FCC TEST REPORT
(Part 22)

REPORT NO.:	RF130902E05F-1
MODEL NO.:	xAPT-103PUW, FD410, xCE_T103PUW
FCC ID:	MQT-XAPT103PUWT
RECEIVED:	Sep. 02, 2013
TESTED:	Sep. 11 to 25, 2013 ; Aug. 10, 2016
ISSUED:	Sep. 09, 2016

APPLICANT:	XAC AUTOMATION CORP.
ADDRESS:	4F, No. 30, INDUSTRY E. RD. IX, SCIENCE-BASED INDUSTRIAL PARK,HSINCHU,TAIWAN

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
LAB ADDRESS :	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
TEST LOCATION (1):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
TEST LOCATION (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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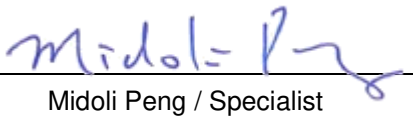
RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130902E05F-1	Original release.	Sep. 09, 2016

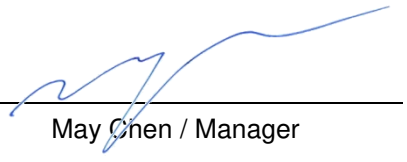
1 CERTIFICATION

PRODUCT:	Terminal
BRAND:	XAC, First Data
MODEL:	xAPT-103PUW, FD410, xCE_T103PUW
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	XAC AUTOMATION CORP.
TESTED:	Sep. 11 to 25, 2013 ; Aug. 10, 2016
STANDARDS:	**FCC PART 22, Subpart H**

The above equipment (model: xAPT-103PUW) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch,** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Sep. 09, 2016

Midoli Peng / Specialist

Approved by :  , **Date:** Sep. 09, 2016

May Chen / Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 22 & Part 2			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
2.1046 22.913 (a)	Effective radiated power	PASS	Meet the requirement of limit.
---	Peak To Average Ratio	PASS	Meet the requirement of limit.
2.1055 22.355	Frequency Stability	PASS	Meet the requirement of limit.
2.1049	Occupied Bandwidth	PASS	Meet the requirement of limit.
22.917	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 22.917	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -16.96dB at 2509.8MHz.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Radiated emissions	30MHz ~ 1GHz	5.37 dB
	1GHz ~ 6GHz	3.54 dB
	6GHz ~ 18GHz	4.08 dB
	18GHz ~ 40GHz	4.11 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2.2 TEST SITE AND INSTRUMENTS

For radiated spurious emissions (above 1GHz):

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 16, 2013	Jan. 15, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 30, 2012	Oct. 29, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Mar. 25, 2013	Mar. 24, 2014
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 27, 2012	Nov. 26, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 26, 2012	Dec. 25, 2013
RF Cable	NA	CHHCAB_001	Oct. 07, 2012	Oct. 06, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
Radio Communication Analyzer	Anritsu	MT8820C	May 30, 2013	May 29, 2014
Universal Radio Communication Tester	R&S	CMU200	Oct. 23, 2012	Oct. 22, 2013

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2 The test was performed in 966 Chamber No. H.
3 The FCC Site Registration No. is 797305.
4 The CANADA Site Registration No. is IC 7450H-3.
5 Tested Date: Sep. 11 to 25, 2013

For radiated spurious emissions (below 1GHz):

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 06, 2016	July 05, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D-FB	CHGCAB-001 -1 CHGCAB-001 -2	Oct. 03, 2015	Oct. 02, 2016
	RF-141	CHGCAB-004	Oct. 03, 2015	Oct. 02, 2016
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	CM100	NA	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-WD01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. G.
3 The FCC Site Registration No. is 966073.
3. The CANADA Site Registration No. is IC 7450H-2.
4 Tested Date: Aug. 10, 2016

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100060	May 03, 2013	May 02, 2014
Spectrum Analyzer Agilent	E4446A	MY48250113	Dec. 05, 2012	Dec. 04, 2013
AC Power Source EXTECH Electronics	6502	1140503	NA	NA
Temperature & Humidity Chamber TERCHY	MHU-225AU	911033	Dec. 11, 2012	Dec. 10, 2013
DC Power Supply GOOD WILL INSTRUMENT CO., LTD.	GPC - 3030D	7700087	NA	NA
ESG Vector signal generator Agilent	E4438C	MY47271330 506 602 UNJ	Apr. 30, 2013	Apr. 29, 2014
ESG Vector signal generator Agilent	E4438C	MY45094468/ 005 506 602 UK6 UNJ	Dec. 14, 2012	Dec. 13, 2013
Power meter Anritsu	ML2495A	1014008	Apr. 23, 2013	Apr. 22, 2014
Power sensor Anritsu	MA2411B	0917122	Apr. 23, 2013	Apr. 22, 2014
Power meter Anritsu	ML2495A	0824006	May 20, 2013	May 19, 2014
Power sensor Anritsu	MA2411B	0738172	May 20, 2013	May 19, 2014
Power meter Anritsu	ML2487B	0930006	Nov. 14, 2012	Nov. 13, 2013
Power sensor Anritsu	MA2491A	0845370	Nov. 14, 2012	Nov. 13, 2013
Software	Total Power Measurement Tools V7.1	NA	NA	NA
Software	ADT_RF Test Software V6.6.5.3	NA	NA	NA
Universal Radio Communication Tester	R&S	CMU200	Oct. 23, 2012	Oct. 22, 2013
Digital Multimeter FLUKE	87III	73680266	Nov. 27, 2012	Nov. 06, 2013

NOTE: 1. The test was performed in Oven room A.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: Sep. 24, 2013

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Terminal	
MODEL NO.	xAPT-103PUW, FD410, xCE_T103PUW	
POWER SUPPLY	DC 7.4V from Battery DC 12V from power adapter	
HW VERSION	B2 (Rev.3)	
SW VERSION	Revision 01.009	
MODULATION TYPE	**GPRS**	GMSK
	EDGE	8PSK
	WCDMA, HSDPA, HSUPA	BPSK
FREQUENCY RANGE	**GPRS, EDGE**	824.2MHz ~ 848.8MHz
	WCDMA	826.4MHz ~ 846.6MHz
MAX. ERP POWER	**GPRS**	1584.9mW
	EDGE	891.3mW
	WCDMA	214.8mW
EMISSION DESIGNATOR	**GPRS**	246KGXW
	EDGE	246KG7W
	WCDMA	4M08F9W
	HSDPA	4M08F9W
	HSUPA	4M08F9W
MULTI-SLOTS CLASS	12	
WCDMA RELEASE VERSION	R7	
ANTENNA TYPE	Refer to Note	
I/O PORTS	Refer to users' manual	
DATA CABLE	NA	
ACCESSORY DEVICES	Adapter (Optional) x 1	

NOTE:

1. The EUT could be supplied with DC 7.4V battery or power adapter as the following table:

Battery		
Brand	Model No.	Spec.
Foxlink	FD400	DC 7.4V, 2300mAh (17.02Wh)
Adapter (only for test, not for sale)		
Brand	Model No.	Spec.
DELTA	ADP-36JH B	AC I/P: 100-240V, 50-60Hz, 1.0A AC input cable: Unshielded, 1.85m DC O/P: 12V, 3A DC output cable: Unshielded, 1.8m with one core

2. All models are listed as below table:

Brand	Model	Difference
XAC	xAPT-103PUW	For marketing requirement
XAC	xCE_T103PUW	
First Data	FD410	

From the above models, model: xAPT-103PUW was selected as representative model for the test and its data was recorded in this report.

