



# FCC PART 15B

## MEASUREMENT AND TEST REPORT

For

### NXP Semiconductors

6501 West William Cannon Dr Mail Drop OE-48 Austin Texas United States

**FCC ID: XXMUSBKW41Z**

<b>Report Type:</b> Original Report	<b>Product Type:</b> USB-KW41Z Packet Sniffer USB Dongle
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<b>Report Number:</b> <u>RKS160720003-00D</u>	
<b>Report Date:</b> <u>2016-08-12</u>	
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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The NXP Semiconductors.'s product, model number: USB-KW41Z (FCC ID: XXMUSBKW41Z), the EUT in this report was a USB-KW41Z Packet Sniffer USB Dongle, which was measured approximately: 79mm(L) x 23mm(W) x 14.7mm(H), rated input voltage: DC 5.0V.

*\*All measurement and test data in this report was gathered from production sample serial number: 20160713001  
(Assigned by the BACL. The EUT supplied by the applicant was received on 2016-07-13)*

### Objective

This report is prepared on behalf of NXP Semiconductors 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 determine the compliance of EUT with FCC Part 15, Class B.

### Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submissions with FCC ID: XXMUSBKW41Z.

### 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.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the Chenghu Road, Kunshan Development Zone No.248, Kunshan, Jiangsu, China

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) 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 November 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. 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).

### **EUT Exercise Software**

No exercise software was used.

### **Special Accessories**

No special accessory was used.

### **Equipment Modifications**

No modification was made to the EUT tested.

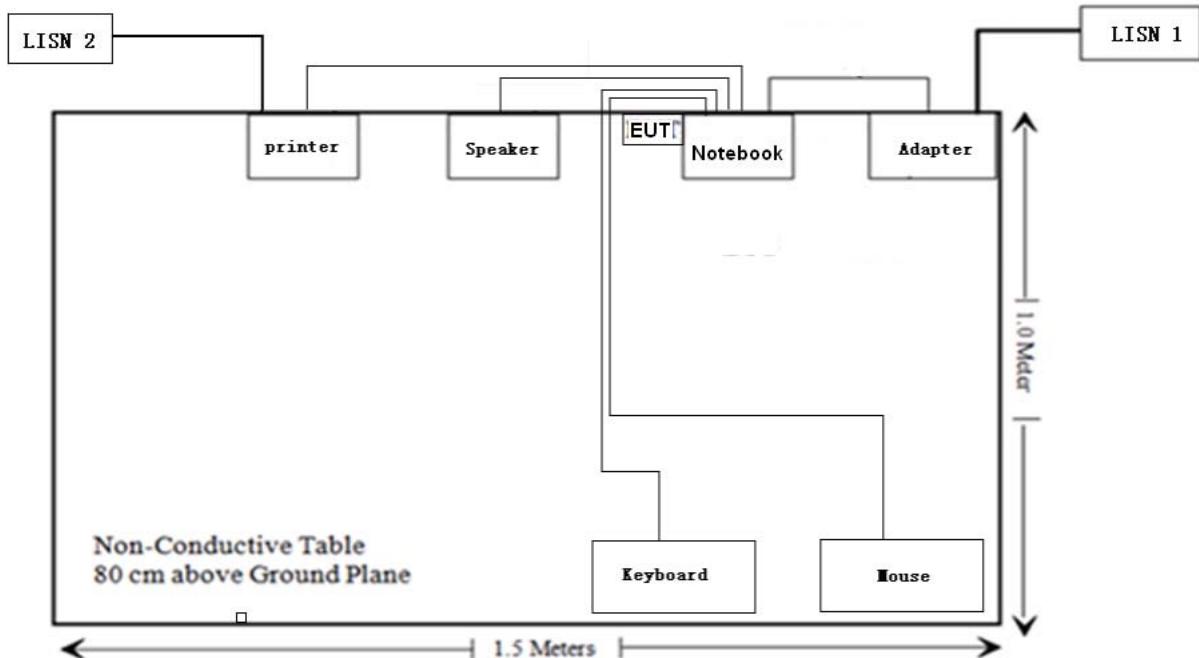
### **Support Equipment List and Details**

Manufacturer	Description	Model	Serial Number
DELL	Notebook PC	D520	0002530
Kyocera	Printer	FS-1125MFP	0365
JBL	Speaker	Micro II	N/A
DELL	Keyboard	KB-BL919EB	N/A
DELL	Mouse	MO-1008BU	N/A

