TEST REPORT

Report Number: R14777340-E11

Applicant	:	Sony Corporation 1-7-1 Konan Minato-Ku Tokyo, 108-0075, Japan
FCC ID	:	PY7-76732V
EUT Description	:	GSM/WCDMA/LTE/5G Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT & NFC
Test Standard(s)	:	FCC CFR 47 Part 2, Part 22, Part 24, and Part 27.

Date Of Issue:
2023-07-17

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

ACCREDITED
CERT #0751.06

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2023-07-06	Initial Review	Noah Bennett
V2	2023-07-17	Revised Section 6.2 and 9.1 per TCB feedback.	Noah Bennett

TABLE OF CONTENTS

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 & NFC
SERIAL NUMBERS:	QV77002SG9, QV77007YG9, QV77008AG9, QV77007DHJ
SAMPLE RECEIPT DATE:	2023-05-03
DATE TESTED:	2023-05-05 to 2023-06-27

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC CFR 47 Part 2, Part 22, Part 24, 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. This report must not be used by the client to claim product certification, approval, or endorsement by a2La, NIST, or any agency of the U.S. government.

Approved & Released
For UL LLC By:

Dan Coronia
Operations Leader
Consumer, Medical and IT Segment
UL VSI

Prepared By:

Noah Bennett
Engineer
Consumer, Medical, and IT Segment
UL LLC

Reviewed By:

Kiya Kedida
Senior Project Engineer
Consumer, Medical and IT Segment
UL VSI

2. SUMMARY OF TEST RESULTS

This report contains data provided by the customer 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 8)

Requirement Description	Band	Requirement Clause Number (FCC)	Result	Remarks
Effective Radiated Power	GSM850, WCDMA5, LTE5	22.913 (a)(5)	Complies	None.
	LTE12	27.50 (c) (10)		
	LTE13	27.50 (b) (10)		
Equivalent Isotropic Radiated Power	GSM1900, WCDMA2, LTE2, LTE25	24.232 (c)		
	WCDMA4, LTE4, LTE66	27.50 (d) (4)		
	LTE41	27.50 (h) (2)		
Requirement Description	**Requirement Clause Number (FCC)**		**Result**	**Remarks**
Occupied Bandwidth	2.1049		Complies	None.
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), 27.53(l),			
Out of Band Emissions	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), 27.53(l),			
Frequency Stability	2.1055, 22.355, 24.235, 27.54,			
Peak-to-Average Ratio	22.913 (d), 24.232 (d), 27.50 (d) (5), 27.50 (j) (4),			
Field Strength of Spurious Radiation	2.1053, 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), 27.53(l),			

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 v02r01: Misc Rev Approv License Devices
- FCC KDB 412172 D01 v01r01. Determining ERP and EIRP

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, Certificate Number 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
☒	Building 2800 Suite 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)
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Conducted Emissions (0.150-30MHz) - LISN	3.40 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%

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

6.2. MAXIMUM OUTPUT POWER

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015
KDB 971168 D01 Section 5.6

ERP/EIRP = PMeas + GT − LC
where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);
PMeas = measured transmitter output power or PSD, in dBm or dBW;
GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

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

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

GSM MODES

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	31.86	-5.31	7.0	24.40	0.275	246.86	247KGXW
	EGPRS	26.84			19.38	0.087	243.14	243KG7W
Part 24 / RSS 133 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	27.12	-3.49	2.0	23.63	0.231	244.82	245KGXW
	EGPRS	26.11			22.62	0.183	245.63	246KG7W

WCDMA MODE

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	21.93	-5.31	7.0	14.47	0.028	4141.4	4M14F9W
	HSUPA	21.00			13.54	0.023	4133.8	4M13F9W

Part 24 Band 2

Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
1852.4-1907.6	REL 99	18.95	-3.49	2.0	15.46	0.035	4145.3	4M15F9W
	HSUPA	18.07			14.58	0.029	4153	4M15F9W

Part 27 Band 4

Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
1712.4-1752.6	REL 99	18.04	-2.88	1.0	15.16	0.033	4153.4	4M15F9W
	HSUPA	17.07			14.19	0.026	4162.3	4M16F9W

LTE BAND 5

Part 22H	
ERP Limit (W)	7.00
Antenna Gain (dBi)	-5.31

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	20.91	13.45	0.022	1097.5	1M10G7W
	16QAM			21.07	13.61	0.023	1094.8	1M09D7W
3.0	QPSK	825.5	847.5	20.99	13.53	0.023	2703.1	2M70G7W
	16QAM			21.20	13.74	0.024	2710.5	2M71D7W
5.0	QPSK	826.5	846.5	20.97	13.51	0.022	4498	4M50G7W
	16QAM			21.16	13.70	0.023	4499.1	4M50D7W
10.0	QPSK	829.0	844.0	20.90	13.44	0.022	8986.7	8M99G7W
	16QAM			21.07	13.61	0.023	8982	8M98D7W

LTE BAND 12

Part 27 / RSS 130	
ERP Limit (W)	3.00
Antenna Gain (dBi)	-5.15

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	21.05	13.75	0.024	1091	1M09G7W
	16QAM			21.21	13.91	0.025	1093	1M09D7W
3.0	QPSK	700.5	714.5	21.05	13.75	0.024	2704	2M70G7W
	16QAM			21.26	13.96	0.025	2704	2M70D7W
5.0	QPSK	701.5	713.5	21.10	13.80	0.024	4504	4M50G7W
	16QAM			21.29	13.99	0.025	4505	4M51D7W
10.0	QPSK	704.0	711.0	21.06	13.76	0.024	8983	8M98G7W
	16QAM			21.16	13.86	0.024	8973	8M97D7W

LTE BAND 13

Part 27 / RSS 130	
ERP Limit (W)	3.00
Antenna Gain (dBi)	-4.52

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	21.09	14.42	0.028	4503	4M50G7W
	16QAM			21.16	14.49	0.028	4503	4M50D7W
10.0	QPSK	782.0	782.0	20.90	14.23	0.026	8947	8M95G7W
	16QAM			21.10	14.43	0.028	8964	8M96D7W

LTE BAND 25

Part 24	
EIRP Limit (W)	2.00
Antenna Gain (dBi)	-3.49

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	1850.7	1914.3	18.87	15.38	0.035	1092	1M09G7W
	16QAM			19.26	15.77	0.038	1096	1M10D7W
3.0	QPSK	1851.5	1913.5	19.05	15.56	0.036	2706	2M71G7W
	16QAM			19.37	15.88	0.039	2704	2M70D7W
5.0	QPSK	1852.5	1912.5	19.12	15.63	0.037	4508	4M51G7W
	16QAM			19.48	15.99	0.040	4512	4M51D7W
10.0	QPSK	1855.0	1910.0	19.03	15.54	0.036	8993	8M99G7W
	16QAM			19.32	15.83	0.038	8999	9M00D7W
15.0	QPSK	1857.5	1907.5	18.87	15.38	0.035	13469	13M5G7W
	16QAM			19.17	15.68	0.037	13470	13M5D7W
20.0	QPSK	1860.0	1905.0	18.86	15.37	0.034	17942	17M9G7W
	16QAM			19.24	15.75	0.038	17960	18M0D7W

LTE BAND 41

Part 27	
EIRP Limit (W)	2.00
Antenna Gain (dBi)	-1.17

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	19.33	18.16	0.065	4493	4M49G7W
	16QAM			19.40	18.23	0.067	4494	4M49D7W
10.0	QPSK	2501.0	2685.0	19.35	18.18	0.066	8981	8M98G7W
	16QAM			19.38	18.21	0.066	8987	8M99D7W
15.0	QPSK	2503.5	2682.5	19.16	17.99	0.063	13448	13M4G7W
	16QAM			19.19	18.02	0.063	13487	13M5D7W
20.0	QPSK	2506.0	2680.0	19.08	17.91	0.062	17926	17M9G7W
	16QAM			19.15	17.98	0.063	17939	17M9D7W

LTE BAND 66

Part 27	
EIRP Limit (W)	1.00
Antenna Gain (dBi)	-2.88

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	18.20	15.32	0.034	1091	1M09G7W
	16QAM			18.57	15.69	0.037	1903	1M90D7W
3.0	QPSK	1711.5	1778.5	18.22	15.34	0.034	2708	2M71G7W
	16QAM			18.50	15.62	0.036	2710	2M71D7W
5.0	QPSK	1712.5	1777.5	18.22	15.34	0.034	4510	4M51G7W
	16QAM			18.50	15.62	0.036	4505	4M51D7W
10.0	QPSK	1715.0	1775.0	18.18	15.30	0.034	8975	8M98G7W
	16QAM			18.56	15.68	0.037	8991	8M99D7W
15.0	QPSK	1717.5	1772.5	18.11	15.23	0.033	13482	13M5G7W
	16QAM			18.41	15.53	0.036	13471	13M5D7W
20.0	QPSK	1720.0	1770.0	18.12	15.24	0.033	17954	18M0G7W
	16QAM			18.48	15.60	0.036	17982	18M0D7W

6.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 2.108.

6.4. MAXIMUM ANTENNA GAIN

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

WWAN Bands	Frequency Range (MHz)	Main 1 Antenna Gain (dBi)	Main 2 Antenna Gain (dBi)
LTE Band 5, WCDMA V, GSM850	814 – 849	-5.31	
LTE Band 12/17	699 – 716	-5.15	
LTE Band 13	777 – 787	-4.52	
LTE Band 2/25, WCDMA2, GSM1900	1850 - 1915		-3.49
LTE Band 41	2496 – 2690		-1.17
LTE Band 4/66, WCDMA4	1710 – 1780		-2.88

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports LTE Bands of:
Band 2, Band 4, Band 5, Band 12, Band 13, Band 14, Band 17, Band 25, Band 41, and Band 66.

The EUT supports 2G/3G Bands of:
WCDMA Band 2, Band 4 and Band 5. GSM 850 and GSM 1900.

LTE Band 2 (1850-1910MHz) is covered by LTE Band 25 because it is a subset of LTE band 25 and they have same output power and supported bandwidths.

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

LTE Band 17 (704-716MHz, 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 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) for both the Main Antennas.

Band (Frequency)	Antenna	Orientation
Low Band (Fc<1GHz)	Main	X
Mid Band (1GHz<Fc<3GHz)		
Bluetooth	BT Chain 0	X
	BT Chain 1	Y
2.4 WLAN	WLAN Chain 0 + Chain 1 (MIMO)	Y
5 WLAN	WLAN Chain 0 + Chain 1 (MIMO)	Y

The EUT was tested while connected to AC Lines via charging cable and brick to represent worst case emissions.

The EUT was tested in radiated emissions at QPSK modulation, max bandwidth with the lowest RB setting for each band to maximize emissions.

The worst-case scenario for all measurements is based on conducted average power on different modulations. Output power measurements were measured on Rel 99, HSDPA, and HSUPA for WCDMA, and QPSK, 16QAM, and 64QAM modulations for LTE. Therefore, conducted licensed testing was done on the following modulations only as worst-case.

Technology	Modulation
GSM	GPRS
WCDMA	REL 99
LTE 5/12/13/25	64QAM
LTE 41/66	16QAM

Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. The only tests with emissions within 20dB of the limit are reported in section 10.2. Other tests in which no emissions within 20dB were observed are not reported.

The following scans were investigated for simultaneous transmission:

Mode	Mode	Mode
LTE B66 1745MHz 20MHz RB1-49	2442MHz BT GFSK C0	5240MHz 11ax HE20 SU MIMO
LTE B66 1745MHz 20MHz RB1-49	2442MHz BT GFSK C1	5240MHz 11ax HE20 SU MIMO
LTE B66 1745MHz 20MHz RB1-49	2442MHz 11g 6Mbps MIMO	
LTE B41 2620MHz 20MHz RB1-49	5240MHz 11ax HE20 SU MIMO	
LTE B12 704MHz 10MHz RB1-24	2462MHz 11g 6Mbps MIMO	

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adaptor	Sony	XQZ-UC1	1821W34209742	NA
Headphones	Sony	MDR-EX15AP	NA	NA

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB-C	1	USB-C	Shielded	<3m	XQZ-UB1
2	Aux	1	AUX	Shielded	<3m	

Test Setup

The EUT was connected to a base station simulator and set to transmit at max power for GSM/WCDMA/LTE testing

Setup Diagram

See R14777340-EP9 for Setup Photos and Setup Diagrams

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				
SA0027	*Spectrum Analyzer	Keysight Technologies	N9030A	2022-05-24	2023-05-24
90410	Spectrum Analyzer	Keysight Technologies	N9030A	2023-06-14	2024-06-14
81018	Spectrum Analyzer	Agilent	E4446A	2022-08-02	2023-08-02
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
SOFTEMI	Power Verification Software	UL	Version 4.0.7	NA	NA
SOFTEMI	Power Verification Software	UL	Version 3.4.9	NA	NA
SOFTEMI	Conducted Licensed Test Software	UL	Version 4.0 b-ph	NA	NA
208720	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500 (SN 170193)	2023-01-06	2024-01-06
208721	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	2023-06-06	2024-06-06
213025	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	2022-12-08	2023-12-08
	Conducted Room 2				
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
SOFTEMI	Power Verification Software	UL	Version 3.4.9	NA	NA
212967	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	2022-12-14	2023-12-14
	Common Equipment				
	Attenuators				
226564	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2023-02-16	2024-02-16
226565	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2023-02-16	2024-02-16
	Cables				
CBL098	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz, 39.3", Connectors 2	Carlisle Interconnect Technologies	UFA147A-0-0180-200200	2023-02-17	2024-02-17
CBL099	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz, 39.3", Connectors 2	Carlisle Interconnect Technologies	UFA147A-0-0180-200200	2023-02-17	2024-02-17
	Couplers				
CPL001	Ultra-Wideband Directional Coupler 0.5-18GHz	Mini-Circuits	ZUDC10-183+	2023-02-17	2024-02-17

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				
135144	Active Loop Antenna	ETS-Lindgren	6502	2023-01-17	2024-01-17
	30-1000 MHz				
90629	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2023-01-06	2024-01-06
	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-626	2022-07-11	2023-07-11
	Gain-Loss Chains				
207638	Gain-loss string: 0.009-30MHz	Various	Various	2023-05-17	2024-05-17
207639	Gain-loss string: 25-1000MHz	Various	Various	2023-05-17	2024-05-17
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				
90416	Spectrum Analyzer	Keysight	N9030A	2023-06-09	2024-06-30
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-04-10	2024-04-10
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
21642	Environmental Meter	Fisher Scientific	15-077-963 (s/n 210701692)	2021-08-16	2023-08-16
208720	Wideband Radio Communications Tester	Rohde and Schwarz	CMW500	2023-01-06	2024-01-06
92492 (HPF012)	1GHz high-pass filter, 2W, Fhigh =18GHz	Micro-Tronics	HPM18129	2023-02-15	2024-02-29
169106 (BRF008)	1710-1785MHz notch filter, 2W, Fhigh = 9GHz	Micro-Tronics	BRM50713-01	2023-02-15	2024-02-29
169108 (BRF010)	1.85-1.97GHz notch filter, 2W, Fhigh = 9GHz	Micro-Tronics	BRM50714-01	2023-02-15	2024-02-29
231408 (BRF011)	2.495-2.690GHz notch filter, 2W, Fhigh = 18GHz	Micro-Tronics	BRM50709-01	2023-02-15	2024-02-29
77412 (BRF001)	900MHz notch filter, 2W, Fhigh =6GHz	Micro-Tronics	BRM50706	2023-02-15	2024-02-29

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

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	0.009-30MHz				
65682	Active Loop Antenna	ETS-Lindgren	6502	2022-09-29	2023-09-29
135144	Active Loop Antenna	ETS-Lindgren	6502	2023-01-17	2024-01-17
	30-1000 MHz				
159203	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2023-01-23	2024-01-23
	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
	Receiver & Software				
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-02-02	2024-02-02
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
200539	Environmental Meter	Fisher Scientific	15-077-963 s/n 18474341	2022-10-05	2023-10-05

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.

