

FCC/ISED Test Report

Product Name : Module
Brand Name : AirPrime
Model No. : HL7812
FCC ID : N7NHL78C
IC : 2417C-HL78C

Applicant : Sierra Wireless, Inc.
Address : 13811 Wireless Way, Richmond, BC V6V 3A4, Canada

Date of Receipt : Mar. 16, 2022
Issued Date : Sep. 30, 2022
Report No. : 2230599R-RFNAOTHV02-B
Report Version : V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

The test report shall not be reproduced except in full without the written approval of DEKRA Testing and Certification Co., Ltd.



Product Name : Module
Applicant : Sierra Wireless, Inc.
Address : 13811 Wireless Way, Richmond, BC V6V 3A4, Canada
Manufacturer : Sierra Wireless, Inc.
Address : 13811 Wireless Way, Richmond, BC V6V 3A4, Canada
Brand Name : AirPrime
Model No. : HL7812
FCC ID : N7NHL78C
IC : 2417C-HL78C
EUT Voltage : DC 2.8~4.35V (host equipment)
Testing Voltage : DC 3.7V
Applicable Standard : FCC CFR Title 47 Part 22 Subpart H
FCC CFR Title 47 Part 24 Subpart E
RSS-132 Issue 3
RSS-133 Issue 6
RSS-Gen Issue 5
ANSI/TIA-603-E-2016
ANSI C63.26-2015
Laboratory Name : DEKRA Testing and Certification Co., Ltd.
Hsin Chu Laboratory
Address : No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu
County 310, Taiwan, R.O.C.
Test Result : Complied

Documented By :



(Hailey Peng / Senior Engineer)

Approved By :



(Rueyyan Lin / Supervisor)

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Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	Sep. 30, 2022

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1. General Information

1.1. EUT Description

Product Name	Module
Brand Name	AirPrime
Model No.	HL7812
Tx Frequency Range (MHz)	GSM 850: 824.2 ~ 848.8 PCS 1900: 1850.2 ~ 1909.8
Rx Frequency Range (MHz)	GSM 850: 869.2 ~ 893.8 PCS 1900: 1930.2 ~ 1989.8
Function	GSM / GPRS
Type of Modulation	GMSK
Hardware Version	1.0
Software Version	HL78xx.5.4.10.0
IMEI No.	356240280000359

Antenna Information				
Ant.	Brand Name	Model No.	Type	Antenna Gain (dBi)
0	Pulse	SPDA24700/2700	Dipole	2
1	Pulse	SPDA24700/2700	Dipole	2

Note: The above EUT information is declared by the manufacturer.

1.2. Mode of Operation

DEKRA has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode	Mode 1: GSM 850 Mode 2: PCS 1900
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Note:

1. Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. The difference compared to the DEKRA Project No.: 19C0344R (FCC ID: N7NHL7802, IC: 2417C-HL7802) is the add in LTE Band 8 (FCC only) and LTE Band 85. After evaluating, the worst result of DEKRA Project No.: 19C0344R (FCC ID: N7NHL7802, IC: 2417C-HL7802) is selected to verify radiated spurious emission test and record in the report.

