

Radio Test Report

Equipment : Rugged Tablet Computer
Brand Name : AAEON
Model No. : xxxRTC-900B-WBGHxxx-xxxx
1. xxx=TF-(TF: Toxic Free) or blank
2. xxx is for marketing purpose
3. xxxx=SW revision, ex: 1110=rev1, x:0~9
FCC ID : OHBRTC900BWBGB
FCC Standard : 47 CFR FCC Part 22(H), 24(E)
WCDMA Band : II, V
Applicant : AAEON Technology Inc.
Manufacturer : 5F, No. 135, Lane 235, Pao Chiao Rd., Taipei, Taiwan

The product sample received on Oct. 24, 2014 and completely tested on Dec. 19, 2014. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI/TIA-603-D-2010, ANSI C63.4 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:


Vic Hsiao / Supervisor



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Summary of Test Result

Test Specifications					
Report Clause	FCC Std. Clause	Description	Measured	Limit	Result
3.1	2.1049 22.917(a) 24.238(a) 27.53(h)	Emission Bandwidth	Bandwidth F9W=4.2234MHz	Information for Emission Designator	Complied
3.1.6	2.1047	Emission Designator	F9W	Information only	Complied
3.2	2.1046	Transmitter Conducted Output Power	Conducted Power [dBm] Cellular: 23.31 PCS: 22.54	Information for RF exposure	Complied
3.2.7	24.232(d) 27.50(d)	Peak to Average Ratio	3.63dB	≤13dB	Complied
3.3	22.913(a)	Effective Radiated Power (ERP)	ERP [dBm] Cellular: 16.86	≤7W[38.45dBm]	Complied
3.4	24.232(c) 27.50(d)	Effective Isotropic Radiated Power (EIRP)	EIRP [dBm] PCS: 24.72	PCS: ≤2W[33.01dBm] AWS: ≤1W[30.00dBm]	Complied
3.5	2.1051 22.917(a) 24.238(a) 27.53(h)	Transmitter Conducted Unwanted Emissions	refer to test data	≤43+10log(P) [-13dBm] P=TX Power in Watts	Complied
3.6	2.1051 22.917(a) 24.238(a) 27.53(h)	Transmitter Conducted Bandedge Emissions	refer to test data	≤43+10log(P) [-13dBm] P=TX Power in Watts	Complied
3.7	2.1053 22.917(a) 24.238(a) 27.53(h)	Transmitter Radiated Unwanted Emissions	[dBm]: 31.94MHz 31.98 (Margin 8.02dB)	≤43+10log(P) [-13dBm] P=TX Power in Watts	Complied
3.8	2.1055 22.355 24.353 27.54	Frequency Stability	Cellular: 0.0141ppm PCS: 0.0053ppm	≤2.5ppm within band	Complied



SPORTON INTERNATIONAL INC.
TEL : 886-3-327-3456
FAX : 886-3-327-0973

1 General Description

1.1.1 RF General Information

Function	Class/Category	
☐ GSM	Multi-Slot Class	
☐ GPRS	Multi-Slot Class	
☐ EDGE	Multi-Slot Class	
☐ DTM	Multi-Slot Class	
☒ HSDPA	Category	10
☒ HSUPA	Category	6

RF General Information							
Freq. Band	Mode	TX Ch. Freq. (MHz)	Channel Number	BW (MHz)	Emission Designator	Max. ERP/EIRP	
						(dBm)	(W)
Cellular	WCDMA850	826.4-846.6	4132-4233	4.685	4M16F9W	16.86	0.049
PCS	WCDMA1900	1852.4-1907.6	9262-9538	4.740	4M22F9W	24.72	0.296
Note 1: WCDMA Rel.99 mode consists of QPSK modulation and HSDPA Rel. 7 mode consists of QPSK and 16QAM modulation.							
Note 2: WCDMA850 (WCDMA Band V), WCDMA1900 (WCDMA Band II)							

1.1.2 Antenna Information

Antenna Category	
☒	Integral antenna (antenna permanently attached)
☒	Temporary RF connector provided
☐	No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.

Antenna General Information				
Operating Band	Ant. Cat.	Ant. Type	Connector	Gain (dBi)
850/Band V	Integral	Dipole	I-pex	-4.31
1900/Band II	Integral	Dipole	I-pex	2.2

1.1.3 Type of EUT

Identify EUT	
Presentation of Equipment	☒ Production ; ☐ Pre-Production ; ☐ Prototype
Type of EUT	
☒	Stand-alone
☐	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.: ...
☐	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: ...
☐	Other:

1.1.4 EUT Operational Condition

Supply Voltage	☒ AC mains	☒ DC	-
Type of DC Source	☐ Internal DC supply	☒ From Adapter	☒ From Li-ion Battery
Test Voltage	☒ Vnom (7.4 V)	☒ Vmax (8.4 V)	☒ Vmin (6.0 V)
Test Climatic	☒ Tnom (20°C)	☒ Tmax (50°C)	☒ Tmin (-30°C)

1.2 Accessories and Support Equipment

Accessories				
AC Adapter	Brand Name	AOEM	Model Name	A048112-TD2
	Power Rating	I/P: 100 - 240 Vac, 1.5A, O/P: 12 Vdc, 4A		
	Power Cord	1.8 meter, non-shielded cable, w/o ferrite core		
Li-ion Battery	Brand Name	Panasonic	Model Name	103450
	Power Rating	7.4V  6810mAh		
LCD Panel	Brand Name	InnoLux	Model Name	EJ101IA-01G

Reminder: Regarding to more detail and other information, please refer to user manual.

Support Equipment - Radiated Emission			
No.	Equipment	Brand Name	Model Name
1	2G/3G Station	Agilent	8960

1.3 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 22(H), 24(E)
- ♦ ANSI/TIA-603-D-2010
- ♦ FCC KDB 971168
- ♦ FCC KDB 412172

1.4 Testing Location Information

Testing Location						
☒	HWA YA	ADD	:	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.		
		TEL	:	886-3-327-3456	FAX	:
						886-3-327-0973
Test Site Registration Number: FCC 636805						
Test Condition		Test Site No.		Test Engineer		Test Environment
RF Conducted		TH01-HY		Candy		20°C / 64%
Radiated Emission		03CH03-HY		Hunter		23.4°C / 53%

1.5 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Uncertainty		
Test Item		Uncertainty
Emission bandwidth		±1.4 %
RF output power, conducted		±0.6 dB
Unwanted emissions, conducted	30 – 1000 MHz	±0.5 dB
	1 – 18 GHz	±0.6 dB
	18 – 40 GHz	±0.8 dB
	40 – 200 GHz	N/A
All emissions, radiated	30 – 1000 MHz	±2.5 dB
	1 – 18 GHz	±3.5 dB
	18 – 40 GHz	±3.8 dB
	40 – 200 GHz	N/A
Temperature		±0.8 °C
Humidity		±3 %
DC and low frequency voltages		±3 %
Time		±1.4 %
Duty Cycle		±1.4 %

