

Variant FCC RF Test Report

APPLICANT : Universal Scientific Industrial Co., Ltd.
EQUIPMENT : UNA_900
BRAND NAME : Universal Global Scientific Industrial Co., Ltd.
MODEL NAME : UNA_900
MARKETING NAME : UNA_900
FCC ID : IXM-UNA900
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION : PCS Licensed Transmitter (PCB)

This is a variant report which is only valid together with the original test report. The product was received on Mar. 17, 2012 and completely tested on Sep. 25, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



TABLE OF CONTENTS

REVISION HISTORY	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant.....	5
1.2 Manufacturer	5
1.3 Feature of Equipment Under Test.....	5
1.4 Testing Site.....	6
1.5 Applied Standards	6
1.6 Ancillary Equipment List.....	6
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	7
2.1 Test Mode.....	7
2.2 Connection Diagram of Test System	8
3 TEST RESULT	9
3.1 Field Strength of Spurious Radiation Measurement	9
4 LIST OF MEASURING EQUIPMENT	16
5 UNCERTAINTY OF EVALUATION	17
APPENDIX A. PHOTOGRAPHS OF EUT	
APPENDIX B. SETUP PHOTOGRAPHS	
APPENDIX C. PRODUCT EQUALITY DECLARATION	
APPENDIX D. ORIGINL REPORT	

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG231721-02	Rev. 01	This is a variant report which can be referred to Product Equality Declaration as Appendix C. All the test cases were performed on original report which can be referred to Sporton Report Number FG231721 as appendix D. Based on original report, only the worst cases of radiation test was verified.	Oct. 05, 2012



SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	§2.1053 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Field Strength of Spurious Radiation	$< 43 + 10 \log_{10}(P[\text{Watts}])$	PASS	Under limit 22.42 dB at 5636.000 MHz

1 General Description

1.1 Applicant

Universal Scientific Industrial Co., Ltd.

141, Lane 351, Taiping Road, Sec. 1, Tsao Tuen, Nan-Tou, Taiwan

1.2 Manufacturer

Universal Scientific Industrial Co., Ltd.

141, Lane 351, Taiping Road, Sec. 1, Tsao Tuen, Nan-Tou, Taiwan

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	UNA_900
Brand Name	Universal Global Scientific Industrial Co., Ltd.
Model Name	UNA_900
Marketing Name	UNA_900
FCC ID	IXM-UNA900
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA
HW Version	V2.3
SW Version	V3.1a
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Product Specification subjective to this standard	
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz
Rx Frequency	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz
Maximum Output Power to Antenna	GSM850 : 32.09 dBm GSM1900 : 28.53 dBm
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: 8PSK

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	Sporton Site No.	FCC/IC Registration No.
	03CH06-HY	722060/4086B-1

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC 47 CFR Part 2, 22(H), 24(E)
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v01
- ♦ IC RSS-132 Issue 2
- ♦ IC RSS-133 Issue 5

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU200	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW	GPC-60300	N/A	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Latitude E6320	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2 Test Configuration of Equipment Under Test

2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.

Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for GSM850
2. 30 MHz to 19000 MHz for GSM1900

