TEST REPORT

Report Number. : 14144434-E1V2

Applicant	:	COGNYTE SOFTWARE LP 35 PINELAWN ROAD, SUITE 204 MELVILLE, NEW YORK 11747 USA
Model	:	FALCONET
FCC ID	:	2A7A2-FNV1
EUT Description	:	PORTABLE MULTI-BTS SDR SYSTEM
Test Standard(s)	:	FCC CFR 47 PART 22H, 24E, 27C, 90R and 90S

Date Of Issue:
JANUARY 10, 2023

Prepared by:
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ACCREDITED
CERT #0751.05

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	12/27/2022	Initial Review	--
V2	1/10/2023	Updated Section 6.2 and 6.4	Kiya Kedida

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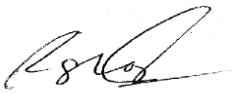
1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	COGNYTE 35 PINELAWN ROAD, SUITE 204 MELVILLE, NEW YORK 11747 USA
Model	FALCONET
FCC ID	2A7A2-FNV1
EUT Description	PORTABLE MULTI-BTS SDR SYSTEM
Serial Number	GI2S BRAIN UNIT(SN:22CU017710265) GI2S CHASSIS(SN:22CU037710556)
Date Tested	SEPTEMBER 26, 2022 to NOVEMBER 17, 2022
Applicable Standards	FCC CFR 47 PART 22, 24, 27 and 90S
Test Results	COMPLIES

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

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

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released By:	Reviewed By:	Prepared By:
		
Dan Coronia Operations Leader UL Verification Services Inc.	Kiya Kedida Project Engineer UL Verification Services Inc.	Rolly Alegre 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 the validity of results after the integration of the data provided by the customer."

Requirement Description	Band	Requirement Clause Number (FCC)	Result*	Remarks
RF Conducted Output Power		2.1046	Complies	
Equivalent Isotropic Radiated Power	26 (90S)	2.1046 , 90.635 (a)	Complies	
	5, 26	22.913 (a)(1)(i)	Complies	
	12	27.50 (c) (3)	Complies	
	13	27.50 (b) (4)	Complies	
	14	90.541 (a)	Complies	
	17	27.50 (c) (3)	Complies	
	2, 25	24.232 (a) (2)	Complies	
	4, 66	27.50 (d) (2)	Complies	
	71, n71	27.50 (c) (3)	Complies	

Requirement Description	Requirement Clause Number (FCC)	Result*	Remarks
Occupied Bandwidth	2.1049	Complies	
Band Edge and Emission Mask	2.1051, 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (g), 27.53 (c) (f), 90.543 (e)(f), 90.691 (a)	Complies	
Out of Band Emissions	2.1051, 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (g), 27.53 (c) (f), 90.543 (e)(f), 90.691 (a)	Complies	
Frequency Stability	2.1055, 22.355, 24.235, 27.54, 90.539, 90.213	Complies	
Peak-to-Average Ratio	22.913 (d), 24.232 (d), 27.50 (d) (5), 27.50 (b)	Complies	
Field Strength of Spurious Radiation	2.1051, 2.1053, 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (g), 27.53 (c) (f), 90.543 (e)(f), 90.691 (a)	Complies	

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, Part 90
- 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 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	208313
☐	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA	US0104	22541	208313
☒	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA	US0104	2324B	208313

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)	141.16 Hz
Occupied Bandwidth	1.22%
Power Spectral Density	2.47 dB
RF Power Measurement Direct Method Using Power Meter	1.3 dB (PK) / 0.45 dB (AV)
Unwanted Emissions, Conducted	1.94 dB
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
Time Domain Measurements	3.39%
Temperature	0.57˚C
Humidity	3.39%
DC Supply Voltages	0.57%

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

MAINS CONDUCTED EMISSIONS

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

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is a base station and support GSM/UMTS/LTE technologies and 5G as well.

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.

The transmitter has a maximum 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)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
869.4-893.6	GPRS	38.21	2.50	1640.0	40.71	11.776	247.75	248KGXW
Part 24 1900MHz								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W/MHz)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
1930.4-1989.6	GPRS	36.58	4.00	1640.0	40.58	11.429	248.44	248KGXW

WCDMA MODE

Part 22 Band 5								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
871.4-891.6	QPSK	34.20	2.50	1640.0	36.70	4.677	4174.8	4M17F9W
Part 24 Band 2								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W/MHz)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
1932.4-1987.6	QPSK	35.89	4.00	1640.0	39.89	9.750	4182.6	4M18F9W
Part 27 Band 4								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W/MHz)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
2112.4-2152.6	QPSK	38.90	3.00	1640.0	41.90	15.488	4180.6	4M18F9W

LTE BAND 2

Part 24	
EIRP Limit (W/MHz)	1640.00
Antenna Gain (dBi)	4.00

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	1932.5	1987.5	27.40	31.40	1.380	4419.8	4M42G7D

LTE BAND 4

Part 27	
EIRP Limit (W/MHz)	1640.00
Antenna Gain (dBi)	4.00

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	2112.5	2152.5	30.17	34.17	2.612	4434.3	4M43G7D

LTE BAND 5

Part 22H	
ERP Limit (W)	500.00
Antenna Gain (dBi)	2.50

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	871.5	891.5	30.66	31.01	1.262	4436.7	4M44G7D

LTE BAND 12

Part 27	
ERP Limit (W/MHz)	1000.00
Antenna Gain (dBi)	2.50

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	731.5	743.5	32.82	33.17	2.075	4481.8	4M48G7D

LTE BAND 13

Part 27	
ERP Limit (W/MHz)	1000.00
Antenna Gain (dBi)	2.50

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	748.5	753.5	32.81	33.16	2.070	4435.3	4M44G7D

LTE BAND 14

Part 90R	
ERP Limit (W/MHz)	1000.00
Antenna Gain (dBi)	2.50

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	760.5	765.5	28.00	28.35	0.684	4465.3	4M47G7D

LTE BAND 17

Part 27	
ERP Limit (W/MHz)	1000.00
Antenna Gain (dBi)	2.50

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	736.5	743.5	31.78	32.13	1.633	4426.4	4M43G7D

LTE BAND 25

Part 24	
EIRP Limit (W/MHz)	1640.00
Antenna Gain (dBi)	4.00

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	1932.5	1992.5	27.44	31.44	1.393	4472	4M47G7D

LTE BAND 26

Part 90S	
ERP Limit (W)	1000.00
Antenna Gain (dBi)	2.50

Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	Conducted Average (W)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	861.5	866.5	27.66	0.58	28.01	0.632	4442.6	4M44G7D

LTE BAND 26

Part 22								
ERP Limit (W)		500.00						
Antenna Gain (dBi)		2.50						
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	871.5	891.5	32.67	33.02	2.004	4470.9	4M47G7D

LTE BAND 66

Part 27								
EIRP Limit (W/MHz)		1640.00						
Antenna Gain (dBi)		4.00						
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	2112.5	2197.5	24.79	28.79	0.757	4487.1	4M49G7D

LTE BAND 71

Part 27								
ERP Limit (W/MHz)		1000.00						
Antenna Gain (dBi)		3.00						
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	619.5	649.5	31.81	32.66	1.845	4468.1	4M47G7D

5G NR n71

Part 27								
ERP Limit (W/MHz)		1000.00						
Antenna Gain (dBi)		3.00						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
20.0	QPSK	627.0	642.0	28.30	29.15	0.822	18838	18M8G7D

6.3. SOFTWARE AND FIRMWARE

The EUT software installed during testing was v58.1.116.

The EUT firmware installed during testing was: gsm_7.1.6.4.img,umts_58.1.220916.1.img,lte_fdd_58.1.0.84.img lte_tdd_58.1.0.73.img, nr_58.1.0920.1.img, GUL_v2.17_RevX.exe;, MPAC_BL_v6_42.exe; Matrix_BL_v2_58.exe;, cell_infra_0.6.107.im

6.4. MAXIMUM ANTENNA GAIN

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

LTE Bands	Frequency Range (MHz)	ANT 1 Antenna Gain (dBi)	ANT 2 Antenna Gain (dBi)	ANT 3 Antenna Gain (dBi)
GSM850	869 – 894	2.5	-	-
GSM1900	1930 – 1990	4	-	-
UMTS Band 5	869 – 894	2.5	-	-
UMTS Band 2	1930 – 1990	4	-	-
UMTS Band 4	2110 – 2155	-	-	4
LTE Band 2	1930 – 1990	-	4	-
LTE Band 4	2110 – 2155	-	-	3
LTE Band 5	869 – 894	2.5	-	-
LTE Band 12	729 – 746	2.5	-	-
LTE Band 13	746 – 756	2.5	-	-
LTE Band 14	758 – 768	2.5	-	-
LTE Band 17	734 – 746	2.5	-	-
LTE Band 25	1930 – 1995	-	4	-
LTE Band 26 (FCC Part 90)	859 – 869	2.5	-	-
LTE Band 26 (FCC Part 22)	869 – 894	2.5	-	-
LTE Band 66	2110 – 2200	-	4	-
LTE Band 71	617 – 652	3	-	-
5G NR n71	617 – 652	3	-	-

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports the following GSM, UMTS, LTE and 5G NR:
GSM850/1900, UMTS Band 2/4/5, LTE Band 2, Band 4, Band 5, Band 12, Band 13, Band 14, Band 17, Band 25, Band 26 PART 90, Band 26 PART 22, Band 66, Band 71, 5G NR n71.

All measurements is tested on QPSK modulation for LTE(5MHz BW only) and 5G NR(20MHz BW only). GPRS slot 1 for GSM, and QPSK modulation for UMTS.

The EUT can only be setup in desktop orientation; therefore, all radiated testing was performed with the EUT in desktop orientation. Radiated spurious emissions were investigated from 30MHz-1GHz, above 1GHz and above 18GHz.