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:	27465/44389	Test Date:	5/5/2023	Sample SN:	QV77002SG9

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GPRS/EDGE (GMSK)	CS1	1	128	824.2	31.6	22.6	32.9	23.9
			190	836.6	31.8	22.8		
			251	848.8	**31.9**	22.8		
		2	128	824.2	28.5	22.5	29.9	23.9
			190	836.6	28.6	22.5		
			251	848.8	28.6	22.6		
		3	128	824.2	26.1	21.9	28.1	23.8
			190	836.6	26.2	21.9		
			251	848.8	27.0	22.7		
		4	128	824.2	25.6	22.6	26.9	**23.9**
			190	836.6	25.7	22.7		
			251	848.8	25.7	22.6		
EDGE (8PSK)	MCS5	1	128	824.2	26.6	17.6	28.0	19.0
			190	836.6	**26.8**	17.8		
			251	848.8	26.8	17.7		
		2	128	824.2	23.8	17.7	25.0	19.0
			190	836.6	23.8	17.8		
			251	848.8	23.9	17.9		
		3	128	824.2	21.9	17.7	23.2	18.9
			190	836.6	21.9	17.7		
			251	848.8	22.0	17.7		
		4	128	824.2	20.8	17.8	22.0	19.0
			190	836.6	20.7	17.7		
			251	848.8	20.7	17.7		

8.1.2. GSM850 DTM

Test Engineer ID:	27465/44389	Test Date:	5/8/2023	Sample SN:	QV77002SG9

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	128	824.2	31.4		22.3		32.9		23.9	
			190	836.6	31.5		22.5					
			251	848.8	**31.6**		22.6					
		2	128	824.2	28.5	28.6	22.5	22.6	29.9	29.9	**23.9**	**23.9**
			190	836.6	28.6	29.2	22.6	23.2				
			251	848.8	28.5	28.6	22.5	22.6				
		3	128	824.2	26.5	26.5	22.2	22.3	28.1	28.1	23.8	23.8
			190	836.6	26.8	26.8	22.6	22.5				
			251	848.8	26.7	26.8	22.4	22.6				
GSM (Voice) + EDGE (8PSK)	MCS5	1	128	824.2	31.4		22.3		32.9		23.9	
			190	836.6	31.5		22.5					
			251	848.8	**31.6**		22.6					
		2	128	824.2	28.5	23.7	22.5	17.7	29.9	25.0	**23.9**	19.0
			190	836.6	28.6	23.7	22.6	17.7				
			251	848.8	28.5	23.7	22.5	17.7				
		3	128	824.2	26.5	22.0	22.2	17.7	28.1	23.2	23.8	18.9
			190	836.6	26.8	21.8	22.6	17.6				
			251	848.8	26.7	21.8	22.4	17.6				

8.1.3. GSM1900

Test Engineer ID:	27465/44389	Test Date:	5/8/2023	Sample SN:	QV77002SG9

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GPRS/EDGE (GMSK)	CS1	1	512	1850.2	**27.1**	18.1	28.0	19.0
			661	1880.0	27.1	18.1		
			810	1909.8	27.1	18.1		
		2	512	1850.2	24.1	18.1	25.0	19.0
			661	1880.0	23.8	17.8		
			810	1909.8	23.8	17.8		
		3	512	1850.2	22.0	17.7	23.2	18.9
			661	1880.0	21.7	17.5		
			810	1909.8	21.7	17.4		
		4	512	1850.2	20.8	17.8	22.0	**19.0**
			661	1880.0	20.8	17.8		
			810	1909.8	21.1	18.0		
EDGE (8PSK)	MCS5	1	512	1850.2	25.7	16.7	27.0	18.0
			661	1880.0	**26.1**	17.1		
			810	1909.8	26.0	16.9		
		2	512	1850.2	22.7	16.7	24.0	18.0
			661	1880.0	22.9	16.9		
			810	1909.8	22.9	16.9		
		3	512	1850.2	21.0	16.7	22.2	17.9
			661	1880.0	21.3	17.0		
			810	1909.8	21.3	17.0		
		4	512	1850.2	19.8	16.7	21.0	18.0
			661	1880.0	19.7	16.7		
			810	1909.8	19.8	16.8		

8.1.4. GSM1900 DTM

Test Engineer ID:	27465/44389	Test Date:	5/8/2023	Sample SN:	QV77002SG9

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	27.0		18.0		28.0		19.0	
			661	1880.0	27.1		18.1					
			810	1909.8	**27.2**		18.1					
		2	512	1850.2	23.4	24.2	17.4	18.2	25.0	25.0	**19.0**	**19.0**
			661	1880.0	23.5	23.9	17.4	17.9				
			810	1909.8	23.5	23.9	17.5	17.8				
		3	512	1850.2	21.4	22.0	17.1	17.7	23.2	23.2	18.9	18.9
			661	1880.0	21.3	21.8	17.1	17.6				
			810	1909.8	21.4	21.7	17.1	17.5				
GSM (Voice) + EDGE (8PSK)	MCS5	1	512	1850.2	27.0		18.0		28.0		19.0	
			661	1880.0	27.1		18.1					
			810	1909.8	**27.2**		18.1					
		2	512	1850.2	23.4	22.8	17.4	16.8	25.0	24.0	**19.0**	18.0
			661	1880.0	23.5	23.0	17.4	17.0				
			810	1909.8	23.5	23.0	17.5	17.0				
		3	512	1850.2	21.4	21.0	17.1	16.8	23.2	22.2	18.9	17.9
			661	1880.0	21.3	21.1	17.1	16.9				
			810	1909.8	21.4	21.4	17.1	17.1				

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
	βc/βd	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} *(Note1, 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 Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_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 Δ_{NACK} = 30/15 with β_{hs} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_c.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_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 β_c = 11/15 and β_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} (Note1)	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	209/225	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	$\beta_{ed}1$: 47/15 $\beta_{ed}2$: 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 Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with β_{hs} = 5/15 * β_c.

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_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 β_c = 10/15 and β_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 were for DC-HSDPA were completed according to Release 8 procedures in table C08.1.12 of 3GPP TS 34.121-1. A summary of these 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

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.

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.

RESULT

8.2.1. WCDMA BAND 2

Test Engineer ID:	27465/44389	Test Date:	5/8/2023	Sample SN:	QV77002SG9

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Conducted Average Power (dBm)
						ANT 1
W-CDMA Band 2 (1900MHz)	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	**19.0**
			9400	1880.0	N/A	18.9
			9538	1907.6	N/A	**19.0**
	HSDPA	Subtest 1	9262	1852.4	0	18.0
			9400	1880.0	0	17.9
			9538	1907.6	0	17.9
		Subtest 2	9262	1852.4	0	17.9
			9400	1880.0	0	17.9
			9538	1907.6	0	17.9
		Subtest 3	9262	1852.4	0.5	17.4
			9400	1880.0	0.5	17.4
			9538	1907.6	0.5	17.4
		Subtest 4	9262	1852.4	0.5	17.4
			9400	1880.0	0.5	17.4
			9538	1907.6	0.5	17.4
	HSPA (HSDPA & HSUPA)	Subtest 1	9262	1852.4	0	18.0
			9400	1880.0	0	18.0
			9538	1907.6	0	17.9
		Subtest 2	9262	1852.4	2	16.0
			9400	1880.0	2	16.1
			9538	1907.6	2	15.9
		Subtest 3	9262	1852.4	1	17.0
			9400	1880.0	1	17.0
			9538	1907.6	1	16.9
		Subtest 4	9262	1852.4	2	16.0
			9400	1880.0	2	16.0
			9538	1907.6	2	15.9
		Subtest 5	9262	1852.4	0	18.1
			9400	1880.0	0	**18.1**
			9538	1907.6	0	18.0
	DC-HSDPA	Subtest 1	9262	1852.4	0	17.9
			9400	1880.0	0	18.0
			9538	1907.6	0	17.9
		Subtest 2	9262	1852.4	0	18.0
			9400	1880.0	0	18.0
			9538	1907.6	0	17.9
		Subtest 3	9262	1852.4	0.5	17.5
			9400	1880.0	0.5	17.5
			9538	1907.6	0.5	17.4
		Subtest 4	9262	1852.4	0.5	17.5
			9400	1880.0	0.5	17.5

8.2.2. WCDMA BAND 4

Test Engineer ID:	27465/44389	Test Date:	5/8/2023	Sample SN:	QV77002SG9

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Conducted Average Power (dBm)
						ANT 1
W-CDMA Band 4 (1700MHz)	Rel 99	RMC, 12.2 kbps	1312	1712.4	N/A	17.9
			1413	1732.6	N/A	**18.0**
			1513	1752.6	N/A	18.0
	HSDPA	Subtest 1	1312	1712.4	0	16.9
			1413	1732.6	0	17.0
			1513	1752.6	0	17.0
		Subtest 2	1312	1712.4	0	16.8
			1413	1732.6	0	17.0
			1513	1752.6	0	17.0
		Subtest 3	1312	1712.4	0.5	16.4
			1413	1732.6	0.5	16.5
			1513	1752.6	0.5	16.5
		Subtest 4	1312	1712.4	0.5	16.4
			1413	1732.6	0.5	16.6
			1513	1752.6	0.5	16.5
	HSPA (HSDPA & HSUPA)	Subtest 1	1312	1712.4	0	16.9
			1413	1732.6	0	17.1
			1513	1752.6	0	17.0
		Subtest 2	1312	1712.4	2	14.9
			1413	1732.6	2	15.1
			1513	1752.6	2	15.0
		Subtest 3	1312	1712.4	1	15.9
			1413	1732.6	1	16.1
			1513	1752.6	1	16.0
		Subtest 4	1312	1712.4	2	14.9
			1413	1732.6	2	15.1
			1513	1752.6	2	15.0
		Subtest 5	1312	1712.4	0	16.9
			1413	1732.6	0	**17.1**
			1513	1752.6	0	17.0
	DC-HSDPA	Subtest 1	1312	1712.4	0	16.9
			1413	1732.6	0	17.0
			1513	1752.6	0	17.0
		Subtest 2	1312	1712.4	0	16.9
			1413	1732.6	0	17.0
			1513	1752.6	0	17.0
		Subtest 3	1312	1712.4	0.5	16.4
			1413	1732.6	0.5	16.5
			1513	1752.6	0.5	16.4
		Subtest 4	1312	1712.4	0.5	16.4
			1413	1732.6	0.5	16.5
			1513	1752.6	0.5	16.5

8.2.3. WCDMA BAND 5

Test Engineer ID:	27465/44389	Test Date:	5/8/2023	Sample SN:	QV77002SG9

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Conducted Average Power (dBm)
						ANT 1
W-CDMA Band 5 (850MHz)	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	**21.9**
			4183	836.6	N/A	21.9
			4233	846.6	N/A	21.8
	HSDPA	Subtest 1	4132	826.4	0	20.9
			4183	836.6	0	20.9
			4233	846.6	0	20.8
		Subtest 2	4132	826.4	0	20.9
			4183	836.6	0	20.9
			4233	846.6	0	20.8
		Subtest 3	4132	826.4	0.5	20.4
			4183	836.6	0.5	20.4
			4233	846.6	0.5	20.3
		Subtest 4	4132	826.4	0.5	20.4
			4183	836.6	0.5	20.4
			4233	846.6	0.5	20.3
	HSPA (HSDPA & HSUPA)	Subtest 1	4132	826.4	0	21.0
			4183	836.6	0	21.0
			4233	846.6	0	20.9
		Subtest 2	4132	826.4	2	19.0
			4183	836.6	2	18.9
			4233	846.6	2	18.9
		Subtest 3	4132	826.4	1	19.9
			4183	836.6	1	19.9
			4233	846.6	1	19.9
		Subtest 4	4132	826.4	2	19.0
			4183	836.6	2	19.0
			4233	846.6	2	18.9
		Subtest 5	4132	826.4	0	**21.0**
			4183	836.6	0	21.0
			4233	846.6	0	20.9
	DC-HSDPA	Subtest 1	4132	826.4	0	20.9
			4183	836.6	0	20.9
			4233	846.6	0	20.8
		Subtest 2	4132	826.4	0	20.9
			4183	836.6	0	20.9
			4233	846.6	0	20.8
		Subtest 3	4132	826.4	0.5	20.4
			4183	836.6	0.5	20.4
			4233	846.6	0.5	20.3
		Subtest 4	4132	826.4	0.5	20.4
			4183	836.6	0.5	20.4
			4233	846.6	0.5	20.3

8.3. LTE

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 DFTs-
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		
	256 QAM	≤ 4.5		
CP-OFDM	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.

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:	85502/44389	Test Date:	5/5/2023	Sample SN:	QV77007YG9

OUTPUT POWER FOR LTE BAND 5 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				20407	20525	20643
				824.7 MHz	836.5 MHz	848.3 MHz
1.4	QPSK	1	0	20.7	20.8	20.8
		1	3	20.7	**20.9**	20.8
		1	5	20.7	20.9	20.8
		3	0	20.7	20.8	20.8
		3	1	20.7	20.9	20.8
		3	3	20.7	20.9	20.8
		6	0	20.7	20.8	20.8
	16QAM	1	0	20.8	21.1	21.0
		1	3	20.8	**21.1**	21.0
		1	5	20.9	21.0	21.0
		3	0	20.8	21.0	20.8
		3	1	20.9	21.0	20.9
		3	3	20.9	21.0	20.9
		6	0	20.7	20.8	20.8
	64QAM	1	0	21.1	21.2	21.0
		1	3	21.1	**21.2**	21.0
		1	5	21.1	21.1	21.0
		3	0	20.9	21.0	21.0
		3	1	20.9	21.0	21.0
		3	3	20.9	21.0	21.0
		6	0	20.4	20.5	20.5

OUTPUT POWER FOR LTE BAND 5 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				20415	20525	20635
				825.5 MHz	836.5 MHz	847.5 MHz
3.0	QPSK	1	0	20.7	20.9	20.8
		1	7	20.8	**21.0**	20.9
		1	14	20.7	20.9	20.8
		8	0	20.8	20.9	20.9
		8	4	20.8	20.9	20.9
		8	7	20.8	21.0	20.9
		15	0	20.7	20.9	20.9
	16QAM	1	0	20.9	21.0	21.0
		1	7	21.0	**21.2**	21.1
		1	14	20.9	21.1	21.0
		8	0	20.8	20.9	20.9
		8	4	20.9	20.9	21.0
		8	7	20.8	21.0	21.0
		15	0	20.8	20.9	20.9
	64QAM	1	0	21.0	21.2	21.0
		1	7	21.2	**21.3**	21.1
		1	14	21.0	21.2	21.0
		8	0	20.4	20.5	20.5
		8	4	20.5	20.6	20.5
		8	7	20.5	20.6	20.5
		15	0	20.4	20.5	20.5

