TEST REPORT

Report Number: R14176139-E1V3

Applicant	:	Sony Corporation 1-7-1 Konan Minato-ku Tokyo, 108-0076, Japan
FCC ID	:	PY7-83262V
EUT Description	:	GSM/WCDMA/LTE PHONE WITH BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT & NFC
Test Standard(s)	:	FCC CFR47 PART Part 22, Part 24, Part 27

Date Of Issue:
2022-03-29

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

CERT #0751.06

CERT #0751.05

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2022-03-16	Initial Review	Noah Bennett
V2	2022-03-22	Revised Software revisions in section 6.3	Brian Kiewra
V3	2022-03-29	Revised TCB Feedback: -Fixed Typo in section 6.2 -Fixed 99% BW Typo for B5 in section 6.2 -Removed LTE 17 Power as it is covered by LTE B12. -Removed RSS references from power tables -Added Client antenna table to section 6.4 -Corrected Typo from section 9.4.6	Noah Bennett

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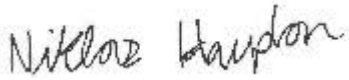
1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	Sony Corporation 1-7-1 Konan Minato-ku Tokyo, 108-0076, Japan
FCC ID	PY7-83262V
EUT Description	GSM/WCDMA/LTE PHONE WITH BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT & NFC
Serial Number	QV770017B8, QV7700BUB8, QV770014B8
Sample Receipt Date	2022-01-13
Date Tested	2022-01-21 to 2022-03-15
Applicable Standards	FCC CFR47 PART Part 22, Part 24, Part 27
Test Results	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 By:	Reviewed By:	Prepared By:
		
Dan Coronia Operations Leader UL Verification Services Inc.	Niklas Haydon Operations Leader UL LLC.	Noah Bennett Engineer UL LLC.

2. SUMMARY OF TEST RESULTS

This report contains data provided by the customer which can impact the validity of results. UL LLC 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
Effective Radiated Power	LTE 5,GSM 850,WCDMA 5	22.913 (a)(5)	Pass	None
	LTE 12	27.50 (c) (10)		
	LTE 13	27.50 (b) (10)		
	LTE 17	27.50 (c) (10)		
Equivalent Isotropic Radiated Power	LTE 4	27.50 (d) (4)		
	LTE 41	27.50 (h) (2)		
	GSM 1900	24.232 (c)		

Requirement Description	Requirement Clause Number (FCC)	Result	Remarks
Occupied Bandwidth	2.1049	Pass	None
Band Edge and Emission Mask	2.1051, 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (m)(4) & (m) (6), 96.41(e) , 27.53 (g), 27.53 (c) (f), 27.53(a), 27.53(l)	Pass	None
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)	Pass	None
Frequency Stability	2.1055, 22.355, 24.235, 27.54	Pass	None
Peak-to-Average Ratio	22.913 (d), 24.232 (d), 27.50 (d) (5), 27.50 (j) (4)	Pass	None
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),	Pass	None

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, certification # 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below. All testing with the exception of RF Conducted Output Power was performed at the below site.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
☒	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A		27265	

UL Verification Services Inc. is accredited by A2LA, Certificate Number #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below. RF Conducted Output Power was the only test performed at the below site.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building 1: 47173 Benicia Street Fremont, CA 94538, U.S.A	US0104	2324A	208313
☒	Building 2: 47266 Benicia Street Fremont, CA 94538, U.S.A	US0104	22541	208313
☒	Building 4: 47658 Kato Rd Fremont, CA 94538, U.S.A	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)	141.2 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

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 GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT & NFC. This report covers GSM/WCDMA/LTE.

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)	ERP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
824.2-848.8	GPRS	32.8	-2.80	7.0	27.85	0.610	240.2	240KGXW
	EGPRS	27.1			22.15	0.164	247.1	247KG7W
Part 24 1900MHz								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
1850.2-1909.8	GPRS	27.4	-2.30	2.0	25.10	0.324	239.8	240KGXW
	EGPRS	26.6			24.30	0.269	244.1	244KG7W

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	21.7	-2.80	7.0	16.75	0.047	4133	4M13F9W
	HSDPA	20.9			15.95	0.039	4161	4M16F9W

LTE BAND 4

Part 27	
EIRP Limit (W)	1.00
Antenna Gain (dBi)	-2.80

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	1754.3	19.7	16.90	0.049	1090	1M09G7W
	16QAM			20.0	17.20	0.052	1090	1M09D7W
3.0	QPSK	1711.5	1753.5	19.7	16.90	0.049	2690	2M69G7W
	16QAM			20.0	17.20	0.052	2690	2M69D7W
5.0	QPSK	1712.5	1752.5	19.8	17.00	0.050	4500	4M50G7W
	16QAM			20.0	17.20	0.052	4510	4M51D7W
10.0	QPSK	1715.0	1750.0	19.7	16.90	0.049	8950	8M95G7W
	16QAM			20.0	17.20	0.052	8970	8M97D7W
15.0	QPSK	1717.5	1747.5	19.6	16.80	0.048	13420	13M4G7W
	16QAM			19.9	17.10	0.051	13460	13M5D7W
20.0	QPSK	1720.0	1745.0	19.6	16.80	0.048	17920	17M9G7W
	16QAM			20.0	17.20	0.052	17880	17M9D7W

LTE BAND 5

Part 22H	
ERP Limit (W)	7.00
Antenna Gain (dBi)	-2.80

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	21.6	16.65	0.046	1090	1M09G7W
	16QAM			21.9	16.95	0.050	1090	1M09D7W
3.0	QPSK	825.5	847.5	21.6	16.65	0.046	2690	2M69G7W
	16QAM			21.9	16.95	0.050	2690	2M69D7W
5.0	QPSK	826.5	846.5	21.7	16.75	0.047	4500	4M50G7W
	16QAM			22.0	17.05	0.051	4500	4M50D7W
10.0	QPSK	829.0	844.0	21.6	16.65	0.046	8960	8M96G7W
	16QAM			22.0	17.05	0.051	8940	8M94D7W

LTE BAND 12

Part 27	
ERP Limit (W)	3.00
Antenna Gain (dBi)	-9.30

Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	699.7	715.3	21.4	9.95	0.010	1090	1M09G7W
	16QAM			21.8	10.35	0.011	1090	1M09D7W
3.0	QPSK	700.5	714.5	21.4	9.95	0.010	2690	2M69G7W
	16QAM			21.7	10.25	0.011	2690	2M69D7W
5.0	QPSK	701.5	713.5	21.4	9.95	0.010	4490	4M49G7W
	16QAM			21.9	10.45	0.011	4500	4M50D7W
10.0	QPSK	704.0	711.0	21.7	10.25	0.011	8940	8M94G7W
	16QAM			21.4	9.95	0.010	8950	8M95D7W

LTE BAND 13

Part 27	
ERP Limit (W)	3.00
Antenna Gain (dBi)	-3.60

Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	779.5	784.5	21.6	15.85	0.038	4500	4M50G7W
	16QAM			22.0	16.25	0.042	4500	4M50D7W
10.0	QPSK	782.0	782.0	21.5	15.75	0.038	8930	8M93G7W
	16QAM			21.9	16.15	0.041	8960	8M96D7W

LTE BAND 41

Part 27	
EIRP Limit (W)	2.00
Antenna Gain (dBi)	-6.90

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	19.7	12.80	0.019	4500	4M50G7W
	16QAM			19.8	12.90	0.019	4510	4M51D7W
10.0	QPSK	2501.0	2685.0	19.7	12.80	0.019	8940	8M94G7W
	16QAM			19.7	12.80	0.019	8960	8M96D7W
15.0	QPSK	2503.5	2682.5	19.6	12.70	0.019	13400	13M4G7W
	16QAM			19.6	12.70	0.019	13440	13M4D7W
20.0	QPSK	2506.0	2680.0	19.6	12.70	0.019	17830	17M8G7W
	16QAM			19.9	13.00	0.020	17900	17M9D7W

6.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 0.363 and 0.428.

6.4. MAXIMUM ANTENNA GAIN

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

Antenna	Support bands	Frequency range (MHz)	Peak gain (dBi)
Main Antenna 1	GSM850, WCDMA B5, LTE B5	824 -849	-2.8
Main Antenna 1	LTE B12, B17	699-716	-9.3
Main Antenna 1	LTE B13	777-787	-3.6
Main Antenna 2	GSM1900	1850-1910	-2.3
Main Antenna 2	LTE B4	1710-1755	-2.8
Main Antenna 2	LTE B41	2496-2690	-6.9

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports LTE Bands of:
Band 4, Band 5, Band 7, Band 12, Band 13, Band 17, and Band 41.

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

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 worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on QPSK, 16QAM and 64QAM modulations. It was found that QPSK and 16QAM results were worst case. All testing was performed using QPSK and 16QAM modulations to represent the worst case. All Conduced Spurious emissions testing was done with the EUT set to RB1-0.

The EUT was investigated in three orthogonal orientations X/Y/Z for both below and above 1GHz. Below 1GHz, it was determined that (X) orientation was the worst-case orientation. For Above 1GHz, it was determined that X orientation was the worst-case orientation. For Radiated measurements the EUT was tested with the AC/DC adaptor and headphones connected as this represents a worst-case mode of operation.

The worst-case scenario for below 1GHz and above 18GHz measurements are as followed:

- GSM GPRS
- WCDMA REL 99
- LTE QPSK

Simultaneous transmission worst case modes selected are as follows:

- LTE Band 4, 20300, 1745MHz, 20MHz, 1RB and 2442MHz 11ax HE20 26T/8 C0/C1 and 5240MHz C0/C1 HE20 26T/0
- LTE Band 4, 20300, 1745MHz, 20MHz, 1RB and 2442MHz 11ax HE20 106T/R54 C0/C1
- LTE Band 4, 20300, 1745MHz, 20MHz, 1RB and 5240MHz 11ax HE20 26T/0 C0/C1
- LTE Band 12, 23060, 704MHz, 10MHz, 1RB and 2462MHz 106T/R54 C0/C1

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	HP	14-dk1003dx	5CG016B4XM	TX2-RTL8821CE
Headphones	Sony	MDR-EX15AP	NA	NA
AC Adapter	Sony	XQZ-UC1	1821W34209742	NA
AC Adapter	Sony	XQZ-UC1	1821W34209856	NA
USB Cable Type C	Sony	XQZ-UB1	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	1	USB-C	Non-Shielded	<3m	Connected to Power Supply
2	3.5mm	1	3.5mm Audio	Non-Shielded	<1m	Connected to headphones

TEST SETUP

The EUT is connected to the Test support laptop and configured to transmit at each test frequency and mode.

For Conducted Testing the EUT was powered via external DC Power Supply.

For Radiated Testing the EUT was connected to AC Mains via ACDC Adaptor and headphones were connected.

CONDUCTED SETUP & RADIATED SETUP

Please see Photos Exhibit report R14176139-EP1 for Setup Diagrams and Photos.

7. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used – SAR Wireless Conducted power measurements

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
3-Path Diode Power Sensor	Rohde & Schwarz	NRP18A	100994	2/16/2023
Base Station Simulator	R & S	CMW 500	125236	2/16/2022[1]
Base Station Simulator	R & S	CMW 500	137873	2/19/2022[1]
Base Station Simulator	R & S	CMW 500	135384	2/28/2022[1]
Base Station Simulator	R & S	CMW 500	132910	2/17/2022[1]
DC Power Supply	Sorensen	TX-154	1802A01877	N/A
DC Power Supply	Sorensen	TX-154	1802A02680	N/A
DC Power Supply	HP	6296A	5955	N/A

Note(s):
1) Equipment not used past calibration due date.

Test Equipment Used – Wireless Conducted Power Measurements (Fremont Location)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
PRE0179234	DC Power Supply	Keysight	XT15-4	NA	NA
85710	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	2022-02-20	2023-02-20
T80396	Spectrum Analyzer	Keysight	PXA	2022-02-01	2023-02-01

Test Equipment Used - Wireless Conducted Measurement Equipment (Morrisville Location)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
T177	Spectrum Analyzer	Keysight Technologies	N9030A	2021-05-19	2022-05-19
212967	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	2021-11-15	2022-11-15
51845	Temp/Humid Chamber	Thermotron	SM-32-8200	2022-01-25	2023-01-25
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2021-07-12	2022-07-12
MY61466084	DC Regulated Power Supply	Keysight	E3633A	NA	NA
SOFTEMI	Antenna Port Software	UL	Version 2021.11.03	NA	NA
	Additional Equipment used				
MM0167 (PRE0126458)	True RMS Multimeter	Agilent	U1232A	2021-08-17	2022-08-17

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (RTP – Chamber A)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0059	**Active Loop Antenna**	EMCO	6502	2021-09-24	2029-09-24
	Gain-Loss Chains				
SAC_E_LR (Loop & Rod 3m location)	Gain-Loss string for loop/rod antenna at 3m	Various	Various	2021-08-03	2022-08-03
	Receiver & Software				
SA0016	Spectrum Analyzer	Agilent	PXA N9030A	2021-12-06	2022-12-06
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Additional Equipment used				
207229	Temp/Humid/Pressure Meter	Extech	SD700	2021-04-20	2022-04-20
20870	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	2021-04-26	2022-04-26

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 2)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	1-18 GHz				
AT0073	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2021-08-30	2022-08-30
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2021-05-03	2022-05-03
AT0063	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2021-11-04	2022-11-04
AT0061	Horn Antenna, 26-40GHz	ARA	MWH-2640/B	2021-11-04	2022-11-04
	Gain-Loss Chains				
C2-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2021-07-09	2022-07-09
C2-SAC03	Gain-loss string: 1-18GHz	Various	Various	2021-07-09	2022-07-09
C2-SAC04	Gain-loss string: 18-40GHz	Various	Various	2021-07-09	2022-07-09
	Receiver & Software				
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2021-03-10	2022-03-10
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
s/n 181474409	Environmental Meter	Fisher Scientific	15-077-963	2021-09-27	2022-09-27
BRF008	1710-1785MHz notch filter, 2W, F_{high} = 9GHz	Micro-Tronics	BRM50713-01	2022-02-17	2023-02-17
BRF011	2.495-2.690GHz notch filter, 2W, F_{high} = 18GHz	Micro-Tronics	BRM50709-01	2022-02-17	2023-02-17
213025	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	2021-11-18	2022-11-18
HPF012	1GHz high-pass filter, 2W, F_{high} =18GHz	Micro-Tronics	HPM18129	2022-02-17	2023-02-17
BRF001	900MHz notch filter, 2W, Fhigh =6GHz	Micro-Tronics	BRM50706	2021-07-22	2022-07-22

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

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	1-18 GHz				
206211	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2021-03-11	2022-03-11
	Gain-Loss Chains				
C4-SAC03	Gain-loss string: 1-18GHz	Various	Various	2021-05-07	2022-05-07
	Receiver & Software				
206496	Spectrum Analyzer	Rohde & Schwarz	ESW44	2021-03-09	2022-03-09
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
210642	Environmental Meter	Fisher Scientific	210701942	2021-8-16	2023-08-16
BRF011	2.495-2.690GHz notch filter, 2W, F_{high} = 18GHz	Micro-Tronics	BRM50709-01	2022-02-17	2023-02-17
HPF012	1GHz high-pass filter, 2W, F_{high} =18GHz	Micro-Tronics	HPM18129	2022-02-17	2023-02-17
213025	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	2021-11-18	2022-11-18

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.GSM GSM850

Test Engineer ID:	40814	Test Date:	1/21/2022

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)	
					Measured	
					Burst Pwr	Frame Pwr
GPRS/EDGE (GMSK)	CS1	1	128	824.2	32.8	23.8
			190	836.6	32.6	23.6
			251	848.8	32.7	23.7
		2	128	824.2	29.8	23.8
			190	836.6	29.7	23.7
			251	848.8	29.5	23.5
		3	128	824.2	27.9	23.6
			190	836.6	27.8	23.5
			251	848.8	27.6	23.3
		4	128	824.2	26.5	23.5
			190	836.6	26.7	23.7
			251	848.8	26.5	23.5
EDGE (8PSK)	MCS5	1	128	824.2	27.1	18.1
			190	836.6	27.1	18.1
			251	848.8	27.1	18.1
		2	128	824.2	24	18.0
			190	836.6	23.9	17.9
			251	848.8	23.9	17.9
		3	128	824.2	22.1	17.8
			190	836.6	22.2	17.9
			251	848.8	21.9	17.6
		4	128	824.2	20.8	17.8
			190	836.6	20.9	17.9
			251	848.8	20.8	17.8

8.1.2.GSM GSM1900

Test Engineer ID:	24506	Test Date:	1/24/2022

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)	
					Measured	
					Burst Pwr	Frame Pwr
GPRS/EDGE (GMSK)	CS1	1	512	1850.2	27.3	18.2
			661	1880.0	27.4	18.3
			810	1909.8	27.3	18.3
		2	512	1850.2	24.3	18.3
			661	1880.0	24.6	18.6
			810	1909.8	24.4	18.3
		3	512	1850.2	22.4	18.1
			661	1880.0	22.7	18.5
			810	1909.8	22.4	18.2
		4	512	1850.2	21.3	18.2
			661	1880.0	21.4	18.4
			810	1909.8	21.4	18.3
EDGE (8PSK)	MCS5	1	512	1850.2	26.5	17.5
			661	1880.0	26.4	17.4
			810	1909.8	26.6	17.6
		2	512	1850.2	23.5	17.5
			661	1880.0	23.7	17.7
			810	1909.8	23.5	17.5
		3	512	1850.2	21.6	17.3
			661	1880.0	21.7	17.5
			810	1909.8	21.7	17.4
		4	512	1850.2	20.1	17.1
			661	1880.0	20.2	17.2
			810	1909.8	20.4	17.4

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	Proces ses	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.		

HSPA+ REL 7

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

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

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.
Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.
Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

RESULT

8.2.1.WCDMA BAND 5

Test Engineer ID:	40814	Test Date:	1/21/2022

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)	
				Measured Pwr	MPR
Release 99	Rel 99 (RMC, 12.2 kbps)	4132	826.4	21.3	N/A
		4183	836.6	21.4	
		4233	846.6	21.7	
HSDPA	Subtest 1	4132	826.4	20.3	0
		4183	836.6	20.4	
		4233	846.6	20.9	
	Subtest 2	4132	826.4	20.3	0
		4183	836.6	20.4	
		4233	846.6	20.9	
	Subtest 3	4132	826.4	19.8	0.5
		4183	836.6	19.9	
		4233	846.6	20.4	
	Subtest 4	4132	826.4	19.8	0.5
		4183	836.6	19.9	
		4233	846.6	20.4	
HSUPA	Subtest 1	4132	826.4	20.3	0
		4183	836.6	20.4	
		4233	846.6	20.9	
	Subtest 2	4132	826.4	18.2	2
		4183	836.6	18.4	
		4233	846.6	18.9	
	Subtest 3	4132	826.4	19.3	1
		4183	836.6	19.4	
		4233	846.6	19.9	
	Subtest 4	4132	826.4	18.3	2
		4183	836.6	18.4	
		4233	846.6	18.9	
	Subtest 5	4132	826.4	20.4	0
		4183	836.6	20.4	
		4233	846.6	20.9	

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 TS36.101 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 TS36.101.

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

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

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 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

RESULTS

8.3.1. LTE4

Test Date	1/24/2022
Tested By	20794
Sample no.	QV770004AQ
Call Box S/N	T959
Cable loss	0.6
Antenna Port	Cell Main2

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				20050	20175	20300	
				1720 MHz	1732.5 MHz	1745 MHz	
20 MHz	QPSK	1	0	19.6	19.6	19.5	0
		1	49	19.6	19.5	19.5	0
		1	99	19.5	19.5	19.4	0
		50	0	19.7	19.5	19.5	0
		50	24	19.7	19.6	19.6	0
		50	50	19.6	19.5	19.5	0
		100	0	19.6	19.6	19.5	0
	16QAM	1	0	19.9	20.0	19.8	0
		1	49	20.0	20.0	20.2	0
		1	99	19.8	19.9	19.7	0
		50	0	19.7	19.6	19.5	0
		50	24	19.7	19.6	19.6	0
		50	50	19.6	19.6	19.5	0
		100	0	19.6	19.6	19.5	0
	64QAM	1	0	19.8	19.9	19.7	0
		1	49	19.9	20.0	19.8	0
		1	99	19.8	19.8	19.7	0
		50	0	19.6	19.5	19.5	0
		50	24	19.6	19.6	19.6	0
		50	50	19.6	19.5	19.5	0
		100	0	19.6	19.6	19.5	0
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				20025	20175	20325	
				1717.5 MHz	1732.5 MHz	1747.5 MHz	
15 MHz	QPSK	1	0	19.6	19.5	19.5	0
		1	37	19.6	19.6	19.5	0
		1	74	19.5	19.4	19.4	0
		36	0	19.6	19.5	19.5	0
		36	20	19.6	19.5	19.6	0
		36	39	19.6	19.6	19.5	0
		75	0	19.6	19.6	19.4	0
	16QAM	1	0	19.9	19.9	19.8	0
		1	37	19.9	19.9	19.9	0
		1	74	19.8	19.8	19.8	0
		36	0	19.6	19.5	19.5	0
		36	20	19.6	19.5	19.6	0
		36	39	19.6	19.6	19.5	0
		75	0	19.6	19.6	19.4	0
	64QAM	1	0	19.8	19.8	19.8	0
		1	37	19.8	19.9	19.8	0
		1	74	19.8	19.8	19.7	0
		36	0	19.6	19.5	19.5	0
		36	20	19.7	19.5	19.6	0
		36	39	19.6	19.5	19.5	0
		75	0	19.6	19.6	19.4	0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				20000	20175	20350	
				1715 MHz	1732.5 MHz	1750 MHz	
10 MHz	QPSK	1	0	19.7	19.6	19.6	0
		1	25	19.7	19.7	19.6	0
		1	49	19.6	19.6	19.5	0
		25	0	19.7	19.6	19.6	0
		25	12	19.7	19.7	19.6	0
		25	25	19.7	19.7	19.6	0
		50	0	19.7	19.7	19.5	0
	16QAM	1	0	20.0	20.0	19.9	0
		1	25	20.0	20.0	19.9	0
		1	49	20.0	20.0	19.9	0
		25	0	19.7	19.7	19.5	0
		25	12	19.8	19.7	19.6	0
		25	25	19.7	19.7	19.6	0
		50	0	19.7	19.7	19.5	0
	64QAM	1	0	20.0	19.9	19.8	0
		1	25	20.0	20.0	19.8	0
		1	49	20.0	19.9	19.8	0
		25	0	19.8	19.7	19.6	0
		25	12	19.8	19.8	19.6	0
		25	25	19.8	19.7	19.7	0
		50	0	19.8	19.7	19.6	0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				19975	20175	20375	
				1712.5 MHz	1732.5 MHz	1752.5 MHz	
5 MHz	QPSK	1	0	19.7	19.7	19.6	0
		1	12	19.8	19.7	19.6	0
		1	24	19.7	19.7	19.6	0
		12	0	19.7	19.6	19.6	0
		12	7	19.7	19.7	19.6	0
		12	13	19.7	19.7	19.6	0
		25	0	19.7	19.7	19.6	0
	16QAM	1	0	20.0	20.0	20.0	0
		1	12	20.0	20.0	20.0	0
		1	24	20.0	20.0	20.0	0
		12	0	19.8	19.7	19.7	0
		12	7	19.8	19.8	19.7	0
		12	13	19.8	19.7	19.7	0
		25	0	19.7	19.7	19.7	0
	64QAM	1	0	20.0	20.0	19.9	0
		1	12	20.0	20.0	19.9	0
		1	24	20.0	20.0	19.9	0
		12	0	19.8	19.7	19.7	0
		12	7	19.8	19.8	19.7	0
		12	13	19.8	19.8	19.7	0
		25	0	19.8	19.7	19.7	0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				19965	20175	20385	
				1711.5 MHz	1732.5 MHz	1753.5 MHz	
3 MHz	QPSK	1	0	19.7	19.5	19.5	0
		1	8	19.7	19.7	19.6	0
		1	14	19.6	19.5	19.5	0
		8	0	19.7	19.7	19.6	0
		8	4	19.7	19.7	19.6	0
		8	7	19.7	19.7	19.6	0
		15	0	19.7	19.6	19.6	0
	16QAM	1	0	19.9	19.9	19.9	0
		1	8	20.0	20.0	20.0	0
		1	14	19.9	20.0	19.8	0
		8	0	19.7	19.7	19.7	0
		8	4	19.8	19.7	19.7	0
		8	7	19.7	19.8	19.7	0
		15	0	19.7	19.7	19.6	0
	64QAM	1	0	19.9	19.9	19.8	0
		1	8	20.0	20.0	19.9	0
		1	14	19.9	19.9	19.8	0
		8	0	19.8	19.7	19.7	0
		8	4	19.9	19.8	19.7	0
		8	7	19.9	19.8	19.7	0
		15	0	19.8	19.7	19.6	0
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				19957	20175	20393	
				1710.7 MHz	1732.5 MHz	1754.3 MHz	
1.4 MHz	QPSK	1	0	19.7	19.7	19.6	0
		1	3	19.7	19.7	19.6	0
		1	5	19.7	19.6	19.6	0
		3	0	19.7	19.6	19.5	0
		3	1	19.7	19.6	19.5	0
		3	3	19.7	19.6	19.6	0
		6	0	19.7	19.6	19.5	0
	16QAM	1	0	19.9	20.0	19.9	0
		1	3	19.9	20.0	19.9	0
		1	5	19.9	20.0	19.9	0
		3	0	19.8	19.8	19.7	0
		3	1	19.8	19.8	19.7	0
		3	3	19.9	19.8	19.7	0
		6	0	19.8	19.7	19.6	0
	64QAM	1	0	20.0	19.8	19.9	0
		1	3	20.0	19.9	19.9	0
		1	5	20.0	19.9	19.9	0
		3	0	19.9	19.8	19.8	0
		3	1	19.9	19.9	19.8	0
		3	3	19.9	19.8	19.8	0
		6	0	19.9	19.8	19.7	0

