



CERTIFICATION TEST REPORT C2PC

Report Number. : 12371499-E1V2

Applicant : SONY MOBILE COMMUNICATIONS INC
4-12-3 HIGASHI-SHINAGAWA
SHINAGAWA -KU,TOKYO, 140-0002, JAPAN

FCC ID : PY7-54264J

EUT Description : GSM/WCDMA/LTE PHONE WITH BT, DTS/UNII A/B/G/N/AC & NFC

Test Standard(s) : FCC CFR47 PART 27 SUBPART F, H, L, and M

Date Of Issue:
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NVLAP Lab code: 200065-0

Revision History



<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	7/13/2018	Initial Review	--
V2	8/7/2018	Updated Section 2, 5.3, 9.1.1, 9.1.2 & Appendix A	Kiya Kedida

TABLE OF CONTENTS

GSM/WCDMA/LTE PHONE WITH BT, DTS/UNII A/B/G/N/AC & NFC	1
1. ATTESTATION OF TEST RESULTS	5
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION	6
4. CALIBRATION AND UNCERTAINTY	6
4.1. MEASURING INSTRUMENT CALIBRATION	6
4.2. SAMPLE CALCULATION	6
4.3. MEASUREMENT UNCERTAINTY	7
5. EQUIPMENT UNDER TEST	8
5.1. DESCRIPTION OF EUT	8
5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE	8
5.3. MAXIMUM OUTPUT POWER	8
5.4. MAXIMUM ANTENNA GAIN	10
5.5. WORST-CASE CONFIGURATION AND MODE	11
5.6. DESCRIPTION OF TEST SETUP	12
6. TEST AND MEASUREMENT EQUIPMENT	15
7. RF OUTPUT POWER VERIFICATION	16
7.1. LTE 7	18
7.2. LTE 41 (FCC)	20
8. CONDUCTED TEST RESULTS	22
8.1. OCCUPIED BANDWIDTH	22
8.1.1. LTE BAND 7	24
8.1.2. LTE BAND 41	26
8.2. BAND EDGE AND EMISSION MASK	28
8.2.1. LTE BAND 7 ADJACENT CHANNEL POWER	29
8.2.2. LTE BAND 41 ADJACENT CHANNEL POWER	37
8.3. OUT OF BAND EMISSIONS	45
8.3.1. LTE BAND 7	46
8.3.2. LTE BAND 41	50
8.4. FREQUENCY STABILITY	54

8.4.1.	LTE BAND 7.....	55
8.4.2.	LTE BAND 41.....	56
8.5.	PEAK TO AVERAGE RATIO.....	57
8.5.1.	LTE BAND 7.....	58
8.5.2.	LTE BAND 41.....	60
9.	RADIATED TEST RESULTS	62
9.1.	FIELD STRENGTH OF SPURIOUS RADIATION.....	62
9.1.1.	LTE BAND 7.....	63
9.1.2.	LTE BAND 41.....	64
10.	VERIFICATION AND VALIDATION OF USING MOBILE COUNTRY CODE	65
11.	SETUP PHOTOS.....	66

1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	SONY MOBILE COMMUNICATIONS INC 4-12-3 HIGASHI-SHINAGAWA SHINAGAWA -KU,TOKYO, 140-0002, JAPAN	
FCC ID	PY7-54264J	
EUT Description	GSM/WCDMA/LTE PHONE WITH BT, DTS/UNII A/B/G/N/AC & NFC	
Serial Number	BH94005RD5, BH94005ND5, BH94008KD5	
Date Tested	JULY 03, 2018 to JULY 11, 2018	
Applicable Standards	FCC CFR 47 PART 27F,H,L,M	
Test Results	COMPLIES	
<p>UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p> <p>Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.</p>		
Approved & Released For UL Verification Services Inc By:	Reviewed By:	
		
Dan Corona Operations Leader UL Verification Services Inc.	Kiya Kedida Project Engineer UL Verification Services Inc..	

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.26:2015, TIA-603-E, FCC CFR 47 Part 2, Part 27, FCC KDB 971168 D01 v3r1.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd.
<input type="checkbox"/> Chamber A (ISED:2324B-1)	<input type="checkbox"/> Chamber D (ISED:22541-1)	<input type="checkbox"/> Chamber K (ISED: 2324A-1)
<input checked="" type="checkbox"/> Chamber B (ISED:2324B-2)	<input type="checkbox"/> Chamber E (ISED:22541-2)	<input checked="" type="checkbox"/> Chamber L (ISED: 2324A-3)
<input type="checkbox"/> Chamber C (ISED:2324B-3)	<input type="checkbox"/> Chamber F (ISED:22541-3)	
	<input type="checkbox"/> Chamber G (ISED:22541-4)	
	<input type="checkbox"/> Chamber H (ISED:22541-5)	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through C are covered under ISED company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under ISED company address code 22541 with site numbers 22541 -1 through 22541-5, respectively.

ISED company address codes for chambers K through L are in process, and have yet to be determined.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \\ &\text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE PHONE WITH BT, DTS/UNII A/B/G/N/AC & NFC

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The major changes filed under Class II Permissive Change application is:

- Change Single SIM to Dual SIM (Dual Standby) by SW.
- Change in Antenna gain affecting LTE band 7/41.
- Change in Minor circuitry for non-transmitter portion

5.3. MAXIMUM OUTPUT POWER

ERP/EIRP LIMIT

FCC: §2.1046, §27.50

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015/ TIA-603-E Clause 2.2.17
KDB 971168 D01 Section 5.6
KDB 412172 D01 v01r01

$ERP/EIRP = P_{Meas} + GT - LC$

where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as P_{Meas} , typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

The transmitter has a maximum average conducted and ERP / EIRP output powers as follows:

LTE BAND 7

Part 27						
EIRP Limit (dBm)		33.00				
Antenna Gain (dBi)		-4.10				
Bandwidth (MHz)	Frequency Range (MHz)	Modulation	Conducted Average (dBm)	EIRP Average		Margin (dB)
				dBm	mW	
5.0	2500-2570	QPSK	20.2	16.1	40.7	-16.9
		16QAM	20.2	16.1	40.7	-16.9
		64QAM	20.0	15.9	38.9	-17.1
10.0		QPSK	20.4	16.3	42.7	-16.7
		16QAM	20.1	16.0	39.8	-17.0
		64QAM	20.0	15.9	38.9	-17.1
15.0		QPSK	20.4	16.3	42.7	-16.7
		16QAM	20.2	16.1	40.7	-16.9
		64QAM	20.1	16.0	39.8	-17.0
20.0		QPSK	20.4	16.3	42.7	-16.7
		16QAM	20.4	16.3	42.7	-16.7
		64QAM	20.3	16.2	41.7	-16.8

LTE BAND 41

Part 27						
EIRP Limit (dBm)		33.00				
Antenna Gain (dBi)		-3.20				
Bandwidth (MHz)	Frequency Range (MHz)	Modulation	Conducted Average (dBm)	EIRP Average		Margin (dB)
				dBm	mW	
5.0	2496-2690	QPSK	24.5	21.3	134.9	-11.7
		16QAM	23.6	20.4	109.6	-12.6
		64QAM	23.0	19.8	95.5	-13.2
10.0		QPSK	24.5	21.3	134.9	-11.7
		16QAM	23.6	20.4	109.6	-12.6
		64QAM	22.8	19.6	91.2	-13.4
15.0		QPSK	24.5	21.3	134.9	-11.7
		16QAM	23.6	20.4	109.6	-12.6
		64QAM	22.8	19.6	91.2	-13.4
20.0		QPSK	24.5	21.3	134.9	-11.7
		16QAM	23.6	20.4	109.6	-12.6
		64QAM	23.0	19.8	95.5	-13.2

5.4. MAXIMUM ANTENNA GAIN

Please see table below:

LTE Bands	Antenna Gain (dBi)
LTE BAND 7, 2500 - 2570 MHz	-4.1
LTE BAND 41 2496 - 2690 MHz	-3.2

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on QPSK, 16QAM, and 64QAM modulations. It was found that QPSK, and 16QAM results were worst case. All testing was performed using QPSK, and 16QAM modulations to represent the worst case.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y, & Z, and it was determined that X-Axis with AC/DC Adapter and headset was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X-Axis with AC/DC Adapter and headset orientation.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	SONY	UCH20	3416W45305784	N/A
DC Power Supply	Ametek	XT 15-4	T463	N/A
Audio & Charging Cable	SONY	1312-8675.1B	YYWWSSPCXXXXXC	N/A
Earphone	SONY	MH750	N/A	N/A

I/O CABLES (RF Conducted Test)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Shielded	None	NA
2	Antenna Port	1	EUT	Shielded	0.1m	NA
3	RF In/Out	1	Communication Test Set	Shielded	1m	NA

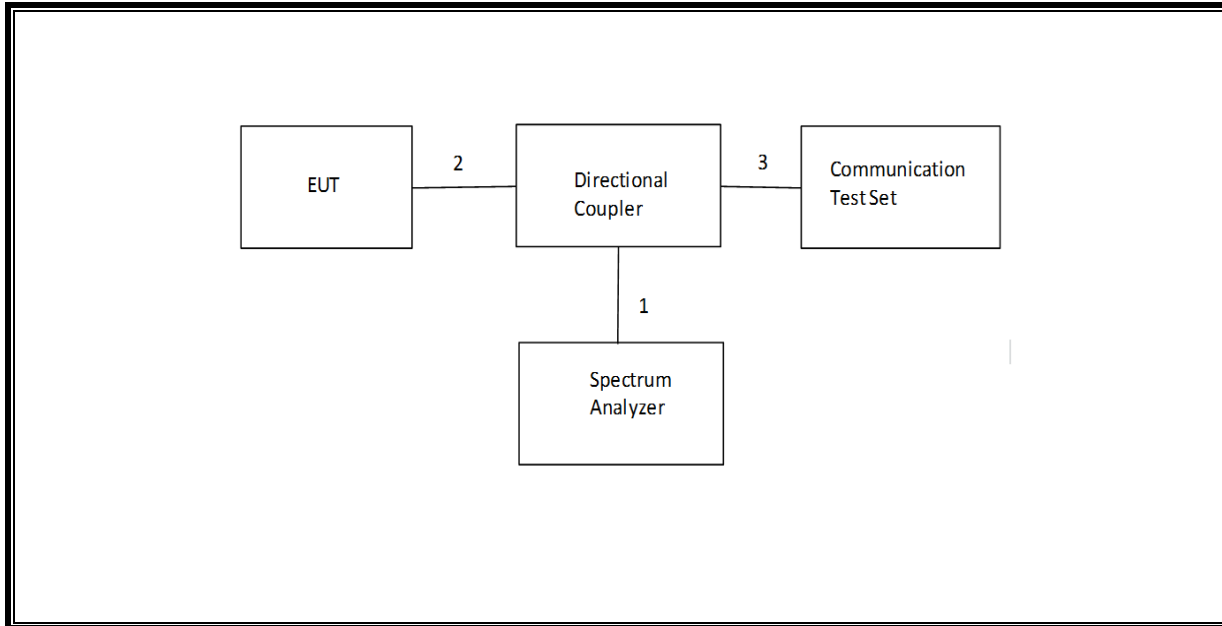
I/O CABLES (RF Radiated Test)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length	Remarks
1	USB	1	AC Adapter	Un-shielded	1.2m	No
2	Jack	1	Headset	Shielded	1m	No
3	USB/Headphone Jack	1	USB Type-C/Audio	Un-shielded	.2m	Audio & Charging Cable
4	RF In/out	1	Communication Test Set	Un-shielded	2m	No

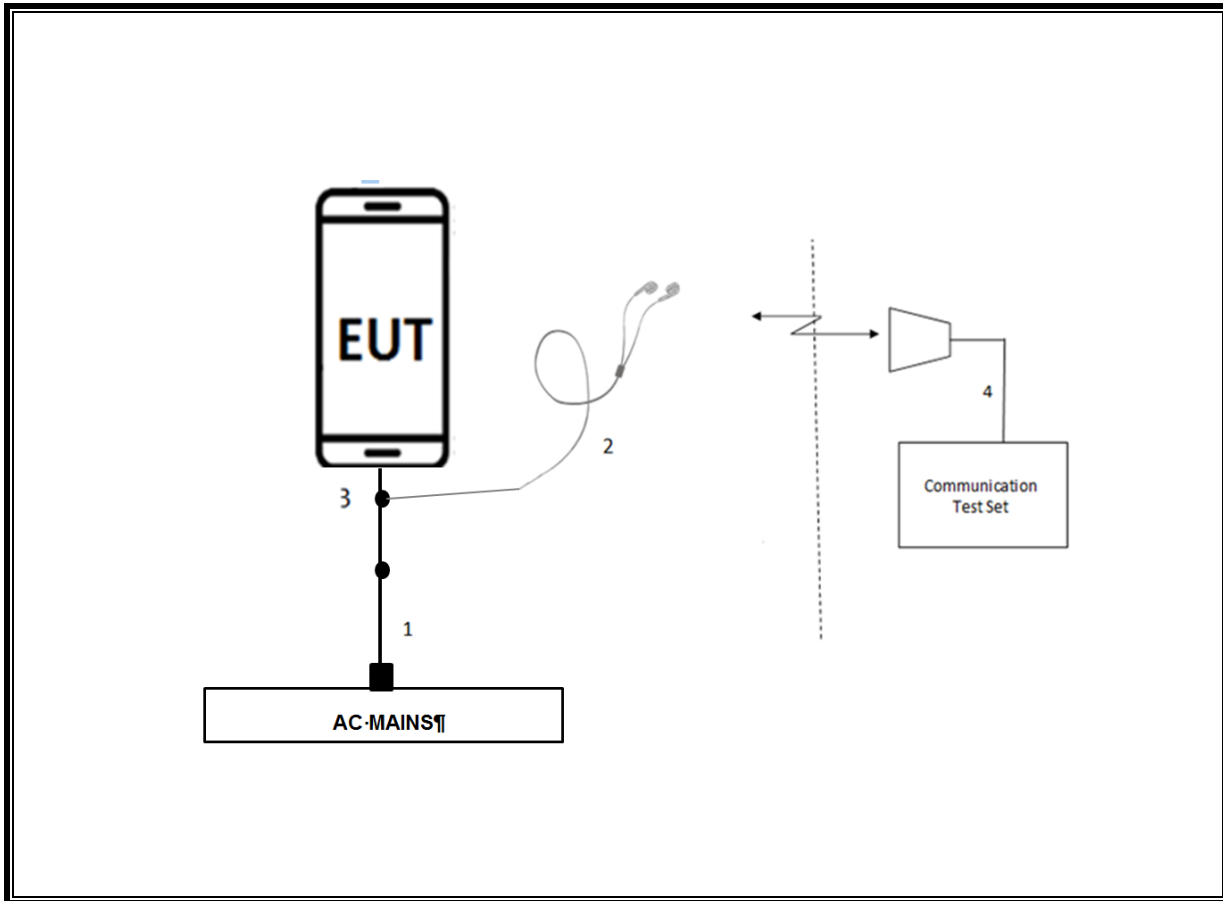
TEST SETUP

The EUT is continuously communicated to the call box during the tests

CONDCUTED TEST SETUP DIAGRAM



RADIATED TEST SETUP DIAGRAM



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Highpass Filter, 2.7 GHz	Micro-Circuits	H2G518G6	T772	07/05/19	07/05/18
Highpass Filter, 1 GHz	Micro-Tronics	HPM18129	T889	02/21/19	02/21/18
Highpass Filter, 4GHz	Micro-Tronics	HPM13351	T1241	07/19/18	07/19/17
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T4942	04/30/19	04/30/18
RF Amplifier	MITEQ	AFS42-00101800-25-S-42	T1568	06/21/19	06/21/18
Directional Coupler	Mini-Circuits	ZUDC10-183+	T1136	06/18/19	06/18/18
Wideband Communication Test Set, Call Box	R&S	CMW500	T972	05/29/19	05/29/18
Wideband Communication Test Set, Call Box	R&S	CMW500	T1872	02/15/19	02/15/18
Chamber, Environmental	Thermotron	SE-600-10-10	T80	02/22/19	02/22/18
Spectrum Analyzer	Agilent (Keysight) Technologies	E4446A	T146	07/18/18	07/18/17
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1450	02/05/19	02/05/18
EMI TEST RECEIVER	R&S	ESW44	PRE0179522	05/11/19	05/11/18
DC power supply, 8 V @ 3 A or 15 V @ 2 A	Agilent / HP	E3610A	None	CNR	CNR

UL AUTOMATION SOFTWARE			
CLT Software	UL	UL RF	Ver 7.6, November 11, 2017
Power Measurement Software	UL	UL RF	Ver 2.2, June 2017

NOTES:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

7. RF OUTPUT POWER VERIFICATION

CONDUCTED OUTPUT POWER MEASUREMENT PROCEDURE

All LTE bands conducted average power is obtained from the CMW500 telecommunication test set.

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".3

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
NS_04	6.6.2.2.2	41	20	>10	≤ 1
			5	>6	≤ 1
NS_05	6.6.3.3.1	1	10, 15, 20	See Table 6.2.4-4	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 ¹	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

MODES TESTED

- LTE 7
- LTE 41

RESULTS

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average conducted output powers as follows

7.1. LTE 7

ID:	40814	Date:	7/3/18
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OUTPUT POWER FOR LTE BAND 7 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				20775	21100	21425
				2502.5 MHz	2535.0 MHz	2567.5 MHz
5.0	QPSK	1	0	20.1	20.1	20.1
		1	12	20.2	20.2	20.1
		1	24	20.2	20.1	20.1
		12	0	20.1	20.2	20.1
		12	6	20.2	20.2	20.2
		12	11	20.1	20.2	20.1
		25	0	20.2	20.2	20.1
	16QAM	1	0	19.8	20.2	19.8
		1	12	19.9	20.2	19.8
		1	24	19.8	20.2	19.7
		12	0	19.8	19.9	19.8
		12	6	19.8	19.9	19.8
		12	11	19.8	19.9	19.8
		25	0	19.8	19.8	19.7
	64QAM	1	0	19.6	19.9	19.9
		1	12	19.7	20.0	19.9
		1	24	19.6	19.9	19.9
		12	0	19.8	19.8	19.7
		12	6	19.8	19.9	19.7
		12	11	19.8	19.8	19.6
		25	0	19.7	19.8	19.7

OUTPUT POWER FOR LTE BAND 7 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				20800	21100	21400
				2505.0 MHz	2535.0 MHz	2565.0 MHz
10.0	QPSK	1	0	20.1	20.1	20.2
		1	24	20.1	20.2	20.1
		1	49	20.3	20.2	20.1
		25	0	20.2	20.3	20.2
		25	12	20.3	20.2	20.2
		25	24	20.4	20.2	20.1
		50	0	20.3	20.2	20.2
	16QAM	1	0	19.7	19.6	20.1
		1	24	19.7	19.6	20.1
		1	49	19.8	19.6	20.0
		25	0	19.9	19.8	19.8
		25	12	20.0	19.8	19.8
		25	24	20.0	19.8	19.7
		50	0	19.9	19.8	19.8
	64QAM	1	0	19.9	19.8	20.0
		1	24	19.9	19.9	20.0
		1	49	20.0	19.8	19.9
		25	0	19.9	19.9	19.8
		25	12	20.0	19.9	19.8
		25	24	20.0	19.9	19.8
		50	0	19.9	19.9	19.8

OUTPUT POWER FOR LTE BAND 7 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				20825	21100	21375
				2507.5 MHz	2535.0 MHz	2562.5 MHz
15.0	QPSK	1	0	20.2	20.2	20.3
		1	37	20.3	20.2	20.1
		1	74	20.3	20.0	20.0
		36	0	20.3	20.3	20.2
		36	16	20.4	20.2	20.2
		36	35	20.3	20.2	20.1
		75	0	20.3	20.2	20.2
	16QAM	1	0	20.2	19.7	20.2
		1	37	20.1	19.6	20.1
		1	74	20.1	19.6	20.0
		36	0	19.9	19.9	19.9
		36	16	19.9	19.8	19.8
		36	35	19.9	19.7	19.8
		75	0	19.9	19.8	19.8
	64QAM	1	0	19.9	20.1	20.1
		1	37	19.9	20.1	20.1
		1	74	20.0	20.0	20.1
		36	0	20.0	19.9	19.8
		36	16	20.1	19.9	19.8
		36	35	20.0	19.8	19.7
		75	0	20.0	19.8	19.8

OUTPUT POWER FOR LTE BAND 7 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				20850	21100	21350
				2510.0 MHz	2535.0 MHz	2560.0 MHz
20.0	QPSK	1	0	20.0	20.3	20.3
		1	49	20.1	20.3	20.2
		1	99	20.1	20.2	20.0
		50	0	20.2	20.4	20.3
		50	24	20.2	20.4	20.3
		50	49	20.2	20.3	20.2
		100	0	20.2	20.4	20.2
	16QAM	1	0	19.9	20.4	20.4
		1	49	20.1	20.3	20.2
		1	99	20.0	20.2	20.2
		50	0	19.7	20.1	19.9
		50	24	19.8	20.0	19.9
		50	49	19.7	20.0	19.8
		100	0	19.8	20.0	19.9
	64QAM	1	0	19.8	20.3	19.9
		1	49	19.9	20.3	20.1
		1	99	19.9	20.3	20.0
		50	0	19.8	20.0	20.0
		50	24	19.9	20.0	19.9
		50	49	19.8	20.0	19.9
		100	0	19.8	19.9	19.9

7.2. LTE 41 (FCC)

ID:	38515	Date:	7/6/18
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OUTPUT POWER FOR LTE BAND 41 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				39675	40620	41565
				2498.5 MHz	2593.0 MHz	2687.5 MHz
5.0	QPSK	1	0	24.3	24.5	24.3
		1	12	24.3	24.5	24.2
		1	24	24.4	24.5	24.2
		12	0	23.8	24.0	23.9
		12	6	24.0	24.0	23.9
		12	11	23.9	24.0	23.8
		25	0	23.9	24.0	23.9
	16QAM	1	0	23.5	23.6	23.3
		1	12	23.5	23.6	23.3
		1	24	23.6	23.5	23.3
		12	0	22.5	22.6	22.4
		12	6	22.6	22.6	22.4
		12	11	22.5	22.5	22.4
		25	0	22.5	22.6	22.4
	64QAM	1	0	22.1	23.0	22.5
		1	12	22.1	23.0	22.5
		1	24	22.2	22.9	22.4
		12	0	21.5	21.7	21.3
		12	6	21.6	21.7	21.3
		12	11	21.5	21.7	21.3
25	0	21.6	21.6	21.3		

OUTPUT POWER FOR LTE BAND 41 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				39700	40620	41540
				2501.0 MHz	2593.0 MHz	2685.0 MHz
10.0	QPSK	1	0	24.4	24.4	24.4
		1	24	24.3	24.5	24.3
		1	49	24.4	24.4	24.3
		25	0	23.9	24.0	23.9
		25	12	24.0	24.0	23.9
		25	24	23.9	24.0	23.8
		50	0	23.9	24.0	23.8
	16QAM	1	0	23.4	23.6	23.6
		1	24	23.4	23.5	23.5
		1	49	23.4	23.5	23.5
		25	0	22.5	22.6	22.4
		25	12	22.6	22.6	22.4
		25	24	22.5	22.5	22.4
		50	0	22.6	22.6	22.5
	64QAM	1	0	22.0	22.8	22.6
		1	24	22.0	22.8	22.4
		1	49	22.1	22.8	22.4
		25	0	21.5	21.6	21.3
		25	12	21.6	21.6	21.3
		25	24	21.6	21.5	21.3
50	0	21.6	21.6	21.4		

OUTPUT POWER FOR LTE BAND 41 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				39725	40620	41515
				2503.5 MHz	2593.0 MHz	2682.5 MHz
15.0	QPSK	1	0	24.4	24.5	24.5
		1	37	24.3	24.5	24.3
		1	74	24.4	24.4	24.2
		36	0	23.9	24.0	23.9
		36	16	24.0	24.0	23.8
		36	35	23.9	24.0	23.8
		75	0	23.9	24.0	23.9
	16QAM	1	0	23.4	23.6	23.6
		1	37	23.4	23.5	23.4
		1	74	23.4	23.5	23.4
		36	0	22.5	22.6	22.5
		36	16	22.6	22.6	22.4
		36	35	22.5	22.5	22.4
		75	0	22.5	22.6	22.4
	64QAM	1	0	22.1	22.8	22.4
		1	37	22.0	22.8	22.2
		1	74	22.0	22.7	22.1
		36	0	21.6	21.7	21.4
		36	16	21.6	21.7	21.4
		36	35	21.6	21.6	21.3
		75	0	21.6	21.6	21.4

OUTPUT POWER FOR LTE BAND 41 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				39750	40620	41490
				2506.0 MHz	2593.0 MHz	2680.0 MHz
20.0	QPSK	1	0	24.4	24.5	24.5
		1	49	24.3	24.5	24.3
		1	99	24.4	24.5	24.2
		50	0	23.9	24.0	24.0
		50	24	24.0	24.0	23.9
		50	49	23.9	24.0	23.8
		100	0	24.0	24.0	23.9
	16QAM	1	0	23.6	23.6	23.6
		1	49	23.5	23.5	23.4
		1	99	23.5	23.4	23.3
		50	0	22.6	22.7	22.5
		50	24	22.6	22.6	22.4
		50	49	22.5	22.6	22.3
		100	0	22.6	22.6	22.4
	64QAM	1	0	22.5	23.0	22.5
		1	49	22.5	22.9	22.3
		1	99	22.5	22.9	22.2
		50	0	21.6	21.7	21.5
		50	24	21.6	21.6	21.4
		50	49	21.6	21.6	21.3
		100	0	21.6	21.6	21.4

8. CONDUCTED TEST RESULTS

8.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only.

