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FCC TEST REPORT (PART 22)

REPORT NO.: RF120507C13
MODEL NO.: 8001 3G Cradle
FCC ID: Q3N-80013GC
RECEIVED: May 07, 2012
TESTED: May 15 ~ May 31, 2012
ISSUED: Jun. 04, 2012

APPLICANT: CIPHERLAB CO., LTD

ADDRESS: 12F, 333 Dunhua S. Rd., Sec.2 Taipei, Taiwan 106

ISSUED BY: Bureau Veritas Consumer Products Services
(H.K.) Ltd., Taoyuan Branch

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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.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120507C13	Original release	Jun. 04, 2012



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1 CERTIFICATION

PRODUCT: CRADLE

MODEL: 8001 3G Cradle

BRAND: CIPHERLAB

APPLICANT: CIPHERLAB CO., LTD

TESTED: May 15 ~ May 31, 2012

TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: FCC PART 22, Subpart H

The above equipment (model: 8001 3G Cradle) 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** : Jun. 04, 2012
Polly Chien / Specialist

APPROVED BY :  , **DATE** : Jun. 04, 2012
Gary Chang / Technical 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.
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 -22.9dB at 2472.60MHz.

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
Conducted emissions	150kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	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
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 19, 2012	Apr. 18, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Aug. 04, 2011	Aug. 03, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Apr. 03, 2012	Apr. 02, 2013
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Sep. 06, 2011	Sep. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 20, 2011	Jul. 19, 2012
Preamplifier Agilent	8449B	3008A01911	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8447D	2944A10638	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295013/4 283403/4	Aug. 19, 2011	Aug. 18, 2012
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 13, 2011	Aug. 12, 2012
Software	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	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 test was performed in HwaYa Chamber 9.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 460141.
 5. The IC Site Registration No. is IC 7450F-4.



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	CRADLE
MODEL NO.	8001 3G Cradle
IMEI Code	35754804*****
HW Version	V1.0
SW Version	V1.0
POWER SUPPLY	5Vdc (Adapter)
MODULATION TYPE	GSM, GPRS: GMSK EDGE: 8PSK WCDMA : QPSK, BPSK
FREQUENCY RANGE	GSM, GPRS, EDGE: 824.2MHz ~ 848.8MHz WCDMA: 826.4MHz ~ 846.6MHz
MAX. ERP POWER	GPRS: 1.0257Watts EDGE: 0.2535Watts WCDMA: 0.1271Watts
MULTI-SLOTS CLASS	10
WCDMA RELEASE VERSION	6
ANTENNA TYPE	Removable external antenna with -0.05dBi gain
I/O PORTS	Refer to users' manual
DATA CABLE	NA
ACCESSORY DEVICES	Adapter

NOTE:

1. The EUT uses following adapters.

Adapter 1	
Brand	I.T.E Power SUPPLY
Model	GPSS-0500200
Input Power	100-240Vac, 50-60Hz, 0.5A
Output Power	5Vdc, 2A
Power Line	1.5m non-shielded cable with 1 core



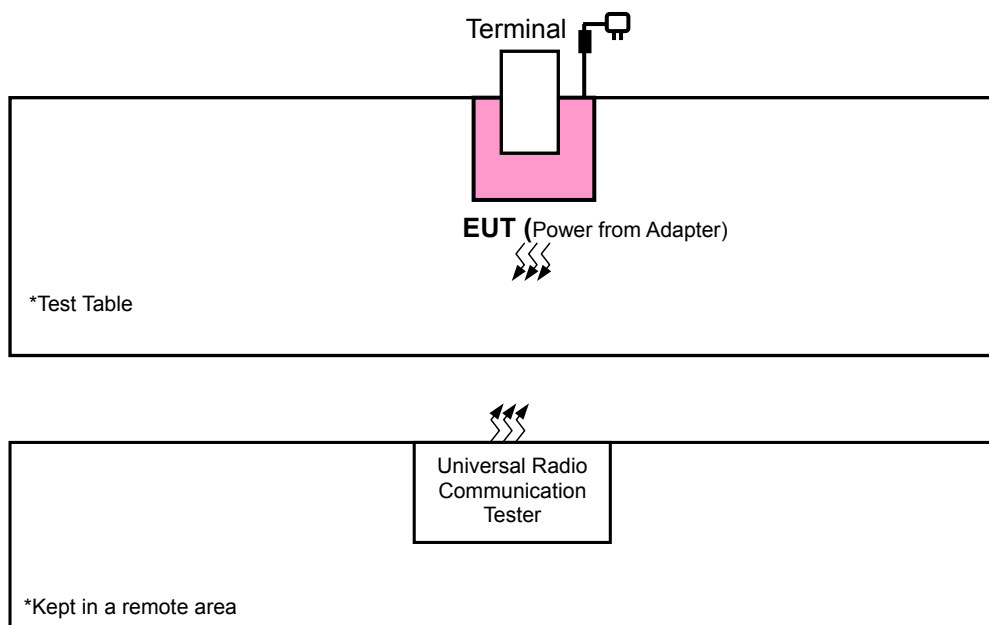
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Adapter 2	
Brand	ADAPTER TECH.
Model	STD-05020U2
Input Power	100-240Vac, 47-63Hz, 0.31A MAX
Output Power	5Vdc, 2A, 10.0W MAX
Power Line	1.8m non-shielded cable with 1 core

**After pre-tested two of adapters found adapter 2 was the worse one and was chosen for final test.

2. 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.

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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Universal Radio Communication Tester	R&S	CMU200	101372	NA
2	TERMINAL	CIPHERLAB	8001 Terminal	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA

NOTE:

1. All power cords of the above support units are non shielded (1.8m).
2. Item 1 acted as a communication partner to transfer data.
3. Item 2 was provided by the manufacturer.



3.4 TEST ITEM AND TEST CONFIGURATION

GSM MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
ERP	128 to 251	128, 189, 251	GPRS, EDGE
FREQUENCY STABILITY	128 to 251	189	GSM
OCCUPIED BANDWIDTH	128 to 251	128, 189, 251	GPRS, EDGE
BAND EDGE	128 to 251	128, 251	GPRS, EDGE
CONDCUDED EMISSION	128 to 251	128, 189, 251	GSM
RADIATED EMISSION BELOW 1 GHz	128 to 251	189	GSM
RADIATED EMISSION ABOCE 1 GHz	128 to 251	128, 189, 251	GSM

WCDMA MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
ERP	4132 to 4233	4132, 4182, 4233	WCDMA
FREQUENCY STABILITY	4132 to 4233	4182	WCDMA
OCCUPIED BANDWIDTH	4132 to 4233	4132, 4182, 4233	WCDMA, HSDPA, HSUPA
BAND EDGE	4132 to 4233	4132, 4233	WCDMA, HSDPA, HSUPA
CONDCUDED EMISSION	4132 to 4233	4132, 4182, 4233	WCDMAA
RADIATED EMISSION BELOW 1 GHz	4132 to 4233	4132	WCDMA
RADIATED EMISSION ABOCE 1 GHz	4132 to 4233	4132, 4182, 4233	WCDMA

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	26deg. C, 65%RH	5.0Vdc	Brad Wu
FREQUENCY STABILITY	26deg. C, 65%RH	5.0Vdc	Brad Wu
OCCUPIED BANDWIDTH	26deg. C, 65%RH	5.0Vdc	Brad Wu
BAND EDGE	26deg. C, 65%RH	5.0Vdc	Brad Wu
CONDCUDED EMISSION	26deg. C, 65%RH	5.0Vdc	Brad Wu
RADIATED EMISSION BELOW 1 GHz	25deg. C, 65%RH	5.0Vdc	Haru Yang
RADIATED EMISSION ABOCE 1 GHz	22deg. C, 71%RH	5.0Vdc	Sun Lin, Anderson Hong



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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-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.

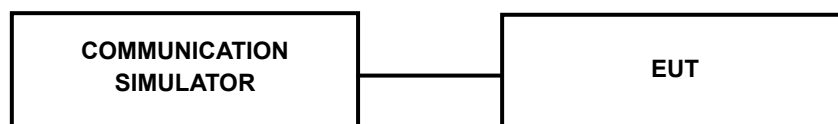
4.1.2 TEST PROCEDURES

CONDUCTED POWER MEASUREMENT:

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

4.1.3 TEST SETUP

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	189	251
Frequency (MHz)	824.2	836.4	848.8
GPRS 8	32.11	32.01	32.31
GPRS 10	32.02	31.97	32.27
EDGE 8 (MCS1)	26.20	26.10	26.24
EDGE 10 (MCS1)	26.13	26.02	26.16
EDGE 8 (MCS9)	26.02	25.99	25.96
EDGE 10 (MCS9)	25.90	25.89	25.88

Band	WCDMA V		
Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	23.19	23.24	23.18
HSDPA Subtest-1	22.63	22.71	22.58
HSDPA Subtest-2	22.71	22.75	22.68
HSDPA Subtest-3	22.27	22.27	22.15
HSDPA Subtest-4	22.24	22.21	22.18
HSUPA Subtest-1	21.89	21.85	22.59
HSUPA Subtest-2	21.08	21.11	22.21
HSUPA Subtest-3	21.58	21.35	21.42
HSUPA Subtest-4	21.55	21.31	21.01
HSUPA Subtest-5	22.63	22.44	22.57

**A D T****ERP POWER (dBm)**

GPRS 8					
CHANNEL NO.	FREQUENCY (MHz)	CONDUCTION POWER (dBm)	ANTENNA GAIN (dBi)	OUTPUT POWER	
				dBm	Watt
128	824.2	32.11	-0.05	29.91	0.9794
189	836.4	32.01	-0.05	29.81	0.9572
251	848.8	32.31	-0.05	30.11	1.0257

EDGE 8					
CHANNEL NO.	FREQUENCY (MHz)	CONDUCTION POWER (dBm)	ANTENNA GAIN (dBi)	OUTPUT POWER	
				dBm	Watt
128	824.2	26.20	-0.05	24.00	0.2512
189	836.4	26.10	-0.05	23.90	0.2455
251	848.8	26.24	-0.05	24.04	0.2535

WCDMA Band V_RMC 12.2K					
CHANNEL NO.	FREQUENCY (MHz)	CONDUCTION POWER (dBm)	ANTENNA GAIN (dBi)	OUTPUT POWER	
				dBm	Watt
4132	826.4	23.19	-0.05	20.99	0.1256
4182	836.4	23.24	-0.05	21.04	0.1271
4233	846.6	23.18	-0.05	20.98	0.1253

