



# FCC Test Report

## FCC ID: 2AHJ6VINCI015N

Product Name:	Vinci Hearable
Trademark:	N/A
Model Name:	Vinci Hearable 1.5
Prepared For:	Inspero Inc.
Address:	Yanqi Street No.31, Yanqi Economic Development Zone, Huairou District, Beijing, China
Prepared By:	Shenzhen BCTC Technology Co., Ltd.
Address:	NO.101, Yousong Road, Longhua New District, Shenzhen, Guangdong, P.R.China
Test Date:	Apr. 13 - May 03, 2017
Date of Report:	May 03, 2017
Report No.:	BCTC-FY170402086-4E



## VERIFICATION OF COMPLIANCE

**Applicant's name** ..... : Inspero Inc.

**Address** ..... : Yanqi Street No.31, Yanqi Economic Development Zone,  
Huairou District, Beijing, China

**Manufacture's Name** ..... : Inspero Inc.

**Address** ..... : Yanqi Street No.31, Yanqi Economic Development Zone,  
Huairou District, Beijing, China

### Product description

**Product name** ..... : Vinci Hearable

**Trademark:** N/A

**Model Name:** Vinci Hearable 1.5

**Test procedure** ..... : FCC CFR Title 47 Part 2: 2015  
FCC CFR Title 47 Part22 Subpart H: 2015  
FCC CFR Title 47 Part24 Subpart E: 2015  
ANSI/ TIA/ EIA-603-D-2010  
FCC KDB 971168 D01 Power Meas. License Digital Systems  
v02v02

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of BCTC, this document may be altered or revised by BCTC, personal only, and shall be noted in the revision of the document.

**Test Result** ..... : **Pass**

**Prepared by(Engineer):** Jack Bu

**Reviewer(Supervisor):** Jade Yang

**Approved(Manager):** Carson Zhang





## TABLE OF CONTENTS

	Page
Test Report Declaration	
<b>1. TEST SUMMARY</b>	<b>4</b>
<b>2. GENERAL PRODUCT INFORMATION</b>	<b>5</b>
2.1. Description of Device (EUT)	5
2.2. Product Function	6
2.3. Independent Operation Modes	6
<b>3. TEST SITES</b>	<b>7</b>
3.1. Test Facilities	7
3.2. List of Test and Measurement Instruments	8
<b>4. TEST SET-UP AND OPERATION MODES</b>	<b>10</b>
4.1. Principle of Configuration Selection	10
4.2. Block Diagram of Test Set-up	10
4.3. Test Environment:	10
<b>5. EMISSION TEST RESULTS</b>	<b>11</b>
5.1. Conducted RF Output Power	11
5.2. -26dB and 99% Occupied Bandwidth	13
5.3. Peak to Average Ratio	17
5.4. Frequency Stability	19
5.5. Conducted Spurious Emissions	22
5.6. Conducted Out of Band Emissions	29
5.7. Transmitter Radiated Power (EIRP/ERP)	32
5.8. Radiated Out of Band Emissions	35
<b>6. PHOTOGRAPHS OF TEST SET-UP</b>	<b>43</b>
<b>7. PHOTOGRAPHS OF THE EUT</b>	<b>44</b>



## 1.TEST SUMMARY

Test Items	Test Requirement	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Passed* (Please refer to SAR Report)
Conducted RF Output Power	2.1046	PASS
Peak to Average Ratio	2.1055,22.355 24.235,27.54	PASS
99% & -26 dB Occupied Bandwidth	2.1049, 22.917 24.238,	PASS
Frequency Stability	2.1055, 22.355 24.235,	PASS
Conducted Out of Band Emissions	2.1051,2.1057 22.917, 24.238	PASS
Band Edge	2.1051,2.1057 22.917, 24.238	PASS
Transmitter Radiated Power (EIPR/ERP)	22.913, 24.232	PASS
Radiated Out of Band Emissions	2.1053,2.1057 22.917, 24.238	PASS



## 2.GENERAL PRODUCT INFORMATION

### 2.1. Description of Device (EUT)

Product Name:	Vinci Hearable
Trademark	N/A
Model No.:	Vinci Hearable 1.5
Model Difference	N/A
Operation Frequency:	Bluetooth:2402~2480MHz WIFI:2412MHz~2462MHz (802.11b/802.11g/802.11n(H20)) 2422MHz~2452MHz (802.11n(H40)) WCDMA Band II: TX: 1852.4MHz - 1907.60MHz, RX: 1932.4MHz - 1987.60MHz WCDMA Band V: Tx: 826.40 - 846.60MHz (at intervals of 200kHz); Rx: 871.40 – 891.60MHz (at intervals of 200kHz)
Channel numbers:	Bluetooth:79 Channels for BDR/ EDR ; 40 Channels for BLE WIFI:11 Channel for 802.11b/g/n(HT20), 9 Channel for 802.11n(HT40)
Channel separation:	BDR/ EDR :1M ; BLE: 2M ; WIFI:5M
Modulation technology:	Bluetooth: GFSK, $\pi/4$ DPSK,8DPSK WIFI:DBPSK/ DQPSK/CCK/BPSK/ QPSK/ 16QAM/ 64QAM WCDMA Mode with BPSK Modulation HSDPA Mode with QPSK, 16QAM Modulation HSUPA Mode with QPSK, 16QAM Modulation
Antenna Type:	Integrated Antenna
Antenna gain:	0.69dBi (BT &WIFI) 1.02dBi (WCDMA)
Power supply:	DC 3.7V from battery



## 2.2. Product Function

Refer to Technical Construction Form and User Manual.

## 2.3. Independent Operation Modes

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 Band II	■ RMC 12.2Kbps link	■ RMC 12.2Kbps link
WCDMA Band V	■ RMC 12.2Kbps link	■ RMC 12.2Kbps link

Note: The maximum power levels are RMC12.2Kbps mode for WCDMA Band II and V. only these modes were used for all tests.



### 3. TEST SITES

#### 3.1. Test Facilities

##### Site Description

Name of Firm : Shenzhen BCTC Technology Co., Ltd.

Site Location : NO.101, Yousong Road, Longhua New District,  
Shenzhen, Guangdong, P.R.China

Lab Qualifications : Certificated by Industry Canada  
Registration No.: 12655A  
Date of registration: January 19, 2015

Certificated by FCC, USA  
Registration No.: 187086  
Date of registration: November 28, 2014

Certificated by CNAS China  
Registration No.: CNAS L6046  
Date of registration: February 3, 2013

##### 3.1.1. Measurement Uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$



### 3.2. List of Test and Measurement Instruments

#### 3.2.1. For conducted emission at the mains terminals test

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Test Receiver	R&S	ESCI	1166.5950K03 -101165-ha	2016.08.27	2017.08.26
2	LISN	SCHWARZBECK	NSLK8127	8127739	2016.08.27	2017.08.26
3	LISN	R&S	NSLK8126	8126487	2016.08.27	2017.08.26
4	RF cables	R&S	R204	R20X	2016.08.27	2017.08.26
5	Attenuator	R&S	ESH3-Z2	143206	2016.08.27	2017.08.26

#### 3.2.2. For radiated test

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4407B	MY45108040	2016.08.27	2017.08.26
2	Test Receiver (9kHz-7GHz)	R&S	ESPI	101318	2016.08.27	2017.08.26
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB 9168	VULB91 68-438	2016.08.27	2017.08.26
4	Horn Antenna (1GHz-18GHz)	SCHWARZBECK	BBHA9120D	1201	2016.09.03	2017.09.03
5	Horn Antenna (14GHz-40GHz)	SCHWARZBECK	BBHA 9170	9170-181	2016.09.03	2017.09.03
6	Amplifier (9KHz-6GHz)	SCHWARZBECK	BBV9744	9744-0037	2016.08.27	2017.08.26
7	Amplifier (1GHz-18GHz)	SCHWARZBECK	BBV9718	9718-309	2016.08.27	2017.08.26
8	Amplifier (18GHz-40GHz)	SCHWARZBECK	BBV 9721	9721-205	2016.08.27	2017.08.26
9	Loop Antenna (9KHz-30MHz)	SCHWARZBECK	FMZB1519B	00014	2016.09.03	2017.09.03
10	RF cables1 (9kHz-1GHz)	R&S	R203	R20X	2016.08.27	2017.08.26
11	RF cables2 (1GHz-40GHz)	R&S	R204	R21X	2016.08.27	2017.08.26
12	Antenna connector	Florida RF Labs	N/A	RF 01#	2016.08.27	2017.08.26
13	Power Metter	ANRITSU	ML2487A	6K00001568	2016.08.27	2017.08.26
14	Power Sensor (AV)	ANRITSU	ML2491A	030989	2016.08.27	2017.08.26
15	Signal Analyzer 9kHz-26.5GHz	Agilent	N9010A	MY48030494	2016.08.27	2017.08.26
16	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	2016.08.27	2017.08.26
17	D.C. Power Supply	LongWei	PS-305D	010964729	2016.08.27	2017.08.26
18	Bilog Antenna	TESEQ	CBL6111D	31217	2016.08.27	2017.08.26





19	System Simulator	Agilent	E5515C	GB43130252	2016.08.27	2017.08.26
20	High Pass filter	KANGMAI	WHKX1.0/1.5 G-10SS	40	2016.08.27	2017.08.26
21	Filter	COM-MW	ZBSF-C836.5-25-X	BCTC042	2016.08.27	2017.08.26
22	Filter	COM-MW	ZBSF-C1747.5-75-X2	BCTC045	2016.08.27	2017.08.26
23	Filter	COM-MW	ZBSF-C1880-60-X2	BCTC047	2016.08.27	2017.08.26
24	Splitter	Agilent	11435B	1125162	2016.08.27	2017.08.26
RF CONDUCTED TEST						
1	System Simulator	Agilent	E5515C	GB43130252	2016.08.27	2017.08.26
2	Spectrum Analyzer	Agilent	E4407B	MY45108040	2016.08.27	2017.08.26
3	DC Power Supply	LongWei	PS-305D	010965682	2016.08.27	2017.08.26
4	Constant temperature and humidity box	GF	GTH-800-40-2 P	MAA9906-012	2016.08.27	2017.08.26
5	Universal radio communication tester	R&S	CMU200	115295	2016.08.27	2017.08.26



## 4. TEST SET-UP

### 4.1. Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

### 4.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



(EUT: Vinci Hearable)

### 4.3. Test Environment:

Ambient conditions in the test laboratory:

Items	Actual
Temperature (°C)	21~23
Humidity (%RH)	50~65



## 5. EMISSION TEST RESULTS

### 5.1. Conducted RF Output Power

#### 5.1.1. Limit

According to FCC section 2.1046(a) , FCC part22.913(a) and FCC part 24.232(b) ,for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

#### 5.1.2. Test Setup

The EUT, which is powered by the adapter, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power.

#### 5.1.3. Test Result

Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT.

Measurement data



The conducted power tables are as follows:

Average Conducted Power						
Band	WCDMA Band II.			WCDMA Band V.		
Frequency	1852.4	1880.0	1907.6	826.4	836.6	846.6
RMC 12.2Kbps	24.57	24.65	24.42	22.62	22.58	22.84
RMC 64kbps	24.38	24.43	24.36	22.08	22.72	22.36
RMC 144kbps	24.62	24.72	24.38	22.74	22.37	22.29
RMC 384kbps	24.41	24.76	24.59	22.72	22.26	22.53
HSDPA Subtest-1	24.26	24.38	24.48	22.64	22.49	22.27
HSDPA Subtest-2	24.55	24.54	24.35	22.17	22.54	22.46
HSDPA Subtest-3	24.31	24.62	24.39	22.24	22.72	22.48
HSDPA Subtest-4	24.65	24.57	24.44	22.31	22.67	22.77
HSUPA Subtest-1	24.48	24.49	24.67	22.66	22.43	22.52
HSUPA Subtest-2	24.54	24.68	24.35	22.13	22.55	22.46
HSUPA Subtest-3	24.39	24.50	24.82	22.85	22.18	22.09
HSUPA Subtest-4	24.27	24.63	24.47	22.60	22.51	22.34

Note: Measurement Uncertainty:  $\pm 2.6$  dB.



## 5.2. -26dB and 99% Occupied Bandwidth

### 5.2.1. Limit

According to FCC section 2.1049 and FCC part22.913(a) and FCC part24.232(b), the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Occupied bandwidth is also known as the 99% emission bandwidth,

### 5.2.2. Test Setup

The EUT, which is powered by the adapter, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power.

### 5.2.3. Test Result

Measurement Data

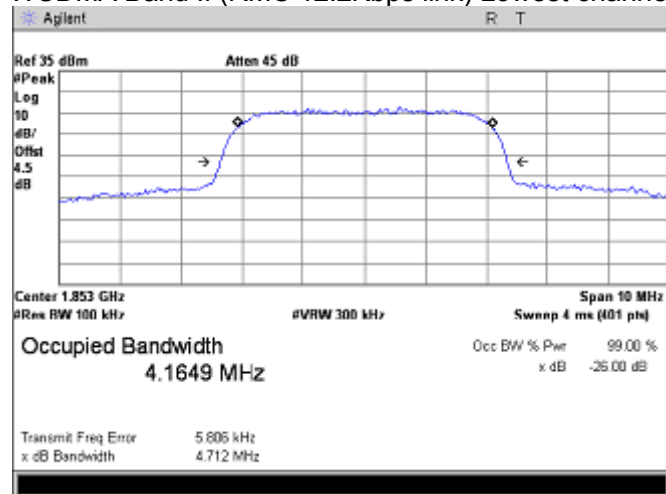
EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
WCDMA Band V (RMC 12.2Kbps link)	4132	826.4	4163.7	4695.0
	4175	836.0	4171.5	4696.0
	4233	846.6	<b>4172.5</b>	<b>4697.0</b>
HSDPA	4132	826.4	4163.3	4694.0
	4175	836.0	4151.7	<b>4696.4</b>
	4233	846.6	<b>4175.2</b>	4696.0
HSUPA	4132	826.4	4163.6	4695.0
	4175	836.0	<b>4175.1</b>	4694.0
	4233	846.6	4174.5	<b>4696.0</b>
WCDMA Band II (RMC 12.2Kbps link)	9262	1852.4	<b>4164.9</b>	4712.0
	9400	1880.0	4164.2	4705.0
	9538	1907.6	4161.5	<b>4714.0</b>
HSDPA	9262	1852.4	<b>4164.6</b>	4715.0
	9400	1880.0	4164.4	4704.0
	9538	1907.6	4161.1	<b>4717.0</b>
HSUPA	9262	1852.4	<b>4166.4</b>	4722.0
	9400	1880.0	4164.6	4707.0
	9538	1907.6	4151.5	<b>4774.0</b>

Note: Measurement Uncertainty:  $\pm 20\text{Hz}$ .