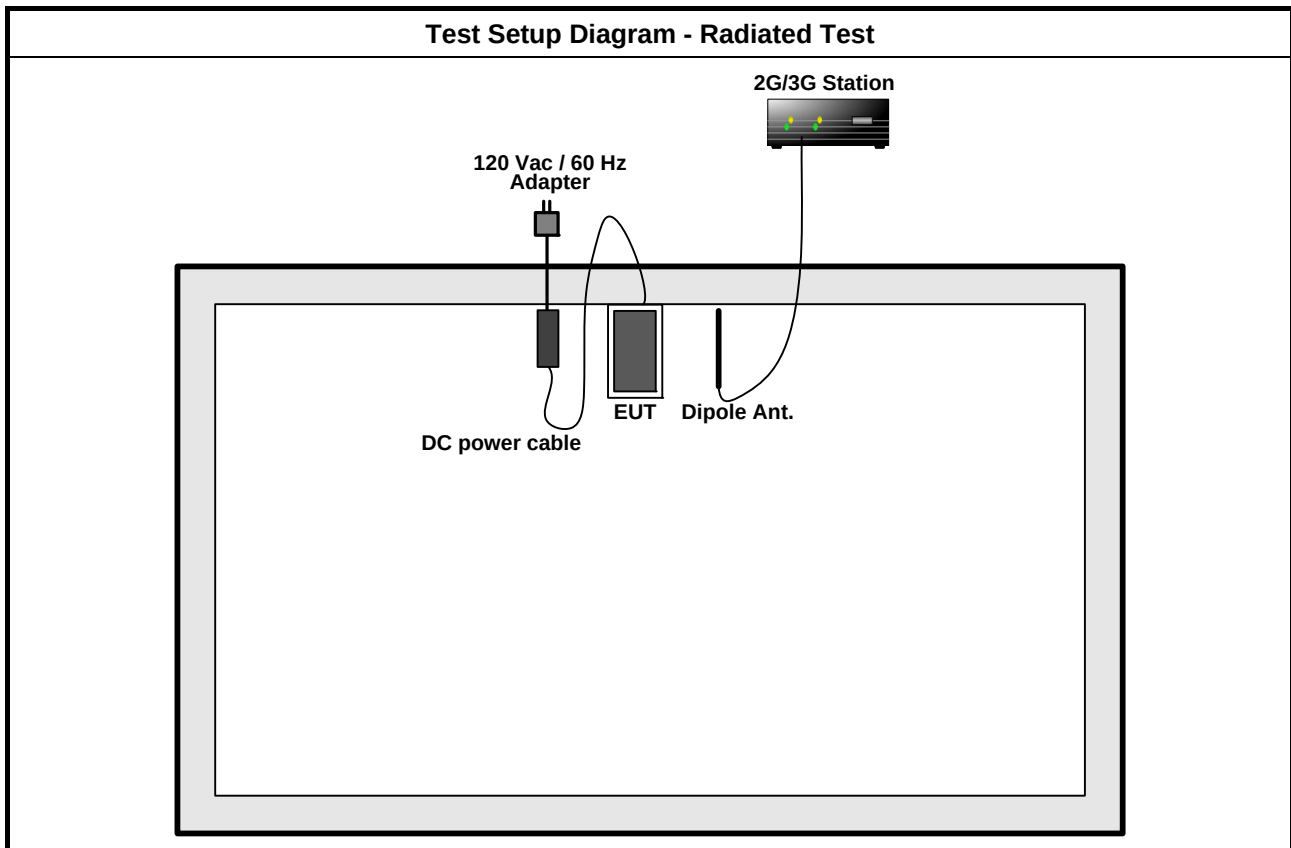
2 Test Configuration of EUT

2.1 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emission Bandwidth, Transmitter Conducted Output Power, Peak-Average Ratio, Transmitter Conducted Bandedge Emissions, Transmitter Conducted Unwanted Emissions, Frequency Stability
Test Condition	Conducted measurement at transmit chains
Modulation Mode	WCDMA

The Worst Case Mode for Following Conformance Tests			
Tests Item	Effective Radiated Power (ERP) Effective Isotropic Radiated Power (EIRP) Transmitter Radiated Unwanted Emissions		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.		
Modulation Mode	WCDMA		
User Position	☐ EUT will be placed in fixed position.		
	☐ EUT will be placed in mobile position and operating multiple positions.		
	☒ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed three orthogonal planes.		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			
Worst Planes of EUT			V

2.2 Test Setup Diagram



3 Transmitter Test Result

3.1 Emission Bandwidth

3.1.1 Emission Bandwidth Limit

Emission Bandwidth Limit	
Information for Emission Designator.	
Note 1: The 99% occupied bandwidth is the frequency bandwidth of the signal power at the 99% channel power of occupied bandwidth when resolution bandwidth should be approximately 1 % to 5 % of the span. These measurements shall also be performed at normal test conditions.	

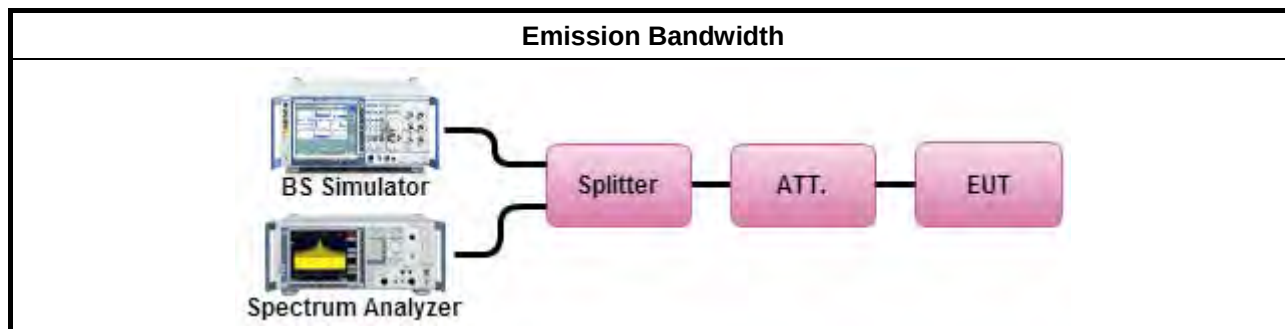
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method	
☒ For the emission bandwidth shall be measured using one of the options below:	
☒	Refer as ANSI/TIA-603-D, clause 1.3.4.4 for test bandwidth.
☒	Refer as KDB 971168, clause 3 for signal bandwidth.
☒	Refer as IC RSS-Gen, clause 6.4 for emission bandwidth.
☒ For conducted measurement.	
☒	If EUT supports single transmit chain and measurements performed on this transmit chain.
☐	If EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☐	If EUT supports multiple transmit chains using options given below:
☐	Option 1: Multiple transmit chains measurements need to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 1.
☐	Option 2: Multiple transmit chains measurements need to be performed on each transmit chains individually (antenna outputs). All measurement had be performed on all transmit chains.
☐ For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.	

3.1.4 Test Setup



3.1.5 Test Result of Emission Bandwidth

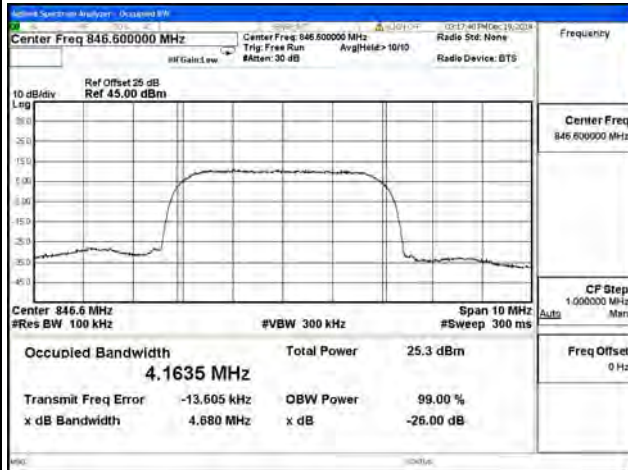
Emission Bandwidth Result				
Mode	Ch.	Freq. (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
WCDMA850	4132	826.4	4.684	4.1604
	4182	836.4	4.685	4.1554
	4233	846.6	4.680	4.1635
WCDMA1900	9262	1852.4	4.692	4.1725
	9400	1880.0	4.740	4.1923
	9538	1907.6	4.795	4.2234
Limit			N/A	
Result			Complied	

3.1.6 Emission Designator

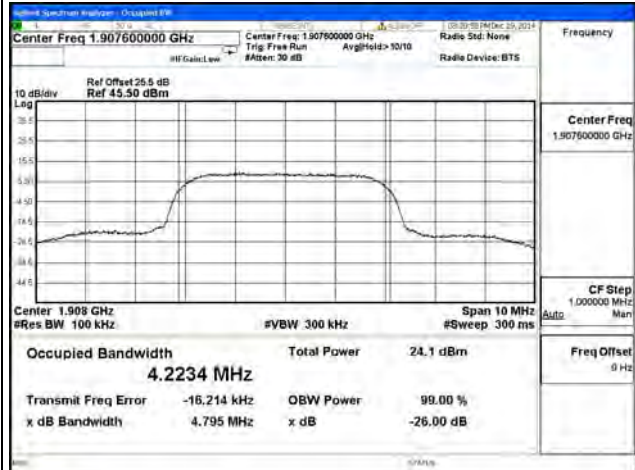
Emission Designator	
Mode	Emission Designator
WCDMA850	4M16F9W
WCDMA1900	4M22F9W
Note 1: WCDMA 99% BW, F = Frequency Modulation, 9 = Composite Digital Info, W = Combination (Audio/Data)	

