



FCC Test Report

Equipment : OH-335 LTE Cat. 6 Outdoor CPE
Brand Name : Greenpacket
Model No. : OH-335
FCC ID : W9V-OH335-GP
FCC Standard : 47 CFR FCC Part 27(M)
LTE Band : XLI
FCC Classification : TNB
Applicant : **Green Packet Berhad, Taiwan**
6F, No.21, Lane 583, Rueiguang Rd. Neihu District, Taipei
City 11492, Taiwan
Manufacturer : **Green Packet Berhad, Taiwan**
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Zhangjiang Hi-Tech Park, Pudong New District, Shanghai
201203, PRC

The product sample received on Sep. 06, 2016 and completely tested on Nov. 23, 2016. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI/TIA-603-D-2010 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

Kevin Liang / Assistant Manager





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Appendix G. Test Photos

Appendix EP. Photographs of EUT v01



Summary of Test Result

Test Specifications					
Report Clause	FCC Std. Clause	Description	Measured	Limit	Result
3.1	2.1049 27.53(m)	Emission Bandwidth	Bandwidth 18.05MHz	Information for Emission Designator	Complied
3.1.6	2.1047	Emission Designator	G7D, W7D	Information only	Complied
3.2	2.1046	Transmitter Conducted Output Power	Conducted Power 24.21 dBm	Information for RF exposure	Complied
3.2.7	-	Peak to Average Ratio	5.48dB	$\leq 13\text{dB}$	Complied
3.3	2.1051 27.53(m)(4)	Transmitter Conducted Bandedge Emissions	refer to test data	$\leq 43 + 10\log(P)$ [-13dBm] P=TX Power in Watts	Complied
3.4	2.1051 27.53(m)(4)	Transmitter Conducted Unwanted Emissions	refer to test data	$\leq 55 + 10\log(P)$ [-25dBm] P=TX Power in Watts	Complied
3.5	2.1055 27.54	Frequency Stability	0.0103ppm	within band	Complied
3.6	2.1053 27.53(m)(4)	Transmitter Radiated Unwanted Emissions	[dBm]: 10359MHz -18.14 (Margin 31.14dB)	$\leq 55 + 10\log(P)$ [-25dBm] P=TX Power in Watts	Complied



Revision History



1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information					
Freq. Band	Mode	TX Ch. Freq. (MHz)	Channel Number	BW (MHz)	Emission Designator
TNB	Band 41	2498.5-2687.5	39675-41565	5-20	18M0W7D
Type of modulation : QPSK / 16QAM					

1.1.2 Antenna Information

Antenna Category	
<input type="checkbox"/>	Equipment placed on the market without antennas
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input checked="" type="checkbox"/>	Temporary RF connector provided
<input type="checkbox"/>	No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.
<input type="checkbox"/>	External antenna (dedicated antennas)

Antenna General Information				
Operating Band	Ant. Cat.	Ant. Type	Connector	Gain (dBi)
Band 41	Integral	Embedded	I-pex	10

1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	N/A
HW Ver. / FW Ver.	N/A
Presentation of Equipment	<input checked="" type="checkbox"/> Production ; <input type="checkbox"/> Pre-Production ; <input type="checkbox"/> Prototype
Type of EUT	
<input checked="" type="checkbox"/>	Stand-alone
<input type="checkbox"/>	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.: ...
<input type="checkbox"/>	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: ...
<input type="checkbox"/>	Other:



1.1.4 EUT Operational Condition

Supply Voltage	<input type="checkbox"/> AC mains	<input checked="" type="checkbox"/> DC	
Type of DC Source	<input type="checkbox"/> Internal DC supply	<input type="checkbox"/> External AC adapter	<input checked="" type="checkbox"/> PoE
Test Voltage	<input checked="" type="checkbox"/> Vnom (12V)	<input checked="" type="checkbox"/> Vmax (13.8 V)	<input checked="" type="checkbox"/> Vmin (10.2 V)
Test Climatic	<input checked="" type="checkbox"/> Tnom (20°C)	<input checked="" type="checkbox"/> Tmax (55°C)	<input checked="" type="checkbox"/> Tmin (-40°C)

1.2 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ◆ 47 CFR FCC Part 27(M)
- ◆ ANSI/TIA-603-D-2010
- ◆ KDB 971168 D01 v02r02
- ◆ KDB 971168 D02 v01
- ◆ KDB 412172 D01 v01r01

1.3 Testing Location Information

Testing Location				
<input checked="" type="checkbox"/>	HWA YA	ADD :	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.	
	TEL :	886-3-327-3456	FAX :	886-3-327-0973
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-HY	Candy Wu	24.3°C / 62%	23/11/2016
Radiated Emission	03CH03-HY	Jeff Lin	24.2°C / 57%	20/11/2016

Test site registered number [553509] with FCC.



1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty		
Test Item	Uncertainty	
AC power-line conducted emissions	±2.2 dB	
Emission bandwidth	±1.4 %	
RF output power, conducted	±0.6 dB	
Unwanted emissions, conducted	30 – 1000 MHz	±0.5 dB
	1 – 18 GHz	±0.6 dB
	18 – 40 GHz	±0.8 dB
	40 – 200 GHz	N/A
All emissions, radiated	30 – 1000 MHz	±2.5 dB
	1 – 18 GHz	±3.5 dB
	18 – 40 GHz	±3.8 dB
	40 – 200 GHz	N/A
Temperature	±0.8 °C	
Humidity	±3 %	
DC and low frequency voltages	±3 %	
Time	±1.4 %	
Duty Cycle	±1.4 %	



2 Test Configuration of EUT

2.1 Frequency List of Low/Middle/High Channels

BW (MHz)	Channel/Freq.(MHz)	Lowest	Middle	Highest
20	Channel	39750	40620	41490
	Freq.(MHz)	2506	2593	2680
15	Channel	39725	40620	41515
	Freq.(MHz)	2503.5	2593	2682.5
10	Channel	39700	40620	41540
	Freq.(MHz)	2501	2593	2685
5	Channel	39675	40620	41565
	Freq.(MHz)	2498.5	2593	2687.5

2.2 Test Mode

Test Items	Band	Bandwidth (MHz)				Modulation		RB#			Test Channel		
		5	10	15	20	QPSK	16QAM	1	Half	Full	L	H	M
Transmitter Conducted Output Power	41	V	V	V	V	V	V	V	V	V	V	V	V
Peak-to-Average Ratio	41	-	-	-	V	V	V	V	-	V	V	V	V
Emission Bandwidth	41	V	V	V	V	V	V	-	-	V	V	V	V
Conducted Band Edge	41	V	V	V	V	V	V	V	-	V	V	-	V
Conducted Spurious Emission	41	V	V	V	V	V	V	V	-	-	V	V	V
Frequency Stability	41	-	V	-	-	V	-	-	-	V	-	V	-
Radiated Spurious Emission	41	V	V	V	V	V	-	V	-	-	-	V	-
Note		1. The mark "v" means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.											



2.3 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	Transmitter Conducted Output Power Peak-to-Average Ratio Emission Bandwidth Conducted Band Edge Conducted Spurious Emission Frequency Stability
Test Condition	Conducted measurement at transmit chains
Modulation Mode	LTE

The Worst Case Mode for Following Conformance Tests	
Tests Item	Radiated Spurious Emission
Test Condition	Radiated measurement
Modulation Mode	LTE
User Position	<input checked="" type="checkbox"/> EUT will be placed in fixed position. <input type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. <input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions.
Orthogonal Planes of EUT	X Plane 
Worst Planes of EUT	V



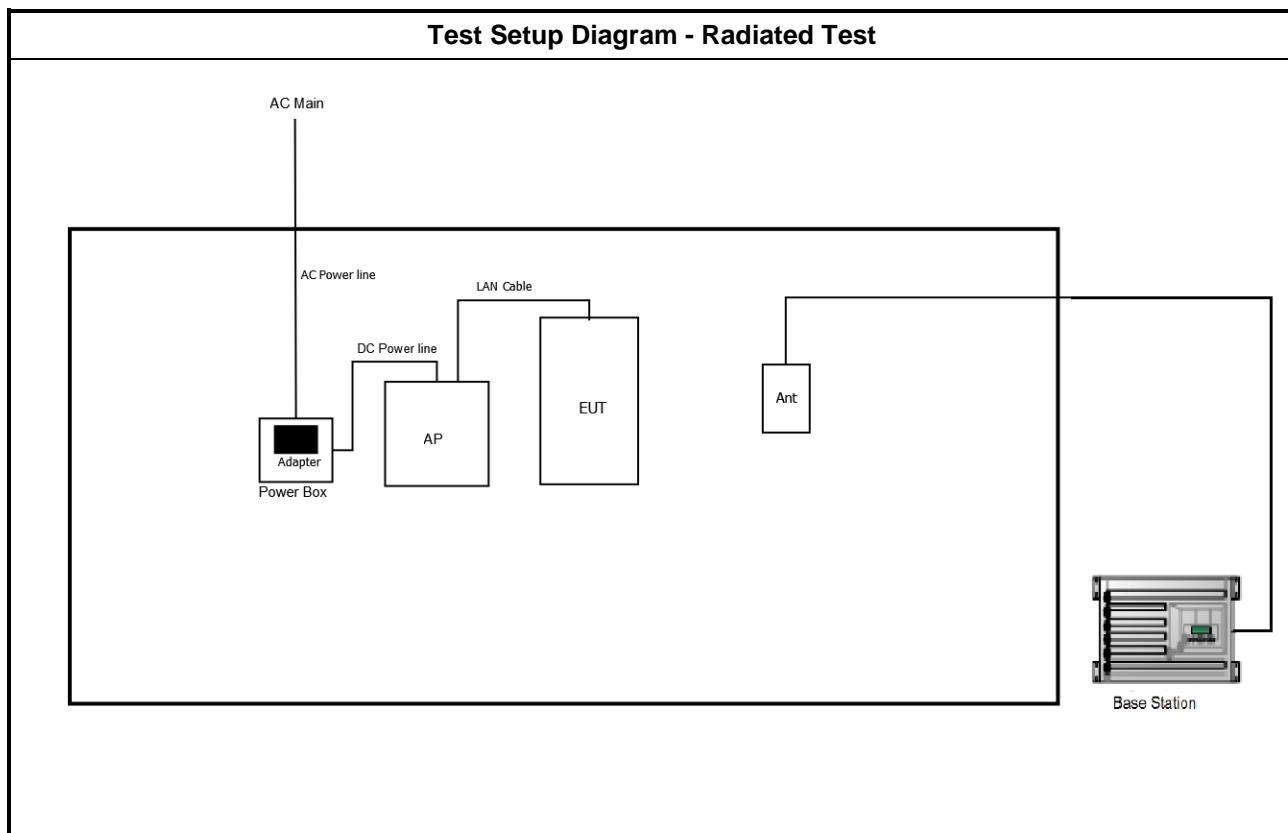
2.4 Accessories and Support Equipment

Accessories				
Greenpacket Wi-Fi 11ac/b/g/n Router	Brand Name	Greenpacket	Model Name	WA-1200
AC Adapter 1	Brand Name	Asian Power Device	Model Name	WA-24Q12R
	Power Rating	I/P: 100 - 240 Vac ~50/60Hz 0.7 A, O/P: 12V, 2A		
	Power Cord	1.14 meter, non-shielded cable, with w/o ferrite core		
AC Adapter 2	Brand Name	SWITCHING POWER SUPPLY	Model Name	S024AMM1200200
	Power Rating	I/P: 100- 240 Vac ~50/60Hz 600 mA, O/P: 12V, 2000 mA		
	Power Cord	1.2 meter, non-shielded cable, with w/o ferrite core		
RJ45 Cable 1	Category	5E	Model Name	E485131
	Power Cord	1.5 meter, shield or non-shielded cable		
RJ45 Cable 2	Category	5E	Model Name	E473734
	Power Cord	1.5 meter, shield or non-shielded cable		
CORE	-	core code :130		
CORE	-	core code :130		

Reminder: Regarding to more detail and other information, please refer to user manual.

Support Equipment				
No.	Equipment	Brand Name	Model Name	
1	SIM card	-	-	

2.5 Test Setup Diagram





3 Transmitter Test Result

3.1 Emission Bandwidth

3.1.1 Emission Bandwidth Limit

Emission Bandwidth Limit
Information for Emission Designator.
Note 1: The 99% occupied bandwidth is the frequency bandwidth of the signal power at the 99% channel power of occupied bandwidth when resolution bandwidth should be approximately 1 % to 5 % of the span. These measurements shall also be performed at normal test conditions.

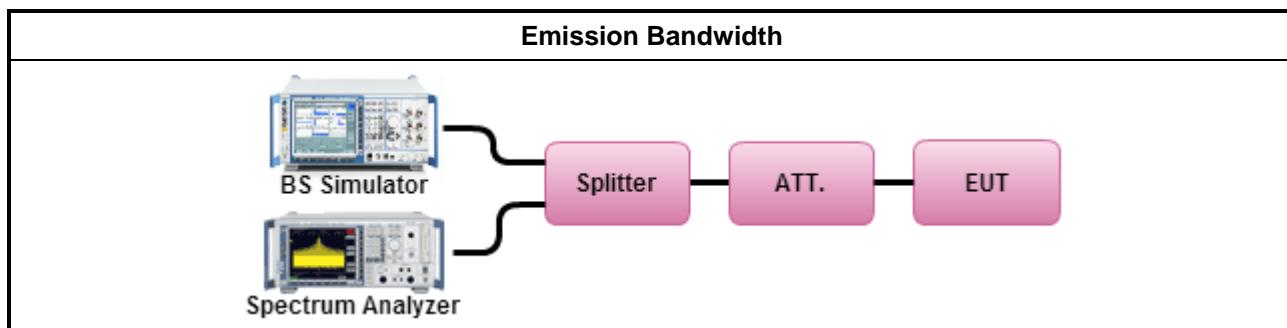
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> For the emission bandwidth shall be measured using one of the options below:
<input type="checkbox"/> Refer as ANSI/TIA-603-D, clause 1.3.4.4 for test bandwidth.
<input checked="" type="checkbox"/> Refer as KDB 971168 D01, clause 4 for occupied bandwidth.
<input type="checkbox"/> Refer as IC RSS-Gen, clause 6.6 for emission bandwidth.
<input checked="" type="checkbox"/> For conducted measurement.
<input checked="" type="checkbox"/> If EUT supports single transmit chain and measurements performed on this transmit chain.
<input type="checkbox"/> If EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
<input type="checkbox"/> If EUT supports multiple transmit chains using options given below:
<input type="checkbox"/> Option 1: Multiple transmit chains measurements need to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 1.
<input type="checkbox"/> Option 2: Multiple transmit chains measurements need to be performed on each transmit chains individually (antenna outputs). All measurement had be performed on all transmit chains.
<input type="checkbox"/> For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.

3.1.4 Test Setup





3.1.5 Test Result of Emission Bandwidth

Refer as Appendix A

3.1.6 Emission Designator

Refer as Appendix A



3.2 Transmitter Conducted Output Power

3.2.1 Transmitter Conducted Output Power Limit

Transmitter Conducted Output Power Limit
Transmitter output power ≤ 2W [33.01dBm] (128.2 dBuV/m at 3m)

3.2.2 Transmitter Peak to Average Ratio Limit

Transmitter Peak to Average Ratio Limit
PAR ≤ 13dB

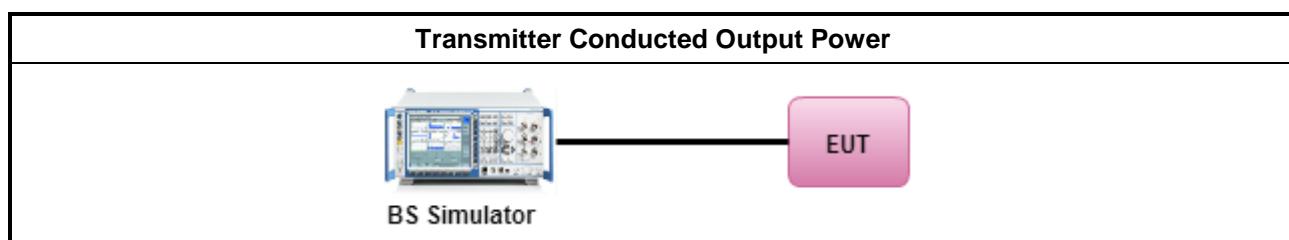
3.2.3 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.4 Test Procedures

Test Method
<input checked="" type="checkbox"/> Transmitter Conducted Output Power
<input checked="" type="checkbox"/> Refer as KDB 971168 D01, clause 5 for RF power output.
<input type="checkbox"/> Refer as RSS-Gen, clause 6.12 for power measurement.
<input checked="" type="checkbox"/> Transmitter Peak-Average Ratio
<input checked="" type="checkbox"/> Refer as KDB 971168 D01, clause 5.7 for CCDF function.
<input checked="" type="checkbox"/> For conducted measurement.
<input checked="" type="checkbox"/> If EUT supports single transmit chain and measurements performed on this transmit chain.
<input type="checkbox"/> If EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
<input type="checkbox"/> If EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.

3.2.5 Test Setup



3.2.6 Test Result of Transmitter Conducted Output Power

Refer as Appendix B

3.2.7 Test Result of Transmitter Peak to Average Ratio

Refer as Appendix B



3.3 Transmitter Conducted Bandedge Emissions

3.3.1 Transmitter Conducted Bandedge Emissions Limit

Transmitter Conducted Bandedge Emissions Limit

For all fixed digital user stations, the attenuation factor shall be not less than $43 + 10 \log (P)$ dB at the channel edge.

