

TEST REPORT

Report Number. : R15110020-E11

Applicant : Sony Corporation
1-7-1 Konan Minato-ku
Tokyo, 108-0075, Japan

FCC ID : PY7-13187R

EUT Description : GSM/WCDMA/LTE/5G Phone with BT, DTS/UNII a/b/g/n/ac/ax,
GPS, WPT and NFC.

Test Standard(s) : FCC CFR 47 Part 2, Part 22, Part 24, and Part 27.

Date Of Issue:
2024-04-25

Prepared by:
UL LLC
12 Laboratory Dr.
Research Triangle Park, NC 27709 U.S.A.
TEL: (919) 549-1400



Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2024-04-04	Initial Review	Noah Bennett
V2	2024-04-08	Corrected Setup Photos Exhibit references in section 6.6 and 11.	Noah Bennett
V3	2024-04-25	Corrected Typo in section 6.2, UMTS B5 designator	Noah Bennett

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS 6

2. SUMMARY OF TEST RESULTS 8

3. TEST METHODOLOGY 8

4. FACILITIES AND ACCREDITATION 9

5. DECISION RULES AND MEASUREMENT UNCERTAINTY 9

5.1. METROLOGICAL TRACEABILITY 9

5.2. DECISION RULES 9

5.3. MEASUREMENT UNCERTAINTY 9

5.4. SAMPLE CALCULATION 9

6. EQUIPMENT UNDER TEST 10

6.1. DESCRIPTION OF EUT 10

6.2. MAXIMUM OUTPUT POWER 11

6.3. SOFTWARE AND FIRMWARE 14

6.4. MAXIMUM ANTENNA GAIN 15

6.5. WORST-CASE CONFIGURATION AND MODE 15

6.6. DESCRIPTION OF TEST SETUP 17

7. TEST AND MEASUREMENT EQUIPMENT 18

8. RF OUTPUT POWER VERIFICATION 23

8.1. GSM 23

8.1.1. GSM850 24

8.1.2. GSM850 (DTM Mode) 25

8.1.3. GSM1900 26

8.1.4. GSM1900 (DTM Mode) 27

8.2. WCDMA 28

8.2.1. WCDMA5 31

8.3. LTE & 5G NR 32

8.3.1. LTE BAND 5 34

8.3.2. 5G NR n5 36

8.3.3. LTE BAND 12 38

8.3.4. LTE BAND 13 40

8.3.5. LTE BAND 41 41

8.3.6. 5G NR n41 43

8.3.7. LTE BAND 66..... 45

8.3.8. 5G NR n66 48

9. CONDUCTED TEST RESULTS 50

9.1. OCCUPIED BANDWIDTH 50

9.1.1. GSM..... 51

9.1.2. WCDMA 52

9.1.3. LTE BAND 5..... 53

9.1.4. 5G NR n5 54

9.1.5. LTE BAND 12..... 55

9.1.6. LTE BAND 13..... 56

9.1.7. LTE BAND 41..... 57

9.1.8. 5G NR n41 58

9.1.9. LTE BAND 66..... 59

9.1.10. 5G NR n66..... 60

9.2.1. GSM 850..... 62

9.2.1. GSM 1900..... 63

9.2.1. WCDMA BAND 5 64

9.3. OUT OF BAND EMISSIONS 107

9.3.2. GSM 1900..... 109

9.3.3. WCDMA BAND 5 110

9.4.1. GSM850 135

9.4.2. GSM1900 136

9.4.3. WCDMA5 137

9.5. PEAK TO AVERAGE RATIO..... 146

9.5.1. WCDMA 147

9.5.2. LTE BAND 5..... 148

9.5.3. 5G NR n5 148

9.5.4. LTE BAND 66..... 148

9.5.5. 5G NR n66 149

10. RADIATED TEST RESULTS..... 150

10.1. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHZ..... 151

10.1.2. GSM 1900 156

10.1.3. WCDMA BAND 5 160

10.1.9. 5G NR n41..... 182

10.1.10. LTE BAND 66 186

10.1.11. 5G NR n66..... 194

10.2. Worst Case Emissions 198

10.3. Simultaneous Transmission..... 199

10.3.1. Scan 1 200

10.3.2. Scan 2 201

10.3.3. Scan 3 202

10.3.4. Scan 4 203

10.3.5. Scan 5 204

11. SETUP PHOTOS..... 205

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Sony Corporation
 1-7-1 Konan Minato-ku
 Tokyo, 108-0075, Japan

EUT DESCRIPTION: GSM/WCDMA/LTE/5G Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT and NFC

SERIAL NUMBER: QV7700P4LQ, QV770018L2, QV7700DSLQ, QV7700KL2

FCC ID: PY7-13187R

SAMPLE RECEIPT DATE: 2023-12-06; 2024-01-02

DATE TESTED: 2024-01-02 to 2024-04-02

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 2	Complies
CFR 47 Part 22	Complies
CFR 47 Part 24	Complies
CFR 47 Part 27	Complies

UL LLC 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 LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released For
UL LLC. By:

Prepared By:



Dan Corona
Operations Leader
Consumer Technology Division
UL Verification Services Inc.

Noah Bennett
Engineering Project Associate
Consumer Technology Division
UL LLC

Co-reviewed By:



Richard Lee
Staff Laboratory Engineer
Consumer Technology Division
UL Verification Services Inc.

2. SUMMARY OF TEST RESULTS

This report contains data provided by the applicant which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer. Below is a list of the data provided by the customer:

- 1) Antenna gain and type (see section 6.4)
- 2) Cable loss (see section 6.2, 8, and 9)
- 3) Supported bands, bandwidths, modulations, power settings, and MPR configurations. (see section 6.5)

Requirement Description	Band	Requirement Clause Number (FCC)	Result	Remarks
Effective Radiated Power	5	22.913 (a)(5)	Complies	N/A
	12	27.50 (c) (10)	Complies	N/A
	13	27.50 (b) (10)	Complies	N/A
	17	27.50 (c) (10)	Complies	N/A
Equivalent Isotropic Radiated Power	4, 66	27.50 (d) (4)	Complies	N/A
	GSM1900	24.232 (c)	Complies	N/A
	41	27.50 (h) (2)	Complies	N/A

Requirement Description	Requirement Clause Number (FCC)	Result	Remarks
Occupied Bandwidth	2.1049	Complies	N/A
Band Edge and Emission Mask	2.1051, 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (m)(4) & (m)(6), 27.53 (g), 27.53 (c) (f), 27.53(a)(4), 27.53(n)(2), 27.53(l)(2)	Complies	N/A
Out of Band Emissions		Complies	N/A
Frequency Stability	2.1055, 22.355, 24.235, 27.54	Complies	N/A
Peak-to-Average Ratio	22.913 (d), 27.50(d)(5), 27.50(j)(4)	Complies	N/A
Field Strength of Spurious Radiation	2.1051, 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (m)(4) & (m)(6), 27.53 (g), 27.53 (c) (f), 27.53(a)(4), 27.53(n)(2), 27.53(l)(2)	Complies	N/A

3. 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 24, Part 27.
- [FCC KDB 971168 D01 v03r01](#): Power Meas License Digital Systems
- [FCC KDB 971168 D02 v02r02](#): Misc Rev Approv License Devices
- [FCC KDB 412172 D01 v01r01](#). Determining ERP and EIRP

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification # 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
<input checked="" type="checkbox"/>	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A	US0067	27265	825374

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. 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.

5.2. 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.)

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U _{Lab}
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%
Power Spectral Density	2.46 dB

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\text{Field Strength (dBuV/m)} = \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Preamp Gain (dB)}$$

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE/5G Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT and NFC.. This test report covers the WWAN radio portion of the EUT.

The EUT supports the following WWAN Bands and their antenna configurations:

WWAN Bands	Main 1 Antenna	Main 2 Antenna	Sub Antenna
GSM1900	-	Y	-
LTE Band 4	-	Y	-
GSM850, WCDMA5, LTE Band 5, 5G FR1 n5	Y	-	-
LTE Band 12	Y	-	-
LTE Band 13	Y	-	-
LTE Band 17	Y	-	-
LTE Band 41, 5G FR1 n41	-	Y	-
LTE Band 66, 5G FR1 n66	-	Y	Y

For 5G NR, the EUT Supports the following Bandwidth Configurations per band:

Band	SCS [kHz]	Supported BWs [MHz]
5G NR n5	15	5, 10, 15, 20
5G NR n41	30	20, 30, 40, 50, 60, 80, 90, 100
5G NR n66	15	5, 10, 15, 20

6.2. MAXIMUM OUTPUT POWER

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015

KDB 971168 D01 Section 5.6

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

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

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

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

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

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

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:

Part 22 850MHz								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	ERP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
824.2-848.8	GPRS	32.90	-4.30	7.0	26.45	0.442	244.33	244KGXW
	EGPRS	27.50			21.05	0.127	231.57	232KG7W

Part 24 1900MHz								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
1850.2-1909.8	GPRS	28.10	-3.05	2.0	25.05	0.320	242.47	242KGXW
	EGPRS	26.90			23.85	0.243	250.33	250KG7W

Part 22 Band 5								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	ERP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
826.4-846.6	REL 99	22.40	-4.30	7.0	15.95	0.039	4143.6	4M14F9W
	HSUPA	21.50			15.05	0.032	4140.4	4M14F9W

LTE BAND 5

Part 22H								
ERP Limit (W)		7.00						
Antenna Gain (dBi)		-4.30						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	824.7	848.3	20.29	13.84	0.024	1091.9	1M09G7W
	16QAM			20.62	14.17	0.026	1101	1M10D7W
3.0	QPSK	825.5	847.5	20.35	13.90	0.025	2711.9	2M71G7W
	16QAM			20.74	14.29	0.027	2702.4	2M70D7W
5.0	QPSK	826.5	846.5	20.38	13.93	0.025	4500.9	4M50G7W
	16QAM			20.79	14.34	0.027	4498.9	4M50D7W
10.0	QPSK	829.0	844.0	20.34	13.89	0.024	8979.5	8M98G7W
	64QAM			20.61	14.16	0.026	8999.5	9M00D7W

5G NR n5

Part 22H								
ERP Limit (W)		7.00						
Antenna Gain (dBi)		-4.30						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
5.0	BPSK	826.5	846.5	21.73	15.28	0.034	4493.8	4M49G7W
	16QAM			20.89	14.44	0.028	4496.3	4M50D7W
10.0	BPSK	829.0	844.0	21.75	15.30	0.034	8969.2	8M97G7W
	16QAM			20.84	14.39	0.027	8967.5	8M97D7W
15.0	BPSK	831.5	841.5	21.72	15.27	0.034	13442	13M4G7W
	16QAM			20.87	14.42	0.028	13456	13M5D7W
20.0	BPSK	834.0	839.0	21.69	15.24	0.033	17954	18M0G7W
	16QAM			20.86	14.41	0.028	17894	17M9D7W

LTE BAND 12

Part 27 / RSS 130								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-4.88						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	699.7	715.3	21.09	14.06	0.025	1093.8	1M09G7W
	16QAM			21.44	14.41	0.028	1094.1	1M09D7W
3.0	QPSK	700.5	714.5	21.24	14.21	0.026	2707.6	2M71G7W
	16QAM			21.62	14.59	0.029	2704.7	2M70D7W
5.0	QPSK	701.5	713.5	21.18	14.15	0.026	4495.6	4M50G7W
	16QAM			21.59	14.56	0.029	4503.2	4M50D7W
10.0	QPSK	704.0	711.0	21.20	14.17	0.026	8984.7	8M98G7W
	16QAM			21.49	14.46	0.028	8973.7	8M97D7W

LTE BAND 13

Part 27 / RSS 130								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-4.29						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	779.5	784.5	21.58	15.14	0.033	4499.1	4M50G7W
	16QAM			21.95	15.51	0.036	4496.6	4M50D7W
10.0	QPSK	782.0	782.0	21.62	15.18	0.033	8968	8M97G7W
	64QAM			21.88	15.44	0.035	8972.7	8M97D7W

LTE BAND 41

Part 27								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		-2.47						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	2498.5	2687.5	18.83	16.36	0.043	4508	4M51G7W
	16QAM			18.89	16.42	0.044	4489.7	4M49D7W
10.0	QPSK	2501.0	2685.0	18.81	16.34	0.043	8951	8M95G7W
	16QAM			18.87	16.40	0.044	8971.7	8M97D7W
15.0	QPSK	2503.5	2682.5	18.81	16.34	0.043	13466	13M5G7W
	64QAM			18.88	16.41	0.044	13477	13M5D7W
20.0	QPSK	2506.0	2680.0	18.60	16.13	0.041	17895	17M9G7W
	16QAM			18.71	16.24	0.042	17925	17M9D7W

5G NR n41

Part 27								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		-2.47						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
20.0	QPSK	2506.5	2680.0	19.49	17.02	0.050	17933	17M9G7W
	16QAM			18.42	15.95	0.039	17931	17M9D7W
30.0	QPSK	2511.0	2675.0	19.65	17.18	0.052	26876	26M9G7W
	16QAM			18.55	16.08	0.041	26938	26M9D7W
40.0	QPSK	2516.0	2670.0	19.48	17.01	0.050	35824	35M8G7W
	16QAM			18.42	15.95	0.039	35834	35M8D7W
50.0	QPSK	2521.0	2665.0	19.68	17.21	0.053	45926	45M9G7W
	16QAM			18.61	16.14	0.041	45757	45M8D7W
60.0	QPSK	2526.0	2660.0	19.65	17.18	0.052	57214	57M2G7W
	16QAM			18.68	16.21	0.042	57254	57M3G7W
70.0	QPSK	2531.0	2655.0	19.73	17.26	0.053	64349	64M3G7W
	16QAM			18.62	16.15	0.041	64377	64M4G7W
80.0	QPSK	2536.0	2650.0	19.55	17.08	0.051	77219	77M2G7W
	16QAM			18.44	15.97	0.040	77257	77M3D7W
90.0	QPSK	2541.0	2645.0	19.56	17.09	0.051	86848	86M8G7W
	16QAM			18.51	16.04	0.040	86923	86M9D7W
100.0	QPSK	2546.0	2640.0	19.85	17.38	0.055	96559	96M6G7W
	16QAM			18.62	16.15	0.041	96557	96M6D7W

LTE BAND 66

Part 27 / RSS 139								
EIRP Limit (W)		1.00						
Antenna Gain (dBi)		-2.23						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	1710.7	1779.3	19.99	17.76	0.060	1094.6	1M09G7W
	16QAM			20.33	18.10	0.065	1096.1	1M10D7W
3.0	QPSK	1711.5	1778.5	20.12	17.89	0.062	2696.9	2M70G7W
	64QAM			20.42	18.19	0.066	2698.9	2M70D7W
5.0	QPSK	1712.5	1777.5	20.12	17.89	0.062	4504.7	4M50G7W
	16QAM			20.42	18.19	0.066	4497.7	4M50D7W
10.0	QPSK	1715.0	1775.0	20.11	17.88	0.061	8981.4	8M98G7W
	64QAM			20.37	18.14	0.065	8976.2	8M98D7W
15.0	QPSK	1717.5	1772.5	20.10	17.87	0.061	13474	13M5G7W
	64QAM			20.40	18.17	0.066	13458	13M5D7W
20.0	QPSK	1720.0	1770.0	20.05	17.82	0.061	17913	17M9G7W
	64QAM			20.33	18.10	0.065	17952	18M0D7W

5G NR n66

Part 27 / RSS 139								
EIRP Limit (W)		1.00						
Antenna Gain (dBi)		-2.23						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5.0	BPSK	1712.5	1777.5	20.99	18.76	0.075	4488.8	4M49G7W
	16QAM			19.84	17.61	0.058	4497.8	4M50D7W
10.0	BPSK	1715.0	1775.0	20.82	18.59	0.072	8980.7	8M98G7W
	16QAM			19.55	17.32	0.054	8977.5	8M98D7W
15.0	16QAM	1717.5	1772.5	20.90	18.67	0.074	13452	13M5G7W
	BPSK			19.62	17.39	0.055	13439	13M4D7W
20.0	BPSK	1720.0	1770.0	20.84	18.61	0.073	17916	17M9G7W
	16QAM			20.00	17.77	0.060	17924	17M9D7W

6.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 0.221 for Conducted and 0.220 radiated samples.

6.4. MAXIMUM ANTENNA GAIN

The antenna(s) gain as provided by the manufacturer' are as follows:

LTE and 5G NR Bands	Frequency Range (MHz)	Main 1 Antenna Gain (dBi)	Main 2 Antenna Gain (dBi)	Sub Antenna Gain (dBi)
LTE BAND 4, LTE BAND 66, 5G NR n66	1710 – 1755	-	-2.23	-5.96
GSM850, WCDMA5, LTE BAND 5, 5G NR n5	824 – 849	-4.30	-	-
LTE BAND 12	699 – 716	-4.88	-	-
LTE BAND 13	777 – 787	-4.29	-	-
LTE BAND 17	704 – 716	-4.88	-	-
GSM1900	1850 – 1915	-	-3.05	-
LTE BAND 41, 5G NR n41	2496 – 2690	-	-2.47	-

6.5. WORST-CASE CONFIGURATION AND MODE

LTE Band 4 (1710-1755MHz, 1.4/3/5/10/15/20MHz bandwidth) is covered by LTE Band 66 because it is a subset of LTE band 66 and they have the same output power.

LTE Band 17 (704-716MHz, 1.4/3/5/10MHz bandwidth) is covered by LTE Band 12 because it is a subset of LTE band 12 and they have the same output power.

The worst-case scenario for all measurements is based on an engineering evaluation made on conducted average power on different modulations found during pretesting. Output power measurements were measured on GPRS and EGPRS modulations for GSM, Rel 99, HSDPA, HDUPA and DC-HSDPA modulations for WCDMA, QPSK, 16QAM, and 64QAM modulations for LTE, and BPSK, QPSK, 16QAM, 64QAM, and 256QAM for 5G FR1. The modulations with the highest output power were selected as worst-case.

For 5G NR Bands, conducted output power was taken on all modulations at Full Bandwidth configurations on Low, Mid, and High channel, to determine worst case modulation between BPSK and QPSK. 16QAM was chosen as worst-case over 64QAM and 256QAM because they have lower output power. Remaining output power was taken on the modulation type with the highest measured output power.

Conducted tests were performed on the worst-case antenna port per band, with spot check tests performed on all other antennas with lower output power. Only the worst-case conducted antenna port band data is reported. Full Radiated Emissions Testing on each antenna was performed and reported. For testing purposes, test data in section 9 and 10 was set at or above target power for all bands. Both modulation types were checked, and the WC data is reported.

For 5G FR1, the manufacturer has declared that DFTs-OFDM was worst-case for all 5G FR1 bands. Therefore, all testing was performed in DFTs-OFDM Waveform mode.

The following is the worst-case antenna port, for Conducted Output Power:

LTE and 5G NR Bands	Worst-case Antenna port for Conducted output power	Worst-case Modulation for Conducted Output Power as tested
GSM1900	Main2	GPRS
GSM850 WCDMA5 LTE BAND 5 5G NR n5	Main1	GPRS (GSM) Rel. 99 (WCDMA) 16QAM (LTE) BPSK (5G NR)
LTE BAND 12	Main1	16QAM
LTE BAND 13	Main1	16QAM
LTE BAND 41 5G NR n41	Main2	16QAM (LTE) QPSK (5G NR)
LTE BAND 66 5G NR n66	Main2	QPSK (LTE) BPSK (5G NR)

The EUT was investigated in three orthogonal orientations X/Y/Z on both Low Band (Fundamental Below 1GHz) Mid Band (Fundamental between 1-3GHz) and High Band (Fundamental above 3GHz) over all antennas to find the worst-case orientation. For Simultaneous Tx scans in which there are two or more F_c ranges with different worst-case orientations, scans were performed in the orientation with the highest output power, and sufficient margin was added to cover other orientations. The following is the worst-case orientations:

LTE and 5G NR Bands	Main 1 Antenna	Main 2 Antenna	Sub Antenna
Low Band ($F_c < 1\text{GHz}$)	Y	-	-
Mid Band ($1\text{GHz} < F_c < 3\text{GHz}$)	-	X	Z
High Band ($F_c > 3\text{GHz}$)	Y	-	-

The EUT was tested while connected to AC Lines via charging cable and brick to represent worst case emissions. Worst Case emissions from 9kHz-30MHz, 30-1000MHz, 18-26.5GHz and 26.5GHz to 40GHz were done on the modes with the highest conducted average power. Simultaneous transmission was also investigated for various configurations that yielded the highest power, and least separation in frequencies as a worst-case scenario. Only Emissions within 20dB were reported.