3. The EUT is a WLAN, RFID, GSM and WCDMA device.
4. The antennas provided to the EUT, please refer to the following table:

GPRS, EDGE, WCDMA, HSDPA and HSUPA Antenna Spec.					
Brand	Model No.	Antenna Type	Antenna Connector	Gain(dBi)	Frequency range (MHz)
Ethertronics Inc.	T-000084-01	FPCB	IPEX	0.14	850
				2.57	1900
WLAN Antenna Spec.					
Brand	Model No.	Antenna Type	Antenna Connector	Gain(dBi)	Frequency range (MHz)
ACX	AT3216-T2R4PAA	Chip	NA	1.5	2400-2500
RFID Antenna Spec.					
Brand	Model No.	Antenna Type	Antenna Connector	Gain(dBi)	Frequency range (MHz)
XAC	PCB ENIG ANT BOARD (W/KEY) 8006(ROHS)	Loop	NA	13	13.56

5. WLAN, RFID, GSM and WCDMA technology cannot transmit at same time.

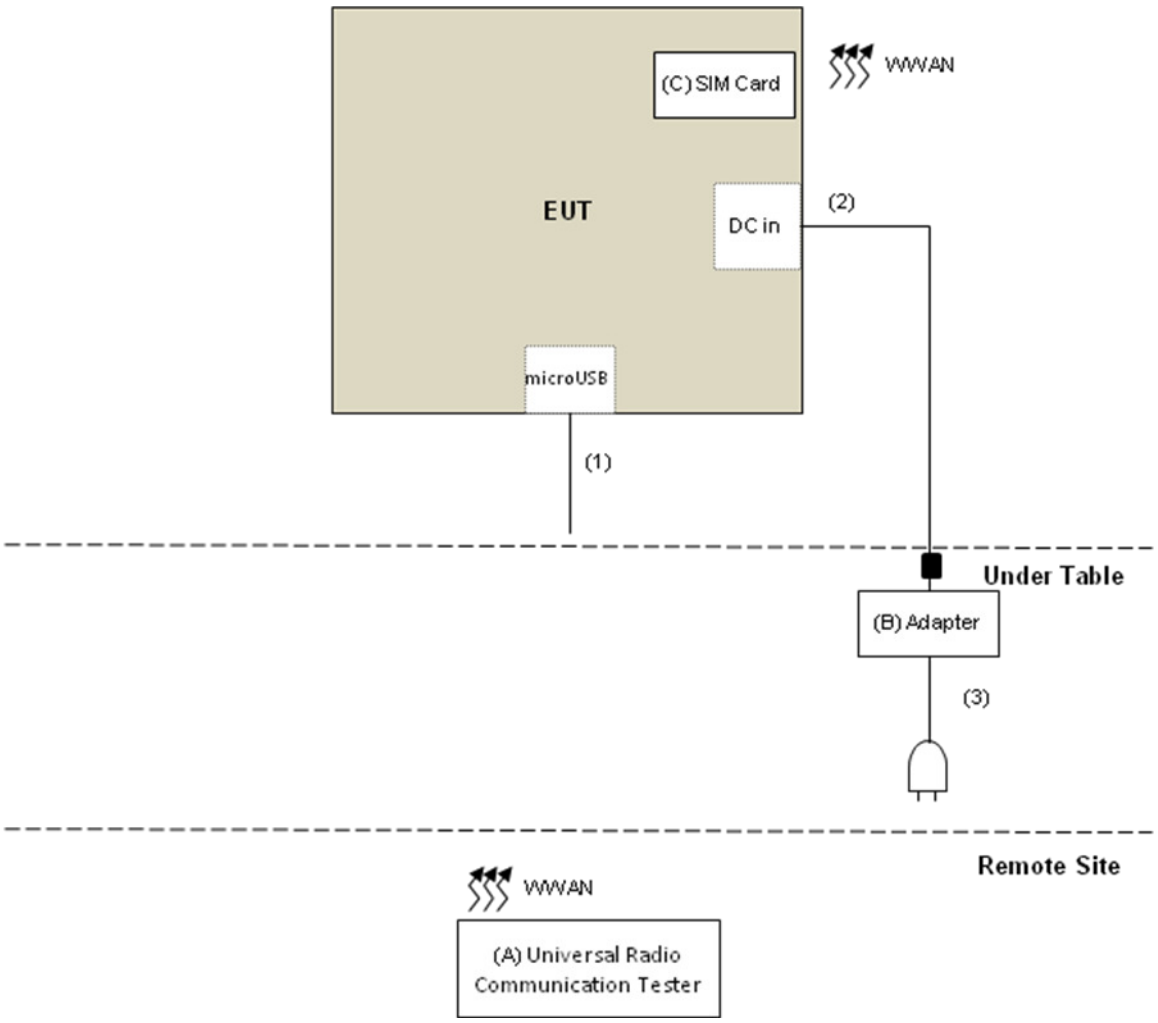
6. The EUT is pre-tested under following test modes :

Pre-test Mode	Description
Mode A	Battery mode
Mode B	**Adapter mode**

For the above modes, the worse radiated emissions test was found in **Mode B**. Therefore only the test data of the modes were recorded in this report.

7. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 CONFIGURATION OF SYSTEM UNDER TEST



3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Universal Radio Communication Tester	R&S	CMU200	121040	NA	Provided by Lab
B.	Adapter	DELTA	ADP-36JH B	NA	NA	Supplied by Client
C.	SIM Card	R&S	CRT-Z3	NA	NA	Provided by Lab

Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	microUSB Cable	1	1	No	0	Provided by Lab
2.	DC Cable	1	1.8	No	1	Supplied by client
3.	AC Cable	1	1.85	No	0	Supplied by client

Note: The core(s) is(are) originally attached to the cable(s).

3.4 TEST ITEM AND TEST CONFIGURATION

Following channel(s) was (were) selected for the final test as listed below:

GPRS MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
ERP	128 to 251	128, 190, 251	GPRS, EDGE
FREQUENCY STABILITY	128 to 251	190	GPRS, EDGE
OCCUPIED BANDWIDTH	128 to 251	128, 190, 251	GPRS, EDGE
BAND EDGE	128 to 251	128, 251	GPRS, EDGE
PEAK TO AVERAGE RATIO	128 to 251	128, 190, 251	GPRS, EDGE
CONDCUDETED EMISSION	128 to 251	190	GPRS, EDGE
RADIATED EMISSION	128 to 251	190	GPRS, EDGE

WCDMA MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
ERP	4132 to 4233	4132, 4183, 4233	WCDMA
FREQUENCY STABILITY	4132 to 4233	4183	WCDMA
OCCUPIED BANDWIDTH	4132 to 4233	4132, 4183, 4233	WCDMA, HSDPA, HSUPA
BAND EDGE	4132 to 4233	4132, 4233	WCDMA, HSDPA, HSUPA
PEAK TO AVERAGE RATIO	4132 to 4233	4132, 4233	WCDMA
CONDCUDETED EMISSION	4132 to 4233	4183	WCDMA
RADIATED EMISSION	4132 to 4233	4183	WCDMA

TEST CONDITION:

GPRS/WCDMA

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	25deg. C, 63%RH	7.4Vdc	James Chan
FREQUENCY STABILITY	25deg. C, 63%RH	7.4Vdc	James Chan
OCCUPIED BANDWIDTH	25deg. C, 63%RH	7.4Vdc	James Chan
BAND EDGE	25deg. C, 63%RH	7.4Vdc	James Chan
PEAK TO AVERAGE RATIO	25deg. C, 63%RH	7.4Vdc	James Chan
CONDCUDETED EMISSION	25deg. C, 63%RH	7.4Vdc	James Chan
RADIATED EMISSION (Below 1GHz)	25deg. C, 63%RH	120Vac, 60Hz	Weiwei Lo
RADIATED EMISSION (Above 1GHz)	25deg. C, 63%RH	120Vac, 60Hz	Tim Ho

3.5 EUT OPERATING CONDITIONS

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

3.6 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 22

ANSI/TIA/EIA-603-D 2010

NOTE: All test items have been performed and recorded as per the above standards.

4 TEST TYPES AND RESULTS

4.1 OUTPUT POWER MEASUREMENT

4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Mobile / Portable station are limited to 7 watts e.r.p.

4.1.2 TEST PROCEDURES

CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with GPRS, EDGE & WCDMA link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

EIRP / ERP MEASUREMENT:

a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GPRS & EDGE and 5MHz for WCDMA mode.

b. Substitution method is used for EIRP measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

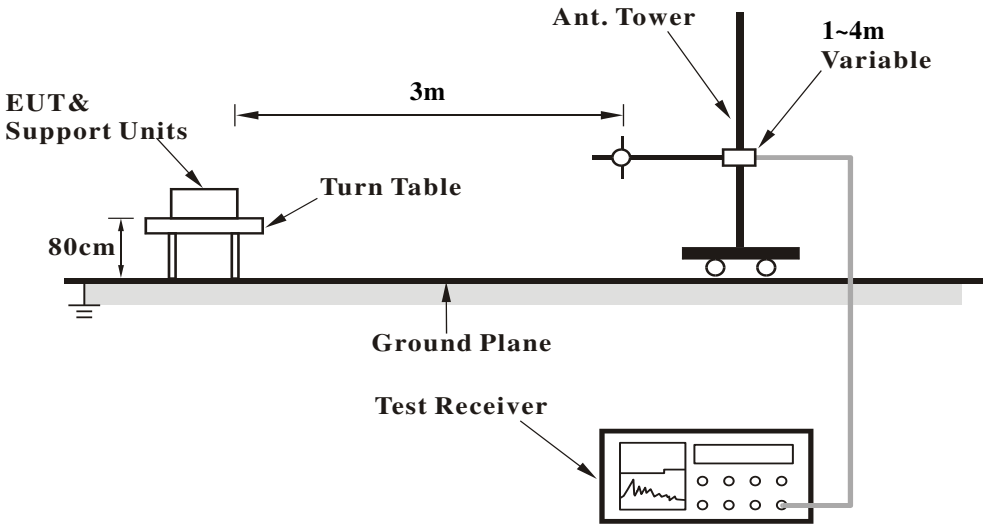
c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step b. Record the power level of S.G

d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn. ERP power can be calculated form E.I.R.P power by subtracting the gain of dipole, ERP power = EIRP power - 2.15dBi.