NOTE: ERP= conducted power(dBm) + Antenna gain(dBi)-2.15dB

4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

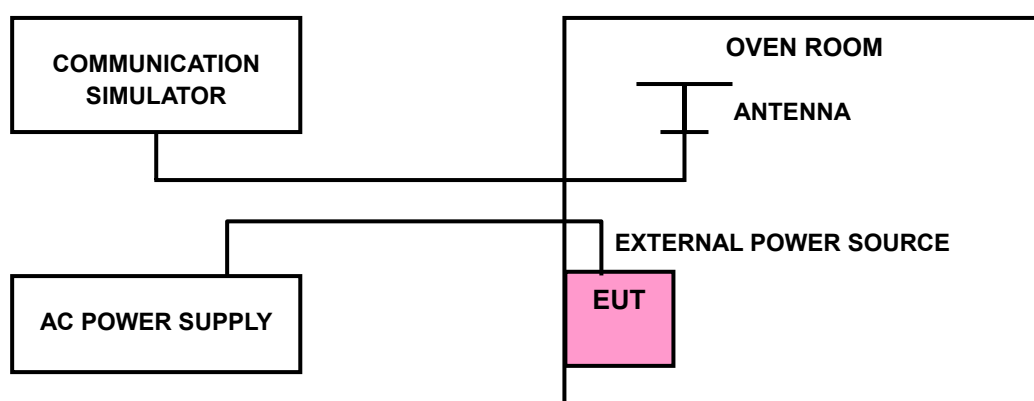
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.2.2 TEST PROCEDURE

- 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.
- EUT is connected the external power supply to control the AC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- 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	WCDMA	
126.5	-0.042	-0.033	2.5
93.5	-0.045	-0.035	2.5

NOTE: The applicant defined the normal working voltage of the adapter is from 93.5Vdc to 126.5Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

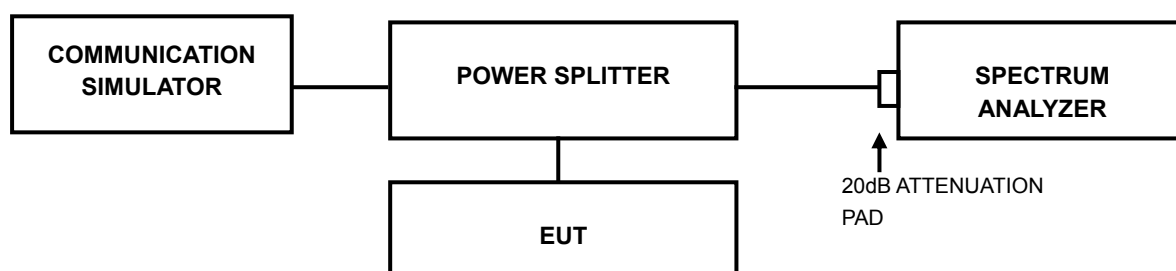
TEMP. (°C)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	GSM	WCDMA	
50	-0.042	-0.039	2.5
40	-0.039	-0.043	2.5
30	-0.045	-0.042	2.5
20	-0.047	-0.044	2.5
10	-0.043	-0.047	2.5
0	-0.041	-0.049	2.5
-10	-0.038	-0.054	2.5
-20	-0.047	-0.057	2.5
-30	-0.050	-0.055	2.5

4.3 OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 TEST PROCEDURES

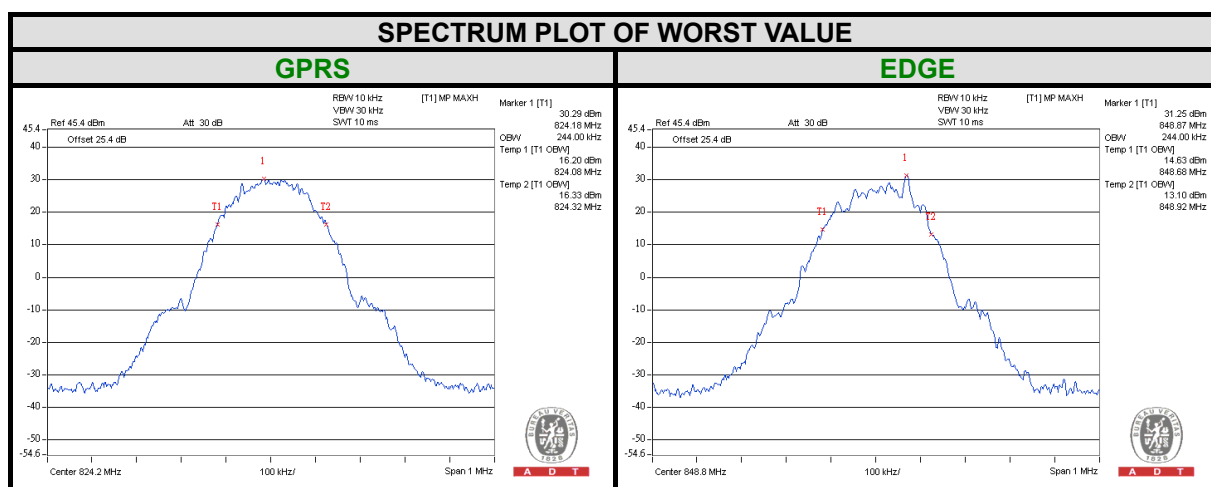
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function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

4.3.2 TEST SETUP



4.3.3 TEST RESULTS

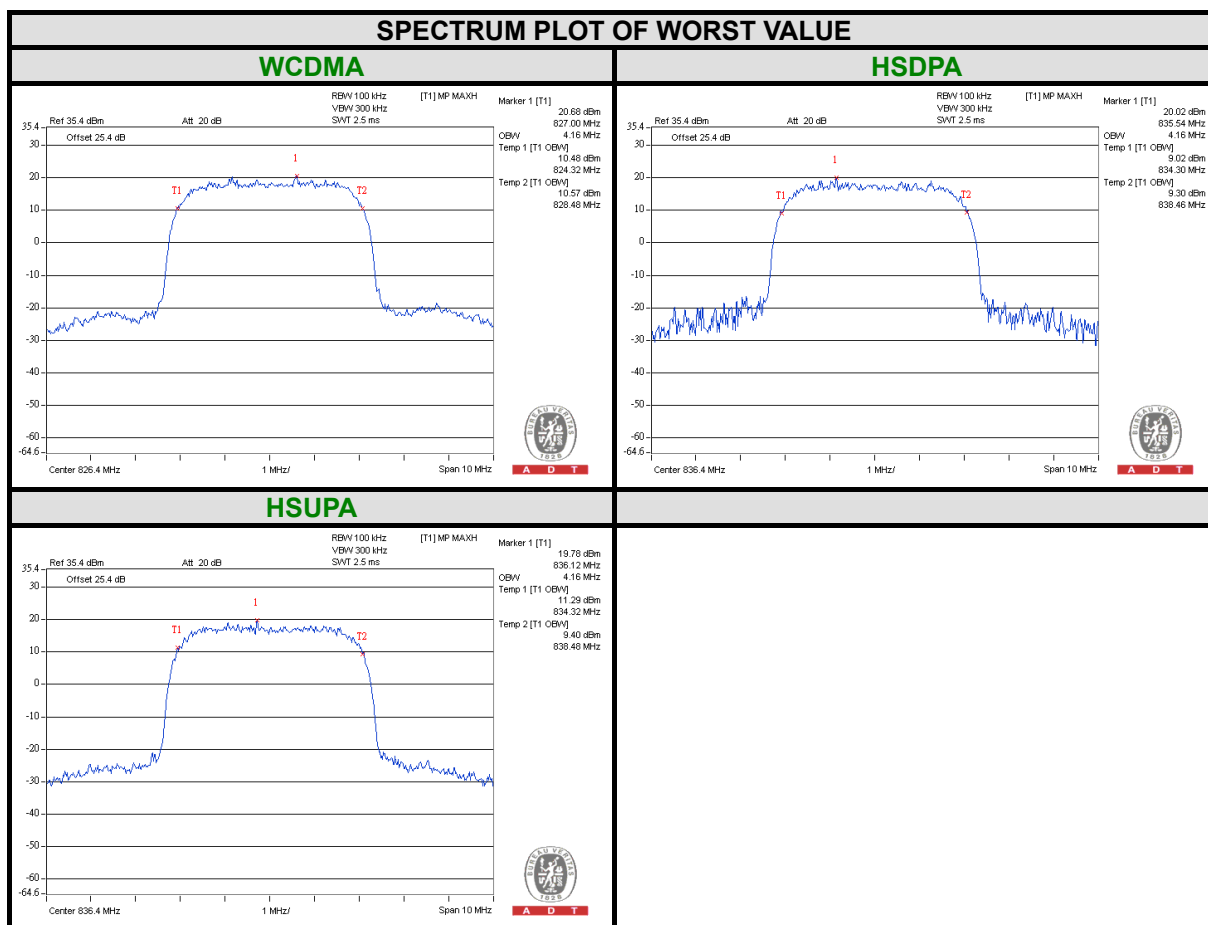
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (kHz)	
		GPRS	EDGE
128	824.2	244	240
189	836.4	242	240
251	848.8	242	244





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CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		
		WCDMA	HSDPA	HSUPA
4132	826.4	4.16	4.14	4.14
4182	836.4	4.14	4.16	4.16
4233	846.6	4.12	4.12	4.16

