SK TECH CO., LTD.

FCC-Certificate of Compliance

Test Report No.:	**SKTTRT-070619-018**		
KOLAS No.:	**KT191**		
Applicant:	**G.I.T Co., Ltd.**		
Applicant Address:	GIT BLDG., 38-5 Garakbon-Dong, Songpa-Gu, Seoul, 138-801 Korea		
Manufacturer:	**G.I.T Co., Ltd.**		
Manufacturer Address:	GIT BLDG., 38-5 Garakbon-Dong, Songpa-Gu, Seoul, 138-801 Korea		
Device Under Test:	**TPMS Module**		
FCC ID:	**TMGG1TDDMN001**	**Model No.:**	**GDS TPMS Module**
Buyer Model Name:	TPMS Exciter, GIT TPMS Module, TPMS PC Interface Module, RF/LF Converter, RF Converter, LF Converter		
Receipt No.:	SKTEU07-0367	**Date of receipt:**	Apr. 30. 2007
Date of Issue:	June 19, 2007		
Location of Testing:	**SK TECH CO., LTD.** 820-2, Wolmoon-Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea		
Test Procedure:	**ANSI C63.4 / 2003**		
Test Specification:	**47CFR, Part 15 Subpart C**		
Equipment Class:	**DCD - Part 15 Low Power Transmitter Below 1705kHz**		
Test Result:	The above-mentioned device has been tested and passed.		

Tested & Reported by: *Seong-Baek, Ko* — *2007. 06. 19* (*Signature* / *Date*)

Approved by: *Jong-Soo, Yoon* — *2007. 06. 19* (*Signature* / *Date*)

Other Aspects:	
Abbreviations:	**· OK, Pass = passed · Fail = failed · N/A = not applicable**

☞
- **This test report is not permitted to copy partly and entirely without our permission.**
- **This test result is dependent on only equipment to be used.**
- **This test result is based on a single evaluation of submitted samples of the above mentioned.**
- **This test report is the accredited testing items by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.**

>> CONTENTS <<

1. GENERAL 3

2. TEST SITE 3

2.1 Location 3

2.2 List of Test and Measurement Instruments 4

2.3 Test Date 4

2.4 Test Environment 4

3. DESCRIPTION OF The EQUIPMENT UNDER TEST 5

3.1 Rating and Physical Characteristics 5

3.2 Equipment Modifications 5

3.3 Submitted Documents 5

4. MEASUREMENT CONDITIONS 6

4.1 Description of test configuration 6

4.2 List of Peripherals 6

4.3 Uncertainty 6

5. TEST AND MEASUREMENTS 7

5.1 ANTENNA REQUIREMENT 7

5.1.1 Regulation 7

5.1.2 Result 7

5.2 RADIATED EMISSIONS(15.209) 8

5.2.1 Regulation 8

5.2.2 Measurement Procedure 8

5.2.3 Calculation of the filed strength limits 9

5.2.4 Test Results 9

Table 1: Measured values of the Field strength (below 30MHz) 10

Table 2: Measured values of the Field strength (above 30MHz) 10

5.3 CONDUCTED EMISSIONS(15.207) 11

5.3.1 Regulation 11

5.3.2 Test Procedure 11

5.3.3 Test Results 12

Table 3: Measured values of the Conducted Emissions 12

Figure 1: Plot of the Conducted Emissions 13

1. GENERAL

These tests were performed using the test procedure outlined in ANSI C63.4, 2003 for intentional radiators, and in accordance with the limits set forth in FCC Part 15.209, 15.207.
The EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards.

We attest to the accuracy of data. All measurements reported herein were performed by SK Tech Co., Ltd. and were made under Chief Engineer's supervision.
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. TEST SITE

SK TECH Co., Ltd.

2.1 Location

820-2, Wolmoon-Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea

This test site is in compliance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories.
This laboratory is recognized as a Conformity Assessment Body(CAB) for CAB's Designation Number: KR0007 by FCC, is accredited by NVLAP for NVLAP Lab. Code: 200220-0, DATech for DAR-Registration No.: DAT-P-076/97-01 and KOLAS for Accreditation No. : KT191.

