Report No.:	RF180307E03A-5
FCC ID:	KA2CHG601A1
Test Model:	DCH-G601
Received Date:	Mar. 12, 2018
Test Date:	Mar. 20 to 27, 2018
Issued Date:	Apr. 24, 2018
Applicant:	D-Link Corporation
Address:	No.289, Xinhu 3rd Rd., Neihu District, Tapei City 11494, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF180307E03A-5	Original release.	Apr. 24, 2018

1 Certificate of Conformity

Product:	LTE Bluetooth Hub
Brand:	D-Link
Test Model:	DCH-G601
Sample Status:	ENGINEERING SAMPLE
Applicant:	D-Link Corporation
Test Date:	Mar. 20 to 27, 2018
Standards:	FCC Part 27 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:** Apr. 24, 2018

Wendy Wu / Specialist

Approved by : _____ , **Date:** Apr. 24, 2018

May Chen / Manager

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50	Radiated Power	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	Occupied Bandwidth	PASS	Meet the requirement of limit.
27.53	Band Edge Measurements	PASS	Meet the requirement of limit.
---	Peak To Average Ratio	PASS	Meet the requirement of limit.
2.1051 27.53	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 27.53	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -12.94dB at 1422MHz.

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 ~ 1GHz	5.33 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.10 dB
	6GHz ~ 18GHz	4.85 dB
	18GHz ~ 40GHz	5.24 dB

2.2 Test Site and Instruments

For radiated spurious emissions test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 08, 2017	July 07, 2018
Pre-Amplifier EMCI	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980385	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Jan. 29, 2018	Jan. 28, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160925	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	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 966 Chamber No. 4.
3. The CANADA Site Registration No. is 20331-2
4. Tested Date: Mar. 20 to 26, 2018

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	July 01, 2017	June 30, 2018
Spectrum Analyzer Agilent	E4446A	MY48250254	Nov. 21, 2017	Nov. 20, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 10, 2018	Jan. 09, 2019
DC Power Supply Topward	6603D	795558	NA	NA
True RMS Clamp Meter FLUKE	325	31130711WS	May 29, 2017	May 28, 2018
ESG Vector signal generator Agilent	E4438C	MY45094468/005 506 602 UK6 UNJ	Nov. 26, 2017	Nov. 25, 2018
ESG Vector signal generator Agilent	E4438C	MY47271330 506 602 UNJ	Oct. 11, 2017	Oct. 10, 2018
Mech Switch Absorptive Mini-Circuits	MSP4TA-18+	0140	Feb. 12, 2018	Feb. 11, 2019
FXD ATTEN Mini-Circuits	BW-S3W2+	MN71981	Feb. 12, 2018	Feb. 11, 2019
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

NOTE: 1. The test was performed in Oven room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: Mar. 23 to 27, 2018

3 General Information

3.1 General Description of EUT

Product	LTE Bluetooth Hub	
Brand	D-Link	
Test Model	DCH-G601	
Status of EUT	ENGINEERING SAMPLE	
Power Supply Rating	5Vdc from power adapter or 3.7Vdc from battery	
Modulation Type	WCDMA, HSDPA, HSUPA	BPSK
	LTE	QPSK, 16QAM
Operating Frequency	WCDMA Band 4	1712.4 ~ 1752.6 MHz
	LTE Band 4	1710.7 ~ 1754.3 MHz
	LTE Band 12	699.7 ~ 715.3 MHz
Max. EIRP Power	WCDMA Band 4	794.33mW(29.00dBm)
	LTE Band 4 (Channel Bandwidth 1.4MHz)	539.51mW(27.32dBm)
	LTE Band 4 (Channel Bandwidth 3MHz)	523.60mW(27.19dBm)
	LTE Band 4 (Channel Bandwidth 5MHz)	530.88mW(27.25dBm)
	LTE Band 4 (Channel Bandwidth 10MHz)	550.81mW(27.41dBm)
	LTE Band 4 (Channel Bandwidth 15MHz)	566.24mW(27.53dBm)
	LTE Band 4 (Channel Bandwidth 20MHz)	559.76mW(27.48dBm)
Max. ERP Power	LTE Band 12 (Channel Bandwidth 1.4MHz)	283.79mW(24.53dBm)
	LTE Band 12 (Channel Bandwidth 3MHz)	276.06mW(24.41dBm)
	LTE Band 12 (Channel Bandwidth 5MHz)	275.42mW(24.40dBm)
	LTE Band 12 (Channel Bandwidth 10MHz)	266.07mW(24.25dBm)

Emission Designator	WCDMA Band 4	4M07F9W
	LTE Band 4 (Channel Bandwidth 1.4MHz)	QPSK: 1M09G7D
		16QAM: 1M09D7W
	LTE Band 4 (Channel Bandwidth 3MHz)	QPSK: 2M70G7D
		16QAM: 2M70D7W
	LTE Band 4 (Channel Bandwidth 5MHz)	QPSK: 4M49G7D
		16QAM: 4M49D7W
	LTE Band 4 (Channel Bandwidth 10MHz)	QPSK: 8M98G7D
		16QAM: 8M98D7W
	LTE Band 4 (Channel Bandwidth 15MHz)	QPSK: 13M5G7D
		16QAM: 13M5D7W
	LTE Band 4 (Channel Bandwidth 20MHz)	QPSK: 18M0G7D
		16QAM: 18M0D7W
	LTE Band 12 (Channel Bandwidth 1.4MHz)	QPSK: 1M09G7D
		16QAM: 1M09D7W
	LTE Band 12 (Channel Bandwidth 3MHz)	QPSK: 2M70G7D
		16QAM: 2M70D7W
	LTE Band 12 (Channel Bandwidth 5MHz)	QPSK: 4M49G7D
		16QAM: 4M49D7W
	LTE Band 12 (Channel Bandwidth 10MHz)	QPSK: 8M99G7D
		16QAM: 8M99D7W
Antenna Type	Refer to Note	
Antenna Connector	Refer to Note	
Accessory Device	Adapter x 1	
Data Cable Supplied	NA	

Note:

1. Simultaneously transmission condition.

Condition	Technology	
1	WLAN 2.4GHz	3G/LTE
2	Bluetooth	3G/LTE
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.		

2. The EUT must be supplied with a power adapter or battery as following table:

Adapter		
Brand	Model No.	Spec.
Asian Power Device Inc	WB-10E05R	Input: 100-240Vac, 0.4A, 50/60Hz Output: 5Vdc, 2A DC output cable (Unshielded, 1.2m)
Battery		
Brand	Model No.	Spec.
GPI International Limited	NTA3555	3.7Vdc / 1490mAh

3. For the radiated emissions, the EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	**Power from adapter**
Mode B	Power from battery

From the above modes, the worst case was found in **Mode A**. Therefore only the test data of the mode was recorded in this report.

4. The antennas provided to the EUT, please refer to the following table:

WLAN & Bluetooth

Ant No.	Model	Antenna Gain (dBi)	Frequency rang (GHz)	Antenna type	Connector type
1	290-20327	1.6	2.4~2.4835	PIFA	NA
2	C037-511302-A	4.55	2.4~2.4835	PIFA	NA

Note: Ant No. 2 was selected as representative antenna for the final test.

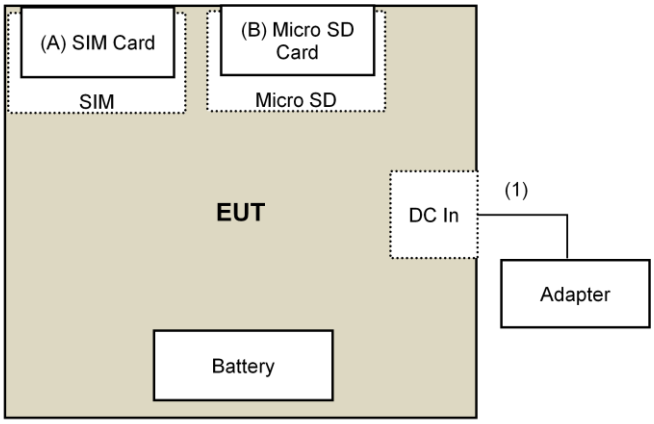
WWAN

Ant No.	Model	Antenna Gain (dBi)	Frequency rang	Antenna type	Connector type	*Cable Length (mm)
1 (Aux)	290-328	0.15	699~894MHz	PCB	i-pex(MHF)	88.7
		5.58	1.71~2.16GHz			
2 (Main)	290-329	0.39	699~894MHz	PCB	i-pex(MHF)	43.7
		4.38	1.71~2.16GHz			

Note: The WWAN mode will fix transmission on Antenna No.: 2.

