FCC Test Report

(Part 27: LTE Band 7)

Report No.: RF170217C15-1

FCC ID: H8NSS2FHI

Test Model: SS2FHI Femtocell Multi-band SOHO

Received Date: Feb. 17, 2017

Test Date: Mar. 15 ~ Mar. 27, 2017

Issued Date: May 18, 2017

Applicant: ASKEY COMPUTER CORP.

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Release Control Record

Issue No.	Description	Date Issued
RF170217C15-1	Original release	May 18, 2017

1 Certificate of Conformity

Product: Femtocell

Brand: Nokia

Test Model: SS2FHI Femtocell Multi-band SOHO

Sample Status: Engineering sample

Applicant: ASKEY COMPUTER CORP.

Test Date: Mar. 15 ~ Mar. 27, 2017

Standards: FCC Part 27, Subpart M
FCC Part 2

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

Prepared by : _____ , **Date:** May 18, 2017
Pettie Chen / Senior Specialist

Approved by : _____ , **Date:** May 18, 2017
Dylan Chiou / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2			
FCC Clause LTE Band 7	Test Item	Result	Remarks
2.1046 27.50(h)	Equivalent Isotropically Radiated Power	Pass	Meet the requirement of limit.
----	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1055 27.54	Frequency Stability Stay with the authorized bands of operation	Pass	Meet the requirement of limit.
2.1049 27.53(h)	Occupied Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53(m)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(m)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(m)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -13.2dB at 8055.00MHz.

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 ROHDE & SCHWARZ	ESIB7	100187	Apr. 18, 2016	Apr. 17, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Nov. 16, 2016	Nov. 15, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Dec. 28, 2016	Dec. 27, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Dec. 27, 2016	Dec. 26, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 14, 2016	Dec. 13, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier Agilent	8449B	3008A01638	Feb. 22, 2017	Feb. 21, 2018
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-02 (248780+MY13377)	Feb. 02, 2017	Feb. 01, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-03 (274092)	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	8D-FB	Cable-CH9-01	Aug. 09, 2016	Aug. 08, 2017
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
High Speed Peak Power Meter	ML2495A	0824012	Aug. 11, 2016	Aug. 10, 2017
Power Sensor	MA2411B	0738171	Aug. 11, 2016	Aug. 10, 2017
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 08, 2016	Jun. 07, 2017
Mini-Circuits Power Splitter	ZN2PD-9G	NA	Jun. 13, 2016	Jun. 12, 2017
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 horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 215374.
5. The IC Site Registration No. is IC 7450F-9.

3 General Information

3.1 General Description of EUT

Product	Femtocell		
Brand	Nokia		
Test Model	SS2FHI Femtocell Multi-band SOHO		
Status of EUT	Engineering sample		
Power Supply Rating	12Vdc (Adapter) 48-52Vdc (PoE)		
Modulation Type	QPSK, 16QAM, 64QAM		
Operating Frequency	LTE Band 7	Channel Bandwidth 5MHz	2622.5MHz ~ 2687.5MHz
		Channel Bandwidth 10MHz	2625.0MHz ~ 2685.0MHz
		Channel Bandwidth 15MHz	2627.5MHz ~ 2682.5MHz
		Channel Bandwidth 20MHz	2630.0MHz ~ 2680.0MHz
Emission Designator	Refer to Note		
Max. EIRP Power	LTE Band 7	Channel Bandwidth 5MHz	758.578mW (28.8dBm)
		Channel Bandwidth 10MHz	645.654mW (28.1dBm)
		Channel Bandwidth 15MHz	758.578mW (28.8dBm)
		Channel Bandwidth 20MHz	645.654mW (28.1dBm)
Antenna Type	LTE Band 7: Antenna 1: PIFA antenna with 3.2dBi gain Antenna 3: PIFA antenna with 2.5dBi gain		
Antenna Connector	NA		
Accessory Device	Adapter		
Data Cable Supplied	2.95m non-shielded RJ45 cable w/o core		

Note:

1. The EUT uses following adapter and PoE.

Adapter	
Brand	SHENZHEN FRECOM ELECTRONICS CO., LTD
Model	F24W5-1202000SPAV
Input Power	100-240Vac, 50/60Hz, 0.6A
Output Power	12Vdc, 2A
Power Line	1.5m DC cable without core attached on adapter

PoE (Support Unit)	
Brand	EUSSO
Model	UPE5600-IHGM
Input Power	100-240Vac, 50/60Hz
Output Power	48-52Vdc, 30W Watt Maximun

2. The EUT provides 2 completed transmitters and 2 receivers.

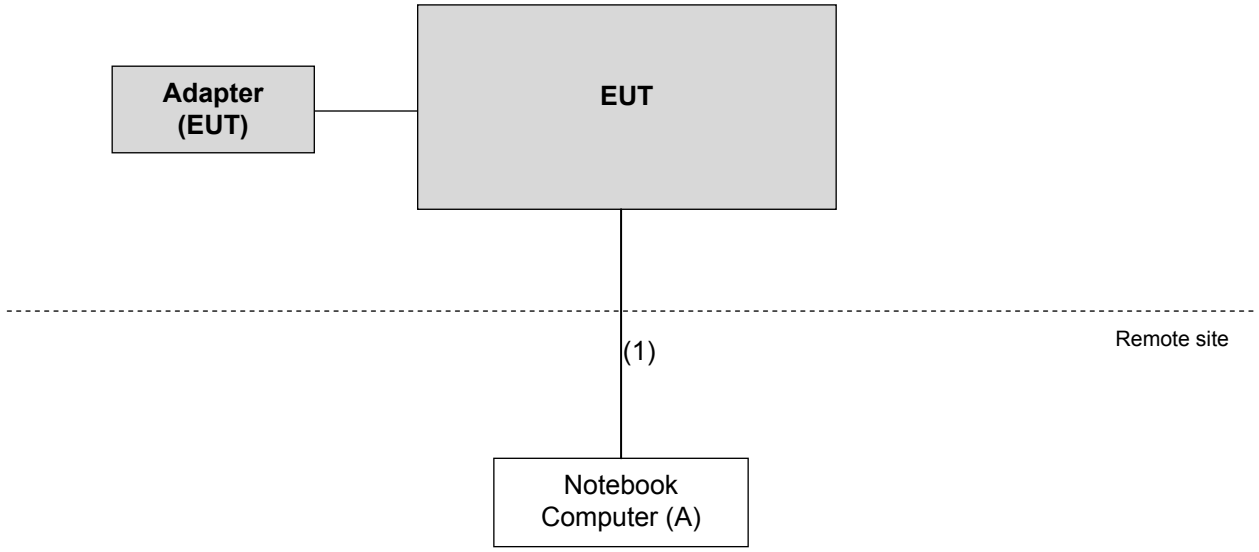
Modulation Mode	TX FUNCTION	RX FUNCTION
LTE	2TX	2RX

3. Carrier Aggregation technology supported for this device, the operation behavior is LTE Band 2 + LTE Band 7, for more details information please refer to “CA Mode” of test report.

4. Emission Designator as below.

Channel Bandwidth	QPSK	16QAM	64QAM
5MHz	4M43G7D	4M45W7D	4M43W7D
10MHz	8M93G7D	8M93W7D	8M93W7D
15MHz	13M3G7D	13M3W7D	13M3W7D
20MHz	18M0G7D	18M0W7D	18M0W7D

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.	Notebook Computer	DELL	E5410	1HC2XM1	FCC DoC Approved	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45 Cable	1	10	N	0	Cat5e

3.3 Test Mode Applicability and Tested Channel Detail

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

LTE Band 7

Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation
Output Power	2775 to 3425	2775, 3100, 3425	5MHz	QPSK / 16QAM / 64QAM
	2800 to 3400	2800, 3100, 3400,	10MHz	QPSK / 16QAM / 64QAM
	2825 to 3375	2825, 3100, 3375	15MHz	QPSK / 16QAM / 64QAM
	2850 to 3350	2850, 3100, 3350	20MHz	QPSK / 16QAM / 64QAM
Frequency Stability	2775 to 3425	2775, 3100, 3425	5MHz	QPSK
Emission Bandwidth	2775 to 3425	2775, 3100, 3425	5MHz	QPSK / 16QAM / 64QAM
	2800 to 3400	2800, 3100, 3400,	10MHz	QPSK / 16QAM / 64QAM
	2825 to 3375	2825, 3100, 3375	15MHz	QPSK / 16QAM / 64QAM
	2850 to 3350	2850, 3100, 3350	20MHz	QPSK / 16QAM / 64QAM
Channel Edge	2775 to 3425	2775, 3425	5MHz	QPSK
	2800 to 3400	2800, 3400,	10MHz	QPSK
	2825 to 3375	2825, 3375	15MHz	QPSK
	2850 to 3350	2850, 3350	20MHz	QPSK
Peak To Average Ratio	2775 to 3425	2775, 3100, 3425	5MHz	QPSK / 16QAM / 64QAM
	2800 to 3400	2800, 3100, 3400,	10MHz	QPSK / 16QAM / 64QAM
	2825 to 3375	2825, 3100, 3375	15MHz	QPSK / 16QAM / 64QAM
	2850 to 3350	2850, 3100, 3350	20MHz	QPSK / 16QAM / 64QAM
Conducted Emission	2775 to 3425	2775, 3100, 3425	5MHz	QPSK
	2800 to 3400	2800, 3100, 3400,	10MHz	QPSK
	2825 to 3375	2825, 3100, 3375	15MHz	QPSK
	2850 to 3350	2850, 3100, 3350	20MHz	QPSK
Radiated Emission Below 1GHz	2775 to 3425	2775	5MHz	QPSK
	2800 to 3400	2800,	10MHz	QPSK
	2825 to 3375	2825	15MHz	QPSK
	2850 to 3350	2850	20MHz	QPSK
Radiated Emission Above 1GHz	2775 to 3425	2775, 3100, 3425	5MHz	QPSK
	2800 to 3400	2800, 3100, 3400,	10MHz	QPSK
	2825 to 3375	2825, 3100, 3375	15MHz	QPSK
	2850 to 3350	2850, 3100, 3350	20MHz	QPSK

Note:

1. For radiated emission below 1 GHz, the low, mid and high channels were pre-tested in chamber. The low channel was the worst case and chosen for final test.
2. The conducted output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM and 64QAM mode. Therefore, Frequency Stability, Channel Edge, Conducted Emission, Radiated Emission were presented under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
Output Power	25deg. C, 69%RH	120Vac, 60Hz	Bond Tseng
Frequency Stability	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Emission Bandwidth	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Channel 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, 69%RH	120Vac, 60Hz	Bond Tseng

3.4 EUT Operating Conditions

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 27

KDB 971168 D01 Power Meas License Digital Systems v02r02

KDB 412172 D01 Determining ERP and EIRP v01r01

KDB 662911 D01 multiple transmitter output v02r01

ANSI/TIA/EIA-603-D 2010

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

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

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

The radiated peak output power shall be according to the specific rule Part 27.50(h) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

4.1.2 Test Procedures

EIRP / ERP Measurement:

a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 10MHz for LTE Mode.

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

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

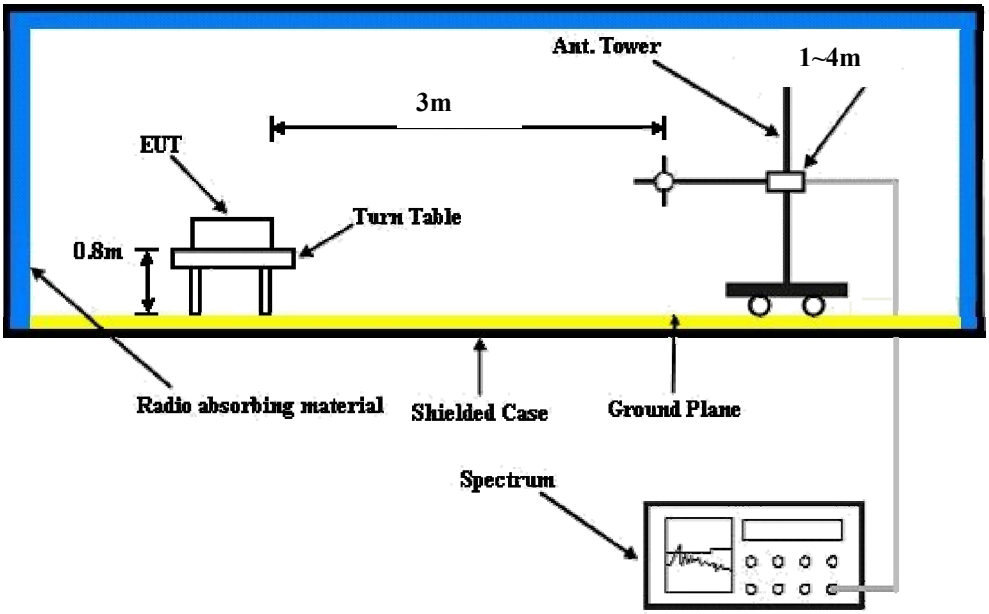
d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15dBi.

Conducted Power Measurement:

A power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

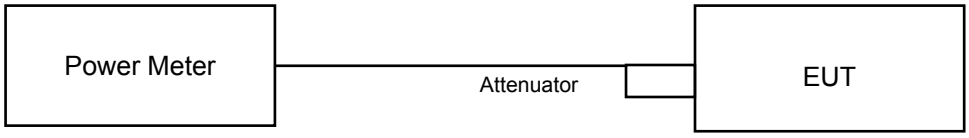
4.1.3 Test Setup

EIRP / ERP MEASUREMENT:



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

CONDUCTED POWER MEASUREMENT:



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

4.1.4 Test Results

CONDUCTED OUTPUT POWER (dBm)

Band / BW	RB Size	RB Offset	QPSK						16QAM						64QAM					
			Low CH 2775		Mid CH 3100		High CH 3425		Low CH 2775		Mid CH 3100		High CH 3425		Low CH 2775		Mid CH 3100		High CH 3425	
			2622.5MHz		2655.0MHz		2687.5MHz		2622.5MHz		2655.0MHz		2687.5MHz		2622.5MHz		2655.0MHz		2687.5MHz	
			Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1
7/5M	25	0	20.35	21.30	20.86	20.92	20.36	20.92	19.50	20.67	20.05	20.02	19.42	20.06	18.62	19.83	19.14	19.18	18.57	19.25
			Total		Total		Total		Total		Total		Total		Total		Total		Total	
			23.86		23.90		23.66		23.13		23.05		22.76		22.28		22.17		21.93	
Band / BW	RB Size	RB Offset	QPSK						16QAM						64QAM					
			Low CH 2775		Mid CH 3100		High CH 3425		Low CH 2775		Mid CH 3100		High CH 3425		Low CH 2775		Mid CH 3100		High CH 3425	
			2622.5MHz		2655.0MHz		2687.5MHz		2622.5MHz		2655.0MHz		2687.5MHz		2622.5MHz		2655.0MHz		2687.5MHz	
			Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0
7/10M	50	0	21.22	21.20	20.72	21.02	20.58	21.07	20.37	20.34	19.91	20.12	19.64	20.23	19.49	19.50	19.00	19.28	18.79	19.42
			Total		Total		Total		Total		Total		Total		Total		Total		Total	
			24.22		23.88		23.84		23.37		23.03		22.96		22.51		22.15		22.13	
Band / BW	RB Size	RB Offset	QPSK						16QAM						64QAM					
			Low CH 2775		Mid CH 3100		High CH 3425		Low CH 2775		Mid CH 3100		High CH 3425		Low CH 2775		Mid CH 3100		High CH 3425	
			2622.5MHz		2655.0MHz		2687.5MHz		2622.5MHz		2655.0MHz		2687.5MHz		2622.5MHz		2655.0MHz		2687.5MHz	
			Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1
7/15M	75	0	21.30	21.40	20.67	21.14	20.69	21.09	20.45	20.55	19.86	20.29	19.75	20.24	19.61	19.71	19.04	19.45	18.94	19.40
			Total		Total		Total		Total		Total		Total		Total		Total		Total	
			24.36		23.92		23.90		23.51		23.09		23.01		22.67		22.26		22.19	
Band / BW	RB Size	RB Offset	QPSK						16QAM						64QAM					
			Low CH 2775		Mid CH 3100		High CH 3425		Low CH 2775		Mid CH 3100		High CH 3425		Low CH 2775		Mid CH 3100		High CH 3425	
			2622.5MHz		2655.0MHz		2687.5MHz		2622.5MHz		2655.0MHz		2687.5MHz		2622.5MHz		2655.0MHz		2687.5MHz	
			Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1	Chain0	Chain1
7/20M	100	0	21.08	21.30	20.78	20.82	20.55	21.02	20.30	20.49	19.99	19.99	19.71	20.20	19.50	19.73	19.17	19.19	18.96	19.41
			Total		Total		Total		Total		Total		Total		Total		Total		Total	
			24.20		23.81		23.80		23.41		23.00		22.97		22.63		22.19		22.20	

EIRP Power (dBm)

LTE Band 7

Channel Bandwidth: 5MHz

MODE		TX channel 2775					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2622.50	-19.5	23.0	0.2	23.2	33.0	-9.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2622.50	-15.2	28.5	0.3	28.8	33.0	-4.2

MODE		TX channel 3100					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2655.00	-19.8	22.9	0.3	23.2	33.0	-9.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2655.00	-15.7	28.0	0.3	28.3	33.0	-4.7

MODE		TX channel 3425					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2687.50	-19.7	23.3	0.2	23.5	33.0	-9.5
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2687.50	-15.4	28.4	0.2	28.6	33.0	-4.4

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

Channel Bandwidth: 10MHz

MODE		TX channel 2800					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2625.00	-18.9	23.6	0.2	23.8	33.0	-9.2
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2625.00	-16.1	27.7	0.2	27.9	33.0	-5.1

MODE		TX channel 3100					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2655.00	-19.1	23.6	0.3	23.9	33.0	-9.1
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2655.00	-15.9	27.8	0.3	28.1	33.0	-4.9

MODE		TX channel 3400					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2685.00	-19.5	23.5	0.2	23.7	33.0	-9.3
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2685.00	-16.0	27.8	0.2	28.0	33.0	-5.0

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

Channel Bandwidth: 15MHz

MODE		TX channel 2825					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2627.50	-18.8	23.7	0.2	23.9	33.0	-9.1
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2627.50	-15.2	28.6	0.2	28.8	33.0	-4.2

MODE		TX channel 3100					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2655.00	-18.6	24.1	0.3	24.4	33.0	-8.6
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2655.00	-15.4	28.3	0.3	28.6	33.0	-4.4

MODE		TX channel 3375					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2682.50	-19.2	23.8	0.2	24.0	33.0	-9.0
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2682.50	-15.9	27.9	0.2	28.1	33.0	-4.9

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

Channel Bandwidth: 20MHz

MODE		TX channel 2850					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2630.00	-19.1	23.4	0.2	23.6	33.0	-9.4
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2630.00	-16.3	27.5	0.2	27.7	33.0	-5.3

MODE		TX channel 3100					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2655.00	-19.5	23.2	0.3	23.5	33.0	-9.5
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2655.00	-16.5	27.2	0.3	27.5	33.0	-5.5

MODE		TX channel 3350					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2680.00	-18.9	24.1	0.2	24.3	33.0	-8.7
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2680.00	-15.9	27.9	0.2	28.1	33.0	-4.9

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

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stabiliity Measurement

According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT -20℃ ~ 50℃.

