



TECHNICAL COMPLIANCE STATEMENT

For the

Product : GIS-PAMSC3
Model : SCOPE2.0 Plus
FCC ID : A3LGIS-PAMSC3
Multiple Model : N/A
Applicant : SAMSUNG Electronics
FCC Rule : CFR 47 Part 15 Subpart B

We hereby certify that the above product has been tested by us with the listed rules and found in compliance with the regulation. The test data and results are issued on the test report no. **TR-W1704-017**

Signature

A handwritten signature in black ink, appearing to read "Kim, Dong-Wan".

Kim, Dong-Wan / Technical Manager

Date: 2017-04-12

Test Laboratory: ENG Co., Ltd.

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Report No.: TR-W1704-017

ENG Co., Ltd. 135-60 Gyeongchung-daero, Gonjam-eup, Gwangju-si, Gyeonggi-do, Korea 464-942

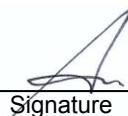
Report Form_02 (Rev.0)

FC TEST REPORT

Project Number : EA1701Q-114
Test Report Number : TR-W1704-017
Type of Equipment : GIS-PAMSC3
Model Name : SCOPE2.0 Plus
FCC ID : A3LGIS-PAMSC3
Multiple Model Name : N/A
Kind of Authorization : Declaration of Conformity
Applicant : SAMSUNG Electronics
Address : 14F Yeoksam823 Bldg., 70, Nonhyeon-ro 85gil,
 Gangnam-gu, Seoul, 06234, Korea
Manufacturer : SAMSUNG Electronics
Address : 14F Yeoksam823 Bldg., 70, Nonhyeon-ro 85gil,
 Gangnam-gu, Seoul, 06234, Korea
FCC Rule : FCC CFR 47 Part 15 Subpart B Class B
Total page of Report : 25 pages
Date of Receipt : 2017-01-31
Date of Issue : 2017-04-12
Test Result : PASS

This test report only contains the result of a single test of the sample supplied for the examination.
 It is not a generally valid assessment of the features of the respective products of the mass-production.

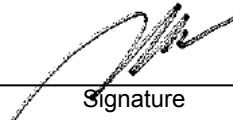
Prepared by Ha, Sang-hoon / Senior Engineer



Signature

2017-04-12
Date

Reviewed by Kim, Dong-Wan / Technical Manager



Signature

2017-04-12
Date

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Release Control Record

Issue Report No.	Issued Date	Revisions	Effect Section
TR-W1704-017	2017-04-12	Initial Release	All

1. TEST SUMMARY

1.1 Test standards and results

The EUT (Equipment Under Test) has been tested according to the following specifications:

Equipment Authorization Procedure		Declaration of Conformity
Type of Device		Class B Personal computers and peripherals
APPLICABLE SECTION	TEST DESCRIPTION	RESULTS
Part 15 Subpart B Section 15.107 (a)	AC Power Line Conducted Emission	Not applicable. (See Note)
Part 15 Subpart B Section 15.109 (a)	Radiated Emission	PASS

NOTE: The Equipment Under Test is operated by DC 24 V, so the test was not performed.

1.2. Test Methodology

FCC: ANSI C 63.4: 2014, FCC CFR 47 Part 2, and Part 15

1.3 Purpose of the test

To determine whether the equipment under test fulfills the FCC Rules, Regulation and standards stated in section 1.1 and 1.2.

1.3 Test Facility

The measurement facilities are located at 135-60 Gyeongchung-daero, Gonjam-eup, Gwangju-si, Gyeonggi-do 12813, Korea. Description details of test facilities were submitted to the FCC and IC, designated by the RRA (Radio Research Agency) and accredited by KOLAS (Korea Laboratory Accreditation Scheme) in Korea and approved by TUV Rheinland and TUV SÜD according to the requirement of ISO 17025.

Laboratory Qualification	Registration No.	Mark
FCC	KR0160	
Industry Canada (IC)	IC 12721A-1	
RRA	KR0160	
TUV Rheinland	UA 50314109-0002	
TUV SÜD	CARAT 15 12 94465 002	
Korean Agency for Technology and Standards	KT733	

2. EUT (Equipment Under Test) Description

The SAMSUNG Electronics, Model SCOPE2.0 Plus (referred to as the EUT in this report) is a GIS-PAMSC3. The product specification described herein was obtained from product data sheet or user's manual.

