FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4:2003 TEST REPORT

For

Programmable Tire Pressure Monitor System

Model : VS-61U003

Trade Name : Cub

Issued for

Cub Elecparts Inc.

No.6,Lane 546, Sec. 6, Changlu Road, Fuhsin Township, Changhua County,Taiwan 506

Issued by

Compliance Certification Services Inc.
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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	05/27/2011	Initial Issue	All Page 33	Winnie Chen

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TITLE PAGE NO.

1. TEST REPORT CERTIFICATION

Applicant	：	Cub Elecparts Inc.
Address	：	No.6,Lane 546, Sec. 6, Changlu Road, Fuhsin Township, Changhua County,Taiwan 506
Equipment Under Test	：	Programmable Tire Pressure Monitor System
Model	：	VS-61U003
Trade Name	：	Cub
Tested Date	：	May 13 ~ 27, 2011

APPLICABLE STANDARD	
Standard	**Test Result**
FCC Part 15 Subpart C AND ANSI C63.4:2003	PASS

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Sb Lu
Sr. Engineer

Reviewed by:

Gundam Lin
Sr. Engineer

2. EUT DESCRIPTION

Product Name	Programmable Tire Pressure Monitor System
Model Number	VS-61U003
Identify Number	T110513301
Received Date	May 13, 2011
Frequency Range	315 MHz
Transmit Power	83.88 dBμV/m
Channel Number	1 Channels
Type of Modulation	ASK, FSK
Antenna Type	PCB Antenna, Antenna Gain -3.4 dBi
Power Source	3Vdc (From battery)

Remark :

1. *The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*
2. *For more details, please refer to the User's manual of the EUT.*
3. *This submittal(s) (test report) is intended for FCC ID：ZPNVS61U003 filing to comply with Section 15.207, 15.209 and 15.231 of the FCC Part 15, Subpart C Rules.*

3. DESCRIPTION OF TEST MODES

Radiated Emission (Below 1 GHz) Test:

1. The following test modes were scanned during the preliminary test:

No.	Pre-Test Mode
1	Normal Operating / ASK Mode
2	Normal Operating / FSK Mode

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode
Normal Operating / ASK Mode
Normal Operating / FSK Mode

Remark : *Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.*

Radiated Emission Test (Above 1 GHz) and Antenna Port Conducted Measurement :

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

ASK Mode, FSK Mode

Remark :*The field strength of spurious emission was measured in the following position: EUT stand-up position(X axis), lie-down position(X, Z axis). The worst emission was found in ie-down position(X axis) and the worst case was recorded.*

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2003 and FCC CFR 47, 15.207, 15.209 and 15.231.

5. FACILITIES AND ACCREDITATION

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

NO. 989-1 Wen Shan Rd., Shang Shan Village,
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.4:2003 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

5.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Taiwan	TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Japan	VCCI
Taiwan	BSMI
USA	FCC MRA

Copies of granted accreditation certificates are available for downloading from our web site, http:///www.ccsrf.com

5.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Open Area Test Site (OATS No.3) / Radiated Emission, 30 to 200 MHz	+/- 3.6037
Open Area Test Site (OATS No.3) / Radiated Emission, 200 to 1000 MHz	+/- 3.5800
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 30 to 200 MHz	+/- 3.1747
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 200 to 1000 MHz	+/- 2.9091
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 1 to 18GHz	+/- 2.8272
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 18 to 26 GHz	+/- 2.8097
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 26 to 40 GHz	+/- 3.0510
Conducted Emission, 9kHz to 30MHz	+/- 1.5384

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Consistent with industry standard (e.g. CISPR 22: 2006, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than U_{CISPR} which is 3.6dB and 5.2dB respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

N/A

SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

EUT OPERATING CONDITION

1. Setup whole system for test as shown on diagram.
2. Power on all equipments.
   TX Mode: Frequency: VS-61U003 (ASK/FSK).
3. All of the functions are under run.
4. Start test.

7. FCC PART 15.231 REQUIREMENTS

7.1 20dB BANDWIDTH

LIMITS

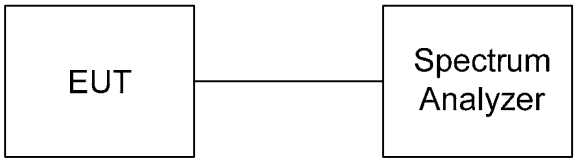
§15.231(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	AGILENT	E4446A	MY46180323	04/24/2012

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP

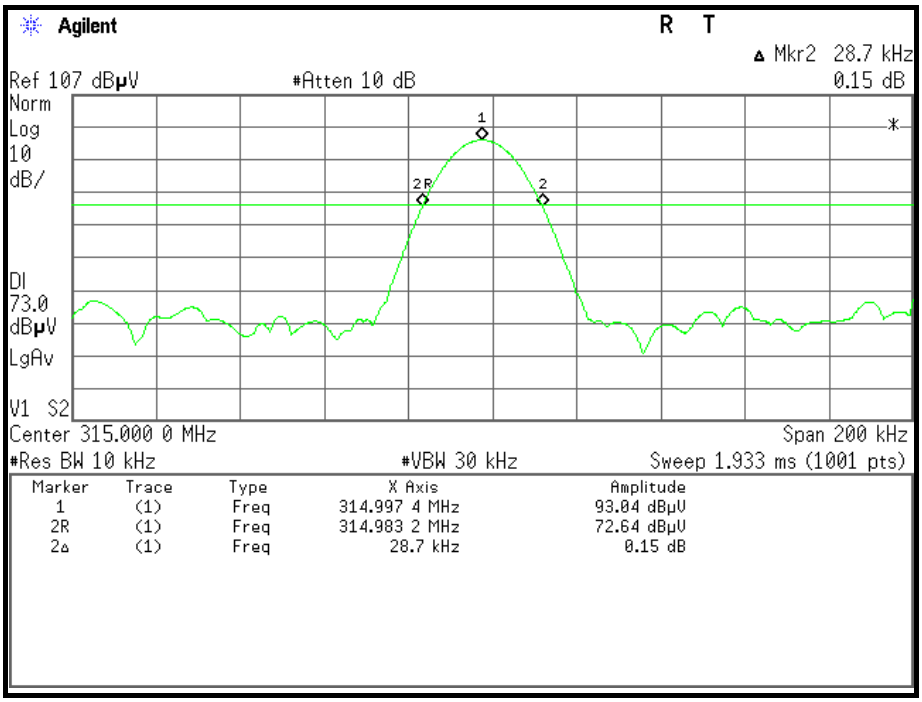


TEST PROCEDURE

The 20dB band width was measured with a spectrum analyzer connected to RF antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency, using the analyzer. Display Line and Marker Delta functions, the 20dB band width of the emission was determined.

