FCC PART 22 TEST REPORT

FCC Part 22

Report Reference No.....	**A15N0166217-WCDMA**
FCC ID..... :	**2ACWO-MT7**
Compiled by (position+printed name+signature)..:	File administrators Tony Li
Supervised by (position+printed name+signature)..:	Technique principal Robin Fang
Approved by (position+printed name+signature)..:	Manager Andy Zhang
Date of issue.....:	Nov,25 2015

Representative Laboratory Name ....:	Shenzhen CTL Electron Technology Co., Ltd.
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Testing Laboratory Name.....:	Dongguan Dongdian Testing Service Co.,Ltd
Address.....:	No.17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China
Applicant's name.....:	**AURA TECHNOLOGY LIMTED**
Address.....:	FLAT/RM810, Star House, 3 Salisbury Road, Tsimshatsui, Hong Kong
Test specification ..... **:**	
Standard .....:	**FCC Part 22: PUBLIC MOBILE SERVICES**
TRF Originator.....:	Shenzhen CTL Electron Technology Co., Ltd.
Master TRF.....:	Dated 2012-06

Test item description .....:	TELPAD
Trade Mark .....:	/
Model/Type reference.....:	MT7
Listed Models .....:	/
Manufacturer .....:	**SHENZHEN KWANG SUNG ELECTRONICS CO.,LTD**
Ratings.....:	DC 3.70V
Modulation .....:	QPSK
Hardware version .....:	V01.00.22
Software version .....:	V01
Frequency.....	UMTS Band V
Result.....:	**PASS**

T E S T R E P O R T

Test Report No. :	A15N0166217-WCDMA	Nov 25, 2015 Date of issue

Equipment under Test	:	TELPAD
Model /Type	:	MT7
Listed Models	:	/
Applicant	:	**AURA TECHNOLOGY LIMTED**
Address	:	FLAT/RM810, Star House, 3 Salisbury Road, Tsimshatsui, Hong Kong
Manufacturer	:	**SHENZHEN KWANG SUNG ELECTRONICS CO.,LTD**
Address	:	Shitoushan Industrial Zone, Shi Yan Town, Baoan District, Shenzhen, PRC

Test Result:	**PASS**

Revison History

Revision	Issue Date	Revisions	Revised By
00	2015-11-25	Initial Issue	Andy Zhang

Contents

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Part 22 (10-1-12 Edition): PRIVATE LAND MOBILE RADIO SERVICES.
TIA/EIA 603 D June 2010: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
47 CFR FCC Part 15 Subpart B: - Unintentional Radiators
FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS
ANSI C63.4:2009: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
FCCKDB971168D01 Power Meas License Digital Systems

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	Nov 15, 2015
Testing commenced on	:	Nov 15, 2015
Testing concluded on	:	Nov 24, 2015

2.2 Product Description

The **AURA TECHNOLOGY LIMTED**'s Model: MT7 or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	TELPAD
Model Number	MT7
FCC ID	2ACWO-MT7
Modilation Type	GMSK for GSM/GPRS, 8-PSK for EDGE,QPSK for UMTS
Antenna Type	Internal
UMTS Operation Frequency Band	Device supported UMTS FDD Band V
WLAN FCC Operation frequency	IEEE 802.11b:2412-2462MHz IEEE 802.11g:2412-2462MHz IEEE 802.11n HT20:2412-2462MHz IEEE 802.11n HT40:2422-2452MHz
BT FCC Operation frequency	2402MHz-2480MHz
HSDPA Release Version	Release 8
HSUPA Release Version	Release 6
DC-HSUPA Release Version	Not Supported
WCDMA Release Version	R99
WLAN FCC Modulation Type	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
BT Modulation Type	GFSK,8DPSK,π/4DQPSK(BT 3.0+HS)
Hardware version	V01.00.22
Software version	V01
Android version	Android 4.4.2
GPS function	Supported
WLAN	Supported 802.11b/802.11g/802.11n
Bluetooth	Supported BT 4.0/BT 3.0+HS
GSM/EDGE/GPRS	Supported GSM/GPRS/EDGE
GSM/EDGE/GPRS Power Class	GSM850:Power Class 4/ PCS1900:Power Class 1
GSM/EDGE/GPRS Operation Frequency	GSM850 :824.2MHz-848.8MHz/PCS1900:1850.2MHz-1909.8MHz
GSM/EDGE/GPRS Operation Frequency Band	GSM850/PCS1900/GPRS850/GPRS1900/EDGE850/EDGE1900
GSM Release Version	R99
GPRS/EDGE Multislot Class	GPRS/EDGE: Multi-slot Class 12
Extreme temp. Tolerance	-30°C to +50°C
Extreme vol. Limits	3.40VDC to 4.20VDC (nominal: 3.70VDC)
GPRS operation mode	Class B

2.3 Equipment under Test

Power supply system utilised

Power supply voltage	:	○	120V / 60 Hz	○	115V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 3.70V

Test frequency list

Test Mode	TX/RX	RF Channel		
		Low(L)	Middle (M)	High (H)
WCDMA850	TX	Channel 4132	Channel 4182	Channel 4233
		826.4 MHz	836.4 MHz	846.6 MHz
	RX	Channel 4357	Channel 4407	Channel 4458
		871.4 MHz	881.4 MHz	891.6 MHz

2.4 Short description of the Equipment under Test (EUT)

2.4.1 General Description

TELPAD is subscriber equipment in the WCDMA/GSM system. The HSPA/UMTS frequency band is Band V; The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900, but only Band V and GSM850 and PCS1900 bands test data included in this report. The TELPAD implements such functions as RF signal receiving/transmitting, HSPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS and WIFI etc. Externally it provides micro SD card interface, earphone port (to provide voice service) and SIM card interface. It also provides Bluetooth module to synchronize data between a PC and the TELPAD, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

2.5 Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery
AE2	Charger

AE1
MODEL:JY-05210
INPUT:100-240V～0.3A 50/60Hz 0.3A
OUTPUT: 5.0V DC 2.1A
◇ Shielded ◆ Unshielded

*AE ID: is used to identify the test sample in the lab internally.

2.6 Normal Accessory setting

Fully charged battery was used during the test.

2.7 EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.8 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2ACWO- MT7** filing to comply with FCC Part 22 Rules

2.9 Modifications

No modifications were implemented to meet testing criteria.

2.10 General Test Conditions/Configurations

2.10.1 Test Modes

NOTE: The test mode(s) are selected according to relevant radio technology specifications.

Test Mode	Test Modes Description
UMTS/TM1	WCDMA system, QPSK modulation
UMTS/TM2	HSDPA system, QPSK modulation
UMTS/TM3	HSUPA system, QPSK modulation

Note:
1. This EUT owns two SIM cards, while SIM2 only support GSM, SIM1 can support GSM/UMTS.
2. As WCDMA, HSDPA and HSUPA with the same emission designator, test result recorded in this report at the worst case UMTS/TM1 only after exploratory scan.

2.11 NOTE

The values used in the test report maybe stringent than the declared.

Environment Parameter	Selected Values During Tests		
NTNV	Temperature	Voltage	Relative Humidity
	Ambient	3.70VDC	Ambient

1. The EUT is a TELPAD with GSM/UMTS/WLAN and Bluetooth function,The functions of the EUT listed as below:

	Test Standards	Reference Report
GSM	FCC Part 22H/ FCC Part 24 E	A15N0166217-GSM
UMTS	FCC Part 22H	A15N0166217-WCDMA
WLAN	FCC Part 15.247	A15N0166217-WLAN
Bluetooth-BR	FCC Part 15.247	A15N0166217-BR
Bluetooth-LE	FCC Part 15.247	A15N0166217-BLE
JBC	FCC Part 15 Subpart B	A15N0166217-JBC
SAR	FCC Per 47 CFR 2.1093(d)	A15N0166217-SAR

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Dongguan Dongdian Testing Service Co.,Ltd

No.17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 10288A-1

The 3m alternate test site of Dongguan Dongdian Testing Service Co.,Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 10288A-1 on May, 2012.

FCC-Registration No.: 270092

Dongguan Dongdian Testing Service Co.,Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 270092, Mar, 2015.

3.3 Environmental conditions

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

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

(1) expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.4 Test Description

3.4.1 Cellular Band (824-849MHz paired with 869-894MHz)

Test Item	FCC Rule No.	Requirements	Verdict
Effective(Isotropic) Radiated Output Power	§2.1046, §22.913	FCC: ERP ≤ 7W.	Pass
Modulatio Characteristics	§2.1047	Digital modulation	N/A
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §22.917	≤-13dBm/1%*EBW, in 1MHz bands immediately outside and adjacent to the frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §22.917	FCC: ≤ -13dBm/100kHz, from 9kHz to 10th harmonics but outside authorized operating frequency ranges.	Pass
Field Strength of Spurious Radiation	§2.1053, §22.917	FCC: ≤ -13dBm/100kHz.	Pass
Frequency Stability	§2.1055, §22.355	≤ ±2.5ppm.	Pass
NOTE 1: For the verdict, the “N/A” denotes “not applicable”, the “N/T” de notes “not tested”.			

