FCC Test Report

Product Name	：	Tire-pressure monitoring system (TPMS)
Model No.	：	VT-56, VT-56025
FCC ID.	：	2ABSJ-VT56025

Applicant	：	CONTROL TECHNOLGY CO. TAIWAN BRANCH
Address	：	221, SAN JIA DONG STREET, 40642, TAICHUNG, TAIWAN

Date of Receipt	：	2014/01/23
Issued Date	：	2014/04/10
Report No.	：	1410463R-RFUSP20V00
Report Version	：	V2.0

Testing Laboratory
1313

Test Report Certification

Issued Date : 2014/04/10
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Product Name	:	Tire-pressure monitoring system (TPMS)
Applicant	:	CONTROL TECHNOLGY CO. TAIWAN BRANCH
Address	:	221, SAN JIA DONG STREET, 40642, TAICHUNG, TAIWAN
Manufacturer	:	CONTROL TECHNOLGY CO. TAIWAN BRANCH
Model No.	:	VT-56, VT-56025
FCC ID.	:	2ABSJ-VT56025
EUT Voltage	:	AC 100-240V, 50/60Hz
Trade Name	:	ATEQ
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C 15.209: 2012 ANSI C63.4: 2009
Test Result	:	Complied

The test results relate only to the samples tested.
The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

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(Fonbo Fang / Engineering Adm. Assistant)

Reviewed By : Bruno Tsai
(Bruno Tsai / Assistant Engineer)

Approved By : Roy Wang
(Roy Wang / Director)

Laboratory Information

We, **QuieTek Corporation**, are an independent RF consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted (audited or listed) by the following related bodies in compliance with ISO 17025 specified testing scopes:

Taiwan R.O.C.	**:**	**TAF, Accreditation Number: 1313**
USA	**:**	**FCC, Registration Number: 365520**
Canada	**:**	**IC, Submission No: 150981**

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site:http://www.quietek.com/tw/ctg/cts/accreditations.htm
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/
If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

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TEL:+886-3-592-8858 / FAX:+886-3-592-8859 E-Mail : service@quietek.com

LinKou Testing Laboratory:
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TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789 E-Mail : service@quietek.com

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Tire-pressure monitoring system (TPMS)
Trade Name	ATEQ
Model No.	VT-56, VT-56025
FCC ID	2ABSJ-VT56025
Frequency Range/Channel Number	125KHz / 1 Channel
Antenna Type	Cap Antenna
Type of Modulation	ASK

Component	
OBD2 Interface Module	1 Set
LAN Cable	Non-Shielded, 1.8m
USB Cable	Non-Shielded, 1.2m
Docking station	1 Set

Frequency of Each Channel:	
Channel	Frequency
Channel 1	125KHz

Note:

1. This device is a Tire-pressure monitoring system (TPMS) device included a 125KHz transmitting function.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.209.
3. The variation of model number is for different strategy of marketing.

1.2. Test Mode

QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Pre-Test Mode	
TX	Mode 1: Transmitter (Operating) Mode 2: Transmitter (Stand By)
Final Test Mode	
TX	Mode 1: Transmitter (Operating) Mode 2: Transmitter (Stand By)