Description of equipment	GIS-PAMSC3
Model Name	SCOPE2.0 Plus
Factory Name	MVTECH Co., Ltd.
Serial Number	N/A
Factory Name	SAMSUNG Electronics
CPU	Freescale-i.MX6Q CPU(Quad)
Operating Frequency used in the EUT	Less than 1 GHz
ETHERNET	10 / 100 Mbps LAN
SERIAL	USB to SERIAL Debug port
USB	USB 2.0 Client Debug port
WIFI	802.11 abgn
ADC BOARD I/F	8 bit Bus, 5 V, 3.3 V, 24 V supply
INDICATOR	3COLOR x2
Digital I/F	RS-232 x 4
CONFIG SWITCH	TACT SWITCH x 1
FPGA I/F	8 bit Bus
FPGA PROGRAMMING	S PI 20MHz 1CH
SUPPLY POWER	24 V (21.6 V~26.4 V)
Size	100 x 60 x 40 (mm)

2.1 Additional Model

None

2.2 Mode of operation during the test

For finding worse case configuration and operating mode, the EUT was operated as following test mode.

Test Mode	Description
#1	The vibration sensor was connected to the EUT and sensor information was transferred to the Notebook PC via Ethernet and serial port of the EUT was connected to a Notebook PC and then continuously communicated with a Notebook PC using software provided by an applicant.

2.3 Description of supported units

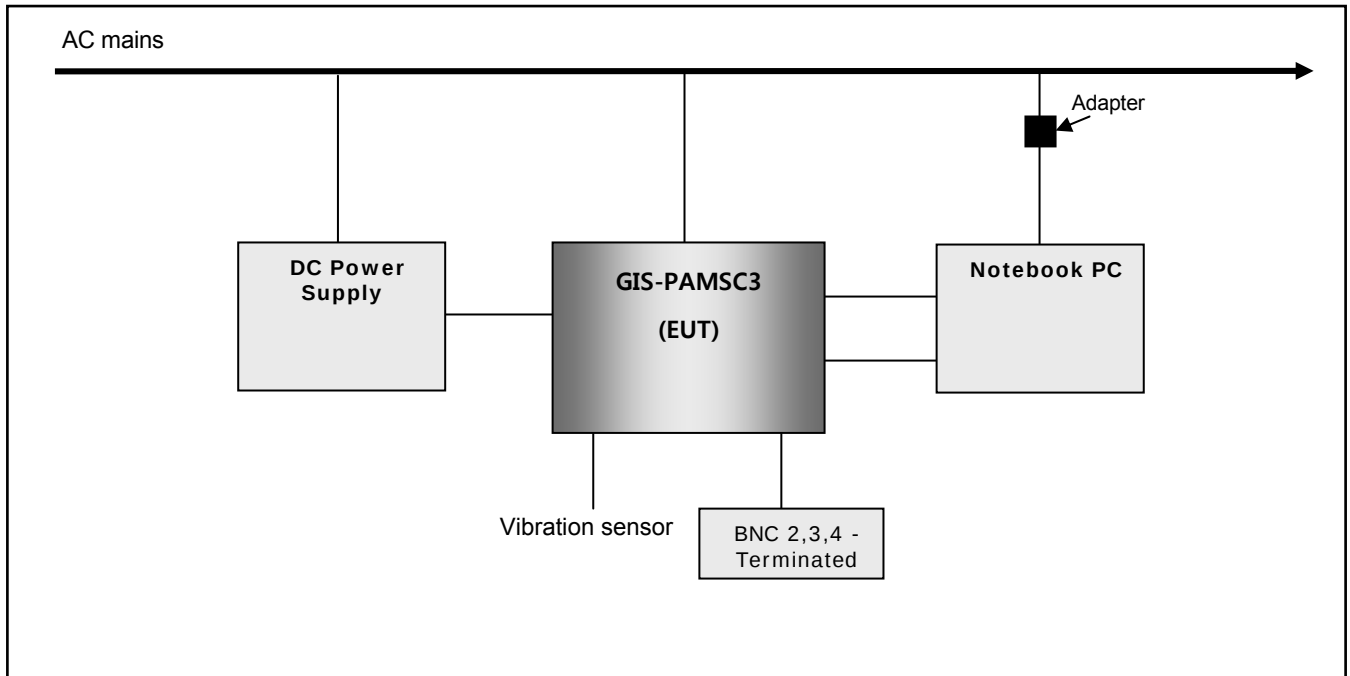
The following peripheral devices and/or interface cables were connected during the measurement:

Description	Model No.	Serial No.	Manufacturer.
GIS-PAMSC3 (EUT)	SCOPE2.0 Plus	N/A	SAMSUNG Electronics
Vibration Sensor	607 A11	LW206955	IMI
Notebook PC	LG15U34	411NZLL052440	LG Electronics Inc.
Adapter for Notebook PC	ADS-40MSG-19	N/A	Shenzhen Honor Electronic Co., Ltd.

