# RF TEST REPORT



Report No.: 15070897-FCC-R1
Supersede Report No.: N/A

Applicant	Verykool USA Inc			
Product Name	Mobile phone			
Model No.	SL5550			
Serial No.	N/A			
Test Standard	FCC Part 22(H):2014 ;FCC Part 24(E):2014; FCC Part 27:2014;			
rest Standard	ANSI/TIAC603 D: 2010			
Test Date	September	September 26 to October 15, 2015		
Issue Date	October 15, 2015			
Test Result	Pass Fail			
Equipment complied with the specification				
Equipment did not comply with the specification				
Winnie Zheng David Huang				
Winnie Zhang Test Engineer		David Huang Checked By		
	l l		L	

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Test result presented in this test report is applicable to the tested sample only

#### Issued by:

#### SIEMIC (SHENZHEN-CHINA) LABORATORIES

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### **Laboratories Introduction**

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



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### **Accreditations for Conformity Assessment**

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety



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## 1. Report Revision History

Report No.	Report Version	Description	Issue Date
15070897-FCC-R1	NONE	Original	October 15, 2015

### 2. Customer information

Applicant Name	Verykool USA Inc	
Applicant Add	3636 Nobel Drive, Suite 325, San Diego, CA 92122 USA	
Manufacturer	Zechin Communications Co.,Ltd.	
Manufacturer Add	Unit804,8th Floor Desay Tech Building Gaoxin, Road South,	
	Nanshan District Shenzhen, China	

### 3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES	
	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park	
Lab Address	South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong	
	China 518108	
FCC Test Site No.	718246	
IC Test Site No.	4842E-1	
Test Software	Radiated Emission Program-To Shenzhen v2.0	



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### 4. Equipment under Test (EUT) Information

Description of EUT: Mobile phone

Main Model: SL5550

Serial Model: N/A

Date EUT received: September 25, 2015

Test Date(s): September 26 to October 15, 2015

Equipment Category : PCE

Antenna Gain:

GSM850: 1.6 dBi PCS1900: 3.8 dBi

UMTS-FDD Band V: 1.7 dBi UMTS-FDD Band IV: 3.7 dBi UMTS-FDD Band II: 3.8 dBi

Bluetooth/BLE: 3 dBi

WIFI: 2.9 dBi

LTE Band 2: 3.8 dBi LTE Band 4: 3.8 dBi LTE Band 5: 3.8 dBi LTE Band 7: 3.8 dBi

LTE Band 12: 3.8 dBi LTE Band 17: 3.8 dBi

GPS:1.6 dBi

GSM / GPRS: GMSK

EGPRS: GMSK

UMTS-FDD: QPSK, 16QAM 802.11b/g/n: DSSS, OFDM

Type of Modulation:

Bluetooth: GFSK, π /4DQPSK, 8DPSK

**BLE: GFSK** 

LTE Band: QPSK, 16QAM

**GPS:BPSK** 

RF Operating Frequency (ies): GSM850 TX: 824.2 ~ 848.8 MHz; RX: 869.2 ~ 893.8 MHz



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PCS1900 TX: 1850.2 ~ 1909.8 MHz; RX: 1930.2 ~ 1989.8 MHz

UMTS-FDD Band V TX: 826.4 ~ 846.6 MHz; RX: 871.4 ~ 891.6 MHz

UMTS-FDD Band IV TX:1712.4  $\sim$  1752.6 MHz; UMTS-FDD Band II TX:1852.4  $\sim$  1907.6 MHz;

RX: 1932.4 ~ 1987.6 MHz

WIFI:802.11b/g/n(20M): 2412-2462 MHz WIFI:802.11n(40M): 2422-2452 MHz

Bluetooth& BLE: 2402-2480 MHz

LTE Band 2 TX:  $1852.5 \sim 1907.5$  MHz; RX :  $1932.5 \sim 1987.5$  MHz LTE Band 4 TX:  $1712.5 \sim 1752.5$  MHz; RX :  $2112.5 \sim 2152.5$  MHz LTE Band 5 TX:  $826.5 \sim 846.5$  MHz; RX :  $871.5 \sim 891.5$  MHz

LTE Band 7 TX: 2502.5 ~ 2567.5 MHz; RX : 2622.5 ~ 2687.5 MHz

LTE Band 12 TX:699.7 ~ 715.3 MHz; RX : 729.7~ 745.3MHz LTE Band 17 TX: 706.5 ~ 713.5 MHz; RX : 736.5 ~ 743.5 MHz

GPS RX:1575.42 MHz

GSM850: 33.90dBm

PCS1900:30.19 dBm

Maximum Conducted

UMTS-FDD Band V: 23.95 dBm

AV Power to Antenna:

UMTS-FDD Band II : 22.48 dBm

UMTS-FDD Band IV: 22.96 dBm

GSM850: 32.78 dBm / ERP

PCS1900: 32.51 dBm / EIRP

ERP/EIRP: UMTS-FDD Band V: 24.78 dBm / ERP

UMTS-FDD Band II: 26.54 dBm / EIRP UMTS-FDD Band IV: 25.96 dBm/ EIRP

GSM 850: 124CH

PCS1900: 299CH

UMTS-FDD Band V : 102CH

UMTS-FDD Band IV: 202CH

UMTS-FDD Band II : 277CH Number of Channels:

WIFI:802.11b/g/n(20M): 11CH

WIFI:802.11n(40M):7CH

Bluetooth: 79CH

BLE: 40CH GPS:1CH



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Port: Power Port, Earphone Port, USB Port

Battery:

Model:355093PV

Spec:3.8V,2500mAh,9.5Wh

Limited Charging Voltage: 4.35V

Input Power: Adapter:

Model:SC050100-US

Input: 100-240V; 50/60Hz; 0.4A

Output: DC 5.0V,1A

Trade Name : verykool

GPRS/EGPRS Multi-slot class 8/10/12

FCC ID: WA6SL5550



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### 5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result	
§ 1.1307; § 2.1093	RF Exposure (SAR)	Compliance	
§2.1046; § 22.913(a); § 24.232(c);	DE Output Dower	Compliance	
§ 27.50(c.10); § 27.50(d.4)	RF Output Power	Compliance	
§ 24.232 (d) ; § 27.50(d)	Peak-Average Ratio	Compliance	
§ 2.1047	Modulation Characteristics	N/A	
§ 2.1049; § 22.905; § 22.917;	000/ 9 26 dB Ossumind Bandwidth	Compliance	
§ 24.238; § 27.53(a.5)	99% & -26 dB Occupied Bandwidth	Compliance	
§ 2.1051; § 22.917(a);	Courier Conincione of Antonina Torrigal	Camplianas	
§ 24.238(a); § 27.53(h)	Spurious Emissions at Antenna Terminal	Compliance	
§ 2.1053; § 22.917(a);	Field Chromath of Counieus Dediction	Camplianas	
§ 24.238(a); § 27.53(h)	Field Strength of Spurious Radiation	Compliance	
§ 22.917(a); § 24.238(a);	Out of hand aminaing Band Edge	Compliance	
§ 27.53(h)	Out of band emission, Band Edge		
§ 2.1055; § 22.355; § 24.235;	Frequency stability vs. temperature	Compliance	
§ 27.5(h); § 27.54	Frequency stability vs. voltage	Compliance	

Note: Testing was performed by configuring EUT to maximum output power status, the declared output power class for different

#### **Measurement Uncertainty**

Emissions				
Test Item	Uncertainty			
Band Edge and Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB		
-	-	-		



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### 6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS

### 6.1 RF Exposure (SAR)

Test Result: Pass

The EUT is a portable device, thus requires SAR evaluation;

Please refer to RF Exposure Evaluation Report: 15070897-FCC-H.



