FCC REPORT

Applicant:	Sinocastel Co.,Ltd.
Address of Applicant:	5/F, 5th Building, Software Park, No.2 Gaoxin C. 3rd Road, Hi-Tech. Industrial Park, Shenzhen, China

Equipment Under Test (EUT)

Product Name:	OBD Vehicle Tracking Device
Model No.:	IDD-213CS, IDD-213CA
FCC ID:	S8U213C
Applicable standards:	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part22 Subpart H FCC CFR Title 47 Part24 Subpart E
Date of sample receipt:	15 Jan., 2015
Date of Test:	15 Jan., to 03 Feb., 2015
Date of report issued:	03 Feb., 2015
Test Result:	PASS *

*   In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

2. Version

Version No.	Date	Description
00	*03 Feb., 2015*	*This report was based on the* *FCC ID : RI7CE910-DUAL differences test.*

Prepared by: *Luna Gao*   **Date:**   *03 Feb., 2015*

Report Clerk

Reviewed by: *Wimer Zhang*   **Date:**   *03 Feb., 2015*

Project Engineer

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3. Contents

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4. Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Passed* (Please refer to SAR Report)
RF Output Power	Part 2.1046 Part 22.913 (a)(2) Part 24.232 (c)	N/A
Modulation Characteristics	Part 2.1047	N/A
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917 Part 24.238	N/A
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 (a) Part 24.238 (a)	N/A
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) Part 24.238 (a)	Pass
Out of band emission, Band Edge	Part 22.917 (a) Part 24.238 (a)	N/A
Frequency stability vs. temperature	Part 2.1055(a)(1)(b)	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2)	Pass

Pass: The EUT complies with the essential requirements in the standard.

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5. General Information

5.1 Client Information

Applicant:	Sinocastel Co.,Ltd.
Address of Applicant:	5/F, 5th Building, Software Park, No.2 Gaoxin C. 3rd Road, Hi-Tech. Industrial Park, Shenzhen , China
Manufacturer:	Sinocastel Co.,Ltd.
Address of Manufacturer:	5/F, 5th Building, Software Park, No.2 Gaoxin C. 3rd Road, Hi-Tech. IndustrialPark, Shenzhen, China
Factory:	China Vehicle Multimedia Internet System Ltd. Company
Address of Factory:	8/F, A2 Building, Longma Industry town, Shixin Community, Shiyan Street, Baoan District, Shenzhen City, China

5.2 General Description of E.U.T.

Product Name:	OBD Vehicle Tracking Device
Model No.:	IDD-213CS, IDD-213CA
Operation Frequency range:	CDMA 800: 824.70MHz-848.31MHz CDMA 1900: 1851.25MHz-1908.75MHz GPS:1.57542GHz
Antenna type:	Internal Antenna
Antenna gain:	CDMA 800: 0.3 dBi CDMA 1900: 1.3 dBi GPS:1.5 dBi
Power supply:	Rechargeable Li-ion Battery DC3.7V-150mAh
Remark:	Model No.: IDD-213CS, IDD-213CA were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name.

Operation Frequency List:

CDMA 800		CDMA1900	
Channel:	Frequency (MHz)	Channel:	Frequency (MHz)
1013	824.70	25	1851.25
1014	824.73	26	1851.28
….	….	….	….
383	836.49	599	1879.97
384	836.52	600	1880
385	836.55	601	1880.03
…	…	…	…
776	848.28	1174	1908.72
777	848.31	1175	1908.75

Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

CDMA 800			CDMA 1900		
	Channel	Frequency(MHz)		Channel	Frequency(MHz)
Lowest channel	1013	824.70	Lowest channel	25	1851.25
Middle channel	384	836.52	Middle channel	600	1880.00
Highest channel	777	848.31	Highest channel	1175	1908.75

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5.3 Test modes

Data mode (CDMA800)	Keep the EUT in data communicating mode on CDMA 800 band.
Data mode(CDMA1900)	Keep the EUT in data communicating mode on CDMA 1900 band.

5.4 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR 47 Rules.

5.5 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

5.6 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in out files. Registration 817957, February 27, 2012.

