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MEASUREMENT REPORT

FCC PART 15.209

FCC ID: 2AEHLXCM-SLT

APPLICANT: EXIEM TECHNOLOGIES, LLC

Application Type: Certification

Product: SMARTLINK TPMS TABLET

Model No.: XCM-SLT

Brand Name: EXIEM

FCC Classification: Part 15 Low Power Transmitter Below 1705 kHz (DCD)

FCC Rule Part(s): FCC Part 15.209

Test Procedure(s): ANSI C63.10-2009

Test Date: Apr. 26 ~ May 12, 2015

Reviewed By :

Robin Wu

(Robin Wu)

Approved By :

Marlin Chen

(Marlin Chen)



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2009. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date
1503RSU02202	Rev. 01	Initial report	05-05-2015
1503RSU02202	Rev. 02	Added the Conducted Emission Test Data	05-12-2015

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§2.1033 General Information

Applicant:	EXIEM TECHNOLOGIES, LLC
Applicant Address:	2851 Massachusetts Avenue, Cincinnati, OH 45225, United States
Manufacturer:	Suzhou Sate Auto Electronic Co., Ltd.
Manufacturer Address:	No.36 Building, Yangtai Road, Suzhou Industrial Park, Suzhou, Jiangsu, P.R.China
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
MRT Registration No.:	809388
FCC Rule Part(s):	Part 15.209
Model No.	XCM-SLT
FCC ID:	2AEHLXCM-SLT
Test Device Serial No.:	N/A <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering
FCC Classification:	Part 15 Low Power Transmitter Below 1705 kHz (DCD)

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-4179, G-814, C-4664, T-2206) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.



1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	SMARTLINK TPMS TABLET
Model No.	XCM-SLT
Trade Name	EXIEM
Frequency Range	125 KHz
Antenna Type	Coil
Device Category	Fixed Device

Note: These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.209

2.2. Test Standards

The following report is prepared on behalf of the **EXIEM TECHNOLOGIES, LLC** in accordance with FCC Part 15, Subpart C, and 15.209 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and 15.209 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