3.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to ETSI TR 100 028 " Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics" and is documented in the Dongguan Dongdian Testing Service Co.,Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Dongguan Dongdian Testing Service Co.,Ltd is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	3.14 dB	(1)
Radiated Emission	1~18GHz	2.56 dB	(1)
Radiated Emission	18-40GHz	3.90 dB	(1)
Conducted Disturbance	0.15~30MHz	2.44 dB	(1)
Conducted Power	9KHz~18GHz	0.60 dB	(1)
Power Spectral Density	9KHz~18GHz	1.20 dB	(1)
Spurious RF Conducted Emission	9KHz~40GHz	0.60 dB	(1)
Band Edge Compliance of RF Emission	9KHz~40GHz	0.60 dB	(1)
Occuiped Bandwidth	9KHz~40GHz	±1%	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.6 Equipments Used during the Test

Effective(Isotropic) Radiated Output Power & Radiated Spurious Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	462	2014/04/12	3 years
2	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	468	2014/04/12	3 years
3	EMI TEST Receiver	Rohde&Schwarz	ESU8	100316	2015/10/21	1 years
4	EMI TEST Software	Audix	E3	6.111111	N/A	N/A
5	Horn Anternna	EMCO	3116	00060095	2014/04/12	3 years
6	Pre-Amplifer	Rohde&Schwarz	SCU-01	10049	2015/10/21	1 years
7	Pre-Amplifer	A.H.	PAM0-0118	360	2015/10/21	1 years
8	Pre-Amplifer	A.H.	PAM-1840VH	562	2015/10/21	1 years
9	Double Ridged Horn Antenna	Rohde&Schwarz	HF907	100265	2014/04/12	3 years
10	Double Ridged Horn Antenna	Rohde&Schwarz	HF907	100281	2014/04/12	3 years
11	Active Loop Antenna	Schwarz beck	FMZB1519	0.38	2014/04/12	3 years
12	TURNTABLE	MATURO	TT2.0	----	N/A	N/A
13	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A	N/A
14	Spectrum Analyzer	Rohde&Schwarz	FSU26	1166.1660.26	2015/10/21	1 years
15	Signal Generator	Rohde&Schwarz	SMB100A	11236891	2015/10/22	1 years
16	Universal Radio Communication Tester	Rohde&Schwarz	CMU200	102638	2015/10/22	1 years

Output Power / Bandwidth / Band Edges Compliance / Spurious Emission at Antenna Terminals / Frequency Stability						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Universal Radio Communication Tester	Rohde&Schwarz	CMU200	102638	2015/10/22	1 years
2	Spectrum Analyzer	Rohde&Schwarz	FSU26	1166.1660.26	2015/10/21	1 years

4 TEST CONDITIONS AND RESULTS

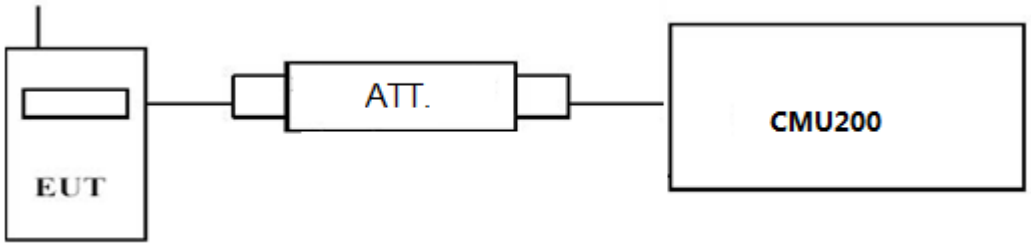
4.1 Output Power

TEST APPLICABLE

During the process of testing, the EUT was controlled via R&S Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation. This result contains output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

4.1.1 Conducted Output Power

TEST CONFIGURATION



TEST PROCEDURE

Conducted Power Measurement:
a) Place the EUT on a bench and set it in transmitting mode.
b) Connect a low loss RF cable from the antenna port to a CMU200 by an Att.
c) EUT Communicate with CMU200 then selects a channel for testing.
d) Add a correction factor to the display CMU200, and then test.

TEST RESULTS

Test Mode	ARFCN	Burst Average Conducted power (dBm)		
		Channel 4132 / 826.40 MHz	Channel 4182 / 836.40 MHz	Channel 4233 / 846.40 MHz
UMTS/TM1/ WCDMA Band V	12.2kbps RMC	23.12	23.25	23.04
	64kbps RMC	23.01	23.10	22.93
	144kbps RMC	22.82	23.02	22.70
	384kbps RMC	22.65	22.89	22.56
UMTS/TM2/ WCDMA Band V	Sub - Test 1	22.97	23.08	22.85
	Sub - Test 2	20.69	20.94	20.37
	Sub - Test 3	20.81	21.13	20.50
	Sub - Test 4	22.72	23.02	22.66
UMTS/TM3/ WCDMA Band V	Sub - Test 1	22.56	23.00	22.43
	Sub - Test 2	20.38	20.74	20.19
	Sub - Test 3	20.49	20.96	20.32
	Sub - Test 4	21.37	21.53	21.14
	Sub - Test 5	22.51	23.00	22.62

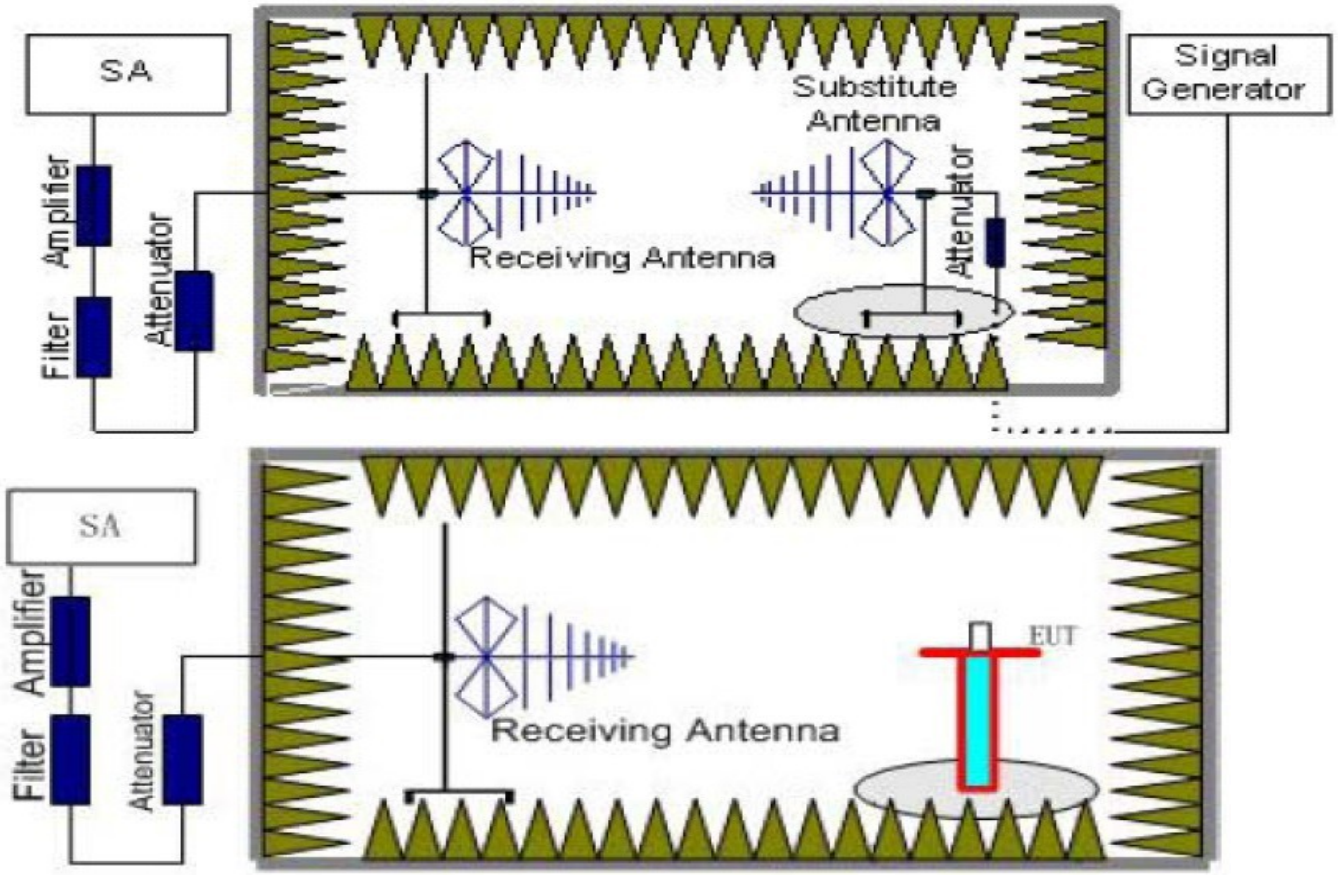
Remark:
1. We were tested all Configuration refer 3GPP TS134 121.

4.1.2 Radiated Output Power

TEST DESCRIPTION

This is the test for the maximum radiated power from the EUT.
Refer to Rule Part 22.913(a) specifies ” The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.”

TEST CONFIGURATION



TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=10MHz,VBW=10MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} + G_a
   We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below:
   Power(EIRP)=P_{Mea}- P_{cl} + G_a
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST LIMIT

According to 22.913(a), the ERP should be not exceeding following table limits:

	Burst Average ERP
UMTS Band V	38.45dBm (7W)

TEST RESULTS

Remark:
1. *We were tested all Configuration refer 3GPP TS134 121.*
2. *EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)*
3. *ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.*
4. *Margin = Limit – Emission Level*

UMTS/TM1/UMTS Band V

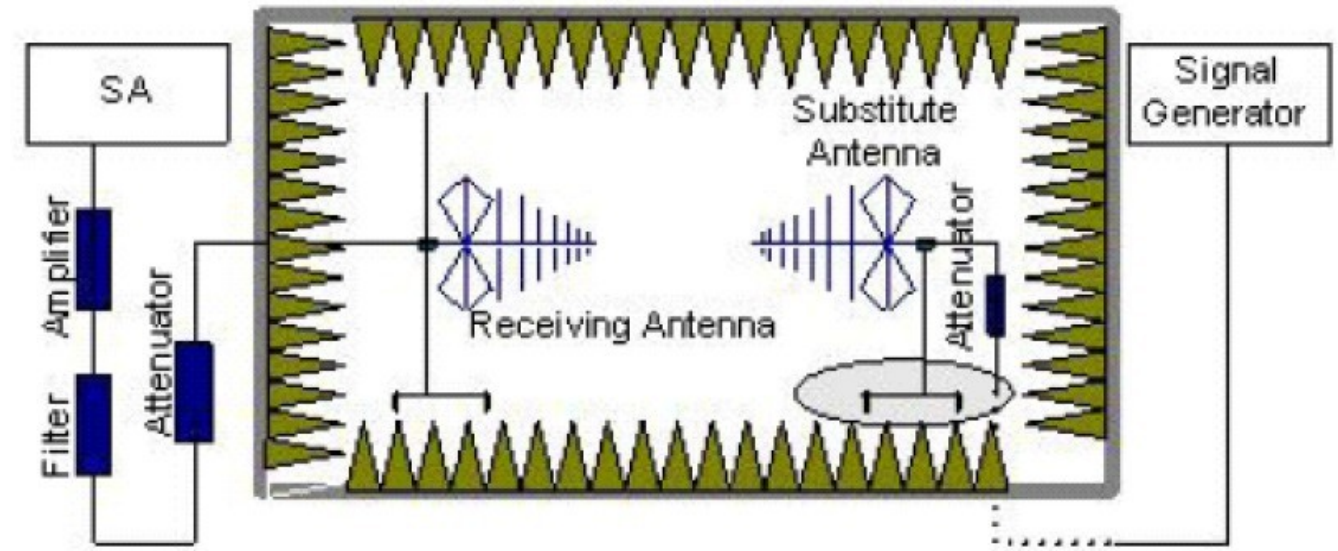
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Aq} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.40	-14.44	4.26	8.45	2.15	32.56	20.16	38.45	18.29	V
836.60	-14.22	4.29	8.45	2.15	32.56	**20.35**	38.45	18.10	V
846.60	-14.68	4.31	8.36	2.15	32.56	19.78	38.45	18.67	V

