FCC Test Report
(Part 22)

Report No.: RF170427C12

FCC ID: UZ7TC25AJ

Test Model: TC25AJ

Received Date: Apr. 27, 2017

Test Date: May 15 ~ Oct. 23, 2017

Issued Date: Oct. 24, 2017

Applicant: Zebra Technologies Corporation

Address: 1 Zebra Plaza Holtsville New York United States 11742

Manufacturer: Zebra Technologies Corporation

Address: 1 Zebra Plaza Holtsville New York United States 11742

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

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Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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Release Control Record

Issue No.	Description	Date Issued
RF170427C12	Original release	Oct. 24, 2017

1 Certificate of Conformity

Product: Touch Computer

Brand: ZEBRA

Test Model: TC25AJ

Sample Status: Engineering sample

Applicant: Zebra Technologies Corporation

Test Date: May 15 ~ Oct. 23, 2017

Standards: FCC Part 22, Subpart H

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

Prepared by : _____ , **Date:** Oct. 24, 2017

Polly Chien / Specialist

Approved by : _____ , **Date:** Oct. 24, 2017

Dylan Chiou / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 22 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 22.913 (a)	Effective radiated power	Pass	Meet the requirement of limit.
2.1047	Modulation characteristics	Pass	Meet the requirement
---	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1055 22.355	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
22.917	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 22.917	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -12.7dB 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	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.63 dB
	200MHz ~1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 24, 2016	Oct. 23, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Aug. 16, 2016	Aug. 15, 2017
			Aug. 18, 2017	Aug. 17, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Dec. 28, 2016	Dec. 27, 2017
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Dec. 15, 2016	Dec. 14, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 14, 2016	Dec. 13, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
			Aug. 10, 2017	Aug. 09, 2018
Preamplifier Agilent	8447D	2944A10738	Aug. 22, 2016	Aug. 21, 2017
			Aug. 21, 2017	Aug. 20, 2018
Preamplifier Agilent	8449B	3008A01922	Sep. 18, 2016	Sep. 17, 2017
			Sep. 15, 2017	Sep. 14, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 09, 2016	Aug. 08, 2017
			Aug. 08, 2017	Aug. 07, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Aug. 09, 2016	Aug. 08, 2017
			Aug. 08, 2017	Aug. 07, 2018
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 08, 2016	Jun. 07, 2017
			Jun. 07, 2017	Jun. 06, 2018
JFW 20dB attenuation	50HF-020-SMA	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 4.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
5. The IC Site Registration No. is IC7450F-4.

3 General Information

3.1 General Description of EUT

Product	Touch Computer	
Brand	ZEBRA	
Test Model	TC25AJ	
Sample Status	Engineering sample	
MFD	11JUL17	
HW Version	DV	
SW Version	90-06-05-N-00-E1	
Power Supply Rating	5Vdc (adapter or host equipment) 12 or 24Vdc (vehicle cigarette adaptor) 3.85Vdc (battery or power pack)	
Modulation Type	GSM, GPRS: GMSK EDGE: 8PSK WCDMA: BPSK, QPSK HSDPA: BPSK HSUPA: QPSK LTE: QPSK, 16QAM	
Operating Frequency	GSM, EDGE	824.2MHz ~ 848.8MHz
	WCDMA Band 5	826.4MHz ~ 846.6MHz
	LTE Band 5 (Channel Bandwidth 1.4MHz)	824.7MHz ~ 848.3MHz
	LTE Band 5 (Channel Bandwidth 3MHz)	825.5MHz ~ 847.5MHz
	LTE Band 5 (Channel Bandwidth 5MHz)	826.5MHz ~ 846.5MHz
	LTE Band 5 (Channel Bandwidth 10MHz)	829.0MHz ~ 844.0MHz
Max. ERP Power	GPRS	1807.174mW (32.57dBm)
	EDGE	409.261mW (26.12dBm)
	WCDMA Band 5	216.770mW (23.36dBm)
	LTE Band 5 (Channel Bandwidth 1.4MHz)	183.231mW (22.63dBm)
	LTE Band 5 (Channel Bandwidth 3MHz)	185.353mW (22.68dBm)
	LTE Band 5 (Channel Bandwidth 5MHz)	187.499mW (22.73dBm)
	LTE Band 5 (Channel Bandwidth 10MHz)	189.671mW (22.78dBm)
Antenna Connector	Refer to Note	
Antenna Connector	Refer to Note	
Accessory Device	Adapter, Gun Handle, Arm Mount, Holster , Vehicle Cigarette Adaptor, Power pack (Refer to note 3 for more details)	
Data Cable Supplied	1.5m shielded USB Type C to Type A cable without core (Refer to note 3 for more details)	

Note:

1. The EUT has two types for sale.

Brand	Model	Difference
ZEBRA	TC25AJ	Scanner SE4710 with camera
	TC25AJ	Scanner SE2100 without camera

2. The EUT consumes power from the following adapter, Vehicle Cigarette Adaptor, battery and power pack.

Adapter	
Brand	ZEBRA
Model	SAWA-65-20005A
Input Power	100-240Vac, 0.5A, 50-60Hz
Output Power	5Vdc, 2.5A

Vehicle Cigarette Adaptor	
Brand	ZEBRA
Model	SAWA-68-25005A
Input Power	12-24V(3.5A)
Output Power	5V(2.5A)

Battery	
Brand	ZEBRA
Model	BT-000334
Rate capacity	3000mAh
Min capacity	2800mAh
Rate Voltage	3.85Vdc

Power Pack	
Brand	ZEBRA
Model	BT-000343
Rate capacity	2900mAh
Min capacity	2800mAh
Rate Voltage	3.85Vdc

3. Accessory devices of EUT are list as below:

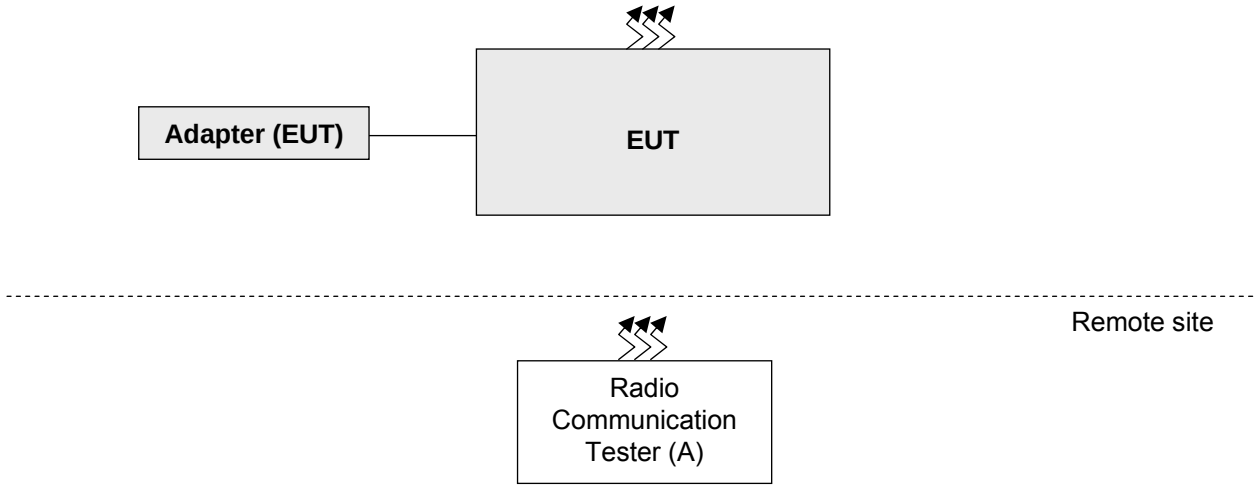
Specification of Accessory		
AC Adapter	Brand Name	ZEBRA
	Model Name	SAWA-65-20005A
USB Type C cable	Brand Name	ZEBRA
	P/N Number	CBL-MPM-USB1-01
Gun Handle	Brand Name	ZEBRA
	P/N Number	TRG-TC2X-SNP1-01
Arm Mount	Brand Name	ZEBRA
	P/N Number	SG-TC2X-ARMNT-01
Holster	Brand Name	ZEBRA
	P/N Number	SG-TC2X-HLSTR1-01
Vehicle Cigarette Adaptor	Brand Name	ZEBRA
	Model Name	SAWA-68-25005A
Power pack	Brand Name	ZEBRA
	Model Name	BT-000343

4. The EUT uses following antennas.

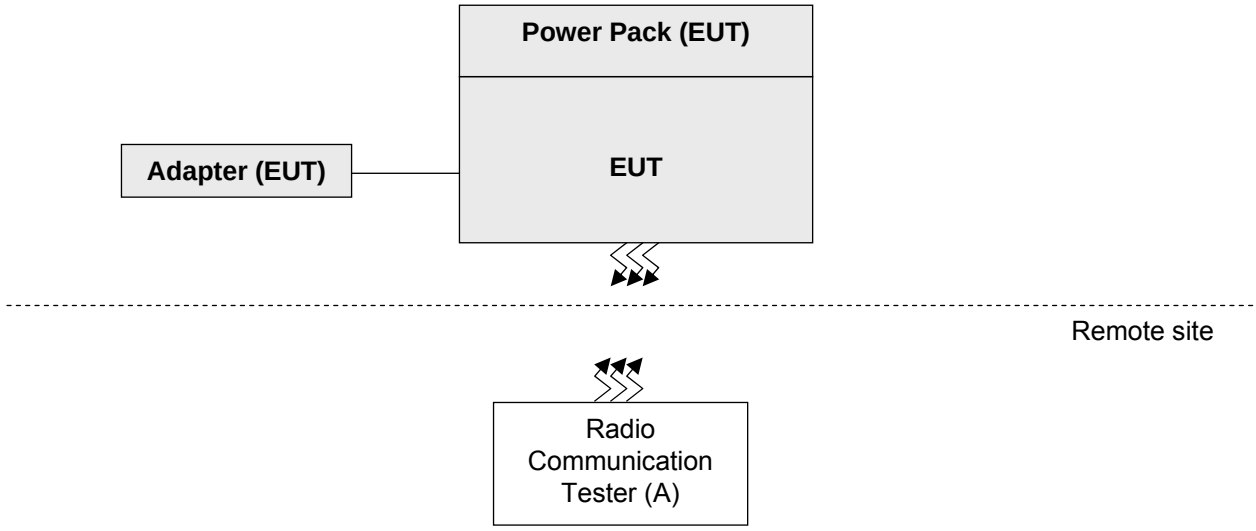
Type	Connector	Gain (dBi)		
		824 MHz	836 MHz	849 MHz
PIFA	NA	0.94	1.1	1.53

3.2 Configuration of System under Test

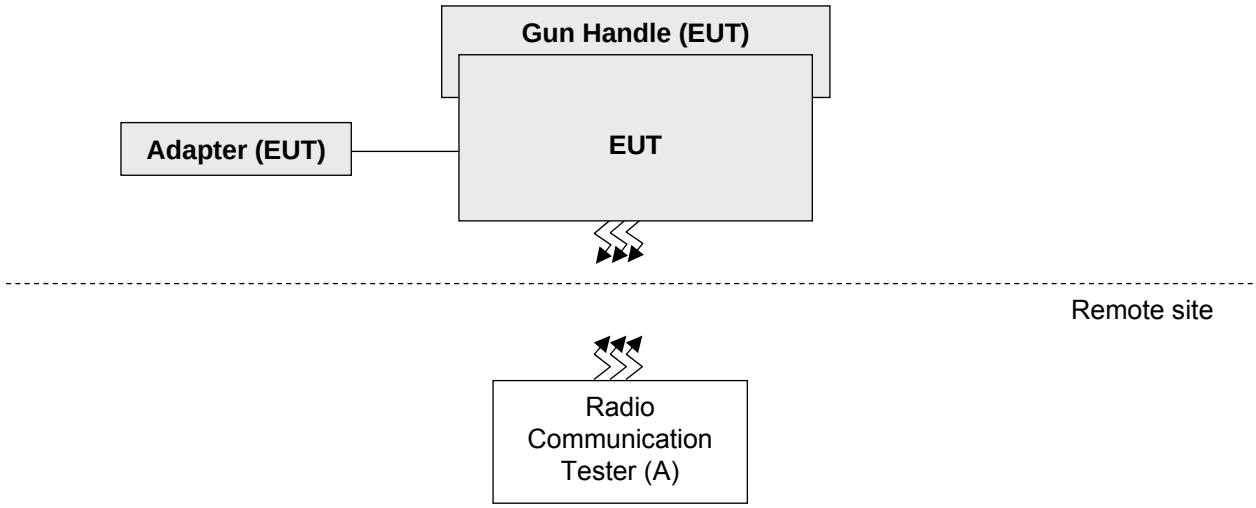
Mode A, E



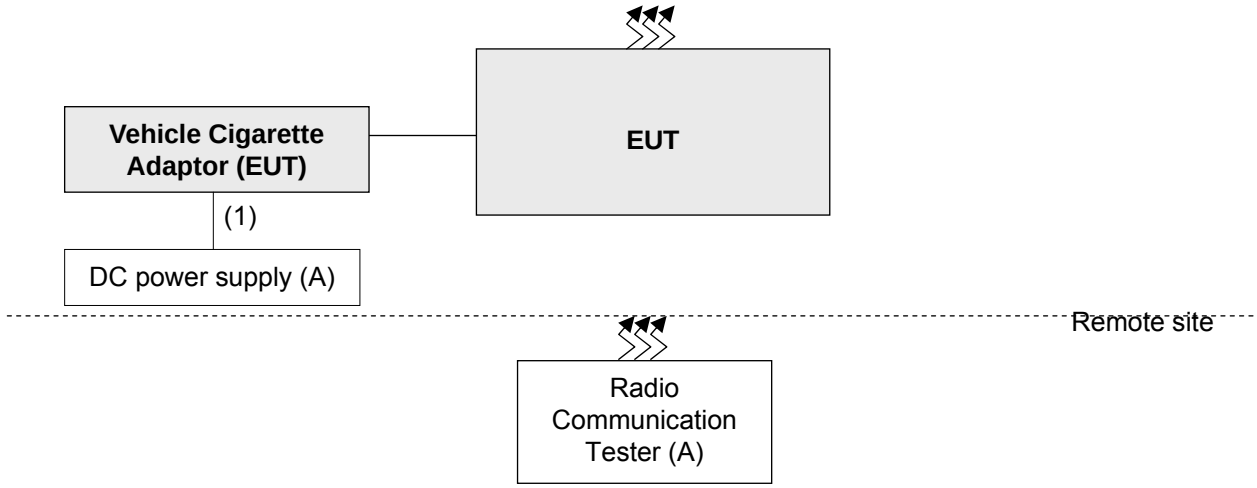
Mode B



Mode C



Mode D



3.2.1 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Radio Communication Tester	R&S	CMU200	123112	NA	-
B.	DC power supply	Keysight	U8002A	MY56330015	NA	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	1.0	N	0	-

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned on Y-plane. Following channel(s) was (were) selected for the final test as listed below:

Test results are presented in the report as below.

Test Mode	Test Condition
A	Scanner SE4710, EUT+USB cable+adapter
B	Scanner SE4710, EUT+USB cable+adapter+power pack
C	Scanner SE4710, EUT+USB cable+adapter+Gun Handle
D	Scanner SE4710, EUT+USB cable+Vehicle Cigarette Adaptor
E	Scanner SE2100, EUT+USB cable+adapter

GPRS Mode

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
A	ERP	128 to 251	128(824.2MHz), 189(836.4MHz), 251(848.8MHz)	GPRS, EDGE
A	Modulation Characteristics	128 to 251	189(836.4MHz)	GSM, GPRS, EDGE
A	Frequency Stability	128 to 251	189(836.4MHz)	GPRS
A	Occupied Bandwidth	128 to 251	128(824.2MHz), 189(836.4MHz), 251(848.8MHz)	GSM, GPRS, EDGE
A	Band Edge	128 to 251	128(824.2MHz), 251(848.8MHz)	GSM, GPRS, EDGE
A	Peak To Average Ratio	128 to 251	128(824.2MHz), 189(836.4MHz), 251(848.8MHz)	GSM, GPRS, EDGE
A	Conducted Emission	128 to 251	128(824.2MHz), 189(836.4MHz), 251(848.8MHz)	GSM, GPRS, EDGE
A, B, C, D, E	Radiated Emission Below 1GHz	128 to 251	128(824.2MHz)	GPRS, EDGE
A	Radiated Emission Above 1GHz	128 to 251	128(824.2MHz), 189(836.4MHz), 251(848.8MHz)	GPRS

WCDMA Mode

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
A	ERP	4132 to 4233	4132(826.4MHz), 4182(836.6MHz), 4233(846.6MHz)	WCDMA
A	Modulation Characteristics	4132 to 4233	4132(836.4MHz)	WCDMA, HSDPA, HSUPA
A	Frequency Stability	4132 to 4233	4182(836.6MHz)	WCDMA
A	Occupied Bandwidth	4132 to 4233	4132(826.4MHz), 4182(836.6MHz), 4233(846.6MHz)	WCDMA, HSDPA, HSUPA
A	Band Edge	4132 to 4233	4132(826.4MHz) 4233(846.6MHz)	WCDMA, HSDPA, HSUPA
A	Peak To Average Ratio	4132 to 4233	4132(826.4MHz), 4182(836.6MHz), 4233(846.6MHz)	WCDMA, HSDPA, HSUPA
A	Conducted Emission	4132 to 4233	4132(826.4MHz), 4182(836.6MHz), 4233(846.6MHz)	WCDMA, HSDPA, HSUPA
A, B, C, D, E	Radiated Emission Below 1GHz	4132 to 4233	4132(826.4MHz)	WCDMA
A	Radiated Emission Above 1GHz	4132 to 4233	4132(826.4MHz), 4182(836.6MHz), 4233(846.6MHz)	WCDMA

LTE Band 5

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
A	ERP	20407 to 20643	20407(824.7MHz), 20525(836.5MHz), 20643(848.3MHz)	1.4MHz	QPSK	1 RB / 5 RB Offset
		20415 to 20635	20415(825.5MHz), 20525(836.5MHz), 20635(847.5MHz)	3MHz	QPSK	1 RB / 14 RB Offset
		20425 to 20625	20425(826.5MHz), 20525(836.5MHz), 20625(846.5MHz)	5MHz	QPSK	1 RB / 24 RB Offset
		20450 to 20600	20450(829.0MHz), 20525(836.5MHz), 20600(844.0MHz)	10MHz	QPSK	1 RB / 49 RB Offset
A	Modulation characteristics	20450 to 20600	20525(836.5MHz),	10MHz	QPSK / 16QAM	1 RB / 49 RB Offset
A	Frequency Stability	20407 to 20643	20525(836.5MHz)	1.4MHz	QPSK	1 RB / 5 RB Offset
A	Occupied Bandwidth	20407 to 20643	20407(824.7MHz), 20525(836.5MHz), 20643(848.3MHz)	1.4MHz	QPSK / 16QAM	5 RB / 0RB Offset
		20415 to 20635	20415(825.5MHz), 20525(836.5MHz), 20635(847.5MHz)	3MHz	QPSK / 16QAM	14 RB / 0RB Offset
		20425 to 20625	20425(826.5MHz), 20525(836.5MHz), 20625(846.5MHz)	5MHz	QPSK / 16QAM	24RB / 0RB Offset
		20450 to 20600	20450(829.0MHz), 20525(836.5MHz), 20600(844.0MHz)	10MHz	QPSK / 16QAM	49RB / 0RB Offset
A	Band Edge	20407 to 20643	20407(824.7MHz), 20643(848.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset 1 RB / 5 RB Offset 6 RB / 0 RB Offset
		20415 to 20635	20415(825.5MHz), 20635(847.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset 1 RB / 14 RB Offset 15 RB / 0 RB Offset
		20425 to 20625	20425(826.5MHz), 20625(846.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		20450 to 20600	20450(829.0MHz), 20600(844.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
A	Peak to Average Ratio	20407 to 20643	20407(824.7MHz), 20525(836.5MHz), 20643(848.3MHz)	1.4MHz	QPSK / 16QAM	1 RB / 5 RB Offset
		20415 to 20635	20415(825.5MHz), 20525(836.5MHz), 20635(847.5MHz)	3MHz	QPSK / 16QAM	1 RB / 14 RB Offset
		20425 to 20625	20425(826.5MHz), 20525(836.5MHz), 20625(846.5MHz)	5MHz	QPSK / 16QAM	1 RB / 24 RB Offset
		20450 to 20600	20450(829.0MHz), 20525(836.5MHz), 20600(844.0MHz)	10MHz	QPSK / 16QAM	1 RB / 49 RB Offset

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
A	Conducted Emission	20407 to 20643	20407(824.7MHz), 20525(836.5MHz), 20643(848.3MHz)	1.4MHz	QPSK	1 RB / 5 RB Offset
		20415 to 20635	20415(825.5MHz), 20525(836.5MHz), 20635(847.5MHz)	3MHz	QPSK	1 RB / 14 RB Offset
		20425 to 20625	20425(826.5MHz), 20525(836.5MHz), 20625(846.5MHz)	5MHz	QPSK	1 RB / 24 RB Offset
		20450 to 20600	20450(829.0MHz), 20525(836.5MHz), 20600(844.0MHz)	10MHz	QPSK	1 RB / 49 RB Offset
A, B, C, D, E	Radiated Emission Below 1GHz	20407 to 20643	20407(824.7MHz)	1.4MHz	QPSK	1 RB / 5 RB Offset
A		20415 to 20635	20415(825.5MHz)	3MHz	QPSK	1 RB / 14 RB Offset
A		20425 to 20625	20425(826.5MHz)	5MHz	QPSK	1 RB / 24 RB Offset
A		20450 to 20600	20450(829.0MHz)	10MHz	QPSK	1 RB / 49 RB Offset
A	Radiated Emission Above 1GHz	20407 to 20643	20407(824.7MHz), 20525(836.5MHz), 20643(848.3MHz)	1.4MHz	QPSK	1 RB / 5 RB Offset
		20415 to 20635	20415(825.5MHz), 20525(836.5MHz), 20635(847.5MHz)	3MHz	QPSK	1 RB / 14 RB Offset
		20425 to 20625	20425(826.5MHz), 20525(836.5MHz), 20625(846.5MHz)	5MHz	QPSK	1 RB / 24 RB Offset
		20450 to 20600	20450(829.0MHz), 20525(836.5MHz), 20600(844.0MHz)	10MHz	QPSK	1 RB / 49 RB Offset

Note:

1. For radiated emission below 1GHz, low, mid and high channels were pre-tested in chamber with 1.4MHz mode. Low channel on mode A was found to be the worst case and therefore had been chosen for all final tests.
2. The conducted output power for QPSK and 16QAM, measured value of QPSK is higher than 16QAM mode. Therefore, only occupied bandwidth and Peak to average ratio items had been tested under QPSK and 16QAM modes, the other test items were performed under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Modulation characteristics	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Frequency Stability	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Occupied Bandwidth	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Band Edge	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Peak To Average Ratio	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Conducted Emission	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Radiated Emission	20deg. C, 69%RH 25deg. C, 70%RH	120Vac, 60Hz	Bayu Chen Bond Tseng Luis Lee Matthew Yang

3.4 EUT Operating Conditions

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

3.5 General Description of Applied Standards

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

FCC 47 CFR Part 2

FCC 47 CFR Part 22

KDB 971168 D01 Power Meas License Digital Systems v02r02

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

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

Note: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

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

4.1.2 Test Procedures

EIRP / ERP Measurement:

a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM, 5MHz for WCDMA mode, 10MHz for LTE mode.

b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.

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

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

Where:

$ERP/EIRP = P_{Meas} + G_T - L_C$

P_{Meas} : Measure transmitter output power.
G_T : Gain of the transmitting antenna.
L_C : signal attenuation in the connecting cable between the transmitter and antenna.

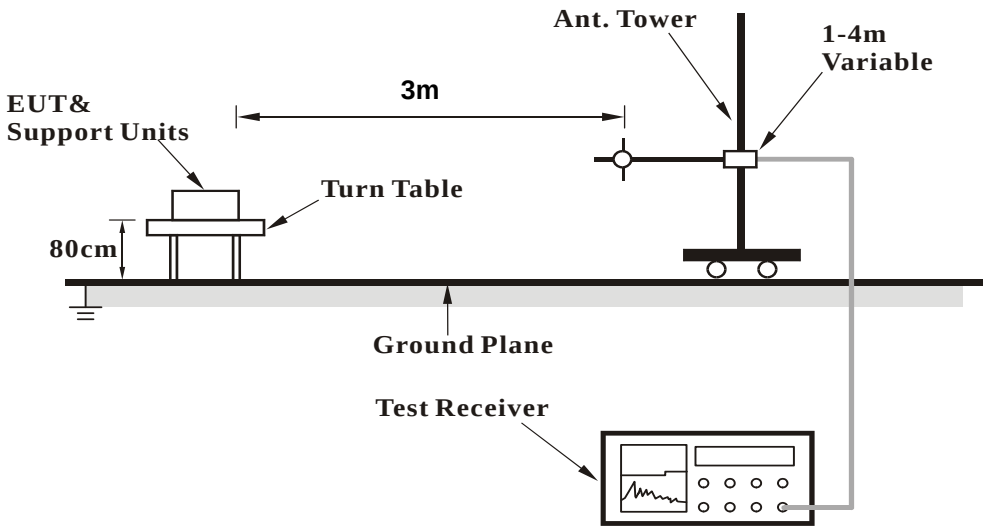
Conducted Power Measurement:

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

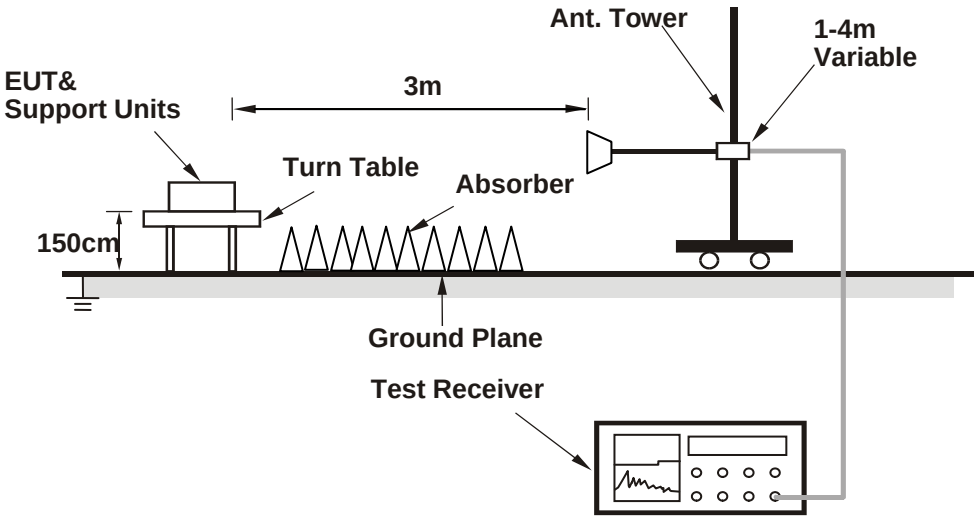
4.1.3 Test Setup

EIRP / ERP Measurement:

For Radiated Emission below or equal 1GHz



For Radiated Emission above 1GHz



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

Conducted Power Measurement:

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

4.1.4 Test Results

Conducted Output Power (dBm)

Band	GSM850		
Channel	128	189	251
Frequency	824.2	836.4	848.8
GSM	32.21	32.73	33.15
GPRS 8	32.24	32.77	**33.19**
GPRS 10	31.72	31.88	31.96
GPRS 11	28.26	28.73	28.96
GPRS 12	26.50	26.92	26.99
EDGE 8 (MCS9)	26.69	26.64	**26.74**
EDGE 10 (MCS9)	26.39	26.52	26.57
EDGE 11 (MCS9)	24.90	24.92	25.03
EDGE 12 (MCS9)	23.79	23.87	23.90

Band	WCDMA V		
Channel	4132	4182	4233
Frequency	826.4	836.6	846.6
RMC 12.2K	23.65	23.95	**23.98**
HSDPA Subtest-1	22.43	22.73	23.39
HSDPA Subtest-2	22.53	22.83	**23.49**
HSDPA Subtest-3	22.02	22.32	22.98
HSDPA Subtest-4	22.02	22.32	22.98
HSUPA Subtest-1	22.48	22.78	23.44
HSUPA Subtest-2	21.46	21.76	22.42
HSUPA Subtest-3	21.03	21.33	21.99
HSUPA Subtest-4	22.10	22.24	22.90
HSUPA Subtest-5	22.50	22.80	**23.46**