Note: The worst case vertical or horizontal polarization have been investigated and reported in this report.

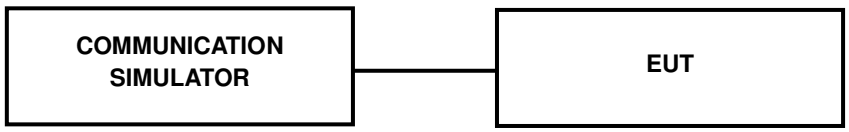
4.1.3 TEST SETUP

EIRP / ERP MEASUREMENT:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

CONDUCTED POWER MEASUREMENT:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

Band	GPRS850		
Channel	128	190	251
Frequency (MHz)	824.2	836.6	848.8
GPRS 8	32.5	32.5	**32.6**
GPRS 10	29.8	29.9	29.9
GPRS 11	28.0	28.0	27.9
GPRS 12	26.9	26.8	26.8
EDGE 8 (MCS9)	30.1	30.0	30.9
EDGE 10 (MCS9)	27.0	26.9	26.9
EDGE 11 (MCS9)	25.1	25.0	25.0
EDGE 12 (MCS9)	24.1	23.9	23.8

Band	WCDMA V		
Channel	4132	4183	4233
Frequency (MHz)	826.4	836.6	846.6
RMC	23.8	23.9	23.7
HSDPA Subtest-1	23.4	23.5	23.3
HSDPA Subtest-2	23.4	23.3	23.3
HSDPA Subtest-3	23.5	23.5	23.4
HSDPA Subtest-4	23.3	23.4	23.4
HSUPA Subtest-1	23.5	23.7	23.5
HSUPA Subtest-2	23.4	23.6	23.4
HSUPA Subtest-3	23.4	23.6	23.5
HSUPA Subtest-4	23.3	23.7	23.5
HSUPA Subtest-5	23.4	23.6	23.4

ERP POWER (dBm)

GPRS

Plane	Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)
X	128	824.2	H	27.5	1.3	28.8	758.6
	190	836.6	H	29.2	1.2	30.4	1096.5
	251	848.8	H	31.0	1.0	32.0	1584.9

EDGE

Plane	Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)
X	128	824.2	H	25.3	1.3	26.6	457.1
	190	836.6	H	26.9	1.2	28.1	645.7
	251	848.8	H	28.5	1.0	29.5	891.3

WCDMA

Plane	Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)
X	4132	826.4	H	20.1	1.3	21.4	136.8
	4183	836.6	H	20.8	1.2	22.0	157.8
	4233	846.6	H	22.3	1.0	23.3	214.8

4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.2.2 TEST PROCEDURE

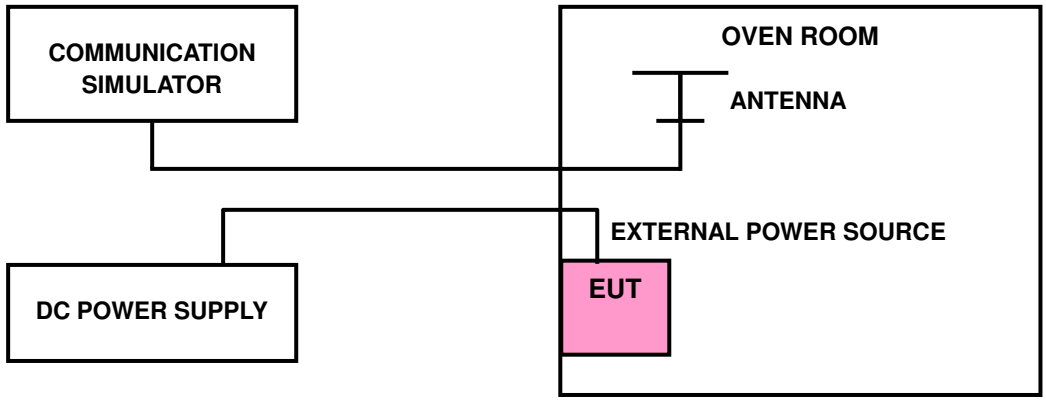
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the DC input power. The test voltage range is from 6.29Vdc to 8.51Vdc working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

4.2.3 TEST SETUP



4.2.4 TEST RESULTS

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)			LIMIT (ppm)
	GPRS	EDGE	WCDMA	
6.29	0.016	0.018	0.006	2.5
8.51	0.017	0.019	0.005	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 6.29Vdc to 8.51Vdc.

FREQUENCY ERROR VS. TEMPERATURE.

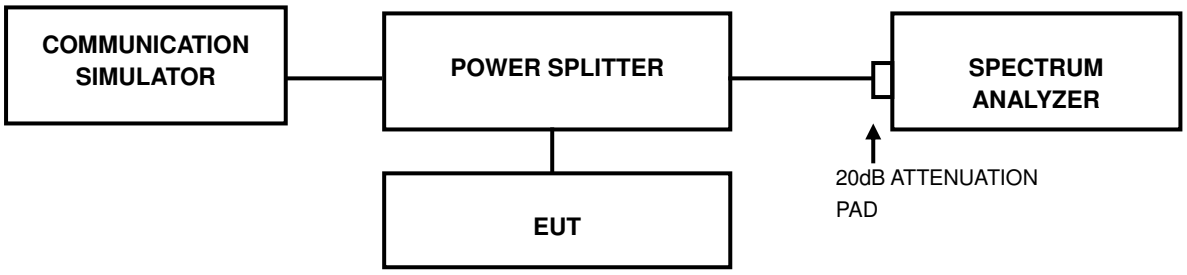
TEMP. (℃)	FREQUENCY ERROR (ppm)			LIMIT (ppm)
	GPRS	EDGE	WCDMA	
50	0.032	0.035	0.016	2.5
40	0.027	0.033	0.014	2.5
30	0.023	0.031	0.011	2.5
20	0.020	0.027	0.010	2.5
10	0.022	0.024	0.008	2.5
0	0.026	0.025	0.011	2.5
-10	0.033	0.031	0.013	2.5
-20	0.032	0.032	0.016	2.5
-30	0.035	0.033	0.019	2.5

4.3 OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 TEST PROCEDURES

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

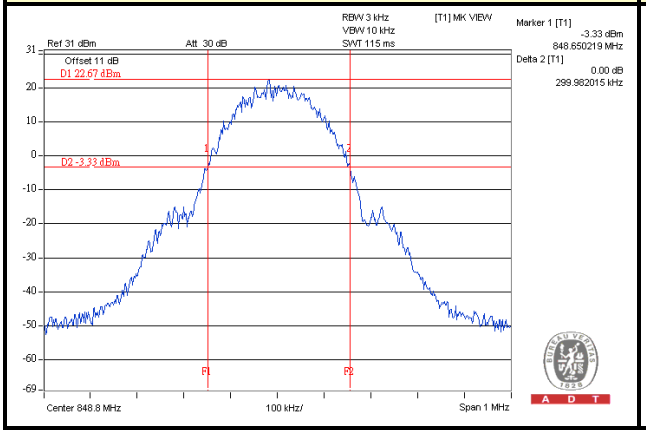
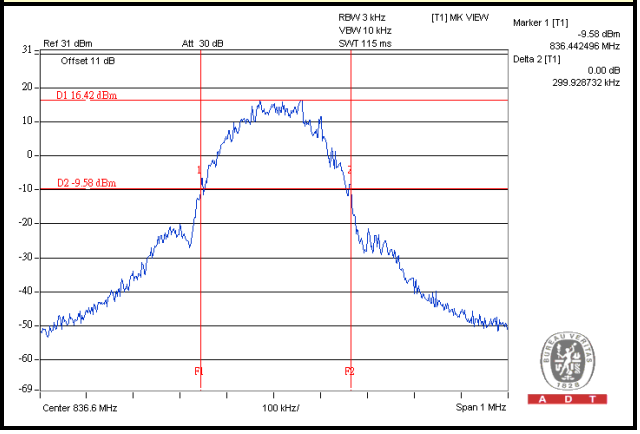
4.3.2 TEST SETUP



