

FCC Test Report

(PART 22)

Report No.: RF150723C09-3

FCC ID: O57PB1750M

Test Model: Lenovo PB1-750M

Received Date: Jul. 23, 2015

Test Date: Jul. 23, 2015 ~ Aug. 12, 2015

Issued Date: Aug. 13, 2015

Applicant: Lenovo (Shanghai) Electronics Technology Co., Ltd.

Address: No. 68 Building, 199 Fenju Road, Wai Gao Qiao FTZ ,
Shanghai , China

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd.,
Taoyuan Branch

Lab Address: No. 47-2, 14th Ling, Chia Cau Vil., Lin Kou Dist., New Taipei
City, Taiwan (R.O.C.)

Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang,
Taoyuan Hsien 333, Taiwan, R.O.C.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies

TABLE OF CONTENTS

RELEASE CONTROL RECORD 3

1 Certificate of Conformity..... 4

2 Summary of Test Results 5

 2.1 Measurement Uncertainty 5

 2.2 Test Site And Instruments 5

3 General Information..... 7

 3.1 General Description of EUT 7

 3.2 Configuration Of System Under Test..... 9

 3.2.1 Description Of Support Units 9

 3.3 Test Mode Applicability and Tested Channel Detail 10

 3.4 EUT Operating Conditions 11

 3.5 General Description of Applied Standards 11

4 Test Types and Results 12

 4.1 Output Power Measurement 12

 4.1.1 Limits of Output Power Measurement 12

 4.1.2 Test Procedures..... 12

 4.1.3 Test Setup..... 13

 4.1.4 Test Results 14

 4.2 Frequency Stability Measurement..... 16

 4.2.1 Limits of Frequency Stabiliity Measurement..... 16

 4.2.2 Test Procedure 16

 4.2.3 Test Setup..... 16

 4.2.4 Test Results 17

 4.3 Occupied Bandwidth Measurement 18

 4.3.1 Test Procedure 18

 4.3.2 Test Setup..... 18

 4.3.3 Test Result..... 19

 4.4 Band Edge Measurement 21

 4.4.1 Limits of Band Edge Measurement 21

 4.4.2 Test Setup..... 21

 4.4.3 Test Procedures..... 21

 4.4.4 Test Results 22

 4.5 Peak To Average Ratio 23

 4.5.1 Limits of Peak To Average Ratio Measurement 23

 4.5.2 Test Setup..... 23

 4.5.3 Test Procedures..... 23

 4.5.4 Test Results 24

 4.6 Conducted Spurious Emissions 25

 4.6.1 Limits of Conducted Spurious Emissions Measurement..... 25

 4.6.2 Test Setup..... 25

 4.6.3 Test Procedure 25

 4.6.4 Test Results 26

 4.7 Radiated Emission Measurement 29

 4.7.1 Limits of Radiated Emission Measurement 29

 4.7.2 Test Procedure 29

 4.7.3 Deviation from Test Standard 29

 4.7.4 Test Setup..... 30

 4.7.5 Test Results 31

5 Pictures of Test Arrangements..... 37

Appendix – Information on the Testing Laboratories 38



A D T

RELEASE CONTROL RECORD


Issue No.	Description	Date Issued
RF150723C09-3	Original release	Aug. 13, 2015



1 Certificate of Conformity

Product: Portable Tablet Computer
Brand: Lenovo
Test Model: Lenovo PB1-750M
Sample Status: Production unit
Applicant: Lenovo (Shanghai) Electronics Technology Co., Ltd.
Test Date: Jul. 23, 2015 ~ Aug. 12, 2015
Standards: FCC Part 22, Subpart H

The above equipment 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:** Aug. 13, 2015
Amyee Qian / Engineer

Approved by :  , **Date:** Aug. 13, 2015
William Chung / Manager

2 Summary of Test Results

Applied Standard: FCC Part 22 & Part 2			
FCC Clause	Test Item	Result	Remarks
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 -27.37dB at 54.84MHz.

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	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	2.93 dB
	200MHz ~ 1000MHz	2.95 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 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

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer Agilent Technologies	N9038A	MY52260177	May 19, 2015	May 18, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 10, 2014	Dec. 09, 2015
BILOG Antenna ETS-Lindgren	3142E	117536	Feb. 24, 2014	Feb. 23, 2015
HORN Antenna ETS-Lindgren	3117	00143293	Aug. 28, 2014	Aug. 27, 2015
Bluetooth Tester	CBT	100980	Apr. 27, 2015	Apr. 26, 2016
Agilent Communications Tester-Wireless	8960 Series 10	MY53201073	Jul. 06, 2015	Jul. 05, 2017
Preamplifier Agilent	310N	187226	Jun. 29, 2015	Jun. 28, 2016
Preamplifier Agilent	83017A	980116	Jan. 09, 2015	Jan. 08, 2016
Power Meter Anritsu	ML2495A	1232002	Sep. 17, 2014	Sep. 16, 2015
Power Sensor Anritsu	MA2411B	1207325	Sep. 17, 2014	Sep. 16, 2015
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-S MS-100-SMS-120+RF C-SMS-100-SMS-400)	Jun. 27, 2015	Jun. 26, 2016
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-S MS-100-SMS-24)	Jun. 27, 2015	Jun. 26, 2016
Software BV ADT	E38.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	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 calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. The test was performed in HwaYa Chamber 4.
 4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 5. The FCC Site Registration No. is 460141.
 6. The IC Site Registration No. is IC7450F-4.

3 General Information

3.1 General Description of EUT

PRODUCT	Portable Tablet Computer	
BRAND	Lenovo	
MODEL NAME	Lenovo PB1-750M	
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.8Vdc (battery)	
MODULATION TYPE	GSM/GPRS	GMSK
	EDGE	GMSK, 8PSK
	WCDMA	BPSK
FREQUENCY RANGE	GSM/GPRS/EDGE	824.2MHz ~ 848.8MHz
	WCDMA	826.4MHz ~ 846.6MHz
MAX. ERP POWER	GSM	1059.74mW
	EDGE	279.25mW
	WCDMA	89.70mW
EMISSION DESIGNATOR	GSM	244KGXW
	EDGE	246KG7W
	WCDMA	4M16F9W
ANTENNA TYPE	Fixed Internal antenna with -1dBi gain	
HW VERSION	LenovoPad PB1-750M	
SW VERSION	PB1-750M_150717	
ACCESSORY DEVICE	Refer to note as below	
DATA CABLE	USB cable: Unshielded, detachable, 1.0m Earphone cable: Unshielded, detachable, 1.1m	

Note:

- The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.
- The EUT was powered by the following adapters:

ADAPTER 1	
BRAND:	Lenovo
MODEL:	C-P62
INPUT:	AC 100-240V, 300mA
OUTPUT:	DC 5V, 1500mA
MANUFACTURER:	Acbel

ADAPTER 2	
BRAND:	Lenovo
MODEL:	C-P62
INPUT:	AC 100-240V, 300mA
OUTPUT:	DC 5V, 1500mA
MANUFACTURER:	Huntkey

- The EUT matched the following USB Cable and Earphone.

USB CABLE	
BRAND:	Lenovo
MODEL:	0154-117

SIGNAL LINE:	1.0 METER
---------------------	-----------

EARPHONE	
BRAND:	Lenovo
MODEL:	LS-118M-09
SIGNAL LINE:	1.1 METER

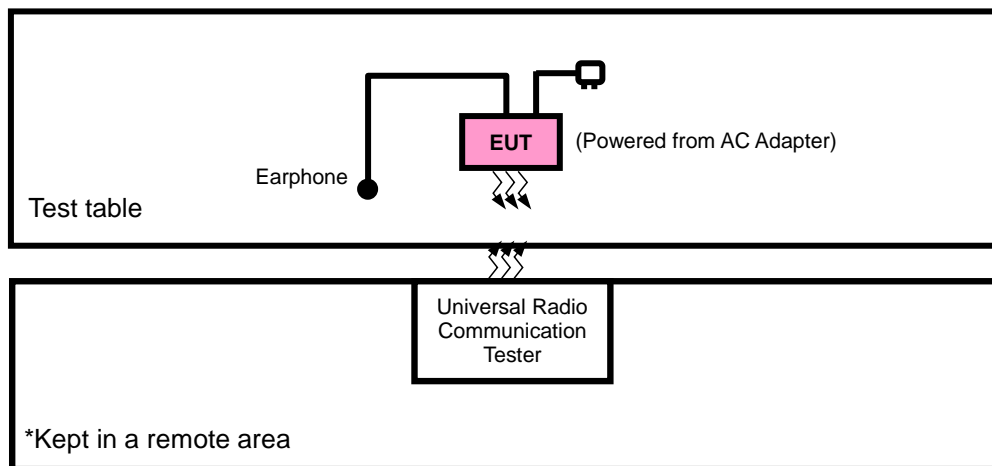
4. Sample A and Sample B were tested for this project and the differences are as below:

Parts	Sample A		Sample B	
	Brand	Model Name	Brand	Model Name
Battery	Lenovo(Sun woda)	L15D1P32	Lenovo (SCUD)	L15D1P32
LCD Panel	BOE	TV070HDM	DSBJ	DO0700HHF00
Front Camera	O-film	L545F00	AVC	CPLBF05003
Rear Camera	Sunny	F13V01L	Qtech	ECM13M0166QF
Main Broad	Chinabuilder	08B05112C	js-huashen	82AD005A0
eMCP	Samsung	KMR820001M-B609(2G+16G) KMQ82000SM-B418(1G+16G)	Hynix	H9TQ17A8GTMCUR-KUM(1G+16G)
CPU	Qualcomm	MSM8916	Qualcomm	MSM8916

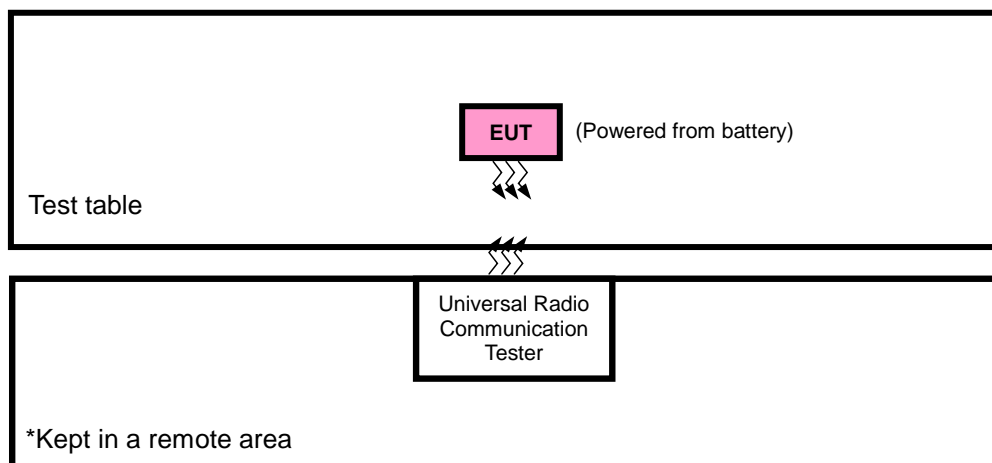
5. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3.2 Configuration of System Under Test

FOR RADIATION EMISSION TEST



FOR E.R.P. TEST



3.2.1 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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	LONG WEI	PS-6403D	010934269	N/A
2	PC	HP	A6608CN	3CR83825X3	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m
2	AC Line: Unshielded, Detachable 1.5m

NOTE:

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

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports

The worst case was found when positioned on Z-plane. Following channel(s) was (were) selected for the final test as listed below:

Test results are presented in the report as below.

Test Mode	Test Condition
A	Power from adapter
B	Power from battery

GSM MODE

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
A	ERP	128 to 251	128, 190, 251	GSM
B	Frequency Stability	128 to 251	190	GSM
A	Occupied Bandwidth	128 to 251	128, 190, 251	GSM, EDGE
A	Band Edge	128 to 251	128, 251	GSM, EDGE
A	Peak To Average Ratio	128 to 251	128, 190, 251	GSM, EDGE
A	Condcudeted Emission	128 to 251	128, 190, 251	GSM, EDGE
A	Radiated Emission Below 1GHz	128 to 251	128	GSM
A	Radiated Emission Above 1GHz	128 to 251	128, 190, 251	GSM

WCDMA MODE

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
A	ERP	4132 to 4233	4132, 4182, 4233	WCDMA
B	Frequency Stability	4132 to 4233	4182	WCDMA
A	Occupied Bandwidth	4132 to 4233	4132, 4182, 4233	WCDMA
A	Band Edge	4132 to 4233	4132, 4233	WCDMA
A	Peak To Average Ratio	4132 to 4233	4132, 4182, 4233	WCDMA
A	Condcudeted Emission	4132 to 4233	4132, 4182, 4233	WCDMA
A	Radiated Emission Below 1GHz	4132 to 4233	4132	WCDMA
A	Radiated Emission Above 1GHz	4132 to 4233	4132, 4182, 4233	WCDMA

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	21deg. C, 71%RH 22deg. C, 71%RH	120Vac, 60Hz	Nick Hsu
Frequency Stability	24deg. C, 64%RH	3.8Vdc	Match Tsui
Occupied Bandwidth	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Band Edge	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Peak To Average Ratio	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Condcudeted Emission	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Radiated Emission	21deg. C, 71%RH	120Vac, 60Hz	Nick Hsu

3.4 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

3.5 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-C 2004

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

EIRP / ERP Measurement:

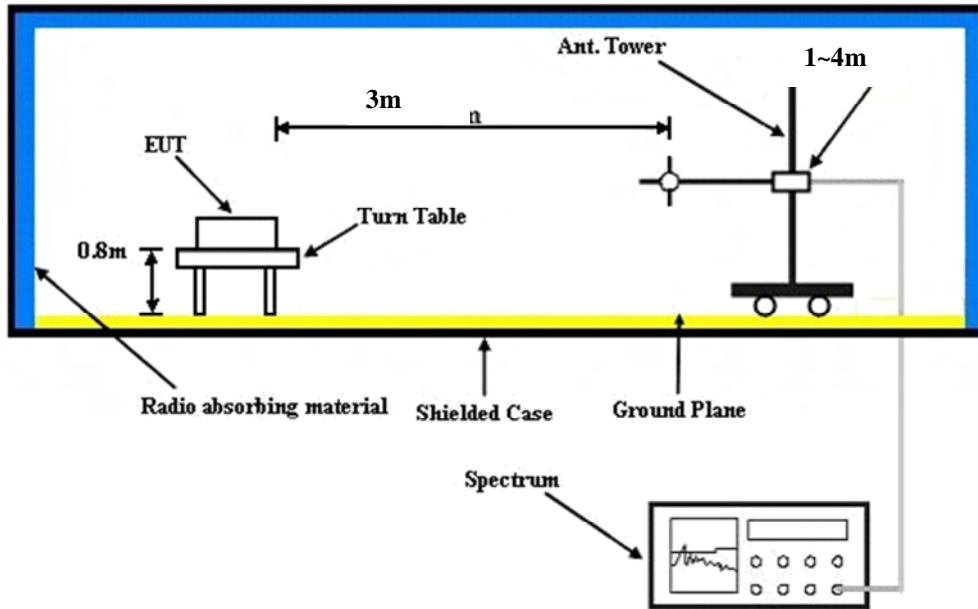
- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM, GPRS and 5MHz for WCDMA mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 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. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn.}$ E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15\text{dBi}$.

Conducted Power Measurement:

The EUT was set up for the maximum power with GSM, GPRS & 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.

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	GSM850		
Channel	128	190	251
Frequency (MHz)	824.2	836.6	848.8
GSM	33.22	33.29	33.27
GPRS 8	33.19	33.05	33.08
GPRS 10	30.35	30.21	30.27
EDGE 8 (MCS1)	32.98	32.99	33.04
EDGE 10 (MCS1)	30.27	29.86	29.99
EDGE 8 (MCS9)	27.26	27.21	27.15
EDGE 10 (MCS9)	25.49	25.37	25.76

Band	WCDMA V		
Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	22.49	22.43	22.68
HSPA			
HSDPA Subtest-1	21.69	21.75	21.92
HSDPA Subtest-2	21.71	21.70	21.81
HSDPA Subtest-3	21.32	21.27	21.22
HSDPA Subtest-4	21.18	21.26	21.38
HSUPA Subtest-1	20.83	21.08	21.35
HSUPA Subtest-2	18.91	19.03	19.21
HSUPA Subtest-3	19.65	19.63	19.93
HSUPA Subtest-4	19.18	19.05	19.14
HSUPA Subtest-5	21.40	21.48	21.64

ERP POWER (dBm)
GSM

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
128	824.2	0.68	31.208	29.74	941.46	H
189	836.4	1.10	31.3	30.25	1059.25	H
251	848.8	1.18	31.222	30.25	1059.74	H
128	824.2	-2.72	31.504	26.63	460.68	V
189	836.4	-2.54	31.117	26.43	439.24	V
251	848.8	-3.04	31.922	26.73	471.19	V

EDGE

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
128	824.2	-4.63	31.208	24.43	277.20	H
189	836.4	-4.69	31.3	24.46	279.25	H
251	848.8	-4.79	31.222	24.28	268.04	H
128	824.2	-9.11	31.504	20.24	105.78	V
189	836.4	-8.23	31.117	20.74	118.49	V
251	848.8	-9.02	31.922	20.75	118.90	V

WCDMA

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
4132	826.4	-9.53	31.208	19.53	89.70	H
4182	836.4	-10.10	31.3	19.05	80.35	H
4233	846.6	-9.73	31.222	19.34	85.94	H
4132	826.4	-13.78	31.504	15.57	36.09	V
4182	836.4	-13.67	31.117	15.30	33.86	V
4233	846.6	-14.07	31.922	15.70	37.17	V