Emission Bandwidth Plots

WCDMA850



WCDMA1900



3.2 Transmitter Conducted Output Power

3.2.1 Transmitter Conducted Output Power Limit

Transmitter Conducted Output Power Limit
Information for RF exposure

3.2.2 Transmitter Peak to Average Ratio Limit

Transmitter Peak to Average Ratio Limit
PAR ≤ 13dB

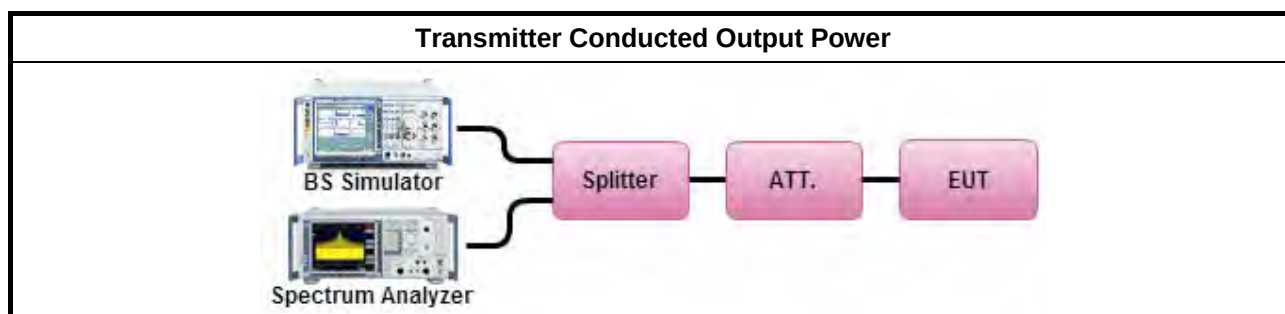
3.2.3 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.4 Test Procedures

Test Method	
☒	Transmitter Conducted Output Power
☐	Refer as FCC KDB 941225 D03 for GSM GPRS EDGE modes.
☐	Refer as FCC KDB 941225 D04 for GSM/(E)GPRS Dual Transfer Mode.
☒	Refer as FCC KDB 941225 D01 for 3G device modes.
☐	Refer as FCC KDB 941225 D02 for 3GPP R6 and R7 additional information.
☐	Refer as FCC KDB 941225 D05 for LTE modes.
☒	Refer as RSS-Gen, clause 4.8 for power measurement.
☒	Transmitter Peak-Average Ratio
☒	For WCDMA signals refer as KDB 971168, clause 6 for CCDF function.
☐	For GSM signals refer average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power.
☒	For conducted measurement.
☒	If EUT supports single transmit chain and measurements performed on this transmit chain.
☐	If EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☐	If EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.

3.2.5 Test Setup



3.2.6 Test Result of Transmitter Conducted Output Power

WCDMA Worst Modulation for Output Power		
3GPP Release Ver.	Mode	Configuration
99	WCDMA	12.2kbps RMC
7	HSDPA	Subtest 1 ~ Subtest 4
5	HSUPA	Subtest 1 ~ Subtest 5

Mode	Subtest	RF Output Power [dBm]						
		Band V (Cellular)			Band II (PCS)			MPR [dB]
		4132	4182	4233	9262	9400	9538	
WCDMA	12.2 kbps RMC	23.06	23.31	23.28	22.54	21.67	21.62	-
HSDPA	Subtest 1	21.83	23.03	23.08	20.71	20.34	20.32	0
	Subtest 2	21.98	23.24	23.24	20.92	20.61	20.46	0
	Subtest 3	21.54	22.82	22.82	20.23	19.91	19.69	0.5
	Subtest 4	21.62	22.82	22.87	20.47	20.18	20.05	0.5
HSUPA	Subtest 1	21.90	22.25	21.99	20.53	20.32	20.15	0
	Subtest 2	20.89	21.20	20.98	19.51	19.15	19.10	2
	Subtest 3	21.71	21.67	21.86	19.39	19.16	18.83	1
	Subtest 4	20.89	20.91	20.93	19.51	19.31	19.11	2
	Subtest 5	21.02	21.28	21.09	19.99	19.86	20.03	0

3.2.7 Test Result of Transmitter Peak to Average Ratio

Transmitter Peak to Average Ratio Result			
Mode	Ch.	Freq. (MHz)	Peak to Average Ratio (dB)
WCDMA850	4132	826.4	3.31
	4182	836.4	3.39
	4233	846.6	3.51
WCDMA1900	9262	1852.4	3.63
	9400	1880	2.73
	9538	1907.6	2.56
Limit			13
Result			Complied

3.3 Effective Radiated Power

3.3.1 Effective Radiated Power Limit

Cellular Band Effective Radiated Power (ERP) Limit

ERP $\leq$ 7W [38.45dBm] (EIRP 40.6dBm [135.8 dBuV/m at 3m]).

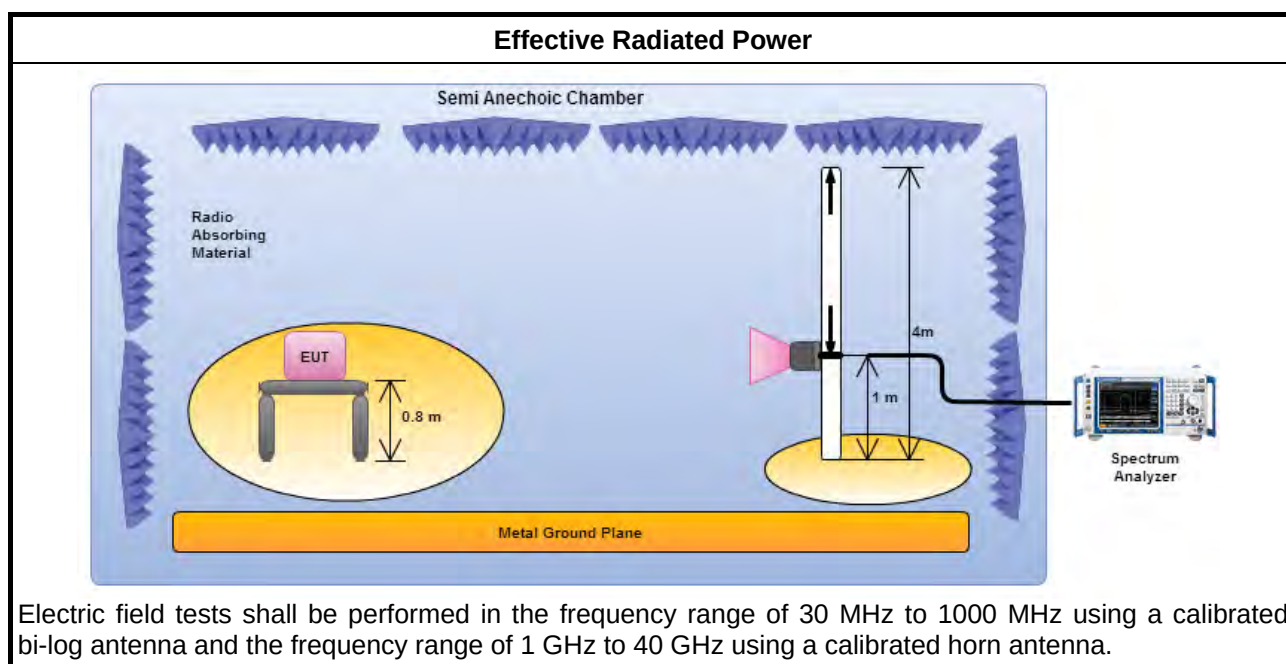
3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method	
☒	For wideband (> 1 MHz) digital transmission systems power measure following as KDB 971168.
☒	Effective Radiated Power (ERP)
☐	Refer as KDB 412172, clause 1.3.2 following as power approach. e.i.r.p.= $P_T + G_T$.
☒	Refer as KDB 412172, clause 1.3.1 following as field strength approach. e.i.r.p.= $(E \times d)^2 / 30$.
☒	Refer as KDB 412172, clause 1.4.4 ERP = EIRP - 2.15 dB.
☐	For radiated measurement.
☐	Refer as KDB 412172, clause 2.2 following eirp can be used radiated test configuration.
☒	Refer as KDB 412172, clause 5 following eirp can be directly determined using the field strength.
☐	Refer as KDB 412172, clause 6 following eirp can be used signal/antenna substitution techniques.
☐	Refer as ANSI/TIA-603-D-2010, clause 2.2.17 for radiated measurement.
☒	Refer as RSS-Gen, clause 4.8 for power measurement.

3.3.4 Test Setup



3.3.5 Test Result of Effective Radiated Power

E-Field method

Mode	Ch.	Freq. [MHz]	E-Field [dBuV/m] @3m	ERP [dBm]	ERP [W]	ERP Limit [dBm]	Margin [dB]	Pol [H/V]
WCDMA850	4132	826.4	111.45	14.10	0.026	38.45	24.35	V
	4182	836.4	114.21	16.86	0.049	38.45	21.59	V
	4233	846.6	113.79	16.44	0.044	38.45	22.01	V

Note 1: EUT was tested in all WCDMA/HSDPA configurations and the highest power is reported in 12.2 kbps RMC and TPC bits all set "1".

Note 2: EUT was tested with its standard battery.

Note 3: Measurement worst emissions of receive antenna polarization.

