

FCC Test Report (Part 22)

Report No.: RF180129C24

FCC ID: JOYDA39

Test Model: AL-T52V1

Received Date: Jan. 29, 2018

Test Date: Feb. 01 ~ Feb. 08, 2018

Issued Date: Feb. 27, 2018

Applicant: Kyocera Corporation

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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.)

FCC Registration / 788550 / TW0003

Designation Number:



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Release Control Record

Issue No.	Description	Date Issued
RF180129C24	Original release	Feb. 27, 2018

1 Certificate of Conformity

Product: Telematics Module

Brand: Kyocera

Test Model: AL-T52V1

Sample Status: Engineering sample

Applicant: Kyocera Corporation

Test Date: Feb. 01 ~ Feb. 08, 2018

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 RF characteristics under the conditions specified in this report.


Prepared by :


Suntee Liu / Specialist

, Date:

Feb. 27, 2018

Approved by :


Bruce Chen / Project Engineer

, Date:

Feb. 27, 2018

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 -23.9dB at 30.00MHz.

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	3.59 dB
	200MHz ~1000MHz	3.60 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 KEYSIGHT	N9038A	MY55420137	Mar. 27, 2017	Mar. 26, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	May 11, 2017	May 10, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Dec. 12, 2017	Dec. 11, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna EMCI	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Aug. 08, 2017	Aug. 07, 2018
Preamplifier Agilent (Above 1GHz)	8449B	3008A01638	Feb. 22, 2017	Feb. 21, 2018
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 15, 2018	Jan. 14, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Aug. 08, 2017	Aug. 07, 2018
RF signal cable Woken	8D-FB	Cable-CH9-01	Aug. 01, 2017	Jul. 31, 2018
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	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 9.
 3. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
 4. The IC Site Registration No. is IC 7450F-9.

3 General Information

3.1 General Description of EUT

Product	Telematics Module	
Brand	Kyocera	
Test Model	AL-T52V1	
Sample Status	Engineering sample	
Power Supply Rating	5Vdc	
Modulation Type	WCDMA: BPSK, QPSK HSDPA: BPSK HSUPA: QPSK LTE: QPSK, 16QAM	
Operating Frequency	WCDMA Band 5	826.4~846.6MHz
	LTE Band 26 (Channel Bandwidth 1.4MHz)	824.7~848.3MHz
	LTE Band 26 (Channel Bandwidth 3MHz)	825.5~847.5MHz
	LTE Band 26 (Channel Bandwidth 5MHz)	826.5~846.5MHz
	LTE Band 26 (Channel Bandwidth 10MHz)	829~844MHz
	LTE Band 26 (Channel Bandwidth 15MHz)	831.5~841.5MHz
Max. ERP Power	WCDMA Band 5	56.234mW (17.5dBm)
	LTE Band 26 (Channel Bandwidth 1.4MHz)	218.776mW (23.4dBm)
	LTE Band 26 (Channel Bandwidth 3MHz)	218.776mW (23.4dBm)
	LTE Band 26 (Channel Bandwidth 5MHz)	199.526mW (23.0dBm)
	LTE Band 26 (Channel Bandwidth 10MHz)	208.930mW (23.2dBm)
	LTE Band 26 (Channel Bandwidth 15MHz)	190.546mW (22.8dBm)
Antenna Type	Refer to Note	
Antenna Connector	Refer to Note	
Accessory Device	Refer to Note	
Cable Supplied	0.08m module cable	

Note:

1. The EUT uses following antennas (support units).

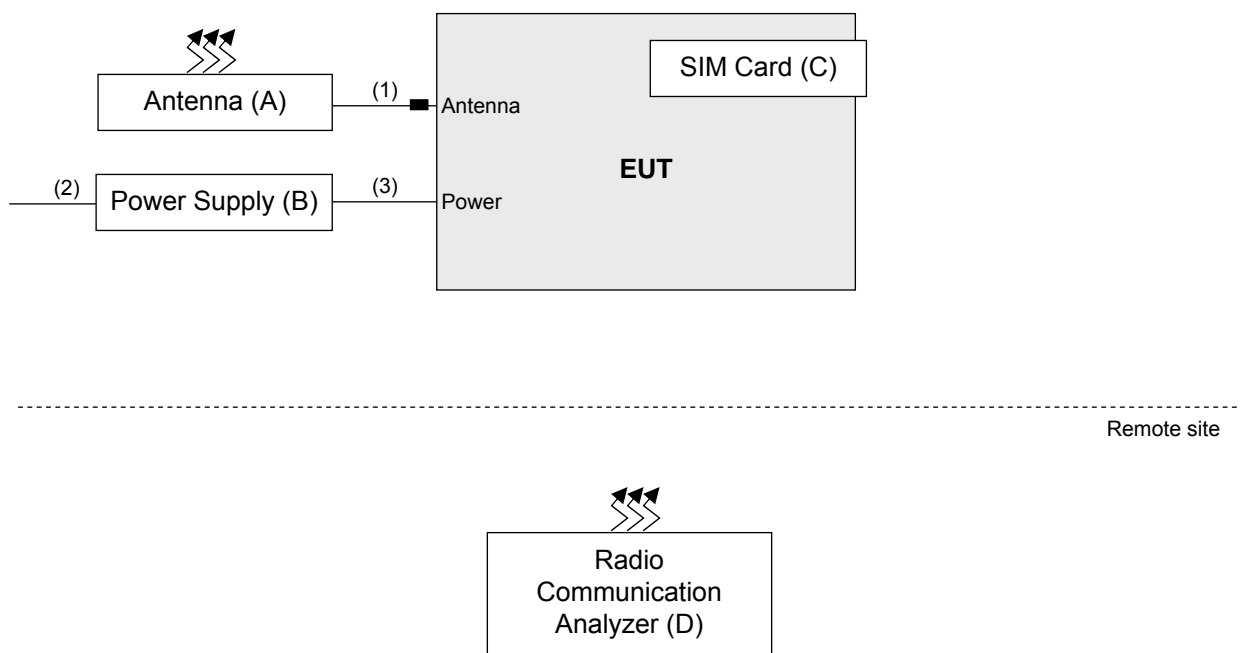
Antenna 1					
Antenna Type	AUX		Connector Type		SMA
Manufacturer	YOKOWO		Part Number		86769-459B1
Band	B12	B13	B5 / B26	B4	B2
Frequency (MHz)	704	782	832	1730	1880
Gain (dBi)	3.1	3.2	3.8	2.6	2.0

Antenna 2					
Antenna Type	AUX		Connector Type		SMA
Manufacturer	taoglas		Part Number		TG.30.8113
Band	B12 / B13	B5 / B26	B4	B2	
Frequency (MHz)	700-800	824-960	1710-1880	1850-1990	
Free Space Straight Gain (dBi)	1.1	0.3	1.9	2.7	
Free Space Bent Gain (dBi)	2.6	1.5	2.7	3.1	

For WCDMA Band 2 and LTE Band 2: Antenna 2 was chosen for final test according to manufacturer's requirement.

For WCDMA Band 4, 5 and LTE Band 4, 5, 12, 13, 26: Antenna 1 was chosen for final test according to manufacturer's requirement.

3.2 Configuration of System under Test



3.2.1 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Antenna	taoglas	TG.30.8113	NA	NA	Provided by manufacturer
B.	Power Supply	Inspower	DC400-20D	212004	FCC DoC Approved	Provided by manufacturer Input:100-240Vac, 0.4A, 50-60Hz Output: 5Vdc, 3A
C.	SIM Card	NA	NA	NA	NA	Provided by manufacturer
D.	Radio Communication Tester	R&S	CMU200	123112	NA	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Antenna	1	3	N	1	Provided by manufacturer
2.	Power	1	1.75	N	0	Provided by manufacturer
3.	Module cable	2	0.08	N	0	Attached on EUT

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

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 X-plane for WCDMA and Y-plane for LTE. Following channel(s) was (were) selected for the final test as listed below.

WCDMA Band 5

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

LTE Band 26

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	26797 to 27033	26797 (824.7MHz), 26915 (836.5MHz), 27033 (848.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		26805 to 27025	26805 (825.5MHz), 26915 (836.5MHz), 27025 (847.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		26815 to 27015	26815 (826.5MHz), 26915 (836.5MHz), 27015 (846.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		26840 to 26990	26840 (829MHz), 26915 (836.5MHz), 26990 (844MHz)	10MHz	QPSK	1 RB / 0 RB Offset
		26865 to 26965	26865 (831.5MHz), 26965 (841.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset
-	Modulation Characteristics	26865 to 26965	26915 (836.5MHz)	15MHz	QPSK / 16QAM	1 RB / 0 RB Offset
-	Frequency Stability	26797 to 27033	26915 (836.5MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	26797 to 27033	26797 (824.7MHz), 26915 (836.5MHz), 27033 (848.3MHz)	1.4MHz	QPSK / 16QAM	1 RB / 6 RB Offset
		26805 to 27025	26805 (825.5MHz), 26915 (836.5MHz), 27025 (847.5MHz)	3MHz	QPSK / 16QAM	1 RB / 15 RB Offset
		26815 to 27015	26815 (826.5MHz), 26915 (836.5MHz), 27015 (846.5MHz)	5MHz	QPSK / 16QAM	1 RB / 25 RB Offset
		26840 to 26990	26840 (829MHz), 26915 (836.5MHz), 26990 (844MHz)	10MHz	QPSK / 16QAM	1 RB / 50 RB Offset
		26865 to 26965	26865 (831.5MHz), 26965 (841.5MHz)	15MHz	QPSK / 16QAM	1 RB / 75 RB Offset
-	Band Edge	26797 to 27033	26797 (824.7MHz), 27033 (848.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset 1 RB / 5 RB Offset 6 RB / 0 RB Offset
		26805 to 27025	26805 (825.5MHz), 27025 (847.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset 1 RB / 14 RB Offset 15 RB / 0 RB Offset
		26815 to 27015	26815 (826.5MHz), 27015 (846.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		26840 to 26990	26840 (829MHz), 26990 (844MHz)	10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
		26865 to 26965	26865 (831.5MHz), 26965 (841.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset 1 RB / 74 RB Offset 75 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	Peak to Average Ratio	26797 to 27033	26797 (824.7MHz), 26915 (836.5MHz), 27033 (848.3MHz)	1.4MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		26805 to 27025	26805 (825.5MHz), 26915 (836.5MHz), 27025 (847.5MHz)	3MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		26815 to 27015	26815 (826.5MHz), 26915 (836.5MHz), 27015 (846.5MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		26840 to 26990	26840 (829MHz), 26915 (836.5MHz), 26990 (844MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		26865 to 26965	26865 (831.5MHz), 26965 (841.5MHz)	15MHz	QPSK / 16QAM	1 RB / 0 RB Offset
-	Conducted Emission	26797 to 27033	26797 (824.7MHz), 26915 (836.5MHz), 27033 (848.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		26805 to 27025	26805 (825.5MHz), 26915 (836.5MHz), 27025 (847.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		26815 to 27015	26815 (826.5MHz), 26915 (836.5MHz), 27015 (846.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		26840 to 26990	26840 (829MHz), 26990 (844MHz)	10MHz	QPSK	1 RB / 0 RB Offset
		26865 to 26965	26865 (831.5MHz), 26965 (841.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Below 1GHz	26797 to 27033	26797 (824.7MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		26805 to 27025	26805 (825.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		26815 to 27015	26815 (826.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		26840 to 26990	26840 (829MHz)	10MHz	QPSK	1 RB / 0 RB Offset
		26865 to 26965	26865 (831.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	26797 to 27033	26797 (824.7MHz), 26915 (836.5MHz), 27033 (848.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		26805 to 27025	26805 (825.5MHz), 26915 (836.5MHz), 27025 (847.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		26815 to 27015	26815 (826.5MHz), 26915 (836.5MHz), 27015 (846.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		26840 to 26990	26840 (829MHz), 26915 (836.5MHz), 26990 (844MHz)	10MHz	QPSK	1 RB / 0 RB Offset
		26865 to 26965	26865 (831.5MHz), 26965 (841.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset

Note:

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

Test Condition:

Test Item	Environmental Conditions	Input Power (system)	Tested By
ERP	25deg. C, 65%RH	120Vac, 60Hz	Greg Lin
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	25deg. C, 66%RH 25deg. C, 65%RH	120Vac, 60Hz	James Yang Greg Lin

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.

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:

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

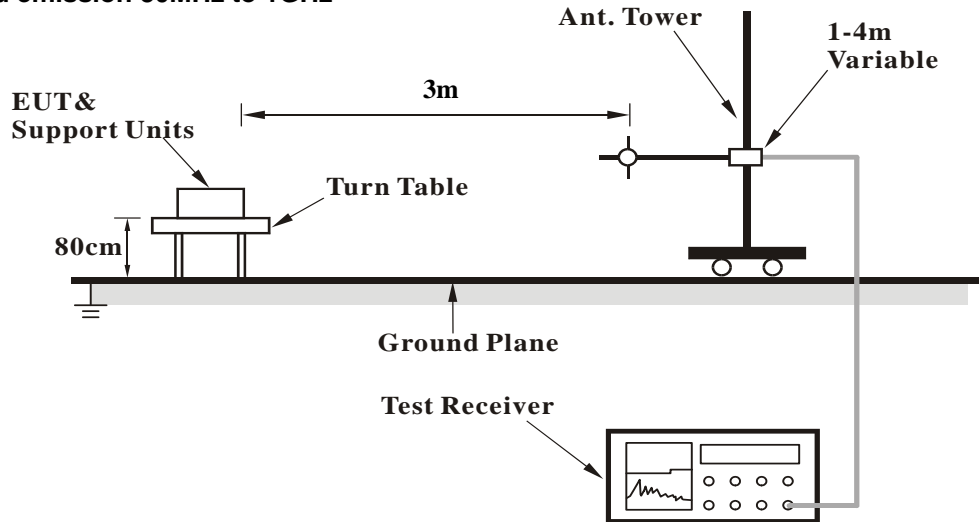
Conducted Power Measurement:

The EUT was set up for the maximum power with 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.

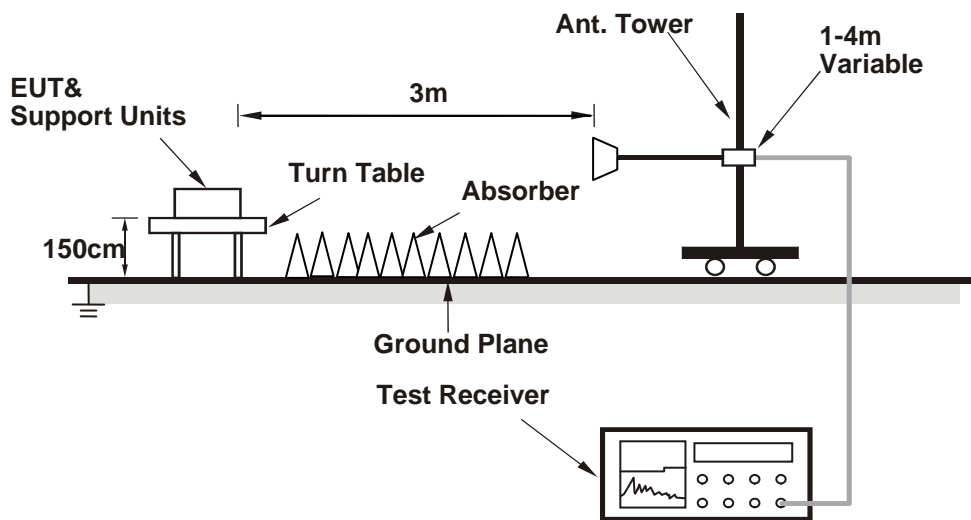
4.1.3 Test Setup

EIRP / ERP Measurement:

For radiated emission 30MHz to 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	WCDMA V		
Channel	4132	4182	4233
Frequency	826.4	836.6	846.6
RMC 12.2K	24.39	24.38	24.32
HSDPA Subtest-1	23.26	23.27	23.19
HSUPA Subtest-1	22.18	22.35	22.26

Band / BW	RB Size	RB Offset	QPSK			16QAM		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			26797	26915	27033	26797	26915	27033
			824.7 MHz	836.5 MHz	848.3 MHz	824.7 MHz	836.5 MHz	848.3 MHz
26 / 1.4M	1	0	23.18	23.24	23.62	22.21	22.28	22.38
	1	2	23.15	23.18	23.55	22.18	22.18	22.26
	1	5	23.11	23.20	23.58	22.15	22.15	22.25
	3	0	23.03	23.16	23.54	21.95	22.06	22.31
	3	1	23.10	23.08	23.49	21.94	22.08	22.24
	3	3	23.06	23.05	23.47	21.93	22.11	22.26
	6	0	22.15	22.38	22.59	20.82	21.06	21.23
Band / BW	RB Size	RB Offset	QPSK			16QAM		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			26805	26915	27025	26805	26915	27025
			825.5 MHz	836.5 MHz	847.5 MHz	825.5 MHz	836.5 MHz	847.5 MHz
26 / 3M	1	0	23.38	23.61	23.70	22.16	22.21	22.50
	1	7	23.18	23.48	23.65	22.16	22.18	22.48
	1	14	23.25	23.44	23.68	22.13	22.15	22.46
	8	0	22.16	22.35	22.46	21.15	21.21	21.50
	8	3	22.18	22.48	22.52	21.16	21.20	21.42
	8	7	22.26	22.37	22.57	21.11	21.16	21.47
	15	0	22.16	22.42	22.59	20.96	21.05	21.26
Band / BW	RB Size	RB Offset	QPSK			16QAM		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			26815	26915	27015	26815	26915	27015
			826.5 MHz	836.5 MHz	846.5 MHz	826.5 MHz	836.5 MHz	846.5 MHz
26 / 5M	1	0	23.21	23.35	23.45	22.32	22.40	22.53
	1	12	23.20	23.28	23.44	22.28	22.38	22.51
	1	24	23.19	23.25	23.41	22.26	22.36	22.50
	12	0	22.31	22.38	22.53	21.16	21.24	21.38
	12	6	22.28	22.28	22.56	21.15	21.26	21.42
	12	13	22.25	22.26	22.54	21.11	21.23	21.38
	25	0	22.21	22.33	22.42	21.14	21.21	21.26
Band / BW	RB Size	RB Offset	QPSK			16QAM		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			26840	26915	26990	26840	26915	26990
			829 MHz	836.5 MHz	844 MHz	829 MHz	836.5 MHz	844 MHz
26 / 10M	1	0	23.33	23.45	23.52	21.99	22.04	22.25
	1	24	23.21	23.33	23.48	21.87	22.01	22.21
	1	49	23.21	23.38	23.46	21.85	22.03	22.26
	25	0	22.38	22.52	22.67	20.99	21.16	21.33
	25	12	22.36	22.38	22.70	20.96	21.11	21.37
	25	25	22.31	22.41	22.65	20.97	21.16	21.32
	50	0	22.26	22.43	22.54	20.87	21.05	21.29

Band / BW	RB Size	RB Offset	QPSK			16QAM		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			26865	26915	26965	26865	26915	26965
			831.5 MHz	836.5 MHz	841.5 MHz	831.5 MHz	836.5 MHz	841.5 MHz
26 / 15M	1	0	23.38	23.45	23.58	21.98	22.01	22.22
	1	37	23.25	23.41	23.45	21.92	21.98	22.18
	1	74	23.21	23.35	23.44	21.96	21.99	22.19
	36	0	22.26	22.47	22.62	20.77	20.78	20.93
	36	19	22.28	22.41	22.57	20.72	20.76	20.94
	36	39	22.26	22.45	22.61	20.76	20.84	20.92
	75	0	22.19	22.47	22.55	20.71	20.77	20.87

ERP Power

WCDMA Band 5

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	-14.8	12.8	3.9	16.7	38.5	-21.8
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	826.40	-14.9	13.5	3.9	17.4	38.5	-21.1

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	-15.6	11.9	3.8	15.7	38.5	-22.8
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	836.40	-14.4	13.7	3.8	17.5	38.5	-21.0

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	-16.4	11.2	3.4	14.6	38.5	-23.9
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	846.60	-14.7	13.5	3.4	16.9	38.5	-21.6

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

LTE Band 26, Channel Bandwidth 1.4MHz

MODE		TX channel 26797					
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	-8.1	19.5	3.9	23.4	38.5	-15.1
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	824.70	-16.9	11.5	3.9	15.4	38.5	-23.1

MODE		TX channel 26915					
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	-8.2	19.2	3.8	23.0	38.5	-15.5
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	836.50	-17.8	10.3	3.8	14.1	38.5	-24.4

MODE		TX channel 27033					
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	-9.6	18.1	3.4	21.5	38.5	-17.0
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	848.30	-15.3	12.8	3.4	16.2	38.5	-22.3

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

LTE Band 26, Channel Bandwidth 3MHz

MODE		TX channel 26805					
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	-8.1	19.5	3.9	23.4	38.5	-15.1
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	825.50	-16.8	11.6	3.9	15.5	38.5	-23.0

