

TEST REPORT

Report Number: 14982436- E14V2

Applicant : APPLE, INC
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A.

Model : A3083

Brand : APPLE

FCC ID : BCG-E8666A

EUT Description : SMARTPHONE

Test Standard(s) : FCC 47 CFR Part 2, Part 96

Date Of Issue:
2024-07-18

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Revision History

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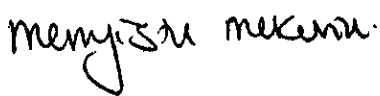
1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	APPLE, INC 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A.
Model	A3083
Brand	APPLE
FCC ID	BCG-E8666A
EUT Description	SMARTPHONE
Serial Number	RADIATED: QM2WVQQ45T, L73Q9RQC46 CONDUCTED: C07H5N000AB0000FDQ, C07H5R000J20000FDR
Sample Receipt Date	2023-12-14
Date Tested	2023-11-14 to 2024-06-24
Applicable Standards	FCC 47 CFR Part 2, Part 96
Test Results	COMPLIES

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

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

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document.

Approved & Released By: 	Reviewed By: 	Prepared By: 
Mengistu Mekuria Staff Engineer UL Verification Services Inc.	Eric Ting Senior Test Engineer UL Verification Services Inc.	Chris He Laboratory Engineer UL Verification Services Inc.

2. SUMMARY OF TEST RESULTS

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for correctly integrating customer-provided data with measurements performed by UL Verification Services Inc.

Below is a list of the data provided by the customer:

1. Antenna gain (see section 6.4.)

Requirement Description	Requirement Clause Number (FCC)	Result	Remarks
Equivalent Isotropic Radiated Power	96.41 (b) Part 2	Complies	

Requirement Description	Requirement Clause Number (FCC)	Result	Remarks
Occupied Bandwidth	2.1049	Complies	
Band Edge and Emission Mask	2.1051, 96.41(e)	Complies	
Out of Band Emissions	2.1051, 96.41(e)	Complies	
Frequency Stability	2.1055	Complies	
Peak-to-Average Ratio	96.41 (g)	Complies	
Field Strength of Spurious Radiation	2.1053, 96.41(e)	Complies	

3. TEST METHODOLOGY

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

- ANSI C63.26:2015
- FCC 47 CFR Part 2, Part 96
- [FCC KDB 971168 D01](#) : Power Meas License Digital Systems
- [FCC KDB 971168 D02](#): Misc Rev Approv License Devices
- [FCC KDB 412172 D01](#) : Determining ERP and EIRP

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, certification #0751.05, 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
☒	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	550739
☒	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA			
☒	Building 3: 843 Auburn Court, Fremont, CA 94538 USA			
☐	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA			
☒	Building 5: 47670 Kato Rd, Fremont, CA 94538 USA			

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}
Conducted Antenna Port Emission Measurement	1.940
Power Spectral Density	2.466
Time Domain Measurements Using SA	3.39
RF Power Measurement Direct Method Using Power Meter	0.450 Peak; 1.300 Ave.
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 db
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 db
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.87 db
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 db
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 db
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 db
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The Apple iPhone is a smartphone with cellular GSM, GPRS, EGPRS, WCDMA, LTE, 5GNR1, 5GNR2, IEEE 802.11a/b/g/n/ac/ax/be, Bluetooth (BT), Ultra-Wideband (UWB), Global Positioning System (GPS), Near-Field

Communication (NFC), Narrow-Band (NB) UNII, 802.15.4, 802.15.4ab-Narrow Band (NB), WPT and Mobile Satellite Service (MSS) technologies. The rechargeable battery is not user accessible. This device is not user-serviceable and requires special tools to disassemble.

6.2. MAXIMUM OUTPUT POWER

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015
KDB 971168 D01 Section 5.6

$$\text{ERP/EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

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

PMeas = measured transmitter output power or PSD, in dBm or dBW;

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

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

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

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

LTE BAND 48 (LOW)

Part 96								
EIRP Limit (W)/ 10MHz		0.20						
Antenna Gain (dBi)		-0.40						
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	3552.5	3697.5	22.80	22.40	0.174	4458	4M46G7W
	16QAM			21.88	21.48	0.141	4458	4M46D7W
10.0	QPSK	3555.0	3695.0	22.80	22.40	0.174	8897	8M90G7W
	16QAM			21.73	21.33	0.136	8973	8M97D7W
15.0	QPSK	3557.5	3692.5	22.80	22.40	0.174	13395	13M4G7W
	16QAM			21.79	21.39	0.138	13382	13M4D7W
20.0	QPSK	3560.0	3690.0	22.80	22.40	0.174	17832	17M8G7W
	16QAM			21.84	21.44	0.139	17815	17M8D7W

LTE BAND 48 (MID)

Part 96								
EIRP Limit (W)/ 10MHz		0.20						
Antenna Gain (dBi)		-1.80						
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	3552.5	3697.5	24.20	22.40	0.174	4458	4M46G7W
	16QAM			23.47	21.67	0.147	4458	4M46D7W
10.0	QPSK	3555.0	3695.0	24.20	22.40	0.174	8897	8M90G7W
	16QAM			23.42	21.62	0.145	8973	8M97D7W
15.0	QPSK	3557.5	3692.5	24.20	22.40	0.174	13395	13M4G7W
	16QAM			23.38	21.58	0.144	13382	13M4D7W
20.0	QPSK	3560.0	3690.0	24.20	22.40	0.174	17832	17M8G7W
	16QAM			23.30	21.50	0.141	17815	17M8D7W

LTE BAND 48 (HIGH)

Part 96								
EIRP Limit (W)/ 10MHz		0.20						
Antenna Gain (dBi)		-2.50						
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	3552.5	3697.5	25.00	22.50	0.178	4458	4M46G7W
	16QAM			24.53	22.03	0.160	4458	4M46D7W
10.0	QPSK	3555.0	3695.0	25.00	22.50	0.178	8897	8M90G7W
	16QAM			24.48	21.98	0.158	8973	8M97D7W
15.0	QPSK	3557.5	3692.5	25.00	22.50	0.178	13395	13M4G7W
	16QAM			24.41	21.91	0.155	13382	13M4D7W
20.0	QPSK	3560.0	3690.0	25.00	22.50	0.178	17832	17M8G7W
	16QAM			24.39	21.89	0.155	17815	17M8D7W

5G NR n48 (LOW)

Part 96								
EIRP Limit (W)		0.20						
Antenna Gain (dBi)		-0.40						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
10.0	BPSK	3555.0	3695.0	22.60	22.20	0.166	8627	8M63G7W
	QPSK			22.61	22.21	0.166	8633	8M63G7W
	16QAM			22.50	22.10	0.162	8642	8M64D7W
15.0	BPSK	3557.5	3692.5	22.80	22.40	0.174	12975	13M0G7W
	QPSK			22.82	22.42	0.175	12922	12M9G7W
	16QAM			22.65	22.25	0.168	12902	12M9D7W
20.0	BPSK	3560.0	3690.0	22.80	22.40	0.174	17858	17M9G7W
	QPSK			22.66	22.26	0.168	17799	17M8G7W
	16QAM			22.66	22.26	0.168	17833	17M8D7W
30.0	BPSK	3565.0	3685.0	22.80	22.40	0.174	26758	26M8G7W
	QPSK			22.69	22.29	0.169	26872	26M9G7W
	16QAM			22.46	22.06	0.161	26854	26M9D7W
40.0	BPSK	3570.0	3680.0	22.80	22.40	0.174	35642	35M6G7W
	QPSK			22.65	22.25	0.168	35911	35M9G7W
	16QAM			22.57	22.17	0.165	35807	35M8D7W

5G NR n48 (MID)

Part 96								
EIRP Limit (W)		0.20						
Antenna Gain (dBi)		-1.80						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
10.0	BPSK	3555.0	3695.0	24.20	22.40	0.174	8627	8M63G7W
	QPSK			24.20	22.40	0.174	8633	8M63G7W
	16QAM			23.27	21.47	0.140	8642	8M64D7W
15.0	BPSK	3557.5	3692.5	24.20	22.40	0.174	12975	13M0G7W
	QPSK			24.20	22.40	0.174	12922	12M9G7W
	16QAM			23.49	21.69	0.148	12902	12M9D7W
20.0	BPSK	3560.0	3690.0	24.20	22.40	0.174	17858	17M9G7W
	QPSK			24.20	22.40	0.174	17799	17M8G7W
	16QAM			23.27	21.47	0.140	17833	17M8D7W
30.0	BPSK	3565.0	3685.0	24.19	22.39	0.173	26758	26M8G7W
	QPSK			24.20	22.40	0.174	26872	26M9G7W
	16QAM			23.61	21.81	0.152	26854	26M9D7W
40.0	BPSK	3570.0	3680.0	24.10	22.30	0.170	35642	35M6G7W
	QPSK			24.20	22.40	0.174	35911	35M9G7W
	16QAM			23.20	21.40	0.138	35807	35M8D7W

5G NR n48 (HIGH)

Part 96								
EIRP Limit (W)		0.20						
Antenna Gain (dBi)		-2.50						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
10.0	BPSK	3555.0	3695.0	24.97	22.47	0.177	8627	8M63G7W
	QPSK			25.00	22.50	0.178	8633	8M63G7W
	16QAM			24.02	21.52	0.142	8642	8M64D7W
15.0	BPSK	3557.5	3692.5	24.91	22.41	0.174	12975	13M0G7W
	QPSK			25.00	22.50	0.178	12922	12M9G7W
	16QAM			24.03	21.53	0.142	12902	12M9D7W
20.0	BPSK	3560.0	3690.0	25.00	22.50	0.178	17858	17M9G7W
	QPSK			24.89	22.39	0.173	17799	17M8G7W
	16QAM			23.83	21.33	0.136	17833	17M8D7W
30.0	BPSK	3565.0	3685.0	25.00	22.50	0.178	26758	26M8G7W
	QPSK			24.98	22.48	0.177	26872	26M9G7W
	16QAM			24.30	21.80	0.151	26854	26M9D7W
40.0	BPSK	3570.0	3680.0	25.00	22.50	0.178	35642	35M6G7W
	QPSK			24.94	22.44	0.175	35911	35M9G7W
	16QAM			24.16	21.66	0.147	35807	35M8D7W

LTE ULCA Band 48

Part 96								
EIRP Limit (W)/ 10MHz		0.20						
Antenna Gain (dBi)		-1.80						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5+20	QPSK	3553.3	3690.0	24.20	22.40	0.174	23238	23M2G7W
	16QAM			24.16	22.36	0.172	23210	23M2D7W
20+5	QPSK	3560.0	3696.7	24.20	22.40	0.174	23386	23M4G7W
	16QAM			23.94	22.14	0.164	23259	23M3D7W
10+20	QPSK	3555.5	3690.0	24.40	22.60	0.182	27977	28M0G7W
	16QAM			24.05	22.25	0.168	27946	27M9D7W
20+10	QPSK	3560.0	3694.5	24.11	22.31	0.170	28003	28M0G7W
	16QAM			23.94	22.14	0.164	27936	27M9D7W
15+20	QPSK	3557.8	3690.0	24.20	22.40	0.174	32909	32M9G7W
	16QAM			24.10	22.30	0.170	32887	32M9D7W
20+15	QPSK	3560.0	3692.2	24.15	22.35	0.172	32920	32M9G7W
	16QAM			24.01	22.21	0.166	32790	32M8D7W
20+20	QPSK	3560.0	3690.0	24.20	22.40	0.174	37729	37M7G7W
	16QAM			24.16	22.36	0.172	37604	37M6D7W

5G NR n48 MIMO

Part 96								
EIRP Limit (W)		0.20						
Antenna Gain (dBi)		-4.30						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
10.0	QPSK	3555.0	3695.0	24.45	20.15	0.104	8627	8M63G7W
	16QAM			23.95	19.65	0.092	8633	8M63D7W
15.0	QPSK	3557.5	3692.5	24.40	20.10	0.102	12975	13M0G7W
	16QAM			24.01	19.71	0.094	12922	12M9D7W
20.0	QPSK	3560.0	3690.0	24.42	20.12	0.103	17858	17M9G7W
	16QAM			23.95	19.65	0.092	17799	17M8D7W
30.0	QPSK	3565.0	3685.0	24.35	20.05	0.101	26758	26M8G7W
	16QAM			23.91	19.61	0.091	26872	26M9D7W
40.0	QPSK	3570.0	3680.0	24.44	20.14	0.103	35642	35M6G7W
	16QAM			23.87	19.57	0.091	35911	35M9D7W

6.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 0.02.01.

6.4. MAXIMUM ANTENNA GAIN

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

LTE Bands, 5G NR Bands, LTECA Bands	Frequency Range (MHz)	ANT 7 Antenna Gain (dBi)	ANT 8 Antenna Gain (dBi)	ANT 9 Antenna Gain (dBi)	ANT 4 Antenna Gain (dBi)
LTE Band 48, 5G NR n48, LTE ULCA48 (Low)	3550 – 3700	-3.3	-3.3	-0.4	-5.5
LTE Band 48, 5G NR n48, LTE ULCA48 (Mid)	3550 – 3700	-2.8	-3.9	-1.8	-5.1
LTE Band 48, 5G NR n48, LTE ULCA48 (High)	3550 – 3700	-2.5	-5.1	-1.9	-5.2

5G NR MIMO Bands	Frequency Range (MHz)	ANT 7+8 Antenna Gain (dBi)	ANT 7+4 Antenna Gain (dBi)	ANT 9+8 Antenna Gain (dBi)	ANT 9+4 Antenna Gain (dBi)
FR1 MIMO n48	3550 – 3700	-4.3	-4.9	-3.3	-3.4

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports the following LTE and 5G NRs:
Band 48, 5G NR n48.

For 5G NRs, conducted spurious emission tests were conducted on wider bandwidth with inner 1RB since this is the worst bandwidth and the highest output power.

BPSK modulation applied only for 5G NR frequencies and has the same tune up power as QPSK modulations.

LTE Band 48 and 5G NR n48, SISO data were used for OBW, PAR and FS because these measurements are independent of the number of antennas used simultaneously.

For SISO DFT-s-OFDM and CP-OFDM waveforms were investigated, and DFT-s-OFDM was found to be the worst case.

For MIMO N48 CP-OFDM waveforms was found to be the worst case.

For MIMO N48, the client declared that the antenna ports combination 7+8 is the highest power of all other combinations. Therefore, all the antenna port measurements can be done with the combination of antenna port 7+8 as a worst-case.

The worst-case scenario for all measurements is based on an engineering evaluation made on different modulations. Then, QPSK and BPSK were observed as the worst mode to LTE bands and 5G NR bands respectively and set for all conducted and radiated. Output power measurements were measured on BPSK, QPSK, 16QAM, 64QAM, and 256QAM modulations. For testing purposes emissions on sections 8 and 9 were measured while QPSK/BPSK was set at or above target power for all bands. Conducted tests were performed on the worst-case antenna port because it has the highest conducted power. The worst-case antenna port is shown in the table below.

	Worst case Antenna Port for Conducted Power
LTE BAND 48 and FR1 5G NR 48	Ant 8

	Worst case Antenna Port for Conducted Power
FR1 5G NR 48 MIMO	Ant 7+8

The EUT was investigated in three orthogonal orientations X/Y/Z on all ANT4, ANT7, ANT8 and ANT 9 antennas to determine the worst-case orientation. The following table exhibit the worst-case orientations. The full tests of the EUT have been made upon the orientations that shown in the table below.

Frequency Bands	ANT1	ANT2	ANT3	ANT4	ANT7	ANT8	ANT9
3300 – 3980 MHz	N/A	N/A	N/A	X	X	X	Z

Frequency Bands	ANT2+1	ANT2+3	ANT4+1	ANT4+3	ANT7+8	ANT7+4	ANT9+8	ANT9+8
3300 – 3980 MHz	N/A	N/A	N/A	N/A	X	X	X	Z

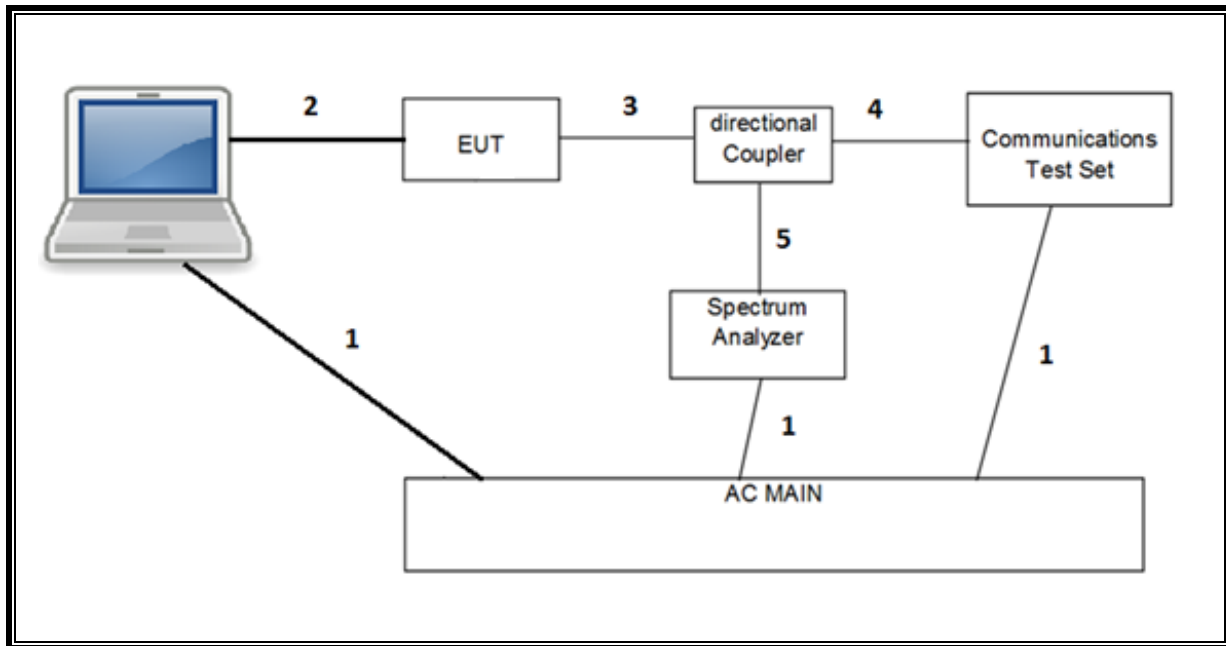
Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 18GHz. There were no emissions found with less than 20dB of margin from 9kHz to 30MHz, 30MHz-1GHz and above 18GHz.

