

FCC Test Report (CA Mode: LTE Band 5+LTE Band 5)

Report No.: RF190114C07-11

FCC ID: MSQI01WD

Test Model: ASUS_I01WD

Received Date: Jan. 14, 2019

Test Date: Jun. 18 ~ Jun. 19, 2019

Issued Date: Jun. 20, 2019

Applicant: ASUSTek COMPUTER INC.

Address: 4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
(R.O.C.)

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
RF190114C07-11	Original release	Jun. 20, 2019

1 Certificate of Conformity

Product: ASUS Phone

Brand: ASUS

Test Model: ASUS_I01WD

Sample Status: Identical Prototype

Applicant: ASUSTek COMPUTER INC.

Test Date: Jun. 18 ~ Jun. 19, 2019

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 : Pettie Chen , **Date:** Jun. 20, 2019
Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Jun. 20, 2019
Bruce Chen / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 22 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 22.913 (a)	Effective radiated power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement
22.913 (d)	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 -26.3dB at 30.00MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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) ($\pm$)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.63 dB
	200MHz ~ 1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Jan. 03, 2019	Jan. 02, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 25, 2018	Sep. 24, 2019
MXG Vector signal generator Agilent	N5182B	MY53050162	Jan. 16, 2019	Jan. 15, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Nov. 20, 2018	Nov. 19, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Nov. 21, 2018	Nov. 20, 2019
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 25, 2018	Nov. 24, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10631	Aug. 08, 2018	Aug. 07, 2019
Preamplifier KEYSIGHT (Above 1GHz)	83017A	MY53270295	Jul. 02, 2018	Jul. 01, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 08, 2018	Aug. 07, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Aug. 08, 2018	Aug. 07, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 03, 2019	Jun. 02, 2020
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
True RMS Clamp Meter Fluke	325	31130711WS	May 21, 2019	May 20, 2020

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 4.

3 General Information

3.1 General Description of EUT

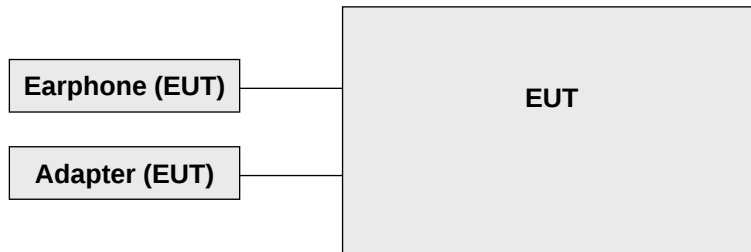
Product	ASUS Phone	
Brand	ASUS	
Test Model	ASUS_I01WDX	
Sample Status	Identical Prototype	
Power Supply Rating	3.85 Vdc (Battery) 5 or 9 Vdc (Adapter) 5 Vdc (Host equipment)	
Modulation Type	QPSK, 16QAM, 64QAM	
Operating Frequency	LTE Band 5 (Channel Bandwidth 10MHz)	829.0~844.0MHz
Max. ERP Power	LTE Band 5 (Channel Bandwidth 10MHz)	25.119mW (14.0dBm)
Emission Designator	LTE Band 5 (Channel Bandwidth 10MHz)	1M05G7D
Antenna Type	Refer to Note as below	
Antenna Connector	Refer to Note as below	
Accessory Device	Refer to Note as below	
Cable Supplied	Refer to Note as below	

Note:

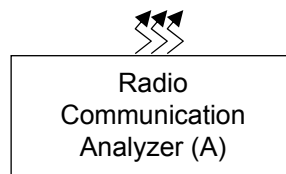
1. The EUT accessories list refers to EUT Photo.pdf.
2. The following antennas were provided to the EUT.

Ant. No.	Type	Connector	Gain (dBi)											
			GSM 850	GSM 1900	WCDMA B2	WCDMA B4	WCDMA B5	LTE B2	LTE B4	LTE B5	LTE B7	LTE B26	LTE B38	LTE B41
WWAN Antenna-0	PIFA	NA	-4.5	-2.6	-2.6	-1.9	-4.5	-2.5	-1.9	-4.5	-1.3	-4.4	-1.0	-1.0
WWAN Antenna-1	PIFA	NA	-3.4	-3.2	-3.2	-5.3	-3.4	-3.2	-5.3	-3.3	-4.7	-3.3	-5.7	-5.7

3.2 Configuration of System under Test



Remote site



3.2.1 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Radio Communication Analyzer	Anritsu	MT8860C	1702001	NA	-

Note:

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

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.

EUT Configure Mode	Test item	Band	Tested Channel		Band	Tested Channel		Modulation
-	ERP	LTE Band 5 (Channel Bandwidth 10MHz)	20450	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20549	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20450	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20549	1 RB / 0 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20476	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20575	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20476	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20575	1 RB / 0 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20501	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20600	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20501	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20600	1 RB / 0 RB Offset	QPSK
-	Modulation Characteristics	LTE Band 5 (Channel Bandwidth 10MHz)	20476	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20575	1 RB / 0 RB Offset	QPSK
-	Frequency Stability	LTE Band 5 (Channel Bandwidth 10MHz)	20450	1 RB / 0 RB Offset	-	-	-	QPSK
-	Occupied Bandwidth	LTE Band 5 (Channel Bandwidth 10MHz)	20450	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20549	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20450	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20549	1 RB / 0 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20476	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20575	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20476	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20575	1 RB / 0 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20501	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20600	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20501	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20600	1 RB / 0 RB Offset	QPSK
-	Band Edge	LTE Band 5 (Channel Bandwidth 10MHz)	20450	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20600	1 RB / 0 RB Offset	QPSK

EUT Configure Mode	Test item	Band	Tested Channel		Band	Tested Channel		Modulation
-	Peak to Average Ratio	LTE Band 5 (Channel Bandwidth 10MHz)	20450	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20549	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20450	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20549	1 RB / 0 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20476	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20575	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20476	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20575	1 RB / 0 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20501	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20600	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20501	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20600	1 RB / 0 RB Offset	QPSK
-	Conducted Emission	LTE Band 5 (Channel Bandwidth 10MHz)	20450	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20549	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20450	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20549	1 RB / 0 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20476	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20575	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20476	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20575	1 RB / 0 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20501	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20600	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20501	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20600	1 RB / 0 RB Offset	QPSK
-	Radiated Emission Below 1GHz	LTE Band 5 (Channel Bandwidth 10MHz)	20450	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20549	1 RB / 49 RB Offset	QPSK

EUT Configure Mode	Test item	Band	Tested Channel		Band	Tested Channel		Modulation
-	Radiated Emission Above 1GHz	LTE Band 5 (Channel Bandwidth 10MHz)	20450	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20549	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20450	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20549	1 RB / 0 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20476	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20575	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20476	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20575	1 RB / 0 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20501	1 RB / 0 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20600	1 RB / 49 RB Offset	QPSK
		LTE Band 5 (Channel Bandwidth 10MHz)	20501	1 RB / 49 RB Offset	LTE Band 5 (Channel Bandwidth 10MHz)	20600	1 RB / 0 RB Offset	QPSK

Test Condition:

Test Item	Environmental Conditions	Input Power (system)	Tested By
ERP	24deg. C, 66%RH	120Vac, 60Hz	Greg Lin
Modulation Characteristics	25deg. C, 70%RH	120Vac, 60Hz	Han Wu
Frequency Stability	25deg. C, 70%RH	120Vac, 60Hz	Han Wu
Occupied Bandwidth	25deg. C, 70%RH	120Vac, 60Hz	Han Wu
Band Edge	25deg. C, 70%RH	120Vac, 60Hz	Han Wu
Peak To Average Ratio	25deg. C, 70%RH	120Vac, 60Hz	Han Wu
Conducted Emission	25deg. C, 70%RH	120Vac, 60Hz	Han Wu
Radiated Emission	24deg. C, 66%RH	120Vac, 60Hz	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 v03r01

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

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.

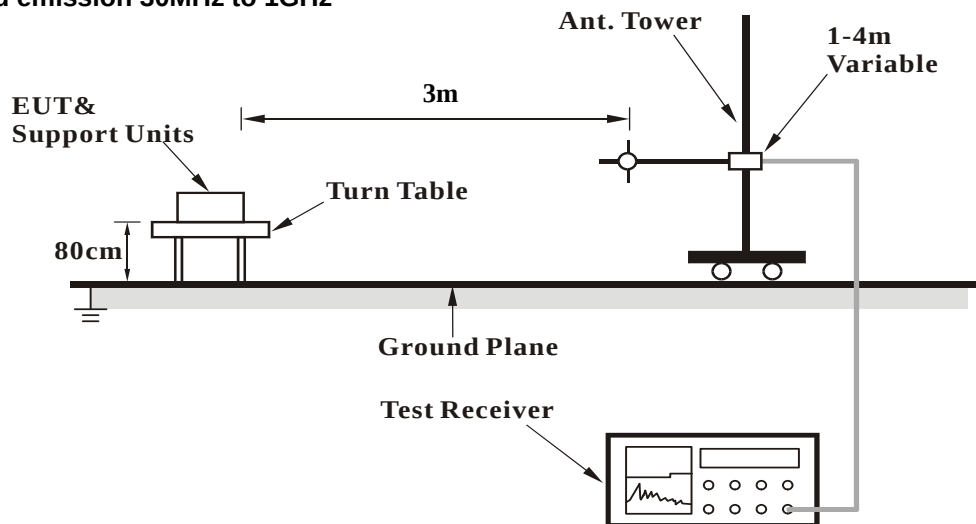
Conducted Power Measurement:

The EUT was set up for the maximum power with 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.

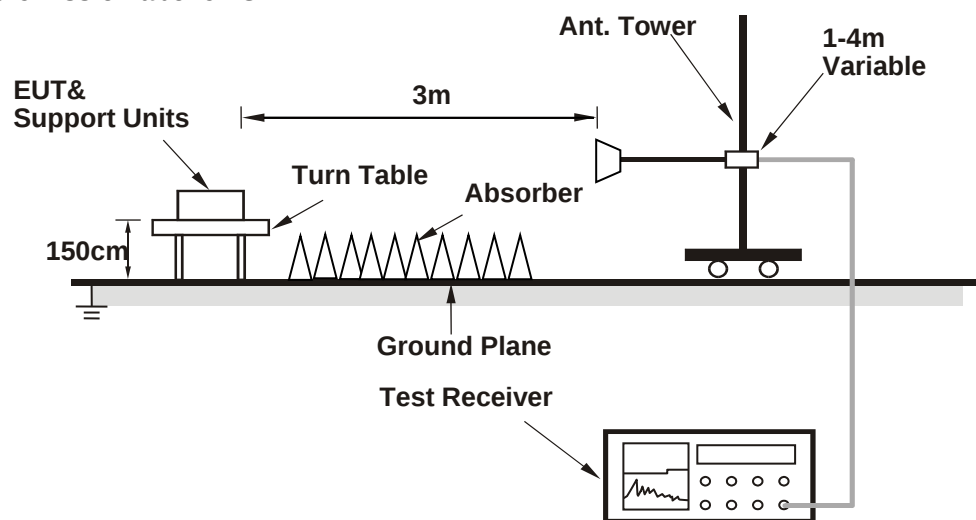
4.1.3 Test Setup

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

PCC							SCC							Measurement Power			
Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Channel	UL Frequency (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Channel	UL Frequency (MHz)	Single Carrier Tx Power without UL-CA Active (dBm)	Tx Power with UL-CA Active (dBm)		
															PCC	SCC	Total
5	10	QPSK	1	0	20450	829.0	5	10	QPSK	1	49	20549	838.9	22.26	10.45	3.40	11.23
			1	49						1	0			22.15	21.38	14.21	22.14
5	10	QPSK	1	0	20476	831.6	5	10	QPSK	1	49	20575	841.5	22.36	10.60	3.46	11.37
			1	49						1	0			22.18	21.27	14.72	22.14
5	10	QPSK	1	0	20501	834.1	5	10	QPSK	1	49	20600	844.0	22.24	10.53	3.37	11.29
			1	49						1	0			22.13	21.19	14.55	22.04

ERP Power

Modulation Type: QPSK

LTE Band 5, Channel Bandwidth: 10MHz+LTE Band 5, Channel Bandwidth: 10MHz

Mode		TX channel 20450 (1 RB / 0 RB Offset) + TX channel 20549 (1 RB / 49 RB Offset)					
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	-32.4	-4.7	3.9	-0.8	38.5	-39.3
2	838.90	-34.9	-7.3	3.7	-3.6	38.5	-42.1
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	829.00	-28.8	-0.6	3.9	3.3	38.5	-35.2
2	838.90	-31.4	-3.2	3.7	0.5	38.5	-38.0

