TEST REPORT

Report Number : 13179110-E10V2

Applicant	:	APPLE, INC 1 APPLE PARK WAY CUPERTINO, CA 95014
Model	:	A2176
FCC ID	:	BCG-E3539A
EUT Description	:	SMARTPHONE
Test Standard(s)	:	FCC CFR47 22H, 27L, 27M, and 96

Date Of Issue:
OCTOBER 01, 2020

Prepared by:
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NVLAP® TESTING ilac-MRA
NVLAP Lab code: 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	9/27/2020	Initial Review	Mengistu Mekuria
V2	10/1/2020	Address TCB Feedback	Sintia Andrean

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1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	APPLE, INC 1 APPLE PARK WAY CUPERTINO, CA 95014
Model	A2176
FCC ID	BCG-E3539A
EUT Description	SMARTPHONE
Serial Number	MODEL (2176): C7H03030030P54X57 (CONDUCTED) AND C7CC904SPVG2 (RADIATED)
Date Tested	JULY 01, 2020 to SEPTEMBER 28, 2020
Applicable Standards	FCC CFR47 22H, 27L, 27M, AND 96
Test Results	COMPLIES

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

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 the U.S. government.

Approved & Released By:	Prepared By:
Mengistu Mekuria Lead Test Engineer UL Verification Services Inc.	John Thompson Laboratory Engineer UL Verification Services Inc.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following:

- ANSI C63.26:2015
- FCC CFR 47 Part 2, Part 22, Part 27 and Part 96
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 971168 D02 v02r01: Misc Rev Approv License Devices
- FCC KDB 412172 D01 v01r01. Determining ERP and EIRP

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. 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 Road
☐ Chamber A	☐ Chamber D	☐ Chamber I
☒ Chamber B	☐ Chamber E	☐ Chamber J
☐ Chamber C	☐ Chamber F	☐ Chamber K
	☐ Chamber G	☐ Chamber L
	☐ Chamber H	☐ Chamber M

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code: 2324A.

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

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4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U_{Lab}
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.39 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.07 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.17 dB
Occupied Channel Bandwidth	±0.39 %
Temperature	±0.9 °C
Supply voltages	±0.45 %
Time	±0.02 %

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

4.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS, NFC and WPT. All models support at least one UICC based SIM. The second SIM is either an UICC based p-SIM (physical SIM) or e-SIM (electronic SIM). The device supports a built-in inductive charging transmitter and receiver. The rechargeable battery is not user accessible.

5.2. MAXIMUM OUTPUT POWER

ERP/EIRP TEST PROCEDURE

ANSI C63.26:2015
KDB 971168 D01 Section 5.6

ERP/EIRP = PMeas + GT − LC
where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);
PMeas = 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.

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 and ERP/EIRP output powers as follows:

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OUTPUT POWER FOR LTE BAND 5

RSS 132	
EIRP Limit (W)	11.50
Antenna Gain (dBi)	-3.60

Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
5+10	QPSK	826.5	844.0	25.70	19.95	0.099	13835.6	13M8G7W
	16QAM			24.81	19.06	0.081	13784.7	13M8D7W
10+5	QPSK	829.0	846.5	25.70	19.95	0.099	13853.8	13M9G7W
	16QAM			24.79	19.04	0.080	13873.3	13M9D7W
10+10	QPSK	829.0	844.0	25.70	19.95	0.099	18794.7	18M8G7W
	16QAM			24.72	18.97	0.079	18764.5	18M8D7W

OUTPUT POWER FOR LTE BAND 7

Part 27 / RSS 199	
EIRP Limit (W)	2.00
Antenna Gain (dBi)	-1.00

Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
10+20	QPSK	2505.5	2560.0	25.00	24.00	0.251	28013.8	28M0G7W
	16QAM			24.04	23.04	0.201	27974.2	28M0D7W
20+10	QPSK	2510.0	2564.5	25.00	24.00	0.251	28030.7	28M0G7W
	16QAM			24.07	23.07	0.203	27932.8	27M9D7W
15+15	QPSK	2507.5	2562.5	25.00	24.00	0.251	28559	28M6G7W
	16QAM			24.06	23.06	0.202	28527.3	28M5D7W
15+20	QPSK	2507.8	2560.0	25.00	24.00	0.251	32729.8	32M7G7W
	16QAM			24.07	23.07	0.203	32752.9	32M8D7W
20+15	QPSK	2510.0	2562.2	25.00	24.00	0.251	32768	32M8G7W
	16QAM			24.07	23.07	0.203	32751.4	32M8D7W
20+20	QPSK	2510.0	2560.0	25.00	24.00	0.251	37629.6	37M6G7W
	16QAM			24.13	23.13	0.206	37634.9	37M6D7W

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OUTPUT POWER FOR LTE BAND 41

Part 27	
EIRP Limit (W)	2.00
Antenna Gain (dBi)	1.30

Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5+20	QPSK	2499.3	2680.0	26.99	28.29	0.675	22816.6	22M8G7W
	16QAM			25.48	26.78	0.476	22826.1	22M8D7W
20+5	QPSK	2506.0	2686.7	27.00	28.30	0.676	22817.8	22M8G7W
	16QAM			25.49	26.79	0.478	22825.7	22M8D7W
10+20	QPSK	2501.5	2680.0	27.00	28.30	0.676	27696.8	27M7G7W
	16QAM			25.34	26.64	0.461	27696	27M7D7W
20+10	QPSK	2506.0	2684.5	27.00	28.30	0.676	27607.2	27M6G7W
	16QAM			25.44	26.74	0.472	27651.2	27M7D7W
15+15	QPSK	2503.5	2682.5	26.91	28.21	0.662	28238.1	28M2G7W
	16QAM			25.39	26.69	0.467	28240.9	28M2D7W
15+20	QPSK	2503.8	2680.0	26.84	28.14	0.652	32531.6	32M5G7W
	16QAM			25.22	26.52	0.449	32555.1	32M6D7W
20+15	QPSK	2506.0	2682.2	27.00	28.30	0.676	32575.1	32M6G7W
	16QAM			25.47	26.77	0.475	32542.5	32M5D7W
20+20	QPSK	2506.0	2680.0	26.71	28.01	0.632	37377.4	37M4G7W
	16QAM			25.41	26.71	0.469	37367.2	37M4D7W

OUTPUT POWER FOR LTE BAND 48

Part 96	
EIRP Limit (W)/ 10MHz	0.20
Antenna Gain (dBi)	-2.20

Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5+20	QPSK	3553.3	3690.0	23.60	21.40	0.138	23242.7	23M2G7W
	16QAM			23.41	21.21	0.132	23291.7	23M3D7W
20+5	QPSK	3560.0	3696.7	23.60	21.40	0.138	23264.5	23M3G7W
	16QAM			23.36	21.16	0.131	23262.4	23M3D7W
10+20	QPSK	3555.5	3690.0	24.03	21.83	0.152	27992.5	28M0G7W
	16QAM			24.10	22.00	0.158	27920.5	27M9D7W
20+10	QPSK	3560.0	3694.5	24.10	21.90	0.155	28074.9	28M1G7W
	16QAM			24.07	22.00	0.158	28026.7	28M0D7W
15+20	QPSK	3557.8	3690.0	24.50	22.30	0.170	32807.8	32M8G7W
	16QAM			24.60	22.50	0.178	32852.7	32M9D7W
20+15	QPSK	3560.0	3692.2	24.58	22.38	0.173	32714.5	32M7G7W
	16QAM			24.60	22.50	0.178	32709	32M7D7W
20+20	QPSK	3560.0	3690.0	24.50	22.30	0.170	37686.1	37M7G7W
	16QAM			24.43	22.23	0.167	37647.9	37M6D7W

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5.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 0.28.03-1.

5.4. MAXIMUM ANTENNA GAIN

Please see table below:

LTE Bands	Antenna Gain (dBi)						
	ANT 1	ANT 2	ANT 3	ANT 4	ANT 7	ANT 8	ANT 9
LTE Band 5, 824 – 849 MHz	-3.6	-4.8	NA	NA	NA	NA	NA
LTE Band 7, 2500 – 2570 MHz	-2.2	-0.7	-1	-3.3	NA	NA	NA
LTE Band 41, 2496 – 2690 MHz	-0.1	0.5	1.3	-1.7	NA	NA	NA
LTE Band 48, 3550 – 3700 MHz	NA	NA	NA	-2.1	-0.7	0	-2.2

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5.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports LTE dual carrier Bands of: Band 5, Band 7, Band 41 and Band 48.

The worst-case scenario for all measurements is based on an engineering evaluation and QPSK was observed as the worst one and set for all conducted and radiated. Output power measurements were measured on QPSK, 16QAM, 64QAM, 256QAM modulations. For testing purposes emissions on sections 8 and 9 were measured while QPSK was set at or above target power for all bands. Conducted tests were performed on the worst case antenna because it has the highest conducted power. ANT1 is the worst case for all bands except Band 48. For band 48 ANT9 is the worst case antenna.

The EUT was investigated in three orthogonal orientations X/Y/Z on all ANT 1, ANT2, ANT3, ANT4, ANT7, ANT8 and ANT 9 antennas to determine the worst case orientation. The following table exabit the worst case orientation for different frequency bands. The full tests of the EUT have made upon the orientations that shown in the table below.

Frequency Bands	ANT1	ANT2	ANT3	ANT4	ANT7	ANT8	ANT9
663 – 849 MHz	X	Y	N/A	N/A	N/A	N/A	N/A
1710 – 1915 MHz	X	X	X	X	N/A	N/A	N/A
2300 – 2700 MHz	X	X	X	X	N/A	N/A	N/A
3300 – 3980 MHz	N/A	N/A	N/A	X	X	Y	Y

For Band Edge and Emission Mask: The highest bandwidth combo was tested. The RB combinations were selected such that the signal is active closest to the band limit, as this is the worst case.

For Out of Band Emissions: The highest bandwidth combination was tested. The highest power RB combination was selected as worst case.

Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. There were no emissions found with less than 20dB of margin from 9kHz to 1GHz.

For interband transmission of multiple channels in different antenna combination in Cellular bands, tests were conducted for various configurations having the highest power, least separation in frequencies and widest operation bandwidths. No noticeable new emission was found.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID/ DoC**
Laptop	Apple	A1398	C02PM012G3QD	QDS-BRCM1069
Laptop AC/DC adapter	Liteon Technology	PA-1450-BA1	B123	N/A

I/O CABLES (RF CONDUCTED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	3	US 115V	Un-shielded	2.0	N/A
2	USB	1	DC	Un-shielded	1.0	N/A
3	RF In/Out	1	EUT	Un-shielded	0.6	N/A
4	RF In/Out	1	Communication Test Set	Un-shielded	1.2	N/A
5	RF In/Out	1	Barrel	N/A	N/A	N/A

I/O CABLES (RF RADIATED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	RF In/Out	1	Antenna	Un-shielded	5.0	N/A

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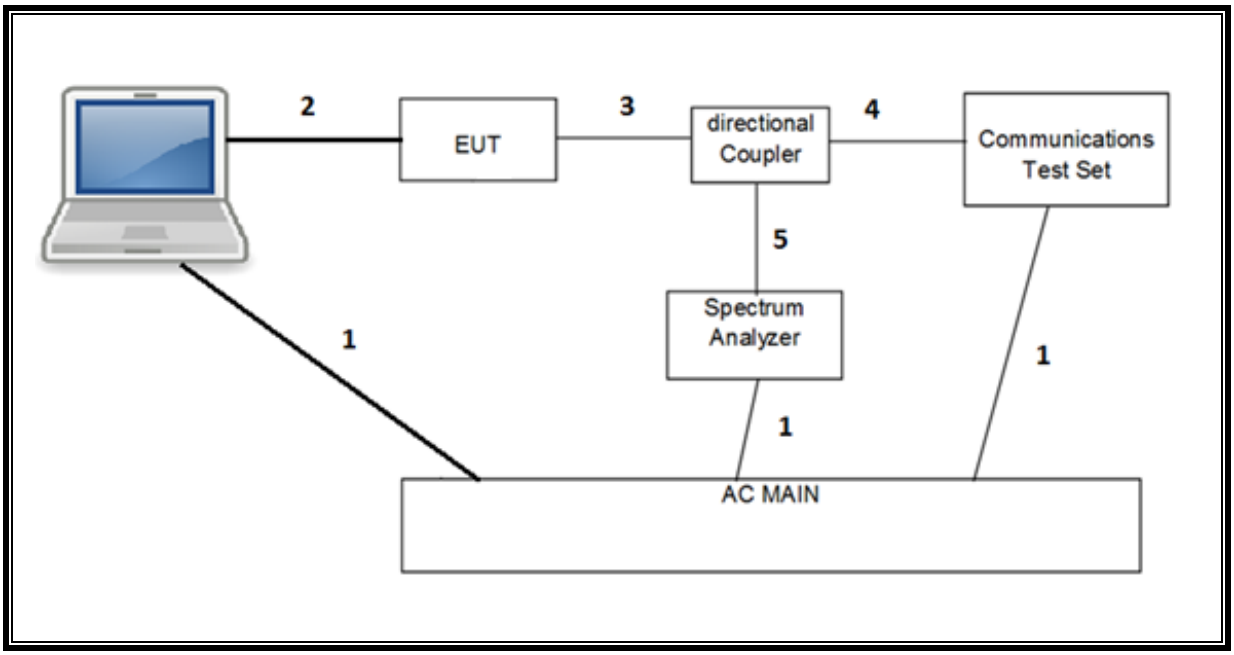
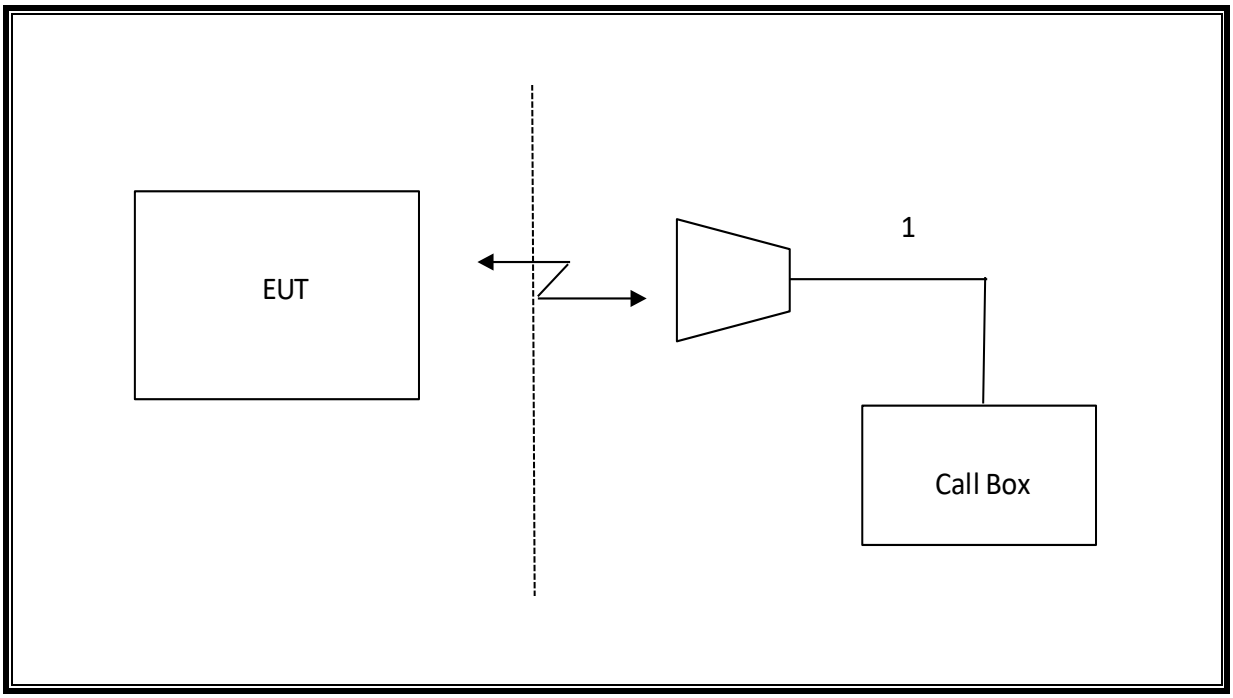
CONDUCTED SETUP



RADIATED SETUP



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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**	**Asset**	**Cal Due**
Antenna, Horn 1-18GHz	A.H. Systems, Inc.	SAS-571	T962	01/25/2021
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T346	07/20/2021
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T136	07/07/2021
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	T407	05/20/2021
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	PRE0184052	11/12/2020
*Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	PRE0181575	09/05/2020
Antenna, Active Loop 9KHz to 30MHz	ETS-Lindgren	6502	T757	10/01/2020
Antenna Horn, 18 to 26GHz	ARA	SWH-28	T125	04/17/2021
Antenna, Horn 26-40GHz	ARA	MWH-2640/B	PRE0182203	04/17/2021
Amplifier, 1 to 18GHz	MITEQ	AFS42-00101800-25-S-42	T1165	08/10/2021
Amplifier, 1 to 18GHz	MITEQ	AFS42-00101800-25-S-42	PRE0181078	05/06/2021
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	PRE0180176	07/14/2021
Amplifier, 100KHz to 1GHz, 32dB	Keysight	8447D	T15	10/26/2020
Pre-Amp 18-26GHz	Agilent Technology	8449B	T404	04/8/2021
Amplifier, 26-40GHz	Miteq	TTA2640	T1864	04/08/2021
Filter, BRF 1850 – 1910 MHz	Micro-Tronics	BRM50714-02	T1796	06/23/2021
Filter, BRF 824 – 848 MHz	Micro-Tronics	BRM20025	PRE0191180	06/23/2021
Filter, HPF 1.2 GHz	MICRO-TRONICS	MICRO-TRONICS	T1737	06/23/2021
Directional Coupler	KRYTAR	152610	198816	05/15/2021
*Directional Coupler	KRYTAR	152610	T1161	08/14/2020
Directional Coupler	KRYTAR	152613	198817	05/15/2021
Spectrum Analyzer, PXA 3Hz to 44GHZ	Keysight	N9030A	T340	01/22/2021
Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	T1454	07/15/2021
Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	T907	01/22/2021
Spectrum Analyzer, PSA, 3Hz to 44GHz	Keysight	N9030A	T908	05/05/2021
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Keysight	E4440A	T198	01/28/2021
Spectrum Analyzer, PSA, 3Hz to 44GHz	Keysight	E4440A	T200	01/24/2021
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179522	02/18/2021
Wireless Communications Test Set, 8960 Series 10	Agilent	E5515C	T211	02/18/2021
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T948	08/10/2021
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T1871	02/25/2021
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T972	02/24/2021
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T260	02/19/2021
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T959	02/19/2021
Chamber, Environmental	Cincinnati Sub Zero	ZPHS-8-3.5-SCT/WC	T754	12/22/2020
Environmental Chamber	Cincinnati Sub Zero	ZPHS-8-3.5-SCT/WC	T1154	12/22/2020
Power Meter, P-series single channel	Keysight	N1912A	T1245	01/22/2021
Power Sensor	Keysight	N1921A	T1225	02/23/2021

UL AUTOMATION SOFTWARE			
CLT Software	UL	UL RF	Ver 7.6, November 11, 2017
Power Measurement Software	UL	UL RF	Ver 2.7, 2019
Radiated test software	UL	UL RF	Ver 9.5 June 15, 2019

NOTES:

* Testing is completed before equipment expiration date.

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7. RF OUTPUT POWER VERIFICATION

RULE PART(S)

FCC: §2.1046, §27.50

RESULT

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:

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7.1. LTE BAND 5

Test Engineer ID:	10641	Test Date:	8/5/2020

OUTPUT POWER FOR LTE BAND 5 (5.0MHz + 10.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm) ANT 1 QPSK	ANT 1 16QAM	ANT 1 64QAM	ANT 1 256QAM	ANT 2 QPSK	ANT 2 16QAM	ANT 2 64QAM	ANT 2 256QAM
5MHz / 10MHz	826.5	833.7	1	24	1	0	25.70	**24.81**	23.78	20.77	24.46	**23.54**	22.52	19.57
			25	0	50	0	23.81	22.84	22.83	**20.85**	22.61	21.65	21.66	19.66
	831.6	838.8	1	24	1	0	25.69	24.73	23.81	20.71	**24.50**	23.45	**22.66**	19.56
			25	0	50	0	23.81	22.80	22.86	20.78	22.61	21.62	21.65	19.64
	836.8	844.0	1	24	1	0	**25.70**	24.76	**23.85**	20.67	24.47	**23.55**	22.54	19.55
			25	0	50	0	23.87	22.88	22.86	20.85	22.6419	21.63	21.67	**19.67**

OUTPUT POWER FOR LTE BAND 5 (10.0MHz + 5.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm) ANT 1 QPSK	ANT 1 16QAM	ANT 1 64QAM	ANT 1 256QAM	ANT 2 QPSK	ANT 2 16QAM	ANT 2 64QAM	ANT 2 256QAM
10MHz/ 5MHz	829.0	836.2	1	49	1	0	25.66	24.62	**23.78**	20.72	**24.50**	23.39	**22.45**	19.42
			50	0	25	0	23.83	22.84	22.88	20.87	22.54	21.55	21.57	19.53
	834.3	841.5	1	49	1	0	**25.70**	24.64	23.67	20.87	24.29	23.31	22.25	19.51
			50	0	25	0	23.85	22.84	22.87	20.90	22.53	21.53	21.58	19.58
	839.3	846.5	1	49	1	0	25.64	**24.79**	23.07	20.84	24.33	**23.45**	22.25	19.52
			50	0	25	0	23.89	22.92	22.88	**20.92**	22.53	21.55	21.56	**19.59**

OUTPUT POWER FOR LTE BAND 5 (10.0MHz + 10.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm) ANT 1 QPSK	ANT 1 16QAM	ANT 1 64QAM	ANT 1 256QAM	ANT 2 QPSK	ANT 2 16QAM	ANT 2 64QAM	ANT 2 256QAM
10MHz/ 10MHz	829.0	838.9	1	49	1	0	**25.70**	24.66	23.68	20.70	24.36	23.42	22.61	19.49
			1	0	1	49	15.45	15.33	15.35	15.42	14.24	14.21	14.33	14.18
			50	0	50	0	23.88	22.89	22.90	**20.94**	22.73	21.72	21.77	19.76
	831.5	841.4	1	49	1	0	25.66	**24.72**	23.76	20.83	**24.50**	23.51	22.53	19.63
			1	0	1	49	15.41	15.43	15.42	15.48	14.19	14.23	14.22	14.29
			50	0	50	0	23.87	22.86	22.90	20.93	22.70	21.73	21.75	19.75
	834.1	844.0	1	49	1	0	25.66	24.67	**23.80**	20.80	24.49	**23.52**	**22.66**	19.64
			1	0	1	49	15.43	15.29	15.45	15.48	14.25	14.31	14.23	14.23
			50	0	50	0	23.92	22.89	22.94	20.94	22.74	21.75	21.76	**19.78**

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7.2. LTE BAND 7

Test Engineer ID:	10646	Test Date:	8/30/2020

OUTPUT POWER FOR LTE BAND 7 (10.0MHz + 20.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
10MHz / 20MHz	2505.5	2519.9	1	49	1	0	**25.70**	**24.76**	**23.81**	20.77	22.69	**21.85**	20.96	**17.97**	**25.00**	**24.04**	22.94	**20.13**	**22.50**	**21.55**	**20.42**	**17.70**
			50	0	100	0	23.72	22.73	22.70	20.76	20.80	19.82	19.84	17.87	23.01	22.00	22.01	20.04	20.49	19.51	19.47	17.55
	2525.6	2540.0	1	49	1	0	25.61	24.59	23.71	20.79	22.77	21.76	20.90	17.82	24.88	23.88	**22.99**	19.91	22.15	21.13	20.25	17.13
			50	0	100	0	23.74	22.74	22.70	20.79	20.87	19.88	19.92	17.91	23.02	22.02	21.99	20.04	20.24	19.25	19.27	17.27
	2545.6	2560.0	1	49	1	0	25.69	24.69	23.79	**20.89**	**22.80**	21.80	**20.99**	17.92	24.84	23.86	22.91	20.02	22.11	21.12	20.22	17.18
			50	0	100	0	23.77	22.77	22.75	20.83	20.89	19.89	19.89	17.93	22.97	21.96	21.94	19.98	20.14	19.12	19.16	17.18