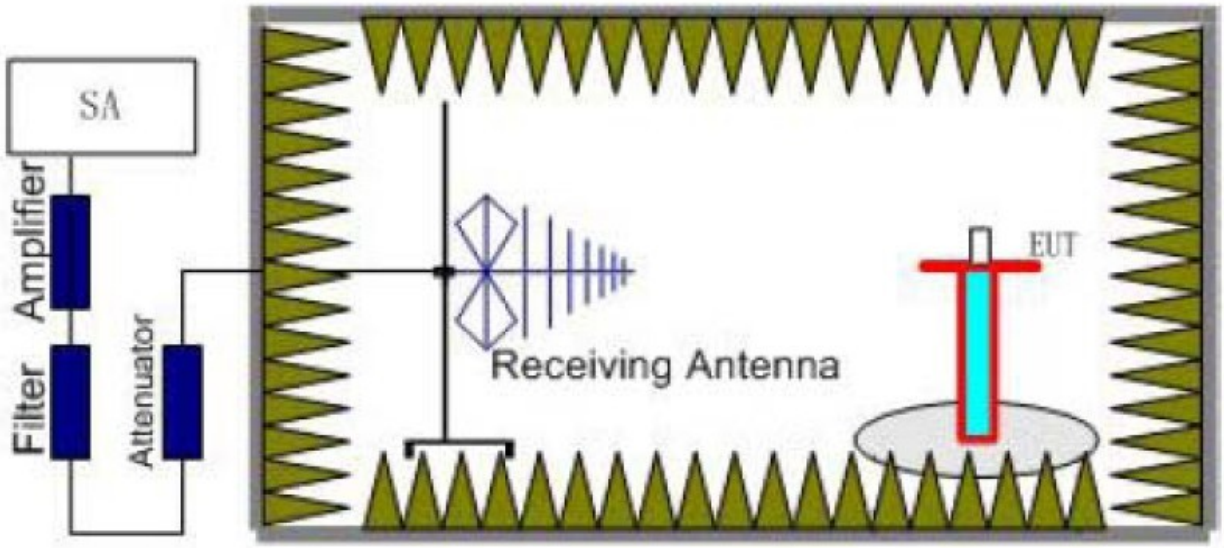
4.2 Radiated Spurious Emssion

TEST APPLICABLE

According to the TIA/EIA 603D:2010 test method, The Receiver or Spectrum was scanned from 9 KHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz The resolution bandwidth is set as outlined in Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of WCDMA Band V.

TEST CONFIGURATION





TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} + G_a
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.
8. In order to make sure test results more clearly,we set frequency range and sweep time for difference frequency range as follows table:

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
UMTS/TM1/ WCDMA Band V	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3

TEST LIMITS

According to 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Test Mode	Channel	Frequency (MHz)	Frequency Range	Verdict
UMTS/TM1/ WCDMA Band V	4132	826.40	9KHz-10GHz	PASS
	4183	836.40	9KHz -10GHz	PASS
	4233	846.60	9KHz -10GHz	PASS

TEST RESULTS

Remark:
1. We were tested all Configuration refer 3GPP TS134 121.
2. EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)
3. ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.
4. Margin = Limit – Emission Level

UMTS/TM1/ WCDMA Band V _ Channel 4132 _ 826.40 MHz

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1652.8	-37.98	6.56	3.00	8.25	-36.29	-13.00	23.29	H
2479.2	-41.87	7.91	3.00	9.61	-40.17	-13.00	27.17	H
1652.8	-41.60	6.56	3.00	8.25	-39.91	-13.00	26.91	V
2479.2	-44.96	7.91	3.00	9.61	-43.26	-13.00	30.26	V

UMTS/TM1/ WCDMA Band V _ Channel 4183 _ 836.40 MHz

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1672.8	-36.15	6.59	3.00	8.25	-34.49	-13.00	21.49	H
2509.2	-32.71	7.98	3.00	9.61	-31.08	-13.00	18.08	H
1672.8	-38.94	6.59	3.00	8.25	-37.28	-13.00	24.28	V
2509.2	-36.86	7.98	3.00	9.61	-35.23	-13.00	22.23	V

UMTS/TM1/ WCDMA Band V _ Channel 4233 _ 846.60 MHz

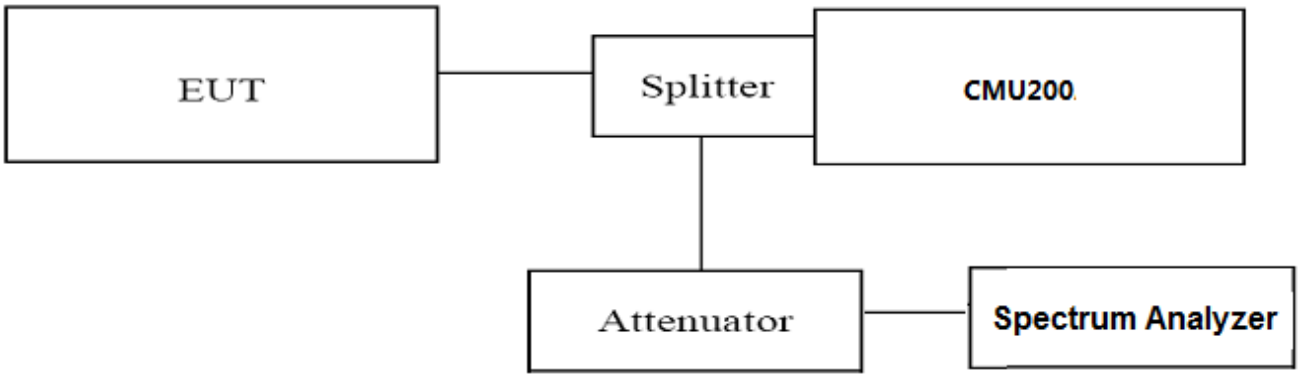
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1693.2	-39.74	6.62	3.00	8.25	-38.11	-13.00	25.11	H
2539.8	-43.64	8.04	3.00	9.61	-42.07	-13.00	29.07	H
1693.2	-42.57	6.62	3.00	8.25	-40.94	-13.00	27.94	V
2539.8	-47.07	8.04	3.00	9.61	-45.50	-13.00	32.50	V

4.3 Occupied Bandwidth and Emission Bandwith

TEST APPLICABLE

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of WCDMA band V. The table below lists the measured 99% Bandwidth and -26dBc Bandwidth.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was set up for the max output power with pseudo random data modulation;
2. The Occupied bandwidth and Emission Bandwidth were measured with Spectrum Analyzer FSU26;
3. Set RBW=100KHz,VBW=300KHz,Span=10MHz,SWT=Auto;
4. Set SPA Max hold and View, Set 99% Occupied Bandwidth/ Set -26dBc Occupied Bandwidth
5. These measurements were done at 3 frequencies for WCDMA band V. (low, middle and high of operational frequency range).

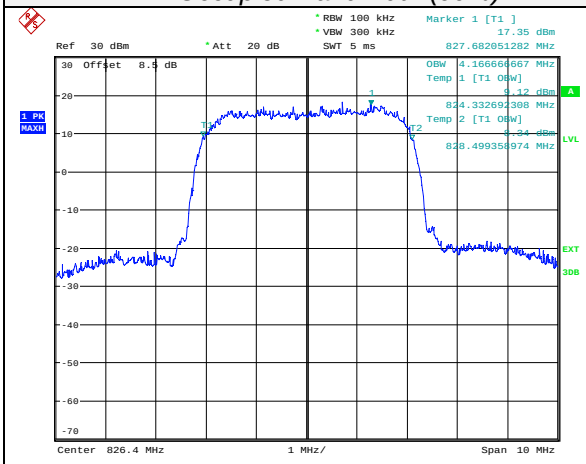
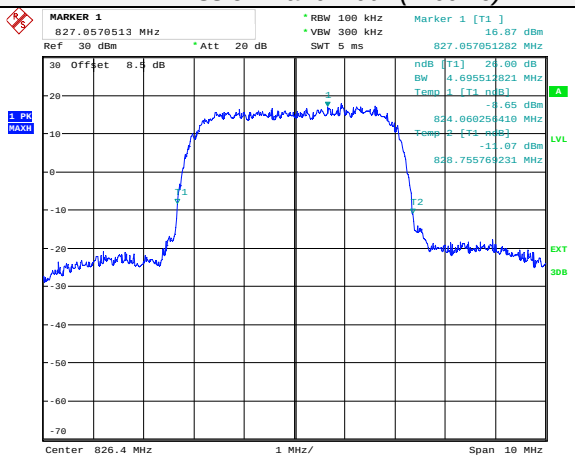
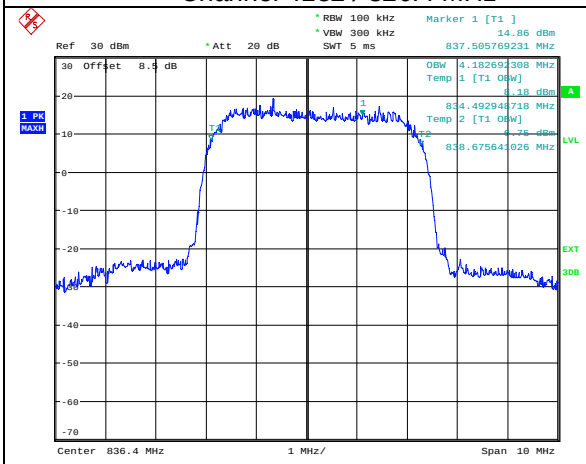
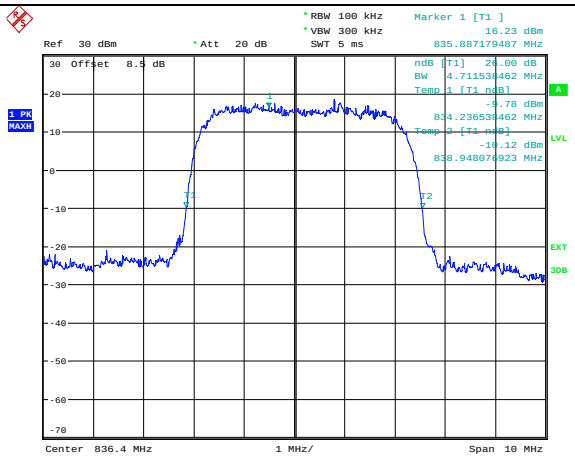
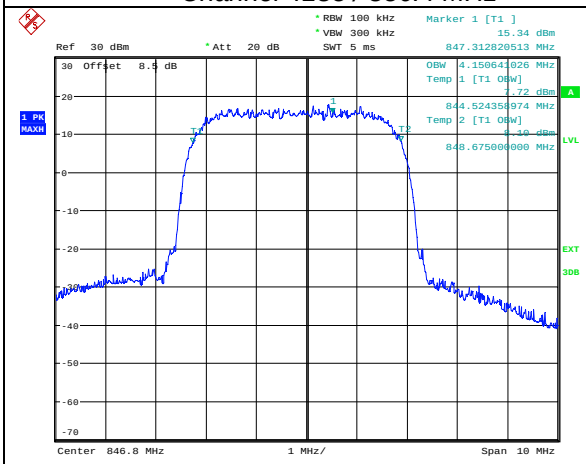
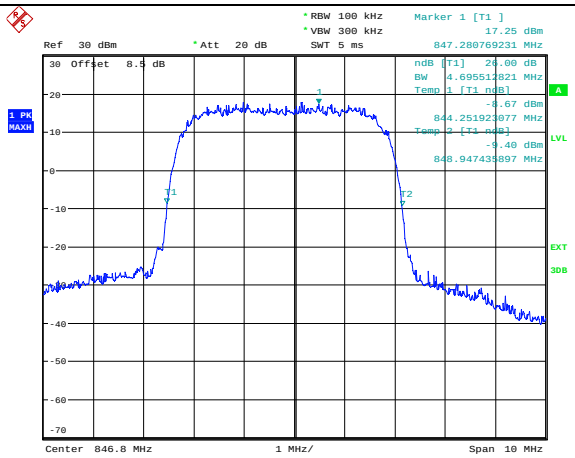
TEST RESULTS

