

# TEST REPORT (WCDMA)

**Applicant:** Shanghai Notion Information Technology CO. LTD

**Address of Applicant:** Floor 5, Building 5, NO 289, Bisheng Rd, Pudong district, Shanghai, China

**Manufacturer:** Shanghai Notion Information Technology CO. LTD

**Address of Manufacturer:** Floor 5, Building 5, NO 289, Bisheng Rd, Pudong district, Shanghai, China

## Equipment Under Test (EUT)

**Product Name:** CPE

**Model No.:** R01, R05, R051, R0511, R0516, P01, P05, P051, P0511, P0561

**FCC ID:** 2AR45-CPE01

**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:** May 29, 2020

**Date of Test:** June 01-June 08, 2020

**Date of report issued:** June 09, 2020

**Test Result :** PASS \*

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

Authorized Signature:

  
A handwritten signature in black ink, appearing to read "Robinson Lo" and "June 09, 2020". To the left of the signature is a circular blue stamp with the text "GTS" in the center, surrounded by "GLOBAL UNITED TECHNOLOGY SERVICES" and "ESTD 2001".

**Robinson Lo**  
**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

Version No.	Date	Description
00	June 09, 2020	Original

Prepared By:

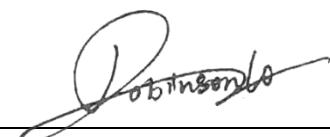


Date:

June 09, 2020

Project Engineer

Check By:



Date:

June 09, 2020

Reviewer

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## 4 Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Pass
RF Output Power	Part 2.1046 Part 22.913(a) Part 24.232(c)	Pass
Peak-to-Average Ratio	Part 2.1046 Part 22.913(d) Part 24.232(d)	Pass
Modulation Characteristics	Part 2.1047	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917(b) Part 24.238(b)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 Part 24.238	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 Part 24.238	Pass
Out of band emission, Band Edge	Part 2.1051 Part 22.917 Part 24.238	Pass
ERP and EIRP	Part 22.913(a) Part 24.232(b)	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b) Part 22.355 Part 24.235	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2) Part 22.355 Part 24.235	Pass

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

## 5 General Information

### 5.1 General Description of EUT

Product Name:	CPE
Model No.:	R01, R05, R051, R0511, R0516, P01, P05, P051, P0511, P0561
Test Model No.:	R01
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The difference is model name for commercial purpose.	
Serial No.:	R051620030600071
Hardware Version:	P056I_1_10
Software Version:	P056IColumbia_CP_R0516_V001_2.160.000_20181210_164611+20181205 /P056IColumbia_AP_R0516_V001
Support Networks:	WCDMA
Support Bands:	WCDMA Band II, Band V
TX Frequency:	WCDMA Band II: 1852.40MHz -1907.60MHz WCDMA Band V: 826.40MHz -846.60MHz
Modulation type:	WCDMA Band II/V: QPSK
Antenna type:	Integral antenna
Antenna gain:	WCDMA Band II: 2.0dBi WCDMA Band V: 2.0dBi
Power supply:	POWER ADAPTER MODEL: RD1201000-C55-91MG INPUT: AC 100-240V, 50/60Hz, 0.6A MAX OUTPUT: DC 12V/1A

**Operation Frequency List:**

WCDMA Band V		WCDMA Band II	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
4132	826.40	9262	1852.40
4133	826.60	9263	1852.60
⋮	⋮	⋮	⋮
4181	836.20	9399	1879.80
4182	836.40	9400	1880.00
4183	836.60	9401	1880.20
⋮	⋮	⋮	⋮
4232	846.40	9537	1907.40
4233	846.60	9538	1907.60

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:

**Final test channel:**

WCDMA Band V		WCDMA Band II	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
4132	826.40	9262	1852.40
4183	836.60	9400	1880.00
4233	846.60	9538	1907.60

## 5.2 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.

## 5.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on ANSI C63.26:2015 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

## 5.4 Test Facility

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

- **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 381383.

- **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A.

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

## 5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China

Tel: 0755-27798480

Fax: 0755-27798960

## 6 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	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 19 2019	Oct. 18 2020
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2019	Oct. 18 2020
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2019	Oct. 18 2020
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 26 2019	June. 25 2020

