



FCC Test Report

Equipment : 7" Rugged Tablet Computer
Brand Name : AAEON
Model No. : xxxRTC-700C-TAy-WBGzxxx-xxxx
1. xxx=TF-(TF: Toxic Free) or blank
2. y is for Touch version , ex: A=rev1, y:A~Z
3. z is blank or H, blank means without 3G function; H means with 3G function
4. xxx is for marketing purpose
5. xxxx=SW revision, ex: 1110=rev1, x:0~9
FCC ID : OHBRTC700CWBGB
FCC Standard : 47 CFR FCC Part 22(H), 24(E)
WCDMA Band : II, V
FCC Classification : PCB
Applicant : AAEON Technology Inc.
Manufacturer : 5F, No. 135, Lane 235, Pao Chiao Rd.,
Hsin-Tien Dist., New Taipei City,
Taiwan, R.O.C

The product sample received on Jul. 13, 2014 and completely tested on Aug. 13, 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:


Wayne Hsu / Assistant Manager



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APPENDIX A. TEST PHOTOS

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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=4.16MHz	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: 22.35 PCS: 21.80	Information for RF exposure	Complied
3.2.7	24.232(d) 27.50(d)	Peak to Average Ratio	3.61dB	≤13dB	Complied
3.3	22.913(a)	Effective Radiated Power (ERP)	ERP [dBm] Cellular: 23.19	≤7W[38.45dBm]	Complied
3.4	24.232(c) 27.50(d)	Effective Isotropic Radiated Power (EIRP)	EIRP [dBm] PCS: 27.16	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]: 7630.4MHz -33.76 (Margin 20.76dB)	≤43+10log(P) [-13dBm] P=TX Power in Watts	Complied
3.8	2.1055 22.355 24.353 27.54	Frequency Stability	Cellular: 0.025ppm PCS: 0.010ppm	≤2.5ppm within band	Complied

Revision History

[illegible]

1 General Description

1.1 Information

1.1.1 RF General Information

Function	Power Class	Category
<input checked="" type="checkbox"/> HSDPA	3	10
<input checked="" type="checkbox"/> HSUPA	3	6

1.1.2 Antenna Information

Antenna Category	
<input type="checkbox"/>	Equipment placed on the market without antennas
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input checked="" type="checkbox"/>	Temporary RF connector provided
<input type="checkbox"/>	<input type="checkbox"/> 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.
<input type="checkbox"/>	External antenna (dedicated antennas)
<input type="checkbox"/>	RF connector provided
<input type="checkbox"/>	<input type="checkbox"/> Unique antenna connector. (e.g., MMCX, U.FL, IPX, and RP-SMA, RP-N type...)
<input type="checkbox"/>	<input type="checkbox"/> Standard antenna connector. (e.g., SMA, N, BNC, and TNC type...)

Antenna General Information			
No.	Ant. Cat.	Ant. Type	Gain (dBi)
1	Integral	PIFA	-1.2

1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	N/A
HW Ver. / FW Ver.	N/A
Presentation of Equipment	<input checked="" type="checkbox"/> Production ; <input type="checkbox"/> Pre-Production ; <input type="checkbox"/> Prototype
Type of EUT	
<input checked="" type="checkbox"/>	Stand-alone
<input type="checkbox"/>	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.: ...
<input type="checkbox"/>	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: ...
<input type="checkbox"/>	Other:

1.1.4 EUT Operational Condition

Supply Voltage	<input checked="" type="checkbox"/> AC mains	<input checked="" type="checkbox"/> DC	
Type of DC Source	<input type="checkbox"/> Internal DC supply	<input checked="" type="checkbox"/> External AC adapter	<input checked="" type="checkbox"/> Battery
Test Voltage	<input checked="" type="checkbox"/> Vnom (7.4 V)	<input checked="" type="checkbox"/> Vmax (8.4 V)	<input checked="" type="checkbox"/> Vmin (6 V)
Test Climatic	<input checked="" type="checkbox"/> Tnom (20°C)	<input checked="" type="checkbox"/> Tmax (50°C)	<input checked="" type="checkbox"/> Tmin (-30°C)

1.2 Accessories and Support Equipment

Accessories				
AC Adapter	Brand Name	LTE	Model Name	LTE24E-S2-2
	Power Rating	I/P: 100-240V $\overline{\sim}$ 1A ; O/P: 12V $\overline{\sim}$ 2A		
	DC Power Cable	1.8 meter, non-shielded cable, without ferrite core		
Battery	Brand Name	JHT	Model Name	J1067
	Power Rating	7.4 Vdc, 3700 mAh	Type	Li-ion
LCD Panel	Brand Name	CHIMEI	Model Name	N070ICG-LD1

Support Equipment			
No.	Equipment	Brand Name	Model Name
1	Base Station (Remote)	R&S	CMU200

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 D01 v02r01
- ♦ FCC KDB 662911 D01 v02r01
- ♦ FCC KDB 412172 D01 v01

1.4 Testing Location Information

Testing Location			
<input checked="" type="checkbox"/>	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 Condition		Test Site No.	Test Engineer
AC Conduction		CO04-HY	Zeus
RF Conducted		TH01-HY	Ian
Radiated Emission		03CH03-HY	Allen
		Test Environment	
		25°C / 46%	
		23.1°C / 60%	
		24.6°C / 49%	

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
AC power-line conducted emissions		±2.2 dB
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 %