MODE		TX channel 26915					
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	-8.6	18.8	3.8	22.6	38.5	-15.9
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	836.50	-16.0	12.1	3.8	15.9	38.5	-22.6

MODE		TX channel 27025					
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	-8.6	19.0	3.4	22.4	38.5	-16.1
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	847.50	-14.6	13.6	3.4	17.0	38.5	-21.5

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

LTE Band 26, Channel Bandwidth 5MHz

MODE		TX channel 26815					
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	-8.5	19.1	3.9	23.0	38.5	-15.5
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	826.50	-16.9	11.5	3.9	15.4	38.5	-23.1

MODE		TX channel 26915					
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	-8.9	18.5	3.8	22.3	38.5	-16.2
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	836.50	-16.0	12.1	3.8	15.9	38.5	-22.6

MODE		TX channel 27015					
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	-8.2	19.4	3.4	22.8	38.5	-15.7
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	846.50	-14.8	13.4	3.4	16.8	38.5	-21.7

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

LTE Band 26, Channel Bandwidth 10MHz

MODE		TX channel 26840					
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	-8.4	19.3	3.9	23.2	38.5	-15.3
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	829.00	-16.6	11.6	3.9	15.5	38.5	-23.0

MODE		TX channel 26915					
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	-9.9	17.6	3.8	21.4	38.5	-17.1
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	836.50	-16.9	11.2	3.8	15.0	38.5	-23.5

MODE		TX channel 26990					
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	-8.1	19.4	3.7	23.1	38.5	-15.4
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	844.00	-15.4	13.0	3.7	16.7	38.5	-21.8

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

LTE Band 26, Channel Bandwidth 15MHz

MODE		TX channel 26865					
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	831.50	-8.6	18.9	3.9	22.8	38.5	-15.7
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	831.50	-16.7	11.3	3.9	15.2	38.5	-23.3

MODE		TX channel 26915					
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	-9.4	18.0	3.8	21.8	38.5	-16.7
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	836.50	-17.1	11.0	3.8	14.8	38.5	-23.7

MODE		TX channel 26965					
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	841.50	-8.5	19.0	3.6	22.6	38.5	-15.9
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	841.50	-16.0	12.4	3.6	16.0	38.5	-22.5

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

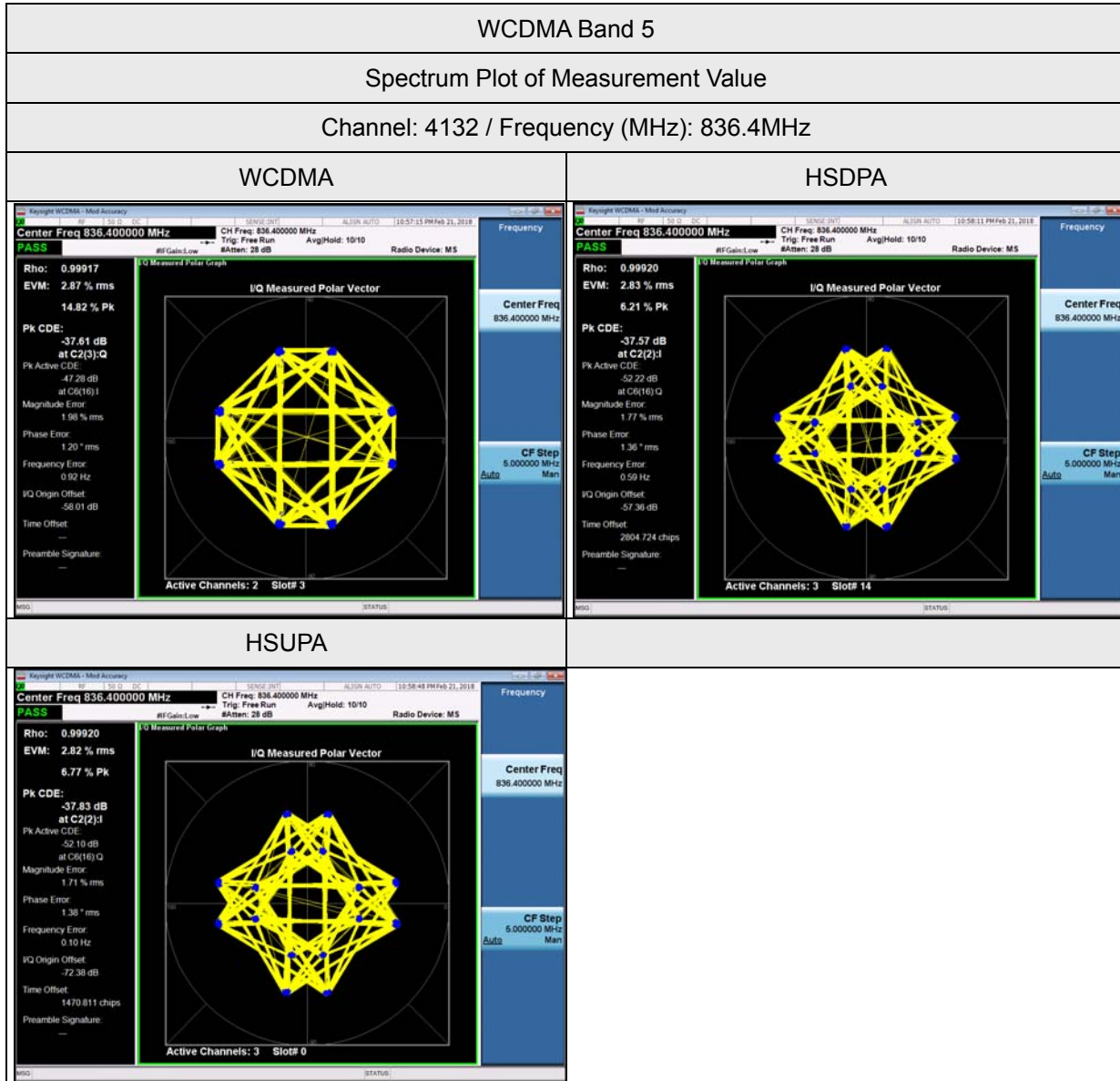
4.2.2 Test Procedure

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



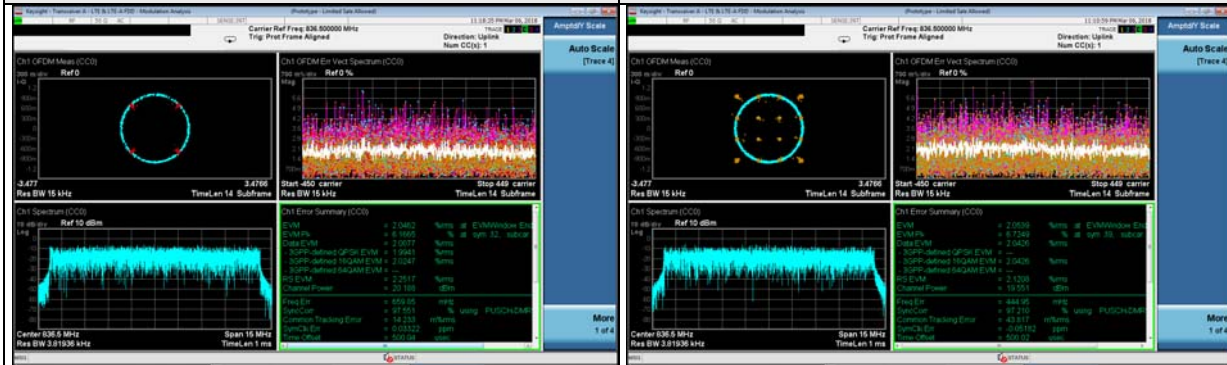
LTE Band 26

Spectrum Plot of Measurement Value

Channel: 26915 / Frequency (MHz): 836.5MHz

Channel Bandwidth 15MHz / QPSK

Channel Bandwidth 15MHz / 16QAM



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

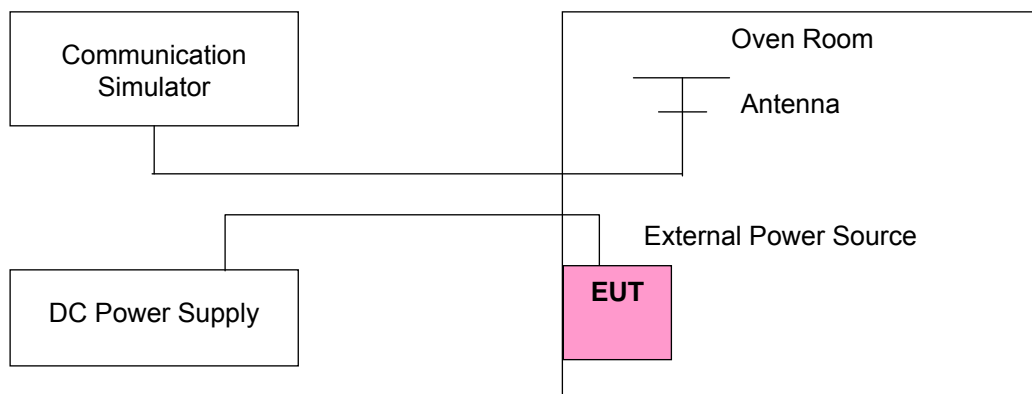
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

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 DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ± 0.5 °C during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

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

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (ppm)		Limit (ppm)
	WCDMA Band 5	LTE Band 26	
4.3	0.05349	0.07116	2.5
3.8	0.06914	0.03057	2.5
3.4	0.06958	0.07121	2.5

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.3Vdc.

Frequency Error vs. Temperature.

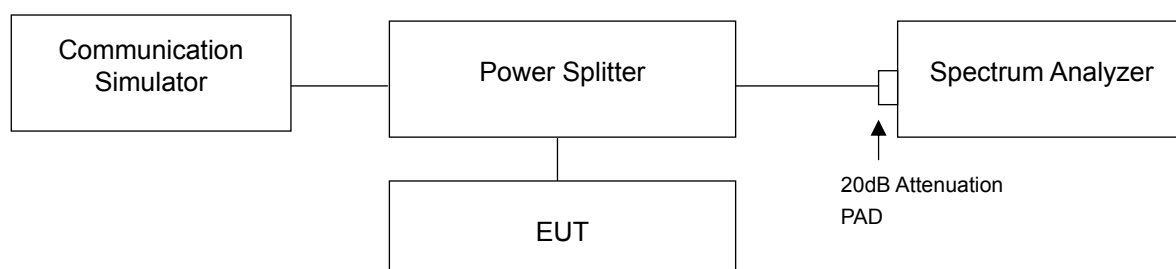
Temp. (°C)	Frequency Error (ppm)		Limit (ppm)
	WCDMA Band 5	LTE Band 26	
50	0.00281	0.01638	2.5
40	0.04713	0.01311	2.5
30	0.00918	0.03617	2.5
20	0.06914	0.03057	2.5
10	0.06753	0.06303	2.5
0	0.02469	0.02859	2.5
-10	0.03519	0.02554	2.5
-20	0.07441	0.05749	2.5

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.

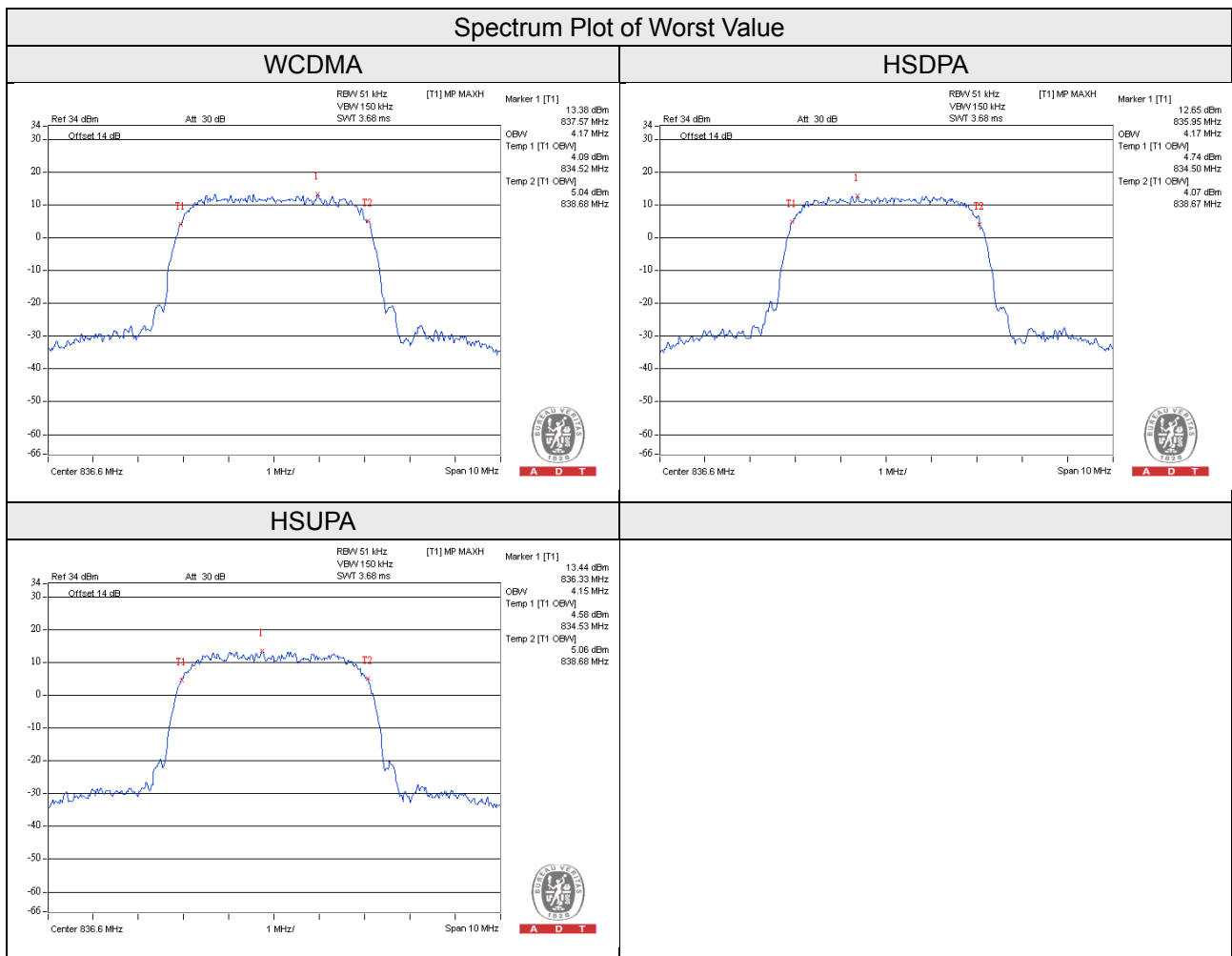
4.4.2 Test Setup



4.4.3 Test Result

Occupied Bandwidth

WCDMA Band 5				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		WCDMA	HSDPA	HSUPA
4132	826.4	4.13	4.13	4.13
4182	836.6	4.17	4.17	4.15
4233	846.6	4.13	4.13	4.13



LTE Band 26, Channel Bandwidth 1.4MHz

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
26797	824.7	1.10	1.11
26915	836.5	1.09	1.09
27033	848.3	1.10	1.10

LTE Band 26, Channel Bandwidth 3MHz

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
26805	825.5	2.68	2.69
26915	836.5	2.68	2.69
27025	847.5	2.68	2.68

LTE Band 26, Channel Bandwidth 5MHz

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
26815	826.5	4.48	4.48
26915	836.5	4.47	4.47
27015	846.5	4.47	4.47

LTE Band 26, Channel Bandwidth 10MHz

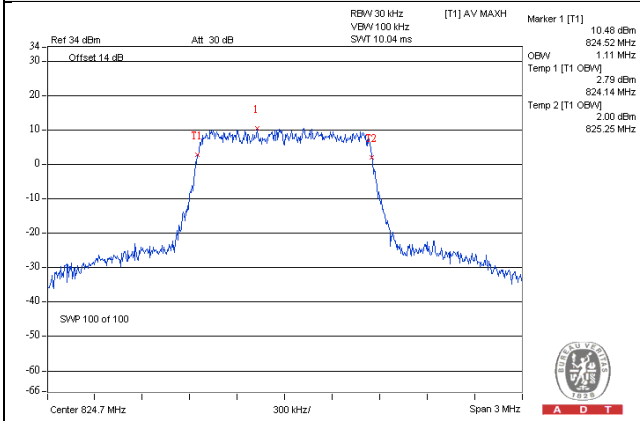
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
26840	829.0	8.93	8.93
26915	836.5	8.90	8.90
26990	844.0	8.90	8.90

LTE Band 26, Channel Bandwidth 15MHz

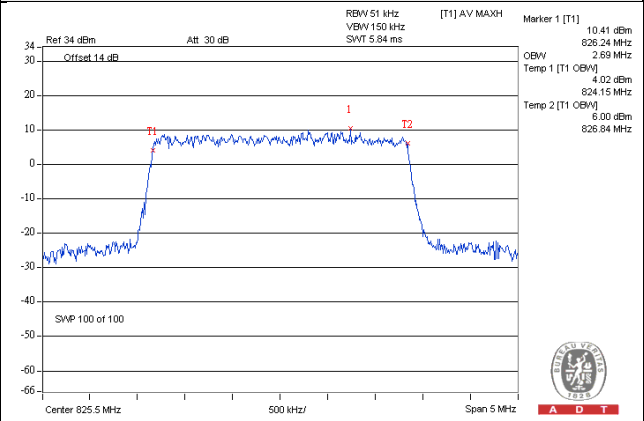
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
26865	831.5	13.40	13.37
26965	841.5	13.40	13.37