1.3. Comments and Remarks

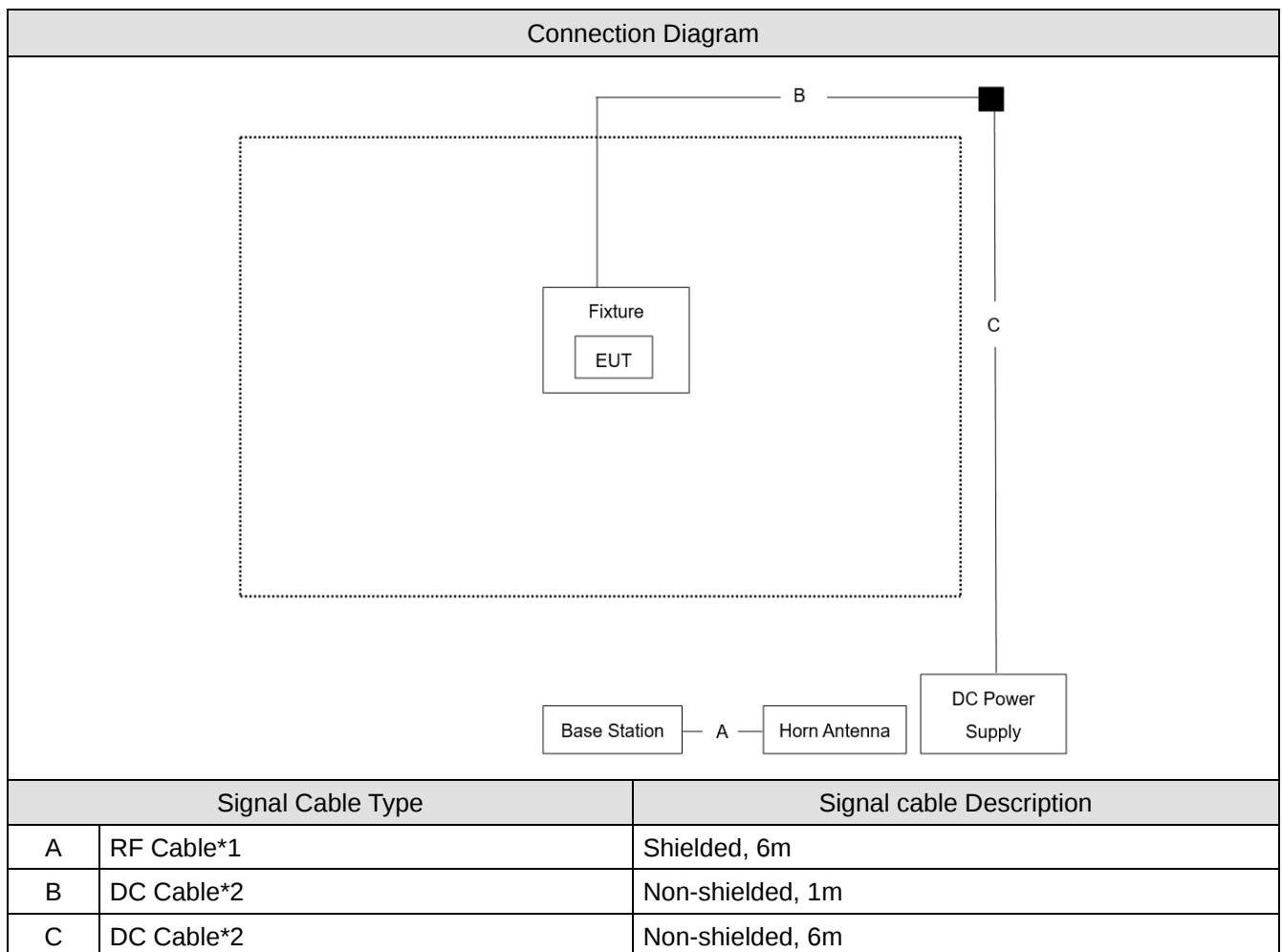
The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.

1.4. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system.

	Product	Manufacturer	Model No.	Serial No.
1	Fixture	AirPrime	HL7812	N/A
2	DC Power Supply	Topward	6030D	809508
3	Horn Antenna	Schwarzbeck	BBHA 9120D	1640
4	Base Station	R&S	CMW500	150246

1.5. Configuration of Tested System



1.6. EUT Operation of during Test

1	Setup the EUT and Base station as shown on.
2	Turn on the power of all equipment.
3	Configure test mode, test channel and data rate.
4	Keep the EUT and base station in Link mode.
5	Repeat the above procedure (3&4).

