

	 MS ISO/IEC 17025 TESTING SMM No. 0825																										
MOTOROLA PENANG ADV. COMM. LABORATORY Motorola Solutions Malaysia Sdn Bhd, Innoplex Plot 2A, Medan Bayan Lepas, Mukim 12 S.W.D, 11900 Bayan Lepas, Penang, Malaysia.	FCC / ISED TEST REPORT Report Revision : Rev.A																										
<table><tr><td>Date/s Tested</td><td>: 27-Dec-2018 - 23-Jan-2019</td></tr><tr><td>Manufacturer/Location</td><td>: Motorola Solutions - Schaumburg</td></tr><tr><td>Requestor</td><td>: HOPKINS, SEAN</td></tr><tr><td>Product Type</td><td>: Hand-held</td></tr><tr><td>Product Version (PMN)</td><td>: P1B</td></tr><tr><td>Model Number (HVIN)</td><td>: H55TGT9PW8AN</td></tr><tr><td>Frequency Band</td><td>: Refer to section 1.4</td></tr><tr><td>Applicant Name</td><td>: Motorola Solutions, Inc</td></tr><tr><td>Applicant Address</td><td>: 8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322</td></tr><tr><td>FCC Registrations</td><td>: 461337</td></tr><tr><td>ISED Registrations</td><td>: 109AK</td></tr><tr><td>Firmware Version (FVIN)</td><td>: D00.00.31</td></tr></table> The equipment was tested accordance to the requirement listed below: <table><tr><td>(LTE Band 12) FCC 47 CFR Part 2 / 27 ISED RSS GEN Issue 5, April 2018 ISED RSS 130 Issue 1, October 2013</td><td>PASS</td></tr></table> 		Date/s Tested	: 27-Dec-2018 - 23-Jan-2019	Manufacturer/Location	: Motorola Solutions - Schaumburg	Requestor	: HOPKINS, SEAN	Product Type	: Hand-held	Product Version (PMN)	: P1B	Model Number (HVIN)	: H55TGT9PW8AN	Frequency Band	: Refer to section 1.4	Applicant Name	: Motorola Solutions, Inc	Applicant Address	: 8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322	FCC Registrations	: 461337	ISED Registrations	: 109AK	Firmware Version (FVIN)	: D00.00.31	(LTE Band 12) FCC 47 CFR Part 2 / 27 ISED RSS GEN Issue 5, April 2018 ISED RSS 130 Issue 1, October 2013	PASS
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Prepared By: Maheshvaran Rajagopal Technician	Approved By: Goh Aik Hong Responsible Engineer																										

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REVISION HISTORY

Revision History	Description	Date	Originator
Rev A.	Initial Report	26-Feb-2019	Maheshvaran Rajagopal

1.0. Summary of Test Results

FCC Clause	ISED Clause	Test Item	Results	Remarks	Serial Number Tested
2.1046	RSS-Gen 6.12 RSS-130 4.1	Conducted RF Output Power	Pass	Meet the requirement of limit.	437P1B0011
-	RSS 130 4.4	Peak-to-Average Power Ratio	Pass	Meet the requirement of limit.	437P1B0011
2.1049	RSS-Gen 6.7	Occupied Bandwidth (26dBc, 99%)	Pass	Meet the requirement of limit.	437P1B0011
2.1055 27.54	RSS-130 4.3	Frequency Stability	Pass	Meet the requirement of limit.	437P1B0011
2.1051 27.53(g)	RSS-Gen 6.13 RSS-130 4.6	Band Edge Conducted Spurious Emission	Pass	Meet the requirement of limit.	437P1B0011
2.1051 27.53(g)	RSS-Gen 6.13 RSS-130 4.6	Conducted Spurious Emissions	Pass	Meet the requirement of limit.	437P1B0011
2.1053 27.53(g)	RSS-130 4.6	Radiated Spurious Emission	Not Performed.	Not Performed.	Not Performed.
2.1049 27.50(c)(9)(10)	RSS-130 4.4	Effective Radiated Power (ERP)	Not Performed.	Not Performed.	Not Performed.

1.1. Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=1.96) (±dB)
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	5.01
	200MHz ~ 1000MHz	5.01
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.01
	18GHz ~ 25GHz	5.01

1.2. Equipment List

Description	Model	Serial Number	Calibration Date	Calibration Due Date
Broadband ATE 1 (Test Software Version : R&S CMWRun 1.8.9)				
Wideband Radio Communication Tester	CMW500	153174	12-Apr-17	12-Apr-19
Signal Analyzer	FSV40	101431	13-Jul-17	12-Jul-19
Chamber	SH-641	92002651	5-Mar-18	5-Mar-19
Power Supply	6623A	3417A03546	15-Nov-17	15-Nov-19

1.3. General Information

General Description of EUT

Product	Hand-held			
Brand	Motorola Solutions			
Test Model	H55TGT9PW8AN			
Power Supply Rating	7.5 Vdc			
Mode of operation	LTE Band 12			
Modulation Type	QPSK, 16QAM			
Operating Frequency	LTE Band 12	Channel Bandwidth 1.4MHz	699.7MHz~715.3MHz	
		Channel Bandwidth 3MHz	700.5MHz~714.5MHz	
		Channel Bandwidth 5MHz	701.5MHz~713.5MHz	
		Channel Bandwidth 10MHz	704.0MHz~711.0MHz	
Max. Conducted RF Output Power	LTE Band 12 QPSK	Channel Bandwidth 1.4MHz	22.742dBm (0.188W)	
		Channel Bandwidth 3MHz	22.807dBm (0.191W)	
		Channel Bandwidth 5MHz	22.734dBm (0.188W)	
		Channel Bandwidth 10MHz	22.763dBm (0.189W)	
	LTE Band 12 16QAM	Channel Bandwidth 1.4MHz	21.967dBm (0.157W)	
		Channel Bandwidth 3MHz	21.971dBm (0.157W)	
		Channel Bandwidth 5MHz	21.902dBm (0.155W)	
		Channel Bandwidth 10MHz	21.927dBm (0.156W)	
Emission Designator	LTE Band 12		QPSK	16QAM
		Channel Bandwidth 1.4MHz	1M09G7D	1M08D7W
		Channel Bandwidth 3MHz	2M68G7D	2M67D7W
		Channel Bandwidth 5MHz	4M47G7D	4M48D7W
		Channel Bandwidth 10MHz	8M91G7D	8M93D7W
Antenna Type	LTE Band 12	Stamped Metal with -3.18dBi gain		
SW Version	D00.00.31			
HW Version	P1B			

Note:

1. The EUT contains following accessory devices and data cable.

Item	Brand	Model or P/N	Specification
DMR Portable Programming Cable	Motorola Solutions	PMKN4012B	-

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.

NO.	Product	Brand	Model No.	Serial No.	FCC ID
1	Wideband Radio Communication Tester	R&S	CMW500	153174	NA

Note:

- Item 1 acted as a communication partner to transfer data.

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.

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 v03r01

KDB 971168 D02 Misc OOB License Digital Systems v02r01

ANSI C63.26-2015

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

Deviation from standard

Not applicable as no deviation from standard test method.

