

FCC TEST REPORT

(PART 22)

REPORT NO.: RF980313L04-3

MODEL NO.: MC9596

RECEIVED: Mar. 13, 2009

TESTED: Mar. 26 ~ Mar. 30, 2009

ISSUED: Mar. 31, 2009

APPLICANT: Motorola, Inc.

ADDRESS: One Motorola Plaza, Holtsville, NY 11742-1300
USA

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

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou
Hsiang, Taipei Hsien 244, 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 test report consists of 78 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by TAF or any government agencies. The test results in the report only apply to the tested sample.





A D T

TABLE OF CONTENTS

1	CERTIFICATION	4
2	SUMMARY OF TEST RESULTS	5
2.1	MEASUREMENT UNCERTAINTY	5
3	GENERAL INFORMATION.....	6
3.1	GENERAL DESCRIPTION OF EUT	6
3.2	DESCRIPTION OF TEST MODES.....	8
3.2.1	CONFIGURATION OF SYSTEM UNDER TEST	9
3.2.2	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL.....	10
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	14
3.4	DESCRIPTION OF SUPPORT UNITS	14
4	TEST TYPES AND RESULTS	15
4.1	OUTPUT POWER MEASUREMENT	15
4.1.1	LIMITS OF OUTPUT POWER MEASUREMENT	15
4.1.2	TEST INSTRUMENTS	16
4.1.3	TEST PROCEDURES	17
4.1.4	TEST SETUP	18
4.1.5	EUT OPERATING CONDITIONS	18
4.1.6	TEST RESULTS	19
4.2	FREQUENCY STABILITY MEASUREMENT	26
4.2.1	LIMITS OF FREQUENCY STABILITY MEASUREMENT	26
4.2.2	TEST INSTRUMENTS	26
4.2.3	TEST PROCEDURE	27
4.2.4	TEST SETUP	27
4.2.5	TEST RESULTS	28
4.3	OCCUPIED BANDWIDTH MEASUREMENT	30
4.3.1	LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT	30
4.3.2	TEST INSTRUMENTS	30
4.3.3	TEST SETUP	30
4.3.4	TEST PROCEDURES	31
4.3.5	EUT OPERATING CONDITION	31
4.3.6	TEST RESULTS	32
4.4	BAND EDGE MEASUREMENT	40
4.4.1	LIMITS OF BAND EDGE MEASUREMENT	40
4.4.2	TEST INSTRUMENTS	40
4.4.3	TEST SETUP	40
4.4.4	TEST PROCEDURES	41
4.4.5	EUT OPERATING CONDITION	41
4.4.6	TEST RESULTS	42
4.5	CONDUCTED SPURIOUS EMISSIONS	46
4.5.1	LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT	46
4.5.2	TEST INSTRUMENTS	46
4.5.3	TEST PROCEDURE	47
4.5.4	TEST SETUP	47



A D T

4.5.5	EUT OPERATING CONDITIONS	47
4.5.6	TEST RESULTS	48
4.6	RADIATED EMISSION MEASUREMENT (BELOW 1GHz).....	60
4.6.1	LIMITS OF RADIATED EMISSION MEASUREMENT	60
4.6.2	TEST INSTRUMENTS	61
4.6.3	TEST PROCEDURES	62
4.6.4	DEVIATION FROM TEST STANDARD	62
4.6.5	TEST SETUP	63
4.6.6	EUT OPERATING CONDITIONS	63
4.6.7	TEST RESULTS	64
4.7	RADIATED EMISSION MEASUREMENT (ABOVE 1GHz)	66
4.7.1	LIMITS OF RADIATED EMISSION MEASUREMENT	66
4.7.2	TEST INSTRUMENTS	67
4.7.3	TEST PROCEDURES	68
4.7.4	DEVIATION FROM TEST STANDARD	68
4.7.5	TEST SETUP	69
4.7.6	EUT OPERATING CONDITIONS	69
4.7.7	TEST RESULTS	70
5	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	76
6	INFORMATION ON THE TESTING LABORATORIES	77
7	APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	78



A D T

1 CERTIFICATION

PRODUCT: Mobile Computer
MODEL NO.: MC9596
BRAND: Motorola
APPLICANT: Motorola, Inc.
TESTED : Mar. 26 ~ Mar. 30, 2009
TEST SAMPLE : ENGINEERING SAMPLE
STANDARDS : **FCC Part 22, Subpart H**
ANSI C63.4-2003

The above equipment (model: MC9596) 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 : Andrea Hsia , **DATE:** Mar. 31, 2009
Andrea Hsia / Specialist

TECHNICAL
ACCEPTANCE : Long Chen , **DATE:** Mar. 31, 2009
Responsible for RF Long Chen / Senior Engineer

APPROVED BY : Gary Chang , **DATE:** Mar. 31, 2009
Gary Chang / Assistant 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 AND LIMIT	RESULT	REMARK
2.1047 (d)	Modulation Characteristics	PASS	Meet the requirement of limit.
2.1046 22.913 (a)	Maximum Peak Output Power Limit: max. 7 watts e.r.p peak power	PASS	Meet the requirement of limit. Minimum passing margin is 30.65dBm at 836.6MHz.
2.1055	Frequency Stability AFC Freq. Error vs. Voltage AFC Freq. Error vs. Temperature Limit: max. ± 2.5 ppm	PASS	Meet the requirement of limit.
2.1049 (h)	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 -26.13dB at 1697.60MHz.

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	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 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.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Mobile Computer
MODEL NO.	MC9596
FCC ID	UZ7MC9596
POWER SUPPLY	3.7Vdc from rechargeable lithium battery 12Vdc from power adapter
MODULATION TYPE	GMSK / 8PSK / BPSK
FREQUENCY RANGE	824.2MHz ~ 848.8MHz
NUMBER OF CHANNEL	124 (GSM band) / 102 (WCDMA band)
MAX. ERP POWER	GSM Mode: 30.65dBm (1.161Watts) GPRS Mode: 30.43dBm (1.104Watts) E-GPRS Mode: 25.29dBm (0.338Watts) WCDMA Mode: 20.71dBm (0.118Watts)
ANTENNA TYPE	monopole
MAX. ANTENNA GAIN	-0.3dBi
DATA CABLE	Refer to NOTE as below
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Battery

NOTE:

- The applicant defined the normal working voltage of the battery is from 3.7Vdc to 4.2Vdc.
- The models identified as below are identical to each other except of the following options:
- Barcode reader: 1D laser scanner / 2D Imager

BRAND	MODEL	DESCRIPTION
Motorola	MC9596	HSDPA 1D Calculator Numeric
Motorola	MC9596	HSDPA 2D Calculator Numeric
Motorola	MC9596	HSDPA 1D Alpha Primary
Motorola	MC9596	HSDPA 2D Alpha Primary
Motorola	MC9596	HSDPA 1D Telephony Numeric
Motorola	MC9596	HSDPA 2D Telephony Numeric
Motorola	MC9596	HSDPA 1D Alpha Numeric Wide
Motorola	MC9596	HSDPA 2D Alpha Numeric Wide
**the worst case had been marked by boldface.		

- The EUT has one lithium battery listed as below:

LI-ION BATTERY	
BRAND:	MOTOROLA
MODEL:	82-111636-01
RATING:	3.7Vdc, 4800mAh, 17.7Wh

4. The EUT is a Mobile Computer. The functions of EUT listed as below:

	TEST STANDARD	REFERENCE REPORT
WLAN 802.11b/g	FCC Part 15, Subpart C (Section 15.247)	RF980313L04
WLAN 802.11a (5745~5825 MHz)		
WLAN 802.11a (5180 ~ 5320MHz, 5500 ~ 5700MHz)	FCC Part 15, Subpart E (Section 15.407)	RF980313L04-1
WLAN 802.11a (For DFS report) (5260 ~ 5320MHz, 5500 ~ 5700MHz)	FCC Part 15, Subpart E (Section 15.407)	RF980313L04-5
BLUETOOTH	FCC Part 15, Subpart C (Section 15.247)	RF980313L04-2
GSM 850 / WCDMA 850	FCC Part 22	RF980313L04-3
PCS 1900 / WCDMA 1900	FCC Part 24	RF980313L04-4

5. The communicated functions of EUT listed as below:

		GSM 850MHz	PCS 1900MHz	WCDMA 850MHz	WCDMA 1900MHz	With 802.11a/b/g + Bluetooth + GPS functions
2G	GSM	√	√			
	GPRS	√	√			
	EDGE	√	√			
3G	WCDMA			√	√	
	Release 5 HSDPA			√	√	

6. The following accessories are for support units only.

PRODUCT	BRAND	MODEL	P/N	DESCRIPTION
USB charging Y cable	Motorola	-	25-116365-01R	1.8m shielded cable with one core
Headset	Motorola	-	50-11300-050R	0.8m non-shielded cable with one core
Adapter	HIPRO	HP-O2040D43	-	Input: 100-240Vac, 50-60Hz, 1.5A Output: 12Vdc, 3.33A, MAX 40W Power line: AC 1.7m non-shielded cable without core DC1.8m non-shielded cable with one core

7. Hardware version: 1A.

8. Software version: BSP15.1.

9. IMEI Code: 00440168005 000 ~ 00440168005 999

10. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

FOR GSM BAND:

124 channels are provided to this EUT in the GSM850 band. Therefore, the low, middle and high channels are chosen for testing.

	CHANNEL	FREQUENCY	TX MODE
LOW	128	824.2 MHz	GSM, GPRS, E-GPRS
MIDDLE	190	836.6 MHz	GSM, GPRS, E-GPRS
HIGH	251	848.8 MHz	GSM, GPRS, E-GPRS

NOTE:

- Below 1 GHz, the channel 128, 190, and 251 were pre-tested in chamber. The channel 190 was chosen for final test.
- Above 1 GHz, the channel 128, 190, and 251 were tested individually.
- The worst case for final test is chosen when the power control level set 5.
- The channel space is 0.2MHz.
- Since the EUT is considered a portable unit, it was pre-tested on the positioned of each 3 axis. The worst case was found when positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.
- The EUT is a GPRS class 10 device (Multislot class: 10, Mobile Terminal B), which provide 2 up-link. After pre-tested both functions, found up-link with 1 time slot is worse, therefore, test results of output power, frequency stability, occupied bandwidth and band edge tests came out from this.
- The EUT is an E-GPRS class 10 device (Multislot class: 10, Mobile Terminal B), which provide 2 up-link. After pre-tested both functions, found up-link with 1 time slot is worse, therefore, test results of output power, frequency stability, occupied bandwidth and band edge tests came out from this.
- The EUT has GSM, GPRS & E-GPRS functions. After pre-testing, GSM function is the worst case for all the emission tests.

FOR WCDMA BAND:

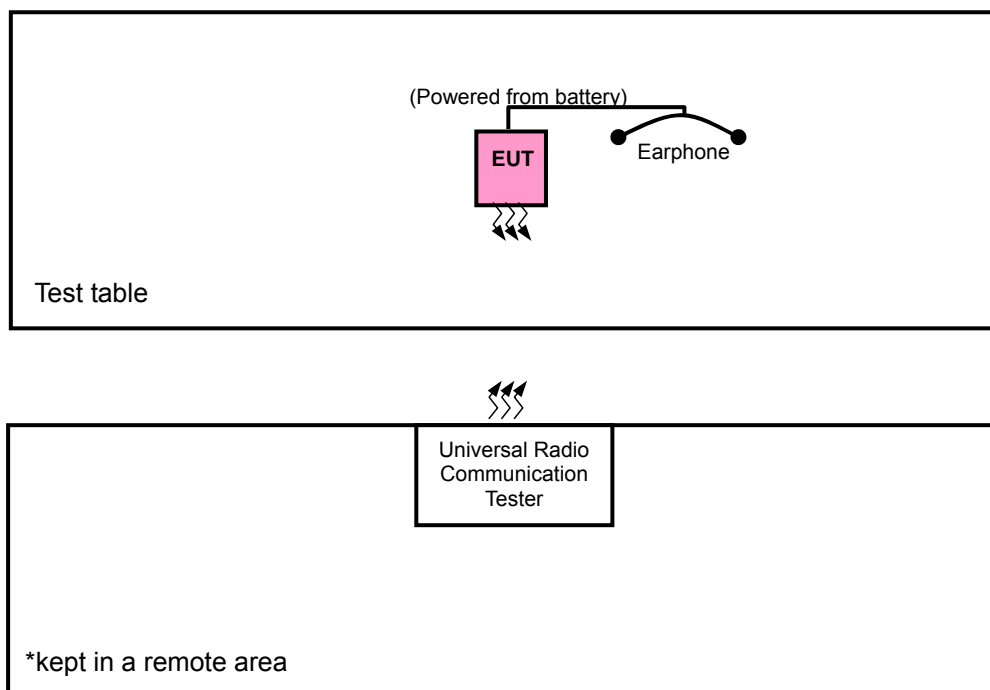
102 channels are provided to this EUT in the WCDMA850 band. Therefore, the low, middle and high channels are chosen for testing.

	CHANNEL	FREQUENCY	TX MODE
LOW	4132	826.4 MHz	WCDMA
MIDDLE	4182	836.4 MHz	WCDMA
HIGH	4233	846.6 MHz	WCDMA

NOTE:

- Below 1 GHz, the channel 4132, 4182 and 4233 were pre-tested in chamber. The channel 4132 was chosen for final test.
- Above 1 GHz, the channel 4132, 4182 and 4233 were tested individually.
- The channel space is 0.2MHz.
- Since the EUT is considered a portable unit, it was pre-tested on the positioned of each 3 axis. The worst case was found when positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.
- (RMC, HSDPA Inactive) mode has been chosen for the worst case to do the final test and record.

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



FOR GSM BAND:

Where **OP**: Output power **FS**: Frequency stability
 OB: Occupied bandwidth **BE**: Band edge
 CE: Conducted spurious emissions **RE<1G**: Radiated emission below 1GHz
 RE≥1G: Radiated emission above 1GHz

☒ 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 (if EUT with antenna diversity architecture).

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

FREQUENCY STABILITY MEASUREMENT:

- | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY |
|-------------------|----------------|-----------------------|
| 128 to 251 | 128, 190, 251 | GSM, GPRS, EGPRS |

BAND EDGE MEASUREMENT:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
128 to 251	128, 251	GSM, GPRS, EGPRS

CONDUCTED SPURIOUS EMISSIONS MEASUREMENT:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
128 to 251	128, 190, 251	GSM

RADIATED EMISSION MEASUREMENT (BELOW 1 GHz):

- ☒ 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 (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
128 to 251	190	GSM	X

RADIATED EMISSION MEASUREMENT (ABOVE 1 GHz):

- ☒ 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 (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
128 to 251	128, 190, 251	GSM	X



A D T

BAND EDGE MEASUREMENT:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
4132 to 4233	4132, 4233	WCDMA

CONDUCTED SPURIOUS EMISSIONS MEASUREMENT:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
4132 to 4233	4132, 4182, 4233	WCDMA

RADIATED EMISSION MEASUREMENT (BELOW 1 GHz):

- ☒ 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 (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
4132 to 4233	4132	WCDMA	Z

RADIATED EMISSION MEASUREMENT (ABOVE 1 GHz):

- ☒ 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 (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
4132 to 4233	4132, 4182, 4233	WCDMA	Z

3.3 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 C63.4-2003

ANSI/TIA/EIA-603-C 2004

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

3.4 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.	CAL. DATE
1	UNIVERSAL RADIO COMMUNICATION TESTER	R&S	CMU200	104484	Feb. 02, 2010
2	NJZ-2000 (GSM+WCDMA SIMULATOR)	JRC	NJZ-2000	ET00054	Sep. 24, 2009

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).

NOTE 2: Item 1-2 acted as a communication partners to transfer data.

4 TEST TYPES AND RESULTS

4.1 OUTPUT POWER MEASUREMENT

4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

The radiated peak output power shall be according to the specific rule Part 22.913 (a) that “Mobile / Portable station are limited to 7 watts e.r.p”.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	100033	Jun. 30, 2008	Jun. 29, 2009
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Apr. 22, 2008	Apr. 21, 2009
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	May 02, 2008	May 01, 2009
HORN Antenna SCHWARZBECK	9120D	9120D-209	Jun. 24, 2008	Jun. 23, 2009
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 25, 2008	Dec. 24, 2009
Preamplifier Agilent	8447D	2944A10633	Nov. 03, 2008	Nov. 02, 2009
Preamplifier Agilent	8449B	3008A01964	Oct. 23, 2008	Oct. 22, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	238141/4	May 20, 2008	May 19, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	May 20, 2008	May 19, 2009
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100.	TT93021703	NA	NA
Turn Table Controller ADT.	SC100.	SC93021703	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 3.
 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 988962.
 5. The IC Site Registration No. is IC 7450F-3.

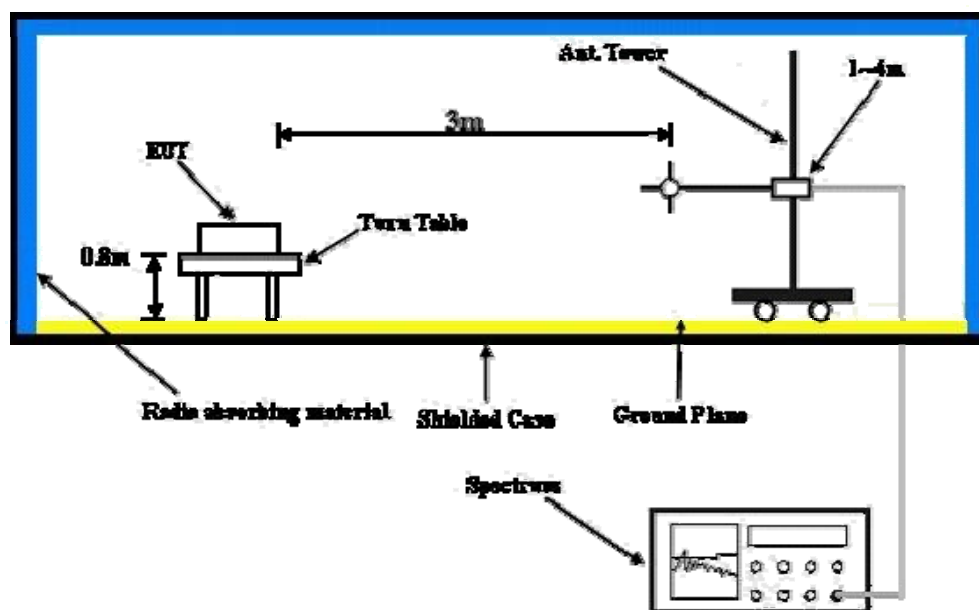
4.1.3 TEST PROCEDURES

- a. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels, 128, 190 and 251 / 4132, 4182 and 4233 (low, middle and high operational frequency range.)
- b. The conducted peak output power used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. The path loss included the splitter loss, cable loss and 20dB pad loss. The spectrum set RB/VB 1MHz (GSM) and 5MHz (WCDMA), then read peak power value and record to the test. (All transmitted path loss shall be considered in the test report data.)
- c. E.I.R.P peak power 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 to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- d. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the calibration antenna. Rotated the Turn Table to find the maximum radiation power. “Raw” is the spectrum reading value, “SG” is signal generator export power, “TX Gain” is calibration antenna isotropic gain value, “TX cable” is the transmitted cable loss between the calibration antenna and signal generator. The “Factor” means that the transmission path loss is equal to “SG” - “TX cable” + “TX Gain” – “Raw”.
- e. Actually the real E.I.R.P peak power is equal to “Read Value” + “Factor”
- f. 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 3MHz for Peak detection (PK)

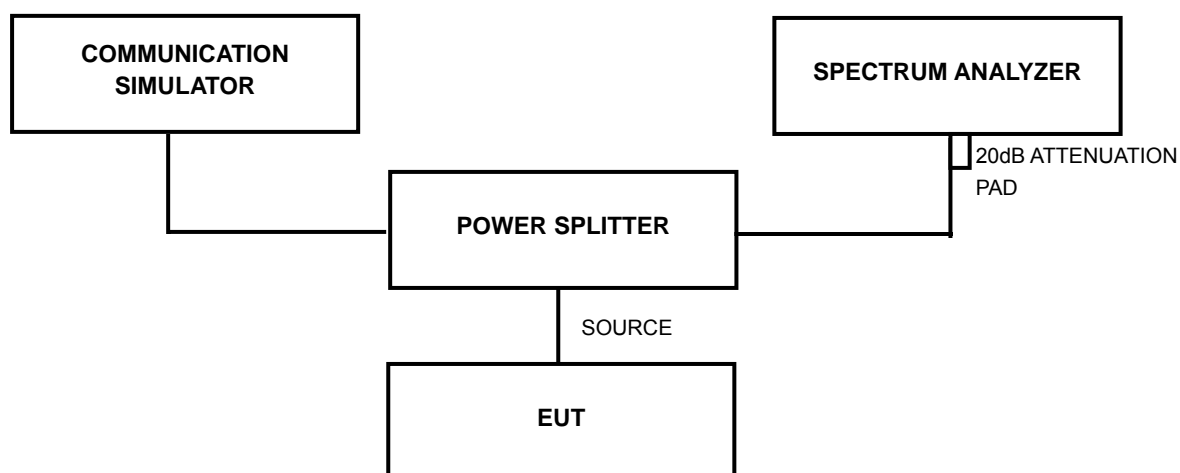
4.1.4 TEST SETUP

EIRP POWER 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 related item – Photographs of the Test Configuration.

4.1.5 EUT OPERATING CONDITIONS

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



A D T

4.1.6 TEST RESULTS

FOR GSM BAND:

MODE	TX connected	POWER CONTROL LEVEL	5
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak
ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa	TESTED BY	Brad Wu

FOR GSM MODE

CONDUCTED PEAK OUTPUT POWER					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	PEAK OUTPUT POWER	
				dBm	Watt
128	824.2	27.83	4.30	32.13	1.633
190	836.6	27.91	4.30	32.21	1.663
251	848.8	28.07	4.30	32.37	1.726

FOR GPRS MODE (UP-LINK WITH 1 TIME SLOT)

CONDUCTED PEAK OUTPUT POWER					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	PEAK OUTPUT POWER	
				dBm	Watt
128	824.2	27.74	4.30	32.04	1.600
190	836.6	27.83	4.30	32.13	1.633
251	848.8	28.01	4.30	32.31	1.702

FOR E-GPRS MODE (UP-LINK WITH 1 TIME SLOT)

CONDUCTED PEAK OUTPUT POWER					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	PEAK OUTPUT POWER	
				dBm	Watt
128	824.2	22.80	4.30	27.10	0.513
190	836.6	23.05	4.30	27.35	0.543
251	848.8	23.14	4.30	27.44	0.555

REMARKS: 1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB).