● **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

5.7 Laboratory Location

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5.8 Test Instruments list

	Radiated Emission:					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	08-23-2014	08-22-2017
2	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	04-19-2014	04-19-2015
3	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	04-19-2014	04-19-2015
4	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
5	Coaxial Cable	CCIS	N/A	CCIS0016	04-01-2014	03-31-2015
6	Coaxial Cable	CCIS	N/A	CCIS0017	04-01-2014	03-31-2015
7	Coaxial cable	CCIS	N/A	CCIS0018	04-01-2014	03-31-2015
8	Coaxial Cable	CCIS	N/A	CCIS0019	04-01-2014	03-31-2015
9	Coaxial Cable	CCIS	N/A	CCIS0087	04-01-2014	03-31-2015
10	Amplifier(10kHz-1.3GHz)	HP	8447D	CCIS0003	04-01-2014	03-31-2015
11	Amplifier(1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	06-09-2014	06-08-2015
12	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	04-01-2014	03-31-2015
13	Horn Antenna	ETS-LINDGREN	3160	GTS217	03-31-2014	03-29-2015
14	Printer	HP	HP LaserJet P1007	N/A	N/A	N/A
15	Positioning Controller	UC	UC3000	CCIS0015	N/A	N/A
16	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP	CCIS0023	04-19-2014	04-19-2015
17	EMI Test Receiver	Rohde & Schwarz	ESPI	CCIS0022	04-01-2014	03-31-2015
18	Loop antenna	Laplace instrument	RF300	EMC0701	04-01-2014	03-31-2015
19	Universal radio communication tester	Rhode & Schwarz	CMU200	CCIS0069	05-29-2014	05-28-2015
20	Signal Analyzer	Rohde & Schwarz	FSIQ3	CCIS0088	04-19-2014	04-19-2015

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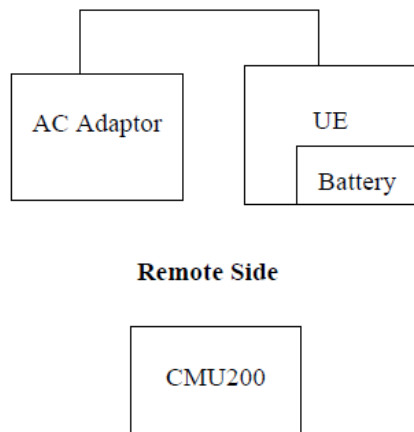
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6. System test configuration

6.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

6.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency which was for the purpose of the measurements.