1.4. Channel number and frequency info

Band	Bandwidth supported	Available Channel Number	Test Channel Number			Test Channel Frequency (MHz)		
			Low Channel	Mid Channel	High Channel	Low Channel	Mid Channel	High Channel
LTE Band 12	1.4 MHz	23017 ~ 23173	23017	23095	23173	699.7	707.5	715.3
	3 MHz	23025 ~ 23165	23025	23095	23165	700.5	707.5	714.5
	5 MHz	23035 ~ 23155	23035	23095	23155	701.5	707.5	713.5
	10 MHz	23060 ~ 23130	23060	23095	23130	704.0	707.5	711.0

1.5. 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 and antenna ports.

The following channel(s) was (were) selected for the final test as listed below:

LTE Band 12

Test Item	Available Channel	Tested Channel	Channel Bandwidth	Uplink Modulation	Mode
Conducted RF Output Power	23017 ~ 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	As per table 1.6.2
	23025 ~ 23165	23025, 23095, 23165	3 MHz		
	23035 ~ 23155	23035, 23095, 23155	5 MHz		
	23060 ~ 23130	23060, 23095, 23130	10 MHz		
Peak to Average Power Ratio	23017 ~ 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
	23025 ~ 23165	23025, 23095, 23165	3 MHz		15 RB / 0 RB Offset
	23035 ~ 23155	23035, 23095, 23155	5 MHz		25 RB / 0 RB Offset
	23060 ~ 23130	23060, 23095, 23130	10 MHz		50 RB / 0 RB Offset
Occupied Bandwidth	23017 ~ 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
	23025 ~ 23165	23025, 23095, 23165	3 MHz		15 RB / 0 RB Offset
	23035 ~ 23155	23035, 23095, 23155	5 MHz		25 RB / 0 RB Offset
	23060 ~ 23130	23060, 23095, 23130	10 MHz		50 RB / 0 RB Offset
Frequency Stability	23017 ~ 23173	23017, 23173	1.4 MHz	QPSK	6 RB / 0 RB Offset
	23025 ~ 23165	23025, 23165	3 MHz		15 RB / 0 RB Offset
	23035 ~ 23155	23035, 23155	5 MHz		25 RB / 0 RB Offset
	23060 ~ 23130	23060, 23130	10 MHz		50 RB / 0 RB Offset
Band Edge Conducted Spurious Emission	23017 ~ 23173	23017, 23173	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 5 RB Offset 6 RB / 0 RB Offset
	23025 ~ 23165	23025, 23165	3 MHz		1 RB / 0 RB Offset 1 RB / 14 RB Offset 15 RB / 0 RB Offset
	23035 ~ 23155	23035, 23155	5 MHz		1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
	23060 ~ 23130	23060, 23130	10 MHz		1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
Conducted Spurious Emission	23017 ~ 23173	23017, 23095, 23173	1.4 MHz	QPSK	3 RB / 2 RB Offset
	23025 ~ 23165	23025, 23095, 23165	3 MHz		1 RB / 7 RB Offset
	23035 ~ 23155	23035, 23095, 23155	5 MHz		1 RB / 13 RB Offset
	23060 ~ 23130	23060, 23095, 23130	10 MHz		1 RB / 0 RB Offset
Radiated Spurious Emission	23017 ~ 23173	23017, 23095, 23173	1.4 MHz	QPSK	Not Performed.
	23025 ~ 23165	23025, 23095, 23165	3 MHz		
	23035 ~ 23155	23035, 23095, 23155	5 MHz		
	23060 ~ 23130	23060, 23095, 23130	10 MHz		
Effective Radiated Power (ERP)	23017 ~ 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	Not Performed.
	23025 ~ 23165	23025, 23095, 23165	3 MHz		
	23035 ~ 23155	23035, 23095, 23155	5 MHz		
	23060 ~ 23130	23060, 23095, 23130	10 MHz		

NOTE:

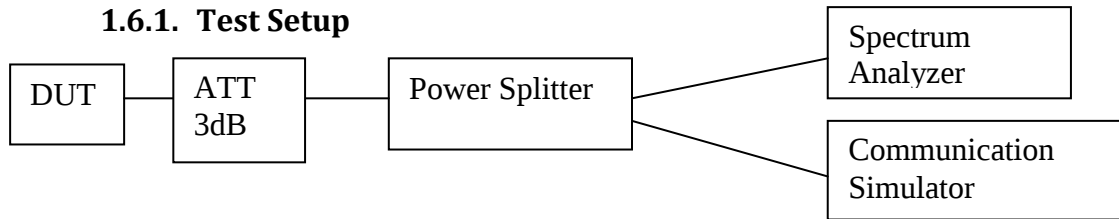
1. The Conducted RF Output Power for QPSK and 16QAM, measured value of QPSK is higher than 16QAM mode. Therefore, only Conducted Spurious Emission had been tested under QPSK modes.
2. Band Edge was performed with 1 and full Resource Block at the lowest and highest operating frequency band.
3. Peak to Average and Occupied Bandwidth were performed with full Resource Block which is the worst case.
4. Frequency stability was performed with full Resource Block in QPSK modulation.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
Conducted RF Output Power	25°C, 50% RH	7.5V DC	Maheshvaran
Peak-to-Average Power Ratio	25°C, 50% RH	7.5V DC	Maheshvaran
Occupied Bandwidth	25°C, 50% RH	7.5V DC	Maheshvaran
Frequency Stability	25°C, 50% RH	7.5V DC	Maheshvaran
Band Edge Conducted Spurious Emission	25°C, 50% RH	7.5V DC	Maheshvaran
Conducted Spurious Emission	25°C, 50% RH	7.5V DC	Maheshvaran
Radiated Spurious Emission	Not Performed.		
Effective Radiated Power (ERP)	Not Performed.		

1.6. Conducted RF Output Power

1.6.1. Test Setup



1. The DUT transmitter output port was connected to communication simulator with above setup.
2. Path loss for the measurement included.
3. Set DUT to transmit maximum power through communication simulator
4. All the measurement was done at low, mid, high channel for each band and different modulation.
5. Record the average power into the test report.

1.6.2. Limits

FCC: Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

ISED: The e.i.r.p. shall not exceed 50 watts for mobile equipment or for outdoor fixed subscriber equipment, nor shall it exceed 5 watts for portable equipment or for indoor fixed subscriber equipment.

