



**FCC 47 CFR PART 22  
FCC 47 CFR PART 24**

**CERTIFICATION TEST REPORT**

*For*

**Children watch**

**MODEL NUMBER: CP303C**

**FCC ID: R38YL303C**

**REPORT NUMBER: 4789488320-4**

**ISSUE DATE: August 13, 2020**

*Prepared for*

**Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd  
Building B, Boton Science Park, Chaguang Road, Xili Town, Nanshan District,  
Shenzhen**

*Prepared by*

**UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch  
Building 10, Innovation Technology Park, No. 1, Li Bin Road,  
Song Shan Lake Hi-Tech Development Zone, Dongguan, People's Republic of China  
Tel: +86 769-22038881  
Fax: +86 769 33244054  
Website: [www.ul.com](http://www.ul.com)**

The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	5/25/2020	Initial Issue	
V1	08/13/2020	Report revised based in reviewer's comments	Jacky Jiang

Summary of Test Results			
Standard(s) Section FCC	Description	Requirements	Result
§22.913(a)(5)	Effective(Isotropic) Radiated Power of Transmitter	FCC: ERP < 7 W	PASS
§24.232(c)	Effective(Isotropic) Radiated Power of Transmitter	EIRP < 2 W	PASS
§24.232(d)	Peak to Average Radio	< 13dB	PASS
§2.1049(h)	Occupied Bandwidth	OBW: No limit EBW: No limit	PASS
§2.1051, §22.917(a) §24.238(a)	Band Edge Compliance	$\leq 43+10\log_{10}(P[W])/1\%*EBW$ , in 1 MHz bands immediately outside and adjacent to the frequency block.	PASS
§2.1051 §22.917(a) §24.238(a)	Spurious Emission at Antenna Terminal	$\leq 43+10\log_{10}(P[W])/100$ kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.	PASS
§2.1053, §22.917(a) §24.238(a)	Radiated Spurious Emissions	$\leq 43+10\log_{10}(P[W])$	PASS
§2.1055 §22.355 §24.235	Frequency Stability	$\leq \pm 2.5\text{ppm}$ (Part 22) Emission must remain in band(Part 24,27)	PASS

## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS .....</b>	<b>5</b>
<b>2. TEST METHODOLOGY .....</b>	<b>6</b>
<b>3. FACILITIES AND ACCREDITATIO .....</b>	<b>6</b>
<b>4. CALIBRATION AND UNCERTAINTY .....</b>	<b>7</b>
<i>MEASURING INSTRUMENT CALIBRATION.....</i>	<i>7</i>
<i>MEASUREMENT UNCERTAINTY .....</i>	<i>7</i>
<b>5. EQUIPMENT UNDER TEST .....</b>	<b>8</b>
5.1 <i>DESCRIPTION OF EUT.....</i>	<i>8</i>
5.2 <i>TECHNICAL INFORMATION .....</i>	<i>8</i>
5.3 <i>MAXIMUM OUTPUT POWER .....</i>	<i>9</i>
5.4 <i>OPERATING CONDITION OF EUT.....</i>	<i>10</i>
5.5 <i>TEST ENVIRONMENT .....</i>	<i>10</i>
5.6 <i>TEST CHANNEL LIST.....</i>	<i>11</i>
5.7 <i>DESCRIPTION OF AVAILABLE ANTENNAS.....</i>	<i>11</i>
5.8 <i>DESCRIPTION OF TEST SETUP .....</i>	<i>12</i>
5.9 <i>MEASURING INSTRUMENT AND SOFTWARE USED .....</i>	<i>14</i>
<b>6. TEST RESULTS.....</b>	<b>16</b>
6.1 <i>OUTPUT POWER VERIFICATION.....</i>	<i>16</i>
6.2 <i>PEAK TO AVERAGE RADIO.....</i>	<i>17</i>
6.3 <i>OCCUPIED BANDWIDTH .....</i>	<i>18</i>
6.4 <i>FREQUENCY STABILITY.....</i>	<i>21</i>
6.5 <i>BAND EDGE EMISSIONS.....</i>	<i>23</i>
6.6 <i>CONDUCTED OUT OF BAND EMISSIONS.....</i>	<i>27</i>
6.7 <i>FIELD STRENGTH OF SPURIOUS RADIATION.....</i>	<i>30</i>

## 1. ATTESTATION OF TEST RESULTS

### Applicant Information

Company Name: Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd  
Address: Building B, Boton Science Park, Chaguang Road, Xili Town, Nanshan District, Shenzhen

### Manufacturer Information

Company Name: Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd  
Address: Building B, Boton Science Park, Chaguang Road, Xili Town, Nanshan District, Shenzhen

### Applicant Information

Company Name: Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd

### EUT Description

Product Name CP303C  
Brand Name Coolpad  
Model Name CP303C  
FCC ID R38YL303C  
Date Tested May 8, 2020~ May 23, 2020

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC 47 CFR PART 22 Subpart H	PASS
FCC 47 CFR PART 24 Subpart E	PASS

Tested By:



Jacky Jiang  
Engineer Project Associate

Checked By:



Shawn Wen  
Laboratory Leader

Approved By:



Stephen Guo  
Laboratory Manager

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.26-2015 & KDB971168, FCC CFR 47 Part 2, Part 22, Part 24.

