



FCC PART 15B TEST REPORT

For

SZ DJI TECHNOLOGY CO., LTD

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FCC ID: SS3-G1S1612

Report Type: Original Report	Product Name: DJI Goggles
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Report Number: <u>RDG161228002A</u>	
Report Date: <u>2017-01-18</u>	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The **SZ DJI TECHNOLOGY CO., LTD**'s product, model number: **G1S (FCC ID: SS3-G1S1612)** (the "EUT") in this report was a **DJI Goggles**, which was measured approximately: 31.78 cm (L) x 15.56 cm (W) x 17.7 cm(H), rated input voltage: DC3.8V Lithium Ion Polymer Rechargeable battery or DC5V~12V charging from adapter.

Adapter Information:

MODEL: QC18-US

INPUT: 100-240V~, 50/60Hz, 0.5A

OUTPUT: DC 5V, 3A/DC 9V, 2A/DC 12V, 1.5A

**All measurement and test data in this report was gathered from final production sample, serial number: 161228002 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2017-01-04, and EUT conformed to test requirement.*

Objective

This report is prepared on behalf of **SZ DJI TECHNOLOGY CO., LTD** in accordance with Part 2, Subpart J, Part 15, Subparts A and B of the Federal Communications Commission rules.

The objective of the manufacturer is to determine compliance with FCC Part 15B, Class B.

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: SS3-G1S1612.

Test Methodology

All measurements contained in this report were conducted with 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.

The uncertainty conducted disturbance at mains port is ± 3.17 dB, the uncertainty of any radiation on emissions measurement is:

30M~200MHz: ± 4.7 dB;

200M~1GHz: ± 6.0 dB;

1G~6GHz: ± 5.13 dB;

6G~25GHz: ± 5.47 dB;

And the uncertainty will not be taken into consideration for all test data recorded in the report.

Test Facility

The test site used by BACL to collect test data is located in the 5040, HuiLongWan Plaza, No. 1, ShaWan Road, JinNiu District, ChengDu, China

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on April 24, 2015. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 560332. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user) as below:

Downloading&HDMI Playing: Downloading data from EUT to PC, and Playing Video at the EUT from the PC HDMI output.

EUT Exercise Software

No software was used during test.

Equipment Modifications

No modification was made to the EUT.

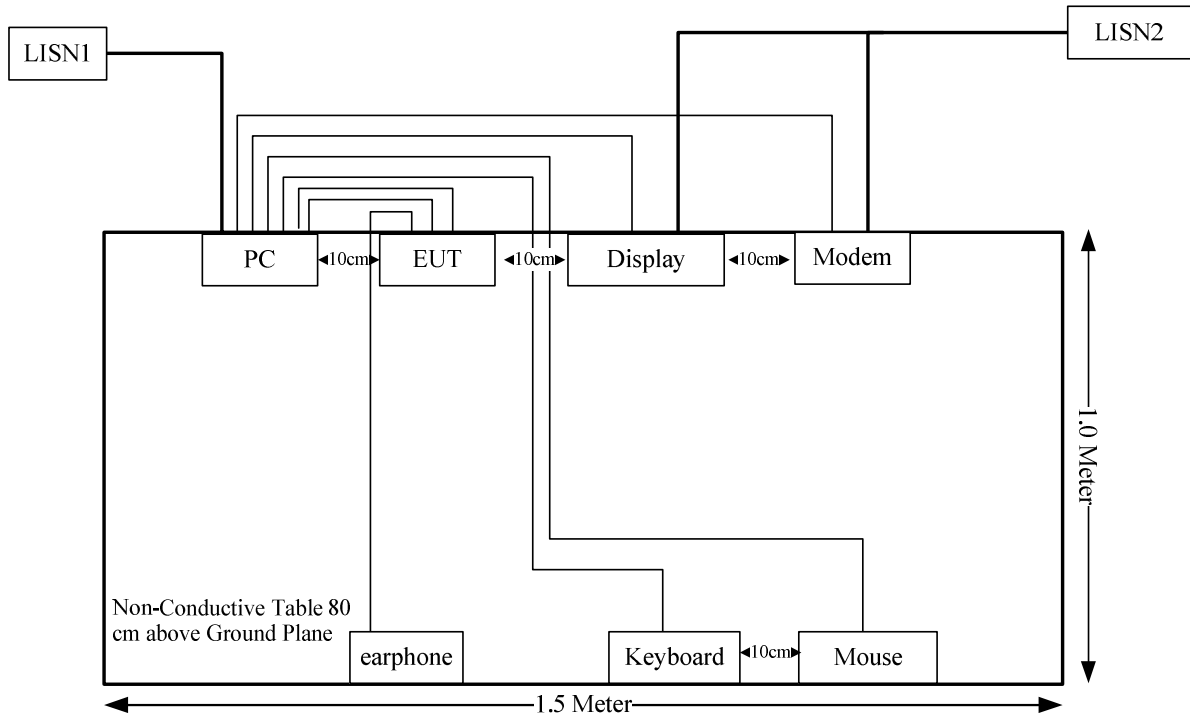
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
IBM	PC	8176	99Y7315
DELL	Display	E157FPC	060229-11
ANTER	Modem	EGW802	0508350054-1B
Lenovo	Keyboard	KB-US19EB	IMHYX011071016460
Lenovo	Mouse	MO-5013U	IMJS011041409259