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stability Measurement

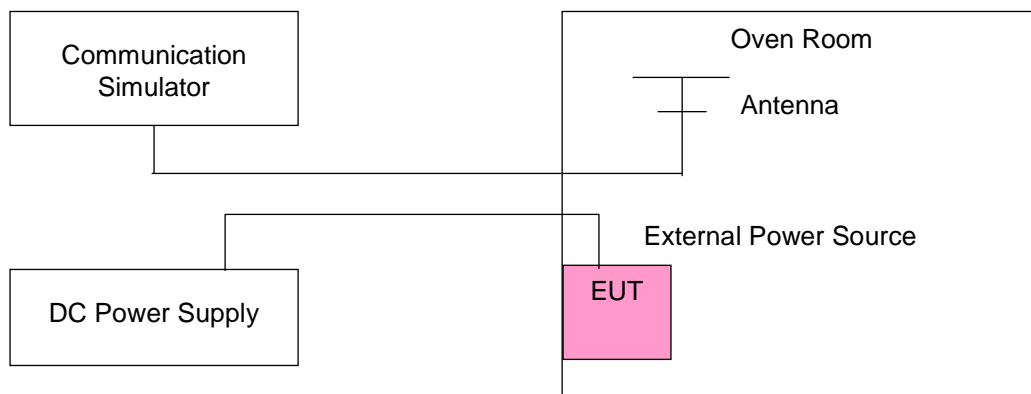
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

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 minimum to maximum 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 $\pm 0.5^{\circ}\text{C}$ 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)
	GSM	EDGE	WCDMA	
3.8	0.0017	0.0010	0.0017	2.5
3.5	-0.0025	-0.0024	-0.0043	2.5
4.2	-0.0038	-0.0043	-0.0053	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.2Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

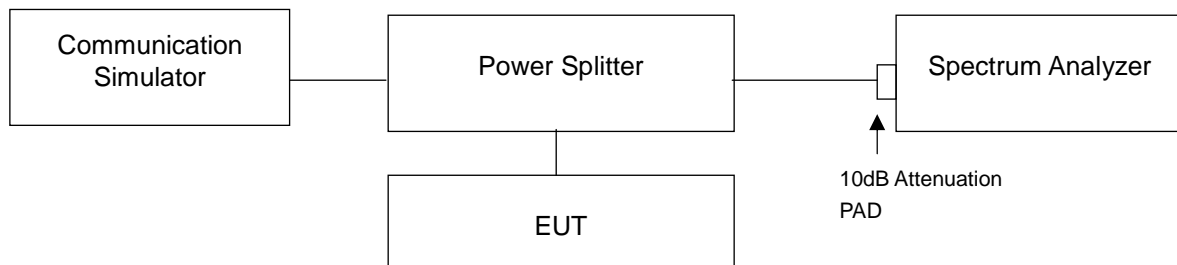
Voltage (Volts)	FREQUENCY ERROR (ppm)			Limit (ppm)
	GSM	EDGE	WCDMA	
-30	-0.0120	-0.0130	-0.0145	2.5
-20	-0.0108	-0.0116	-0.0125	2.5
-10	-0.0101	-0.0090	-0.0110	2.5
0	-0.0076	-0.0072	-0.0093	2.5
10	-0.0065	-0.0062	-0.0072	2.5
20	-0.0047	-0.0051	-0.0053	2.5
30	-0.0030	-0.0035	-0.0032	2.5
40	-0.0013	-0.0018	-0.0013	2.5
50	-0.0010	-0.0006	-0.0007	2.5
60	0.0008	0.0014	0.0004	2.5

4.3 Occupied Bandwidth Measurement

4.3.1 Test Procedure

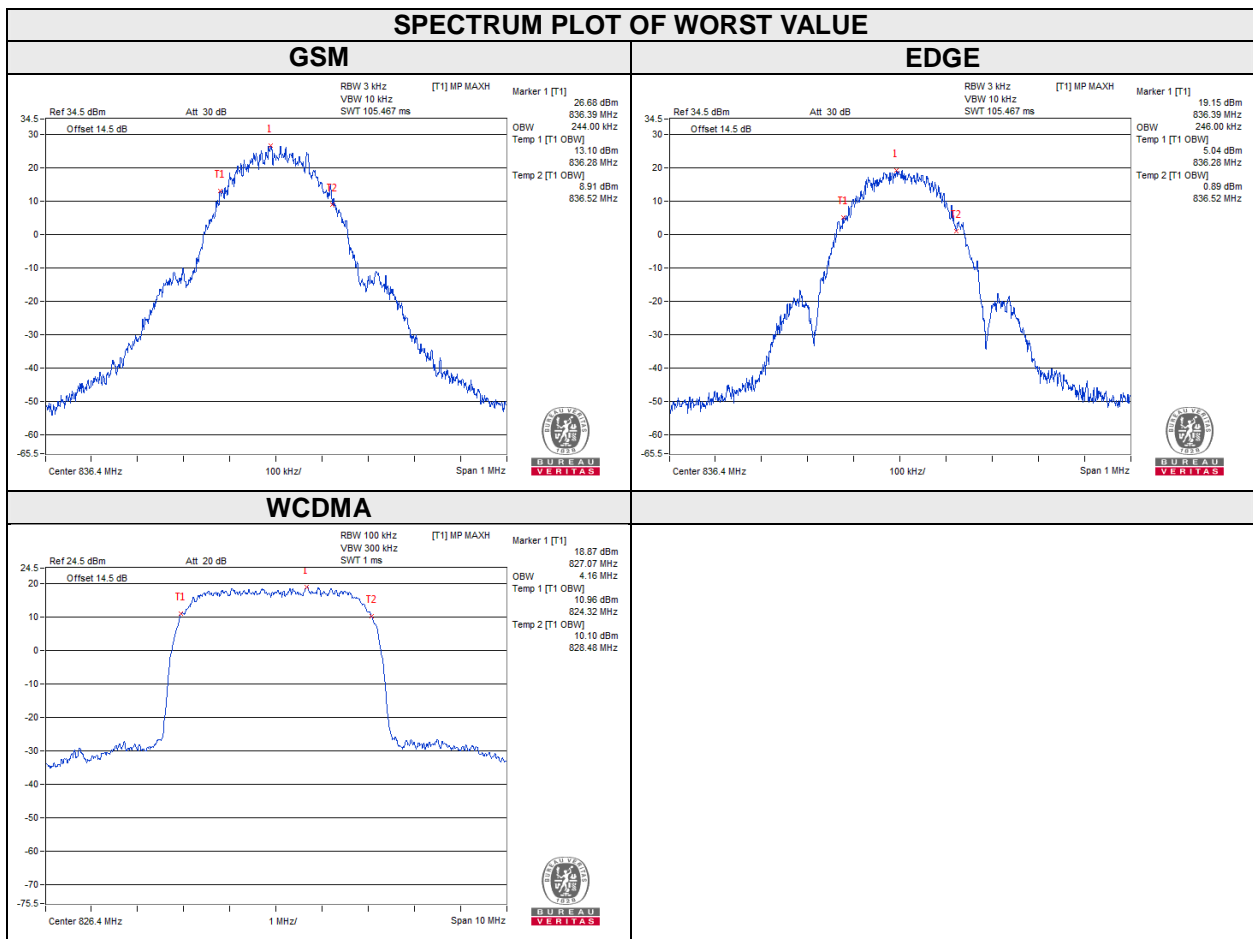
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function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