OUTPUT POWER FOR LTE BAND 7 (20.0MHz + 10.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz / 10MHz	2510.0	2524.4	1	99	1	0	25.56	24.57	23.67	20.50	22.72	21.72	20.72	17.60	**25.00**	**24.07**	**23.00**	**20.11**	**22.50**	**21.62**	**20.48**	17.65
			100	0	50	0	23.61	22.64	22.61	20.67	20.78	19.75	19.76	17.81	23.02	22.04	22.05	20.07	20.62	19.64	19.62	**17.67**
	2530.1	2544.5	1	99	1	0	25.54	24.61	23.65	**20.85**	22.78	21.86	20.79	**17.94**	24.89	23.89	22.95	19.94	22.26	21.37	20.35	17.36
			100	0	50	0	23.64	22.64	22.63	20.71	20.82	19.84	19.83	17.84	23.00	22.02	21.98	20.01	20.37	19.40	19.40	17.42
	2550.1	2564.5	1	99	1	0	**25.70**	**24.75**	**23.73**	20.66	**22.80**	**21.86**	**20.86**	17.80	24.87	23.93	22.98	19.84	22.19	21.28	20.31	17.22
			100	0	50	0	23.67	22.68	22.68	20.71	20.81	19.83	19.80	17.82	22.88	21.89	21.91	19.95	20.25	19.25	19.28	17.29

OUTPUT POWER FOR LTE BAND 7 (15.0MHz + 15.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
15MHz / 15MHz	2507.5	2522.5	1	74	1	0	25.46	24.68	23.76	20.80	22.65	21.64	20.68	17.85	**25.00**	**24.06**	22.60	**20.17**	**22.50**	**21.55**	20.25	**17.72**
			75	0	75	0	23.69	22.69	22.71	20.76	20.75	19.77	19.77	17.80	23.04	22.06	22.08	20.07	20.60	19.60	19.60	17.64
	2527.5	2542.5	1	74	1	0	25.58	**24.71**	23.69	20.74	22.72	**21.90**	**20.85**	17.77	24.84	23.94	22.97	19.96	22.16	21.21	20.27	17.24
			75	0	75	0	23.71	22.73	22.72	20.77	20.81	19.81	19.86	**17.87**	23.04	22.06	22.03	20.06	20.34	19.34	19.39	17.39
	2547.5	2562.5	1	74	1	0	**25.70**	24.69	**23.81**	20.73	**22.80**	21.71	20.85	17.81	24.88	23.91	**22.97**	19.87	22.21	21.16	**20.27**	17.13
			75	0	75	0	23.75	22.75	22.76	**20.80**	20.81	19.84	19.82	17.85	22.92	21.91	21.95	19.95	20.22	19.22	19.27	17.25

OUTPUT POWER FOR LTE BAND 7 (15.0MHz + 20.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
15MHz / 20MHz	2507.8	2524.9	1	74	1	0	25.64	24.68	**23.76**	**20.79**	22.72	21.69	20.75	17.77	**25.00**	**24.07**	22.97	**20.21**	**22.50**	**21.51**	20.19	**17.66**
			75	0	100	0	23.67	22.69	22.68	20.68	20.79	19.80	19.79	17.83	23.01	22.04	22.04	20.07	20.53	19.53	19.52	17.57
	2525.3	2542.4	1	74	1	0	25.56	24.69	23.66	20.68	**22.80**	**21.77**	20.80	**17.89**	24.92	23.85	**22.98**	19.91	22.19	21.19	20.25	17.31
			75	0	100	0	23.70	22.72	22.69	20.71	20.84	19.84	19.86	17.88	23.04	22.05	22.03	20.05	20.33	19.34	19.38	17.36
	2542.9	2560.0	1	74	1	0	**25.70**	**24.71**	23.71	20.69	22.76	21.70	**20.90**	17.86	24.88	23.91	22.98	20.03	22.19	21.20	**20.38**	17.35
			75	0	100	0	23.72	22.72	22.72	20.73	20.82	19.85	19.84	17.87	22.99	21.98	21.98	20.00	20.19	19.20	19.21	17.22

OUTPUT POWER FOR LTE BAND 7 (20.0MHz + 15.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz / 15MHz	2510.0	2527.1	1	99	1	0	25.59	24.60	23.67	20.57	22.70	21.71	20.83	17.74	**25.00**	**24.07**	22.88	20.02	**22.50**	**21.63**	20.40	17.56
			100	0	75	0	23.68	22.65	22.65	20.67	20.75	19.76	19.77	17.82	23.04	22.04	22.04	20.04	20.62	19.62	19.59	**17.64**
	2527.6	2544.7	1	99	1	0	25.58	24.66	23.59	20.70	22.77	**21.88**	20.89	17.83	24.96	23.94	22.92	20.04	22.23	21.38	**20.46**	17.43
			100	0	75	0	23.68	22.71	22.68	20.69	20.85	19.83	19.84	**17.88**	23.02	22.04	21.99	**20.04**	20.43	19.44	19.45	17.47
	2545.1	2562.2	1	99	1	0	**25.70**	**24.73**	**23.82**	**20.77**	**22.80**	21.84	**20.91**	17.87	24.89	23.90	**22.98**	19.93	22.27	21.27	20.40	17.39
			100	0	75	0	23.70	22.72	22.69	20.71	20.81	19.84	19.83	17.86	22.91	21.92	21.93	19.94	20.28	19.29	19.32	17.31

OUTPUT POWER FOR LTE BAND 7 (20.0MHz + 20.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz/ 20MHz	2510.0	2529.8	1	99	1	0	25.69	**24.70**	**23.77**	20.64	22.75	21.69	20.85	17.78	**25.00**	**24.13**	**23.01**	**20.18**	**22.50**	**21.56**	**20.48**	17.52
			1	0	1	99	16.72	16.81	16.80	16.77	13.43	13.22	13.14	12.21	16.01	15.98	15.95	16.09	13.44	11.60	11.48	13.58
			100	0	100	0	23.68	22.66	22.66	20.66	20.73	19.74	19.75	17.81	22.97	22.00	21.99	20.02	20.50	19.49	19.51	**17.52**
	2525.1	2544.9	1	99	1	0	25.59	24.68	23.67	**20.74**	22.73	21.83	**20.90**	17.82	24.86	23.95	22.95	19.91	22.23	21.41	20.26	17.40
			1	0	1	99	16.87	16.98	16.97	17.07	13.89	14.02	13.98	13.38	15.64	15.51	15.51	15.79	12.67	12.65	12.58	12.35
			100	0	100	0	23.68	22.71	22.68	20.71	20.82	19.82	19.83	**17.88**	23.02	22.00	22.00	20.05	20.38	19.40	19.43	17.43
	2540.2	2560.0	1	99	1	0	**25.70**	24.69	23.73	20.72	**22.80**	**21.89**	20.84	17.82	24.90	23.90	22.98	19.88	22.27	21.26	20.38	17.37
			1	0	1	99	16.72	16.82	16.74	16.70	13.39	13.30	13.20	12.99	15.34	15.24	15.19	14.98	11.91	11.75	11.78	11.47
			100	0	100	0	23.67	22.68	22.67	20.70	20.77	19.77	19.79	17.84	22.89	21.86	21.89	19.92	20.21	19.22	19.24	17.24

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7.3. LTE BAND 41

Test Engineer ID:	10646	Test Date:	8/30/2020

OUTPUT POWER FOR LTE BAND 41 (5.0MHz + 20.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
5MHz / 20MHz	2499.3	2511.0	1	24	1	0	22.73	22.70	22.58	22.46	19.87	19.47	19.24	19.90	22.02	21.46	22.09	21.94	19.50	18.83	18.76	19.48
			25	0	100	0	22.68	22.11	21.84	22.60	19.80	19.31	19.31	19.78	21.99	21.52	21.53	21.97	19.44	18.96	18.83	19.50
	2583.8	2595.5	1	24	1	0	27.70	**26.27**	24.89	22.80	24.50	23.25	**23.20**	19.52	**26.99**	**25.48**	**25.13**	22.11	24.05	22.65	21.94	19.32
			25	0	100	0	25.86	24.87	24.88	22.89	22.98	22.00	21.95	**20.00**	25.12	24.13	24.11	**22.12**	22.34	22.36	21.34	19.39
	2668.3	2680.0	1	24	1	0	**27.70**	26.23	**25.00**	**22.99**	**24.80**	**23.25**	22.47	20.00	26.69	25.23	24.41	21.93	**24.42**	**22.92**	**22.99**	**19.71**
			25	0	100	0	25.94	24.93	24.94	22.92	22.99	22.00	21.97	19.98	24.98	24.95	24.03	21.95	22.61	21.63	21.58	19.65

OUTPUT POWER FOR LTE BAND 41 (20.0MHz + 5.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz / 5MHz	2506.0	2517.7	1	99	1	0	26.70	**26.24**	24.98	22.81	23.80	**23.45**	21.97	19.91	26.04	25.23	24.43	21.65	23.50	22.11	21.34	18.82
			100	0	25	0	22.72	21.74	21.23	**22.92**	19.89	18.90	18.59	16.90	22.09	21.11	20.43	19.10	22.74	21.76	21.04	**19.83**
	2590.5	2602.2	1	99	1	0	27.70	26.21	**25.67**	22.75	24.80	23.39	22.75	**19.99**	**27.00**	**25.49**	25.07	**22.24**	24.22	22.88	22.20	19.50
			100	0	25	0	25.82	24.81	24.85	22.86	22.88	21.82	21.86	19.91	25.11	24.11	24.15	22.11	22.38	21.38	21.40	19.35
	2675.0	2686.7	1	99	1	0	**27.70**	26.22	24.91	22.91	**24.80**	23.37	**23.07**	19.92	26.83	25.45	**25.30**	22.11	**24.43**	**22.92**	**22.69**	19.72
			100	0	25	0	25.73	24.74	24.76	22.77	22.93	21.91	21.90	19.92	24.96	23.99	24.00	21.96	22.62	21.60	21.59	19.62

OUTPUT POWER FOR LTE BAND 41 (10.0MHz + 20.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
10MHz / 20MHz	2501.5	2515.9	1	49	1	0	22.73	22.58	22.54	22.64	19.67	19.80	19.69	19.75	21.88	21.91	21.89	21.90	19.43	19.32	19.44	19.50
			50	0	100	0	22.50	22.51	22.70	22.53	19.80	19.73	19.78	19.76	21.88	21.86	22.00	21.99	19.37	19.38	19.32	19.32
	2583.6	2598.0	1	49	1	0	27.70	26.24	**25.58**	22.80	24.80	23.18	22.67	19.86	26.67	**25.34**	**25.09**	**22.34**	24.21	22.69	**22.53**	19.61
			50	0	100	0	25.88	24.87	24.88	22.86	22.94	21.97	21.92	19.97	25.13	24.16	24.18	22.14	22.36	21.44	21.45	19.40
	2665.6	2680.0	1	49	1	0	**27.70**	**26.32**	25.22	22.89	**24.80**	**23.44**	**23.12**	20.00	**27.00**	25.18	23.56	21.87	**24.44**	**22.85**	22.21	19.57
			50	0	100	0	25.93	24.93	24.92	**22.93**	22.84	22.04	22.01	**20.03**	24.96	24.01	23.96	21.99	22.61	21.63	21.59	**19.65**

OUTPUT POWER FOR LTE BAND 41 (20.0MHz + 10.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz / 10MHz	2506.0	2520.4	1	99	1	0	26.70	**26.32**	24.78	22.89	23.80	**23.48**	21.97	**20.13**	26.01	25.26	23.41	21.72	23.50	22.17	20.34	18.66
			100	0	50	0	22.72	21.69	21.16	19.73	19.83	18.87	18.55	16.86	22.02	21.04	20.46	19.04	22.73	21.80	20.99	**19.81**
	2588.1	2602.5	1	99	1	0	27.70	26.25	**25.64**	22.89	24.80	23.42	22.79	20.02	**27.00**	**25.44**	**25.00**	**22.23**	24.24	22.90	22.32	19.52
			100	0	50	0	25.73	24.76	24.80	22.79	22.89	21.89	21.93	19.92	25.10	24.10	24.16	22.13	22.37	21.40	21.46	19.43
	2670.1	2684.5	1	99	1	0	**27.70**	26.17	25.31	**22.95**	**24.80**	23.29	**23.16**	19.87	26.82	25.32	24.93	22.09	**24.43**	**22.96**	**22.99**	19.73
			100	0	50	0	25.90	24.88	24.87	22.90	22.93	21.94	21.92	19.92	25.00	24.03	24.05	21.96	22.61	21.65	21.57	19.65

OUTPUT POWER FOR LTE BAND 41 (15.0MHz + 15.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
15MHz / 15MHz	2503.5	2518.5	1	74	1	0	27.70	26.31	24.74	**23.00**	24.80	**23.40**	22.10	19.92	26.46	25.01	23.07	21.57	19.50	18.09	16.11	14.63
			75	0	75	0	22.86	21.91	21.34	22.94	19.81	18.85	18.63	16.89	22.02	21.00	20.57	19.02	22.73	21.74	21.10	**19.83**
	2585.5	2600.5	1	74	1	0	27.70	26.20	**25.60**	22.77	24.80	23.14	**22.80**	**20.06**	26.89	**25.39**	**24.87**	**22.15**	24.21	22.64	22.23	19.45
			75	0	75	0	25.88	24.87	24.92	22.88	22.89	21.91	21.93	19.95	25.09	24.10	24.20	22.13	22.35	21.39	21.44	19.38
	2667.5	2682.5	1	74	1	0	**27.70**	**26.33**	25.18	22.91	**24.80**	23.32	22.75	19.89	**26.91**	25.18	23.96	21.82	**24.44**	**22.82**	**22.28**	19.56
			75	0	75	0	25.93	24.96	24.98	22.99	22.89	22.02	22.00	20.03	24.96	23.99	24.05	22.00	22.57	21.61	21.63	19.65

OUTPUT POWER FOR LTE BAND 41 (15.0MHz + 20.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
15MHz / 20MHz	2503.8	2520.9	1	74	1	0	27.70	26.09	24.41	22.68	24.80	23.36	21.93	**20.10**	26.64	25.14	22.99	21.90	19.50	18.05	16.15	14.64
			75	0	100	0	22.74	22.74	22.80	21.81	19.85	19.85	19.87	18.87	22.07	22.08	22.10	21.07	20.81	20.79	20.81	**19.80**
	2583.3	2600.4	1	74	1	0	27.70	**26.35**	**26.06**	22.88	24.80	23.18	22.67	19.90	**26.84**	25.18	**24.67**	21.96	24.21	22.69	**22.25**	19.50
			75	0	100	0	25.97	24.92	25.01	22.98	22.80	22.02	21.99	20.02	25.12	24.13	24.15	**22.15**	22.40	21.36	21.45	19.33
	2662.9	2680.0	1	74	1	0	**27.70**	26.30	25.02	**22.99**	**24.80**	**23.49**	**23.21**	20.02	26.72	**25.22**	23.90	21.80	**24.43**	**22.83**	**22.25**	19.56
			75	0	100	0	25.91	24.92	24.87	22.94	22.80	22.10	22.11	20.06	24.99	23.99	23.93	21.97	22.58	21.59	21.60	19.64

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OUTPUT POWER FOR LTE BAND 41 (20.0MHz + 15.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz / 15MHz	2506.0	2523.1	1	99	1	0	27.70	26.26	24.60	22.74	24.80	23.39	21.93	19.94	26.67	25.20	23.43	21.76	19.50	18.08	16.29	14.70
			100	0	75	0	22.73	21.74	21.16	19.77	19.84	18.85	18.63	16.84	22.03	21.02	20.60	19.06	22.71	21.73	21.04	**19.78**
	2585.6	2602.7	1	99	1	0	27.70	**26.29**	**25.67**	**22.91**	24.80	**23.40**	22.77	20.03	**27.00**	**25.47**	**25.03**	**22.23**	24.25	22.89	22.29	19.52
			100	0	75	0	25.80	24.84	24.83	22.85	22.83	21.98	21.94	19.96	25.16	24.17	24.20	22.18	22.41	21.42	21.46	19.50
	2665.1	2682.2	1	99	1	0	**27.70**	26.23	25.31	22.89	**24.80**	23.37	**23.20**	19.95	26.77	25.28	24.59	21.99	**24.42**	**22.94**	**23.02**	**19.78**
			100	0	75	0	25.88	24.92	24.85	22.88	22.81	22.07	22.03	**20.04**	24.99	24.07	24.04	21.99	22.59	21.62	21.57	19.65

OUTPUT POWER FOR LTE BAND 41 (20.0MHz + 20.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 1				ANT 2				ANT 3				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz/ 20MHz	2506.0	2525.8	1	99	1	0	**27.70**	**26.29**	24.82	22.86	24.80	**23.38**	21.88	19.92	26.67	25.21	23.45	21.71	**24.50**	**23.02**	21.34	19.51
			1	0	1	99	14.78	14.41	14.83	14.05	11.85	10.94	11.67	11.90	14.07	14.01	14.20	14.00	11.59	11.60	11.65	11.51
			100	0	100	0	22.70	21.68	21.67	20.64	19.81	18.80	18.83	17.80	22.08	21.07	21.07	20.03	21.73	20.71	20.72	**19.74**
	2583.1	2602.9	1	99	1	0	27.70	26.27	**25.62**	22.86	**24.80**	23.20	22.71	19.94	**26.71**	**25.41**	**24.96**	22.06	24.29	22.66	22.29	19.47
			1	0	1	99	18.15	18.21	17.65	17.53	14.73	14.17	14.40	14.69	16.75	16.87	16.80	16.96	13.99	14.10	13.99	14.15
			100	0	100	0	25.84	24.84	24.86	22.80	22.83	21.92	21.95	19.93	25.14	24.18	24.20	**22.18**	22.43	21.43	21.43	19.38
	2660.2	2680.0	1	99	1	0	27.70	26.22	25.35	22.87	24.80	23.36	**23.32**	19.88	26.65	25.16	24.19	21.84	24.30	22.83	**22.89**	19.65
			1	0	1	99	18.32	18.36	17.46	18.10	15.44	15.36	14.47	14.70	16.37	16.40	16.92	16.60	13.90	13.83	14.36	14.13
			100	0	100	0	25.97	24.99	24.87	**23.00**	22.86	22.09	22.08	**20.10**	24.98	23.98	23.95	21.96	22.55	21.57	21.53	19.53

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7.4. LTE BAND 48

Test Engineer ID:	10646	Test Date:	8/30/2020

OUTPUT POWER FOR LTE BAND 48 (5.0MHz + 20.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 7				ANT 4				ANT 9				ANT 8			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
5MHz / 20MHz	3553.3	3565.0	1	24	1	0	17.50	17.00	17.00	17.29	16.52	16.51	17.00	16.69	19.60	19.66	20.10	19.85	16.63	16.66	17.10	16.72
			25	0	100	0	10.70	10.73	10.68	10.70	10.29	10.31	10.26	10.29	13.36	13.38	13.28	13.32	10.43	10.40	10.37	10.38
	3615.8	3627.5	1	24	1	0	**21.00**	**20.84**	**20.83**	18.06	**20.37**	**20.32**	**20.50**	17.53	**23.60**	**23.41**	**23.45**	20.60	**19.95**	**19.78**	**20.00**	**17.22**
			25	0	100	0	19.08	19.03	19.04	**18.08**	18.59	18.56	18.53	**17.59**	21.70	21.63	21.61	**20.68**	18.08	18.07	18.08	17.17
	3678.3	3690.0	1	24	1	0	17.50	17.31	17.11	17.43	16.72	16.61	16.40	17.00	20.05	19.96	19.72	20.10	16.73	16.63	16.45	16.90
			25	0	100	0	11.15	11.17	11.16	11.03	10.46	10.43	10.48	10.58	13.82	13.77	13.74	13.68	10.51	10.49	10.51	10.50

OUTPUT POWER FOR LTE BAND 48 (20.0MHz + 5.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 7				ANT 4				ANT 9				ANT 8			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz / 5MHz	3560.0	3571.7	1	99	1	0	17.50	17.32	17.49	17.31	16.97	16.81	17.00	16.78	19.64	19.62	20.10	19.91	17.06	16.88	17.09	17.30
			100	0	25	0	10.64	10.69	10.68	10.64	10.14	10.14	10.16	10.19	12.89	12.90	12.81	12.81	10.28	10.26	10.27	10.27
	3622.5	3634.2	1	99	1	0	**21.00**	**20.92**	**20.95**	**18.11**	**20.41**	**20.50**	**20.42**	**17.61**	**23.60**	**23.36**	**23.55**	**20.80**	**20.20**	**20.30**	**20.21**	**17.40**
			100	0	25	0	18.89	18.92	18.93	17.92	18.43	18.40	18.45	17.46	21.61	21.61	21.62	20.60	18.20	18.19	18.21	17.21
	3685.0	3696.7	1	99	1	0	16.99	17.03	17.50	17.30	16.50	16.51	17.00	16.39	19.94	20.10	19.97	19.72	16.77	16.79	17.30	16.64
			100	0	25	0	10.24	10.19	10.24	10.13	9.71	9.68	9.67	9.81	12.98	13.00	12.95	12.98	9.97	9.94	9.94	9.97

OUTPUT POWER FOR LTE BAND 48 (10.0MHz + 20.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 7				ANT 4				ANT 9				ANT 8			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
10MHz / 20MHz	3555.5	3569.9	1	49	1	0	16.78	16.72	17.00	16.74	16.36	16.40	16.50	16.28	19.36	19.33	19.60	19.10	16.15	16.20	16.02	16.18
			50	0	100	0	11.89	11.95	11.87	11.88	11.48	11.51	11.53	11.51	14.53	14.46	14.47	14.24	11.40	11.44	11.41	11.41
	3615.6	3630.0	1	49	1	0	**21.50**	**21.41**	**21.14**	**18.37**	**21.00**	**20.87**	**20.30**	**17.89**	**24.03**	**24.10**	**23.70**	**20.75**	**20.50**	**20.45**	**20.28**	**17.46**
			50	0	100	0	18.63	18.63	18.64	18.16	18.16	18.17	18.19	17.68	21.21	21.24	21.27	20.51	17.65	17.67	17.64	17.24
	3675.6	3690.0	1	49	1	0	16.91	16.93	16.78	17.00	16.27	16.21	16.50	16.31	19.60	19.60	19.45	19.44	16.26	16.40	16.37	16.24
			50	0	100	0	12.16	12.19	12.10	12.13	11.48	11.52	11.55	11.54	14.85	14.76	14.74	14.55	11.46	11.46	11.51	11.54

OUTPUT POWER FOR LTE BAND 48 (20.0MHz + 10.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 7				ANT 4				ANT 9				ANT 8			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz / 10MHz	3560.0	3574.4	1	99	1	0	16.96	16.81	17.00	16.87	16.44	16.29	16.50	16.31	19.10	19.09	19.60	18.90	16.24	16.13	16.30	16.15
			100	0	50	0	12.14	12.15	12.10	12.15	11.63	11.66	11.65	11.67	14.34	14.31	14.27	14.17	11.43	11.43	11.45	11.47
	3620.1	3634.5	1	99	1	0	**21.50**	**21.45**	**21.00**	**18.14**	**20.97**	**21.00**	**20.47**	**17.66**	**24.10**	**24.07**	**23.74**	**20.72**	**20.86**	**20.90**	**20.28**	**17.52**
			100	0	50	0	18.40	18.41	18.43	17.91	17.93	17.88	17.96	17.43	21.20	21.17	21.14	20.47	17.72	17.73	17.73	17.28
	3680.1	3694.5	1	99	1	0	16.46	16.47	17.00	16.71	15.99	16.00	16.50	16.25	19.49	19.60	19.49	19.06	16.24	16.25	16.80	16.45
			100	0	50	0	11.63	11.63	11.55	11.55	11.15	11.19	11.21	11.15	14.46	14.43	14.45	14.23	11.36	11.38	11.37	11.41

OUTPUT POWER FOR LTE BAND 48 (15.0MHz + 20.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 7				ANT 4				ANT 9				ANT 8			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
15MHz / 20MHz	3557.8	3574.9	1	74	1	0	16.79	16.75	17.00	16.77	16.28	16.30	16.50	16.28	19.37	19.39	19.60	19.20	16.24	16.19	16.10	16.60
			75	0	100	0	11.95	11.96	11.91	11.92	11.46	11.48	11.52	11.55	14.57	14.56	14.56	14.29	11.41	11.48	11.46	11.52
	3615.3	3632.4	1	74	1	0	**22.00**	**21.86**	**20.86**	**18.21**	**21.38**	**21.50**	**20.38**	17.41	**24.50**	**24.60**	**23.51**	**20.70**	**21.05**	**21.10**	**20.40**	**17.29**
			75	0	100	0	18.45	18.46	18.51	17.97	17.97	18.01	18.01	**17.48**	21.10	21.10	21.11	20.41	17.71	17.70	17.70	17.25
	3672.9	3690.0	1	74	1	0	16.85	16.80	16.74	17.00	16.50	16.48	16.34	16.44	19.60	19.55	19.46	19.48	16.24	16.50	16.23	16.17
			75	0	100	0	12.09	12.12	12.03	12.04	11.69	11.73	11.77	11.67	14.81	14.74	14.74	14.51	11.42	11.45	11.47	11.46

OUTPUT POWER FOR LTE BAND 48 (20.0MHz + 15.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 7				ANT 4				ANT 9				ANT 8			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz / 15MHz	3560.0	3577.1	1	99	1	0	16.90	16.80	17.00	16.85	16.26	16.14	16.37	16.50	19.51	19.41	19.60	19.34	16.26	16.15	16.36	16.21
			100	0	75	0	12.07	12.09	12.09	12.12	11.47	11.48	11.48	11.52	14.77	14.67	14.69	14.57	11.43	11.45	11.44	11.52
	3617.6	3634.7	1	99	1	0	**22.00**	**21.98**	**20.97**	**18.18**	**21.47**	**21.50**	**20.48**	**17.63**	**24.58**	**24.60**	**23.59**	**20.65**	**21.38**	**21.40**	**20.35**	**17.54**
			100	0	75	0	18.39	18.38	18.43	17.92	17.92	17.91	18.00	17.42	21.04	21.04	21.06	20.41	17.76	17.78	17.79	17.32
	3675.1	3692.2	1	99	1	0	16.45	16.46	17.00	16.67	16.01	16.01	16.50	15.96	19.08	19.10	19.60	19.24	16.26	16.28	16.80	16.47
			100	0	75	0	11.64	11.63	11.56	11.58	11.13	11.17	11.16	11.22	14.25	14.17	14.18	14.05	11.44	11.44	11.45	11.48

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OUTPUT POWER FOR LTE BAND 48 (20.0MHz + 20.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average (dBm)															
							ANT 7				ANT 4				ANT 9				ANT 8			
			Size	Offset	Size	Offset	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz / 20MHz	3560.0	3579.8	1	99	1	0	18.42	18.29	18.50	17.81	17.95	17.85	18.00	17.37	20.53	20.53	21.00	19.86	17.76	17.61	17.80	17.19
			1	0	1	99	4.84	4.78	4.97	4.79	4.22	4.21	4.37	4.20	7.01	6.96	7.43	6.83	4.01	3.95	4.35	4.30
			100	0	100	0	12.06	12.06	12.08	12.07	11.57	11.59	11.65	11.61	14.28	14.23	14.22	14.07	11.33	11.32	11.34	11.38
	3615.1	3634.9	1	99	1	0	**22.00**	**21.95**	**20.96**	**18.11**	**21.47**	**21.50**	**20.47**	**17.63**	**24.50**	**24.43**	**23.61**	**20.63**	**21.10**	**20.95**	**20.16**	**17.37**
			1	0	1	99	11.33	11.45	11.31	11.50	10.79	10.91	10.83	11.01	14.00	14.00	14.09	13.99	10.64	10.57	10.74	10.74
			100	0	100	0	18.42	18.45	18.45	17.93	17.97	18.00	18.02	17.49	21.15	21.09	21.10	20.43	17.71	17.71	17.70	17.24
	3670.2	3690.0	1	99	1	0	17.98	17.92	18.50	17.80	17.47	17.46	18.00	17.31	20.98	21.00	20.92	20.31	18.02	18.10	17.93	17.21
			1	0	1	99	4.31	4.27	4.73	4.46	3.81	3.79	4.24	3.96	7.18	7.22	7.18	7.04	4.26	4.32	4.24	4.17
			100	0	100	0	11.65	11.67	11.55	11.55	11.14	11.17	11.20	11.21	14.38	14.31	14.33	14.16	11.44	11.45	11.53	11.50

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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.

