FCC PART 15B CLASS B

MEASUREMENT AND TEST REPORT

For

Feitian Technologies Co., Ltd.

Floor 17th, Tower B, Huizhi Mansion, No.9 Xueqing Road Haidian District, Beijing, P.R China

FCC ID: ZD3FTEPASSFIDOK13

Model Number: ePass FIDO K13

Report Type:	**Equipment Name:**
Original Report	ePass FIDO

Test Engineer:	Kevin Hu
Report Number:	RSC160426002A
Report Date:	2016-06-07
Reviewed By:	Henry Ding EMC Engineer
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The **Feitian Technologies Co., Ltd.**'s product, model number: **ePass FIDO K13, (FCC ID: ZD3FTEPASSFIDOK13)** or the "EUT" as referred to in this report was the **ePass FIDO,** which has the plastic enclosure. The highest frequency was 2.48 GHz.

Mechanical Description of EUT

The EUT was measured approximately 47 mm L x 28 mm W x 7 mm H.

Rated input voltage: DC 5V from laptop or DC 3.7V battery.

**All measurement and test data in this report was gathered from final production sample, serial number: 160426002/01 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2016-04-25, and EUT conformed to test requirement.*

Objective

The following Class B report was prepared on behalf of **Feitian Technologies Co., Ltd.**, in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to demonstrate compliance with FCC Part 15 Class B limits.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submissions with FCC ID: ZD3FTEPASSFIDOK13.

Test Methodology

All measurements contained in this report are 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. All radiated and conducted emissions measurement is performed at BACL. The radiated testing is performed at an antenna-to-EUT distance of 3 Meters.

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 is configured for testing in a typical fashion (as a normally used by a typical user).

EUT Exercise Software

N/A

Special Accessories

No special accessories were supplied by BACL.

Equipment Modifications

No modification to the EUT was made by BACL to make sure the EUT comply with applicable limits.

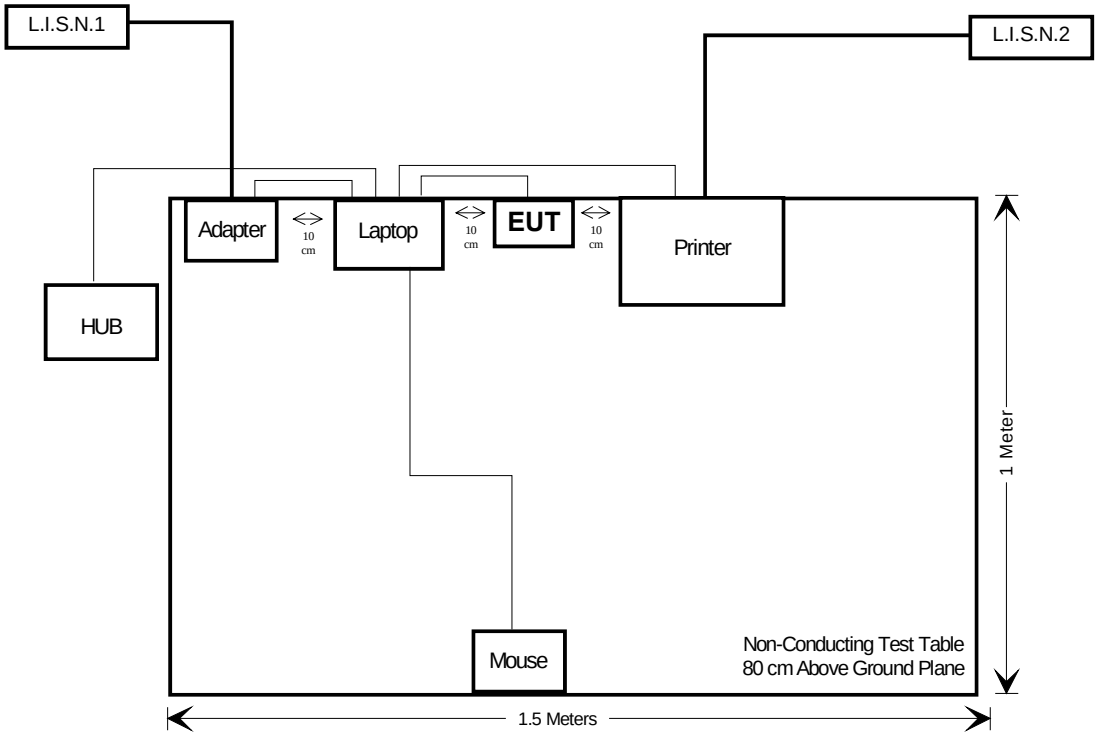
Local Support Equipment List and Details