For simultaneous transmission of multiple channels in the 2.4GHz/5GHz WLAN, UWB, and Cellular bands, tests were conducted for various configurations having the highest power, least separation in frequencies and widest operation bandwidths. No noticeable new emission was found.

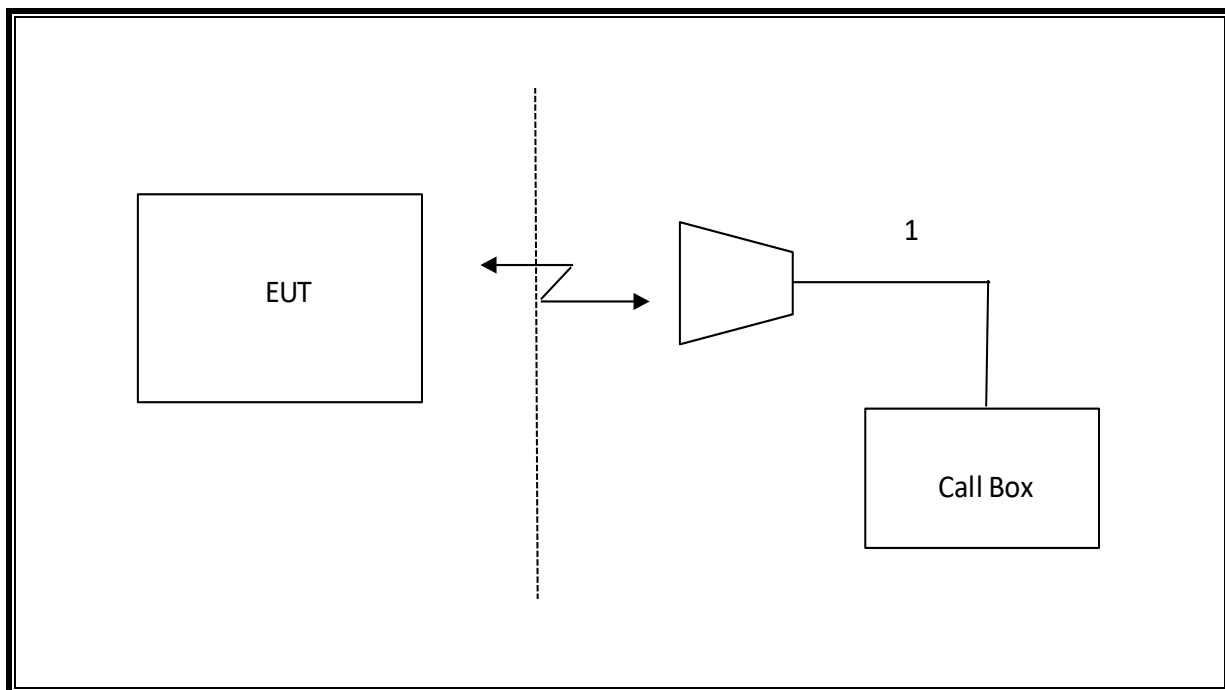
6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		Manufacturer	Model	Serial Number		FCC ID/ DoC
Laptop		Apple	MacBook Pro	HRP082673		BCGA1708
AC/DC adapter		Apple	A1718	C4H64450HH3GN8RA6		--
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	3	US 115V	Un-shielded	2.0	N/A
2	USB	1	DC	Un-shielded	1.0	N/A
3	RF In/Out	1	EUT	Un-shielded	0.6	N/A
4	RF In/Out	1	Communication Test Set	Un-shielded	1.2	N/A
5	RF In/Out	1	Barrel	N/A	N/A	N/A
I/O CABLES (RF RADIATED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF In/Out	1	Antenna	Un-shielded	5.0	N/A

CONDUCTED SETUP



RADIATED SETUP



7. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	80430	2024-08-31
Antenna, Horn 1-18GHz	ETS Lindgren	3117	79834	2024-06-30
Antenna, Broadband Hybrid, 30MHz to 3000MHz	SUNAR	JB3	222009	2024-10-31
RF Filter Box, 1-18GHz	UL-FR1	NA	217255	2024-10-31
RF Filter Box, 1-18GHz	UL-FR1	RATS 2	226781	2024-09-30
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	430250	2024-09-30
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	169936	2025-02-28
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	169935	2025-02-28
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	85943	2025-02-28
Directional Coupler	KRYTAR	152610	198816	2024-10-31
Directional Coupler	KRYTAR	152610	231664	2025-01-22
Power Meter, P-series single channel	Keysight	N1912A	90719	2025-01-31
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight	N1921A	81319	2025-01-31
Filter, HPF 1.2GHz	Wainwright Instruments GmbH	WHKX6-948-1.2/15G-40ST	99	2024-10-31
Spectrum Analyzer, PXA, 2Hz to 44GHz	Keysight	N9030B	231739	2025-01-31
Spectrum Analyzer, PXA, 2Hz to 44GHz	Keysight	N9030B	245120	2025-02-28
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	85212	2025-02-28
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	222793	2025-02-28
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	222797	2025-02-28
Chamber, Environmental	Thermotron Corp.	SM-16C Mini-Max	179936	2024-06-30
Transmitting Antenna, Horn Antenna	TEKBOX Digital Solutions	TBMA4	226709	C.N.R.
Antenna, Horn 18 to 26.5GHz	A.R.A.	MWH-1826/B	199659	2024-12-31
Amplifier 18-26.5GHz, +5Vdc, -54dBm P1dB	AMPLICAL	AMP18G26.5-60	234683	2025-05-31
DC Power Supply	GWINSTEK	GPS18500	N/A	C.N.R.
Conducted Switch Box	N/A	CSB	208281	2025-05-08
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO-METRICS	EM-6871	170014	2024-08-31
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO-METRICS	EM-6872	170016	2024-08-31
UL AUTOMATION SOFTWARE				
CLT Software	UL	UL RF	V2023.11.21.0	
Power Measurement Software	UL	UL RF	V2023.08.14.0	
Radiated test software	UL	UL RF	Ver 9.5 2023-05-01	

NOTES:

- * Testing is completed before equipment expiration date.

8. RF OUTPUT POWER MEASUREMENTS

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 TS136.101 specification.

UE Power Class: 3 (23 +/- 2dBm). Band 41 UE Power Class: 2 (26 +/-2 dBm).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 TS136.101.

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 allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS136.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".

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

Network Signalling value	Requirements (subclause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	N/A
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36, 66, 70	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2, 6.6.3.3.19	41	5, 10, 15, 20	Table 6.2.4-4, Table 6.2.4-4a	

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:

8.1. LTE BAND 48 AND 5G NR n48

LTE BAND 48

Test Engineer ID:	39004	Test Date:	2023-11-17
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OUTPUT POWER FOR LTE BAND 48 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)											
				ANT 7			ANT 8			ANT 9			ANT 4		
				55265	55990	56715	55260	55990	56715	55265	55990	56715	55260	55990	56715
5.0	QPSK	1	0	24.93	24.90	24.98	25.54	25.49	25.55	22.78	24.20	24.30	25.14	25.10	25.20
		1	12	25.00	25.00	25.00	25.60	25.60	25.60	22.80	24.20	24.30	25.20	25.20	25.20
		1	24	24.93	24.94	24.94	25.53	25.53	25.53	22.72	24.20	24.30	25.16	25.14	25.17
		12	0	24.32	24.22	24.34	24.63	24.56	24.63	21.68	23.22	23.41	24.23	24.11	24.27
		12	6	24.33	24.33	24.33	24.65	24.65	24.70	21.70	23.36	23.45	24.26	24.14	24.34
		12	11	24.35	24.31	24.36	24.64	24.63	24.70	21.70	23.36	23.41	24.22	24.23	24.25
		25	0	24.35	24.22	24.32	24.61	24.58	24.66	21.69	23.23	23.41	24.22	24.14	24.27
		25	12	24.38	24.40	24.51	24.65	24.72	24.77	21.80	23.38	23.48	24.28	24.39	24.33
	16QAM	1	0	24.46	24.49	24.53	24.84	24.80	24.78	21.88	23.47	23.55	24.43	24.37	24.46
		1	24	24.43	24.46	24.45	24.71	24.81	24.76	21.79	23.43	23.50	24.33	24.36	24.31
		12	0	23.45	23.28	23.47	23.63	23.69	23.59	20.67	22.23	22.42	23.13	23.11	23.29
		12	6	23.32	23.33	23.47	23.72	23.73	23.64	20.78	22.43	22.53	23.31	23.19	23.21
		12	11	23.39	23.35	23.36	23.61	23.72	23.73	20.62	22.38	22.46	23.25	23.27	23.20
		25	0	23.35	23.22	23.37	23.70	23.61	23.67	20.78	22.33	22.43	23.24	23.17	23.26
		25	12	23.54	23.59	23.60	23.93	23.75	23.82	21.16	22.39	22.71	22.69	22.45	22.40
		25	24	23.67	23.60	23.65	24.04	23.82	23.94	20.93	22.65	22.67	22.77	22.67	22.52
	64QAM	1	0	23.50	23.56	23.60	23.94	23.88	23.88	20.90	22.51	22.69	22.68	22.48	22.39
		12	0	22.41	22.33	22.41	22.78	22.60	22.67	19.66	21.30	21.55	21.58	21.35	21.32
		12	6	22.41	22.43	22.41	22.90	22.74	22.67	19.69	21.43	21.56	21.63	21.38	21.34
		12	11	22.38	22.45	22.39	22.84	22.73	22.65	19.79	21.42	21.53	21.57	21.45	21.33
		25	0	22.40	22.32	22.43	22.74	22.66	22.64	19.71	21.32	21.54	21.52	21.36	21.28
		25	12	20.42	20.54	20.55	20.82	20.74	20.77	17.75	19.43	19.65	19.57	19.48	19.44
		25	24	20.62	20.59	20.57	20.97	20.85	20.88	17.83	19.52	19.73	19.76	19.63	19.43
		25	49	20.52	20.60	20.47	20.86	20.92	20.70	17.79	19.53	19.65	19.60	19.59	19.41
	256QAM	1	0	20.44	20.36	20.43	20.73	20.68	20.68	17.72	19.35	19.55	19.54	19.41	19.29
		12	0	20.47	20.45	20.42	20.77	20.77	20.69	17.72	19.44	19.58	19.58	19.44	19.35
		12	6	20.43	20.45	20.41	20.74	20.76	20.68	17.70	19.43	19.54	19.56	19.48	19.31
		12	11	20.43	20.35	20.42	20.72	20.65	20.65	17.69	19.33	19.50	19.54	19.39	19.31
		25	0	20.43	20.35	20.42	20.72	20.65	20.65	17.69	19.33	19.50	19.54	19.39	19.31
		25	12	20.43	20.35	20.42	20.72	20.65	20.65	17.69	19.33	19.50	19.54	19.39	19.31
		25	24	20.43	20.35	20.42	20.72	20.65	20.65	17.69	19.33	19.50	19.54	19.39	19.31
		25	49	20.43	20.35	20.42	20.72	20.65	20.65	17.69	19.33	19.50	19.54	19.39	19.31

OUTPUT POWER FOR LTE BAND 48 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)											
				ANT 7			ANT 8			ANT 9			ANT 4		
				55290	55990	56690	55290	55990	56690	55290	55990	56690	55290	55990	56690
10.0	QPSK	1	0	24.97	24.92	25.00	25.60	25.56	25.60	22.59	24.18	24.12	25.16	25.13	25.19
		1	24	25.00	25.00	25.00	25.56	25.60	25.56	22.80	24.20	24.30	25.20	25.20	25.20
		1	49	24.96	24.94	24.92	25.53	25.59	25.50	22.56	24.20	24.30	25.18	25.15	25.13
		25	0	24.36	24.21	24.37	24.65	24.59	24.64	21.66	23.24	23.49	24.17	24.19	24.24
		25	12	24.39	24.27	24.39	24.65	24.65	24.63	21.71	23.30	23.51	24.25	24.19	24.26
		25	24	24.37	24.35	24.33	24.65	24.69	24.61	21.66	23.38	23.47	24.23	24.17	24.25
		50	0	24.33	24.22	24.36	24.64	24.61	24.61	21.66	23.26	23.48	24.24	24.15	24.23
		50	12	24.37	24.31	24.45	24.66	24.64	24.66	21.69	23.34	23.55	24.27	24.26	24.24
	16QAM	1	0	24.40	24.44	24.48	24.68	24.69	24.70	21.73	23.41	23.53	24.30	24.34	24.30
		1	49	24.33	24.40	24.34	24.63	24.67	24.58	21.59	23.42	23.46	24.27	24.21	24.23
		25	0	23.37	23.23	23.38	23.68	23.63	23.67	20.71	22.26	22.49	23.22	23.18	23.27
		25	12	23.39	23.30	23.43	23.70	23.65	23.69	20.71	22.31	22.51	23.33	23.24	23.28
		25	24	23.35	23.34	23.37	23.69	23.73	23.64	20.71	22.39	22.50	23.27	23.19	23.23
		50	0	23.35	23.25	23.36	23.68	23.62	23.64	20.69	22.30	22.51	23.24	23.19	23.24
		50	12	23.64	23.56	23.61	23.80	23.73	23.89	20.77	22.46	22.59	22.71	22.52	22.42
		50	24	23.66	23.63	23.60	23.91	23.88	23.82	20.82	22.57	22.78	22.78	22.72	22.38
	64QAM	1	0	23.60	23.61	23.61	23.82	23.81	23.79	20.73	22.52	22.56	22.70	22.58	22.50
		25	0	22.42	22.34	22.46	22.71	22.62	22.71	19.66	21.32	21.43	21.47	21.39	21.27
		25	12	22.49	22.37	22.45	22.73	22.68	22.73	19.66	21.34	21.42	21.55	21.42	21.28
		25	24	22.45	22.41	22.40	22.68	22.74	22.69	19.64	21.39	21.42	21.52	21.41	21.29
		50	0	22.47	22.32	22.39	22.69	22.64	22.67	19.63	21.31	21.40	21.47	21.38	21.27
		50	12	20.42	20.39	20.45	20.66	20.70	20.77	17.65	19.34	19.47	19.51	19.45	19.41
		50	24	20.54	20.66	20.51	20.80	20.78	20.85	17.80	19.57	19.53	19.61	19.65	19.44
		50	49	20.48	20.62	20.37	20.82	20.86	20.72	17.75	19.49	19.46	19.60	19.44	19.38
	256QAM	25	0	20.45	20.31	20.43	20.73	20.65	20.71	17.67	19.31	19.45	19.49	19.40	19.29
		25	12	20.47	20.38	20.46	20.73	20.70	20.76	17.69	19.35	19.49	19.58	19.45	19.33
		25	24	20.45	20.45	20.42	20.72	20.75	20.70	17.66	19.42	19.42	19.52	19.44	19.30
		50	0	20.46	20.35	20.41	20.70	20.63	20.69	17.65	19.32	19.41	19.51	19.39	19.23
		50	12	20.46	20.35	20.41	20.70	20.63	20.69	17.65	19.32	19.41	19.51	19.39	19.23
		50	24	20.46	20.35	20.41	20.70	20.63	20.69	17.65	19.32	19.41	19.51	19.39	19.23
		50	49	20.46	20.35	20.41	20.70	20.63	20.69	17.65	19.32	19.41	19.51	19.39	19.23
		50	99	20.46	20.35	20.41	20.70	20.63	20.69	17.65	19.32	19.41	19.51	19.39	19.23

OUTPUT POWER FOR LTE BAND 48 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)											
				ANT 7			ANT 8			ANT 9			ANT 4		
				55315	55990	56665	55315	55990	56665	55315	55990	56665	55315	55990	56665
15.0	QPSK	1	0	3557.5	3625.0	3692.5	3557.5	3625.0	3692.5	3557.5	3625.0	3692.5	3557.5	3625.0	3692.5
		1	0	24.90	24.90	24.92	25.57	25.57	25.54	22.64	24.18	24.30	25.15	25.09	25.20
		1	37	25.00	25.00	25.00	25.58	25.60	25.60	22.80	24.20	24.30	25.19	25.20	25.17
		1	74	24.99	24.98	24.90	25.60	25.56	25.42	22.67	24.20	24.29	25.20	25.12	25.16
		36	0	24.33	24.30	24.28	24.65	24.64	24.66	21.70	23.26	23.50	24.21	24.21	24.31
		36	16	24.34	24.31	24.34	24.70	24.64	24.65	21.73	23.28	23.49	24.31	24.19	24.28
		36	35	24.34	24.39	24.31	24.70	24.73	24.62	21.78	23.37	23.48	24.33	24.20	24.30
	16QAM	75	0	24.31	24.30	24.23	24.71	24.61	24.62	21.79	23.26	23.47	24.32	24.20	24.27
		1	0	24.31	24.32	24.41	24.72	24.69	24.66	21.76	23.28	23.58	24.23	24.29	24.32
		1	37	24.39	24.40	24.40	24.70	24.81	24.71	21.79	23.38	23.54	24.39	24.43	24.39
		1	74	24.35	24.37	24.27	24.72	24.76	24.58	21.77	23.34	23.43	24.24	24.26	24.21
		36	0	23.36	23.30	23.29	23.67	23.67	23.66	20.71	22.28	22.51	23.24	23.22	23.32
		36	16	23.33	23.32	23.37	23.75	23.65	23.65	20.79	22.28	22.48	23.34	23.22	23.30
		36	35	23.34	23.40	23.35	23.74	23.78	23.63	20.79	22.39	22.49	23.33	23.21	22.42
	64QAM	75	0	23.33	23.31	23.27	23.74	23.66	23.64	20.80	22.30	22.47	23.33	23.21	22.41
		1	0	23.74	23.27	23.23	23.87	23.92	23.81	20.64	22.20	22.39	22.66	22.58	22.77
		1	37	23.57	23.44	23.23	23.94	23.98	23.85	20.66	22.41	22.58	22.63	22.93	22.83
		1	74	23.61	23.27	23.20	23.84	23.81	23.75	20.69	22.27	22.39	22.56	22.77	22.78
		36	0	22.36	22.16	22.05	22.68	22.70	22.71	19.48	21.10	21.43	21.45	21.57	21.58
		36	16	22.32	22.17	22.13	22.75	22.70	22.68	19.55	21.12	21.41	21.51	21.61	21.58
		36	35	22.31	22.26	22.14	22.78	22.77	22.67	19.54	21.22	21.37	21.79	21.59	21.60
	256QAM	75	0	22.28	22.18	22.03	22.77	22.72	22.68	19.56	21.11	21.40	21.69	21.59	21.58
		1	0	20.24	20.11	20.44	20.65	20.75	20.80	17.68	19.04	19.40	19.67	19.66	19.56
		1	37	20.28	20.24	20.66	20.74	20.87	20.76	17.69	19.41	19.48	19.77	19.76	19.74
		1	74	20.37	20.41	20.35	20.88	20.96	20.76	17.63	19.38	19.49	19.75	19.75	19.70
		36	0	20.24	20.17	20.33	20.70	20.69	20.69	17.51	19.12	19.42	19.65	19.58	19.59
		36	16	20.22	20.16	20.40	20.76	20.72	20.69	17.55	19.12	19.40	19.72	19.60	19.58
		36	35	20.25	20.25	20.35	20.77	20.79	20.64	17.57	19.23	19.39	19.69	19.62	19.57
		75	0	20.25	20.17	20.31	20.78	20.71	20.65	17.57	19.10	19.37	19.68	19.59	19.55