3.3.2 Measuring Instruments

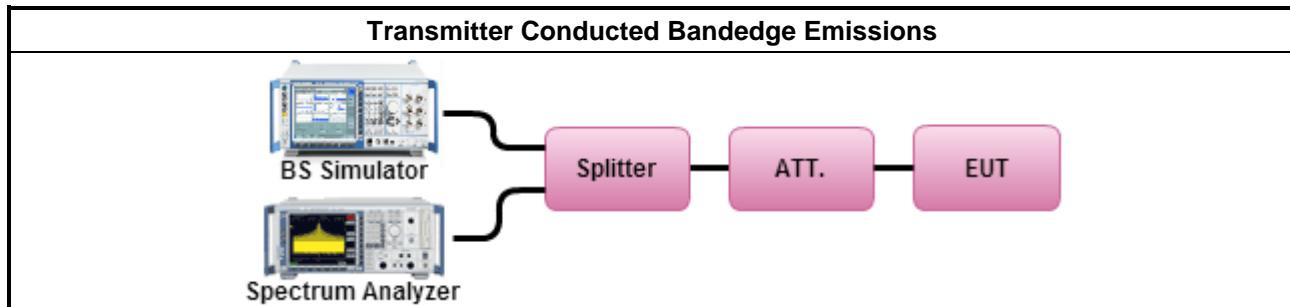
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method

- | | | | | |
|---|---|--|--|---|
| <input checked="" type="checkbox"/> Refer as KDB 971168 D01, clause 6 for spurious emissions. | | | | |
| <input type="checkbox"/> Refer as RSS-Gen, clause 6.13 for transmitter unwanted emissions measurement. | | | | |
| <input type="checkbox"/> In case a narrower measurement bandwidth was used, the following conversion formula has to be applied: (e.g. if reference bandwidth 1 MHz and measurement bandwidth 100 kHz, then measurement bandwidth conversion factor is 10 dB); $B = A + 10 \log (BW_{ref} / BW_{measured})$
• A is the value at the narrower measurement bandwidth;
• B is the value referred to the reference bandwidth;
• Correction Factor(dB)= $10\log(1\% \text{ Emission BW/RBW})$; | | | | |
| <input checked="" type="checkbox"/> For conducted measurement. <table border="1"><tr><td><input checked="" type="checkbox"/> For conducted measurements on devices with single transmit chain.</td></tr><tr><td><input type="checkbox"/> For conducted measurements on devices with multiple transmit chains using options given below:<table border="1"><tr><td><input type="checkbox"/> Option 1: measure and sum the spectra across the transmitter outputs.</td></tr><tr><td><input type="checkbox"/> Option 2: N transmitter outputs, then spurious emissions limits on each individual output. Measure and add $10 \log (N)$ dB.</td></tr></table></td></tr></table> | <input checked="" type="checkbox"/> For conducted measurements on devices with single transmit chain. | <input type="checkbox"/> For conducted measurements on devices with multiple transmit chains using options given below: <table border="1"><tr><td><input type="checkbox"/> Option 1: measure and sum the spectra across the transmitter outputs.</td></tr><tr><td><input type="checkbox"/> Option 2: N transmitter outputs, then spurious emissions limits on each individual output. Measure and add $10 \log (N)$ dB.</td></tr></table> | <input type="checkbox"/> Option 1: measure and sum the spectra across the transmitter outputs. | <input type="checkbox"/> Option 2: N transmitter outputs, then spurious emissions limits on each individual output. Measure and add $10 \log (N)$ dB. |
| <input checked="" type="checkbox"/> For conducted measurements on devices with single transmit chain. | | | | |
| <input type="checkbox"/> For conducted measurements on devices with multiple transmit chains using options given below: <table border="1"><tr><td><input type="checkbox"/> Option 1: measure and sum the spectra across the transmitter outputs.</td></tr><tr><td><input type="checkbox"/> Option 2: N transmitter outputs, then spurious emissions limits on each individual output. Measure and add $10 \log (N)$ dB.</td></tr></table> | <input type="checkbox"/> Option 1: measure and sum the spectra across the transmitter outputs. | <input type="checkbox"/> Option 2: N transmitter outputs, then spurious emissions limits on each individual output. Measure and add $10 \log (N)$ dB. | | |
| <input type="checkbox"/> Option 1: measure and sum the spectra across the transmitter outputs. | | | | |
| <input type="checkbox"/> Option 2: N transmitter outputs, then spurious emissions limits on each individual output. Measure and add $10 \log (N)$ dB. | | | | |

3.3.4 Test Setup



3.3.5 Test Result of Transmitter Conducted Bandedge Emissions

Refer as Appendix C



3.4 Transmitter Conducted Unwanted Emissions

3.4.1 Transmitter Conducted Unwanted Emissions Limit

Transmitter Conducted Unwanted Emissions Limit

For all fixed digital user stations, the attenuation factor shall be not less than $43 + 10 \log (P)$ dB at the channel edge. It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

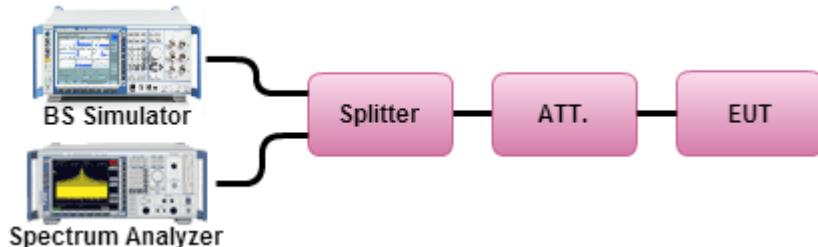
3.4.3 Test Procedures

Test Method

- Refer as KDB 971168 D01, clause 6 for spurious emissions.
- Refer as RSS-Gen, clause 6.13 for transmitter unwanted emissions measurement.
- In case a narrower measurement bandwidth was used, the following conversion formula has to be applied: (e.g. if reference bandwidth 1 MHz and measurement bandwidth 100 kHz, then measurement bandwidth conversion factor is 10 dB); $B = A + 10 \log (BW_{ref} / BW_{measured})$
 - A is the value at the narrower measurement bandwidth;
 - B is the value referred to the reference bandwidth;
 - Correction Factor(dB)= $10\log(1\% \text{ Emission BW}/RBW)$;
- For conducted measurement.
 - For conducted measurements on devices with single transmit chain.
 - For conducted measurements on devices with multiple transmit chains using options given below:
 - Option 1: measure and sum the spectra across the transmitter outputs.
 - Option 2: N transmitter outputs, then spurious emissions limits on each individual output. Measure and add 10 log (N) dB.

3.4.4 Test Setup

Transmitter Conducted Unwanted Emissions



3.4.5 Test Result of Transmitter Conducted Unwanted Emissions

Refer as Appendix D

3.5 Frequency Stability

3.5.1 Frequency Stability Limit

Frequency Stability Limit	
<input checked="" type="checkbox"/>	The transmitter center frequency stability shall be ± 2.5 ppm maximum. The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.
<input checked="" type="checkbox"/>	Temperature: <input checked="" type="checkbox"/> -40°C to +55°C in 10°C step. <input checked="" type="checkbox"/> If the EUT cannot be turned on at -40°C, the testing lowest temperature will be raised in 10°C step until the EUT can be turned on.
<input checked="" type="checkbox"/>	Voltage: <input checked="" type="checkbox"/> For non hand-carried battery and AC powered equipment: 85% to 115% of the nominal value <input type="checkbox"/> For hand-carried, battery-powered equipment: Voltage is reduced to the battery operating end point which shall be specified by the manufacturer.
Note 1: These measurements shall also be performed at normal and extreme test conditions.	

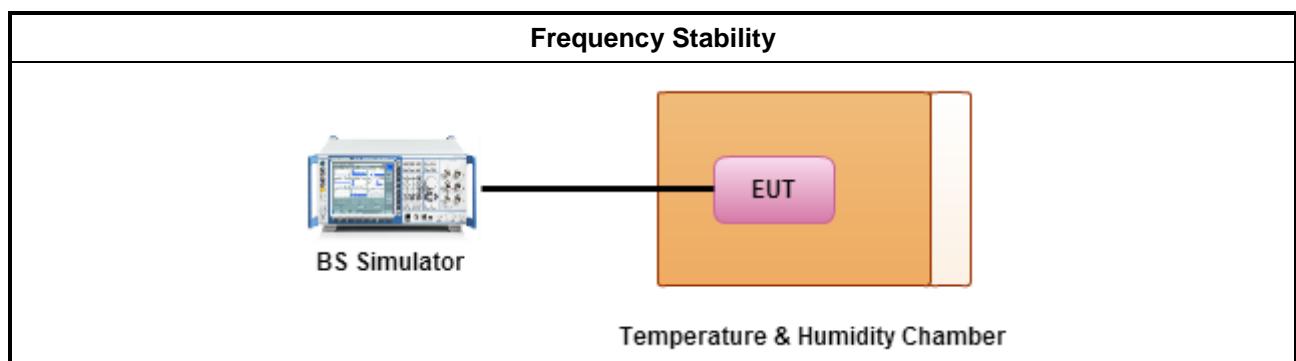
3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as KDB 971168 D01, clause 9 for frequency stability.
<input checked="" type="checkbox"/>	Frequency stability with respect to ambient temperature
<input checked="" type="checkbox"/>	Frequency stability when varying supply voltage
<input checked="" type="checkbox"/>	For conducted measurement.
<input type="checkbox"/>	For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.

3.5.4 Test Setup



3.5.5 Test Result of Frequency Stability

Refer as Appendix E



3.6 Transmitter Radiated Unwanted Emissions

3.6.1 Transmitter Radiated Unwanted Emissions Limit

Transmitter Radiated Unwanted Emissions Limit
For all fixed digital user stations, the attenuation factor shall be not less than $43 + 10 \log (P)$ dB at the channel edge. It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10 th harmonic.

3.6.2 Measuring Instruments

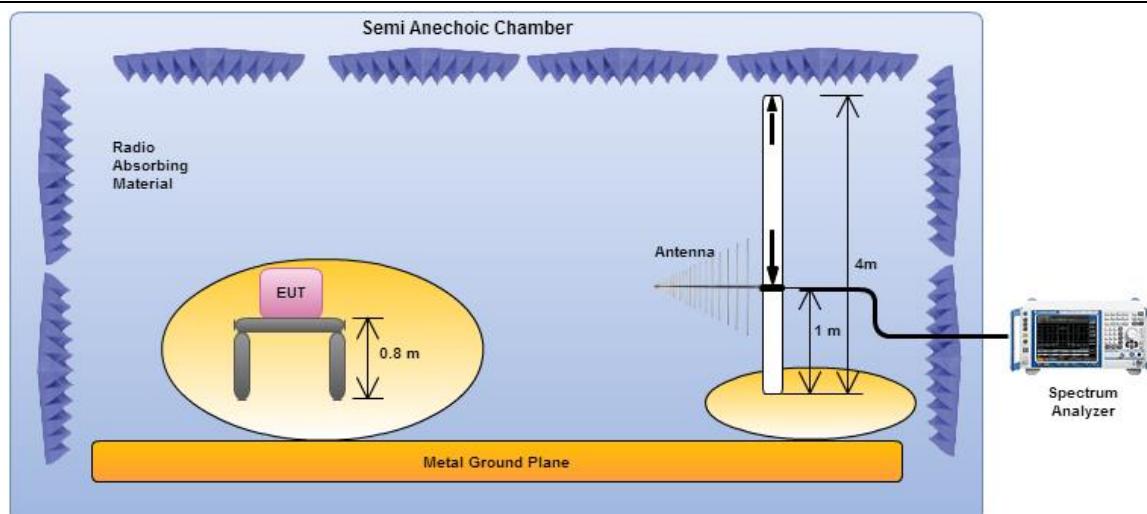
Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> Refer as KDB 971168 D01, clause 6 for spurious emissions.
<input checked="" type="checkbox"/> Refer as RSS-Gen, clause 6.13 for transmitter unwanted emissions measurement.
<input type="checkbox"/> In case a narrower measurement bandwidth was used, the following conversion formula has to be applied: (e.g. if reference bandwidth 1 MHz and measurement bandwidth 100 kHz, then measurement bandwidth conversion factor is 10 dB) $B = A + 10 \log (BW_{ref} / BW_{measured})$ <ul style="list-style-type: none">• A is the value at the narrower measurement bandwidth;• B is the value referred to the reference bandwidth;• Correction Factor(dB)= $10\log(1\% \text{ Emission BW}/\text{RBW})$;
<input checked="" type="checkbox"/> Effective Isotropic Radiated Power (EIRP) <ul style="list-style-type: none"><input checked="" type="checkbox"/> Refer as KDB 412172, clause 1.2 following as power approach. e.i.r.p.= $P_T+G_T+L_c$.<input type="checkbox"/> Refer as KDB 412172, clause 1.1 following as field strength approach. e.i.r.p.= $(E \times d)^2 / 30$.
<input checked="" type="checkbox"/> For radiated measurement. <ul style="list-style-type: none"><input type="checkbox"/> Refer as KDB 412172, clause 2.2 following eirp can be used radiated test configuration.<input checked="" type="checkbox"/> Refer as KDB 412172, clause 2.3 following eirp can be used signal/antenna substitution techniques.<input type="checkbox"/> Refer as ANSI/TIA-603-D-2010, clause 2.2.12 for radiated measurement.

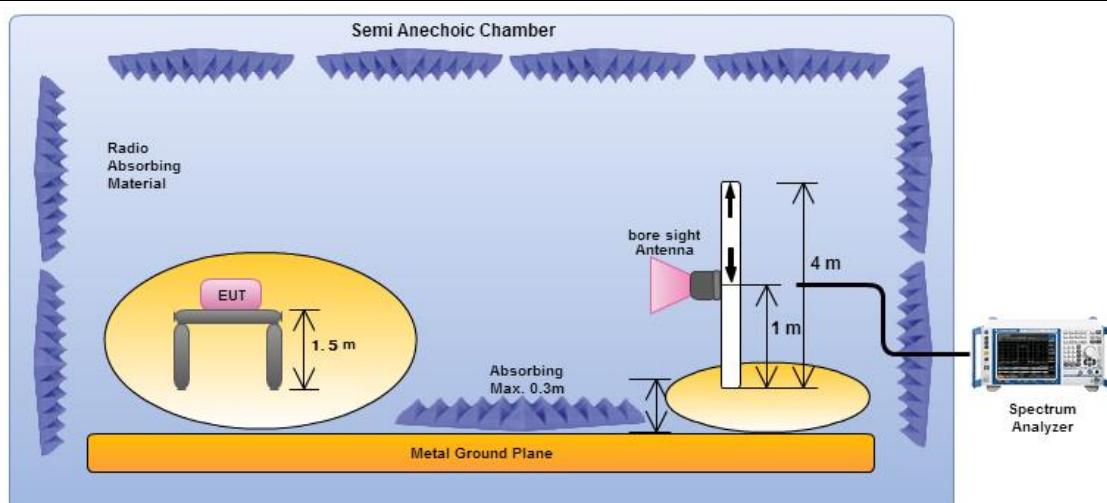
3.6.4 Test Setup

Transmitter Radiated Unwanted Emissions (below 1GHz)



Electric field tests shall be performed in the frequency range of 1 GHz to 10th harmonic of highest fundamental frequency or 40 GHz using a calibrated horn antenna

Transmitter Radiated Unwanted Emissions (Above 1GHz)



Electric field tests shall be performed in the frequency range of 1 GHz to 10th harmonic of highest fundamental frequency or 40 GHz using a calibrated horn antenna.

3.6.5 Test Result of Transmitter Radiated Unwanted Emissions

Refer as Appendix F



4 Test Equipment and Calibration Data

RF Conducted

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
Radio Communication Analyzer	Anritsu	MT8820C	MY53202219	N/A	03/05/2016	03/05/2017
Spectrum Analyzer	R&S	FSV 40	101013	9KHz~40GHz	16/02/2016	15/02/2017
Temp. and Humidity Chamber	Giant Force	GTH-225-40-CP-AR	MAA1311-008	-40 ~ 100°C	04/05/2016	03/05/2017
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	27/07/2016	26/07/2017
Radio Communication Analyzer	Anritsu	MT8820C	6201465544	WWAN Station	19/08/2016	18/08/2017

Radiated Emissions

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	28/11/2015	27/11/2016
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	1GHz ~ 18GHz 3m	16/12/2015	15/12/2016
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	10/05/2016	09/05/2017
Amplifier	Keysight	83017A	MY53270197	1GHz ~ 26.5GHz	29/08/2016	28/08/2017
Spectrum	R&S	FSV40	101513	9kHz ~ 40GHz	16/02/ 2016	15/02/2017
Bilog Antenna	SCHAFFNER	CBL 6112B	2723	30MHz ~ 1GHz	01/10/2016	30/09/2017
Horn Antenna	SCHWARZBECK	BBHA9120D	1531	1GHz ~ 18GHz	22/04/ 2016	21/04/2017
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	18GHz ~ 40GHz	29/01/ 2016	28/01/2017
Amplifier	MITEQ	JS44-18004000-33-8P	1840917	18GHz ~ 40GHz	02/06/ 2015	01/06/2017
Radio Communication Analyzer	Anritsu	MT8820C	6201465544	WWAN Station	19/08/2016	18/08/2017



Emission Bandwidth

Appendix A

Mode	LTE Band 41: 99%OBW (MHz)							
Bandwidth (MHz)	5		10		15		20	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH.	4.50	4.48	8.94	8.98	13.43	13.46	17.97	18.05
Middle CH.	4.53	4.48	8.93	8.94	13.43	13.38	17.97	17.95
Highest CH.	4.47	4.48	8.91	8.95	13.38	13.49	17.89	18.05

