



Report Revision : Rev.B

PASS

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Responsible Engineer

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REVISION HISTORY

Revision History	Description	Date	Originator
Rev A.	Initial Report	17-Apr-2018	Maheshvaran Rajagopal
Rev B.	i. Applicant name and address has been added. ii. The battery model number has been revised. iii. AC adapter accessories devices information has been added.	30-May-2018	Maheshvaran Rajagopal

	iv. The Test report number of page format is corrected.		
	v. RSSs version standard have been added to the cover page.		
	vi. Justification statement of accessory devices is included at section 1.5.		

1.0. Summary of Test Results

FCC Clause	ISED Clause	Test Item	Results	Remarks
2.1046 27.50(h)(2)	RSS-Gen 6.12 RSS-199 4.4	Conducted RF Output Power	Pass	Meet the requirement of limit
2.1046 27.50(d)(5)	-	Peak-to-Average Power Ratio	Pass	Meet the requirement of limit
2.1049 27.53(m)(6)	RSS-Gen 6.6	Occupied Bandwidth (26dBc, 99%)	Pass	Meet the requirement of limit
2.1055 27.54	RSS-199 4.3	Frequency Stability	Pass	Meet the requirement of limit
2.1051 27.53(m)(4)(6)	RSS-Gen 6.13 RSS-199 4.6	Band Edge Conducted Spurious Emission	Pass	Meet the requirement of limit
2.1051 27.53(m)(4)(6)	RSS-Gen 6.13 RSS-199 4.6	Conducted Spurious Emissions	Pass	Meet the requirement of limit
2.1053 27.53(m)(4)(6)	RSS-199 4.6	Radiated Spurious Emission	Pass	Meet the requirement of limit
2.1049 27.50(h)(2)	RSS-199 4.4	Equivalent Isotropically Radiated Power (EIRP)	Pass	Meet the requirement of limit

1.1. Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=1.96) (±)
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				
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	154550	14-FEB-17	14-FEB-19
SIGNAL ANALYZER	FSV40	101431	13-JUL-17	12-JUL-19
CHAMBER	SH-641	92002651	6-MAR-17	6-MAR-18
POWER SUPPLY	6621A	US37370810	5-JUN-17	5-JUN-18
RADIATED EMISSION				
DRG HORN FREQ.	SAS-571	719	18-JUL-17	18-JUL-19
DRG HORN FREQ.	SAS-571	720	2-MAR-17	2-MAR-19
POWER SUPPLY	6032A	2615A01178	6-JUN-17	6-JUN-18

MICROWAVE SIGNAL GENERATOR	SMP04	100127	19-JUL-17	18-JUL-18
EMI TEST RECEIVER	ESIB26	100336	13-JUL-17	12-JUL-18
SIGNAL ANALYZER	FSV40	101103	18-JUL-17	17-JUL-18
5M SEMI-ANECHOIC CHAMBER	S800-HX	J2308	NO CAL. REQ'D	NO CAL. REQ'D
BILOG ANTENNA	CBL6112D	25224	22-JUL-17	22-JUL-18
BILOG ANTENNA	CBL6112B	2964	16-FEB-18	16-FEB-20
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170255	7-NOV-17	7-NOV-18
DATA LOGGER	SDL500	A.016776	18-MAR-17	18-MAR-19
LOOP ANTENNA	6502	208416	27-JUL-17	27-JUL-18
SYSTEM CONTROLLER	SC104V	050806-1	NO CAL. REQ'D	NO CAL. REQ'D
TURNTABLE FLUSH MOUNT 2M	FM2011	NA	NO CAL. REQ'D	NO CAL. REQ'D
ANTENNA POSITIONING TOWER	TLT2	NA	NO CAL. REQ'D	NO CAL. REQ'D
18 - 40GHZ PREAMPLIFIER	MITEQ HI GAIN SUCOFLEX	002	NO CAL. REQ'D	NO CAL. REQ'D
PREAMPLIFIER	PAM-0118P	361	NO CAL. REQ'D	NO CAL. REQ'D
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	153174	9-JAN-2017	9-JAN-2019

1.3. General Information

General Description of EUT

Product	LEX L11 Mission Critical LTE Device		
Brand	Motorola Solutions		
Test Model	LEX L11n		
Power Supply Rating	3.7Vdc (Battery), 5Vdc (Adapter)		
Mode of operation	LTE Band 7		
Modulation Type	QPSK, 16QAM		
Operating Frequency	LTE Band 7	Channel Bandwidth 5MHz	2502.5MHz~2567.5MHz
		Channel Bandwidth 10MHz	2505.0MHz~2565.0MHz
		Channel Bandwidth 15MHz	2507.5MHz~2562.5MHz
		Channel Bandwidth 20MHz	2510.0MHz~2560.0MHz
Max. EIRP Power	LTE Band 7 QPSK	Channel Bandwidth 5MHz	23.854dBm (0.242W)
		Channel Bandwidth 10MHz	23.834dBm (0.241W)
		Channel Bandwidth 15MHz	23.803dBm (0.24W)
		Channel Bandwidth 20MHz	23.688dBm (0.234W)
	LTE Band 7 16QAM	Channel Bandwidth 5MHz	22.955dBm (0.197W)
		Channel Bandwidth 10MHz	22.899dBm (0.194W)
		Channel Bandwidth 15MHz	22.778dBm (0.189W)
		Channel Bandwidth 20MHz	23.102dBm (0.204W)
Antenna Type	LTE Band 7	Monopole with 1.1dBi gain	
SW Version	L11_D01.00.48		
HW Version	P4a		

Note:

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

Item	Brand	Model or P/N	Specification
Rechargeable Lithium ion battery	Motorola Solutions	PMNN4545A	2500mAh 3.7V LI-ION STD
Rechargeable Lithium ion battery	Motorola Solutions	PMNN4546A	5000mAh 3.7V LI-ION HICAP
Charger Vehicular Adapter VPA	Motorola Solutions	PMLN7779A	18W
Power Supply Adaptor, Power supply Wall cube, AC, DC (USB type A-C)	Motorola Solutions	PS000150A31 - US/JPN plug	7.5W, 100V-240V
Power Supply Adaptor (USB type C-C)	Motorola Solutions	PS000278A01 - US/JPN plug	27W
Detachable Power/Data Cable USB-A to USB-C	Motorola Solutions	CB000756A01	-
Detachable Power/Data Cable USB-C to USB-C	Motorola Solutions	CB000754A01	-

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	154550	NA

NO.	Signal Cable Description of The above Support Units
1	NA

Note:

1. All power cords of the above support units are non-shielded.
2. 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.

1.4. Channel number and frequency info

			Test Channel Number			Test Channel Frequency (MHz)		
Band	Bandwidth	Available Channel	Low	Mid	High	Low	Mid	High

	supported	Number	Channel	Channel	Channel	Channel	Channel	Channel
LTE Band 7	5 MHz	20775~ 21425	20775	21100	21425	2502.5	2535	2567.5
	10 MHz	20800~ 21400	20800	21100	21400	2505	2535	2565
	15 MHz	20825~ 21375	20825	21100	21375	2507.5	2535	2562.5
	20 MHz	20850~ 21350	20850	21100	21350	2510	2535	2560

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, XYZ axis and antenna ports. The Radiated Emission worst case was found when positioned on X-Plane for LTE band 7.

Pre-scan also have been conducted with the accessory devices listed in section table 1.3, only the worst case radiated emission results of the combination test configuration is reported in this report.

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

LTE Band 7

Test Item	Available Channel	Tested Channel	Channel Bandwidth	Uplink Modulation	Mode
Conducted RF Output Power/ Equivalent Isotropically Radiated Power (EIRP)	20775~ 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM	As per table 1.6.2 & 1.6.4
	20800~ 21400	20800, 21100, 21400	10 MHz		
	20825~ 21375	20825, 21100, 21375	15 MHz		
	20850~ 21350	20850, 21100, 21350	20 MHz		
Peak to Average Power Ratio	20775~ 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
	20800~ 21400	20800, 21100, 21400	10 MHz		50 RB / 0 RB Offset
	20825~ 21375	20825, 21100, 21375	15 MHz		75 RB / 0 RB Offset
	20850~ 21350	20850, 21100, 21350	20 MHz		100 RB / 0 RB Offset
Occupied Bandwidth	20775~ 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
	20800~ 21400	20800, 21100, 21400	10 MHz		50 RB / 0 RB Offset
	20825~ 21375	20825, 21100, 21375	15 MHz		75 RB / 0 RB Offset
	20850~ 21350	20850, 21100, 21350	20 MHz		100 RB / 0 RB Offset
Frequency Stability	20775~ 21425	20775, 21425	5 MHz	QPSK	25 RB / 0 RB Offset
	20800~ 21400	20800, 21400	10 MHz		50 RB / 0 RB Offset
	20825~ 21375	20825, 21375	15 MHz		75 RB / 0 RB Offset
	20850~ 21350	20850, 21350	20 MHz		100 RB / 0 RB Offset
Band Edge Conducted Spurious Emission	20775~ 21425	20775, 21425	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
	20800~ 21400	20800, 21400	10 MHz		1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
	20825~ 21375	20825, 21375	15 MHz		1 RB / 0 RB Offset 1 RB / 74 RB Offset 75 RB / 0 RB Offset
	20850~ 21350	20850, 21350	20 MHz		1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset

Conducted Spurious Emission	20775~ 21425	20775, 21100, 21425	5 MHz	QPSK	1 RB / 13 RB Offset
	20800~ 21400	20800, 21100, 21400	10 MHz		1 RB / 24 RB Offset
	20825~ 21375	20825, 21100, 21375	15 MHz		1 RB / 0 RB Offset
	20850~ 21350	20850, 21100, 21350	20 MHz		1 RB / 49 RB Offset
Radiated Spurious Emission	20775~ 21425	20775, 21100, 21425	5 MHz	QPSK	1 RB / 13 RB Offset
	20800~ 21400	20800, 21100, 21400	10 MHz		1 RB / 24 RB Offset
	20825~ 21375	20825, 21100, 21375	15 MHz		1 RB / 0 RB Offset
	20850~ 21350	20850, 21100, 21350	20 MHz		1 RB / 49 RB Offset

NOTE:

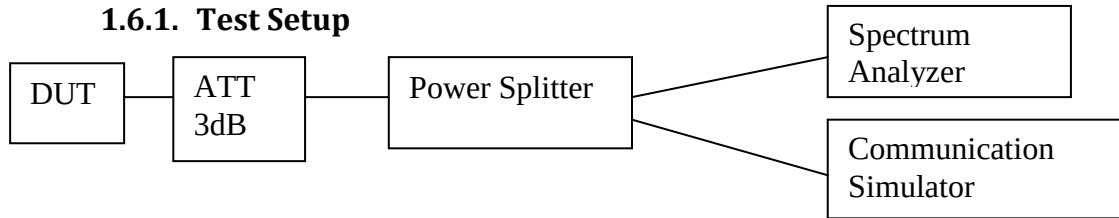
1. The Conducted RF Output Power for QPSK and 16QAM, measured value of QPSK mode is higher than 16QAM mode. Therefore, only Conducted Spurious Emission and Radiated Emission had been tested under QPSK modes.
2. Band Edge was performed with 1 and full Resource Block at the lowest and highest operating frequency band.
3. The Equivalent Isotropically Radiated Power (EIRP) was calculated from Conducted RF Output Power results in QPSK and 16QAM modulation.
4. Peak to Average and Occupied Bandwidth were performed with full Resource Block which is the worst case.
5. 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/ Equivalent Isotropically Radiated Power (EIRP)	25°C, 50% RH	3.7V DC	Maheshvaran
Peak-to-Average Power Ratio	25°C, 50% RH	3.7V DC	Maheshvaran
Occupied Bandwidth	25°C, 50% RH	3.7V DC	Maheshvaran
Frequency Stability	25°C, 50% RH	3.7V DC	Maheshvaran
Band Edge Conducted Spurious Emission	25°C, 50% RH	3.7V DC	Maheshvaran
Conducted Spurious Emission	25°C, 50% RH	3.7V DC	Maheshvaran
Radiated Spurious Emission	25°C, 63.7% RH	3.7V DC	Nazrin&Qawiman

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: Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

ISED: For mobile subscriber equipment, the e.i.r.p. shall not exceed 2 watts.

1.6.3. Conducted RF Output Power – LTE Band 7 (2500 - 2570MHz)

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
			20775	21100	21425	20775	21100	21425
			2502.5MHz	2535MHz	2567.5MHz	2502.5MHz	2535MHz	2567.5MHz
Band 7 / 5.0MHz	1	0	22.256	22.701	22.578	21.136	21.754	21.843
	1	13	22.262	22.754	22.473	21.148	21.855	21.753
	1	24	22.112	22.693	22.318	21.105	21.757	21.518
	12	0	21.321	21.743	21.596	20.3	20.667	20.669
	12	6	21.329	21.782	21.55	20.346	20.686	20.627
	12	13	21.29	21.754	21.437	20.332	20.665	20.536
	25	0	21.282	21.719	21.52	20.285	20.705	20.635

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
			20800	21100	21400	20800	21100	21400
			2505MHz	2535MHz	2565MHz	2505MHz	2535MHz	2565MHz
Band 7 / 10.0MHz	1	0	22.049	22.699	22.01	21.019	21.646	21.435
	1	25	21.899	22.734	22.384	20.981	21.628	21.799
	1	49	22.206	22.706	22.077	21.378	21.64	21.498

	25	0	21.201	21.686	21.301	20.275	20.768	20.378
	25	13	21.183	21.718	21.55	20.277	20.772	20.592
	25	25	21.234	21.696	21.447	20.429	20.752	20.547
	50	0	21.243	21.689	21.415	20.285	20.718	20.507

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
			20825	21100	21375	20825	21100	21375
			2507.5MHz	2535MHz	2562.5 MHz	2507.5MHz	2535MHz	2562.5MHz
Band 7 / 15.0MHz	1	0	21.92	22.663	21.84	20.957	21.599	21.216
	1	38	22.179	22.703	22.105	21.234	21.642	21.464
	1	74	22.593	22.491	22.026	21.678	21.483	21.36
	36	0	21.12	21.679	20.997	20.201	20.685	20.101
	36	19	21.394	21.733	21.233	20.482	20.71	20.291
	36	39	21.527	21.709	21.403	20.601	20.667	20.481
	75	0	21.297	21.653	21.143	20.387	20.651	20.263

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
			20850	21100	21350	20850	21100	21350
			2510 MHz	2535MHz	2560MHz	2510MHz	2535MHz	2560MHz
Band 7 / 20.0MHz	1	0	21.815	22.537	22.065	21.315	21.943	21.14
	1	49	22.417	22.588	21.913	22.002	21.973	20.986
	1	99	22.402	22.28	21.88	21.943	21.717	20.961
	50	0	21.197	21.66	21.006	20.247	20.675	20.09
	50	25	21.538	21.719	21.124	20.593	20.7	20.171
	50	50	21.665	21.685	21.273	20.747	20.686	20.355
	100	0	21.307	21.678	21.081	20.398	20.675	20.151

1.6.4. Equivalent Isotropically Radiated Power (EIRP) – LTE Band 7 (2500 - 2570MHz)

EIRP (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			20775	21100	21425	20775	21100	21425
			2502.5MHz	2535MHz	2567.5MHz	2502.5MHz	2535MHz	2567.5MHz
Band 7 / 5.0MHz	1	0	23.356	23.801	23.678	22.236	22.854	22.943
	1	13	23.362	23.854	23.573	22.248	22.955	22.853
	1	24	23.212	23.793	23.418	22.205	22.857	22.618
	12	0	22.421	22.843	22.696	21.4	21.767	21.769
	12	6	22.429	22.882	22.65	21.446	21.786	21.727
	12	13	22.39	22.854	22.537	21.432	21.765	21.636
	25	0	22.382	22.819	22.62	21.385	21.805	21.735

EIRP (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			20800	21100	21400	20800	21100	21400
			2505MHz	2535MHz	2565MHz	2505MHz	2535MHz	2565MHz
Band 7 / 10.0MHz	1	0	23.149	23.799	23.11	22.119	22.746	22.535
	1	25	22.999	23.834	23.484	22.081	22.728	22.899
	1	49	23.306	23.806	23.177	22.478	22.74	22.598
	25	0	22.301	22.786	22.401	21.375	21.868	21.478
	25	13	22.283	22.818	22.65	21.377	21.872	21.692
	25	25	22.334	22.796	22.547	21.529	21.852	21.647
	50	0	22.343	22.789	22.515	21.385	21.818	21.607

EIRP (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			20825	21100	21375	20825	21100	21375
			2507.5MHz	2535MHz	2562.5 MHz	2507.5MHz	2535MHz	2562.5MHz
Band 7 / 15.0MHz	1	0	23.02	23.763	22.94	22.057	22.699	22.316
	1	38	23.279	23.803	23.205	22.334	22.742	22.564
	1	74	23.693	23.591	23.126	22.778	22.583	22.46
	36	0	22.22	22.779	22.097	21.301	21.785	21.201
	36	19	22.494	22.833	22.333	21.582	21.81	21.391
	36	39	22.627	22.809	22.503	21.701	21.767	21.581
	75	0	22.397	22.753	22.243	21.487	21.751	21.363

EIRP (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			20850	21100	21350	20850	21100	21350
			2510 MHz	2535MHz	2560MHz	2510MHz	2535MHz	2560MHz
Band 7 / 20.0MHz	1	0	22.915	23.637	23.165	22.415	23.043	22.24
	1	49	23.517	23.688	23.013	23.102	23.073	22.086
	1	99	23.502	23.38	22.98	23.043	22.817	22.061
	50	0	22.297	22.76	22.106	21.347	21.775	21.19
	50	25	22.638	22.819	22.224	21.693	21.8	21.271
	50	50	22.765	22.785	22.373	21.847	21.786	21.455
	100	0	22.407	22.778	22.181	21.498	21.775	21.251

The maximum ERP/EIRP from the measured RF output power is given in Equation as follows:

$$\text{EIRP} = \text{P}_{\text{Meas}} + \text{G}_T$$

$$\text{ERP} = \text{EIRP} - 2.15$$

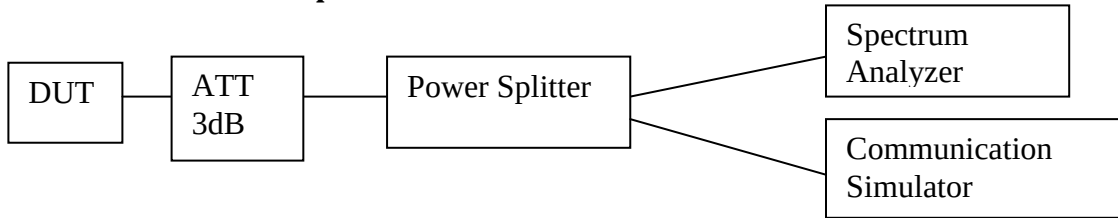
Where, ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively
 (Expressed in the same units as P_{Meas}, e.g., dBm)

P_{Meas} measured transmitter output power, in dBm

G_T gain of the transmitting antenna, in dBi (EIRP)

1.7. Peak-to-Average Power Ratio

1.7.1. Test Setup



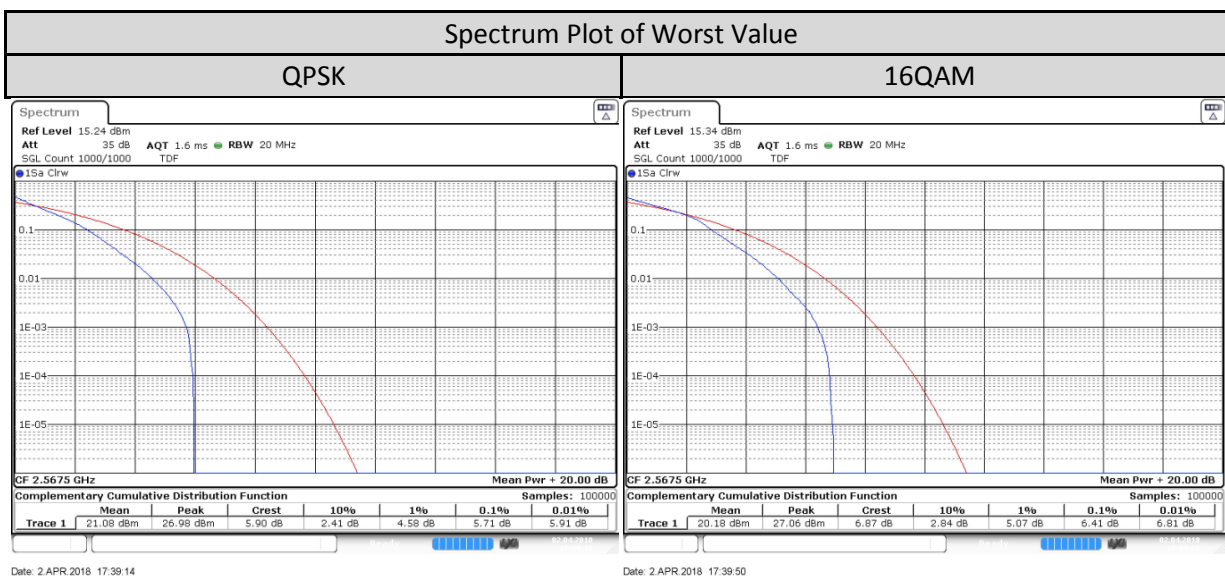
1. The DUT transmitter output port was connected to communication simulator with above setup.
2. Path loss for the measurement included.
3. Set DUT to transmit maximum power through communication simulator
4. Set the CCDF (Complementary Cumulative Distribution Function) option in the spectrum analyzer.
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.