OUTPUT POWER FOR LTE BAND 48 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)											
				ANT 7			ANT 8			ANT 9			ANT 4		
				55340	55990	56640	55340	55990	56640	55340	55990	56640	55340	55990	56640
20.0	QPSK	1	0	3560.0	3625.0	3690.0	3560.0	3625.0	3690.0	3560.0	3625.0	3690.0	3560.0	3625.0	3690.0
		1	0	24.92	24.86	25.00	25.60	25.50	25.60	22.70	24.16	24.30	25.20	25.04	25.20
		1	49	25.00	25.00	24.98	25.57	25.57	25.54	22.71	24.20	24.29	25.17	25.20	25.15
		1	99	24.94	24.99	24.90	25.58	25.60	25.54	22.80	24.20	24.16	25.15	25.08	25.08
		50	0	24.25	24.24	24.32	24.61	24.57	24.64	21.75	23.25	23.40	24.22	24.08	24.20
		50	24	24.35	24.27	24.30	24.71	24.60	24.66	21.84	23.28	23.41	24.28	24.11	24.21
		50	49	24.34	24.37	24.38	24.71	24.70	24.64	21.84	23.35	23.37	24.27	24.13	24.23
	16QAM	100	0	24.29	24.28	24.26	24.69	24.57	24.65	21.79	23.25	23.38	24.26	24.09	24.21
		1	0	24.22	24.21	24.23	24.70	24.54	24.59	21.84	23.14	23.36	24.23	24.06	24.27
		1	49	24.19	24.27	24.39	24.66	24.54	24.57	21.82	23.19	23.30	24.21	24.11	24.18
		1	99	24.21	24.31	24.23	24.65	24.52	24.65	21.79	23.30	23.34	24.09	24.10	24.12
		50	0	23.23	23.27	23.31	23.64	23.57	23.66	20.75	22.25	22.41	23.23	23.03	23.20
		50	24	23.35	23.27	23.30	23.71	23.59	23.66	20.86	22.25	22.39	23.32	23.12	23.24
		50	49	23.34	23.38	23.39	23.71	23.68	23.65	20.88	22.38	22.37	23.29	23.08	23.21
	64QAM	100	0	23.35	23.32	23.31	23.73	23.57	23.66	20.87	22.26	22.39	23.29	23.09	23.24
		1	0	23.65	23.38	23.60	23.80	23.37	23.48	20.69	22.01	22.44	23.40	23.49	23.52
		1	49	23.81	23.79	23.73	23.86	23.60	23.60	20.66	22.13	22.40	23.43	23.38	23.81
		1	99	23.54	23.53	23.42	23.80	23.30	23.49	20.67	22.13	22.33	23.40	23.47	23.74
		50	0	22.32	22.35	22.31	22.58	22.28	22.41	19.46	21.02	21.32	22.31	22.24	22.79
		50	24	22.44	22.39	22.33	22.71	22.28	22.45	19.58	21.10	21.33	22.39	22.26	22.81
		50	49	22.45	22.46	22.40	22.73	22.25	22.45	19.56	21.21	21.30	22.35	22.27	22.79
	256QAM	100	0	22.40	22.38	22.36	22.74	22.28	22.43	19.58	21.08	21.30	22.37	22.25	22.79
		1	0	20.46	20.42	20.64	20.73	20.42	20.58	17.71	19.09	19.46	20.50	20.29	20.86
		1	49	20.48	20.49	20.52	20.77	20.31	20.52	17.62	19.24	19.42	20.46	20.47	20.77
		1	99	20.61	20.56	20.44	20.91	20.36	20.60	17.74	19.34	19.35	20.56	20.38	20.72
		50	0	20.33	20.32	20.35	20.62	20.23	20.39	17.48	19.00	19.32	20.31	20.24	20.81
		50	24	20.44	20.39	20.40	20.74	20.22	20.38	17.59	19.07	19.33	20.40	20.28	20.85
		50	49	20.45	20.46	20.40	20.74	20.21	20.38	17.59	19.18	19.31	20.35	20.28	20.86
		100	0	20.41	20.36	20.36	20.72	20.21	20.38	17.59	19.07	19.30	20.37	20.24	20.84

5G NR n48

Test Engineer ID:	28567	Test Date:	2024-01-25
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OUTPUT POWER FOR 5G NR n48 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)											
				ANT 7			ANT 8			ANT 9			ANT 4		
				637000	641666	646333	637000	641666	3695.0	637000	641666	646333	637000	641666	646333
10.0	BPSK	1	0	24.43	24.29	24.41	25.04	25.09	24.87	22.60	23.63	24.16	25.10	24.65	25.06
		1	1	24.80	24.69	24.97	25.50	25.60	25.35	22.50	24.20	24.28	25.17	25.06	25.11
		1	22	25.00	24.41	24.81	25.60	25.43	25.45	22.47	24.13	24.04	25.07	25.17	25.14
		1	23	24.34	23.88	24.26	25.05	24.92	24.98	22.43	23.63	24.03	25.03	24.52	25.15
		12	6	24.79	24.80	24.75	25.36	25.35	25.36	22.49	24.06	23.99	25.12	24.93	24.97
		24	0	24.26	25.00	24.22	24.84	25.60	24.86	22.38	24.01	24.05	25.08	24.49	24.98
		1	0	23.85	23.99	23.93	24.49	24.51	24.42	22.61	23.21	24.23	24.89	24.11	24.81
		1	1	24.97	25.00	25.00	25.39	25.51	25.35	22.50	24.20	24.18	25.20	25.20	25.20
	QPSK	1	22	24.96	24.71	24.84	25.52	25.43	25.60	22.59	24.20	24.05	25.05	25.12	25.18
		1	23	23.83	23.66	23.68	24.38	24.50	24.47	22.43	23.18	24.04	24.76	24.09	24.81
		12	6	24.84	24.71	24.77	25.39	25.36	25.37	22.47	24.17	24.03	25.15	24.97	25.00
		24	0	23.82	24.78	23.68	24.37	25.42	24.33	22.41	24.13	24.01	24.83	24.98	24.72
		1	0	23.24	23.04	22.80	23.46	23.66	23.19	21.89	22.55	23.66	23.51	22.99	23.81
		1	1	23.82	24.27	24.02	24.61	24.69	24.42	22.30	23.08	24.00	24.73	23.91	24.52
		1	22	23.81	23.43	23.65	24.60	24.26	24.65	22.45	22.90	24.12	24.98	24.28	24.57
		1	23	22.84	22.76	22.85	23.39	23.39	23.58	21.95	22.64	23.79	23.88	22.97	23.75
	16QAM	12	6	23.84	23.79	23.77	24.37	24.28	24.34	22.50	23.27	24.30	24.78	23.94	24.56
		24	0	22.85	23.79	22.77	23.44	24.31	23.47	21.94	23.25	23.71	23.85	24.03	23.67
		1	0	22.46	22.56	22.48	23.11	23.11	22.62	21.81	21.93	23.41	23.25	22.53	23.09
		1	1	22.56	22.59	22.46	22.80	22.94	22.98	21.42	21.45	23.46	23.41	22.60	23.16
		1	22	22.63	22.31	22.18	22.83	22.82	23.02	21.41	21.62	23.34	22.99	22.80	23.21
		1	23	22.46	22.28	22.06	22.82	22.72	23.10	21.54	21.65	23.36	23.12	22.06	23.06
		12	6	22.36	22.28	22.29	22.85	22.78	22.75	21.51	21.62	23.28	23.34	22.40	23.14
		24	0	22.30	23.24	22.27	22.80	23.00	22.86	21.48	22.58	23.07	23.17	23.50	23.18
	64QAM	1	0	20.48	20.47	20.40	21.01	21.07	20.85	18.09	19.57	19.76	20.66	20.53	20.69
		1	1	20.42	20.49	20.49	21.07	20.88	20.98	18.09	19.69	19.80	20.69	20.62	20.69
		1	22	20.41	20.25	20.49	20.74	21.07	20.94	18.10	19.69	19.79	20.69	20.53	20.69
		1	23	20.46	20.40	20.39	21.09	20.86	20.95	18.09	19.69	19.80	20.70	20.63	20.70
		12	6	20.33	20.16	20.14	20.84	20.76	20.79	18.10	19.62	19.79	20.70	20.61	20.69
		24	0	20.20	20.49	20.25	20.91	21.10	20.93	18.09	19.70	19.80	20.69	20.70	20.67
	256QAM	1	0	20.48	20.47	20.40	21.01	21.07	20.85	18.09	19.57	19.76	20.66	20.53	20.69
		1	1	20.42	20.49	20.49	21.07	20.88	20.98	18.09	19.69	19.80	20.69	20.62	20.69
		1	22	20.41	20.25	20.49	20.74	21.07	20.94	18.10	19.69	19.79	20.69	20.53	20.69
		1	23	20.46	20.40	20.39	21.09	20.86	20.95	18.09	19.69	19.80	20.70	20.63	20.70
		12	6	20.33	20.16	20.14	20.84	20.76	20.79	18.10	19.62	19.79	20.70	20.61	20.69
		24	0	20.20	20.49	20.25	20.91	21.10	20.93	18.09	19.70	19.80	20.69	20.70	20.67

OUTPUT POWER FOR 5G NR n48 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)											
				ANT 7			ANT 8			ANT 9			ANT 4		
				637166	641333	646166	637166	641333	646166	637166	641333	646166	637166	641333	646166
15.0	BPSK	1	0	24.52	24.39	24.60	25.09	24.99	25.02	22.76	23.72	24.30	24.59	24.80	24.60
		1	1	25.00	24.95	24.91	25.55	25.60	25.56	22.71	24.20	24.25	25.04	25.20	25.20
		1	36	24.97	24.74	24.69	25.60	24.76	25.55	22.70	24.13	24.11	25.09	25.14	25.13
		1	37	24.32	24.16	24.33	24.99	24.25	25.07	22.80	23.67	24.04	24.54	24.63	24.65
		18	9	24.84	24.86	24.84	25.39	24.93	25.43	22.55	24.16	23.96	24.97	25.05	25.09
		36	0	22.85	24.17	22.90	23.00	24.62	22.86	22.80	23.64	23.00	22.80	24.46	22.80
		1	0	23.92	23.90	24.07	24.42	24.52	24.48	22.82	23.26	24.27	24.21	24.24	24.15
		1	1	25.00	25.00	25.00	25.58	25.44	25.49	22.71	24.20	24.26	25.20	25.16	25.18
	QPSK	1	36	24.98	24.76	24.77	25.44	24.67	25.60	22.65	24.18	24.14	25.12	24.97	25.15
		1	37	23.95	23.63	23.75	24.49	23.63	24.67	22.73	23.16	24.10	24.18	23.97	24.26
		18	9	24.92	24.75	24.82	25.53	24.91	25.19	22.68	24.14	24.07	25.04	24.90	24.93
		36	0	22.65	23.73	23.00	23.00	24.12	23.00	22.80	23.18	23.00	22.80	24.89	22.80
		1	0	22.96	22.85	22.89	23.15	23.84	23.59	22.52	21.93	23.43	23.34	23.21	23.15
		1	1	23.94	24.07	24.03	24.67	24.52	24.49	22.30	23.49	3.45	23.88	23.97	24.22
		1	36	24.39	23.48	23.60	24.72	23.99	25.06	22.40	22.70	23.62	24.25	23.98	24.30
		1	37	23.03	22.61	22.67	23.87	22.91	23.58	22.05	22.14	23.55	23.25	22.70	23.02
	16QAM	18	9	23.86	23.85	23.80	24.67	24.10	24.75	22.65	23.07	24.05	24.03	24.00	24.12
		36	0	22.88	22.83	22.68	22.87	23.12	22.78	22.65	22.17	23.00	22.80	23.83	22.80
		1	0	22.48	22.50	22.51	23.28	23.44	23.35	21.85	21.70	23.35	22.66	22.67	22.48
		1	1	22.58	22.57	22.65	23.22	23.29	23.00	21.72	21.69	23.43	22.47	22.74	22.65
		1	36	22.72	22.32	22.22	23.17	22.57	23.14	21.61	21.64	23.11	22.55	22.27	22.54
		1	37	22.09	22.35	22.28	23.38	22.49	23.31	22.03	21.51	22.80	22.33	22.19	22.92
		18	9	22.35	22.30	22.36	23.04	22.54	23.11	21.66	21.66	23.00	22.54	22.39	22.61
		36	0	22.58	22.41	22.69	23.00	22.63	22.89	22.45	21.70	23.00	22.80	23.29	22.80
	64QAM	1	0	20.40	20.47	20.50	21.10	21.09	21.09	18.10	19.69	19.80	20.69	20.67	20.68
		1	1	20.49	20.50	20.50	21.06	21.10	21.09	18.09	19.70	19.79	20.70	20.47	20.69
		1	36	20.40	20.18	20.30	21.09	20.96	21.09	18.10	19.69	19.79	20.65	20.60	20.70
		1	37	20.49	20.39	20.37	21.10	20.75	21.07	18.09	19.68	19.79	20.67	20.56	20.49
		18	9	20.34	20.44	20.39	21.09	20.90	21.04	18.09	19.68	19.77	20.61	20.44	20.62
		36	0	20.50	20.33	20.46	21.09	20.91	21.09	18.09	19.59	19.79	20.69	20.69	20.70

OUTPUT POWER FOR 5G NR n48 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)											
				ANT 7			ANT 8			ANT 9			ANT 4		
				637333	641333	646000	637333	641333	646000	637333	641333	646000	637333	641333	646000
20.0	BPSK	1	0	24.32	24.56	24.58	25.08	25.11	25.07	22.70	23.68	24.30	24.50	24.60	24.67
		1	1	24.86	25.00	25.00	25.60	25.49	25.60	22.67	24.20	24.30	24.98	25.13	25.15
		1	49	24.89	24.74	24.66	25.58	24.47	25.49	22.80	24.04	24.10	25.20	25.01	25.20
		1	50	24.30	24.14	24.26	25.05	23.91	25.00	22.69	23.56	23.99	24.53	24.66	24.70
		25	12	24.74	24.94	24.82	25.44	24.76	25.44	22.68	24.00	24.05	24.95	25.13	25.02
		50	0	21.98	24.28	22.00	21.69	24.40	22.00	21.78	23.61	22.00	22.00	24.43	21.80
	QPSK	1	0	23.80	24.03	23.96	24.64	24.48	24.63	22.66	23.29	24.27	23.98	24.33	24.16
		1	1	25.00	24.94	24.89	25.53	25.60	25.43	22.40	24.20	24.30	25.02	25.20	24.93
		1	49	24.89	24.42	24.65	25.60	24.49	25.38	22.30	24.07	24.09	25.08	24.83	25.03
		1	50	23.89	23.49	23.74	24.53	23.37	24.44	22.45	23.16	24.10	24.07	23.91	24.05
		25	12	24.76	24.69	24.67	25.54	24.68	25.22	22.56	24.06	23.99	24.98	24.94	24.75
		50	0	22.00	23.61	22.00	22.00	23.89	21.66	21.89	23.11	22.00	21.98	25.08	21.80
	16QAM	1	0	22.93	22.77	22.74	23.46	23.83	23.46	22.10	22.04	23.58	22.76	23.15	23.16
		1	1	23.97	24.08	23.83	24.69	24.39	24.79	22.37	23.27	24.29	24.00	24.00	24.19
		1	49	23.82	23.48	23.81	24.53	23.29	24.68	22.47	23.06	24.00	24.27	23.68	24.07
		1	50	23.03	22.39	22.87	23.83	22.40	23.74	22.19	22.23	23.64	23.21	22.97	23.27
		25	12	23.71	23.65	23.75	24.54	23.55	24.36	22.66	23.01	24.03	24.05	24.18	23.97
		50	0	22.00	21.00	21.89	21.65	22.54	21.76	21.55	22.08	22.00	21.80	24.05	21.80
	64QAM	1	0	22.41	22.23	22.49	22.97	23.16	22.82	21.82	21.85	23.20	22.34	23.24	22.79
		1	1	22.43	22.46	22.47	22.98	23.16	22.99	21.70	21.72	23.38	22.77	22.69	22.57
		1	49	22.47	22.23	22.31	23.05	22.06	23.23	21.69	21.54	23.02	22.69	22.48	22.51
		1	50	22.31	22.11	22.34	22.87	22.01	23.24	21.50	21.22	23.12	22.74	22.41	22.35
		25	12	22.22	22.26	22.29	22.91	22.16	22.80	21.55	21.48	23.02	22.39	22.64	22.48
		50	0	21.69	22.21	22.00	21.89	22.37	22.00	21.78	21.55	22.00	21.86	23.45	22.00
	256QAM	1	0	20.37	20.44	20.50	21.09	21.04	21.10	18.09	19.59	19.80	20.52	20.70	20.67
		1	1	20.32	20.47	20.50	21.09	21.09	21.03	18.10	19.70	19.79	20.67	20.69	20.70
		1	49	20.49	20.10	20.21	21.06	20.06	21.09	18.10	19.63	19.79	20.64	20.70	20.69
		1	50	20.17	19.99	20.39	21.09	20.10	21.10	18.10	19.58	19.79	20.65	20.69	20.65
		25	12	20.25	20.23	20.22	20.91	20.10	20.96	18.09	19.62	19.80	20.35	20.69	20.53
		50	0	20.49	20.23	20.49	21.08	20.32	21.10	18.09	19.52	19.79	20.66	20.67	20.68