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## 6.2 RF Output Power

Temperature	24°C		
Relative Humidity	52%		
Atmospheric Pressure	1006mbar		
Test date :	October 08, 2015		
Tested By :	Winnie Zhang		

#### Requirement(s):

Requirement(s):	ı		1					
Spec	Item	Requirement Applicab						
§22.913 (a)	a)	ERP:38.45dBm						
§24.232 (c)	b)	RP:33dBm						
§27.50 (c)	c)	EIRP: 30dBm	<b>&gt;</b>					
Test Setup		Base Station EUT						
	Fo	or Conducted Power:						
	-	- The transmitter output port was connected to base station.						
	-	- Set EUT at maximum power through base station.						
	- Select lowest, middle, and highest channels for each band and							
	different test mode.							
	For ERP/EIRP:							
	- The transmitter was placed on a wooden turntable, and it was							
	transmitting into a non-radiating load which was also placed on the							
Test Procedure	turntable.							
	- The measurement antenna was placed at a distance of 3 meters							
	from the EUT. During the tests, the antenna height and							
	polarization as well as EUT azimuth were varied in order to iden							
	the maximum level of emissions from the EUT. The test was							
	performed by placing the EUT on 3-orthogonal axis.							
	- The frequency range up to tenth harmonic of the fundamental							
	frequency was investigated.							
	-	Remove the EUT and replace it with substitution anten	na. A signal					



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_						
	generator was connected to the substitution antenna by a non-					
	radiating cable. The absolute levels of the spurious emissions					
	were measured by the substitution.					
	- Spurious emissions in dB = 10 log (TX power in Watts/0.001) –					
	the absolute level					
	<ul> <li>Spurious attenuation limit in dB = 43 + 10 Log10 (power out in</li> </ul>					
	Watts.					
Remark						
Result	Pass					
Test Data Yes	□ <sub>N/A</sub>					
Test Plot Yes	(See below) N/A					



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#### **Conducted Power**

#### **GSM Mode:**

Burst Average Power (dBm);								
Band		GSM850 PCS1900						
Channel	128	190	251	Tune up Power tolerant	512	661	810	Tune up Power tolerant
Frequency (MHz)	824.2	836.6	848.8	1	1850.2	1880	1909.8	1
GSM Voice (1 uplink),GMSK	33.90	33.70	33.74	33±1	30.19	29.90	29.31	30±1
GPRS Multi-Slot Class 8 (1 uplink),GMSK	33.68	33.68	33.70	33±1	29.30	29.88	30.17	30±1
GPRS Multi-Slot Class 10 (2 uplink) GMSK	33.24	33.29	33.30	33±1	28.72	29.33	29.73	29±1
GPRS Multi-Slot Class 12 (4 uplink) GMSK	30.91	30.95	30.94	30±1	26.15	26.82	26.73	26±1
EGPRS Multi-Slot Class 8 (1 uplink) GMSK MCS1	33.82	33.87	33.71	33±1	29.29	29.87	30.17	30±1
EGPRS Multi-Slot Class 10 (2 uplink) GMSK MCS1	33.28	33.34	33.38	33±1	28.73	29.35	29.74	29±1
EGPRS Multi-Slot Class 12 (4 uplink) GMSK MCS1	29.45	29.51	29.55	29±1	26.10	26.73	26.72	26±1

Remark:

GPRS, CS1 coding scheme.

EGPRS, MCS1 coding scheme.

Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link

Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 5 working link

Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 5 working link

Note: Since GSM mode has higher power, so the test items below were not performed to GPRS and EGPRS mode.



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### **UMTS Mode:**

### UMTS-FDD Band V

Band/ Time Slot	Observat	<b>5</b>	Average power	Tune up	
configuration	Channel	Frequency	(dBm)	Power tolerant	
DMO	4132	826.4	23.83	23±1	
RMC	4175	835	23.92	23±1	
12.2kbps	4233	846.6	23.95	23±1	
LICDDA	4132	826.4	22.75	22±1	
HSDPA Subtest1	4175	835	22.86	22±1	
Sublest i	4233	846.6	22.59	22±1	
LIODDA	4132	826.4	22.75	22±1	
HSDPA Subtest2	4175	835	22.73	22±1	
Sublestz	4233	846.6	22.76	22±1	
LIODDA	4132	826.4	22.69	22±1	
HSDPA Subtest3	4175	835	22.73	22±1	
Sublesis	4233	846.6	22.78	22±1	
LICDDA	4132	826.4	22.77	22±1	
HSDPA Subtest4	4175	835	22.81	22±1	
Sublest4	4233	846.6	22.80	22±1	
LICLIDA	4132	826.4	22.68	22±1	
HSUPA Subtest1	4175	835	22.69	22±1	
Sublest	4233	846.6	22.75	22±1	
LIQUIDA	4132	826.4	22.74	22±1	
HSUPA	4175	835	22.79	22±1	
Subtest2	4233	846.6	22.82	22±1	
LIGUIDA	4132	826.4	22.75	22±1	
HSUPA Subtest3	4175	835	22.79	22±1	
Sublests	4233	846.6	22.83	22±1	
LICUIDA	4132	826.4	22.71	22±1	
HSUPA	4175	835	22.78	22±1	
Subtest4	4233	846.6	22.76	22±1	
1101:54	4132	826.4	22.73	22±1	
HSUPA Subtrate	4175	835	22.75	22±1	
Subtest5	4233	846.6	22.77	22±1	



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### **UMTS-FDD Band II**

Band/ Time Slot configuration	Channel	Frequency	Average power (dBm)	Tune up Power tolerant
DMC	9262	1852.4	22.28	22±1
RMC	9400	1880	22.36	22±1
12.2kbps	9538	1907.6	22.48	22±1
HCDDA	9262	1852.4	21.16	22±1
HSDPA Subtest1	9400	1880	21.32	22±1
Sublest I	9538	1880 21.32 1907.6 21.25		22±1
HCDDA	9262	1852.4	21.19	22±1
HSDPA Subtest2	9400	1880	21.22	22±1
Sublesiz	9538	1907.6	21.31	22±1
11000	9262	1852.4	21.20	22±1
HSDPA Subtest3	9400	1880	21.23	22±1
Sublesis	9538	1907.6	21.22	22±1
HODDA	9262	1852.4	21.14	22±1
HSDPA Subtest4	9400	1880	21.19	22±1
Sublest4	9538	1907.6	21.23	22±1
HOUDA	9262	1852.4	21.15	22±1
HSUPA Subtest1	9400	1880	21.13	22±1
Sublest i	9538	1907.6	21.19	22±1
HOUDA	9262	1852.4	21.14	22±1
HSUPA Subtest2	9400	1880	21.26	22±1
Sublesiz	9538	1907.6	21.23	22±1
LICLIDA	9262	1852.4	21.22	22±1
HSUPA	9400	1880	21.25	22±1
Subtest3	9538	1907.6	21.29	22±1
LICUIDA	9262	1852.4	21.18	22±1
HSUPA Subtest4	9400	1880	21.32	22±1
Sublest4	9538	1907.6	21.29	22±1
LICUDA	9262	1852.4	21.16	22±1
HSUPA Subtest5	9400	1880	21.24	22±1
Sublesto	9538	1907.6	21.26	22±1