Mode		Channel 20450 (1 RB / 49 RB Offset) + Channel 20549 (1 RB / 0 RB Offset)					
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	-21.7	6.0	3.9	9.9	38.5	-28.6
2	838.90	-24.1	3.4	3.7	7.1	38.5	-31.4
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	829.00	-18.2	10.0	3.9	13.9	38.5	-24.6
2	838.90	-20.5	7.7	3.7	11.4	38.5	-27.1

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

Mode		Channel 20476 (1 RB / 0 RB Offset) + Channel 20575 (1 RB / 49 RB Offset)					
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	831.60	-32.2	-4.7	3.8	-0.9	38.5	-39.4
2	841.50	-34.8	-7.2	3.6	-3.6	38.5	-42.1
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	831.60	-28.5	-0.4	3.8	3.4	38.5	-35.1
2	841.50	-31.2	-2.8	3.6	0.8	38.5	-37.7

Mode		Channel 20476 (1 RB / 49 RB Offset) + Channel 20575 (1 RB / 0 RB Offset)					
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	831.60	-21.4	6.2	3.8	10.0	38.5	-28.5
2	841.50	-23.9	3.6	3.6	7.2	38.5	-31.3
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	831.60	-17.9	10.2	3.8	14.0	38.5	-24.5
2	841.50	-20.5	7.9	3.6	11.5	38.5	-27.0

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

Mode		Channel 20501 (1 RB / 0 RB Offset) + Channel 20600 (1 RB / 49 RB Offset)					
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	834.10	-32.8	-5.2	3.8	-1.4	38.5	-39.9
2	844.00	-35.2	-7.7	3.7	-4.0	38.5	-42.5
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	834.10	-29.2	-1.1	3.8	2.7	38.5	-35.8
2	844.00	-31.8	-3.4	3.7	0.3	38.5	-38.2

Mode		Channel 20501 (1 RB / 49 RB Offset) + Channel 20600 (1 RB / 0 RB Offset)					
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	834.10	-22.0	5.6	3.8	9.4	38.5	-29.1
2	844.00	-24.4	3.2	3.7	6.9	38.5	-31.6
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	834.10	-18.4	9.7	3.8	13.5	38.5	-25.0
2	844.00	-20.9	7.5	3.7	11.2	38.5	-27.3

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.

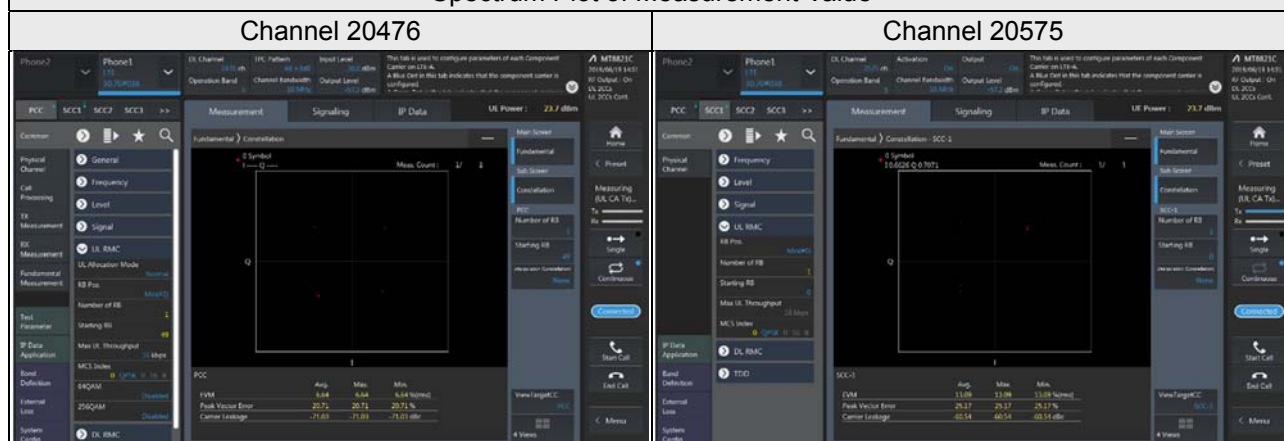
4.2.3 Test Setup



4.2.4 Test Results

LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Spectrum Plot of Measurement Value



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

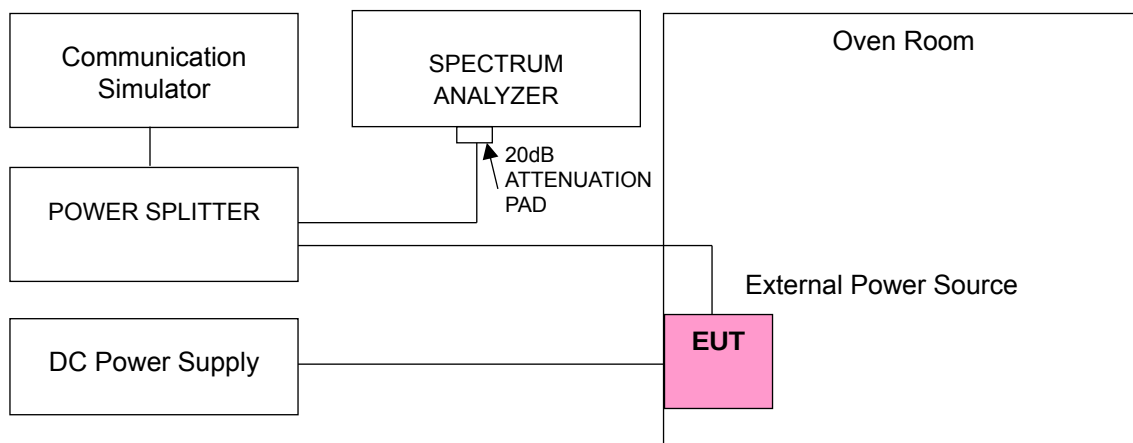
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.3.2 Test Procedure

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

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

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 5			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.4275	829.000004	0.005	844.000004	0.004
3.85	829.000003	0.003	844.000003	0.003
3.2725	829.000004	0.004	844.000002	0.002

Note: The applicant defined the normal working voltage is from 3.2725Vdc to 4.4275Vdc.

Frequency Error vs. Temperature

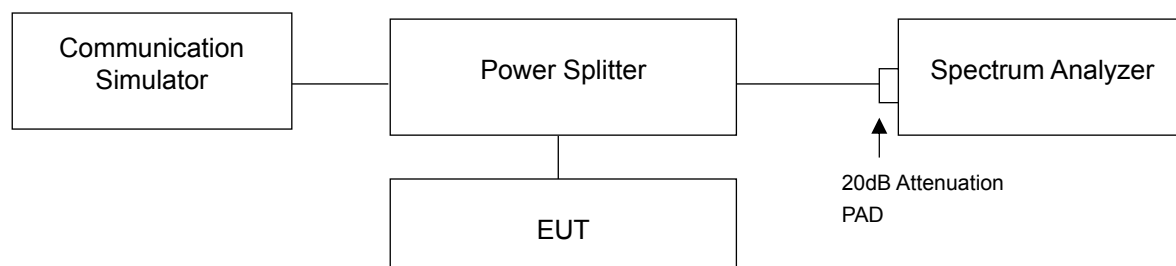
Temp. (°C)	LTE Band 5			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	829.000001	0.002	844.000004	0.004
-20	829.000002	0.002	844.000002	0.002
-10	829.000003	0.003	844.000004	0.005
0	829.000002	0.002	844.000001	0.001
10	829.000003	0.003	844.000004	0.004
20	828.999999	-0.001	843.999998	-0.002
30	828.999997	-0.004	843.999997	-0.003
40	828.999998	-0.003	843.999999	-0.002
50	828.999996	-0.004	843.999999	-0.001
55	828.999999	-0.002	843.999999	-0.001

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

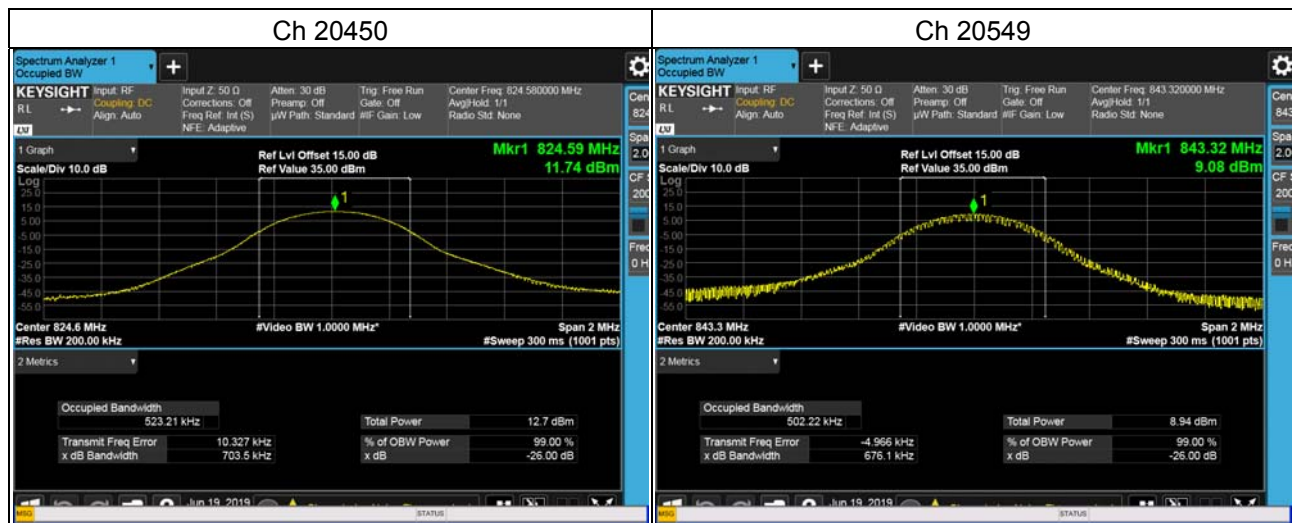


4.4.3 Test Result

Occupied Bandwidth

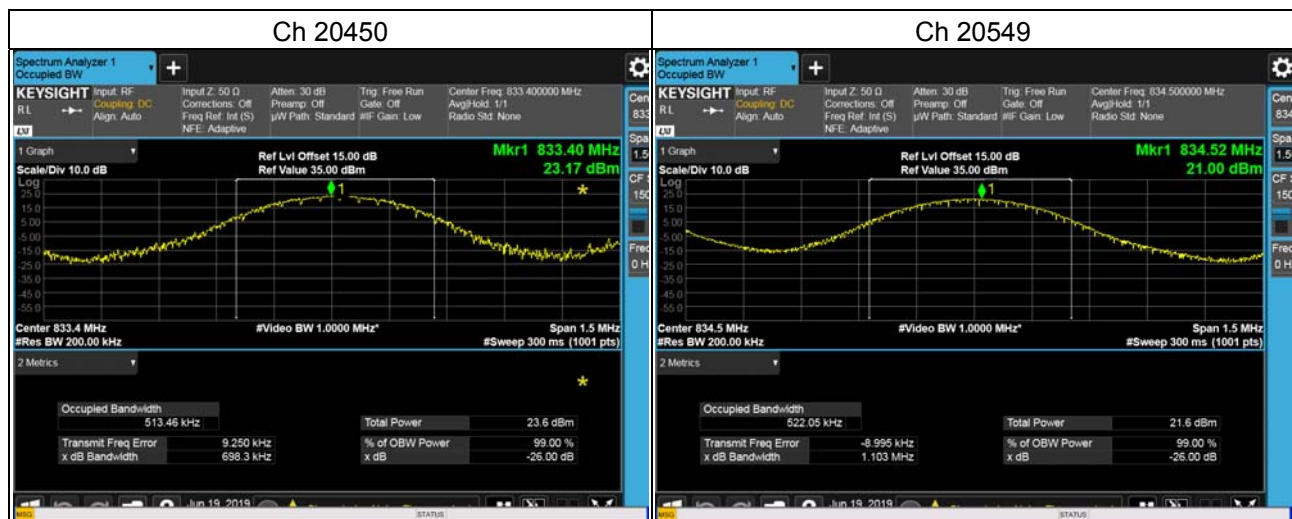
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	Occupied Bandwidth (kHz)
		QPSK
20450	1 RB / 0 RB Offset	523.21
20549	1 RB / 49 RB Offset	502.22
Total		1025.43