4.3.2 Test Setup

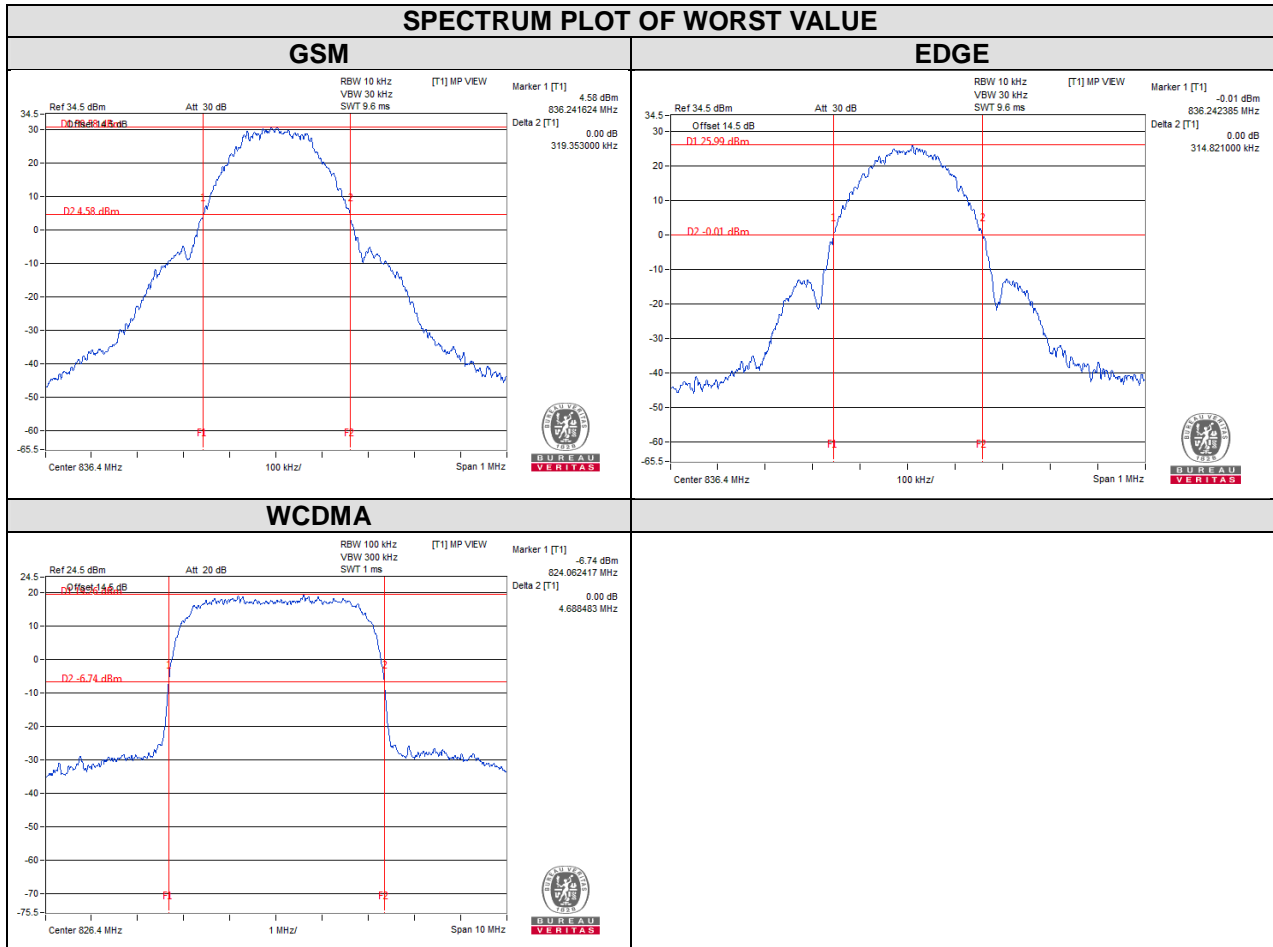


4.3.3 Test Result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)		Channel	FREQ. (MHz)	99% Occupied Bandwidth (MHz)
		GSM	EDGE			WCDMA
128	824.2	243.00	244.00	4132	826.4	4.16
190	836.6	244.00	246.00	4182	836.6	4.16
251	848.8	242.00	245.00	4233	846.6	4.15



CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (MHz)
		GSM	EDGE			WCDMA
128	824.2	315.55	308.29	4132	826.4	4.69
190	836.6	319.35	314.82	4182	836.4	4.68
251	848.8	315.60	309.42	4233	846.6	4.69

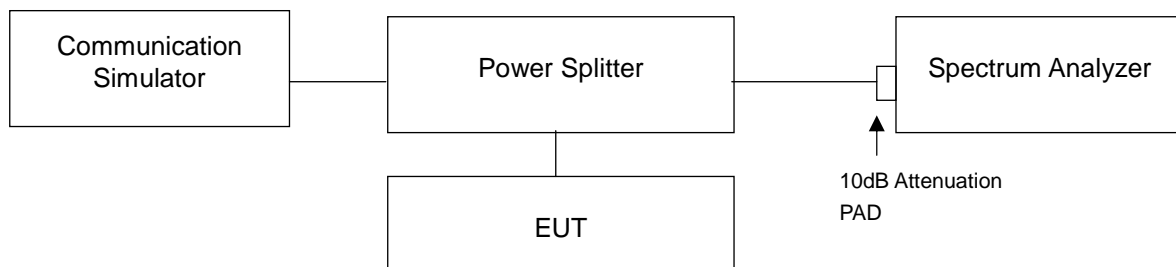


4.4 Band Edge Measurement

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.

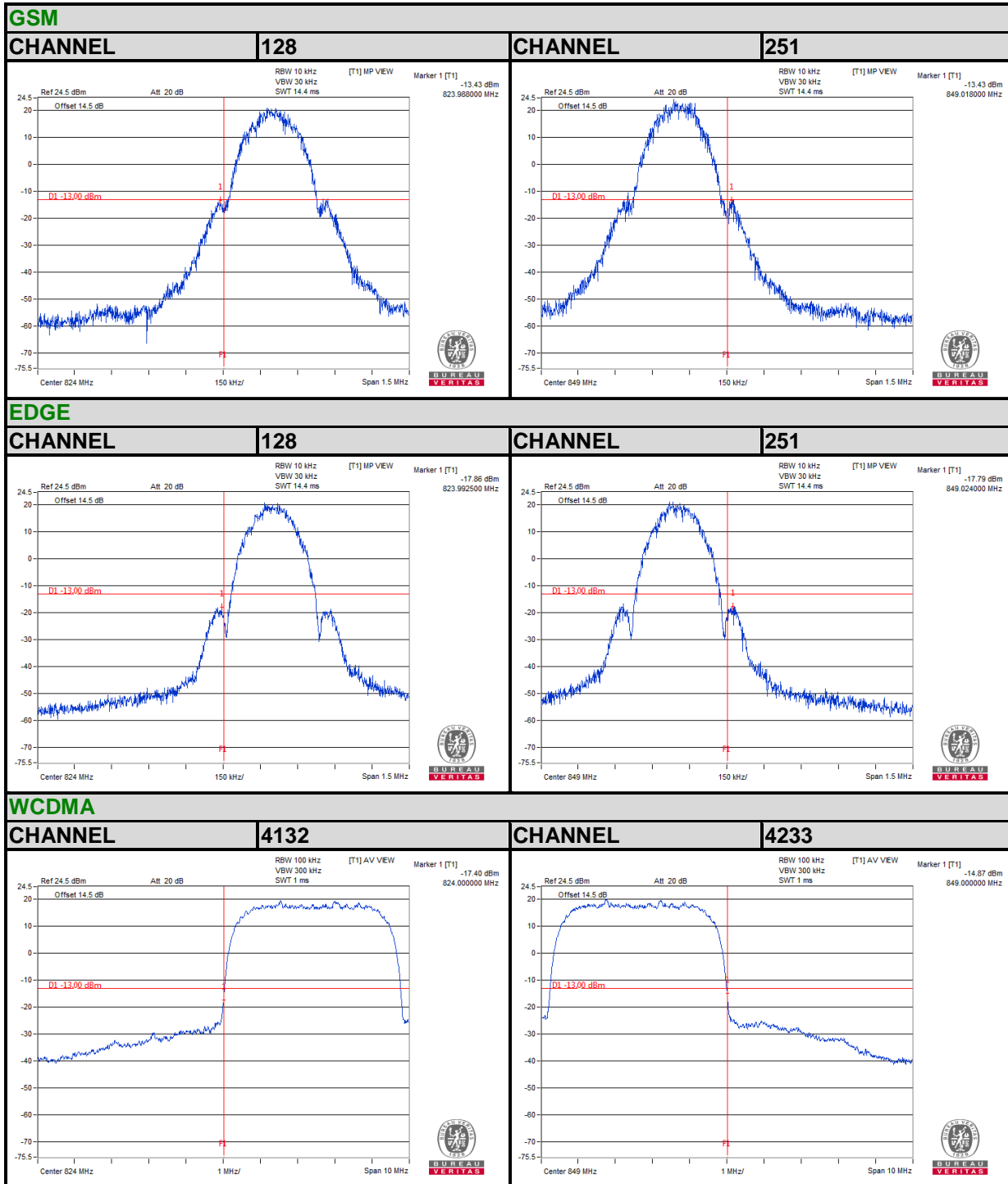
4.4.2 Test Setup



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 span is 1.5MHz. RB of the spectrum is 3kHz and VB of the spectrum is 10kHz (GSM/EDGE).
- c. The center frequency of spectrum is the band edge frequency and span is 10MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (WCDMA).
- d. Record the max trace plot into the test report.

