



Variant FCC RF Test Report

APPLICANT : Sierra Wireless Inc.
EQUIPMENT : Embedded module
BRAND NAME : AirPrime
MODEL NAME : HL6528RD-G2.8V
MARKETING NAME : HL6528RD-G2.8V
FCC ID : N7NHL6528RD
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 testing was completed on Jun. 05, 2016. We, SPORTON INTERNATIONAL(SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-D-2010 and has been in 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 (SHENZHEN) INC., the test report shall not be reproduced except in full.

Prepared by: Ken Chen / Manager

Approved by: Jones Tsai / Manager



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG591804-03	Rev. 01	This is a variant report for HL6528RD-G2.8V. The product equality declaration could be referred to Appendix C. All test cases were performed on original report which can be referred to SPORTON Report Number FG591804. Based on the original test report, only the worst case of RSE was verified for the differences.	Oct. 10, 2016



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	$< 43 + 10 \log_{10}(P[\text{Watts}])$	PASS	Under limit 10.02 dB at 2510.000 MHz



1 General Description

1.1 Applicant

Sierra Wireless Inc.

13811 Wireless Way, Richmond, British Columbia V6V 3A4

1.2 Manufacturer

Sierra Wireless Inc.

13811 Wireless Way, Richmond, British Columbia V6V 3A4

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Embedded module
Brand Name	AirPrime
Model Name	HL6528RD-G2.8V
Marketing Name	HL6528RD-G2.8V
FCC ID	N7NHL6528RD
EUT supports Radios application	GSM/GPRS
IMEI Code	014495000000535
HW Version	1.0
SW Version	RHL6528RD.2.2.5
EUT Stage	Production Unit

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

1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx Frequency	GSM/GPRS: 850: 824.2 MHz ~ 848.8 MHz 1900: 1850.2 MHz ~ 1909.8MHz
	GSM/GPRS: 850: 869.2 MHz ~ 893.8 MHz 1900: 1930.2 MHz ~ 1989.8 MHz
Rx Frequency	
Antenna Type	body mounted Antenna
Type of Modulation	GSM/GPRS: GMSK

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-3320-2398	
Test Site No.	Sporton Site No.	FCC Registration No.
	03CH03-SZ	565805

1.7 Applicable Standards

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

- ♦ 47 CFR Part 2, 22(H), 24(E)
- ♦ ANSI / TIA / EIA-603-D-2010
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.



2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

Radiated emissions were investigated as following frequency range:

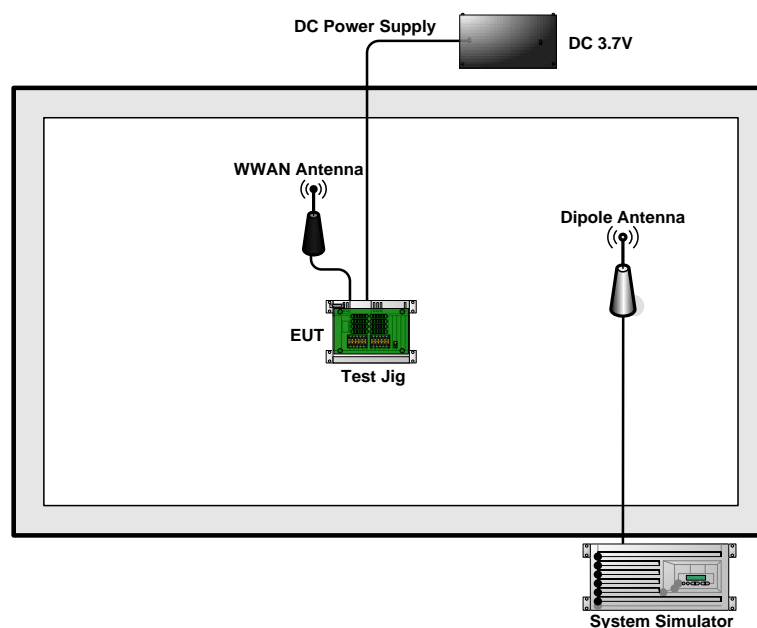
1. 30 MHz to 10th harmonic for GSM850.
2. 30 MHz to 10th harmonic for GSM1900.