RESULTS

There is no limit required and power is the same for low, middle and high channel; therefore, only middle channel was tested. Only QPSK plots are reported to show setting parameter complies with testing method/procedure.

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LTE BAND 5

Band	Mode	RB Allocation/RB Offset	f (MHz)	99% BW (MHz)	- 26dB BW (MHz)
LTE BAND 5	5MHz + 10MHz BAND QPSK	25/0 + 50/0	836.5	13.8356	14.481
	5MHz + 10MHz BAND 16QAM			13.7847	14.434
	5MHz + 10MHz BAND 64QAM			13.8993	14.384
	10MHz + 5MHz BAND QPSK	50/0 + 25/0		13.8538	14.502
	10MHz + 5MHz BAND 16QAM			13.8733	14.462
	10MHz + 5MHz BAND 64QAM			13.8698	14.431
	10MHz + 10MHz BAND QPSK	50/0 + 50/0		18.7947	19.755
	10MHz + 10MHz BAND 16QAM			18.7645	19.785
	10MHz + 10MHz BAND 64QAM			18.6787	19.866

LTE BAND 7

Band	Mode	RB Allocation/RB Offset	f (MHz)	99% BW (MHz)	- 26dB BW (MHz)
LTE BAND 7	10MHz + 20MHz BAND QPSK	50/0 + 100/0	2535	28.0138	30.178
	10MHz + 20MHz BAND 16QAM			27.9742	30.055
	10MHz + 20MHz BAND 64QAM			27.9747	30.066
	20MHz + 10MHz BAND QPSK	100/0 + 50/0		28.0307	30.340
	20MHz + 10MHz BAND 16QAM			27.9328	30.027
	20MHz + 10MHz BAND 64QAM			27.9865	29.958
	15MHz + 15MHz BAND QPSK	75/0 + 75/0		28.5590	30.777
	15MHz + 15MHz BAND 16QAM			28.5273	30.729
	15MHz + 15MHz BAND 64QAM			28.5803	30.694
	15MHz + 20MHz BAND QPSK	75/0 + 100/0		32.7298	34.972
	15MHz + 20MHz BAND 16QAM			32.7529	35.072
	15MHz + 20MHz BAND 64QAM			32.7891	35.069
	20MHz + 15MHz BAND QPSK	100/0 + 75/0		32.7680	34.975
	20MHz + 15MHz BAND 16QAM			32.7514	35.086
	20MHz + 15MHz BAND 64QAM			32.7702	35.094
	20MHz + 20MHz BAND QPSK	100/0 + 100/0		37.6296	39.903
	20MHz + 20MHz BAND 16QAM			37.6349	40.098
	20MHz + 20MHz BAND 64QAM			37.5818	40.071

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LTE BAND 41

Band	Mode	RB Allocation/RB Offset	f (MHz)	99% BW (MHz)	- 26dB BW (MHz)
LTE BAND 41 (FCC)	5MHz + 20MHz BAND QPSK	25/0 + 100/0	2593	22.8166	23.831
	5MHz + 20MHz BAND 16QAM			22.8261	23.952
	5MHz + 20MHz BAND 64QAM			22.7966	23.762
	20MHz + 5MHz BAND QPSK	100/0 + 25/0		22.8178	23.819
	20MHz + 5MHz BAND 16QAM			22.8257	23.717
	20MHz + 5MHz BAND 64QAM			22.8160	23.852
	10MHz + 20MHz BAND QPSK	50/0 + 100/0		27.6968	28.898
	10MHz + 20MHz BAND 16QAM			27.6960	28.961
	10MHz + 20MHz BAND 64QAM			27.6583	28.689
	20MHz + 10MHz BAND QPSK	100/0 + 50/0		27.6072	28.929
	20MHz + 10MHz BAND 16QAM			27.6512	28.871
	20MHz + 10MHz BAND 64QAM			27.7284	28.794
	15MHz + 15MHz BAND QPSK	75/0 + 75/0		28.2381	29.678
	15MHz + 15MHz BAND 16QAM			28.2409	29.592
	15MHz + 15MHz BAND 64QAM			28.2577	29.520
	15MHz + 20MHz BAND QPSK	75/0 + 100/0		32.5316	33.687
	15MHz + 20MHz BAND 16QAM			32.5551	33.667
	15MHz + 20MHz BAND 64QAM			32.5476	33.740
	20MHz + 15MHz BAND QPSK	100/0 + 75/0		32.5751	33.768
	20MHz + 15MHz BAND 16QAM			32.5425	34.120
	20MHz + 15MHz BAND 64QAM			32.7010	33.808
	20MHz + 20MHz BAND QPSK	100/0 + 100/0		37.3774	38.989
	20MHz + 20MHz BAND 16QAM			37.3473	38.935
	20MHz + 20MHz BAND 64QAM			37.3672	38.997

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LTE BAND 48

Band	Mode	RB Allocation/RB Offset	f (MHz)	99% BW (MHz)	- 26dB BW (MHz)
LTE BAND 48 (FCC)	5MHz + 20MHz BAND QPSK	25/0 + 100/0	3625	23.2427	24.894
	5MHz + 20MHz BAND 16QAM			23.2917	25.048
	5MHz + 20MHz BAND 64QAM			23.3005	25.205
	20MHz + 5MHz BAND QPSK	100/0 + 25/0		23.2645	24.917
	20MHz + 5MHz BAND 16QAM			23.2624	24.922
	20MHz + 5MHz BAND 64QAM			23.2973	24.992
	10MHz + 20MHz BAND QPSK	50/0 + 100/0		27.9925	29.840
	10MHz + 20MHz BAND 16QAM			27.9205	30.019
	10MHz + 20MHz BAND 64QAM			28.0390	29.906
	20MHz + 10MHz BAND QPSK	100/0 + 50/0		28.0749	30.196
	20MHz + 10MHz BAND 16QAM			28.0267	30.007
	20MHz + 10MHz BAND 64QAM			28.0150	29.856
	15MHz + 20MHz BAND QPSK	75/0 + 100/0		32.8078	34.992
	15MHz + 20MHz BAND 16QAM			32.8527	35.115
	15MHz + 20MHz BAND 64QAM			32.8298	34.987
	20MHz + 15MHz BAND QPSK	100/0 + 75/0		32.7145	34.890
	20MHz + 15MHz BAND 16QAM			32.7090	34.953
	20MHz + 15MHz BAND 64QAM			32.8139	34.843
	20MHz + 20MHz BAND QPSK	100/0 + 100/0		37.6861	40.006
	20MHz + 20MHz BAND 16QAM			37.6479	39.903
	20MHz + 20MHz BAND 64QAM			37.6903	39.904

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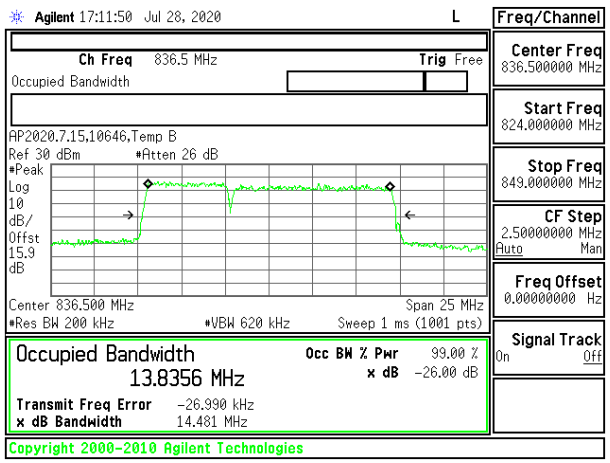
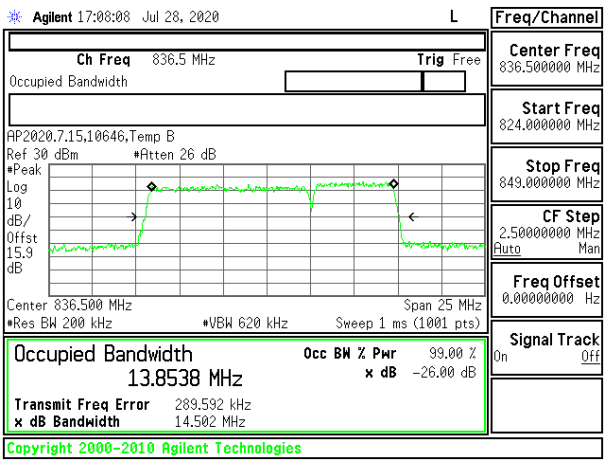
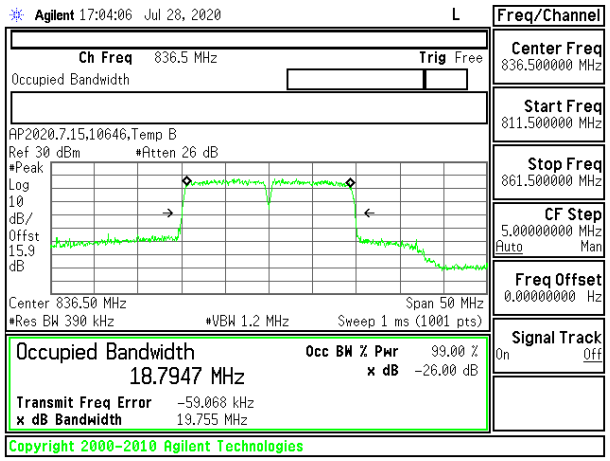
8.1.1. LTE BAND 5



LTE B5 5MHz + 10MHz QPSK RB25-0 + RB50-0



LTE B5 10MHz + 5MHz QPSK RB50-0 + RB25-0



LTE B5 10MHz + 10MHz QPSK RB50-0 + RB50-0

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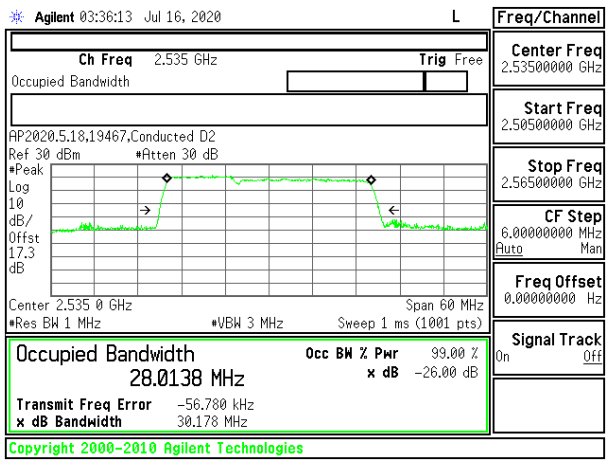
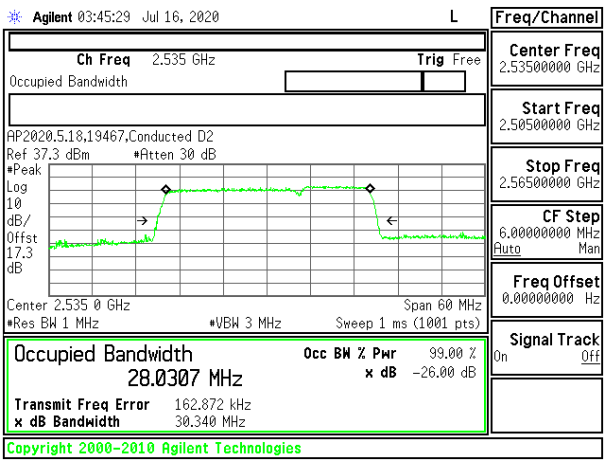
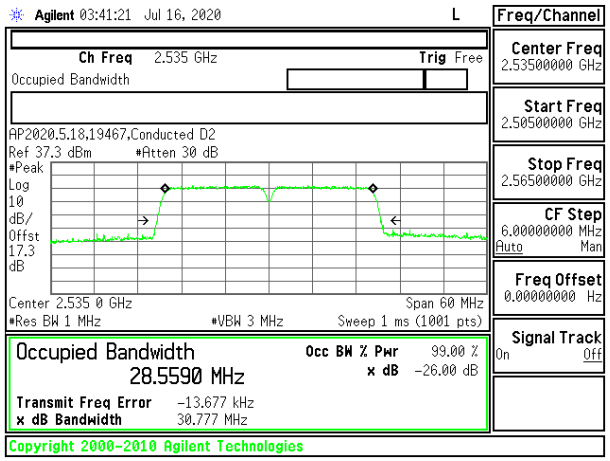
8.1.2. LTE BAND 7



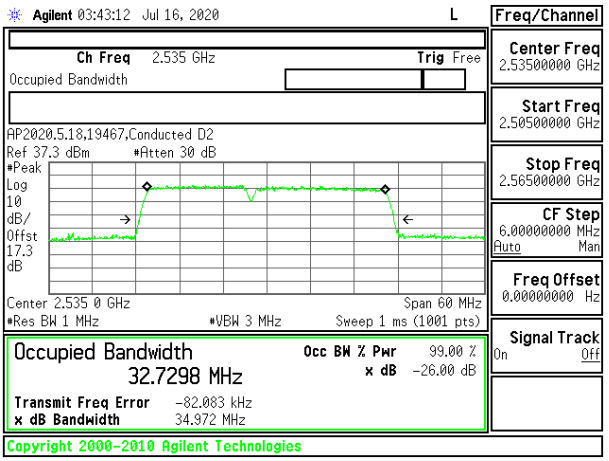
LTE B7 10MHz + 20MHz QPSK RB50-0 + RB100-0



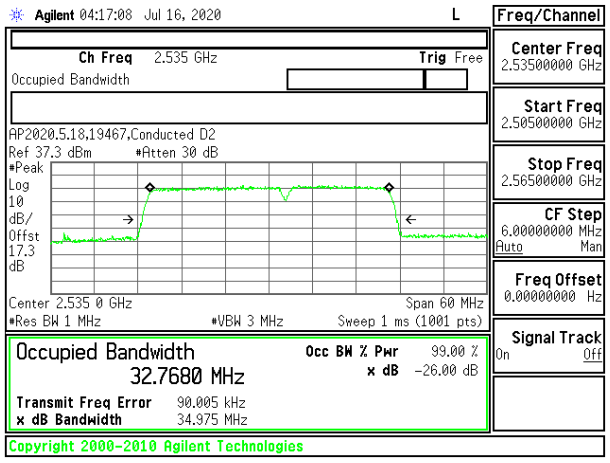
LTE B7 20MHz + 10MHz QPSK RB100-0 + RB50-0



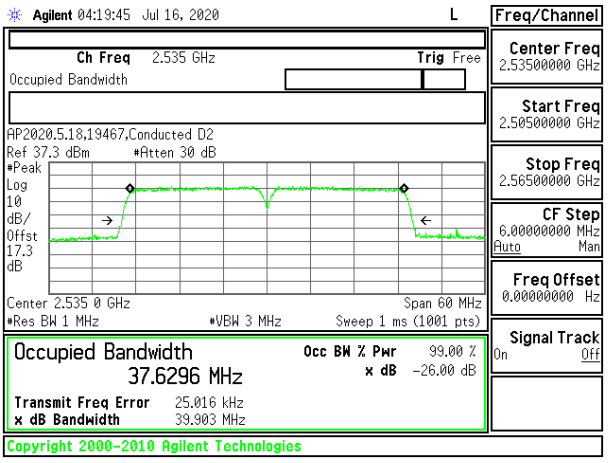
LTE B7 15MHz + 15MHz QPSK RB75-0 + RB75-0



LTE B7 15MHz + 20MHz QPSK RB75-0 + RB100-0



LTE B7 20MHz + 15MHz QPSK RB100-0 + RB75-0



LTE B7 20MHz + 20MHz QPSK RB100-0 + RB100-0

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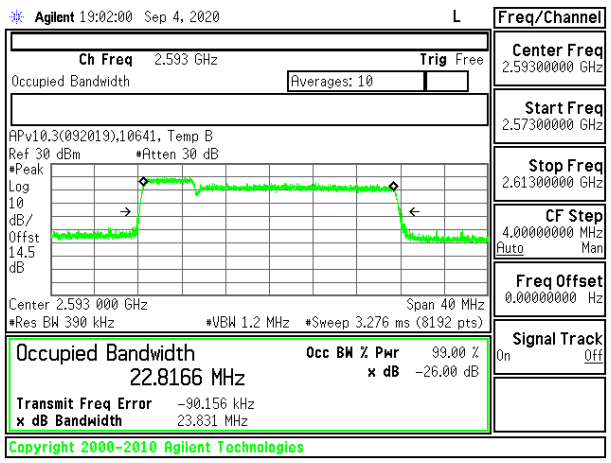
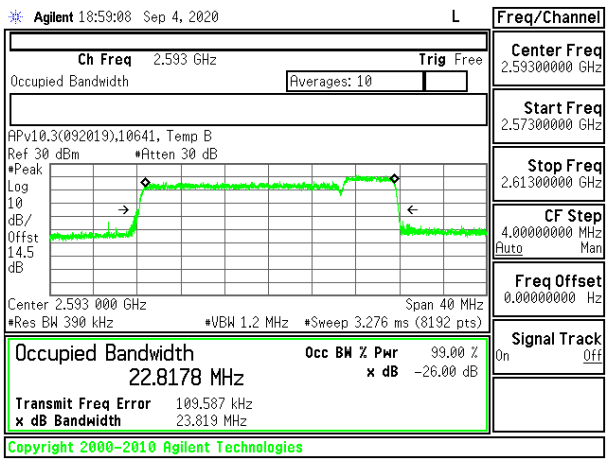
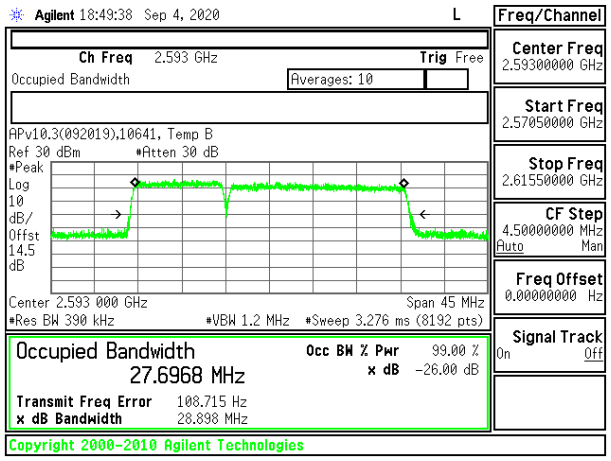
8.1.3. LTE BAND 41



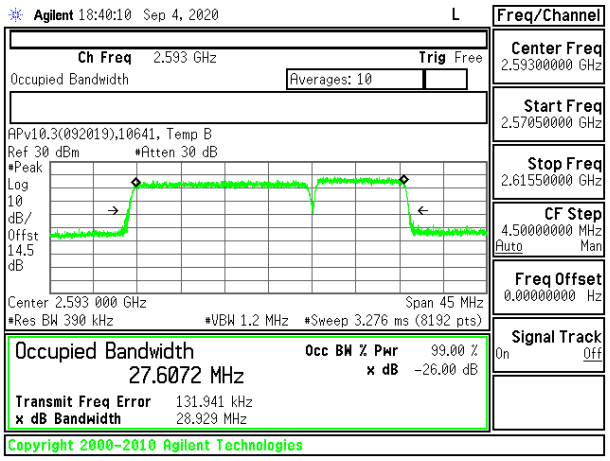
LTE B41 5MHz + 20MHz QPSK RB25-0 + RB100-0



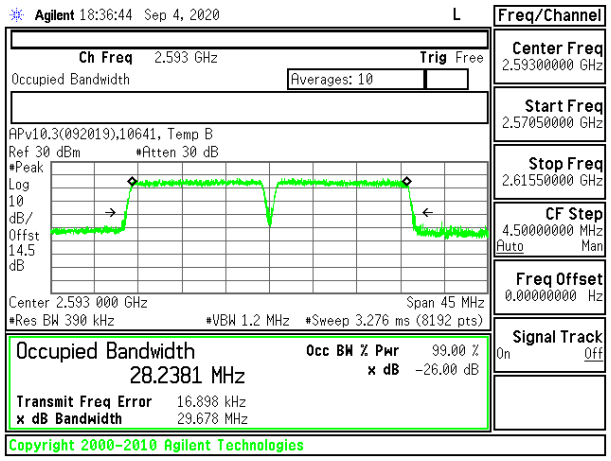
LTE B41 20MHz + 5MHz QPSK RB100-0 + RB25-0



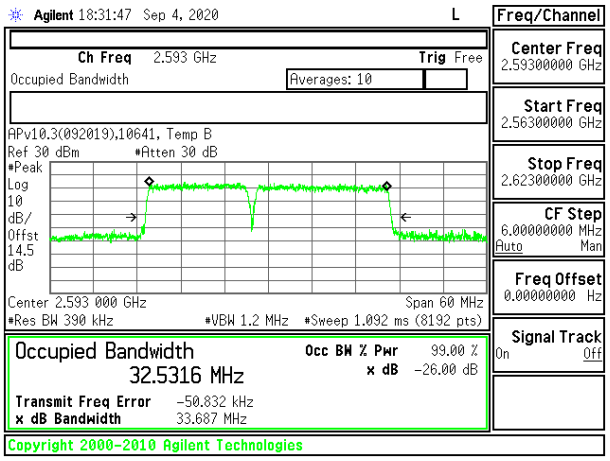
LTE B41 10MHz + 20MHz QPSK RB50-0 + RB100-0



