RF TEST REPORT

Test Equipment	:	Scan Tool
Model Name	:	G-scan3
FCC ID	:	TMGG1NDDMN002
Date of receipt	:	2017.11.28
Test duration	:	2017.12.06 ~ 2017.12.26
Date of issue	:	2018.03.14

Applicant : G.I.T Co.,Ltd.

87, Macheon-ro, Songpa-gu, Seoul, 05655, Republic of Korea

Test Laboratory : Lab-T, Inc.

2182-42 Baegok-daero, Mohyeon-myeon, Cheoin-gu, Yongin-si
Gyeonggi-do, 17036, Korea

Test specification	:	FCC Part 15 Subpart C 15.205 FCC Part 15 Subpart C 15.209
Test result	:	Pass

The above equipment was tested by Lab-T Testing Laboratory for compliance
with the requirements of FCC Rules and Regulations.
The test results presented in this test report are limited only to the sample supplied by applicant
and the use of this test report is inhibited other than its purpose.
This test report shall not be reproduced except in full, without the written approval of Lab-T, Inc

Tested by:

Engineer
SungSin Kim

Reviewed by:

Technical Manager
SangHoon Yu

CONTENTS

1. Applicant Information

Applicant	:	G.I.T Co.,Ltd.
Address	:	87, Macheon-ro, Songpa-gu, Seoul, 05655, Republic of Korea
Telephone No.	:	+82-2-2189-3353
Person in charge	:	MinKyu Jeon / mkjeon@gitauto.com
Manufacturer	:	G.I.T Co.,Ltd.
Address	:	87, Macheon-ro, Songpa-gu, Seoul, 05655, Republic of Korea

2. Laboratory Information

Test Laboratory	:	Lab-T, Inc.
Address	:	2182-42 Baegok-daero, Mohyeon-myeon, Cheoin-gu, Yongin-si Gyeonggi-do 17036, Korea
Telephone No.	:	+82 31-322-6767
Facsimile No.	:	+82 31-322-6768

Certificate

FCC Designation No.	:	KR0159
FCC Registration No.	:	133186
IC Site Registration No.	:	22000-1

3. Information About Test Equipment

3.1 Equipment Information

Equipment type	Scan Tool
Equipment model name	G-scan3
Equipment add model name	-
Frequency range	2 412 ~ 2 462 MHz 5 180 ~ 5 240 MHz / 5 190 ~ 5 230 MHz 5 745 ~ 5 805 MHz / 5 755 ~ 5 795 MHz 2 402 ~ 2 480 MHz 125 kHz transmitter / 433.92 MHz receiver
Modulation type	CCK, OFDM, GFSK, pi/4-DQPSK, 8DPSK, ASK, FSK
Modulation technology	DSSS(802.11b), OFDM(802.11g/n_HT20/ n_HT40)[Note2], F1D, G1D
Power supply	DC 3.7 V
H/W version	V1.0
S/W version	V1.0

Note1: The above EUT information was declared by the manufacturer.
Note2 : 802.11n_HT40 operate only at 5GHz.

3.2 Antenna Information

Antenna	Type	Loop Coil Antenna
	Gain	-

3.3 Test Frequency

Test mode	Test frequency (MHz)		
	Lowest frequency	Middle frequency	Highest frequency
125 kHz	-	0.125	-

3.4 Tested Companion Device Information

Type	Manufacturer	Model	Note
-	-	-	-

4. Test Report

4.1 Summary

FCC Part 15			
Reference	Parameter	Clause	Status
Transmitter Requirements			
15.203 15.247(b)(4)	Antenna Requirement	5.3.2	C
15.205(a) 15.209(a)	Spurious Emission, Band Edge and Restricted bands	5.3.8	C
15.207(a)	Conducted Emissions	5.3.9	C
NOTE 1 : C = Comply N/C = Not Comply N/T = Not Tested N/A = Not Applicable			