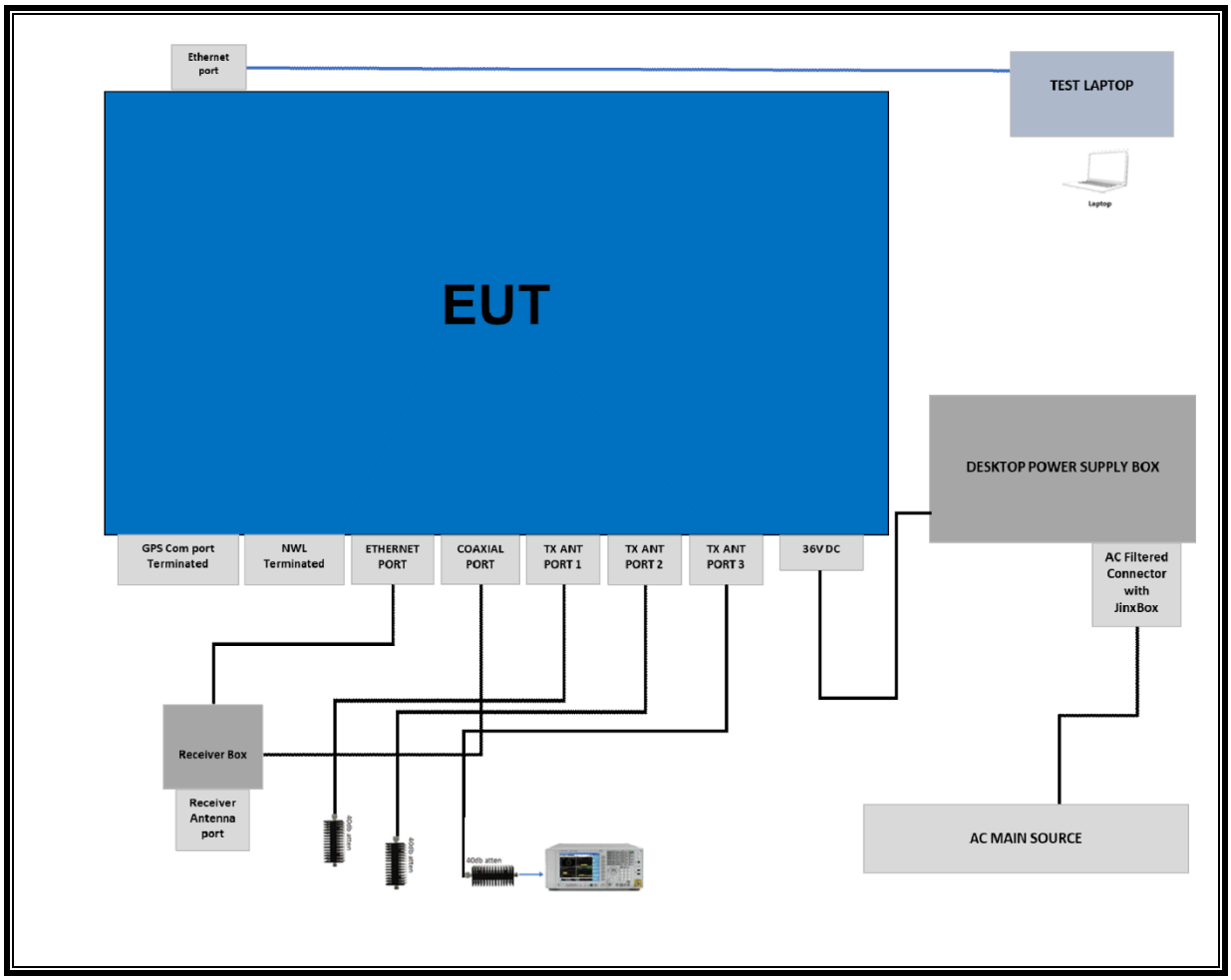
6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID/ DoC**
Laptop	Lenovo	ThinkPad T14 Gen 2, Intel Core i7	PF-385ATZ	N/A
AC/DC adapter	Lite-on Technology	ADLX65YLC3D	N/A	N/A
AC/DC DPSU (Internal DCDC converter) to EUT	Artesyn	LCM1500U-T-4	224A0425C1066	N/A
AC/DC DPSU (S1 designator) to EUT	Souriau	UT0714G1SH	46-140-0109	N/A

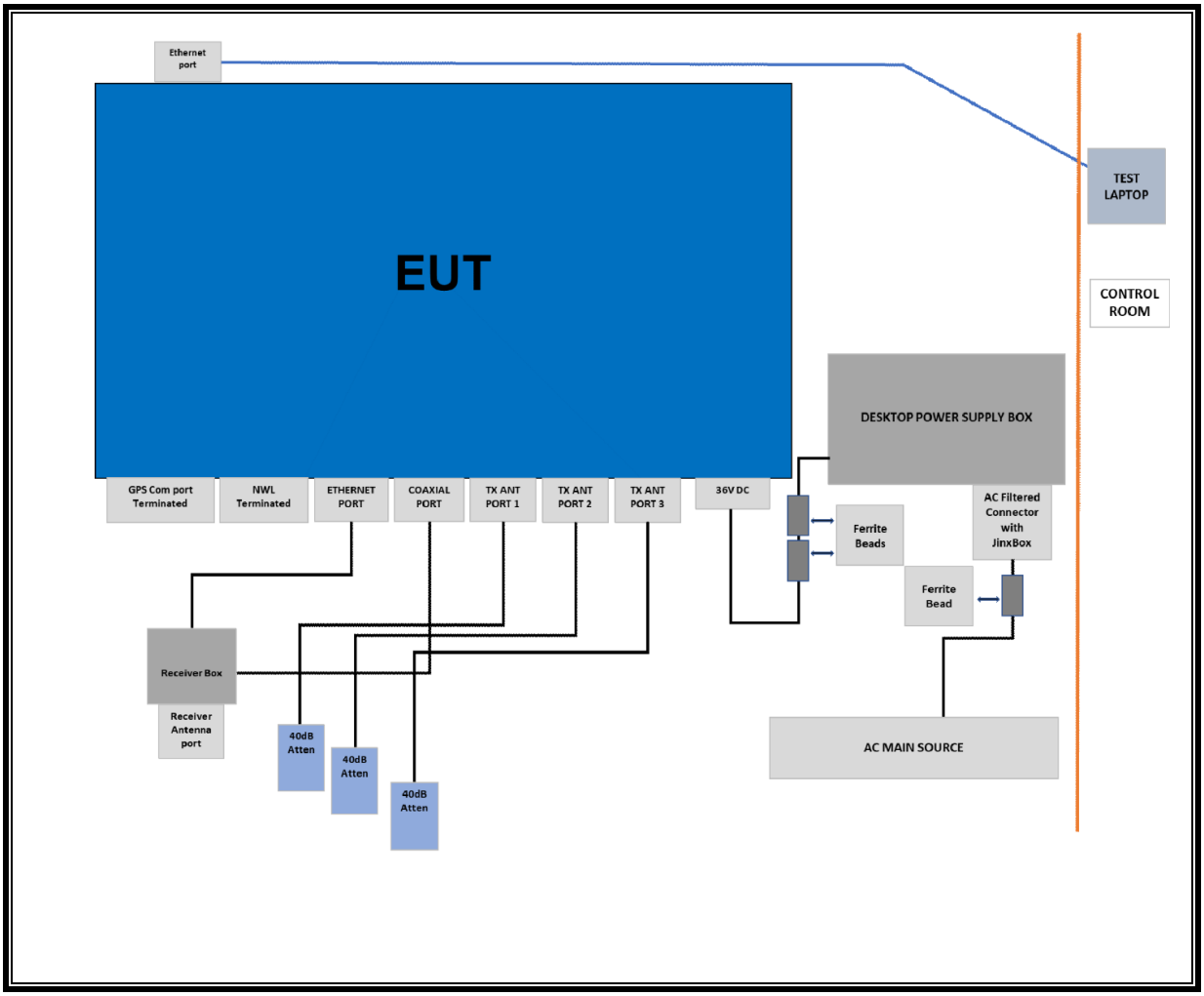
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC DPSU	1	TE connectivity and Amphenol	Shielded	0.5	N/A
2	AC DPSU	1	AC power cord	Unshielded	1.5	N/A
3	RF In/Out	1	40dB attenuator	N/A	N/A	N/A
4	RF In/Out	3	RF TX cable Q to Ntype female	N/A	3.0	N/A
5	RF In/Out	1	RF RX cable Q to Ntype female	N/A	1.0	N/A
6	LAN	2	RJ-45 CAT6	Shielded	1.0	N/A
7	RF In/Out	1	SMA cable	Shielded	0.2	N/A

I/O CABLES (RF RADIATED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC/DPSU	1	AC power cord (3-Prong Grounded Male)	Unshielded	1.5	To AC Mains
2	DC/DPSU/36V	1	TE connectivity and Amphenol	Shielded	0.5	To EUT
3	RF In/Out	1	RF TX cable Q to Ntype female	N/A	3.0	To 40dB attenuator
4	RF In/Out	2	RF TX cable Q to Ntype female	N/A	3.0	To Terminators
5	RF In/Out	1	RF RX cable Q to Ntype female	N/A	1.0	To Receiver Box
6	LAN	1	RJ-45 CAT6	Shielded	1.0	To Receiver Box
7	RF In/Out	1	40dB attenuator	N/A	N/A	To SMA cable
8	RF In/Out	1	SMA cable	Shielded	0.2	To EUT
9	LAN	1	RJ-45 CAT6	Shielded	1.0	From Laptop to EUT

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	80402	7/5/2023
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB1	80813	6/8/2023
RF Filter Box, 1 to 18GHz	UL FREMONT	SAC-L1	197920	4/19/2023
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	175953	2/8/2023
ESW EMI Test Receiver, 2Hz to 44GHz	ROHDE & SCHWARZ	ESW44	169927	2/16/2023
Power Meter, P-series single channel	Keysight	N1912A	90630	1/24/2023
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight	N1921A	81319	1/24/2023
Spectrum Analyzer, PXA, 3Hz to 50GHz	Keysight	N9030A	80400	2/1/2023
Chamber, Environmental	Thermotron	29800	T80	11/11/2022
Amplifier 26.5-40GHz +5Vdc, -62dBm P1dB	AMPLICAL	AMP26G40-65	172345	6/22/2023
Amplifier 18-26.5GHz, +5Vdc, 60dB min	AMPLICAL	AMP18G26.5-60	215705	2/26/2023
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826/B	81138	10/13/2022
Antenna, Horn 26.5GHz to 40GHz	ARA	MWH-2640/B	81104	10/14/2022
PSA Spectrum Analyzer	Agilent	E4440A	80386	3/2/2023
UL AUTOMATION SOFTWARE				
Radiated test software	UL	UL EMC	Ver 9.5 April 30, 2020	

8. RF OUTPUT POWER VERIFICATION

8.1. GSM

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 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 connected to a power meter via wideband peak power sensor. Peak output power was read directly from power meter.

8.1.1. GSM 850

Test Engineer ID:	39005	Test Date:	11/17/2022

Mode	Time Slots	Ch No.	Freq. (MHz)	Conducted Average Power (dBm)
				ANT 1
GSM850	1	129	869.4	**38.21**
		190	881.6	37.86
		251	893.6	37.33

8.1.2. GSM 1900

Test Engineer ID:	39005	Test Date:	11/17/2022

Mode	Time Slots	Ch No.	Freq. (MHz)	Conducted Average Power (dBm)
				ANT 1
GSM1900	1	512	1930.2	36.15
		661	1960	**36.58**
		810	1989.8	35.91

8.2. UMTS

QPSK

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

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

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK

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.

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 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 connected to a power meter via wideband peak power sensor. Peak output power was read directly from power meter.

8.2.1. UMTS B5

Test Engineer ID:	39005	Test Date:	11/17/2022

Band		UL Ch No.	Freq. (MHz)	MPR (dB)	Conducted Average
UMTS B5	QPSK	4357	871.4	N/A	33.88
		4408	881.6	N/A	34.12
		4458	891.6	N/A	**34.20**

8.2.2. UMTS B4

Test Engineer ID:	39005	Test Date:	11/17/2022

Band		UL Ch No.	Freq. (MHz)	MPR (dB)	Conducted Average
UMTS B4	QPSK	10562	2112.4	N/A	**38.90**
		10663	2132.6	N/A	38.50
		10763	2152.6	N/A	38.60

8.2.3. UMTS B2

Test Engineer ID:	39005	Test Date:	11/17/2022

Band		UL Ch No.	Freq. (MHz)	MPR (dB)	Conducted Average
UMTS B2	QPSK	9662	1932.4	N/A	35.50
		9800	1960.0	N/A	**35.89**
		9938	1987.6	N/A	35.80

8.3. LTE CONDUCTED OUTPUT POWER MEASUREMENT PROCEDURE

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

<table>
<tr><th colspan="2" rowspan="2">Modulation</th><th colspan="3">MPR (dB)</th></tr>
<tr><th>Edge RB allocations</th><th>Outer RB allocations</th><th>Inner RB allocations</th></tr>
<tr><td rowspan="6">DFT-s-OFDM</td><td>Pi/2 BPSK</td><td>≤ 3.5[1]</td><td>≤ 1.2[1]</td><td>≤ 0.2[1]</td></tr>
<tr><td>Pi/2 BPSK w Pi/2 BPSK DMRS</td><td colspan="2">≤ 0.5[2]</td><td>0[2]</td></tr>
<tr><td>Pi/2 BPSK w Pi/2 BPSK DMRS</td><td>≤ 0.5[2]</td><td colspan="2">0[2]</td></tr>
<tr><td>QPSK</td><td colspan="2">≤ 1</td><td>0</td></tr>
<tr><td>16 QAM</td><td colspan="2">≤ 2</td><td>≤ 1</td></tr>
<tr><td>64 QAM</td><td colspan="3">≤ 2.5</td></tr>
<tr><td>256 QAM</td><td colspan="3">≤ 4.5</td></tr>
<tr><td rowspan="4">CP-OFDM</td><td>QPSK</td><td colspan="2">≤ 3</td><td>≤ 1.5</td></tr>
<tr><td>16 QAM</td><td colspan="2">≤ 3</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td colspan="3">≤ 3.5</td></tr>
<tr><td>256 QAM</td><td colspan="3">≤ 6.5</td></tr>
<tr><td colspan="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.</td></tr>
</table>

Table 6.2.2.3-2: Maximum power reduction (MPR) for power class 2

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

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS 36.101 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	

The allowed A-MPR values specified below in Table 6.2.3.3.1-1 of 3GPP TS 38.521-1 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 6.2.3.3.1-1: Additional maximum power reduction (A-MPR)

Network signalling label	Requirements (subclause)	NR Band	Channel bandwidth (MHz)	Resources blocks (N_{RB})	A-MPR (dB)
NS_01		Table 5.2-1	5, 10, 15, 20, 25, 30, 40, 50, 60, 80, 90, 100	Table 5.3.2-1	N/A
NS_03	6.5.2.3.3.3	n2, n25, n66, n70, n86			Clause 6.2.3.3.7
NS_03U	6.5.2.3.3.3, 6.5.2.4.2.3	n2, n25, n66, n86			Clause 6.2.3.3.7
NS_04	6.5.2.3.3.2, 6.5.3.3.3.1	n41	10, 15, 20, 40, 50, 60, 80, 90, 100		Clause 6.2.3.3.2

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 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 connected to a power meter via wideband peak power sensor. Peak output power was read directly from power meter.