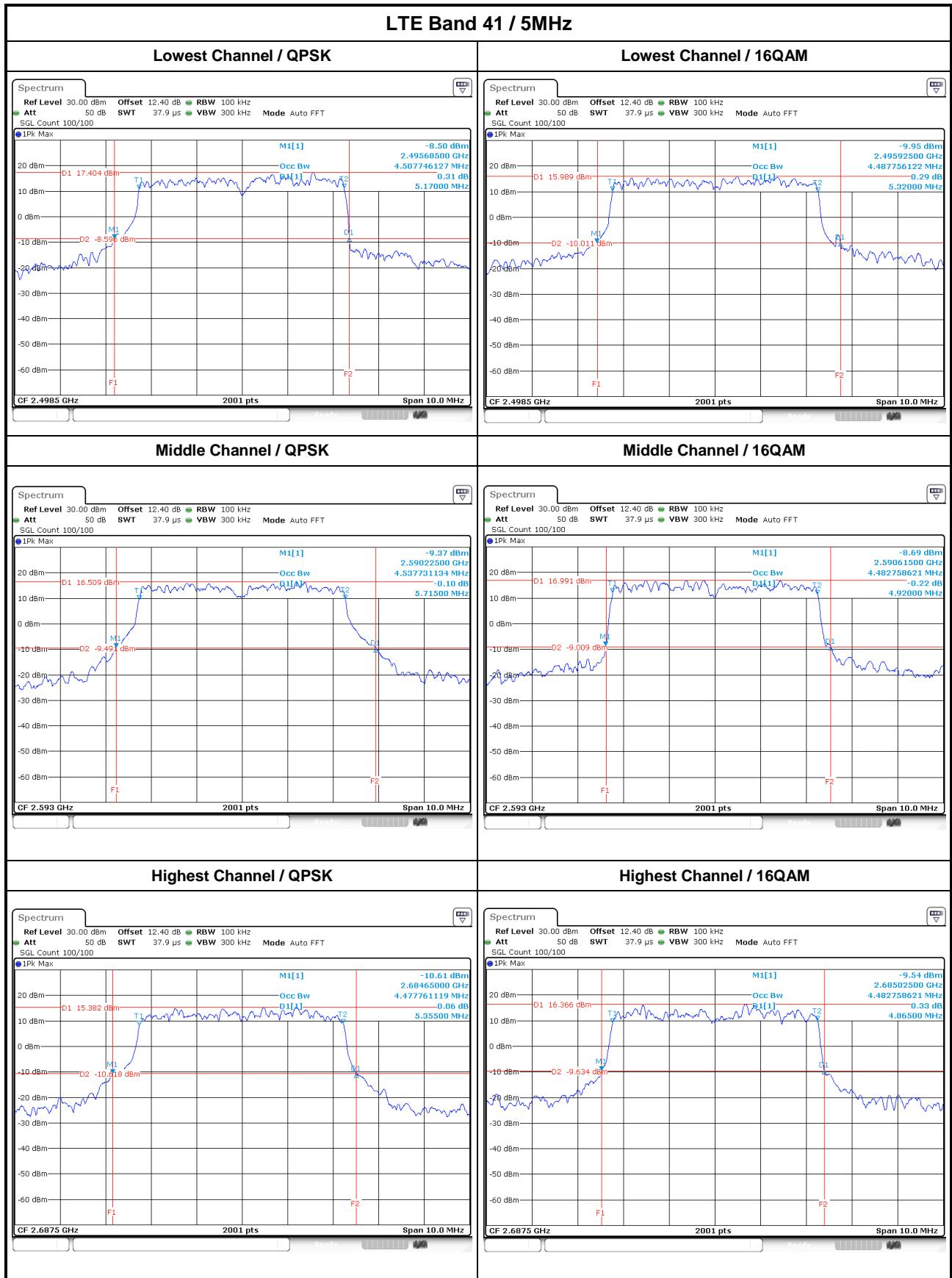
Mode	LTE Band 41 : 26dB bandwidth (MHz)							
Bandwidth (MHz)	5		10		15		20	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH.	5.17	5.32	9.87	10.32	14.19	14.46	19.22	19.78
Middle CH.	5.71	4.92	10.27	9.94	14.52	14.95	19.24	18.70
Highest CH.	5.35	4.86	9.53	9.67	14.59	14.55	18.78	19.24

LTE Band 41 Emission Designator		
Bandwidth (MHz)	Mode	Emission Designator
5	QPSK	4M53G7D
	16QAM	4M48W7D
10	QPSK	8M94G7D
	16QAM	8M98W7D
15	QPSK	13M4G7D
	16QAM	13M4W7D
20	QPSK	17M9G7D
	16QAM	18M0W7D



Emission Bandwidth

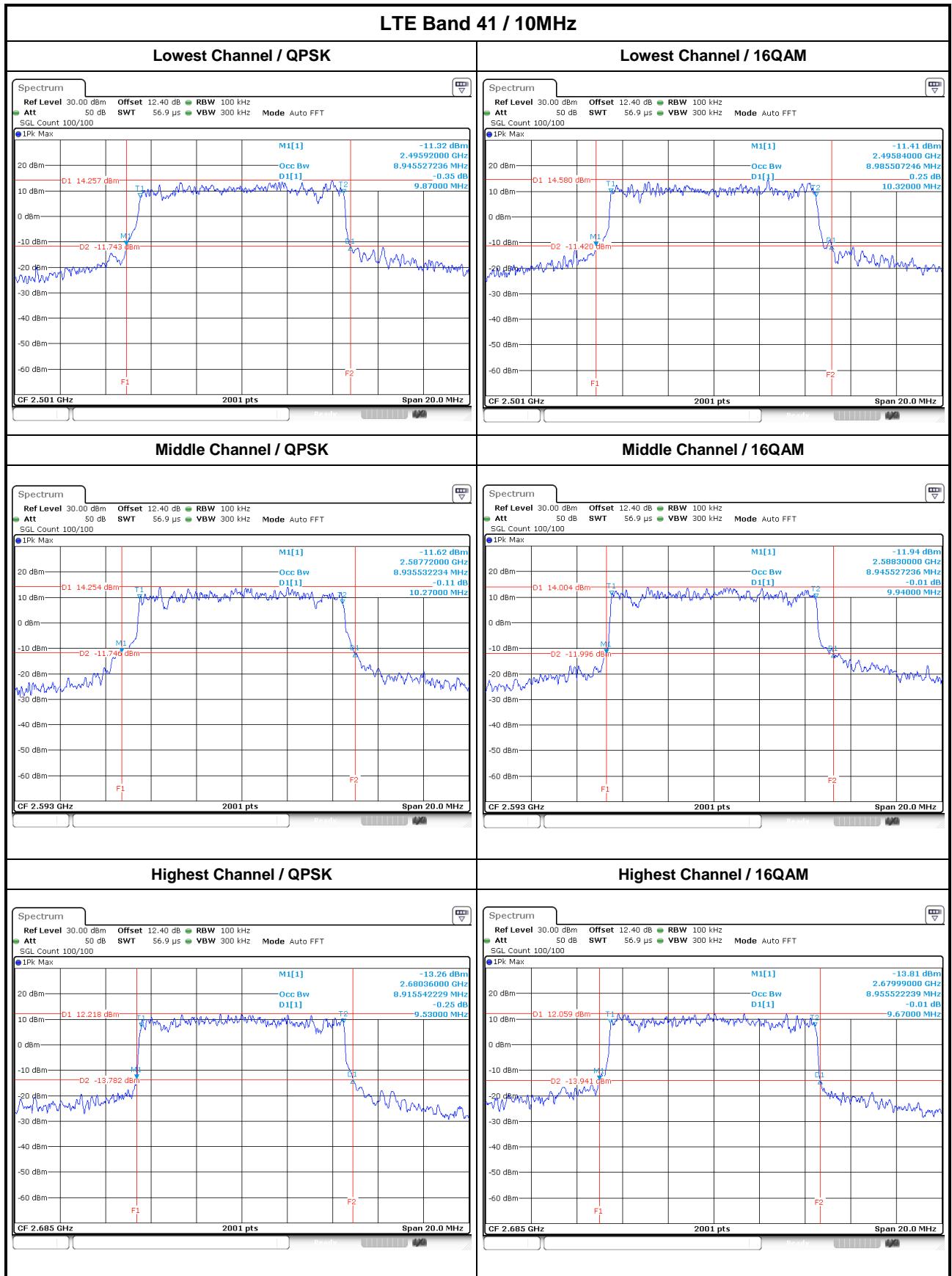
Appendix A





Emission Bandwidth

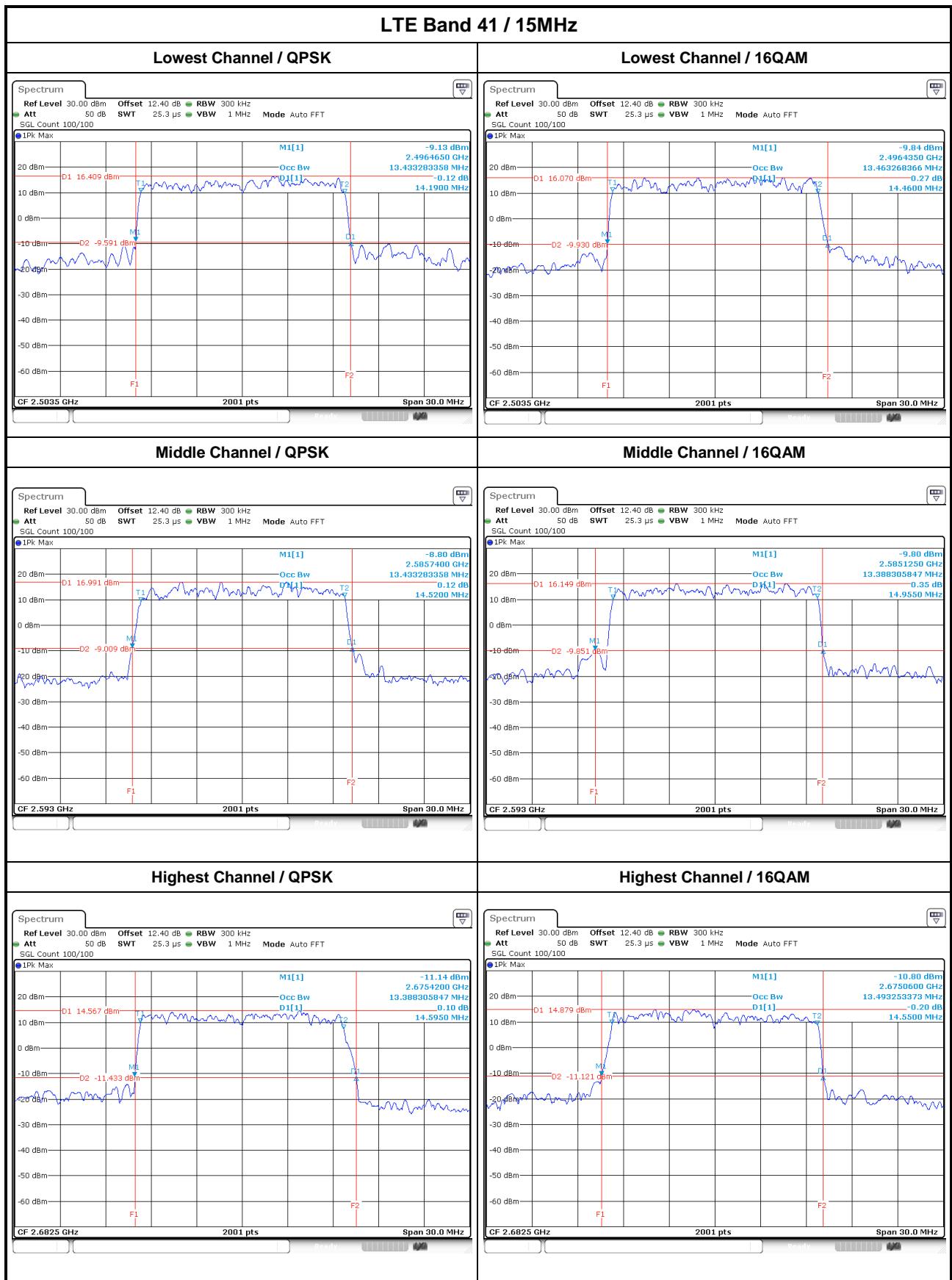
Appendix A





Emission Bandwidth

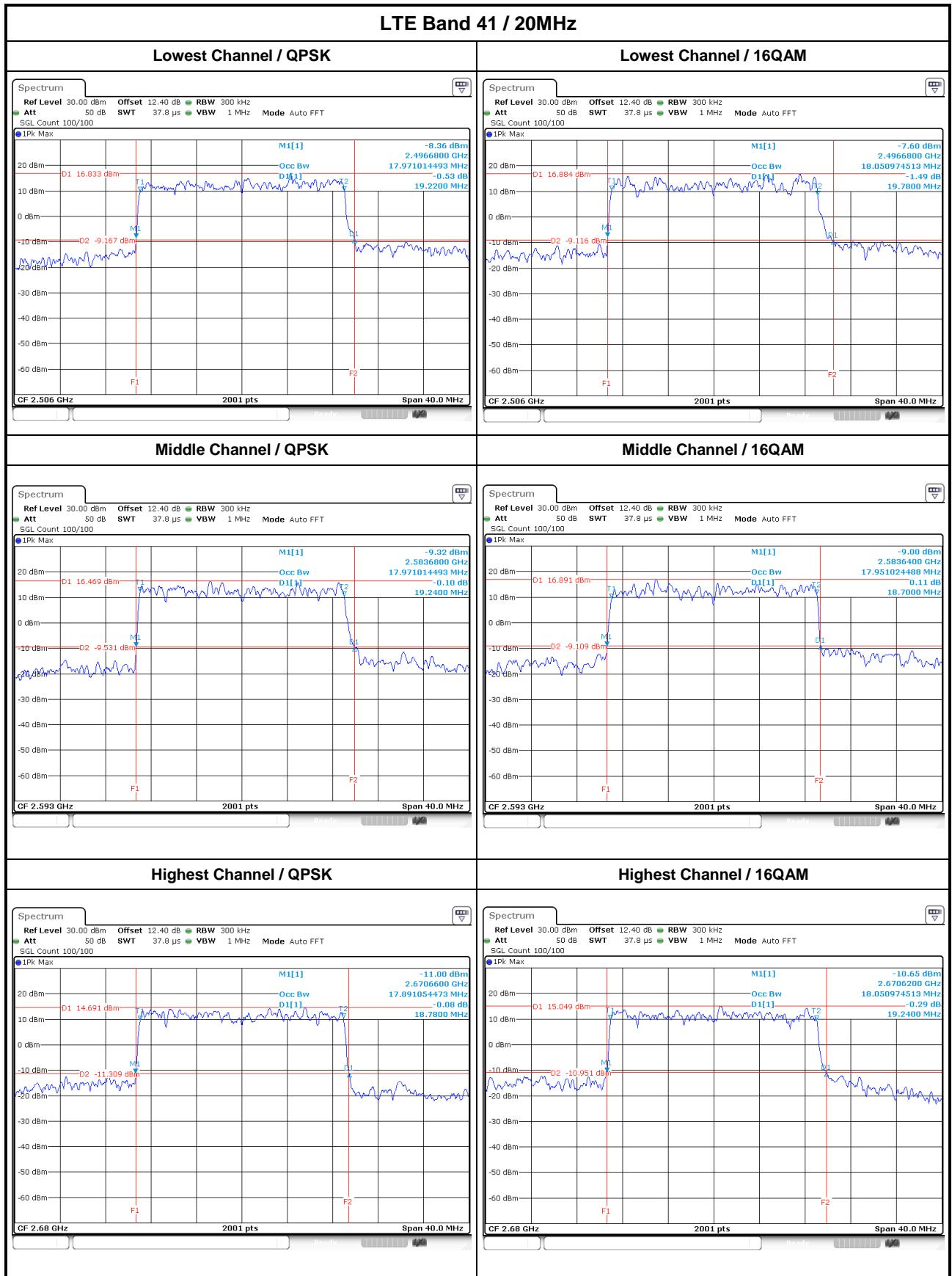
Appendix A





Emission Bandwidth

Appendix A





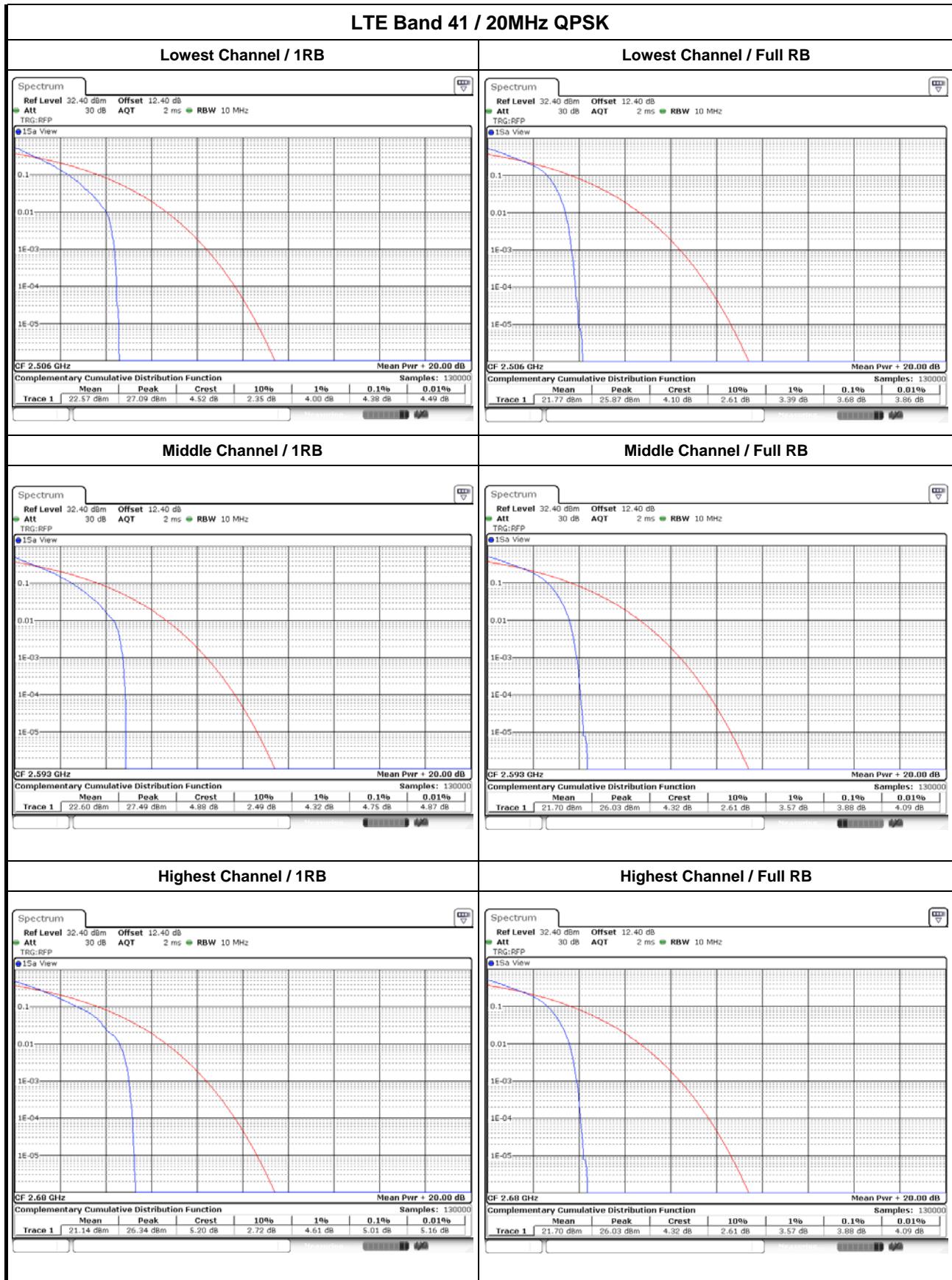
LTE Band 41-Conducted Output Power(Average power)							
BW	Mod.	RB Size	RB Offset	Lowest CH.	Middle CH.	Highest CH.	
Channel				39750	40620	41490	
Frequency(MHz)				2506	2593	2680	
20M	QPSK	1	0	23.98	24.21	23.89	
		1	49	23.71	23.86	23.81	
		1	99	23.67	23.95	23.71	
		50	0	23.15	23.09	23.21	
		50	24	23.10	23.29	23.25	
		50	50	23.16	23.08	22.67	
		100	0	23.08	23.29	23.26	
	16QAM	1	0	23.19	23.58	23.31	
		1	49	23.05	23.49	23.22	
		1	99	23.35	23.41	23.29	
		50	0	22.85	22.65	22.78	
		50	24	22.78	22.68	22.62	
		50	50	22.88	22.69	22.45	
		100	0	22.81	22.86	22.73	
Channel				39725	40620	41515	
Frequency(MHz)				2503.5	2593	2682.5	
15M	QPSK	1	0	23.72	24.02	23.07	
		1	37	23.44	23.25	23.02	
		1	74	23.69	23.72	23.11	
		36	0	23.28	23.54	23.05	
		36	20	23.20	23.25	23.01	
		36	39	23.50	23.70	23.08	
		75	0	23.38	23.41	23.01	
	16QAM	1	0	23.05	23.10	23.11	
		1	37	23.21	23.35	23.28	
		1	74	23.37	23.17	23.14	
		36	0	22.57	22.98	23.02	
		36	20	22.97	22.67	22.74	
		36	39	22.84	22.55	22.88	
		75	0	22.67	22.88	22.89	