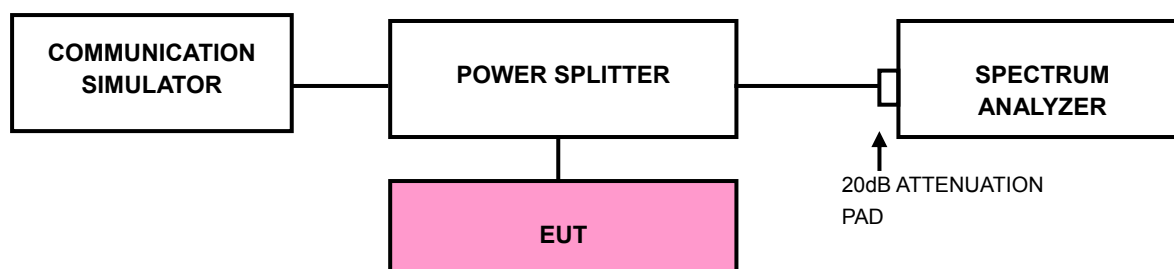


4.4 BAND EDGE MEASUREMENT

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



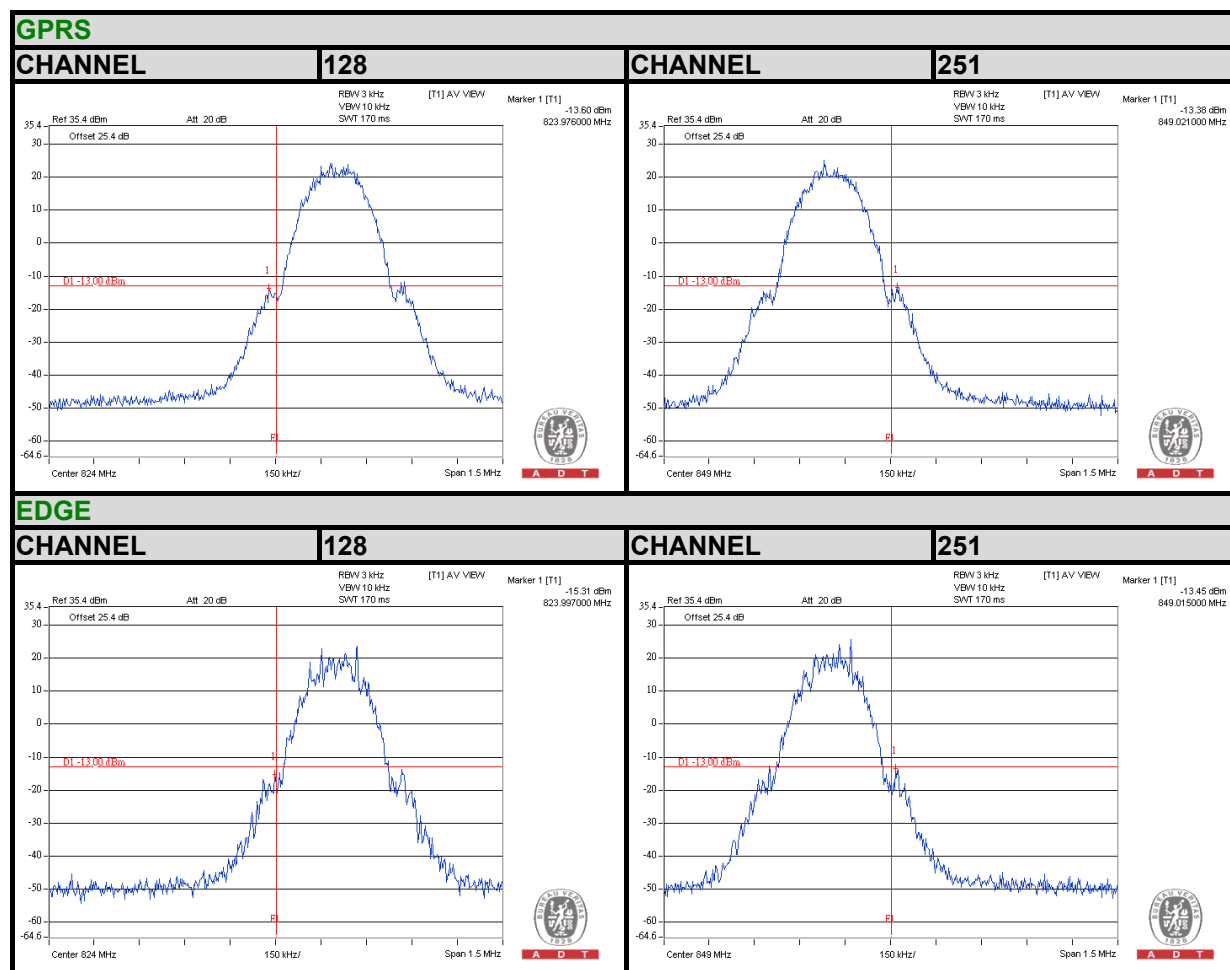
4.4.3 TEST PROCEDURES

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1.5 MHz. RB of the spectrum is 3kHz and VB of the spectrum is 10kHz (GSM/GPRS/ EDGE).
- 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).
- Record the max trace plot into the test report.



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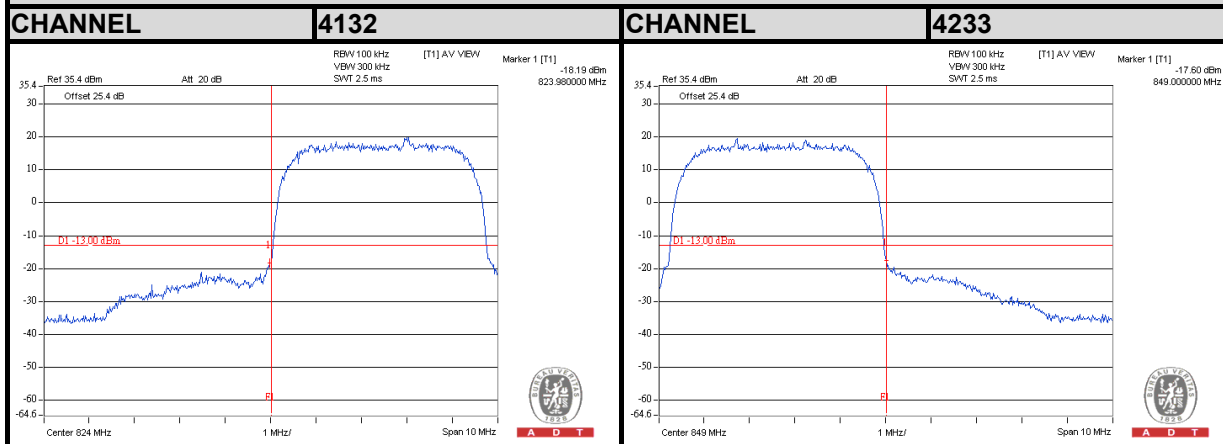
4.4.4 TEST RESULTS



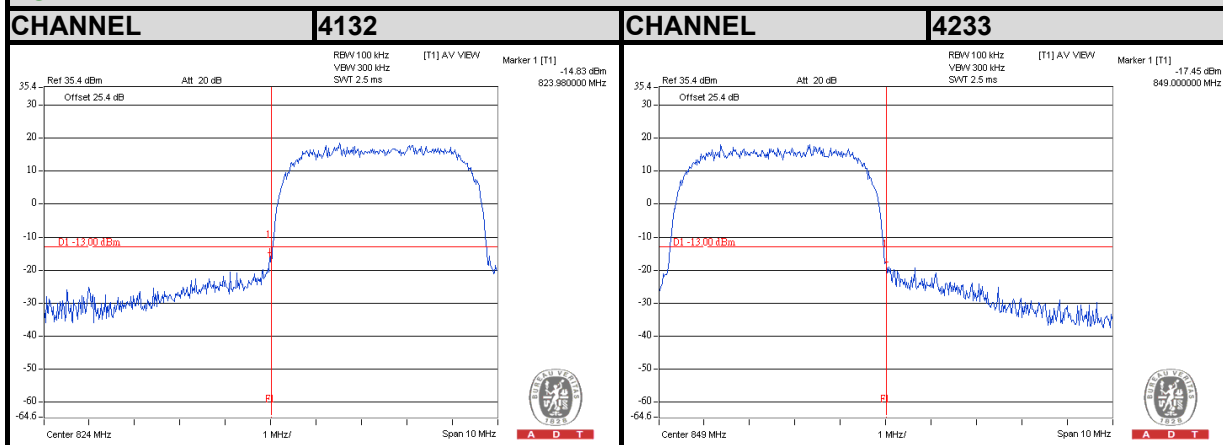


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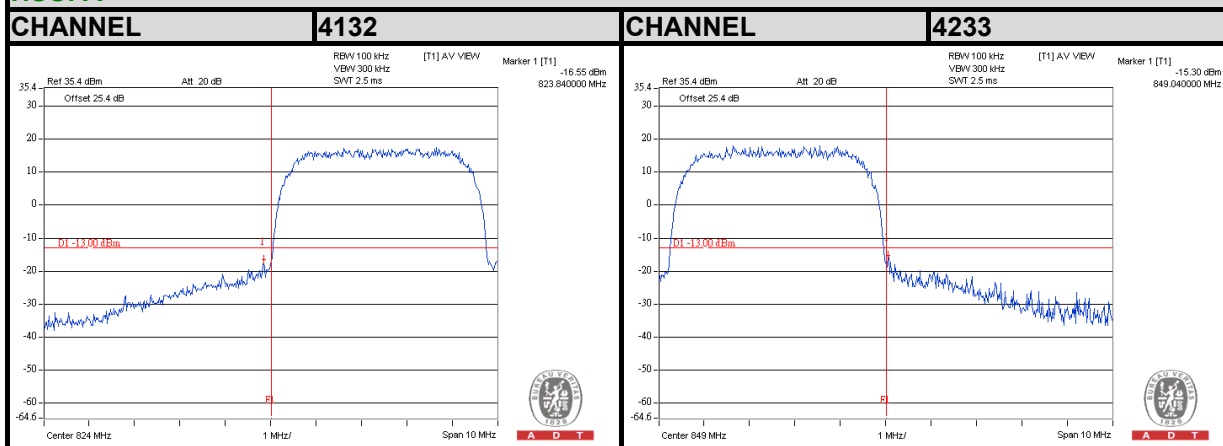
WCDMA



HSDPA



HSUPA



4.5 CONDUCTED SPURIOUS EMISSIONS

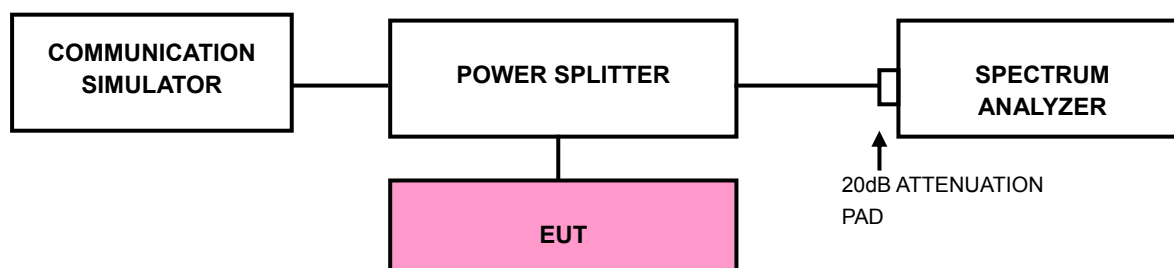
4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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 .