Note 4: $ERP [dBm] = E\text{-Field} [dBuV/m] - 95.2 - 2.15$; $E\text{-Field} [dBuV/m] = Raw [dBuV] + Factor [dB]$

3.4 Effective Isotropic Radiated Power

3.4.1 Effective Isotropic Radiated Power Limit

PCS Band and AWS Band Effective Isotropic Radiated Power (EIRP) Limit
PCS Band: EIRP $\leq$ 2W [33.01dBm] (128.2 dBuV/m at 3m) AWS Band: EIRP $\leq$ 1W [30.00dBm] (125.2 dBuV/m at 3m)

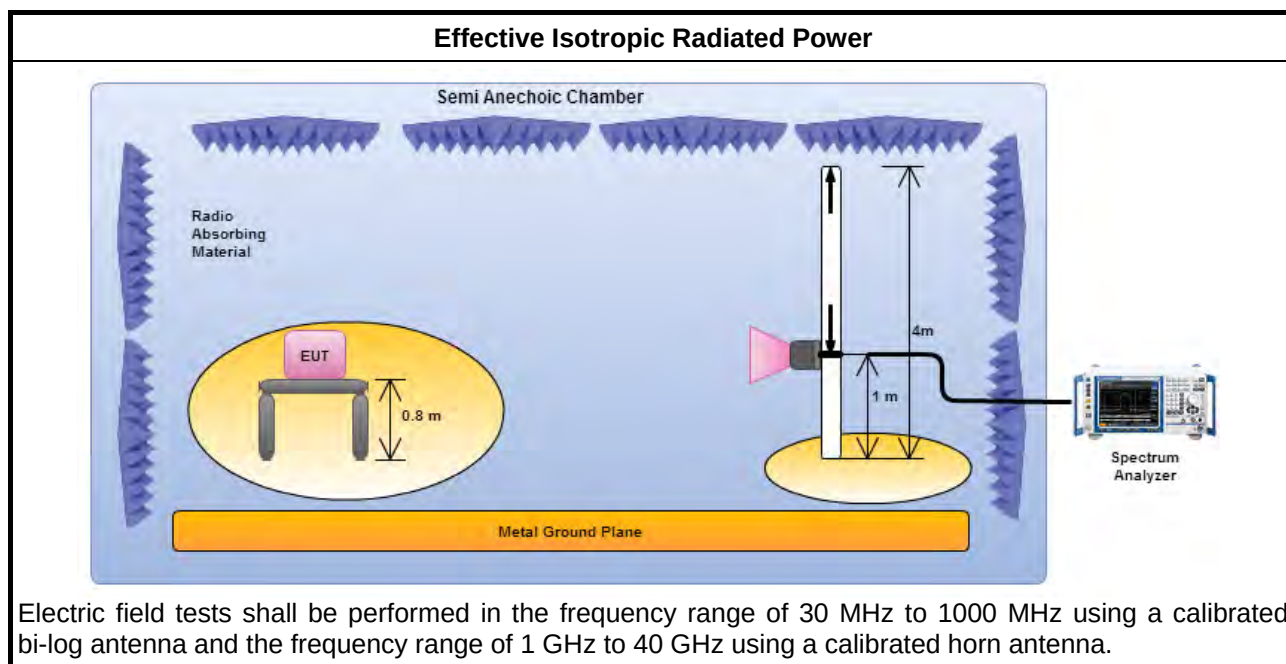
3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method	
☒	For wideband (> 1 MHz) digital transmission systems power measure following as KDB 971168.
☒	Effective Isotropic Radiated Power (EIRP)
☐	Refer as KDB 412172, clause 1.3.2 following as power approach. $e.i.r.p. = P_T + G_T$.
☒	Refer as KDB 412172, clause 1.3.1 following as field strength approach. $e.i.r.p. = (E \times d)^2 / 30$.
☐	For radiated measurement.
☐	Refer as KDB 412172, clause 2.2 following eirp can be used radiated test configuration.
☒	Refer as KDB 412172, clause 5 following eirp can be directly determined using the field strength.
☐	Refer as KDB 412172, clause 6 following eirp can be used signal/antenna substitution techniques.
☐	Refer as ANSI/TIA-603-D-2010, clause 2.2.17 for radiated measurement.
☒	Refer as RSS-Gen, clause 4.8 for power measurement.

3.4.4 Test Setup



3.4.5 Test Result of Effective Isotropic Radiated Power

E-Field method

Mode	Ch.	Freq. [MHz]	E-Field [dBuV/m] @3m	EIRP [dBm]	EIRP [W]	EIRP Limit [dBm]	Margin [dB]	Pol [H/V]
WCDMA1900	9262	1852.4	119.92	24.72	0.296	33.01	8.29	V
	9400	1880	118.32	23.12	0.205	33.01	9.89	V
	9538	1907.6	115.93	20.73	0.118	33.01	12.28	V

Note 1: EUT was tested in all WCDMA/HSDPA configurations and the highest power is reported in 12.2 kbps RMC and TPC bits all set "1".

Note 2: EUT was tested with its standard battery.

Note 3: Measurement worst emissions of receive antenna polarization.

Note 4: $EIRP [dBm] = E-Field [dBuV/m] - 95.2$; $E-Field [dBuV/m] = Raw [dBuV] + Factor [dB]$

3.5 Transmitter Conducted Unwanted Emissions

3.5.1 Transmitter Conducted Unwanted Emissions Limit

Transmitter Conducted Unwanted Emissions Limit

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $[43 + 10 \log (P)]$ (-13dBm).

3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

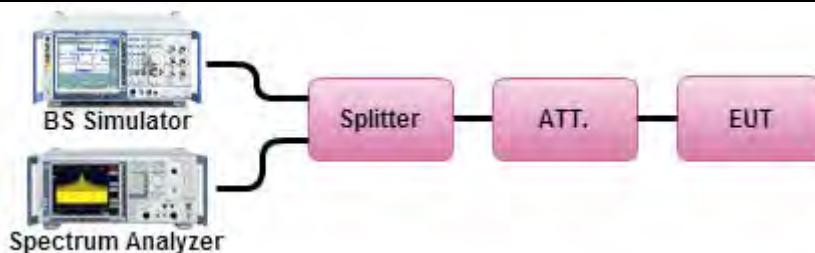
3.5.3 Test Procedures

Test Method

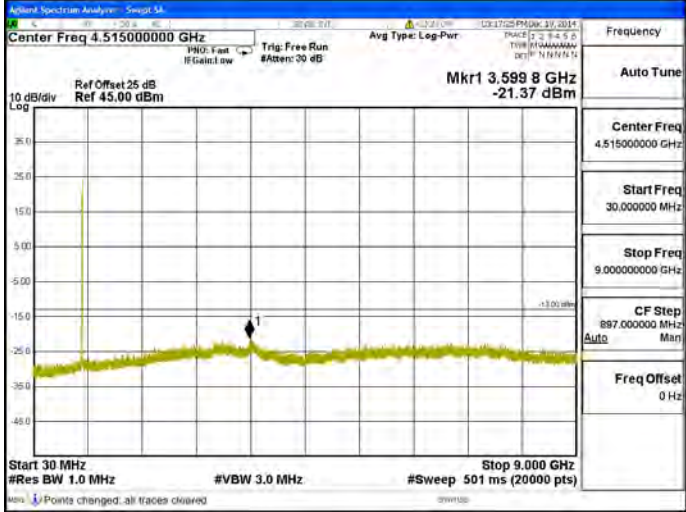
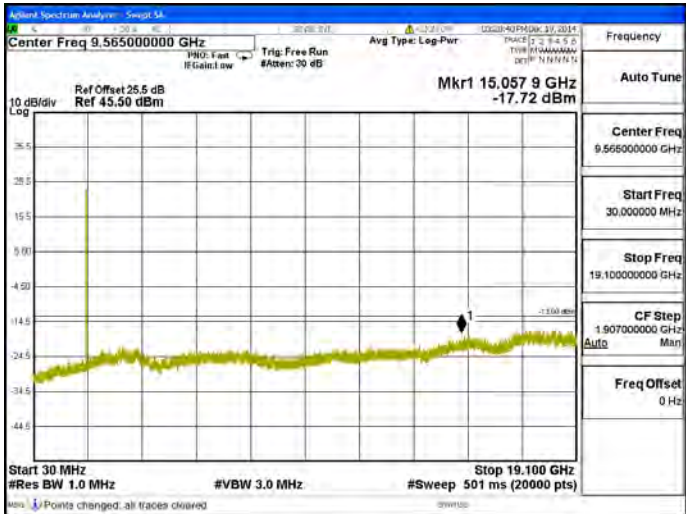
- ☒ Refer as ANSI/TIA-603-D-2010, clause 3.2.13 for conducted measurement.
- ☒ Refer as RSS-Gen, clause 4.9 for transmitter unwanted emissions measurement.
- ☐ In case a narrower measurement bandwidth was used, the following conversion formula has to be applied: (e.g. if reference bandwidth 1 MHz and measurement bandwidth 100 kHz, then measurement bandwidth conversion factor is 10 dB); $B = A + 10 \log (BW_{ref} / BW_{measured})$
 - A is the value at the narrower measurement bandwidth;
 - B is the value referred to the reference bandwidth;
 - Correction Factor(dB)= $10 \log (1\% \text{ Emission BW/RBW})$;
- ☒ For conducted measurement.
 - ☒ For conducted measurements on devices with single transmit chain.
 - ☐ For conducted measurements on devices with multiple transmit chains using options given below:
 - ☐ Option 1: measure and sum the spectra across the transmitter outputs.
 - ☐ Option 2: N transmitter outputs, then spurious emissions limits on each individual output. Measure and add 10 log (N) dB.