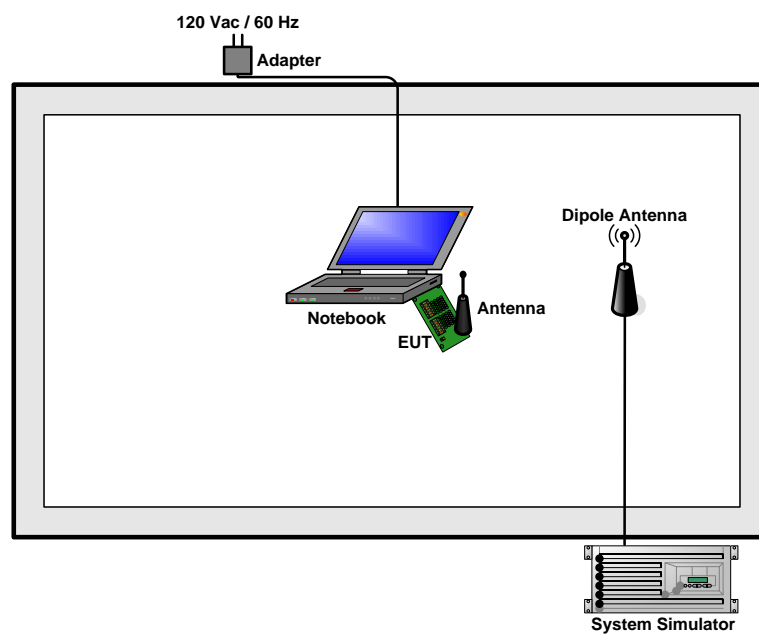
Test Modes	
Band	Radiated TCs
GSM 850	■ GSM Link
GSM 1900	■ GSMLink

Note: The maximum power levels are GSM mode for GMSK link and EDGE multi-slot class 8 mode for 8PSK link, only these modes were used for all tests.

The conducted power tables are as follows:

Conducted Power (*Unit: dBm)						
Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency	824.2	836.4	848.8	1850.2	1880.0	1909.8
GSM	32.04	32.07	32.09	28.50	28.53	27.90
GPRS 8	32.02	32.05	32.07	27.99	27.98	27.88
GPRS 10	31.34	31.42	31.41	27.25	27.27	27.19
GPRS 12	28.73	28.52	28.42	24.61	24.49	24.44
EGPRS 8	25.85	25.83	25.79	23.87	23.77	23.62
EGPRS 10	24.74	24.72	24.69	22.85	22.78	22.62
EGPRS 12	21.65	21.64	21.63	20.71	20.64	20.50

2.2 Connection Diagram of Test System



3 Test Result

3.1 Field Strength of Spurious Radiation Measurement

3.1.1 Description of Field Strength of Spurious Radiated Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.1.2 Measuring Instruments

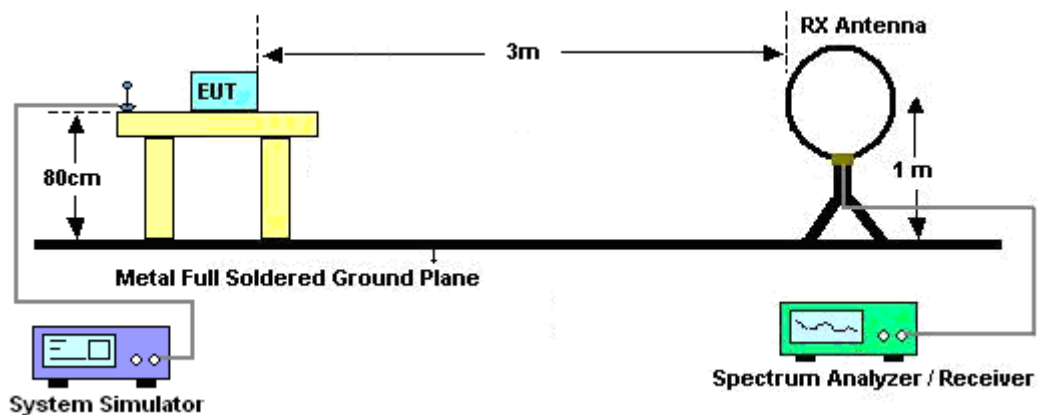
See list of measuring instruments of this test report.