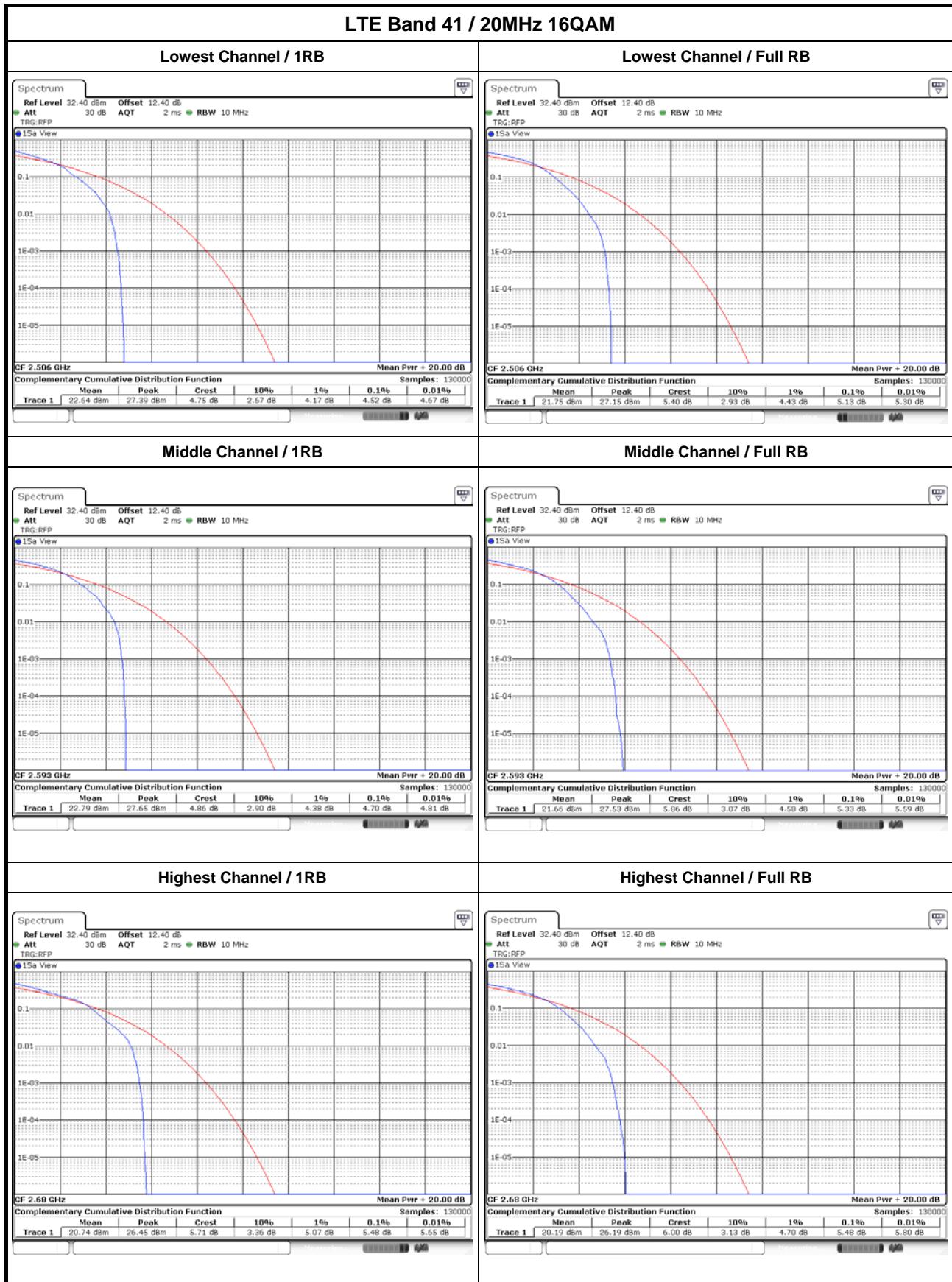


LTE Band 41-Conducted Output Power(Average power)							
Channel				39700	40620	41540	
Frequency(MHz)				2501	2593	2685	
10M	QPSK	1	0	23.77	24.09	23.67	
		1	25	23.19	23.51	23.21	
		1	49	23.35	23.71	23.69	
		25	0	23.52	23.96	23.51	
		25	12	23.70	23.85	23.22	
		25	25	23.60	23.68	23.48	
		50	0	23.55	23.79	23.42	
	16QAM	1	0	23.34	23.85	23.61	
		1	25	23.94	23.75	23.65	
		1	49	23.50	23.55	23.60	
		25	0	22.91	22.95	22.65	
		25	12	22.71	22.65	22.61	
		25	25	22.90	22.76	22.71	
		50	0	22.85	22.71	22.68	
Channel				39675	40620	41565	
Frequency(MHz)				2498.5	2593	2687.5	
5M	QPSK	1	0	23.79	24.18	23.39	
		1	12	23.57	23.77	23.23	
		1	24	23.53	23.85	22.88	
		12	0	23.63	23.71	23.58	
		12	7	23.70	23.92	23.56	
		12	13	23.62	23.81	23.64	
		25	0	23.67	23.88	23.62	
	16QAM	1	0	23.74	23.86	23.54	
		1	12	23.95	23.98	23.68	
		1	24	23.72	23.96	23.68	
		12	0	23.11	23.05	23.04	
		12	7	22.85	22.71	22.99	
		12	13	22.59	22.91	22.65	
		25	0	22.91	22.89	22.97	



Mode	LTE Band 41: Peak-to-Average Ratio				Limit
Mod.	QPSK		16QAM		
RB size	1RB	Full RB	1RB	Full RB	13dB
Lowest CH.	4.38	3.68	4.52	5.13	
Middle CH.	4.75	3.88	4.70	5.33	
Highest CH.	5.01	3.88	5.48	5.48	