Emission	
Performed Item	Test
Conducted Emission	No
Radiated Emission	Yes

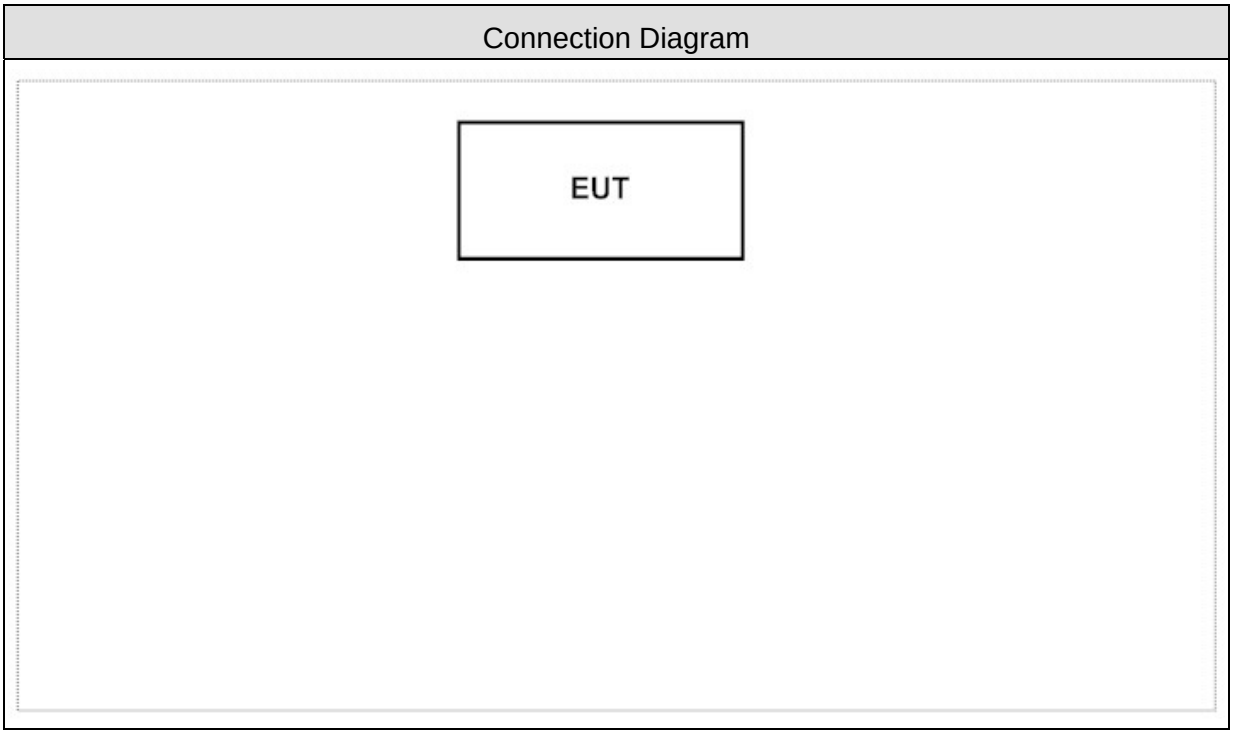
1.3. Tested System Details

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

N/A

1.4. Configuration of tested System

Connection Diagram



1.5. EUT Exercise Software

1	Setup the EUT and simulators as shown on 1.5.
2	Turn on the power.
3	The RF signal's status will continue transmit through EUT(TX).
4	Repeat the above procedure (3)

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	ANSI.C63.4 CE	15 - 35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	ANSI.C63.4 RE	15 -35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000

2. Radiated Emission

2.1. Test Equipment

The following test equipments are used during the test:

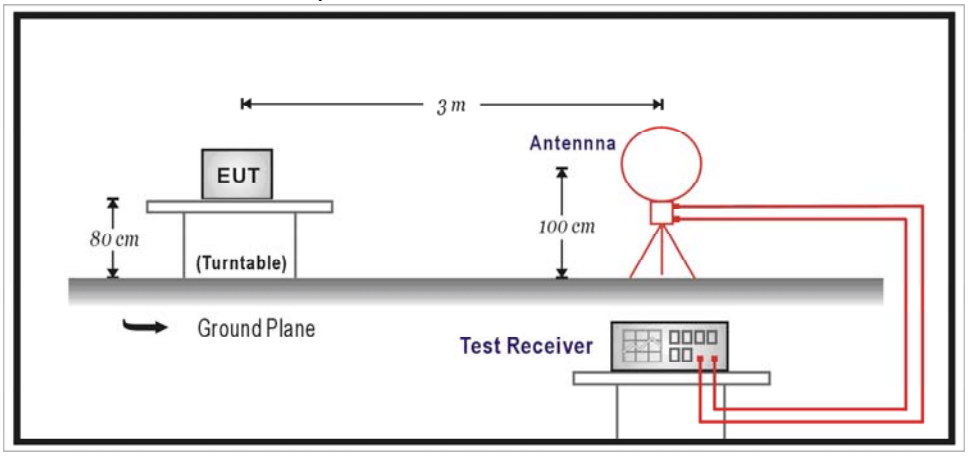
Radiated Emission / CB1

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Magnetic Loop Antenna	Teseq	HLA6120	26739	2014/11/09
Bilog Antenna	SCHAFFNER	CBL6112B	2895(CB1)	2014/08/14
Pre-Amplifier	QuieTek	AP-025C	CHM-0706049	2015/02/06
Test Receiver	R&S	ESCS 30	100122	2015/02/20
Spectrum Analyzer	Agilent	E4440A	MY46187335	2015/01/12
k Type Cable	Huber Suhner	Sucoflex 102	25623/2	2015/02/10