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

## 7 System test configuration

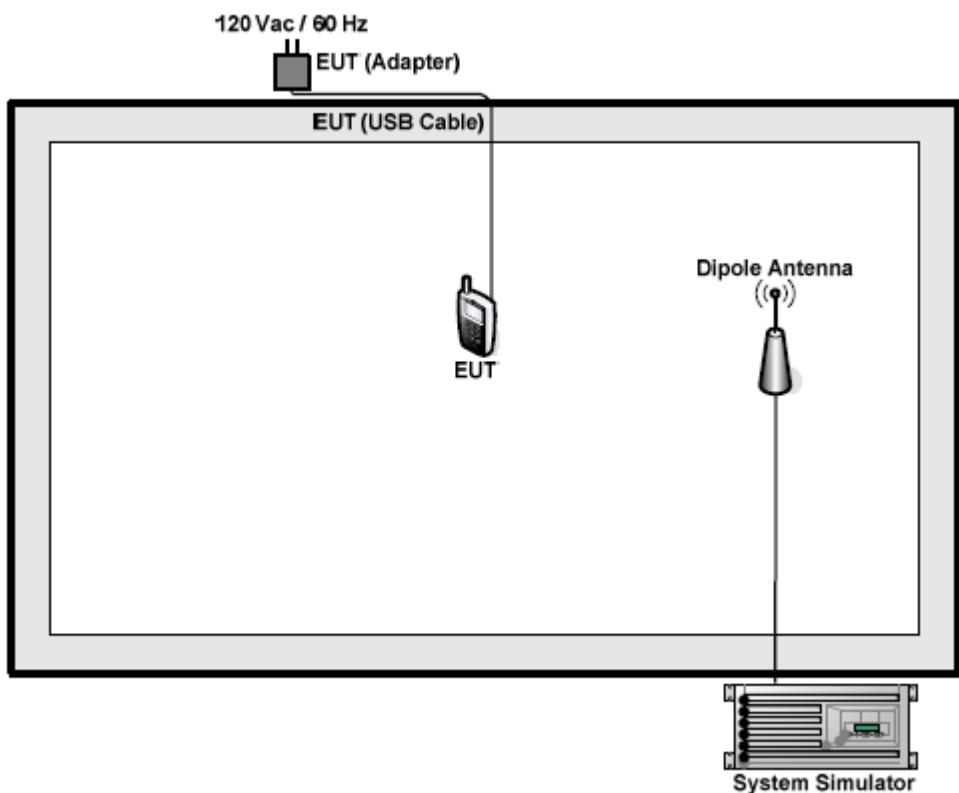
### 7.1 Test mode

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, and EUT is rotated on three test planes to find out the worst emission.

Test modes		
Band	Radiated	Conducted
WCDMA II	■ RMC 12.2Kbps link	■ RMC 12.2Kbps link
WCDMA Band V	■ RMC 12.2Kbps link	■ RMC 12.2Kbps link

Note: The maximum power level is RMC12.2Kbps mode for WCDMA Band V and Band II. Only these modes were used for all tests.

### 7.2 Configuration of Tested System



## 7.3 RF Exposure Evaluation

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

Friis transmission formula:  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>,  $P_{out}$  = output power to antenna in mW;

$G$  = gain of antenna in linear scale,  $\pi = 3.1416$ ;

$r$  = distance between observation point and center of the radiator in cm

$P_d$  is the limit of MPE, If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance  $r$  where the MPE limit is reached.

Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

## Test Result of RF Exposure Evaluation

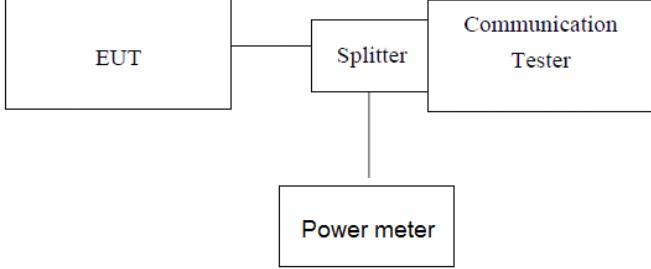
Band	Frequency (MHz)	Output power to antenna adjust tune-up tolerance(dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
Band 5	836.6	23	199.526	0.06291	1.0	PASS
Band 2	1880.0	23	199.526	0.06291	1.0	PASS

### Tune-up:

Mode	Tune-up(dBm)
Band 5	22±1
Band 2	22±1

The max power density is less than SAR exempt limit, so SAR evaluation is not required.

## 7.4 Conducted Average Output Power and ERP/EIRP

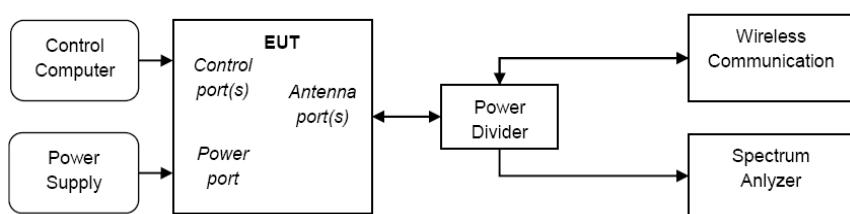
Test Requirement:	FCC part 22.913(a) and FCC part 24.232(c)
Test Method:	FCC part 2.1046
Limit:	WCDMA Band V: 7W(38.45dBm) WCDMA Band II: 2W(33dBm)
Test setup:	 <p><i>Note: Measurement setup for testing on Antenna connector</i></p>
Test Procedure:	<ol style="list-style-type: none"> <li>1. The transmitter output port was connected to base station.</li> <li>2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.</li> <li>3. Set EUT at maximum power through base station.</li> <li>4. Select lowest, middle, and highest channels for each band and different modulation.</li> <li>5. Measure the maximum burst power.</li> </ol>
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

### Measurement Data

Conducted Power (dBm)						
Band	WCDMA Band II			WCDMA Band V		
Channel	9262	9400	9538	4132	4183	4233
Frequency	1852.4	1880.0	1907.6	826.4	836.6	846.6
RMC 12.2Kbps	22.80	21.29	22.13	22.36	21.48	21.51
HSDPA Subtest-1	22.36	22.35	22.38	22.10	22.32	22.87
HSDPA Subtest-2	21.02	21.04	22.80	22.10	22.00	22.20
HSDPA Subtest-3	22.42	<b>22.94</b>	22.65	22.21	22.44	21.19
HSDPA Subtest-4	21.27	21.44	22.69	21.53	22.51	21.20
HSUPA Subtest-1	21.62	22.76	21.42	22.39	21.50	22.19
HSUPA Subtest-2	21.66	22.79	21.76	22.92	<b>22.98</b>	21.70
HSUPA Subtest-3	22.31	21.91	22.57	21.34	22.14	22.19
HSUPA Subtest-4	22.24	22.98	21.72	22.96	21.05	21.25
HSUPA Subtest-5	22.03	22.63	22.25	21.87	21.23	22.96
AMR	22.87	22.29	22.00	22.21	21.31	22.19