Spectrum Plot of Worst Value

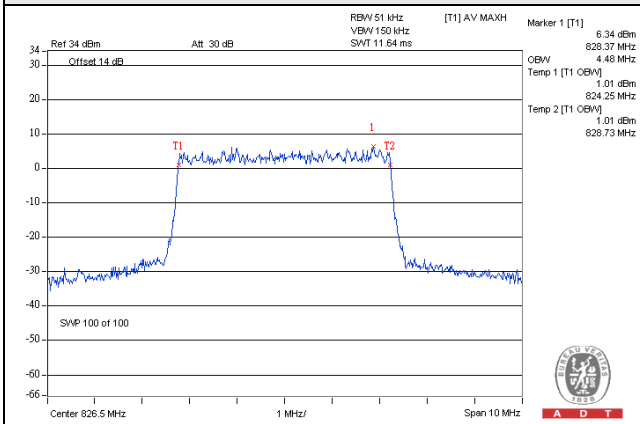
1.4MHz / 16QAM



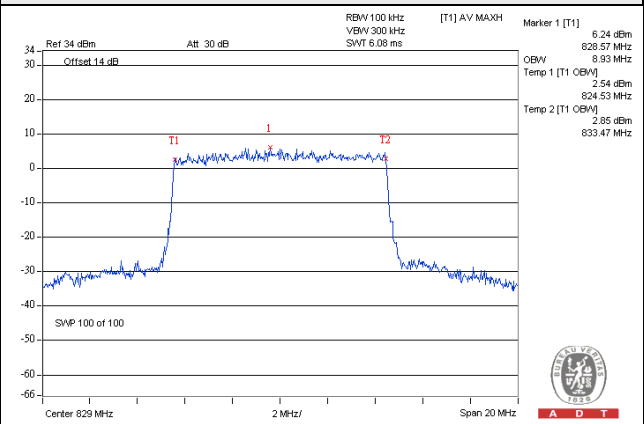
3MHz / 16QAM



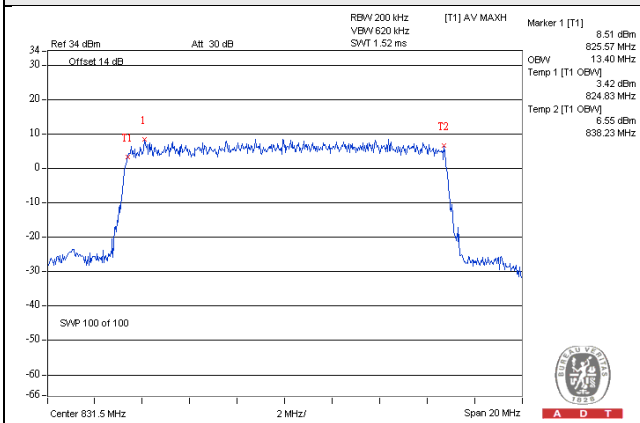
5MHz / QPSK



10MHz / QPSK

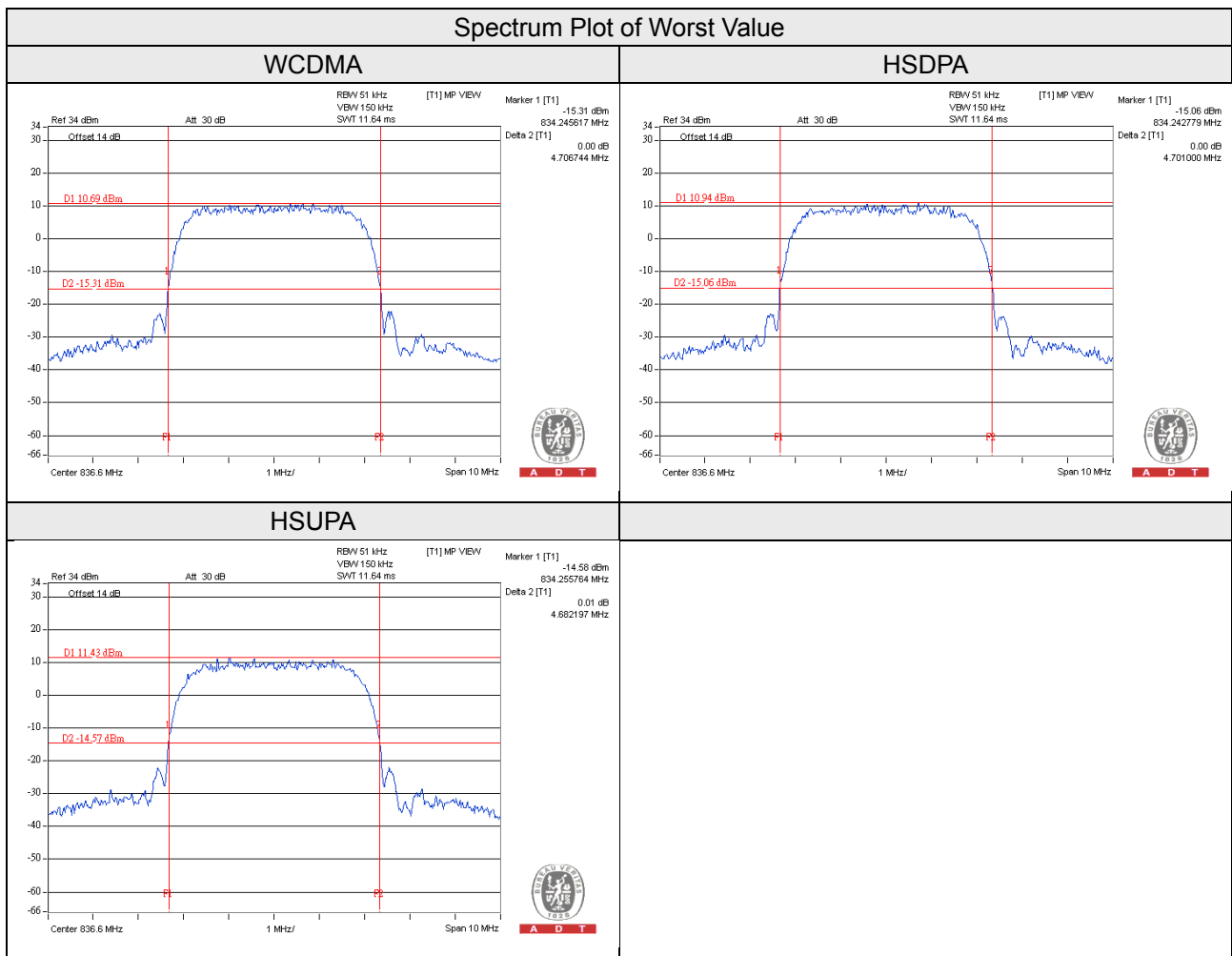


15MHz / QPSK



26dB Bandwidth

WCDMA Band 5				
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		
		WCDMA	HSDPA	HSUPA
4132	826.4	4.675	4.657	4.664
4182	836.6	4.707	4.701	4.682
4233	846.6	4.666	4.642	4.678



LTE Band 26, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
26797	824.7	1.284	1.288
26915	836.5	1.261	1.261
27033	848.3	1.271	1.286

LTE Band 26, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
26805	825.5	2.957	2.979
26915	836.5	2.958	2.949
27025	847.5	2.973	2.985

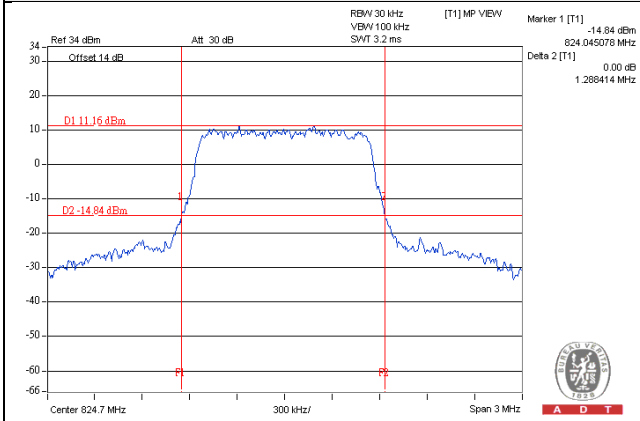
LTE Band 26, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
26815	826.5	4.930	4.914
26915	836.5	4.903	4.884
27015	846.5	4.885	4.865

LTE Band 26, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
26840	829.0	9.672	9.661
26915	836.5	9.612	9.577
26990	844.0	9.623	9.626

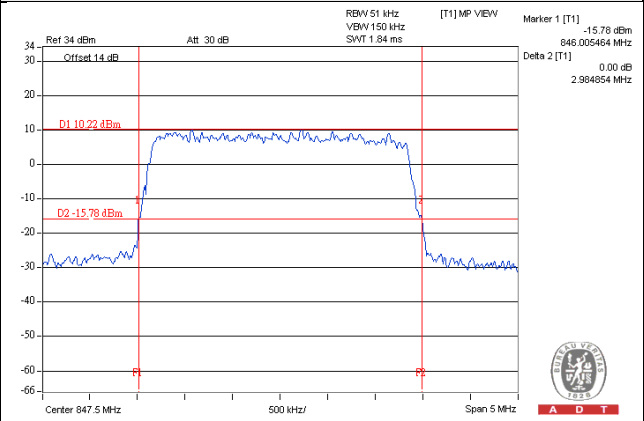
LTE Band 26, Channel Bandwidth 15MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
26865	831.5	14.408	14.434
26965	841.5	14.369	14.457

Spectrum Plot of Worst Value

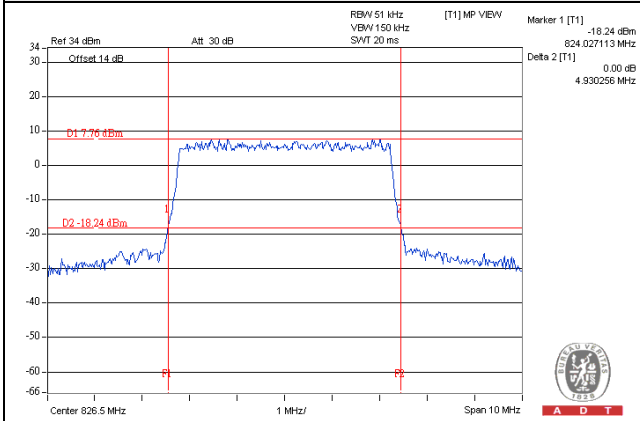
1.4MHz / 16QAM



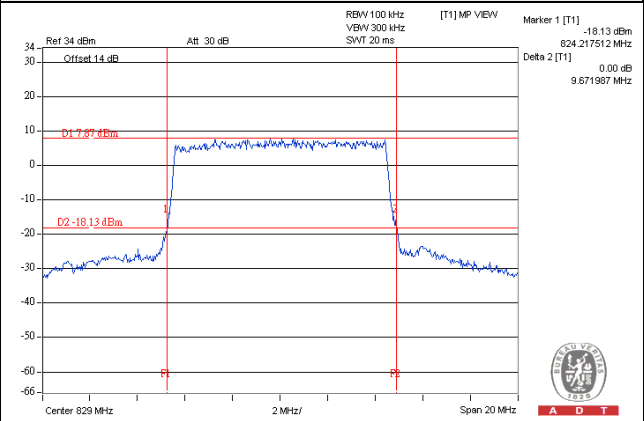
3MHz / 16QAM



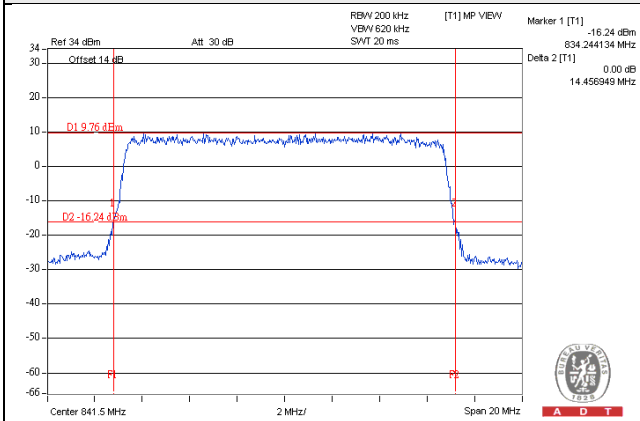
5MHz / QPSK



10MHz / QPSK



15MHz / 16QAM

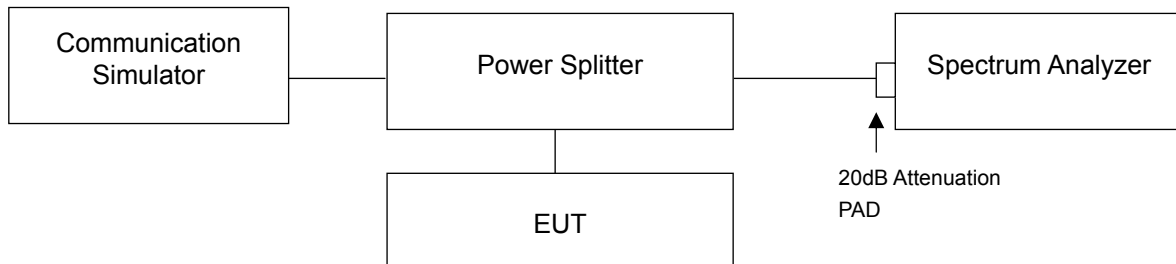


4.5 Band Edge Measurement

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.

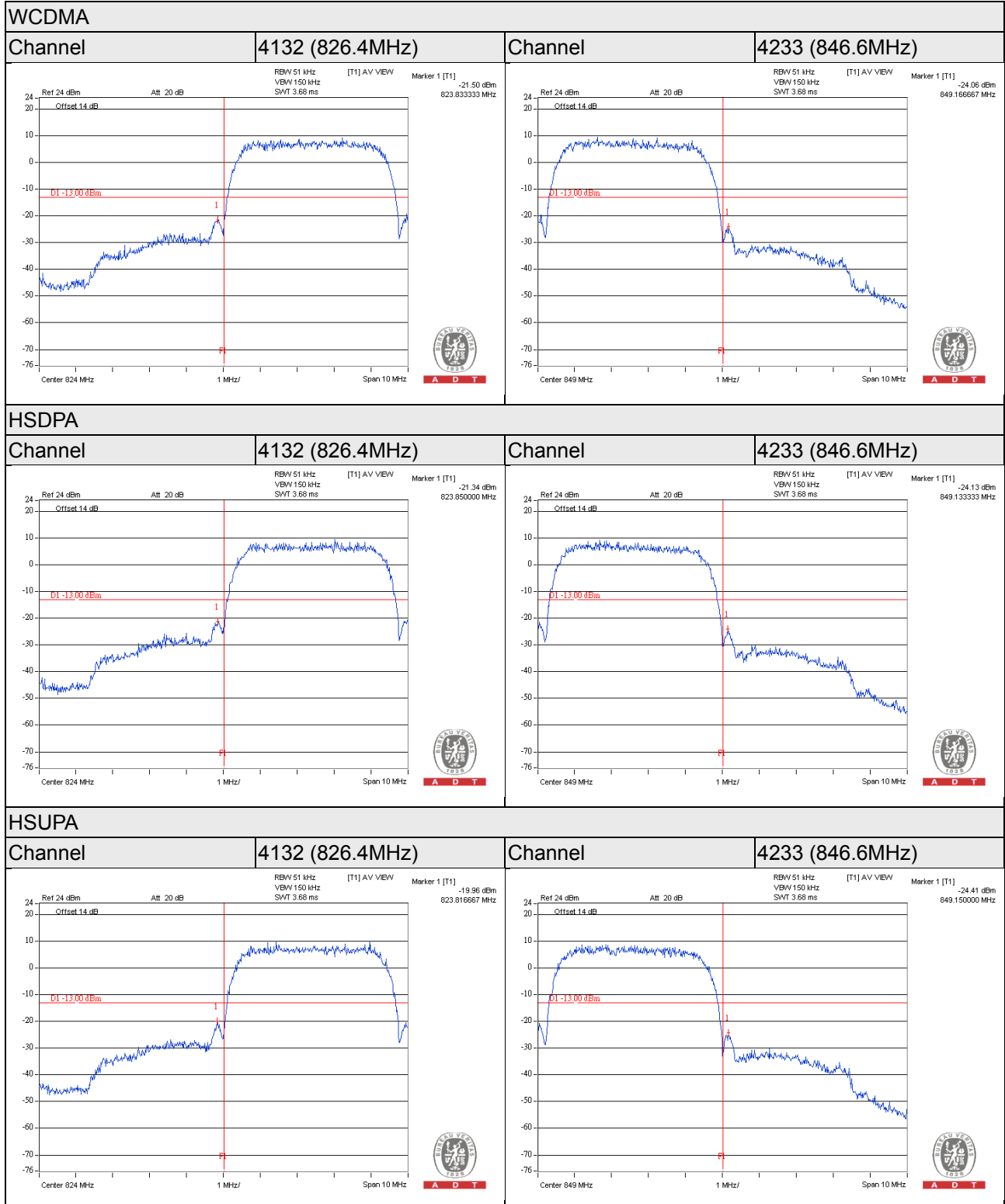
4.5.2 Test Setup



4.5.3 Test Procedures

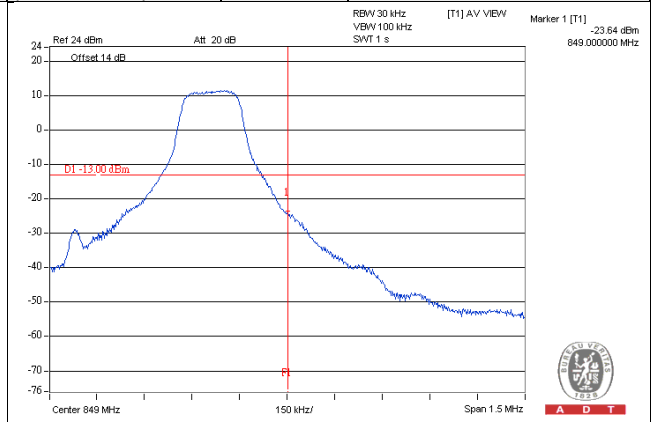
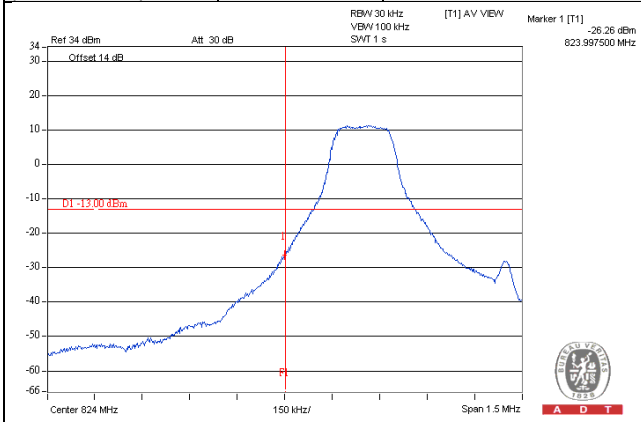
- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 10MHz. RB of the spectrum is 51kHz and VB of the spectrum is 150kHz (WCDMA / HSDPA / HSUPA).
- c. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz (LTE Channel Bandwidth 1.4MHz).
- d. 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).
- e. 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).
- f. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 200kHz and VB of the spectrum is 620kHz (LTE Channel Bandwidth 15MHz).
- g. Record the max trace plot into the test report.

4.5.4 Test Results

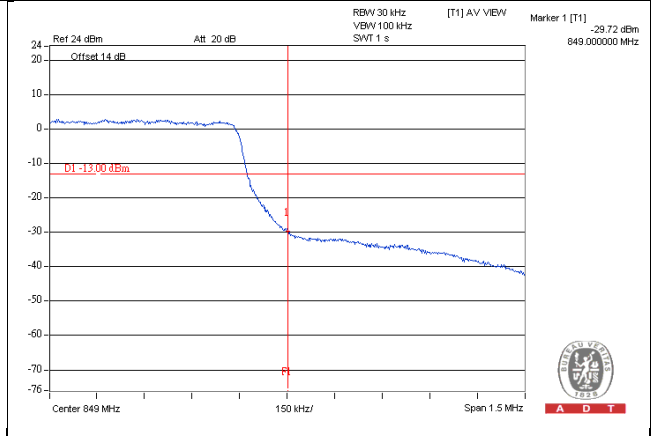
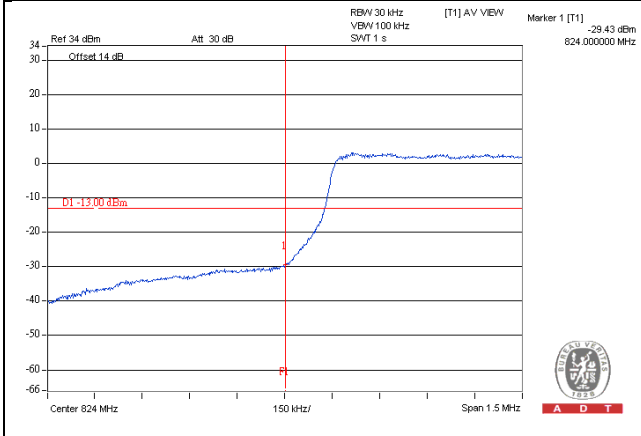


LTE Band 26, Channel Bandwidth 1.4MHz

Channel 26797 (824.7MHz)	QPSK	1 RB / 0 RB Offset	Channel 27033 (848.3MHz)	QPSK	1 RB / 5 RB Offset
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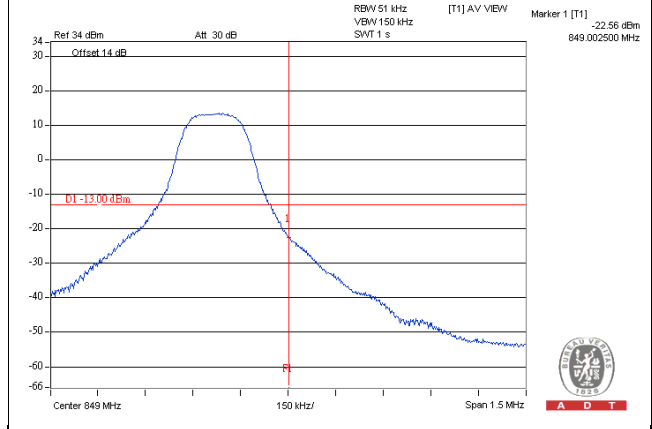
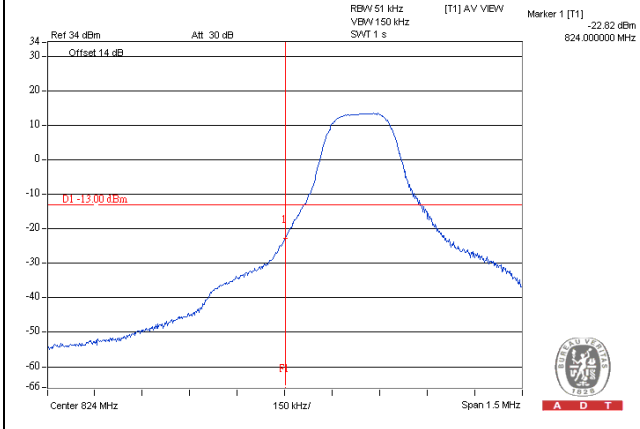


Channel 26797 (824.7MHz)	QPSK	6 RB / 0 RB Offset	Channel 27033 (848.3MHz)	QPSK	6 RB / 0 RB Offset
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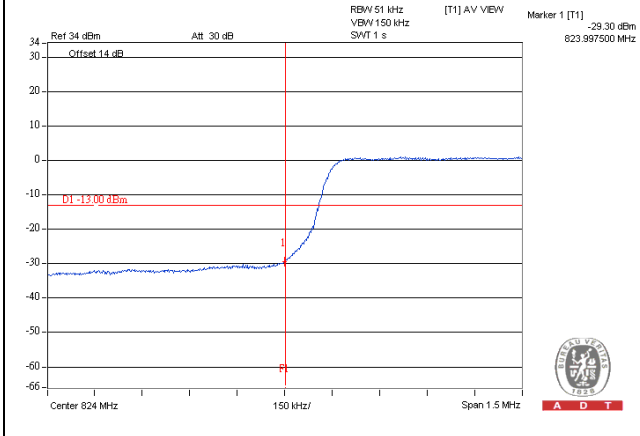