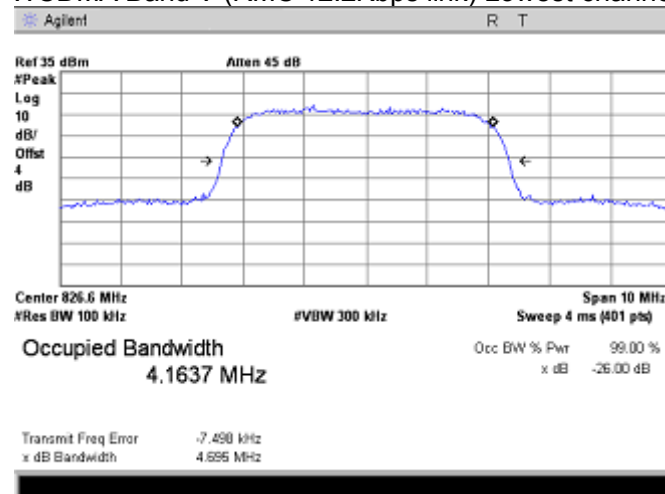


Test plot as follows:

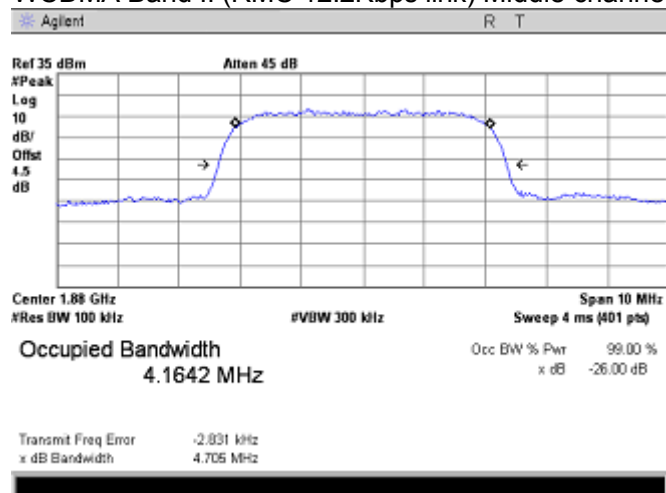
WCDMA Band II (RMC 12.2Kbps link) Lowest channel



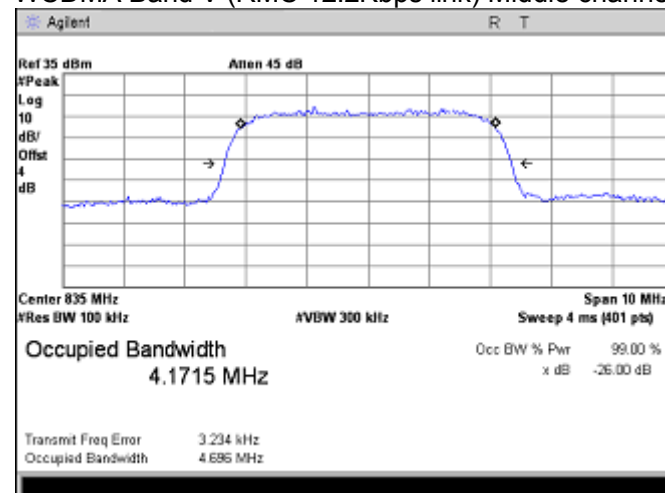
WCDMA Band V (RMC 12.2Kbps link) Lowest channel



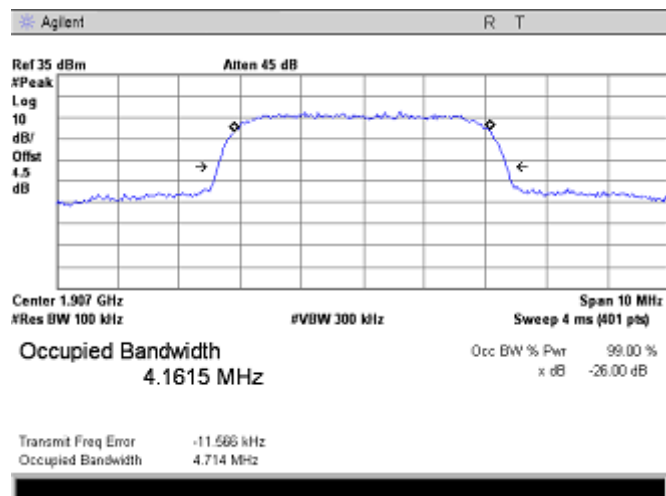
WCDMA Band II (RMC 12.2Kbps link) Middle channel



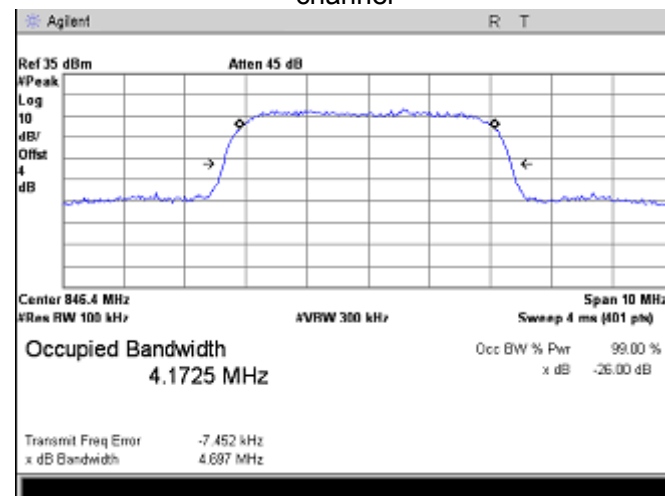
WCDMA Band V (RMC 12.2Kbps link) Middle channel