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### **UMTS-FDD Band IV**

Band/ Time Slot configuration	Channel	Frequency	Average power (dBm)	Tune up Power tolerant
DMC	1313	1712.6	22.96	22±1
RMC	1413	1732.6	22.58	22±1
12.2kbps	1512	1752.4	22.33	22±1
LICDDA	1313	1712.6	21.46	22±1
HSDPA Subtest1	1413	1732.6	21.43	22±1
Sublest i	1512	1752.4	21.26	22±1
LIODDA	1313	1712.6	21.46	22±1
HSDPA	1413	1732.6	21.38	22±1
Subtest2	1512	1752.4	21.15	22±1
LIODDA	1313	1712.6	21.44	22±1
HSDPA	1413	1732.6	21.35	22±1
Subtest3	1512	1752.4	21.13	22±1
LIODEA	1313	1712.6	21.48	22±1
HSDPA	1413	1732.6	21.32	22±1
Subtest4	1512	1752.4	21.12	22±1
HOUDA	1313	1712.6	21.51	22±1
HSUPA	1413	1732.6	21.13	22±1
Subtest1	1512	1752.4	21.08	22±1
HOURA	1313	1712.6	21.36	22±1
HSUPA Subtest2	1413	1732.6	21.15	22±1
Sublesiz	1512	1752.4	21.11	22±1
HOUDA	1313	1712.6	21.28	22±1
HSUPA	1413	1732.6	21.20	22±1
Subtest3	1512	1752.4	21.15	22±1
LICUIDA	1313	1712.6	21.33	22±1
HSUPA Subtost4	1413	1732.6	21.15	22±1
Subtest4	1512	1752.4	21.24	22±1
LICUDA	1313	1712.6	21.16	22±1
HSUPA Subtest5	1413	1732.6	21.13	22±1
Sublesto	1512	1752.4	21.09	22±1



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#### **ERP & EIRP**

### ERP for Cellular Band (Part 22H)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
824.2	25.90	V	6.8	0.53	32.17	38.45
824.2	26.18	Н	6.8	0.53	32.45	38.45
836.6	26.51	V	6.8	0.53	32.78	38.45
836.6	26.18	Н	6.8	0.53	32.45	38.45
848.8	25.84	V	6.9	0.53	32.21	38.45
848.8	26.18	Н	6.9	0.53	32.55	38.45

### EIRP for PCS Band (Part 24E)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1850.2	25.42	V	7.88	0.85	32.45	33
1850.2	25.38	Н	7.88	0.85	32.41	33
1880	25.14	V	7.88	0.85	32.17	33
1880	25.45	Н	7.88	0.85	32.48	33
1909.8	25.50	V	7.86	0.85	32.51	33
1909.8	25.13	Н	7.86	0.85	32.14	33



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### ERP for UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
826.4	17.85	V	6.8	0.53	24.12	38.45
826.4	18.27	Н	6.8	0.53	24.54	38.45
835	18.09	V	6.8	0.53	24.36	38.45
835	17.86	Н	6.8	0.53	24.13	38.45
846.6	18.14	V	6.9	0.53	24.51	38.45
846.6	18.41	Н	6.9	0.53	24.78	38.45

### EIRP for UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1852.4	19.42	V	7.88	0.85	26.45	33
1852.4	19.11	Н	7.88	0.85	26.14	33
1880	19.42	V	7.88	0.85	26.45	33
1880	19.29	Н	7.88	0.85	26.32	33
1907.6	19.11	V	7.86	0.85	26.12	33
1907.6	19.53	Н	7.86	0.85	26.54	33

#### EIRP for UMTS-FDD Band IV (Part 27H)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1712.4	18.94	V	7.76	0.82	25.88	30
1712.4	18.51	Н	7.76	0.82	25.45	30
1740	18.18	V	7.76	0.82	25.12	30
1740	18.19	Н	7.76	0.82	25.13	30
1752.6	18.53	V	7.74	0.82	25.45	30
1752.6	19.04	Н	7.74	0.82	25.96	30

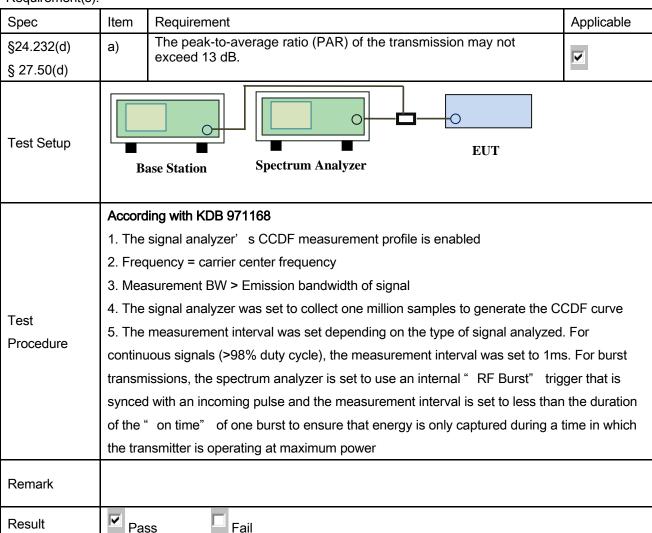


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#### 6.3 Peak-Average Ratio

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1006mbar
Test date :	October 08, 2015
Tested By :	Winnie Zhang

#### Requirement(s):



Test Data	Yes	□ <sub>N/A</sub>
Test Plot	Yes (See below)	✓ <sub>N/A</sub>



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#### GSM 1900 PK-AV POWER(PART 24E)

Frequency	Conducted power(dBm)		Peak-Average
(MHz)	Peak	Average	Ratio(PAR)
1850.2	31.53	29.31	2.22
1880	31.45	29.9	1.55
1909.8	31.36	30.19	1.17

#### UMTS-FDD BandII PK-AV POWER(PART 24E)

Frequency	Conducted power(dBm)		Peak-Average
(MHz)	Peak	Average	Ratio(PAR)
1852.4	25.23	22.28	2.95
1880	25.3	22.36	2.94
1907.6	25.21	22.48	2.73

#### UMTS-FDD BandIV PK-AV POWER (PART 27)

Frequency	Conducted power(dBm)		Peak-Average
(MHz)	Peak	Average	Ratio(PAR)
1712.6	25.52	22.96	2.56
1732.6	25.13	22.58	2.55
1752.4	24.89	22.33	2.56



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### 6.4 Modulation Characteristic

According to FCC § 2.1047(d), Part 22H, 24E& Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.



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### 6.5 Occupied Bandwidth

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1006mbar
Test date :	October 08, 2015
Tested By :	Winnie Zhang

#### Requirement(s):

Spec	Item	Requirement	Applicable
§2.1049, §22.917,	a) 99% Occupied Bandwidth(kHz)		<b>V</b>
§22.905 §24.238 §27.53(a)	b)	26 dB Bandwidth(kHz)	V
Test Setup	B	EUT Spectrum Analyzer	
Test Procedure	-	The EUT was connected to Spectrum Analyzer and Base power divider.  The 99% and 26 dB occupied bandwidth (BW) of the midd for the highest RF powers.	
Remark			
Result	Pa	ss Fail	

Test Data	Yes	□ <sub>N/A</sub>
Test Plot	Yes (See below)	□ <sub>N/A</sub>



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### Cellular Band (Part 22H) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
128	824.2	246.9940	314.589
190	836.6	246.0024	319.941
251	848.8	249.9971	324.966

### PCS Band (Part 24E) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
512	1850.2	247.0133	320.351
661	1880.0	247.1740	321.592
810	1909.8	247.8071	314.582

### UMTS-FDD Band V (Part 22H)

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
4132	826.4	4.2291	4.882
4175	835.0	4.2237	4.882
4233	846.6	4.2019	4.926