3.1.3 Test Procedures

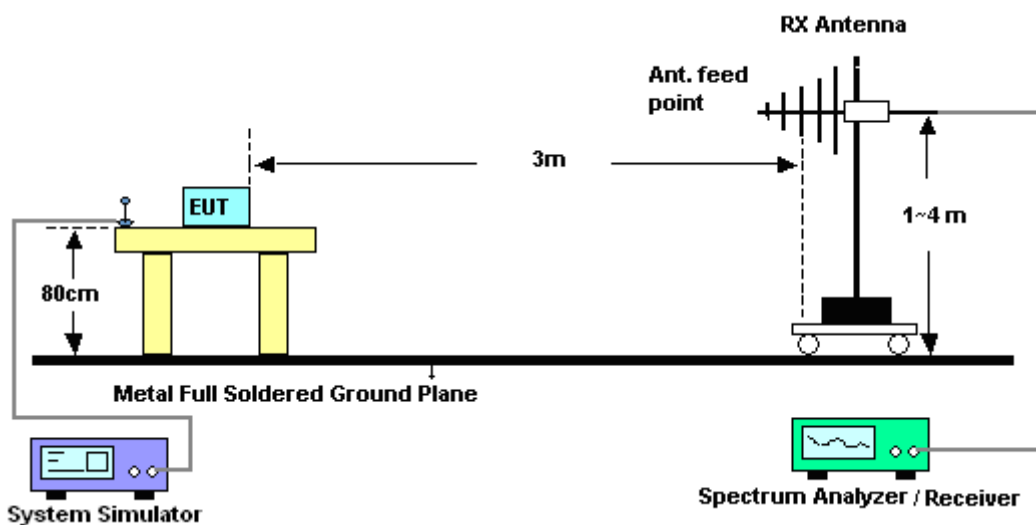
1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11. $ERP \text{ (dBm)} = EIRP - 2.15$

3.1.4 Test Setup

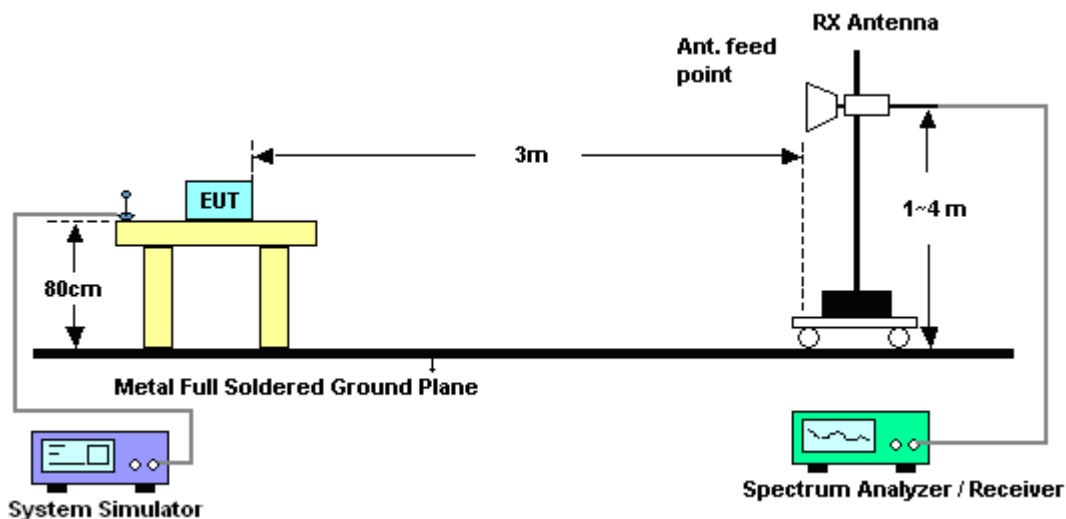
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