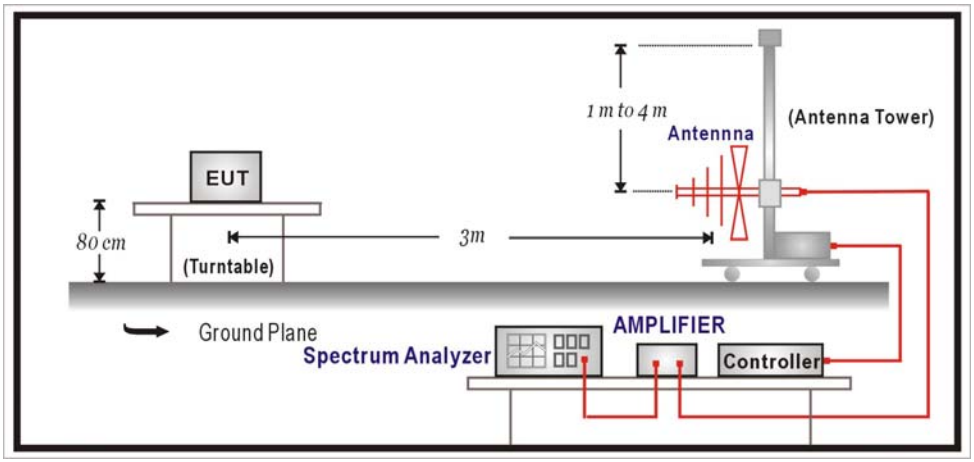
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

2.2. Test Setup

Under 30MHz Test Setup:



Under 1GHz Test Setup:



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark[1]	300
0.490-1.705	24000/F(kHz)	See Remark[1]	30
1.705-30	30	29.54	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV).

2. In the 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.

4. When the very low emission of EUT, the 3m measurement distance was performed. Regards to an inverse linear extrapolation 40dB/dec is adopted.

2.4. Test Procedure

Under 30MHz Test:

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

The antenna which is 1.0 meter above ground. All X-axis, Y-axis and Z-axis polarization of the antenna are set on measurement.

The emission limit 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 1000 MHz. Radiated emission limit in these three bands are based on measurements employing an average detector.

Under 1GHz Test:

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

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 C63.4:2009 on radiated measurement.

On any frequency the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

The bandwidth below 30MHz setting on the field strength meter is 9kHz and above 30MHz is 120kHz.

2.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.209: 2010

2.6. Test Result

Product	Tire-pressure monitoring system (TPMS)		
Test Item	Fundamental		
Test Mode	Mode 1: Transmitter (Operating)		
Date of Test	2014/02/24	Test Site	Site3

Fundamental at 3m

Test Conditions	Frequency (MHz)	Reading Level (dBuV)	Measure level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
X-axis	125.00	93.4	93.69	105.67	-11.98
Y-axis	125.00	92.4	92.69	105.67	-12.98
Z-axis	125.00	88.2	88.49	105.67	-17.18

Measure level (dBuA/m) = Reading Level (dBuA/m) + cable loss(0.29)

dBuV/m=20log(uV/m) , Limit dBuV/m at 3m = dBuV/m at 300m + 40log(300m/3m)

Spurious Emission (<30MHz) at 3m

Transmit Mode				
Frequency (MHz)	Reading Level (dBuV)	Measure level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
0.250	62.8	63.09	99.65	-36.56
0.375	54.6	54.89	96.12	-41.23
0.540	46.8	47.09	92.96	-45.87
0.625	69.5	69.79	91.69	-21.90
12.550	40.7	40.99	69.54	-28.55
24.660	41.4	41.69	69.54	-27.85