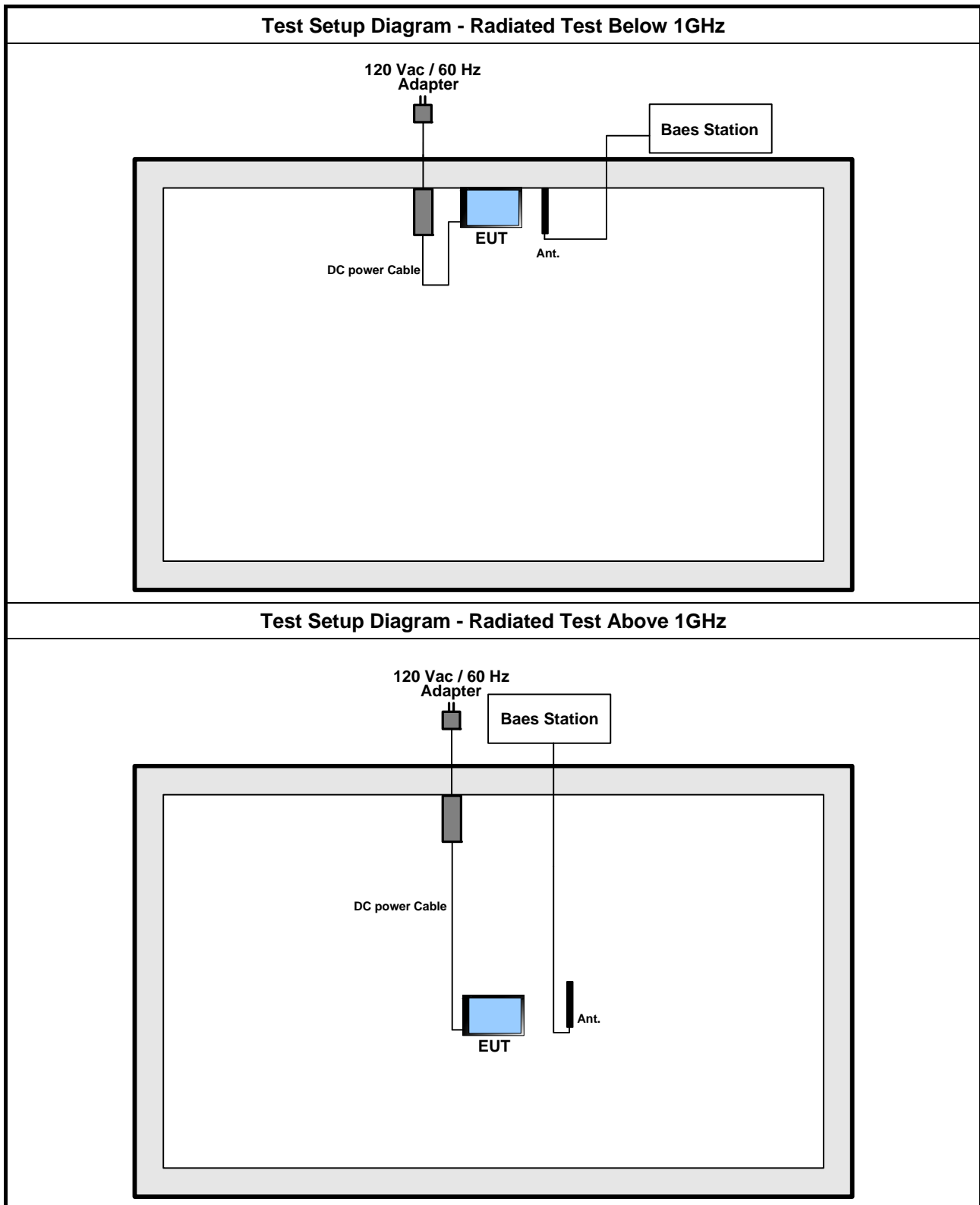
2 Test Configuration of EUT

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	<input type="checkbox"/> EUT will be placed in fixed position.		
	<input type="checkbox"/> EUT will be placed in mobile position and operating multiple positions.		
	<input checked="" type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. The worst planes is X.		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			

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.	

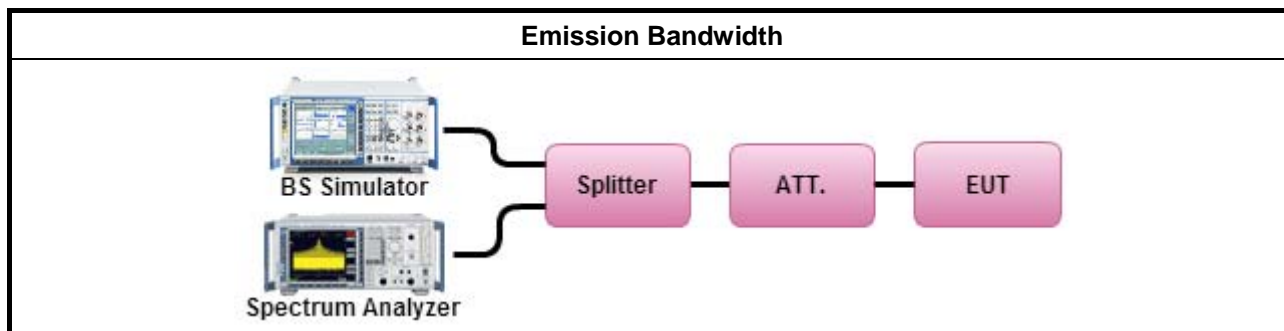
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/> For the emission bandwidth shall be measured using one of the options below:	
<input checked="" type="checkbox"/>	Refer as ANSI/TIA-603-D, clause 1.3.4.4 for test bandwidth.
<input checked="" type="checkbox"/>	Refer as KDB 971168, clause 3 for signal bandwidth.
<input type="checkbox"/>	Refer as IC RSS-Gen, clause 6.4 for emission bandwidth.
<input checked="" type="checkbox"/> For conducted measurement.	
<input checked="" type="checkbox"/>	If EUT supports single transmit chain and measurements performed on this transmit chain.
<input type="checkbox"/>	If EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
<input type="checkbox"/>	If EUT supports multiple transmit chains using options given below:
<input type="checkbox"/>	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.
<input type="checkbox"/>	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.
<input type="checkbox"/> 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