2. Technical Test

2.1. Summary of Test Result

- ☒ No deviations from the test standards
☐ Deviations from the test standards as below description:

<For FCC>

GSM 850			
FCC Part 22 Subpart H			
Performed Item	FCC Rule	Limit	Result
Spurious Emission	§2.1053 §22.917	< -13dBm	Pass

Note: Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

PCS 1900			
FCC Part 24 Subpart E			
Performed Item	FCC Rule	Limit	Result
Spurious Emission	§2.1053 §24.238	< -13dBm	Pass

Note: Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

<For ISED>

GSM 850			
RSS-132, RSS-GEN			
Performed Item	IC Rule	Limit	Result
Spurious Emission	§5.5	< -13dBm	Pass

Note: Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

PCS 1900			
RSS-133, RSS-GEN			
Performed Item	IC Rule	Limit	Result
Spurious Emission	§6.5	< -13dBm	Pass

Note: Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.2. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Actually	Tested by	Test Date	Test Site
Temperature (°C)	Radiated Spurious Emission	23	Cyril Chen	2022/09/26	HC-CB02
Humidity (%RH)		61			

Note: Test site information refers to Laboratory Information.

Laboratory Information

USA : FCC Registration Number: TW3024

Canada CAB identifier : TW3024

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: <http://www.dekra.com.tw>

If you have any comments, please don't hesitate to contact us. Our test sites as below:

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
Address	1. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. 2. No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
Phone number	1. +886-3-582-8001 2. +886-3-582-8001
Fax number	1. +886-3-582-8958 2. +886-3-582-8958
E mail address	info.tw@dekra.com
Website	http://www.dekra.com.tw
Note: Test site number for address 1 includes HC-SR02. Test site number for address 2 includes HC-CB02, HC-CB03, HC-CB04, HC-SR10 and HC-SR12.	

2.3. List of Test Equipment

HC-CB02

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2021/10/22	2022/10/21
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2022/01/07	2023/01/06
Trilog Broadband Antenna	Schwarzbeck	VULB 9168	1272	2022/05/19	2023/05/18
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2022/05/06	2023/05/05
Horn Antenna	Schwarzbeck	BBHA 9170	202	2021/12/01	2022/11/30
Pre-Amplifier	EMCI	EMC01820I	980365	2022/04/15	2023/04/14
Pre-Amplifier	EMEC	EM01G18GA	060741	2022/05/06	2023/05/05
Pre-Amplifier	DEKRA	AP-400C	201801231	2021/12/24	2022/12/23
Wideband Radio Communication Tester	R&S	CMW500	150246	2022/03/04	2023/03/03
Coaxial Cable(13m)	Suhner	SF104	HC-CB02	2022/08/15	2023/08/14
Coaxial Cable(3m)	Suhner,Rosno	SF102_UP0264	HC-CB02_1	2022/08/14	2023/08/13
Radiated Software	AUDIX	e3 V9	HC-CB02_1	N/A	N/A

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.4. Measurement Uncertainty

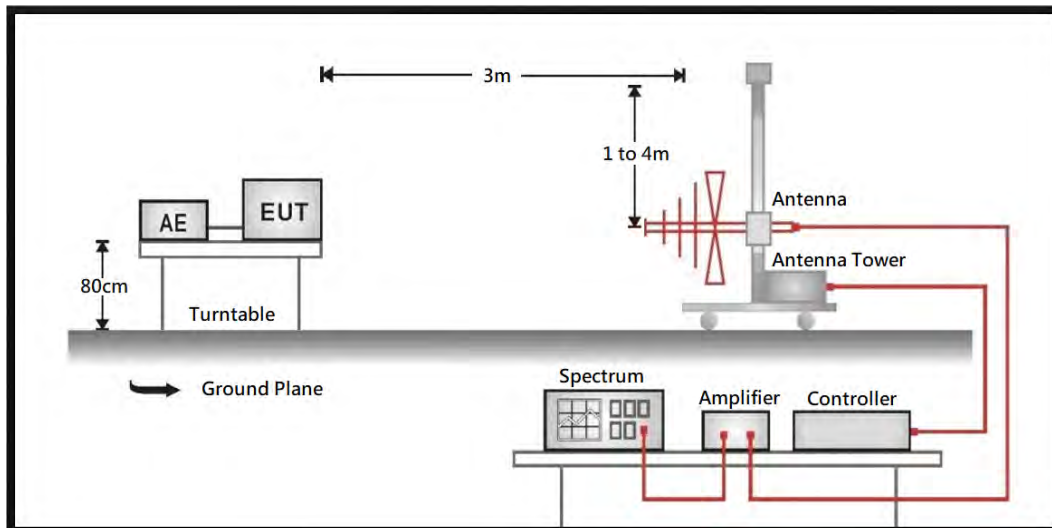
Uncertainties have been calculated according to the DEKRA internal document with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Test Item	Uncertainty
Spurious Emissions	± 3.25 dB below 1 GHz ± 3.32 dB above 1 GHz