Test Mode	Channel	Frequency (MHz)	Occupied Bandwidth (99% BW) (kHz)	Emission Bandwidth (-26 dBc BW) (kHz)	Verdict
UMTS/TM1/ WCDMA Band V	4132	826.40	4166.67	4695.51	PASS
	4183	836.40	4182.69	4711.54	PASS
	4233	846.60	4150.64	4695.51	PASS

Remark:
1. *Test results including cable loss;*
2. *please refer to following plots;*

Occupied Bandwidth

UMTS/TM1/ WCDMA Band V

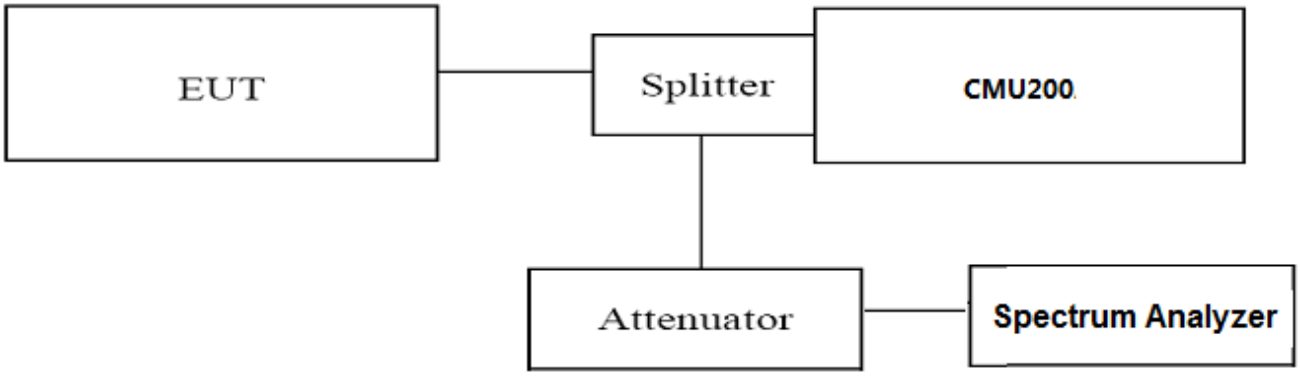
Occupied Bandwidth (99%)	Emission Bandwidth (-26dBc)
	
Date: 24.NOV.2015 18:35:13	Date: 24.NOV.2015 18:35:00
Channel 4132 / 826.4 MHz	Channel 4132 / 826.4 MHz
	
Date: 24.NOV.2015 18:34:03	Date: 24.NOV.2015 18:34:44
Channel 4183 / 836.4 MHz	Channel 4183 / 836.4 MHz
	
Date: 24.NOV.2015 18:33:18	Date: 24.NOV.2015 18:33:05
Channel 4233 / 846.6 MHz	Channel 4233 / 846.6 MHz

4.4 Band Edge Compliance

TEST APPLICABLE

During the process of testing, the EUT was controlled via Digital Radio Communication tester (CMU200) to ensure max power transmission and proper modulation.

TEST CONFIGURATION



TEST PROCEDURE

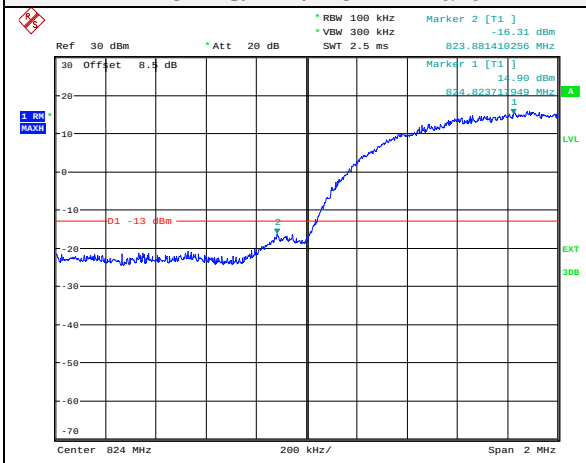
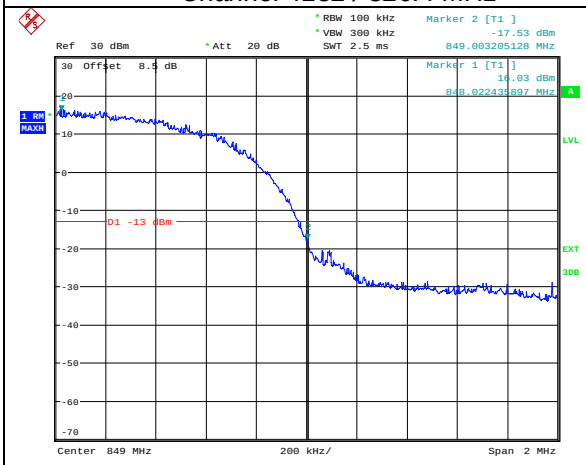
1. The EUT was set up for the max output power with pseudo random data modulation;
2. The power was measured with Spectrum Analyzer FSU26;
3. Set RBW=100KHz,VBW=300KHz,Span=2MHz,SWT=Auto,Dector:RMS;

These measurements were done at 2 frequencies for WCDMA Band V. (low and high of operational frequency range).

TEST RESULTS

UMTS/TM1/WCDMA Band V					
Test Mode	**Channel**	**Frequency (MHz)**	**Band Edg Compliance (dBm)**	**Limits (dBm)**	**Verdict**
UMTS/TM1/WCDMA Band V	4132	826.4	<-13dBm	-13dBm	PASS
	4233	846.6	<-13dBm	-13dBm	

Remark:
1. *Test results including cable loss;*
2. *please refer to following plots;*

Band-edge Compliance	
UMTS/TM1/WCDMA Band V	
	
Channel 4132 / 826.4 MHz	
	
Channel 4233 / 846.6 MHz	

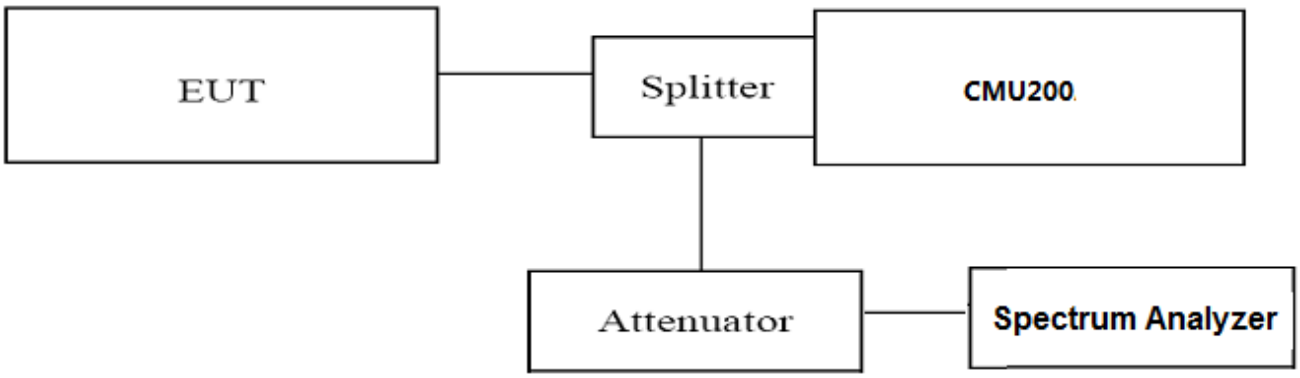
4.5 Spurious Emssion on Antenna Port

TEST APPLICABLE

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For WCDMA Band V, data taken from 9 KHz to 9 GHz.
2. The sweep time is set automatically by instrument itself. That should be the optimal sweep time for the span and the RBW. If the sweep time is too short, that is sweep is too fast, the sweep result is not accurate; if the sweep time is too long, that is sweep is too low, some frequency components may be lost. The instrument will give an optimal sweep time according the selected span and RBW.
3. The procedure to get the conducted spurious emission is as follows:
   The trace mode is set to MaxHold to get the highest signal at each frequency;
   Wait 25 seconds;
   Get the result.
4. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was set up for the max output power with pseudo random data modulation;
2. The power was measured with Spectrum Analyzer FSU26;
3. These measurements were done at 3 frequencies for WCDMA band V. (low, middle and high of operational frequency range).