RESULTS

8.3.1. LTE BAND 2

Test Engineer ID:	39005	Test Date:	10/28/2022

OUTPUT POWER FOR LTE BAND 2 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				625	900	1175
				1932.5	1960.0	1987.5
5.0	QPSK	25	0	27.3	**27.4**	27.2

8.3.2. LTE BAND 4

Test Engineer ID:	39005	Test Date:	10/28/2022

OUTPUT POWER FOR LTE BAND 4 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1975	2175	2375
				2112.5	2132.5	2152.5
5.0	QPSK	25	0	**30.2**	30.1	30.0

8.3.3. LTE BAND 5

Test Engineer ID:	39005	Test Date:	10/28/2022

OUTPUT POWER FOR LTE BAND 5 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				2425	2525	2625
				871.5	881.5	891.5
5.0	QPSK	25	0	**30.7**	30.7	30.5

8.3.4. LTE BAND 12

Test Engineer ID:	39005	Test Date:	10/28/2022

OUTPUT POWER FOR LTE BAND 12 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				5035	5095	5155
				731.5	737.5	743.5
5.0	QPSK	25	0	32.7	**32.8**	32.6

8.3.5. LTE BAND 13

Test Engineer ID:	39005	Test Date:	11/17/2022

OUTPUT POWER FOR LTE BAND 13 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				5205	5230	5255
				748.5	751.0	753.5
5.0	QPSK	25	0	**32.8**	32.7	32.6

8.3.6. LTE BAND 14

Test Engineer ID:	39005	Test Date:	10/27/2022

OUTPUT POWER FOR LTE BAND 14 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				5305	5330	5355
				760.5	763.0	765.5
5.0	QPSK	25	0	27.9	**28.0**	27.9

8.3.7. LTE BAND 17

Test Engineer ID:	39005	Test Date:	10/27/2022

OUTPUT POWER FOR LTE BAND 14 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				5755	5790	5825
				736.5	740.0	743.5
5.0	QPSK	25	0	31.6	31.7	**31.8**

8.3.8. LTE BAND 25

Test Engineer ID:	39005	Test Date:	11/17/2022

OUTPUT POWER FOR LTE BAND 25 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				8065	8365	8665
				1932.5	1962.5	1992.5
5.0	QPSK	25	0	27.1	**27.4**	27.4

8.3.9. LTE BAND 26 (FCC Part 90S)

Test Engineer ID:	39005	Test Date:	11/17/2022

OUTPUT POWER FOR LTE BAND 26 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				8715	8740	8765
				861.5	864.0	866.5
5.0	QPSK	25	0	27.4	27.5	**27.7**

8.3.10. LTE BAND 26 (FCC Part 22)

Test Engineer ID:	39005	Test Date:	11/17/2022

OUTPUT POWER FOR LTE BAND 26 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				8815	8915	9015
				871.5	881.5	891.5
5.0	QPSK	25	0	32.4	**32.7**	32.6

8.3.11. LTE BAND 66

Test Engineer ID:	39005	Test Date:	11/17/2022

OUTPUT POWER FOR LTE BAND 66 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				66461	66886	67111
				2112.5	2155.0	2177.5
5.0	QPSK	25	0	24.1	24.2	**24.8**

8.3.12. LTE BAND 71

Test Engineer ID:	39005	Test Date:	11/17/2022

OUTPUT POWER FOR LTE BAND 71 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				68611	68761	68911
				619.5	634.5	649.5
5.0	QPSK	25	0	31.6	31.7	**31.8**

8.3.13. 5G NR n71

Test Engineer ID:	39005	Test Date:	11/17/2022

OUTPUT POWER FOR 5G NR n71 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				68693	68753	68824
				627.7	633.7	640.8
20.0	QPSK	100	0	27.9	**28.3**	28.1

9. CONDUCTED TEST RESULTS

9.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only.

TEST PROCEDURE

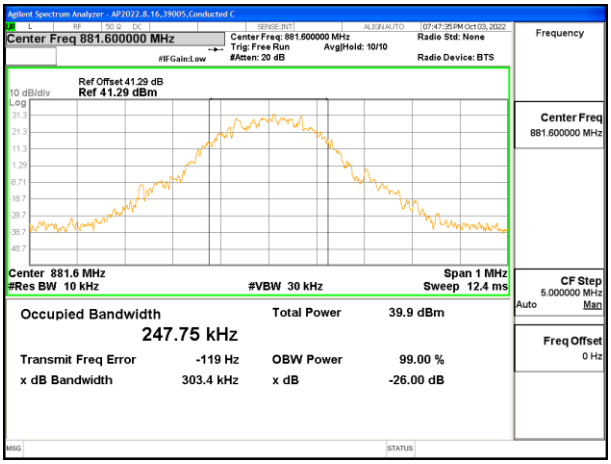
The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the middle channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

RESULTS

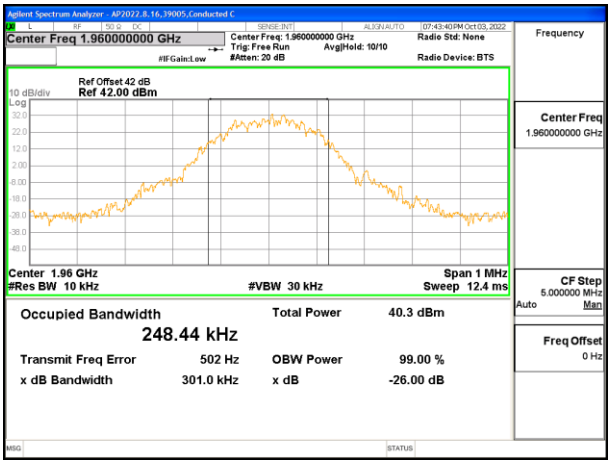
There is no limit required and power is the same for low, middle and high channel; therefore, only middle channel was tested.

Band	Modulation	Channel	f(MHz)	99% BW (kHz)	-26dB BW (kHz)
GSM850	GPRS	190	881.6	247.75	303.4
GSM1900	GPRS	661	1960	248.44	301.0
Band	**Modulation**	**Channel**	**f(MHz)**	**99% BW (MHz)**	**-26dB BW (MHz)**
UMTS BAND 5	QPSK	4408	881.6	4.1748	4.584
UMTS BAND 2	QPSK	9800	1960	4.1826	4.595
UMTS BAND 4	QPSK	1638	2132.6	4.1806	4.593

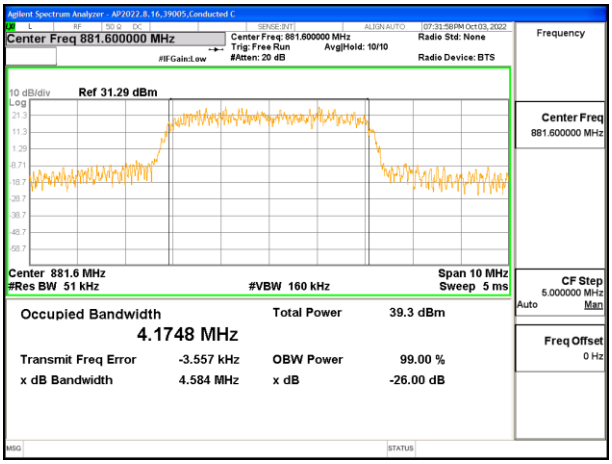
Band	Mode	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 2	5MHz, QPSK	1960	4.4198	4.790
LTE BAND 4		2132.5	4.4343	4.742
LTE BAND 5		881.5	4.4367	4.677
LTE BAND 12		737.5	4.4818	4.738
LTE BAND 13		751	4.4353	4.732
LTE BAND 14		763	4.4653	4.807
LTE BAND 17		740	4.4264	4.675
LTE BAND 25		1962.5	4.4720	4.780
LTE BAND 26 (FCC Part 90S)		864	4.4426	4.673
LTE BAND 26 (FCC Part 22)		881.5	4.4709	4.687
LTE BAND 66		2155	4.4871	4.722
LTE BAND 71		634.5	4.4681	4.656
5G NR n71	20MHz, QPSK	633.7	18.838	19.63



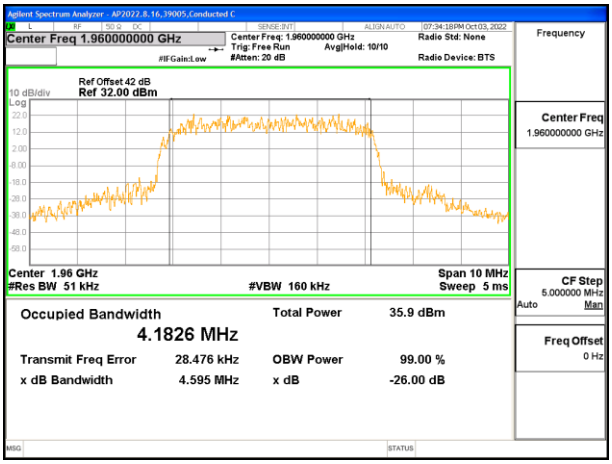
GSM 850 GPRS Middle Channel



GSM 1900 GPRS Middle Channel



UMTS Band 5 QPSK Middle Channel



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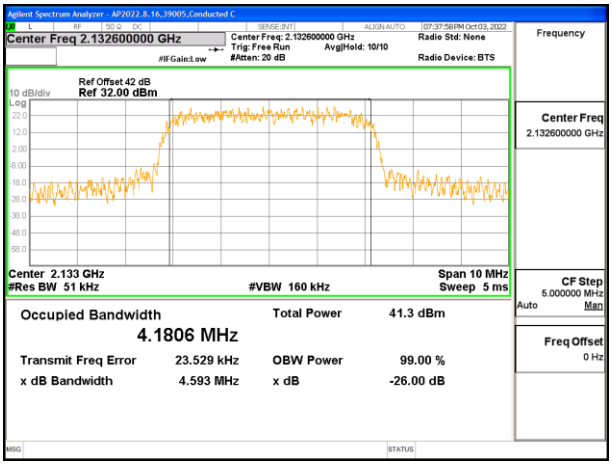
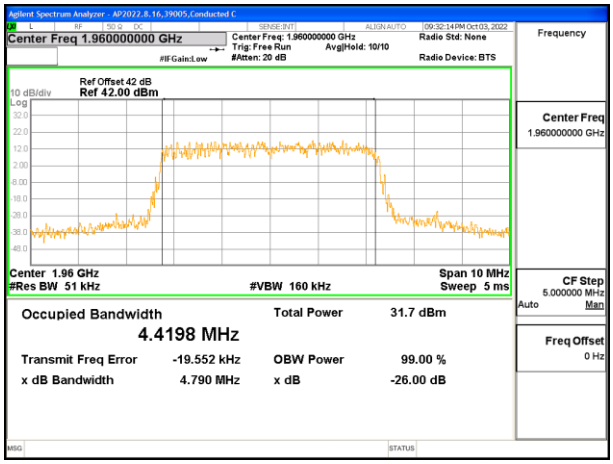
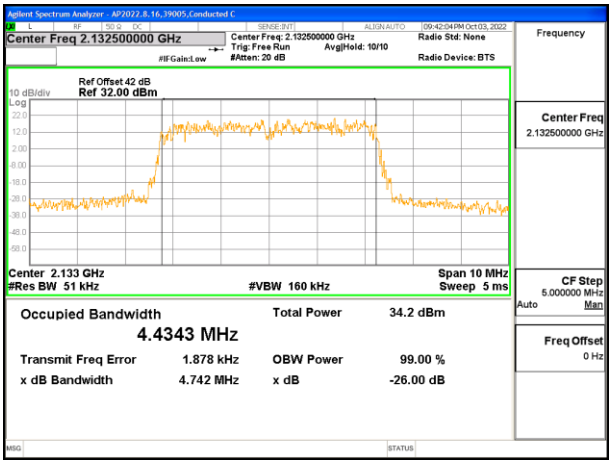