8.3.2. LTE5

Test Date	1/21/2022
Tested By	Morning
Sample no.	QV77002CAQ
Call Box S/N	T959
Cable loss	0.5
Antenna Port	Cell Main 1

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				20450	20525	20600	
				829 MHz	836.5 MHz	844 MHz	
10 MHz	QPSK	1	0	21.6	21.6	21.5	0
		1	25	21.6	21.6	21.5	0
		1	49	21.5	21.5	21.4	0
		25	0	21.6	21.6	21.5	0
		25	12	21.7	21.6	21.5	0
		25	25	21.6	21.6	21.5	0
		50	0	21.7	21.6	21.5	0
	16QAM	1	0	22.0	22.0	21.9	0
		1	25	21.9	21.9	21.8	0
		1	49	21.9	22.0	21.8	0
		25	0	21.6	21.6	21.5	0
		25	12	21.7	21.6	21.5	0
		25	25	21.7	21.6	21.5	0
		50	0	21.7	21.6	21.5	0
	64QAM	1	0	21.9	21.9	21.7	0
		1	25	22.0	21.8	21.7	0
		1	49	21.9	21.8	21.6	0
		25	0	21.5	21.5	21.4	0
		25	12	21.6	21.5	21.4	0
		25	25	21.6	21.5	21.4	0
		50	0	21.6	21.5	21.4	0
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				20425	20525	20625	
				826.5 MHz	836.5 MHz	846.5 MHz	
5 MHz	QPSK	1	0	21.7	21.6	21.4	0
		1	12	21.7	21.6	21.5	0
		1	24	21.6	21.6	21.4	0
		12	0	21.6	21.5	21.4	0
		12	7	21.6	21.5	21.4	0
		12	13	21.6	21.6	21.5	0
		25	0	21.6	21.5	21.4	0
	16QAM	1	0	22.0	21.9	21.9	0
		1	12	22.0	22.0	22.0	0
		1	24	22.0	21.9	21.8	0
		12	0	21.7	21.5	21.5	0
		12	7	21.7	21.5	21.4	0
		12	13	21.6	21.6	21.5	0
		25	0	21.6	21.5	21.4	0
	64QAM	1	0	22.0	21.9	21.9	0
		1	12	21.9	22.0	21.9	0
		1	24	21.9	21.9	21.8	0
		12	0	21.7	21.5	21.3	0
		12	7	21.7	21.5	21.3	0
		12	13	21.6	21.6	21.4	0
		25	0	21.6	21.5	21.3	0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				20415	20525	20635	
				825.5 MHz	836.5 MHz	847.5 MHz	
3 MHz	QPSK	1	0	21.6	21.5	21.4	0
		1	8	21.6	21.6	21.5	0
		1	14	21.5	21.5	21.3	0
		8	0	21.6	21.5	21.4	0
		8	4	21.6	21.5	21.5	0
		8	7	21.6	21.6	21.5	0
		15	0	21.6	21.5	21.4	0
	16QAM	1	0	21.9	21.9	21.7	0
		1	8	21.9	22.0	21.8	0
		1	14	21.9	21.9	21.7	0
		8	0	21.7	21.6	21.5	0
		8	4	21.7	21.6	21.6	0
		8	7	21.7	21.7	21.6	0
		15	0	21.6	21.5	21.5	0
	64QAM	1	0	22.0	21.8	21.8	0
		1	8	22.0	21.9	21.7	0
		1	14	22.0	21.8	21.7	0
		8	0	21.6	21.5	21.4	0
		8	4	21.6	21.6	21.4	0
		8	7	21.6	21.6	21.4	0
		15	0	21.6	21.5	21.4	0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				20407	20525	20643	
				824.7 MHz	836.5 MHz	848.3 MHz	
1.4 MHz	QPSK	1	0	21.6	21.5	21.4	0
		1	3	21.6	21.6	21.4	0
		1	5	21.5	21.5	21.4	0
		3	0	21.6	21.5	21.4	0
		3	1	21.6	21.5	21.4	0
		3	3	21.6	21.5	21.4	0
		6	0	21.6	21.4	21.4	0
	16QAM	1	0	21.7	21.9	21.7	0
		1	3	21.7	21.9	21.8	0
		1	5	21.7	21.9	21.7	0
		3	0	21.7	21.7	21.6	0
		3	1	21.7	21.7	21.6	0
		3	3	21.7	21.7	21.6	0
		6	0	21.6	21.5	21.5	0
	64QAM	1	0	21.9	21.8	21.8	0
		1	3	22.0	21.9	21.8	0
		1	5	21.9	21.8	21.8	0
		3	0	21.8	21.7	21.6	0
		3	1	21.8	21.8	21.6	0
		3	3	21.8	21.8	21.6	0
		6	0	21.6	21.4	21.4	0

8.3.3. LTE12

Test Date	1/21/2022
Tested By	24506
Sample no.	QV77002CAQ
Call Box S/N	T959
Cable loss	0.5
Antenna Port	Cell Main 1

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				23060	23095	23130	
				704 MHz	707.5 MHz	711 MHz	
10 MHz	QPSK	1	0	21.3	21.3	21.3	0
		1	25	21.3	21.3	21.3	0
		1	49	21.3	21.4	21.3	0
		25	0	21.3	21.3	21.3	0
		25	12	21.3	21.4	21.3	0
		25	25	21.3	21.3	21.4	0
		50	0	21.3	21.3	21.3	0
	16QAM	1	0	21.8	21.7	21.6	0
		1	25	21.7	21.6	21.7	0
		1	49	21.7	21.7	21.7	0
		25	0	21.3	21.3	21.3	0
		25	12	21.4	21.3	21.3	0
		25	25	21.4	21.3	21.4	0
		50	0	21.3	21.3	21.3	0
	64QAM	1	0	21.6	21.5	21.6	0
		1	25	21.5	21.5	21.6	0
		1	49	21.5	21.5	21.7	0
		25	0	21.2	21.2	21.2	0
		25	12	21.2	21.3	21.2	0
		25	25	21.2	21.3	21.3	0
		50	0	21.2	21.2	21.2	0
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				23035	23095	23155	
				701.5 MHz	707.5 MHz	713.5 MHz	
5 MHz	QPSK	1	0	21.3	21.3	21.4	0
		1	12	21.4	21.4	21.4	0
		1	24	21.3	21.3	21.3	0
		12	0	21.4	21.3	21.4	0
		12	7	21.4	21.4	21.4	0
		12	13	21.3	21.3	21.4	0
		25	0	21.3	21.3	21.3	0
	16QAM	1	0	21.7	21.6	21.8	0
		1	12	21.7	21.7	21.9	0
		1	24	21.7	21.6	21.8	0
		12	0	21.4	21.3	21.4	0
		12	7	21.4	21.5	21.4	0
		12	13	21.3	21.4	21.4	0
		25	0	21.4	21.3	21.3	0
	64QAM	1	0	21.6	21.5	21.7	0
		1	12	21.6	21.5	21.8	0
		1	24	21.6	21.5	21.7	0
		12	0	21.3	21.2	21.2	0
		12	7	21.3	21.3	21.2	0
		12	13	21.2	21.3	21.3	0
		25	0	21.2	21.2	21.2	0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				23025	23095	23165	
				700.5 MHz	707.5 MHz	714.5 MHz	
3 MHz	QPSK	1	0	21.3	21.2	21.3	0
		1	8	21.3	21.3	21.4	0
		1	14	21.1	21.2	21.3	0
		8	0	21.3	21.3	21.4	0
		8	4	21.3	21.4	21.4	0
		8	7	21.3	21.3	21.4	0
		15	0	21.3	21.3	21.3	0
	16QAM	1	0	21.6	21.6	21.6	0
		1	8	21.6	21.7	21.7	0
		1	14	21.5	21.6	21.6	0
		8	0	21.4	21.3	21.4	0
		8	4	21.4	21.4	21.4	0
		8	7	21.4	21.4	21.4	0
		15	0	21.3	21.3	21.3	0
	64QAM	1	0	21.6	21.5	21.4	0
		1	8	21.6	21.6	21.6	0
		1	14	21.5	21.5	21.4	0
		8	0	21.3	21.2	21.3	0
		8	4	21.3	21.3	21.3	0
		8	7	21.2	21.2	21.4	0
		15	0	21.2	21.2	21.2	0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				23017	23095	23173	
				699.7 MHz	707.5 MHz	715.3 MHz	
1.4 MHz	QPSK	1	0	21.3	21.3	21.4	0
		1	3	21.3	21.3	21.4	0
		1	5	21.2	21.3	21.3	0
		3	0	21.3	21.3	21.3	0
		3	1	21.3	21.3	21.3	0
		3	3	21.3	21.3	21.3	0
		6	0	21.3	21.3	21.3	0
	16QAM	1	0	21.5	21.6	21.8	0
		1	3	21.5	21.7	21.7	0
		1	5	21.4	21.6	21.6	0
		3	0	21.4	21.5	21.5	0
		3	1	21.5	21.5	21.5	0
		3	3	21.4	21.4	21.5	0
		6	0	21.3	21.3	21.4	0
	64QAM	1	0	21.5	21.5	21.7	0
		1	3	21.5	21.6	21.8	0
		1	5	21.5	21.5	21.6	0
		3	0	21.5	21.4	21.4	0
		3	1	21.4	21.4	21.4	0
		3	3	21.5	21.3	21.4	0
		6	0	21.3	21.2	21.2	0

8.3.4. LTE13

Test Date	1/21/2022
Tested By	24506
Sample no.	QV77002CAQ
Call Box S/N	T959
Cable loss	0.5
Antenna Port	Cell Main 1

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				[redacted]	23230	[redacted]	
					782 MHz		
10 MHz	QPSK	1	0		21.5		0
		1	25		21.5		0
		1	49		21.5		0
		25	0		21.5		0
		25	12		21.5		0
		25	25		21.5		0
		50	0		21.5		0
	16QAM	1	0		21.8		0
		1	25		21.8		0
		1	49		21.9		0
		25	0		21.6		0
		25	12		21.6		0
		25	25		21.6		0
		50	0		21.5		0
	64QAM	1	0		21.6		0
		1	25		21.6		0
		1	49		21.6		0
		25	0		21.4		0
		25	12		21.4		0
		25	25		21.4		0
		50	0		21.4		0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				23205	23230	23255	
				779.5 MHz	782 MHz	784.5 MHz	
5 MHz	QPSK	1	0	21.5	21.5	21.5	0
		1	12	21.6	21.6	21.6	0
		1	24	21.5	21.5	21.5	0
		12	0	21.4	21.5	21.5	0
		12	7	21.5	21.5	21.5	0
		12	13	21.5	21.5	21.5	0
		25	0	21.5	21.5	21.5	0
	16QAM	1	0	21.9	21.9	21.9	0
		1	12	22.0	22.0	22.0	0
		1	24	21.9	22.0	21.9	0
		12	0	21.6	21.5	21.5	0
		12	7	21.7	21.5	21.6	0
		12	13	21.7	21.5	21.6	0
		25	0	21.6	21.5	21.5	0
	64QAM	1	0	21.5	21.7	21.7	0
		1	12	21.8	21.8	21.8	0
		1	24	21.8	21.7	21.8	0
		12	0	21.4	21.5	21.5	0
		12	7	21.5	21.6	21.6	0
		12	13	21.5	21.6	21.6	0
		25	0	21.4	21.4	21.4	0

8.3.5. LTE17

Test Date	1/31/2022
Tested By	David C
Sample no.	QV77002CAQ
Call Box S/N	T959
Cable loss	0.6
Antenna Port	Cell Main 1

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				23780	23790	23800	
					710 MHz		
10 MHz	QPSK	1	0	21.6	21.6	21.6	0
		1	25	21.7	21.6	21.6	0
		1	49	21.6	21.6	21.6	0
		25	0	21.6	21.6	21.6	0
		25	12	21.7	21.6	21.6	0
		25	25	21.6	21.6	21.6	0
		50	0	21.6	21.6	21.6	0
	16QAM	1	0	21.9	22.0	21.9	0
		1	25	21.9	22.0	21.9	0
		1	49	21.9	22.0	21.9	0
		25	0	21.7	21.7	21.6	0
		25	12	21.6	21.6	21.6	0
		25	25	21.7	21.6	21.6	0
		50	0	21.6	21.6	21.6	0
	64QAM	1	0	21.8	21.8	21.8	0
		1	25	21.9	21.9	21.8	0
		1	49	21.8	21.8	21.8	0
		25	0	21.5	21.5	21.5	0
		25	12	21.5	21.5	21.5	0
		25	25	21.5	21.5	21.5	0
		50	0	21.5	21.5	21.5	0
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR
				23755	23790	23825	
					710 MHz		
5 MHz	QPSK	1	0	21.6	21.7	21.7	0
		1	12	21.6	21.7	21.7	0
		1	24	21.5	21.6	21.6	0
		12	0	21.6	21.6	21.6	0
		12	7	21.6	21.6	21.6	0
		12	13	21.6	21.6	21.6	0
		25	0	21.6	21.6	21.6	0
	16QAM	1	0	22.0	22.0	22.1	0
		1	12	21.9	22.0	22.1	0
		1	24	21.9	21.9	21.9	0
		12	0	21.6	21.6	21.8	0
		12	7	21.6	21.6	21.7	0
		12	13	21.6	21.6	21.7	0
		25	0	21.7	21.6	21.6	0
	64QAM	1	0	22.0	22.0	22.0	0
		1	12	21.9	22.0	21.9	0
		1	24	21.9	21.9	21.8	0
		12	0	21.4	21.5	21.6	0
		12	7	21.5	21.5	21.5	0
		12	13	21.4	21.5	21.5	0
		25	0	21.5	21.5	21.5	0

8.3.6. LTE41

Test Date	1/24/2022
Tested By	20794
Sample no.	QV770004AQ
Call Box S/N	T959
Cable loss	1
Antenna Port	Cell Main2

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR
				39750	40185	40620	41055	41490	
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz	
20 MHz	QPSK	1	0	19.4	19.3	19.5	19.3	19.2	0
		1	49	19.4	19.4	19.5	19.6	19.6	0
		1	99	19.3	19.4	19.5	19.2	19.5	0
		50	0	19.5	19.5	19.6	19.5	19.5	0
		50	24	19.5	19.5	19.6	19.6	19.6	0
		50	50	19.4	19.4	19.5	19.4	19.5	0
		100	0	19.5	19.5	19.6	19.4	19.5	0
	16QAM	1	0	19.5	19.6	19.6	19.3	19.2	0
		1	49	19.7	19.8	19.9	19.8	19.9	0
		1	99	19.4	19.5	19.5	19.2	19.6	0
		50	0	19.5	19.5	19.6	19.5	19.4	0
		50	24	19.5	19.5	19.6	19.6	19.6	0
		50	50	19.5	19.5	19.5	19.5	19.5	0
		100	0	19.5	19.5	19.6	19.4	19.5	0
	64QAM	1	0	19.4	19.5	19.4	19.1	19.2	0
		1	49	19.5	19.8	19.5	19.6	19.7	0
		1	99	19.3	19.4	19.5	19.1	19.6	0
		50	0	19.5	19.5	19.5	19.4	19.4	0
		50	24	19.6	19.5	19.5	19.6	19.6	0
		50	50	19.5	19.5	19.5	19.4	19.5	0
		100	0	19.6	19.4	19.5	19.4	19.5	0
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR
				39750	40185	40620	41055	41490	
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz	
15 MHz	QPSK	1	0	19.4	19.4	19.4	19.3	19.2	0
		1	37	19.4	19.4	19.4	19.5	19.6	0
		1	74	19.4	19.3	19.4	19.3	19.5	0
		36	0	19.5	19.4	19.5	19.5	19.5	0
		36	20	19.5	19.4	19.5	19.5	19.6	0
		36	39	19.5	19.4	19.5	19.5	19.5	0
		75	0	19.5	19.4	19.5	19.5	19.5	0
	16QAM	1	0	19.4	19.3	19.5	19.4	19.2	0
		1	37	19.5	19.3	19.5	19.6	19.5	0
		1	74	19.4	19.3	19.5	19.3	19.5	0
		36	0	19.5	19.5	19.5	19.5	19.5	0
		36	20	19.5	19.4	19.5	19.5	19.6	0
		36	39	19.5	19.4	19.5	19.5	19.5	0
		75	0	19.5	19.4	19.5	19.5	19.5	0
	64QAM	1	0	19.4	19.4	19.5	19.4	19.3	0
		1	37	19.4	19.5	19.5	19.6	19.6	0
		1	74	19.4	19.4	19.5	19.3	19.5	0
		36	0	19.5	19.5	19.5	19.5	19.5	0
		36	20	19.5	19.5	19.5	19.5	19.6	0
		36	39	19.5	19.5	19.5	19.5	19.5	0
		75	0	19.5	19.5	19.5	19.5	19.5	0

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR
				39750	40185	40620	41055	41490	
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz	
10 MHz	QPSK	1	0	19.6	19.5	19.6	19.3	19.4	0
		1	25	19.6	19.5	19.6	19.6	19.6	0
		1	49	19.6	19.5	19.5	19.4	19.3	0
		25	0	19.6	19.6	19.6	19.6	19.6	0
		25	12	19.6	19.6	19.6	19.7	19.7	0
		25	25	19.6	19.6	19.7	19.6	19.6	0
		50	0	19.6	19.6	19.6	19.6	19.6	0
	16QAM	1	0	19.6	19.6	19.6	19.3	19.4	0
		1	25	19.6	19.6	19.5	19.7	19.7	0
		1	49	19.6	19.6	19.5	19.4	19.4	0
		25	0	19.6	19.6	19.6	19.6	19.6	0
		25	12	19.6	19.6	19.6	19.7	19.7	0
		25	25	19.6	19.6	19.6	19.6	19.6	0
		50	0	19.6	19.6	19.6	19.6	19.6	0
	64QAM	1	0	19.6	19.5	19.6	19.3	19.5	0
		1	25	19.6	19.5	19.6	19.7	19.7	0
		1	49	19.5	19.5	19.6	19.5	19.4	0
		25	0	19.6	19.6	19.7	19.6	19.7	0
		25	12	19.6	19.6	19.7	19.7	19.7	0
		25	25	19.6	19.6	19.7	19.6	19.7	0
		50	0	19.6	19.6	19.7	19.6	19.6	0
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR
				39750	40185	40620	41055	41490	
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz	
5 MHz	QPSK	1	0	19.6	19.5	19.5	19.5	19.6	0
		1	12	19.6	19.6	19.7	19.6	19.7	0
		1	24	19.6	19.6	19.6	19.6	19.6	0
		12	0	19.7	19.6	19.6	19.6	19.7	0
		12	7	19.7	19.6	19.6	19.6	19.8	0
		12	13	19.6	19.5	19.6	19.6	19.7	0
		25	0	19.6	19.6	19.6	19.6	19.7	0
	16QAM	1	0	19.7	19.5	19.6	19.6	19.6	0
		1	12	19.8	19.6	19.7	19.8	19.7	0
		1	24	19.7	19.6	19.6	19.7	19.6	0
		12	0	19.6	19.6	19.6	19.8	19.7	0
		12	7	19.6	19.6	19.6	19.8	19.7	0
		12	13	19.6	19.6	19.6	19.8	19.7	0
		25	0	19.6	19.5	19.6	19.6	19.7	0
	64QAM	1	0	19.7	19.5	19.6	19.6	19.7	0
		1	12	19.7	19.6	19.7	19.7	19.7	0
		1	24	19.6	19.6	19.7	19.7	19.6	0
		12	0	19.7	19.6	19.7	19.6	19.7	0
		12	7	19.7	19.7	19.7	19.6	19.7	0
		12	13	19.7	19.6	19.7	19.6	19.7	0
		25	0	19.7	19.6	19.7	19.7	19.7	0

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.

GSM

Band	Modulation	Channel	f(MHz)	99% BW (KHz)	-26dB BW (KHz)
GSM850	GPRS	190	836.6	240.2	313.1
	EGPRS			247.1	303.2
GSM1900	GPRS	661	1880.0	239.8	319.5
	EGPRS			244.1	310.5

WCDMA

Band	Modulation	Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
BAND5	REL 99	4408	836.6	4.133	4.713
	HSDPA			4.161	4.712

LTE4

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 4	1.4MHz, QPSK	6/0	1732.5	1.09	1.33
	1.4MHz,16QAM			1.09	1.31
	3MHz, QPSK	15/0		2.69	3
	3MHz, 16QAM			2.69	3.04
	5MHz, QPSK	25/0		4.5	5.09
	5MHz, 16QAM			4.51	5.04
	10MHz, QPSK	50/0		8.95	9.8
	10MHz, 16QAM			8.97	9.82
	15MHz, QPSK	75/0		13.42	14.78
	15MHz, 16QAM			13.46	14.68
	20MHz, QPSK	100/0		17.92	19.72
	20MHz, 16QAM			17.88	19.33

LTE5

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 5	1.4MHz, QPSK	6/0	836.5	1.09	1.3
	1.4MHz,16QAM			1.09	1.33
	3MHz, QPSK	15/0		2.69	3.05
	3MHz, 16QAM			2.69	3.04
	5MHz, QPSK	25/0		4.5	5.1
	5MHz, 16QAM			4.5	5.22
	10MHz, QPSK	50/0		8.96	9.78
	10MHz, 16QAM			8.94	9.76

LTE12

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 12	1.4MHz, QPSK	6/0	707.5	1.09	1.3
	1.4MHz,16QAM			1.09	1.33
	3MHz, QPSK	15/0		2.69	3.03
	3MHz, 16QAM			2.69	3.01
	5MHz, QPSK	25/0		4.49	5.04
	5MHz, 16QAM			4.5	5.08
	10MHz, QPSK	50/0		8.94	9.89
	10MHz, 16QAM			8.95	9.66

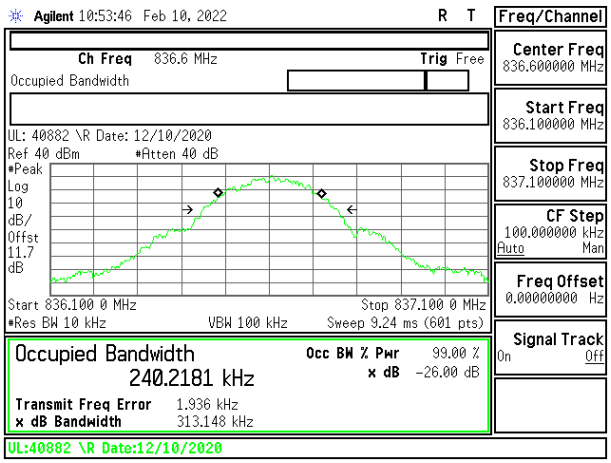
LTE13

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 13	5MHz, QPSK	25/0	782.0	4.5	5.13
	5MHz, 16QAM			4.5	5.1
	10MHz, QPSK	50/0		8.93	9.88
	10MHz, 16QAM			8.96	9.65

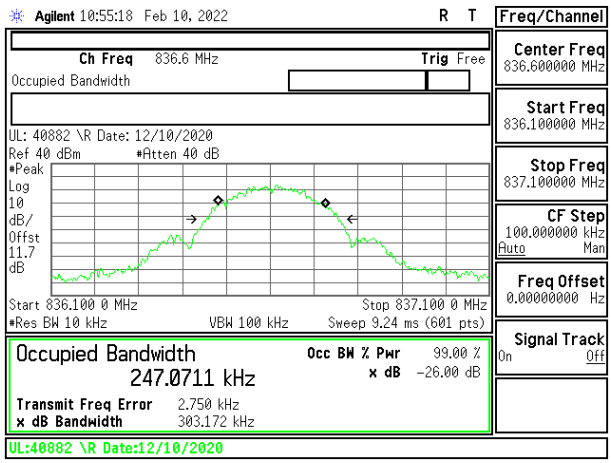
LTE41

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 41	5MHz, QPSK	25/0	2593.0	4.5	5.11
	5MHz, 16QAM			4.51	4.97
	10MHz, QPSK	50/0		8.94	9.81
	10MHz, 16QAM			8.96	9.82
	15MHz, QPSK	75/0		13.4	14.46
	15MHz, 16QAM			13.44	14.64
	20MHz, QPSK	100/0		17.83	19.22
	20MHz, 16QAM			17.9	19.24