2.4 Cable Description

Ports Name	Shielded (Y/N)	Ferrite Bead (Y/N)	Length (m)	Connected to
LAN	Y	N	1.5	Notebook PC
IO	Y	N	4.5	Notebook PC
BNC 1	Y	N	3.5	Vibration sensor
BNC 2,3,4	Y	N	3.5	Terminated
DC IN	N	N	0.5	DC Power Supply

2.5 Test Setup Drawing



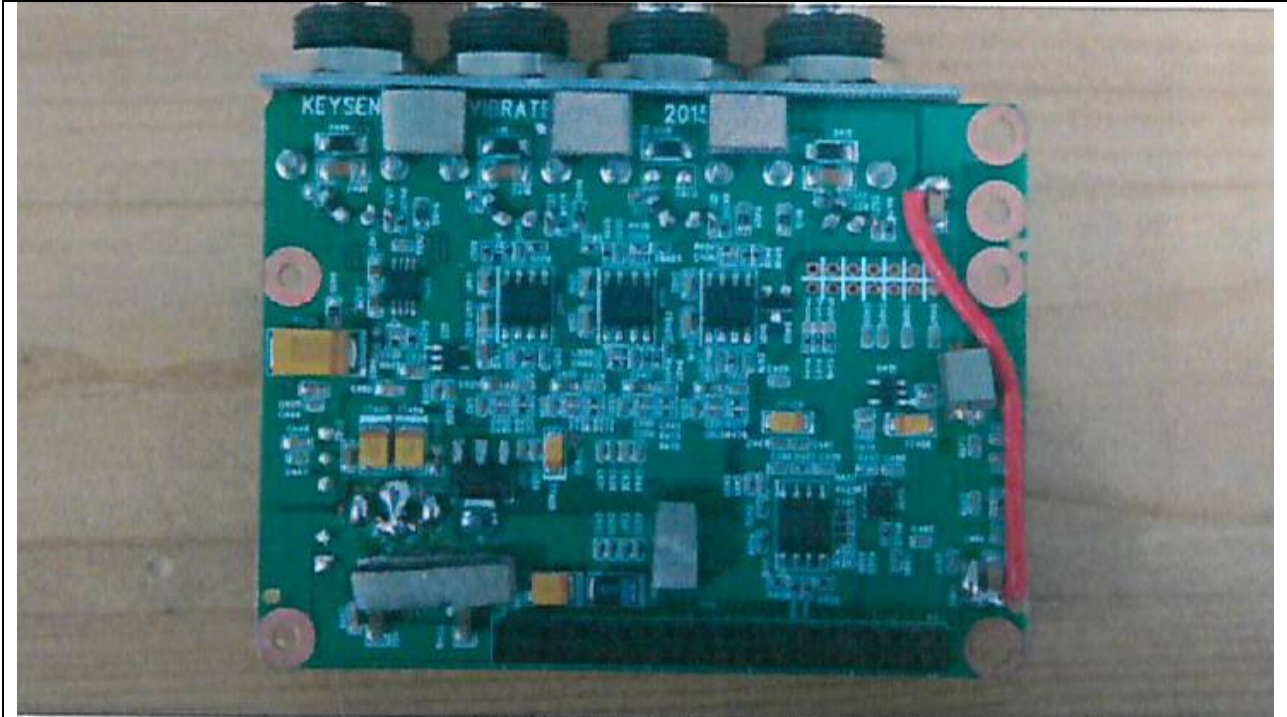
3. EUT Modifications

Following modifications were implemented on the EUT for fixing the problem caused by EMC testing and the product will have all of the modifications incorporated into the product when manufactured and placed on the market.