Conducted Output Power (dBm)

Band / BW	RB Size	RB Offset	QPSK			16QAM		
			CH 20407	CH 20525	CH 20643	CH 20407	CH 20525	CH 20643
			824.7 MHz	836.5 MHz	848.3 MHz	824.7 MHz	836.5 MHz	848.3 MHz
5 / 1.4MHz	1	0	22.87	22.96	22.72	21.87	21.95	21.72
	1	2	23.19	**23.25**	23.03	22.21	**22.30**	22.10
	1	5	22.93	23.07	22.72	21.99	22.08	21.82
	3	0	22.74	22.97	22.66	21.85	21.98	21.65
	3	1	22.99	**23.07**	22.79	21.98	**22.08**	21.80
	3	3	22.92	23.02	22.70	21.89	22.01	21.68
	6	0	21.90	**22.05**	21.74	20.89	**21.04**	20.69

Band / BW	RB Size	RB Offset	QPSK			16QAM		
			CH 20415	CH 20525	CH 20635	CH 20415	CH 20525	CH 20635
			825.5 MHz	836.5 MHz	847.5 MHz	825.5 MHz	836.5 MHz	847.5 MHz
5 / 3MHz	1	0	22.93	23.01	22.77	21.99	22.09	21.83
	1	7	23.22	**23.30**	23.06	22.28	**22.35**	22.05
	1	14	22.98	23.10	22.83	22.09	22.17	21.90
	8	0	22.02	22.15	21.93	21.07	21.20	20.90
	8	3	22.16	**22.23**	22.07	21.20	**21.30**	21.02
	8	7	22.09	22.18	21.93	21.09	21.24	20.90
	15	0	21.98	**22.13**	21.88	20.99	**21.15**	20.83

Band / BW	RB Size	RB Offset	QPSK			16QAM		
			CH 20425	CH 20525	CH 20625	CH 20425	CH 20525	CH 20625
			826.5 MHz	836.5 MHz	846.5 MHz	826.5 MHz	836.5 MHz	846.5 MHz
5 / 5MHz	1	0	23.03	23.09	22.88	22.05	22.11	21.91
	1	12	23.29	**23.35**	23.12	22.32	**22.39**	22.18
	1	24	23.09	23.18	22.93	22.13	22.21	21.93
	12	0	22.16	22.27	22.06	21.17	21.26	21.02
	12	6	22.26	**22.35**	22.12	21.27	**21.38**	21.11
	12	13	22.21	22.30	22.06	21.20	21.32	21.04
	25	0	22.13	**22.26**	22.04	21.09	**21.24**	20.98

Band / BW	RB Size	RB Offset	QPSK			16QAM		
			CH 20450	CH 20525	CH 20600	CH 20450	CH 20525	CH 20600
			829.0 MHz	836.5 MHz	844.0 MHz	829.0 MHz	836.5 MHz	844.0 MHz
5 / 10MHz	1	0	23.10	23.16	22.97	22.12	22.19	21.98
	1	24	23.32	**23.40**	23.20	22.36	**22.45**	22.16
	1	49	23.17	23.24	23.04	22.17	22.27	22.09
	25	0	22.26	22.38	22.21	21.30	21.37	21.18
	25	12	22.38	**22.45**	22.30	21.41	**21.46**	21.22
	25	25	22.33	22.40	22.22	21.33	21.39	21.17
	50	0	22.25	**22.37**	22.19	21.26	**21.36**	21.14

ERP Power
GPRS Mode

MODE	TX channel 128						
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	824.20	0.16	27.70	3.92	31.62	38.45	-6.83
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	824.20	-4.04	24.30	3.92	28.22	38.45	-10.23

MODE	TX channel 189						
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	836.40	0.88	28.36	3.79	32.15	38.45	-6.30
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	836.40	-3.19	24.88	3.79	28.67	38.45	-9.78

MODE	TX channel 251						
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	848.80	1.54	29.15	3.42	**32.57**	38.45	-5.88
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	848.80	-2.83	25.18	3.42	28.60	38.45	-9.85

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

EDGE Mode

MODE	TX channel 128						
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	824.20	-5.39	22.15	3.92	26.07	38.45	-12.38
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	824.20	-9.69	18.65	3.92	22.57	38.45	-15.88

MODE	TX channel 189						
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	836.40	-5.25	22.23	3.79	26.02	38.45	-12.43
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	836.40	-9.00	19.07	3.79	22.86	38.45	-15.59

MODE	TX channel 251						
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	848.80	-4.91	22.70	3.42	**26.12**	38.45	-12.33
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	848.80	-8.48	19.53	3.42	22.95	38.45	-15.50

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

WCDMA Mode

MODE	TX channel 4132						
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	826.40	-8.58	19.52	3.51	23.03	38.45	-15.42
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	826.40	-13.74	14.55	3.92	18.47	38.45	-19.98

MODE	TX channel 4182						
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	836.40	-7.94	19.54	3.79	23.33	38.45	-15.12
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	836.40	-13.14	14.93	3.79	18.72	38.45	-19.73

MODE	TX channel 4233						
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	846.60	-7.56	19.91	3.45	**23.36**	38.45	-15.09
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	846.60	-12.37	15.70	3.45	19.15	38.45	-19.30

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

LTE Band 5, Channel Bandwidth: 1.4MHz

MODE		TX channel 20407					
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	824.70	-9.31	18.23	3.92	22.15	38.45	-16.30
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	824.70	-9.68	18.65	3.92	22.57	38.45	-15.88

MODE		TX channel 20525					
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	836.50	-9.33	18.15	3.79	21.94	38.45	-16.51
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	836.50	-9.23	18.84	3.79	**22.63**	38.45	-15.82

MODE		TX channel 20643					
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	848.30	-8.81	18.77	3.46	22.23	38.45	-16.22
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	848.30	-9.07	18.95	3.46	22.41	38.45	-16.04

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

LTE Band 5, Channel Bandwidth: 3MHz

MODE		TX channel 20415					
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	825.50	-9.37	18.17	3.92	22.09	38.45	-16.36
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	825.50	-9.63	18.68	3.92	22.60	38.45	-15.85

MODE		TX channel 20525					
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	836.50	-9.36	18.12	3.79	21.91	38.45	-16.54
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	836.50	-9.18	18.89	3.79	**22.68**	38.45	-15.77

MODE		TX channel 20635					
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	847.50	-9.51	18.02	3.47	21.49	38.45	-16.96
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	847.50	-9.17	18.46	3.98	22.44	38.45	-16.01

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

LTE Band 5, Channel Bandwidth: 5MHz

MODE	TX channel 20425						
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	826.50	-9.11	18.43	3.92	22.35	38.45	-16.10
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	826.50	-9.54	18.75	3.92	22.67	38.45	-15.78

MODE	TX channel 20525						
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	836.50	-9.53	17.95	3.79	21.74	38.45	-16.71
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	836.50	-9.13	18.94	3.79	**22.73**	38.45	-15.72

MODE	TX channel 20625						
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	846.50	-9.32	18.15	3.44	21.59	38.45	-16.86
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	846.50	-9.02	19.06	3.44	22.5	38.45	-15.95

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

LTE Band 5, Channel Bandwidth: 10MHz

MODE	TX channel 20450						
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	829.00	-9.69	17.90	3.92	21.82	38.45	-16.63
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	829.00	-9.43	18.78	3.92	22.70	38.45	-15.75

MODE	TX channel 20525						
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	836.50	-9.47	18.01	3.79	21.80	38.45	-16.65
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	836.50	-9.08	18.99	3.79	**22.78**	38.45	-15.67

MODE	TX channel 20600						
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	844.00	-9.32	18.25	3.69	21.94	38.45	-16.51
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	844.00	-9.43	18.89	3.69	22.58	38.45	-15.87

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

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

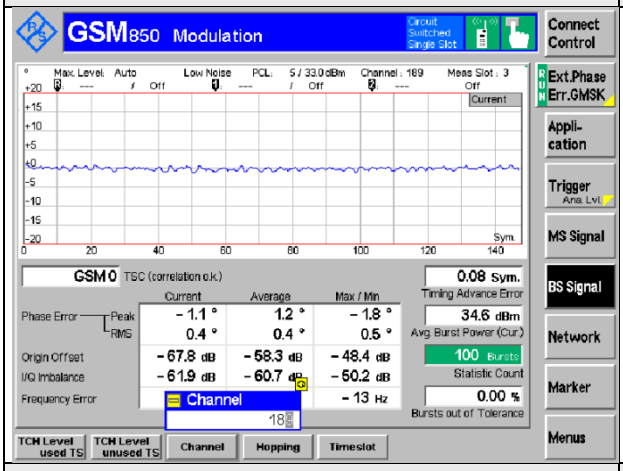
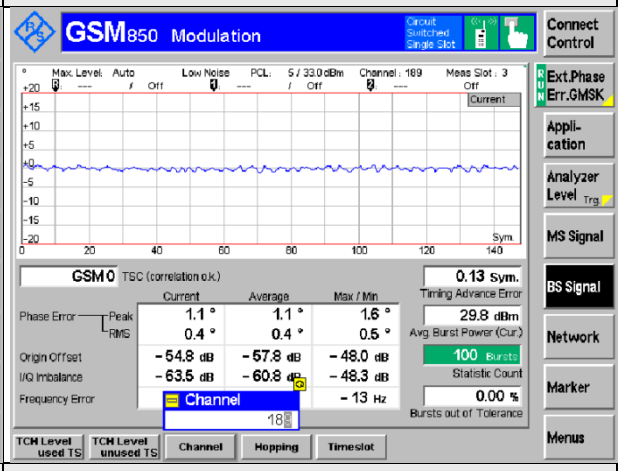
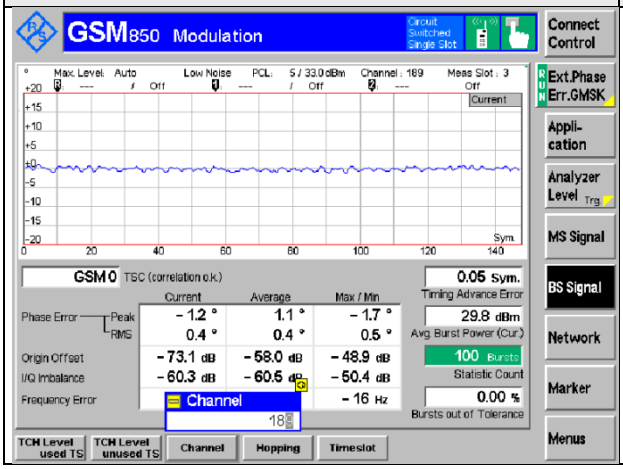
N/A

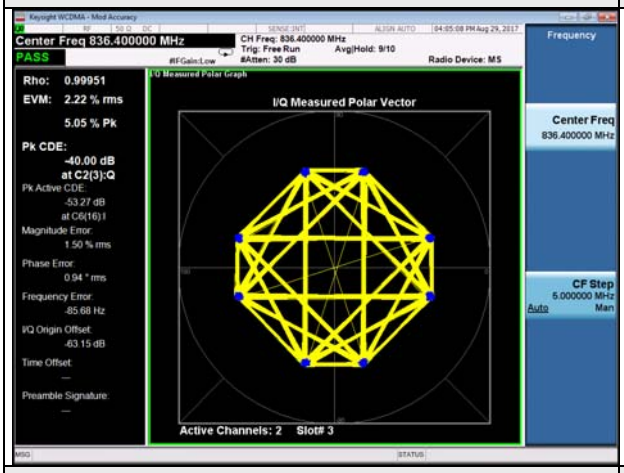
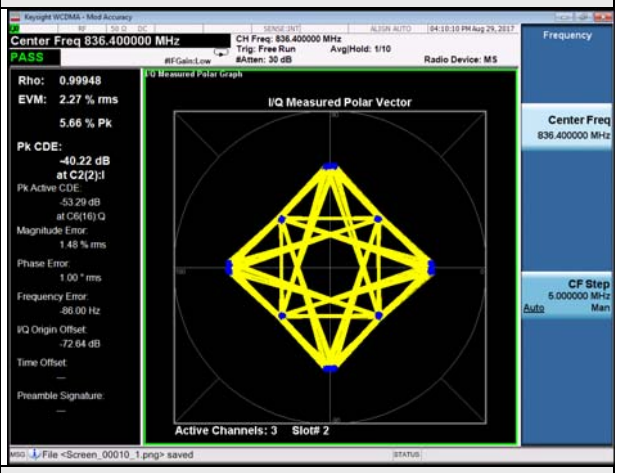
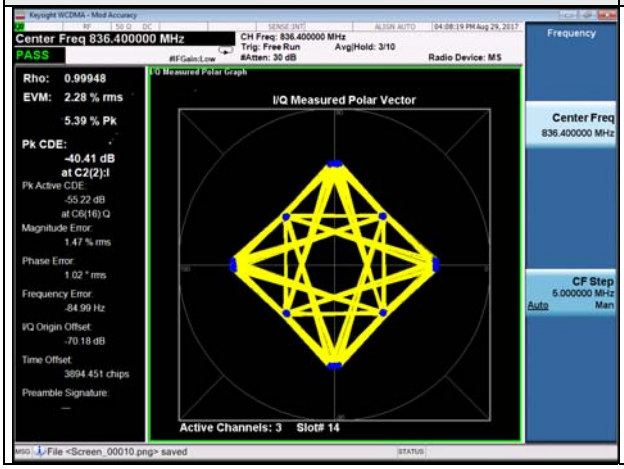
4.2.2 Test Procedure

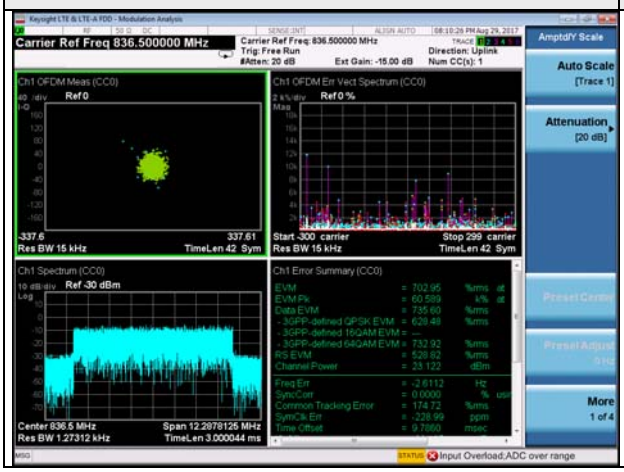
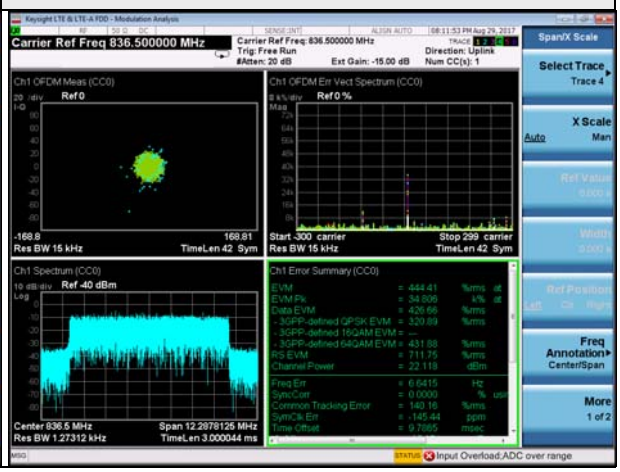
Connect the EUT to Communication Simulator via the antenna connector, The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.2.3 Test Setup

4.2.4 Test Results

GSM	
Spectrum Plot of Measurement Value	
Channel: 189 / Frequency (MHz): 836.4MHz	
GSM	GPRS
	
EDGE	
	

WCDMA Band 5	
Spectrum Plot of Measurement Value	
Channel: 4132 / Frequency (MHz): 836.4MHz	
WCDMA	HSDPA
	
HSUPA	
	

LTE Band 5	
Spectrum Plot of Measurement Value	
Channel: 20525 / Frequency (MHz): 836.5MHz	
Channel Bandwidth: 10MHz / QPSK	Channel Bandwidth: 10MHz / 16QAM
	

4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stabiliity Measurement

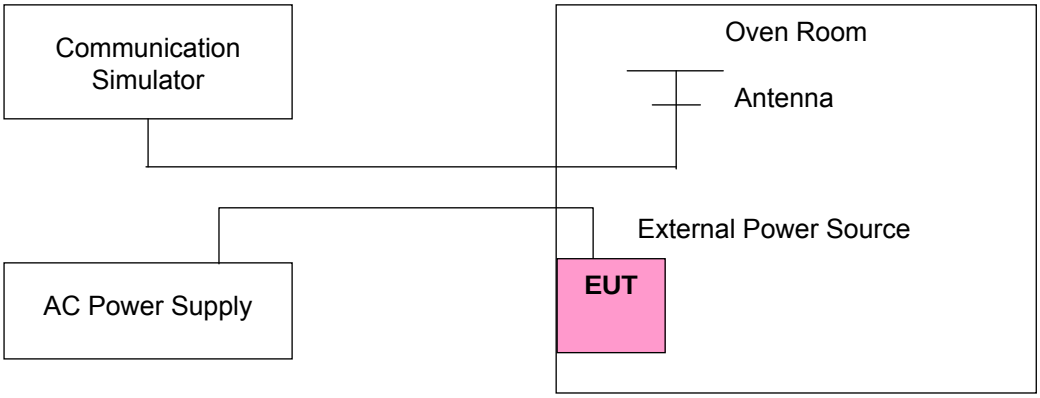
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.3.2 Test Procedure

a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
b. EUT is connected the external power supply to control the AC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5 ℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

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

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (ppm)			Limit (ppm)
	GSM	WCDMA Band 5	LTE Band 5	
138	-0.010	-0.008	-0.013	2.5
120	-0.009	-0.008	-0.012	2.5
102	-0.010	-0.008	-0.011	2.5

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature.

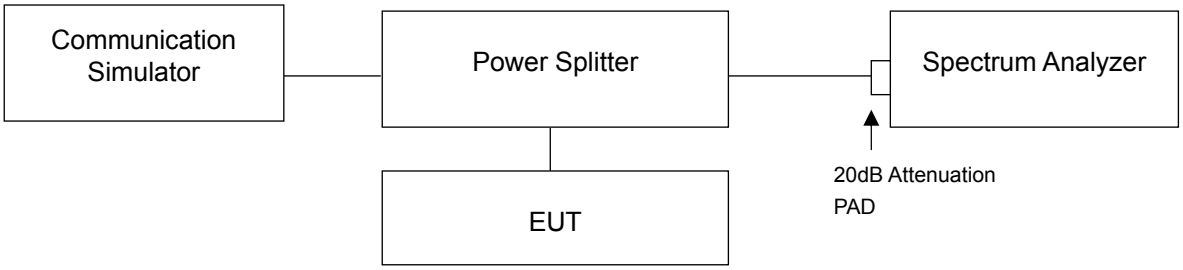
Temp. (℃)	Frequency Error (ppm)			Limit (ppm)
	GSM	WCDMA Band 5	LTE Band 5	
50	-0.012	-0.010	-0.014	2.5
40	-0.012	-0.010	-0.014	2.5
30	-0.010	-0.009	-0.012	2.5
20	-0.009	-0.008	-0.012	2.5
10	-0.011	-0.010	-0.013	2.5
0	-0.014	-0.012	-0.015	2.5
-10	-0.015	-0.014	-0.016	2.5
-20	-0.015	-0.016	-0.018	2.5
-30	-0.016	-0.017	-0.019	2.5

4.4 Occupied Bandwidth Measurement

4.4.1 Test Procedure

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

4.4.2 Test Setup

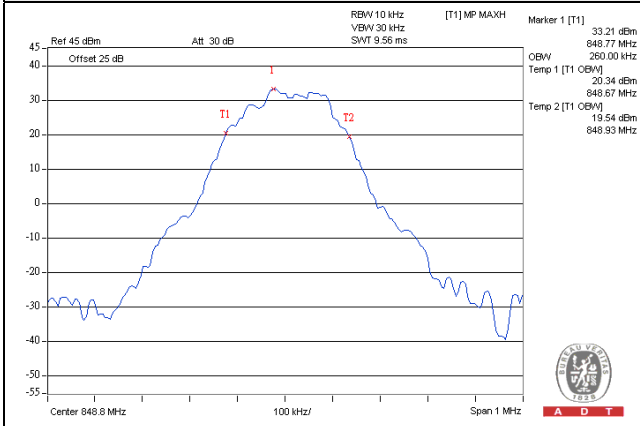


4.4.3 Test Result

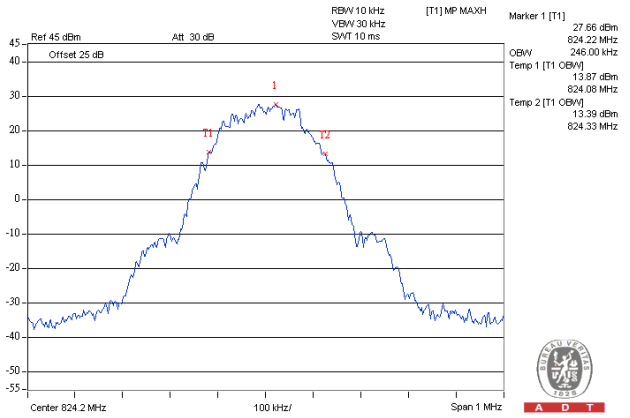
Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)		
		GSM	GPRS	EDGE
128	824.2	250	246	242
189	836.4	240	246	246
251	848.8	260	246	244

Spectrum Plot of Worst Value

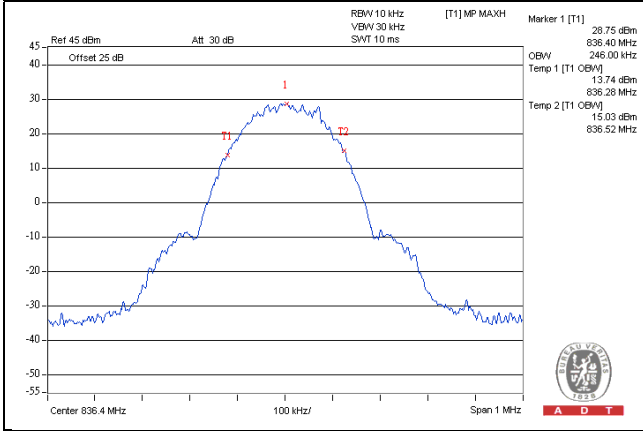
GSM



GPRS



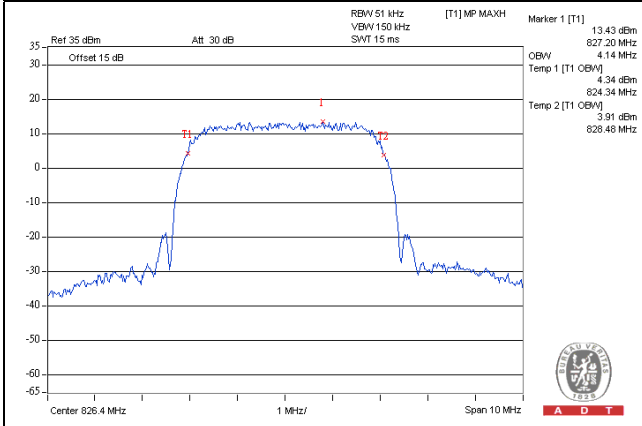
EDGE



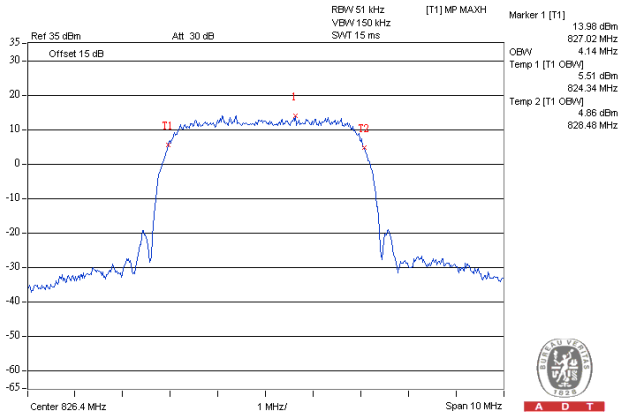
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		WCDMA	HSDPA	HSUPA
4132	826.4	4.14	4.14	4.14
4182	836.6	4.12	4.14	4.12
4233	846.6	4.12	4.12	4.14

Spectrum Plot of Worst Value

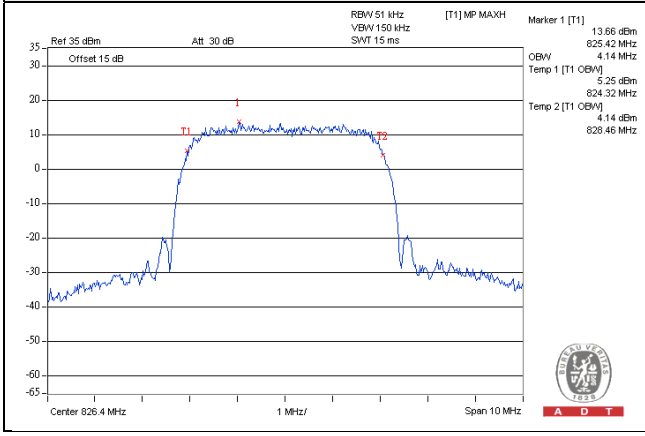
WCDMA



HSDPA



HSUPA

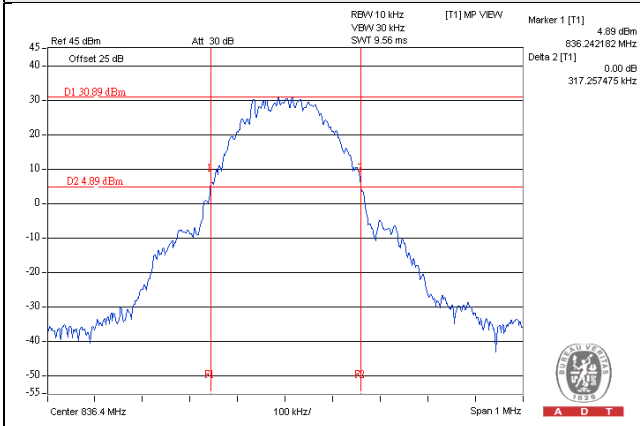


26dB Bandwidth

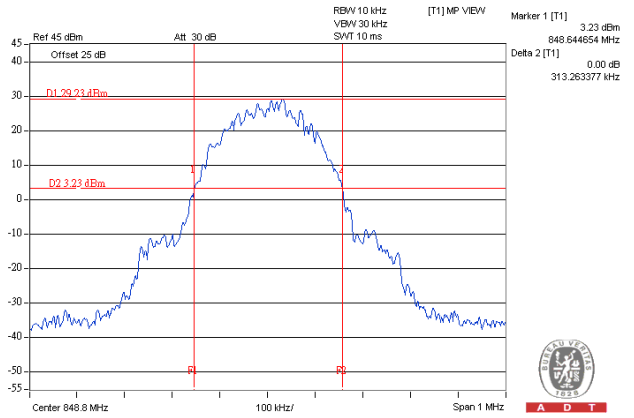
Channel	Frequency (MHz)	26dB Bandwidth (kHz)		
		GSM	GPRS	EDGE
128	824.2	314.689	307.878	317.633
189	836.4	317.257	310.392	319.880
251	848.8	313.878	313.263	314.263