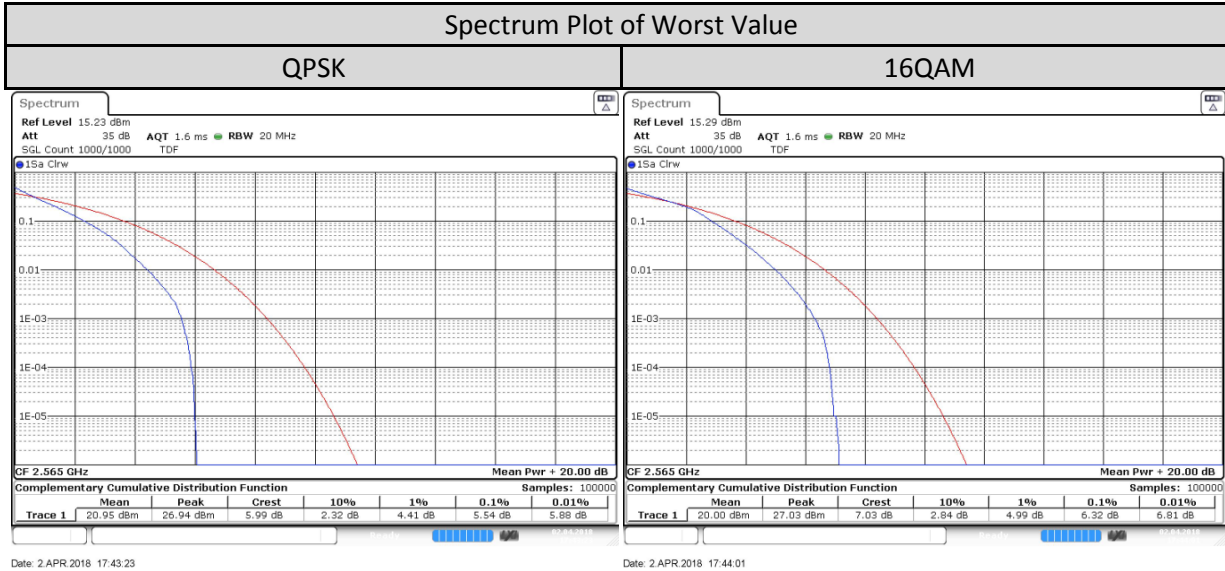
1.7.3. Peak-to-Average Power Ratio –LTE Band 7 (2500 - 2570MHz)

LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 7/5MHz/25/0	Low CH 20775	2502.5 MHz	4.551	5.507
	Mid CH 21100	2535 MHz	4.58	5.594
	High CH 21425	2567.5 MHz	5.71	6.406

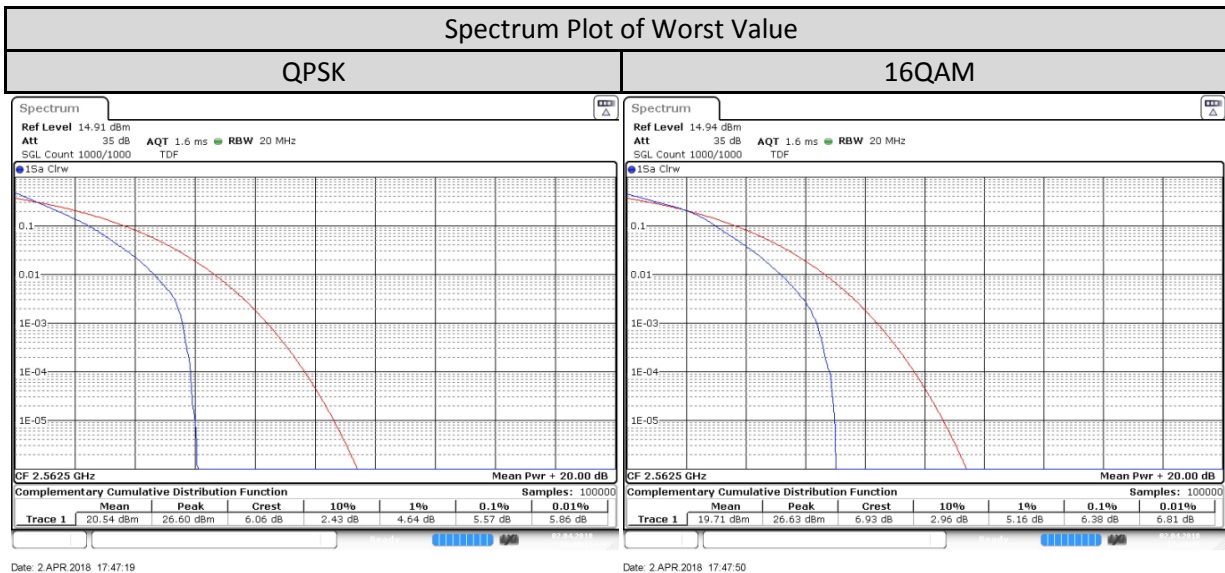


LTE Band/BW/RB	Channel Number	Tx	Peak To Average (dB)
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Size/RB Offset		Frequency	QPSK Modulation	16QAM Modulation
Band 7/10MHz/50/0	Low CH 20800	2505 MHz	4.696	5.594
	Mid CH 21100	2535 MHz	4.493	5.565
	High CH 21400	2565 MHz	5.536	6.319

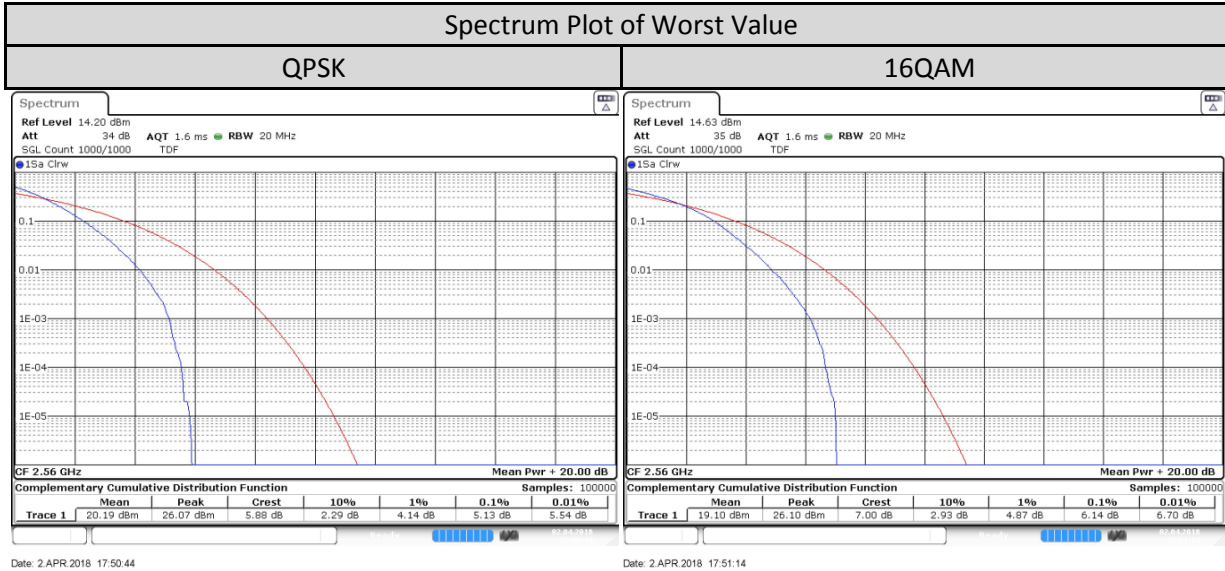


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 7/15MHz/75/0	Low CH 20825	2507.5 MHz	4.986	5.913
	Mid CH 21100	2535 MHz	4.522	5.536
	High CH 21375	2562.5 MHz	5.565	6.377



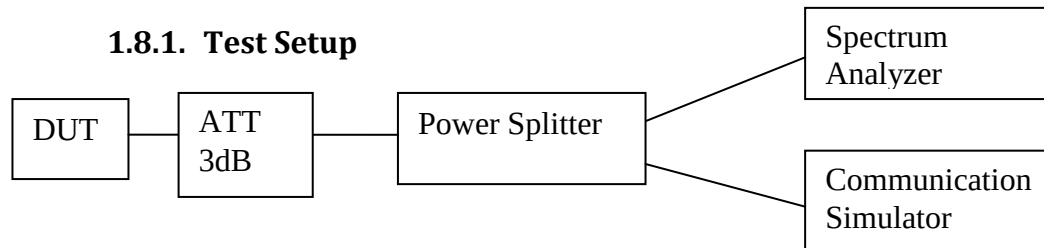
LTE Band/BW/RB	Channel Number	Tx	Peak To Average (dB)
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Size/RB Offset		Frequency	QPSK Modulation	16QAM Modulation
Band 7/ 20MHz/100/0	Low CH 20850	2510 MHz	4.986	5.942
	Mid CH 21100	2535 MHz	4.406	5.507
	High CH 21350	2560 MHz	5.13	6.145