Additionally, simultaneous transmission was investigated on EN-DC combinations, and it was found that no new emissions within 20dB of the limit were observed.

The following scans were investigated for simultaneous transmission:

Scan #	Mode	Mode	Mode
1	LTE B66 QPSK, 20M, RB1-49, 1745MHz (Main2)	BT GFSK C0 2441MHz	WLAN UNII-1 11ax HE20 26T RU4 MCS0 5240MHz (CH 48) MIMO
2	LTE B66 QPSK, 20M, RB1-49, 1745MHz [(Main2)	BT GFSK C1 2441MHz	WLAN UNII-1 11ax HE20 26T RU4 MCS0 5240MHz (CH 48) MIMO
3	LTE B66 QPSK, 20M, RB1-49, 1745MHz (Main2)	2442MHz 11g 6Mbps MIMO	-
5	LTE B41, 20M, RB1-49, 2620Mhz, (Main2)	WLAN UNII-5 11ax HE40 484T RU65 MCS0 6365MHz (CH 83) MIMO	-
6	LTE B12 QPSK, 10M, RB1-24, 704MHz (Main1)	2462MHz 11g 6Mbps MIMO	-

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Support Laptop	Lenovo	T14 Gen3	PF4FKVWW	N/A
Support Laptop	Lenovo	T14 Gen3	PF4FKVZE	N/A
Support Laptop	Lenovo	Yoga 7	PF49WDF9	PD9AX211NG
AC Adapter	Sony	XQZ-UC1-010-236-21	3223W09206247	N/A
AC Adapter	Sony	XQZ-UC1-010-236-21	1821W34209802	N/A
AC Adapter	Sony	XQZ-UC1-010-236-21	1821W34209866	N/A
Headphones	Sony	--	--	--

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB-C	2	USB	Shielded	<1m	Used to Connect EUT to AC Mains.
2	3.5MM	1	Audio	Unshielded	<3m	Used to populate EUT headphone jack 3.5mm

Test Setup

The EUT was connected to a base station simulator and set to transmit at max power for GSM/WCDMA/LTE testing. For 5G FR1 testing, Factory Test Mode software was used.

Setup Diagram

Please see R15110020-EP11 for Setup Diagrams and Setup Photos.

7. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
Common Equipment					
Conducted Room 1					
90411	Spectrum Analyzer	Keysight Technologies	N9030A	2023-08-02	2024-08-02
211056	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2023-08-01	2024-08-01
211055	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2023-08-01	2024-08-01
-	DC Power Supply	Keysight Technologies	E3633A	-	-
SOFTEMI	Antenna Port Software	UL	Version 2024.2.23	NA	NA
Conducted Room 2					
90410	Spectrum Analyzer	Keysight Technologies	N9030A	2023-06-14	2024-06-14
76023	Temp/Humid Chamber	Cincinnati Sub-Zero	ZPH-8-3.5-SCT/AC	2024-01-12	2025-01-12
238710	Environmental Meter	Fisher Scientific	15-077-963	2023-06-27	2024-06-27
-	DC Power Supply	Keysight Technologies	E3633A	-	-
211057	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2023-08-01	2024-08-01
91213	True RMS Multimeter	Agilent	U1232A	2023-08-03	2024-08-03
SOFTEMI	Antenna Port Software	UL	Version 2024.2.23	NA	NA
Additional Equipment used					
212167	Wideband Radio Communications Tester	Anritsu	MT8821C	2023-05-05	2024-05-05
212967	Wideband Radio Communications Tester	Rohde&Schwarz	CMW500	2024-01-03	2025-01-03
213025	Wideband Radio Communications Tester	Rohde&Schwarz	CMW500	2023-12-18	2024-12-18

Test Equipment Used - Wireless Conducted Attenuators, Cables, and Couplers

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
Attenuators					
226561	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2024-02-29	2025-02-29
Cables					
CBL091	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz	Carlisle Interconnect Technologies	UFA147A-2-0360- 200200	2024-03-01	2025-03-01
CBL093	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz	Carlisle Interconnect Technologies	UFA147A-2-0360- 200200	2022-08-24	2023-08-24

NOTES:

1. * Testing is completed before equipment expiration date.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 1)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
0-009-30MHz					
8939	Passive Loop Antenna	EMCO	EM-6872	2023-10-19	2024-10-19
8940	Passive Loop Antenna	EMCO	EM-6871	2023-10-19	2024-10-19
30-1000 MHz					
90629	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2024-01-30	2026-01-30
1-18 GHz					
206211	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-04-06	2024-04-06
Gain-Loss Chains					
91974	Gain-loss string: 0.009-30MHz	Various	Various	2023-05-16	2024-05-16
91976	Gain-loss string: 25-1000MHz	Various	Various	2023-05-16	2024-05-16
91979	Gain-loss string: 1-18GHz	Various	Various	2023-05-16	2024-05-16
Receiver & Software					
206496	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-07-19	2024-07-19
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
241205	Environmental Meter	Fisher Scientific	15-077-963	2023-09-05	2025-09-05
212967	Wideband Radio Communications Tester	Rohde and Schwarz	CMW500	2024-01-03	2025-01-03
231408 (BRF011)	2.495-2.690GHz notch filter, 2W, Fhigh = 18GHz	Micro-Tronics	BRM50709-01	2024-03-01	2025-03-01
169106 (BRF008)	1710-1785MHz notch filter, 2W, Fhigh = 9GHz	Micro-Tronics	BRM50713-01	2024-03-01	2025-03-01
82635 (HPF009)	1GHz high-pass filter, 2W, Fhigh = 10GHz	Micro-Tronics	HPM17672	2024-03-01	2025-03-01
150716 (LPF008)	DC-1000MHz low-pass filter	Pasternack	PE8720	2024-03-04	2025-03-04

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 4)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	0.009-30MHz				
8939	Passive Loop Antenna	EMCO	EM-6872	2023-10-19	2024-10-19
8940	Passive Loop Antenna	EMCO	EM-6871	2023-10-19	2024-10-19
	30-1000 MHz				
90628	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2024-01-02	2026-01-02
	1-18 GHz				
89509	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-05-23	2025-05-23
	18-40 GHz				
204704	Horn Antenna, 18-26.5GHz	Com-Power	AH-826	2023-07-20	2025-07-20
204705	Horn Antenna, 26-40GHz	Com-Power	AH-640	2023-07-20	2025-07-20
	Gain-Loss Chains				
207638	Gain-loss string: 0.009-30MHz	Various	Various	2023-09-18	2024-09-18
207639	Gain-loss string: 25-1000MHz	Various	Various	2023-09-18	2024-09-18
207640	Gain-loss string: 1-18GHz	Various	Various	2023-05-17	2024-05-17
225795	Gain-loss string: 18-40GHz	Various	Various	2023-05-17	2024-05-17
	Receiver & Software				
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-04-10	2024-04-10
214284	Spectrum Analyzer	Rohde & Schwarz	FSW50	2024-02-04	2025-02-04
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
241204	Environmental Meter	Fisher Scientific	15-077-963	2023-09-05	2025-09-05
207620	Wideband Radio Communications Tester	Anritsu	MT8821C	2022-07-03	2023-07-03

NOTES:

1. * Testing is completed before equipment expiration date.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. Equipment ID 207620 was only used for signaling, and no measurements were performed or recorded from this equipment.

8. RF OUTPUT POWER VERIFICATION

8.1. GSM

Using CMW500 Communication Test Set

Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900

Press **Connection control** to choose the different menus

Press **RESET** > choose all to reset all settings

Connection	Press Signal Off to turn off the signal and change settings Network Support > GSM+GPRS or GSM+EGPRS Main Service > Packet Data Service selection > Test Mode A – Auto Slot Config. off
MS Signal	Press Slot Config bottom on the right twice to select and change the number of time slots and power setting > Slot configuration > Uplink/Gamma > 33 dBm for GPRS 850/900 > 27 dBm for EGPRS 850/900 > 30 dBm for GPRS1800/1900 > 26 dBm for EGPRS1800/1900
BS Signal	Enter the same channel number for TCH channel (test channel) and BCCH channel Frequency Offset > + 0 Hz Mode > BCCH and TCH BCCH Level > -85 dBm (May need to adjust if link is not stable) BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel] Channel Type > Off P0> 4 dB Slot Config > Unchanged (if already set under MS Signal) TCH > choose desired test channel Hopping > Off Main Timeslot > 3 (Default)
Network	Coding Scheme > CS 1 (GPRS) and MCS5 (EGPRS) Bit Stream > 2E9-1PSR Bit Pattern
AF/RF	Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
Connection	Press Signal On to turn on the signal and change settings

RESULT

8.1.1. GSM850

Test Engineer ID:	27338/44389	Test Date:	2024-02-21	EUT Serial Number:	QV770018L2
--------------------------	-------------	-------------------	------------	---------------------------	------------

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pw r	Frame Pw r	Burst Pw r	Frame Pw r
GPRS/EDGE (GMSK)	CS1	1	128	824.2	32.4	23.3	33.5	24.5
			190	836.6	32.9	23.9		
			251	848.8	33.1	24.0		
		2	128	824.2	29.5	23.5	30.5	24.5
			190	836.6	29.5	23.5		
			251	848.8	29.7	23.7		
		3	128	824.2	27.6	23.4	28.7	24.4
			190	836.6	27.8	23.5		
			251	848.8	27.8	23.6		
		4	128	824.2	26.5	23.5	27.5	24.5
			190	836.6	26.8	23.7		
			251	848.8	26.8	23.7		
EDGE (8PSK)	MCS5	1	128	824.2	27.1	18.1	28.0	19.0
			190	836.6	27.4	18.3		
			251	848.8	27.5	18.5		
		2	128	824.2	24.1	18.0	25.0	19.0
			190	836.6	24.1	18.0		
			251	848.8	24.2	18.2		
		3	128	824.2	22.2	17.9	23.2	18.9
			190	836.6	22.0	17.7		
			251	848.8	22.3	18.0		
		4	128	824.2	21.2	18.2	22.0	19.0
			190	836.6	21.1	18.1		
			251	848.8	21.3	18.2		

8.1.2. GSM850 (DTM Mode)

Test Engineer ID:	27338/44389	Test Date:	2024-02-21 2024-02-22	EUT Serial Number:	QV770018L2
--------------------------	-------------	-------------------	--------------------------	---------------------------	------------

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)							
					Measured				Tune-up Limit			
					CS Burst Pw r	PS Burst Pw r	CS Frame Pw r	PS Frame Pw r	CS Burst Pw r	PS Burst Pw r	CS Frame Pw r	PS Frame Pw r
GSM (Voice) + GPRS/EDGE (GMSK)	CS1	1	128	824.2	32.6		23.6		33.5		24.5	
			190	836.6	32.8		23.7					
			251	848.8	33.0		24.0					
		2	128	824.2	30.1	29.5	24.1	23.5	30.5	30.5	24.5	24.5
			190	836.6	30.1	30.2	24.0	24.2				
			251	848.8	30.2	29.5	24.2	23.5				
		3	128	824.2	27.5	27.4	23.2	23.1	28.7	28.7	24.4	24.4
			190	836.6	27.4	27.6	23.1	23.3				
			251	848.8	28.0	27.7	23.7	23.4				
GSM (Voice) + EDGE (8PSK)	MCS5	1	128	824.2	32.6		23.6		33.5		24.5	
			190	836.6	32.8		23.7					
			251	848.8	33.0		24.0					
		2	128	824.2	30.1	23.8	24.1	17.8	30.5	25.0	24.5	19.0
			190	836.6	30.1	23.9	24.0	17.9				
			251	848.8	30.2	24.1	24.2	18.1				
		3	128	824.2	27.5	21.8	23.2	17.5	28.7	23.2	24.4	18.9
			190	836.6	27.4	21.4	23.1	17.2				
			251	848.8	28.0	21.9	23.7	17.6				

8.1.3. GSM1900

Test Engineer ID:	27338/44389	Test Date:	2024-02-21	EUT Serial Number:	QV770018L2
--------------------------	-------------	-------------------	------------	---------------------------	------------

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pw r	Frame Pw r	Burst Pw r	Frame Pw r
GPRS/EDGE (GMSK)	CS1	1	512	1850.2	27.9	18.9	29.0	20.0
			661	1880.0	28.0	19.0		
			810	1909.8	28.0	19.0		
		2	512	1850.2	24.7	18.7	26.0	20.0
			661	1880.0	24.7	18.7		
			810	1909.8	25.0	18.9		
		3	512	1850.2	22.9	18.7	24.2	19.9
			661	1880.0	23.0	18.8		
			810	1909.8	23.1	18.9		
		4	512	1850.2	22.1	19.1	23.0	20.0
			661	1880.0	22.0	19.0		
			810	1909.8	22.1	19.1		
EDGE (8PSK)	MCS5	1	512	1850.2	26.6	17.6	27.0	18.0
			661	1880.0	26.9	17.9		
			810	1909.8	26.9	17.9		
		2	512	1850.2	23.5	17.5	24.0	18.0
			661	1880.0	23.7	17.6		
			810	1909.8	23.8	17.8		
		3	512	1850.2	21.7	17.5	22.2	17.9
			661	1880.0	22.1	17.9		
			810	1909.8	22.1	17.8		
		4	512	1850.2	20.3	17.3	21.0	18.0
			661	1880.0	20.7	17.7		
			810	1909.8	20.6	17.6		

8.1.4. GSM1900 (DTM Mode)

Test Engineer ID:	27338/44389	Test Date:	2024-02-21 2024-02-22 2024-02-27	EUT Serial Number:	QV770018L2
--------------------------	-------------	-------------------	--	---------------------------	------------

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)							
					Measured				Tune-up Limit			
					CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr	CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr
GSM (Voice) + GPRS/EDGE (GMSK)	CS1	1	512	1850.2	28.0		18.9		29.0		20.0	
			661	1880.0	28.1		19.1					
			810	1909.8	28.1		19.1					
		2	512	1850.2	24.9	24.9	18.8	18.8	26.0	26.0	20.0	20.0
			661	1880.0	24.9	24.8	18.9	18.8				
			810	1909.8	24.7	24.6	18.7	18.5				
		3	512	1850.2	23.1	22.9	18.8	18.7	24.2	24.2	19.9	19.9
			661	1880.0	23.0	22.9	18.7	18.6				
			810	1909.8	23.0	22.9	18.7	18.7				
GSM (Voice) + EDGE (8PSK)	MCS5	1	512	1850.2	28.0		18.9		29.0		20.0	
			661	1880.0	28.1		19.1					
			810	1909.8	28.1		19.1					
		2	512	1850.2	24.9	23.2	18.8	17.2	26.0	24.0	20.0	18.0
			661	1880.0	24.9	23.6	18.9	17.6				
			810	1909.8	24.7	23.7	18.7	17.7				
		3	512	1850.2	23.1	21.7	18.8	17.4	24.2	22.2	19.9	17.9
			661	1880.0	23.0	21.9	18.7	17.6				
			810	1909.8	23.0	21.8	18.7	17.6				

8.2. WCDMA

TEST PROCEDURE

The transmitter output was connected to the input terminal of Directional Coupler via calibrated coaxial cable. The output coupling terminal of the Directional Coupler was directly connected to a spectrum analyzer while the output through terminal connected to the communication test set via calibrated coaxial cable.

The output power was measured with the spectrum analyzer at the low, middle and high channel in each band.

- Set the spectrum analyzer span wide enough or greater than the modulated signal BW.
- Set a spectrum analyzer at peak detection mode with VBW ≥ RBW ≥ 26dB BW, typically 5MHz.
- Set a marker to point the corresponding peak value.

REL 99

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	β_c/β_d	8/15

HSDPA REL 5

The following 4 Sub-tests were completed according to Release 5 procedures in table C.10.1.4 of 3GPP TS 34.121-1 A summary of these settings are illustrated below:

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$, and $\Delta_{CQI} = 24/15$ with $\beta_{HS} = 24/15 * \beta_c$.

Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{HS}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

HSPA REL 6 (HSDPA & HSUPA)

The following 5 Sub-tests were completed according to Release 6 procedures in table C.11.1.3 of 3GPP TS 34.121-1. A summary of these settings are illustrated below:

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/25	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1} : 47/15 β_{ed2} : 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$. For sub-test 5, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 5/15$ with $\beta_{hs} = 5/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

DUAL CARRIER HSDPA (DC-HSDPA (REL 8, CAT 24))

The following 4 Sub-tests for DC-HSDPA were completed according to Release 8 procedures in table C08.1.12 of 3GPP TS 34.121-1. A summary of subtest settings are illustrated below:

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
<p>Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.</p> <p>Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.</p>		

HSPA+ REL 7

The following 1 Sub-test was completed according to Release 7 procedures in table C.11.1.4 of 3GPP TS34.121. A summary of these settings are illustrated below:

Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed1} : 30/15 β_{ed2} : 30/15	β_{ed3} : 24/15 β_{ed4} : 24/15	3.5	2.5	14	105	105

Note 1: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).

Note 3: DPDCH is not configured, therefore the β_c is set to 1 and $\beta_d = 0$ by default.

Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

RESULT

8.2.1. WCDMA5

Test Engineer ID:	27338/44389	Test Date:	2024-02-20	EUT Serial Number:	QV770018L2
--------------------------	-------------	-------------------	------------	---------------------------	------------

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	4132	826.4	22.4	N/A	22.7
		4183	836.6	22.4		
		4233	846.6	22.4		
HSDPA	Subtest 1	4132	826.4	21.4	0	22.0
		4183	836.6	21.4		
		4233	846.6	21.4		
	Subtest 2	4132	826.4	21.4	0	22.0
		4183	836.6	21.3		
		4233	846.6	21.4		
	Subtest 3	4132	826.4	20.9	0.5	21.5
		4183	836.6	20.8		
		4233	846.6	20.9		
	Subtest 4	4132	826.4	20.9	0.5	21.5
		4183	836.6	20.9		
		4233	846.6	20.9		
HSUPA	Subtest 1	4132	826.4	21.4	0	22.0
		4183	836.6	21.4		
		4233	846.6	21.5		
	Subtest 2	4132	826.4	19.4	2	20.0
		4183	836.6	19.3		
		4233	846.6	19.3		
	Subtest 3	4132	826.4	20.3	1	21.0
		4183	836.6	20.3		
		4233	846.6	20.4		
	Subtest 4	4132	826.4	19.3	2	20.0
		4183	836.6	19.4		
		4233	846.6	19.3		
	Subtest 5	4132	826.4	21.4	0	22.0
		4183	836.6	21.5		
		4233	846.6	21.5		
DC-HSDPA	Subtest 1	4132	826.4	21.4	0	22.0
		4183	836.6	21.4		
		4233	846.6	21.4		
	Subtest 2	4132	826.4	21.4	0	22.0
		4183	836.6	21.4		
		4233	846.6	21.4		
	Subtest 3	4132	826.4	20.9	0.5	21.5
		4183	836.6	20.9		
		4233	846.6	20.9		
	Subtest 4	4132	826.4	20.9	0.5	21.5
		4183	836.6	20.9		
		4233	846.6	20.9		

8.3. LTE & 5G NR

CONDUCTED OUTPUT POWER MEASUREMENT PROCEDURE

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

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS 36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS 36.101.

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

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

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS 38.521-1 specification.

The allowed MPR for SRS, PUCCH formats 0, 1, 3 and 4, and PRACH shall be as specified for QPSK modulated DFT-s-OFDM of equivalent RB allocation. The allowed MPR for PUCCH format 2 shall be as specified for QPSK modulated CP-OFDM of equivalent RB allocation.

Table 6.2.2.3-1: Maximum power reduction (MPR) for power class 3

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	Pi/2 BPSK	≤ 3.5 ¹	≤ 1.2 ¹	≤ 0.2 ¹
		≤ 0.5 ²		0 ²
	Pi/2 BPSK w Pi/2 BPSK DMRS	≤ 0.5 ²		0 ²
	QPSK	≤ 1		0
	16 QAM	≤ 2		≤ 1
	64 QAM	≤ 2.5		
CP-OFDM	256 QAM	≤ 4.5		
	QPSK	≤ 3		≤ 1.5
	16 QAM	≤ 3		≤ 2
	64 QAM	≤ 3.5		
256 QAM	≤ 6.5			

NOTE 1: Applicable for UE operating in TDD mode with Pi/2 BPSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and if the IE *powerBoostPi2BPSK* is set to 1 and 40 % or less slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79. The reference power of 0dB MPR is 26dBm.