OUTPUT POWER FOR 5G NR n48 (30.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)											
				ANT 7			ANT 8			ANT 9			ANT 4		
				637666	641666	645666	637666	641666	645666	637666	641666	645666	637666	641666	645666
30.0	BPSK	1	0	24.36	24.39	24.64	25.29	25.46	25.23	22.80	23.77	24.24	24.49	24.69	24.61
		1	1	24.86	25.00	25.00	25.60	25.60	25.54	22.54	24.19	24.20	25.11	25.20	25.15
		1	76	24.85	24.13	24.72	25.60	25.52	25.54	22.56	23.83	24.03	25.20	24.76	25.20
		1	77	24.32	23.65	24.20	25.52	25.04	25.12	22.51	23.35	23.92	24.49	24.31	24.62
		36	18	24.82	24.69	24.72	25.60	24.97	25.55	22.53	23.91	24.01	24.93	24.95	24.93
		75	0	19.80	24.09	20.00	19.55	24.63	19.69	20.00	23.34	19.89	19.80	24.43	20.00
	QPSK	1	0	23.91	23.91	23.99	24.77	24.89	24.66	22.69	23.11	24.21	23.99	24.07	24.00
		1	1	24.84	24.82	24.98	25.15	25.45	25.53	22.46	24.20	24.24	25.10	24.98	24.85
		1	76	25.00	24.24	24.73	25.58	25.45	25.59	22.47	23.88	23.97	25.10	24.49	24.99
		1	77	23.77	23.12	23.60	24.89	24.41	24.52	22.35	22.86	24.06	24.09	23.72	24.11
		36	18	24.79	24.62	24.79	25.60	24.99	25.27	22.46	23.93	24.03	24.92	24.69	24.77
		75	0	20.00	23.56	19.88	20.00	24.04	19.54	20.00	22.87	19.80	20.00	23.99	19.88
	16QAM	1	0	23.06	23.28	23.07	24.04	23.92	23.64	21.64	22.35	23.96	22.88	22.98	23.22
		1	1	23.97	23.78	24.30	24.56	24.66	24.95	22.30	23.61	24.37	24.35	24.19	23.91
		1	76	23.82	23.08	23.36	24.97	24.56	24.60	22.39	22.63	24.03	24.14	23.55	24.14
		1	77	22.88	22.60	22.56	23.80	23.42	23.91	22.33	21.99	23.63	23.44	22.52	23.21
		36	18	23.76	23.58	23.78	24.70	23.87	24.49	22.46	22.92	23.97	23.95	23.92	23.96
		75	0	20.00	22.42	20.00	19.57	23.04	19.88	19.88	21.94	20.00	20.00	22.99	19.80
	64QAM	1	0	22.46	22.44	22.45	23.13	23.68	23.22	21.46	21.13	23.21	22.44	22.68	22.53
		1	1	22.43	22.17	22.62	23.60	23.43	23.12	21.69	21.74	23.53	22.40	22.90	22.56
		1	76	22.39	21.84	22.27	23.36	23.05	23.12	21.53	21.09	23.35	22.51	22.16	22.71
		1	77	22.51	21.71	22.22	22.79	23.16	23.13	21.54	20.99	23.12	22.49	22.15	22.15
		36	18	22.33	22.22	22.25	23.14	22.43	23.01	21.45	21.49	23.03	22.44	22.58	22.41
		75	0	19.89	22.09	20.00	20.00	22.60	20.00	19.88	21.49	19.88	19.69	22.53	19.80
	256QAM	1	0	20.49	20.28	20.49	21.09	21.08	21.09	18.09	19.35	19.80	20.52	20.69	20.70
		1	1	20.50	20.49	20.50	21.08	21.09	21.09	18.10	19.69	19.79	20.59	20.70	20.69
		1	76	20.50	19.73	20.50	21.09	21.08	21.10	18.09	19.30	19.79	20.67	20.46	20.43
		1	77	20.40	19.98	20.40	21.07	21.09	21.09	18.10	19.34	19.79	20.43	20.40	20.53
		36	18	20.25	20.24	20.24	20.99	20.49	20.98	18.09	19.28	19.80	20.21	20.54	20.40
		75	0	20.00	20.07	19.88	19.88	20.56	19.97	18.07	19.45	19.78	19.96	20.49	19.84

OUTPUT POWER FOR 5G NR n48 (40.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)											
				ANT 7			ANT 8			ANT 9			ANT 4		
				638000	641333	645333	638000	641333	645333	638000	641333	645333	638000	641333	645333
40.0	BPSK	1	0	24.52	23.93	24.63	25.31	25.31	25.23	22.33	23.69	24.09	24.38	24.57	24.73
		1	1	24.88	24.46	25.00	25.60	25.54	25.60	22.53	24.10	24.18	25.09	25.20	25.20
		1	104	25.00	24.37	24.70	25.60	25.27	25.60	22.80	23.82	24.04	25.11	24.78	25.06
		1	105	24.52	23.91	24.26	25.38	24.71	25.18	22.65	23.34	23.90	24.73	24.28	24.59
		50	25	24.86	25.00	24.78	25.40	24.85	25.49	22.38	23.81	23.98	24.93	24.89	24.86
		100	0	18.99	24.22	19.00	18.55	24.45	18.69	19.00	23.34	19.00	18.80	24.32	19.00
	QPSK	1	0	23.97	23.51	23.98	24.84	24.70	24.68	22.52	23.15	24.18	24.01	24.29	23.94
		1	1	24.97	24.48	24.94	25.55	25.60	25.45	22.29	24.20	24.30	25.04	24.96	24.60
		1	104	24.89	24.44	24.73	25.40	25.00	25.43	22.64	23.90	23.89	25.20	24.34	24.64
		1	105	23.99	23.33	23.75	24.94	24.20	24.54	22.65	22.89	23.55	24.22	23.57	23.77
		50	25	24.81	24.92	24.74	25.46	24.81	25.28	22.47	23.87	23.76	24.95	24.80	24.62
		100	0	18.88	23.70	18.77	18.78	23.91	19.00	18.99	22.79	18.79	19.00	23.90	18.87
	16QAM	1	0	23.26	22.02	23.18	23.24	23.88	23.61	22.09	22.27	23.20	22.98	22.93	22.81
		1	1	23.86	23.15	24.16	24.99	24.73	24.54	22.57	23.20	23.91	23.79	24.15	23.97
		1	104	23.96	23.70	23.77	24.57	23.91	24.50	22.30	23.03	23.74	23.99	23.23	23.46
		1	105	23.04	22.64	22.43	23.84	23.33	23.66	22.15	22.04	22.88	23.17	22.26	22.88
		50	25	23.74	23.96	23.86	24.72	23.78	24.39	22.42	22.86	23.79	23.99	23.95	23.61
		100	0	19.00	22.73	18.73	19.00	22.93	18.99	19.00	21.92	19.78	18.98	22.95	19.00
	64QAM	1	0	22.50	21.90	22.68	23.19	23.14	23.32	21.78	21.51	23.04	22.66	22.58	22.24
		1	1	22.49	21.80	22.51	23.22	23.24	23.16	21.64	21.49	23.04	22.34	22.58	22.32
		1	104	22.54	22.00	22.17	23.36	22.76	23.08	21.74	21.49	22.84	22.69	21.61	22.37
		1	105	22.56	21.75	22.29	22.99	22.81	22.99	21.68	21.49	22.68	22.79	22.03	22.16
		50	25	22.20	22.44	22.44	23.07	22.24	22.96	21.41	21.38	22.74	22.47	22.42	22.13
		100	0	19.00	22.23	19.00	18.78	22.38	18.99	19.00	21.46	18.99	18.77	22.48	18.80
	256QAM	1	0	20.48	20.01	20.50	21.09	21.10	21.07	18.09	19.64	19.79	20.50	20.69	20.49
		1	1	20.49	20.49	20.49	21.09	21.10	21.10	18.06	19.69	19.80	20.70	20.70	20.44
		1	104	20.41	19.92	20.44	21.09	20.92	21.04	18.07	19.31	19.79	20.67	20.58	20.35
		1	105	20.49	20.12	20.45	21.07	20.90	21.00	18.09	19.20	19.79	20.70	20.53	20.46
		50	25	20.26	20.34	20.29	21.09	20.26	21.05	18.09	19.51	19.79	20.56	20.36	20.26
		100	0	18.68	20.25	18.54	18.99	20.49	18.95	18.10	19.45	18.99	18.80	20.50	18.65

8.2. LTE ULCA BAND 48

Test Engineer ID:	39004	Test Date:	2024-01-26
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OUTPUT POWER FOR LTE BAND 48 (5.0MHz + 20.0MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB		SCC1 RB		Conducted Average (dBm)															
			Size	Offset	Size	Offset	ANT 7				ANT 8				ANT 9				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
5MHz / 20MHz	3553.3	3565.0	1	24	1	0	21.36	21.17	21.15	21.13	22.01	21.71	21.64	21.70	22.53	22.51	22.55	22.45	21.70	21.23	21.23	21.60
			25	0	100	0	14.50	14.63	14.60	14.53	15.50	15.40	15.12	15.05	16.02	15.90	15.98	15.77	15.05	14.95	14.77	14.85
	3615.8	3627.5	1	24	1	0	25.00	24.81	24.85	21.90	25.60	25.44	25.12	22.12	24.20	24.16	24.12	20.96	25.20	24.83	25.14	21.70
			25	0	100	0	22.78	22.94	22.57	21.85	23.55	23.25	23.08	22.36	22.03	22.17	22.01	20.84	22.92	23.14	23.03	21.73
	3678.3	3690.0	1	24	1	0	21.28	21.11	21.26	21.10	22.10	22.05	21.70	21.60	24.10	23.90	23.50	21.00	21.31	21.36	21.43	21.61
			25	0	100	0	14.87	14.77	14.70	14.61	15.48	15.38	15.20	15.15	17.50	17.68	17.74	17.62	14.84	15.04	14.99	14.74

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

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB		SCC1 RB		Conducted Average (dBm)															
			Size	Offset	Size	Offset	ANT 7				ANT 8				ANT 9				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz / 5MHz	3560.0	3571.7	1	99	1	0	21.41	21.44	21.21	21.52	21.40	21.20	21.00	21.41	22.80	22.42	22.19	22.10	21.58	21.50	21.44	21.42
			100	0	25	0	14.71	14.99	14.76	15.05	15.04	14.86	14.66	14.62	15.98	15.94	15.58	15.63	14.97	15.01	14.78	14.72
	3622.5	3634.2	1	99	1	0	24.94	24.81	24.95	21.77	25.40	25.12	24.65	21.65	24.20	23.73	23.68	20.55	25.10	24.78	24.88	22.17
			100	0	25	0	22.89	23.09	22.90	21.87	22.93	22.79	22.62	21.61	21.93	21.82	21.60	20.59	22.84	22.73	22.08	21.79
	3685.0	3696.7	1	99	1	0	21.44	21.57	21.18	21.58	21.50	21.39	21.25	21.10	24.17	23.94	23.45	23.10	21.58	21.50	21.42	21.23
			100	0	25	0	14.92	14.78	14.67	14.98	15.02	14.96	14.86	14.96	17.34	17.50	17.48	17.61	15.12	15.05	15.01	14.83

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

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB		SCC1 RB		Conducted Average (dBm)															
			Size	Offset	Size	Offset	ANT 7				ANT 8				ANT 9				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
10MHz / 20MHz	3555.5	3569.9	1	49	1	0	20.20	19.91	19.80	19.77	20.30	20.22	20.21	20.10	22.80	22.75	22.50	22.59	20.79	20.58	20.68	20.86
			50	0	100	0	15.07	15.02	15.20	15.13	15.61	15.24	15.64	15.23	17.45	17.51	17.42	17.76	15.56	15.67	15.62	15.62
	3615.6	3630.0	1	49	1	0	24.70	24.28	24.06	20.95	25.45	25.12	24.60	21.44	24.20	24.01	22.89	19.42	25.18	25.00	24.52	22.00
			50	0	100	0	21.61	21.28	21.51	20.80	21.86	21.97	21.58	21.54	20.32	20.35	20.16	19.67	22.19	22.02	22.20	21.71
	3675.6	3690.0	1	49	1	0	20.05	20.02	19.89	19.65	20.77	20.69	20.46	20.47	24.11	24.05	23.99	23.48	20.88	20.86	20.55	20.62
			50	0	100	0	14.86	14.76	14.78	15.03	15.30	15.22	15.54	15.55	20.00	19.74	19.66	19.45	15.70	15.87	15.72	15.54

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

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC Offset	SCC1 RB	SCC1 Offset	Conducted Average (dBm)															
							ANT 7				ANT 8				ANT 9				ANT 4			
			Size	Offset	Size	Offset	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz / 10MHz	3560.0	3574.4	1	99	1	0	19.88	19.50	19.44	19.80	19.24	19.32	19.20	19.49	22.05	21.08	20.04	19.41	20.71	20.98	19.86	19.97
			100	0	50	0	14.87	14.88	14.92	14.79	14.15	14.46	14.45	14.03	14.85	14.93	14.60	14.75	15.71	15.89	14.74	14.85
	3620.1	3634.5	1	99	1	0	24.57	24.37	23.57	20.90	25.37	24.43	23.11	20.51	24.11	23.94	23.81	21.93	24.95	23.93	23.38	20.93
			100	0	50	0	21.04	20.99	21.17	20.45	20.67	20.55	20.86	20.47	21.15	21.39	20.90	20.90	22.43	21.65	21.35	20.83
	3680.1	3694.5	1	99	1	0	19.57	19.44	19.55	19.81	19.11	19.34	19.21	19.07	24.06	23.11	22.95	21.38	20.93	20.93	19.83	19.73
			100	0	50	0	14.88	14.76	14.50	14.63	14.10	14.17	14.07	14.27	14.93	14.56	14.74	14.31	15.78	15.83	14.98	14.66

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

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB		SCC1 RB		Conducted Average (dBm)															
			Size	Offset	Size	Offset	ANT 7				ANT 8				ANT 9				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
15MHz / 20MHz	3557.8	3574.9	1	74	1	0	19.96	19.55	19.94	19.64	20.49	20.38	20.05	20.11	22.78	22.05	22.04	22.47	19.93	19.75	20.14	19.78
			75	0	100	0	14.68	14.63	14.96	14.77	15.37	15.13	15.17	15.12	17.30	17.30	17.05	17.18	15.15	15.02	14.72	14.84
	3615.3	3632.4	1	74	1	0	24.69	24.55	23.89	20.80	25.45	25.42	24.29	21.01	24.20	24.04	23.37	20.08	25.11	24.73	24.02	21.19
			75	0	100	0	21.45	21.42	21.17	20.76	21.79	21.65	21.63	21.07	20.71	20.60	20.96	20.29	21.24	21.24	21.25	21.01
	3672.9	3690.0	1	74	1	0	19.83	19.58	19.70	19.79	20.05	20.18	20.49	20.04	24.20	24.10	24.05	23.08	20.13	19.77	19.97	20.09
			75	0	100	0	14.74	14.87	14.77	14.75	15.12	15.40	15.16	15.06	19.49	19.27	19.06	19.19	14.88	15.15	15.11	14.92

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

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB		SCC1 RB		Conducted Average (dBm)															
			Size	Offset	Size	Offset	ANT 7				ANT 8				ANT 9				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz / 15MHz	3560.0	3577.1	1	99	1	0	19.74	19.90	19.76	19.54	20.28	20.14	20.48	20.35	22.30	22.12	22.10	20.88	20.14	20.19	20.45	20.14
			100	0	75	0	14.66	14.68	14.77	14.65	15.32	15.52	15.31	15.46	16.89	16.78	16.61	16.54	15.33	15.07	15.22	15.01
			1	99	1	0	24.90	24.20	23.90	20.82	26.47	26.25	24.28	21.56	24.15	24.01	23.00	21.12	25.32	25.01	24.02	21.09
	3617.6	3634.7	100	75	24.7	21.0	21.12	20.59	21.33	21.92	21.92	21.50	20.50	20.22	21.94	21.76	21.98	21.49	21.76	21.98	21.49	
			100	99	1	0	19.83	19.72	19.99	19.77	20.56	20.33	20.39	20.36	24.12	24.00	22.50	21.00	20.24	20.47	20.01	20.41
			100	0	75	0	14.52	14.97	14.74	14.77	15.29	15.46	15.31	15.14	19.32	19.36	19.35	19.36	15.31	15.46	15.13	15.05

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

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB Size	PCC RB Offset	SCC1 RB Size	SCC1 RB Offset	Conducted Average (dBm)															
							ANT 7				ANT 8				ANT 9				ANT 4			
							QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20MHz/ 20MHz	3560.0	3579.8	1	99	1	0	21.42	21.26	21.13	20.89	21.96	21.84	21.76	21.34	22.56	22.49	22.80	22.02	21.21	21.65	21.48	20.85
			1	0	1	99	7.83	7.92	7.89	7.59	8.43	8.32	8.26	8.49	9.24	9.17	9.26	9.19	7.98	8.00	7.90	8.08
			100	0	100	0	14.82	14.89	14.56	14.99	15.43	15.68	15.47	15.61	15.85	16.30	16.23	15.88	15.07	14.94	15.06	15.03
	3615.1	3634.9	1	99	1	0	24.83	24.54	23.81	20.91	25.33	25.32	24.46	21.47	24.20	24.16	23.09	20.03	25.07	24.73	24.03	20.73
			1	0	1	99	14.14	14.06	14.48	14.46	14.71	15.03	15.16	14.77	13.42	13.80	13.67	13.69	14.70	14.51	14.29	14.28
			100	0	100	0	21.48	21.19	21.43	20.71	22.06	21.74	22.03	21.56	20.45	20.58	20.58	20.18	21.21	21.54	21.47	20.97
	3670.2	3690.0	1	99	1	0	21.50	21.07	21.43	21.00	22.12	22.09	21.79	21.38	24.10	23.90	24.10	23.67	21.29	21.69	21.38	21.09
			1	0	1	99	7.71	7.63	7.98	7.57	8.52	8.26	8.36	8.28	10.47	10.54	10.57	10.46	8.07	8.17	8.03	8.19
			100	0	100	0	14.80	14.76	14.58	14.87	15.28	15.51	15.69	15.49	17.68	17.63	17.68	17.37	14.98	14.89	15.01	14.91