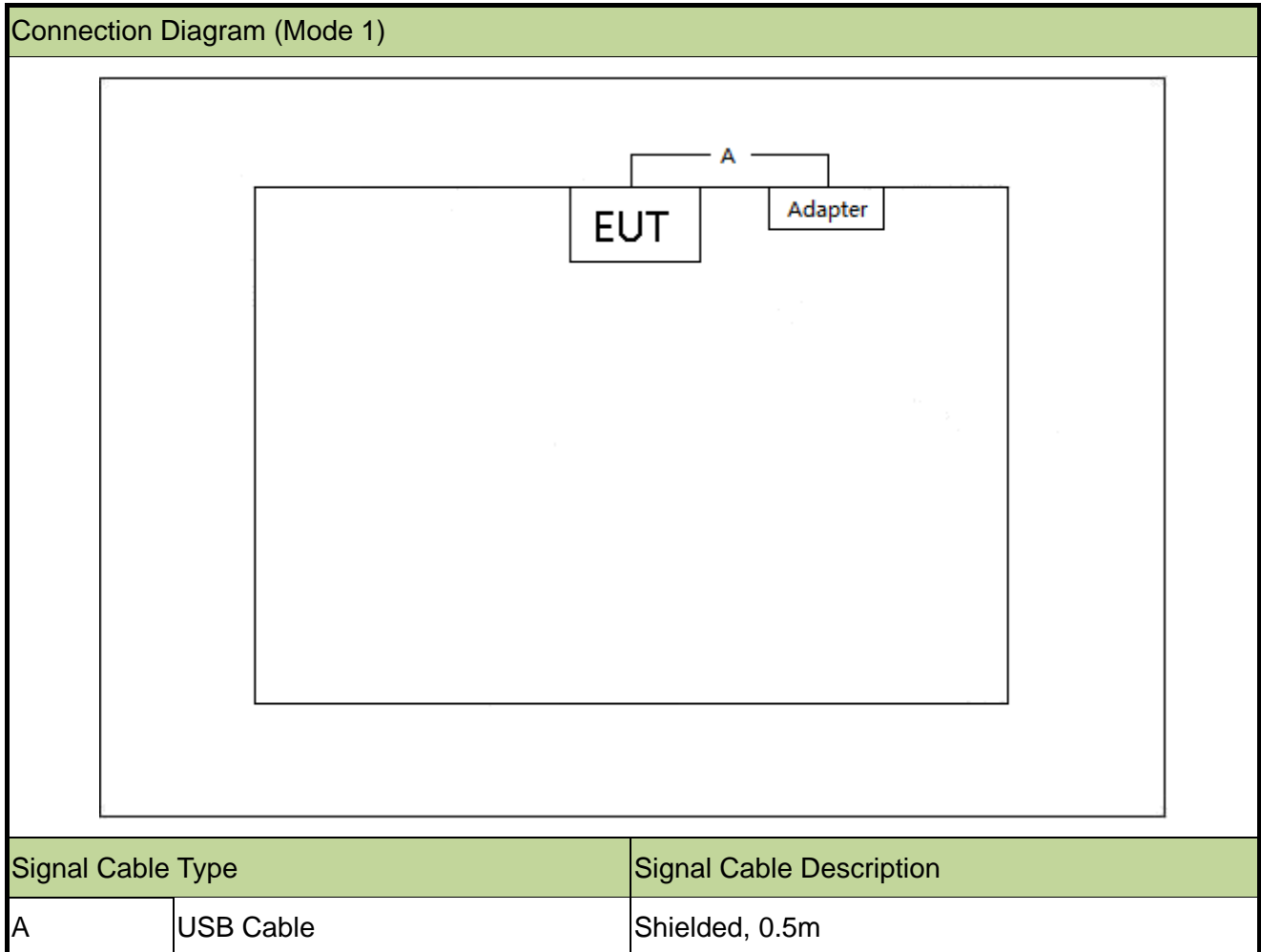
2.3. Test Methodology

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2009).

Deviation from measurement procedure.....None

2.4. Test Configuration of Equipment under Test

2.4.1 Configuration of Tested System



2.4.2 Test System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
N/A	N/A	N/A	N/A	N/A

3. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- The antenna of the **SMARTLINK TPMS TABLET** is **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The SMARTLINK TPMS TABLET **FCC ID: 2AEHLXCM-SLT** unit complies with the requirement of §15.203.

4. TEST EQUIPMENT CALIBRATION DATA

Radiated Emission

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2015/11/07
Loop Antenna	Schwarzbeck	FMZB1519	MRTSUE06025	1 year	2015/11/08
TRILOG Antenna	Schwarzbeck	VULB9162	MRTSUE06022	1 year	2015/11/08
Temperature/Humidity Meter	Anymetre	TH101B	MRTSUE06046	1 year	2015/11/14

5. MEASUREMENT UNCERTAINTY

Where relevant, the following test 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 $k = 2$.

Radiated Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 9kHz ~ 1GHz: 4.18dB

6. TEST RESULT

6.1. Summary

Company Name: EXIEM TECHNOLOGIES, LLC

FCC ID: 2AEHLXCM-SLT

FCC Part Section(s)	Test Description	Test Condition	Test Result
15.209	Radiated Spurious Emissions	Radiated	Pass

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

6.2. Radiated Emissions

6.2.1. Standard Applicable

According to §15.209, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

FCC Part 15 Subpart B Paragraph 15.209 Limits		
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2,400/F(kHz)	300
0.490– 1.705	24,000/F(kHz)	30
1.705 – 30	30	30
30 – 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

1. RF Voltage (dBμv) = 20 log RF Voltage (μv)
2. Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

6.2.2. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz. Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle

towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

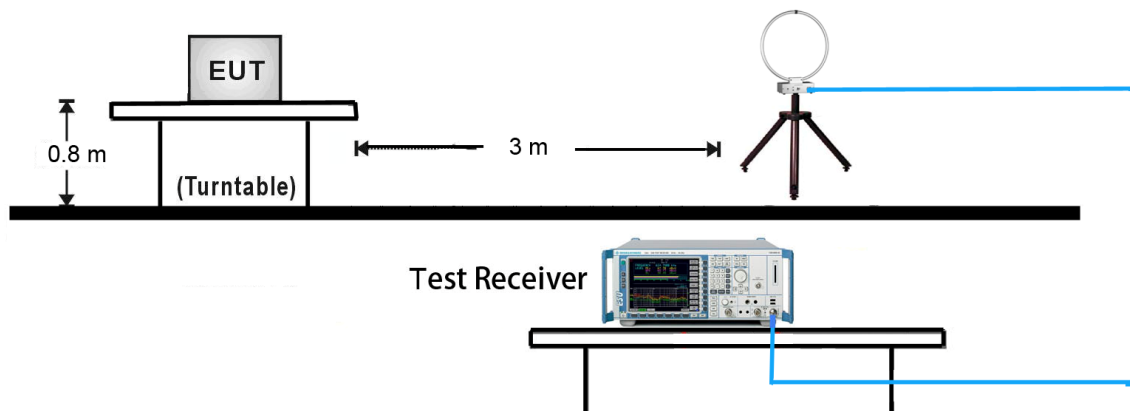
The worst radiated emission is measured on the Final Measurement.