4.4.4 Test Results

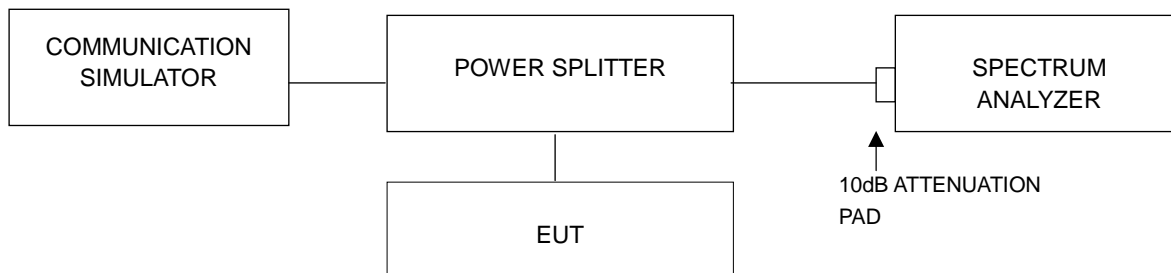


4.5 Peak To Average Ratio

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

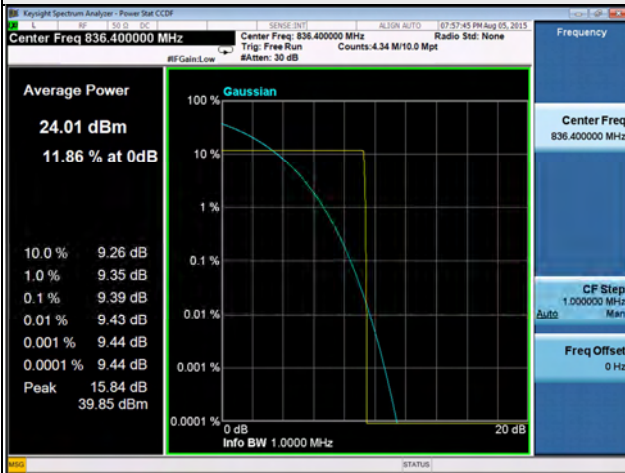
1. Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

4.5.4 Test Results

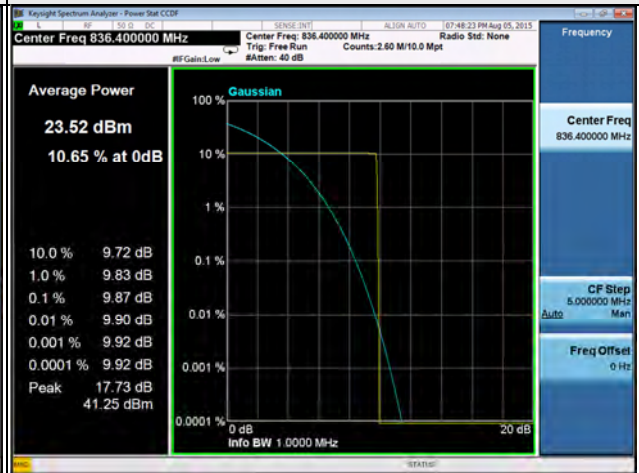
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		Channel	Frequency (MHz)	Peak To Average Ratio (dB)
		GSM	EDGE			
189	836.4	9.39	9.87	4182	836.4	2.97

SPECTRUM PLOT OF WORST VALUE

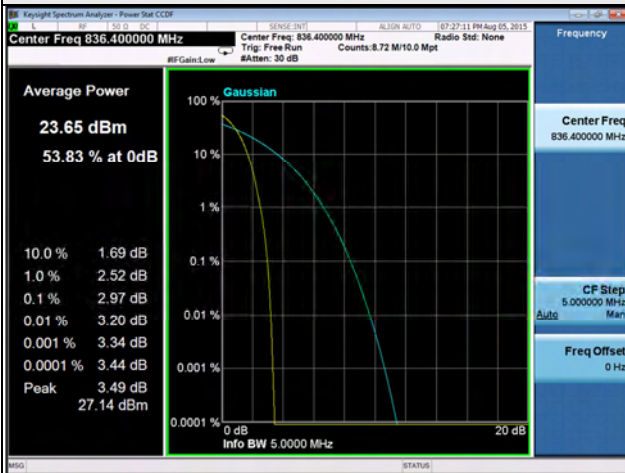
GSM



EDGE



WCDMA

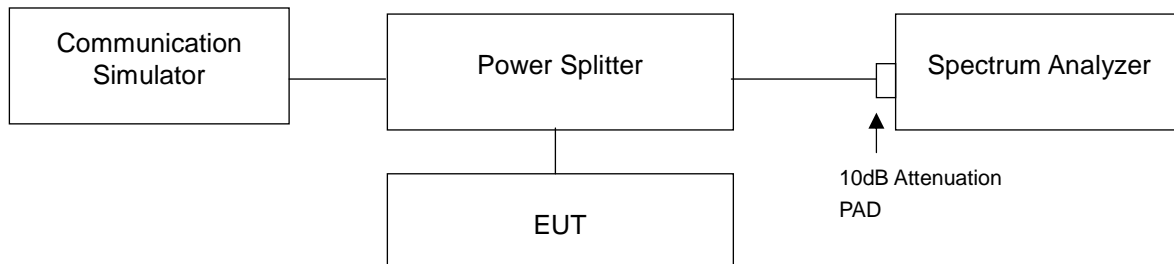


4.6 Conducted Spurious Emissions

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 .

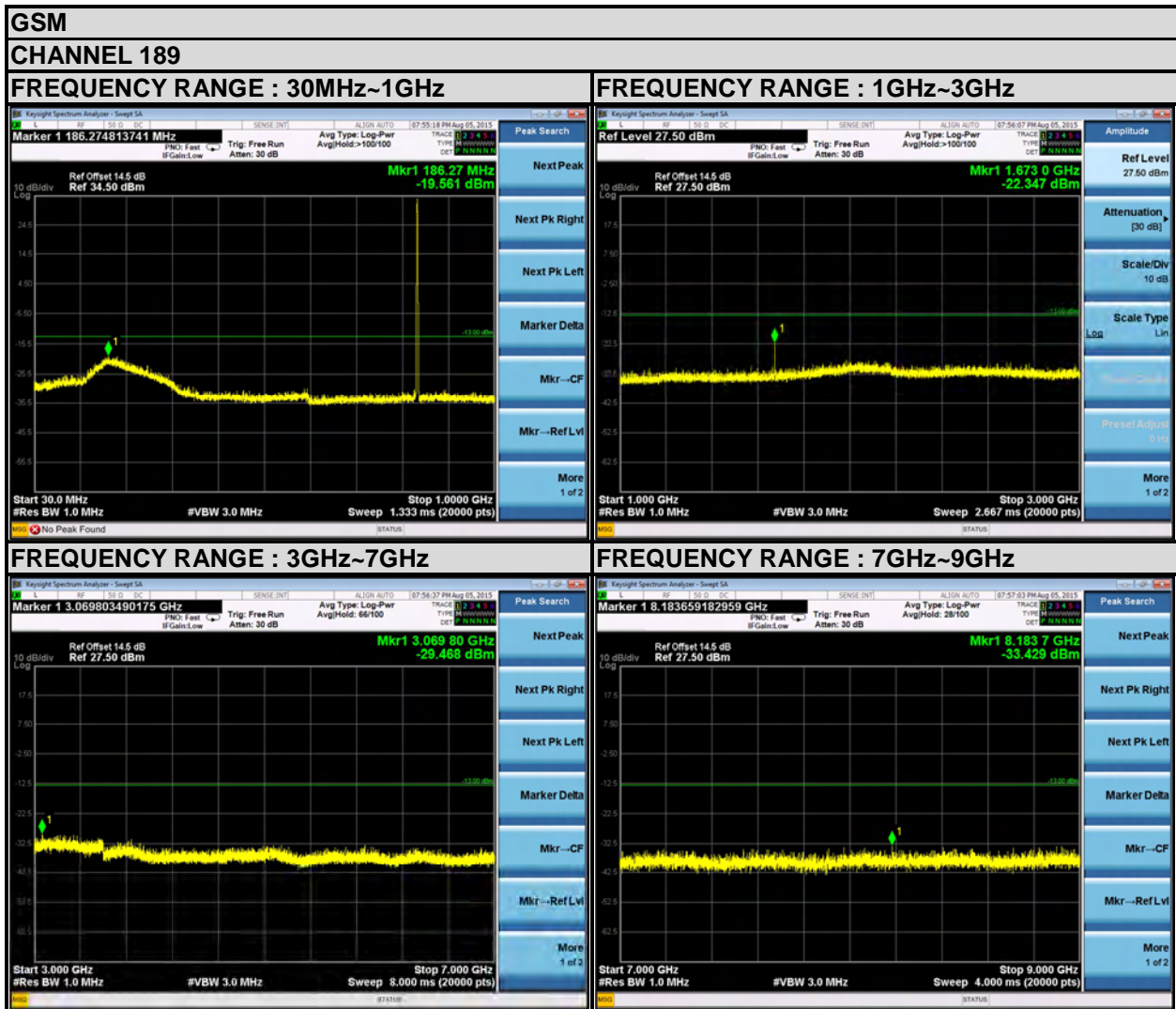
4.6.2 Test Setup



4.6.3 Test Procedure

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 9GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