4.2.2 Test Procedure

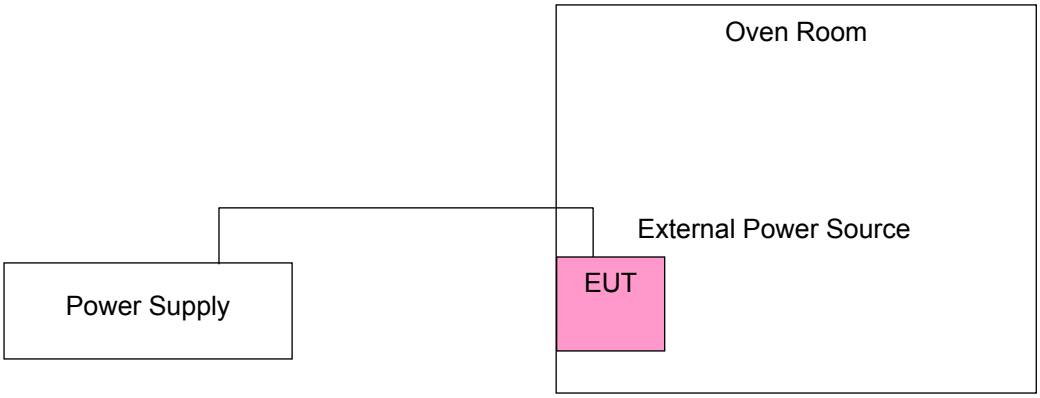
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the AC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5 ℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

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

4.2.3 Test Setup



4.2.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (ppm)	Limit (Pass/Fail)
	LTE Band 7	
138	-0.004	Pass
120	-0.004	Pass
102	-0.004	Pass

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

Frequency Error vs. Temperature.

TEMP. (℃)	Frequency Error (ppm)	Limit (Pass/Fail)
	LTE Band 7	
50	-0.004	Pass
40	-0.004	Pass
30	-0.004	Pass
20	-0.004	Pass
10	-0.004	Pass
0	-0.005	Pass
-10	-0.005	Pass
-20	-0.005	Pass

4.3 Emission Bandwidth Measurement

4.3.1 Limits of Emission Bandwidth Measurement

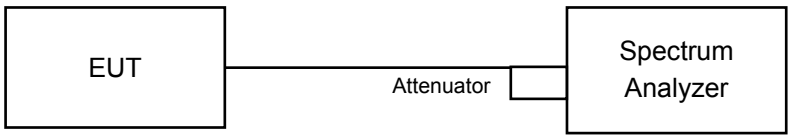
-26dBc Bandwidth
According to FCC 27.53(m)(6) specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

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

4.3.2 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW = 51kHz and VBW = 150kHz (Channel Bandwidth: 5MHz), RBW = 100kHz and VBW = 300kHz (Channel Bandwidth: 10MHz), RBW = 200kHz and VBW = 620kHz (Channel Bandwidth: 15MHz) and RBW = 430kHz and VBW = 1.2MHz (Channel Bandwidth: 20MHz).

4.3.3 Test Setup



4.3.4 Test Result

LTE Band 7 / Chain 0

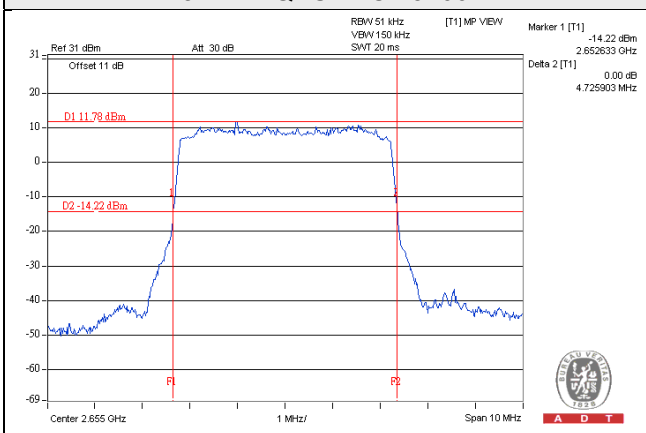
Channel Bandwidth: 5MHz							
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
2775	2622.5	4.72	4.71	4.71	4.43	4.43	4.42
3100	2655.0	4.73	4.68	4.71	4.42	4.43	4.42
3425	2687.5	4.72	4.71	4.70	4.42	4.42	4.43

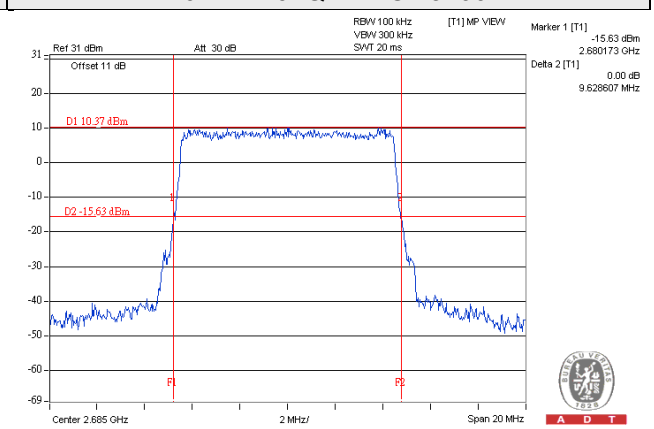
Channel Bandwidth: 10MHz							
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
2800	2625.0	9.60	9.57	9.53	8.93	8.93	8.93
3100	2655.0	9.59	9.52	9.55	8.90	8.90	8.90
3400	2685.0	9.59	9.53	9.63	8.93	8.90	8.90

Channel Bandwidth: 15MHz							
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
2825	2627.5	14.23	14.22	14.13	13.30	13.30	13.30
3100	2655.0	14.26	14.14	14.17	13.30	13.33	13.33
3375	2682.5	14.18	14.18	14.15	13.30	13.30	13.30

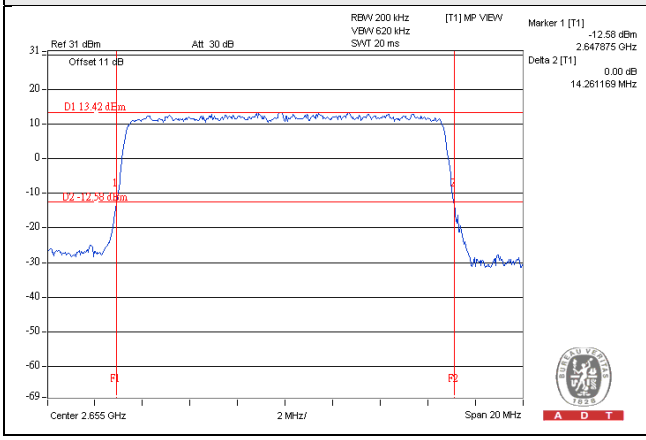
Channel Bandwidth: 20MHz							
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
2850	2630.0	19.39	19.28	19.21	18.00	18.00	18.00
3100	2655.0	19.35	19.23	19.27	17.93	17.93	17.93
3350	2680.0	19.37	19.33	19.20	17.93	17.93	17.93

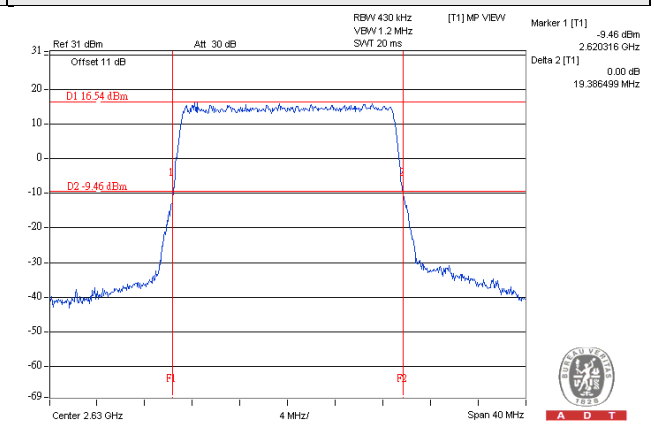
Spectrum Plot of Worst Value	
26dBc Bandwidth	
5MHz / QPSK / Ch 3100	10MHz / 64QAM / Ch 3400



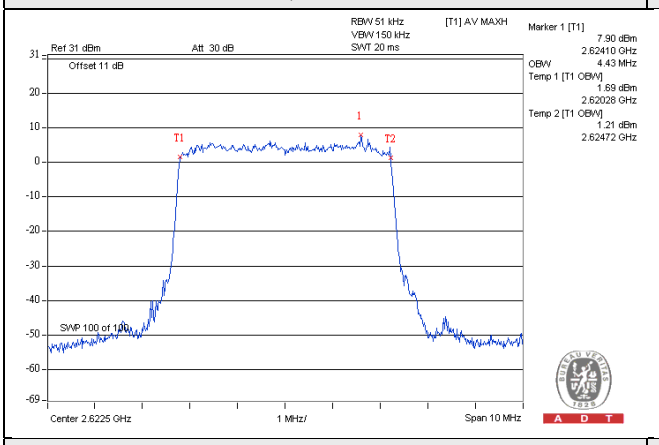


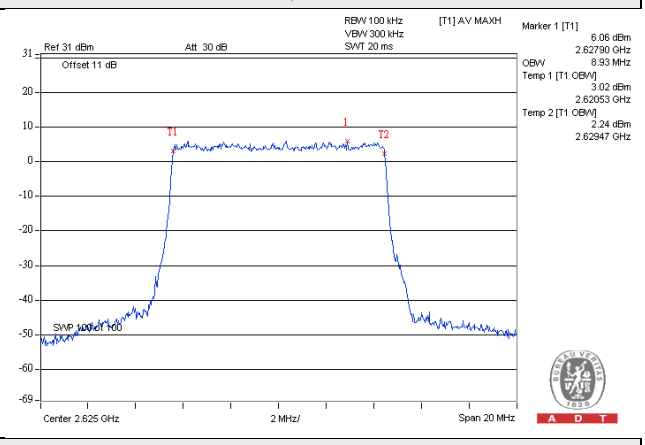
15MHz / QPSK / Ch 3100	20MHz / QPSK / Ch 2850



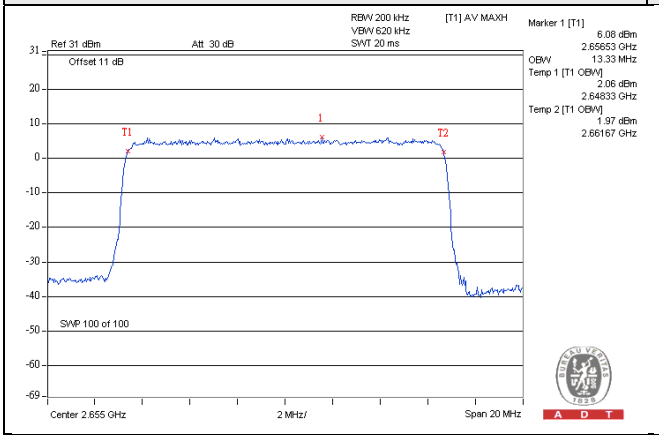


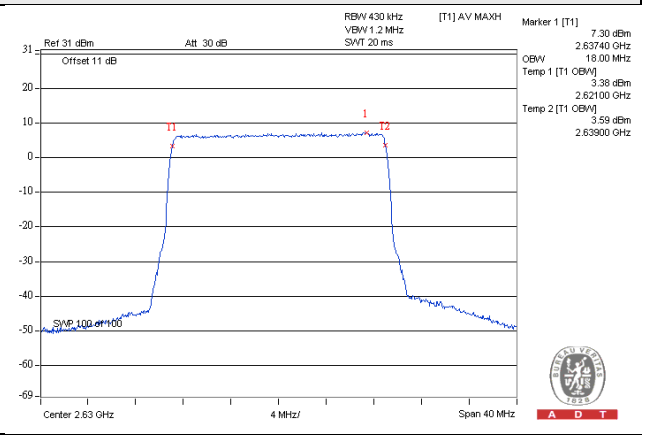
Spectrum Plot of Worst Value	
Occupied Bandwidth	
5MHz / QPSK / Ch 2775	10MHz / QPSK / Ch 2800





15MHz / 16QAM / Ch 3100	20MHz / QPSK / Ch 2850





LTE Band 7 / Chain 1

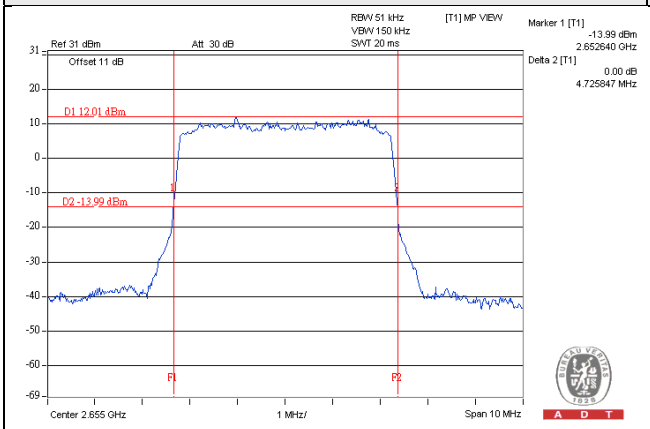
Channel Bandwidth: 5MHz							
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
2775	2622.5	4.71	4.70	4.71	4.43	4.45	4.43
3100	2655.0	4.73	4.70	4.71	4.43	4.43	4.43
3425	2687.5	4.70	4.73	4.70	4.43	4.43	4.43

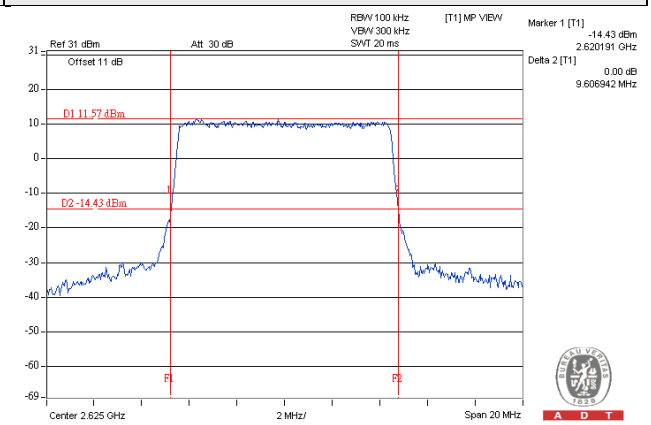
Channel Bandwidth: 10MHz							
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
2800	2625.0	9.61	9.58	9.48	8.93	8.93	8.93
3100	2655.0	9.61	9.59	9.55	8.93	8.93	8.93
3400	2685.0	9.61	9.57	9.57	8.93	8.93	8.93

Channel Bandwidth: 15MHz							
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
2825	2627.5	14.27	14.25	14.19	13.33	13.33	13.30
3100	2655.0	14.21	14.13	14.08	13.30	13.33	13.33
3375	2682.5	14.19	14.14	14.11	13.33	13.30	13.33

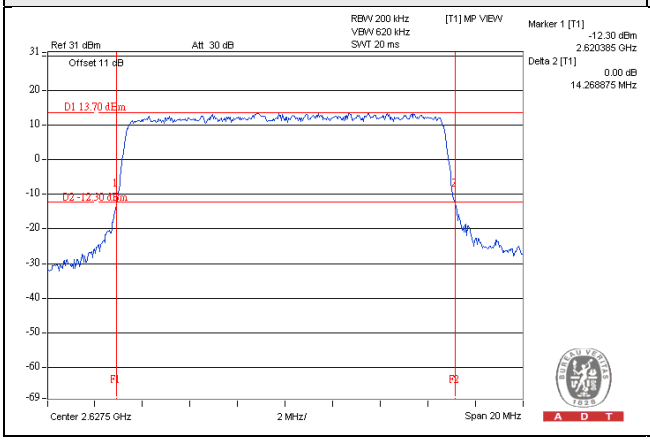
Channel Bandwidth: 20MHz							
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
2850	2630.0	19.26	19.30	19.08	17.93	17.93	18.00
3100	2655.0	19.36	19.28	19.31	17.93	17.93	17.93
3350	2680.0	19.34	19.27	19.14	18.00	18.00	18.00

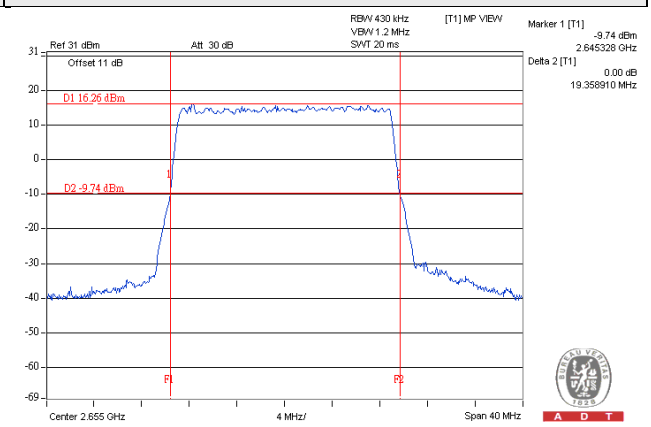
Spectrum Plot of Worst Value	
26dBc Bandwidth	
5MHz / QPSK / Ch 3100	10MHz / QPSK / Ch 2800