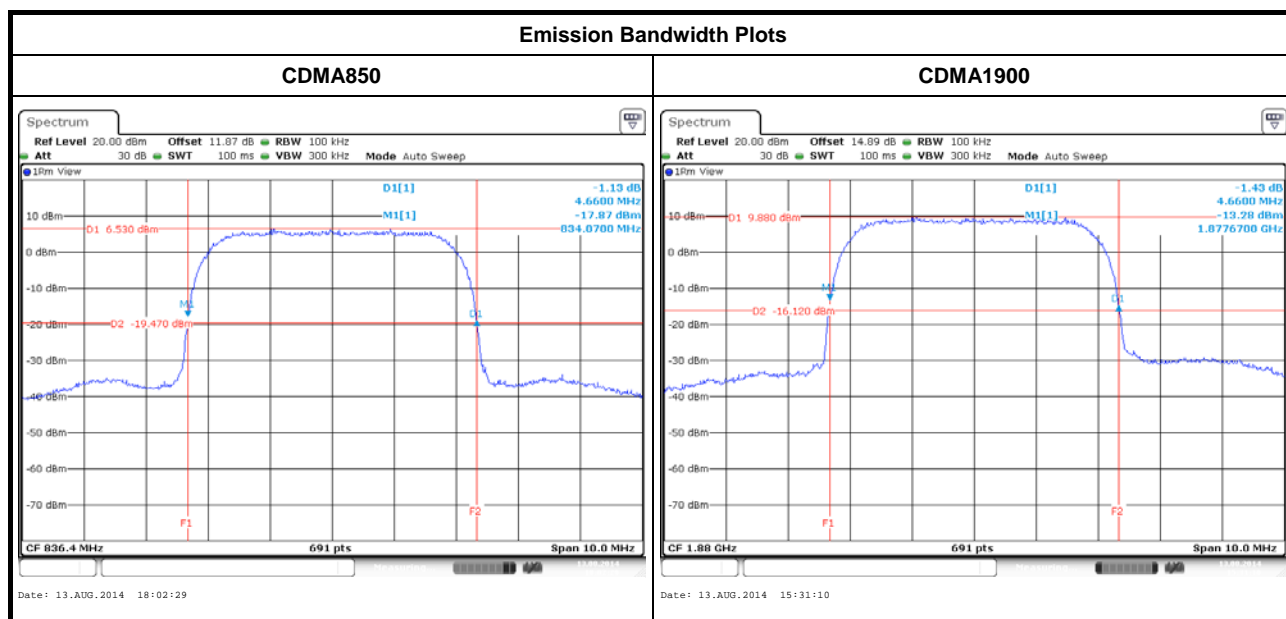
3.1.5 Test Result of Emission Bandwidth

Emission Bandwidth Result				
Mode	Ch.	Freq. (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
WCDMA850	4182	836.4	4.16	4.66
WCDMA1900	9400	1880	4.16	4.66
Limit			N/A	
Result			Complied	

3.1.6 Emission Designator

Emission Designator	
Mode	Emission Designator
WCDMA850	4M16F9W
WCDMA1900	4M16F9W

Note 1: WCDMA 99% BW, F = Frequency Modulation, 9 = Composite Digital Info, W = Combination (Audio/Data)



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

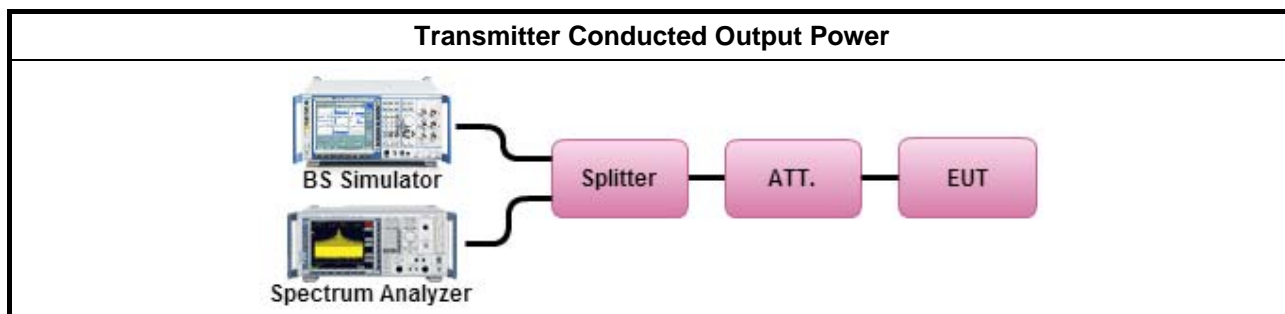
3.2.3 Measuring Instruments

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

3.2.4 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Transmitter Conducted Output Power
<input type="checkbox"/>	Refer as FCC KDB 941225 D03 for GSM GPRS EDGE modes.
<input type="checkbox"/>	Refer as FCC KDB 941225 D04 for GSM/(E)GPRS Dual Transfer Mode.
<input checked="" type="checkbox"/>	Refer as FCC KDB 941225 D01 for 3G device modes.
<input type="checkbox"/>	Refer as FCC KDB 941225 D02 for 3GPP R6 and R7 additional information.
<input type="checkbox"/>	Refer as FCC KDB 941225 D05 for LTE modes.
<input type="checkbox"/>	Refer as RSS-Gen, clause 4.8 for power measurement.
<input checked="" type="checkbox"/>	Transmitter Peak-Average Ratio
<input checked="" type="checkbox"/>	For WCDMA signals refer as KDB 971168, clause 6 for CCDF function.
<input type="checkbox"/>	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.
<input checked="" type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	If EUT supports single transmit chain and measurements performed on this transmit chain.
<input type="checkbox"/>	If EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
<input type="checkbox"/>	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

Mode	Subtest	RF Output Power [dBm]						MPR [dB]
		Band V (Cellular)			Band II (PCS)			
		4132	4182	4233	9262	9400	9538	
WCDMA	12.2 kbps RMC	22.35	22.34	22.28	21.71	21.80	21.74	-

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	4182	836.4	3.61
WCDMA1900	9400	1880	3.05
Limit			13
Result			Complied

3.3 Effective Radiated Power

3.3.1 Effective Radiated Power Limit

Cellular Band Effective Radiated Power (ERP) Limit
ERP ≤ 7W [38.45dBm] (EIRP 40.6dBm [135.8 dBuV/m at 3m]).