ERP/EIRP Power (dBm)						
Band	WCDMA Band II			WCDMA Band V		
Channel	9262	9400	9538	4132	4183	4233
Frequency	1852.4	1880.0	1907.6	826.4	836.6	846.6
RMC 12.2Kbps	24.80	23.29	24.13	22.21	21.33	21.36
HSDPA Subtest-1	24.36	24.35	24.38	21.95	22.17	22.72
HSDPA Subtest-2	23.02	23.04	24.80	21.95	21.85	22.05
HSDPA Subtest-3	24.42	24.94	24.65	22.06	22.29	21.04
HSDPA Subtest-4	23.27	23.44	24.69	21.38	22.36	21.05
HSUPA Subtest-1	23.62	24.76	23.42	22.24	21.35	22.04
HSUPA Subtest-2	23.66	24.79	23.76	22.77	<b>22.83</b>	21.55
HSUPA Subtest-3	24.31	23.91	24.57	21.19	21.99	22.04
HSUPA Subtest-4	24.24	<b>24.98</b>	23.72	22.81	20.90	21.10
HSUPA Subtest-5	24.03	24.63	24.25	21.72	21.08	22.81

## 7.5 Peak-to-Average Ratio

Test Requirement:	FCC Part 22.913(d) and FCC Part 24.232(d)
Test Method:	FCC part2.1046
Limit:	13db
Test setup:	
Test Procedure:	<p>A peak to average ratio measurement is performed at the conducted port of the EUT. For WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. The traces are generated with the spectrum analyzer set to zero span mode.</p> <p><b>Test Settings</b></p> <ol style="list-style-type: none"> <li>1. The signal analyzer's CCDF measurement profile enabled</li> <li>2. Frequency= carrier center frequency</li> <li>3. Measurement BW &gt; EBW of signal</li> <li>4. for continuous transmissions, set to 1ms</li> </ol> <p>Record the maximum PAPR level associated with a probability of 0.1%.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

### Measurement data:

Test Band	Peak to Average Ratio ( dB )			Limit ( dB )	Result
	Low Ch.	Middle Ch.	High Ch.		
WCDMA Band V	3.35	3.33	3.35	13	PASS
WCDMA Band II	3.54	3.55	3.65	13	PASS

## 7.6 Occupy Bandwidth

Test Requirement:	FCC part 22.917(b) and FCC part 24.238(b)
Test Method:	FCC part2.1049
Test setup:	<pre> graph LR     EUT[EUT] --- Splitter[Splitter]     Splitter --- SPA[SPA]     Splitter --- Tester[Communication Tester]   </pre>
<p><i>Note: Measurement setup for testing on Antenna connector</i></p>	
Test Procedure:	<ol style="list-style-type: none"> <li>1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer</li> <li>2. RBW was set to about 1% of emission BW, VBW= 3 times RBW.</li> <li>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.</li> </ol>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

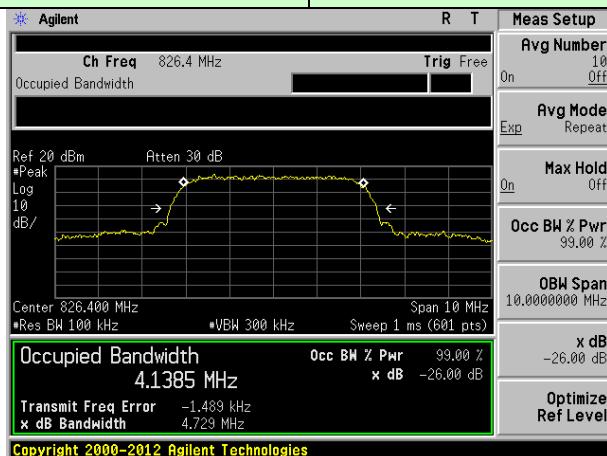
### Measurement Data

EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
WCDMA Band V (RMC 12.2Kbps link)	4132	826.40	4138.5	4729.0
	4183	836.60	4129.9	4752.0
	4233	846.60	4146.2	4735.0
WCDMA Band II (RMC 12.2Kbps link)	9262	1852.40	4148.7	4719.0
	9400	1880.00	4140.9	4743.0
	9538	1907.60	4159.7	4738.0

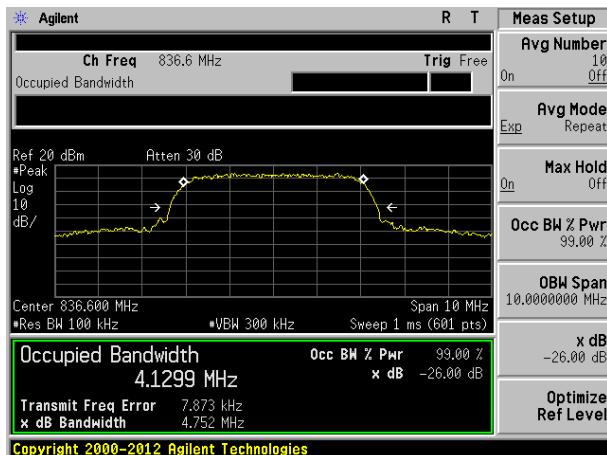
Test plot as follows:

Test band:

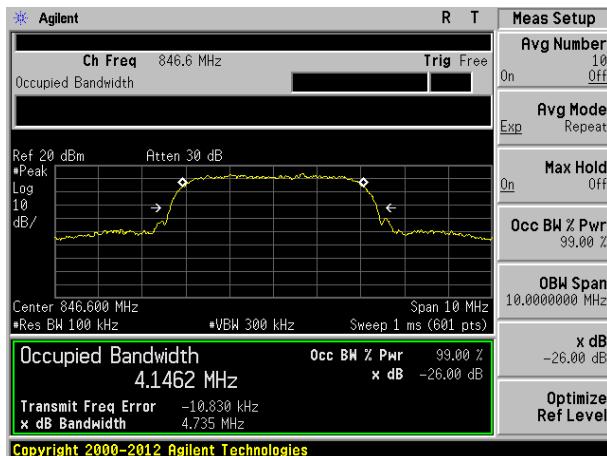
WCDMA Band V (RMC 12.2Kbps link)



Lowest channel



Middle channel



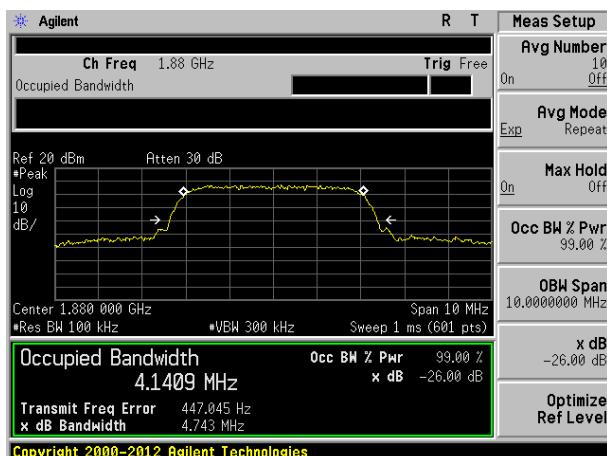
Highest channel

Test band:

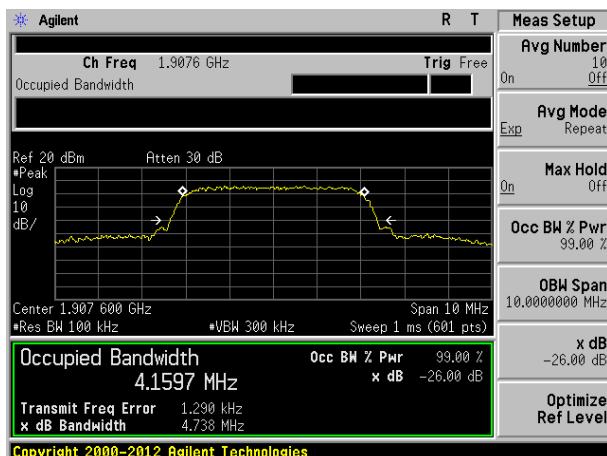
WCDMA Band II (RMC 12.2Kbps link)



Lowest channel



Middle channel



Highest channel

## 7.7 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.

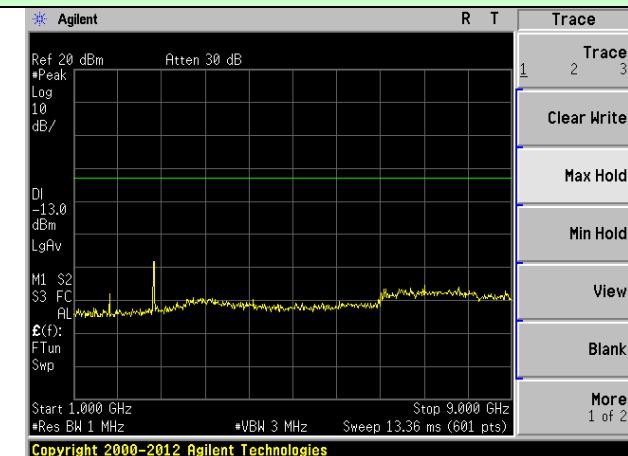
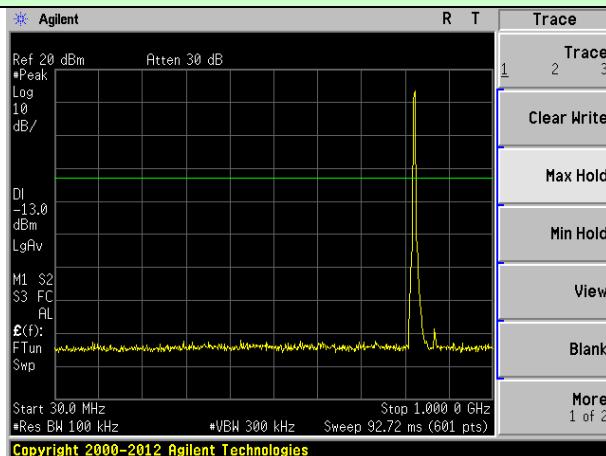
## 7.8 Out of band emission at antenna terminals

Test Requirement:	FCC part 22.917 and FCC part 24.238
Test Method:	FCC part 2.1051
Limit:	-13dBm
Test setup:	<p><i>Note: Measurement setup for testing on Antenna connector</i></p>
<p><b>Test Procedure:</b></p> <ol style="list-style-type: none"> <li>1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.</li> <li>2 The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.</li> <li>3 For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10th harmonic.</li> <li>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.</li> </ol>	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