LTE B41 20MHz + 10MHz QPSK RB100-0 + RB50-0



LTE B41 15MHz + 15MHz QPSK RB75-0 + RB75-0



LTE B41 15MHz + 20MHz QPSK RB75-0 + RB100-0

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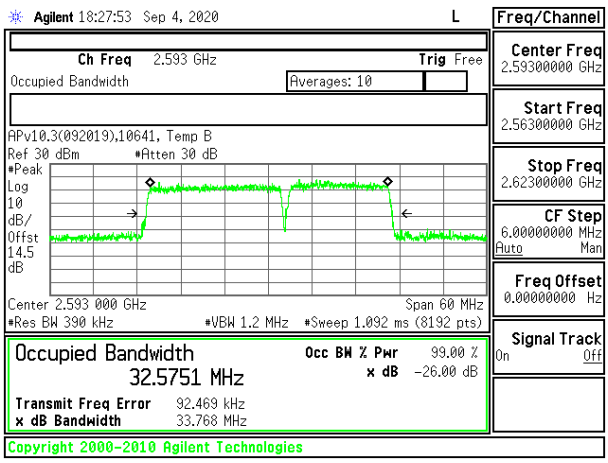
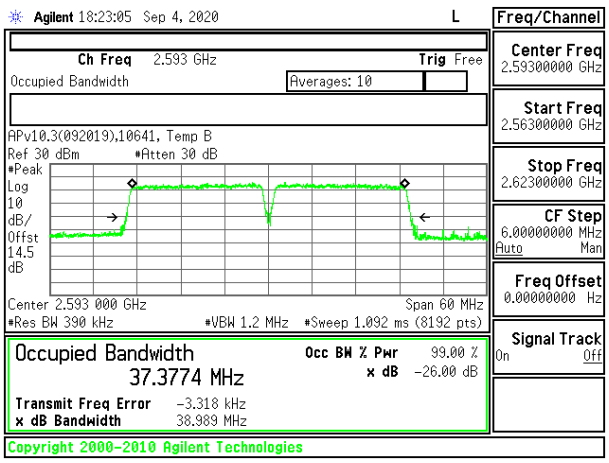


LTE B41 20MHz + 15MHz QPSK RB100-0 + RB75-0



LTE B41 20MHz + 20MHz QPSK RB100-0 + RB100-0

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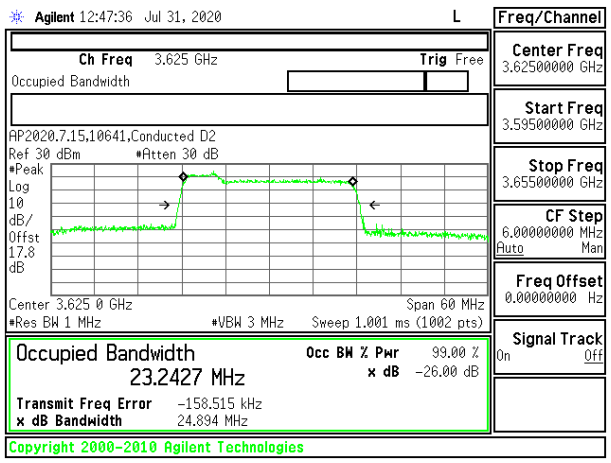
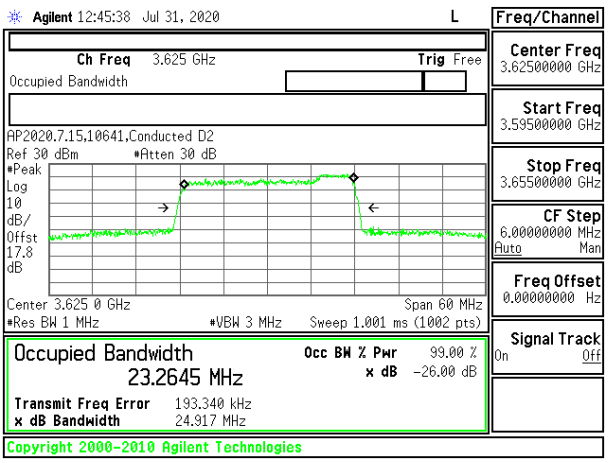
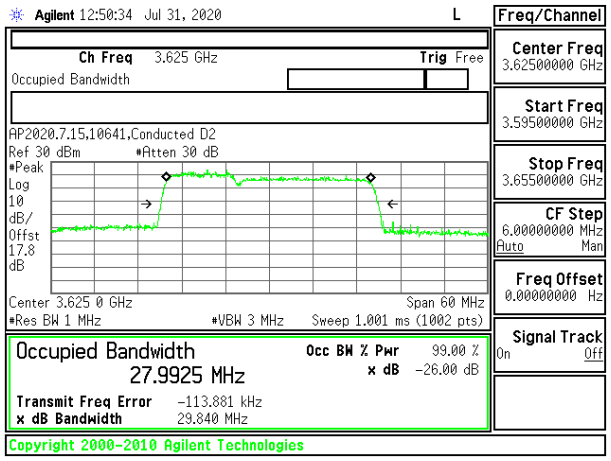
8.1.4. LTE BAND 48



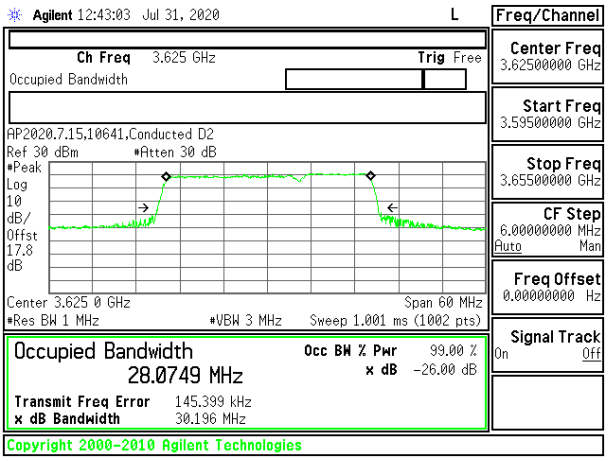
LTE B48 5MHz + 20MHz QPSK RB25-0 + RB100-0



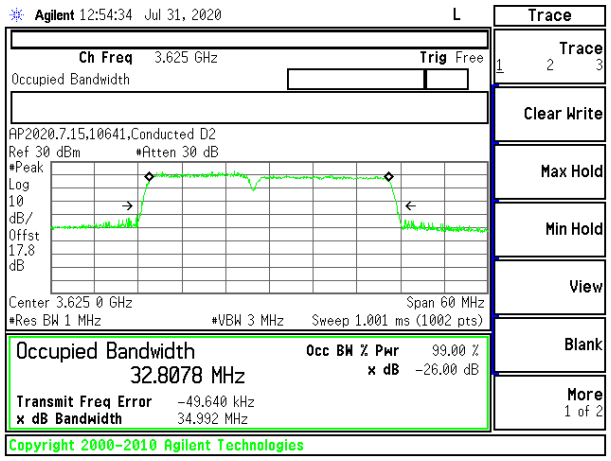
LTE B48 20MHz + 5MHz QPSK RB100-0 + RB25-0



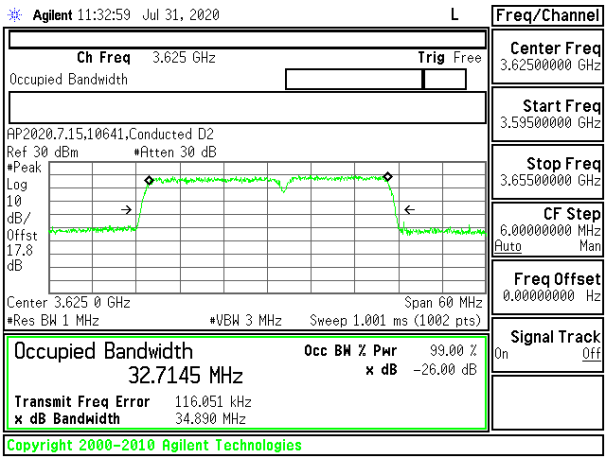
LTE B48 10MHz + 20MHz QPSK RB50-0 + RB100-0



LTE B48 20MHz + 10MHz QPSK RB100-0 + RB50-0



LTE B48 15MHz + 20MHz QPSK RB75-0 + RB100-0



LTE B48 20MHz + 15MHz QPSK RB100-0 + RB75-0

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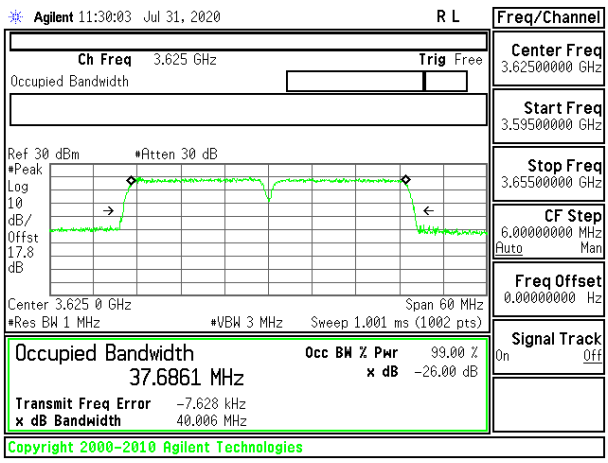

LTE B48 20MHz + 20MHz QPSK RB100-0 + RB100-0

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8.2. BAND EDGE AND EMISSION MASK

TEST PROCEDURE

The transmitter output was connected to a R&S CMW500 Test 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:

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

TEST PROCEDURE FOR FCC PART 27

(m)(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

TEST PROCEDURE FOR FCC PART 96

(3)Measurement procedure.
(i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full reference bandwidth (i.e.,1 MHz or 1 percent of emission bandwidth, as specified). The fundamental emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(ii) When measuring unwanted emissions to demonstrate compliance with the limits, the CBSD and End User Device nominal carrier frequency/channel shall be adjusted as close to the licensee's authorized frequency block edges, both upper and lower, as the design permits.

(iii) Compliance with emission limits shall be demonstrated using either average (RMS)-detected or peak-detected power measurement techniques.

RESULTS

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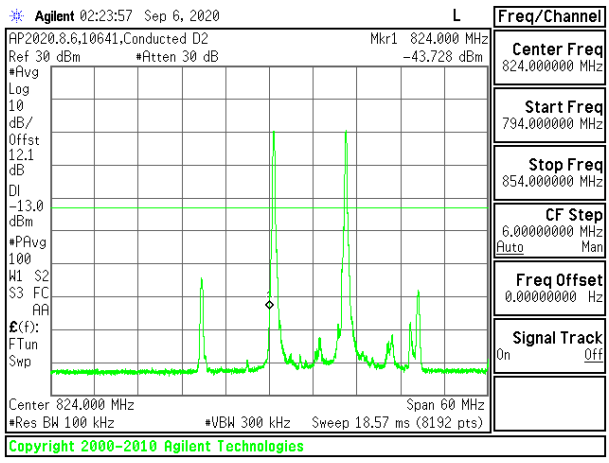
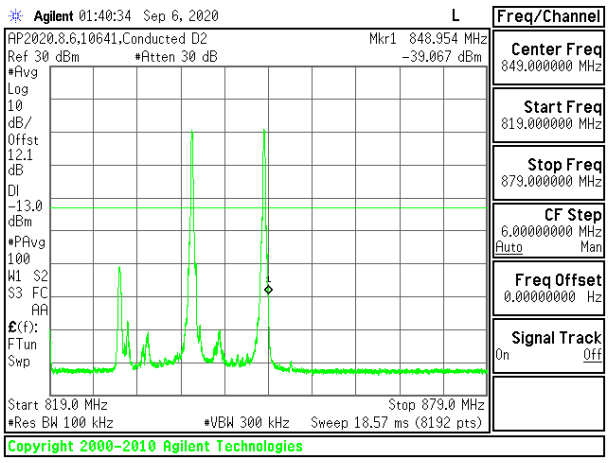
8.2.1. LTE BAND 5

LIMITS

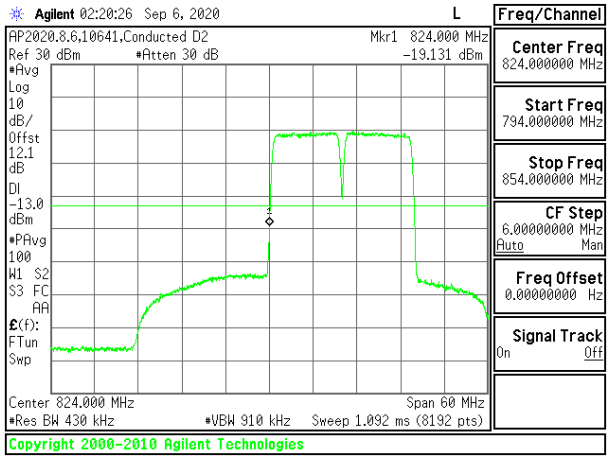
FCC: §22.917
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.



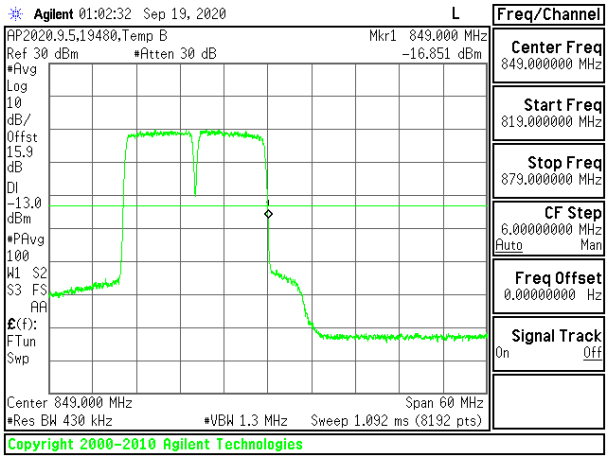
LTE B5 10MHz + 10MHz QPSK Low Ch RB1-0 + RB1-0



LTE B5 10MHz + 10MHz QPSK High Ch RB1-49 + RB1-49



LTE B5 10MHz + 10MHz QPSK Low Ch RB50-0 + RB50-0



LTE B5 10MHz + 10MHz QPSK High Ch RB50-0 + RB50-0

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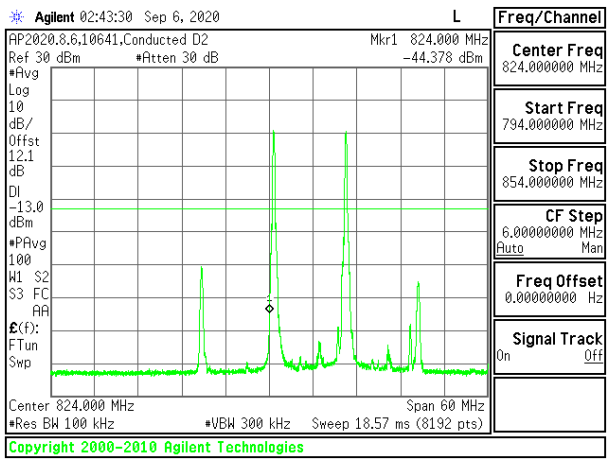
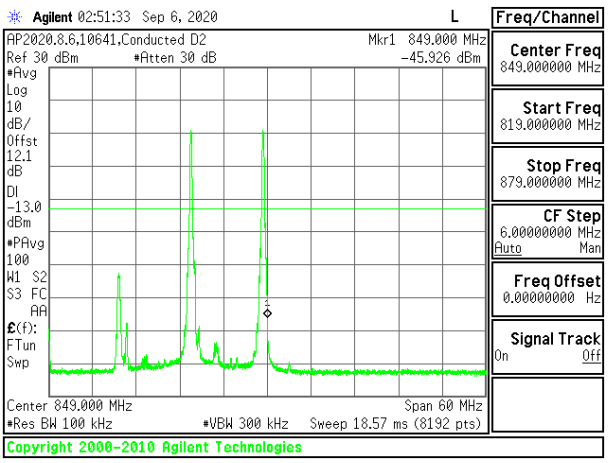
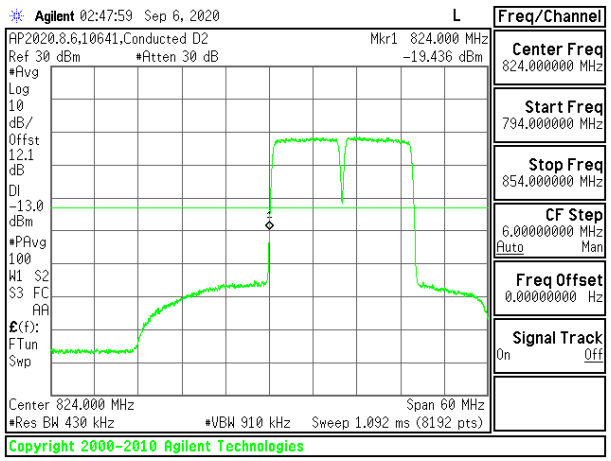


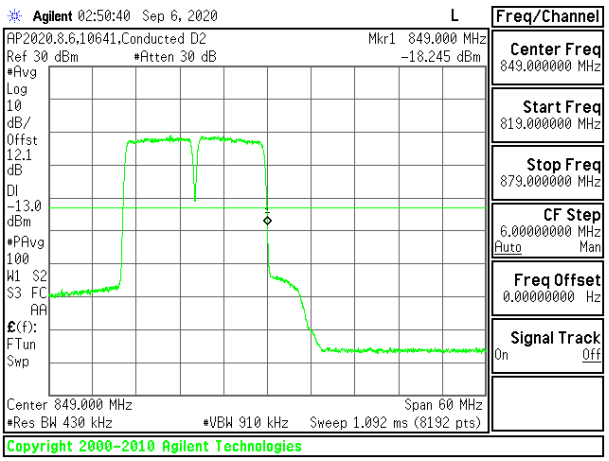
LTE B5 10MHz + 10MHz 16QAM Low Ch RB1-0 + RB1-0



LTE B5 10MHz + 10MHz 16QAM High Ch RB1-49 + RB1-49



LTE B5 10MHz + 10MHz 16QAM Low Ch RB50-0 + RB50-0



LTE B5 10MHz + 10MHz 16QAM High Ch RB50-0 + RB50-0

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8.2.2. LTE BAND 7

LIMITS

FCC: §27.53(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.

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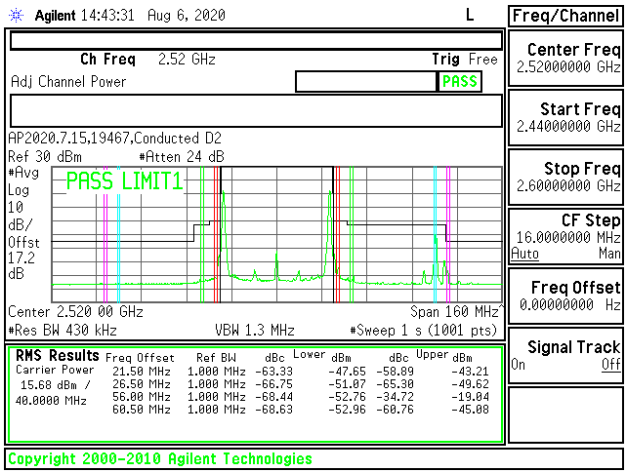
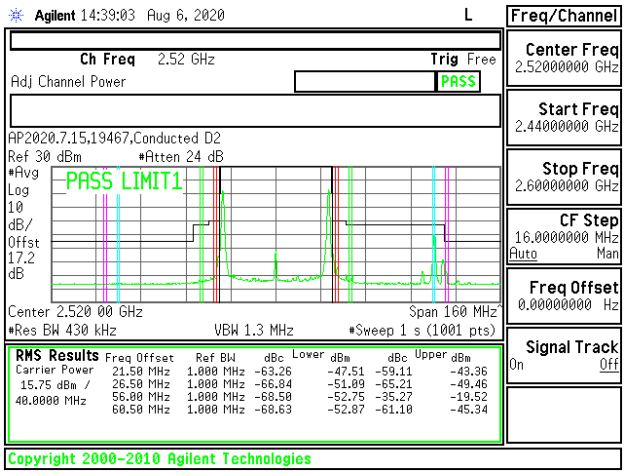
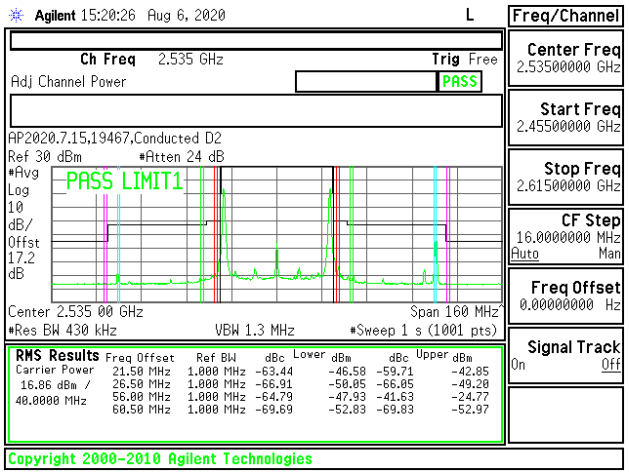


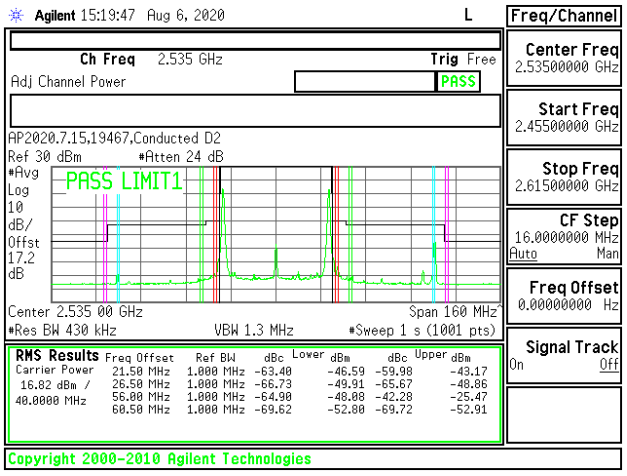
LTE B7 20MHz + 20MHz QPSK Low Ch RB1-0 + RB1-99



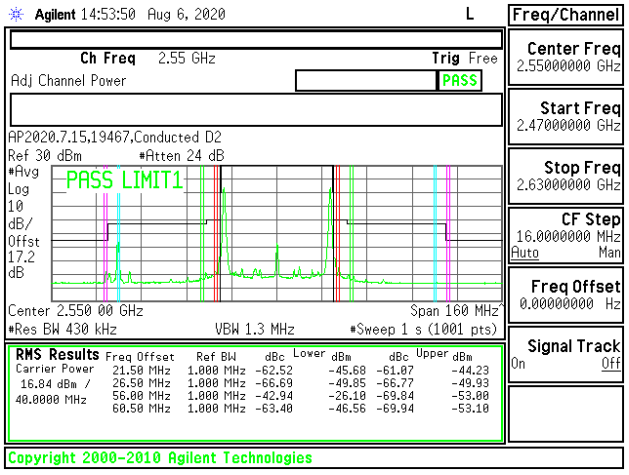
LTE B7 20MHz + 20MHz 16QAM Low Ch RB1-0 + RB1-99



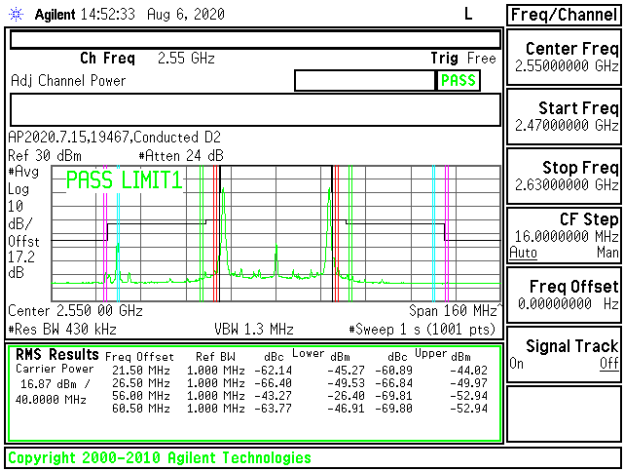
LTE B7 20MHz + 20MHz QPSK Mid Ch RB1-0 + RB1-99