OUTPUT POWER FOR LTE BAND 5 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	ANT 1		
				Conducted Average (dBm)		
				20425	20525	20625
				826.5 MHz	836.5 MHz	846.5 MHz
5.0	QPSK	1	0	20.7	20.8	20.8
		1	12	20.8	**21.0**	**21.0**
		1	24	20.7	20.9	20.8
		12	0	20.8	20.8	20.8
		12	6	20.8	20.9	20.8
		12	11	20.8	20.9	20.9
		25	0	20.8	20.9	20.8
	16QAM	1	0	20.9	21.0	21.0
		1	12	21.0	**21.2**	**21.2**
		1	24	20.9	21.1	21.1
		12	0	20.8	20.9	20.7
		12	6	20.8	21.0	20.8
		12	11	20.8	21.0	20.8
		25	0	20.8	20.9	20.8
	64QAM	1	0	20.9	21.2	21.1
		1	12	21.0	**21.2**	21.2
		1	24	20.9	21.2	21.2
		12	0	20.4	20.5	20.5
		12	6	20.5	20.5	20.5
		12	11	20.4	20.6	20.6
		25	0	20.4	20.5	20.4

OUTPUT POWER FOR LTE BAND 5 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				20450	20525	20600
				829.0 MHz	836.5 MHz	844.0 MHz
10.0	QPSK	1	0	20.8	20.8	20.9
		1	24	20.8	20.9	20.9
		1	49	20.8	20.9	20.8
		25	0	20.7	20.9	20.8
		25	12	20.8	20.9	20.8
		25	24	20.8	**20.9**	**20.9**
		50	0	20.8	20.8	20.8
	16QAM	1	0	21.0	21.0	**21.1**
		1	24	20.9	**21.1**	21.0
		1	49	21.0	21.1	21.0
		25	0	20.8	20.9	20.9
		25	12	20.9	20.9	20.9
		25	24	20.8	20.9	20.9
		50	0	20.8	20.9	20.9
	64QAM	1	0	21.1	21.1	21.2
		1	24	21.1	21.2	**21.2**
		1	49	21.2	21.1	21.1
		25	0	20.4	20.5	20.6
		25	12	20.5	20.5	20.6
		25	24	20.4	20.6	20.6
		50	0	20.4	20.5	20.6

8.3.2. LTE BAND 12

Test Engineer ID:	27465/44389	Test Date:	2023-05-05	EUT Serial Number:	QV77007YG9

OUTPUT POWER FOR LTE BAND 12 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				23017	23095	23173
				699.7 MHz	707.5 MHz	715.3 MHz
1.4	QPSK	1	0	21.0	21.0	21.0
		1	3	21.0	**21.1**	21.0
		1	5	21.0	21.0	21.0
		3	0	21.0	21.0	20.9
		3	1	21.0	21.0	21.0
		3	3	21.0	21.0	21.0
		6	0	21.0	20.9	21.0
	16QAM	1	0	21.1	21.1	21.1
		1	3	21.2	**21.2**	21.2
		1	5	21.1	21.1	21.1
		3	0	21.0	21.0	21.0
		3	1	21.1	21.0	21.0
		3	3	21.1	21.1	21.0
		6	0	21.0	21.0	21.0
	64QAM	1	0	21.3	21.3	21.3
		1	3	21.4	**21.4**	21.3
		1	5	21.3	21.3	21.3
		3	0	21.1	21.1	21.0
		3	1	21.1	21.1	21.0
		3	3	21.1	21.2	21.0
		6	0	20.5	20.4	20.5

OUTPUT POWER FOR LTE BAND 12 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				23025	23095	23165
				700.5 MHz	707.5 MHz	714.5 MHz
3.0	QPSK	1	0	20.9	20.9	20.9
		1	7	20.9	**21.1**	21.0
		1	14	20.9	21.0	20.9
		8	0	20.9	21.0	20.9
		8	4	20.9	21.0	**21.1**
		8	7	21.0	**21.1**	21.0
		15	0	20.9	20.9	20.9
	16QAM	1	0	21.0	21.1	21.1
		1	7	21.1	**21.3**	21.2
		1	14	21.0	21.1	21.1
		8	0	21.0	21.0	21.0
		8	4	21.0	21.0	21.1
		8	7	21.0	21.1	21.1
		15	0	20.9	21.0	20.9
	64QAM	1	0	**21.3**	21.3	21.3
		1	7	21.3	**21.3**	**21.3**
		1	14	21.3	21.3	21.2
		8	0	20.5	20.5	20.5
		8	4	20.5	20.5	20.6
		8	7	20.5	20.6	20.6
		15	0	20.5	20.4	20.5

OUTPUT POWER FOR LTE BAND 12 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				23035	23095	23155
				701.5 MHz	707.5 MHz	713.5 MHz
5.0	QPSK	1	0	20.9	20.9	20.9
		1	12	21.0	**21.1**	21.1
		1	24	20.9	20.9	21.0
		12	0	20.9	20.9	21.0
		12	6	21.0	21.0	21.0
		12	11	21.0	21.0	21.0
		25	0	21.0	20.9	20.9
	16QAM	1	0	21.0	21.1	21.1
		1	12	21.1	**21.3**	**21.3**
		1	24	21.0	21.2	21.2
		12	0	20.9	21.0	20.9
		12	6	21.0	21.1	21.0
		12	11	21.0	21.1	21.0
		25	0	21.0	20.9	20.9
	64QAM	1	0	21.3	21.3	21.3
		1	12	21.2	21.3	**21.4**
		1	24	21.2	21.2	21.3
		12	0	20.4	20.5	20.5
		12	6	20.5	20.5	20.6
		12	11	20.5	20.6	20.6
		25	0	20.5	20.4	20.5

OUTPUT POWER FOR LTE BAND 12 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				23060	23095	23130
				704.0 MHz	707.5 MHz	711.0 MHz
10.0	QPSK	1	0	21.0	20.9	21.0
		1	24	21.0	21.0	21.0
		1	49	21.0	21.0	20.9
		25	0	20.9	21.0	21.0
		25	12	21.1	21.0	**21.1**
		25	24	21.0	21.0	21.0
		50	0	21.0	21.0	21.0
	16QAM	1	0	21.1	21.1	21.1
		1	24	21.1	21.1	**21.2**
		1	49	**21.2**	21.1	21.0
		25	0	20.9	21.0	21.0
		25	12	21.0	21.0	21.0
		25	24	21.0	21.0	21.0
		50	0	21.0	21.0	21.0
	64QAM	1	0	21.3	21.3	21.3
		1	24	21.2	**21.3**	21.3
		1	49	21.3	21.3	21.3
		25	0	20.4	20.5	20.5
		25	12	20.5	20.5	20.6
		25	24	20.5	20.5	20.6
		50	0	20.5	20.5	20.6

8.3.3. LTE BAND 13

Test Engineer ID:	84740/44389	Test Date:	2023-05-05	EUT Serial Number:	QV77007YG9

OUTPUT POWER FOR LTE BAND 13 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				23205	23230	23255
				779.5 MHz	782.0 MHz	784.5 MHz
5.0	QPSK	1	0	20.9	20.9	21.0
		1	12	**21.1**	21.0	21.1
		1	24	20.9	20.9	21.0
		12	0	20.9	20.8	20.9
		12	6	21.0	20.9	20.9
		12	11	20.9	20.9	20.9
		25	0	21.0	20.9	20.9
	16QAM	1	0	21.0	21.0	**21.2**
		1	12	21.1	21.1	21.1
		1	24	21.0	21.0	21.1
		12	0	20.9	20.8	20.9
		12	6	21.0	20.8	20.9
		12	11	20.9	20.9	20.9
		25	0	20.9	20.9	20.8
	64QAM	1	0	21.1	21.2	21.0
		1	12	21.1	**21.2**	21.1
		1	24	21.2	21.2	21.0
		12	0	20.4	20.4	20.4
		12	6	20.5	20.4	20.4
		12	11	20.5	20.5	20.5
		25	0	20.5	20.4	20.4

OUTPUT POWER FOR LTE BAND 13 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				N/A	23230	N/A
				N/A	782.0 MHz	N/A
10.0	QPSK	1	0		20.9	
		1	24		**20.9**	
		1	49		**20.9**	
		25	0		20.9	
		25	12		20.9	
		25	24		**20.9**	
		50	0		20.9	
	16QAM	1	0		21.0	
		1	24		**21.1**	
		1	49		21.1	
		25	0		20.9	
		25	12		20.9	
		25	24		21.0	
		50	0		20.9	
	64QAM	1	0		**21.1**	
		1	24		21.1	
		1	49		21.1	
		25	0		20.4	
		25	12		20.4	
		25	24		20.4	
		50	0		20.4	

8.3.4. LTE BAND 25

Test Engineer ID:	85502/44389	Test Date:	2023-05-08	EUT Serial Number:	QV77008AG9

OUTPUT POWER FOR LTE BAND 25 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				26047	26365	26683
				1850.7 MHz	1882.5 MHz	1914.3 MHz
1.4	QPSK	1	0	18.8	18.9	18.6
		1	3	18.8	**18.9**	18.7
		1	5	18.8	18.8	18.6
		3	0	18.8	18.8	18.6
		3	1	18.8	18.9	18.6
		3	3	18.8	18.9	18.6
		6	0	18.8	18.9	18.6
	16QAM	1	0	18.9	19.2	18.9
		1	3	19.0	19.2	18.9
		1	5	19.0	**19.3**	19.0
		3	0	19.0	19.1	18.8
		3	1	19.0	19.0	18.8
		3	3	19.0	19.0	18.8
		6	0	18.8	19.0	18.7
	64QAM	1	0	19.2	19.2	18.9
		1	3	**19.2**	19.2	18.9
		1	5	19.1	19.2	18.9
		3	0	18.9	18.9	18.7
		3	1	18.9	19.0	18.7
		3	3	19.0	18.9	18.7
		6	0	18.8	18.9	18.8

OUTPUT POWER FOR LTE BAND 25 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				26055	26365	26675
				1851.5 MHz	1882.5 MHz	1913.5 MHz
3.0	QPSK	1	0	18.9	18.9	18.7
		1	8	18.9	**19.1**	18.8
		1	14	18.8	18.9	18.7
		8	0	18.9	18.9	18.8
		8	4	19.0	**19.1**	18.8
		8	7	19.0	19.0	18.8
		15	0	18.9	18.9	18.8
	16QAM	1	0	19.2	19.2	19.0
		1	8	19.3	**19.4**	19.1
		1	14	19.2	19.2	19.0
		8	0	19.0	19.0	18.8
		8	4	19.0	19.1	18.8
		8	7	19.0	19.1	18.8
		15	0	19.0	18.9	18.8
	64QAM	1	0	19.1	19.3	19.1
		1	8	19.2	**19.4**	19.1
		1	14	19.2	19.2	19.0
		8	0	19.0	19.0	18.8
		8	4	19.0	19.1	18.8
		8	7	19.0	19.1	18.8
		15	0	19.0	19.0	18.8

OUTPUT POWER FOR LTE BAND 25 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				26065	26365	26665
				1852.5 MHz	1882.5 MHz	1912.5 MHz
5.0	QPSK	1	0	18.9	19.0	18.7
		1	12	19.1	**19.1**	18.8
		1	24	19.0	19.0	18.8
		12	0	18.9	19.0	18.8
		12	7	19.0	19.0	18.8
		12	13	19.0	19.1	18.8
		25	0	18.9	19.0	18.8
	16QAM	1	0	19.3	19.3	19.1
		1	12	**19.5**	19.5	19.2
		1	24	19.3	19.4	19.1
		12	0	19.0	19.0	18.9
		12	7	19.1	19.0	18.9
		12	13	19.1	19.1	18.9
		25	0	19.0	19.0	18.8
	64QAM	1	0	19.2	19.3	19.0
		1	12	19.4	**19.4**	19.1
		1	24	19.3	19.3	19.0
		12	0	19.0	19.0	19.0
		12	7	19.0	19.1	19.0
		12	13	19.1	19.1	19.0
		25	0	19.0	18.9	18.8

OUTPUT POWER FOR LTE BAND 25 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				26090	26365	26640
				1855 MHz	1882.5 MHz	1910 MHz
10.0	QPSK	1	0	19.0	19.0	18.8
		1	25	18.9	19.0	18.8
		1	49	18.9	19.0	18.8
		25	0	19.0	19.0	18.8
		25	12	19.0	19.0	18.9
		25	25	19.0	**19.0**	18.8
		50	0	19.0	19.0	18.8
	16QAM	1	0	19.3	**19.3**	19.2
		1	25	19.2	19.3	19.1
		1	49	19.3	**19.3**	19.1
		25	0	19.0	19.0	18.9
		25	12	19.0	19.0	18.9
		25	25	19.0	19.0	18.9
		50	0	18.9	19.0	18.8
	64QAM	1	0	19.2	19.3	19.0
		1	25	19.2	19.3	19.0
		1	49	19.2	**19.4**	19.0
		25	0	19.0	19.0	18.8
		25	12	19.0	19.0	18.9
		25	25	19.0	19.1	18.8
		50	0	19.0	19.0	18.8

OUTPUT POWER FOR LTE BAND 25 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				26115	26365	26615
				1857.5 MHz	1882.5 MHz	1907.5 MHz
15.0	QPSK	1	0	18.8	18.8	18.8
		1	37	**18.9**	18.9	18.7
		1	74	18.8	18.8	18.7
		36	0	18.9	18.9	18.9
		36	20	18.9	18.9	18.8
		36	39	18.9	18.9	18.8
		75	0	18.9	18.8	18.8
	16QAM	1	0	19.1	19.1	19.0
		1	37	**19.2**	**19.2**	19.0
		1	74	19.1	19.0	18.9
		36	0	18.9	18.8	18.8
		36	20	18.9	18.8	18.8
		36	39	18.9	18.8	18.8
		75	0	18.9	18.8	18.8
	64QAM	1	0	18.8	19.2	19.0
		1	37	19.0	**19.2**	19.0
		1	74	18.9	19.2	18.9
		36	0	18.8	19.0	18.8
		36	20	18.8	19.0	18.8
		36	39	18.8	19.0	18.8
		75	0	18.8	18.9	18.8

OUTPUT POWER FOR LTE BAND 25 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				26140	26365	26590
				1860 MHz	1882.5 MHz	1905 MHz
20.0	QPSK	1	0	18.8	18.8	18.7
		1	49	18.8	18.8	18.6
		1	99	18.7	18.8	18.6
		50	0	18.8	18.9	18.7
		50	24	18.8	**18.9**	18.7
		50	50	18.7	18.8	18.7
		100	0	18.8	18.9	18.7
	16QAM	1	0	19.0	19.0	18.9
		1	49	**19.2**	19.2	19.1
		1	99	18.9	19.0	18.8
		50	0	18.8	18.8	18.7
		50	24	18.8	18.9	18.7
		50	50	18.8	18.8	18.7
		100	0	18.8	18.8	18.7
	64QAM	1	0	19.1	19.1	18.9
		1	49	**19.3**	**19.3**	19.0
		1	99	19.1	19.0	18.7
		50	0	18.8	18.8	18.7
		50	24	18.8	18.8	18.7
		50	50	18.8	18.8	18.7
		100	0	18.8	18.8	18.7

8.3.5. LTE BAND 41

Test Engineer ID:	27465/44389	Test Date:	2023-06-26	EUT Serial Number:	QV77008AG9

OUTPUT POWER FOR LTE BAND 41 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				39675	40620	41565
				2498.5	2593 MHz	2687.5
5.0	QPSK	1	0	19.3	18.9	19.0
		1	12	**19.3**	19.1	19.2
		1	24	19.2	19.0	19.0
		12	0	19.3	18.9	19.1
		12	6	19.3	19.1	19.1
		12	11	19.3	19.0	19.1
		25	0	19.3	19.0	19.1
	16QAM	1	0	19.3	19.0	19.0
		1	12	**19.4**	19.1	19.1
		1	24	19.3	19.0	19.0
		12	0	19.3	19.0	19.0
		12	6	19.4	19.1	19.0
		12	11	19.3	19.1	19.0
		25	0	19.3	19.0	19.1
	64QAM	1	0	19.2	19.0	19.1
		1	12	19.3	19.1	19.1
		1	24	19.2	19.0	19.1
		12	0	**19.3**	18.9	19.0
		12	6	**19.3**	19.1	19.0
		12	11	**19.3**	19.0	19.0
		25	0	19.2	19.0	19.0