6.3 Configuration of Tested System

```
         ┌────────────┐
         │            │
   ┌─────┴─────┐   ┌──┴──────────┐
   │ AC Adaptor│   │     UE      │
   │           │   │  ┌──────────┤
   │           │   │  │ Battery  │
   └───────────┘   └──┴──────────┘

      Remote Side

        ┌───────────┐
        │  CMU200   │
        │           │
        └───────────┘
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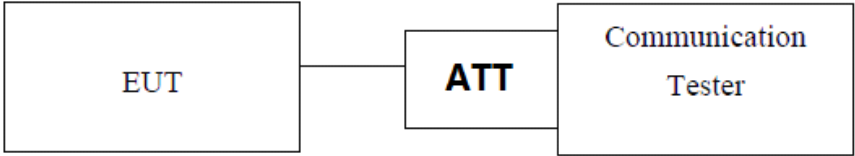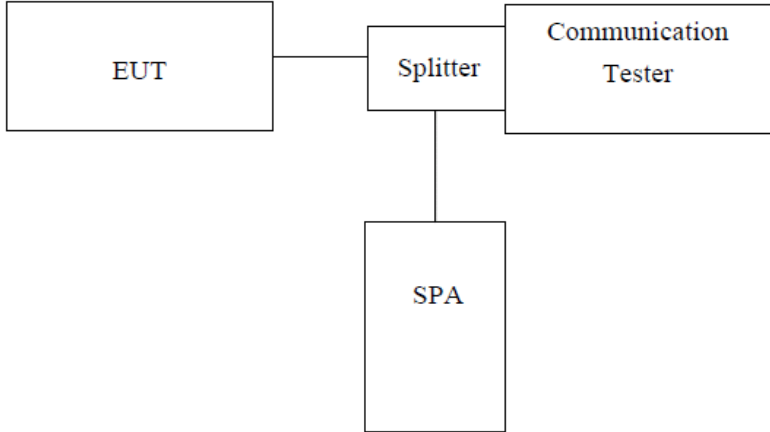
6.4 Description of Test Modes

The EUT has been tested under operating condition.
EUT staying in continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing.
The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for three modes (CDMA800 and CDMA1900,) with power adaptor, earphone and Data cable. The worst-case H mode for CDMA800 and CDMA1900.

Remark: The OBD Vehicle Tracking Device only refer to CDMA Wireless Data Module (FCC ID: RI7CE910-DUAL) of the

data link functions, so we refer to the FCC ID: RI7CE910-DUAL conduction method test data, report data were radiated

spurious and ERP&EIRP difference test.

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6.5 Conducted Output Power

Test Requirement:	FCC part 22.913(a) and FCC part 24.232(b)
Test Method:	FCC part 2.1046
Limit:	CDMA 800: 7W CDMA 1900: 2W
Test setup:	 EUT — ATT — Communication Tester *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	The transmitter output was connected to a calibrated attenuator, the other end of which was connected to the CMU200. Transmitter output power was read off in dBm.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Refer to FCC ID: RI7CE910-DUAL

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6.6 Occupy Bandwidth

Test Requirement:	FCC part 22.913(a) and FCC part 24.232(b)
Test Method:	FCC part 2.1049
Test setup:
Note: Measurement setup for testing on Antenna connector
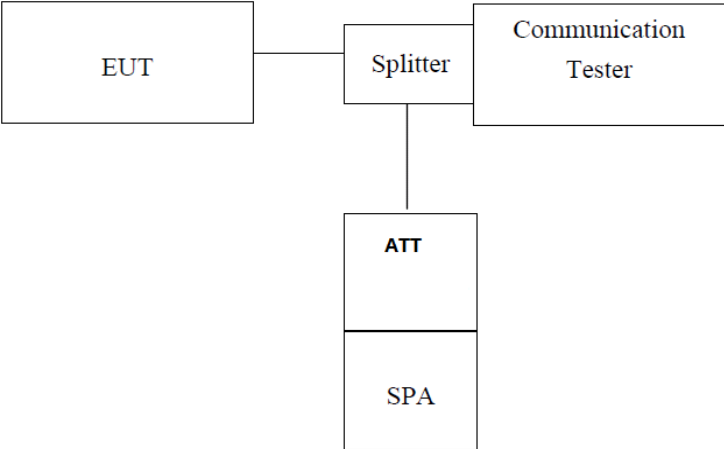| Test Procedure:	1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer 2. RBW was set to about 1% of emission BW, VBW= 3 times RBW. 3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Refer to FCC ID: RI7CE910-DUAL

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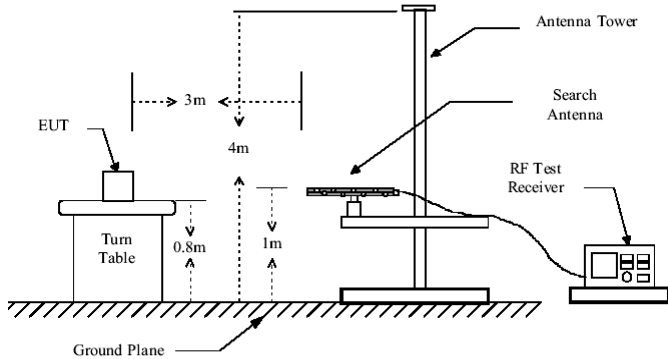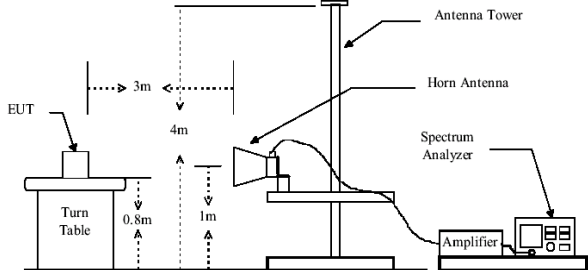
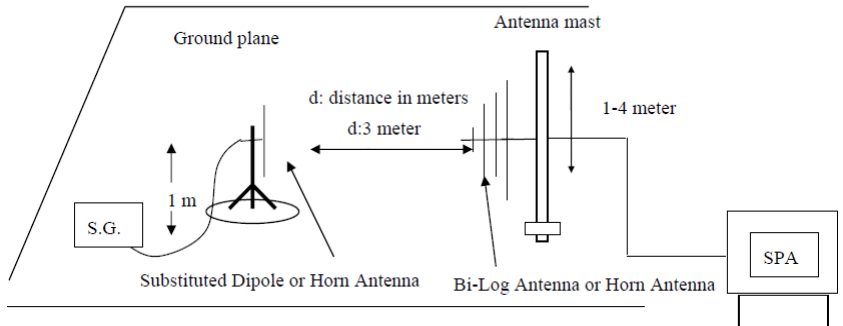Project No.: CCIS150100032RF

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6.7 Modulation Characteristic

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

6.8 Out of band emission at antenna terminals

Test Requirement:	FCC part22.917(a) and FCC part24.238(a)