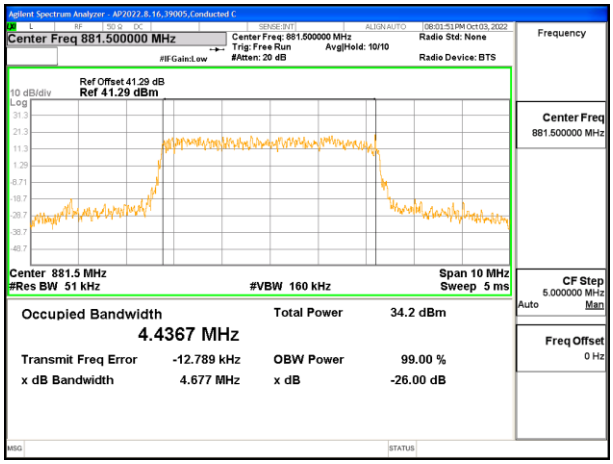
UMTS Band 4 QPSK Middle Channel



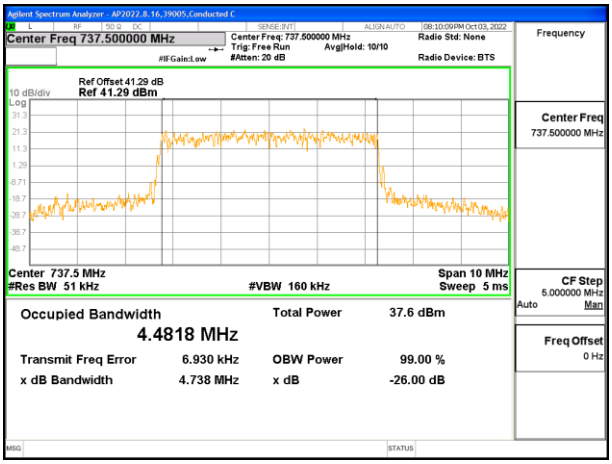
LTE B2 5MHz QPSK Middle Channel



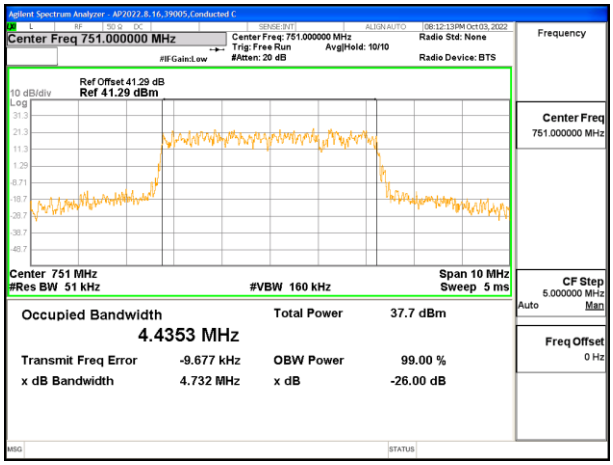
LTE B4 5MHz QPSK Middle Channel



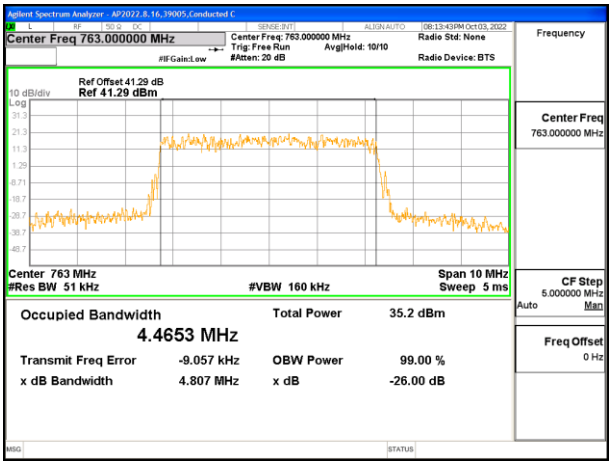
LTE B5 5MHz QPSK Middle Channel



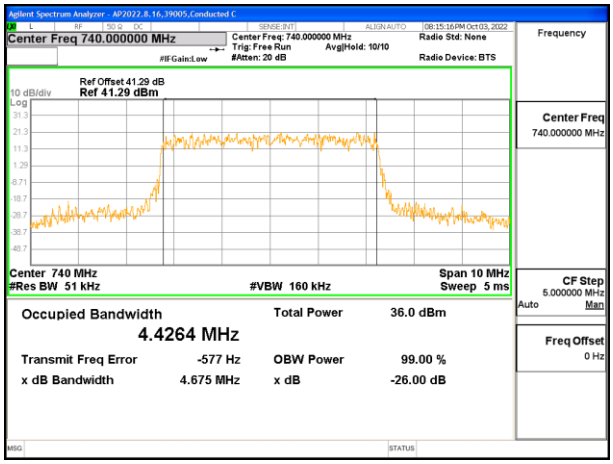
LTE B12 5MHz QPSK Middle Channel



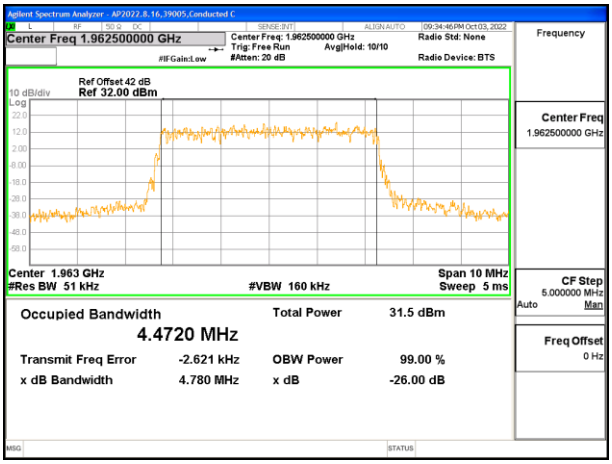
LTE B13 5MHz QPSK Middle Channel



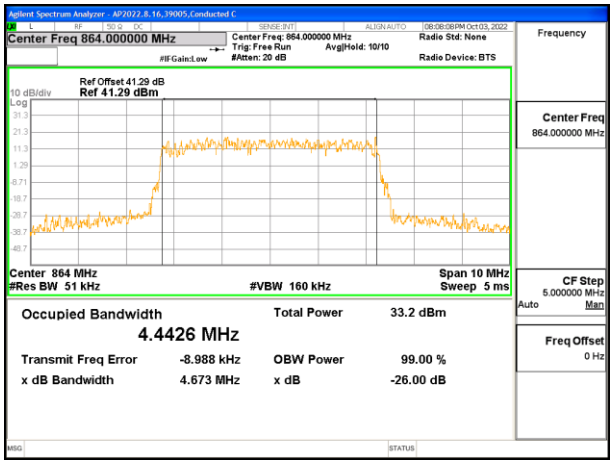
LTE B14 5MHz QPSK Middle Channel



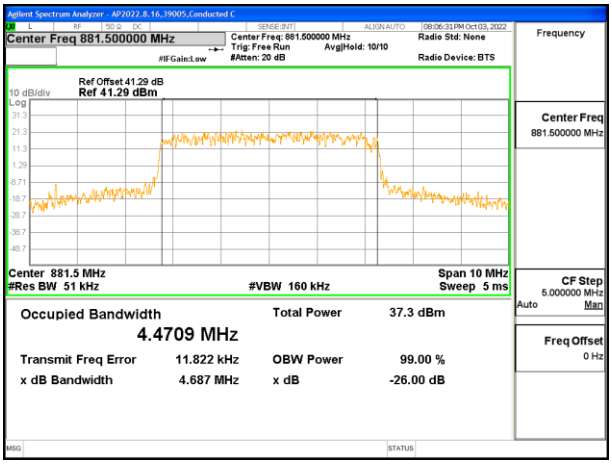
LTE B17 5MHz QPSK Middle Channel



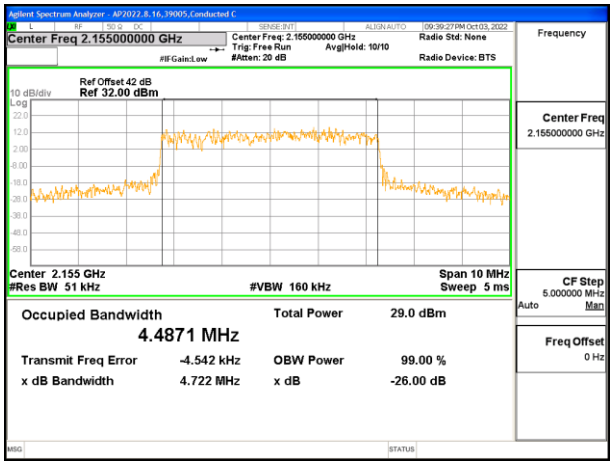
LTE B25 5MHz QPSK Middle Channel



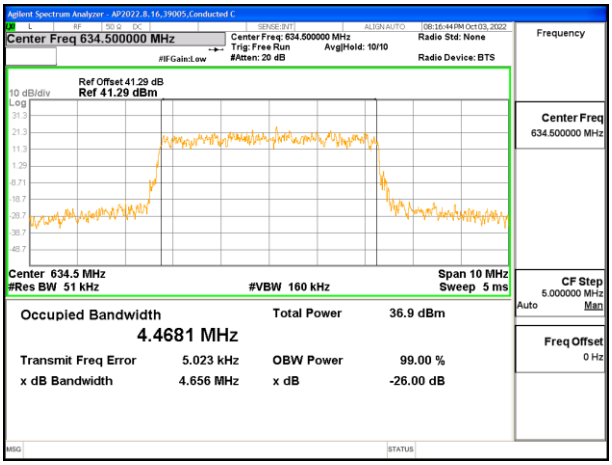
LTE B26 5MHz QPSK Middle Channel (FCC Part 90S)



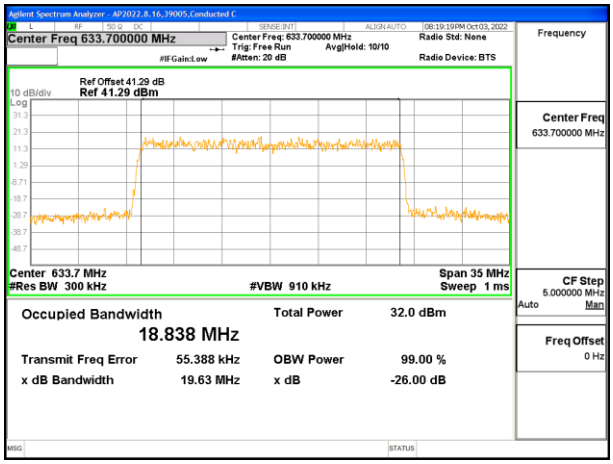
LTE B26 5MHz QPSK Middle Channel (FCC Part 22)



LTE B66 5MHz QPSK Middle Channel



LTE B71 5MHz QPSK Middle Channel



5G NR n71 QPSK Middle Channel

9.2. BAND EDGE/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.

RULE PART(S)

FCC: 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (g), 27.53 (c) (f), 90.543 (e)(f), 90.691 (a)

TEST PROCEDURE

The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

1. Set the spectrum analyzer span to include the block edge frequency.
2. Set a marker to point the corresponding band edge frequency in each test case.
3. Set display line at -13, -20, -25, -40, -42, -45, and -46dBm
4. Set resolution bandwidth to at least 1% of emission bandwidth.