A D T

MODE	TX connected	POWER CONTROL LEVEL	5
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak
ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa	TESTED BY	Brad Wu

FOR GSM MODE

ERP POWER					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	PEAK OUTPUT POWER	
				dBm	Watt
128	824.2	-4.47	33.87	29.40	0.871
190	836.6	-3.17	33.82	30.65	1.161
251	848.8	-3.21	33.79	30.58	1.143

FOR GPRS MODE (UP-LINK WITH 1 TIME SLOT)

ERP POWER					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	PEAK OUTPUT POWER	
				dBm	Watt
128	824.2	-4.73	33.87	29.14	0.820
190	836.6	-3.39	33.82	30.43	1.104
251	848.8	-3.37	33.79	30.42	1.102

FOR E-GPRS MODE (UP-LINK WITH 1 TIME SLOT)

ERP POWER					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	PEAK OUTPUT POWER	
				dBm	Watt
128	824.2	-9.37	33.87	24.50	0.282
190	836.6	-8.89	33.82	24.93	0.311
251	848.8	-8.50	33.79	25.29	0.338

- REMARKS:** 1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Receiver Antenna Gain (dBi) + Cable Loss (dB) + Free Space Loss (dB).

FOR WCDMA BAND:

The following procedures were followed according to FCC “SAR Measurement Procedures for 3G Devices”, October, 2007.

Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the procedures described in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1”s for WCDMA/HSDPA or applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA) should be tabulated in the SAR report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations should be clearly identified.



A D T

MODE	TX connected	POWER CONTROL LEVEL	0
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak / Average
ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa	TESTED BY	Match Tsui

CONDUCTED PEAK OUTPUT POWER (RMC, HSDPA INACTIVE)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	PEAK OUTPUT POWER	
				dBm	Watt
4132	826.4	22.08	4.30	26.38	0.435
4182	836.4	22.27	4.30	26.57	0.454
4233	846.6	22.44	4.30	26.74	0.472

CONDUCTED AVERAGE OUTPUT POWER (RMC, HSDPA INACTIVE)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	AVERAGE OUTPUT POWER	
				dBm	Watt
4132	826.4	18.38	4.30	22.68	0.185
4182	836.4	18.44	4.30	22.74	0.188
4233	846.6	18.70	4.30	23.00	0.200

REMARKS: 1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB).



A D T

MODE	TX connected	POWER CONTROL LEVEL	0
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak / Average
ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa	TESTED BY	Match Tsui

CONDUCTED PEAK OUTPUT POWER (AMR, HSDPA INACTIVE)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	PEAK OUTPUT POWER	
				dBm	Watt
4132	826.4	21.92	4.30	26.22	0.419
4182	836.4	21.98	4.30	26.28	0.425
4233	846.6	22.43	4.30	26.73	0.471

CONDUCTED AVERAGE OUTPUT POWER (AMR, HSDPA INACTIVE)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	AVERAGE OUTPUT POWER	
				dBm	Watt
4132	826.4	18.38	4.30	22.68	0.185
4182	836.4	18.45	4.30	22.75	0.188
4233	846.6	18.67	4.30	22.97	0.198

REMARKS: 1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB).



A D T

MODE	TX connected	POWER CONTROL LEVEL	0
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak / Average
ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa	TESTED BY	Match Tsui

CONDUCTED PEAK OUTPUT POWER (HSDPA ACTIVE)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	PEAK OUTPUT POWER	
				dBm	Watt
4132	826.4	22.02	4.30	26.32	0.429
4182	836.4	22.15	4.30	26.45	0.442
4233	846.6	22.31	4.30	26.61	0.458

CONDUCTED AVERAGE OUTPUT POWER (HSDPA ACTIVE)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	AVERAGE OUTPUT POWER	
				dBm	Watt
4132	826.4	18.25	4.30	22.55	0.180
4182	836.4	18.41	4.30	22.71	0.187
4233	846.6	18.50	4.30	22.80	0.191

REMARKS: 1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB).



A D T

MODE	TX connected	POWER CONTROL LEVEL	0
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Average
ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa	TESTED BY	Brad Wu

ERP POWER (RMC, HSDPA INACTIVE)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	PEAK OUTPUT POWER	
				dBm	Watt
4132	826.4	-13.16	33.87	20.71	0.118
4182	836.4	-13.63	33.82	20.19	0.104
4233	846.6	-14.12	33.79	19.67	0.093

REMARKS: 1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Receiver Antenna Gain (dBi) + Cable Loss (dB) + Free Space Loss (dB).

4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

According to the FCC part 2.4235 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The frequency error rate is according to the JTC standard that the frequency error rate shall be accurate to within 2.5ppm of the received frequency from the base station. The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with the 2.1055(a)(1) $-30^{\circ}\text{C} \sim 50^{\circ}\text{C}$.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL	CALIBRATED UNTIL
* ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100041	Apr. 22, 2008	Apr. 21, 2009
* Hewlett Packard RF cable	8120-6192	01428251	NA	NA
* Suhner RF cable	Sucoflex104	204850/4	NA	NA
* WIT Standard Temperature & Humidity Chamber	TH-4S-C	W981030	Jun. 28, 2008	Jun. 27, 2009

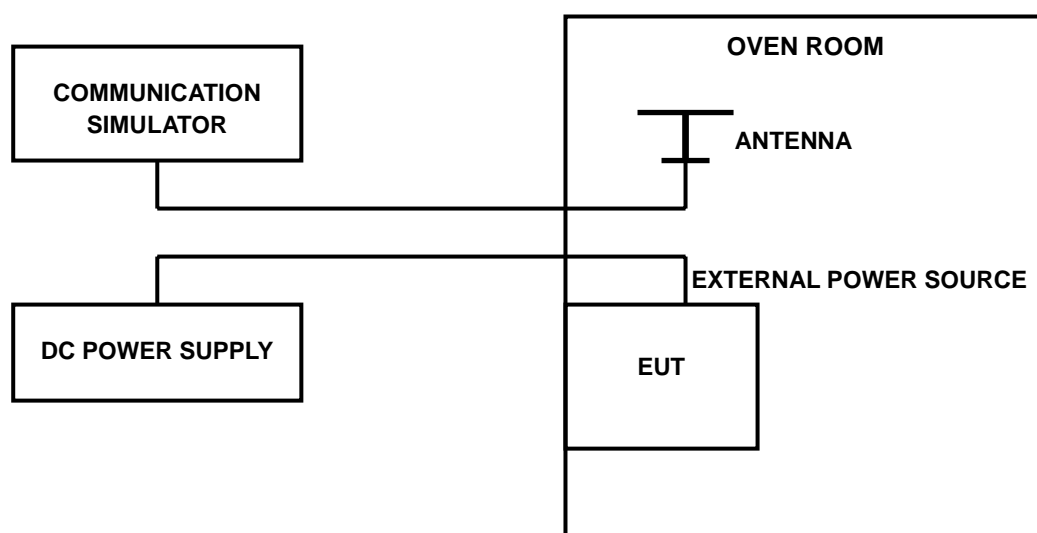
- NOTE:**
1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
 2. "*" = These equipments are used for the final measurement.
 3. The test was performed in RF OVEN room.

4.2.3 TEST PROCEDURE

- Because of the measure the carrier frequency under the condition of the AFC lock, it shall be used the mobile station in the GSM / WCDMA link mode. This is accomplished with the use of the R&S CMU200 / JRC NJZ-2000 simulator station. The oven room could control the temperatures and humidity. The GSM link channel is the 190 and the WCDMA link channel is the 4182.
- Power must be removed when changing from one temperature to another or one voltage to another voltage. 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 DC input power. The various Volts from the minimum 3.7Volts to 4.2Volts. 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 GSM simulator.

4.2.4 TEST SETUP





4.2.5 TEST RESULTS

FOR GSM BAND:

MODE	TX Mid. channel	POWER CONTROL LEVEL	5
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa
TESTED BY	Brad Wu		

AFC FREQUENCY ERROR vs. VOLTAGE			
VOLTAGE (Volts)	FREQUENCY ERROR (Hz)	FREQUENCY ERROR (ppm)	LIMIT (ppm)
4.2	10	0.0119531437	2.5
3.7	11	0.0131484580	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.7Vdc to 4.2Vdc.

AFC FREQUENCY ERROR vs. TEMP.			
TEMP. (°C)	FREQUENCY ERROR (Hz)	FREQUENCY ERROR (ppm)	LIMIT (ppm)
50	10	0.0119531437	2.5
40	10	0.0119531437	2.5
30	9	0.0107578293	2.5
20	8	0.0095625149	2.5
10	8	0.0095625149	2.5
0	9	0.0107578293	2.5
-10	9	0.0107578293	2.5
-20	10	0.0119531437	2.5
-30	11	0.0131484580	2.5



FOR WCDMA BAND:

MODE	TX Mid. channel	POWER CONTROL LEVEL	0
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa
TESTED BY	Brad Wu		

AFC FREQUENCY ERROR vs. VOLTAGE			
VOLTAGE (Volts)	FREQUENCY ERROR (Hz)	FREQUENCY ERROR (ppm)	LIMIT (ppm)
4.2	9	0.0107578293	2.5
3.7	11	0.0131484580	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.7Vdc to 4.2Vdc.

AFC FREQUENCY ERROR vs. TEMP.			
TEMP. (°C)	FREQUENCY ERROR (Hz)	FREQUENCY ERROR (ppm)	LIMIT (ppm)
50	10	0.0119531437	2.5
40	10	0.0119531437	2.5
30	10	0.0119531437	2.5
20	8	0.0095625149	2.5
10	9	0.0107578293	2.5
0	9	0.0107578293	2.5
-10	10	0.0119531437	2.5
-20	10	0.0119531437	2.5
-30	11	0.0131484580	2.5

4.3 OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

According to FCC 2.1049 (h) specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

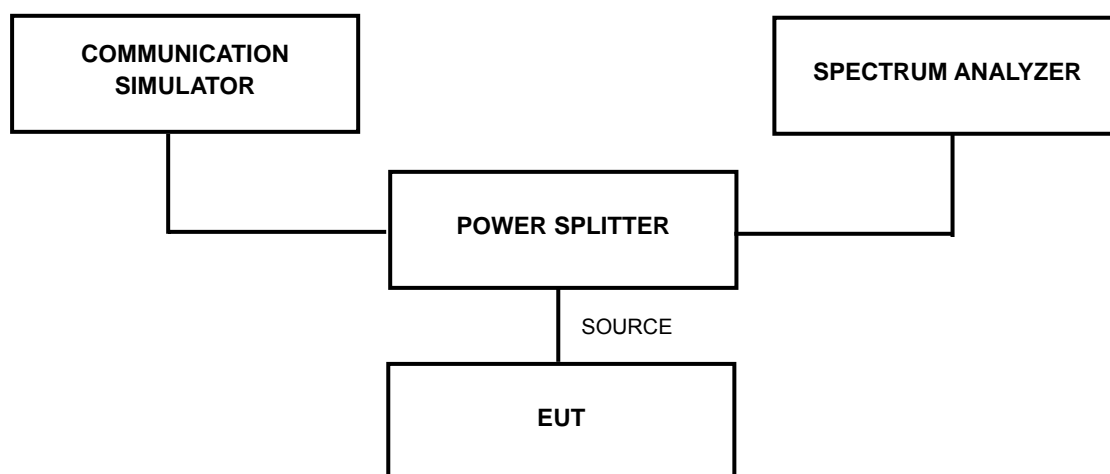
4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
* ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100041	Apr. 22, 2008	Apr. 21, 2009
* Mini-Circuits Power Splitter	ZAPD-4	400005	NA	NA
* Hewlett Packard RF cable	8120-6192	01428251	NA	NA
* JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
* Suhner RF cable	Sucoflex104	204850/4	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. "*" = These equipments are used for the final measurement.

4.3.3 TEST SETUP



4.3.4 TEST PROCEDURES

- a. The EUT was set up for the maximum peak power with GSM / WCDMA link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels, 128, 190 and 251 / 4132, 4182 and 4233 (low, middle and high operational frequency range.)
- b. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. This splitter loss and cable loss is the worst loss 4.3dB in the transmitted path track.
- c. FCC 2.1049 (h) required a measurement bandwidth is the fundamental emission below 26dB bandwidth.

4.3.5 EUT OPERATING CONDITION

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



A D T

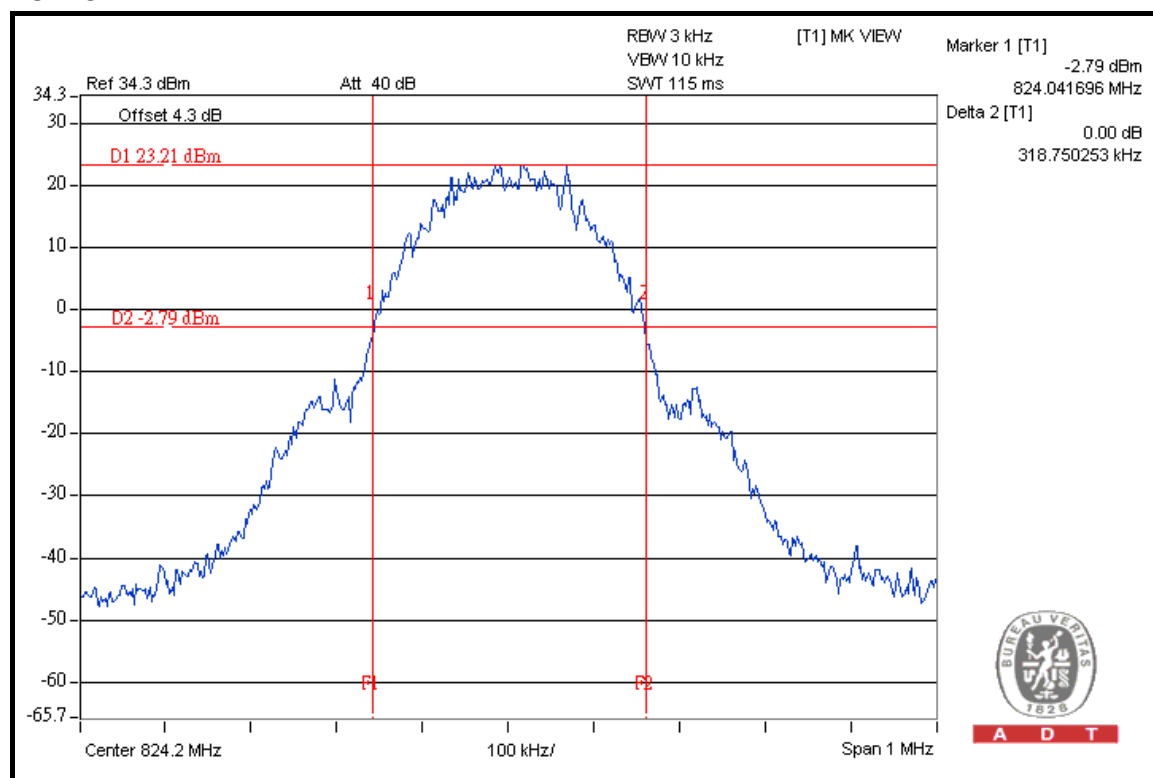
4.3.6 TEST RESULTS

FOR GSM BAND:

FOR GSM MODE

CHANNEL	MAX. OUTPUT POWER -26 dBc BANDWIDTH (kHz)
LOW	318.75
MIDDLE	308.84
HIGH	313.41

LOW CHANNEL

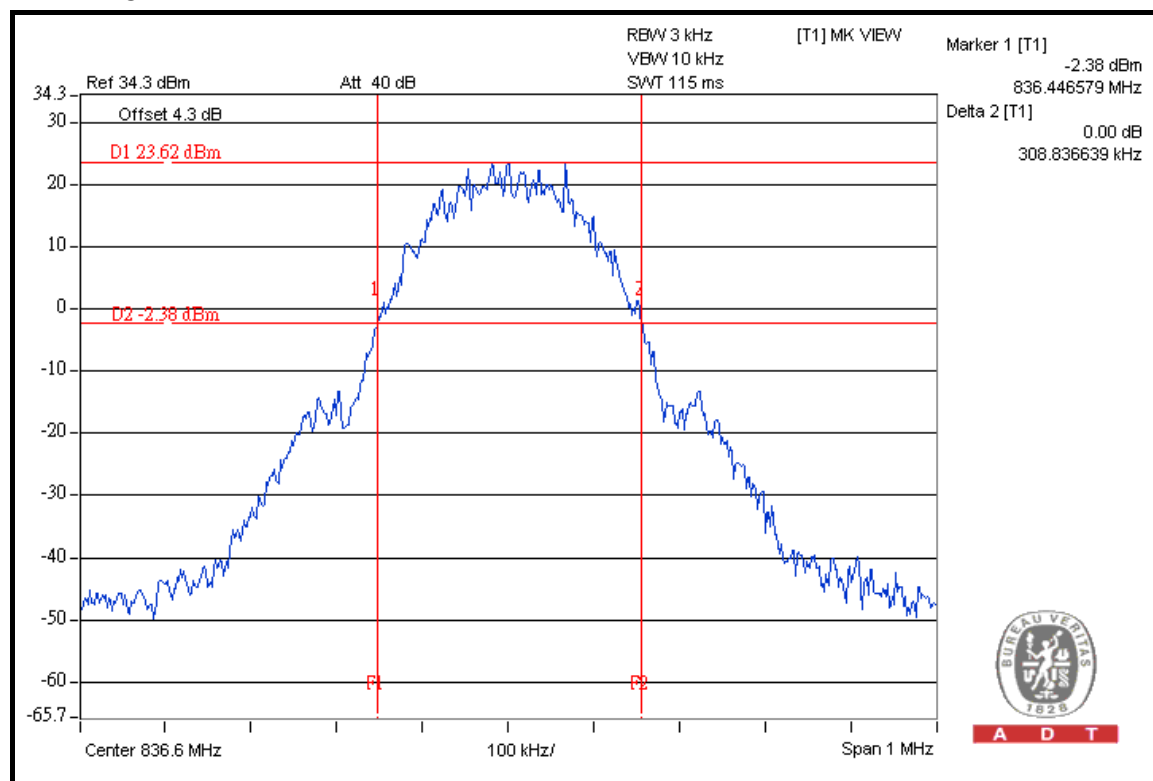


A D T



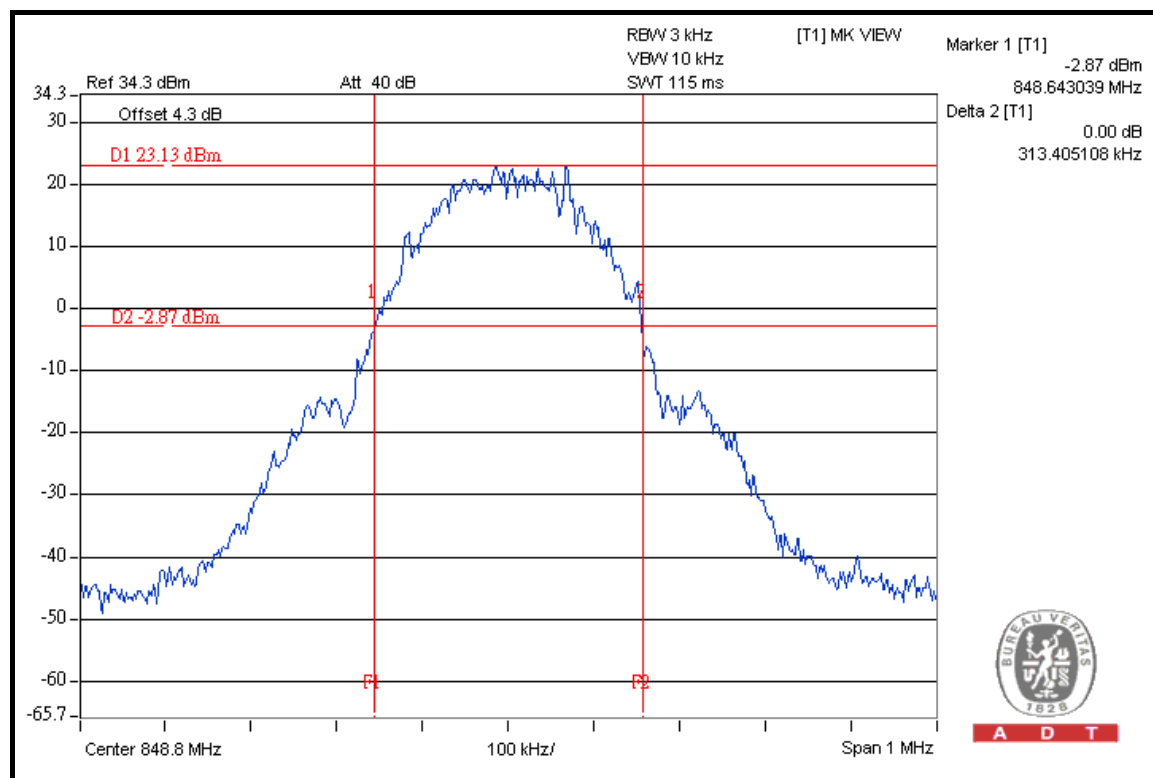
A D T

MIDDLE CHANNEL



A D T

HIGH CHANNEL



A D T

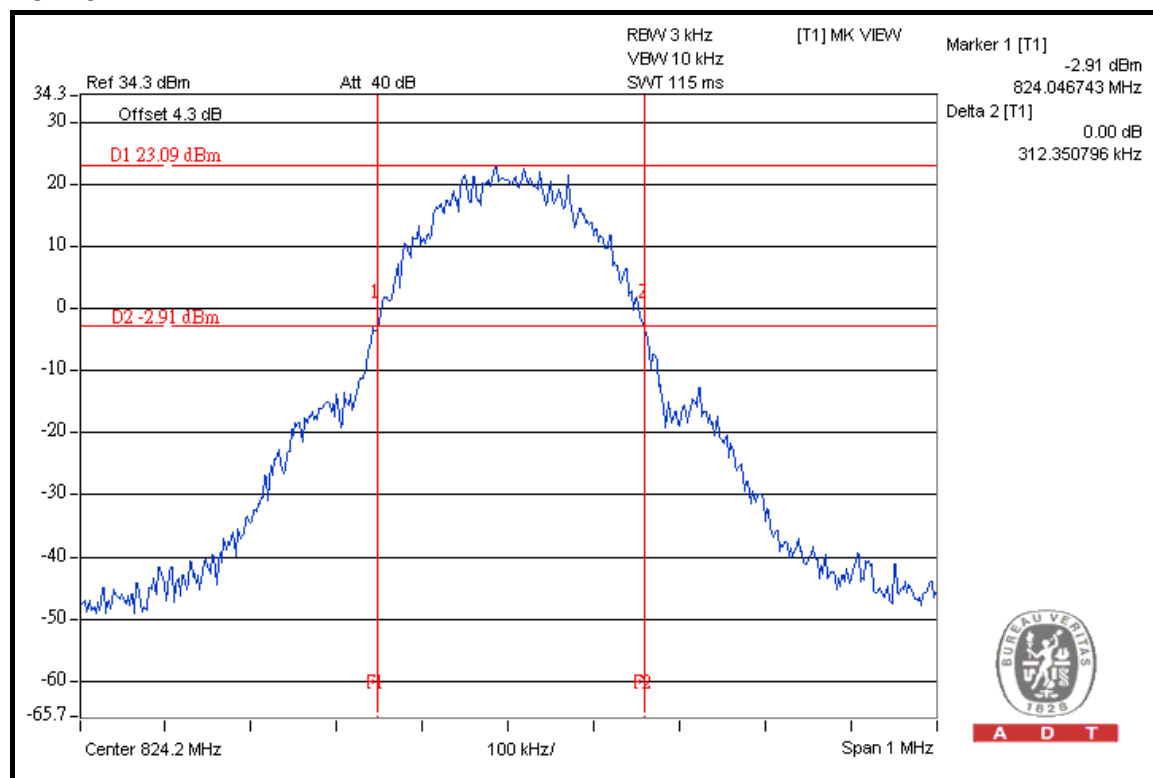


A D T

FOR GPRS MODE (UP-LINK WITH 1 TIME SLOT)