1.8. Occupied Bandwidth

1.8.1. Test Setup



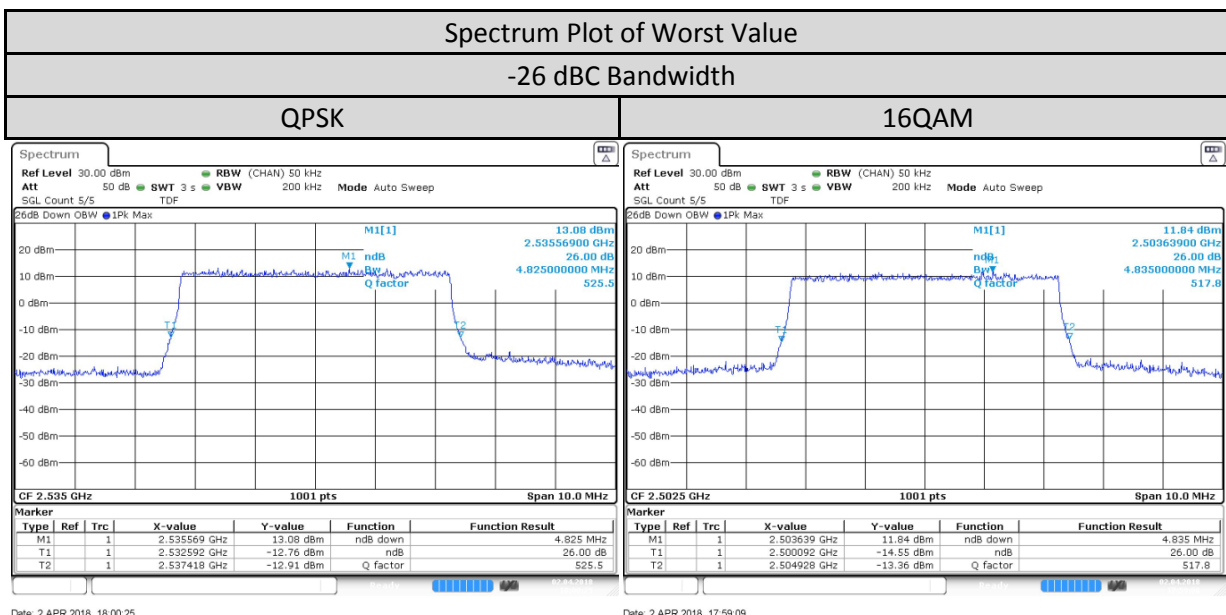
- 1) The DUT transmitter output port was connected to communication simulator with above setup.
- 2) Path loss for the measurement included.
- 3) For LTE measurement, set DUT to transmit maximum power & full RB size through communication simulator.
- 4) For LTE measurement, set DUT to transmit maximum 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

The 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 26 dB below the transmitter power.

1.8.3. Occupied Bandwidth – LTE Band 7 (2500 - 2570MHz)

LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 7/5MHz/25/0	Low CH 20775	2502.5 MHz	4.815	4.835
	Mid CH 21100	2535 MHz	4.825	4.785
	High CH 21425	2567.5 MHz	4.815	4.825

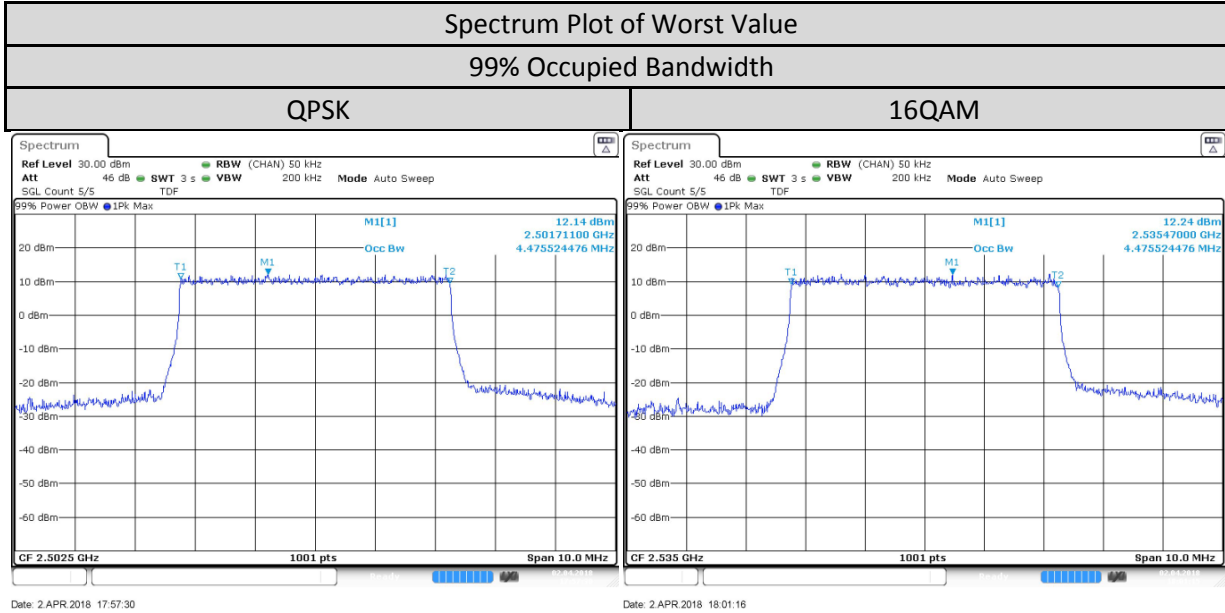


Date: 2 APR 2018 18:00:25

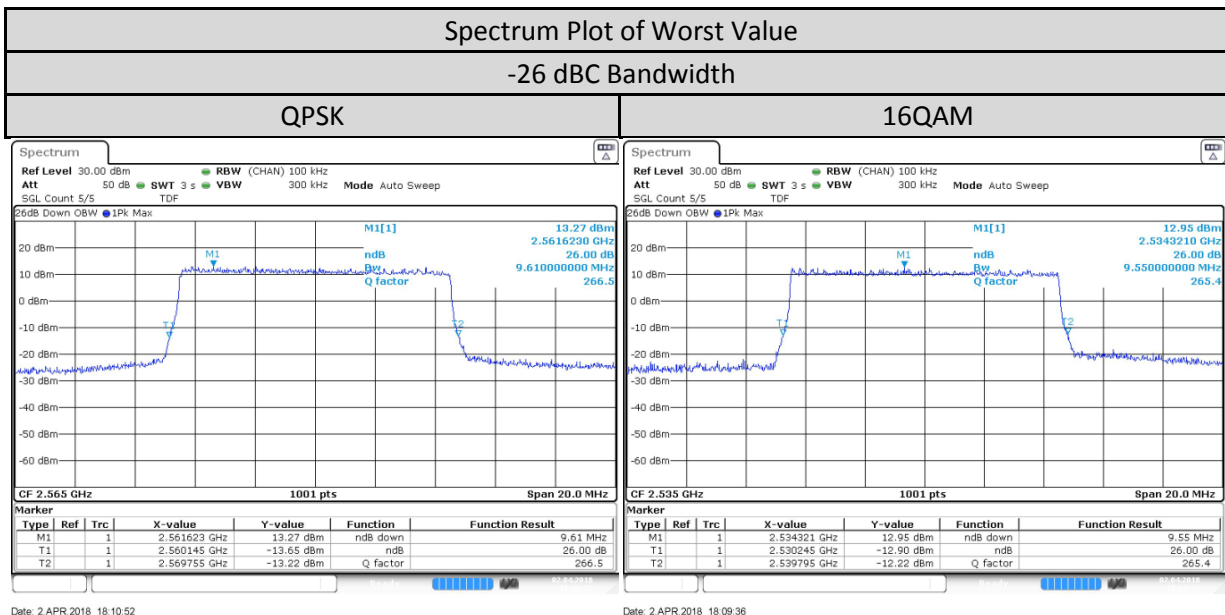
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LTE Band/BW/RB	Channel	Tx Frequency	99% Occupied Bandwidth (MHz)
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Size/RB Offset	Number		QPSK Modulation	16QAM Modulation
Band 7/5MHz/25/0	Low CH 20775	2502.5 MHz	4.476	4.466
	Mid CH 21100	2535 MHz	4.456	4.476
	High CH 21425	2567.5 MHz	4.476	4.476

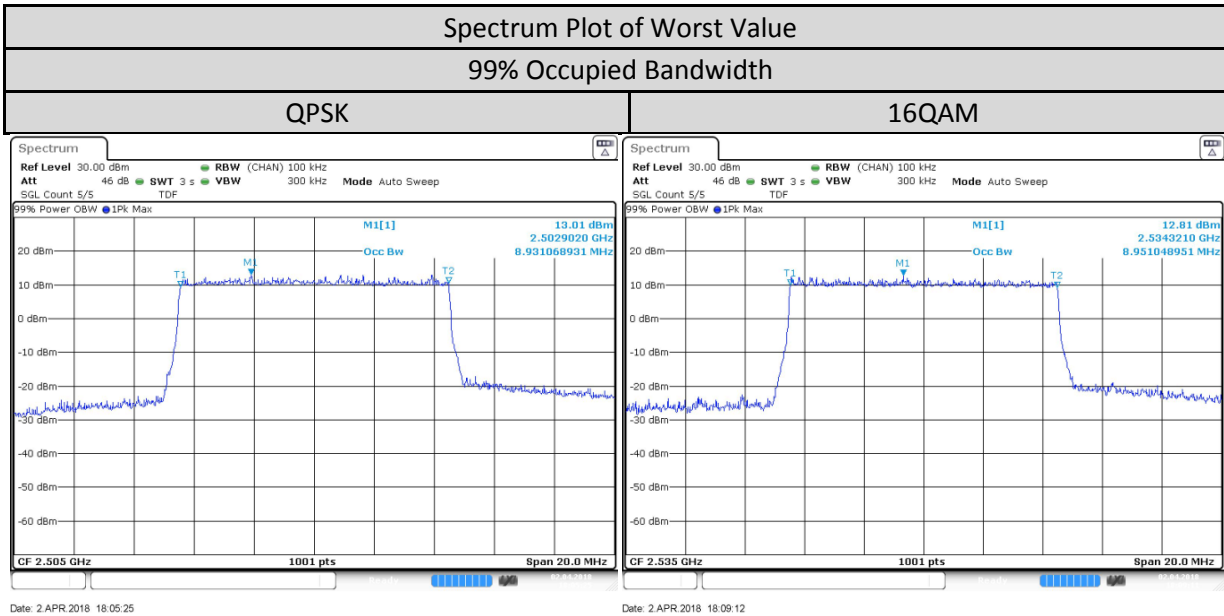


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 7/10MHz/50/0	Low CH 20800	2505 MHz	9.55	9.53
	Mid CH 21100	2535 MHz	9.51	9.55
	High CH 21400	2565 MHz	9.61	9.55