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the middle channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

MODES TESTED

- LTE Band 7
- LTE Band 41

RESULTS

There is no limit required and power is the same for low, middle and high channel; therefore, only middle channel was tested.

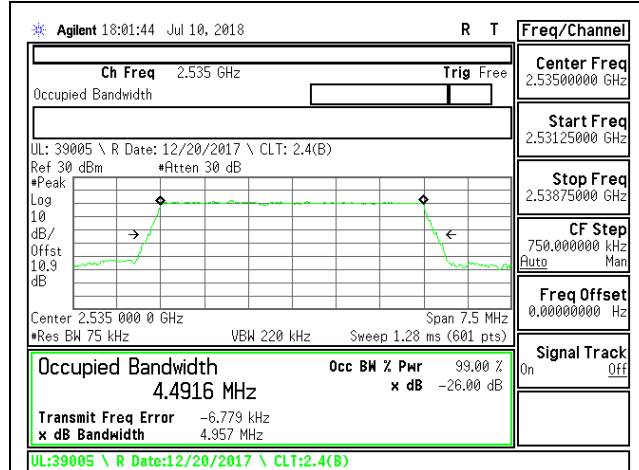
LTE7

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 7	5 MHz, QPSK	25/0	2535.0	4.49	4.96
	5 MHz, 16QAM			4.49	4.96
	10 MHz, QPSK	50/0		8.94	9.65
	10 MHz, 16QAM			8.93	9.55
	15 MHz, QPSK	75/0		13.39	14.57
	15 MHz, 16QAM			13.44	14.50
	20 MHz, QPSK	100/0		17.86	19.19
	20 MHz, 16QAM			17.86	19.24
	20 MHz, 64QAM			17.89	19.41

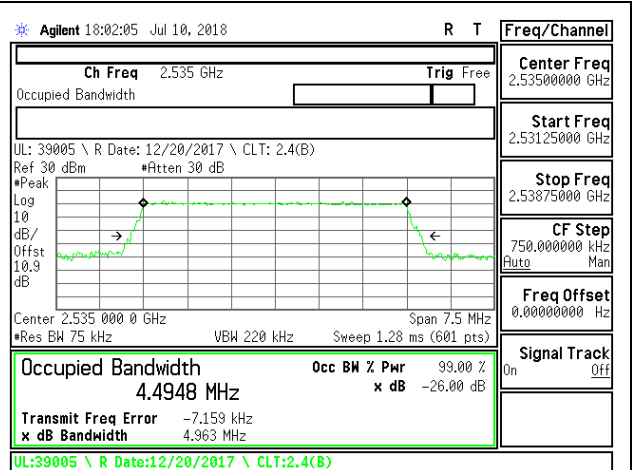
LTE41

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 41	5 MHz, QPSK	25/0	2593.0	4.48	4.96
	5 MHz, 16QAM			4.49	4.80
	10 MHz, QPSK	50/0		8.93	9.43
	10 MHz, 16QAM			8.93	9.60
	15 MHz, QPSK	75/0		13.41	14.10
	15 MHz, 16QAM			13.41	14.21
	20 MHz, QPSK	100/0		17.84	19.12
	20 MHz, 16QAM			17.79	18.98
	20 MHz, 64QAM			17.84	19.27

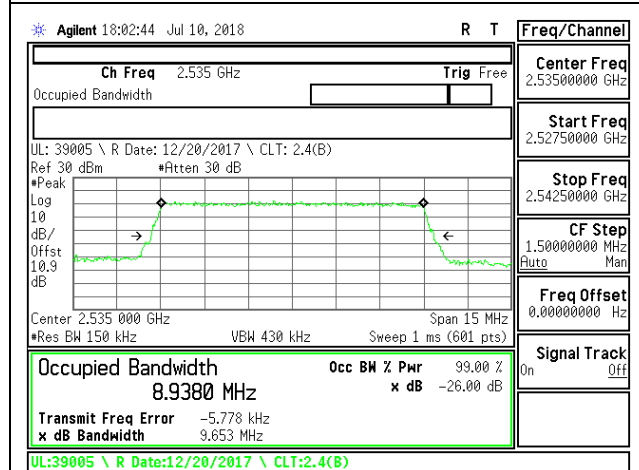
8.1.1. LTE BAND 7



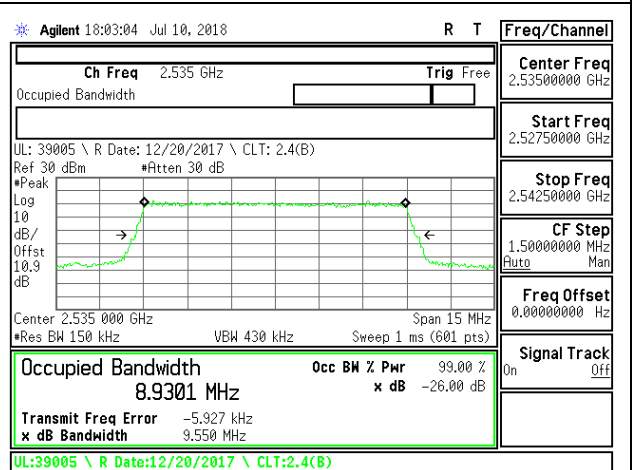
LTE B7 5MHz QPSK Mid Channel RB25-0



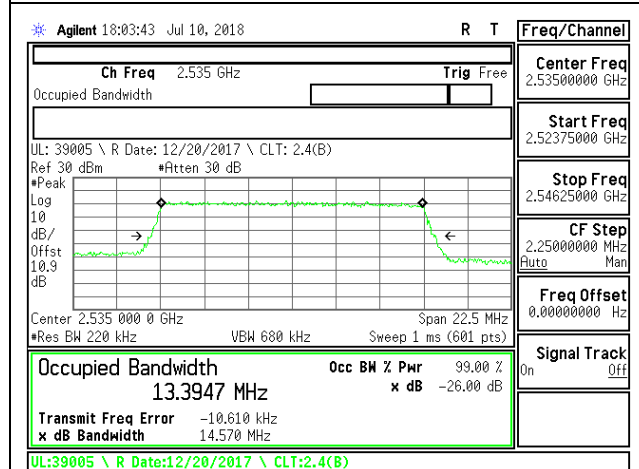
LTE B7 5MHz 16QAM Mid Channel RB25-0



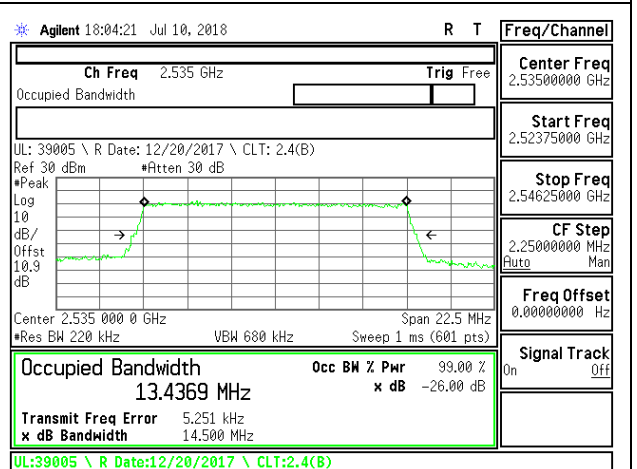
LTE B7 10MHz QPSK Mid Channel RB50-0



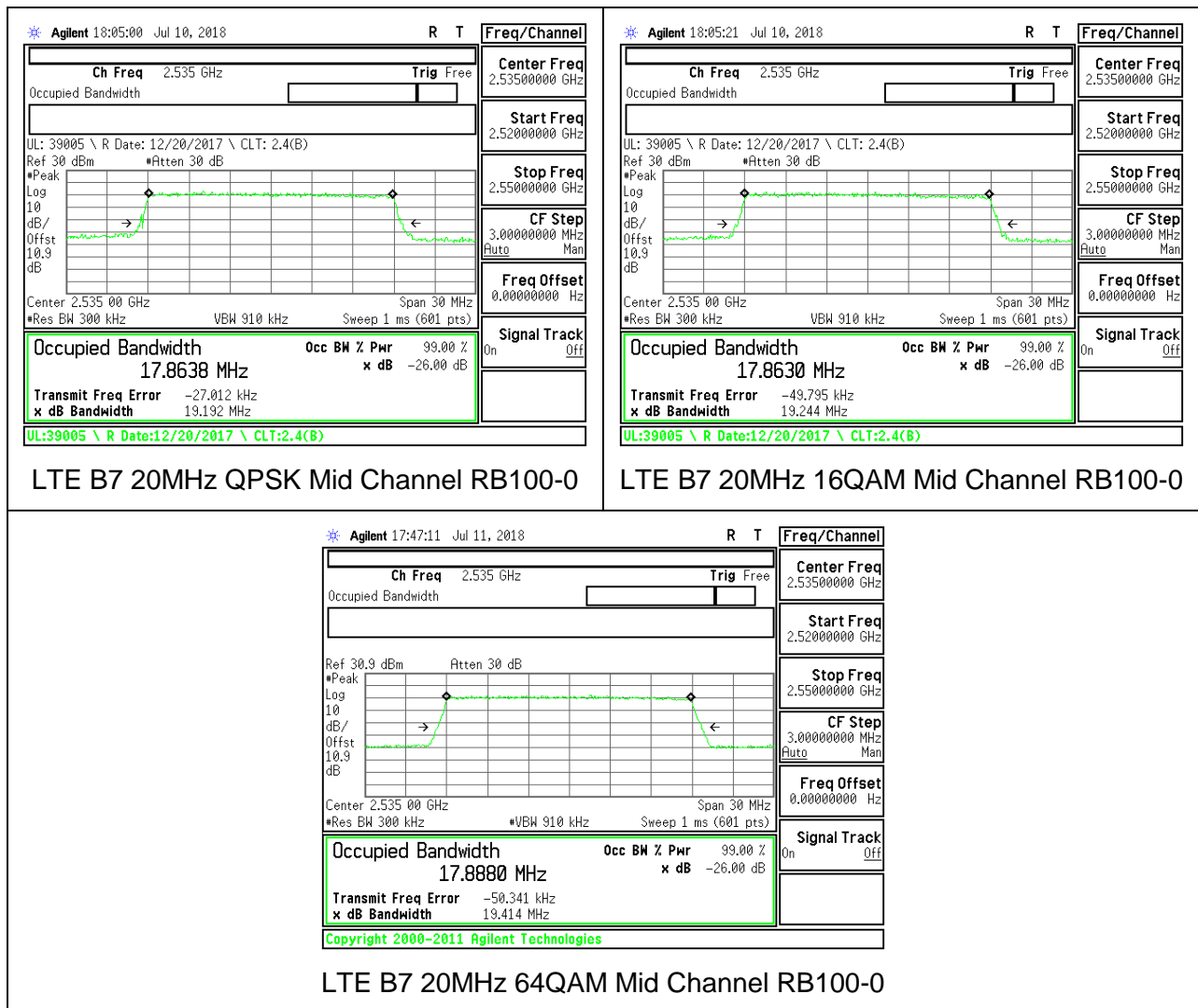
LTE B7 10MHz 16QAM Mid Channel RB50-0



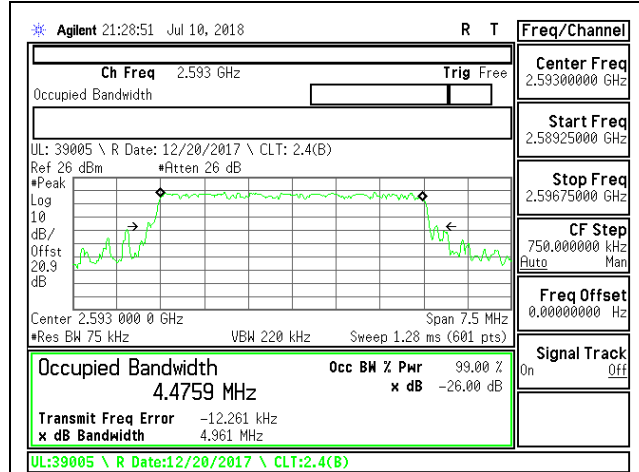
LTE B7 15MHz QPSK Mid Channel RB75-0



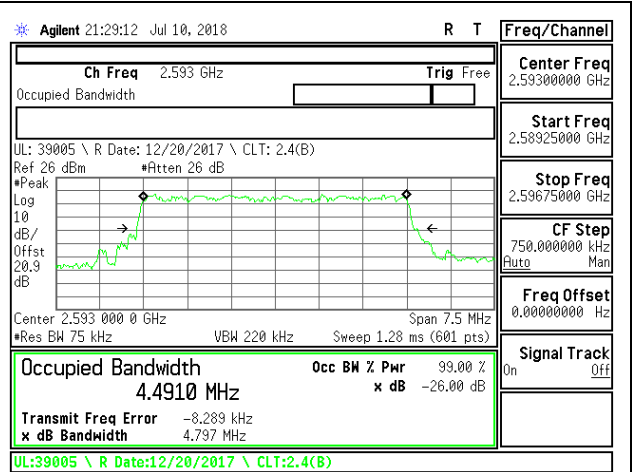
LTE B7 15MHz 16QAM Mid Channel RB75-0



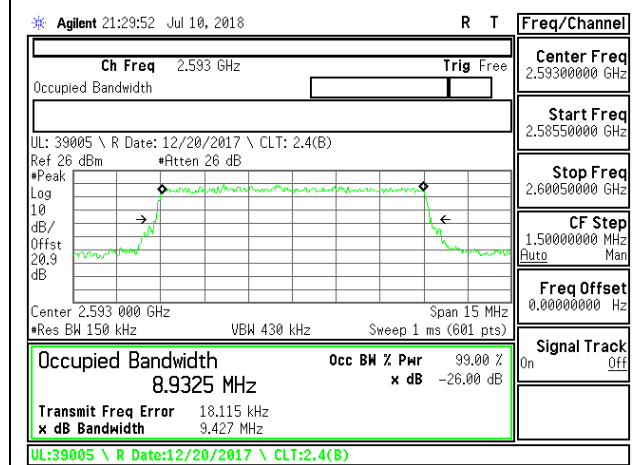
8.1.2. LTE BAND 41



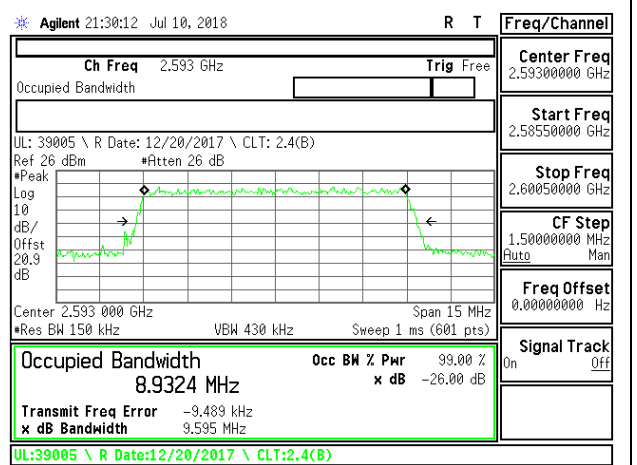
LTE B41 5MHz QPSK Mid Channel RB25-0



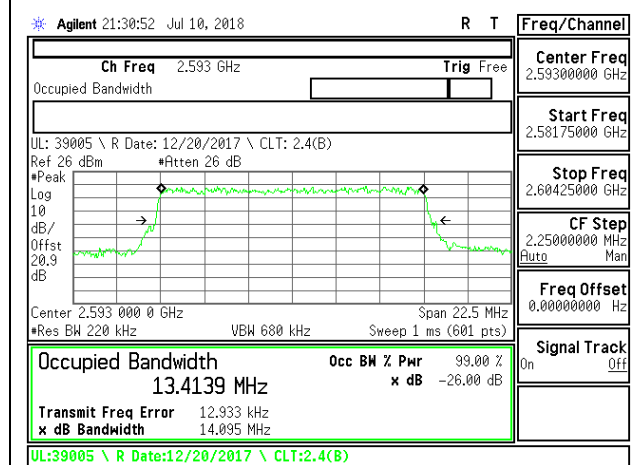
LTE B41 5MHz 16QAM Mid Channel RB25-0



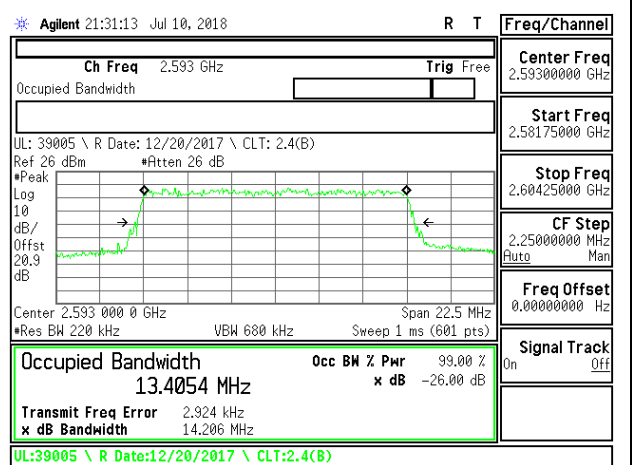
LTE B41 10MHz QPSK Mid Channel RB50-0



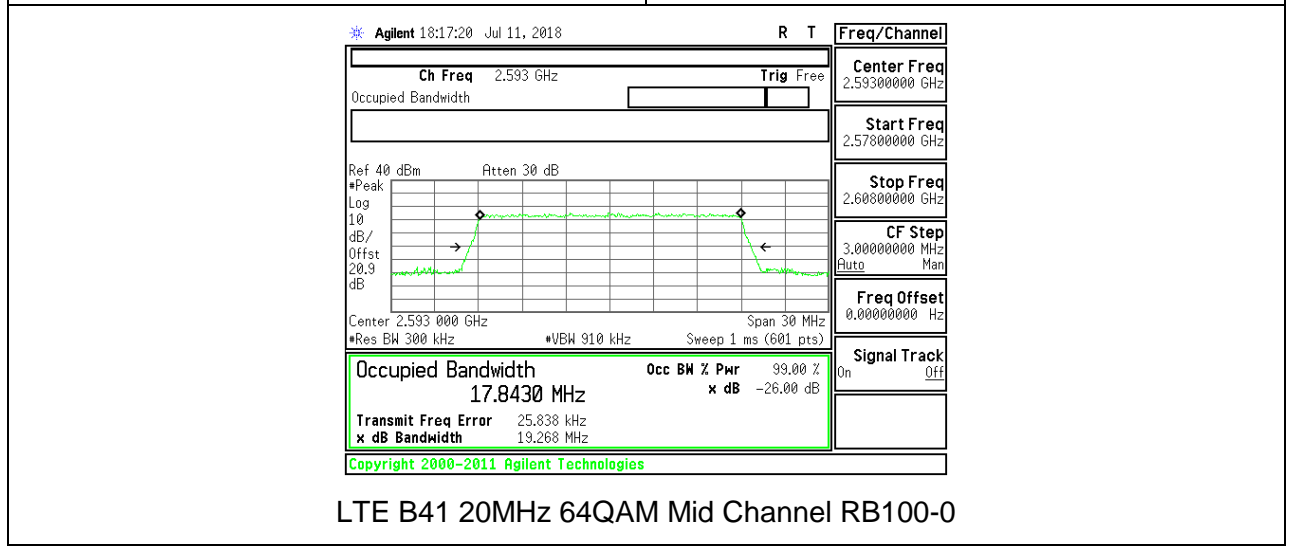
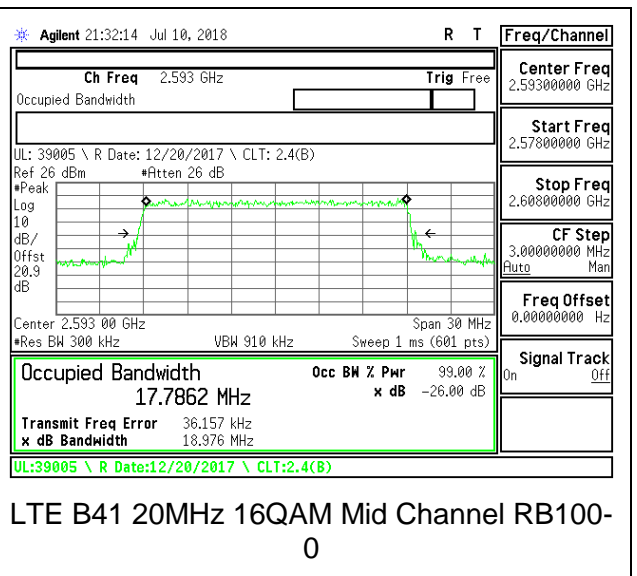
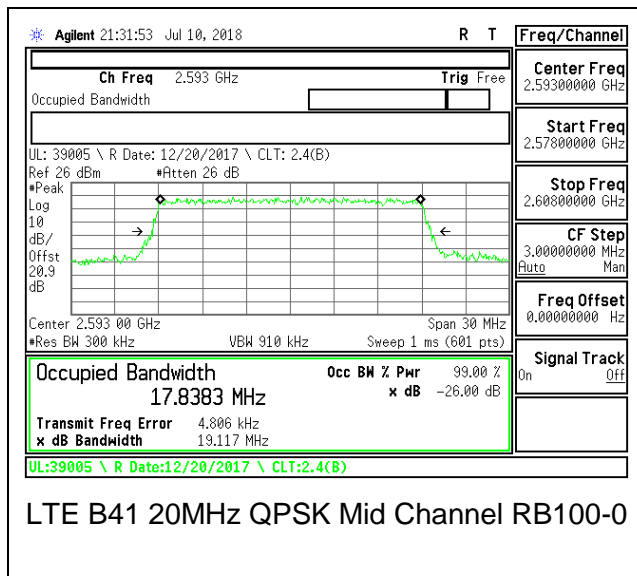
LTE B41 10MHz 16QAM Mid Channel RB50-0



LTE B41 15MHz QPSK Mid Channel RB75-0



LTE B41 15MHz 16QAM Mid Channel RB75-0



8.2. BAND EDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051§27.53

LIMITS

FCC: §27.53(h)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

FCC: §27.53 (Band 7, 41)

(m)(4) 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.