TEST LIMIT

Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

TEST RESULTS

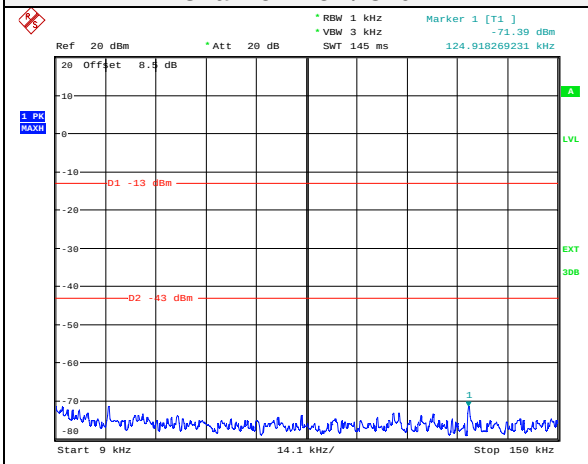
Test Mode	Channel	Frequency (MHz)	Spurious RF Conducted Emission (dBm)	Limits (dBm)	Verdict
UMTS/TM1/WCDMA Band V	4132	826.40	<-13dBm	-13dBm	PASS
	4183	836.40	<-13dBm	-13dBm	
	4233	846.60	<-13dBm	-13dBm	

Remark:
1. *Test results including cable loss;*
2. *please refer to following plots;*