## 3. FACILITIES AND ACCREDITATIO

Accreditation Certificate	<p><b>A2LA (Certificate No.: 4102.01)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p><b>FCC (FCC Designation No.: CN1187)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Delcaration of Conformity (DoC) and Certification rules</p> <p><b>IC(Company No.: 21320)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320.</p> <p><b>VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793.</p> <p><u>Facility Name:</u> Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B , the VCCI registration No. is C-20012 and T-20011</p>
---------------------------	---

Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

Note 2: The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

## 4. CALIBRATION AND UNCERTAINTY

### MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Uncertainty for Conduction emission test	3.32dB (150KHz-30MHz)
	3.72dB (9KHz-150KHz)
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.70 dB (Antenna Polarize: V)
	4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1GHz to 26GHz)( include Fundamental emission)	4.10dB(1-6GHz)
	4.40dB (6GHz-18Gz)
	3.54dB (18GHz-26Gz)
Bandwidth	1.1%
Stop Transmitting Time Test	0.6%
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

## 5. EQUIPMENT UNDER TEST

### 5.1 DESCRIPTION OF EUT

Equipment	Children watch
Model Name	CP303C
Power Input	DC 3.85V, 890mAh
Hardware Version	P1
Software Version	/

### 5.2 TECHNICAL INFORMATION

Frequency Bands	<input checked="" type="checkbox"/> WCDMA Band II	1850 MHz ~ 1910 MHz (Uplink)	
		1930 MHz ~ 1990 MHz (Downlink)	
	<input checked="" type="checkbox"/> WCDMA Band V	824 MHz ~ 849 MHz (Uplink)	
		869 MHz ~ 894 MHz (Downlink)	
Modulation Mode	QPSK;16QAM;BPSK		
WCDMA Release Version	WCDMA Release 99	HSPA+ Release Version	Release 8
HSDPA Release Version	Release 5	HSUPA Release Version	Release 6
Power Class	3		

### 5.3 MAXIMUM OUTPUT POWER

#### ERP/EIRP RULE PART(S)

FCC: §2.1046, §22.913, §24.232

#### LIMITS

22.913(a)(5) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13dB.

#### ERP/EIRP TEST PROCEDURE

ANSI C63.26:2015/ KDB 971168 D01 Section 5.6

$$\text{ERP/ EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

where:

ERP or EIRP = effective or equivalent isotropically radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);

PMeas = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB

The transmitter has a maximum radiated ERP / EIRP output powers as follows:

Mode	Modulation	Conducted(Average) (dBm)	Antenna Gain (dBi)	Limit (W)	EIRP	
					(dBm)	(W)
WCDMA Band 2	REL99	22.91	-1.38	2	20.64	0.116
	HSDPA	21.04	-1.38		19.66	0.092

Mode	Modulation	Conducted(Average) (dBm)	Antenna Gain (dBi)	Limit (W)	ERP	
					(dBm)	(W)
WCDMA Band 5	REL99	22.50	-5.87	7	16.63	0.046
	HSDPA	21.51	--5.87		15.64	0.037

### 5.4 OPERATING CONDITION OF EUT

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 (Y plane).

Worst-case modes:

Test Mode	Test Modes Description
UMTS/TM1	WCDMA REL99
UMTS/TM2	WCDMA HSDPA

Note: If no any other statement, UMTS/TM1 shall be used RCM 12.2K mode.

Note: For simultaneous transmission of multiple channels in the 2.4 / 5GHz and cellular bands, no noticeable emission was found.

### 5.5 TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	52%	
Atmospheric Pressure:	1025Pa	
Temperature	TN	25 °C
Voltage :	VL	3.60V
	VN	3.85V
	VH	4.40V
	End Voltage	3.0V

Note: VL= Lower Extreme Test Voltage  
 VN= Nominal Voltage  
 VH= Upper Extreme Test Voltage  
 TN= Normal Temperature

### 5.6 TEST CHANNEL LIST

Bands	Channel	Frequency	
		Channel Number	Frequency(MHz)
WCDMA Band 2	Low	9262	1852.4
	Mid	9400	1880.0
	High	9538	1907.6
WCDMA Band 5	Low	4132	826.4
	Mid	4182	836.4
	High	4233	846.6

### 5.7 DESCRIPTION OF AVAILABLE ANTENNAS

Band	Antenna Type	Antenna Gain (dBi)
WCDMA Band 2	PIFA	-4.32
WCDMA Band 5	PIFA	-7.49

## 5.8 DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	FCC ID
1	N/A	N/A	N/A	N/A

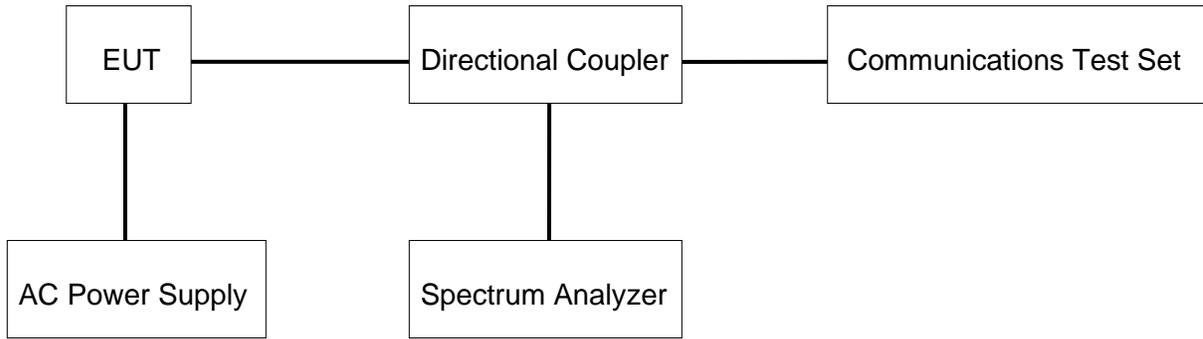
### I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	N/A	N/A	N/A	N/A	N/A