1.6.3. Conducted RF Output Power – LTE Band 12 (698-716MHz)

Conducted Output Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			23017	23095	23173	23017	23095	23173
			699.7 MHz	707.5 MHz	715.3 MHz	699.7 MHz	707.5 MHz	715.3 MHz
Band 12 / 1.4 MHz	1	0	22.621	22.427	22.521	21.808	21.583	21.552
	1	3	22.699	22.489	22.558	21.877	21.658	21.591
	1	5	22.676	22.435	22.525	21.823	21.593	21.55
	3	0	22.664	22.49	22.472	21.899	21.527	21.732
	3	2	22.742	22.511	22.517	21.967	21.575	21.779
	3	3	22.674	22.451	22.504	21.903	21.519	21.739
	6	0	21.686	21.477	21.427	20.803	20.567	20.592

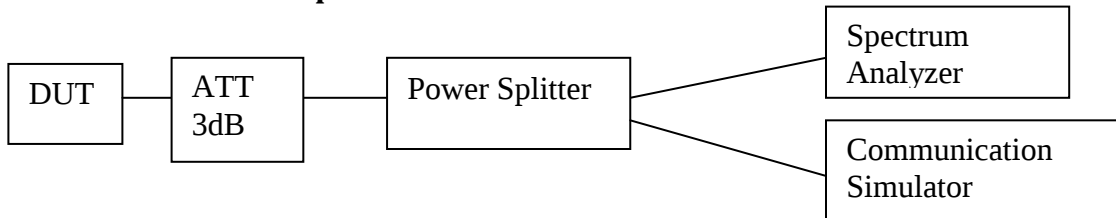
Conducted Output Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			23025	23095	23165	23025	23095	23165
			700.5 MHz	707.5 MHz	714.5 MHz	700.5 MHz	707.5 MHz	714.5 MHz
Band 12 / 3MHz	1	0	22.761	22.575	22.509	21.837	21.663	21.829
	1	7	22.807	22.643	22.59	21.886	21.671	21.971
	1	14	22.698	22.571	22.491	21.786	21.574	21.864
	8	0	21.747	21.555	21.57	20.782	20.658	20.777
	8	4	21.796	21.556	21.581	20.817	20.676	20.802
	8	7	21.728	21.524	21.528	20.779	20.61	20.74
	15	0	21.767	21.549	21.572	20.821	20.645	20.708

Conducted Output Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			23035	23095	23155	23035	23095	23155
			701.5 MHz	707.5 MHz	713.5 MHz	701.5 MHz	707.5 MHz	713.5 MHz
Band 12 / 5MHz	1	0	22.681	22.554	22.532	21.734	21.722	21.779
	1	13	22.734	22.596	22.65	21.733	21.73	21.902
	1	25	22.549	22.496	22.575	21.589	21.667	21.869
	12	0	21.786	21.622	21.481	20.872	20.624	20.577
	12	6	21.795	21.606	21.642	20.865	20.606	20.691
	12	13	21.643	21.591	21.577	20.707	20.567	20.651
	25	0	21.653	21.573	21.517	20.706	20.649	20.589

Conducted Output Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			23060	23095	23130	23060	23095	23130
			704.0 MHz	707.5 MHz	711.0 MHz	704.0 MHz	707.5MHz	711.0 MHz
Band 12 / 10MHz	1	0	22.736	22.763	22.506	21.877	21.769	21.927
	1	25	22.554	22.567	22.425	21.717	21.591	21.788
	1	49	22.518	22.615	22.524	21.66	21.626	21.911
	25	0	21.661	21.619	21.568	20.81	20.731	20.705
	25	13	21.638	21.601	21.586	20.77	20.732	20.692
	25	25	21.612	21.573	21.528	20.765	20.7	20.633
	50	0	21.637	21.593	21.571	20.716	20.705	20.668

1.7. Peak-to-Average Power Ratio

1.7.1. Test Setup



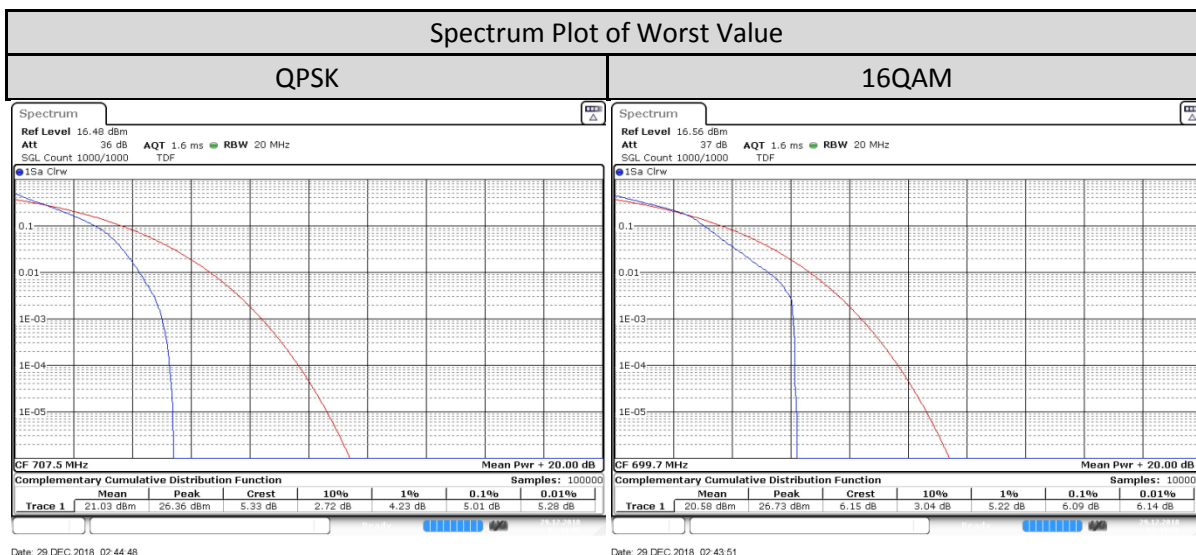
1. The DUT transmitter output port was connected to communication simulator with above setup.
2. Path loss for the measurement included.
3. Set DUT to transmit maximum power through communication simulator
4. Set the CCDF (Complementary Cumulative Distribution Function) option in the spectrum analyzer.
5. Spectrum Analyzer setting, RBW = 20MHz.
6. Recorded the maximum PAR level associated with a probability of 0.1% as Peak to Average Ratio.
7. All the measurement was done at low, mid, high channel for each band and different modulation.

1.7.2. Test Limit

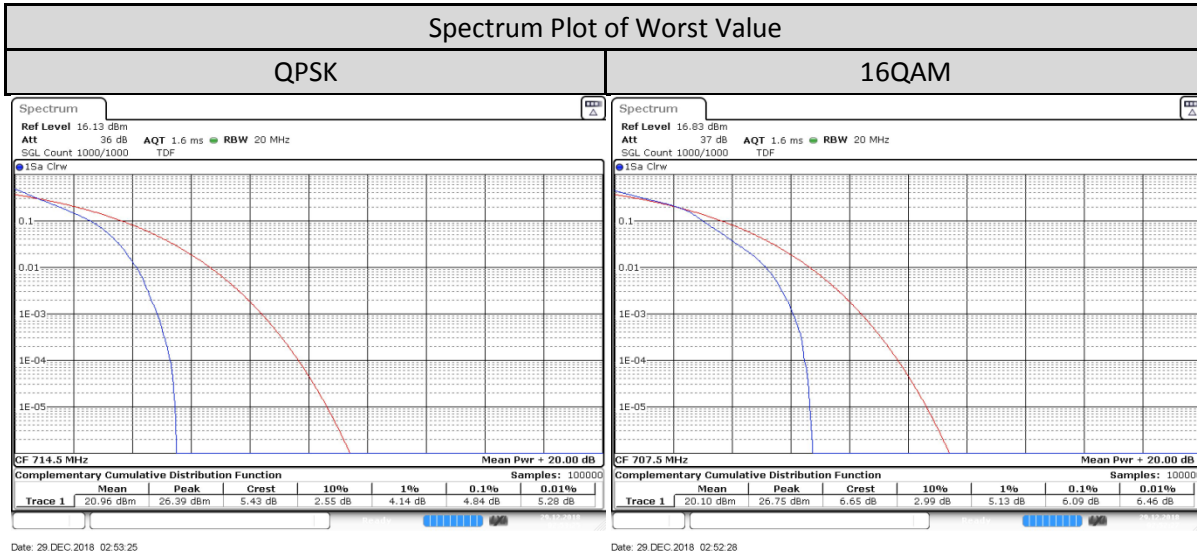
In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