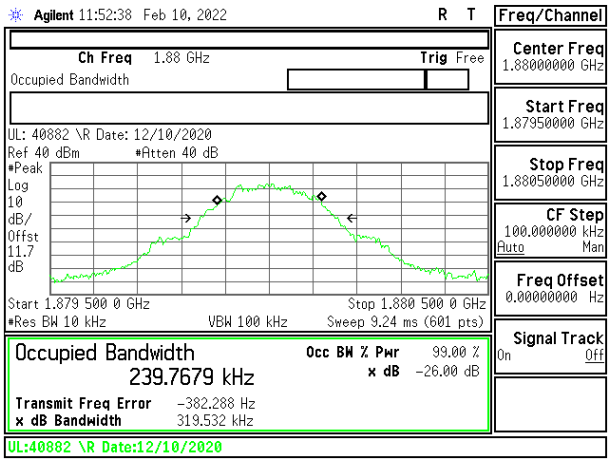
9.1.1.GSM



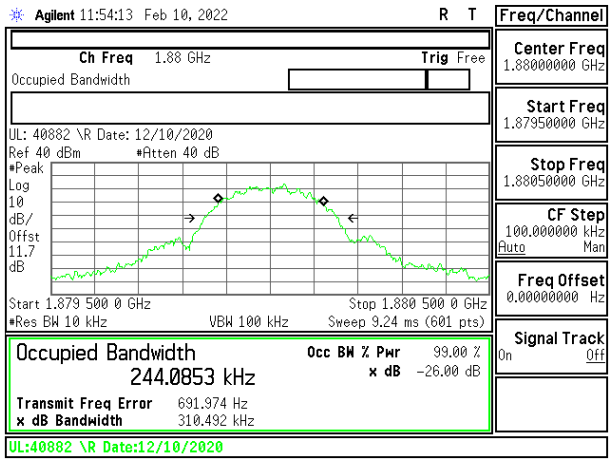
GSM850 GPRS MID Channel



GSM850 EGPRS MID Channel

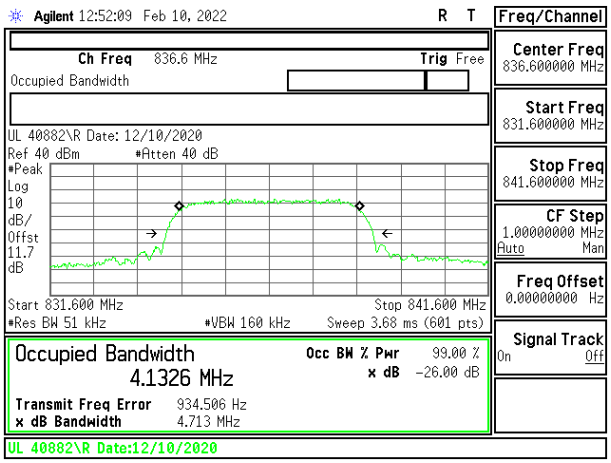


GSM1900 GPRS MID Channel

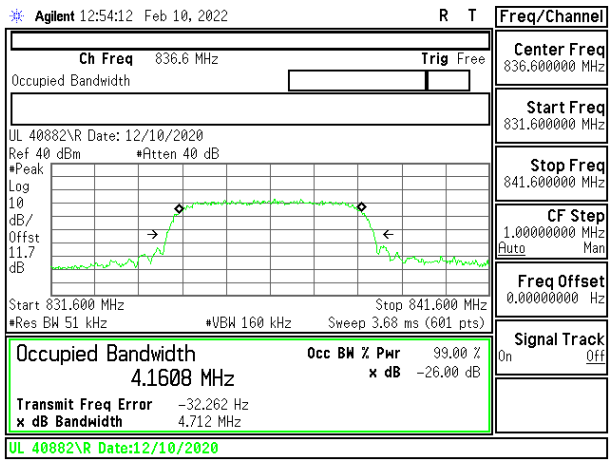


GSM1900 EGPRS MID Channel

9.1.2.WCDMA

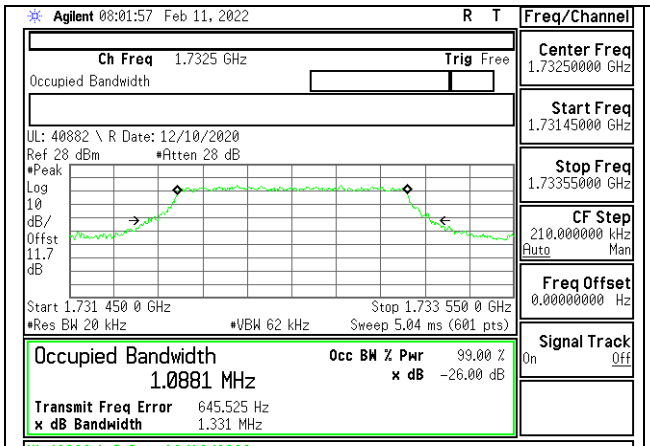


BAND 5 Rel 99 MID Channel

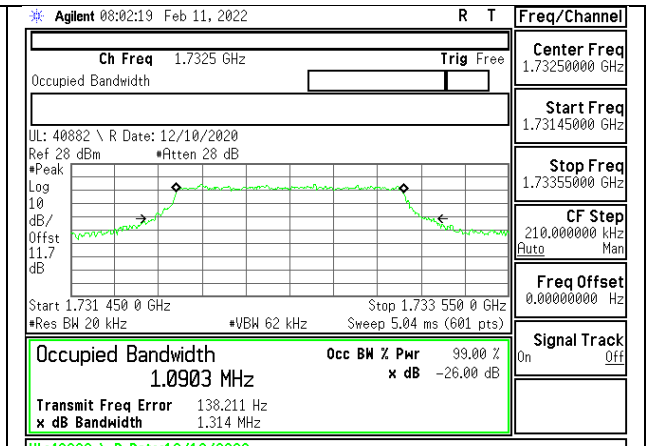


BAND 5 HSDPA MID Channel

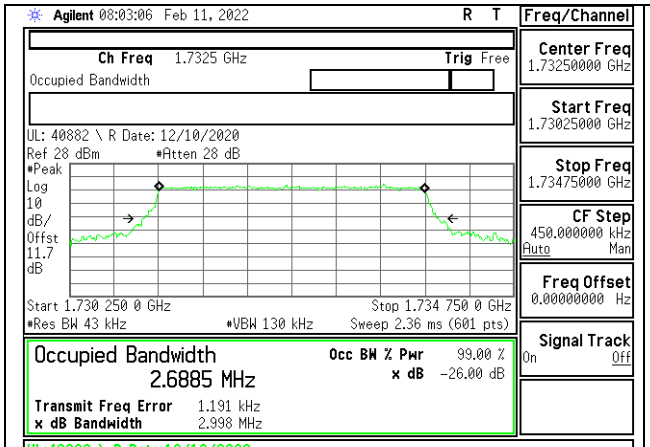
9.1.3.LTE4



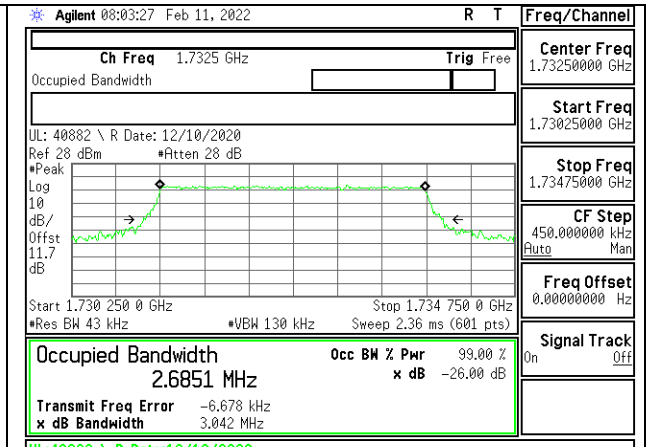
LTE4 1.4MHz QPSK MID Channel



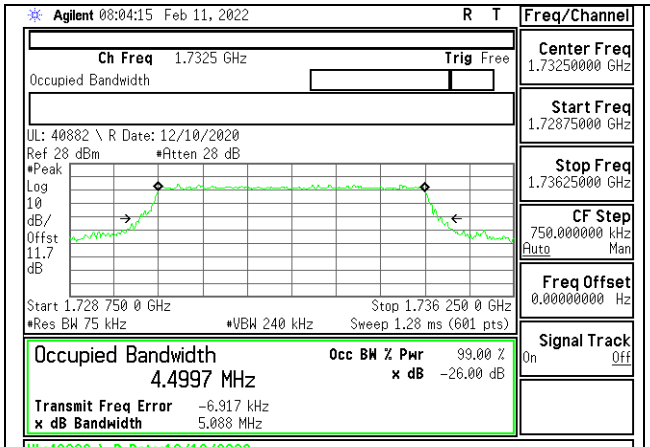
LTE4 1.4MHz 16QAM MID Channel



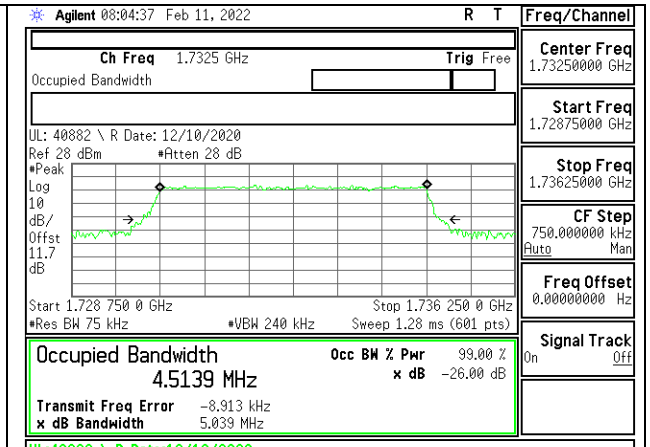
LTE4 3MHz QPSK MID Channel



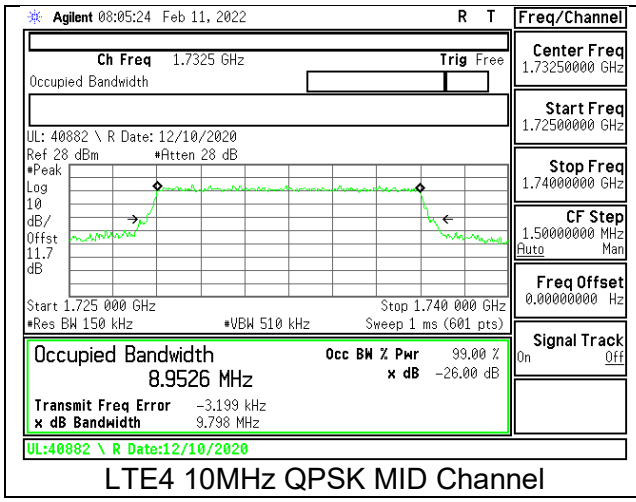
LTE4 3MHz 16QAM MID Channel



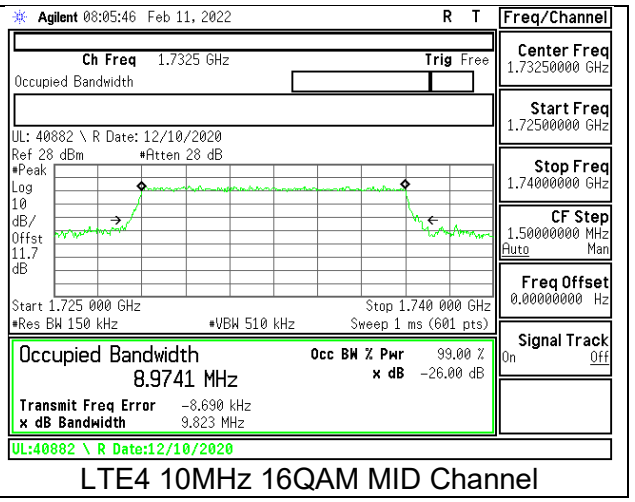
LTE4 5MHz QPSK MID Channel



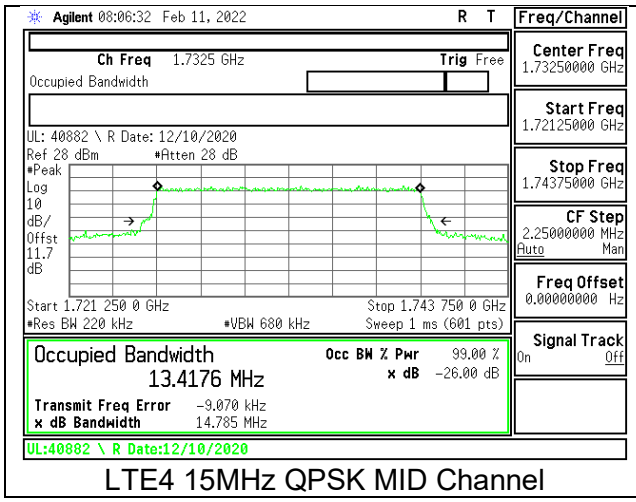
LTE4 5MHz 16QAM MID Channel



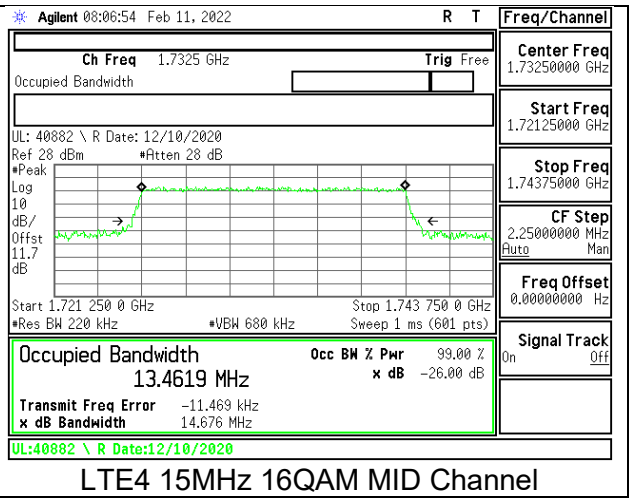
LTE4 10MHz QPSK MID Channel



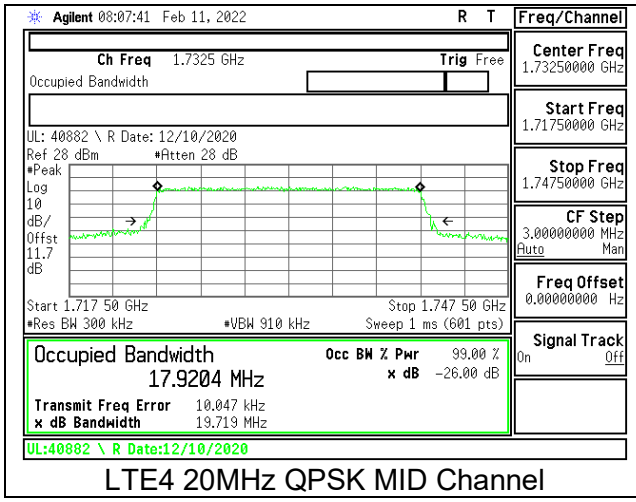
LTE4 10MHz 16QAM MID Channel



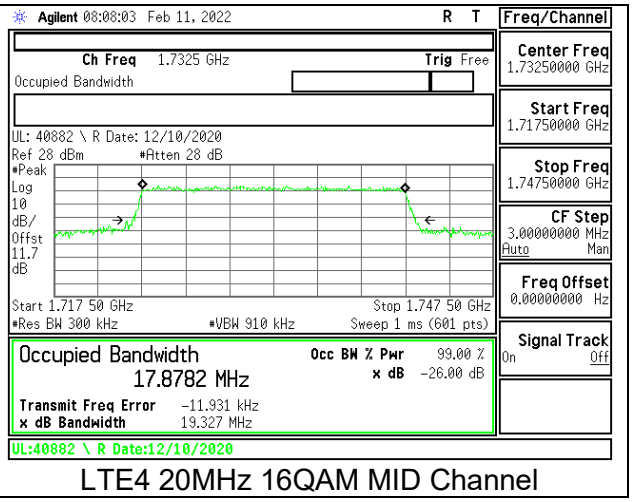
LTE4 15MHz QPSK MID Channel



LTE4 15MHz 16QAM MID Channel

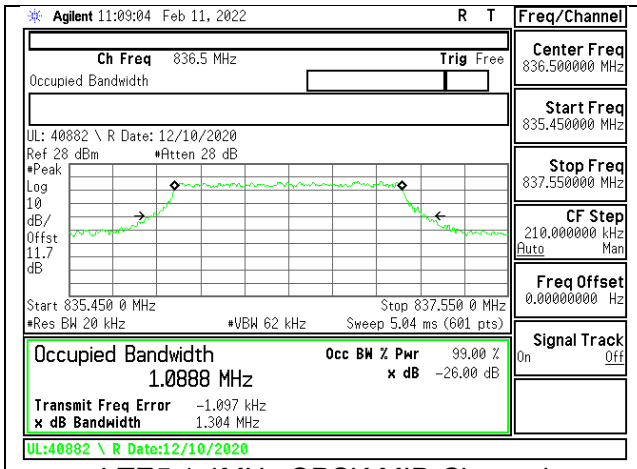


LTE4 20MHz QPSK MID Channel

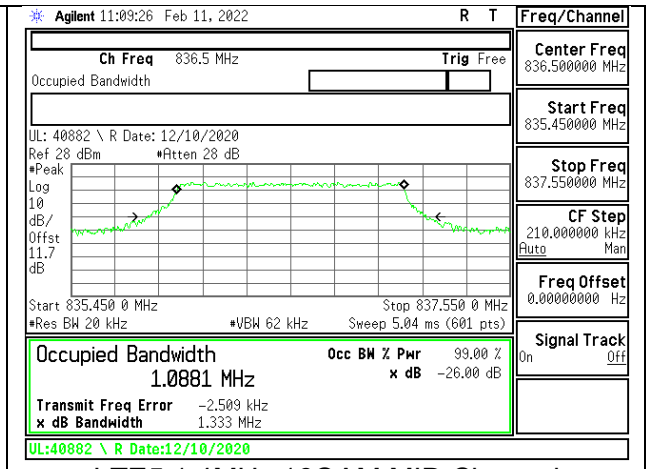


LTE4 20MHz 16QAM MID Channel

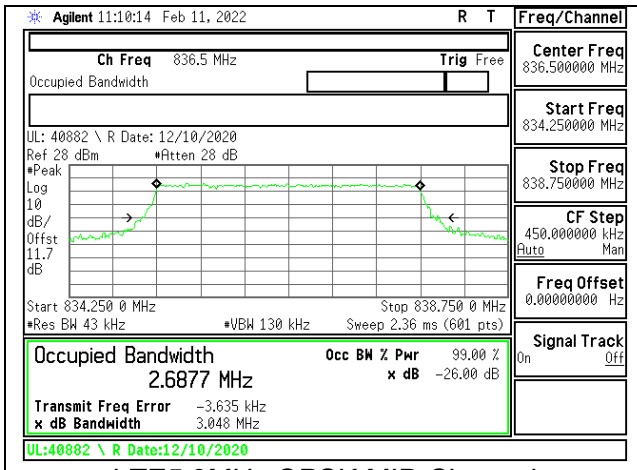
9.1.4.LTE5



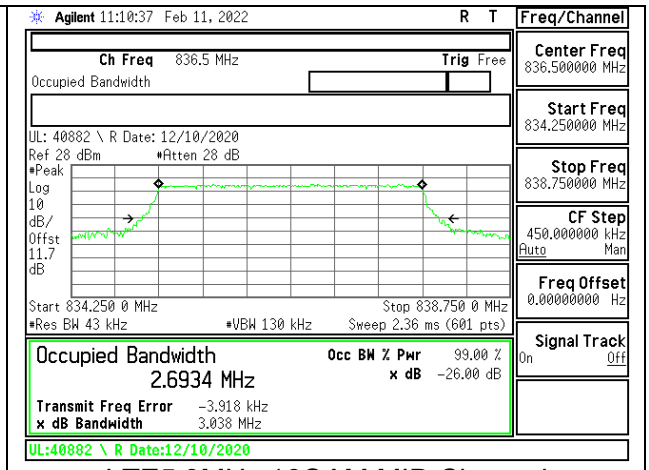
LTE5 1.4MHz QPSK MID Channel



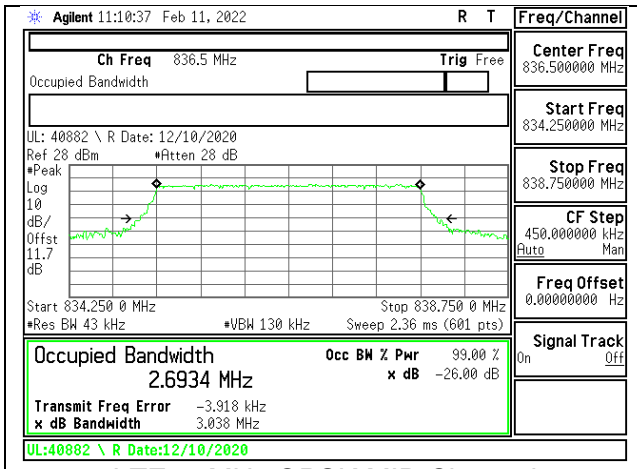
LTE5 1.4MHz 16QAM MID Channel



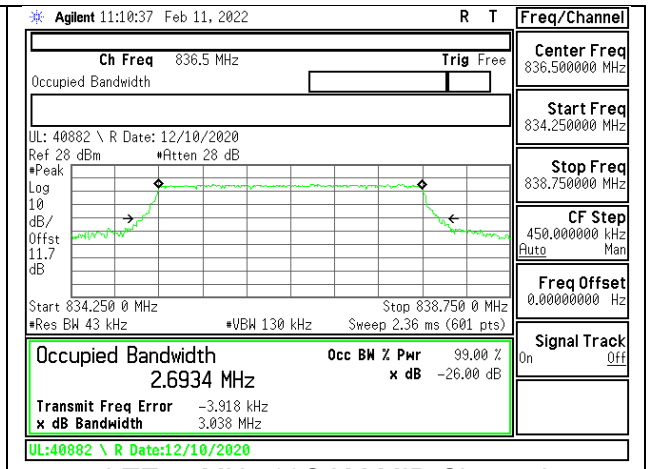
LTE5 3MHz QPSK MID Channel



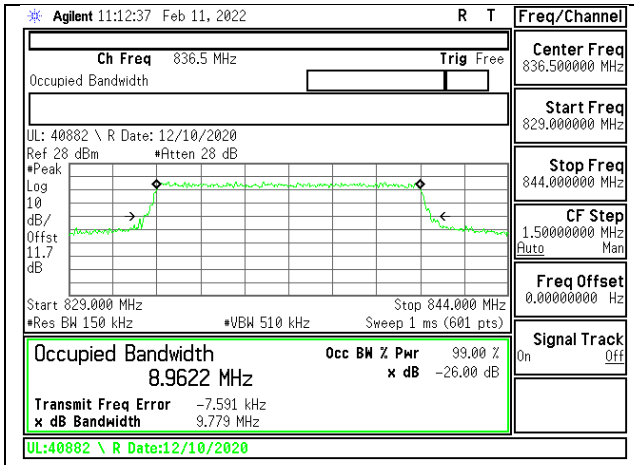
LTE5 3MHz 16QAM MID Channel



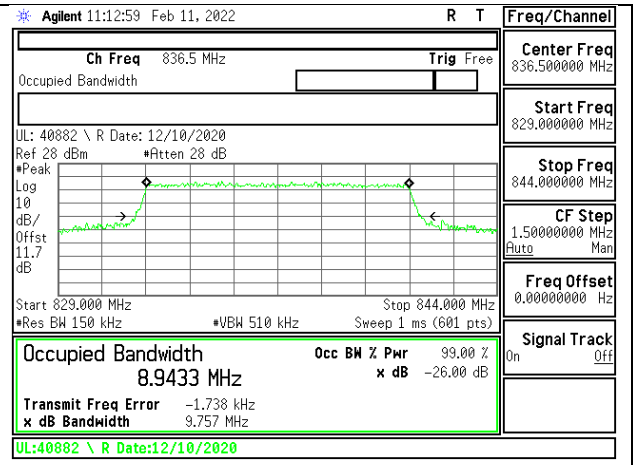
LTE5 5MHz QPSK MID Channel



LTE5 5MHz 16QAM MID Channel

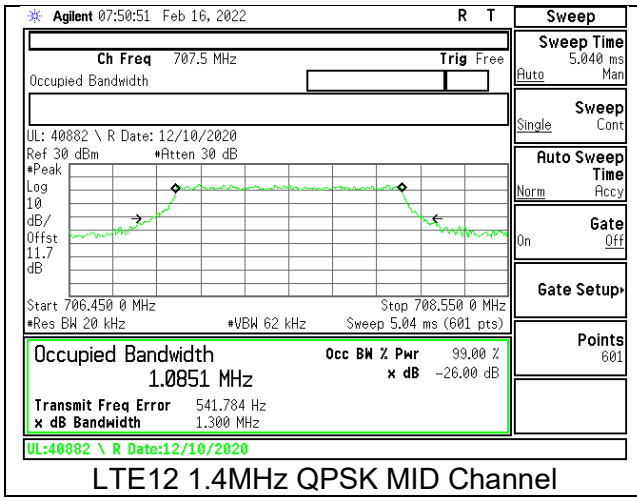


LTE5 10MHz QPSK MID Channel

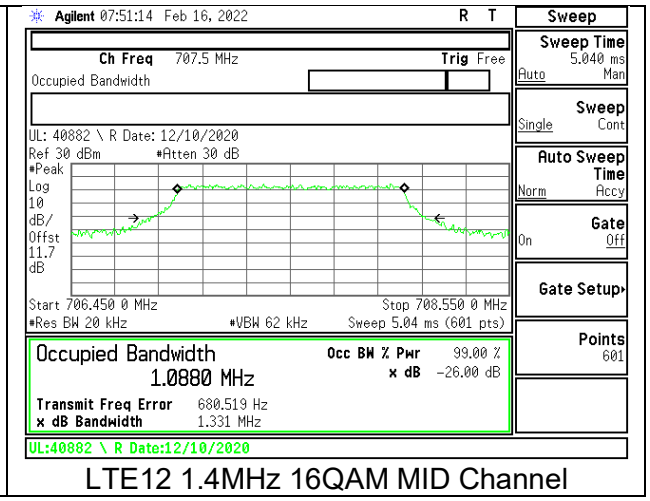


LTE5 10MHz 16QAM MID Channel

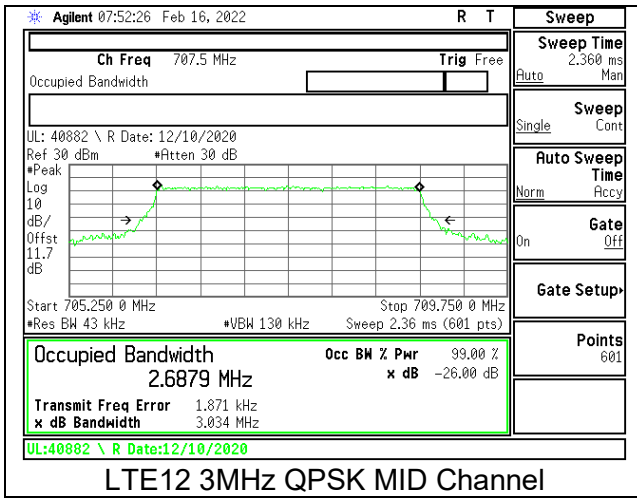
9.1.5.LTE12



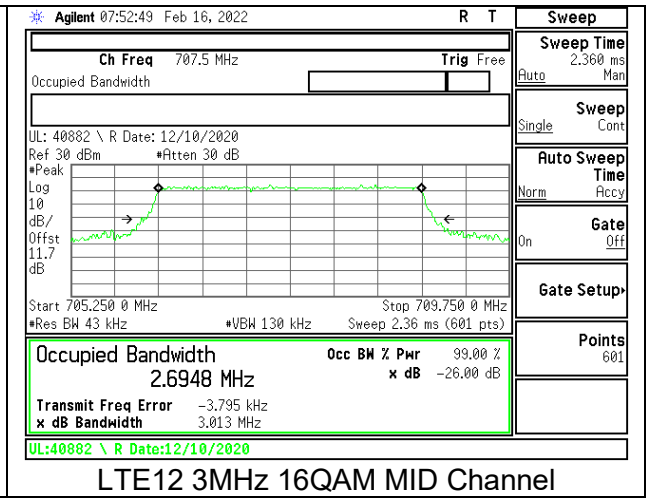