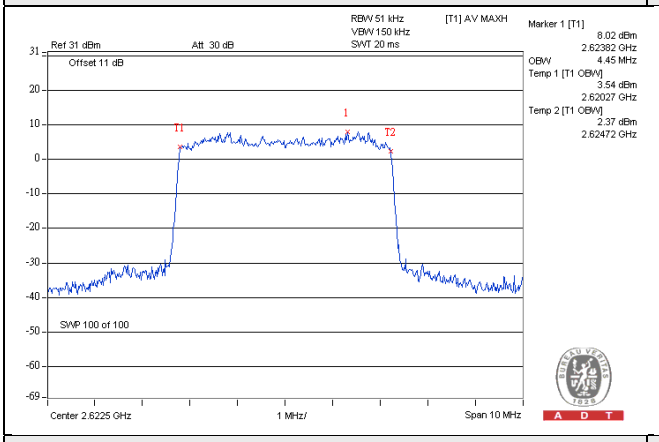


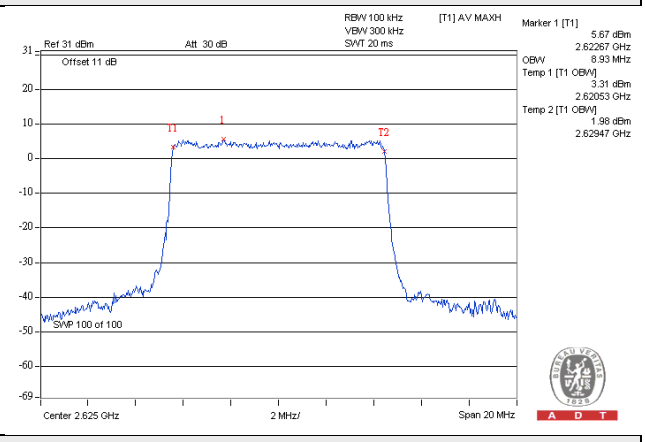
15MHz / QPSK / Ch 2825	20MHz / QPSK / Ch 3350



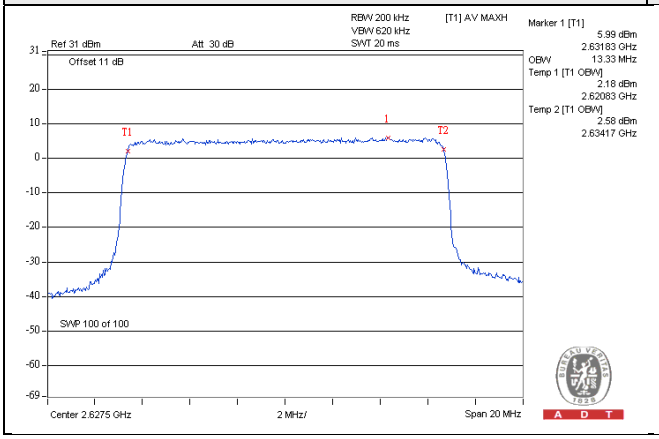


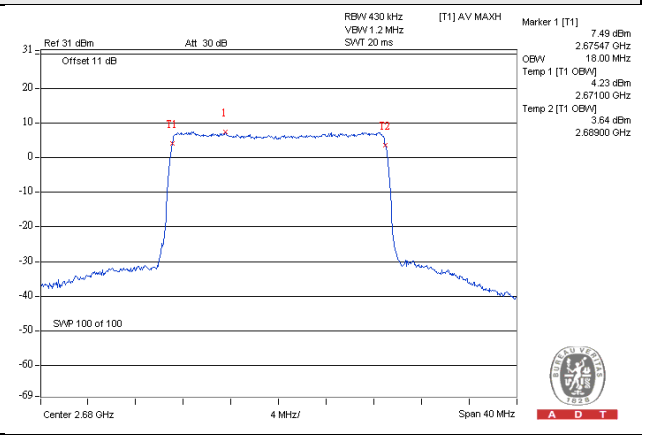
Spectrum Plot of Worst Value	
Occupied Bandwidth	
5MHz / 16QAM / Ch 2775	10MHz / QPSK / Ch 2800





15MHz / QPSK / Ch 2825	20MHz / QPSK / Ch 3350





4.4 Channel Edge Measurement

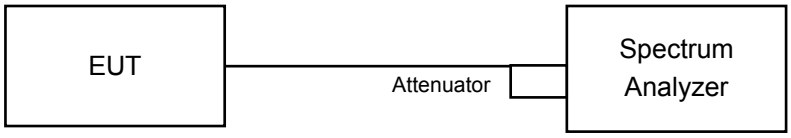
4.4.1 Limits of Band Edge Measurement

According to FCC 27.53(m) For all fixed digital user stations, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge.

Note:

This device can be impelement MIMO function, so the limit of spurious emissions needs to be reduced by 10log($Numbers_{Ant}$) according to FCC KDB 662911 D01 guidance.

4.4.2 Test Setup



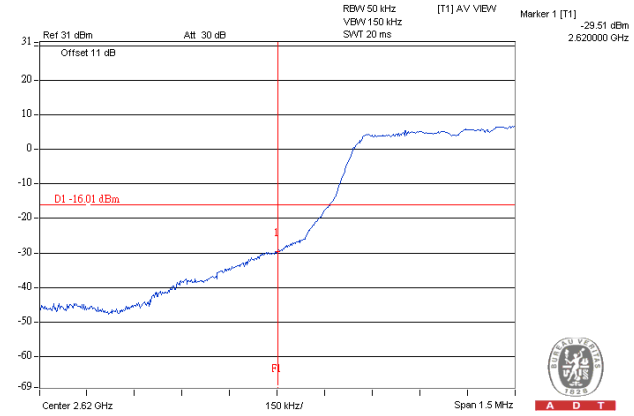
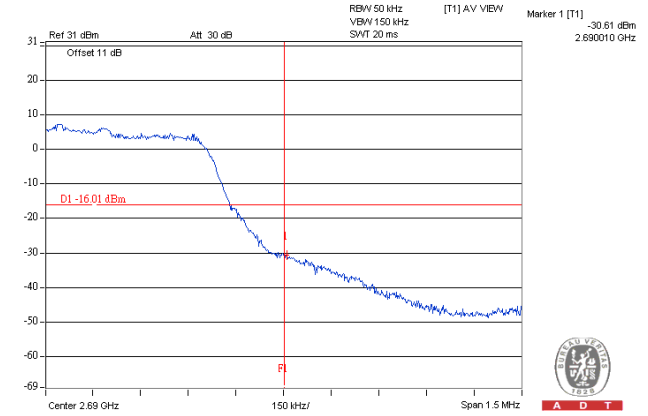
4.4.3 Test Procedures

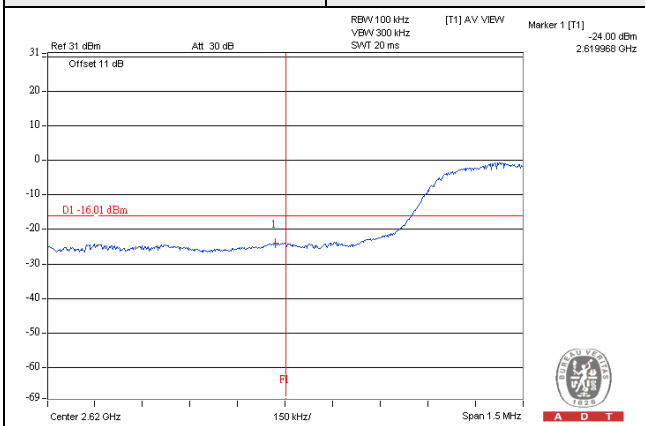
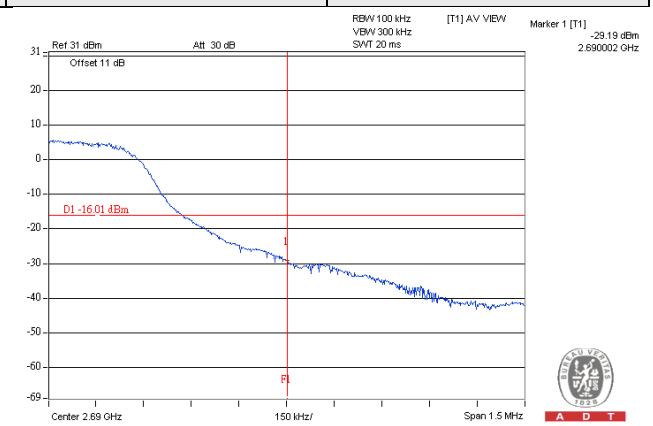
a. The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels: low, middle and high operational frequency range.

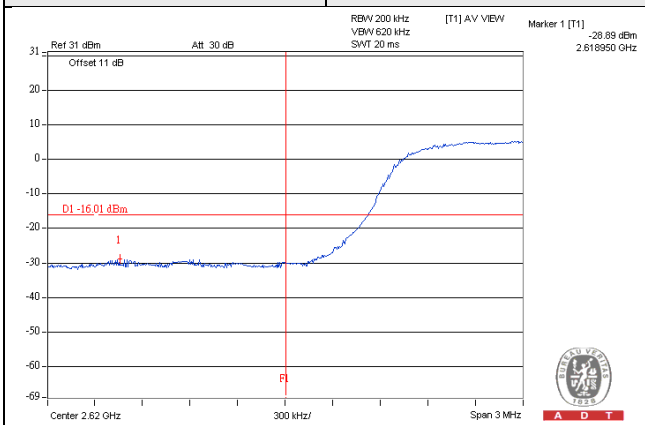
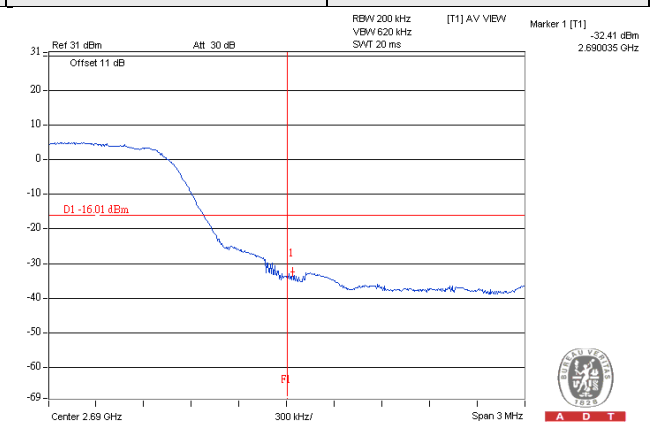
b. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 50kHz and VB of the spectrum is 150kHz (LTE/Channel Bandwidth 5MHz), RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE/Channel Bandwidth 10MHz), RB of the spectrum is 200kHz and VB of the spectrum is 620kHz (LTE/Channel Bandwidth 15MHz), RB of the spectrum is 130kHz and VB of the spectrum is 1.2MHz (LTE/Channel Bandwidth 20MHz).

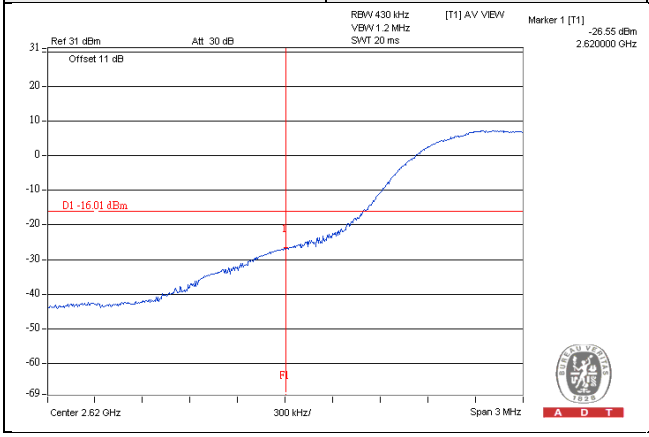
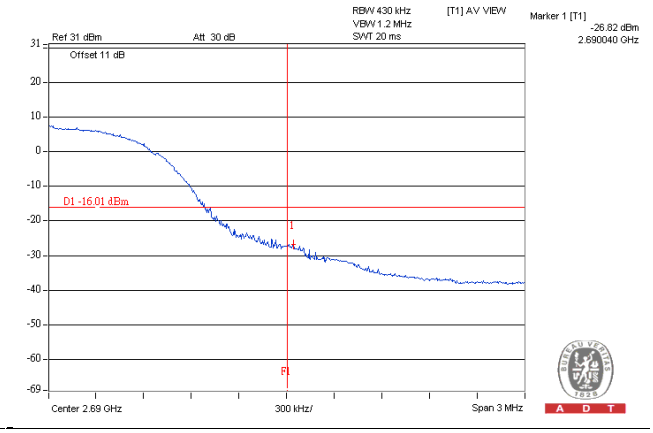
c. Record the max trace plot into the test report.

4.4.4 Test Results

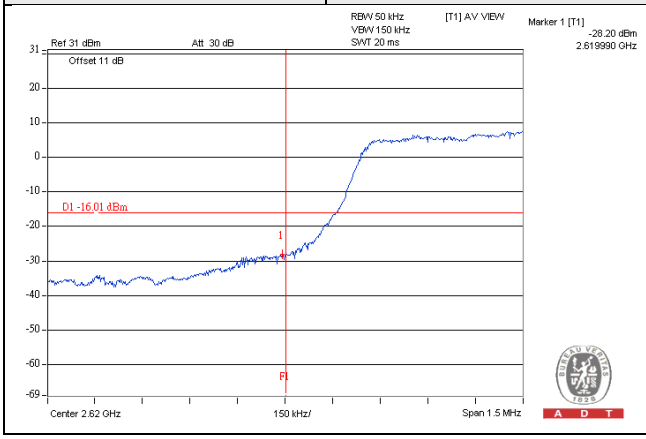
LTE Band 7 / Chain 0 / Channel Bandwidth: 5MHz			
Channel 2775	QPSK	Channel 3425	QPSK
			

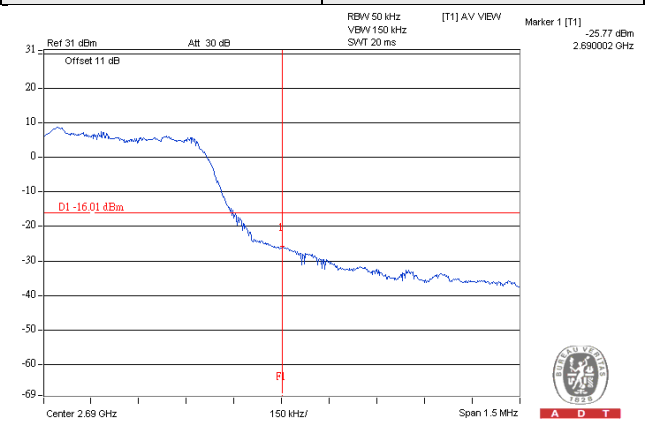
LTE Band 7 / Chain 0 / Channel Bandwidth: 10MHz			
Channel 2800	QPSK	Channel 3400	QPSK
			

LTE Band 7 / Chain 0 / Channel Bandwidth: 15MHz			
Channel 2825	QPSK	Channel 3375	QPSK
			

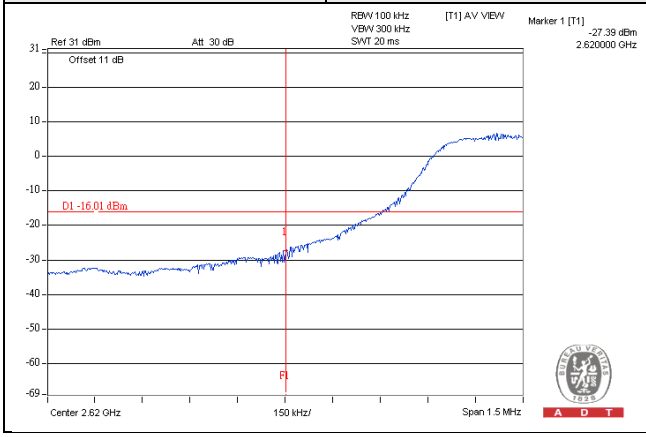
LTE Band 7 / Chain 0 / Channel Bandwidth: 20MHz			
Channel 2850	QPSK	Channel 3350	QPSK
			

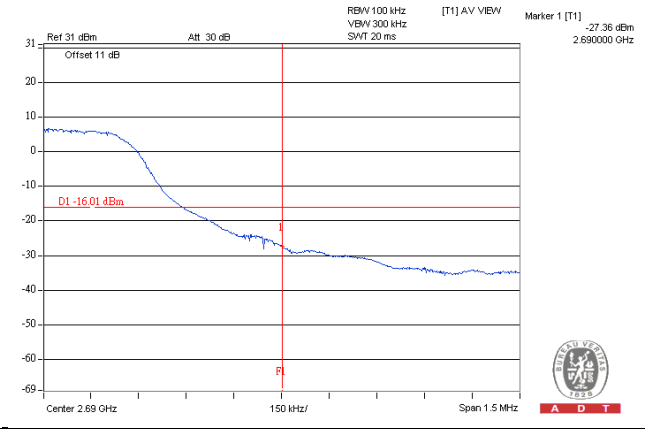
LTE Band 7 / Chain 1 / Channel Bandwidth: 5MHz			
Channel 2775	QPSK	Channel 3425	QPSK



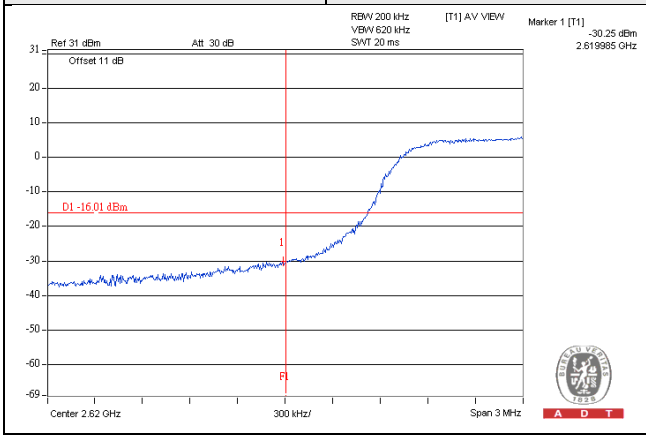


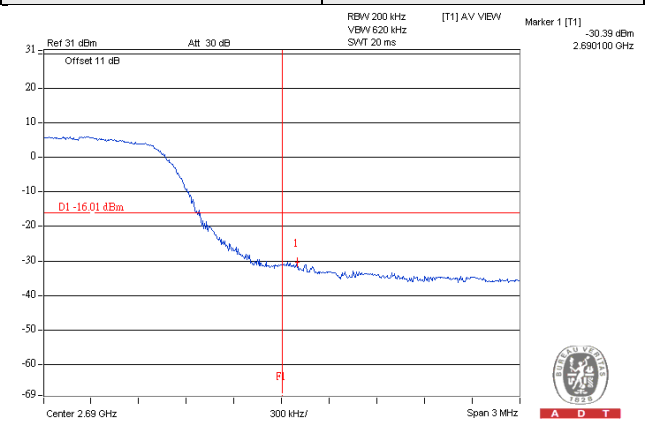
LTE Band 7 / Chain 1 / Channel Bandwidth: 10MHz			
Channel 2800	QPSK	Channel 3400	QPSK

