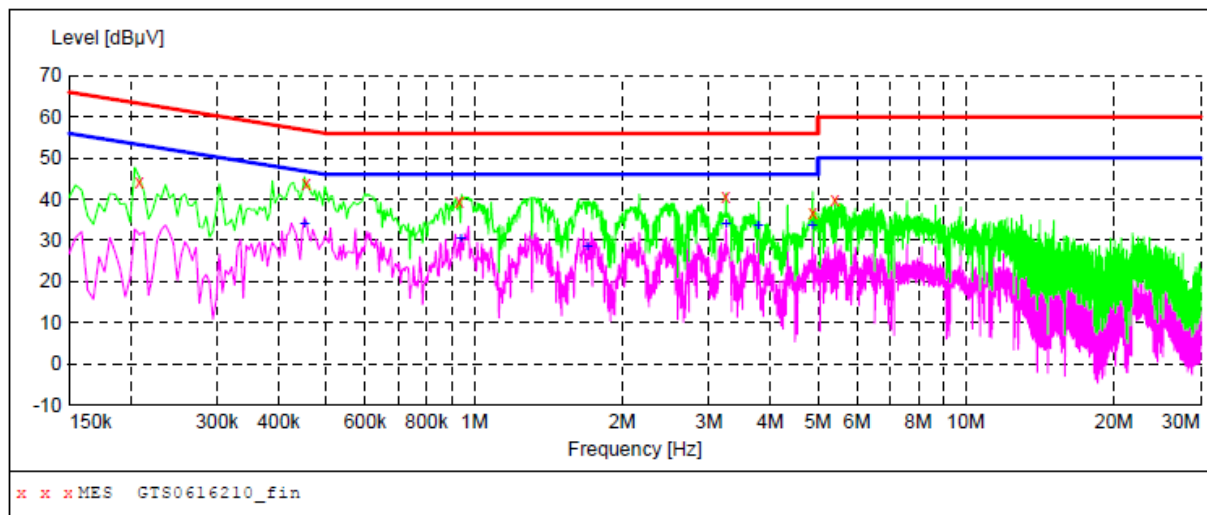
1. Measured data exchange from PC mode;
2. Over Limit = Emission level - Limit value
3. "----" states emission level at least lower than limit 20dB, so without recorded any values;

Power supply:

USB 5V From PC

Polarization

L

**MEASUREMENT RESULT: "GTS0616210_fin"**

6/16/2016 10:41AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.208500	44.20	10.0	63	19.1	QP	L1	GND
0.456000	43.70	9.8	57	13.1	QP	L1	GND
0.933000	39.60	9.6	56	16.4	QP	L1	GND
3.250500	40.60	9.4	56	15.4	QP	L1	GND
4.879500	36.90	9.3	56	19.1	QP	L1	GND
5.415000	39.70	9.3	60	20.3	QP	L1	GND

MEASUREMENT RESULT: "GTS0616210_fin2"

6/16/2016 10:41AM

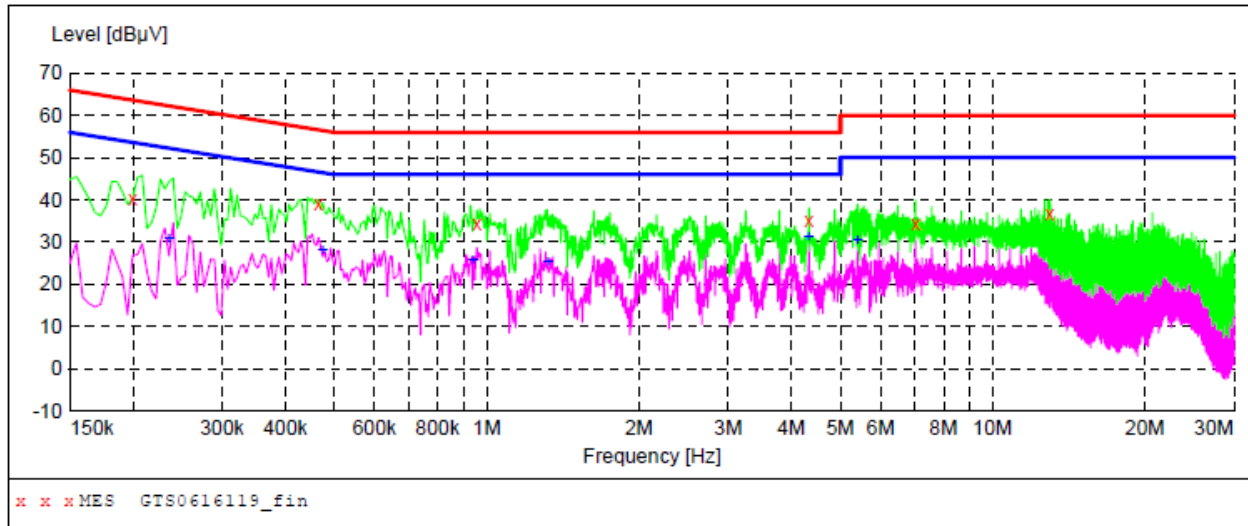
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.451500	34.00	9.8	47	12.8	AV	L1	GND
0.937500	30.50	9.6	46	15.5	AV	L1	GND
1.698000	28.30	9.5	46	17.7	AV	L1	GND
3.250500	34.00	9.4	46	12.0	AV	L1	GND
3.790500	33.50	9.4	46	12.5	AV	L1	GND
4.875000	33.50	9.3	46	12.5	AV	L1	GND