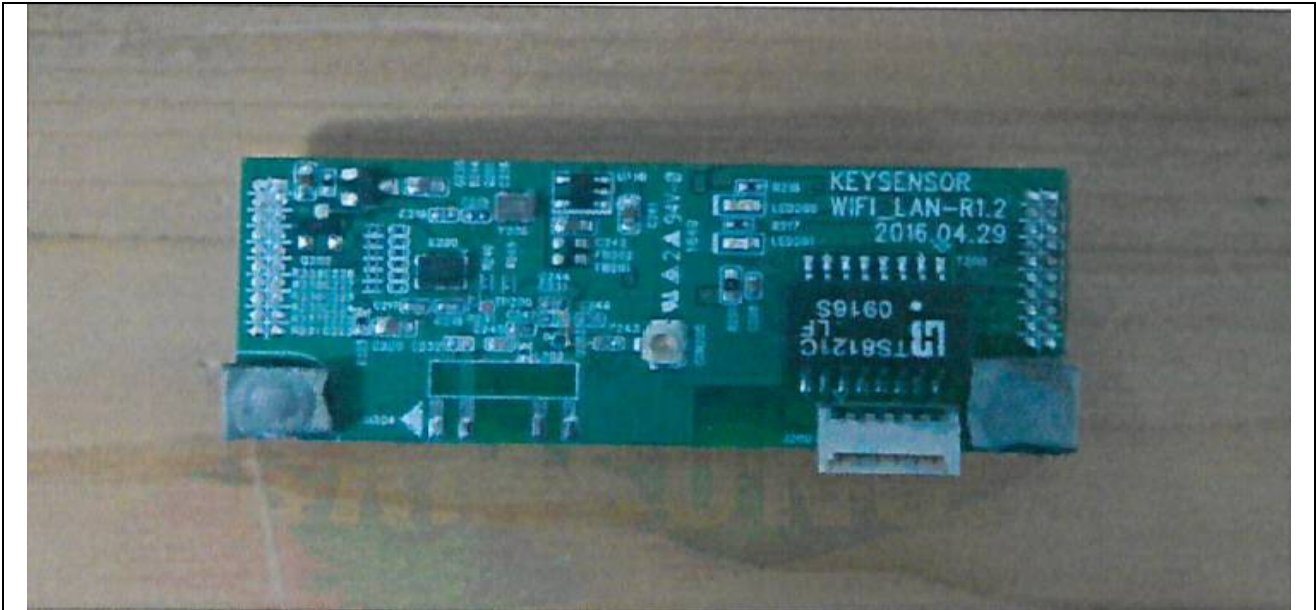
- 1) 1. C228, C461 : NC/1608
2. R10, R15, R17, R20 : NC/10k/1005
3. R13 : NC/0R/1005
4. R24, R25 : NC/10M
5. R78, R88 : NC/F10K
6. R104 : NC/0603
7. R553, R556 : NC
8. U10 : NC/FDC6321C
9. Y2 : NC/32, 768kHz
10. Add gasket to the bottom of PCB
11. J2 18, 19, 20 : NC -> Changed to Ground pattern
12. C487, C488, C489, C490, C491, C492, C493, C494 : 20Pf / 1005



- 2) 1. R447 : NC/1k/1005
2. R464, R465 : NC/1005
3. Add port input, add gasket to the bottom of PCB
4. U411 : IL1117-5.0 -> IL1117-2.5 Changed
5. Add R499, R501, R502, R503 : 33R/1005
6. R420, R422, R423, R428, R429, R430 : 22R/1005 -> 33R/1005 Changed
7. Connect FGND1 and FGND2
8. J400 17, 19, 20 : NC -> GND Changed



- 3)** 1. C219, C231 : NC
 2. C222, C224, C225, C226, C227 : NC/30pF/0603
 3. C223 : NC/22pF/0603
 4. L201 : NC
 5. Add gasket to the bottom of PCB
 6. Changed capacitor value from 12pF to 10 pF at C217, C218
 7. U204 : deleted