TEST PROCEDURE

The transmitter output was connected to a CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

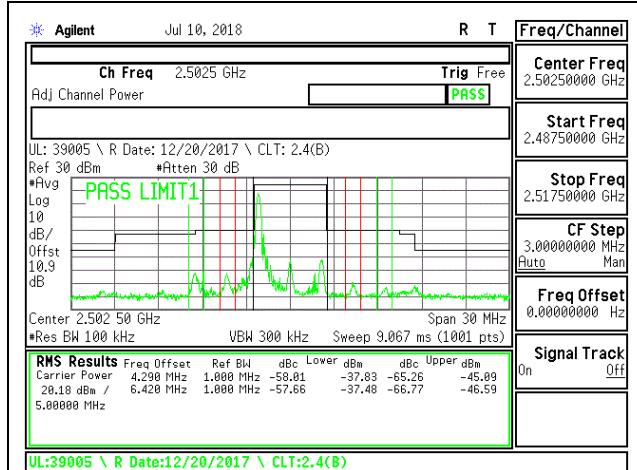
1. Set the spectrum analyzer span to include the block edge frequency.
2. Set a marker to point the corresponding band edge frequency in each test case.
3. Set display line at -13 dBm
4. Set resolution bandwidth to at least 1% of emission bandwidth.

MODES TESTED

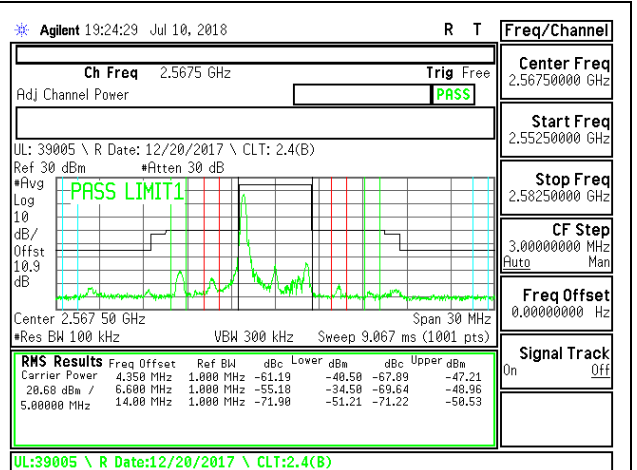
- LTE Band 7
- LTE Band 41

RESULTS

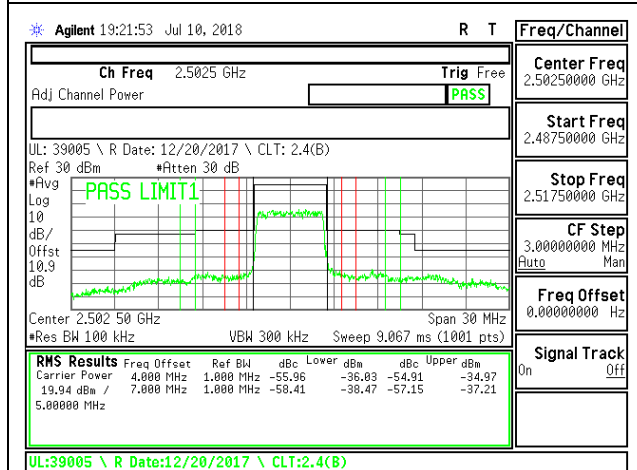
8.2.1. LTE BAND 7 ADJACENT CHANNEL POWER