CHANNEL	MAX. OUTPUT POWER -26 dBc BANDWIDTH (kHz)
LOW	312.35
MIDDLE	309.26
HIGH	315.52

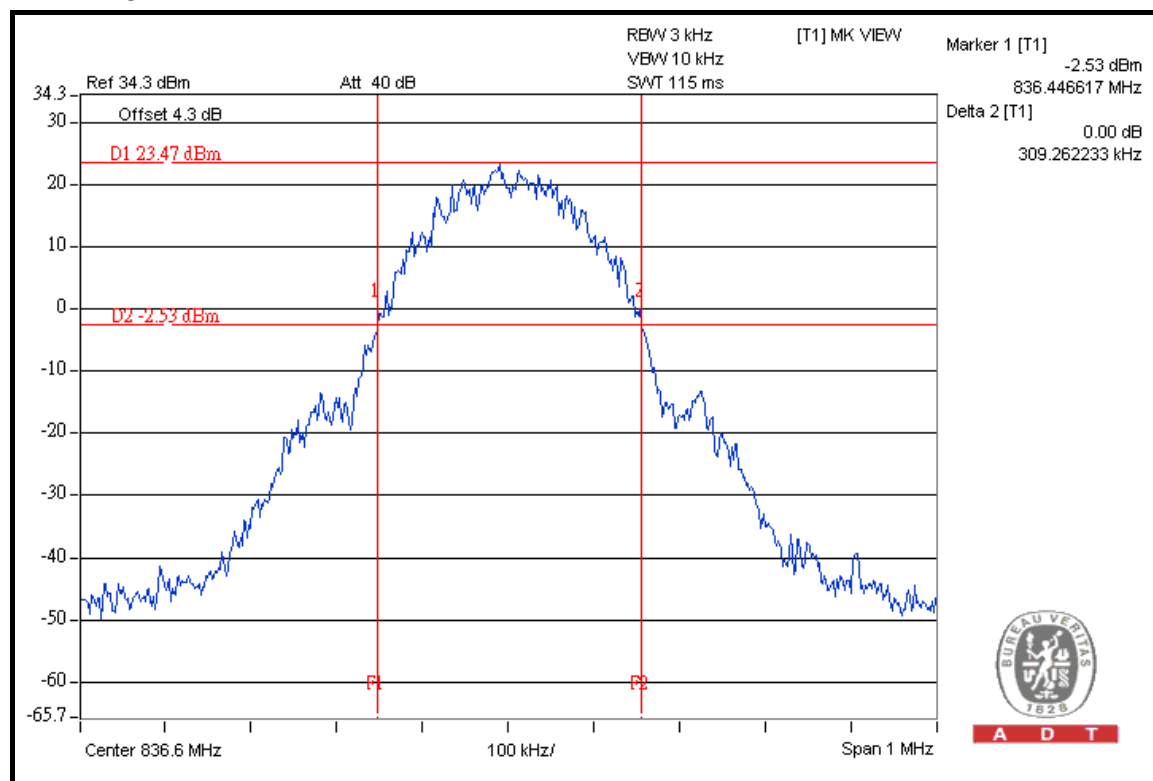
LOW CHANNEL





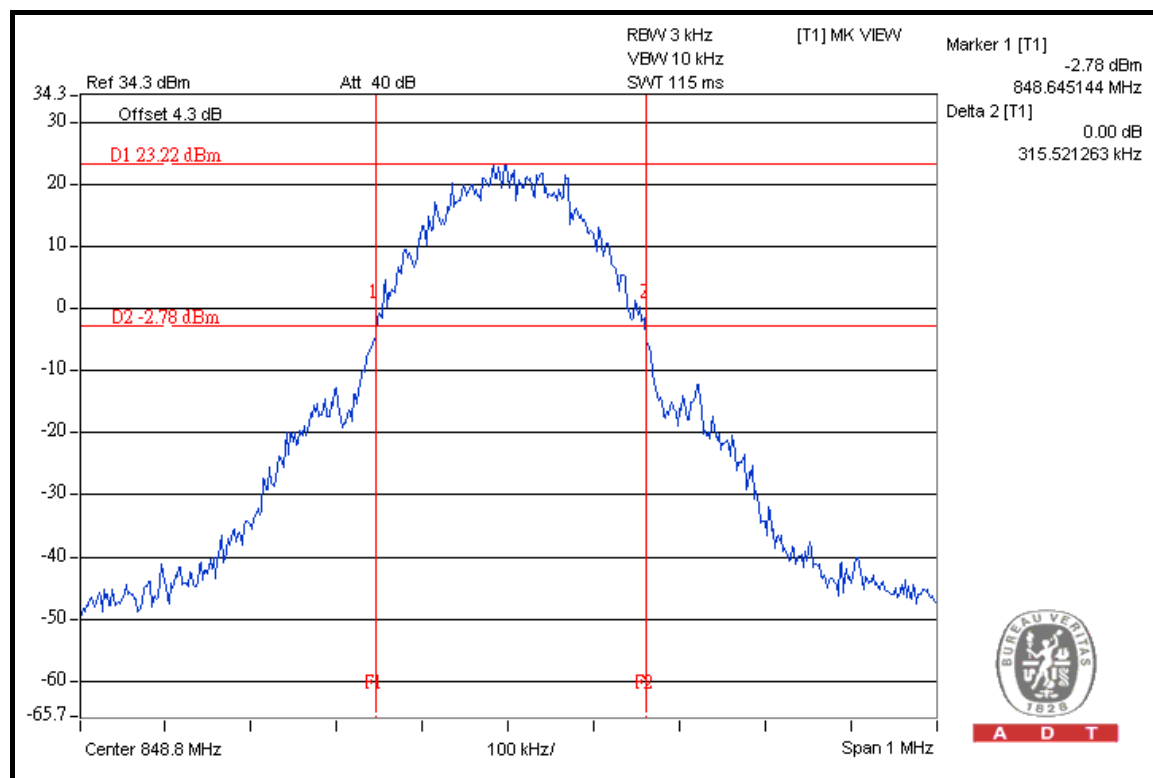
A D T

MIDDLE CHANNEL



A D T

HIGH CHANNEL



A D T

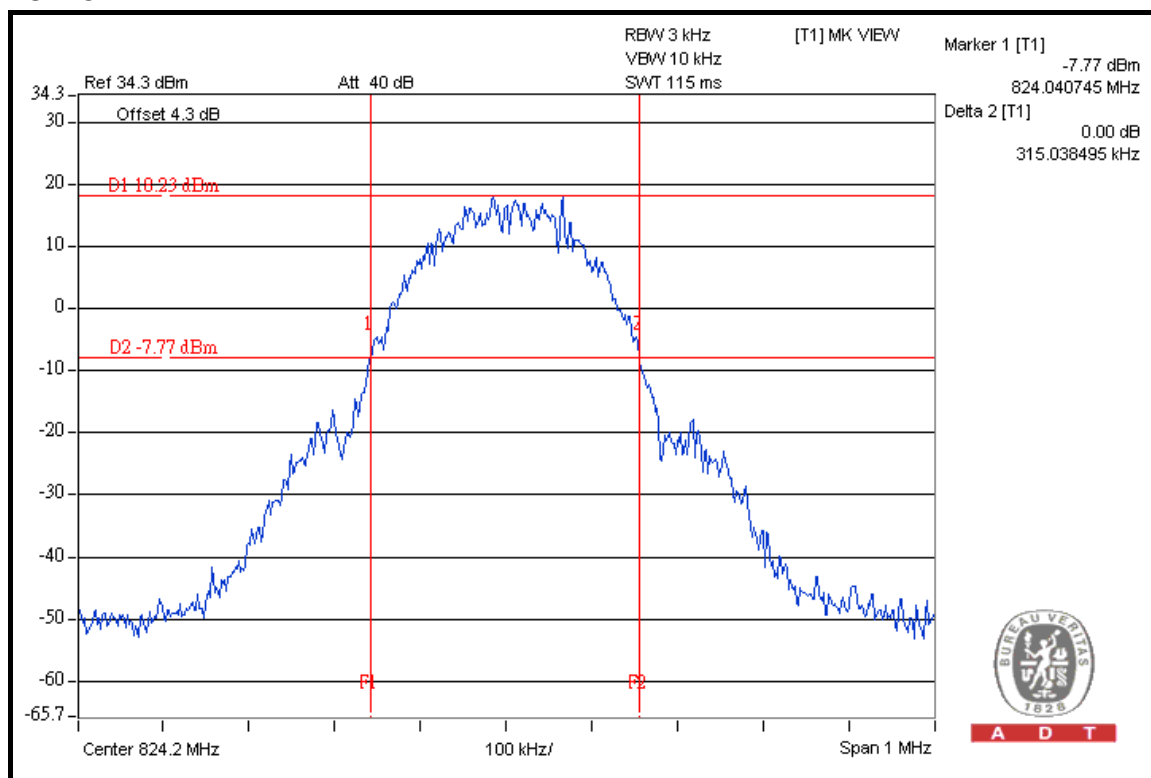


A D T

FOR E-GPRS MODE (UP-LINK WITH 1 TIME SLOT)

CHANNEL	MAX. OUTPUT POWER -26 dBc BANDWIDTH (kHz)
LOW	315.04
MIDDLE	310.50
HIGH	312.00

LOW CHANNEL

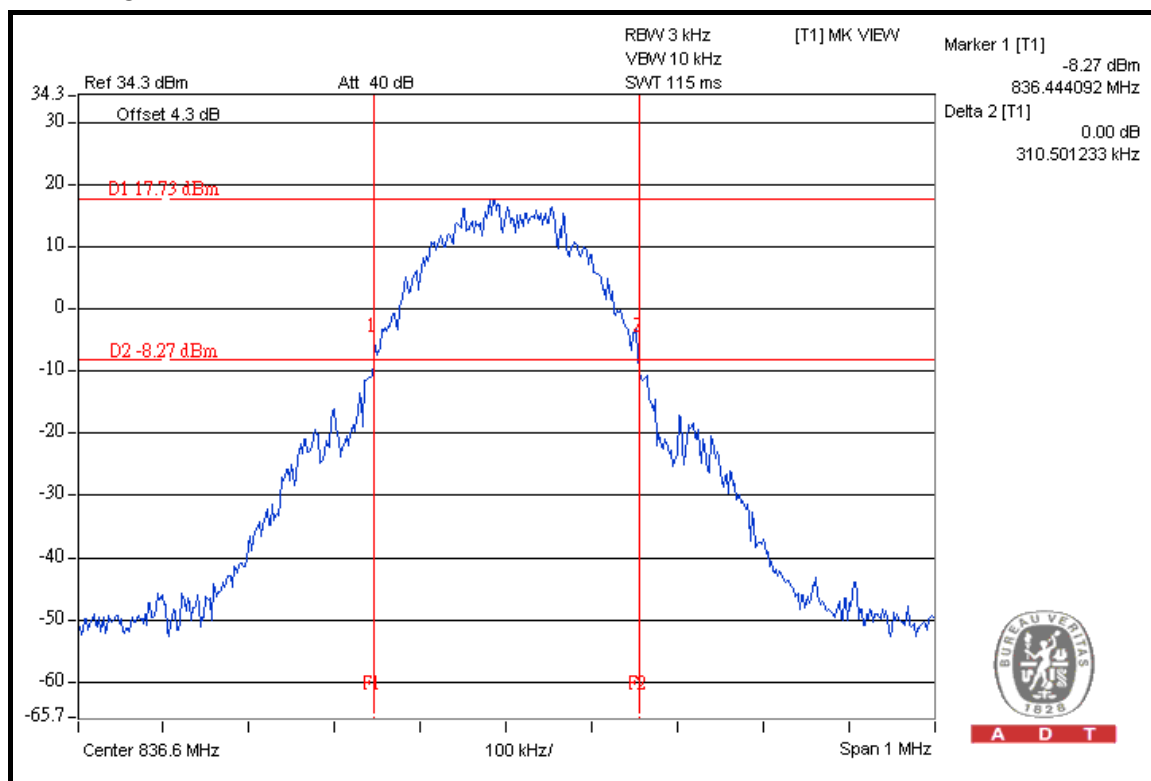


A D T



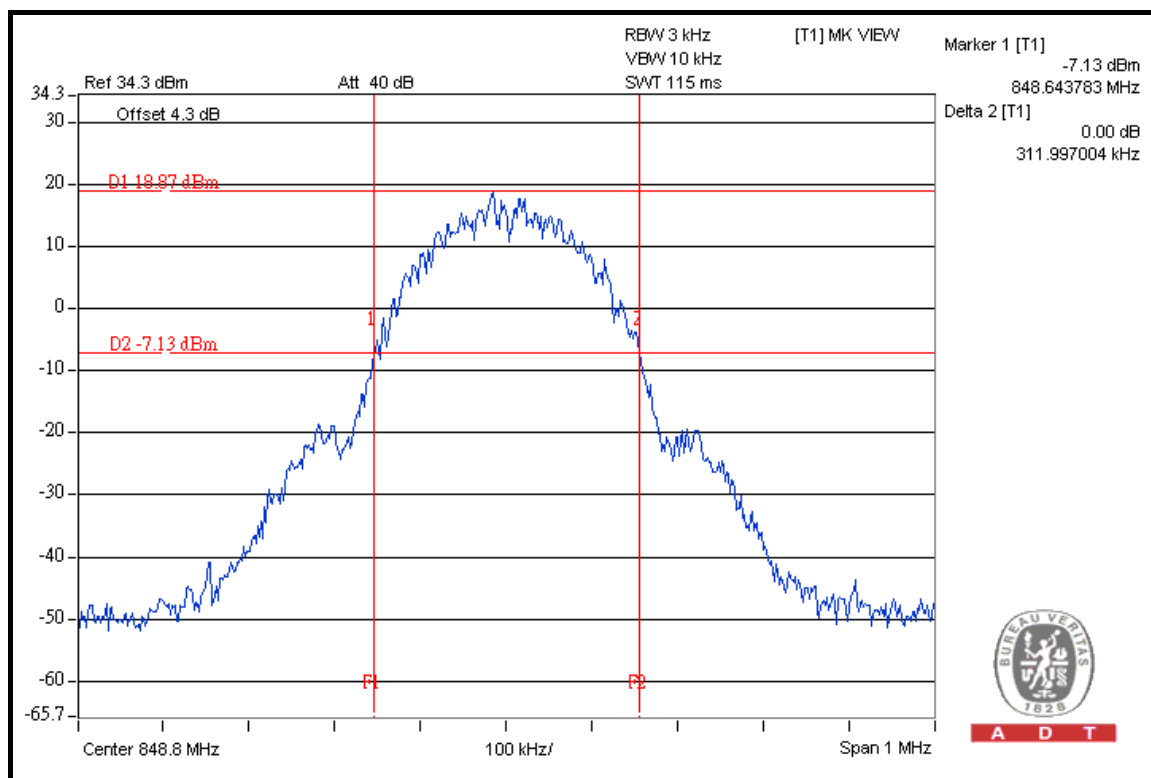
A D T

MIDDLE CHANNEL



A D T

HIGH CHANNEL

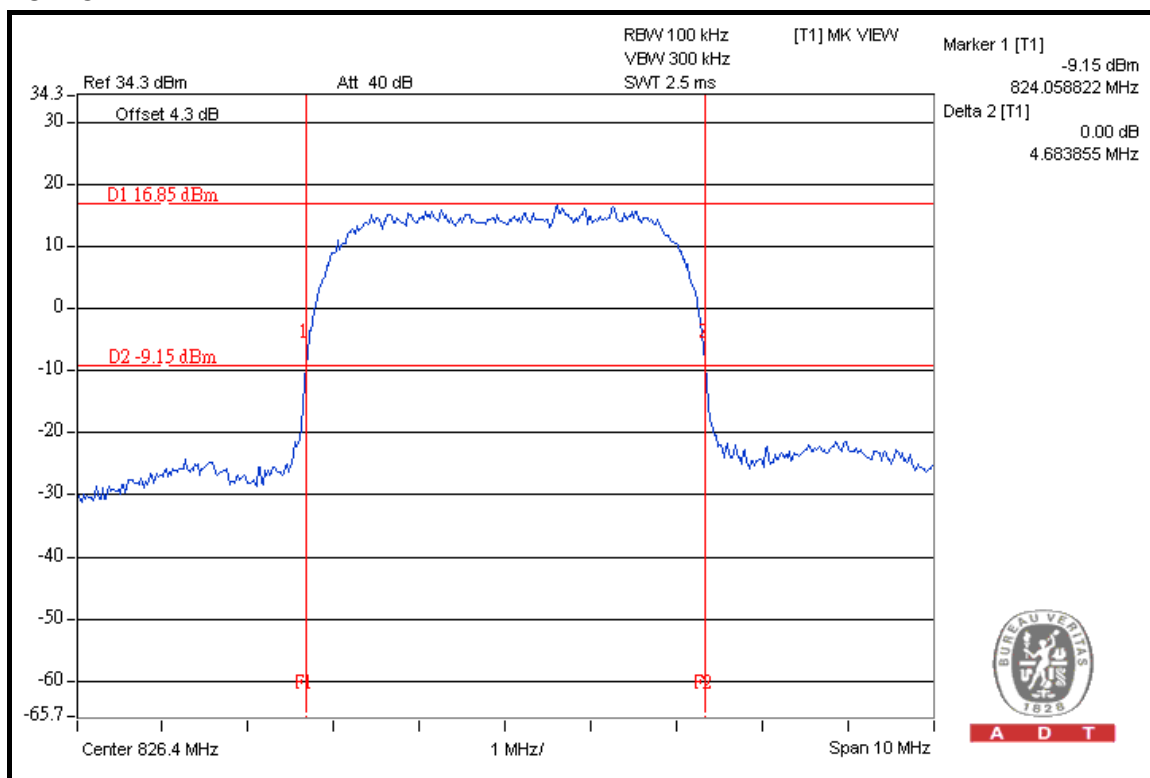


A D T

FOR WCDMA BAND:

CHANNEL	MAX. OUTPUT POWER -26 dBc BANDWIDTH (MHz)
LOW	4.68
MIDDLE	4.69
HIGH	4.69

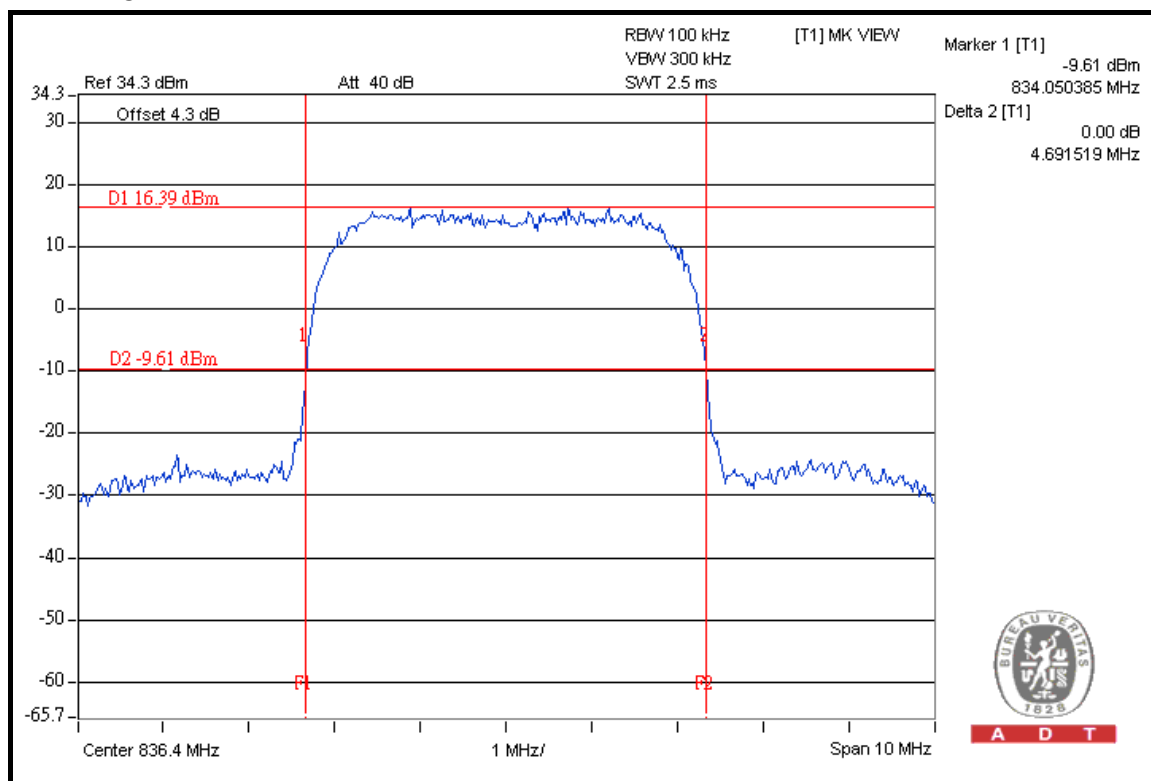
LOW CHANNEL



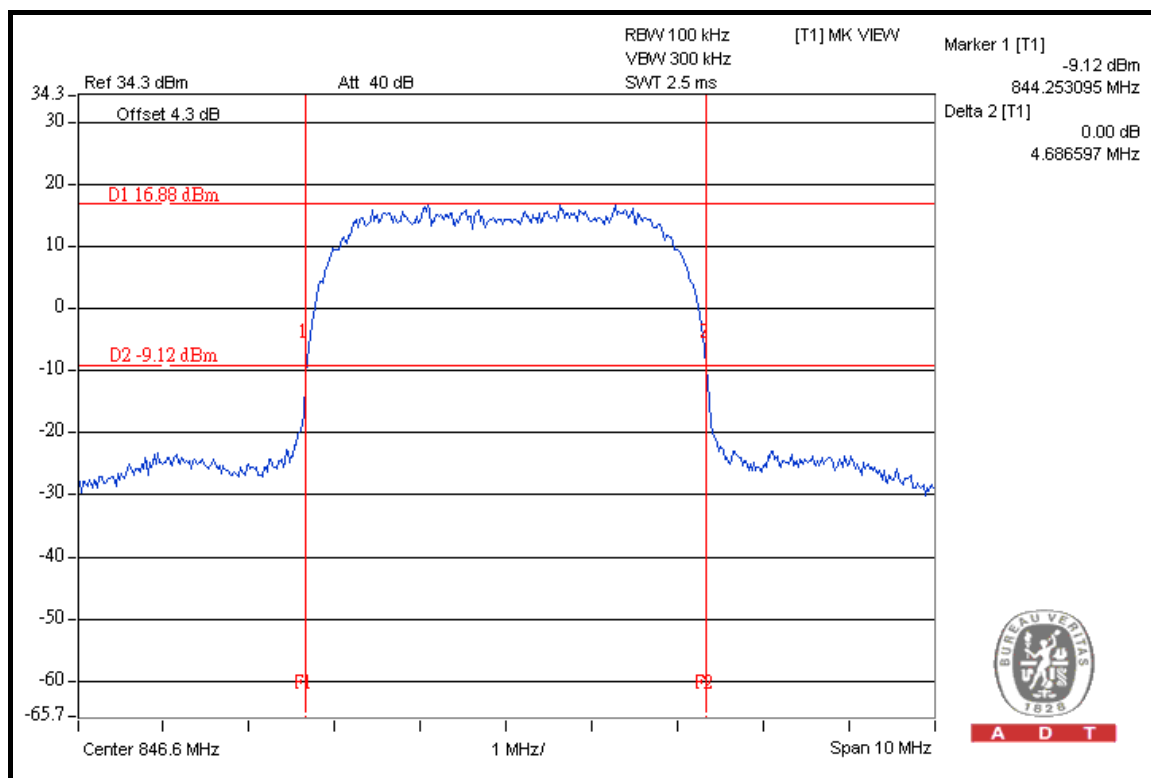


A D T

MIDDLE CHANNEL



HIGH CHANNEL



4.4 BAND EDGE MEASUREMENT

4.4.1 LIMITS OF BAND EDGE MEASUREMENT

According to FCC 22.917 specified that 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.