NOTE 2: Applicable for UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79 with Pi/2 BPSK modulation and if the IE *powerBoostPi2BPSK* is set to 0 and if more than 40% of slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79.

Table 6.2.2-2 Maximum power reduction (MPR) for power class 2

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	PI/2 BPSK	≤ 3.5	≤ 0.5	0
	QPSK	≤ 3.5	≤ 1	0
	16 QAM	≤ 3.5	≤ 2	≤ 1
	64 QAM	≤ 3.5	≤ 2.5	
	256 QAM	≤ 4.5		
CP-OFDM	QPSK	≤ 3.5	≤ 3	≤ 1.5
	16 QAM	≤ 3.5	≤ 3	≤ 2
	64 QAM	≤ 3.5		
	256 QAM	≤ 6.5		

AVERAGE OUTPUT POWER TEST PROCEDURE

The transmitter output is connected to a power meter.

The power output was measured on the EUT antenna port using SMA cable with directional coupler connected to a power meter via wideband average power sensor. Gated average output power was read directly from power meter.

PEAK OUTPUT POWER TEST PROCEDURE

The transmitter output is connected to a power meter.

The power output was measured on the EUT antenna port using SMA cable with directional coupler connected to a power meter via wideband peak power sensor. Peak output power was read directly from power meter.

RESULTS

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

8.3.1. LTE BAND 5

Test Engineer ID:	85502	Test Date:	2024-01-24	EUT Serial Number:	QV77000KL2
-------------------	-------	------------	------------	--------------------	------------

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1		
				Conducted Average (dBm)		
				20450 829 MHz	20525 836.5 MHz	20600 844 MHz
10.0	QPSK	1	0	20.31	20.27	20.26
		1	25	20.29	20.28	20.26
		1	49	20.23	20.22	20.07
		25	0	20.28	20.27	20.26
		25	12	20.34	20.28	20.27
		25	25	20.29	20.26	20.11
	16QAM	50	0	20.33	20.23	20.20
		1	0	20.54	20.59	20.59
		1	25	20.46	20.60	20.51
		1	49	20.42	20.52	20.35
		25	0	20.27	20.28	20.26
		25	12	20.38	20.29	20.26
	64QAM	25	25	20.33	20.25	20.13
		50	0	20.32	20.27	20.23
		1	0	20.61	20.40	20.39
		1	25	20.56	20.46	20.39
		1	49	20.50	20.36	20.27
		25	0	20.23	20.24	20.23
		25	12	20.30	20.26	20.24
		25	25	20.27	20.22	20.09
		50	0	20.29	20.23	20.22

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1		
				Conducted Average (dBm)		
				20425 826.5 MHz	20525 836.5 MHz	20625 846.5 MHz
5.0	QPSK	1	0	20.32	20.35	20.21
		1	12	20.26	20.27	20.15
		1	24	20.30	20.32	20.11
		12	0	20.31	20.26	20.25
		12	7	20.38	20.29	20.19
		12	13	20.32	20.23	20.17
	16QAM	25	0	20.33	20.28	20.18
		1	0	20.79	20.66	20.54
		1	12	20.69	20.68	20.45
		1	24	20.75	20.57	20.48
		12	0	20.37	20.32	20.21
		12	7	20.42	20.31	20.20
	64QAM	12	13	20.38	20.25	20.14
		25	0	20.35	20.25	20.18
		1	0	20.60	20.54	20.43
		1	12	20.56	20.50	20.36
		1	24	20.57	20.41	20.39
		12	0	20.36	20.27	20.22
		12	7	20.42	20.27	20.21
		12	13	20.39	20.22	20.18
		25	0	20.31	20.24	20.17

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1		
				Conducted Average (dBm)		
				20415	20525	20635
				825.5 MHz	836.5 MHz	847.5 MHz
3.0	QPSK	1	0	20.06	20.28	20.17
		1	8	20.02	20.35	20.18
		1	14	20.05	20.23	20.10
		8	0	20.01	20.26	20.19
		8	4	20.00	20.28	20.21
		8	7	20.02	20.27	20.18
	16QAM	15	0	20.06	20.27	20.16
		1	0	20.29	20.68	20.49
		1	8	20.24	20.74	20.45
		1	14	20.28	20.62	20.43
		8	0	20.14	20.35	20.26
		8	4	20.12	20.35	20.27
	64QAM	8	7	20.14	20.35	20.22
		15	0	20.13	20.30	20.18
		1	0	20.37	20.49	20.40
		1	8	20.45	20.62	20.45
		1	14	20.35	20.44	20.32
		8	0	20.36	20.30	20.18
		8	4	20.37	20.30	20.20
		8	7	20.37	20.30	20.16
		15	0	20.32	20.28	20.18

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1			
				Conducted Average (dBm)			
				20407	20525	20643	
				824.7 MHz	836.5 MHz	848.3 MHz	
1.4	QPSK	1	0	20.29	20.27	20.06	
		1	2	20.28	20.26	20.02	
		1	5	20.29	20.29	20.05	
		3	0	20.26	20.20	20.01	
		3	1	20.28	20.22	20.00	
		3	2	20.27	20.23	20.02	
	16QAM	6	0	20.28	20.20	20.06	
		1	0	20.62	20.49	20.29	
		1	2	20.62	20.49	20.24	
		1	5	20.60	20.53	20.28	
		3	0	20.43	20.39	20.14	
		3	1	20.41	20.38	20.12	
	64QAM	3	2	20.37	20.38	20.14	
		6	0	20.34	20.34	20.13	
		1	0	20.56	20.42	20.38	
		1	2	20.55	20.45	20.37	
		1	5	20.50	20.44	20.30	
		3	0	20.37	20.34	20.15	
			3	1	20.38	20.35	20.16
			3	2	20.37	20.35	20.13
			6	0	20.35	20.25	20.06

8.3.2. 5G NR n5

Test Engineer ID:	27338/44389	Test Date:	2024-01-04 2024-01-05 2024-01-08	EUT Serial Number:	QV77000KL2
--------------------------	-------------	-------------------	--	---------------------------	------------

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1		
				Conducted Average (dBm)		
				166800	167300	167800
20.0	BPSK	1	0	834.0	836.5	839.0
		1	52	21.63	21.66	21.67
		1	104	21.65	21.69	21.68
		50	0	21.62	21.51	21.55
		50	25	21.35	21.43	21.37
		50	50	21.48	21.45	21.42
		100	0	21.32	21.33	21.30
	QPSK	1	0	21.42	21.38	21.45
		1	52	21.67	21.69	21.65
		1	104	21.64	21.62	21.66
		50	0	21.65	21.59	21.65
		50	25	21.44	21.00	21.41
		50	50	21.48	21.42	21.42
		100	0	21.38	21.35	21.30
	16QAM	1	0	21.40	21.48	21.44
		1	52	20.86	20.80	20.85
		1	104	20.83	20.81	20.78
		50	0	20.75	20.69	20.65
		50	25	20.79	20.81	20.82
		50	50	20.79	20.76	20.72
		100	0	20.76	20.74	20.72
	64QAM	1	0	20.73	20.79	20.75
		1	52	19.35	19.28	19.28
		1	104	19.24	19.29	19.25
		50	0	19.24	19.20	19.16
		50	25	19.29	19.32	19.33
		50	50	19.34	19.27	19.26
		100	0	19.30	19.26	19.22
	256QAM	1	0	19.22	19.30	19.27
		1	52	17.34	17.32	17.25
1		104	17.33	17.24	17.30	
50		0	17.13	17.11	17.11	
50		25	17.33	17.34	17.34	
50		50	17.20	17.28	17.24	
100		0	17.28	17.22	17.22	
		100	0	17.24	17.27	17.27

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1		
				Conducted Average (dBm)		
				166300	167300	168300
15.0	BPSK	1	0	21.70	21.70	21.63
		1	39	21.69	21.67	21.60
		1	77	21.65	21.72	21.57
		36	0	21.32	21.24	21.30
		36	18	21.39	21.40	21.44
		36	36	21.33	21.29	21.24
		75	0	21.29	21.19	21.28
	16QAM	1	0	20.87	20.79	20.86
		1	39	20.74	20.78	20.78
		1	77	20.81	20.74	20.60
		36	0	20.81	20.82	20.67
		36	18	20.71	20.75	20.61
		36	36	20.69	20.74	20.61
		75	0	20.72	20.77	20.63
Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1		
				Conducted Average (dBm)		
				165800	167300	168800
10.0	BPSK	1	0	21.67	21.74	21.75
		1	26	21.73	21.68	21.64
		1	50	21.68	21.63	21.60
		25	0	21.42	21.38	21.29
		25	12	21.48	21.43	21.38
		25	25	21.36	21.35	21.25
		50	0	21.41	21.37	21.31
	16QAM	1	0	20.82	20.81	20.77
		1	26	20.79	20.77	20.74
		1	50	20.84	20.78	20.66
		25	0	20.80	20.83	20.73
		25	12	20.84	20.77	20.73
		25	25	20.84	20.76	20.70
		50	0	20.76	20.81	20.70
Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1		
				Conducted Average (dBm)		
				165300	167300	169300
5.0	BPSK	1	0	21.64	21.58	21.54
		1	12	21.64	21.57	21.60
		1	23	21.63	21.59	21.59
		12	0	21.52	21.39	21.28
		12	6	21.60	21.73	21.59
		12	12	21.46	21.39	21.23
		25	0	21.27	21.35	21.24
	16QAM	1	0	20.89	20.80	20.72
		1	12	20.80	20.75	20.65
		1	23	20.86	20.81	20.69
		12	0	20.86	20.82	20.72
		12	6	20.80	20.76	20.65
		12	12	20.80	20.79	20.67
		25	0	20.83	20.80	20.68

8.3.3. LTE BAND 12

Test Engineer ID:	27338/44389	Test Date:	12-14-2023	EUT Serial Number:	QV77000KL2
--------------------------	-------------	-------------------	------------	---------------------------	------------

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1		
				Conducted Average (dBm)		
				23060 704 MHz	23095 707.5 MHz	23130 711 MHz
10.0	QPSK	1	0	21.12	21.08	21.14
		1	25	21.10	21.13	21.11
		1	49	21.09	21.07	21.11
		25	0	21.04	21.10	21.09
		25	12	21.14	21.12	21.16
		25	25	21.14	21.20	21.15
	16QAM	50	0	21.13	21.07	21.08
		1	0	21.32	21.35	21.28
		1	25	21.33	21.49	21.35
		1	49	21.37	21.36	21.31
		25	0	21.04	21.15	21.08
		25	12	21.16	21.17	21.19
	64QAM	25	25	21.12	21.22	21.18
		50	0	21.14	21.10	21.07
		1	0	21.30	21.21	21.30
		1	25	21.29	21.34	21.25
		1	49	21.35	21.26	21.26
		25	0	21.04	21.08	21.07
		25	12	21.14	21.10	21.15
		25	25	21.12	21.16	21.14
		50	0	21.08	21.08	21.04

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1		
				Conducted Average (dBm)		
				23035 701.5 MHz	23095 707.5 MHz	23155 713.5 MHz
5.0	QPSK	1	0	21.15	21.11	21.17
		1	12	21.11	21.16	21.18
		1	24	21.06	21.09	21.13
		12	0	21.06	21.09	21.14
		12	7	21.10	21.09	21.16
		12	13	21.11	21.07	21.14
		25	0	21.09	21.10	21.11
	16QAM	1	0	21.50	21.54	21.47
		1	12	21.46	21.59	21.47
		1	24	21.40	21.54	21.44
		12	0	21.05	21.20	21.20
		12	7	21.12	21.18	21.20
		12	13	21.09	21.16	21.17
	64QAM	25	0	21.07	21.08	21.13
		1	0	21.37	21.36	21.46
		1	12	21.38	21.47	21.46
		1	24	21.38	21.34	21.44
		12	0	21.07	21.02	21.08
		12	7	21.14	21.04	21.09
		12	13	21.08	20.99	21.06
	25	0	21.08	21.08	21.11	

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1		
				Conducted Average (dBm)		
				20415 825.5 MHz	20525 836.5 MHz	20635 847.5 MHz
3.0	QPSK	1	0	21.04	21.13	21.08
		1	8	21.16	21.24	21.19
		1	14	21.02	21.10	20.99
		8	0	21.03	21.11	21.09
		8	4	21.11	21.08	21.11
		8	7	21.09	21.06	21.12
	16QAM	15	0	21.09	21.07	21.08
		1	0	21.30	21.47	21.43
		1	8	21.44	21.62	21.55
		1	14	21.30	21.53	21.43
		8	0	21.09	21.13	21.21
		8	4	21.15	21.17	21.19
	64QAM	8	7	21.14	21.16	21.18
		15	0	21.09	21.11	21.16
		1	0	21.20	21.35	21.35
		1	8	21.34	21.51	21.47
		1	14	21.18	21.34	21.30
		8	0	21.08	21.17	21.19
		8	4	21.16	21.18	21.20
		8	7	21.13	21.16	21.21
		15	0	21.11	21.08	21.15

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1		
				Conducted Average (dBm)		
				20407 824.7 MHz	20525 836.5 MHz	20643 848.3 MHz
1.4	QPSK	1	0	21.01	21.08	21.00
		1	3	21.01	21.09	21.03
		1	5	20.99	21.07	21.04
		3	0	21.01	21.09	21.00
		3	1	21.00	21.03	21.00
		3	3	20.98	21.06	21.00
	16QAM	6	0	21.04	21.05	21.07
		1	0	21.25	21.44	21.25
		1	3	21.21	21.40	21.23
		1	5	21.23	21.42	21.26
		3	0	21.13	21.19	21.16
		3	1	21.15	21.23	21.13
	64QAM	3	3	21.15	21.23	21.14
		6	0	21.13	21.10	21.14
		1	0	21.39	21.26	21.31
		1	3	21.42	21.32	21.32
		1	5	21.35	21.26	21.33
		3	0	21.17	21.24	21.16
		3	1	21.15	21.24	21.15
		3	3	21.16	21.29	21.17
		6	0	21.13	21.05	21.15

8.3.4. LTE BAND 13

Test Engineer ID:	27338/44389	Test Date:	01-26-2024	EUT Serial Number:	QV77001AL2
--------------------------	-------------	-------------------	------------	---------------------------	------------

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1		
				Conducted Average (dBm)		
				-	23230	-
10.0	QPSK	1	0	-	782 MHz	-
		1	25	-	21.62	-
		1	49	-	21.61	-
		25	0	-	21.52	-
		25	12	-	21.52	-
		25	25	-	21.60	-
	16QAM	50	0	-	21.56	-
		1	0	-	21.57	-
		1	25	-	21.59	-
		1	49	-	21.69	-
		25	0	-	21.73	-
		25	12	-	21.49	-
	64QAM	25	25	-	21.52	-
		25	25	-	21.56	-
		50	0	-	21.54	-
		1	0	-	21.75	-
		1	25	-	21.88	-
		1	49	-	21.70	-
		25	0	-	21.50	-
		25	12	-	21.52	-
25	25	-	21.59	-		
50	0	-	21.60	-		

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1		
				Conducted Average (dBm)		
				23205	23230	23255
5.0	QPSK	1	0	779.5 MHz	782 MHz	784.5 MHz
		1	12	21.50	21.49	21.54
		1	24	21.47	21.48	21.58
		1	24	21.46	21.48	21.56
		12	0	21.40	21.44	21.50
		12	7	21.50	21.48	21.56
	16QAM	12	13	21.46	21.52	21.56
		25	0	21.46	21.50	21.48
		1	0	21.72	21.85	21.84
		1	12	21.74	21.85	21.95
		1	24	21.72	21.83	21.87
		12	0	21.57	21.56	21.58
	64QAM	12	7	21.69	21.60	21.60
		12	13	21.61	21.62	21.62
		25	0	21.51	21.49	21.51
		1	0	21.69	21.72	21.76
		1	12	21.81	21.83	21.89
		1	24	21.72	21.72	21.82
		12	0	21.39	21.50	21.60
		12	7	21.50	21.53	21.67
12	13	21.46	21.56	21.69		
25	0	21.52	21.53	21.51		

8.3.5. LTE BAND 41

Test Engineer ID:		27338/44389		Test Date:		02-06-2024 02-23-2024		EUT Serial Number:		QV77001AL2	
Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2							
				Conducted Average (dBm)							
				39750	40620	41490					
				2506 MHz	2593 MHz	2680 MHz					
20.0	QPSK	1	0	18.46	18.46	18.39					
		1	49	18.50	18.58	18.46					
		1	99	18.42	18.43	18.29					
		50	0	18.44	18.51	18.43					
		50	24	18.54	18.60	18.49					
		50	50	18.52	18.56	18.48					
	16QAM	100	0	18.52	18.55	18.47					
		1	0	18.53	18.58	18.44					
		1	49	18.64	18.71	18.54					
		1	99	18.57	18.54	18.41					
		50	0	18.47	18.54	18.45					
		50	24	18.57	18.64	18.51					
	64QAM	50	50	18.54	18.58	18.48					
		100	0	18.51	18.58	18.47					
		1	0	18.47	18.50	18.42					
		1	49	18.53	18.61	18.49					
		1	99	18.48	18.50	18.34					
		50	0	18.49	18.54	18.48					
		50	24	18.59	18.64	18.55					
		50	50	18.57	18.60	18.47					
100	0	18.53	18.59	18.50							

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2							
				Conducted Average (dBm)							
				39725	40620	41515					
				2503.5 MHz	2593 MHz	2682.5 MHz					
15.0	QPSK	1	0	18.65	18.60	18.77					
		1	37	18.65	18.62	18.79					
		1	74	18.65	18.57	18.75					
		36	0	18.61	18.61	18.70					
		36	20	18.62	18.71	18.81					
		36	39	18.66	18.69	18.78					
		75	0	18.65	18.66	18.75					
	16QAM	1	0	18.67	18.61	18.74					
		1	37	18.70	18.69	18.82					
		1	74	18.65	18.59	18.78					
		36	0	18.64	18.63	18.75					
		36	20	18.64	18.72	18.84					
		36	39	18.70	18.69	18.83					
		75	0	18.68	18.68	18.79					
	64QAM	1	0	18.72	18.65	18.79					
		1	37	18.82	18.73	18.87					
		1	74	18.70	18.66	18.79					
		36	0	18.66	18.62	18.76					
		36	20	18.66	18.73	18.88					
		36	39	18.72	18.71	18.86					
75	0	18.73	18.71	18.85							

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				39700	40620	41540
				2501 MHz	2593 MHz	2685 MHz
10.0	QPSK	1	0	18.62	18.63	18.79
		1	25	18.68	18.68	18.75
		1	49	18.64	18.61	18.74
		25	0	18.70	18.61	18.73
		25	12	18.78	18.71	18.80
		25	25	18.77	18.71	18.77
	16QAM	50	0	18.70	18.66	18.81
		1	0	18.59	18.67	18.81
		1	25	18.68	18.77	18.87
		1	49	18.58	18.69	18.85
		25	0	18.68	18.66	18.79
		25	12	18.77	18.75	18.86
	64QAM	25	25	18.74	18.74	18.83
		50	0	18.77	18.71	18.83
		1	0	18.75	18.71	18.73
		1	25	18.85	18.76	18.77
		1	49	18.74	18.64	18.73
		25	0	18.70	18.63	18.77
		25	12	18.83	18.77	18.86
		25	25	18.80	18.71	18.81
50	0	18.83	18.70	18.85		

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				39675	40620	41565
				2498.5 MHz	2593 MHz	2687.5 MHz
5.0	QPSK	1	0	18.74	18.69	18.75
		1	12	18.72	18.69	18.80
		1	24	18.64	18.64	18.83
		12	0	18.71	18.63	18.80
		12	7	18.73	18.71	18.81
		12	13	18.74	18.68	18.75
	16QAM	25	0	18.69	18.69	18.77
		1	0	18.74	18.74	18.84
		1	12	18.84	18.76	18.89
		1	24	18.69	18.69	18.80
		12	0	18.73	18.69	18.84
		12	7	18.75	18.74	18.84
	64QAM	12	13	18.80	18.74	18.83
		25	0	18.72	18.71	18.80
		1	0	18.76	18.68	18.76
		1	12	18.80	18.77	18.87
		1	24	18.66	18.63	18.79
		12	0	18.66	18.64	18.78
		12	7	18.68	18.73	18.82
		12	13	18.75	18.74	18.79
25	0	18.68	18.72	18.84		