8.3. 5G NR n48 MIMO

Test Engineer ID:	27342	Test Date:	2024-01-25
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OUTPUT POWER FOR 5G NR n48 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)								
				ANT 7			ANT 8			ANT 7+8		
				637000	641666	646333	637000	641666	646333	637000	641666	646333
10.0	QPSK	1	0	19.73	19.79	19.81	19.92	19.94	19.72	22.84	22.88	22.78
		1	1	21.47	21.38	21.36	21.40	21.49	21.06	24.45	24.45	24.22
		1	22	21.18	21.31	21.47	21.43	21.06	21.40	24.32	24.20	24.45
		1	23	19.62	19.60	19.61	19.82	19.80	19.54	22.73	22.71	22.59
		12	6	19.76	20.01	19.90	19.61	19.64	19.70	22.70	22.84	22.81
		24	0	19.52	19.82	19.70	19.73	19.89	19.82	22.64	22.87	22.77
		1	0	19.72	19.89	19.92	19.92	19.63	19.56	22.83	22.77	22.75
		1	1	20.63	20.67	20.82	20.62	20.89	20.73	23.64	23.79	23.79
	16QAM	1	22	20.86	20.85	20.90	21.01	20.79	20.88	23.95	23.83	23.90
		1	23	19.87	19.94	19.85	19.72	19.90	19.53	22.81	22.93	22.70
		12	6	19.64	19.71	19.74	19.55	19.65	19.93	22.61	22.69	22.85
		24	0	19.82	19.91	19.59	20.01	19.67	19.56	22.93	22.80	22.59
		1	0	19.40	19.32	19.28	19.19	19.37	19.26	22.31	22.36	22.28
		1	1	19.04	19.47	19.38	19.28	19.38	19.48	22.17	22.44	22.44
		1	22	19.16	19.39	19.31	19.44	19.27	19.08	22.31	22.34	22.21
		1	23	19.28	19.42	19.17	19.15	19.46	19.28	22.23	22.45	22.24
	64QAM	12	6	19.28	19.05	19.13	19.48	19.45	19.47	22.39	22.26	22.31
		24	0	19.22	19.46	19.31	19.22	19.33	19.03	22.23	22.41	22.18
		1	0	16.02	16.15	16.38	16.32	16.08	16.04	19.18	19.13	19.22
		1	1	16.26	16.25	16.41	16.23	16.49	16.20	19.26	19.38	19.32
		1	22	16.11	16.42	16.12	16.33	16.41	16.14	19.23	19.43	19.14
		1	23	16.22	16.08	16.44	16.41	16.48	16.21	19.33	19.29	19.34
		12	6	16.31	16.49	16.15	16.48	16.33	16.03	19.41	19.42	19.10
		24	0	16.37	16.43	16.07	16.10	16.50	16.17	19.25	19.48	19.13

OUTPUT POWER FOR 5G NR n48 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)								
				ANT 7			ANT 8			ANT 7+8		
				637166	641333	646166	637166	641333	646166	637166	641333	646166
15.0	QPSK	1	0	19.59	19.94	20.01	19.71	19.62	19.96	22.66	22.79	23.00
		1	1	21.27	21.66	21.42	21.14	21.10	21.11	24.22	24.40	24.28
		1	36	21.19	21.37	21.43	21.22	21.39	21.34	24.22	24.39	24.40
		1	37	19.52	19.92	19.59	19.73	19.65	19.88	22.64	22.80	22.75
		18	9	19.77	19.60	19.70	19.85	19.79	19.70	22.82	22.71	22.71
		36	0	19.59	19.61	19.54	19.92	19.99	19.71	22.77	22.81	22.64
	16QAM	1	0	19.65	19.90	19.55	19.99	20.01	19.65	22.83	22.97	22.61
		1	1	20.70	20.88	20.79	20.52	20.54	20.71	23.62	23.72	23.76
		1	36	20.71	21.00	20.64	20.56	20.99	20.84	23.65	24.01	23.75
		1	37	19.72	19.76	19.57	19.68	20.00	19.54	22.71	22.89	22.57
		18	9	19.83	19.59	19.65	19.96	19.57	19.70	22.91	22.59	22.69
		36	0	19.68	19.75	19.97	19.97	19.66	19.70	22.84	22.72	22.85
	64QAM	1	0	19.34	19.26	19.24	19.02	19.15	19.49	22.19	22.22	22.38
		1	1	19.38	19.05	19.13	19.38	19.11	19.45	22.39	22.09	22.30
		1	36	19.25	19.21	19.10	19.49	19.10	19.02	22.38	22.17	22.07
		1	37	19.15	19.09	19.08	19.39	19.20	19.23	22.28	22.16	22.17
		18	9	19.32	19.48	19.02	19.26	19.02	19.04	22.30	22.27	22.04
		36	0	19.06	19.11	19.17	19.35	19.24	19.25	22.22	22.19	22.22
	256QAM	1	0	16.49	16.50	16.45	16.35	16.07	16.07	19.43	19.30	19.27
		1	1	16.28	16.02	16.17	16.07	16.45	16.19	19.19	19.25	19.19
		1	36	16.41	16.27	16.47	16.42	16.36	16.26	19.43	19.33	19.38
		1	37	16.46	16.28	16.12	16.21	16.36	16.45	19.35	19.33	19.30
		18	9	16.31	16.51	16.48	16.29	16.33	16.11	19.31	19.43	19.31
		36	0	16.23	16.48	16.05	16.41	16.49	16.09	19.33	19.50	19.08

OUTPUT POWER FOR 5G NR n48 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)								
				ANT 7			ANT 8			ANT 7+8		
				637333	641333	646000	637333	641333	646000	637333	641333	646000
20.0	QPSK	1	0	19.55	19.52	19.75	19.73	19.56	19.98	22.65	22.55	22.88
		1	1	21.38	21.36	21.49	21.23	21.32	21.33	24.32	24.35	24.42
		1	49	21.24	21.09	21.41	21.50	21.26	21.13	24.38	24.19	24.28
		1	50	19.92	19.86	19.55	19.81	19.82	19.76	22.88	22.85	22.67
		25	12	19.96	19.78	19.79	19.79	20.05	20.00	22.89	22.93	22.91
		50	0	19.69	19.58	19.86	19.53	19.90	19.97	22.62	22.75	22.93
	16QAM	1	0	19.95	19.52	19.88	19.60	19.73	19.53	22.79	22.64	22.72
		1	1	20.69	20.89	20.97	20.91	20.59	20.82	23.81	23.75	23.91
		1	49	20.91	20.56	21.00	20.58	20.63	20.88	23.76	23.61	23.95
		1	50	19.65	19.52	19.85	19.93	19.71	19.61	22.80	22.63	22.74
		25	12	19.56	19.68	19.76	19.63	19.57	19.56	22.61	22.64	22.67
		50	0	19.75	20.00	19.88	19.69	19.73	19.74	22.73	22.88	22.82
	64QAM	1	0	19.20	19.37	19.28	19.37	19.50	19.44	22.30	22.45	22.37
		1	1	19.18	19.13	19.43	19.46	19.37	19.20	22.33	22.26	22.33
		1	49	19.36	19.42	19.28	19.15	19.07	19.30	22.27	22.26	22.30
		1	50	19.35	19.47	19.34	19.37	19.22	19.31	22.37	22.36	22.34
		25	12	19.47	19.06	19.38	19.24	19.05	19.16	22.37	22.07	22.28
		50	0	19.34	19.43	19.31	19.42	19.34	19.14	22.39	22.40	22.24
	256QAM	1	0	16.33	16.07	16.23	16.25	16.51	16.45	19.30	19.31	19.35
		1	1	16.02	16.19	16.47	16.09	16.28	16.16	19.07	19.25	19.33
		1	49	16.45	16.11	16.35	16.23	16.36	16.22	19.35	19.25	19.30
		1	50	16.39	16.29	16.51	16.23	16.40	16.22	19.32	19.36	19.38
		25	12	16.27	16.14	16.08	16.41	16.07	16.27	19.35	19.12	19.19
		50	0	16.43	16.10	16.38	16.14	16.02	16.26	19.30	19.07	19.33

OUTPUT POWER FOR 5G NR n48 (30.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)								
				ANT 7			ANT 8			ANT 7+8		
				637666	641666	645666	637666	641666	645666	637666	641666	645666
30.0	QPSK	1	0	19.84	19.95	19.61	19.79	19.55	19.53	22.83	22.76	22.58
		1	1	21.23	21.20	21.10	21.15	21.42	21.15	24.20	24.32	24.14
		1	76	21.43	21.21	21.21	21.08	21.03	21.46	24.27	24.13	24.35
		1	77	19.55	19.78	19.93	19.70	19.78	19.53	22.64	22.79	22.74
		36	18	15.57	15.58	15.93	15.62	15.95	15.82	18.61	18.78	18.89
		75	0	15.81	15.80	15.77	15.94	15.60	15.97	18.89	18.71	18.88
	16QAM	1	0	19.85	19.84	19.72	19.74	19.98	19.95	22.81	22.92	22.85
		1	1	20.67	20.87	20.84	20.75	20.92	20.74	23.72	23.91	23.80
		1	76	20.63	20.73	20.85	20.82	20.68	20.78	23.74	23.72	23.83
		1	77	19.92	19.68	19.83	19.92	19.87	19.69	22.93	22.79	22.77
		36	18	15.83	15.79	15.72	15.53	15.68	15.77	18.69	18.75	18.76
		75	0	15.64	15.61	15.91	15.96	15.83	15.90	18.81	18.73	18.92
	64QAM	1	0	19.13	19.38	19.05	19.06	19.37	19.30	22.11	22.39	22.19
		1	1	19.11	19.04	19.49	19.39	19.11	19.50	22.26	22.09	22.51
		1	76	19.14	19.08	19.05	19.37	19.03	19.45	22.27	22.07	22.26
		1	77	19.36	19.02	19.45	19.17	19.10	19.42	22.28	22.07	22.45
		36	18	15.91	15.70	15.80	15.89	15.98	15.99	18.91	18.85	18.91
		75	0	15.56	15.79	15.75	15.55	15.74	15.75	18.57	18.78	18.76
	256QAM	1	0	16.35	16.02	16.13	16.36	16.14	16.42	19.37	19.09	19.29
		1	1	16.25	16.43	16.40	16.43	16.35	16.04	19.35	19.40	19.23
		1	76	16.45	16.25	16.45	16.16	16.20	16.23	19.32	19.24	19.35
		1	77	16.48	16.38	16.10	16.31	16.50	16.48	19.41	19.45	19.30
		36	18	15.64	15.76	15.52	15.75	15.90	15.52	18.71	18.84	18.53
		75	0	15.56	15.62	15.61	15.87	15.93	15.57	18.73	18.79	18.60

OUTPUT POWER FOR 5G NR n48 (40.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)								
				ANT 7			ANT 8			ANT 7+8		
				638000	641333	645333	638000	641333	645333	638000	641333	645333
				3570.0	3620.0	3680.0	3570.0	3620.0	3680.0	3570.0	3620.0	3680.0
40.0	QPSK	1	0	19.88	19.85	20.09	19.83	19.95	19.77	22.87	22.91	22.94
		1	1	21.41	21.26	21.35	21.19	21.03	21.45	24.31	24.16	24.41
		1	104	21.30	21.07	21.45	21.49	21.10	21.41	24.41	24.10	24.44
		1	105	19.77	19.87	19.92	19.68	19.64	19.83	22.74	22.77	22.89
		50	25	15.69	15.90	15.81	15.96	15.67	15.98	18.84	18.80	18.91
		100	0	15.57	15.88	15.63	15.81	15.94	15.97	18.70	18.92	18.81
	16QAM	1	0	19.55	19.59	19.59	19.75	19.82	19.97	22.66	22.72	22.79
		1	1	21.00	20.72	20.83	20.62	20.83	20.77	23.82	23.79	23.81
		1	104	20.77	20.75	20.55	20.94	20.89	20.83	23.87	23.83	23.70
		1	105	19.52	19.66	20.01	19.94	19.87	20.01	22.75	22.78	23.02
		50	25	15.51	15.55	15.61	15.55	15.86	15.76	18.54	18.72	18.70
		100	0	15.91	15.81	15.70	15.57	15.95	15.90	18.75	18.89	18.81
	64QAM	1	0	19.51	19.34	19.06	19.21	19.21	19.19	22.37	22.29	22.14
		1	1	19.25	19.21	19.24	19.26	19.33	19.15	22.27	22.28	22.21
		1	104	19.16	19.03	19.20	19.32	19.44	19.06	22.25	22.25	22.14
		1	105	19.03	19.50	19.51	19.01	19.48	19.13	22.03	22.50	22.33
		50	25	15.51	15.62	15.94	15.98	15.56	15.50	18.76	18.60	18.74
		100	0	15.79	15.96	15.89	15.69	15.70	15.81	18.75	18.84	18.86
	256QAM	1	0	16.49	16.50	16.17	16.26	16.45	16.34	19.39	19.49	19.27
		1	1	16.51	16.39	16.35	16.16	16.24	16.22	19.35	19.33	19.30
		1	104	16.40	16.32	16.06	16.13	16.23	16.24	19.28	19.29	19.16
		1	105	16.19	16.02	16.20	16.15	16.51	16.07	19.18	19.28	19.15
		50	25	15.98	15.61	15.64	15.90	15.92	16.10	18.95	18.78	18.89
		100	0	15.65	15.55	15.94	15.93	16.18	15.84	18.80	18.89	18.90

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.

LTE BAND 48

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 48	5MHz, QPSK	25/0	3625.0	4.458	4.909
	5MHz, 16QAM			4.458	5.003
	10MHz, QPSK	50/0		8.897	9.346
	10MHz, 16QAM			8.973	9.385
	15MHz, QPSK	75/0		13.395	14.21
	15MHz, 16QAM			13.382	14.51
	20MHz, QPSK	100/0		17.832	19.26
	20MHz, 16QAM			17.815	18.69
	20MHz, QPSK	1/0		0.265	0.448

5G NR n48

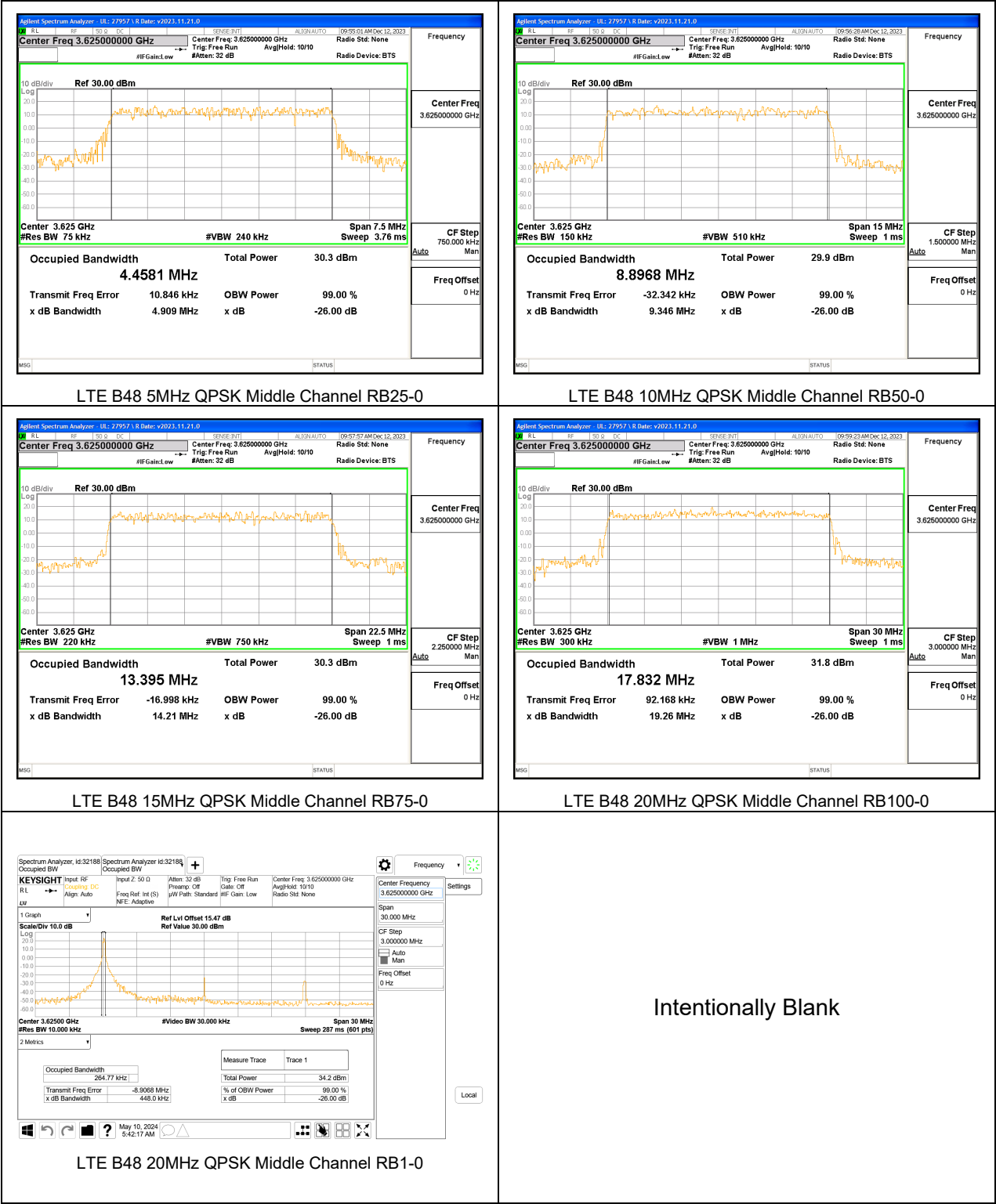
Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n48	10MHz, BPSK	24/0	3625	8.627	9.811
	10MHz, QPSK			8.633	9.664
	10MHz, 16QAM			8.642	9.588
	15MHz, BPSK	36/0	3620	12.975	13.83
	15MHz, QPSK			12.922	13.88
	15MHz, 16QAM			12.902	14.06
	20MHz, BPSK	50/0		17.858	18.76
	20MHz, QPSK			17.799	18.63
	20MHz, 16QAM			17.833	19.28
	30MHz, BPSK	75/0	3625	26.758	28.50
	30MHz, QPSK			26.872	28.49
	30MHz, 16QAM			26.854	28.23
	40MHz, BPSK	100/0	3620	35.642	37.45
	40MHz, QPSK			35.911	37.78
	40MHz, 16QAM			35.807	37.53
	40MHz, BPSK	1/0		0.479	0.856

