

# Report No.:SET2020-05571Report No.:SET2020-05571Product Name:Mobile phoneFCC ID:2AJZP-D450C1Model No.:0450C1Andrean:Nason America, Inc.Address:S06 2nd Ave Suite 1400 Seattle Washington United StatesDates of Testing:0514/2019 - 06/01/2020Issued bi:CiC Southern Testing Co., Ltd.Lab Locatio:Ectronic Testing Building, No. 43 Shahe Road, Xili Street, Nanshah<br/>District, Shenzhen, China.Te:: 8 6 755 2662738Fax: 8 6 755 26627238

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	Test Report
Product:	Mobile phone
Brand Name:	MASON
Trade Name:	MASON
Applicant:	Mason America, Inc.
Applicant Address:	506 2nd Ave Suite 1400 Seattle Washington United States
Manufacturer:	Mason America, Inc.
Manufacturer Address:	506 2nd Ave Suite 1400 Seattle Washington United States
Test Standards	47 CFR FCC Part 2/22/24/27
Test Result: Tested by	
	Vincent 2020.08.03
	Vincent, Test Engineer
Reviewed by	Chris Jon 2020.08.03
	Chris You, Senior Engineer
Approved by	Shuangwan Zhang 2020.08.03
	Shuangwen Zhang, Manager



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	Change History				
Issue	Date	Reason for change			
1.0	2020.08.03	First edition			



# 1. GENERAL INFORMATION

# 1.1 EUT Description

EUT Type	Mobile phone
EUT supports Radios application	WCDMA/HSPA
	WCDMA 850MHz
	Tx: 826.4 - 846.6MHz (at intervals of 200kHz);
	Rx: 871.4 - 891.6MHz (at intervals of 200kHz)
	WCDMA 1900MHz
Frequency Range	Tx: 1852.4 - 1907.6MHz (at intervals of 200kHz);
	Rx: 1932.4 - 1987.6MHz (at intervals of 200kHz)
	WCDMA 1700MHz
	Tx: 1712.4 - 1752.6MHz (at intervals of 200kHz);
	Rx: 2112.4 - 2152.6MHz (at intervals of 200kHz)
Mariana Ordand Dama da	WCDMA 850: 22.5dBm
Maximum Output Power to	WCDMA 1700: 22.82dBm
Antenna	WCDMA 1900: 23.29dBm
Type of Modulation	HSDPA:QPSK(Uplink)
Type of Modulation	HSUPA:QPSK(Uplink)
Antenna Type	Internal Antenna



1.2	2 Maximum Designator	ERP/EIRP	Power, Freq	luency Tolerance	e, and Emissio	on
	System	Type of Modulation	Emission Designator	Frequency Tolerance (ppm)	Maximum ERP/EIRP(W)	
	WCDMA 850 RMC 12.2Kbps	QPSK	4M15F9W	0.0038	0.173	
ĺ	WCDMA 1700 RMC 12.2Kbps	QPSK	4M13F9W	0.0039	0.195	
	WCDMA 1900 RMC 12.2Kbps	QPSK	4M16F9W	0.0052	0.200	



# **1.3** Test Standards and Results

- 1. 47 CFR Part 2, 22(H), 24(E) ,(27L)
- 2. ANSI / TIA / EIA-603-D-2010
- 3. FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- 4. RSS-GEN Issue 4
- 5. RSS-132 Issue 3
- 6. RSS-133 Issue 6
- 7. RSS-139 Issue 3

#### Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.

2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

Test detailed items/section required by FCC rules and results are as below:

N	Section	Section	Description	Timit	D14
No.	FCC	IC	- Description	Limit	Result
1	2.1046	N/A	Conducted Output Power	Reporting Only	PASS
	24.232(d)	RSS-132,5.4	,		
2	24.232(d) 27.50(d)	RSS-133,6.4	Peak to Average Radio	<13dBm	PASS
	27.30(u)	RSS-139,6.5		!	
	2.1049	RSS-GEN,6.7		'	1
3	22.917(b)	RSS-132, 5.5	Occupied Bandwidth	Reporting	PASS
	24.238(b)	RSS-133, 6.5	Occupica Danawiaan	Only	LYPP
	27.53(g)	RSS-139, 3.1		!	l
	2.1055	RSS-GEN, 6.11			
4	22.355	RSS-132, 5.3	Eracuanay Stability	<+2 5ppm	PASS
4	24.235	RSS-133, 6.3	Frequency Stability	$\leq \pm 2.5$ ppm	
	27.54	RSS-139, 6.4		!	
	2.1051	RSS-GEN,6.13	· · · · · · · · · · · · · · · · · · ·	!	
5	22.917	RSS-132,5.5	Conducted Out of	<43+10log10	PASS
5	24.238	RSS-133,6.5	<b>Band Emissions</b>	(P[Watts])	PASS
	27.53	RSS-139,6.6			
6	22.913	RSS-132,5.4	Effective Radiated Power	<7Watts	PASS
0	24.232	RSS-133,6.4	Equivalent Isotropic Radiated Power	<2Watts	PASS



	27.50d	RSS-139,6.5	Effective Radiated Power	<1Watts	PASS
	2.1053	RSS-GEN,6.13			
7	22.917	RSS-132,5.5	Radiated Spurious	< 43+10log10	PASS
/	24.238	RSS-133,6.5	Emissions	(P[Watts])	IASS
	27.53	RSS-139,6.6			

# **1.4** Test Configuration of Equipment under Test

Antenna port conducted and radiated test items were performed according to KDB 971168

D01 Power Meas. License Digital Systems v03r01 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 9000 MHz for WCDMA Band V.

2. 30 MHz to 20000 MHz for WCDMA Band II.

3. 30 MHz to 18000 MHz for WCDMA Band IV.

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes					
Band	Radiated TCs	Conducted TCs			
WCDMA Band V	RMC 12.2Kbps Link	RMC 12.2Kbps Link			
WCDMA Band II	RMC 12.2Kbps Link	RMC 12.2Kbps Link			
WCDMA Band IV	RMC 12.2Kbps Link	RMC 12.2Kbps Link			

Note: The maximum power levels are chosen to test as the worst case configuration as follows:

RMC 12.2Kbps mode for WCDMA band V,

RMC 12.2Kbps mode for WCDMA band II,

RMC 12.2Kbps mode for WCDMA band IV, only these modes were used for all tests.





# **1.5** Measurement Results Explanation Example

# For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 6B and 10dB attenuator.

Example:

Offset (dB) = RF cable loss(dB) + attenuator factor(dB).