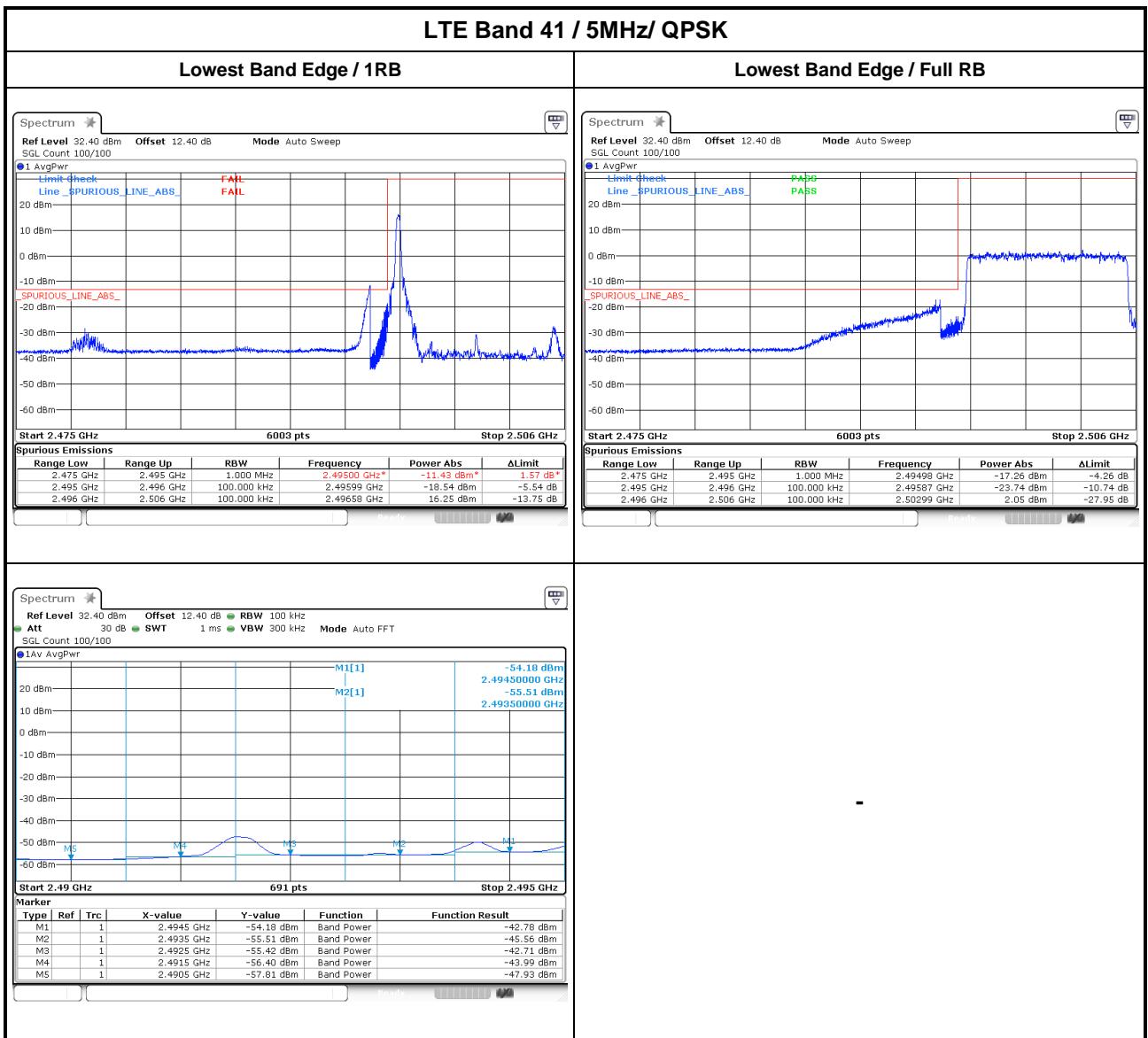






Transmitter Conducted Bandedge Emissions

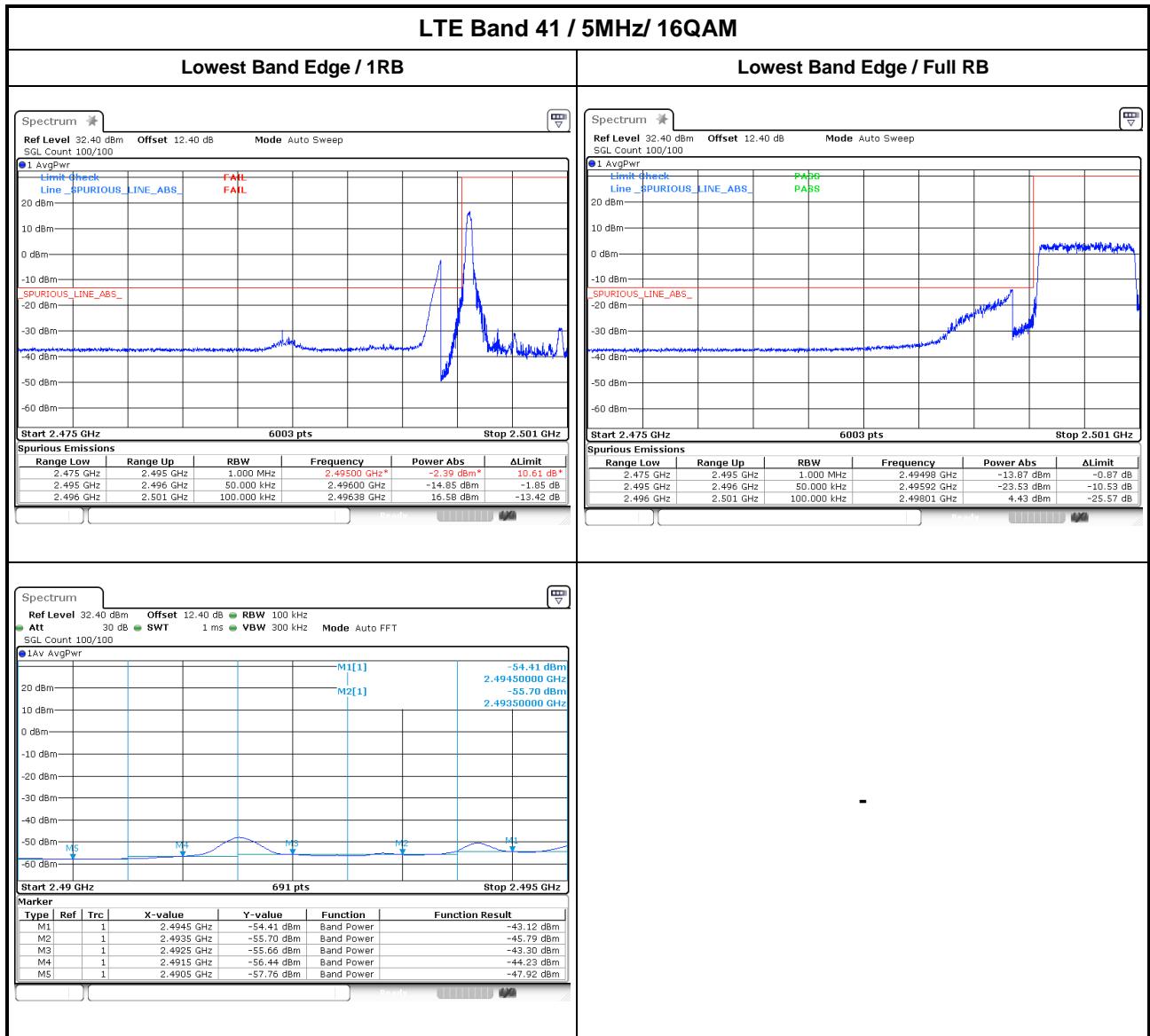
Appendix C





Transmitter Conducted Bandedge Emissions

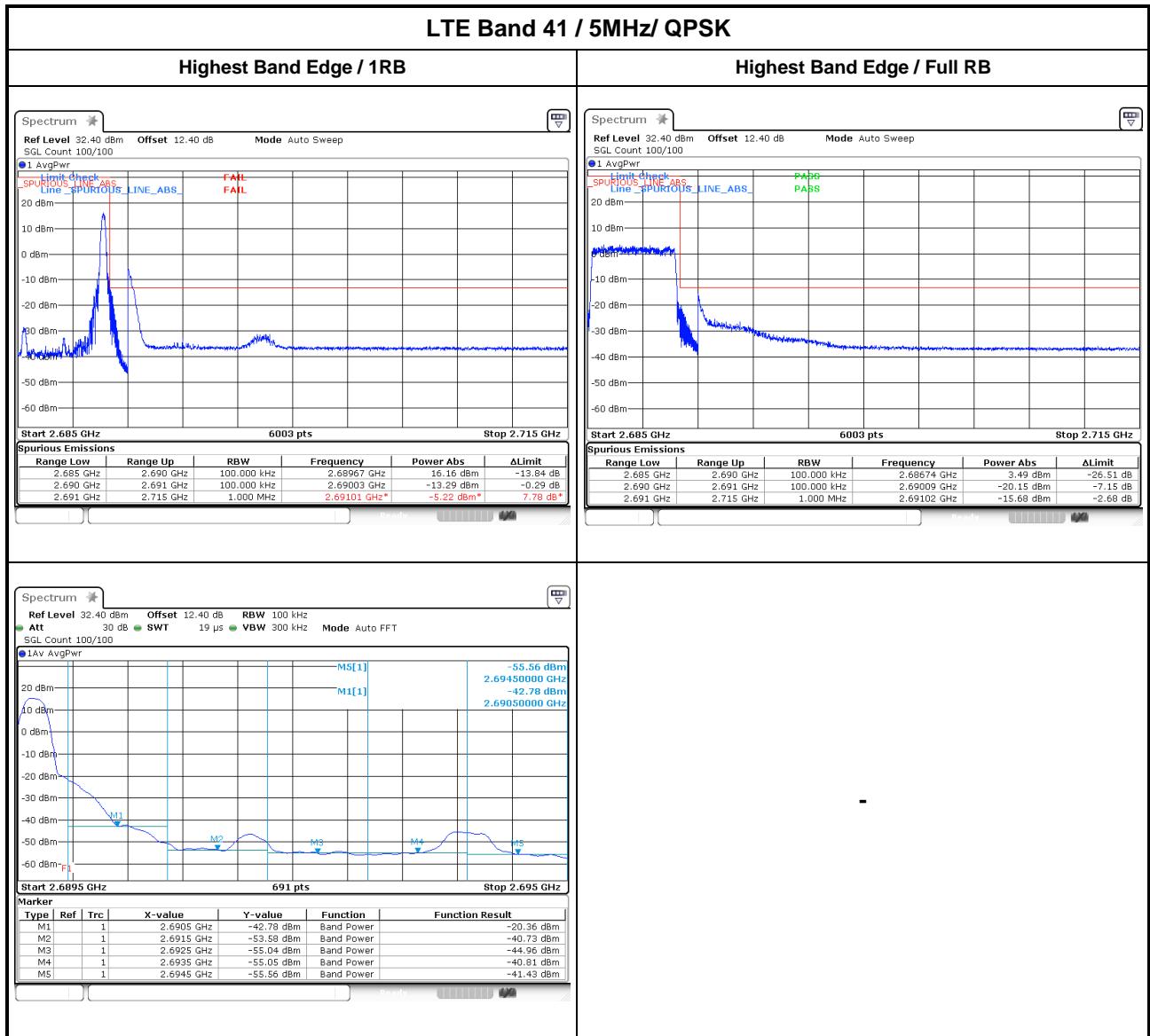
Appendix C

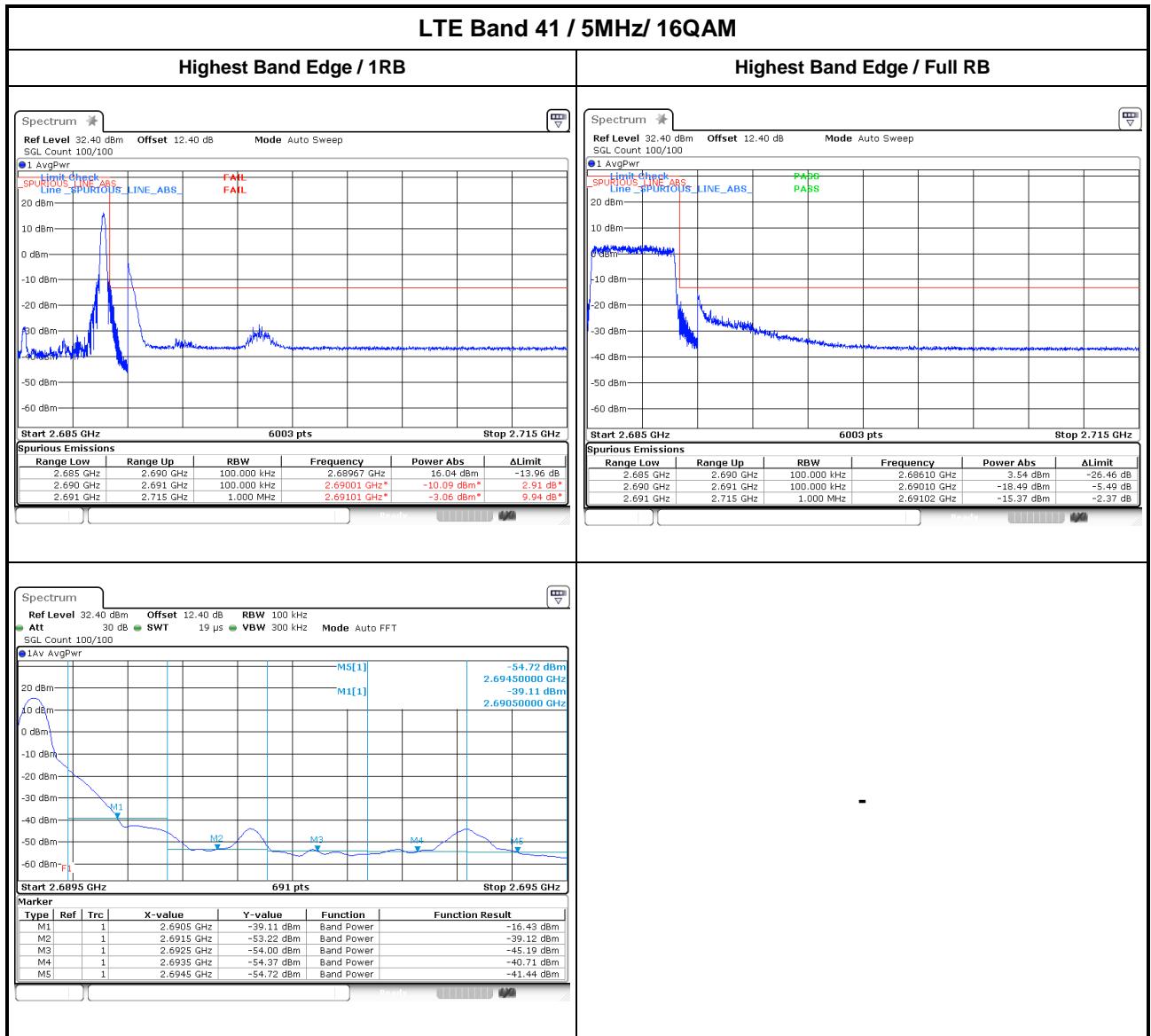




Transmitter Conducted Bandedge Emissions

Appendix C

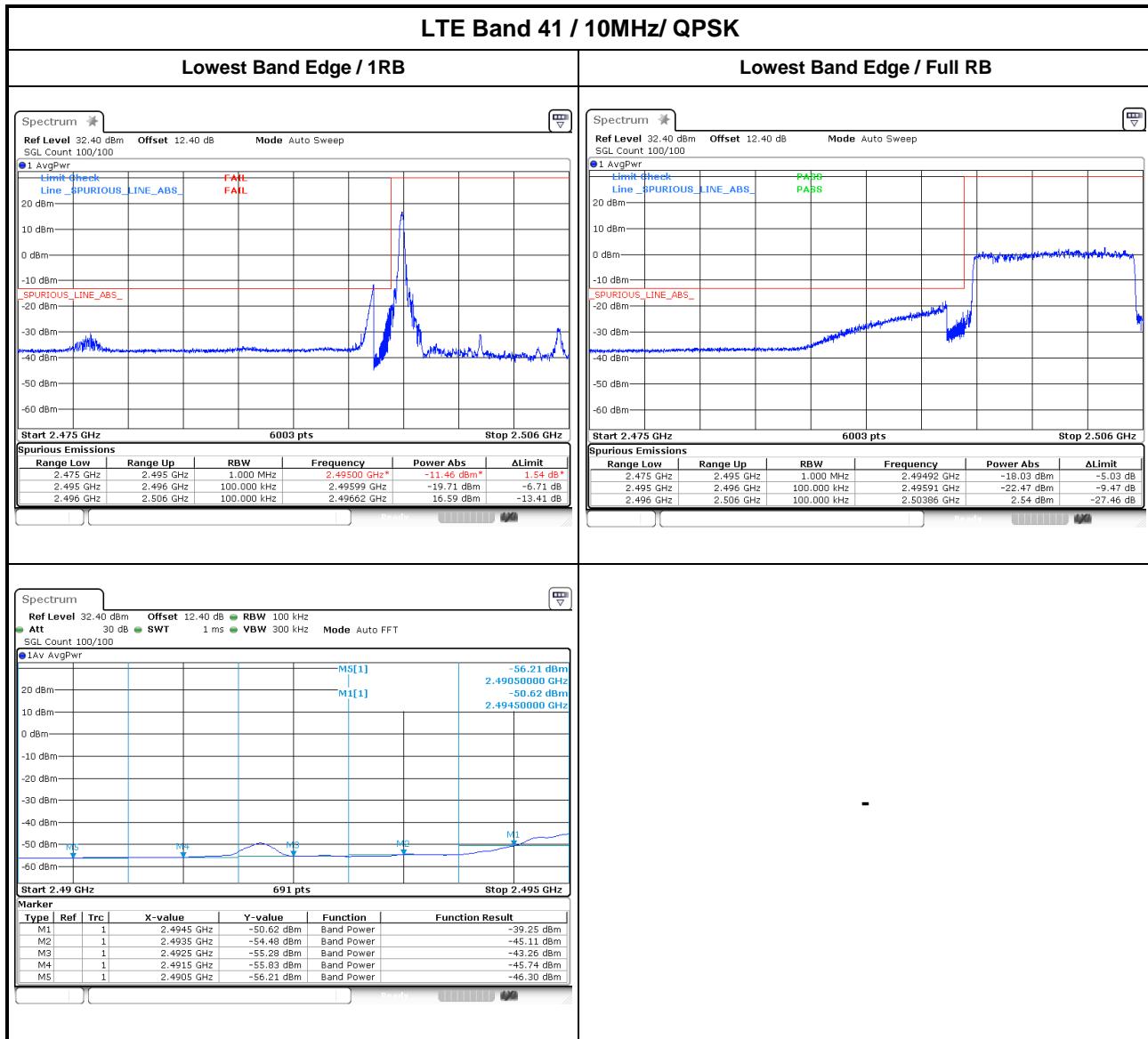






Transmitter Conducted Bandedge Emissions

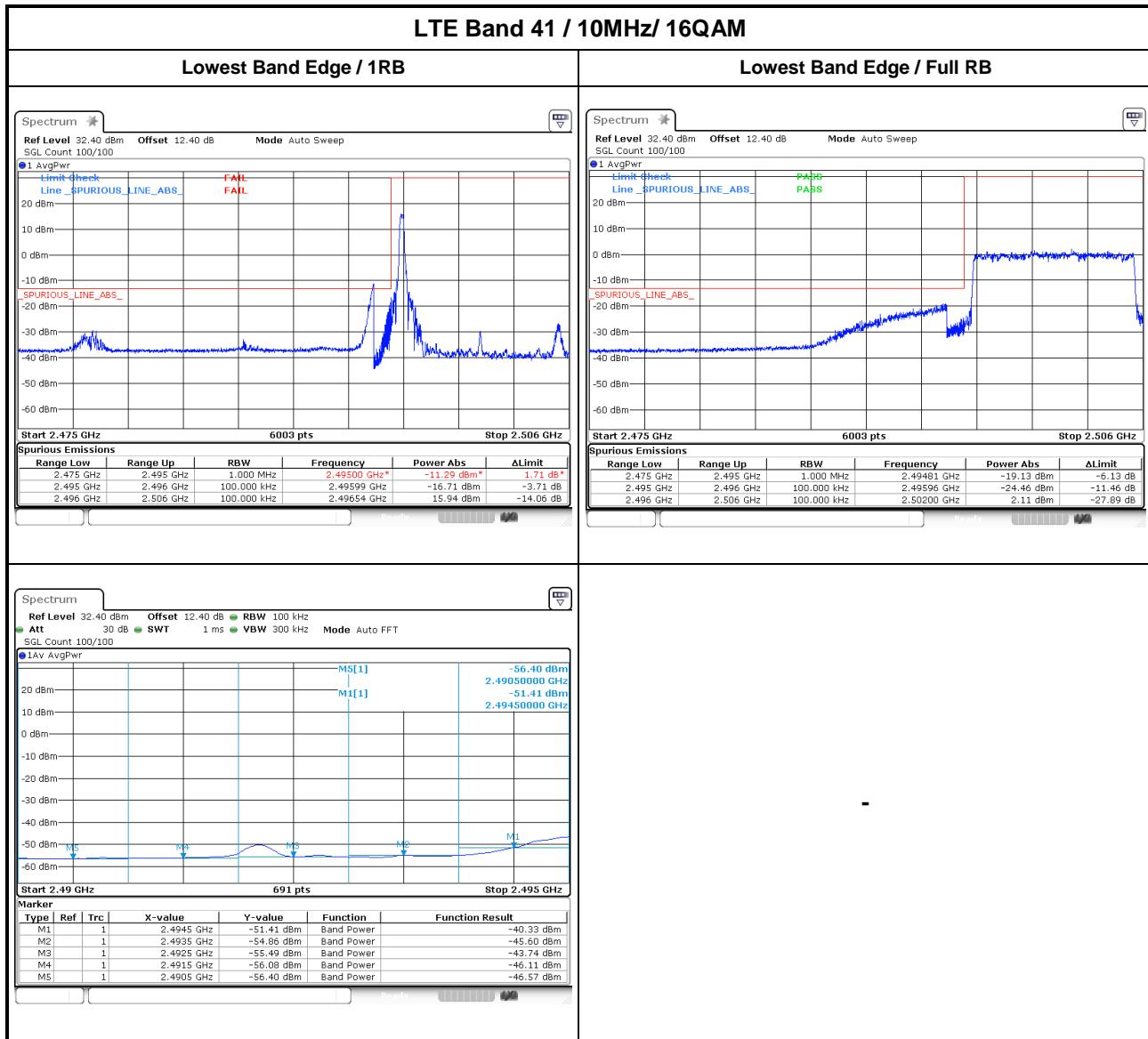
Appendix C





Transmitter Conducted Bandedge Emissions

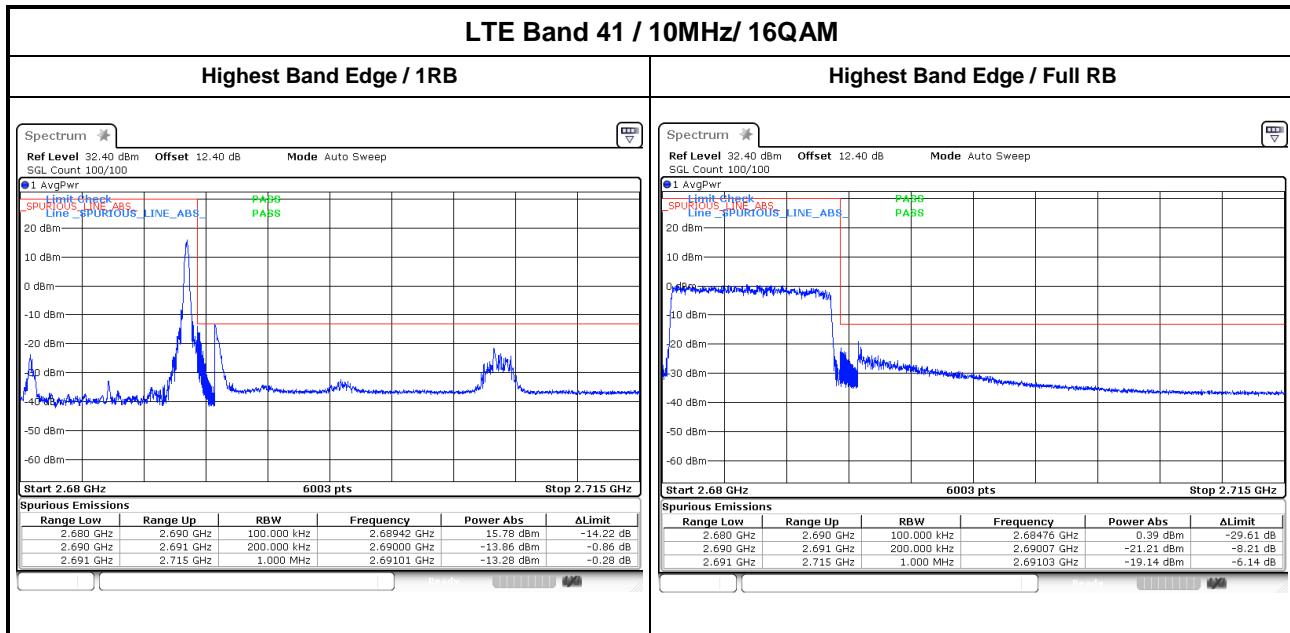
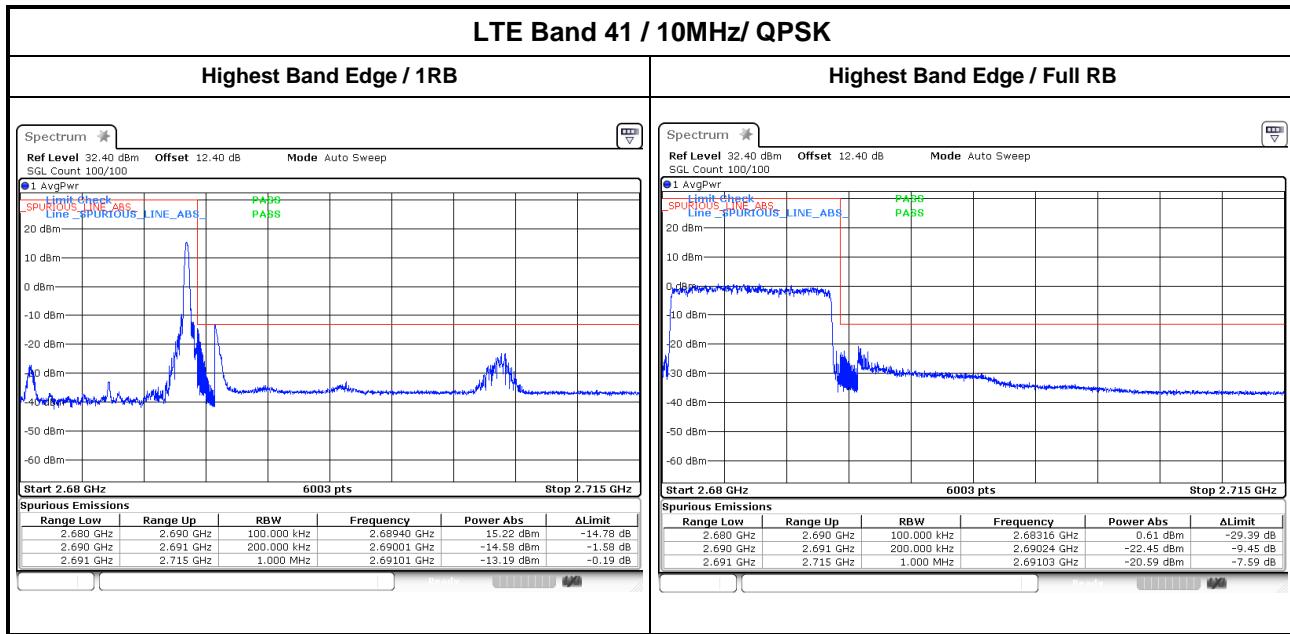
Appendix C





Transmitter Conducted Bandedge Emissions

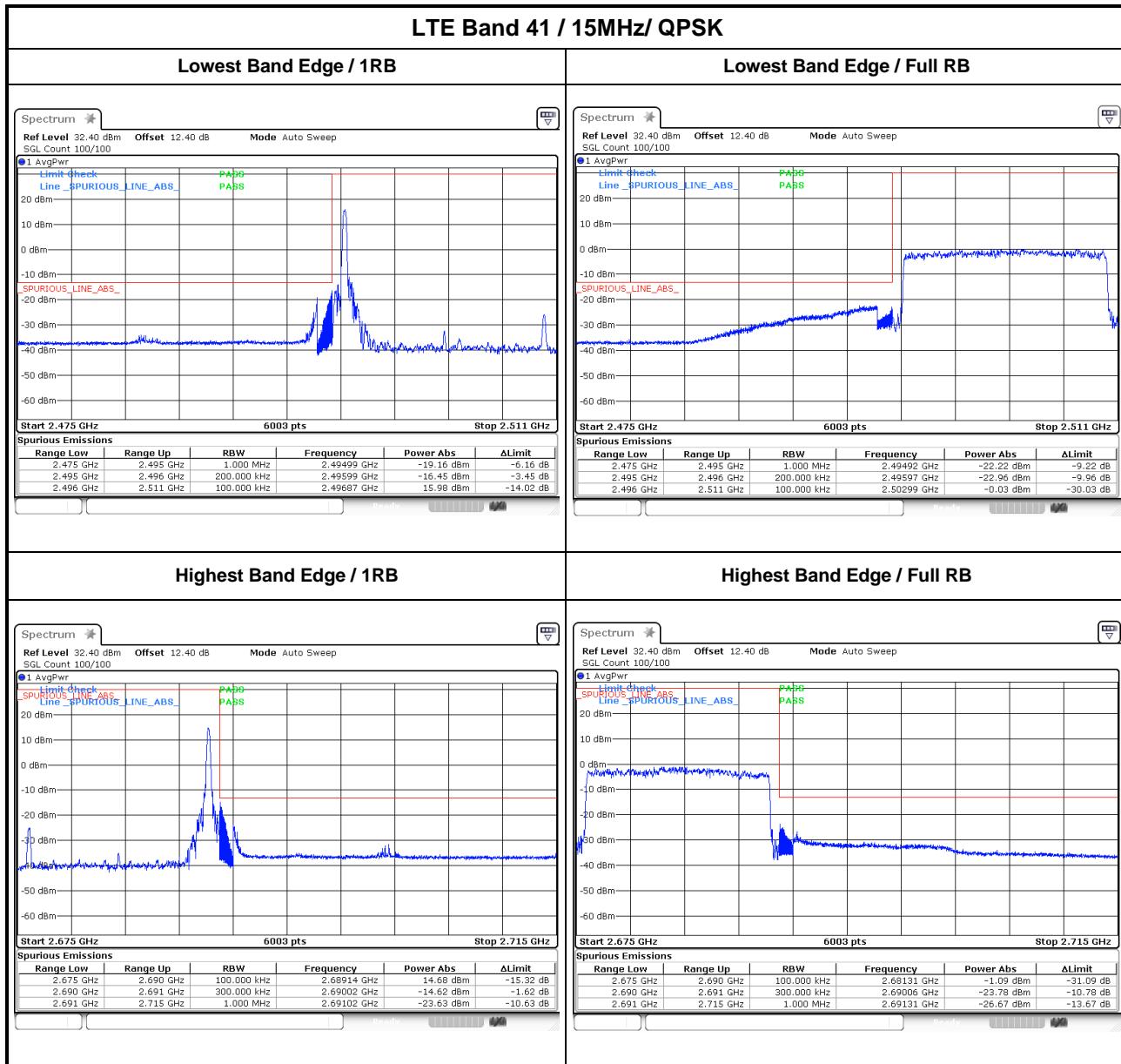
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Transmitter Conducted Bandedge Emissions