Test Method:	FCC part2.1051
Limit:	-13dBm
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 The resolution bandwidth of the spectrum analyzer was set at 100 kHz when below 1GHz, 1MHz when above 1 GHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic. 3 For the out of band: Set the RBW=100 kHz, VBW=300 kHz when below 1 GHz, RBW =1 MHz, VBW=3 MHz when above 1 GHz, Start=30MHz, Stop= 10th harmonic. 4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Refer to FCC ID: RI7CE910-DUAL

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6.9 ERP, EIRP Measurement

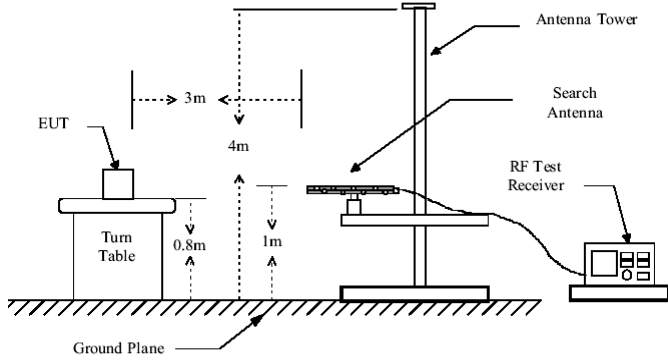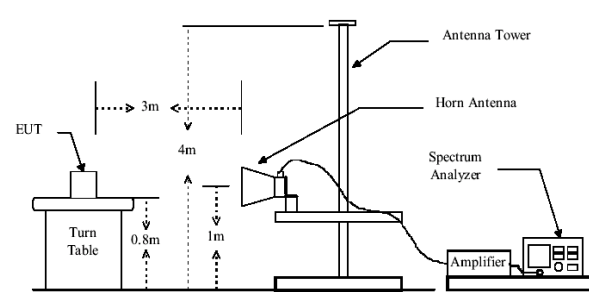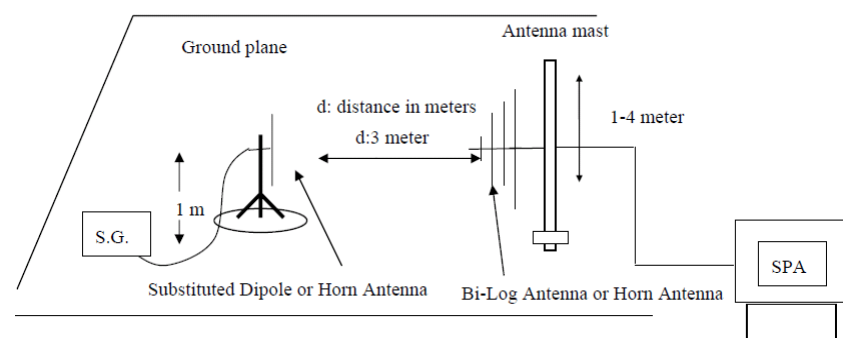| Test Requirement:	FCC part 22.913(a) and FCC part 24.232(b)
Test Method:	FCC part 2.1046
Limit:	CDMA 800: 7W ERP CDMA 1900: 2W EIRP
Test setup:	Below 1GHz Above 1GHz Substituted method:

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Test Procedure:	1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
	2. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.
	3. ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows: ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)
	4. EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows: EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)
	5. The worse case was relating to the conducted output power.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data (worst case)

EUT mode	Channel	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
CDMA800	1013	H	V	13.42	38.45	Pass
			H	18.42		
		E1	V	13.27		
			H	18.33		
		E2	V	13.15		
			H	18.29		
	384	H	V	20.12		
			H	14.63		
		E1	V	20.03		
			H	14.41		
		E2	V	19.92		
			H	14.36		
	777	H	V	14.15		
			H	20.76		
		E1	V	14.00		
			H	20.53		
		E2	V	13.86		
			H	20.30		

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EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
CDMA1900	25	H	V	23.79	33.00	Pass
			H	19.13		
		E1	V	23.55		
			H	19.02		
		E2	V	23.21		
			H	18.86		
	600	H	V	23.50		
			H	18.82		
		E1	V	23.31		
			H	18.69		
		E2	V	23.23		
			H	18.54		
	1175	H	V	21.79		
			H	18.28		
		E1	V	21.62		
			H	18.23		
		E2	V	21.46		
			H	18.17		

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6.10 Field strength of spurious radiation measurement

Test Requirement:	FCC part 22.917(a) and FCC part 24.238(a)
Test Method:	FCC part 2.1053
Limit:	-13dBm
Test setup:	Below 1GHz Above 1GHz Substituted method:

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Test Procedure:	1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
	2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.
