



TECHNICAL COMPLIANCE STATEMENT

For the

Product : SCOPE2.0 Plus
Model : GIS-PAMSC3
FCC ID : 2AN5BGIS-PAMSC3
Multiple Model : N/A
Applicant : SEMES CO., LTD.
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-W1711-021

Signature

A handwritten signature in black ink, appearing to read 'Choi, Young-min', written over a horizontal line.

Choi, Young-min / Technical Manager

Date: 2017-11-27

Test Laboratory: ENG Co., Ltd.

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Report No.: TR-W1711-021



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

Report Form_02 (Rev.0)

FCC TEST REPORT

Project Number : EA1710C-008
Test Report Number : TR-W1711-021
Type of Equipment : SCOPE2.0 Plus
Model Name : GIS-PAMSC3
FCC ID : 2AN5BGIS-PAMSC3
Multiple Model Name : N/A
Kind of Authorization : Supplier's Declaration of Conformity
Applicant : SEMES CO., LTD.
Address : 77, 4sandan 5-gil, Jiksan-eup Seobuk-gu, Cheonan-si, Chungcheongnam-do, Korea
Manufacturer : SEMES CO., LTD.
Address : 77, 4sandan 5-gil, Jiksan-eup Seobuk-gu, Cheonan-si, Chungcheongnam-do, Korea
FCC Rule : FCC CFR 47 Part 15 Subpart B Class B
Total page of Report : 19 pages
Date of Receipt : 2017-10-11
Date of Issue : 2017-11-27
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 Chu, Woo-Sik / Senior Engineer		2017-11-27
	Signature	Date
Reviewed by Choi, Young-min / Technical Manager		2017-11-27
	Signature	Date

CONTENTS

Page

1. TEST SUMMARY	4
1.1 TEST STANDARDS AND RESULTS.....	4
1.2. TEST METHODOLOGY	4
1.3 ADDITIONS, DEVIATIONS, EXCLUSIONS FROM STANDARDS.....	4
1.4 PURPOSE OF THE TEST	4
1.5 TEST FACILITY.....	5
2. EUT (EQUIPMENT UNDER TEST) DESCRIPTION.....	6
2.1 ADDITIONAL MODEL.....	6
2.3 DESCRIPTION OF SUPPORTED UNITS	7
2.4 CABLE DESCRIPTION	7
2.5 TEST SETUP DRAWING	8
3. EMISSION TESTS.....	9
3.1 RADIATED EMISSION.....	9
APPENDIX I - TEST INSTRUMENTATION	14

Release Control Record

Issue Report No.	Issued Date	Revisions	Effect Section
TR-W1711-021	2017-11-27	Initial Release	All

1. TEST SUMMARY

1.1 Test standards and results

The Equipment Under Test (referred to as the EUT in this report) has been tested according to the following specifications:

Equipment Authorization Procedure		Supplier's 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 EUT 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 Additions, deviations, exclusions from standards







No additions, deviations or exclusions have been made from standard.

1.4 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.

1.5 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 ISED, Canada, accredited as a Conformity Assessment Body (CAB) by the FCC, 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	
ISED (Canada)	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 SEMES CO., LTD., Model GIS-PAMSC3 (referred to as the EUT in this report) is a SCOPE2.0 Plus. The product specification described herein was obtained from product data sheet or user's manual.

CPU	Freescall-i.MX6Q CPU(Quad)
ETHERNET	10 / 100 Mbps LAN
SERIAL	USB to SERIAL Debug port
USB	USB 2.0 Client Debug port
WIFI Function	802.11 a/b/g
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 information from the EUT was transmitted to the notebook PC and communication status between the UART port of the EUT and notebook PC was monitored using Comport Master program supplied from the applicant..

2.3 Description of supported units

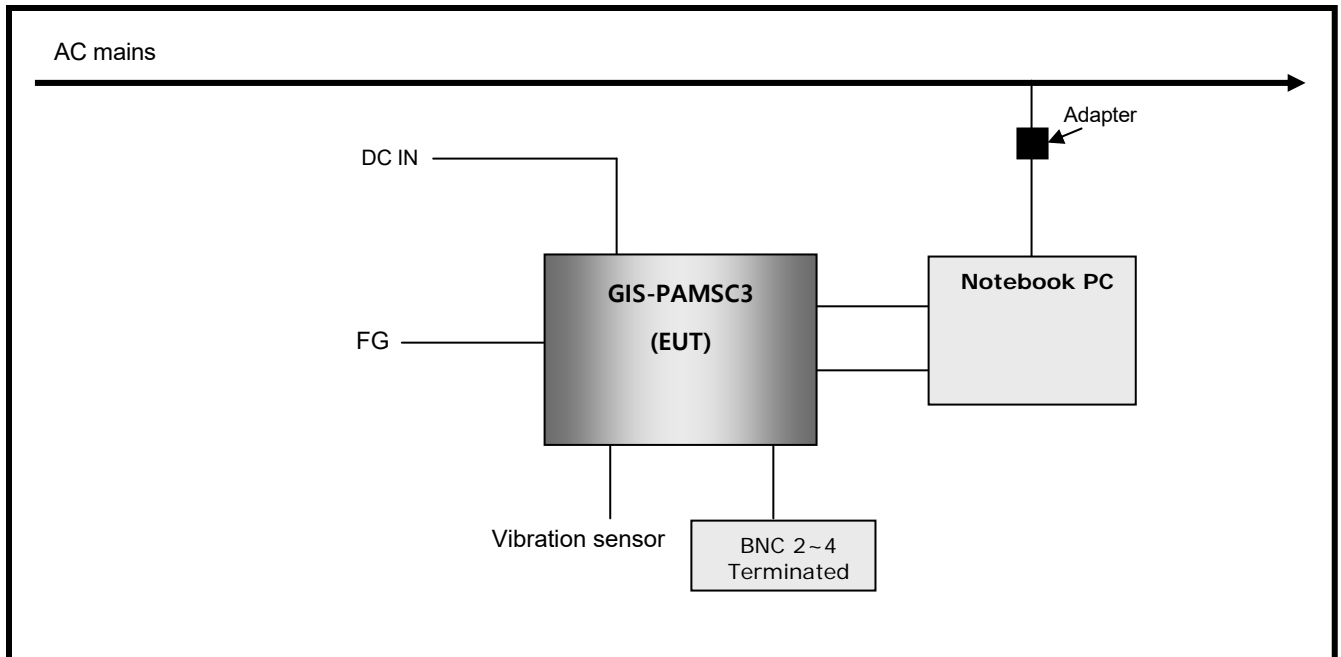
The following peripheral devices and/or interface cables were connected during the measurement:

Description	Model No.	Serial No.	Manufacturer.
SCOPE2.0 Plus (EUT)	GIS-PAMSC3	N/A	SEMES CO., LTD.
Vibration Sensor	N/A	N/A	N/A
Notebook PC	LG15U34	411NZLL052440	LG Electronics Inc.
Adapter for Notebook PC	ADS-40MSG-19	N/A	Shenzhen Honor Electronic Co., Ltd.
DC Power Supply	U8001A	MY51080019	Agilent

2.4 Cable Description

Ports Name	Shielded (Y/N)	Ferrite Bead (Y/N)	Length (m)	Connected to
DC IN	N	Y	1.8	DC Power Supply
UART	Y	Y	3.0	Notebook PC
LAN	Y	Y	1.6	
BNC 1	Y	N	3.5	Vibration sensor
BNC 2~4	Y	N	3.5	Terminated
Flame Ground	N	Y	2.5	Ground plane

2.5 Test Setup Drawing



3. EMISSION TESTS

3.1 RADIATED EMISSION

3.1.1 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.

3.1.2 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.

3.1.3 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.

3.1.4 Test result

Date of Test	2017-11-03, 11-16			
Temperature	(21.9, 22.1) °C	Relative humidity	(48.8, 48.9) % R.H.	
Operating Input Voltage	DC 24 V	Input Frequency	-	
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 	

3.1.5 Sample Calculated Example

At 80 MHz

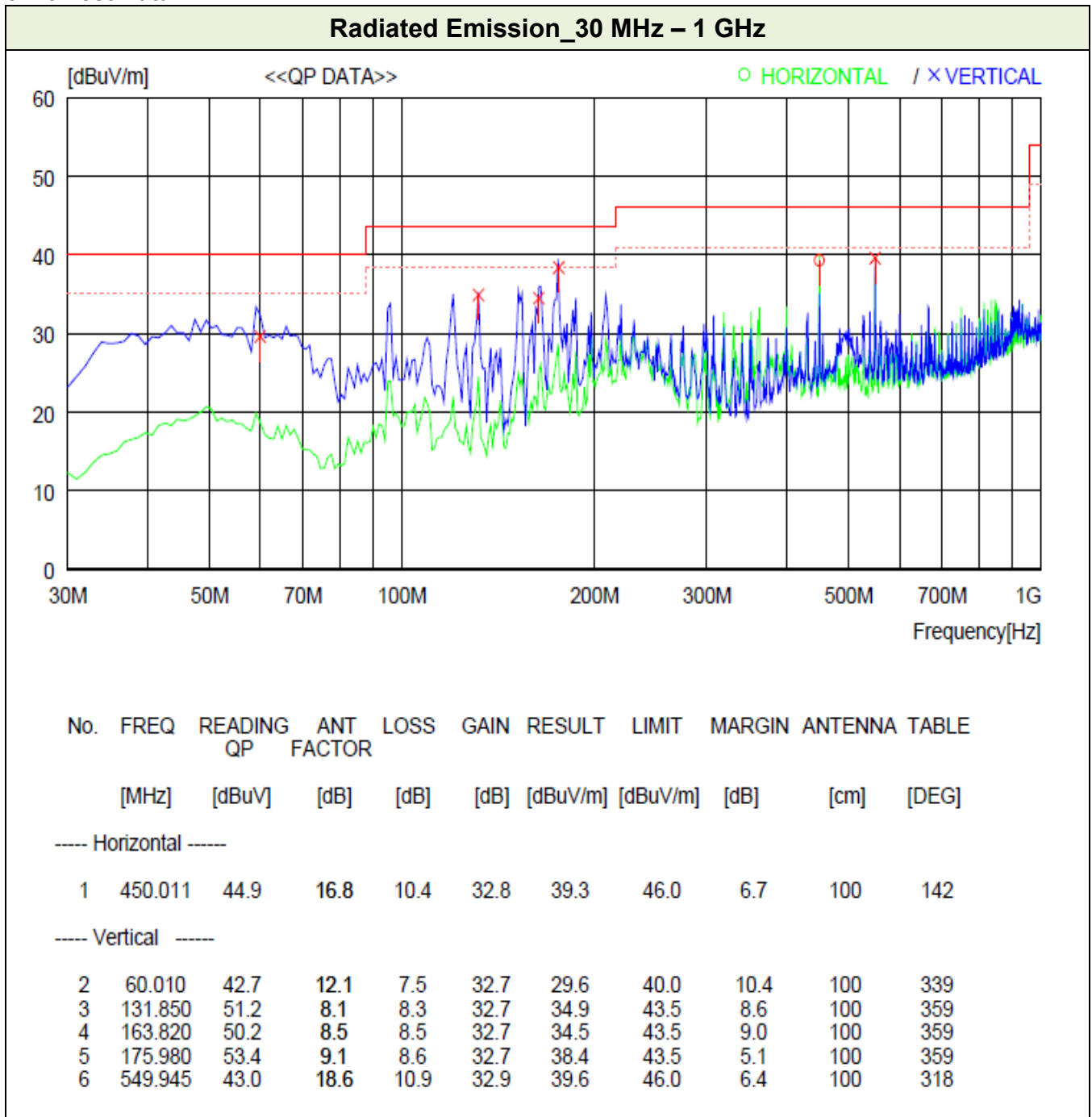
Limit = 40.0 dBuV/m

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

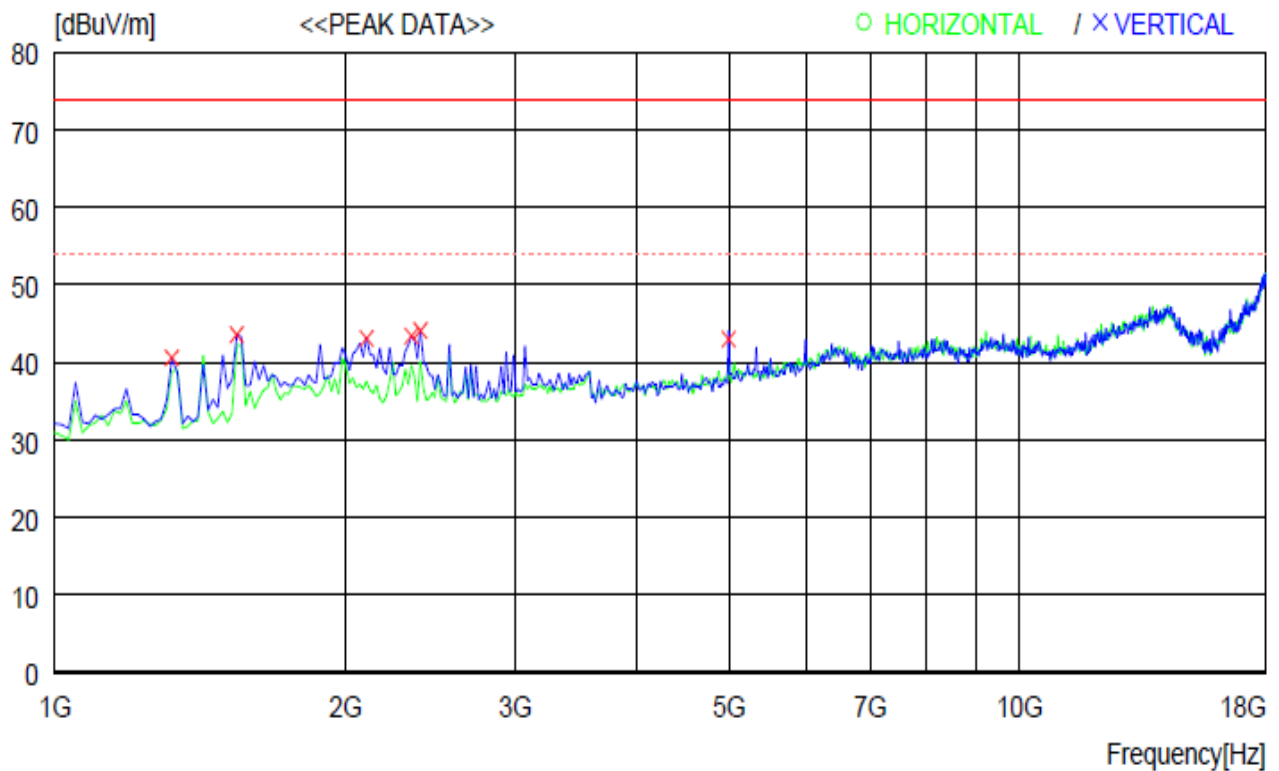
Margin = Limit - Result = 40 - 30 = 10

so the EUT has 10.0 dB margin at 80 MHz

3.1.6 Test Data

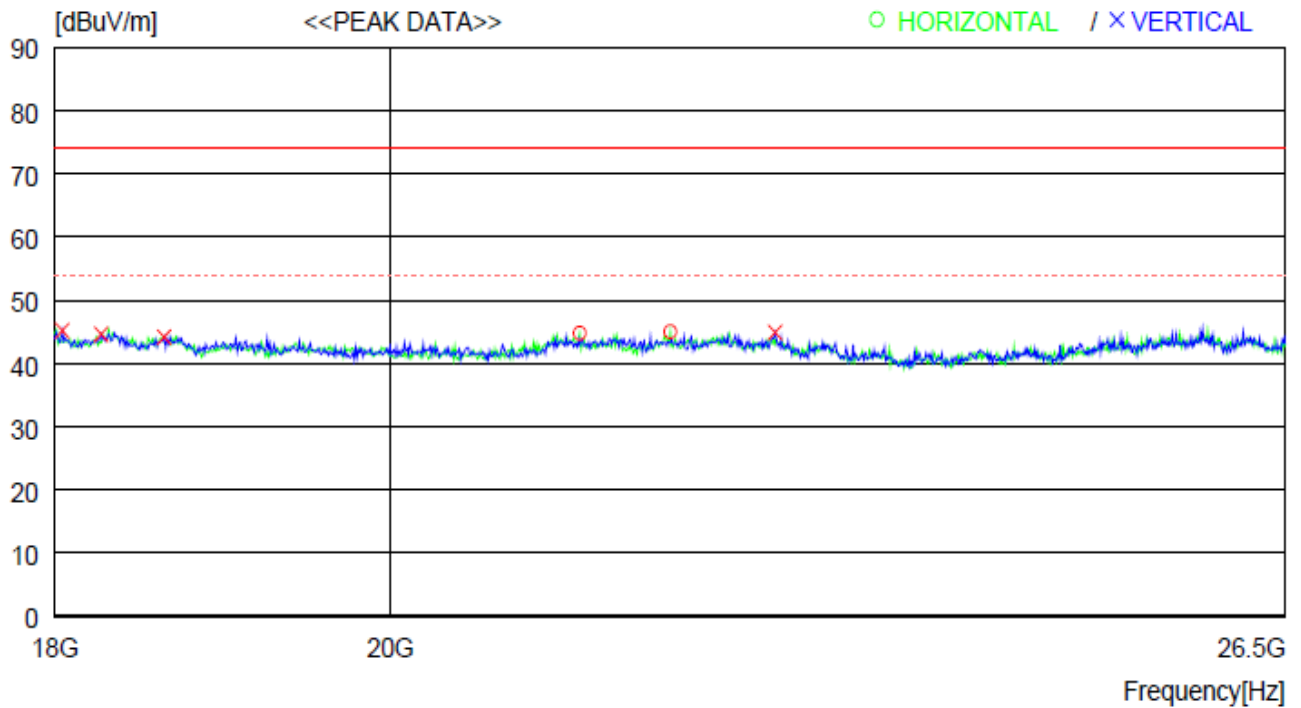


Radiated Emission_ 1 GHz – 18 GHz (Peak)



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]
---- Vertical ----										
1	1323.000	54.7	25.2	1.4	40.7	40.6	74.0	33.4	200	0
2	1544.000	56.6	26.0	1.6	40.6	43.6	74.0	30.4	100	135
3	2105.000	53.9	28.0	1.7	40.5	43.1	74.0	30.9	300	9
4	2343.000	53.3	28.7	1.8	40.4	43.4	74.0	30.6	100	359
5	2394.000	53.8	28.9	1.9	40.5	44.1	74.0	29.9	100	359
6	4995.000	49.3	32.7	1.6	40.6	43.0	74.0	31	100	73

Radiated Emission_ 18 GHz – 26.5 GHz (Peak)



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	21230.000	49.2	37.7	11.2	53.3	44.8	74.0	29.2	100	126
2	21842.000	48.9	37.8	11.4	53.1	45.0	74.0	29	100	207
---- Vertical ----										
3	18042.500	50.5	37.5	10.2	53.0	45.2	74.0	28.8	200	295
4	18263.500	49.9	37.4	10.3	53.0	44.6	74.0	29.4	200	163
5	18629.000	49.4	37.3	10.5	53.0	44.2	74.0	29.8	100	133
6	22573.000	47.8	38.1	11.6	52.6	44.9	74.0	29.1	200	0

NOTE: 26.5 GHz to 30 GHz band was measured but no noise component was detected

Appendix I - Test Instrumentation

Name of Equipment	Model Number	Manufacturer	Serial Number	Next Cal. (Interval)	USE
For EMISSION					
EMI Test Receiver	ESCI 7	Rohde & Schwarz	100722	2018-01-19(1Y)	<input type="checkbox"/>
Test Receiver	ESIB 26	Rohde & Schwarz	100298	2018-02-09(1Y)	<input type="checkbox"/>
LISN	ENV4200	Rohde & Schwarz	100203	2018-01-19(1Y)	<input type="checkbox"/>
LISN	ENV216	Rohde & Schwarz	100110	2018-07-28(1Y)	<input type="checkbox"/>
LISN	LS16C	AFJ	16011403310	2018-07-28(1Y)	<input type="checkbox"/>
LISN	NNLK8121	SchwarzBeck	8121-163	2018-08-04(1Y)	<input type="checkbox"/>
Voltage Probe	TK9420	Schwarzbeck	9420-165	2018-01-20(1Y)	<input type="checkbox"/>
Loop Antenna	HFH2-Z2	Rohde & Schwarz	100341	2019-06-15(2Y)	<input type="checkbox"/>
8-Wire ISN CAT 3	CAT3 8158	Schwarzbeck	CAT3 8158 #70	2018-01-24(1Y)	<input type="checkbox"/>
8-Wire ISN CAT 5	CAT5 8158	Schwarzbeck	CAT5 8158 #126	2018-01-24(1Y)	<input type="checkbox"/>
8-Wire ISN CAT 6	NTFM 8158	Schwarzbeck	NTFM 8158 #95	2018-01-24(1Y)	<input type="checkbox"/>
Test Receiver	ESU	Rohde & Schwarz	100303	2018-01-19(1Y)	<input checked="" type="checkbox"/>
TRILog Broadband Antenna	VULB9163	Schwarzbeck	9163-799	2019-10-30(2Y)	<input checked="" type="checkbox"/>
DOPPEL STEG HORN Antenna	HF 907	Rohde & Schwarz	102426	2019-01-06(2Y)	<input checked="" type="checkbox"/>
Preamp (1-18) GHz	SCU 18D	Rohde & Schwarz	19006450	2018-04-24(1Y)	<input checked="" type="checkbox"/>
Preamp 9 kHz-1 GHz	310N	Sonoma Instrument	344015	2018-01-19(1Y)	<input checked="" type="checkbox"/>
Attenuators	6 dB	Rohde & Schwarz	272.4110.50	2018-01-19(1Y)	<input checked="" type="checkbox"/>
Antenna Master(Below 1 GHz)	MA4000-EP	INNCO SYSTEM	4600814	N/A	<input checked="" type="checkbox"/>
Antenna Master(Above 1 GHz)	MA4000-XP-ET	INNCO SYSTEM	N/A	N/A	<input checked="" type="checkbox"/>
Turn Table	DT3000-3t	INNCO SYSTEM	1310814	N/A	<input checked="" type="checkbox"/>
CO3000 Controller (Below 1 GHz)	CO3000-4PORT	INNCO SYSTEM	CO3000/806/34130 814/L	N/A	<input checked="" type="checkbox"/>
CO3000 Controller (Above 1 GHz)	CO3000-4PORT	INNCO SYSTEM	CO3000/807/34130 814/L	N/A	<input checked="" type="checkbox"/>
Horn Antenna	BBHA 9170	Schwarzbeck	BBHA 9170 #783	2018-11-28(1Y)	<input checked="" type="checkbox"/>
PRE AMPLIFIER	CBL 18265035	CERNEX	28706	2018-03-29(1Y)	<input checked="" type="checkbox"/>
PRE AMPLIFIER	CBL 26405040	CERNEX	28707	2018-03-29(1Y)	<input checked="" type="checkbox"/>
Spectrum Analyzer	FSW43	Rohde & Schwarz	100578	2018-05-04(1Y)	<input checked="" type="checkbox"/>
Digital Power Analyzer For Harmonic & Flicker	DPA 500	EM Test	V0713102356	2018-01-20(1Y)	<input type="checkbox"/>
AC Power Source	ACS 500	EM Test	V0713102357	N/A	<input type="checkbox"/>

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.