4.3.3 TEST RESULTS(-26dB Bandwidth)

GPRS / EDGE

CHANNEL	FREQUENCY (MHz)	-26dB BANDWIDTH (kHz)	
		GPRS	EDGE
128	824.2	299.737	299.024
190	836.6	299.374	299.929
251	848.8	299.982	299.205

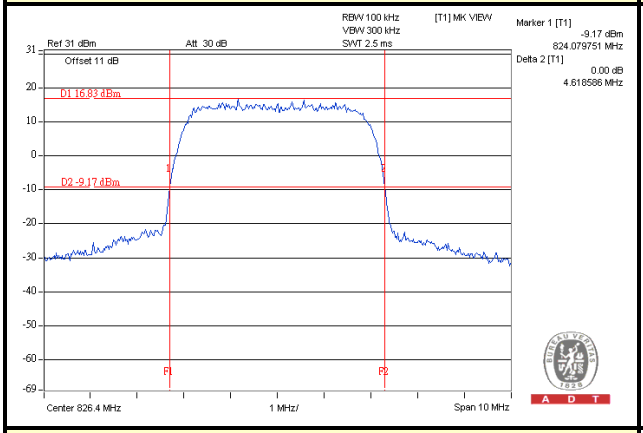
SPECTRUM PLOT OF WORST VALUE	
GPRS	EDGE
	

WCDMA / HSDPA / HSUPA

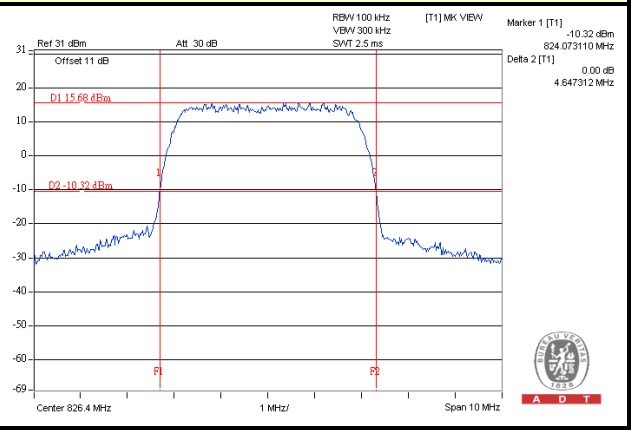
CHANNEL	FREQUENCY (MHz)	-26dB BANDWIDTH (MHz)		
		WCDMA	HSDPA	HSUPA
4132	826.4	4.619	4.647	4.620
4183	836.6	4.585	4.618	4.606
4233	846.6	4.599	4.635	4.548

SPECTRUM PLOT OF WORST VALUE

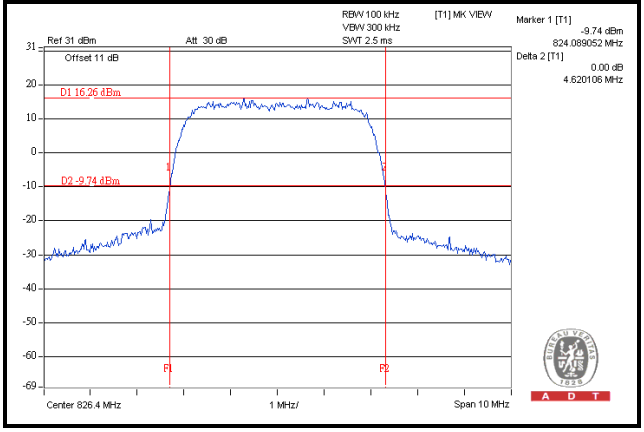
WCDMA



HSDPA



HSUPA



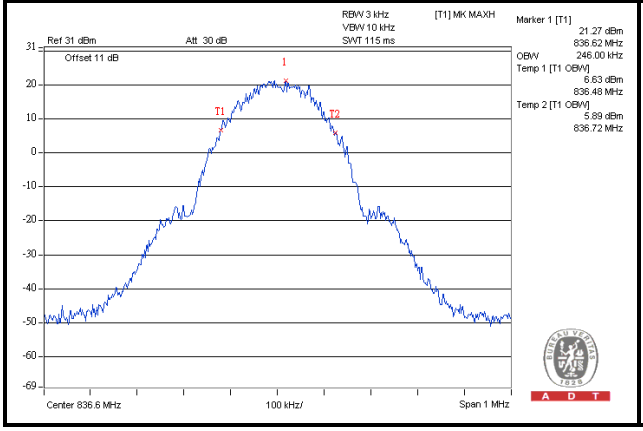
4.3.4 TEST RESULTS(Occupied Bandwidth)

GPRS / EDGE

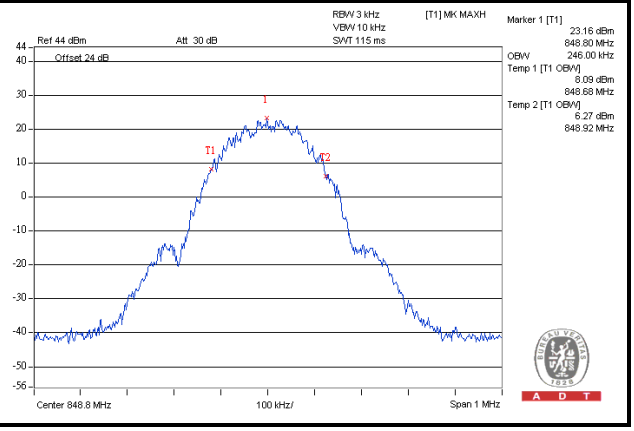
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (kHz)	
		GPRS	EDGE
128	824.2	240	244
190	836.6	246	242
251	848.8	242	246

SPECTRUM PLOT OF WORST VALUE

GPRS



EDGE

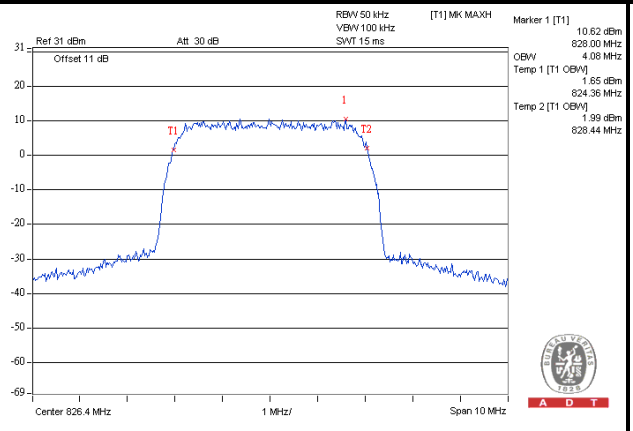


WCDMA / HSDPA / HSUPA

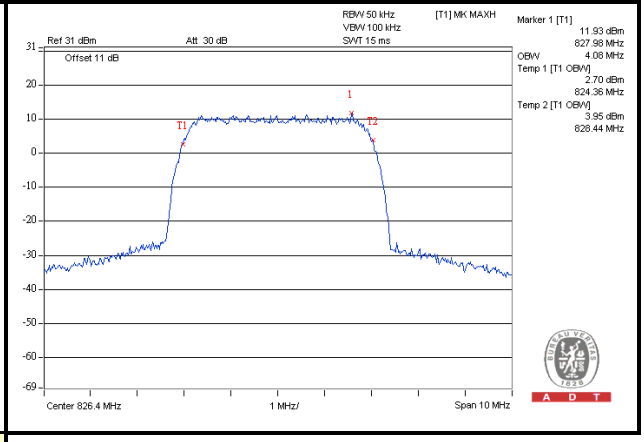
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		
		WCDMA	HSDPA	HSUPA
4132	826.4	4.08	4.08	4.06
4183	836.6	4.07	4.06	4.06
4233	846.6	4.06	4.06	4.08