1.7.3. Peak-to-Average Power Ratio - LTE Band 12 (698-716MHz)

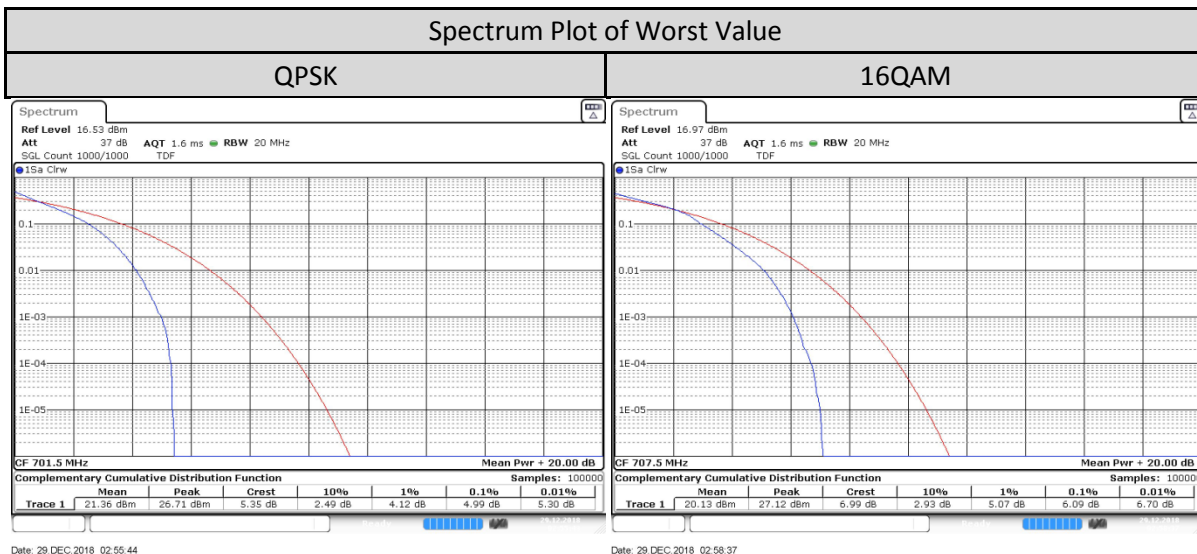
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 12/1.4MHz/6/0	Low CH 23017	699.7 MHz	4.899	6.087
	Mid CH 23095	707.5 MHz	5.014	5.855
	High CH 23173	715.3 MHz	4.812	6.087



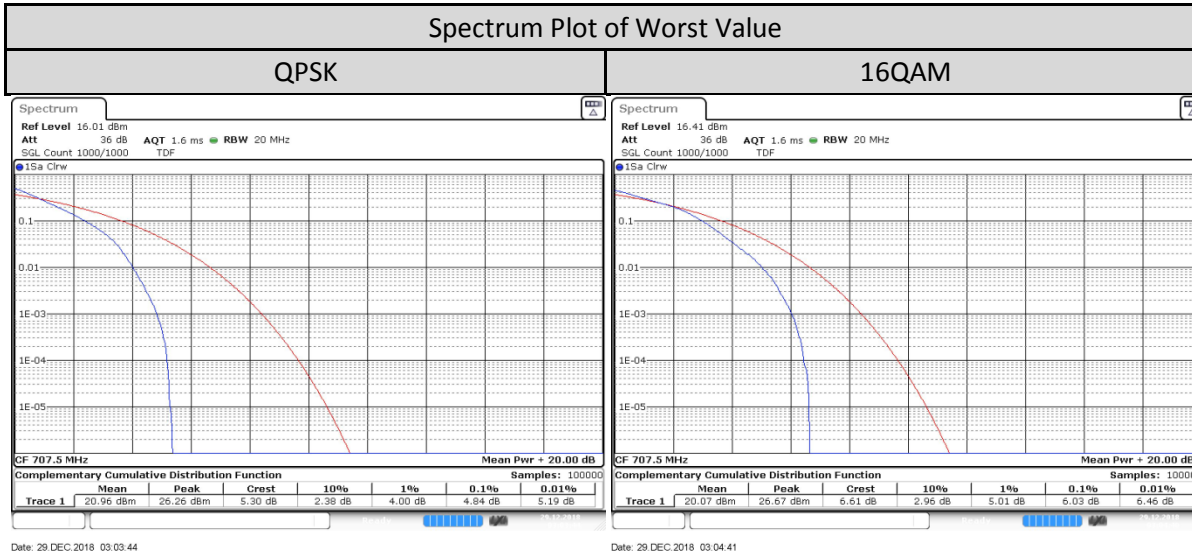
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 12/3MHz/15/0	Low CH 23025	700.5 MHz	4.725	5.971
	Mid CH 23095	707.5 MHz	4.725	6.087
	High CH 23165	714.5 MHz	4.841	6.058



LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 12/5MHz/25/0	Low CH 23035	701.5 MHz	4.986	5.971
	Mid CH 23095	707.5 MHz	4.899	6.087
	High CH 23155	713.5 MHz	4.957	6.058

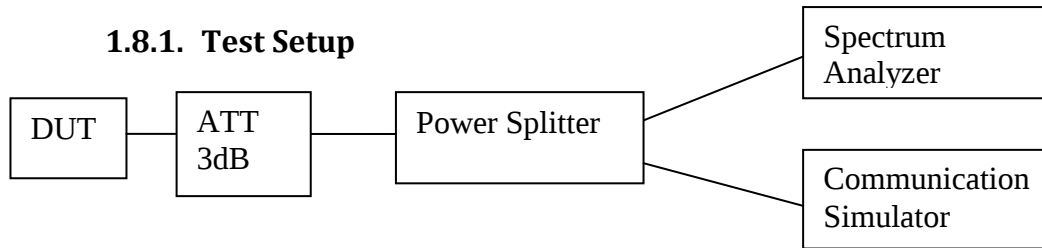


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 12/10MHz/50/0	Low CH 23060	704 MHz	4.812	6
	Mid CH 23095	707.5 MHz	4.841	6.029
	High CH 23130	711 MHz	4.812	6.029