Spectrum Plot of Worst Value

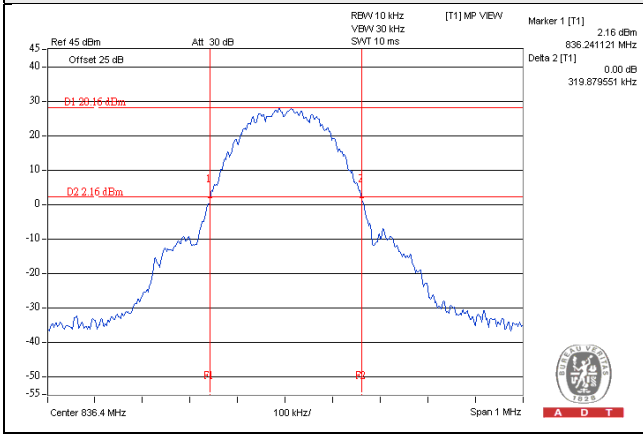
GSM



GPRS



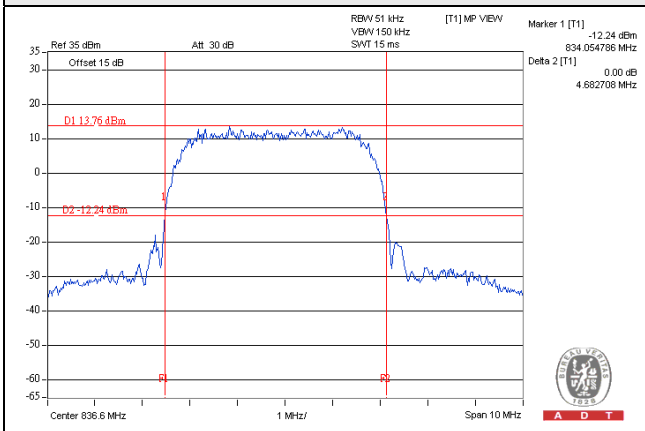
EDGE



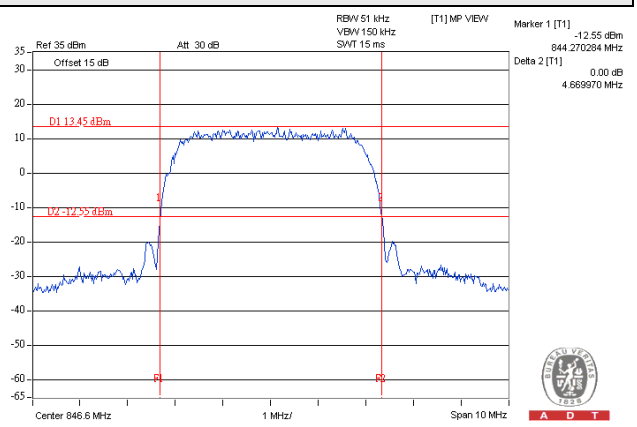
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		
		WCDMA	HSDPA	HSUPA
4132	826.4	4.678	4.669	4.678
4182	836.6	4.682	4.660	4.675
4233	846.6	4.676	4.669	4.668

Spectrum Plot of Worst Value

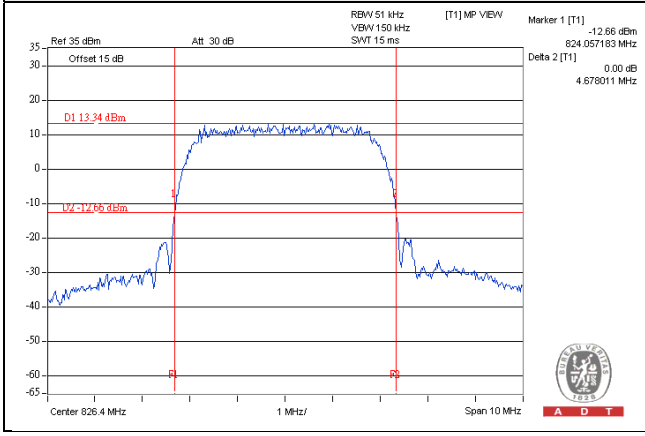
WCDMA



HSDPA



HSUPA



LTE Band 5, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
20407	824.7	1.264	1.273
20525	836.5	1.289	1.276
20643	848.3	1.264	1.275

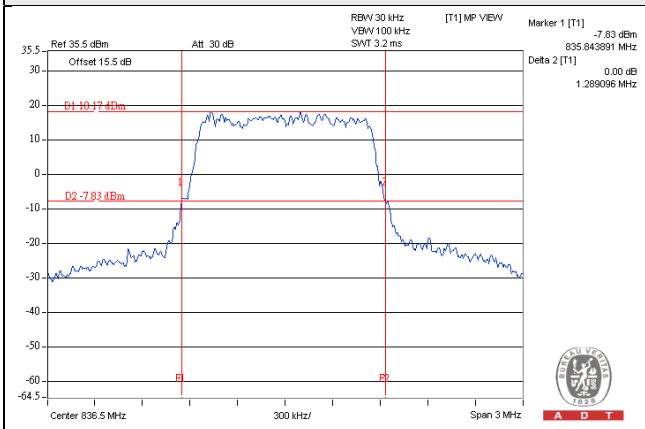
LTE Band 5, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
20415	825.5	2.967	2.939
20525	836.5	2.944	2.960
20635	847.5	2.960	2.968

LTE Band 5, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
20425	826.5	4.923	4.934
20525	836.5	4.954	4.922
20625	846.5	4.916	4.903

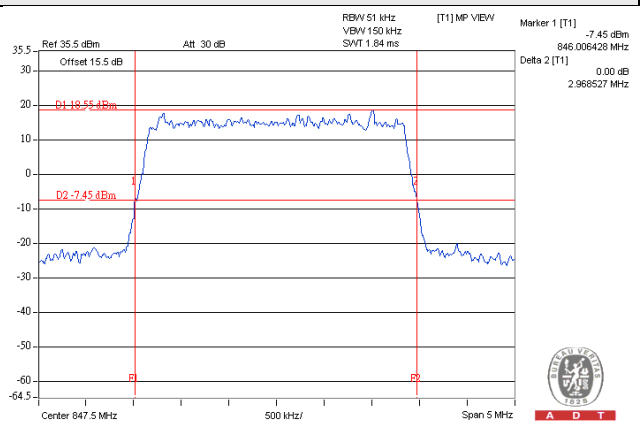
LTE Band 5, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
20450	829.0	9.720	9.710
20525	836.5	9.609	9.707
20600	844.0	9.714	9.694

Spectrum Plot of Worst Value

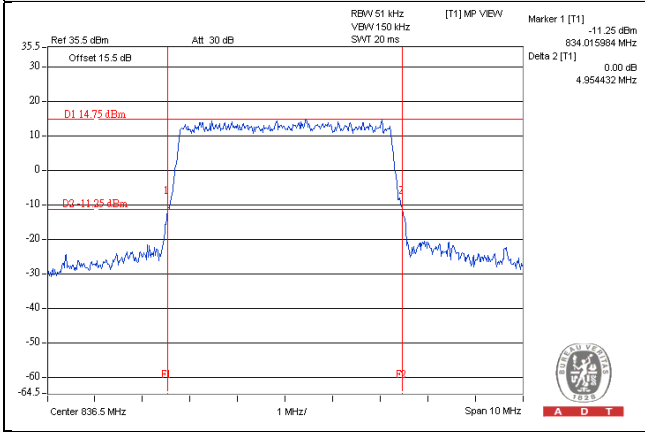
1.4MHz / QPSK



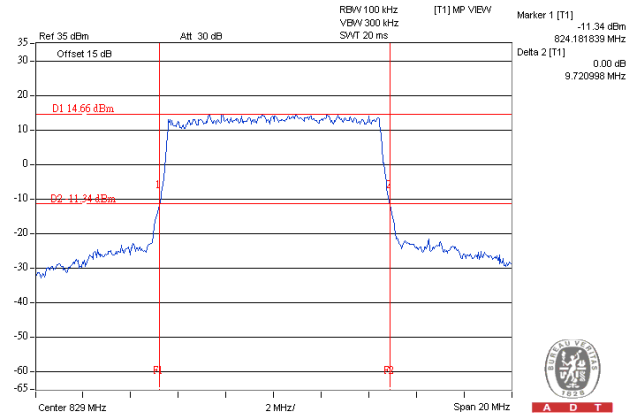
3MHz / 16QAM



5MHz / QPSK



10MHz / QPSK



Occupied Bandwidth

LTE Band 5, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
20407	824.7	1.09	1.09
20525	836.5	1.09	1.09
20643	848.3	1.09	1.09

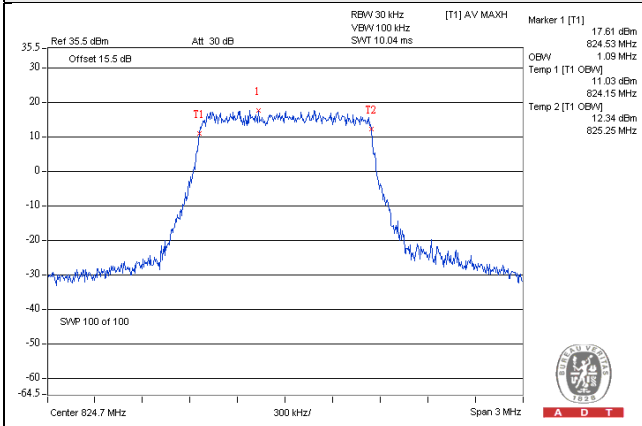
LTE Band 5, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
20415	825.5	2.68	2.68
20525	836.5	2.68	2.68
20635	847.5	2.68	2.68

LTE Band 5, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
20425	826.5	4.48	4.48
20525	836.5	4.48	4.48
20625	846.5	4.48	4.48

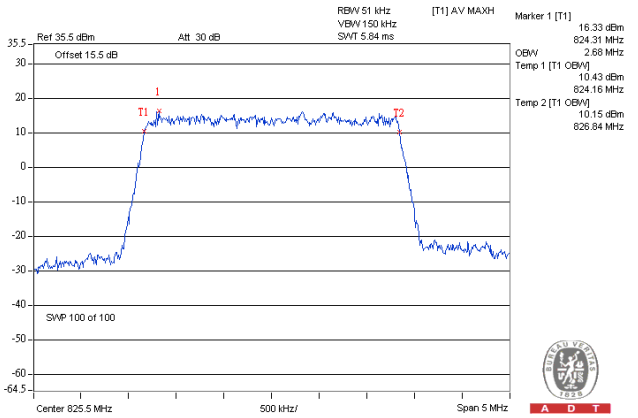
LTE Band 5, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
20450	829.0	8.97	8.90
20525	836.5	8.93	8.97
20600	844.0	8.90	8.97

Spectrum Plot of Worst Value

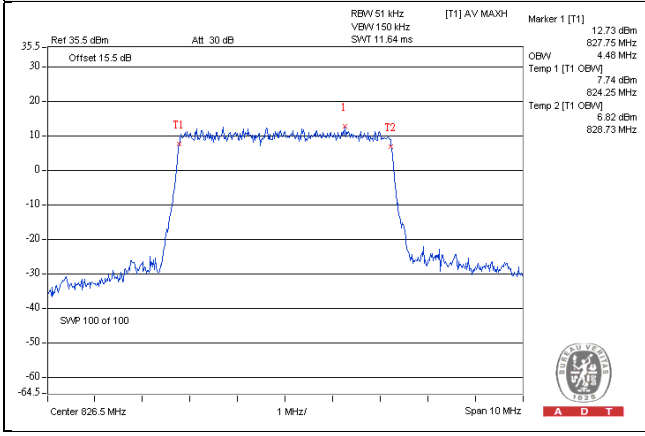
1.4MHz / QPSK



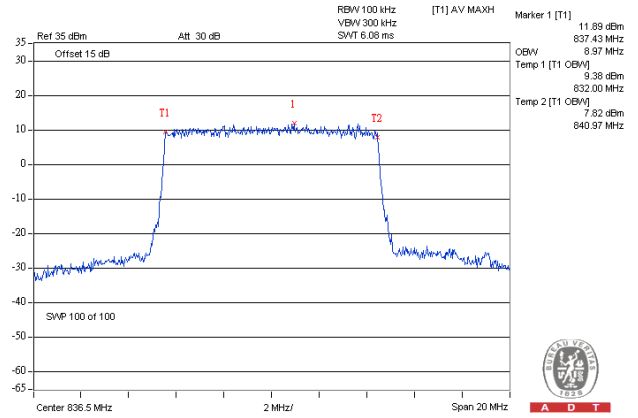
3MHz / QPSK



5MHz / QPSK



10MHz / QPSK

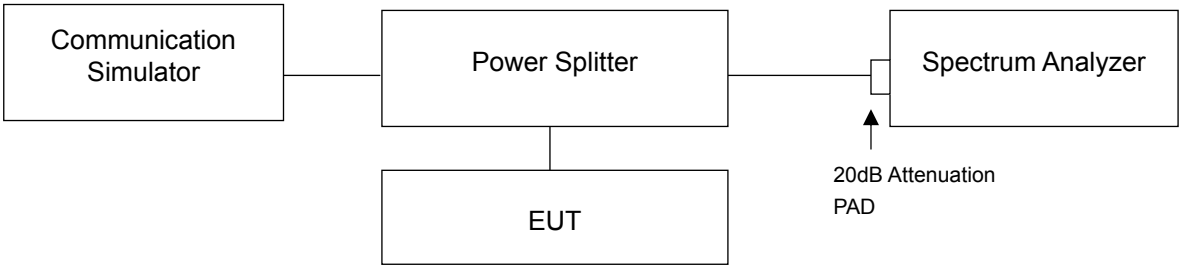


4.5 Band Edge Measurement

4.5.1 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.

4.5.2 Test Setup

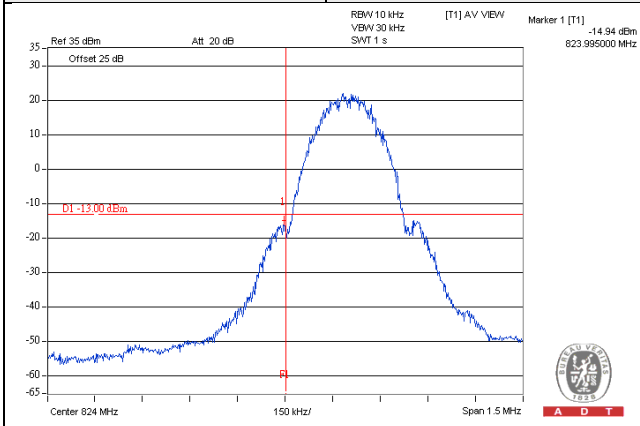


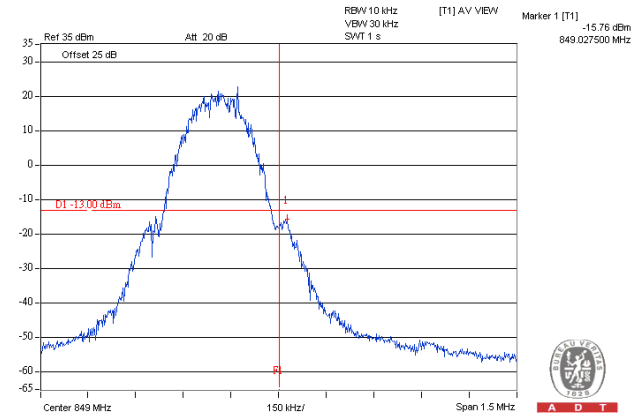
4.5.3 Test Procedures

a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 10kHz and VB of the spectrum is 30kHz (GSM / GPRS / EDGE).
c. The center frequency of spectrum is the band edge frequency and span is 10MHz. RB of the spectrum is 51kHz and VB of the spectrum is 150kHz (WCDMA / HSDPA / HSUPA).
d. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz (LTE Channel Bandwidth 1.4MHz).
e. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 51kHz and VB of the spectrum is 150kHz (LTE Channel Bandwidth 3MHz and 5MHz).
f. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Channel Bandwidth 10MHz).
g. Record the max trace plot into the test report.

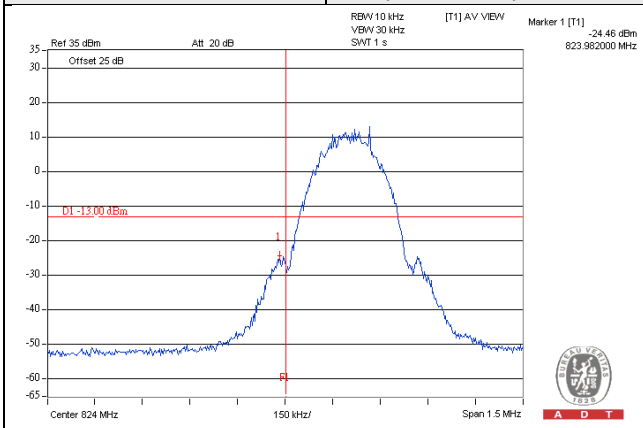
4.5.4 Test Results

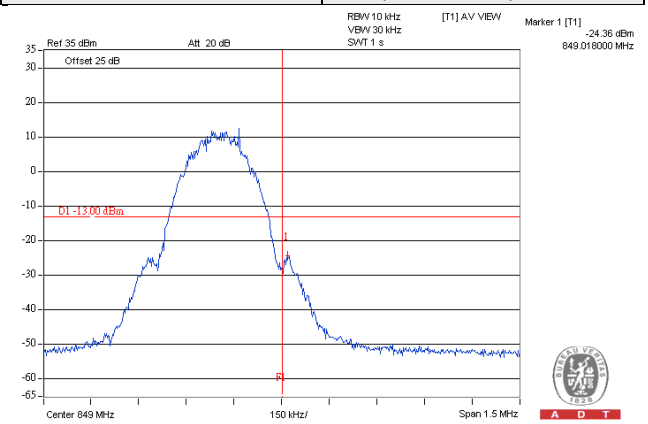
GSM			
Channel	128 (824.2MHz)	Channel	251 (848.8MHz)



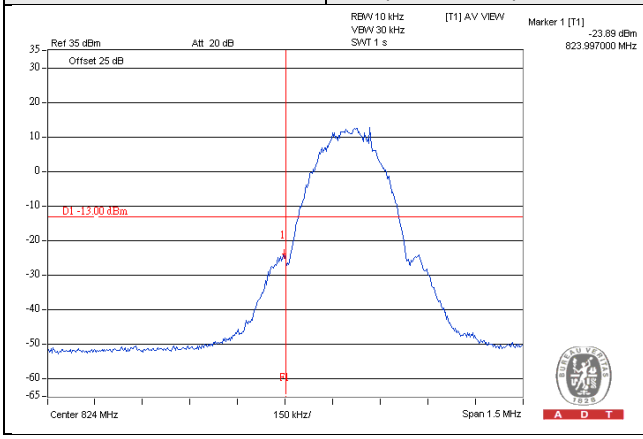


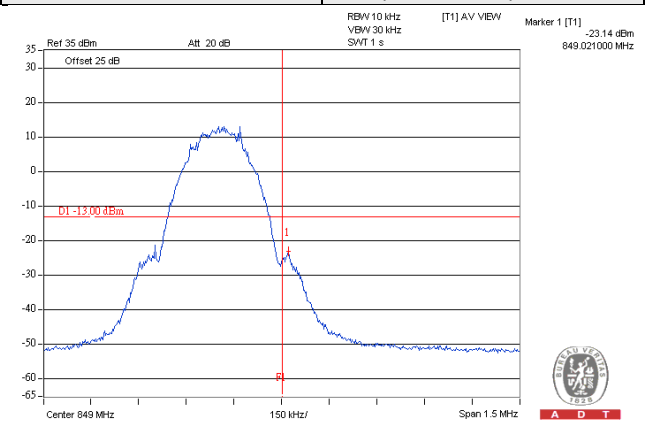
GPRS			
Channel	128 (824.2MHz)	Channel	251 (848.8MHz)



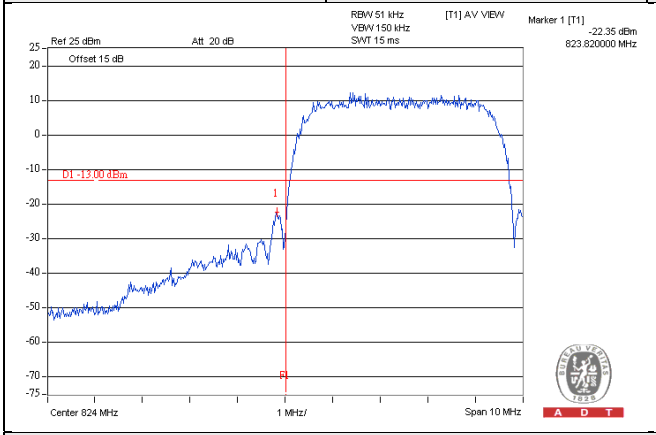


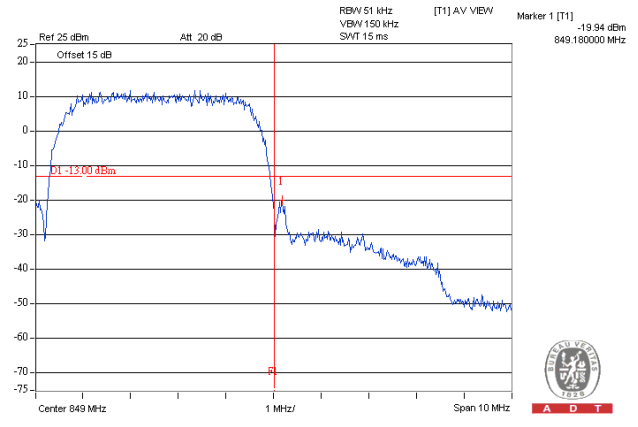
EDGE			
Channel	128 (824.2MHz)	Channel	251 (848.8MHz)



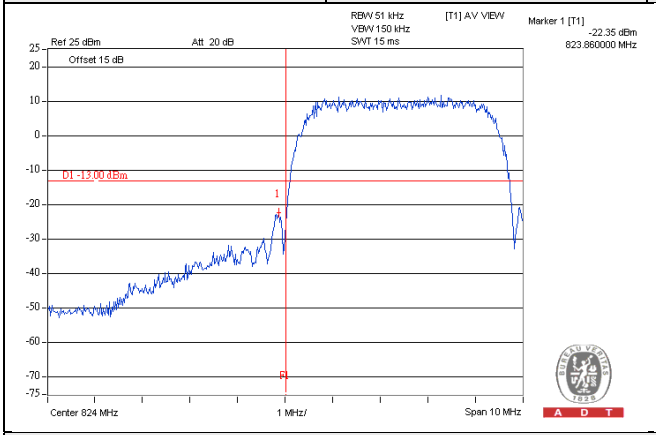


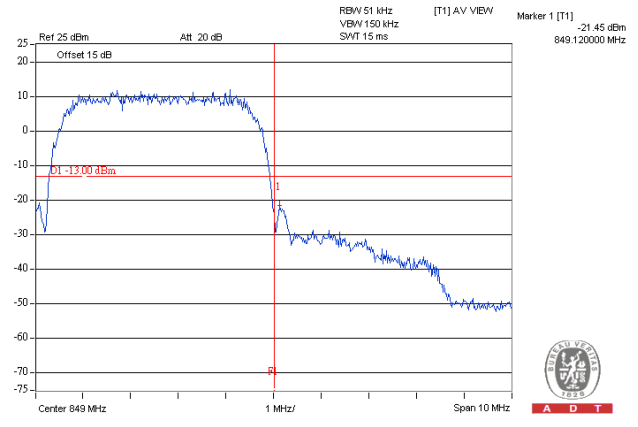
WCDMA			
Channel	4132 (826.4MHz)	Channel	4233 (846.6MHz)



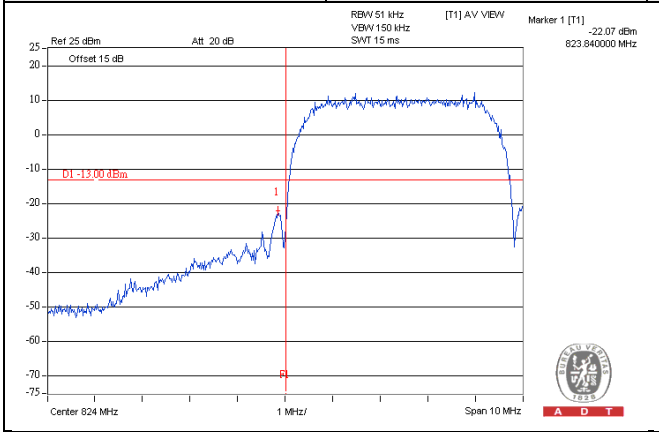


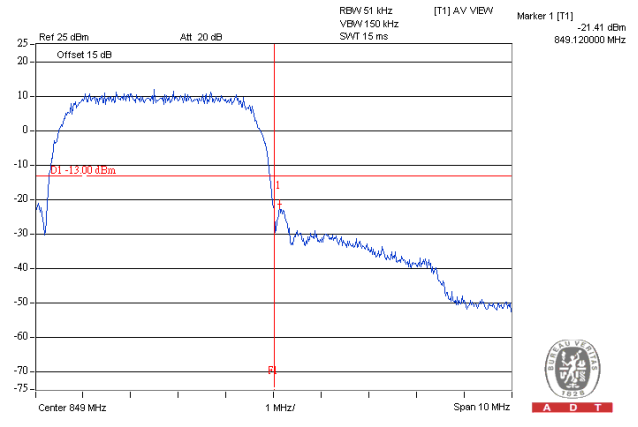
HSDPA			
Channel	4132 (826.4MHz)	Channel	4233 (846.6MHz)



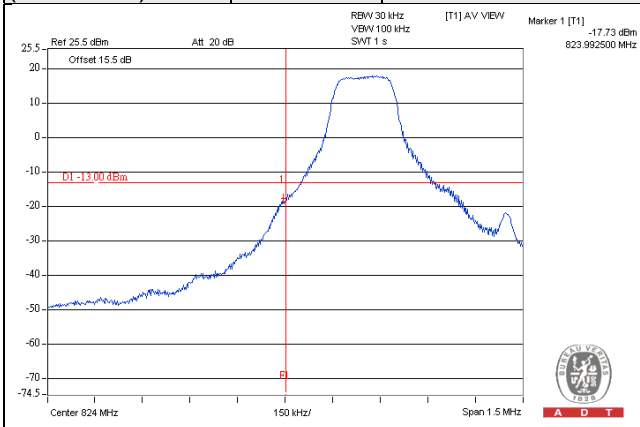


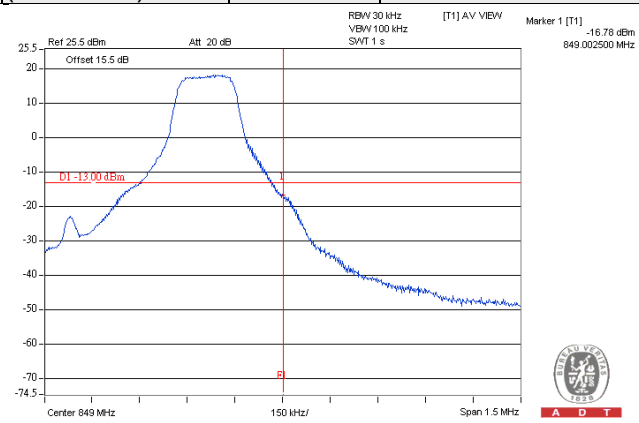
HSUPA			
Channel	4132 (826.4MHz)	Channel	4233 (846.6MHz)



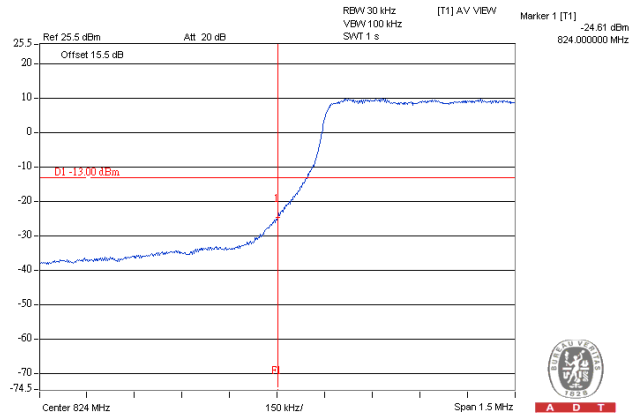


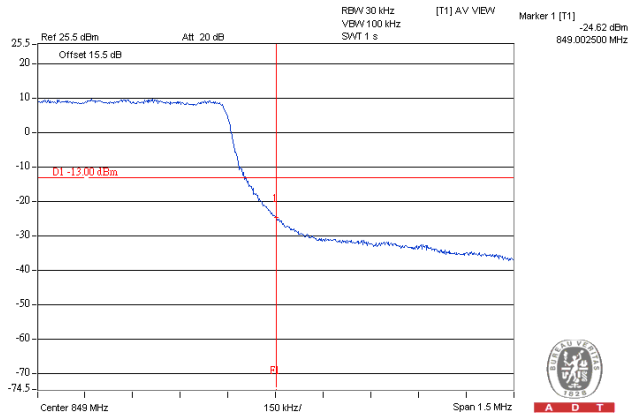
LTE Band 5, Channel Bandwidth 1.4MHz					
Channel 20407 (824.7MHz)	QPSK	1 RB / 0 RB Offset	Channel 20643 (848.3MHz)	QPSK	1 RB / 5 RB Offset