WCDMA Band II (RMC 12.2Kbps link) Highest channel

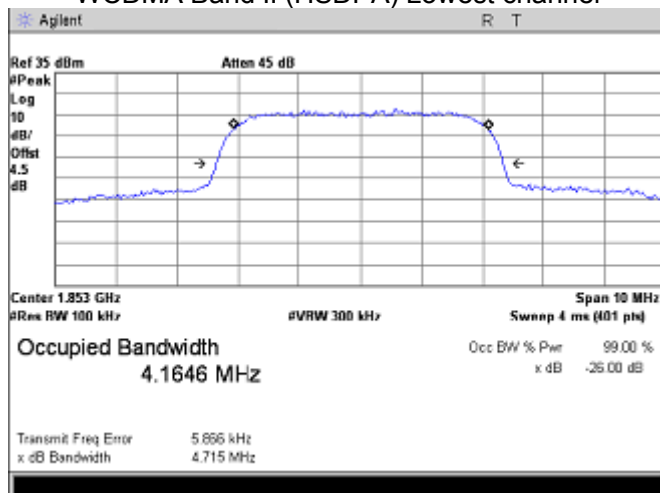


WCDMA Band V (RMC 12.2Kbps link) Highest channel

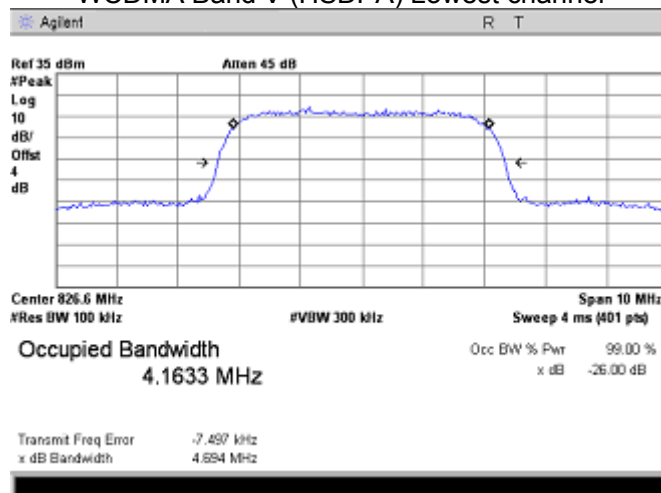




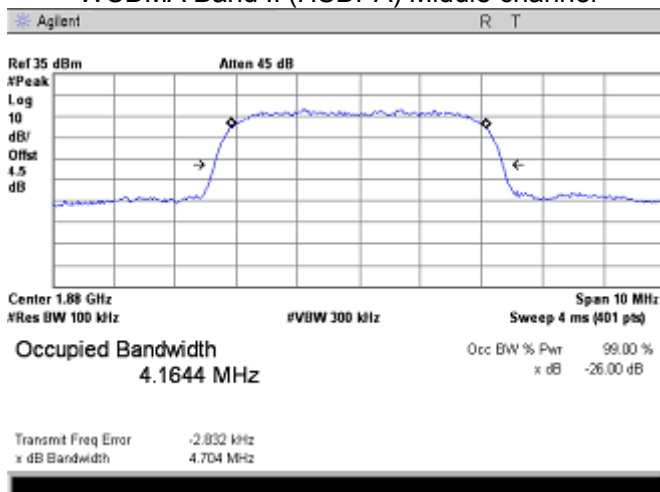
WCDMA Band II (HSDPA) Lowest channel



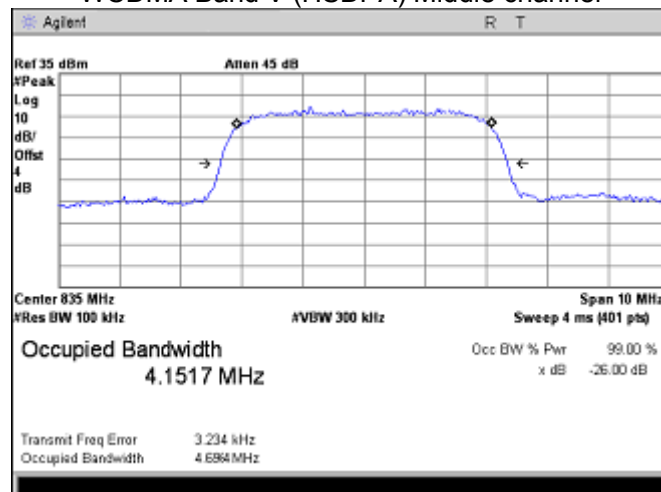
WCDMA Band V (HSDPA) Lowest channel



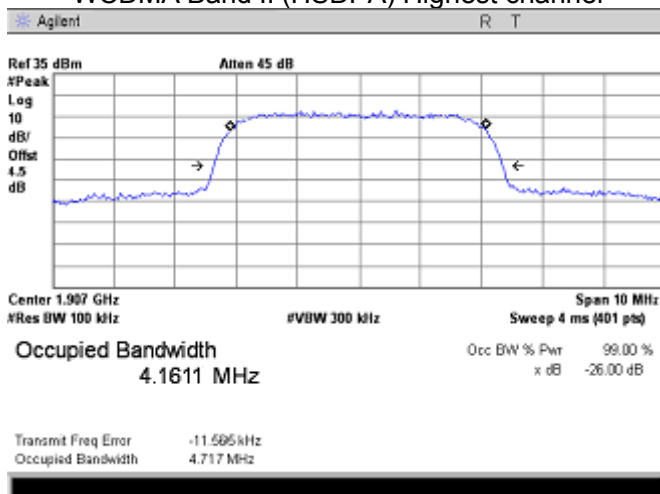
WCDMA Band II (HSDPA) Middle channel



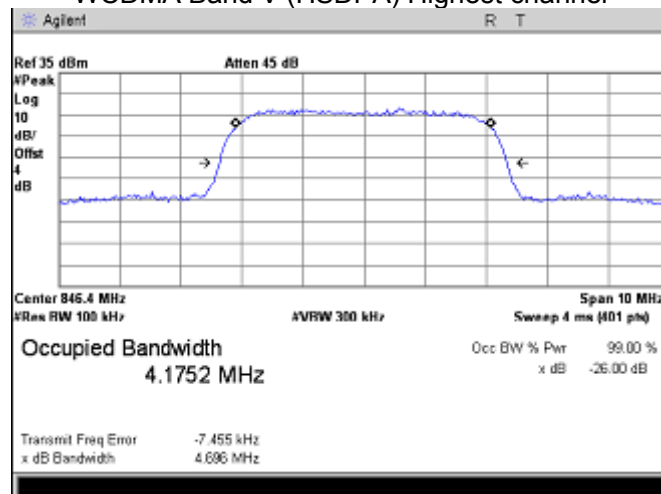
WCDMA Band V (HSDPA) Middle channel



WCDMA Band II (HSDPA) Highest channel

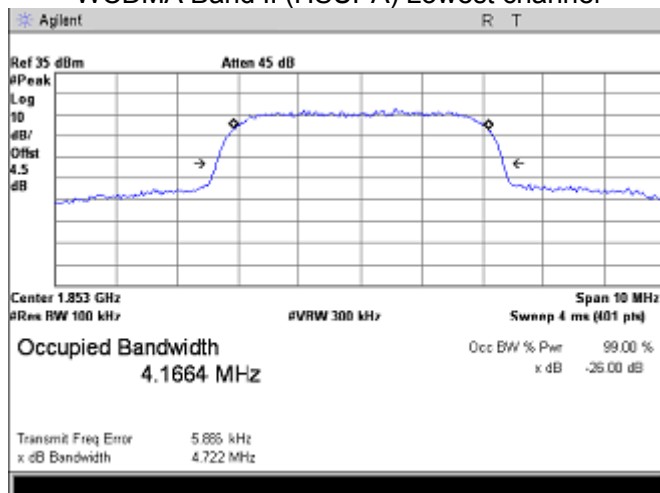


WCDMA Band V (HSDPA) Highest channel

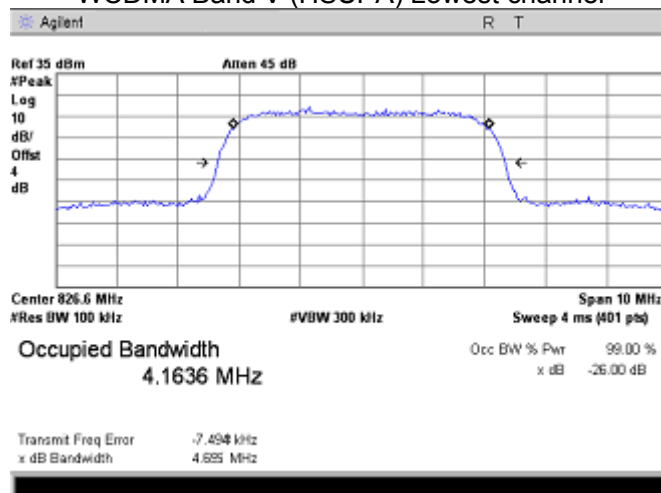




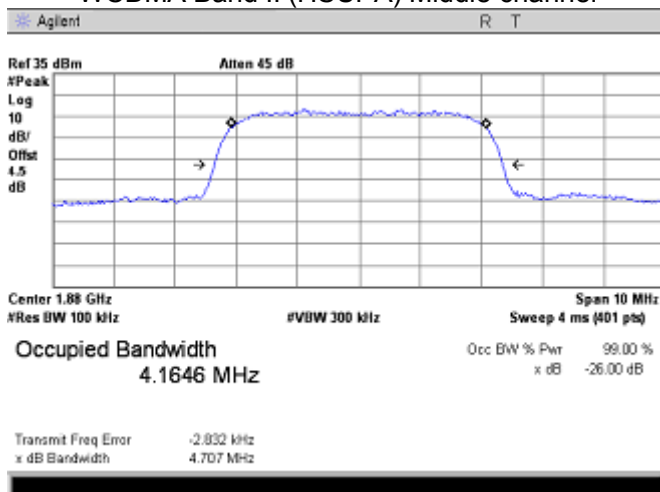
WCDMA Band II (HSUPA) Lowest channel



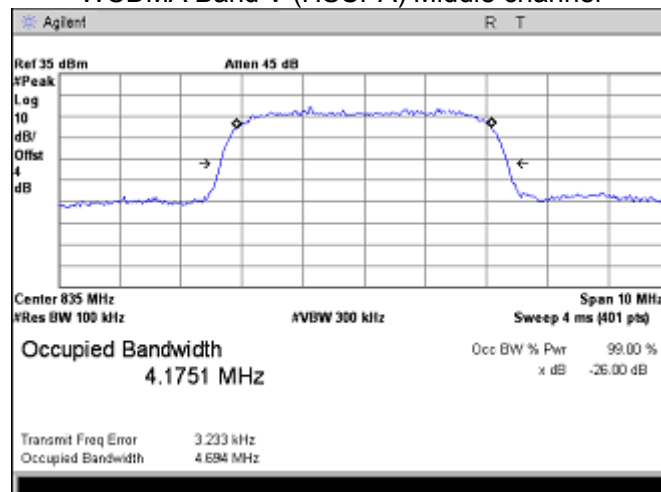
WCDMA Band V (HSUPA) Lowest channel



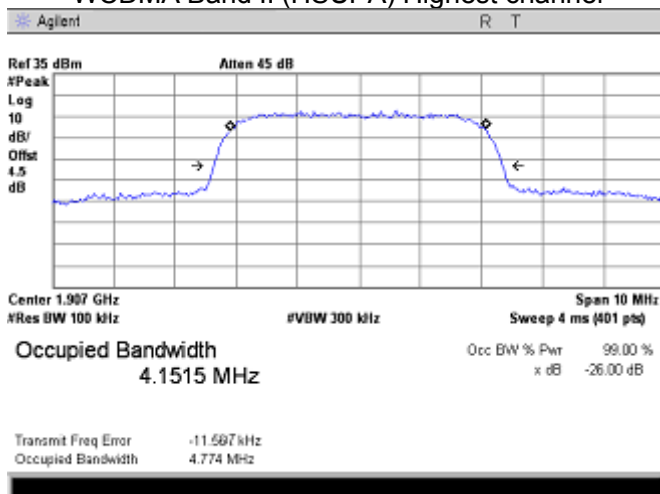
WCDMA Band II (HSUPA) Middle channel



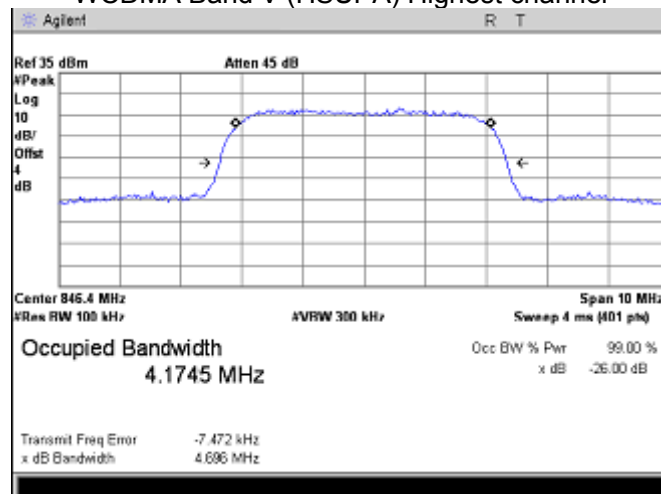
WCDMA Band V (HSUPA) Middle channel



WCDMA Band II (HSUPA) Highest channel



WCDMA Band V (HSUPA) Highest channel



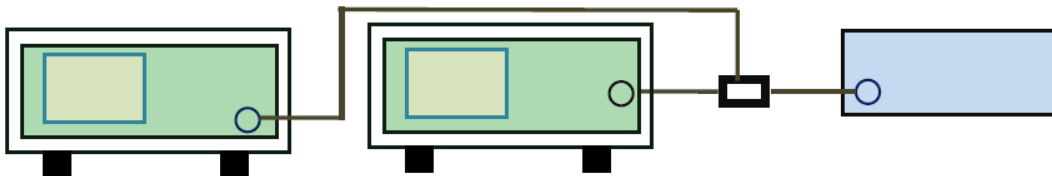


## 5.3. Peak to Average Ratio

### 5.3.1. Limit

According to FCC section 27.50(d)(5) , the peak to average ratio(PAR) of the transmission may not exceed 13dB.

### 5.3.2. Test Setup



### 5.3.3. Test Procedure

According with KDB 971168 v02r02

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal " RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the " on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

### 5.3.4. Test Result



Measurement data as follows:

Band	Channel	Conducted power(dBm)		Peak-Average Ratio(PAR)
		Peak	Average	
WCDMA Band II	Low	26.53	24.52	2.01
	Middle	26.89	24.46	2.43
	High	27.13	24.48	2.65

Note: Measurement Uncertainty:  $\pm 0.2$  dB.

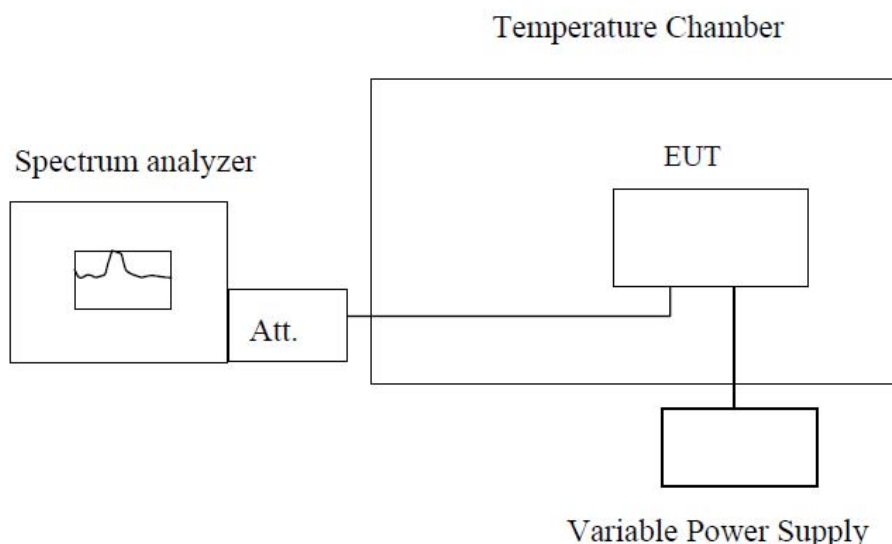
## 5.4. Frequency Stability

### 5.4.1. Limit

According to FCC section 22.355 and FCC section 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- (a) The temperature is varied from  $-30^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  at intervals of not more than  $10^{\circ}\text{C}$ .
- (b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

### 5.4.2. Test Setup



**Note :** Measurement setup for testing on Antenna connector

The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber.

The EUT is commanded by the System Simulator (SS) to operate at the maximum output power

### 5.4.3. Test Result

The nominal, highest and lowest extreme voltages are separately 3.8VDC, 4.25VDC and 3.6VDC which are specified by the applicant; the normal temperature here used is  $25^{\circ}\text{C}$ . The frequency deviation limit of 850MHz band is  $\pm 2.5\text{ppm}$ , and 1900MHz is  $\pm 1\text{ppm}$



Test Conditions			Frequency Deviation			Result
Band	Power(Vdc)	Temperature(°C)	Frequency Error(Hz)	ppm	Limit	
WCDMA Band II Middle channel=188 0.0MHz	3.7	-30	72	0.0383	±1	PASS
	3.7	-20	61	0.0324		
	3.7	-10	58	0.0309		
	3.7	0	74	0.0394		
	3.7	10	55	0.0293		
	3.7	20	43	0.0229		
	3.7	30	52	0.0277		
	3.7	40	61	0.0324		
	3.7	50	64	0.0340		
	4.25	25	39	0.0207		
	3.70	25	81	0.0431		
	3.40	25	73	0.0388		
	3.40	25	73	0.0388		
HSDPA Middle channel=188 0.0MHz	3.7	-30	46	0.0245	±1	PASS
	3.7	-20	51	0.0271		
	3.7	-10	67	0.0356		
	3.7	0	32	0.0170		
	3.7	10	49	0.0261		
	3.7	20	65	0.0346		
	3.7	30	28	0.0149		
	3.7	40	30	0.0160		
	3.7	50	54	0.0287		
	4.25	25	47	0.0250		
	3.70	25	39	0.0207		
	3.40	25	62	0.0330		
	3.40	25	62	0.0330		
HSUPA Middle channel=188 0.0MHz	3.7	-30	43	0.0229	±1	PASS
	3.7	-20	29	0.0154		
	3.7	-10	34	0.0181		
	3.7	0	61	0.0324		
	3.7	10	57	0.0303		
	3.7	20	26	0.0138		
	3.7	30	33	0.0176		
	3.7	40	26	0.0138		
	3.7	50	49	0.0261		
	4.25	25	53	0.0282		
	3.70	25	27	0.0144		
	3.40	25	42	0.0223		
	3.40	25	42	0.0223		
WCDMA Band V Middle channel=835. 0MHz	3.7	-30	59	0.0707	±2.5	PASS
	3.7	-20	60	0.0719		
	3.7	-10	42	0.0503		
	3.7	0	45	0.0539		
	3.7	10	54	0.0647		
	3.7	20	76	0.0910		
	3.7	30	69	0.0826		
	3.7	40	44	0.0527		
	3.7	50	38	0.0455		
	4.25	25	41	0.0491		
	3.70	25	57	0.0683		
	3.40	25	49	0.0587		
	3.40	25	49	0.0587		



HSDPA Middle channel=835. 0MHz	3.7	-30	45	0.0539	±2.5	PASS
	3.7	-20	36	0.0431		
	3.7	-10	27	0.0323		
	3.7	0	46	0.0551		
	3.7	10	38	0.0455		
	3.7	20	55	0.0659		
	3.7	30	62	0.0743		
	3.7	40	31	0.0371		
	3.7	50	56	0.0671		
	4.25	25	34	0.0407		
	3.70	25	64	0.0766		
	3.40	25	27	0.0323		
HSUPA Middle channel=835. 0MHz	3.7	-30	48	0.0575	±2.5	PASS
	3.7	-20	25	0.0299		
	3.7	-10	37	0.0443		
	3.7	0	22	0.0263		
	3.7	10	19	0.0228		
	3.7	20	28	0.0335		
	3.7	30	37	0.0443		
	3.7	40	51	0.0611		
	3.7	50	43	0.0515		
	4.25	25	49	0.0587		
	3.70	25	60	0.0719		
	3.40	25	52	0.0623		

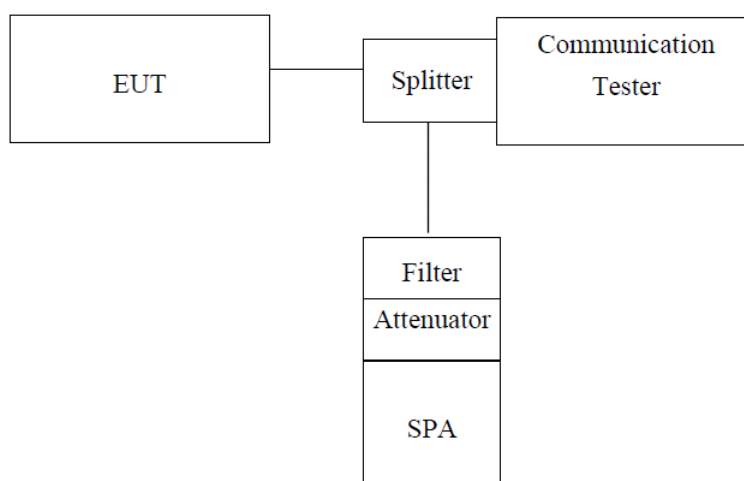
Note: Measurement Uncertainty: ±20Hz.

## 5.5. Conducted Spurious Emissions

### 5.5.1. Limit

According to FCC section 22.917(a) and FCC section 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. This calculated to be -13dBm.

### 5.5.2. Test Setup



*Note: Measurement setup for testing on Antenna connector*

### 5.5.3. Measurement Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 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.

For the out of band: Set the RBW, VBW = 100KHz, Start=30MHz, Stop= 10th harmonic.

Limit = -13dBm

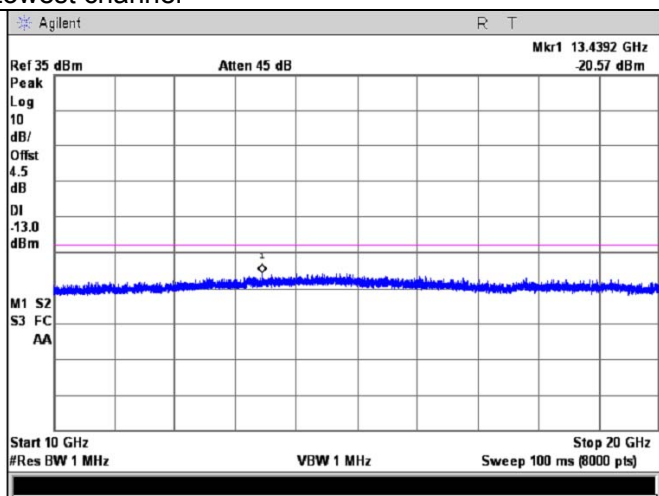
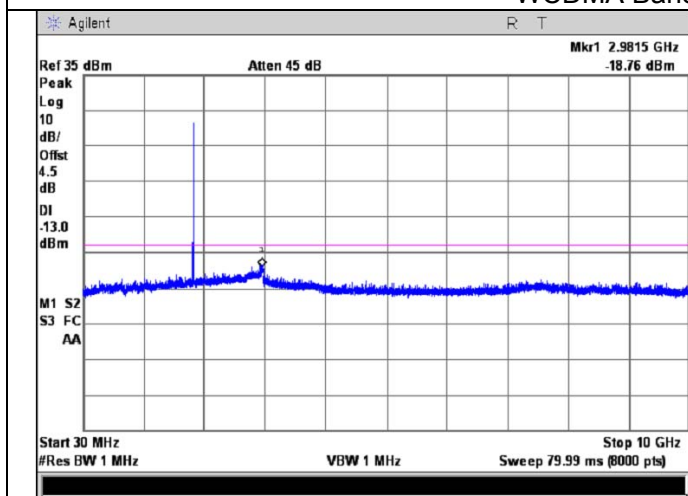
### 5.5.4. Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