Measure level (dBuV/m) = Reading Level (dBuV/m) + cable loss(0.29)

dBuV/m=20log(uV/m) , Limit dBuV/m at 3m = dBuV/m at 300m + 40log(300m/3m)

Product	Tire-pressure monitoring system (TPMS)		
Test Item	Radiated Emission		
Test Mode	Mode 2: Transmitter (Stand By)		
Date of Test	2014/02/24	Test Site	Site3

Spurious Emission (<30MHz) at 3m

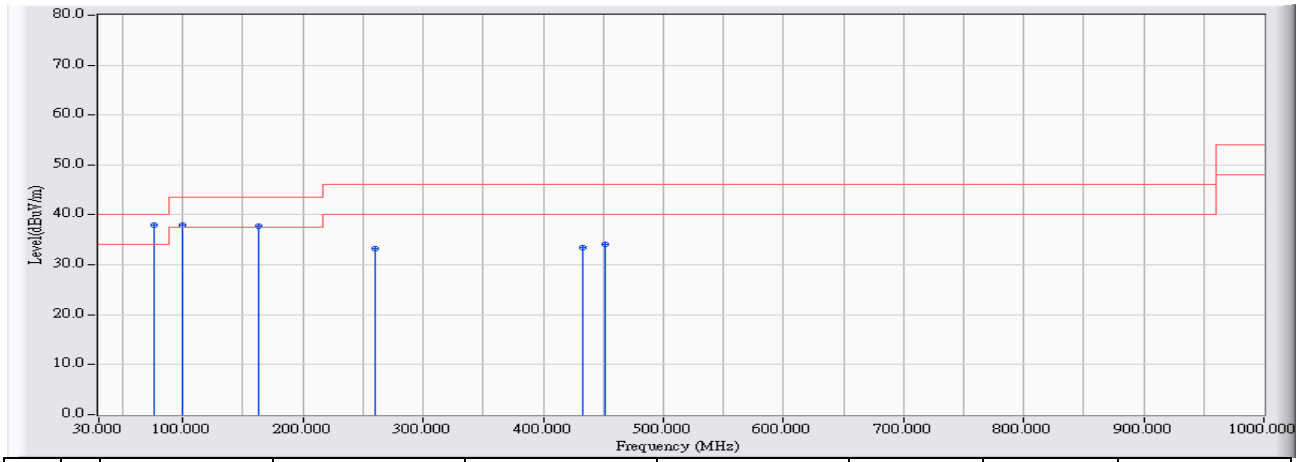
Stand By Mode				
Frequency (MHz)	Reading Level (dBuV)	Measure level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
0.250	62.6	62.89	99.65	-36.76
0.377	54.3	54.59	96.08	-41.49
0.502	46.7	46.99	73.59	-26.60
0.755	49.9	50.19	70.05	-19.86
0.895	55.6	55.89	68.57	-12.68
1.122	40.9	41.19	66.60	-25.41

Measure level (dBuV/m) = Reading Level (dBuV/m) + cable loss(0.29)

dBuV/m=20log(uV/m) , Limit dBuV/m at 3m = dBuV/m at 300m + 40log(300m/3m)

30 MHz – 1 GHz Spurious:

Site : CB1	**Time : 2014/02/10 - 18:50**
Limit : FCC_SpartC_15.209_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - HORIZONTAL	**Power : AC120V/ 60Hz**
EUT : Tire-pressure monitoring system (TPMS)	**Note : Mode 1: Transmitter (Operating)_Axis_X**