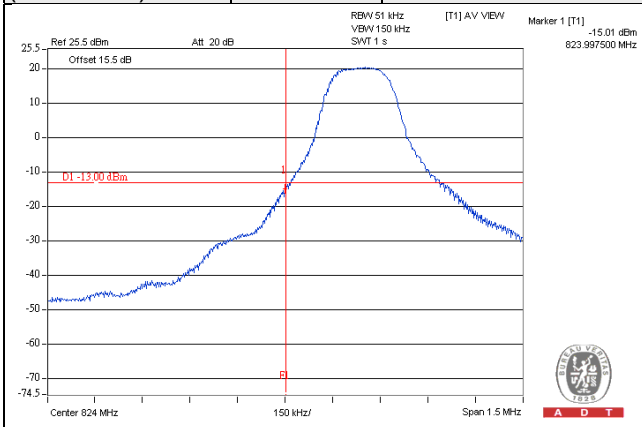
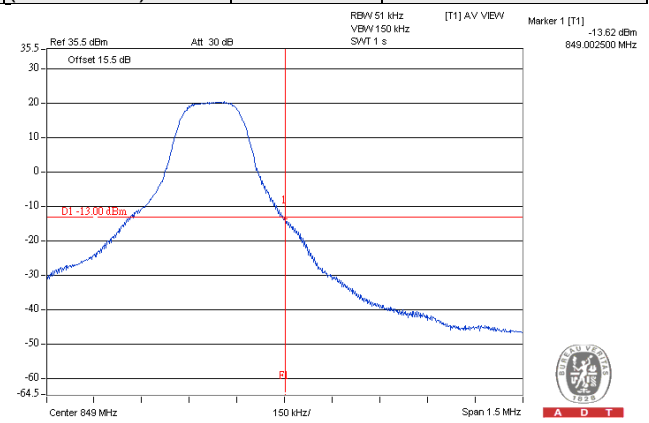
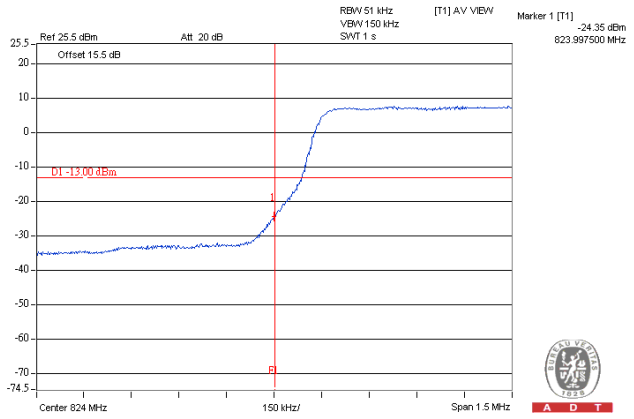
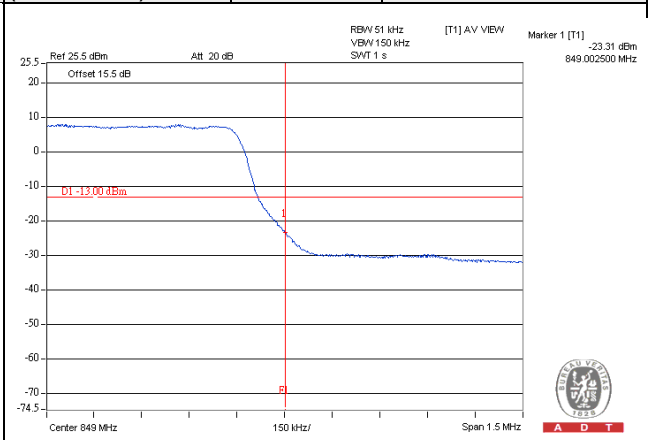


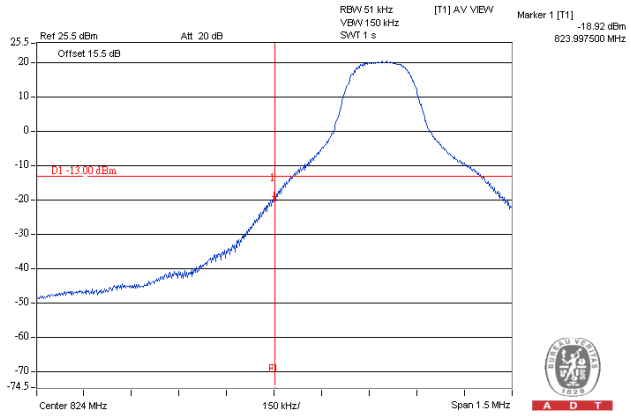
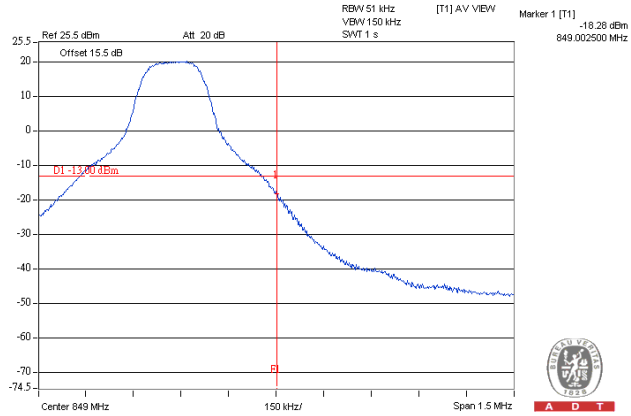
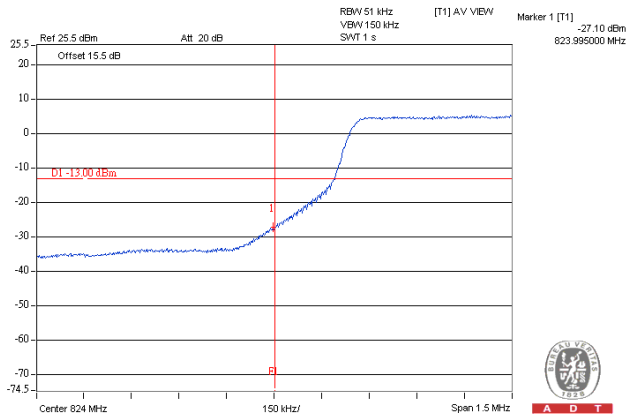
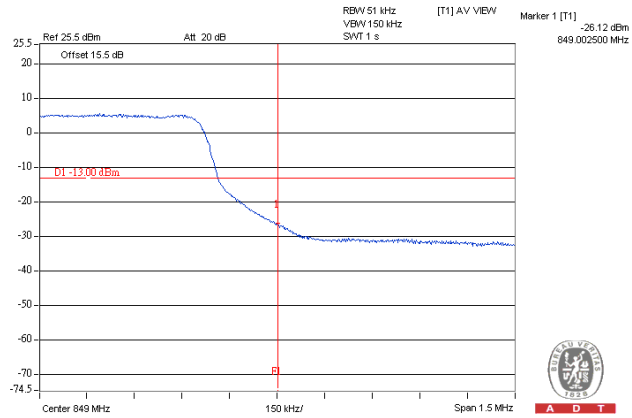


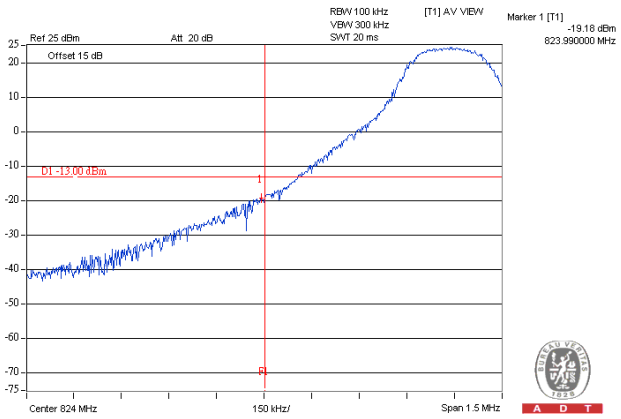
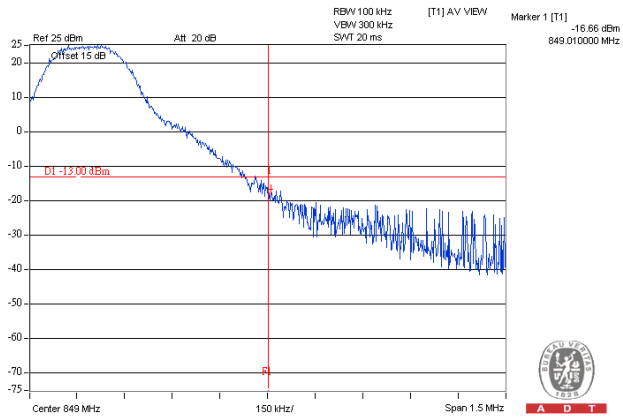
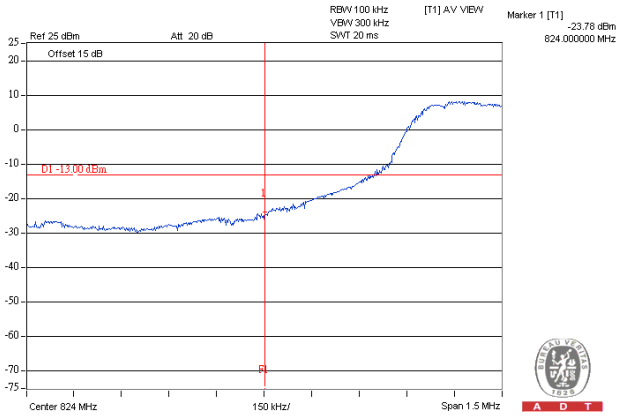
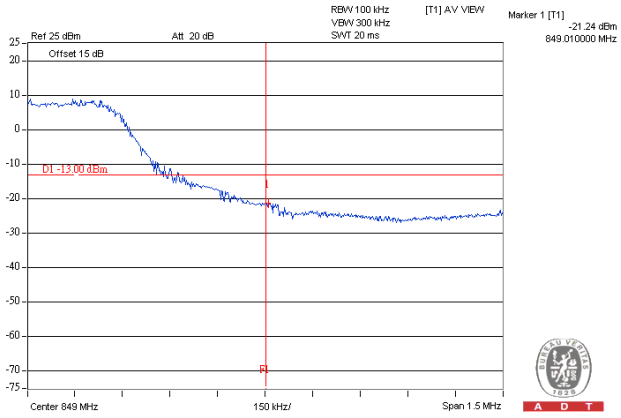
Channel 20407 (824.7MHz)	QPSK	6 RB / 0 RB Offset	Channel 20643 (848.3MHz)	QPSK	6 RB / 0 RB Offset





LTE Band 5, Channel Bandwidth 3MHz					
Channel 20415 (825.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 20635 (847.5MHz)	QPSK	1 RB / 14 RB Offset
				
Channel 20415 (825.5MHz)	QPSK	15 RB / 0 RB Offset	Channel 20635 (847.5MHz)	QPSK	15 RB / 0 RB Offset
				

LTE Band 5, Channel Bandwidth 5MHz					
Channel 20425 (826.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 20625 (846.5MHz)	QPSK	1 RB / 24 RB Offset
					
Channel 20425 (826.5MHz)	QPSK	25 RB / 0 RB Offset	Channel 20625 (846.5MHz)	QPSK	25 RB / 0 RB Offset
					

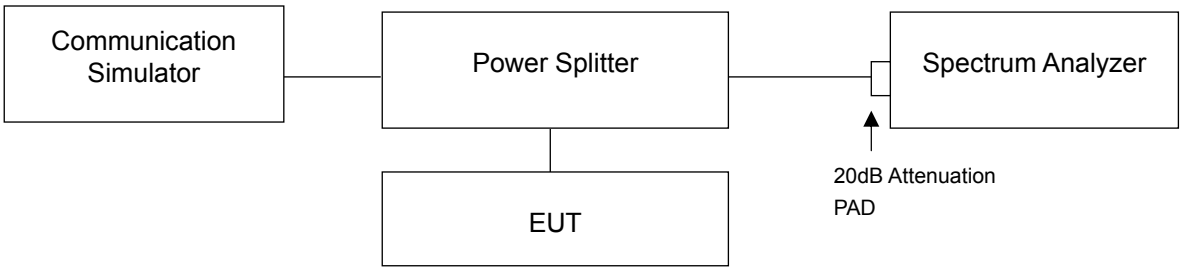
LTE Band 5, Channel Bandwidth 10MHz					
Channel 20450 (829.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 20600 (844.0MHz)	QPSK	1 RB / 49 RB Offset
					
Channel 20450 (829.0MHz)	QPSK	50 RB / 0 RB Offset	Channel 20600 (844.0MHz)	QPSK	50 RB / 0 RB Offset
					

4.6 Peak to Average Ratio

4.6.1 Limits of Peak to Average Ratio Measurement

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

4.6.2 Test Setup



4.6.3 Test Procedures

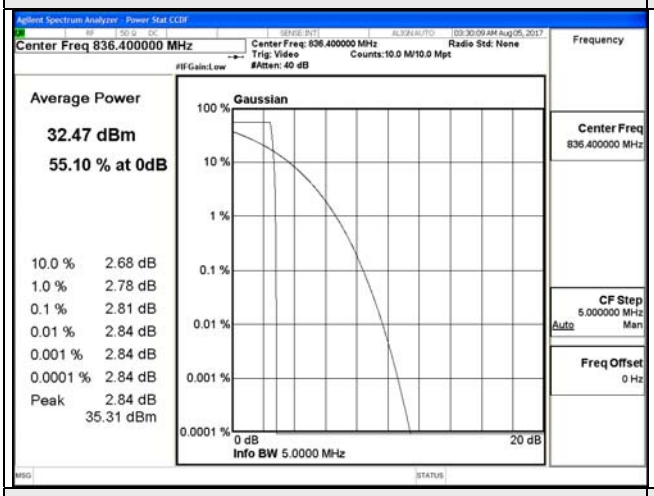
a. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
b. Set the number of counts to a value that stabilizes the measured CCDF curve;
c. Record the maximum PAPR level associated with a probability of 0.1%.

4.6.4 Test Results

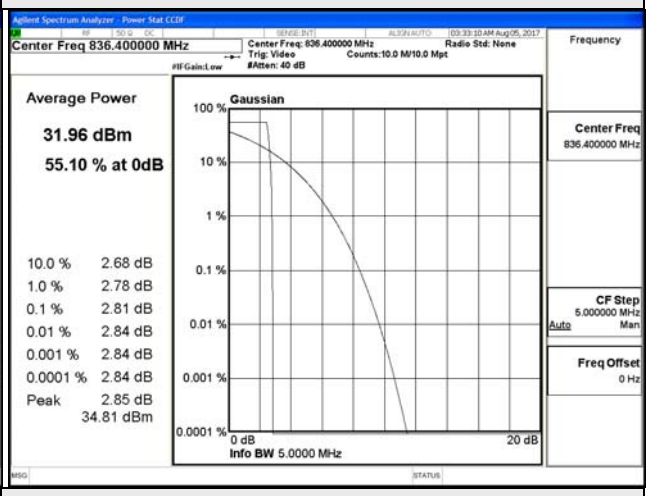
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		GSM	GPRS	EDGE
128	824.2	2.80	2.80	2.80
189	836.4	2.81	2.81	2.82
251	848.8	2.78	2.78	2.81

Spectrum Plot of Worst Value

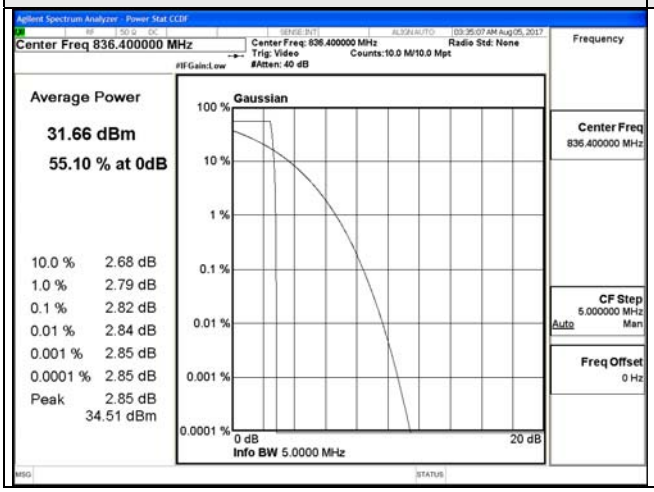
GSM



GPRS



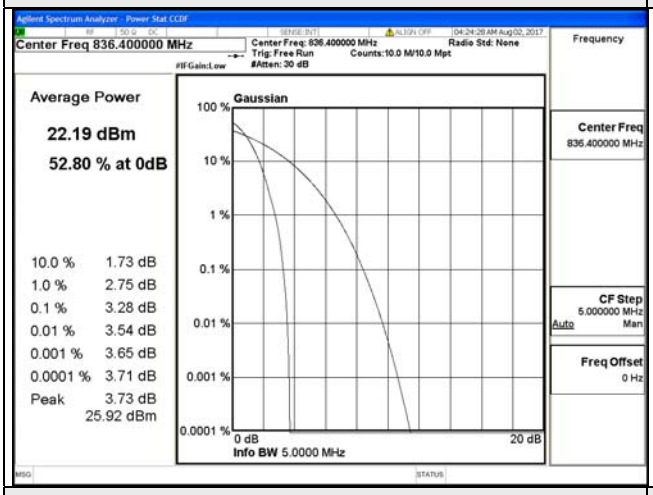
EDGE



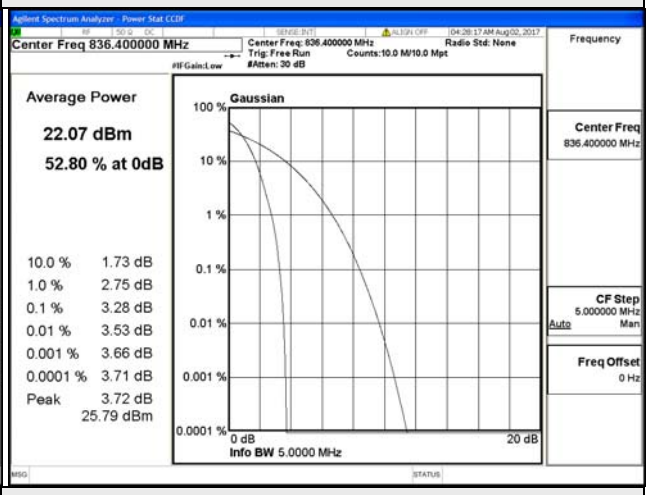
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		WCDMA	HSDPA	HSUPA
4132	826.4	3.23	3.23	3.23
4182	836.6	3.28	3.28	3.28
4233	846.6	3.19	3.19	3.20

Spectrum Plot of Worst Value

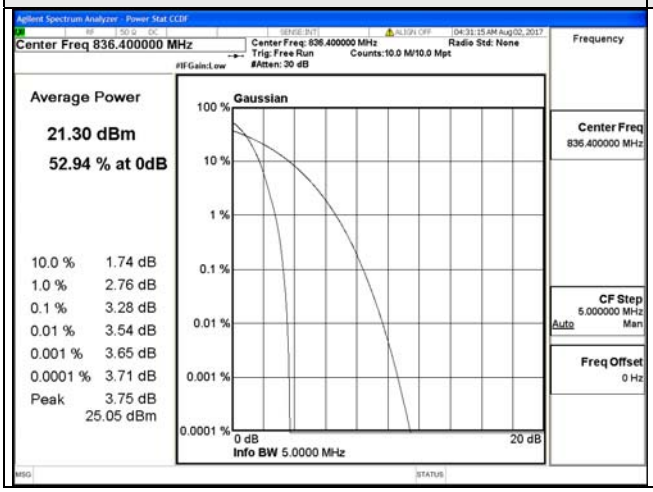
WCDMA



HSDPA



HSUPA

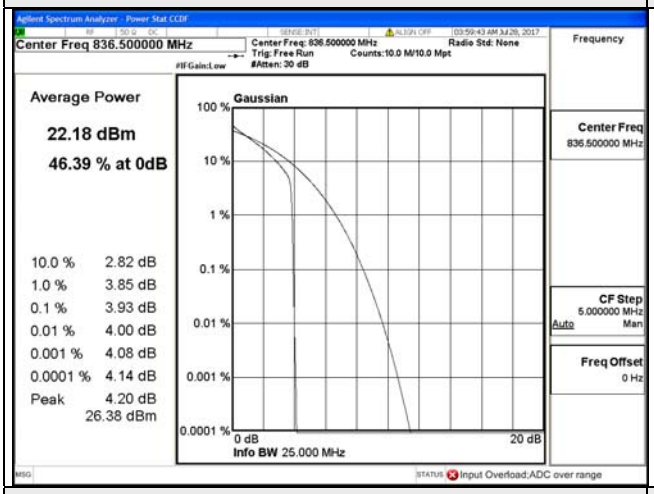
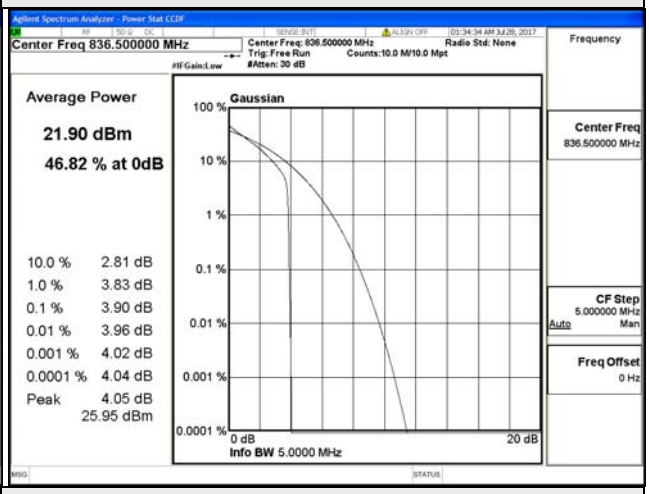
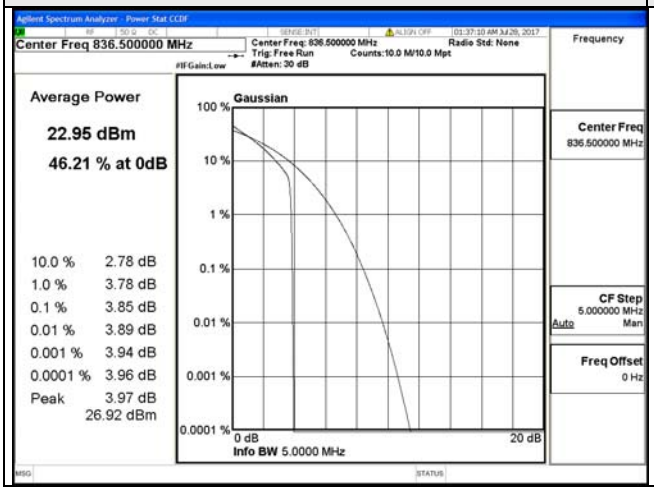
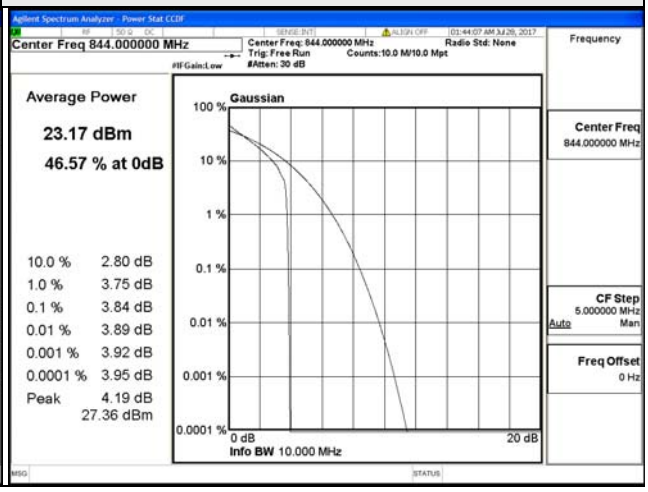


LTE Band 5, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
20407	824.7	3.66	3.60
20525	836.5	3.83	3.93
20643	848.3	3.63	3.71

LTE Band 5, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
20415	825.5	3.68	3.56
20525	836.5	3.90	3.90
20635	847.5	3.72	3.72

LTE Band 5, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
20425	826.5	3.59	3.59
20525	836.5	3.85	3.84
20625	846.5	3.82	3.82

LTE Band 5, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
20450	829.0	3.62	3.62
20525	836.5	3.71	3.71
20600	844.0	3.84	3.73

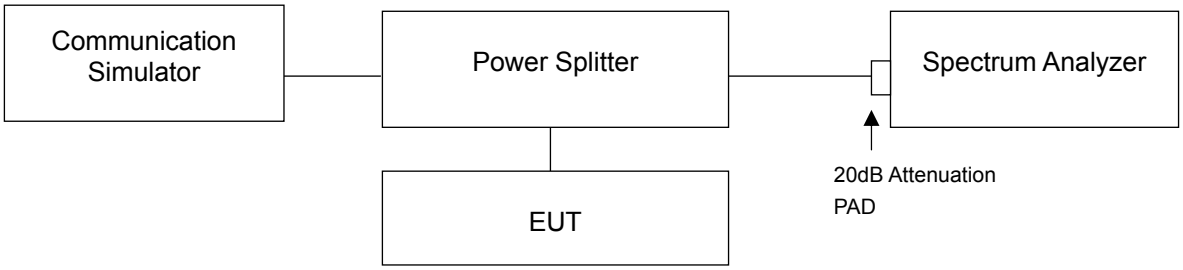
Spectrum Plot of Worst Value	
1.4MHz / 16QAM	3MHz / 16QAM
	
5MHz / QPSK	10MHz / QPSK
	

4.7 Conducted Spurious Emissions

4.7.1 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.