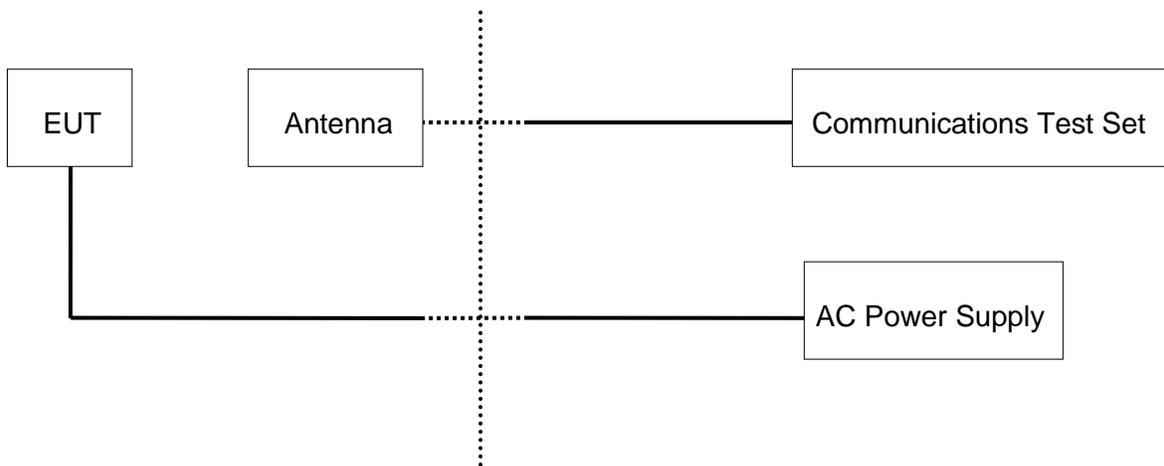
### ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	Travel Changer	Coolpad	RD0501000-USBA18MG	5V/1A

**CONDUCTED TEST SETUP**



**RADIATED TEST SETUP**



### 5.9 MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	Spectrum Analyzer	Keysight	N9030A	MY5541051 2	Dec.06,20 19	Dec.06,2020
<input checked="" type="checkbox"/>	Power Meter	Keysight	N1911A	MY5541602 4	Dec.06,20 19	Dec.06,2020
<input checked="" type="checkbox"/>	Wideband Radio Communication Tester	R&S	CMW500	155523	Dec.06,20 19	Dec.05,2020
Software						
Used	Description	Manufacturer	Name	Version		
<input checked="" type="checkbox"/>	Antenna port test software	UL	CLT	Ver 2.4		
Radiated Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	MXE EMI Receiver	KESIGHT	N9038A	MY5640003 6	Dec.06,20 19	Dec.06,2020
<input checked="" type="checkbox"/>	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Sep.17, 2018	Sep.17, 2021
<input checked="" type="checkbox"/>	Preamplifier	HP	8447D	2944A09099	Dec.05,20 19	Dec.05,2020
<input checked="" type="checkbox"/>	EMI Measurement Receiver	R&S	ESR26	101377	Dec.05,20 19	Dec.05,2020
<input checked="" type="checkbox"/>	Horn Antenna	TDK	HRN-0118	130939	Sep.17, 2018	Sep.17, 2021
<input checked="" type="checkbox"/>	High Gain Horn Antenna	Schwarzbeck	BBHA-9170	691	Aug.11, 2018	Aug.11, 2021
<input checked="" type="checkbox"/>	Preamplifier	TDK	PA-02-0118	TRS-305- 00066	Dec.05,20 19	Dec.05,2020
<input checked="" type="checkbox"/>	Preamplifier	TDK	PA-02-2	TRS-307- 00003	Dec.05,20 19	Dec.05,2020
<input checked="" type="checkbox"/>	Loop antenna	Schwarzbeck	1519B	00008	Jan.07, 2019	Jan.07, 2022
<input checked="" type="checkbox"/>	Band Reject Filter	Wainwright	WRCJV8- 2350-2400- 2483.5- 2533.5-40SS	4	Dec.05,20 19	Dec.05,2020
<input checked="" type="checkbox"/>	High Pass Filter	Wi	WHKX10- 2700-3000- 18000-40SS	23	Dec.05,20 19	Dec.05,2020
Software						

---

Used	Description	Manufacturer	Name	Version
<input checked="" type="checkbox"/>	Test Software for Radiated disturbance	Farad	EZ-EMC	Ver. UL-3A1

## 6. TEST RESULTS

### 6.1 OUTPUT POWER VERIFICATION

Band	WCDMA II		
	9262	9400	9538
Tx Channel	1852.4	1880	1907.6
Frequency	1852.4	1880	1907.6
Rel99	22.02	21.91	21.93
HSDPA Subtest-1	21.01	20.91	20.92
HSDPA Subtest-2	21.04	20.98	20.99
HSDPA Subtest-3	20.41	20.37	20.51
HSDPA Subtest-4	20.51	20.49	20.50
HSUPA Subtest-1	20.26	20.87	20.54
HSUPA Subtest-2	19.52	19.53	19.98
HSUPA Subtest-3	19.92	19.20	19.79
HSUPA Subtest-4	19.87	19.80	20.31
HSUPA Subtest-5	20.50	20.43	20.80
DC-HSDPA Subtest-1	21.14	20.95	20.87
DC-HSDPA Subtest-2	21.05	21.03	21.01
DC-HSDPA Subtest-3	20.48	20.50	20.54
DC-HSDPA Subtest-4	20.44	20.50	20.53