8.3.6. 5G NR n41

Test Engineer ID:	84740	Test Date:	03-05-2024 03-06-2024	EUT Serial Number:	QV770018L2
--------------------------	-------	-------------------	--------------------------	---------------------------	------------

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				509199	518598	527997
100.0	BPSK	1	1	19.65	19.77	19.70
		1	135	19.27	19.60	19.63
		1	271	19.47	19.78	19.75
		135	0	19.35	19.57	19.54
		135	67	19.31	19.48	19.44
		135	135	19.41	19.49	19.50
		270	0	19.24	19.46	19.38
	QPSK	1	1	19.60	19.78	19.81
		1	135	19.35	19.64	19.67
		1	271	19.55	19.85	19.74
		135	0	19.40	19.68	19.63
		135	67	19.22	19.42	19.36
		135	135	19.34	19.46	19.39
		270	0	19.14	19.35	19.29
	16QAM	1	1	18.33	18.52	18.53
		1	135	18.21	18.44	18.34
		1	271	18.47	18.62	18.49
		135	0	18.25	18.39	18.32
		135	67	18.26	18.36	18.29
		135	135	18.27	18.38	18.31
	64QAM	270	0	18.05	18.26	18.21
		1	1	16.84	17.03	17.05
		1	135	16.76	16.95	16.84
		1	271	16.99	17.10	16.96
		135	0	16.75	16.88	16.89
		135	67	16.70	16.91	16.82
		135	135	16.76	16.92	16.88
	256QAM	270	0	16.52	16.75	16.65
		1	1	14.96	15.08	14.96
		1	135	14.78	14.88	14.83
		1	271	15.01	15.04	14.93
		135	0	14.79	14.85	14.85
		135	67	14.74	14.88	14.79
		135	135	14.81	14.93	14.84
		270	0	14.65	14.70	14.63

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2			Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)							Conducted Average (dBm)		
				508200	518598	528996					507198	518598	529998
90.0	QPSK	1	1	19.42	19.56	19.53	80.0	QPSK	1	1	19.24	19.45	19.46
		1	120	19.28	19.52	19.41			1	108	19.31	19.44	19.40
		1	243	19.43	19.55	19.43			1	215	19.39	19.55	19.46
		120	0	19.27	19.41	19.32			108	0	19.30	19.46	19.40
		120	60	19.22	19.40	19.34			108	54	19.25	19.49	19.42
		120	120	19.32	19.44	19.34			108	108	19.35	19.50	19.41
		243	0	19.09	19.33	19.24			216	0	19.18	19.41	19.29
	16QAM	1	1	18.30	18.46	18.45		1	1	18.30	18.44	18.42	
		1	120	18.21	18.39	18.30		1	108	18.18	18.42	18.33	
		1	243	18.41	18.51	18.40		1	215	18.35	18.42	18.39	
		120	0	18.22	18.34	18.30		108	0	18.20	18.40	18.30	
		120	60	18.13	18.32	18.26		108	54	18.14	18.30	18.30	
		120	120	18.25	18.36	18.28		108	108	18.26	18.42	18.33	
		243	0	18.03	18.22	18.18		216	0	18.07	18.31	18.27	
Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2			Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)							Conducted Average (dBm)		
				506196	518598	530994					505200	518598	531996
70.0	QPSK	1	1	19.20	19.38	19.38	60.0	QPSK	1	1	19.20	19.35	19.24
		1	81	19.27	19.52	19.36			1	81	19.16	19.35	19.25
		1	160	19.49	19.73	19.51			1	160	19.30	19.45	19.25
		81	0	19.32	19.50	19.44			81	0	19.23	19.30	19.25
		81	40	19.33	19.56	19.40			81	40	19.12	19.56	19.20
		81	81	19.31	19.50	19.42			81	81	19.31	19.65	19.27
		162	0	19.25	19.47	19.32			162	0	19.14	19.40	19.24
	16QAM	1	1	18.16	18.45	18.41		1	1	18.19	18.00	18.24	
		1	81	18.30	18.45	18.35		1	81	18.09	18.32	18.11	
		1	160	18.45	18.62	18.46		1	160	18.22	18.45	18.22	
		81	0	18.26	18.48	18.37		81	0	18.14	18.43	18.23	
		81	40	18.24	18.40	18.28		81	40	18.09	18.62	18.15	
		81	81	18.25	18.41	18.34		81	81	18.22	18.68	18.16	
		162	0	18.21	18.39	18.25		162	0	18.05	18.43	18.13	
Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2			Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)							Conducted Average (dBm)		
				504198	518598	532998					503199	518598	533997
50.0	QPSK	1	1	19.27	19.56	19.51	40.0	QPSK	1	1	19.14	19.33	19.23
		1	64	19.44	19.50	19.46			1	50	19.25	19.39	19.34
		1	131	19.49	19.68	19.54			1	104	19.35	19.46	19.26
		64	0	19.47	19.60	19.56			50	0	19.31	19.47	19.42
		64	32	19.51	19.61	19.55			50	25	19.34	19.47	19.40
		64	64	19.47	19.67	19.50			50	50	19.34	19.48	19.38
		128	0	19.42	19.55	19.50			100	0	19.33	19.46	19.37
	16QAM	1	1	18.39	18.57	18.51		1	1	18.22	18.41	18.30	
		1	64	18.35	18.48	18.41		1	50	18.24	18.40	18.30	
		1	131	18.49	18.61	18.40		1	104	18.22	18.42	18.19	
		64	0	18.37	18.53	18.46		50	0	18.27	18.39	18.32	
		64	32	18.35	18.49	18.40		50	25	18.24	18.35	18.27	
		64	64	18.39	18.60	18.41		50	50	18.31	18.41	18.31	
		128	0	18.35	18.46	18.40		100	0	18.24	18.37	18.29	
Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2			Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)							Conducted Average (dBm)		
				502200	518598	534996					501198	518598	535998
30.0	QPSK	1	1	19.33	19.45	19.40	20.0	BPSK	1	1	19.12	19.31	19.18
		1	36	19.30	19.42	19.27			1	25	19.30	19.46	19.20
		1	76	19.40	19.65	19.34			1	49	19.30	19.48	19.18
		36	0	19.38	19.51	19.40			25	0	19.29	19.40	19.27
		36	18	19.32	19.45	19.33			25	12	19.27	19.36	19.22
		36	36	19.39	19.47	19.37			25	25	19.31	19.49	19.23
		75	0	19.38	19.48	19.36			50	0	19.30	19.41	19.27
	16QAM	1	1	18.30	18.55	18.44		1	1	18.19	18.35	18.17	
		1	36	18.30	18.39	18.27		1	25	18.25	18.36	18.19	
		1	76	18.37	18.46	18.29		1	49	18.23	18.42	18.17	
		36	0	18.32	18.45	18.35		25	0	18.23	18.35	18.22	
		36	18	18.26	18.36	18.24		25	12	18.17	18.27	18.14	
		36	36	18.33	18.41	18.30		25	25	18.24	18.34	18.20	
		75	0	18.30	18.41	18.27		50	0	18.22	18.32	18.20	

8.3.7. LTE BAND 66

Test Engineer ID:	27338/44389	Test Date:	01-19-2024 02-05-2024	EUT Serial Number:	QV77001AL2
--------------------------	-------------	-------------------	--------------------------	---------------------------	------------

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2			Sub Antenna			
				Conducted Average (dBm)			Conducted Average (dBm)			
				132072 1720 MHz	132322 1745 MHz	132572 1770 MHz	132072 1720 MHz	132322 1745 MHz	132572 1770 MHz	
20.0	QPSK	1	0	19.95	19.98	19.99	13.81	13.80	13.74	
		1	49	19.98	20.03	19.95	13.85	13.78	13.73	
		1	99	19.93	19.92	19.92	13.76	13.66	13.65	
		50	0	19.97	20.01	20.05	13.92	13.83	13.74	
		50	24	20.04	19.99	20.01	13.92	13.89	13.81	
		50	50	20.02	20.04	19.96	13.86	13.81	13.74	
	16QAM	100	0	20.01	19.97	19.98	13.86	13.84	13.76	
		1	0	20.21	20.24	20.31	14.13	14.10	14.06	
		1	49	20.24	20.26	20.21	14.22	14.12	14.04	
		1	99	20.20	20.24	20.18	14.13	14.02	13.95	
		50	0	20.01	20.03	20.06	13.93	13.84	13.75	
		50	24	20.07	20.01	20.03	13.91	13.91	13.83	
	64QAM	50	50	20.05	20.06	20.03	13.87	13.83	13.76	
		100	0	20.02	20.00	19.98	13.90	13.85	13.79	
		1	0	20.18	20.33	20.26	14.12	14.09	14.02	
		1	49	20.30	20.31	20.14	14.13	14.10	14.04	
		1	99	20.16	20.25	20.13	14.06	13.99	13.98	
		50	0	19.98	20.02	20.03	13.93	13.84	13.76	
			50	24	20.08	20.01	20.01	13.92	13.92	13.81
			50	50	20.04	20.06	19.98	13.87	13.85	13.75
			100	0	20.06	20.00	20.01	13.92	13.87	13.79

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 1			Sub Antenna			
				Conducted Average (dBm)			Conducted Average (dBm)			
				132047 1717.5 MHz	132322 1745 MHz	132597 1772.5 MHz	132047 1717.5 MHz	132322 1745 MHz	132597 1772.5 MHz	
15.0	QPSK	1	0	20.02	20.10	19.98	13.92	13.88	13.72	
		1	37	19.95	20.03	19.97	13.88	13.84	13.77	
		1	74	19.98	19.93	19.89	13.81	13.68	13.70	
		36	0	20.03	20.00	19.92	13.91	13.80	13.71	
		36	20	20.04	19.99	19.91	13.93	13.84	13.70	
		36	39	20.01	20.02	19.93	13.91	13.83	13.75	
	16QAM	75	0	19.99	19.92	19.86	13.88	13.82	13.70	
		1	0	20.28	20.32	20.17	14.17	14.17	14.08	
		1	37	20.28	20.31	20.13	14.19	14.14	14.10	
		1	74	20.21	20.15	20.13	14.10	13.99	14.02	
		36	0	20.05	20.02	19.98	13.95	13.85	13.75	
		36	20	20.07	20.01	19.96	13.90	13.89	13.75	
	64QAM	36	39	20.05	20.06	20.00	13.92	13.84	13.75	
		75	0	20.01	19.99	19.91	13.90	13.86	13.72	
		1	0	20.39	20.38	20.30	14.26	14.20	14.03	
		1	37	20.32	20.40	20.24	14.24	14.19	14.07	
		1	74	20.30	20.26	20.22	14.16	14.07	13.99	
		36	0	20.06	20.02	19.95	13.97	13.83	13.81	
			36	20	20.06	20.03	19.94	13.95	13.90	13.74
			36	39	20.04	20.06	20.00	13.91	13.86	13.75
			75	0	20.06	19.98	19.92	13.94	13.86	13.73

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2			Sub Antenna		
				Conducted Average (dBm)			Conducted Average (dBm)		
				132022 1715 MHz	132322 1745 MHz	132622 1775 MHz	132022 1715 MHz	132322 1745 MHz	132622 1775 MHz
10.0	QPSK	1	0	19.94	20.03	20.02	13.93	13.81	13.73
		1	25	19.98	20.07	19.97	13.94	13.88	13.79
		1	49	19.94	19.99	19.92	13.81	13.77	13.67
		25	0	20.01	19.99	20.01	13.95	13.82	13.71
		25	12	20.04	20.11	20.00	13.97	13.89	13.78
		25	25	19.99	20.07	19.99	13.93	13.85	13.75
	16QAM	50	0	19.99	19.99	20.00	13.91	13.86	13.76
		1	0	20.19	20.25	20.11	14.10	14.07	13.93
		1	25	20.15	20.29	20.17	14.15	14.09	14.04
		1	49	20.18	20.15	20.08	14.13	13.97	13.96
		25	0	20.07	20.05	20.06	13.99	13.89	13.73
		25	12	20.06	20.17	20.06	13.97	13.94	13.83
	64QAM	25	25	20.07	20.12	20.04	13.94	13.95	13.77
		50	0	20.02	20.02	20.03	13.95	13.91	13.79
		1	0	20.21	20.32	20.30	14.16	14.21	14.02
		1	25	20.37	20.35	20.35	14.24	14.20	14.12
		1	49	20.32	20.33	20.20	14.13	14.03	13.92
		25	0	20.08	20.05	20.06	14.00	13.80	13.75
		25	12	20.10	20.12	20.07	13.96	13.92	13.81
		25	25	20.08	20.09	20.03	13.97	13.88	13.80
		50	0	20.04	20.04	20.04	13.93	13.91	13.79

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2			Sub Antenna		
				Conducted Average (dBm)			Conducted Average (dBm)		
				131997 1712.5 MHz	132322 1745 MHz	132647 1777.5 MHz	131997 1712.5 MHz	132322 1745 MHz	132647 1777.5 MHz
5.0	QPSK	1	0	19.98	20.04	19.99	13.91	13.80	13.68
		1	12	20.05	20.10	20.02	13.95	13.89	13.78
		1	24	19.97	19.95	19.97	13.85	13.77	13.65
		12	0	20.03	20.09	20.01	13.92	13.91	13.68
		12	7	20.06	20.12	20.04	14.00	13.94	13.72
		12	13	20.02	20.09	20.01	13.91	13.85	13.75
	16QAM	25	0	20.01	20.07	19.99	13.90	13.85	13.66
		1	0	20.37	20.34	20.35	14.28	14.22	14.09
		1	12	20.38	20.42	20.37	14.36	14.28	14.18
		1	24	20.34	20.38	20.28	14.31	14.17	14.07
		12	0	20.12	20.16	20.04	14.00	13.86	13.69
		12	7	20.18	20.18	20.12	14.06	13.91	13.72
	64QAM	12	13	20.11	20.13	20.07	13.97	13.85	13.74
		25	0	20.09	20.12	20.05	13.98	13.88	13.70
		1	0	20.29	20.24	20.23	14.28	14.13	13.97
		1	12	20.33	20.33	20.28	14.28	14.20	14.09
		1	24	20.24	20.27	20.19	14.24	14.07	13.97
		12	0	20.07	20.22	20.03	13.93	13.88	13.72
		12	7	20.08	20.24	20.08	13.99	13.95	13.84
		12	13	20.02	20.16	20.04	13.93	13.87	13.76
		25	0	20.05	20.10	20.05	13.96	13.90	13.70

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2			Sub Antenna		
				Conducted Average (dBm)			Conducted Average (dBm)		
				131987 1711.5 MHz	132322 1745 MHz	132657 1778.5 MHz	131987 1711.5 MHz	132322 1745 MHz	132657 1778.5 MHz
3.0	QPSK	1	0	19.95	19.99	19.90	13.90	13.82	13.72
		1	8	20.09	20.11	19.98	13.97	13.91	13.78
		1	14	19.95	19.98	19.92	13.84	13.80	13.64
		8	0	20.08	20.08	19.97	13.95	13.88	13.75
		8	4	20.09	20.12	19.99	13.96	13.95	13.78
		8	7	20.08	20.08	19.97	13.99	13.94	13.77
	16QAM	15	0	20.06	20.05	19.98	13.96	13.87	13.74
		1	0	20.27	20.22	20.09	14.27	14.17	13.99
		1	8	20.40	20.38	20.21	14.30	14.29	14.06
		1	14	20.29	20.15	20.11	14.21	14.11	13.95
		8	0	20.16	20.17	20.09	14.07	13.98	13.77
		8	4	20.20	20.20	20.11	14.06	13.97	13.78
	64QAM	8	7	20.21	20.21	20.13	14.05	13.95	13.78
		15	0	20.11	20.11	20.03	14.03	13.96	13.78
		1	0	20.31	20.30	20.20	14.21	14.09	13.81
1		8	20.40	20.42	20.33	14.32	14.23	13.93	
1		14	20.26	20.22	20.21	14.22	14.03	13.80	
8		0	20.16	20.16	20.06	14.09	13.91	13.79	
		8	4	20.18	20.18	20.05	14.11	13.95	13.84
		8	7	20.14	20.20	20.07	14.12	13.99	13.83
		15	0	20.13	20.12	20.06	14.05	13.90	13.89

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2			Sub Antenna		
				Conducted Average (dBm)			Conducted Average (dBm)		
				131979 1710.7 MHz	132322 1745 MHz	132665 1779.3 MHz	131979 1710.7 MHz	132322 1745 MHz	132665 1779.3 MHz
1.4	QPSK	1	0	19.88	19.99	19.93	13.77	13.75	13.66
		1	3	19.90	19.95	19.90	13.80	13.77	13.60
		1	5	19.88	19.95	19.90	13.77	13.72	13.59
		3	0	19.90	19.94	19.90	13.77	13.75	13.65
		3	1	19.90	19.90	19.90	13.72	13.72	13.66
		3	3	19.91	19.93	19.90	13.84	13.72	13.63
	16QAM	6	0	19.92	19.99	19.95	13.85	13.76	13.66
		1	0	20.27	20.29	20.33	14.03	14.17	13.86
		1	3	20.30	20.23	20.28	14.08	14.16	13.95
		1	5	20.27	20.22	20.29	13.99	14.16	13.91
		3	0	20.12	20.14	20.05	14.01	13.93	13.82
		3	1	20.05	20.17	20.07	14.00	13.95	13.80
	64QAM	3	3	20.07	20.14	20.05	13.98	13.91	13.79
		6	0	20.00	20.10	20.00	13.93	13.87	13.75
		1	0	20.24	20.32	20.25	14.17	14.15	13.99
		1	3	20.23	20.30	20.24	14.21	14.15	13.99
		1	5	20.17	20.29	20.17	14.13	14.10	13.97
		3	0	20.06	20.15	20.05	13.90	13.92	13.81
		3	1	20.07	20.19	20.04	13.88	13.96	13.82
		3	3	20.03	20.14	20.08	13.97	13.95	13.85
		6	0	20.13	20.04	19.98	14.02	13.91	13.90

8.3.8. 5G NR n66

Test Engineer ID:	84740	Test Date:	03-05-2024 03-06-2024	EUT Serial Number:	QV770018L2
--------------------------	-------	-------------------	--------------------------	---------------------------	------------

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				344000	349000	354000
20.0	BPSK	1	0	20.68	20.79	20.77
		1	52	20.81	20.84	20.67
		1	104	20.80	20.76	20.71
		50	0	20.44	20.54	20.59
		50	25	20.61	20.64	20.65
		50	50	20.47	20.52	20.57
	QPSK	100	0	20.44	20.54	20.57
		1	0	20.65	20.81	20.75
		1	52	20.75	20.80	20.70
		1	104	20.77	20.78	20.63
		50	0	20.47	20.47	20.50
		50	25	20.43	20.53	20.56
	16QAM	50	50	20.43	20.55	20.56
		100	0	20.42	20.54	20.58
		1	0	19.90	19.91	19.95
		1	52	19.89	19.98	19.99
		1	104	19.91	19.95	19.98
		50	0	19.91	19.92	19.92
	64QAM	50	25	19.83	19.94	19.95
		50	50	19.87	19.98	19.99
		100	0	19.87	19.99	20.00
		1	0	17.83	17.92	17.95
		1	52	17.93	18.01	18.04
		1	104	17.92	17.95	17.99
	256QAM	50	0	17.92	17.91	17.95
		50	25	17.89	18.00	18.02
		50	50	17.87	17.98	18.01
		100	0	17.89	17.90	18.01
		1	0	15.89	15.91	15.91
		1	52	15.87	16.00	16.02
	16QAM	1	104	15.89	15.92	15.94
		50	0	15.89	15.91	15.92
		50	25	15.87	15.98	16.01
	256QAM	50	50	15.85	15.95	15.99
		100	0	15.85	15.96	15.98

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				343500	349000	354500
15.0	BPSK	1	0	20.82	20.90	20.78
		1	39	20.73	20.79	20.68
		1	77	20.86	20.76	20.68
		36	0	20.47	20.52	20.54
		36	18	20.48	20.53	20.58
		36	36	20.42	20.57	20.51
		75	0	20.47	20.51	20.54
	16QAM	1	0	19.51	19.47	19.62
		1	39	19.38	19.48	19.50
		1	77	19.48	19.51	19.53
		36	0	19.40	19.42	19.54
		36	18	19.30	19.31	19.42
		36	36	19.36	19.49	19.49
		75	0	19.36	19.40	19.51

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				343000	349000	355000
10.0	QPSK	1	0	20.78	20.68	20.77
		1	26	20.78	20.75	20.78
		1	50	20.82	20.67	20.74
		25	0	20.45	20.60	20.45
		25	12	20.52	20.59	20.51
		25	25	20.63	20.65	20.51
	16QAM	50	0	20.51	20.62	20.53
		1	0	19.47	19.55	19.42
		1	26	19.42	19.52	19.39
		1	50	19.52	19.53	19.50
		25	0	19.43	19.55	19.41
		25	12	19.40	19.50	19.37
		25	25	19.43	19.54	19.42
		50	0	19.42	19.52	19.41
Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				342500	349000	355500
5.0	QPSK	1	0	20.83	20.92	20.77
		1	12	20.78	20.92	20.81
		1	23	20.85	20.89	20.83
		12	0	20.78	20.81	20.73
		12	6	20.99	20.91	20.85
		12	12	20.75	20.85	20.77
	16QAM	25	0	20.85	20.89	20.80
		1	0	19.76	19.80	19.78
		1	12	19.81	19.82	19.84
		1	23	19.75	19.79	19.75
		12	0	19.79	19.82	19.80
		12	6	19.79	19.83	19.80
		12	12	19.77	19.84	19.80
		25	0	19.78	19.80	19.77

9. CONDUCTED TEST RESULTS

9.1. 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.