External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Serial Cable	yes	No	1.6	Serial Port of PC	Modem
Mouse Cable	yes	No	1.4	USB Port of PC	Mouse
Keyboard Cable	yes	No	1.3	USB Port of PC	Keyboard
Earphone Cable	no	No	1.2	Audio Port of EUT	Earphone
VGA Cable	yes	yes	1.2	VGA port of PC	Display
USB Cable	yes	No	1.25	EUT	PC
HDMI Cable	yes	yes	2.0	EUT	PC

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	AC Line Conducted Emissions	Compliance
§15.109	Radiated Emissions	Compliance

FCC§15.107 - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are Receiver, cable loss, and LISN.

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:

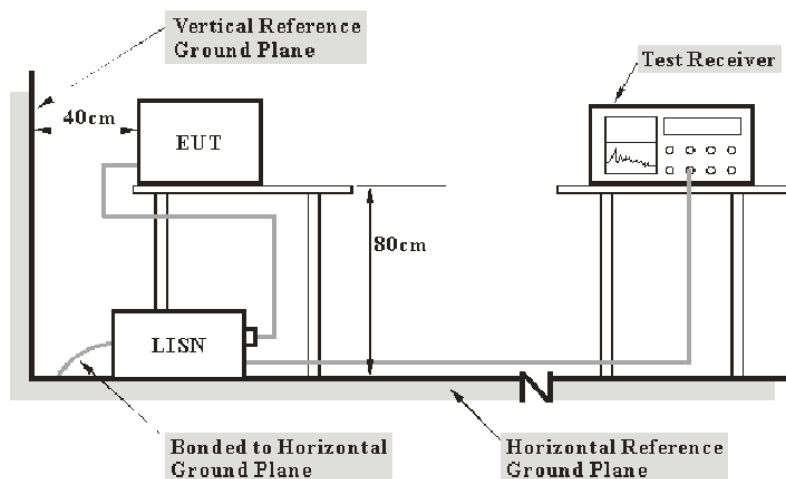
- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

Based on CISPR 16-4-2:2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Chengdu) is ± 3.17 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

EUT Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15 B Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The PC was connected to a 120V/60Hz AC power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2016-12-02	2017-12-01
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6550.06	2016-12-02	2017-12-01
N/A	Conducted Cable	NO.5	N/A	2016-11-10	2017-11-09
Rohde & Schwarz	PULSE LIMITER	ESH3Z2	357.8810.52	2016-10-31	2017-10-30
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

* **Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

During the conducted emission test, the adapter of laptop was connected to the outlet of the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

Herein,

V_C : corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF: voltage division factor of AMN or ISN