### **External I/O Cable**

Cable Description	Length (m)	From/Port	To
Unshielded Detachable Audio Cable	1.0	Speaker	PC
Unshielded Detachable RJ45 Cable	1.0	Printer	PC
USB Cable	1.0	Keyboard	Notebook
USB Cable	0.5	Mouse	Notebook

### Block Diagram of Test Setup



## **SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Results</b>
§15.107	AC Line Conducted Emissions	Compliance
§15.109	Radiated Emissions	Compliance

## FCC §15.107 – AC LINE CONDUCTED EMISSIONS

### Applicable Standard

According to FCC§15.107

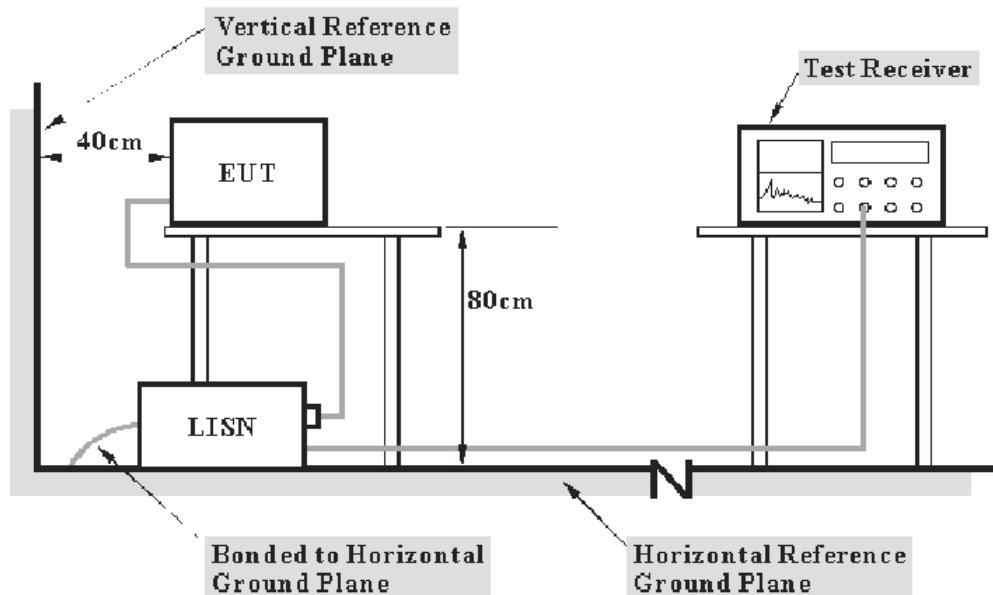
### Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Kunshan) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report.

Port	Expanded Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

### 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 measurement procedure of EUT setup is according with ANSI C63.4-2014. The related limit was specified in FCC Part 15.107 Class B.

### 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

During the conducted emission test, the notebook was connected to the outlet of the LISN.

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

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

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	831294/005	2015-11-04	2016-11-03
Rohde & Schwarz	LISN	ESH3-Z5	12005	2015-11-04	2016-11-03
Rohde & Schwarz	LISN	ESH3-Z5	12008	2016-06-23	2017-06-22
BACL	RF cable	KS-LAB-09	KS-LAB-09	2016-06-16	2017-06-15
Rohde & Schwarz	CE Test software	EMC 32	V 09.10.0	--	--

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

### Corrected Amplitude & Margin Calculation

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

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

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 7 dB below the limit. The equation for margin calculation is as follows:

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

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.107 Class B, the worst margin reading as below:

**13.34 dB at 0.155000 MHz** in the **Neutral** conducted mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(L_m)} \leq L_{\lim} + U_{\text{cisp}}$$

In BACL,  $U_{(L_m)}$  is less than  $U_{\text{cisp}}$ , if  $L_m$  is less than  $L_{\lim}$ , it implies that the EUT complies with the limit.