TEST RESULTS

Channel Frequency (MHz)	20dB Bandwidth (kHz)	Minimum Limit (kHz)	Result
315	28.7	787.5	PASS



7.2 LIMIT OF TRANSMISSION TIME

LIMITS

§ 15.231(e) In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	AGILENT	E4446A	MY46180323	04/24/2012

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The spectrum analyzer center frequency is set to the transmitter frequency. The RBW and VBW are set to 100kHz.

TEST RESULTS

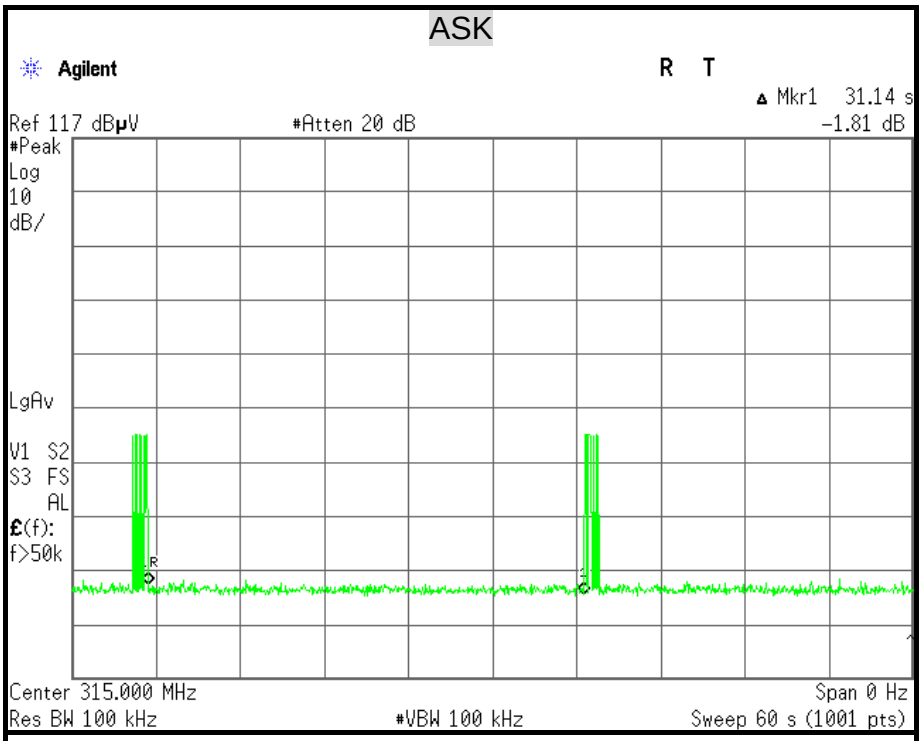
Modulation	Channel Frequency (MHz)	Pulse Width (ms)	Number of Pulse	Transmission Time (ms)	Limit (Second)	Result
ASK	315	13.4	8	107.2	1	PASS
FSK		8.5	4	34	1	PASS

ASK: Transmission Time = Pulse Width × Number of Pulse = 13.4 × 8 = 107.2 (ms)
FSK: Transmission Time = Pulse Width × Number of Pulse = 8.5 × 4 = 34 (ms)

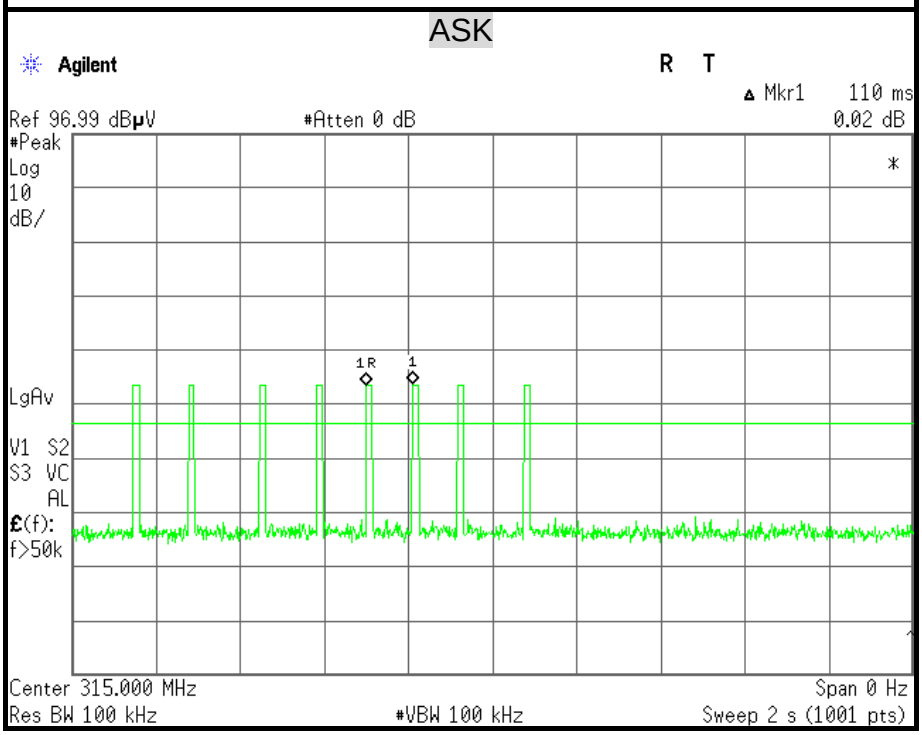
Modulation	Channel Frequency (MHz)	Silent Period (Second)	30 Times Of The Transmission Time (Second)	Limit (Second)	Result
ASK	315	31.14	3.216	10	PASS
FSK		15.42	1.02	10	PASS