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

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

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW INSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
3.	WWAN Antenna	N/A	N/A	N/A	N/A	N/A
4.	Test Jig	N/A	N/A	N/A	N/A	N/A

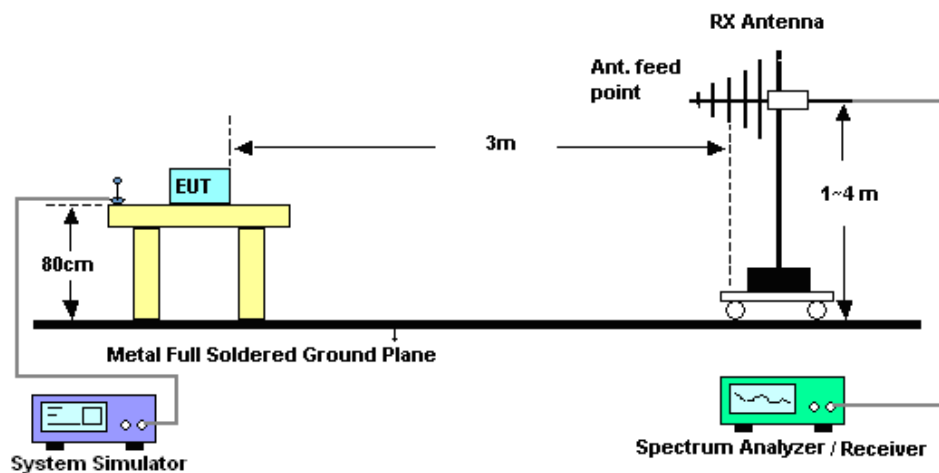
3 Radiated Test Items

3.1 Measuring Instruments

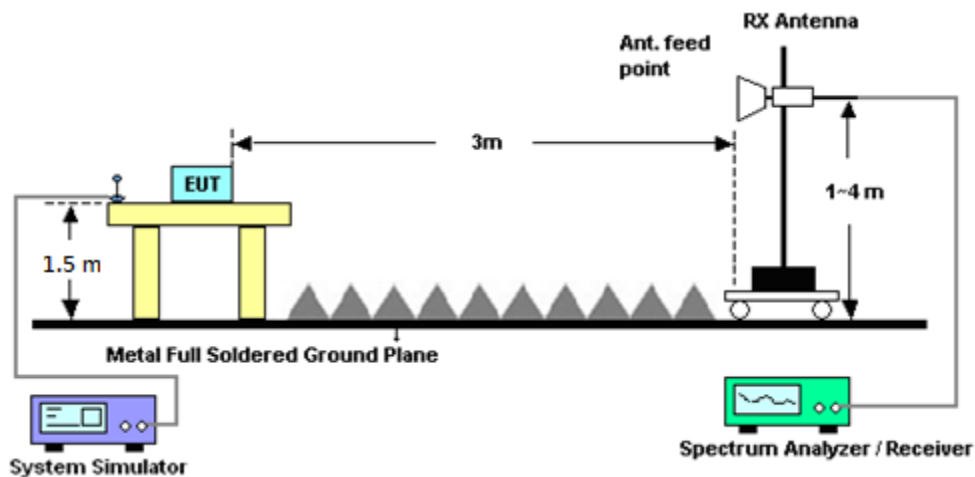
See list of measuring instruments of this test report.

3.2 Test Setup

3.2.1 For radiated test from 30MHz to 1GHz



3.2.2 For radiated test above 1GHz



3.3 Test Result of Radiated Test

Please refer to Appendix A.



3.4 Field Strength of Spurious Radiation Measurement

3.4.1 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.

3.4.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.
2. The EUT was placed on a non-conductive rotating platform with height 0.8 and 1.5 meters above ground for frequency below 1GHz and above 1GHz respectively.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12. $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY54450083	20Hz~8.4GHz	May 07, 2016	Jun. 05, 2016	May 06, 2017	Radiation (03CH03-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz	May 07, 2016	Jun. 05, 2016	May 06, 2017	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 07, 2016	Jun. 05, 2016	May 06, 2017	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz~2GHz	May 21, 2016	Jun. 05, 2016	May 20, 2017	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1355	1GHz~18GHz	May 07, 2016	Jun. 05, 2016	May 06, 2017	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 17, 2015	Jun. 05, 2016	Jul. 16, 2016	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Aug.19, 2015	Jun. 05, 2016	Aug. 18, 2016	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102210	0.01Hz ~3000MHz	Oct. 20, 2015	Jun. 05, 2016	Oct. 19, 2016	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P-R	1943528	1GHz~18GHz	Oct. 20, 2015	Jun. 05, 2016	Oct. 19, 2016	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Jan. 12, 2016	Jun. 05, 2016	Jan. 11, 2017	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	61601000198 5	N/A	NCR	Jun. 05, 2016	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jun. 05, 2016	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jun. 05, 2016	NCR	Radiation (03CH03-SZ)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1 dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0 dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0 dB
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Appendix A. Test Results of Radiated Test