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Data

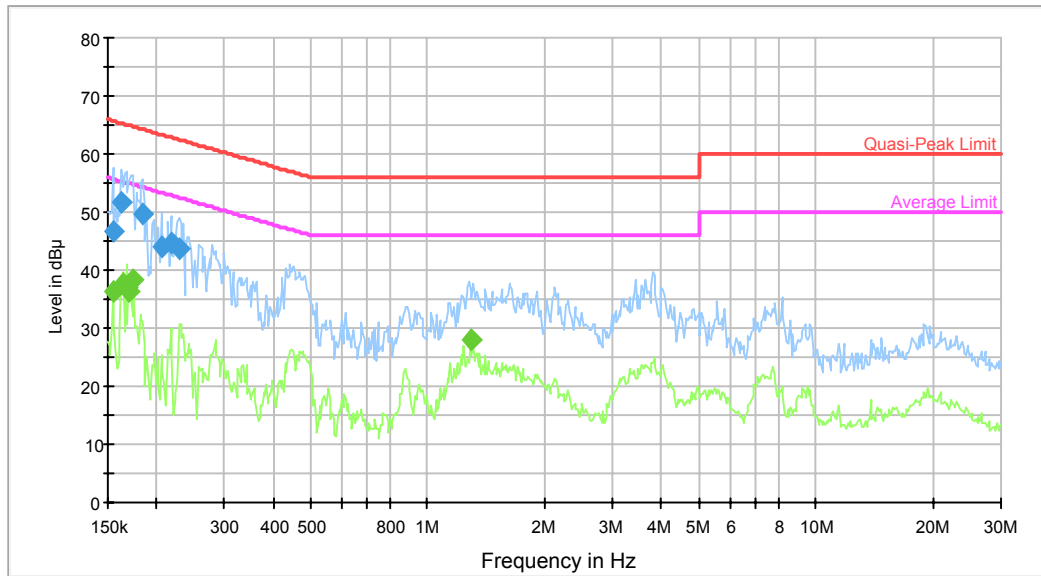
Environmental Conditions

Temperature:	24.9 °C
Relative Humidity:	50 %
ATM Pressure:	101 kPa

The testing was performed by Lorin Bian on 2017-01-06.

Test Mode: Downloading&HDMI Playing

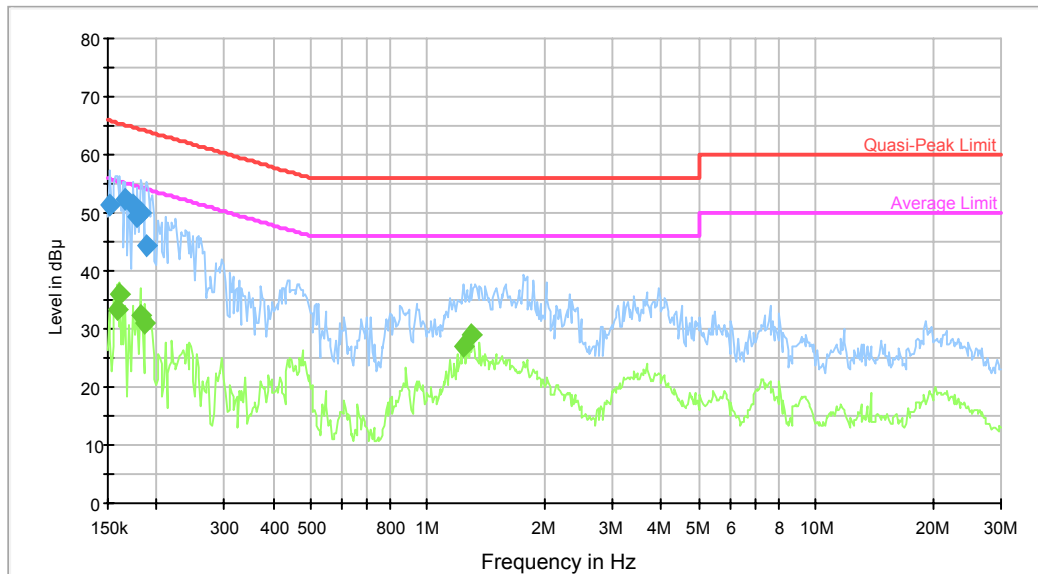
AC120V, 60Hz, Line:



Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.154858	46.5	9.000	L1	19.7	19.2	65.7	Compliance
0.162441	51.7	9.000	L1	19.7	13.6	65.3	Compliance
0.184529	49.7	9.000	L1	19.7	14.6	64.3	Compliance
0.206306	44.1	9.000	L1	19.7	19.3	63.4	Compliance
0.218141	44.5	9.000	L1	19.7	18.4	62.9	Compliance
0.228823	43.8	9.000	L1	19.7	18.7	62.5	Compliance

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.154858	36.3	9.000	L1	19.7	19.4	55.7	Compliance
0.165051	37.7	9.000	L1	19.7	15.5	55.2	Compliance
0.167702	37.1	9.000	L1	19.7	18.0	55.1	Compliance
0.170396	36.3	9.000	L1	19.7	18.6	54.9	Compliance
0.174519	38.3	9.000	L1	19.7	16.4	54.7	Compliance
1.289541	28.1	9.000	L1	19.7	17.9	46.0	Compliance