5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

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.	SIM Card	NA	NA	NA	NA	Provided by Lab
B.	MicroSD Card	Transcend	8GB	NA	NA	Provided by Lab
C.	Simulator	R&S	CMW500	151084	NA	Provided by Lab

Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.2	No	0	Supplied by client

3.3 Test Mode Applicability and Tested Channel Detail

WCDMA IV

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
EIRP	1312 to 1513	1312, 1413, 1513	WCDMA
Frequency Stability	1312 to 1513	1413	WCDMA
Occupied Bandwidth	1312 to 1513	1312, 1413, 1513	WCDMA
Peak to Average Ratio	1312 to 1513	1312, 1413, 1513	WCDMA
Band Edge	1312 to 1513	1312, 1513	WCDMA
Conducted Emission	1312 to 1513	1312, 1413, 1513	WCDMA
Radiated Emission	1312 to 1513	1312, 1413, 1513	WCDMA

Test Condition:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP	25deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin
Frequency Stability	25deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin
Occupied Bandwidth	25deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin
Band Edge	25deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin
Peak to Average Ratio	25deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin
Conducted Emission	25deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin
Radiated Emission Below 1GHz	22deg. C, 63%RH	120Vac, 60Hz	Eason Tseng
Radiated Emission Above 1GHz	22deg. C, 63%RH	120Vac, 60Hz	Eason Tseng

LTE Band 4

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
EIRP	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK / 16QAM	1RB / 0 RB offset
	19965 to 20385	19965, 20175, 20385	3MHz	QPSK / 16QAM	1RB / 0 RB offset
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK / 16QAM	1RB / 0 RB offset
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK / 16QAM	1RB / 0 RB offset
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK / 16QAM	1RB / 0 RB offset
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK / 16QAM	1RB / 0 RB offset
Frequency Stability	19957 to 20393	20175	1.4MHz	QPSK	-
	19965 to 20385	20175	3MHz	QPSK	-
	19975 to 20375	20175	5MHz	QPSK	-
	20000 to 20350	20175	10MHz	QPSK	-
	20025 to 20325	20175	15MHz	QPSK	-
	20050 to 20300	20175	20MHz	QPSK	-
Occupied Bandwidth	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK / 16QAM	Full RB
	19965 to 20385	19965, 20175, 20385	3MHz	QPSK / 16QAM	Full RB
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK / 16QAM	Full RB
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK / 16QAM	Full RB
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK / 16QAM	Full RB
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK / 16QAM	Full RB
Peak to Average Ratio	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK / 16QAM	Full RB
	19965 to 20385	19965, 20175, 20385	3MHz	QPSK / 16QAM	Full RB
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK / 16QAM	Full RB
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK / 16QAM	Full RB
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK / 16QAM	Full RB
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK / 16QAM	Full RB
Band Edge	19957 to 20393	19957	1.4MHz	QPSK	1 RB / 0 RB Offset
		20393			1 RB / 5 RB Offset
		19957, 20393			6 RB / 0 RB Offset
	19965 to 20385	19965	3MHz	QPSK	1 RB / 0 RB Offset
		20385			1 RB / 14 RB Offset
		19965 , 20385			15 RB / 0 RB Offset
	19975 to 20375	19975	5MHz	QPSK	1 RB / 0 RB Offset
		20375			1 RB / 24 RB Offset
		19975, 20375			25 RB / 0 RB Offset
	20000 to 20350	20000	10MHz	QPSK	1 RB / 0 RB Offset
		20350			1 RB / 49 RB Offset
		20000, 20350			50 RB / 0 RB Offset
	20025 to 20325	20025	15MHz	QPSK	1 RB / 0 RB Offset
		20325			1 RB / 74 RB Offset
		20025, 20325			75 RB / 0 RB Offset
	20050 to 20300	20050	20MHz	QPSK	1 RB / 0 RB Offset
		20300			1 RB / 99 RB Offset
		20050, 20300			100 RB / 0 RB Offset

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
Conducted Emission	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK	1 RB / 0 RB Offset
	19965 to 20385	19965, 20175, 20385	3MHz	QPSK	1 RB / 0 RB Offset
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK	1 RB / 0 RB Offset
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK	1 RB / 0 RB Offset
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK	1 RB / 0 RB Offset
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK	1 RB / 0 RB Offset
Radiated Emission	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK	1 RB / 0 RB Offset
	19965 to 20385	19965, 20175, 20385	3MHz	QPSK	1 RB / 0 RB Offset
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK	1 RB / 0 RB Offset
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK	1 RB / 0 RB Offset
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK	1 RB / 0 RB Offset
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK	1 RB / 0 RB Offset

NOTE:
All supported modulation types were evaluated.The Worst case of QPSK was selected. Therefore, the Frequency Stability, Band Edge, Conducted Emission and Radiated Emission were presented under QPSK mode only.

Test Condition:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Frequency Stability	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Occupied Bandwidth	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Band Edge	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Peak to Average Ratio	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Conducted Emission	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Radiated Emission Below 1GHz	25deg. C, 66%RH	120Vac, 60Hz	Eason Tseng
Radiated Emission Above 1GHz	25deg. C, 66%RH	120Vac, 60Hz	Eason Tseng

LTE Band 12

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	23017 to 23173	23017, 23095, 23173	1.4MHz	QPSK	1RB / 0 RB offset
	23025 to 23165	23025, 23095, 23165	3MHz	QPSK	1RB / 0 RB offset
	23035 to 23155	23035, 23095, 23155	5MHz	QPSK	1RB / 0 RB offset
	23060 to 23130	23060, 23095, 23130	10MHz	QPSK	1RB / 0 RB offset
Frequency Stability	23017 to 23173	23095	1.4MHz	QPSK	-
	23025 to 23165	23095	3MHz	QPSK	-
	23035 to 23155	23095	5MHz	QPSK	-
	23060 to 23130	23095	10MHz	QPSK	-
Occupied Bandwidth	23017 to 23173	23017, 23095, 23173	1.4MHz	QPSK / 16QAM	Full RB
	23025 to 23165	23025, 23095, 23165	3MHz	QPSK / 16QAM	Full RB
	23035 to 23155	23035, 23095, 23155	5MHz	QPSK / 16QAM	Full RB
	23060 to 23130	23060, 23095, 23130	10MHz	QPSK / 16QAM	Full RB
Peak to Average Ratio	23017 to 23173	23017, 23095, 23173	1.4MHz	QPSK / 16QAM	Full RB
	23025 to 23165	23025, 23095, 23165	3MHz	QPSK / 16QAM	Full RB
	23035 to 23155	23035, 23095, 23155	5MHz	QPSK / 16QAM	Full RB
	23060 to 23130	23060, 23095, 23130	10MHz	QPSK / 16QAM	Full RB
Band Edge	23017 to 23173	23017	1.4MHz	QPSK	1 RB / 0 RB Offset
		23173			1 RB / 5 RB Offset
		23017, 23173			6 RB / 0 RB Offset
	23025 to 23165	23025	3MHz	QPSK	1 RB / 0 RB Offset
		23165			1 RB / 14 RB Offset
		23025, 23165			15 RB / 0 RB Offset
	23035 to 23155	23035	5MHz	QPSK	1 RB / 0 RB Offset
		23155			1 RB / 24 RB Offset
		23035, 23155			25 RB / 0 RB Offset
	23060 to 23130	23060	10MHz	QPSK	1 RB / 0 RB Offset
		23155			1 RB / 49 RB Offset
		23060, 23155			50 RB / 0 RB Offset
Conducted Emission	23017 to 23173	23017, 23095, 23173	1.4MHz	QPSK	1RB / 0 RB offset
	23025 to 23165	23025, 23095, 23165	3MHz	QPSK	1RB / 0 RB offset
	23035 to 23155	23035, 23095, 23155	5MHz	QPSK	1RB / 0 RB offset
	23060 to 23130	23060, 23095, 23130	10MHz	QPSK	1RB / 0 RB offset
Radiated Emission	23017 to 23173	23017, 23095, 23173	1.4MHz	QPSK	1RB / 0 RB offset
	23025 to 23165	23025, 23095, 23165	3MHz	QPSK	1RB / 0 RB offset
	23035 to 23155	23035, 23095, 23155	5MHz	QPSK	1RB / 0 RB offset
	23060 to 23130	23060, 23095, 23130	10MHz	QPSK	1RB / 0 RB offset

NOTE:
All supported modulation types were evaluated.The Worst case of QPSK was selected. Therefore, the Output power, Frequency Stability, Band Edge, Conducted Emission and Radiated Emission were presented under QPSK mode only.