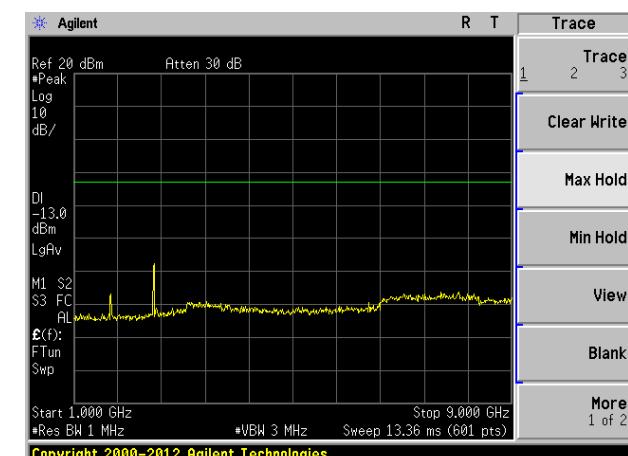
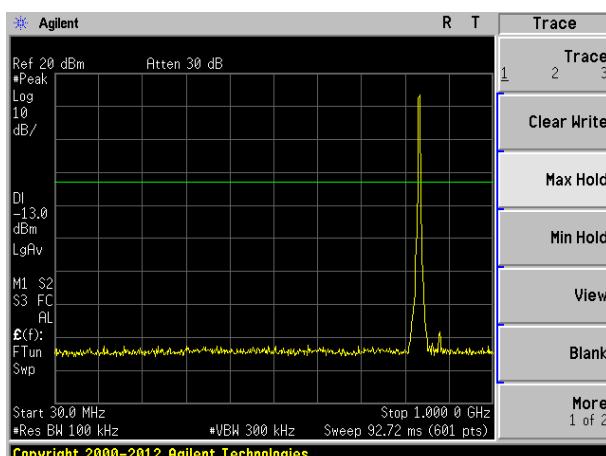
Test plot as follows:

## Test Mode: Traffic mode

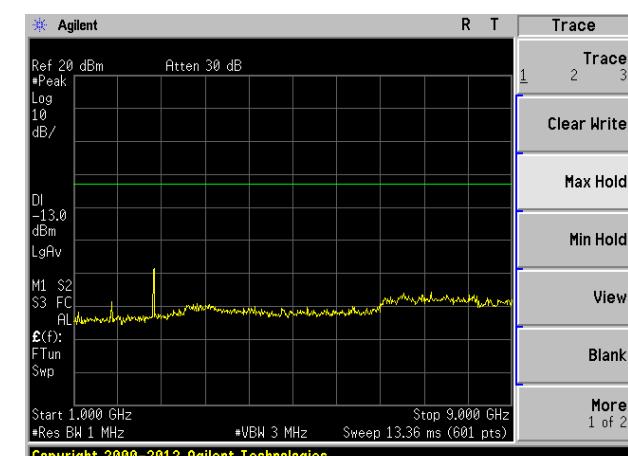
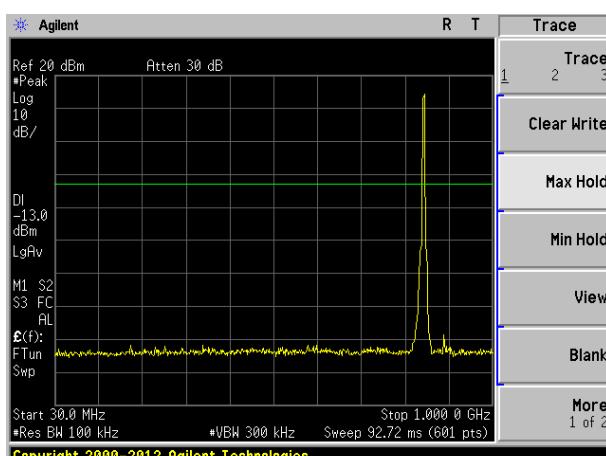
## WCDMA Band V (RMC 12.2Kbps link)