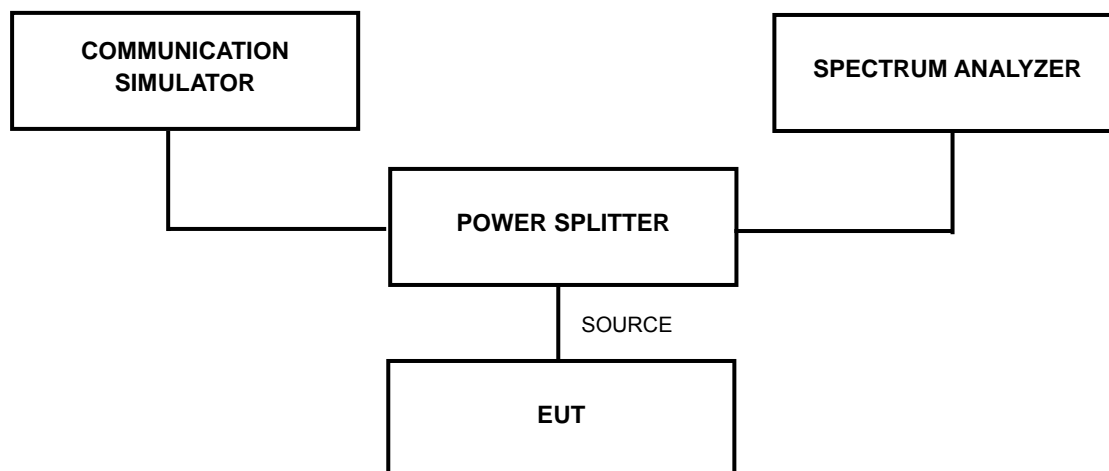
4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
* ROHDE & SCHWARZ Spectrum Analyzer	E4446A	MY44360128	Dec. 06, 2008	Dec. 07, 2009
* Mini-Circuits Power Splitter	ZAPD-4	400005	NA	NA
* Hewlett Packard RF cable	8120-6192	01428251	NA	NA
* Suhner RF cable	Sucoflex104	204850/4	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. "*" = These equipments are used for the final measurement.

4.4.3 TEST SETUP



4.4.4 TEST PROCEDURES

- a. The EUT was set up for the maximum peak power with GSM / WCDMA link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels, 128 and 251 / 4132 and 4233 (low and high operational frequency range.)
- b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. This splitter loss and cable loss is the worst loss 4.3dB in the transmitted path track.
- c. 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 (for GSM band).
- d. 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 (for WCDMA band).
- e. Record the max trace plot into the test report.

4.4.5 EUT OPERATING CONDITION

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

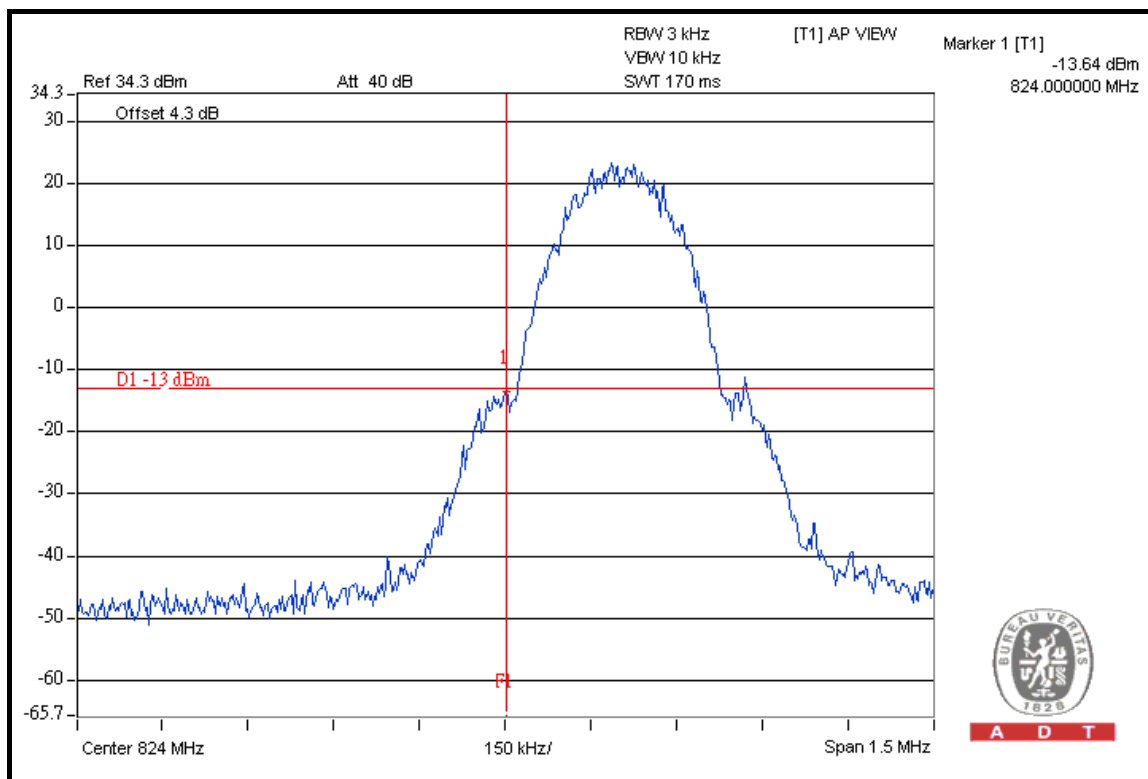


A D T

4.4.6 TEST RESULTS

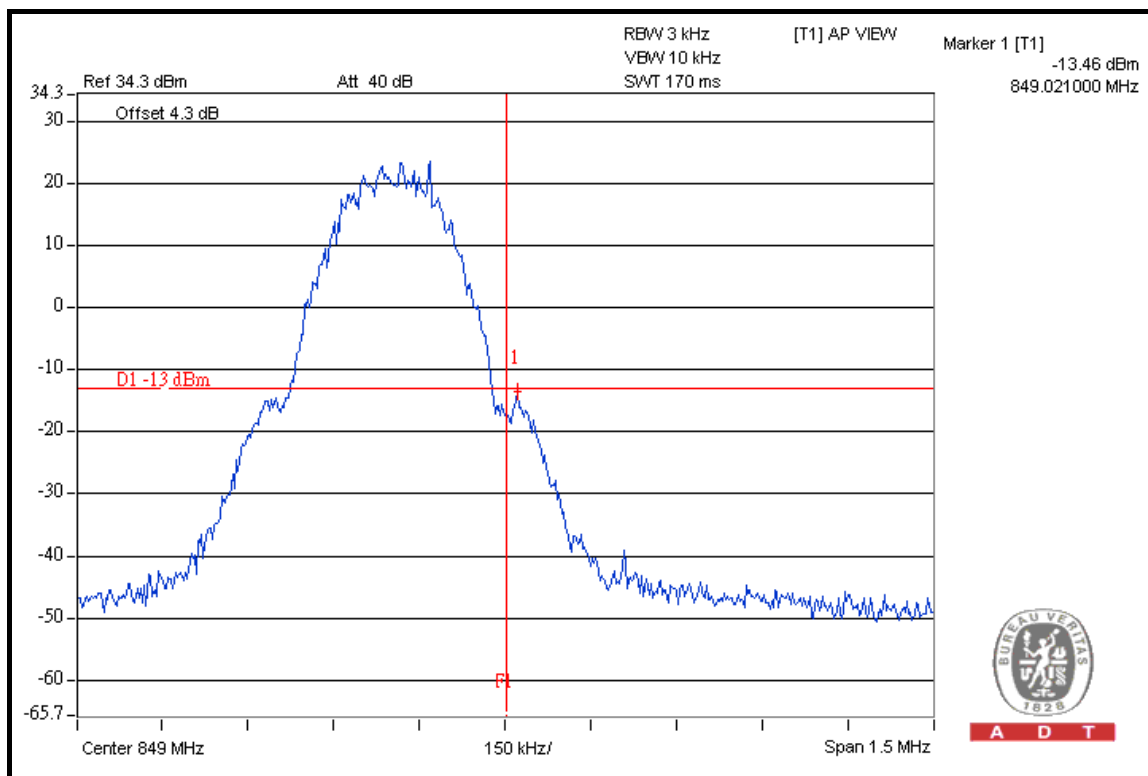
FOR GSM BAND: FOR GSM MODE

LOWER BAND EDGE



A D T

HIGHER BAND EDGE



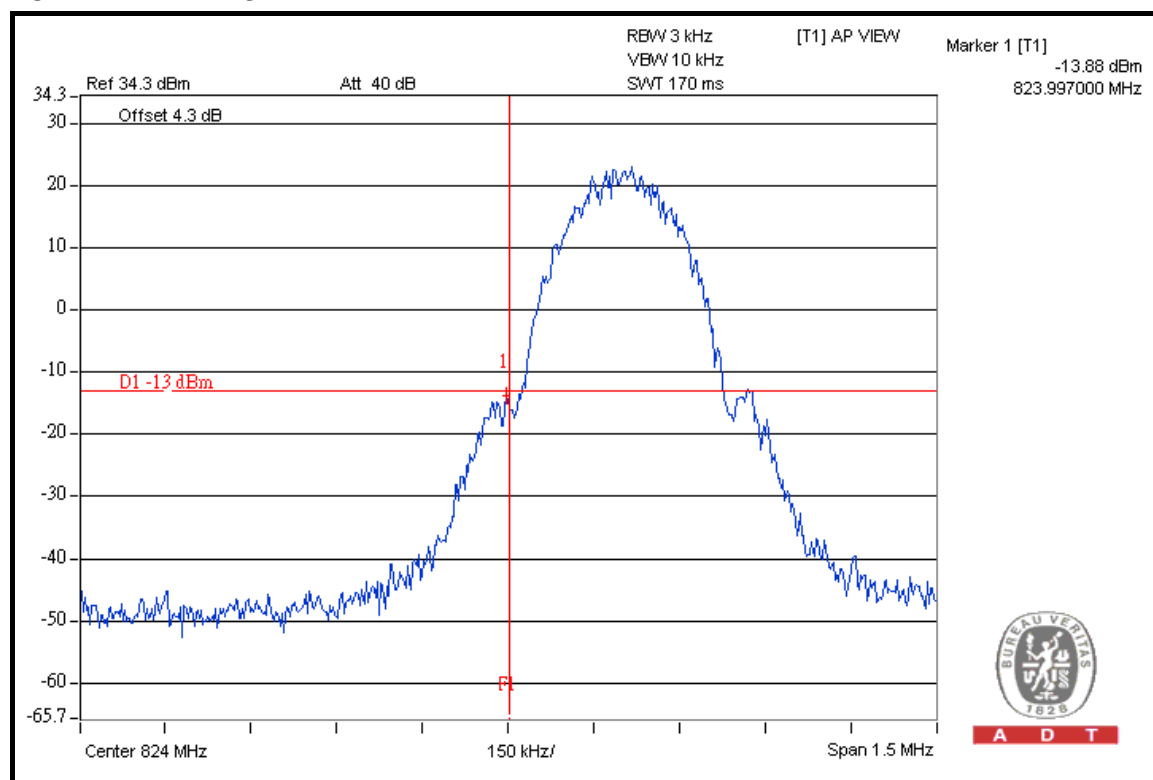
A D T



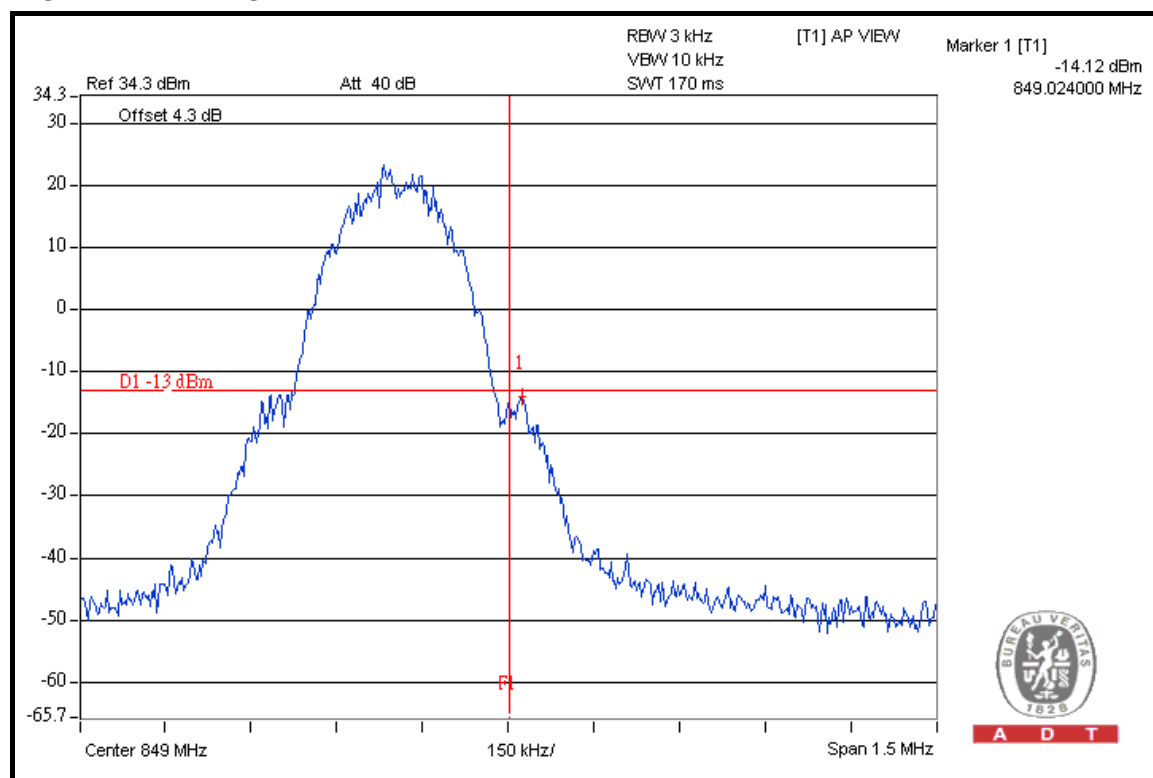
A D T

FOR GPRS MODE (UP-LINK WITH 1 TIME SLOT)

LOWER BAND EDGE



HIGHER BAND EDGE

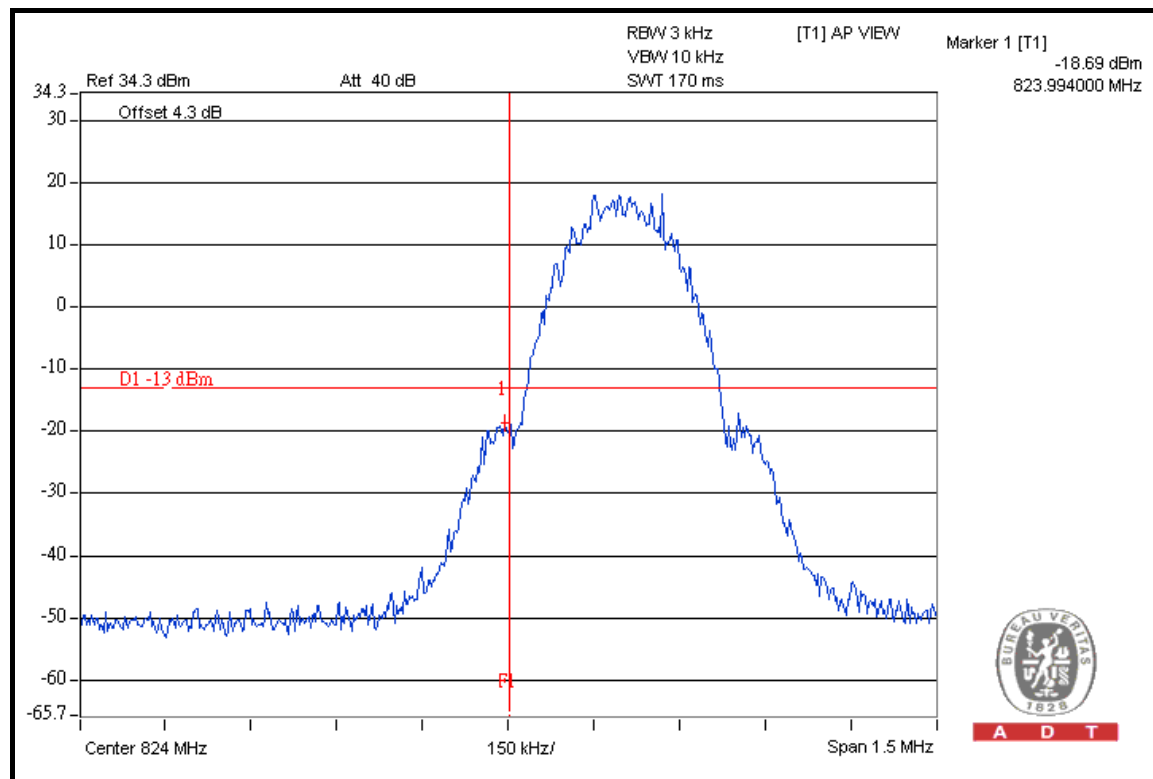




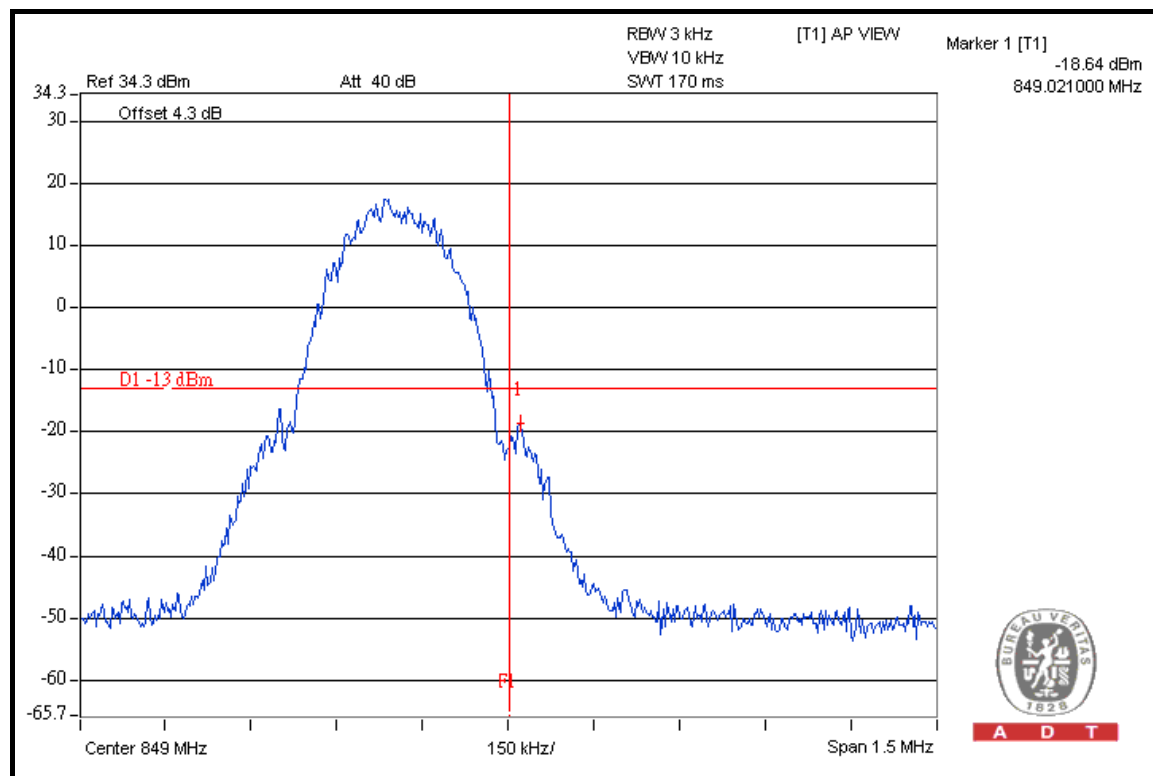
A D T

FOR E-GPRS MODE (UP-LINK WITH 1 TIME SLOT)