The measurement frequency range from 9 KHz to 10th Harmonic of fundamental was investigated.

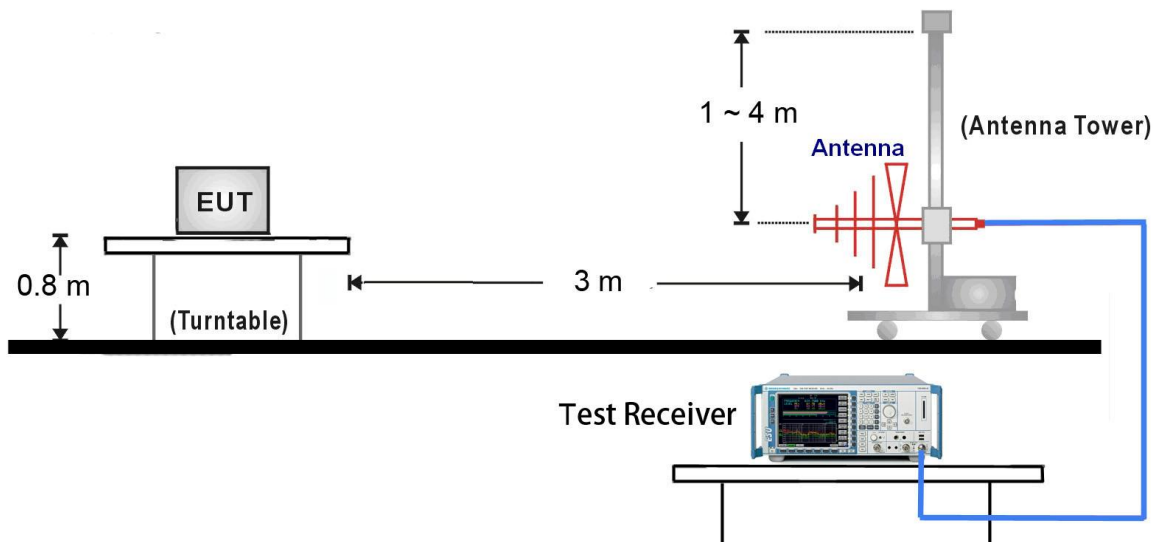
6.2.3. Test Setup

The setup of EUT is according with per ANSI C63.10-2009 measurement procedure. The specification used was FCC Part 15.209 Limit.

9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



6.2.4. Test Results

Fundamental Emission

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
X Axis							
0.125	46.0	20.2	66.2	125.7	-59.5	PK	Face on
0.125	28.4	20.2	48.6	125.7	-77.1	PK	Face off
Y Axis							
0.125	45.6	20.2	65.8	125.7	-59.9	PK	Face on
0.125	23.9	20.2	44.1	125.7	-81.6	PK	Face off
Z Axis							
0.125	50.8	20.2	71.0	125.7	-54.7	PK	Face on
0.125	45.9	20.2	66.1	125.7	-59.6	PK	Face off

Note:

1. $\text{Limit} = 25.666 \text{ dB}\mu\text{V/m} + 40 \cdot \log(300(\text{m})/3(\text{m})) = 105.7 \text{ dB}\mu\text{V/m}$ (Average detector),
125.67 dBμV/m (Peak detector).
2. Measurement Level = Reading Level + Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