Manufacturer	Description	Model Number	Serial Number
DELL	Laptop	C640	5P804A00
EPSON	Printer	R230	C62607000W
IBM	Mouse	MO28UO	89P5089

External I/O Cable

Cable Description	Length (m)	From	To
Unshielded RJ45 Cable	3	RJ45 Port/Laptop	HUB
Unshielded USB Cable	1.5	USB Port/Laptop	Printer
Unshielded USB Cable	1	USB Port/Laptop	EUT
Unshielded USB Cable	1	USB Port/Laptop	Mouse

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

Standard	Description	Result
FCC §15.107	Conducted Emission	Compliance
FCC §15.109	Radiated Emission	Compliance

FCC §15.107 CONDUCTED EMISSION TEST

Applicable Standard

FCC §15.107

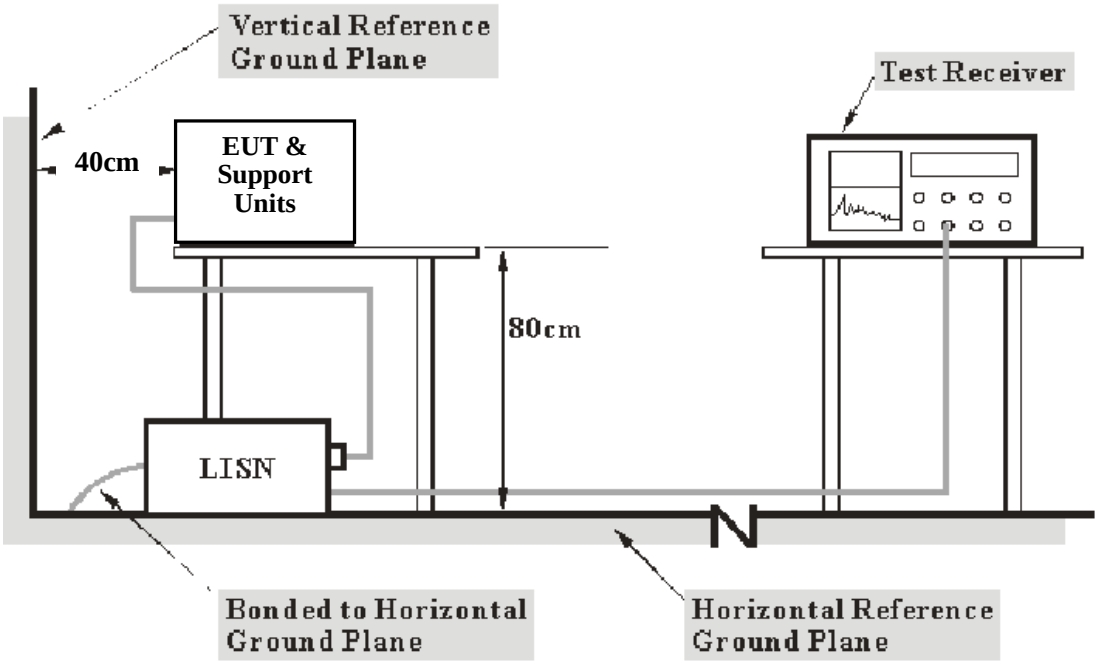
Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMI. The factors contributing to uncertainties are EMI Test Receiver, cable loss, and L.I.S.N.

Based on CISPR 16-4-2, the Treatment of Uncertainty in EMI Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratories Corp. (Chengdu) is ±3.17 dB.

EUT Setup

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



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 power cables and excess cables shall be folded at the cable center into a bundle no longer than 40 cm.

The spacing between the peripherals unit & EUT was 10 cm.

DC 5V power source was provided to EUT through Laptop.

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 Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combination.

All data are recorded in the Quasi-peak and Average detection mode. Quasi-peak readings are distinguished with a "**QP**". Average readings are distinguished with an "**AV**".

The EUT is in the normal operating mode during the final qualification test to represent the worst cases results.

Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2015-12-02	2016-12-01
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6550.06	2015-12-02	2016-12-01
BACL	CVP	CVP	150602	2015-07-17	2016-07-16
N/A	Conducted Cable	NO.1	N/A	2015-11-10	2016-11-09

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

Summary of Test Results

According to the data in the following, the EUT complied with the FCC Part 15B Conducted margin for a Class B device, with the *worst* margin reading of:

6.5 dB at **2.289094 MHz** in the **Line** Phase

Conducted Emission Test Data and Plots

Test Environment Conditions

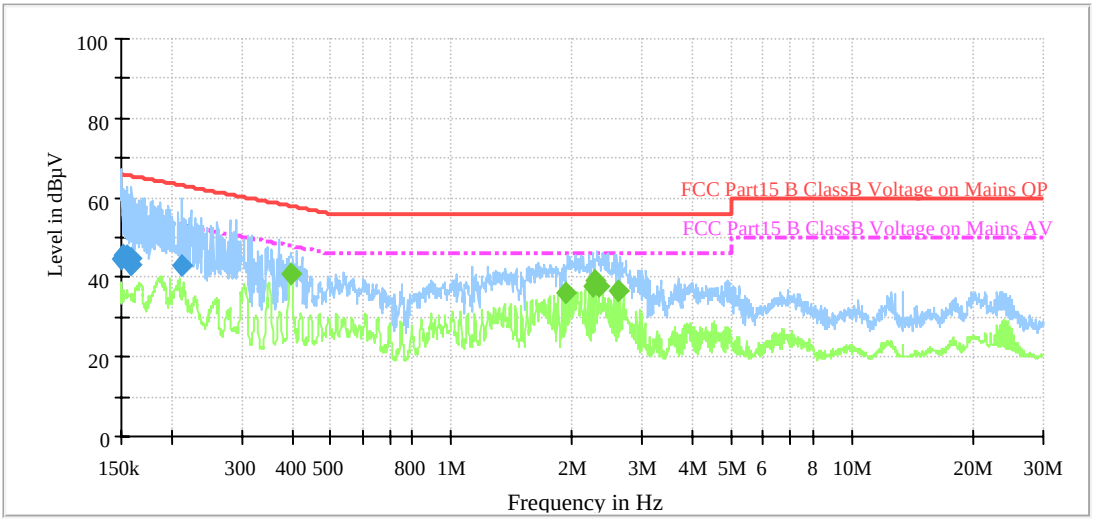
Temperature:	25 °C
Relative Humidity:	64 %
ATM Pressure:	100.9 kPa

The testing was performed by Kevin Hu on 2016-05-03.

Test Mode: Communication Mode

0.15 MHz – 30 MHz

Line

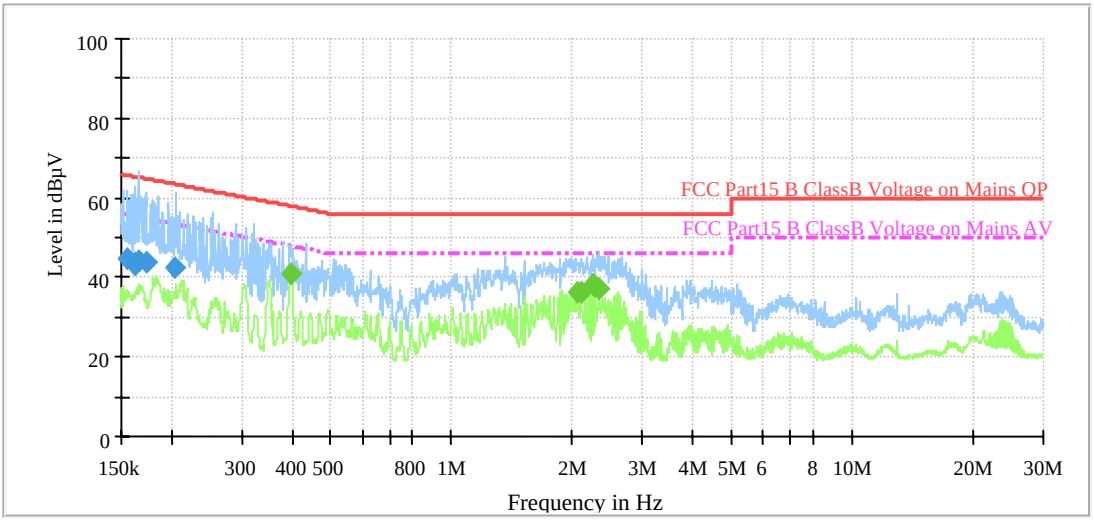


Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150800	45.4	9.000	L1	18.8	20.6	66.0
0.151304	44.8	9.000	L1	18.8	21.1	65.9
0.155173	45.6	9.000	L1	18.8	20.1	65.7
0.158114	43.2	9.000	L1	18.8	22.4	65.6
0.159287	43.3	9.000	L1	18.8	22.2	65.5
0.221872	42.6	9.000	L1	19.0	20.5	63.1