LOWER BAND EDGE



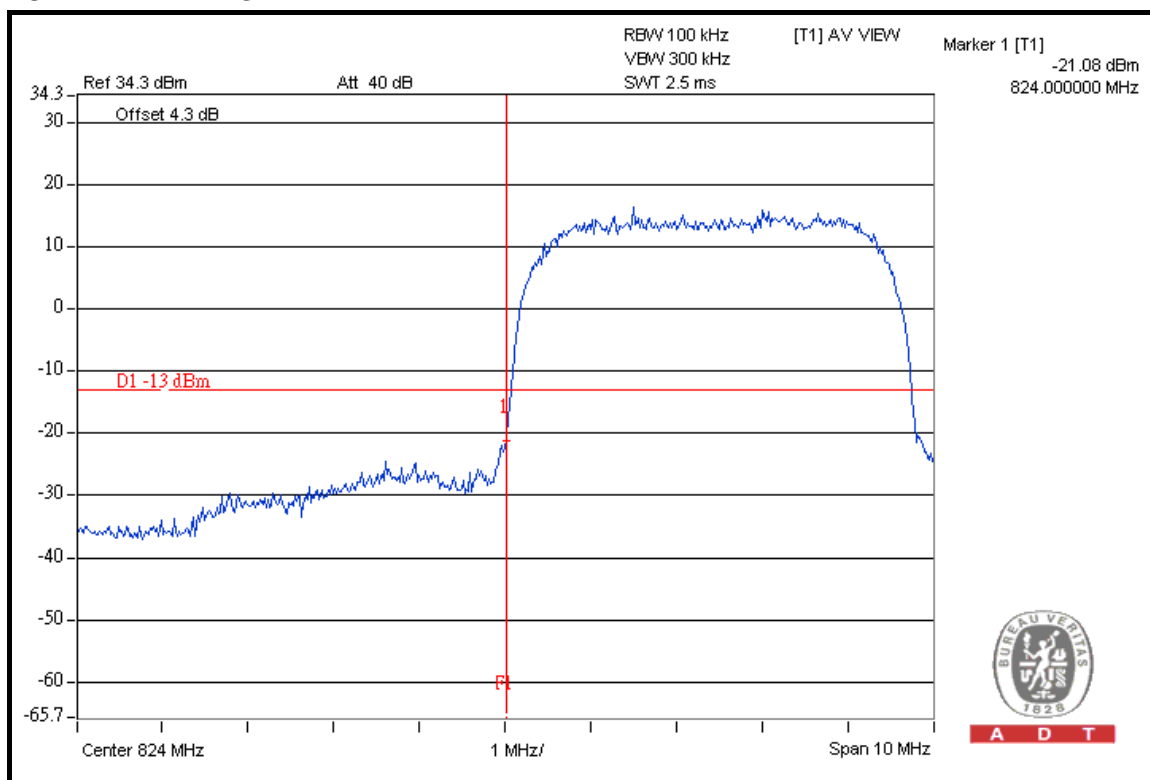
HIGHER BAND EDGE





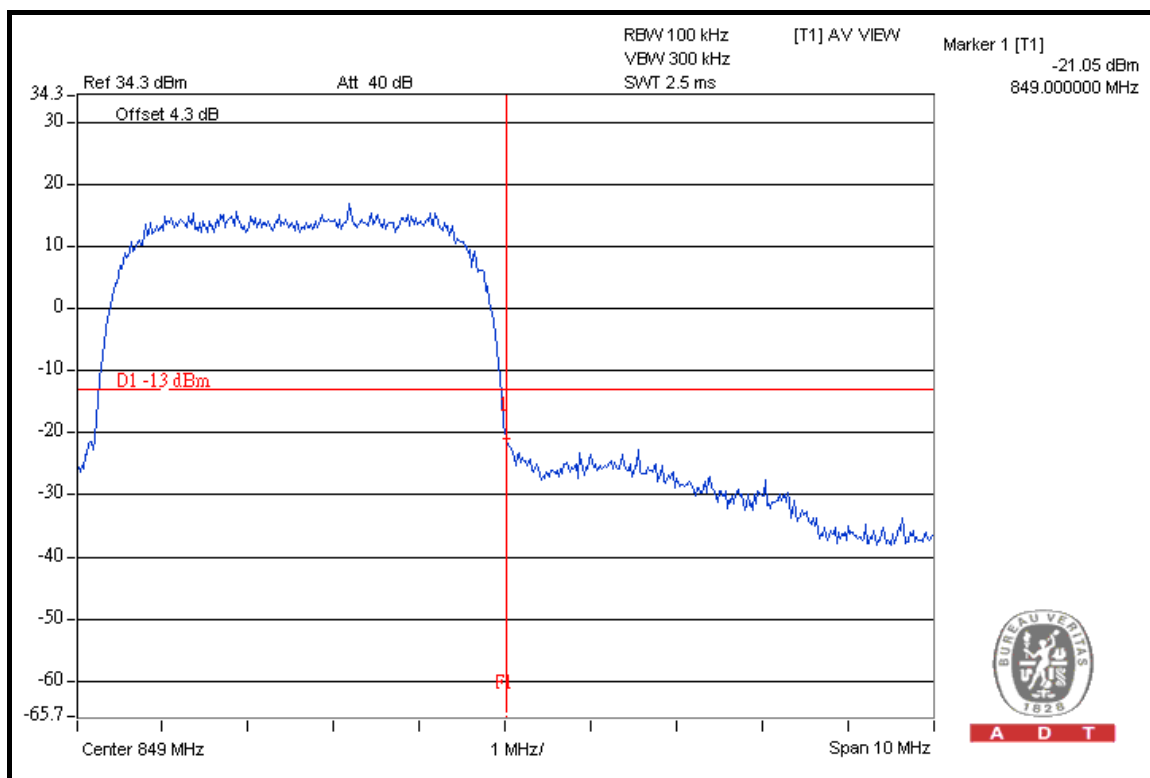
A D T

FOR WCDMA BAND: LOWER BAND EDGE



A D T

HIGHER BAND EDGE



A D T

4.5 CONDUCTED SPURIOUS EMISSIONS

4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

In the FCC 22.917, On any frequency outside a licensee's frequency block within GSM spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. The emission limit equal to -13dBm .

4.5.2 TEST INSTRUMENTS

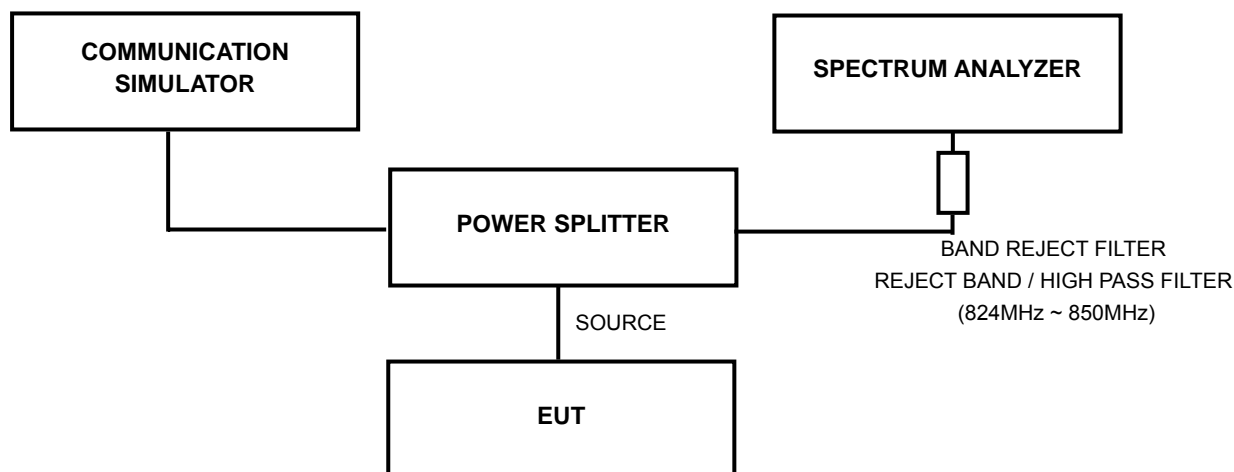
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
* ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100041	Apr. 22, 2008	Apr. 21, 2009
* Wainwright Instruments Band Reject Filter	WRCG1850/1910-1 830/1930-60/10SS	SN1	NA	NA
* Wainwright Instruments High Pass Filter	WHK1.5/15G-10ST	SN5	NA	NA
* Mini-Circuits Power Splitter	ZAPD-4	400005	NA	NA
* Hewlett Packard RF cable	8120-6192	01428251	NA	NA
* JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
* Suhner RF cable	Sucoflex104	204850/4	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. "*" = These equipments are used for the final measurement.

4.5.3 TEST PROCEDURE

- The EUT was set up for the maximum peak power with GSM / WCDMA link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels, 128, 190 and 251 / 4132, 4182 and 4233 (low, middle and high operational frequency range.)
- The conducted spurious emission used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. This splitter loss and cable loss are the worst loss 4.3dB in the transmitted path track.
- When the spectrum scanned from 9kHz to 1GHz, it shall be connected to the band reject filter attenuated the carried frequency. The spectrum set RB=1MHz, VB=3MHz.
- When the spectrum scanned from 1GHz to 9GHz, it shall be connected to the high pass filter attenuated the carried frequency. The spectrum set RB=1MHz, VB=3MHz.

4.5.4 TEST SETUP



4.5.5 EUT OPERATING CONDITIONS

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

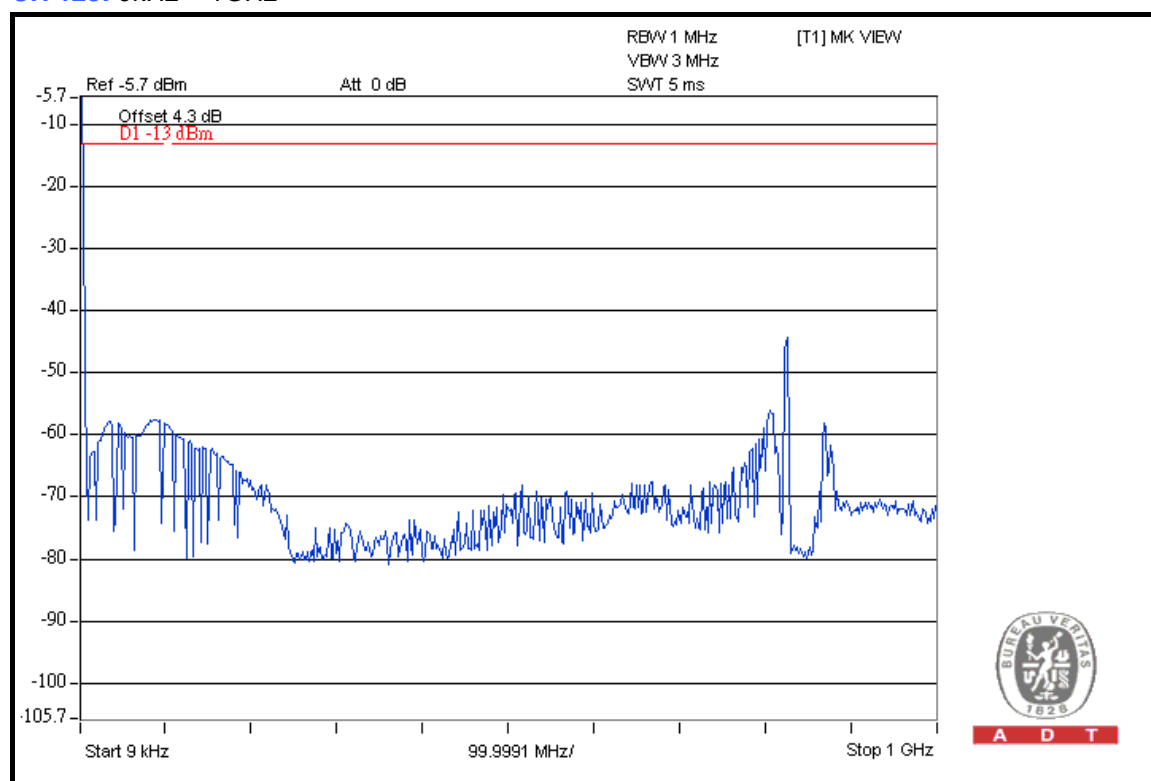


A D T

4.5.6 TEST RESULTS

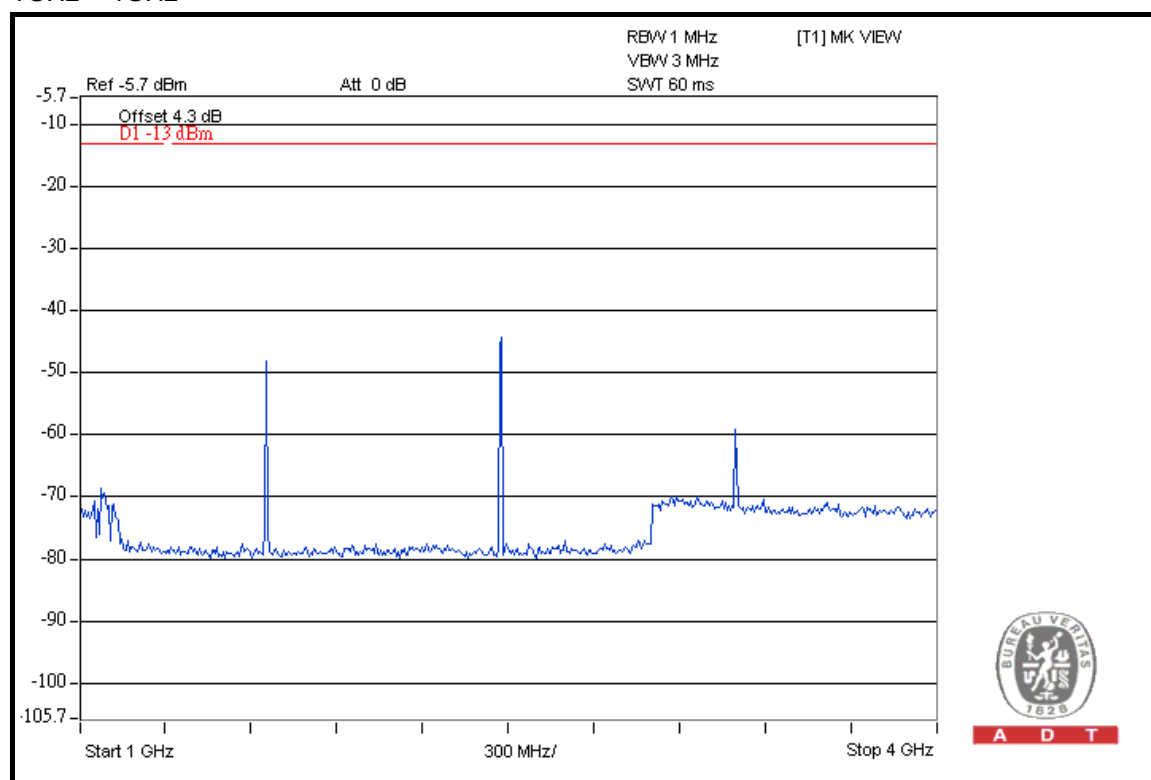
FOR GSM BAND:

CH 128: 9kHz ~ 1GHz



A D T

1GHz ~ 4GHz

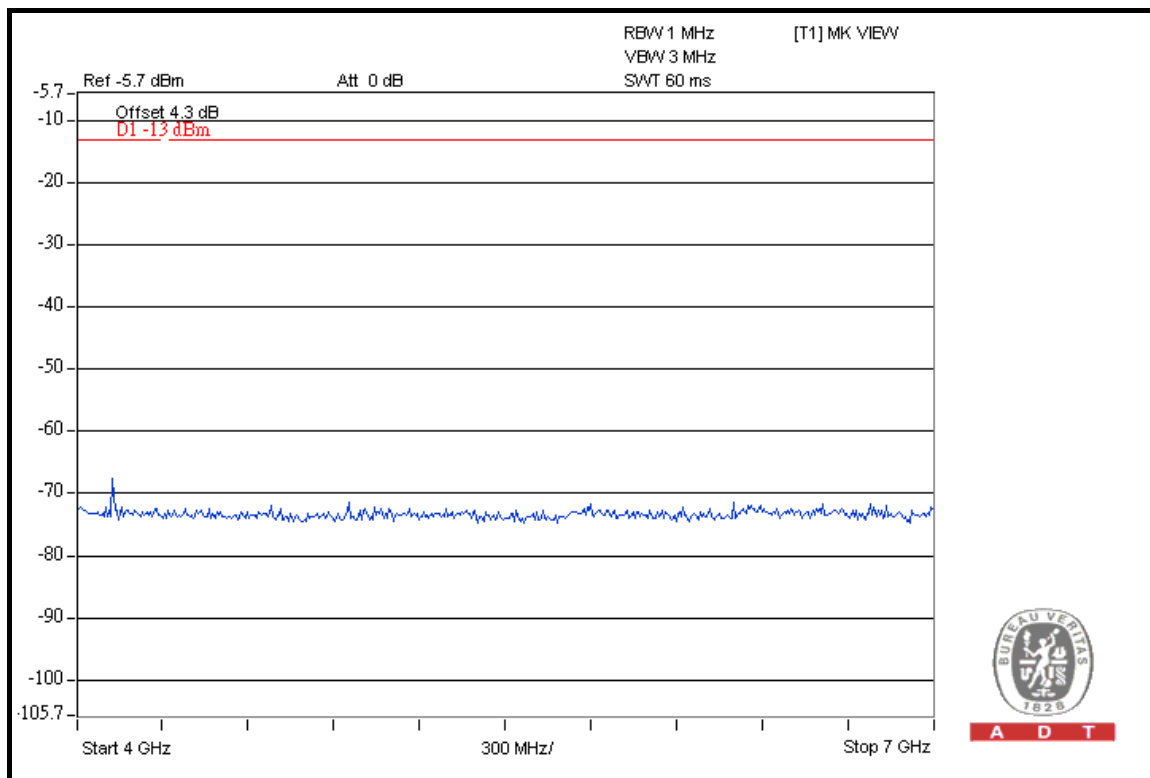


A D T

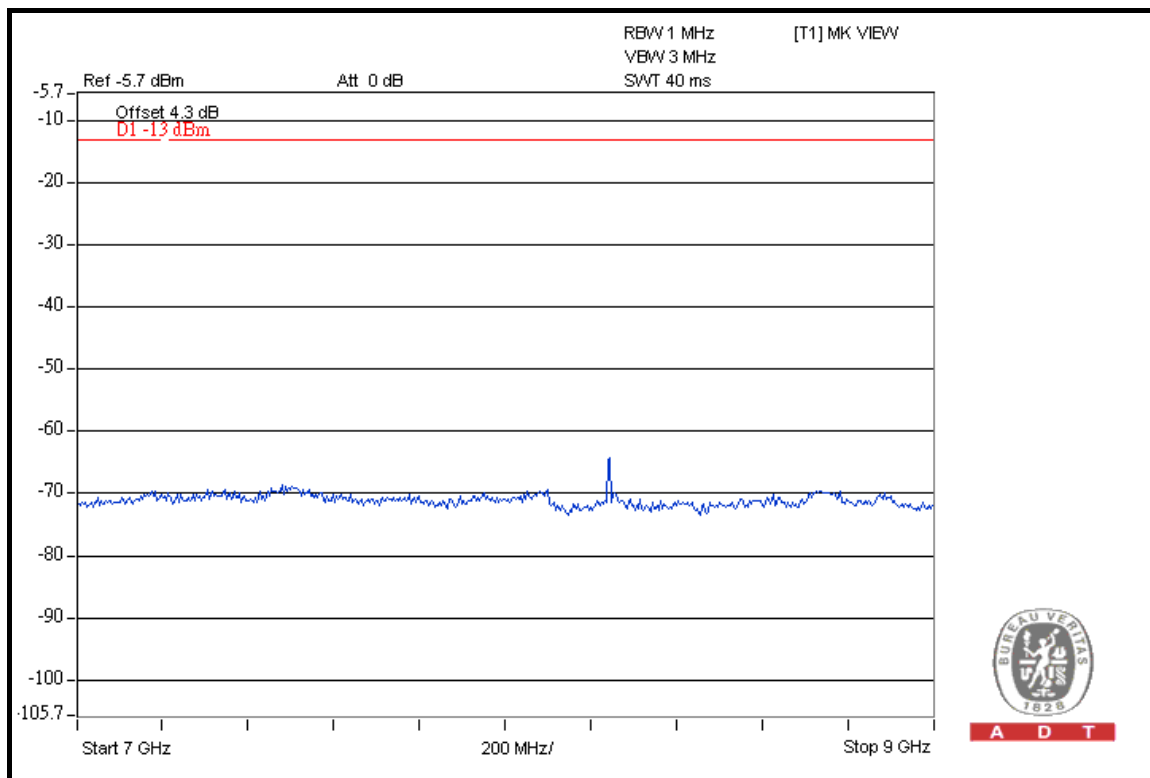


A D T

4GHz ~ 7GHz



7GHz ~ 9GHz

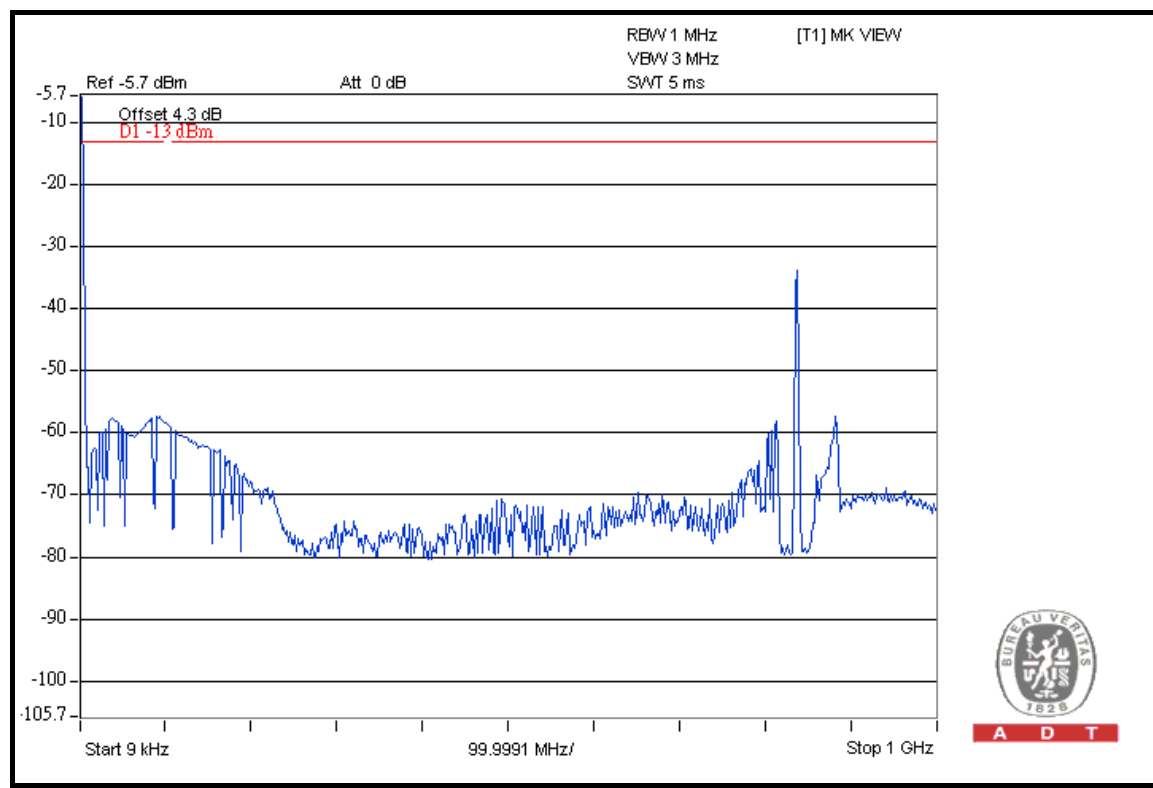




A D T

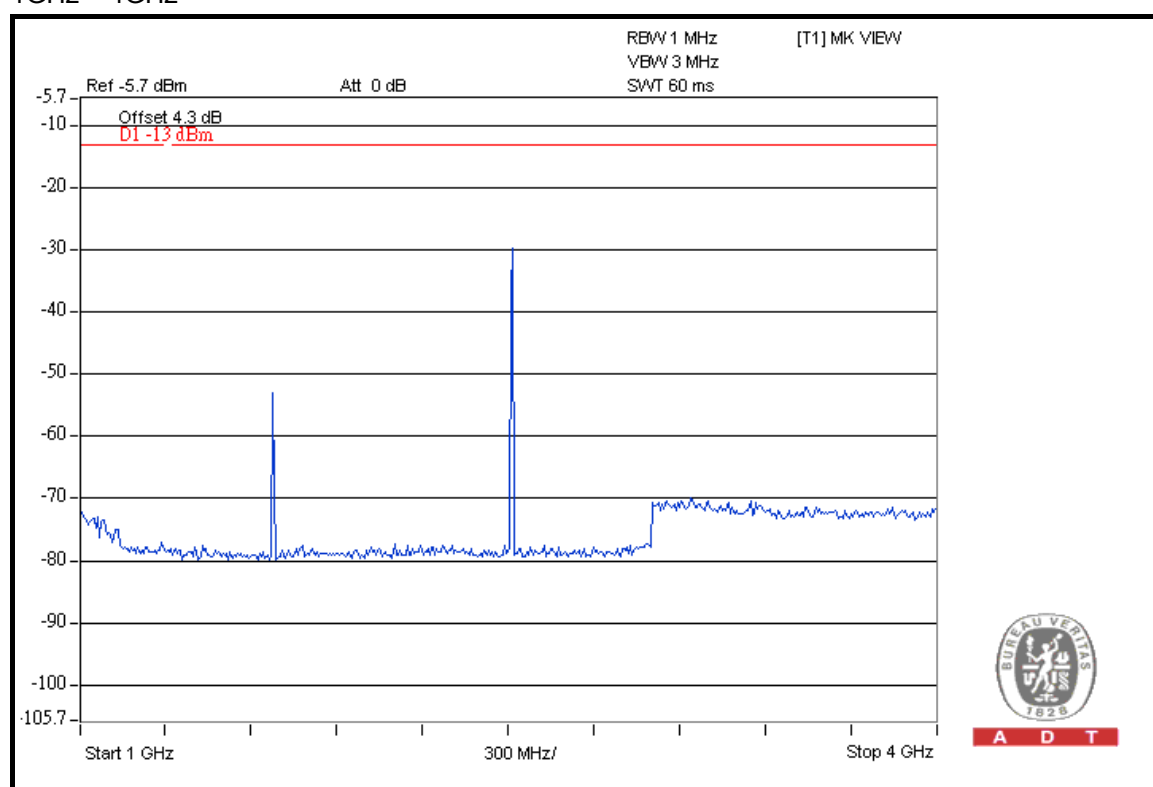
CH 190:

9kHz ~ 1GHz



A D T

1GHz ~ 4GHz

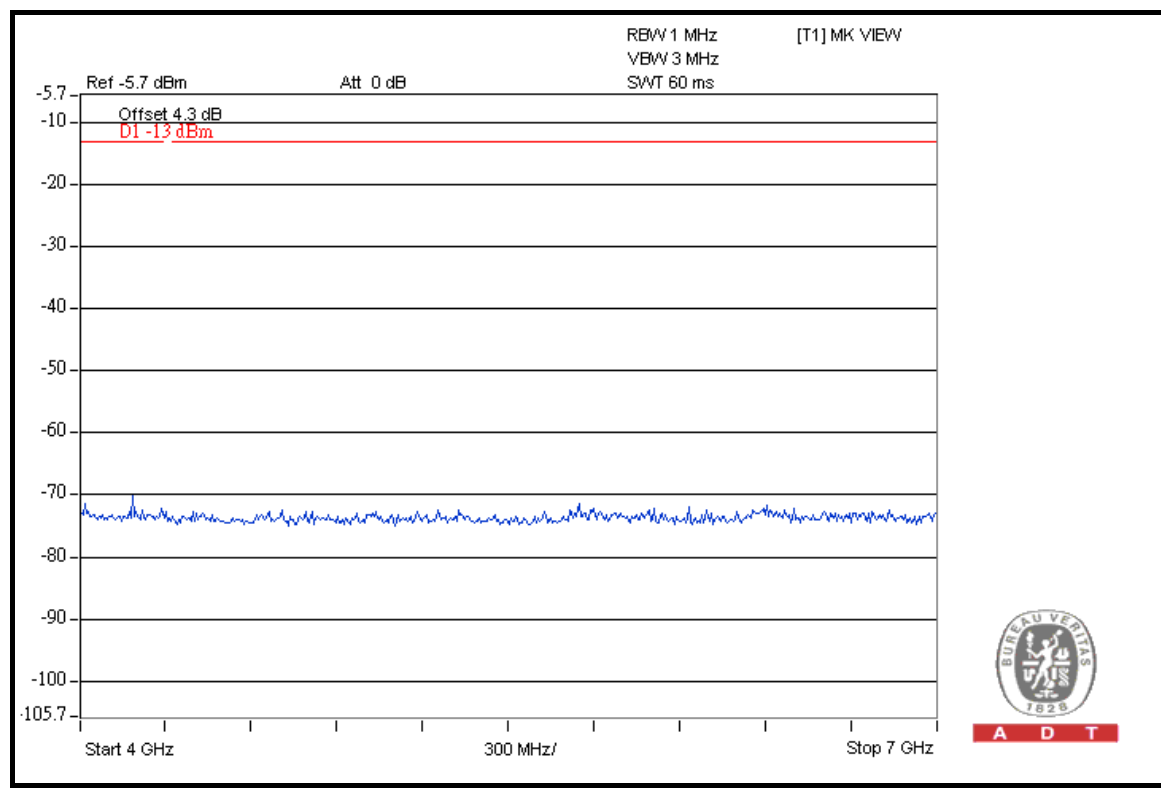


A D T



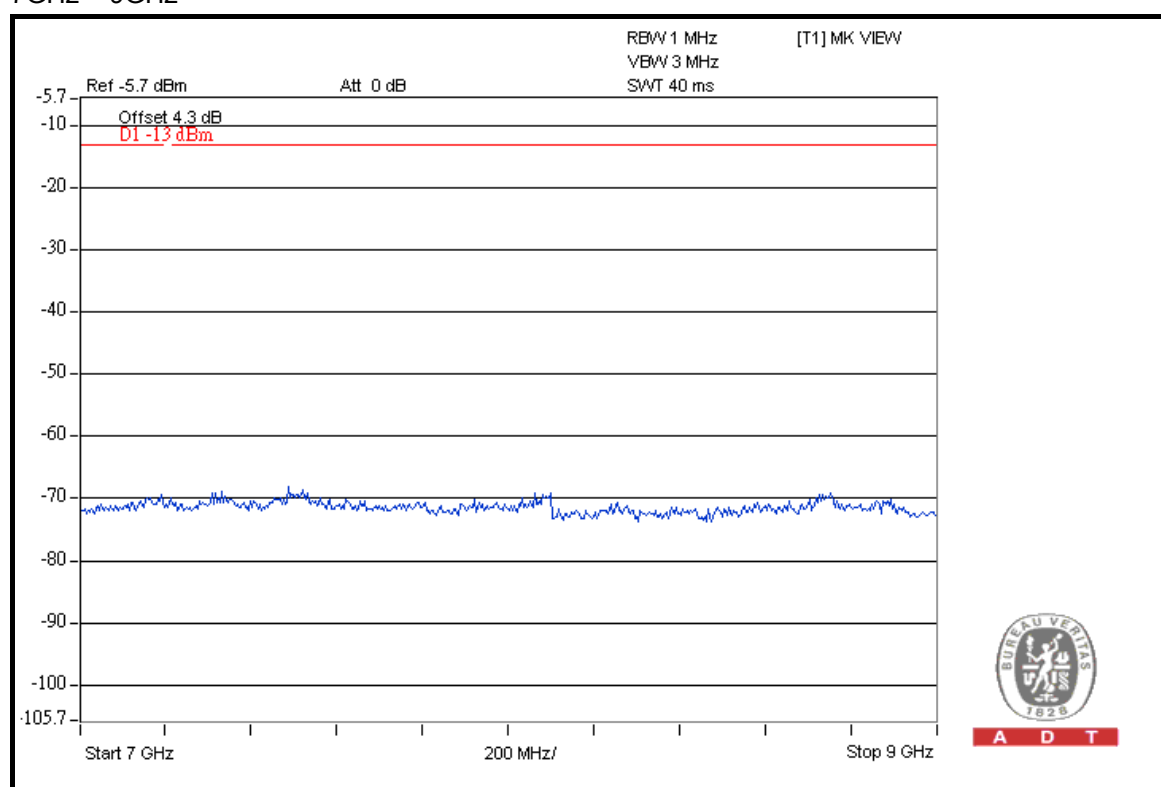
A D T

4GHz ~ 7GHz



A D T

7GHz ~ 9GHz



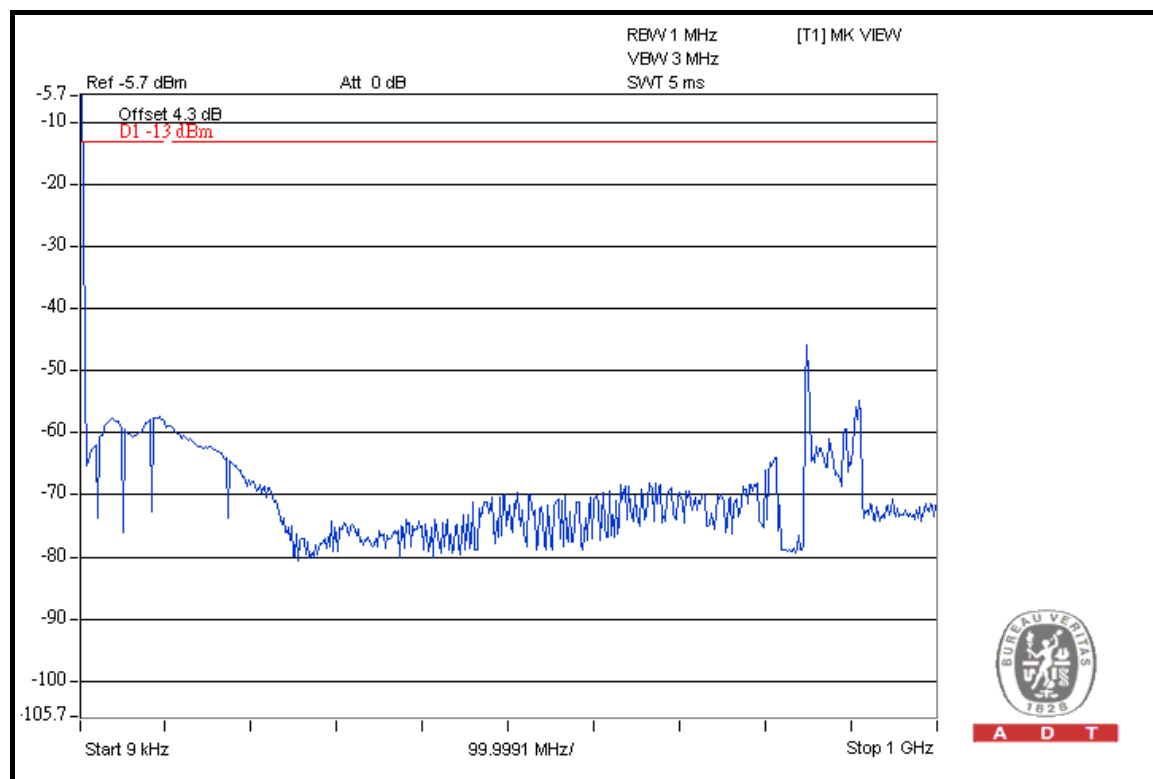
A D T



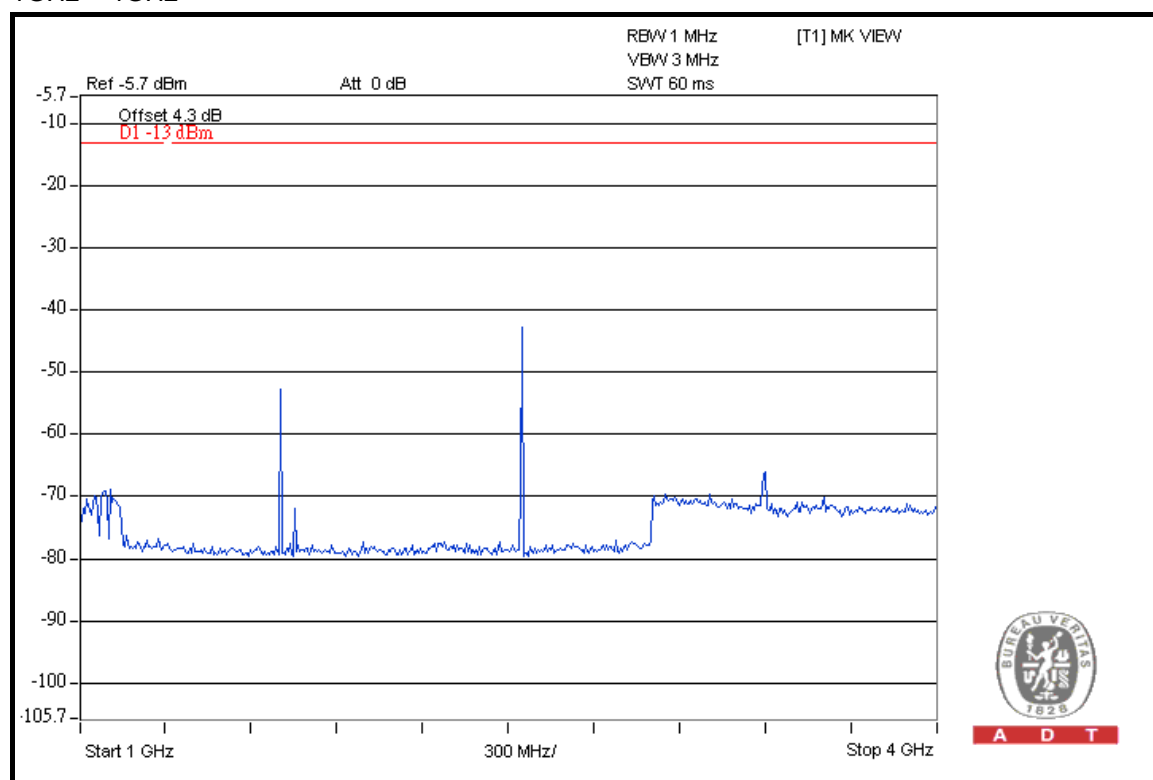
A D T

CH 251:

9kHz ~ 1GHz



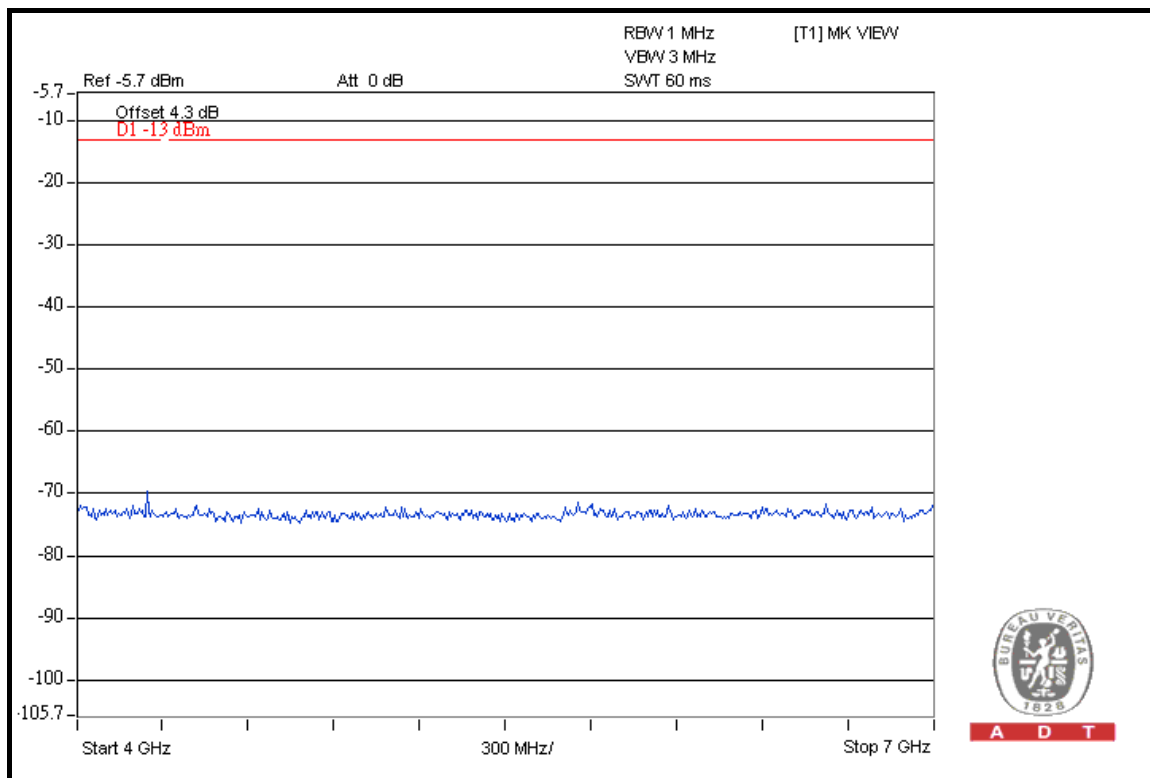
1GHz ~ 4GHz



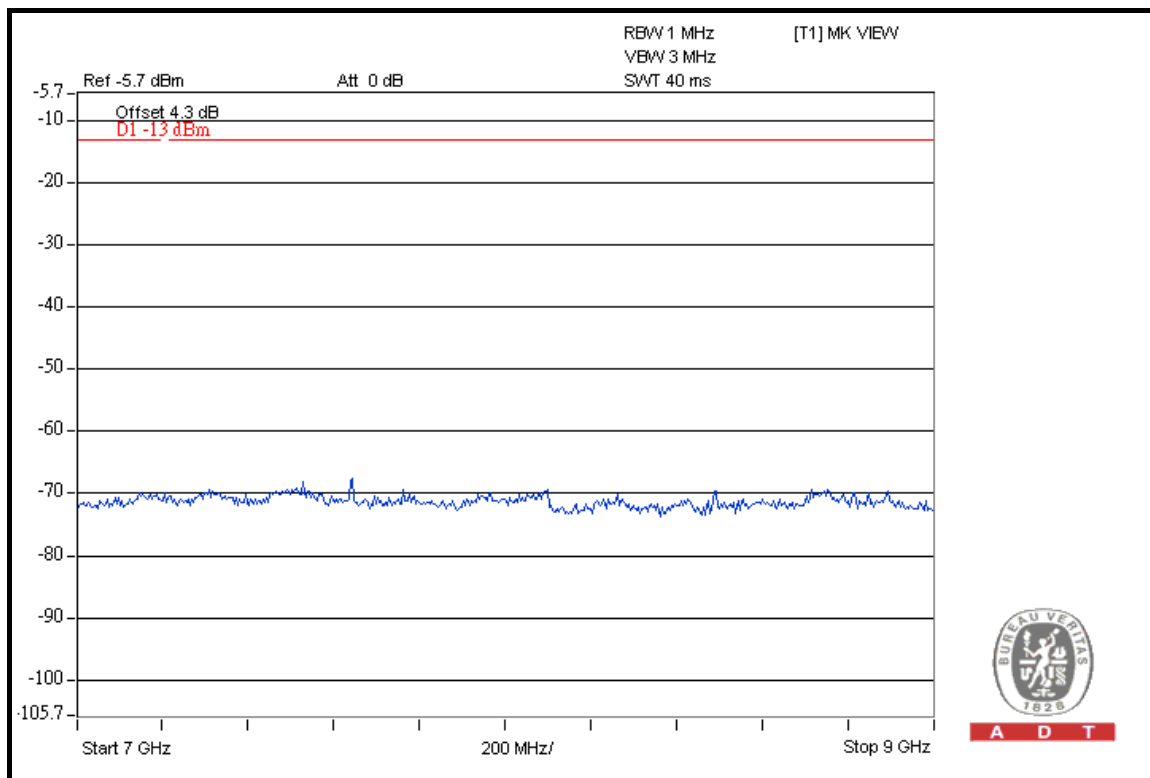


A D T

4GHz ~ 7GHz



7GHz ~ 9GHz



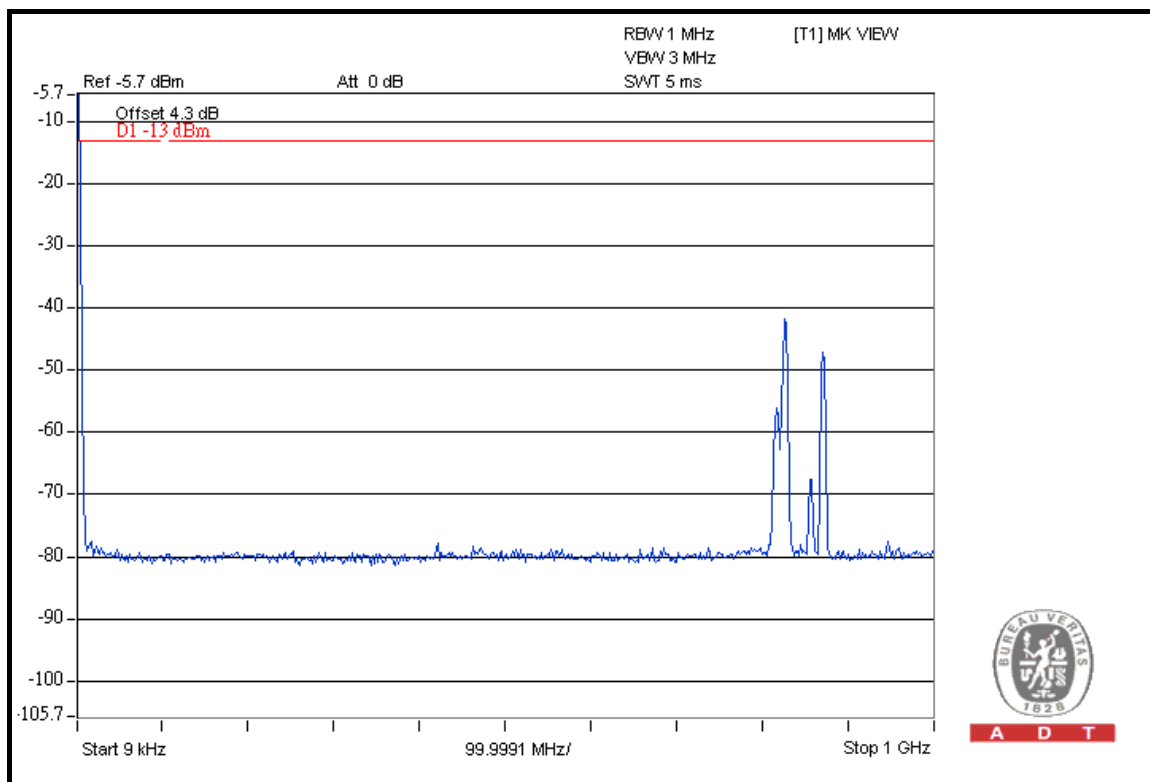


A D T

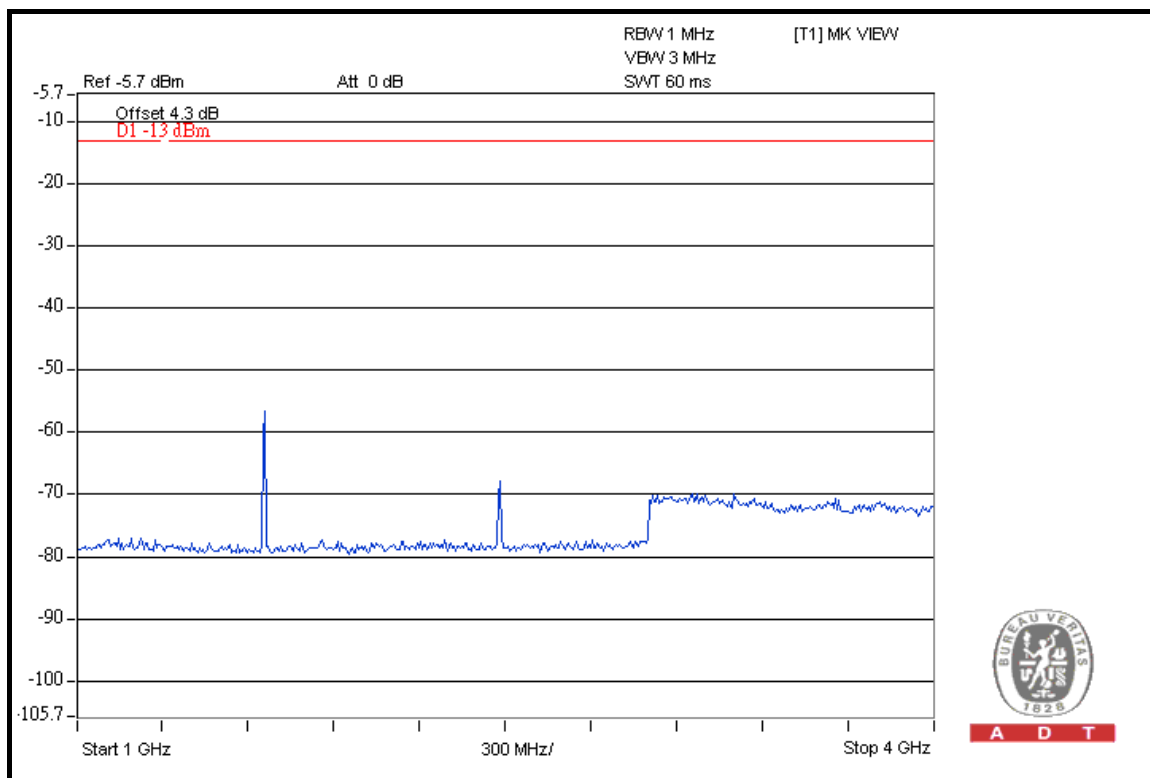
FOR WCDMA BAND:

CH 4132:

9kHz ~ 1GHz



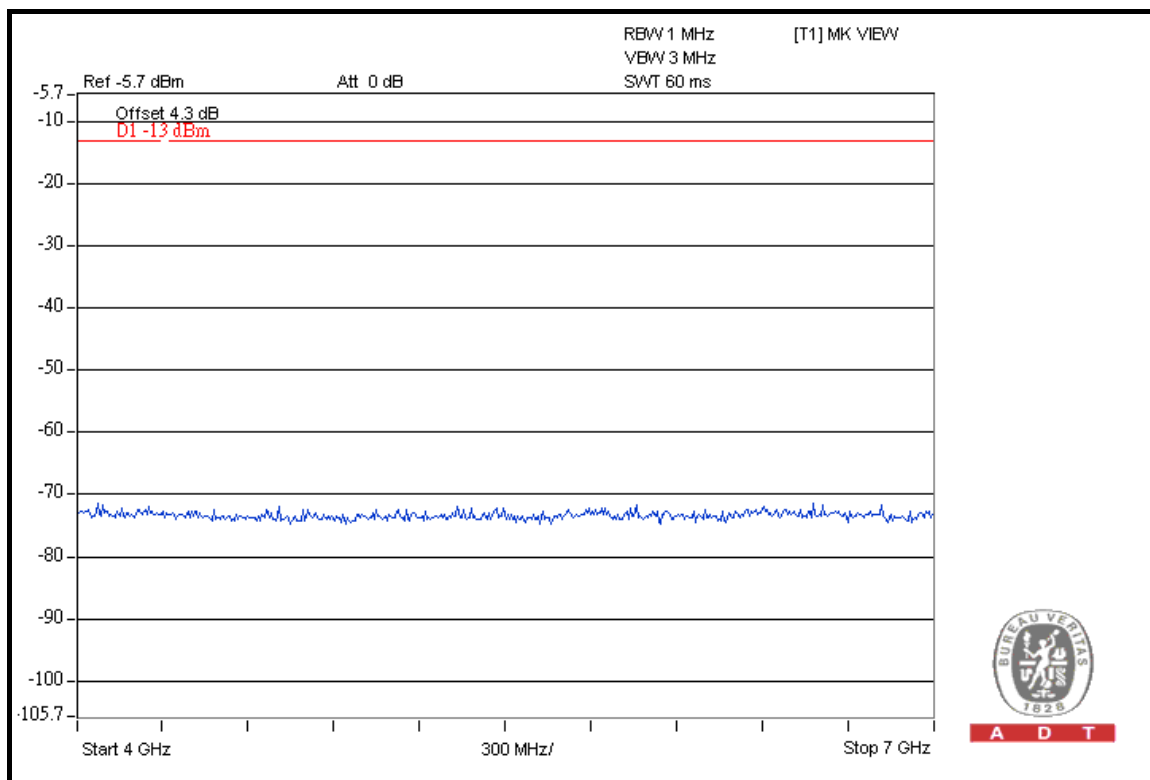
1GHz ~ 4GHz



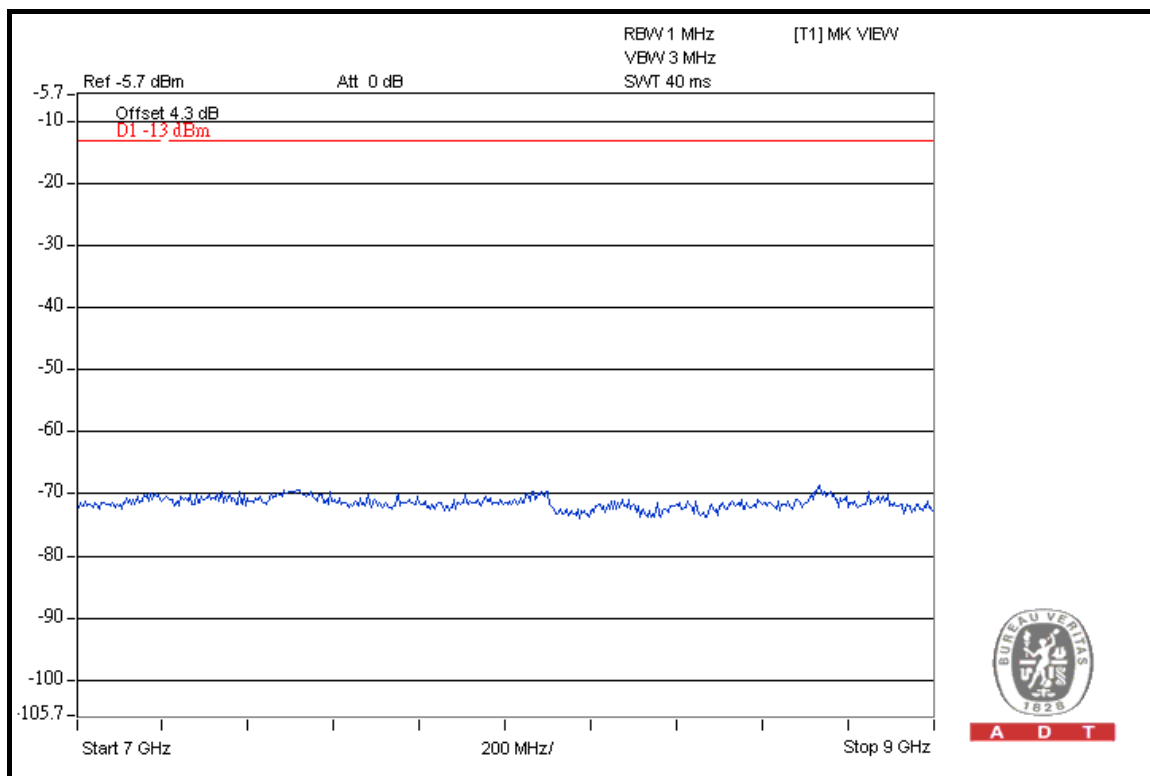


A D T

4GHz ~ 7GHz



7GHz ~ 9GHz

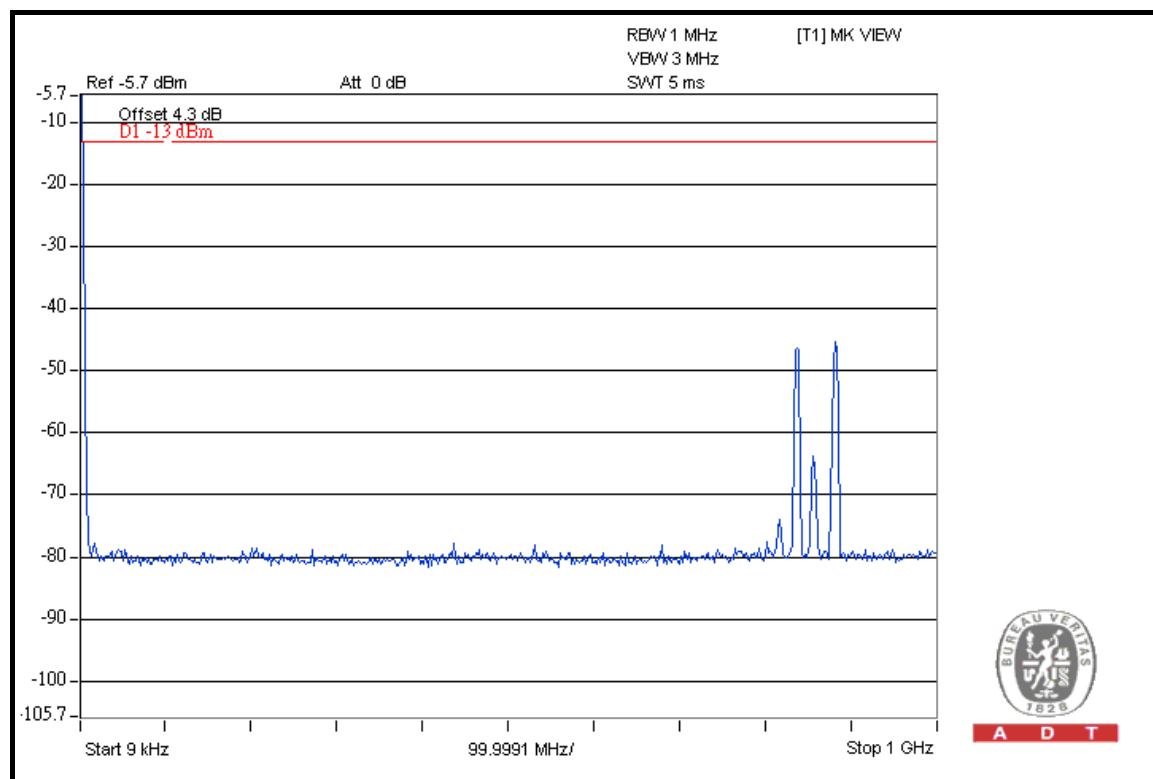




A D T

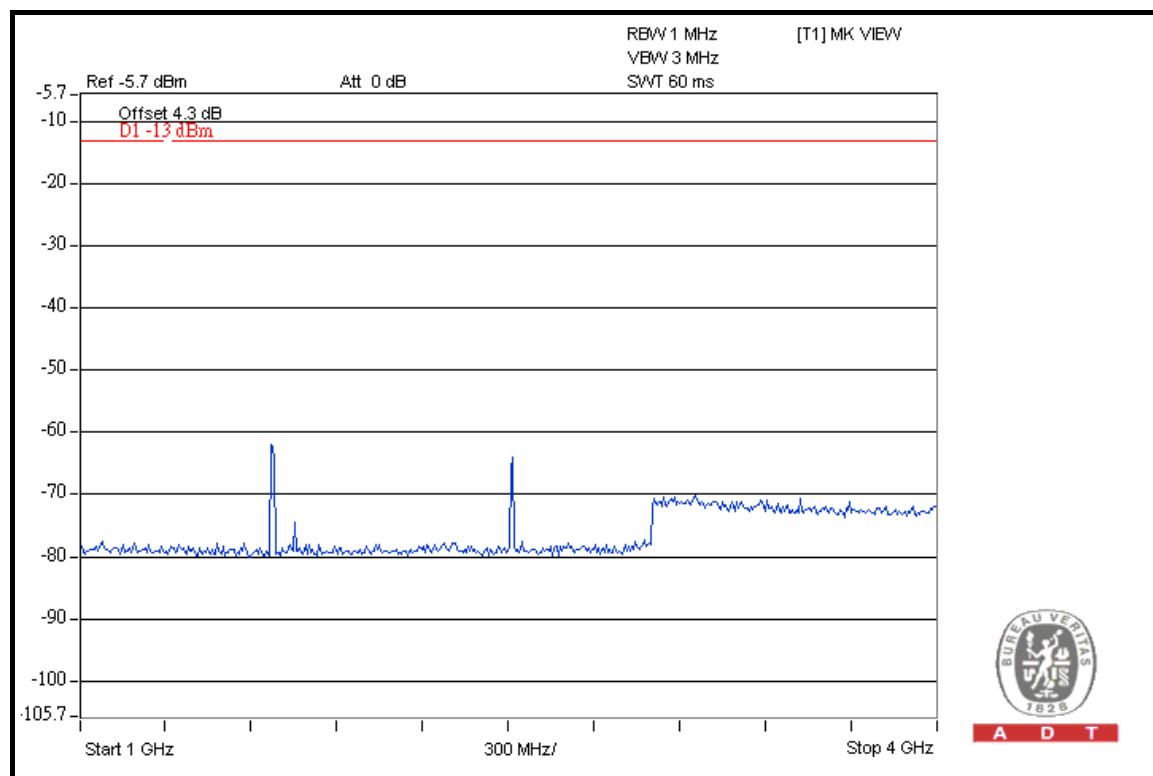
CH 4182:

9kHz ~ 1GHz



A D T

1GHz ~ 4GHz

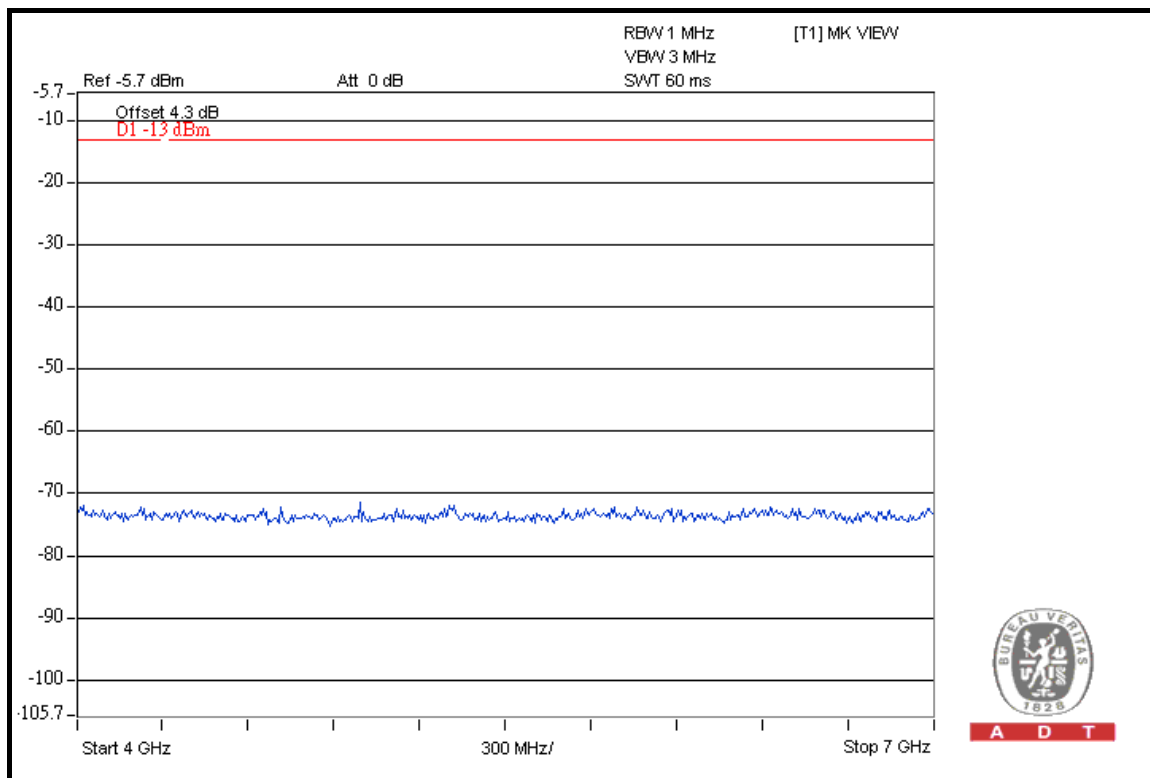


A D T

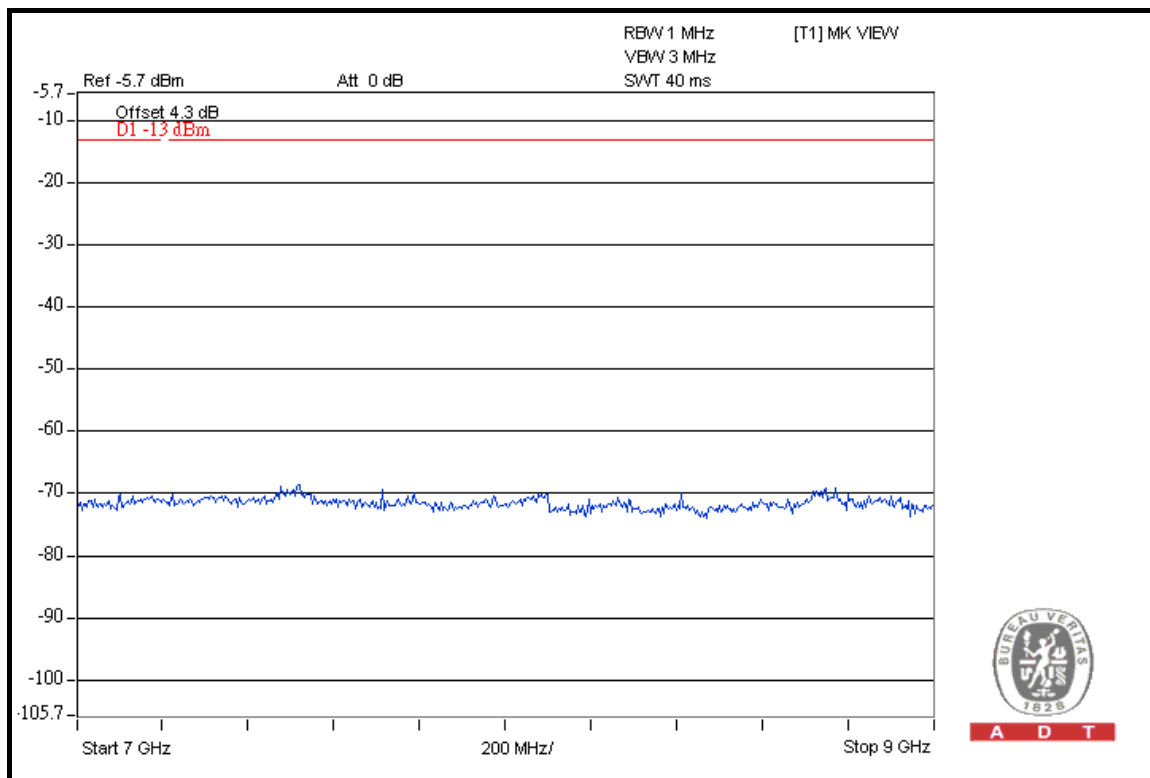


A D T

4GHz ~ 7GHz



7GHz ~ 9GHz

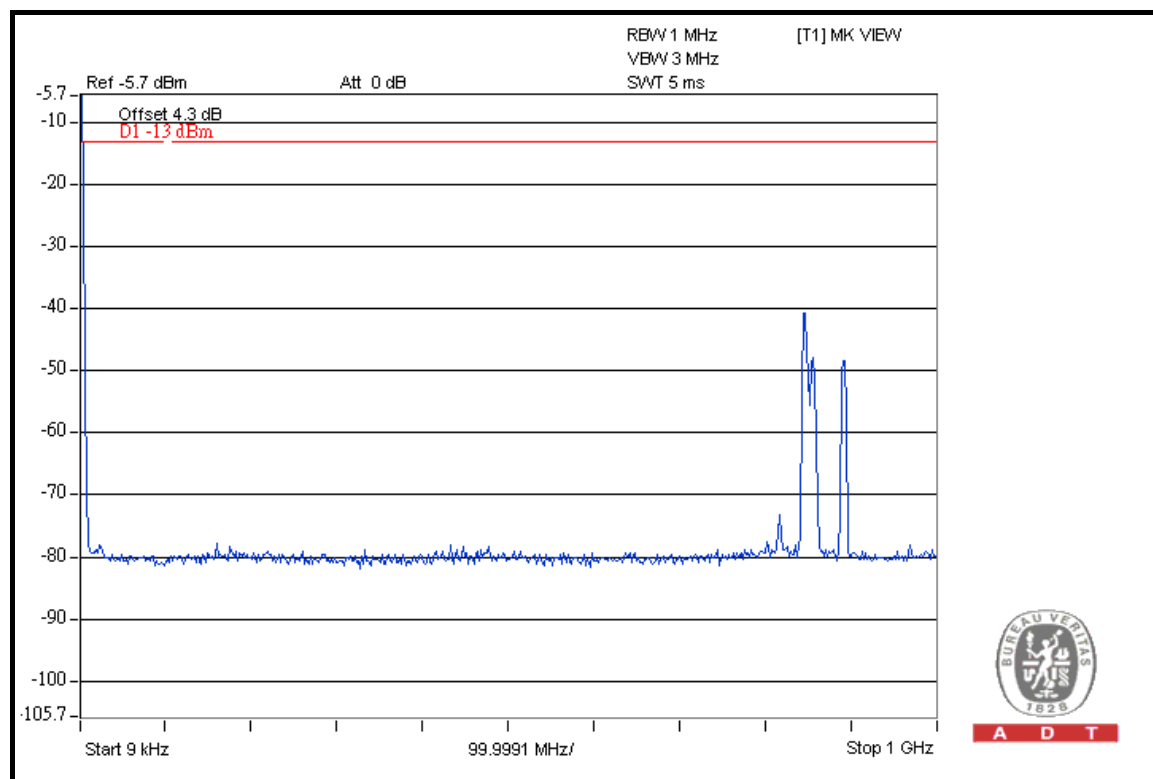




A D T

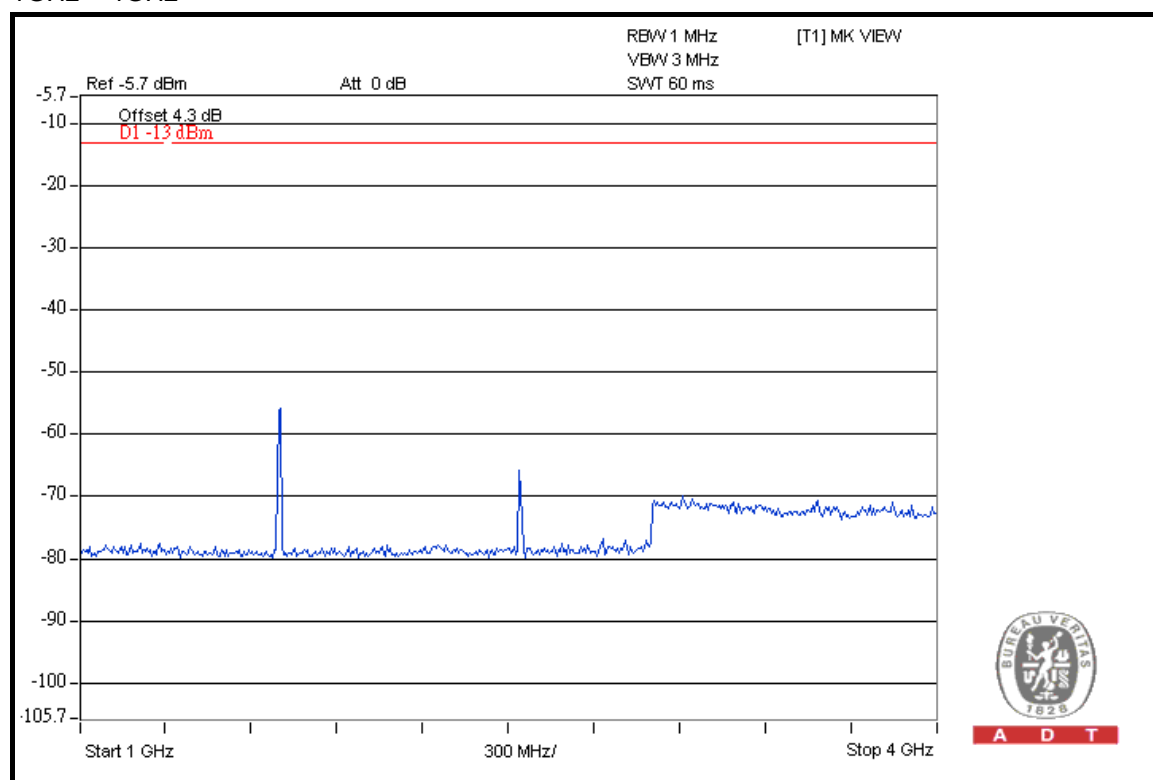
CH 4233:

9kHz ~ 1GHz



A D T

1GHz ~ 4GHz

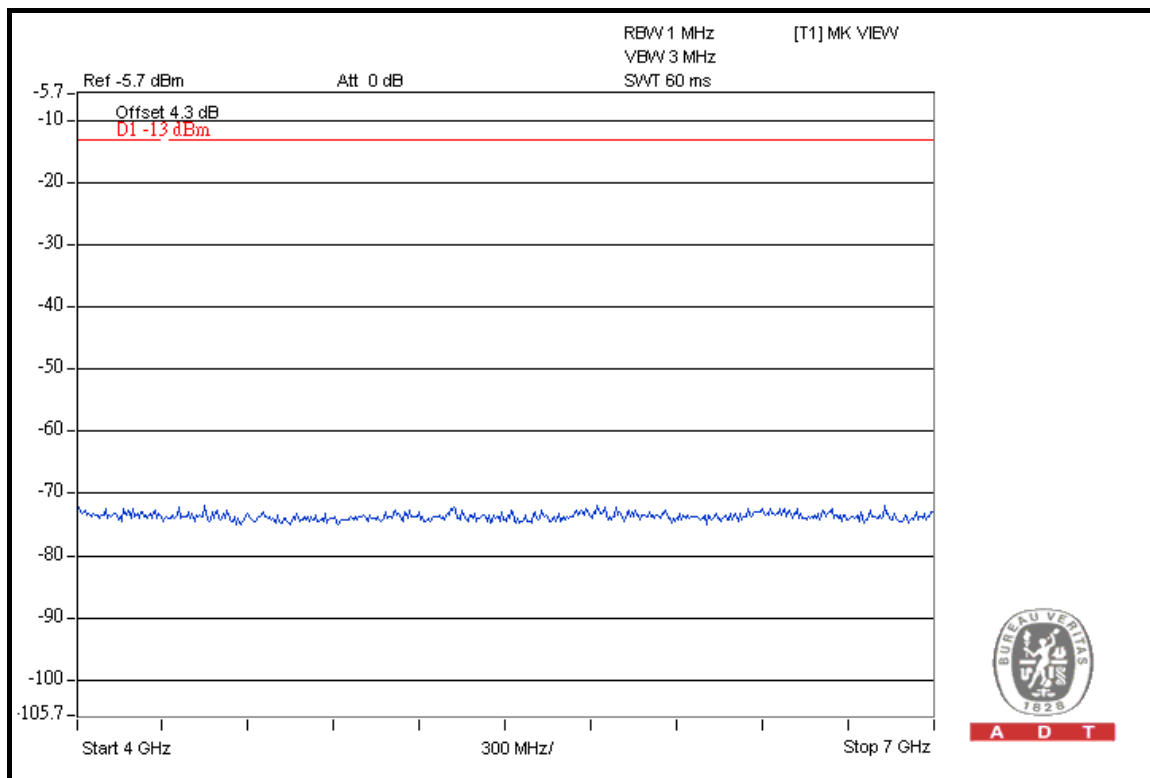


A D T

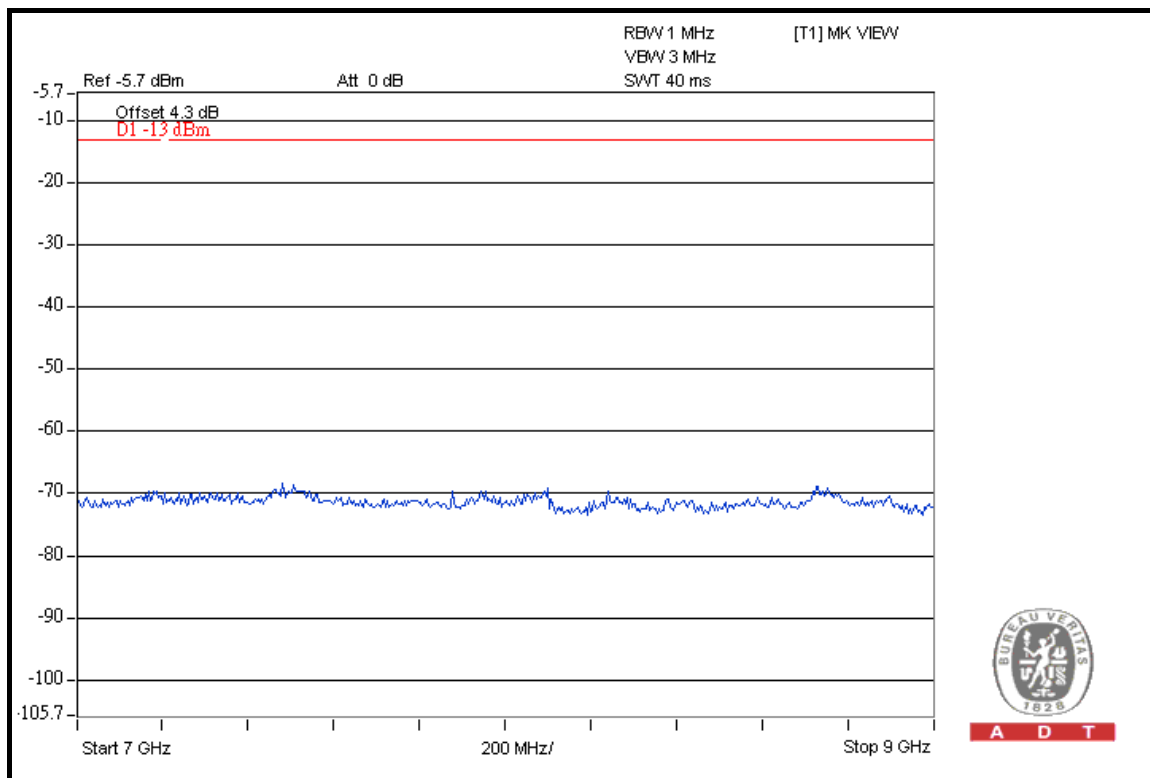


A D T

4GHz ~ 7GHz



7GHz ~ 9GHz



4.6 RADIATED EMISSION MEASUREMENT (BELOW 1GHz)

4.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 24.238(a), On any frequency outside a licensee's frequency block within USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. The emission limit equal to -13dBm . So the limit of emission is the same absolute specified line.

LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBuV/m) (NOTE)
-13	82.22

NOTE: The following formula is used to convert the equipment radiated power to field strength.

$$E = [1000000 \sqrt{(30P)}] / 3 \text{ uV/m, where P is Watts.}$$

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	100033	Jun. 30, 2008	Jun. 29, 2009
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Apr. 22, 2008	Apr. 21, 2009
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	May 02, 2008	May 01, 2009
HORN Antenna SCHWARZBECK	9120D	9120D-209	Jun. 24, 2008	Jun. 23, 2009
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 25, 2008	Dec. 24, 2009
Preamplifier Agilent	8447D	2944A10633	Nov. 03, 2008	Nov. 02, 2009
Preamplifier Agilent	8449B	3008A01964	Oct. 23, 2008	Oct. 22, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	238141/4	May 20, 2008	May 19, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	May 20, 2008	May 19, 2009
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100.	TT93021703	NA	NA
Turn Table Controller ADT.	SC100.	SC93021703	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 3.
 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 988962.
 5. The IC Site Registration No. is IC 7450F-3.

4.6.3 TEST PROCEDURES

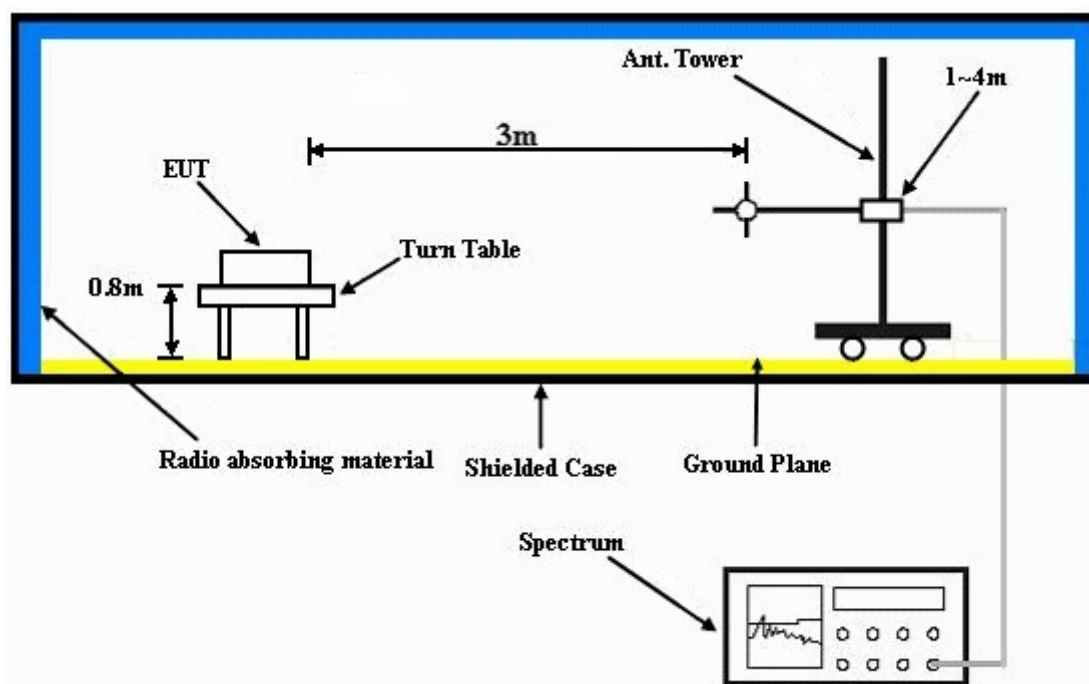
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.
- c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
- d. Repeat step a ~ c for horizontal polarization.

NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



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

4.6.6 EUT OPERATING CONDITIONS

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

4.6.7 TEST RESULTS

FOR GSM BAND:

MODE	TX channel 190	DETECTOR FUNCTION	Peak
FREQUENCY RANGE	Below 1000 MHz	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	22deg. C, 67%RH, 991hPa	TESTED BY	Match Tsui

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	39.72	39.88	82.22	-42.34	1.50 H	112	24.77	15.10
2	150.52	39.41	82.22	-42.81	2.00 H	103	25.37	14.04
3	162.18	39.96	82.22	-42.26	1.50 H	85	25.77	14.19
4	206.89	40.24	82.22	-41.98	2.00 H	178	29.32	10.93
5	241.88	42.22	82.22	-40.00	1.50 H	190	28.94	13.28
6	900.86	39.96	82.22	-42.26	1.50 H	136	12.04	27.92
7	943.63	39.28	82.22	-42.94	2.00 H	289	10.80	28.48
8	1000.00	41.73	82.22	-40.49	2.00 H	73	12.95	28.78

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	39.72	50.15	82.22	-32.07	1.00 V	13	35.04	15.10
2	150.52	42.42	82.22	-39.80	1.00 V	265	28.38	14.04
3	162.18	42.58	82.22	-39.64	1.00 V	214	28.39	14.19
4	241.88	46.45	82.22	-35.77	1.00 V	220	33.16	13.28
5	484.87	43.91	82.22	-38.31	1.00 V	10	23.82	20.09
6	494.59	43.01	82.22	-39.21	1.00 V	331	22.70	20.31
7	1000.00	43.29	82.22	-38.93	1.00 V	259	14.51	28.78

NOTE:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. This is valid for all 3 channels.



A D T

FOR WCDMA BAND:

MODE	TX channel 4132	DETECTOR FUNCTION	Peak
FREQUENCY RANGE	Below 1000 MHz	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	22deg. C, 67%RH, 991hPa	TESTED BY	Match Tsui

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	39.72	39.95	82.22	-42.27	1.50 H	100	24.85	15.10
2	154.41	39.99	82.22	-42.23	1.50 H	121	25.84	14.16
3	162.18	39.58	82.22	-42.64	1.50 H	115	25.39	14.19
4	206.89	41.94	82.22	-40.28	2.00 H	172	31.01	10.93
5	241.88	42.36	82.22	-39.86	1.50 H	187	29.08	13.28
6	900.86	40.28	82.22	-41.94	1.50 H	136	12.36	27.92
7	998.06	40.00	82.22	-42.22	2.00 H	298	11.23	28.77

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	39.72	50.15	82.22	-32.07	1.00 V	355	35.04	15.10
2	150.52	42.35	82.22	-39.87	1.00 V	253	28.31	14.04
3	166.07	42.76	82.22	-39.46	1.00 V	253	28.81	13.95
4	241.88	46.42	82.22	-35.80	1.00 V	226	33.13	13.28
5	484.87	43.53	82.22	-38.69	1.00 V	10	23.44	20.09
6	1000.00	44.55	82.22	-37.67	1.00 V	103	15.77	28.78

NOTE:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. This is valid for all 3 channels.

4.7 RADIATED EMISSION MEASUREMENT (ABOVE 1GHz)

4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 22.917 (a), On any frequency outside a licensee's frequency block within GSM spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. The emission limit equal to -13dBm .

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	100033	Jun. 30, 2008	Jun. 29, 2009
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Apr. 22, 2008	Apr. 21, 2009
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	May 02, 2008	May 01, 2009
HORN Antenna SCHWARZBECK	9120D	9120D-209	Jun. 24, 2008	Jun. 23, 2009
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 25, 2008	Dec. 24, 2009
Preamplifier Agilent	8447D	2944A10633	Nov. 03, 2008	Nov. 02, 2009
Preamplifier Agilent	8449B	3008A01964	Oct. 23, 2008	Oct. 22, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	238141/4	May 20, 2008	May 19, 2009
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	May 20, 2008	May 19, 2009
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100.	TT93021703	NA	NA
Turn Table Controller ADT.	SC100.	SC93021703	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 3.
 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 988962.
 5. The IC Site Registration No. is IC 7450F-3.

4.7.3 TEST PROCEDURES

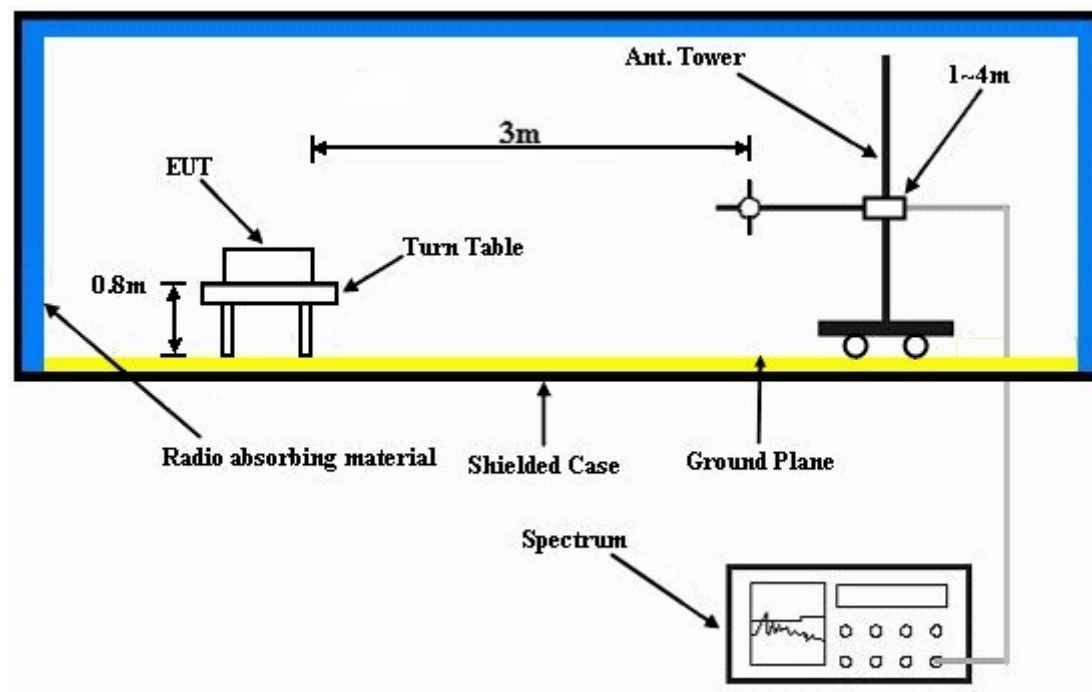
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.
- c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
- d. The EUT is replaced by a horn antenna connected to a signal generator tuned to the frequency of emission.
- e. The signal generator level has to be adjusted to have the same emission nature.
- f. The radiated power can be calculated via the factor and antenna gain.
- g. Repeat step a ~ f for horizontal polarization.

NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



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

4.7.6 EUT OPERATING CONDITIONS

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



4.7.7 TEST RESULTS

FOR GSM BAND:

MODE	TX channel 128	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa
TESTED BY	Brad Wu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1648.40	51.20	-13.00	-53.70	10.12	-43.58
2	2472.60	50.21	-13.00	-56.14	11.49	-44.65
3	3296.80	44.75	-13.00	-62.37	12.50	-49.87

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1648.40	53.65	-13.00	-51.30	10.12	-41.18
2	2472.60	45.71	-13.00	-60.52	11.49	-49.03
3	3296.80	44.88	-13.00	-62.39	12.50	-49.89

NOTE: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).



A D T

MODE	TX channel 190	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa
TESTED BY	Brad Wu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1673.20	51.40	-13.00	-53.58	10.12	-43.46
2	2509.80	50.32	-13.00	-55.88	11.49	-44.39
3	3346.40	44.61	-13.00	-62.61	12.50	-50.11

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1673.20	54.37	-13.00	-50.39	10.12	-40.27
2	2509.80	50.82	-13.00	-55.24	11.49	-43.75
3	3346.40	46.57	-13.00	-60.87	12.50	-48.37

NOTE: Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



A D T

MODE	TX channel 251	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa
TESTED BY	Brad Wu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1697.60	52.98	-13.00	-52.01	10.17	-41.84
2	2546.40	51.36	-13.00	-54.84	11.49	-43.35
3	3395.20	45.33	-13.00	-62.12	12.56	-49.56

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1697.60	55.63	-13.00	-49.30	10.17	-39.13
2	2546.40	50.79	-13.00	-55.54	11.49	-44.05
3	3395.20	45.59	-13.00	-61.74	12.56	-49.18

NOTE: Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



A D T

FOR WCDMA BAND:

MODE	TX channel 4132	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa
TESTED BY	Brad Wu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1652.80	40.88	-13.00	-63.94	10.12	-53.82
2	2479.20	41.45	-13.00	-64.65	11.49	-53.16
3	3305.60	44.91	-13.00	-62.23	12.50	-49.73

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1652.80	41.08	-13.00	-63.89	10.12	-53.77
2	2479.20	44.05	-13.00	-61.92	11.49	-50.43
3	3305.60	45.00	-13.00	-61.93	12.50	-49.43

NOTE: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).



A D T

MODE	TX channel 4182	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa
TESTED BY	Brad Wu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1672.80	43.06	-13.00	-61.60	10.12	-51.48
2	2509.20	43.21	-13.00	-62.70	11.49	-51.21
3	3345.60	44.40	-13.00	-62.66	12.50	-50.16

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1672.80	42.68	-13.00	-62.07	10.12	-51.95
2	2509.20	43.69	-13.00	-62.31	11.49	-50.82
3	3345.60	44.70	-13.00	-62.28	12.50	-49.89

NOTE: Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



A D T

MODE	TX channel 4233	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	18deg. C, 66%RH, 991hPa
TESTED BY	Brad Wu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1693.20	43.05	-13.00	-61.79	10.17	-51.62
2	2539.80	41.80	-13.00	-64.52	11.49	-53.03
3	3386.40	45.09	-13.00	-62.22	12.56	-49.66

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1693.20	42.43	-13.00	-62.55	10.17	-52.38
2	2539.80	42.72	-13.00	-63.56	11.49	-52.07
3	3386.40	44.53	-13.00	-62.69	12.56	-50.13

NOTE: Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



A D T

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 by the following approval agencies according to ISO/IEC 17025.

USA	FCC, NVLAP
GERMANY	TUV Rheinland
JAPAN	VCCI
NORWAY	NEMKO
CANADA	INDUSTRY CANADA , CSA
R.O.C.	TAF, BSMI, NCC
NETHERLANDS	Telefication
SINGAPORE	GOST-ASIA (MOU)
RUSSIA	CERTIS (MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.
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:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

Web Site: www.adt.com.tw

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



A D T

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---