3.3.2 Measuring Instruments

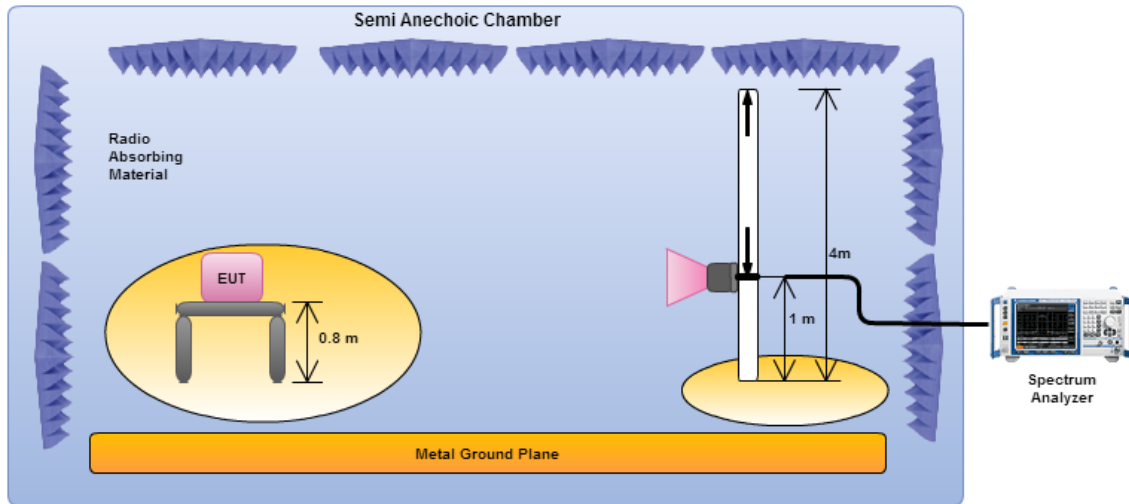
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

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

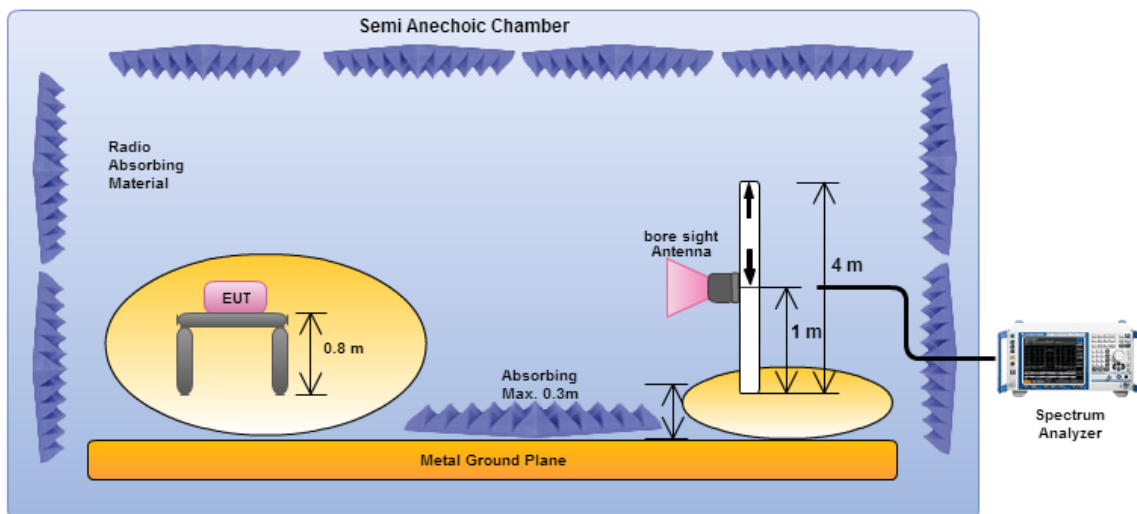
3.3.4 Test Setup

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.

3.3.5 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	118.54	21.19	0.132	38.45	17.26	H
	4182	836.4	117.88	20.53	0.113	38.45	17.92	H
	4233	846.6	120.54	23.19	0.208	38.45	15.26	H

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

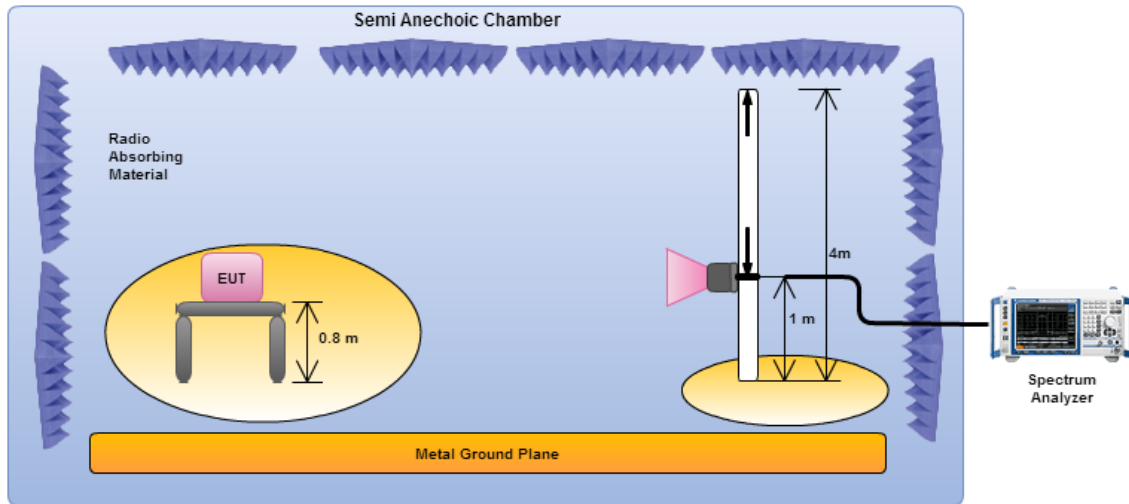
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