General Radiated Emission 9kHz ~ 30MHz

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
0.250	44.0	23.7	67.7	99.6	-31.9	PK	Face on
0.375	45.3	25.0	70.3	96.1	-25.8	PK	Face on
0.500	35.0	14.6	49.6	73.6	-24.0	QP	Face on
0.625	35.8	15.3	51.1	71.7	-20.6	QP	Face on
0.750	33.6	13.0	46.6	70.1	-23.5	QP	Face on
0.875	33.6	13.0	46.6	68.8	-22.2	QP	Face on
1.000	32.1	11.6	43.7	67.6	-23.9	QP	Face on
1.125	33.0	12.5	45.5	66.6	-21.1	QP	Face on
1.250	32.1	11.6	43.7	65.7	-22.0	QP	Face on
0.250	38.1	17.8	55.9	99.6	-43.7	PK	Face off
0.375	45.7	25.4	71.1	96.1	-25.0	PK	Face off
0.500	34.8	14.4	49.2	73.6	-24.4	QP	Face off
0.625	36.3	15.8	52.1	71.7	-19.6	QP	Face off
0.750	33.7	13.1	46.8	70.1	-23.3	QP	Face off
0.875	34.0	13.4	47.4	68.8	-21.4	QP	Face off
1.000	33.3	12.8	46.1	67.6	-21.5	QP	Face off
1.125	32.1	11.6	43.7	66.6	-22.9	QP	Face off
1.250	25.0	4.5	29.5	65.7	-36.2	QP	Face off

Note:

1. Measurement Level = Reading Level + Factor.
2. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

General Radiated Emission 30MHz ~ 1GHz

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
47.9	7.2	14.9	22.1	40.0	-17.9	QP	Horizontal
54.1	6.4	14.8	21.2	40.0	-18.8	QP	Horizontal
144.0	15.7	9.4	25.1	43.5	-18.4	QP	Horizontal
431.8	11.6	17.1	28.7	46.0	-17.3	QP	Horizontal
575.9	11.6	19.6	31.2	46.0	-14.8	QP	Horizontal
767.8	9.8	22.3	32.1	46.0	-13.9	QP	Horizontal
51.3	7.1	14.9	22.0	40.0	-18.0	QP	Vertical
143.9	11.2	9.4	20.6	43.5	-22.9	QP	Vertical
265.1	11.0	13.9	24.9	46.0	-21.1	QP	Vertical
431.8	11.9	17.1	29.0	46.0	-17.0	QP	Vertical
575.9	11.6	19.6	31.2	46.0	-14.8	QP	Vertical
671.8	9.3	21.0	30.3	46.0	-15.7	QP	Vertical

Note:

1. Measurement Level = Reading Level + Factor.
2. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

6.3. AC Conducted Emissions Measurement

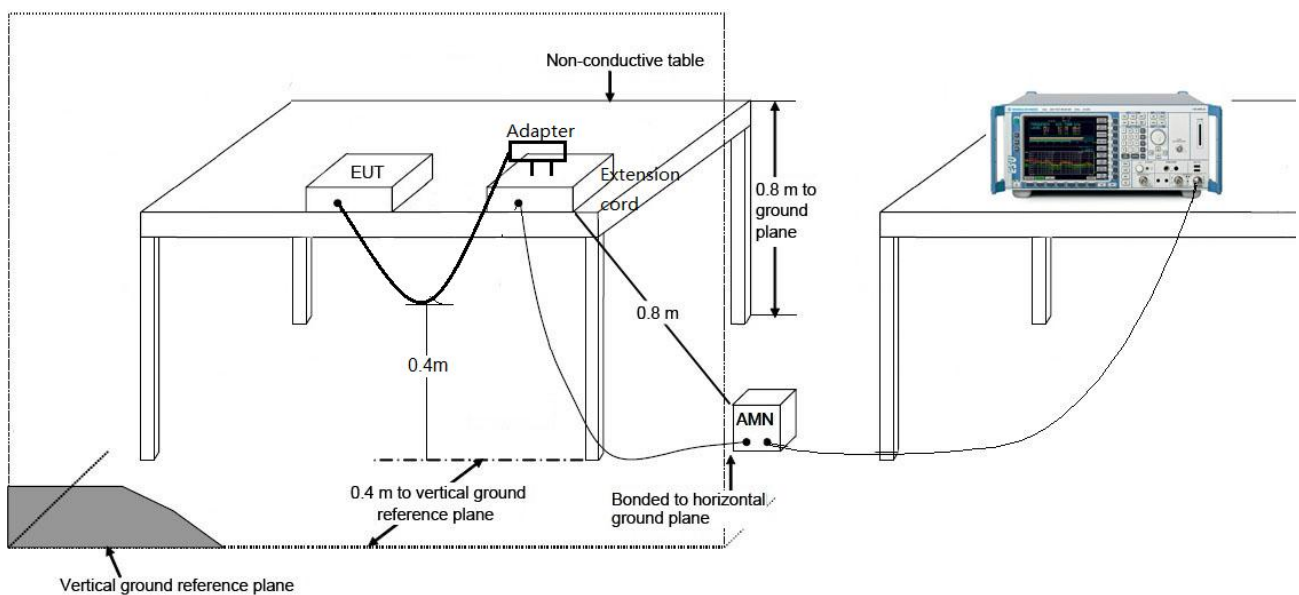
6.3.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