= 7.5 + 10 = 17.5(dB)

# **1.6 Facilities and Accreditations**

# 1.6.1 Test Facilities

# NVLAP Lab Code: 201008-0

CCIC-SET is a third party testing organization accredited by NVLAP according to ISO/IEC 17025. The accreditation certificate number is 201008-0.

#### FCC- Designation Number: CN5031

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN5031, valid time is until December 31, 2020.

#### **ISED Registration: 11185A-1**

#### CAB identifier: CN0064

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Dec. 03, 2020

# **1.6.2** Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15°C-35°C
Relative Humidity (%):	30% -60%
Atmospheric Pressure (kPa):	86KPa-106KPa





# 2. 47 CFR PART 2, PART 22H & 24E, 27L REQUIREMENTS

# 2.1 Conducted RF Output Power

#### 2.1.1 Definition

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

# 2.1.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

# 2.1.3 Test Procedures

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

#### 2.1.4 Test Setup





# 2.1.5 Test Results of Conducted Output Power

# WCDMA Model Test Verdict:

UM	UMTS1900		Average Power (dBm)			
(В	and II)	9262CH	9400CH	9538cH		
WCDMA	12.2kbps RMC	23.21	23.29	23.20		
	Subtest 1	23.13	23.2	23.09		
HSDPA	Subtest 2	23.02	23.12	22.98		
HSDFA	Subtest 3	22.94	23.01	22.87		
	Subtest 4	22.83	22.92	22.79		
	Subtest 1	22.74	22.81	22.67		
	Subtest 2	22.61	22.7	22.58		
HSUPA	Subtest 3	22.52	22.61	22.49		
	Subtest 4	22.45	22.53	22.37		
	Subtest 5	22.34	22.44	22.26		
UM	TS1700	Av	erage Power (d	Bm)		
(Ba	and IV)	1313CH	1413CH	1513CH		
WCDMA	12.2kbps RMC	22.71	22.82	22.76		
	Subtest 1	22.63	22.74	22.68		
HSDPA	Subtest 2	22.52	22.66	22.55		
HSDFA	Subtest 3	22.43	22.55	22.46		
	Subtest 4	22.31	22.43	22.37		
	Subtest 1	22.23	22.34	22.28		
	Subtest 2	22.12	22.25	22.16		
HSUPA	Subtest 3	22.03	22.17	22.07		
	Subtest 4	21.92	22.06	21.98		
	Subtest 5	22.71	22.82	22.76		
UN	1TS850	Average Power (dBm)				
(B	and V)	4132CH	4183CH	4233CH		
WCDMA	12.2kbps RMC	22.43	22.50	22.48		
	Subtest 1	22.33	22.41	22.37		
HSDPA	Subtest 2	22.24	22.32	22.29		
HISDEA	Subtest 3	22.12	22.21	22.17		
	Subtest 4	22.03	22.1	22.08		
	Subtest 1	21.95	22.02	21.97		
	Subtest 2	21.81	21.89	21.86		
HSUPA	Subtest 3	21.72	21.8	21.78		
	Subtest 4	21.6	21.71	21.67		
	Subtest 5	21.49	21.62	21.6		



# 2.2 Peak to Average Radio

# 2.2.1 Definition

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

# 2.2.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

# 2.2.3 Test Procedures

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.7.1.

2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

3. For GSM/EGPRS operating modes:

a. Set EUT in maximum power output.

b. Set the RBW = 1MHz, VBW = 3MHz, Peak detector on spectrum analyzer for first trace.

c. Set the RBW = 1MHz, VBW = 3MHz, RMS detector on spectrum analyzer for second

trace.

d. The wanted burst signal is triggered by spectrum analyzer, and measured respectively the peak level and Mean level without burst-off time, after system simulator has synchronized with the spectrum analyzer.

4. For UMTS operating modes:

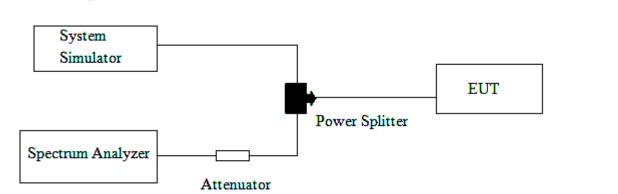
a. Set the CCDF (Complementary Cumulative Distribution Function) option on the spectrum analyzer.

b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

5. Record the deviation as Peak to Average Ratio.



# 2.2.4 Test Setup



# 2.2.5 Test Results of Peak-to-Average Ratio

Band	Channel	Frequency	Peak to Average radio	Limit	Verdict
Dallu	Channel	(MHz)	dB	dB	verdict
WCDMA	4132	826.4	3.26		PASS
WCDMA 850MHz	4183	836.6	3.36	13	PASS
850MHz	4233	846.6	3.36		PASS
WCDMA	9262	1852.4	2.94		PASS
1900MHz	9400	1880.0	3.13	13	PASS
1900/01/12	9538	1907.6	3.03		PASS
WCDMA	1312	1712.4	2.73		PASS
WCDMA	1412	1732.4	3.15	13	PASS
1700MHz	1513	1752.6	2.75		PASS



# 2.3 99% Occupied Bandwidth and 26dB Bandwidth Measurement

#### 2.3.1 Definition

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The emission bandwidth is defined as the width of the signal between two points, located at

the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

# 2.3.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

# 2.3.3 Test Procedures

1. The testing follows FCC KDB 971168 D01 v03r01 Section 4.2.

2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

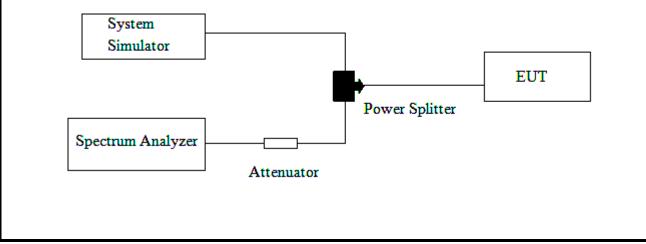
3. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

4. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3\*RBW, sample detector, trace maximum hold.

5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3\*RBW, peak detector, trace maximum hold.