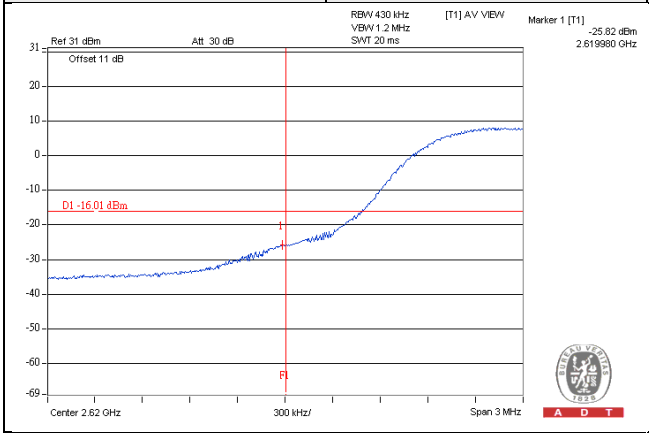
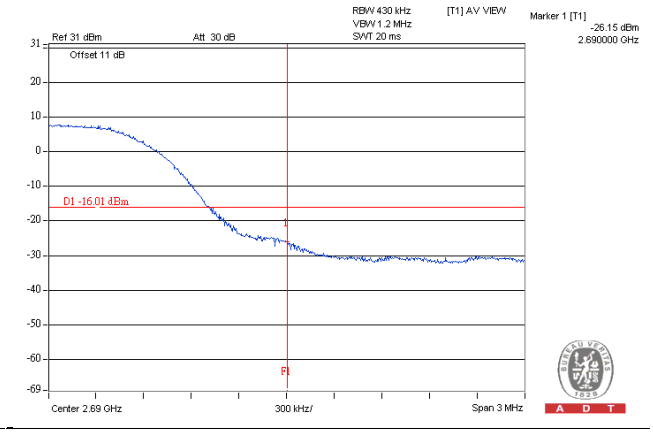




LTE Band 7 / Chain 1 / Channel Bandwidth: 15MHz			
Channel 2825	QPSK	Channel 3375	QPSK





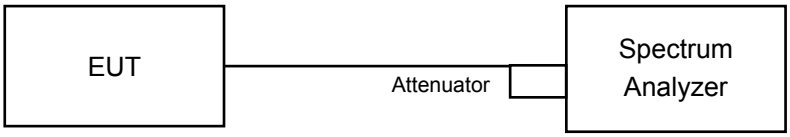
LTE Band 7 / Chain 1 / Channel Bandwidth: 20MHz			
Channel 2850	QPSK	Channel 3350	QPSK
			

4.5 Peak to Average Ratio

4.5.1 Limits of Peak to Average Ratio Measurement

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

4.5.2 Test Setup



4.5.3 Test Procedures

a. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

b. Set the number of counts to a value that stabilizes the measured CCDF curve;

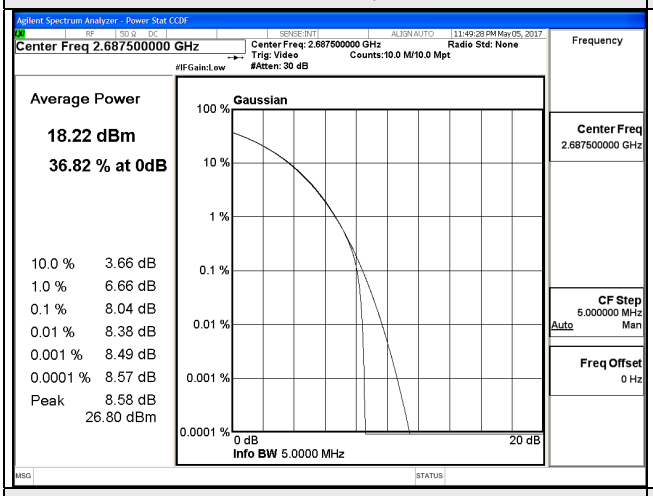
c. Record the maximum PAPR level associated with a probability of 0.1%.

4.5.4 Test Results

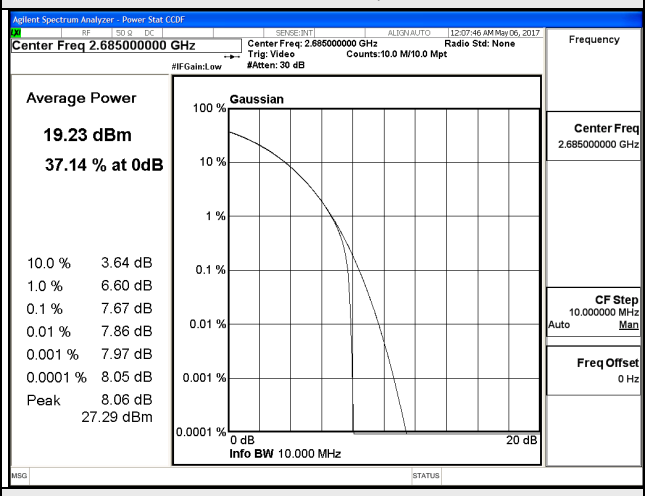
LTE Band 7 / Chain 0									
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
2775	2622.5	7.98	8.01	7.99	2800	2625.0	7.63	7.62	7.64
3100	2655.0	8.01	7.98	8.00	3100	2655.0	7.65	7.64	7.67
3425	2687.5	7.92	8.02	8.04	3400	2685.0	7.66	7.67	7.66
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
2825	2627.5	8.38	8.37	8.34	2850	2630.0	7.47	7.49	7.47
3100	2655.0	8.16	8.17	8.18	3100	2655.0	7.44	7.45	7.49
3375	2682.5	7.90	7.98	8.04	3350	2680.0	7.50	7.44	7.44

Spectrum Plot of Worst Value

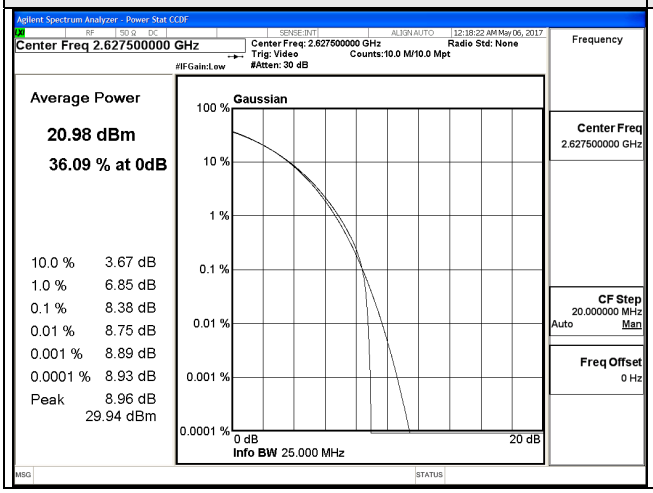
5MHz / 64QAM



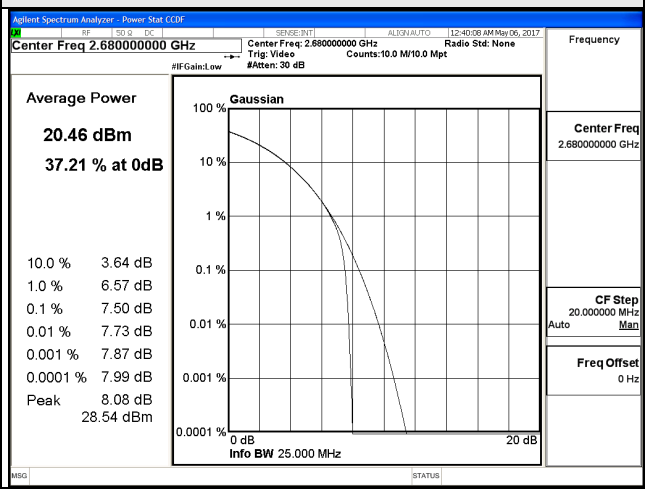
10MHz / 16QAM



15MHz / QPSK



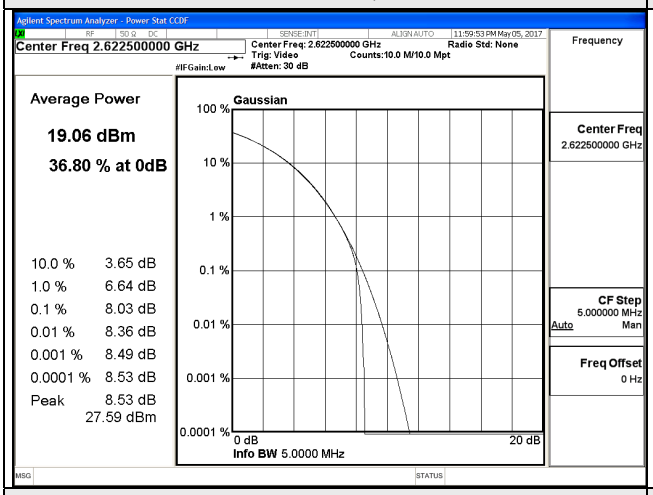
20MHz / QPSK



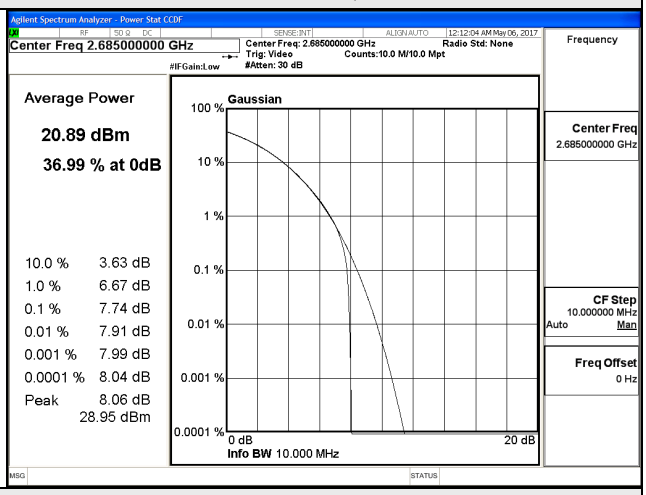
LTE Band 7 / Chain 1									
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
2775	2622.5	7.75	8.03	8.03	2800	2625.0	7.66	7.64	7.59
3100	2655.0	8.01	7.98	7.95	3100	2655.0	7.63	7.61	7.64
3425	2687.5	7.95	7.93	7.92	3400	2685.0	7.74	7.63	7.60
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
2825	2627.5	7.65	7.90	8.00	2850	2630.0	7.45	7.43	7.45
3100	2655.0	7.83	7.99	8.05	3100	2655.0	7.42	7.42	7.45
3375	2682.5	7.78	8.02	8.08	3350	2680.0	7.48	7.43	7.52

Spectrum Plot of Worst Value

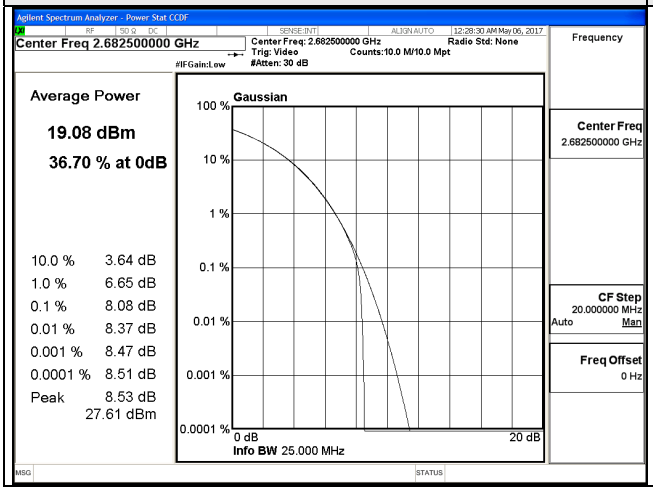
5MHz / 64QAM



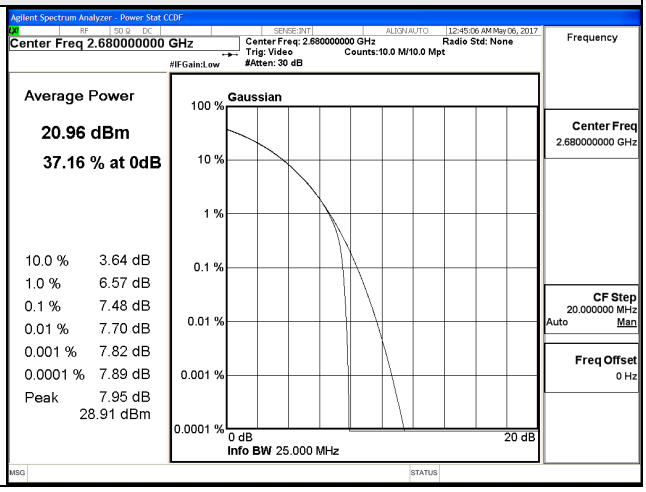
10MHz / QPSK



15MHz / 64QAM



20MHz / QPSK



4.6 Conducted Spurious Emissions

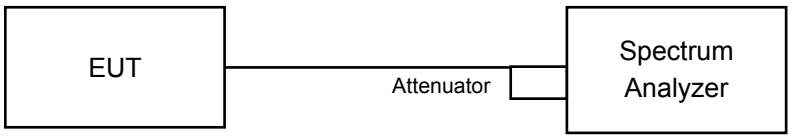
4.6.1 Limits of Conducted Spurious Emissions Measurement

In the FCC 27.53(m), On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, the emission limit equal to –13dBm.

Note:

This device can be impelement MIMO function, so the limit of spurious emissions needs to be reduced by 10log($Numbers_{Ant}$) according to FCC KDB 662911 D01 guidance.

4.6.2 Test Setup

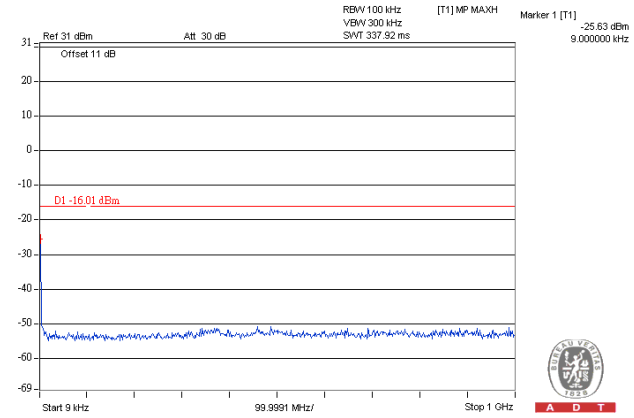
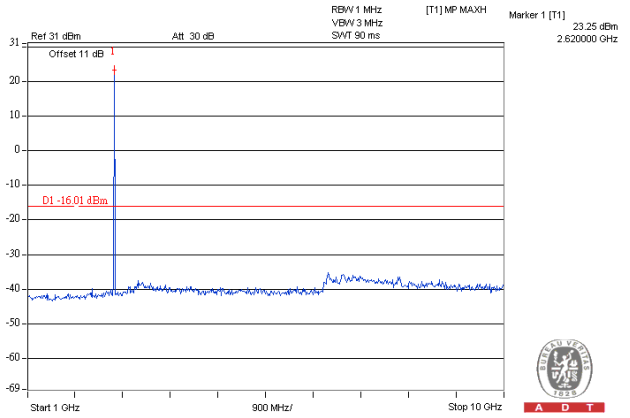
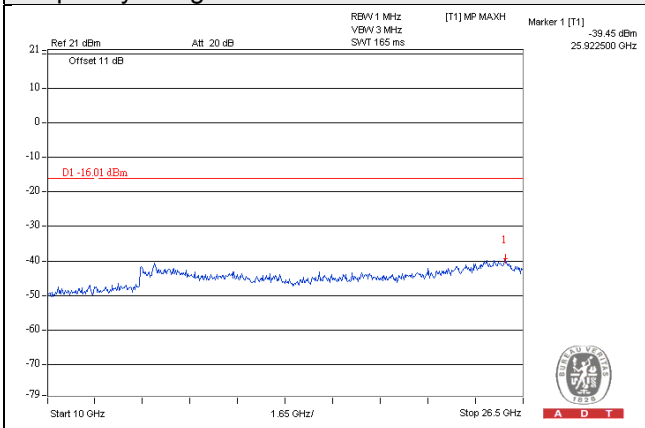


4.6.3 Test Procedure

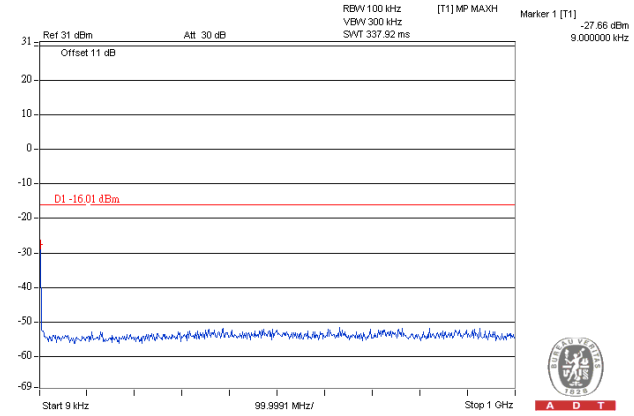
a. All measurements were done at 3 channels: low, middle and high operational frequency range.

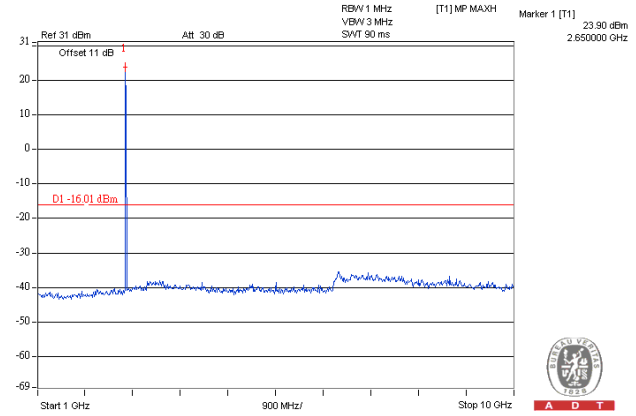
b. When the spectrum scanned from 9kHz to 26.5GHz, it shall be connected to the attenuator with the carried frequency.