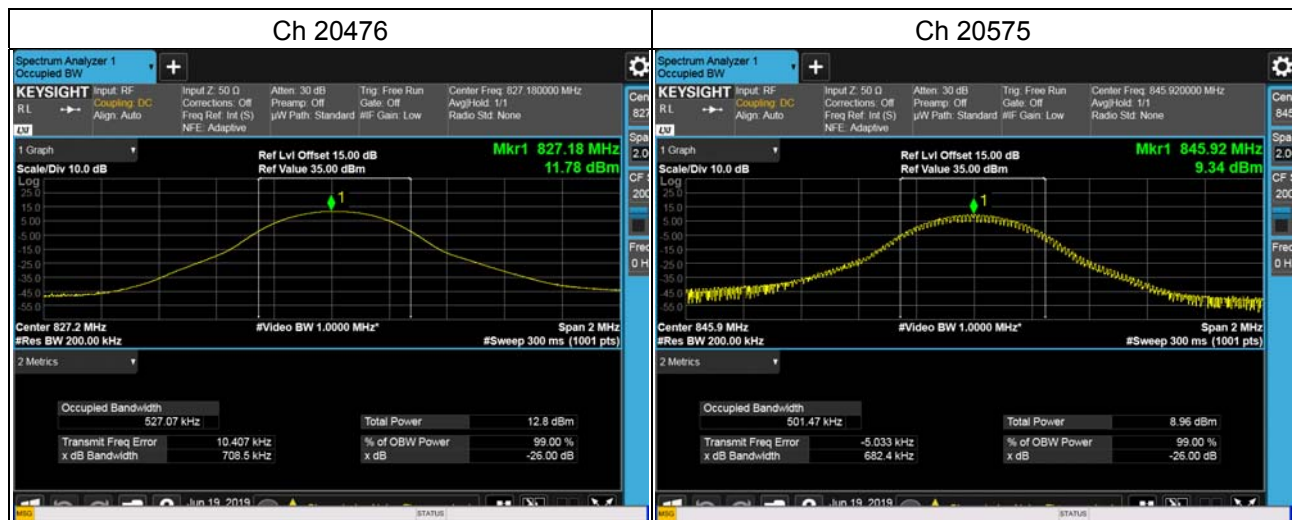
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	Occupied Bandwidth (kHz)
		QPSK
20450	1 RB / 49 RB Offset	513.46
20549	1 RB / 0 RB Offset	522.05
Total		1035.51



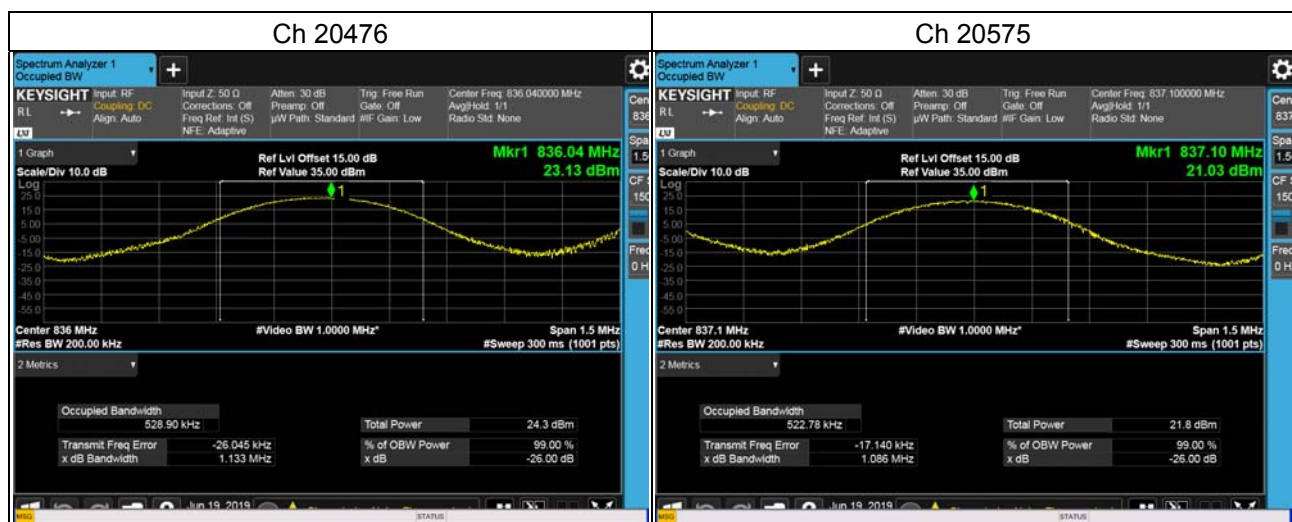
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	Occupied Bandwidth (kHz)
		QPSK
20476	1 RB / 0 RB Offset	527.07
20575	1 RB / 49 RB Offset	501.47
Total		1028.54



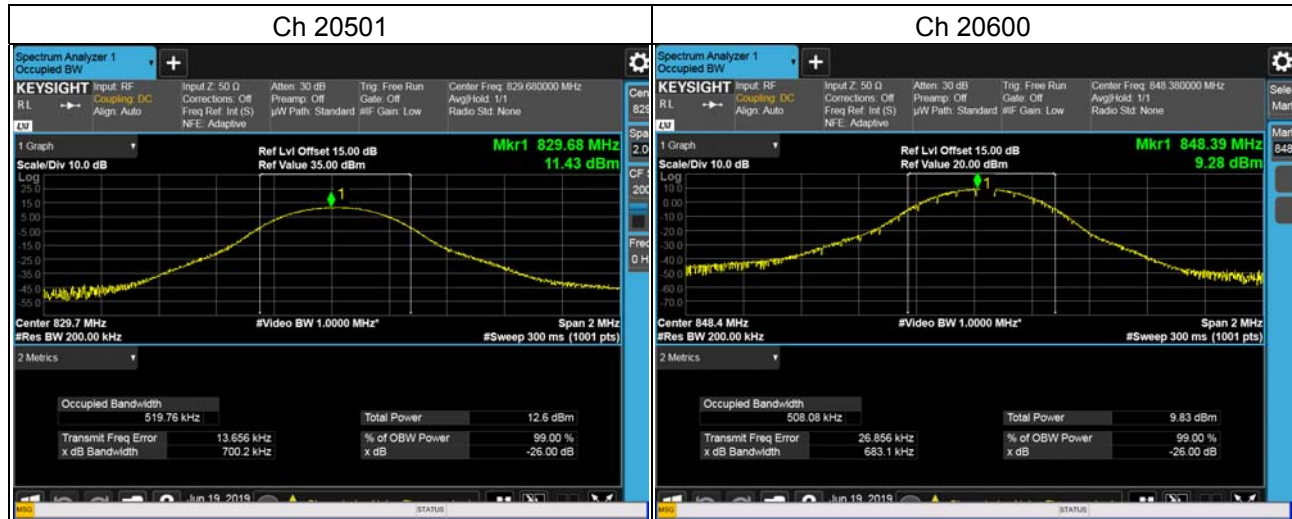
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	Occupied Bandwidth (kHz)
		QPSK
20476	1 RB / 49 RB Offset	528.90
20575	1 RB / 0 RB Offset	522.78
Total		1051.68



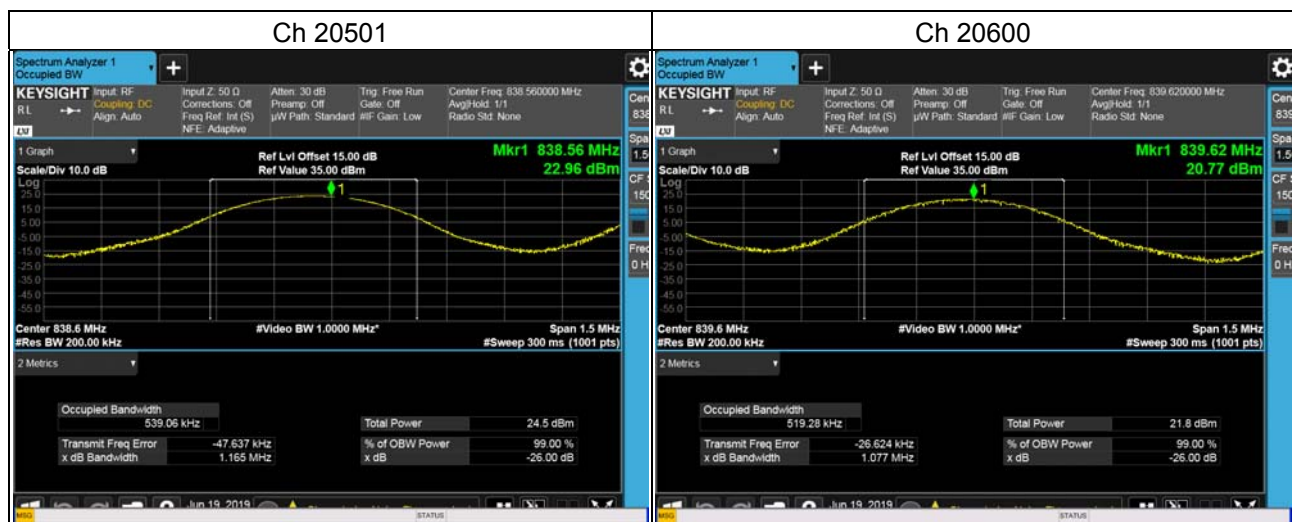
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	Occupied Bandwidth (kHz)
		QPSK
20501	1 RB / 0 RB Offset	519.76
20600	1 RB / 49 RB Offset	508.08
Total		1027.84



LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

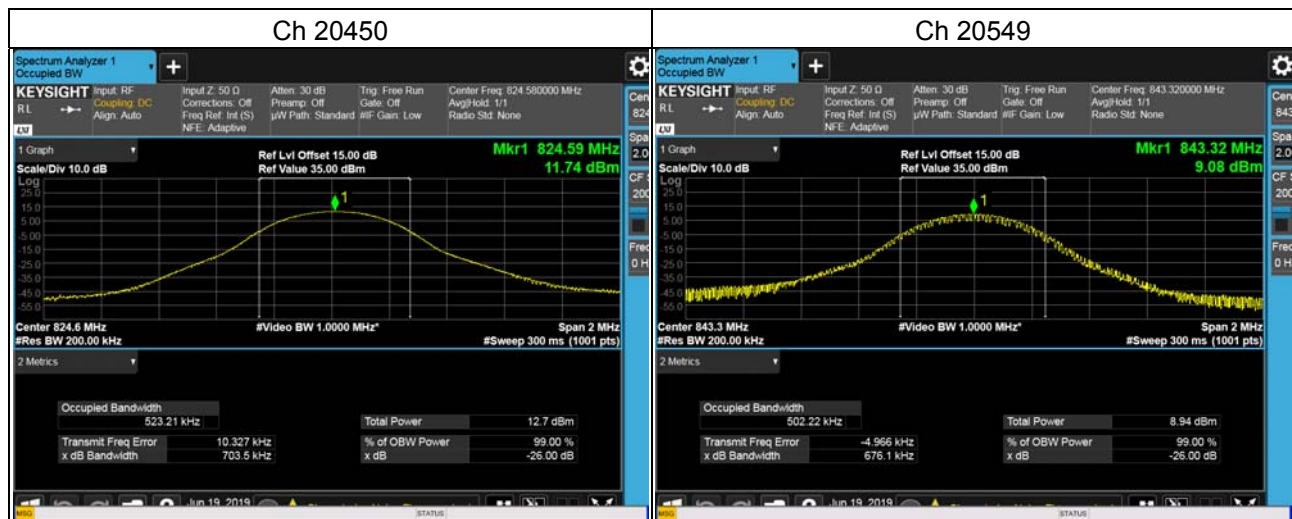
Channel	Mode	Occupied Bandwidth (kHz)
		QPSK
20501	1 RB / 49 RB Offset	539.06
20600	1 RB / 0 RB Offset	519.28
Total		1058.34



26dB Bandwidth

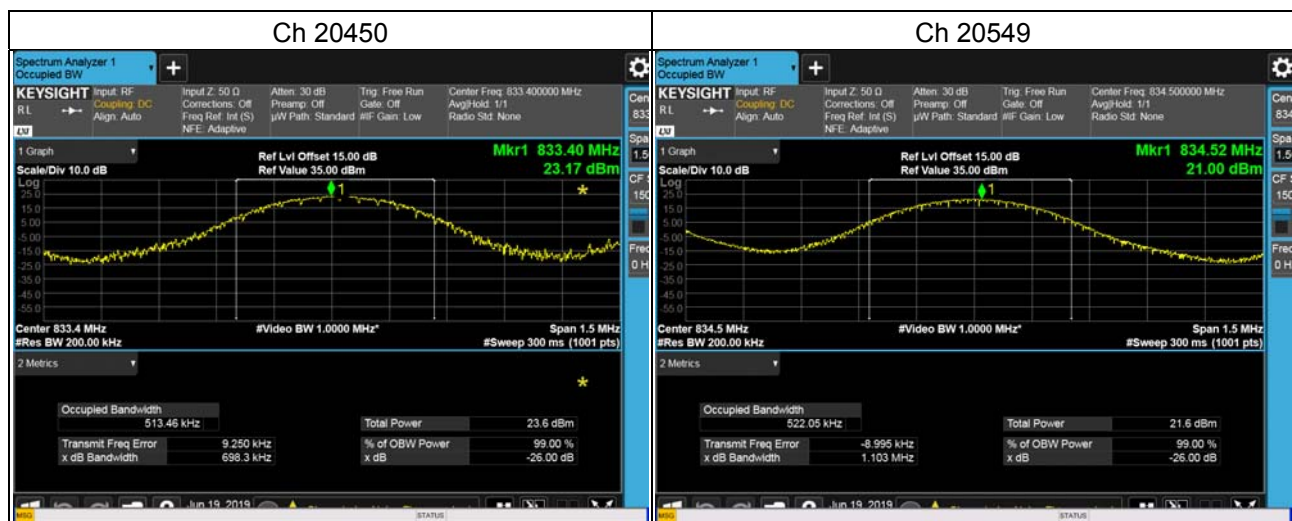
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	26dB Bandwidth (MHz)
		QPSK
20450	1 RB / 0 RB Offset	0.7035
20549	1 RB / 49 RB Offset	0.6761