LTE12 1.4MHz QPSK MID Channel



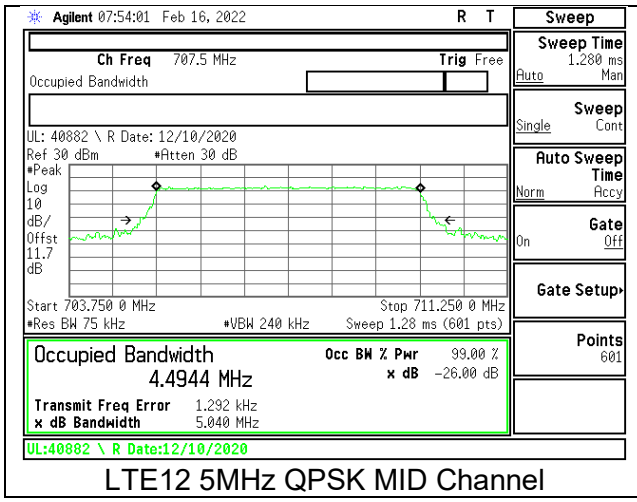
LTE12 1.4MHz 16QAM MID Channel



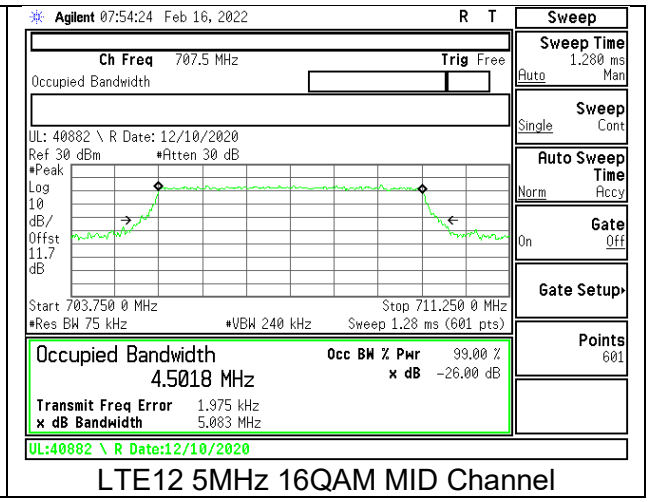
LTE12 3MHz QPSK MID Channel



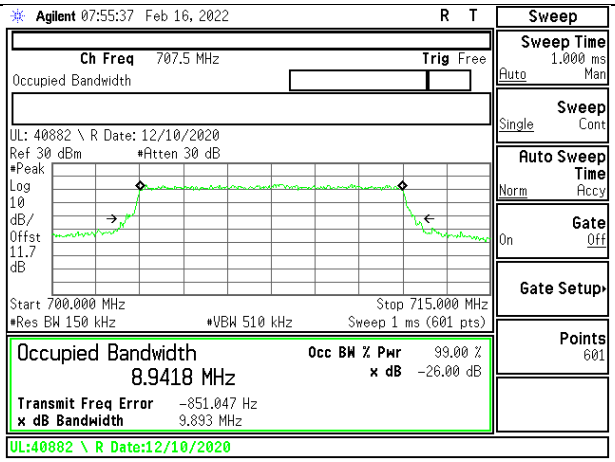
LTE12 3MHz 16QAM MID Channel



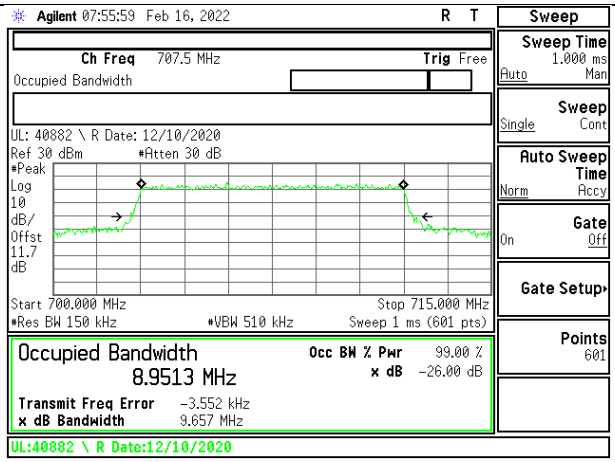
LTE12 5MHz QPSK MID Channel



LTE12 5MHz 16QAM MID Channel

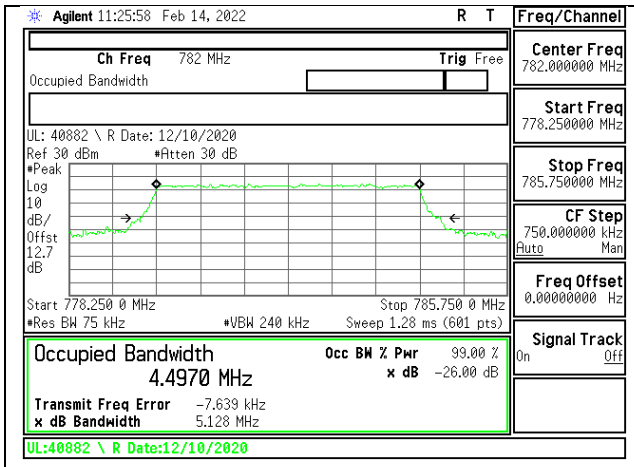


LTE12 10MHz QPSK MID Channel

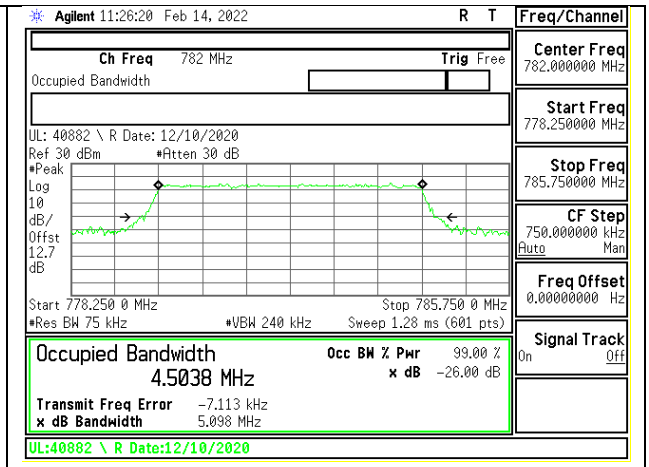


LTE12 10MHz 16QAM MID Channel

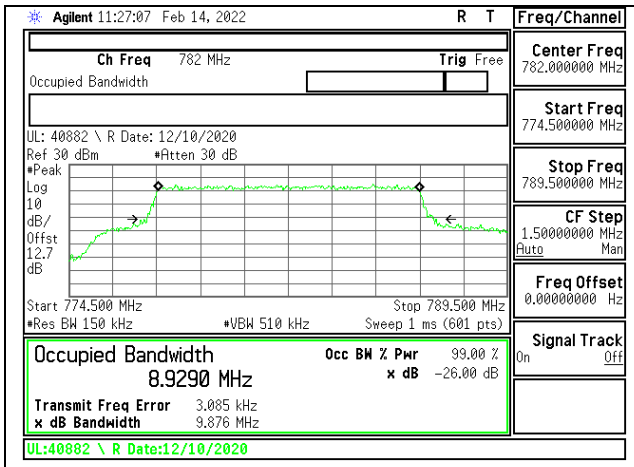
9.1.6.LTE13



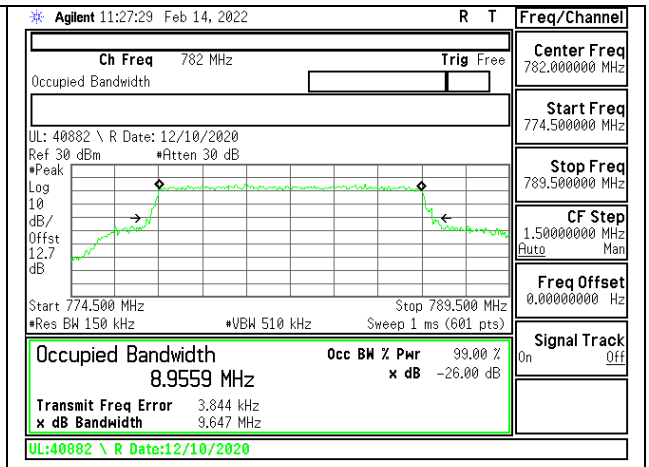
LTE13 5MHz QPSK MID Channel



LTE13 5MHz 16QAM MID Channel

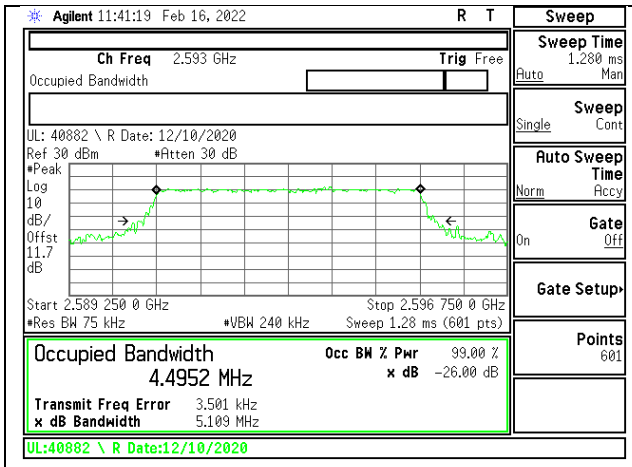


LTE13 10MHz QPSK MID Channel

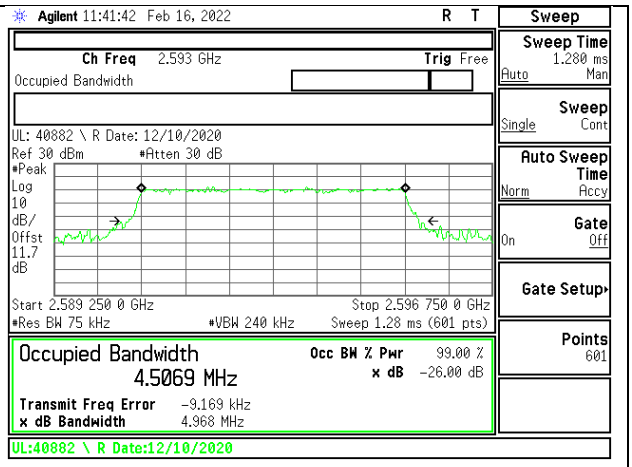


LTE13 10MHz 16QAM MID Channel

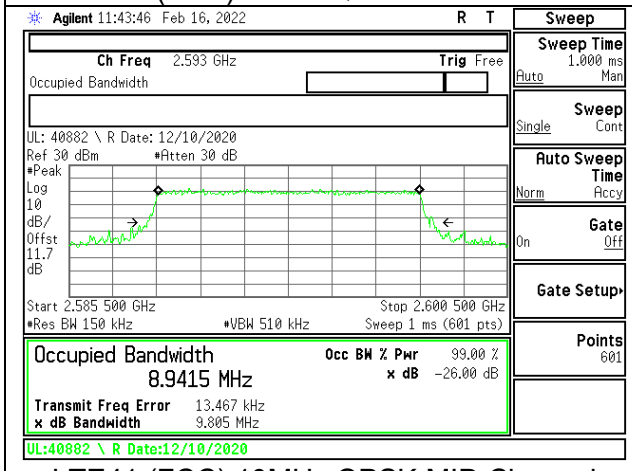
9.1.7.LTE41



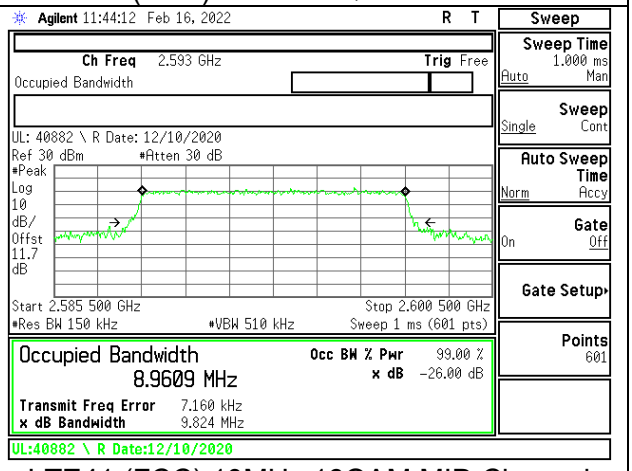
LTE41 (FCC) 5MHz QPSK MID Channel



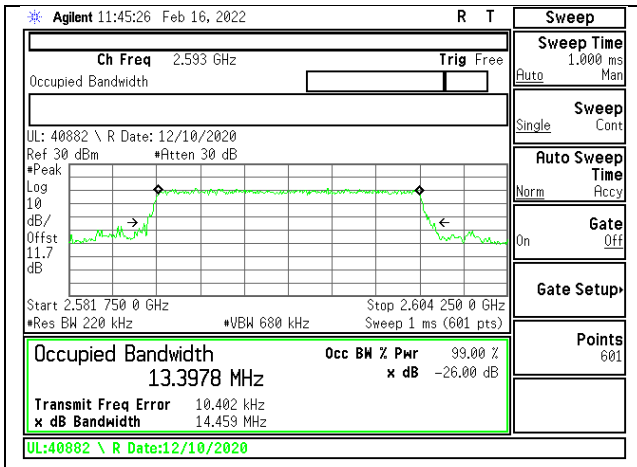
LTE41 (FCC) 5MHz 16QAM MID Channel



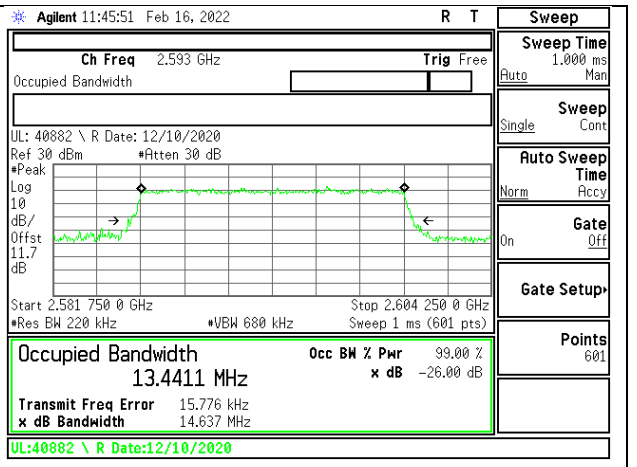
LTE41 (FCC) 10MHz QPSK MID Channel



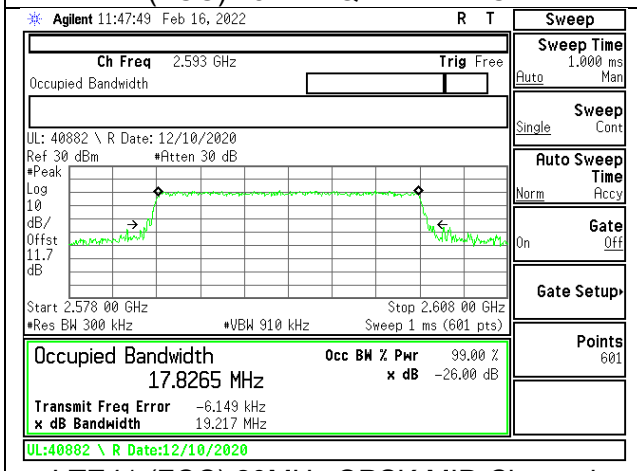
LTE41 (FCC) 10MHz 16QAM MID Channel



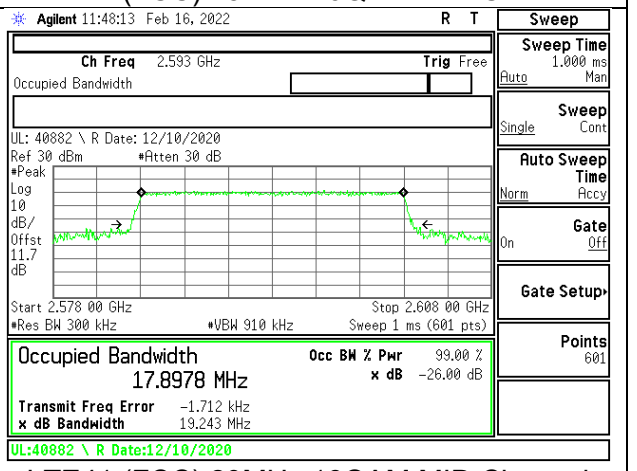
LTE41 (FCC) 15MHz QPSK MID Channel



LTE41 (FCC) 15MHz 16QAM MID Channel



LTE41 (FCC) 20MHz QPSK MID Channel



LTE41 (FCC) 20MHz 16QAM MID Channel

9.2. BAND EDGE AND EMISSION MASK

LIMITS

FCC: §22.917, §24.238, §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.

TEST PROCEDURE

The transmitter output was connected to a R&S CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

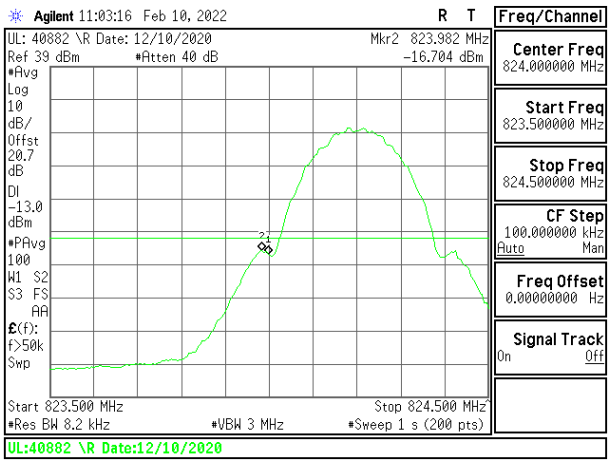
- Set the spectrum analyzer span to include the block edge frequency.
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

TEST PROCEDURE (FCC LTE BAND 7, 41)

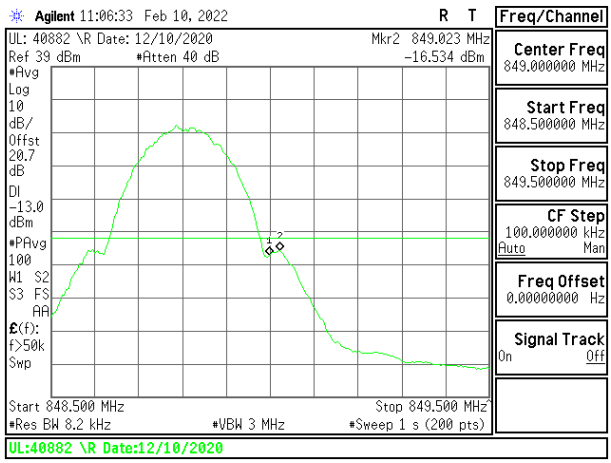
(m)(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of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