3.5.4 Test Setup

Transmitter Conducted Unwanted Emissions



3.5.5 Test Result of Transmitter Conducted Unwanted Emissions

Transmitter Conducted Unwanted Emissions		Mode	WCDMA850
Channel	4182	Test Range	30 MHz - 10 harmonic
			
Transmitter Conducted Unwanted Emissions		Mode	WCDMA1900
Channel	9400	Test Range	30 MHz - 10 harmonic
			

Note: "ALIGN OFF" means that we turn off the auto align. We align the spectrum at each time before test.

3.6 Transmitter Conducted Bandedge Emissions

3.6.1 Transmitter Conducted Bandedge Emissions Limit

Transmitter Conducted Bandedge Emissions Limit
Cellular Band: (i) In the first 1.0 MHz band immediately outside frequency block, the power of emissions per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log(P)$ (watts) (-13dBm). (ii) After the first 1.0 MHz immediately outside frequency block, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log(P)$ (watts) (-13dBm). If the measurement is performed using 1% of the emission bandwidth, power integration over 100 kHz is required. PCS/AWS Band: (i) In the 1.0 MHz bands immediately outside frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log(P)$ (watts) (-13dBm). (ii) After the first 1.0 MHz immediately outside frequency block, the power of emissions in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log(P)$ (watts) (-13dBm). If the measurement is performed using 1% of the occupied bandwidth, power integration over 1 MHz is required.

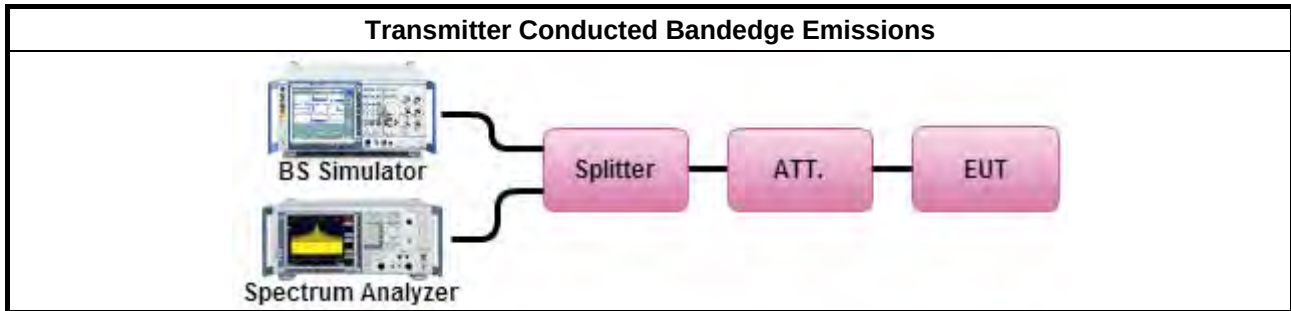
3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

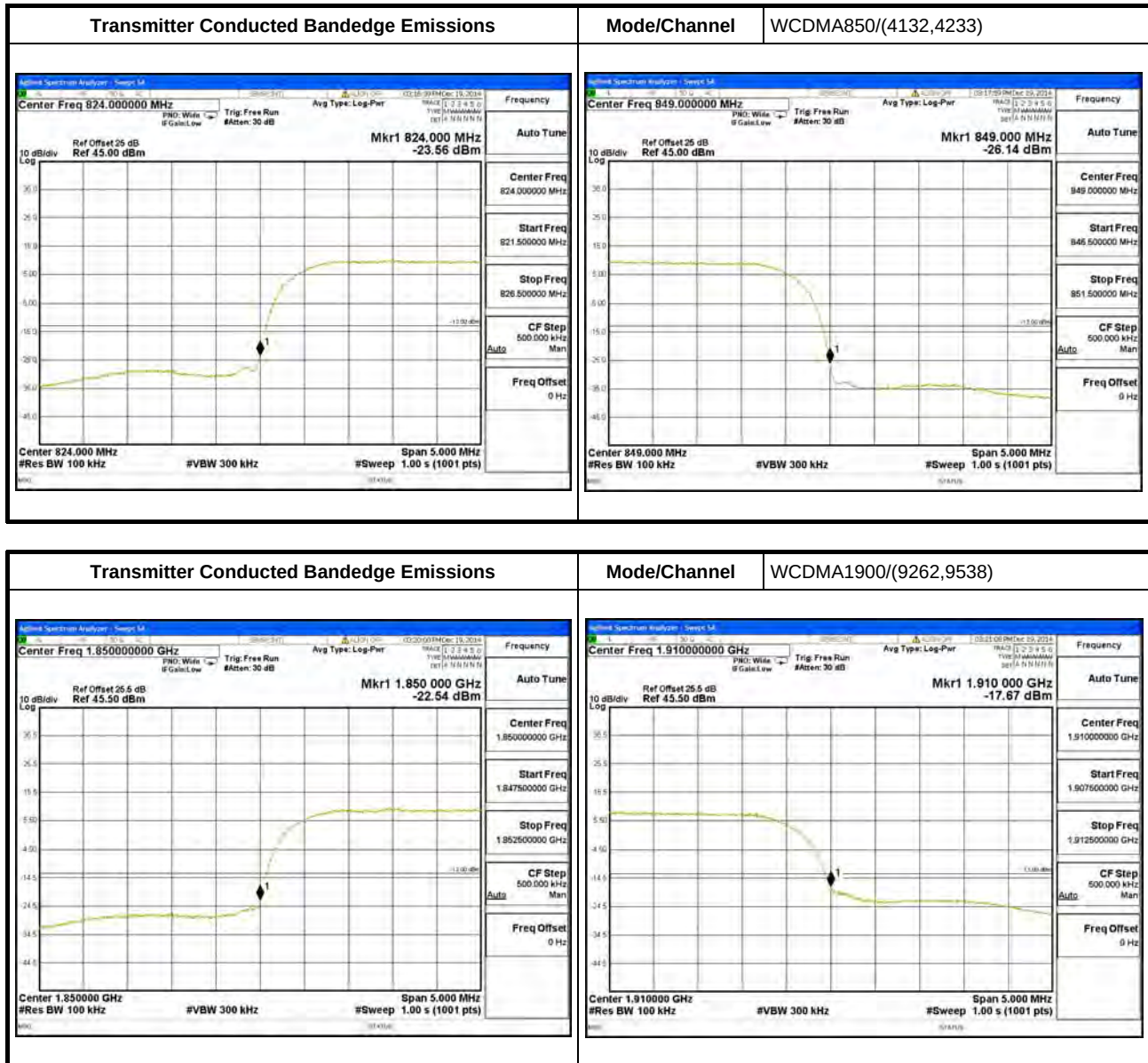
3.6.3 Test Procedures

Test Method		
☒ Refer as ANSI/TIA-603-D-2010, clause 3.2.13 for conducted measurement.		
☒ Refer as RSS-Gen, clause 4.9 for transmitter unwanted emissions measurement.		
☒ In case a narrower measurement bandwidth was used, the following conversion formula has to be applied: (e.g. if reference bandwidth 1 MHz and measurement bandwidth 100 kHz, then measurement bandwidth conversion factor is 10 dB); $B = A + 10 \log (BW_{ref} / BW_{measured})$ • A is the value at the narrower measurement bandwidth; • B is the value referred to the reference bandwidth; • Correction Factor(dB)= $10\log(1\% \text{ Emission BW/RBW})$;		
☒ For conducted measurement.		
☒ For conducted measurements on devices with single transmit chain. ☐ For conducted measurements on devices with multiple transmit chains using options given below: <table border="1" data-bbox="204 1615 1441 1736"> <tr> <td>☐ Option 1: measure and sum the spectra across the transmitter outputs.</td></tr> <tr> <td>☐ Option 2: N transmitter outputs, then spurious emissions limits on each individual output. Measure and add $10 \log (N)$ dB.</td></tr> </table>	☐ Option 1: measure and sum the spectra across the transmitter outputs.	☐ Option 2: N transmitter outputs, then spurious emissions limits on each individual output. Measure and add $10 \log (N)$ dB.
☐ Option 1: measure and sum the spectra across the transmitter outputs.		
☐ Option 2: N transmitter outputs, then spurious emissions limits on each individual output. Measure and add $10 \log (N)$ dB.		