# 2.3.4 Test Setup





<b>3.5</b> Test Results of 99% Occupied Bandwidth and 26dB Bandwidth						
Band	Channel	Frequency (MHz)	26dB bandwidth (KHz)	99% Occupied Bandwidth (KHz)	Refer to Plot	
	4132	826.4	4681	4100.2	Plot E1	
WCDMA 850MHz	4183	836.6	4717	4146.1	Plot E2	
	4233	846.6	4700	4115.6	Plot E3	
	9262	1852.4	4719	4142.6	Plot F1	
WCDMA 1900MHz	9400	1880	4749	4156.1	Plot F2	
	9538	1907.6	4728	4155.0	Plot F3	
WCDMA 1700MHz	1312	1712.4	4699	4126.1	Plot G1	
	1412	1732.4	4681	4133.1	Plot G2	
	1513	1752.6	4719	4132.9	Plot G3	

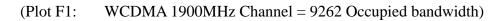
#### ...... 4 964D D J\_\_\_\_ J41. ..... 0 . . .



#### 2.3.6 Test Results (Plots) of 99% Occupied Bandwidth and 26dB Bandwidth Radio Std: No Center Freq: 826 Trig: Free Run #Atten: 36 dB Ref 40.00 dE Center Fr Span 10 Mi Sweep 5 n 826,4 MH 29.4 dB 4.1002 MHz -6.929 kHz 99.00 % 4.681 MHz x dB -26.00 dB dB Band WCDMA 850MHz Channel = 4132 Occupied bandwidth) (Plot E1: 02:33:50 PM May 2 Radio Std: None r Freg 836.6 Center Freq: 83 Trig: Free Run ce: BT Ref 40.00 dBi Center F 836.6 MH Span 10 MH Sweep 5 m #VBW 300 kHz Total D 29.6 dE 4.1461 MHz Freq 6.547 kHz 99.00 % % of 4.717 MH 26.00 dB (Plot E2: WCDMA 850MHz Channel = 4183 Occupied bandwidth) Ref 40.00 dB Center Fre 846.600000 MH Span 10 MH Sweep 5 m 46.6 MH W 300 kH 4.1156 MHz it Freg Er 7.598 kHz % of OBW P 99.00 % (Plot E3: WCDMA 850MHz Channel = 4233 Occupied bandwidth)

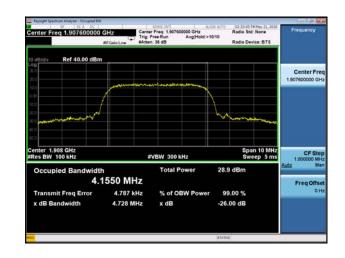


Center 1.852 GHz Ref 80.00 dBm Center 1.852 GHz Res BW 100 kHz Sweep 5 ms Occupied Bandwidth Total Power 23.7 dBm	4 Transmit Freq Error x dB Bandwidth	-1.421 kHz 4.719 MHz	% of OBW Pow x dB	er 99.00 % -26.00 dB		Freq Offse 0 H
Center 1.852 CHz res BW 100 kHz sweep 5 ms 5			Total Power	29.7 dBm		
Center Fr 1 85240000 G Center Fr 1 85240000 G Center Fr 1 85240000 G Center Fr 1 85240000 G			#VBW 300 kHz	Spa Sw	eep 5 ms	CF Ste 1.000000 MH
Conter Fin         Center Fin           20						
0 dB/dy Ref 40.00 dBm 20 20 20 20 20 20 20 20 20 20	Man Marth			Mun	and a start of the	
Center Fin         Center Fin           20         0				h		
10 dB/dy Ref 40.00 dBm Center Fin 20 20 20 20 20 20 20 20 20 20 20 20 20 2		1		A.		
10 dBldiv Ref 40.00 dBm		manda	minum			1.852400000 GH
10 dBldiv Ref 40.00 dBm	20.0					Center Fre
#FGalmLow #Atten: 36 dB Radio Device: BTS		m				
Trig: Free Run Avg(Hold>10/10					vice: BTS	



Keysight Spectrum Analyzer - Occupied Bil		and with	A ID ALTO	02-32-48 PM May 21, 2020	04
Center Freq 1.88000000	Trig: I	r Freq: 1.88000000 GHz Free Run Avg Holi h: 36 dB	d>10/10	tadio Std: None tadio Device: BTS	Frequency
10 dB/div Ref 40.00 dBn	n				
30 0					Center Freq 1.88000000 GHz
10.0					
100 200 200			h	Martin Jakaman and	
410					
Center 1.88 GHz #Res BW 100 kHz		VBW 300 kHz		Span 10 MHz Sweep 5 ms	CF Step
Occupied Bandwidt		Total Power	29.5 c		1.000000 MHz Auto Man
4.	1561 MHz				Freq Offset
Transmit Freq Error x dB Bandwidth	10.709 kHz 4.749 MHz	% of OBW Pow x dB	er 99.0		0 Hz
			STATUS		
			atorios		

<sup>(</sup>Plot F2: WCDMA 1900MHz Channel = 9400 Occupied bandwidth)



(Plot F3: WCDMA 1900MHz Channel = 9538 Occupied bandwidth)

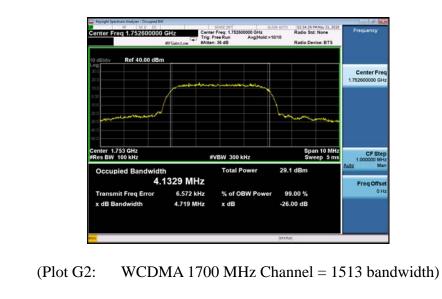


Transmit I x dB Band	Freq Error	1261 MHz 25.361 kHz 4.699 MHz	% of OBW Pow x dB		.00 % 00 dB		Freq Offse 0 H
	d Bandwidt	h	Total Power	30.1	dBm		1.000000 Mi Auto Ma
Center 1.712 #Res BW 100			VBW 300 kHz		Span 1 Sweep	0 MHz	CF Ste
40 0 63 0							
30.0 Water	ment			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	man	m	
10.0				ł.			
0.00		1					
20.0		and the second second	- And the second				Center Fr 1.712400000 G
10 dBldiv	Ref 40.00 dBm						
			n: 36 dB		Nadio Device:	BTS	
Center Freq	1.712400000	Trig: I	r Freq: 1.712400000 GHz Free Run Avg Hole h: 36 dB		Radio Std: No Radio Device	ne	Frequency
Keysight spectrum	Analyzer - Occupied EW		sense peri	ALISN AUTO	02:35:04 PM Mu		0-0

(Plot G1: WCDMA 1700MHz Channel = 1312 bandwidth)









# 2.4 Frequency Stability

# 2.4.1 Requirement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$ ppm) of the center frequency.

# 2.4.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

#### 2.4.3 Test Procedures for Temperature Variation

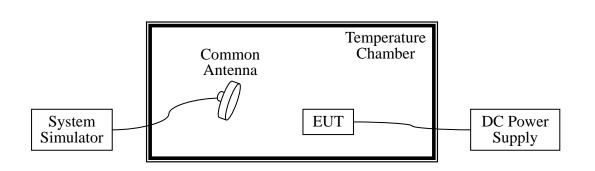
- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.
- 2. The EUT was set up in the thermal chamber and connected with the system simulator.
- 3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
- 4. With power OFF, the temperature was raised in 10°C steps up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

# 2.4.4 Test Procedures for Voltage Variation

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.
- 2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.
- 3. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
- 4. The variation in frequency was measured for the worst case.