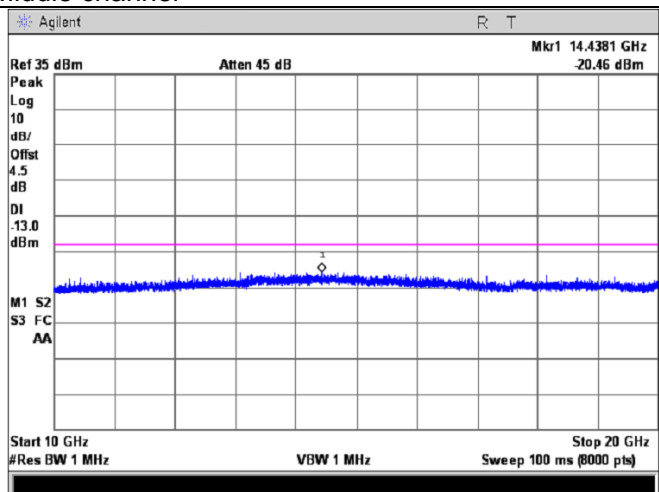
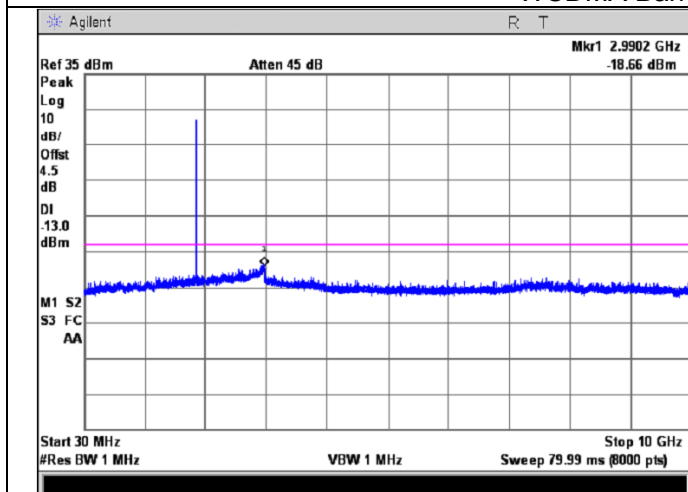
Test plot as follows:



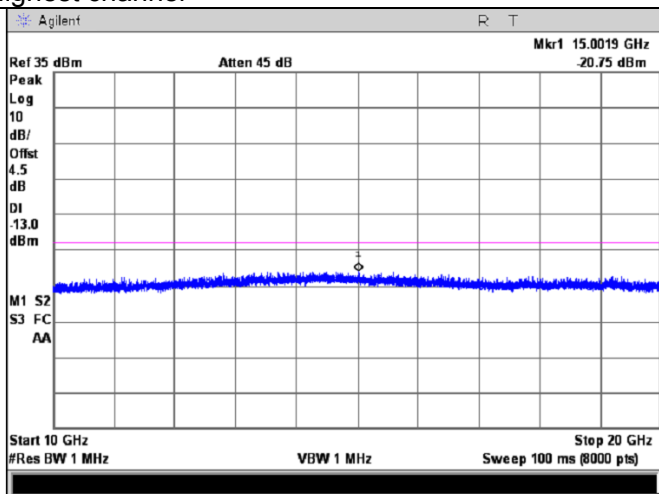
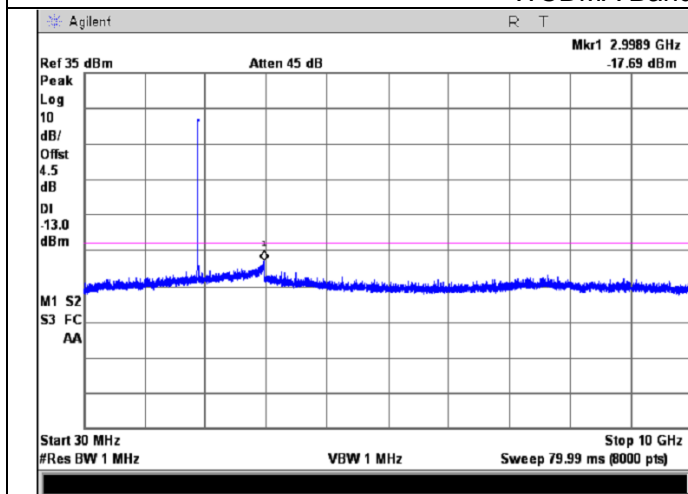
## WCDMA Band V Lowest channel



## WCDMA Band V Middle channel

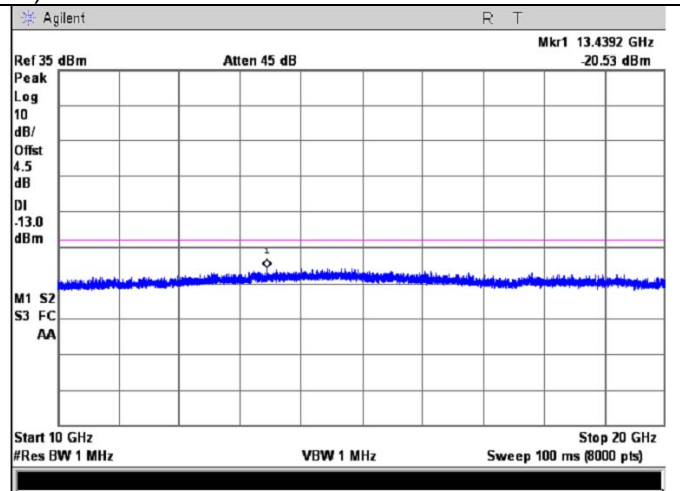
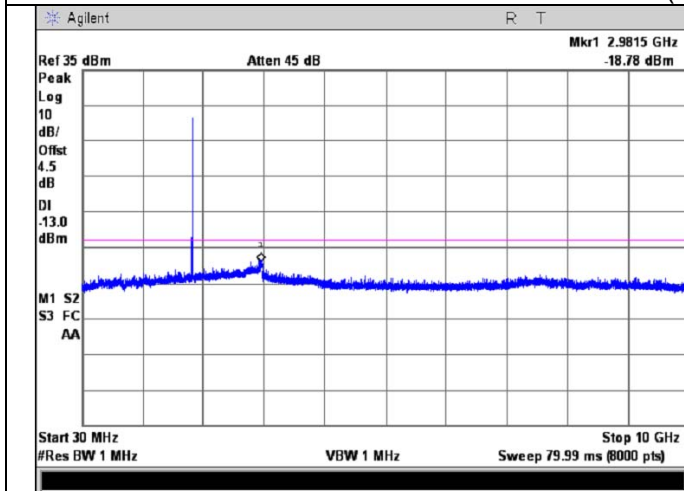


## WCDMA Band V Highest channel

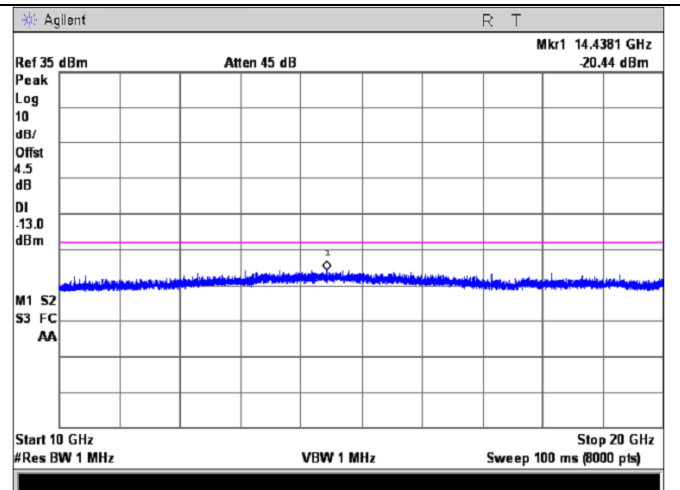
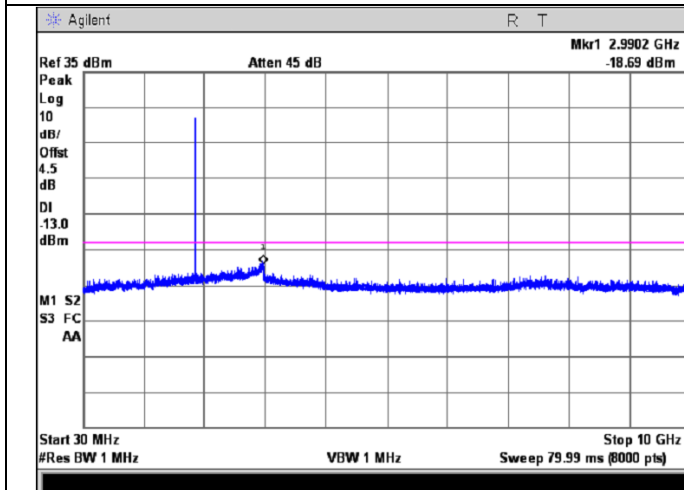




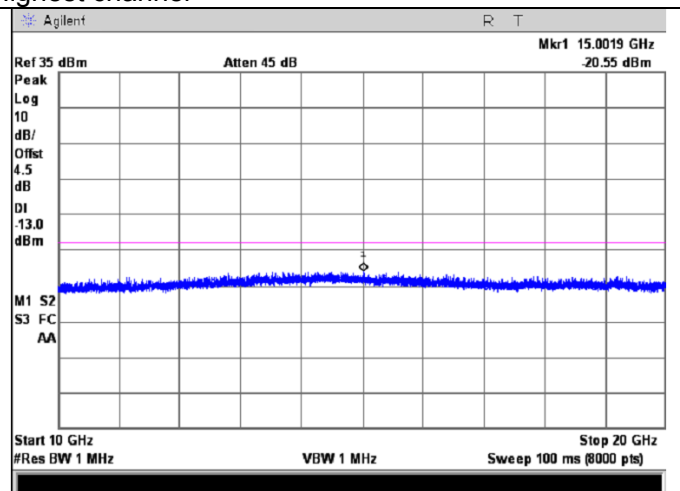
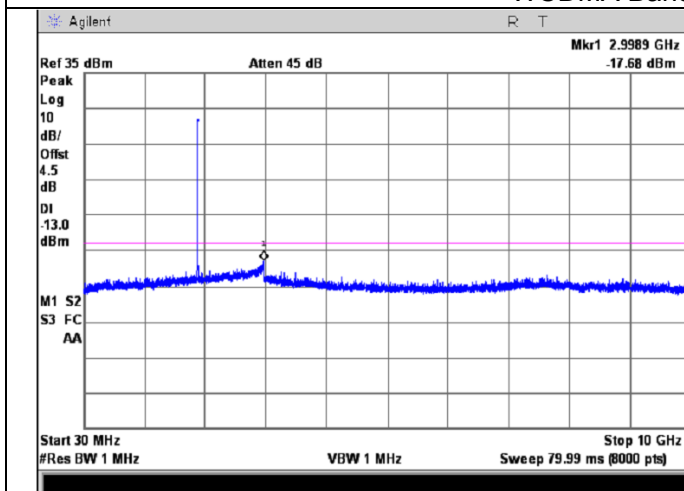
## WCDMA Band V (HSDPA) Lowest channel



## WCDMA Band V Middle channel



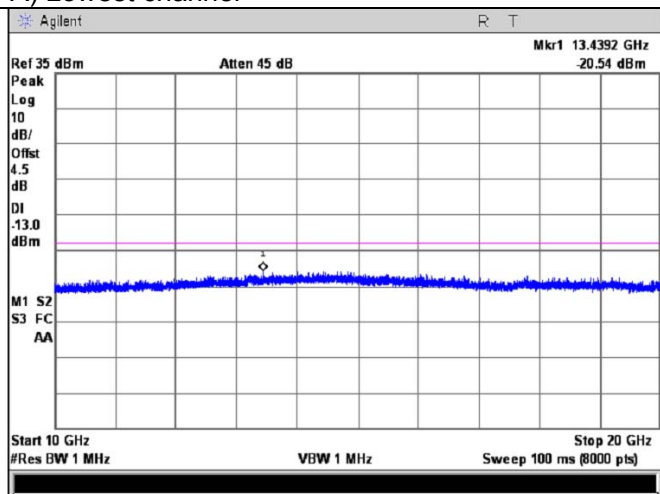
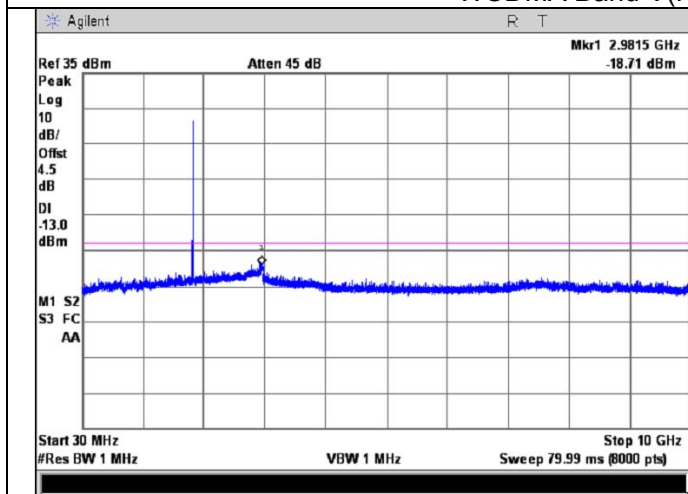
## WCDMA Band V Highest channel



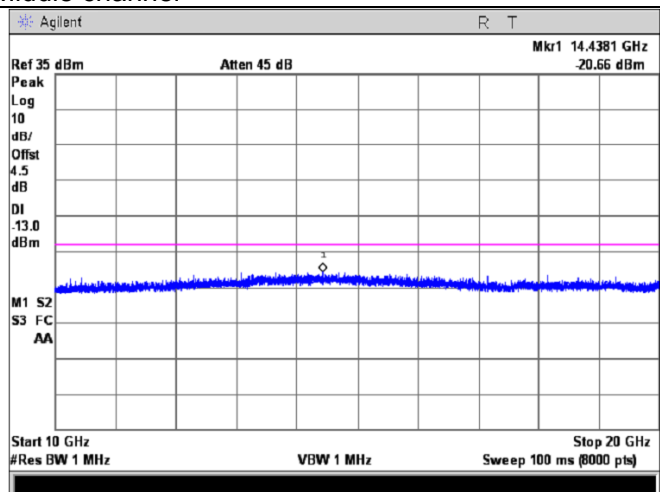
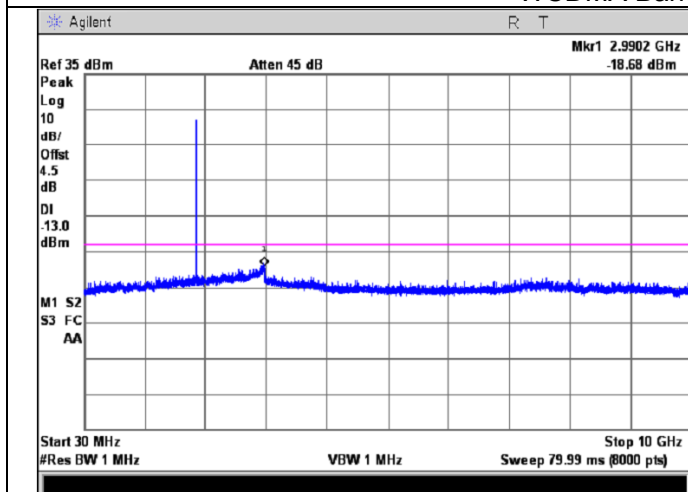