Band	WCDMA V		
	4132	4182	4233
Tx Channel	826.4	836.4	846.6
Frequency	826.4	836.4	846.6
Rel99	22.50	22.44	22.38
HSDPA Subtest-1	21.49	21.47	21.47
HSDPA Subtest-2	21.51	21.50	21.44
HSDPA Subtest-3	21.05	21.06	20.93
HSDPA Subtest-4	20.93	21.05	20.92
HSUPA Subtest-1	21.05	21.49	20.84
HSUPA Subtest-2	19.97	20.21	20.40
HSUPA Subtest-3	20.34	20.55	20.19
HSUPA Subtest-4	20.84	20.59	20.79
HSUPA Subtest-5	21.20	21.09	21.07
DC-HSDPA Subtest-1	21.48	21.46	21.42
DC-HSDPA Subtest-2	21.46	21.44	21.38
DC-HSDPA Subtest-3	20.96	20.94	20.90
DC-HSDPA Subtest-4	21.02	20.93	20.88

## 6.2 PEAK TO AVERAGE RADIO

### Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v03r01;

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The PAR were measured on the Spectrum Analyzer.

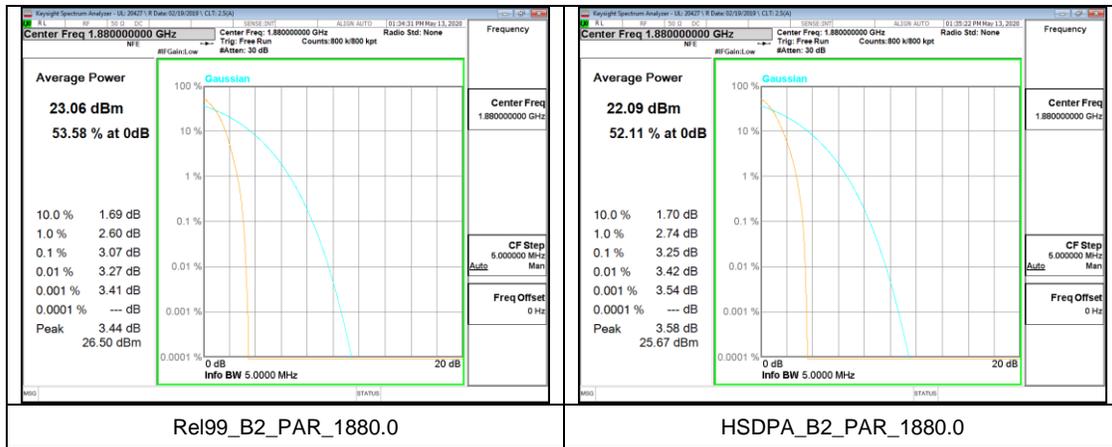
### Test Spec

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

### RESULTS

See the following pages.

#### WCDMA MODE



## 6.3 OCCUPIED BANDWIDTH

### RULE PART(S)

FCC: §2.1049

### LIMITS

For reporting purposes only

### TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v03r01)

### RESULTS

The table shows the worst case results, for the other results please See the following pages.

#### WCDMA

Mode	Channel	f(MHz)	Modulation	-26dB BW (MHz)
BAND 2	HIGH	1907.6	REL 99	4.709
	HIGH	1907.6	HSDPA	4.680
BAND 5	LOW	826.4	REL 99	4.731
	LOW	826.4	HSDPA	4.716

**WCDMA MODE**





## **6.4 FREQUENCY STABILITY**

### **RULE PART(S)**

FCC: §2.1055, §22.355, §24.235

### **LIMITS**

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations.

§24.235 - The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### **TEST PROCEDURE**

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

### **RESULTS**

See the following pages.

Test Mode	Test Conditions		Frequency Deviation Middle Channel		
			Frequency Error	Frequency Error	Limit
WCDMA Band 2 REL99	Power (VDC)	Temperature (°C)	Hz	ppm	ppm
			-30	-0.26	
	-20	-2.57	-0.0014		
	-10	-6.38	-0.0034		
	0	1.79	0.0010		
	+10	-2.15	-0.0011		
	+20	-6.74	-0.0036		
	+30	2.57	0.0014		
	+40	-2.02	-0.0011		
	+50	-6.52	-0.0035		
	VL	TN	1.95	0.0010	
	VH		-2.52	-0.0013	
	End Point		-6.53	-0.0035	

Test Mode	Test Conditions		Frequency Deviation Middle Channel		
			Frequency Error	Frequency Error	Limit
WCDMA Band5 REL99	Power (VDC)	Temperature (°C)	Hz	ppm	ppm
			-30	-0.12	
	-20	-0.78	-0.0009		
	-10	-2.75	-0.0033		
	0	0.94	0.0011		
	+10	-0.82	-0.0010		
	+20	-2.91	-0.0035		
	+30	1.19	0.0014		
	+40	-0.83	-0.0010		
	+50	-2.60	-0.0031		
	VL	TN	1.43	0.0017	
	VH		-0.77	-0.0009	
	End Point		-2.86	-0.0034	