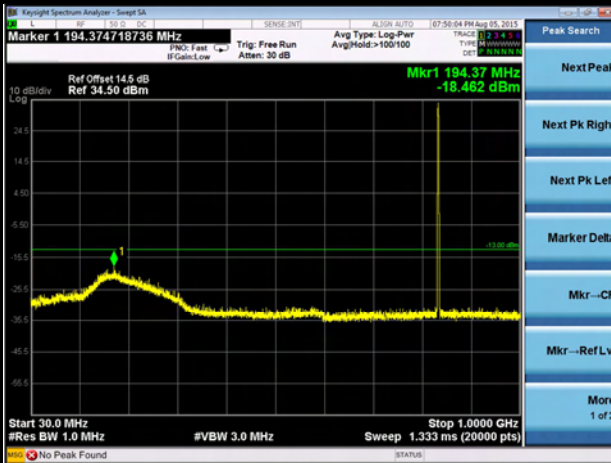
4.6.4 Test Results



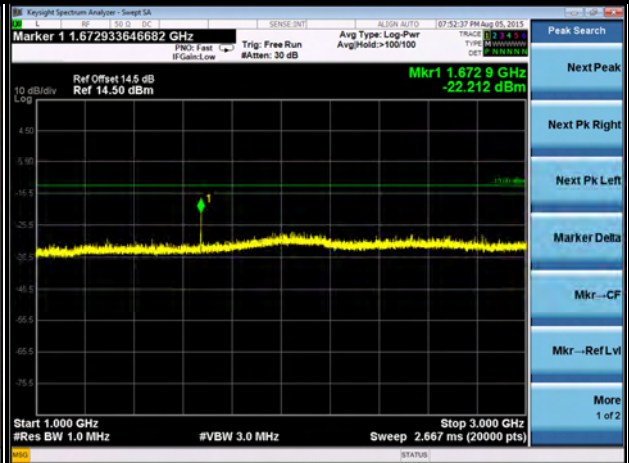
EDGE

CHANNEL 189

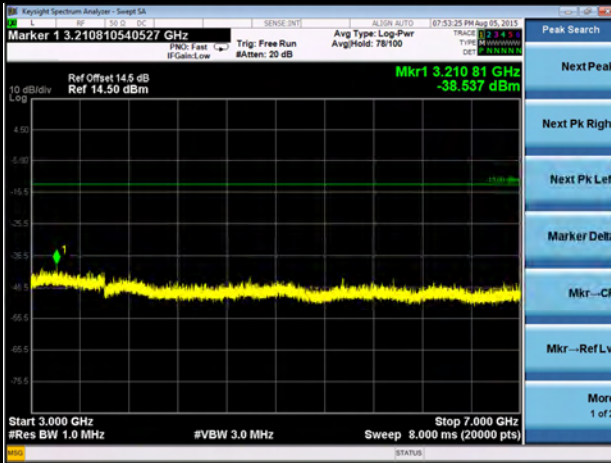
FREQUENCY RANGE : 30MHz~1GHz



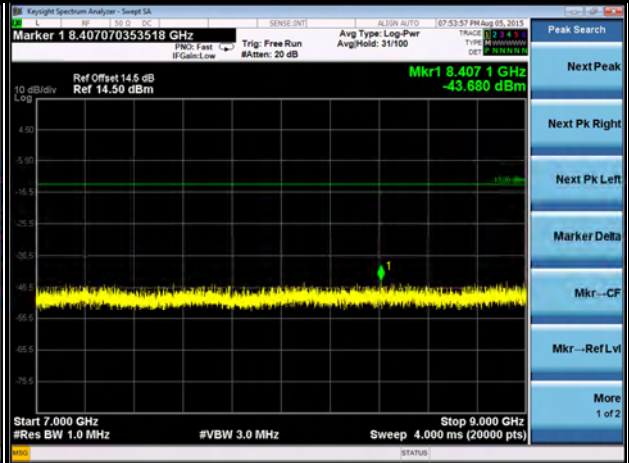
FREQUENCY RANGE : 1GHz~3GHz



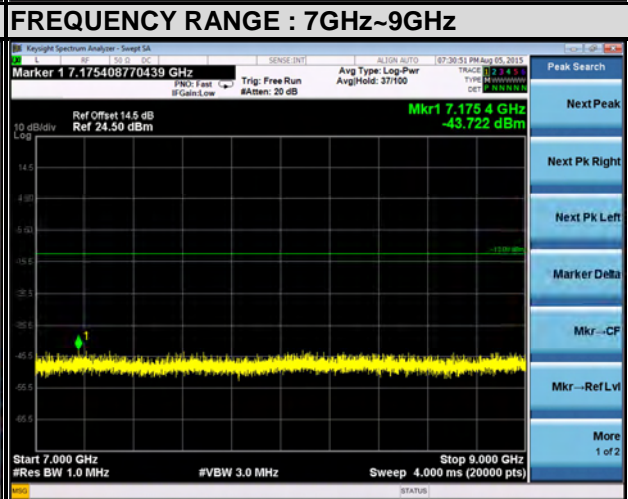
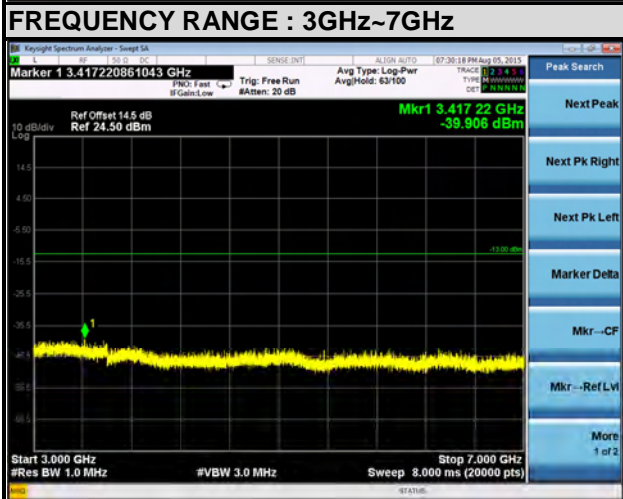
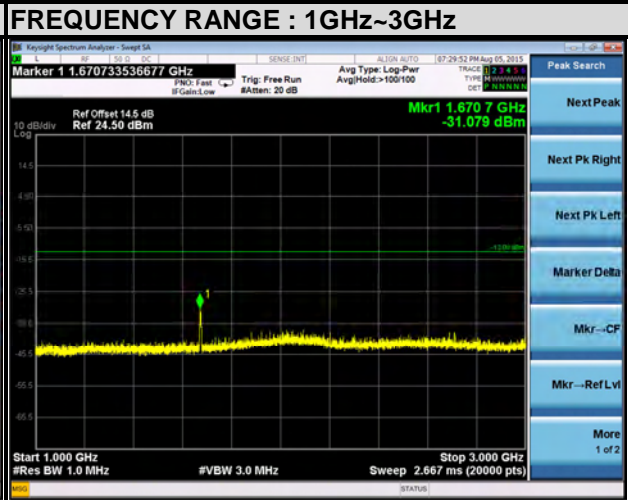
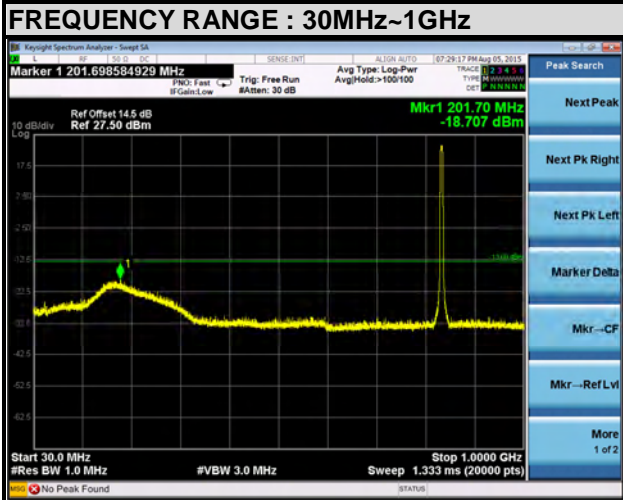
FREQUENCY RANGE : 3GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz



WCDMA
CHANNEL 4182



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 Procedure

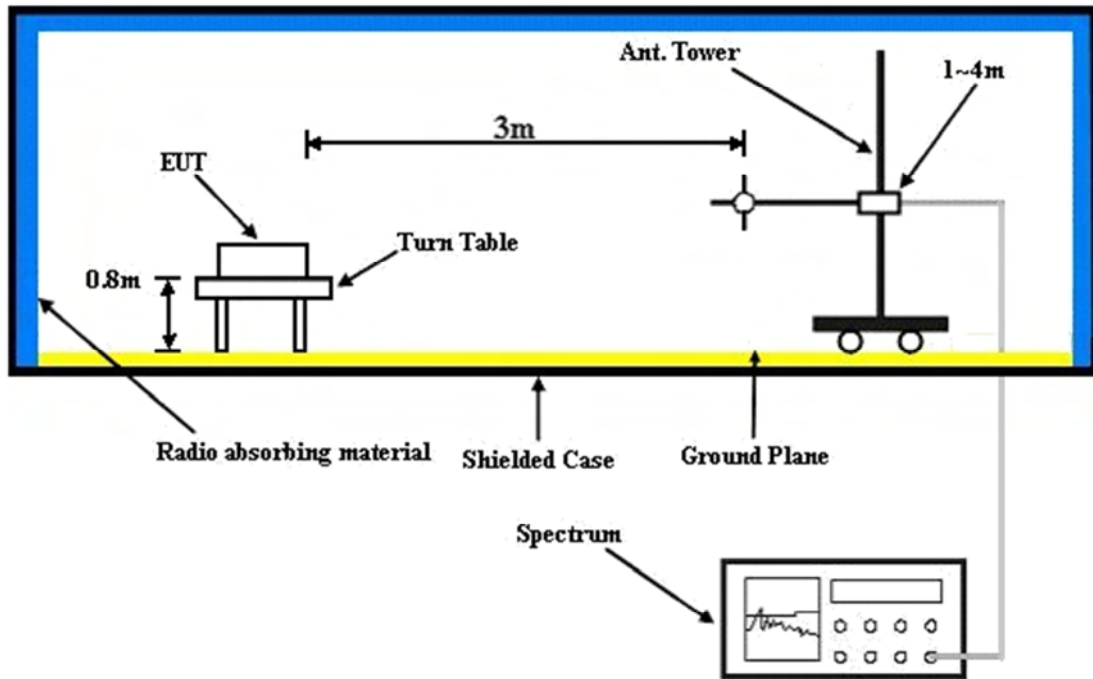
- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 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. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $\text{E.R.P power} = \text{E.I.R.P power} - 2.15\text{dBi}$.

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).

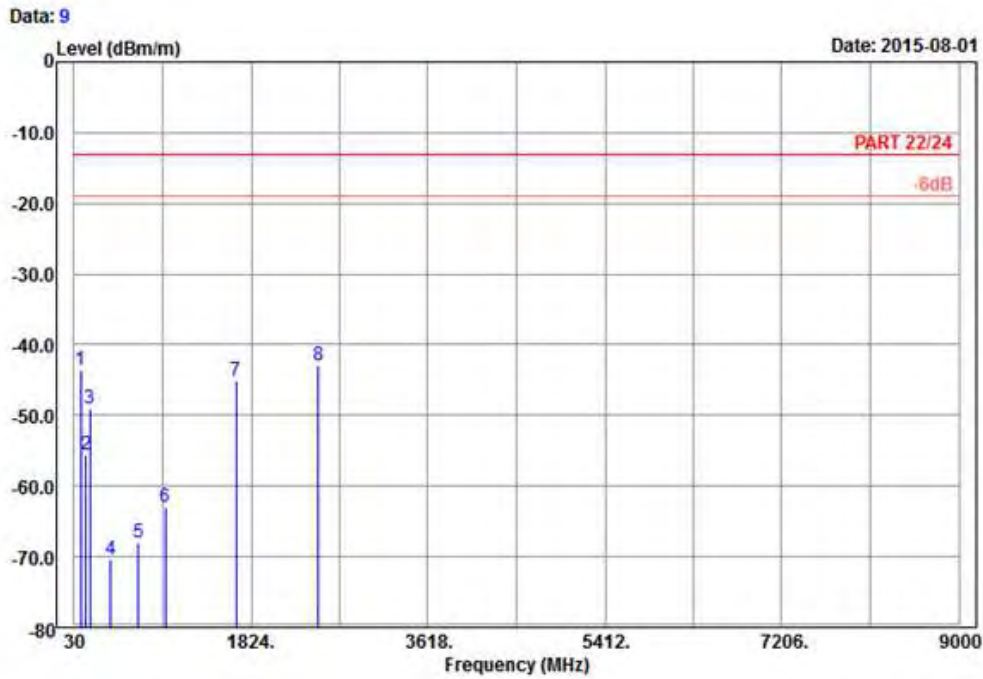
4.7.5 Test Results

GSM:



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T



Site : 966 chamber 1
 Condition: PART 22/24 3m Horizontal
 Remark : GSM 850_Link_CH189
 Tested by: Charles Hsiao
 Plane : X
 SIM : 1

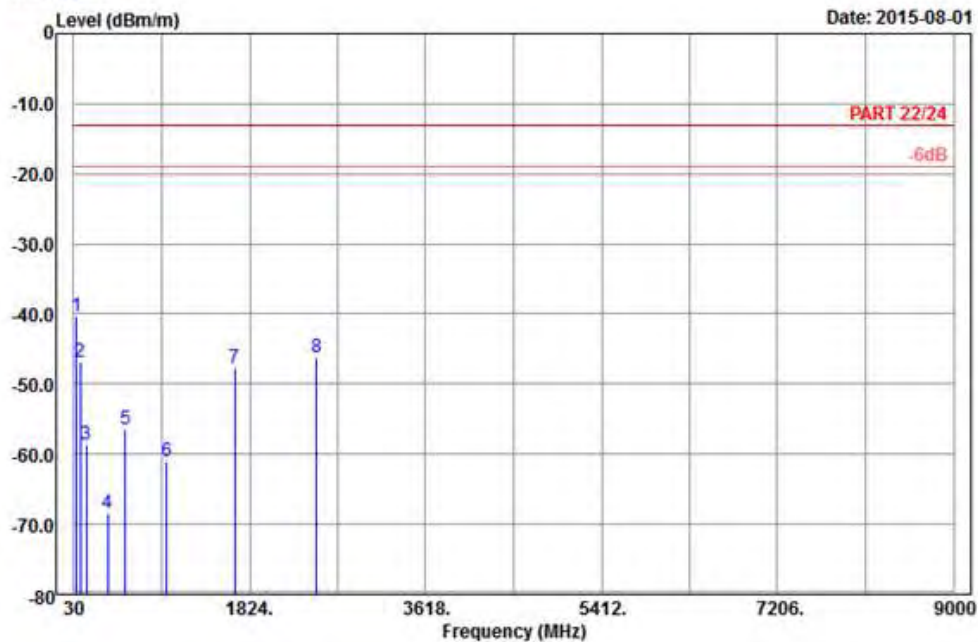
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	96.96	-43.56	-33.27	-13.00	-30.56	-10.29	Peak
2	153.66	-55.50	-47.64	-13.00	-42.50	-7.86	Peak
3	190.11	-49.00	-43.27	-13.00	-36.00	-5.73	Peak
4	400.10	-70.49	-67.73	-13.00	-57.49	-2.76	Peak
5	680.80	-68.00	-67.72	-13.00	-55.00	-0.28	Peak
6	952.40	-62.93	-68.05	-13.00	-49.93	5.12	Peak
7	1672.80	-45.11	-53.02	-13.00	-32.11	7.91	Peak
8 pp	2509.20	-42.92	-54.20	-13.00	-29.92	11.28	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1
 Condition: PART 22/24 3m Vertical
 Remark : GSM 850_Link_CH189
 Tested by: Charles Hsiao
 Plane : X
 SIM : 1

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	pp	54.84	-40.37	-26.31	-13.00	-27.37	-14.06 Peak
2		93.99	-46.82	-36.37	-13.00	-33.82	-10.45 Peak
3		162.30	-58.64	-51.17	-13.00	-45.64	-7.47 Peak
4		373.50	-68.43	-64.29	-13.00	-55.43	-4.14 Peak
5		559.70	-56.52	-55.26	-13.00	-43.52	-1.26 Peak
6		979.70	-61.10	-66.30	-13.00	-48.10	5.20 Peak
7		1672.80	-47.80	-55.71	-13.00	-34.80	7.91 Peak
8		2509.20	-46.23	-57.51	-13.00	-33.23	11.28 Peak