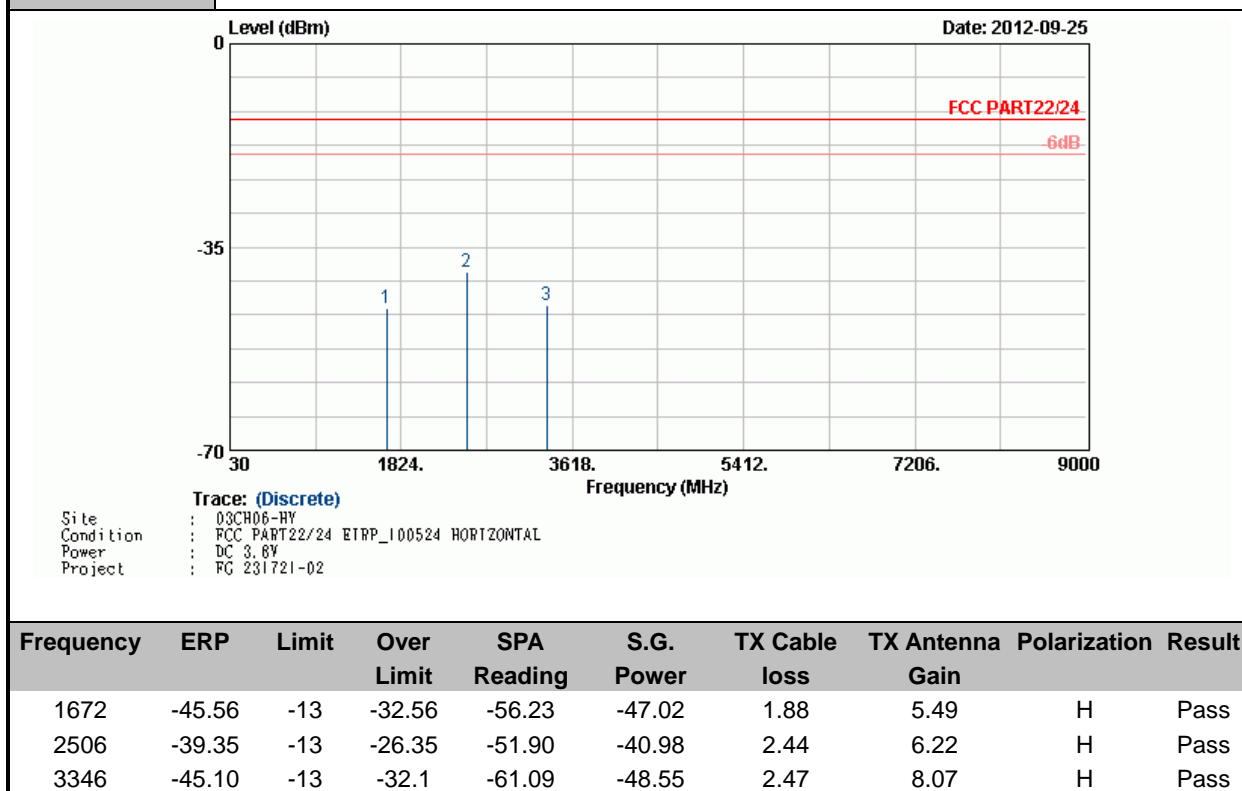


3.1.5 Test Results of Radiated Emissions (9 KHz ~ 30 MHz)

The low frequency, which started from 9 KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