## **6.5 BAND EDGE EMISSIONS**

### **RULE PART(S)**

FCC: §22.359, §24.238

### **LIMITS**

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

### **TEST PROCEDURE**

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

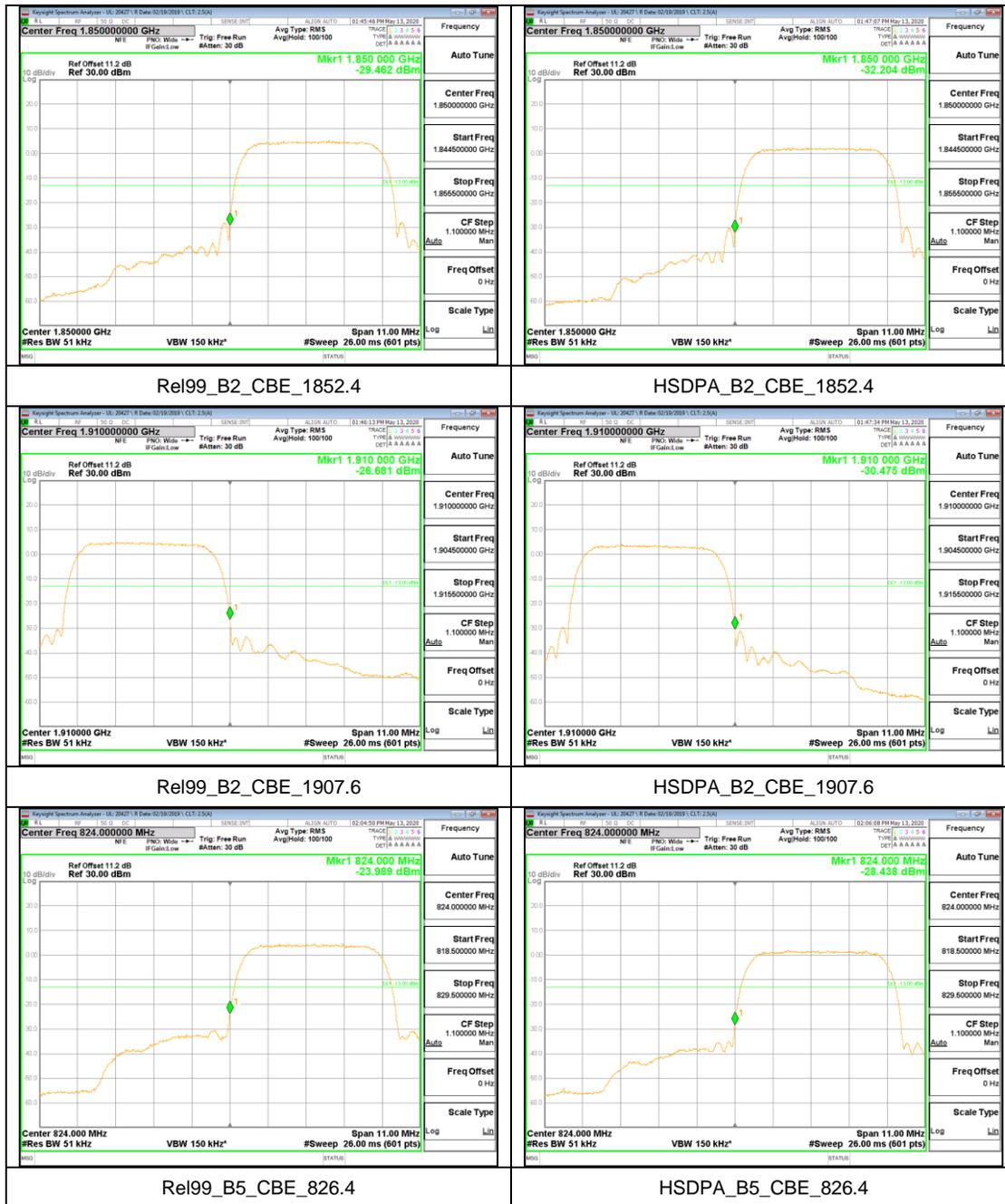
**GSM/WCDMA**

- a) Set the RBW = 1 ~ 1.5 % of OBW(Typically limited to a minimum RBW of 1% of the OBW)
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 1.5$  times the OBW;
- d) Sweep time = Auto;
- e) Detector = RMS;
- f) Ensure that the number of measurement points  $\geq 2 \times$  Span/RBW;
- g) Trace mode = Average (100);

**RESULTS**

See the following pages.

**WCDMA MODE**





## 6.6 CONDUCTED OUT OF BAND EMISSIONS

### RULE PART(S)

FCC: §2.1051, §22.917, §24.238

### LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

### TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

- a) Set the RBW = 100KHz for emission below 1GHz and 1MHz for emissions above 1GHz  
(Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 1.5$  times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points = Max (40001);
- g) Trace mode = average(LTE 5), Maxhold(LTE Band41);