ASK: 30 times of transmission time = 107.2 (ms) × 30 = 3.216 (s)
FSK: 30 times of transmission time = 34 (ms) × 30 = 1.02 (s)

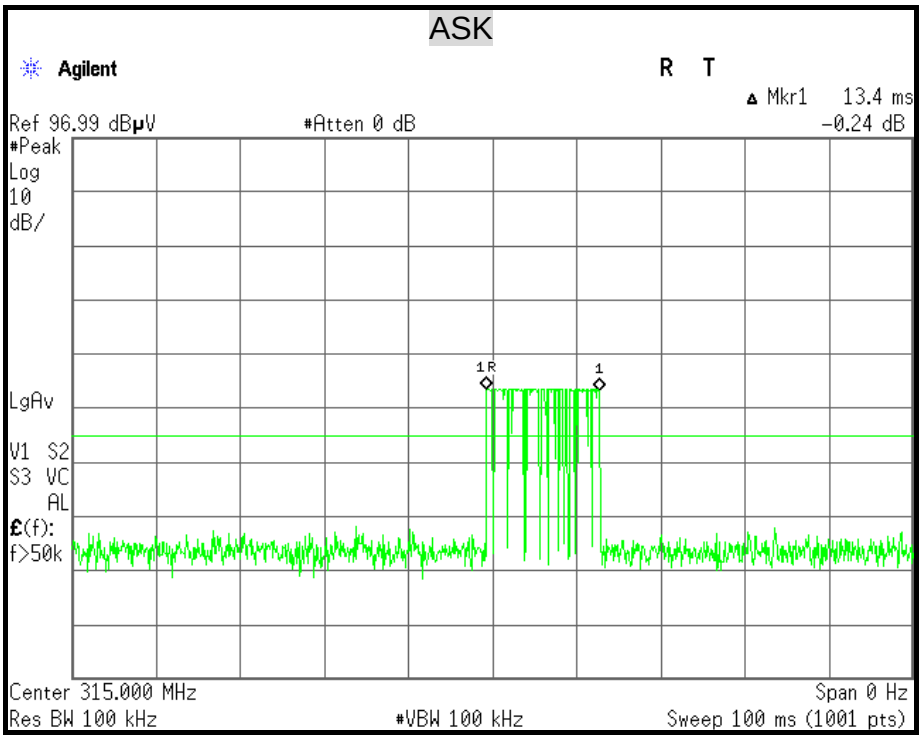
ASK



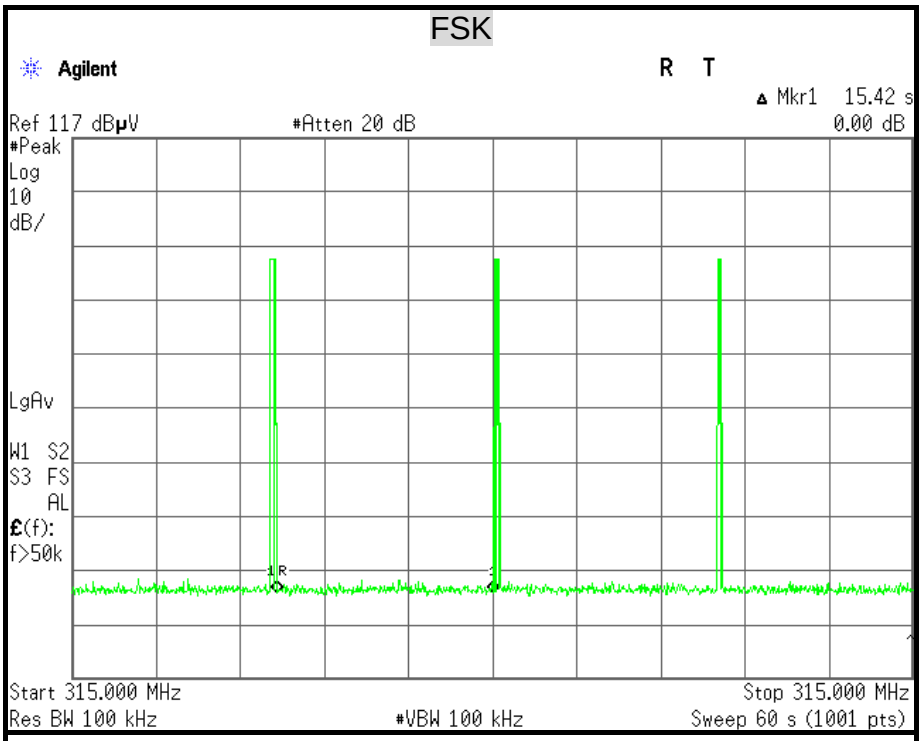
ASK



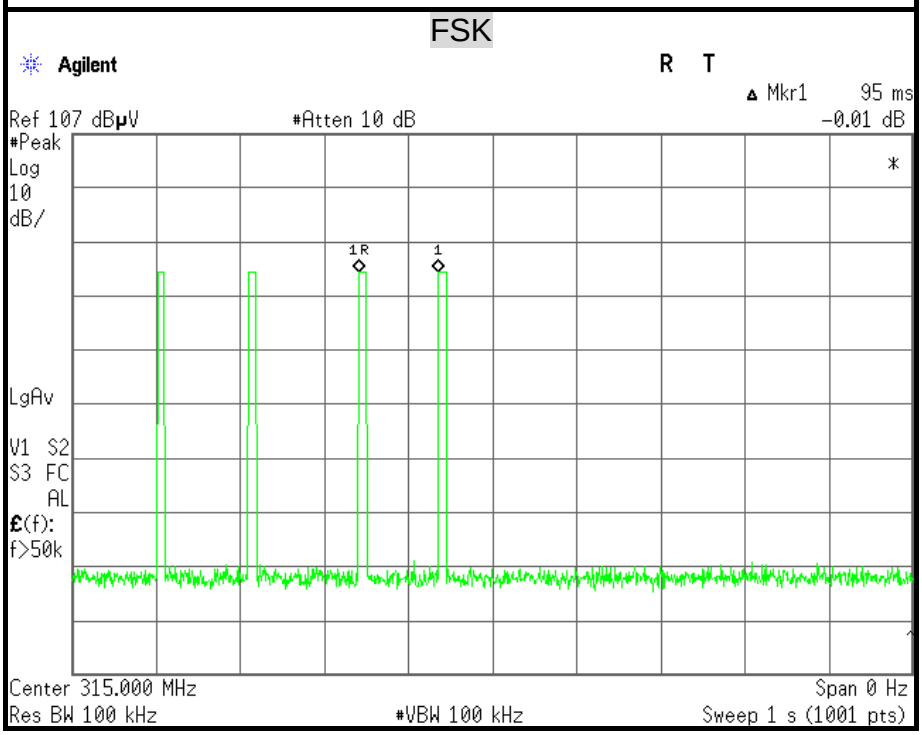
ASK



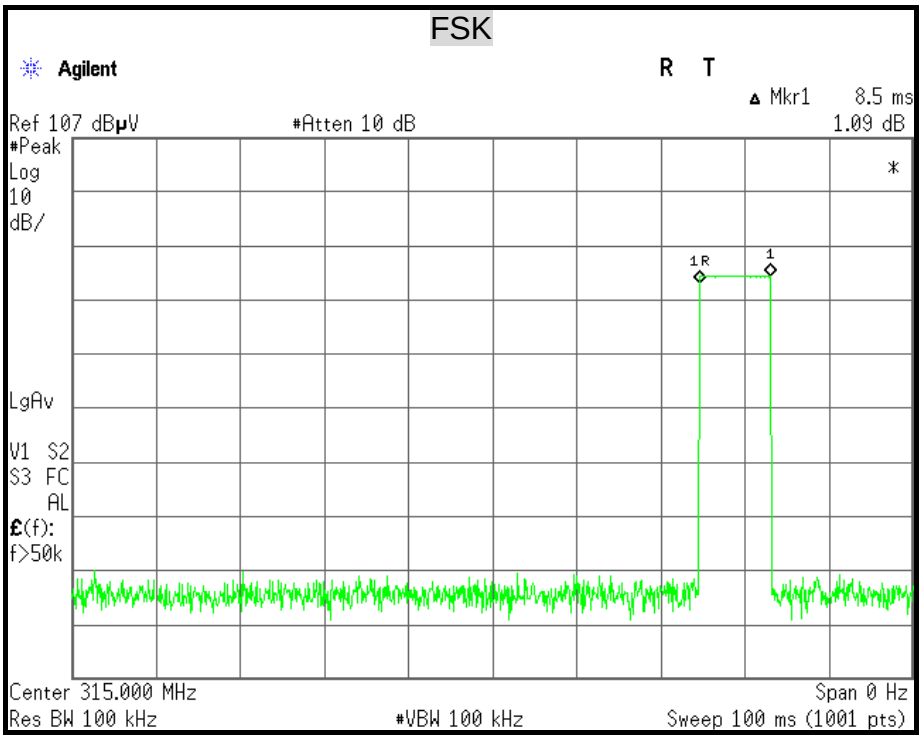
FSK



FSK



FSK



7.3 DUTY CYCLE CORRECTION FACTOR

LIMITS

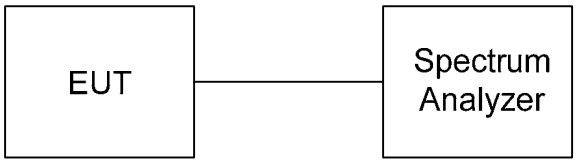
Nil (No dedicated limit specified in the Rules).

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	AGILENT	E4446A	MY46180323	04/24/2012

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span = 0Hz,
5. Repeat above procedures until all frequency measured were complete.