Spurious Emssion on Antenna Port

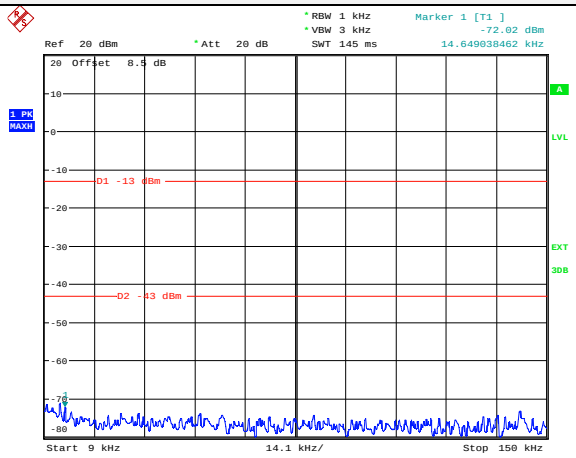
UMTS/TM1/WCDMA Band V

Channel 4132 / 826.4 MHz



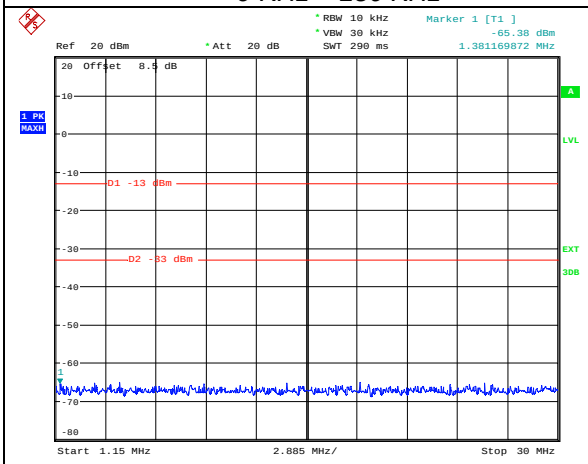
Date: 24.NOV.2015 18:36:33

Channel 4182 / 836.4 MHz



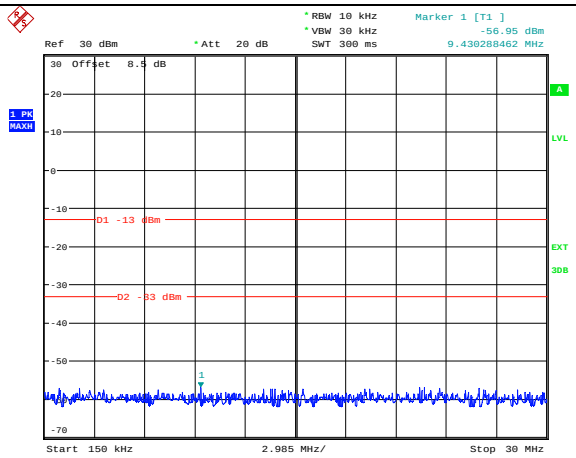
Date: 24.NOV.2015 18:39:53

9 KHz – 150 KHz



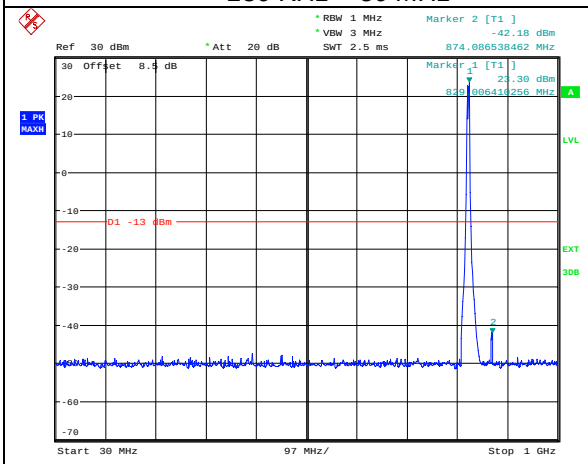
Date: 24.NOV.2015 18:37:38

9 KHz – 150 KHz



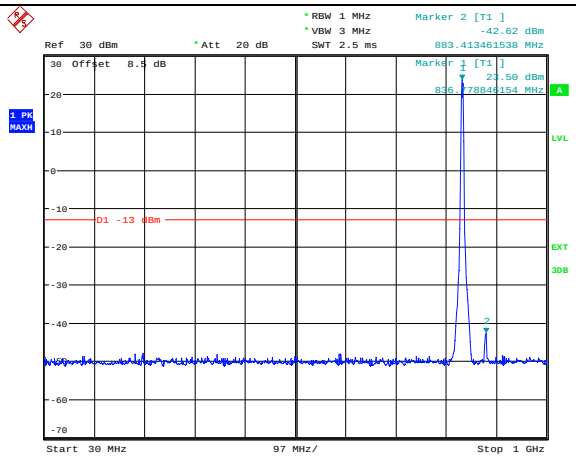
Date: 24.NOV.2015 18:39:33

150 KHz – 30 MHz



Date: 24.NOV.2015 18:38:11

150 KHz – 30 MHz



Date: 24.NOV.2015 18:39:12

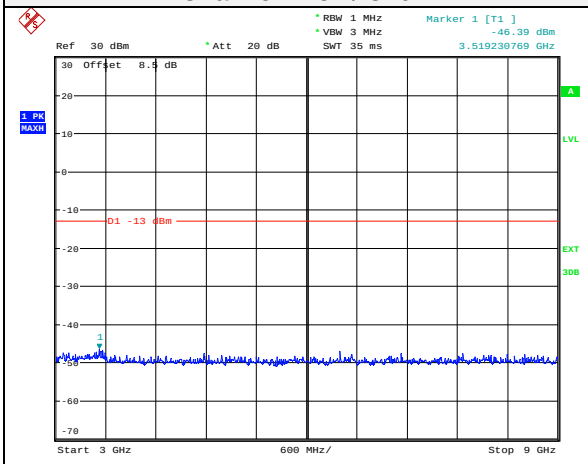
30 MHz – 1000 MHz

30 MHz – 1000 MHz

Spurious Emssion on Antenna Port

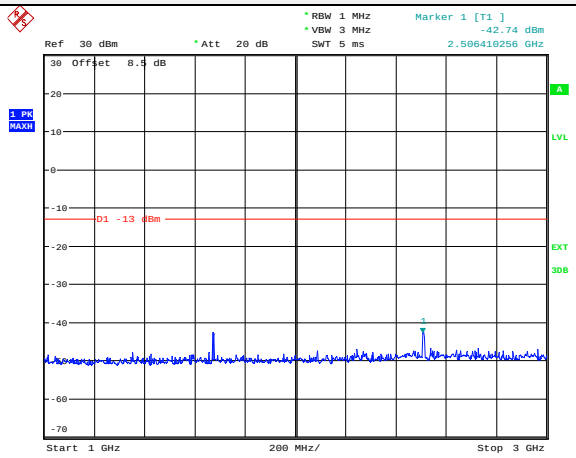
UMTS/TM1/WCDMA Band V

Channel 4132 / 826.4 MHz



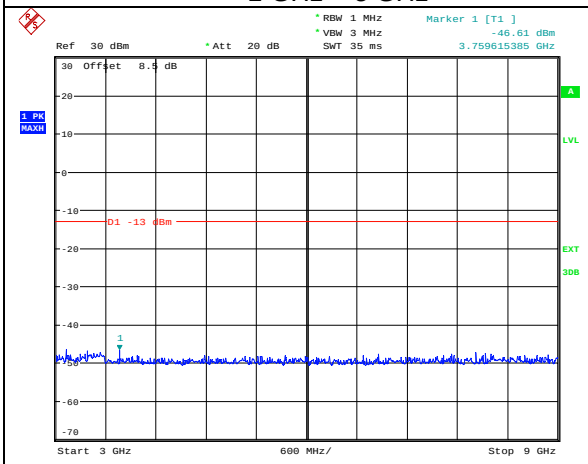
Date: 24.NOV.2015 18:38:32

Channel 4182 / 836.4 MHz



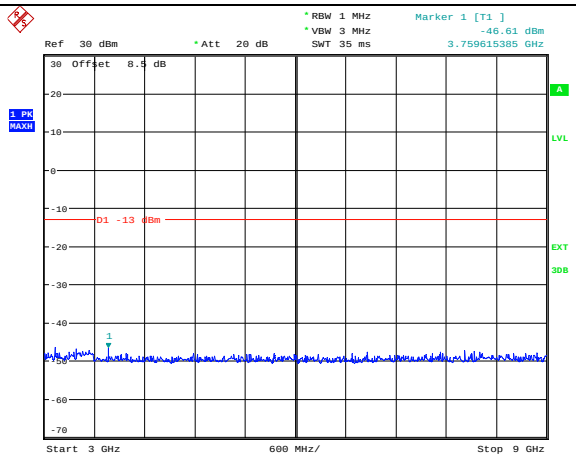
Date: 24.NOV.2015 18:39:03

1 GHz – 3 GHz



Date: 24.NOV.2015 18:38:54

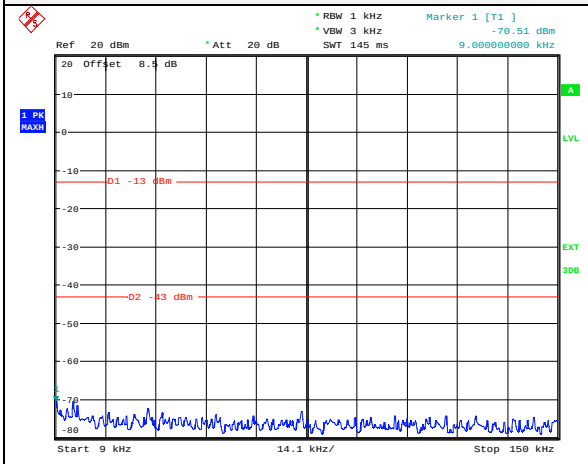
1 GHz – 3 GHz



Date: 24.NOV.2015 18:38:54

3 GHz – 9 GHz

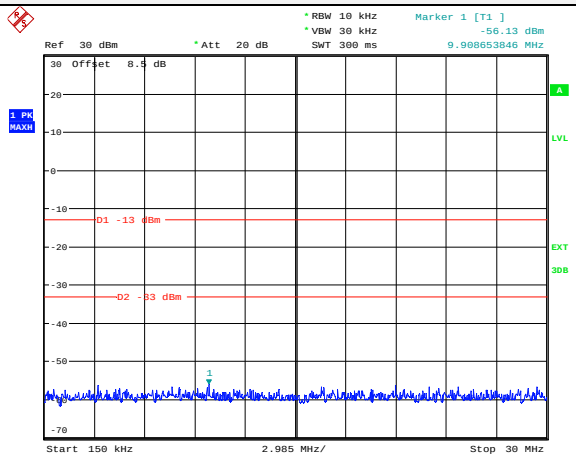
Channel 4233 / 846.6 MHz



Date: 24.NOV.2015 18:40:19

3 GHz – 9 GHz

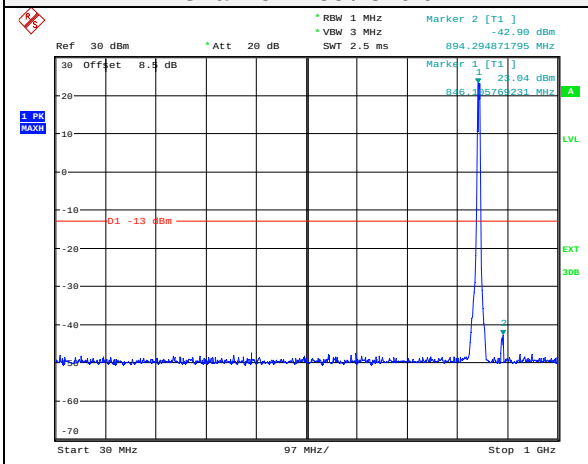
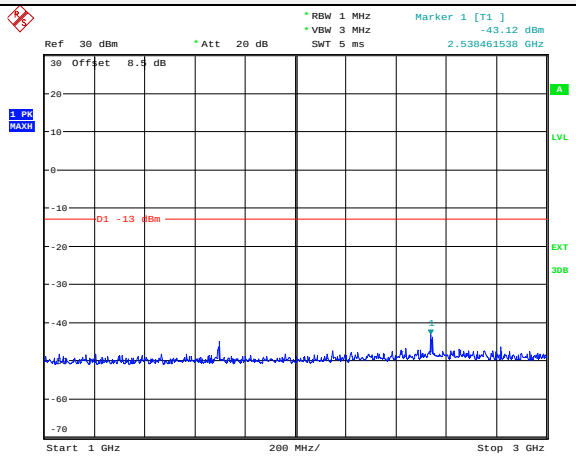
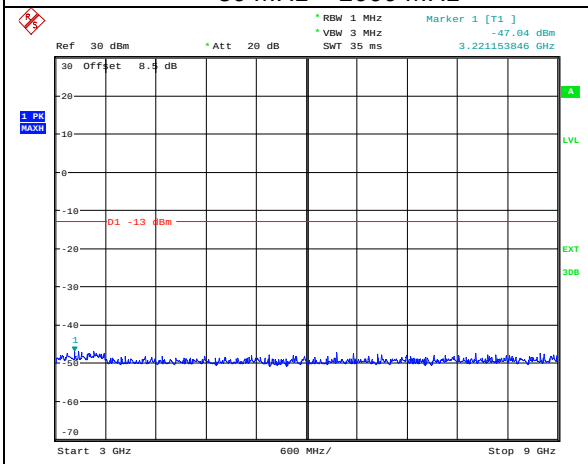
Channel 4233 / 846.6 MHz



Date: 24.NOV.2015 18:40:48

9 KHz – 150 KHz

150 KHz – 30 MHz

Spurious Emssion on Antenna Port	
UMTS/TM1/WCDMA Band V	
Channel 4233 / 846.6 MHz	*Channel 4233 / 846.6 MHz*
 Date: 24.NOV.2015 18:41:12	 Date: 24.NOV.2015 18:41:22
30 MHz – 1000 MHz	*1 GHz – 3 GHz*
 Date: 24.NOV.2015 18:41:31	
3 GHz – 9 GHz	

4.6 Frequency Stability Test

TEST APPLICABLE

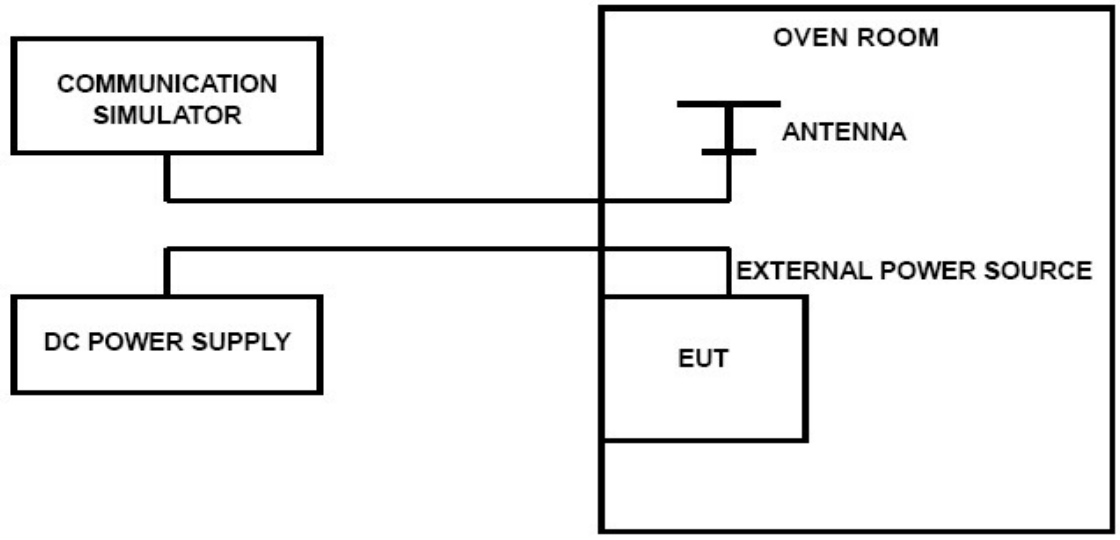
1. According to FCC Part 2 Section 2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30℃ to +50℃ centigrade.
2. According to FCC Part 2 Section 2.1055 (E) (2), for battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacture.
3. Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried voltage equipment and the end voltage point was 3.40V.

TEST PROCEDURE

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMU200 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature;
2. Subject the EUT to overnight soak at -30℃;
3. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on middle channel of WCDMA Band V, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming;
4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 0.5 hours at each temperature, unpowered, before making measurements;
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 0.5 hours unpowered, to allow any self-heating to stabilize, before continuing;
6. Subject the EUT to overnight soak at +50℃;
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming;
8. Repeat the above measurements at 10℃ increments from +50℃ to -30℃. Allow at least 0.5 hours at each temperature, unpowered, before making measurements;
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure;

TEST CONFIGURATION



TEST LIMITS

For Hand carried battery powered equipment
According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section

2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.40VDC and 4.20VDC, with a nominal voltage of 3.70DC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

For equipment powered by primary supply voltage

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

TEST RESULTS

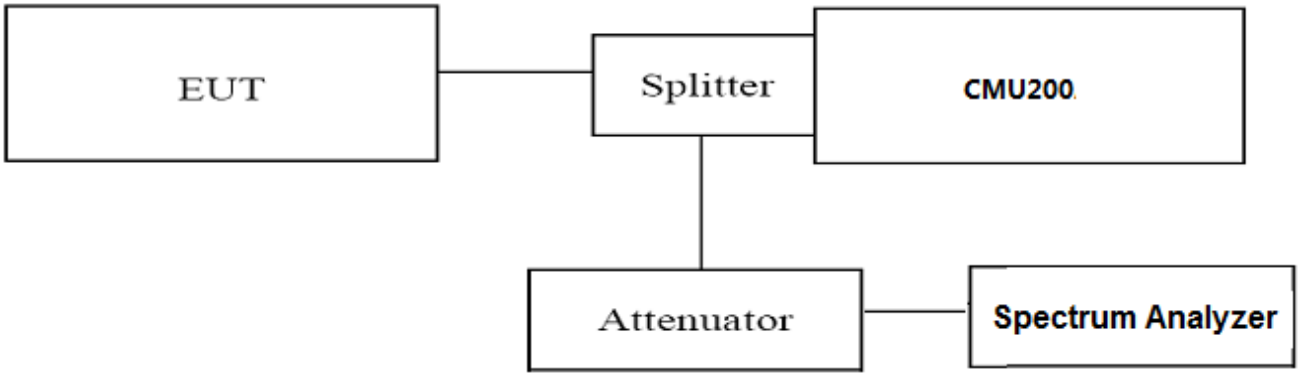
UMTS/TM1/WCDMA Band V					
DC Power	**Temperature (℃)**	**Frequency error (Hz)**	**Frequency error (ppm)**	**Limit (ppm)**	**Verdict**
3.40	20	5.56	0.01	2.50	PASS
3.70	20	-8.91	-0.01	2.50	PASS
4.20	20	1.36	0.00	2.50	PASS
3.70	-30	9.52	0.01	2.50	PASS
3.70	-20	5.12	0.01	2.50	PASS
3.70	-10	3.77	0.00	2.50	PASS
3.70	0	-6.17	-0.01	2.50	PASS
3.70	10	4.32	0.01	2.50	PASS
3.70	20	8.26	0.01	2.50	PASS
3.70	30	5.56	0.01	2.50	PASS
3.70	40	10.34	0.01	2.50	PASS
3.70	50	-7.14	-0.01	2.50	PASS

4.7 Peak-to-Average Ratio (PAR)

LIMIT

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

TEST CONFIGURATION



TEST PROCEDURE

1. Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
2. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
3. Set the number of counts to a value that stabilizes the measured CCDF curve;
4. Set the measurement interval as follows:
   1). for continuous transmissions, set to 1 ms,
   2). for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
5. Record the maximum PAPR level associated with a probability of 0.1%.