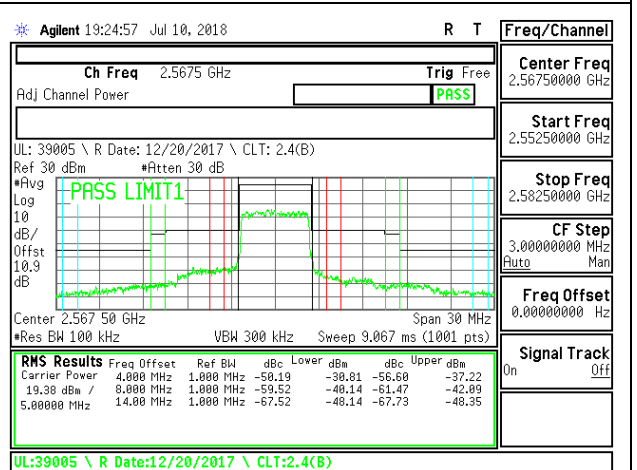
LTE B7 5MHz QPSK Low Channel RB1-0



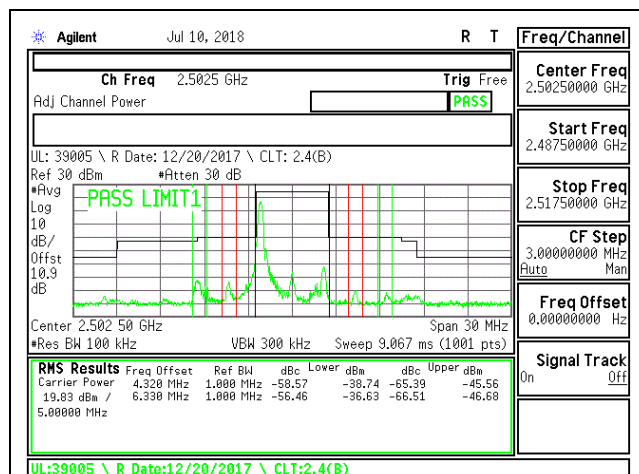
LTE B7 5MHz QPSK High Channel RB1-0



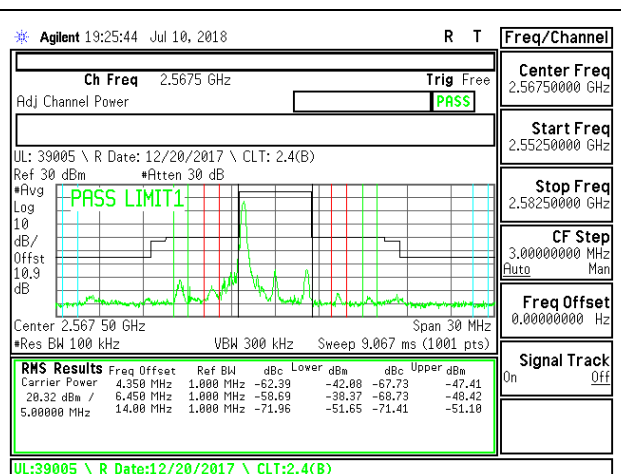
LTE B7 5MHz QPSK Low Channel RB25-0



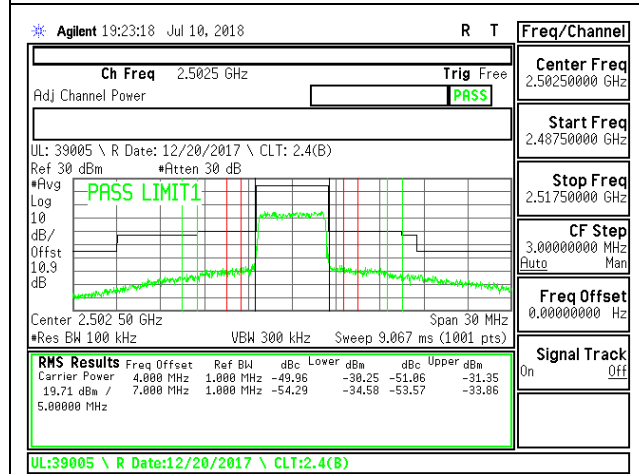
LTE B7 5MHz QPSK High Channel RB25-0



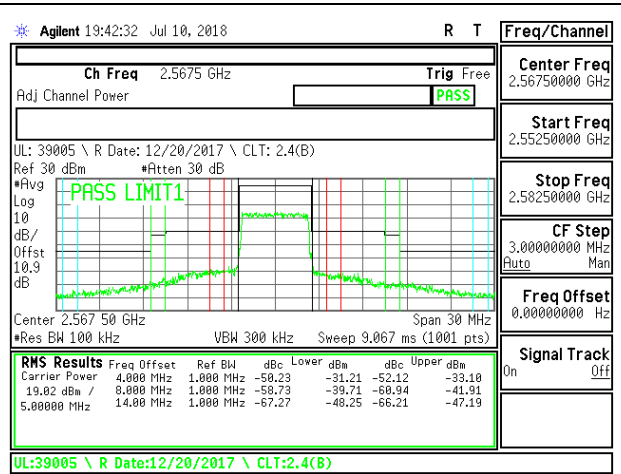
LTE B7 5MHz 16QAM Low Channel RB1-0



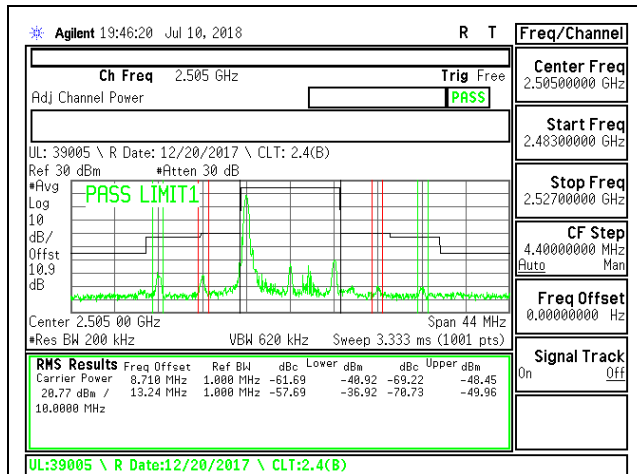
LTE B7 5MHz 16QAM High Channel RB1-0



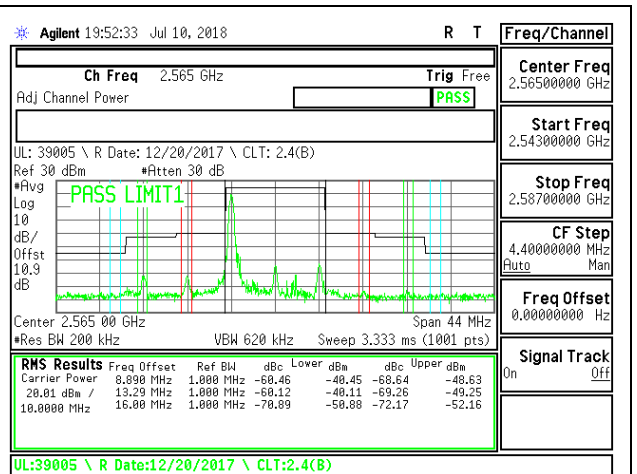
LTE B7 5MHz 16QAM Low Channel RB25-0



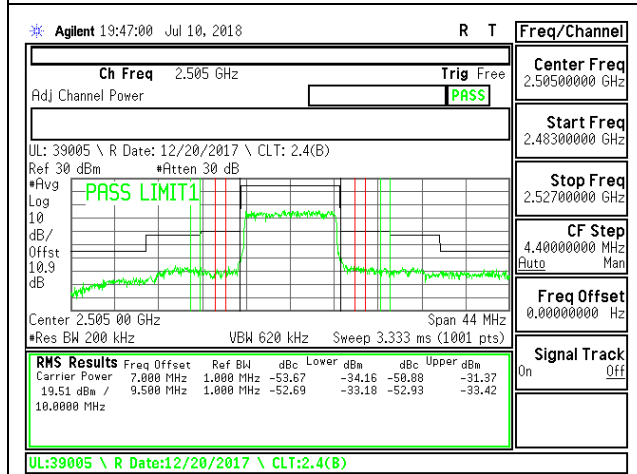
LTE B7 5MHz 16QAM High Channel RB25-0



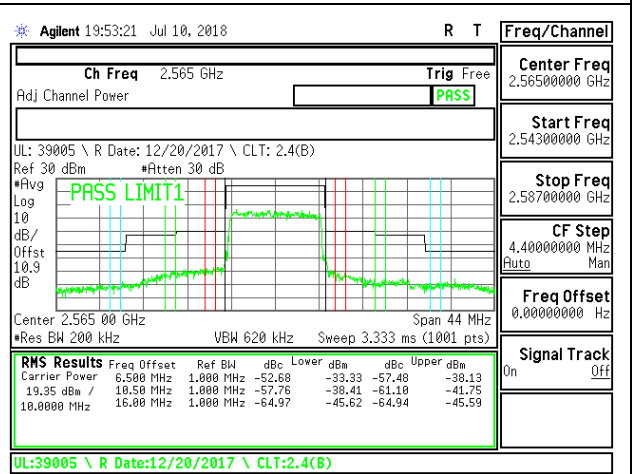
LTE B7 10MHz QPSK Low Channel RB1-0



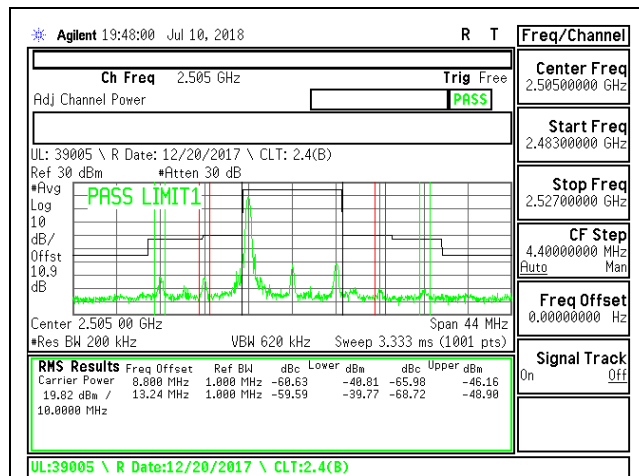
LTE B7 10MHz QPSK High Channel RB1-0



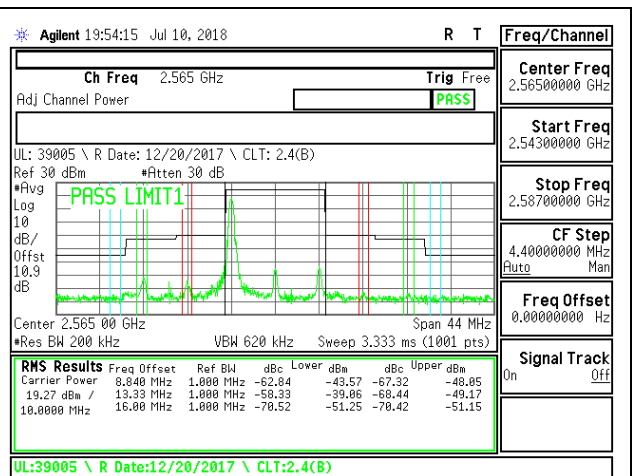
LTE B7 10MHz QPSK Low Channel RB50-0



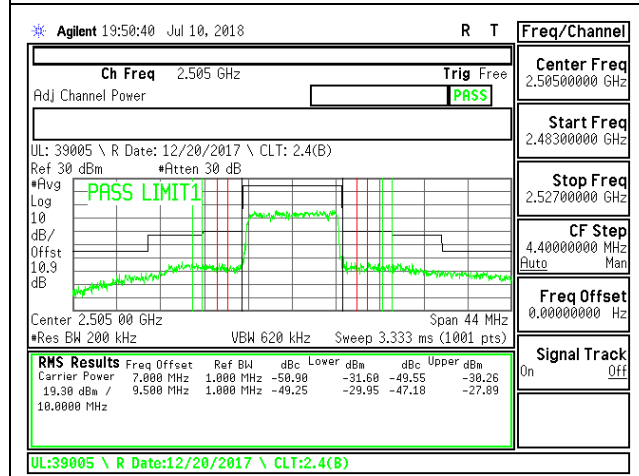
LTE B7 10MHz QPSK High Channel RB50-0



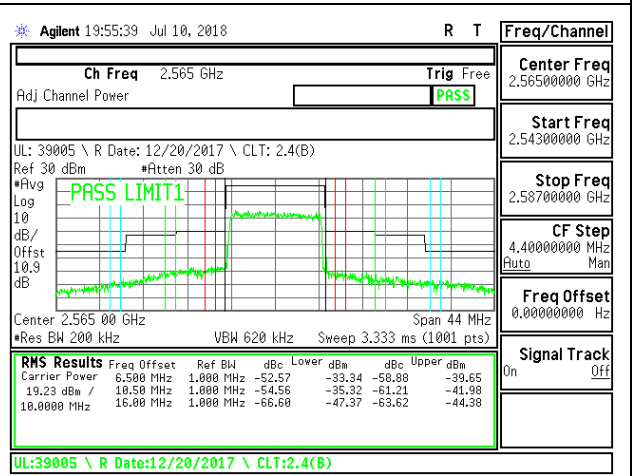
LTE B7 10MHz 16QAM Low Channel RB1-0



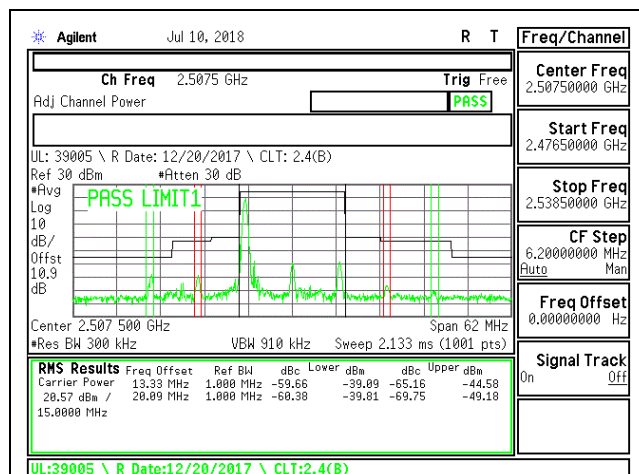
LTE B7 10MHz 16QAM High Channel RB1-0



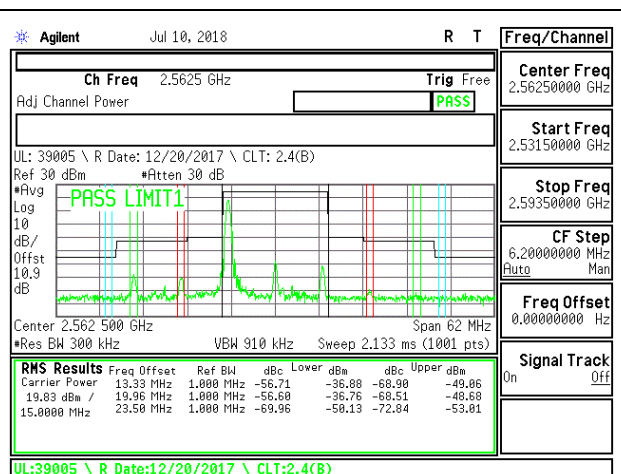
LTE B7 10MHz 16QAM Low Channel RB50-0



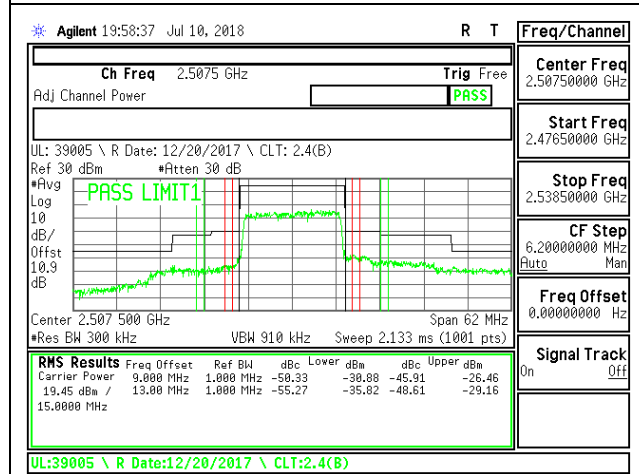
LTE B7 10MHz 16QAM High Channel RB50-0



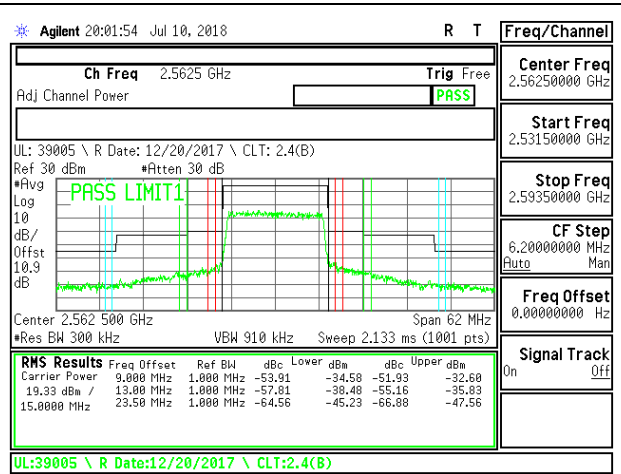
LTE B7 15MHz QPSK Low Channel RB1-0



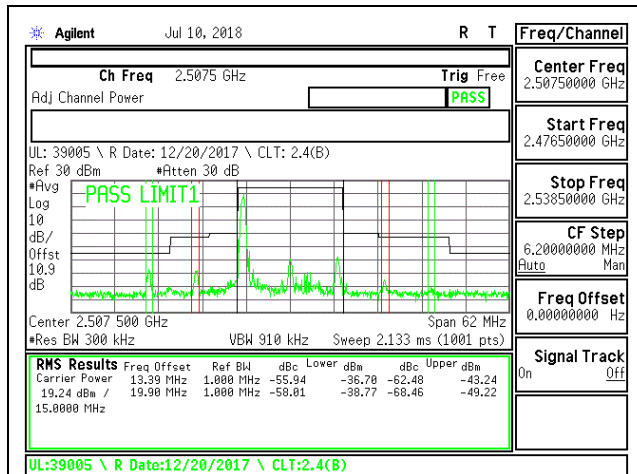
LTE B7 15MHz QPSK High Channel RB1-0



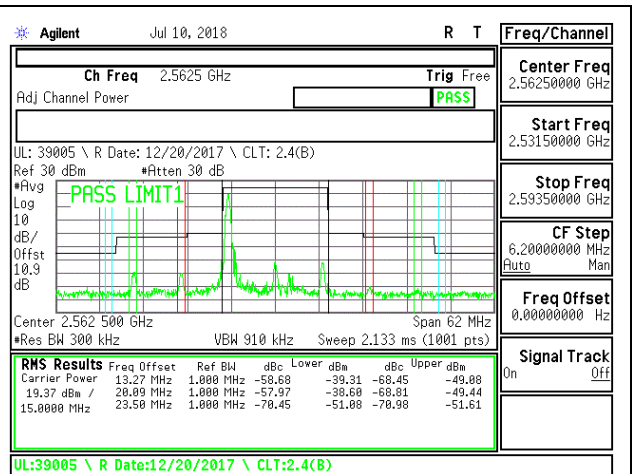
LTE B7 15MHz QPSK Low Channel RB75-0



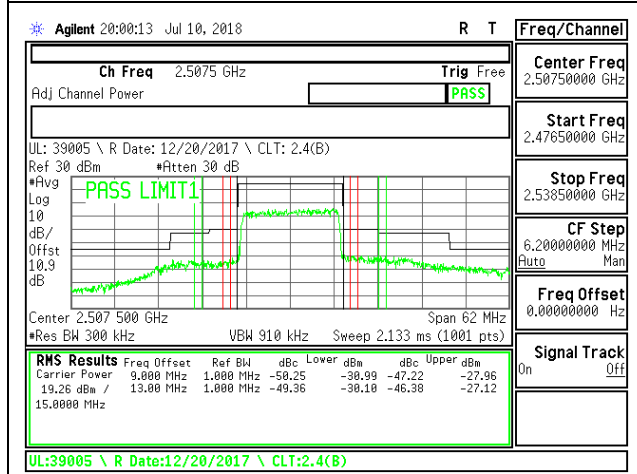
LTE B7 15MHz QPSK High Channel RB75-0



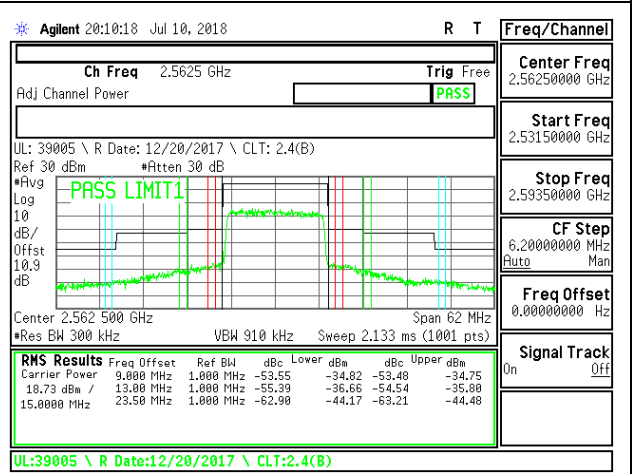
LTE B7 15MHz 16QAM Low Channel RB1-0



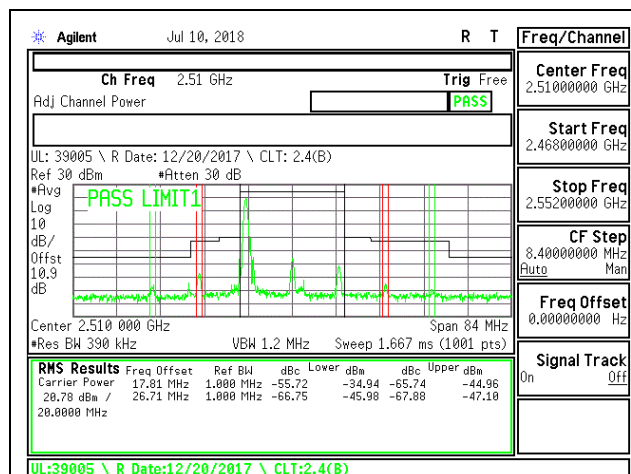
LTE B7 15MHz 16QAM High Channel RB1-0



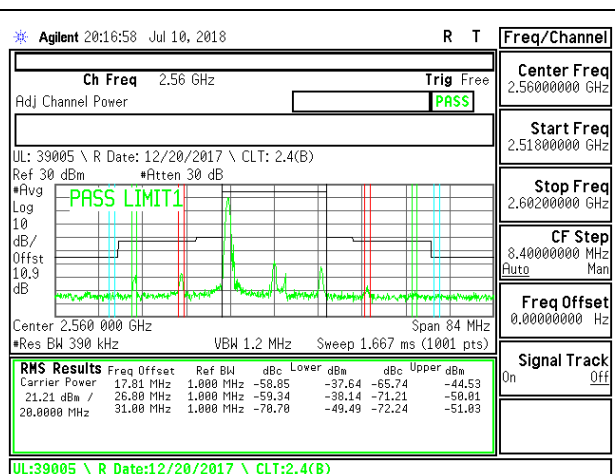
LTE B7 15MHz 16QAM Low Channel RB75-0



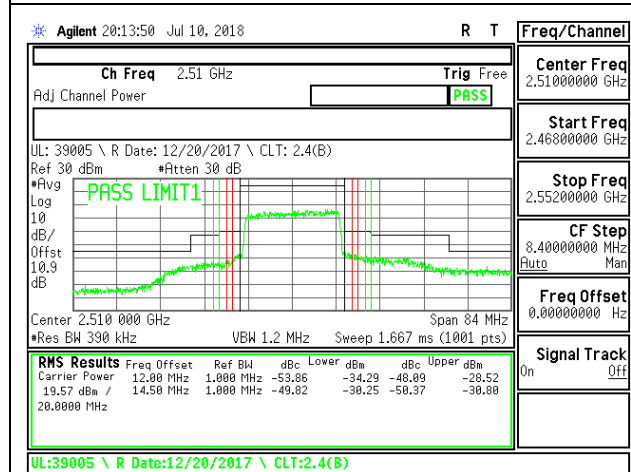
LTE B7 15MHz 16QAM High Channel RB75-0



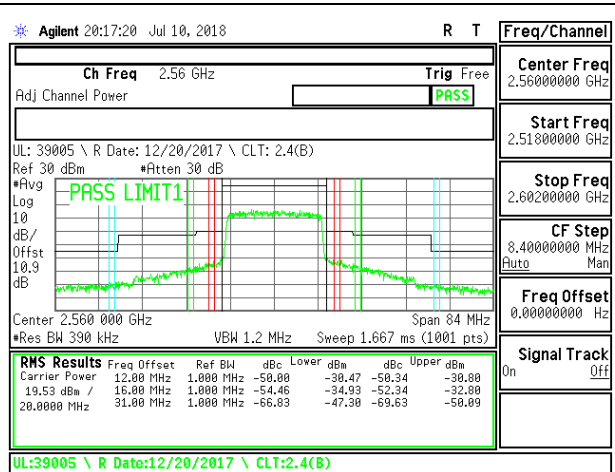
LTE B7 20MHz QPSK Low Channel RB1-0



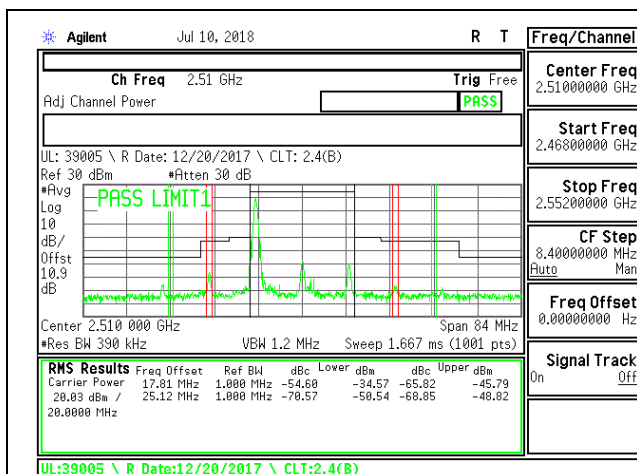
LTE B7 20MHz QPSK High Channel RB1-0



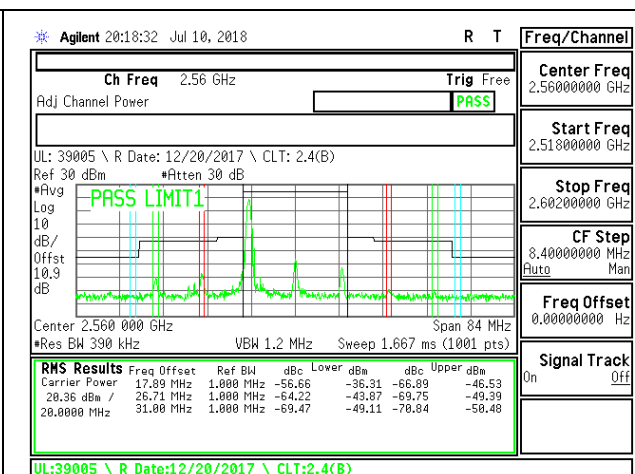
LTE B7 20MHz QPSK Low Channel RB100-0



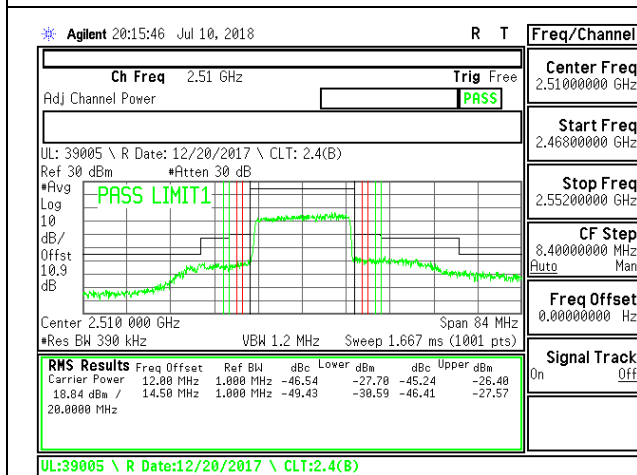
LTE B7 20MHz QPSK High Channel RB100-0



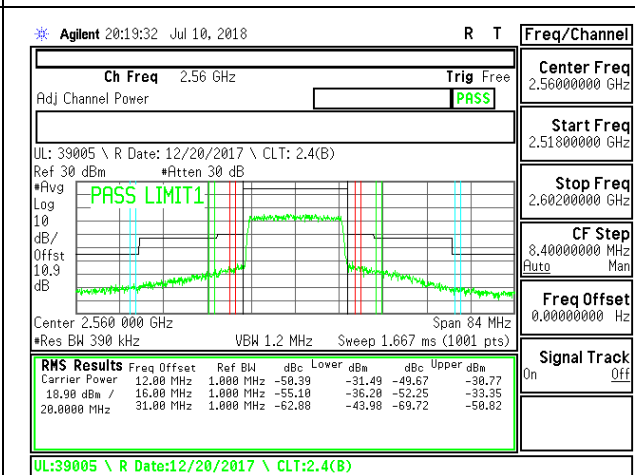
LTE B7 20MHz 16QAM Low Channel RB1-0



LTE B7 20MHz 16QAM High Channel RB1-0

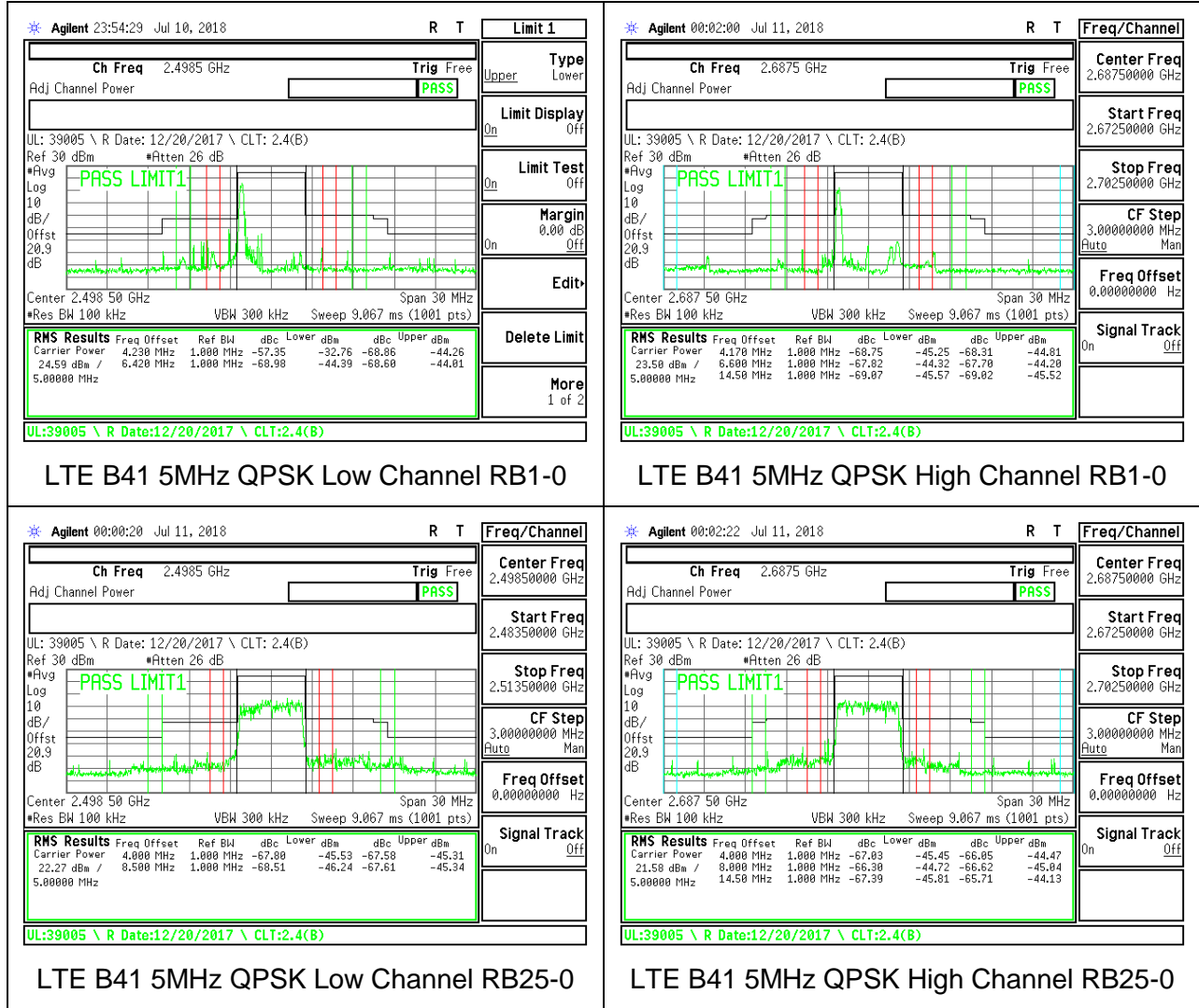


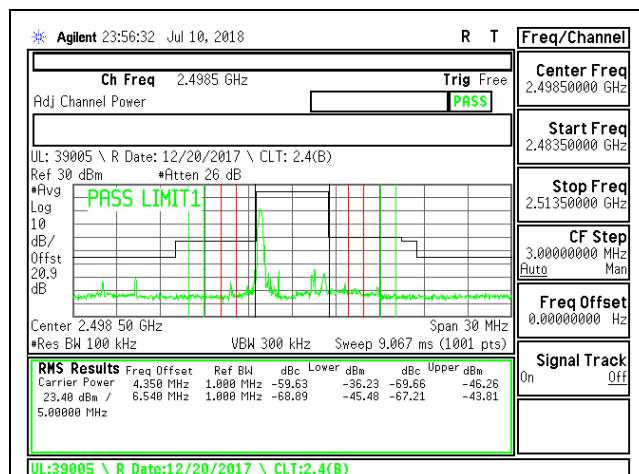
LTE B7 20MHz 16QAM Low Channel RB100-0



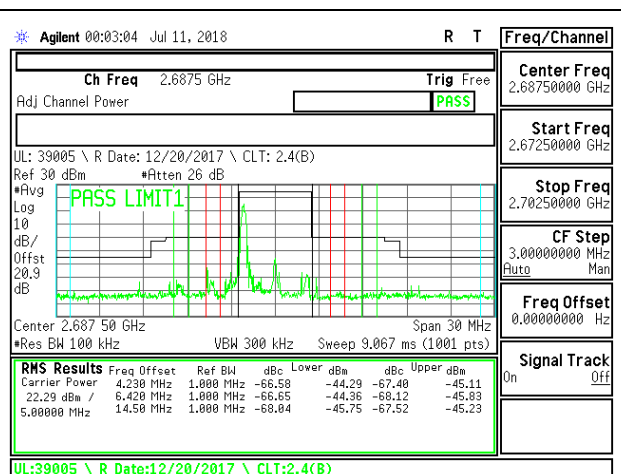
LTE B7 20MHz 16QAM High Channel RB100-0

8.2.2. LTE BAND 41 ADJACENT CHANNEL POWER

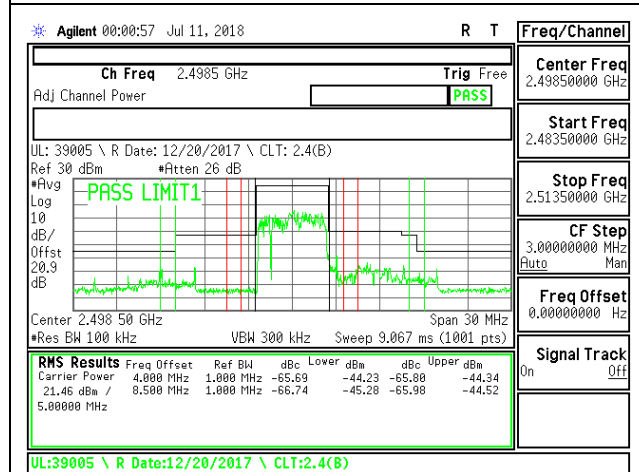




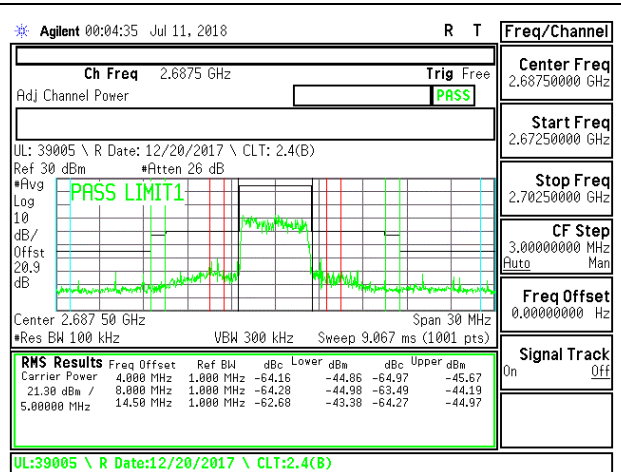
LTE B41 5MHz 16QAM Low Channel RB1-0



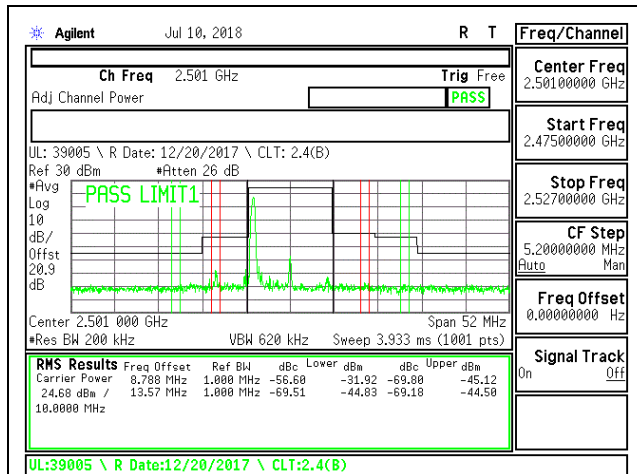
LTE B41 5MHz 16QAM High Channel RB1-0



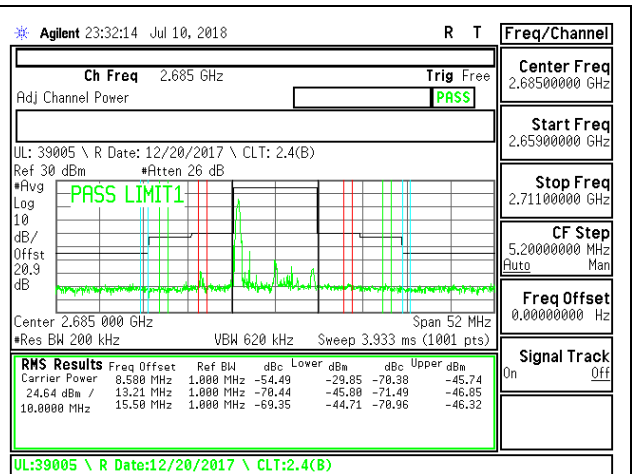
LTE B41 5MHz 16QAM Low Channel RB25-0



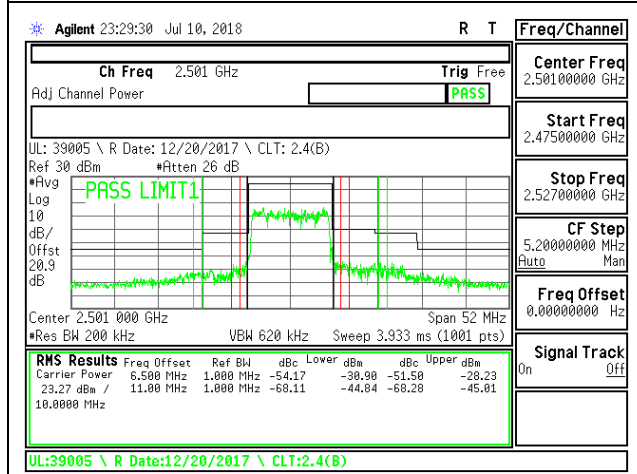
LTE B41 5MHz 16QAM High Channel RB25-0



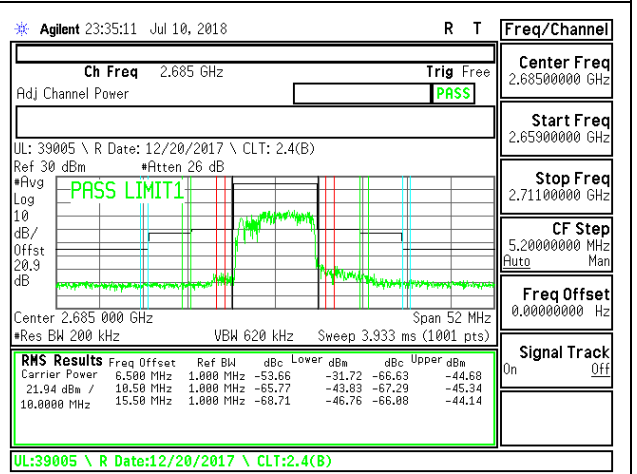
LTE B41 10MHz QPSK Low Channel RB1-0



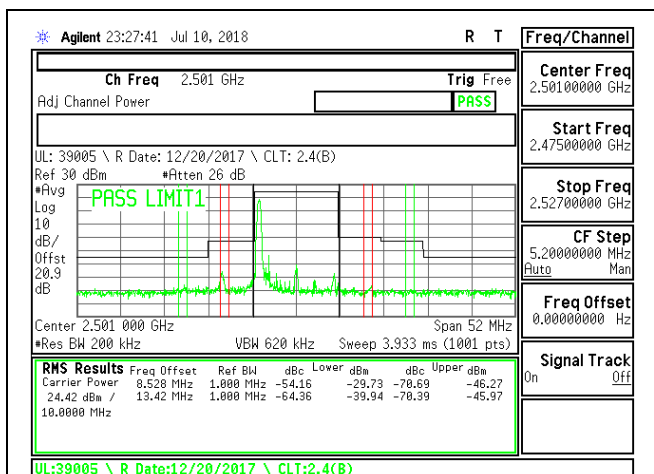
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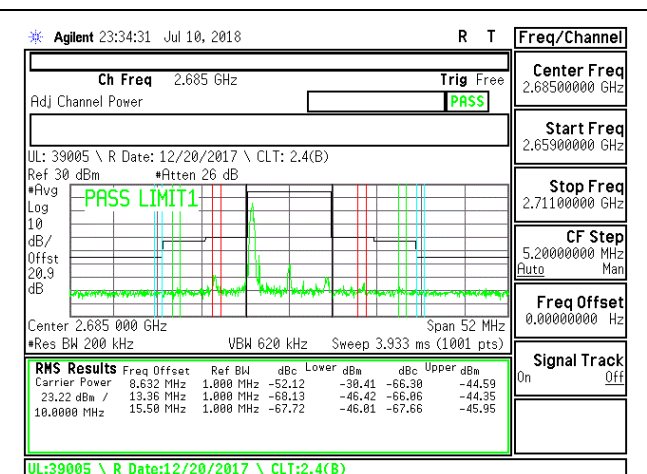
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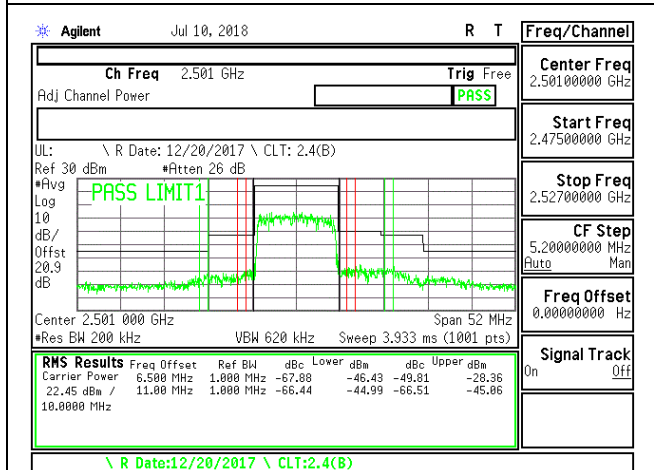
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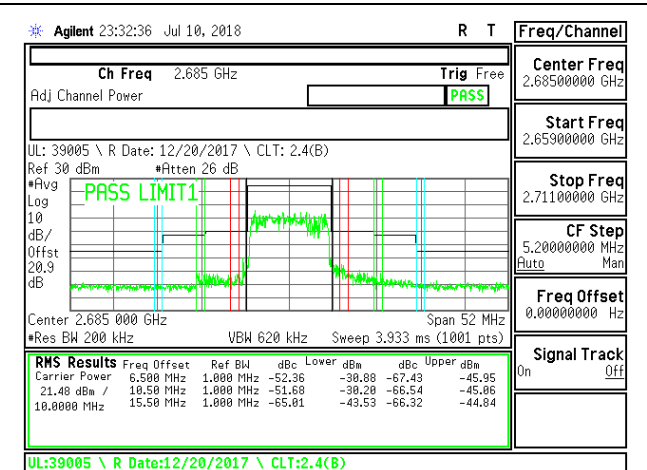
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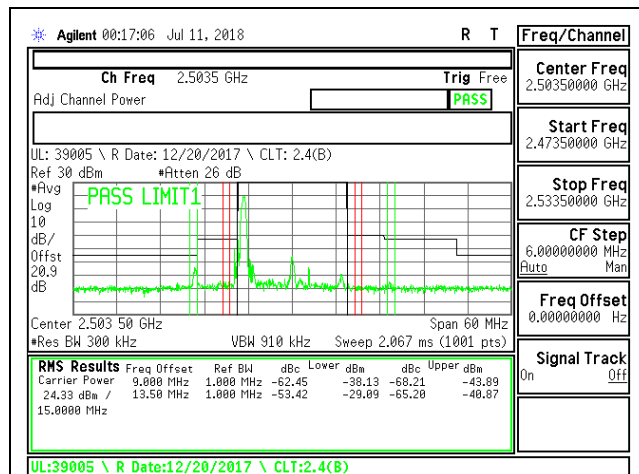
LTE B41 10MHz 16QAM High Channel RB1-0