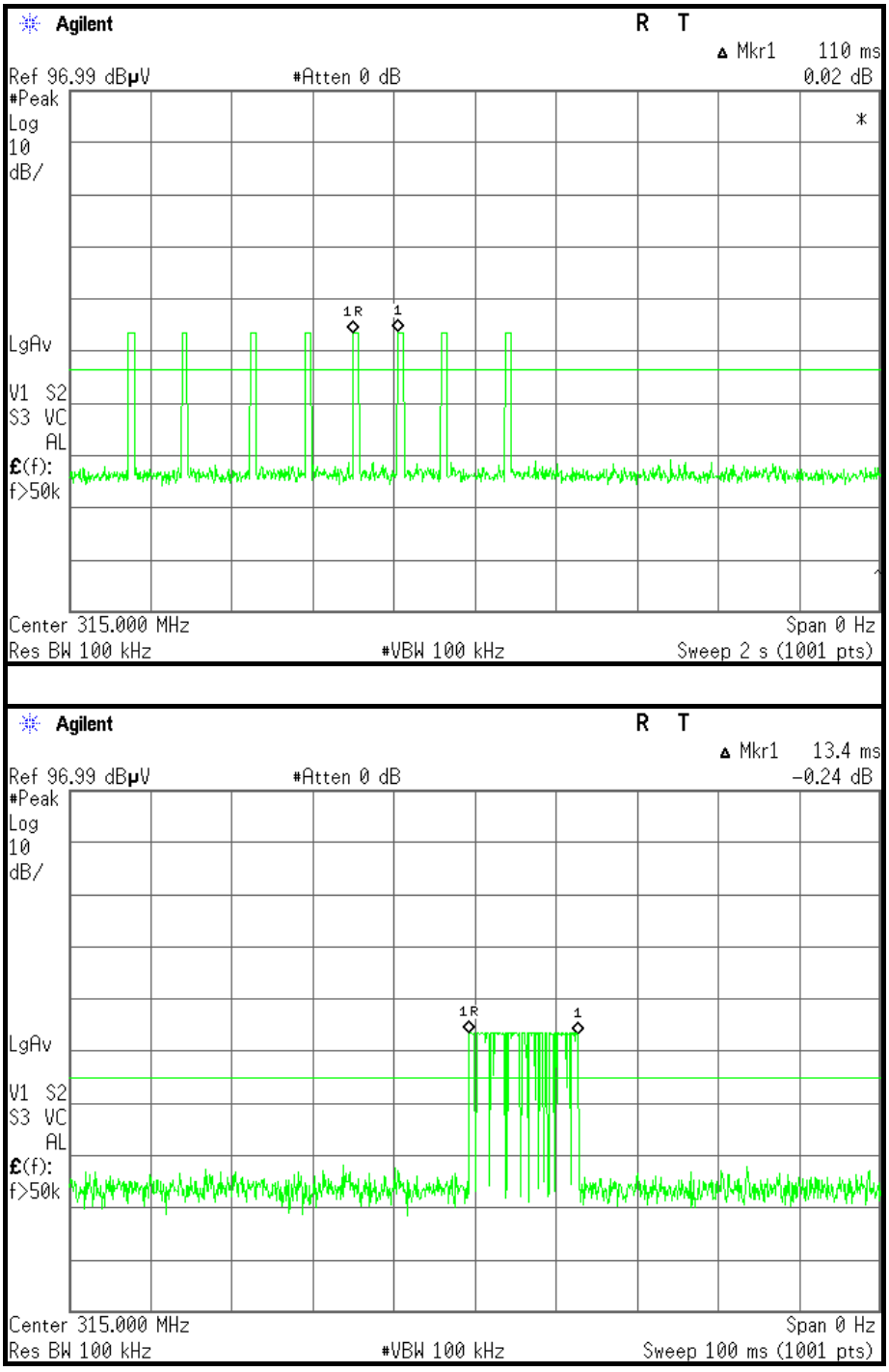
TEST RESULTS

Modulation : ASK

Tp = 100ms

Ton = 13.4ms

Duty Cycle Correction Factor= 20×log (Ton / Tp) = 20×log (13.4/100) = -17.46 dB

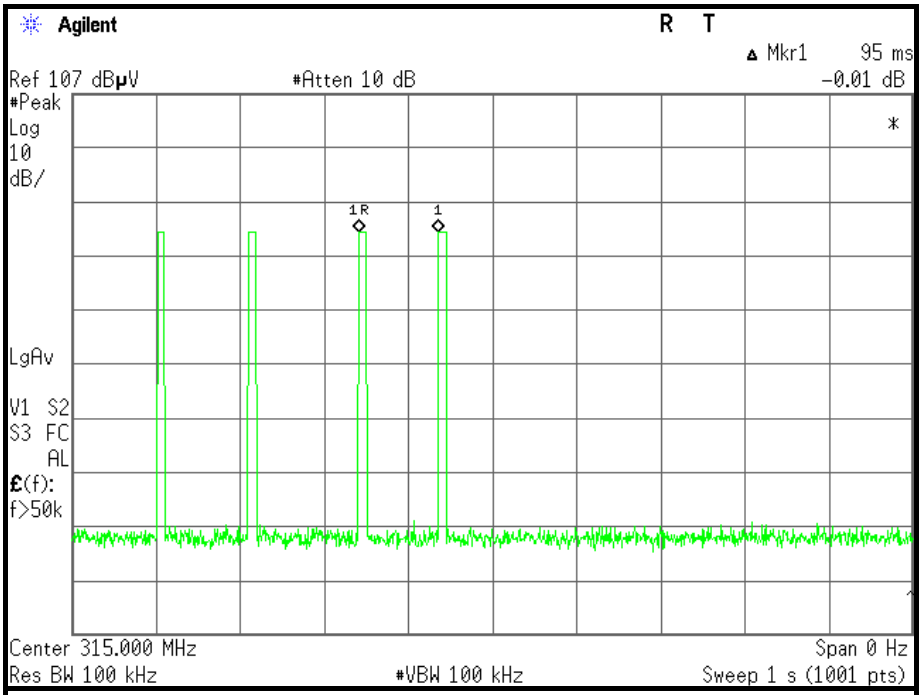


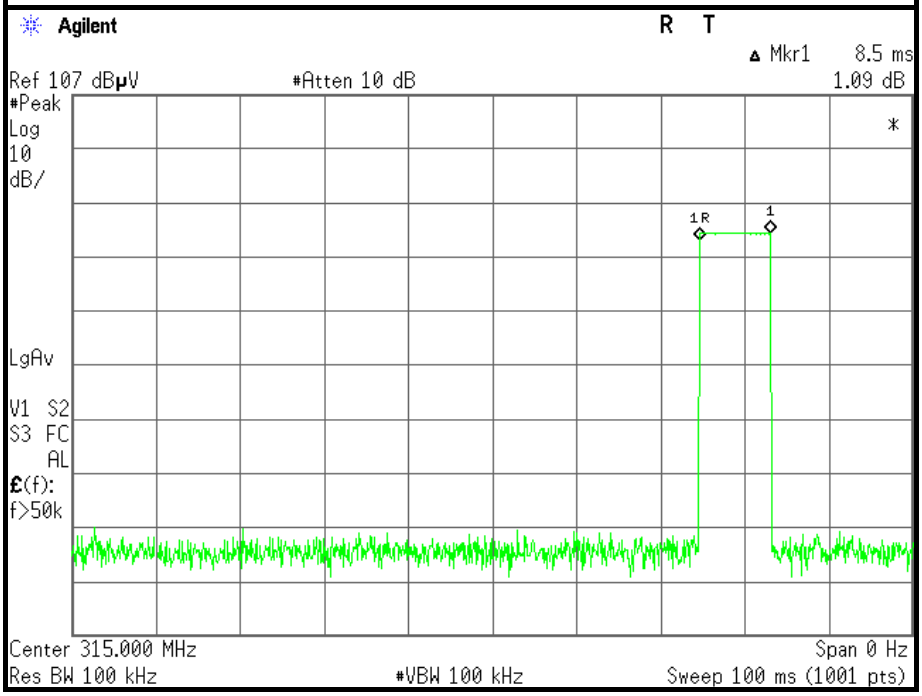
Modulation : FSK

Tp = 95ms

Ton = 8.5ms

Duty Cycle Correction Factor= 20×log (Ton / Tp) = 20×log (8.5/95) = -20.97 dB





7.4 RADIATED EMISSION

LIMITS

(1) According to §15.231(b), in addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 – 40.70	2250	225
70 – 130	1250	125
130 – 174	1250 to 3750 **	125 to 375 **
174 – 260	3750	375
260 – 470	3750 to 12500 **	375 to 1250 **
Above 470	12500	1250