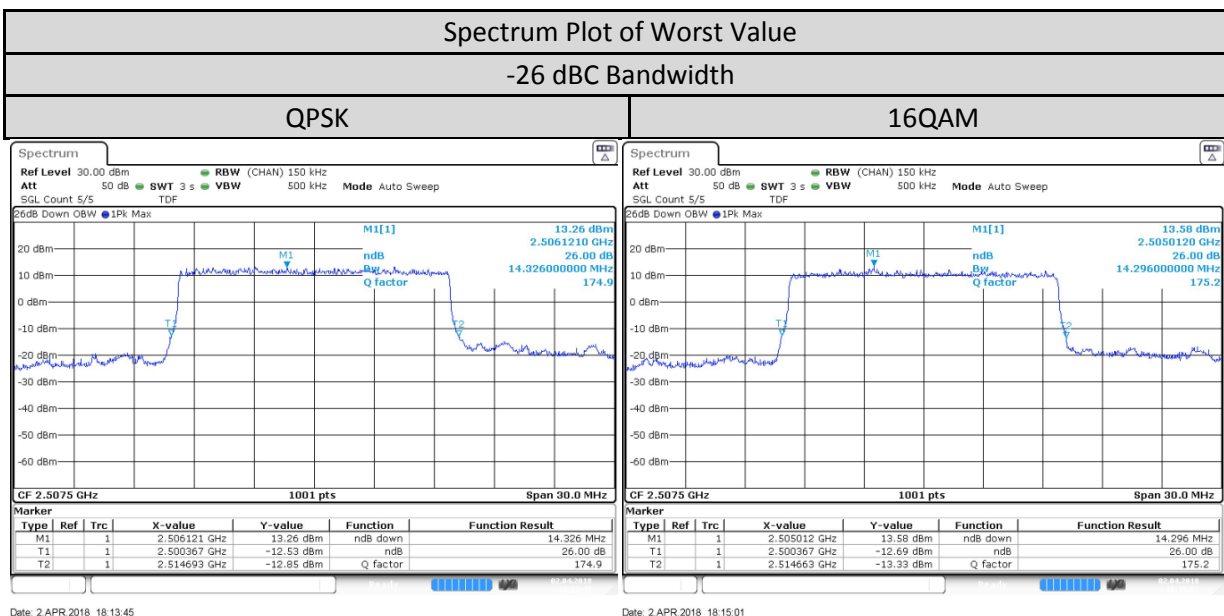


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation

Band 7/10MHz/50/0	Low CH 20800	2505 MHz	8.931	8.911
	Mid CH 21100	2535 MHz	8.931	8.951
	High CH 21400	2565 MHz	8.931	8.931

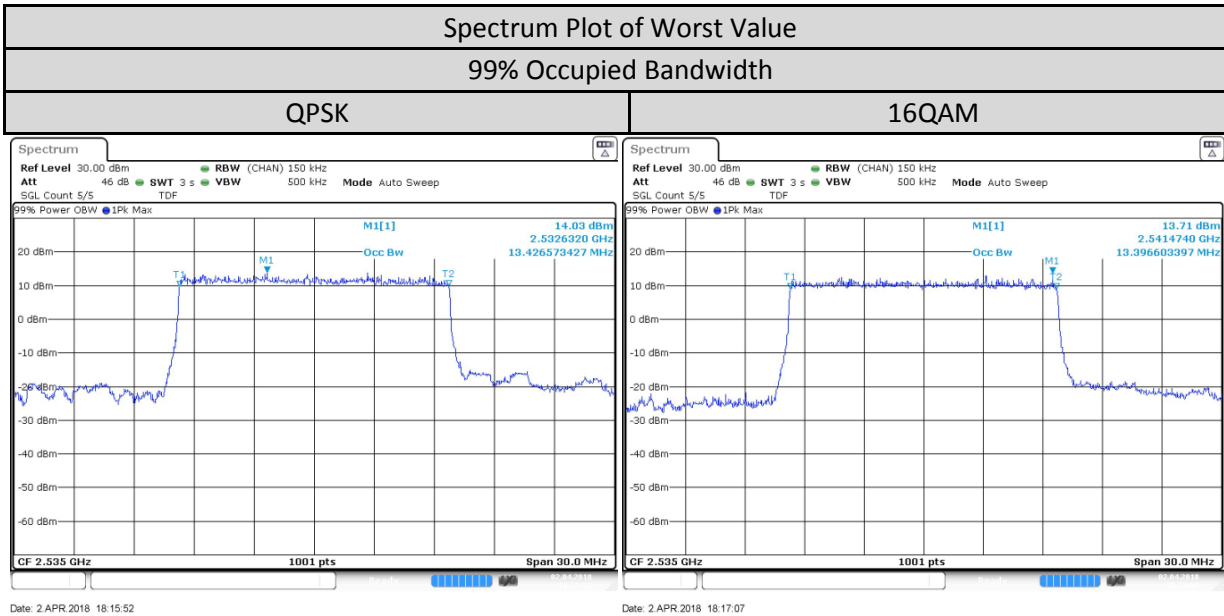


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 7/15MHz/75/0	Low CH 20825	2507.5 MHz	14.326	14.296
	Mid CH 21100	2535 MHz	14.296	14.236
	High CH 21375	2562.5 MHz	14.266	14.176

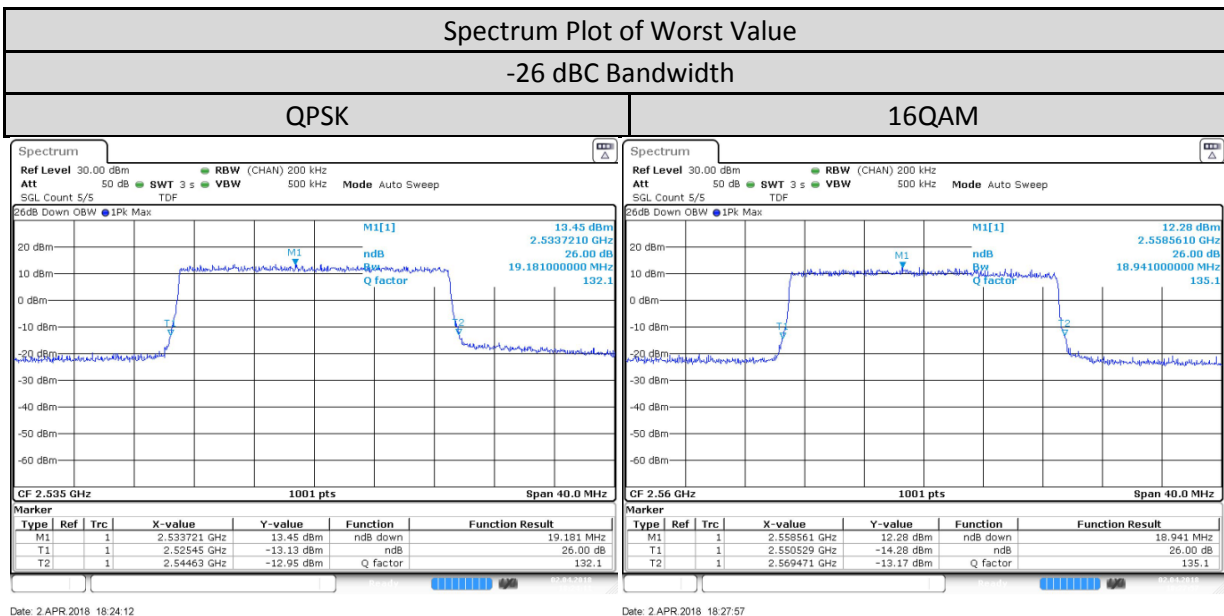


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band	Low CH 20825	2507.5 MHz	13.367	13.367

7/15MHz/75/0	Mid CH 21100	2535 MHz	13.427	13.397
	High CH 21375	2562.5 MHz	13.367	13.397



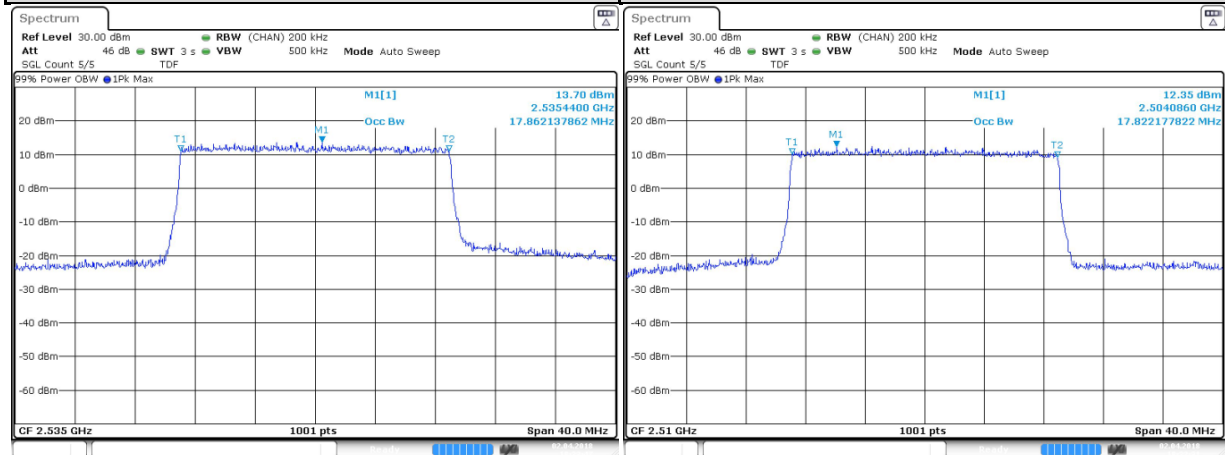
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 7/20MHz/100/0	Low CH 20850	2510 MHz	19.061	18.901
	Mid CH 21100	2535 MHz	19.181	18.901
	High CH 21350	2560 MHz	18.701	18.941



LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 7/20MHz/100/0	Low CH 20850	2510 MHz	17.822	17.822
	Mid CH 21100	2535 MHz	17.862	17.822

	High CH 21350	2560 MHz	17.822	17.822
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Spectrum Plot of Worst Value	
99% Occupied Bandwidth	
QPSK	16QAM