LTE B7 20MHz + 20MHz 16QAM Mid Ch RB1-0 + RB1-99



LTE B7 20MHz + 20MHz QPSK High Ch RB1-0 + RB1-99



LTE B7 20MHz + 20MHz 16QAM High Ch RB1-0 + RB1-99

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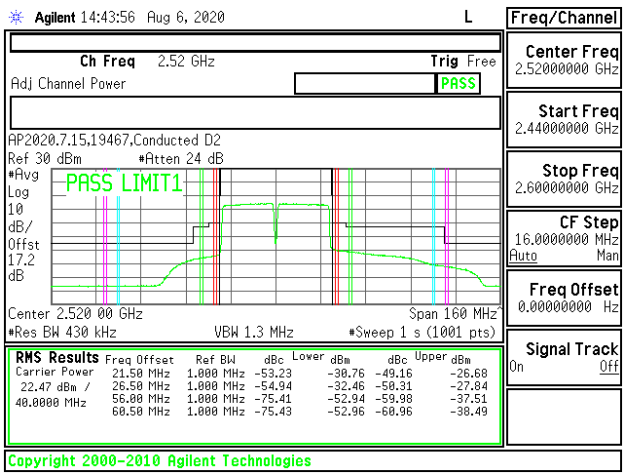
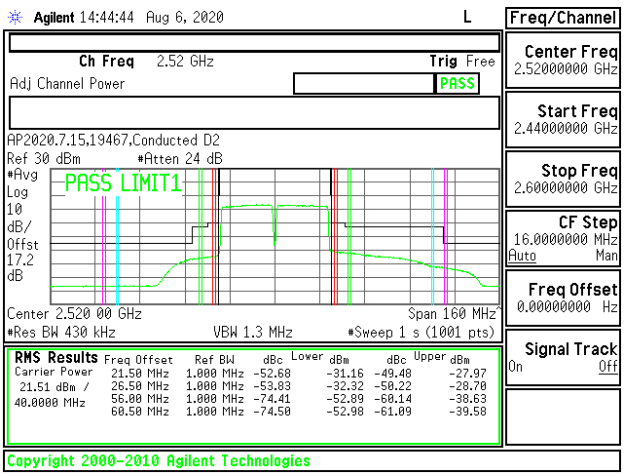
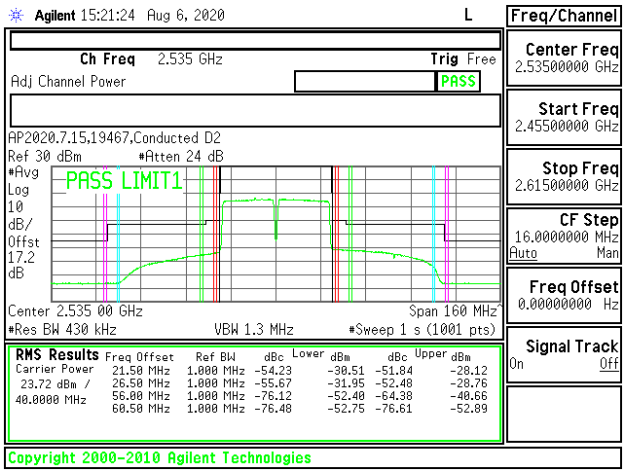


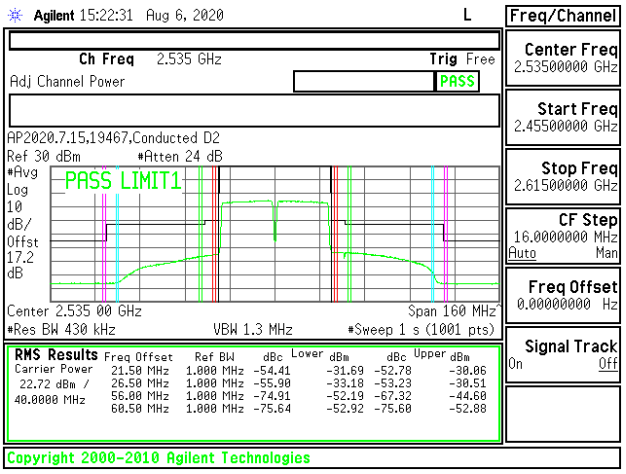
LTE B7 20MHz + 20MHz QPSK Low Ch RB100-0 + RB100-0



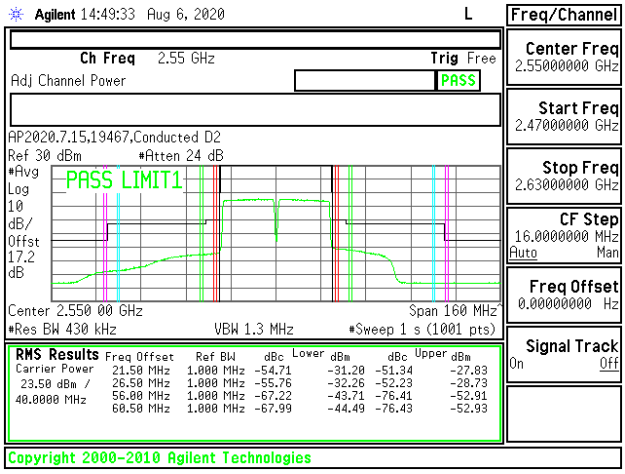
LTE B7 20MHz + 20MHz 16QAM Low Ch RB100-0 + RB100-0



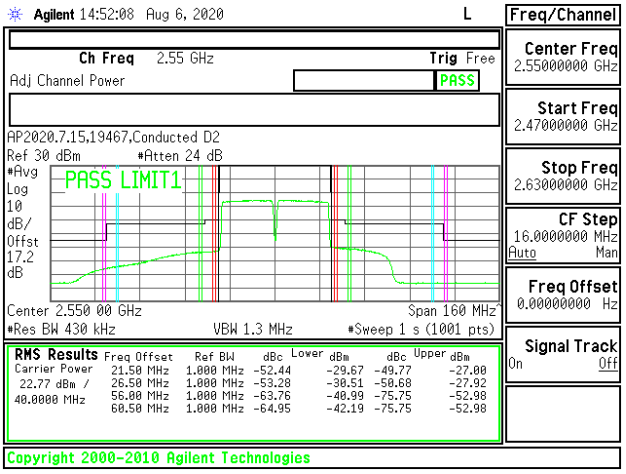
LTE B7 20MHz + 20MHz QPSK Mid Ch RB100-0 + RB100-0



LTE B7 20MHz + 20MHz 16QAM Mid Ch RB100-0 + RB100-0



LTE B7 20MHz + 20MHz QPSK High Ch RB100-0 + RB100-0



LTE B7 20MHz + 20MHz 16QAM High Ch RB100-0 + RB100-0

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8.2.3. LTE BAND 41

LIMITS

FCC: §27.53(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.

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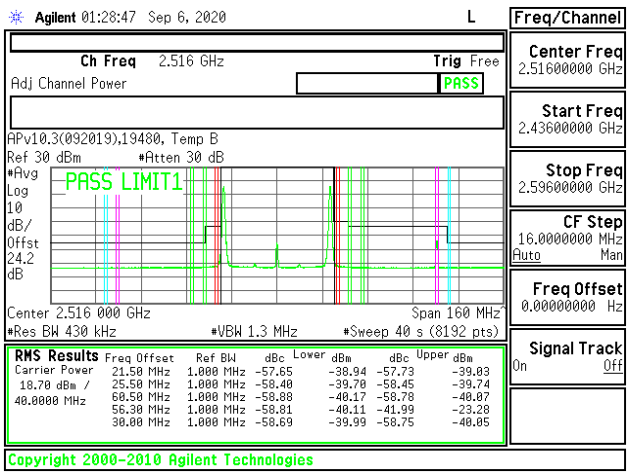
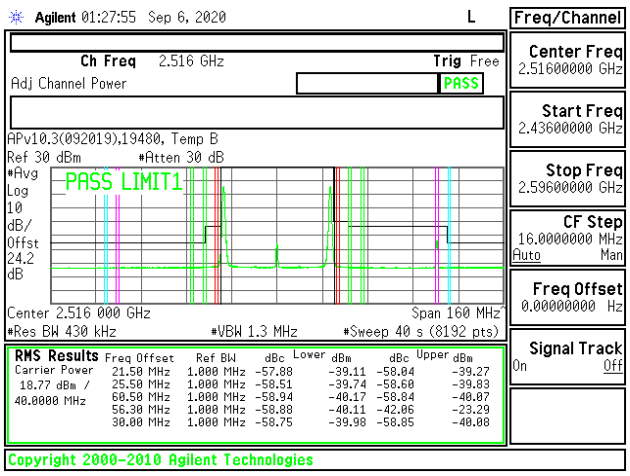
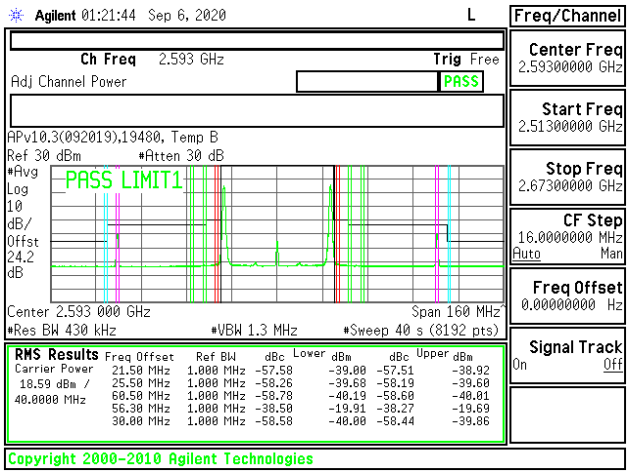


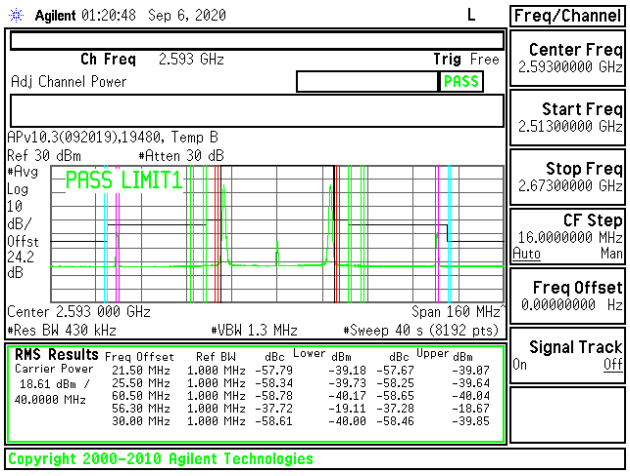
LTE B41 20MHz + 20MHz QPSK Low Ch RB1-0 + RB1-99



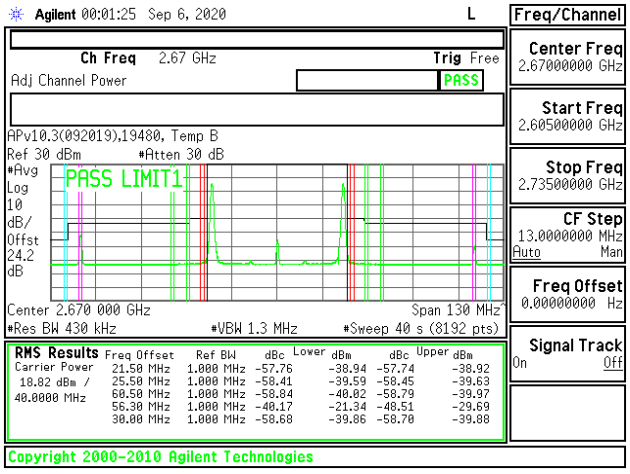
LTE B41 20MHz + 20MHz 16QAM Low Ch RB1-0 + RB1-99



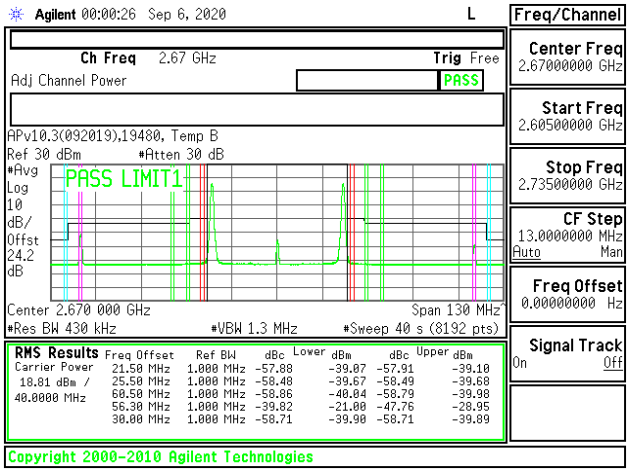
LTE B41 20MHz + 20MHz QPSK Mid Ch RB1-0 + RB1-99



LTE B41 20MHz + 20MHz 16QAM Mid Ch RB1-0 + RB1-99



LTE B41 20MHz + 20MHz QPSK High Ch RB1-0 + RB1-99



LTE B41 20MHz + 20MHz 16QAM High Ch RB1-0 + RB1-99

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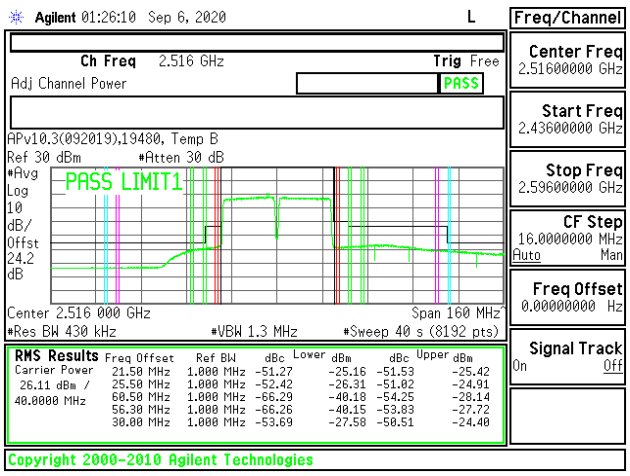
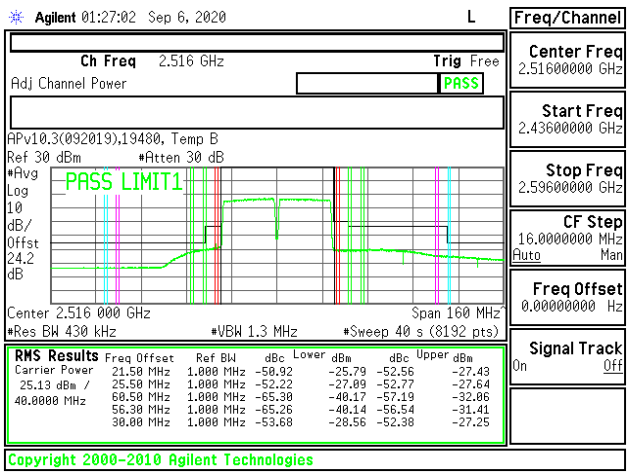
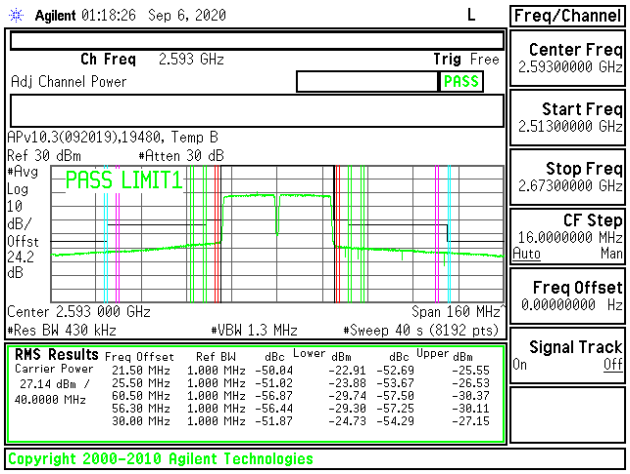


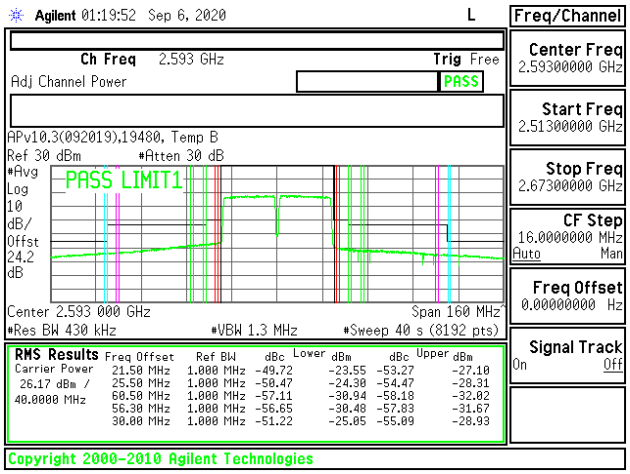
LTE B41 20MHz + 20MHz QPSK Low Ch RB100-0 + RB100-0



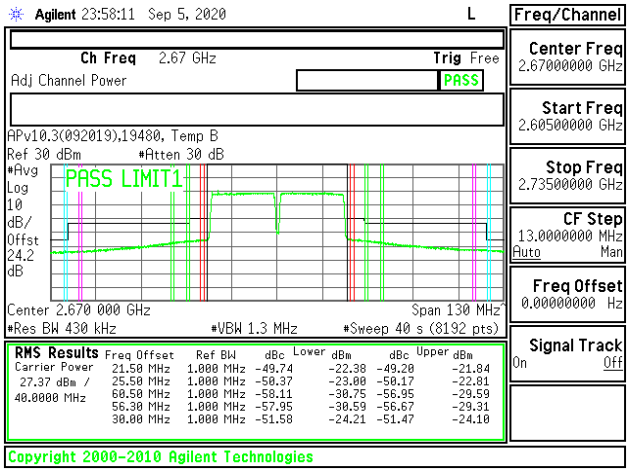
LTE B41 20MHz + 20MHz 16QAM Low Ch RB100-0 + RB100-0



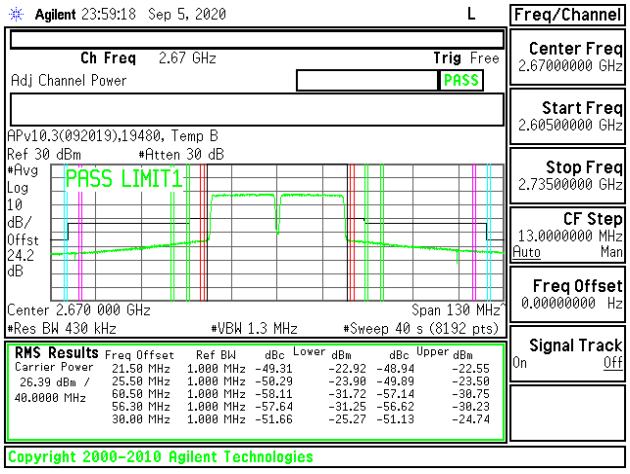
LTE B41 20MHz + 20MHz QPSK Mid Ch RB100-0 + RB100-0



LTE B41 20MHz + 20MHz 16QAM Mid Ch RB100-0 + RB100-0



LTE B41 20MHz + 20MHz QPSK High Ch RB100-0 + RB100-0



LTE B41 20MHz + 20MHz 16QAM High Ch RB100-0 + RB100-0

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8.2.4. LTE BAND 48

LIMITS

FCC: §96.41
(e) 3.5 GHz Emissions and Interference Limits—
(1) General protection levels
(ii) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed −13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed −25 dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.
licensees.

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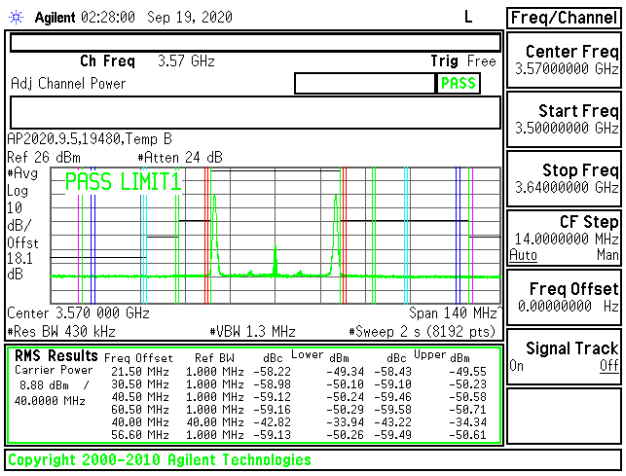
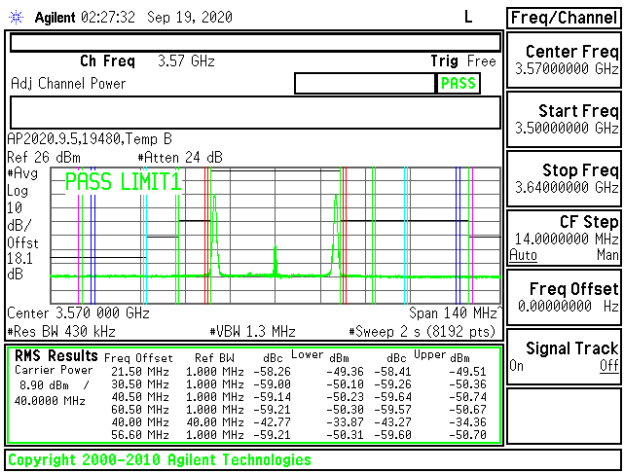
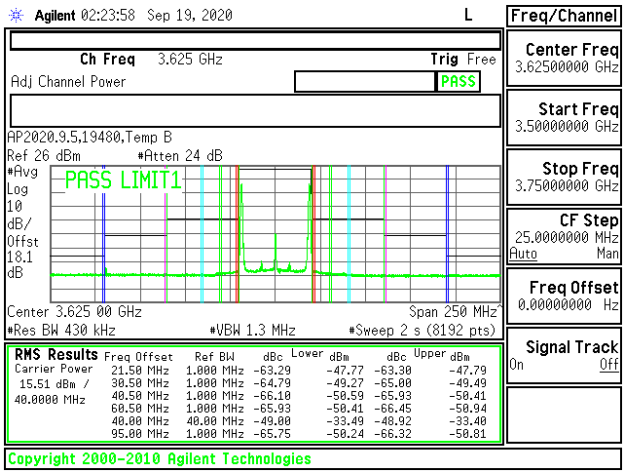


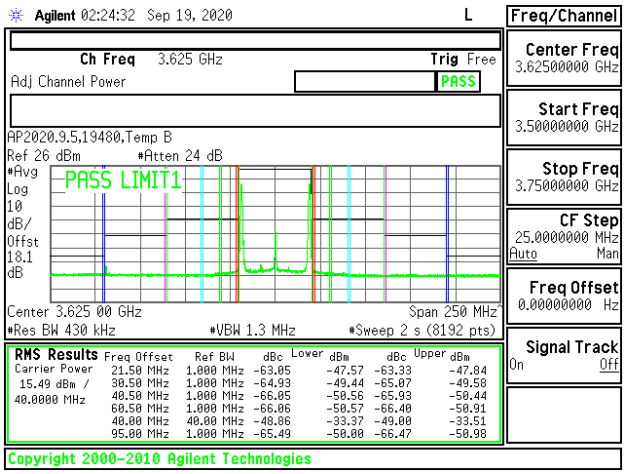
LTE B48 20MHz + 20MHz QPSK Low Ch RB1-0 + RB1-99



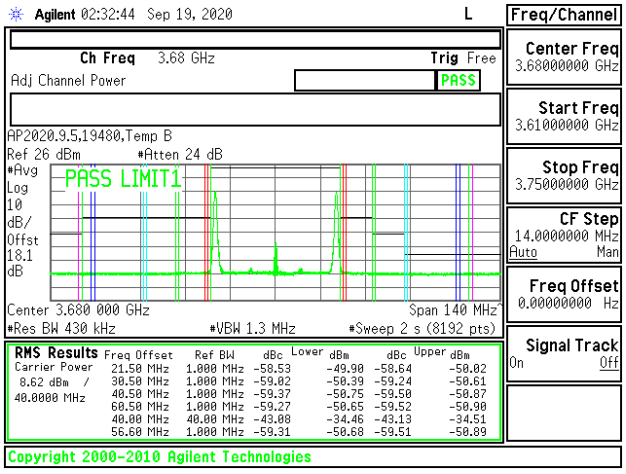
LTE B48 20MHz + 20MHz 16QAM Low Ch RB1-0 + RB1-99



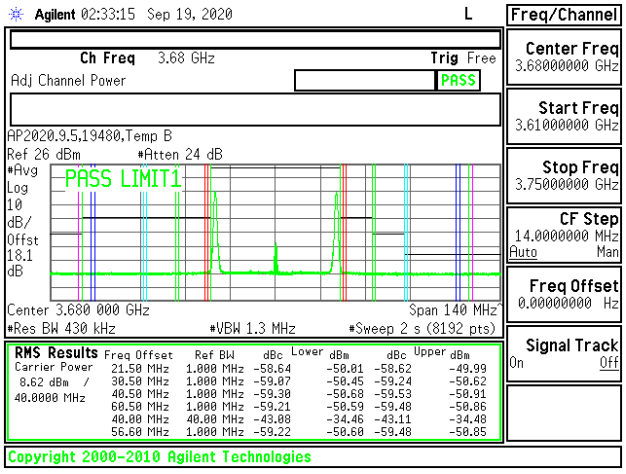
LTE B48 20MHz + 20MHz QPSK Mid Ch RB1-0 + RB1-99