2.2 List of Test and Measurement Instruments

Description	Manufacturer	Model #	Serial #	
Spectrum Analyzer	Agilent	E4405B	US40520856	
EMC Spectrum Analyzer	Agilent	E7405A	US40240203	☒
EMI Test Receiver	Rohde&Schwarz	ESIB40	100277	☒
EMI Test Receiver	Rohde&Schwarz	ESHS10	835871/002	
EMI Test Receiver	Rohde&Schwarz	ESHS10	862970/019	☒
Artificial Mains Network	Rohde&Schwarz	ESH2-Z5	834549/011	☒
Pre-amplifier	HP	8447F	3113A05153	☒
Pre-amplifier	MITEQ	AFS44	1116321	
Pre-amplifier	MITEQ	AFS44	1116322	
Power Meter	Agilent	E4418B	US39402179	
Power Sensor	HP	8485A	3318A13916	
Oscilloscope	Agilent	54820A	US40240160	
Diode detector	Agilent	8473C	1882A03173	
High Pass Filter	Wainwright	WHKX3.0/18G	8	
Attenuator (10dB)	HP	8491B	38067	☒
VHF Precision Dipole Antenna (TX/RX)	Schwarzbeck	VHAP	1014 / 1015	
UHF Precision Dipole Antenna (TX/RX)	Schwarzbeck	UHAP	989 / 990	
Loop Antenna	Schwarzbeck	HFH2-Z2	863048/019	☒
TRILOG Broadband Antenna	Schwarzbeck	VULB9160	3141	☒
Biconical Antenna	Schwarzbeck	VHA9103	2265	
Log-Periodic Antenna	Schwarzbeck	UHALP9107	1819	
Horn Antenna	AH Systems	SAS-200/571	304	
Horn Antenna	EMCO	3115	00040723	
Horn Antenna	EMCO	3115	00056768	
Vector Signal Generator	Agilent	E4438C	MY42080359	
PSG analog signal generator	Agilent	E8257D-520	MY45141255	
DC Power Supply	HP	6634A	2926A-01078	
DC Power Supply	HP	6622A	3448A03950	
Digital Multimeter	HP	HP3458A	2328A14389	
PCS Interface	HP	83236B	3711J00881	
CDMA Mobile Test Set	HP	8924C	US35360253	
Hygro/Thermo Graph	SATO	PC-5000TRH-II	-	☒
Temperature/Humidity Chamber	All Three	ATH-50M	20030425	

2.3 Test Date

Date of Application : Apr. 30, 2007

Date of Test : May 31, 2007 ~ Jun. 18, 2007

2.4 Test Environment

See each test item's description.

3. DESCRIPTION OF THE EQUIPMENT UNDER TEST

The product specification described herein was obtained from the product data sheet or user's manual.

3.1 Rating and Physical Characteristics

No. Of Unit	One (125 kHz Transmitter & 315 MHz /433.92 MHz Receiver**)
Type / Model No.	TPMS Module/ GDS TPMS Module
Power source	Intentional Li-ion 3.7 V, External AC/DC adaptor and/or 12 V/ 24 V Lead-acid battery
Local Oscillator or X-Tal	X-Tal: 4 MHz, 10.178125 MHz, 13.225625 MHz
Tx / Rx Frequency	125 kHz (Tx), 315/ 433.92 MHz(Rx)
Antenna Type	Loop Coil Antenna (Tx), PCB Pattern Antenna (Rx)
Type of Modulation	FSK (Tx), FSK (Rx)
External Ports	- RS 232C Port for communication with the computer - DC Input Port for battery charging - Manufacturer: SUNNY COMPUTER TECHNOLOGY CO., LTD. - Model Name: STD-1203 - Input: AC 100~240 V, Max. 0.8 A - Output: DC 12 V, 3.0 A

**: The equipment authorization for the two receivers was made under DoC process with separate the report.

3.2 Equipment Modifications

None.