# 2.4.5 Test Setup



# 2.4.6 Test Results of Frequency Stability

# WCDMA 850MHz Band

Band:	WCDMA I	Band V	Channel:	4183
Limit(ppm)	2.5		Frequency:	836.6MHz
Power (VDC)	Temperature (°C)		RMC 12.2Kbps Deviation (ppm)	Result
	-30		0.0033	
	-20		0.0018	
	-10		0.0025	
	0		0.0005	
3.85	+10		0.0011	
	+20		0.0021	PASS
	+30		0.0023	
	+40	0.0020		
	+50		0.0023	
4.4	+25		0.0024	
3.5	+25		0.0038	



Band:	WCDMA	Band II	Channel:	9400
Limit(ppm):	2.5		Frequency:	1880.0MHz
Daman	Townserveture		RMC 12.2Kbps	
Power (VDC)	Temperature		Deviation	Result
(VDC)	(°C)		(ppm)	
	-30		0.0009	
	-20		0.0014	
	-10		0.0034	
	0		0.0041	
3.85	+10		0.0033	
	+20		0.0052	PASS
	+30		0.0028	
	+40		0.0037	
	+50		0.0023	
4.4	+25		0.0033	
3.5	+25		0.0024	

# WCDMA 1700MHz Band

Band:		WCDMA	Band IV	Channel:	1412
Limit(ppm):		2.5	Frequency:		1732.4MHz
Power (VDC)	-	perature (°C)		IC 12.2Kbps Deviation (ppm)	Result
		-30 -20 -10		0.0025 0.0034 0.0021	
3.85		0 +10		0.0037 0.0025	
	$ \begin{array}{r} +20 \\ +30 \\ +40 \\ +50 \\ 4.4 \\ +25 \end{array} $			0.0018 0.0025 0.0034	 PASS
4.4			0.0028		
3.5	-	+25		0.0022	



# 2.5 Conducted Out of Band Emissions

#### 2.5.1 Requirement

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

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

# 2.5.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

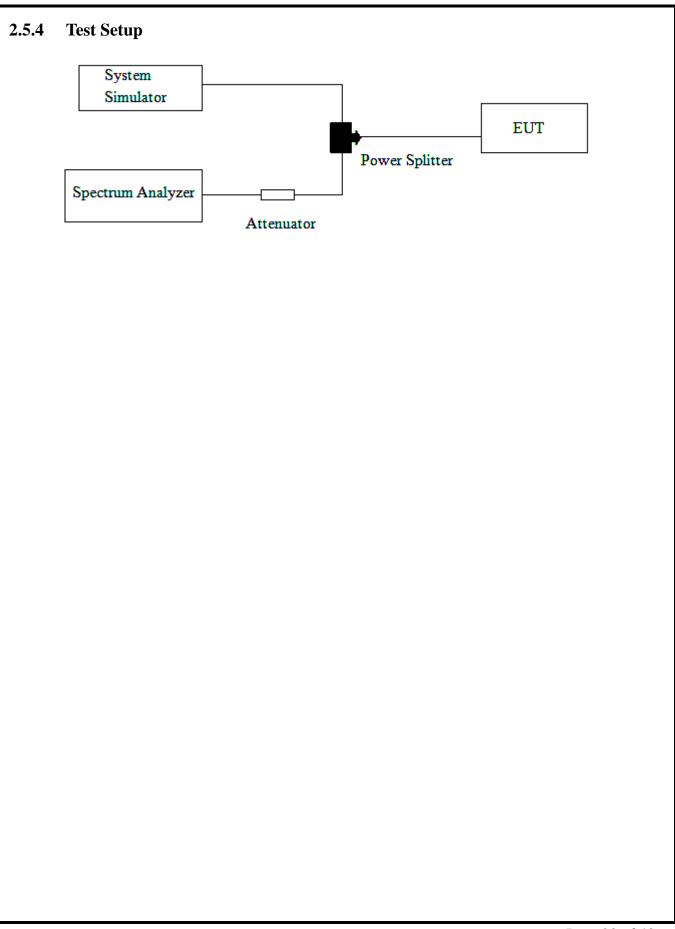
# 2.5.3 Test Procedures

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 6.0.
- 2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
- 3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 4. The middle channel for the highest RF power within the transmitting frequency was measured.
- 5. The conducted spurious emission for the whole frequency range was taken.
- 6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 7. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)

= P(W) - [43 + 10log(P)] (dB)

- $= [30 + 10\log(P)] (dBm) [43 + 10\log(P)] (dB)$
- = -13dBm.
- 8. For 9KHz to 30MHz: the amplitude of spurious emissions are attenuated by more than 20dB below the permissible value has no need to be reported.

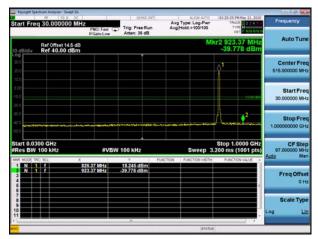






# 2.5.5 Test Result (Plots) of Conducted Spurious Emission

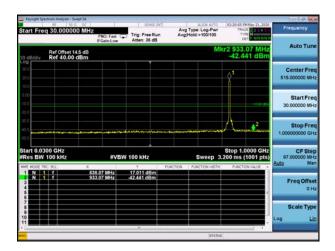
Note: For 9 KHz to 30MHz: the amplitude of spurious emissions is attenuated by more than 20dB below the permissible value, so we not provide the test result here.