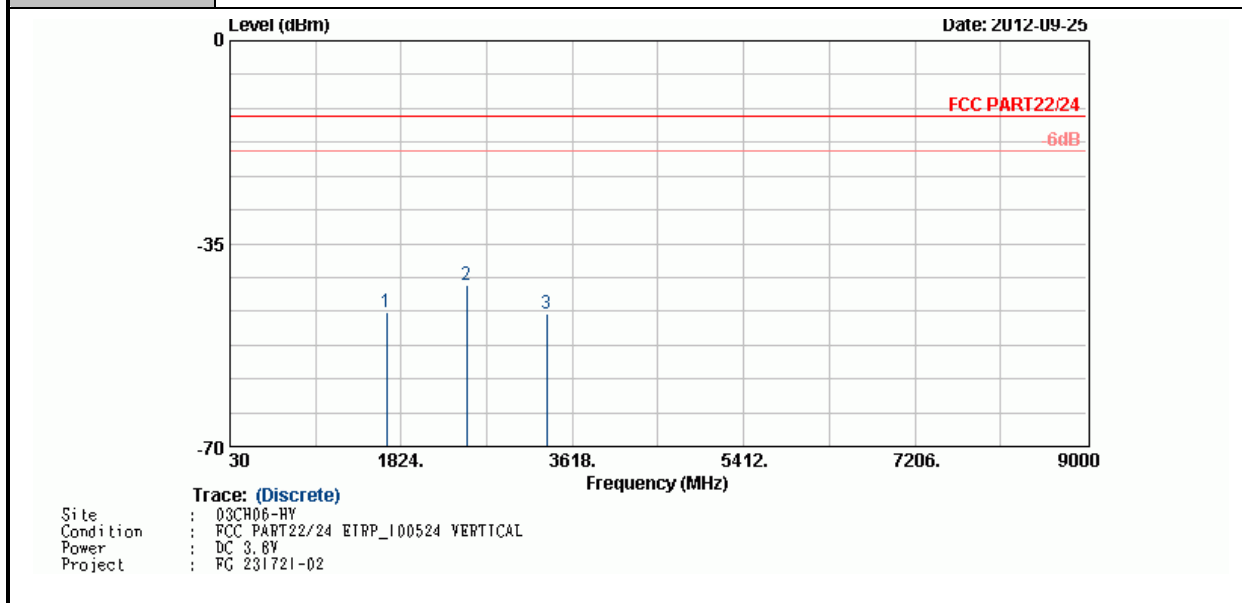
3.1.6 Test Result of Field Strength of Spurious Radiated

Band :	GSM850	Temperature :	27~28°C
Test Mode :	GSM Link	Relative Humidity :	45~46%
Test Engineer :	Kai Wang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		





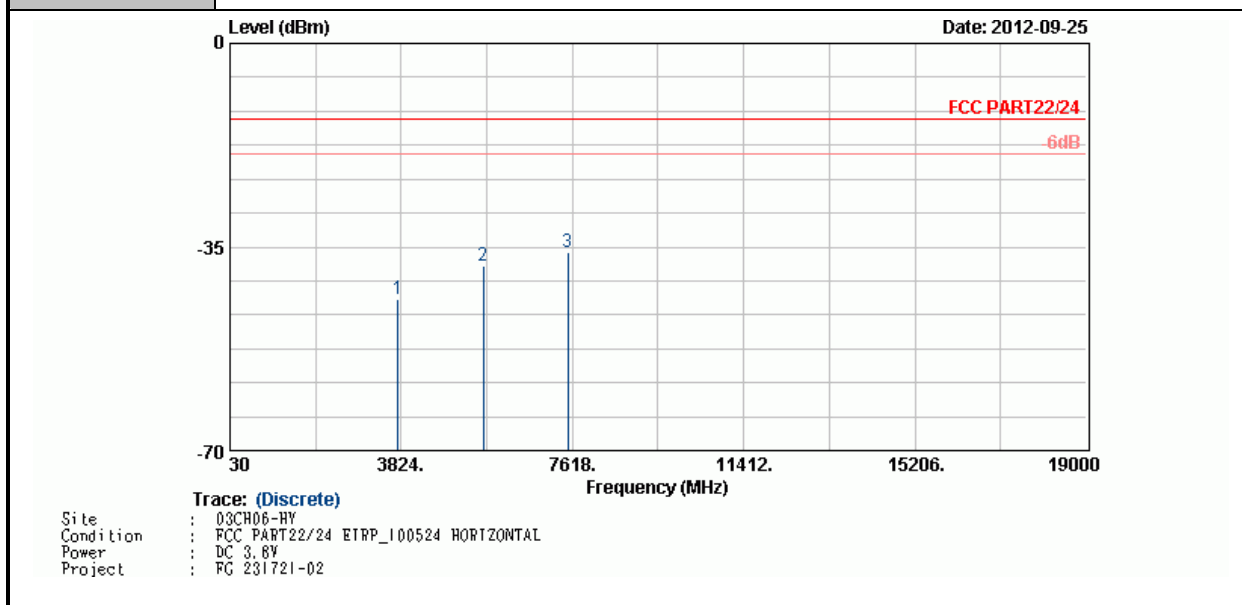
Band :	GSM850	Temperature :	27~28°C
Test Mode :	GSM Link	Relative Humidity :	45~46%
Test Engineer :	Kai Wang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-46.80	-13	-33.8	-57.52	-48.26	1.88	5.49	V	Pass
2506	-42.12	-13	-29.12	-54.69	-43.75	2.44	6.22	V	Pass
3345	-46.98	-13	-33.98	-63.06	-50.43	2.47	8.07	V	Pass