LTE ULCA BAND 48

Band	Mode	RB Allocation/RB Offset	f (MHz)	99% BW (MHz)	- 26dB BW (MHz)
LTE BAND 48	5MHz + 20MHz BAND QPSK	25/0 + 100/0	3625	23.238	24.96
	5MHz + 20MHz BAND 16QAM			23.210	24.90
	20MHz + 5MHz BAND QPSK	100/0 + 25/0		23.386	25.03
	20MHz + 5MHz BAND 16QAM			23.259	24.85
	10MHz + 20MHz BAND QPSK	50/0 + 100/0		27.977	30.29
	10MHz + 20MHz BAND 16QAM			27.946	29.84
	20MHz + 10MHz BAND QPSK	100/0 + 50/0		28.003	29.97
	20MHz + 10MHz BAND 16QAM			27.936	30.03
	15MHz + 20MHz BAND QPSK	75/0 + 100/0		32.909	35.06
	15MHz + 20MHz BAND 16QAM			32.887	34.87
	20MHz + 15MHz BAND QPSK	100/0 + 75/0		32.920	34.98
	20MHz + 15MHz BAND 16QAM			32.790	34.89
	20MHz + 20MHz BAND QPSK	100/0 + 100/0		37.729	39.81
	20MHz + 20MHz BAND 16QAM			37.604	39.85

9.1.1. LTE BAND 48 AND 5G NR n48

LTE BAND 48



Agilent Spectrum Analyzer - UL: 27957 / R Date: v2023.11.21.0

Center Freq 3.625000000 GHz

Center Freq: 3.625000000 GHz

Trig: Free Run

Avg/Hold: 10/10

Radio Std: None

Radio Device: BTS

Ref 30.00 dBm

Log

10 dB/div

20.0

10.0

0.00

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

Center 3.625 GHz

#Res BW 220 kHz

#VBW 750 kHz

Span 22.5 MHz

Sweep 1 ms

CF Step 2.250000 MHz

Man

Occupied Bandwidth 13.395 MHz

Total Power 30.3 dBm

Transmit Freq Error -16.998 kHz

OBW Power 99.00 %

x dB Bandwidth 14.21 MHz

x dB -26.00 dB

Auto

Man

Freq Offset 0 Hz

MSG

STATUS

LTE B48 15MHz QPSK Middle Channel RB75-0

Agilent Spectrum Analyzer - UL: 27957 / R Date: v2023.11.21.0

Center Freq 3.625000000 GHz

Center Freq: 3.625000000 GHz

Trig: Free Run

Avg/Hold: 10/10

Radio Std: None

Radio Device: BTS

Ref 30.00 dBm

Log

10 dB/div

20.0

10.0

0.00

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

Center 3.625 GHz

#Res BW 300 kHz

#VBW 1 MHz

Span 30 MHz

Sweep 1 ms

CF Step 3.000000 MHz

Man

Occupied Bandwidth 17.832 MHz

Total Power 31.8 dBm

Transmit Freq Error 92.168 kHz

OBW Power 99.00 %

x dB Bandwidth 19.26 MHz

x dB -26.00 dB

Auto

Man

Freq Offset 0 Hz

MSG

STATUS

LTE B48 20MHz QPSK Middle Channel RB100-0

Spectrum Analyzer, id:32188

Occupied BW

KEYSIGHT

Input RF

Align: Auto

Input 2: 50.0

Attenu: 32 dB

Presamp: Off

Trig: Free Run

Gate: Off

Center Freq: 3.625000000 GHz

Avg/Hold: 10/10

Radio Std: None

Settings

1 Graph

Scale/Div 10.0 dB

Log

20.0

10.0

0.00

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

Center 3.62500 GHz

#Res BW 10.000 kHz

#Video BW 30.000 kHz

Span 30 MHz

Sweep 287 ms (601 pts)

Ref Lvl Offset 15.47 dB

Ref Value 30.00 dBm

Occupied Bandwidth 294.77 kHz

Total Power 34.2 dBm

Transmit Freq Error -8.9068 kHz

% of OBW Power 99.00 %

x dB Bandwidth 448.0 kHz

x dB -26.00 dB

Measure Trace Trace 1

Auto

Man

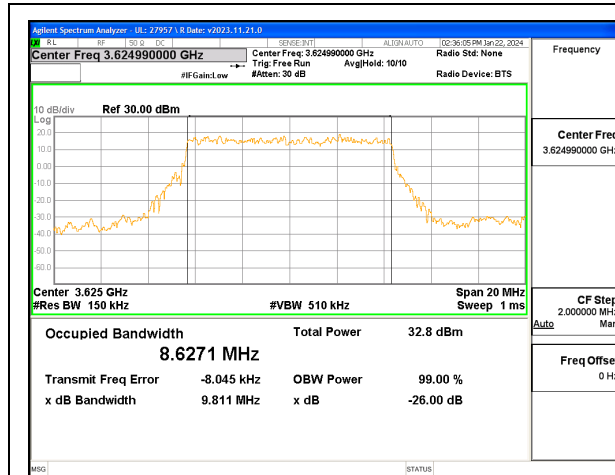
Freq Offset 0 Hz

Local

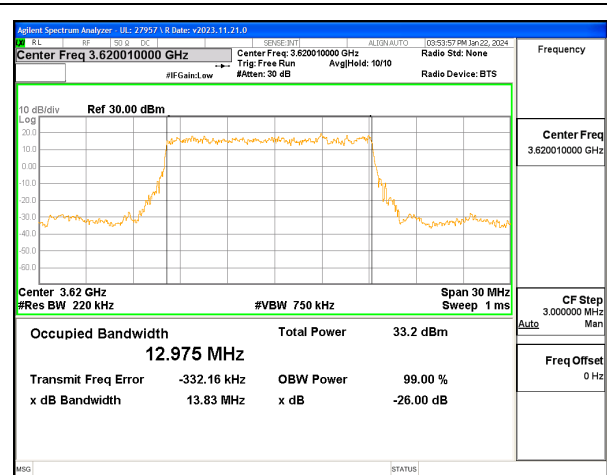
LTE B48 20MHz QPSK Middle Channel RB1-0

Intentionally Blank

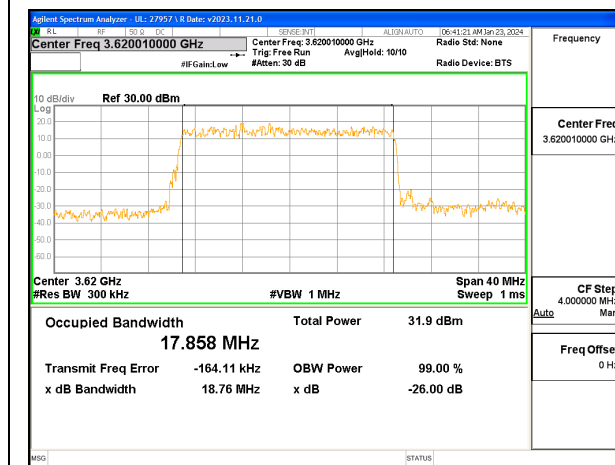
5G NR n48



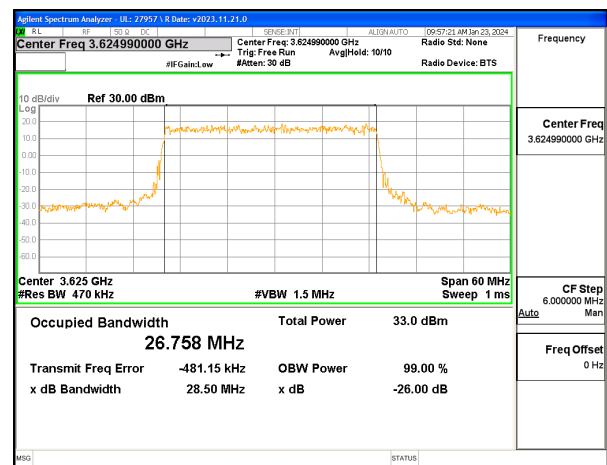
5G NR n48 10MHz BPSK Middle Channel RB24-0



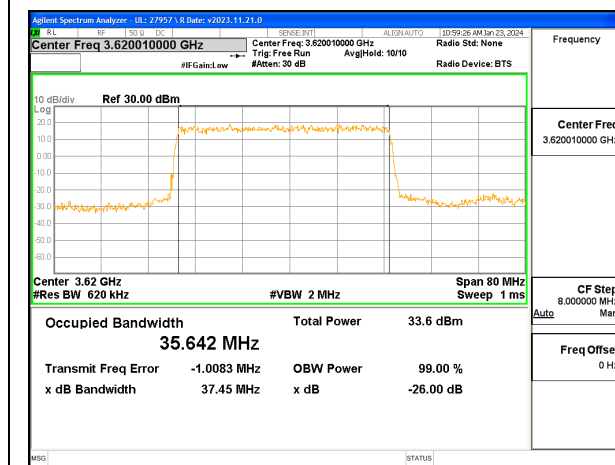
5G NR n48 15MHz BPSK Middle Channel RB36-0



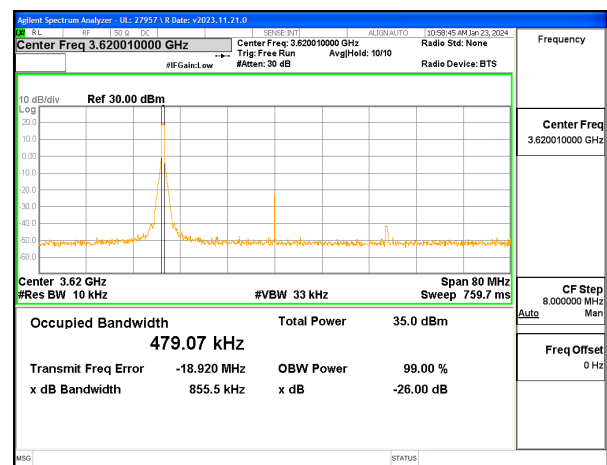
5G NR n48 20MHz BPSK Middle Channel RB50-0



5G NR n48 30MHz BPSK Middle Channel RB75-0



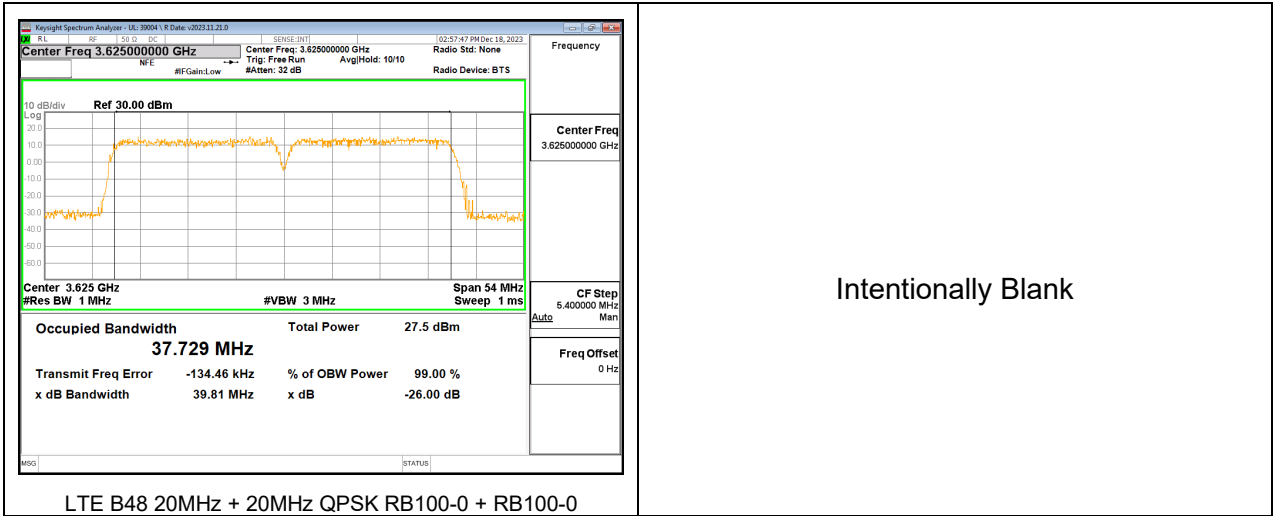
5G NR n48 40MHz BPSK Middle Channel RB100-0



5G NR n48 40MHz BPSK Middle Channel RB1-0

9.1.2. LTE ULCA BAND 48





9.2. EMISSION MASK AND ADJACENT CHANNEL POWER

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 CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

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 X dBm,
4. Set resolution bandwidth to at least 1% of emission bandwidth.

TEST PROCEDURE (FCC LTE BAND 48)

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

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

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

RESULTS

LIMITS

FCC: §96.41

(e) 3.5 GHz Emissions and Interference Limits—

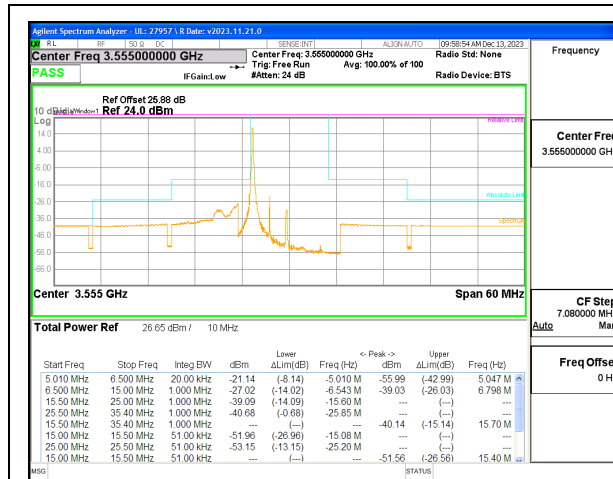
(1) General protection levels

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

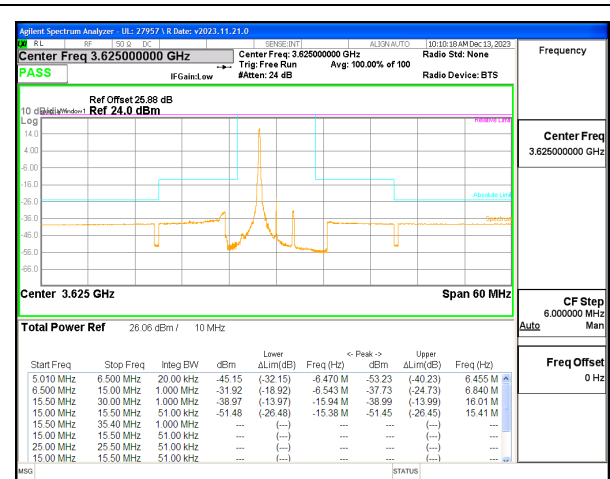
(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40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