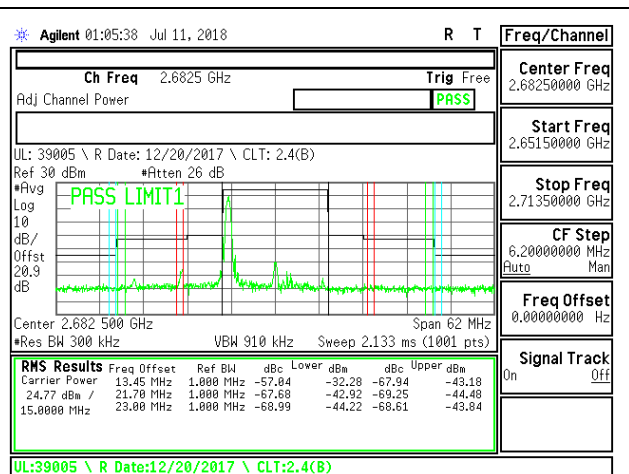
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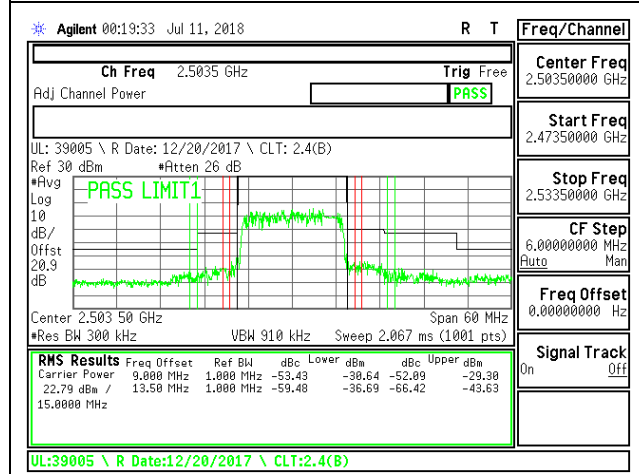
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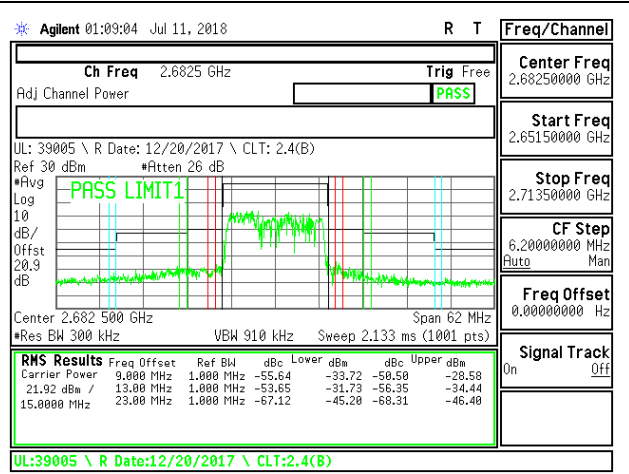
LTE B41 15MHz QPSK Low Channel RB1-0



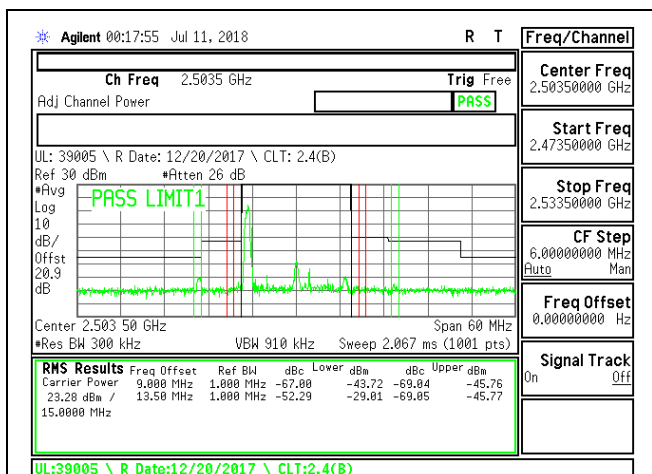
LTE B41 15MHz QPSK High Channel RB1-0



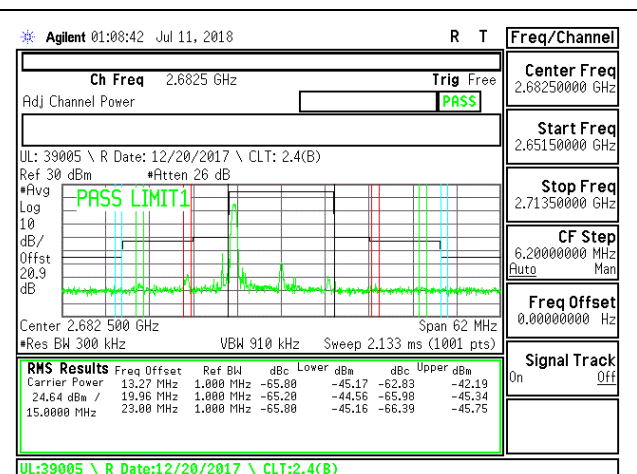
LTE B41 15MHz QPSK Low Channel RB75-0



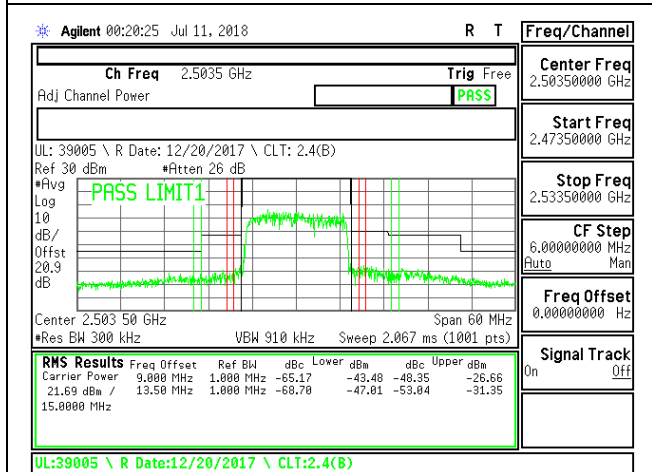
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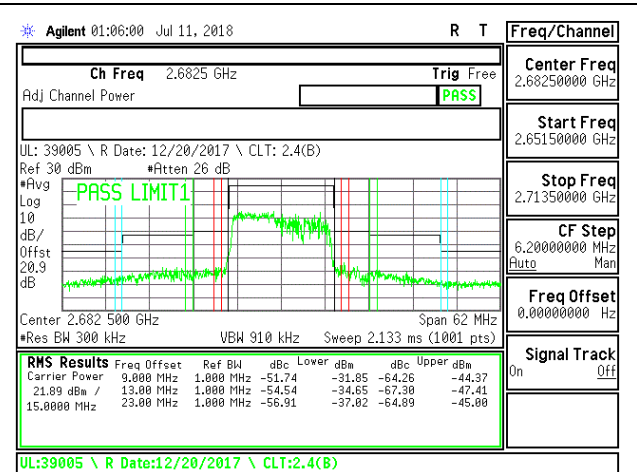
LTE B41 15MHz 16QAM Low Channel RB1-0



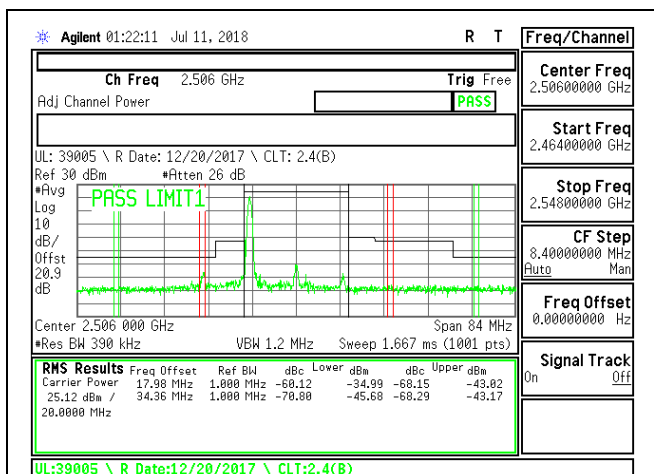
LTE B41 15MHz 16QAM High Channel RB1-0



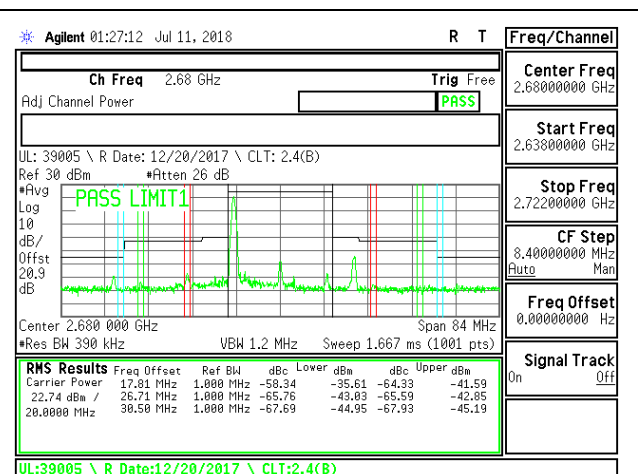
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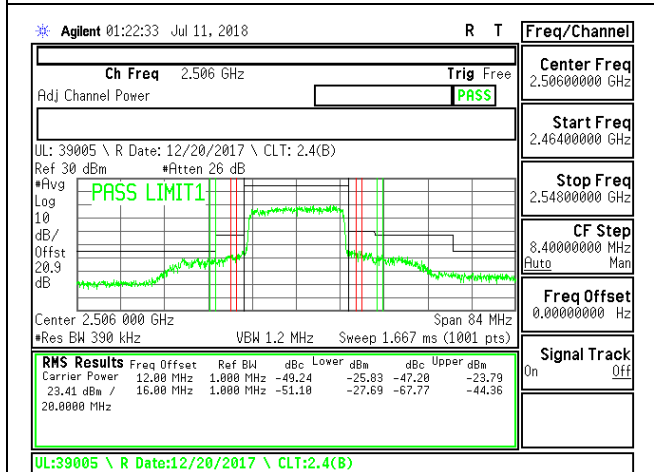
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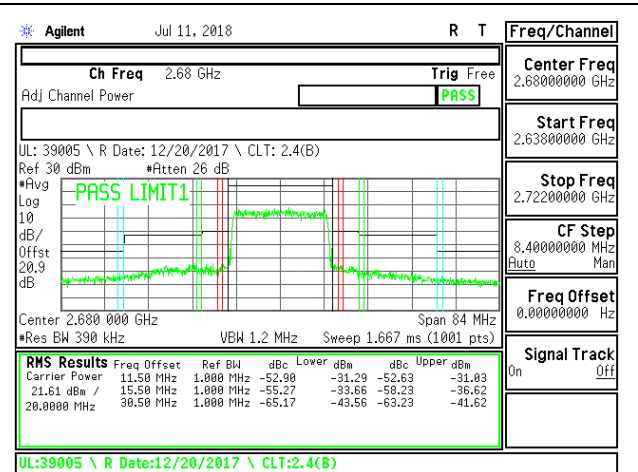
LTE B41 20MHz QPSK Low Channel RB1-0



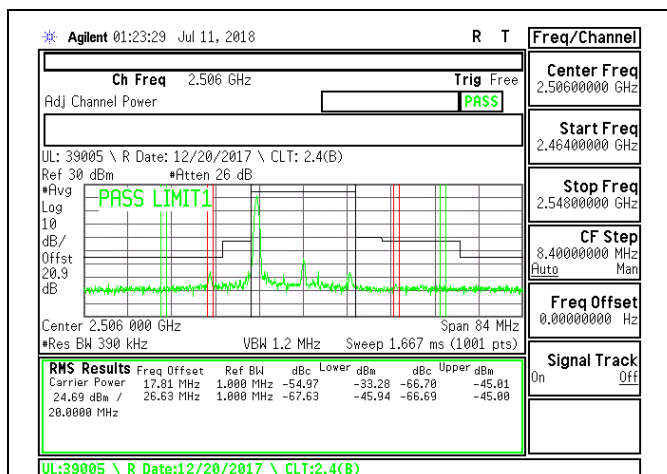
LTE B41 20MHz QPSK High Channel RB1-0



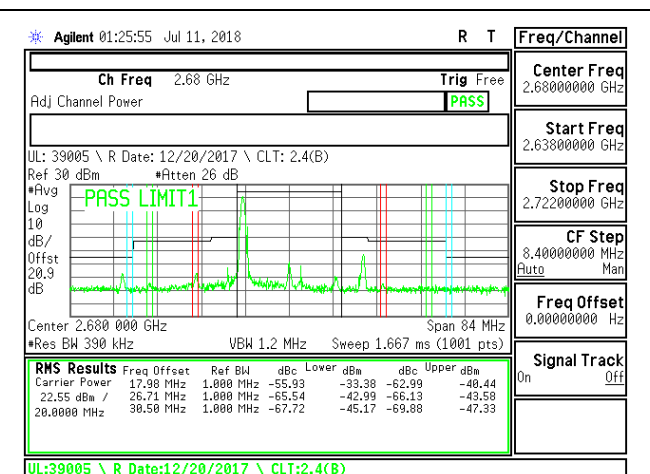
LTE B41 20MHz QPSK Low Channel RB100-0



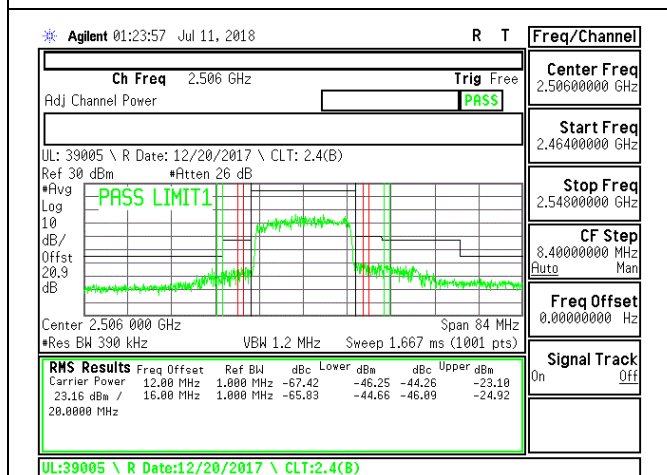
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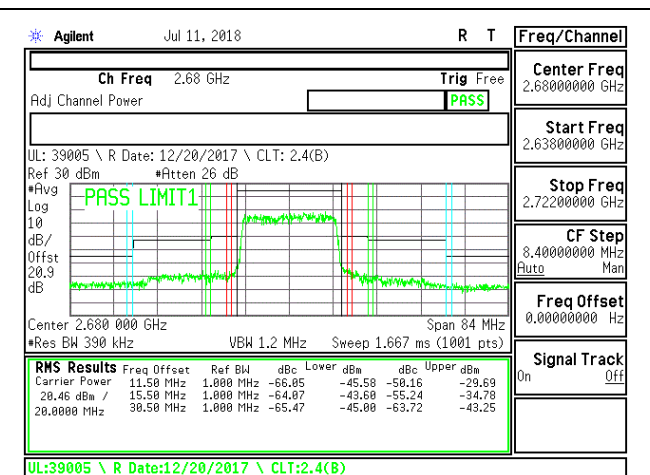
LTE B41 20MHz 16QAM Low Channel RB1-0



LTE B41 20MHz 16QAM High Channel RB1-0



LTE B41 20MHz 16QAM Low Channel RB100-0



LTE B41 20MHz 16QAM High Channel RB100-0

8.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051,§27.53

LIMITS

FCC: §27.53 (c), (g), (h)

The minimum permissible attenuation level of any spurious emissions is $43 + 10 \log (P)$ dB where transmitting power (P) in Watts.

FCC: §27.53 (m) (Band 7, 41)

The minimum permissible attenuation level of any spurious emissions is $55 + 10 \log (P)$ dB where transmitting power (P) in Watts.

TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

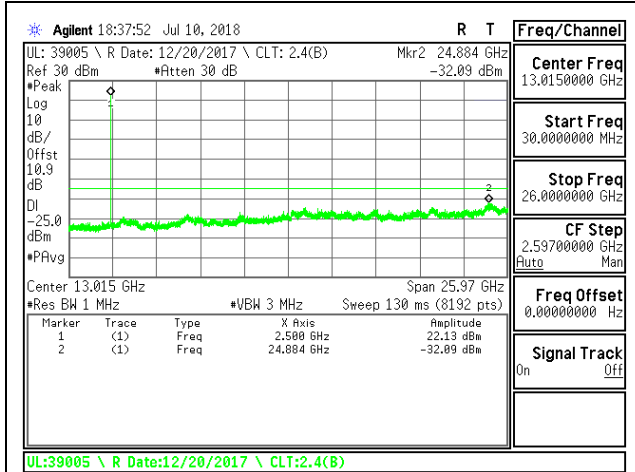
- Set display line at -13 dBm, -25dBm and -40dBm according to the band Limit
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz. (NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