### UMTS-FDD Band II (Part 24E)

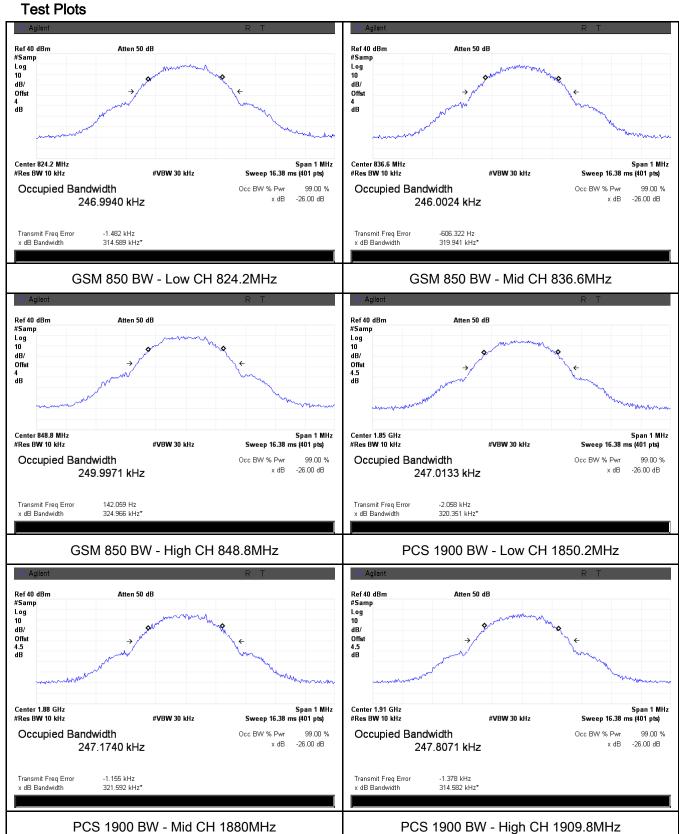
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
9262	1852.4	4.2277	4.929
9400	1880.0	4.2188	4.904
9538	1907.6	4.2185	4.963

#### UMTS-FDD Band IV (Part 27)

Channel	Frequency	99% Occupied	26 dB Bandwidth
Channel	(MHz)	Bandwidth (MHz)	(MHz)
9262	1852.4	4.2100	4.874
9400	1880.0	4.2126	4.912
9538	1907.6	4.2548	4.919



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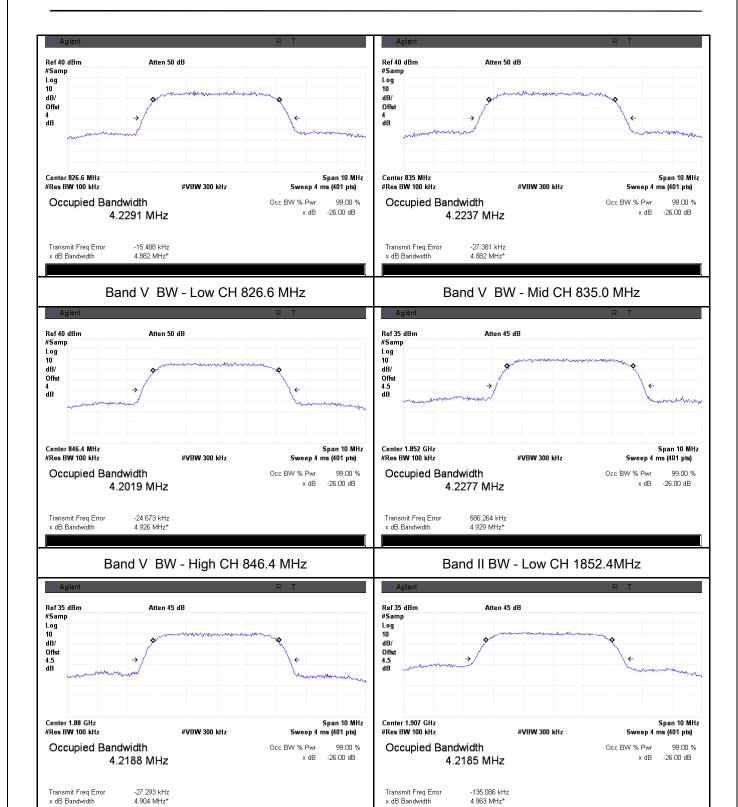


x dB Bandwidth

Band II BW - Mid CH 1880MHz

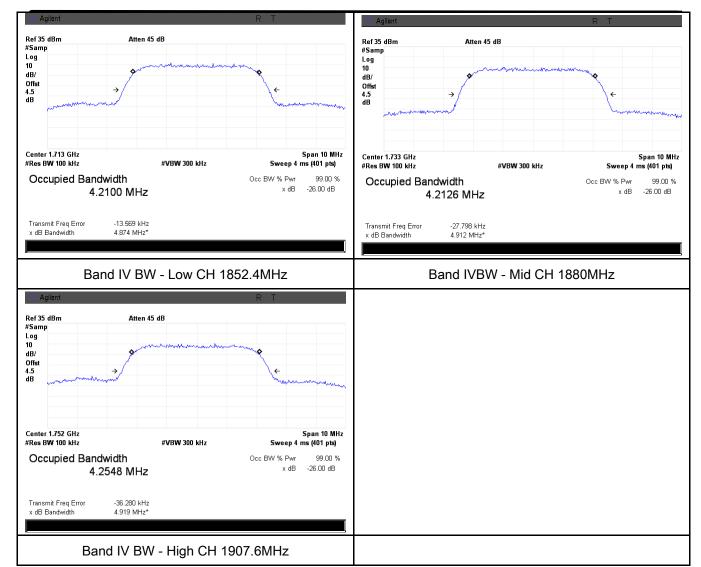
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Band II BW - High CH 1907.6MHz





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### 6.6 Spurious Emissions at Antenna Terminals

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1006mbar
Test date :	October 08, 2015
Tested By :	Winnie Zhang

#### Requirement(s):

Spec	Item	Requirement	Applicable
§2.1051,		The power of any emission outside of the authorized	
§22.917(a)&	2)	operating frequency ranges must be lower than the	<b>V</b>
§24.238(a)	(a)	transmitter power (P) by a factor of at least 43 + 10 log	
§ 27.53(h)		(P) dB	
Test Setup		Base Station Spectrum Analyzer	
Test Procedure	-	The EUT was connected to Spectrum Analyzer and Base via power divider.  The Band Edges of low and high channels for the highest powers were measured.  Setting RBW as roughly BW/100.	
Remark		Cetting NEW do reaging EW/ 100.	
Remark			
Result	<b>☑</b> Pa	ass Fail	

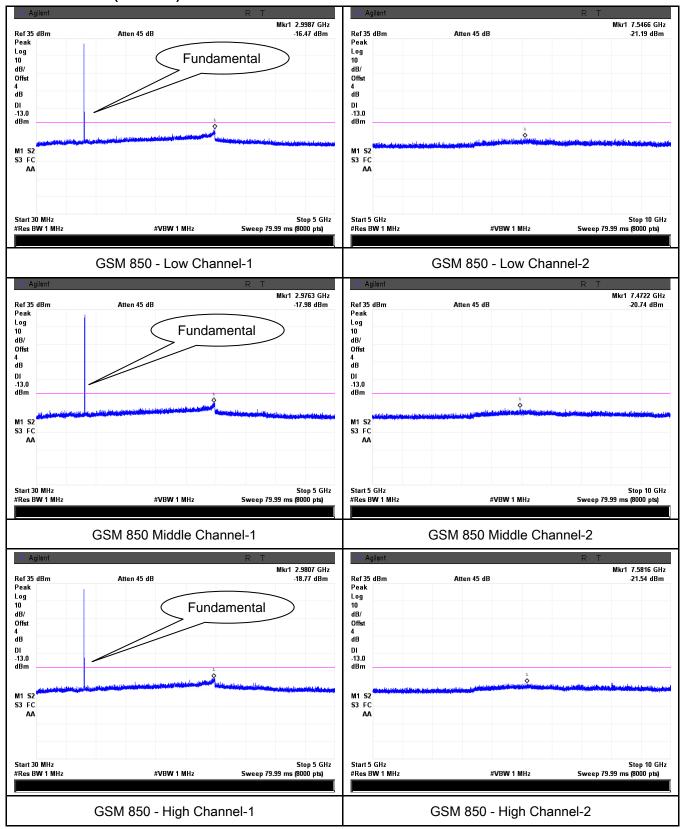
Test Data	Yes	□ <sub>N/A</sub>
Test Plot	Yes (See below)	□ <sub>N/A</sub>