9.2.1. LTE BAND 48 AND 5G NR n48

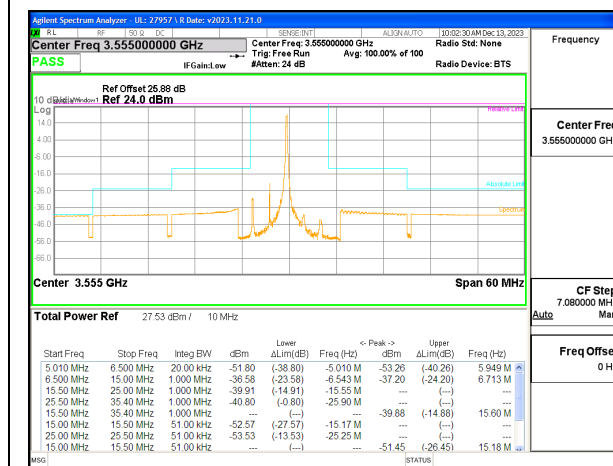
LTE BAND 48 EMISSION MASK



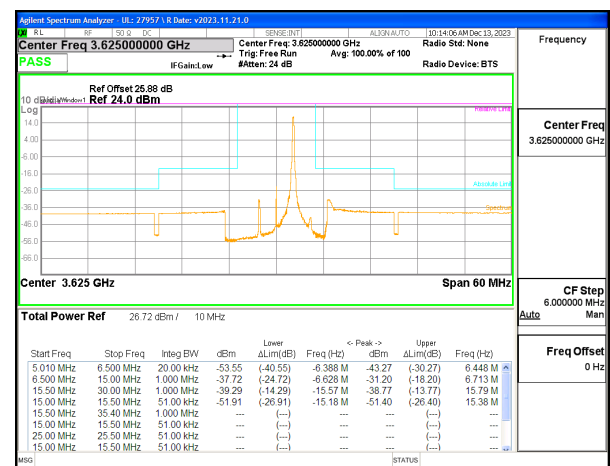
LTE B48 5MHz QPSK Low Channel RB1-0



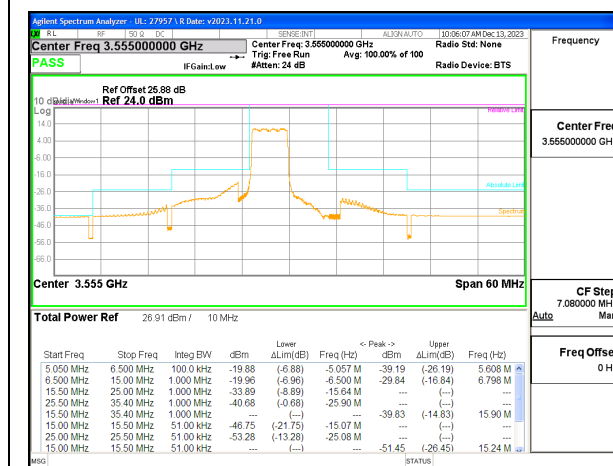
LTE B48 5MHz QPSK Middle Channel RB1-0



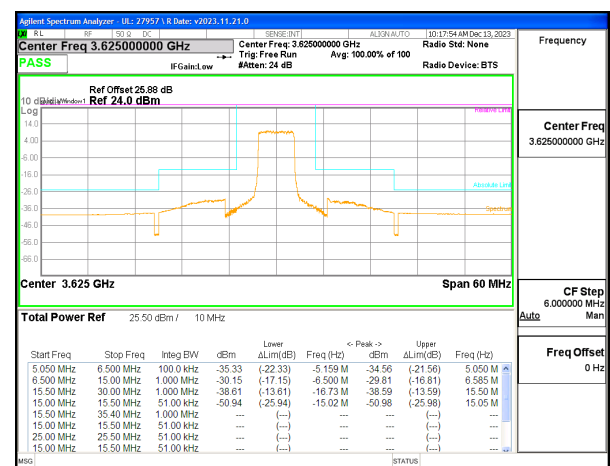
LTE B48 5MHz QPSK Low Channel RB1-24



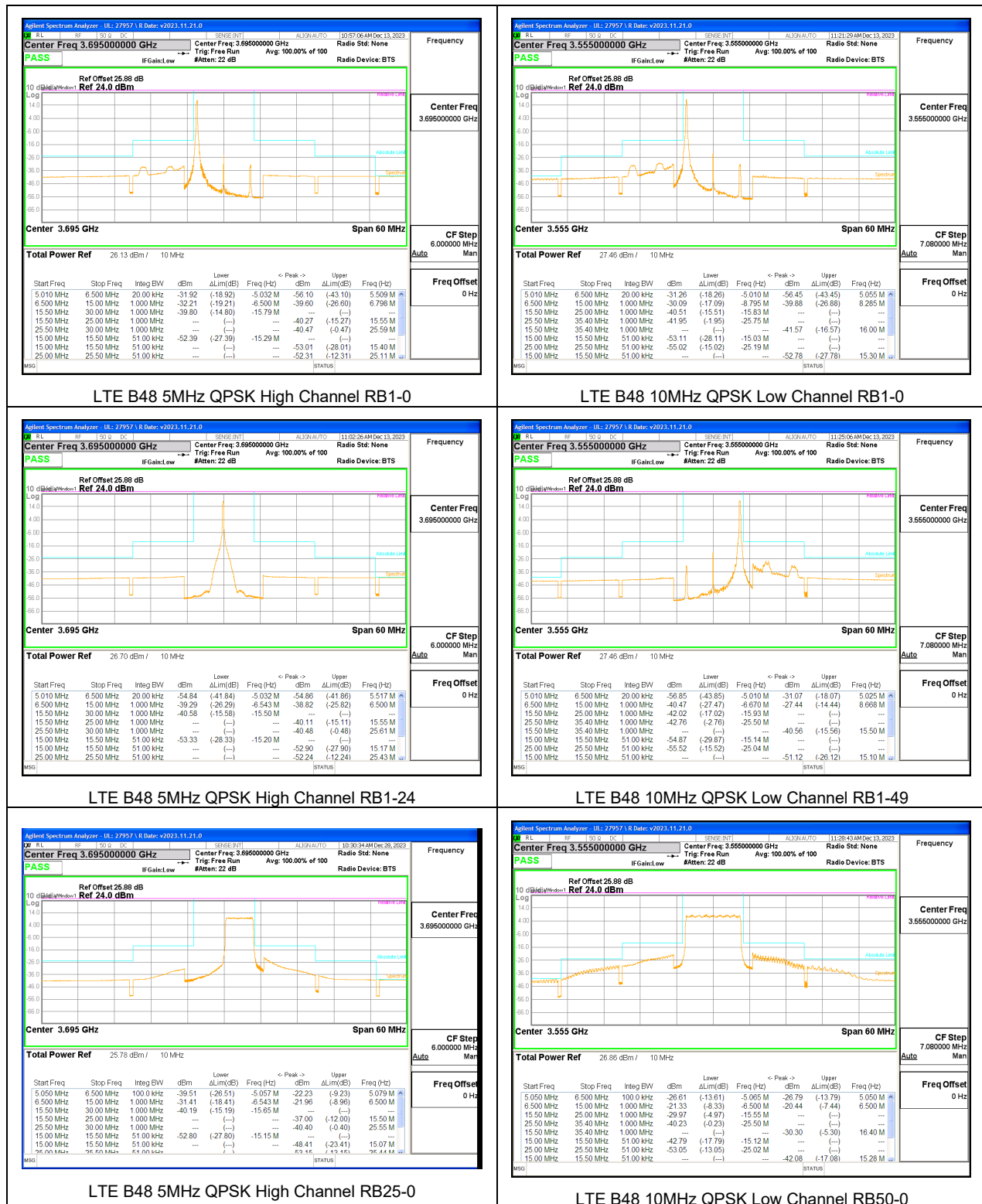
LTE B48 5MHz QPSK Middle Channel RB1-24

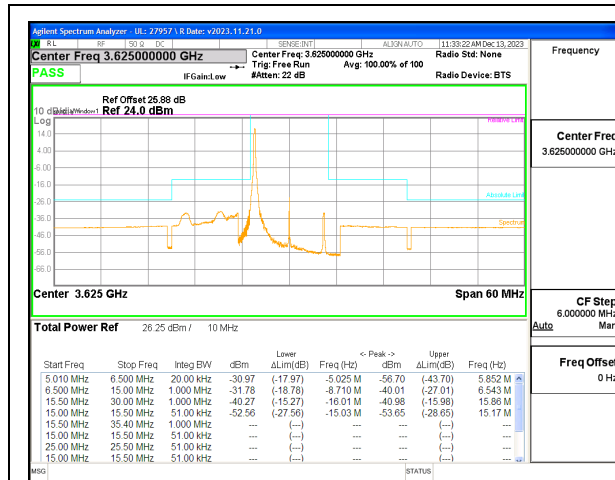


LTE B48 5MHz QPSK Low Channel RB25-0

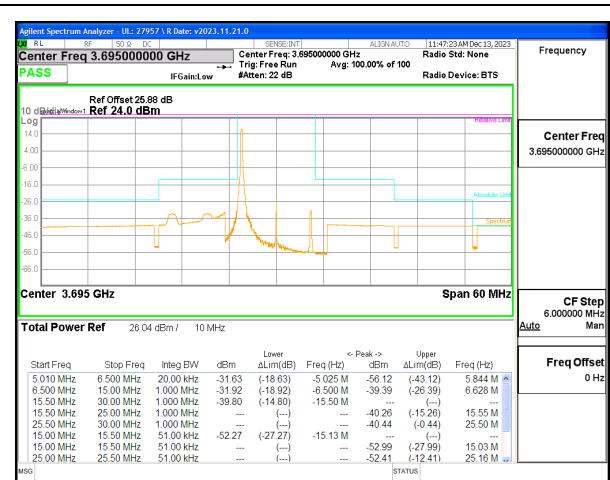


LTE B48 5MHz QPSK Middle Channel RB25-0

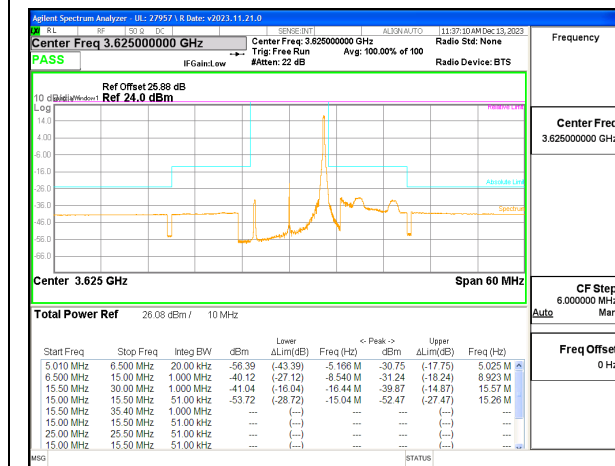




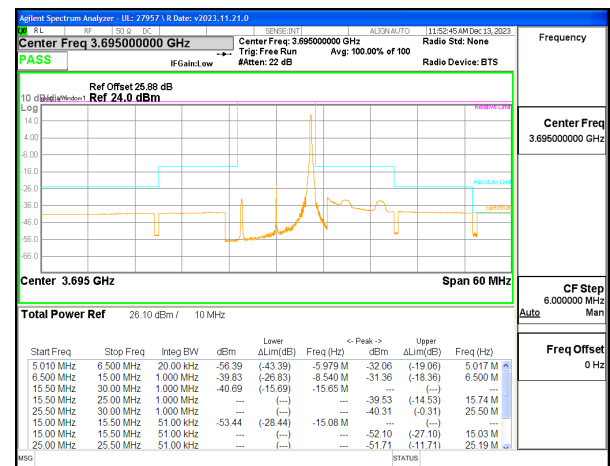
LTE B48 10MHz QPSK Middle Channel RB1-0



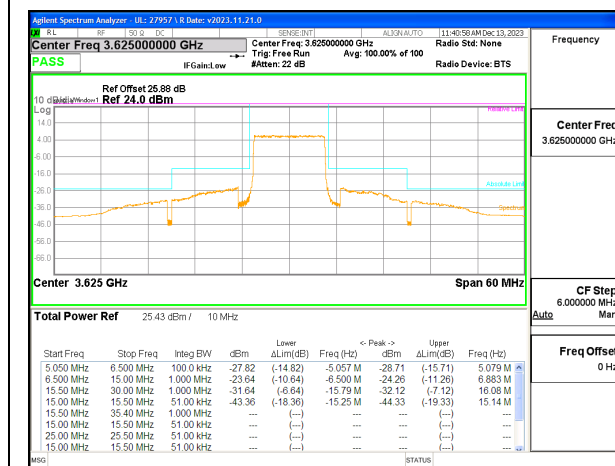
LTE B48 10MHz QPSK High Channel RB1-0



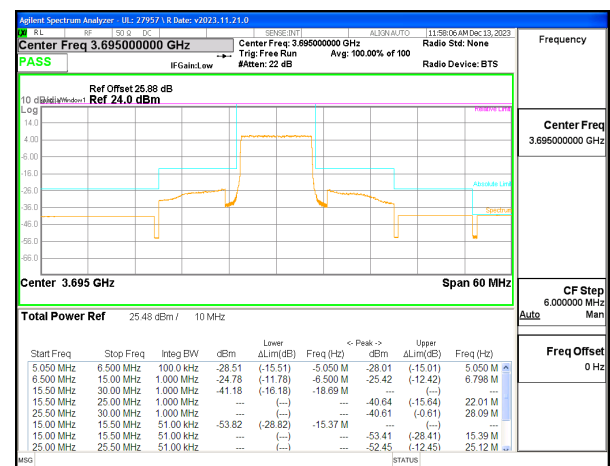
LTE B48 10MHz QPSK Middle Channel RB1-49



LTE B48 10MHz QPSK High Channel RB1-49

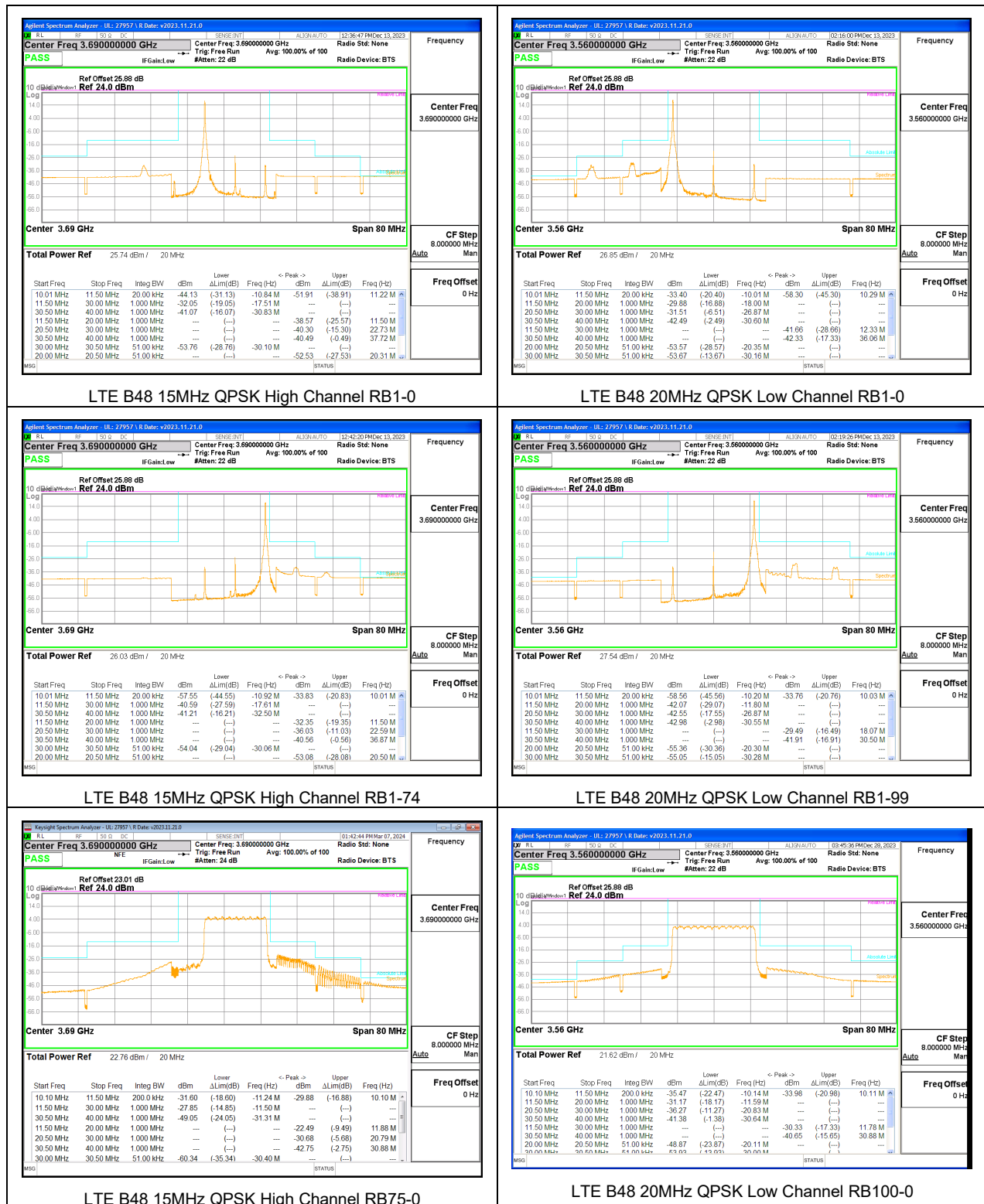


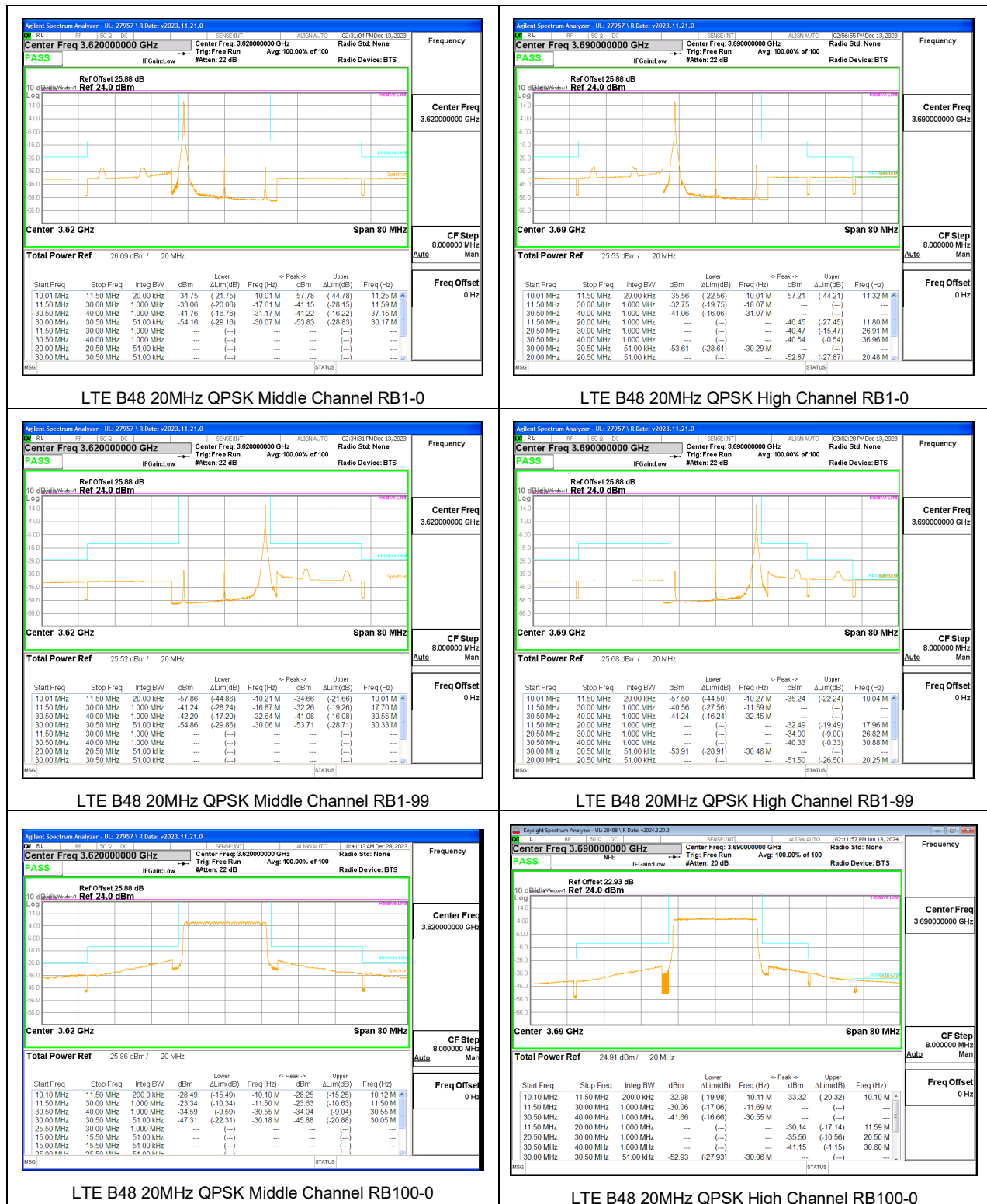
LTE B48 10MHz QPSK Middle Channel RB50-0