SPECTRUM PLOT OF WORST VALUE

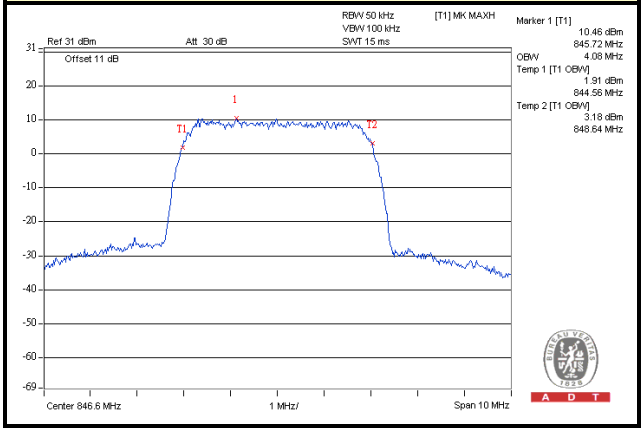
WCDMA



HSDPA



HSUPA

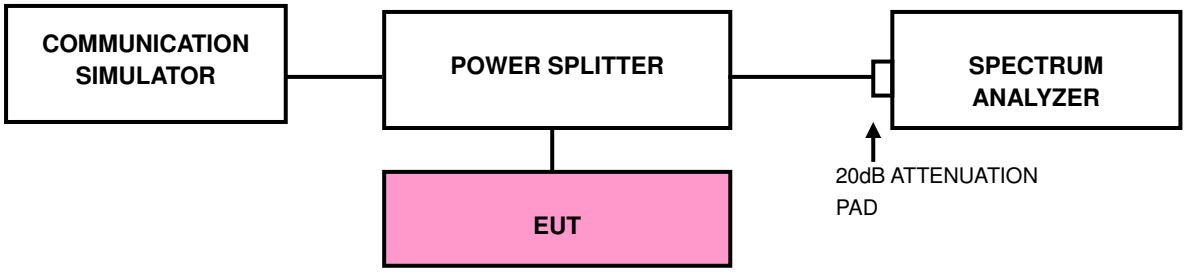


4.4 BAND EDGE MEASUREMENT

4.4.1 LIMITS OF BAND EDGE MEASUREMENT

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. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

4.4.2 TEST SETUP



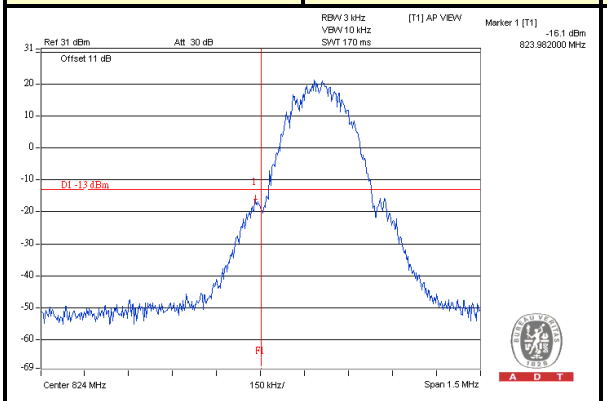
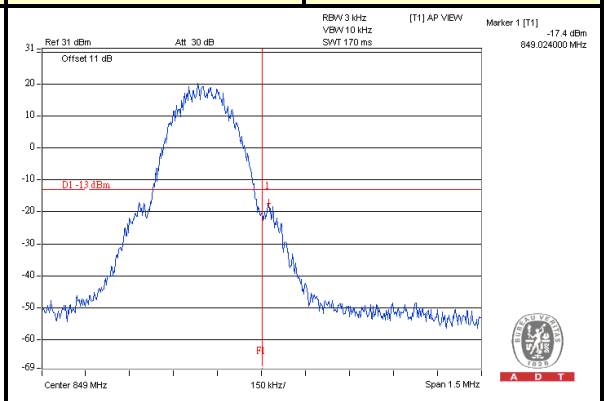
4.4.3 TEST PROCEDURES

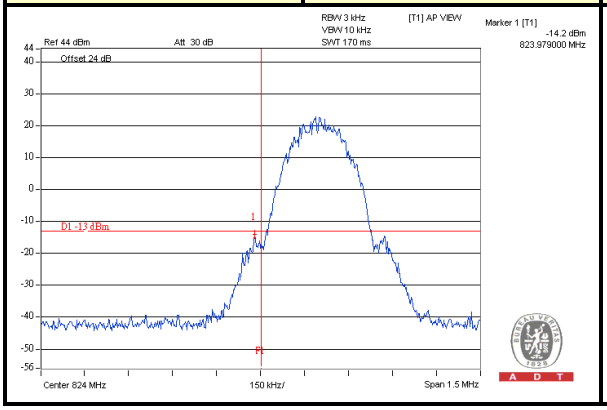
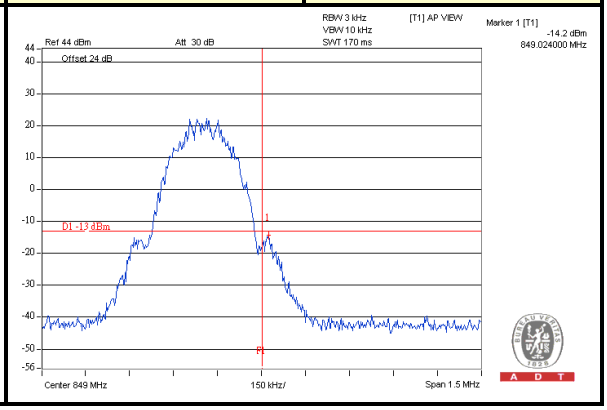
a. All measurements were done at low and high operational frequency range.

b. The center frequency of spectrum is the band edge frequency and s RB of the spectrum is >1% OCCUPIED BANDWIDTH and VB of the spectrum is $\geqq$ 3*RB.

c. Record the max trace plot into the test report.