3.6.4 Test Setup



3.6.5 Test Result of Transmitter Conducted Bandedge Emissions



Note: "ALIGN OFF" means that we turn off the auto align. We align the spectrum at each time before test.

3.7 Transmitter Radiated Unwanted Emissions

3.7.1 Transmitter Radiated Unwanted Emissions Limit

Transmitter Radiated Unwanted Emissions Limit
The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $[43 + 10 \log (P)]$ (EIRP -13dBm).

3.7.2 Measuring Instruments

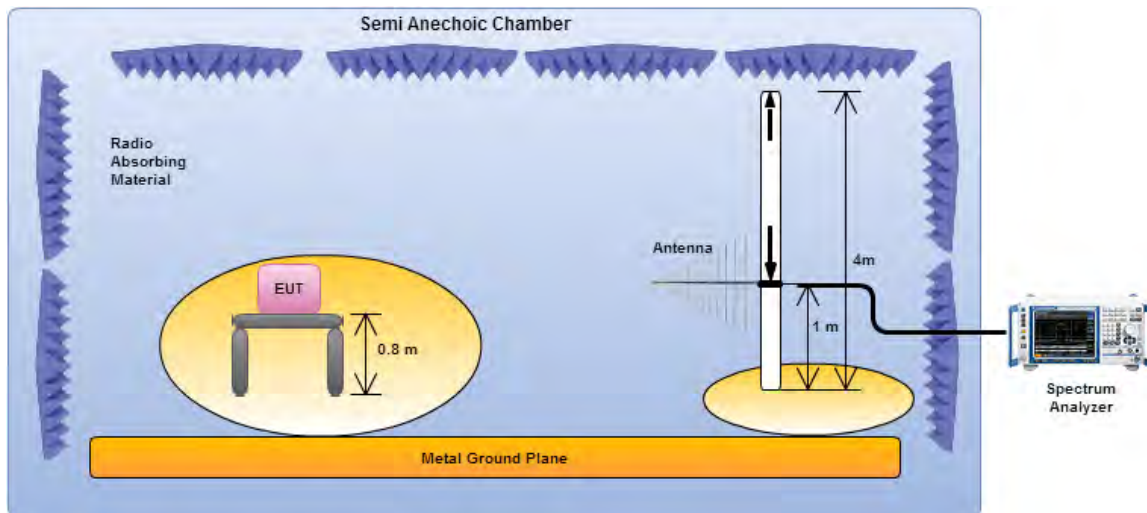
Refer a test equipment and calibration data table in this test report.

3.7.3 Test Procedures

Test Method
☒ Refer as ANSI/TIA-603-D-2010, clause 3.2.12 for radiated measurement.
☒ Refer as RSS-Gen, clause 4.9 for transmitter unwanted emissions measurement.
☐ In case a narrower measurement bandwidth was used, the following conversion formula has to be applied: (e.g. if reference bandwidth 1 MHz and measurement bandwidth 100 kHz, then measurement bandwidth conversion factor is 10 dB) $B = A + 10 \log (BW_{ref} / BW_{measured})$ • A is the value at the narrower measurement bandwidth; • B is the value referred to the reference bandwidth; • Correction Factor(dB)= $10 \log (1\% \text{ Emission BW/RBW})$;
☒ Effective Isotropic Radiated Power (EIRP)
☐ Refer as KDB 412172, clause 1.3.2 following as power approach. $e.i.r.p. = P_T + G_T$. ☒ Refer as KDB 412172, clause 1.3.1 following as field strength approach. $e.i.r.p. = (E \times d)^2 / 30$.
☐ For radiated measurement.
☐ Refer as KDB 412172, clause 2.2 following eirp can be used radiated test configuration. ☒ Refer as KDB 412172, clause 5 following eirp can be directly determined using the field strength. ☐ Refer as KDB 412172, clause 6 following eirp can be used signal/antenna substitution techniques. ☐ Refer as ANSI/TIA-603-D-2010, clause 2.2.12 for radiated measurement.

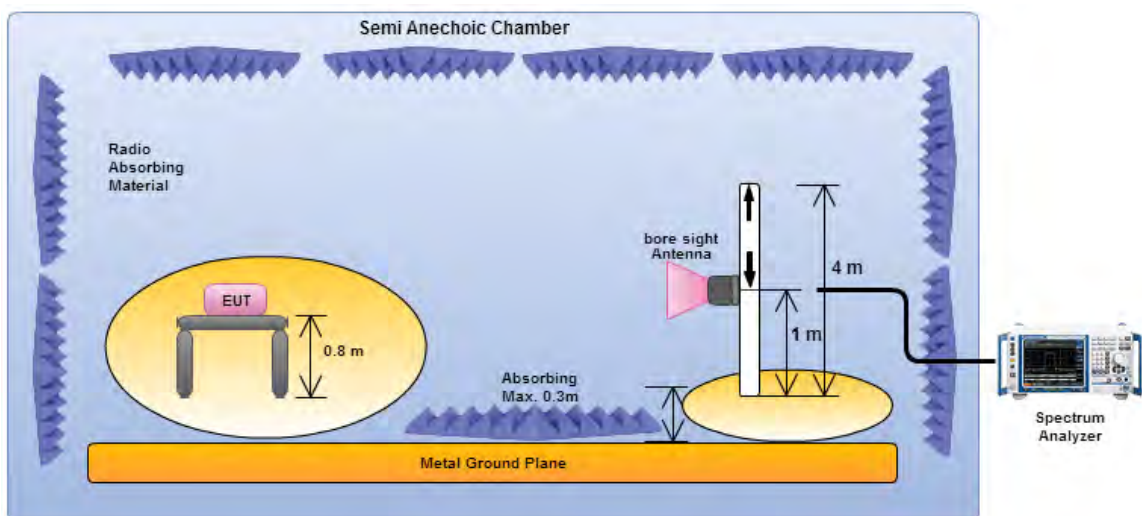
3.7.4 Test Setup

Transmitter Radiated Unwanted Emissions (below 1GHz)

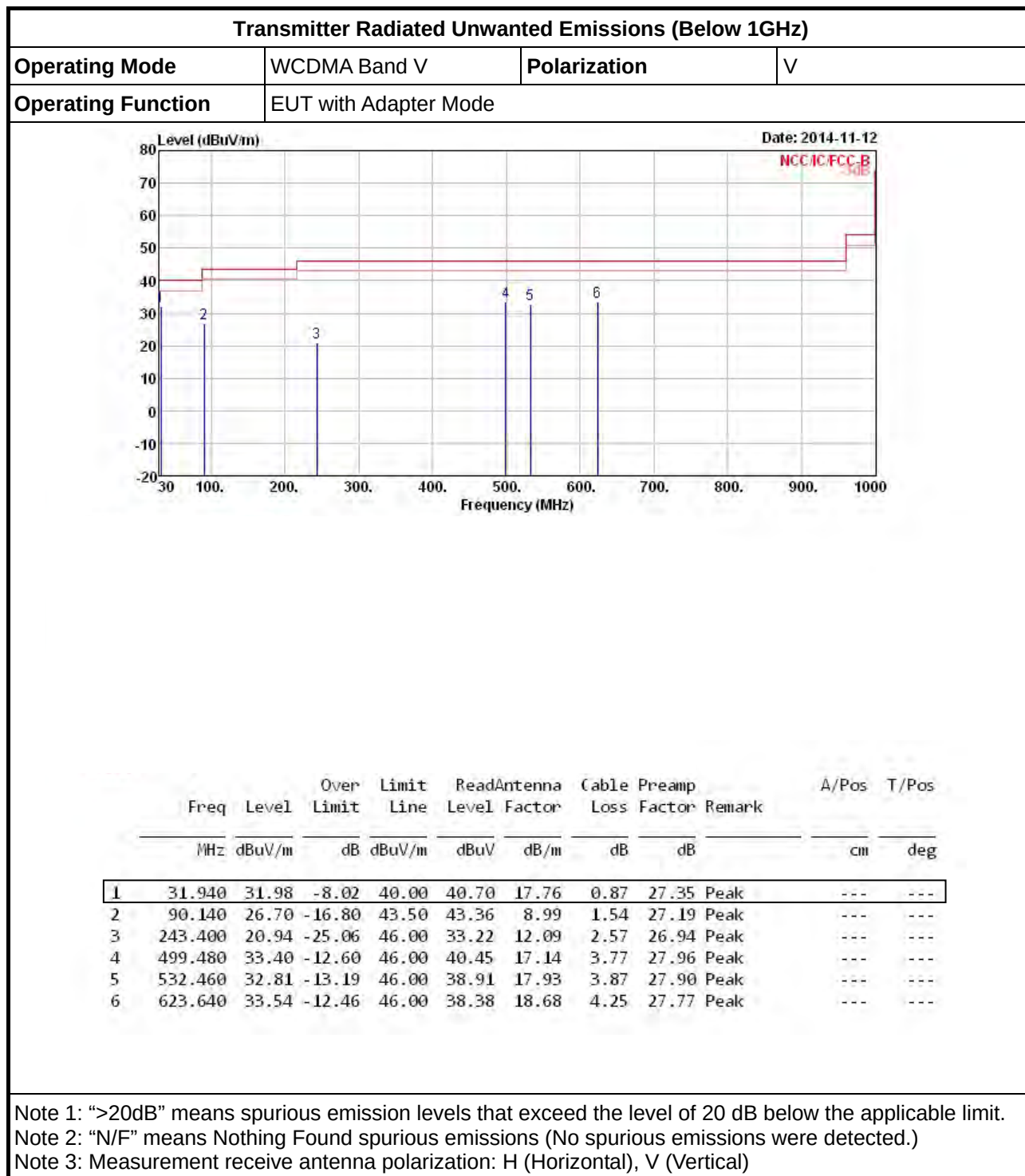


Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna. Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