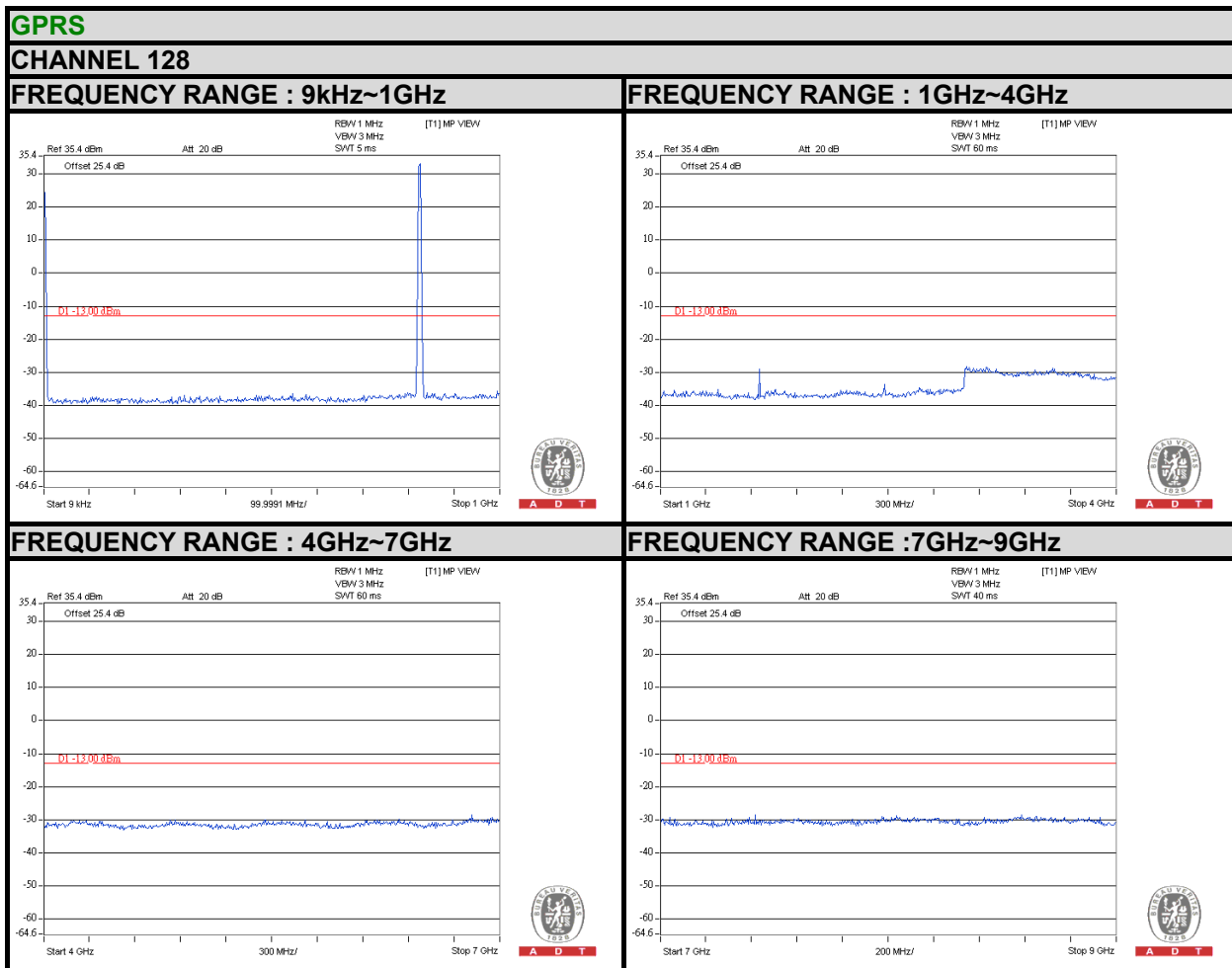
4.5.2 TEST PROCEDURE

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

4.5.3 TEST SETUP



4.5.4 TEST RESULTS

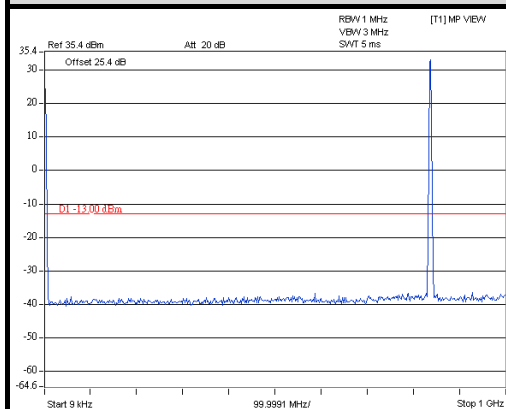




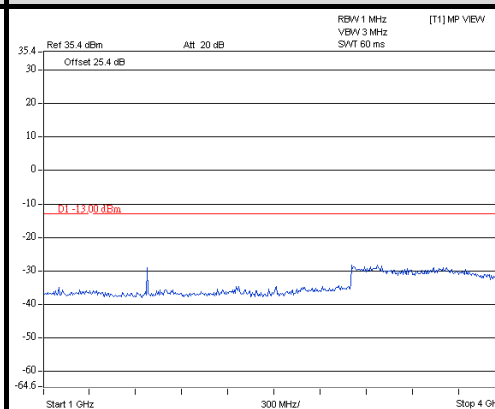
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CHANNEL 189

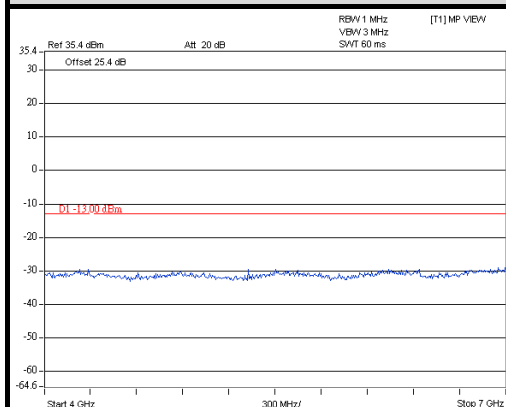
FREQUENCY RANGE : 9kHz~1GHz



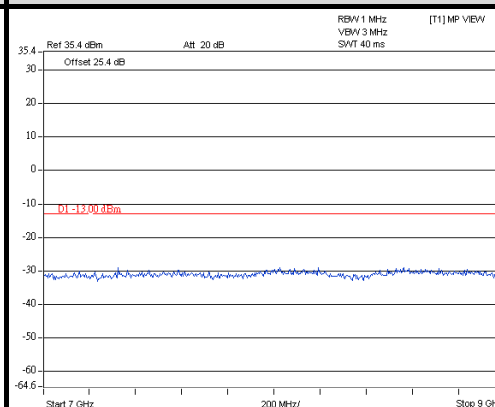
FREQUENCY RANGE : 1GHz~4GHz



FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz

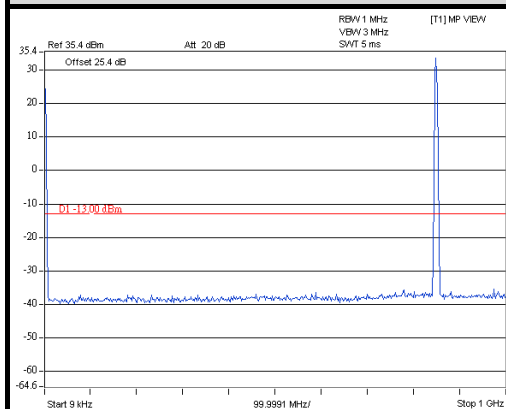




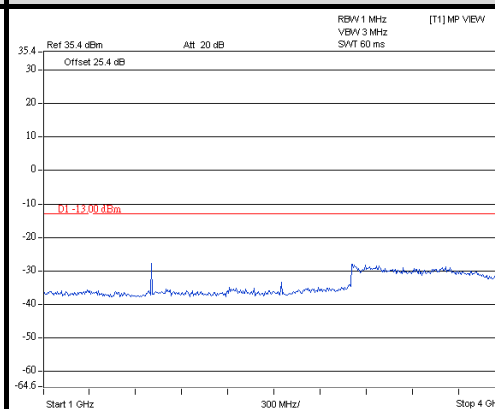
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CHANNEL 251

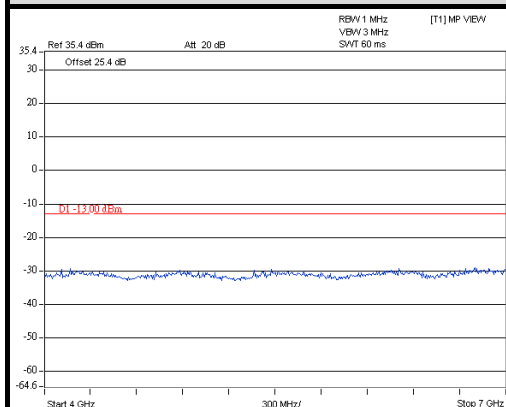
FREQUENCY RANGE : 9kHz~1GHz



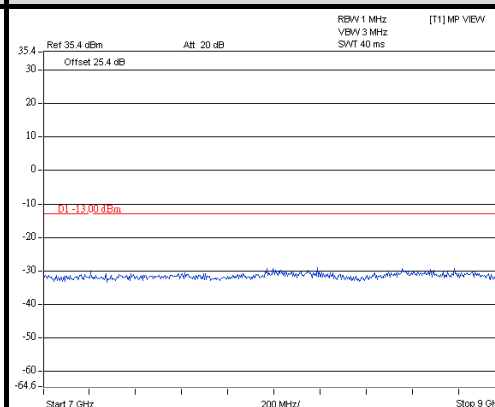
FREQUENCY RANGE : 1GHz~4GHz



FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz



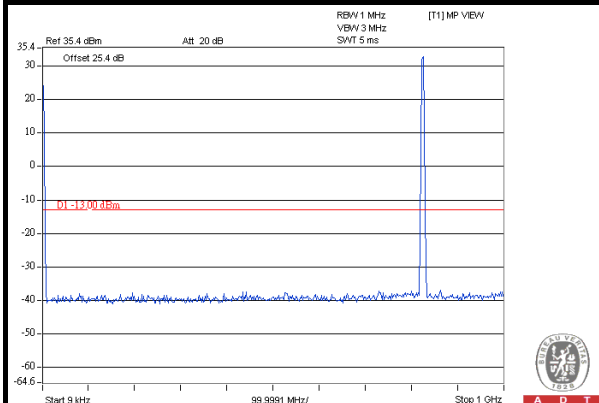


A D T

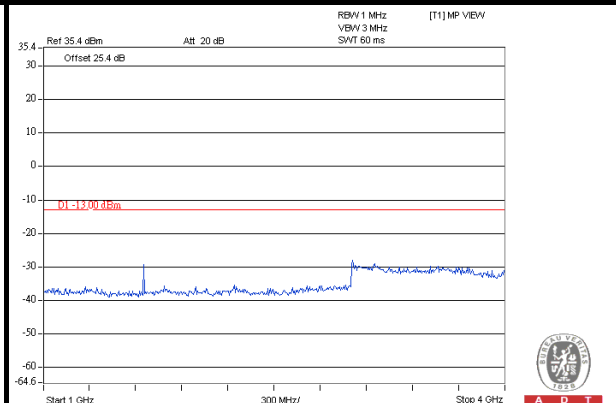
EDGE

CHANNEL 128

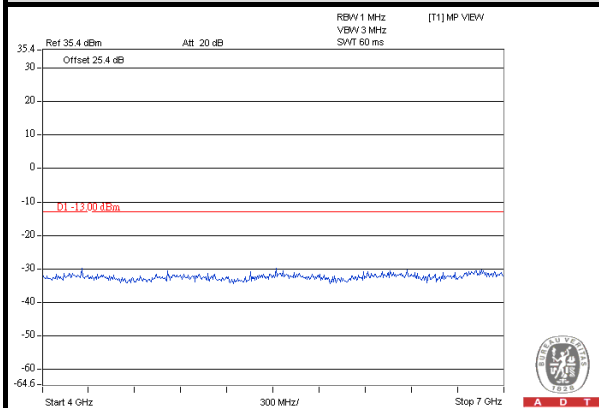
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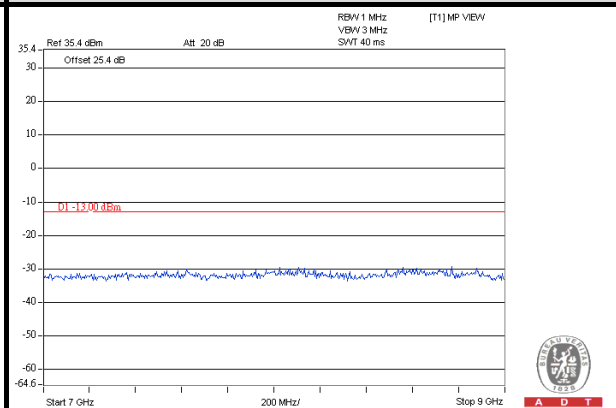
FREQUENCY RANGE : 1GHz~4GHz



FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz

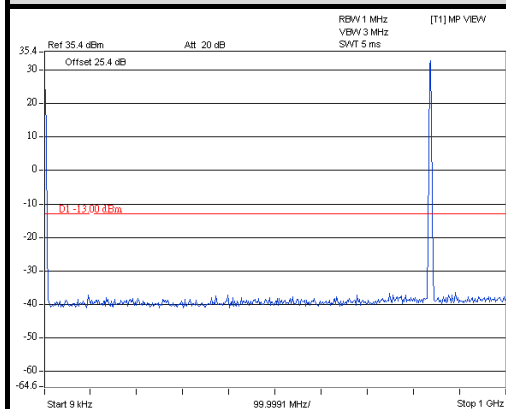




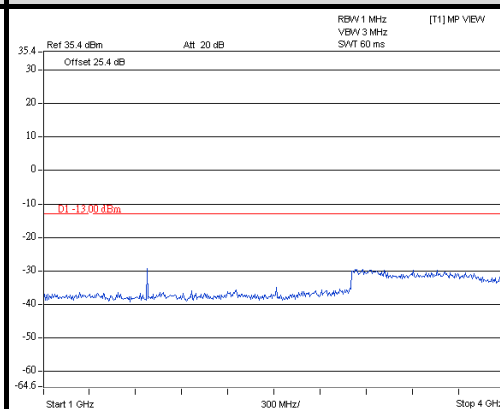
A D T

CHANNEL 189

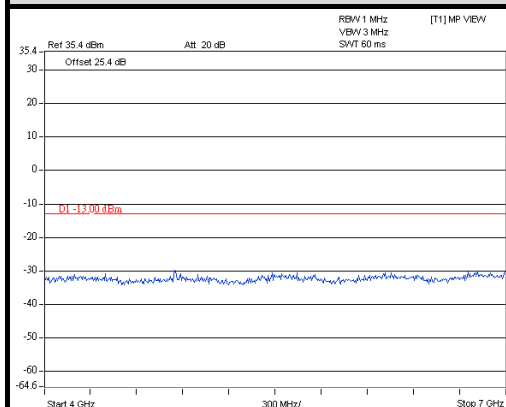
FREQUENCY RANGE : 9kHz~1GHz



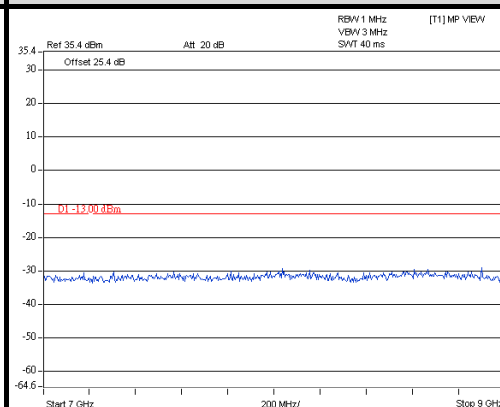
FREQUENCY RANGE : 1GHz~4GHz



FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz

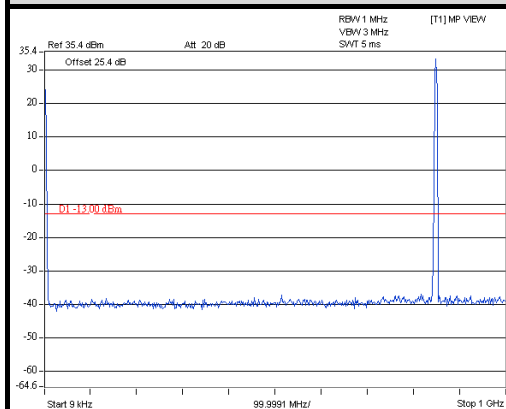




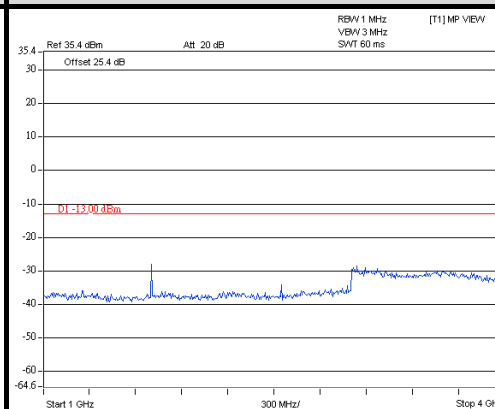
A D T

CHANNEL 251

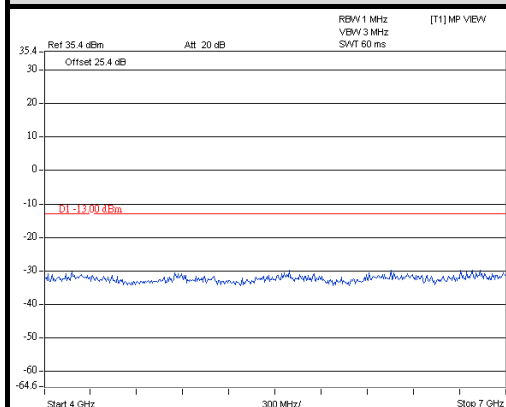
FREQUENCY RANGE : 9kHz~1GHz



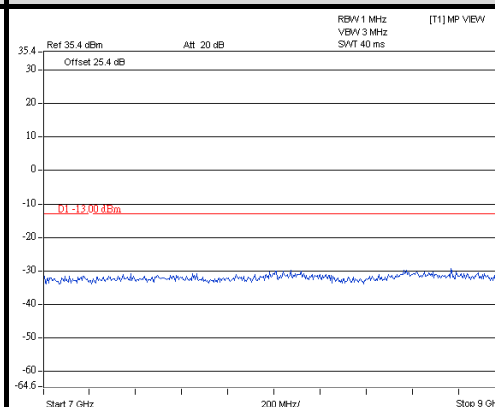
FREQUENCY RANGE : 1GHz~4GHz



FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz



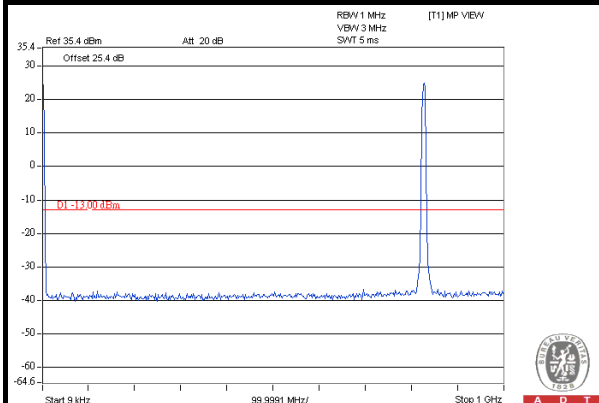


A D T

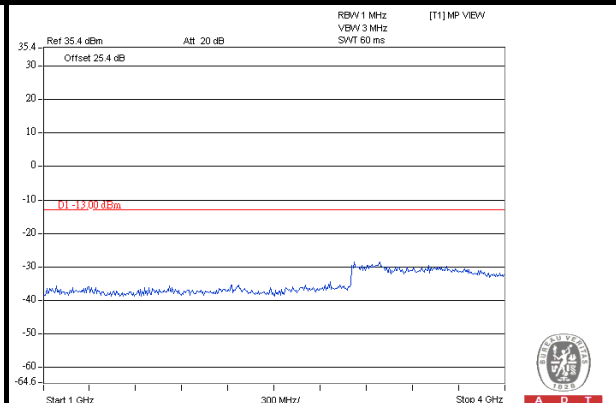
WCDMA

CHANNEL 4132

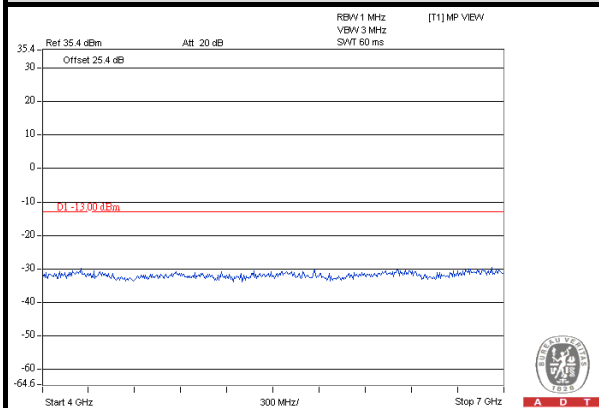
FREQUENCY RANGE : 9kHz~1GHz



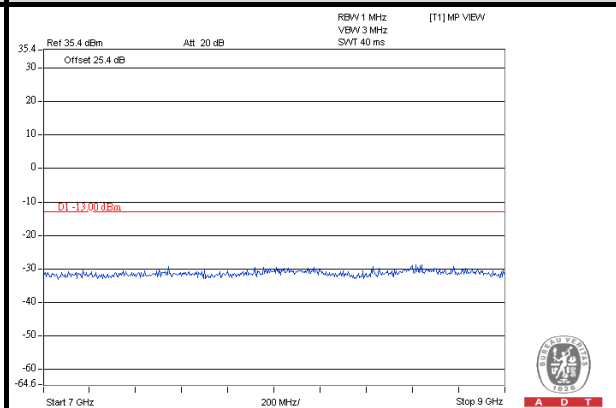
FREQUENCY RANGE : 1GHz~4GHz



FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz

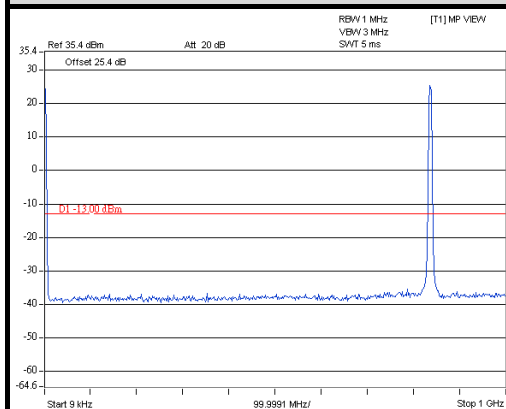




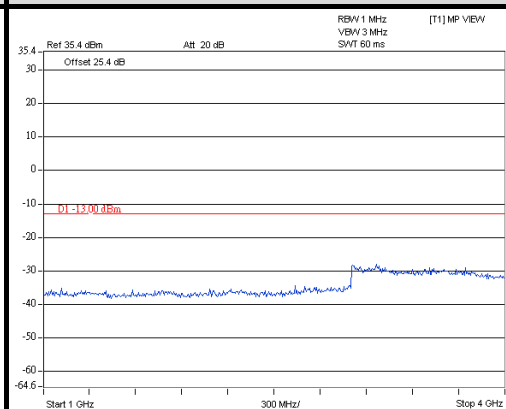
A D T

CHANNEL 4182

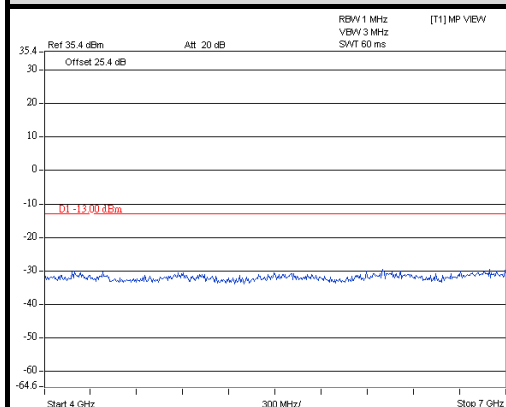
FREQUENCY RANGE : 9kHz~1GHz



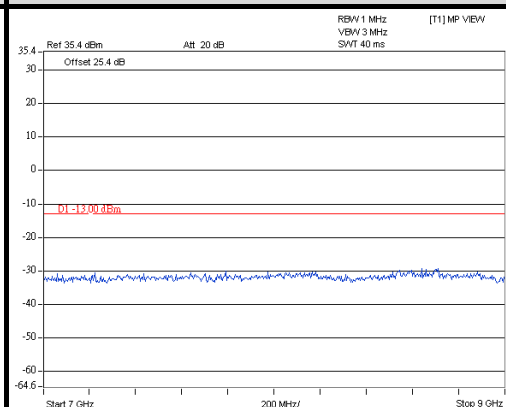
FREQUENCY RANGE : 1GHz~4GHz



FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz

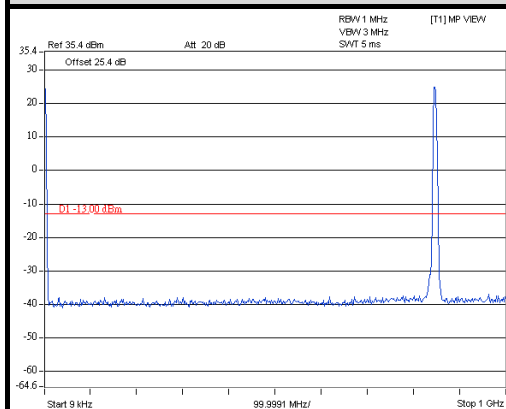




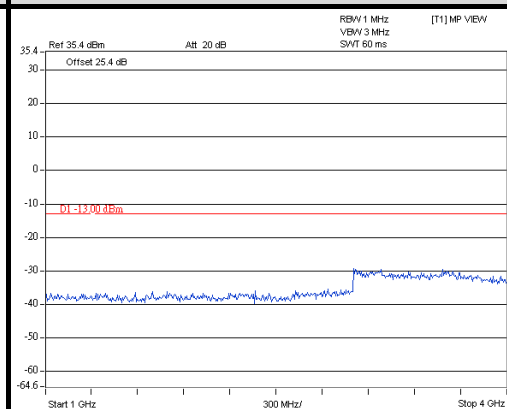
A D T

CHANNEL 4233

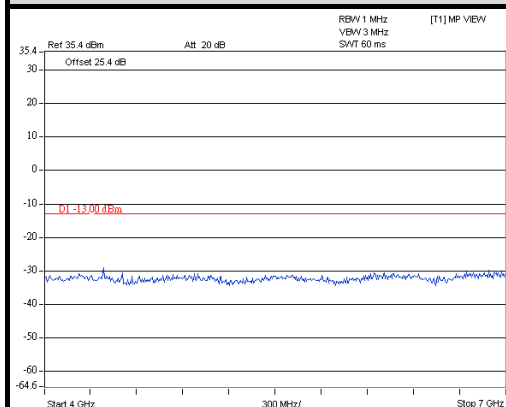
FREQUENCY RANGE : 9kHz~1GHz



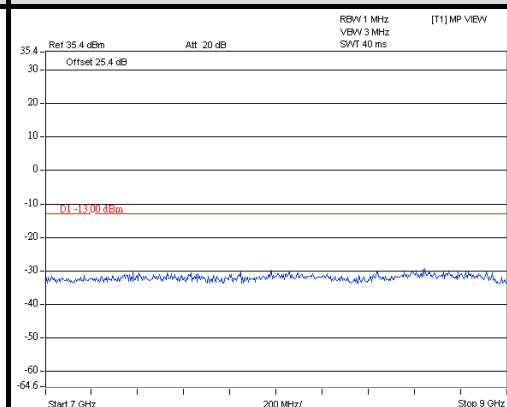
FREQUENCY RANGE : 1GHz~4GHz

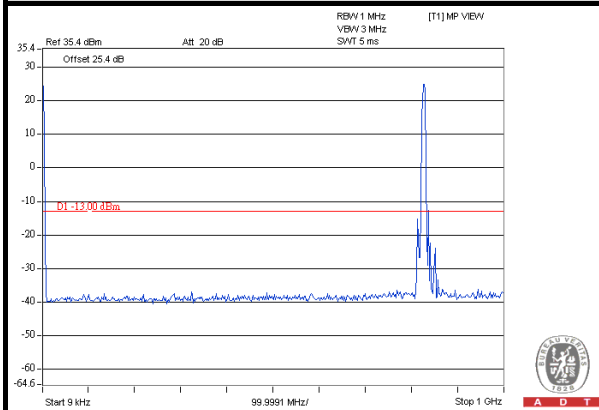
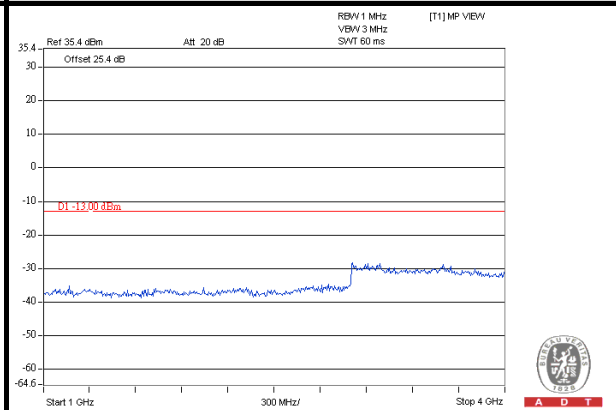
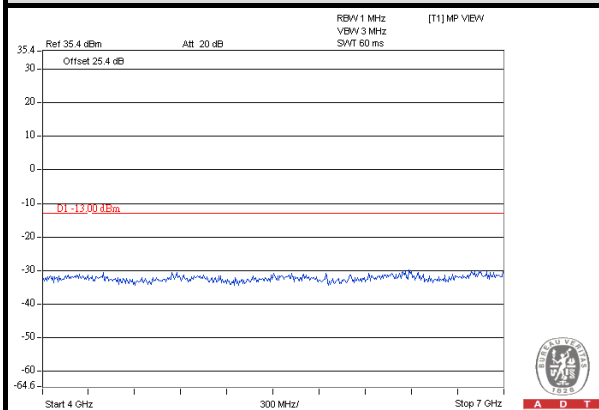
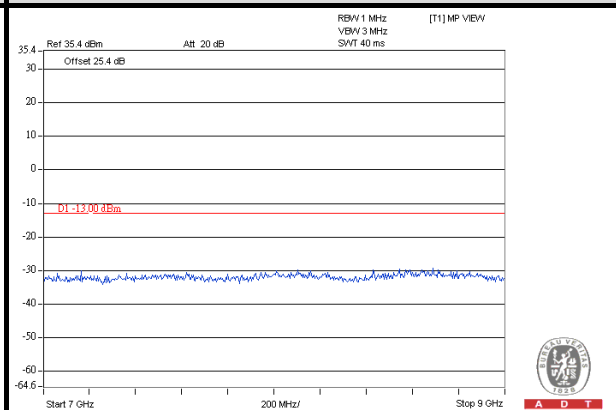


FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz



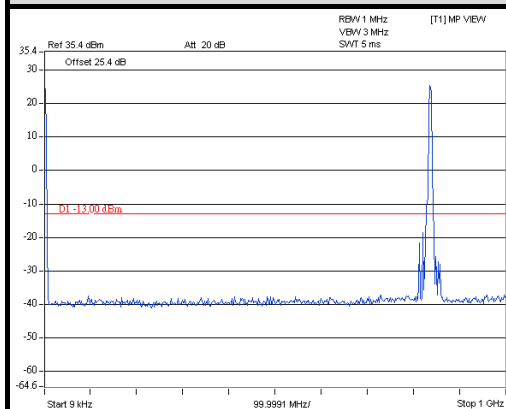
HSDPA**CHANNEL 4132****FREQUENCY RANGE : 9kHz~1GHz****FREQUENCY RANGE : 1GHz~4GHz****FREQUENCY RANGE : 4GHz~7GHz****FREQUENCY RANGE : 7GHz~9GHz**