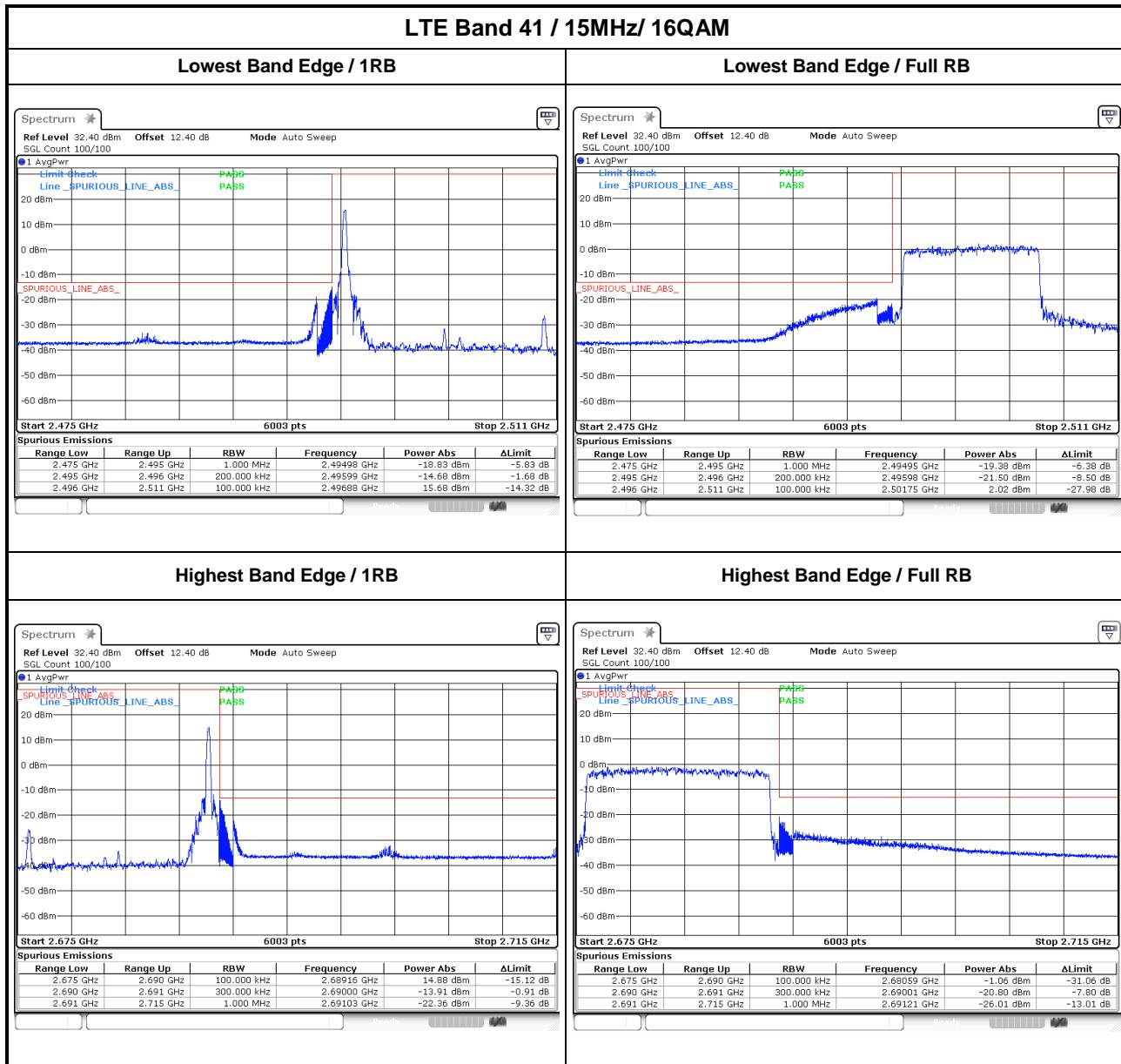
Appendix C





Transmitter Conducted Bandedge Emissions

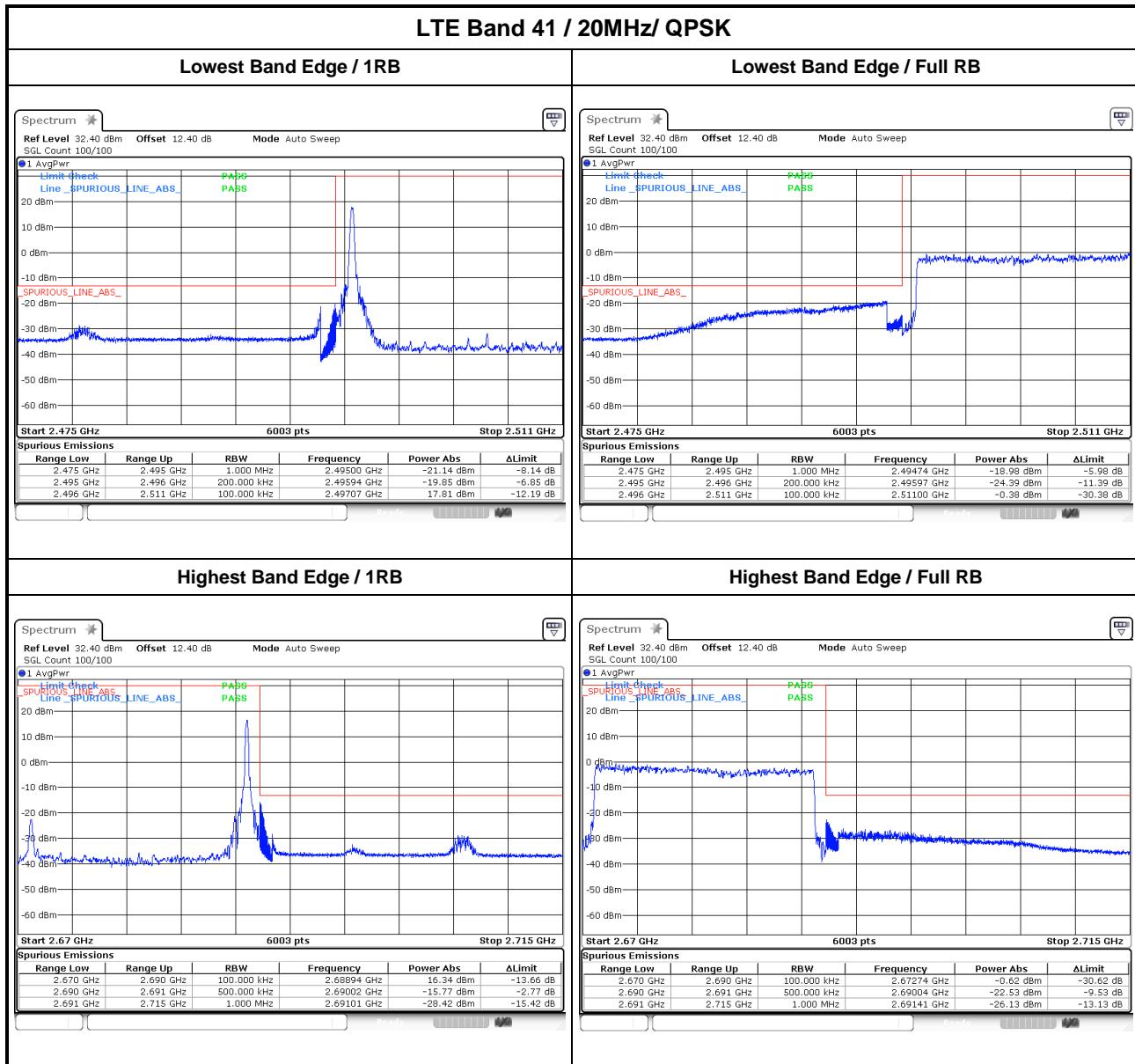
Appendix C





Transmitter Conducted Bandedge Emissions

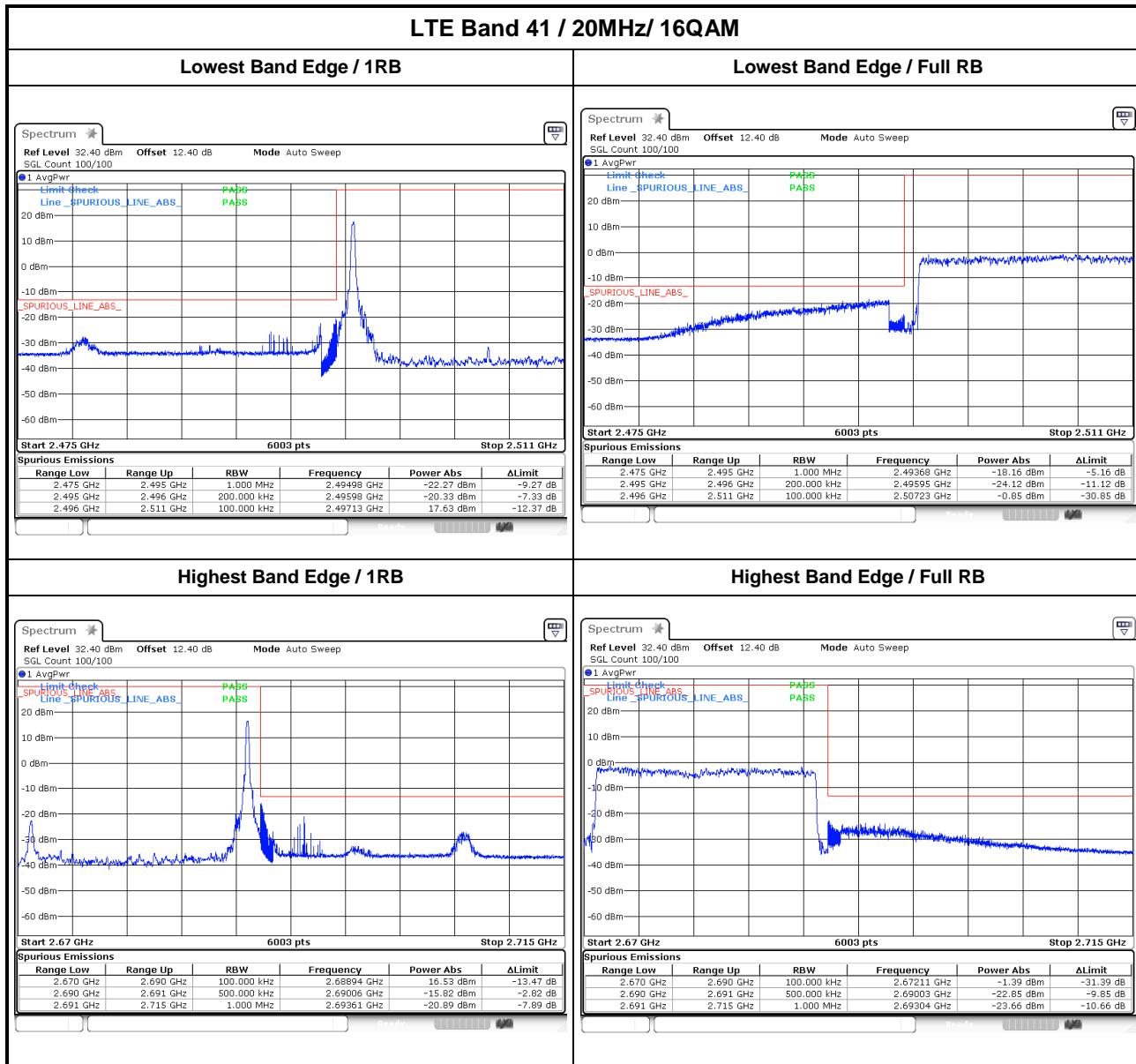
Appendix C





Transmitter Conducted Bandedge Emissions

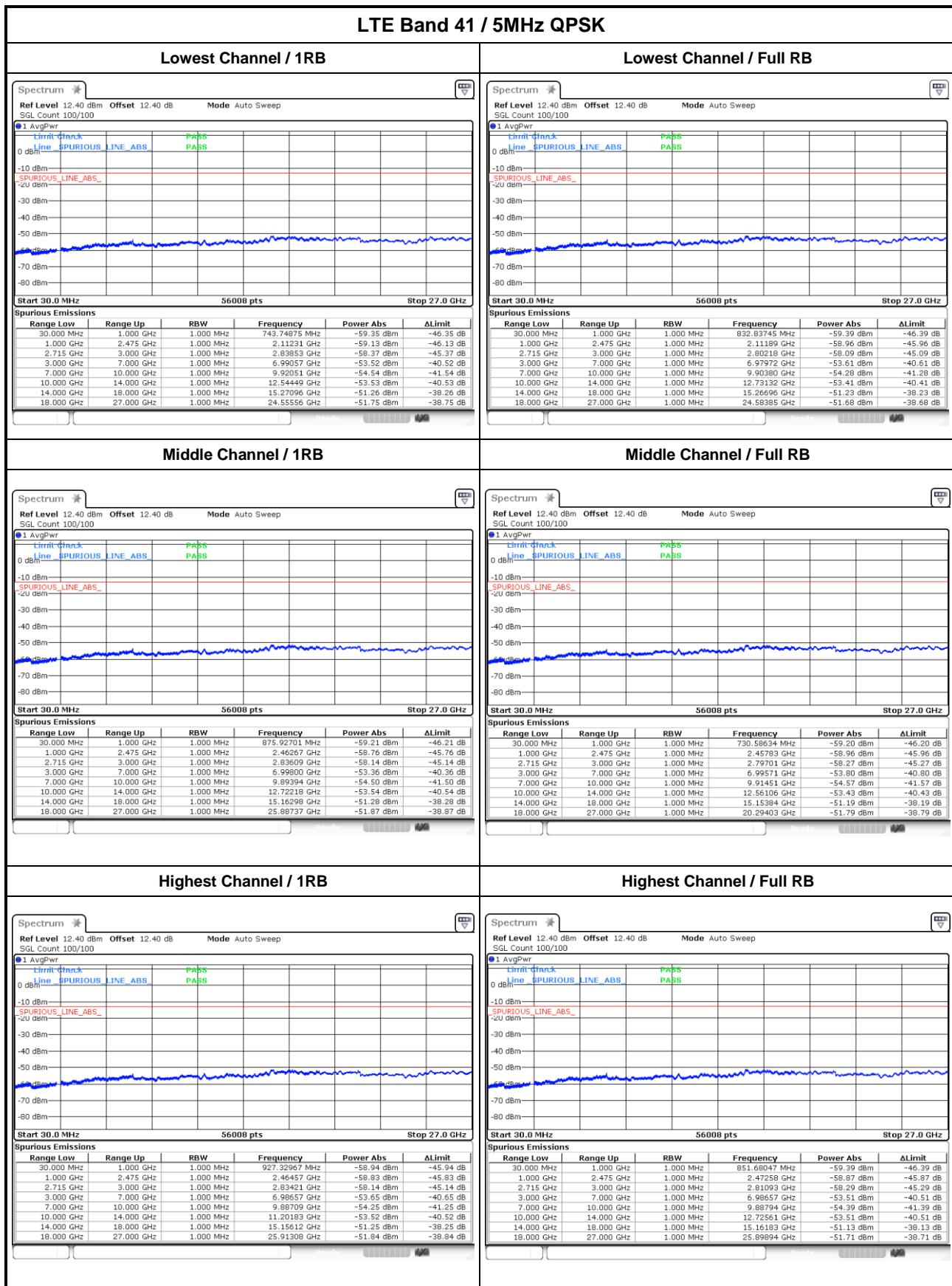
Appendix C





Transmitter Conducted Unwanted Emissions

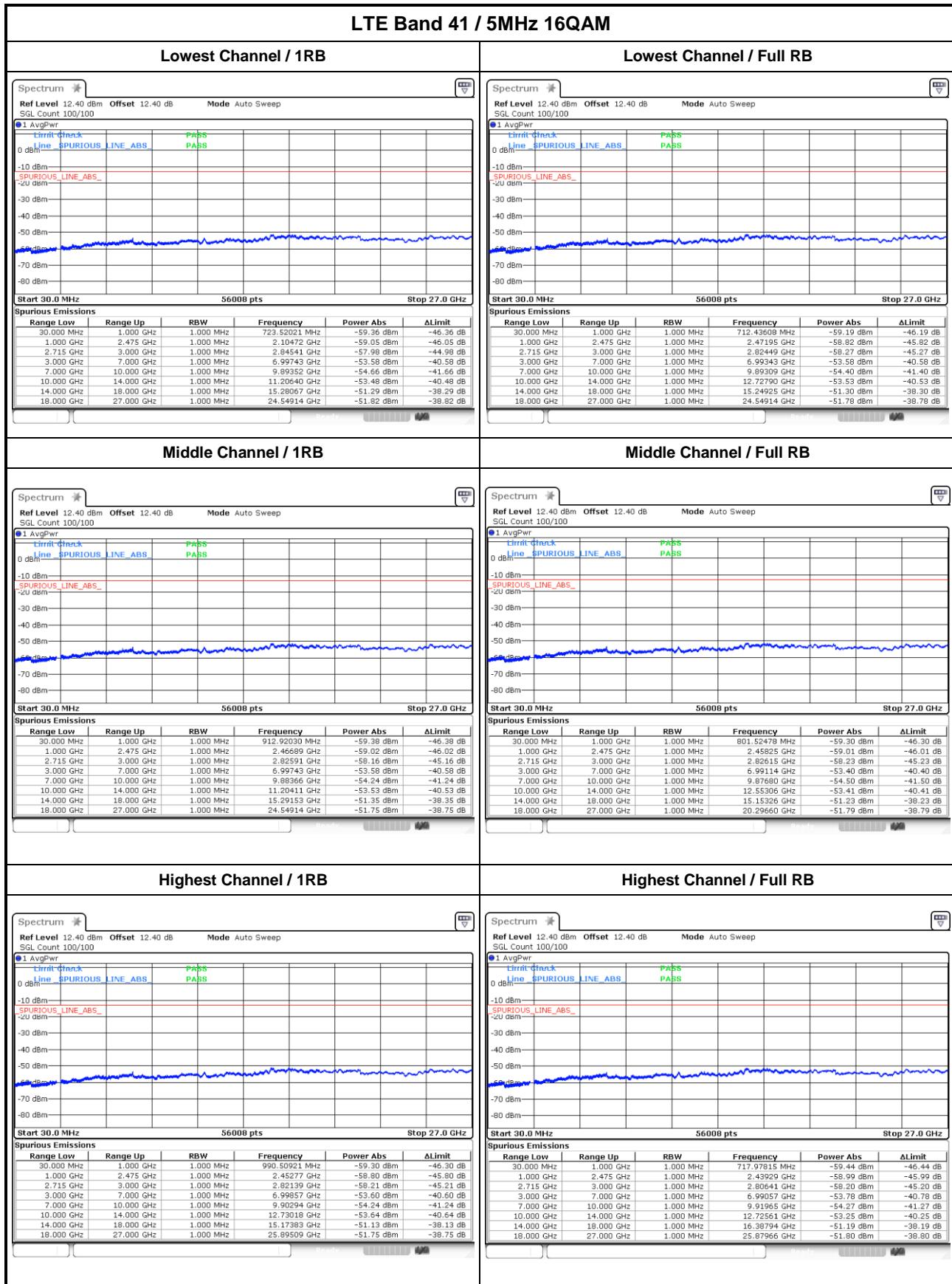
Appendix D





Transmitter Conducted Unwanted Emissions