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

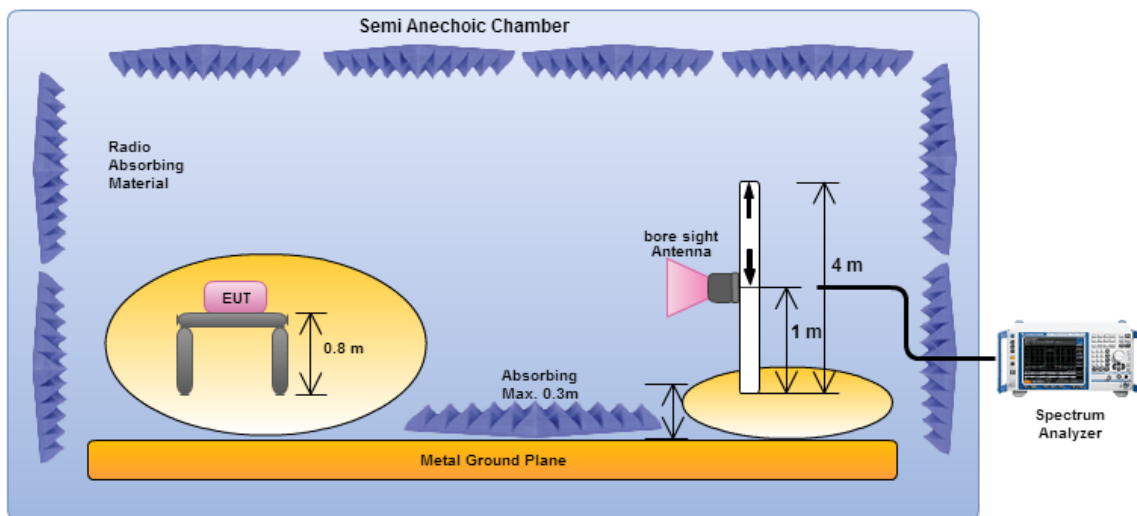
3.4.4 Test Setup

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.

3.4.5 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	120.73	25.53	0.357	33.01	7.48	H
	9400	1880	122.36	27.16	0.520	33.01	5.85	H
	9538	1907.6	120.36	25.16	0.328	33.01	7.85	H
<p>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".</p> <p>Note 2: EUT was tested with its standard battery.</p> <p>Note 3: Measurement worst emissions of receive antenna polarization.</p> <p>Note 4: $EIRP [dBm] = E-Field [dBuV/m] - 95.2$; $E-Field [dBuV/m] = Raw [dBuV] + Factor [dB]$</p>								

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.

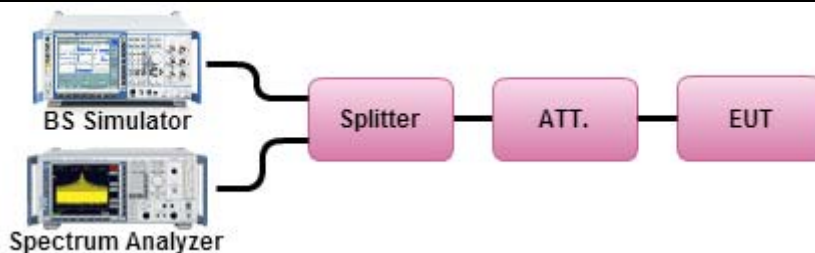
3.5.3 Test Procedures

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	4132	Test Range	30 MHz - 10 harmonic

Spectrum

Ref Level 10.00 dBm Offset 11.87 dB Mode Auto Sweep
SQL Count 20/20

1 AvgPwr

Limit Check

Line SPURIOUS LINE_ABS

PASS PASS

0 dBm

-10 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

-70 dBm

-80 dBm

SPURIOUS_LINE_ABS_

Start 30.0 MHz

19920 pts

Stop 8.49 GHz

Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	823.000 MHz	100.000 kHz	822.75000 MHz	-43.91 dBm	-30.91 dB
823.000 MHz	824.000 MHz	100.000 kHz	823.99300 MHz	-31.95 dBm	-18.95 dB
849.000 MHz	850.000 MHz	100.000 kHz	849.58433 MHz	-60.75 dBm	-55.75 dB
850.000 MHz	1.000 GHz	100.000 kHz	854.45000 MHz	-69.93 dBm	-56.93 dB
1.000 GHz	8.490 GHz	1.000 MHz	1.65450 GHz	-52.22 dBm	-39.22 dB

Date: 13.AUG.2014 17:40:18

Channel	4182	Test Range	30 MHz - 10 harmonic
---------	------	------------	----------------------

Spectrum

Ref Level 10.00 dBm Offset 11.87 dB Mode Auto Sweep
SQL Count 20/20

1 AvgPwr

Limit Check

Line SPURIOUS LINE_ABS

PASS PASS

0 dBm

-10 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

-70 dBm

-80 dBm

SPURIOUS_LINE_ABS_

Start 30.0 MHz

19920 pts

Stop 8.49 GHz

Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	823.000 MHz	100.000 kHz	822.95000 MHz	-61.61 dBm	-40.61 dB
823.000 MHz	824.000 MHz	100.000 kHz	823.10233 MHz	-58.68 dBm	-45.68 dB
849.000 MHz	850.000 MHz	100.000 kHz	849.66233 MHz	-59.88 dBm	-46.88 dB
850.000 MHz	1.000 GHz	100.000 kHz	851.15000 MHz	-65.09 dBm	-52.09 dB
1.000 GHz	8.490 GHz	1.000 MHz	6.98750 GHz	-55.00 dBm	-42.00 dB

Date: 13.AUG.2014 17:19:38

Channel	4233	Test Range	30 MHz - 10 harmonic
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Spectrum

Ref Level 10.00 dBm Offset 11.87 dB Mode Auto Sweep
SQL Count 20/20

1 AvgPwr

Limit Check

Line SPURIOUS LINE_ABS

PASS PASS

0 dBm

-10 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

-70 dBm

-80 dBm

SPURIOUS_LINE_ABS_

Start 30.0 MHz

19920 pts

Stop 8.49 GHz

Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	823.000 MHz	100.000 kHz	816.05000 MHz	-68.93 dBm	-55.93 dB
823.000 MHz	824.000 MHz	100.000 kHz	823.21100 MHz	-68.11 dBm	-55.11 dB
849.000 MHz	850.000 MHz	100.000 kHz	849.00633 MHz	-31.35 dBm	-10.35 dB
850.000 MHz	1.000 GHz	100.000 kHz	850.45000 MHz	-42.22 dBm	-29.22 dB
1.000 GHz	8.490 GHz	1.000 MHz	1.69550 GHz	-51.72 dBm	-38.72 dB

Date: 13.AUG.2014 17:40:57

Transmitter Conducted Unwanted Emissions		Mode	WCDMA1900
Channel	9262	Test Range	30 MHz - 10 harmonic
 <p>Date: 13.AUG.2014 15:36:29</p>			
Channel	9400	Test Range	30 MHz - 10 harmonic
 <p>Date: 13.AUG.2014 15:17:52</p>			
Channel	9538	Test Range	30 MHz - 10 harmonic
 <p>Date: 13.AUG.2014 15:38:08</p>			

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.