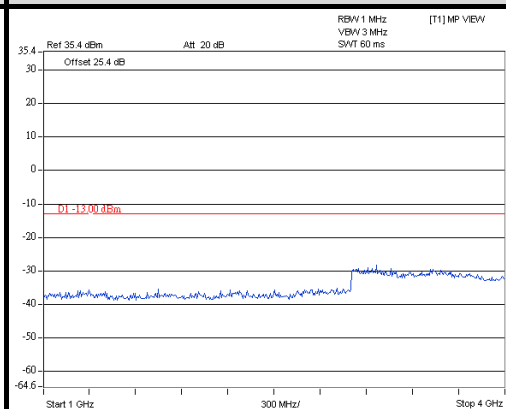
A D T

CHANNEL 4182

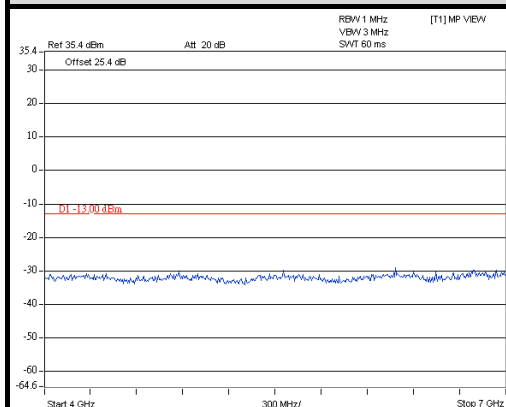
FREQUENCY RANGE : 9kHz~1GHz



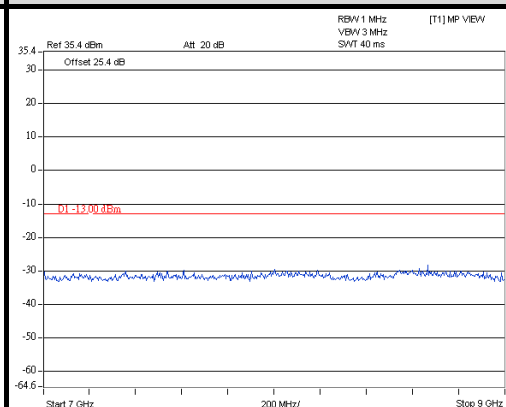
FREQUENCY RANGE : 1GHz~4GHz

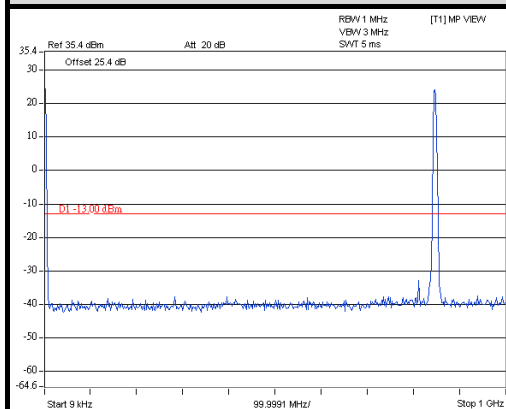
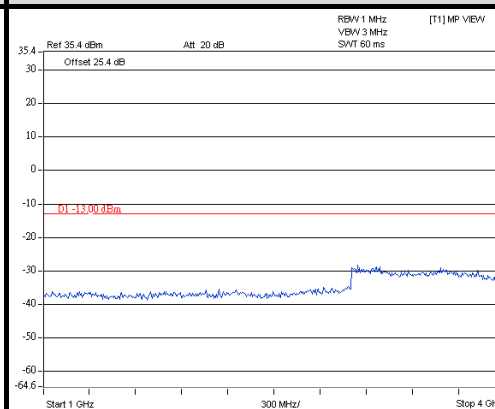
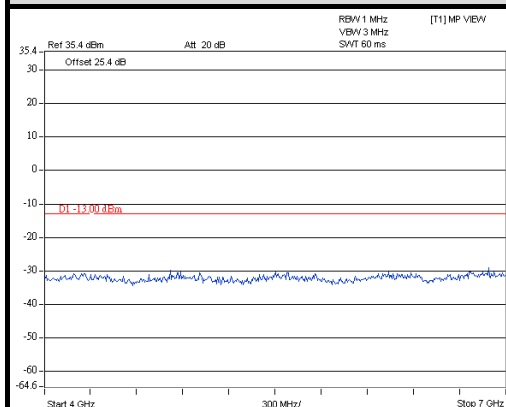
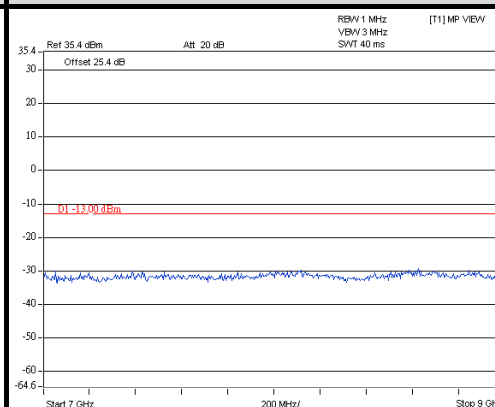


FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz



CHANNEL 4233**FREQUENCY RANGE : 9kHz~1GHz****FREQUENCY RANGE : 1GHz~4GHz****FREQUENCY RANGE : 4GHz~7GHz****FREQUENCY RANGE : 7GHz~9GHz**

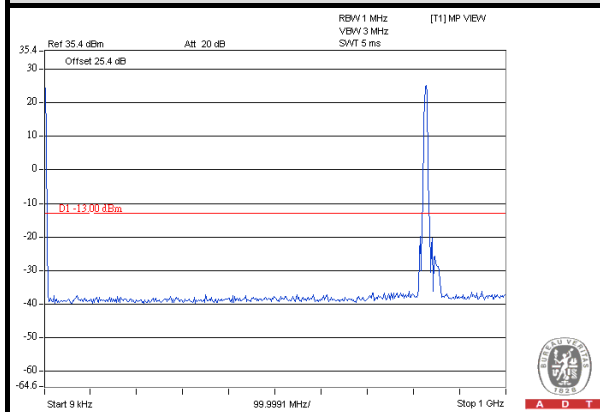


A D T

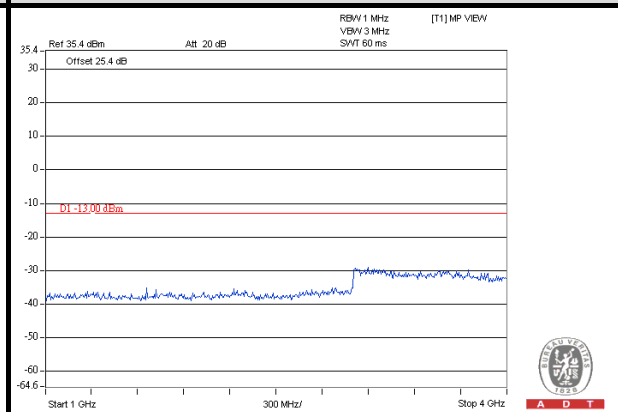
HSUPA

CHANNEL 4132

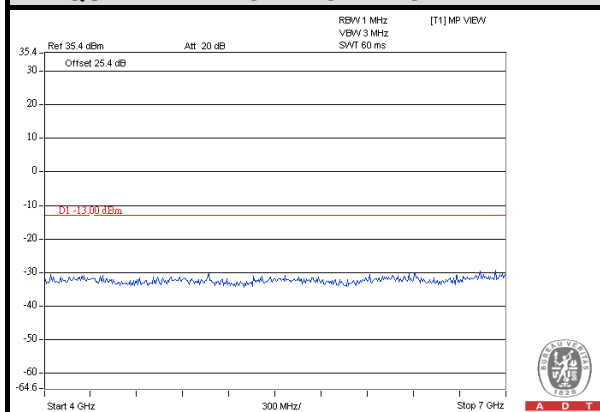
FREQUENCY RANGE : 9kHz~1GHz



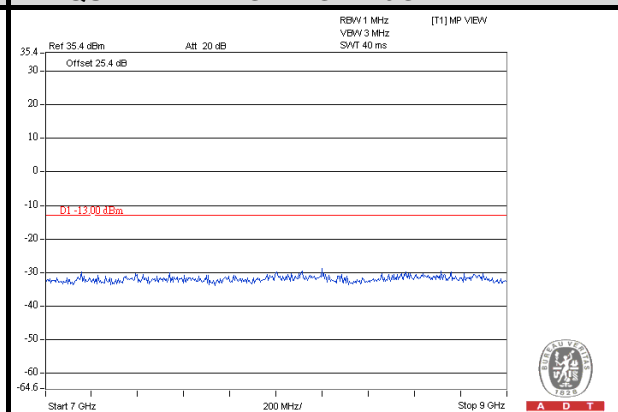
FREQUENCY RANGE : 1GHz~4GHz



FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz

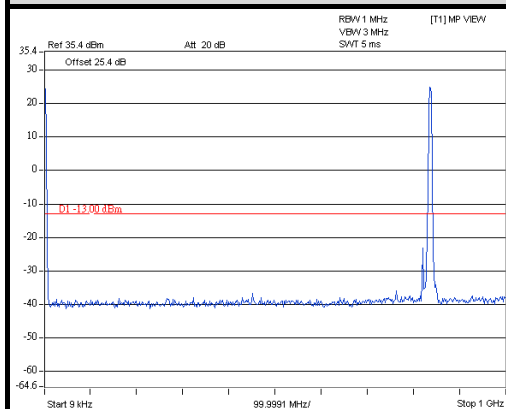




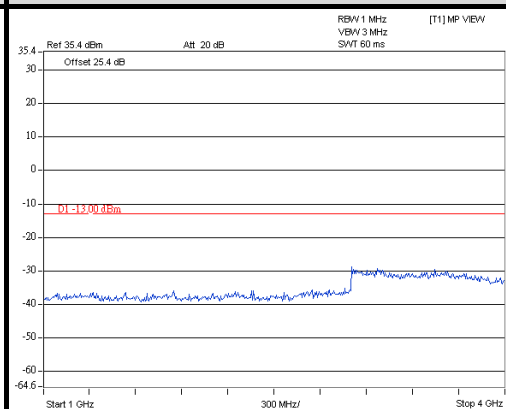
A D T

CHANNEL 4182

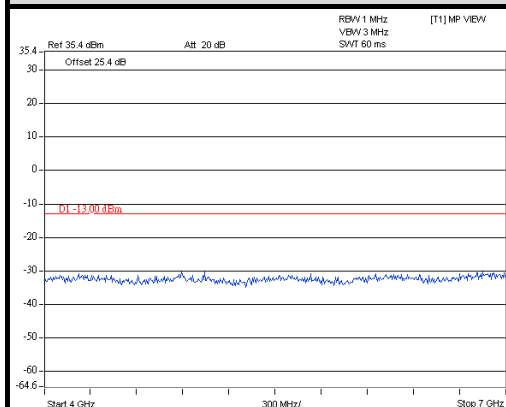
FREQUENCY RANGE : 9kHz~1GHz



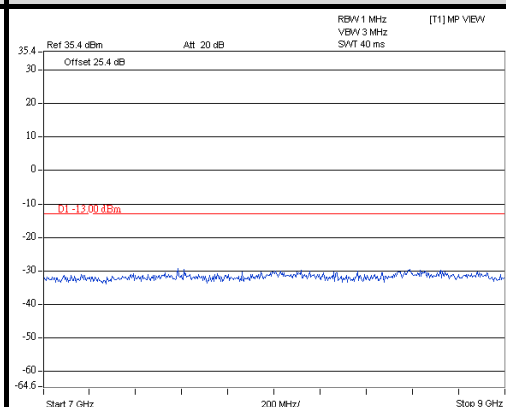
FREQUENCY RANGE : 1GHz~4GHz



FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz

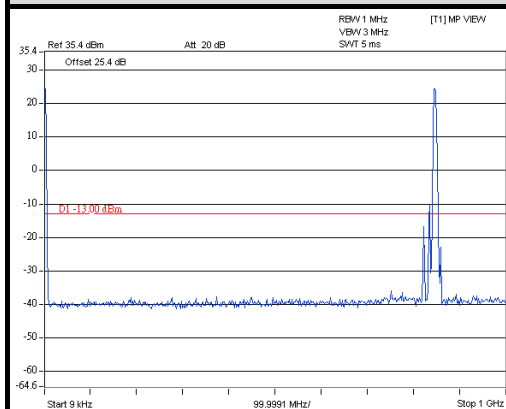




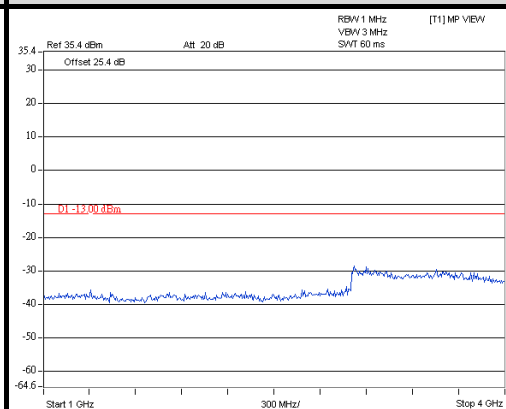
A D T

CHANNEL 4233

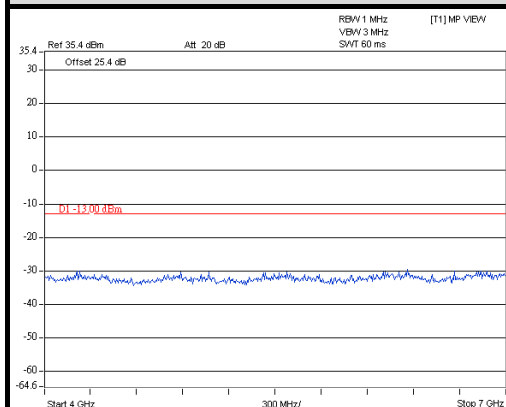
FREQUENCY RANGE : 9kHz~1GHz



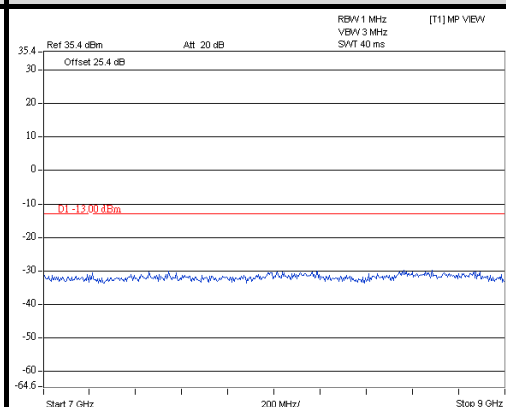
FREQUENCY RANGE : 1GHz~4GHz



FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz





4.6 RADIATED EMISSION MEASUREMENT

4.6.1 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 .