WCDMA850MHz Channel = 4132, 30MHz to 1GHz



WCDMA850MHz Channel = 4132, 1GHz to 9GHz

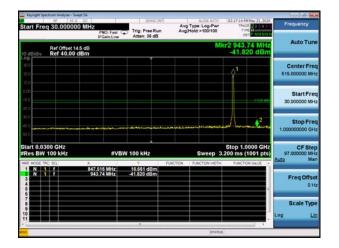




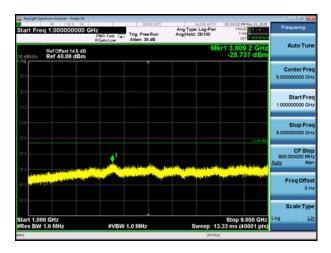
#### WCDMA850MHz Channel = 4183, 30MHz to 1GHz



WCDMA850MHz Channel = 4183, 1GHz to 9GHz



WCDMA850MHz Channel = 4233, 30MHz to 1GHz

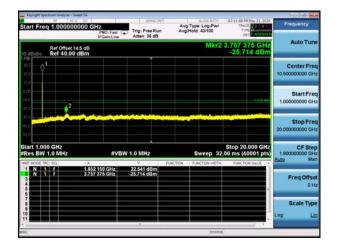


WCDMA850MHz Channel = 4233, 1GHz to 9GHz

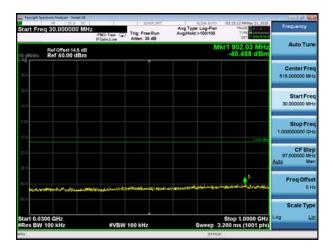


Keysight Spectrum Analyzer - Swept SA					0 4 0
tart Freq 30.000000 MHz	PNO: Fast	Trig: Free Run Atten: 36 dB	Avg Type: Log-Pwr Avg(Hold>100/100	02:13:16 PM May 21, 2020 TRACE 0 2 3 4 5 TYPE 000000000000000000000000000000000000	Frequency
Ref Offset 14.5 dB 0 dB/div Ref 40.00 dBm	IFGain1.ow	Atten: 35 66	M	kr1 883.60 MHz -39.703 dBm	Auto Tune
og 300		Í			Center Fred 515.000000 MHz
20.C					Start Free 30.000000 MH
000				.1100	Stop Free 1.000000000 GH
					CF Step 97.000000 MH Auto Mar
0 0 with the part of the fill of the same states are	minerastin	البرميوبرد موزار ومد	the advertigent of the second	alkarinen de aurania se las	Freq Offse 0 H
tart 0.0300 GHz Res BW 100 kHz	#VBW 1			Stop 1.0000 GHz 3.200 ms (1001 pts)	Scale Type

WCDMA1900MHz Channel = 9262, 30MHz to 1GHz



WCDMA1900MHz Channel = 9262, 1GHz to 20GHz

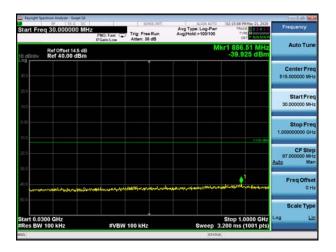


WCDMA1900MHz Channel = 9400, 30MHz to 1GHz



Keysight Spectrum Analyzer - Swept RF 50 D		SENSI (NT)	ALIEN AUTO	02:10:47 PM May 21, 2020	0 0 0
Start Freq 1.0000000	DO GHZ PNO: Fast C IFGain:Low	Trig: Free Run Atten: 36 dB	Avg Type: Log-Pwr Avg[Hold:>100/100	TRACE 2 3 4 5 0 TYPE ROUTING	Frequency
Ref Offset 14.5 0 dB/div Ref 40.00 dB	dB	Louiseductorio	Mkr2	3.810 100 GHz -25.049 dBm	Auto Tune
200 1 200 200					Center Free 10.500000000 GH:
100 100 200				-15.09-00-	Start Free 1.000000000 GH
					Stop Free 20.000000000 GH
itart 1.000 GHz Res BW 1.0 MHz	#VB	W 1.0 MHz	Sweep 32	Stop 20.000 GHz .00 ms (40001 pts)	CF Step 1.900000000 GH Auto Mar
NR MODE TRC SCL	× 1.880 175 GHz 3.810 100 GHz	Y F. 22.526 dBm -25.049 dBm	INCTION FUNCTION WOTH	FUNCTION VALUE	Auto Mar
	3.810 100 002	-20.049 dibin			Freq Offse 0 H
7					Scale Type
10				-	Log <u>Lir</u>
56			ETATU	1	

WCDMA1900MHz Channel = 9400, 1GHz to 20GHz



WCDMA1900MHz Channel = 9538, 30MHz to 1GHz



WCDMA1900MHz Channel = 9538 1GHz to 20GHz

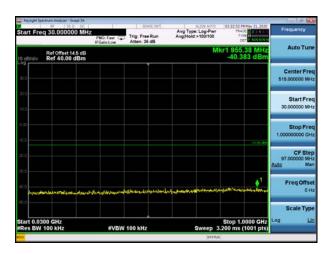


Start Fre	q 30.000000 MHz	PNO: Fast	Trig: Free Run Atten: 36 dB	Avg Type: Log-Pwr Avg[Hold:>100/100	02:22:55 PM May 21, 2020 TRACE 1 2 3 4 TYPE N 00000000 EET 7 NN NN N	Frequency
10 dB/div	Ref Offset 14.5 dB Ref 40.00 dBm			M	kr1 905.91 MHz -40.081 dBm	Auto Tun
300						Center Fre 515.000000 MH
20.0 10.0						Start Fre 30.000000 MF
0.00					110 @	Stop Fre 1.00000000 GH
30.0						CF Ste 97.000000 Mi <u>Auto</u> Ma
					<b>↓</b> 1	Freq Offse
	anteresting magazitati	attension of the set		wanterstrandurate	(1846191-19/1-18665121-19-3	01
-60.0						Scale Typ
Start 0.03 Res BW		#VBW	100 kHz	Sween 3	Stop 1.0000 GHz .200 ms (1001 pts)	Log

WCDMA1700MHz Channel = 1312, 30MHz to 1GHz

Keysight Spectrum Analyzer - Swe	yt SA			And a local state of the local state	0.0
tart Freq 1.000000	PNO: Fast	Trig: Free Run Atten: 36 dB	Avg Type: Log-Pwr Avg(Hold: 38/100	02:22:09 PM May 21, 2020 TRACE 0 2 3 4 5 TVPE	Frequency
Ref Offset 14.	IFGaint.ow 5 dB IBm	Atten: 36 db	Mkr2	3.810 100 GHz -25.820 dBm	Auto Tun
					Center Fre 10.500000000 GH
				-12:00:00+	Start Fre 1.000000000 GH
					Stop Fre 20.000000000 GH
tart 1.000 GHz Res BW 1.0 MHz	#VB1	W 1.0 MHz	Sweep 32	Stop 20.000 GHz .00 ms (40001 pts)	CF Ste 1.90000000 GH Auto Ma
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1.713 925 GHz 3.810 100 GHz	22.783 dBm -25.820 dBm			Freq Offse 0 H
6 7 8 9					Scale Typ
1					