Remark: *** linear interpolations*

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 56.81818(F) - 6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(F) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

(2) According to § 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

Remark: ***Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

(3) According to § 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST EQUIPMENT

966Chamber_B

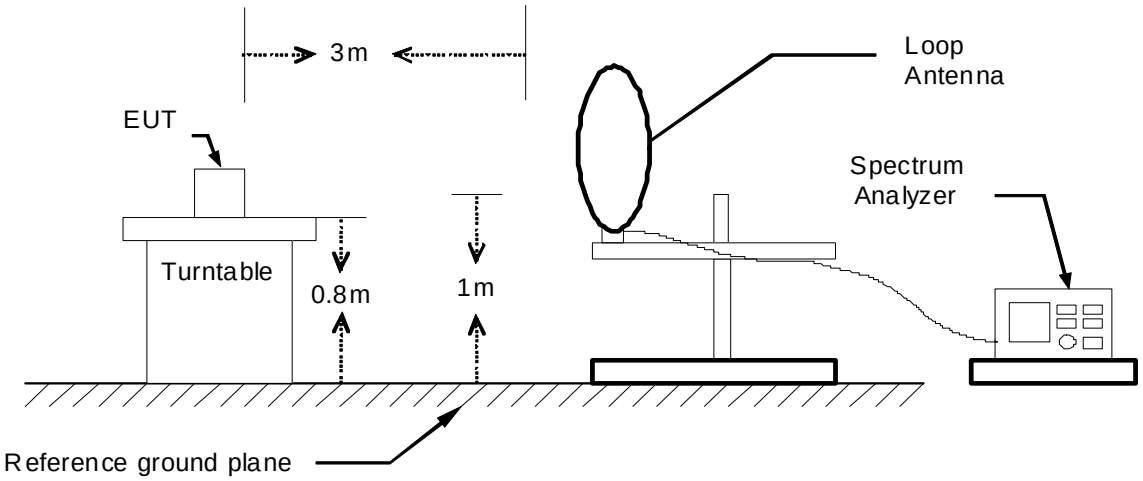
Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/20/2011
EMI Receiver	ROHDE & SCHWARZ	ESCI	101131	01/13/2012
Broadband Hybrid Bi-Log Antenna	Sunol Sciences	JB1	A100209-4	10/07/2011
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078732	07/05/2011
Pre-Amplifier	Agilent	8447D	2944A10052	07/26/2011
Pre-Amplifier	Agilent	8449B	3008A01916	09/21/2011
LOOP Antenna	EMCO	6502	8905-2356	06/09/2011
TUNABLE BANDREJETC FILTER	K&L	3TNF-250/500 N/N	205	N.C.R.

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2. N.C.R = No Calibration Request.

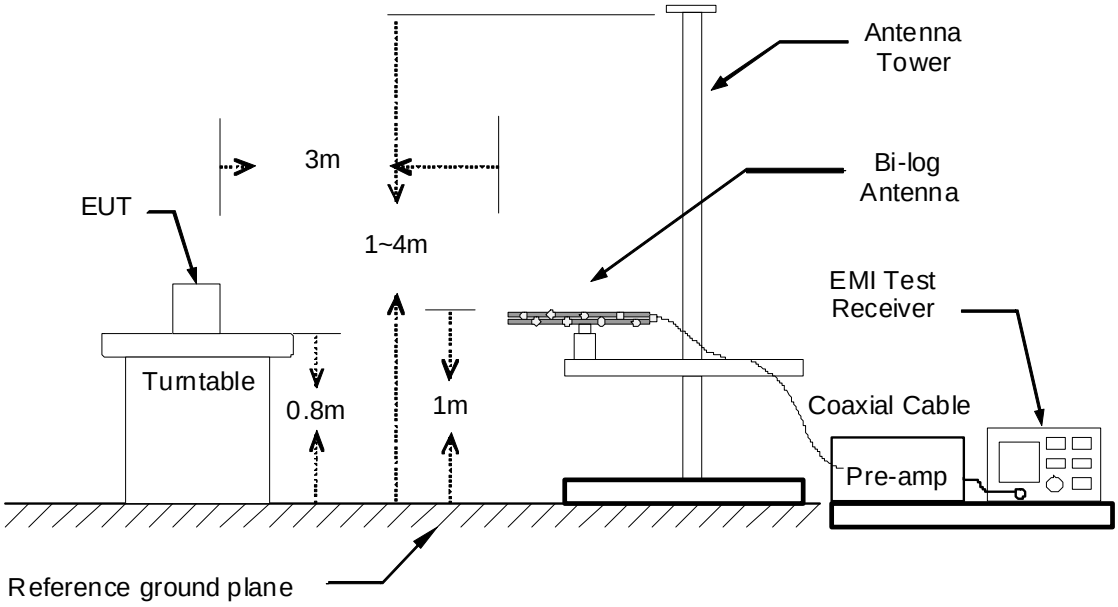
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.