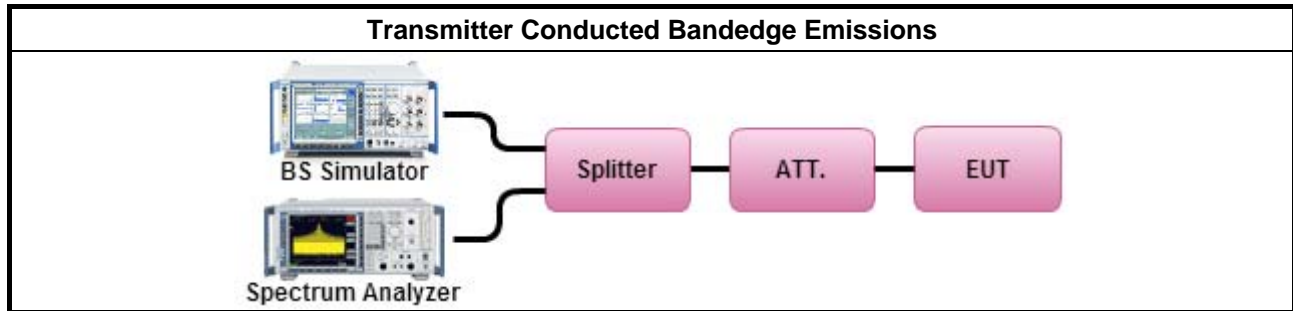
3.6.2 Measuring Instruments

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

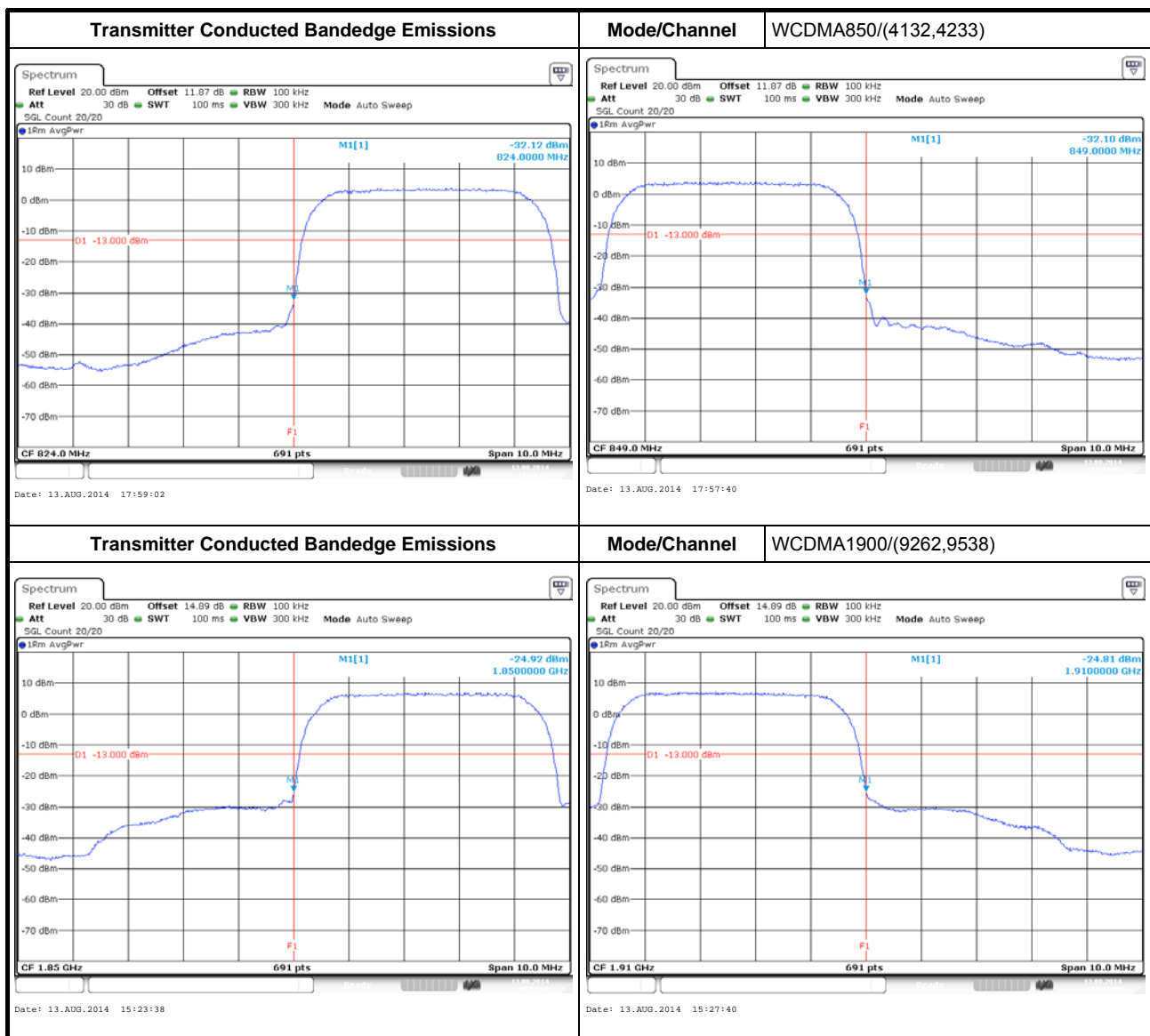
3.6.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI/TIA-603-D-2010, clause 3.2.13 for conducted measurement.
<input type="checkbox"/>	Refer as RSS-Gen, clause 4.9 for transmitter unwanted emissions measurement.
<input checked="" type="checkbox"/>	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); $B = A + 10 \log (BW_{ref} / BW_{measured})$ <ul style="list-style-type: none"> • A is the value at the narrower measurement bandwidth; • B is the value referred to the reference bandwidth; • Correction Factor(dB)= $10\log(1\% \text{ Emission BW/RBW})$;
<input checked="" type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	For conducted measurements on devices with single transmit chain.
<input type="checkbox"/>	For conducted measurements on devices with multiple transmit chains using options given below:
<input type="checkbox"/>	Option 1: measure and sum the spectra across the transmitter outputs.
<input type="checkbox"/>	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