OUTPUT POWER FOR LTE BAND 41 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				27900	40620	41540
				2501.0	2593 MHz	2685.0
10.0	QPSK	1	0	19.3	18.9	19.0
		1	24	19.3	19.0	19.1
		1	49	19.2	19.0	19.0
		25	0	19.3	19.0	19.0
		25	12	**19.4**	19.1	19.1
		25	24	19.3	19.0	19.1
		50	0	19.3	19.0	19.0
	16QAM	1	0	**19.4**	19.1	19.1
		1	24	19.3	19.0	19.1
		1	49	19.3	19.1	19.1
		25	0	19.3	19.0	19.0
		25	12	19.3	19.1	19.1
		25	24	19.3	19.1	19.1
		50	0	19.3	19.0	19.0
	64QAM	1	0	19.3	19.0	19.0
		1	24	**19.4**	19.1	19.1
		1	49	19.2	19.0	19.1
		25	0	19.3	19.0	19.0
		25	12	19.3	19.1	19.1
		25	24	19.3	19.0	19.1
		50	0	19.3	19.1	19.0

OUTPUT POWER FOR LTE BAND 41 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				39725	40620	41515
				2503.5	2593 MHz	2682.5
15.0	QPSK	1	0	19.1	18.9	19.0
		1	37	19.1	18.9	19.0
		1	74	19.0	19.0	19.0
		36	0	19.2	18.9	18.9
		36	16	**19.2**	19.0	18.9
		36	35	19.1	19.0	18.9
		75	0	19.1	18.9	18.9
	16QAM	1	0	19.1	18.9	19.1
		1	37	19.1	19.0	19.0
		1	74	19.1	19.0	19.0
		36	0	19.2	18.9	19.0
		36	16	**19.2**	18.9	19.0
		36	35	19.1	18.9	18.9
		75	0	19.1	18.9	18.9
	64QAM	1	0	**19.1**	18.8	19.0
		1	37	19.1	18.9	19.0
		1	74	19.0	18.9	19.0
		36	0	**19.1**	18.9	19.0
		36	16	19.1	18.9	18.9
		36	35	19.1	18.9	18.9
		75	0	19.1	18.9	18.9

OUTPUT POWER FOR LTE BAND 41 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				39750	40620	41490
				2506 MHz	2593 MHz	2680 MHz
20.0	QPSK	1	0	19.0	18.9	19.0
		1	49	19.0	18.8	18.9
		1	99	18.9	18.9	18.9
		50	0	19.0	18.9	19.0
		50	24	**19.1**	19.0	19.0
		50	49	19.0	18.9	19.0
		100	0	19.0	19.0	18.9
	16QAM	1	0	19.1	19.0	19.1
		1	49	**19.2**	**19.2**	19.0
		1	99	19.0	19.0	18.9
		50	0	19.0	18.9	18.9
		50	24	19.1	19.0	19.0
		50	49	19.1	18.9	18.9
		100	0	19.1	19.0	18.9
	64QAM	1	0	19.0	18.9	18.9
		1	49	**19.2**	19.1	18.8
		1	99	19.0	18.8	18.8
		50	0	19.0	18.9	18.9
		50	24	19.1	18.9	19.0
		50	49	19.1	18.9	19.0
		100	0	19.1	18.9	18.9

8.3.6. LTE BAND 66

Test Engineer ID:	85502/44389	Test Date:	2023-05-08	EUT Serial Number:	QV77008AG9

OUTPUT POWER FOR LTE BAND 66 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				131979	132322	132665
				1710.7 MHz	1745.0 MHz	1779.3 MHz
1.4	QPSK	1	0	18.2	18.2	18.0
		1	3	**18.2**	18.2	18.0
		1	5	18.2	18.2	18.0
		3	0	18.1	18.1	18.0
		3	1	18.1	18.2	18.0
		3	3	18.1	18.2	18.0
		6	0	18.2	18.2	18.0
	16QAM	1	0	18.5	**18.6**	18.3
		1	3	18.5	**18.6**	18.4
		1	5	18.5	18.5	18.3
		3	0	18.3	18.4	18.1
		3	1	18.3	18.3	18.2
		3	3	18.4	18.4	18.2
		6	0	18.2	18.2	18.1
	64QAM	1	0	18.4	18.3	18.2
		1	3	**18.5**	18.5	18.2
		1	5	18.4	18.4	18.2
		3	0	18.3	18.3	18.1
		3	1	18.2	18.3	18.1
		3	3	18.3	18.3	18.0
		6	0	18.1	18.3	18.1

OUTPUT POWER FOR LTE BAND 66 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				131987	132322	132657
				1711.5 MHz	1745.0 MHz	1778.5 MHz
3.0	QPSK	1	0	18.0	18.1	17.9
		1	7	18.1	18.2	18.0
		1	14	18.0	18.1	17.9
		8	0	18.1	18.1	18.0
		8	4	18.1	18.1	18.0
		8	7	18.1	**18.2**	18.0
		15	0	18.1	18.1	18.0
	16QAM	1	0	18.4	18.4	18.3
		1	7	18.5	**18.5**	18.3
		1	14	18.3	18.4	18.3
		8	0	18.1	18.2	18.0
		8	4	18.2	18.2	18.1
		8	7	18.2	18.3	18.1
		15	0	18.1	18.1	18.0
	64QAM	1	0	18.3	18.3	18.2
		1	7	**18.4**	18.3	18.3
		1	14	18.3	18.3	18.2
		8	0	18.3	18.1	18.1
		8	4	18.3	18.2	18.1
		8	7	18.3	18.3	18.1
		15	0	18.2	18.1	18.0

OUTPUT POWER FOR LTE BAND 66 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				131997	132322	132647
				1712.5 MHz	1745.0 MHz	1777.5 MHz
5.0	QPSK	1	0	18.0	18.0	17.9
		1	12	18.2	**18.2**	18.0
		1	24	18.0	18.1	17.9
		12	0	18.1	18.1	18.0
		12	6	18.1	18.1	18.0
		12	11	18.1	18.1	18.0
		25	0	18.1	18.0	17.9
	16QAM	1	0	18.3	18.4	18.2
		1	12	18.5	**18.5**	18.3
		1	24	18.3	18.5	18.3
		12	0	18.1	18.1	18.0
		12	6	18.1	18.1	18.0
		12	11	18.1	18.1	18.0
		25	0	18.1	18.1	18.0
	64QAM	1	0	18.3	18.4	18.3
		1	12	18.4	**18.5**	18.4
		1	24	18.3	18.4	18.3
		12	0	18.1	18.1	17.9
		12	6	18.1	18.1	18.0
		12	11	18.1	18.2	17.9
		25	0	18.1	18.1	18.0

OUTPUT POWER FOR LTE BAND 66 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				132022	132322	132622
				1715.0 MHz	1745.0 MHz	1775.0 MHz
10.0	QPSK	1	0	18.1	18.1	18.0
		1	24	18.1	18.2	18.0
		1	49	18.1	18.1	17.9
		25	0	18.2	18.1	17.9
		25	12	**18.2**	18.1	18.0
		25	24	18.2	**18.2**	18.0
		50	0	18.2	18.1	17.9
	16QAM	1	0	**18.6**	18.5	18.3
		1	24	18.5	18.5	18.3
		1	49	18.6	18.4	18.3
		25	0	18.2	18.1	17.9
		25	12	18.2	18.1	18.0
		25	24	18.2	18.2	18.0
		50	0	18.1	18.1	17.9
	64QAM	1	0	18.4	18.4	18.3
		1	24	**18.4**	18.4	18.3
		1	49	18.4	18.4	18.2
		25	0	18.1	18.1	17.9
		25	12	18.2	18.1	18.0
		25	24	18.1	18.2	18.0
		50	0	18.1	18.1	17.9

OUTPUT POWER FOR LTE BAND 66 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				132047	132322	132597
				1717.5 MHz	1745.0 MHz	1772.5 MHz
15.0	QPSK	1	0	18.0	18.0	17.9
		1	37	18.1	18.0	17.9
		1	74	18.1	18.0	17.8
		36	0	18.1	18.0	17.9
		36	16	18.0	18.0	17.9
		36	35	**18.1**	18.0	17.9
		75	0	18.0	18.0	17.9
	16QAM	1	0	**18.4**	18.2	18.1
		1	37	18.3	18.2	18.1
		1	74	18.4	18.2	18.0
		36	0	18.0	18.0	17.9
		36	16	18.0	18.0	17.9
		36	35	18.1	18.0	17.9
		75	0	18.0	18.0	17.9
	64QAM	1	0	18.3	18.3	18.1
		1	37	18.3	18.3	18.2
		1	74	**18.4**	18.3	18.1
		36	0	18.0	18.0	17.9
		36	16	18.0	18.0	17.9
		36	35	18.1	18.0	17.9
		75	0	18.0	18.0	17.9

OUTPUT POWER FOR LTE BAND 66 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				132072	132322	132572
				1720.0 MHz	1745.0 MHz	1770.0 MHz
20.0	QPSK	1	0	18.1	18.1	18.0
		1	49	18.1	18.0	17.9
		1	99	18.1	18.0	17.8
		50	0	18.0	18.0	17.9
		50	24	**18.1**	18.1	17.9
		50	49	18.1	18.1	18.0
		100	0	18.1	18.0	17.9
	16QAM	1	0	18.3	18.3	18.2
		1	49	**18.5**	18.4	18.3
		1	99	18.3	18.3	18.1
		50	0	18.0	18.0	17.9
		50	24	18.1	18.0	17.9
		50	49	18.1	18.1	18.0
		100	0	18.0	18.0	17.9
	64QAM	1	0	18.2	18.2	18.1
		1	49	18.3	**18.3**	18.1
		1	99	18.2	18.2	18.1
		50	0	18.0	18.0	17.9
		50	24	18.1	18.0	17.9
		50	49	18.0	18.1	17.9
		100	0	18.0	18.0	17.9

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.

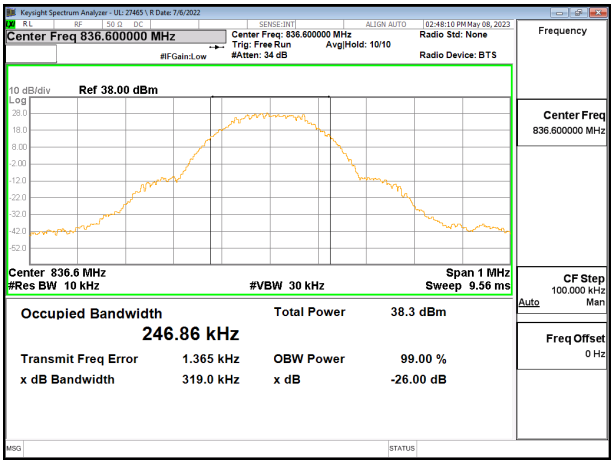
RESULTS

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.

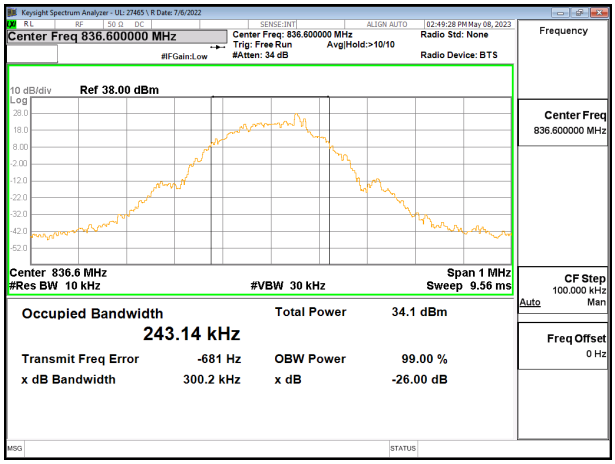
9.1.1. GSM

Test Engineer ID:	27465/44389	Test Date:	2023-05-06	EUT Serial Number:	QV77002SG9

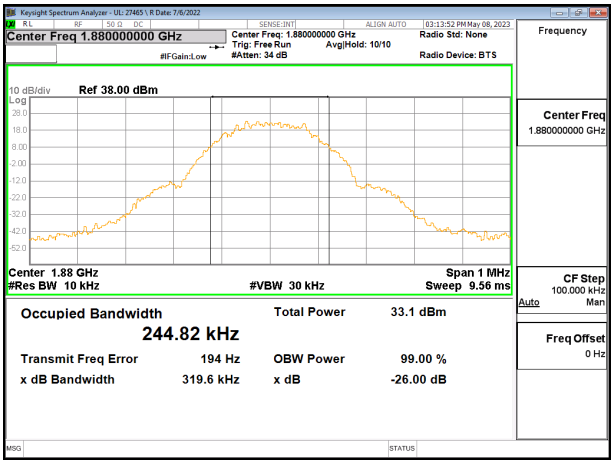
Band	Modulation	Channel	f(MHz)	99% BW (KHz)	-26dB BW (KHz)
GSM850	GPRS	190	836.6	246.86	319.0
	EGPRS			243.14	309.2
GSM1900	GPRS	661	1880.0	244.82	319.6
	EGPRS			245.63	304.5



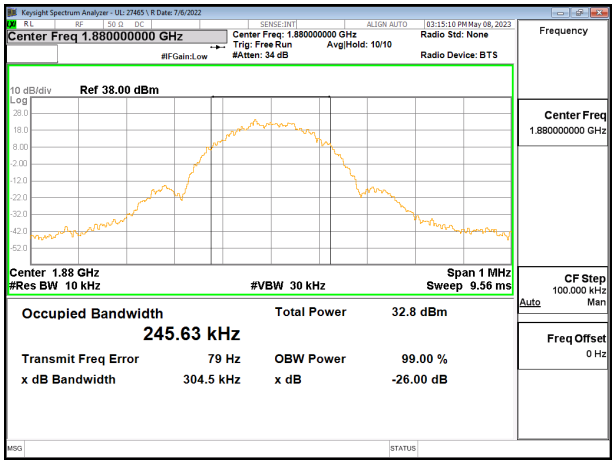
GSM850 GPRS MID Channel



GSM850 EGPRS MID Channel



GSM1900 GPRS MID Channel

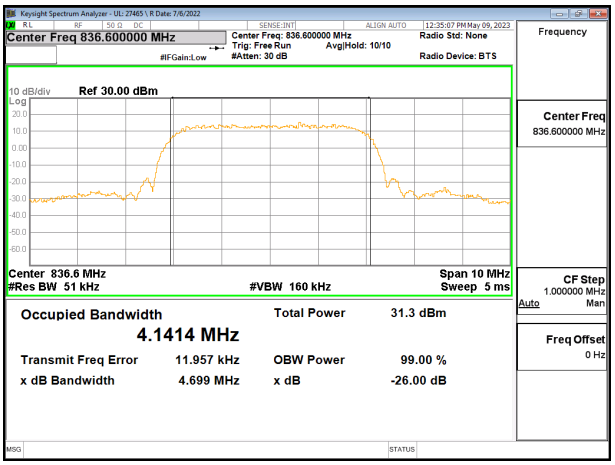


GSM1900 EGPRS MID Channel

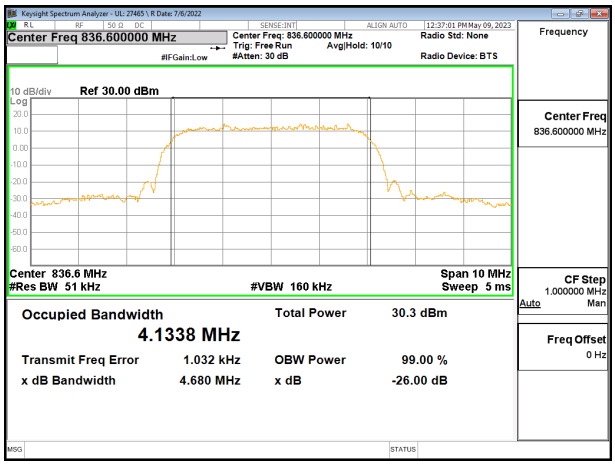
9.1.2. WCDMA

Test Engineer ID:	27465/44389	Test Date:	2023-05-08 2023-05-09	EUT Serial Number:	QV77002SG9