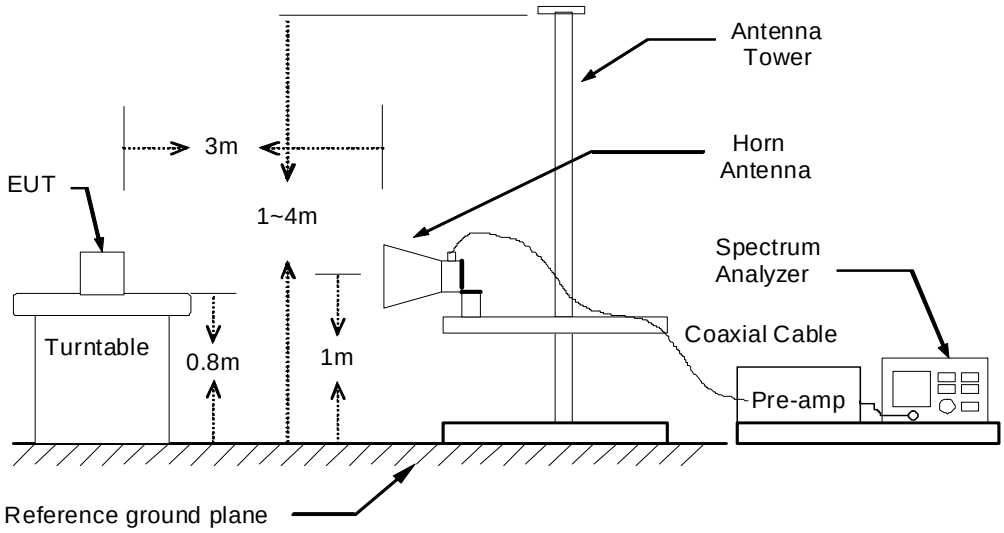
9kHz ~ 30MHz



30MHz ~ 1GHz



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Remark：

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

TEST RESULTS

Below 1 GHz (9kHz ~ 30MHz)

No emission found between lowest internal used/generated frequency to 30MHz.

Below 1 GHz (30MHz ~ 1GHz)

Product Name	Programmable Tire Pressure Monitor System	Test By	Leon Cheng
Model	VS-61U003	Test Date	2011/05/23
Test Mode	Normal operating / ASK Mode	TEMP & Humidity	26°C, 56%

966 Chamber_B at 3Meter / Horizontal								
Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Duty Cycle Correction Factor	Result (AVG/QP)	Limit (AVG/QP) (dBµV/m)	Margin (dB)	Remark
* 315.00	93.05	-9.17	83.88	-17.46	66.42	67.66	-1.24	AVG
275.41	36.61	-10.75	25.86	---	---	46.00	-20.14	Peak
332.64	38.10	-8.18	29.92	---	---	46.00	-16.08	Peak
375.32	38.53	-7.02	31.51	---	---	46.00	-14.49	Peak
* 630.43	64.66	-6.28	58.38	-17.46	40.92	62.00	-21.08	AVG
642.07	45.60	-6.11	39.49	---	---	46.00	-6.51	Peak
* 944.71	61.78	-1.61	60.17	-17.46	42.71	62.00	-19.29	AVG

966 Chamber_B at 3Meter / Vertical								
Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Duty Cycle Correction Factor	Result (AVG/QP)	Limit (AVG/QP) (dBµV/m)	Margin (dB)	Remark
* 315.00	79.05	-9.17	69.88	-17.46	52.42	67.66	-15.24	AVG
159.98	49.68	-14.24	35.44	---	---	43.50	-8.06	Peak
224.97	47.51	-12.70	34.81	---	---	46.00	-11.19	Peak
275.41	44.90	-10.75	34.15	---	---	46.00	-11.85	Peak
375.32	44.70	-7.02	37.68	---	---	46.00	-8.32	Peak
* 630.43	59.40	-6.28	53.13	-17.46	35.67	62.00	-26.33	AVG
* 944.71	54.94	-1.61	53.33	-17.46	35.87	62.00	-26.13	AVG

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB).*
4. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m).*
5. *Margin (dB) = Remark result (dBuV/m) - limit (dBuV/m).*
6. *(*) For Fundamental & Harmonics: Average Level = Peak Level + Duty Cycle Factor.*

Product Name	Programmable Tire Pressure Monitor System	Test By	Leon Cheng
Model	VS-61U003	Test Date	2011/05/23
Test Mode	Normal operating / FSK Mode	TEMP & Humidity	26°C, 56%

966 Chamber_B at 3Meter / Horizontal								
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Duty Cycle Correction Factor	Result (AVG/QP)	Limit (AVG/QP) (dBμV/m)	Margin (dB)	Remark
* 315.00	93.05	-9.17	83.88	-20.97	62.91	67.66	-4.75	AVG
275.41	36.61	-10.75	25.86	---	---	46.00	-20.14	Peak
332.64	38.10	-8.18	29.92	---	---	46.00	-16.08	Peak
375.32	38.53	-7.02	31.51	---	---	46.00	-14.49	Peak
* 630.43	64.66	-6.28	58.38	-20.97	37.41	62.00	-24.59	AVG
642.07	45.60	-6.11	39.49	---	---	46.00	-6.51	Peak
* 944.71	61.78	-1.61	60.17	-20.97	39.20	62.00	-22.80	AVG

966 Chamber_B at 3Meter / Vertical								
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Duty Cycle Correction Factor	Result (AVG/QP)	Limit (AVG/QP) (dBμV/m)	Margin (dB)	Remark
* 315.00	79.05	-9.17	69.88	-20.97	48.91	67.66	-18.75	AVG
159.98	49.68	-14.24	35.44	---	---	43.50	-8.06	Peak
224.97	47.51	-12.70	34.81	---	---	46.00	-11.19	Peak
275.41	44.90	-10.75	34.15	---	---	46.00	-11.85	Peak
375.32	44.70	-7.02	37.68	---	---	46.00	-8.32	Peak
* 630.43	59.40	-6.28	53.13	-20.97	32.16	62.00	-29.84	AVG
* 944.71	56.72	-1.61	55.11	-20.97	34.14	62.00	-27.86	AVG

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB).*
4. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m).*
5. *Margin (dB) = Remark result (dBuV/m) - limit (dBuV/m).*
6. *(*) For Fundamental & Harmonics: Average Level = Peak Level + Duty Cycle Factor.*