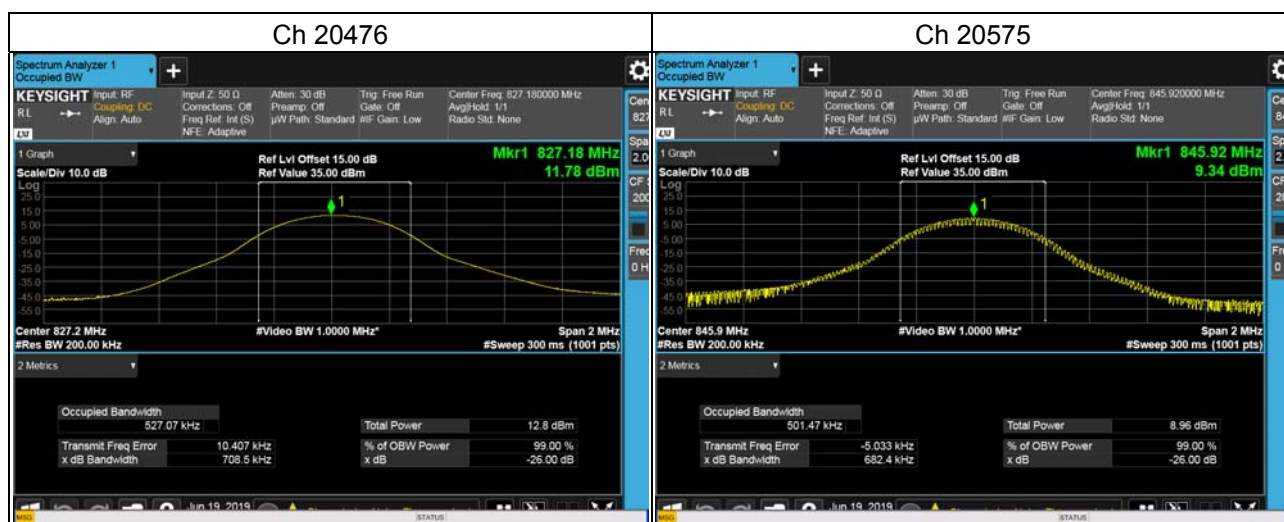
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	26dB Bandwidth (MHz)
		QPSK
20450	1 RB / 49 RB Offset	0.6983
20549	1 RB / 0 RB Offset	1.103



LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	26dB Bandwidth (MHz)
		QPSK
20476	1 RB / 0 RB Offset	0.7085
20575	1 RB / 49 RB Offset	0.6824



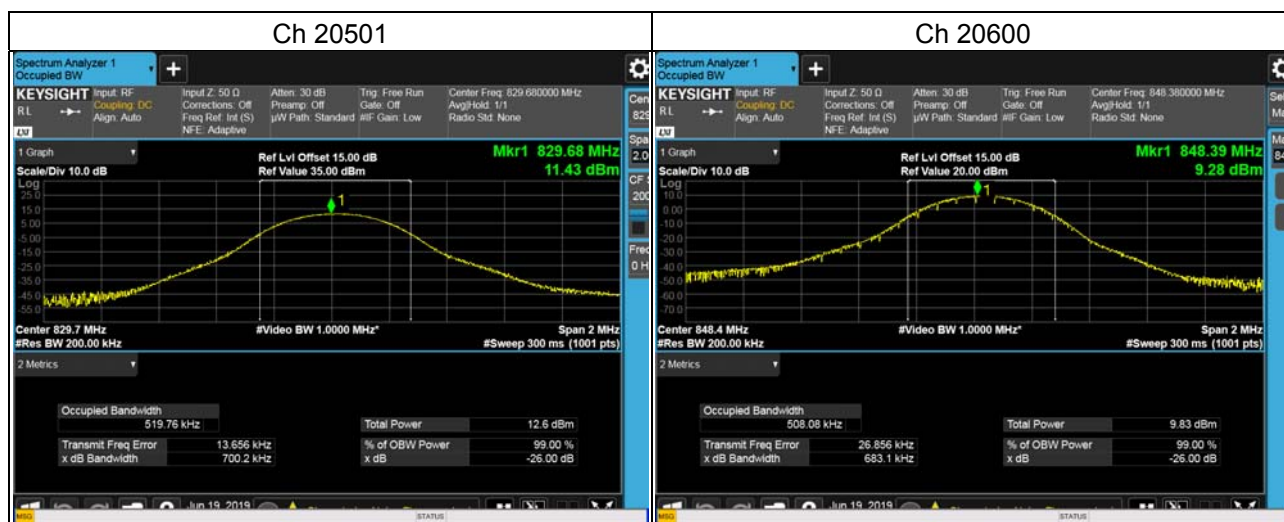
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	26dB Bandwidth (MHz)
		QPSK
20476	1 RB / 49 RB Offset	1.133
20575	1 RB / 0 RB Offset	1.086
Total		



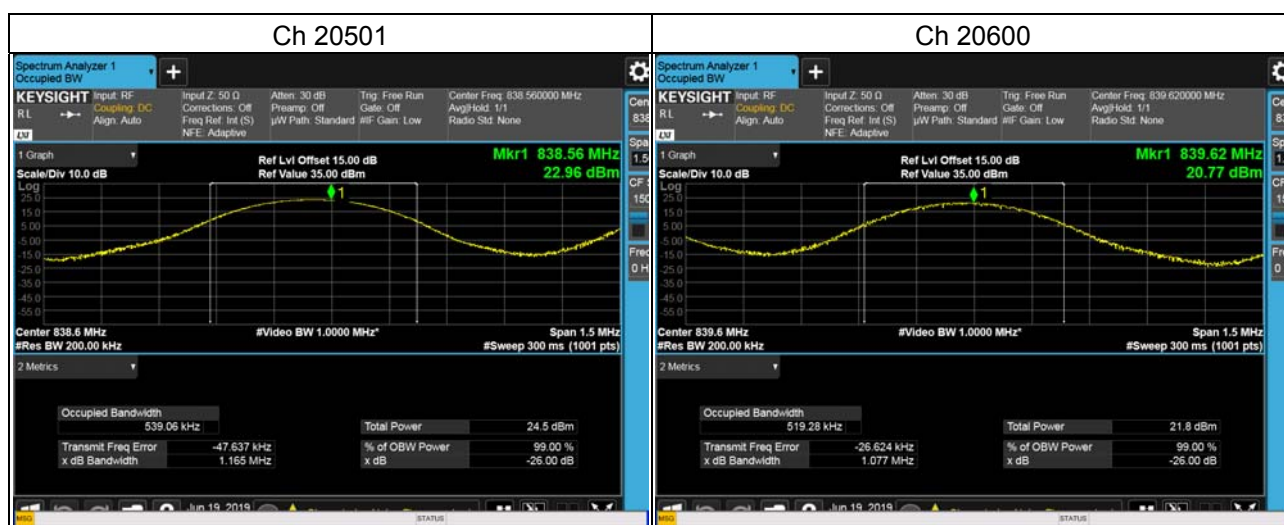
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	26dB Bandwidth (MHz)
		QPSK
20501	1 RB / 0 RB Offset	0.7002
20600	1 RB / 49 RB Offset	0.6831



LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	26dB Bandwidth (MHz)
		QPSK
20501	1 RB / 49 RB Offset	1.165
20600	1 RB / 0 RB Offset	1.077

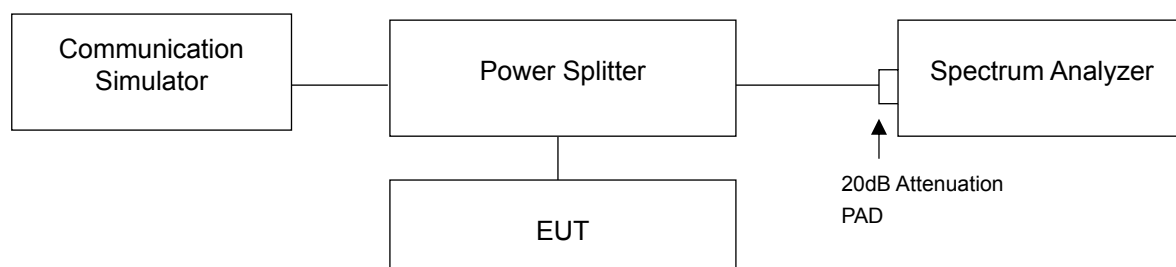


4.5 Band Edge Measurement

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.

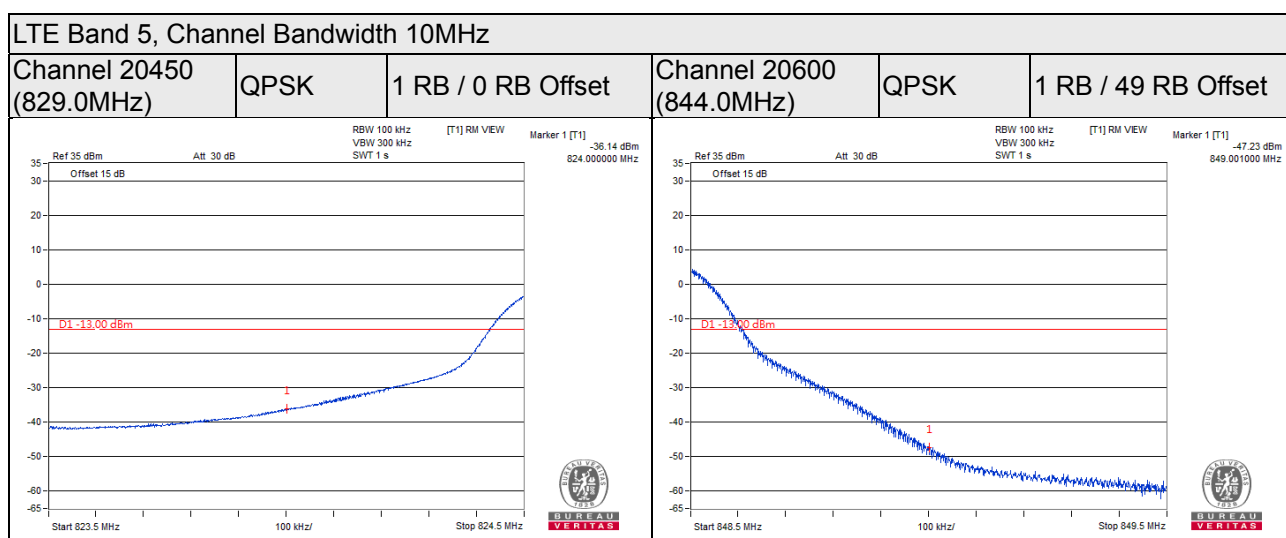
4.5.2 Test Setup



4.5.3 Test Procedures

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Channel Bandwidth 10MHz).
- Record the max trace plot into the test report.