3.3 Submitted Documents

Block diagram

Schematic diagram

Part List

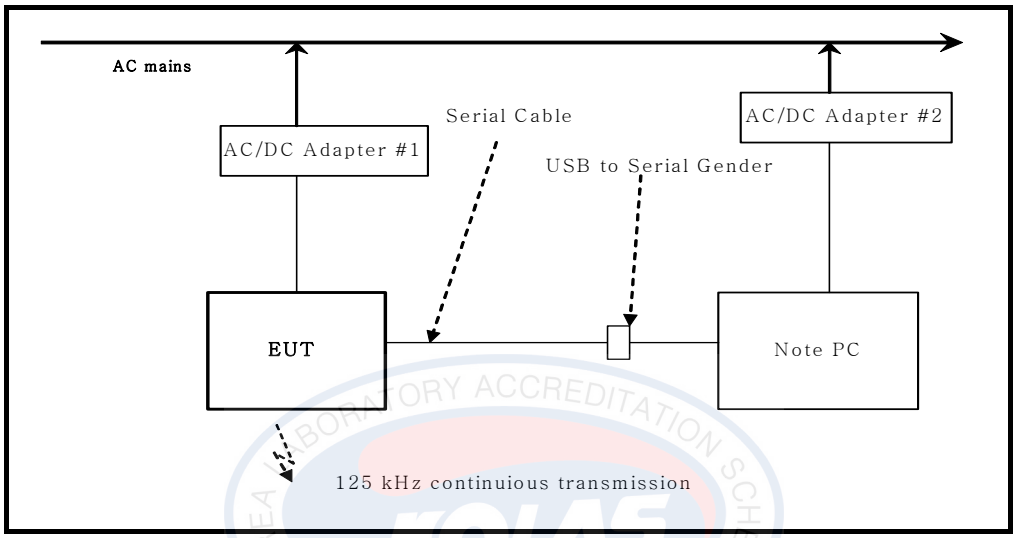
User manual

4. MEASUREMENT CONDITIONS

4.1 Description of test configuration

The measurements were taken in a test mode for RF transmitting continuously.

.



4.2 List of Peripherals

Equipment Type	Manufacture	Model	Cable Description
AC/DC Adapter #1	SUNNY COMPUTER	STD-1203	1.5 m, Unshielded DC Power Cable
Note PC	Panasonic	CF-18	-
AC/DC Adaptor #2	Panasonic	CF-AA1623A M4	1.5 m, Unshielded DC Power Cable
Serial Cable	G.I.T Co., Ltd.	-	6.0 m Shielded Signal Cable
USB to Serial Gender	G.I.T Co., Ltd.	-	0.2 m, Shielded Signal Cable

4.3 Uncertainty

Measurement Item	Combined Standard Uncertainty Uc	Expanded Uncertainty U = KUc (K = 2)
Radiated disturbance	± 2.30 dB	± 4.60 dB
Conducted disturbance	± 1.96 dB	± 3.92 dB

5. TEST AND MEASUREMENTS

Summary of Test Results

Requirement	CFR Section	Report Section	Test Result
Antenna Requirement	15.203	5.1	PASS
Radiated Spurious Emissions	15.209	5.2	PASS
Conducted Emissions	15.207	5.3	PASS

5.1 ANTENNA REQUIREMENT

5.1.1 Regulation

FCC section 15.203, An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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 Part 15C. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31 (d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

5.1.2 Result: PASS

The EUT has an integral loop coil antenna (125 kHz transmitter), and meets the requirements of this section.

5.2 RADIATED EMISSIONS

5.2.1 Regulation

- Emissions below 30 MHz

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

Frequency (MHz)	Field strength	Calculation of Field Strength (uV/m)	Calculation of Field Strength (dBuv/m)
0.009 – 0.490	2400/F(kHz) (uV/m @ 300m)	266.7 – 4.9 (uV/m @ 300m)	48.5 – 13.8 (dBuV/m @ 300m)
0.490 – 1.705	24000/F(kHz) (uV/m @ 30m)	49.0 – 14.1 (uV/m @ 30m)	33.8 – 23.0 (dBuV/m @ 30m)
1.705 – 30.0	30 (uV/m @ 30m)	30 (uV/m @ 30m)	29.5 (dBuV/m @ 30m)

- Emissions above 30 MHz

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in §15.209.

Frequency (MHz)	Field strength (uV/m @ 3m)	Field strength (dBuV/m @ 3m)
30–88	100	40.0
88–216	150	43.5
216–960	200	46.0
Above 960	500	54.0

The emission limits shown in the above table are based on measurement instrumentation employing a CISPR quasi-peak detector. For the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1000 MHz, the radiated emission limits are based on measurements employing an average detector.

5.2.2 Measurement Procedure

For tabletop equipment, the EUT is placed on a 1 × 1.5 meter wide and 0.8 meter high onconductive table that sits on a flush mounted metal turntable. Preview tests are performed to determine the "worst case" mode of operation. With the EUT operating in "worst case" mode, emissions from the unit are maximized by adjusting the polarization and height of the receive antenna and rotating the EUT on the turntable.