TEST PROCEDURE (FCC LTE BAND 14)

(b)ACP measurement procedure. The following are the procedures for making the transmitter ACP measurements. For all measurements modulate the transmitter as it would be modulated in normal operating conditions. For time division multiple access (TDMA) systems, the measurements are to be made under TDMA operation only during time slots when the transmitter is active. All measurements are made at the transmitter's output port. If a transmitter has an integral antenna, a suitable power coupling device shall be used to couple the RF signal to the measurement instrument. The coupling device shall substantially maintain the proper transmitter load impedance. The ACP measurements may be made with a spectrum analyzer capable of making direct ACP measurements. “Measurement bandwidth”, as used for non-swept measurements, implies an instrument that measures the power in many narrow bandwidths equal to the nominal resolution bandwidth and integrates these powers to determine the total power in the specified measurement bandwidth.

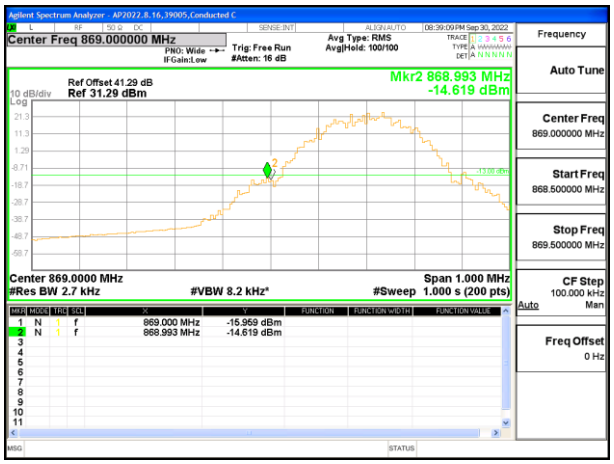
(1)Setting reference level. Set transmitter to maximum output power. Using a spectrum analyzer capable of ACP measurements, set the measurement bandwidth to the channel size. For example, for a 6.25 kHz transmitter set the measurement bandwidth to 6.25 kHz. Set the frequency offset of the measurement bandwidth to zero and adjust the center frequency of the instrument to the assigned center frequency to measure the average power level of the transmitter. Record this power level in dBm as the “reference power level.”

(2)Non-swept power measurement. Using a spectrum analyzer capable of ACP measurements, set the measurement bandwidth and frequency offset from the assigned center frequency as shown in the tables in §90.543 (a) above. Any value of resolution bandwidth may be used as long as it does not exceed 2 percent of the specified measurement bandwidth. Measure the power level in dBm. These measurements should be made at maximum power. Calculate ACP by subtracting the reference power level measured in (b)(1) from the measurements made in this step. The absolute value of the calculated ACP must be greater than or equal to the absolute value of the ACP given in the table for each condition above.

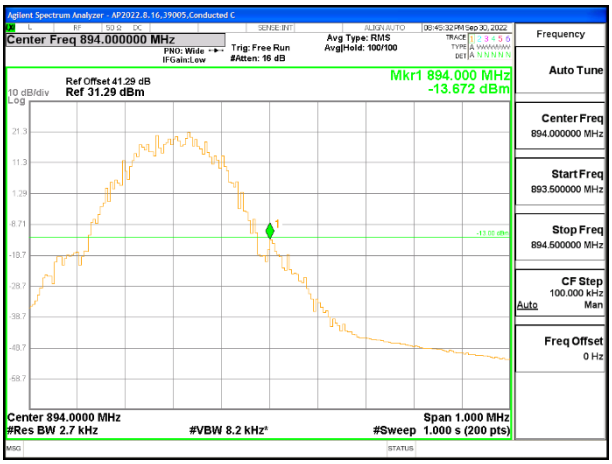
(3)Swept power measurement. Set a spectrum analyzer to 30 kHz resolution bandwidth, 1 MHz video bandwidth and average, sample, or RMS detection. Set the reference level of the spectrum analyzer to the RMS value of the transmitter power. Sweep above and below the carrier frequency to the limits defined in the tables. Calculate ACP by subtracting the reference power level measured in (b)(1) from the measurements made in this step. The absolute value of the calculated ACP must be greater than or equal to the absolute value of the ACP given in the table for each condition above.