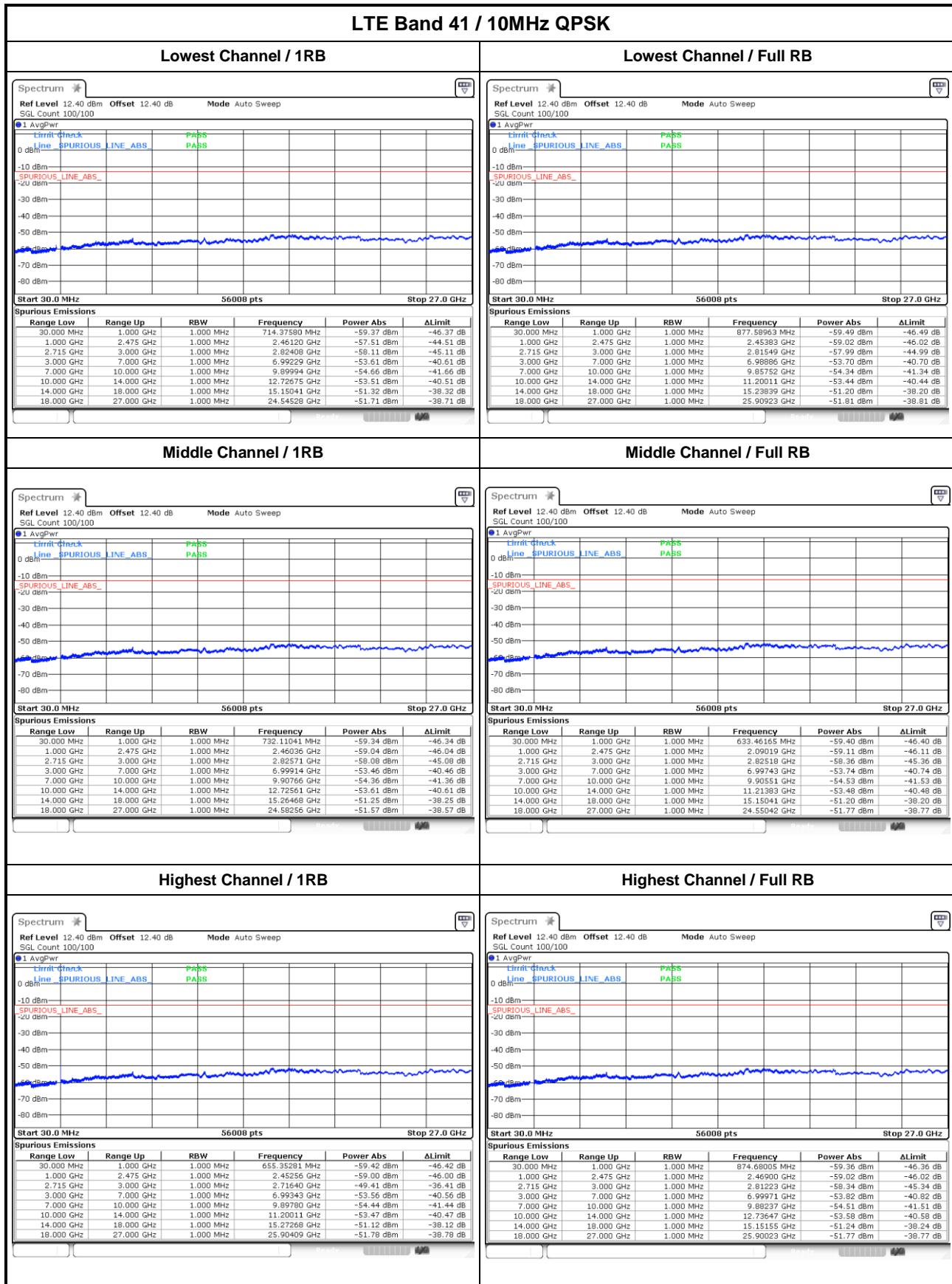
Appendix D





Transmitter Conducted Unwanted Emissions

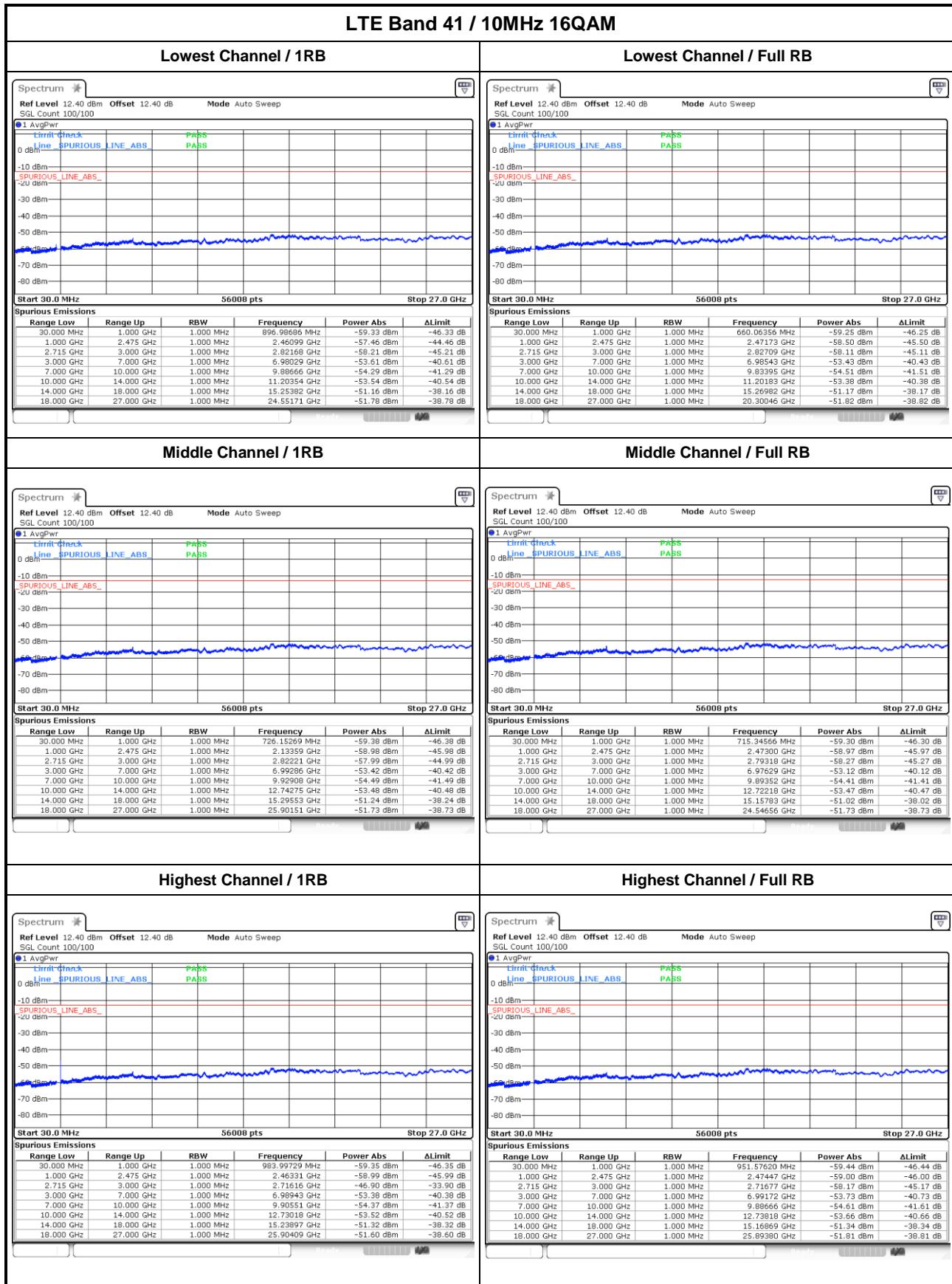
Appendix D





Transmitter Conducted Unwanted Emissions

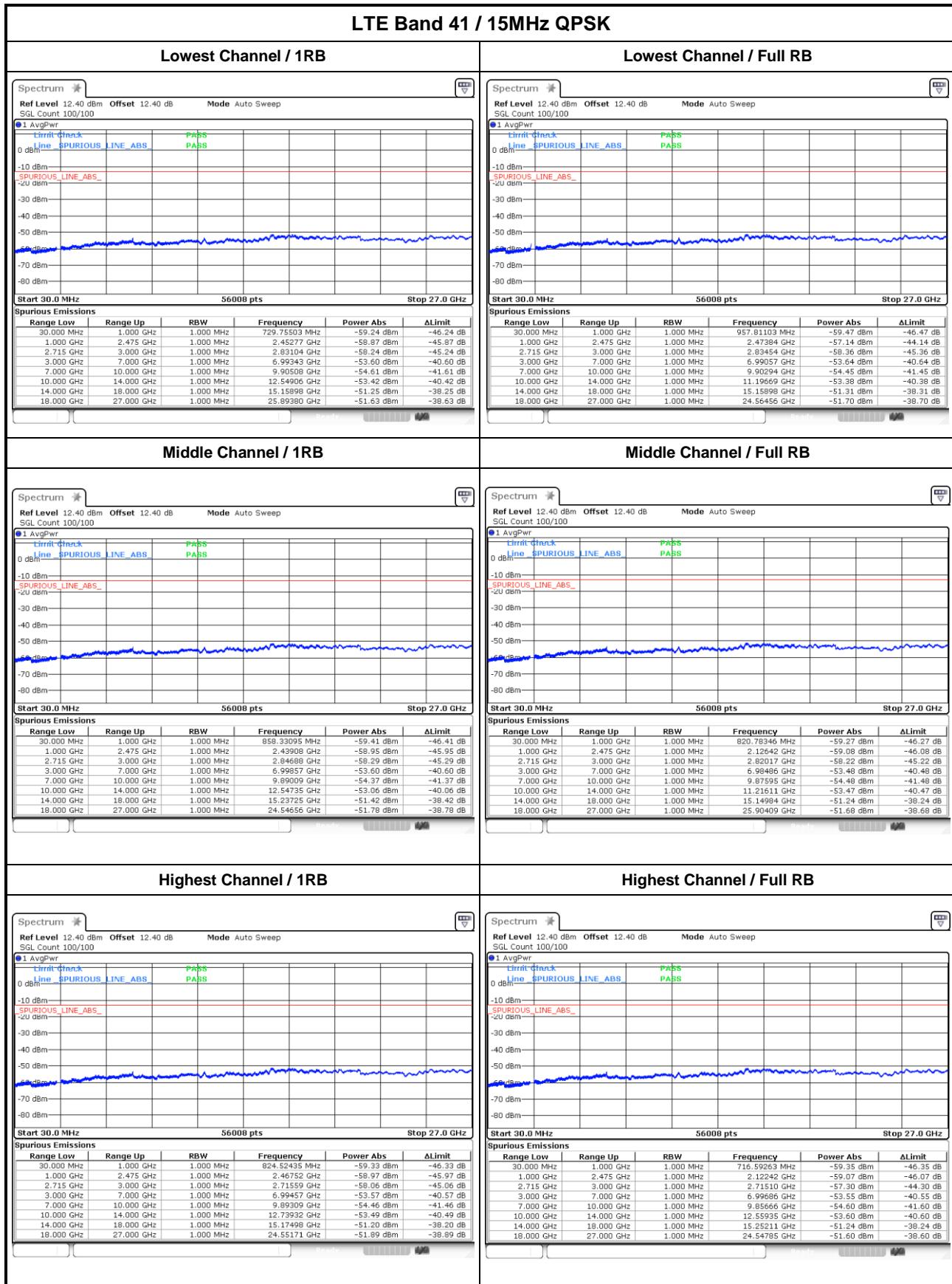
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Transmitter Conducted Unwanted Emissions

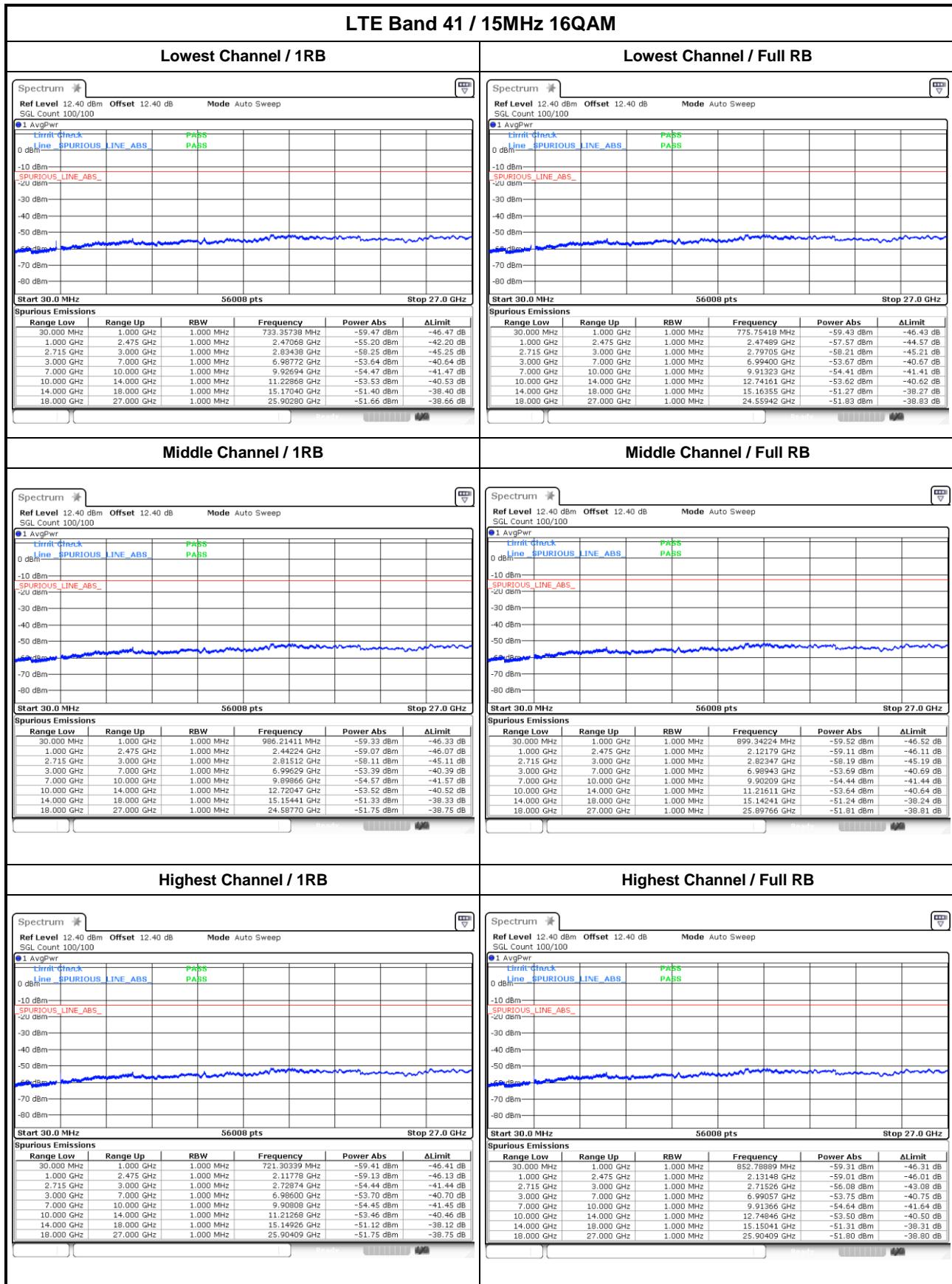
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Transmitter Conducted Unwanted Emissions