The initial step in collecting radiated data is a peak scan of the measurement range with an EMI test receiver under closer distances as given in the rule.

The significant peaks are then measured with the appropriate detectors (QP, AV and PK).

5.2.3 Calculation of the field strength limits

- Emissions below 30 MHz

No special calculation for obtaining the field strength in dBuV/m is necessary, because the EMI receiver and the active loop antenna operate as a system, where the reading gives directly the field strength result (dBuV/m). The gain, antenna factors and cable losses are already taken into consideration.

For test distance other than what is specified, but fulfilling the requirements of section 15.31 (f) (2) the field strength is calculated by adding additionally an extrapolation factor of 40dB/decade (inverse linear distance for field strength measurements).

All following emission measurements were performed using the test receiver's average detector and peak detector function.

The basic equation is as follow ;

FS= RA + DF

Where

FS = Field strength in dBuV/m

RA = Receiver Amplitude in dBuV/m

DF = Distance Extrapolation Factor in dB

Where DF = 20log(Dtest/Dspec) where Dtest = Test Distance and Dspec = Specified Distance

DF = 40log(3m/300m)= - 80 dB (Frequency : 0.009 ~ 0.490 MHz)

DF = 40log(3m/30m)= - 40 dB (Frequency : 0.490 ~ 30 MHz)

5.2.4 Test Results: PASS

Table 1: Measured values of the Field strength (below 30 MHz)				
Frequency (MHz)	Bandwidth (kHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Emissions (Average Detector)				
0.125	0.2	66.86	105.70	38.84
Emissions (Peak Detector)				
0.125	0.2	71.44	125.70	54.26
Emissions (Quasi-peak Detector)				
0.625	9	64.30	71.70	7.40
0.750	9	62.61	70.10	7.49

Margin (dB) = Limit – Reading

Table 2: Measured values of the Field strength (above 30 MHz)										
Frequency [MHz]	RBW [kHz]	POL [V/H]	ANT [m]	Reading [dBuV]	AMP [dB]	AF [dB/m]	CL [dB]	Actual [dBuV/m]	Limit [dBuV/m]	Margin [dB]
100.08	120	H	3.1	57.0	28.0	8.9	1.0	38.9	43.5	4.6*
161.26	120	H	2.0	50.2	27.7	12.8	1.2	36.5	43.5	7.0
243.90	120	H	1.0	40.8	27.4	9.3	1.3	24.0	46.0	22.0
299.91	120	H	1.0	53.7	27.1	12.9	1.7	41.2	46.0	4.8
364.92	120	H	1.0	45.1	27.5	14.1	1.8	33.5	46.0	12.6

Margin (dB) = Limit – Actual
[Actual = Reading – Amp Gain + AF + CL]
1. H = Horizontal, V = Vertical Polarization
2. AF/CL = Antenna Factor and Cable Loss

NOTE:
1. All emissions not reported were more than 20 dB below the specified limit or in the noise floor.

* The measured result is within the test standard limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95 % level of confidence. However, the result indicates that compliance is more probable than non-compliance.

5.3 CONDUCTED EMISSIONS(15.207)

5.3.1 Regulation

According to §15.207(a), 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 50μH/50Ω 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 of emission (MHz)	Conducted limit (dBμV)	
	Qausi-peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50

* Decreases with the logarithm of the frequency.

5.3.2 Test Procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50Ω/50μH LISN, which is an input transducer to a Spectrum Analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.
5. The measurements were made with the detector set to PEAK amplitude within a bandwidth of 10 kHz or to QUASI-PEAK and AVERAGE within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