1.8. Occupied Bandwidth

1.8.1. Test Setup



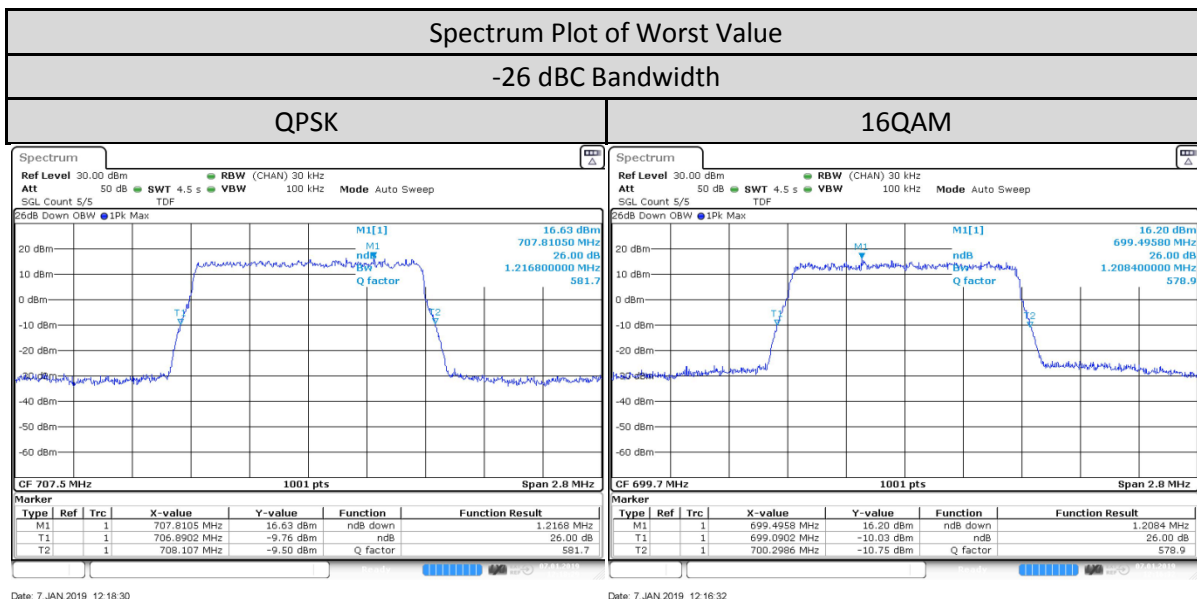
- 1) The DUT transmitter output port was connected to communication simulator with above setup.
- 2) Path loss for the measurement included.
- 3) For LTE measurement, set DUT to transmit maximum power & full RB size through communication simulator.
- 4) For LTE measurement, set DUT to transmit maximum power through communication simulator.
- 5) Spectrum Analyzer setting, RBW is 1% of OBW and VBW is 3 times of RBW.
- 6) Measure & record -26dBc and 99% occupied bandwidth (BW).
- 7) All the measurement was done at low, mid, high channel for each band and different modulation.

1.8.2. Test Limit

For measurement 99% of occupied bandwidth that is required by FCC 2.1049 and RSS Gen 6.6.

1.8.3. Occupied Bandwidth - LTE Band 12 (698-716MHz)

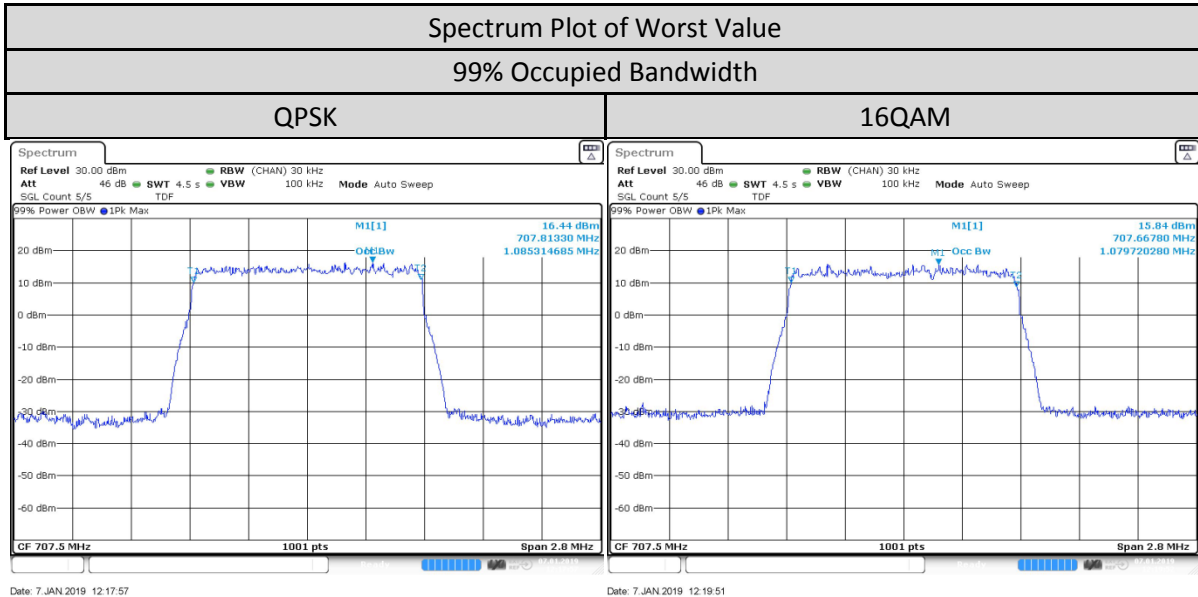
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 12/1.4MHz/6/0	Low CH 23017	699.7 MHz	1.206	1.208
	Mid CH 23095	707.5 MHz	1.217	1.208
	High CH 23173	715.3 MHz	1.217	1.2