LTE Band 26, Channel Bandwidth 3MHz

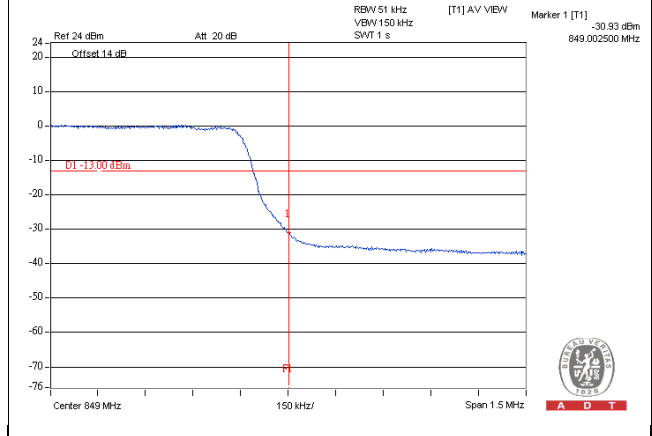
Channel 26805 (825.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 27025 (847.5MHz)	QPSK	1 RB / 14 RB Offset
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Channel 26805 (825.5MHz)	QPSK	15 RB / 0 RB Offset
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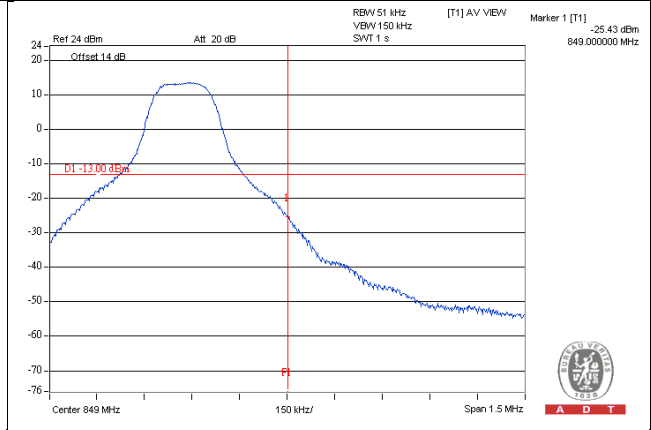
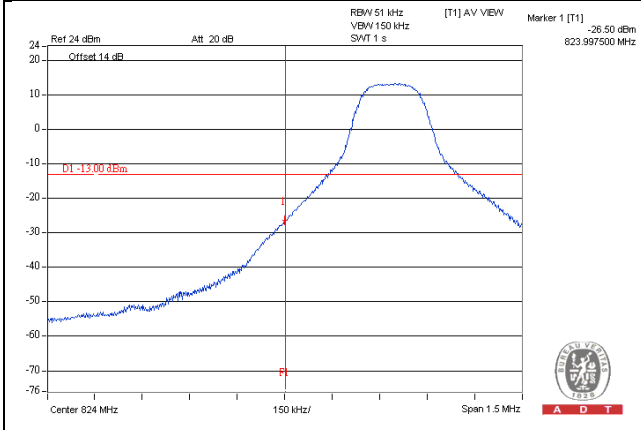


Channel 27025 M(847.5MHz)	QPSK	15 RB / 0 RB Offset
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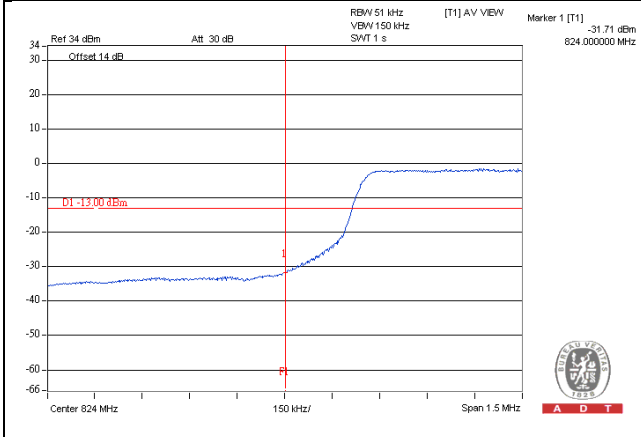


LTE Band 26, Channel Bandwidth 5MHz

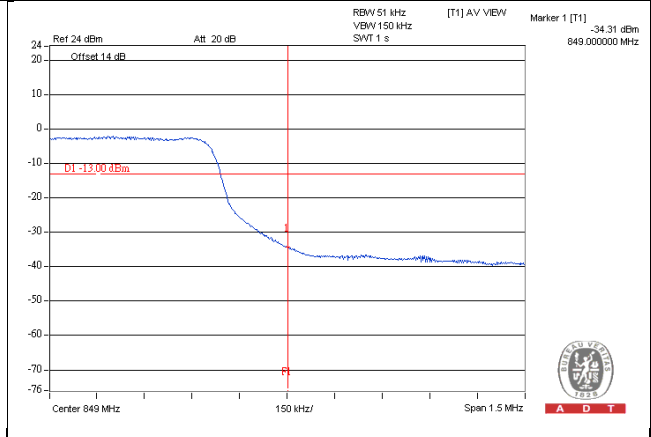
Channel 26815 (826.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 27015 (846.5MHz)	QPSK	1 RB / 24 RB Offset
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Channel 26815 (826.5MHz)	QPSK	25 RB / 0 RB Offset
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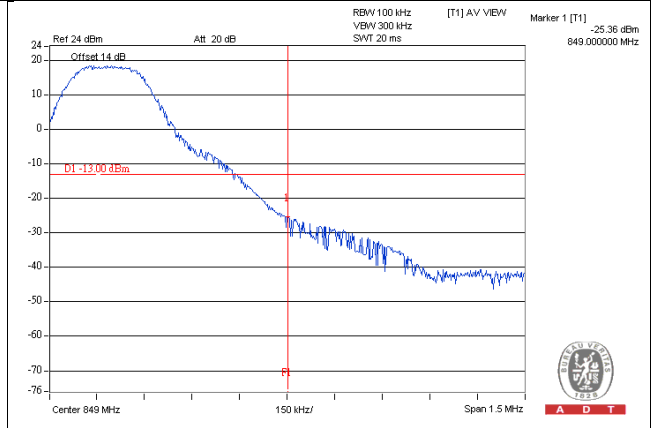
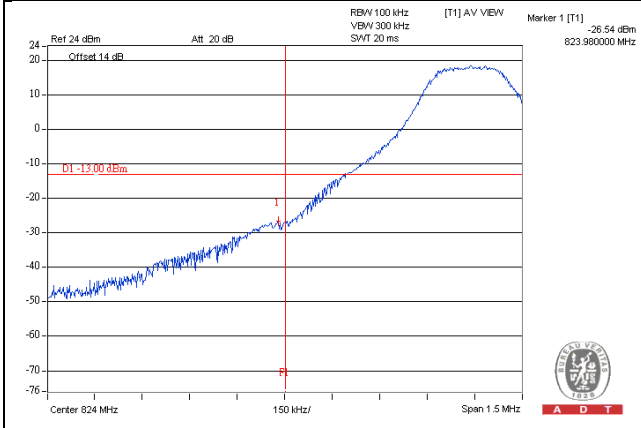


Channel 27015 (846.5MHz)	QPSK	25 RB / 0 RB Offset
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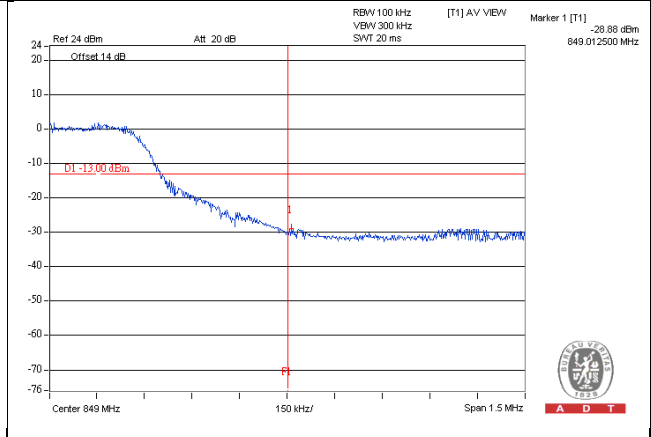
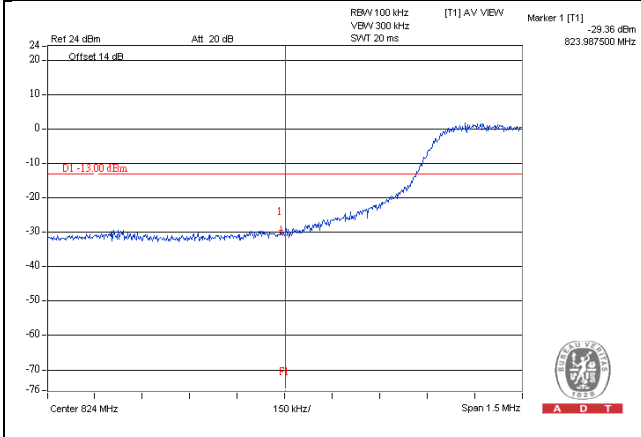


LTE Band 26, Channel Bandwidth 10MHz

Channel 26840 (829MHz)	QPSK	1 RB / 0 RB Offset	Channel 26990 (844MHz)	QPSK	1 RB / 49 RB Offset
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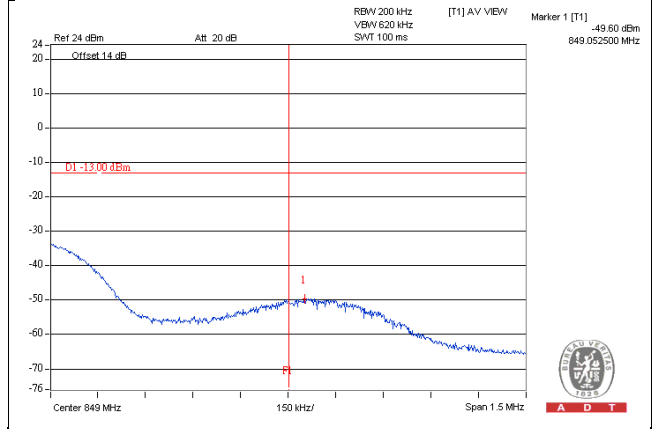
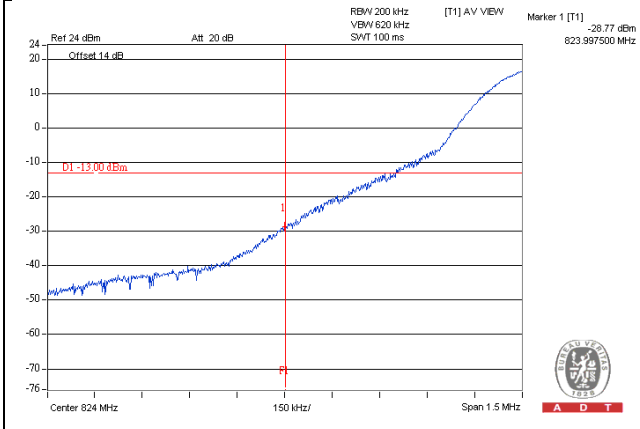


Channel 26840 (829MHz)	QPSK	50 RB / 0 RB Offset	Channel 26990 (844MHz)	QPSK	50 RB / 0 RB Offset
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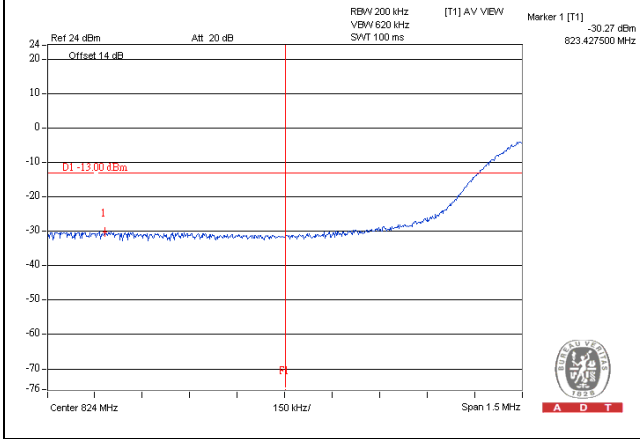


LTE Band 26, Channel Bandwidth 15MHz

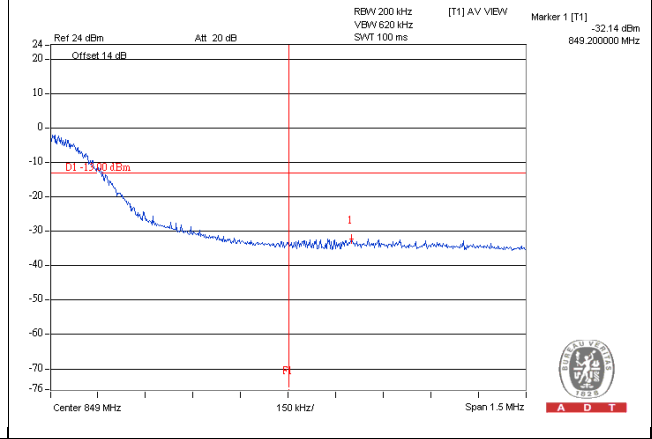
Channel 26915 (831.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 26965 (841.5MHz)	QPSK	1 RB / 74 RB Offset
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Channel 26915 (831.5MHz)	QPSK	75 RB / 0 RB Offset
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Channel 26965 (841.5MHz)	QPSK	75 RB / 0 RB Offset
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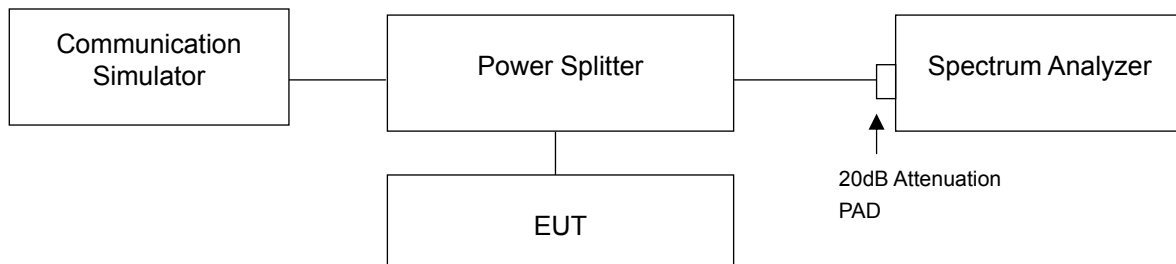


4.6 Peak to Average Ratio

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

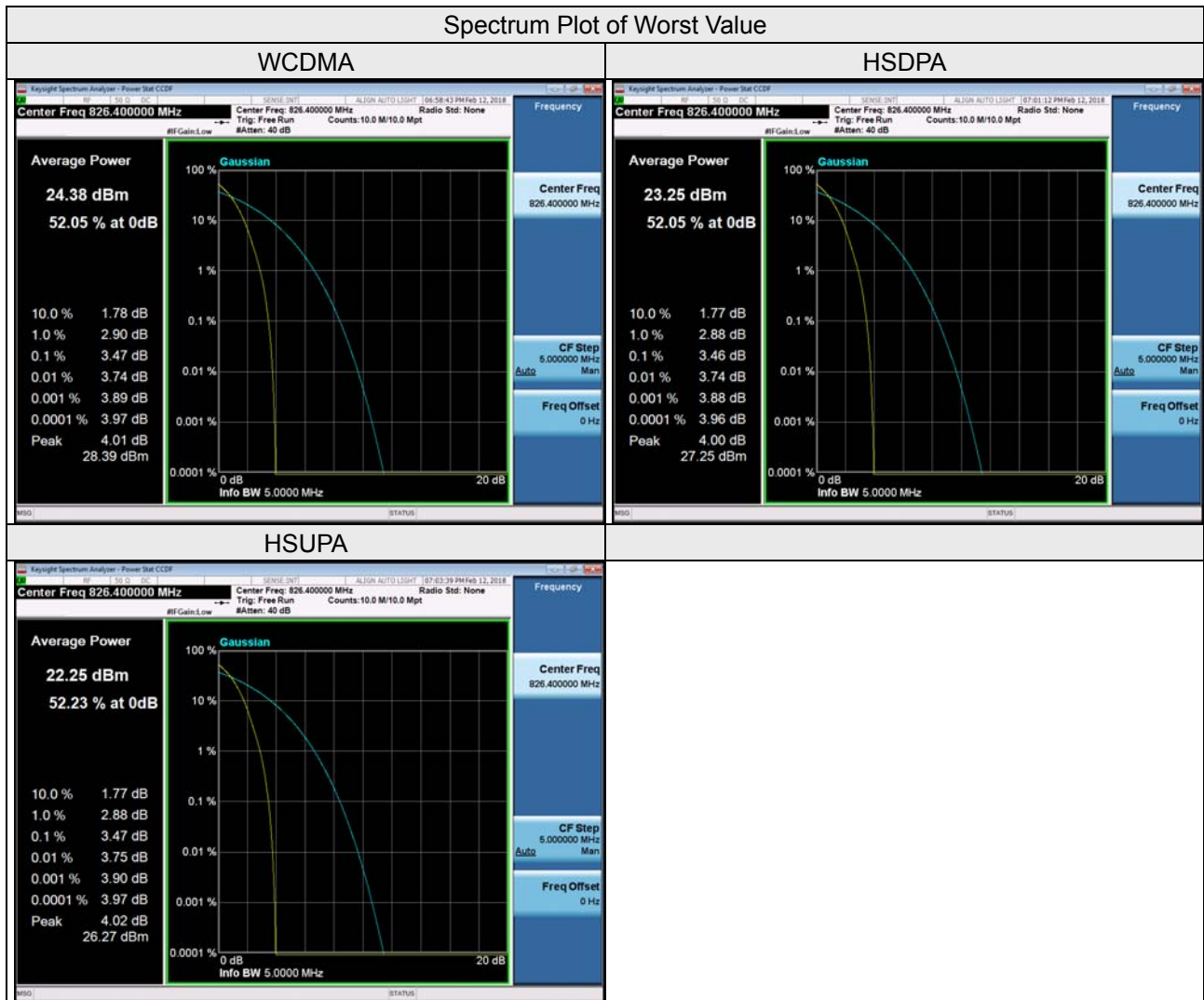


4.6.3 Test Procedures

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

4.6.4 Test Results

WCDMA Band 5				
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		WCDMA	HSDPA	HSUPA
4132	826.4	3.47	3.46	3.47
4182	836.6	3.31	3.30	3.29
4233	846.6	3.37	3.37	3.38



LTE Band 26, Channel Bandwidth 1.4MHz

Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26797	824.7	6.22	6.23
26915	836.5	5.81	5.80
27033	848.3	5.89	5.87

LTE Band 26, Channel Bandwidth 3MHz

Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26805	825.5	6.06	6.10
26915	836.5	5.77	5.76
27025	847.5	5.88	5.87

LTE Band 26, Channel Bandwidth 5MHz

Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26815	826.5	5.76	5.76
26915	836.5	5.56	5.56
27015	846.5	5.64	5.65

LTE Band 26, Channel Bandwidth 10MHz

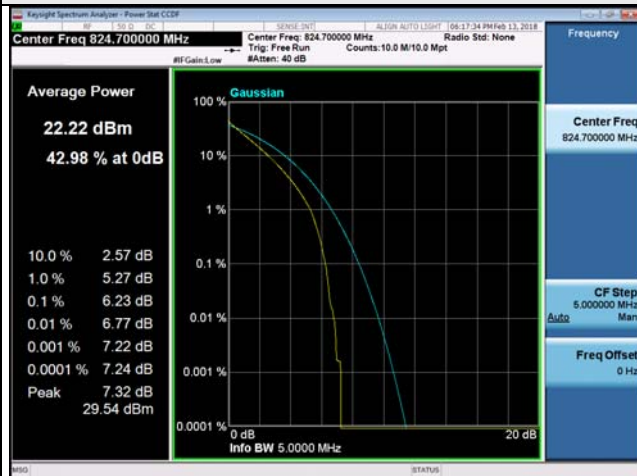
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26840	829.0	5.78	5.78
26915	836.5	5.68	5.68
26990	844.0	5.73	5.71

LTE Band 26, Channel Bandwidth 15MHz

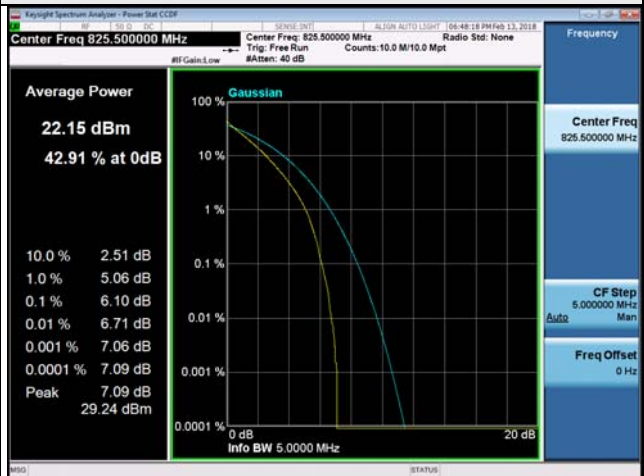
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26865	831.5	5.59	5.57
26965	841.5	5.60	5.60