Note : Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

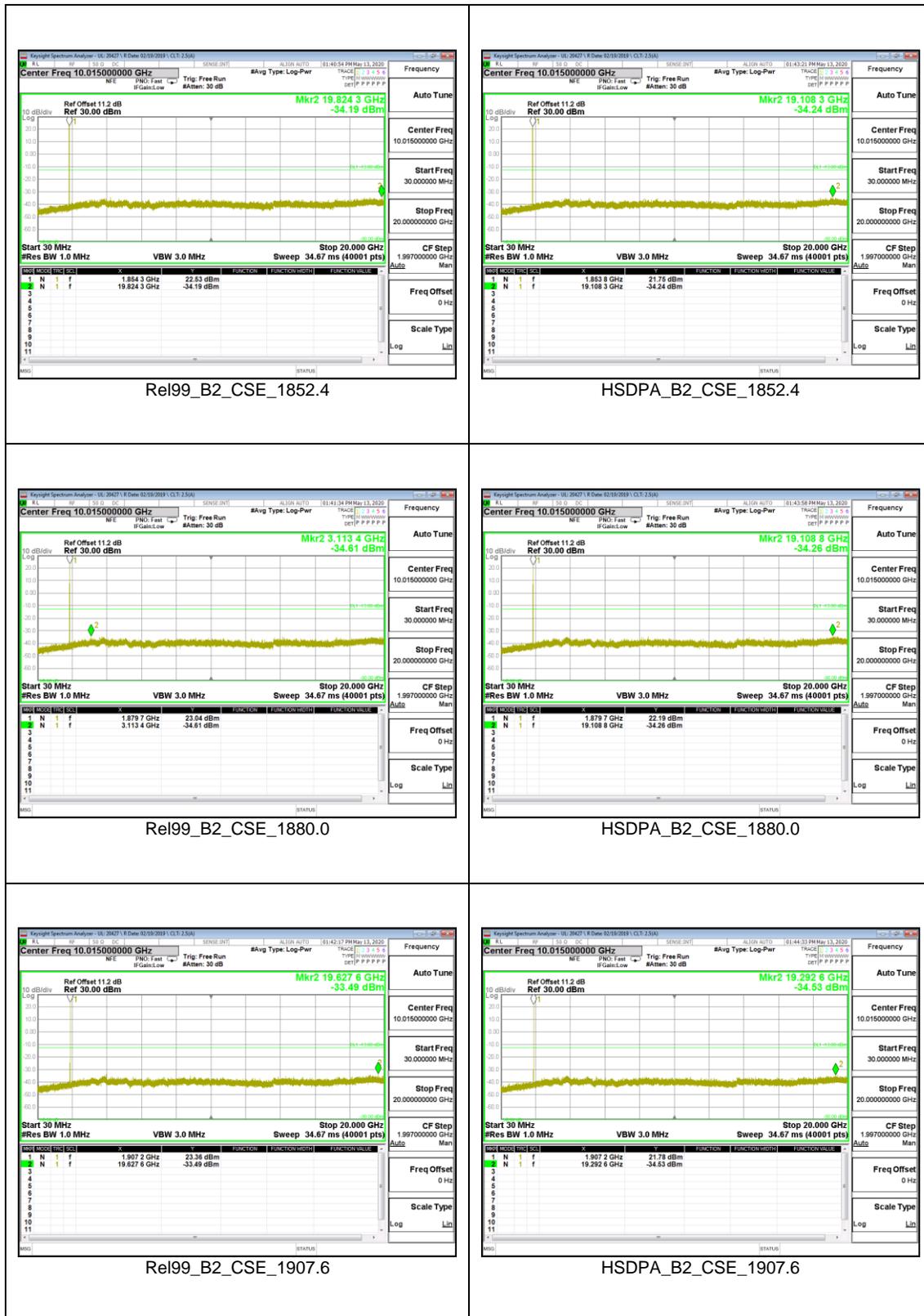
### RESULTS

See the following pages.

#### WCDMA

Mode	Channel	F (MHz)	Modulation	The maximum Emissions (dBm)	Limit (dBm)	Verdict
Band 2	High	1907.6	REL 99	-33.49	-13	PASS
	Low	1907.6	HSDPA	-34.24	-13	PASS
Band 5	Mid	826.4	REL 99	-34.53	-13	PASS
	Mid	846.6	HSDPA	-34.35	-13	PASS

**WCDMA Mode**





## 6.7 FIELD STRENGTH OF SPURIOUS RADIATION

### RULE PART(S)

FCC: §2.1053, §22.917, §24.238

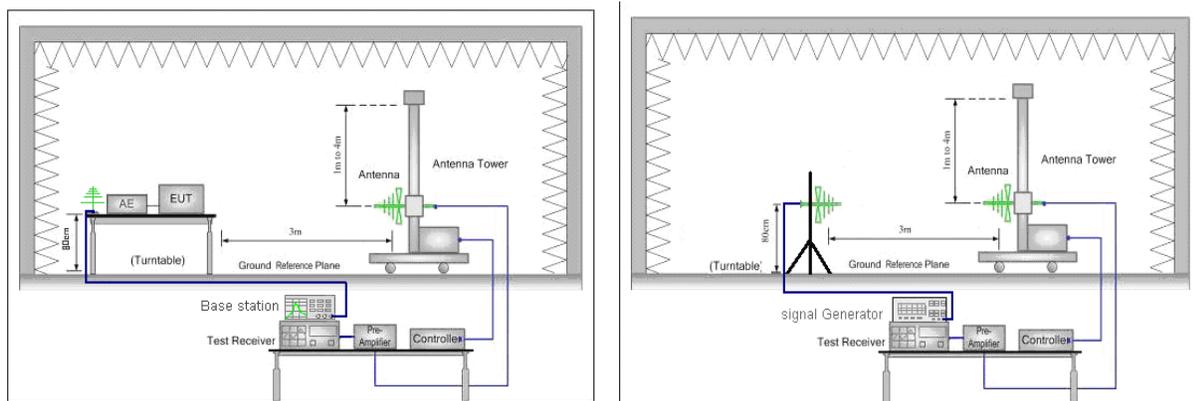
### LIMIT

Part 22.917(a) ,§24.238(a)

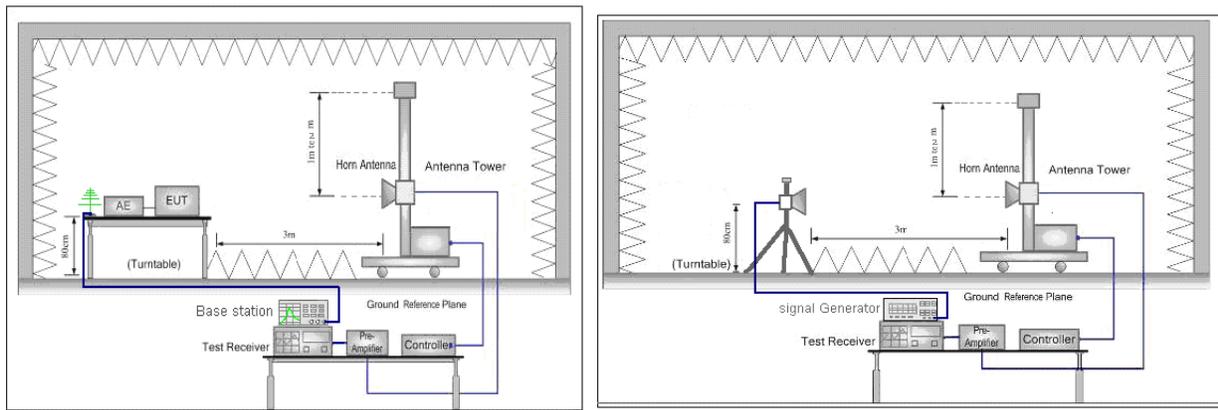
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

### TEST SETUP

Test Setup for Below 1G



Test Setup for Above 1G



### TEST PROCEDURE

KDB 971168 D01 Section 7

Below 1GHz test procedure as below:

1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.