* The general test methods used to test this device is ANSI C63.10:2013

4.2 Measurement Uncertainty

Mesurement items	Expanded Uncertainty
Radiated Spurious Emissions (1 GHz under)	4.56 dB (The confidence level is about 95 %, *k*=2)
Conducted emission	4.08 dB (The confidence level is about 95 %, *k*=2)

4.3 Test Report Version

Test Report No.	Date	Description
TRRFCC18-0008	18.03.14	Initial issue

4.4 Transmitter Requirements

4.4.1 Antenna Requirement

4.4.1.1 Regulation

Accoding to §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 this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

4.4.1.2 Result

Comply
(The transmitter has a Internal Loop coil antenna and meets the requirements.)

4.4.2 Spurious Emission, Band Edge, and Restricted bands

4.4.2.1 Regulation

According to §15.209(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall notexceed the field strength levels specified in the following table:

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 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shallnot 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., §§15.231 and 15.241.

According to §15.205(a) and (b), only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.009 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.694 75 - 16.695 25	608 - 614	5.35 - 5.46
2.173 5 - 2.190 5	16.804 25 - 16.804 75	960 – 1 240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1 300 – 1 427	8.025 - 8.5
4.177 25 - 4.177 75	37.5 - 38.25	1 435 – 1 626.5	9.0 - 9.2
4.207 25 - 4.207 75	73 - 74.6	1 645.5 – 1 646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1 660 – 1 710	10.6 - 12.7
6.267 75 - 6.268 25	108 - 121.94	1 718.8 – 1 722.2	13.25 - 13.4
6.311 75 - 6.312 25	123 - 138	2 200 – 2 300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2 310 – 2 390	15.35 - 16.2
8.362 - 8.366	156.524 75 - 156.525 25	2 483.5 – 2 500	17.7 - 21.4
8.376 25 - 8.386 75	156.7 - 156.9	2 690 – 2 900	22.01 - 23.12
8.414 25 - 8.414 75	162.012 5 - 167.17	3 260 – 3 267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3 332 – 3 339	31.2 - 31.8
12.519 75 - 12.520 25	240 - 285	3 345.8 – 3 358	36.43 - 36.5
12.576 75 - 12.577 25	322 - 335.4	3 600 – 4 400	Above 38.6
13.36 - 13.41			

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurement

4.4.2.2 Measurement Procedure

Radiated Spurious Emissions

1) The preliminary and final rdiated measurements were performed to determine the frequency producing the maximum emissions in at a 10m anechoic chamber. The EUT was tested at a distance 3 meters.
2) The EUT was placed on the top of the 0.8 m height or 1.5 m height non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360°.
3) The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 9 kHz to 30 MHz using the loop antenna, and from 30 to 1 000 MHz using the TRILOG broadband antenna.
4) Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.

NOTE1 : 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 1 GHz.

4.4.2.3 Result

Comply (measurement data : refer to the next page)

4.4.2.4 Measurement data

Test mode : Below 30 MHz

Frequency (MHz)	Detector	Pol. (V/H)	Reading (dBµV)	Ant Factor (dB)	Loss (dB)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
0.125	QP	H	8.40	11.60	0.10	20.10	105.70	85.60
24.800	QP	H	6.40	8.40	0.60	15.40	69.50	54.10
0.125	QP	V	6.10	11.60	0.10	17.80	105.70	87.90
12.888	QP	V	18.20	10.30	0.50	29.00	69.50	40.50

Note 1 : Loss : Cable loss - Amp gain
Note 2 : Result : Reading + Ant Factor + Loss