Test Condition:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
ERP	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Frequency Stability	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Occupied Bandwidth	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Band Edge	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Peak to Average Ratio	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Conducted Emission	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Radiated Emission Below 1GHz	25deg. C, 66%RH	120Vac, 60Hz	Eason Tseng
Radiated Emission Above 1GHz	25deg. C, 66%RH	120Vac, 60Hz	Eason 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 v03

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

NOTE: 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

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Portable stations (hand-held devices) operating in the 698-787 MHz band are limited to 3 watts ERP.

4.1.2 Test Procedures

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

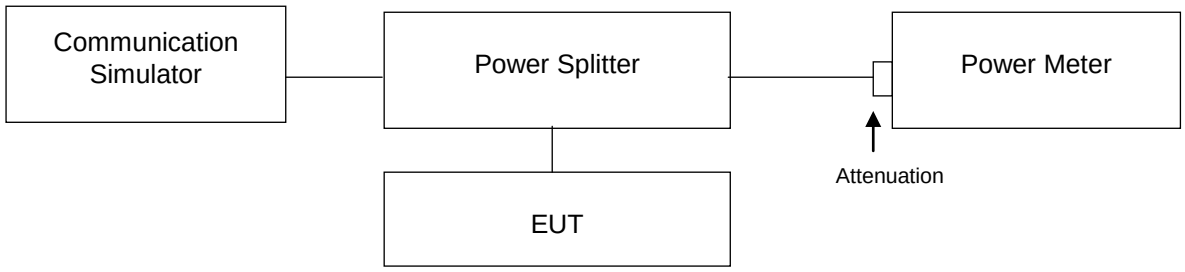
Conducted Power Measurement:

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

EIRP / ERP Measurement:

1. EIRP = Conducted output power level + Antenna gain
2. ERP power = EIRP power - 2.15dBi.

4.1.3 Test Setup



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

4.1.4 Test Results

CONDUCTED OUTPUT POWER (dBm)

WCDMA B4

Band	WCDMA IV		
Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
RMC	22.32	23.39	23.38
HSDPA Subtest-1	21.54	21.59	21.59
HSDPA Subtest-2	21.92	21.97	21.97
HSDPA Subtest-3	21.43	21.50	21.50
HSDPA Subtest-4	21.42	21.48	21.49
HSUPA Subtest-1	20.31	20.66	20.61
HSUPA Subtest-2	21.12	21.48	21.42
HSUPA Subtest-3	20.54	20.87	20.84
HSUPA Subtest-4	18.84	19.18	19.15
HSUPA Subtest-5	20.93	21.29	21.24

LTE Band 4

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			19957	20175	20393		19957	20175	20393	
			1710.7	1732.5	1754.3		1710.7	1732.5	1754.3	
			MHz	MHz	MHz		MHz	MHz	MHz	
4 / 1.4M	1	0	22.79	22.94	22.75	0	22.64	21.97	22.65	1
	1	2	22.72	22.55	22.57	0	22.55	21.77	22.24	1
	1	5	22.82	22.54	22.71	0	22.47	21.78	21.76	1
	3	0	22.85	22.77	22.46	0	22.19	21.85	22.45	1
	3	1	22.79	22.65	22.68	0	21.96	21.72	22.19	1
	3	3	22.71	22.83	22.67	0	21.92	21.94	22.37	1
	6	0	21.59	21.58	21.49	1	20.76	20.53	20.72	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			19965	20175	20385		19965	20175	20385	
			1711.5	1732.5	1753.5		1711.5	1732.5	1753.5	
			MHz	MHz	MHz		MHz	MHz	MHz	
4 / 3M	1	0	22.81	22.64	22.56	0	22.06	22.04	22.07	1
	1	7	22.79	22.57	22.48	0	21.85	21.50	21.52	1
	1	14	22.74	22.52	22.54	0	21.89	21.83	21.69	1
	8	0	21.72	21.53	21.47	1	20.83	20.64	20.68	2
	8	3	21.74	21.47	21.65	1	20.63	20.57	20.66	2
	8	7	21.59	21.53	21.57	1	20.57	20.55	20.57	2
	15	0	21.64	21.43	21.43	1	20.76	20.53	20.60	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			19975	20175	20375		19975	20175	20375	
			1712.5	1732.5	1752.5		1712.5	1732.5	1752.5	
			MHz	MHz	MHz		MHz	MHz	MHz	
4 / 5M	1	0	22.87	22.71	22.58	0	21.97	21.84	21.71	1
	1	12	22.80	22.47	22.46	0	21.82	21.51	21.60	1
	1	24	22.69	22.43	22.51	0	21.70	21.40	21.46	1
	12	0	21.75	21.54	21.53	1	20.85	20.65	20.67	2
	12	6	21.69	21.49	21.50	1	20.54	20.62	20.55	2
	12	13	21.63	21.51	21.54	1	20.73	20.52	20.61	2
	25	0	21.59	21.58	21.60	1	20.57	20.68	20.54	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			20000	20175	20350		20000	20175	20350	
			1715	1732.5	1750		1715	1732.5	1750	
			MHz	MHz	MHz		MHz	MHz	MHz	
4 / 10M	1	0	23.03	22.90	22.62	0	22.52	22.38	21.75	1
	1	24	22.76	22.47	22.52	0	21.81	21.71	21.63	1
	1	49	22.75	22.42	22.48	0	22.25	22.02	21.72	1
	25	0	21.79	21.55	21.58	1	20.97	20.84	20.60	2
	25	12	21.70	21.47	21.62	1	20.80	20.62	20.58	2
	25	25	21.64	21.41	21.49	1	20.63	20.56	20.60	2
	50	0	21.76	21.54	21.42	1	20.82	20.62	20.56	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			20025	20175	20325		20025	20175	20325	
			1717.5	1732.5	1747.5		1717.5	1732.5	1747.5	
			MHz	MHz	MHz		MHz	MHz	MHz	
4 / 15M	1	0	23.15	23.03	22.94	0	22.38	22.48	22.04	1
	1	37	22.88	22.71	22.59	0	22.24	21.72	22.01	1
	1	74	22.59	22.50	22.47	0	21.67	21.44	22.02	1
	36	0	21.89	21.71	21.67	1	20.94	20.93	20.69	2
	36	19	21.72	21.54	21.50	1	20.65	20.64	20.56	2
	36	39	21.68	21.49	21.45	1	20.65	20.54	20.50	2
	75	0	21.81	21.58	21.68	1	20.79	20.60	20.59	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			20050	20175	20300		20050	20175	20300	
			1720	1732.5	1745		1720	1732.5	1745	
			MHz	MHz	MHz		MHz	MHz	MHz	
4 / 20M	1	0	23.10	22.97	22.95	0	22.29	22.20	22.32	1
	1	50	22.77	22.49	22.34	0	22.22	22.02	21.69	1
	1	99	22.34	22.05	22.39	0	21.39	21.14	21.55	1
	50	0	21.97	21.75	21.77	1	21.03	20.82	20.86	2
	50	25	21.69	21.59	21.46	1	20.67	20.57	20.54	2
	50	50	21.47	21.41	21.44	1	20.68	20.51	20.51	2
	100	0	21.85	21.69	21.63	1	20.81	20.58	20.52	2