LTE B48 20MHz + 20MHz 16QAM Mid Ch RB1-0 + RB1-99



LTE B48 20MHz + 20MHz QPSK High Ch RB1-0 + RB1-99



LTE B48 20MHz + 20MHz 16QAM High Ch RB1-0 + RB1-99

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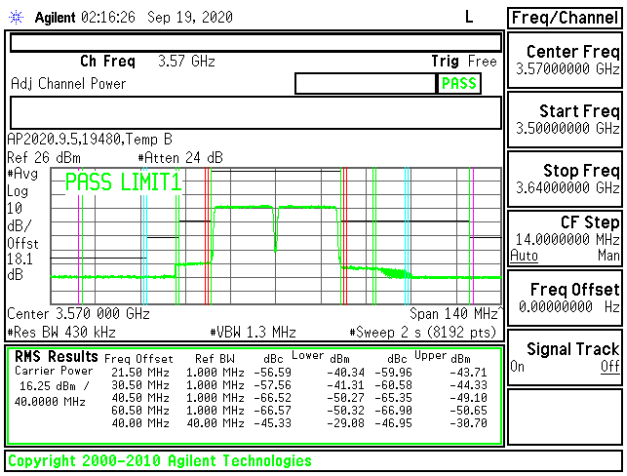
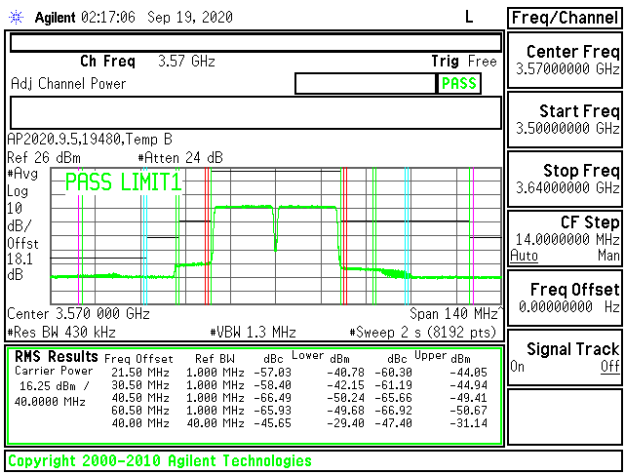
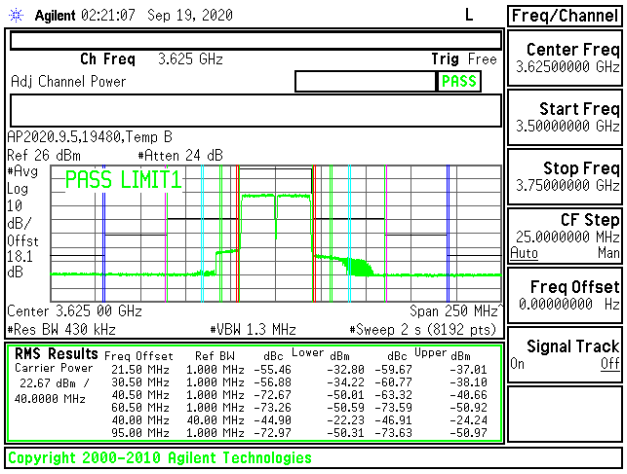


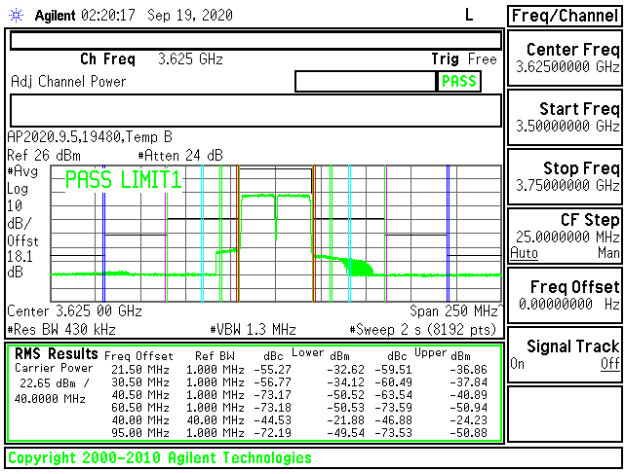
LTE B48 20MHz + 20MHz QPSK Low Ch RB100-0 + RB100-0



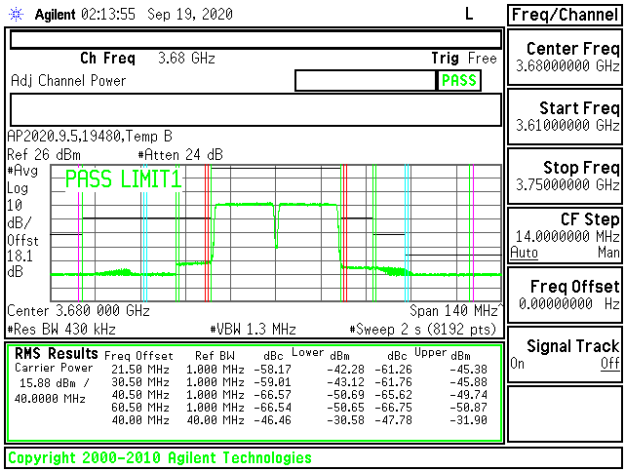
LTE B48 20MHz + 20MHz 16QAM Low Ch RB100-0 + RB100-0



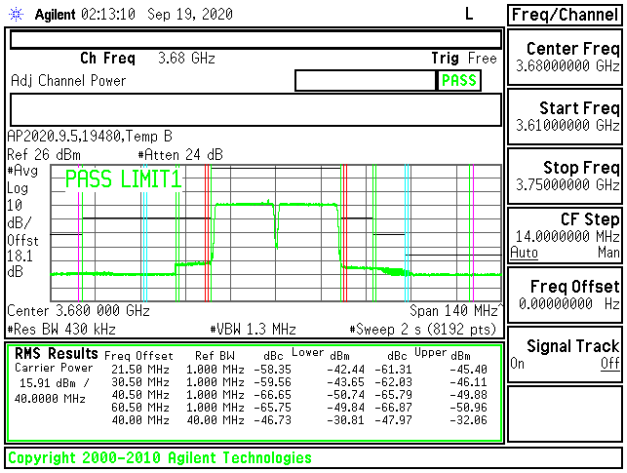
LTE B48 20MHz + 20MHz QPSK Mid Ch RB100-0 + RB100-0



LTE B48 20MHz + 20MHz 16QAM Mid Ch RB100-0 + RB100-0



LTE B48 20MHz + 20MHz QPSK High Ch RB100-0 + RB100-0



LTE B48 20MHz + 20MHz 16QAM High Ch RB100-0 + RB100-0

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8.3. OUT OF BAND EMISSIONS

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 to band 5 and -25 dBm to band 7 and 41
- 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)

RESULTS

Both maximum + maximum bandwidth combinations of QPSK and 16QAM modes are tested, QPSK results are reported as worst case.

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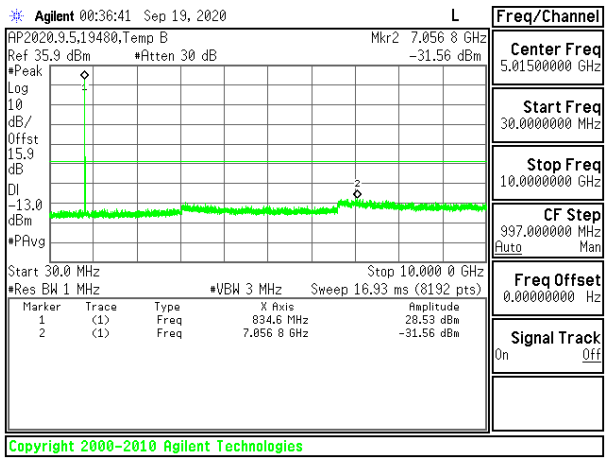
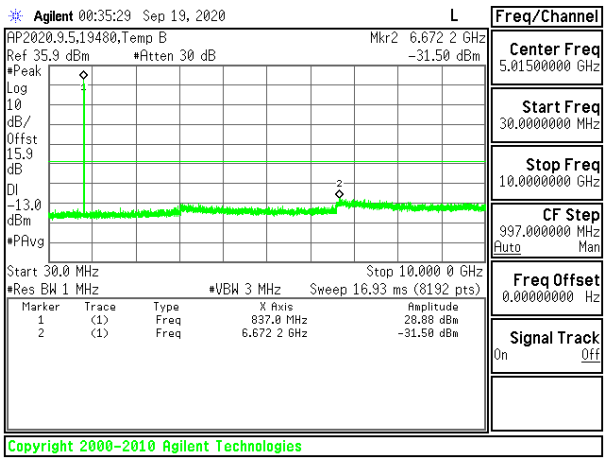
8.3.1. LTE BAND 5

LIMITS

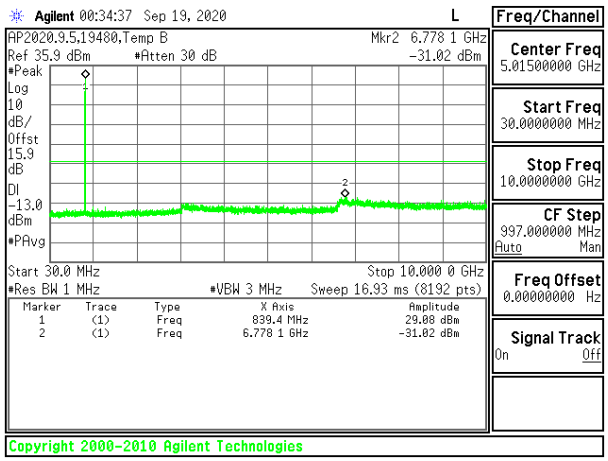
FCC: §22.917
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.



LTE B5 10MHz + 10MHz QPSK Low Ch RB1-49 + RB1-0



LTE B5 10MHz + 10MHz QPSK Middle Ch RB1-49 + RB1-0



LTE B5 10MHz + 10MHz QPSK High Ch RB1-49 + RB1-0

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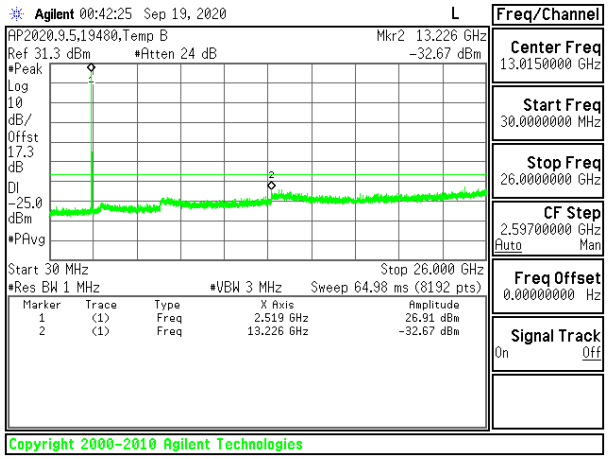
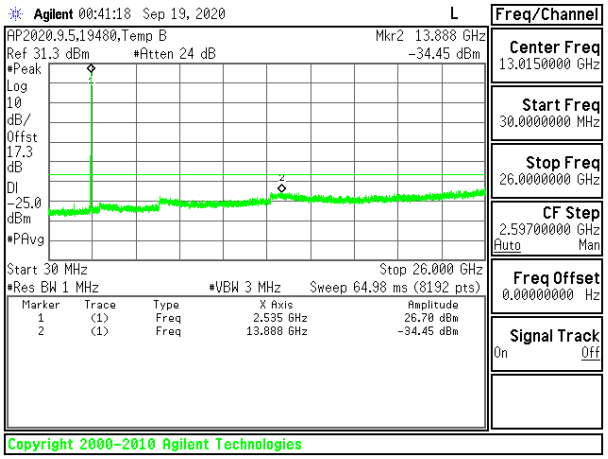
8.3.2. LTE BAND 7

LIMITS

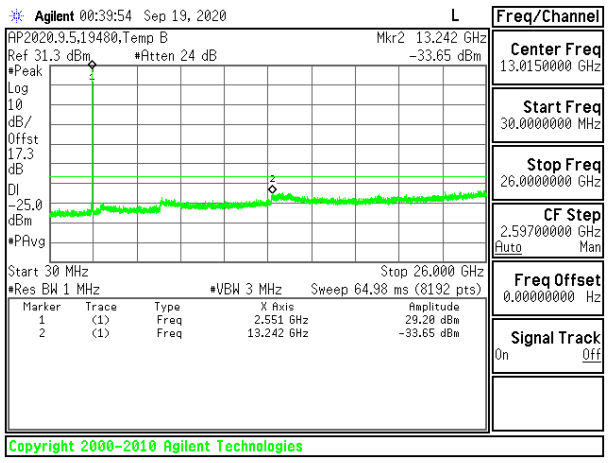
FCC: §27.53 (m)
The minimum permissible attenuation level of any spurious emissions is 55 + 10 log (P) dB where transmitting power (P) in Watts.



LTE B7 20MHz + 20MHz QPSK Low Ch RB1-99 + RB1-0



LTE B7 20MHz + 20MHz QPSK Middle Ch RB1-99 + RB1-0



LTE B7 20MHz + 20MHz QPSK High Ch RB1-99 + RB1-0

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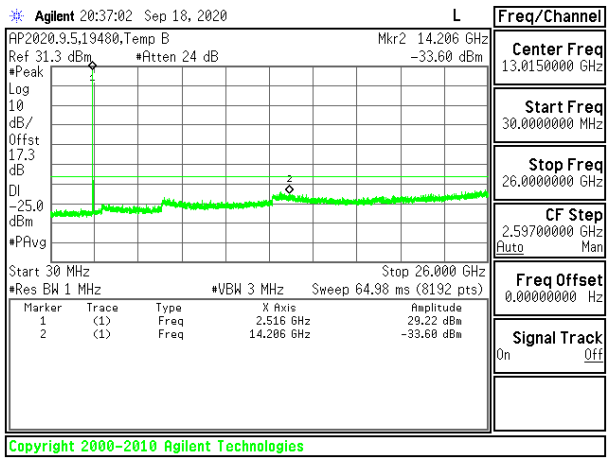
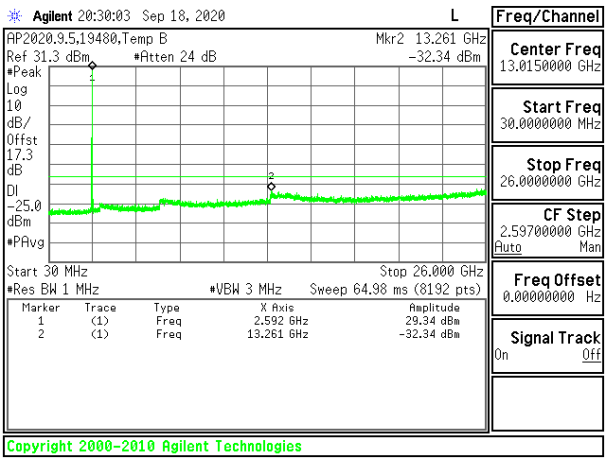
8.3.3. LTE BAND 41

LIMITS

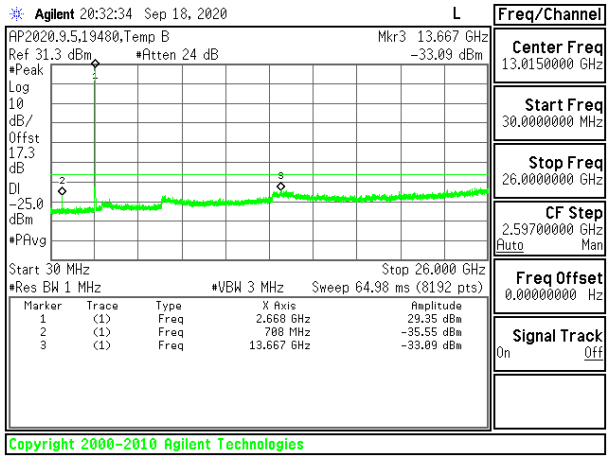
FCC: §27.53 (m)
The minimum permissible attenuation level of any spurious emissions is 55 + 10 log (P) dB where transmitting power (P) in Watts.



LTE B41 20MHz + 20MHz QPSK Low Ch RB1-99 + RB1-0



LTE B41 20MHz + 20MHz QPSK Middle Ch RB1-99 + RB1-0



LTE B41 20MHz + 20MHz QPSK High Ch RB1-99 + RB1-0

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8.3.4. LTE BAND 48

LIMITS

FCC: §96.41
(e) 3.5 GHz Emissions and Interference Limits—
(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

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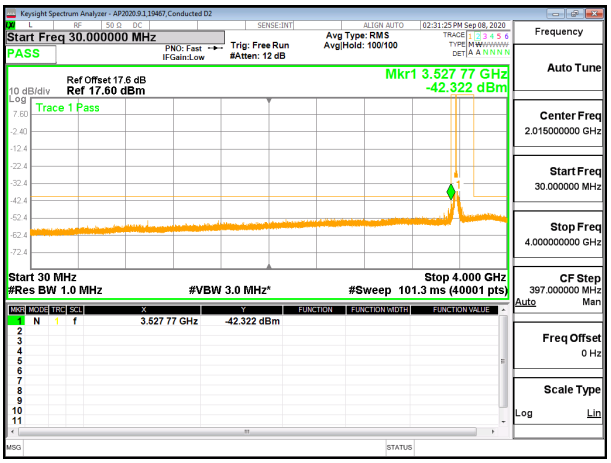
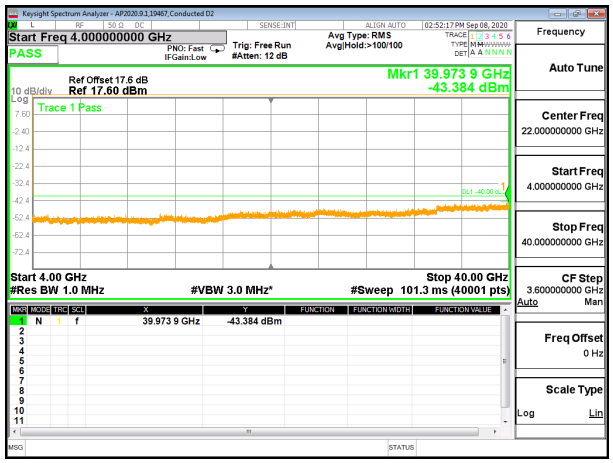
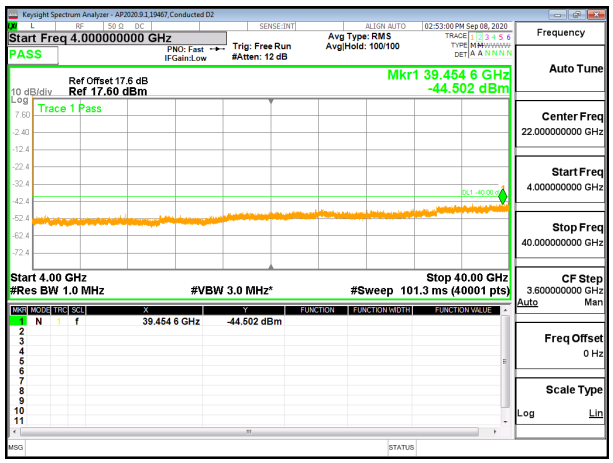


LTE B48 20MHz + 20MHz QPSK Low Ch RB1-99 + RB1-0 30MHz-4GHz

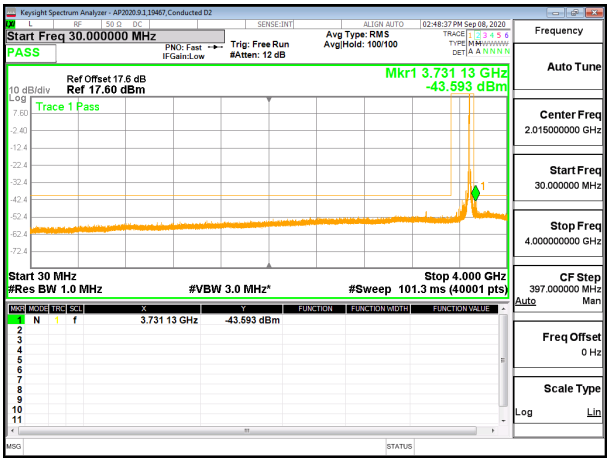


LTE B48 20MHz + 20MHz QPSK Low Ch RB1-99 + RB1-0 4GHz-40GHz

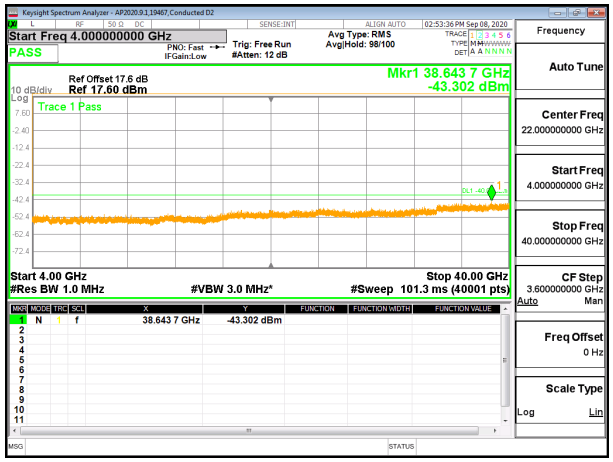
LTE B48 20MHz + 20MHz QPSK Mid Ch RB1-99 + RB1-0 30MHz-4GHz



LTE B48 20MHz + 20MHz QPSK Mid Ch RB1-99 + RB1-0 4GHz-40GHz



LTE B48 20MHz + 20MHz QPSK High Ch RB1-99 + RB1-0 30MHz-4GHz



LTE B48 20MHz + 20MHz QPSK High Ch RB1-99 + RB1-0 4GHz-40GHz

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8.4. FREQUENCY STABILITY

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 place inside a temperature chamber. The temperature is set to 20ºC 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 +50ºC is reached.

Frequency Stability vs Voltage:

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

RESULTS

See the following pages.

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8.4.1. LTE BAND 5

LIMITS

FCC §22.355
The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

Test Engineer ID:	38602	Test Date:	7/29/2020

QPSK, (10MHz + 10MHz BANDWIDTH)

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	824.5272000	848.4886000		
Extreme (50C)		824.5272225	848.4886225	22.5	0.027
Extreme (40C)		824.5272184	848.4886184	18.4	0.022
Extreme (30C)		824.5272156	848.4886156	15.6	0.019
Extreme (10C)		824.5272150	848.4886150	15.0	0.018
Extreme (0C)		824.5271983	848.4885983	-1.7	-0.002
Extreme (-10C)		824.5271935	848.4885935	-6.5	-0.008
Extreme (-20C)		824.5271886	848.4885886	-11.4	-0.014
Extreme (-30C)		824.5271824	848.4885824	-17.6	-0.021
20C	15%	824.5272115	848.4886115	11.5	0.014
	-15%	824.5271972	848.4885972	-2.8	-0.003
	End Point	824.5271956	848.4885956	-4.4	-0.005

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8.4.2. LTE BAND 7

LIMITS

FCC: §27.54
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Engineer ID:	38602	Test Date:	7/29/2020

QPSK, (20MHz + 20MHz BANDWIDTH)

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	2501.0534000	2568.9308000		
Extreme (50C)		2501.0534396	2568.9308396	39.6	0.016
Extreme (40C)		2501.0534275	2568.9308275	27.5	0.011
Extreme (30C)		2501.0534102	2568.9308102	10.2	0.004
Extreme (10C)		2501.0533976	2568.9307976	-2.4	-0.001
Extreme (0C)		2501.0533785	2568.9307785	-21.5	-0.008
Extreme (-10C)		2501.0534186	2568.9308186	18.6	0.007
Extreme (-20C)		2501.0534053	2568.9308053	5.3	0.002
Extreme (-30C)		2501.0533834	2568.9307834	-16.6	-0.007
20C	15%	2501.0534048	2568.9308048	4.8	0.002
	-15%	2501.0533936	2568.9307936	-6.4	-0.003
	End Point	2501.0533918	2568.9307918	-8.2	-0.003

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8.4.3. LTE BAND 41

LIMITS

FCC: §27.54
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Engineer ID:	38602	Test Date:	7/29/2020

QPSK, (20MHz + 20MHz BANDWIDTH)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	2496.4146000	2689.0805000		
Extreme (50C)		2496.4146296	2689.0805296	29.6	0.011
Extreme (40C)		2496.4146049	2689.0805049	4.9	0.002
Extreme (30C)		2496.4145916	2689.0804916	-8.4	-0.003
Extreme (10C)		2496.4145755	2689.0804755	-24.5	-0.009
Extreme (0C)		2496.4145617	2689.0804617	-38.3	-0.015
Extreme (-10C)		2496.4146071	2689.0805071	7.1	0.003
Extreme (-20C)		2496.4145882	2689.0804882	-11.8	-0.005
Extreme (-30C)		2496.4145695	2689.0804695	-30.5	-0.012
20C	15%	2496.4146332	2689.0805332	33.2	0.013
	-15%	2496.4146241	2689.0805241	24.1	0.009
	End Point	2496.4146226	2689.0805226	22.6	0.009

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8.4.4. LTE BAND 48

Test Engineer ID:	38602	Test Date:	7/31/2020

QPSK, (20MHz + 20MHz BANDWIDTH)

Limit		3550	3700	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	3551.3074000	3699.6532000		
Extreme (50C)		3551.3073527	3699.6531527	-47.3	-0.013
Extreme (40C)		3551.3073622	3699.6531622	-37.8	-0.010
Extreme (30C)		3551.3073794	3699.6531794	-20.6	-0.006
Extreme (10C)		3551.3073917	3699.6531917	-8.3	-0.002
Extreme (0C)		3551.3073938	3699.6531938	-6.2	-0.002
Extreme (-10C)		3551.3073949	3699.6531949	-5.1	-0.001
Extreme (-20C)		3551.3073716	3699.6531716	-28.4	-0.008
Extreme (-30C)		3551.3074026	3699.6532026	2.6	0.001
20C	15%	3551.3073647	3699.6531647	-35.3	-0.010
	-15%	3551.3073614	3699.6531614	-38.6	-0.011
	End Point	3551.3073626	3699.6531626	-37.4	-0.010

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8.5. PEAK-TO-AVERAGE POWER 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

Test was performed on Antenna 1; 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 ratio criteria.