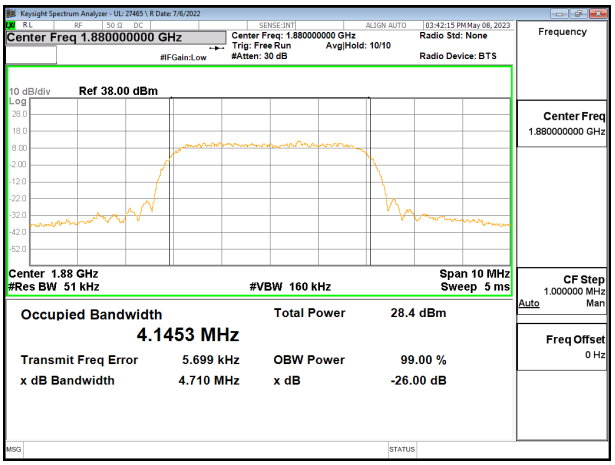
Band	Modulation	Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
BAND2	REL 99	9800	1880.0	4.145	5.699
	HSDPA			4.153	4.695
BAND4	REL 99	1638	1732.6	4.153	4.714
	HSDPA			4.162	4.697
BAND5	REL 99	4408	836.6	4.141	4.699
	HSDPA			4.134	4.680



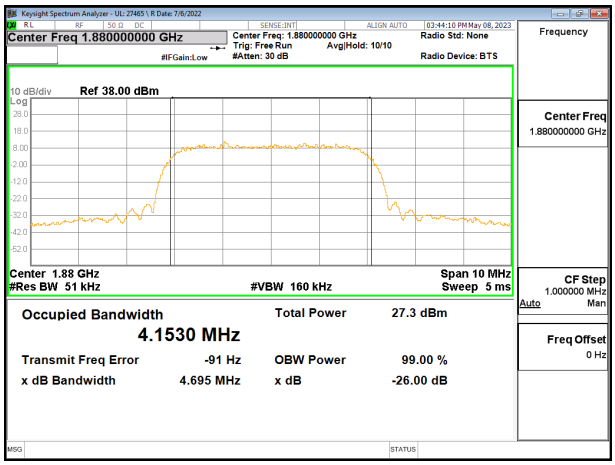
BAND 5 Rel 99 MID Channel



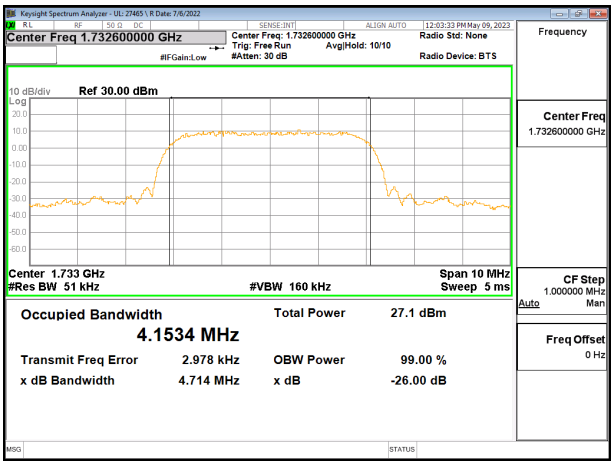
BAND 5 HSDPA MID Channel



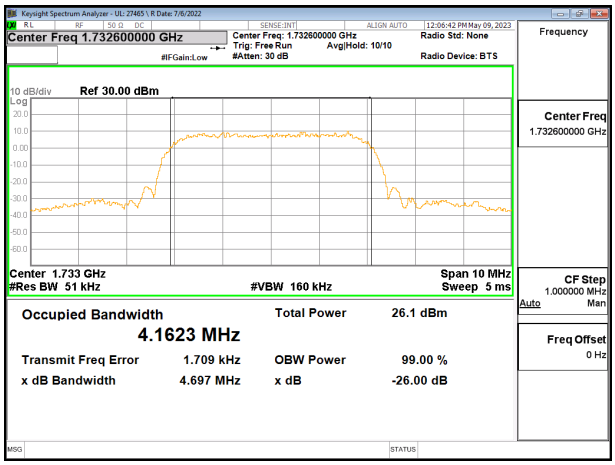
BAND 2 Rel 99 MID Channel



BAND 2 HSDPA MID Channel



BAND 4 Rel 99 MID Channel

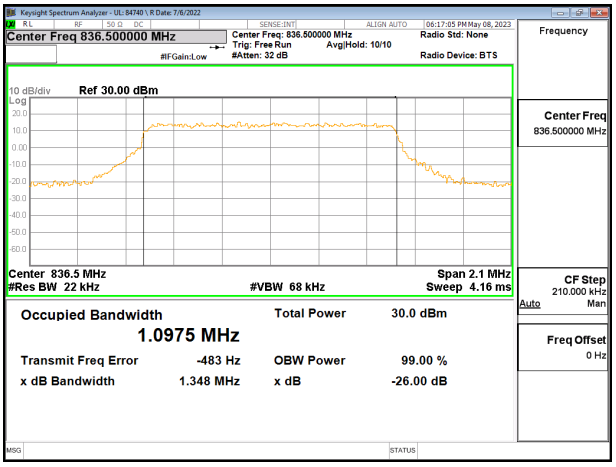


BAND 4 HSDPA MID Channel

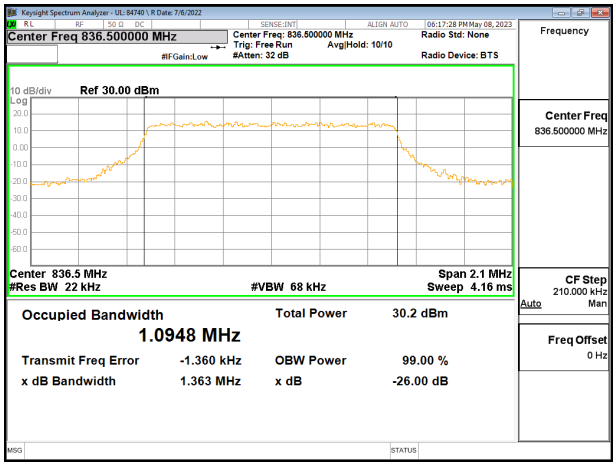
9.1.3. LTE5

Test Engineer ID:	84740/44389	Test Date:	2023-05-08	EUT Serial Number:	QV77007YG9

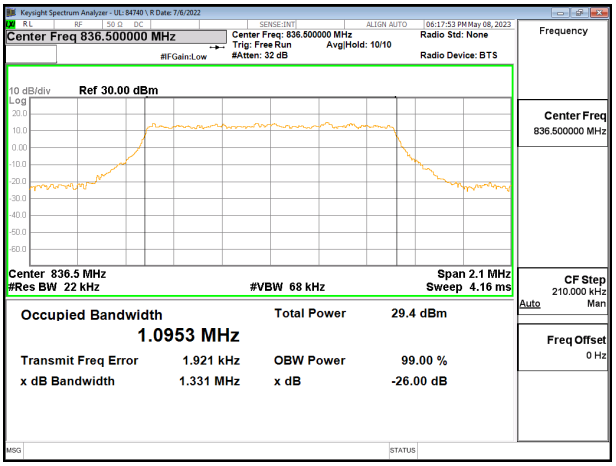
Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 5	1.4MHz, QPSK	6/0	836.5	1.098	1.348
	1.4MHz,16QAM			1.095	1.363
	1.4MHz, 64QAM			1.095	1.331
	3MHz, QPSK	15/0		2.703	3.026
	3MHz, 16QAM			2.711	3.080
	3MHz, 64QAM			2.705	3.037
	5MHz, QPSK	25/0		4.498	5.058
	5MHz, 16QAM			4.499	5.084
	5MHz, 64QAM			4.504	5.034
	10MHz, QPSK	50/0		8.987	10.04
	10MHz, 16QAM			8.982	9.928
	10MHz, 64QAM			8.993	9.888