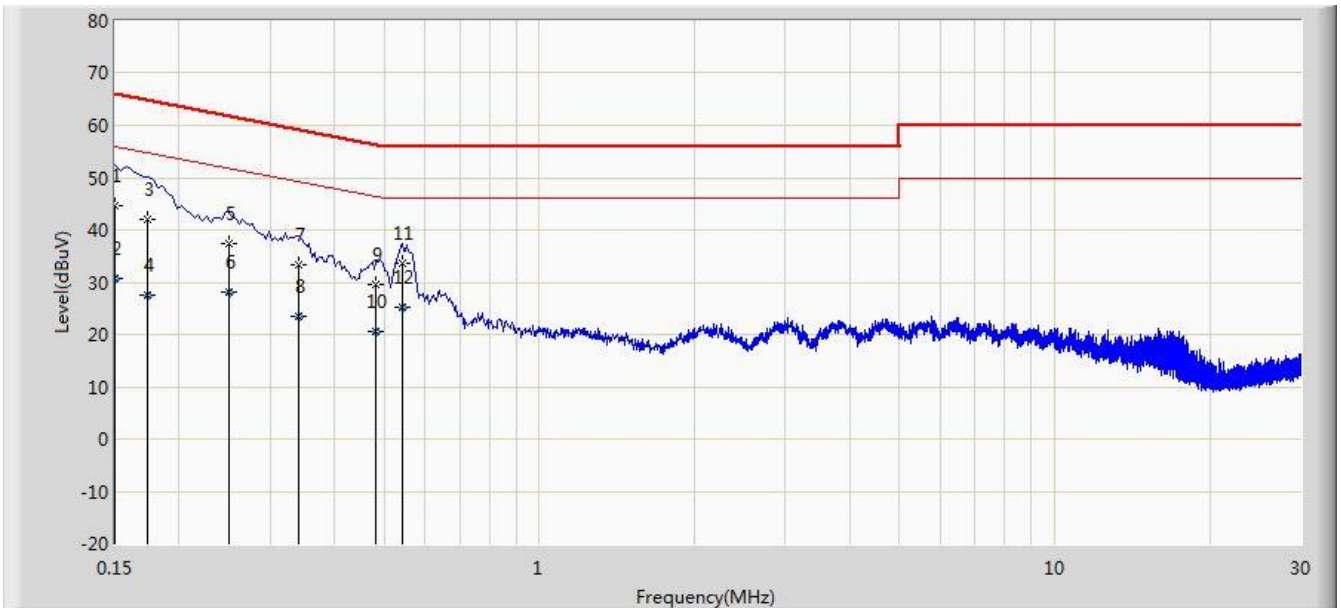
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.3.2. Test Setup



6.3.3. Test Result

Site: SR2	Time: 2015/05/12 - 17:31
Limit: FCC_Part15.207_CE_AC Power	Engineer: Roy Cheng
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: SMARTLINK TPMS TABLET	Power: AC 120V/60Hz
Note: Normal Operation	