WCDMA1700MHz Channel = 1312, 1GHz to 18GHz



WCDMA1700MHz Channel = 1414, 30MHz to 1GHz

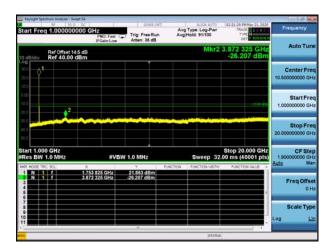


Start Fre	q 1.000000	0000 GHz PNO: Fast IFGain3.cw	Trig: Free Run Atten: 36 dB	Avg Type: Log-Pwr Avg(Hold: 40/100	02:21:50 PH May 21, 2020 TRACE 1 2 3 4 5 TYPE DET 2 NNNNS	Frequency
t0 dB/div	Ref Offset 1 Ref 40.00	4.5 dB dBm		Mkr2	3.761 650 GHz -25.916 dBm	Auto Tun
300 220						Center Fre 10.50000000 GH
10.00	¢2				-17.09-00-	Start Fre 1.000000000 GF
-30.0 -40.0 -50.0						Stop Fre 20.00000000 GF
Start 1.00 Res BW	0 GHz 1.0 MHz	#VB	W 1.0 MHz	Sweep 32.	Stop 20.000 GHz 00 ms (40001 pts)	CF Ste 1.90000000 G
INR MODE TH	111	× 1.731 975 GHz	22.079 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	Auto Mi
23456		3.761 650 GHz	-25,916 dBm			Freq Offs 01
789						Scale Typ
10						Log

WCDMA1700MHz Channel = 1412, 1GHz to 18GHz



WCDMA1700MHz Channel = 1513, 30MHz to 1GHz



WCDMA1700MHz Channel = 1513, 1GHz to 18GHz



# 2.6 Bandedge

#### 2.6.1 Requirement

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

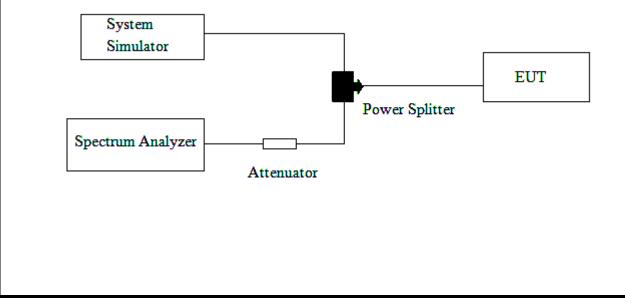
# 2.6.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

# 2.6.3 Test Procedures

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 6.0.
- 2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
- 3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 4. The band GPRSs of low and high channels for the highest RF powers were measured.
- 5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 6. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)
  - = P(W) [43 + 10log(P)] (dB)
  - $= [30 + 10\log(P)] (dBm) [43 + 10\log(P)] (dB)$
  - = -13dBm.

# 2.6.4 Test Setup

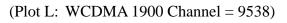




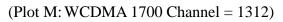
# 2.6.5 Test Result of Conducted Bandedge Avg Type: RMS Avg(Hold >100/100 er Freq 824.000000 MHz Trig: Free Run Atten: 36 dB Auto Ref Offset 14.5 dB Ref 40.00 dBm Center Fr 824.000000 M Start Scale Ty 824.000 W 51 kH Span 1.000 MH ep 1.000 ms (1001 pts #VBW 150 kHz\* (Plot I: WCDMA 850 Channel = 4132) Avg Type: RMS Avg(Hold >100/100 3 849.0 Trig: Free Run Atten: 36 dB Auto 1 Ref Offset 14.5 dB Ref 40.00 dBm Scale Ty Span 1.000 MHz ep 1.000 ms (1001 pts) 49.00 / 51 ki W 150 kH (Plot J: WCDMA 850 Channel = 4233) r Freq 1.85000000 GHz Avg Type: RMS Avg(Hold >100/100 Trig: Free Run Auto T Ref Offset 14.5 dB Ref 40.00 dBm 850 000 0 -28.017 d Center F Start F Scale Ty Span 1.000 MH 1.000 ms (1001 pt 3W 150 kHz (Plot K: WCDMA 1900 Channel = 9262)













(Plot N: WCDMA 1700 Channel = 1513)



# 2.7 Transmitter Radiated Power (EIRP/ERP)

# 2.7.1 Requirement

The substitution method, in ANSI / TIA / EIA-603-D-2010, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v03r01. The ERP of mobile transmitters must not exceed 7 Watts (Cellular Band) and the EIRP of mobile transmitters are limited to 2 Watts (PCS Band) and 1 Watts (AWS Band).

# 2.7.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

# 2.7.3 Test Procedures

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GSM/GPRS) and ANSI / TIA-603-D-2010 Section 2.2.17.
- 2. The EUT was placed on a turntable 1.5 meters high in a fully anechoic chamber.
- 3. The EUT was placed 3 meters from the receiving antenna, which was mounted on the antenna tower.
- 4. GSM operating modes: Set RBW= 1MHz, VBW= 3MHz, RMS detector over burst;

UMTS operating modes: Set RBW= 100 kHz, VBW= 300 kHz, RMS detector over frame, and use channel power option with bandwidth=5MHz, per KDB 971168 D01 v03r01.

- 5. The table was rotated 360 degrees to determine the position of the highest radiated power.
- 6. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
- 7. Taking the record of maximum ERP/EIRP.
- 8. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.





9. The conducted power at the terminal of the dipole antenna is measured.

10. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.

11. ERP/EIRP = Ps + Et - Es + Gs = Ps + Rt - Rs + Gs

Ps (dBm): Input power to substitution antenna.

Gs (dBi or dBd): Substitution antenna Gain.

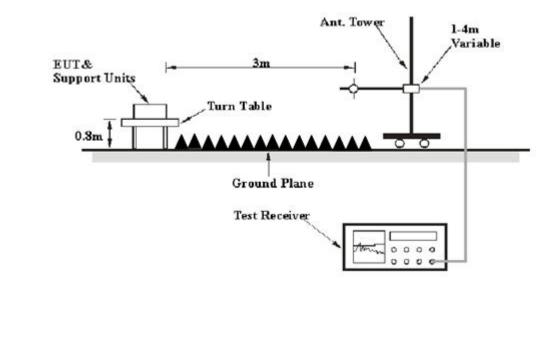
Et = Rt + AF Es = Rs + AF

AF (dB/m): Receive antenna factor

Rt: The highest received signal in spectrum analyzer for EUT.