RESULTS

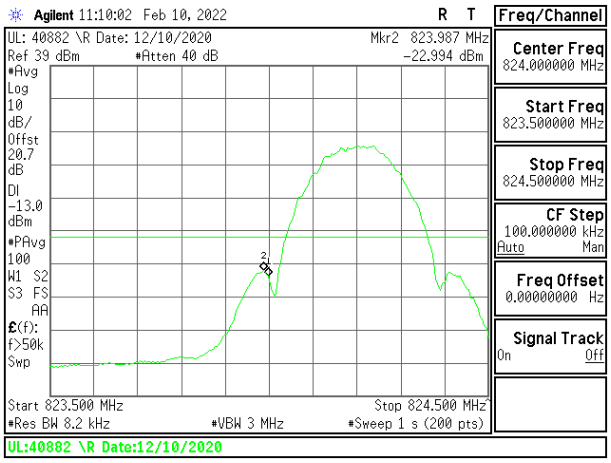
9.2.1.GSM GSM850



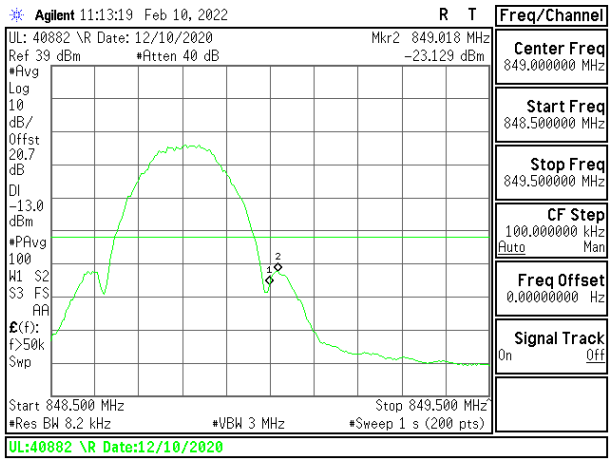
GSM850 GPRS LOW Channel



GSM850 GPRS HIGH Channel

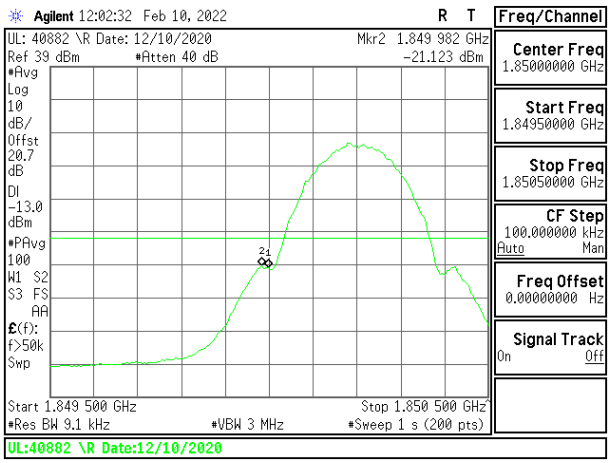


GSM850 EGPRS LOW Channel

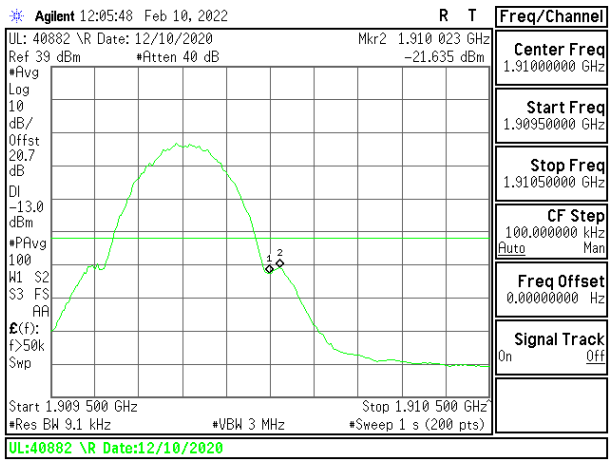


GSM850 EGPRS HIGH Channel

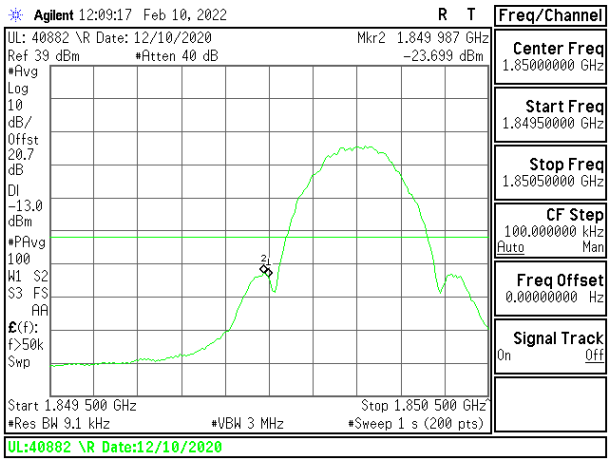
9.2.2.GSM GSM1900



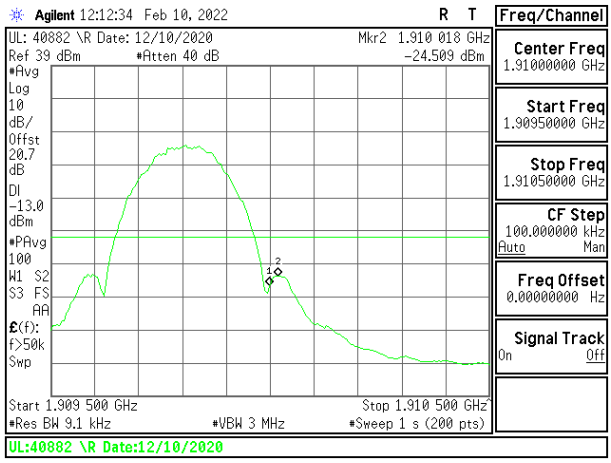
GSM1900 GPRS LOW Channel



GSM1900 GPRS HIGH Channel

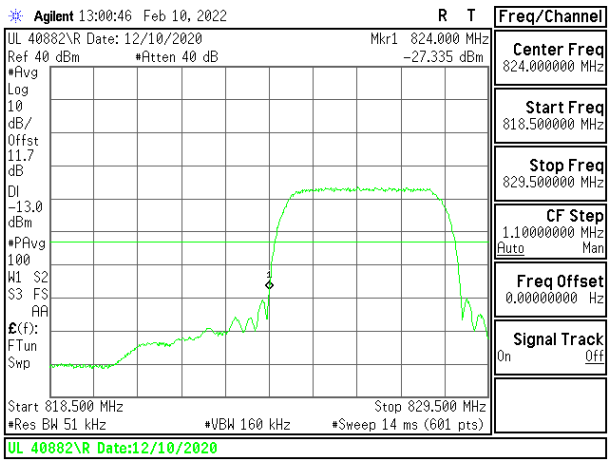


GSM1900 EGPRS LOW Channel

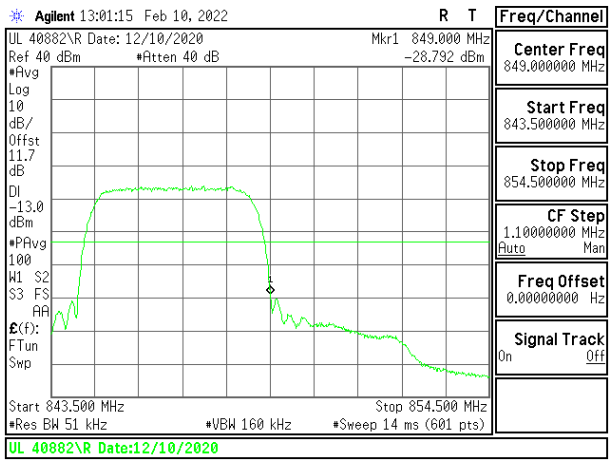


GSM1900 EGPRS HIGH Channel

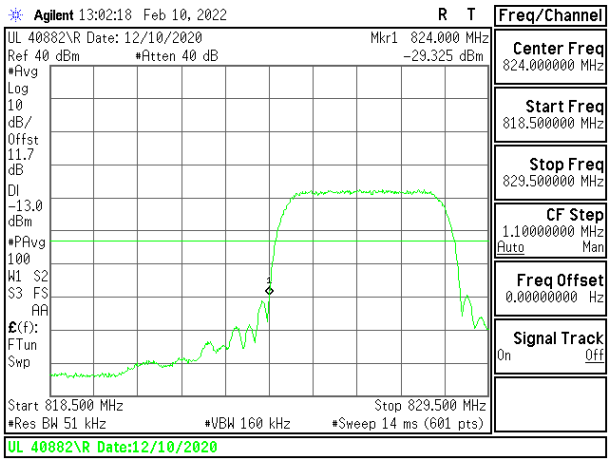
9.2.3.WCDMA BAND 5



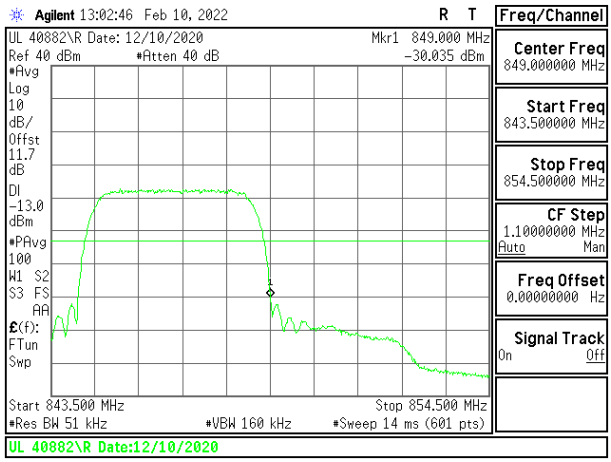
BAND 5 Rel 99 LOW Channel



BAND 5 Rel 99 HIGH Channel



BAND 5 HSDPA LOW Channel

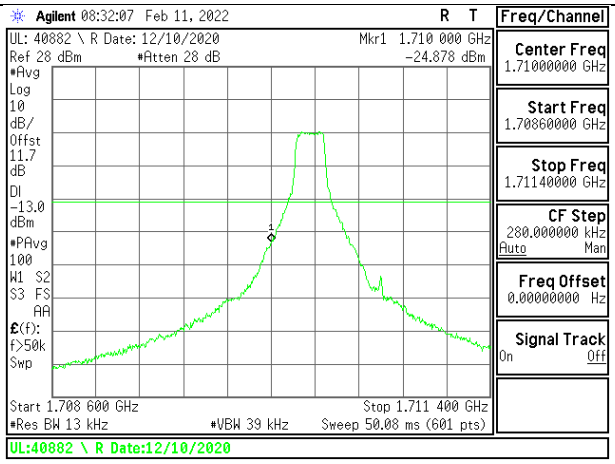


BAND 5 HSDPA HIGH Channel

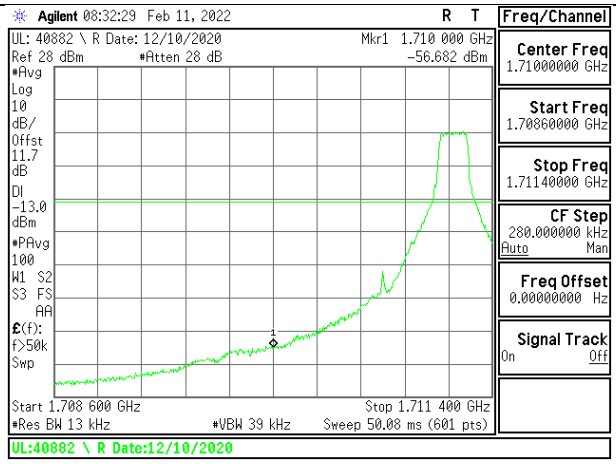
9.2.4.LTE4

LIMITS

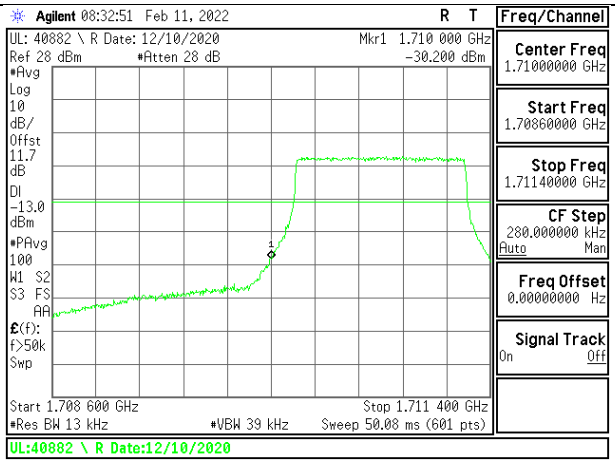
FCC: §27.53(h)
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.