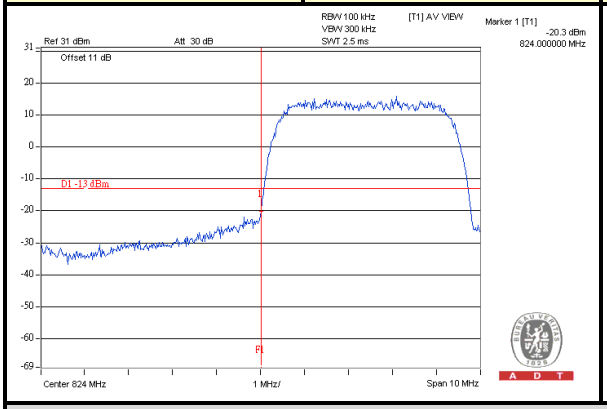
4.4.4 TEST RESULTS

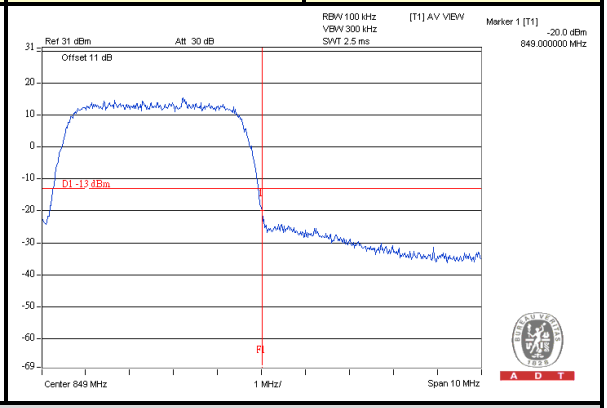
GPRS			
CHANNEL	128	CHANNEL	251
			

EDGE			
CHANNEL	128	CHANNEL	251
			

WCDMA

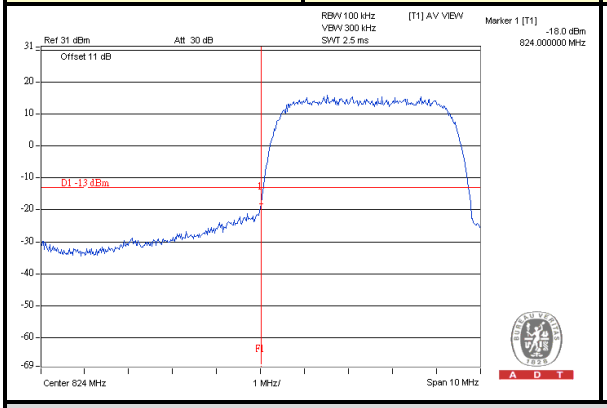
CHANNEL	4132	CHANNEL	4233

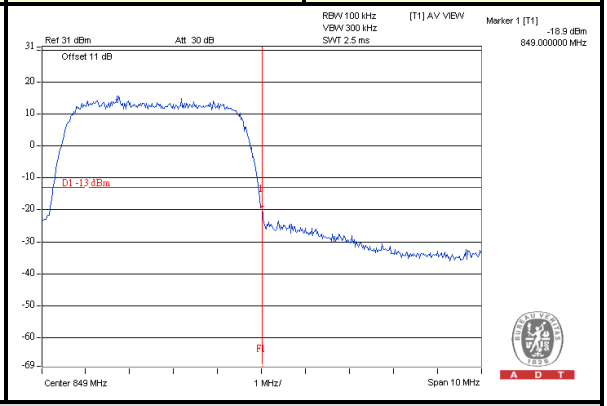




HSDPA

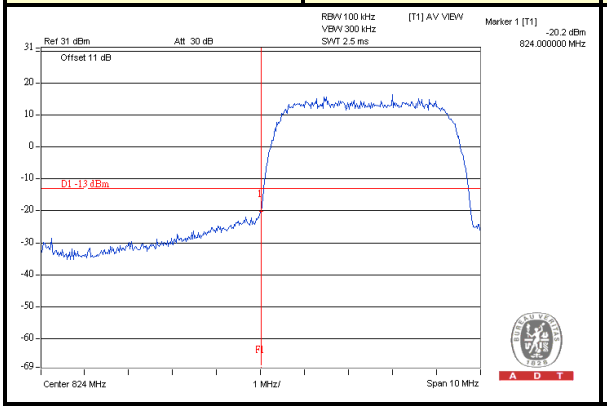
CHANNEL	4132	CHANNEL	4233

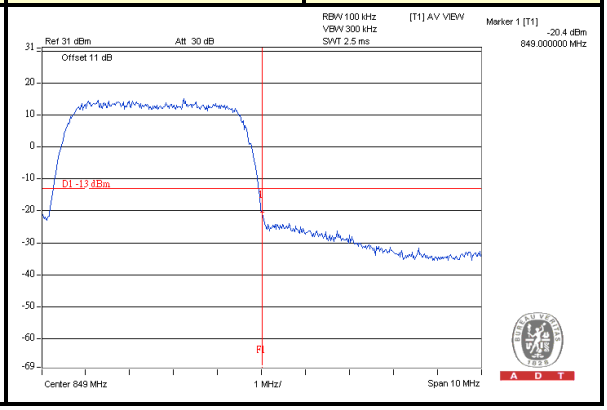




HSUPA

CHANNEL	4132	CHANNEL	4233



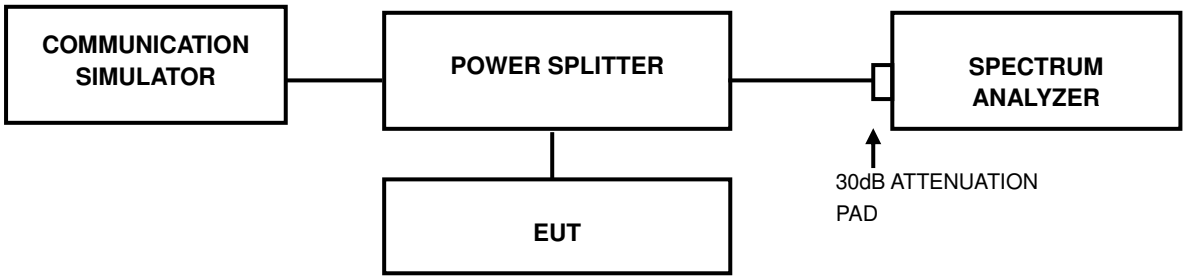


4.5 PEAK TO AVERAGE RATIO

4.5.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

4.5.2 TEST SETUP



4.5.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

4.5.4 TEST RESULTS

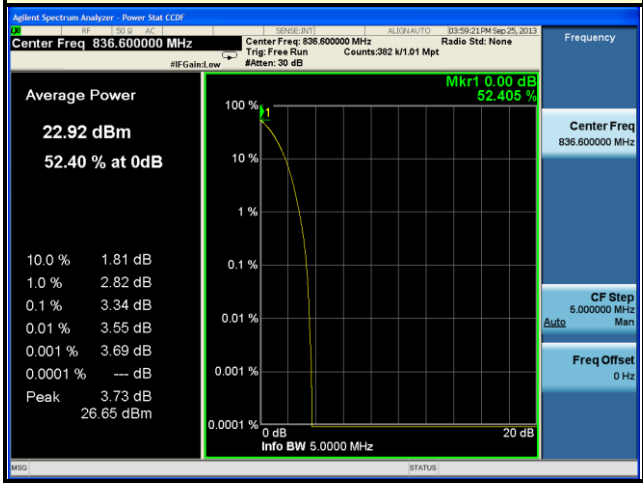
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQ. (MHz)	PEAK TO AVERAGE RATIO (dB)
		GPRS	EDGE			WCDMA
128	824.2	0.12	3.18	4132	826.4	2.84
189	836.4	0.12	3.15	4182	836.4	3.34
251	848.8	0.11	3.06	4233	846.6	2.76

SPECTRUM PLOT OF WORST VALUE

GPRS

EDGE

WCDMA



4.6 CONDUCTED SPURIOUS EMISSIONS

4.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

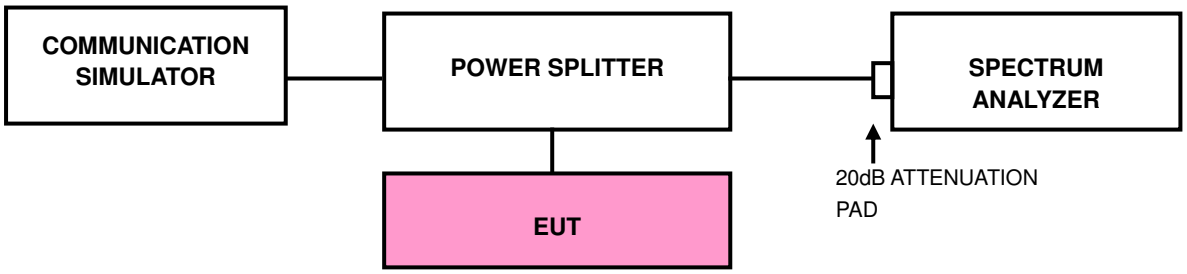
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

4.6.2 TEST PROCEDURE

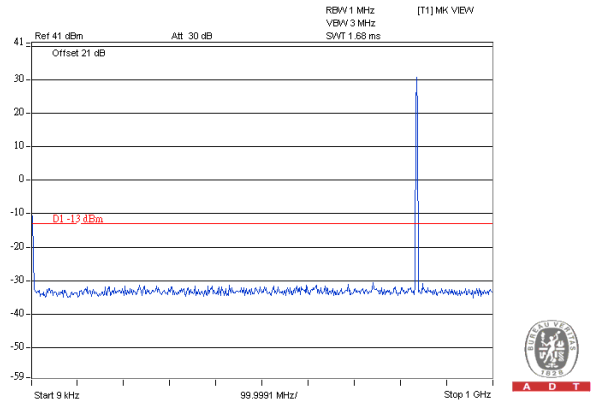
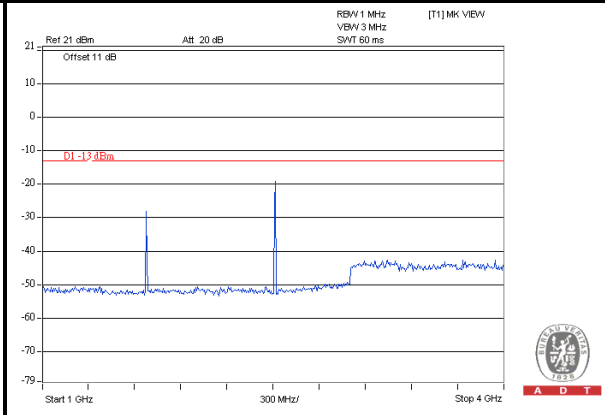
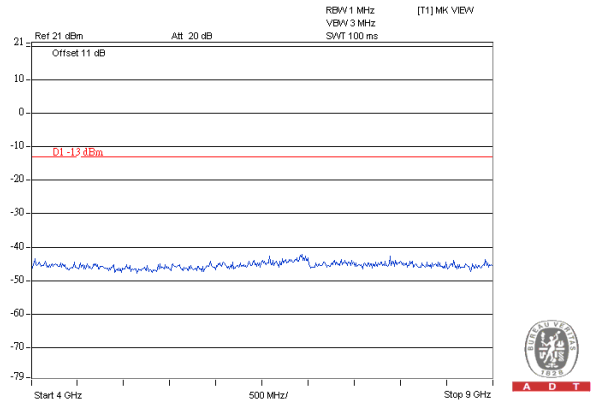
a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.