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.412585	41.0	9.000	L1	19.9	6.9	47.9
1.943512	35.2	9.000	L1	20.1	10.8	46.0
2.251536	37.1	9.000	L1	20.1	8.9	46.0
2.289094	39.5	9.000	L1	20.1	**6.5**	46.0
2.315614	37.7	9.000	L1	20.1	8.3	46.0
2.614521	37.2	9.000	L1	20.1	8.8	46.0

0.15 MHz – 30 MHz

Neutral



Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.156151	44.5	9.000	N	18.8	21.2	65.7
0.161752	43.8	9.000	N	18.8	21.6	65.4
0.163314	43.4	9.000	N	18.8	21.9	65.3
0.165125	44.1	9.000	N	18.8	21.1	65.2
0.171254	42.5	9.000	N	18.8	22.3	64.8
0.212545	42.1	9.000	N	18.9	21.3	63.4

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.405212	40.1	9.000	N	19.9	7.8	47.9
2.061230	36.2	9.000	N	20.1	9.8	46.0
2.104152	36.2	9.000	N	20.1	9.8	46.0
2.241512	38.5	9.000	N	20.1	7.5	46.0
2.291324	37.6	9.000	N	20.1	8.4	46.0
2.345267	37.1	9.000	N	20.1	8.9	46.0

FCC §15.109 RADIATED EMISSION TEST

Applicable Standard

FCC §15.109

Measurement Uncertainty

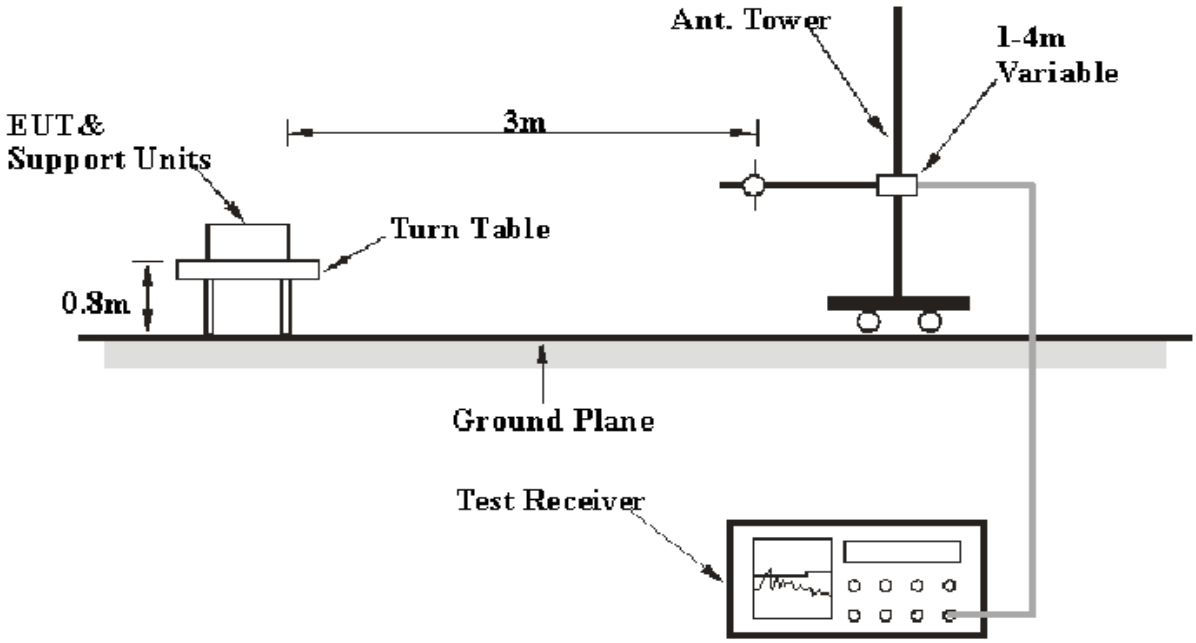
All measurements involve certain levels of uncertainties, especially in the field of EMI. The factors contributing to uncertainties are EMI Test Receiver, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2, the Treatment of Uncertainty in EMI Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is
30M~200MHz: ±4.7 dB;
200M~1GHz: ±6.0 dB;
1G-6GHz: ±5.13dB;
6G-25GHz: ±5.47dB.