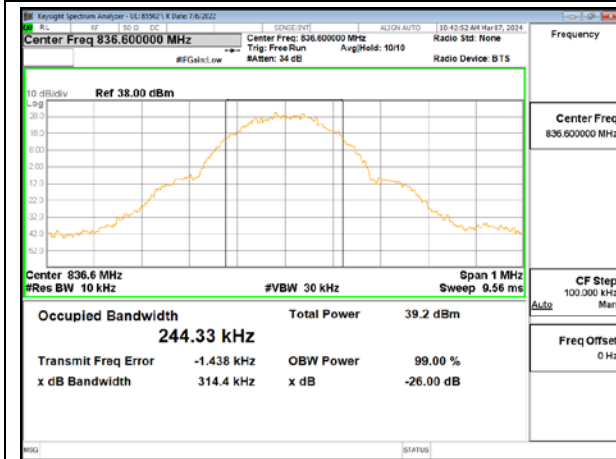
RESULTS

There is no limit required and power is the same for low, middle and high channel; therefore, only middle channel was tested. Worst-case plots (highest bandwidth) are reported only.

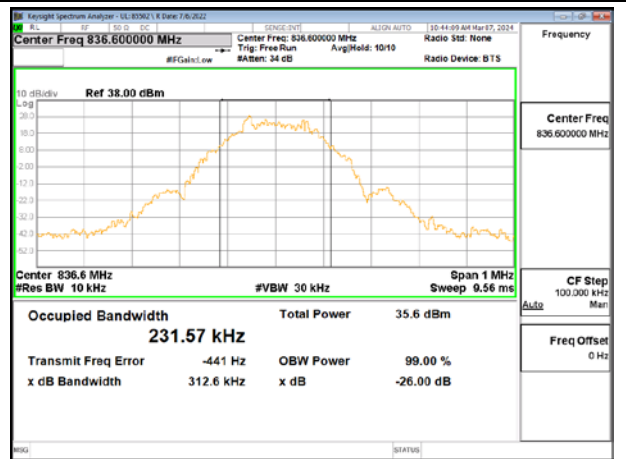
GSM

Band	Modulation	Channel	f(MHz)	99% BW (kHz)	-26dB BW (kHz)
850	GPRS	190	836.6	244.33	314.4
	EGPRS			231.57	312.6
1900	GPRS	661	1880.0	242.47	317.5
	EGPRS			250.33	322.6
	HSDPA			4.1404	4.700

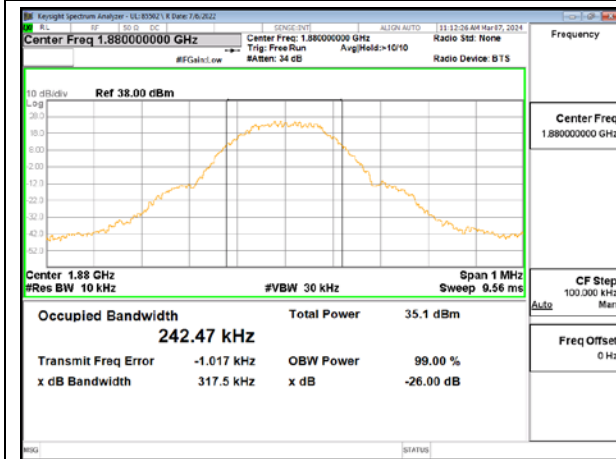
9.1.1. GSM



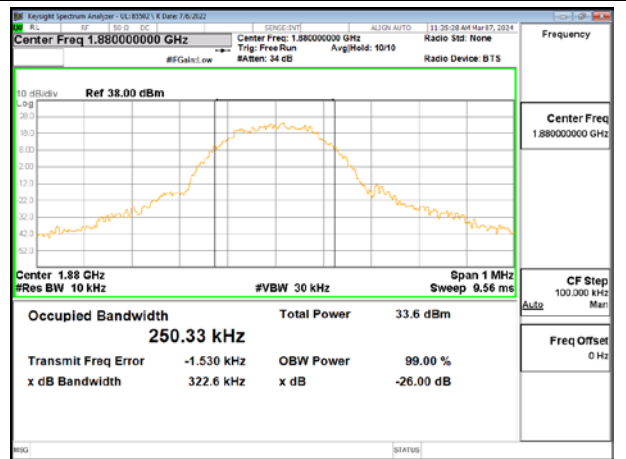
GSM 850 GPRS Middle Channel



GSM 850 EGPRS Middle Channel



GSM 1900 GPRS Middle Channel

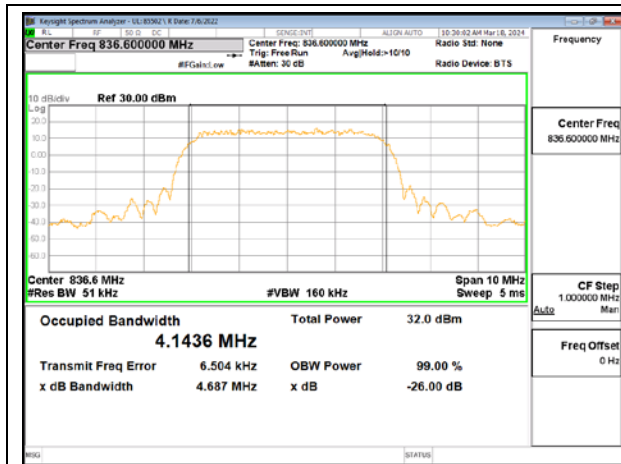


GSM 1900 EGPRS Middle Channel

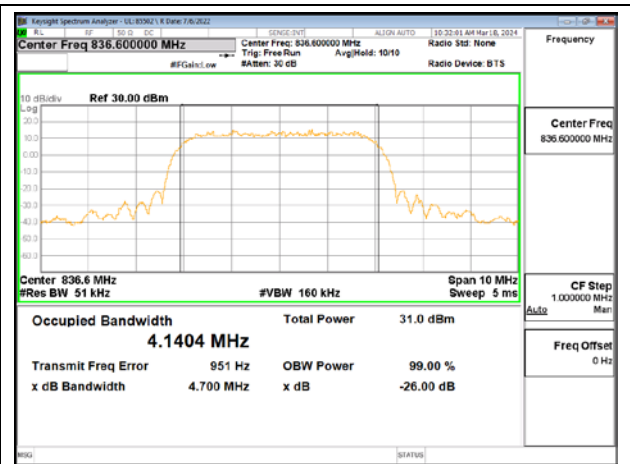
9.1.2. WCDMA

WCDMA

Band	Modulation	Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
BAND 5	REL 99	4408	836.6	4.1436	4.687
	HSDPA			4.1404	4.700



WCDMA Band 5 Rel 99 Middle Channel

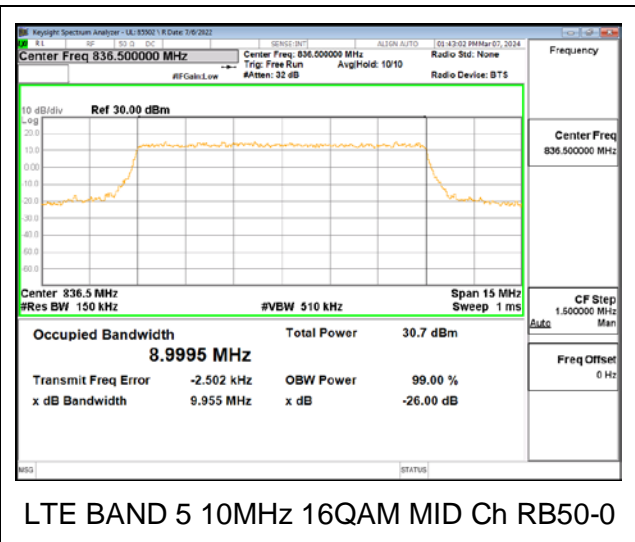
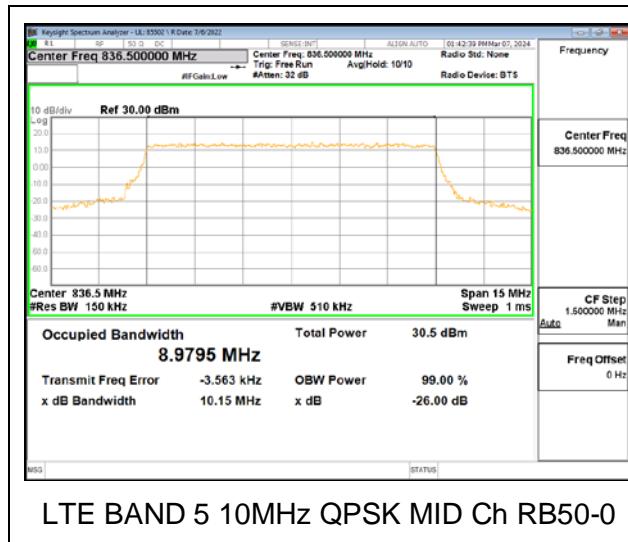


WCDMA Band 5 HSDPA Middle Channel

Test Engineer ID:	85502	Test Date:	2024-03-18	EUT Serial Number:	QV770018L2
-------------------	-------	------------	------------	--------------------	------------

9.1.3. LTE BAND 5

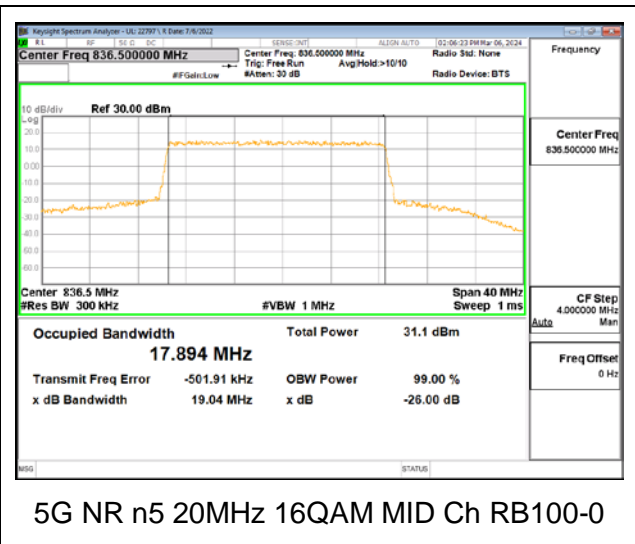
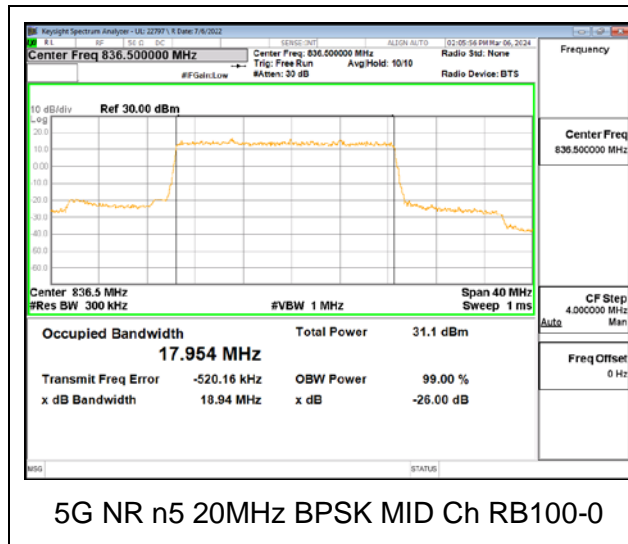
Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 5	1.4MHz, QPSK	6/0	836.5	1.0919	1.328
	1.4MHz, 16QAM			1.1010	1.468
	3MHz, QPSK	15/0		2.7119	3.051
	3MHz, 16QAM			2.7024	3.092
	5MHz, QPSK	25/0		4.5009	5.074
	5MHz, 16QAM			4.4989	5.083
	10MHz, QPSK	50/0		8.9795	10.15
	10MHz, 16QAM			8.9995	9.955



Test Engineer ID:	85502	Test Date:	2024-03-07	EUT Serial Number:	QV7700DSLQ
-------------------	-------	------------	------------	--------------------	------------

9.1.4. 5G NR n5

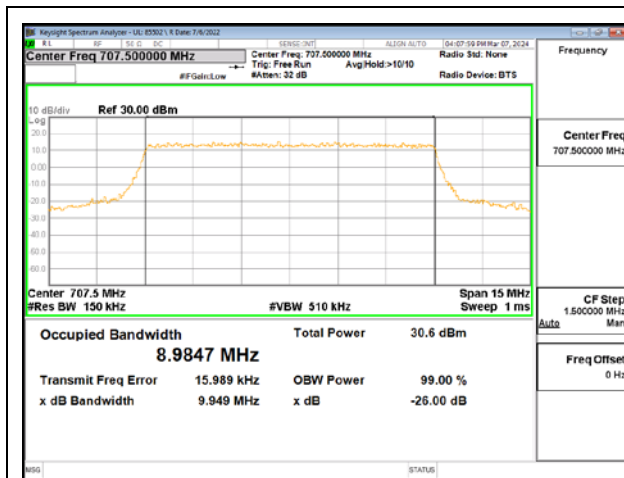
Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n5	5MHz, BPSK	25/0	836.5	4.4938	5.099
	5MHz, 16QAM			4.4963	5.242
	10MHz, BPSK	50/0		8.9692	9.731
	10MHz, 16QAM			8.9675	9.773
	15MHz, BPSK	75/0		13.442	14.39
	15MHz, 16QAM			13.456	14.39
	20MHz, BPSK	100/0		17.954	18.94
	20MHz, 16QAM			17.894	19.04



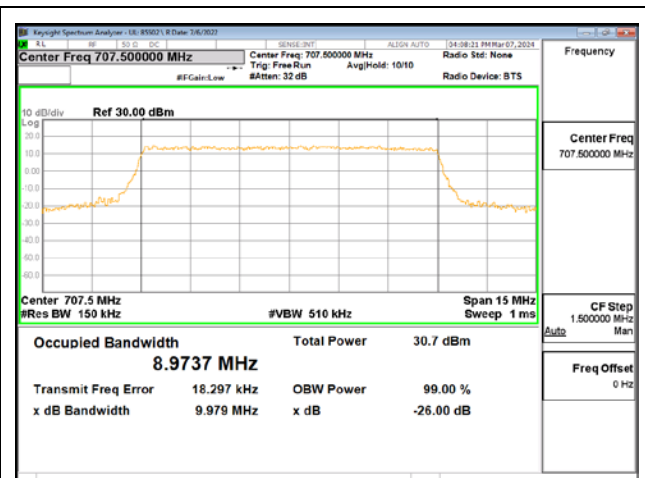
Test Engineer ID:	22797/84740	Test Date:	2024-03-06	EUT Serial Number:	QV7700DSLQ
-------------------	-------------	------------	------------	--------------------	------------

9.1.5. LTE BAND 12

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 12	1.4MHz, QPSK	6/0	707.5	1.0938	1.382
	1.4MHz, 16QAM			1.0941	1.455
	3MHz, QPSK	15/0		2.7076	3.074
	3MHz, 16QAM			2.7047	3.030
	5MHz, QPSK	25/0		4.4956	5.104
	5MHz, 16QAM			4.5032	5.145
	10MHz, QPSK	50/0		8.9847	9.949
	10MHz, 16QAM			8.9737	9.979



LTE BAND 12 10MHz QPSK MID Ch RB50-0

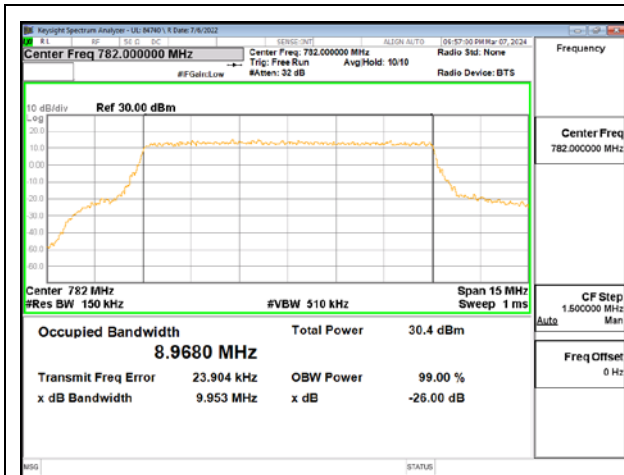


LTE BAND 12 10MHz 16QAM MID Ch RB50-0

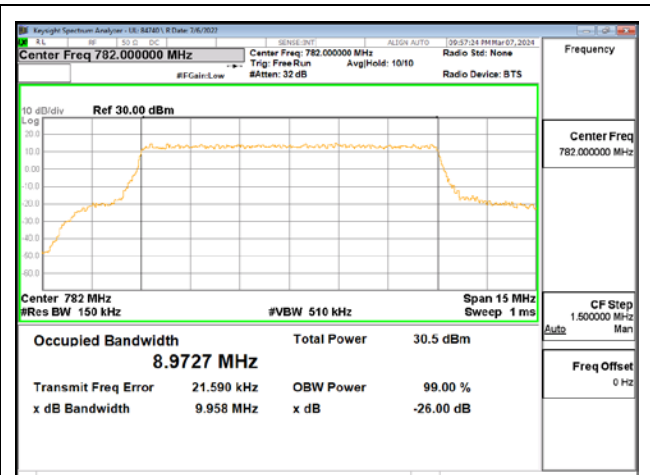
Test Engineer ID:	85502	Test Date:	2024-03-07	EUT Serial Number:	QV7700DSLQ
-------------------	-------	------------	------------	--------------------	------------

9.1.6. LTE BAND 13

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 13	5MHz, QPSK	25/0	782.0	4.4991	5.151
	5MHz, 16QAM			4.4966	5.077
	10MHz, QPSK	50/0		8.9680	9.953
	10MHz, 16QAM			8.9727	9.958