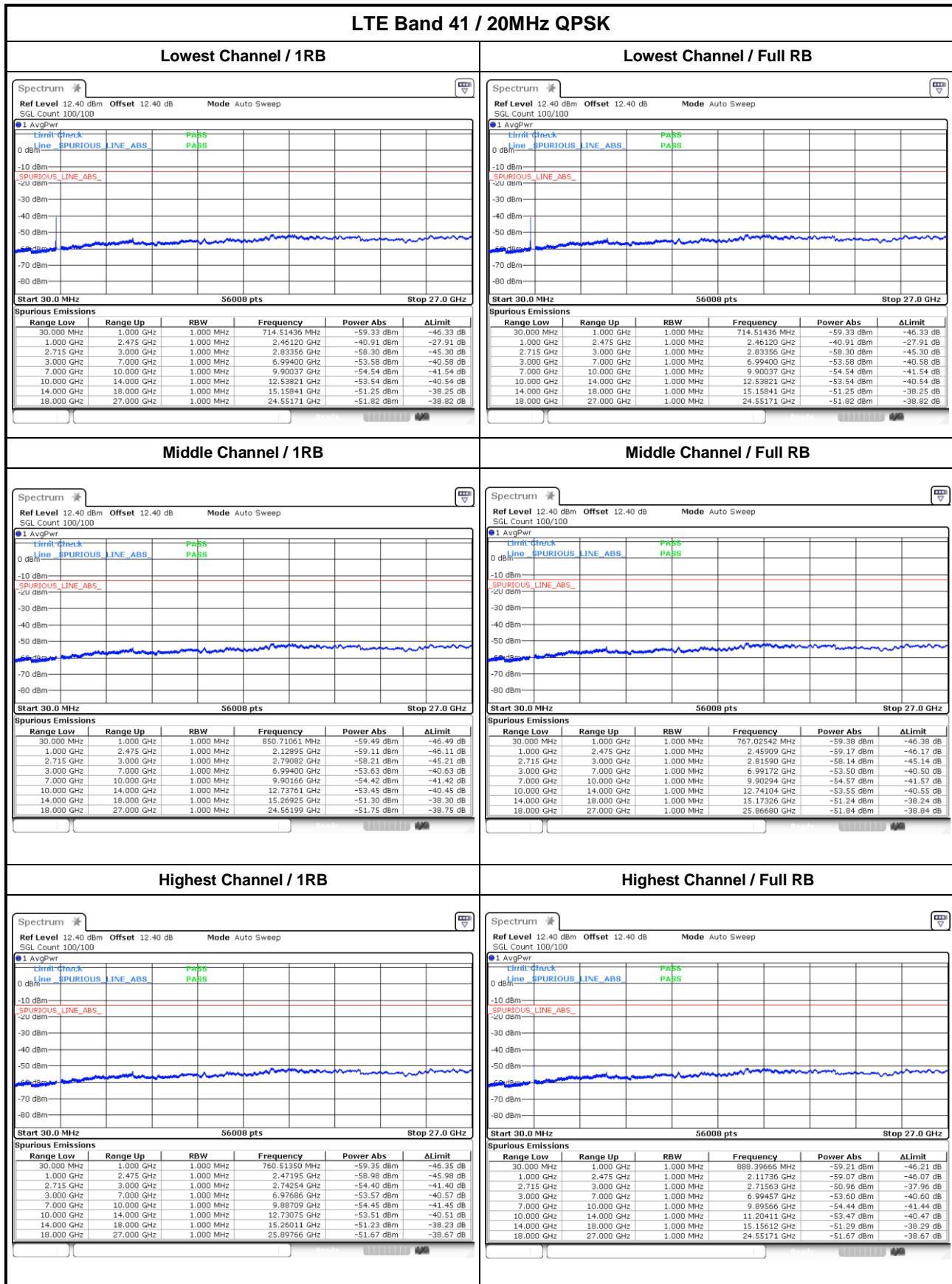
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Transmitter Conducted Unwanted Emissions

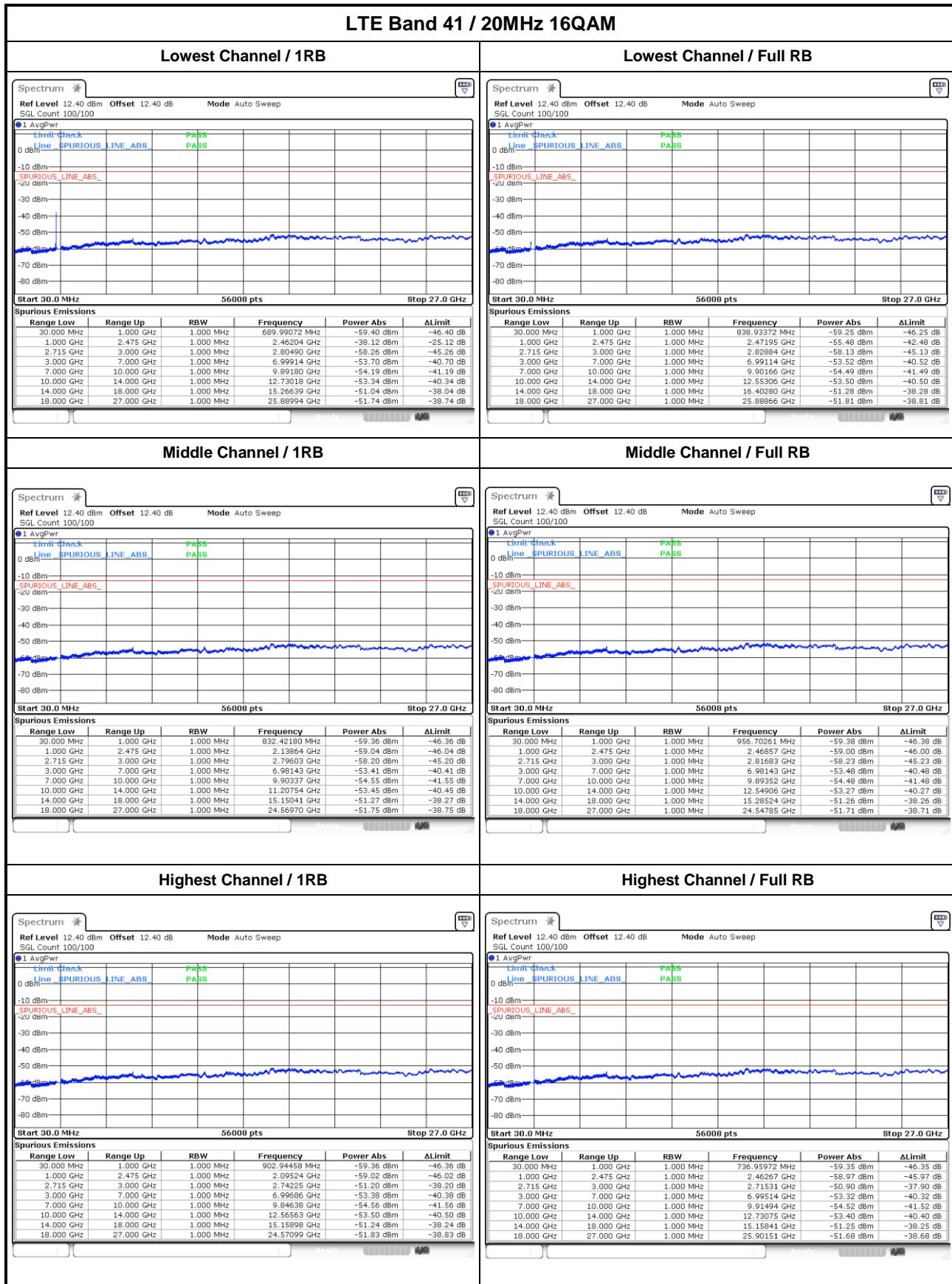
Appendix D





Transmitter Conducted Unwanted Emissions

Appendix D

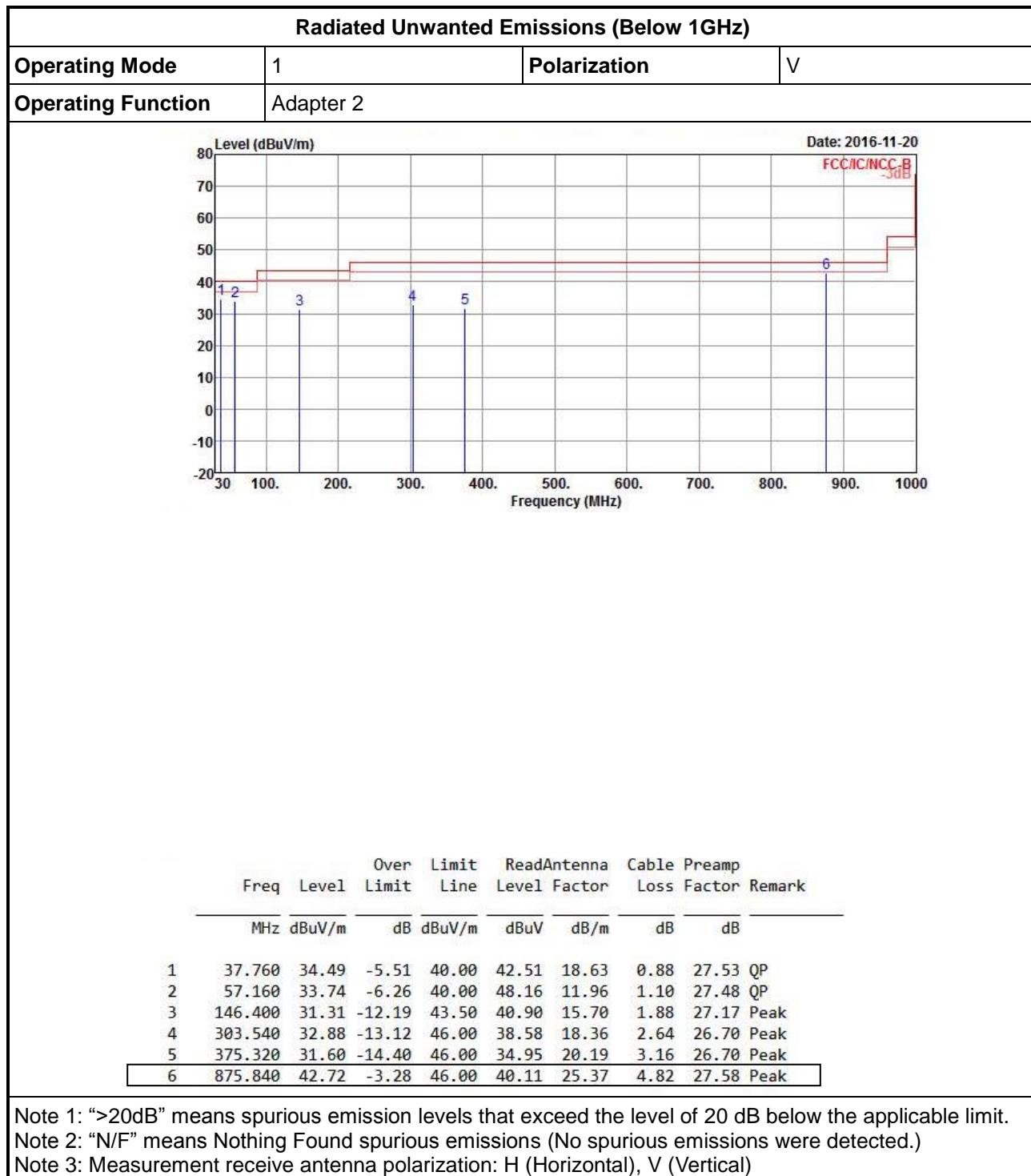




Test Conditions		LTE Band 41 / Middle Channel			
Temp.(°C)	Vol.(V)	Freq. Error			
		Hz	ppm	Limit (ppm)	Result
55	12	7.81	0.0030	2.50	Pass
50	12	8.30	0.0032	2.50	Pass
40	12	13.50	0.0052	2.50	Pass
30	12	11.20	0.0043	2.50	Pass
20	12	18.70	0.0072	2.50	Pass
10	12	25.90	0.0100	2.50	Pass
0	12	11.40	0.0044	2.50	Pass
-10	12	16.80	0.0065	2.50	Pass
-20	12	18.40	0.0071	2.50	Pass
-30	12	19.50	0.0075	2.50	Pass
-40	12	26.70	0.0103	2.50	Pass
20	13.8	16.80	0.0065	2.50	Pass
20	12	16.20	0.0062	2.50	Pass
20	10.2	14.50	0.0056	2.50	Pass



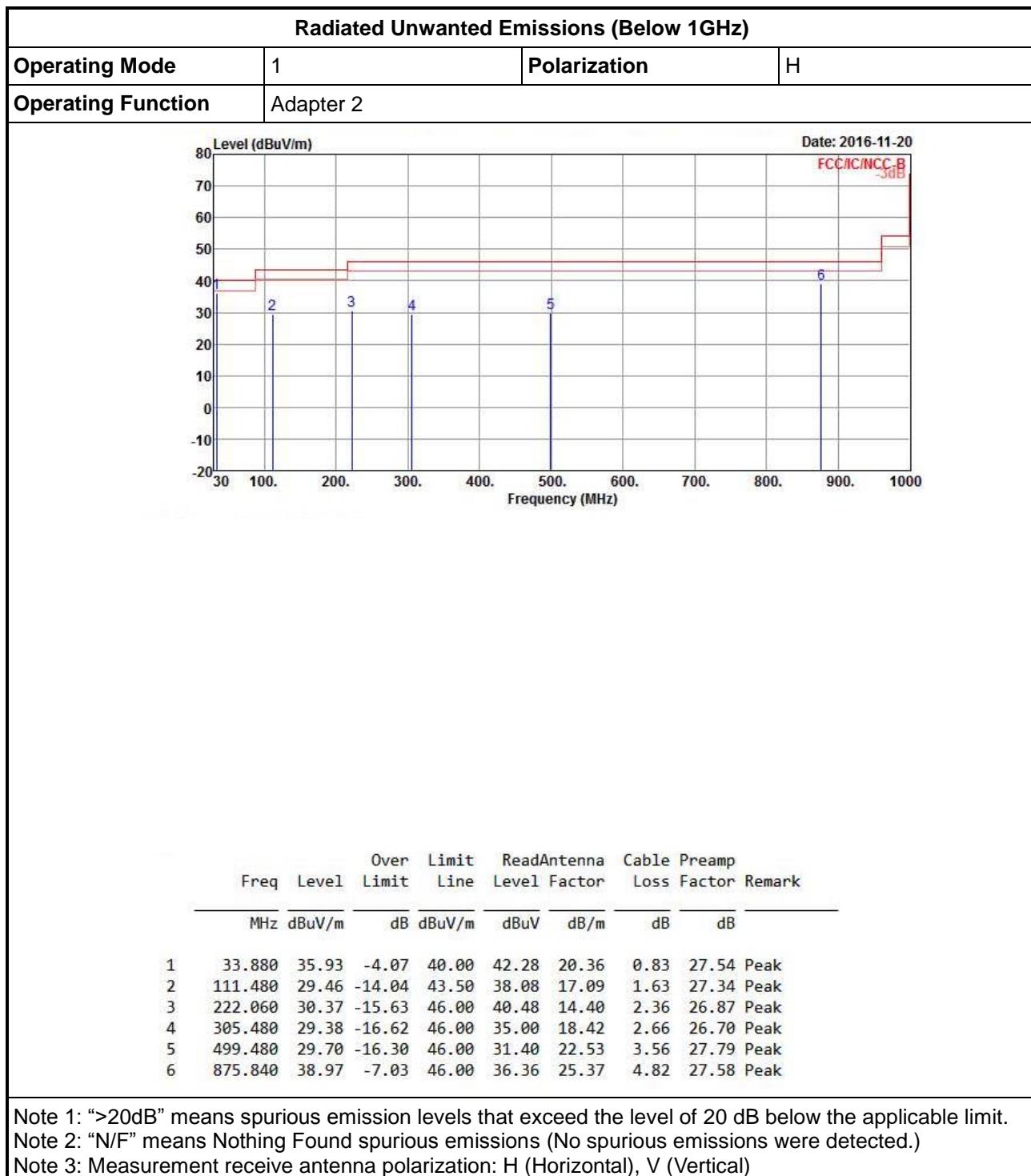
Transmitter Radiated Unwanted Emissions (Below 1GHz)





Transmitter Radiated Unwanted Emissions

Appendix F





Transmitter Radiated Unwanted Emissions

Appendix F

LTE Band 41 /5MHz /QPSK/RB Size 1 Offset 0									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dBm)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	5180	-36.77	-13	-23.77	-61.10	-46.81	5.02	12.91	H
	7772	-36.24	-13	-23.24	-63.50	-43.69	5.99	11.29	H
	10359	-31.92	-13	-18.92	-63.32	-38.07	7.15	11.15	H
	5180	-31.14	-13	-26.47	-63.55	-49.51	5.02	12.91	V
	7772	-31.14	-13	-23.61	-63.79	-44.06	5.99	11.29	V
	10359	-31.14	-13	-18.14	-63.03	-37.29	7.15	11.15	V

LTE Band 41 /10MHz /QPSK/RB Size 1 Offset 0									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dBm)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	5176	-38.74	-13	-25.74	-63.07	-48.78	5.02	12.91	H
	7764	-36.33	-13	-23.33	-63.59	-43.78	5.99	11.29	H
	10350	-32.29	-13	-19.29	-63.69	-38.44	7.15	11.15	H
	5176	-41.23	-13	-28.23	-65.31	-51.27	5.02	12.91	V
	7764	-36.14	-13	-23.14	-63.32	-43.59	5.99	11.29	V
	10350	-31.51	-13	-18.51	-63.40	-37.66	7.15	11.15	V

LTE Band 41 /15MHz /QPSK/RB Size 1 Offset 0									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dBm)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	5172	-40.17	-13	-27.17	-64.50	-50.21	5.02	12.91	H
	7760	-36.31	-13	-23.31	-63.57	-43.76	5.99	11.29	H
	10341	-32.01	-13	-19.01	-63.41	-38.16	7.15	11.15	H
	5172	-42.03	-13	-29.03	-66.11	-52.07	5.02	12.91	V
	7760	-36.26	-13	-23.26	-63.44	-43.71	5.99	11.29	V
	10341	-31.28	-13	-18.28	-63.17	-37.43	7.15	11.15	V



Transmitter Radiated Unwanted Emissions

Appendix F

LTE Band 41 /20MHz /QPSK/RB Size 1 Offset 0									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dBm)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	5168	-39.12	-13	-26.12	-61.35	-47.06	5.02	12.91	H
	7752	-39.13	-13	-26.13	-64.29	-44.48	5.99	11.29	H
	10332	-32.15	-13	-19.15	-63.55	-38.30	7.15	11.15	H
	5168	-39.29	-13	-26.29	-63.37	-49.33	5.02	12.91	V
	7752	-36.52	-13	-23.52	-63.70	-43.97	5.99	11.29	V
	10332	-31.30	-13	-18.30	-63.19	-37.45	7.15	11.15	V