4.6.2 TEST PROCEDURES

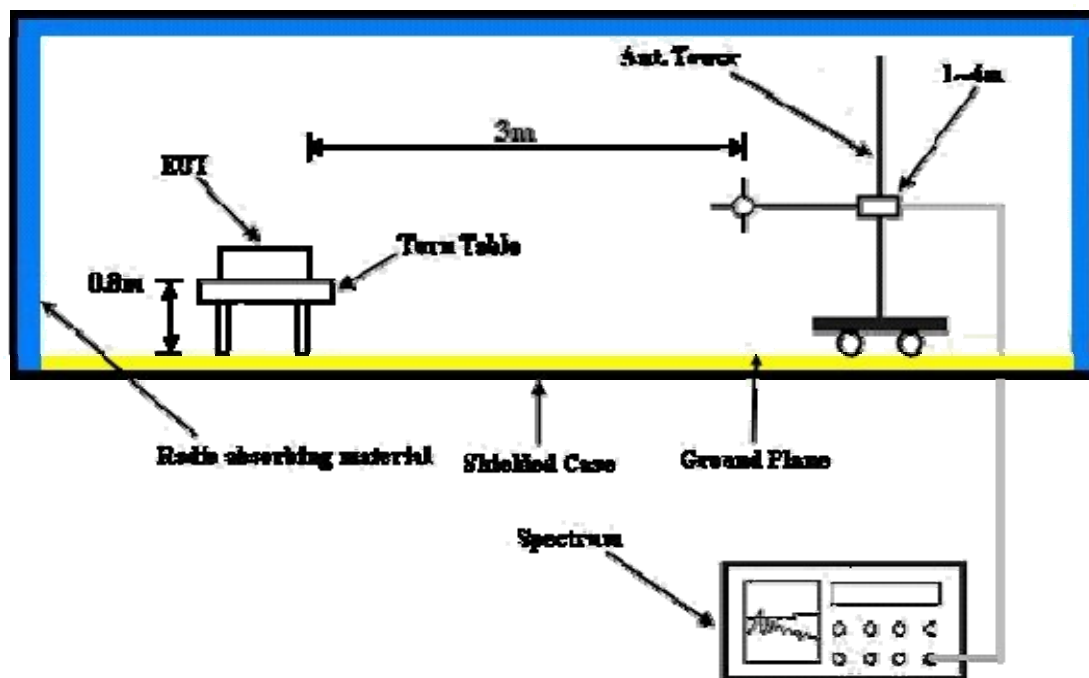
- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 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,
 $\text{E.R.P power} = \text{E.I.P.R power} - 2.15\text{dBi}$.

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

4.6.3 DEVIATION FROM TEST STANDARD

No deviation

4.6.4 TEST SETUP



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

4.6.5 TEST RESULTS

Below 1GHz

GSM:

MODE	TX channel 128	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	INPUT POWER	120Vac, 60 Hz
TESTED BY	Haru Yang		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	33.89	-59.4	-43.3	-12.1	-57.5	-13.0	-44.5
2	131.08	-58.4	-64.2	0.0	-66.4	-13.0	-53.4
3	156.35	-60.9	-64.8	0.0	-67.0	-13.0	-54.0
4	214.67	-55.6	-67.1	5.5	-63.8	-13.0	-50.8
5	455.71	-66.3	-71.2	5.1	-68.2	-13.0	-55.2
6	716.19	-67.3	-68.1	5.0	-65.2	-13.0	-52.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-50.1	-44.9	-12.6	-59.6	-13.0	-46.6
2	92.20	-53.9	-58.0	1.1	-59.0	-13.0	-46.0
3	136.91	-57.9	-59.8	0.0	-61.9	-13.0	-48.9
4	469.32	-64.0	-67.6	5.0	-64.8	-13.0	-51.8
5	723.97	-68.1	-66.1	4.9	-63.4	-13.0	-50.4
6	889.20	-68.4	-63.5	3.9	-61.8	-13.0	-48.8

REMARKS:

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



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WCDMA:

MODE	TX channel 4132	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	INPUT POWER	120Vac, 60 Hz
TESTED BY	Haru Yang		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	31.94	-60.2	-43.8	-12.4	-58.4	-13.0	-45.4
2	68.88	-59.4	-60.5	-5.3	-68.0	-13.0	-55.0
3	134.97	-58.7	-64.3	0.0	-66.5	-13.0	-53.5
4	203.01	-56.4	-67.6	5.5	-64.2	-13.0	-51.2
5	599.56	-68.0	-71.1	4.4	-68.9	-13.0	-55.9
6	793.95	-68.1	-66.9	4.1	-65.0	-13.0	-52.0

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-49.0	-43.8	-12.6	-58.5	-13.0	-45.5
2	70.82	-54.2	-56.0	-4.7	-62.9	-13.0	-49.9
3	94.15	-54.7	-59.2	1.0	-60.4	-13.0	-47.4
4	134.97	-57.7	-60.0	0.0	-62.1	-13.0	-49.1
5	193.29	-63.2	-69.9	4.6	-67.5	-13.0	-54.5
6	471.26	-63.3	-66.9	5.0	-64.0	-13.0	-51.0

REMARKS:

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



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Above 1GHz

GSM:

MODE	Channel 128	FREQUENCY RANGE	Above 1000MHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	22deg. C, 71%RH
TESTED BY	Sun Lin		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1648.4	-54.2	-57.2	5.5	-53.9	-13.0	-40.9
2	2472.6	-48.9	-50.4	6.4	-46.1	-13.0	-33.1
3	3296.8	-53.4	-52.7	6.9	-47.9	-13.0	-34.9
4	4121.0	-54.3	-51.3	7.0	-46.4	-13.0	-33.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1648.4	-52.7	-58.7	5.5	-55.4	-13.0	-42.4
2	2472.6	-39.4	-40.1	6.4	-35.9	-13.0	-22.9
3	3296.8	-56.1	-56.0	6.9	-51.2	-13.0	-38.2
4	4121.0	-51.7	-50.0	7.0	-45.1	-13.0	-32.1

REMARKS:

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



A D T

MODE	Channel 189	FREQUENCY RANGE	Above 1000MHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	22deg. C, 71%RH
TESTED BY	Sun Lin		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.8	-54.7	-57.6	5.5	-54.2	-13.0	-41.2
2	2509.2	-49.8	-51.3	6.4	-47.0	-13.0	-34.0
3	3345.6	-54.3	-53.5	6.9	-48.8	-13.0	-35.8
4	4182.0	-54.7	-51.5	6.9	-46.8	-13.0	-33.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.8	-49.7	-55.4	5.5	-52.0	-13.0	-39.0
2	2509.2	-40.1	-41.1	6.4	-36.9	-13.0	-23.9
3	3345.6	-53.4	-53.0	6.9	-48.2	-13.0	-35.2
4	4182.0	-54.1	-52.1	6.9	-47.4	-13.0	-34.4

REMARKS:

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



A D T

MODE	Channel 251	FREQUENCY RANGE	Above 1000MHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	22deg. C, 71%RH
TESTED BY	Sun Lin		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1697.6	-56.8	-59.6	5.6	-56.1	-13.0	-43.1
2	2546.4	-49.5	-51.0	6.4	-46.8	-13.0	-33.8
3	3395.2	-53.3	-52.4	7.0	-47.5	-13.0	-34.5
4	4244.0	-56.5	-53.2	6.9	-48.4	-13.0	-35.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1697.6	-51.2	-56.7	5.6	-53.2	-13.0	-40.2
2	2546.4	-40.7	-41.7	6.4	-37.4	-13.0	-24.4
3	3395.2	-53.2	-52.6	7.0	-47.8	-13.0	-34.8
4	4244.0	-56.7	-54.5	6.9	-49.8	-13.0	-36.8

REMARKS:

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



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WCDMA:

MODE	Channel 4132	FREQUENCY RANGE	Above 1000MHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	22deg. C, 71%RH
TESTED BY	Anderson Hong		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1652.8	-57.5	-60.5	5.5	-57.1	-13.0	-44.1
2	2479.2	-49.8	-51.3	6.4	-47.0	-13.0	-34.0
3	3305.6	-55.0	-54.3	6.9	-49.5	-13.0	-36.5
4	4132.0	-57.8	-54.7	6.9	-19.9	-13.0	-36.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1652.8	-57.4	-63.4	5.5	-60.0	-13.0	-47.0
2	2479.2	-40.9	-41.7	6.4	-37.4	-13.0	-24.4
3	3305.6	-53.0	-52.8	6.9	-48.0	-13.0	-35.0
4	4132.0	-57.5	-55.6	6.9	-50.9	-13.0	-37.9

REMARKS:

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



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MODE	Channel 4182	FREQUENCY RANGE	Above 1000MHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	22deg. C, 71%RH
TESTED BY	Anderson Hong		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.8	-58.3	-61.2	5.5	-57.9	-13.0	-44.9
2	2509.2	-48.9	-50.4	6.4	-46.1	-13.0	-33.1
3	3345.6	-56.3	-55.5	6.9	-50.8	-13.0	-37.8
4	4182.0	-58.8	-55.6	6.9	-50.9	-13.0	-37.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.8	-57.7	-63.4	5.5	-60.0	-13.0	-47.0
2	2509.2	-41.8	-42.8	6.4	-38.5	-13.0	-25.5
3	3345.6	-56.5	-56.1	6.9	-51.4	-13.0	-38.4
4	4182.0	-57.8	-55.8	6.9	-51.0	-13.0	-38.0

REMARKS:

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



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MODE	Channel 4233	FREQUENCY RANGE	Above 1000MHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	22deg. C, 71%RH
TESTED BY	Anderson Hong		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1693.2	-54.8	-57.6	5.6	-54.1	-13.0	-41.1
2	2539.8	-49.3	-50.8	6.4	-46.5	-13.0	-33.5
3	3386.4	-55.2	-54.3	7.0	-49.4	-13.0	-36.4
4	4233.0	-56.7	-53.4	6.9	-48.6	-13.0	-35.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1693.2	-50.9	-56.5	5.6	-53.0	-13.0	-40.0
2	2539.8	-41.7	-42.7	6.4	-38.4	-13.0	-25.4
3	3386.4	-55.5	-54.9	7.0	-50.0	-13.0	-37.0
4	4233.0	-56.4	-54.2	6.9	-49.4	-13.0	-36.4

REMARKS:

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



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5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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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:

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



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

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

---END---