LTE Band 12

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			23017	23095	23173		23017	23095	23173	
			699.7	707.5	715.3		699.7	707.5	715.3	
			MHz	MHz	MHz		MHz	MHz	MHz	
12 / 1.4M	1	0	24.59	24.56	24.46	0	24.14	23.75	23.99	1
	1	2	24.49	24.53	24.38	0	23.72	23.41	23.59	1
	1	5	24.51	24.50	24.40	0	23.94	23.56	23.75	1
	3	0	24.58	24.51	24.39	0	23.66	23.57	23.45	1
	3	1	24.54	24.39	24.34	0	23.40	23.61	23.40	1
	3	3	24.53	24.47	24.37	0	23.69	23.65	23.56	1
	6	0	23.55	23.32	23.30	1	22.56	22.56	22.21	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			23025	23095	23165		23025	23095	23165	
			700.5	707.5	714.5		700.5	707.5	714.5	
			MHz	MHz	MHz		MHz	MHz	MHz	
12 / 3M	1	0	24.68	24.54	24.46	0	23.93	24.02	23.77	1
	1	7	24.59	24.34	24.41	0	23.77	23.73	23.37	1
	1	14	24.49	24.29	24.32	0	23.65	23.52	23.56	1
	8	0	23.48	23.33	23.32	1	22.58	22.37	22.22	2
	8	3	23.51	23.36	23.38	1	22.58	22.55	22.42	2
	8	7	23.46	23.28	23.26	1	22.65	22.51	22.37	2
	15	0	23.45	23.37	23.23	1	22.76	22.69	22.35	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			23035	23095	23155		23035	23095	23155	
			701.5	707.5	713.5		701.5	707.5	713.5	
			MHz	MHz	MHz		MHz	MHz	MHz	
12 / 5M	1	0	24.52	24.50	24.40	0	23.99	24.01	23.55	1
	1	12	24.48	24.46	24.37	0	23.67	23.99	23.50	1
	1	24	24.50	24.40	24.30	0	23.86	23.49	23.43	1
	12	0	23.56	23.40	23.29	1	22.50	22.53	22.32	2
	12	6	23.46	23.35	23.32	1	22.59	22.29	22.29	2
	12	13	23.49	23.34	23.30	1	22.50	22.42	22.37	2
	25	0	23.36	23.39	23.26	1	22.43	22.43	22.27	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			23060	23095	23130		23060	23095	23130	
			704	707.5	711		704	707.5	711	
			MHz	MHz	MHz		MHz	MHz	MHz	
12 / 10M	1	0	24.40	24.48	24.49	0	23.86	23.67	23.82	1
	1	24	24.39	24.44	24.35	0	23.83	23.62	23.74	1
	1	49	24.32	24.33	24.35	0	23.67	23.35	23.62	1
	25	0	23.54	23.45	23.35	1	22.40	22.40	22.31	2
	25	12	23.38	23.34	23.26	1	22.51	22.41	22.32	2
	25	25	23.52	23.40	23.31	1	22.43	22.55	22.34	2
	50	0	23.49	23.33	23.41	1	22.43	22.36	22.28	2

EIRP/ERP POWER

WCDMA

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	EIRP(dBm)	EIRP(mW)	Pass /Fail	Setting
1312	1712.4	24.62	4.38	29.00	794.33	Pass	Max
1413	1732.6	24.39	4.38	28.77	753.36	Pass	Max
1513	1752.6	24.48	4.38	28.86	769.13	Pass	Max

LTE Band 4

QPSK

1.4MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	EIRP(dBm)	EIRP(mW)	Pass /Fail	Setting
19957	1710.7	22.79	4.38	27.17	521.19	Pass	Max
20175	1732.5	22.94	4.38	27.32	539.51	Pass	Max
20393	1754.3	22.75	4.38	27.13	516.42	Pass	Max

3MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	EIRP(dBm)	EIRP(mW)	Pass /Fail	Setting
19957	1711.5	22.81	4.38	27.19	523.60	Pass	Max
20175	1732.5	22.64	4.38	27.02	503.50	Pass	Max
20385	1753.5	22.56	4.38	26.94	494.31	Pass	Max

5MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	EIRP(dBm)	EIRP(mW)	Pass /Fail	Setting
19975	1712.5	22.87	4.38	27.25	530.88	Pass	Max
20175	1732.5	22.71	4.38	27.09	511.68	Pass	Max
20375	1752.5	22.58	4.38	26.96	496.59	Pass	Max

10MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	EIRP(dBm)	EIRP(mW)	Pass /Fail	Setting
20000	1715	23.03	4.38	27.41	550.81	Pass	Max
20175	1732.5	22.90	4.38	27.28	534.56	Pass	Max
20350	1750	22.62	4.38	27.00	501.19	Pass	Max

15MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	EIRP(dBm)	EIRP(mW)	Pass /Fail	Setting
20025	1717.5	23.15	4.38	27.53	566.24	Pass	Max
20175	1732.5	23.03	4.38	27.41	550.81	Pass	Max
20325	1747.5	22.94	4.38	27.32	539.51	Pass	Max

20MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	EIRP(dBm)	EIRP(mW)	Pass /Fail	Setting
20050	1720	23.10	4.38	27.48	559.76	Pass	Max
20175	1732.5	22.97	4.38	27.35	543.25	Pass	Max
20300	1745	22.95	4.38	27.33	540.75	Pass	Max

16QAM

1.4MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	EIRP(dBm)	EIRP(mW)	Pass /Fail	Setting
19957	1710.7	22.64	4.38	27.02	503.50	Pass	Max
20175	1732.5	21.97	4.38	26.35	431.52	Pass	Max
20393	1754.3	22.65	4.38	27.03	504.66	Pass	Max

3MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	EIRP(dBm)	EIRP(mW)	Pass /Fail	Setting
19957	1711.5	22.06	4.38	26.44	440.55	Pass	Max
20175	1732.5	22.04	4.38	26.42	438.53	Pass	Max
20385	1753.5	22.07	4.38	26.45	441.57	Pass	Max

5MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	EIRP(dBm)	EIRP(mW)	Pass /Fail	Setting
19975	1712.5	21.97	4.38	26.35	431.52	Pass	Max
20175	1732.5	21.84	4.38	26.22	418.79	Pass	Max
20375	1752.5	21.71	4.38	26.09	406.44	Pass	Max

10MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	EIRP(dBm)	EIRP(mW)	Pass /Fail	Setting
20000	1715	22.52	4.38	26.90	489.78	Pass	Max
20175	1732.5	22.38	4.38	26.76	474.24	Pass	Max
20350	1750	21.75	4.38	26.13	410.20	Pass	Max

15MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	EIRP(dBm)	EIRP(mW)	Pass /Fail	Setting
20025	1717.5	22.38	4.38	26.76	474.24	Pass	Max
20175	1732.5	22.48	4.38	26.86	485.29	Pass	Max
20325	1747.5	22.04	4.38	26.42	438.53	Pass	Max

20MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	EIRP(dBm)	EIRP(mW)	Pass /Fail	Setting
20050	1720	22.29	4.38	26.67	464.52	Pass	Max
20175	1732.5	22.20	4.38	26.58	454.99	Pass	Max
20300	1745	22.32	4.38	26.70	467.74	Pass	Max

LTE Band 12

QPSK

1.4MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	ERP(dBm)	ERP(mW)	Pass /Fail	Setting
20017	699.7	24.59	0.39	22.83	191.87	Pass	Max
23095	707.5	24.56	0.39	22.80	190.55	Pass	Max
23173	715.3	24.46	0.39	22.70	186.21	Pass	Max

3MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	ERP(dBm)	ERP(mW)	Pass /Fail	Setting
23025	700.5	24.68	0.39	22.92	195.88	Pass	Max
23095	707.5	24.54	0.39	22.78	189.67	Pass	Max
23165	714.5	24.46	0.39	22.70	186.21	Pass	Max

5MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	ERP(dBm)	ERP(mW)	Pass /Fail	Setting
23035	701.5	24.52	0.39	22.76	188.80	Pass	Max
23095	707.5	24.50	0.39	22.74	187.93	Pass	Max
23155	713.5	24.40	0.39	22.64	183.65	Pass	Max

10MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	ERP(dBm)	ERP(mW)	Pass /Fail	Setting
23060	704	24.40	0.39	22.64	183.65	Pass	Max
23095	707.5	24.48	0.39	22.72	187.07	Pass	Max
23130	711	24.49	0.39	22.73	187.50	Pass	Max

16QAM

1.4MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	ERP(dBm)	ERP(mW)	Pass /Fail	Setting
20017	699.7	24.14	0.39	22.38	172.98	Pass	Max
23095	707.5	23.75	0.39	21.99	158.12	Pass	Max
23173	715.3	23.99	0.39	22.23	167.11	Pass	Max

3MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	ERP(dBm)	ERP(mW)	Pass /Fail	Setting
23025	700.5	23.93	0.39	22.17	164.82	Pass	Max
23095	707.5	24.02	0.39	22.26	168.27	Pass	Max
23165	714.5	23.77	0.39	22.01	158.85	Pass	Max

5MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	ERP(dBm)	ERP(mW)	Pass /Fail	Setting
23035	701.5	23.99	0.39	22.23	167.11	Pass	Max
23095	707.5	24.01	0.39	22.25	167.88	Pass	Max
23155	713.5	23.55	0.39	21.79	151.01	Pass	Max

10MHz

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	ERP(dBm)	ERP(mW)	Pass /Fail	Setting
23060	704	23.86	0.39	22.10	162.18	Pass	Max
23095	707.5	23.67	0.39	21.91	155.24	Pass	Max
23130	711	23.82	0.39	22.06	160.69	Pass	Max

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 102 to 138 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT -30℃ ~ 75℃.