Radiated Spurious Emission

GSM850									
Channel	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)
Lowest	1648.4	-36.50	-13	-23.50	-42.81	-43.19	0.56	9.40	H
	2472.6	-24.98	-13	-11.98	-35.36	-32.69	0.74	10.60	H
	3296.8	-43.60	-13	-30.60	-53.73	-53.20	0.85	12.60	H
	4121	-40.91	-13	-27.91	-53.60	-50.47	0.89	12.60	H
	1648.4	-41.69	-13	-28.69	-46.93	-48.38	0.56	9.40	V
	2472.6	-26.93	-13	-13.93	-36.29	-34.64	0.74	10.60	V
	3296.8	-46.97	-13	-33.97	-56.25	-56.57	0.85	12.60	V
	4121	-32.81	-13	-19.81	-47.18	-42.37	0.89	12.60	V
Middle	1672	-38.94	-13	-25.94	-45.13	-45.63	0.56	9.40	H
	2510	-23.02	-13	-10.02	-33.10	-30.73	0.74	10.60	H
	3346	-51.22	-13	-38.22	-60.03	-60.82	0.85	12.60	H
	4180	-41.50	-13	-28.50	-53.89	-51.06	0.89	12.60	H
	1672	-40.46	-13	-27.46	-45.86	-47.15	0.56	9.40	V
	2510	-27.79	-13	-14.79	-37.08	-35.50	0.74	10.60	V
	3346	-51.06	-13	-38.06	-59.20	-60.66	0.85	12.60	V
	4180	-33.50	-13	-20.50	-47.83	-43.06	0.89	12.60	V
Highest	1697.6	-35.86	-13	-22.86	-42.22	-42.55	0.56	9.40	H
	2546.4	-24.84	-13	-11.84	-35.16	-32.55	0.74	10.60	H
	3395.2	-53.71	-13	-40.71	-62.52	-63.31	0.85	12.60	H
	4244	-37.55	-13	-24.55	-50.91	-47.11	0.89	12.60	H
	1697.6	-44.39	-13	-31.39	-49.26	-51.08	0.56	9.40	V
	2546.4	-27.07	-13	-14.07	-36.43	-34.78	0.74	10.60	V
	3395.2	-52.94	-13	-39.94	-61.08	-62.54	0.85	12.60	V
	4244	-34.22	-13	-21.22	-48.51	-43.78	0.89	12.60	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



GSM1900									
Channel	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)
Lowest	3700.4	-52.81	-13	-39.81	-66.36	-58.85	6.56	12.60	H
	5550.6	-52.17	-13	-39.17	-68.11	-57.27	8	13.10	H
	7400.8	-48.23	-13	-35.23	-66.97	-49.96	9.57	11.30	H
	3700.4	-50.15	-13	-37.15	-63.5	-56.19	6.56	12.6	V
	5550.6	-45.71	-13	-32.71	-63.06	-50.81	8	13.1	V
	7400.8	-48.74	-13	-35.74	-67.14	-50.47	9.57	11.3	V
Middle	3760	-53.32	-13	-40.32	-66.87	-59.36	6.56	12.60	H
	5640	-52.04	-13	-39.04	-67.98	-57.14	8	13.10	H
	7520	-48.60	-13	-35.60	-67.34	-50.33	9.57	11.30	H
	3760	-47.75	-13	-34.75	-61.1	-53.79	6.56	12.6	V
	5640	-49.92	-13	-36.92	-67.27	-55.02	8	13.1	V
	7520	-48.35	-13	-35.35	-66.75	-50.08	9.57	11.3	V
Highest	3819.6	-50.83	-13	-37.83	-64.38	-56.87	6.56	12.60	H
	5729.4	-51.50	-13	-38.50	-67.44	-56.60	8	13.10	H
	7639.2	-48.06	-13	-35.06	-66.80	-49.79	9.57	11.30	H
	3819.6	-42.97	-13	-29.97	-56.32	-49.01	6.56	12.6	V
	5729.4	-50.53	-13	-37.53	-67.88	-55.63	8	13.1	V
	7639.2	-48.60	-13	-35.60	-67.00	-50.33	9.57	11.3	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



Appendix C. Product Equality Declaration



Product Equity Declaration Letter

23-Dec-2015

To Whom It May Concern,

We, Sierra Wireless, certify that AirPrime HL6528RD and AirPrime HL6528RD-G2.8V shall be considered as identical for all and any Industry certification purposes.

From a HW point of view, the only differences are:

- ONE non-connected resistor to identify them on production line.
- ONE level shifter connected to I/O pad to enable customers to receive 2.8V GPIOs instead of 1.8V GPIO in HL6528RD.
- GPS component populated on the same PCB

Additionally the firmware is 100% identical.

Sincerely,

A handwritten signature in black ink, appearing to read "Denis Chabot", written over a horizontal line.

Denis CHABOT
Sierra Wireless