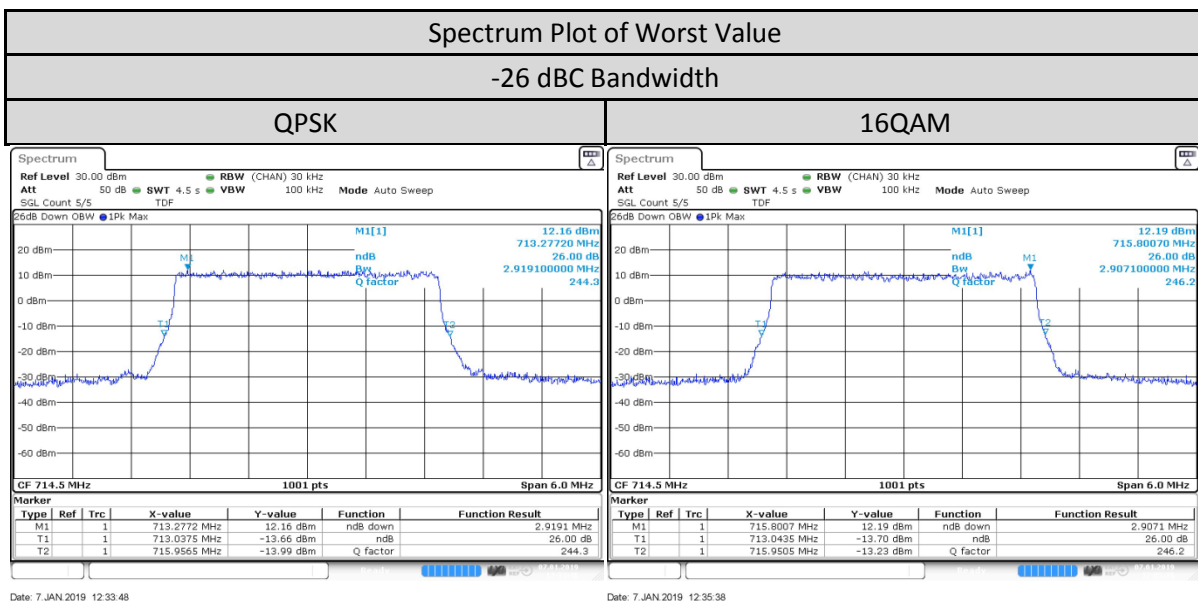
Date: 7 JAN 2019 12:18:30

Date: 7 JAN 2019 12:16:32

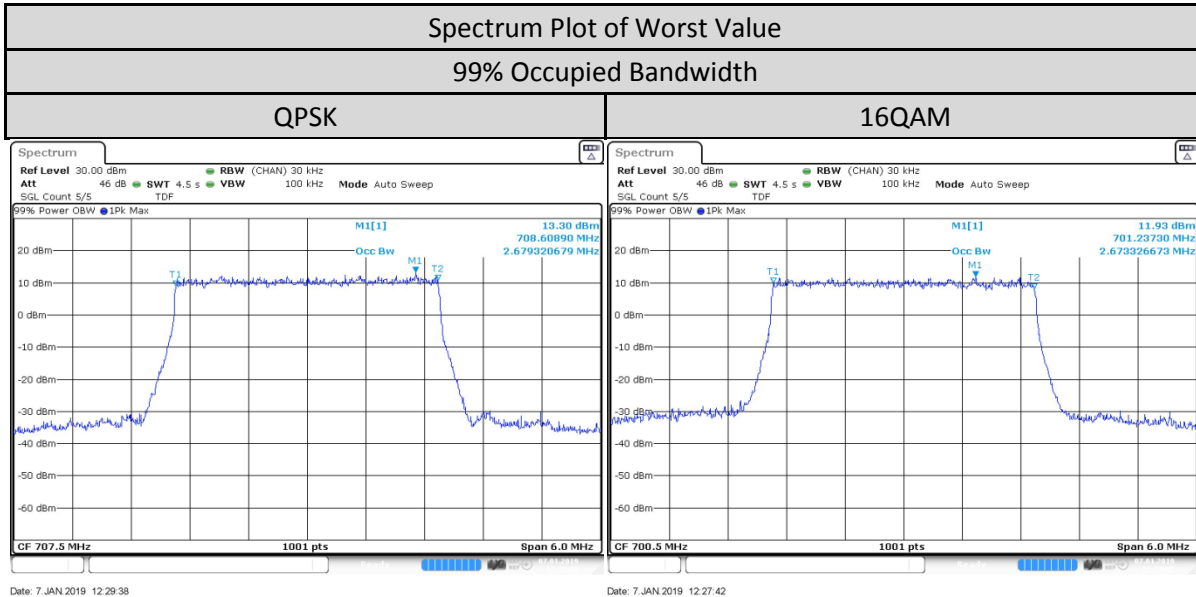
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 12/1.4MHz/6/0	Low CH 23017	699.7 MHz	1.08	1.077
	Mid CH 23095	707.5 MHz	1.085	1.08
	High CH 23173	715.3 MHz	1.085	1.077



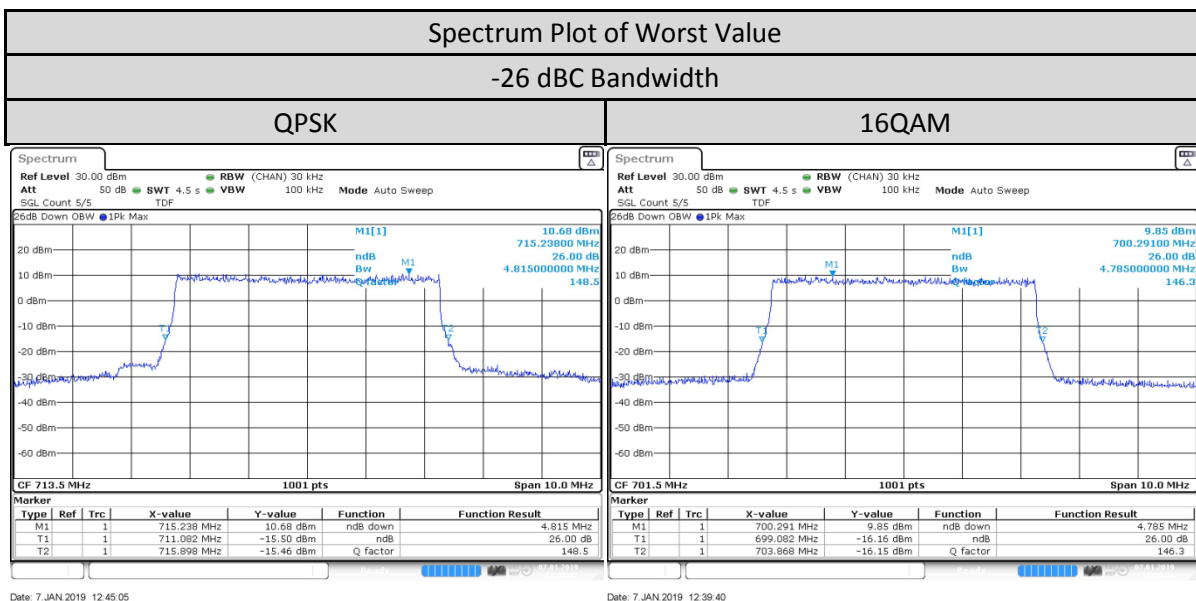
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 12/3MHz/15/0	Low CH 23025	700.5 MHz	2.895	2.901
	Mid CH 23095	707.5 MHz	2.889	2.889
	High CH 23165	714.5 MHz	2.919	2.907



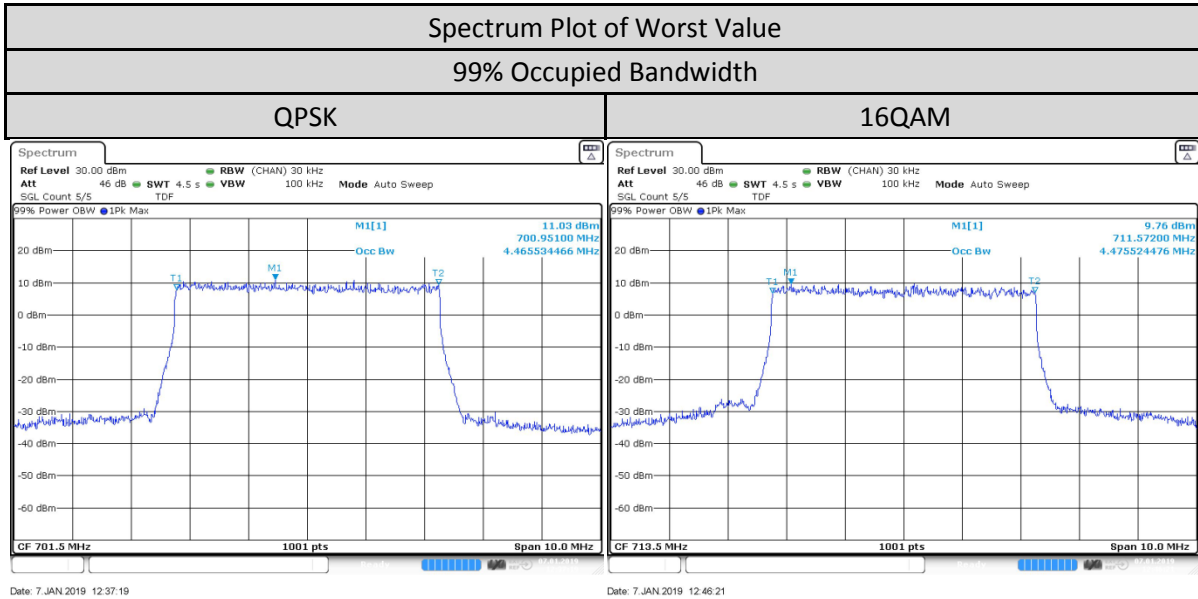
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 12/3MHz/15/0	Low CH 23025	700.5 MHz	2.673	2.673
	Mid CH 23095	707.5 MHz	2.679	2.673
	High CH 23165	714.5 MHz	2.679	2.673