5.3.3 Test Results: **PASS**

Table 3: Measured values of the Conducted Emissions

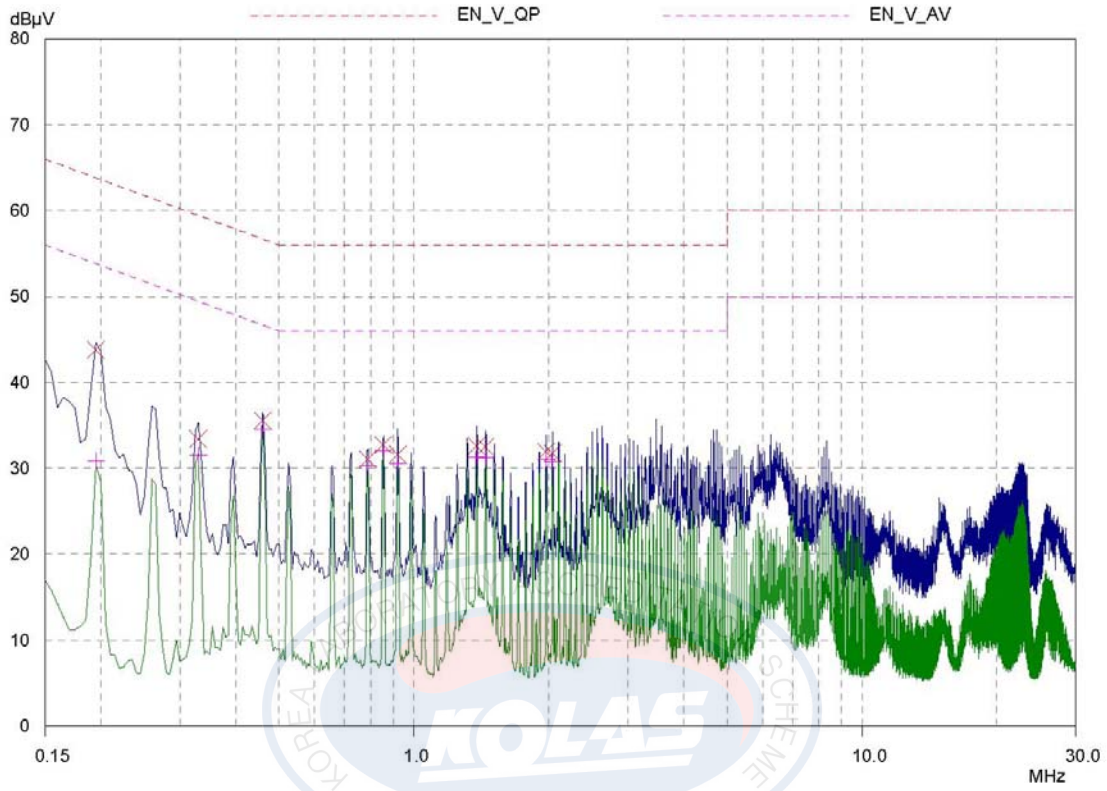
Frequency [MHz]	Reading [dBµV]	L / N	CF [dB]	CL [dB]	Actual [dBµV]	Limit [dBµV]	Margin [dB]
QUASI-PEAK DATA							
0.195	44.09	N	0.12	0.02	44.23	63.82	19.59
0.330	36.07	N	0.12	0.04	36.23	59.45	23.22
0.460	35.82	N	0.12	0.04	35.98	56.69	20.71
0.790	31.04	L	0.14	0.05	31.23	56.00	24.77
0.855	32.74	L	0.14	0.06	32.94	56.00	23.06
0.920	32.39	N	0.13	0.06	32.58	56.00	23.42
1.380	32.62	L	0.15	0.07	32.84	56.00	23.16
1.445	32.52	L	0.15	0.07	32.74	56.00	23.26
1.975	31.93	L	0.15	0.07	32.15	56.00	23.85
2.040	32.4	N	0.15	0.11	32.66	56.00	23.34
AVERAGE DATA							
0.330	32.04	N	0.12	0.04	32.20	49.45	17.25
0.460	34.78	N	0.12	0.04	34.94	46.69	11.75
0.725	29.43	N	0.12	0.05	29.60	46.00	16.40
0.790	30.31	L	0.14	0.05	30.50	46.00	15.50
0.855	32.09	L	0.14	0.06	32.29	46.00	13.71
0.920	31.43	N	0.13	0.06	31.62	46.00	14.38
1.380	31.33	L	0.15	0.07	31.55	46.00	14.45
1.445	31.24	L	0.15	0.07	31.46	46.00	14.54
1.975	31.16	N	0.14	0.07	31.37	46.00	14.63
2.040	31.75	N	0.15	0.11	32.01	46.00	13.99

Margin (dB) = Limit – Actual
[Actual = Reading + CF + CL]
L/N = LINE / NEUTRAL
CF/CL = Correction Factor and Cable Loss

NOTE: The frequency range was scanned from 150 kHz to 30 MHz. All emissions not reported were more than 20 dB below the specified limit.

Figure 1. Plot of the Conducted Emissions

Line - PE



Neutral - PE