LTE BAND 13 10MHz QPSK MID Ch RB50-0

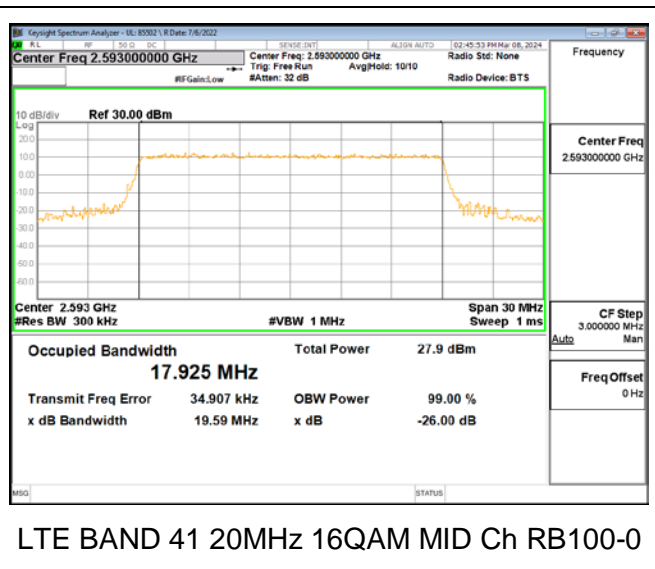
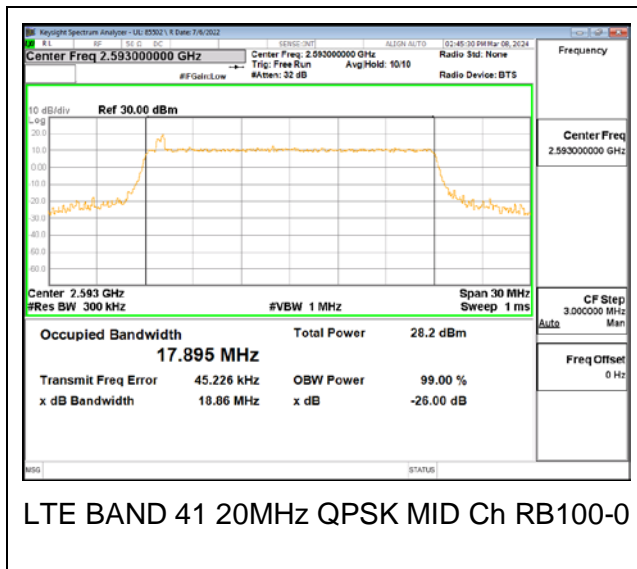


LTE BAND 13 10MHz 16QAM MID Ch RB50-0

Test Engineer ID:	84740	Test Date:	2024-03-07	EUT Serial Number:	QV7700DSLQ
-------------------	-------	------------	------------	--------------------	------------

9.1.7. LTE BAND 41

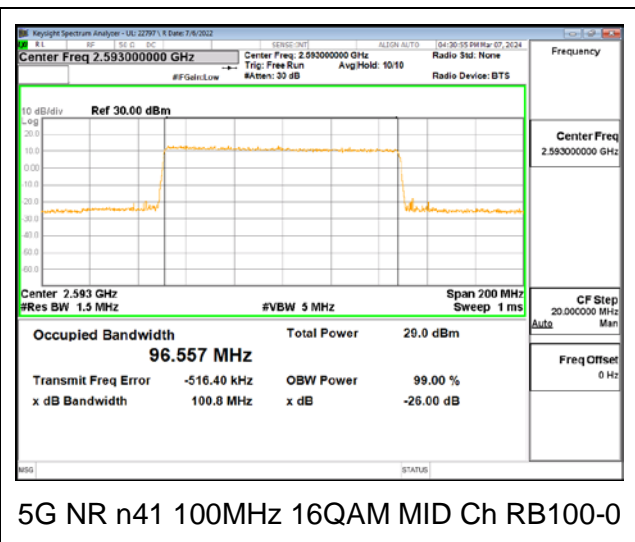
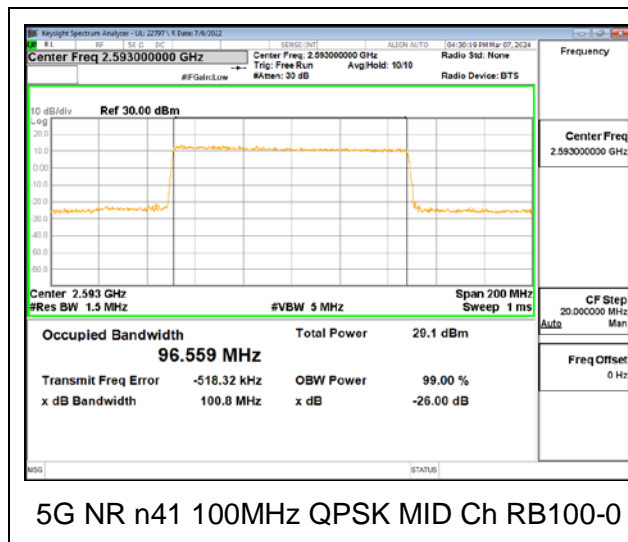
Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 41	5MHz, QPSK	25/0	2593.0	4.5080	5.059
	5MHz, 16QAM			4.4897	4.813
	10MHz, QPSK	50/0		8.9510	9.446
	10MHz, 16QAM			8.9717	10.01
	15MHz, QPSK	75/0		13.466	14.80
	15MHz, 16QAM			13.477	14.59
	20MHz, QPSK	100/0		17.895	18.86
	20MHz, 16QAM			17.925	19.59



Test Engineer ID:	85502	Test Date:	2024-03-08	EUT Serial Number:	QV7700DSLQ
-------------------	-------	------------	------------	--------------------	------------

9.1.8. 5G NR n41

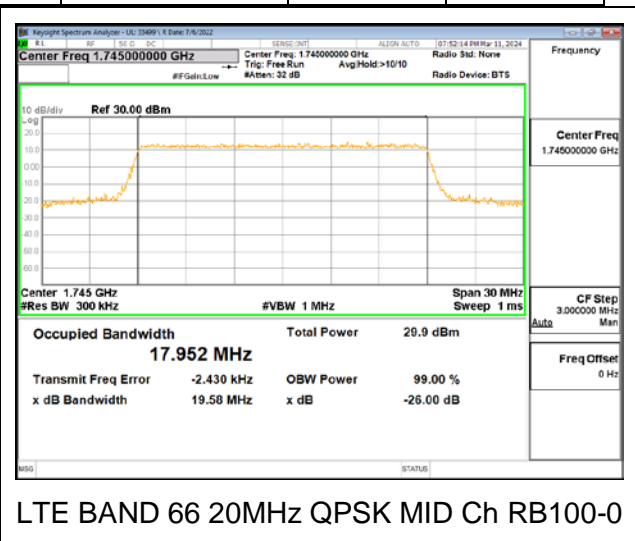
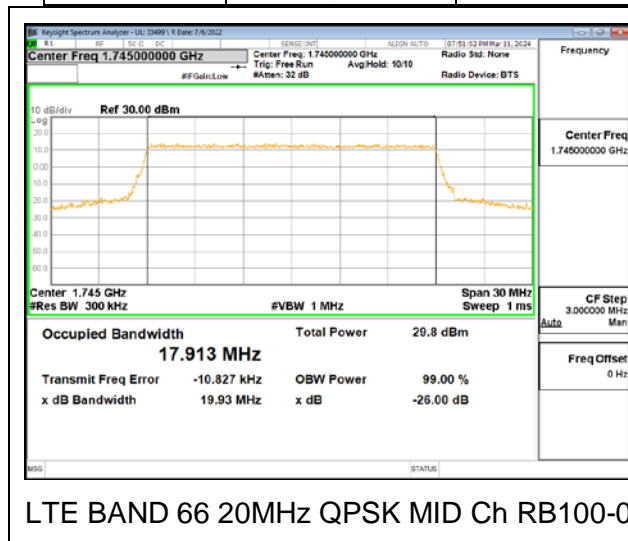
Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n41	20MHz, QPSK	50/0	2593.0	17.933	19.70
	20MHz, 16QAM			17.931	19.59
	30MHz, QPSK	75/0		26.876	28.95
	30MHz, 16QAM			26.938	28.97
	40MHz, QPSK	100/0		35.824	38.34
	40MHz, 16QAM			35.834	38.17
	50MHz, QPSK	128/0		45.926	48.38
	50MHz, 16QAM			45.757	48.54
	60MHz, QPSK	162/0		57.214	60.08
	60MHz, 16QAM			57.254	60.12
	70MHz, QPSK	162/0		64.349	67.80
	70MHz, 16QAM			64.377	67.59
	80MHz, QPSK	216/0		77.219	80.69
	80MHz, 16QAM			77.257	80.74
	90MHz, QPSK	243/0		86.848	90.85
	90MHz, 16QAM			86.923	90.62
100MHz, QPSK	270/0	96.559	100.8		
100MHz, 16QAM		96.557	100.8		



Test Engineer ID:	22797/84740	Test Date:	2024-03-07	EUT Serial Number:	QV7700DSLQ
-------------------	-------------	------------	------------	--------------------	------------

9.1.9. LTE BAND 66

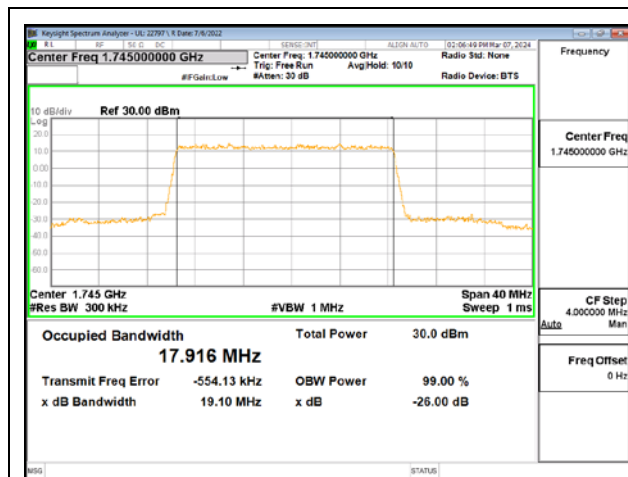
Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 66	1.4MHz, QPSK	6/0	1745.0	1.0946	1.389
	1.4MHz, 16QAM			1.0961	1.403
	3MHz, QPSK	15/0		2.6969	3.052
	3MHz, 16QAM			2.6989	3.048
	5MHz, QPSK	25/0		4.5047	5.112
	5MHz, 16QAM			4.4977	5.121
	10MHz, QPSK	50/0		8.9814	10.00
	10MHz, 16QAM			8.9762	10.02
	15MHz, QPSK	75/0		13.474	14.92
	15MHz, 16QAM			13.458	14.90
	20MHz, QPSK	100/0		17.913	19.93
	20MHz, 16QAM			17.952	19.58



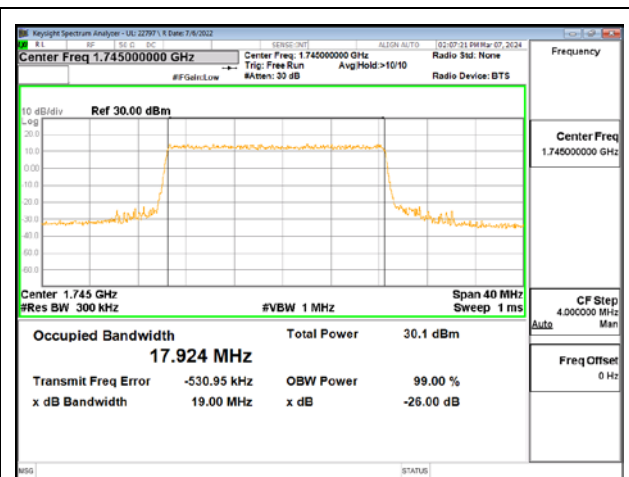
Test Engineer ID:	33499/85502	Test Date:	2024-03-11	EUT Serial Number:	QV77000KL2
-------------------	-------------	------------	------------	--------------------	------------

9.1.10. 5G NR n66

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n66	5MHz, BPSK	25/0	1745	4.4888	5.063
	5MHz, 16QAM			4.4978	5.031
	10MHz, BPSK	50/0		8.9807	9.838
	10MHz, 16QAM			8.9775	9.785
	15MHz, BPSK	75/0		13.452	14.40
	15MHz, 16QAM			13.439	14.43
	20MHz, BPSK	100/0		17.916	19.10
	20MHz, 16QAM			17.924	19.00



5G NR n66 20MHz BPSK MID Ch RB100-0



5G NR n66 20MHz 16QAM MID Ch RB100-0

Test Engineer ID:	22797/84740	Test Date:	2024-03-07	EUT Serial Number:	QV7700DSLQ
-------------------	-------------	------------	------------	--------------------	------------

9.2. EMISSION MASK AND BAND EDGE

For Spectrum Emission Mask plots, the Keysight PXA N9030A is configured to sweep with a moving integration window, the width of which can be adjusted to different sizes across the sweep. The window width is configured to be greater than or equal to the required reference bandwidth. The center frequencies of the integration window for the different integration windows was set such that the upper and lower edges of the windows are aligned with the transition points in the reference bandwidths. This is achieved by setting the start / stop frequencies of the window with an offset equal to the reference bandwidth / 2 from the transition point.

TEST PROCEDURE

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

For each band edge measurement:

1. Set the spectrum analyzer span to include the block edge frequency.
2. Set a marker to point the corresponding band edge frequency in each test case.
3. Set display line at -13/-25/-40 dBm
4. Set resolution bandwidth to at least 1% of emission bandwidth.

TEST PROCEDURE (FCC LTE BAND 41)

(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.

RESULTS

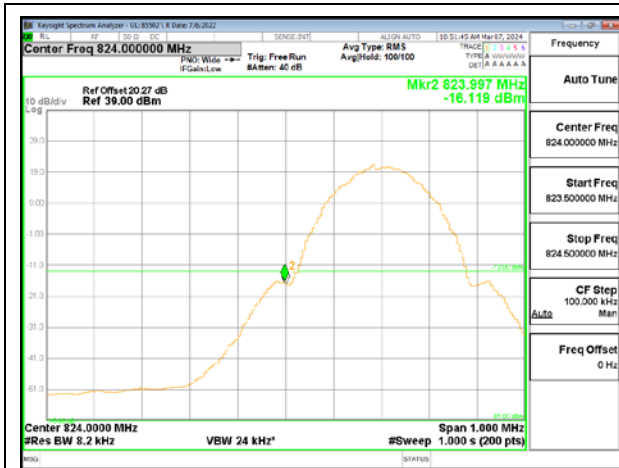
9.2.1. GSM 850

LIMITS

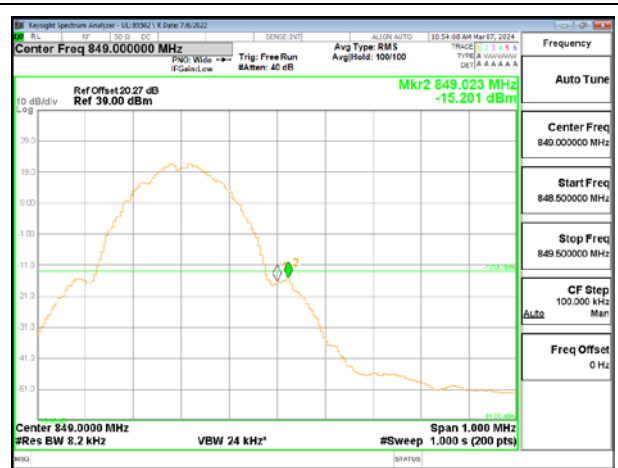
FCC: §22.917 (a)

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.

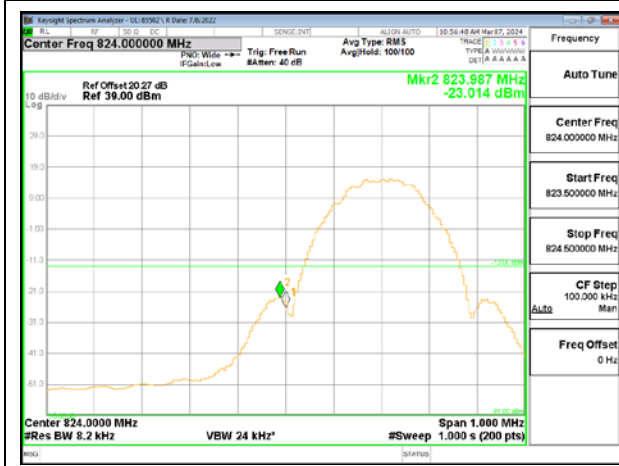
Test Engineer ID:	85502	Test Date:	2024-03-07	EUT Serial Number:	QV7700DSLQ
--------------------------	-------	-------------------	------------	---------------------------	------------



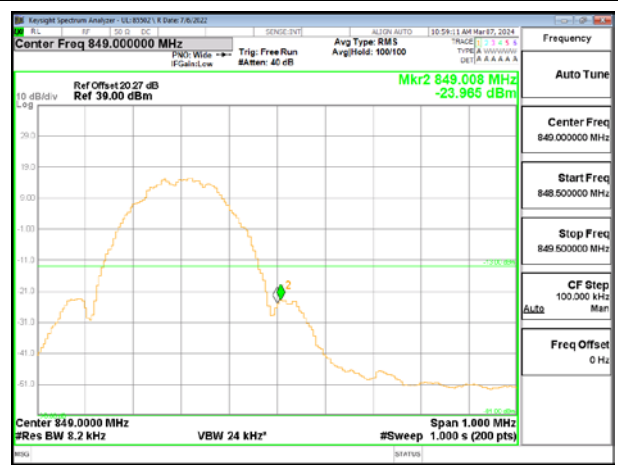
GSM 850 GPRS Low Channel



GSM 850 GPRS High Channel



GSM 850 EGPRS Low Channel



GSM 850 EGPRS High Channel

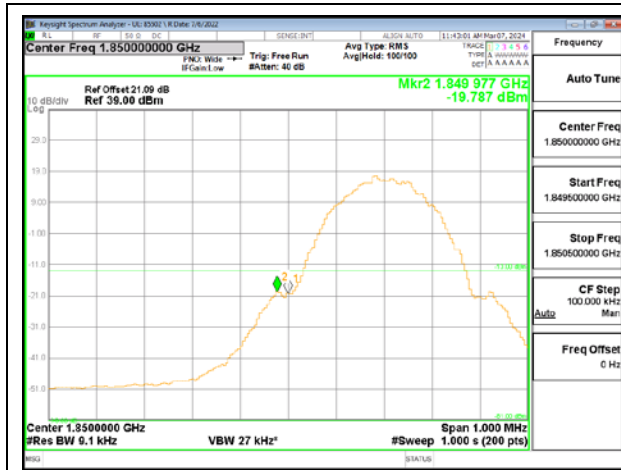
9.2.1. GSM 1900

LIMITS

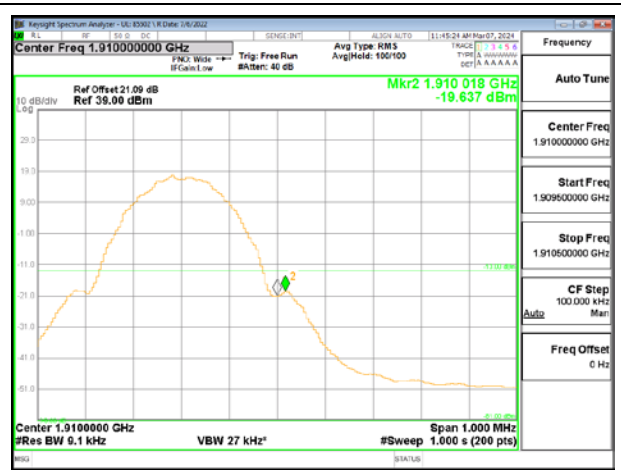
FCC: §24.238

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

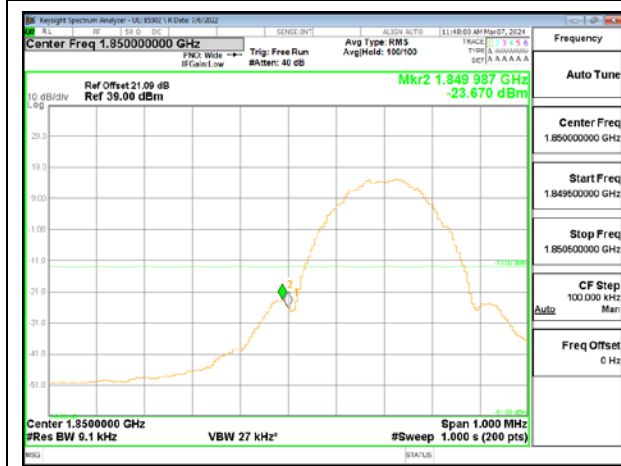
Test Engineer ID:	85502	Test Date:	2024-03-07	EUT Serial Number:	QV7700DSLQ
--------------------------	-------	-------------------	------------	---------------------------	------------



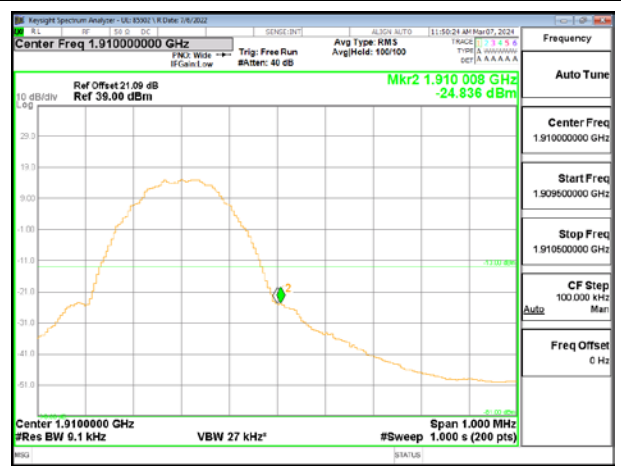
GSM 1900 GPRS Low Channel



GSM 1900 GPRS High Channel



GSM 1900 EGPRS Low Channel



GSM 1900 EGPRS High Channel

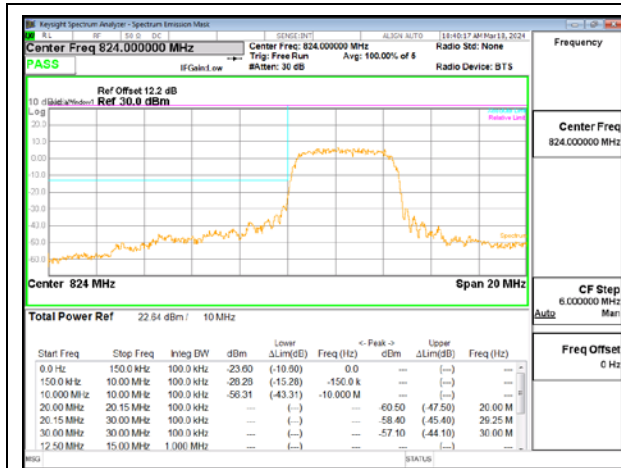
9.2.1. WCDMA BAND 5

LIMITS

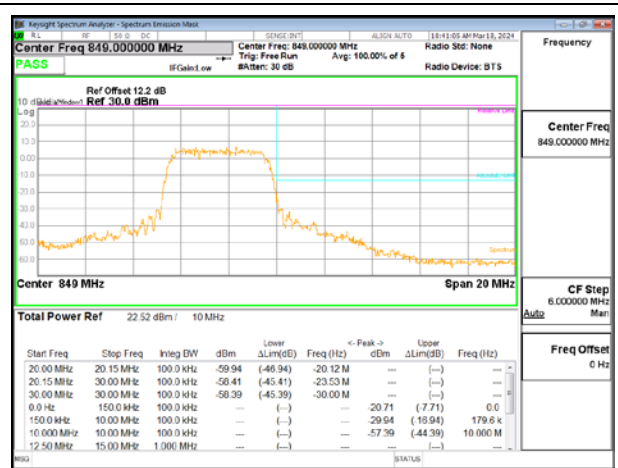
FCC: §22.917 (a)

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.