4.6.4 Test Results

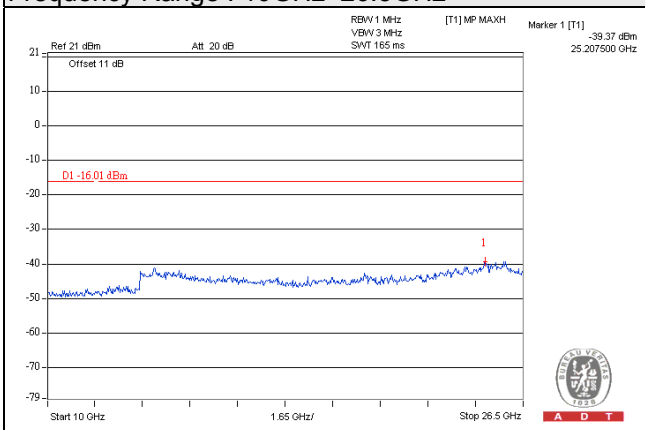
LTE Band 7 / Chain 0 / Channel Bandwidth: 5MHz	
Channel 2775	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

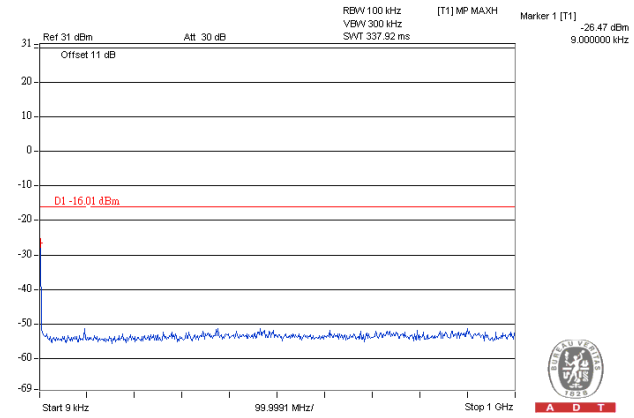
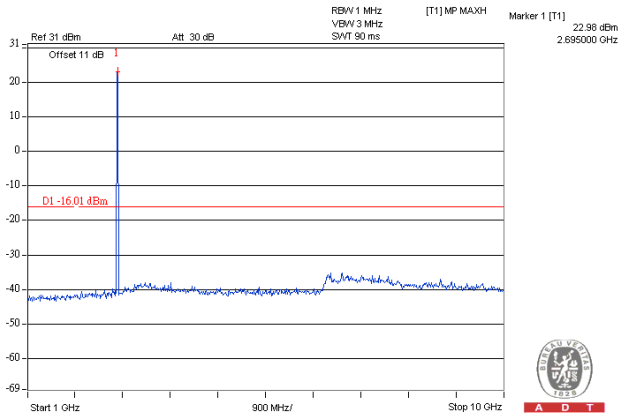
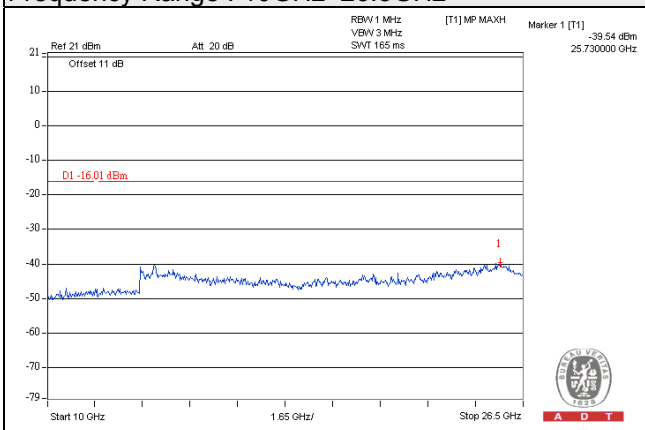
LTE Band 7 / Chain 0 / Channel Bandwidth: 5MHz	
Channel 3100	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz



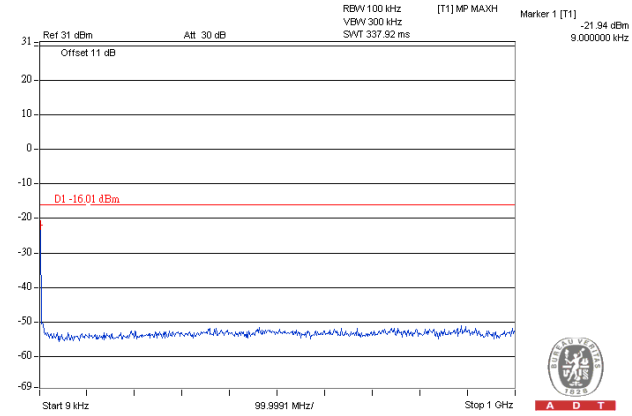


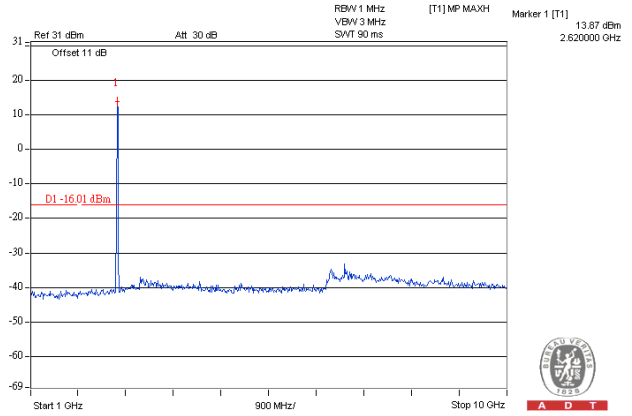
Frequency Range : 10GHz~26.5GHz	



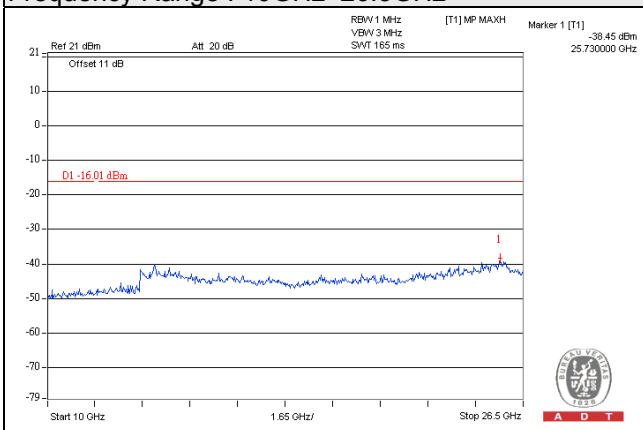
LTE Band 7 / Chain 0 / Channel Bandwidth: 5MHz	
Channel 3425	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

LTE Band 7 / Chain 0 / Channel Bandwidth: 10MHz	
Channel 2800	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

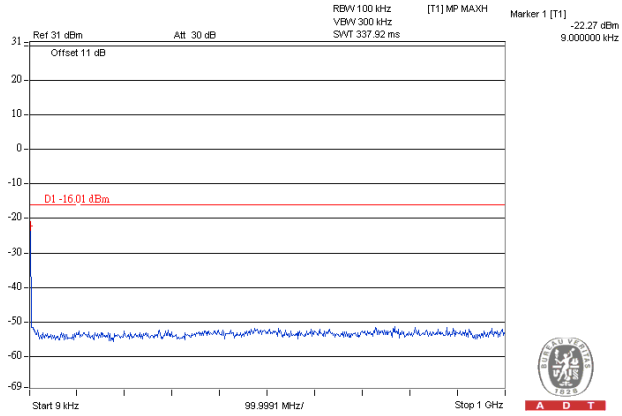


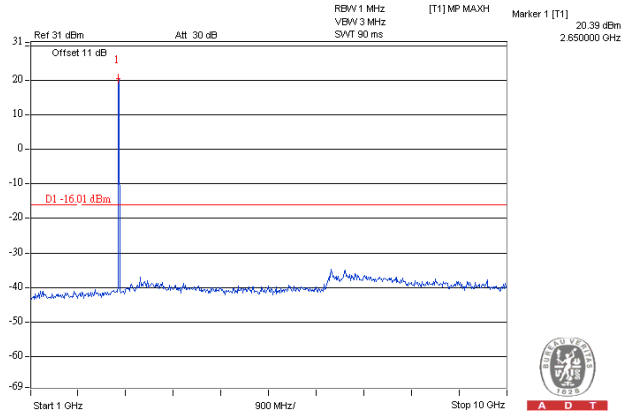


Frequency Range : 10GHz~26.5GHz	

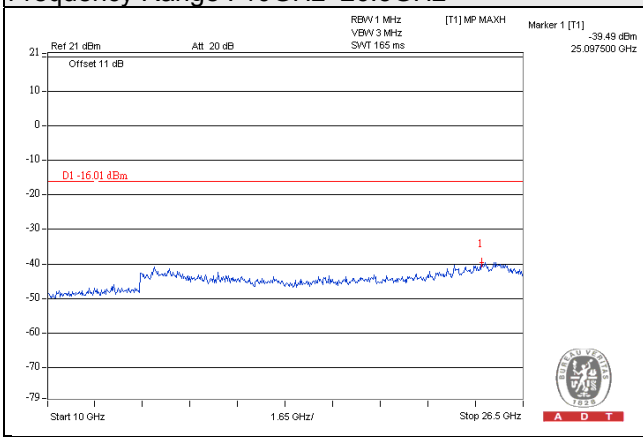


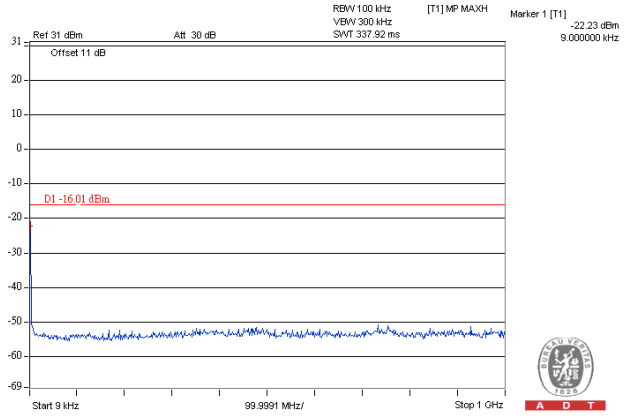
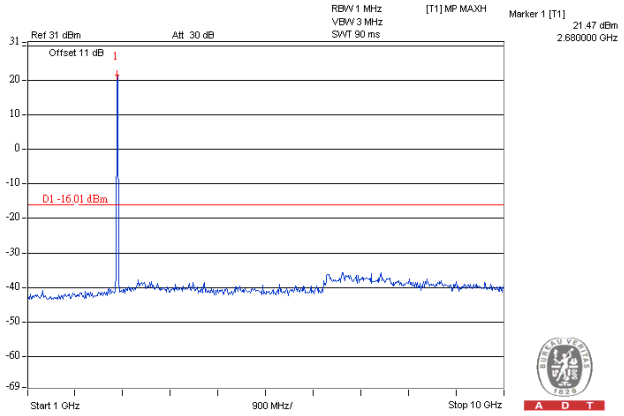
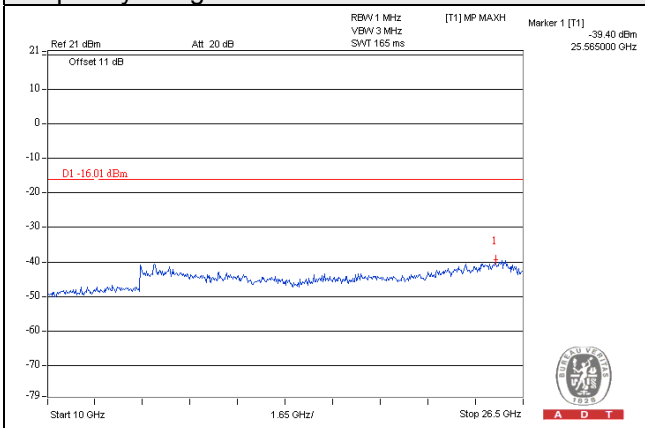
LTE Band 7 / Chain 0 / Channel Bandwidth: 10MHz	
Channel 3100	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz



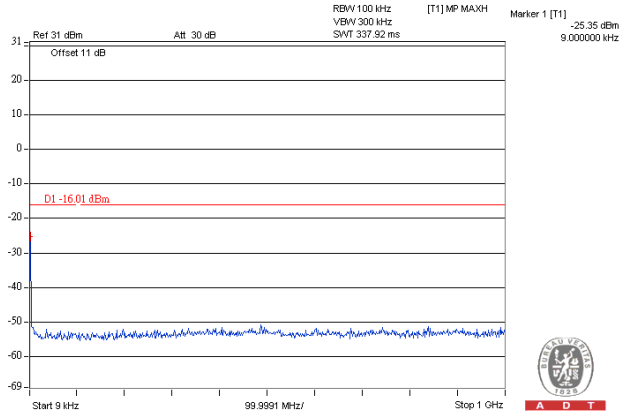


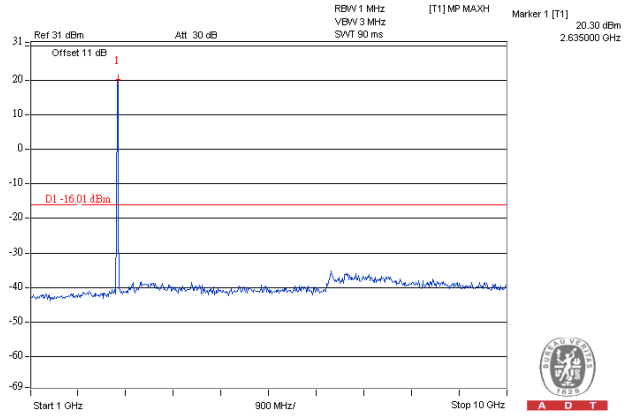
Frequency Range : 10GHz~26.5GHz	



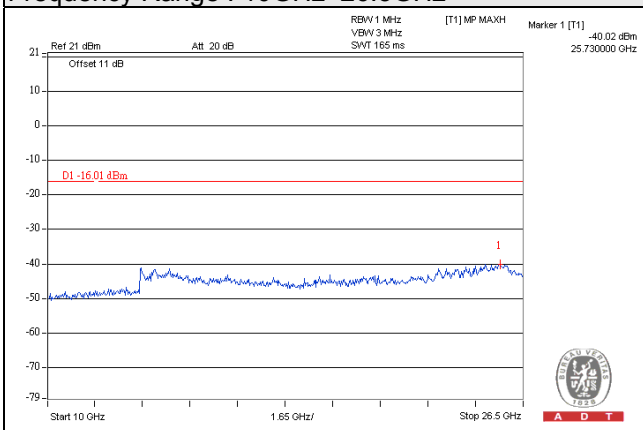
LTE Band 7 / Chain 0 / Channel Bandwidth: 10MHz	
Channel 3400	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

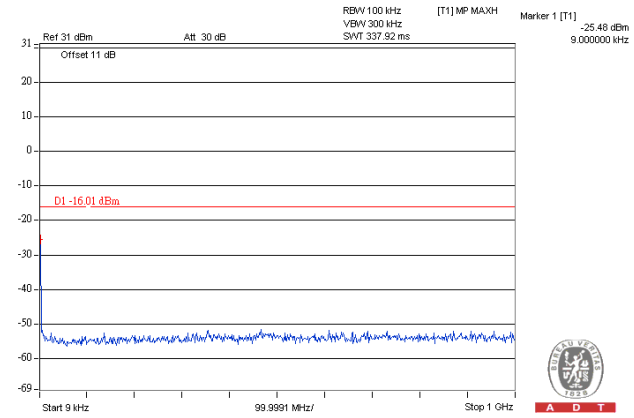
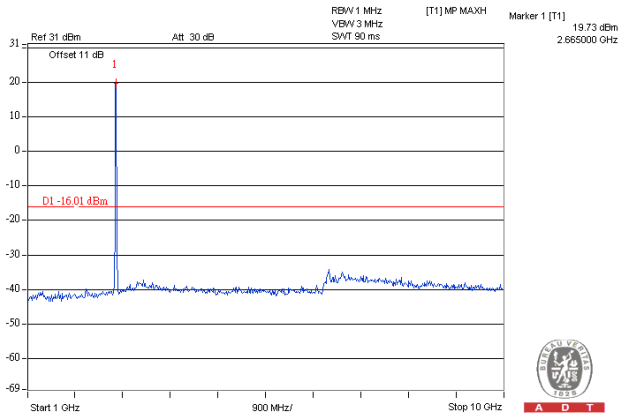
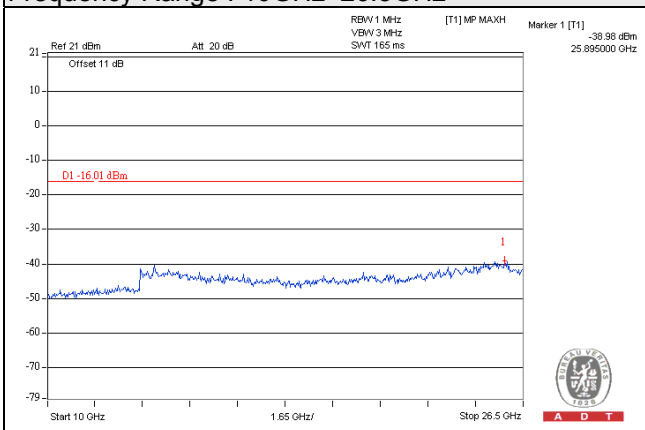
LTE Band 7 / Chain 0 / Channel Bandwidth: 15MHz	
Channel 2825	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz



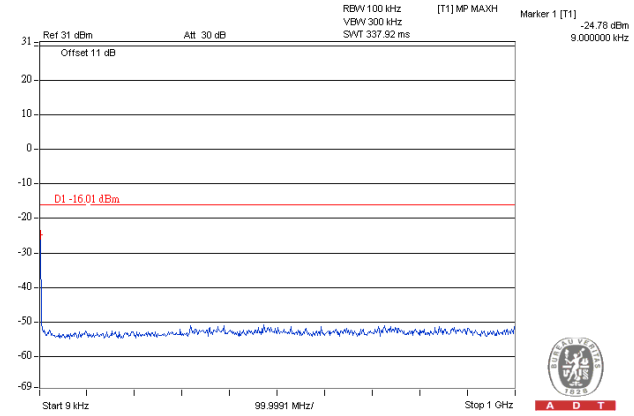


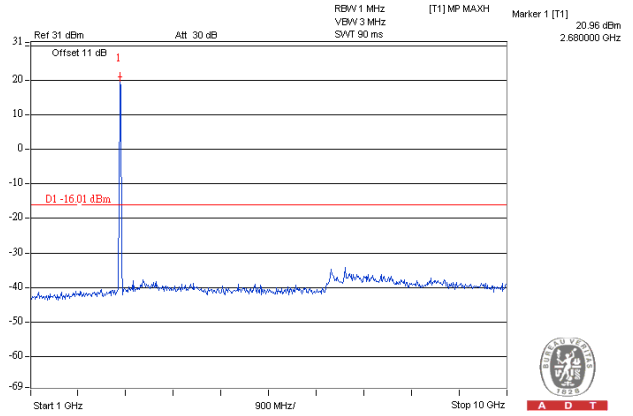
Frequency Range : 10GHz~26.5GHz	



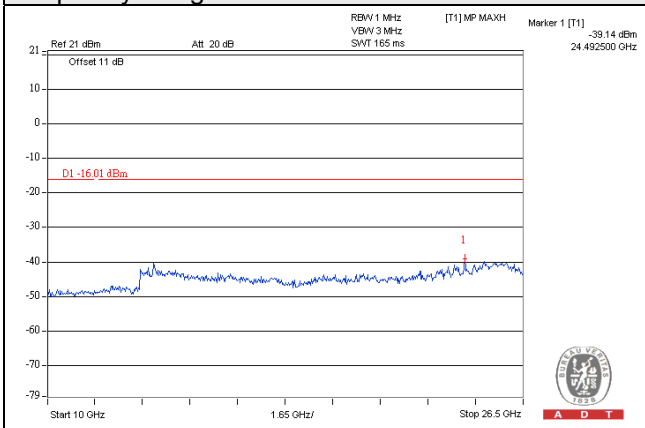
LTE Band 7 / Chain 0 / Channel Bandwidth: 15MHz	
Channel 3100	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