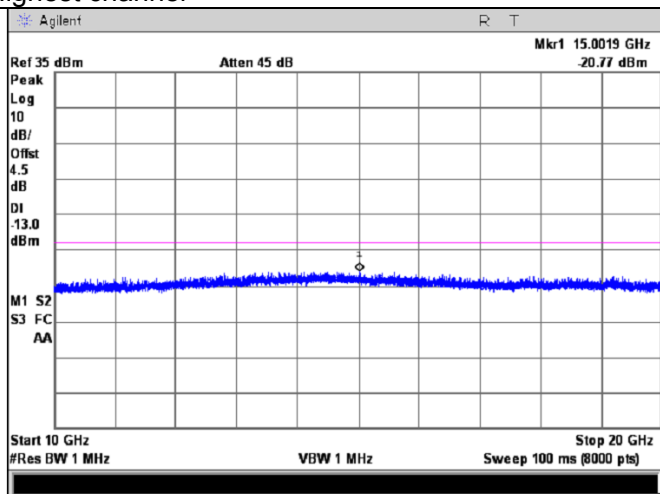
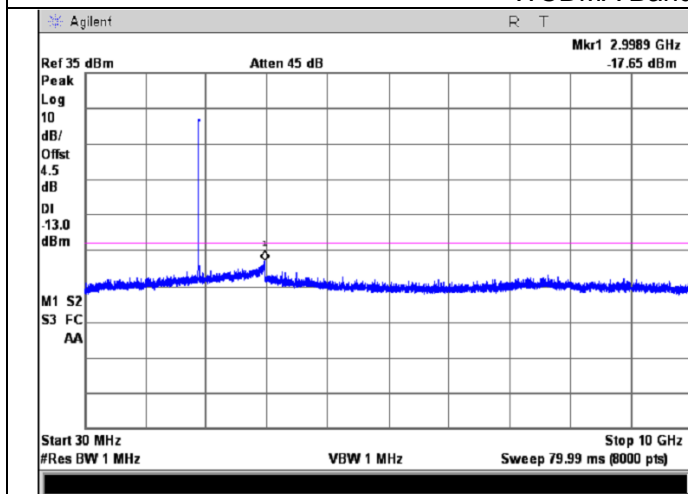
## WCDMA Band V(HSUPA) Lowest channel



## WCDMA Band V Middle channel

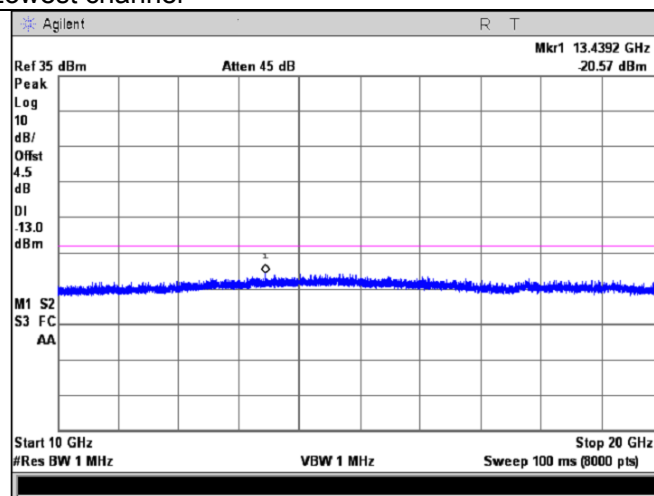
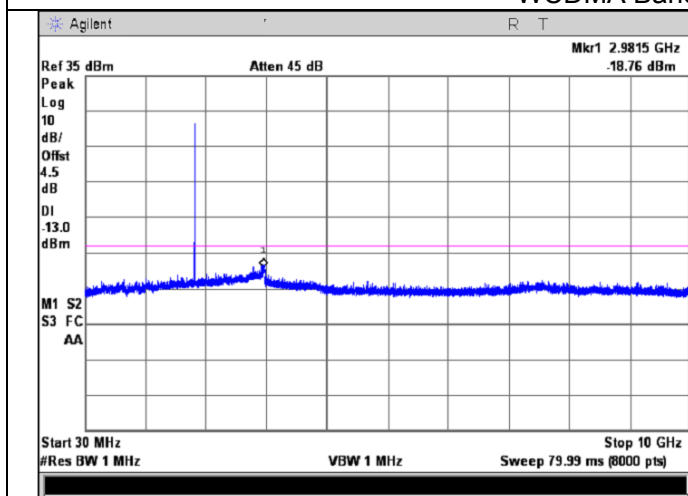


## WCDMA Band V Highest channel

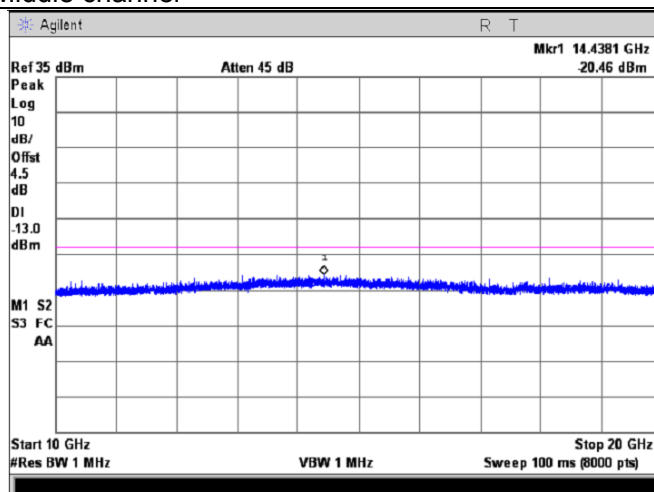
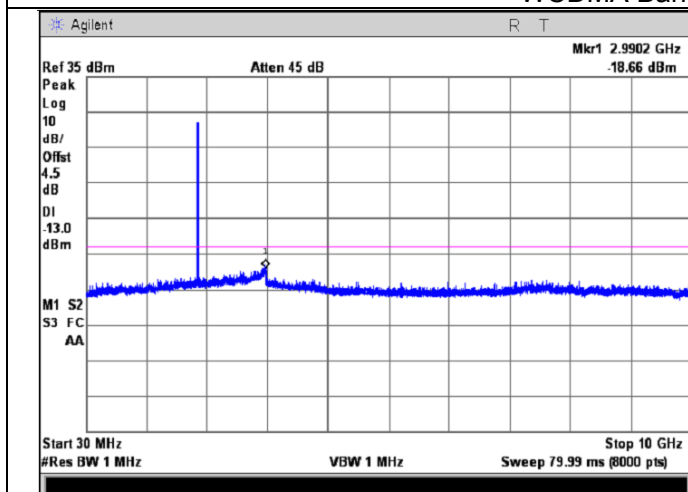




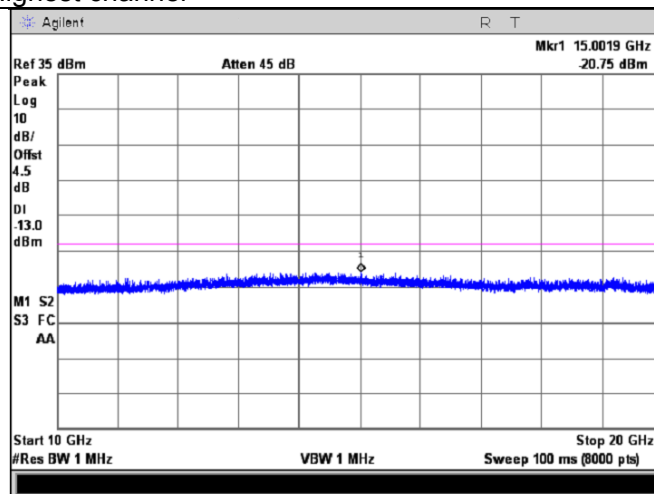
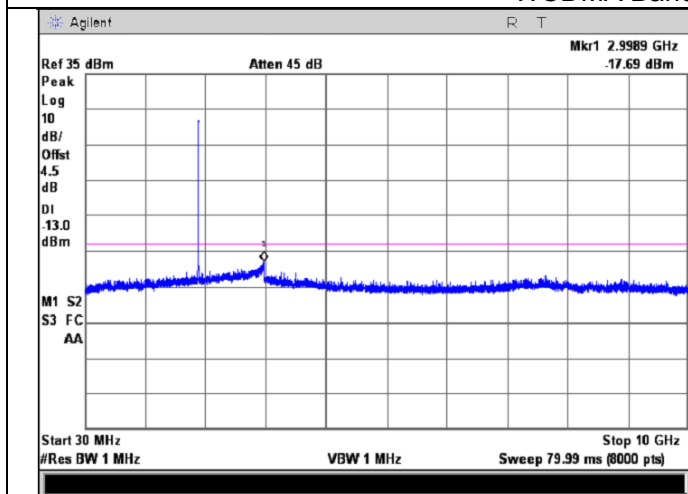
## WCDMA Band II Lowest channel



## WCDMA Band II Middle channel

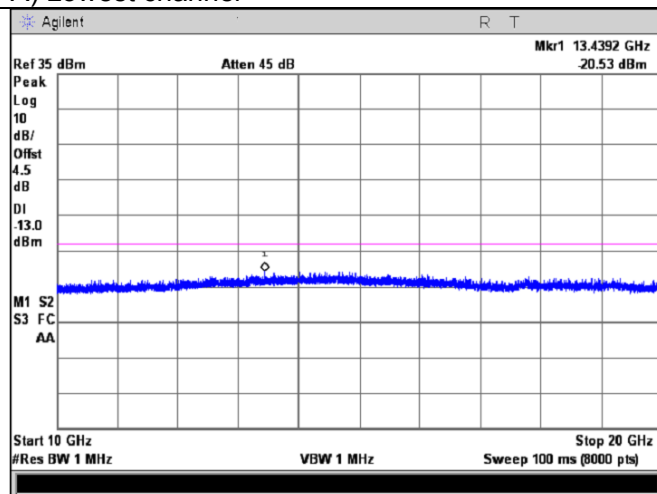
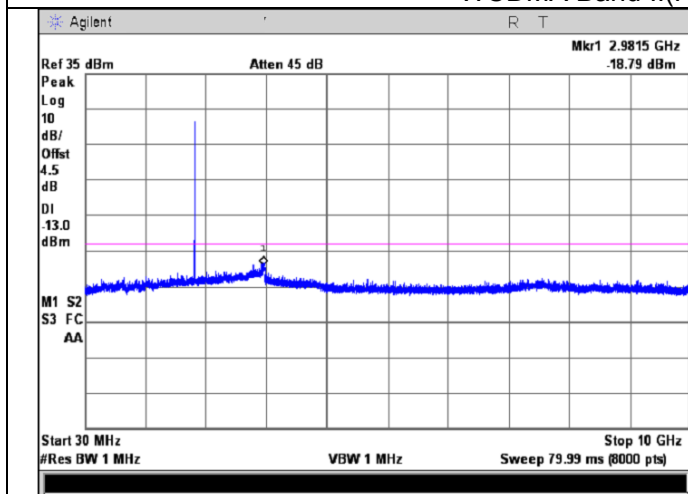


## WCDMA Band II Highest channel

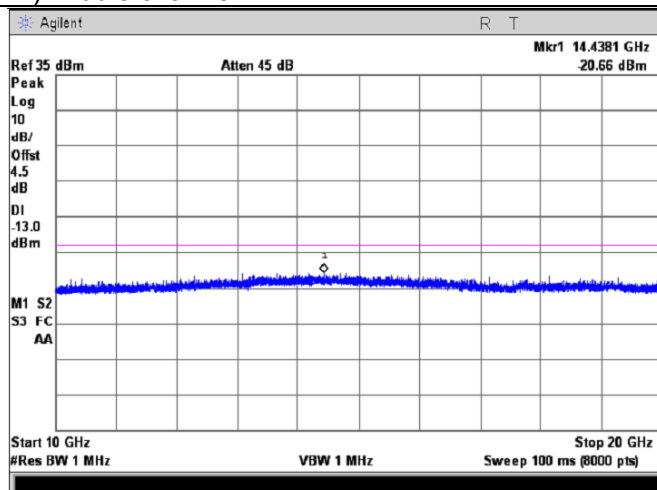
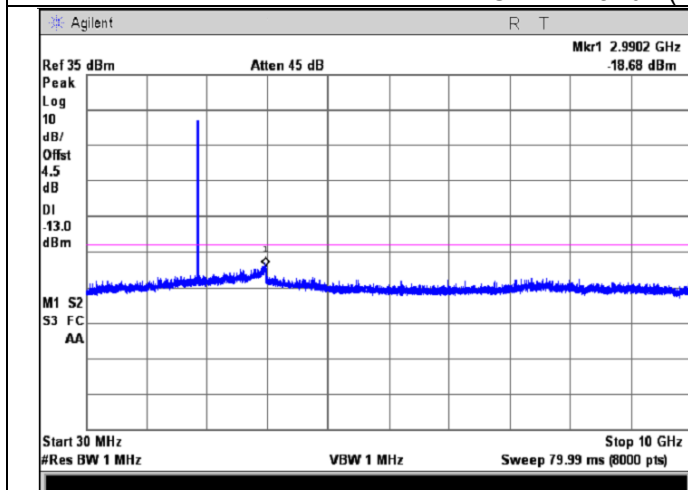




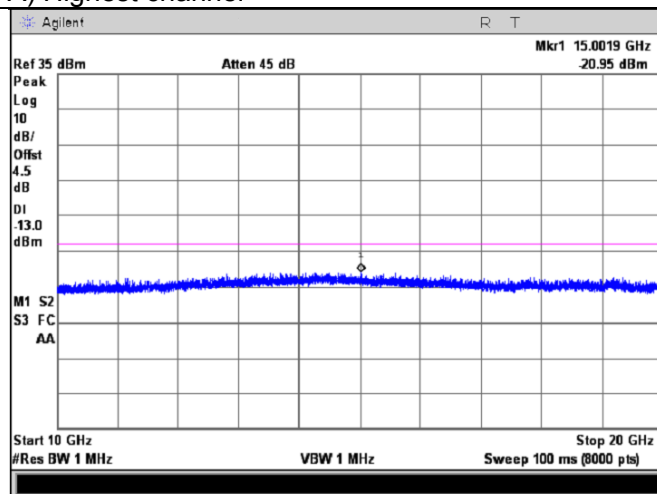
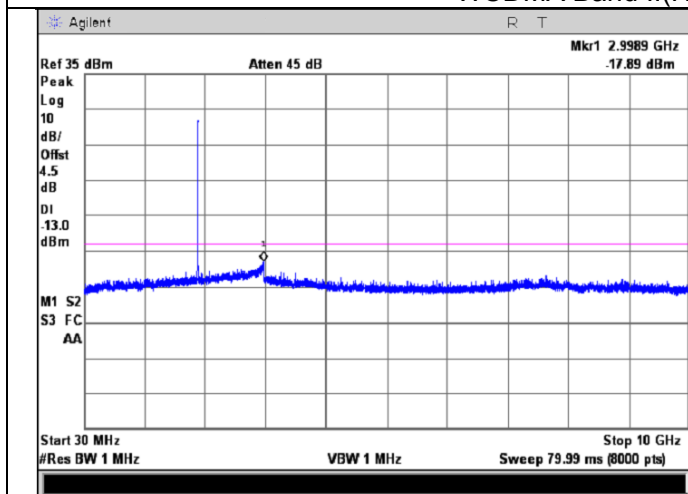
## WCDMA Band II(HSDPA) Lowest channel