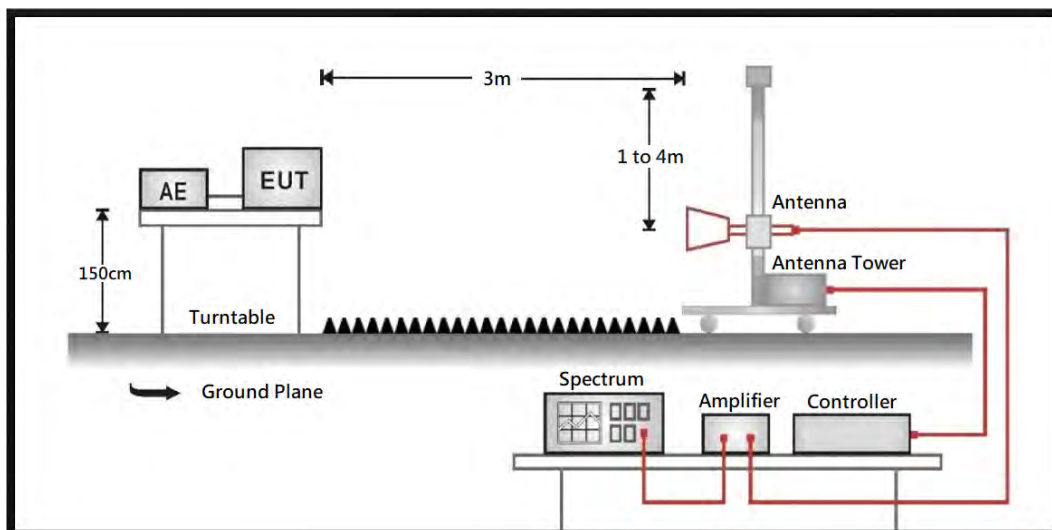
3. Spurious Emission

3.1. Test Setup

Radiated Spurious Measurement (below 1 GHz)



Radiated Spurious Measurement (above 1 GHz)



3.2. Test Procedure

Radiated Spurious Measurement:

The EUT and its simulators are placed on a turn table which is 0.8 or 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. 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. The resolution bandwidth of the spectrum analyzer was set at 1 MHz, sufficient scans were taken to show the out of band Emission if any up to 10th harmonic. Taking the record of maximum spurious emission.

3.3. Test Methodology and Reference Procedures

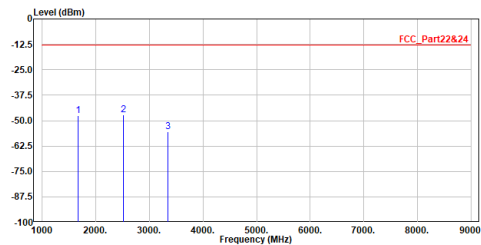
KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI C63.26-2015