RESULTS

9.2.1. GSM 850



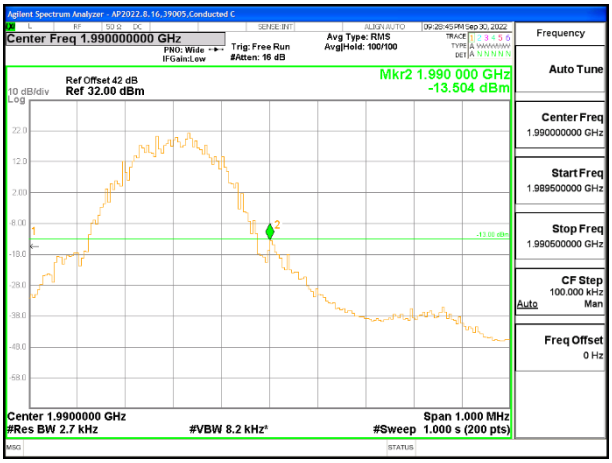
GSM 850 GPRS Low Channel



GSM 850 GPRS High Channel

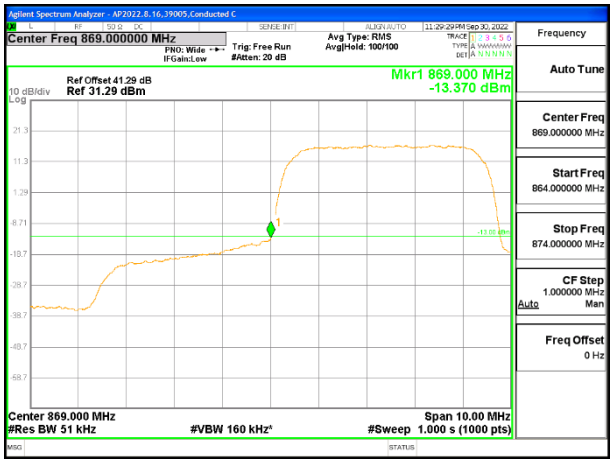
9.2.2. GSM 1900

GSM 1900 GPRS Low Channel

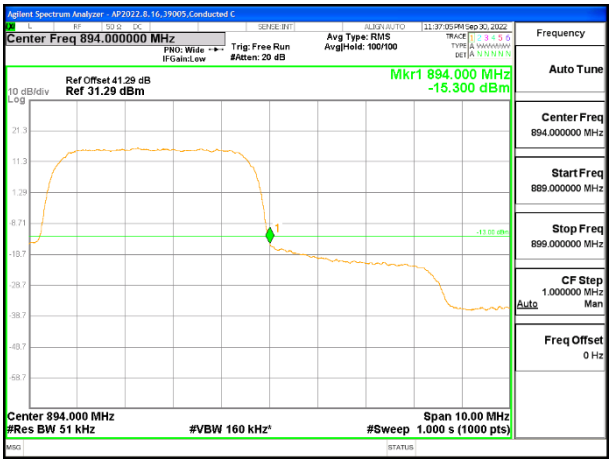


GSM 1900 GPRS High Channel

9.2.3. UMTS BAND 5

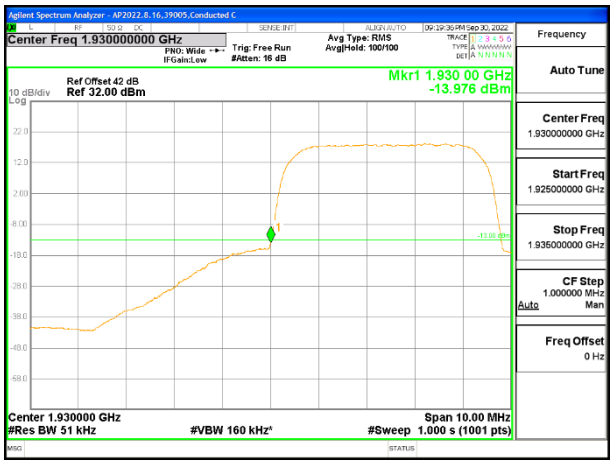


UMTS Band 5 QPSK Low Channel

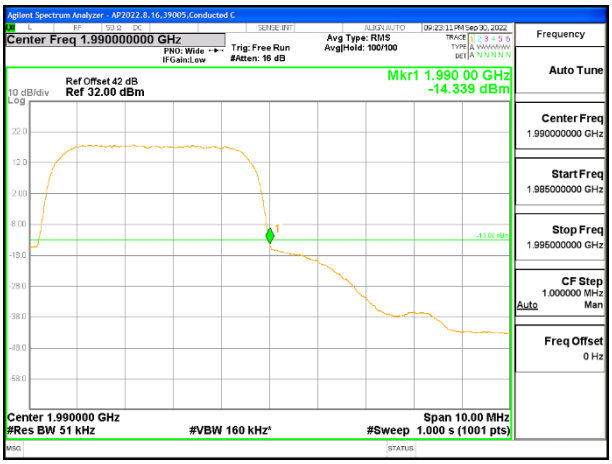


UMTS Band 5 QPSK High Channel

9.2.4. UMTS BAND 2

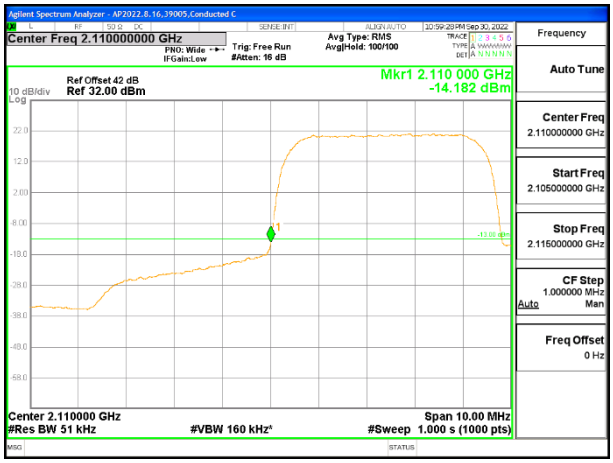


UMTS Band 2 QPSK Low Channel

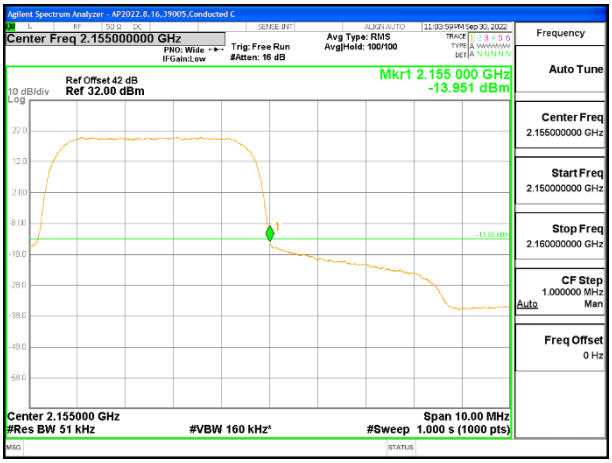


UMTS Band 2 QPSK High Channel

9.2.5. UMTS BAND 4



UMTS Band 4 QPSK Low Channel



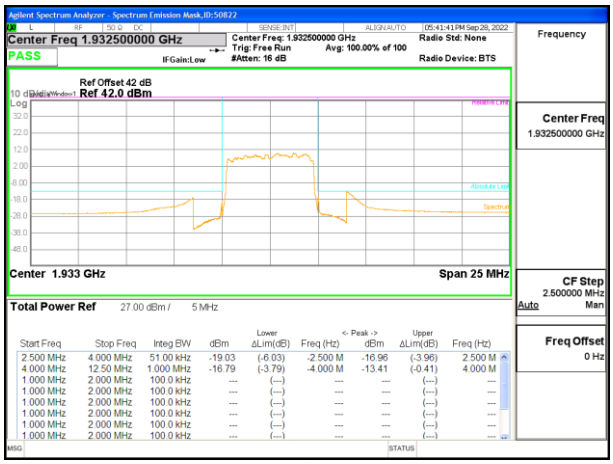
UMTS Band 4 QPSK High Channel

9.2.6. LTE BAND 2 EMISSION MASK

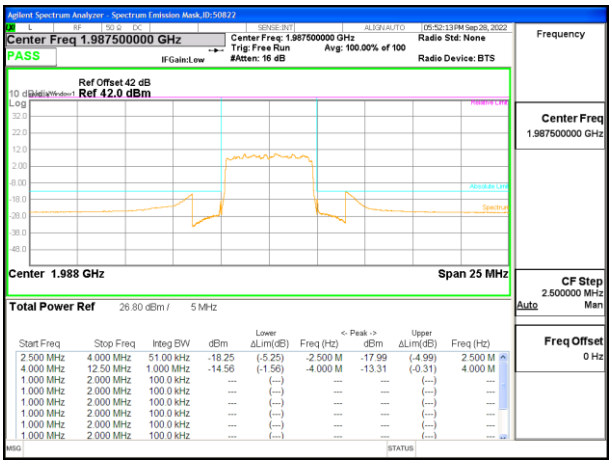
LIMITS

FCC: §24.238 (a)
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

LTE BAND 2 BANDEDGE



LTE B2 5MHz QPSK Low Channel



LTE B2 5MHz QPSK High Channel

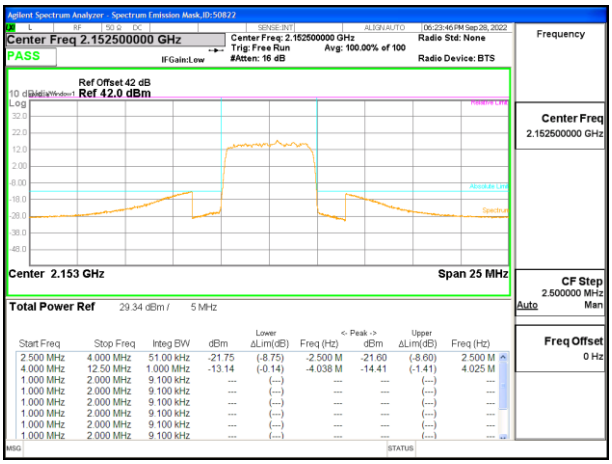
9.2.7. LTE BAND 4 EMISSION MASK

LIMITS

FCC: §27.53(h)
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

LTE BAND 4 BANDEGE

LTE B4 5MHz QPSK Low Channel



LTE B4 5MHz QPSK High Channel

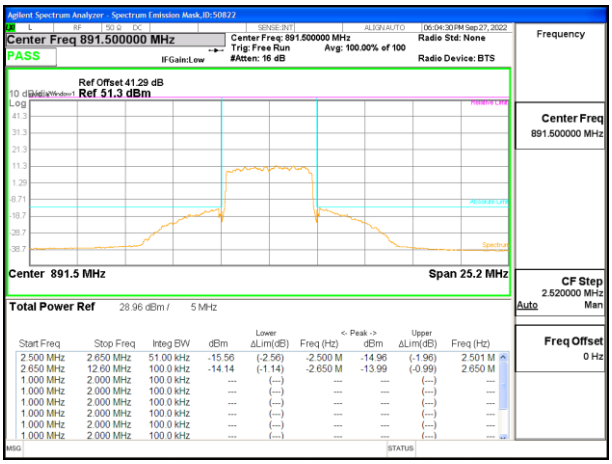
9.2.8. LTE BAND 5 EMISSION MASK

LIMITS

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

LTE BAND 5 EMISSION MASK

LTE B5 5MHz QPSK Low Channel



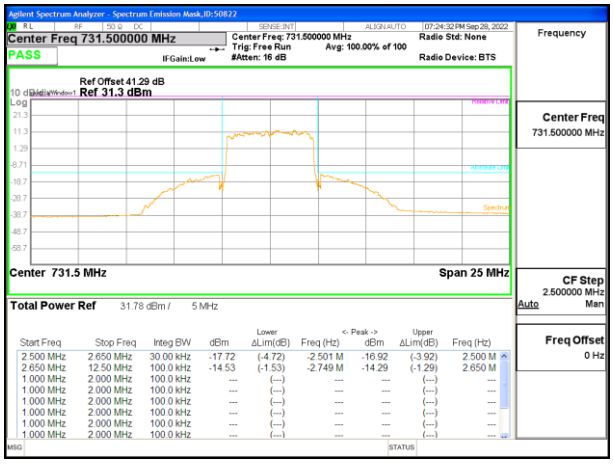
LTE B5 5MHz QPSK High Channel

9.2.9. LTE BAND 12 EMISSION MASK

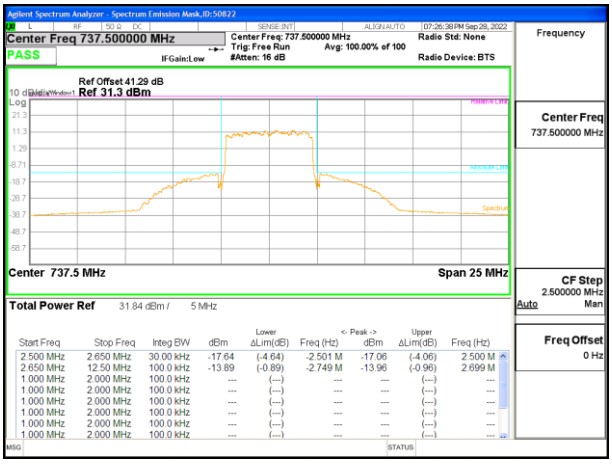
LIMITS

FCC: §27.53
(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

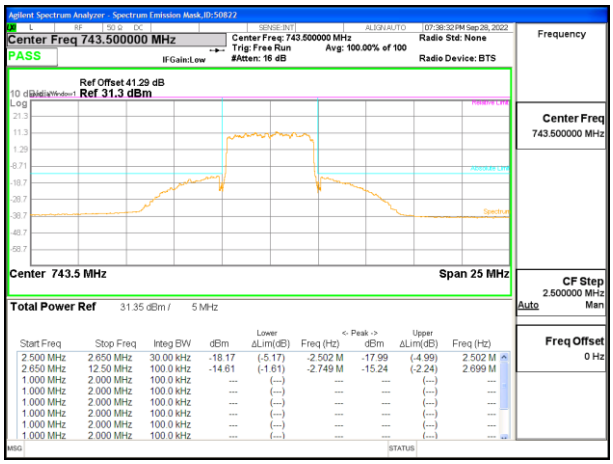
LTE BAND 12 EMISSION MASK



LTE B12 5MHz QPSK Low Channel



LTE B12 5MHz QPSK Middle Channel



LTE B12 5MHz QPSK High Channel

9.2.10. LTE BAND 13 EMISSION MASK

LIMITS

FCC: §27.53
(c)For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

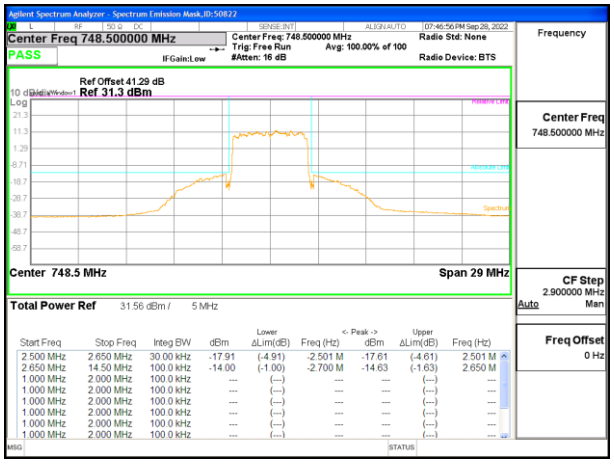
(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;

(5) Compliance with the provisions of paragraphs (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

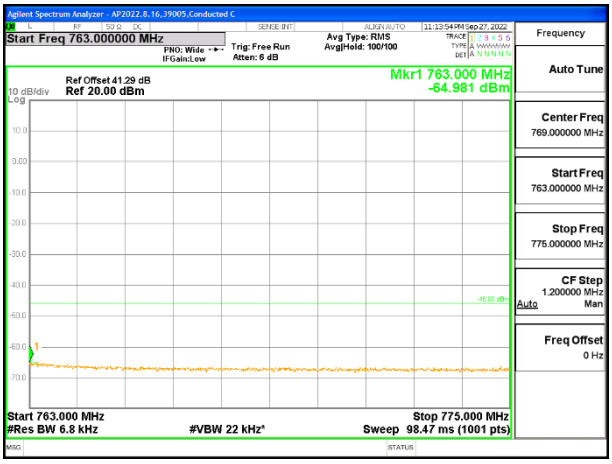
(6) Compliance with the provisions of paragraphs (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(f) or operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals. (-70 dBW/MHz = -40dBm/MHz).