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#### Test Plots

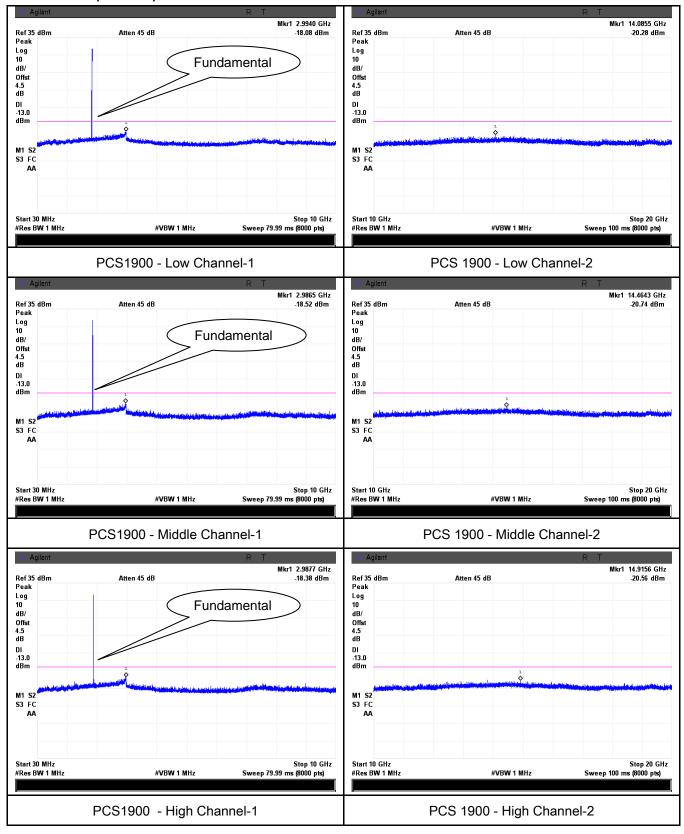
#### Cellular Band (Part 22H) result





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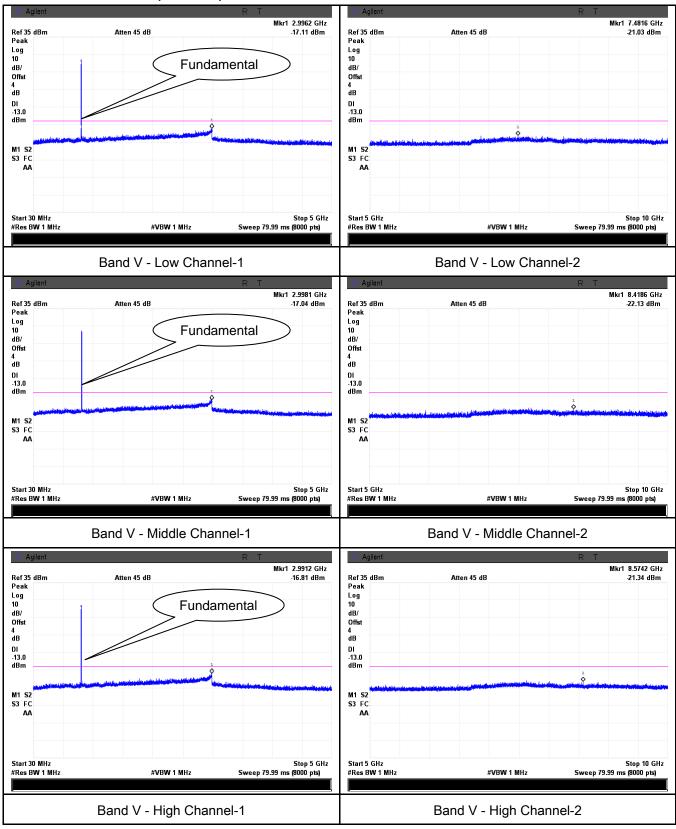
#### PCS Band (Part24E) result





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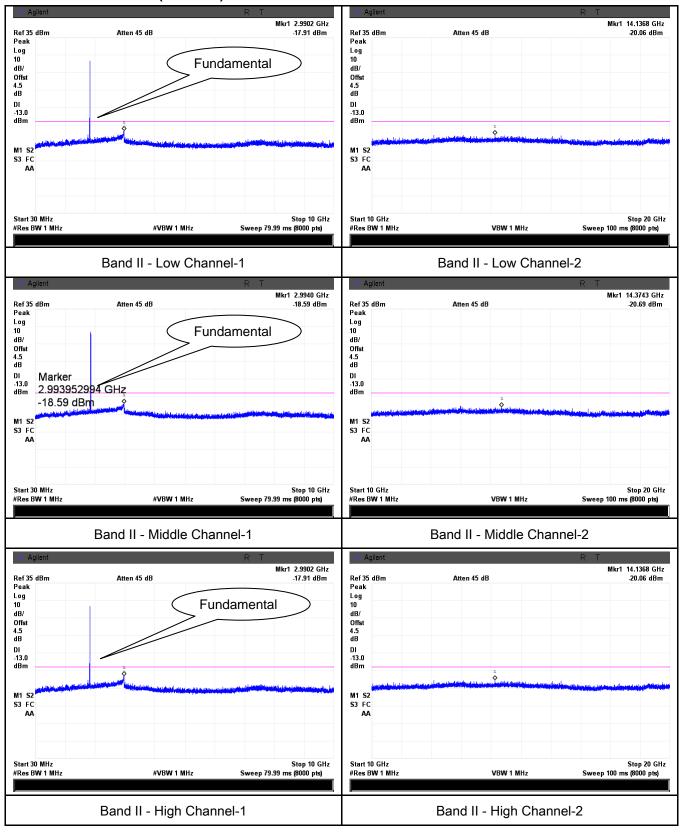
#### UMTS-FDD Band V (Part 22H)





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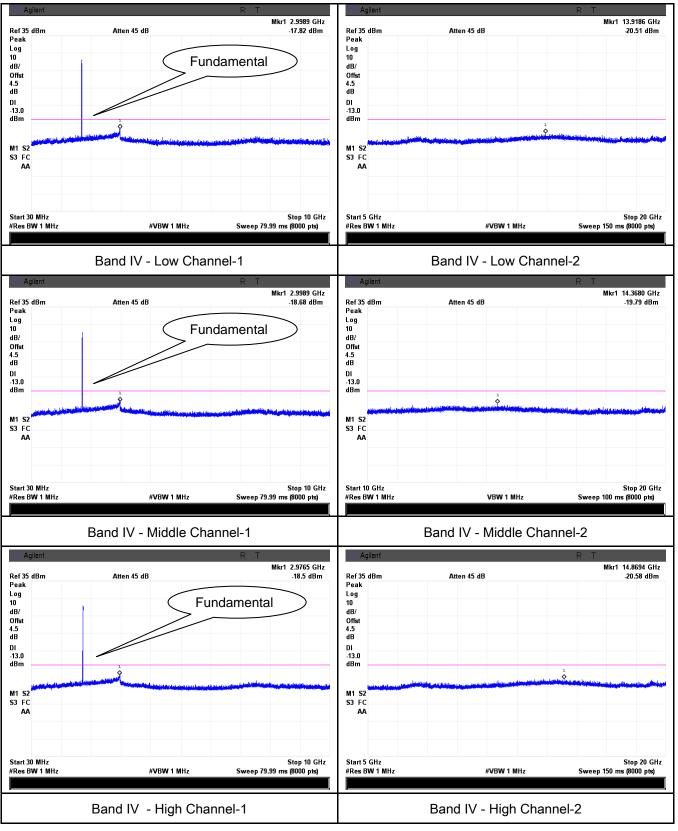
#### UMTS-FDD Band II (Part 24E)





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#### UMTS-FDD Band IV (Part 27)





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### 6.7 Spurious Radiated Emissions