4. 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.
5. Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. Calculate power in dBm by the following formula:  
$$\text{ERP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$

Where:

$P_d$  is the dipole equivalent power,  $P_g$  is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to  $P_g$  [dBm] – cable loss [dB]. The calculated  $P_d$  levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of  $43 + 10\log_{10}(\text{Power [Watts]})$ .

Above 1GHz test procedure as below:

1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. 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.
5. Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. Calculate power in dBm by the following formula:  
$$\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$
$$\text{EIRP} = \text{ERP} + 2.15\text{dB}$$

Where:  $P_g$  is the generator output power into the substitution antenna.

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

The limit line is derived from  $43 + 10\log(P)$ dB below the transmitter power  $P$ (Watts)

$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$

$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$$

$$= -13\text{dBm.}$$

NOTE 1: Radiated spurious emissions were investigated below 30MHz, 30MHz – 1GHz and above 1GHz. There were no emissions found on below 30MHz.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site.

Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

## **RESULTS**

See the following pages.

**6.7.1 Radiated spurious emissions 30MHz to 1GHz**

Frequency (MHz)	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization	Frequency (MHz)	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization
32.91	-70.18	-13.00	-57.18	Horizontal	32.91	-70.18	-13.00	-57.18	Horizontal
176.47	-82.97	-13.00	-69.97	Horizontal	176.47	-82.97	-13.00	-69.97	Horizontal
299.66	-79.60	-13.00	-66.60	Horizontal	299.66	-79.60	-13.00	-66.60	Horizontal
350.10	-80.62	-13.00	-67.62	Horizontal	350.10	-80.62	-13.00	-67.62	Horizontal
800.18	-69.03	-13.00	-56.03	Horizontal	800.18	-69.03	-13.00	-56.03	Horizontal
960.23	-69.71	-13.00	-56.71	Horizontal	960.23	-69.71	-13.00	-56.71	Horizontal
Frequency (MHz)	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization	Frequency (MHz)	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization
32.91	-65.50	-13.00	-52.50	Vertical	32.91	-71.41	-13.00	-58.41	Vertical
61.04	-73.89	-13.00	-60.89	Vertical	167.74	-85.74	-13.00	-72.74	Vertical
202.66	-77.71	-13.00	-64.71	Vertical	426.73	-82.74	-13.00	-69.74	Vertical
385.02	-78.45	-13.00	-65.45	Vertical	573.20	-79.88	-13.00	-66.88	Vertical
676.99	-75.80	-13.00	-62.80	Vertical	771.08	-75.59	-13.00	-62.59	Vertical
858.38	-71.44	-13.00	-58.44	Vertical	944.71	-69.27	-13.00	-56.27	Vertical
WCDMA Band 2					WCDMA Band 5				