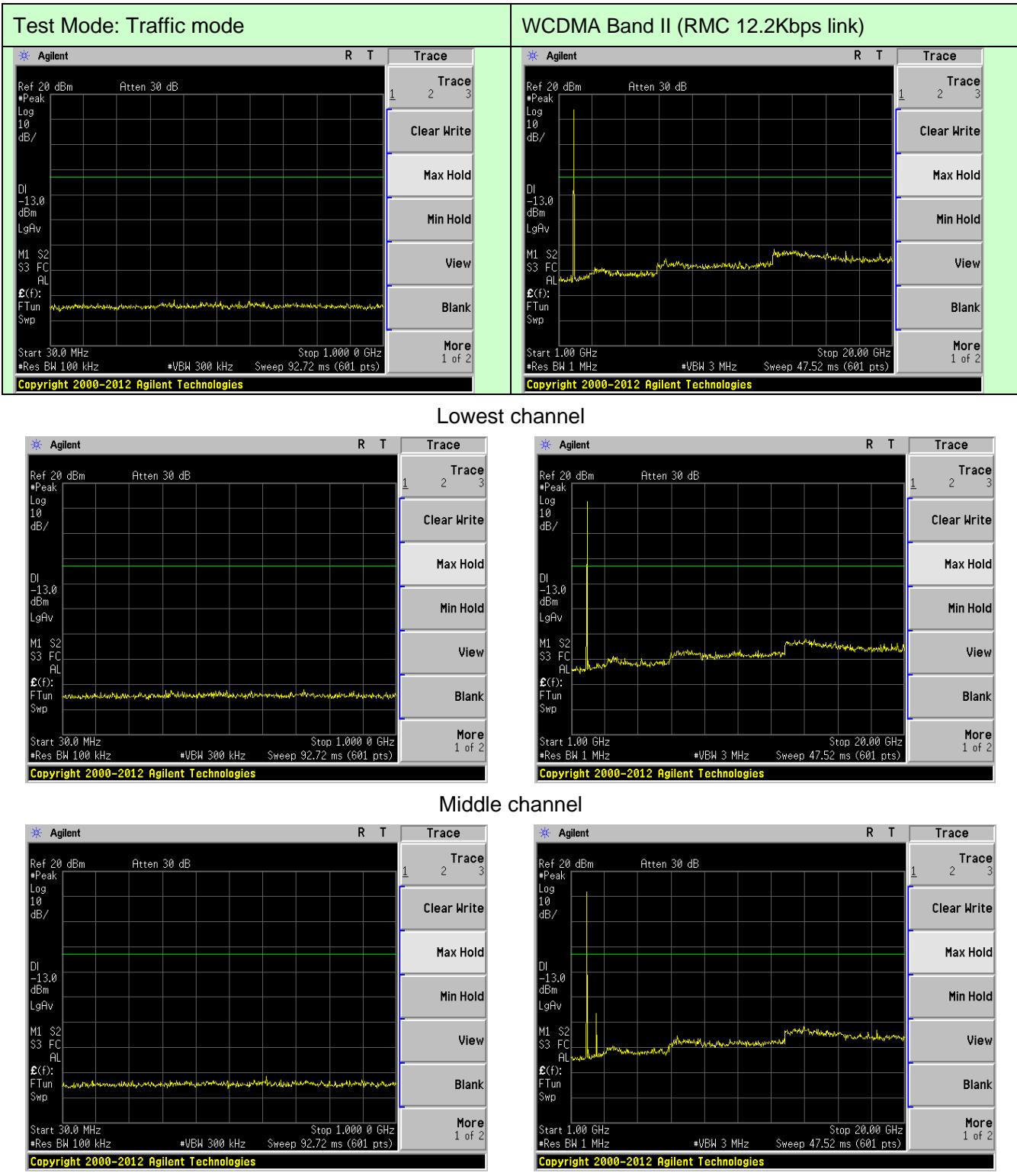
## Lowest channel



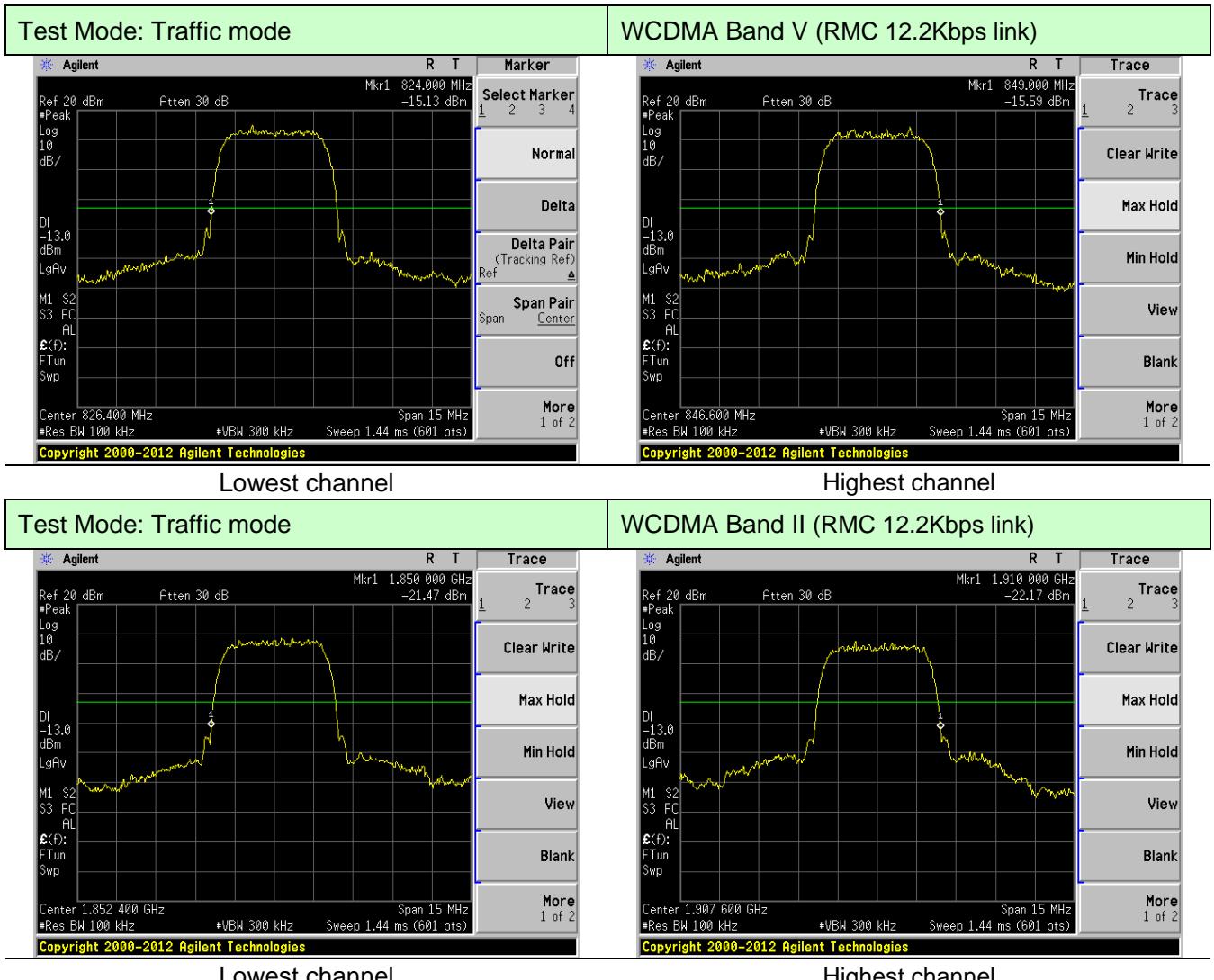
## Middle channel



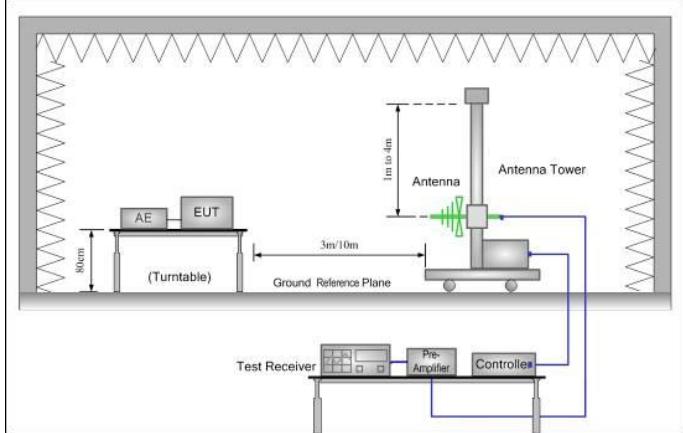
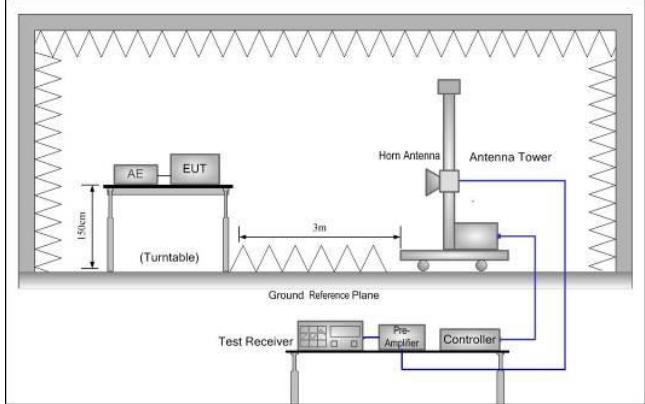
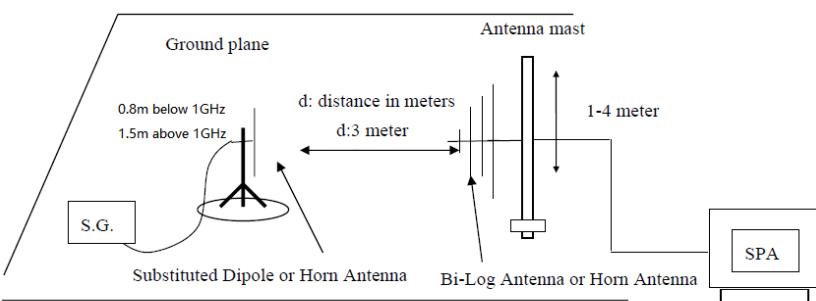
## Highest channel



Band Edge:



## 7.9 Field strength of spurious radiation measurement

Test Requirement:	FCC part22.917 and FCC part24.238
Test Method:	FCC part 2.1053 and ANSI C63.26:2015
Limit:	-13dBm
Test setup:	<p>Below 1GHz</p>  <p>Above 1GHz</p>  <p>Substituted method:</p> 

Test Procedure:	<ol style="list-style-type: none"><li>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.</li><li>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.</li><li>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.</li><li>4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. <math display="block">\text{ERP / EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain(dB/dBi)} - \text{Cable Loss (dB)}</math></li></ol>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