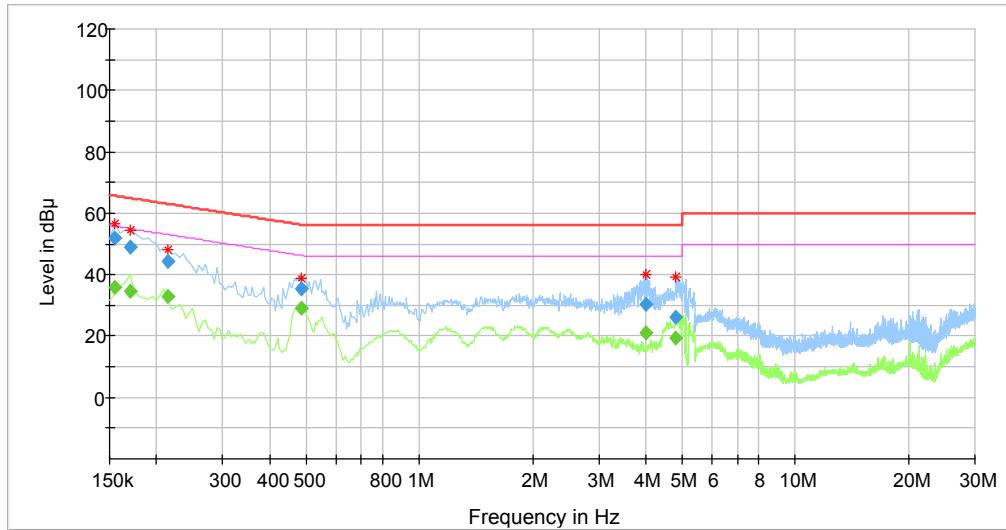
## Test Data

### Environmental Conditions

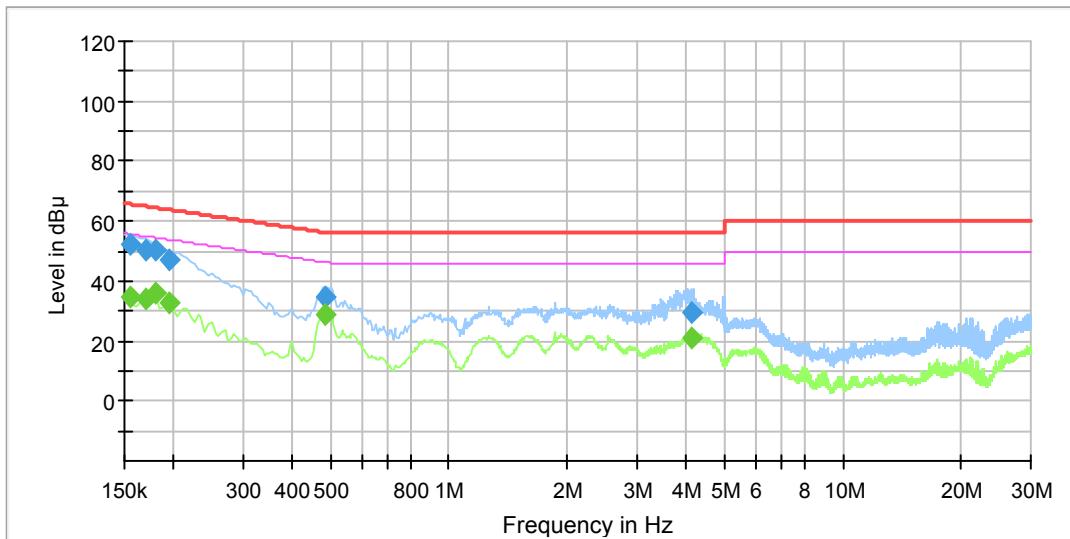
<b>Temperature:</b>	25°C
<b>Relative Humidity:</b>	51 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Allen.tian on 2016-07-22*

*Test Mode: Operation*

**AC 120V/60 Hz, Line**

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Average (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	35.71	55.73	20.02	9.000	L1	10.3
0.155000	51.91	---	65.73	13.82	9.000	L1	10.3
0.170000	---	34.40	54.96	20.56	9.000	L1	10.3
0.170000	49.03	---	64.96	15.93	9.000	L1	10.3
0.215000	---	32.90	53.01	20.11	9.000	L1	10.3
0.215000	44.38	---	63.01	18.63	9.000	L1	10.3
0.485000	---	29.24	46.25	17.01	9.000	L1	10.3
0.485000	35.30	---	56.25	20.95	9.000	L1	10.3
3.995000	---	21.19	46.00	24.81	9.000	L1	10.5
3.995000	30.33	---	56.00	25.67	9.000	L1	10.5
4.810000	---	19.16	46.00	26.84	9.000	L1	10.5
4.810000	26.14	---	56.00	29.86	9.000	L1	10.5

