



# FCC RF Test Report

**APPLICANT** : Sonim Technologies, Inc.  
**EQUIPMENT** : Smart phone  
**BRAND NAME** : Sonim  
**MODEL NAME** : XP9900 (P14001)  
**FCC ID** : WYPP14010  
**STANDARD** : 47 CFR Part 2, 90(R)  
**CLASSIFICATION** : PCS Licensed Transmitter Held to Ear (PCE)  
**TEST DATE(S)** : Aug. 30, 2023 ~ Oct. 17, 2023

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26 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. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia



Approved by: Jason Jia

**Sportun International Inc. (Kunshan)**  
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300  
People's Republic of China



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### APPENDIX A. TEST RESULTS OF CONDUCTED TEST

### APPENDIX B. TEST RESULTS OF RADIATED TEST

### APPENDIX C. TEST SETUP PHOTOGRAPHS



## REVISION HISTORY



## SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.2	§2.1046	Conducted Output Power	—	Reporting only	-
	§90.542 (a)(7)	Effective Radiated Power	ERP < 3Watt	PASS	-
4.4	§2.1053 §90.543 (e)(3) §90.543 (f)	Radiated Spurious Emission	< 43+10log <sub>10</sub> (P[Watts])	PASS	Under limit 26.14 dB at 1576.000 MHz

**Note:**

This is a variant report, the change note could be referred to the XP9900\_ Class II Permissive Change letter which is exhibit separately. According to the change, only the related test cases of power and RSE from original test report (Report Number I22Z60589-WMD03) were verified for the differences.

**Conformity Assessment Condition:**

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty"

**Disclaimer:**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.



## 1 General Description

### 1.1 Applicant

**Sonim Technologies, Inc.**

4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA

### 1.2 Manufacturer

**Sonim Technologies, Inc.**

4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA

### 1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Smart phone
Brand Name	Sonim
Model Name	XP9900 (P14001)
FCC ID	WYPP14010
Tx Frequency	5G NR n14: 788 MHz ~ 798 MHz
Rx Frequency	5G NR n14: 758 MHz ~ 768 MHz
Bandwidth	n14: 5MHz / 10MHz
SCS	15kHz
Antenna Gain	<Ant. 1>: -0.56dBi <Ant. 4>: -7.03dBi
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM
IMEI Code	Conducted : 016188000785233 Radiation : 016188000788997
HW Version	V1.0
SW Version	10.0.0-01-12.0.0-10.60.10
EUT Stage	Identical Prototype

**Remark:**

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. The maximum ERP is calculated from max output power and max antenna gain, only the maximum ERP of Ant. 1 is shown in the report.



## 1.4 Maximum ERP Power

5G NR n14		PI/2 BPSK	QPSK	16QAM / 64QAM / 256QAM
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Maximum ERP(W)	Maximum ERP(W)
5	790.5~795.5	0.1091	0.1038	0.0887
10	793	0.1112	0.1109	0.0877

**Note:** All modulations have been tested, only the worst test results of PSK & QAM are shown in the report.

## 1.5 Testing Site

Sportun International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sportun International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	Sportun Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH03-KS TH01-KS	CN1257	314309

## 1.6 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH03-KS	AUDIX	E3	210616



## **1.7 Applied Standards**

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

- 47 CFR Part 2, Part 90(R)
- ANSI C63.26
- KDB 971168 D01 Power Meas License Digital Systems v03r01
- KDB 412172 D01 Determining ERP and EIRP v01r01

**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.



## 2 Test Configuration of Equipment Under Test

### 2.1 Test Mode

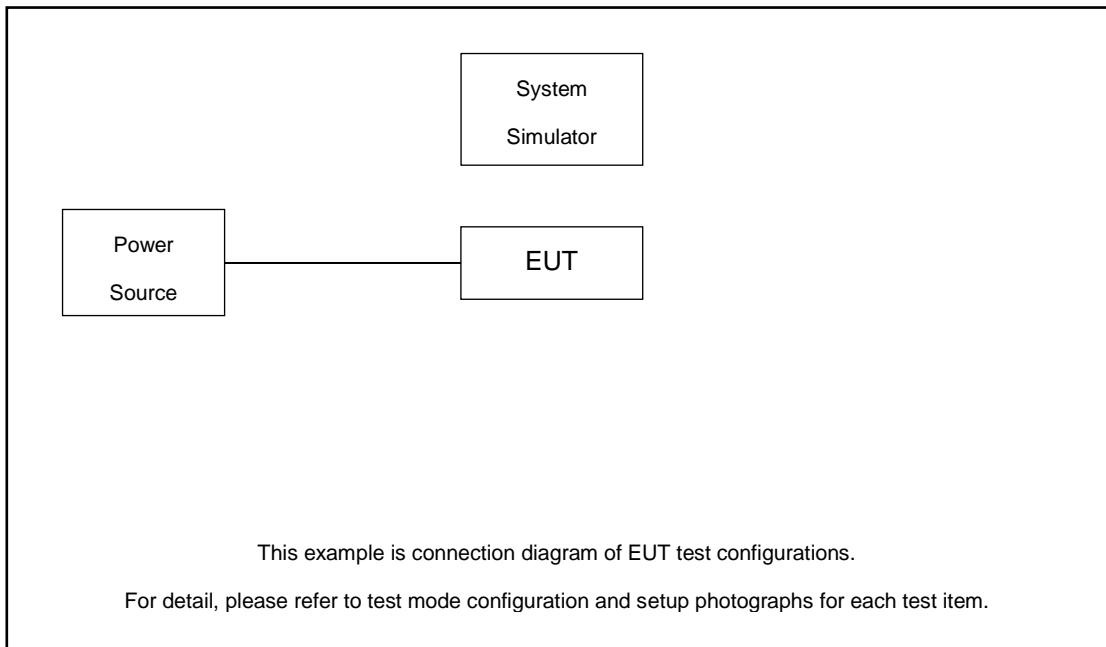
Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission. (X Plane)