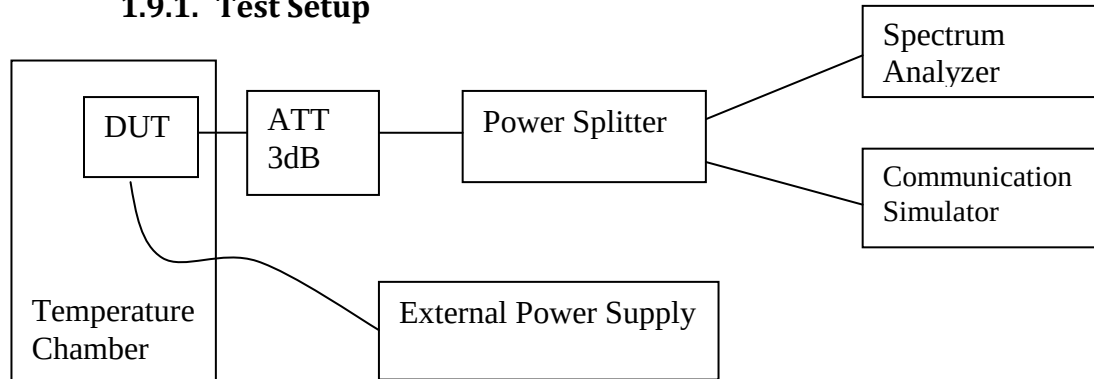


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1.9. Frequency Stability

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 7 (2500 - 2570MHz)

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 5 MHz			
		Low Channel		High Channel	
		2502.5MHz		2567.5MHz	
		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
LTE Band 7	50	2502.499982	-0.007014	2567.499986	-0.005332
	40	2502.499985	-0.006099	2567.499982	-0.007204
	30	2502.499982	-0.007334	2567.499982	-0.006926
	20	2502.499985	-0.006191	2567.499986	-0.005304
	10	2502.499984	-0.006219	2567.499984	-0.006123
	0	2502.499986	-0.005419	2567.499986	-0.005605
	-10	2502.499981	-0.007448	2567.499993	-0.002624
	-20	2502.499985	-0.006156	2567.499987	-0.004953
	-30	2502.499984	-0.006442	2567.499985	-0.005995

Band	Voltage	Frequency Error VS Voltage
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	(V)	Channel Bandwidth: 5 MHz			
		Low Channel		High Channel	
		2502.5MHz		2567.5MHz	
LTE Band 7		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	4.35	2502.499982	-0.007237	2567.499983	-0.006714
	3.7	2502.499982	-0.007283	2567.499985	-0.005672
	3.2	2502.499984	-0.006379	2567.500014	0.005516

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 10 MHz			
		Low Channel		High Channel	
		2505MHz		2565MHz	
LTE Band 7		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	50	2505.000014	0.005488	2565.000013	0.005237
	40	2504.999979	-0.008218	2564.999985	-0.005956
	30	2505.000013	0.005351	2564.999988	-0.004869
	20	2505.000014	0.005539	2564.999986	-0.005382
	10	2505.000014	0.005591	2565.000026	0.010156
	0	2505.000016	0.006476	2565.000014	0.005566
	-10	2505.000014	0.005556	2565.000015	0.005973
	-20	2505.000013	0.005317	2565.000013	0.005164
	-30	2505.000013	0.005334	2565.000014	0.005499

Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 10 MHz			
		Low Channel		High Channel	
		2505MHz		2565MHz	
LTE Band 7		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	4.35	2505.000017	0.006916	2565.000013	0.004913
	3.7	2504.999986	-0.005602	2565.000017	0.006586
	3.2	2505.000015	0.00615	2565.000012	0.004612

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 15 MHz			
		Low Channel		High Channel	
		2507.5MHz		2562.5MHz	
LTE Band 7		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	50	2507.500018	0.007268	2562.499982	-0.007218
	40	2507.500021	0.008187	2562.499981	-0.007391
	30	2507.500028	0.01113	2562.499981	-0.00728
	20	2507.50002	0.008084	2562.499982	-0.007079
	10	2507.500021	0.008483	2562.49998	-0.00762

	0	2507.500023	0.008985	2562.499981	-0.007263
	-10	2507.500022	0.008694	2562.499982	-0.00714
	-20	2507.500023	0.008974	2562.499985	-0.005968
	-30	2507.500019	0.00757	2562.499984	-0.006107

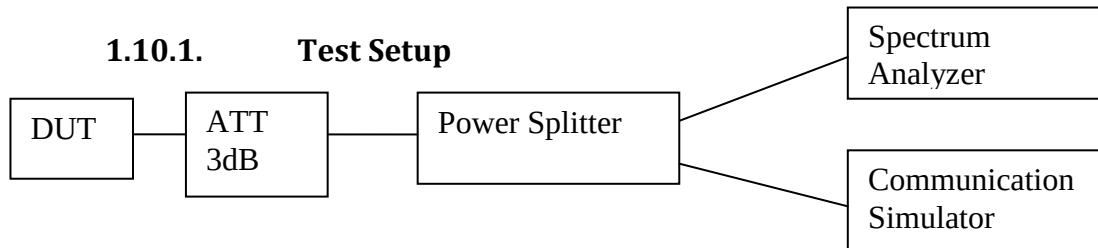
Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 15 MHz			
		Low Channel		High Channel	
		2507.5MHz		2562.5MHz	
LTE Band 7		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	4.35	2507.500019	0.00761	2562.499981	-0.007347
	3.7	2507.500019	0.007645	2562.499982	-0.006855
	3.2	2507.500021	0.008409	2562.499982	-0.006839

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 20 MHz			
		Low Channel		High Channel	
		2510MHz		2560MHz	
LTE Band 7		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	50	2509.999986	-0.005625	2560.000022	0.008538
	40	2510.000013	0.005363	2560.000018	0.006985
	30	2510.000013	0.005021	2560.000018	0.006907
	20	2510.000016	0.006229	2560.000019	0.007454
	10	2510.000014	0.005665	2560.00002	0.007857
	0	2510.000014	0.005762	2560.000019	0.007264
	-10	2510.000017	0.0066	2560.000021	0.008309
	-20	2510.000015	0.006053	2560.00002	0.007907
	-30	2509.999984	-0.006429	2560.00002	0.007823

Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 20 MHz			
		Low Channel		High Channel	
		2510MHz		2560MHz	
LTE Band 7		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	4.35	2510.000014	0.005505	2560.00002	0.007968
	3.7	2510.000014	0.005608	2560.000022	0.008734
	3.2	2510.000015	0.005956	2560.00002	0.007711

1.10. Band Edge Conducted Spurious Emission

1.10.1. Test Setup

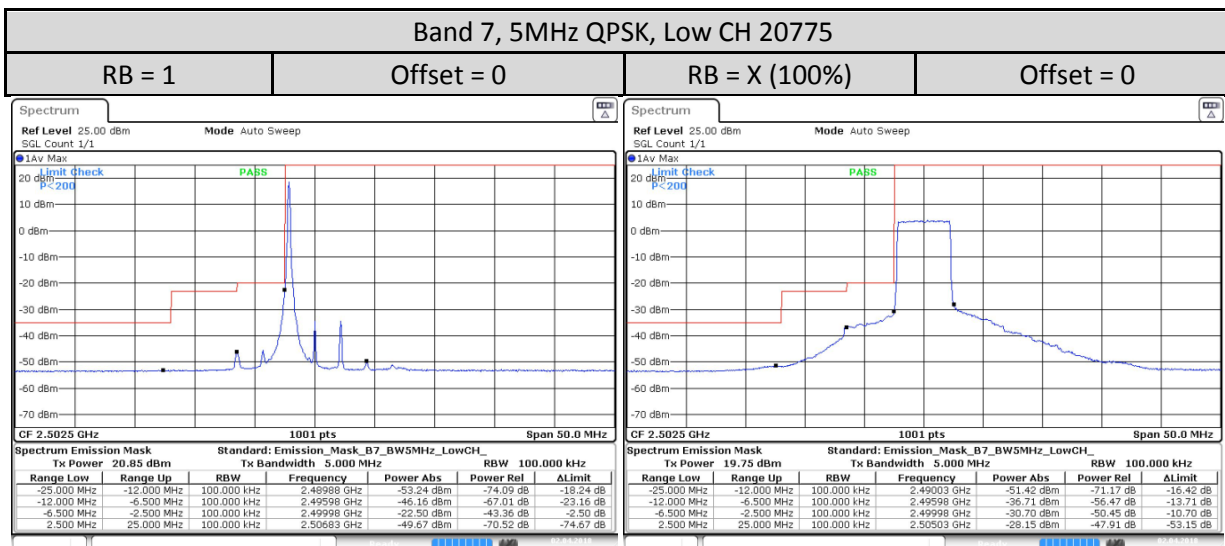


- 1) The DUT transmitter output port was connected to communication simulator with above setup.
- 2) Path loss for the measurement included.
- 3) Set DUT to transmit maximum power through communication simulator.
- 4) The band edges of lowest and highest channels with the highest RF powers were measured.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