MODES TESTED

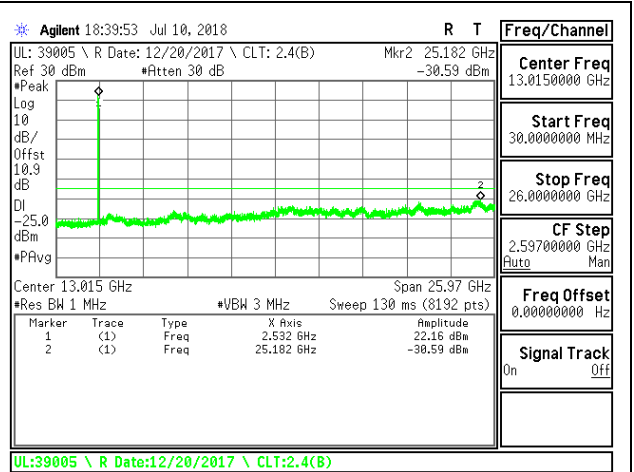
- LTE Band 7
- LTE Band 41

RESULTS

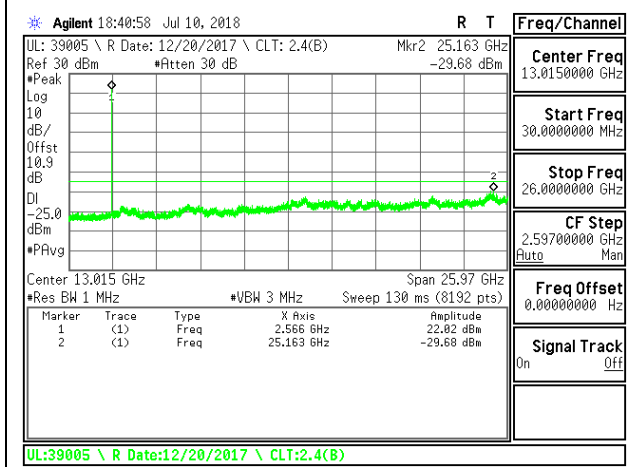
8.3.1. LTE BAND 7



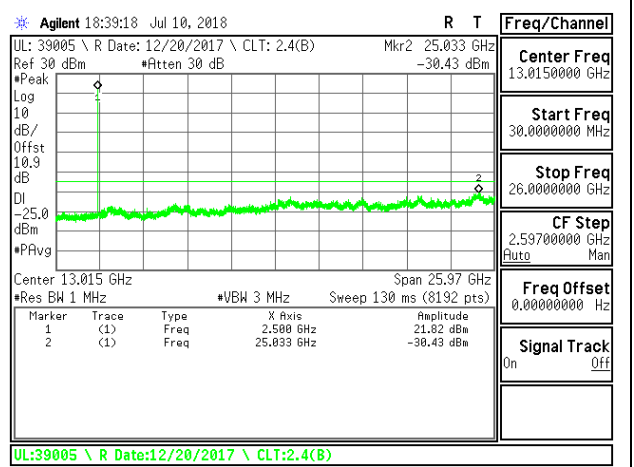
LTE B7 5MHz QPSK Low Channel RB1-0



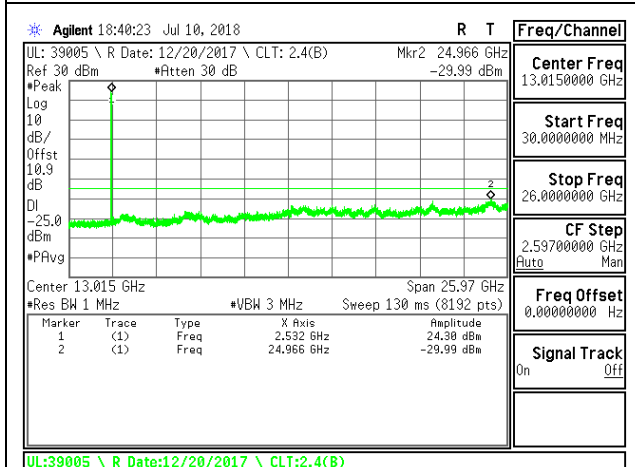
LTE B7 5MHz QPSK Mid Channel RB1-0



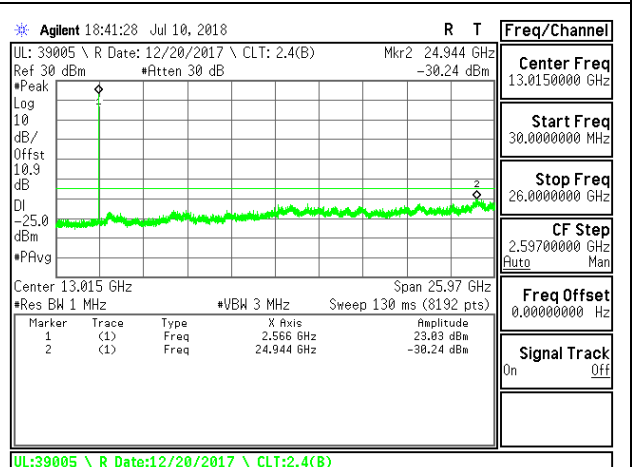
LTE B7 5MHz QPSK High Channel RB1-0



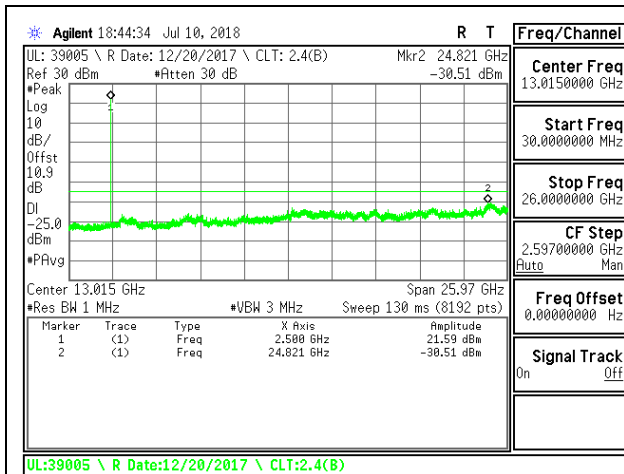
LTE B7 5MHz 16QAM Low Channel RB1-0



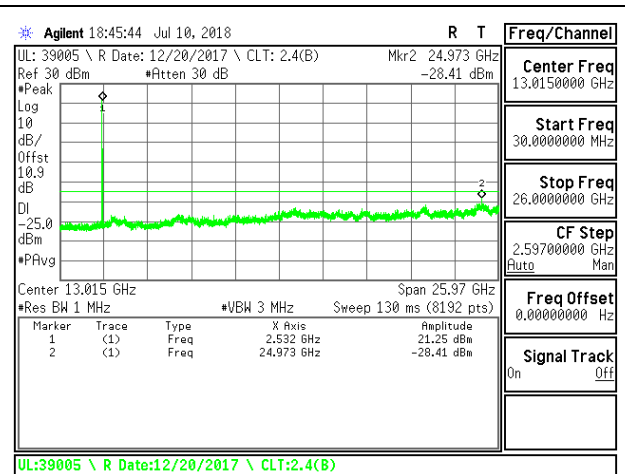
LTE B7 5MHz 16QAM Mid Channel RB1-0



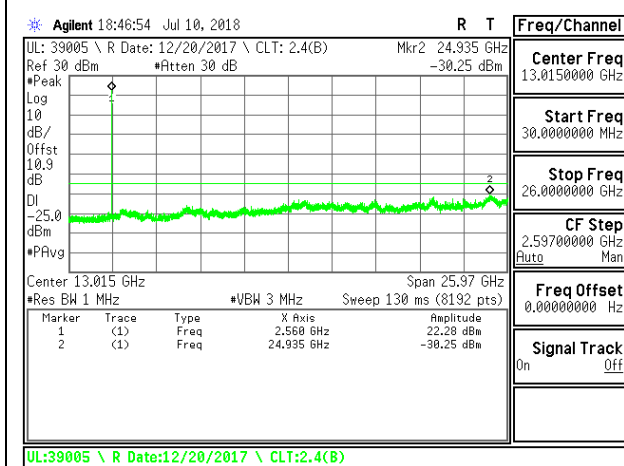
LTE B7 5MHz 16QAM High Channel RB1-0



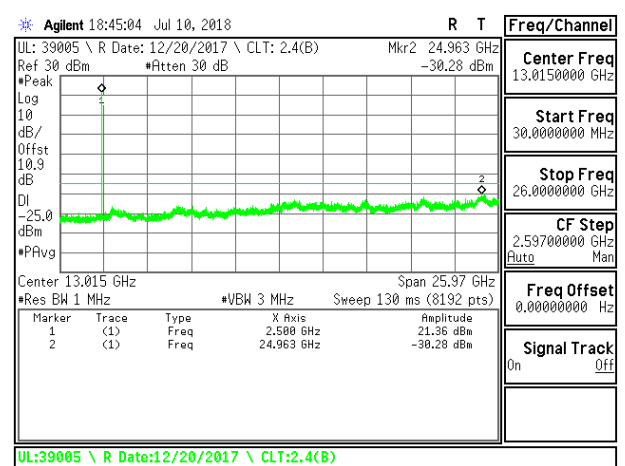
LTE B7 10MHz QPSK Low Channel RB1-0



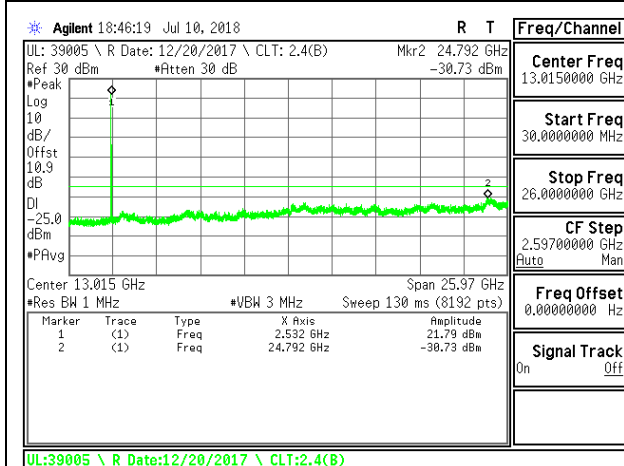
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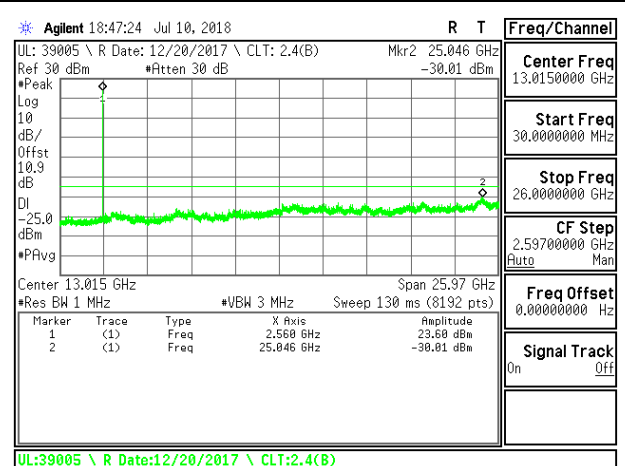
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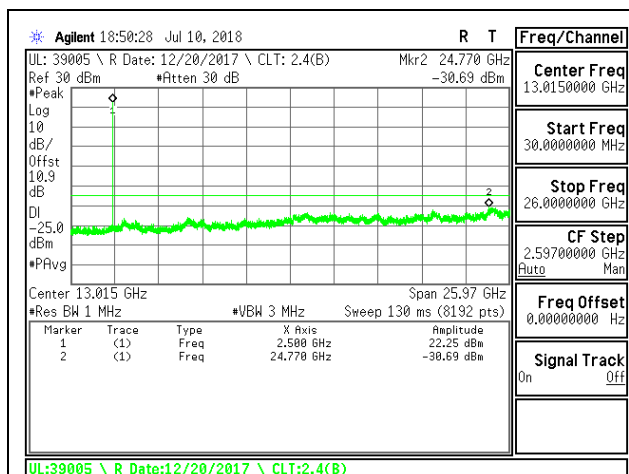
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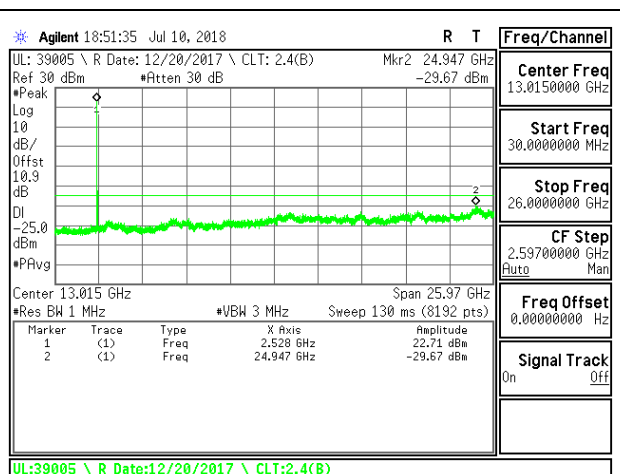
LTE B7 10MHz 16QAM Mid Channel RB1-0



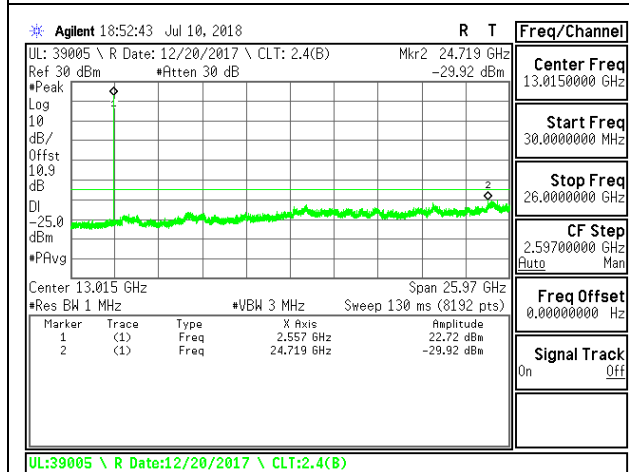
LTE B7 10MHz 16QAM High Channel RB1-0



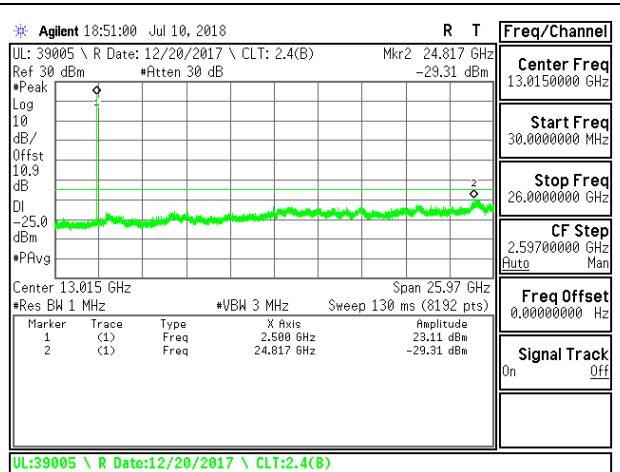
LTE B7 15MHz QPSK Low Channel RB1-0



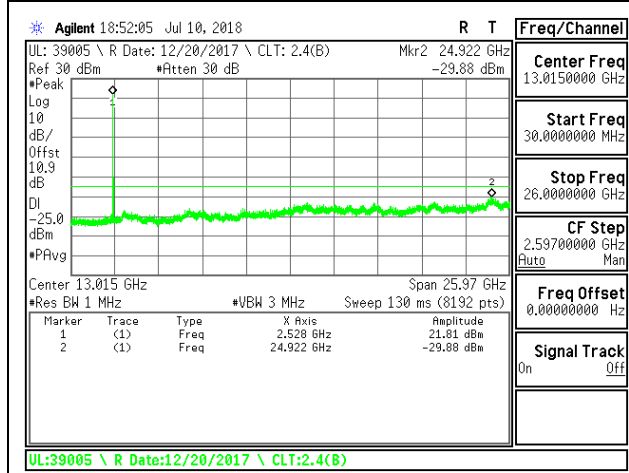
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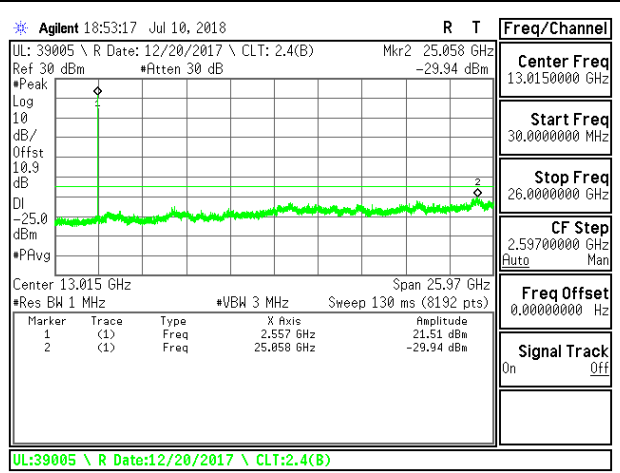
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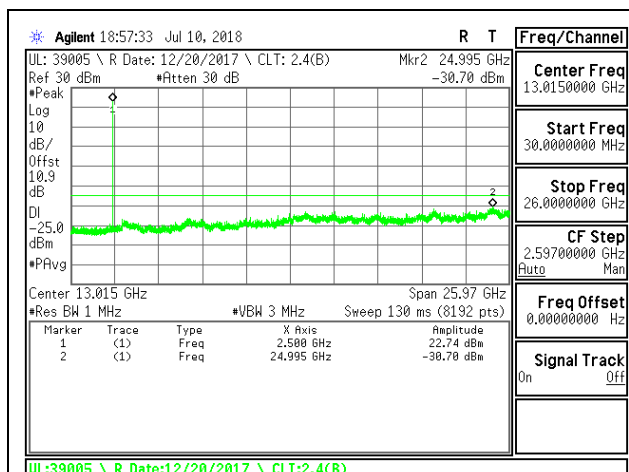
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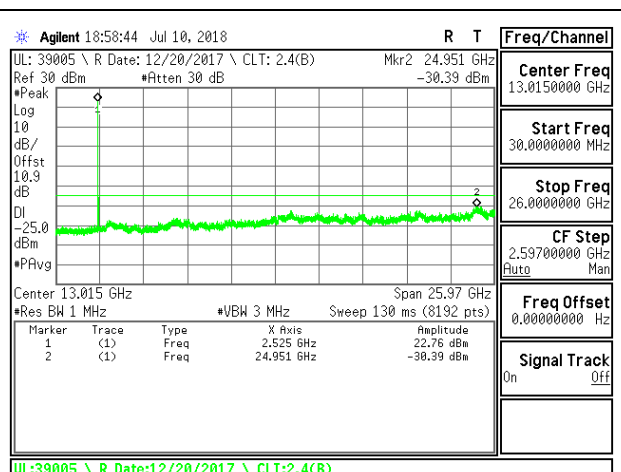
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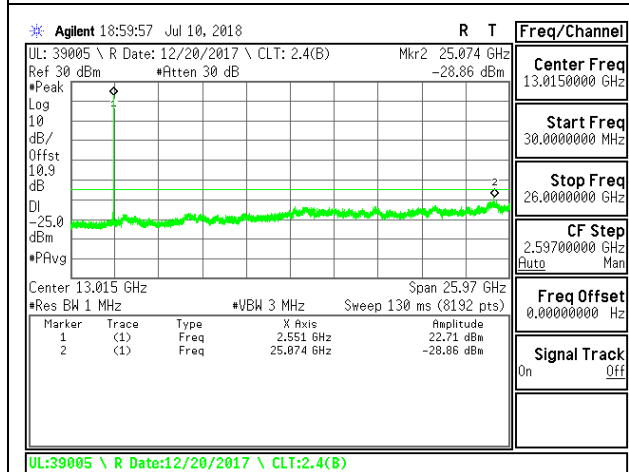
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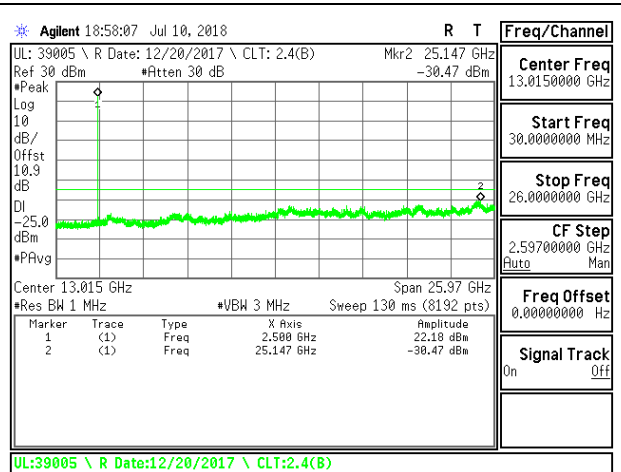
LTE B7 20MHz QPSK Low Channel RB1-0



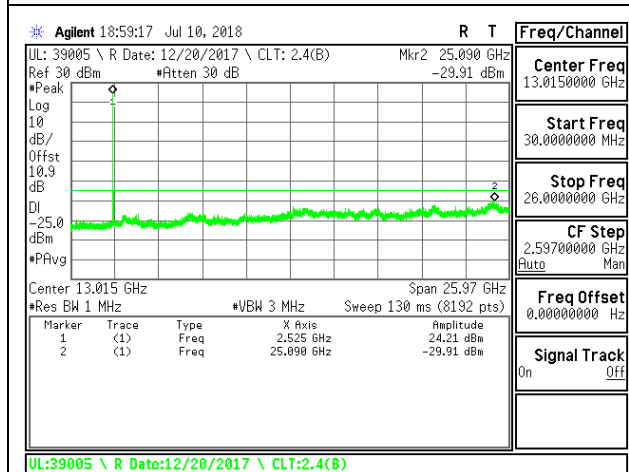
LTE B7 20MHz QPSK Mid Channel RB1-0



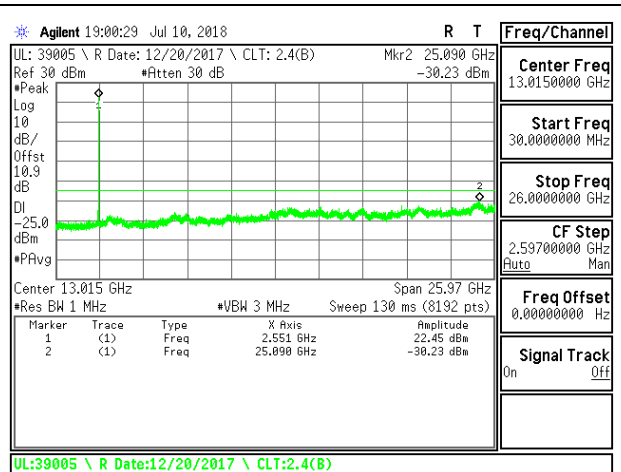
LTE B7 20MHz QPSK High Channel RB1-0



LTE B7 20MHz 16QAM Low Channel RB1-0

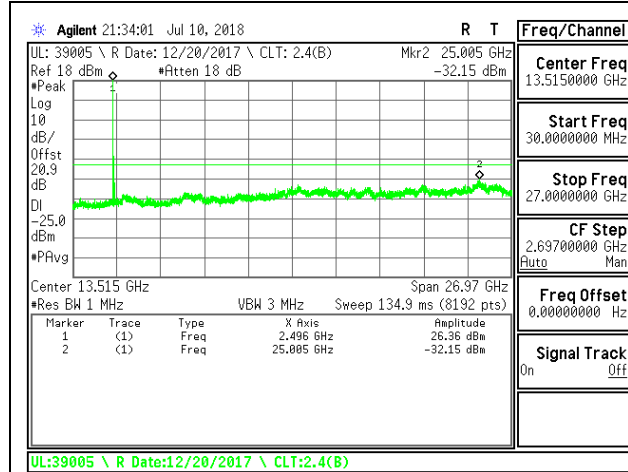


LTE B7 20MHz 16QAM Mid Channel RB1-0

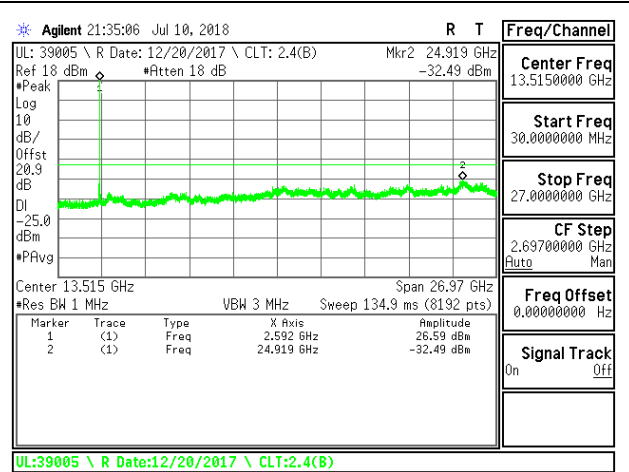


LTE B7 20MHz 16QAM High Channel RB1-0

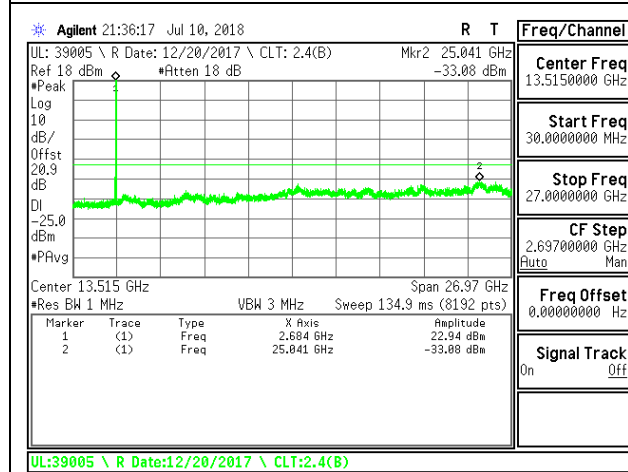
8.3.2. LTE BAND 41



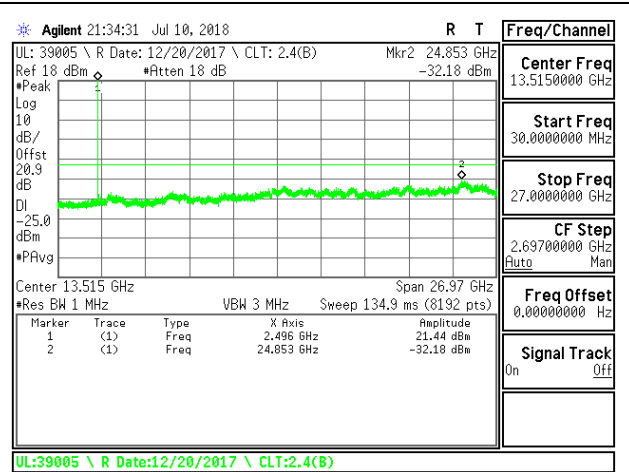
LTE B41 5MHz QPSK Low Channel RB1-0



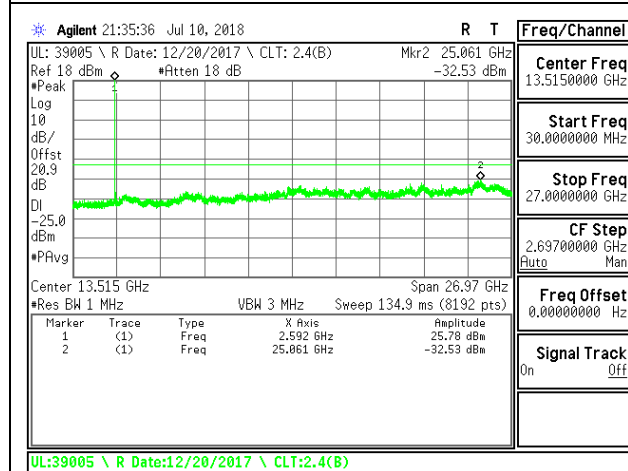
LTE B41 5MHz QPSK Mid Channel RB1-0



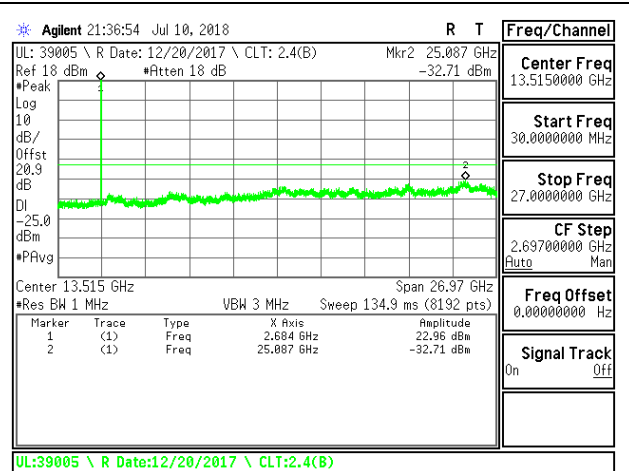
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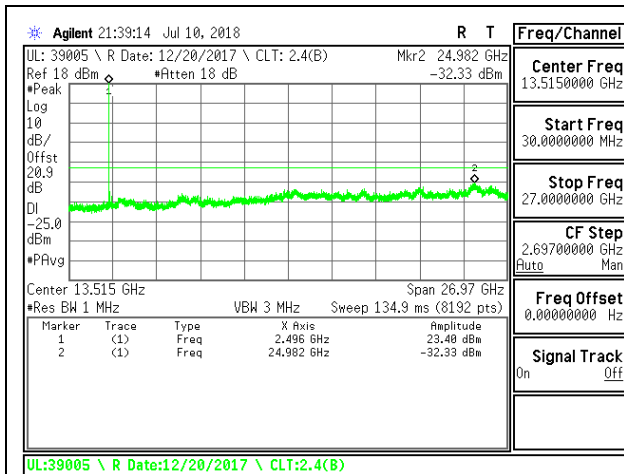
LTE B41 5MHz 16QAM Low Channel RB1-0