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8.5.1. LTE BAND 5

Test Engineer ID:	10641	Test Date:	7/30/2020

Band	Bandwidth (MHz)	PCC f (MHz)	SCC1 f (MHz)	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
					Peak	Average	
Band 5	5MHz / 10MHz	831.8	839.0	QPSK	32.30	24.88	7.42
				16QAM	32.34	23.89	8.45
	10MHz / 5MHz	834.3	841.5	QPSK	32.17	24.86	7.31
				16QAM	32.13	23.88	8.25
	10MHz / 10MHz	831.6	831.5	QPSK	32.14	24.9	7.24
				16QAM	32.29	23.9	8.39
Duty Cycle Correction Factor (dB) =			0.00				
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor							

8.5.2. LTE BAND 7

Test Engineer ID:	10641	Test Date:	7/30/2020

Band	Bandwidth (MHz)	PCC f (MHz)	SCC1 f (MHz)	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
					Peak	Average	
Band 7	10MHz / 20MHz	2525.6	2540.0	QPSK	31.94	24.24	7.70
				16QAM	31.59	23.19	8.40
	20MHz / 10MHz	2530.1	2544.5	QPSK	32.06	24.17	7.89
				16QAM	31.93	23.23	8.70
	15 MHz / 15MHz	2527.5	2542.5	QPSK	32.10	24.16	7.94
				16QAM	31.76	23.23	8.53
	15MHz / 20MHz	2525.3	2542.4	QPSK	31.89	24.15	7.74
				16QAM	31.76	23.15	8.61
	20MHz / 15MHz	2527.6	2544.7	QPSK	32.02	24.11	7.91
				16QAM	31.83	23.16	8.67
	20MHz / 20MHz	2525.1	2544.9	QPSK	31.96	24.16	7.80
				16QAM	31.81	23.19	8.62
Duty Cycle Correction Factor (dB) =			0.00				
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor							

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8.5.3. LTE BAND 41

Test Engineer ID:	10641	Test Date:	9/4/2020

Band	Bandwidth (MHz)	PCC f (MHz)	SCC1 f (MHz)	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
					Peak	Average	
Band 41 (FCC)	5MHz / 20MHz	2583.8	2595.5	QPSK	32.11	17.18	7.93
				16QAM	32.12	16.70	8.42
	20MHz / 5MHz	2590.5	2602.2	QPSK	31.90	18.23	6.67
				16QAM	31.88	17.24	7.64
	10MHz / 20MHz	2583.6	2598.0	QPSK	29.38	16.13	6.25
				16QAM	31.85	16.18	8.67
	20MHz / 10MHz	2588.1	2602.5	QPSK	31.91	18.2	6.71
				16QAM	31.89	17.2	7.69
	15MHz / 15MHz	2585.5	2600.5	QPSK	32.07	18.15	6.92
				16QAM	32.07	17.16	7.91
	15MHz / 20MHz	2583.3	2600.4	QPSK	31.09	16.40	7.69
				16QAM	31.84	16.43	8.41
	20MHz / 15MHz	2585.6	2602.7	QPSK	31.91	18.11	6.80
				16QAM	32.03	17.15	7.88
	20MHz / 20MHz	2583.1	2602.9	QPSK	31.92	18.06	6.86
				16QAM	31.94	17.08	7.86
Duty Cycle Correction Factor (dB) =			7.00				
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor							

8.5.4. LTE BAND 48

Test Engineer ID:	10641	Test Date:	9/4/2020

Band	Bandwidth (MHz)	PCC f (MHz)	SCC1 f (MHz)	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
					Peak	Average	
Band 41 (FCC)	5MHz / 20MHz	3615.8	3627.5	QPSK	32.27	17.30	7.97
				16QAM	32.81	17.30	8.51
	20MHz / 5MHz	3622.5	3634.2	QPSK	32.05	17.35	7.70
				16QAM	32.77	17.32	8.45
	10MHz / 20MHz	3615.6	3630.0	QPSK	31.61	16.74	7.87
				16QAM	32.19	16.77	8.42
	20MHz / 10MHz	3620.1	3634.5	QPSK	31.68	16.93	7.75
				16QAM	32.53	16.93	8.60
	15MHz / 20MHz	3615.3	3632.4	QPSK	31.79	16.82	7.97
				16QAM	32.59	16.86	8.73
	20MHz / 15MHz	3617.6	3634.7	QPSK	32.68	16.91	8.77
				16QAM	32.78	16.91	8.87
	20MHz / 20MHz	3615.1	3634.9	QPSK	32.07	16.9	8.17
				16QAM	32.68	16.91	8.77
Duty Cycle Correction Factor (dB) =			7.00				
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor							

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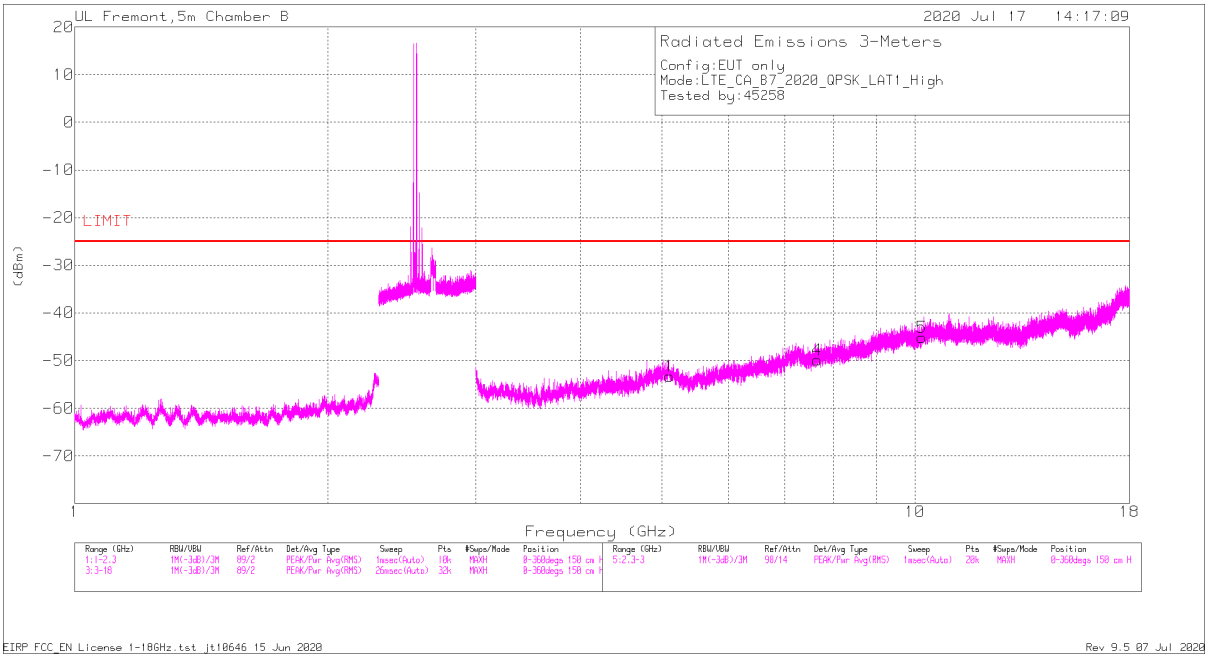
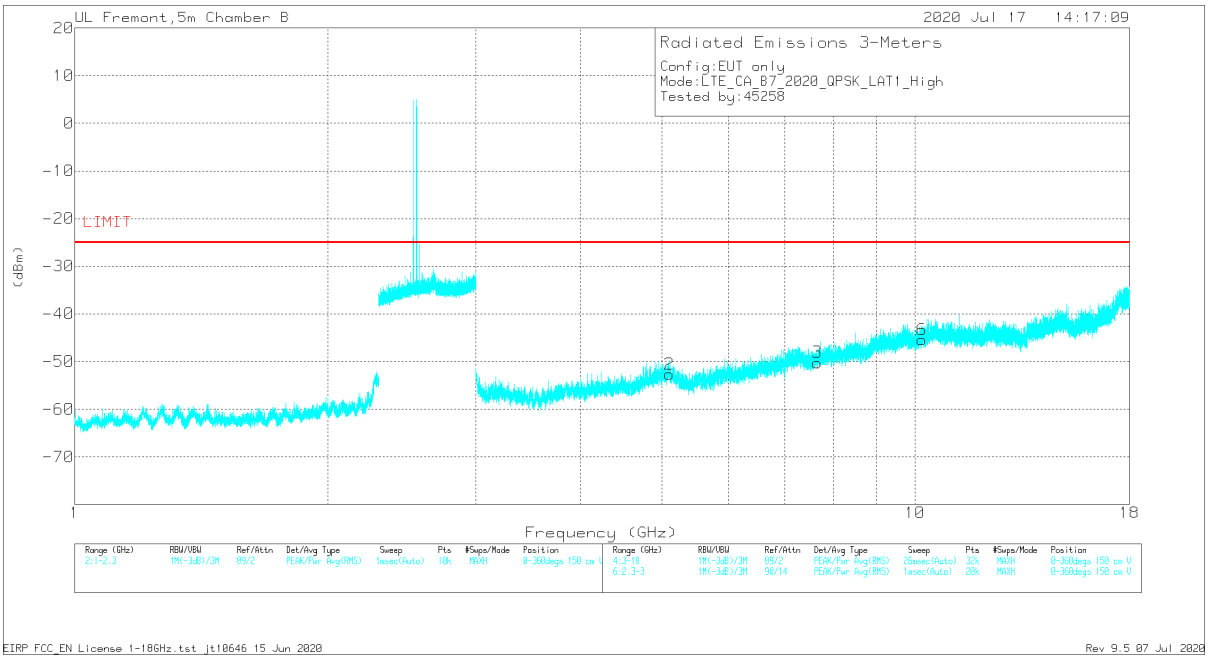
9. RADIATED TEST RESULTS

9.1. Example Plot



Horizontal Polarity



Vertical Polarity

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Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	BRF 2495-2690MHz T1790 1-18GHz	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
1	5.1	33.62	Pk	33.9	-26.4	.8	-95.2	-53.28	-25	-28.28	H
2	5.1	34.28	Pk	33.9	-26.4	.8	-95.2	-52.62	-25	-27.62	V
4	7.65047	31.54	Pk	36.9	-23.4	.3	-95.2	-49.86	-25	-24.86	H
3	7.65047	31.2	Pk	36.9	-23.4	.3	-95.2	-50.2	-25	-25.2	V
5	10.20047	30.34	Pk	38.7	-19.8	.8	-95.2	-45.16	-25	-20.16	H
6	10.20047	30.09	Pk	38.7	-19.8	.8	-95.2	-45.41	-25	-20.41	V

Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	BRF 2495-2690MHz T1790 1-18GHz	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
5.09891	37.2	Pk	33.9	-26.4	.8	-95.2	-49.7	-25	-24.7	V
5.10198	47.47	Pk	33.9	-26.4	.8	-95.2	-39.43	-25	-14.43	H
7.64923	35.46	Pk	36.9	-23.5	.3	-95.2	-46.04	-25	-21.04	H
7.65095	35.35	Pk	36.9	-23.4	.3	-95.2	-46.05	-25	-21.05	V
10.1987	34.35	Pk	38.7	-19.8	.8	-95.2	-41.15	-25	-16.15	V
10.20171	33.97	Pk	38.7	-19.9	.8	-95.2	-41.63	-25	-16.63	H

Pk - Peak detector

EIRP FCC_EN License 1-18GHz.tst jt10646 15 Jun 2020

Rev 9.5 07 Jul 2020

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9.2. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT1

TEST PROCEDURE

KDB 971168 D01/D02 v02r01

RESULTS

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

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9.2.1. LTE BAND 5

LIMIT

FCC: §22.917(a)
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.

QPSK LTE BAND 5 (10.0MHZ + 10.0MHZ BANDWIDTH)

Project #:	13179110
Date:	7/16/2020
Test Engineer:	19410
Configuration:	EUT Only
Mode:	Band 5 QPSK 10+10MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	HPF 1.2GHz T1737 1-18GHz	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 829MHz + 838.9MHz										
1.65644	42.04	Pk	25	-30.5	.8	-95.2	-57.86	-13	-44.86	V
1.65894	40.63	Pk	25	-30.4	.8	-95.2	-59.17	-13	-46.17	H
2.48862	40.25	Pk	29	-29.2	.5	-95.2	-54.65	-13	-41.65	V
2.48908	39.25	Pk	29	-29.2	.6	-95.2	-55.55	-13	-42.55	H
3.31643	39.19	Pk	31.1	-28.1	.6	-95.2	-52.41	-13	-39.41	H
3.31765	39.51	Pk	31.1	-28.1	.6	-95.2	-52.09	-13	-39.09	V
Mid Channel, 831.6MHz + 841.5MHz										
1.66324	40.38	Pk	25	-30.4	.8	-95.2	-59.42	-13	-46.42	H
1.66401	40.38	Pk	25	-30.4	.8	-95.2	-59.42	-13	-46.42	V
2.49316	39.75	Pk	29	-29.3	.6	-95.2	-55.15	-13	-42.15	H
2.49585	40.6	Pk	29	-29.3	.6	-95.2	-54.3	-13	-41.3	V
3.36205	37.72	Pk	30.9	-28.1	.6	-95.2	-54.08	-13	-41.08	V
3.36224	37.69	Pk	30.9	-28	.6	-95.2	-54.01	-13	-41.01	H
High Channel, 834.1MHz + 844MHz										
1.68944	41.18	Pk	25	-30.4	.7	-95.2	-58.72	-13	-45.72	V
1.68965	41.4	Pk	25	-30.4	.7	-95.2	-58.5	-13	-45.5	H
2.53042	38.84	Pk	29.2	-29.4	.8	-95.2	-55.76	-13	-42.76	V
2.53255	38.4	Pk	29.2	-29.3	.8	-95.2	-56.1	-13	-43.1	H
3.37693	38.96	Pk	30.8	-28	.6	-95.2	-52.84	-13	-39.84	H
3.37719	39.22	Pk	30.8	-28.1	.6	-95.2	-52.68	-13	-39.68	V

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9.2.2. LTE BAND 7

LIMIT

FCC: §27.53 (m)
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.

QPSK LTE BAND 7 (20.0MHZ + 20.0MHZ BANDWIDTH)

Project #:	131719110
Date:	7/17/2020
Test Engineer:	45258
Configuration:	EUT Only
Mode:	Band 7 QPSK 20+20MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	BRF 2495-2690MHz T1790 1-18GHz	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 2510MHz + 2529.8MHz										
5.04072	37.93	Pk	33.7	-26.2	.6	-95.2	-49.17	-25	-24.17	V
5.04112	38.33	Pk	33.7	-26.2	.6	-95.2	-48.77	-25	-23.77	H
7.55956	36.13	Pk	36.8	-24.1	.3	-95.2	-46.07	-25	-21.07	H
7.56097	35.28	Pk	36.8	-24.1	.4	-95.2	-46.82	-25	-21.82	V
10.07775	33.65	Pk	38.4	-20.1	.7	-95.2	-42.55	-25	-17.55	V
10.07924	33.89	Pk	38.4	-20.1	.6	-95.2	-42.41	-25	-17.41	H
Mid Channel, 2525.1MHz + 2544.9MHz										
5.06972	37.82	Pk	33.8	-26.1	.7	-95.2	-48.98	-25	-23.98	V
5.07193	43.67	Pk	33.8	-26.1	.7	-95.2	-43.13	-25	-18.13	H
7.60316	36.2	Pk	36.9	-23.7	.4	-95.2	-45.4	-25	-20.4	H
7.60329	35.56	Pk	36.9	-23.7	.4	-95.2	-46.04	-25	-21.04	V
10.13837	34.55	Pk	38.4	-19.9	.7	-95.2	-41.45	-25	-16.45	H
10.13993	34.24	Pk	38.4	-19.9	.7	-95.2	-41.76	-25	-16.76	V
High Channel, 2540.2MHz + 2560MHz										
5.09891	37.2	Pk	33.9	-26.4	.8	-95.2	-49.7	-25	-24.7	V
5.10198	47.47	Pk	33.9	-26.4	.8	-95.2	-39.43	-25	-14.43	H
7.64923	35.46	Pk	36.9	-23.5	.3	-95.2	-46.04	-25	-21.04	H
7.65095	35.35	Pk	36.9	-23.4	.3	-95.2	-46.05	-25	-21.05	V
10.1987	34.35	Pk	38.7	-19.8	.8	-95.2	-41.15	-25	-16.15	V
10.20171	33.97	Pk	38.7	-19.9	.8	-95.2	-41.63	-25	-16.63	H

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9.2.3. LTE BAND 41

LIMIT

FCC: §27.53 (m)
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.

QPSK LTE BAND 41 (20.0MHZ + 20.0MHZ BANDWIDTH)

Project #:	13179110
Date:	7/19/2020
Test Engineer:	19410
Configuration:	EUT Only
Mode:	Band 41FCC QPSK 20+20MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	BRF 2495-2690MHz T1790 1-18GHz	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 2506MHz + 2525.8MHz										
5.03059	37.85	Pk	33.7	-26	.7	-95.2	-48.95	-25	-23.95	H
5.03074	37.51	Pk	33.7	-26	.7	-95.2	-49.29	-25	-24.29	V
7.54646	36.33	Pk	36.9	-23.9	.3	-95.2	-45.57	-25	-20.57	V
7.54949	36.03	Pk	36.9	-24	.3	-95.2	-45.97	-25	-20.97	H
10.06329	34.97	Pk	38.4	-19.9	.7	-95.2	-41.03	-25	-16.03	H
10.06548	35.45	Pk	38.4	-19.9	.7	-95.2	-40.55	-25	-15.55	V
Mid Channel, 2583.1MHz + 2602.9MHz										
5.18593	37.31	Pk	33.6	-26.4	.8	-95.2	-49.89	-25	-24.89	V
5.18775	36.53	Pk	33.6	-26.4	.8	-95.2	-50.67	-25	-25.67	H
7.77783	35.23	Pk	37.2	-23.4	.3	-95.2	-45.87	-25	-20.87	V
7.77994	36.02	Pk	37.2	-23.3	.3	-95.2	-44.98	-25	-19.98	H
10.37069	34.43	Pk	39.2	-19.3	.8	-95.2	-40.07	-25	-15.07	V
10.37183	33.12	Pk	39.2	-19.3	.8	-95.2	-41.38	-25	-16.38	H
High Channel, 2660.2MHz + 2680MHz										
5.33899	36.98	Pk	33.2	-26.5	.6	-95.2	-50.92	-25	-25.92	V
5.33934	37.29	Pk	33.2	-26.5	.6	-95.2	-50.61	-25	-25.61	H
8.00926	34.78	Pk	37.1	-22.9	.3	-95.2	-45.92	-25	-20.92	H
8.01245	35.22	Pk	37.1	-22.9	.3	-95.2	-45.48	-25	-20.48	V
10.67859	34.44	Pk	39.4	-19.5	.5	-95.2	-40.36	-25	-15.36	V
10.6793	33.99	Pk	39.4	-19.5	.5	-95.2	-40.81	-25	-15.81	H

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9.3. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT2

TEST PROCEDURE

KDB 971168 D01/D02 v02r01

RESULTS

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

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9.3.1. LTE BAND 5

LIMIT

FCC: §22.917(a)
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.

QPSK LTE BAND 5 (10.0MHZ + 10.0MHZ BANDWIDTH)

Project #:	13179110
Date:	7/17/2020
Test Engineer:	45258
Configuration:	EUT Only
Mode:	Band 5 QPSK 10+10MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	HPF 1.2GHz T1737 1-18GHz	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 829MHz + 838.9MHz										
1.66903	40.93	Pk	25	-30.4	.7	-95.2	-58.97	-13	-45.97	H
1.66922	40.58	Pk	25	-30.4	.7	-95.2	-59.32	-13	-46.32	V
2.50124	40.44	Pk	29	-29.3	.6	-95.2	-54.46	-13	-41.46	H
2.50249	40.18	Pk	29	-29.3	.6	-95.2	-54.72	-13	-41.72	V
3.33578	39.38	Pk	31.1	-28.2	.6	-95.2	-52.32	-13	-39.32	H
3.33603	38.61	Pk	31.1	-28.2	.6	-95.2	-53.09	-13	-40.09	V
Mid Channel, 831.6MHz + 841.5MHz										
1.67193	40.94	Pk	25	-30.4	.7	-95.2	-58.96	-13	-45.96	V
1.67204	40.94	Pk	25	-30.4	.7	-95.2	-58.96	-13	-45.96	H
2.50856	40.23	Pk	29.1	-29.3	.7	-95.2	-54.47	-13	-41.47	H
2.50872	39.67	Pk	29.1	-29.3	.7	-95.2	-55.03	-13	-42.03	V
3.34539	37.98	Pk	30.9	-28.2	.6	-95.2	-53.92	-13	-40.92	V
3.34633	37.95	Pk	31	-28.2	.6	-95.2	-53.85	-13	-40.85	H
High Channel, 834.1MHz + 844MHz										
1.67823	40.53	Pk	24.9	-30.4	.7	-95.2	-59.47	-13	-46.47	V
1.67975	40.95	Pk	24.9	-30.4	.7	-95.2	-59.05	-13	-46.05	H
2.51549	39.18	Pk	29.2	-29.3	.7	-95.2	-55.42	-13	-42.42	H
2.51771	39.74	Pk	29.2	-29.3	.8	-95.2	-54.76	-13	-41.76	V
3.35456	37.71	Pk	31	-28	.6	-95.2	-53.89	-13	-40.89	H
3.35521	38.04	Pk	31	-28	.6	-95.2	-53.56	-13	-40.56	V

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9.3.2. LTE BAND 7

LIMIT

FCC: §27.53 (m)
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.