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

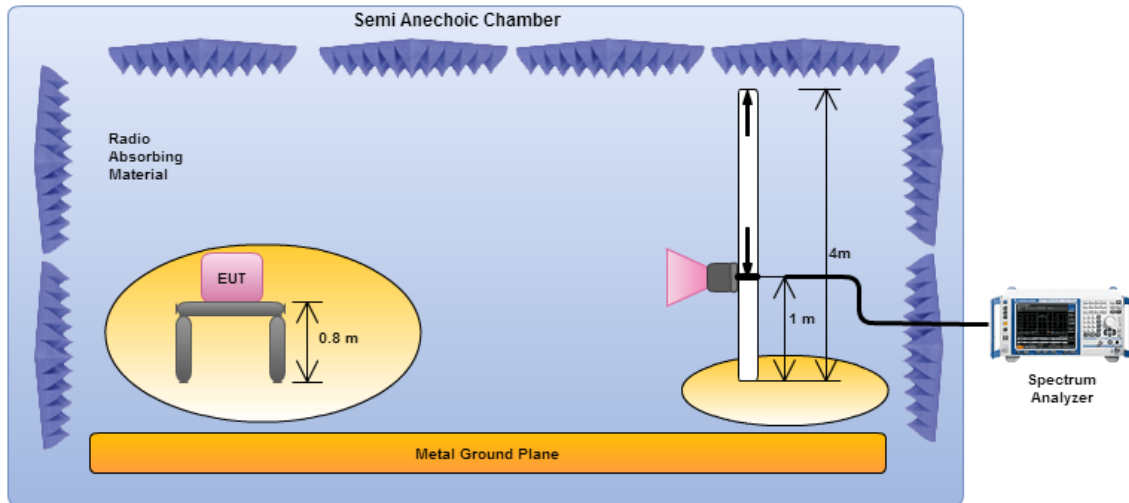
Refer a test equipment and calibration data table in this test report.

3.7.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> Refer as ANSI/TIA-603-D-2010, clause 3.2.12 for radiated measurement.
<input type="checkbox"/> Refer as RSS-Gen, clause 4.9 for transmitter unwanted emissions measurement.
<input type="checkbox"/> 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) $B = A + 10 \log (BW_{ref} / BW_{measured})$ <ul style="list-style-type: none"> • A is the value at the narrower measurement bandwidth; • B is the value referred to the reference bandwidth; • Correction Factor(dB)= $10 \log (1\% \text{ Emission BW/RBW})$;
<input checked="" type="checkbox"/> Effective Isotropic Radiated Power (EIRP)
<input type="checkbox"/> Refer as KDB 412172, clause 1.3.2 following as power approach. $e.i.r.p. = P_T + G_T$. <input checked="" type="checkbox"/> Refer as KDB 412172, clause 1.3.1 following as field strength approach. $e.i.r.p. = (E \times d)^2 / 30$.
<input checked="" type="checkbox"/> For radiated measurement.
<input type="checkbox"/> Refer as KDB 412172, clause 2.2 following eirp can be used radiated test configuration. <input checked="" type="checkbox"/> Refer as KDB 412172, clause 5 following eirp can be directly determined using the field strength. <input type="checkbox"/> Refer as KDB 412172, clause 6 following eirp can be used signal/antenna substitution techniques. <input type="checkbox"/> Refer as ANSI/TIA-603-D-2010, clause 2.2.12 for radiated measurement.