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1006mbar
Test date :	October 08, 2015
Tested By :	Winnie Zhang

#### Requirement(s):

Requirement(s):			
Spec	Item	Requirement	Applicable
§2.1053, §22.917 & §24.238 § 27.53(h)	a)	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.	
Test setup	Ant. Tower  Support Units  Turn Table  Ground Plane  Test Receiver		
Test Procedure	<ol> <li>The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.</li> <li>The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.</li> <li>Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.         Sample Calculation:         EUT Field Strength = Raw Amplitude (dBµV/m) – Amplifier Gain (dB) + Antenna Factor (dB) + Cable Loss (dB) + Filter Attenuation (dB, if used)     </li> </ol>		
Remark			
Result	Pas	ss Fail	



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Test Data	Yes	□ <sub>N/A</sub>
	_	

### Cellular Band (Part 22H) result

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1648.4	-49.63	٧	7.95	0.78	-42.46	-13	-29.46
1648.4	-49.97	Н	7.95	0.78	-42.80	-13	-29.80
218.3	-53.41	V	6.4	0.2	-47.21	-13	-34.21
643.7	-54.15	Н	6.5	0.38	-48.03	-13	-35.03

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1673.2	-49.72	V	7.95	0.78	-42.55	-13	-29.55
1673.2	-49.88	Η	7.95	0.78	-42.71	-13	-29.71
218.9	-53.45	V	6.4	0.2	-47.25	-13	-34.25
643.5	-54.09	Н	6.5	0.38	-47.97	-13	-34.97

#### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1697.6	-49.85	V	7.95	0.78	-42.68	-13	-29.68
1697.6	-49.96	Н	7.95	0.78	-42.79	-13	-29.79
218.2	-53.51	V	6.4	0.2	-47.31	-13	-34.31
643.9	-54.17	Н	6.5	0.38	-48.05	-13	-35.05



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### PCS Band (Part24E) result

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3700.4	-50.86	V	10.25	2.73	-43.34	-13	-30.34
3700.4	-51.42	Н	10.25	2.73	-43.90	-13	-30.90
216.3	-52.75	V	6.4	0.2	-46.55	-13	-33.55
645.8	-53.89	Н	6.5	0.38	-47.77	-13	-34.77

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3760	-50.95	V	10.25	2.73	-43.43	-13	-30.43
3760	-51.56	Н	10.25	2.73	-44.04	-13	-31.04
216.7	-52.81	V	6.4	0.2	-46.61	-13	-33.61
645.2	-53.94	Н	6.5	0.38	-47.82	-13	-34.82

### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3819.6	-50.93	V	10.36	2.73	-43.3	-13	-30.3
3819.6	-51.67	Н	10.36	2.73	-44.04	-13	-31.04
216.1	-52.77	V	6.4	0.2	-46.57	-13	-33.57
645.9	-53.82	Н	6.5	0.38	-47.7	-13	-34.7



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### UMTS-FDD Band V (Part 22H)

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1652.8	-49.38	V	7.95	0.78	-42.21	-13	-29.21
1652.8	-49.82	Н	7.95	0.78	-42.65	-13	-29.65
217.3	-53.66	V	6.4	0.2	-47.46	-13	-34.46
644.9	-54.13	Н	6.5	0.38	-48.01	-13	-35.01

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1670	-49.41	V	7.95	0.78	-42.24	-13	-29.24
1670	-49.99	Н	7.95	0.78	-42.82	-13	-29.82
217.8	-53.57	V	6.4	0.2	-47.37	-13	-34.37
644.5	-54.12	Н	6.5	0.38	-48.00	-13	-35.00

### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1693.2	-49.37	V	7.95	0.78	-42.20	-13	-29.20
1693.2	-49.92	Н	7.95	0.78	-42.75	-13	-29.75
217.6	-53.61	V	6.4	0.2	-47.41	-13	-34.41
644.3	-54.08	Н	6.5	0.38	-47.96	-13	-34.96



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## UMTS-FDD Band II (Part 24E)

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3704.8	-50.37	٧	10.25	2.73	-42.85	-13	-29.85
3704.8	-51.22	Н	10.25	2.73	-43.70	-13	-30.70
215.9	-53.19	V	6.4	0.2	-46.99	-13	-33.99
642.3	-53.85	Н	6.5	0.38	-47.73	-13	-34.73

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Substituted level Polarity Gain Lo		Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3760	-50.42	V	10.25	2.73	-42.90	-13	-29.90
3760	-51.38	Η	10.25	2.73	-43.86	-13	-30.86
215.5	-53.27	V	6.4	0.2	-47.07	-13	-34.07
642.9	-53.91	Н	6.5	0.38	-47.79	-13	-34.79

## High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3815.2	-50.39	V	10.36	2.73	-42.76	-13	-29.76
3815.2	-51.24	Н	10.36	2.73	-43.61	-13	-30.61
215.6	-53.13	V	6.4	0.2	-46.93	-13	-33.93
642.5	-53.86	Н	6.5	0.38	-47.74	-13	-34.74



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### UMTS-FDD Band IV (Part 27)

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3424.8	-50.29	V	10.07	2.52	-42.74	-13	-29.74
3424.8	-50.93	Η	10.07	2.52	-43.38	-13	-30.38
219.3	-53.43	٧	6.4	0.2	-47.23	-13	-34.23
647.5	-54.11	Н	6.5	0.38	-47.99	-13	-34.99

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3480	-50.31	V	10.09	2.52	-42.74	-13	-29.74
3480	-51.07	Н	10.09	2.52	-43.5	-13	-30.50
219.7	-53.52	V	6.4	0.2	-47.32	-13	-34.32
647.3	-54.08	Н	6.5	0.38	-47.96	-13	-34.96

## High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3505.2	-45.88	V	10.09	2.52	-38.31	-13	-25.31
3505.2	-45.27	Н	10.09	2.52	-37.70	-13	-24.70
219.8	-53.43	V	6.4	0.2	-47.23	-13	-34.23
647.2	-54.16	Н	6.5	0.38	-48.04	-13	-35.04



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# 6.8 Band Edge

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1006mbar
Test date :	October 08, 2015
Tested By:	Winnie Zhang

## Requirement(s):

Spec	Item	Requirement	Applicable		
§22.917(a) §24.238(a) § 27.53(h)	a)	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.			
Test setup		Base Station Spectrum Analyzer EUT			
Procedure	-	The EUT was connected to Spectrum Analyzer and Base S power divider.  The Band Edges of low and high channels for the highest R were measured. Setting RBW as roughly BW/100.			
Remark					
Result	<b>☑</b> Pa	ss Fail			

Test Data	Yes	□ <sub>N/A</sub>
Test Plot	Yes (See below)	□ <sub>N/A</sub>



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### Cellular Band (Part 22H) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.9950	-17.13	-13
849.0175	-15.59	-13

### PCS Band (Part24E) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)	
1849.9950	-14.33	-13	
1910.0175	-15.07	-13	

#### UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Emission (dBm)	Limit (dBm)	
823.9000	-24.03	-13	
849.2000	-24.08	-13	

## UMTS-FDD Band IV (Part 27)

Frequency (MHz)	Emission (dBm)	Limit (dBm)	
1849.8500	-22.79	-13	
1910.0500	-22.07	-13	