**AC 120V/60 Hz, Neutral**

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Average (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	34.46	55.73	21.27	9.000	N	10.3
0.155000	52.39	---	65.73	13.34	9.000	N	10.3
0.170000	---	33.88	54.96	21.08	9.000	N	10.3
0.170000	50.28	---	64.96	14.68	9.000	N	10.3
0.180000	---	35.86	54.49	18.63	9.000	N	10.3
0.180000	50.20	---	64.49	14.29	9.000	N	10.3
0.195000	---	32.46	53.82	21.36	9.000	N	10.3
0.195000	47.22	---	63.82	16.60	9.000	N	10.3
0.485000	---	29.12	46.25	17.13	9.000	N	10.3
0.485000	34.61	---	56.25	21.64	9.000	N	10.3
4.110000	---	21.23	46.00	24.77	9.000	N	10.5
4.110000	29.64	---	56.00	26.36	9.000	N	10.5

## FCC §15.109 - RADIATED EMISSIONS

### Applicable Standard

FCC §15.109

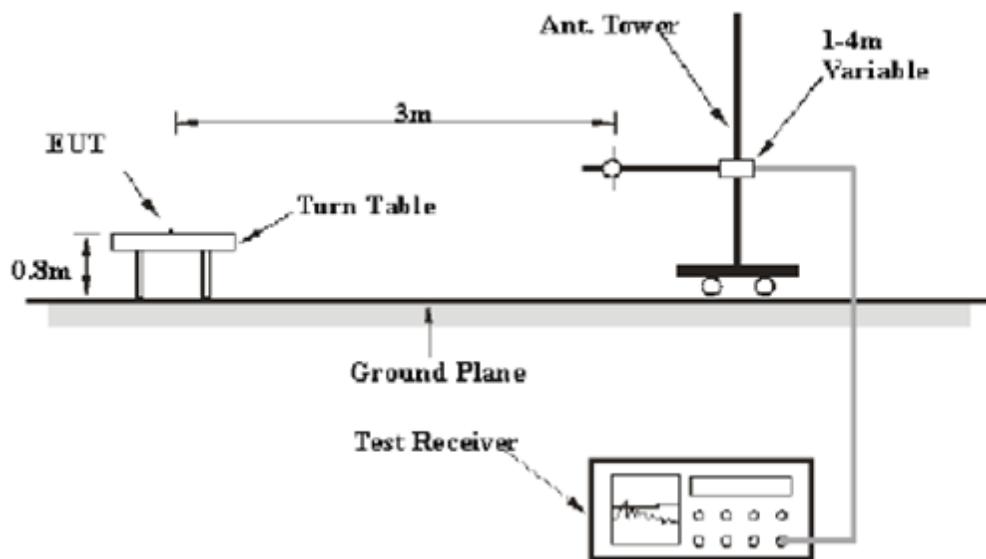
### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, 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 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Kunshan) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report

Frequency	Polarity	Measurement uncertainty
30 MHz~200 MHz	Horizontal	4.62 dB (k=2, 95% level of confidence)
	Vertical	4.54 dB (k=2, 95% level of confidence)
200 MHz~1 GHz	Horizontal	4.84 dB (k=2, 95% level of confidence)
	Vertical	5.91 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	Horizontal/Vertical	4.68 dB (k=2, 95% level of confidence)
Above 6 GHz	Horizontal/Vertical	4.92 dB (k=2, 95% level of confidence)

### EUT Setup



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

The system was investigated from 30 MHz to 14 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	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	1 Hz	/	AV

### Test Procedure

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

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrunent	Amplifier	330	171377	2015-09-16	2016-09-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-05-20	2017-05-19
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2015-11-07	2016-11-06
ETS	Horn Antenna	3115	6229	2015-11-07	2016-11-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-04	2016-11-03
Mini	Pre-amplifier	ZVA-183-S+	857001418	2015-09-16	2016-09-15
BACL	RF cable	KS-LAB-012	KS-LAB-012	2016-06-16	2017-06-15
HP	Signal Generator	E4421B	US38440505	2015-11-12	2016-11-11
R&S	Auto test Software	EMC32	V 09.10.0	-	-

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

### Correction Factor & Margin Calculation

The Correction Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain. The basic equation is as follows:

$$\text{Correction Amplitude} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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

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

## Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.109 Class B, with the worst margin reading of:

**5.67 dB at 675.050000 MHz** in the **Horizontal** polarization mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{\text{lim}} + U_{\text{cisp}}$$

In BACL,  $U_{(Lm)}$  is less than  $U_{\text{cisp}}$ , if  $L_m$  is less than  $L_{\text{lim}}$ , it implies that the EUT complies with the limit.