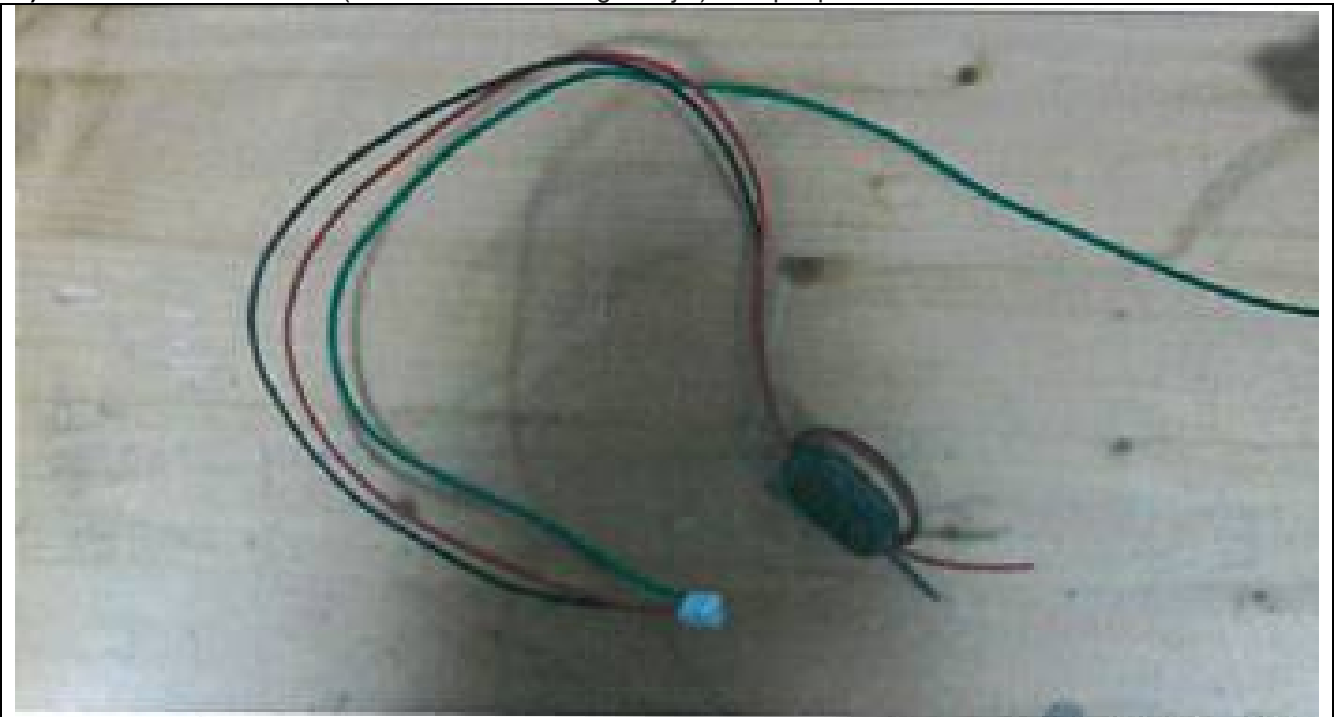
- 4)** 1. Added a Ferrite core (Model: EMI1330B / Mfg: Taejin) on the both end of a LAN cable.
 2. Added copper tape at the end of LAN cable



5) 1. Added copper tape at the both end of IO cable and on RS232c to USB converter.



6) 11. Added a Ferrite core (Model: EMI5730 / Mfg: Taejin) on input power cable



4. EMISSION TESTS

4.1 RADIATED EMISSION

4.1.1 Test setup

The radiated emissions measurements were in the 3/10 m, Semi Anechoic Chamber. The EUT and all local supporting equipments were placed on a non-conductive table approximately 0.8 m above the ground plane.

The frequency spectrum from 30 MHz to the maximum frequency as specified in CFR 47 Part 15 section 15.33 was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

Preliminary radiated emission test was conducted using the procedure in ANSI C63.4: 2014 8.3.1.1 below 1 000 MHz, 8.3.1.2 above 1 GHz to determine the worse operating conditions

Measurement distance between the EUT and an antenna was 3 m..

The test set-up photos are included in appendix I.

Used Software for measurement is manufactured by TSJ.

4.1.2 Measurement frequency range

Highest frequency generated or used in the device or on which the device operates or tunes	Upper Frequency of Measurement range (MHz)
Below 1.705 MHz	30
(1.705 ~ 108) MHz	1 000
(108 ~ 500) MHz	2 000
(500 ~ 1 000) MHz	5 000
Above 1 000 MHz	5th harmonic of the highest freq. or 40 GHz, whichever is lower

The measurement uncertainties are given with 95 % confidence.

4.1.3 Measurement uncertainty

Frequency range	Val. acc. CISPR 16-4-2
Below 1 000 MHz	± 4.66 dB
Above 1 000 MHz	± 4.75 dB

The measurement uncertainties are given with 95 % confidence.

4.1.4 Test result

Date of Test	2017-03-11			
Temperature	22.3 °C	Relative humidity	27.1 % R.H.	
Operating Input Voltage	120 Vac	Input Frequency	60 Hz	
Frequency range	Resolution Bandwidth	Video Bandwidth	Detector Mode	Measurement distance
Below 1 000 MHz	100 kHz or 120 kHz	300 kHz	Peak or Q.P.	3 m
Above 1 000 MHz	1 MHz	1 MHz or 10 Hz	Peak or Average	3 m
Test Mode	Mode #1			
Test Result	Pass	Tested By	Shin, Jae-young 	