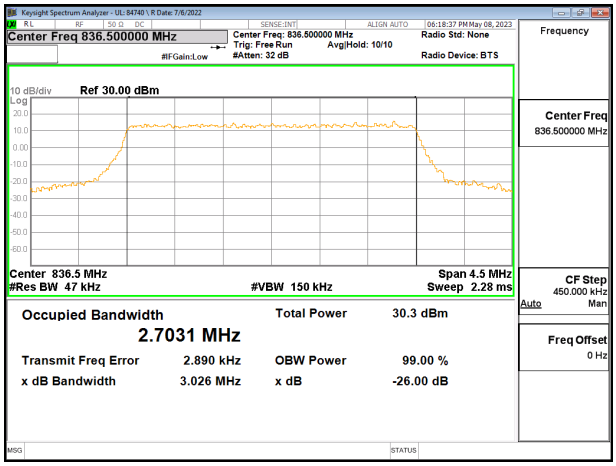
LTE5 1.4MHz QPSK MID Ch RB6-0



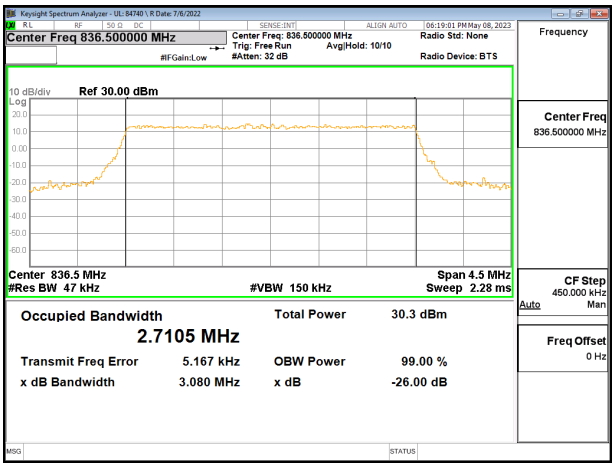
LTE5 1.4MHz 16QAM MID Ch RB6-0



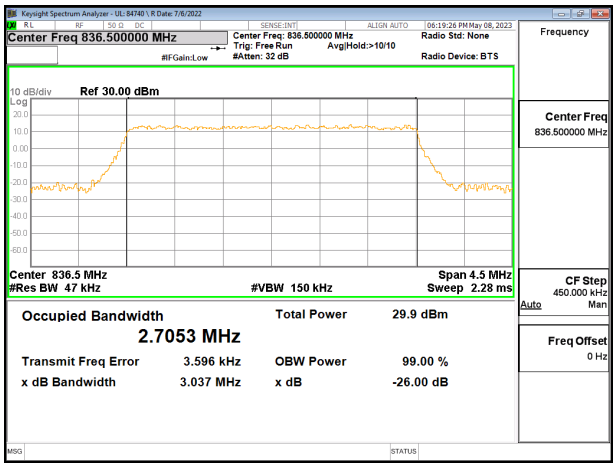
LTE5 1.4MHz 64QAM MID Ch RB6-0



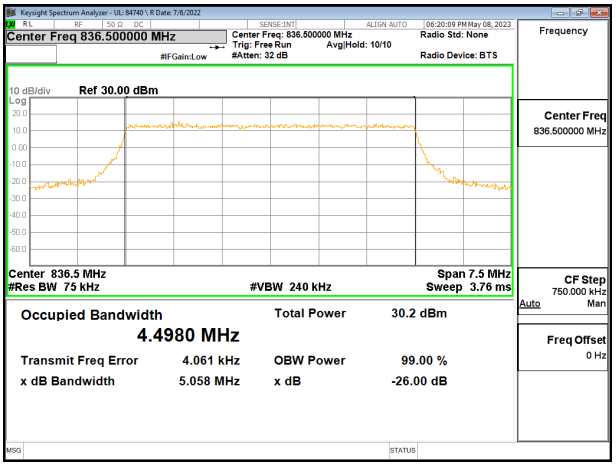
LTE5 3MHz QPSK MID Ch RB15-0



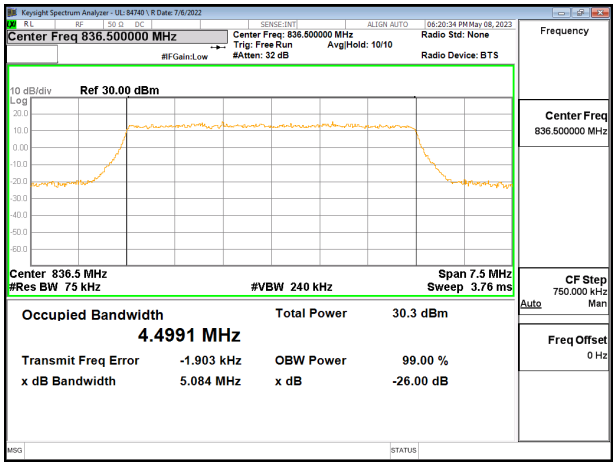
LTE5 3MHz 16QAM MID Ch RB15-0



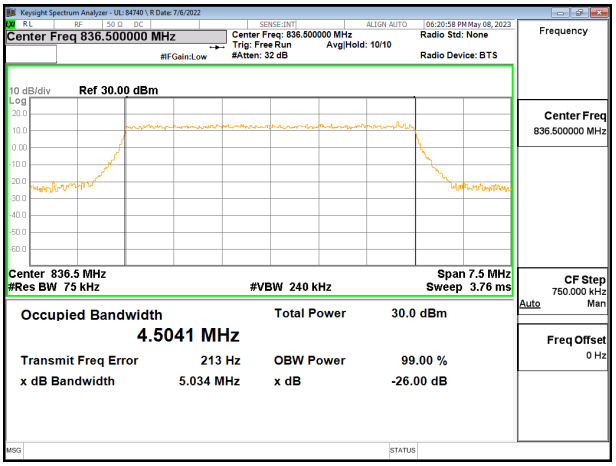
LTE5 3MHz 64QAM MID Ch RB15-0



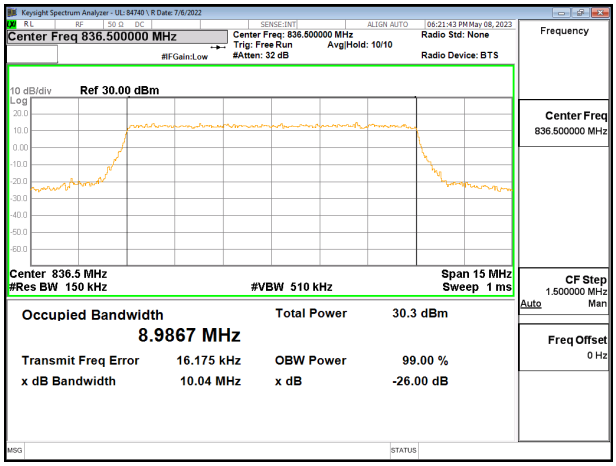
LTE5 5MHz QPSK MID Ch RB6-0



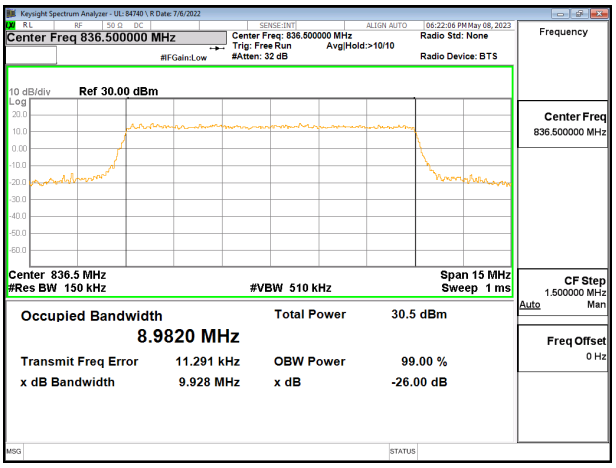
LTE5 5MHz 16QAM MID Ch RB6-0



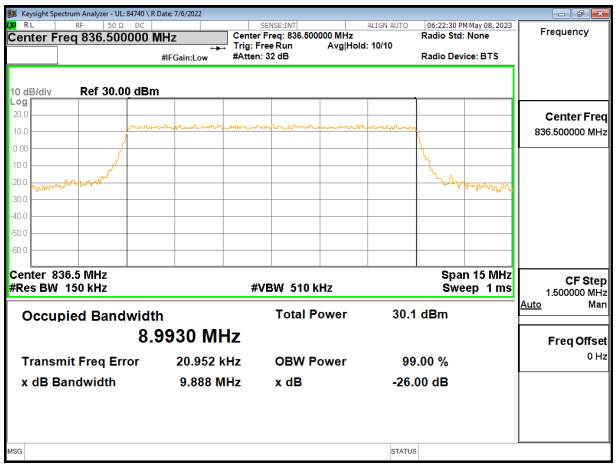
LTE5 5MHz 64QAM MID Ch RB6-0



LTE5 10MHz QPSK MID Ch RB15-0



LTE5 10MHz 16QAM MID Ch RB15-0

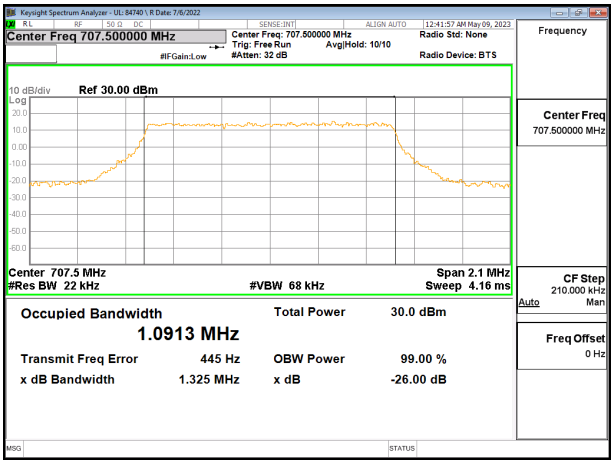


LTE5 10MHz 64QAM MID Ch RB15-0

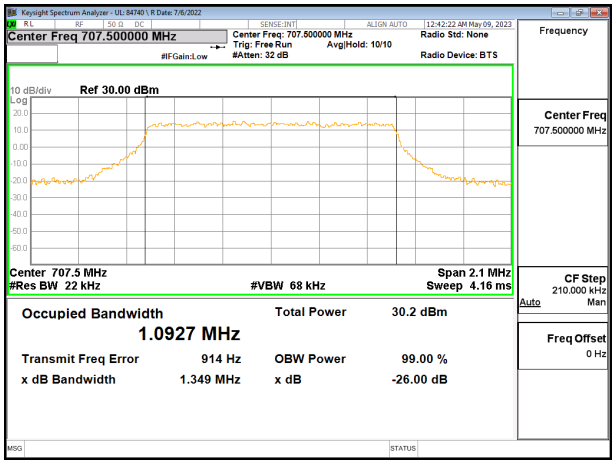
9.1.4. LTE12

Test Engineer ID:	84740/44389	Test Date:	2023-05-09	EUT Serial Number:	QV77007YG9

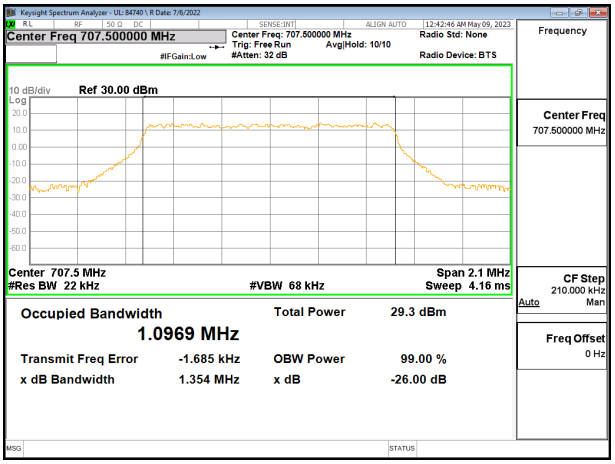
Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 12	1.4MHz, QPSK	6/0	707.5	1.091	1.325
	1.4MHz,16QAM			1.093	1.349
	1.4MHz, 64QAM			1.097	1.354
	3MHz, QPSK	15/0		2.704	3.055
	3MHz, 16QAM			2.704	3.043
	3MHz, 64QAM			2.705	3.078
	5MHz, QPSK	25/0		4.504	5.152
	5MHz, 16QAM			4.505	5.051
	5MHz, 64QAM			4.507	5.074
	10MHz, QPSK	50/0		8.983	9.958
	10MHz, 16QAM			8.973	9.921
	10MHz, 64QAM			8.991	9.965



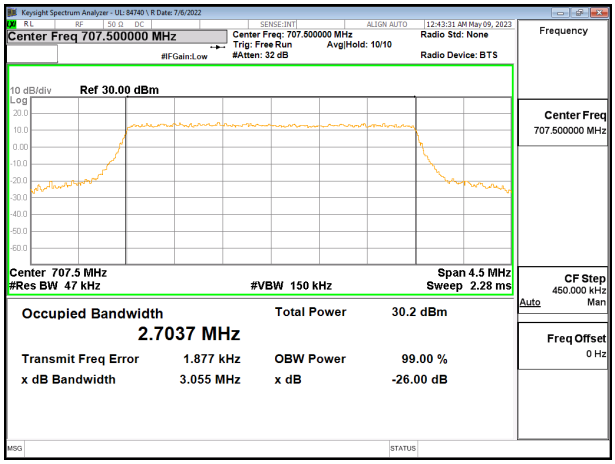
LTE12 1.4MHz QPSK MID Ch RB6-0



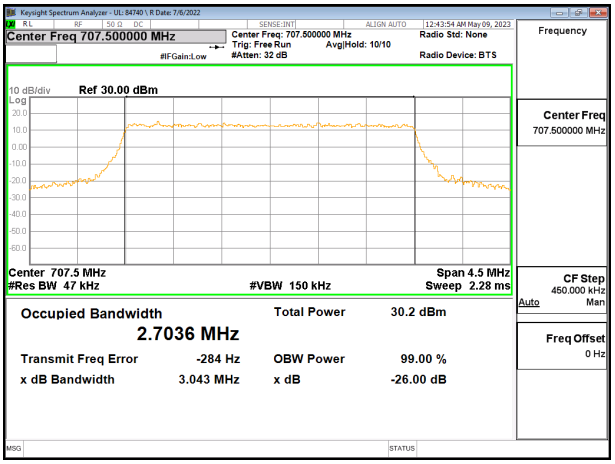
LTE12 1.4MHz 16QAM MID Ch RB6-0



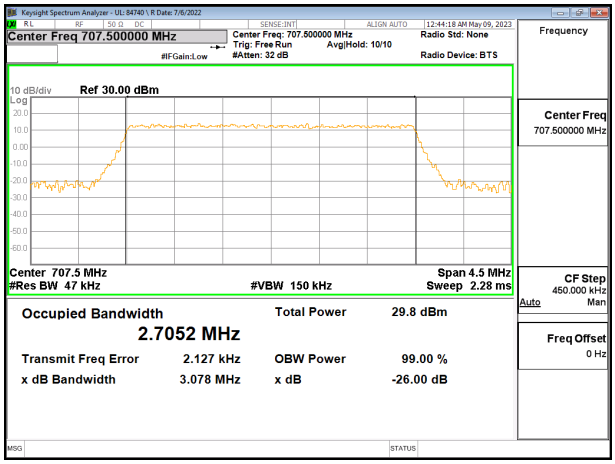
LTE12 1.4MHz 64QAM MID Ch RB6-0



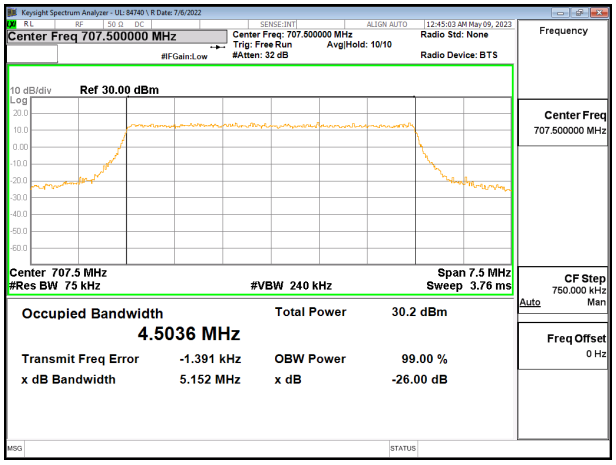
LTE12 3MHz QPSK MID Ch RB15-0



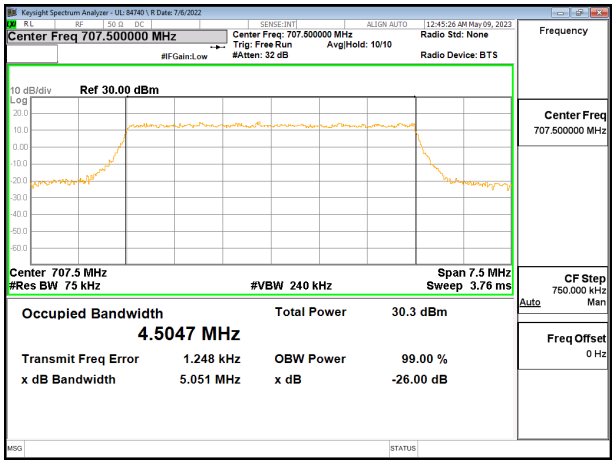
LTE12 3MHz 16QAM MID Ch RB15-0



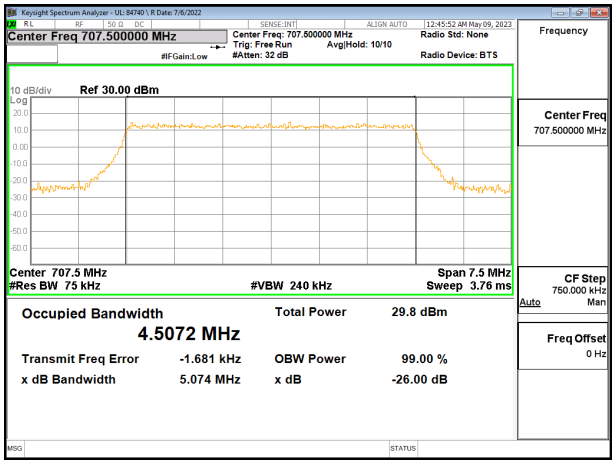
LTE12 3MHz 64QAM MID Ch RB15-0



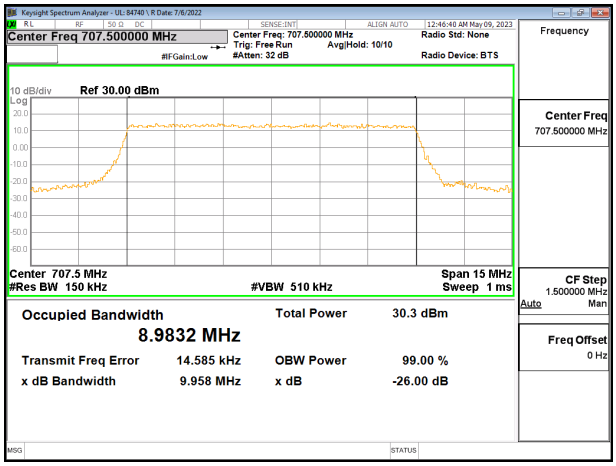
LTE12 5MHz QPSK MID Ch RB25-0



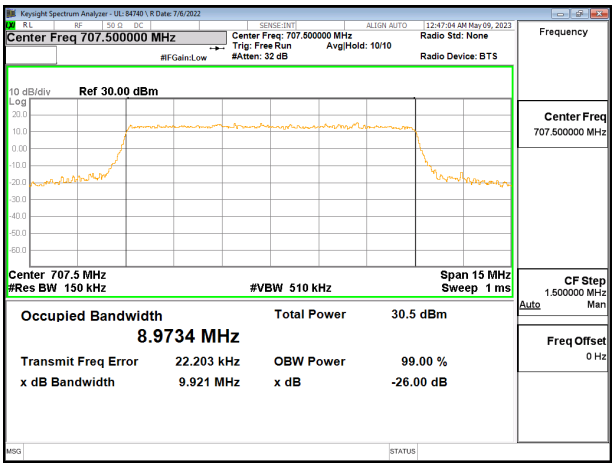
LTE12 5MHz 16QAM MID Ch RB25-0



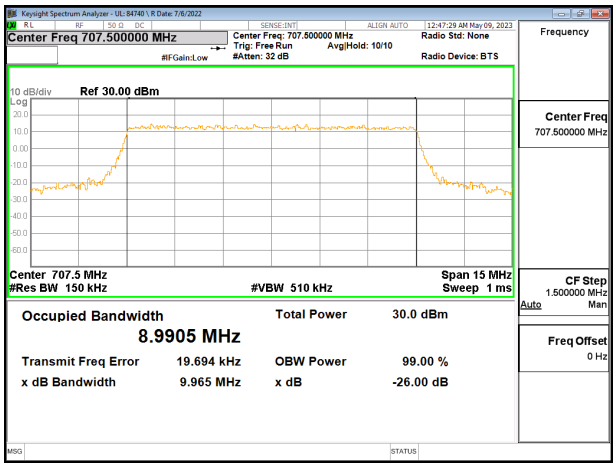
LTE12 5MHz 64QAM MID Ch RB25-0



LTE12 10MHz QPSK MID Ch RB50-0



LTE12 10MHz 16QAM MID Ch RB50-0

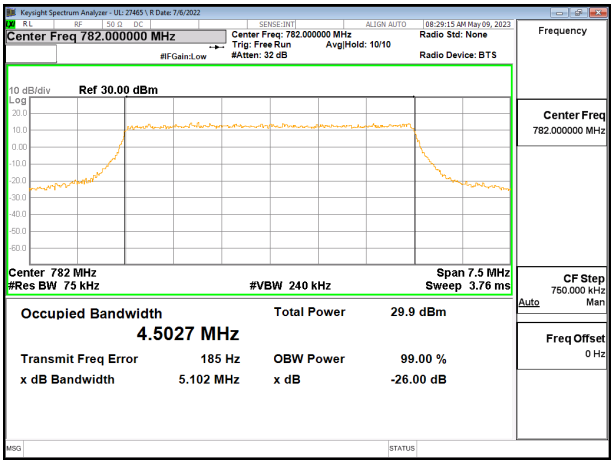


LTE12 10MHz 64QAM MID Ch RB50-0

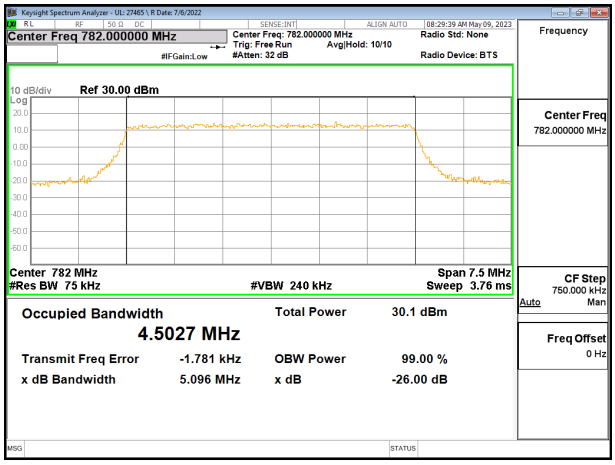
9.1.5. LTE13

Test Engineer ID:	27465/44389	Test Date:	2023-05-09	EUT Serial Number:	QV77007YG9