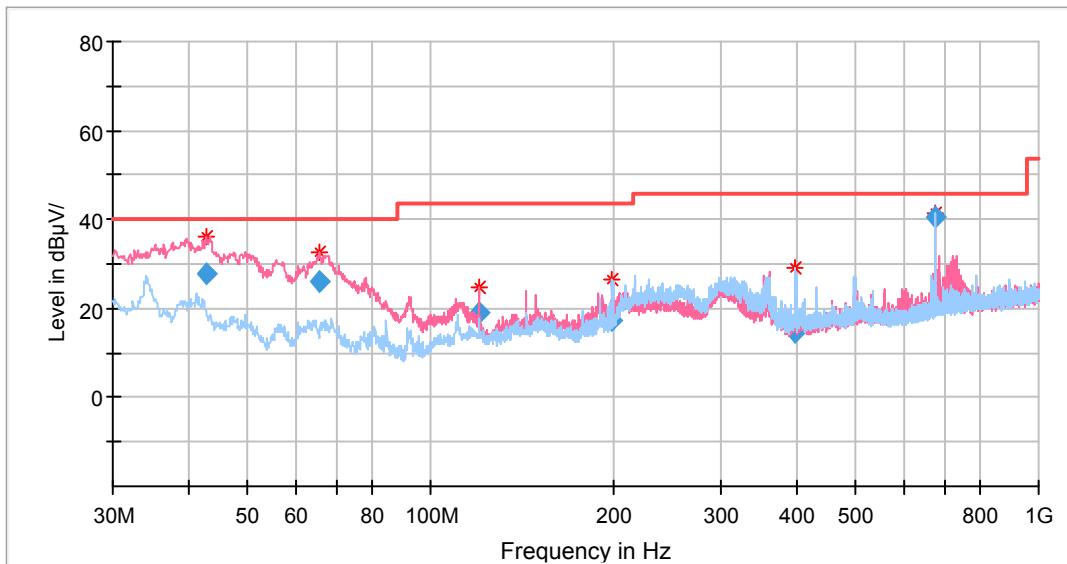
## Test Data

### Environmental Conditions

<b>Temperature:</b>	25°C
<b>Relative Humidity:</b>	51 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Allen Tian on 2016-07-26*

*Test Mode: Operation*

**30MHz ~ 1GHz, AC 120V/60 Hz**

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
42.610000	27.75	40.00	12.25	120.000	101.0	V	180.0	-12.0
65.526250	25.88	40.00	14.12	120.000	101.0	V	171.0	-17.0
119.967500	18.88	43.50	24.62	120.000	101.0	V	291.0	-11.7
199.143750	17.12	43.50	26.38	120.000	101.0	H	258.0	-12.5
398.357500	14.82	46.00	31.18	120.000	101.0	H	258.0	-8.5
675.050000	40.33	46.00	5.67	120.000	199.0	H	208.0	-3.2

**1G Hz ~ 14GHz, AC 120V/60 Hz**

Frequency (MHz)	MaxPeak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1350.701403	50.88	---	74.00	23.02	1000.000	149.0	V	176.0	2.0
1350.701403	---	45.07	54.00	8.83	1000.000	149.0	V	176.0	2.0
1589.178357	37.30	---	74.00	36.60	1000.000	149.0	H	325.0	2.8
1589.178357	---	24.11	54.00	29.79	1000.000	149.0	H	325.0	2.8
1715.430862	38.37	---	74.00	35.53	1000.000	149.0	V	39.0	3.3
1715.430862	---	25.01	54.00	28.89	1000.000	149.0	V	39.0	3.3
2136.272545	39.43	---	74.00	34.47	1000.000	149.0	V	119.0	4.6
2136.272545	---	26.24	54.00	27.66	1000.000	149.0	V	119.0	4.6
3833.667335	---	30.67	54.00	23.23	1000.000	149.0	H	48.0	9.4
3833.667335	44.04	---	74.00	29.86	1000.000	149.0	H	48.0	9.4
6667.334669	---	40.91	54.00	12.99	1000.000	149.0	H	121.0	17.8
6667.334669	54.26	---	74.00	19.64	1000.000	149.0	H	121.0	17.8

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