4.5.4 Test Results

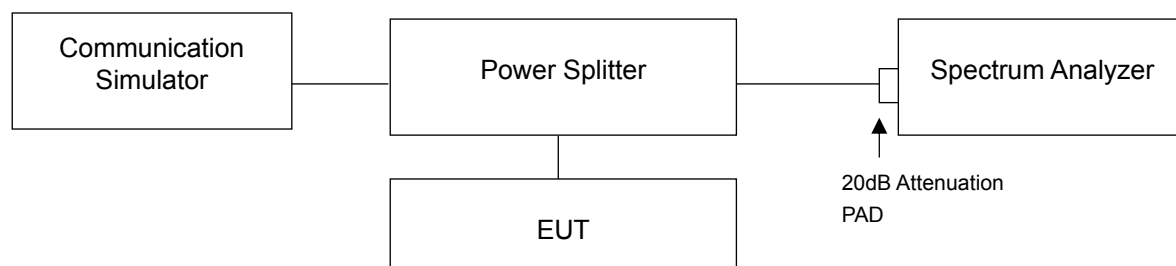


4.6 Peak to Average Ratio

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



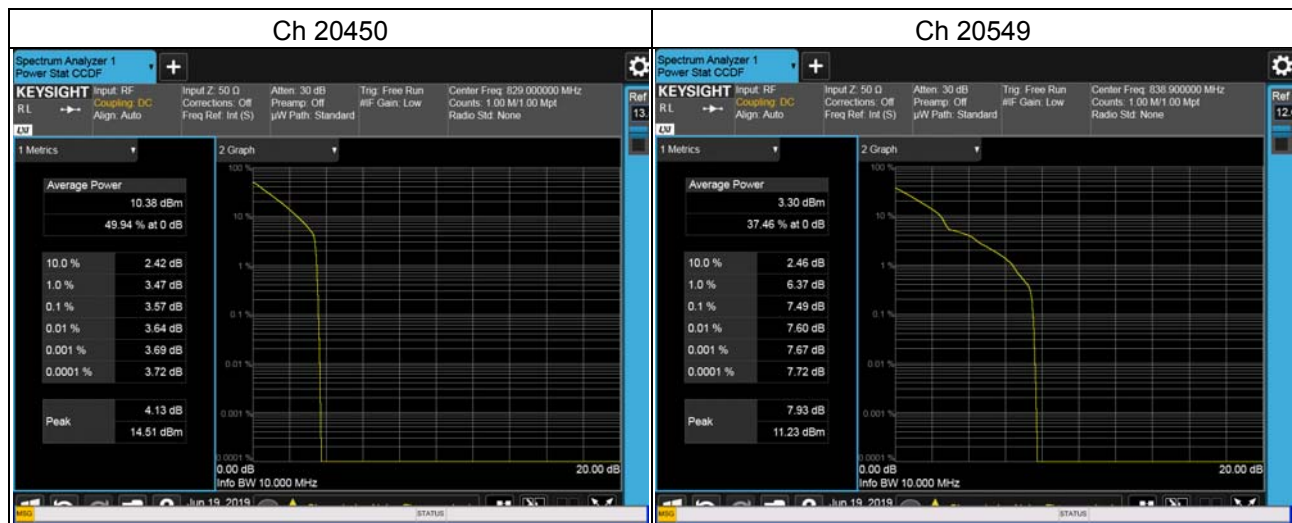
4.6.3 Test Procedures

- 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

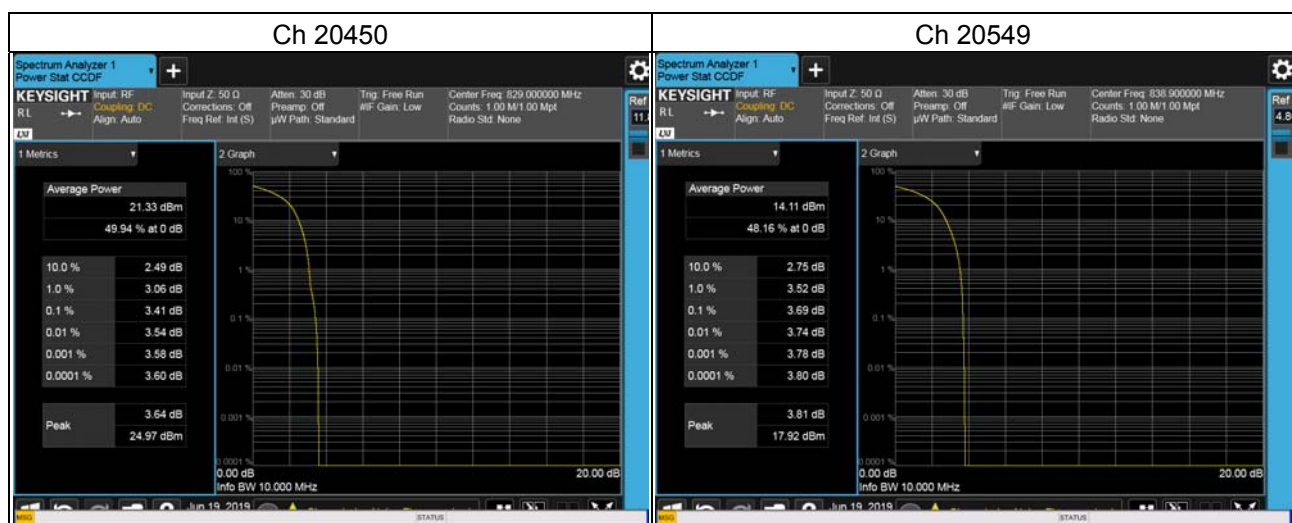
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	Peak To Average Ratio (dB)
		QPSK
20450	1 RB / 0 RB Offset	3.57
20549	1 RB / 49 RB Offset	7.49



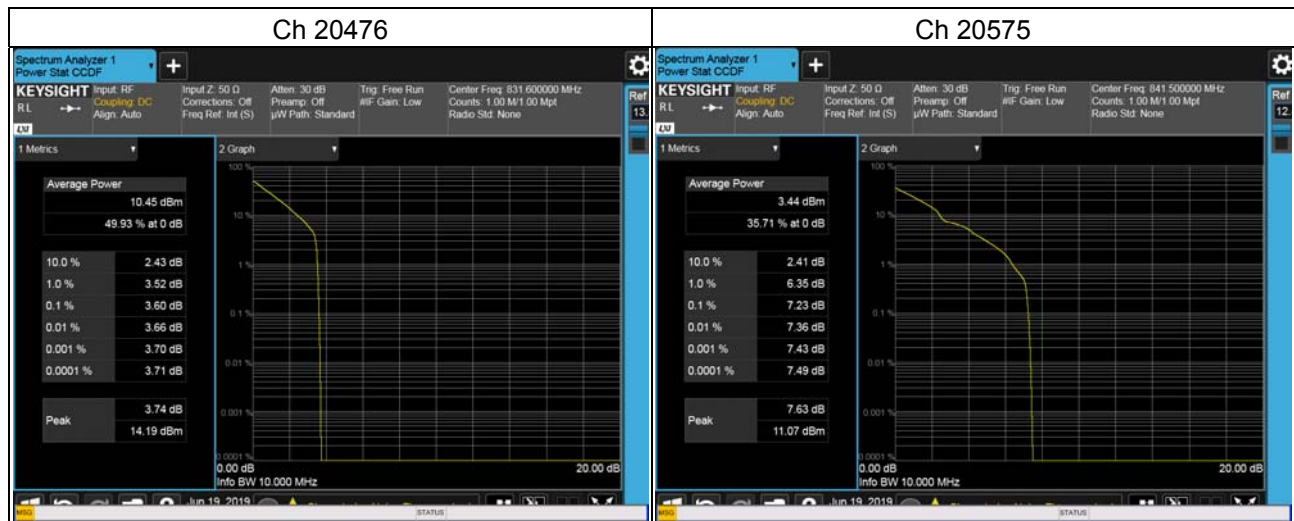
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	Peak To Average Ratio (dB)
		QPSK
20450	1 RB / 49 RB Offset	3.41
20549	1 RB / 0 RB Offset	3.69



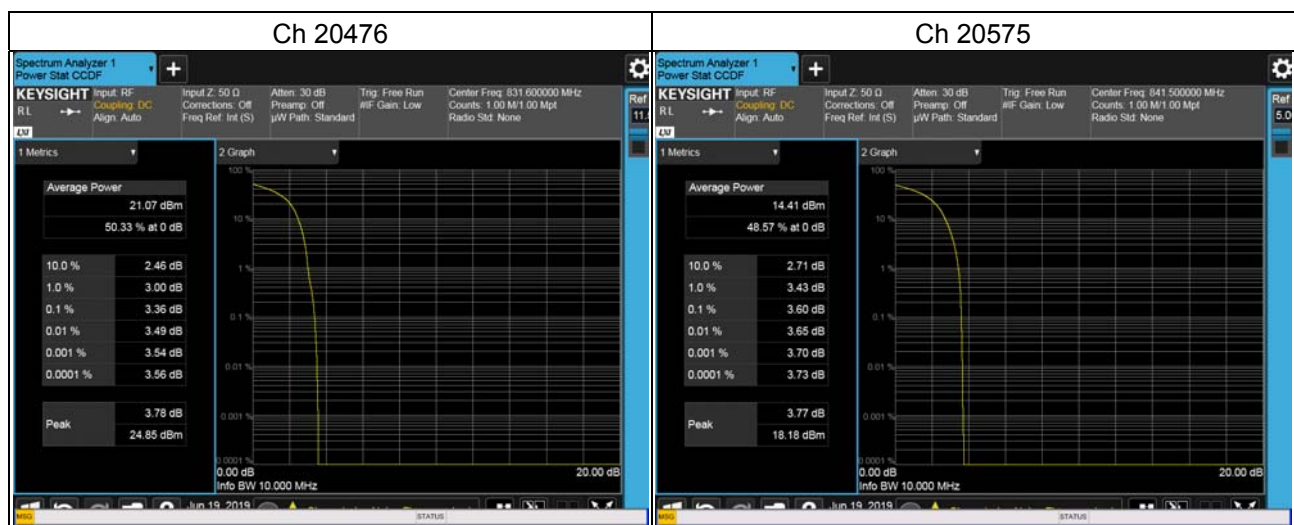
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	Peak To Average Ratio (dB)
		QPSK
20476	1 RB / 0 RB Offset	3.60
20575	1 RB / 49 RB Offset	7.23



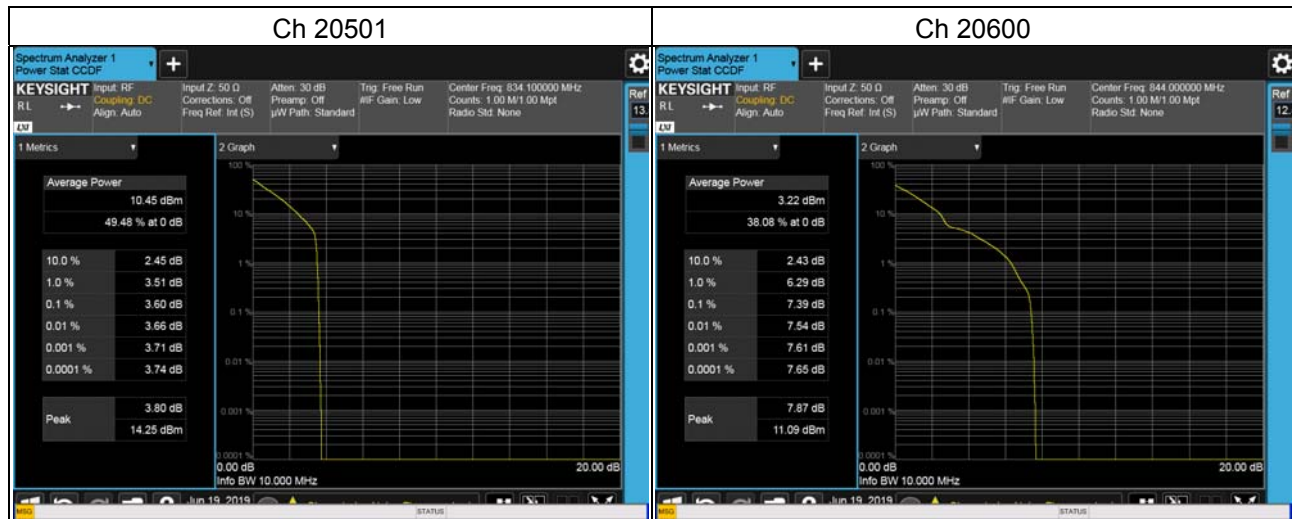
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	Peak To Average Ratio (dB)
		QPSK
20476	1 RB / 49 RB Offset	3.36
20575	1 RB / 0 RB Offset	3.60



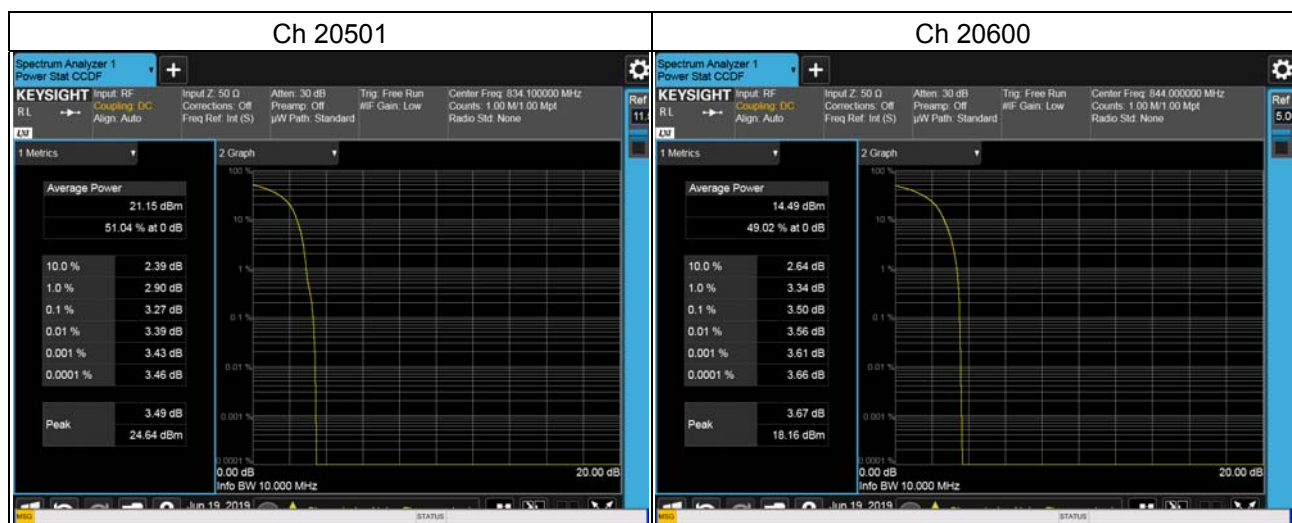
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	Peak To Average Ratio (dB)
		QPSK
20501	1 RB / 0 RB Offset	3.60
20600	1 RB / 49 RB Offset	7.39



LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel	Mode	Peak To Average Ratio (dB)
		QPSK
20501	1 RB / 49 RB Offset	3.27
20600	1 RB / 0 RB Offset	3.50

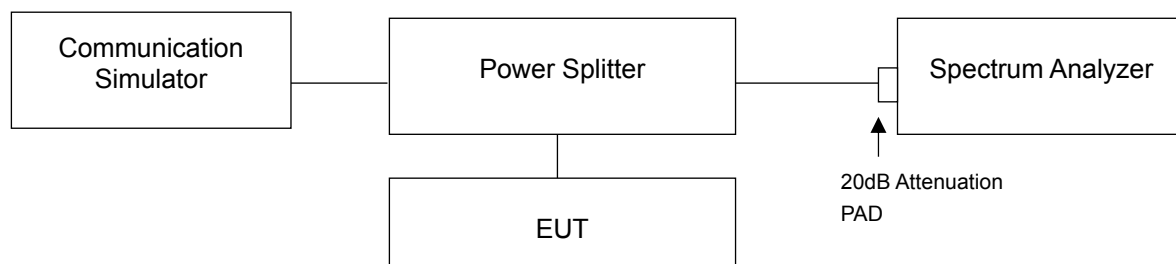


4.7 Conducted Spurious Emissions

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

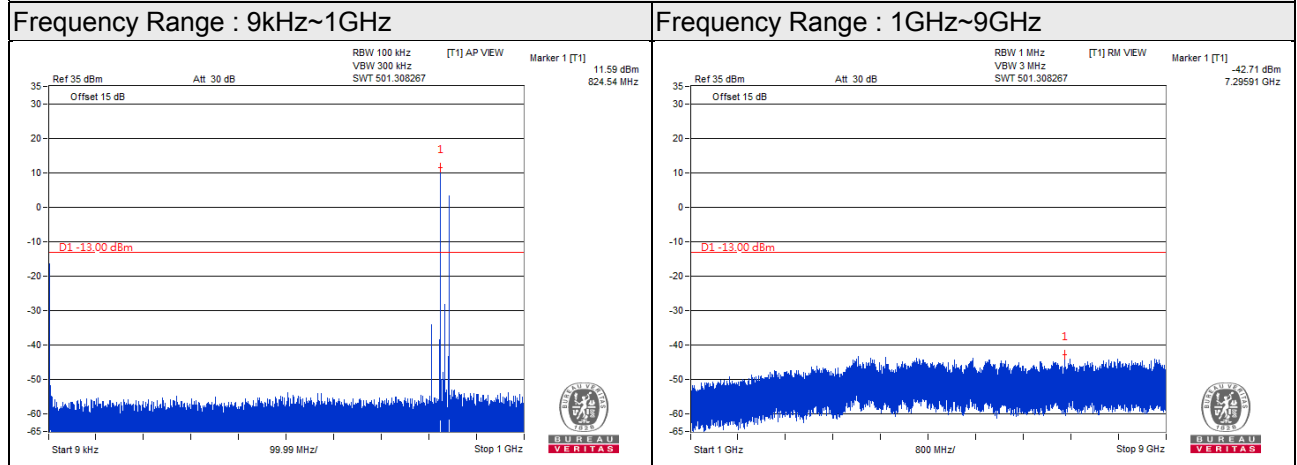
- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 1GHz. 20dB attenuation pad is connected with spectrum. RBW=100kHz and VBW=300kHz is used for conducted emission measurement.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

4.7.4 Test Results

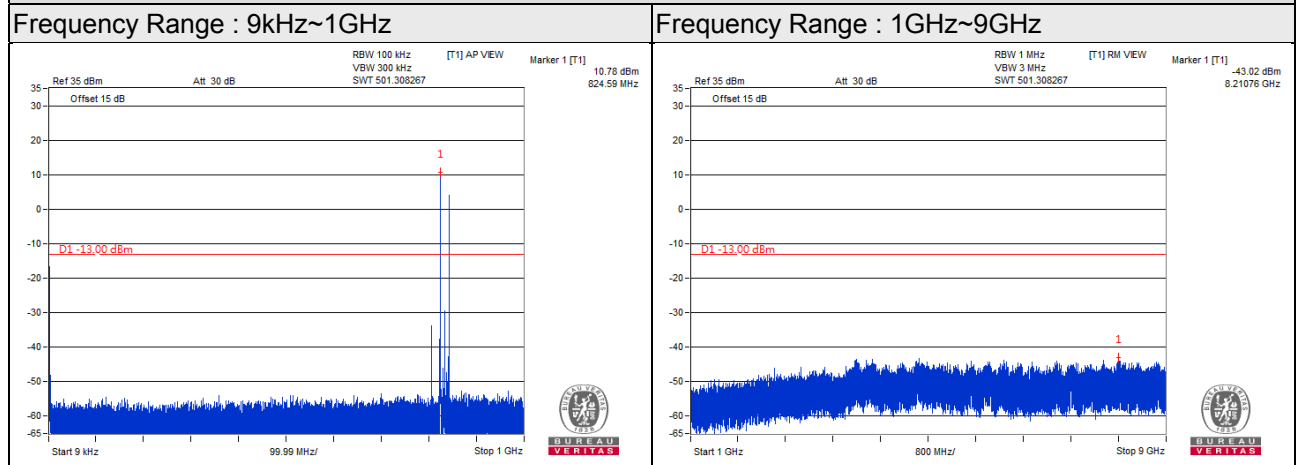
LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

Channel 20450 (829.0MHz) (1 RB / 0 RB Offset) + Channel 20549 (838.9MHz) (1 RB / 49 RB Offset)

Channel 20450 (829.0MHz) (1 RB / 0 RB Offset)



Channel 20549 (838.9MHz) (1 RB / 49 RB Offset)

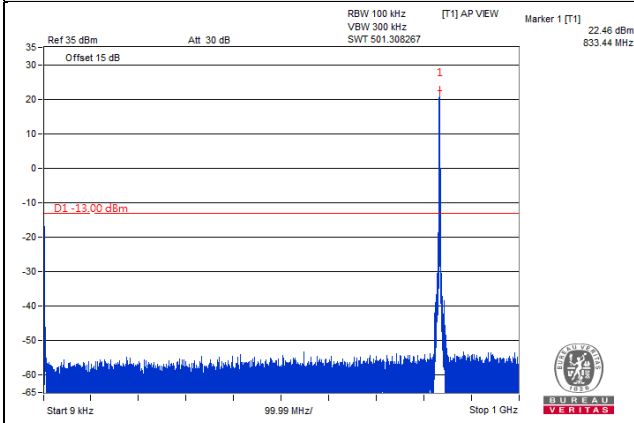


LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

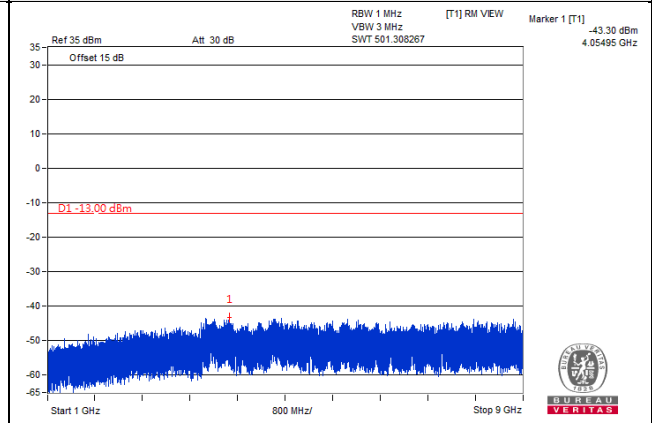
Channel 20450 (829.0MHz) (1 RB / 49 RB Offset) + Channel 20549 (838.9MHz) (1 RB / 0 RB Offset)

Channel 20450 (829.0MHz) (1 RB / 49 RB Offset)

Frequency Range : 9kHz~1GHz

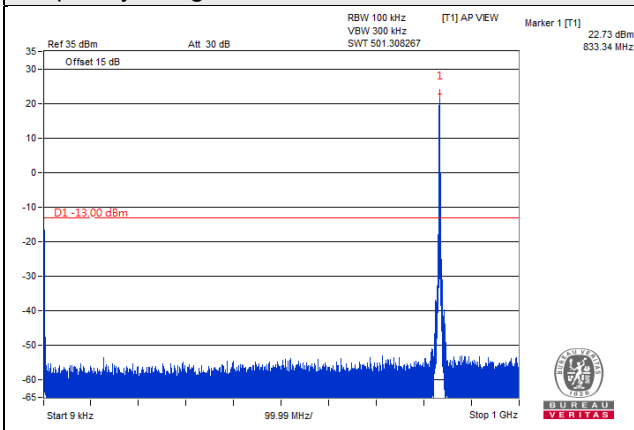


Frequency Range : 1GHz~9GHz

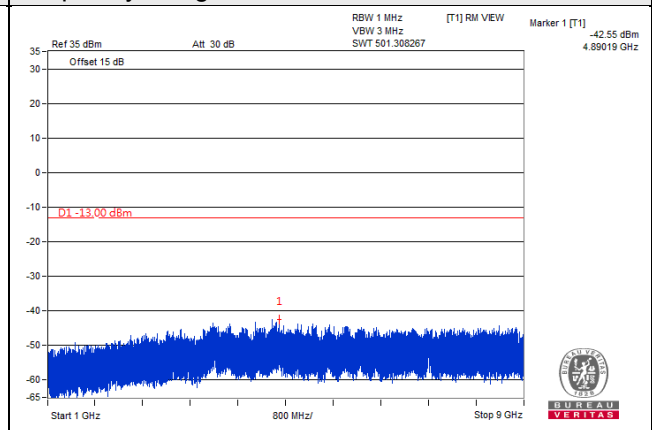


Channel 20549 (838.9MHz) (1 RB / 0 RB Offset)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~9GHz

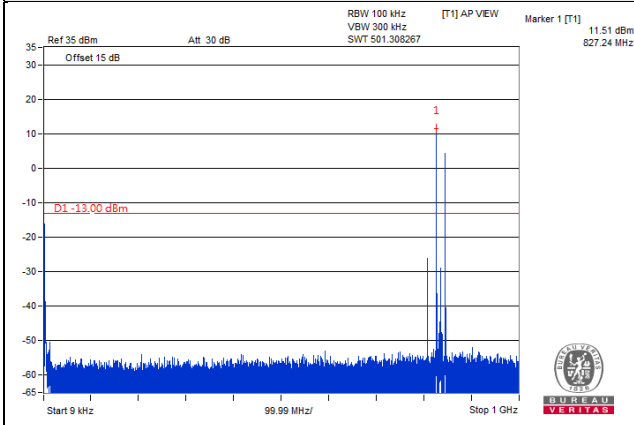


LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

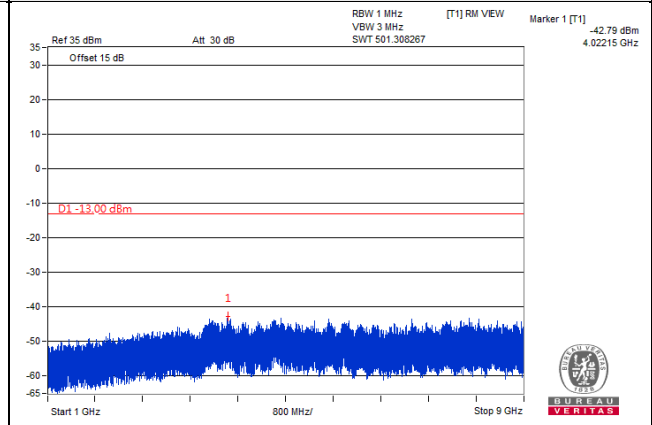
Channel 20476 (831.6MHz) (1 RB / 0 RB Offset) + Channel 20575 (841.5MHz) (1 RB / 49 RB Offset)

Channel 20476 (831.6MHz) (1 RB / 0 RB Offset)