	3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.
	4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB)
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details. Based on the ERP/EIRP results, we selected CDMA800 and CDMA1900 for Radiated spurious emission test, other modes were not test.
Test results:	Passed

Measurement Data (worst case)

Test Channel	Test mode:	CDMA800		Lowest	
CH1013		Spurious Emission		Limit (dBm)	Result
	Frequency (MHz)	Polarization	Level (dBm)		
	1646.95	Vertical	-20.10	-13	Pass
	2474.92	V	-22.54		
	3299.78	V	-44.85		
	4128.28	V	-43.21		
	4946.07	V	-40.52		
	5776.92	V	-33.90		
	1646.95	Horizontal	-25.45		
	2474.92	H	-32.15		
	3299.78	H	-49.61		
	4128.28	H	-47.81		
	4946.07	H	-40.46		
	5776.92	H	-36.38		

Test Channel	Test mode:	CDMA800		Middle	
CH384		Spurious Emission		Limit (dBm)	Result
	Frequency (MHz)	Polarization	Level (dBm)		
	1672.30	Vertical	-27.88	-13	Pass
	2512.01	V	-28.48		
	3350.56	V	-45.91		
	4181.16	V	-47.55		
	5022.19	V	-41.02		
	5865.83	V	-36.13		
	1672.30	Horizontal	-28.07		
	2512.01	H	-29.41		
	3350.56	H	-46.83		
	4181.16	H	-48.28		
	5022.19	H	-42.89		
	5865.83	H	-35.98		

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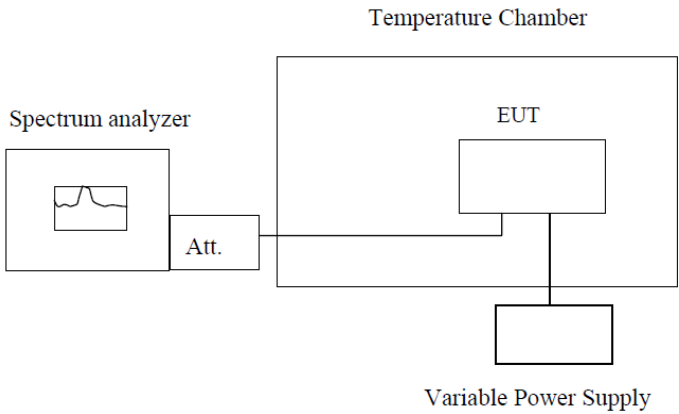| Test Channel	Test mode:	CDMA800				Highest
		Spurious Emission		Limit (dBm)		Result
	Frequency (MHz)	Polarization	Level (dBm)			
CH777	1693.72	Vertical	-21.88	-13		Pass
	2545.20	V	-20.61			
	3393.48	V	-41.47			
	4245.51	V	-45.47			
	5099.49	V	-41.67			
	5940.97	V	-32.42			
	1693.72	Horizontal	-29.06			
	2545.20	H	-25.89			
	3393.48	H	-44.34			
	4245.51	H	-45.28			
	5099.49	H	-41.24			
	5940.97	H	-36.97			

Remark：

1. The emission behavior belongs to narrowband spurious emission.
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

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Test Channel	Test mode:	CDMA1900		Test channel:	Lowest
CH25	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
	3700.26	Vertical	-37.15	-13	Pass
	5550.50	V	-29.66		
	3700.26	Horizontal	-33.46		
	5550.50	H	-34.83		
	7400.80	H	-39.63		
	9251.00	H	-30.71		
Test Channel	**Test mode:**	**CDMA1900**		**Test channel:**	**Middle**
CH600	Frequency (MHz)	Spurious Emission		Limit (dBM)	Result
		Polarization	Level (dBm)		
	3757.28	Vertical	-33.13	-13	Pass
	5646.079	V	-24.36		
	7520.00	V	-39.65		
	9417.908	V	-27.59		
	11280.00	V	-30.89		
	3757.208	Horizontal	-29.11		
	5646.079	H	-25.02		
	7520.00	H	-39.85		
	9417.91	H	-31.68		
Test Channel	**Test mode:**	**CDMA1900**		**Test channel:**	**Highest**
CH1175	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
	3815.033	Vertical	-31.70	-13	Pass
	5732.974	V	-38.56		