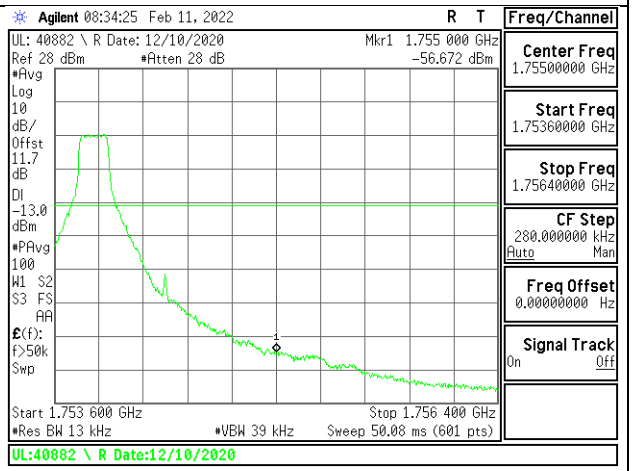
LTE4 1.4MHz QPSK LOW Ch RB1-0



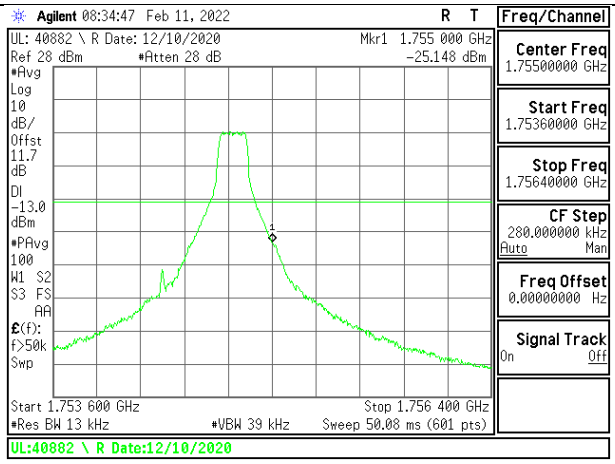
LTE4 1.4MHz QPSK LOW Ch RB1-5



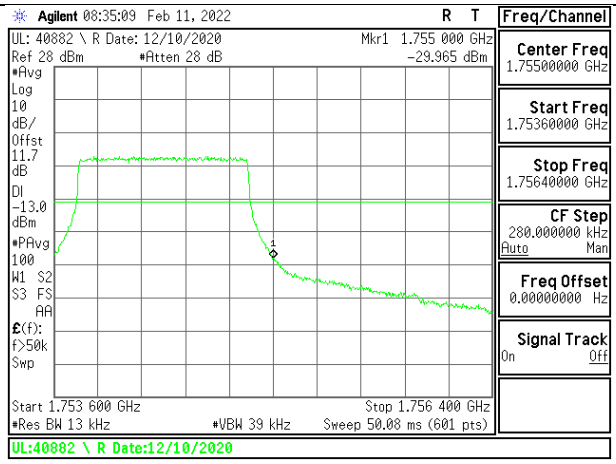
LTE4 1.4MHz QPSK LOW Ch RB6-0



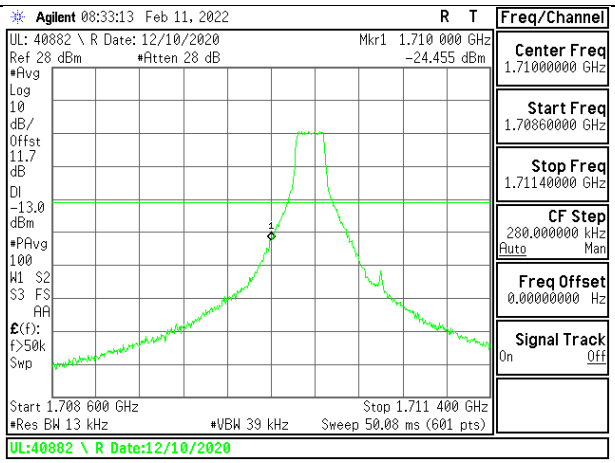
LTE4 1.4MHz QPSK HIGH Ch RB1-0



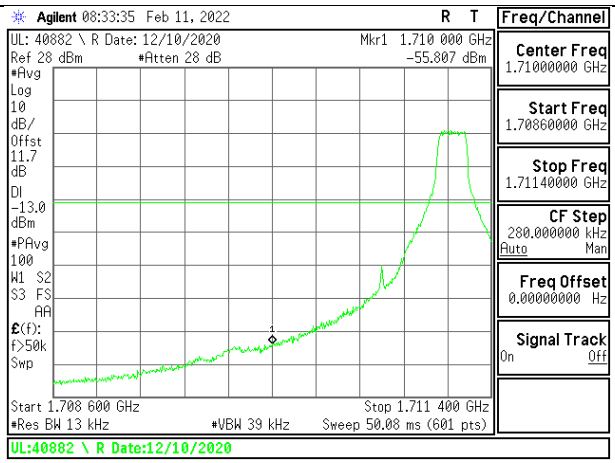
LTE4 1.4MHz QPSK HIGH Ch RB1-5



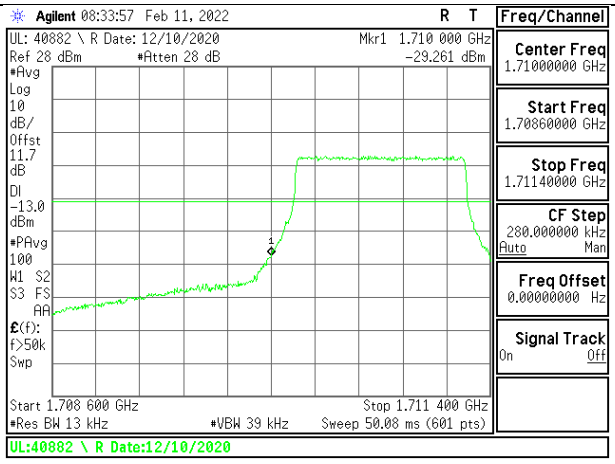
LTE4 1.4MHz QPSK HIGH Ch RB6-0



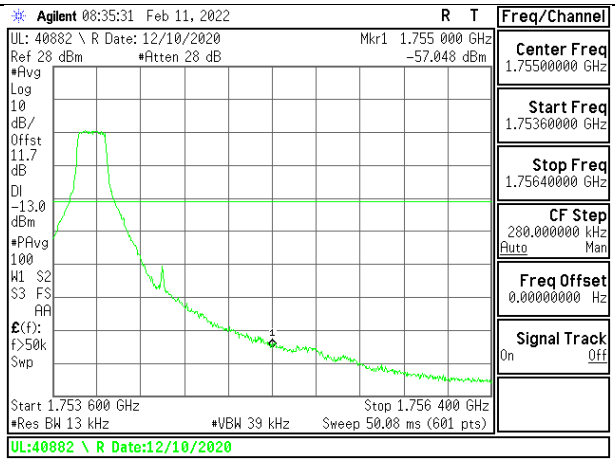
LTE4 1.4MHz 16QAM LOW Ch RB1-0



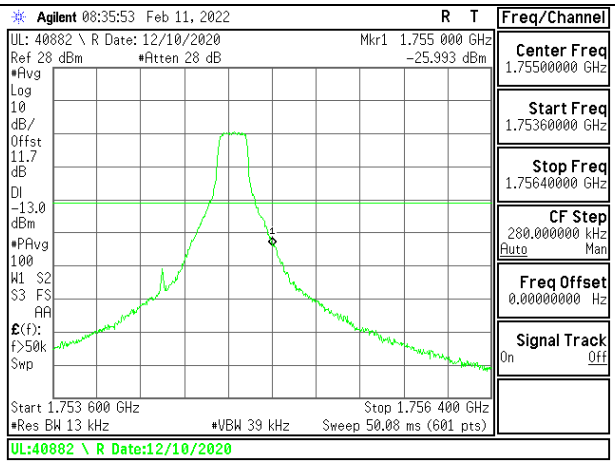
LTE4 1.4MHz 16QAM LOW Ch RB1-5



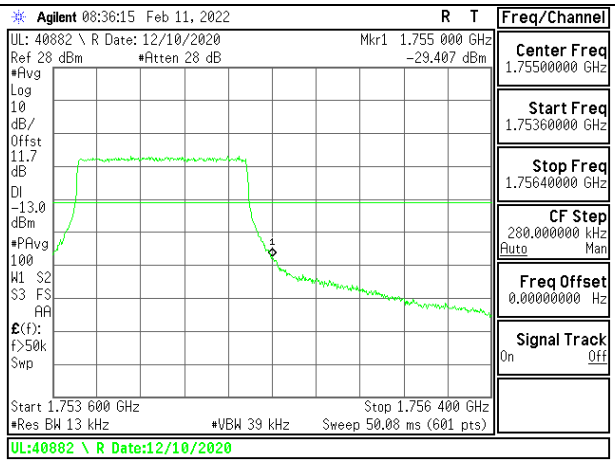
LTE4 1.4MHz 16QAM LOW Ch RB6-0



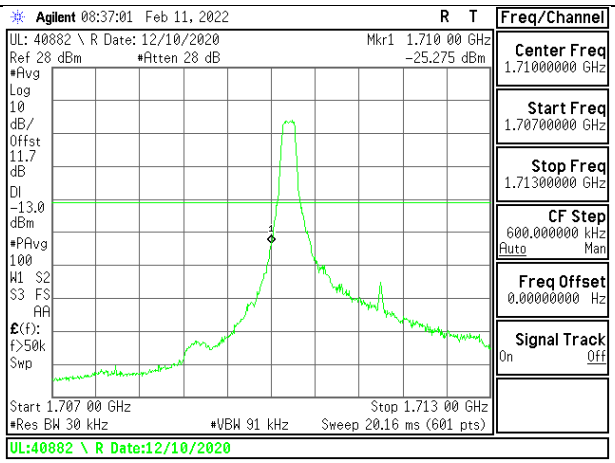
LTE4 1.4MHz 16QAM HIGH Ch RB1-0



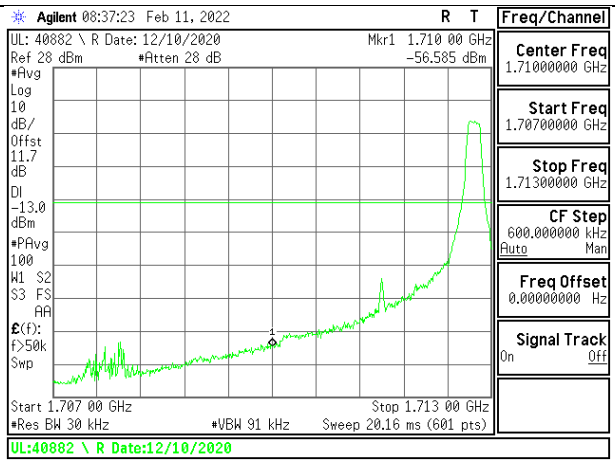
LTE4 1.4MHz 16QAM HIGH Ch RB1-5



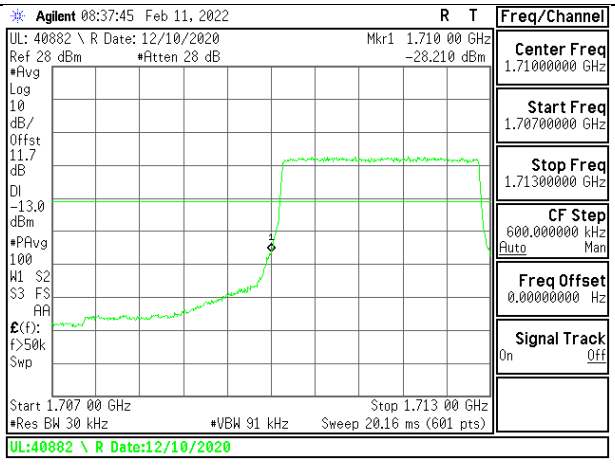
LTE4 1.4MHz 16QAM HIGH Ch RB6-0



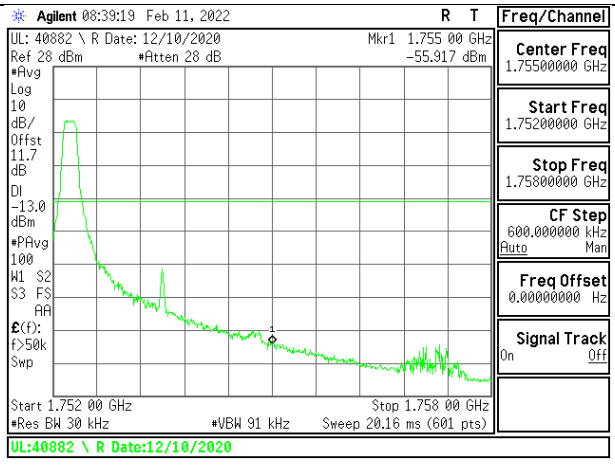
LTE4 3MHz QPSK LOW Ch RB1-0



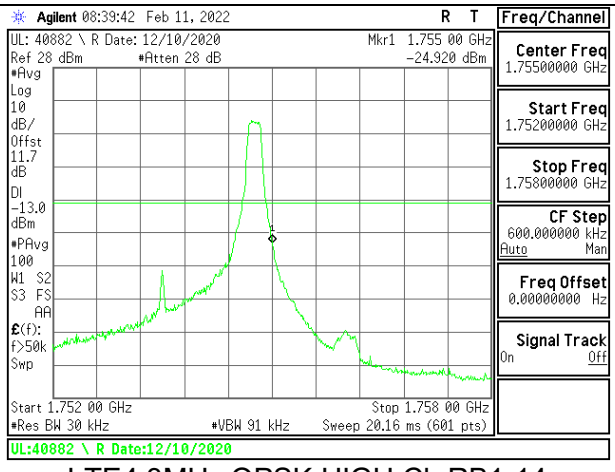
LTE4 3MHz QPSK LOW Ch RB1-14



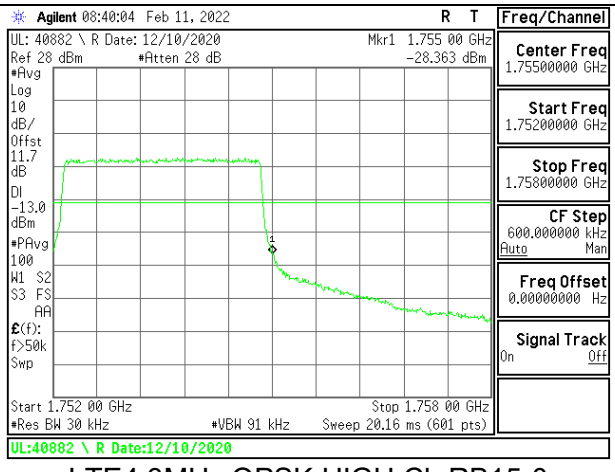
LTE4 3MHz QPSK LOW Ch RB15-0



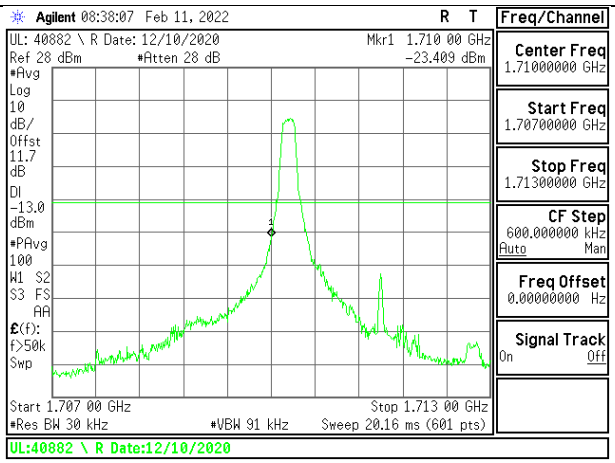
LTE4 3MHz QPSK HIGH Ch RB1-0



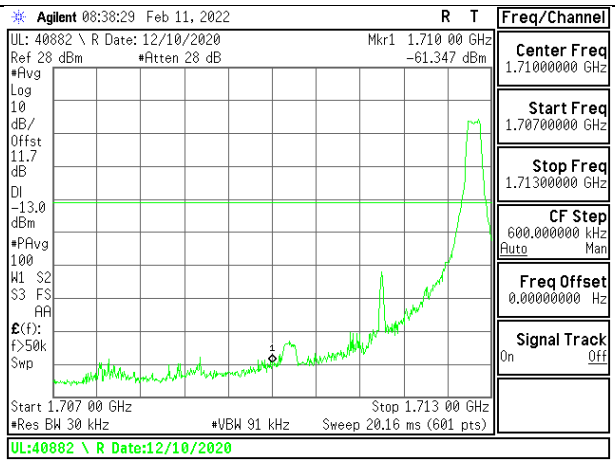
LTE4 3MHz QPSK HIGH Ch RB1-14



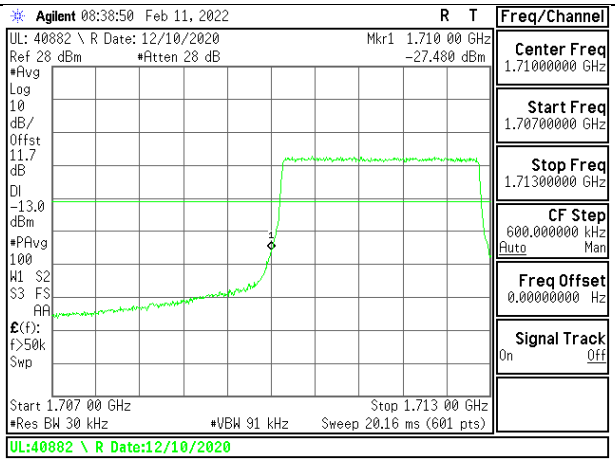
LTE4 3MHz QPSK HIGH Ch RB15-0



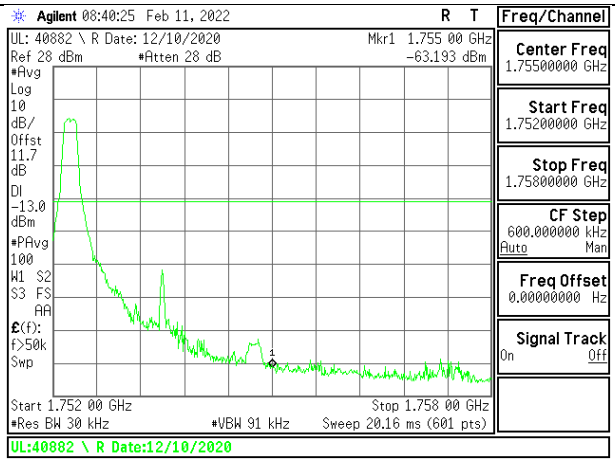
LTE4 3MHz 16QAM LOW Ch RB1-0



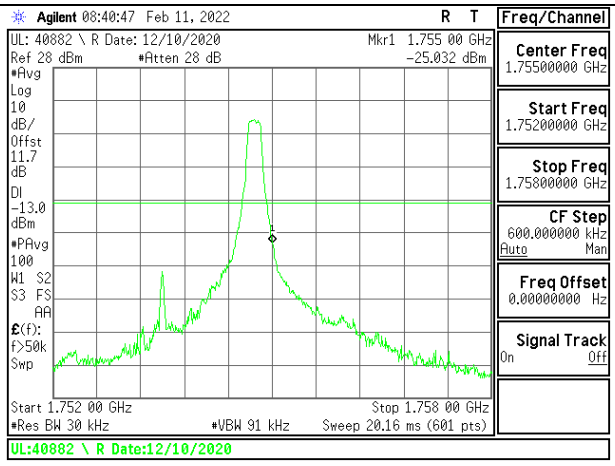
LTE4 3MHz 16QAM LOW Ch RB1-14



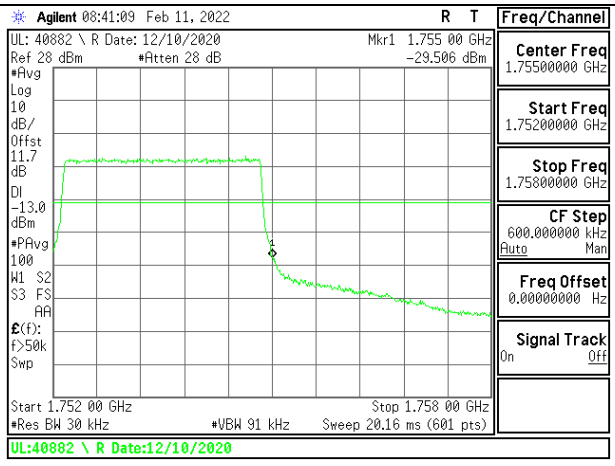
LTE4 3MHz 16QAM LOW Ch RB15-0



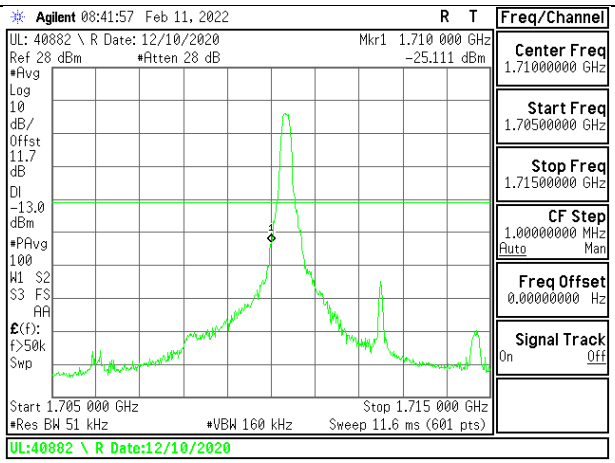
LTE4 3MHz 16QAM HIGH Ch RB1-0



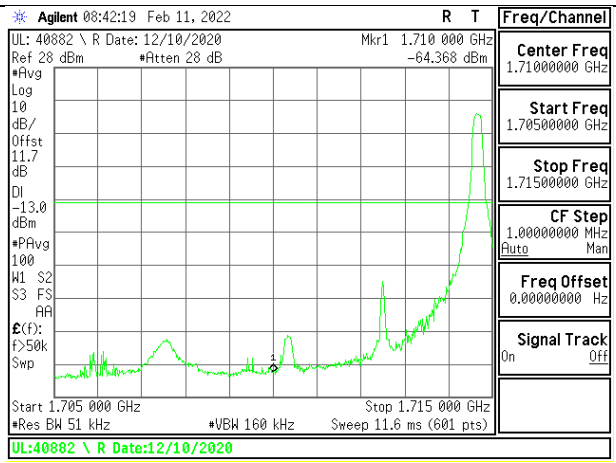
LTE4 3MHz 16QAM HIGH Ch RB1-14



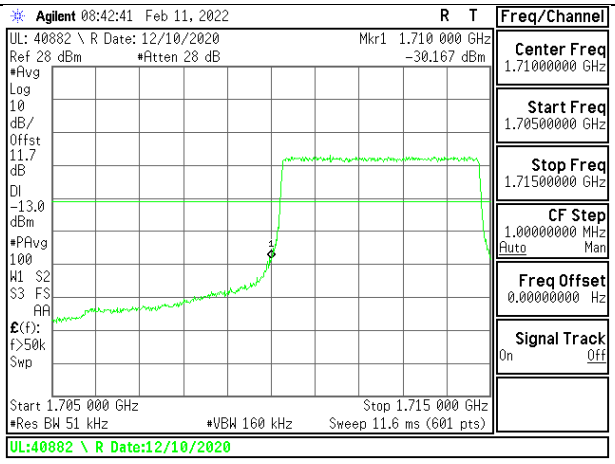
LTE4 3MHz 16QAM HIGH Ch RB15-0



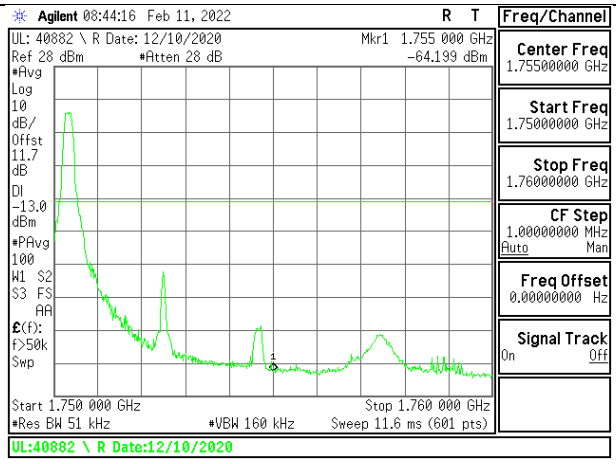
LTE4 5MHz QPSK LOW Ch RB1-0



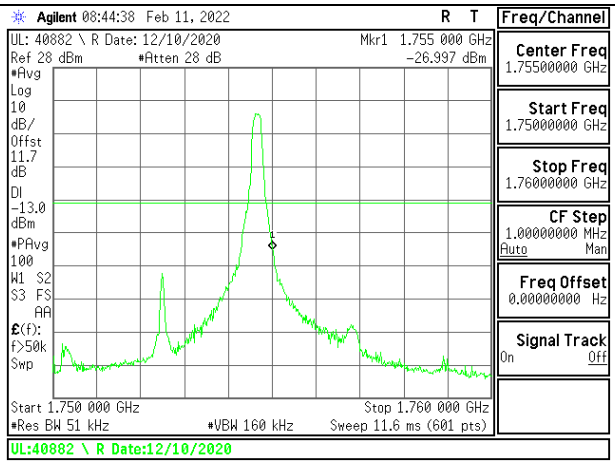
LTE4 5MHz QPSK LOW Ch RB1-24



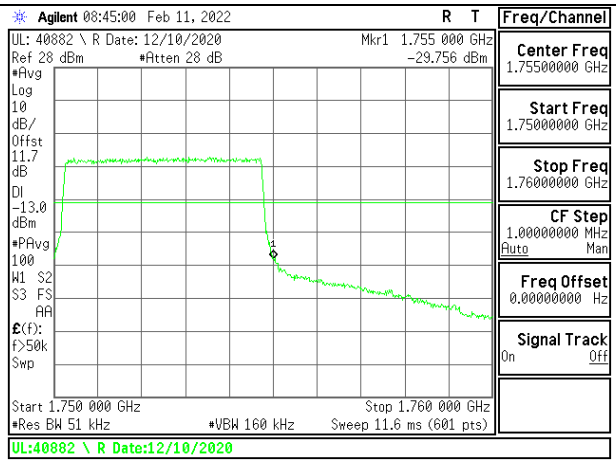
LTE4 5MHz QPSK LOW Ch RB25-0



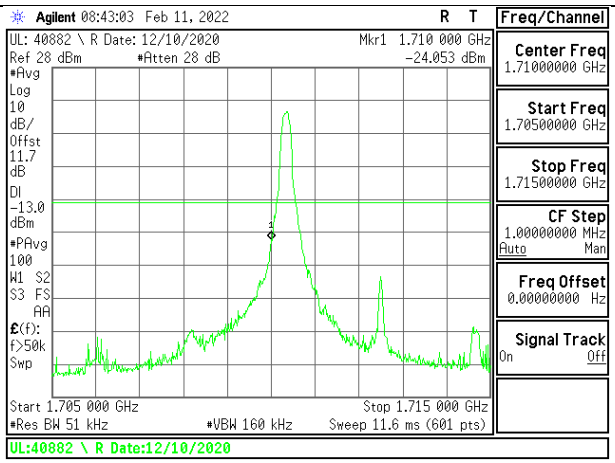
LTE4 5MHz QPSK HIGH Ch RB1-0



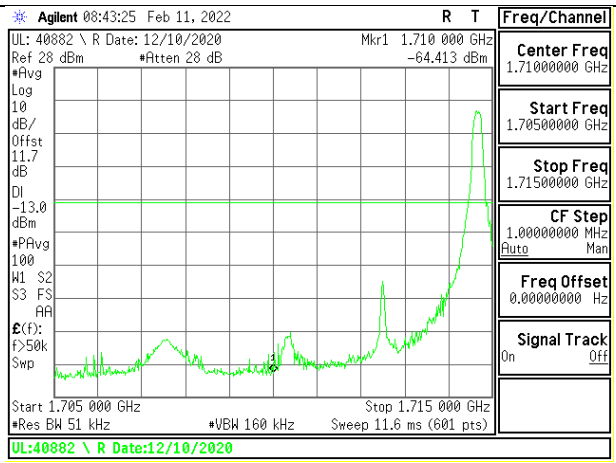
LTE4 5MHz QPSK HIGH Ch RB1-24



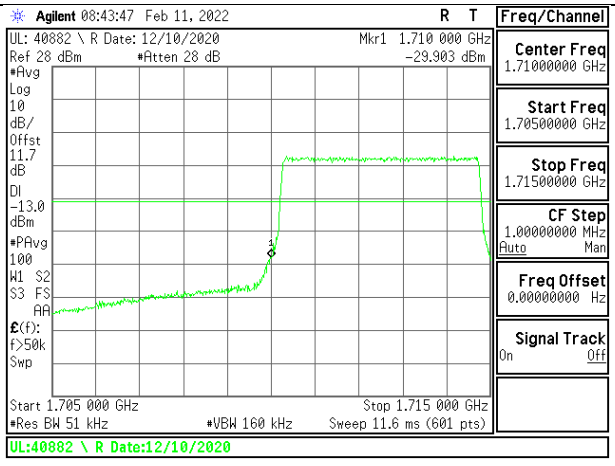
LTE4 5MHz QPSK HIGH Ch RB25-0



LTE4 5MHz 16QAM LOW Ch RB1-0



LTE4 5MHz 16QAM LOW Ch RB1-24



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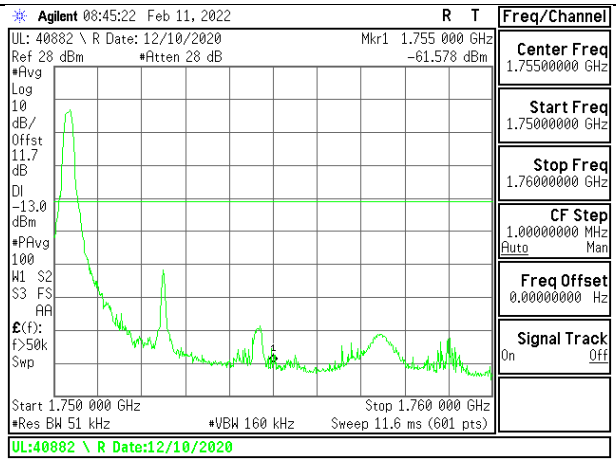
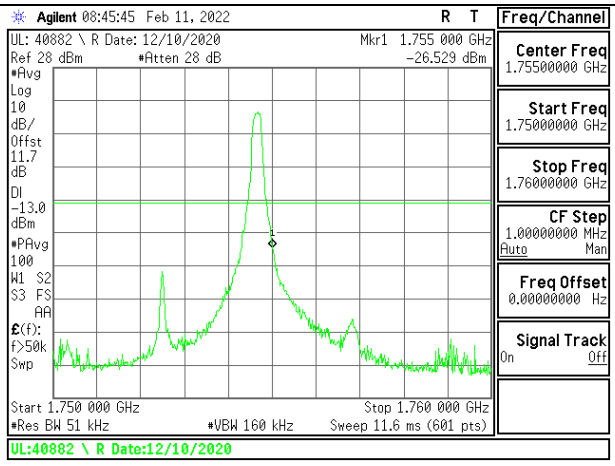
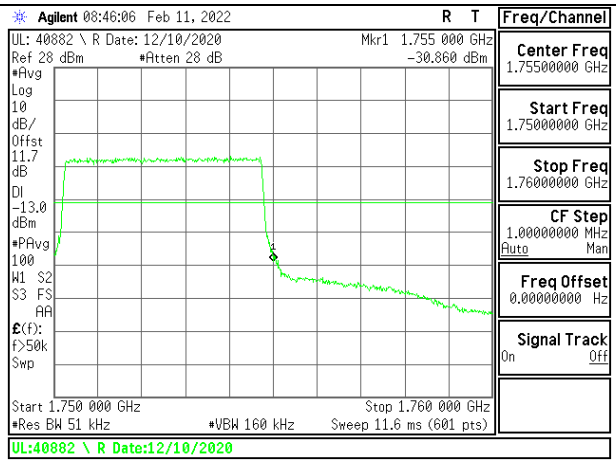


LTE4 5MHz 16QAM HIGH Ch RB1-0



LTE4 5MHz 16QAM HIGH Ch RB1-24



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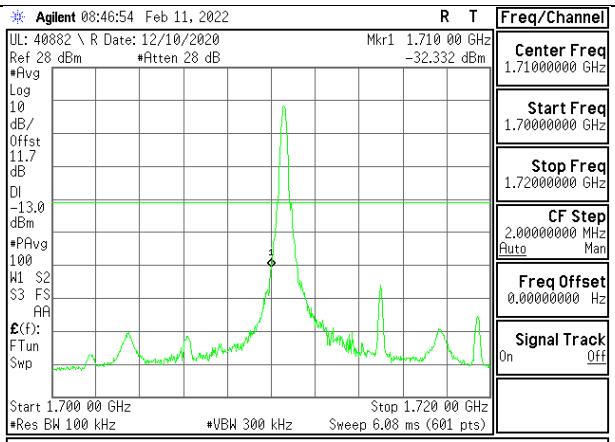
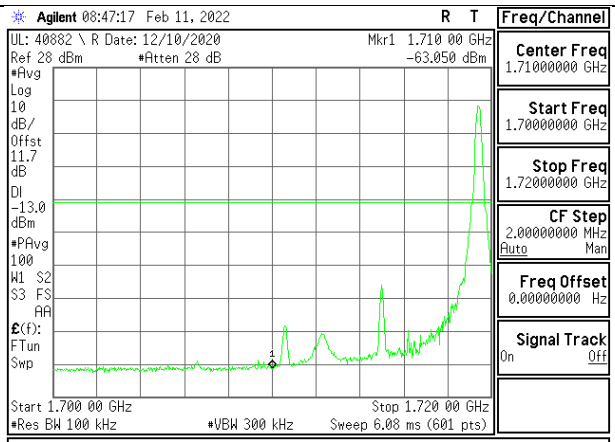
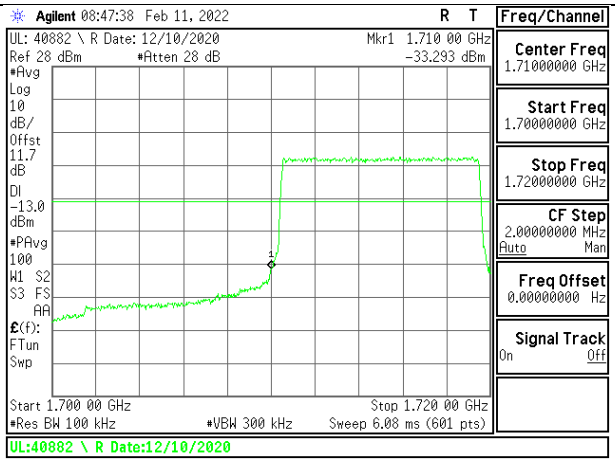


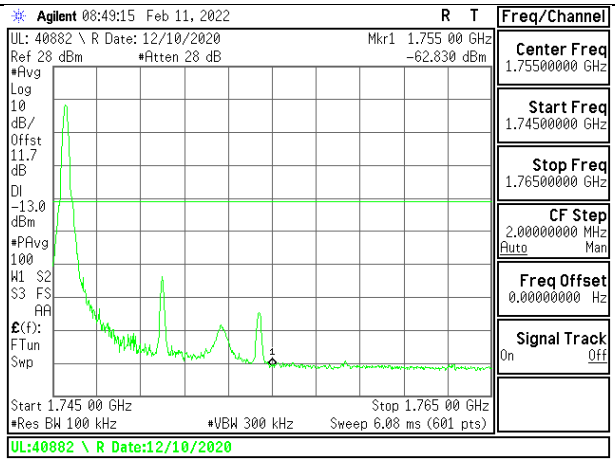
LTE4 10MHz QPSK LOW Ch RB1-0



LTE4 10MHz QPSK LOW Ch RB1-49



LTE4 10MHz QPSK LOW Ch RB50-0



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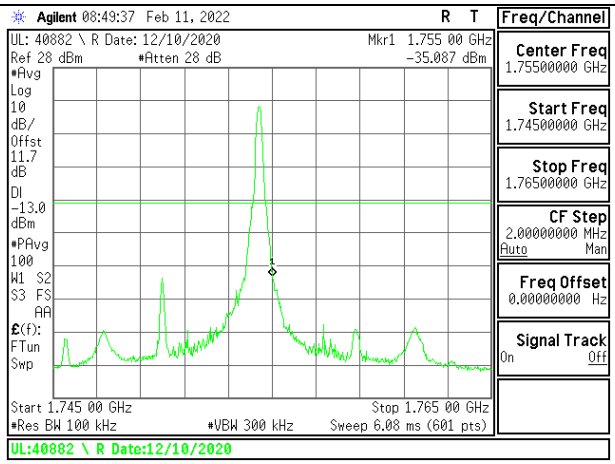

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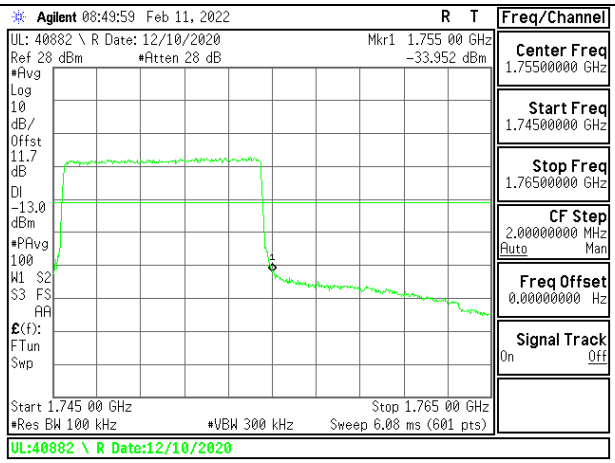

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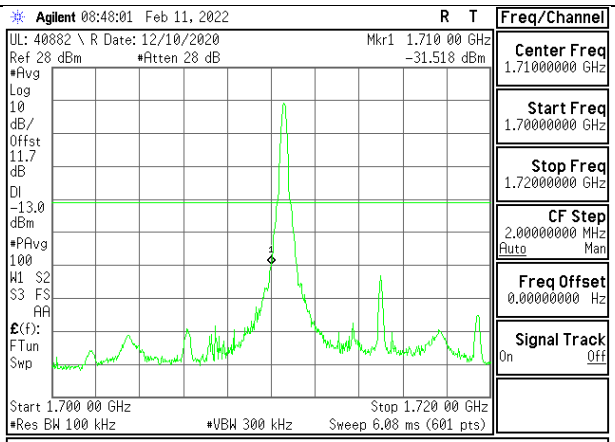

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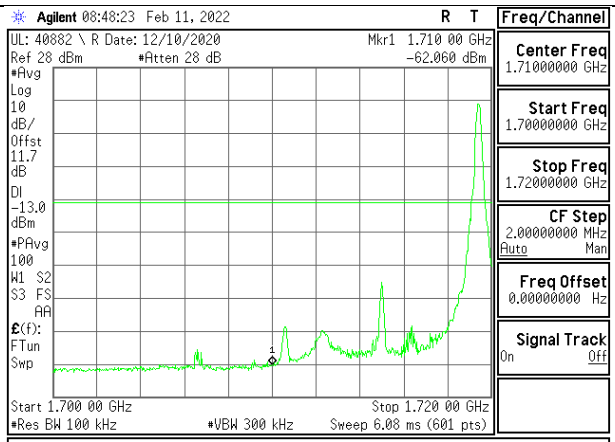

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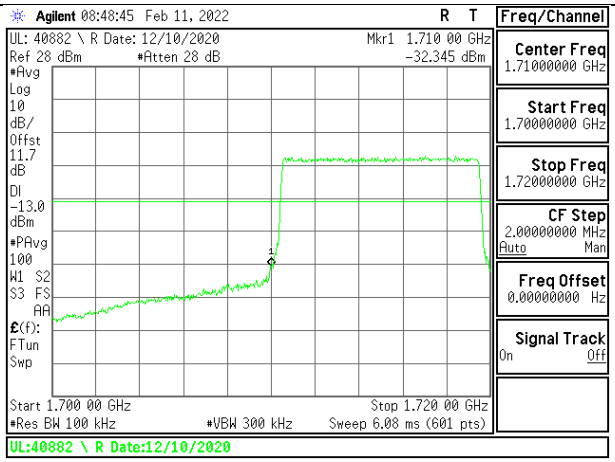
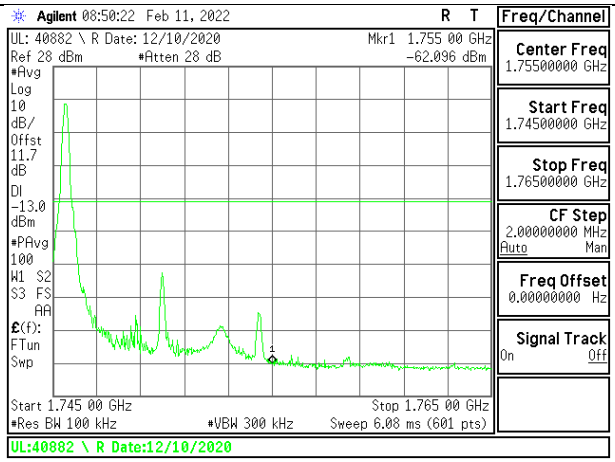
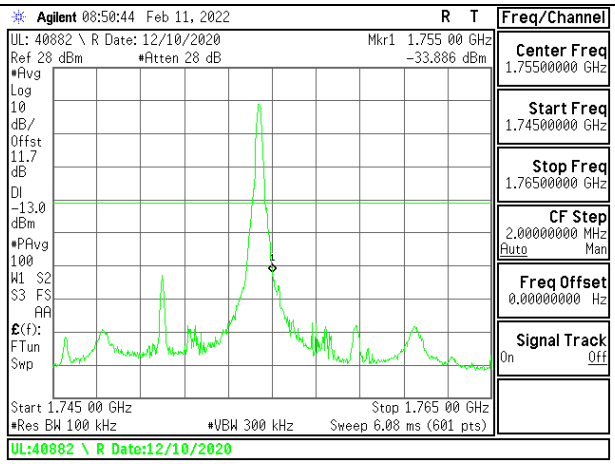