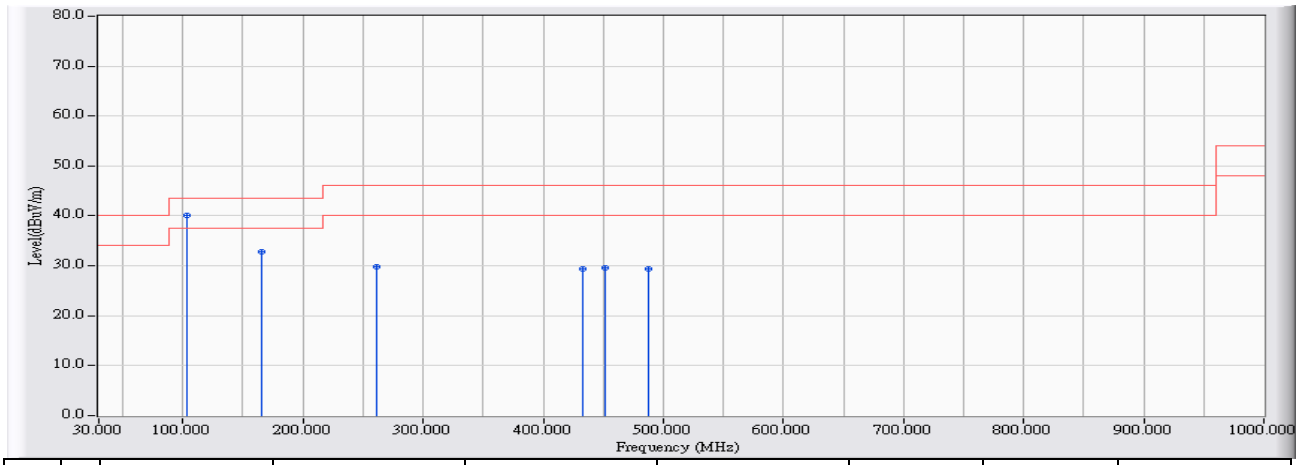


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	75.590	-27.056	64.989	37.933	-2.067	40.000	QUASIPEAK
2		99.840	-23.194	61.093	37.899	-5.621	43.520	QUASIPEAK
3		162.890	-23.991	61.703	37.713	-5.807	43.520	QUASIPEAK
4		259.890	-20.825	54.164	33.339	-12.681	46.020	QUASIPEAK
5		432.550	-16.918	50.286	33.368	-12.652	46.020	QUASIPEAK
6		450.980	-16.562	50.616	34.054	-11.966	46.020	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB1	**Time : 2014/02/10 - 19:05**
Limit : FCC_SpartC_15.209_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - VERTICAL	**Power : AC120V/ 60Hz**
EUT : Tire-pressure monitoring system (TPMS)	**Note : Mode 1: Transmitter (Operating)_Axis_X**