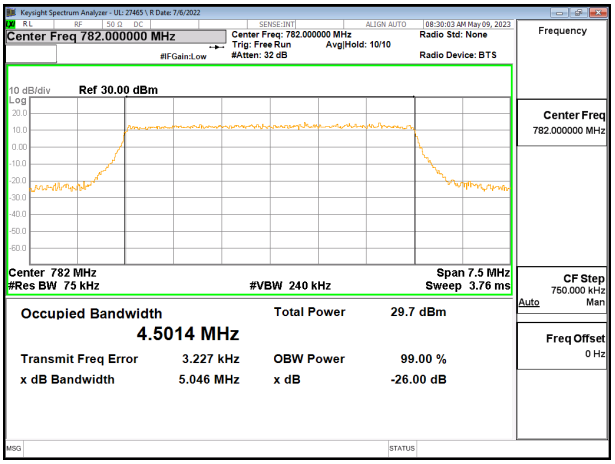
Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 13	5MHz, QPSK	25/0	782	4.503	5.102
	5MHz, 16QAM			4.503	4.096
	5MHz, 64QAM			4.501	5.046
	10MHz, QPSK	50/0		8.947	9.832
	10MHz, 16QAM			8.964	9.848
	10MHz, 64QAM			8.969	9.849



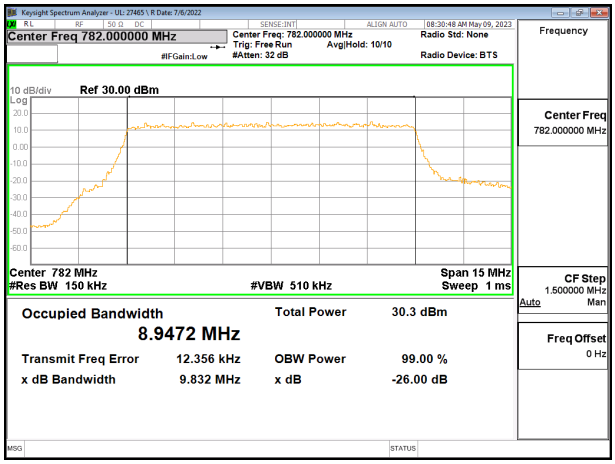
LTE13 5MHz QPSK MID Ch RB25-0



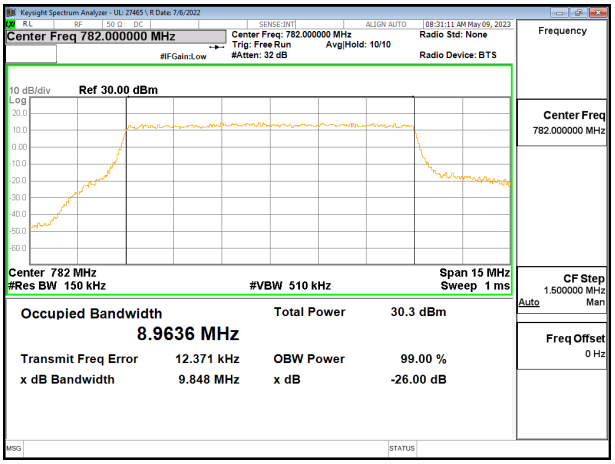
LTE13 5MHz 16QAM MID Ch RB25-0



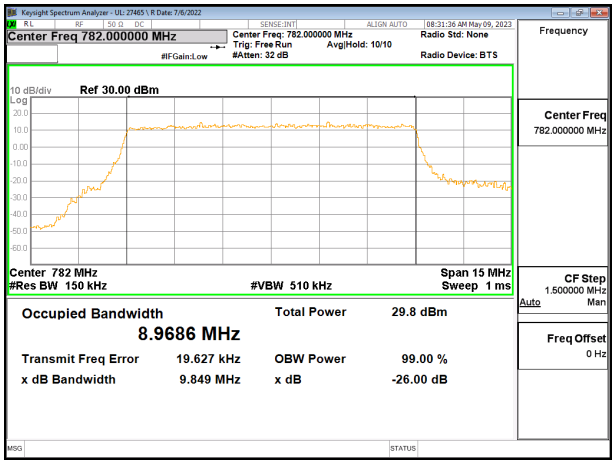
LTE13 5MHz 64QAM MID Ch RB25-0



LTE13 10MHz QPSK MID Ch RB50-0



LTE13 10MHz 16QAM MID Ch RB50-0

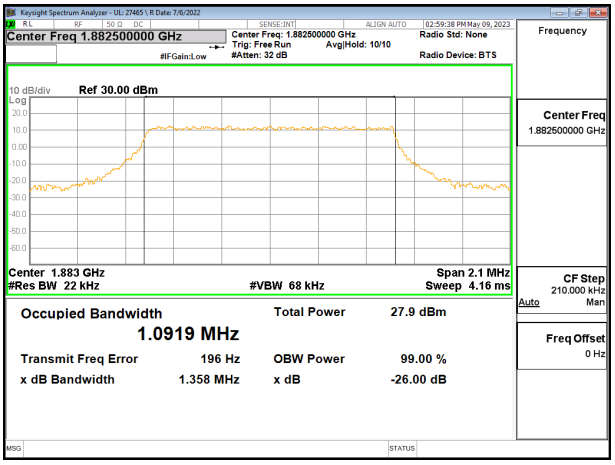


LTE13 10MHz 64QAM MID Ch RB50-0

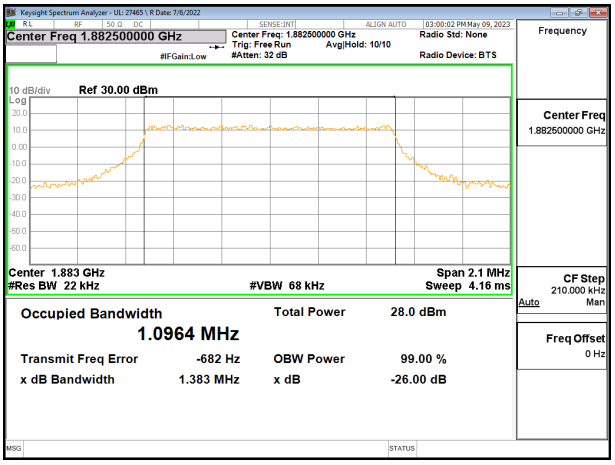
9.1.6. LTE25

Test Engineer ID:	27465/44389	Test Date:	2023-05-09	EUT Serial Number:	QV77008AG9

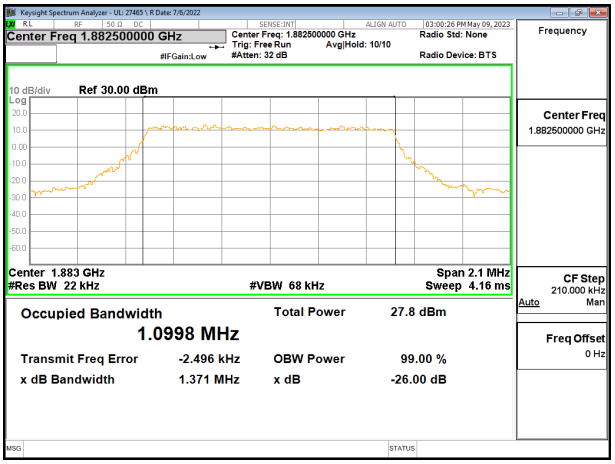
Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 25	1.4MHz, QPSK	6/0	1882.5	1.092	1.358
	1.4MHz,16QAM			1.096	1.383
	1.4MHz, 64QAM			1.100	1.371
	3MHz, QPSK	15/0		2.706	3.050
	3MHz, 16QAM			2.704	3.061
	3MHz, 64QAM			2.708	3.047
	5MHz, QPSK	25/0		4.508	5.175
	5MHz, 16QAM			4.512	5.115
	5MHz, 64QAM			4.499	5.096
	10MHz, QPSK	50/0		8.993	10.06
	10MHz, 16QAM			8.999	10.02
	10MHz, 64QAM			8.989	10.01
	15MHz, QPSK	75/0		13.469	14.80
	15MHz, 16QAM			13.470	14.82
	15MHz, 64QAM			13.470	14.74
	20MHz, QPSK	100/0		17.942	19.65
	20MHz, 16QAM			17.960	19.70
	20MHz, 64QAM			17.985	19.75