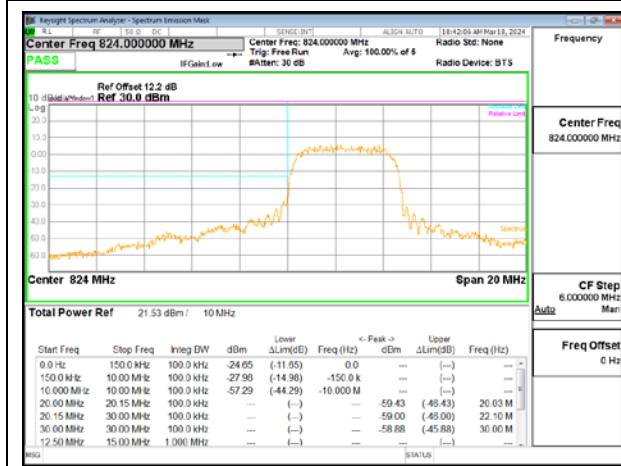
Test Engineer ID:	85502	Test Date:	2024-03-18	EUT Serial Number:	QV770018L2
-------------------	-------	------------	------------	--------------------	------------



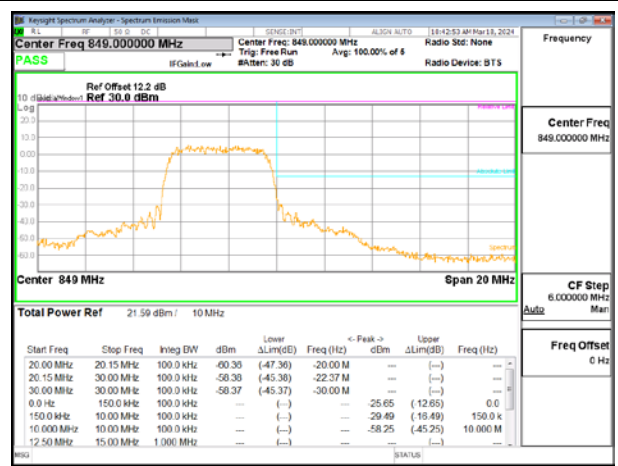
WCDMA Band 5 Rel 99 Low Channel



WCDMA Band 5 Rel 99 High Channel



WCDMA Band 5 HSDPA Low Channel



WCDMA Band 5 HSDPA High Channel

9.2.2. LTE BAND 5 AND 5G NR n5 EMISSION MASK

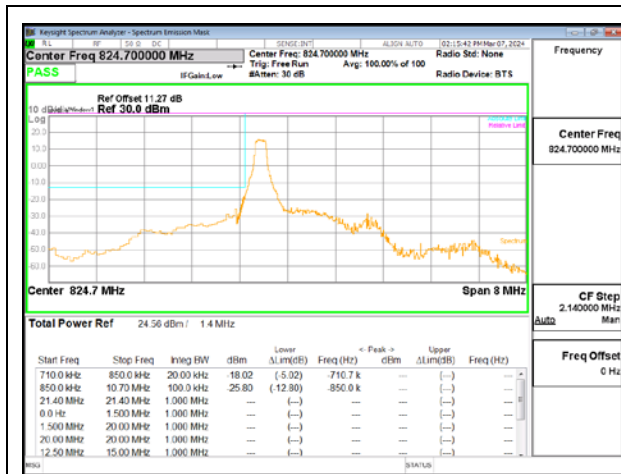
LIMITS

FCC: §22.917 (a)

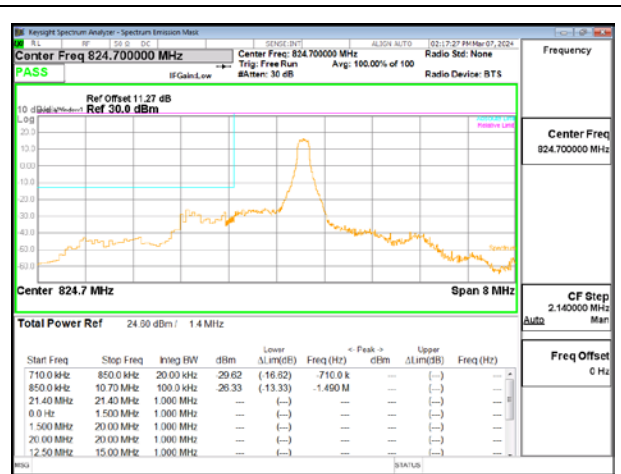
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

Test Engineer ID:	85502	Test Date:	2024-03-07	EUT Serial Number:	QV7700DSLQ
--------------------------	-------	-------------------	------------	---------------------------	------------

LTE BAND 5



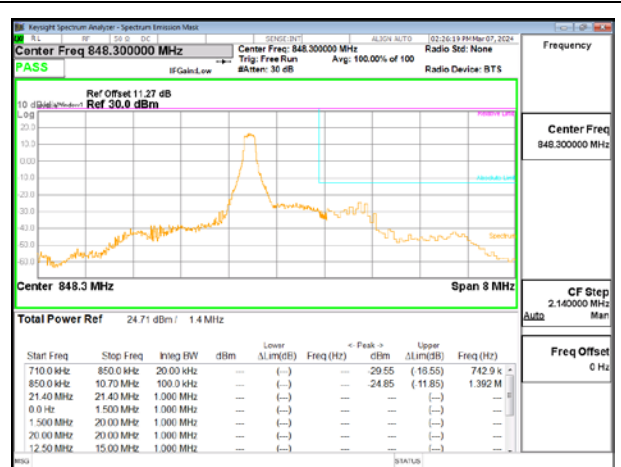
LTE Band 5 1.4MHz 16QAM Low Channel RB1-0



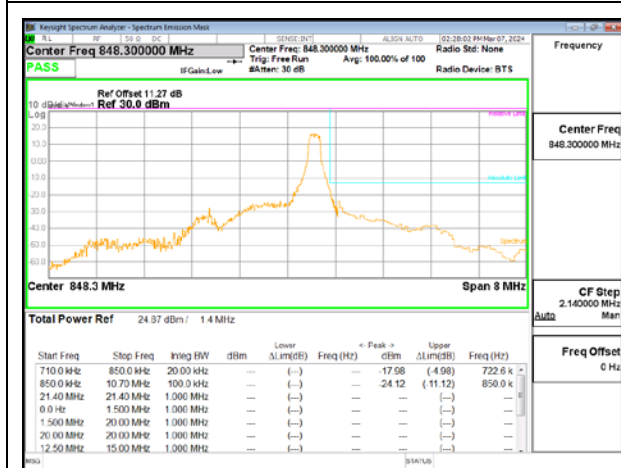
LTE Band 5 1.4MHz 16QAM Low Channel RB1-5



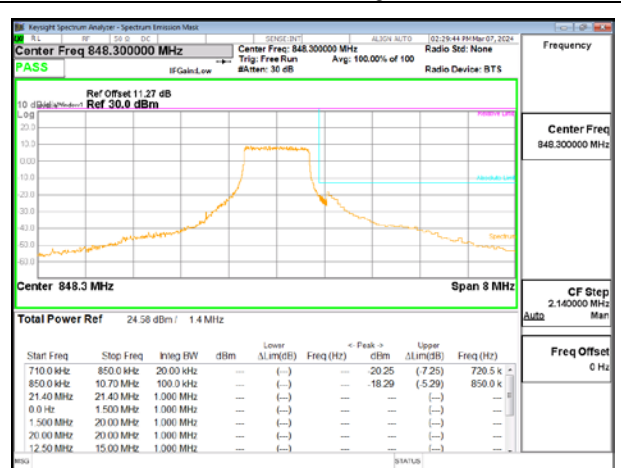
LTE Band 5 1.4MHz 16QAM Low Channel RB6-0



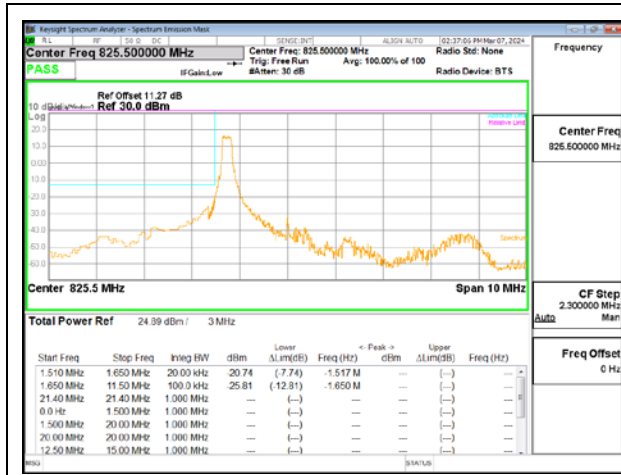
LTE Band 5 1.4MHz 16QAM High Channel RB1-0



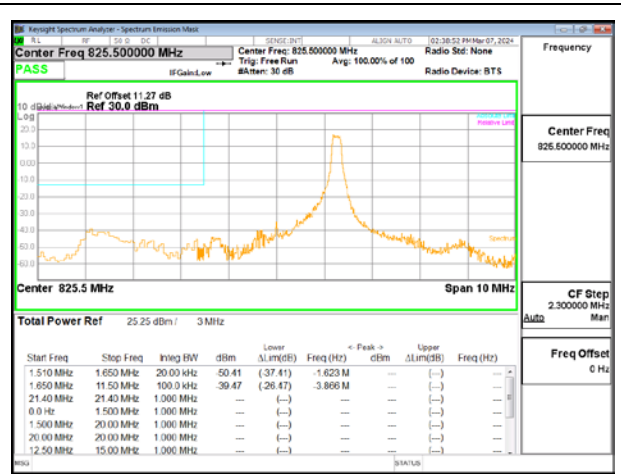
LTE Band 5 1.4MHz 16QAM High Channel RB1-5



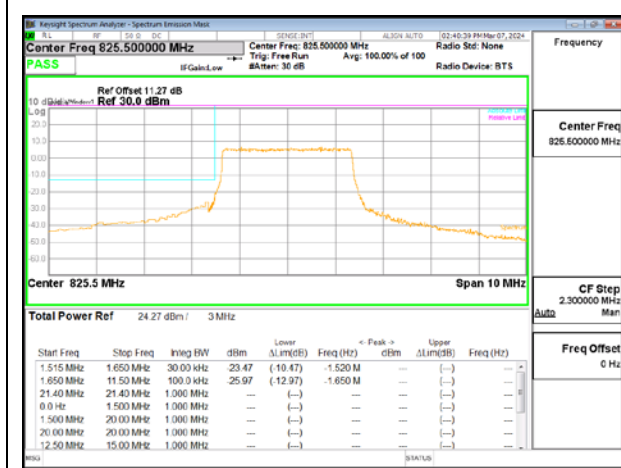
LTE Band 5 1.4MHz 16QAM High Channel RB6-0



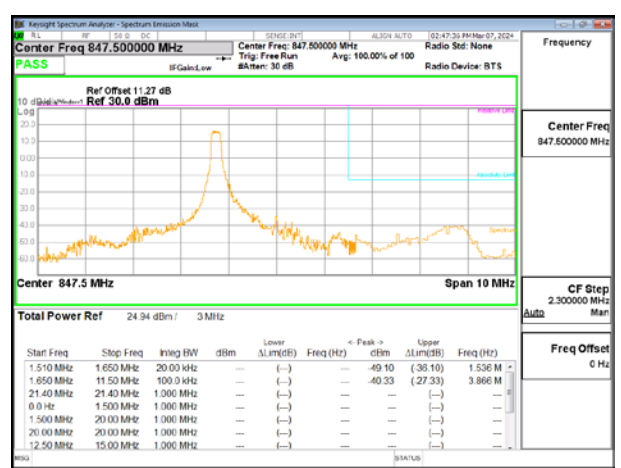
LTE Band 5 3MHz 16QAM Low Channel RB1-0



LTE Band 5 3MHz 16QAM Low Channel RB1-14



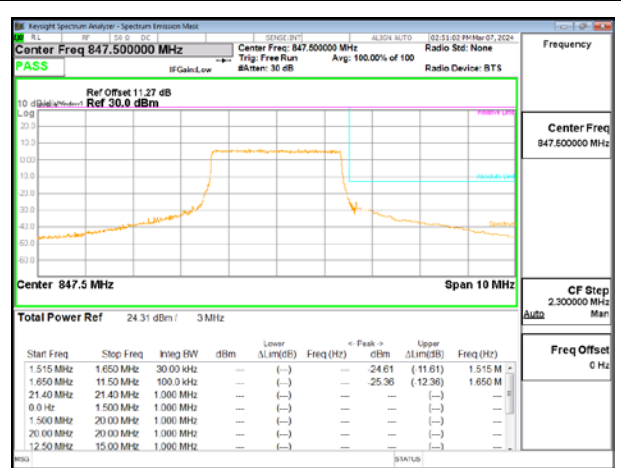
LTE Band 5 3MHz 16QAM Low Channel RB15-0



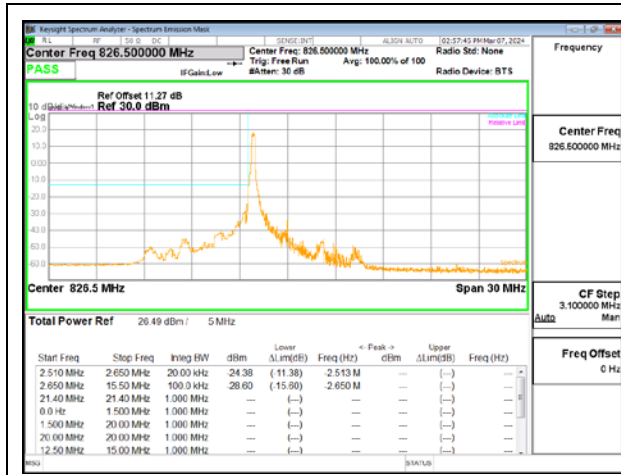
LTE Band 5 3MHz 16QAM High Channel RB1-0



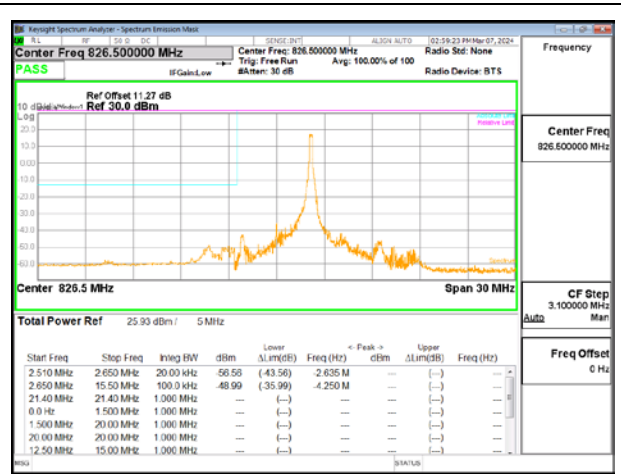
LTE Band 5 3MHz 16QAM High Channel RB1-14



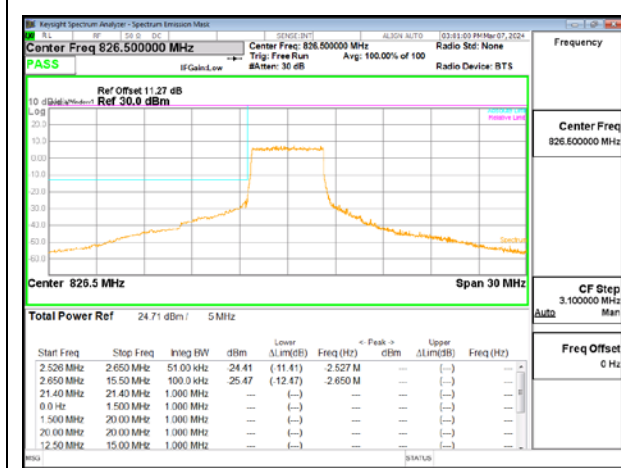
LTE Band 5 3MHz 16QAM High Channel RB15-0



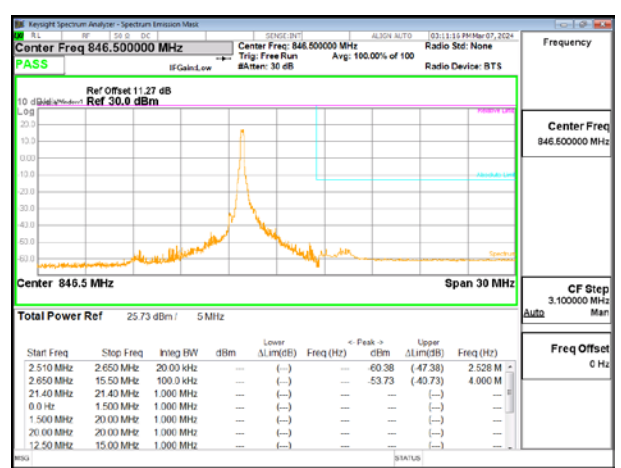
LTE Band 5 5MHz 16QAM Low Channel RB1-0



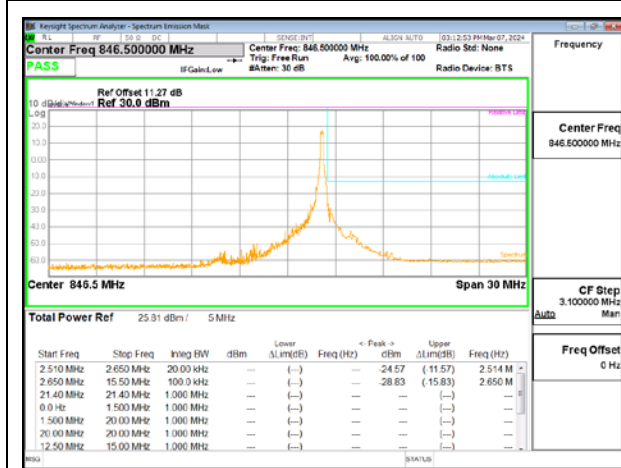
LTE Band 5 5MHz 16QAM Low Channel RB1-24