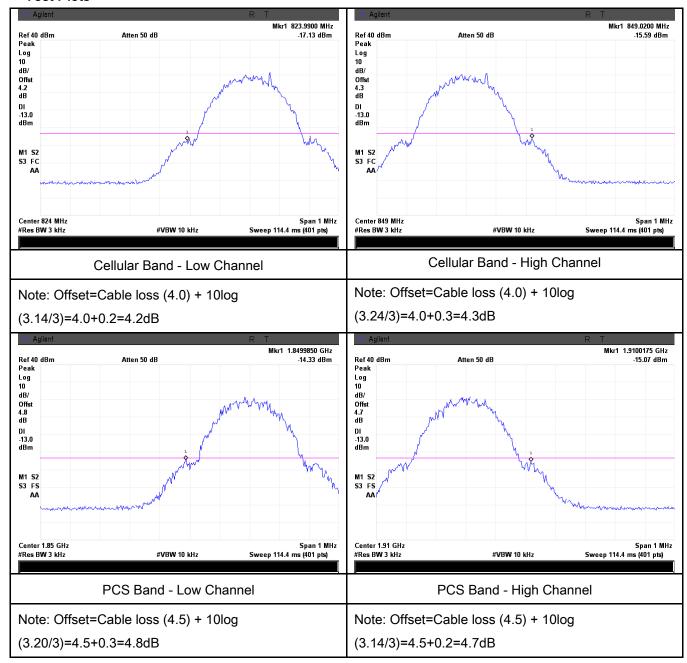
## UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Emission (dBm)	Limit (dBm)	
1849.8500	-21.83	-13	
1910.0500	-20.96	-13	



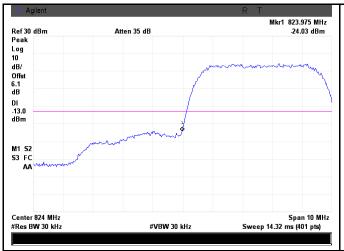
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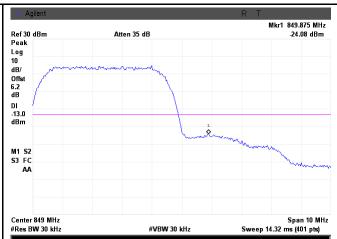
#### **Test Plots**





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UMTS-FDD Band V - Low Channel

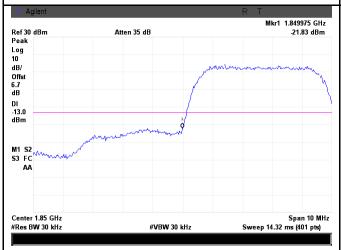
UMTS-FDD Band V - High Channel

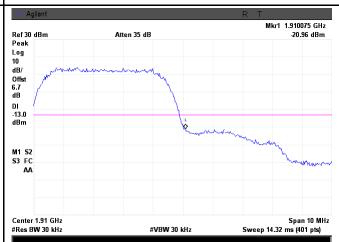
Note: Offset=Cable loss (4.0) + 10log

Note: Offset=Cable loss (4.0) + 10log

(48.82/30)=4.0+2.1=6.1 dB

(49.26/30)=4.0+2.2=6.2 dB





UMTS-FDD Band II - Low Channel

UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log

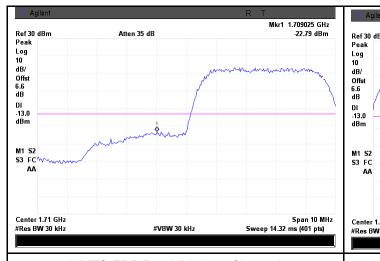
Note: Offset=Cable loss (4.5) + 10log

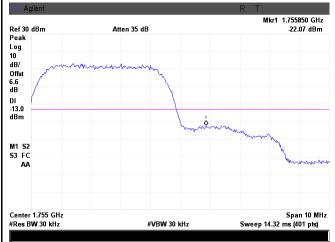
(49.29/30)=4.5+2.2=6.7 dB

(49.63/30)=4.5+2.2=6.7 dB



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UMTS-FDD Band IV - Low Channel

Note: Offset=Cable loss (4.5) + 10log

(48.74/30)=4.5+2.1=6.6 dB

UMTS-FDD Band IV - High Channel

Note: Offset=Cable loss (4.5) + 10log

(49.19/30)=4.5+2.1=6.6 dB



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# 6.9 Frequency Stability

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1006mbar
Test date :	October 08, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement				Applicable
§2.1055, §22.355 & §24.235 § 27.5(h); § 27.54	a)	According to §22.3 the Public Mobile S tolerances given in Frequency Toleran Services  Frequency Range (MHz) 25 to 50 50 to 450 45 to 512 821 to 896 928 to 29. 929 to 960. 2110 to 2220 According to §24.2	Base, fixed (ppm) 20.0 5.0 2.5 1.5 5.0 1.5 10.0	it be maintained w  it be maintained w  it is	ic Mobile  Mobile ≤ 3 watts (ppm) 50.0 50.0 .0 2.5 N/A N/A N/A	
		ensure that the fun frequency block.	•	-		
Test setup	Base Station EUT Thermal Chamber					



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	A communication link was established between EUT and base station. The	
	frequency error was monitored and measured by base station under variation	
Procedure	of ambient temperature and variation of primary supply voltage.	
	Limit: The frequency stability of the transmitter shall be maintained within	
	±0.00025% (±2.5ppm) of the center frequency.	
Remark		
Result	Pass Fail	

Test Data	Yes	□ <sub>N/A</sub>
Test Plot	Yes (See below)	✓ <sub>N/A</sub>



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## Cellular Band (Part 22H) result

	Middle Channel, f₀ = 836.6 MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	
-10		21	0.0251	2.5	
0	3.7	22	0.0263	2.5	
10		23	0.0275	2.5	
20		16	0.0191	2.5	
30		17	0.0203	2.5	
40		21	0.0251	2.5	
50		17	0.0203	2.5	
55		25	0.0299	2.5	
4.2	4.2	24	0.0287	2.5	
25	3.5	20	0.0239	2.5	

## PCS Band (Part 24E) result

. CO Band	1 Go Band (1 art 242) result				
	Middle Channel, f₀ = 1880 MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	
-10		21	0.0112	2.5	
0		22	0.0117	2.5	
10	3.7	19	0.0101	2.5	
20		15	0.0080	2.5	
30		16	0.0085	2.5	
40		20	0.0106	2.5	
50		22	0.0117	2.5	
55		24	0.0128	2.5	
25	4.2	22	0.0117	2.5	
25	3.5	22	0.0117	2.5	



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### UMTS-FDD Band V (Part 22H)

	Middle Channel, f <sub>o</sub> = 835 MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	
-10		21	0.0251	2.5	
0	3.7	17	0.0204	2.5	
10		16	0.0192	2.5	
20		16	0.0192	2.5	
30		14	0.0168	2.5	
40		15	0.0180	2.5	
50		18	0.0216	2.5	
55		21	0.0251	2.5	
25	4.2	20	0.0240	2.5	
25	3.5	21	0.0251	2.5	

## UMTS-FDD Band II (Part 24E)

	Middle Channel, f₀ = 1880 MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	
-10		16	0.0085	2.5	
0		15	0.0080	2.5	
10	3.7	12	0.0064	2.5	
20		11	0.0059	2.5	
30		10	0.0053	2.5	
40		13	0.0069	2.5	
50		16	0.0085	2.5	
55		19	0.0101	2.5	
25	4.2	12	0.0064	2.5	
25	3.5	15	0.0080	2.5	



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### UMTS-FDD Band IV (Part 27)

Middle Channel, f <sub>o</sub> = 1880 MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10		12	0.0064	2.5
0		13	0.0069	2.5
10	3.7	10	0.0053	2.5
20		9	0.0048	2.5
30		10	0.0053	2.5
40		11	0.0059	2.5
50		12	0.0064	2.5
55		9	0.0048	2.5
25	4.2	12	0.0064	2.5
20	3.5	15	0.0080	2.5