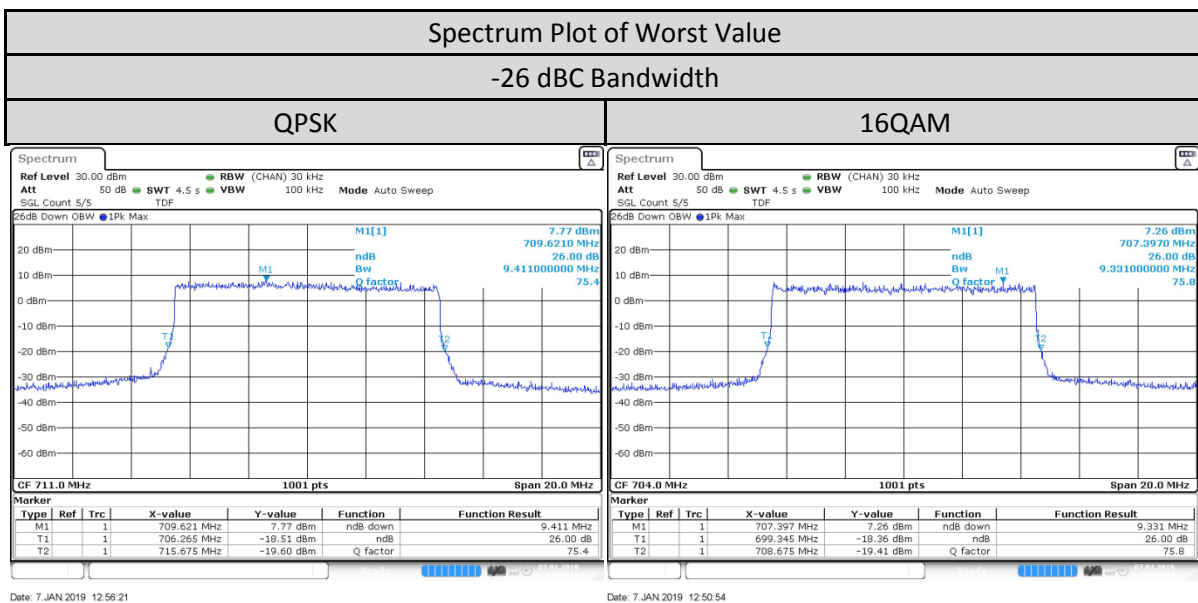
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 12/5MHz/25/0	Low CH 23035	701.5 MHz	4.765	4.785
	Mid CH 23095	707.5 MHz	4.725	4.745
	High CH 23155	713.5 MHz	4.815	4.755



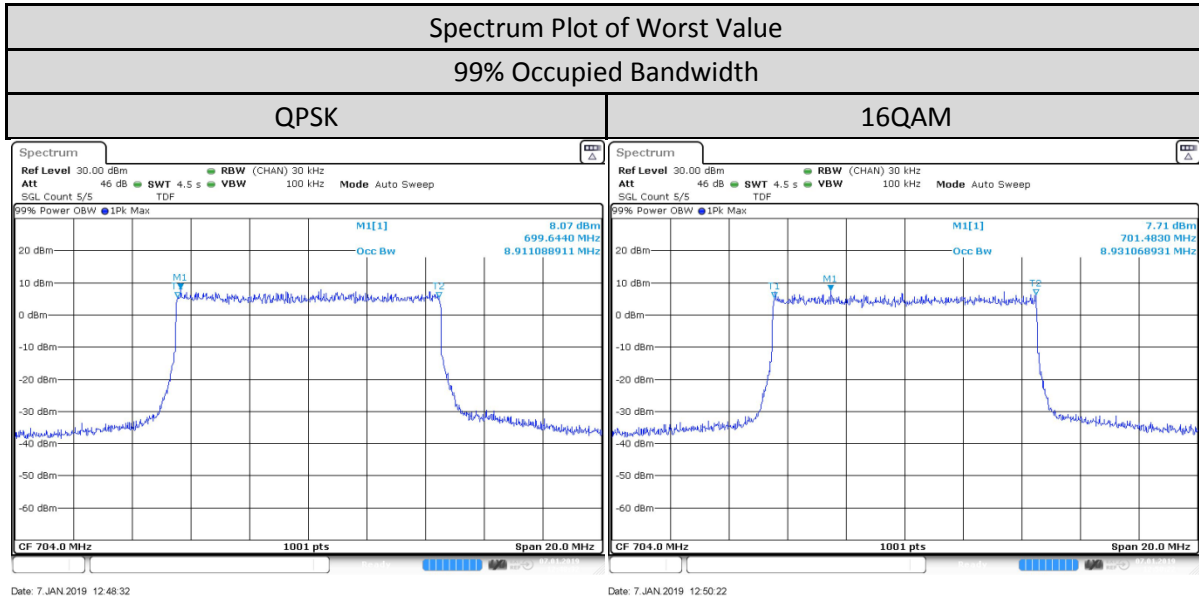
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 12/5MHz/25/0	Low CH 23035	701.5 MHz	4.466	4.466
	Mid CH 23095	707.5 MHz	4.456	4.456
	High CH 23155	713.5 MHz	4.466	4.476



LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 12/10MHz/50/0	Low CH 23060	704 MHz	9.371	9.331
	Mid CH 23095	707.5 MHz	9.291	9.311
	High CH 23130	711 MHz	9.411	9.331