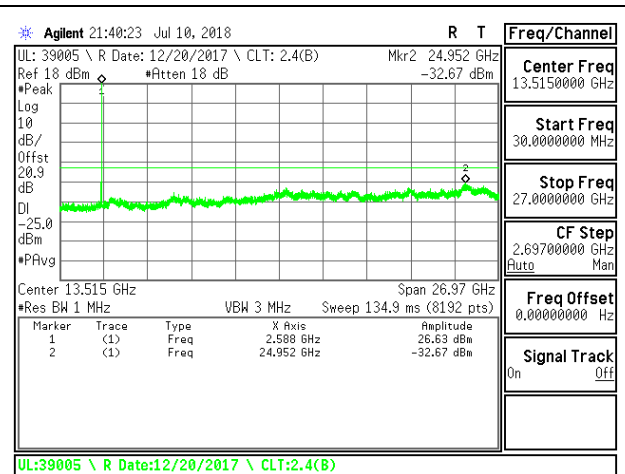
LTE B41 5MHz 16QAM Mid Channel RB1-0



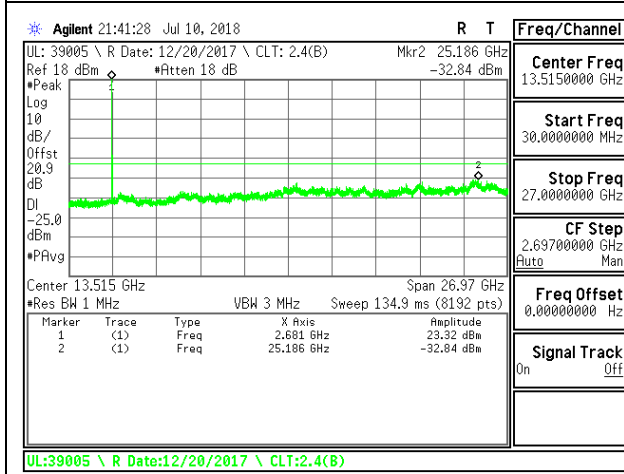
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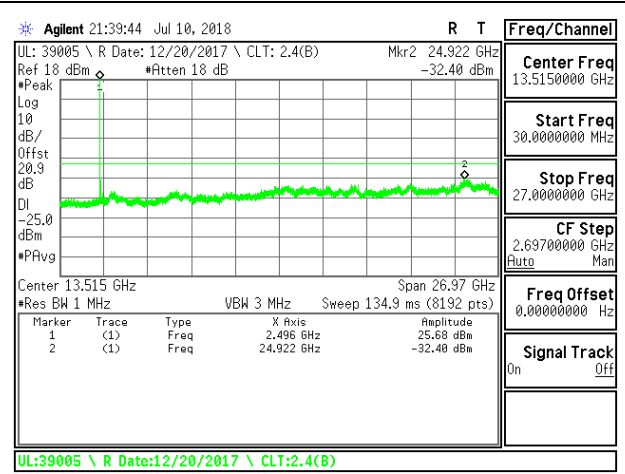
LTE B41 10MHz QPSK Low Channel RB1-0



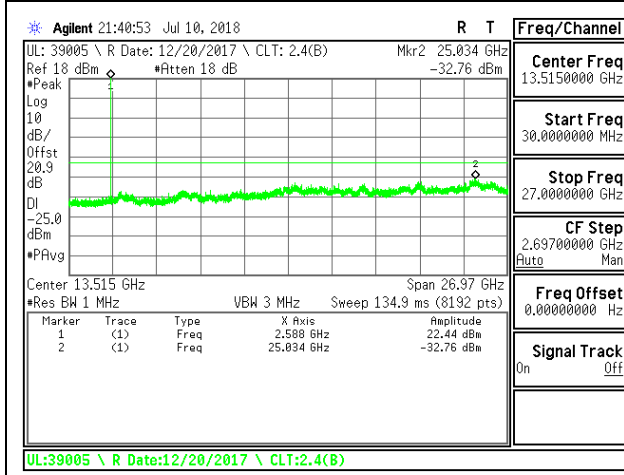
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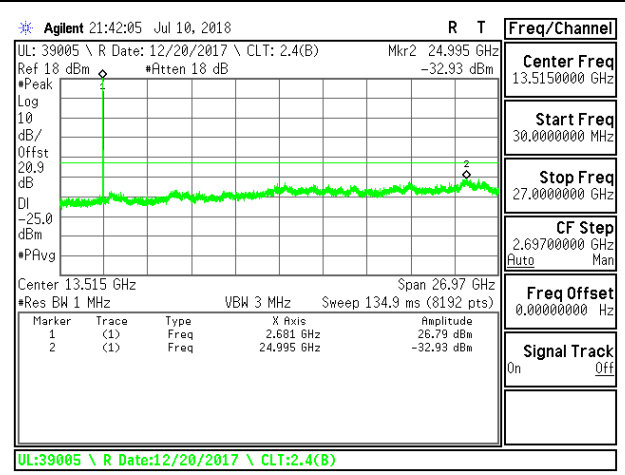
LTE B41 10MHz QPSK High Channel RB1-0



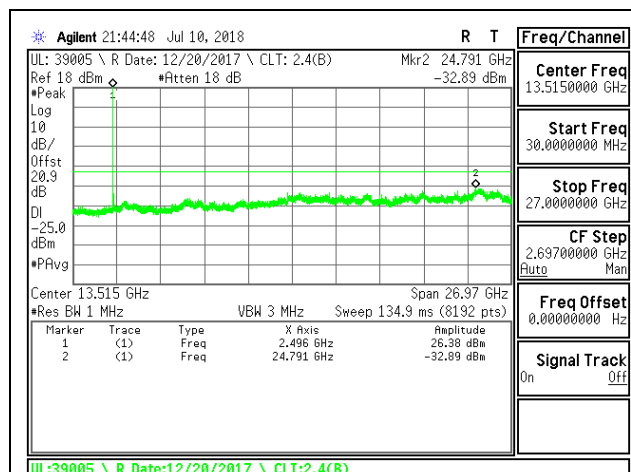
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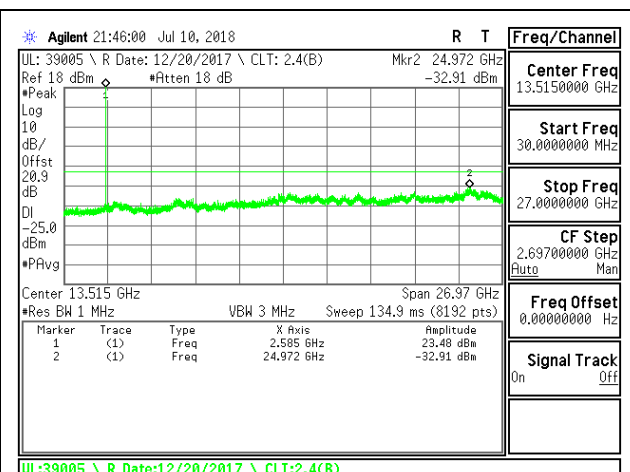
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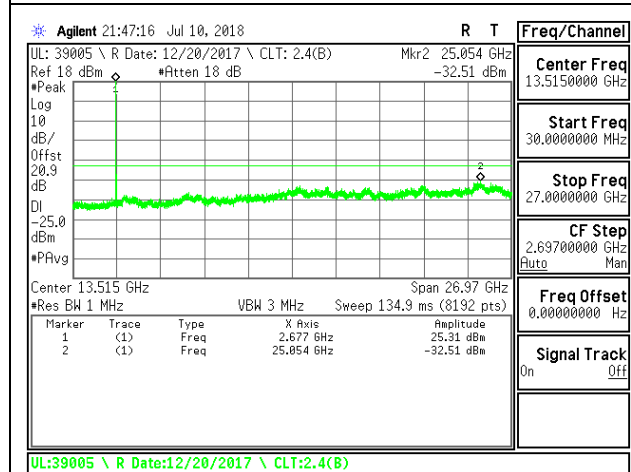
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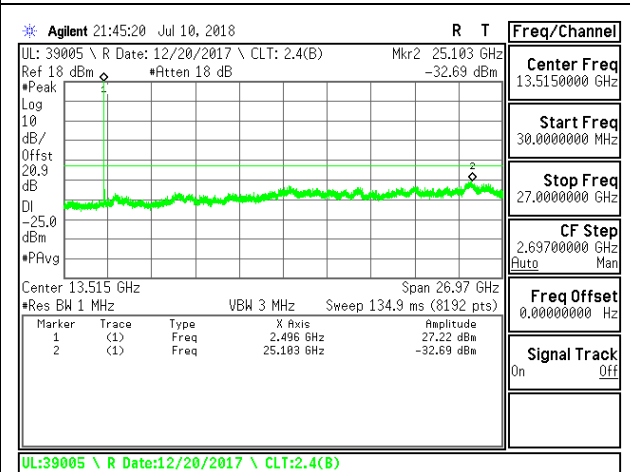
LTE B41 15MHz QPSK Low Channel RB1-0



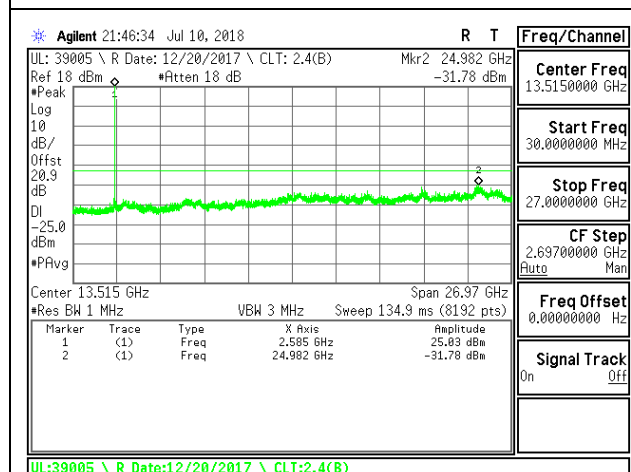
LTE B41 15MHz QPSK Mid Channel RB1-0



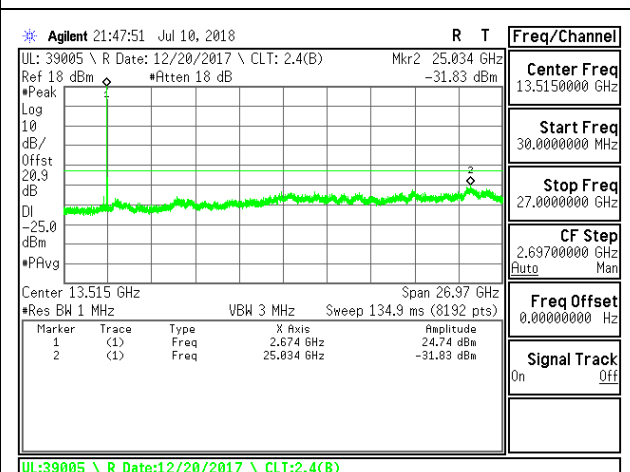
LTE B41 15MHz QPSK High Channel RB1-0



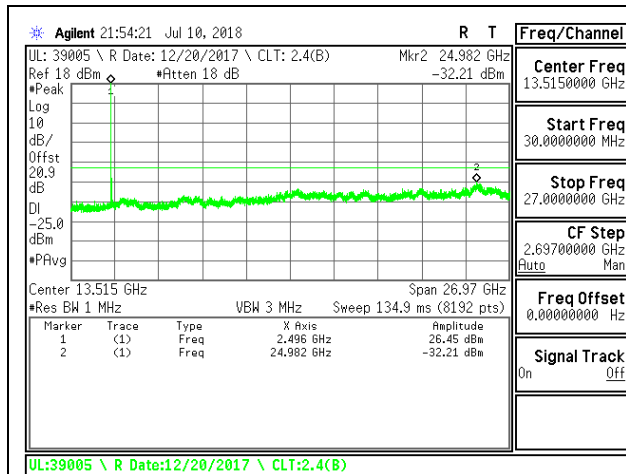
LTE B41 15MHz 16QAM Low Channel RB1-0



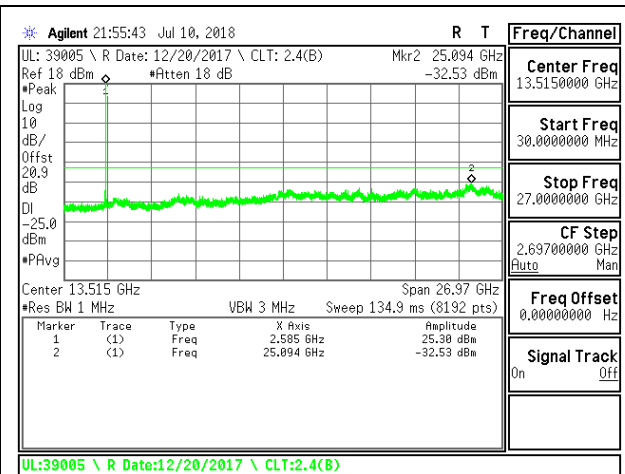
LTE B41 15MHz 16QAM Mid Channel RB1-0



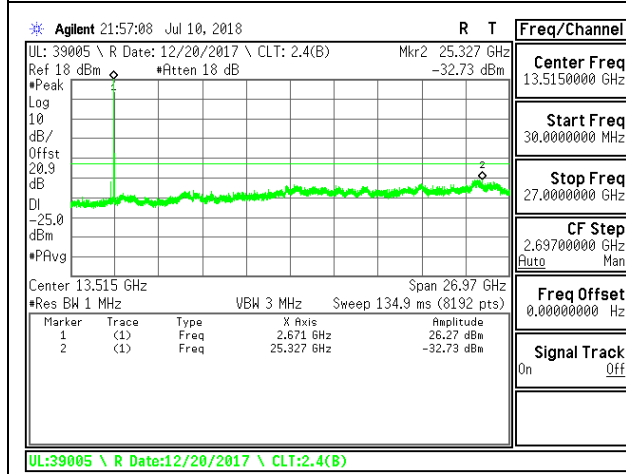
LTE B41 15MHz 16QAM High Channel RB1-0



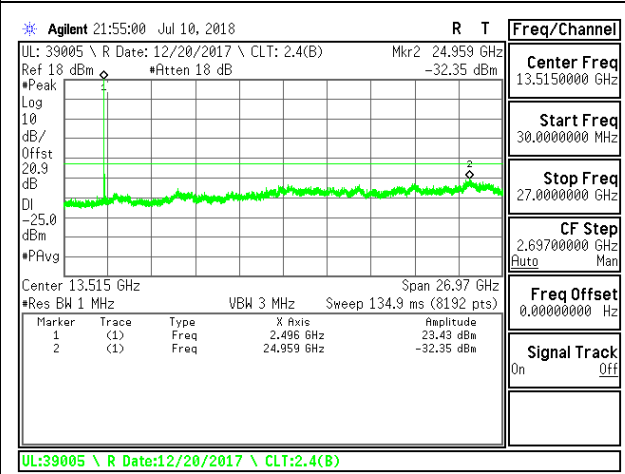
LTE B41 20MHz QPSK Low Channel RB1-0



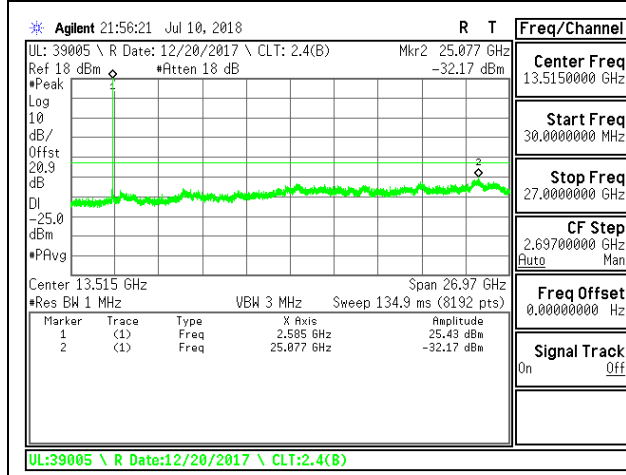
LTE B41 20MHz QPSK Mid Channel RB1-0



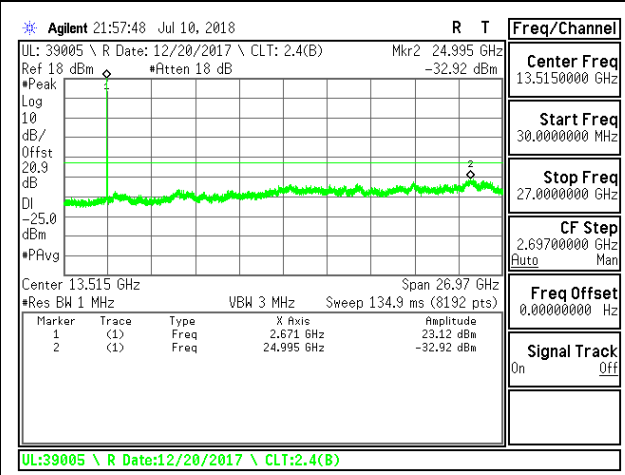
LTE B41 20MHz QPSK High Channel RB1-0



LTE B41 20MHz 16QAM Low Channel RB1-0



LTE B41 20MHz 16QAM Mid Channel RB1-0



LTE B41 20MHz 16QAM High Channel RB1-0

8.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §27.54

LIMITS

FCC: §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = -30°C to +50°C
- Voltage = (85% - 115%)
Low voltage, 3.23VDC, Normal, 3.8VDC and High voltage, 4.37VDC.
End Voltage, 3.2VDC.

Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to 20°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50°C is reached.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

MODES TESTED

- LTE Band 7
- LTE Band 41

RESULTS

8.4.1. LTE BAND 7

ID:	39005	Date:	7/10/18
------------	-------	--------------	---------

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	2500.8700	2569.1500		
Extreme (50C)		2500.8700	2569.1500	11.2	0.004
Extreme (40C)		2500.8700	2569.1500	10.8	0.004
Extreme (30C)		2500.8700	2569.1500	11.6	0.005
Extreme (10C)		2500.8700	2569.1500	10.3	0.004
Extreme (0C)		2500.8700	2569.1500	11.1	0.004
Extreme (-10C)		2500.8700	2569.1500	11.2	0.004
Extreme (-20C)		2500.8700	2569.1500	10.3	0.004
Extreme (-30C)		2500.8700	2569.1500	10.2	0.004
20C	15%	2500.8700	2569.1500	11.5	0.005
	-15%	2500.8700	2569.1500	12.3	0.005
	End Point	2500.8700	2569.1500	10.6	0.004

8.4.2. LTE BAND 41

ID:	39005	Date:	7/10/18
------------	-------	--------------	---------

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	2496.6970	2689.2770		
Extreme (50C)		2496.6970	2689.2770	12.1	0.005
Extreme (40C)		2496.6970	2689.2770	11.3	0.004
Extreme (30C)		2496.6970	2689.2770	12.0	0.005
Extreme (10C)		2496.6970	2689.2770	12.5	0.005
Extreme (0C)		2496.6970	2689.2770	10.3	0.004
Extreme (-10C)		2496.6970	2689.2770	8.3	0.003
Extreme (-20C)		2496.6970	2689.2770	12.5	0.005
Extreme (-30C)		2496.6970	2689.2770	11.9	0.005
20C	15%	2496.6970	2689.2770	10.8	0.004
	-15%	2496.6970	2689.2770	11.2	0.004
	End Point	2496.6970	2689.2770	12.3	0.005

8.5. PEAK TO AVERAGE RATIO

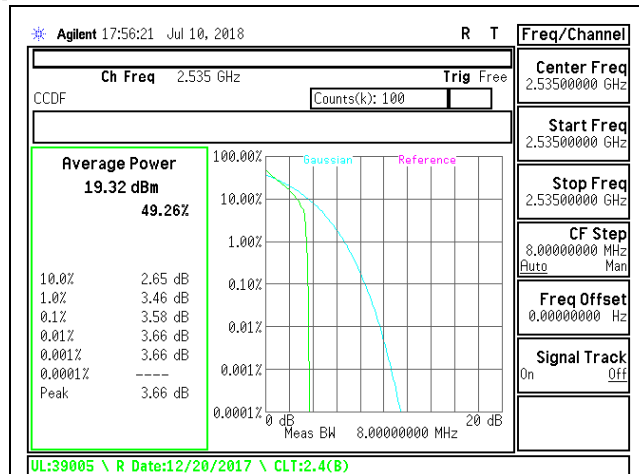
LIMIT

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

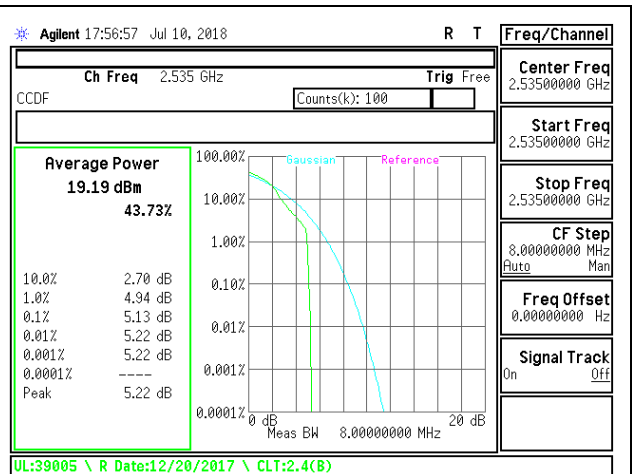
RESULT

Full resource block (FRB) for each bandwidth was used to measure as the worst case. The results from all CCDF measurements are passed with 13dB peak-to-average power ratio criteria.