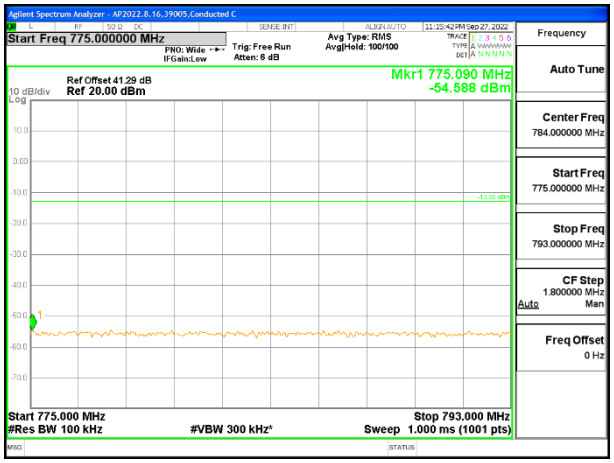
LTE BAND 13 EMISSION MASK



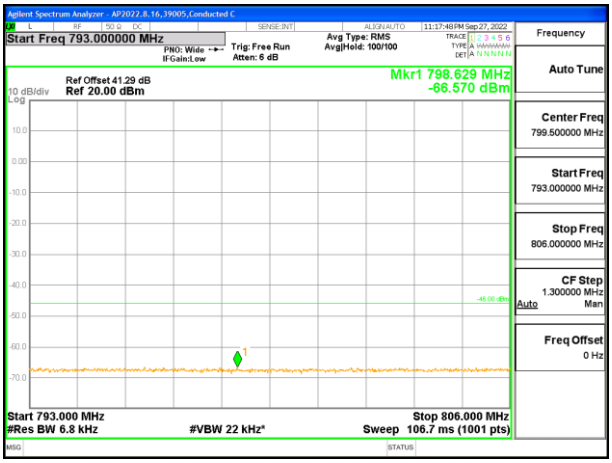
LTE B13 5MHz QPSK Low Channel



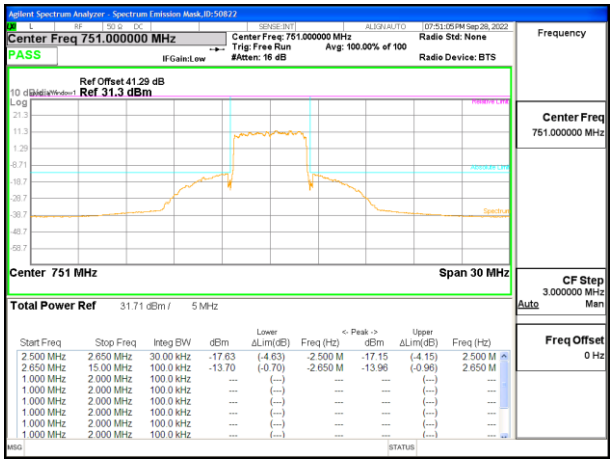
Second segment 763MHz-775MHz



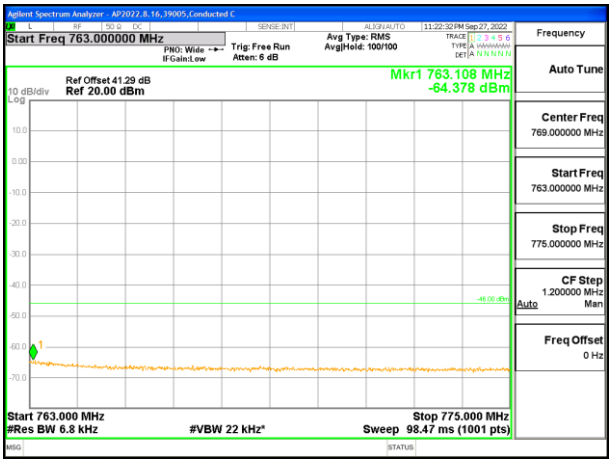
Third segment 775MHz-793MHz



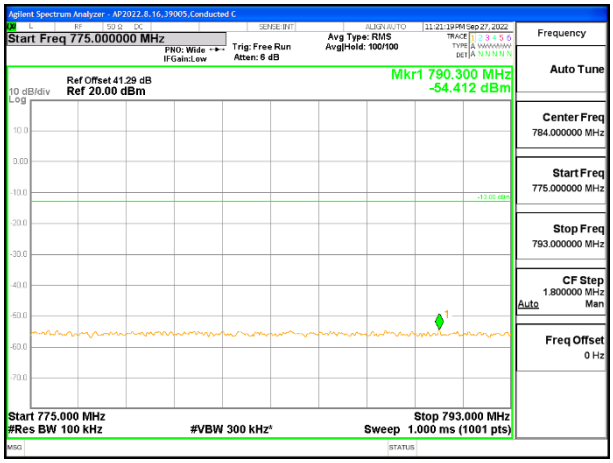
Fourth segment 793MHz-806MHz



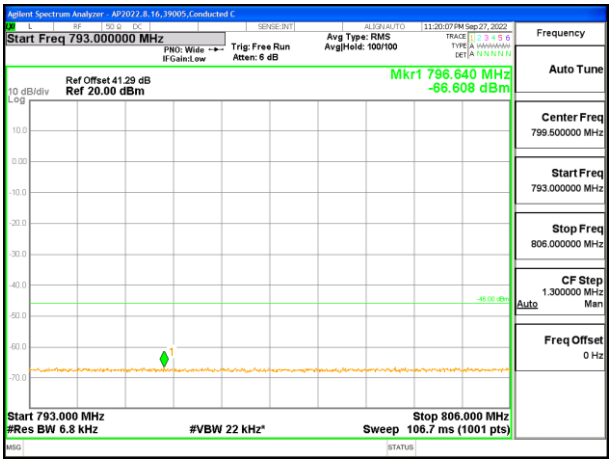
LTE B13 5MHz QPSK Middle Channel



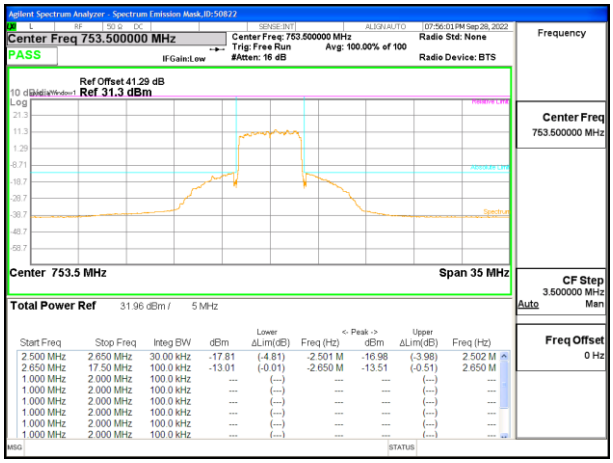
Second segment 763MHz-775MHz



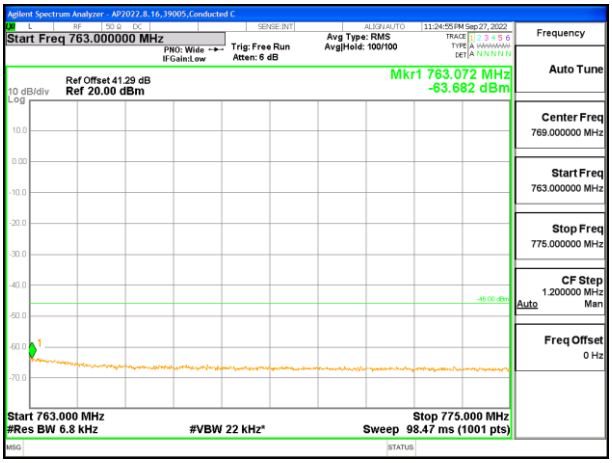
Third segment 775MHz-793MHz



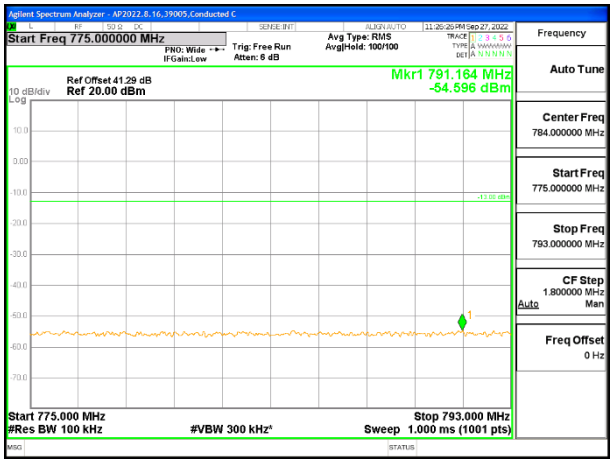
Fourth segment 793MHz-806MHz



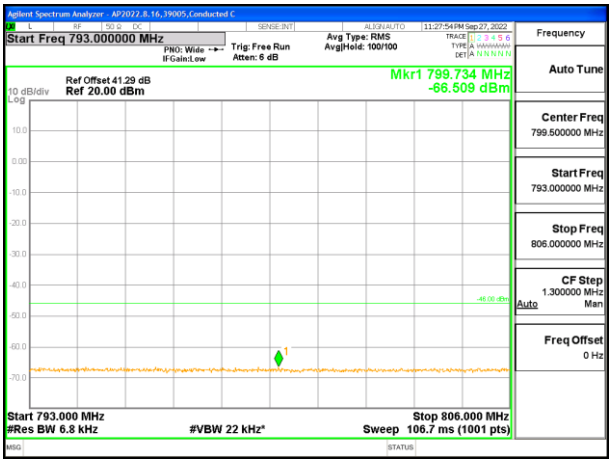
LTE B13 5MHz QPSK High Channel



Second segment 763MHz-775MHz



Third segment 775MHz-793MHz



Fourth segment 793MHz-806MHz

9.2.11. LTE BAND 14 EMISSION MASK

LIMITS

FCC: §90.543 Emission Limitations.
(e) For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

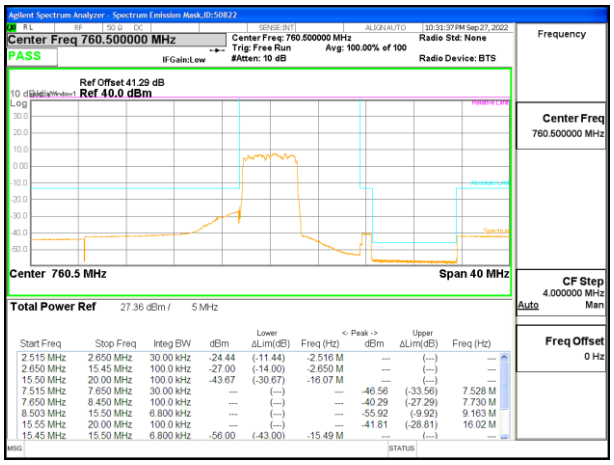
(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

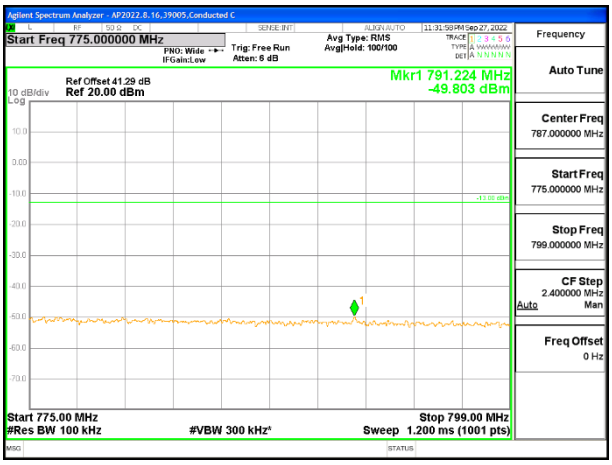
(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