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# Annex A. TEST INSTRUMENT

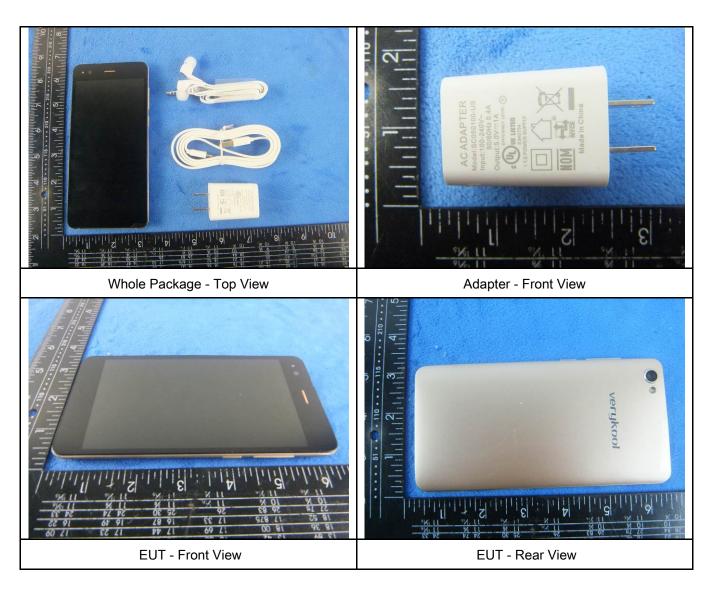
Instrument	Model	Serial #	Cal Date	Cal Due	In use
RF Conducted Test					
Agilent ESA-E SERIES SPECTRUM ANALYZER	E4407B	MY45108319	09/16/2015	09/15/2016	<u> </u>
Power Splitter	1#	1#	09/01/2015	08/31/2016	~
Universal Radio Communication Tester	CMU200	121393	09/25/2015	09/24/2016	<u>&lt;</u>
Temperature/Humidity Chamber	UHL-270	001	10/10/2014	10/09/2015	V
DC Power Supply	E3640A	MY40004013	09/17/2015	09/16/2016	~
Radiated Emissions					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	•
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/01/2015	08/31/2016	<u>&lt;</u>
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/25/2015	03/24/2016	<b>\</b>
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/21/2015	09/20/2016	<u>\</u>
Bilog Antenna (30MHz~2GHz)	JB1	A112017	09/21/2015	09/20/2016	<u>&lt;</u>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71259	09/24/2015	09/23/2016	<b>(</b>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/24/2015	09/23/2016	<u>&lt;</u>
SYNTHESIZED SIGNAL GENERATOR	8665B	3744A01293	09/17/2015	09/16/2016	<b>&gt;</b>
Tunable Notch Filter	3NF- 800/1000-S	AA4	09/01/2015	08/31/2016	>
Tunable Notch Filter	3NF- 1000/2000-S	AM 4	09/01/2015	08/31/2016	V



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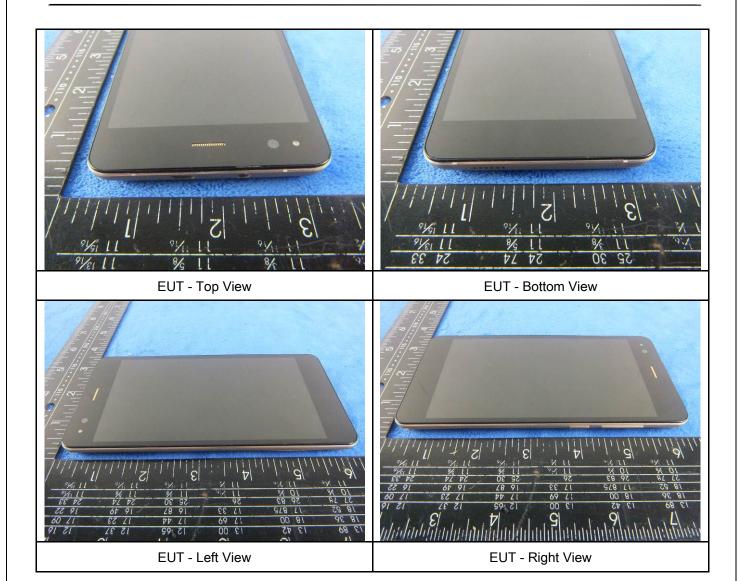
## Annex B. EUT And Test Setup Photographs

### Annex B.i. Photograph: EUT External Photo





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## Annex B.ii. Photograph: EUT Internal Photo

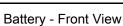




Cover Off - Top View 1

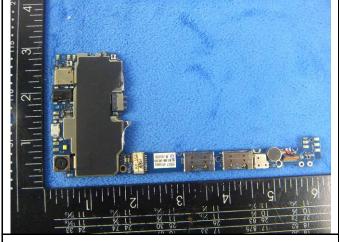
Cover Off - Top View 2







Battery - Rear View



Mainbard with Shielding - Front View



Mainbard without Shielding - Front View



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Mainborad - Rear View

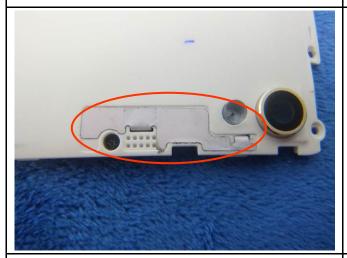
LCD - Front View





LCD - Rear View

GSM/PCS/UMTS-FDD/LTE Antenna View





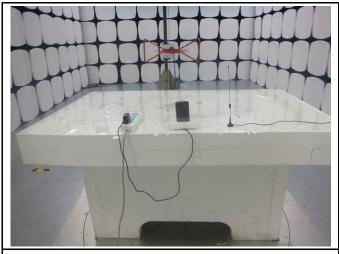
WIFI/BT/BLE - Antenna View

GPS - Antenna View

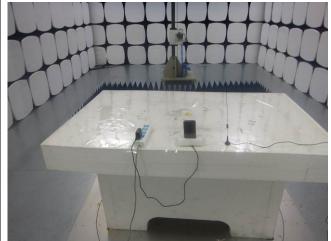


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## Annex B.iii. Photograph: Test Setup Photo



Radiated Spurious Emissions Test Setup Below 1GHz



Radiated Spurious Emissions Test Setup Above 1GHz

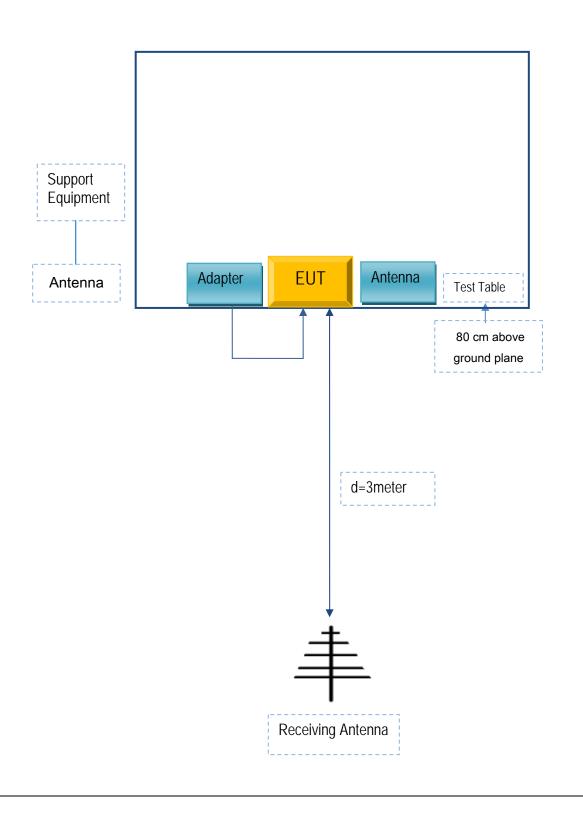


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## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

## Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for Radiated Emissions





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## Annex C. il. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Manufacturer	Equipment Description	Model	Calibration Date	Calibration Due Date
N/A	N/A	N/A	N/A	N/A



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## Annex C.ii. EUT OPERATING CONKITIONS

N/A



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# Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see attachment



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## Annex E. DECLARATION OF SIMILARITY

N/A