Conducted Test Cases	Band	Bandwidth (MHz)						Modulation					RB #			Test Channel		
		1.4	3	5	10	15	20	PI/2 BPSK	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Max. Output Power	14	-	-	v		-	-	v	v	v	v	v	v		v	v	v	
	14	-	-		v	-	-	v	v	v	v	v	v		v		v	
E.R.P	14	-	-	v		-	-	v	v	v	v	v	v		v	v	v	
	14	-	-		v	-	-	v	v	v	v	v	v		v		v	
Radiated Spurious Emission	14	Worst Case															v	
Note		<ol style="list-style-type: none"><li>1. The mark "v" means that this configuration is chosen for testing</li><li>2. The mark "-" means that this bandwidth is not supported.</li><li>3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.</li><li>4. Frequency Stability : Normal Voltage = 3.9V ; Low Voltage =3.60V. ; High Voltage =4.45V</li></ol>																



## 2.2 Connection Diagram of Test System



## 2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	DC Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
2.	NR Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m

## 2.4 Frequency List of Low/Middle/High Channels

5G NR n14 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	-	158600	-
	Frequency	-	793	-
5	Channel	158100	158600	159100
	Frequency	790.5	793	795.5

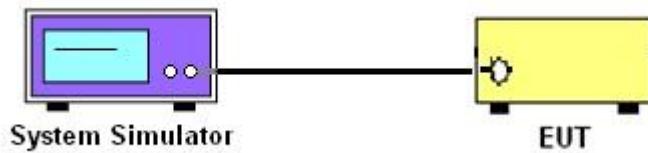
### 3 Conducted Test Items

#### 3.1 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.1 Test Setup

##### 3.1.2 Conducted Output Power



##### 3.1.3 Test Result of Conducted Test

Please refer to Appendix A.



## 3.2 Conducted Output Power and ERP

### 3.2.1 Description of the Conducted Output Power Measurement and ERP

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 14.

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$ ,  $ERP = EIRP \cdot 2.15$ , where

$P_T$  = transmitter output power in dBm

$G_T$  = gain of the transmitting antenna in dBi

$L_C$  = signal attenuation in the connecting cable between the transmitter and antenna in dB