Frequency Range : 9kHz~1GHz

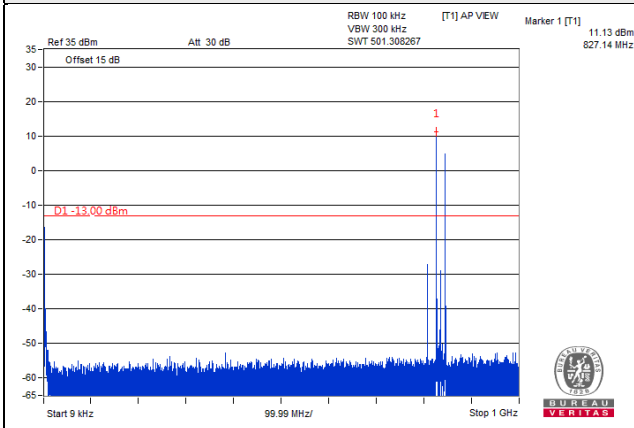


Frequency Range : 1GHz~9GHz

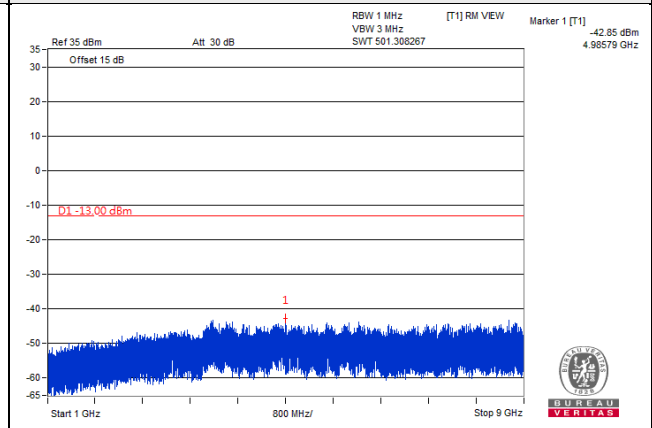


Channel 20575 (841.5MHz) (1 RB / 49 RB Offset)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~9GHz

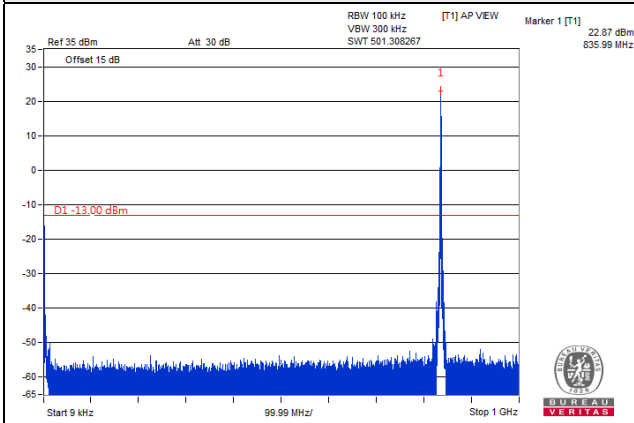


LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

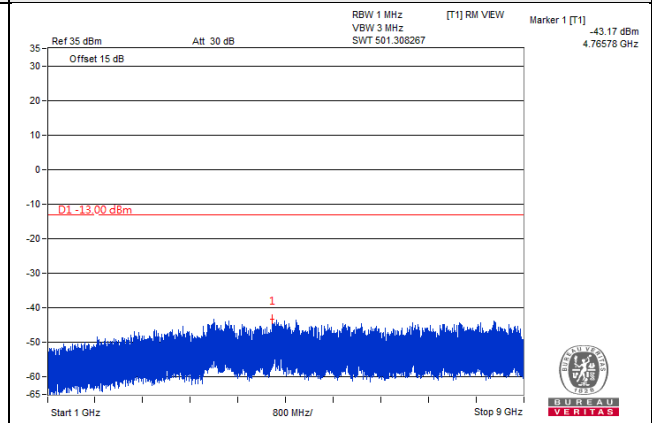
Channel 20476 (831.6MHz) (1 RB / 49 RB Offset) + Channel 20575 (841.5MHz) (1 RB / 0 RB Offset)

Channel 20476 (831.6MHz) (1 RB / 49 RB Offset)

Frequency Range : 9kHz~1GHz

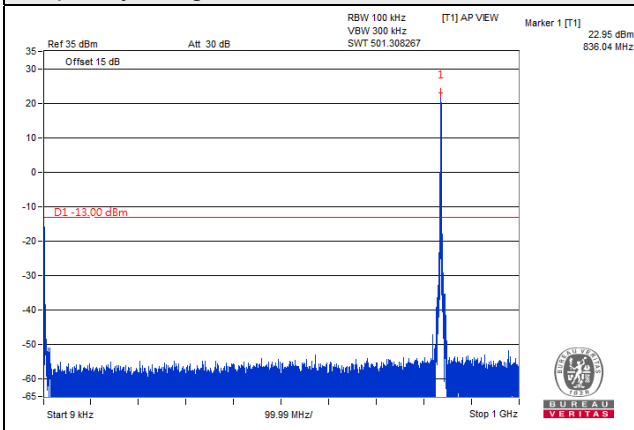


Frequency Range : 1GHz~9GHz

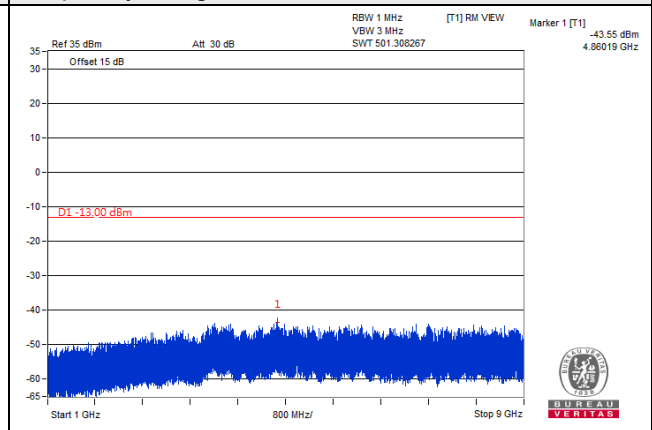


Channel 20575 (841.5MHz) (1 RB / 0 RB Offset)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~9GHz

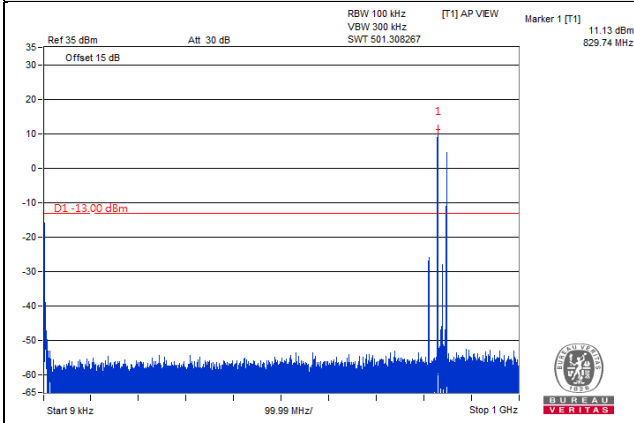


LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

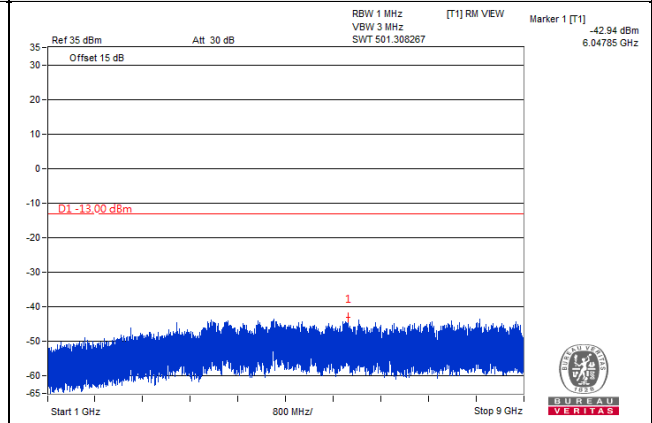
Channel 20501 (834.1MHz) (1 RB / 0 RB Offset) + Channel 20600 (844.05MHz) (1 RB / 49 RB Offset)

Channel 20501 (834.1MHz) (1 RB / 0 RB Offset)

Frequency Range : 9kHz~1GHz

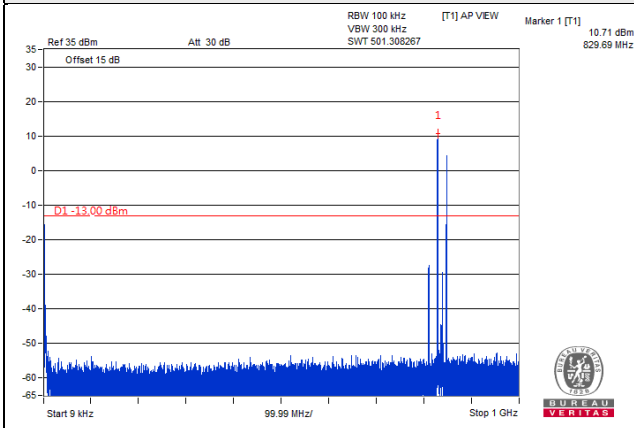


Frequency Range : 1GHz~9GHz

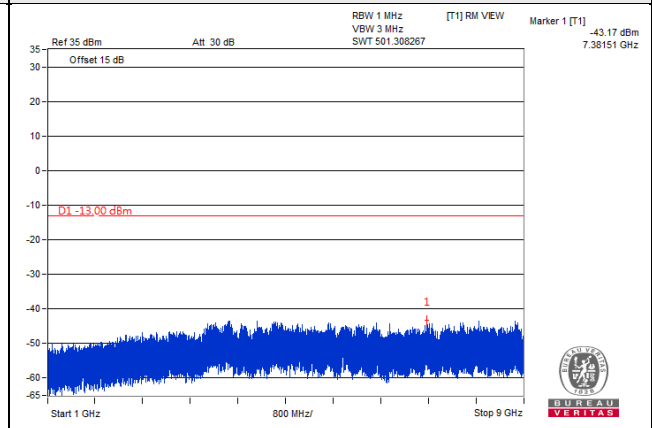


Channel 20600 (844.05MHz) (1 RB / 49 RB Offset)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~9GHz

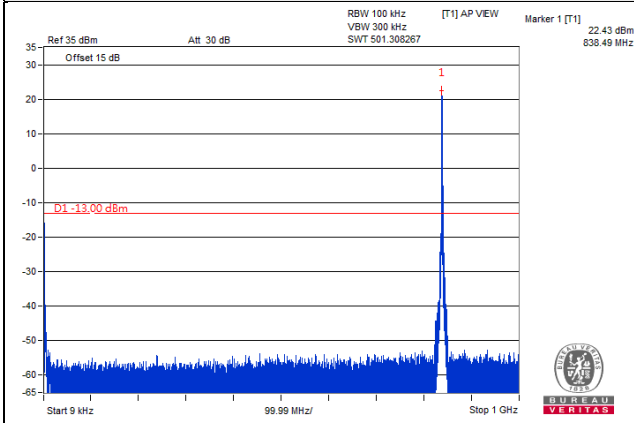


LTE Band 5, Channel Bandwidth: 10MHz + LTE Band 5, Channel Bandwidth: 10MHz

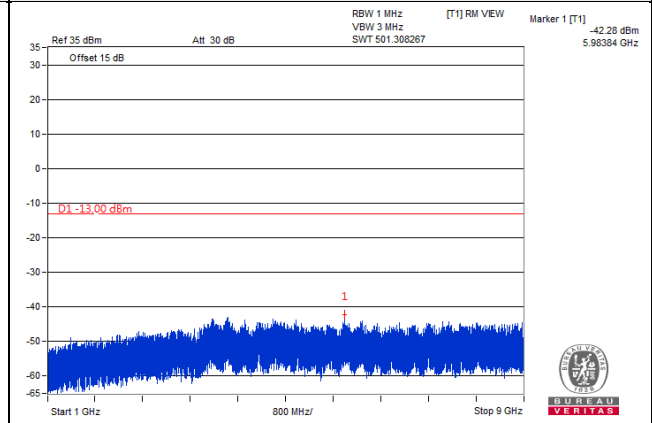
Channel 20501 (834.1MHz) (1 RB / 49 RB Offset) + Channel 20600 (844.05MHz) (1 RB / 0 RB Offset)

Channel 20501 (834.1MHz) (1 RB / 49 RB Offset)

Frequency Range : 9kHz~1GHz

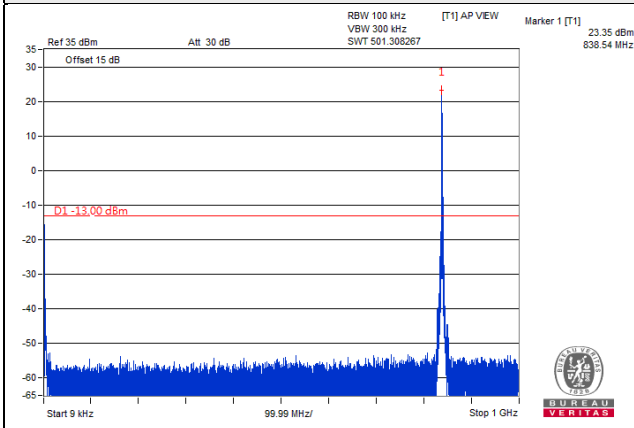


Frequency Range : 1GHz~9GHz

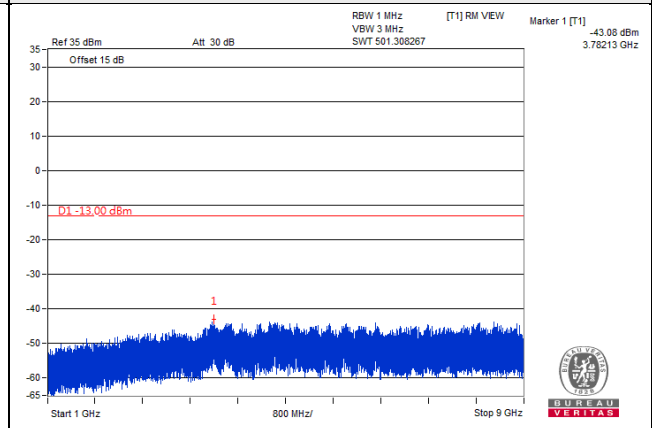


Channel 20600 (844.05MHz) (1 RB / 0 RB Offset)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~9GHz



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, $\text{E.R.P power} = \text{E.I.R.P power} - 2.15\text{dBi}$.