QPSK LTE BAND 7 (20.0MHZ + 20.0MHZ BANDWIDTH)

Project #:	13179110
Date:	7/18/2020
Test Engineer:	45258
Configuration:	EUT Only
Mode:	Band 5 QPSK 20+20MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	BRF 2495-2690MHz T1790 1-18GHz	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 2510MHz + 2529.8MHz										
5.04121	37.45	Pk	33.7	-26.2	.6	-95.2	-49.65	-25	-24.65	H
5.04144	37.97	Pk	33.7	-26.2	.6	-95.2	-49.13	-25	-24.13	V
7.5587	36.05	Pk	36.8	-24.1	.3	-95.2	-46.15	-25	-21.15	V
7.56041	35.51	Pk	36.8	-24.1	.3	-95.2	-46.69	-25	-21.69	H
10.08053	34.61	Pk	38.4	-20.1	.6	-95.2	-41.69	-25	-16.69	H
10.08126	34.49	Pk	38.4	-20.1	.6	-95.2	-41.81	-25	-16.81	V
Mid Channel, 2525.1MHz + 2544.9MHz										
5.0707	37.31	Pk	33.8	-26.1	.7	-95.2	-49.49	-25	-24.49	V
5.07086	37.31	Pk	33.8	-26.1	.7	-95.2	-49.49	-25	-24.49	H
7.64949	36.09	Pk	36.9	-23.4	.3	-95.2	-45.31	-25	-20.31	V
7.64984	34.8	Pk	36.9	-23.4	.3	-95.2	-46.6	-25	-21.6	H
10.14055	35.41	Pk	38.4	-19.9	.6	-95.2	-40.69	-25	-15.69	V
10.14078	34.63	Pk	38.4	-19.9	.6	-95.2	-41.47	-25	-16.47	H
High Channel, 2540.2MHz + 2560MHz										
5.10095	38.51	Pk	33.9	-26.4	.8	-95.2	-48.39	-25	-23.39	V
5.10162	37.73	Pk	33.9	-26.4	.8	-95.2	-49.17	-25	-24.17	H
7.64909	35.21	Pk	36.9	-23.5	.3	-95.2	-46.29	-25	-21.29	H
7.65209	35.17	Pk	36.9	-23.4	.3	-95.2	-46.23	-25	-21.23	V
10.19869	34.14	Pk	38.7	-19.8	.8	-95.2	-41.36	-25	-16.36	V
10.20176	35.48	Pk	38.7	-19.9	.8	-95.2	-40.12	-25	-15.12	H

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9.3.3. LTE BAND 41

LIMIT

FCC: §27.53 (m)
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.

QPSK LTE BAND 41 (20.0MHZ + 20.0MHZ BANDWIDTH)

Project #:	13179110
Date:	7/20/2020
Test Engineer:	19480
Configuration:	EUT Only
Mode:	Band 41FCC QPSK 20+20MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	BRF 2495-2690MHz T1790 1-18GHz	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 2506MHz + 2525.8MHz										
5.02811	38.25	Pk	33.7	-26.1	.7	-95.2	-48.65	-25	-23.65	V
5.03043	38.28	Pk	33.7	-26	.7	-95.2	-48.52	-25	-23.52	H
7.55362	35.91	Pk	36.9	-24	.3	-95.2	-46.09	-25	-21.09	V
7.55514	36.43	Pk	36.8	-24	.3	-95.2	-45.67	-25	-20.67	H
10.06117	35.16	Pk	38.4	-19.9	.7	-95.2	-40.84	-25	-15.84	H
10.06676	35	Pk	38.3	-20	.7	-95.2	-41.2	-25	-16.2	V
Mid Channel, 2583.1MHz + 2602.9MHz										
5.18348	38	Pk	33.6	-26.4	.7	-95.2	-49.3	-25	-24.3	H
5.18411	37.17	Pk	33.6	-26.4	.7	-95.2	-50.13	-25	-25.13	V
7.77968	35.97	Pk	37.2	-23.3	.3	-95.2	-45.03	-25	-20.03	V
7.78157	35.93	Pk	37.2	-23.3	.3	-95.2	-45.07	-25	-20.07	H
10.37128	34.84	Pk	39.2	-19.3	.8	-95.2	-39.66	-25	-14.66	V
10.37275	33.93	Pk	39.2	-19.3	.8	-95.2	-40.57	-25	-15.57	H
High Channel, 2660.2MHz + 2680MHz										
5.33862	37.75	Pk	33.2	-26.5	.6	-95.2	-50.15	-25	-25.15	V
5.34591	37.66	Pk	33.1	-26.6	.5	-95.2	-50.54	-25	-25.54	H
8.01049	35.72	Pk	37.1	-22.9	.3	-95.2	-44.98	-25	-19.98	V
8.01785	35.42	Pk	37.1	-22.8	.3	-95.2	-45.18	-25	-20.18	H
10.66724	34.32	Pk	39.4	-19.7	.5	-95.2	-40.68	-25	-15.68	V
10.68419	34.34	Pk	39.4	-19.5	.5	-95.2	-40.46	-25	-15.46	H

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9.4. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT3

TEST PROCEDURE

KDB 971168 D01/D02 v02r01

RESULTS

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

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9.4.1. LTE BAND 7

LIMIT

FCC: §27.53 (m)
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.

QPSK LTE BAND 7 (20.0MHZ + 20.0MHZ BANDWIDTH)

Project #:	13179110
Date:	7/21/2020
Test Engineer:	19206
Configuration:	EUT Only
Mode:	Band 7 QPSK 20+20MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	BRF 2495-2690MHz T1790 1-18GHz	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 2510MHz + 2529.8MHz										
4.89307	36.93	Pk	33.3	-26.5	.9	-95.2	-50.57	-25	-25.57	H
5.02613	37.34	Pk	33.7	-26	.7	-95.2	-49.46	-25	-24.46	V
7.90993	34.91	Pk	37.2	-22.6	.3	-95.2	-45.39	-25	-20.39	H
8.002	36.23	Pk	37.1	-23	.3	-95.2	-44.57	-25	-19.57	V
10.60032	34.33	Pk	39.6	-19.8	.8	-95.2	-40.27	-25	-15.27	H
10.9848	33.9	Pk	39.5	-19.7	.7	-95.2	-40.8	-25	-15.8	V
Mid Channel, 2525.1MHz + 2544.9MHz										
5.0851	37.48	Pk	33.8	-26.2	.8	-95.2	-49.32	-25	-24.32	H
5.08943	37.57	Pk	33.8	-26.2	.8	-95.2	-49.23	-25	-24.23	V
8.1092	35.85	Pk	37.2	-22.6	.3	-95.2	-44.45	-25	-19.45	H
8.23057	35.89	Pk	37.4	-22.7	.3	-95.2	-44.31	-25	-19.31	V
10.57518	34.07	Pk	39.5	-19.4	.9	-95.2	-40.13	-25	-15.13	H
11.08907	33.82	Pk	39.3	-19.5	.8	-95.2	-40.78	-25	-15.78	V
High Channel, 2540.2MHz + 2560MHz										
5.01688	37.52	Pk	33.8	-26	.8	-95.2	-49.08	-25	-24.08	H
5.08362	37.39	Pk	33.8	-26.2	.8	-95.2	-49.41	-25	-24.41	V
7.1382	36.16	Pk	36.8	-24	.4	-95.2	-45.84	-25	-20.84	H
7.20576	35.56	Pk	37	-23.8	.4	-95.2	-46.04	-25	-21.04	V
10.43624	33.8	Pk	39.4	-19.3	.8	-95.2	-40.5	-25	-15.5	V
10.50035	33.73	Pk	39.5	-19.2	.6	-95.2	-40.57	-25	-15.57	H

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9.4.2. LTE BAND 41

LIMIT

FCC: §27.53 (m)
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.

QPSK LTE BAND 41 (20.0MHZ + 20.0MHZ BANDWIDTH)

Project #:	13179110
Date:	7/20/2020
Test Engineer:	19410
Configuration:	EUT Only
Mode:	Band 41FCC QPSK 20+20MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	BRF 2495-2690MHz T1790 1-18GHz	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 2506MHz + 2525.8MHz										
5.03082	37.82	Pk	33.7	-26	.7	-95.2	-48.98	-25	-23.98	H
5.03099	37.78	Pk	33.7	-26	.7	-95.2	-49.02	-25	-24.02	V
7.54673	36.05	Pk	36.9	-23.9	.3	-95.2	-45.85	-25	-20.85	H
7.54891	36.41	Pk	36.9	-24	.3	-95.2	-45.59	-25	-20.59	V
10.06393	34.5	Pk	38.3	-19.9	.7	-95.2	-41.6	-25	-16.6	V
10.0642	34.39	Pk	38.3	-19.9	.7	-95.2	-41.71	-25	-16.71	H
Mid Channel, 2583.1MHz + 2602.9MHz										
5.18441	36.86	Pk	33.6	-26.4	.7	-95.2	-50.44	-25	-25.44	H
5.18514	36.54	Pk	33.6	-26.4	.8	-95.2	-50.66	-25	-25.66	V
7.77772	35.78	Pk	37.2	-23.4	.3	-95.2	-45.32	-25	-20.32	H
7.77979	35.44	Pk	37.2	-23.3	.3	-95.2	-45.56	-25	-20.56	V
10.37149	34.31	Pk	39.2	-19.3	.8	-95.2	-40.19	-25	-15.19	V
10.37281	34.45	Pk	39.2	-19.3	.8	-95.2	-40.05	-25	-15.05	H
High Channel, 2660.2MHz + 2680MHz										
5.3407	37.44	Pk	33.2	-26.5	.6	-95.2	-50.46	-25	-25.46	V
5.34129	37.23	Pk	33.1	-26.6	.6	-95.2	-50.87	-25	-25.87	H
8.00892	35.36	Pk	37.1	-22.9	.3	-95.2	-45.34	-25	-20.34	V
8.01024	34.94	Pk	37.1	-22.9	.3	-95.2	-45.76	-25	-20.76	H
10.68065	33.97	Pk	39.4	-19.5	.5	-95.2	-40.83	-25	-15.83	V
10.68127	33.65	Pk	39.4	-19.5	.5	-95.2	-41.15	-25	-16.15	H

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9.5. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT4

TEST PROCEDURE

KDB 971168 D01/D02 v02r01

RESULTS

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

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9.5.1. LTE BAND 7

LIMIT

FCC: §27.53 (m)
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.

QPSK LTE BAND 7 (20.0MHZ + 20.0MHZ BANDWIDTH)

Project #:	13179110
Date:	7/21/2020
Test Engineer:	19206
Configuration:	EUT Only
Mode:	Band 7 QPSK 20+20MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	BRF 2495-2690MHz T1790 1-18GHz	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 2510MHz + 2529.8MHz										
5.01582	37.25	Pk	33.7	-26	.8	-95.2	-49.45	-25	-24.45	H
5.09377	37.45	Pk	33.9	-26.3	.8	-95.2	-49.35	-25	-24.35	V
7.19252	35.8	Pk	37	-24	.4	-95.2	-46	-25	-21	H
7.21086	35.69	Pk	37.1	-23.7	.4	-95.2	-45.71	-25	-20.71	V
10.9042	33.6	Pk	39.4	-19.5	.7	-95.2	-41	-25	-16	H
11.03972	34.13	Pk	39.4	-19.7	.5	-95.2	-40.87	-25	-15.87	V
Mid Channel, 2525.1MHz + 2544.9MHz										
5.03222	38.91	Pk	33.7	-26	.7	-95.2	-47.89	-25	-22.89	H
5.15047	37.42	Pk	33.8	-26.3	.8	-95.2	-49.48	-25	-24.48	V
7.29257	35.67	Pk	37.1	-23.2	.4	-95.2	-45.23	-25	-20.23	V
7.35869	35.45	Pk	36.9	-23.7	.5	-95.2	-46.05	-25	-21.05	H
10.38589	33.71	Pk	39.2	-19.4	.8	-95.2	-40.89	-25	-15.89	V
10.56324	34.55	Pk	39.6	-19.4	.8	-95.2	-39.65	-25	-14.65	H
High Channel, 2540.2MHz + 2560MHz										
5.003	37.95	Pk	33.7	-25.9	.8	-95.2	-48.65	-25	-23.65	V
5.0168	36.77	Pk	33.8	-26	.8	-95.2	-49.83	-25	-24.83	H
7.2084	36.32	Pk	37.1	-23.8	.4	-95.2	-45.18	-25	-20.18	H
7.20927	35.72	Pk	37.1	-23.7	.4	-95.2	-45.68	-25	-20.68	V
9.72353	34.33	Pk	38.7	-20	.8	-95.2	-41.37	-25	-16.37	V
9.81179	34.77	Pk	38.6	-20	.5	-95.2	-41.33	-25	-16.33	H

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9.5.2. LTE BAND 41

LIMIT

FCC: §27.53 (m)
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.

QPSK LTE BAND 41 (20.0MHZ + 20.0MHZ BANDWIDTH)

Project #:	13179110
Date:	7/21/2020
Test Engineer:	19410
Configuration:	EUT Only
Mode:	Band 41FCC QPSK 20+20MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	BRF 2495-2690MHz T1790 1-18GHz	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 2506MHz + 2525.8MHz										
5.0311	38.56	Pk	33.7	-26	.7	-95.2	-48.24	-25	-23.24	H
5.0334	38.54	Pk	33.7	-26	.7	-95.2	-48.26	-25	-23.26	V
7.54588	36	Pk	36.9	-23.9	.3	-95.2	-45.9	-25	-20.9	H
7.54856	35.28	Pk	36.9	-24	.3	-95.2	-46.72	-25	-21.72	V
10.06277	34.31	Pk	38.4	-19.9	.7	-95.2	-41.69	-25	-16.69	V
10.06399	34.01	Pk	38.3	-19.9	.7	-95.2	-42.09	-25	-17.09	H
Mid Channel, 2583.1MHz + 2602.9MHz										
5.18505	37.07	Pk	33.6	-26.4	.8	-95.2	-50.13	-25	-25.13	H
5.186	36.71	Pk	33.6	-26.4	.8	-95.2	-50.49	-25	-25.49	V
7.77947	35.41	Pk	37.2	-23.4	.3	-95.2	-45.69	-25	-20.69	V
7.7798	35.09	Pk	37.2	-23.3	.3	-95.2	-45.91	-25	-20.91	H
10.37034	33.46	Pk	39.2	-19.3	.8	-95.2	-41.04	-25	-16.04	V
10.37397	34.09	Pk	39.2	-19.3	.8	-95.2	-40.41	-25	-15.41	H
High Channel, 2660.2MHz + 2680MHz										
5.33818	37.26	Pk	33.2	-26.5	.6	-95.2	-50.64	-25	-25.64	H
5.34055	37.2	Pk	33.2	-26.5	.6	-95.2	-50.7	-25	-25.7	V
8.0109	34.83	Pk	37.1	-22.9	.3	-95.2	-45.87	-25	-20.87	V
8.01229	34.79	Pk	37.1	-22.9	.3	-95.2	-45.91	-25	-20.91	H
10.67862	34.05	Pk	39.4	-19.5	.5	-95.2	-40.75	-25	-15.75	V
10.68073	34.14	Pk	39.4	-19.5	.5	-95.2	-40.66	-25	-15.66	H

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9.5.3. LTE BAND 48

LIMIT

FCC: §96.41
(e) 3.5 GHz Emissions and Interference Limits—
(2) Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

QPSK LTE BAND 48((20.0MHZ + 20.0MHZ BANDWIDTH)

Project #:	13179110
Date:	8/5/2020
Test Engineer:	19206
Configuration:	EUT Only
Mode:	Band 48 QPSK 20+20MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	T1792 3400-3800MHz BRF	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 3560MHz + 3579.8MHz										
4.99223	31.51	RMS	33.6	-26	.5	-95.2	-55.59	-40	-15.59	H
5.05848	32.41	RMS	33.8	-26.1	.4	-95.2	-54.69	-40	-14.69	V
6.18871	30.93	RMS	34.6	-25.7	.5	-95.2	-54.87	-40	-14.87	H
6.26234	30.32	RMS	34.5	-25.1	.4	-95.2	-55.08	-40	-15.08	V
7.14146	29.85	RMS	36.9	-23.9	.6	-95.2	-51.75	-40	-11.75	V
7.28543	30.02	RMS	37.1	-23.1	.5	-95.2	-50.68	-40	-10.68	H
Mid Channel, 3615.1MHz + 3634.9MHz										
5.11014	32.02	RMS	33.9	-26.4	.5	-95.2	-55.18	-40	-15.18	V
5.18454	31.95	RMS	33.6	-26.4	.6	-95.2	-55.45	-40	-15.45	H
6.20022	30.89	RMS	34.5	-25.7	.5	-95.2	-55.01	-40	-15.01	V
6.38205	30.57	RMS	34.6	-24.9	.6	-95.2	-54.33	-40	-14.33	H
7.20461	29.85	RMS	37.1	-23.8	.6	-95.2	-51.45	-40	-11.45	H
7.20495	29.86	RMS	37.1	-23.8	.6	-95.2	-51.44	-40	-11.44	V
High Channel, 3670.2MHz + 3690MHz										
4.99134	31.59	RMS	33.6	-26	.5	-95.2	-55.51	-40	-15.51	V
5.18471	31.61	RMS	33.6	-26.4	.6	-95.2	-55.79	-40	-15.79	H
6.50668	29.76	RMS	35.3	-24.4	.5	-95.2	-54.04	-40	-14.04	V
6.64073	30.15	RMS	35.7	-24.7	.4	-95.2	-53.65	-40	-13.65	H
8.41957	28.85	RMS	37.5	-22.2	.9	-95.2	-50.15	-40	-10.15	V
8.48825	29.17	RMS	37.5	-22.2	.8	-95.2	-49.93	-40	-9.93	H

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9.6. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT7

TEST PROCEDURE

KDB 971168 D01/D02 v02r01

RESULTS

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

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9.6.1. LTE BAND 48

LIMIT

FCC: §96.41
(e) 3.5 GHz Emissions and Interference Limits
(2) Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

QPSK LTE BAND 48((20.0MHZ + 20.0MHZ BANDWIDTH)

Project #:	13179110
Date:	8/05/2020
Test Engineer:	19206
Configuration:	EUT Only
Mode:	Band 48 QPSK 20+20MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	T1792 3400-3800MHz BRF	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 3560MHz + 3579.8MHz										
5.10978	31.65	RMS	33.9	-26.4	.5	-95.2	-55.55	-40	-15.55	V
5.11952	32.29	RMS	33.9	-26.4	.5	-95.2	-54.91	-40	-14.91	H
6.51478	29.67	RMS	35.2	-24.3	.5	-95.2	-54.13	-40	-14.13	H
6.5754	29.85	RMS	35.5	-24.3	.6	-95.2	-53.55	-40	-13.55	V
7.27303	29.38	RMS	37.2	-23.3	.5	-95.2	-51.42	-40	-11.42	H
7.27388	30.07	RMS	37.1	-23.3	.5	-95.2	-50.83	-40	-10.83	V
Mid Channel, 3615.1MHz + 3634.9MHz										
5.05835	31.53	RMS	33.8	-26.1	.4	-95.2	-55.57	-40	-15.57	V
5.06389	31.51	RMS	33.9	-26.1	.5	-95.2	-55.39	-40	-15.39	H
6.13221	31.5	RMS	34.6	-25.7	.5	-95.2	-54.3	-40	-14.3	H
6.18717	30.95	RMS	34.6	-25.7	.5	-95.2	-54.85	-40	-14.85	V
7.20049	30.21	RMS	37.1	-23.9	.6	-95.2	-51.19	-40	-11.19	V
7.20792	30.56	RMS	37.1	-23.8	.6	-95.2	-50.74	-40	-10.74	H
High Channel, 3670.2MHz + 3690MHz										
5.05592	31.99	RMS	33.8	-26.2	.4	-95.2	-55.21	-40	-15.21	V
5.05954	31.7	RMS	33.8	-26.1	.5	-95.2	-55.3	-40	-15.3	H
6.45219	30.02	RMS	35	-24.8	.6	-95.2	-54.38	-40	-14.38	V
6.50554	30.4	RMS	35.3	-24.4	.5	-95.2	-53.4	-40	-13.4	H
8.09889	29.66	RMS	37.2	-22.5	.6	-95.2	-50.24	-40	-10.24	V
8.36743	29.22	RMS	37.6	-22.6	.7	-95.2	-50.28	-40	-10.28	H

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9.7. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT8

TEST PROCEDURE

KDB 971168 D01/D02 v02r01

RESULTS

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

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9.7.1. LTE BAND 48

LIMIT

FCC: §96.41
(e) 3.5 GHz Emissions and Interference Limits—
(2) Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

QPSK LTE BAND 48((20.0MHZ + 20.0MHZ BANDWIDTH)

Project #:	13179110
Date:	9/3/2020
Test Engineer:	50822
Configuration:	EUT Only
Mode:	Band 48 QPSK 20+20MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	T1792 3400-3800MHz BRF	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 3560MHz + 3579.8MHz										
5.05412	31.9	RMS	33.8	-26.2	.4	-95.2	-55.3	-40	-15.3	H
5.18281	31.23	RMS	33.6	-26.4	.6	-95.2	-56.17	-40	-16.17	V
6.1203	31.01	RMS	34.6	-25.8	.4	-95.2	-54.99	-40	-14.99	H
6.12676	30.88	RMS	34.6	-25.7	.5	-95.2	-54.92	-40	-14.92	V
7.20422	29.83	RMS	37.1	-23.8	.6	-95.2	-51.47	-40	-11.47	V
7.27874	29.89	RMS	37.1	-23.2	.5	-95.2	-50.91	-40	-10.91	H
Mid Channel, 3615.1MHz + 3634.9MHz										
6.88616	31.13	RMS	36.2	-24.6	.6	-95.2	-51.87	-40	-11.87	H
6.88989	30.31	RMS	36.1	-24.5	.6	-95.2	-52.69	-40	-12.69	V
8.91693	28.39	RMS	38	-21.6	.5	-95.2	-49.91	-40	-9.91	H
8.92642	29.74	RMS	38	-21.5	.5	-95.2	-48.46	-40	-8.46	V
11.9408	26.89	RMS	39.5	-20	.9	-95.2	-47.91	-40	-7.91	H
12.06602	27.49	RMS	39.9	-20	.9	-95.2	-46.91	-40	-6.91	V
High Channel, 3670.2MHz + 3690MHz										
7.27125	30.08	RMS	37.2	-23.4	.5	-95.2	-50.82	-40	-10.82	H
7.32847	29.44	RMS	37	-23.7	.5	-95.2	-51.96	-40	-11.96	V
9.82333	28.36	RMS	38.6	-20.3	.6	-95.2	-47.94	-40	-7.94	V
9.95	27.47	RMS	38.3	-20	.6	-95.2	-48.83	-40	-8.83	H
13.19803	28.66	RMS	40.1	-21	.6	-95.2	-46.84	-40	-6.84	V
13.22907	27.37	RMS	40	-20.9	.6	-95.2	-48.13	-40	-8.13	H

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9.8. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT9

TEST PROCEDURE

KDB 971168 D01/D02 v02r01

RESULTS

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

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9.8.1. LTE BAND 48

LIMIT

FCC: §96.41
(e) 3.5 GHz Emissions and Interference Limits—
(2) Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

QPSK LTE BAND 48((20.0MHZ + 20.0MHZ BANDWIDTH)

Project #:	13179110
Date:	8/06/2020
Test Engineer:	19206
Configuration:	EUT Only
Mode:	Band 48 QPSK 20+20MHz
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	T1792 3400-3800MHz BRF	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 3560MHz + 3579.8MHz										
4.86171	31.89	RMS	33.3	-26.9	.5	-95.2	-56.41	-40	-16.41	H
4.989	31.26	RMS	33.6	-26	.5	-95.2	-55.84	-40	-15.84	V
6.0048	30.73	RMS	34.4	-25.6	.5	-95.2	-55.17	-40	-15.17	V
6.00827	30.84	RMS	34.5	-25.7	.5	-95.2	-55.06	-40	-15.06	H
7.26455	29.43	RMS	37.1	-23.4	.6	-95.2	-51.47	-40	-11.47	V
7.26538	29.66	RMS	37.1	-23.4	.6	-95.2	-51.24	-40	-11.24	H
Mid Channel, 3615.1MHz + 3634.9MHz										
4.81008	32.93	RMS	33	-27	.5	-95.2	-55.77	-40	-15.77	H
5.06211	31.77	RMS	33.9	-26.1	.5	-95.2	-55.13	-40	-15.13	V
5.87675	31.33	RMS	33.8	-25.9	.4	-95.2	-55.57	-40	-15.57	H
5.95107	31.39	RMS	34.3	-25.6	.3	-95.2	-54.81	-40	-14.81	V
7.18357	29.54	RMS	37	-24.1	.6	-95.2	-52.16	-40	-12.16	V
7.27686	29.23	RMS	37.1	-23.2	.5	-95.2	-51.57	-40	-11.57	H
High Channel, 3670.2MHz + 3690MHz										
5.18716	31.68	RMS	33.6	-26.4	.6	-95.2	-55.72	-40	-15.72	V
5.20281	31.44	RMS	33.6	-26.2	.6	-95.2	-55.76	-40	-15.76	H
6.75664	30.06	RMS	35.8	-24.8	.6	-95.2	-53.54	-40	-13.54	V
6.87823	29.95	RMS	36.3	-24.7	.6	-95.2	-53.05	-40	-13.05	H
8.41453	29.82	RMS	37.6	-22.2	.8	-95.2	-49.18	-40	-9.18	V
8.48127	29.01	RMS	37.5	-22.1	.7	-95.2	-50.09	-40	-10.09	H

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10. SETUP PHOTOS

Please refer to 13179110-EP1V1 for setup photos.

END OF REPORT

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