Power supply:

USB 5V From PC

Polarization

N

**MEASUREMENT RESULT: "GTS0616119_fin"**

6/16/2016 10:37AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.199500	40.30	10.0	64	23.3	QP	N	GND
0.465000	38.90	9.8	57	17.7	QP	N	GND
0.955500	34.50	9.6	56	21.5	QP	N	GND
4.330500	35.20	9.4	56	20.8	QP	N	GND
7.039500	34.30	9.1	60	25.7	QP	N	GND
12.961500	36.80	8.4	60	23.2	QP	N	GND

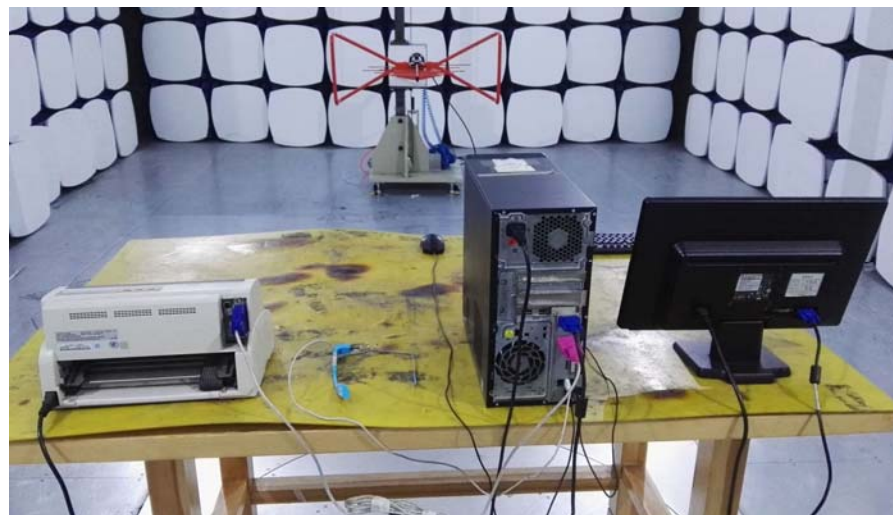
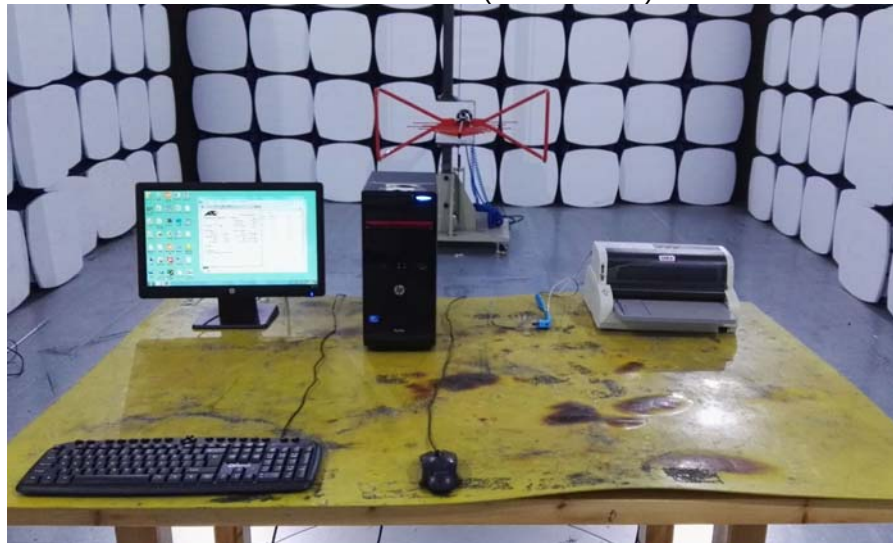
MEASUREMENT RESULT: "GTS0616119_fin2"