### 3.2.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

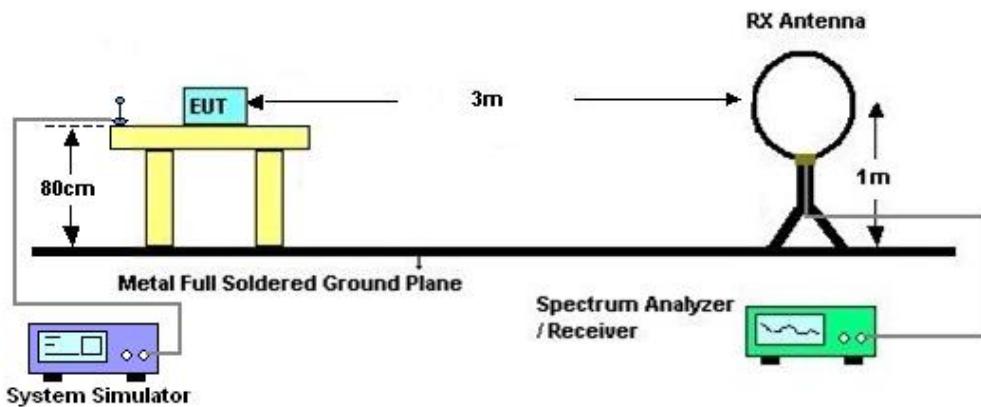
## 4 Radiated Test Items

### 4.1 Measuring Instruments

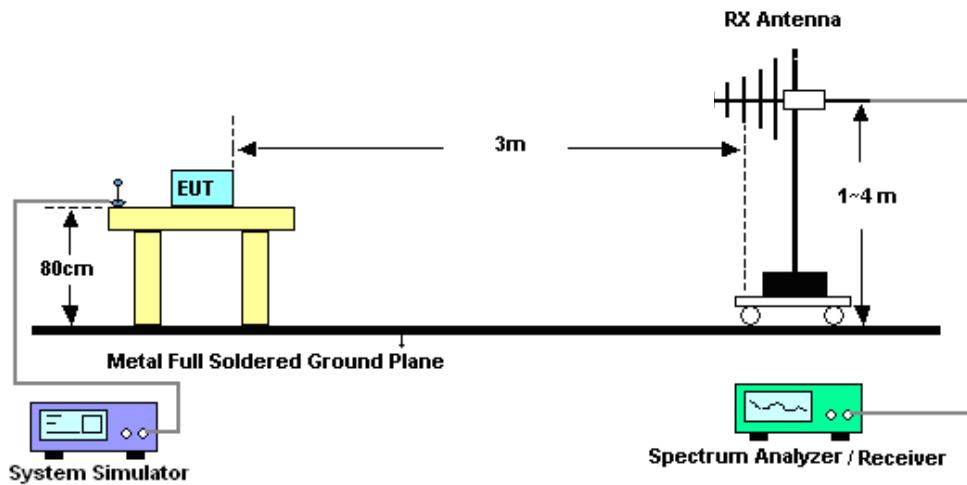
See list of measuring instruments of this test report.

### 4.2 Test Setup

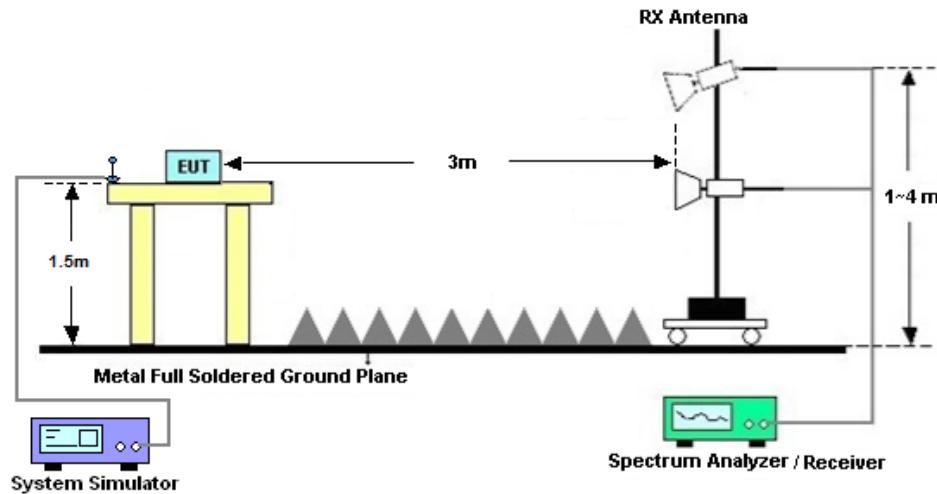
#### 4.2.1 For radiated test below 30MHz



#### 4.2.2 For radiated test from 30MHz to 1GHz



#### 4.2.3 For radiated test above 1GHz



### 4.3 Test Result of Radiated Test

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Please refer to Appendix B.



## 4.4 Radiated Spurious Emission Measurement

### 4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26.

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.

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559–1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

### 4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna 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 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15

The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

$$\begin{aligned} \text{The limit line is derived from } & 43 + 10\log(P) \text{ dB below the transmitter power } P(\text{Watts}) \\ & = P(\text{W}) - [43 + 10\log(P)] \text{ (dB)} \\ & = [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)} \\ & = -13 \text{ dBm.} \end{aligned}$$



## 5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 11, 2023	Oct. 17, 2023	Oct. 10, 2024	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Oct. 17, 2023	NCR	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44GHz	May 15, 2023	Aug. 30, 2023	May 14, 2024	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 16, 2022	Aug. 30, 2023	Oct. 15, 2023	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	30MHz-1GHz	Dec. 23, 2022	Aug. 30, 2023	Dec. 22, 2023	Radiation (03CH03-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 15, 2022	Aug. 30, 2023	Nov. 14, 2023	Radiation (03CH03-KS)
SHF-EHF Horn	com-power	AH-840	101116	18GHz~40GHz	Oct. 17, 2022	Aug. 30, 2023	Oct. 16, 2023	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	413740	30MHz ~1000MHz	Jan. 05, 2023	Aug. 30, 2023	Jan. 04, 2024	Radiation (03CH03-KS)
Amplifier	EM	EM18G40G A	060851	18~40GHz	Jan. 05, 2023	Aug. 30, 2023	Jan. 04, 2024	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P	2082394	1Ghz-18Ghz	Jan. 05, 2023	Aug. 30, 2023	Jan. 04, 2024	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Aug. 30, 2023	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Aug. 30, 2023	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Aug. 30, 2023	NCR	Radiation (03CH03-KS)