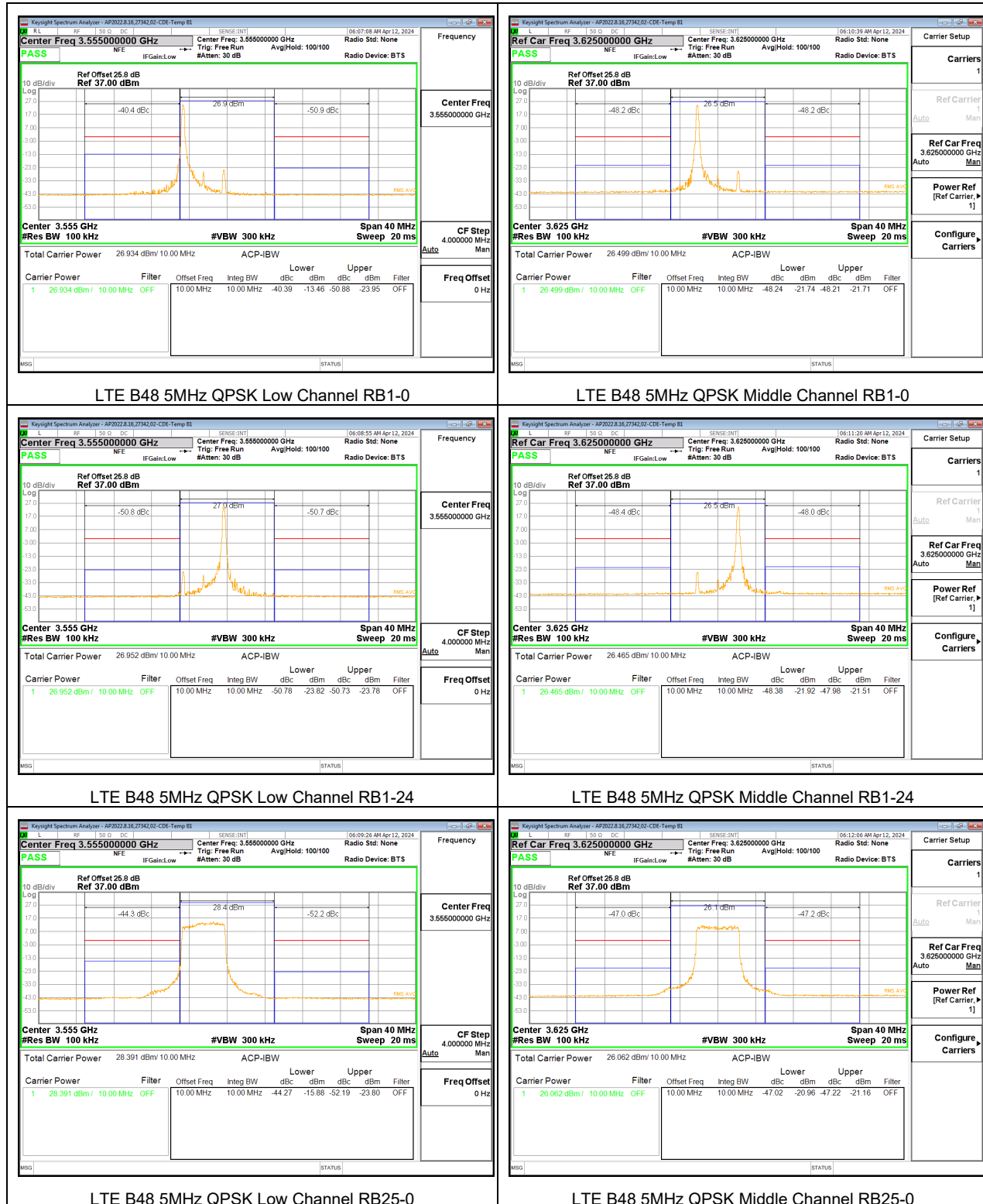
LTE B48 10MHz QPSK High Channel RB50-0

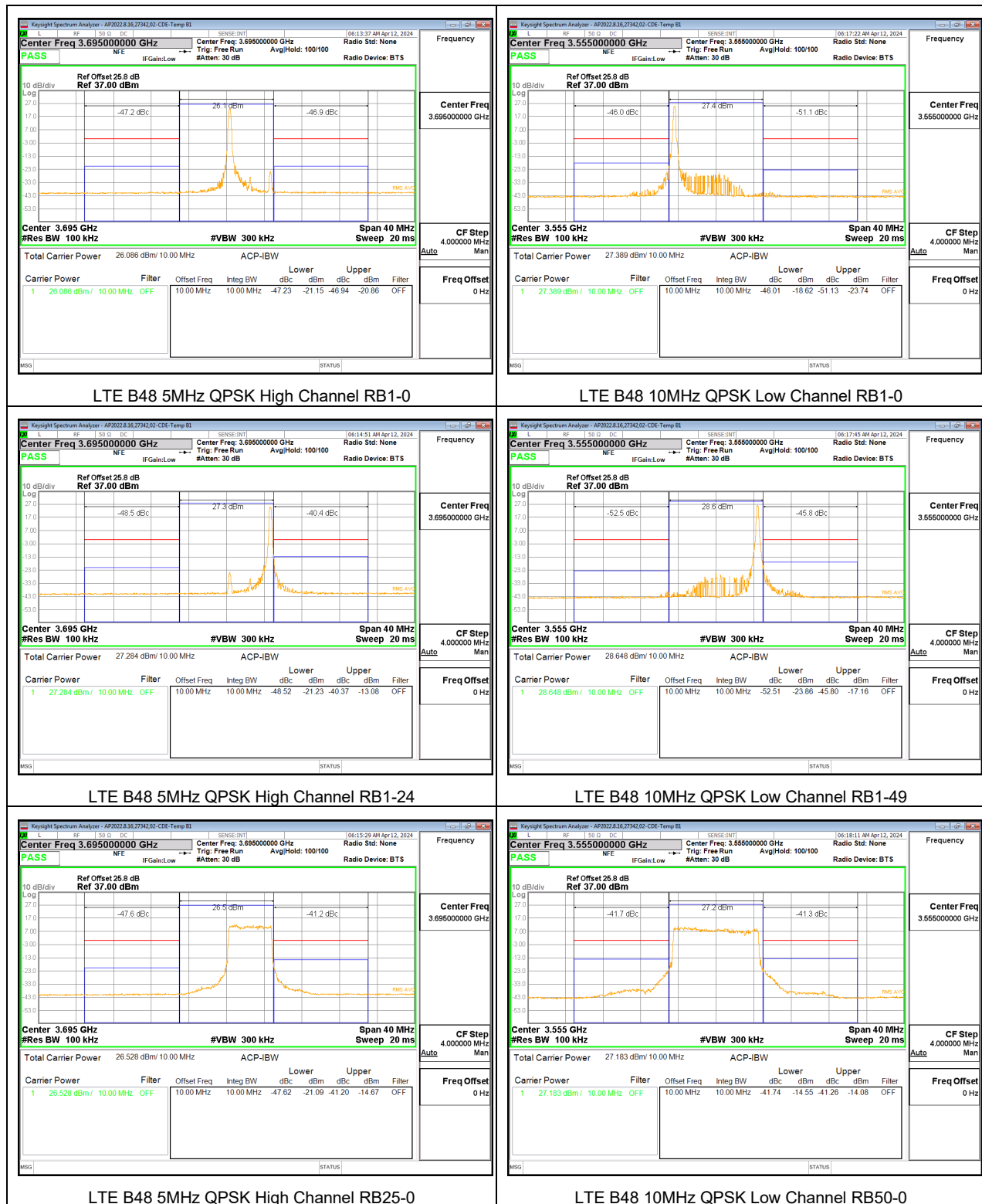


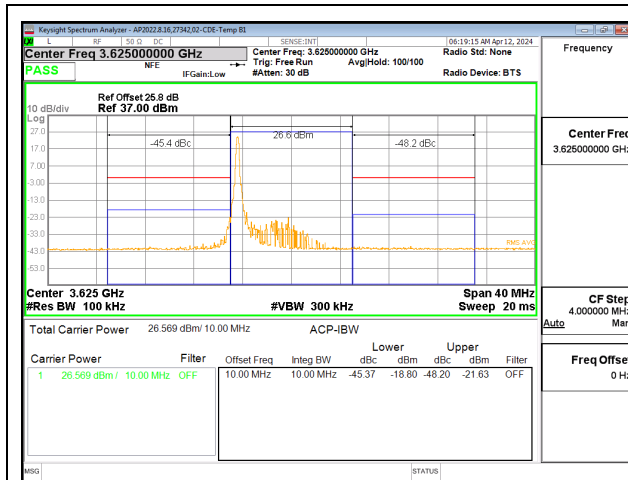




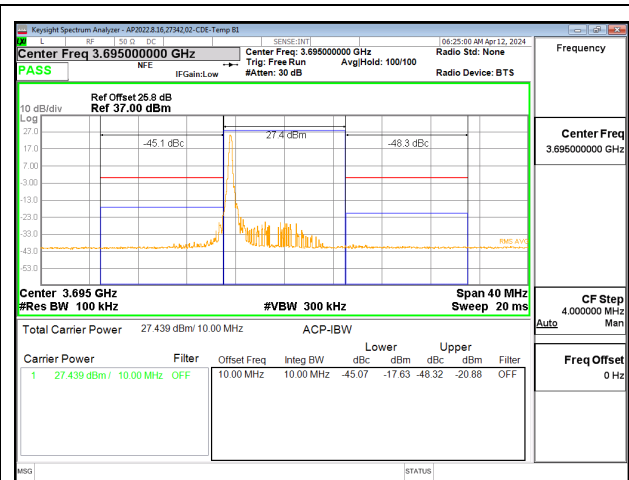
LTE BAND 48 ADJACENT CHANNEL POWER



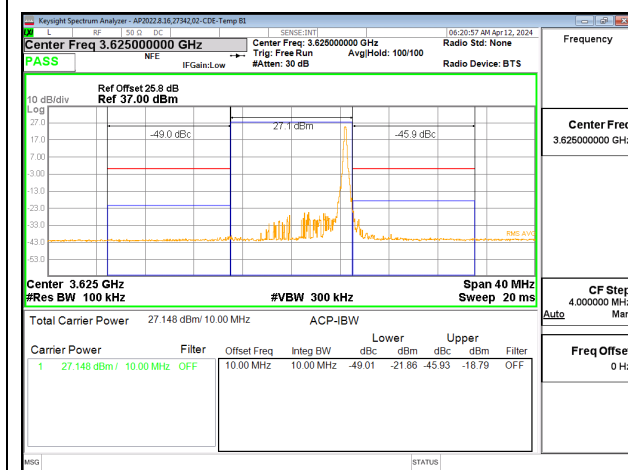




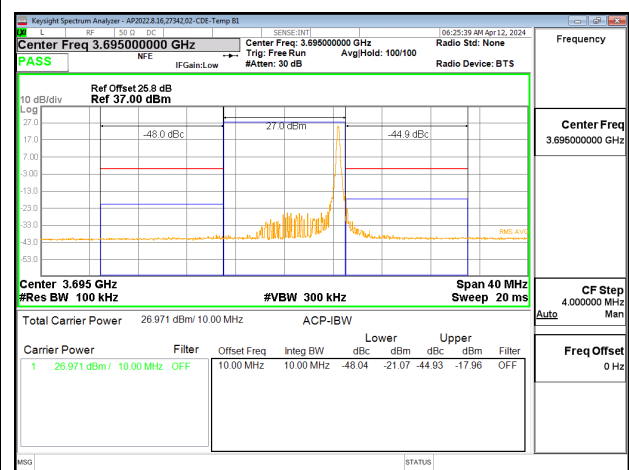
LTE B48 10MHz QPSK Middle Channel RB1-0



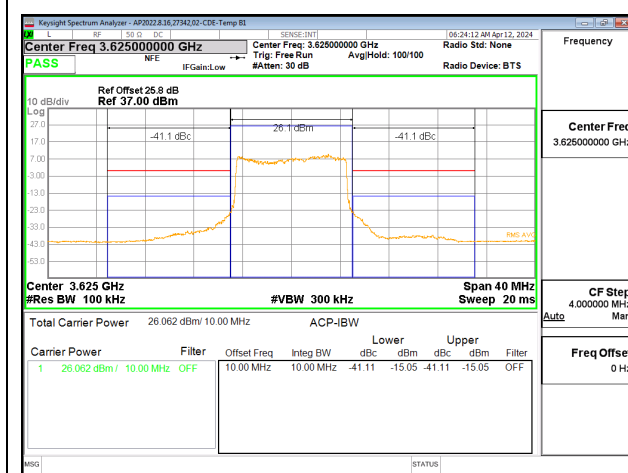
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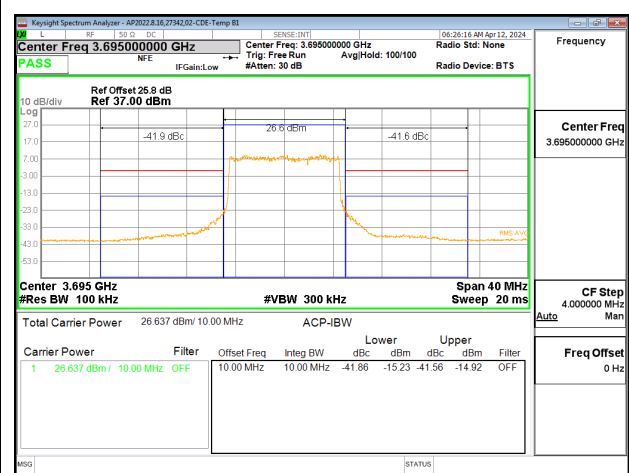
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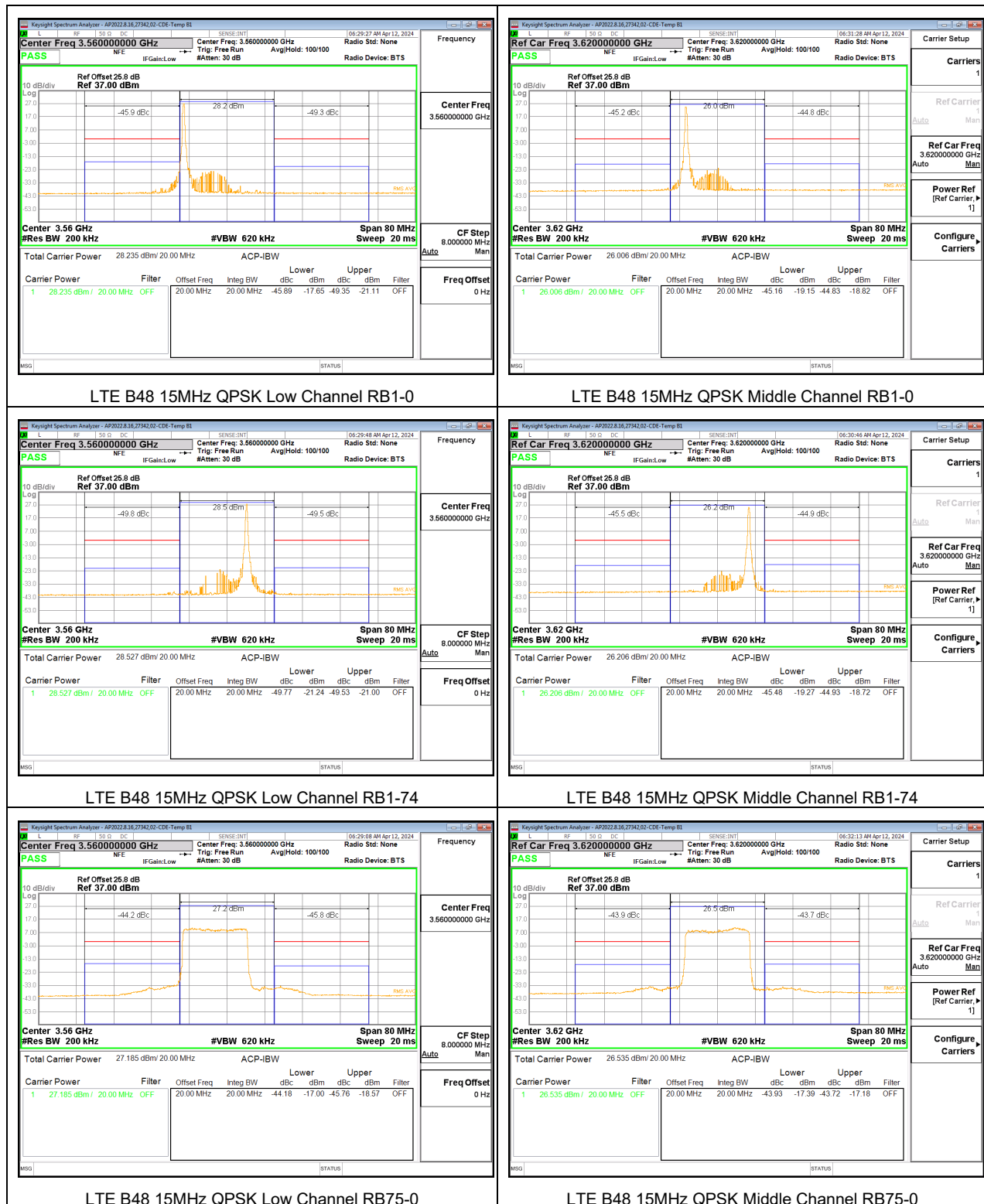
LTE B48 10MHz QPSK High Channel RB1-49



LTE B48 10MHz QPSK Middle Channel RB50-0



LTE B48 10MHz QPSK High Channel RB50-0







5G NR n48 EMISSION MASK