**6.7.2 Radiated spurious emissions above 1GHz**

Frequency	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization	Frequency	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization	
1500.00	-50.54	-13.00	-37.54	Horizontal	1890.00	16.20	-13.00	/	Horizontal	
1854.00	16.84	-13.00	/	Horizontal	1962.00	-33.67	-13.00	-20.67	Horizontal	
1934.00	-34.26	-13.00	-21.26	Horizontal	2006.00	-33.82	-13.00	-20.82	Horizontal	
2158.00	-46.36	-13.00	-33.36	Horizontal	2390.00	-34.20	-13.00	-21.20	Horizontal	
2448.00	-44.57	-13.00	-31.57	Horizontal	2458.00	-33.06	-13.00	-20.06	Horizontal	
2838.00	-44.94	-13.00	-31.94	Horizontal	2828.00	-34.83	-13.00	-21.83	Horizontal	
4995.00	-44.14	-13.00	-31.14	Horizontal	1006.00	-33.54	-13.00	-20.54	Horizontal	
6000.00	-43.14	-13.00	-30.14	Horizontal	1504.00	-36.00	-13.00	-23.00	Horizontal	
7245.00	-42.03	-13.00	-29.03	Horizontal	1586.00	-30.31	-13.00	-17.31	Horizontal	
8505.00	-43.89	-13.00	-30.89	Horizontal	1726.00	-19.66	-13.00	-6.66	Horizontal	
10005.00	-40.82	-13.00	-27.82	Horizontal	1878.00	21.58	-13.00	/	Horizontal	
11505.00	-43.29	-13.00	-30.29	Horizontal	1960.00	-24.37	-13.00	-11.37	Horizontal	
Frequency	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization	Frequency	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization	
1324.00	-41.91	-13.00	-28.91	Vertical	1006.00	-33.54	-13.00	-20.54	Vertical	
1854.00	21.72	-13.00	/	Vertical	1504.00	-36.00	-13.00	-23.00	Vertical	
1934.00	-25.03	-13.00	-12.03	Vertical	1586.00	-30.31	-13.00	-17.31	Vertical	
2266.00	-37.50	-13.00	-24.50	Vertical	1726.00	-19.66	-13.00	-6.66	Vertical	
2636.00	-35.65	-13.00	-22.65	Vertical	1878.00	21.58	-13.00	/	Vertical	
2768.00	-34.39	-13.00	-21.39	Vertical	1960.00	-24.37	-13.00	-11.37	Vertical	
5490.00	-43.47	-13.00	-30.47	Vertical	4995.00	-43.08	-13.00	-30.08	Vertical	
5745.00	-42.79	-13.00	-29.79	Vertical	5490.00	-43.93	-13.00	-30.93	Vertical	
6000.00	-42.37	-13.00	-29.37	Vertical	5745.00	-41.71	-13.00	-28.71	Vertical	
6990.00	-43.15	-13.00	-30.15	Vertical	6000.00	-42.28	-13.00	-29.28	Vertical	
8865.00	-42.08	-13.00	-29.08	Vertical	6990.00	-41.38	-13.00	-28.38	Vertical	
10005.00	-41.64	-13.00	-28.64	Vertical	10005.00	-40.60	-13.00	-27.60	Vertical	
WCDMA Band2 REL99 Low Channel					WCDMA Band2 REL99 Mid Channel					
Frequency	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization	Frequency	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization	
1540.00	-40.84	-13.00	-27.84	Horizontal	2395.00	-49.53	-13.00	-36.53	Horizontal	
1906.00	16.93	-13.00	/	Horizontal	4996.00	-42.55	-13.00	-29.55	Horizontal	
1988.00	-32.96	-13.00	-19.96	Horizontal	6004.00	-43.61	-13.00	-30.61	Horizontal	
2478.00	-36.43	-13.00	-23.43	Horizontal	7255.00	-43.28	-13.00	-30.28	Horizontal	
2672.00	-34.57	-13.00	-21.57	Horizontal	7498.00	-43.11	-13.00	-30.11	Horizontal	
2902.00	-34.45	-13.00	-21.45	Horizontal	8506.00	-43.90	-13.00	-30.90	Horizontal	
4995.00	-42.95	-13.00	-29.95	Horizontal	<th>Frequency</th> <th>Level (dB)</th> <th>Limit Line (dB)</th> <th>Over Limit (dB)</th> <th>Polarization</th>	Frequency	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization
6000.00	-42.23	-13.00	-29.23	Horizontal	4996.00	-42.40	-13.00	-29.40	Vertical	
6990.00	-41.93	-13.00	-28.93	Horizontal	6004.00	-42.83	-13.00	-29.83	Vertical	
7245.00	-41.32	-13.00	-28.32	Horizontal	7255.00	-42.42	-13.00	-29.42	Vertical	
10005.00	-40.23	-13.00	-27.23	Horizontal	7498.00	-43.45	-13.00	-30.45	Vertical	
11505.00	-42.22	-13.00	-29.22	Horizontal	8506.00	-43.42	-13.00	-30.42	Vertical	
1882.00	-30.11	-13.00	-17.11	Vertical	9001.00	-45.53	-13.00	-32.53	Vertical	
1906.00	22.34	-13.00	/	Vertical						
1942.00	-31.89	-13.00	-18.89	Vertical						
1996.00	-25.11	-13.00	-12.11	Vertical						
2014.00	-28.78	-13.00	-15.78	Vertical						
2490.00	-35.64	-13.00	-22.64	Vertical						
4995.00	-42.41	-13.00	-29.41	Vertical						
5745.00	-41.26	-13.00	-28.26	Vertical						
6000.00	-43.22	-13.00	-30.22	Vertical						
6990.00	-42.59	-13.00	-29.59	Vertical						
7245.00	-42.76	-13.00	-29.76	Vertical						
10005.00	-41.27	-13.00	-28.27	Vertical						
WCDMA Band2 REL99 High Channel					WCDMA Band5 REL99 Low Channel					

Frequency	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization
4654.00	-46.80	-13.00	-33.80	Horizontal
4996.00	-42.01	-13.00	-29.01	Horizontal
6004.00	-42.47	-13.00	-29.47	Horizontal
7255.00	-42.67	-13.00	-29.67	Horizontal
7498.00	-43.61	-13.00	-30.61	Horizontal
8506.00	-44.40	-13.00	-31.40	Horizontal
Frequency	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization
4996.00	-41.35	-13.00	-28.35	Vertical
6004.00	-43.64	-13.00	-30.64	Vertical
7003.00	-44.75	-13.00	-31.75	Vertical
7255.00	-41.73	-13.00	-28.73	Vertical
7498.00	-43.34	-13.00	-30.34	Vertical
8506.00	-42.86	-13.00	-29.86	Vertical

Frequency	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization
4996.00	-43.11	-13.00	-30.11	Horizontal
6004.00	-42.98	-13.00	-29.98	Horizontal
7003.00	-44.88	-13.00	-31.88	Horizontal
7255.00	-41.63	-13.00	-28.63	Horizontal
7498.00	-43.94	-13.00	-30.94	Horizontal
8506.00	-43.60	-13.00	-30.60	Horizontal
Frequency	Level (dB)	Limit Line (dB)	Over Limit (dB)	Polarization
4978.00	-39.33	-13.00	-26.33	Vertical
5752.00	-42.51	-13.00	-29.51	Vertical
6004.00	-42.40	-13.00	-29.40	Vertical
7003.00	-42.80	-13.00	-29.80	Vertical
7255.00	-43.41	-13.00	-30.41	Vertical
8110.00	-42.45	-13.00	-29.45	Vertical

WCDMA Band5 REL99 Mid Channel	WCDMA Band5 REL99 High Channel
-------------------------------	--------------------------------

**END OF REPORT**