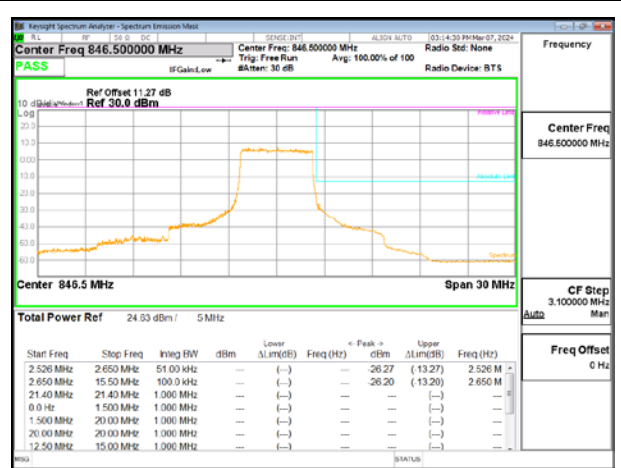
LTE Band 5 5MHz 16QAM Low Channel RB25-0



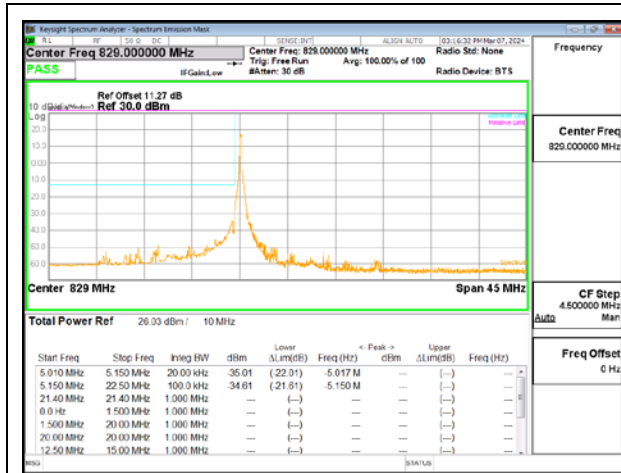
LTE Band 5 5MHz 16QAM High Channel RB1-0



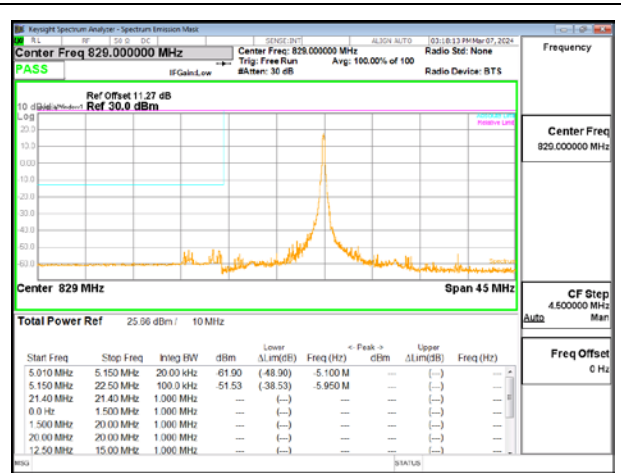
LTE Band 5 5MHz 16QAM High Channel RB1-24



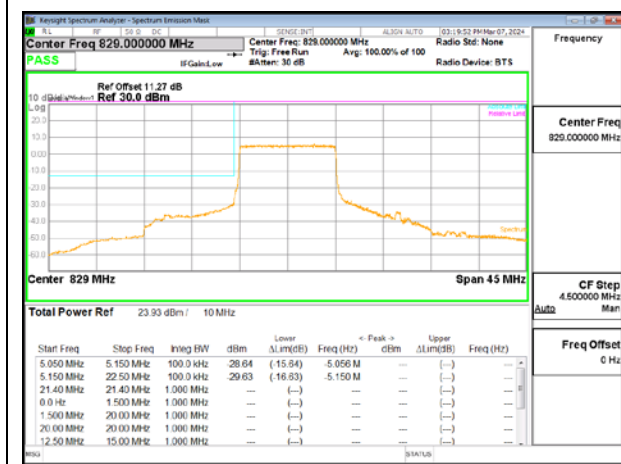
LTE Band 5 5MHz 16QAM High Channel RB25-0



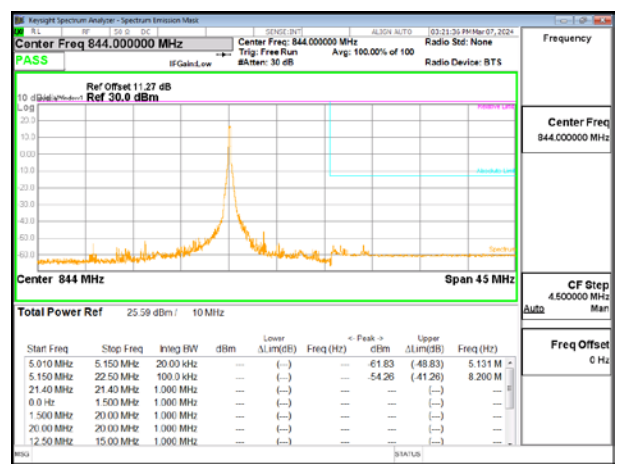
LTE Band 5 10MHz 16QAM Low Channel RB1-0



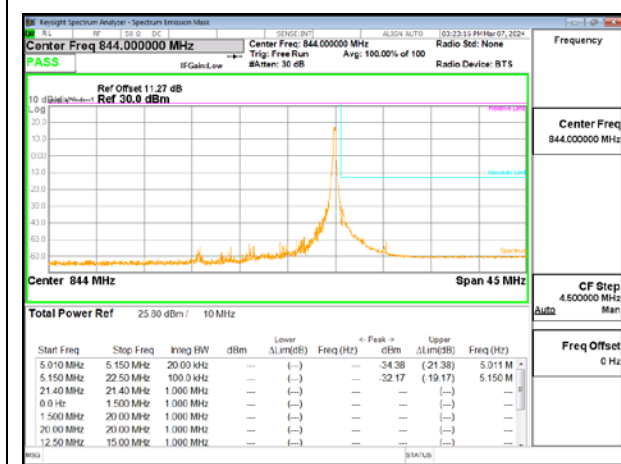
LTE Band 5 10MHz 16QAM Low Channel RB1-49



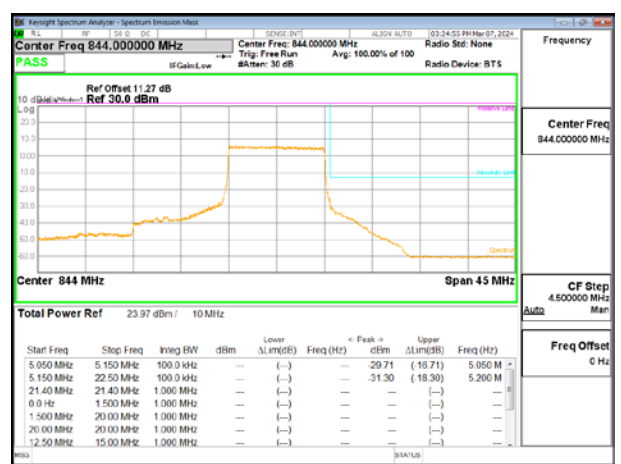
LTE Band 5 10MHz 16QAM Low Channel RB50-0



LTE Band 5 10MHz 16QAM High Channel RB1-0



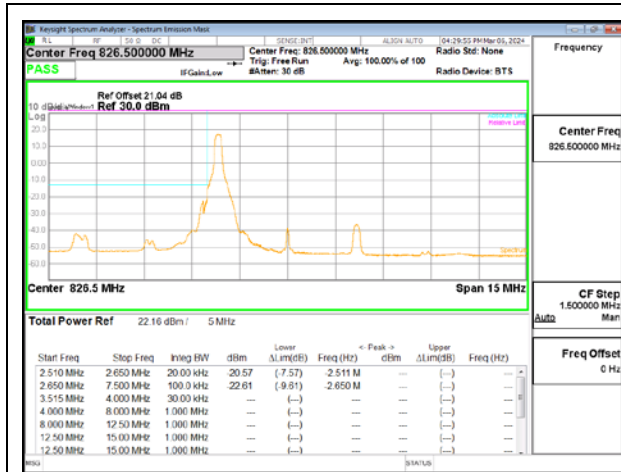
LTE Band 5 10MHz 16QAM High Channel RB1-49



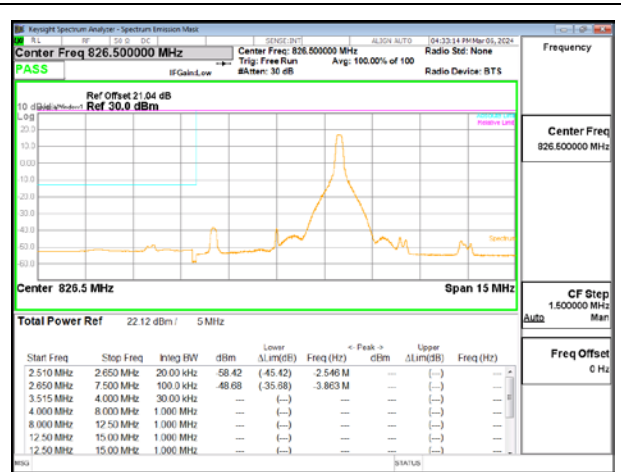
LTE Band 5 10MHz 16QAM High Channel RB50-0

5G NR n5

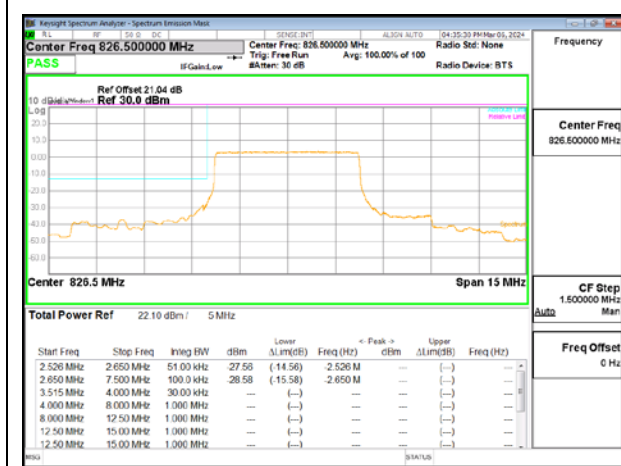
Test Engineer ID:	22797/85502	Test Date:	2024-03-06	EUT Serial Number:	<QV77000KL2>
-------------------	-------------	------------	------------	--------------------	--------------



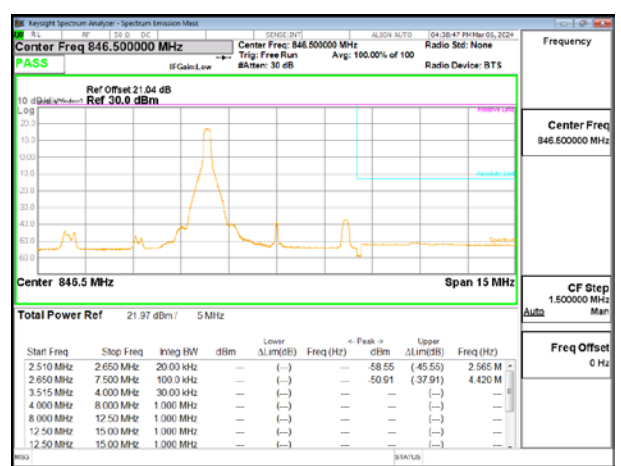
5G NR n5 5MHz BPSK Low Channel RB1-0



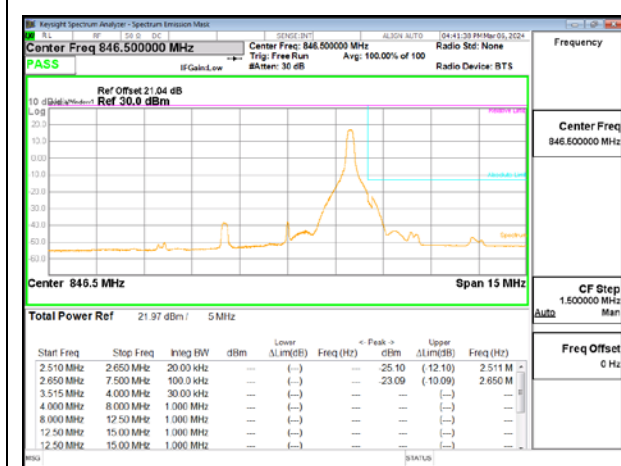
5G NR n5 5MHz BPSK Low Channel RB1-24



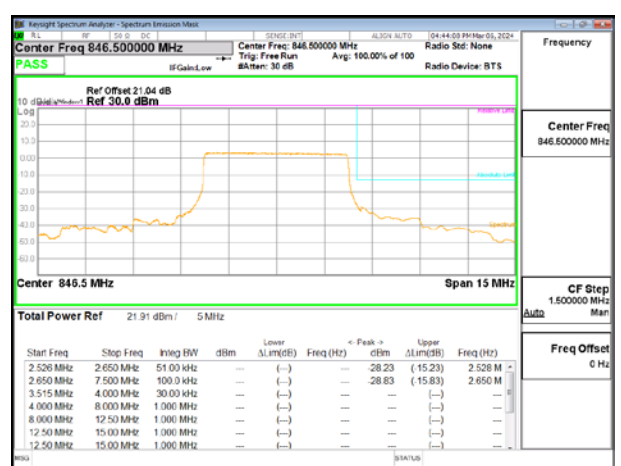
5G NR n5 5MHz BPSK Low Channel RB25-0



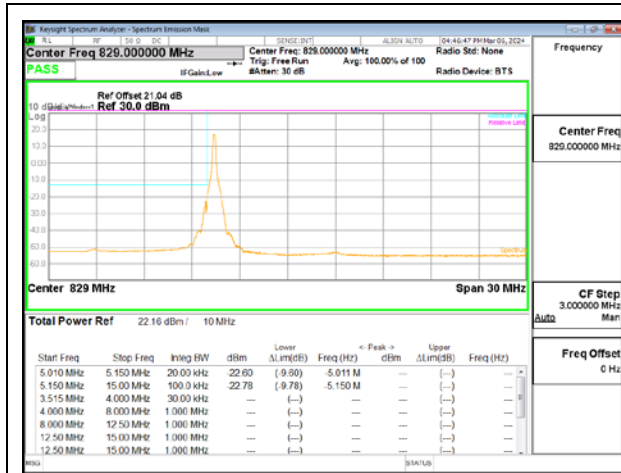
5G NR n5 5MHz BPSK High Channel RB1-0



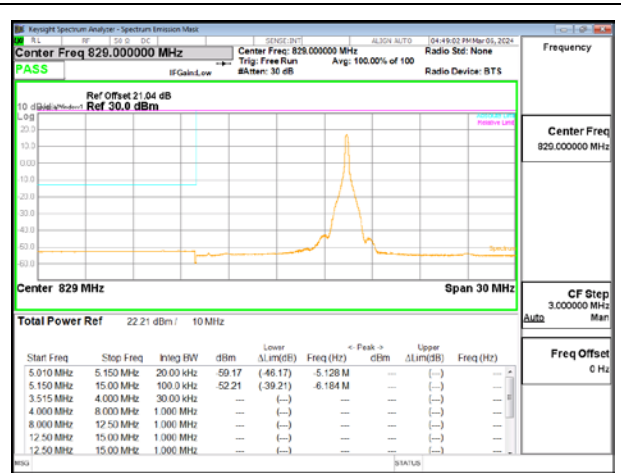
5G NR n5 5MHz BPSK High Channel RB1-24



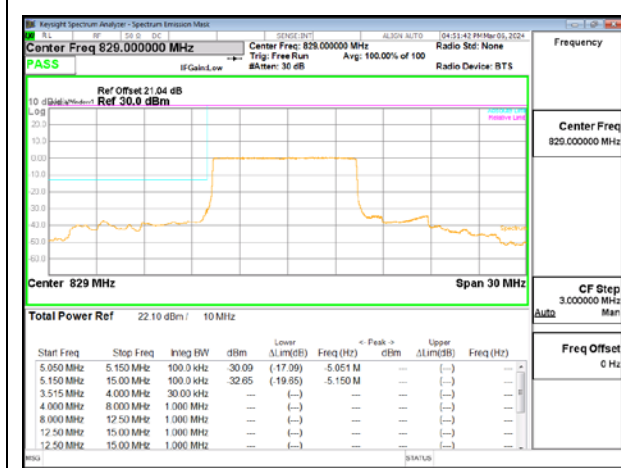
5G NR n5 5MHz BPSK High Channel RB25-0



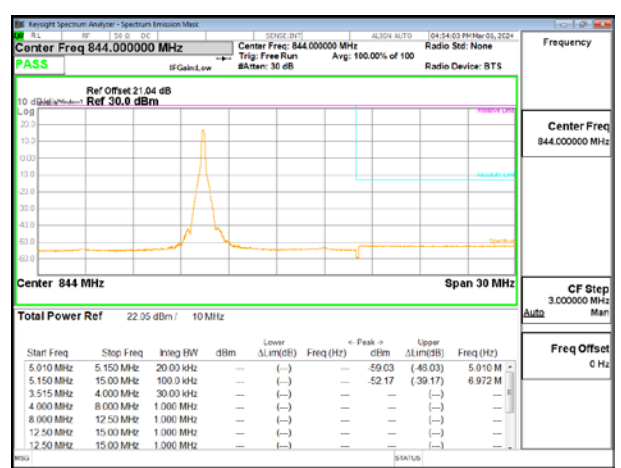
5G NR n5 10MHz BPSK Low Channel RB1-0



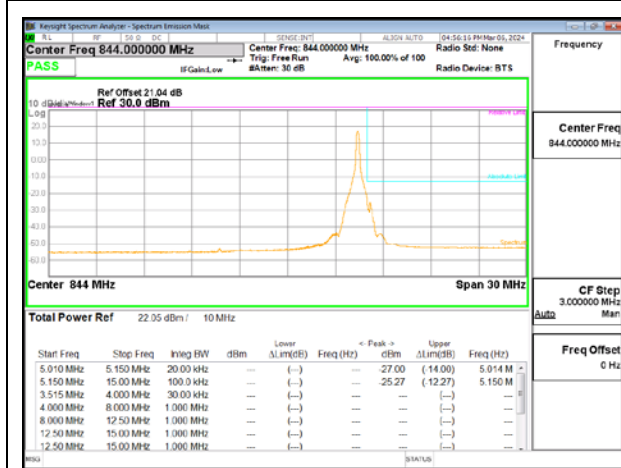
5G NR n5 10MHz BPSK Low Channel RB1-50



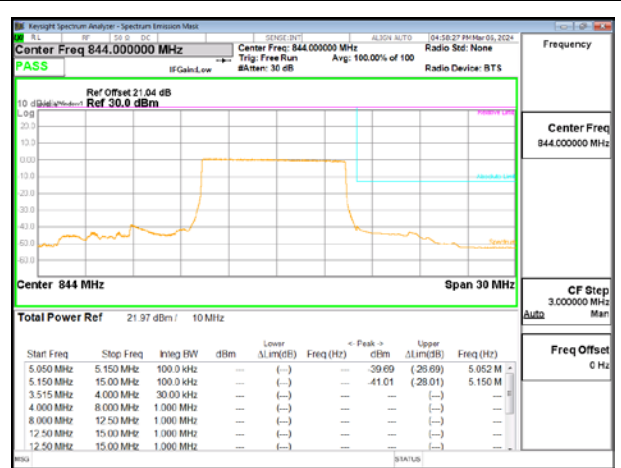
5G NR n5 10MHz BPSK Low Channel RB50-0



5G NR n5 10MHz BPSK High Channel RB1-0



5G NR n5 10MHz BPSK High Channel RB1-50



5G NR n5 10MHz BPSK High Channel RB50-0