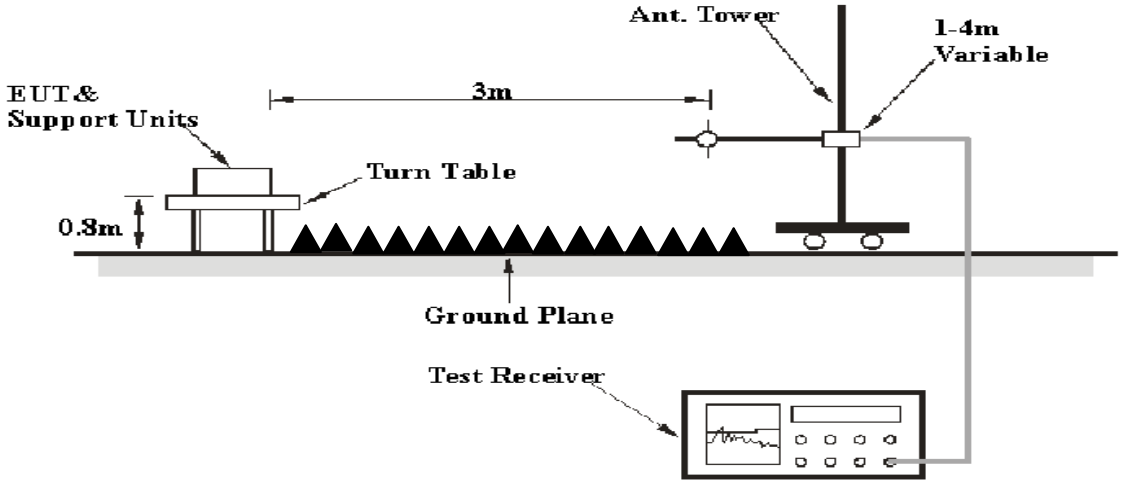
EUT Setup

The radiated emission tests were performed in the 3 meter Semi Anechoic Chamber, using the setup in accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15 Class B limits.

Below 1GHz:



Above 1GHz:



The excess cables shall be folded at the cable center into a bundle no longer than 40 cm.

The spacing between the peripherals unit & EUT was 10 cm.

DC 5V power source was provided to EUT through laptop.

DC 3.7V battery power was provided to EUT.

EMI Test Receiver Setup

According to FCC Rules, the frequency range to be tested from 30 MHz to 13 GHz.

During the radiated emission test, the EMI test receiver is 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 1 GHz	1 MHz	3 MHz	/	PK
	1 MHz	10 Hz	/	Ave.

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.

All data were recorded in the quasi-peak detection mode from 30 MHz to 1GHz. Peak and average detection mode above 1 GHz.

The EUT was in the normal operating mode during the final qualification test to represent the worst case results.

Corrected Amplitude & Margin Calculation

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

Corr. Ampl. = Antenna Factor + Cable Factor - 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 7 dBμV/m below the maximum limit for FCC Part 15 Class B. The equation for margin calculation is as follows:

Margin = FCC Part 15 Class B Limit – Corr. Ampl.

Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Agilent	Amplifier	8447D	2944A10442	2015-12-02	2016-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2015-12-02	2016-12-01
Sunol Sciences	Broadband Antenna	JB3	A101808	2016-04-10	2019-04-09
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2015-12-02	2016-12-01
EM TEST	Horn Antenna	3115	003-6076	2015-12-02	2016-12-01
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-0113024	2014-06-16	2017-06-15
HP	Amplifier	8449B	3008A00277	2016-04-09	2019-04-08
EMCT	Semi-Anechoic Chamber	966	N/A	2015-04-24	2018-04-23
N/A	RF Cable (below 1GHz)	NO.1	N/A	2015-11-10	2016-11-09
N/A	RF Cable (below 1GHz)	NO.4	N/A	2015-11-10	2016-11-09
N/A	RF Cable (above 1GHz)	NO.2	N/A	2015-11-10	2016-11-09
WEINSCHEL ENGINEERING	Attenuator	1A10dB	AA4135	2015-11-10	2016-11-09