4.1.5 Sample Calculated Example

At 80 MHz

Limit = 40.0 dBuV/m

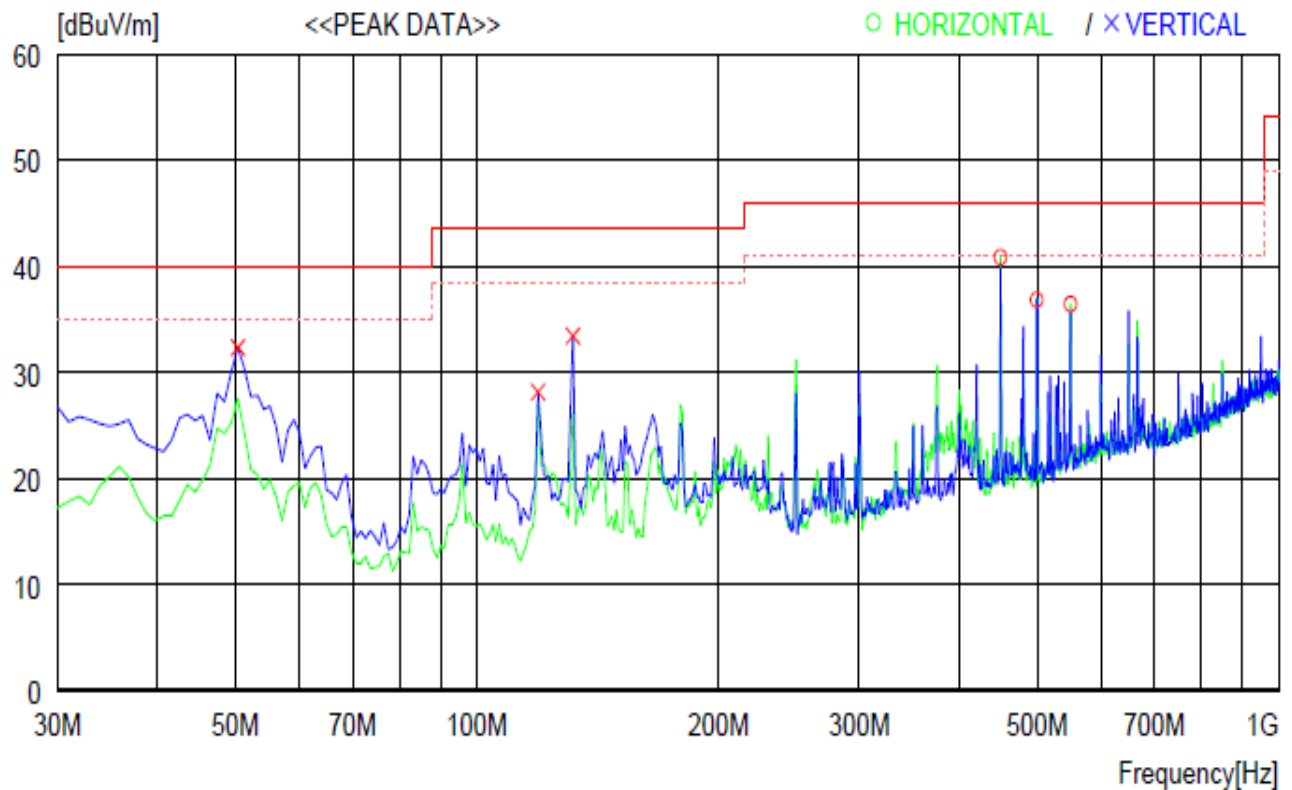
Result = Receiver reading value + Antenna Factor + Cable Loss - Pre-amplifier gain = 30 dBuV/m