4.2.2 Test Procedure

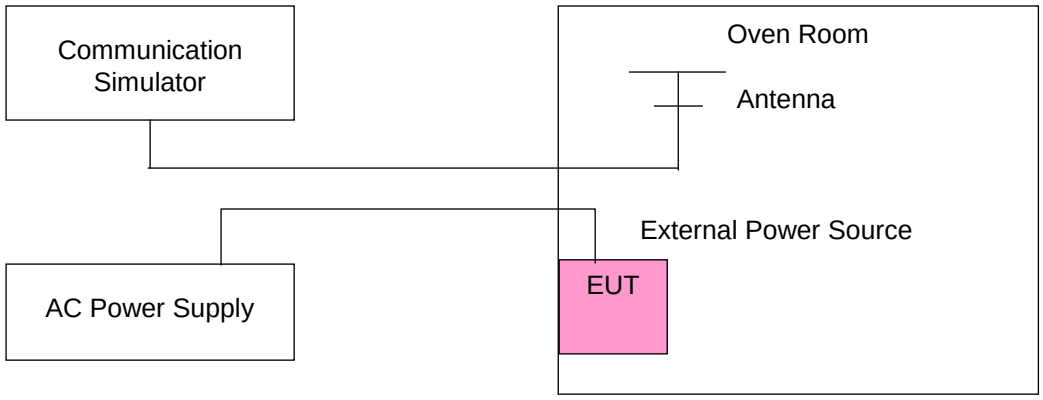
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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

WCDMA IV

Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (MHz)
	WCDMA
102	1732.600035
138	1732.600024

Frequency Error vs. Temperature.

TEMP. (℃)	Frequency Error (MHz)
	WCDMA
75	1732.600049
70	1732.600022
60	1732.600030
50	1732.600028
40	1732.600044
30	1732.600023
20	1732.600046
10	1732.600026
0	1732.600049
-10	1732.600036
-20	1732.600023
-30	1732.600043

LTE Band 4

Voltage (Volts)	Frequency Error (MHz)					
	1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz
102	1732.500025	1732.500047	1732.500042	1732.500023	1732.500023	1732.500034
138	1732.500022	1732.500025	1732.500049	1732.500021	1732.500028	1732.500029

TEMP. (℃)	Frequency Error (MHz)					
	1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz
75	1732.500023	1732.500041	1732.500020	1732.500048	1732.500021	1732.500021
70	1732.500035	1732.500020	1732.500023	1732.500026	1732.500020	1732.500036
60	1732.500025	1732.500041	1732.500026	1732.500020	1732.500034	1732.500039
50	1732.500033	1732.500046	1732.500037	1732.500047	1732.500039	1732.500026
40	1732.500043	1732.500039	1732.500026	1732.500022	1732.500036	1732.500042
30	1732.500047	1732.500030	1732.500020	1732.500035	1732.500022	1732.500045
20	1732.500031	1732.500029	1732.500037	1732.500024	1732.500027	1732.500038
10	1732.500044	1732.500022	1732.500040	1732.500036	1732.500027	1732.500036
0	1732.500044	1732.500021	1732.500041	1732.500025	1732.500035	1732.500037
-10	1732.500031	1732.500035	1732.500035	1732.500025	1732.500024	1732.500043
-20	1732.500042	1732.500049	1732.500030	1732.500027	1732.500020	1732.500030
-30	1732.500039	1732.500034	1732.500045	1732.500045	1732.500027	1732.500022

LTE Band 12

Voltage (Volts)	Frequency Error (MHz)			
	1.4MHz	3MHz	5MHz	10MHz
102	707.500041	707.500049	707.500049	707.500035
138	707.500032	707.500028	707.500040	707.500022

TEMP. (℃)	Frequency Error (MHz)			
	1.4MHz	3MHz	5MHz	10MHz
75	707.500040	707.500041	707.500028	707.500024
70	707.500044	707.500047	707.500022	707.500041
60	707.500042	707.500027	707.500044	707.500046
50	707.500028	707.500027	707.500023	707.500031
40	707.500033	707.500036	707.500034	707.500021
30	707.500047	707.500033	707.500041	707.500035
20	707.500023	707.500039	707.500023	707.500020
10	707.500032	707.500039	707.500035	707.500021
0	707.500046	707.500040	707.500045	707.500032
-10	707.500027	707.500043	707.500046	707.500039
-20	707.500036	707.500032	707.500038	707.500022
-30	707.500000	707.500032	707.500021	707.500026

4.3 Emission Bandwidth Measurement

4.3.1 Limits of Emission Bandwidth Measurement

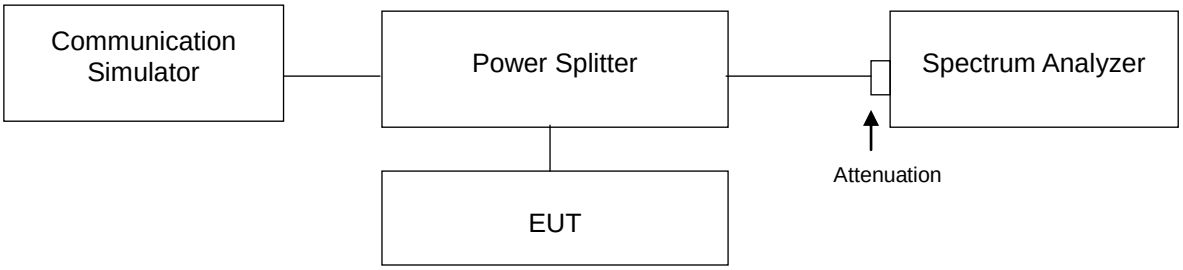
-26dBc Bandwidth
According to FCC 27.53 specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

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≥1% x OBW and VBW≥3 x VBW.