LTE Band 7 / Chain 0 / Channel Bandwidth: 15MHz	
Channel 3375	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

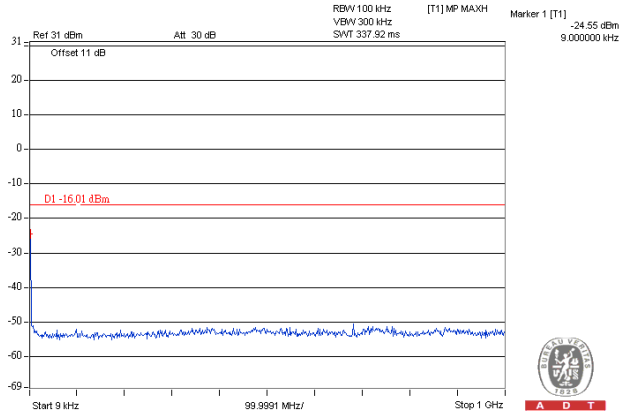


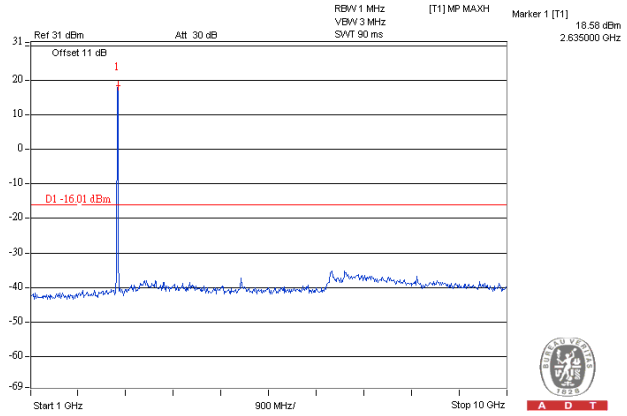


Frequency Range : 10GHz~26.5GHz	

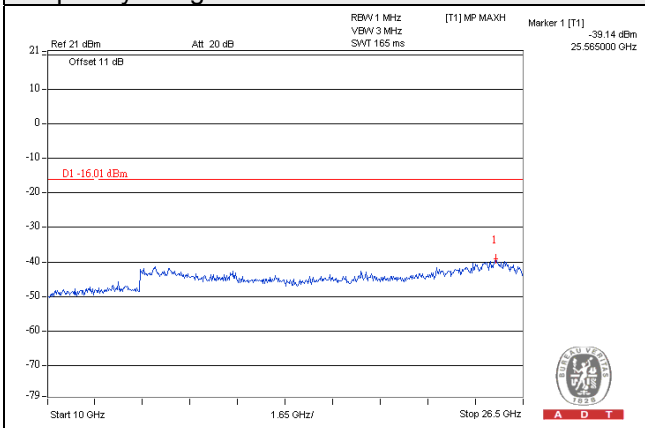


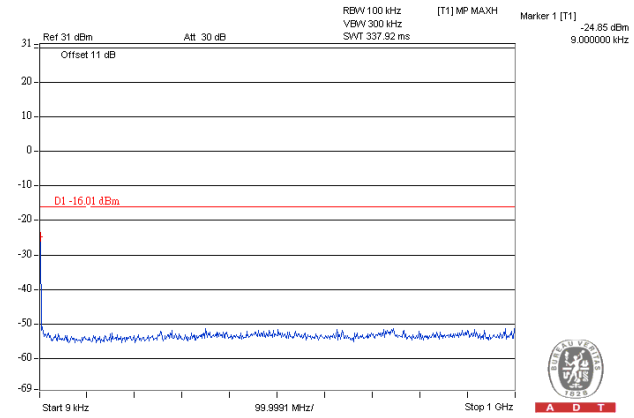
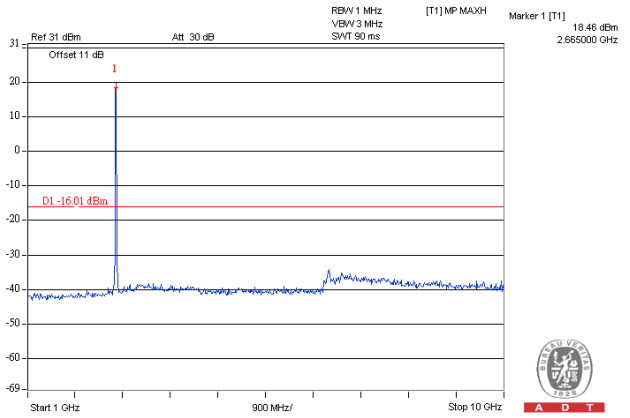
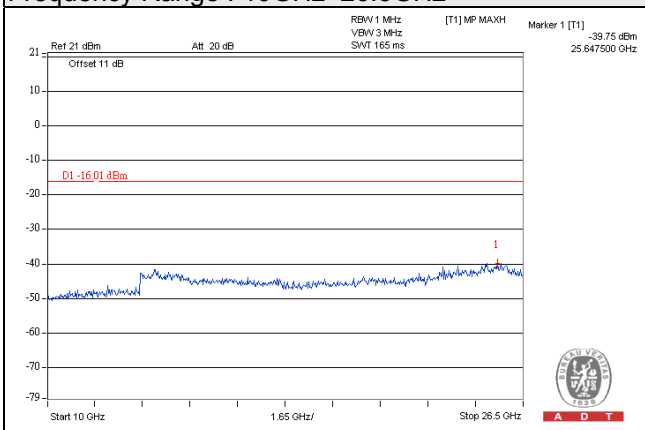
LTE Band 7 / Chain 0 / Channel Bandwidth: 20MHz	
Channel 2850	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

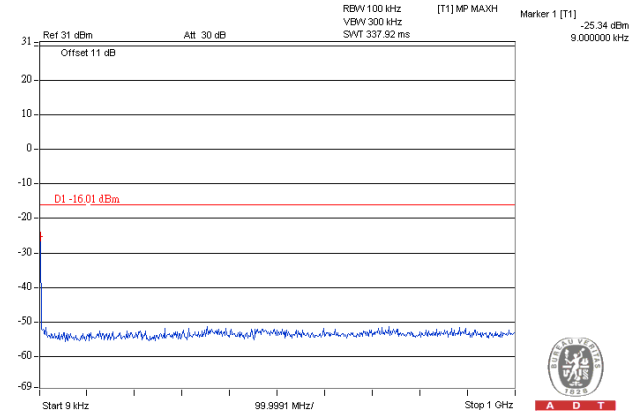
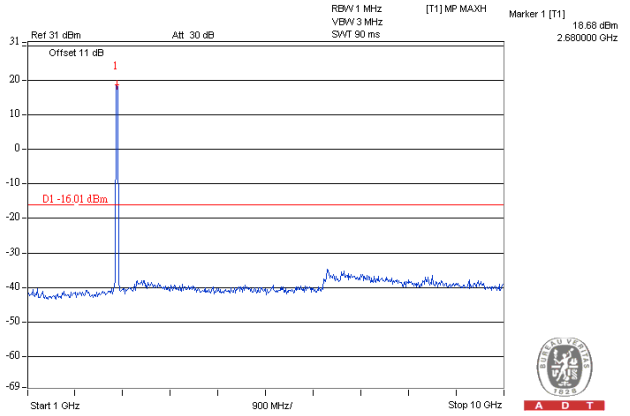
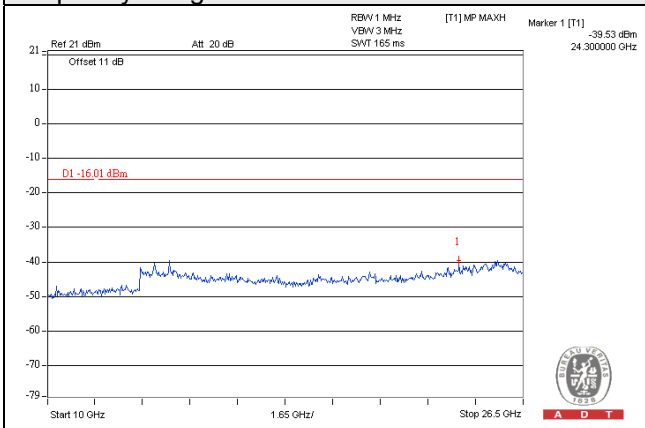




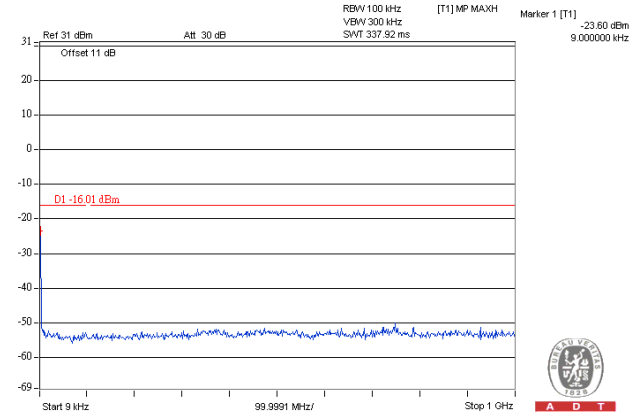
Frequency Range : 10GHz~26.5GHz	

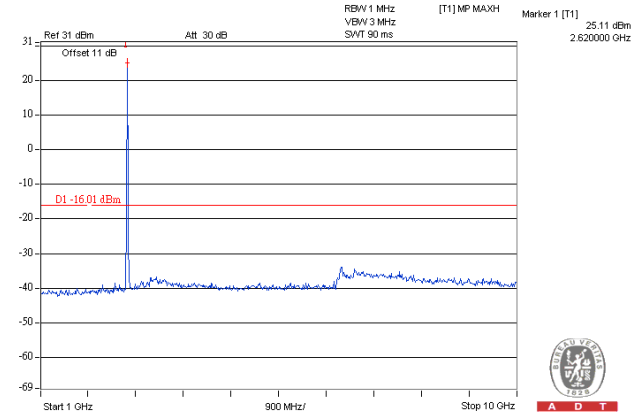


LTE Band 7 / Chain 0 / Channel Bandwidth: 20MHz	
Channel 3100	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

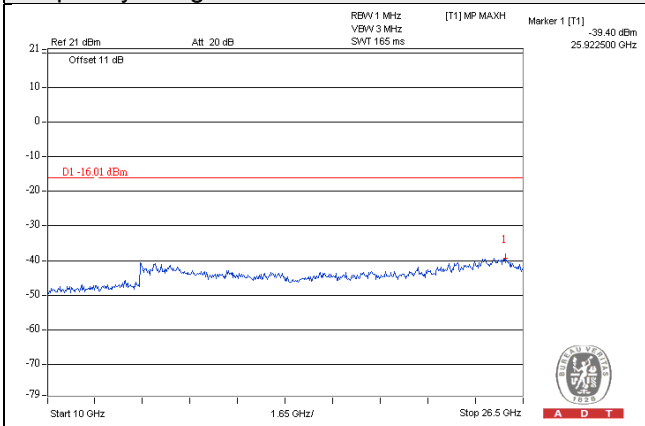
LTE Band 7 / Chain 0 / Channel Bandwidth: 20MHz	
Channel 3350	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

LTE Band 7 / Chain 1 / Channel Bandwidth: 5MHz	
Channel 2775	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

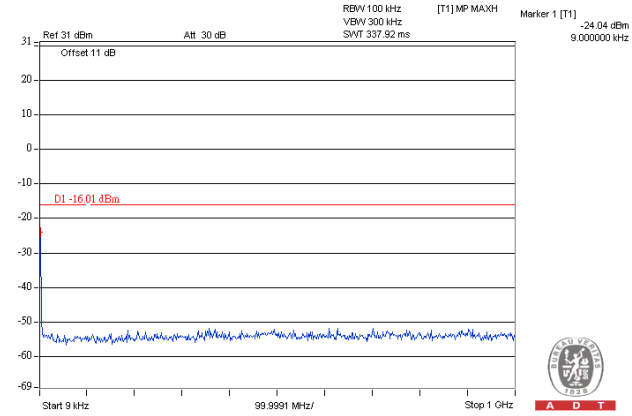


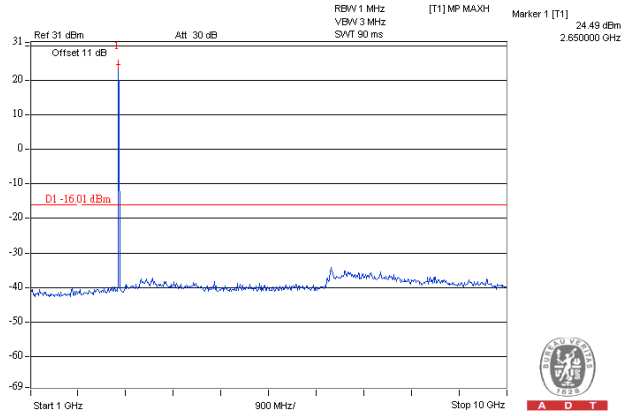


Frequency Range : 10GHz~26.5GHz	

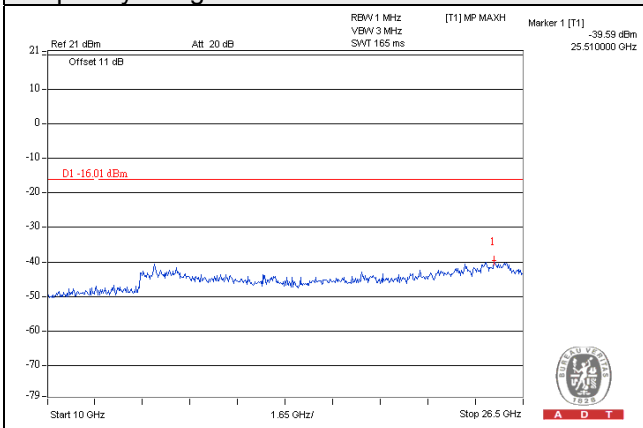


LTE Band 7 / Chain 1 / Channel Bandwidth: 5MHz	
Channel 3100	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

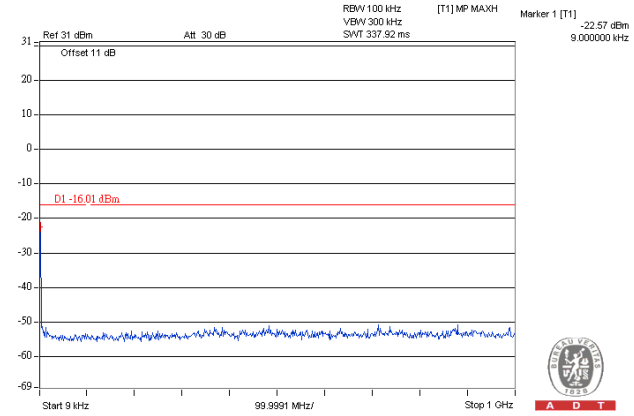


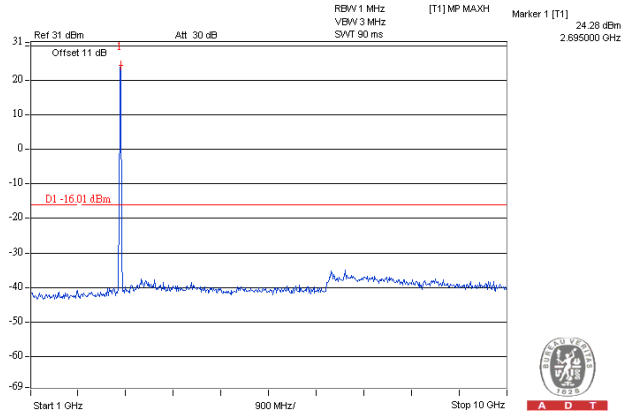


Frequency Range : 10GHz~26.5GHz	

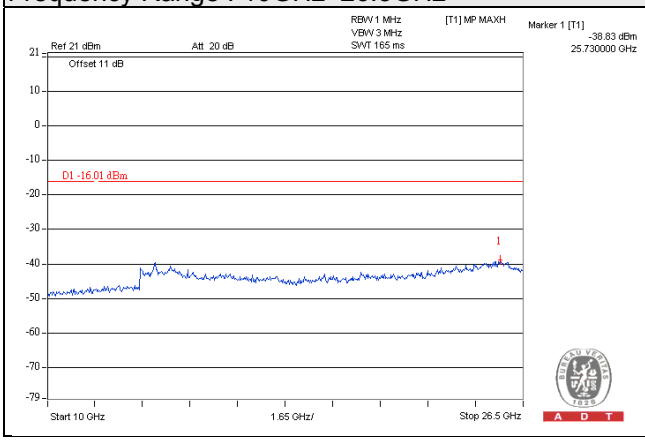


LTE Band 7 / Chain 1 / Channel Bandwidth: 5MHz	
Channel 3425	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