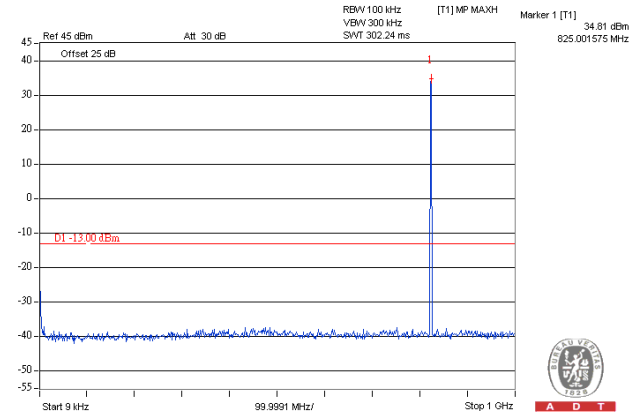
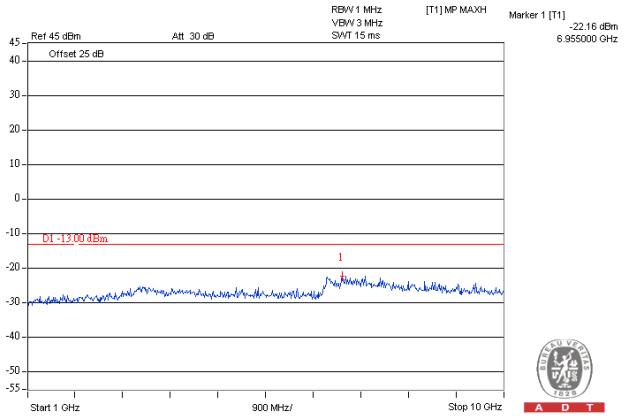
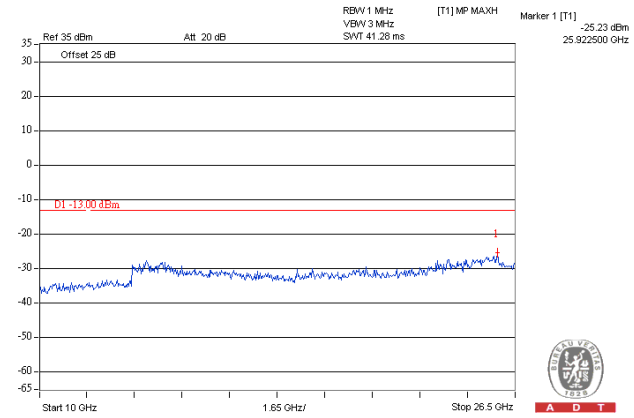
4.7.2 Test Setup



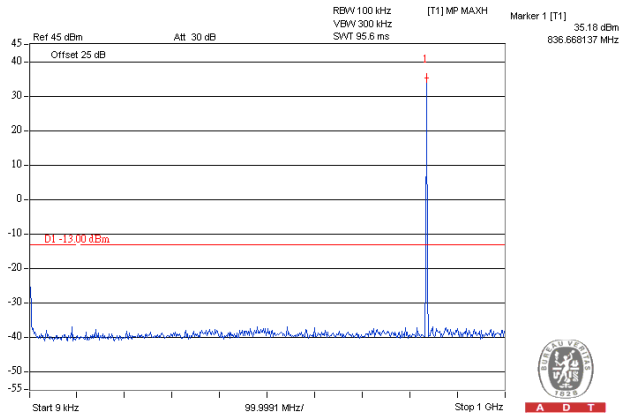
4.7.3 Test Procedure

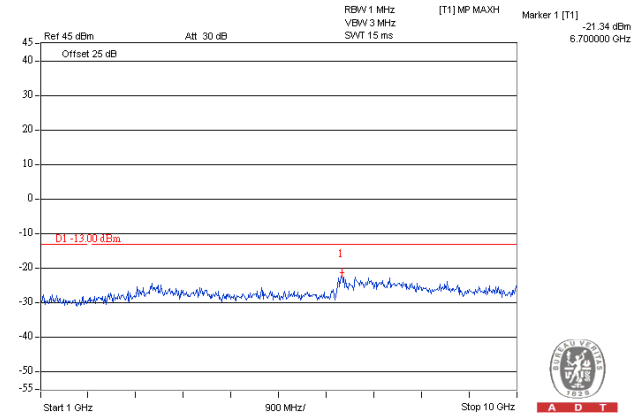
a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. Measuring frequency range is from 9 kHz to 1GHz. 20dB attenuation pad is connected with spectrum. RBW=100kHz and VBW=300kHz is used for conducted emission measurement.
c. Measuring frequency range is from 1GHz to 26.5GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

4.7.4 Test Results

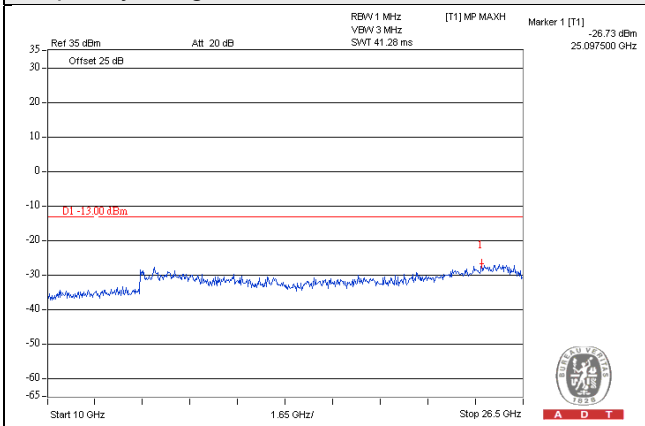
GSM	
Channel 128 (824.2MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