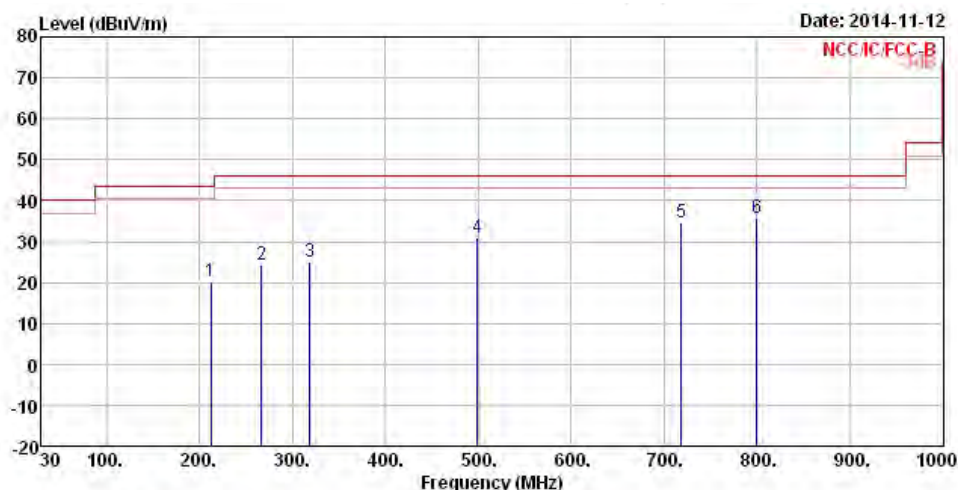


Electric field tests shall be performed in the frequency range of 1 GHz to 10th harmonic of highest fundamental frequency or 40 GHz using a calibrated horn antenna.

3.7.5 Test Result of Transmitter Radiated Unwanted Emissions (Below 1GHz)


Transmitter Radiated Unwanted Emissions (Below 1GHz)

Operating Mode	WCDMA Band V	Polarization	H
Operating Function	EUT with Adapter Mode		



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	212.360	20.36	-23.14	43.50	35.56	9.48	2.40	27.08	Peak	---	---
2	266.680	24.28	-21.72	46.00	35.16	13.24	2.71	26.83	Peak	---	---
3	319.060	25.20	-20.80	46.00	35.36	13.66	2.98	26.80	Peak	---	---
4	499.480	30.91	-15.09	46.00	37.96	17.14	3.77	27.96	Peak	---	---
5	718.700	34.58	-11.42	46.00	38.56	19.18	4.60	27.76	Peak	---	---
6	800.180	35.79	-10.21	46.00	38.86	19.64	4.92	27.63	Peak	---	---

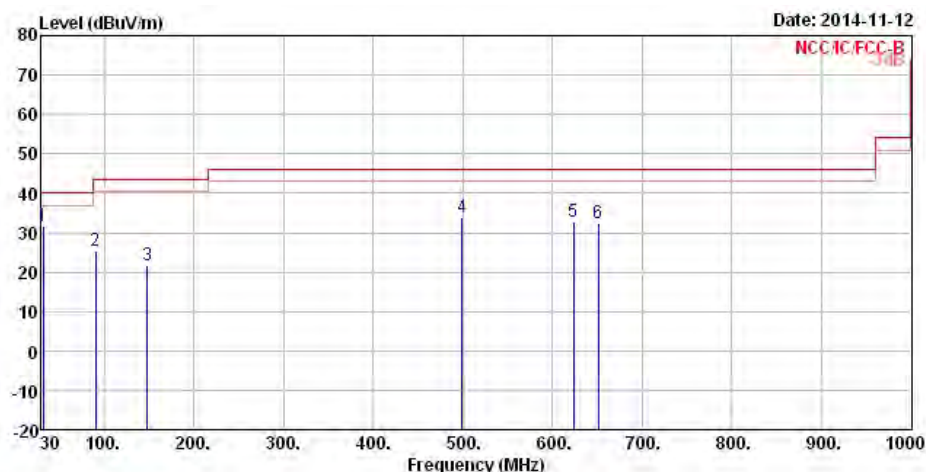
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Unwanted Emissions (Below 1GHz)

Operating Mode	WCDMA Band II	Polarization	V
Operating Function	EUT with Adapter Mode		



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	31.940	31.59	-8.41	40.00	40.31	17.76	0.87	27.35	Peak	---	---
2	90.140	25.55	-17.95	43.50	42.21	8.99	1.54	27.19	Peak	---	---
3	148.340	21.70	-21.80	43.50	36.17	10.68	2.01	27.16	Peak	---	---
4	499.480	33.95	-12.05	46.00	41.00	17.14	3.77	27.96	Peak	---	---
5	623.640	32.72	-13.28	46.00	37.56	18.68	4.25	27.77	Peak	---	---
6	650.800	32.36	-13.64	46.00	36.98	18.81	4.35	27.78	Peak	---	---

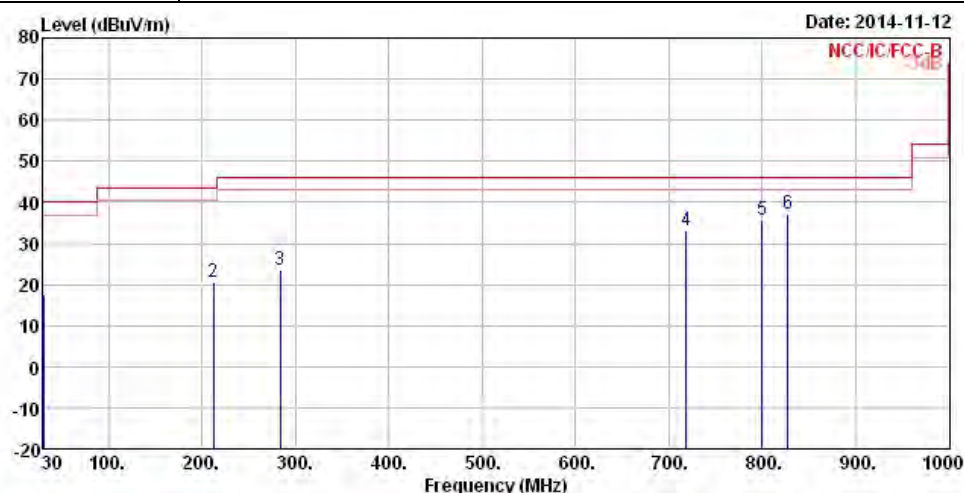
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Unwanted Emissions (Below 1GHz)

Operating Mode	WCDMA Band II	Polarization	H
Operating Function	EUT with Adapter Mode		



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	A/Pos	T/Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	30.000	17.55	-22.45	40.00	25.27	18.85	0.82	27.39	Peak	---	---
2	212.360	20.41	-23.09	43.50	35.61	9.48	2.40	27.08	Peak	---	---
3	284.140	23.68	-22.32	46.00	34.72	12.90	2.81	26.75	Peak	---	---
4	718.700	33.19	-12.81	46.00	37.17	19.18	4.60	27.76	Peak	---	---
5	800.180	35.67	-10.33	46.00	38.74	19.64	4.92	27.63	Peak	---	---
6	827.340	37.06	-8.94	46.00	39.56	20.11	4.93	27.54	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