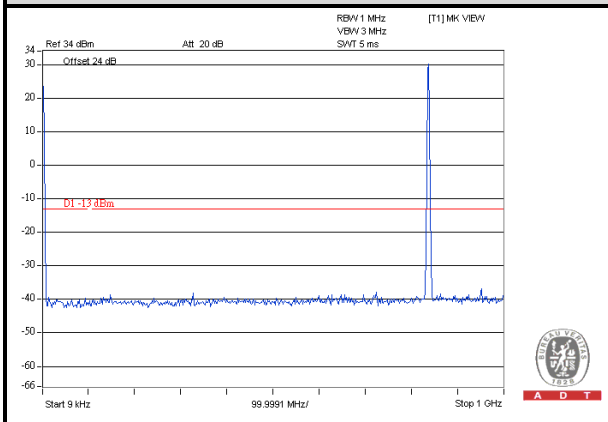
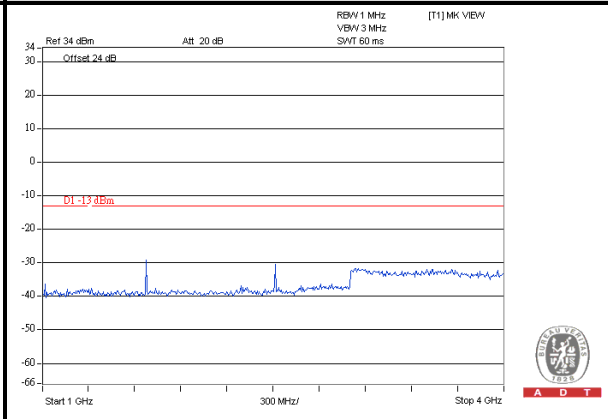
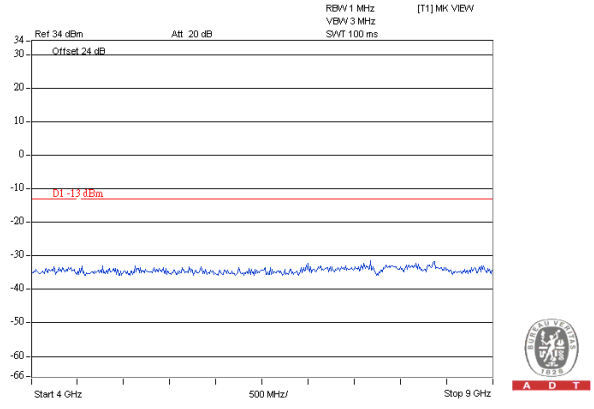
b. Measuring frequency range is from 9kHz to 9GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

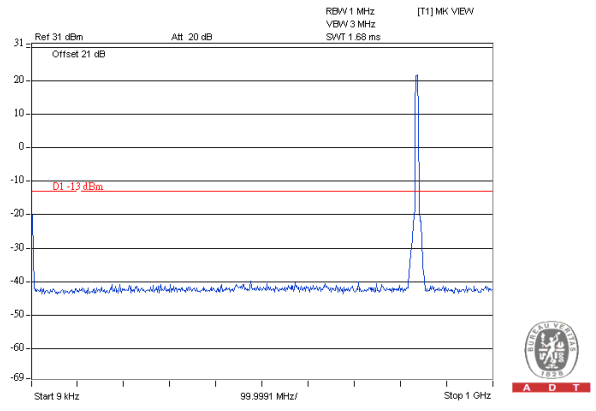
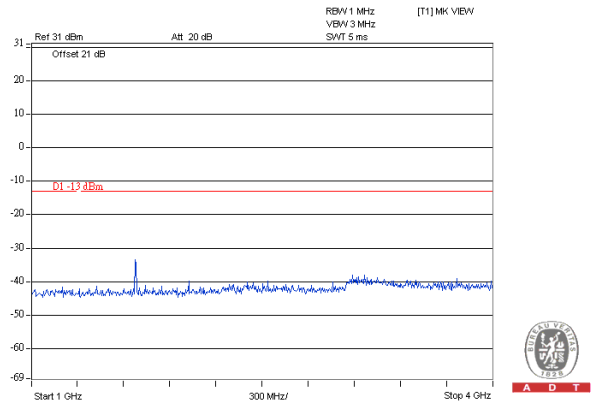
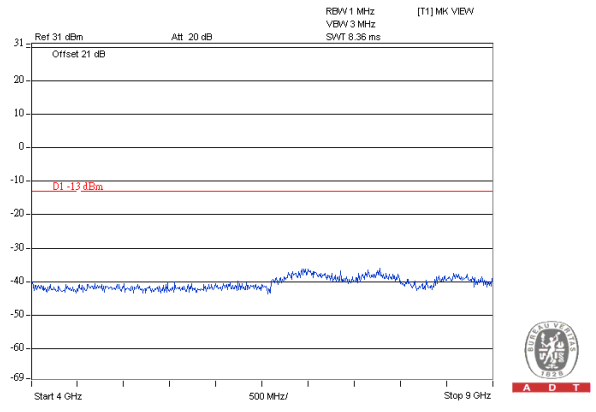
4.6.3 TEST SETUP



4.6.4 TEST RESULTS

GPRS	
CHANNEL 190	
FREQUENCY RANGE : 9kHz~1GHz	FREQUENCY RANGE : 1GHz~4GHz
	
FREQUENCY RANGE : 4GHz~9GHz	
	

EDGE	
CHANNEL 190	
FREQUENCY RANGE : 9kHz~1GHz	FREQUENCY RANGE : 1GHz~4GHz
	
FREQUENCY RANGE : 4GHz~9GHz	
	

WCDMA	
CHANNEL 4183	
FREQUENCY RANGE : 9kHz~1GHz	FREQUENCY RANGE : 1GHz~4GHz
	
FREQUENCY RANGE : 4GHz~9GHz	
	

4.7 RADIATED EMISSION MEASUREMENT

4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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 emission limit equal to –13dBm.

4.7.2 TEST PROCEDURES

a. Substitution method is used for EIRP measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G

c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

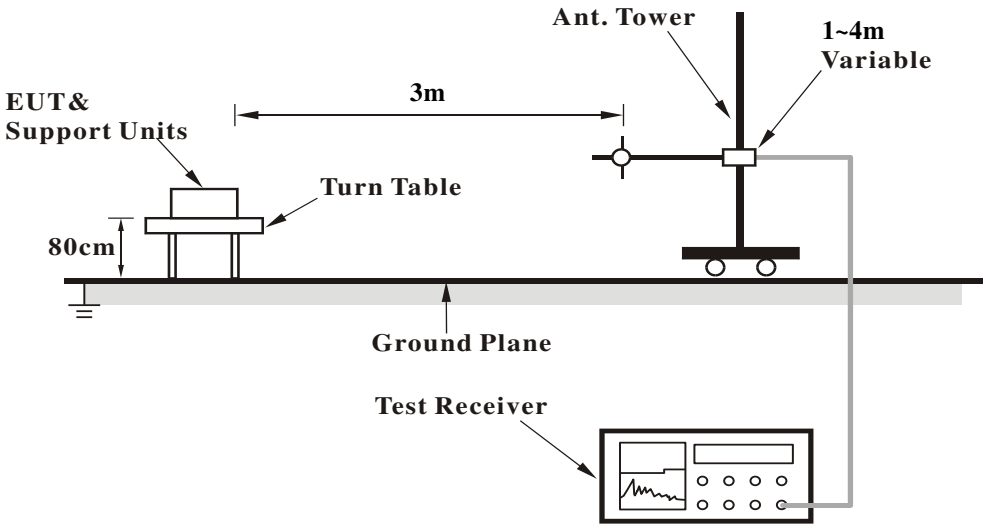
d. ERP power can be calculated form EIRP power by subtracting the gain of dipole, ERP power = EIRP power - 2.15dBi.

NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.7.3 DEVIATION FROM TEST STANDARD

No deviation

4.7.4 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.5 TEST RESULTS

Below 1GHz
GPRS:

MODE	TX channel 190	FREQUENCY RANGE	Below 1000MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	261.73	30.30	-13	-64.33	3.96	-60.36	-47.36
2	291.37	33.00	-13	-62.42	3.73	-58.69	-45.69
3	338.29	32.50	-13	-65.37	3.66	-61.71	-48.71
4	498.8	31.80	-13	-63.74	2.90	-60.84	-47.84
5	617.29	34.90	-13	-59.85	1.77	-58.08	-45.08
6	949.51	37.20	-13	-60.99	0.34	-60.65	-47.65
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	41.2	29.40	-13	-45.91	-12.17	-58.08	-45.08
2	144	25.10	-13	-67.69	-1.19	-68.88	-55.88
3	291.37	32.70	-13	-62.72	3.73	-58.99	-45.99
4	350.61	26.60	-13	-71.26	3.59	-67.67	-54.67
5	498.44	29.00	-13	-66.54	2.90	-63.64	-50.64
6	632.1	31.50	-13	-63.36	1.76	-61.60	-48.60

REMARKS:

1. ERP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor = gain of substitution antenna + cable loss

EDGE:

MODE	TX channel 190	FREQUENCY RANGE	Below 1000MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	144	25.30	-13	-67.49	-1.19	-68.68	-55.68
2	288	30.70	-13	-64.58	3.74	-60.84	-47.84
3	300	31.60	-13	-64.18	3.71	-60.47	-47.47
4	493.76	29.30	-13	-66.29	2.94	-63.36	-50.36
5	607.44	31.40	-13	-63.28	1.78	-61.49	-48.49
6	949.63	39.00	-13	-59.18	0.34	-58.84	-45.84
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	39.77	28.80	-13	-46.00	-12.52	-58.51	-45.51
2	266.68	27.00	-13	-67.78	3.93	-63.85	-50.85
3	291.37	33.00	-13	-62.42	3.73	-58.69	-45.69
4	306.18	29.90	-13	-66.14	3.70	-62.44	-49.44
5	496.86	27.50	-13	-68.06	2.91	-65.14	-52.14
6	617.29	32.10	-13	-62.65	1.77	-60.88	-47.88

REMARKS:

1. ERP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor = gain of substitution antenna + cable loss

WCDMA:

MODE	TX channel 4183	FREQUENCY RANGE	Below 1000MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	143.97	26.70	-13	-66.10	-1.19	-67.29	-54.29
2	300	31.60	-13	-64.18	3.71	-60.47	-47.47
3	400.03	26.80	-13	-71.04	3.33	-67.71	-54.71
4	607.42	31.70	-13	-62.98	1.78	-61.19	-48.19
5	666.68	31.10	-13	-64.34	1.70	-62.63	-49.63
6	949.56	36.00	-13	-62.18	0.34	-61.85	-48.85
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	40.19	29.20	-13	-45.75	-12.41	-58.16	-45.16
2	266.68	26.10	-13	-68.68	3.93	-64.75	-51.75
3	300	32.70	-13	-63.08	3.71	-59.37	-46.37
4	335.99	26.90	-13	-70.97	3.67	-67.30	-54.30
5	491.48	30.30	-13	-65.32	2.95	-62.37	-49.37
6	949.66	34.60	-13	-63.58	0.34	-63.24	-50.24

REMARKS:

1. ERP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor = gain of substitution antenna + cable loss

Above 1GHz

GPRS:

MODE	TX channel 190	FREQUENCY RANGE	Above 1000MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1673.2	63.47	-13	-39.16	6.31	-32.85	-19.85
2	2509.8	61.29	-13	-37.23	6.66	-30.57	-17.57
3	3346.4	62.41	-13	-40.60	7.63	-32.97	-19.97
4	4183	46.8	-13	-58.04	7.44	-50.60	-37.60
5	5019.6	49.7	-13	-54.56	7.01	-47.55	-34.55
6	5856.2	51.36	-13	-53.02	6.87	-46.15	-33.15
7	6692.8	56.11	-13	-47.21	5.56	-41.65	-28.65
8	7529.4	56.53	-13	-46.09	4.52	-41.57	-28.57
9	8366	55.88	-13	-46.74	4.18	-42.56	-29.56
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1673.2	63.11	-13	-39.52	6.31	-33.21	-20.21
2	2509.8	59.82	-13	-38.70	6.66	-32.04	-19.04
3	3346.4	62.21	-13	-40.80	7.63	-33.17	-20.17
4	4183	47.4	-13	-57.44	7.44	-50.00	-37.00
5	5019.6	50.08	-13	-54.18	7.01	-47.17	-34.17
6	5856.2	53.76	-13	-50.62	6.87	-43.75	-30.75
7	6692.8	55.08	-13	-48.24	5.56	-42.68	-29.68
8	7529.4	57.77	-13	-44.85	4.52	-40.33	-27.33
9	8366	55.93	-13	-46.69	4.18	-42.51	-29.51

REMARKS:

1. ERP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor = gain of substitution antenna + cable loss

EDGE:

MODE	TX channel 190	FREQUENCY RANGE	Above 1000MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1673.2	64.33	-13	-38.30	6.31	-31.99	-18.99
2	**2509.8**	**61.90**	**-13**	**-36.62**	**6.66**	**-29.96**	**-16.96**
3	3346.4	61.40	-13	-41.61	7.63	-33.98	-20.98
4	4183	45.47	-13	-59.37	7.44	-51.93	-38.93
5	5019.6	50.51	-13	-53.75	7.01	-46.74	-33.74
6	5856.2	50.99	-13	-53.39	6.87	-46.52	-33.52
7	6692.8	53.76	-13	-49.56	5.56	-44.00	-31.00
8	7529.4	56.07	-13	-46.55	4.52	-42.03	-29.03
9	8366	56.59	-13	-46.03	4.18	-41.85	-28.85
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1673.2	64.21	-13	-38.42	6.31	-32.11	-19.11
2	2509.8	60.68	-13	-37.84	6.66	-31.18	-18.18
3	3346.4	61.71	-13	-41.30	7.63	-33.67	-20.67
4	4183	46.9	-13	-57.94	7.44	-50.50	-37.50
5	5019.6	48.51	-13	-55.75	7.01	-48.74	-35.74
6	5856.2	53.06	-13	-51.32	6.87	-44.45	-31.45
7	6692.8	56.29	-13	-47.03	5.56	-41.47	-28.47
8	7529.4	59.16	-13	-43.46	4.52	-38.94	-25.94
9	8366	55.53	-13	-47.09	4.18	-42.91	-29.91

REMARKS:

1. ERP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor = gain of substitution antenna + cable loss

WCDMA:

MODE	TX channel 4183	FREQUENCY RANGE	Above 1000MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1673.2	64.34	-13	-38.29	6.31	-31.98	-18.98
2	2509.8	61.15	-13	-37.37	6.66	-30.71	-17.71
3	3346.4	62.49	-13	-40.52	7.63	-32.89	-19.89
4	4183	46.55	-13	-58.29	7.44	-50.85	-37.85
5	5019.6	50.34	-13	-53.92	7.01	-46.91	-33.91
6	5856.2	51.09	-13	-53.29	6.87	-46.42	-33.42
7	6692.8	55.87	-13	-47.45	5.56	-41.89	-28.89
8	7529.4	56.41	-13	-46.21	4.52	-41.69	-28.69
9	8366	55.47	-13	-47.15	4.18	-42.97	-29.97
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1673.2	62.2	-13	-40.43	6.31	-34.12	-21.12
2	2509.8	60.17	-13	-38.35	6.66	-31.69	-18.69
3	3346.4	62.9	-13	-40.11	7.63	-32.48	-19.48
4	4183	48.29	-13	-56.55	7.44	-49.11	-36.11
5	5019.6	50.52	-13	-53.74	7.01	-46.73	-33.73
6	5856.2	54.6	-13	-49.78	6.87	-42.91	-29.91
7	6692.8	54.66	-13	-48.66	5.56	-43.10	-30.10
8	7529.4	57.5	-13	-45.12	4.52	-40.60	-27.60
9	8366	55.92	-13	-46.70	4.18	-42.52	-29.52

REMARKS:

1. ERP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor = gain of substitution antenna + cable loss

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab:
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab:
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

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