Spectrum Plot of Worst Value

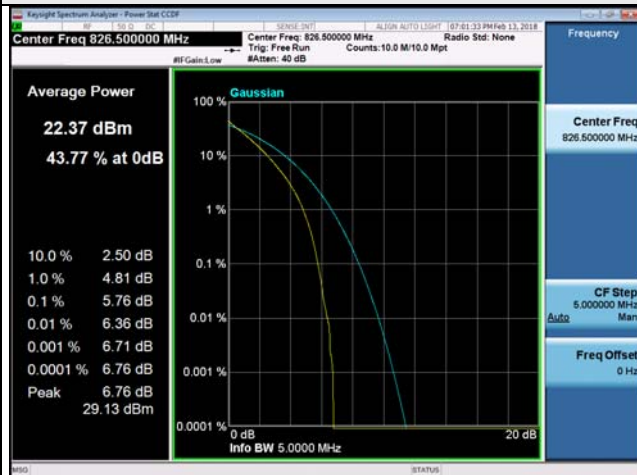
1.4MHz / 16QAM



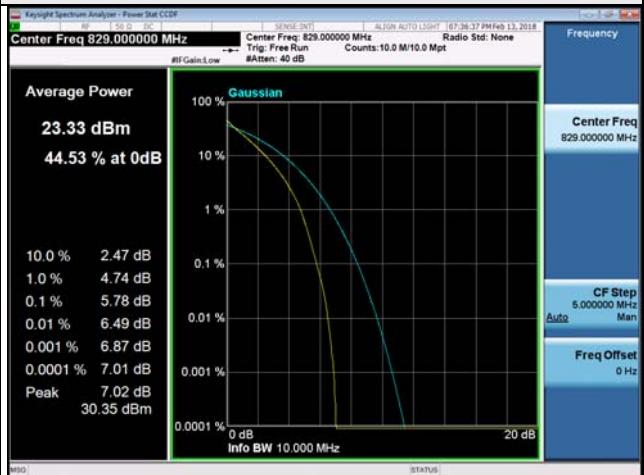
3MHz / 16QAM



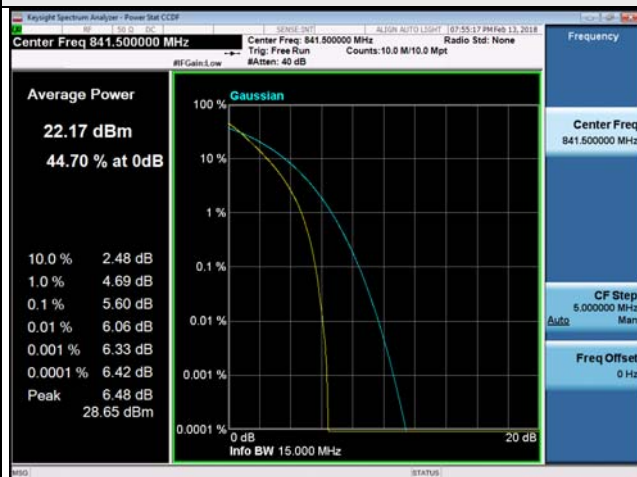
5MHz / 16QAM



10MHz / 16QAM



15MHz / 16QAM

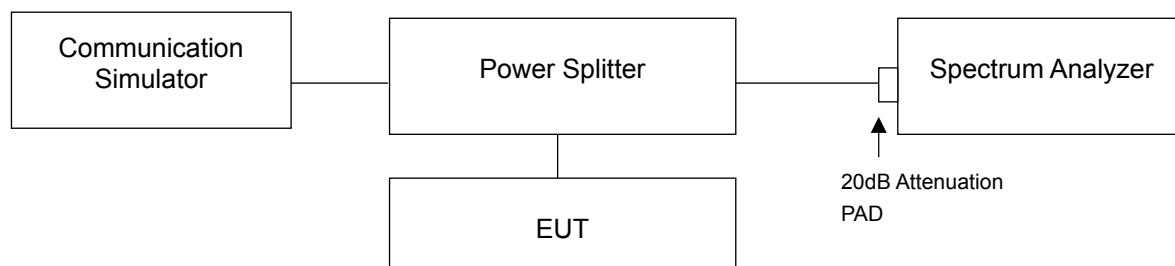


4.7 Conducted Spurious Emissions

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

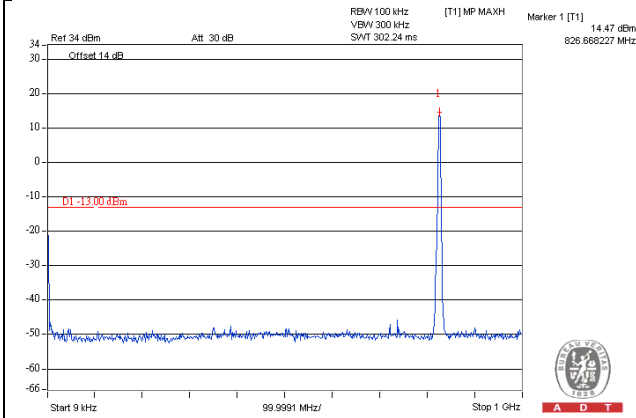
- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 1GHz. 20dB attenuation pad is connected with spectrum. RBW=100kHz and VBW=300kHz is used for conducted emission measurement.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

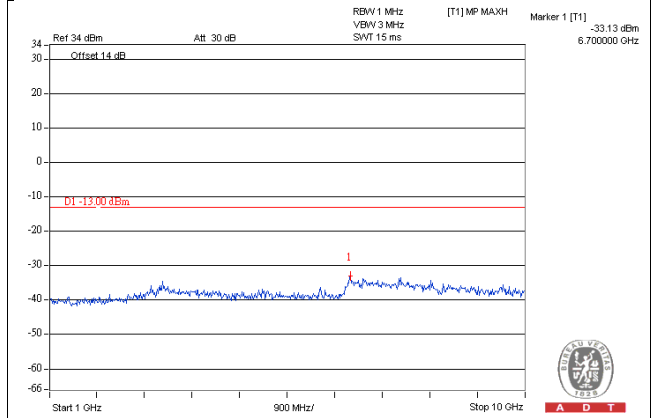
WCDMA

Channel 4132 (826.4MHz)

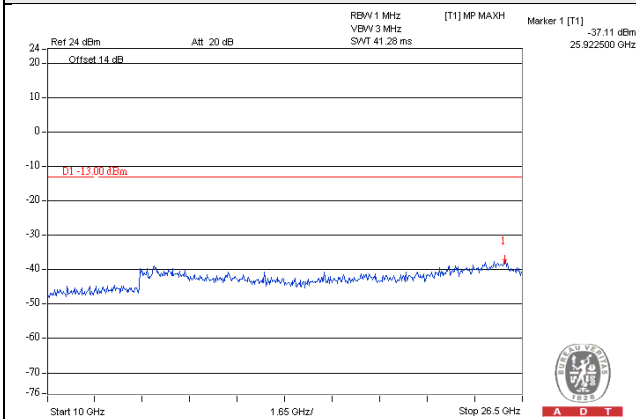
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



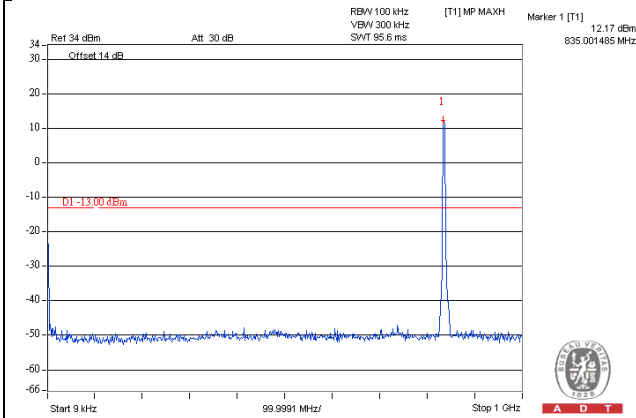
Frequency Range : 10GHz~26.5GHz



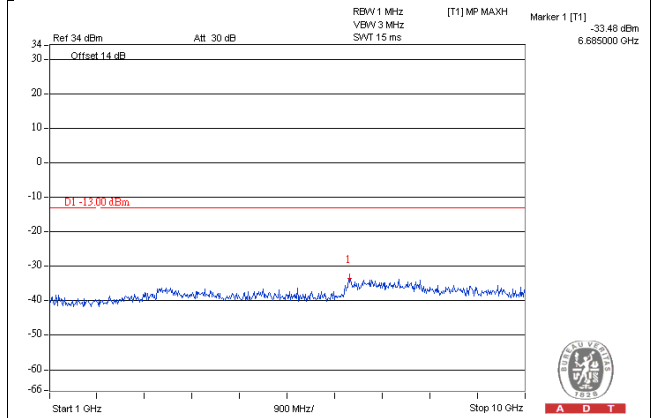
WCDMA

Channel 4182 (836.4MHz)

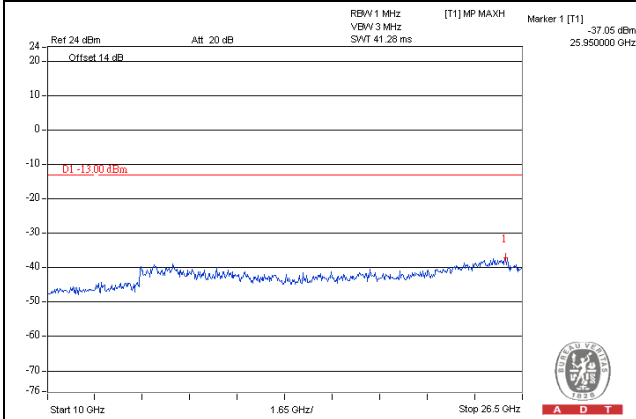
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



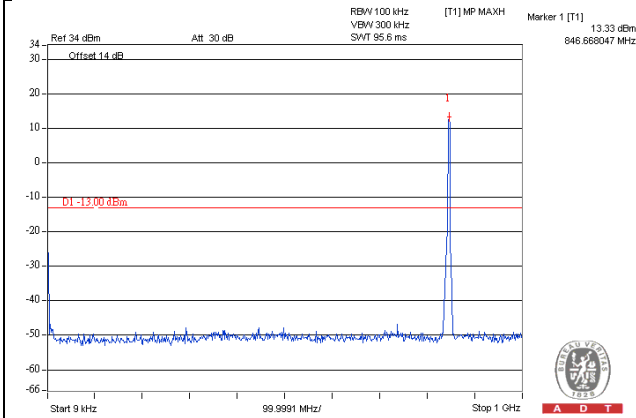
Frequency Range : 10GHz~26.5GHz



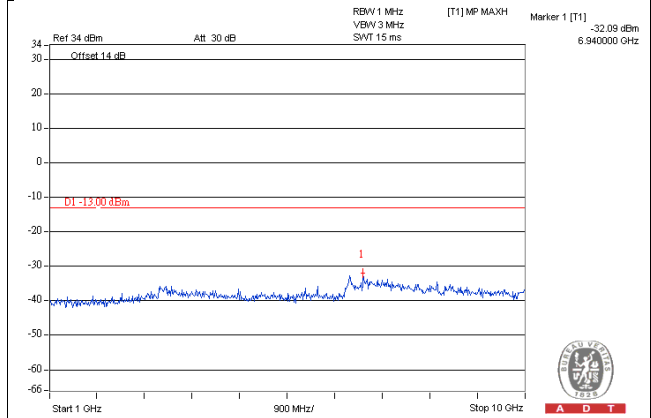
WCDMA

Channel 4233 (846.6MHz)

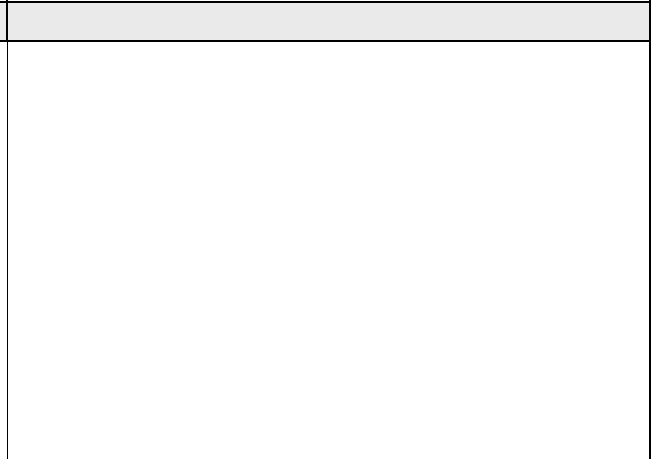
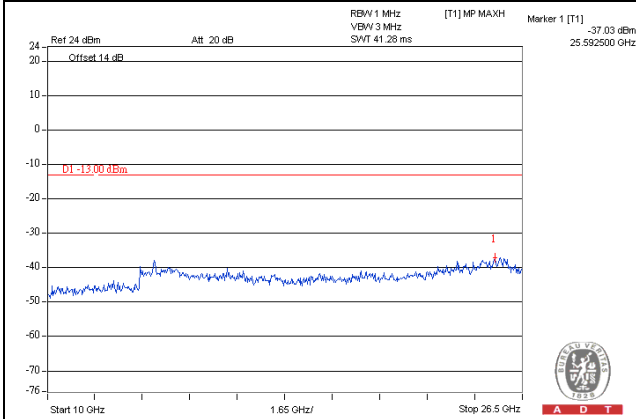
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



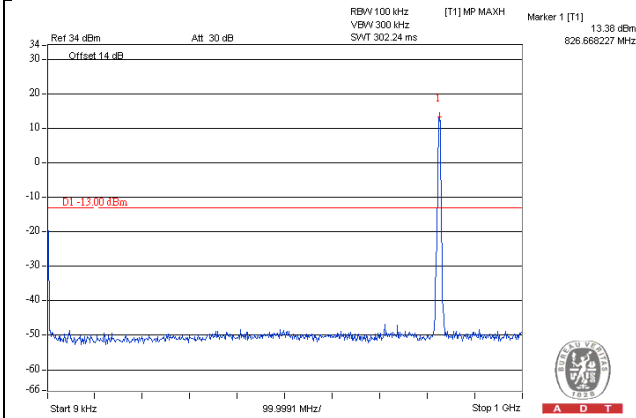
Frequency Range : 10GHz~26.5GHz



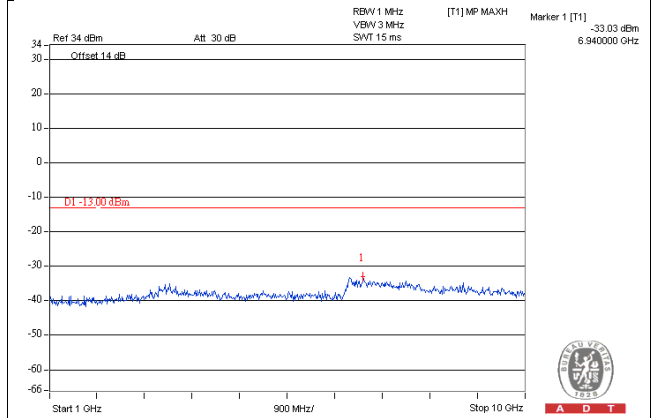
HSDPA

Channel 4132 (826.4MHz)

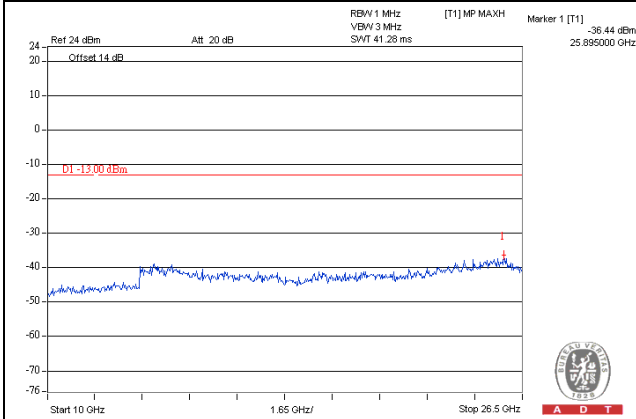
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



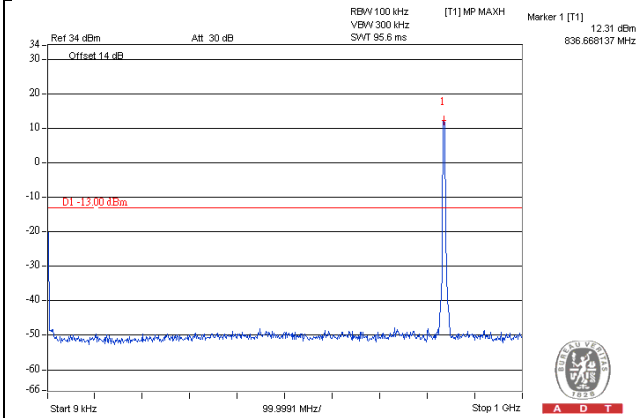
Frequency Range : 10GHz~26.5GHz



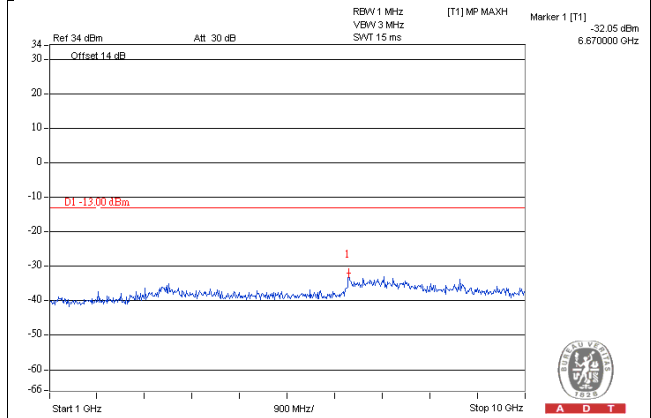
HSDPA

Channel 4182 (836.4MHz)

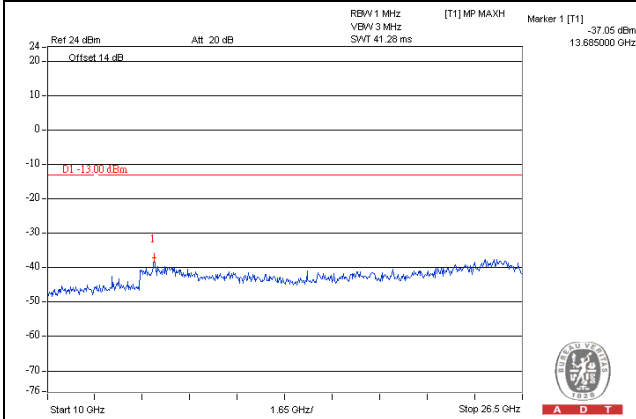
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



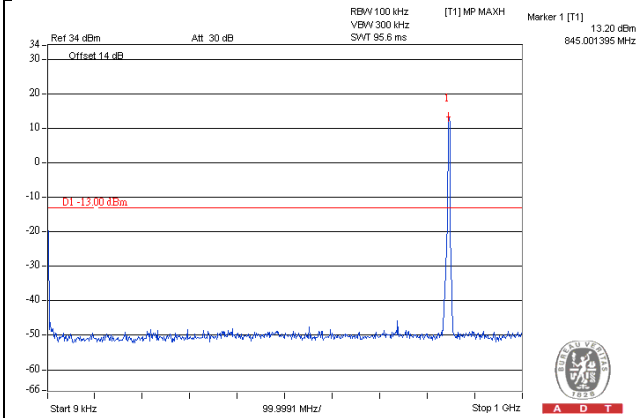
Frequency Range : 10GHz~26.5GHz



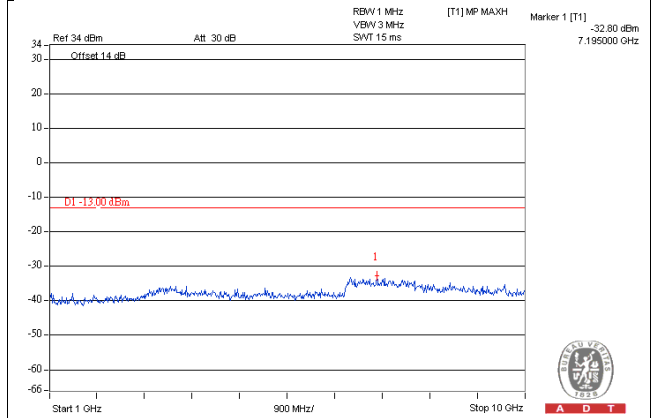
HSDPA

Channel 4233 (846.6MHz)