3.7.6 Test Result of Transmitter Radiated Unwanted Emissions (Above 1GHz)

E-Field method

WCDMA850				Mod.	12.2 kbps RMC			Config.	standard battery		
Mode											
Ch.	4132			Ch.	4182			Ch.	4233		
Freq.	826.4			Freq.	836.4			Freq.	846.6		
Freq. [MHz]	E-Field [dBuV/m] @3m	EIRP [dBm]	Pol [H/V]	Freq. [MHz]	E-Field [dBuV/m] @3m	EIRP [dBm]	Pol [H/V]	Freq. [MHz]	E-Field [dBuV/m] @3m	EIRP [dBm]	Pol [H/V]
1652.8	57.59	-37.61	V	1672.8	58.51	-36.69	H	1693.2	57.09	-38.11	H
2479.2	59.14	-36.06	V	2509.2	53.93	-41.27	H	2539.8	54.81	-40.39	V
3305.6	50.28	-44.92	V	3345.6	50.23	-44.97	V	3386.4	49.83	-45.37	V
4132.0	-	-	-	4182	-	-	-	4233.0	-	-	-
4958.4	-	-	-	5018.4	-	-	-	5079.6	-	-	-
5784.8	-	-	-	5854.8	-	-	-	5926.2	-	-	-
6611.2	-	-	-	6691.2	-	-	-	6772.8	-	-	-
7437.6	-	-	-	7527.6	-	-	-	7619.4	-	-	-
8264.0	-	-	-	8364	-	-	-	8466.0	-	-	-
Limit [dBm]		-13		Limit [dBm]		-13		Limit [dBm]		-13	
Note 1: Measurement worst emissions of receive antenna polarization											
Note 2: EIRP [dBm] = E-Field [dBuV/m] - 95.2; E-Field [dBuV/m] = Raw [dBuV] + Factor [dB]											
Note 3: Other spurious emissions (30MHz - 10 th harmonic) that exceed the level of 20 dB below the applicable limit.											

Mode	WCDMA1900			Mod.	12.2 kbps RMC			Config.	standard battery		
Ch.	9262			Ch.	9400			Ch.	9538		
Freq.	1852.4			Freq.	1880.0			Freq.	1907.6		
Freq. [MHz]	E-Field [dBuV/m] @3m	EIRP [dBm]	Pol [H/V]	Freq. [MHz]	E-Field [dBuV/m] @3m	EIRP [dBm]	Pol [H/V]	Freq. [MHz]	E-Field [dBuV/m] @3m	EIRP [dBm]	Pol [H/V]
3704.8	61.12	-34.08	H	3760	53.72	-41.48	V	3815.2	59.85	-35.35	V
5557.2	56.62	-38.58	V	5640	60.57	-34.63	V	5722.8	67.85	-27.35	V
7409.6	61.56	-33.64	H	7520	60.81	-34.39	H	7630.4	61.80	-33.40	H
9262	-	-	-	9400	-	-	-	9538	-	-	-
11114.4	-	-	-	11280	-	-	-	11445.6	-	-	-
12966.8	-	-	-	13160	-	-	-	13353.2	-	-	-
14819.2	-	-	-	15040	-	-	-	15260.8	-	-	-
16671.6	-	-	-	16920	-	-	-	17168.4	-	-	-
18524	-	-	-	18800	-	-	-	19076	-	-	-
Limit [dBm]		-13		Limit [dBm]		-13		Limit [dBm]		-13	
Note 1: Measurement worst emissions of receive antenna polarization											
Note 2: EIRP [dBm] = E-Field [dBuV/m] - 95.2; E-Field [dBuV/m] = Raw [dBuV] + Factor [dB]											
Note 3: Other spurious emissions (30MHz - 10 th harmonic) that exceed the level of 20 dB below the applicable limit.											

3.8 Frequency Stability

3.8.1 Frequency Stability Limit

Frequency Stability Limit	
☒	The transmitter center frequency stability shall be ± 2.5 ppm maximum. The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.
☒	Temperature:
☒	-30°C to +50°C in 10°C step.
☒	If the EUT cannot be turned on at -30°C, the testing lowest temperature will be raised in 10°C step until the EUT can be turned on.
☒	Voltage:
☒	For non hand-carried battery and AC powered equipment: 85% to 115% of the nominal value
☒	For hand-carried, battery-powered equipment: Voltage is reduced to the battery operating end point which shall be specified by the manufacturer.
Note 1: These measurements shall also be performed at normal and extreme test conditions.	

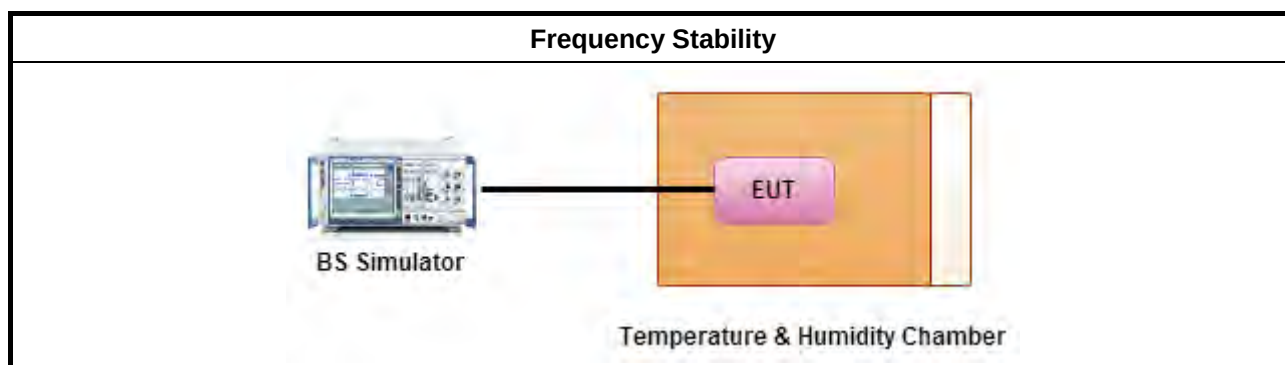
3.8.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.8.3 Test Procedures

Test Method	
☒	Refer as ANSI/TIA-603-D-2010, clause 3.2.2 for frequency stability tests
☒	Refer as RSS-Gen, clause 4.7 for transmitter frequency stability measurement.
☒	Frequency stability with respect to ambient temperature
☒	Frequency stability when varying supply voltage
☒	For conducted measurement.
☒	For conducted measurements on devices with multiple transmit chains: Measurements need only to be performed on one of the active transmit chains (antenna outputs)
☐	For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.

3.8.4 Test Setup



3.8.5 Test Result of Frequency Stability

Mode		WCDMA850		WCDMA1900	
Channel		4182		9400	
Frequency (MHz)		836.4		1880.0	
Temp. (°C)	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (Hz)	Frequency Error (ppm)
50	7.4	-4.7	-0.0056	-6.29	-0.0033
40	7.4	-3.32	-0.0040	-6.96	-0.0037
30	7.4	-10.46	-0.0125	-9.96	-0.0053
20	7.4	-2.7	-0.0032	-8.22	-0.0044
10	7.4	-9.21	-0.0110	-5.96	-0.0032
0	7.4	-11.76	-0.0141	-8.91	-0.0047
-10	7.4	-10.46	-0.0125	-9.96	-0.0053
-20	7.4	-10.43	-0.0125	-7.62	-0.0041
-30	7.4	-5.21	-0.0062	-5.96	-0.0032
20	8.4	-4.96	-0.0059	-6.24	-0.0033
20	7.4	-2.7	-0.0032	-8.22	-0.0044
20	6	-4.26	-0.0051	-4.88	-0.0026
Limit [ppm]		± 2.5			

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV 40	101013	9KHz~40GHz	Jan. 25, 2014	RF Conducted
AC Power Source	G.W	APS-9102	EL920581	AC 0V ~ 300V	Jul. 15, 2014	RF Conducted
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jul. 31, 2014	RF Conducted
Power Sensor	Anritsu	MA2411B	0917017	300MHz ~ 40GHz	Jan. 28, 2014	RF Conducted
Power Meter	Anritsu	ML2495A	0949003	300MHz ~ 40GHz	Jan. 28, 2014	RF Conducted

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Nov. 30, 2013	Radiation
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	May 05, 2014	Radiation
Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	Sep. 01, 2014	Radiation
Spectrum	R&S	FSP40	100004	9kHz ~ 40GHz	Mar. 27, 2014	Radiation
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 20, 2014	Radiation
Horn Antenna	ETS • LINDGREN	3115	6741	1GHz ~ 18GHz	Jun. 11, 2014	Radiation
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 10, 2014	Radiation
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 16, 2013	Radiation
RF Cable-high	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz ~ 40GHz	Dec. 11, 2013	Radiation
Turn Table	EM Electronics	EM Electronics	060615	0 ~ 360 degree	N/A	Radiation
Antenna Mast	MF	MF-7802	MF780208179	1 ~ 4 m	N/A	Radiation

Note: Calibration Interval of instruments listed above is one year.