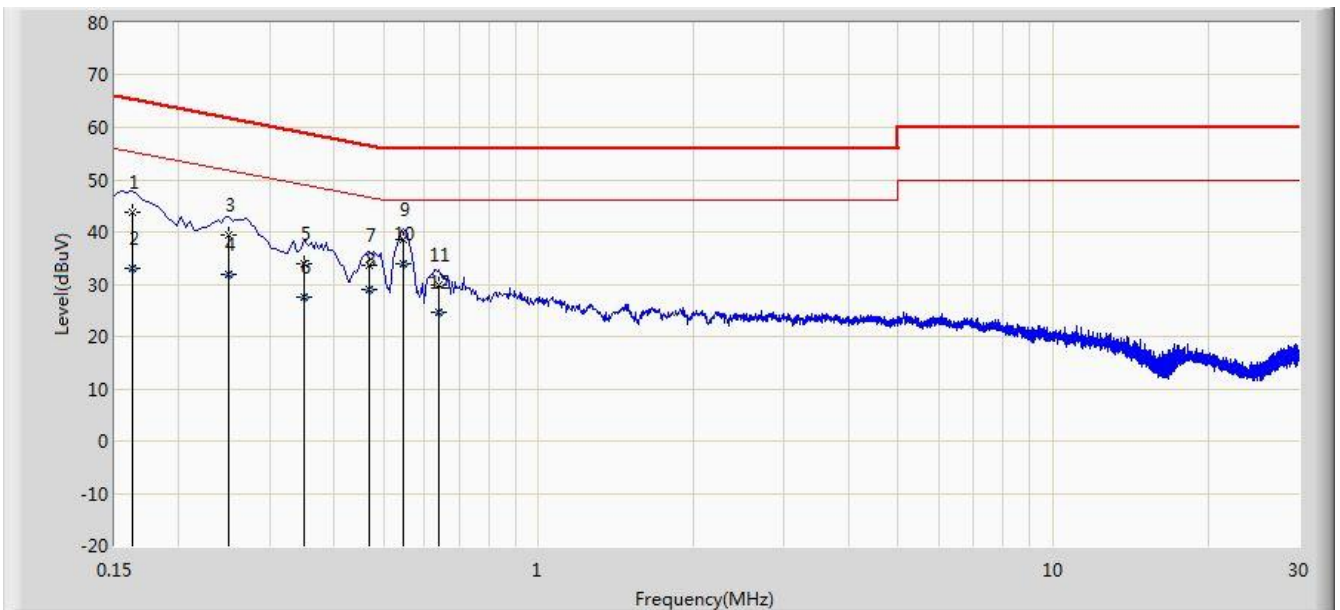


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.150	44.620	33.452	-21.380	66.000	11.168	QP
2			0.150	30.771	19.603	-25.229	56.000	11.168	AV
3			0.174	41.968	31.901	-22.799	64.767	10.068	QP
4			0.174	27.549	17.481	-27.218	54.767	10.068	AV
5			0.250	37.344	27.380	-24.413	61.757	9.964	QP
6			0.250	28.204	18.240	-23.553	51.757	9.964	AV
7			0.342	33.200	23.162	-25.954	59.155	10.038	QP
8			0.342	23.465	13.427	-25.690	49.155	10.038	AV
9			0.482	29.604	19.452	-26.701	56.305	10.152	QP
10			0.482	20.707	10.555	-25.598	46.305	10.152	AV
11			0.542	33.507	23.362	-22.493	56.000	10.145	QP
12		*	0.542	25.215	15.070	-20.785	46.000	10.145	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Site: SR2	Time: 2015/05/12 - 17:36
Limit: FCC_Part15.207_CE_AC Power	Engineer: Roy Cheng
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: SMARTLINK TPMS TABLET	Power: AC 120V/60Hz
Note: Normal Operation	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.162	43.759	33.681	-21.601	65.361	10.078	QP
2			0.162	32.957	22.879	-22.404	55.361	10.078	AV
3			0.250	39.552	29.551	-22.205	61.757	10.001	QP
4			0.250	31.901	21.900	-19.857	51.757	10.001	AV
5			0.350	33.892	23.817	-25.071	58.962	10.074	QP
6			0.350	27.535	17.460	-21.428	48.962	10.074	AV
7			0.470	33.741	23.576	-22.773	56.514	10.164	QP
8			0.470	28.951	18.787	-17.563	46.514	10.164	AV
9			0.546	38.636	28.475	-17.364	56.000	10.161	QP
10		*	0.546	33.996	23.835	-12.004	46.000	10.161	AV
11			0.638	29.978	19.868	-26.022	56.000	10.110	QP
12			0.638	24.753	14.643	-21.247	46.000	10.110	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

7. CONCLUSION

The data collected relate only the item(s) tested and show that the **SMARTLINK TPMS TABLET** **FCC ID: 2AEHLXCM-SLT** is in compliance with FCC Part 15.209 of the FCC Rules.

_____ The End _____