1.10.2. Test Limit

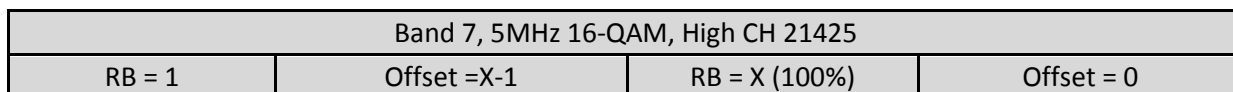
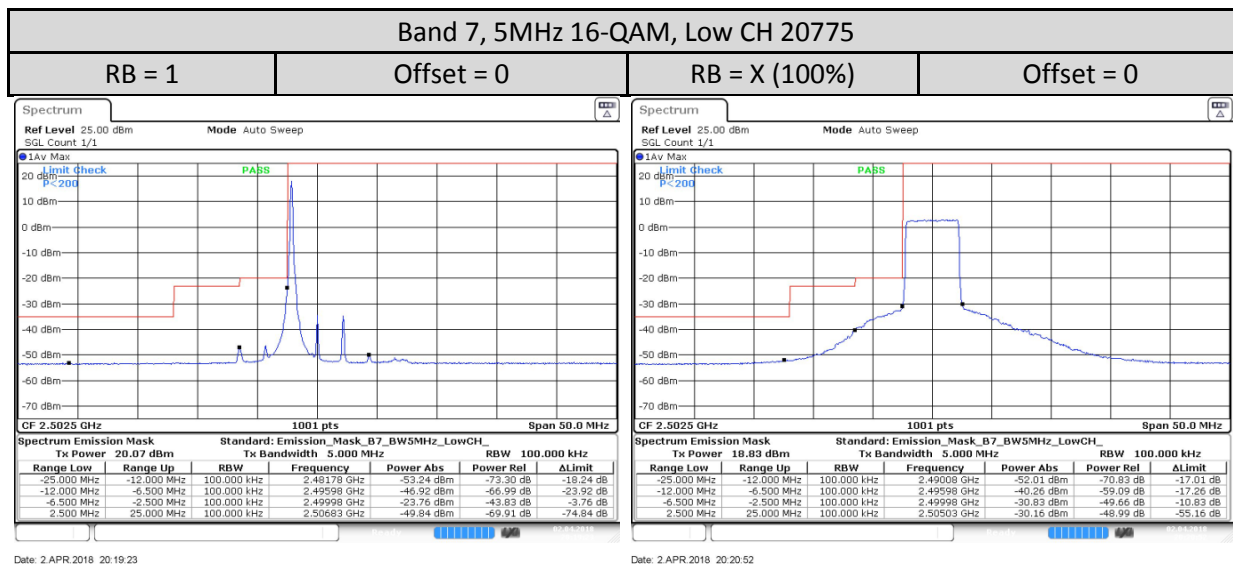
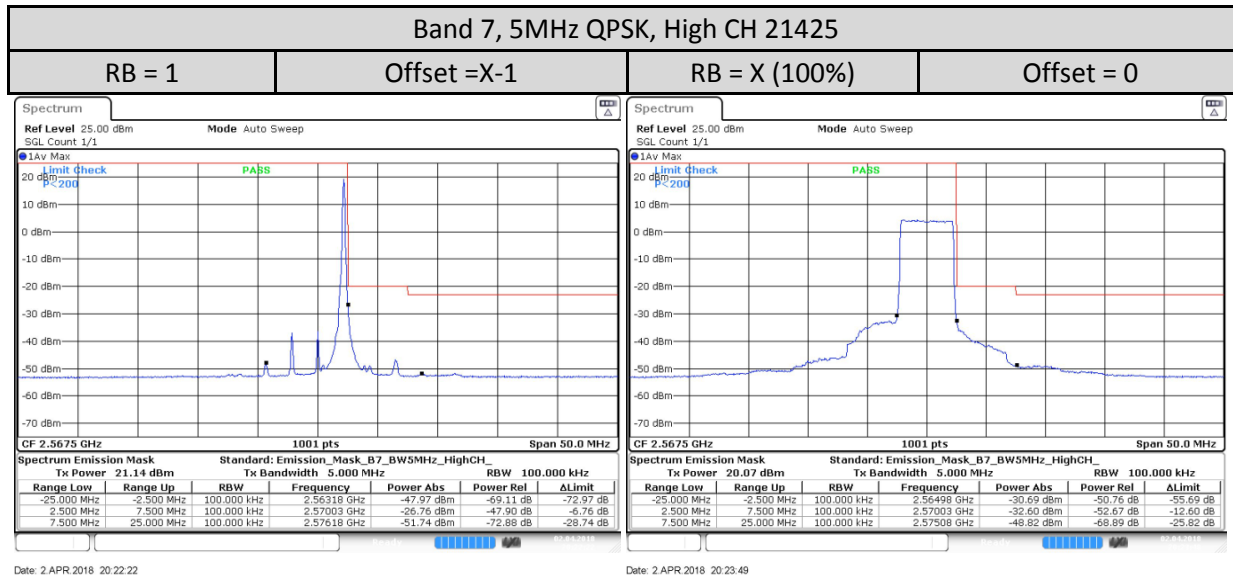
For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the *channel* edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

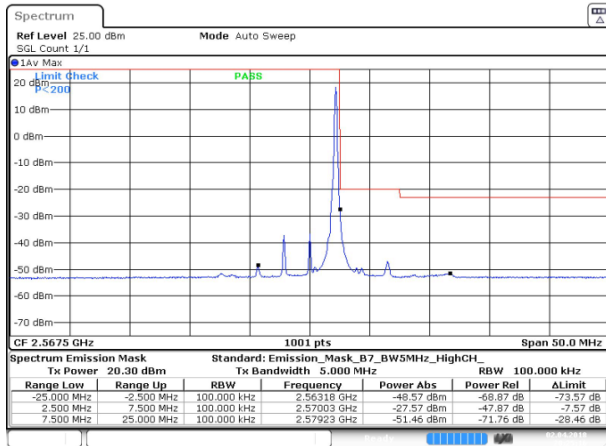
1.10.3. Band Edge Conducted Spurious Emission – LTE Band 7 (2500 - 2570MHz)