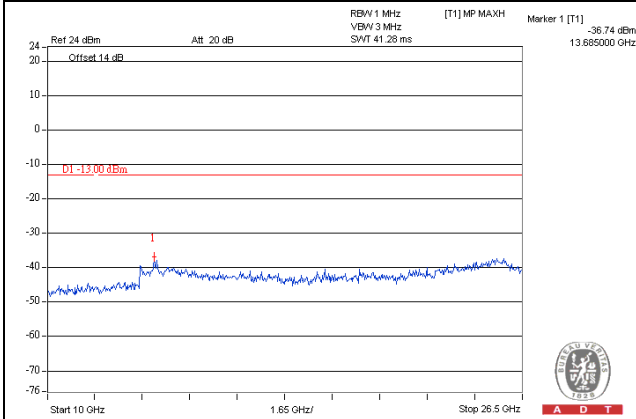
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



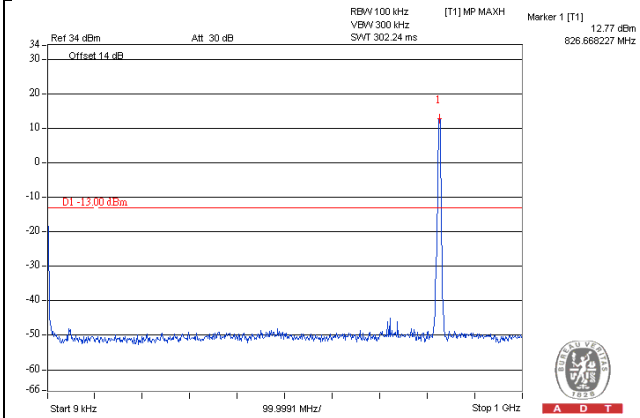
Frequency Range : 10GHz~26.5GHz



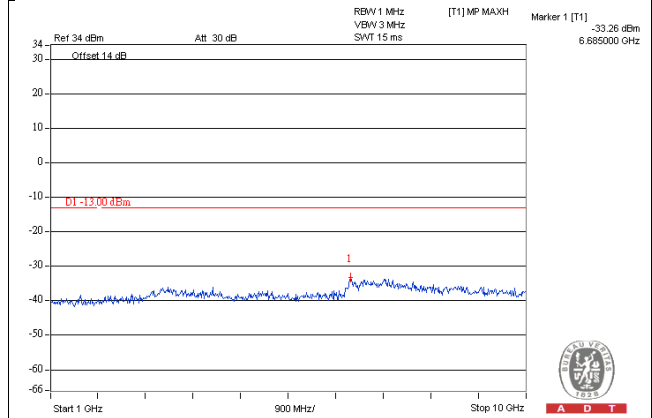
HSUPA

Channel 4132 (826.4MHz)

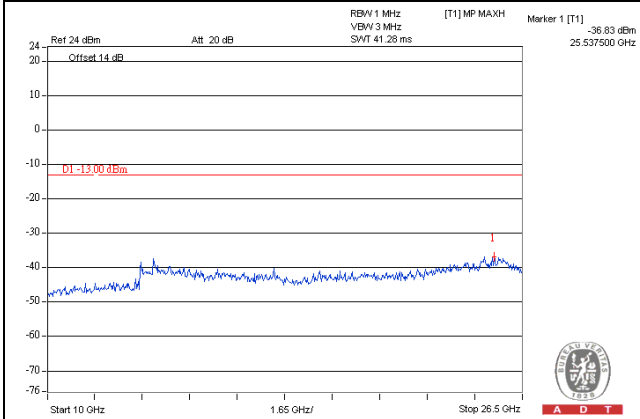
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



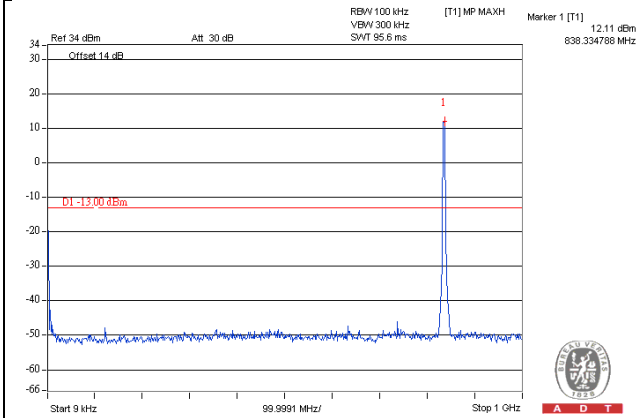
Frequency Range : 10GHz~26.5GHz



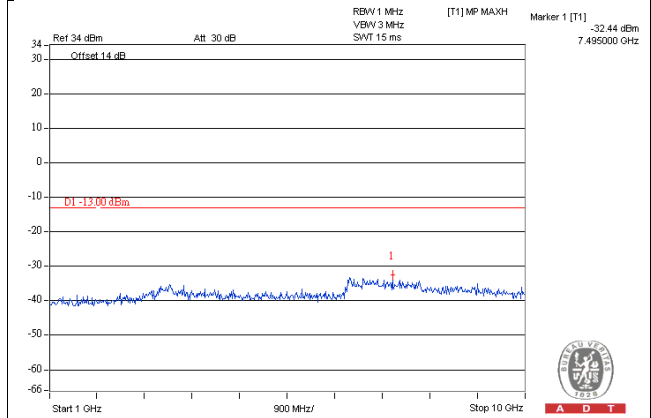
HSUPA

Channel 4182 (836.4MHz)

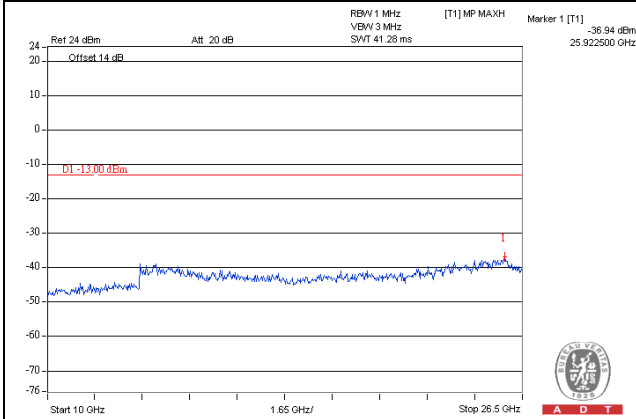
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



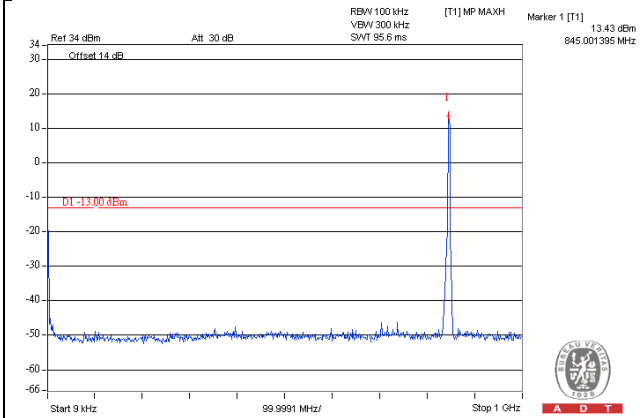
Frequency Range : 10GHz~26.5GHz



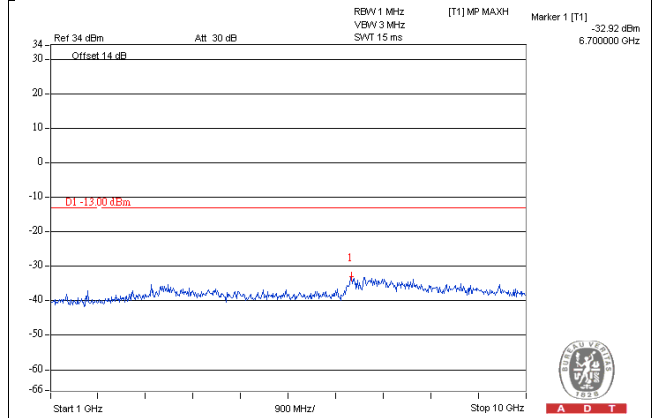
HSUPA

Channel 4233 (846.6MHz)

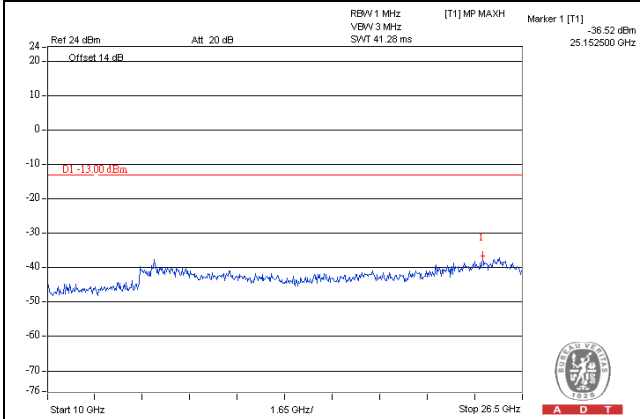
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



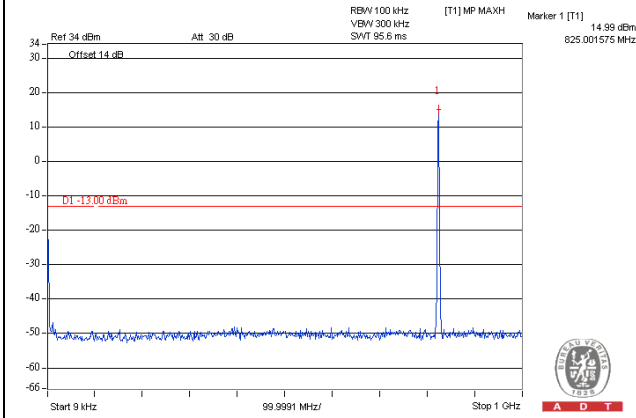
Frequency Range : 10GHz~26.5GHz



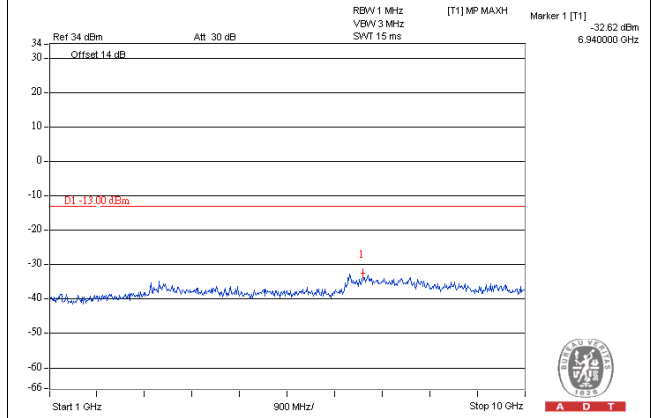
LTE Band 26, Channel Bandwidth 1.4MHz

Channel 26897 (824.7MHz)

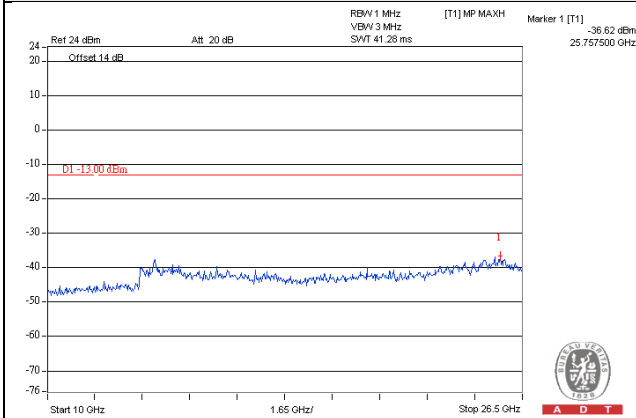
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



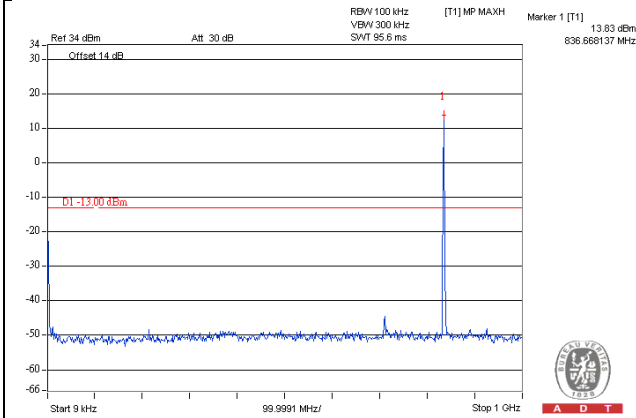
Frequency Range : 10GHz~26.5GHz



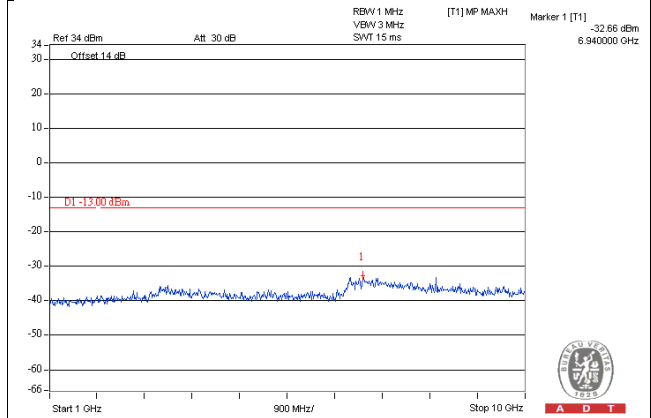
LTE Band 26, Channel Bandwidth 1.4MHz

Channel 26915 (836.5MHz)

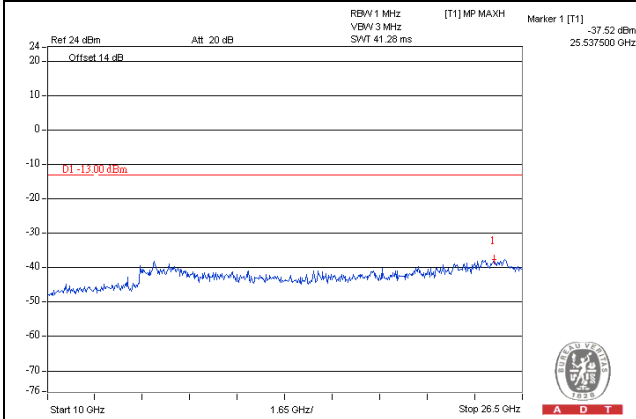
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



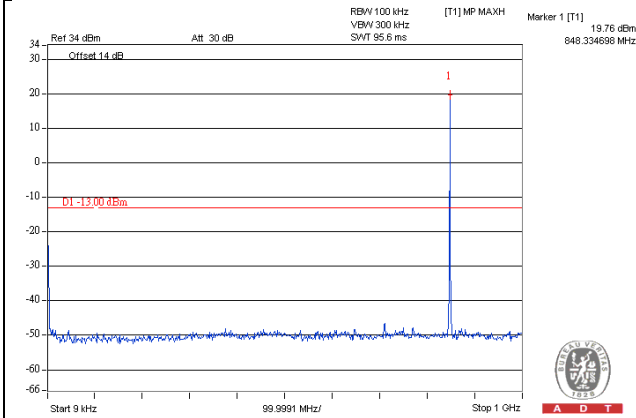
Frequency Range : 10GHz~26.5GHz



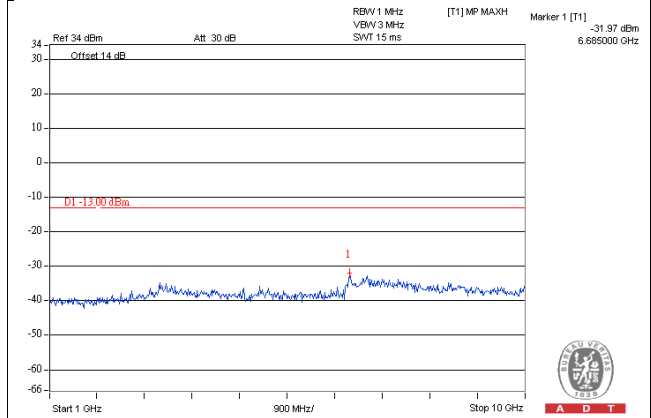
LTE Band 26, Channel Bandwidth 1.4MHz

Channel 27033 (848.3MHz)

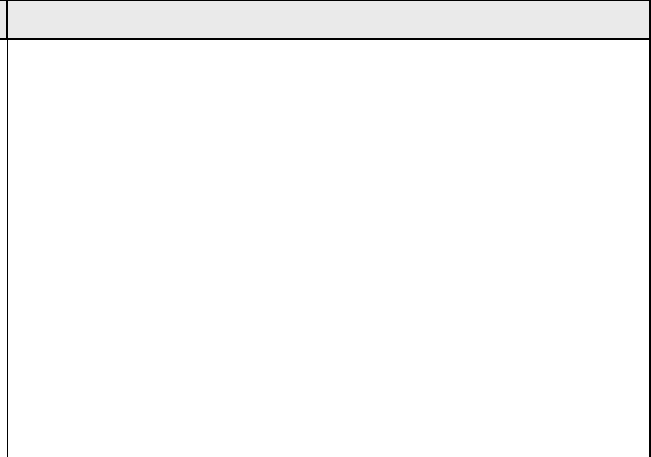
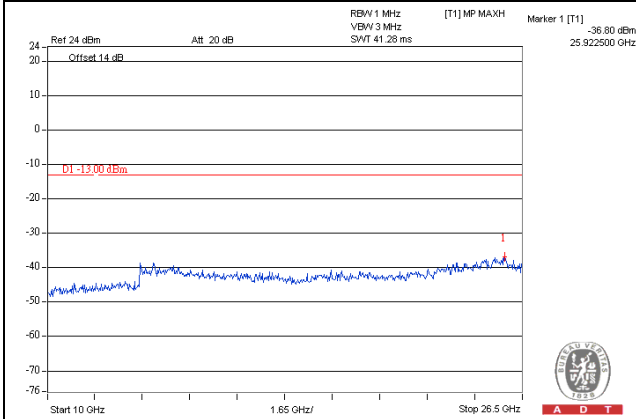
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



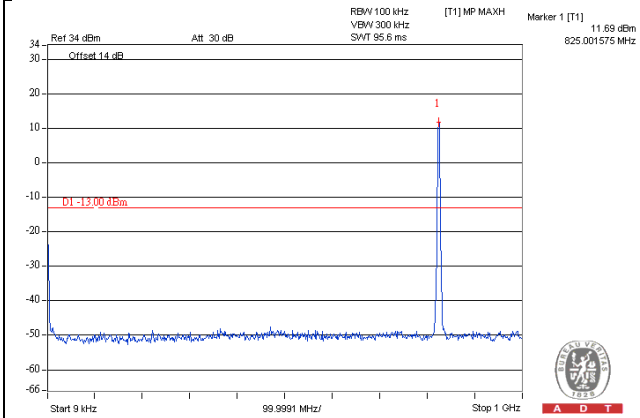
Frequency Range : 10GHz~26.5GHz



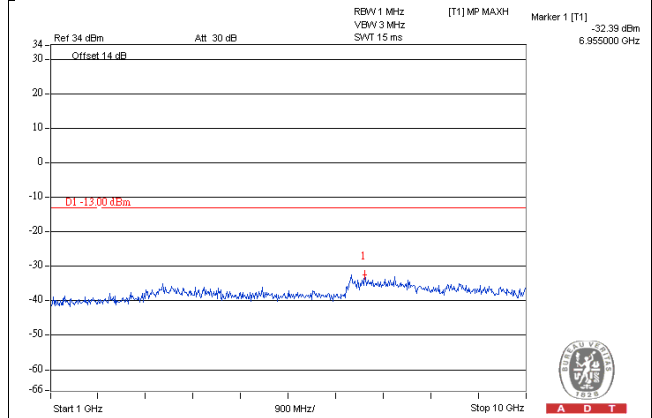
LTE Band 26, Channel Bandwidth 3MHz

Channel 26805 (825.5MHz)