3.4. Test Result of Radiated Spurious Emission

Mode 1: GSM 850

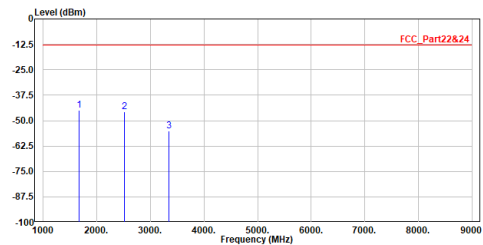
Site :HC-CB02
Condition :3m Horizontal
Mode :GSM_850_Ch190
Test By :Cyril



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBm	dBm	Limit	Level	dB	
1	1673.200	-47.71	-13.00	-34.71	-35.01	-12.70	Peak
2	2509.800	-47.01	-13.00	-34.01	-37.75	-9.26	Peak
3	3346.400	-55.51	-13.00	-42.51	-48.75	-6.76	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuVm) to EIRP (dBm)
= $107 + 20\log(3) - 104.8 = 11.8$ dB
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

Site :HC-CB02
Condition :3m Vertical
Mode :GSM_850_Ch190
Test By :Cyril

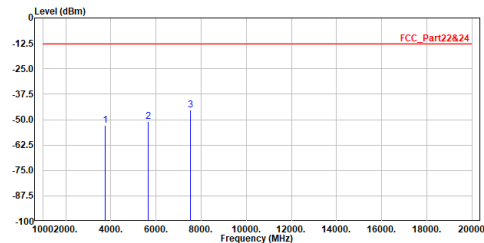


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBm	dBm	Limit	Level	dB	
1	1673.200	-44.80	-13.00	-31.80	-32.10	-12.70	Peak
2	2509.800	-45.58	-13.00	-32.58	-36.32	-9.26	Peak
3	3346.400	-54.96	-13.00	-41.96	-48.20	-6.76	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuVm) to EIRP (dBm)
= $107 + 20\log(3) - 104.8 = 11.8$ dB
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

Mode 2: PCS 1900

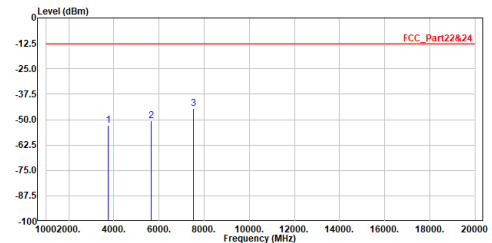
Site :HC-CB02
 Condition :3m Horizontal
 Mode :PCS_1900_Ch661
 Test By :Cyril



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBm	dBm	Limit	Level	dB	
1	3760.000	-52.84	-13.00	-39.84	-47.28	-5.56	Peak
2	5640.000	-50.90	-13.00	-37.90	-51.87	0.97	Peak
3	7520.000	-45.13	-13.00	-32.13	-52.53	7.40	Peak

Note:
 1. Level = Read Level + Factor
 2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
 3. Over Limit = Level - Limit Line
 4. Aux Factor = Convert E (dBuVm) to EIRP (dBm)
 $= 107 + 20\log(3) - 104.8 = 11.8 \text{ dB}$
 5. The other emission levels were very low against the limit.
 6. The emission under 1GHz was not included since the emission levels are very low against the limit.

Site :HC-CB02
 Condition :3m Vertical
 Mode :PCS_1900_Ch661
 Test By :Cyril



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBm	dBm	Limit	Level	dB	
1	3760.000	-52.96	-13.00	-39.96	-47.40	-5.56	Peak
2	5640.000	-50.64	-13.00	-37.64	-51.61	0.97	Peak
3	7520.000	-44.66	-13.00	-31.66	-52.06	7.40	Peak

Note:
 1. Level = Read Level + Factor
 2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
 3. Over Limit = Level - Limit Line
 4. Aux Factor = Convert E (dBuVm) to EIRP (dBm)
 $= 107 + 20\log(3) - 104.8 = 11.8 \text{ dB}$
 5. The other emission levels were very low against the limit.
 6. The emission under 1GHz was not included since the emission levels are very low against the limit.