6/16/2016 10:37AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.235500	30.90	10.0	52	21.4	AV	N	GND
0.474000	28.20	9.8	46	18.2	AV	N	GND
0.937500	25.50	9.6	46	20.5	AV	N	GND
1.320000	25.10	9.6	46	20.9	AV	N	GND
4.330500	31.10	9.4	46	14.9	AV	N	GND
5.415000	30.50	9.3	50	19.5	AV	N	GND

5. Test Setup Photos of the EUT

Radiated Emission (30-1000MHz)



Radiated Emission (1G-6GHz)



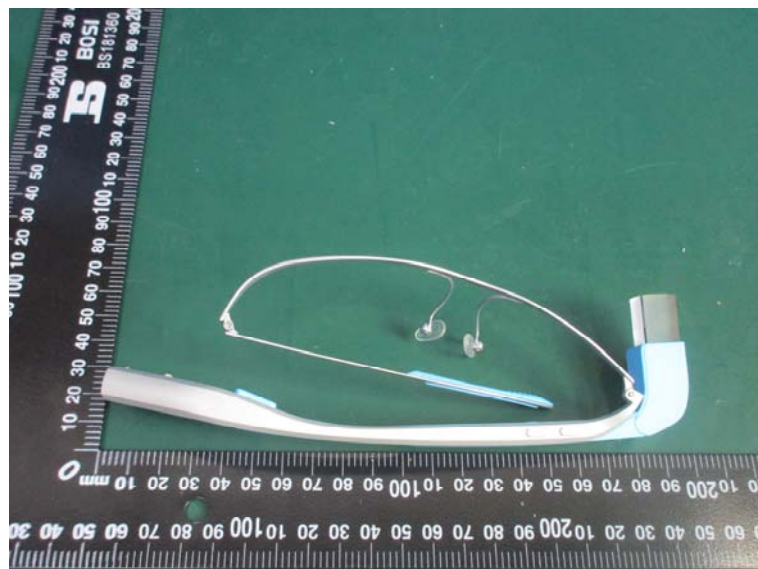
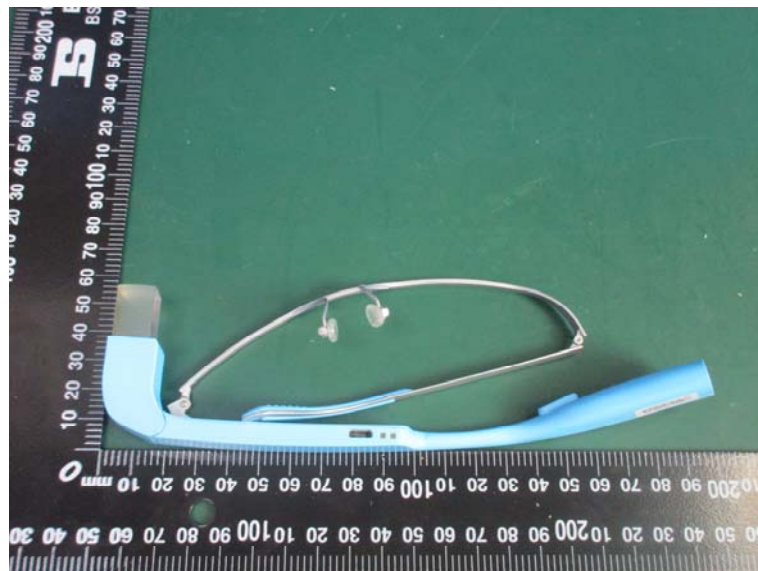