Rs: The highest received signal in spectrum analyzer for substitution antenna.

#### 2.7.4 Test Setup





# 2.7.5 Test Result of Transmitter Radiated Power

Test Notes:

1. This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA capabilities. All configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2Kbps.

2. This unit was tested with its standard battery.

3. The worst case test configuration was found in the vertical positioning where the EUT is laying on its side. The data reported in the tables below were measured in this test setup.

Band	Channel	Frequency (MHz)	Antenna Pol (H/V)	Measured ERP dBm	Limit dBm	Verdict
	4122	926.4	Н	22.37		DACC
	4132	826.4	V	20.11		PASS
WCDMA	4175	835	Н	22.36	38.5	PASS
850MHz	4173	833	V	20.14	36.3	PASS
4233	000	Н	22.27		PASS	
	4233	846.6	V	20.00		PASS

Band	Channel	Frequency (MHz)	Antenna Pol (H/V)	Measured EIRP dBm	Limit dBm	Verdict
	0262	1852.4	Н	23.01		PASS
	9262	1632.4	V	21.07		
WCDMA	0.400	1000	Н	22.97	33	PASS
1900MHz	9400	1880	V	21.76	33	PASS
	9538	9538 1907.6	Н	22.78		DASS
			V	21.12		PASS

Band	Channel	Frequency (MHz)	Antenna Pol (H/V)	Measured ERP dBm	Limit dBm	Verdict	
	1212	312 1712.4	н н		22.91		DACC
	1312		V	20.11		PASS	
WCDMA	1412	1722.4	Н	22.82	20 5	DACC	
1700MHz	1412	1732.4	V	20.14	38.5	PASS	
	1513	1510 1750 (	1752 6	Н	22.87		DACC
		3 1752.6	V	20.00		PASS	



# 2.8 Radiated Spurious Emissions

#### 2.8.1 Requirement

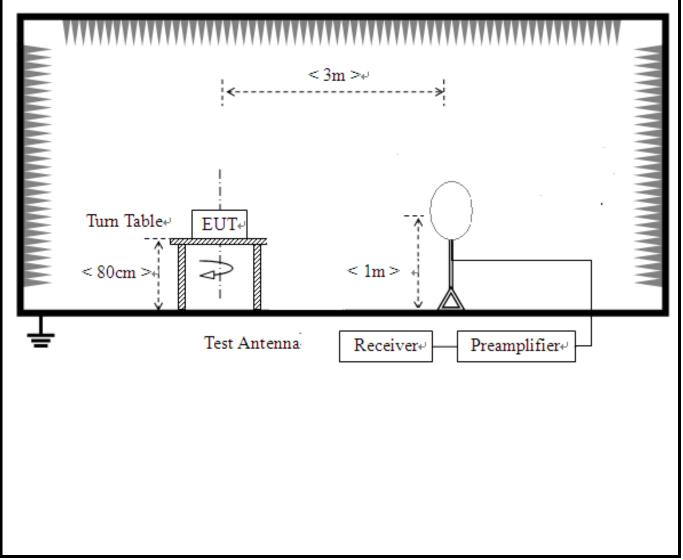
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P) dB$ . The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

# 2.8.2 Measuring Instruments

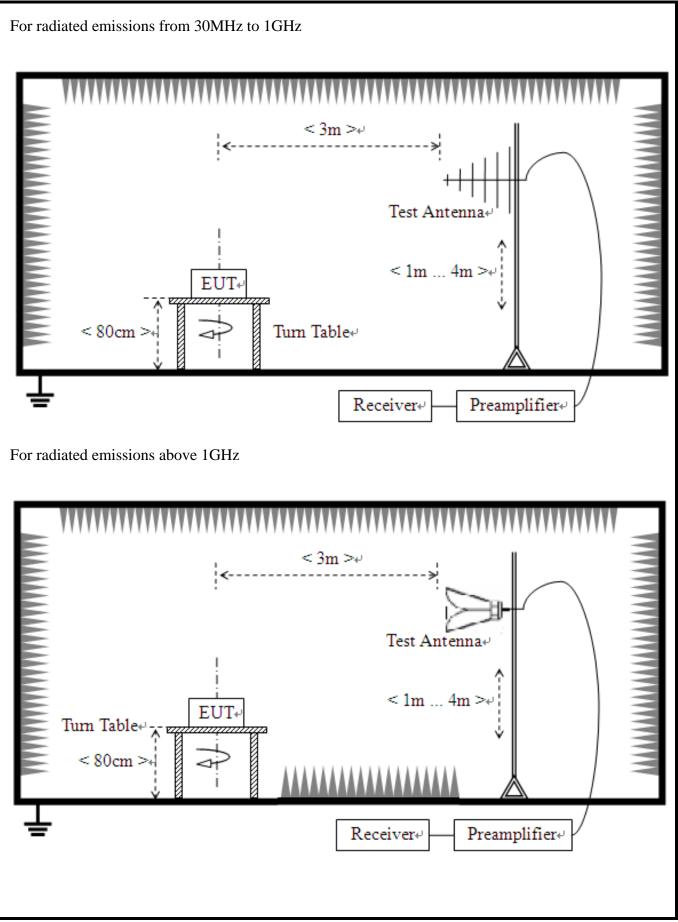
The measuring equipment is listed in the section 3 of this test report.

# 2.8.3 Test Setup

For radiated emissions from 9 kHz to 30MHz









# 2.8.4 Test Procedures

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.
- 2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.
- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
- 4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
- 5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
- 6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
- 7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
- 8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
- 9. Taking the record of output power at antenna port.
- 10. Repeat step 7 to step 8 for another polarization.
- 11. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 12. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
  - = P(W) [43 + 10log(P)] (dB)
  - $= [30 + 10\log(P)] (dBm) [43 + 10\log(P)] (dB)$
  - = -13dBm.
- 13. This device employs GMSK technology with GSM and GSM capabilities. All configurations were investigated and the worst case emissions were found in GSM mode.
- 14. This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA capabilities. All configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2Kbps.
- 15. This unit was tested with its standard battery.
- 16. All Spurious Emission tests were performed in X, Y, Z axis direction and low, middle, high channel. And only the worst axis test condition was recorded in this test report.