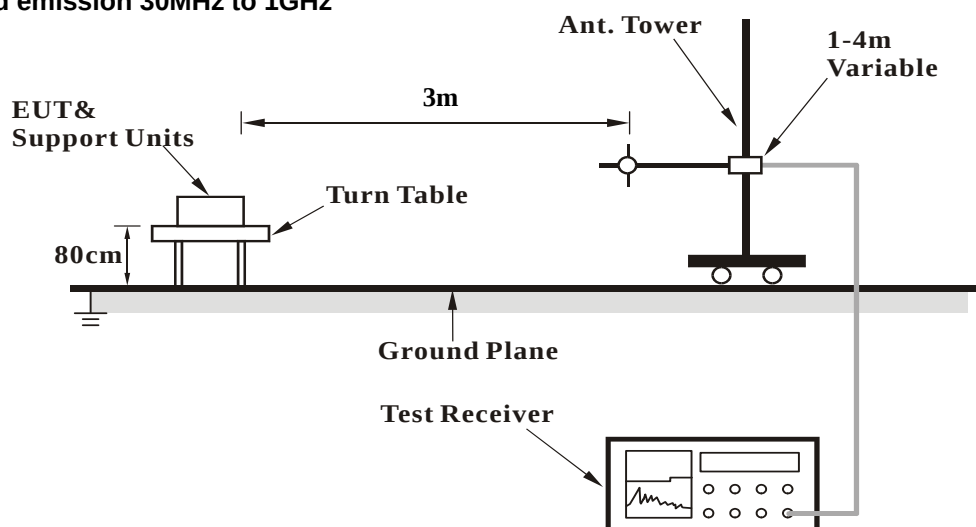
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.8.3 Deviation from Test Standard

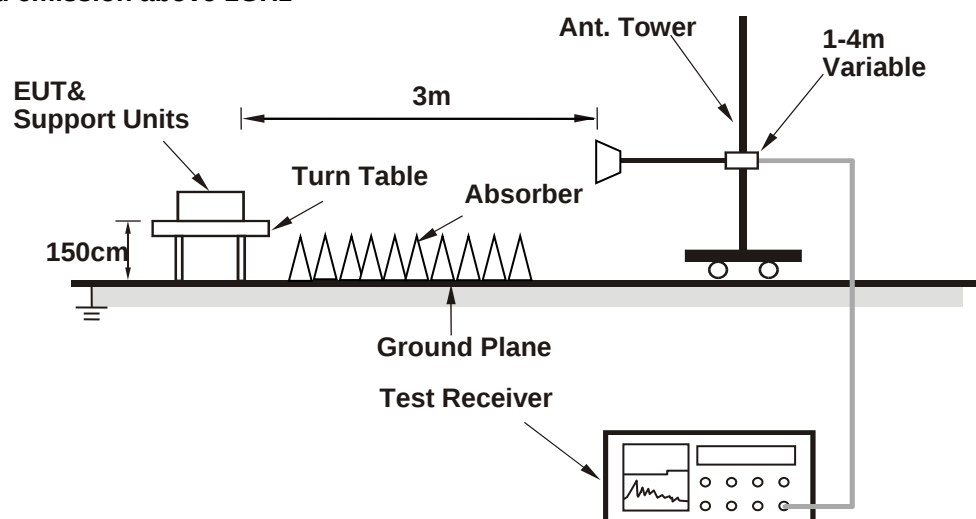
No deviation.

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

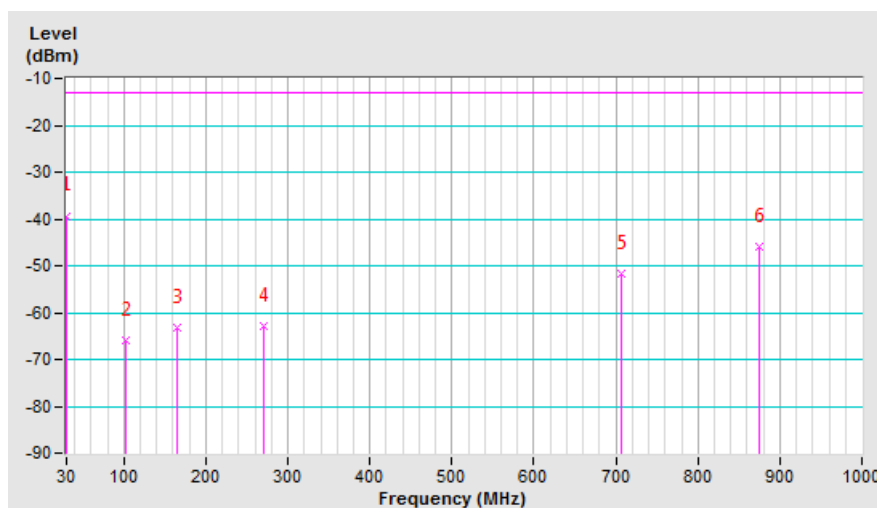
LTE Band 5, Channel Bandwidth: 10MHz+LTE Band 5, Channel Bandwidth: 10MHz

Mode	TX channel 20450 (1 RB / 0 RB Offset) + TX channel 20549 (1 RB / 49 RB Offset)	Frequency Range	Below 1000 MHz
Environmental Conditions	24deg. C, 66%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	30.00	-41.1	-19.9	-19.4	-39.3	-13.0	-26.3
2	101.78	-55.5	-64.4	-1.6	-66.0	-13.0	-53.0
3	165.80	-54.4	-60.1	-3.0	-63.1	-13.0	-50.1
4	269.59	-56.8	-61.6	-1.4	-63.0	-13.0	-50.0
5	707.06	-52.7	-55.2	3.5	-51.7	-13.0	-38.7
6	874.87	-51.2	-49.5	3.4	-46.1	-13.0	-33.1

Remarks:

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

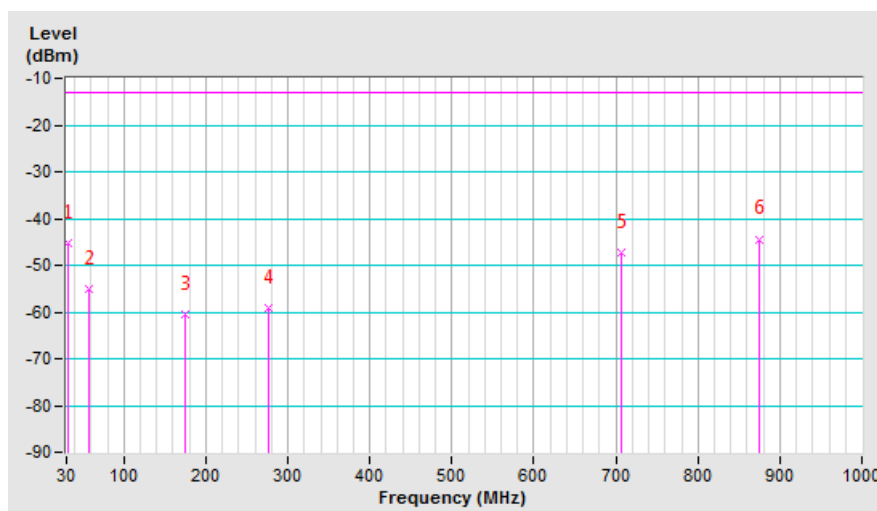


Mode	TX channel 20450 (1 RB / 0 RB Offset) + TX channel 20549 (1 RB / 49 RB Offset)	Frequency Range	Below 1000 MHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

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	32.91	-32.5	-27.6	-17.7	-45.3	-13.0	-32.3
2	58.13	-46.2	-51.0	-4.2	-55.2	-13.0	-42.2
3	174.53	-54.6	-57.6	-2.8	-60.4	-13.0	-47.4
4	277.35	-60.2	-57.5	-1.6	-59.1	-13.0	-46.1
5	707.06	-51.1	-50.8	3.5	-47.3	-13.0	-34.3
6	873.90	-49.8	-47.9	3.5	-44.4	-13.0	-31.4

Remarks:

- ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
- Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Above 1GHz

LTE Band 5, Channel Bandwidth: 10MHz

Mode	TX channel 20450 (1 RB / 0 RB Offset) + TX channel 20549 (1 RB / 49 RB Offset)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%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	-65.2	-57.6	0.9	-56.7	-13.0	-43.7
2	1677.80	-62.8	-55.1	0.8	-54.3	-13.0	-41.3
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	1658.00	-64.5	-57.2	0.9	-56.3	-13.0	-43.3
2	1677.80	-62.2	-54.9	0.8	-54.1	-13.0	-41.1

Remarks:

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

Mode	TX channel 20450 (1 RB / 49 RB Offset) + TX channel 20549 (1 RB / 0 RB Offset)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%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	-65.0	-57.4	0.9	-56.5	-13.0	-43.5
2	1677.80	-63.2	-55.6	0.8	-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	1658.00	-64.2	-57.0	0.9	-56.1	-13.0	-43.1
2	1677.80	-62.8	-55.4	0.8	-54.6	-13.0	-41.6

Remarks:

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

Mode	TX channel 20476 (1 RB / 0 RB Offset) + TX channel 20575 (1 RB / 49 RB Offset)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%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	1663.20	-64.5	-56.9	0.9	-56.0	-13.0	-43.0
2	1683.00	-63.6	-56.0	0.8	-55.2	-13.0	-42.2
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	1663.20	-63.8	-56.5	0.9	-55.6	-13.0	-42.6
2	1683.00	-63.1	-55.8	0.8	-55.0	-13.0	-42.0

Remarks:

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

Mode	TX channel 20476 (1 RB / 49 RB Offset) + TX channel 20575 (1 RB / 0 RB Offset)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%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	1663.20	-64.2	-56.6	0.9	-55.7	-13.0	-42.7
2	1683.00	-63.4	-55.8	0.8	-55.0	-13.0	-42.0
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	1663.20	-63.6	-56.4	0.9	-55.5	-13.0	-42.5
2	1683.00	-63.0	-55.7	0.8	-54.9	-13.0	-41.9

Remarks:

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

Mode	TX channel 20501 (1 RB / 0 RB Offset) + TX channel 20600 (1 RB / 49 RB Offset)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%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	1668.20	-63.7	-56.0	0.8	-55.2	-13.0	-42.2
2	1688.00	-61.9	-54.2	0.7	-53.5	-13.0	-40.5
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	1668.20	-63.1	-55.8	0.8	-55.0	-13.0	-42.0
2	1688.00	-61.2	-53.9	0.7	-53.2	-13.0	-40.2

Remarks:

1. $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$.
2. $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} + \text{Cable Loss (dB)}$.

Mode	TX channel 20501 (1 RB / 49 RB Offset) + TX channel 20600 (1 RB / 0 RB Offset)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%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	1668.20	-63.2	-55.6	0.8	-54.8	-13.0	-41.8
2	1688.00	-61.6	-53.9	0.7	-53.2	-13.0	-40.2
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1668.20	-62.8	-55.4	0.8	-54.6	-13.0	-41.6
2	1688.00	-60.8	-53.5	0.7	-52.8	-13.0	-39.8

Remarks:

1. $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$.
2. $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} + \text{Cable Loss (dB)}$.

5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

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

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Web Site: www.bureauveritas-adt.com

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

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