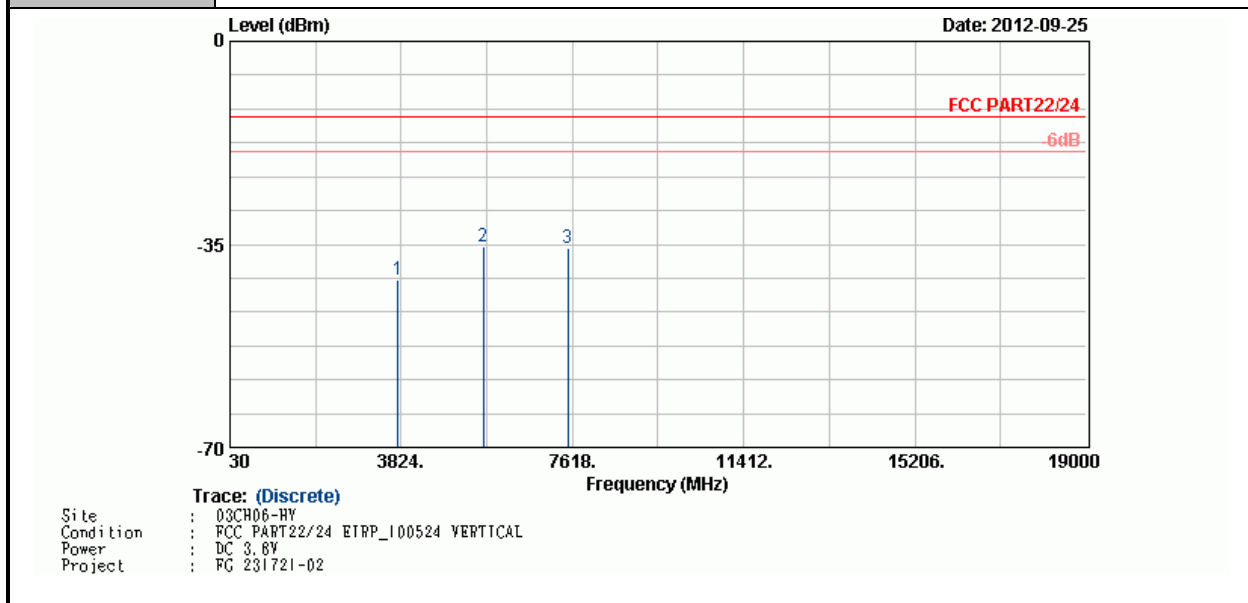
Band :	GSM1900	Temperature :	27~28°C
Test Mode :	GSM Link	Relative Humidity :	45~46%
Test Engineer :	Kai Wang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3756	-43.95	-13	-30.95	-61.66	-50.20	2.56	8.81	H	Pass
5636	-38.29	-13	-25.29	-61.31	-46.03	2.96	10.70	H	Pass
7520	-35.86	-13	-22.86	-63.05	-44.76	3.22	12.12	H	Pass



Band :	GSM1900	Temperature :	27~28°C
Test Mode :	GSM Link	Relative Humidity :	45~46%
Test Engineer :	Kai Wang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3756	-41.10	-13	-28.10	-58.83	-47.35	2.56	8.81	V	Pass
5636	-35.42	-13	-22.42	-58.46	-43.16	2.96	10.70	V	Pass
7520	-35.74	-13	-22.74	-62.74	-44.64	3.22	12.12	V	Pass