NCR: No Calibration Required



## 6 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

### Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Power	±0.46 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.76dB
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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))	3.65dB
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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))	3.57dB
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----- THE END -----



## Appendix A. Test Results of Conducted Test

<b>Test Engineer :</b>	Simle Wang	<b>Temperature :</b>		22~23°C
		<b>Relative Humidity :</b>		40~42%

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Conducted Power (dBm)	EIRP (dBm)	ERP (W)
14	15	10	158600	793	DFT-s-OFDM PI/2 BPSK	25@12	23.07	22.51	0.1086
14	15	10	158600	793	DFT-s-OFDM PI/2 BPSK	1@1	23.17	22.61	0.1112
14	15	10	158600	793	DFT-s-OFDM PI/2 BPSK	1@50	22.76	22.2	0.1012
14	15	10	158600	793	DFT-s-OFDM QPSK	25@12	23.03	22.47	0.1076
14	15	10	158600	793	DFT-s-OFDM QPSK	1@1	23.16	22.6	0.1109
14	15	10	158600	793	DFT-s-OFDM QPSK	1@50	23.02	22.46	0.1074
14	15	10	158600	793	DFT-s-OFDM 16 QAM	25@12	21.98	21.42	0.0845
14	15	10	158600	793	DFT-s-OFDM 16 QAM	1@1	22.14	21.58	0.0877
14	15	10	158600	793	DFT-s-OFDM 16 QAM	1@50	21.96	21.4	0.0841
14	15	10	158600	793	DFT-s-OFDM 64 QAM	25@12	20.65	20.09	0.0622
14	15	10	158600	793	DFT-s-OFDM 64 QAM	1@1	20.7	20.14	0.0630
14	15	10	158600	793	DFT-s-OFDM 64 QAM	1@50	20.52	19.96	0.0604
14	15	10	158600	793	DFT-s-OFDM 256 QAM	25@12	18.47	17.91	0.0377
14	15	10	158600	793	DFT-s-OFDM 256 QAM	1@1	18.13	17.57	0.0348
14	15	10	158600	793	DFT-s-OFDM 256 QAM	1@50	18.09	17.53	0.0345
14	15	10	158600	793	CP-OFDM QPSK	26@13	21.46	20.9	0.0750
14	15	10	158600	793	CP-OFDM QPSK	1@1	21.58	21.02	0.0771
14	15	10	158600	793	CP-OFDM QPSK	1@50	21.41	20.85	0.0741
14	15	5	158100	790.5	DFT-s-OFDM PI/2 BPSK	1@1	23.06	22.5	0.1084
14	15	5	158100	790.5	DFT-s-OFDM QPSK	1@1	22.85	22.29	0.1033
14	15	5	158100	790.5	DFT-s-OFDM 16 QAM	1@1	22.19	21.63	0.0887
14	15	5	158600	793	DFT-s-OFDM PI/2 BPSK	1@1	23.04	22.48	0.1079
14	15	5	158600	793	DFT-s-OFDM QPSK	1@1	22.78	22.22	0.1016
14	15	5	158600	793	DFT-s-OFDM 16 QAM	1@1	22.03	21.47	0.0855
14	15	5	159100	795.5	DFT-s-OFDM PI/2 BPSK	1@1	23.09	22.53	0.1091
14	15	5	159100	795.5	DFT-s-OFDM QPSK	1@1	22.87	22.31	0.1038
14	15	5	159100	795.5	DFT-s-OFDM 16 QAM	1@1	22.11	21.55	0.0871



## Appendix B. Test Results of Radiated Test

### Field Strength of Spurious Radiated

Test Engineer :	Chris Chen	Temperature :	23~25°C
		Relative Humidity :	41~42%

Pre-scanned harmonic for the different antennas, we choose the worst antenna mode to perform final test and record in the report.

SA n14 / NR 5MHz / QPSK / ANT1								
Bandwidth	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1576	-68.29	-42.15	-26.14	-70.92	1.09	5.87	H
	2368	-69.59	-13	-56.59	-71.99	1.37	5.92	H
	3152	-68.46	-13	-55.46	-72.35	1.64	7.68	H
	1576	-70.53	-42.15	-28.38	-73.16	1.09	5.87	V
	2368	-68.96	-13	-55.96	-71.36	1.37	5.92	V
	3152	-68.22	-13	-55.22	-72.11	1.64	7.68	V
Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Test Result				PASS				