Above 1 GHz

Product Name	Programmable Tire Pressure Monitor System	Test By	Leon Cheng
Model	VS-61U003	Test Date	2011/05/23
Test Mode	ASK Mode	TEMP & Humidity	26°C, 56%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
* 1261.00	53.65	---	-4.49	49.16	31.70	74.00	54.00	-22.30	AVG
* 1576.00	57.82	---	-2.90	54.92	37.46	74.00	54.00	-16.54	AVG
* 2521.00	60.26	---	2.40	62.66	45.20	74.00	54.00	-8.80	AVG

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
* 1261.00	53.85	---	-4.49	49.36	31.90	74.00	54.00	-22.10	AVG
* 1576.00	57.01	---	-2.90	54.11	36.65	74.00	54.00	-17.35	AVG
* 2521.00	62.26	---	2.40	64.66	47.20	74.00	54.00	-6.80	AVG

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)
7. *(*) For Fundamental & Harmonics: Average Level = Peak Level + Duty Cycle Factor*

Product Name	Programmable Tire Pressure Monitor System	Test By	Leon Cheng
Model	VS-61U003	Test Date	2011/05/23
Test Mode	FSK Mode	TEMP & Humidity	26°C, 56%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
* 1261.00	53.65	---	-4.49	49.15	28.18	74.00	54.00	-25.82	AVG
* 1576.00	57.82	---	-2.90	54.92	33.95	74.00	54.00	-20.05	AVG
* 2521.00	60.26	---	2.40	62.66	41.69	74.00	54.00	-12.31	AVG

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
* 1261.00	53.85	---	-4.49	49.36	28.39	74.00	54.00	-25.61	AVG
* 1576.00	57.01	---	-2.90	54.11	33.14	74.00	54.00	-20.86	AVG
* 2521.00	62.26	---	2.40	64.66	43.69	74.00	54.00	-10.31	AVG

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)
7. *(*) For Fundamental & Harmonics: Average Level = Peak Level + Duty Cycle Factor*

7.5 CONDUCTED EMISSION

LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

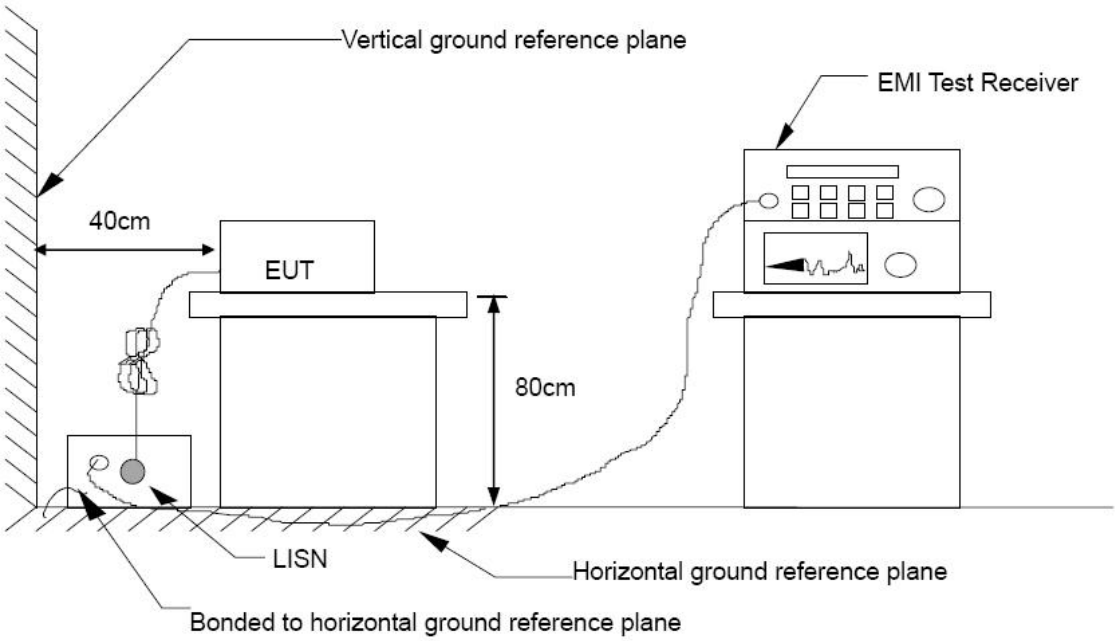
Frequency Range (MHz)	Conducted Limit (dBμv)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5.00	56	46
5.00 - 30.0	60	50

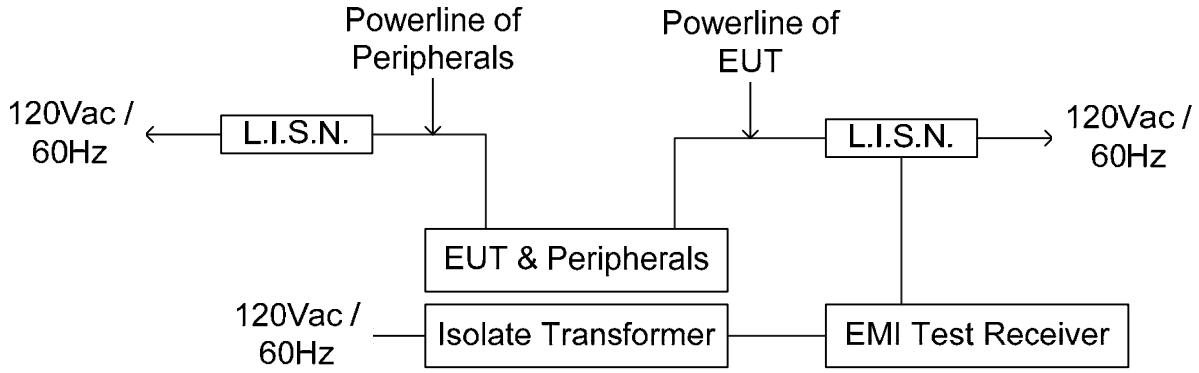
TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/08/2011
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	03/14/2012
EMI Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/24/2011
Pulse Limit	ROHDE & SCHWARZ	ESH3-Z2	100117	09/17/2011

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP





TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2003.

The test procedure is performed in a 4m × 3m × 2.4m (L×W×H) shielded room.

The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.

The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

TEST RESULTS

Since the EUT is powered by Battery Powered, this test item is not applicable.