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Agilent	E4408B	MY44211030	9KHz ~ 26.5GHz	Nov. 23, 2011	Sep. 25, 2012	Nov. 22, 2012	Radiation (03CH06-HY)
Spectrum Analyzer	R&S	FSP30	101352	9KHz-30GHz	Nov. 03, 2011	Sep. 25, 2012	Nov. 02, 2012	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/003	20MHz ~ 1000MHz	May 04, 2012	Sep. 25, 2012	May. 03, 2013	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz ~ 2GHz	Oct. 22, 2011	Sep. 25, 2012	Oct. 21, 2012	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz ~ 18GHz	Aug. 01, 2012	Sep. 25, 2012	Jul. 31, 2013	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA917025 1	15GHz ~ 40GHz	Oct. 20, 2011	Sep. 25, 2012	Oct. 19, 2012	Radiation (03CH06-HY)
Preamplifier	Agilent	8449B	3008A01917	1GHz ~ 26.5GHz	Apr. 13, 2012	Sep. 25, 2012	Apr. 12, 2013	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz ~ 1GHz	Apr. 11, 2012	Sep. 25, 2012	Apr. 10, 2013	Radiation (03CH06-HY)
Pre Amplifier	EMCI	EMC051845	SN980048	1GHz ~ 18GHz	Jul. 21, 2012	Sep. 25, 2012	Jul. 20, 2013	Radiation (03CH06-HY)
Pre Amplifier	MITEQ	AMF-7D-00 101800-30-1	159087	1GHz~18GHz	Feb. 27, 2012	Sep. 25, 2012	Feb. 26, 2013	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9KHz ~ 30MHz	Jul. 03, 2012	Sep. 25, 2012	Jul. 02, 2014	Radiation (03CH06-HY)
System Simulator	R&S	CMU200	117997	N/A	Aug. 22, 2011	Sep. 25, 2012	Aug. 21, 2013	Radiation (03CH06-HY)

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.54
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.72
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Appendix A. Photographs of EUT

Please refer to Sporton report number EP231721-02 as below.

Appendix C. Product Equality Declaration

Universal Scientific Industrial Co., Ltd.
141, Lane 351, Sec. 1, Taiping Road, Tsao-tueng, Nantou 54261 Taiwan
Tel: 886-49-2350876 ; Fax: 886-49-2332061

Date: September 28, 2012

Product Equality Declaration

To whom it may concern,

Please be notified that we, Universal Scientific Industrial Co., Ltd., have assigned **Sporton International Inc.**, located at No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C., as our agent.

Any and all acts carried out by **Sporton International Inc.**, on the matters of UNA_850 TCF Filing, shall have the same legal authority as acts on our own behalf.

Parent Model of as following:
Brand Name: Universal Global Scientific Industrial Co., Ltd
Model Name: UNA_900
HW Version: V2.1
SW Version: MAUI.11A.W11.12.MP.V67.F1

Valiant Model of as following:
Brand Name: Universal Global Scientific Industrial Co., Ltd
Model Name: UNA_900
HW Version: V2.3
SW Version: V3.1a

Declaration of Hardware Equality in tested devices of above two models:

- 1. HW version change**
UNA module is the same and it only change to EVB circuit.
EVB change item:
 - a. add ESD parts on SIM card signal.
 - b. change pin define (J51 and J52).
 - c. change audio codec package.
- 2. SW version change**
The major changes in V3.1a are:
 - 1) To shift the block address of NVRAM data in MCP. (For preventing the data overlap caused by bad block of MCP.



2) Add an AT command to switch UNA USB mode (AT+UMSW)

These modifications have no change on RF & protocol features compared with parent model of UNA_900.

If you have any acknowledgement and response, please send it to **Sporton International Inc.** directly.

Should you have any questions or comments regarding this matter, please have my best attention.

Sincerely yours,

Henry Cheng

Contact Person: Henry Cheng

Applicant: 2G/3G modem

E-Mail: henry_cheng@ms.usi.com.tw



Appendix D. Original Report

Please refer to Sporton report number FG231721 as below.