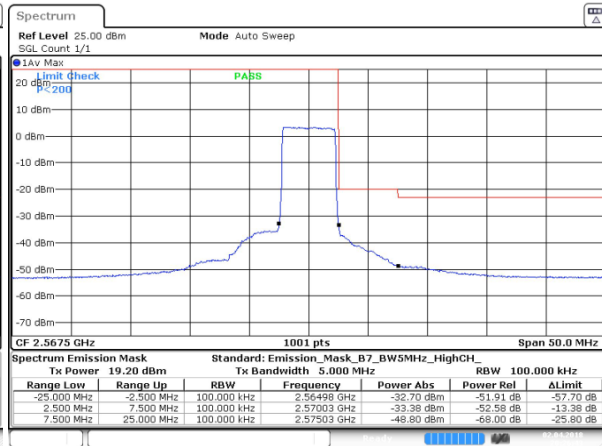
Date: 2 APR 2018 20:16:26

Date: 2 APR 2018 20:17:55





Date: 2 APR 2018 20:25:16



Date: 2 APR 2018 20:26:43

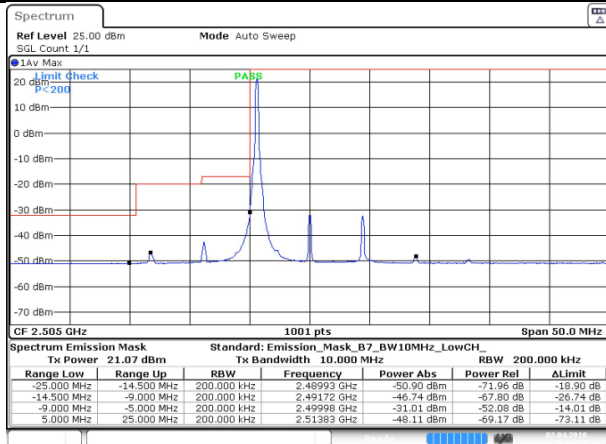
Band 7, 10MHz QPSK, Low CH 20800

RB = 1

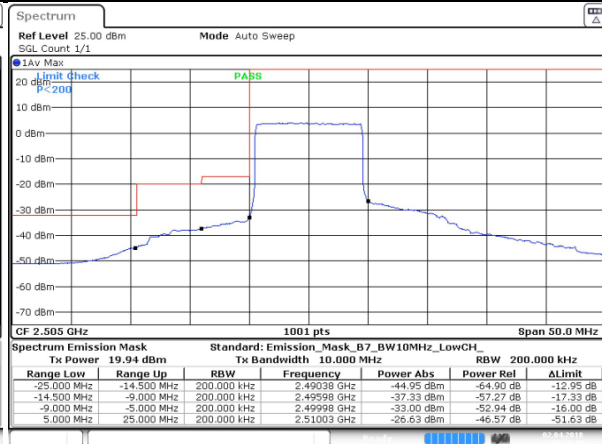
Offset = 0

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:28:15



Date: 2 APR 2018 20:29:45

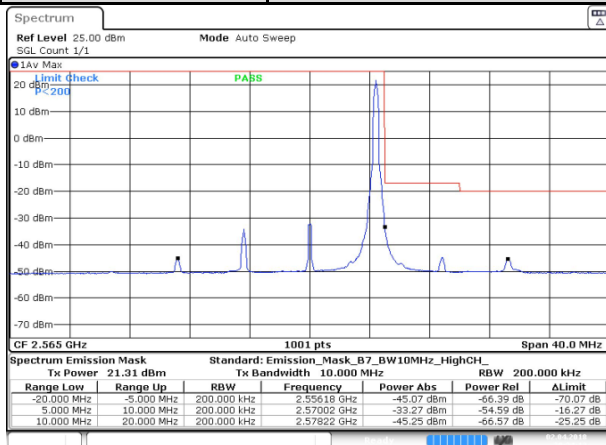
Band 7, 10MHz QPSK, High CH 21400

RB = 1

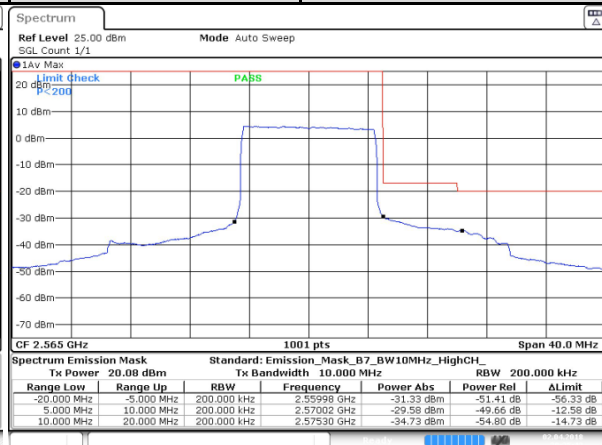
Offset = X-1

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:34:14



Date: 2 APR 2018 20:35:42

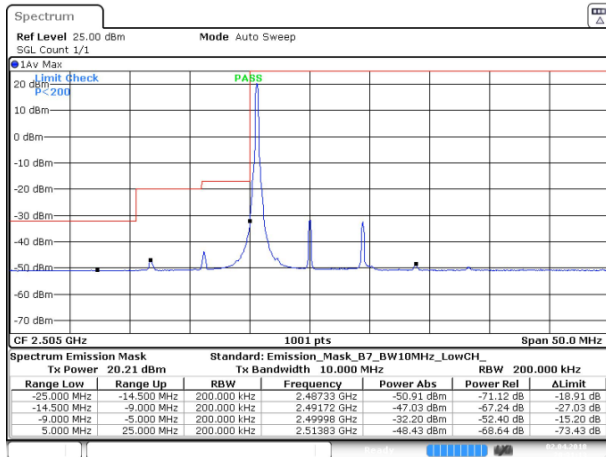
Band 7, 10MHz 16-QAM, Low CH 20800

RB = 1

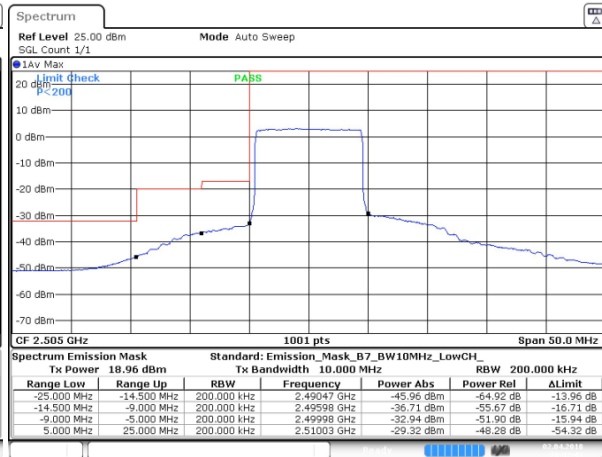
Offset = 0

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:31:13



Date: 2 APR 2018 20:32:43

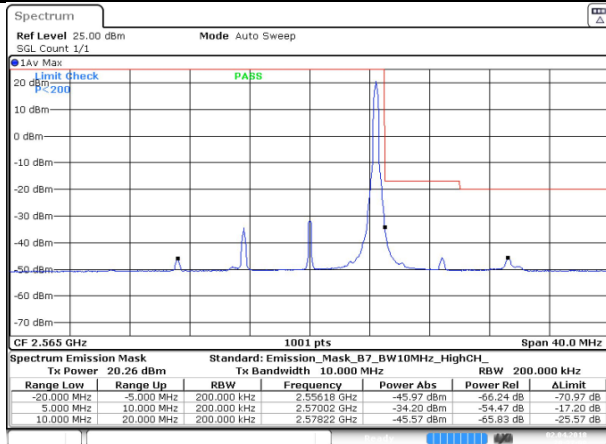
Band 7, 10MHz 16-QAM, High CH 21400

RB = 1

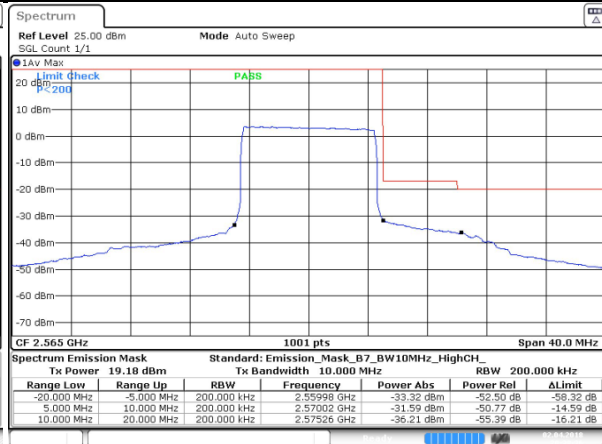
Offset = X-1

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:37:09



Date: 2 APR 2018 20:38:36

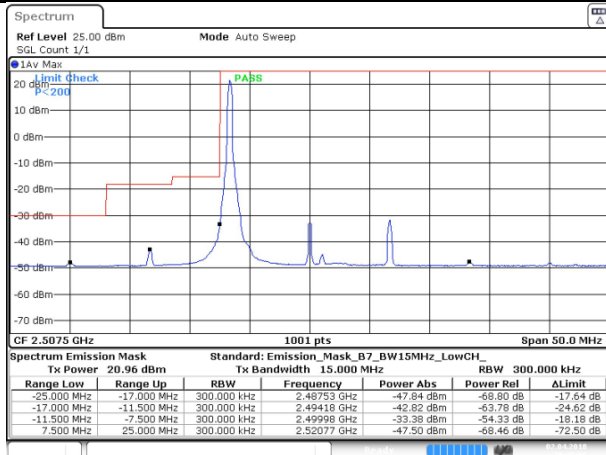
Band 7, 15MHz QPSK, Low CH 20825

RB = 1

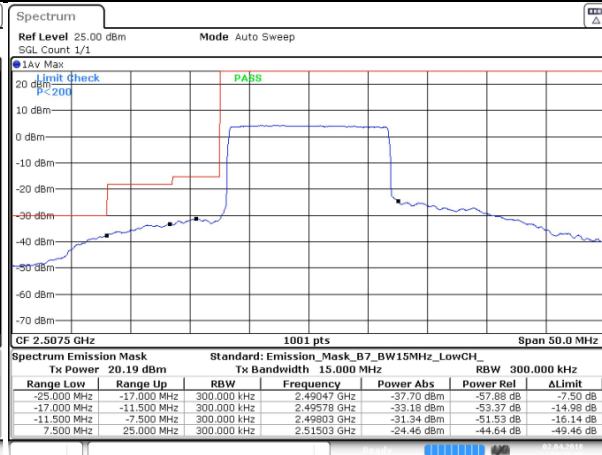
Offset = 0

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:40:09



Date: 2 APR 2018 20:41:38

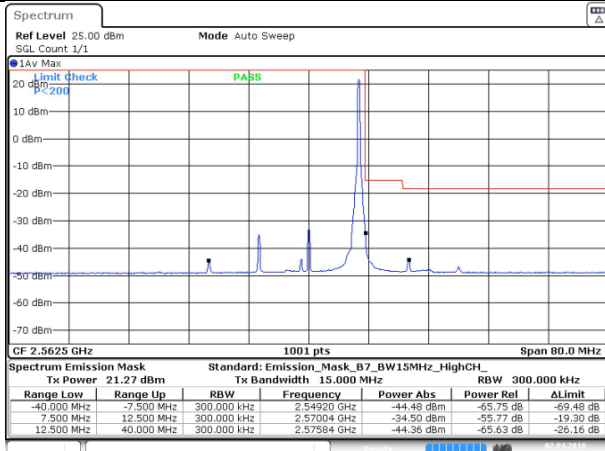
Band 7, 15MHz QPSK, High CH 21375

RB = 1

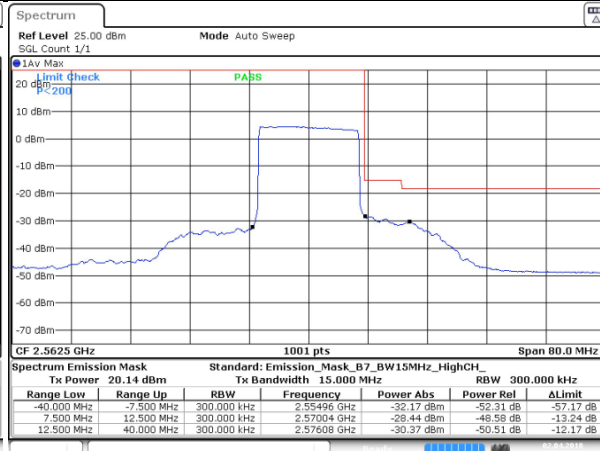
Offset =X-1

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:46:08



Date: 2 APR 2018 20:47:34

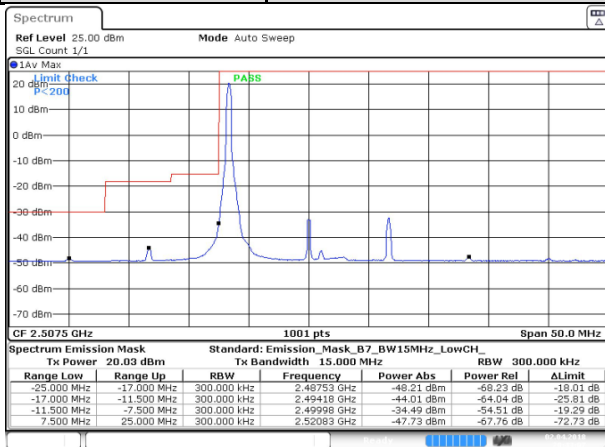
Band 7, 15MHz 16-QAM, Low CH 20825

RB = 1

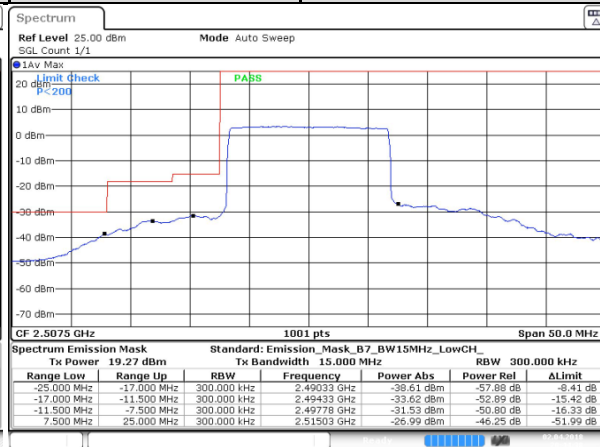
Offset = 0

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:43:07



Date: 2 APR 2018 20:44:37

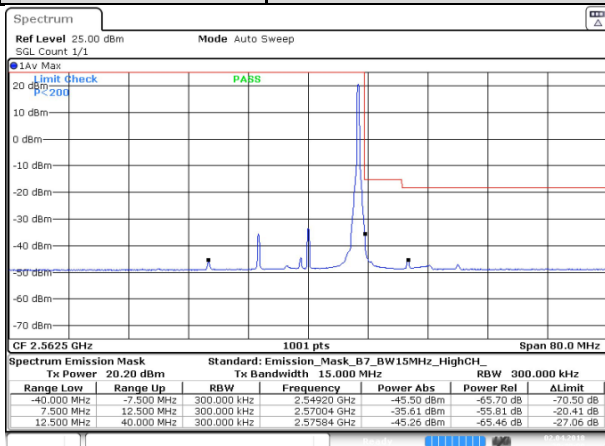
Band 7, 15MHz 16-QAM, High CH 21375

RB = 1

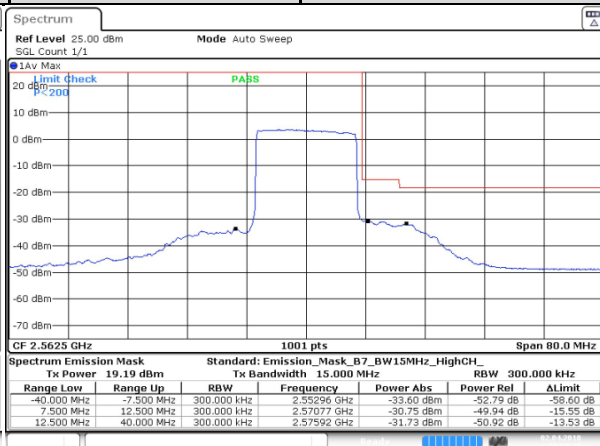
Offset =X-1

RB = X (100%)

Offset = 0



Date: 2 APR 2018 20:49:01



Date: 2 APR 2018 20:50:28