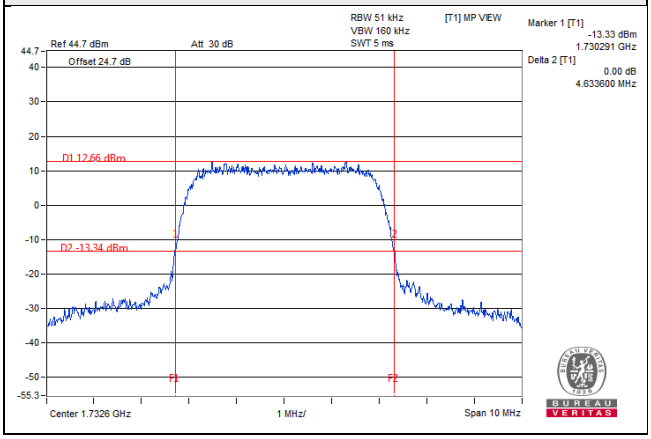
4.3.3 Test Setup



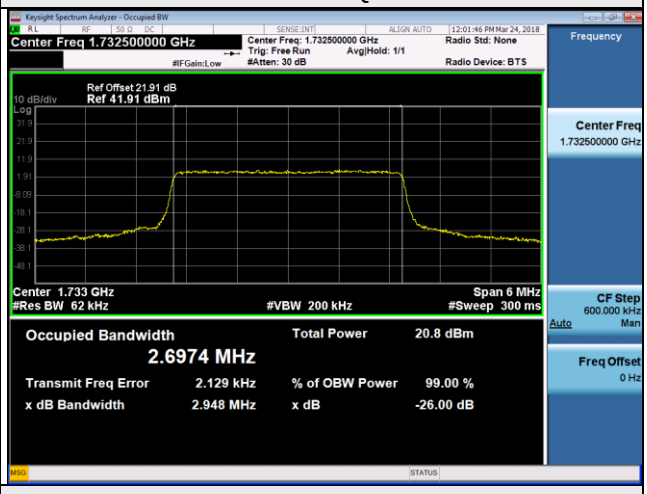
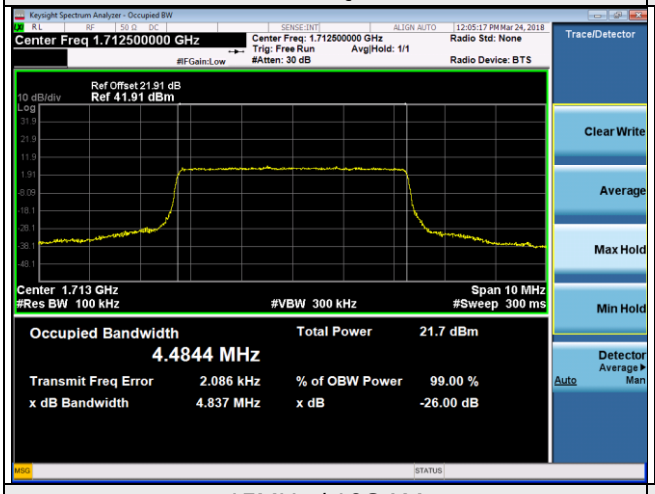
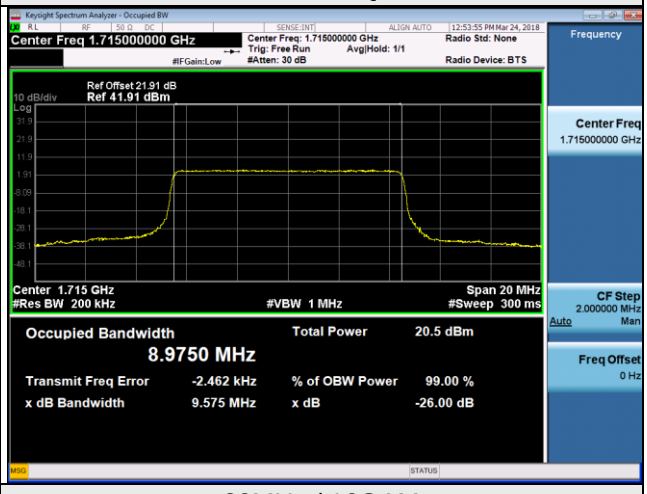
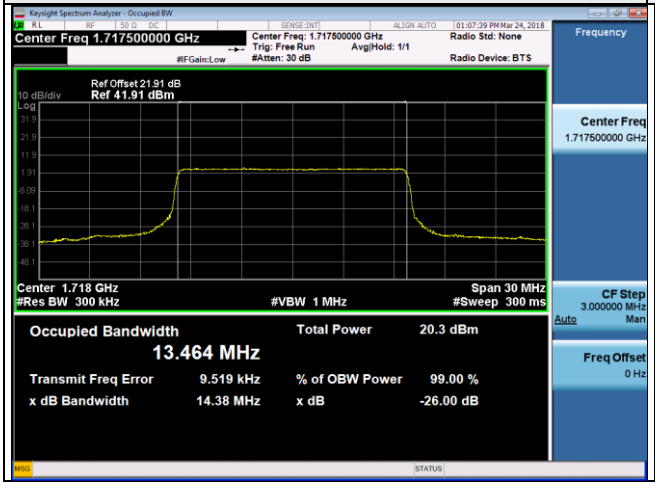
4.3.4 Test Results (-26dBc Bandwidth)

Channel	FREQ. (MHz)	-26dB Bandwidth (MHz)
		WCDMA IV
1312	1712.4	4.60
1413	1732.6	4.63
1513	1752.6	4.61

Spectrum Plot of Worst Value
WCDMA



LTE Band 4							
Channel Bandwidth 1.4MHz				Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		Channel	Frequency (MHz)	-26dB Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	1.30	1.30	19965	1711.5	2.92	2.94
20175	1732.5	1.31	1.30	20175	1732.5	2.92	2.95
20393	1754.3	1.29	1.29	20385	1753.5	2.93	2.93
Channel Bandwidth 5MHz				Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		Channel	Frequency (MHz)	-26dB Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	4.84	4.81	20000	1715	9.51	9.58
20175	1732.5	4.84	4.82	20175	1732.5	9.54	9.56
20375	1752.5	4.82	4.82	20350	1750	9.56	9.57
Channel Bandwidth 15MHz				Channel Bandwidth 20MHz			
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		Channel	Frequency (MHz)	-26dB Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	14.31	14.38	20050	1720	19.06	19.11
20175	1732.5	14.29	14.32	20175	1732.5	19.08	19.03
20325	1747.5	14.32	14.34	20300	1745	19.10	19.05

Spectrum Plot of Worst Value	
1.4MHz / QPSK	3MHz / 16QAM
	
5MHz / QPSK	10MHz / 16QAM
	
15MHz / 16QAM	20MHz / 16QAM
	

LTE Band 12							
Channel Bandwidth 1.4MHz				Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		Channel	Frequency (MHz)	-26dB Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
23017	699.7	1.29	1.29	23025	700.5	2.93	2.96
23095	707.5	1.29	1.26	23095	707.5	2.92	2.92
23173	715.3	1.28	1.28	23165	714.5	2.91	2.94
Channel Bandwidth 5MHz				Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		Channel	Frequency (MHz)	-26dB Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
23035	701.5	4.80	4.80	23060	704	9.50	9.51
23095	707.5	4.83	4.82	23095	707.5	9.52	9.54
23155	713.5	4.82	4.82	23130	711	9.58	9.59

Spectrum Plot of Worst Value

1.4MHz / QPSK

3MHz / 16QAM

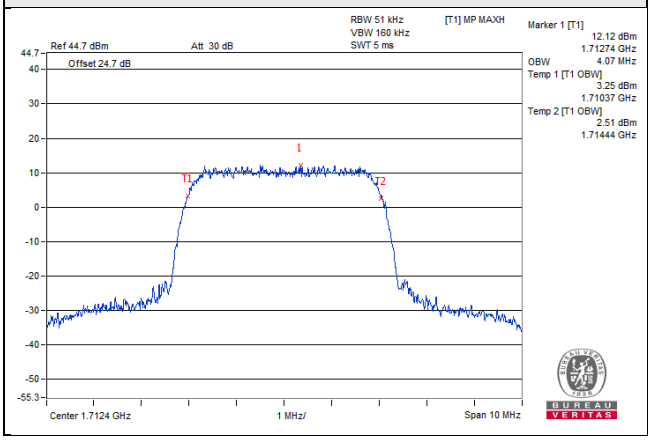
5MHz / QPSK

10MHz / 16QAM

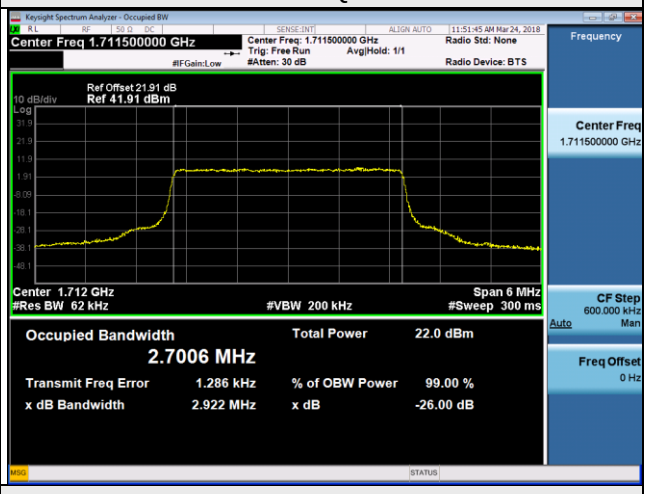
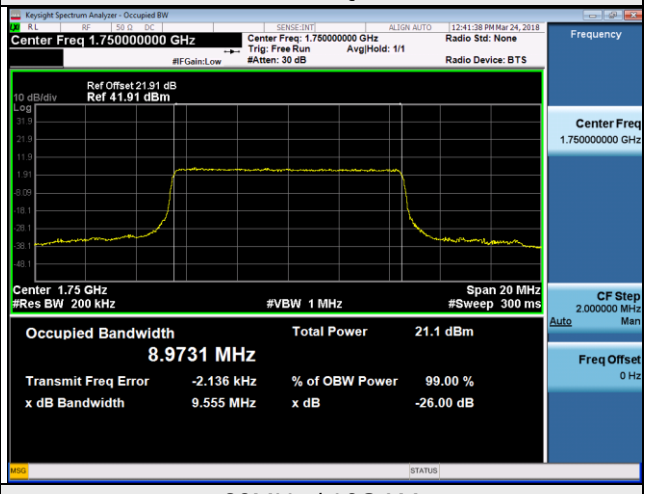
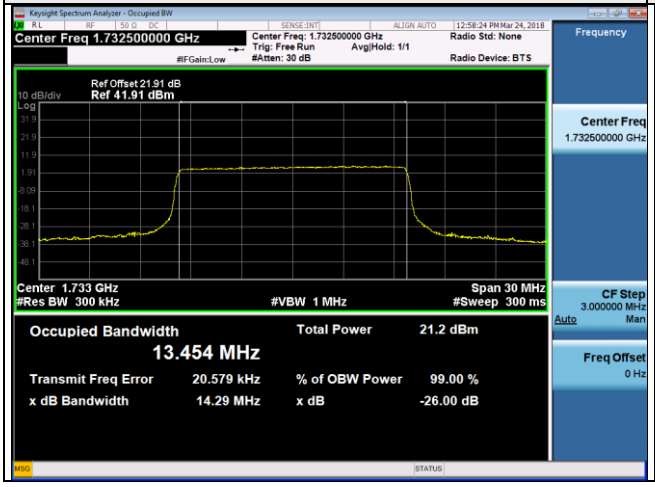
4.3.5 Test Results (Occupied Bandwidth)