Conducted Emission

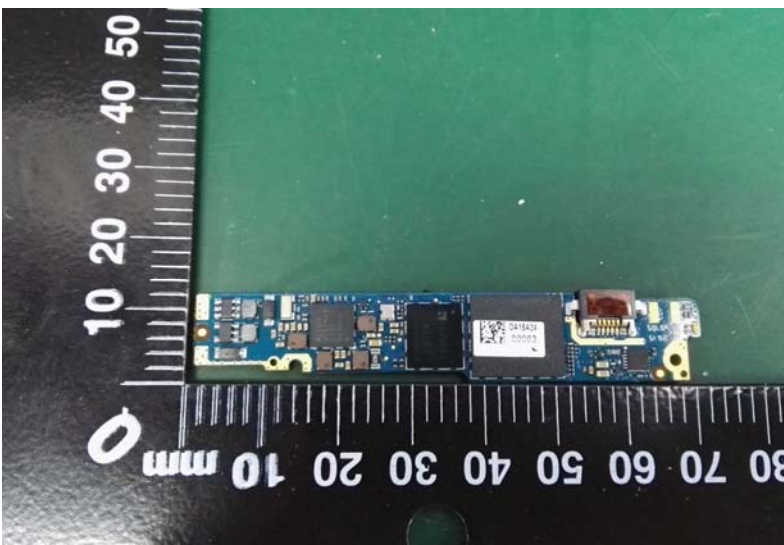
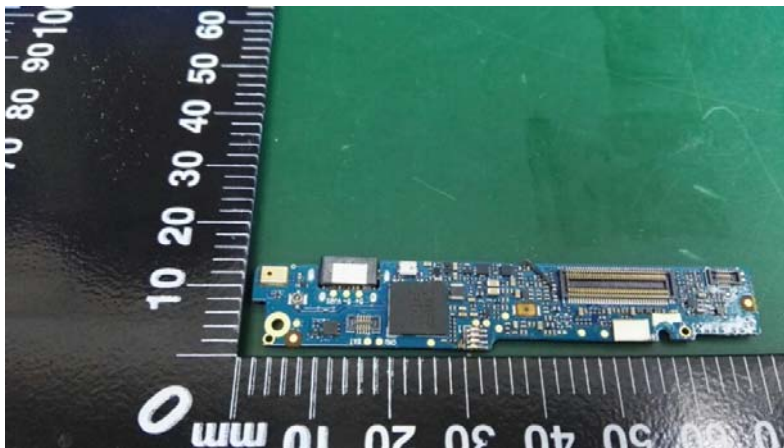
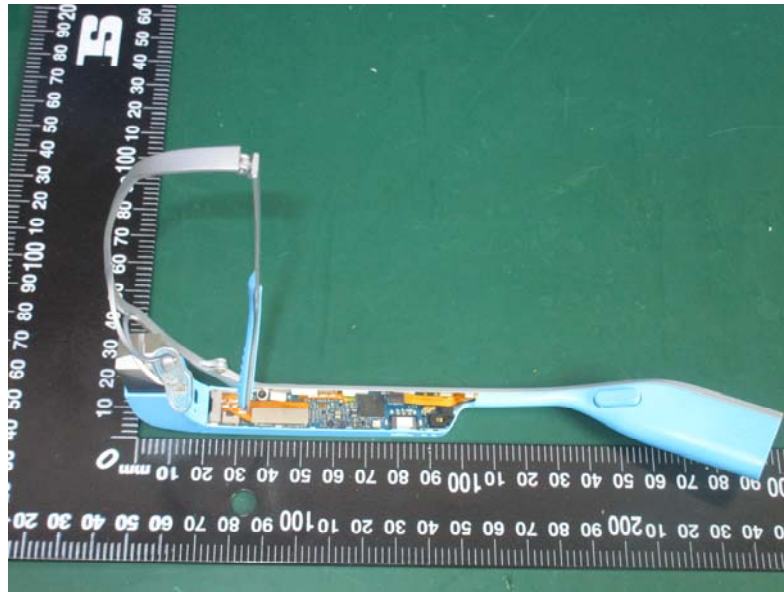


6. External and Internal Photos of the EUT

External Photos



Internal Photos





.....End of Report.....