GSM	
Channel 189 (836.4MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

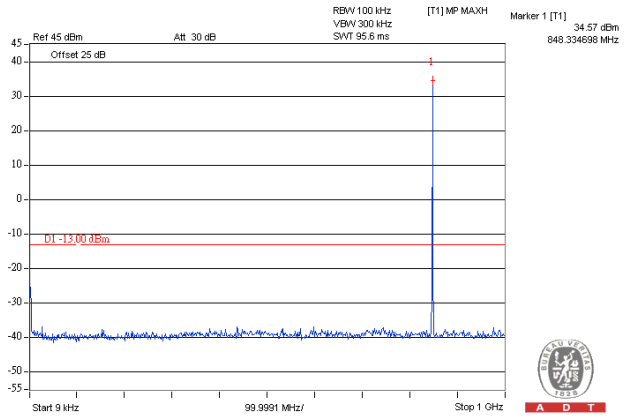


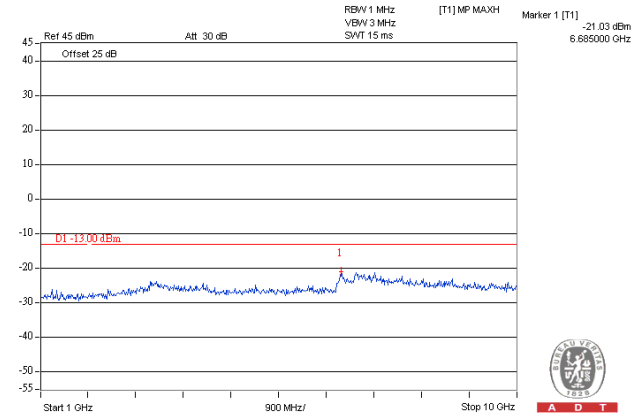


Frequency Range : 10GHz~26.5GHz	

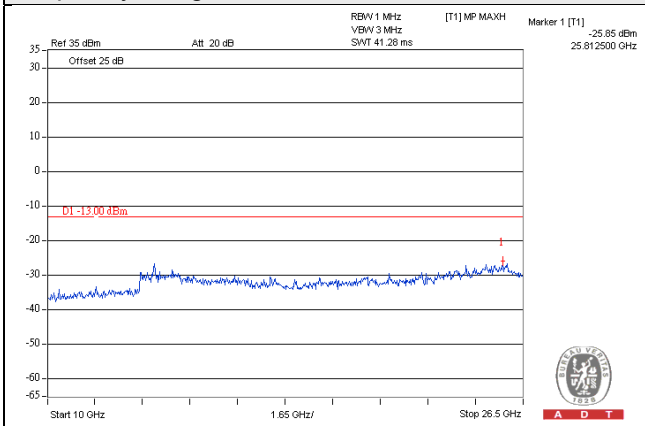


GSM	
Channel 251 (848.8MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

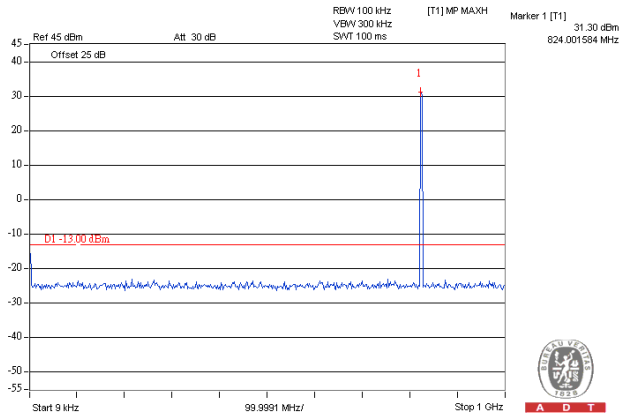


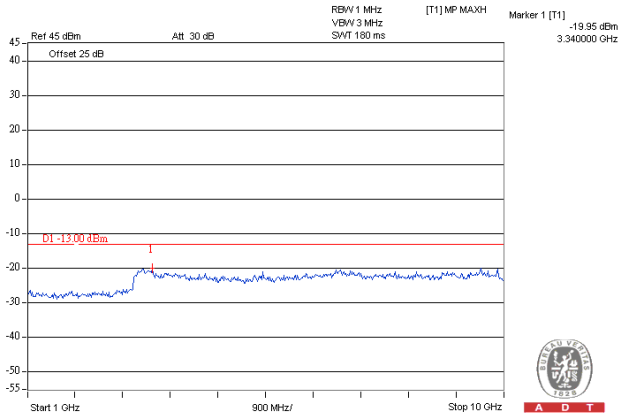


Frequency Range : 10GHz~26.5GHz	

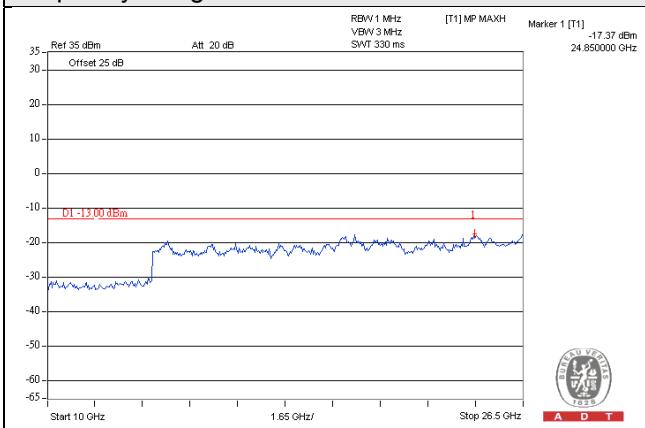


GPRS	
Channel 128 (824.2MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

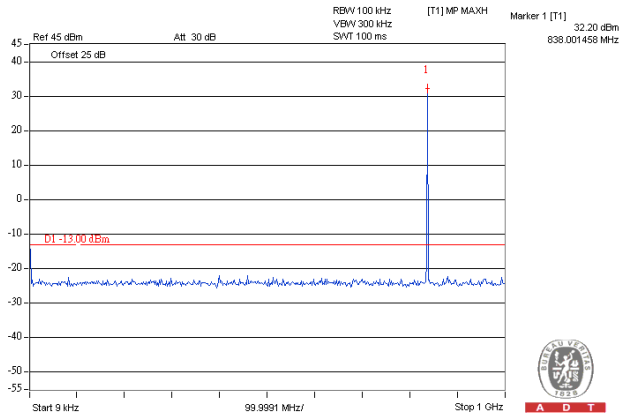


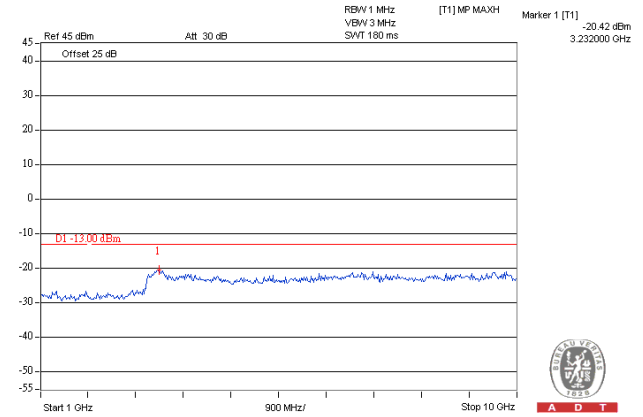


Frequency Range : 10GHz~26.5GHz	

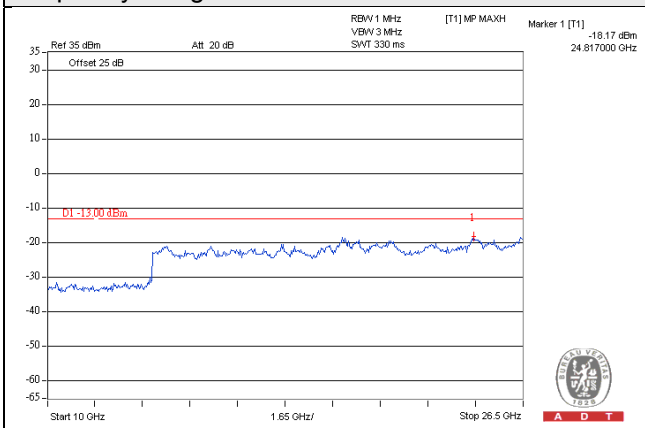


GPRS	
Channel 189 (836.4MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

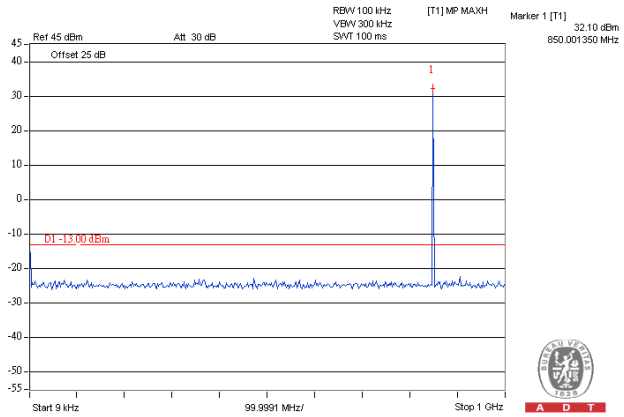


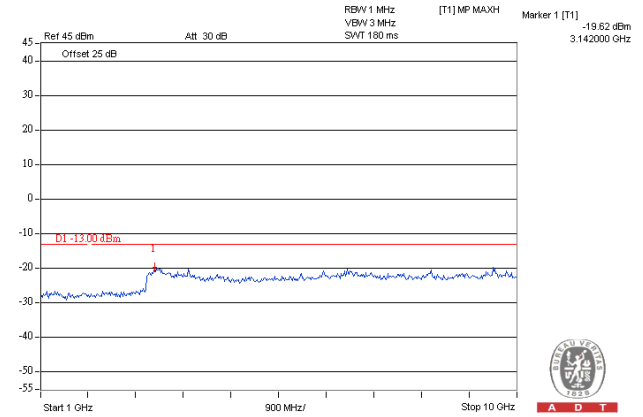


Frequency Range : 10GHz~26.5GHz	

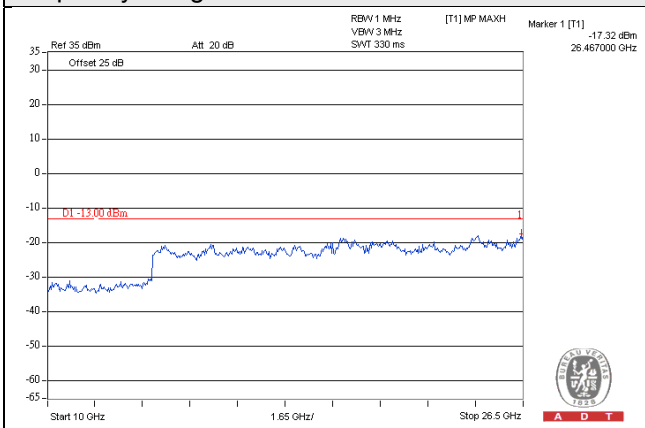


GPRS	
Channel 251 (848.8MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

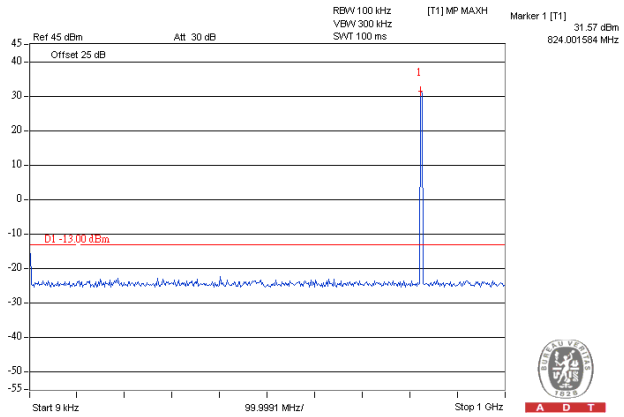


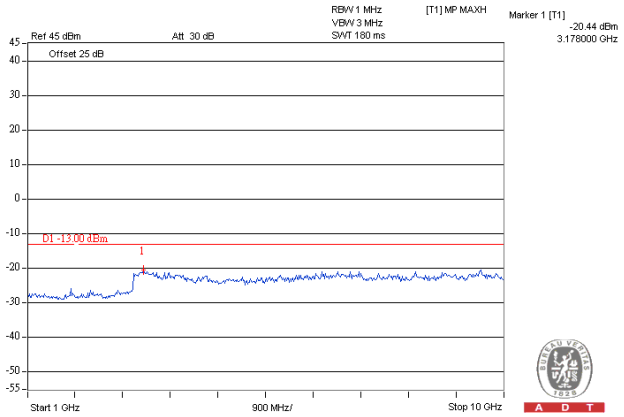


Frequency Range : 10GHz~26.5GHz	

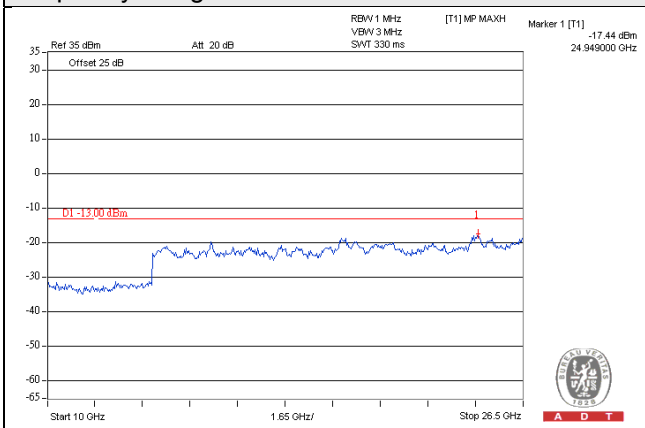


EDGE	
Channel 128 (824.2MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

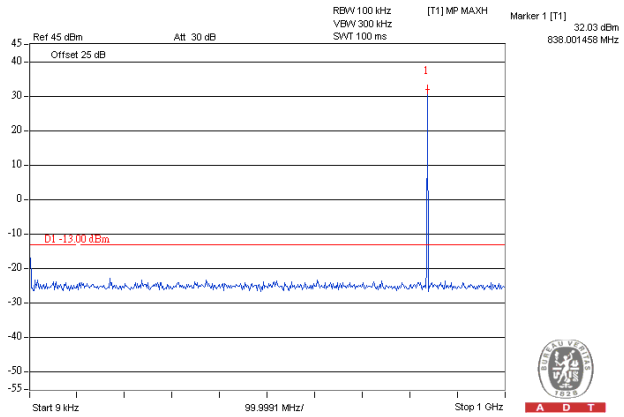


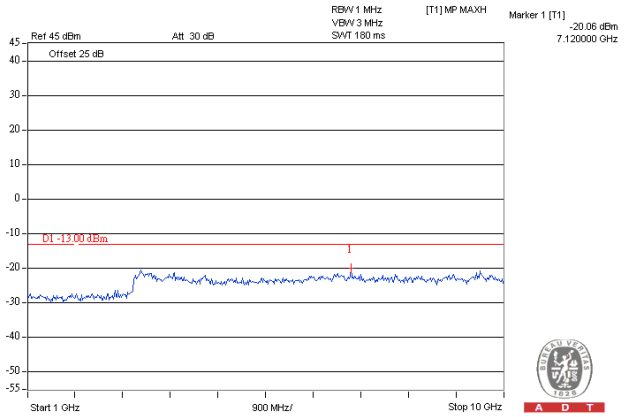


Frequency Range : 10GHz~26.5GHz	

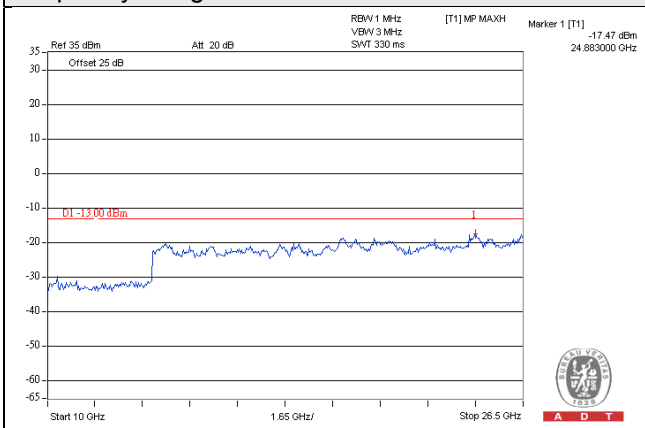


EDGE	
Channel 189 (836.4MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

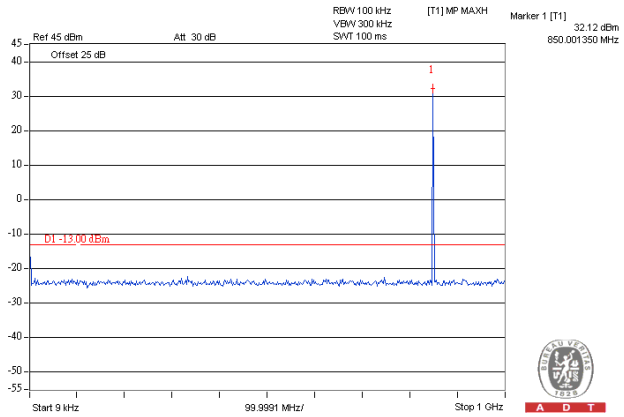


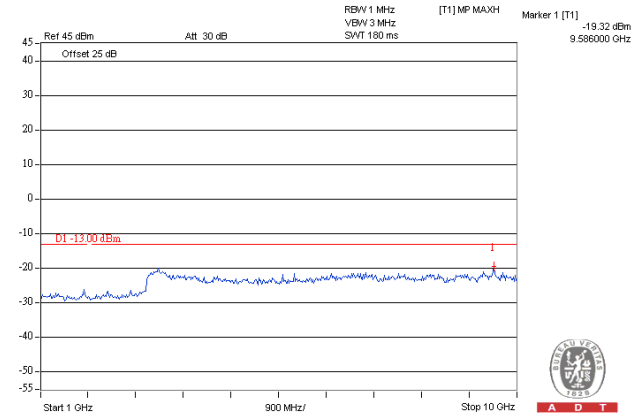


Frequency Range : 10GHz~26.5GHz	

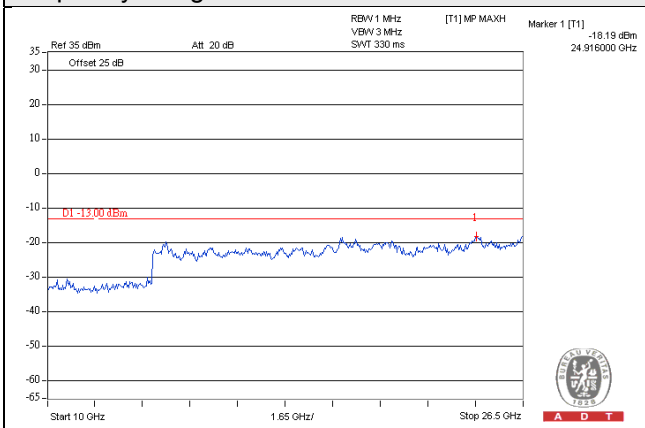


EDGE	
Channel 251 (848.8MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

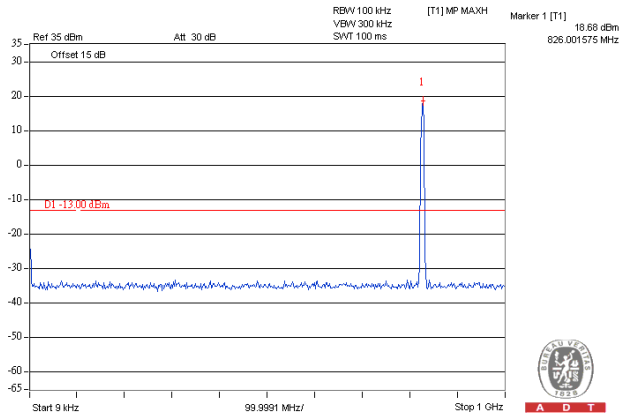


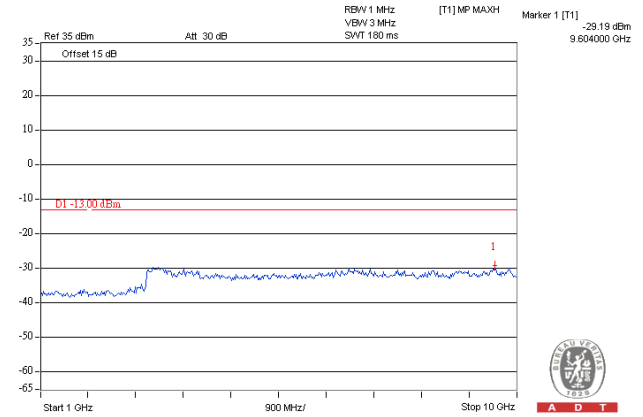


Frequency Range : 10GHz~26.5GHz	

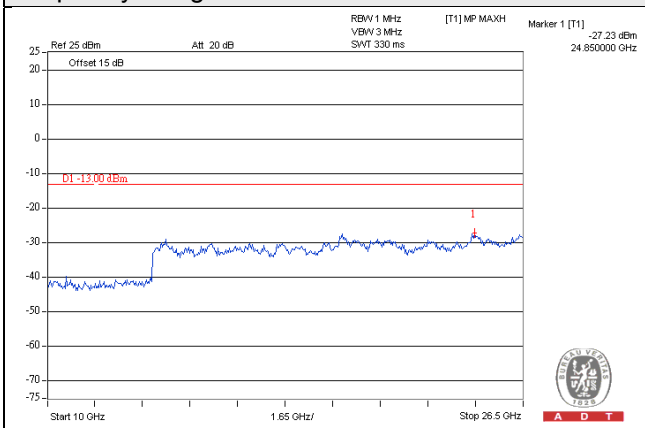


WCDMA	
Channel 4132 (826.4MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

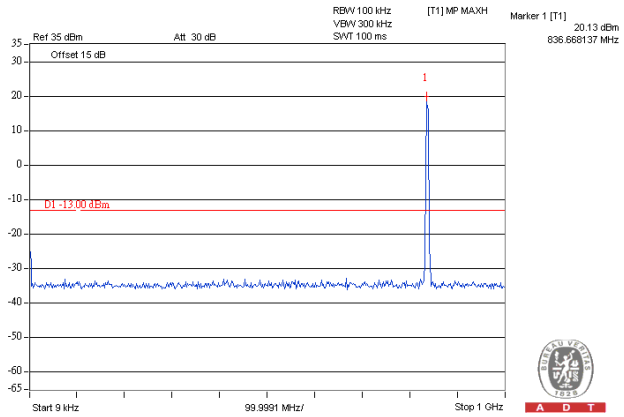


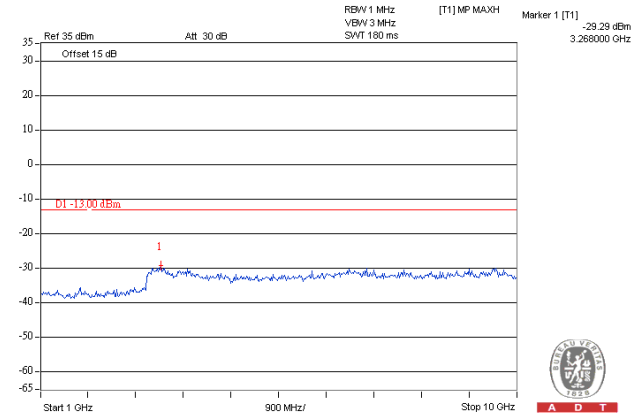


Frequency Range : 10GHz~26.5GHz	

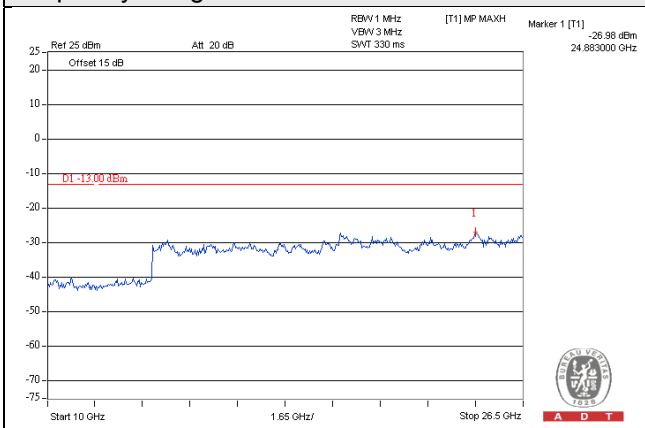


WCDMA	
Channel 4182 (836.6MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

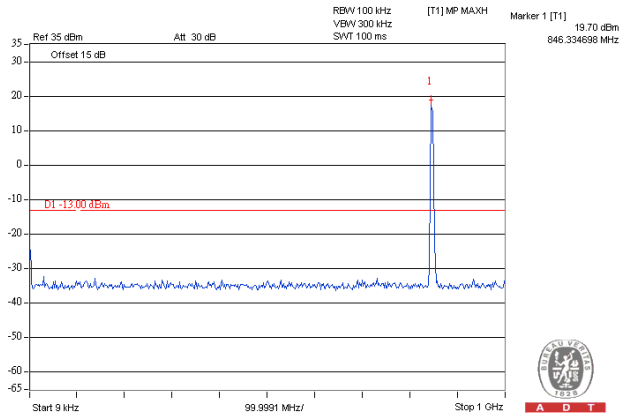


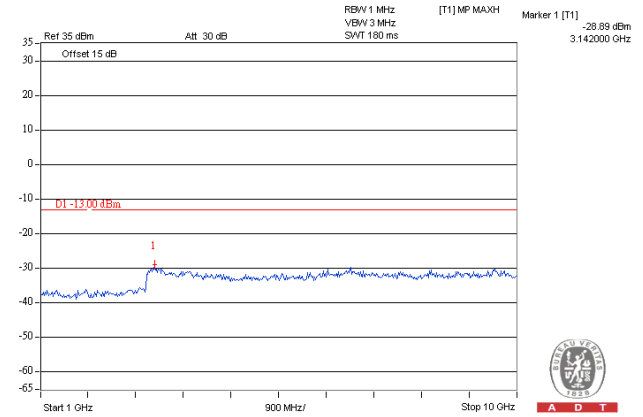


Frequency Range : 10GHz~26.5GHz	

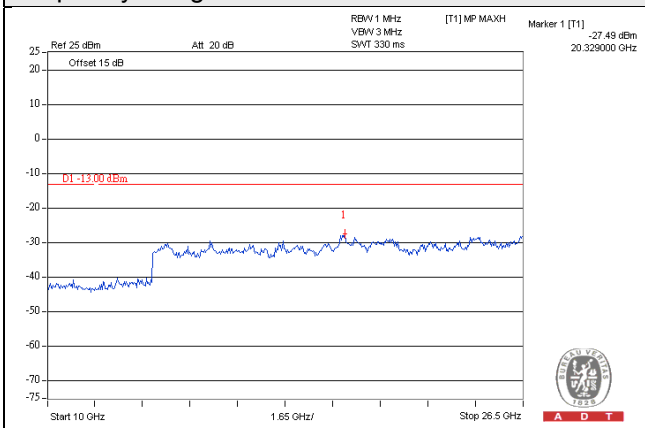


WCDMA	
Channel 4233 (846.6MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

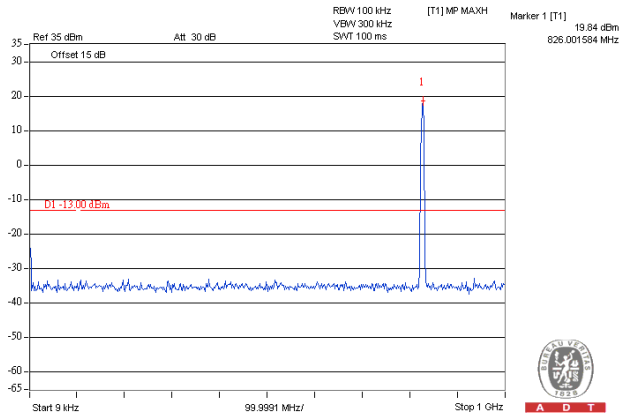


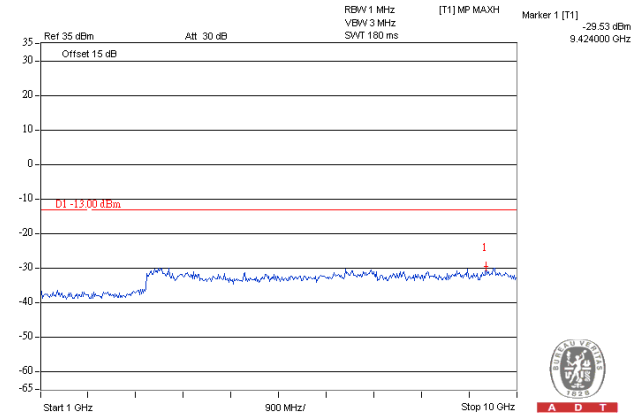


Frequency Range : 10GHz~26.5GHz	

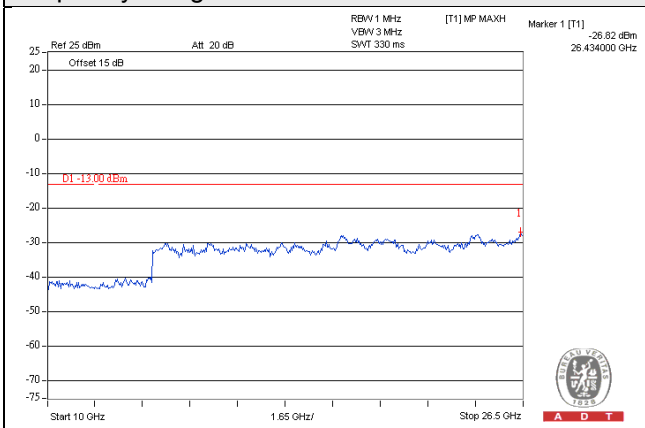


HSDPA	
Channel 4132 (826.4MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

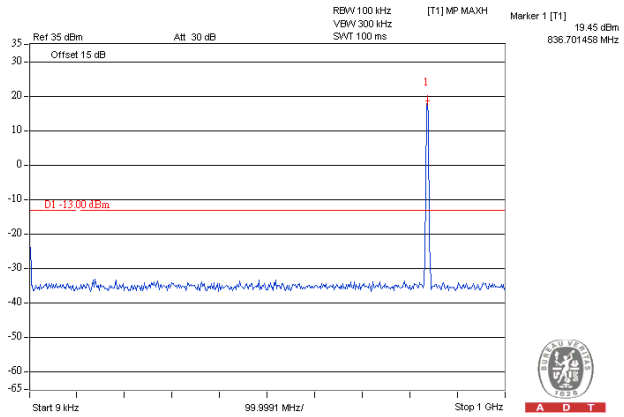


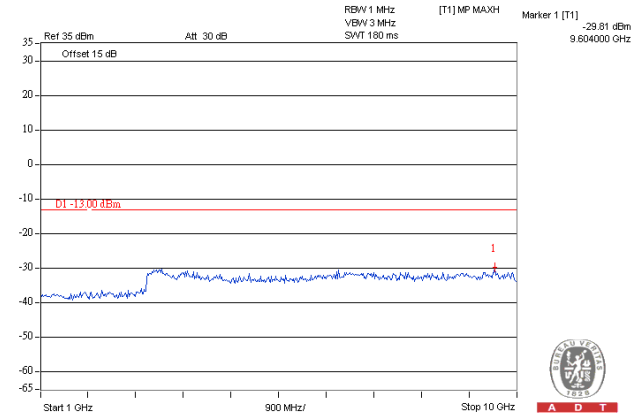


Frequency Range : 10GHz~26.5GHz	

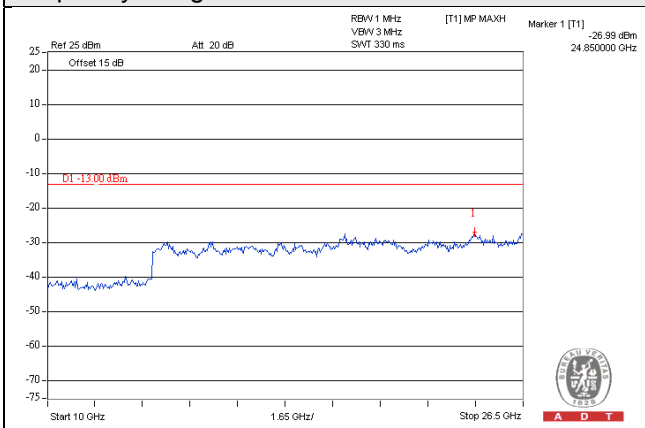


HSDPA	
Channel 4182 (836.6MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

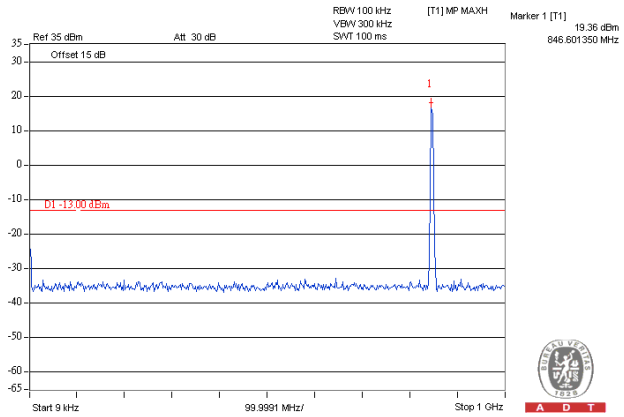


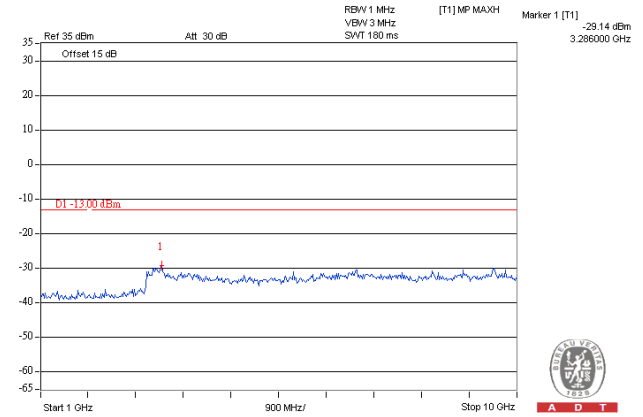


Frequency Range : 10GHz~26.5GHz	

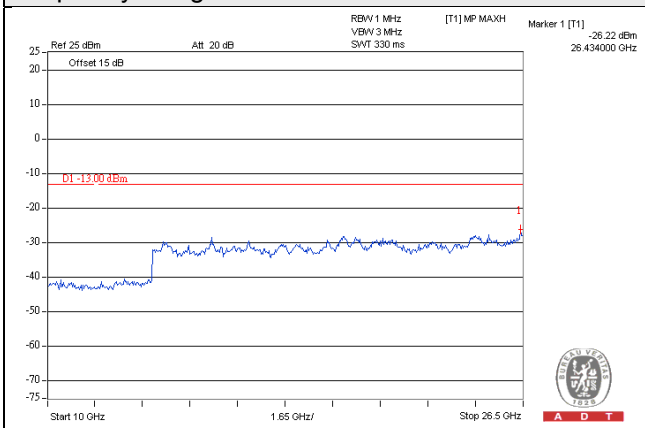


HSDPA	
Channel 4233 (846.6MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

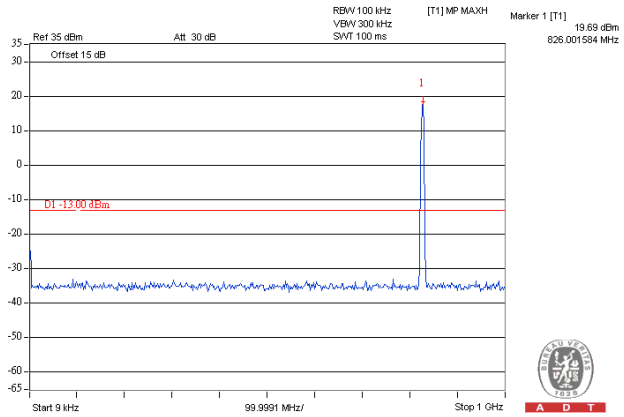


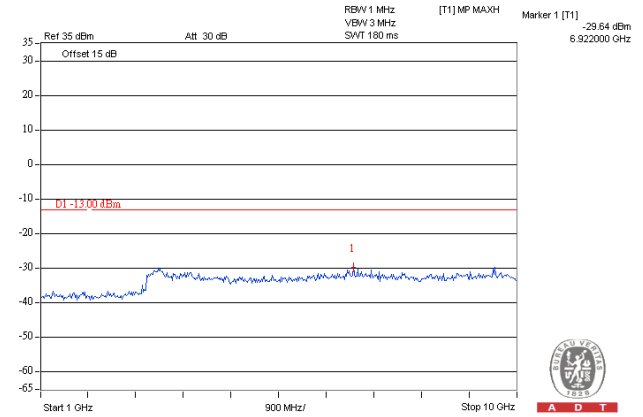


Frequency Range : 10GHz~26.5GHz	

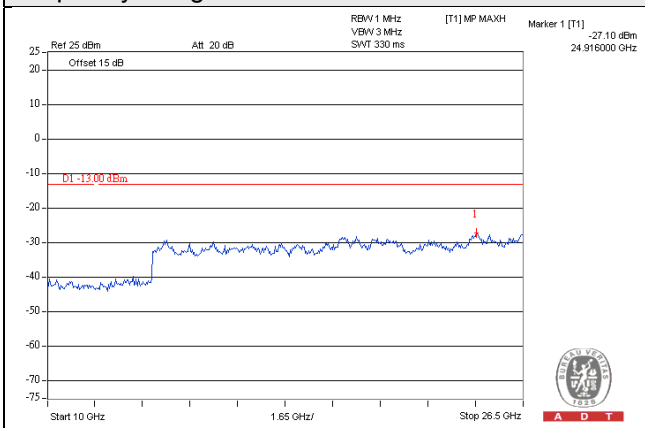


HSUPA	
Channel 4132 (826.4MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

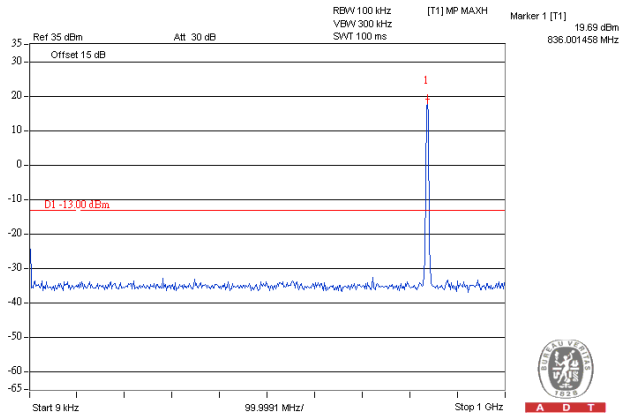


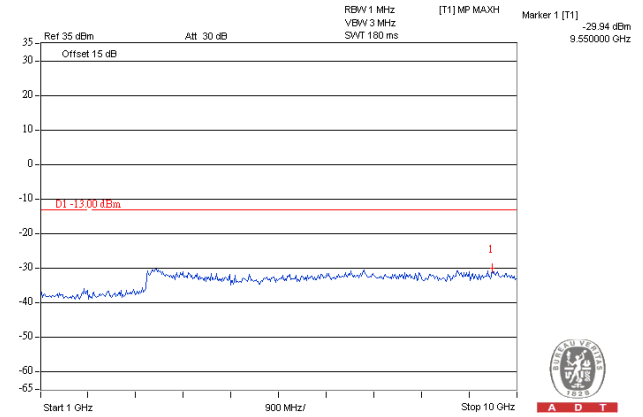


Frequency Range : 10GHz~26.5GHz	

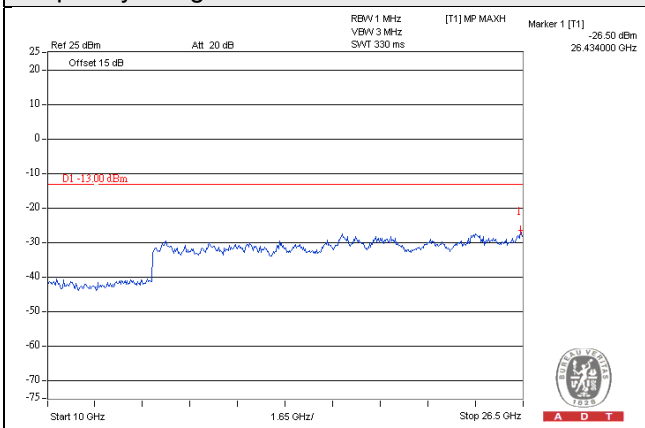


HSUPA	
Channel 4182 (836.6MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

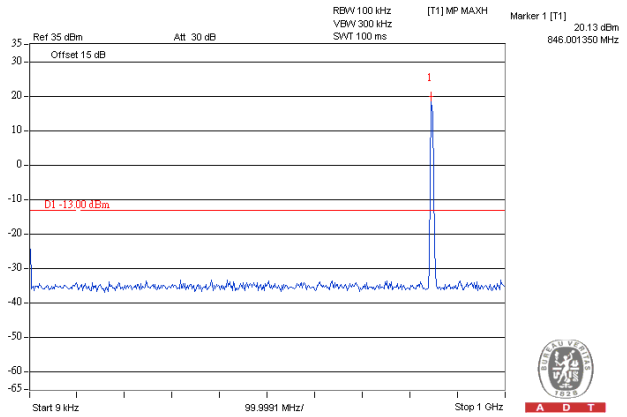


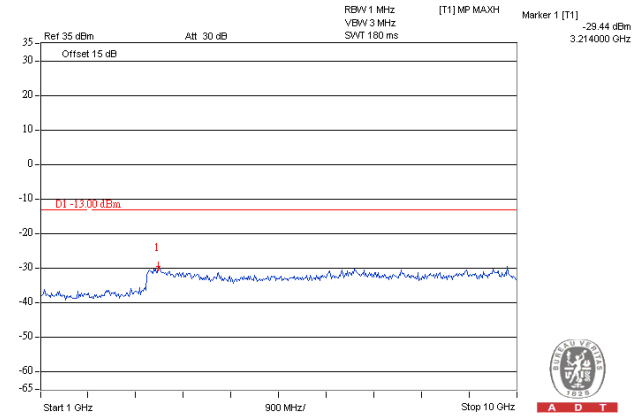


Frequency Range : 10GHz~26.5GHz	

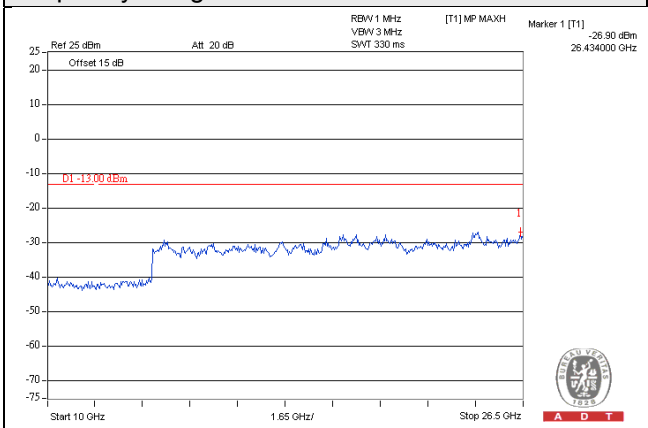


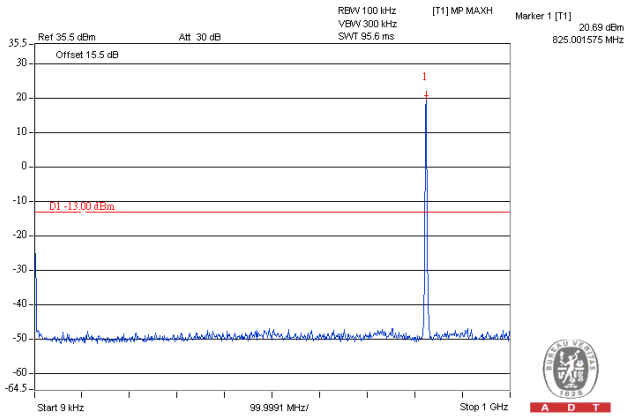
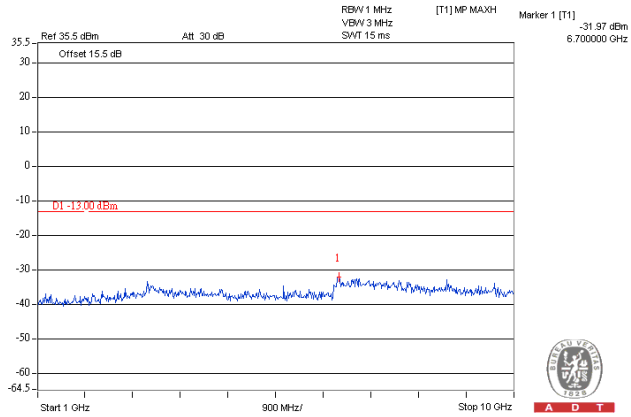
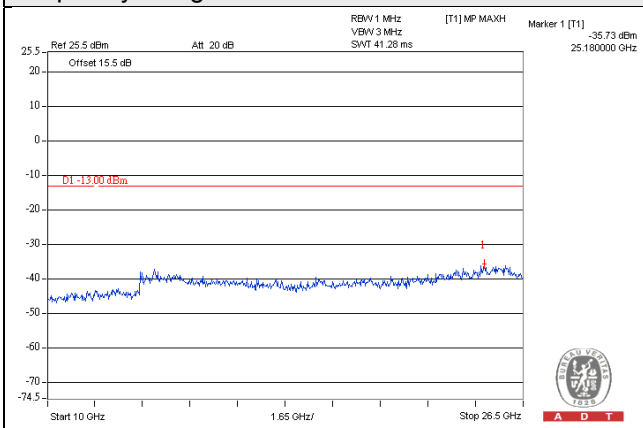
HSUPA	
Channel 4233 (846.6MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz



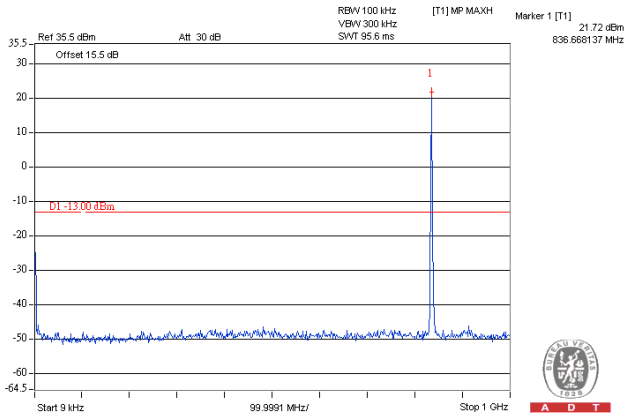


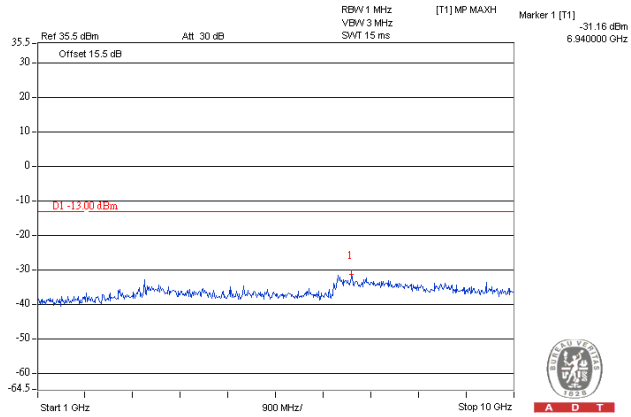
Frequency Range : 10GHz~26.5GHz	



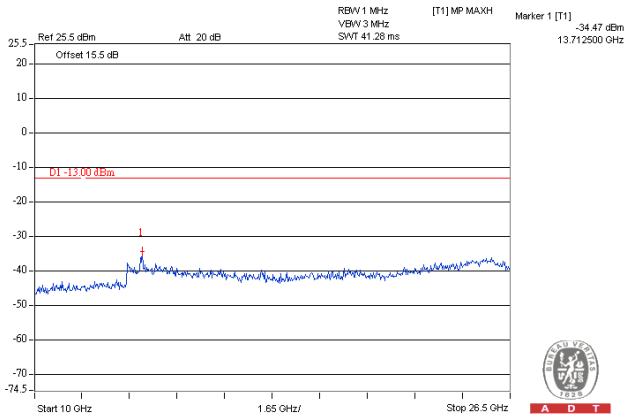
LTE Band 5, Channel Bandwidth 1.4MHz	
Channel 20407 (824.7MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

LTE Band 5, Channel Bandwidth 1.4MHz	
Channel 20525 (836.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

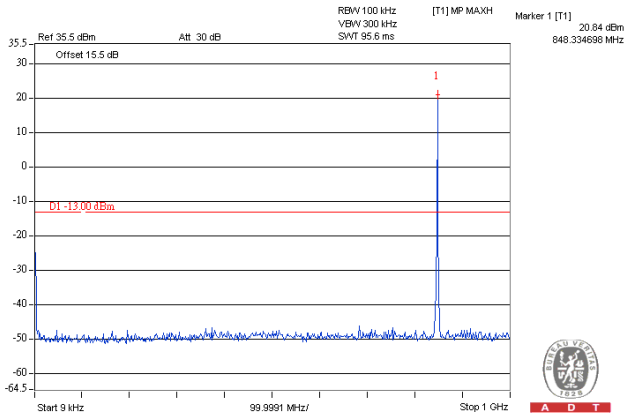


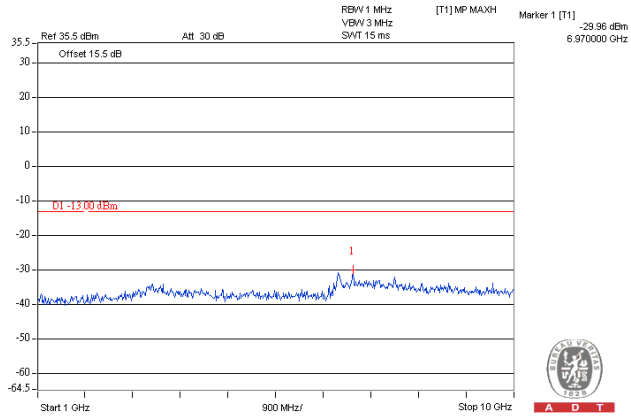


Frequency Range : 10GHz~26.5GHz	

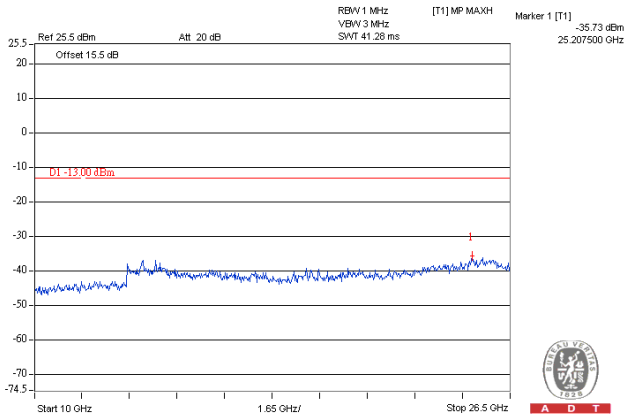


LTE Band 5, Channel Bandwidth 1.4MHz	
Channel 20643 (848.3MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

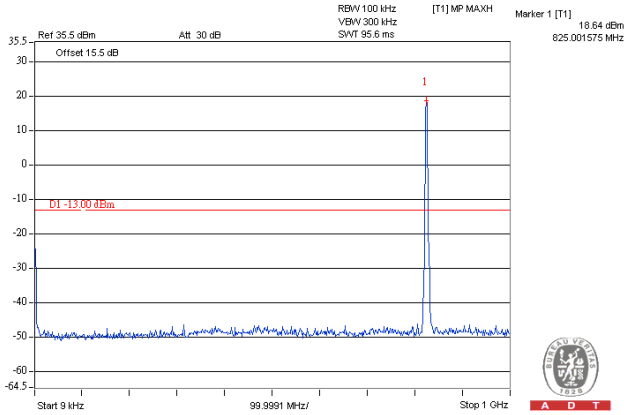


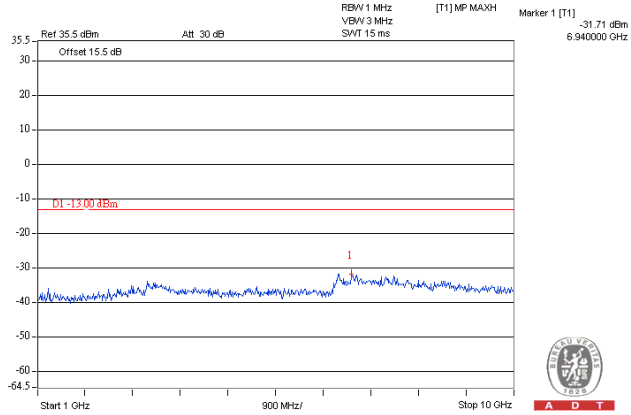


Frequency Range : 10GHz~26.5GHz	

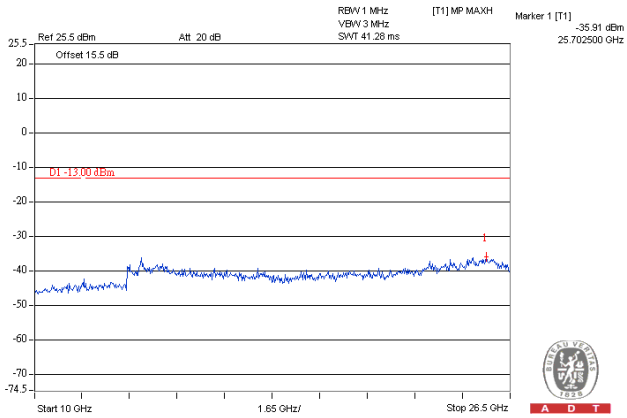


LTE Band 5, Channel Bandwidth 3MHz	
Channel 20415 (825.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