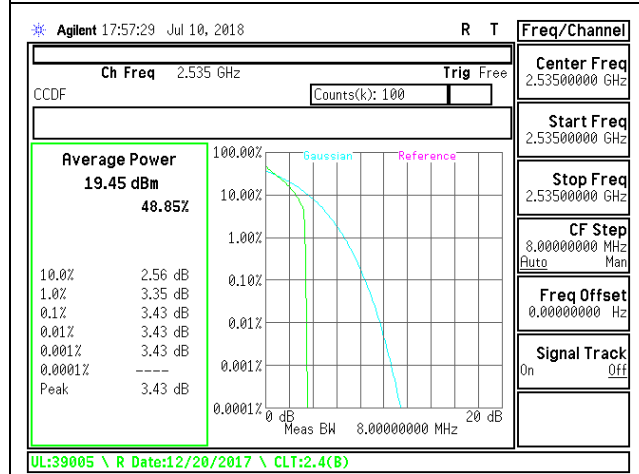
8.5.1. LTE BAND 7



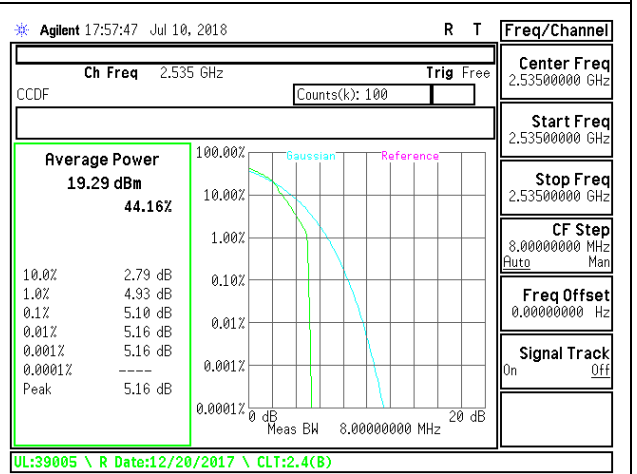
LTE B7 5MHz QPSK Mid Channel



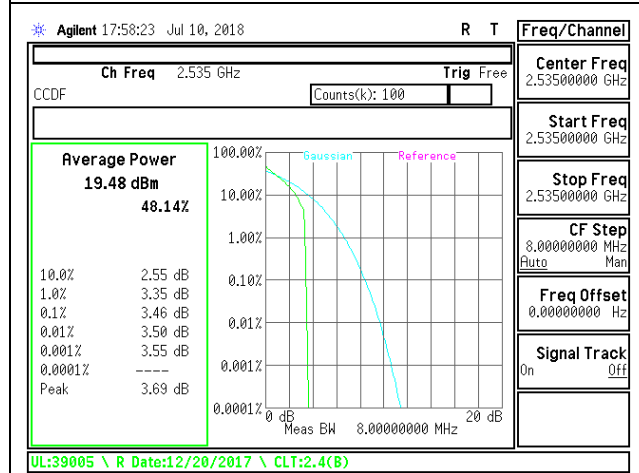
LTE B7 5MHz 16QAM Mid Channel



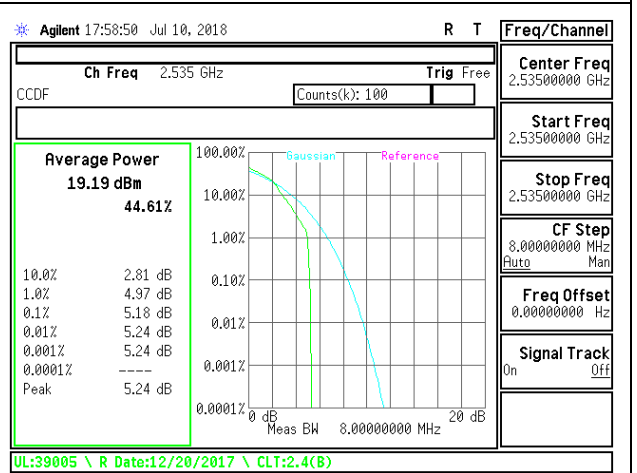
LTE B7 10MHz QPSK Mid Channel



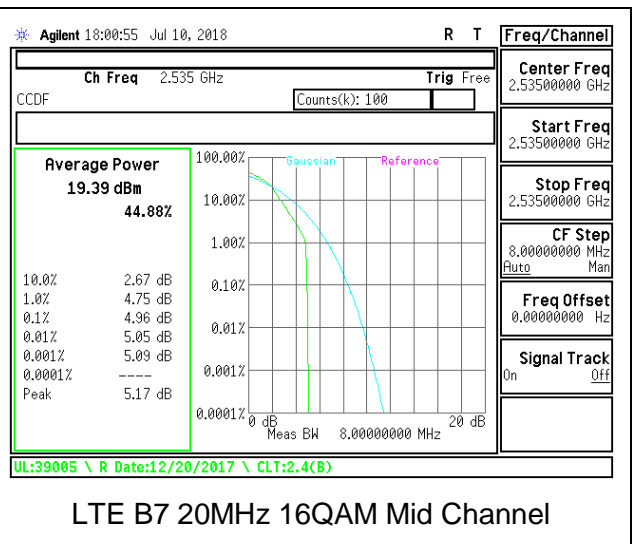
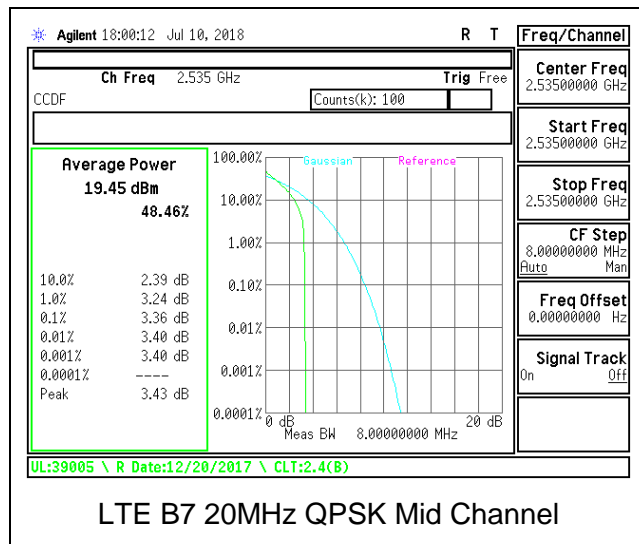
LTE B7 10MHz 16QAM Mid Channel



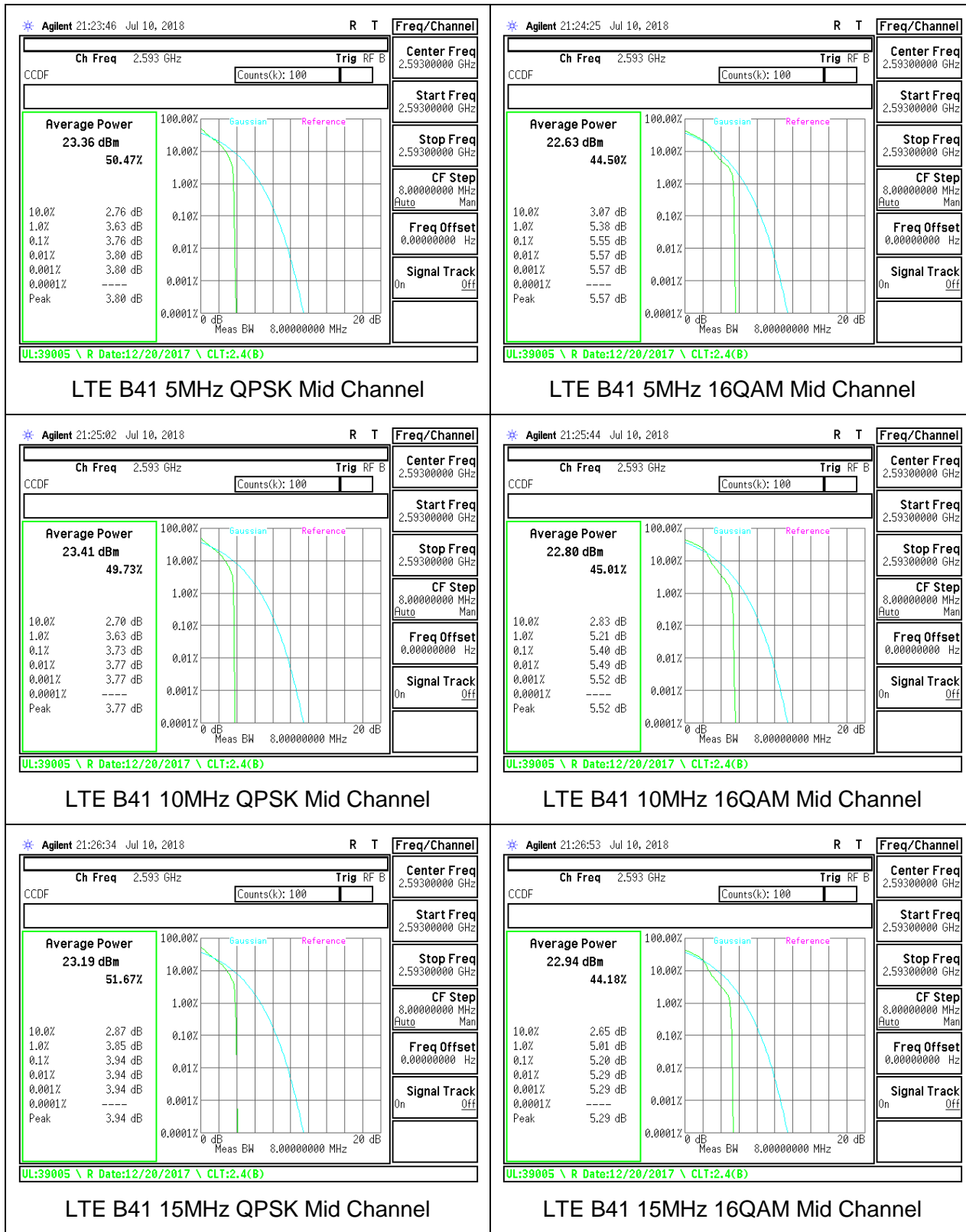
LTE B7 15MHz QPSK Mid Channel

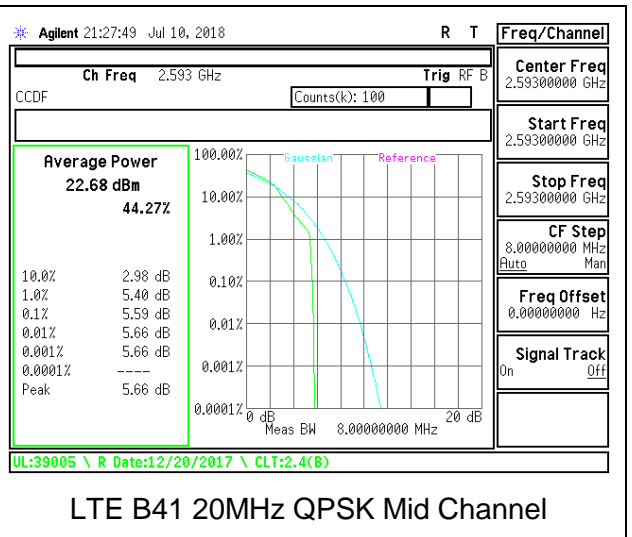
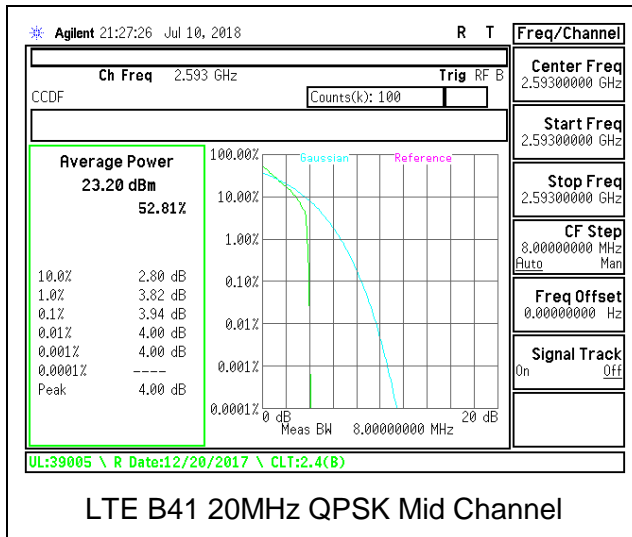


LTE B7 15MHz 16QAM Mid Channel



8.5.2. LTE BAND 41





9. RADIATED TEST RESULTS

9.1. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §27.53

LIMIT

FCC: §27.53 (g), (h)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

FCC: §27.53 (m) (Band 7, 41)

At least $55 + 10 \log (P)$ 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.

TEST PROCEDURE

KDB 971168 D01 v02r02/D02 v01
TIA-603-E, Section 2.2.12.

MODES TESTED

- LTE Band 7
- LTE Band 41

NOTE: All bandwidths were tested but only highest bandwidth recorded on the report as worst case.

RESULTS

9.1.1. LTE BAND 7

Company:		SOMC										
Project #:		12371499										
Date:		07/11/2018										
Test Engineer:		43575 OS										
Configuration:		EUT+ Support Equipment										
Mode:		LTE 7 QPSK 20MHz										
Chamber #:		Chamber L										
Frequency (MHz)	Meter Reading (dBm)	Det	AF T4942 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	ETSI 417 TX Below 1GHz	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity	
Low Channel 2510MHz												
5.02	-72.36	Pk	34.4	-29.3	10.3	-56.96	-25	-31.96	0-360	151	H	
7.54	-75.09	Pk	35.7	-25.5	10.3	-54.59	-25	-29.59	0-360	151	H	
10.031	-78.37	Pk	37.2	-21.8	10.5	-52.47	-25	-27.47	0-360	151	H	
5.018	-73.43	Pk	34.4	-29.2	10.5	-57.73	-25	-32.73	0-360	151	V	
7.537	-75.41	Pk	35.7	-25.5	10.6	-54.61	-25	-29.61	0-360	151	V	
10.029	-78.33	Pk	37.2	-21.8	10.6	-52.33	-25	-27.33	0-360	151	V	
Mid Channel 2535MHz												
5.072	-72.15	Pk	34.4	-29.3	10.3	-56.75	-25	-31.75	0-360	151	H	
7.62	-74.71	Pk	35.7	-25.5	10.4	-54.11	-25	-29.11	0-360	151	H	
10.157	-76.7	Pk	37.4	-21.9	10.5	-50.7	-25	-25.7	0-360	151	H	
5.068	-72.27	Pk	34.4	-29.2	10.5	-56.57	-25	-31.57	0-360	151	V	
7.607	-74.8	Pk	35.7	-25.5	10.5	-54.1	-25	-29.1	0-360	151	V	
10.145	-77.43	Pk	37.4	-22	10.7	-51.33	-25	-26.33	0-360	151	V	
High Channel 2560MHz												
5.115	-71.1	Pk	34.4	-29.4	10.5	-55.6	-25	-30.6	0-360	152	H	
7.681	-73.97	Pk	35.8	-25.4	10.3	-53.27	-25	-28.27	0-360	152	H	
10.242	-77.51	Pk	37.5	-21.8	10.5	-51.31	-25	-26.31	0-360	152	H	
5.123	-71.24	Pk	34.4	-29.2	10.5	-55.54	-25	-30.54	0-360	152	V	
7.68	-74.71	Pk	35.8	-25.4	10.4	-53.91	-25	-28.91	0-360	152	V	
10.242	-76.74	Pk	37.5	-21.8	10.6	-50.44	-25	-25.44	0-360	152	V	

Company:		SOMC										
Project #:		12371499										
Date:		07/11/2018										
Test Engineer:		43575 OS										
Configuration:		EUT+ Support Equipment										
Mode:		LTE 7 16QAM 20MHz										
Chamber #:		Chamber L										
Frequency (MHz)	Meter Reading (dBm)	Det	AF T4942 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	ETSI 417 TX Below 1GHz	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity	
Low Channel 2510MHz												
5.017	-72.48	Pk	34.4	-29.1	10.3	-56.88	-25	-31.88	0-360	152	H	
7.525	-75.32	Pk	35.7	-25.4	10.4	-54.62	-25	-29.62	0-360	152	H	
10.057	-77.99	Pk	37.2	-22.1	10.5	-52.39	-25	-27.39	0-360	152	H	
5.017	-72.1	Pk	34.4	-29.1	10.5	-56.3	-25	-31.3	0-360	152	V	
7.529	-75.38	Pk	35.7	-25.5	10.6	-54.58	-25	-29.58	0-360	152	V	
10.038	-77.6	Pk	37.2	-21.8	10.6	-51.6	-25	-26.6	0-360	152	V	
Mid Channel 2535MHz												
5.075	-71.96	Pk	34.4	-29.3	10.2	-56.66	-25	-31.66	0-360	151	H	
7.619	-73.91	Pk	35.7	-25.5	10.4	-53.31	-25	-28.31	0-360	151	H	
10.149	-77.01	Pk	37.4	-22	10.5	-51.11	-25	-26.11	0-360	151	H	
5.072	-72.31	Pk	34.4	-29.3	10.4	-56.81	-25	-31.81	0-360	151	V	
7.606	-74.57	Pk	35.7	-25.5	10.5	-53.87	-25	-28.87	0-360	151	V	
10.143	-77.89	Pk	37.4	-22	10.6	-51.89	-25	-26.89	0-360	151	V	
High Channel 2560MHz												
5.121	-71.38	Pk	34.4	-29.3	10.3	-55.98	-25	-30.98	0-360	152	H	
7.68	-72.78	Pk	35.8	-25.4	10.3	-52.08	-25	-27.08	0-360	152	H	
10.238	-77.44	Pk	37.5	-21.8	10.4	-51.34	-25	-26.34	0-360	152	H	
5.116	-68.66	Pk	34.4	-29.4	10.7	-52.96	-25	-27.96	0-360	152	V	
7.676	-74.65	Pk	35.8	-25.4	10.5	-53.75	-25	-28.75	0-360	152	V	
10.23	-76.62	Pk	37.5	-21.8	10.4	-50.52	-25	-25.52	0-360	152	V	

9.1.2. LTE BAND 41

Company:		SOMC										
Project #:		12371499										
Date:		07/11/2018										
Test Engineer:		43575 OS										
Configuration:		EUT+ Support Equipment										
Mode:		LTE 41 QPSK 20MHz										
Chamber #:		Chamber L										
Frequency (MHz)	Meter Reading (dBm)	Det	AF T4942 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	ETSI 417 TX Below 1GHz	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity	
Low Channel 2506MHz												
5.017	-71.34	Pk	34.4	-29.1	10.3	-55.74	-25	-30.74	0-360	151	H	
7.525	-75.62	Pk	35.7	-25.4	10.4	-54.92	-25	-29.92	0-360	151	H	
10.016	-77.47	Pk	37.2	-21.7	10.5	-51.47	-25	-26.47	0-360	151	H	
5.017	-71.34	Pk	34.4	-29.1	10.3	-55.74	-25	-30.74	0-360	151	H	
7.525	-75.62	Pk	35.7	-25.4	10.4	-54.92	-25	-29.92	0-360	151	H	
10.016	-77.47	Pk	37.2	-21.7	10.5	-51.47	-25	-26.47	0-360	151	H	
Mid Channel 2593MHz												
5.186	-72.77	Pk	34.4	-29.1	10.5	-56.97	-25	-31.97	0-360	152	H	
7.779	-72.03	Pk	35.8	-25.3	10.2	-51.33	-25	-26.33	0-360	152	H	
10.385	-77.35	Pk	37.5	-21.3	10.4	-50.75	-25	-25.75	0-360	152	H	
5.185	-70.96	Pk	34.4	-29.2	10.6	-55.16	-25	-30.16	0-360	152	V	
7.77	-74.02	Pk	35.8	-25.3	10.4	-53.12	-25	-28.12	0-360	152	V	
10.364	-76.73	Pk	37.5	-21.4	10.6	-50.03	-25	-25.03	0-360	152	V	
High Channel 2680MHz												
5.369	-73.04	Pk	34.4	-28.7	10.6	-56.74	-25	-31.74	0-360	152	H	
8.036	-75.69	Pk	35.8	-24.9	10.5	-54.29	-25	-29.29	0-360	152	H	
10.719	-77.19	Pk	37.7	-22	9.8	-51.69	-25	-26.69	0-360	152	H	
5.361	-72.64	Pk	34.5	-28.6	10.9	-55.84	-25	-30.84	0-360	152	V	
8.033	-76.09	Pk	35.8	-24.9	10.8	-54.39	-25	-29.39	0-360	152	V	
10.711	-78.53	Pk	37.7	-21.9	10.2	-52.53	-25	-27.53	0-360	152	V	

Company:		SOMC										
Project #:		12371499										
Date:		07/11/2018										
Test Engineer:		43575 OS										
Configuration:		EUT+ Support Equipment										
Mode:		LTE 41 16QAM 20MHz										
Chamber #:		Chamber L										
Frequency (MHz)	Meter Reading (dBm)	Det	AF T4942 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	ETSI 417 TX Below 1GHz	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity	
Low Channel 2506MHz												
5.01	-72.64	Pk	34.4	-29	10.5	-56.74	-25	-31.74	0-360	151	H	
7.503	-75.82	Pk	35.7	-25.5	10.6	-55.02	-25	-30.02	0-360	151	H	
10.022	-78.18	Pk	37.2	-21.7	10.5	-52.18	-25	-27.18	0-360	151	H	
5.01	-72.05	Pk	34.4	-29	10.7	-55.95	-25	-30.95	0-360	151	V	
7.518	-75.67	Pk	35.7	-25.4	10.7	-54.67	-25	-29.67	0-360	151	V	
10.014	-78.22	Pk	37.2	-21.7	10.6	-52.12	-25	-27.12	0-360	151	V	
Mid Channel 2593MHz												
5.19	-71.85	Pk	34.4	-29.2	10.5	-56.15	-25	-31.15	0-360	151	H	
7.78	-73.52	Pk	35.8	-25.3	10.2	-52.82	-25	-27.82	0-360	151	H	
10.379	-77.31	Pk	37.5	-21.3	10.3	-50.81	-25	-25.81	0-360	151	H	
5.19	-72.54	Pk	34.4	-29.2	10.6	-56.74	-25	-31.74	0-360	151	V	
7.773	-74.16	Pk	35.8	-25.3	10.5	-53.16	-25	-28.16	0-360	151	V	
10.376	-77.78	Pk	37.5	-21.3	10.4	-51.18	-25	-26.18	0-360	151	V	
High Channel 2680MHz												
5.361	-73.86	Pk	34.5	-28.6	10.7	-57.26	-25	-32.26	0-360	151	H	
8.048	-75.47	Pk	35.8	-24.8	10.5	-53.97	-25	-28.97	0-360	151	H	
10.701	-77.34	Pk	37.6	-21.9	9.9	-51.74	-25	-26.74	0-360	151	H	
5.362	-73.23	Pk	34.5	-28.6	10.8	-56.53	-25	-31.53	0-360	151	V	
8.037	-75.18	Pk	35.8	-24.9	10.8	-53.48	-25	-28.48	0-360	151	V	
10.728	-76.8	Pk	37.7	-22	10.1	-51	-25	-26	0-360	151	V	

10. VERIFICATION AND VALIDATION OF USING MOBILE COUNTRY CODE

RESULTS

- Appendix A

Appendix A

For this product when the Mobile Country Code (=MCC) is set to US MCC, the below bands will be disabled.

- LTE B19
- LTE B38
- LTE B40

The following pages show that when US MCC is connected on the base station, LTE B19/38/40 cannot be registered and no capability (i.e. disabled). On the other hand, when non-US MCC is connected, the above bands are able to register and have capability.

UE don't show B19, B38 & B40 with US MCC (310)

CMW 500 V 3.7.10 - LTE Signaling 1 - V3.7.20

Operating Band: **Band 4** FDD

Parameter	Downlink	Uplink
Channel	2175 Ch	20175 Ch
Frequency	2132.5 MHz	1732.5 MHz
Cell Bandwidth	20.0 MHz	20.0 MHz
RS EPRE	-85.0 dBm/15kHz	
Full Cell BW Pow.	-54.2 dBm	
PUSCH Open Loop Norm.Power		20 dBm
PUSCH Closed Loop Target Power		20.0 dBm

Sched: **User def. Channels**

RB: Downlink **100**, Uplink **100**

Mod / TBSI: Downlink **QPSK**, Uplink **QPSK**

Code Rate / TBS: Downlink 0.330 8760, Uplink 0.613 17568

Throughput: Downlink 8.734 Mbit/s, Uplink 17.568 Mbit/s

LTE Signaling 1 - Configuration

Path: Network/Identity/MCC

- Network
 - Identity
 - MCC: 310
 - MNC: 01 Two Digits
 - TAC: 1
 - E-UTRAN Cell Identifier: 0000 0000 0000 0000 0001 0000 0000 bin
 - Security Settings
 - Authentication:
 - NAS Security:
 - AS Security:
 - Integrity Algorithm: SNOW3G (EIA1)
 - Milenage:
 - OPc: 0000 0000 0000 0000 0000 0000 0000 0000 hex
 - Secret Key: 0011 2233 4455 6677 8899 AABB CCDD EEFF hex
 - RAND Value: Even
 - UE Identity
 - Default IMSI: 001010123456063

UE Shows B19, B38 & B40 with Non-US MCC (440)

The screenshot shows the 'RF Parameters' section of the CMW 500 V 3.7.10 - LTE Signaling 1 - V3.7.20 interface. The 'Operating Band' is set to 'Band 4' (FDD). The 'Channel' is '2175 Ch' (Downlink) and '20175 Ch' (Uplink). The 'Frequency' is '2132.5 MHz' (Downlink) and '1732.5 MHz' (Uplink). The 'Cell Bandwidth' is '20.0 MHz' for both. The 'RS EPRE' is '-85.0 dBm/15kHz' and 'Full Cell BW Pow.' is '-54.2 dBm'. The 'PUSCH Open Loop Norm. Power' is '20 dBm' and 'PUSCH Closed Loop Target Power' is '20.0 dBm'. The 'Sched.' is 'User def. Channels'. The '# RB' is '100' for both Downlink and Uplink. The 'Mod / TBSI' is 'QPSK' and '5' for Downlink, and 'QPSK' and '10' for Uplink. The 'Code Rate / TBS' is '0.330 8760' and '0.613 17568'. The 'Throughput' is '8.734 Mbit/s' and '17.568 Mbit/s'. The interface also shows a list of supported bands on the left and various control buttons on the right.

The screenshot shows the 'LTE Signaling 1 - Configuration' interface. The 'Path' is 'Network/Identity/MCC'. The 'MCC' is '440'. The 'MNC' is '01' with a dropdown set to 'Two Digits'. The 'TAC' is '1'. The 'E-UTRAN Cell Identifier' is '0000 0000 0000 0000 0001 0000 0000 bin'. The 'Security Settings' section includes 'Authentication' (checked), 'NAS Security' (checked), 'AS Security' (checked), 'Integrity Algorithm' (SNOW3G (EIA1)), 'Milenage' (unchecked), 'OPc' (0000 0000 0000 0000 0000 0000 0000 hex), 'Secret Key' (0011 2233 4455 6677 8899 AABB CCDD EEEF hex), and 'RAND Value' (Even). The 'UE Identity' section includes 'Default IMSI' (001010123456063).

END OF REPORT