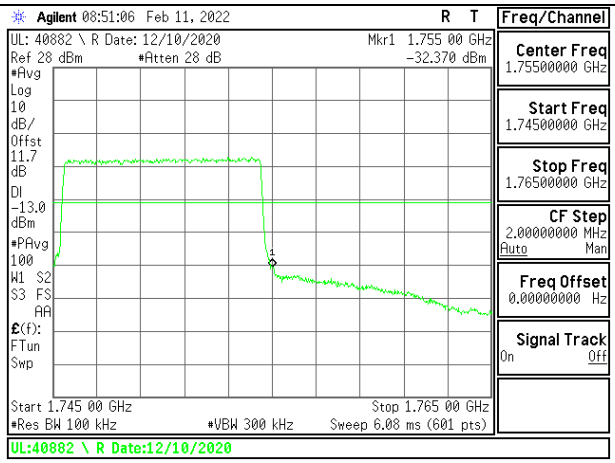
LTE4 10MHz 16QAM LOW Ch RB50-0



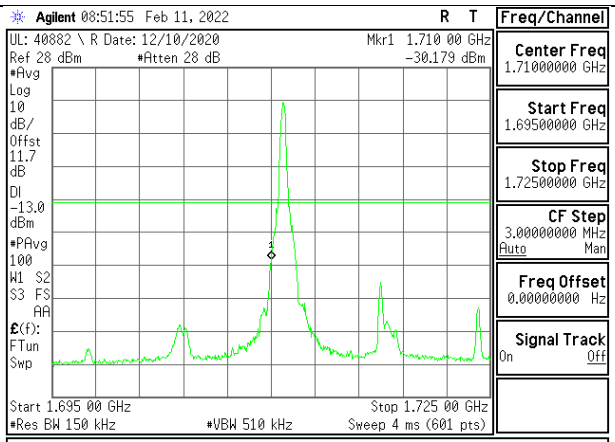
LTE4 10MHz 16QAM HIGH Ch RB1-0



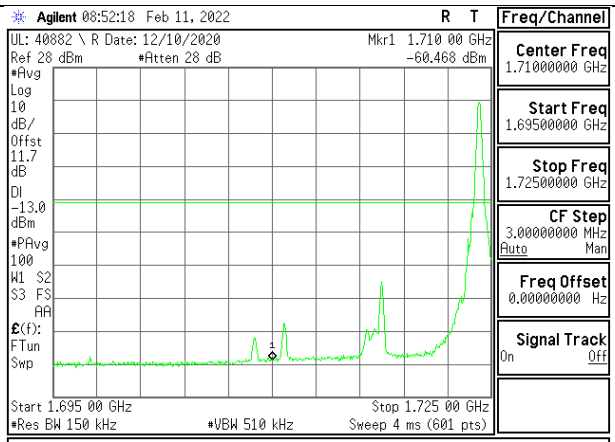
LTE4 10MHz 16QAM HIGH Ch RB1-49



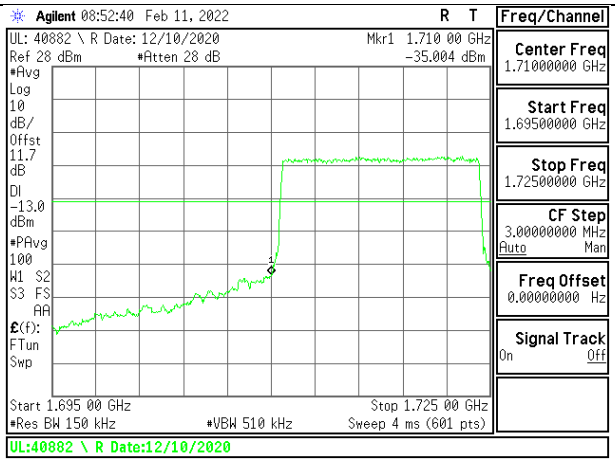
LTE4 10MHz 16QAM HIGH Ch RB50-0



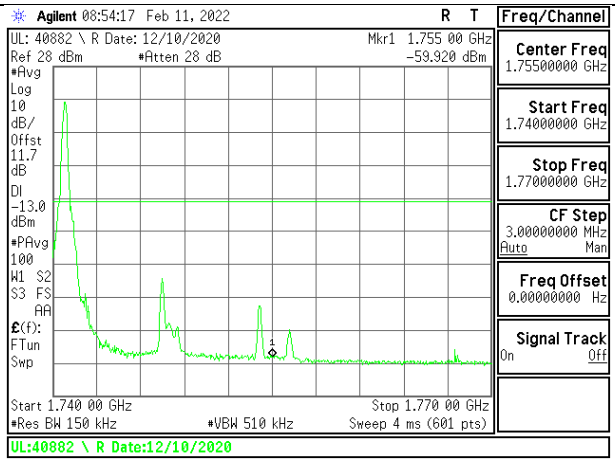
LTE4 15MHz QPSK LOW Ch RB1-0



LTE4 15MHz QPSK LOW Ch RB1-74



LTE4 15MHz QPSK LOW Ch RB75-0



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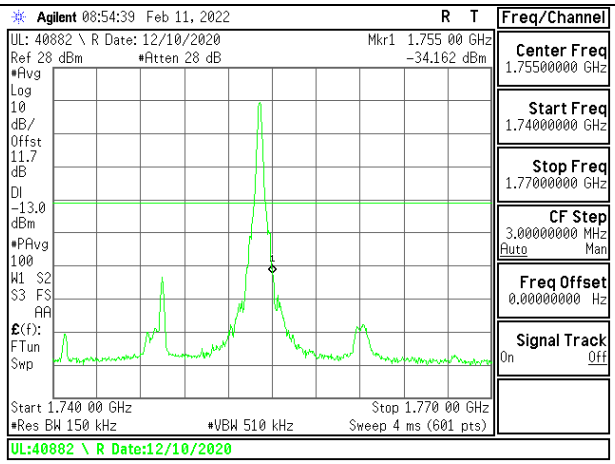

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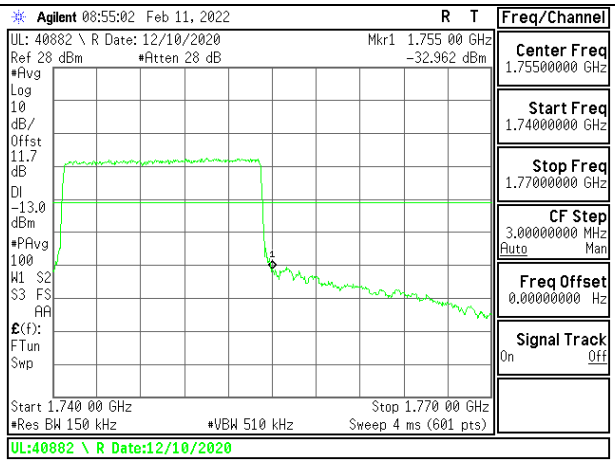

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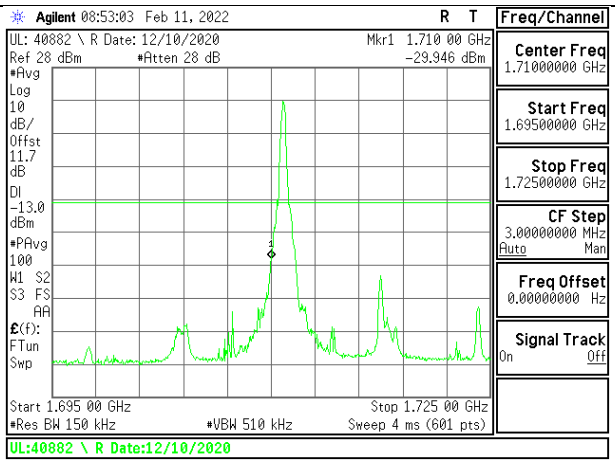

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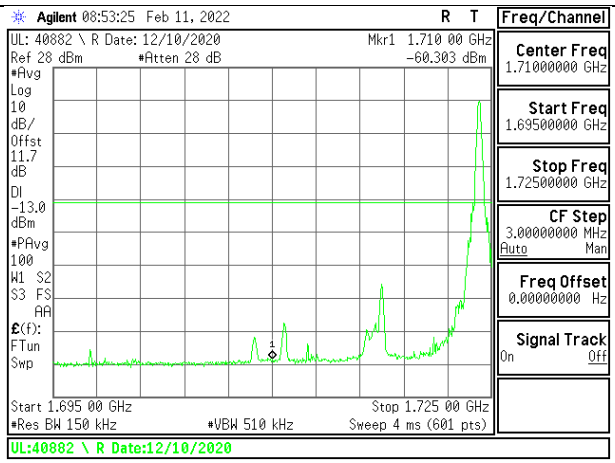

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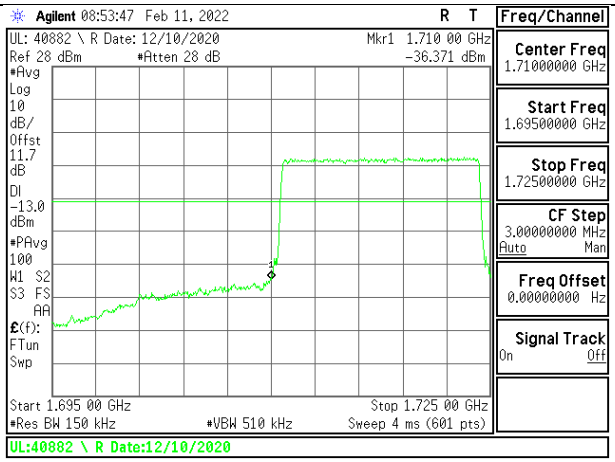
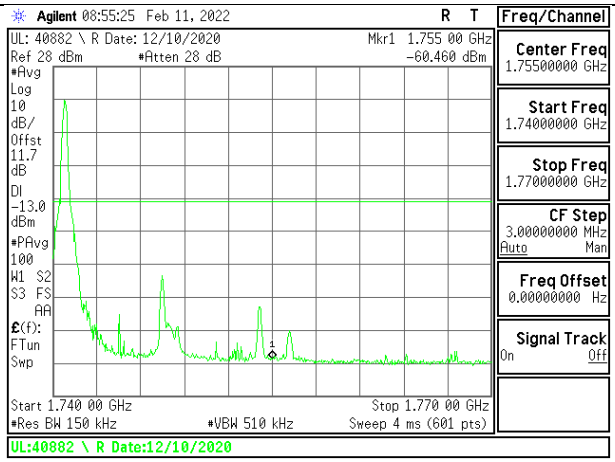
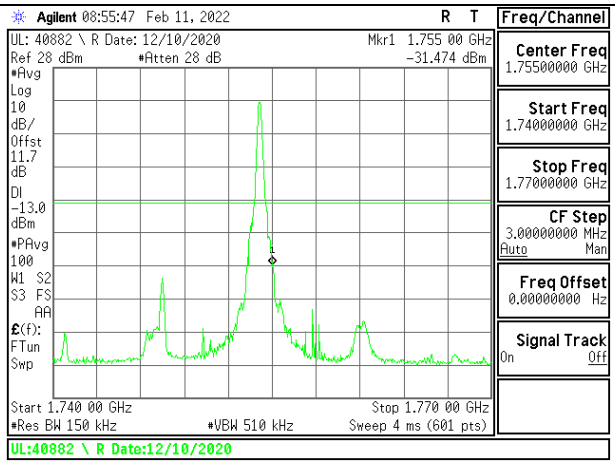


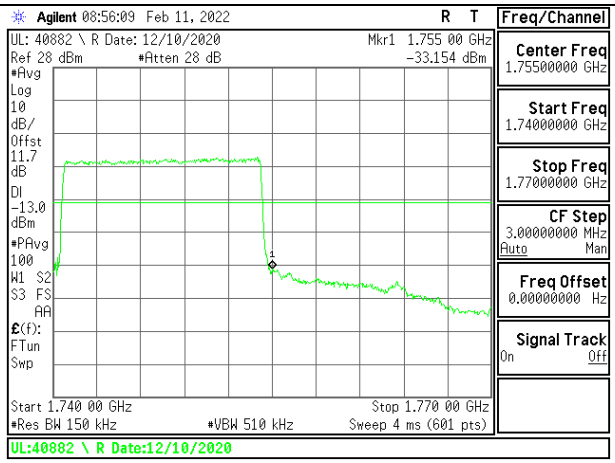
LTE4 15MHz 16QAM LOW Ch RB75-0



LTE4 15MHz 16QAM HIGH Ch RB1-0



LTE4 15MHz 16QAM HIGH Ch RB1-74



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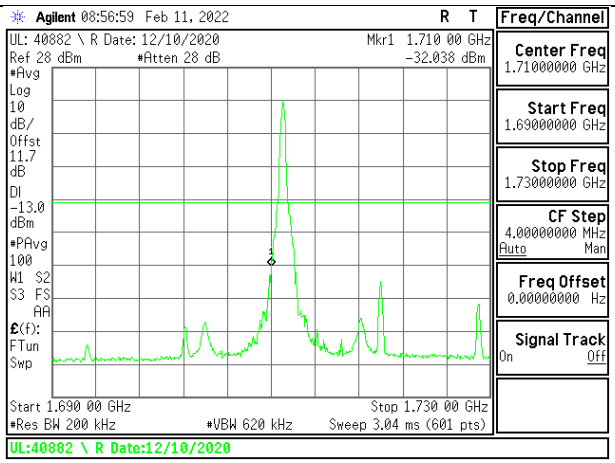
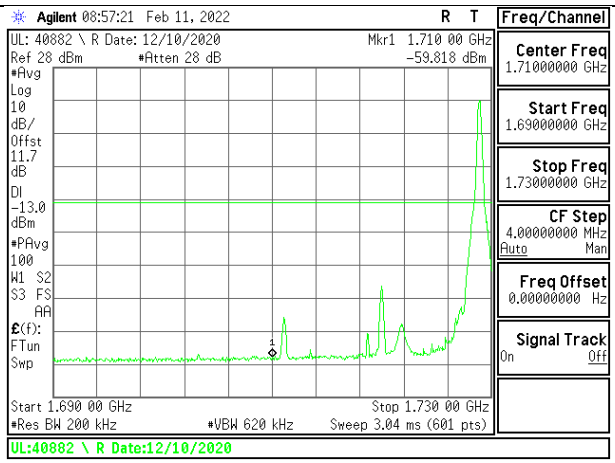
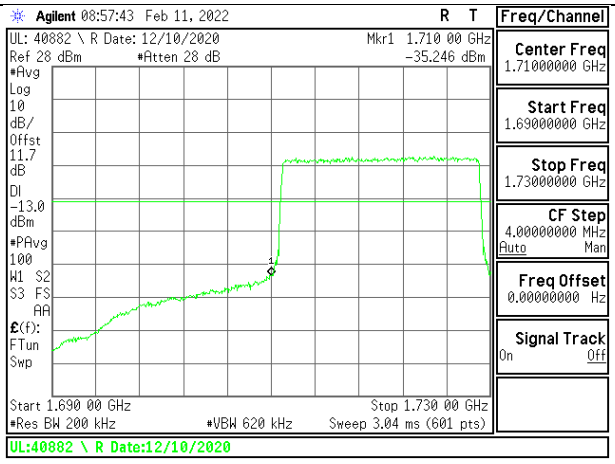


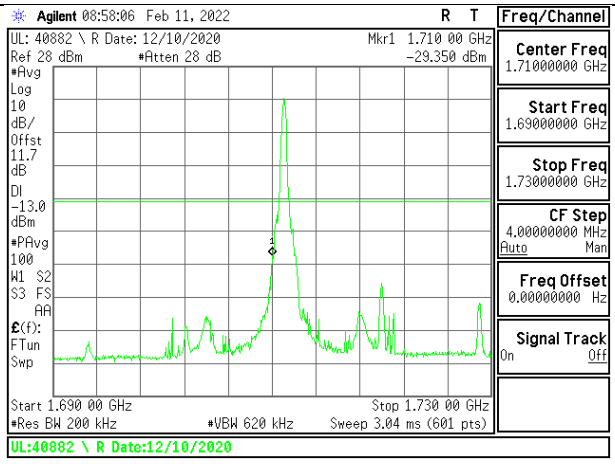
LTE4 20MHz QPSK LOW Ch RB1-0



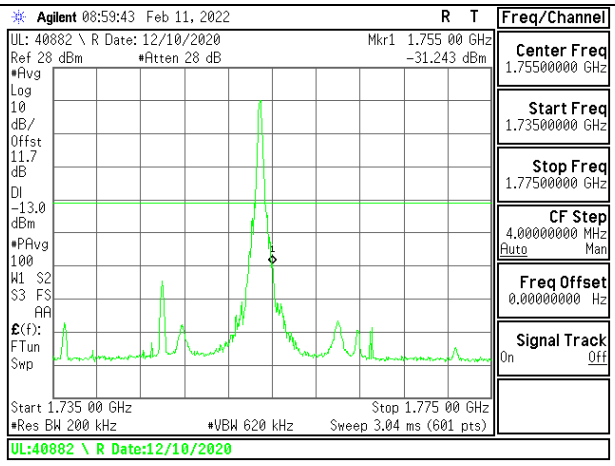
LTE4 20MHz QPSK LOW Ch RB1-99



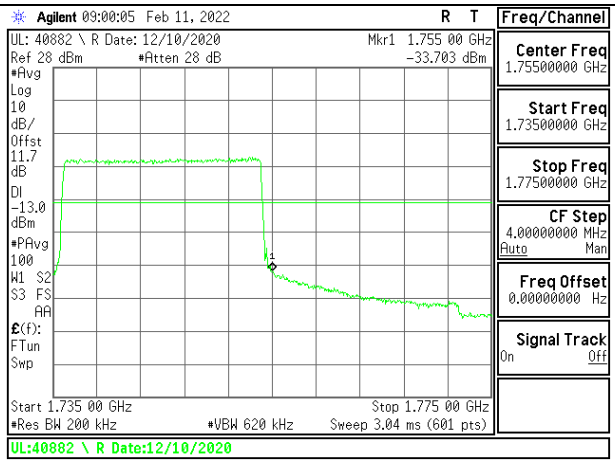
LTE4 20MHz QPSK LOW Ch RB100-0



LTE4 20MHz QPSK HIGH Ch RB1-0



LTE4 20MHz QPSK HIGH Ch RB1-99



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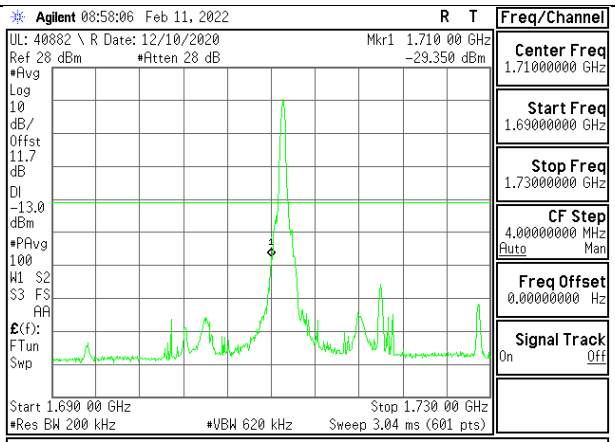
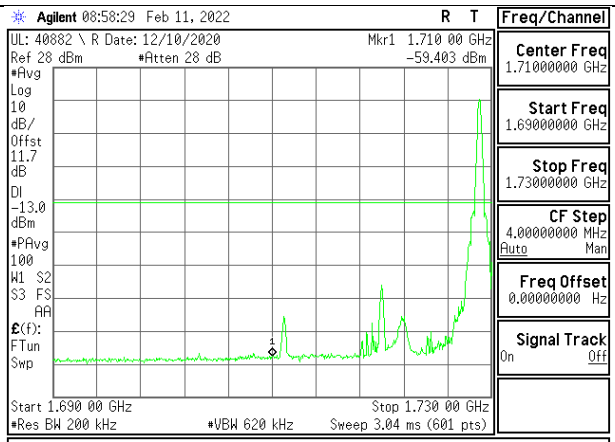
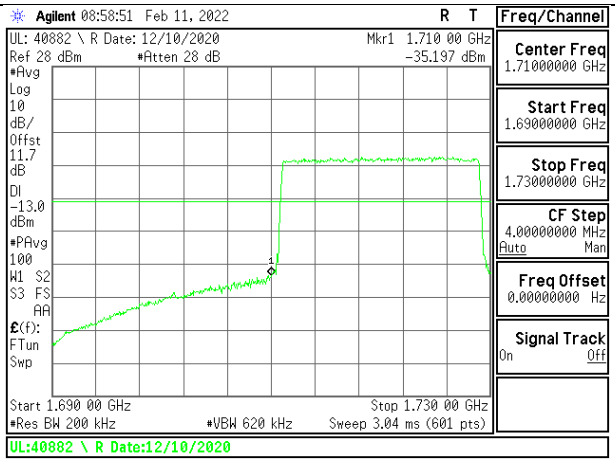