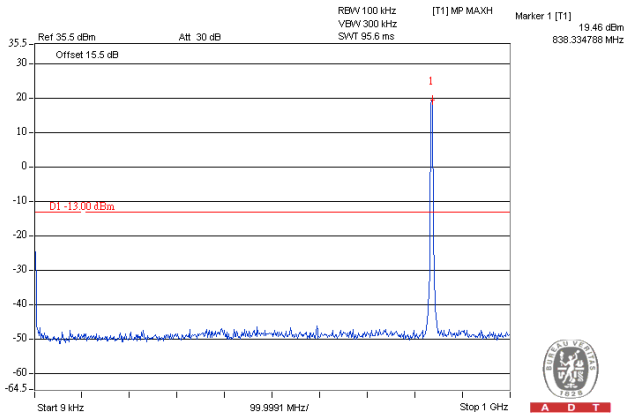


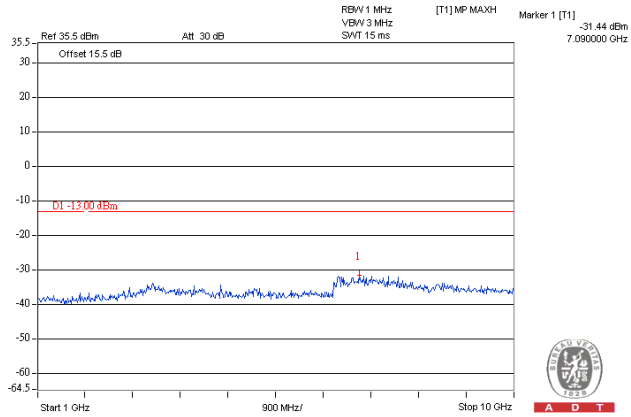


Frequency Range : 10GHz~26.5GHz	

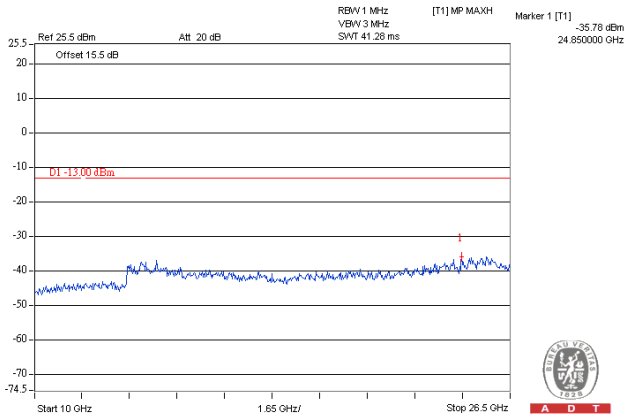


LTE Band 5, Channel Bandwidth 3MHz	
Channel 20525 (836.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

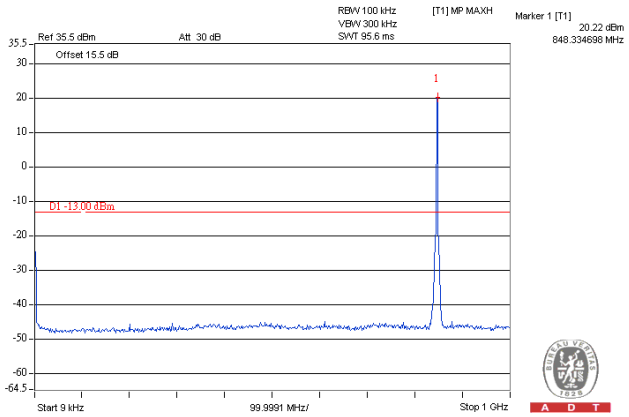


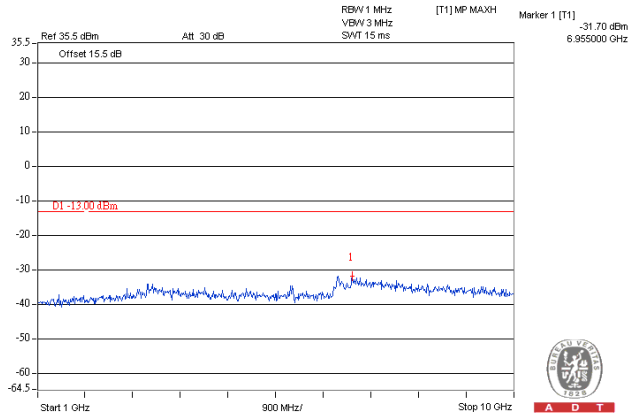


Frequency Range : 10GHz~26.5GHz	

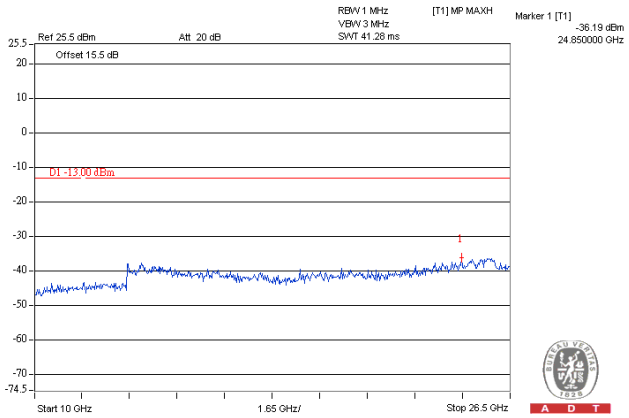


LTE Band 5, Channel Bandwidth 3MHz	
Channel 20635 (847.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

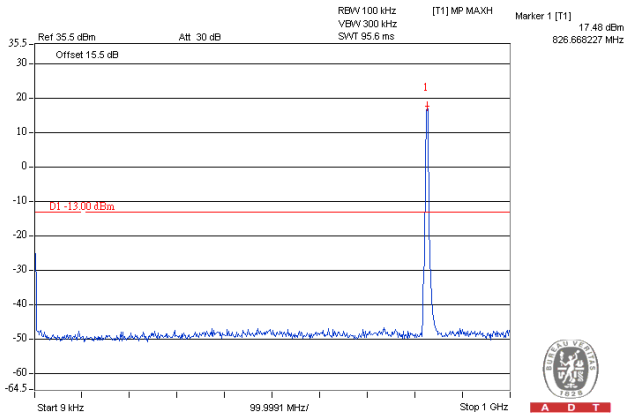


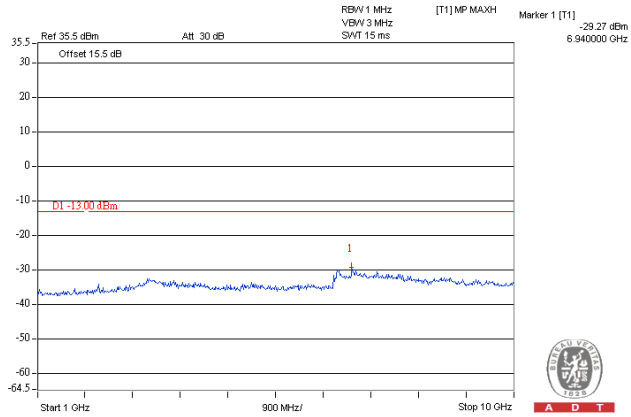


Frequency Range : 10GHz~26.5GHz	

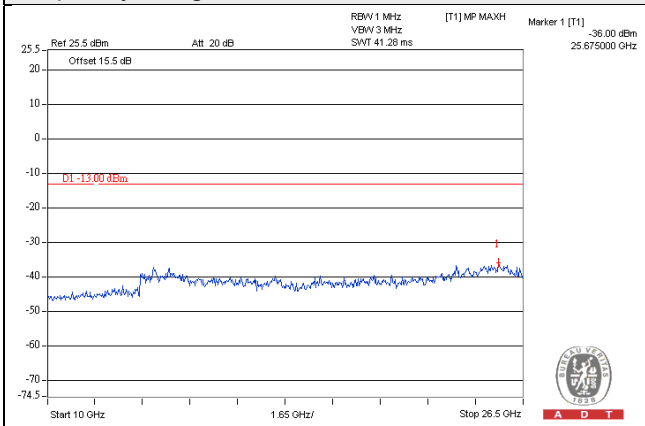


LTE Band 5, Channel Bandwidth 5MHz	
Channel 20425 (826.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

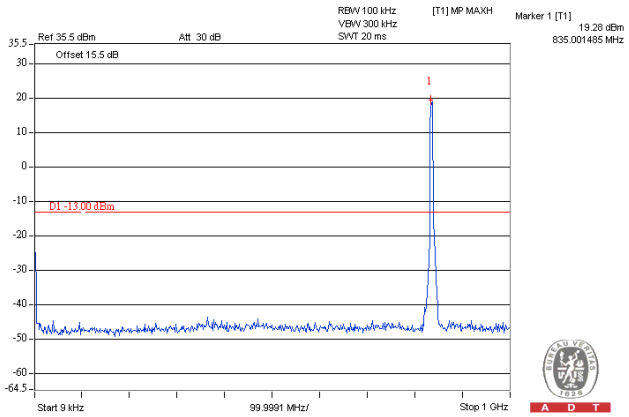


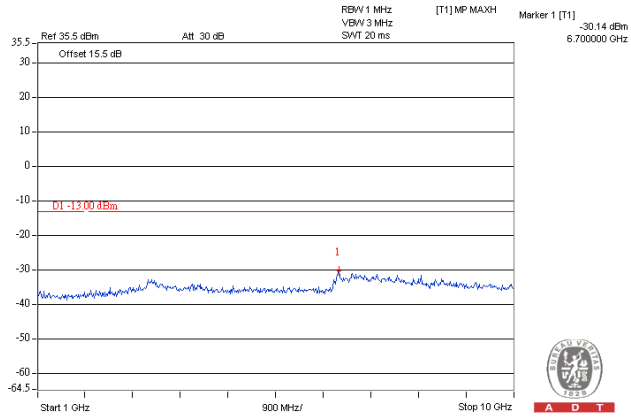


Frequency Range : 10GHz~26.5GHz	

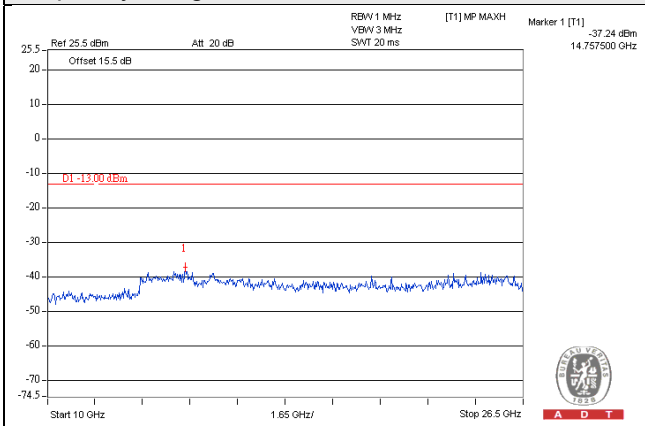


LTE Band 5, Channel Bandwidth 5MHz	
Channel 20525 (836.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

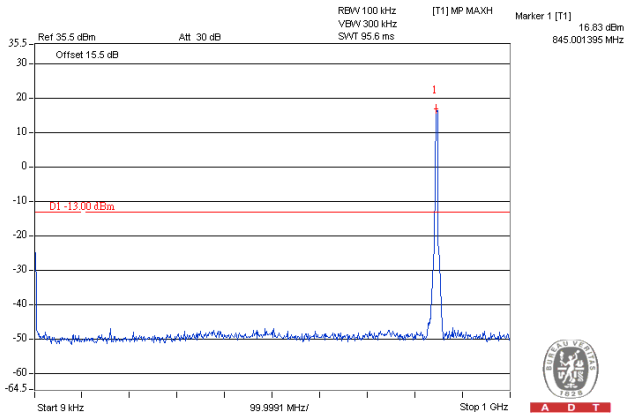


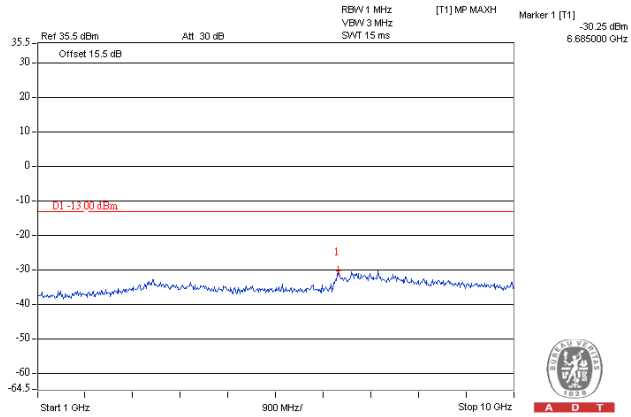


Frequency Range : 10GHz~26.5GHz	

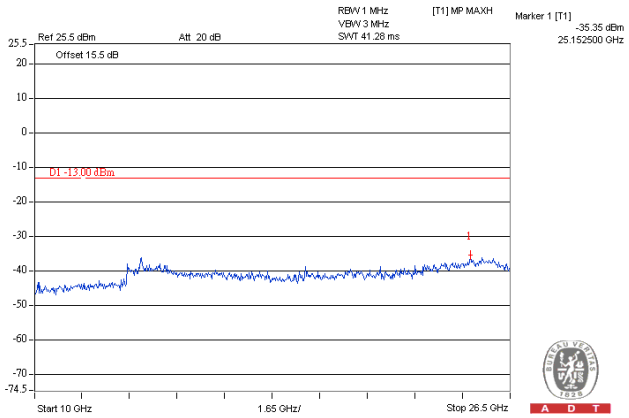


LTE Band 5, Channel Bandwidth 5MHz	
Channel 20625 (847.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

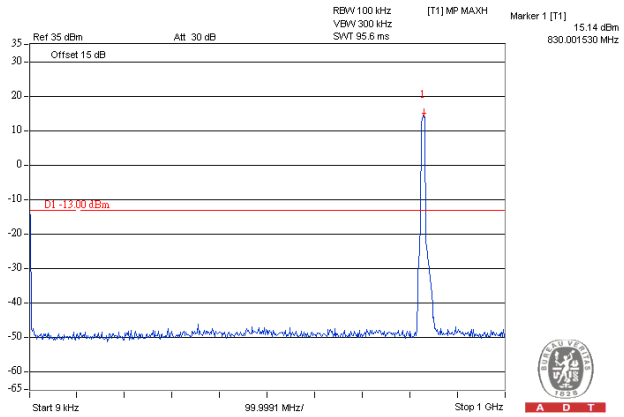


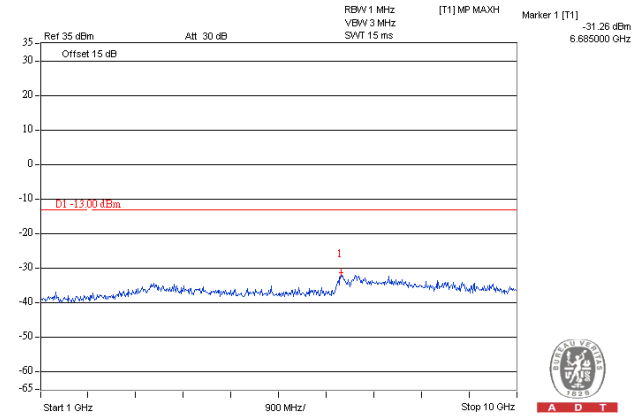


Frequency Range : 10GHz~26.5GHz	

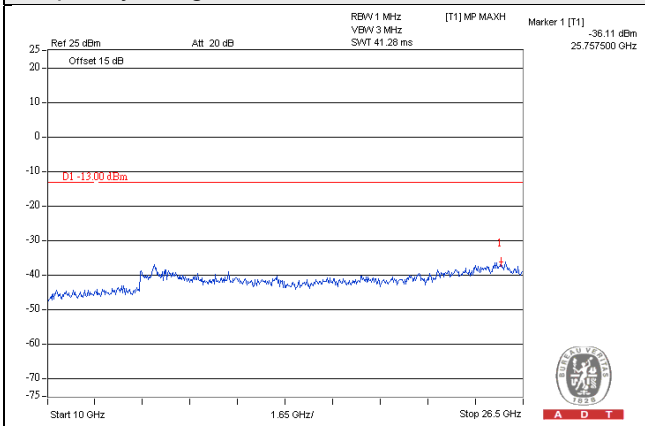


LTE Band 5, Channel Bandwidth 10MHz	
Channel 20450 (829.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

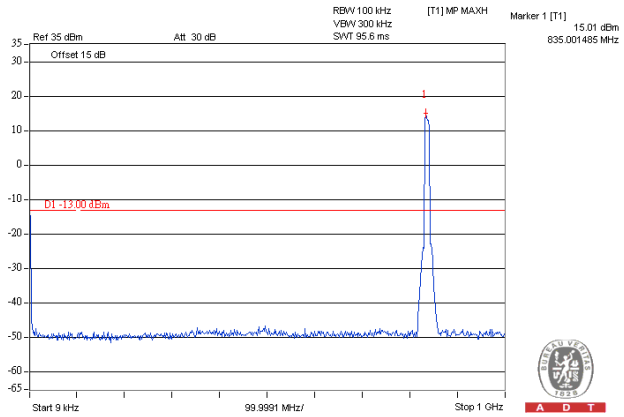


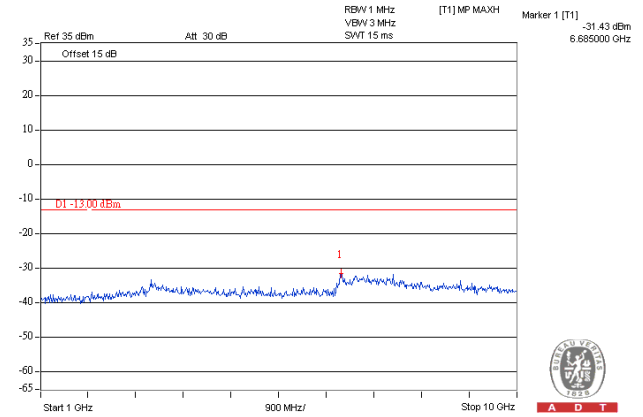


Frequency Range : 10GHz~26.5GHz	

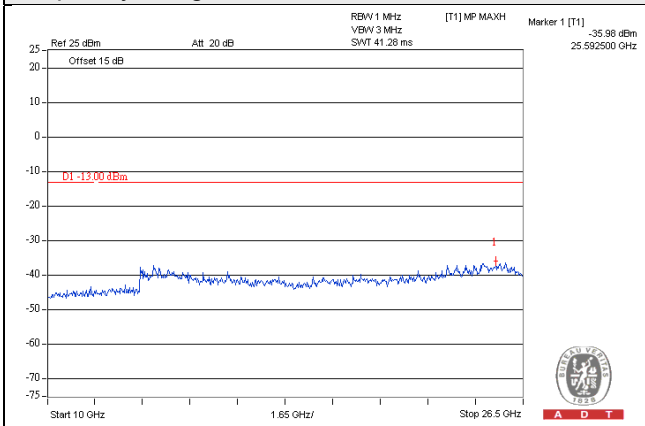


LTE Band 5, Channel Bandwidth 10MHz	
Channel 20525 (836.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

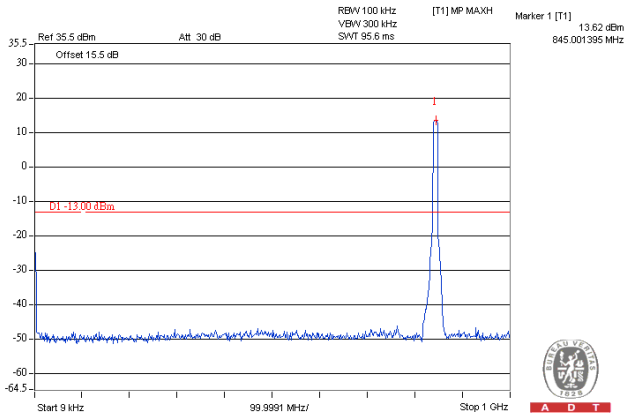


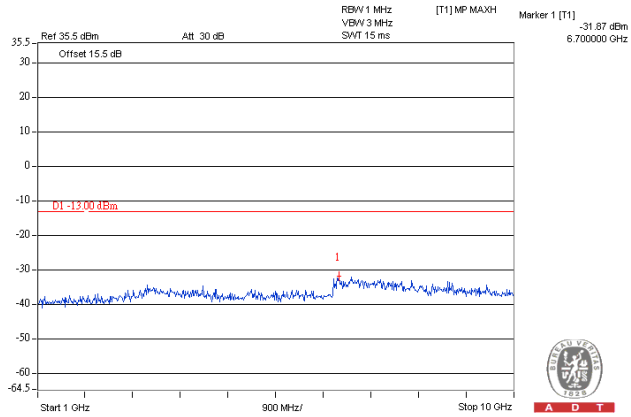


Frequency Range : 10GHz~26.5GHz	

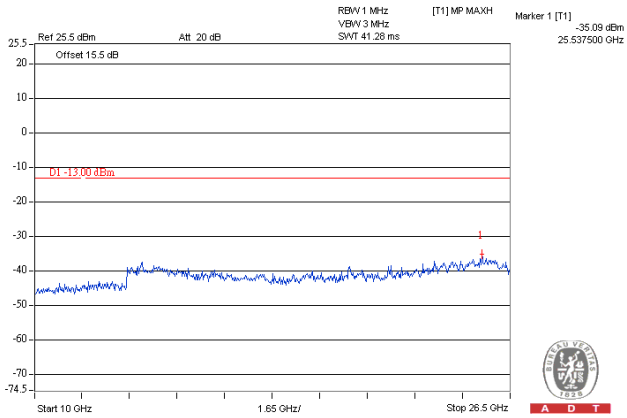


LTE Band 5, Channel Bandwidth 10MHz	
Channel 20600 (844.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz





Frequency Range : 10GHz~26.5GHz	



4.8 Radiated Emission Measurement

4.8.1 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.

4.8.2 Test Procedure

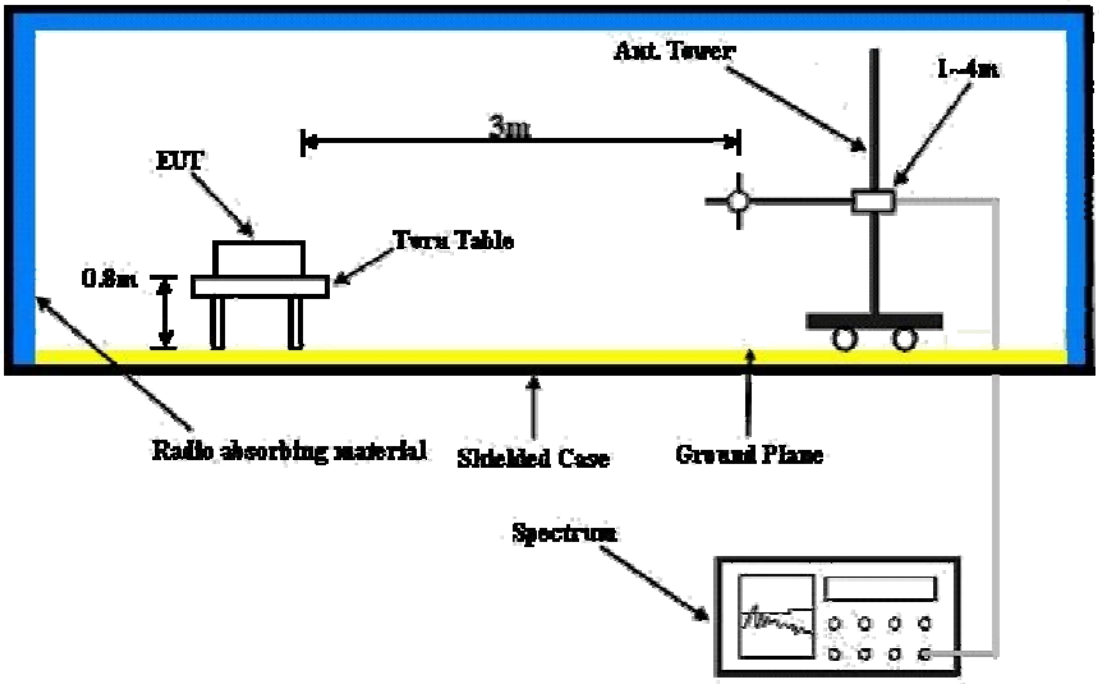
a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G
c. EIRP = Output power level of S.G – TX cable loss + 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, E.R.P power = E.I.R.P power - 2.15dBi.

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

4.8.3 Deviation from Test Standard

No deviation.