## WCDMA Band II(HSDPA) Middle channel

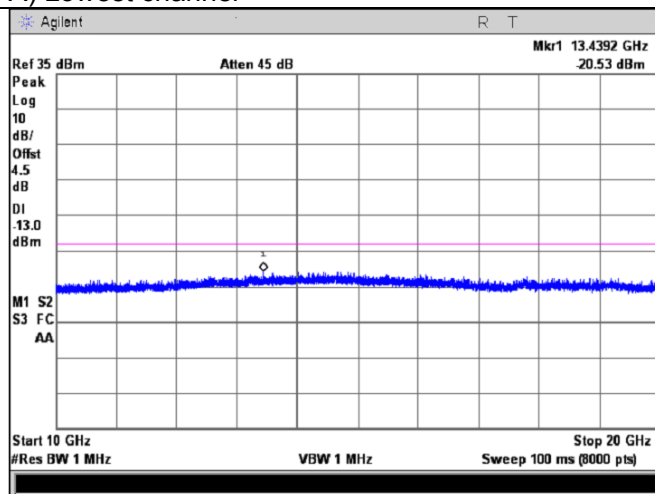
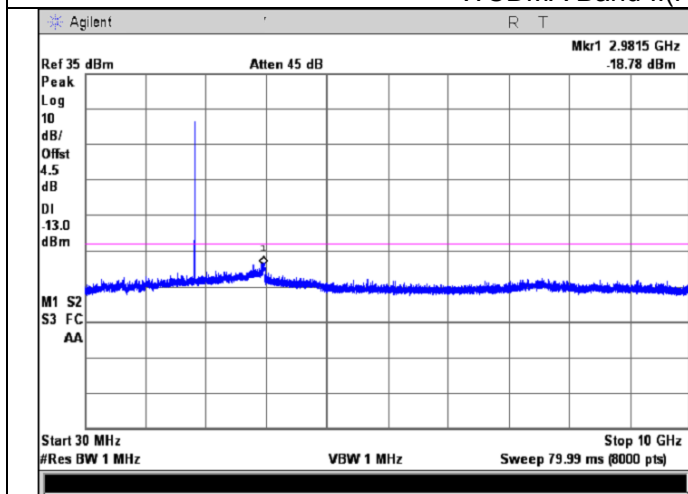


## WCDMA Band II(HSDPA) Highest channel

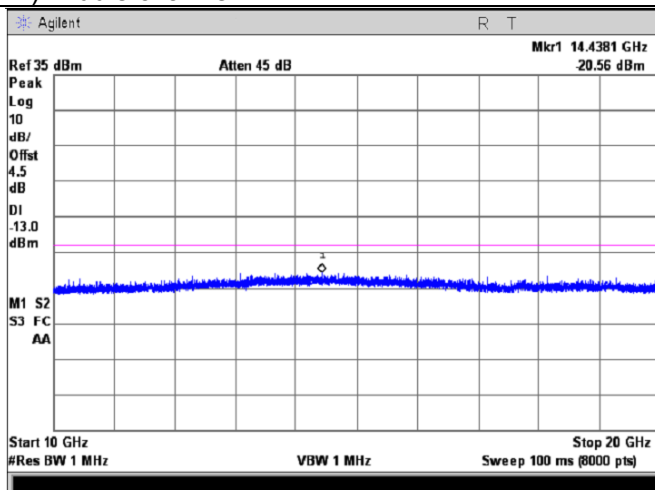
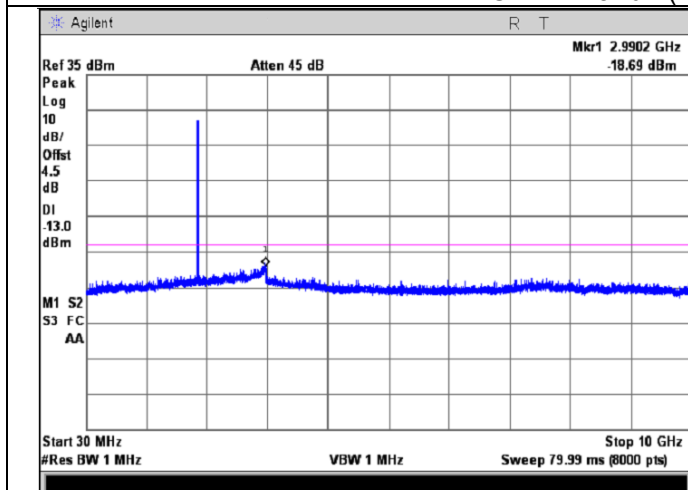




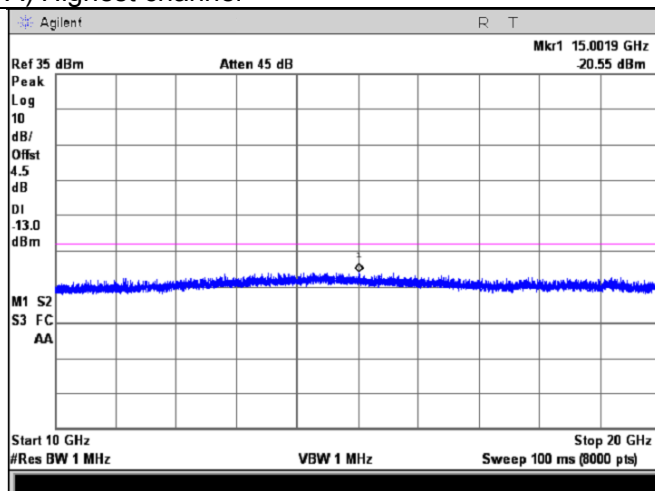
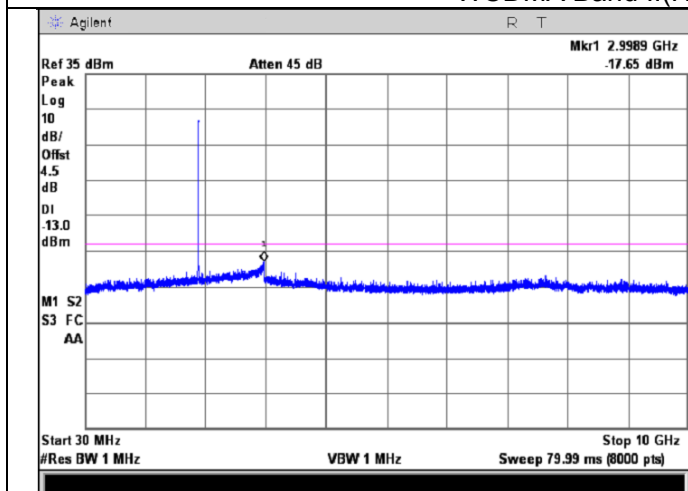
## WCDMA Band II(HSUPA) Lowest channel



## WCDMA Band II(HSUPA) Middle channel



## WCDMA Band II(HSUPA) Highest channel

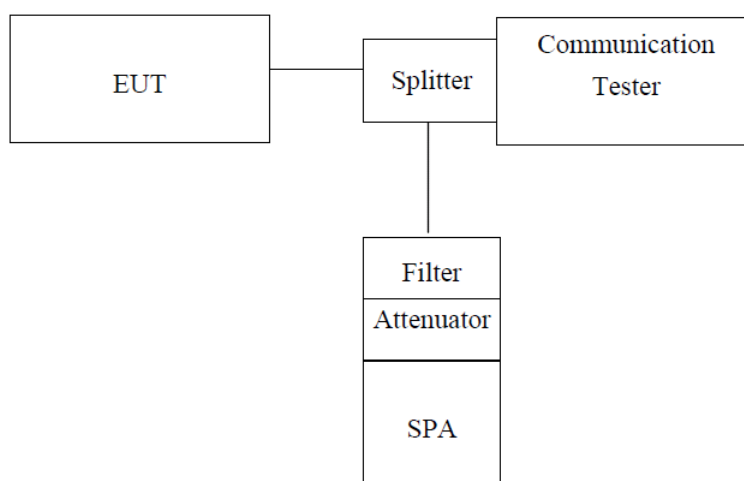


## 5.6. Conducted Out of Band Emissions

### 5.6.1. Limit

According to FCC section 22.917(b) and FCC section 24.238(b), 27.53(g)(h) in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth (26dB emission bandwidth) of the fundamental emission of the transmitter may be employed.

### 5.6.2. Test Setup



*Note: Measurement setup for testing on Antenna connector*

### 5.6.3. Measurement Procedure

The EUT, which is powered by the adapter, is coupled to the Spectrum Analyzer and the System Simulator with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the System Simulator to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the System Simulator.

and reference KDB 971168 D01 Power Meas. License Digital Systems v02v02

### 5.6.4. Test Result

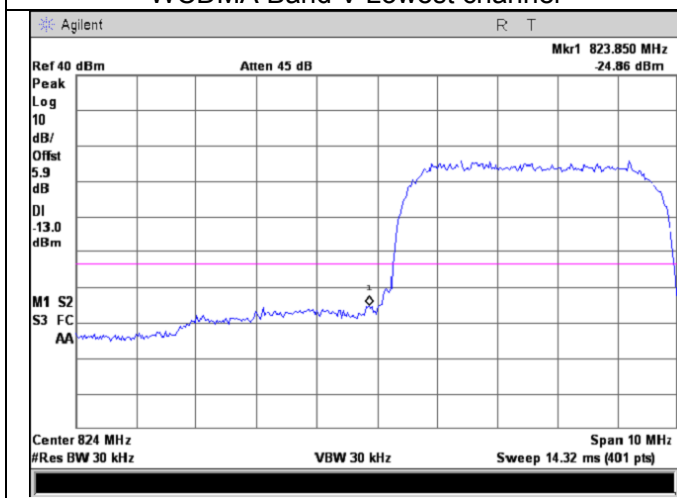
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

Note: Offset=Cable loss+  $10\log((-26\text{dB bandwidth}/100)/\text{RBW})$

Test plot as follows:

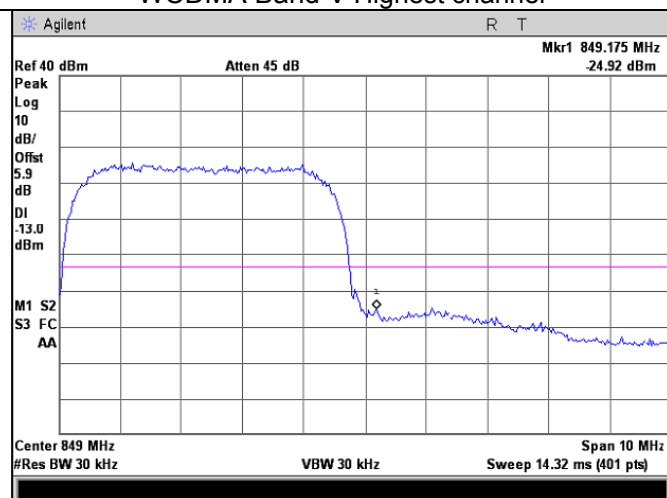


## WCDMA Band V Lowest channel



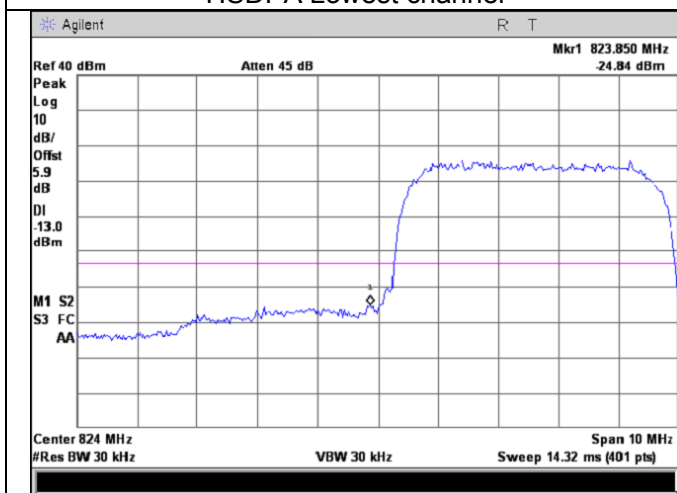
Note: Offset=Cable loss(4.0)+10log (46.95/30)=4.0+1.9=5.9 dB

## WCDMA Band V Highest channel



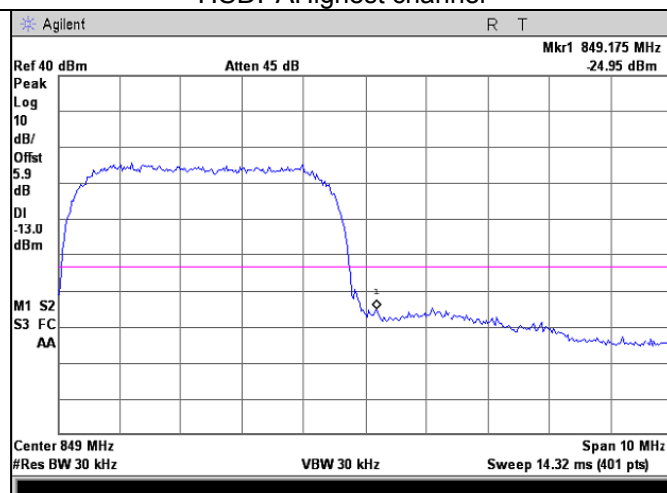
Note: Offset=Cable loss (4.0) + 10log (46.97/30)=4.0+1.9=5.9 dB

## HSDPA Lowest channel



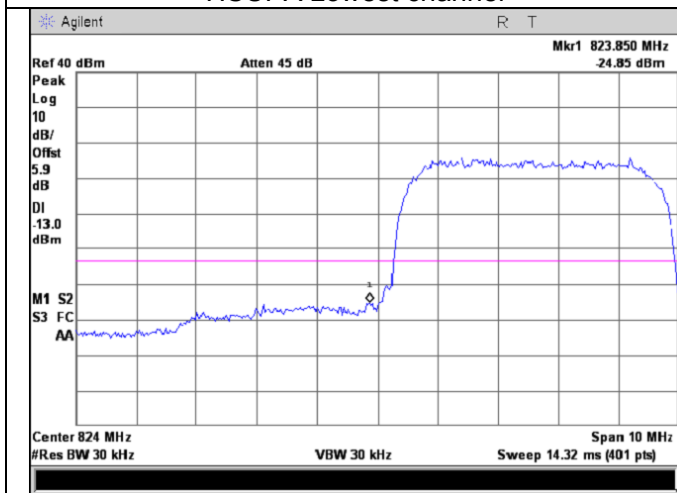
Note: Offset=Cable loss(4.0)+10log (46.95/30)=4.0+1.9=5.9 dB