Channel	FREQ. (MHz)	Occupied Bandwidth (MHz)
		WCDMA
1312	1712.4	4.07
1413	1732.6	4.07
1513	1752.6	4.07

Spectrum Plot of Worst Value
WCDMA



LTE Band 4							
Channel Bandwidth 1.4MHz				Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	1.09	1.09	19965	1711.5	2.70	2.70
20175	1732.5	1.09	1.09	20175	1732.5	2.70	2.70
20393	1754.3	1.09	1.09	20385	1753.5	2.70	2.70
Channel Bandwidth 5MHz				Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	4.48	4.49	20000	1715	8.96	8.97
20175	1732.5	4.49	4.49	20175	1732.5	8.97	8.97
20375	1752.5	4.49	4.49	20350	1750	8.98	8.98
Channel Bandwidth 15MHz				Channel Bandwidth 20MHz			
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	13.42	13.44	20050	1720	17.90	17.92
20175	1732.5	13.48	13.46	20175	1732.5	17.97	17.98
20325	1747.5	13.42	13.46	20300	1745	17.94	17.96

Spectrum Plot of Worst Value	
1.4MHz / QPSK	3MHz / QPSK
	
5MHz / 16QAM	10MHz / QPSK
	
15MHz / QPSK	20MHz / 16QAM
	

LTE Band 12							
Channel Bandwidth 1.4MHz				Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
23017	699.7	1.09	1.09	23025	700.5	2.70	2.70
23095	707.5	1.09	1.09	23095	707.5	2.70	2.70
23173	715.3	1.09	1.09	23165	714.5	2.70	2.69
Channel Bandwidth 5MHz				Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
23035	701.5	4.47	4.48	23060	704	8.94	8.94
23095	707.5	4.49	4.49	23095	707.5	8.98	8.98
23155	713.5	4.49	4.48	23130	711	8.99	8.99

Spectrum Plot of Worst Value

1.4MHz / QPSK

3MHz / QPSK

5MHz / QPSK

10MHz / QPSK

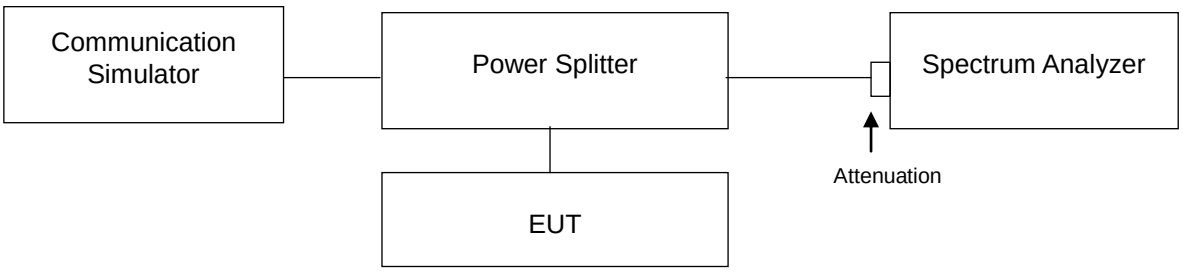
4.4 Channel Edge Measurement

4.4.1 Limits of Channel Edge Measurement

According to FCC 27.53(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

According to FCC 27.53(h) AWS emission limits— General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

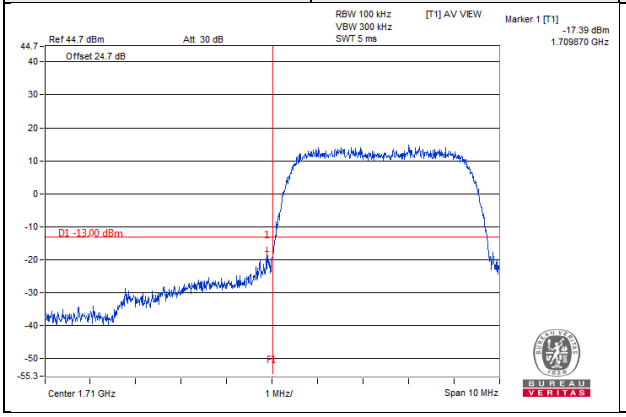
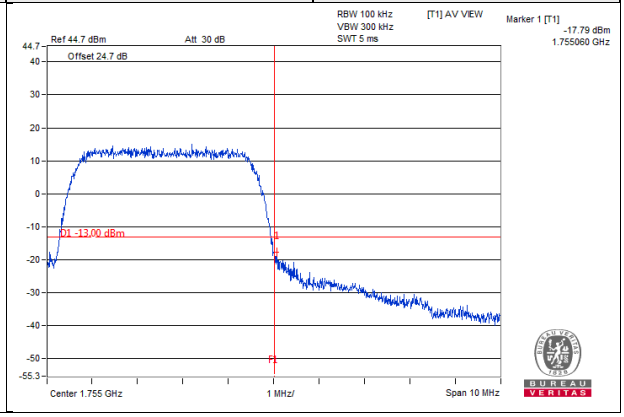
4.4.2 Test Setup



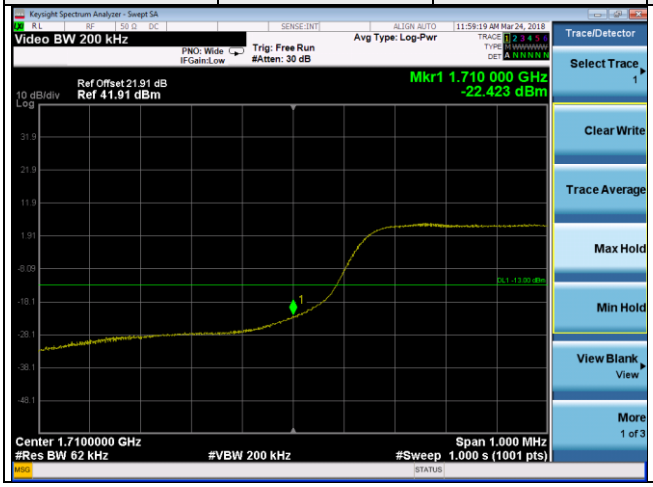
4.4.3 Test Procedures

a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency and s RB of the spectrum is >1% emission bandwidth and VB of the spectrum is ≧ 3*RB.
c. Record the max trace plot into the test report.

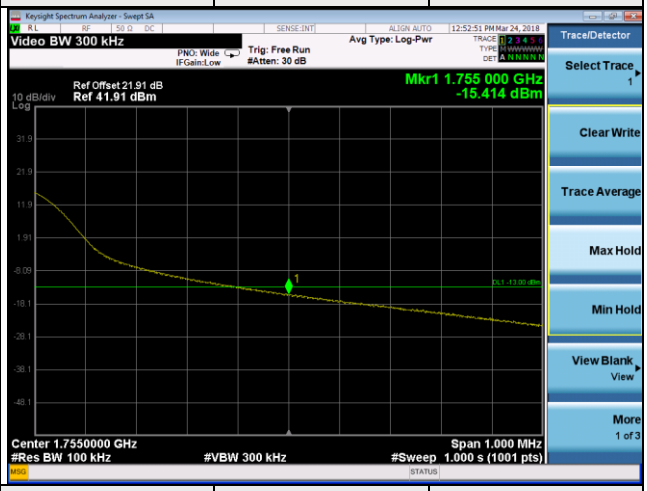
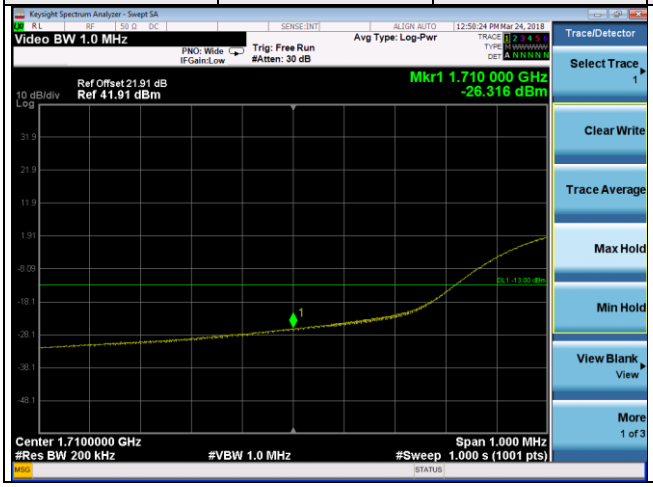
4.4.4 Test Results