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

Test Software

Description	Manufacturer	Version
EMC32	R&S	V 8.54.0

Summary of Test Results

According to the data in the following, the EUT complied with the FCC Part 15 Class B standards, and had the worst margin of:

12.27 dB at **11455.000 MHz** in the **Horizontal** polarization

Radiated Emission Test

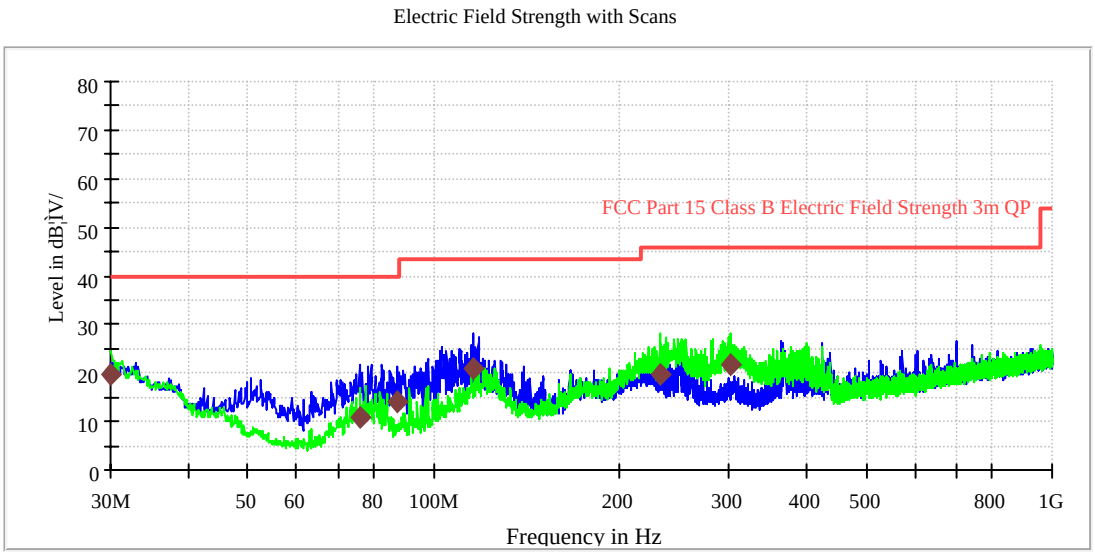
Test Environment Conditions

Temperature:	25 °C
Relative Humidity:	52 %
ATM Pressure:	100.9 kPa

The testing was performed by Kevin Hu on 2016-05-03.

Test Mode: Communication Mode

Below 1 GHz:



Frequency (MHz)	QuasiPeak (dB µ V/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dBµV/m)	Margin (dB)	Limit (dB µ V/m)
30.000000	19.6	120.000	100.0	H	328.0	-5.6	20.4	40.0
75.711250	10.7	120.000	100.0	V	286.0	-20.2	29.3	40.0
87.230000	14.1	120.000	100.0	V	275.0	-19.3	25.9	40.0
115.966250	21.0	120.000	100.0	V	338.0	-13.0	22.5	43.5
231.760000	19.8	120.000	100.0	H	90.0	-14.5	26.2	46.0
301.600000	21.7	120.000	100.0	H	80.0	-12.4	24.3	46.0

Above 1 GHz:

Frequency	Result	Polarity	Detector	Corrected factor	Limit	Antenna Height	Turntable Position	Margin
MHz	(dBµV/m)	V/H	PK/Ave.	(dBµV/m)	(dBµV/m)	(cm)	(deg)	(dB)
11455.000	52.50	H	PK	20.20	74	100	190	21.50
11455.000	41.73	H	AV	20.20	54	100	190	**12.27**
10808.000	51.33	V	PK	19.74	74	100	205	22.67
10808.000	40.14	V	AV	19.74	54	100	205	13.86
9874.000	50.76	V	PK	18.42	74	100	152	23.24
9874.000	40.22	V	AV	18.42	54	100	152	13.78

Test Result: Compliance

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