## HSDPA Highest channel



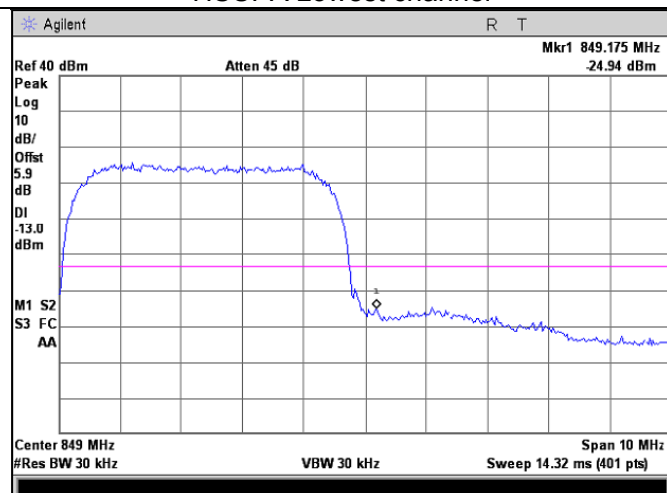
Note: Offset=Cable loss (4.0) + 10log (46.97/30)=4.0+1.9=5.9 dB

## HSUPA Lowest channel



Note: Offset=Cable loss(4.0)+10log (46.95/30)=4.0+1.9=5.9 dB

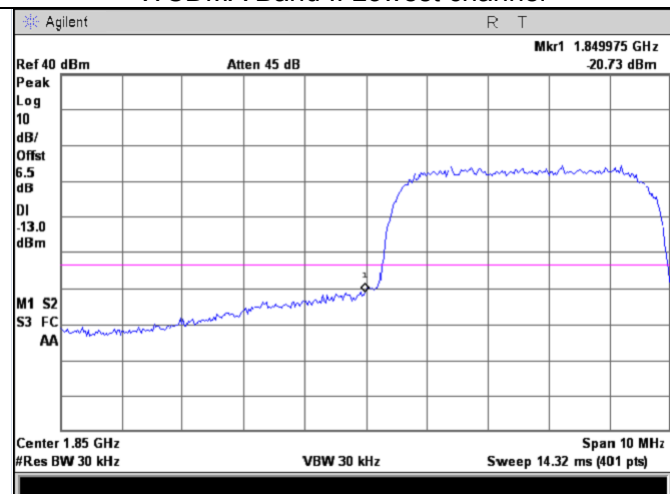
## HSUPA Highest channel



Note: Offset=Cable loss (4.0) + 10log (46.97/30)=4.0+1.9=5.9 dB

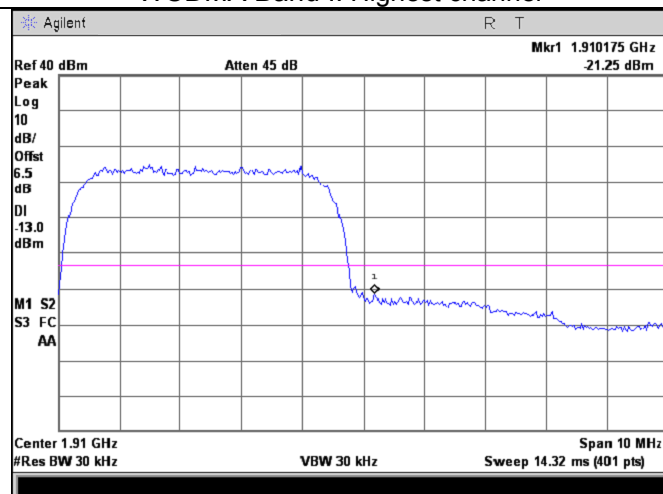


## WCDMA Band II Lowest channel



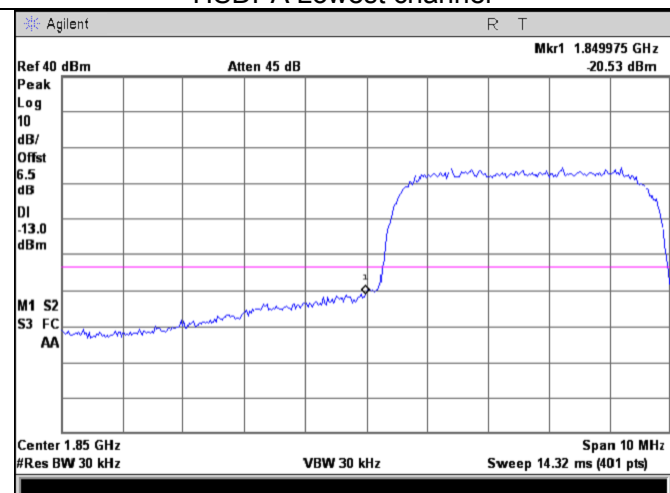
Note: Offset=Cable loss (4.5) + 10log  
(47.12/30)=4.5+2.0=6.5dB

## WCDMA Band II Highest channel



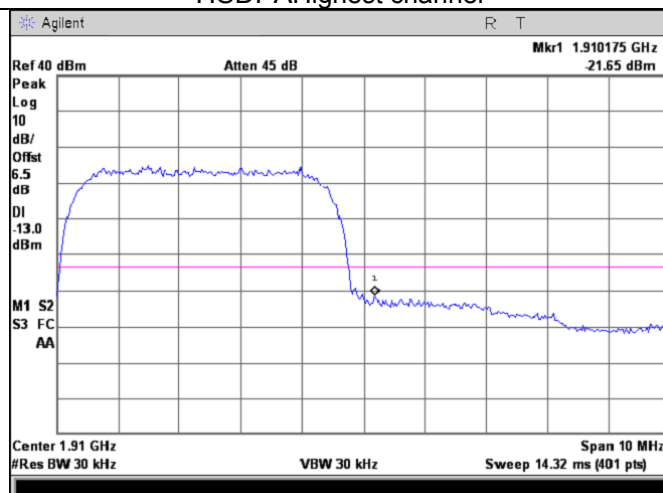
Note: Offset=Cable loss (4.5) + 10log (47.14/30)=4.5+2.0=6.5dB

## HSDPA Lowest channel



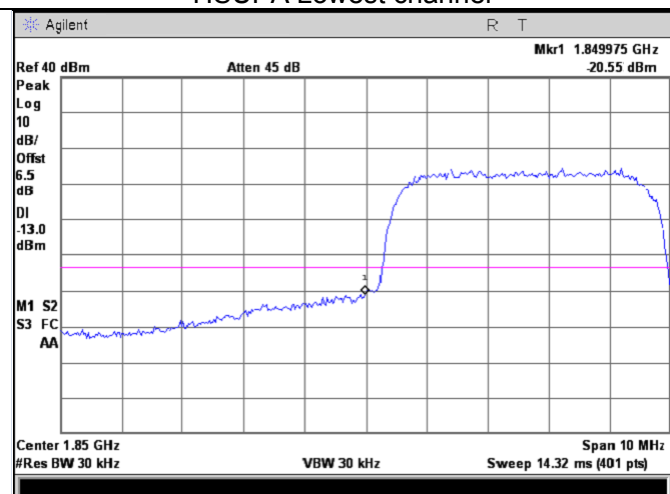
Note: Offset=Cable loss (4.5) + 10log  
(47.12/30)=4.5+2.0=6.5dB

## HSDPA Highest channel



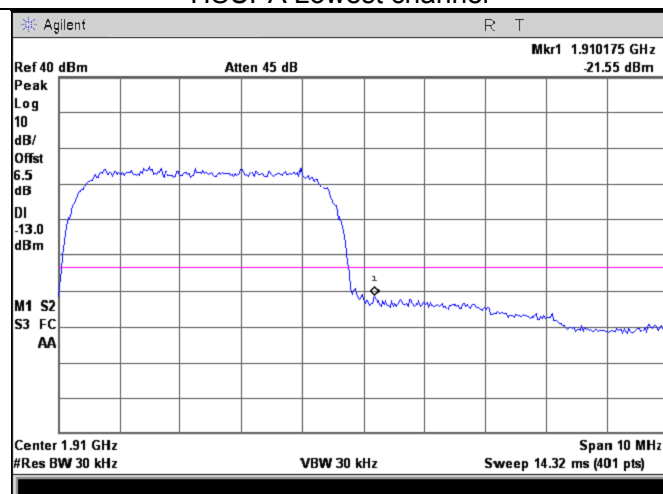
Note: Offset=Cable loss (4.5) + 10log (47.14/30)=4.5+2.0=6.5dB

## HSUPA Lowest channel



Note: Offset=Cable loss (4.5) + 10log  
(47.12/30)=4.5+2.0=6.5dB

## HSUPA Highest channel



Note: Offset=Cable loss (4.5) + 10log (47.14/30)=4.5+2.0=6.5dB

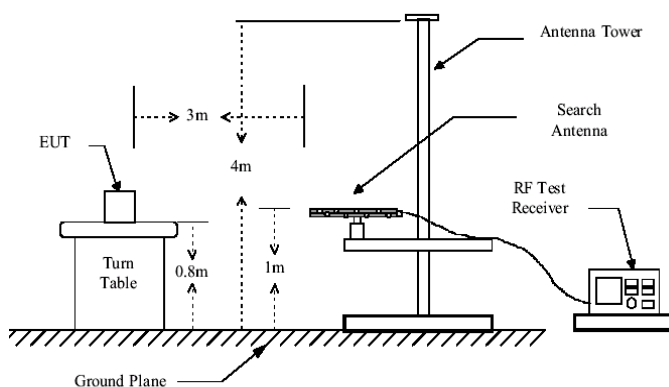
## 5.7. Transmitter Radiated Power (EIRP/ERP)

### 5.7.1. Limit

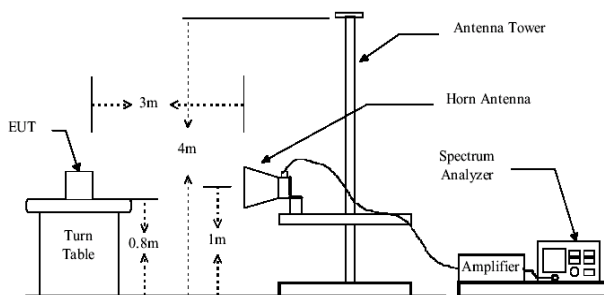
According to FCC section 22.913, the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7Watts, and FCC section 24.232, the broadband PCS mobile station is limited to 2 Watts e.i.r.p. peak power.

### 5.7.2. Test Setup

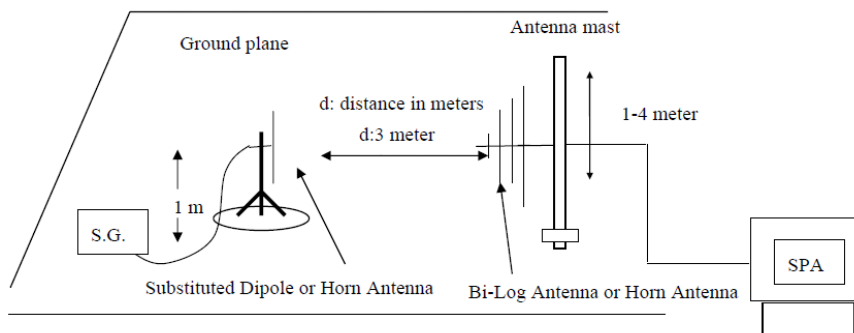
Below 1GHz



Above 1GHz



Substituted method:







### 5.7.3. Measurement Procedure

The EUT was placed on a 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. All test in Full-Anechoic Chamber.

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.

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:

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:

For BAND II:  $ERP = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$

For BAND V:  $EIRP = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$

### 5.7.4. Test Result

EUT mode	Channel	Antenna Pol.	S.G. output (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	ERP (dBm)	Limit (dBm)	Result
WCDMA Band V	Lowest	V	7.01	15.68	1.65	21.04	38.45	Pass
		H	6.42	15.68	1.65	20.45		
	Middle	V	6.98	15.70	1.67	21.01	38.45	Pass
		H	7.14	15.70	1.67	21.17		
	Highest	V	7.92	15.70	1.71	21.91	38.45	Pass
		H	<b>8.09</b>	<b>15.70</b>	<b>1.71</b>	<b>22.08</b>		
WCDMA Band V HSDPA	Lowest	V	6.57	15.68	1.65	20.60	38.45	Pass
		H	6.13	15.68	1.65	20.16		
	Middle	V	6.26	15.70	1.67	20.29	38.45	Pass
		H	6.38	15.70	1.67	20.41		
	Highest	V	7.04	15.70	1.71	21.03	38.45	Pass
		H	<b>7.49</b>	<b>15.70</b>	<b>1.71</b>	<b>21.48</b>		



WCDMA Band V HSUPA	Lowest	V	<b>6.43</b>	<b>15.68</b>	<b>1.65</b>	<b>20.46</b>		
		H	6.20	15.68	1.65	20.23		
	Middle	V	6.19	15.70	1.67	20.22	38.45	Pass
		H	6.17	15.70	1.67	20.20		
	Highest	V	7.25	15.70	1.71	21.24	38.45	Pass
		H	7.36	15.70	1.71	21.35		
WCDMA Band II	Lowest	V	7.62	19.33	2.52	24.43	38.45	Pass
		H	6.93	19.33	2.52	23.74		
	Middle	V	<b>7.87</b>	<b>19.50</b>	<b>2.60</b>	<b>24.77</b>	38.45	Pass
		H	7.33	19.50	2.60	24.23		
	Highest	V	6.92	19.94	2.71	24.15	38.45	Pass
		H	7.26	19.94	2.71	24.49		
WCDMA Band II HSDPA	Lowest	V	7.40	19.33	2.52	24.21	38.45	Pass
		H	6.56	19.33	2.52	23.37		
	Middle	V	7.39	19.50	2.60	24.29	38.45	Pass
		H	7.24	19.50	2.60	24.14		
	Highest	V	6.38	19.94	2.71	23.61	38.45	Pass
		H	<b>7.45</b>	<b>19.94</b>	<b>2.71</b>	<b>24.68</b>		
WCDMA Band II HSUPA	Lowest	V	7.37	19.33	2.52	24.18	38.45	Pass
		H	6.42	19.33	2.52	23.23		
	Middle	V	7.36	19.50	2.60	24.26	38.45	Pass
		H	7.51	19.50	2.60	24.41		
	Highest	V	6.57	19.94	2.71	23.80	38.45	Pass
		H	<b>7.29</b>	<b>19.94</b>	<b>2.71</b>	<b>24.52</b>		

## 5.8. Radiated Out of Band Emissions

### 5.8.1. Limit

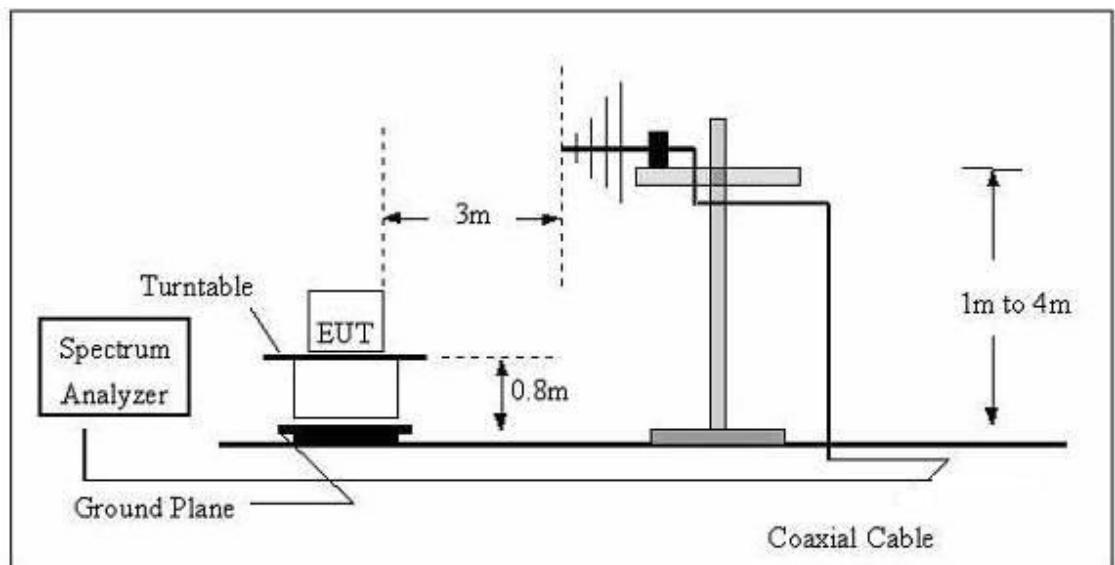
According to FCC section 22.917(a) and section 24.238(a), 27.53(g) the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power

(P) by a factor of at least  $43+10\log(P)$ dB. This calculated to be -13dBm.