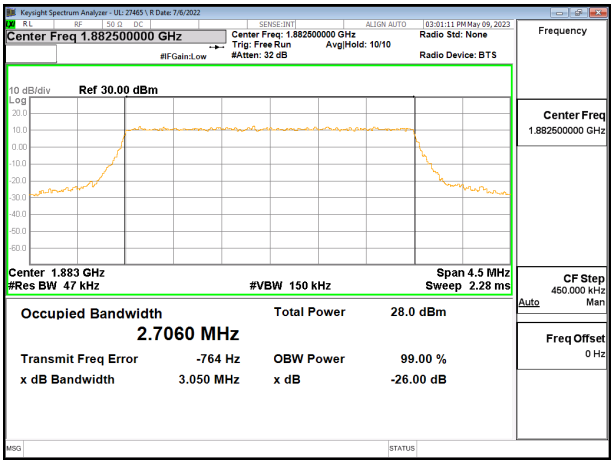
LTE25 1.4MHz QPSK MID Ch RB6-0



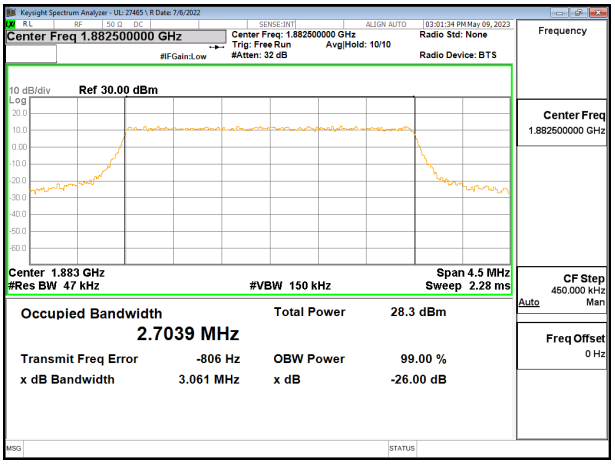
LTE25 1.4MHz 16QAM MID Ch RB6-0



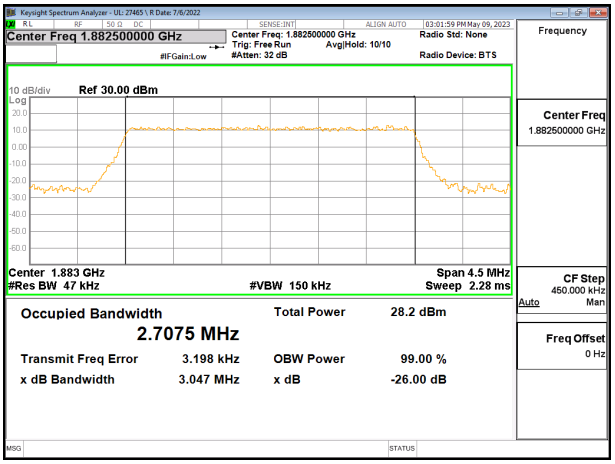
LTE25 1.4MHz 64QAM MID Ch RB6-0



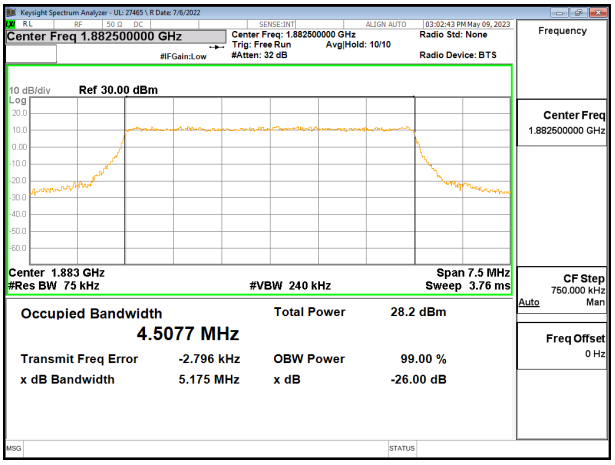
LTE25 3MHz QPSK MID Ch RB15-0



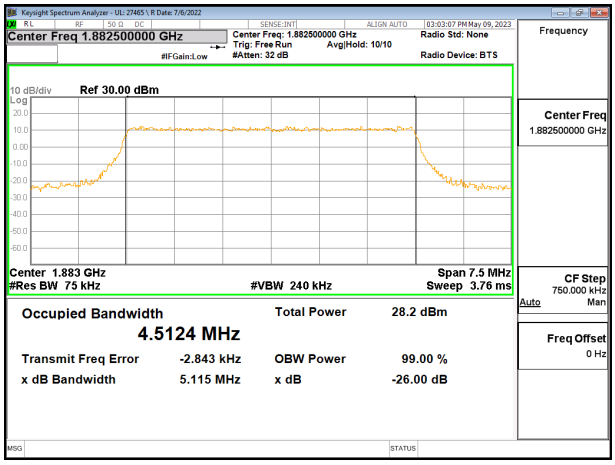
LTE25 3MHz 16QAM MID Ch RB15-0



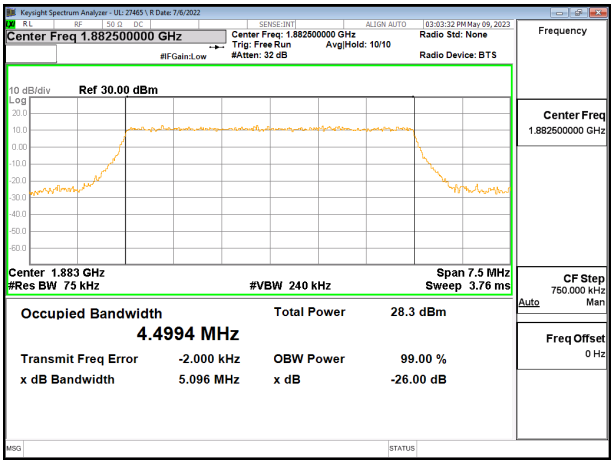
LTE25 3MHz 64QAM MID Ch RB15-0



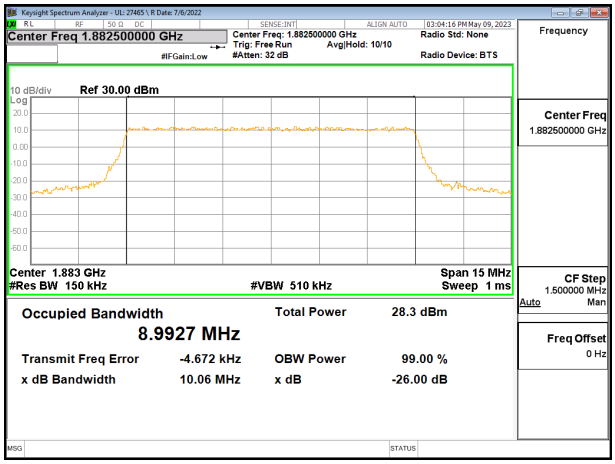
LTE25 5MHz QPSK MID Ch RB25-0



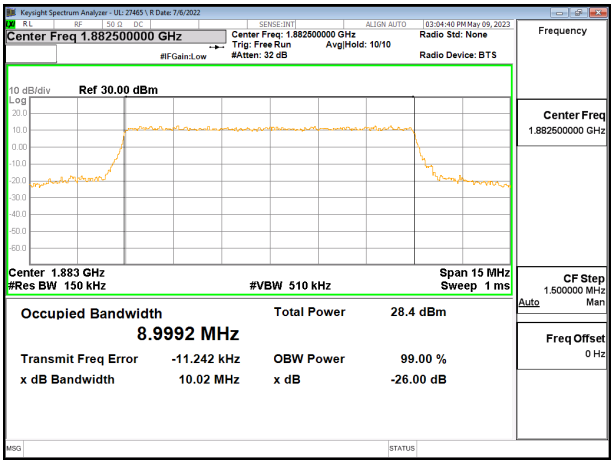
LTE25 5MHz 16QAM MID Ch RB25-0



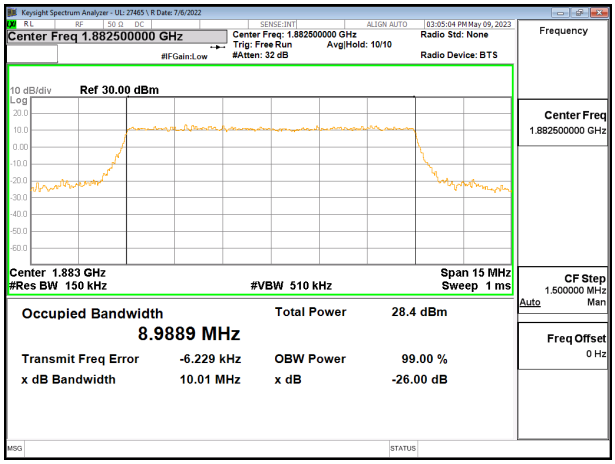
LTE25 5MHz 64QAM MID Ch RB25-0



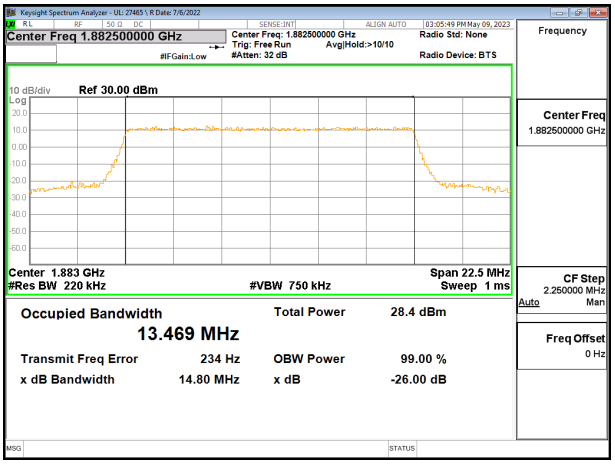
LTE25 10MHz QPSK MID Ch RB50-0



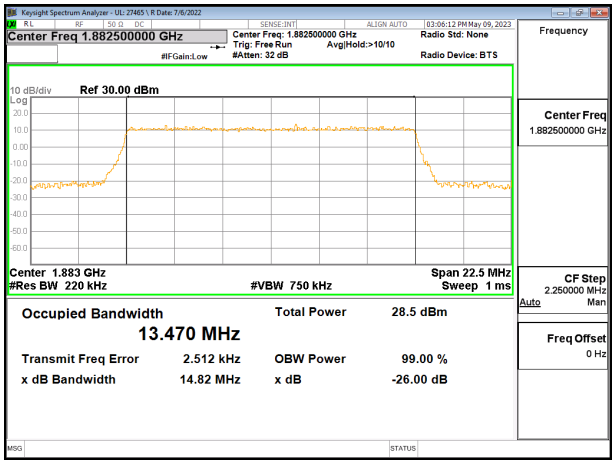
LTE25 10MHz 16QAM MID Ch RB50-0



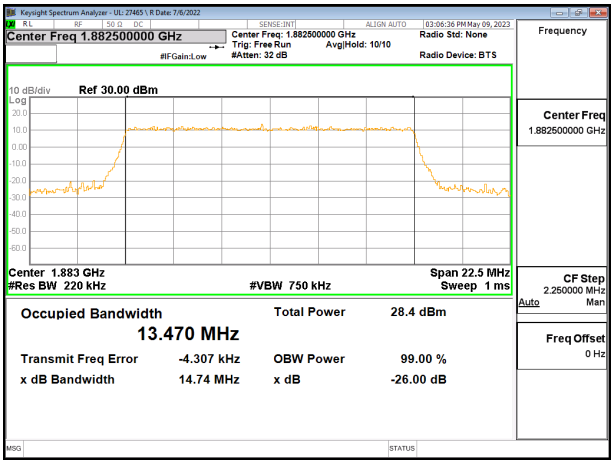
LTE25 10MHz 64QAM MID Ch RB50-0



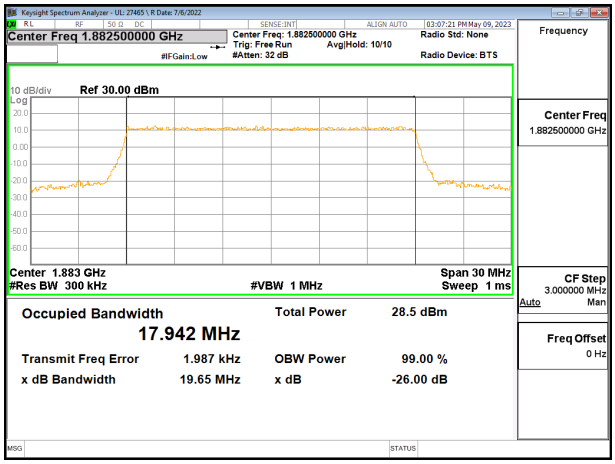
LTE25 15MHz QPSK MID Ch RB75-0



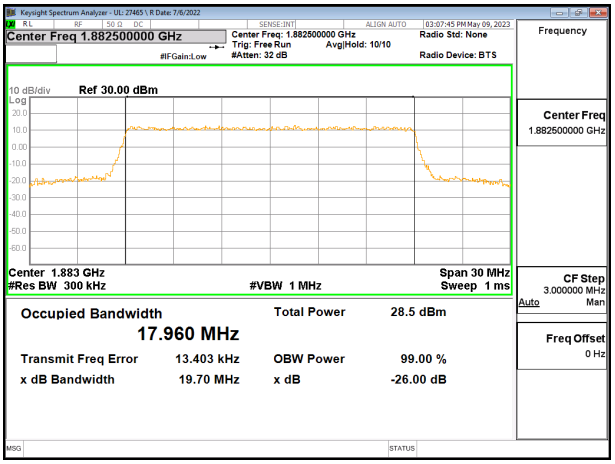
LTE25 15MHz 16QAM MID Ch RB75-0



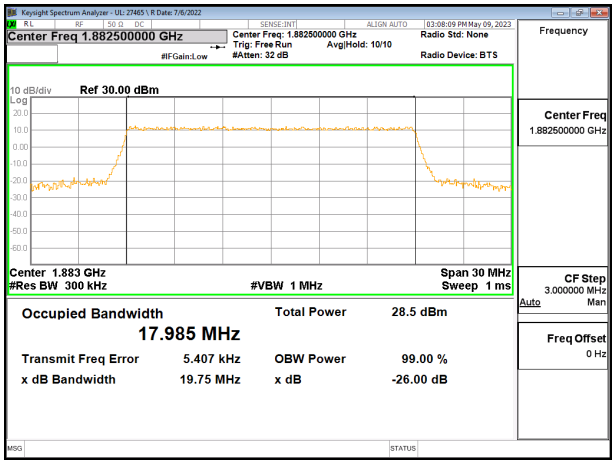
LTE25 15MHz 64QAM MID Ch RB75-0



LTE25 20MHz QPSK MID Ch RB50-24



LTE25 20MHz 16QAM MID Ch RB50-24

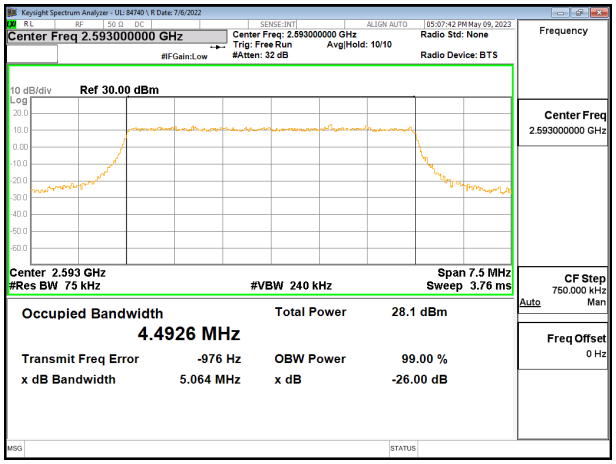


LTE25 20MHz 64QAM MID Ch RB50-24

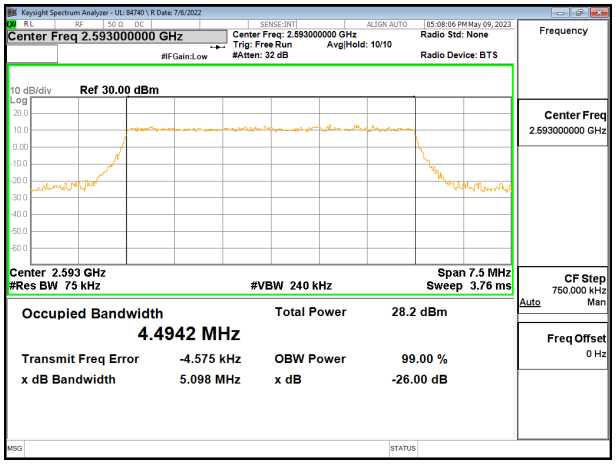
9.1.7. LTE41

Test Engineer ID:	84740/44389	Test Date:	2023-05-09	EUT Serial Number:	QV77008AG9

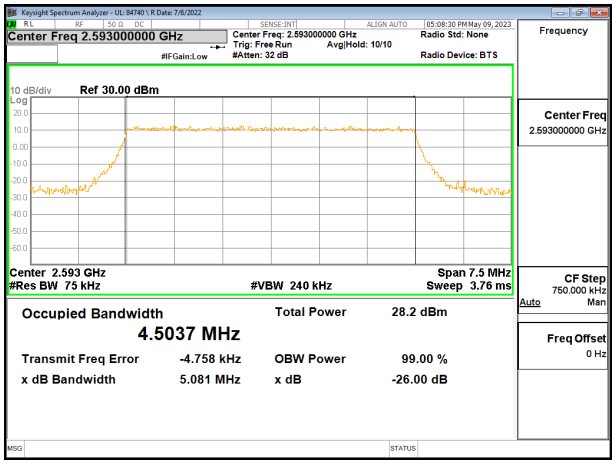
Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 41	5MHz, QPSK	25/0	2593.0	4.493	5.064
	5MHz, 16QAM			4.494	5.098
	5MHz, 64QAM			4.504	5.081
	10MHz, QPSK	50/0		8.981	9.948
	10MHz, 16QAM			8.987	9.868
	10MHz, 64QAM			8.992	9.918
	15MHz, QPSK	75/0		13.448	14.85
	15MHz, 16QAM			13.487	14.63
	15MHz, 64QAM			13.450	14.77
	20MHz, QPSK	100/0		17.926	19.56
	20MHz, 16QAM			17.939	19.53
	20MHz, 64QAM			17.913	19.46



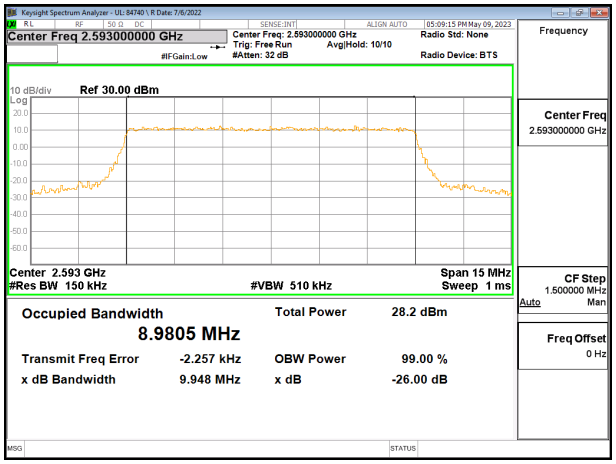
LTE41 5MHz QPSK MID Ch RB25-0



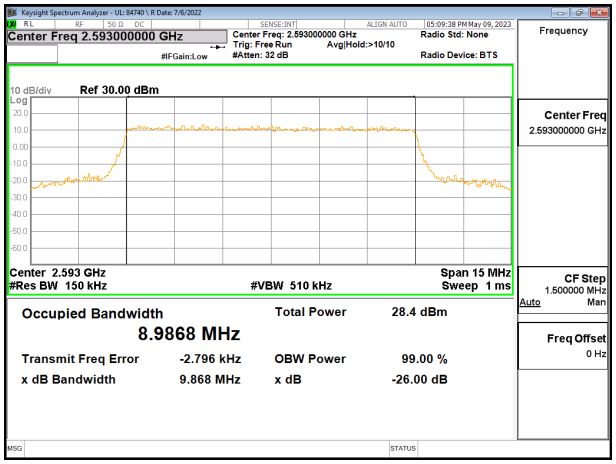
LTE41 5MHz 16QAM MID Ch RB25-0



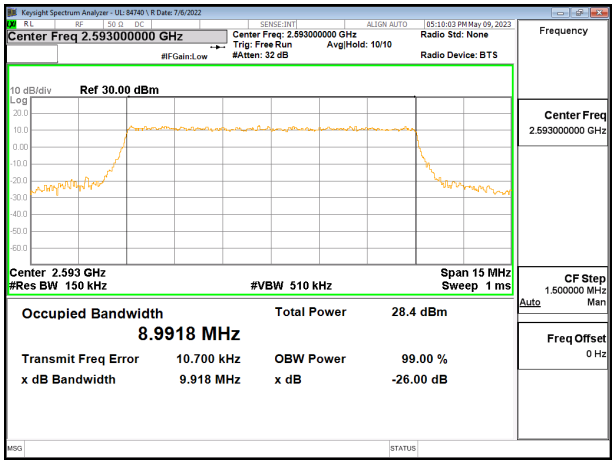
LTE41 5MHz 64QAM MID Ch RB25-0



LTE41 10MHz QPSK MID Ch RB50-0



LTE41 10MHz 16QAM MID Ch RB50-0



LTE41 10MHz 64QAM MID Ch RB50-0