- 17. The spectrum is measured from 9 KHz to the 10<sup>th</sup> harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. The worst case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
- 18. For 9KHz to 30MHz: the amplitude of spurious emissions are attenuated by more than 20dB below the permissible value has no need to be reported.



# 2.8.5 Test Results of Radiated Spurious Emissions

# Note: 1. (Absolute)Level=Reading Level + Factor

Worst-Case test data provide as below:

#### WCDMA 850 Middle Channel

30MHz~10GHz:
--------------

Susp	Suspected List						
	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-86.00	-61.64	-13.00	48.64	24.36	Horizontal
2	74.1571	-85.60	-64.34	-13.00	51.34	21.26	Horizontal
3	343.466	-104.51	-74.59	-13.00	61.59	29.92	Horizontal
4	1674.33	-53.13	-54.48	-13.00	41.48	-1.35	Horizontal
5	2472.73	-54.48	-51.56	-13.00	38.56	2.92	Horizontal
6	7517.25	-59.34	-42.69	-13.00	29.69	16.65	Horizontal
Sus	pected List	:					
NO.	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-84.74	-62.14	-13.00	49.14	22.60	Vertical
2	48.4392	-90.21	-69.16	-13.00	56.16	21.05	Vertical
3	126.563	-101.24	-77.23	-13.00	64.23	24.01	Vertical
4	1671.33	-52.70	-54.35	-13.00	41.35	-1.65	Vertical
5	5116.05	-59.27	-45.37	-13.00	32.37	13.90	Vertical
6	10143.5	-61.93	-38.53	-13.00	25.53	23.40	Vertical





# WCDMA 1900 Middle Channel

# 30MHz~20GHz:

Susp	Suspected List						
	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-83.69	-62.04	-13.00	49.04	21.65	Horizontal
2	344.922	-105.01	-78.38	-13.00	65.38	26.63	Horizontal
3	492.921	-103.38	-73.75	-13.00	60.75	29.63	Horizontal
4	3757.87	-58.06	-49.27	-13.00	36.27	8.79	Horizontal
5	7989.99	-61.78	-43.02	-13.00	30.02	18.76	Horizontal
6	10166.0	-62.02	-38.24	-13.00	25.24	23.78	Horizontal
Susp	ected List						
	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-84.29	-64.40	-13.00	51.40	19.89	Vertical
2	492.921	-100.93	-73.08	-13.00	60.08	27.85	Vertical
3	1243.12	-56.71	-58.86	-13.00	45.86	-2.15	Vertical
4	4913.45	-58.58	-45.70	-13.00	32.70	12.88	Vertical
5	6324.16	-59.35	-44.35	-13.00	31.35	15.00	Vertical
6	10706.3	-62.87	-39.06	-13.00	26.06	23.81	Vertical

WCDMA 1700 Middle Channel

#### 30MHz~18GHz:

Susp	Suspected List						
	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	60.1001	-96.49	-78.09	-13.00	65.09	18.40	Horizontal
2	81.4615	-97.46	-79.13	-13.00	66.13	18.33	Horizontal
3	942.712	-101.26	-67.49	-13.00	54.49	33.77	Horizontal
4	4067.03	-53.64	-45.02	-13.00	32.02	8.62	Horizontal
5	6510.25	-54.30	-39.35	-13.00	26.35	14.95	Horizontal
6	13995.9	-58.42	-34.59	-13.00	21.59	23.83	Horizontal
Susp	ected List						
	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	38.7387	-95.47	-75.84	-13.00	62.84	19.63	Vertical
2	49.4194	-95.74	-77.42	-13.00	64.42	18.32	Vertical
3	80.4905	-97.87	-76.51	-13.00	63.51	21.36	Vertical
4	3966.48	-54.16	-45.62	-13.00	32.62	8.54	Vertical
5	6606.30	-54.05	-40.01	-13.00	27.01	14.04	Vertical
6	13995.9	-58.56	-35.05	-13.00	22.05	23.51	Vertical



# 3. LIST OF MEASURING EQUIPMENT

			1			
Description	Manufactu rer	Model	Serial No.	Cal. Date	Due Date	Remark
EMI Test Receiver	R&S	ESIB7	A0501375	2019.07.30	2020.07.29	Radiation
Loop Antenna	Schwarz beck	HFH2-Z2	100047	2019.04.26	2022.04.25	Radiation
Broadband antenna (30MHz~1GHz)	R&S	HL562	101341	2017.07.14	2020.07.13	Radiation
Broadband antenna (30MHz~1GHz)	R&S	HL562	101339	2017.07.14	2020.07.13	Radiation
Double ridge horn antenna (1GHz~18GHz)	R&S	HF906	100150	2019.04.27	2022.04.26	Radiation
Double ridge horn antenna (1GHz~18GHz)	R&S	HF906	100149	2019.04.17	2022.04.16	Radiation
Horn antenna (18GHz~26.5GHz)	AR	AT4002A	305753	2017.07.12	2020.07.11	Radiation
Horn antenna (18GHz~26.5GHz)	AR	AT4003A	0329293	2018.09.17	2020.09.16	Radiation
Amplifier 1GHz-18GHz	AR	25S1G4AM1	22018	2018.09.17	2020.09.16	Radiation
Ampilier 20M~3GHz	MILMEGA	80RF1000-250	1064573	2017.10.09	2020.10.08	Radiation
Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2020.05.18	2021.05.17	Conducted
Test Receiver	R&S	ESCI	A0902601	2019.07.02	2020.07.01	Conducted
Temperature chamber	welissom Inc.	SU-642	A150802409	2019.07.18	2020.07.17	Conducted
Wideband Radio Communication tester	R&S	CMW500	A130101034	2019.07.30	2021.07.29	Conducted
Power Supply	R&S	NGMO1	101037	2019.08.03	2020.08.02	Conducted



# 4. UNCERTAINTY OF EVALUATION

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150KHz~30MHz)

Measuring Uncertainty for a level of	2 6 JD
confidence of 95%(U=2Uc(y))	2.6dB

Uncertainty of Radiated Emission Measurement (30MHz~1GHz)

Measuring Uncertainty for a level of	2.4dB
confidence of 95%(U=2Uc(y))	2.40D

Uncertainty of Radiated Emission Measurement (1GHz~40GHz)

Measuring Uncertainty for a level of	2.8dB
confidence of 95%(U=2Uc(y))	2.800

\*\* END OF REPORT \*\*