(f) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

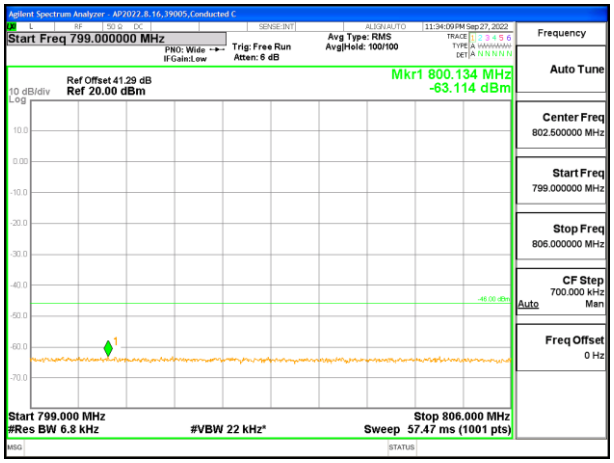
LTE BAND 14 EMISSION MASK



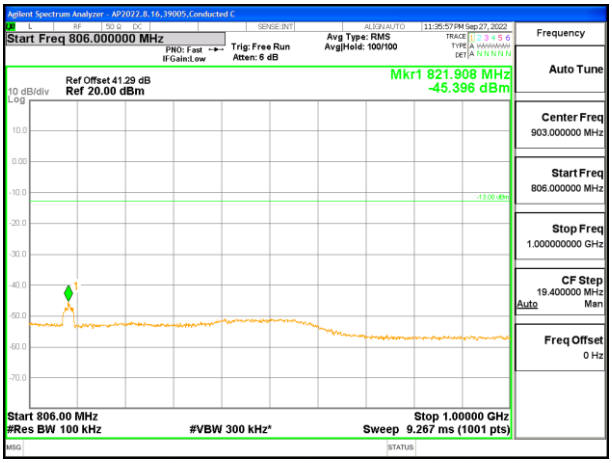
LTE B14 5MHz QPS Low Channel



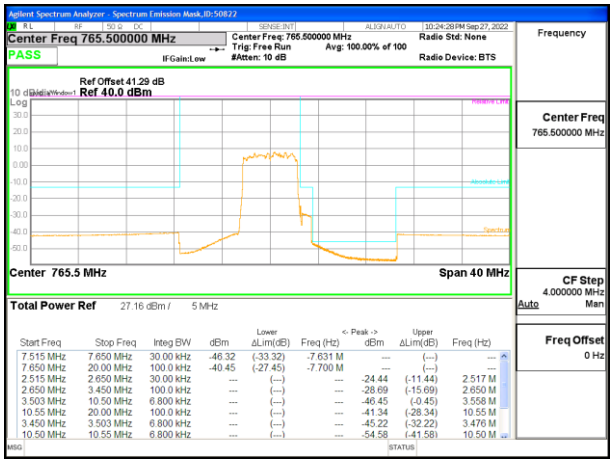
Second segment 775MHz-799MHz



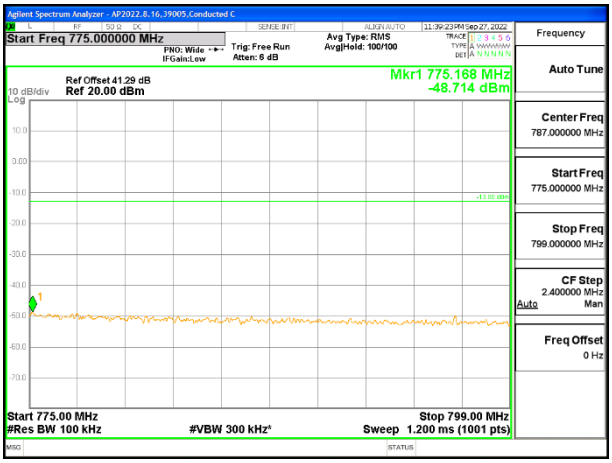
Third segment 799MHz-806MHz



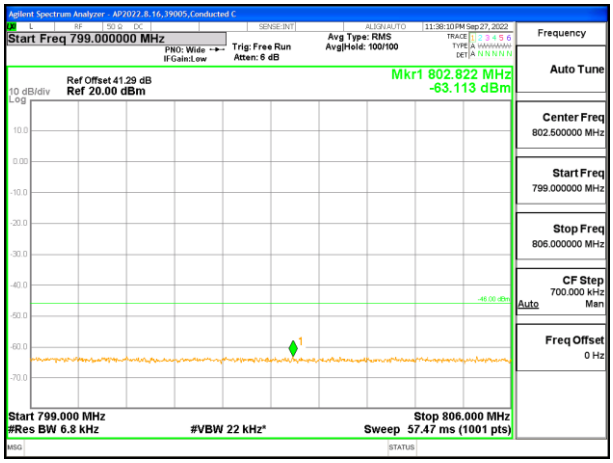
Fourth segment 806MHz-1GHz



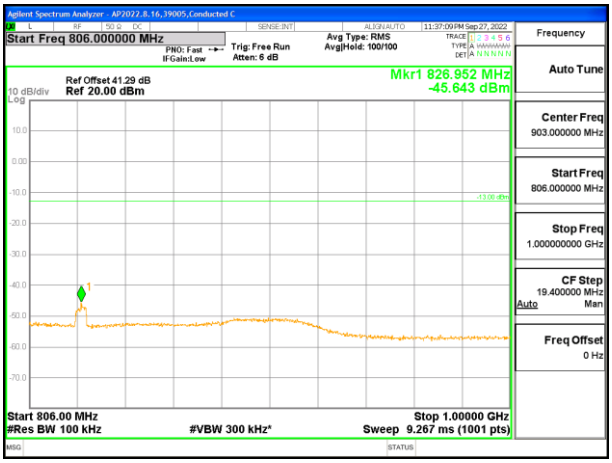
LTE B14 5MHz QPSK High Channel



Second segment 775MHz-799MHz



Third segment 799MHz-806MHz



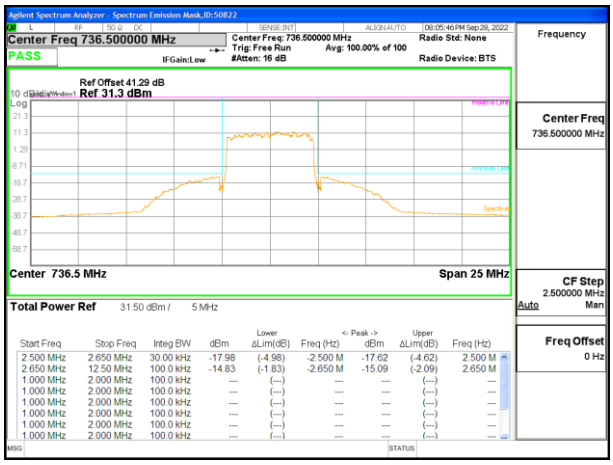
Fourth segment 806MHz-1GHz

9.2.12. LTE BAND 17 EMISSION MASK

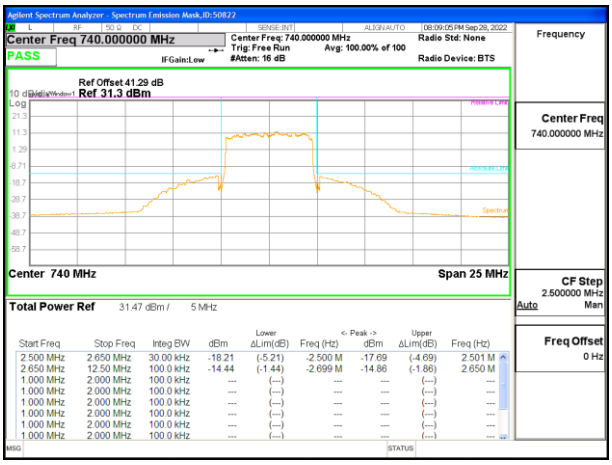
LIMITS

FCC: §27.53
(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

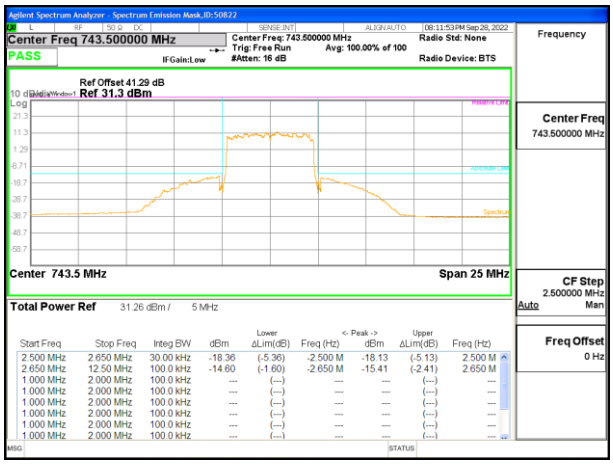
LTE BAND 17 EMISSION MASK



LTE B17 5MHz QPSK Low Channel



LTE B17 5MHz QPSK Middle Channel



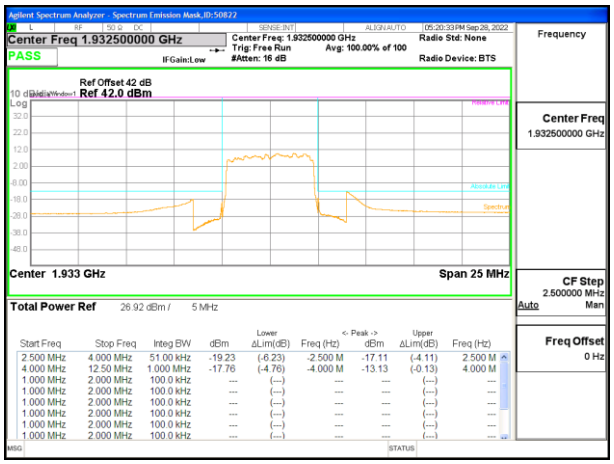
LTE B17 5MHz QPSK High Channel

9.2.13. LTE BAND 25 EMISSION MASK

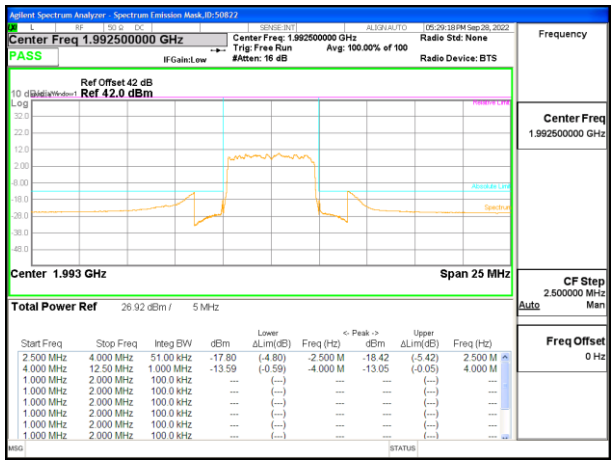
LIMITS

FCC: §24.238 (a)
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

LTE BAND 25 BANDEDGE



LTE B25 5MHz QPSK Low Channel



LTE B25 5MHz QPSK High Channel

9.2.14. LTE BAND 26 EMISSION MASK (FCC PART 90S)

LIMITS

FCC: §90.691 Emission mask requirements for EA-based systems.
(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

LTE BAND 26 EMISSION MASK

LTE B26 5MHz QPSK Low Channel

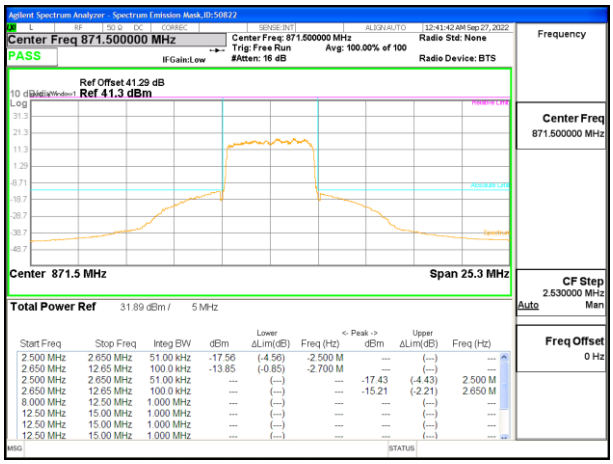
LTE B26 5MHz QPSK High Channel

9.2.15. LTE BAND 26 EMISSION MASK (FCC PART 22)

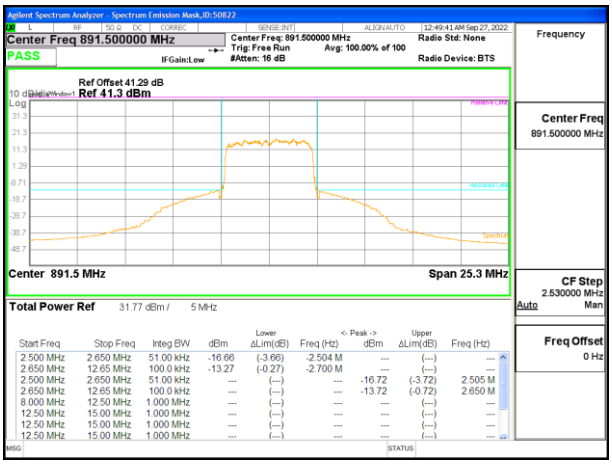
LIMITS

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

LTE BAND 26 EMISSION MASK



LTE B26 5MHz QPSK Low Channel



LTE B26 5MHz QPSK High Channel