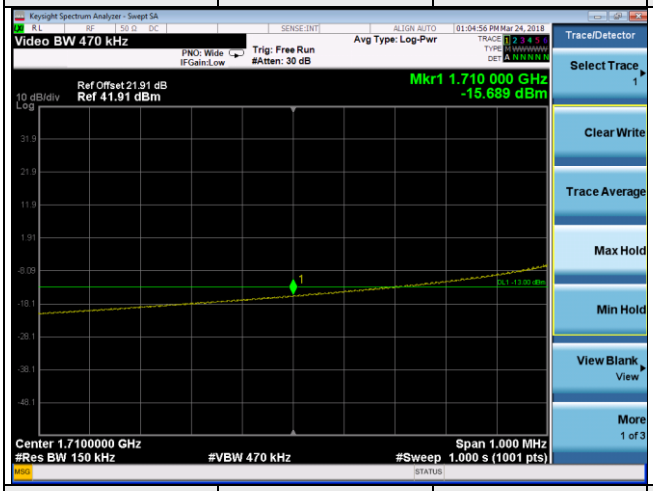
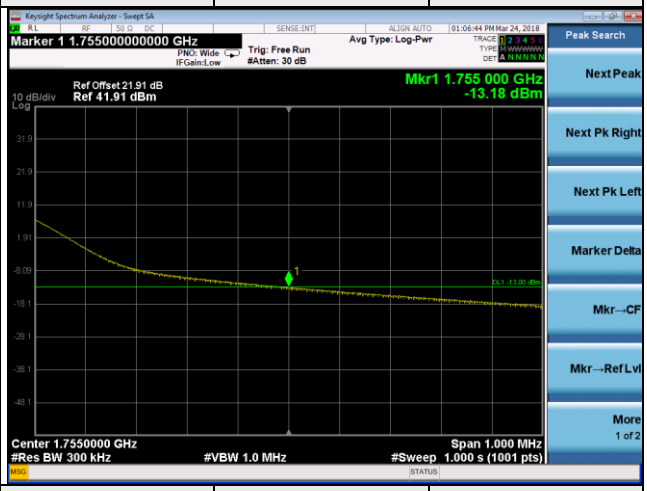
WCDMA Band 4			
Channel	1312	Channel	1513
			

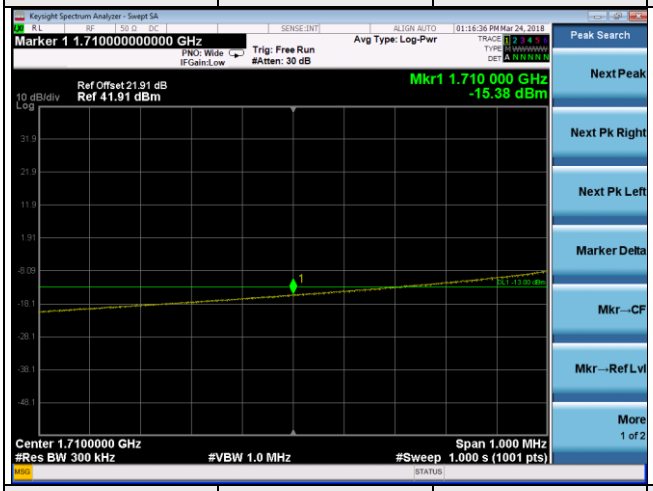
LTE Band 4					
Channel Bandwidth 1.4MHz					
Channel	19957	1 RB	Channel	20393	1 RB
					
Channel	19957	6 RB	Channel	20393	6 RB
					

LTE Band 4					
Channel Bandwidth 3MHz					
Channel	19965	1 RB	Channel	20385	1 RB
					
Channel	19965	15 RB	Channel	20385	15 RB
					

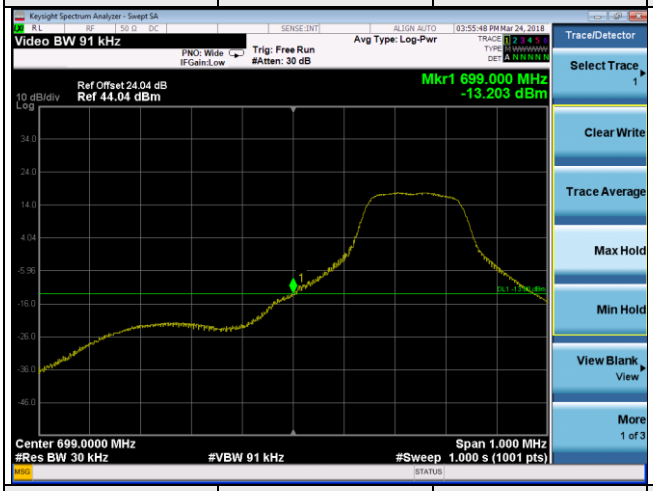
LTE Band 4					
Channel Bandwidth 5MHz					
Channel	19975	1 RB	Channel	20375	1 RB
					
Channel	19975	25 RB	Channel	20375	25 RB
					

LTE Band 4					
Channel Bandwidth 10MHz					
Channel	20000	1 RB	Channel	20350	1 RB
					
Channel	20000	50 RB	Channel	20350	50 RB
					

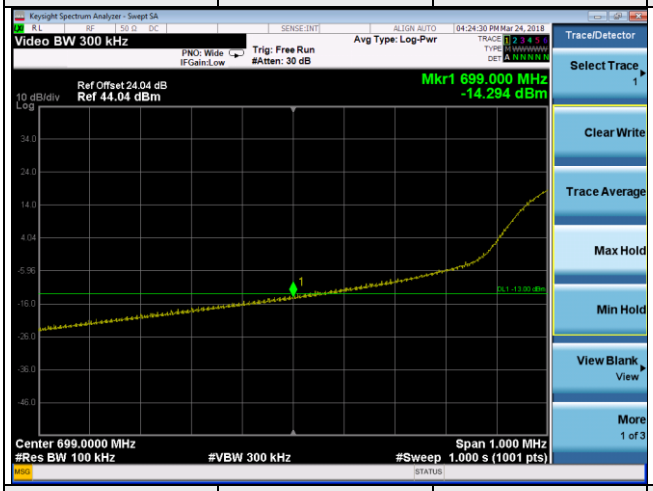
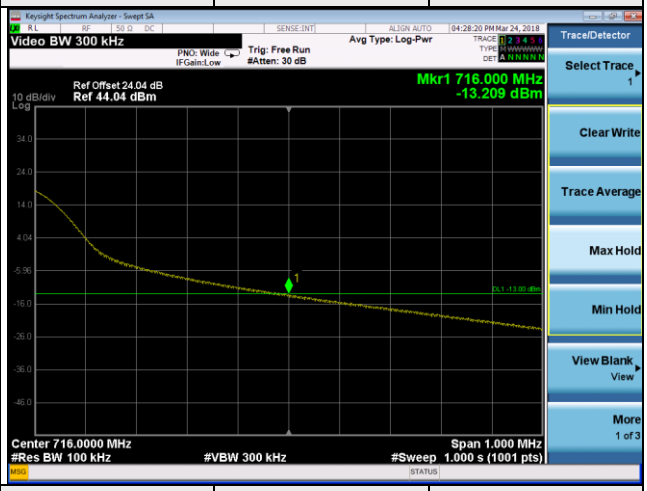
LTE Band 4					
Channel Bandwidth 15MHz					
Channel	20025	1 RB	Channel	20325	1 RB
					
Channel	20025	75 RB	Channel	20325	75 RB
					

LTE Band 4					
Channel Bandwidth 20MHz					
Channel	20050	1 RB	Channel	20300	1 RB
					
Channel	20050	100 RB	Channel	20300	100 RB
					

LTE Band 12					
Channel Bandwidth 1.4MHz					
Channel	23017	1 RB	Channel	23173	1 RB
					
Channel	23017	6 RB	Channel	23173	6 RB
					

LTE Band 12					
Channel Bandwidth 3MHz					
Channel	23025	1 RB	Channel	23165	1 RB
					
Channel	23025	15 RB	Channel	23165	15 RB
					

LTE Band 12					
Channel Bandwidth 5MHz					
Channel	23035	1 RB	Channel	23155	1 RB
					
Channel	23035	25 RB	Channel	23155	25 RB
					

LTE Band 12					
Channel Bandwidth 10MHz					
Channel	23060	1 RB	Channel	23155	1 RB
					
Channel	23060	50 RB	Channel	23155	50 RB