AC120V, 60Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.152410	51.2	9.000	N	19.7	14.7	65.9	Compliance
0.166371	52.3	9.000	N	19.7	12.8	65.1	Compliance
0.173134	51.3	9.000	N	19.7	13.5	64.8	Compliance
0.178741	49.4	9.000	N	19.7	15.1	64.5	Compliance
0.183065	49.9	9.000	N	19.6	14.4	64.3	Compliance
0.188994	44.4	9.000	N	19.6	19.7	64.1	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.158604	33.2	9.000	N	19.7	22.3	55.5	Compliance
0.161152	35.9	9.000	N	19.7	19.5	55.4	Compliance
0.181612	32.2	9.000	N	19.7	22.2	54.4	Compliance
0.187494	31.0	9.000	N	19.6	23.1	54.1	Compliance
1.239175	27.0	9.000	N	19.6	19.0	46.0	Compliance
1.289541	29.1	9.000	N	19.6	16.9	46.0	Compliance

FCC §15.109 - RADIATED EMISSIONS

Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 2, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 2, then:

- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Chengdu) is:

30M~200MHz: ±4.7 dB;

200M~1GHz: ±6.0 dB;

1G~6GHz: ±5.13dB;

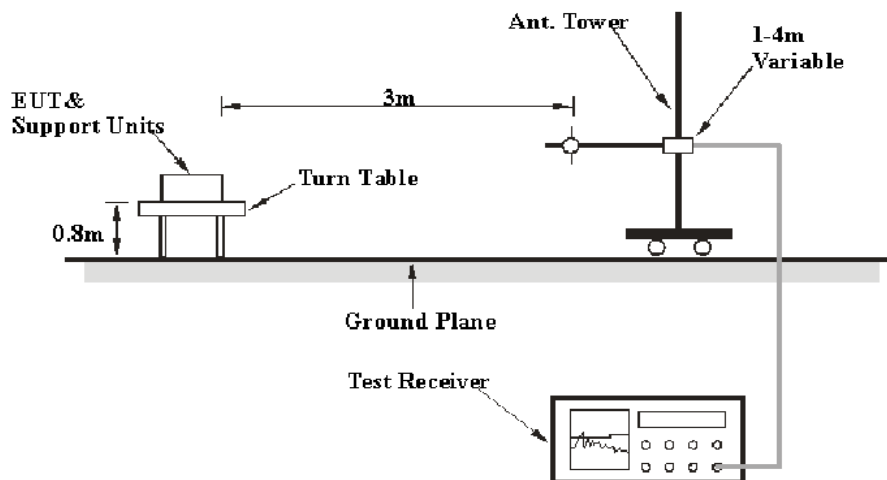
6G~25GHz: ±5.47 dB;

Table 2 – Values of U_{cispr}

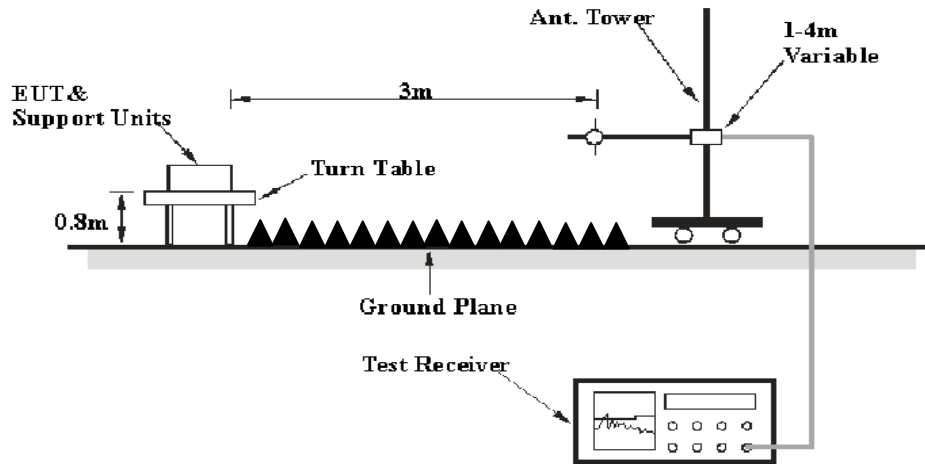
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109, Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

According to FCC 15.33 requirements, the system was measured from 30 MHz to 13.0 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1GHz	1MHz	3 MHz	/	Peak
	1MHz	10 Hz	/	Ave.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in Quasi-peak detection mode for 30 MHz to 1 GHz, Peak and average detection mode above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Amplifier	8447D	2944A10442	2016-12-02	2017-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Sunol Sciences	Broadband Antenna	JB3	A101808	2016-04-10	2019-04-09
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
ETS	Horn Antenna	3115	003-6076	2016-12-02	2017-12-01
Mini-circuits	Amplifier	ZVA-183-S+	771001215	2016-05-20	2017-05-19
EMCT	Semi-Anechoic Chamber	966	N/A	2015-04-24	2018-04-23
N/A	RF Cable (below 1GHz)	NO.1	N/A	2016-11-10	2017-11-09
N/A	RF Cable (below 1GHz)	NO.4	N/A	2016-11-10	2017-11-09
N/A	RF Cable (above 1GHz)	NO.2	N/A	2016-11-10	2017-11-09