Margin = Limit - Result = 40 - 30 = 10

so the EUT has 10.0 dB margin at 80 MHz

4.1.6 Test Data

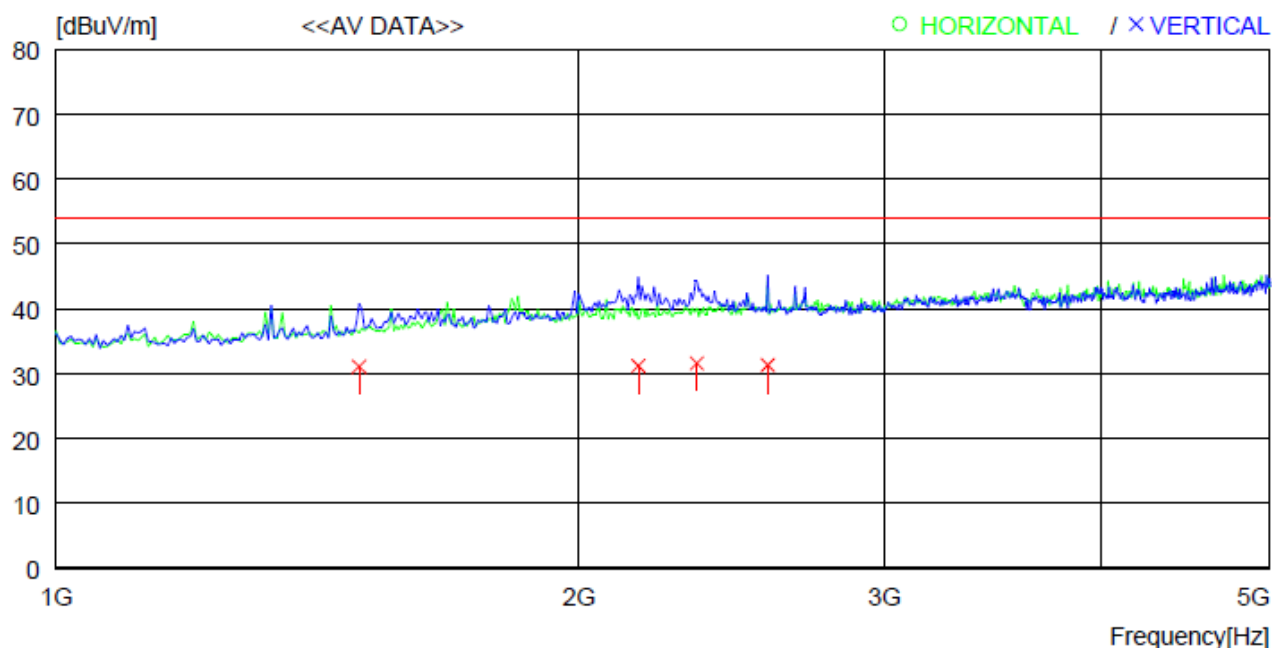
Graphical Test Data for Radiated Emission_30 MHz – 1 GHz



Tabulated Test Data

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
---- Horizontal ----										
1	450.011	47.6	16.6	9.4	32.8	40.8	46.0	5.2	200	142
2	499.481	42.7	17.4	9.6	32.9	36.8	46.0	9.2	200	120
3	549.919	40.9	18.5	9.9	32.9	36.4	46.0	9.6	200	142
---- Vertical ----										
4	50.370	45.2	12.9	6.9	32.7	32.3	40.0	7.7	100	295
5	119.240	44.3	9.0	7.5	32.7	28.1	43.5	15.4	100	48
6	131.850	50.3	8.2	7.6	32.7	33.4	43.5	10.1	100	55

Graphical Test Data for Radiated Emission_ Above 1 000 MHz (Average)



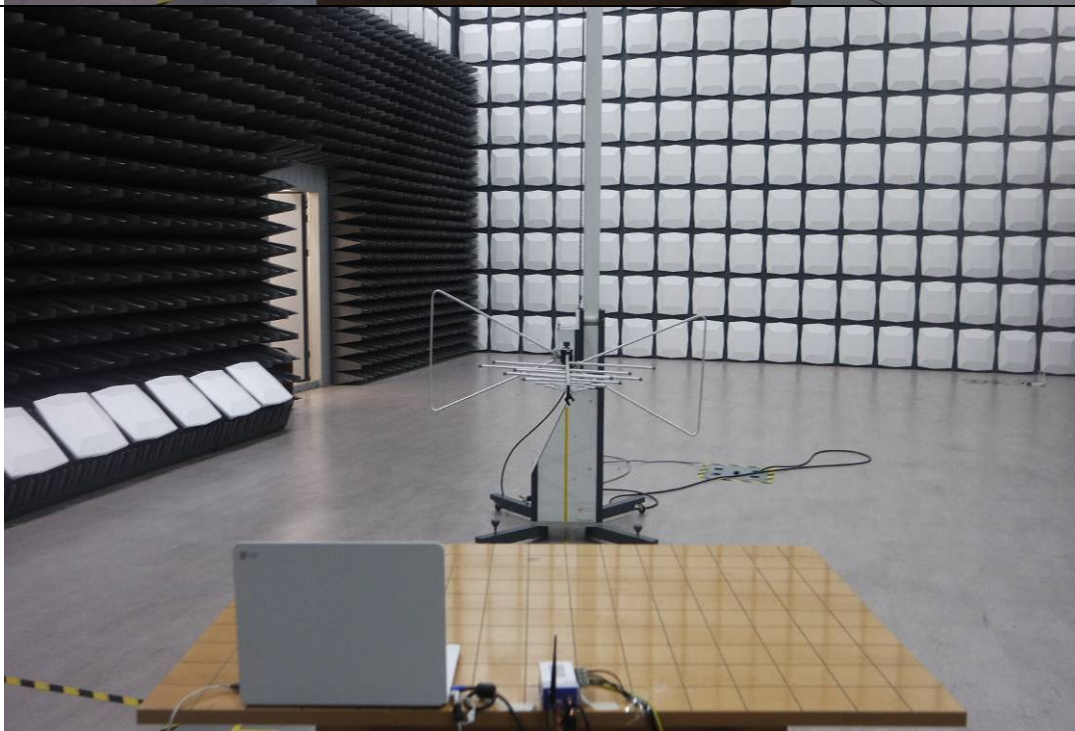
Tabulated Test Data

No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	AV	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
		[dBuV]	[dB]							
----- Vertical -----										
1	1495.000	33.4	25.9	5.4	33.6	31.1	54.0	22.9	100	359
2	2165.000	29.7	28.2	6.5	33.2	31.2	54.0	22.8	100	359
3	2340.000	29.2	28.7	6.9	33.2	31.6	54.0	22.4	100	169
4	2570.000	28.0	29.3	7.2	33.2	31.3	54.0	22.7	100	359

NOTE: 5 GHz to 30 GHz band was measured but no noise component was detected

Appendix I - Test Setup Photos: Radiated Emission Test

Test Setup for 30 MHz – 1 GHz



Test Setup for 1 GHz – 6 GHz



Appendix II - Test Instrumentation

Name of Equipment	Model Number	Manufacturer	Serial Number	Last Cal.(Interval)	USE
EMI Test Receiver	ESCI 7	Rohde & Schwarz	100722	2017-01-19(1Y)	☐
LISN	ENV4200	Rohde & Schwarz	100203	2017-01-19(1Y)	☐
LISN	ENV216	Rohde & Schwarz	100110	2016-07-29(1Y)	☐
LISN	LS16C	AFJ	16011403310	2016-07-29(1Y)	☐
Loop Antenna	HFH2-Z2	Rohde & Schwarz	100341	2015-06-04(2Y)	☐
8-Wire ISN CAT 3	CAT3 8158	Schwarzbeck	CAT3 8158 #70	2017-01-24(1Y)	☐
8-Wire ISN CAT 5	CAT5 8158	Schwarzbeck	CAT5 8158 #126	2017-01-24(1Y)	☐
8-Wire ISN CAT 6	NTFM 8158	Schwarzbeck	NTFM 8158 #95	2017-01-24(1Y)	☐
Test Receiver	ESU	Rohde & Schwarz	100303	2017-01-19(1Y)	☒
TRILog Broadband Antenna	VULB9163	Schwarzbeck	9163-770	2017-02-13(2Y)	☒
DOPPEL STEG HORN Antenna	HF 907	Rohde & Schwarz	102426	2017-01-06(2Y)	☒
Preamp (1-26.5) GHz	8449B	HP	3008A00175	2017-03-08(1Y)	☒
Preamp (30-1000) MHz	310N	Sonoma Instrument	344015	2017-01-19(1Y)	☒
Attenuators	6 dB	Rohde & Schwarz	272.4110.50	2017-01-19(1Y)	☒
Antenna Master	MA4000-EP	INNCO SYSTEM	4600814	N/A	☒
Turn Table	DT3000-3t	INNCO SYSTEM	1310814	N/A	☒
CO3000 Controller	CO3000-4PORT	INNCO SYSTEM	CO3000/806/34130814/L	N/A	☒
Digital Power Analyzer For Harmonic & Flicker	DPA 500	EM Test	V0713102356	2017-01-20(1Y)	☐
AC Power Source	ACS 500	EM Test	V0713102357	N/A	☐

The above measuring equipments have been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

APPENDIX III - IDENTIFICATION LABEL

PROPOSED FCC LABEL (Part 15 sec. 15.19(b))

The label should include the FCC logo along with the Trade Name and Model Number, which satisfies the unique identifier requirement of Section 2.1074 if it represents the identical equipment tested for DoC compliance and a statement

When the device is so small and/or when it is not practical to place the required additional text on the device, the text may be placed in the user manual or pamphlet supplied to the user. However, the FCC logo, Trade Name, and Model Number must still be displayed on the device (Section 15.19(b) (3)).

Model name: SCOPE2.0 Plus	
SAMSUNG Electronics	
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operations.	
Made in Korea	

APPENDIX IV - PHOTOGRAPHS REPORT