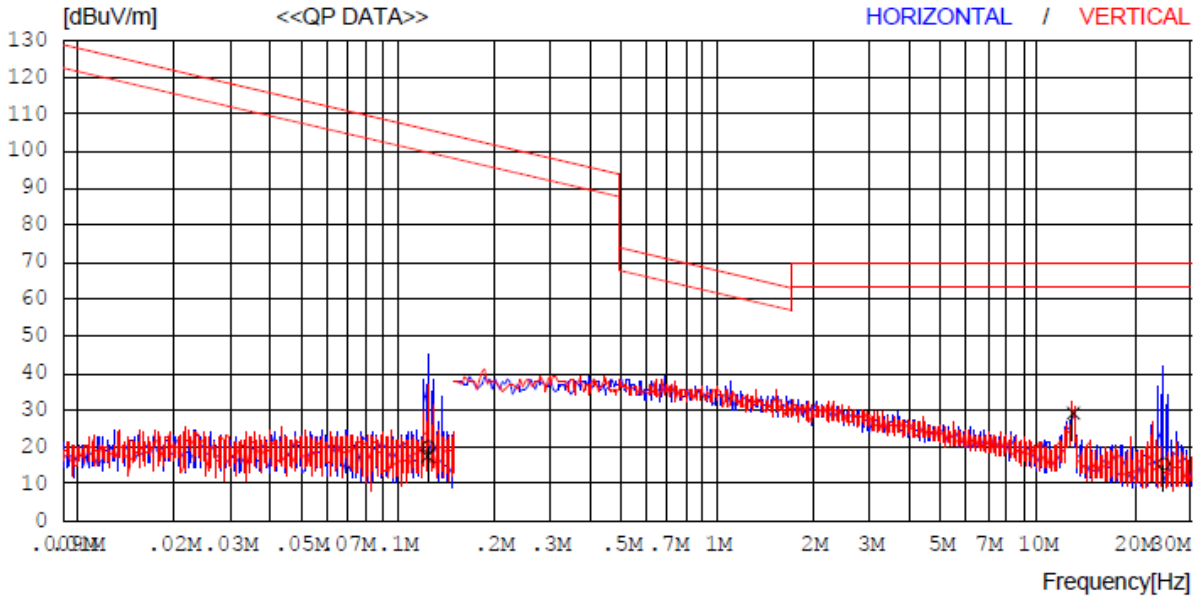
Test mode : 30 MHz ~ 1 GHz

Frequency (MHz)	Detector	Pol. (V/H)	Reading (dBµV)	Ant Factor (dB)	Loss (dB)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
279.284	QP	H	40.20	12.70	-21.10	31.80	46.00	14.20
864.143	QP	H	29.70	23.50	-19.10	34.10	46.00	11.90
440.420	QP	V	35.40	16.70	-20.60	31.50	46.00	14.50
910.107	QP	V	30.60	23.90	-18.50	36.00	46.00	10.00

Note 1 : Loss : Cable loss - Amp gain
Note 2 : Result : Reading + Ant Factor + Loss