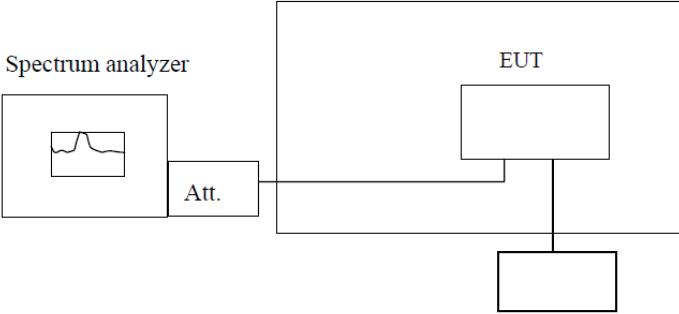
## Measurement Data

WCDMA Band V								
Channel	Frequency (MHz)	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	ERP (dBm)	Limit (dBm)	Over Limit (dBm)
Lowest	1652.8	H	-58.66	6.74	2.37	-56.44	-13	-43.44
	2479.2	H	-58.68	8.94	3.18	-55.07	-13	-42.07
	3305.6	H	-63.6	10.62	3.62	-58.75	-13	-45.75
	1652.8	V	-60.57	6.74	2.37	-58.35	-13	-45.35
	2479.2	V	-59.18	8.94	3.18	-55.57	-13	-42.57
	3305.6	V	-58.11	10.62	3.62	-53.26	-13	-40.26
Middle	1672.8	H	-61.33	6.74	2.39	-59.13	-13	-46.13
	2509.2	H	-58.81	8.94	3.03	-55.05	-13	-42.05
	3345.6	H	-59.1	10.62	3.63	-54.26	-13	-41.26
	1672.8	V	-61.77	6.74	2.39	-59.57	-13	-46.57
	2509.2	V	-63.54	8.94	3.03	-59.78	-13	-46.78
	3345.6	V	-58.01	10.62	3.63	-53.17	-13	-40.17
Highest	1693.2	H	-62.67	6.74	2.4	-60.48	-13	-47.48
	2539.8	H	-62.79	8.94	3.06	-59.06	-13	-46.06
	3386.4	H	-63.27	10.62	3.64	-58.44	-13	-45.44
	1693.2	V	-59.19	6.74	2.4	-57	-13	-44
	2539.8	V	-63.06	8.94	3.06	-59.33	-13	-46.33
	3386.4	V	-59.42	10.62	3.64	-54.59	-13	-41.59

WCDMA Band II								
Channel	Frequency (MHz)	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Over Limit (dBm)
Lowest	3704.8	H	-61.45	13.13	3.88	-52.2	-13	-39.2
	5557.2	H	-58.97	11.62	5.27	-52.62	-13	-39.62
	7409.6	H	-60.65	10.22	6.73	-57.16	-13	-44.16
	3704.8	V	-63.44	13.13	3.88	-54.19	-13	-41.19
	5557.2	V	-61.67	11.62	5.27	-55.32	-13	-42.32
	7409.6	V	-62.16	10.22	6.73	-58.67	-13	-45.67
Middle	3760	H	-62.16	13.13	3.9	-52.93	-13	-39.93
	5640	H	-61.92	11.62	5.33	-55.63	-13	-42.63
	7520	H	-60.82	10.22	6.82	-57.42	-13	-44.42
	3760	V	-63.43	13.13	3.9	-54.2	-13	-41.2
	5640	V	-58.74	11.62	5.33	-52.45	-13	-39.45
	7520	V	-59.44	10.22	6.82	-56.04	-13	-43.04
Highest	3815.2	H	-63.28	13.13	3.92	-54.07	-13	-41.07
	5722.8	H	-60.48	11.62	5.4	-54.26	-13	-41.26
	7630.4	H	-59.43	10.22	6.8	-56.01	-13	-43.01
	3815.2	V	-58.17	13.13	3.92	-48.96	-13	-35.96
	5722.8	V	-60.44	11.62	5.4	-54.22	-13	-41.22
	7630.4	V	-60.47	10.22	6.8	-57.05	-13	-44.05

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

## 7.10 Frequency stability V.S. Temperature measurement

Test Requirement:	FCC part 22.355 and FCC part 24.235
Test Method:	FCC Part2.1055(a)(1)(b)
Limit:	±2.5ppm
Test setup:	<p style="text-align: center;">Temperature Chamber</p>  <p style="text-align: center;">Note : Measurement setup for testing on Antenna connector</p>
Test procedure:	<ol style="list-style-type: none"> <li>1. The equipment under test was connected to an external DC power supply and input rated voltage.</li> <li>2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.</li> <li>3. The EUT was placed inside the temperature chamber.</li> <li>4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.</li> <li>5. Turn EUT off and set the chamber temperature to -20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.</li> <li>6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.</li> </ol>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

### Measurement Data

Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz					
Power supplied (Vac)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
120	-30	77	0.0925	±2.5	Pass
	-20	87	0.1045		
	-10	74	0.0885		
	0	61	0.0726		
	10	71	0.0846		
	20	61	0.0726		
	30	101	0.1204		
	40	91	0.1084		
	50	87	0.1045		
Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880.0MHz					
Power supplied (Vac)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
120	-30	49	0.0583	±2.5	Pass
	-20	56	0.0670		
	-10	47	0.0565		
	0	41	0.0494		
	10	46	0.0550		
	20	40	0.0482		
	30	67	0.0799		
	40	58	0.0699		
	50	55	0.0663		

## 7.11 Frequency stability V.S. Voltage measurement

Test Requirement:	FCC part 22.355 and FCC part 24.235
Test Method:	FCC Part2.1055(d)(1)(2)
Limit:	±2.5ppm
Test setup:	<p style="text-align: center;">Temperature Chamber</p> <p style="text-align: center;">Variable Power Supply</p> <p><b>Note :</b> Measurement setup for testing on Antenna connector</p>
Test procedure:	<ol style="list-style-type: none"> <li>1. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage.</li> <li>2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.</li> <li>3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.</li> </ol>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

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## Measurement Data

Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz					
Temperature (°C)	Power supplied (Vac)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	240	118	0.1406	±2.5	Pass
	120	85	0.1017		
	100	96	0.1147		

Reference Frequency: WCDMA Band II Middle channel=940 channel=1880.0MHz					
Temperature (°C)	Power supplied (Vac)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	240	115	0.1375	±2.5	Pass
	120	131	0.1566		
	100	147	0.1751		

## 8 Test Setup Photo

Reference to the **appendix I** for details.

## 9 EUT Constructional Details

Reference to the **appendix II** for details.

-----End-----