* **Statement of Traceability:** BA CL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

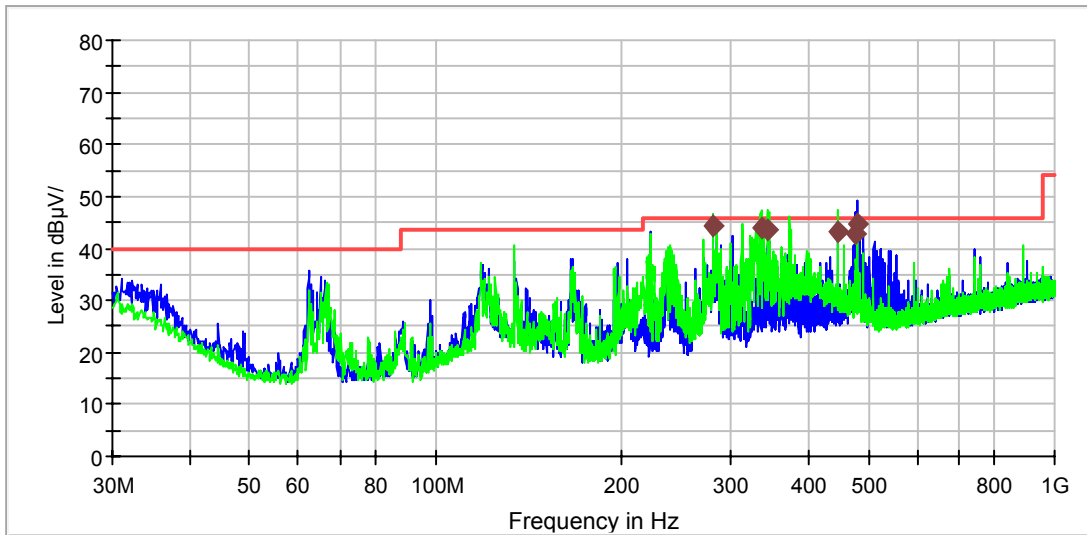
Temperature:	23.2~24 °C
Relative Humidity:	45~50 %
ATM Pressure:	101~101.1 kPa

The testing was performed by Lorin Bian from 2017-01-06 to 2017-01-13.

Refer to the following data.

Test mode: Downloading & HDMI Playing

Below 1 GHz:



Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
280.260000	44.5	100.0	H	49.0	-3.9	1.5	46.0
335.428750	43.8	100.0	H	1.0	-3.1	2.2	46.0
344.765000	43.6	100.0	H	1.0	-2.9	2.4	46.0
445.766250	43.3	100.0	H	179.0	-1.4	2.7	46.0
478.018750	43.0	100.0	V	90.0	-0.5	3.0	46.0
480.080000	44.6	100.0	V	90.0	-0.4	1.4	46.0

Above 1 GHz:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
	Reading (dB μ V)	Detector	Polar (H/V)	Factor (dB)					
1396	42.82	PK	V	23.83	2.53	26.43	42.75	74.00	31.25
1396	31.68	AV	V	23.83	2.53	26.43	31.61	54.00	22.39
1798	43.03	PK	V	24.58	2.90	26.62	43.89	74.00	30.11
1798	32.51	AV	V	24.58	2.90	26.62	33.37	54.00	20.63
1996	43.45	PK	V	24.89	3.05	26.82	44.57	74.00	29.43
1996	31.96	AV	V	24.89	3.05	26.82	33.08	54.00	20.92
3190	36.12	PK	H	25.26	3.72	26.48	38.62	74.00	35.38
3190	28.05	AV	H	25.26	3.72	26.48	30.55	54.00	23.45
1396	41.02	PK	H	23.83	2.53	26.43	40.95	74.00	33.05
1396	30.42	AV	H	23.83	2.53	26.43	30.35	54.00	23.65
2896	36.7	PK	H	23.99	3.34	26.51	37.52	74.00	36.48
2896	27.35	AV	H	23.99	3.34	26.51	28.17	54.00	25.83

*******END OF REPORT*******