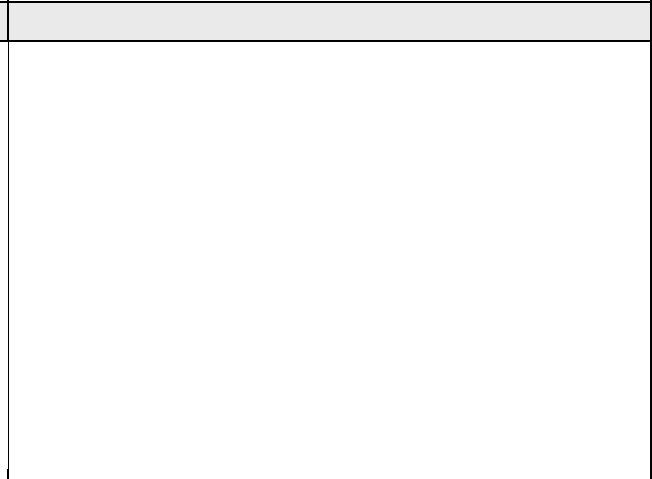
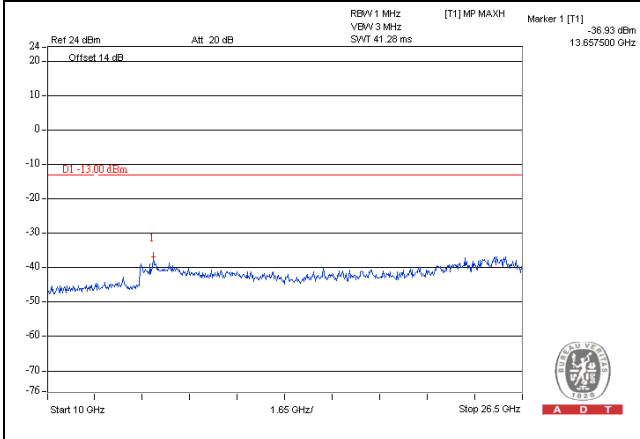
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



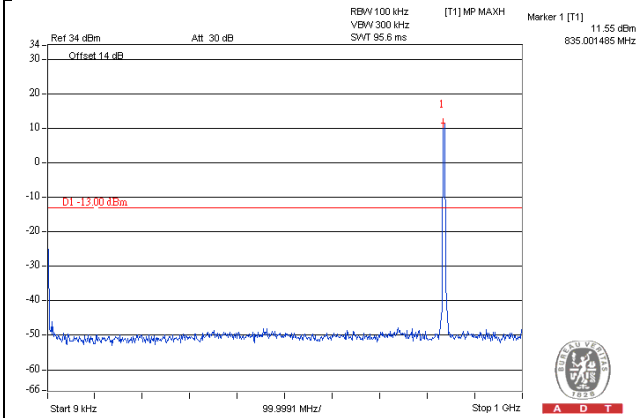
Frequency Range : 10GHz~26.5GHz



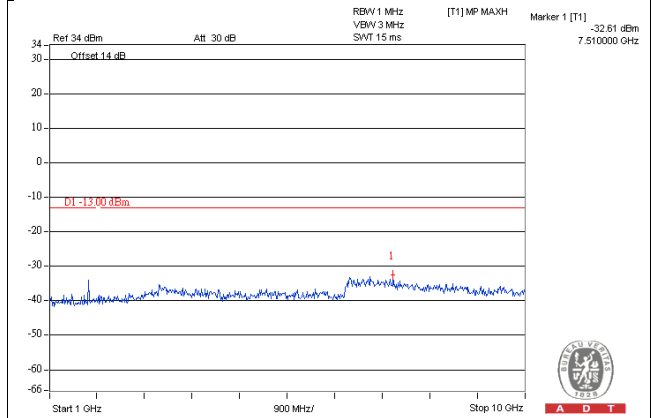
LTE Band 26, Channel Bandwidth 3MHz

Channel 26915 (836.5MHz)

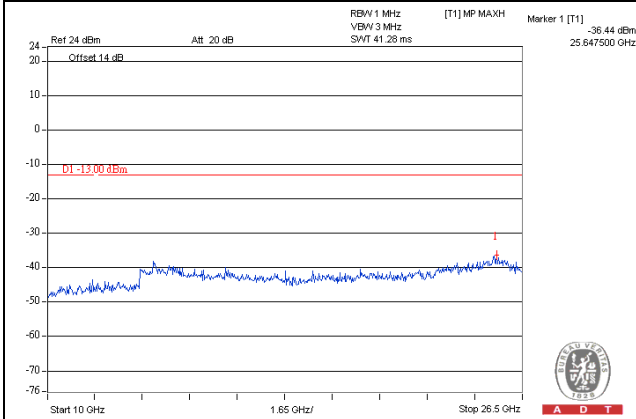
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



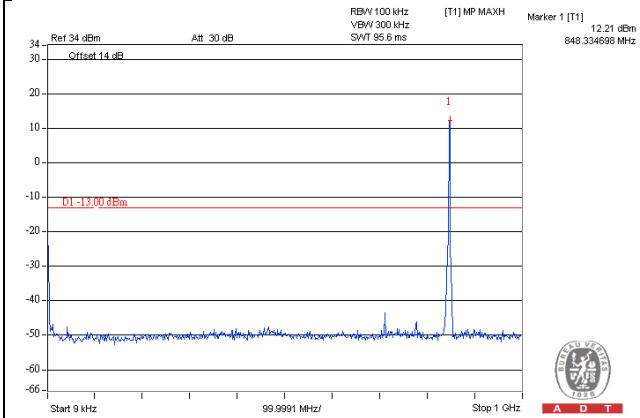
Frequency Range : 10GHz~26.5GHz



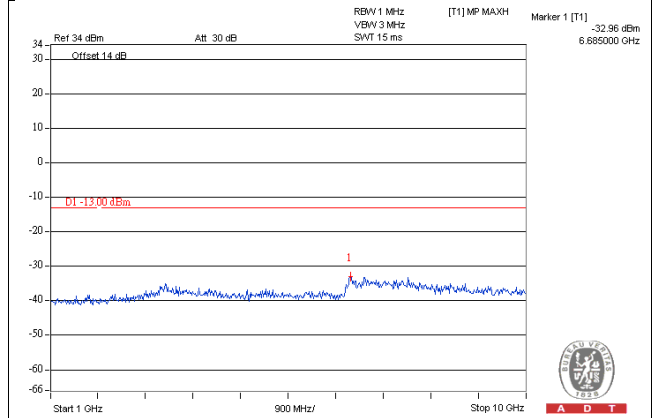
LTE Band 26, Channel Bandwidth 3MHz

Channel 27025 (847.5MHz)

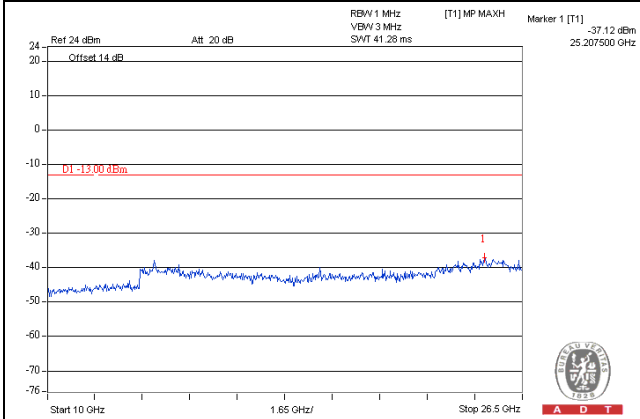
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



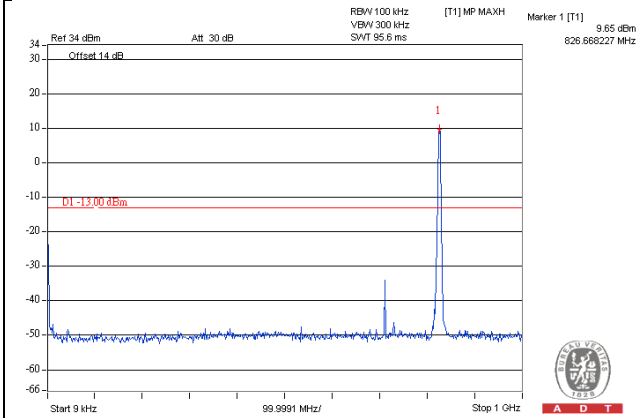
Frequency Range : 10GHz~26.5GHz



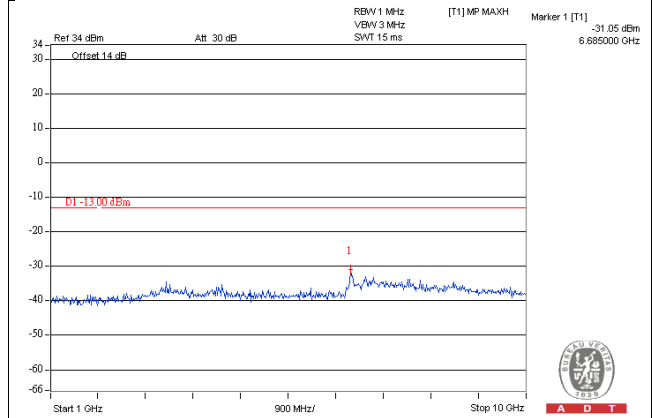
LTE Band 26, Channel Bandwidth 5MHz

Channel 26815 (826.5MHz)

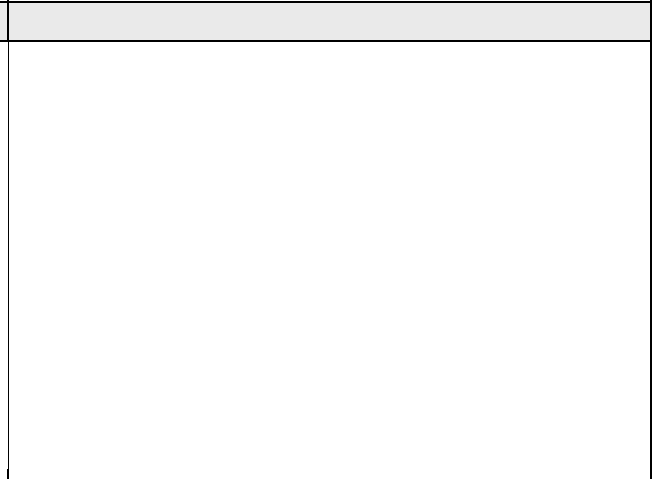
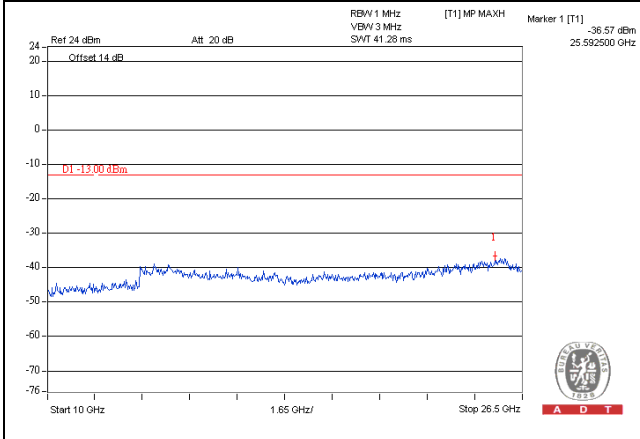
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



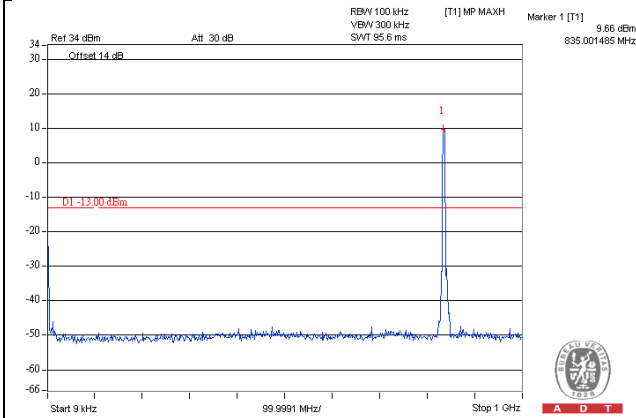
Frequency Range : 10GHz~26.5GHz



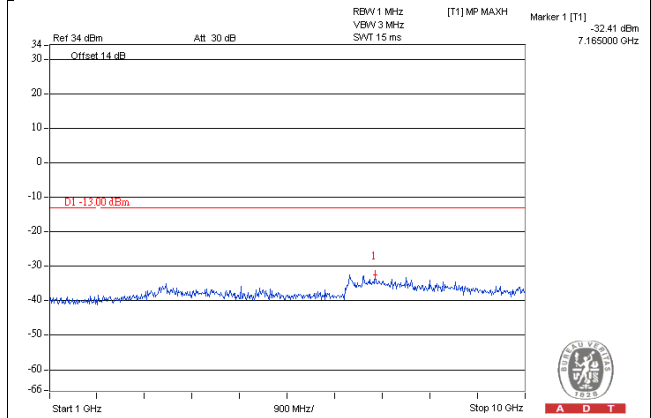
LTE Band 26, Channel Bandwidth 5MHz

Channel 26915 (836.5MHz)

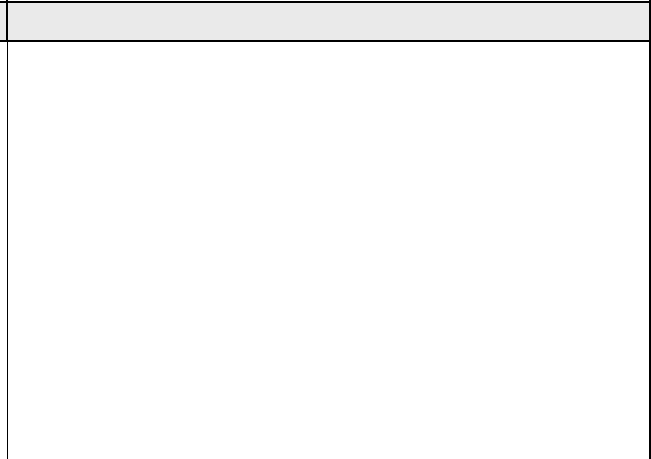
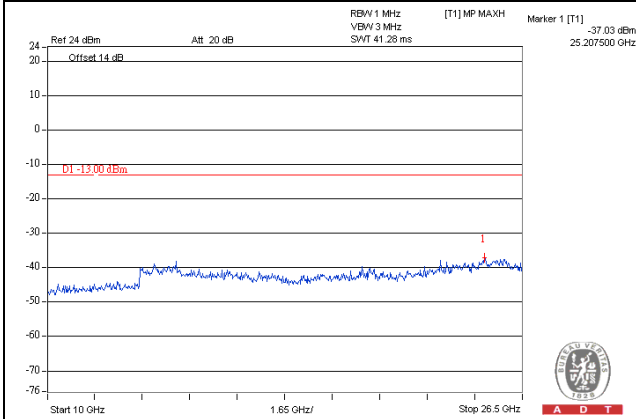
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



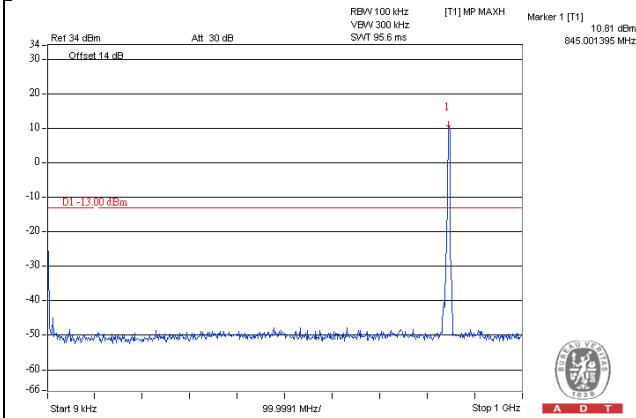
Frequency Range : 10GHz~26.5GHz



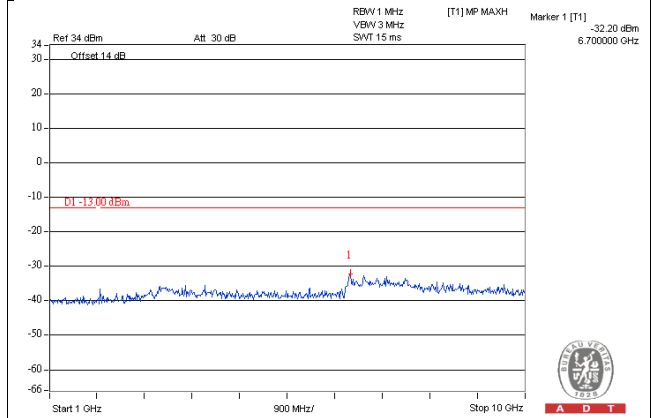
LTE Band 26, Channel Bandwidth 5MHz

Channel 27015 (846.5MHz)

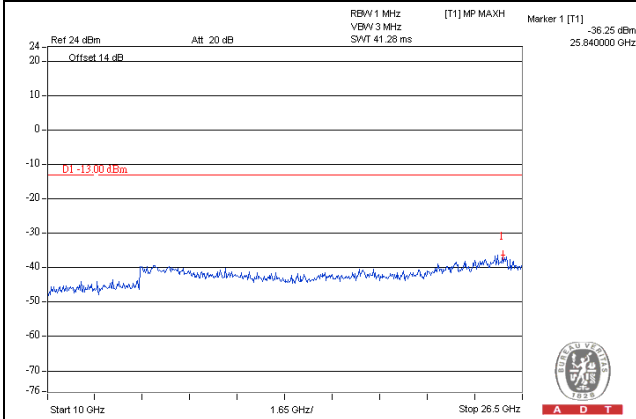
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



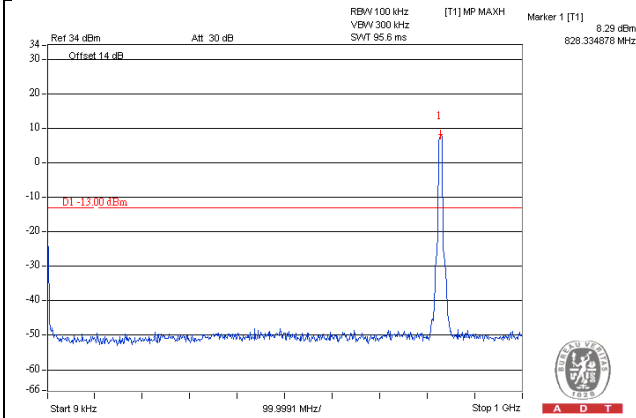
Frequency Range : 10GHz~26.5GHz



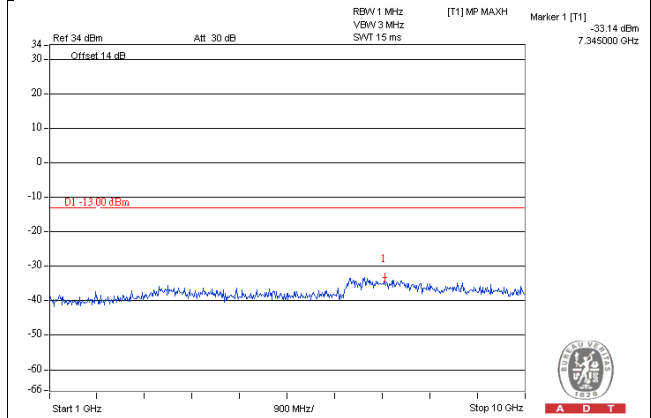
LTE Band 26, Channel Bandwidth 10MHz

Channel 26840 (829MHz)

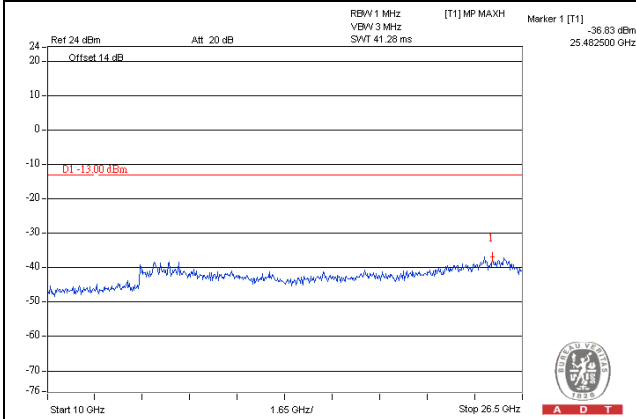
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



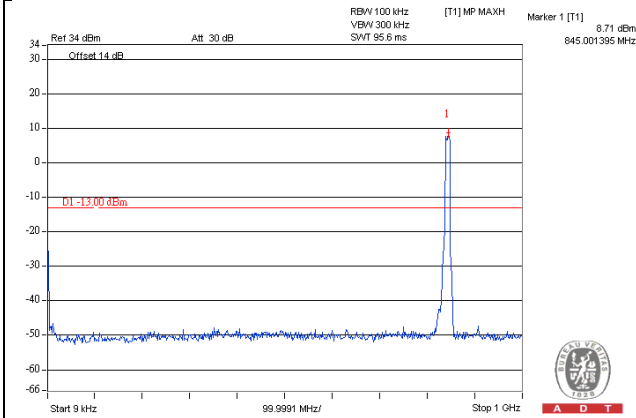
Frequency Range : 10GHz~26.5GHz



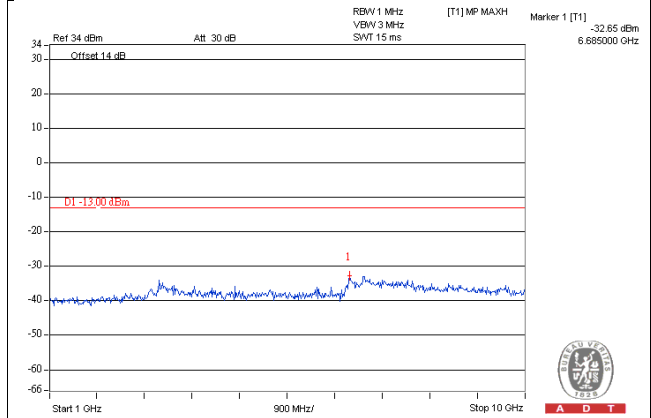
LTE Band 26, Channel Bandwidth 10MHz

Channel 26990 (844MHz)