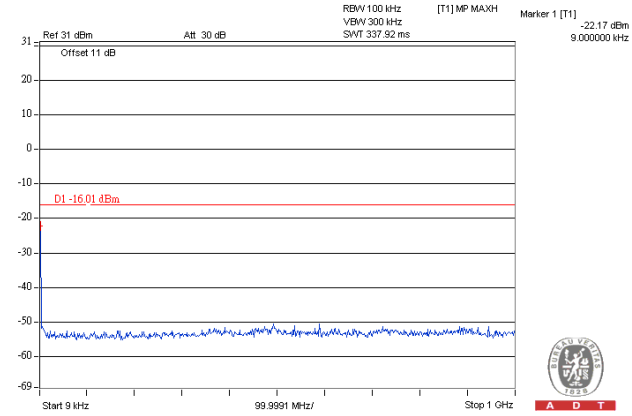


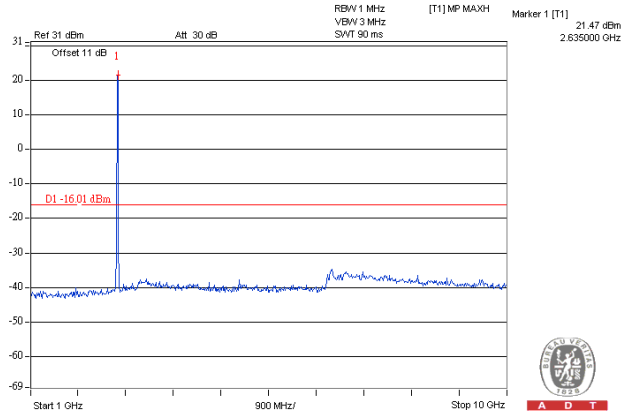


Frequency Range : 10GHz~26.5GHz	

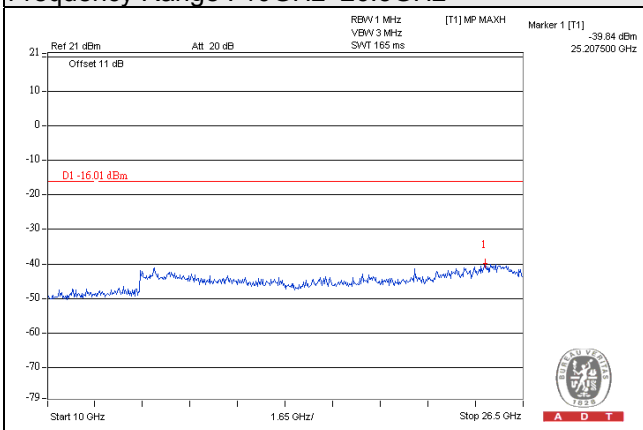


LTE Band 7 / Chain 1 / Channel Bandwidth: 10MHz	
Channel 2800	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

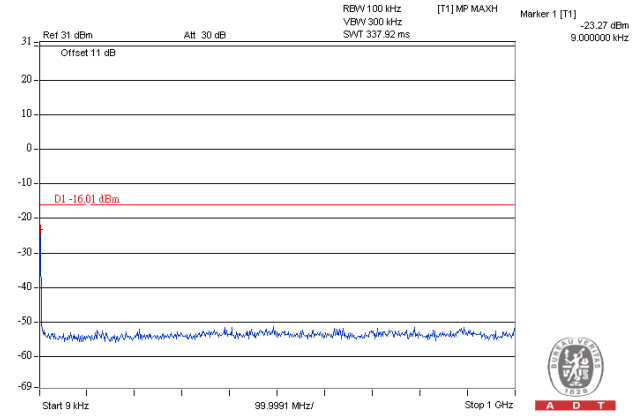


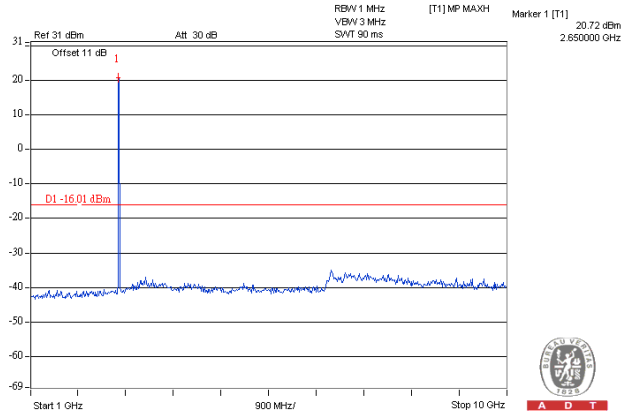


Frequency Range : 10GHz~26.5GHz	

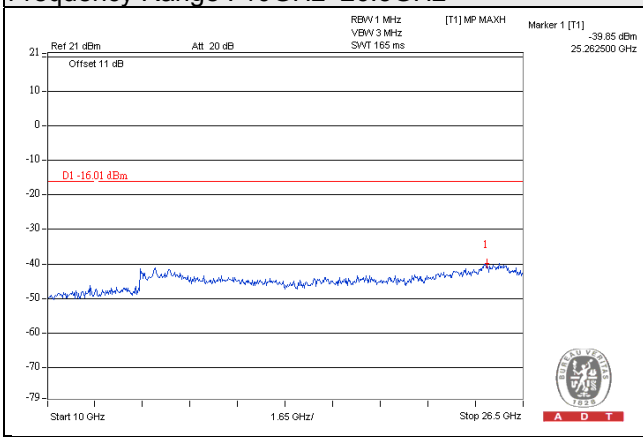


LTE Band 7 / Chain 1 / Channel Bandwidth: 10MHz	
Channel 3100	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

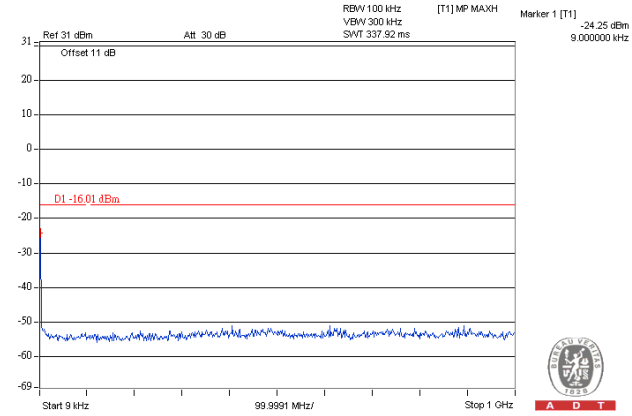


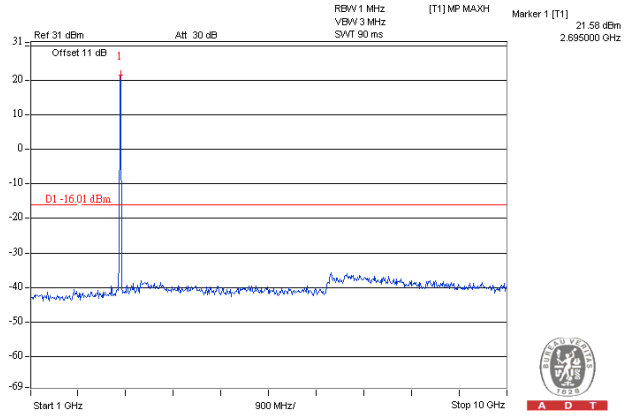


Frequency Range : 10GHz~26.5GHz	

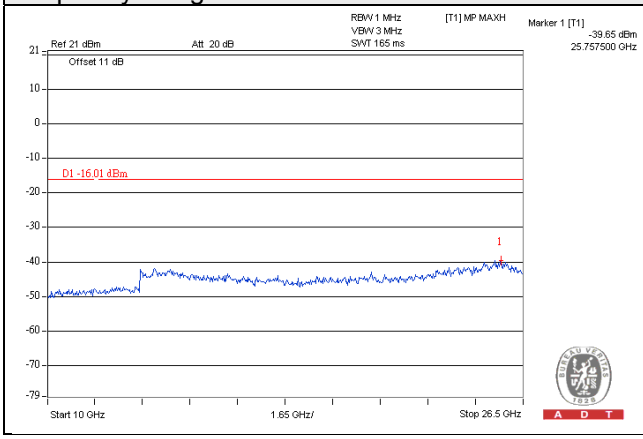


LTE Band 7 / Chain 1 / Channel Bandwidth: 10MHz	
Channel 3400	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

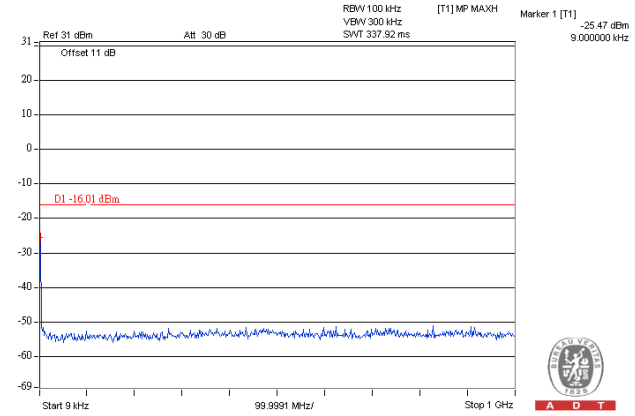


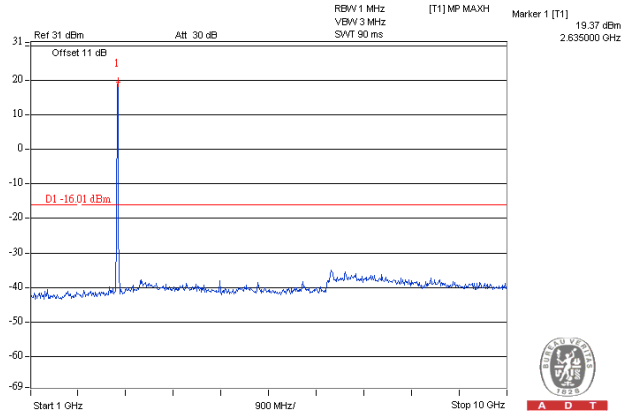


Frequency Range : 10GHz~26.5GHz	

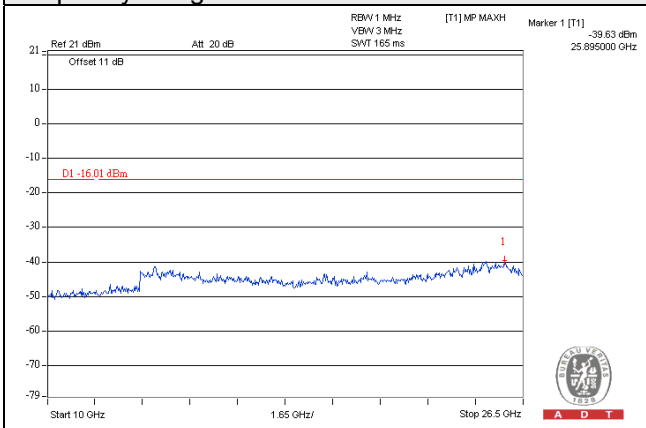


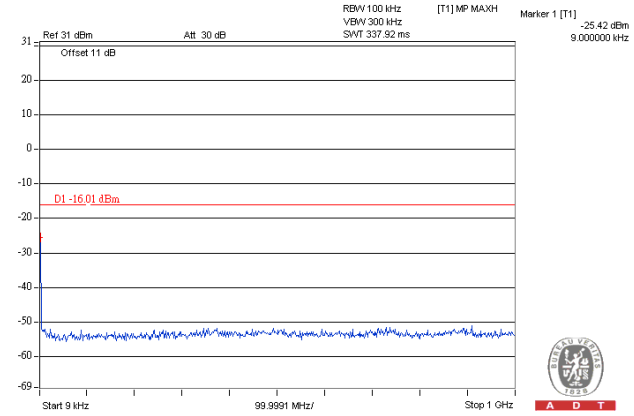
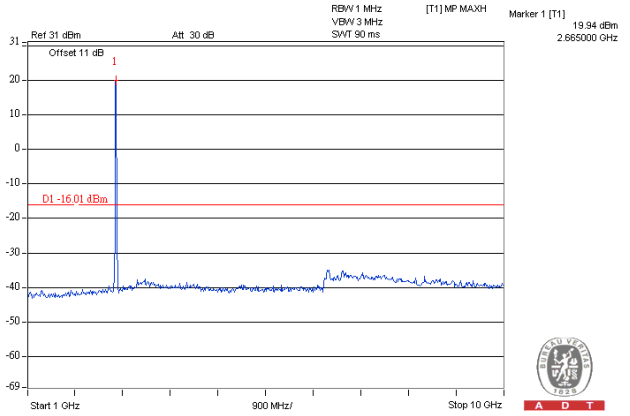
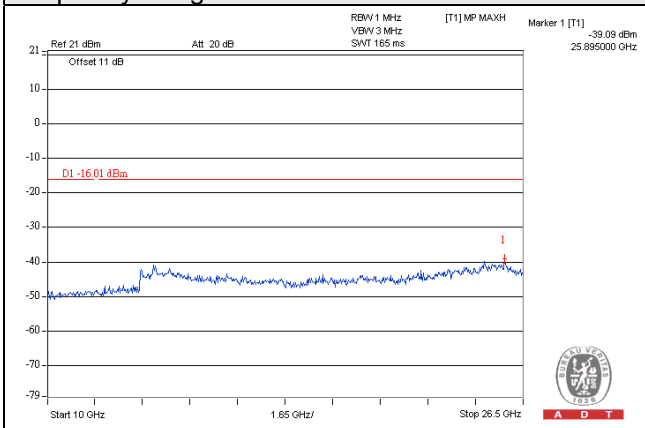
LTE Band 7 / Chain 1 / Channel Bandwidth: 15MHz	
Channel 2825	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz



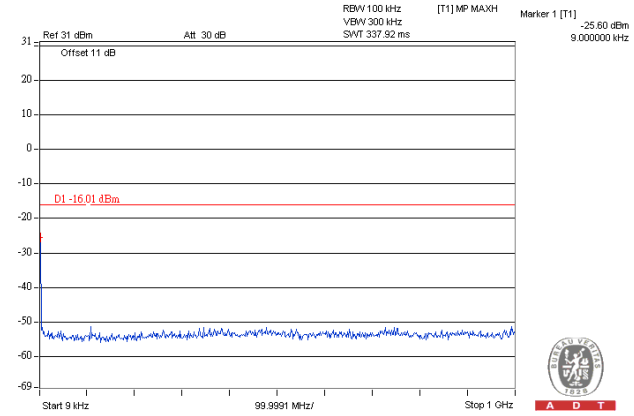


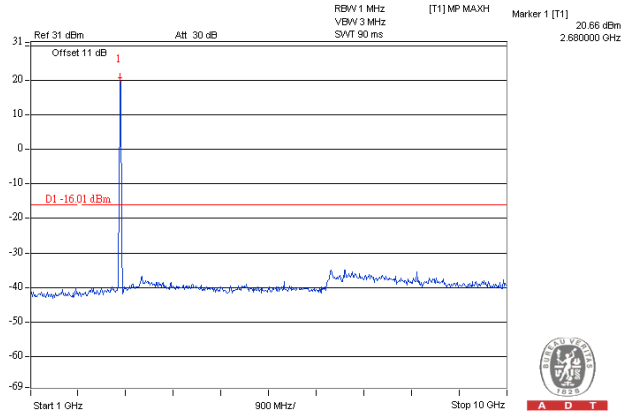
Frequency Range : 10GHz~26.5GHz	



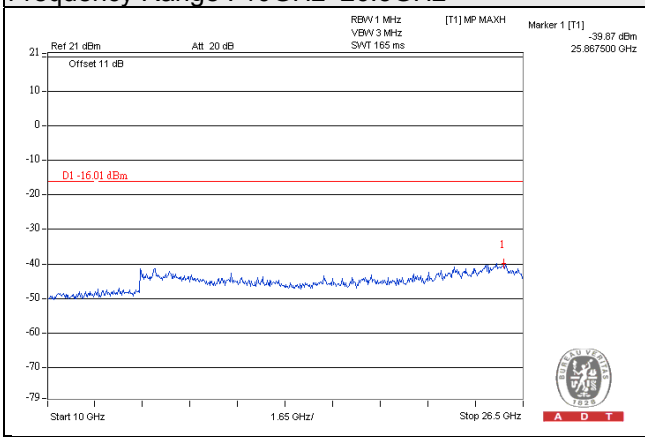
LTE Band 7 / Chain 1 / Channel Bandwidth: 15MHz	
Channel 3100	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

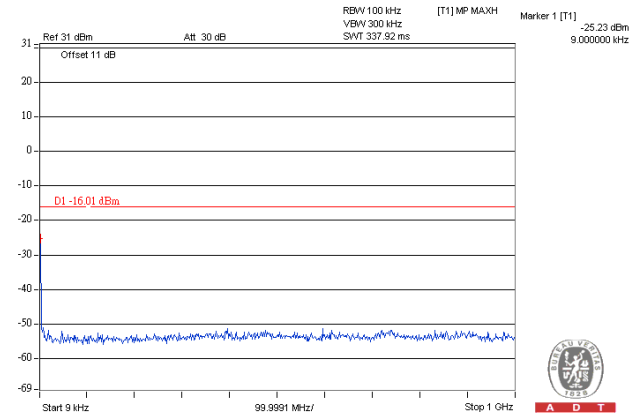
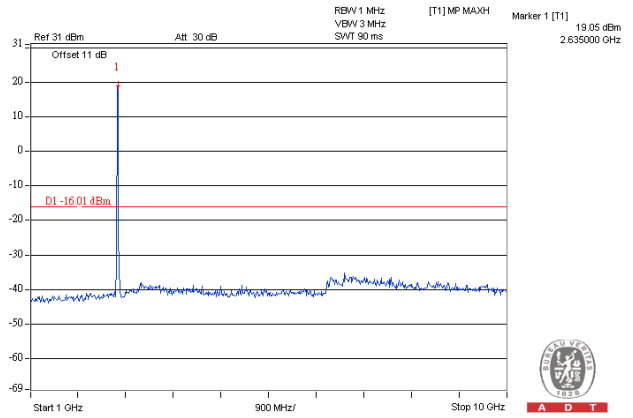
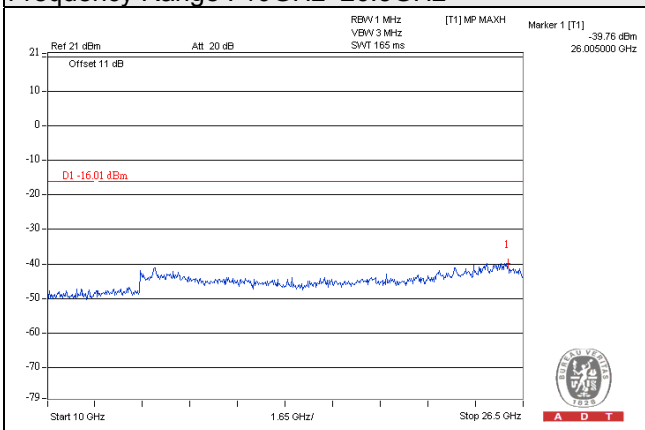
LTE Band 7 / Chain 1 / Channel Bandwidth: 15MHz	
Channel 3375	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz

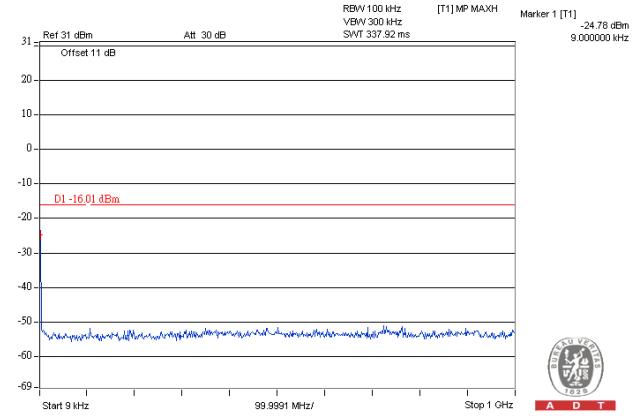
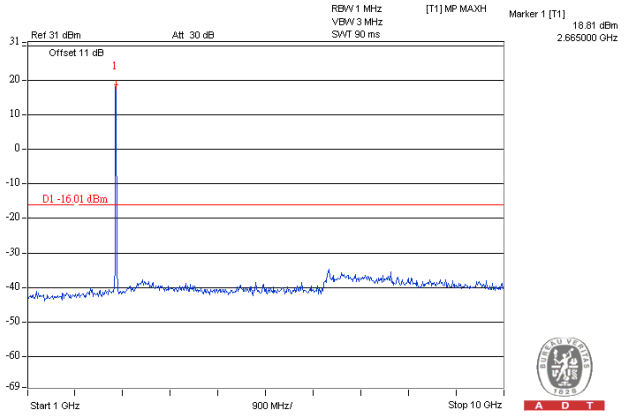
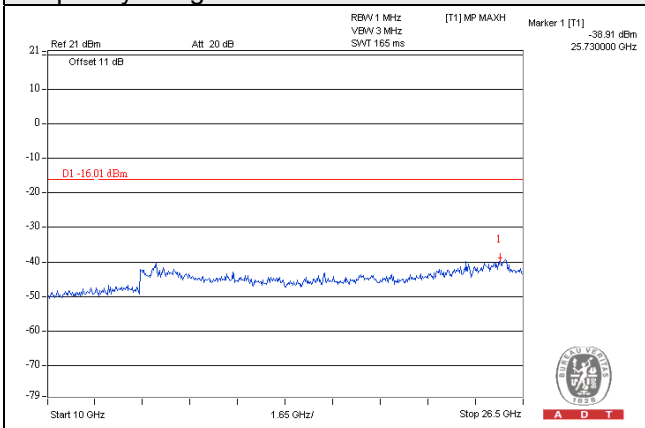


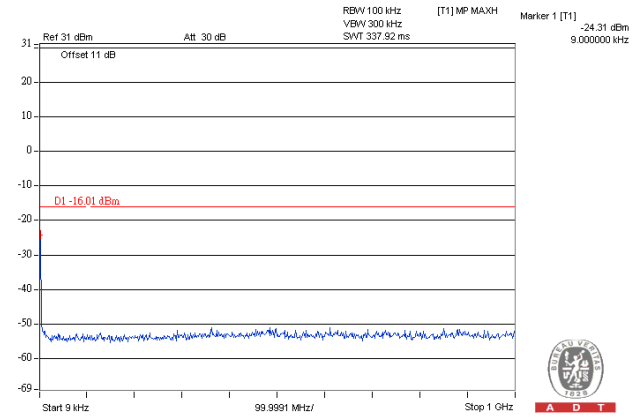
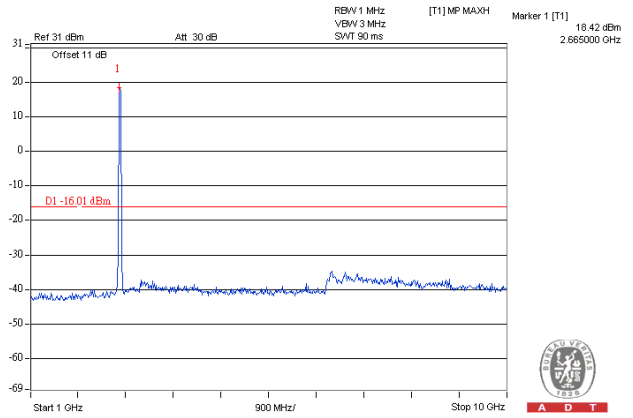
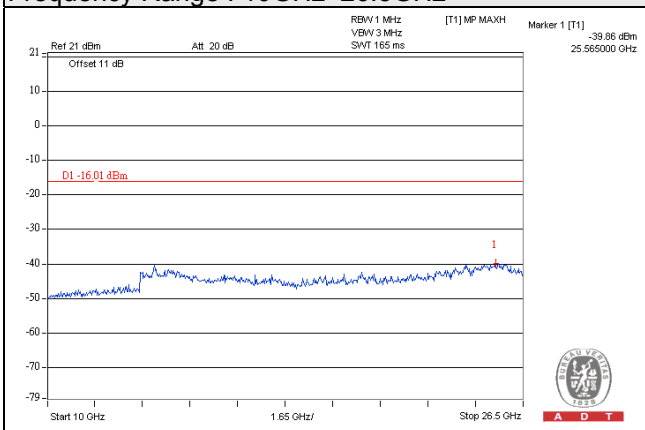


Frequency Range : 10GHz~26.5GHz	



LTE Band 7 / Chain 1 / Channel Bandwidth: 20MHz	
Channel 2850	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

LTE Band 7 / Chain 1 / Channel Bandwidth: 20MHz	
Channel 3100	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

LTE Band 7 / Chain 1 / Channel Bandwidth: 20MHz	
Channel 3350	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

4.7 Radiated Emission Measurement

4.7.1 Limits of Radiated Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

4.7.2 Test Procedure

a. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high channel of operational frequency range.)

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

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

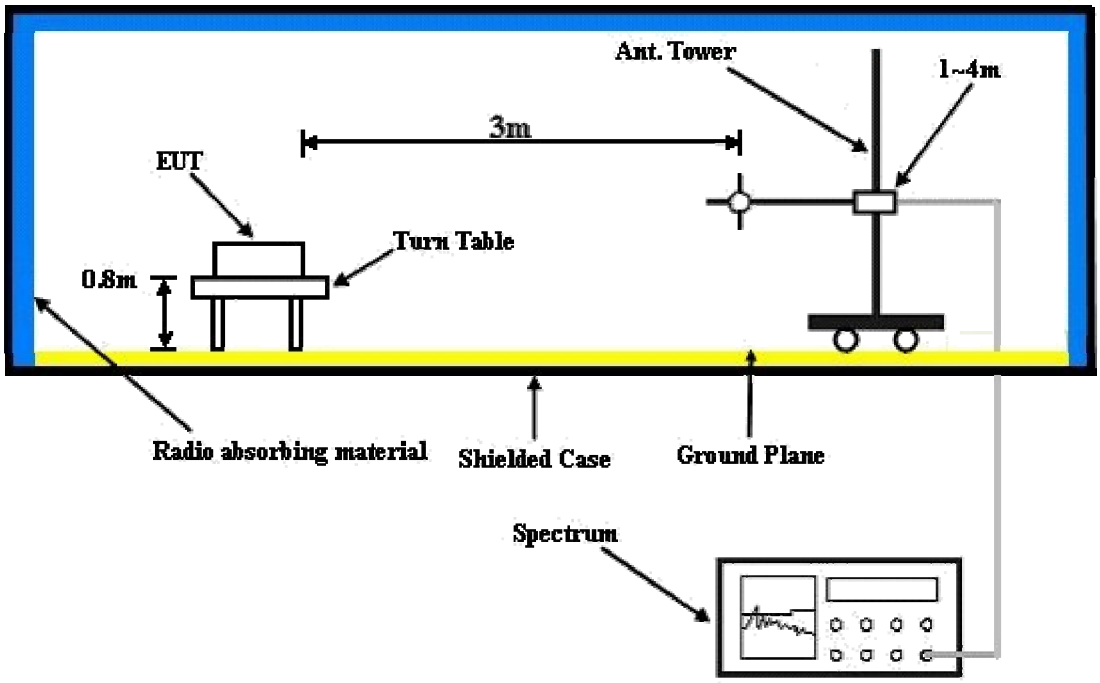
d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution antenna.

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

4.7.3 Deviation from Test Standard

No deviation.

4.7.4 Test Setup



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

4.7.5 Test Results

Below 1GHz

LTE Band 7

Channel Bandwidth: 5MHz

Mode	TX channel 2775	Frequency Range	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-39.7	-16.3	-19.4	-35.7	-13.0	-22.7
2	92.08	-48.0	-56.0	-0.6	-56.6	-13.0	-43.6
3	224.00	-49.9	-56.0	-2.1	-58.1	-13.0	-45.1
4	270.56	-54.1	-56.9	-1.4	-58.3	-13.0	-45.3
5	443.22	-52.3	-56.0	3.5	-52.5	-13.0	-39.5
6	897.18	-60.0	-56.0	3.5	-52.5	-13.0	-39.5
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-27.5	-18.0	-19.4	-37.4	-13.0	-24.4
2	62.98	-37.2	-41.5	-2.4	-43.9	-13.0	-30.9
3	94.02	-45.3	-51.9	-0.7	-52.6	-13.0	-39.6
4	229.82	-50.1	-51.9	-1.7	-53.6	-13.0	-40.6
5	495.60	-53.3	-57.2	3.8	-53.4	-13.0	-40.4
6	897.18	-62.0	-57.2	3.5	-53.7	-13.0	-40.7

Remarks:

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

Channel Bandwidth: 10MHz

Mode	TX channel 2800	Frequency Range	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-37.1	-13.7	-19.4	-33.1	-13.0	-20.1
2	103.72	-42.4	-48.8	-2.0	-50.8	-13.0	-37.8
3	142.52	-46.9	-49.0	-3.1	-52.1	-13.0	-39.1
4	202.66	-52.9	-58.8	-2.1	-60.9	-13.0	-47.9
5	274.44	-53.9	-56.8	-1.6	-58.4	-13.0	-45.4
6	901.06	-62.1	-58.0	3.5	-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)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-27.5	-18.0	-19.4	-37.4	-13.0	-24.4
2	61.04	-41.8	-45.4	-3.2	-48.6	-13.0	-35.6
3	191.02	-53.3	-52.5	-2.7	-55.2	-13.0	-42.2
4	272.50	-59.3	-55.4	-1.5	-56.9	-13.0	-43.9
5	419.94	-58.3	-62.1	3.5	-58.6	-13.0	-45.6
6	831.22	-59.3	-55.9	3.9	-52.0	-13.0	-39.0

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

Channel Bandwidth: 15MHz

Mode	TX channel 2825	Frequency Range	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	31.94	-41.0	-19.3	-18.3	-37.6	-13.0	-24.6
2	128.94	-43.7	-46.7	-3.2	-49.9	-13.0	-36.9
3	206.54	-51.4	-57.6	-2.0	-59.6	-13.0	-46.6
4	270.56	-53.6	-56.4	-1.4	-57.8	-13.0	-44.8
5	738.10	-57.3	-56.9	3.7	-53.2	-13.0	-40.2
6	897.18	-61.2	-57.2	3.5	-53.7	-13.0	-40.7
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-33.7	-24.2	-19.4	-43.6	-13.0	-30.6
2	53.28	-41.2	-41.9	-6.2	-48.1	-13.0	-35.1
3	192.96	-53.9	-52.8	-2.6	-55.4	-13.0	-42.4
4	270.56	-59.6	-56.2	-1.4	-57.6	-13.0	-44.6
5	489.78	-56.3	-60.2	3.7	-56.5	-13.0	-43.5
6	831.22	-61.1	-57.7	3.9	-53.8	-13.0	-40.8

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

Channel Bandwidth: 20MHz

Mode	TX channel 2850	Frequency Range	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-47.9	-24.5	-19.4	-43.9	-13.0	-30.9
2	61.04	-44.1	-46.2	-3.2	-49.4	-13.0	-36.4
3	127.00	-51.5	-54.7	-3.3	-58.0	-13.0	-45.0
4	206.54	-51.7	-57.9	-2.0	-59.9	-13.0	-46.9
5	256.98	-51.4	-55.1	-1.5	-56.6	-13.0	-43.6
6	897.18	-62.2	-58.2	3.5	-54.7	-13.0	-41.7
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-26.5	-17.0	-19.4	-36.4	-13.0	-23.4
2	57.16	-43.7	-45.9	-4.7	-50.6	-13.0	-37.6
3	192.96	-54.2	-53.1	-2.6	-55.7	-13.0	-42.7
4	270.56	-58.4	-55.0	-1.4	-56.4	-13.0	-43.4
5	483.96	-47.0	-50.9	3.7	-47.2	-13.0	-34.2
6	897.18	-61.4	-56.6	3.5	-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).

Above 1GHz

Channel Bandwidth: 5MHz

Mode	TX channel 2775	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5245.00	-53.3	-41.5	1.4	-40.1	-13.0	-27.1
2	7867.50	-50.3	-32.1	1.1	-31.0	-13.0	-18.0
3	10490.00	-62.2	-37.6	0.2	-37.4	-13.0	-24.4
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5245.00	-57.5	-45.6	1.4	-44.2	-13.0	-31.2
2	7867.50	-49.9	-31.9	1.1	-30.8	-13.0	-17.8
3	10490.00	-59.7	-35.8	0.2	-35.6	-13.0	-22.6

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 3100	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5310.00	-53.6	-41.6	1.4	-40.2	-13.0	-27.2
2	7965.00	-50.6	-31.9	1.2	-30.7	-13.0	-17.7
3	10620.00	-61.7	-37.1	0.2	-36.9	-13.0	-23.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5310.00	-56.8	-45.4	1.4	-44.0	-13.0	-31.2
2	7965.00	-50.2	-32.0	1.2	-30.8	-13.0	-17.8
3	10620.00	-58.8	-35.0	0.2	-34.8	-13.0	-22.6

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 3425	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5375.00	-52.7	-40.7	1.5	-39.2	-13.0	-26.2
2	8062.50	-51.2	-31.7	1.1	-30.6	-13.0	-17.6
3	10750.00	-62.6	-36.9	0.2	-36.7	-13.0	-23.7
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5375.00	-56.5	-45.1	1.5	-43.6	-13.0	-30.6
2	8062.50	-47.6	-29.1	1.1	-28.0	-13.0	-15.0
3	10750.00	-57.7	-33.2	0.2	-33.0	-13.0	-20.0

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

Channel Bandwidth: 10MHz

Mode	TX channel 2800	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5250.00	-57.2	-45.5	1.5	-44.0	-13.0	-31.0
2	7875.00	-51.8	-33.7	1.2	-32.5	-13.0	-19.5
3	10500.00	-61.7	-37.0	0.1	-36.9	-13.0	-23.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5250.00	-58.3	-46.6	1.5	-45.1	-13.0	-32.1
2	7875.00	-46.5	-28.6	1.2	-27.4	-13.0	-14.4
3	10500.00	-57.9	-33.9	0.1	-33.8	-13.0	-20.8

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

Mode	TX channel 3100	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5310.00	-57.5	-45.5	1.4	-44.1	-13.0	-31.1
2	7965.00	-52.1	-33.4	1.2	-32.2	-13.0	-19.2
3	10620.00	-61.2	-36.6	0.2	-36.4	-13.0	-23.4
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5310.00	-58.6	-47.2	1.4	-45.8	-13.0	-32.8
2	7965.00	-46.2	-28.0	1.2	-26.8	-13.0	-13.8
3	10620.00	-57.6	-33.8	0.2	-33.6	-13.0	-20.6

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 3400	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5370.00	-57.1	-45.1	1.5	-43.6	-13.0	-30.6
2	8055.00	-51.5	-32.0	1.1	-30.9	-13.0	-17.9
3	10740.00	-61.3	-35.6	0.1	-35.5	-13.0	-22.5
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5370.00	-58.5	-47.2	1.5	-45.7	-13.0	-32.7
2	**8055.00**	**-45.8**	**-27.3**	**1.1**	**-26.2**	**-13.0**	**-13.2**
3	10740.00	-58.3	-33.7	0.1	-33.6	-13.0	-20.6

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

Channel Bandwidth: 15MHz

Mode	TX channel 2825	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5255.00	-57.0	-45.3	1.5	-43.8	-13.0	-30.8
2	7882.50	-52.1	-34.1	1.2	-32.9	-13.0	-19.9
3	10510.00	-60.6	-36.0	0.2	-35.8	-13.0	-22.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5255.00	-58.5	-46.8	1.5	-45.3	-13.0	-32.3
2	7882.50	-49.9	-32.0	1.2	-30.8	-13.0	-17.8
3	10510.00	-60.7	-36.9	0.2	-36.7	-13.0	-23.7

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

Mode	TX channel 3100	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5310.00	-56.7	-44.7	1.4	-43.3	-13.0	-30.3
2	7965.00	-51.9	-33.2	1.2	-32.0	-13.0	-19.0
3	10620.00	-60.7	-36.1	0.2	-35.9	-13.0	-22.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5310.00	-58.8	-47.4	1.4	-46.0	-13.0	-33.0
2	7965.00	-48.6	-30.4	1.2	-29.2	-13.0	-16.2
3	10620.00	-60.4	-36.6	0.2	-36.4	-13.0	-23.4

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 3375	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5365.00	-57.6	-45.6	1.5	-44.1	-13.0	-31.1
2	8047.50	-52.6	-33.2	1.1	-32.1	-13.0	-19.1
3	10730.00	-60.9	-35.3	0.1	-35.2	-13.0	-22.2
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5365.00	-57.8	-46.5	1.5	-45.0	-13.0	-32.0
2	8047.50	-49.5	-31.0	1.1	-29.9	-13.0	-16.9
3	10730.00	-60.2	-35.6	0.1	-35.5	-13.0	-22.5

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

Channel Bandwidth: 20MHz

Mode	TX channel 2850	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5260.00	-57.3	-45.5	1.5	-44.0	-13.0	-31.0
2	7890.00	-52.2	-34.2	1.2	-33.0	-13.0	-20.0
3	10520.00	-61.0	-36.4	0.2	-36.2	-13.0	-23.2
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5260.00	-57.7	-46.1	1.5	-44.6	-13.0	-31.6
2	7890.00	-51.2	-33.3	1.2	-32.1	-13.0	-19.1
3	10520.00	-59.8	-36.0	0.2	-35.8	-13.0	-22.8

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

Mode	TX channel 3100	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5310.00	-57.6	-45.6	1.4	-44.2	-13.0	-31.2
2	7965.00	-52.6	-33.9	1.2	-32.7	-13.0	-19.7
3	10620.00	-61.2	-36.6	0.2	-36.4	-13.0	-23.4
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5310.00	-45.8	-34.4	1.4	-33.0	-13.0	-20.0
2	7965.00	-49.5	-31.3	1.2	-30.1	-13.0	-17.1
3	10620.00	-58.6	-34.8	0.2	-34.6	-13.0	-21.6

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 3350	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5360.00	-57.5	-45.5	1.5	-44.0	-13.0	-31.0
2	8040.00	-52.7	-33.3	1.1	-32.2	-13.0	-19.2
3	10720.00	-60.7	-35.2	0.1	-35.1	-13.0	-22.1
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5360.00	-57.6	-46.3	1.5	-44.8	-13.0	-31.8
2	8040.00	-52.3	-33.8	1.1	-32.7	-13.0	-19.7
3	10720.00	-60.1	-35.6	0.1	-35.5	-13.0	-22.5

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 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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