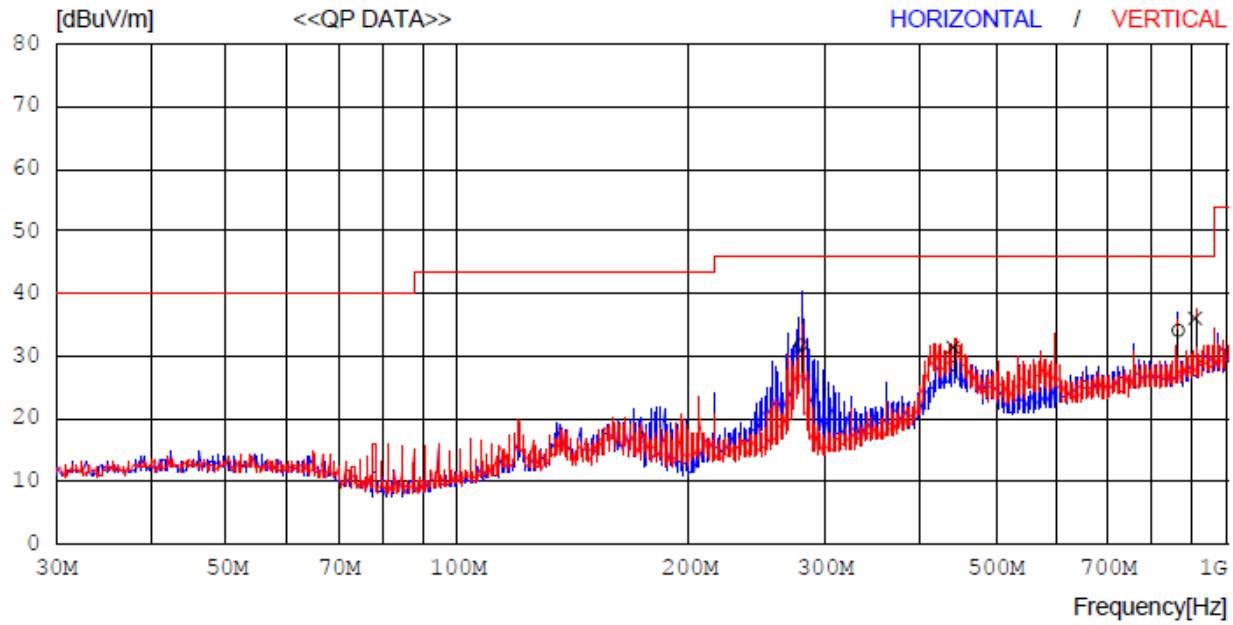
4.4.2.5 Measurement Plot

Test mode : 9 kHz ~ 30 MHz



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	0.125	8.4	11.6	0.1	0.0	20.1	105.7	85.6	100	293
2	24.800	6.4	8.4	0.6	0.0	15.4	69.5	54.1	100	9
----- Vertical ------										
3	0.125	6.1	11.6	0.1	0.0	17.8	105.7	87.9	100	249
4	12.888	18.2	10.3	0.5	0.0	29.0	69.5	40.5	100	311

Test mode : 30 MHz ~ 1 GHz



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	279.284	40.2	12.7	-21.1	0.0	31.8	46.0	14.2	100	194
2	864.143	29.7	23.5	-19.1	0.0	34.1	46.0	11.9	100	204
----- Vertical ------										
3	440.420	35.4	16.7	-20.6	0.0	31.5	46.0	14.5	100	359
4	910.107	30.6	23.9	-18.5	0.0	36.0	46.0	10.0	100	359

4.4.3 Conducted Emission

4.4.3.1 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 50 μH/50 Ω 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.

According to §15.107(a), for unintentional device, except for Class A digital devices, line conducted emission limits are the same as the above table.

4.4.3.2 Measurement 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 1.5 m away from the side wall of the shielded room.

2) Each current-carrying conductor of the EUT power cord was individually connected through a 50 Ω/50 μH 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.