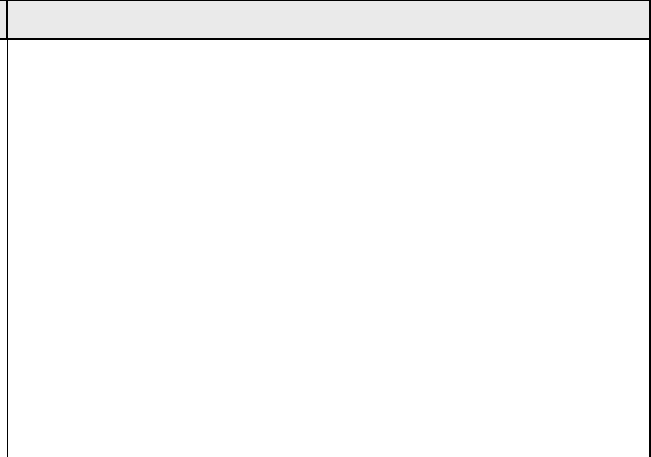
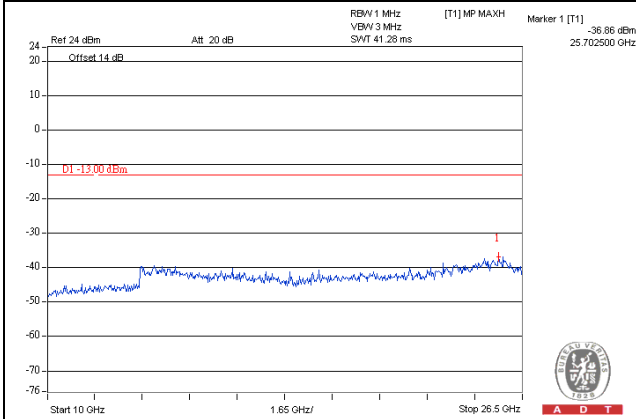
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



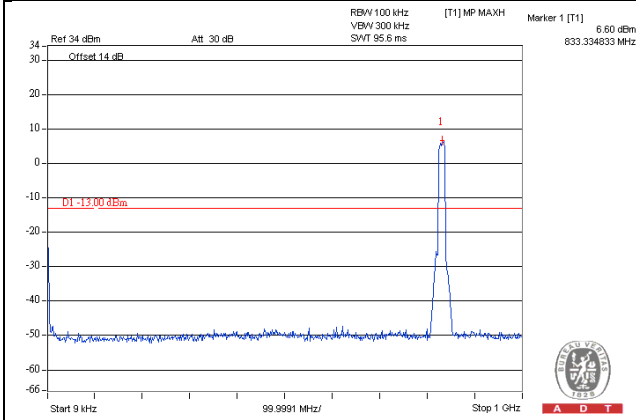
Frequency Range : 10GHz~26.5GHz



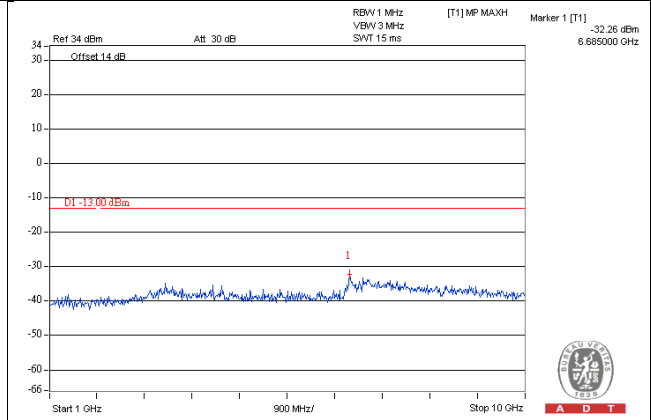
LTE Band 26, Channel Bandwidth 15MHz

Channel 26915 (831.5MHz)

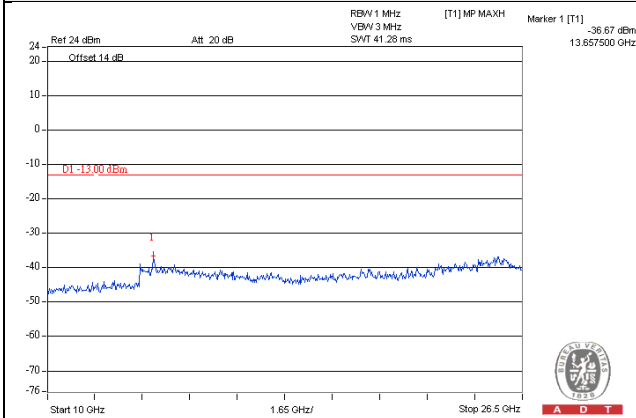
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



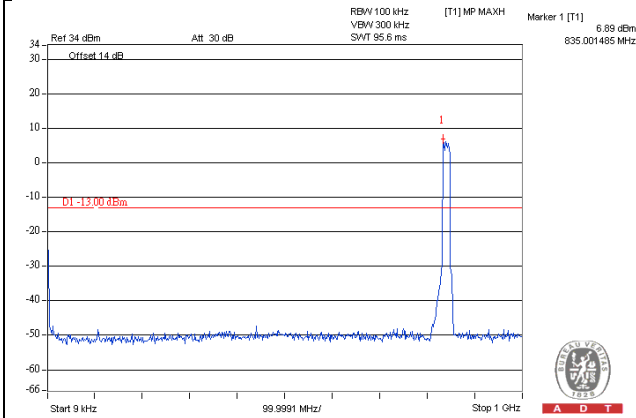
Frequency Range : 10GHz~26.5GHz



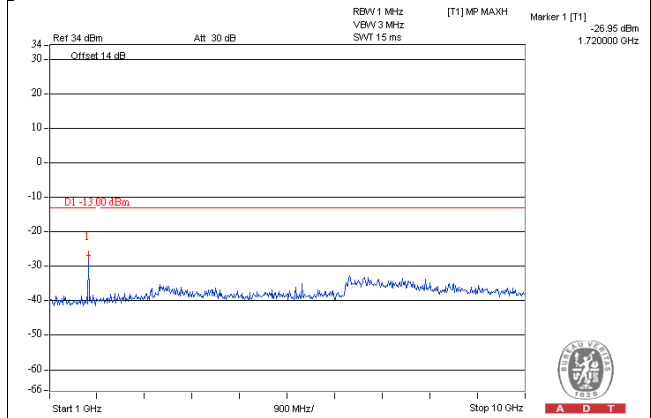
LTE Band 26, Channel Bandwidth 15MHz

Channel 26965 (841.5MHz)

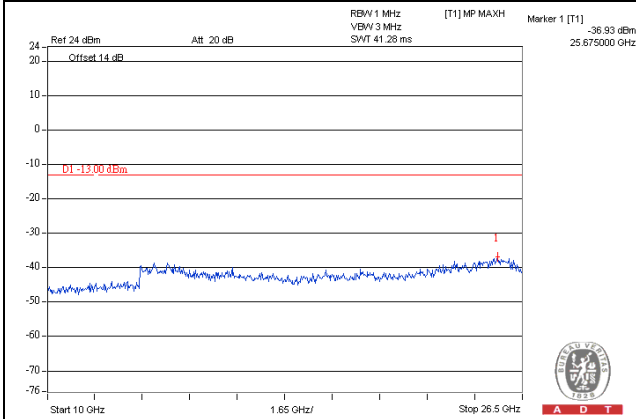
Frequency Range : 9kHz~1GHz



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

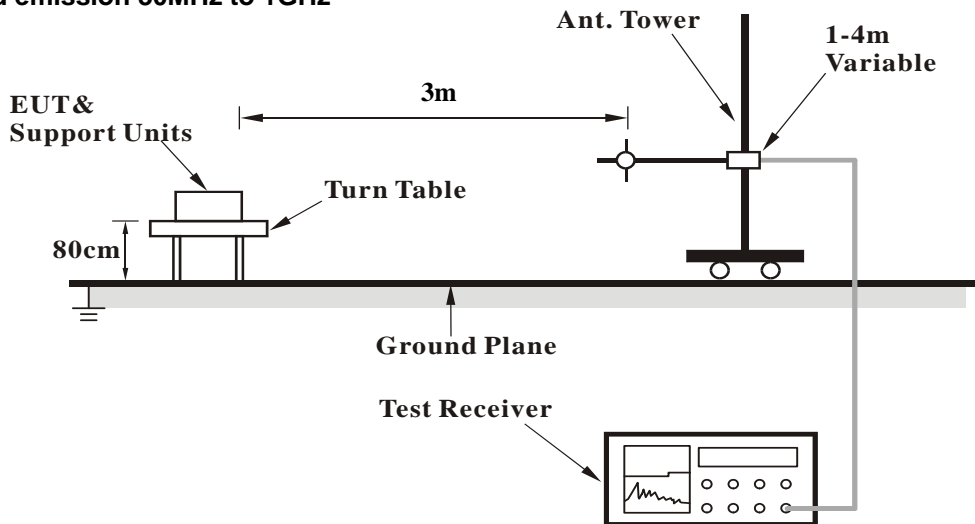
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.8.3 Deviation from Test Standard

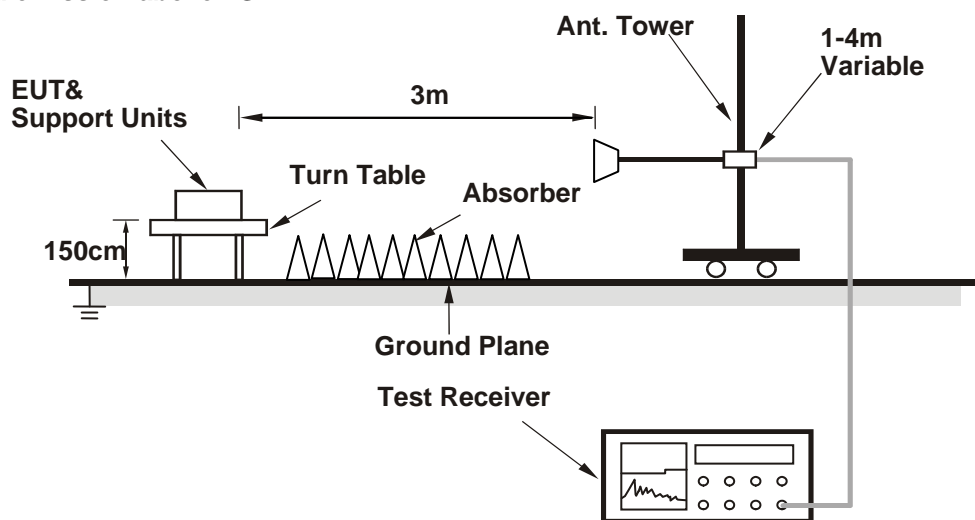
No deviation.

4.8.4 Test Setup

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



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

4.8.5 Test Results

Below 1GHz
WCDMA Band 5

Mode	TX channel 4132 (826.4MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	James Yang		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	32.91	-53.4	-34.7	-17.7	-52.4	-13.0	-39.4
2	137.67	-51.8	-56.8	-3.2	-60.0	-13.0	-47.0
3	425.76	-58.1	-64.1	3.5	-60.6	-13.0	-47.6
4	556.71	-61.0	-66.3	3.7	-62.6	-13.0	-49.6
5	770.11	-60.9	-62.3	3.9	-58.4	-13.0	-45.4
6	966.05	-60.4	-57.8	3.6	-54.2	-13.0	-41.2
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	45.52	-41.8	-41.9	-10.4	-52.3	-13.0	-39.3
2	136.70	-47.4	-49.5	-3.2	-52.7	-13.0	-39.7
3	246.31	-54.2	-55.8	-1.6	-57.4	-13.0	-44.4
4	377.26	-58.7	-64.8	3.6	-61.2	-13.0	-48.2
5	660.50	-61.1	-61.3	3.7	-57.6	-13.0	-44.6
6	994.18	-61.2	-56.7	3.4	-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 26, Channel Bandwidth 1.4MHz

Mode	TX channel 26897 (824.7MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	James Yang		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-46.1	-24.9	-19.4	-44.3	-13.0	-31.3
2	60.07	-51.2	-54.7	-3.4	-58.1	-13.0	-45.1
3	138.64	-52.5	-57.4	-3.2	-60.6	-13.0	-47.6
4	363.68	-58.5	-67.0	3.9	-63.1	-13.0	-50.1
5	541.19	-61.6	-67.3	3.9	-63.4	-13.0	-50.4
6	955.38	-60.9	-58.3	3.8	-54.5	-13.0	-41.5

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	30.97	-35.5	-29.1	-18.8	-47.9	-13.0	-34.9
2	169.68	-48.4	-50.9	-2.8	-53.7	-13.0	-40.7
3	363.68	-54.5	-60.9	3.9	-57.0	-13.0	-44.0
4	429.64	-57.8	-63.8	3.5	-60.3	-13.0	-47.3
5	594.54	-61.9	-64.7	3.8	-60.9	-13.0	-47.9
6	995.15	-61.5	-56.9	3.4	-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).

LTE Band 26, Channel Bandwidth 3MHz

Mode	TX channel 26805 (825.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	James Yang		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-43.5	-22.2	-19.4	-41.6	-13.0	-28.6
2	137.67	-52.4	-57.4	-3.2	-60.6	-13.0	-47.6
3	256.98	-59.4	-65.3	-1.5	-66.8	-13.0	-53.8
4	363.68	-58.6	-67.2	3.9	-63.3	-13.0	-50.3
5	567.38	-62.0	-67.0	3.7	-63.3	-13.0	-50.3
6	980.60	-61.4	-58.3	3.5	-54.8	-13.0	-41.8

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	-28.7	-21.4	-19.4	-40.8	-13.0	-27.8
2	83.35	-45.7	-53.1	0.5	-52.6	-13.0	-39.6
3	138.64	-48.5	-50.4	-3.2	-53.6	-13.0	-40.6
4	363.68	-53.8	-60.2	3.9	-56.3	-13.0	-43.3
5	429.64	-58.1	-64.1	3.5	-60.6	-13.0	-47.6
6	660.50	-60.5	-60.7	3.7	-57.0	-13.0	-44.0

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 26, Channel Bandwidth 5MHz

Mode	TX channel 26815 (826.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	James Yang		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-43.6	-22.3	-19.4	-41.7	-13.0	-28.7
2	37.76	-47.9	-32.1	-14.7	-46.8	-13.0	-33.8
3	141.55	-53.2	-57.7	-3.0	-60.7	-13.0	-47.7
4	363.68	-59.1	-67.6	3.9	-63.7	-13.0	-50.7
5	674.08	-62.1	-65.2	3.6	-61.6	-13.0	-48.6
6	980.60	-60.8	-57.6	3.5	-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	31.94	-35.4	-29.7	-18.3	-48.0	-13.0	-35.0
2	138.64	-49.1	-51.1	-3.2	-54.3	-13.0	-41.3
3	363.68	-54.4	-60.8	3.9	-56.9	-13.0	-43.9
4	429.64	-57.9	-63.9	3.5	-60.4	-13.0	-47.4
5	660.50	-60.4	-60.6	3.7	-56.9	-13.0	-43.9
6	985.45	-60.6	-56.9	3.5	-53.4	-13.0	-40.4

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 26, Channel Bandwidth 10MHz

Mode	TX channel 26840 (829MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	James Yang		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-41.5	-20.2	-19.4	-39.6	-13.0	-26.6
2	81.41	-52.6	-60.4	0.5	-59.9	-13.0	-46.9
3	139.61	-53.7	-58.5	-3.1	-61.6	-13.0	-48.6
4	363.68	-57.5	-66.0	3.9	-62.1	-13.0	-49.1
5	609.09	-61.5	-65.6	3.7	-61.9	-13.0	-48.9
6	917.55	-60.2	-58.0	3.6	-54.4	-13.0	-41.4

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	30.00	-28.3	-21.0	-19.4	-40.4	-13.0	-27.4
2	63.95	-45.6	-52.4	-2.0	-54.4	-13.0	-41.4
3	138.64	-49.6	-51.5	-3.2	-54.7	-13.0	-41.7
4	363.68	-54.4	-60.8	3.9	-56.9	-13.0	-43.9
5	429.64	-58.2	-64.3	3.5	-60.8	-13.0	-47.8
6	634.31	-61.9	-62.7	3.6	-59.1	-13.0	-46.1

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 26, Channel Bandwidth 15MHz

Mode	TX channel 26915 (831.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	James Yang		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	35.82	-45.1	-27.8	-15.9	-43.7	-13.0	-30.7
2	148.34	-54.5	-58.5	-3.0	-61.5	-13.0	-48.5
3	260.86	-59.9	-65.2	-1.5	-66.7	-13.0	-53.7
4	363.68	-58.4	-66.9	3.9	-63.0	-13.0	-50.0
5	558.65	-62.1	-67.4	3.7	-63.7	-13.0	-50.7
6	942.77	-61.0	-58.6	3.8	-54.8	-13.0	-41.8

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	-24.8	-17.5	-19.4	-36.9	-13.0	-23.9
2	82.38	-48.6	-55.7	0.4	-55.3	-13.0	-42.3
3	138.64	-49.1	-51.0	-3.2	-54.2	-13.0	-41.2
4	363.68	-54.0	-60.4	3.9	-56.5	-13.0	-43.5
5	631.40	-61.1	-62.0	3.6	-58.4	-13.0	-45.4
6	959.26	-61.0	-57.7	3.8	-53.9	-13.0	-40.9

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
WCDMA Band 5

Mode	TX channel 4132 (826.4MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1652.80	-60.6	-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	1652.80	-60.9	-51.5	0.9	-50.6	-13.0	-37.6

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 4182 (836.4MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.80	-60.9	-51.1	0.8	-50.3	-13.0	-37.3
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	1672.80	-60.8	-51.3	0.8	-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 4233 (846.6MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1693.20	-60.5	-50.8	0.7	-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	1693.20	-60.6	-51.1	0.7	-50.4	-13.0	-37.4

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 26, Channel Bandwidth 1.4MHz

Mode	TX channel 26897 (824.7MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1649.40	-60.2	-52.5	0.9	-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	1649.40	-61.4	-54.1	0.9	-53.2	-13.0	-40.2

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 26915 (836.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-60.8	-53.2	0.8	-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	1673.00	-61.5	-54.2	0.8	-53.4	-13.0	-40.4

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 27033 (848.3MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1696.00	-60.4	-52.8	0.7	-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	1696.00	-61.1	-53.8	0.7	-53.1	-13.0	-40.1

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 26, Channel Bandwidth 3MHz

Mode	TX channel 26805 (825.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1651.00	-60.2	-52.5	0.9	-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	1651.00	-61.1	-53.9	0.9	-53.0	-13.0	-40.0

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 26915 (831MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-60.2	-52.5	0.8	-51.7	-13.0	-38.7

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	-61.4	-54.0	0.8	-53.2	-13.0	-40.2

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 27025 (847.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1695.00	-60.6	-53.1	0.7	-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	1695.00	-61.4	-54.1	0.7	-53.4	-13.0	-40.4

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 26, Channel Bandwidth 5MHz

Mode	TX channel 26815 (826.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1653.00	-60.2	-52.5	0.9	-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	1653.00	-61.2	-54.0	0.9	-53.1	-13.0	-40.1

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 26915 (831MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-59.8	-52.1	0.8	-51.3	-13.0	-38.3

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	1673.00	-60.8	-53.4	0.8	-52.6	-13.0	-39.6

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 27015 (846.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1693.00	-60.4	-52.8	0.7	-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	1693.00	-61.2	-53.9	0.7	-53.2	-13.0	-40.2

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 26, Channel Bandwidth 10MHz

Mode	TX channel 26840 (829MHZ)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1658.00	-60.2	-52.6	0.9	-51.7	-13.0	-38.7
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	-61.4	-54.1	0.9	-53.2	-13.0	-40.2

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 26915 (831MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-60.2	-52.5	0.8	-51.7	-13.0	-38.7
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	-61.0	-53.7	0.8	-52.9	-13.0	-39.9

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 26990 (844MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1688.00	-60.5	-52.8	0.7	-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	1688.00	-61.2	-53.9	0.7	-53.2	-13.0	-40.2

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 26, Channel Bandwidth 15MHz

Mode	TX channel 26915 (831.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1663.00	-60.3	-52.7	0.9	-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	1663.00	-61.5	-54.3	0.9	-53.4	-13.0	-40.4

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 26965 (841.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-60.0	-52.3	0.8	-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	1673.00	-60.9	-53.6	0.8	-52.8	-13.0	-39.8

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.

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

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

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