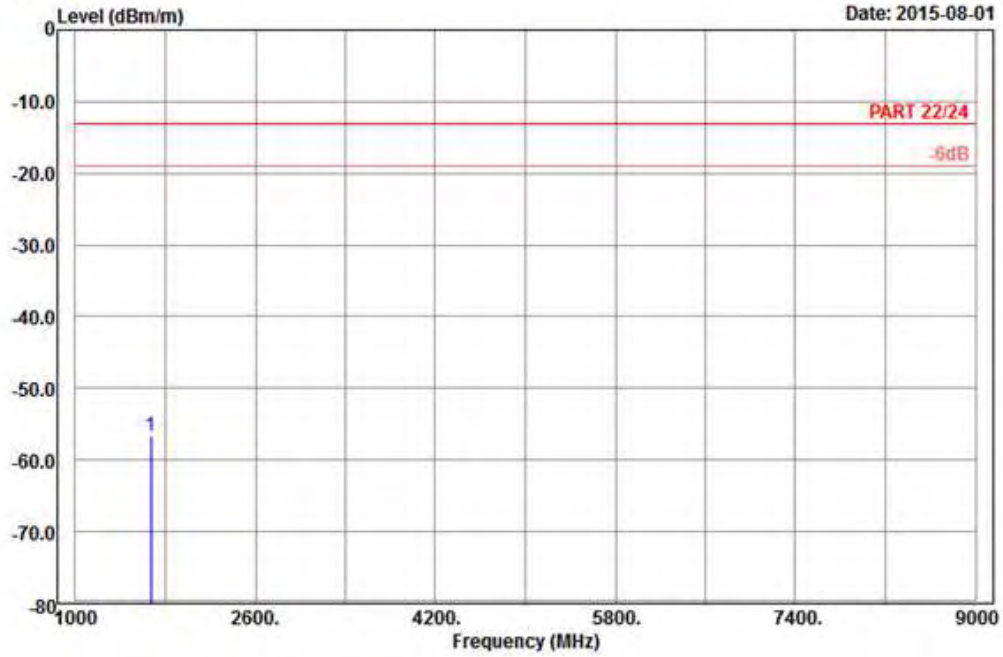
EDGE:



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1
 Condition: PART 22/24 3m Horizontal
 Remark : EDGE 850_Link_CH189
 Tested by: Charles Hsiao
 Plane : X
 SIM : 1

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1 pp 1672.80	-56.64	-64.55	-13.00	-43.64	7.91	Peak

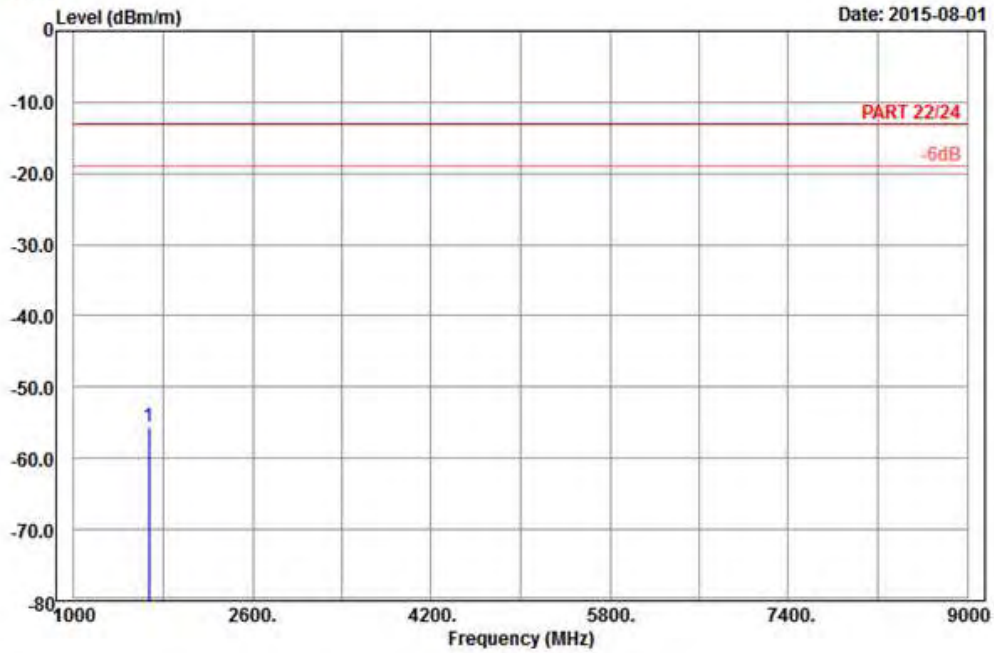


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2015-08-01



Site : 966 chamber 1
 Condition: PART 22/24 3m Vertical
 Remark : EDGE 850_Link_CH189
 Tested by: Charles Hsiao
 Plane : X
 SIM : 1

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1 pp 1672.80	-55.63	-63.54	-13.00	-42.63	7.91	Peak

WCDMA:

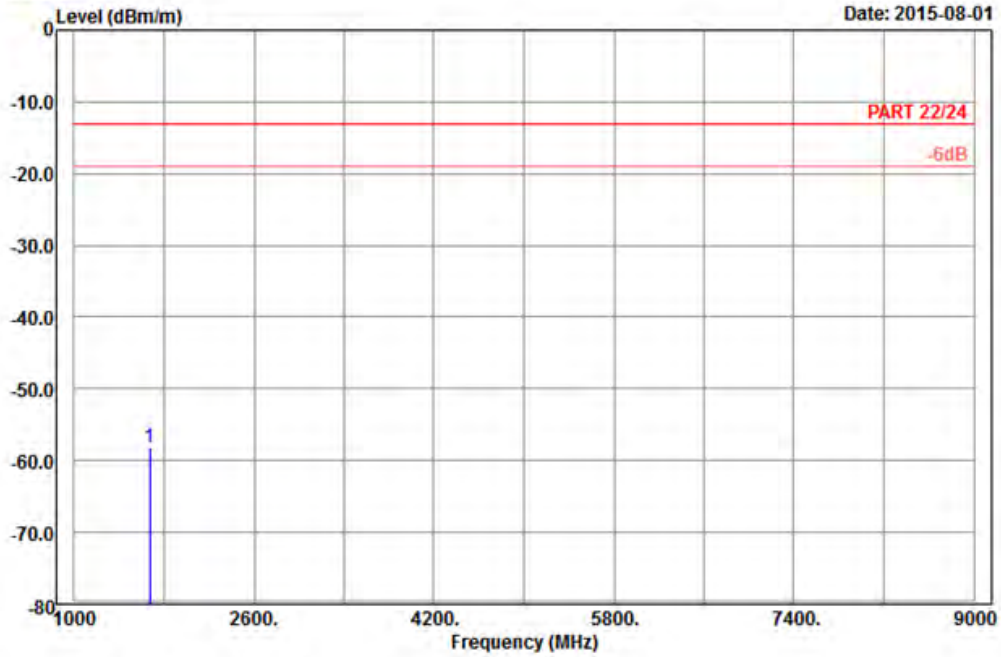


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2015-08-01



Site : 966 chamber 1
 Condition: PART 22/24 3m Horizontal
 Remark : Band V_Link_CH4182
 Tested by: Charles Hsiao
 Plane : X
 SIM : 1

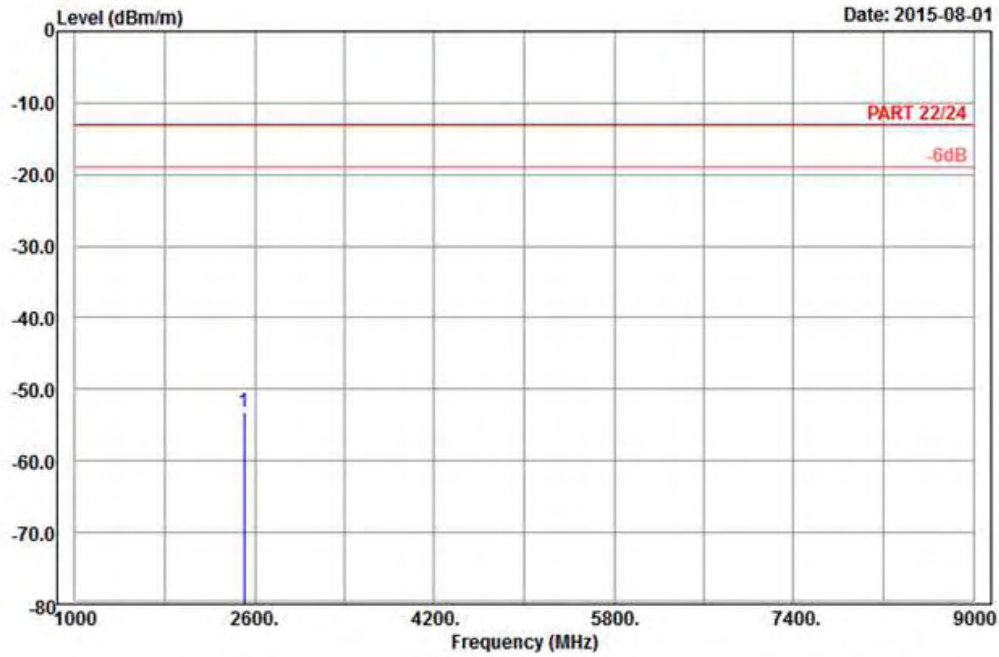
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1 pp	1672.80	-58.18	-66.09	-13.00	-45.18	7.91	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6



Site : 966 chamber 1
 Condition: PART 22/24 3m Vertical
 Remark : Band V_Link_CH4182
 Tested by: Charles Hsiao
 Plane : X
 SIM : 1

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1 pp 2509.20	-53.11	-64.39	-13.00	-40.11	11.28	Peak



5 Pictures of Test Arrangements

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



A D T

Appendix – 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 Lab/Telecom Lab

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety

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.

--- END ---