4.8.4 Test Setup



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

4.8.5 Test Results

Below 1GHz
GPRS Mode

Mode	TX channel 128 (824.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	A

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	43.58	-55.6	-44.9	-10.3	-55.2	-13.0	-42.2
2	68.80	-41.1	-44.1	-5.3	-49.4	-13.0	-36.4
3	111.48	-41.2	-51.1	0.4	-50.7	-13.0	-37.7
4	146.40	-42.2	-48.6	-0.2	-48.8	-13.0	-35.8
5	212.36	-46.6	-62.7	5.4	-57.3	-13.0	-44.3
6	935.98	-58.5	-57.5	3.9	-53.6	-13.0	-40.6
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	41.64	-37.2	-35.5	-10.6	-46.1	-13.0	-33.1
2	68.80	-33.8	-36.7	-5.3	-42.0	-13.0	-29.0
3	115.36	-42.6	-51.8	0.3	-51.5	-13.0	-38.5
4	173.56	-57.0	-61.4	2.1	-59.3	-13.0	-46.3
5	208.48	-54.8	-63.7	5.4	-58.3	-13.0	-45.3
6	934.04	-58.3	-55.7	3.9	-51.8	-13.0	-38.8

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 128 (824.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	B

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	41.64	-54.1	-42.7	-10.6	-53.3	-13.0	-40.3
2	121.18	-38.4	-48.1	0.1	-48.0	-13.0	-35.0
3	212.36	-52.1	-68.1	5.4	-62.7	-13.0	-49.7
4	288.02	-58.8	-69.4	5.2	-64.2	-13.0	-51.2
5	730.34	-61.9	-65.7	4.9	-60.8	-13.0	-47.8
6	903.00	-53.4	-52.7	3.9	-48.8	-13.0	-35.8
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	41.64	-40.5	-38.8	-10.6	-49.4	-13.0	-36.4
2	64.92	-40.1	-42.9	-6.3	-49.2	-13.0	-36.2
3	107.60	-47.2	-56.3	0.5	-55.8	-13.0	-42.8
4	276.38	-58.5	-63.7	5.3	-58.4	-13.0	-45.4
5	388.90	-51.9	-60.4	5.2	-55.2	-13.0	-42.2
6	730.34	-59.8	-61.1	4.9	-56.2	-13.0	-43.2

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 128 (824.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	C

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	43.58	-45.2	-34.6	-10.3	-44.9	-13.0	-31.9
2	68.80	-41.2	-44.2	-5.3	-49.5	-13.0	-36.5
3	107.60	-40.1	-50.5	0.5	-50.0	-13.0	-37.0
4	132.82	-49.1	-58.2	-0.1	-58.3	-13.0	-45.3
5	730.34	-59.1	-62.9	4.9	-58.0	-13.0	-45.0
6	935.98	-57.2	-56.3	3.9	-52.4	-13.0	-39.4
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	43.58	-42.0	-40.1	-10.3	-50.4	-13.0	-37.4
2	68.80	-37.1	-40.1	-5.3	-45.4	-13.0	-32.4
3	111.48	-41.6	-50.8	0.4	-50.4	-13.0	-37.4
4	130.88	-48.1	-55.4	-0.1	-55.5	-13.0	-42.5
5	730.34	-60.0	-61.4	4.9	-56.5	-13.0	-43.5
6	937.92	-58.9	-56.1	3.9	-52.2	-13.0	-39.2

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 128 (824.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	D

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	301.60	-48.8	-60.6	5.1	-55.5	-13.0	-42.5
2	330.70	-51.4	-62.5	5.2	-57.3	-13.0	-44.3
3	386.96	-50.2	-58.6	5.2	-53.4	-13.0	-40.4
4	406.36	-48.8	-57.1	5.2	-51.9	-13.0	-38.9
5	480.08	-54.5	-62.9	5.0	-57.9	-13.0	-44.9
6	937.92	-56.2	-55.1	3.9	-51.2	-13.0	-38.2
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	59.10	-48.4	-49.9	-7.8	-57.7	-13.0	-44.7
2	80.44	-50.0	-54.2	-1.6	-55.8	-13.0	-42.8
3	404.42	-54.9	-63.2	5.2	-58.0	-13.0	-45.0
4	468.44	-54.6	-62.6	5.0	-57.6	-13.0	-44.6
5	615.88	-59.0	-60.7	4.6	-56.1	-13.0	-43.1
6	937.92	-55.8	-53.0	3.9	-49.1	-13.0	-36.1

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 128 (824.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Matthew Yang	Test Mode	E

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	45.52	-52.1	-42.9	-10.0	-52.9	-13.0	-39.9
2	109.54	-39.6	-50.0	0.5	-49.5	-13.0	-36.5
3	212.36	-57.4	-73.4	5.4	-68.0	-13.0	-55.0
4	282.20	-56.2	-67.7	5.3	-62.4	-13.0	-49.4
5	730.34	-59.9	-63.7	4.9	-58.8	-13.0	-45.8
6	897.18	-59.8	-59.2	3.9	-55.3	-13.0	-42.3
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	45.52	-39.8	-38.3	-10.0	-48.3	-13.0	-35.3
2	76.56	-40.7	-44.4	-2.8	-47.2	-13.0	-34.2
3	113.42	-43.2	-52.5	0.3	-52.2	-13.0	-39.2
4	173.56	-56.5	-60.8	2.1	-58.7	-13.0	-45.7
5	284.14	-58.1	-64.4	5.2	-59.2	-13.0	-46.2
6	937.92	-59.1	-56.4	3.9	-52.5	-13.0	-39.5

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

EDGE Mode

Mode	TX channel 128 (824.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	A

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	35.82	-54.8	-42.2	-11.4	-53.6	-13.0	-40.6
2	68.80	-41.6	-44.6	-5.3	-49.9	-13.0	-36.9
3	111.48	-41.8	-51.7	0.4	-51.3	-13.0	-38.3
4	204.60	-46.8	-63.1	5.4	-57.7	-13.0	-44.7
5	288.02	-55.5	-66.2	5.2	-61.0	-13.0	-48.0
6	935.98	-59.5	-58.5	3.9	-54.6	-13.0	-41.6
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	45.52	-39.7	-38.2	-10.0	-48.2	-13.0	-35.2
2	68.80	-34.0	-36.9	-5.3	-42.2	-13.0	-29.2
3	117.30	-43.8	-52.4	0.2	-52.2	-13.0	-39.2
4	220.12	-56.6	-64.5	5.4	-59.1	-13.0	-46.1
5	299.66	-53.6	-61.5	5.1	-56.4	-13.0	-43.4
6	935.98	-58.1	-55.5	3.9	-51.6	-13.0	-38.6

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 128 (824.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	B

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	66.86	-44.4	-46.7	-5.8	-52.5	-13.0	-39.5
2	117.30	-38.1	-47.9	0.2	-47.7	-13.0	-34.7
3	214.30	-50.5	-66.4	5.4	-61.0	-13.0	-48.0
4	388.90	-62.9	-71.3	5.2	-66.1	-13.0	-53.1
5	745.86	-56.2	-59.4	4.7	-54.7	-13.0	-41.7
6	903.00	-56.1	-55.4	3.9	-51.5	-13.0	-38.5
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	41.64	-39.2	-37.5	-10.6	-48.1	-13.0	-35.1
2	64.92	-39.1	-41.9	-6.3	-48.2	-13.0	-35.2
3	117.30	-47.0	-55.7	0.2	-55.5	-13.0	-42.5
4	130.88	-51.5	-58.8	-0.1	-58.9	-13.0	-45.9
5	730.34	-51.8	-53.2	4.9	-48.3	-13.0	-35.3
6	937.92	-55.9	-53.2	3.9	-49.3	-13.0	-36.3

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 128 (824.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	C

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	41.64	-44.4	-32.9	-10.6	-43.5	-13.0	-30.5
2	64.92	-39.8	-41.6	-6.3	-47.9	-13.0	-34.9
3	109.54	-40.4	-50.8	0.5	-50.3	-13.0	-37.3
4	136.70	-50.0	-58.1	-0.3	-58.4	-13.0	-45.4
5	732.28	-60.4	-64.0	4.9	-59.1	-13.0	-46.1
6	935.98	-59.0	-58.0	3.9	-54.1	-13.0	-41.1
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	43.58	-41.6	-39.7	-10.3	-50.0	-13.0	-37.0
2	68.80	-37.5	-40.4	-5.3	-45.7	-13.0	-32.7
3	109.54	-40.2	-49.6	0.5	-49.1	-13.0	-36.1
4	136.70	-49.9	-56.0	-0.3	-56.3	-13.0	-43.3
5	730.34	-59.3	-60.7	4.9	-55.8	-13.0	-42.8
6	937.92	-57.9	-55.1	3.9	-51.2	-13.0	-38.2

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 128 (824.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	D

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	30.00	-59.0	-45.6	-12.2	-57.8	-13.0	-44.8
2	307.42	-49.8	-61.7	5.1	-56.6	-13.0	-43.6
3	338.46	-51.6	-62.5	5.2	-57.3	-13.0	-44.3
4	381.14	-53.2	-61.6	5.3	-56.3	-13.0	-43.3
5	404.42	-48.8	-57.2	5.2	-52.0	-13.0	-39.0
6	935.98	-58.1	-57.1	3.9	-53.2	-13.0	-40.2
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	53.28	-48.4	-48.5	-8.5	-57.0	-13.0	-44.0
2	138.64	-51.6	-57.6	-0.3	-57.9	-13.0	-44.9
3	371.44	-53.2	-61.8	5.2	-56.6	-13.0	-43.6
4	394.72	-54.2	-62.4	5.2	-57.2	-13.0	-44.2
5	617.82	-54.6	-56.4	4.6	-51.8	-13.0	-38.8
6	937.92	-56.2	-53.5	3.9	-49.6	-13.0	-36.6

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 128 (824.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Matthew Yang	Test Mode	E

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	47.10	-51.4	-42.7	-9.7	-52.4	-13.0	-39.4
2	112.39	-40.5	-50.5	0.4	-50.1	-13.0	-37.1
3	286.49	-57.2	-67.9	5.2	-62.7	-13.0	-49.7
4	354.89	-63.0	-73.3	5.2	-68.1	-13.0	-55.1
5	729.52	-52.1	-56.0	4.9	-51.1	-13.0	-38.1
6	937.82	-55.8	-54.8	3.9	-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	67.31	-40.7	-43.5	-5.7	-49.2	-13.0	-36.2
2	112.39	-43.6	-52.8	0.4	-52.4	-13.0	-39.4
3	166.79	-58.8	-62.2	1.2	-61.0	-13.0	-48.0
4	280.27	-59.4	-65.3	5.3	-60.0	-13.0	-47.0
5	729.52	-52.9	-54.3	4.9	-49.4	-13.0	-36.4
6	902.07	-51.5	-50.4	3.9	-46.5	-13.0	-33.5

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

WCDMA Mode

Mode	TX channel 4132 (826.4MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	20deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	A

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	43.58	-56.1	-45.5	-10.3	-55.8	-13.0	-42.8
2	68.80	-41.1	-44.1	-5.3	-49.4	-13.0	-36.4
3	111.48	-41.7	-51.6	0.4	-51.2	-13.0	-38.2
4	208.48	-45.9	-62.3	5.4	-56.9	-13.0	-43.9
5	305.48	-56.8	-69.0	5.1	-63.9	-13.0	-50.9
6	935.98	-58.1	-57.1	3.9	-53.2	-13.0	-40.2
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	43.58	-39.9	-38.0	-10.3	-48.3	-13.0	-35.3
2	68.80	-34.0	-36.9	-5.3	-42.2	-13.0	-29.2
3	113.42	-42.7	-51.9	0.3	-51.6	-13.0	-38.6
4	231.76	-55.2	-63.3	5.4	-57.9	-13.0	-44.9
5	386.96	-61.5	-70.1	5.2	-64.9	-13.0	-51.9
6	935.98	-57.5	-54.9	3.9	-51.0	-13.0	-38.0

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 4132 (826.4MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	20deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	B

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	41.64	-55.4	-43.9	-10.6	-54.5	-13.0	-41.5
2	70.74	-45.0	-48.8	-4.7	-53.5	-13.0	-40.5
3	117.30	-37.9	-47.7	0.2	-47.5	-13.0	-34.5
4	212.36	-48.0	-64.0	5.4	-58.6	-13.0	-45.6
5	730.34	-61.5	-65.3	4.9	-60.4	-13.0	-47.4
6	935.98	-57.2	-56.3	3.9	-52.4	-13.0	-39.4
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	41.64	-40.6	-38.9	-10.6	-49.5	-13.0	-36.5
2	64.92	-40.4	-43.2	-6.3	-49.5	-13.0	-36.5
3	117.30	-46.5	-55.2	0.2	-55.0	-13.0	-42.0
4	235.64	-58.8	-66.0	5.4	-60.6	-13.0	-47.6
5	743.92	-50.8	-51.9	4.7	-47.2	-13.0	-34.2
6	935.98	-57.0	-54.4	3.9	-50.5	-13.0	-37.5

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 4132 (826.4MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	20deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	C

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	41.64	-45.0	-33.5	-10.6	-44.1	-13.0	-31.1
2	66.86	-39.8	-42.1	-5.8	-47.9	-13.0	-34.9
3	109.54	-40.8	-51.1	0.5	-50.6	-13.0	-37.6
4	136.70	-49.7	-57.8	-0.3	-58.1	-13.0	-45.1
5	231.76	-50.4	-66.3	5.4	-60.9	-13.0	-47.9
6	937.92	-57.2	-56.2	3.9	-52.3	-13.0	-39.3
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	43.58	-41.4	-39.5	-10.3	-49.8	-13.0	-36.8
2	68.80	-37.0	-39.9	-5.3	-45.2	-13.0	-32.2
3	109.54	-39.8	-49.2	0.5	-48.7	-13.0	-35.7
4	136.70	-50.1	-56.2	-0.3	-56.5	-13.0	-43.5
5	216.24	-55.4	-64.0	5.4	-58.6	-13.0	-45.6
6	935.98	-57.4	-54.8	3.9	-50.9	-13.0	-37.9

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 4132 (826.4MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	20deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	D

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	299.66	-51.2	-62.0	5.1	-56.9	-13.0	-43.9
2	348.16	-50.8	-61.5	5.2	-56.3	-13.0	-43.3
3	361.74	-50.8	-60.8	5.2	-55.6	-13.0	-42.6
4	404.42	-49.0	-57.5	5.2	-52.3	-13.0	-39.3
5	425.76	-54.0	-62.8	5.2	-57.6	-13.0	-44.6
6	935.98	-56.5	-55.5	3.9	-51.6	-13.0	-38.6
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	49.40	-49.1	-48.2	-9.3	-57.5	-13.0	-44.5
2	398.60	-55.0	-63.1	5.2	-57.9	-13.0	-44.9
3	470.38	-55.5	-63.2	5.0	-58.2	-13.0	-45.2
4	610.06	-56.1	-58.2	4.5	-53.7	-13.0	-40.7
5	745.86	-58.5	-59.7	4.7	-55.0	-13.0	-42.0
6	935.98	-55.8	-53.1	3.9	-49.2	-13.0	-36.2

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 4132 (826.4MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Matthew Yang	Test Mode	E

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	45.52	-51.1	-41.9	-10.0	-51.9	-13.0	-38.9
2	109.54	-39.4	-49.7	0.5	-49.2	-13.0	-36.2
3	256.98	-56.5	-69.7	5.3	-64.4	-13.0	-51.4
4	282.20	-57.1	-68.6	5.3	-63.3	-13.0	-50.3
5	730.34	-57.6	-61.4	4.9	-56.5	-13.0	-43.5
6	935.98	-57.0	-56.0	3.9	-52.1	-13.0	-39.1
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	43.58	-42.5	-40.6	-10.3	-50.9	-13.0	-37.9
2	66.86	-40.2	-43.1	-5.8	-48.9	-13.0	-35.9
3	109.54	-43.2	-52.6	0.5	-52.1	-13.0	-39.1
4	268.62	-60.6	-64.9	5.3	-59.6	-13.0	-46.6
5	390.84	-62.9	-71.2	5.2	-66.0	-13.0	-53.0
6	730.34	-58.5	-59.9	4.9	-55.0	-13.0	-42.0

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 5, Channel Bandwidth: 1.4MHz

Mode	TX channel 20407 (824.7MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bond Tseng	Test Mode	A

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	51.34	-40.8	-36.8	-7.3	-44.1	-13.0	-31.1
2	86.26	-37.3	-46.4	0.1	-46.3	-13.0	-33.3
3	144.46	-43.5	-47.6	-3.2	-50.8	-13.0	-37.8
4	192.96	-48.2	-56.1	-2.6	-58.7	-13.0	-45.7
5	255.04	-59.5	-65.7	-1.4	-67.1	-13.0	-54.1
6	943.74	-55.0	-52.6	3.7	-48.9	-13.0	-35.9
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	55.22	-35.5	-39.2	-5.4	-44.6	-13.0	-31.6
2	86.26	-32.2	-40.3	0.1	-40.2	-13.0	-27.2
3	140.58	-47.5	-49.3	-3.0	-52.3	-13.0	-39.3
4	179.38	-50.8	-53.4	-2.9	-56.3	-13.0	-43.3
5	297.72	-56.2	-57.0	-1.7	-58.7	-13.0	-45.7
6	947.62	-57.4	-54.0	3.8	-50.2	-13.0	-37.2

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 20407 (824.7MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	B

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	39.70	-52.5	-41.5	-10.9	-52.4	-13.0	-39.4
2	68.80	-49.0	-52.0	-5.3	-57.3	-13.0	-44.3
3	117.30	-39.0	-48.8	0.2	-48.6	-13.0	-35.6
4	128.94	-47.1	-56.3	-0.1	-56.4	-13.0	-43.4
5	745.86	-56.6	-59.8	4.7	-55.1	-13.0	-42.1
6	937.92	-54.8	-53.8	3.9	-49.9	-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	39.70	-41.8	-41.0	-10.9	-51.9	-13.0	-38.9
2	66.86	-40.8	-43.6	-5.8	-49.4	-13.0	-36.4
3	119.24	-48.5	-57.1	0.1	-57.0	-13.0	-44.0
4	730.34	-56.8	-58.2	4.9	-53.3	-13.0	-40.3
5	937.92	-56.5	-53.8	3.9	-49.9	-13.0	-36.9
6	990.30	-69.0	-64.7	3.9	-60.8	-13.0	-47.8

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 20407 (824.7MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	C

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	41.64	-43.9	-32.4	-10.6	-43.0	-13.0	-30.0
2	68.80	-40.5	-43.4	-5.3	-48.7	-13.0	-35.7
3	107.60	-40.1	-50.5	0.5	-50.0	-13.0	-37.0
4	136.70	-49.7	-57.8	-0.3	-58.1	-13.0	-45.1
5	730.34	-61.0	-64.8	4.9	-59.9	-13.0	-46.9
6	935.98	-56.6	-55.7	3.9	-51.8	-13.0	-38.8
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	43.58	-41.8	-39.8	-10.3	-50.1	-13.0	-37.1
2	66.86	-36.8	-39.6	-5.8	-45.4	-13.0	-32.4
3	111.48	-39.6	-48.8	0.4	-48.4	-13.0	-35.4
4	270.56	-58.8	-63.0	5.3	-57.7	-13.0	-44.7
5	734.22	-60.1	-61.4	4.8	-56.6	-13.0	-43.6
6	937.92	-58.2	-55.5	3.9	-51.6	-13.0	-38.6

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 20407 (824.7MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Luis Lee	Test Mode	D

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	49.40	-55.2	-47.9	-9.3	-57.2	-13.0	-44.2
2	107.60	-47.0	-57.4	0.5	-56.9	-13.0	-43.9
3	305.48	-49.7	-61.8	5.1	-56.7	-13.0	-43.7
4	390.84	-53.5	-61.8	5.2	-56.6	-13.0	-43.6
5	404.42	-48.4	-56.8	5.2	-51.6	-13.0	-38.6
6	935.98	-56.2	-55.3	3.9	-51.4	-13.0	-38.4
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	61.04	-49.9	-52.0	-7.3	-59.3	-13.0	-46.3
2	123.12	-51.0	-58.9	0.0	-58.9	-13.0	-45.9
3	136.70	-49.5	-55.6	-0.3	-55.9	-13.0	-42.9
4	392.78	-53.8	-62.0	5.2	-56.8	-13.0	-43.8
5	666.32	-61.8	-63.9	5.0	-58.9	-13.0	-45.9
6	935.98	-57.4	-54.8	3.9	-50.9	-13.0	-37.9

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 20407 (824.7MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Matthew Yang	Test Mode	E

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	47.10	-51.4	-42.7	-9.7	-52.4	-13.0	-39.4
2	112.39	-40.5	-50.5	0.4	-50.1	-13.0	-37.1
3	286.49	-57.2	-67.9	5.2	-62.7	-13.0	-49.7
4	354.89	-63.0	-73.3	5.2	-68.1	-13.0	-55.1
5	729.52	-52.1	-56.0	4.9	-51.1	-13.0	-38.1
6	937.82	-55.8	-54.8	3.9	-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	67.31	-40.7	-43.5	-5.7	-49.2	-13.0	-36.2
2	112.39	-43.6	-52.8	0.4	-52.4	-13.0	-39.4
3	166.79	-58.8	-62.2	1.2	-61.0	-13.0	-48.0
4	280.27	-59.4	-65.3	5.3	-60.0	-13.0	-47.0
5	729.52	-52.9	-54.3	4.9	-49.4	-13.0	-36.4
6	902.07	-51.5	-50.4	3.9	-46.5	-13.0	-33.5

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 5, Channel Bandwidth: 3MHz

Mode	TX channel 20415 (825.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bond Tseng	Test Mode	A

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	33.88	-51.0	-33.2	-17.1	-50.3	-13.0	-37.3
2	53.28	-48.5	-46.2	-6.2	-52.4	-13.0	-39.4
3	86.26	-37.8	-46.9	0.1	-46.8	-13.0	-33.8
4	148.34	-44.7	-48.6	-3.0	-51.6	-13.0	-38.6
5	183.26	-43.8	-51.3	-3.0	-54.3	-13.0	-41.3
6	949.56	-56.9	-54.5	3.7	-50.8	-13.0	-37.8
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	30.00	-34.3	-27.0	-19.4	-46.4	-13.0	-33.4
2	86.26	-32.0	-40.2	0.1	-40.1	-13.0	-27.1
3	138.64	-49.4	-51.3	-3.2	-54.5	-13.0	-41.5
4	185.20	-49.9	-52.1	-2.8	-54.9	-13.0	-41.9
5	429.64	-56.2	-62.3	3.5	-58.8	-13.0	-45.8
6	943.74	-55.2	-52.0	3.7	-48.3	-13.0	-35.3

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 5, Channel Bandwidth: 5MHz

Mode	TX channel 20415 (825.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bond Tseng	Test Mode	A

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	53.28	-48.5	-46.2	-6.2	-52.4	-13.0	-39.4
2	86.26	-37.2	-46.3	0.1	-46.2	-13.0	-33.2
3	146.40	-42.8	-46.7	-3.0	-49.7	-13.0	-36.7
4	187.14	-44.8	-52.4	-2.7	-55.1	-13.0	-42.1
5	295.78	-61.2	-64.4	-1.8	-66.2	-13.0	-53.2
6	947.62	-57.6	-55.3	3.8	-51.5	-13.0	-38.5
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	53.28	-36.0	-38.8	-6.2	-45.0	-13.0	-32.0
2	86.26	-33.8	-42.0	0.1	-41.9	-13.0	-28.9
3	136.70	-46.6	-48.8	-3.2	-52.0	-13.0	-39.0
4	185.20	-50.6	-52.8	-2.8	-55.6	-13.0	-42.6
5	297.72	-55.8	-56.5	-1.7	-58.2	-13.0	-45.2
6	943.74	-54.0	-50.7	3.7	-47.0	-13.0	-34.0

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 5, Channel Bandwidth: 10MHz

Mode	TX channel 20415 (825.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bond Tseng	Test Mode	A

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	33.88	-49.9	-32.0	-17.1	-49.1	-13.0	-36.1
2	84.32	-38.4	-46.9	0.4	-46.5	-13.0	-33.5
3	146.40	-42.8	-46.7	-3.0	-49.7	-13.0	-36.7
4	183.26	-45.0	-52.6	-3.0	-55.6	-13.0	-42.6
5	297.72	-60.2	-63.4	-1.7	-65.1	-13.0	-52.1
6	941.80	-54.5	-52.0	3.8	-48.2	-13.0	-35.2
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	53.28	-36.5	-39.4	-6.2	-45.6	-13.0	-32.6
2	88.20	-31.8	-40.2	-0.2	-40.4	-13.0	-27.4
3	140.58	-49.2	-51.0	-3.0	-54.0	-13.0	-41.0
4	189.08	-54.5	-56.1	-2.8	-58.9	-13.0	-45.9
5	429.64	-56.9	-62.9	3.5	-59.4	-13.0	-46.4
6	941.80	-54.8	-51.6	3.8	-47.8	-13.0	-34.8

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Above 1GHz
GPRS Mode

Mode	TX channel 128 (824.2MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bayu Chen		

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	1648.40	-47.9	-40.1	0.9	-39.2	-13.0	-26.2
2	**2472.60**	**-32.1**	**-25.8**	**0.1**	**-25.7**	**-13.0**	**-12.7**
3	4121.00	-50.6	-44.1	1.1	-43.0	-13.0	-30.0
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	1648.40	-44.4	-37.0	0.9	-36.1	-13.0	-23.1
2	2472.60	-38.5	-34.5	0.1	-34.4	-13.0	-21.4
3	4121.00	-53.6	-46.4	1.1	-45.3	-13.0	-32.3

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 189 (836.4MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bayu Chen		

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	1672.80	-47.0	-39.3	0.8	-38.5	-13.0	-25.5
2	2509.20	-32.9	-26.5	0.2	-26.3	-13.0	-13.3
3	4182.00	-49.8	-43.4	1.0	-42.4	-13.0	-29.4
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	1672.80	-43.9	-36.6	0.8	-35.8	-13.0	-22.8
2	2509.20	-39.9	-36.0	0.2	-35.8	-13.0	-22.8
3	4182.00	-53.4	-45.9	1.0	-44.9	-13.0	-31.9

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 251 (848.8MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bayu Chen		

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	1697.60	-47.5	-40.0	0.7	-39.3	-13.0	-26.3
2	2546.40	-33.0	-27.0	0.2	-26.8	-13.0	-13.8
3	4244.00	-49.5	-42.9	1.0	-41.9	-13.0	-28.9
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	1697.60	-43.0	-35.7	0.7	-35.0	-13.0	-22.0
2	2546.40	-40.9	-36.8	0.2	-36.6	-13.0	-23.6
3	4244.00	-54.5	-47.0	1.0	-46.0	-13.0	-33.0

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

WCDMA Mode

Mode	TX channel 4132 (826.4MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bond Tseng		

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	1652.80	-59.4	-51.6	0.9	-50.7	-13.0	-37.7
2	2479.20	-55.7	-49.3	0.1	-49.2	-13.0	-36.2
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	1652.80	-57.9	-50.6	0.9	-49.7	-13.0	-36.7
2	2479.20	-57.9	-53.8	0.1	-53.7	-13.0	-40.7

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 4182 (836.6MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bond Tseng		

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	1672.80	-59.2	-51.6	0.8	-50.8	-13.0	-37.8
2	2509.20	-55.5	-49.2	0.2	-49.0	-13.0	-36.0
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	1672.80	-57.8	-50.4	0.8	-49.6	-13.0	-36.6
2	2509.20	-57.6	-53.7	0.2	-53.5	-13.0	-40.5

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 4233 (846.6MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bond Tseng		

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	1693.20	-59.5	-52.0	0.7	-51.3	-13.0	-38.3
2	2539.80	-49.1	-43.0	0.2	-42.8	-13.0	-29.8
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	1693.20	-57.6	-50.3	0.7	-49.6	-13.0	-36.6
2	2539.80	-57.5	-53.5	0.2	-53.3	-13.0	-40.3

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 5, Channel Bandwidth: 1.4MHz

Mode	TX channel 20407 (824.7MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bond Tseng		

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	1649.40	-58.8	-51.0	0.9	-50.1	-13.0	-37.1
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	1649.40	-57.9	-50.7	0.9	-49.8	-13.0	-36.8

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 20525 (836.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bond Tseng		

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	1673.00	-56.0	-48.3	0.8	-47.5	-13.0	-34.5
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	1673.00	-54.8	-47.4	0.8	-46.6	-13.0	-33.6

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 20643 (848.3MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bond Tseng		

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	1696.60	-58.5	-50.9	0.7	-50.2	-13.0	-37.2
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	1696.60	-57.8	-50.4	0.7	-49.7	-13.0	-36.7

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 5, Channel Bandwidth: 3MHz

Mode	TX channel 20415 (825.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bond Tseng		

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	1649.40	-58.4	-50.7	0.9	-49.8	-13.0	-36.8
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	1649.40	-57.4	-50.2	0.9	-49.3	-13.0	-36.3

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 20525 (836.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bond Tseng		

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	1673.00	-56.5	-48.8	0.8	-48.0	-13.0	-35.0
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	1673.00	-54.6	-47.3	0.8	-46.5	-13.0	-33.5

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 20635 (847.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Bond Tseng		

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	1695.00	-57.8	-50.2	0.7	-49.5	-13.0	-36.5
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	1695.00	-57.4	-50.1	0.7	-49.4	-13.0	-36.4

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 5, Channel Bandwidth: 5MHz

Mode	TX channel 20425 (826.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Jones Chang		

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	1653.00	-58.4	-50.7	0.9	-49.8	-13.0	-36.8
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	1653.00	-58.4	-51.1	0.9	-50.2	-13.0	-37.2

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 20525 (836.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Jones Chang		

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	1673.00	-56.3	-48.7	0.8	-47.9	-13.0	-34.9
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	1673.00	-54.2	-46.9	0.8	-46.1	-13.0	-33.1

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 20625 (846.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Jones Chang		

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	1693.00	-59.0	-51.5	0.7	-50.8	-13.0	-37.8
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	1693.00	-58.2	-50.9	0.7	-50.2	-13.0	-37.2

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 5, Channel Bandwidth: 10MHz

Mode	TX channel 20450 (829.0MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Jones Chang		

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	1658.00	-59.2	-51.6	0.9	-50.7	-13.0	-37.7
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	1658.00	-57.1	-49.9	0.9	-49.0	-13.0	-36.0

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 20525 (836.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Jones Chang		

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	1673.00	-56.2	-48.5	0.8	-47.7	-13.0	-34.7
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	1673.00	-55.2	-47.9	0.8	-47.1	-13.0	-34.1

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 20600 (844.0MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	20deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Jones Chang		

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	1688.00	-58.1	-50.5	0.7	-49.8	-13.0	-36.8
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	1688.00	-57.8	-50.5	0.7	-49.8	-13.0	-36.8
2	1688.00	-58.3	-51.0	0.7	-50.3	-13.0	-37.3

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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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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