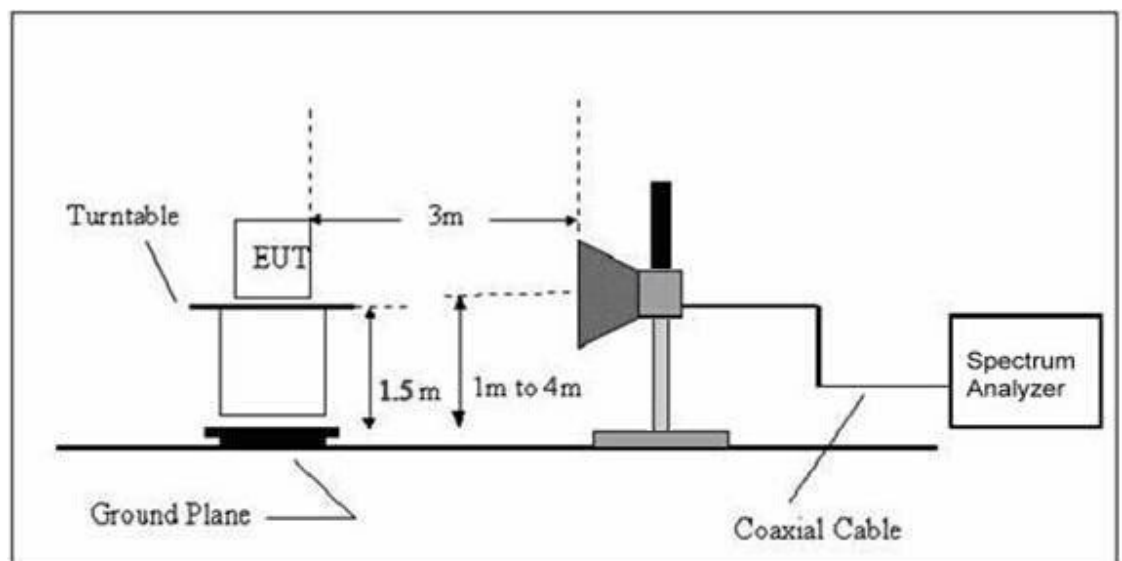
The spurious emission with frequency band 1900 according to FCC section 2.1057.

### 5.8.2. Test Setup

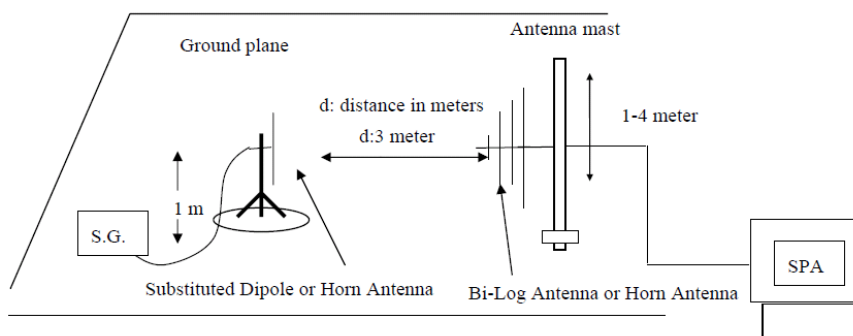
Below 1GHz



Above 1GHz



Substituted method:



### 5.8.3. Measurement Procedure

The EUT was placed on a non-conductive, The measurement antenna was placed at a distance of 3 meters from the EUT. 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. all test in Full-Anechoic Chamber.

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.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

$EIRP (Level) = S.G. \text{ output (dBm)} + \text{Antenna Gain(dBi)} - \text{Cable Loss (dB)}$

Note: Measurement Uncertainty:  $\pm 3.6 \text{ dB}$ .

The data show only the worst results, and the other results are very low and not shown in the report.



Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Level (dBm)		
WCDMA Band II Lowest	87.21	Vertical	-74.26	3.35	0.38	-71.29	-13	PASS
	3700.40	Vertical	-47.93	7.76	3.75	-43.92		
	5550.60	Vertical	-46.84	9.84	4.94	-41.94		
	7400.80	Vertical	-38.82	10.21	5.32	-33.93		
	9251.00	Vertical	-44.33	11.36	6.02	-38.99		
	11101.20	Vertical	-43.96	14.52	6.68	-36.12		
	137.26	Horizontal	-74.27	4.12	0.51	-70.66		
	3700.40	Horizontal	-47.65	7.76	3.75	-43.64		
	5550.60	Horizontal	-46.98	9.84	4.94	-42.08		
	7400.80	Horizontal	-43.12	10.21	5.32	-38.23		
	9251.00	Horizontal	-46.65	11.36	6.02	-41.31		
	11101.20	Horizontal	-48.43	14.52	6.68	-40.59		



Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Level (dBm)		
WCDMA Band II Middle	88.39	Vertical	-74.31	3.35	0.38	-71.34	-13	PASS
	3760.00	Vertical	-46.25	7.76	3.75	-42.24		
	5640.00	Vertical	-48.46	9.84	4.94	-43.56		
	7520.00	Vertical	-43.34	10.21	5.32	-38.45		
	9400.00	Vertical	-43.62	11.36	6.02	-38.28		
	11280.00	Vertical	-47.41	14.52	6.68	-39.57		
	137.43	Horizontal	-76.83	4.12	0.51	-73.22-		
	3760.00	Horizontal	-46.52	7.76	3.75	-42.51		
	5640.00	Horizontal	-47.59	9.84	4.94	-42.69		
	7520.00	Horizontal	-38.28	10.21	5.32	-33.39		
	9400.00	Horizontal	-44.36	11.36	6.02	-39.02		
	11280.00	Horizontal	-46.57	14.52	6.68	-38.73		



Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Level (dBm)		
WCDMA Band II Highest	88.24	Vertical	-76.27	3.35	0.38	-73.3	-13	PASS
	3819.60	Vertical	-46.86	7.79	3.53	-42.6		
	5729.40	Vertical	-42.54	9.88	5.02	-37.68		
	7639.20	Vertical	-36.68	10.25	5.54	-31.97		
	9549.00	Vertical	-45.74	11.38	6.16	-40.52		
	11458.80	Vertical	-46.69	14.56	6.72	-38.85		
	139.04	Horizontal	-74.12	4.12	0.51	-70.51-		
	3819.60	Horizontal	-44.78	7.79	3.53	-40.52		
	5729.40	Horizontal	-42.33	9.88	5.02	-37.47		
	7639.20	Horizontal	-36.17	10.25	5.54	-31.46		
	9549.00	Horizontal	-43.59	11.38	6.16	-38.37		
	11458.80	Horizontal	-45.48	14.56	6.72	-37.64		



Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	Level (dBm)		
WCDMA Band V Lowest	87.48	Vertical	-74.62	3.35	0.38	-71.65	-13	PASS
	1652.80	Vertical	-30.32	6.51	1.35	-25.16		
	2479.20	Vertical	-34.79	6.88	2.53	-30.44		
	3305.60	Vertical	-36.84	7.61	3.67	-32.9		
	4132.00	Vertical	-47.59	8.67	4.06	-42.98		
	4958.40	Vertical	-41.83	9.35	4.38	-36.86		
	138.21	Horizontal	-74.16	4.12	0.51	-70.55		
	1652.80	Horizontal	-35.24	6.51	1.35	-30.08		
	2479.20	Horizontal	-36.67	6.88	2.53	-32.32		
	3305.60	Horizontal	-46.95	7.61	3.67	-43.01		
	4132.00	Horizontal	-48.27	8.67	4.06	-43.66		
	4958.40	Horizontal	-45.88	9.35	4.38	-40.91		





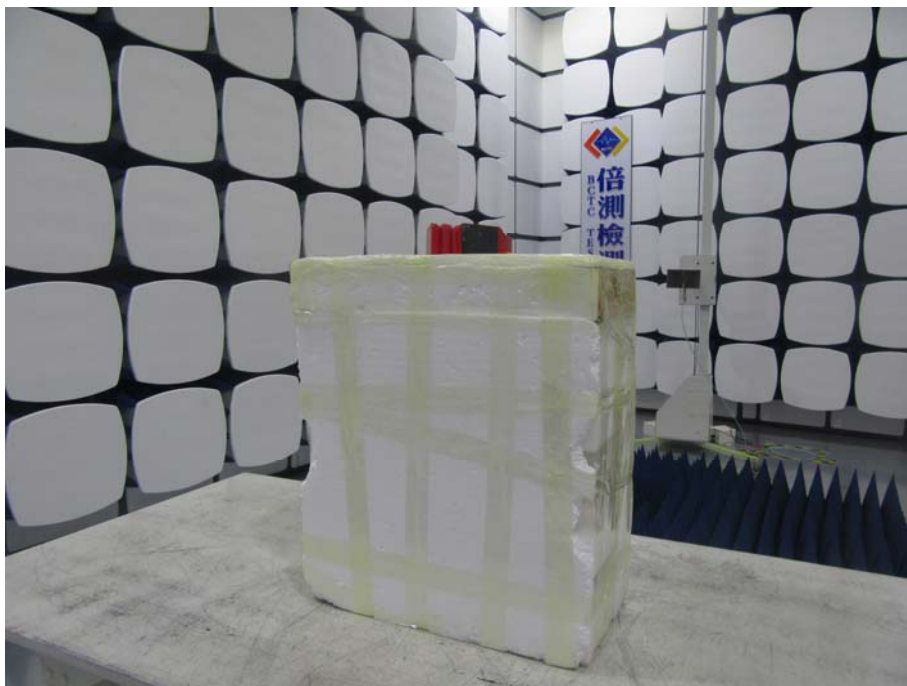
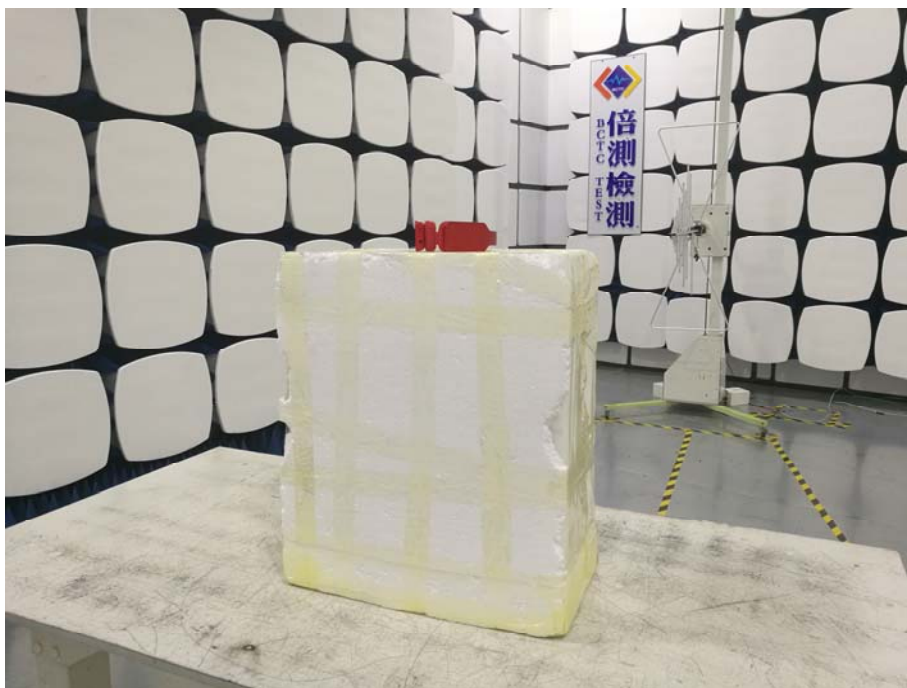
Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	Level (dBm)		
WCDMA Band V Middle	87.69	Vertical	-74.67	3.35	0.38	-71.7	-13	PASS
	1670.00	Vertical	-33.28	6.58	1.38	-28.08		
	2505.00	Vertical	-31.48	6.92	2.57	-27.13		
	3340.00	Vertical	-41.33	7.67	3.72	-37.38		
	4175.00	Vertical	-46.65	8.75	4.19	-42.09		
	5010.00	Vertical	-44.74	9.48	4.45	-39.71		
	139.86	Horizontal	-75.83	4.12	0.51	-72.22		
	1670.00	Horizontal	-28.92	6.58	1.38	-23.72		
	2505.00	Horizontal	-31.64	6.92	2.57	-27.29		
	3340.00	Horizontal	-49.72	7.67	3.72	-45.77		
	4175.00	Horizontal	-48.25	8.75	4.19	-43.69		
	5010.00	Horizontal	-39.96	9.48	4.45	-34.93		



Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	Level (dBm)		
WCDMA Band V Highest	88.26	Vertical	-74.96	3.35	0.38	-71.99	-13	PASS
	1693.20	Vertical	-32.38	6.57	1.48	-27.29		
	2539.80	Vertical	-34.97	6.96	2.67	-30.68		
	3386.40	Vertical	-35.22	7.68	3.78	-31.32		
	4233.00	Vertical	-42.34	8.76	4.24	-37.82		
	5079.60	Vertical	-45.29	9.47	4.63	-40.45		
	137.65	Horizontal	-75.84	4.12	0.51	-72.23		
	1693.20	Horizontal	-29.16	6.57	1.48	-24.07		
	2539.80	Horizontal	-34.43	6.96	2.67	-30.14		
	3386.40	Horizontal	-39.86	7.68	3.78	-35.96		
	4233.00	Horizontal	-46.27	8.76	4.24	-41.75		
	5079.60	Horizontal	-54.35	9.47	4.63	-49.51		

## 6. PHOTOGRAPHS OF TEST SET-UP

RE



## 7. PHOTOGRAPHS OF THE EUT



\*\*\*\*\* END OF REPORT \*\*\*\*\*