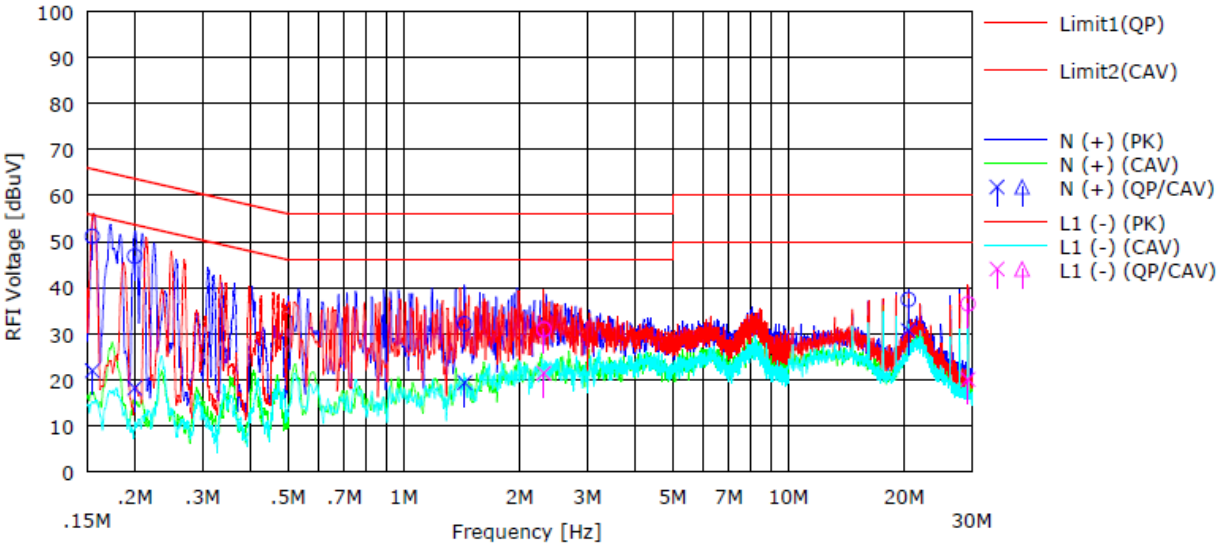
5) The measurements were made with the detector set to PEAK amplitude within a bandwidth of 10 kHz or to QUASIPEAK and AVERAGE within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

4.4.3.3 Result

Comply (measurement data : refer to the next page)

4.4.3.4 Measurement Plot

Test mode : worst case of all modulation.(WLAN2.4 GHz_802.11n_HT20_2 462 MHz)



NO	FREQ	READING QP	READING CAV	C.FACTOR	RESULT QP	RESULT CAV	LIMIT QP	LIMIT CAV	MARGIN QP	MARGIN CAV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15480	31.2	2.1	19.9	51.1	22.0	65.7	55.7	14.6	33.7	N (+)
2	0.19953	26.8	-1.8	20.0	46.8	18.2	63.6	53.6	16.8	35.4	N (+)
3	1.43900	12.3	-0.4	19.8	32.1	19.4	56.0	46.0	23.9	26.6	N (+)
4	20.50258	17.2	10.5	20.2	37.4	30.7	60.0	50.0	22.6	19.3	N (+)
5	2.31298	11.1	1.6	19.8	30.9	21.4	56.0	46.0	25.1	24.6	L1 (-)
6	29.34005	16.4	0.0	20.1	36.5	20.1	60.0	50.0	23.5	29.9	L1 (-)

APPENDIX I

TEST EQUIPMENT USED FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment.

Equipment	Manufacturer	Model	Serial No.	Cal. Date (yy.mm.dd)	Next Cal.Date (yy.mm.dd)
EMI Test Receiver	ROHDE&SCHWARZ	ESU40	100445	2017-12-15	2018-12-15
BiLog Antenna	Schwarzbeck	VULB9160	9160-3381	2017-06-15	2019-06-15
Preamplifier	TSJ	MLA-10k01-b01-27	1870369	2018-01-15	2019-01-15
Antenna Mast(10 m)	TOKIN	5977	-	-	-
Antenna Mast(10 m)	Innco	MA4640-XPET-0800	578	-	-
Controller(10 m)	TOKIN	5909L	141909L-1	-	-
Controller(10 m)	Innco	CO3000	40040217	-	-
Turn Table(10 m)	TOKIN	5983-1.5	-	-	-
10 m Semi-Anechoic Chamber	SY CORPORATION	-	-	-	-
Active Loop H-Field	ETS	6502	00150598	2017-06-01	2019-06-01
EMI Test Receiver	ROHDE&SCHWARZ	ESR7	101440	2017-12-15	2018-12-15
LISN	ROHDE&SCHWARZ	ENV216	101883	2017-04-24	2018-04-24
Pulse Limiter	Schwarzbeck	VTSD 9561-F	9561-F189	2017-04-24	2018-04-24