	7639.20	V	-39.74		
	9562.854	V	-30.73		
	3815.033	Horizontal	-30.81		
	5732.974	H	-35.73		
	7639.20	H	-39.41		
	9562.854	H	-34.09		

Remark：

1. The emission behavior belongs to narrowband spurious emission.

2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

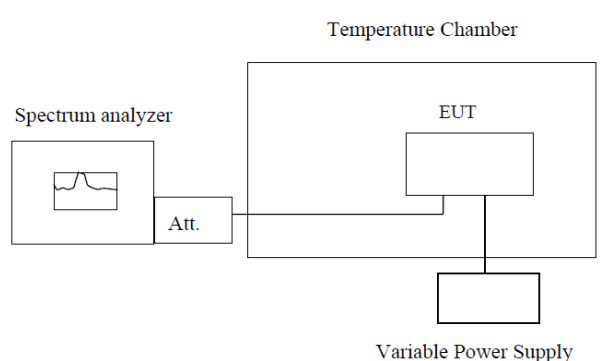Shenzhen Zhongjian Nanfang Testing Co., Ltd.
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6.11 Frequency stability V.S. Temperature measurement

Test Requirement:	FCC Part 2.1055(a)(1)(b)
Test Method:	FCC Part 2.1055(a)(1)(b)
Limit:	2.5 ppm
Test setup:	 Note : Measurement setup for testing on Antenna connector
Test procedure:	1. The equipment under test was connected to an external DC power supply and input rated voltage. 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	All three channels of all modulations have been tested, but only the worst channel and the worst modulation show in this test item.

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Measurement Data:

Reference Frequency: Middle channel=384 channel=836.52MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	182	0.217568	2.5	Pass
	-20	163	0.194855		
	-10	140	0.167360		
	0	105	0.125520		
	10	124	0.148233		
	20	109	0.130302		
	30	134	0.160187		
	40	128	0.153015		
	50	107	0.127911		

Reference Frequency: Middle channel=600 channel=1880MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	168	0.089362	2.5	Pass
	-20	145	0.077128		
	-10	134	0.071277		
	0	120	0.063830		
	10	118	0.062766		
	20	124	0.065957		
	30	109	0.057979		
	40	102	0.054255		
	50	115	0.061170		

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6.12   Frequency stability V.S. Voltage measurement

Test Requirement:	FCC Part 2.1055(d)(1)(2)
Test Method:	FCC Part 2.1055(d)(1)(2)
Limit:	2.5ppm
Test setup:	Temperature Chamber Spectrum analyzer EUT Att. Variable Power Supply **Note :** Measurement setup for testing on Antenna connector
Test procedure:	1. Set chamber temperature to 25℃. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. 3. Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details, and all channels have been tested, only shows the worst channel data in this report.
Test results:	Passed

Measurement Data (the worst channel):

Reference Frequency: Middle channel=384 channel=836.52MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	127	0.151819	2.5	Pass
	3.70	98	0.117152		
	3.40	87	0.104002		

Reference Frequency: Middle channel=600 channel=1880MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	102	0.054255	2.5	Pass
	3.70	94	0.050000		
	3.40	82	0.043617		

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