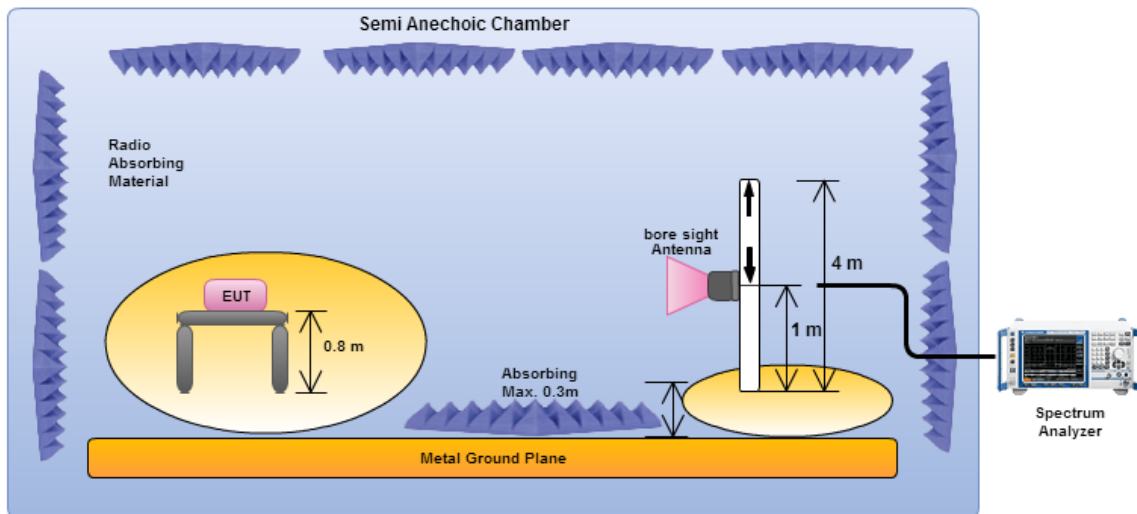
3.7.4 Test Setup

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

E-Field method

Mode	WCDMA850			Mod.	12.2 kbps RMC			Config.	standard battery		
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	58.10	-37.10	H	1672.8	54.31	-40.89	H	1693.2	56.01	-39.19	H
2479.2	55.83	-39.37	V	2509.2	52.12	-43.08	V	2539.8	48.84	-46.36	V
3305.6	49.49	-45.71	V	3345.6	49.39	-45.81	V	3386.4	48.92	-46.28	V
4132.0	-	-	-	4182	-	-	-	4233	-	-	-
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	-	-	-	8364	-	-	-	8466	-	-	-
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 - 10th 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	53.79	-41.41	V	3760	53.36	-41.84	V	3815.2	52.85	-42.35	V
5557.2	57.47	-37.73	H	5640	56.73	-38.47	H	5722.8	56.72	-38.48	H
7409.6	61.40	-33.80	H	7520	60.60	-34.60	H	7630.4	61.44	-33.76	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 - 10th 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	
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	Temperature:
<input checked="" type="checkbox"/>	-30°C to +50°C in 10°C step.
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	Voltage:
<input checked="" type="checkbox"/>	For non hand-carried battery and AC powered equipment: 85% to 115% of the nominal value
<input checked="" type="checkbox"/>	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.	

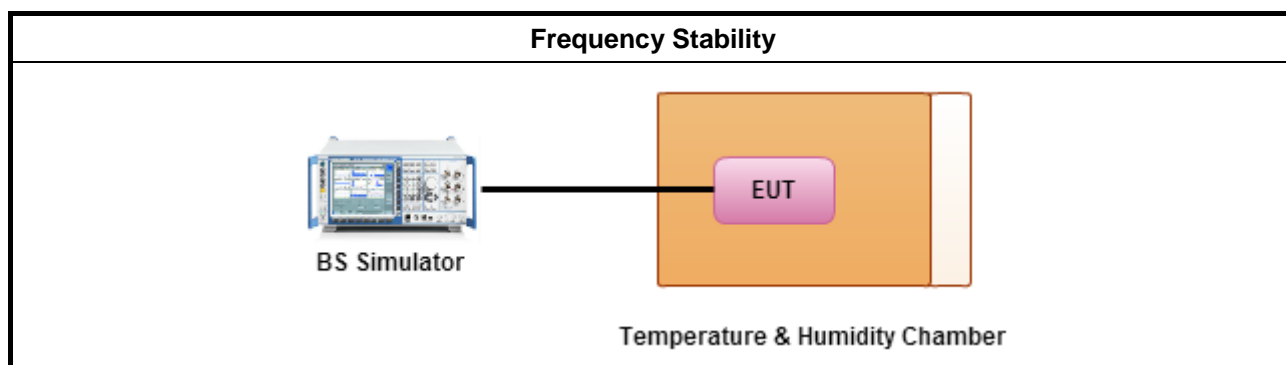
3.8.2 Measuring Instruments

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

3.8.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI/TIA-603-D-2010, clause 3.2.2 for frequency stability tests
<input checked="" type="checkbox"/>	Refer as RSS-Gen, clause 4.7 for transmitter frequency stability measurement.
<input checked="" type="checkbox"/>	Frequency stability with respect to ambient temperature
<input checked="" type="checkbox"/>	Frequency stability when varying supply voltage
<input checked="" type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	For conducted measurements on devices with multiple transmit chains: Measurements need only to be performed on one of the active transmit chains (antenna outputs)
<input type="checkbox"/>	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		Mode		WCDMA1900	
Channel		4183		Channel		9400	
Frequency (MHz)		836.6		Frequency (MHz)		1880.0	
Temp. (°C)	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Temp. (°C)	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)
20	8.4	-17	-0.020	20	8.4	13	0.007
20	6	-17	-0.020	20	6	13	0.007
-30	7.4	-11	-0.013	-30	7.4	-11	-0.006
-20	7.4	-15	-0.018	-20	7.4	-10	-0.005
-10	7.4	-19	-0.023	-10	7.4	-9	-0.005
0	7.4	-19	-0.023	0	7.4	-13	-0.007
10	7.4	-18	-0.022	10	7.4	11	0.006
20	7.4	-17	-0.020	20	7.4	13	0.007
30	7.4	-15	-0.018	30	7.4	14	0.007
40	7.4	17	0.020	40	7.4	16	0.009
50	7.4	21	0.025	50	7.4	18	0.010
Limit [ppm]		± 2.5		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
Temp. and Humidity Chamber	Giant Force	GTH-225-40-CP-AR	MAA1311-008	-40 ~ 100°C	Nov. 20, 2013	RF Conducted
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jul. 31, 2014	RF Conducted
RF Cable-2m	HUBER+SUHNER	SUCOFLEX_104	SN 345675/4	30MHz ~ 26.5GHz	Dec. 02, 2013	RF Conducted
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Jul. 26, 2014	RF Conducted
Vector Signal Generator	R&S	SMU200A	102098	100kHz ~ 6GHz	Nov. 12, 2013	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	Radiated Emission
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	May 05, 2014	Radiated Emission
Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	Aug. 20, 2013	Radiated Emission
Spectrum	R&S	FSP40	100004	9kHz ~ 40GHz	Mar. 27, 2014	Radiated Emission
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 21, 2013	Radiated Emission
Horn Antenna	ETS • LINDGREN	3115	6741	1GHz ~ 18GHz	Jun. 11, 2014	Radiated Emission
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 10, 2014	Radiated Emission
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 16, 2013	Radiated Emission
RF Cable-high	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz ~ 40GHz	Dec. 11, 2013	Radiated Emission
Turn Table	EM Electronics	EM Electronics	060615	0 ~ 360 degree	N/A	Radiated Emission
Antenna Mast	MF	MF-7802	MF780208179	1 ~ 4 m	N/A	Radiated Emission

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	TESEQ	HLA 6120	31244	9kHz ~ 30MHz	Dec. 02, 2012	Radiated Emission

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