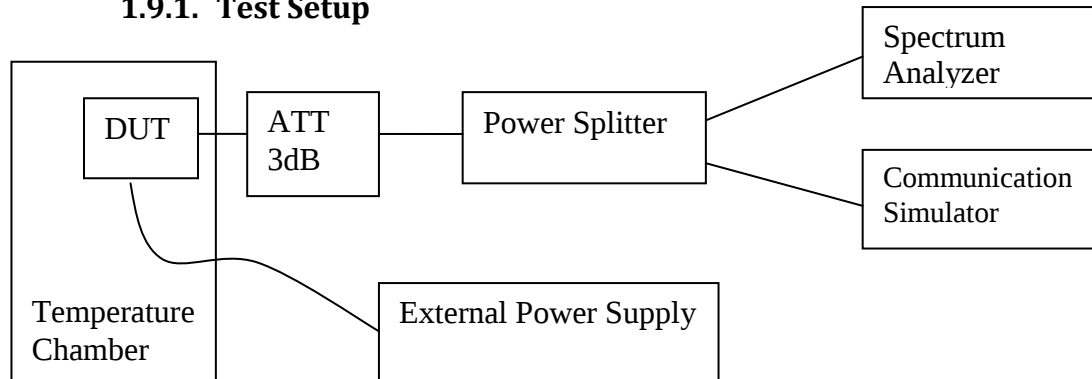


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 12/10MHz/50/0	Low CH 23060	704 MHz	8.911	8.931
	Mid CH 23095	707.5 MHz	8.911	8.891
	High CH 23130	711 MHz	8.911	8.931



1.9. Frequency Stability

1.9.1. Test Setup



- 1) The DUT is placed in the temperature chamber and DUT is power up by external power supply to control the DC input voltage.
- 2) The temperature chamber could control the temperature and humidity and external power supply could control the test voltage range from minimum to maximum operating voltage.
- 3) Measured frequency error from the communication simulator by vary below step :
 - i. Vary temperature of the temperature chamber from -30 ~ 50 deg C (10 deg C / Step) and set external supply voltage constant at nominal voltage.
 - ii. Vary external supply voltage from minimum to maximum operation voltage support by DUT and set temperature chamber constant at room temp.
- 4) All the measurement was done at mid channel for each band.

1.9.2. Test Limit

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

1.9.3. Frequency Stability - LTE Band 12 (698-716MHz)

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 1.4 MHz			
		Low Channel		High Channel	
		699.7MHz		715.3MHz	
		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
LTE Band 12	50	699.699968	-0.04596	715.299994	-0.008299
	40	699.699991	-0.012635	715.299991	-0.012859
	30	699.699991	-0.012287	715.300009	0.012059
	20	699.699992	-0.011081	715.299991	-0.013239
	10	699.699993	-0.009813	715.299992	-0.011599
	0	699.699991	-0.01333	715.299994	-0.008539
	-10	699.700008	0.010733	715.299997	-0.00358
	-20	699.699978	-0.032098	715.299991	-0.012099
	-30	699.699991	-0.012533	715.299993	-0.009639

Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 1.4 MHz			
		Low Channel		High Channel	
		699.7MHz		715.3MHz	
LTE Band 12		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	9	699.699994	-0.009261	715.299991	-0.012699
	7.5	699.699992	-0.011429	715.299996	-0.00522
	6	699.699992	-0.011613	715.299992	-0.011159

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 3 MHz			
		Low Channel		High Channel	
		700.5MHz		714.5MHz	
LTE Band 12		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	50	700.500007	0.010088	714.500011	0.015757
	40	700.500007	0.009782	714.500011	0.015156
	30	700.500007	0.009292	714.500011	0.015717
	20	700.500006	0.009128	714.500012	0.017238
	10	700.500008	0.010823	714.500012	0.016317
	0	700.500005	0.006841	714.500011	0.014896
	-10	700.500007	0.009639	714.500011	0.015757
	-20	700.500009	0.012763	714.500012	0.017318
	-30	700.500004	0.005044	714.50001	0.013634

Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 3 MHz			
		Low Channel		High Channel	
		700.5MHz		714.5MHz	
LTE Band 12		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	9	700.500008	0.010966	714.500012	0.017218
	7.5	700.499992	-0.011007	714.500012	0.017058
	6	700.500008	0.012008	714.50001	0.014035

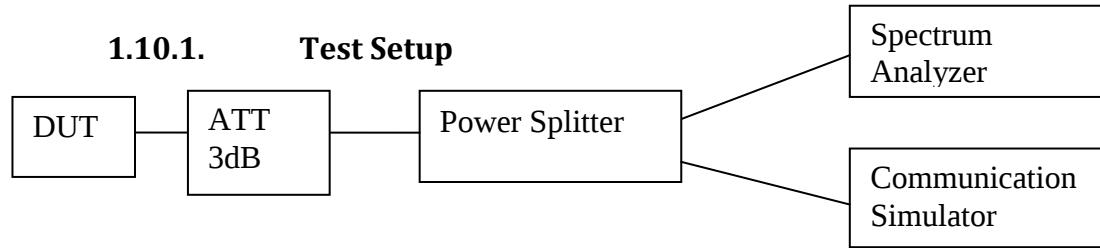
Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 5 MHz			
		Low Channel		High Channel	
		701.5MHz		713.5MHz	
LTE Band 12		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	50	701.499992	-0.01144	713.499991	-0.01239
	40	701.499999	-0.013704	713.499992	-0.011408
	30	701.499991	-0.01352	713.499999	-0.013774
	20	701.499993	-0.009707	713.499993	-0.009122
	10	701.499991	-0.012439	713.499992	-0.010626
	0	701.499993	-0.00989	713.499993	-0.010245
	-10	701.499991	-0.012602	713.500006	0.009042
	-20	701.499994	-0.00832	713.499993	-0.009142
	-30	701.499992	-0.011481	713.499994	-0.008942

Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 5 MHz			
		Low Channel		High Channel	
		701.5MHz		713.5MHz	
LTE Band 12		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	9	701.499989	-0.015641	713.499993	-0.010185
	7.5	701.499994	-0.009197	713.500005	0.006777
	6	701.499991	-0.012541	713.499993	-0.009864

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 10 MHz			
		Low Channel		High Channel	
		704MHz		711MHz	
LTE Band 12		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	50	704.000011	0.016215	711.000009	0.012394
	40	704.000011	0.015971	711.000007	0.009657
	30	704.000012	0.016418	711.000007	0.009376
	20	704.000012	0.017678	711.000008	0.010643
	10	704.000012	0.017191	711.000007	0.010482
	0	704.000012	0.016479	711.000007	0.009899
	-10	704.000012	0.017394	711.000006	0.008511
	-20	704.000011	0.016195	711.000009	0.012535
	-30	704.000012	0.017353	711.000007	0.01014

Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 10 MHz			
		Low Channel		High Channel	
		704MHz		711MHz	
LTE Band 12		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	9	704.000014	0.01967	711.000008	0.011126
	7.5	704.000011	0.016276	710.999993	-0.009175
	6	704.000012	0.016947	710.999995	-0.006881

1.10. Band Edge Conducted Spurious Emission



- 1) The DUT transmitter output port was connected to communication simulator with above setup.
- 2) Path loss for the measurement included.
- 3) Set DUT to transmit maximum power through communication simulator.
- 4) The band edges of lowest and highest channels with the highest RF powers were measured.
- 5) The center frequency of spectrum is the band edge frequency, span is 3MHz, RBW is 30kHz and VBW is at least 3 times of RBW.
- 6) Record the maximum trace plot into the test report.

1.10.2. Test Limit

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.

1.10.3. Band Edge Conducted Spurious Emission – LTE Band 12 (698-716MHz)