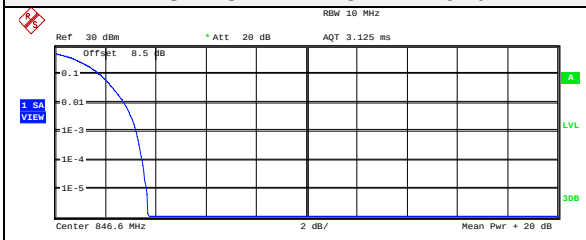
TEST RESULTS

Test Mode	Channel	Frequency (MHz)	PAPR Value (dB)	Limits (dB)	Verdict
UMTS/TM1/ WCDMA Band V	4132	826.4	3.21	13.0	PASS
	4182	836.4	3.27	13.0	PASS
	4233	846.6	3.56	13.0	PASS

Remark:
1. *Test results including cable loss;*
2. *please refer to following plots;*

Peak-to-Average Ratio (PAR)

UMTS/TM1/ WCDMA Band V

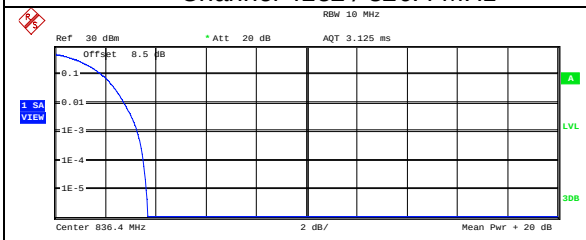


Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	22.27 dBm
Peak	25.96 dBm
Crest	3.69 dB
10 %	1.76 dB
1 %	2.72 dB
.1 %	3.21 dB
.01 %	3.46 dB

Date: 24.NOV.2015 18:42:28

Channel 4132 / 826.4 MHz

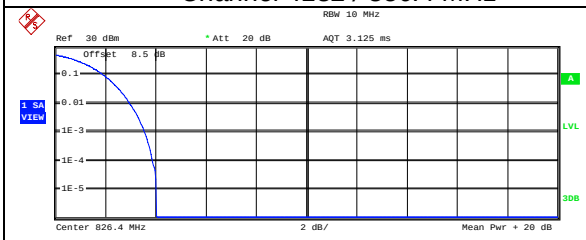


Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	22.50 dBm
Peak	26.17 dBm
Crest	3.68 dB
10 %	1.83 dB
1 %	2.72 dB
.1 %	3.27 dB
.01 %	3.49 dB

Date: 24.NOV.2015 18:42:51

Channel 4182 / 836.4 MHz



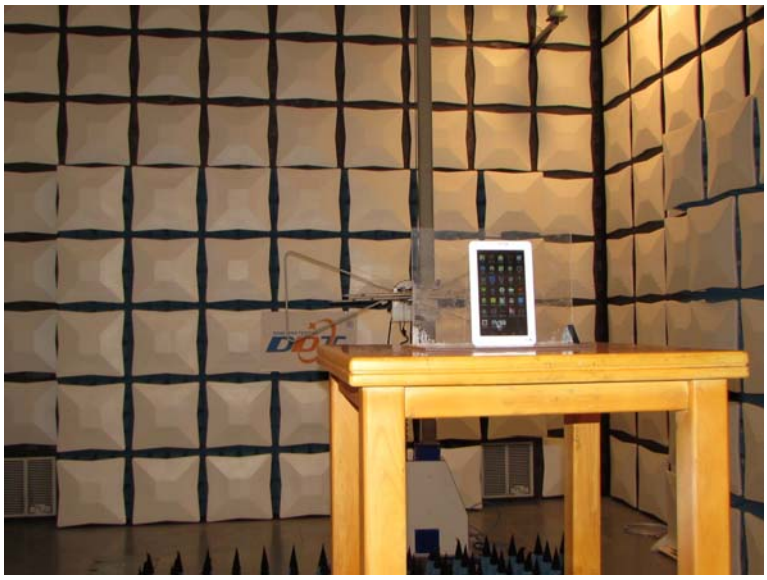
Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	22.43 dBm
Peak	26.46 dBm
Crest	4.03 dB
10 %	1.92 dB
1 %	2.95 dB
.1 %	3.56 dB
.01 %	3.88 dB

Date: 24.NOV.2015 18:43:22

Channel 4233 / 846.6 MHz

5 Test Setup Photos of the EUT



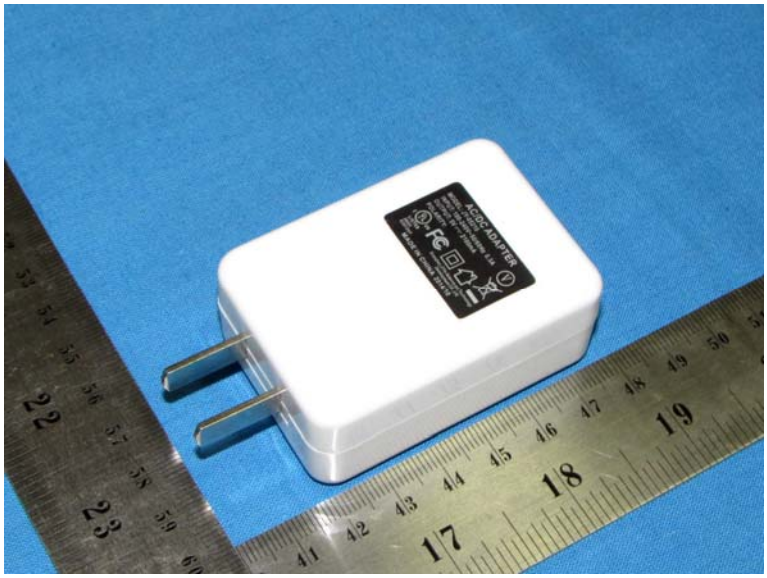
6 External and Internal Photos of the EUT