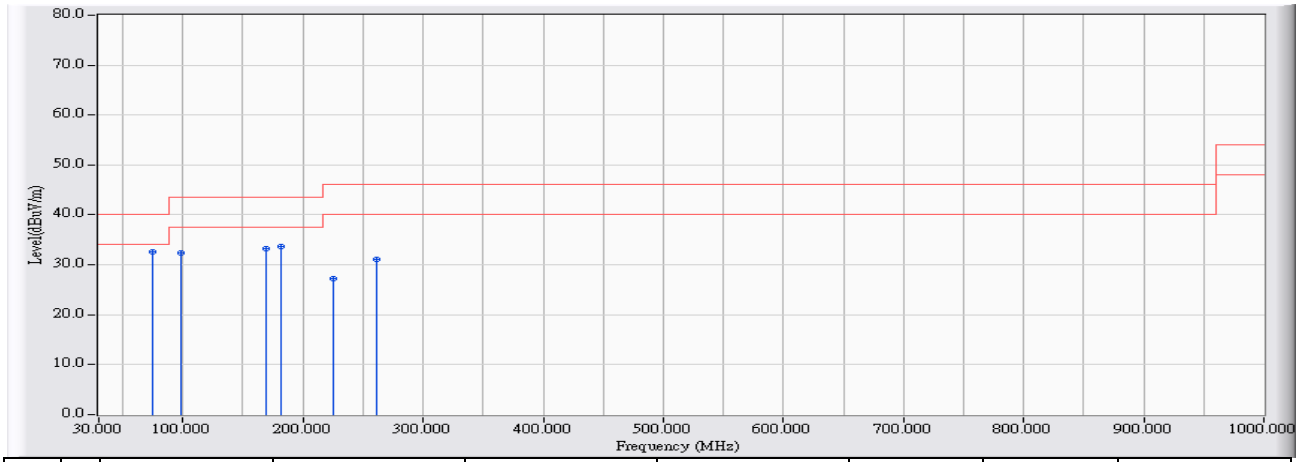


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	103.720	-22.975	63.062	40.086	-3.434	43.520	QUASIPEAK
2		165.800	-24.118	56.980	32.862	-10.658	43.520	QUASIPEAK
3		260.860	-20.805	50.540	29.734	-16.286	46.020	QUASIPEAK
4		432.550	-16.918	46.401	29.483	-16.537	46.020	QUASIPEAK
5		450.980	-16.562	46.108	29.546	-16.474	46.020	QUASIPEAK
6		487.840	-15.852	45.320	29.468	-16.552	46.020	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB1	**Time : 2014/02/10 - 21:17**
Limit : FCC_SpartC_15.209_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - HORIZONTAL	**Power : AC120V/ 60Hz**
EUT : Tire-pressure monitoring system (TPMS)	**Note : Mode 2: Transmitter (Stand By)_Axis_X**

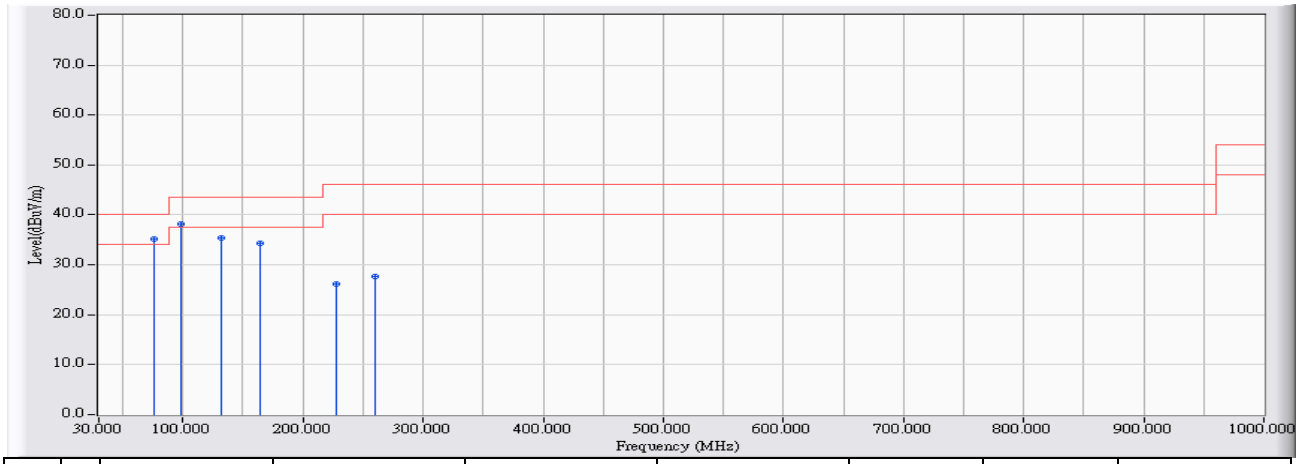


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	74.620	-27.128	59.781	32.653	-7.347	40.000	QUASIPEAK
2		98.870	-23.421	55.807	32.385	-11.135	43.520	QUASIPEAK
3		168.710	-24.245	57.583	33.338	-10.182	43.520	QUASIPEAK
4		181.320	-24.746	58.440	33.694	-9.826	43.520	QUASIPEAK
5		224.970	-22.928	50.135	27.207	-18.813	46.020	QUASIPEAK
6		260.860	-20.805	51.864	31.058	-14.962	46.020	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB1	**Time : 2014/02/10 - 21:22**
Limit : FCC_SpartC_15.209_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - VERTICAL	**Power : AC120V/ 60Hz**
EUT : Tire-pressure monitoring system (TPMS)	**Note : Mode 2: Transmitter (Stand By)_Axis_X**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	75.590	-27.056	62.179	35.123	-4.877	40.000	QUASIPEAK
2		98.870	-23.421	61.706	38.284	-5.236	43.520	QUASIPEAK
3		131.850	-22.589	58.040	35.451	-8.069	43.520	QUASIPEAK
4		164.830	-24.075	58.285	34.210	-9.310	43.520	QUASIPEAK
5		227.880	-22.705	48.877	26.171	-19.849	46.020	QUASIPEAK
6		259.890	-20.825	48.558	27.733	-18.287	46.020	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor