

FCC-DOC COMPLIANCE REPORT

Test Report No. : E1/2016/20066

Applicant : Athentek Corp.

Address : 7F., No.10, Ln. 360, Sec. 1, Neihu Rd, Neihu Dist., Taipei City
114, Taiwan

Manufacturer : Athentek Corp.

Address : 7F., No.10, Ln. 360, Sec. 1, Neihu Rd, Neihu Dist., Taipei City
114, Taiwan

Equipment Under Test (EUT) :

Product Name : Smart Tracker

Brand Name : Athentek

Model No. : AT502

Added Model(s) : N/A

Standards : FCC Part 15:2016, Subpart B, Class B

Date of Receipt : Feb. 24, 2016

Date of Test : Feb 24 ~ Mar. 09, 2016

Date of Issue : Apr. 26, 2016

Test Result :	PASS
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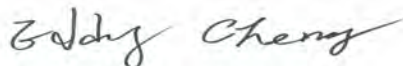
In the configuration tested, the EUT complied with the standards specified above.

Remarks :

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report shall not be reproduced except in full, without the written approval of the laboratory. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

Tested By:



Date

Apr. 26, 2016

Eddy Cheng (Engineer)

Approved By



Date

Apr. 26, 2016

Victor Wen (Assistant Manager)



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Revision History

Report Number	Revision	Description	Issue Date
E1/2016/20066	Rev.00	Initial creation of document	Apr. 26, 2016

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1. General Information

1.1 Applicant & Manufacturer Information

Applicant : Athentek Corp.
Address of Applicant : 7F., No.10, Ln. 360, Sec. 1, Neihu Rd, Neihu Dist.,
Taipei City 114, Taiwan
Manufacturer : Athentek Corp.
Address of Manufacturer : 7F., No.10, Ln. 360, Sec. 1, Neihu Rd, Neihu Dist.,
Taipei City 114, Taiwan

1.2 General Description of EUT

Product Name : Smart Tracker
Brand Name : Athentek
Model No. : AT502
Added Model(s) : N/A
Model Difference : N/A

1.3 Details of EUT

Power Supply : From System / Battery 3.7 V
Modes/Function : Mode 1. GSM900+NB Charger
Mode 2. GSM1800+NB Charger
Mode 3. Wifi Link+NB Charger
Mode 4. GPS Link+NB Charger
Mode 5. BT Link+NB Charger
Mode 6. GSM900+Battery
Mode 7. GSM1800+Battery"
Worst case : CE Worst :Mode 3. Wifi Link+NB Charger
RE Worst :Mode 2. GSM1800+NB Charger
Highest operate description : 2.4GHz
Adapter : N/A

1.4 Operation Procedure

Test Mode: 1~2

1. NB and Adapter placed on the edge of the table.
2. The NB periphery (Hard Disk, Printer, Mouse) placed on the edge of the table per 10 cm distance.
3. Insert SIM card to EUT, connected EUT and Notebook by USB cable.
4. Open MyHWin program, set up CMU200 and connected to EUT.
5. Start the test.

Test Mode: 3

1. NB and Adapter placed on the edge of the table.
2. The NB periphery (Hard Disk, Printer, Mouse) placed on the edge of the table per 10 cm distance.
3. Turn on the EUT and connected to AP.
4. Open "Maui META 3G ver 7.1452.0.0" press the "Disconnect" Press "Reconnect." connected EUT and Notebook by USB cable, the EUT is red at the time, and out of the "WiFi Tool" window select one of Channel ID 1 ~ 14 press the "Start" can be. (Channel ID option, select FER (%)lowest connection values)
5. Open MyHWin program.
6. Start the test.

Test Mode: 4

1. NB and Adapter placed on the edge of the table.
2. The NB periphery (Hard Disk, Printer, Mouse) placed on the edge of the table per 10 cm distance.
3. Open "Maui META 3G ver 7.1452.0.0" press the "Disconnect" Press "Reconnect." connected EUT and Notebook by USB cable, and select "GPS Tool" window Load Spec File from client Open GPS (green light on the right show success) Click "CNR test mode" and then click "Start" Svid: (number Key GPS satellite simulator) CNR (db-Hz) value will be displayed on right.
4. Open MyHWin program.
5. Start the test.

Test Mode: 5

1. NB and Adapter placed on the edge of the table.
2. The NB periphery (Hard Disk, Printer, Mouse) placed on the edge of the table per 10 cm distance.
3. EUT connected to USB Cable Link NB, check the COM value from Device Manager. Open Tera Term Serial Port: choose EUT COM OK Key instruction following, Android phone open BT pairing with EUT
4. Here is the BT function at command
at + bt on
at + bt off
at + bt query
BT state, 0 BT is power on
BT state, 1 BT is power off
BT state, 2 BT is switch on
BT state, 3 BT is switch off
5. Open MyHWin program.
6. Start the test.

Test Mode: 6~7

1. Insert SIM card to EUT, and placed on the edge of the table.
2. The CMU200 set up and connected to EUT.
3. Start the test.

1.5 Description of Support Units

PRODUCT	MANUFACTURER	MODEL NO.	SERIAL NO.
BT Speaker	Creative	MF8090	YFMF8090245R00855Y
AP	BUFFALO	WZR-HP-G300NH2	44066221202559[[G]]
GPS Signal Generator	Spectracom	GSG53 GNSS4	200218
CMU 200	R&S	CMU 200	102189
Mouse (EMI)	DELL	MS111-T	CN-OKW2YH-71616-345-OL7T
Notebook (EMI)(Win8)	DELL	P37G	H55Z0Z1
Printer (EMI)	HP	VCVRA-1004	CN33K19J3F
Phone	HTC	M8	N/A
Hard Disk	Transcend (1TB)	TS1TSJ25M3	B73536-0169

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1.6 Modification List

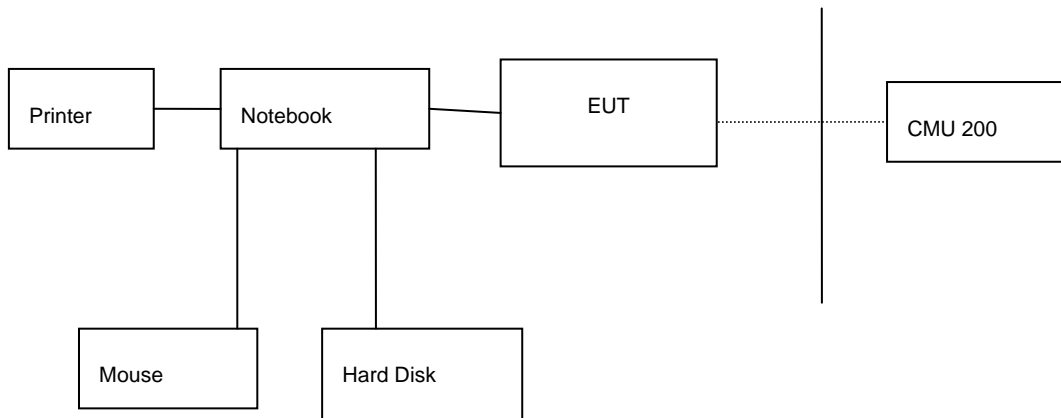
No modification was made by SGS Taiwan Electronics & Communication Laboratory.

1.7 Cable List

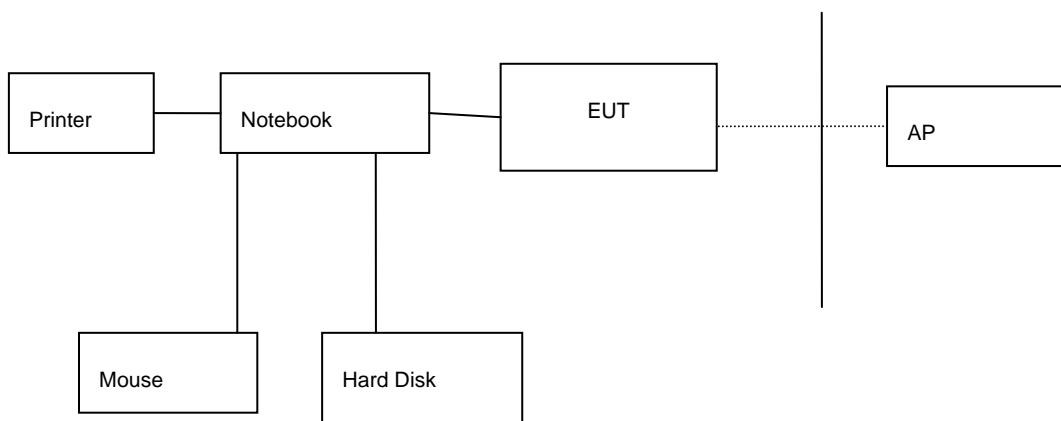
Cable Type	Core	Length	Category	Shielding/Non-shielding
USB cable	N/A	0.09m	N/A	N/A

1.8 Test Set-Up Configuration

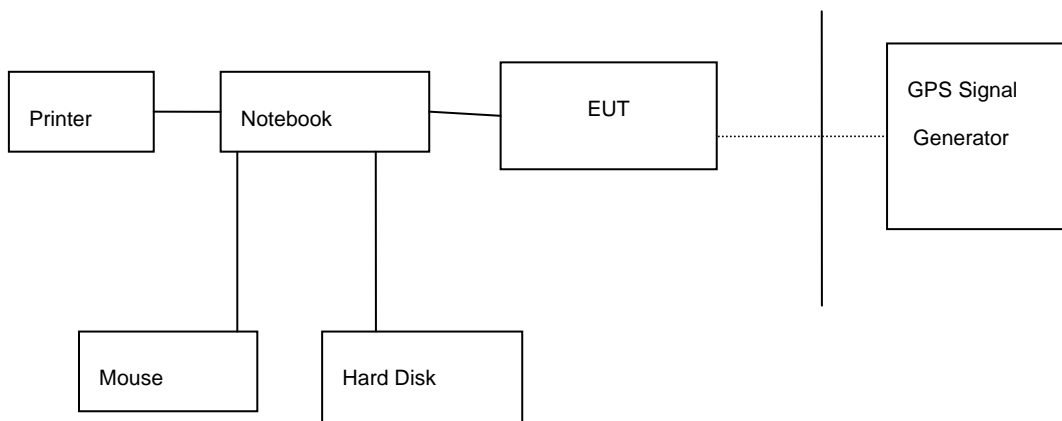
Test mode 1~2



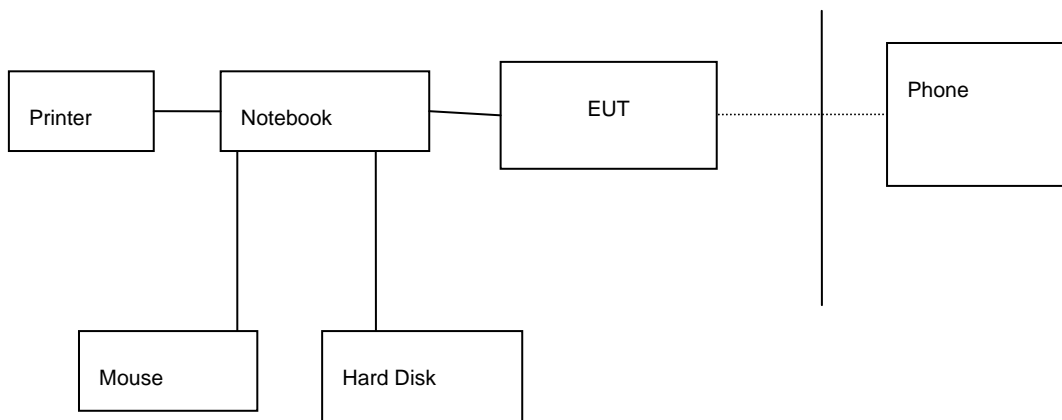
Test mode 3



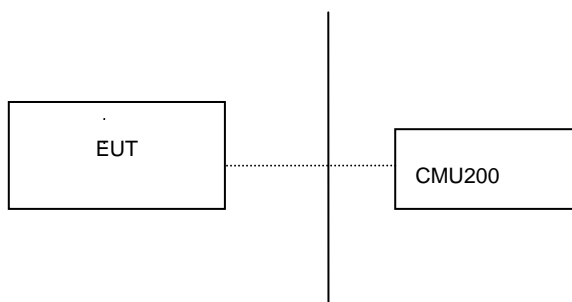
Test mode 4



Test mode 5



Test mode 6~7



1.9 Measurement Procedure

Conducted Emission Testing was performed according to ANSI C63.4:2014 in a shielded room with peripherals placed on a table, 0.8m high over a metal floor. It was located more than required distance away from the shielded room wall.

Radiated Emission Testing was performed according to ANSI C63.4:2014 at the 10m semi-anechoic chamber. The EUT was placed on a 0.8m high table along with the peripherals. The turn table was placed 10m distance from the antenna. Cables were placed in a position to produce maximum emissions as determined by experimentation, and operation mode was selected for production of maximum emission.

The frequencies and amplitudes of maximum emission were measured at varying azimuths, antenna heights and antenna polarities. Maximum emission levels are then reported.

1.10 Standards Applicable for Testing

Tests to be carried out under FCC Part 15, Subpart B

Test Standards	Status
FCC Part 15, Subpart B	Applicable
Deviation from Standard	No deviation

1.11 Summary of Results

Highest Emission					
Standard	Test Type	Result	Phase/Pol.	Frequency(MHz)	Margin(dB)
FCC Part 15 Subpart B Class B/ CISPR 22 Class B	Conducted Emission	PASS	Line	4.0170	-19.45 (AVG)
			Neutral	3.8948	-16.38 (AVG)
	Radiated Emission	PASS	Ver.	14098.476	-10.13 (AVG)

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2. EMISSION

2.1 Test Results

	Results
Conducted Emission	Pass
Radiated Emission	Pass

2.2 Frequency Range

Conducted Emission : 150 kHz - 30 MHz

Radiated Emission : See below table

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 - 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

2.3 Limits of Conducted and Radiated Emission

2.3.1 Limits of Conducted Emission for FCC Part 15, Subpart B/CISPR 22

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi - peak	Average	Quasi - peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Note : (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected there to, shall not exceed the level of field strengths specified above.

2.3.2 Limits of Radiated Emissions for FCC Part 15, Subpart B/CISPR 22

FCC Limit:

- Detector Function : Quasi – Peak

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 3m)
	dBuV/m	dBuV/m
30~88	39	40
88~216	43.5	43.5
216~960	46.44	46
Above 960	49.54	54

- Detector Function : Peak , Average

FREQUENCY (MHz)	Class A (dBuV) (at 3m)		Class B (dBuV) (at 3m)	
	Peak	Average	Peak	Average
Above 1000	79.3	59.3	73.9	53.9

CISPR Limit:

- Detector Function : Quasi – Peak

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30-230	40	30
230-1000	47	37

- Detector Function : Peak , Average – Class A

Frequency range GHz	Average Limit dB(μV/m)	Peak Limit dB(μV/m)
1 to 3	56	76
3 to 6	60	80

- Detector Function : Peak , Average – Class B

Frequency range GHz	Average Limit dB(μV/m)	Peak Limit dB(μV/m)
1 to 3	50	70
3 to 6	54	74

Note : The lower limit applies at the transition frequency.

2.4. Test of Conducted Emission

2.4.1 Test Equipments

SGS Conducted Emission HWAYA Conducted Room No.A EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESCI 3	101311	2015/6/18	2016/6/17
Coaxial Cables	N/A	N30N30-1042-150	N/A	2016/2/6	2017/2/5
LISN	SCHWARZBECK	NSLK 8127	8127-648	2015/6/9	2016/6/8
Pulse Limiter	Narda S.T.S.	PMM PL01	1110X30602	2015/8/13	2016/8/12
LISN	Schwarzbeck	NSLK 8128	NSLK8127-300	2015/6/23	2016/6/22
Universal Digital Radio Communication Tester	R&S	CMU 200	120239	2015/11/24	2016/11/23
Test S/W	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) Measurement Uncertainty of Conducted Emission Expanded uncertainty (K=2) of conducted emission is 2.20 dB					

2.4.2 Operating Environment

Temperature :21 degree C

Humidity : 58 %RH

Atmospheric Pressure : 992 mBar

2.4.3 Measurement Level Calculation

Factor = LISN insertion loss + Cable loss

Measurement Level = Reading Level + Factor

2.4.4 Measurement Data:

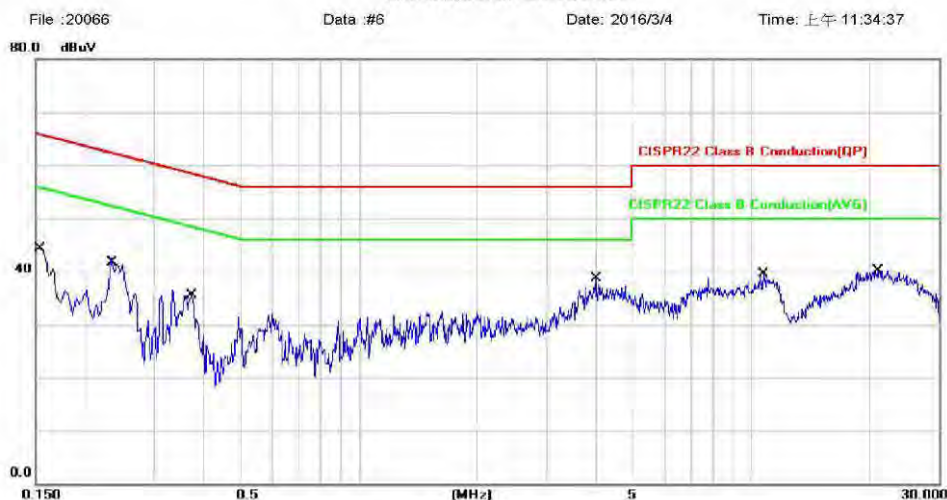
Mode_3_L

Site : Conduction Room
Limit: CISPR22 Class B Conduction(QP)
Mode: Mode 3
Note: AC 120V / 60Hz

Phase: L1
Power: From System

Temperature: 21 °C
Humidity: 58 %

Conducted Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1504	41.66	0.14	41.80	65.98	-24.18	QP	
2		0.1504	28.78	0.14	28.92	55.98	-27.06	AVG	
3		0.2380	38.98	0.13	39.11	62.17	-23.06	QP	
4		0.2380	28.79	0.13	28.92	52.17	-23.25	AVG	
5		0.3744	33.81	0.14	33.95	58.40	-24.45	QP	
6		0.3744	23.93	0.14	24.07	48.40	-24.33	AVG	
7		4.0170	33.05	0.23	33.28	56.00	-22.72	QP	
8 *		4.0170	26.32	0.23	26.55	46.00	-19.45	AVG	
9		10.7372	32.56	0.42	32.98	60.00	-27.02	QP	
10		10.7372	25.40	0.42	25.82	50.00	-24.18	AVG	
11		20.9690	32.95	0.64	33.59	60.00	-26.41	QP	
12		20.9690	24.03	0.64	24.67	50.00	-25.33	AVG	

*:Maximum data x:Over limit l:over margin

File :20066\Data :#6

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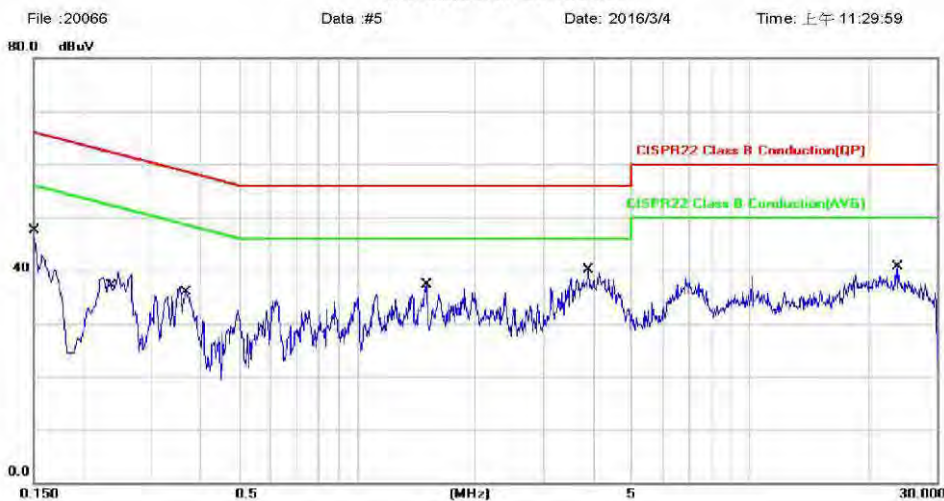
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Mode_3_N

Site : Conduction Room Phase: **N** Temperature: 21 °C
Limit: CISPR22 Class B Conduction(QP) Power: From System Humidity: 58 %
Mode: Mode 3
Note: AC 120V / 60Hz

Conducted Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	41.45	0.20	41.65	66.00	-24.35	QP	
2		0.1500	28.04	0.20	28.24	56.00	-27.76	AVG	
3		0.2382	38.54	0.19	38.73	62.16	-23.43	QP	
4		0.2382	28.88	0.19	29.07	52.16	-23.09	AVG	
5		0.3650	33.45	0.19	33.64	58.61	-24.97	QP	
6		0.3650	24.95	0.19	25.14	48.61	-23.47	AVG	
7		1.5054	33.92	0.23	34.15	56.00	-21.85	QP	
8		1.5054	28.53	0.23	28.76	46.00	-17.24	AVG	
9		3.8948	34.96	0.28	35.24	56.00	-20.76	QP	
10	*	3.8948	29.34	0.28	29.62	46.00	-16.38	AVG	
11		23.8940	31.44	0.79	32.23	60.00	-27.77	QP	
12		23.8940	21.74	0.79	22.53	50.00	-27.47	AVG	

*:Maximum data x:Over limit l:over margin

File :20066\Data :#5

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2.5 Test of Radiated Emission

2.5.1 Test Equipments

Below 1GHz

SGS Radiated_Below_1GHz HWAYA 10m_EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESCI 7	100950	2015/12/8	2016/12/7
EMI Test Receiver	R&S	ESCI 3	101343	2015/12/25	2016/12/24
Broadband Antenna	SCHWAZBECK	VULB9168	9168-628	2015/9/23	2016/9/22
Broadband Antenna	SCHWAZBECK	VULB9168	9168-629	2015/9/23	2016/9/22
Pre Amplifier	EMC Instruments Corp.	EMC330	980178	2015/3/31	2016/3/30
Pre Amplifier	EMC Instruments Corp.	EMC330	980179	2015/3/31	2016/3/30
Coaxial Cable	Huber+Suhner	RG 214/U	W30.02	2015/3/31	2016/3/30
Coaxial Cable	Huber+Suhner	RG 214/U	W31.02	2015/3/31	2016/3/30
Coaxial Cable	Huber+Suhner	RG 214/U	W32.02	2015/3/31	2016/3/30
Coaxial Cable	Huber+Suhner	RG 214/U	W30.03	2015/3/31	2016/3/30
Coaxial Cable	Huber+Suhner	RG 214/U	W31.03	2015/3/31	2016/3/30
Coaxial Cable	Huber+Suhner	RG 214/U	W32.03	2015/3/31	2016/3/30
Universal Digital Radio Communication Tester	R&S	CMU 200	120239	2015/11/24	2016/11/23
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Site NSA	Chance Most	10M Chamber	10M SAC	2015/12/31	2016/12/30
Test S/W	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) Measurement Uncertainty of Radiated Emission Expanded uncertainty of radiated emission is 4.16 dB. (30MHz ~ 1000MHz)					

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Above 1GHz

SGS Radiated_Above_1GHz HWAYA 966A EMC					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	R&S	FSV 40	101059	2015/12/9	2016/12/8
EMI Test Receiver	R&S	ESR 7	101507	2015/5/20	2016/5/19
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA9120D803	2015/10/8	2016/10/7
Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170-184	2015/12/11	2016/12/10
Pre Amplifier	EMC Instruments Corp.	EMC012645B	980216	2015/9/30	2016/9/29
Pre Amplifier	EMC Instruments Corp.	EMC184045B	980135	2015/10/27	2016/10/26
Coaxial Cable	JUNFLOW	MWX221-NMSNMS	J0778929	2015/4/23	2016/4/22
Coaxial Cable	Huber+Suhner	SUCCOFLEX 104PEA	30255/4PEA	N.C.R.	N.C.R.
Coaxial Cable	EMC Instruments	EMC104-SM-SM	140927	2015/4/23	2016/4/22
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	MY 2152/2	2015/6/5	2016/6/4
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	MY 2153/2	2015/6/5	2016/6/4
Universal Digital Radio Communication Tester	R&S	CMU 200	120239	2015/11/24	2016/11/23
Controller	MF	MF-7802	N.C.R.	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Site VSWR	SGS	966 Chamber A	SAC-A	2016/1/12	2017/1/11
Test S/W	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.
SGS Taiwan LTD. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) Measurement Uncertainty of Radiated Emission Expanded uncertainty (k=2) of radiated emission measurement is 4.96 dB. (1-6GHz) Expanded uncertainty (k=2) of radiated emission measurement is 5.14 dB. (6-18GHz) Expanded uncertainty (k=2) of radiated emission measurement is 4.86 dB. (18-26GHz) Expanded uncertainty (k=2) of radiated emission measurement is 4.81 dB. (26-40GHz)					

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2.5.2 Operating Environment

Temperature : 26 degree C

Humidity : 60 %RH

Atmospheric Pressure : 996 mBar

2.5.3 Measurement Level Calculation

Correction Factor = Antenna Factor + Cable loss- Amplifier Gain

Measurement Level = Reading Level + Correction Factor

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2.5.4 Measurement Data

Below 1GHz

Mode_2_H

Site: SGS 10m Chamber Polarization: **Horizontal** Temperature: 26 °C
Limit: EN55022 Class B 10M Radiation Power: From System Humidity: 60 %
Mode: Mode_2 Distance:
Note:

Radiated Emission



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		52.3000	25.36	-11.56	13.80	30.00	-16.20	QP	
2		164.8000	25.63	-11.93	13.70	30.00	-16.30	QP	
3 *		214.3100	32.44	-15.04	17.40	30.00	-12.60	QP	
4		232.7000	34.08	-14.28	19.80	37.00	-17.20	QP	
5		247.2900	31.64	-13.54	18.10	37.00	-18.90	QP	
6		493.6500	25.51	-6.91	18.60	37.00	-18.40	QP	

*: Maximum data x: Over limit !: over margin

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Mode_2_V

Site: SGS 10m Chamber
Limit: CISPR22 Class B 10M Radiation
Mode: Mode_2
Note:

Polarization: **Vertical**
Power: From System
Distance:

Temperature: 26 °C
Humidity: 60 %

Radiated Emission



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		49.1400	25.21	-11.01	14.20	30.00	-15.80	QP	
2		167.0900	27.81	-11.51	16.30	30.00	-13.70	QP	
3	*	206.6400	31.06	-14.56	16.50	30.00	-13.50	QP	
4		232.3600	33.95	-13.85	20.10	37.00	-16.90	QP	
5		429.8200	24.65	-7.35	17.30	37.00	-19.70	QP	
6		617.5400	25.05	-3.95	21.10	37.00	-15.90	QP	

*: Maximum data x: Over limit !: over margin

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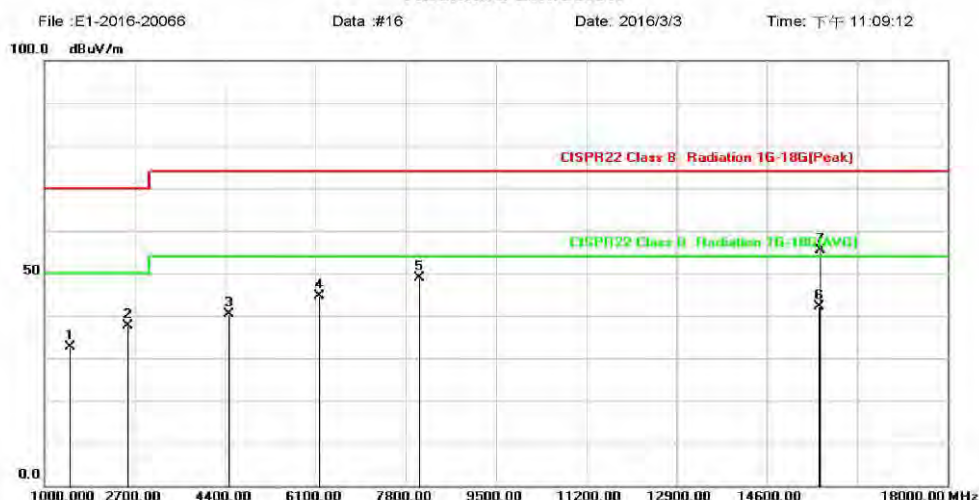
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Above 1GHz

Mode_2_H

Site: SGS 966 Chamber A
Limit: CISPR22 Class B Radiation 1G-18G(Peak)
Mode: Mode_2
Note:
Polarization: **Horizontal**
Power: From System
Distance:
Temperature: 19 °C
Humidity: 50 %

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		1476.000	47.84	-15.14	32.70	70.00	-37.30	peak	
2		2581.000	46.79	-9.25	37.54	70.00	-32.46	peak	
3		4468.000	46.24	-5.87	40.37	74.00	-33.63	peak	
4		6168.000	46.58	-1.93	44.65	74.00	-29.35	peak	
5		8055.000	45.06	3.71	48.77	74.00	-25.23	peak	
6 *		15593.293	32.77	9.34	42.11	54.00	-11.89	AVG	
7		15603.000	46.13	9.30	55.43	74.00	-18.57	peak	

*:Maximum data x:Over limit !:over margin

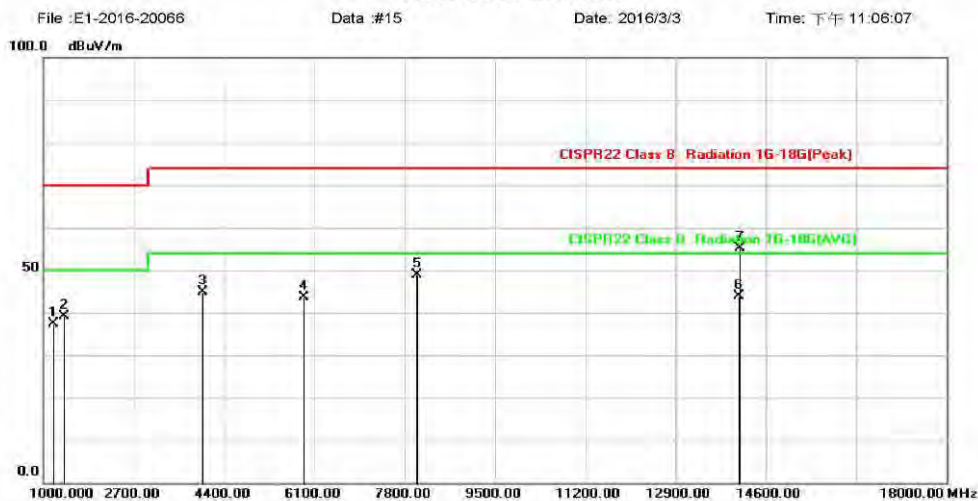
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Mode_2_V

Site: SGS 966 Chamber A
Limit: CISPR22 Class B Radiation 1G-18G(Peak)
Mode: Mode_2
Note:
Polarization: **Vertical**
Power: From System
Distance:
Temperature: 19 °C
Humidity: 50 %

Radiated Emission



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		1187.000	53.66	-16.38	37.28	70.00	-32.72	peak	
2		1391.000	54.73	-15.51	39.22	70.00	-30.78	peak	
3		3992.000	52.57	-7.63	44.94	74.00	-29.06	peak	
4		5896.000	46.08	-2.40	43.68	74.00	-30.32	peak	
5		8038.000	45.31	3.69	49.00	74.00	-25.00	peak	
6 *		14098.476	33.36	10.51	43.87	54.00	-10.13	AVG	
7		14107.000	44.58	10.52	55.10	74.00	-18.90	peak	

*: Maximum data x: Over limit o: Over margin

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