External Photos

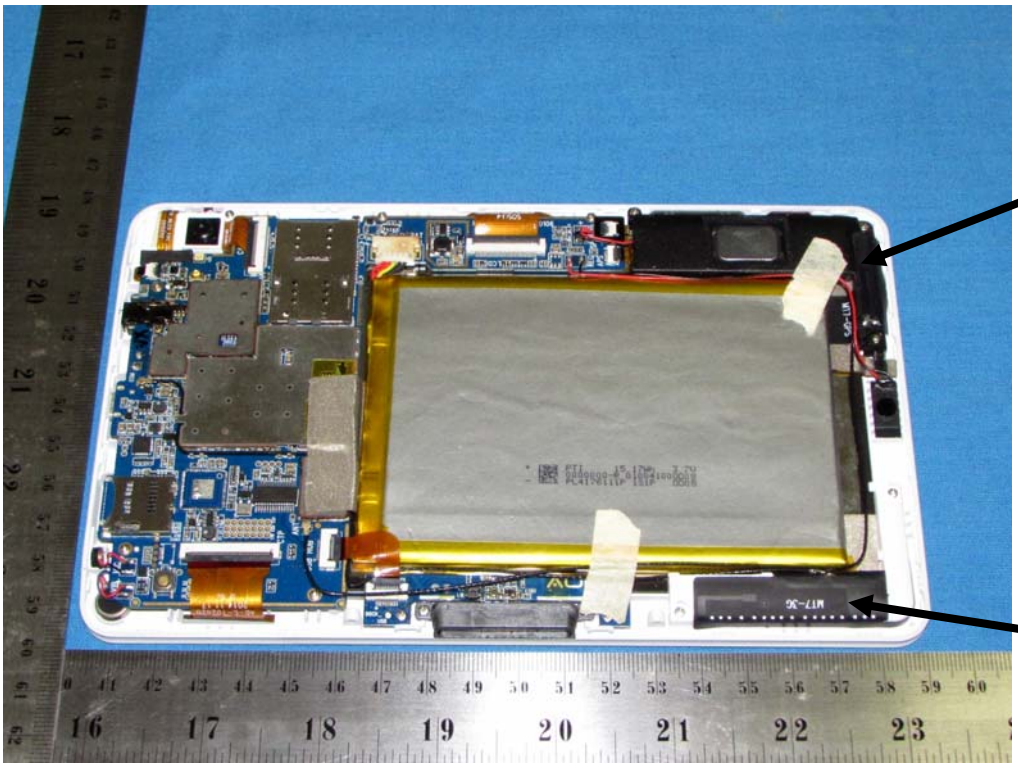

PLDT
HOME
TELPAD

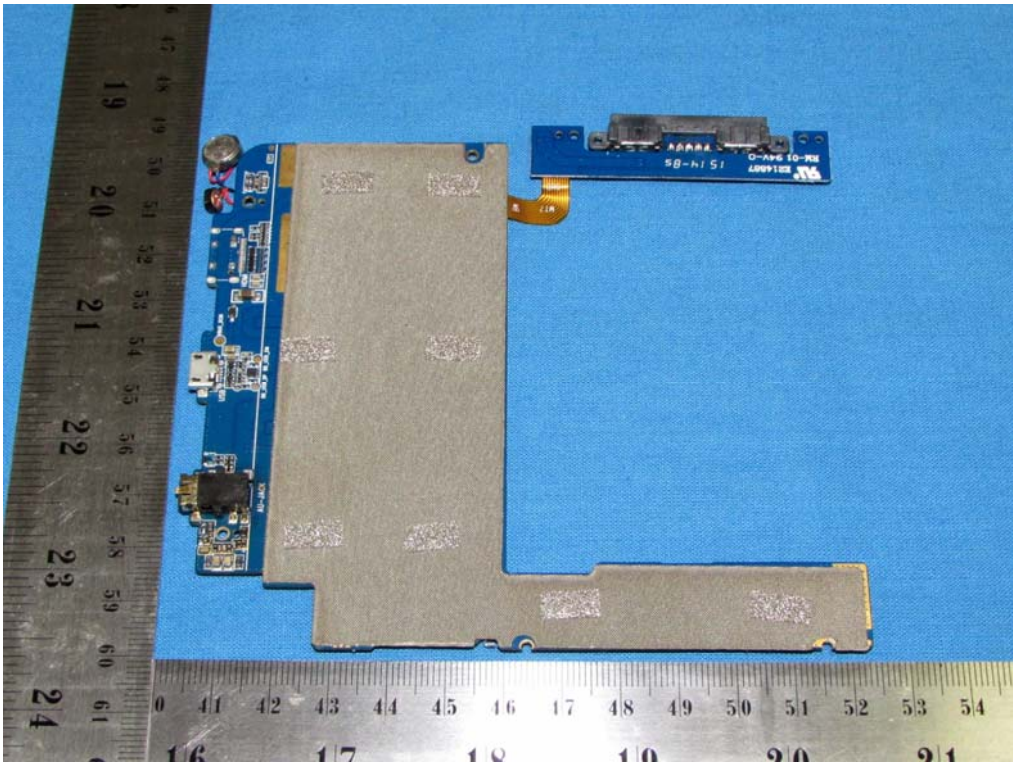

PLDT
HOME
TELPAD

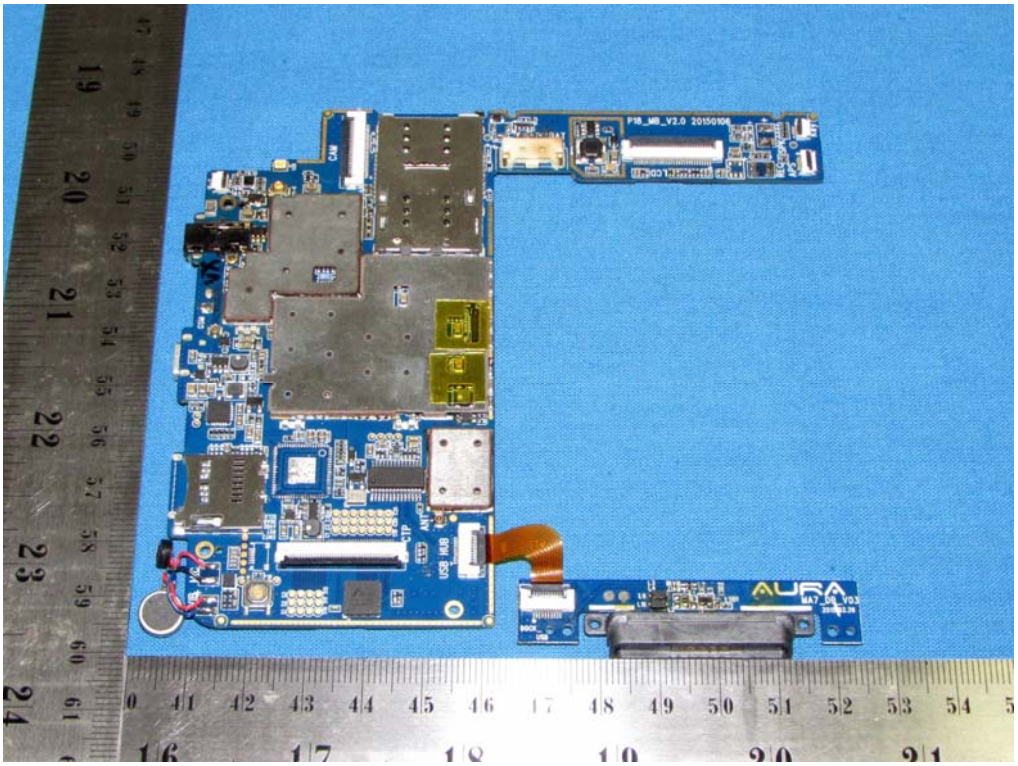

PLDT
HOME
TELPAD

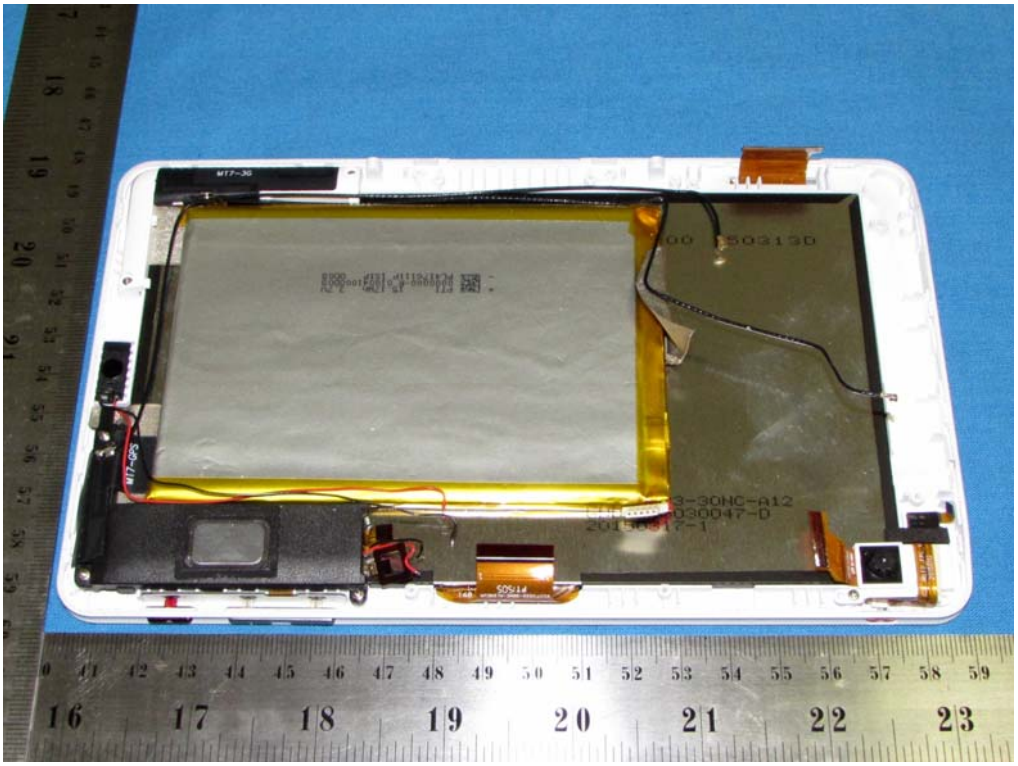


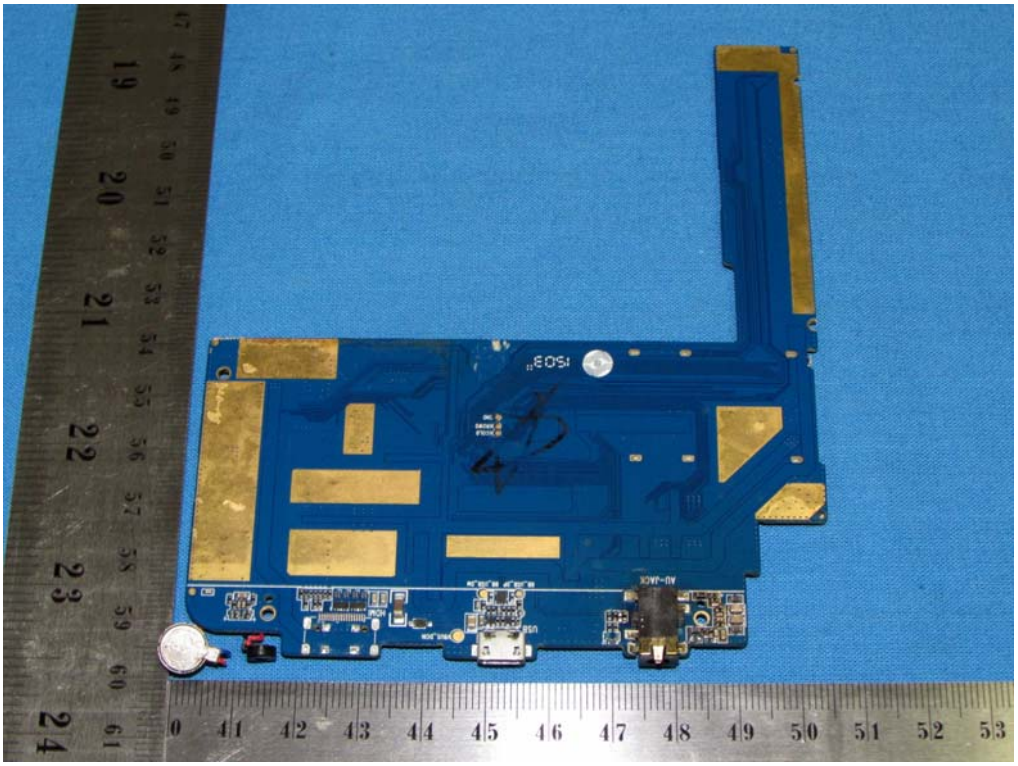
Internal Photos

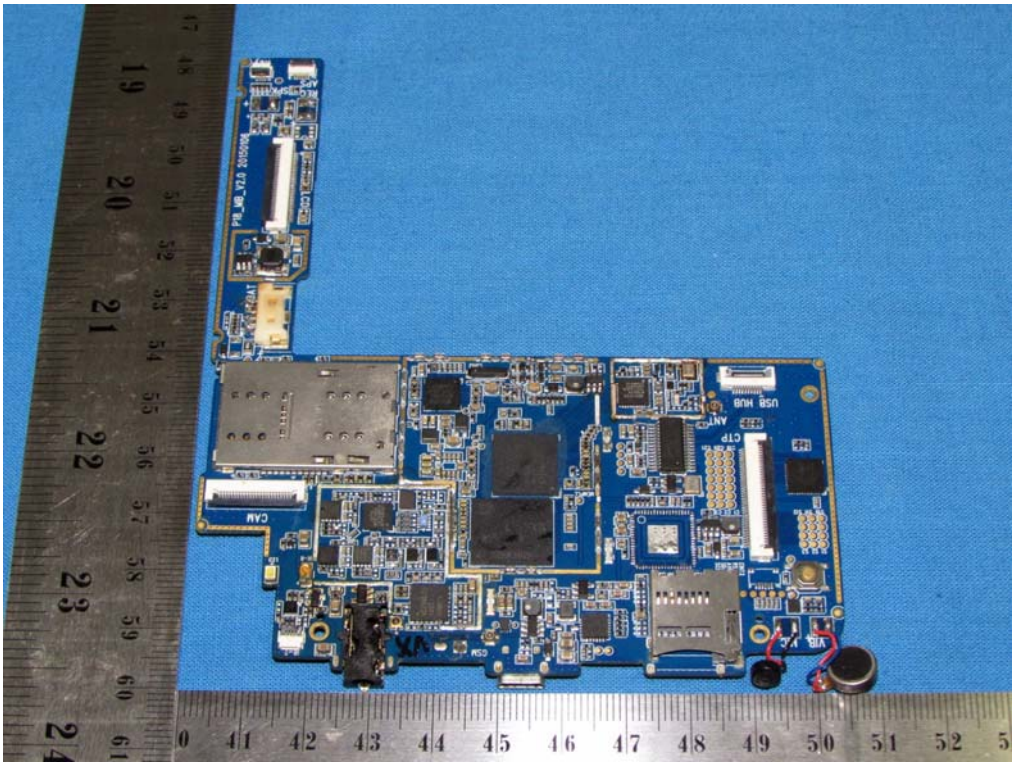












.....End of Report.....