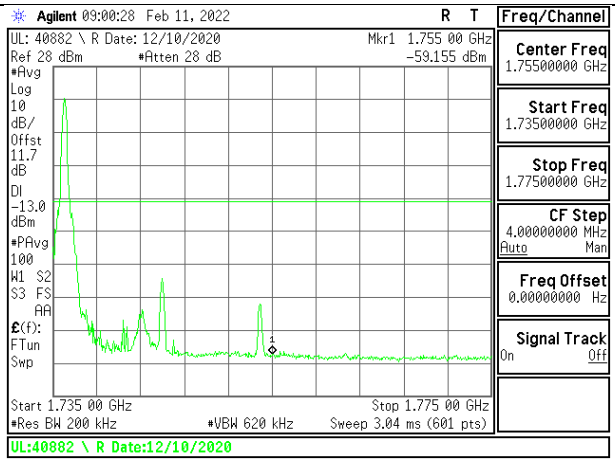
LTE4 20MHz 16QAM LOW Ch RB1-0



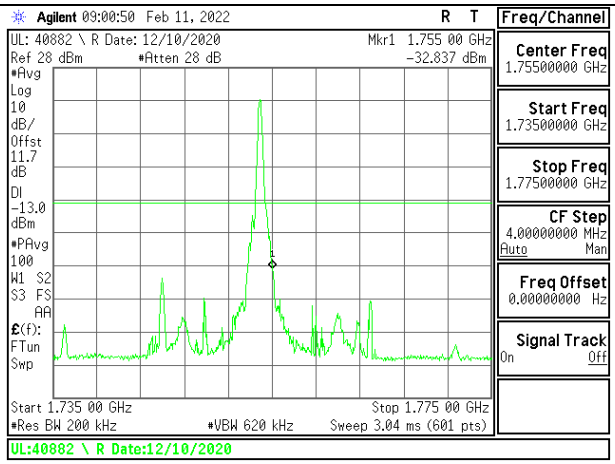
LTE4 20MHz 16QAM LOW Ch RB1-99



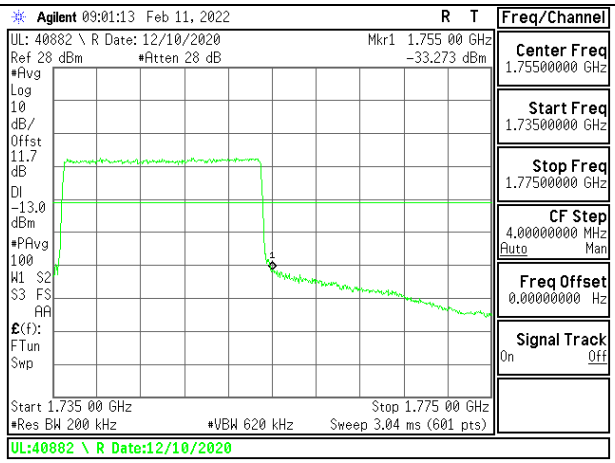
LTE4 20MHz 16QAM LOW Ch RB100-0



LTE4 20MHz 16QAM HIGH Ch RB1-0



LTE4 20MHz 16QAM HIGH Ch RB1-99

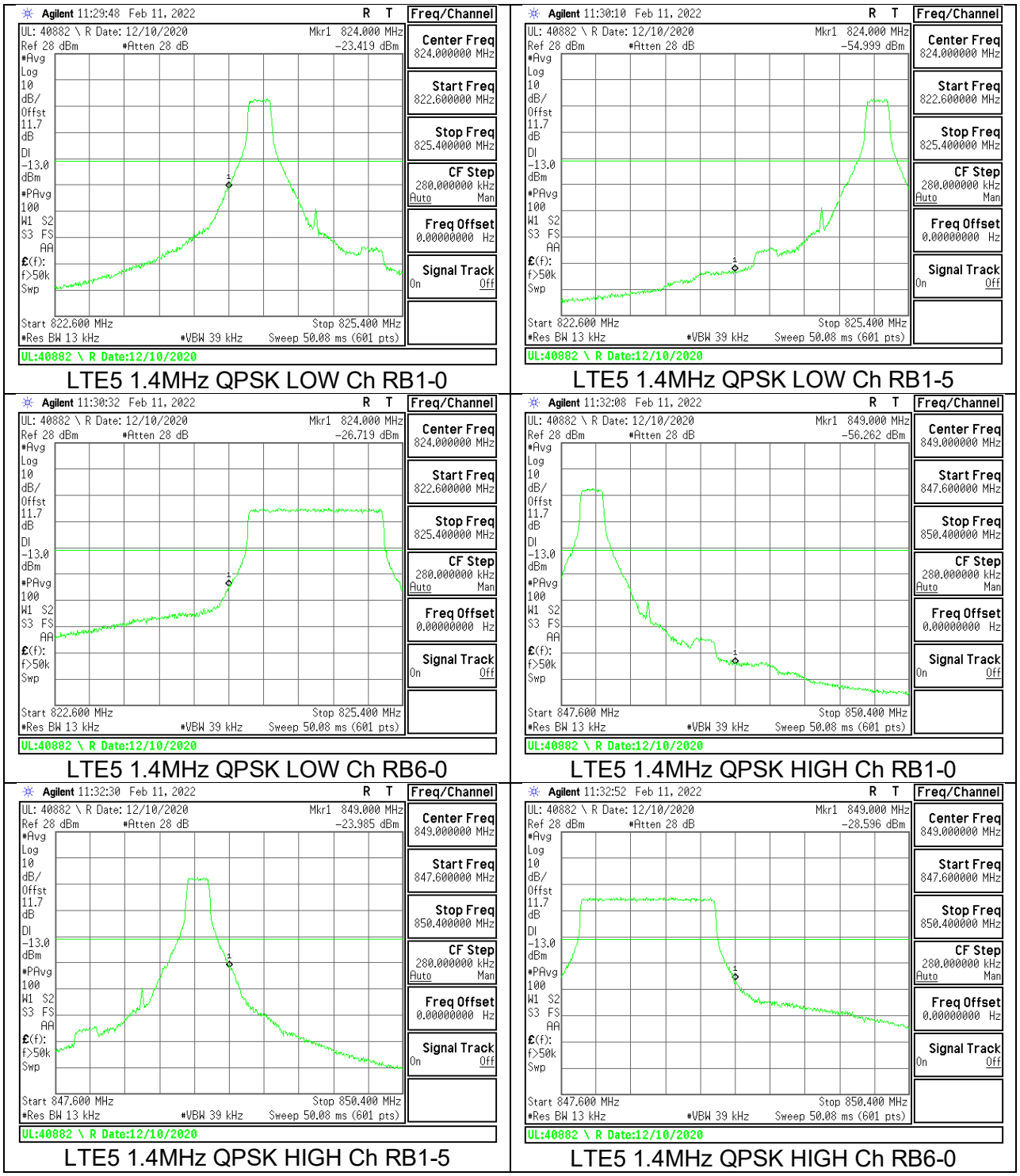


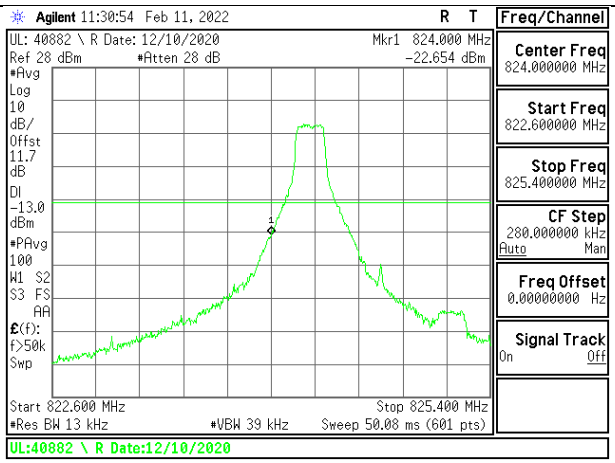
LTE4 20MHz 16QAM HIGH Ch RB100-0

9.2.5.LTE5

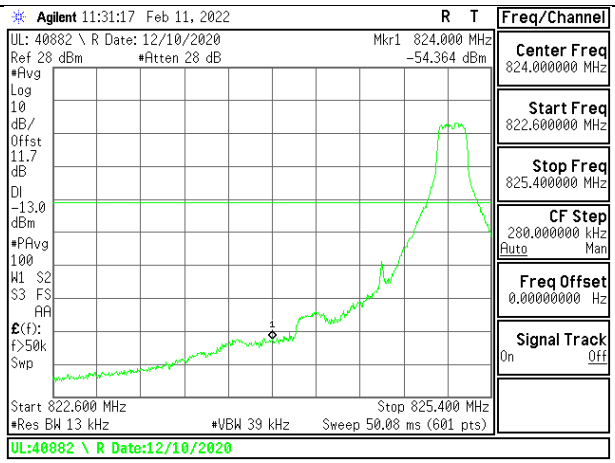
LIMITS

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

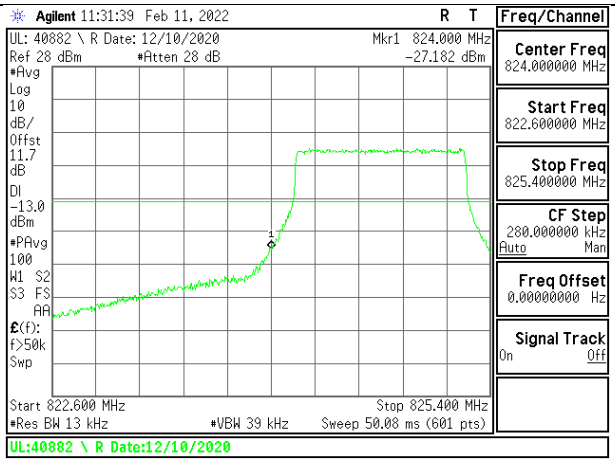




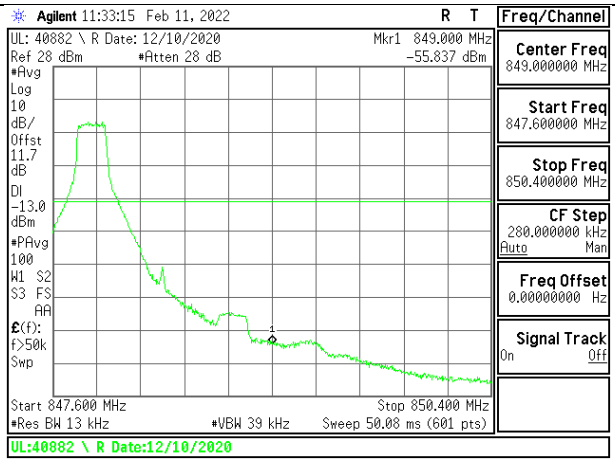
LTE5 1.4MHz 16QAM LOW Ch RB1-0



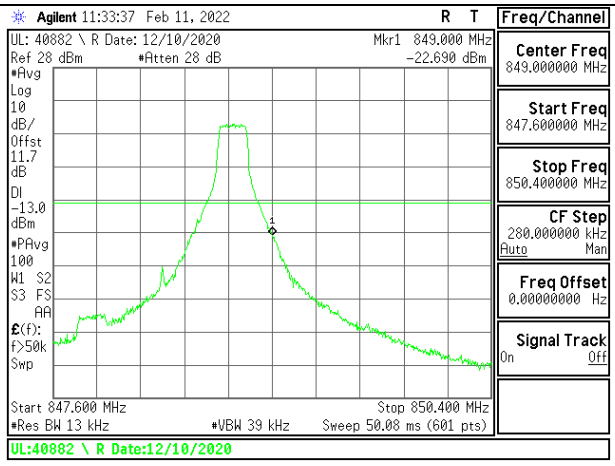
LTE5 1.4MHz 16QAM LOW Ch RB1-5



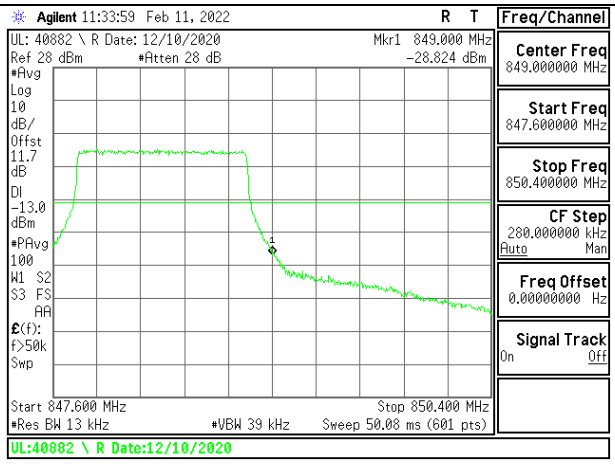
LTE5 1.4MHz 16QAM LOW Ch RB6-0



LTE5 1.4MHz 16QAM HIGH Ch RB1-0



LTE5 1.4MHz 16QAM HIGH Ch RB1-5



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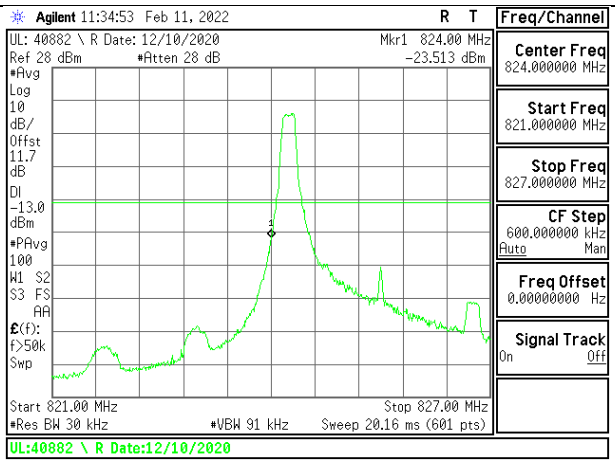
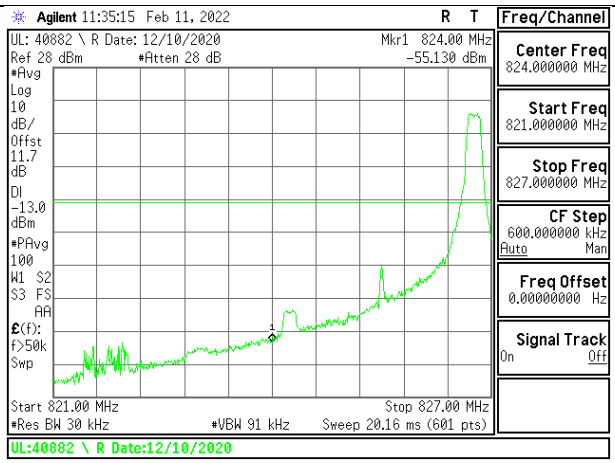
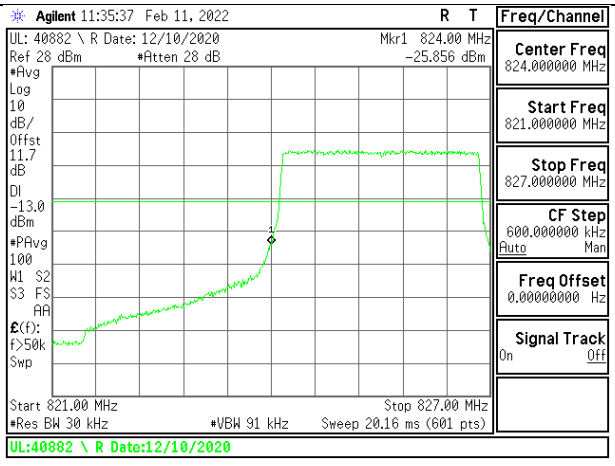


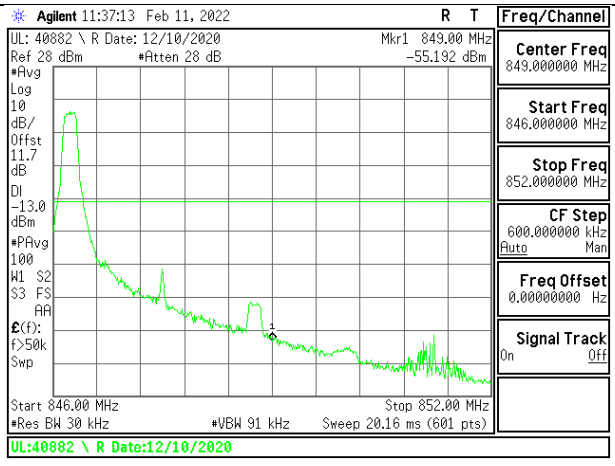
LTE5 3MHz QPSK LOW Ch RB1-0



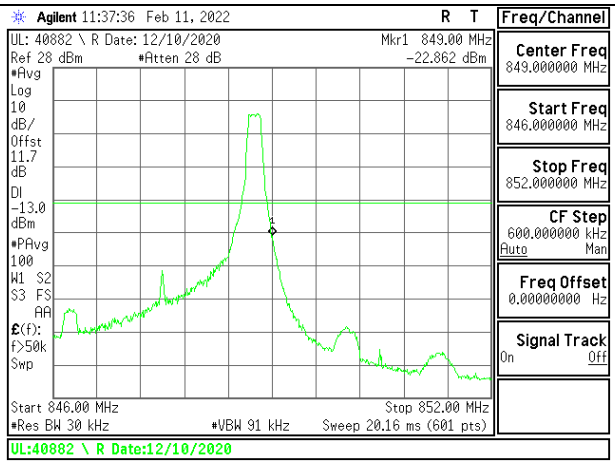
LTE5 3MHz QPSK LOW Ch RB1-14



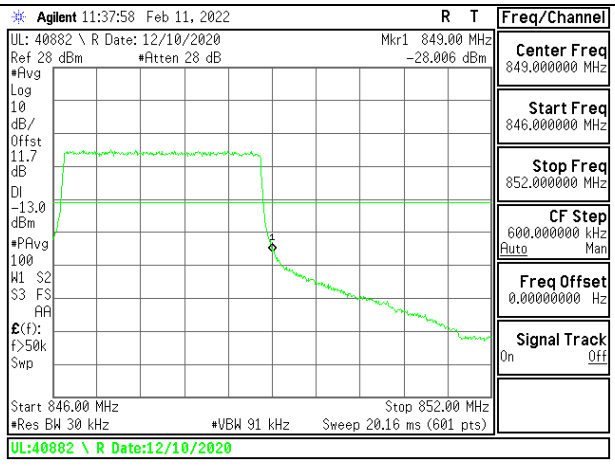
LTE5 3MHz QPSK LOW Ch RB15-0



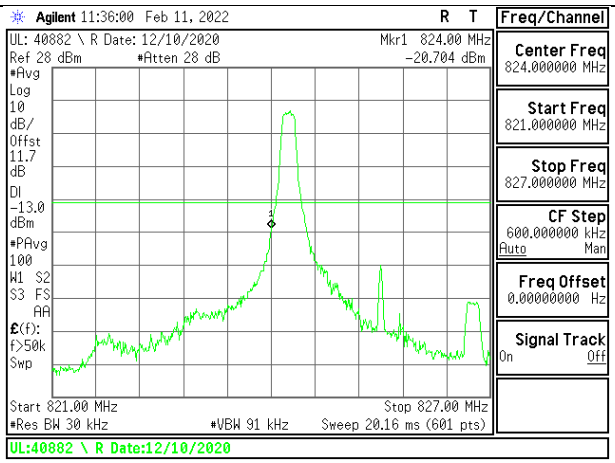
LTE5 3MHz QPSK HIGH Ch RB1-0



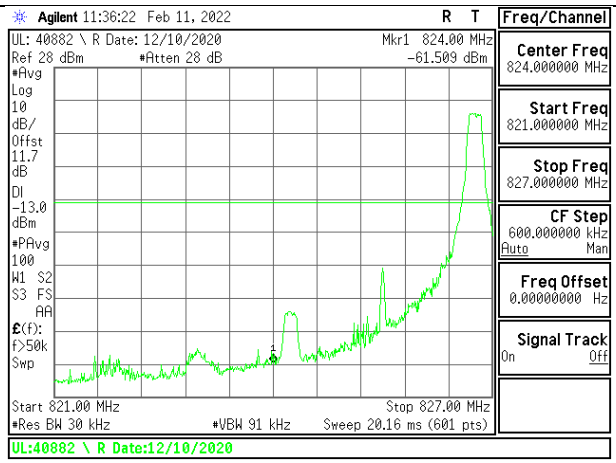
LTE5 3MHz QPSK HIGH Ch RB1-14



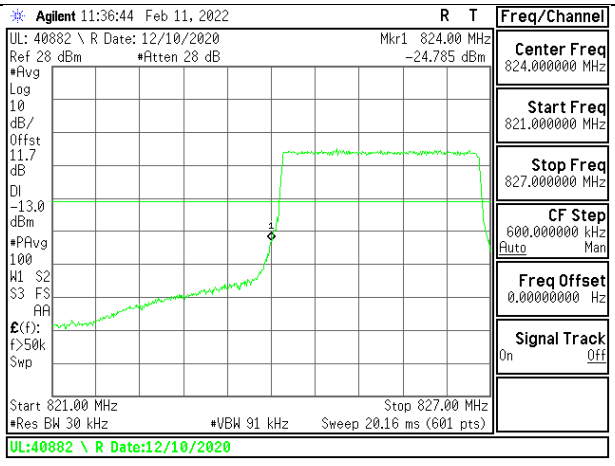
LTE5 3MHz QPSK HIGH Ch RB15-0



LTE5 3MHz 16QAM LOW Ch RB1-0



LTE5 3MHz 16QAM LOW Ch RB1-14



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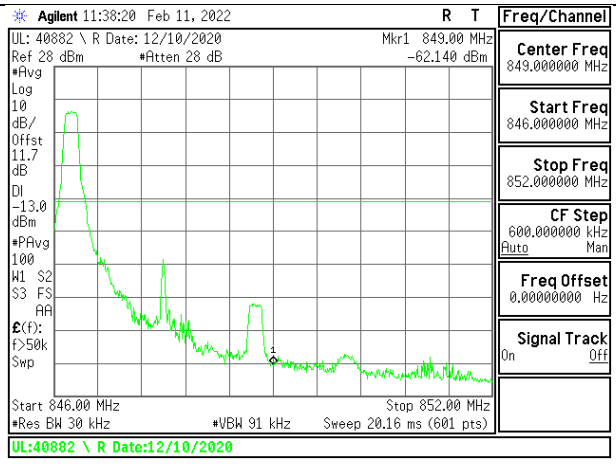

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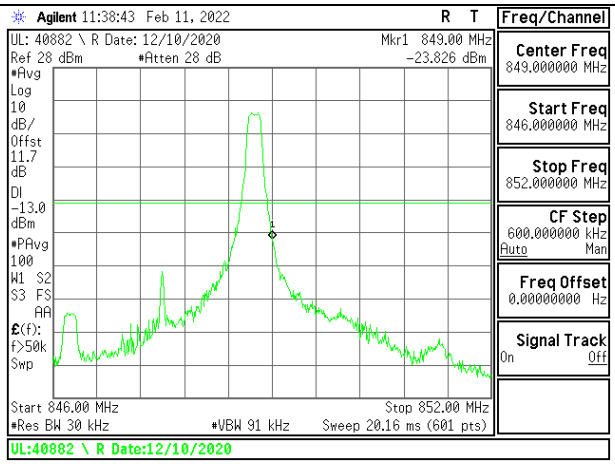

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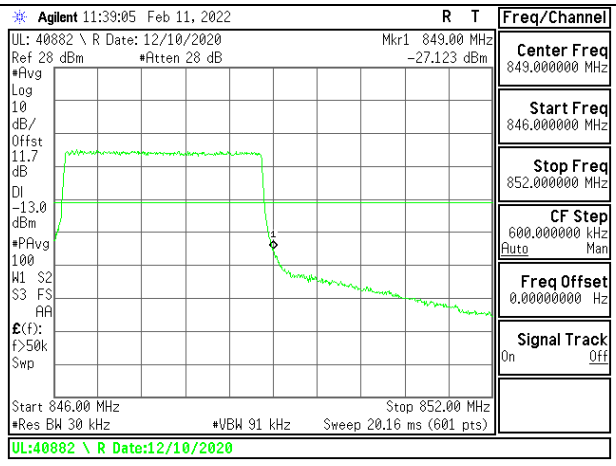

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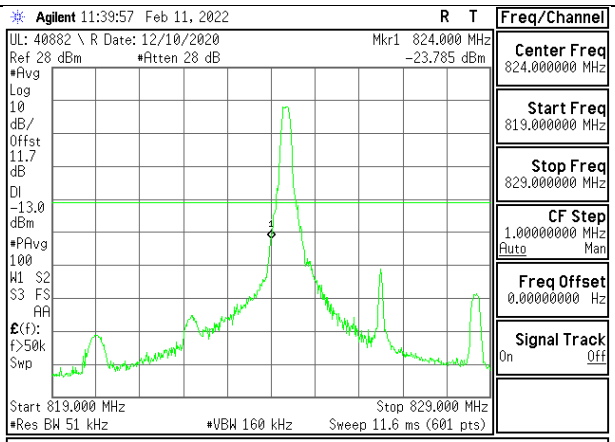
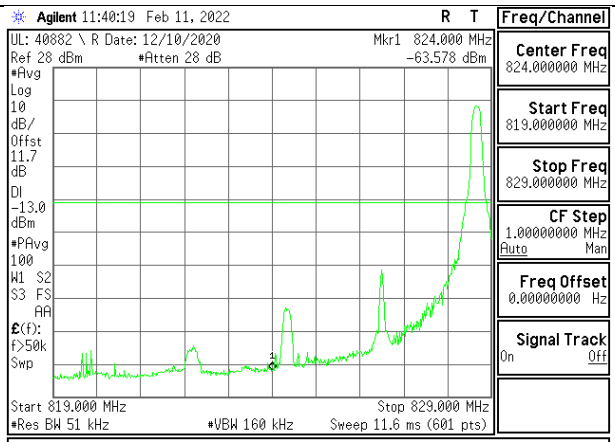
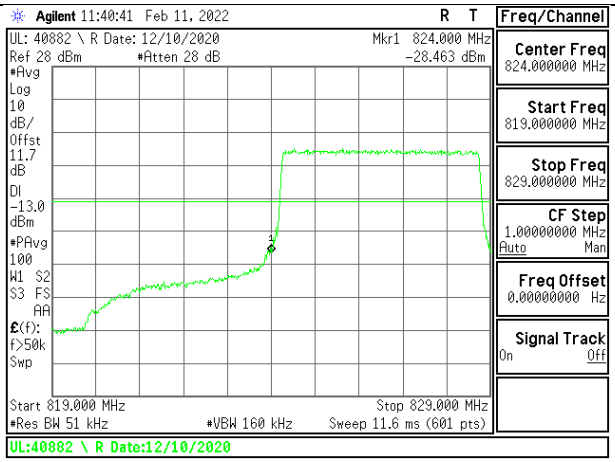


LTE5 5MHz QPSK LOW Ch RB1-0



LTE5 5MHz QPSK LOW Ch RB1-24



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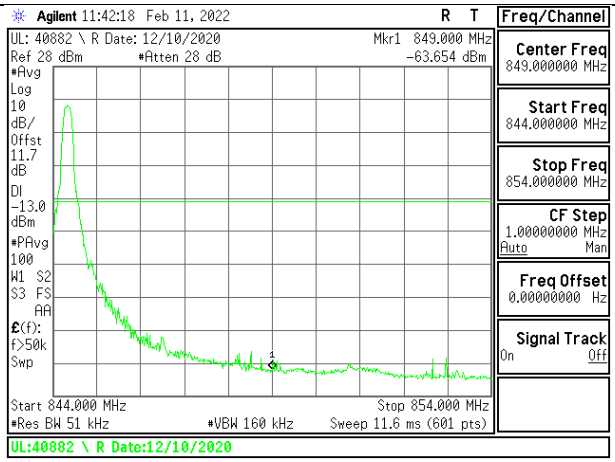

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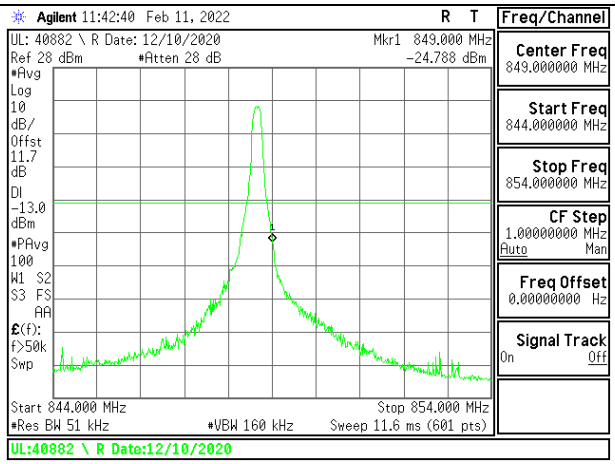

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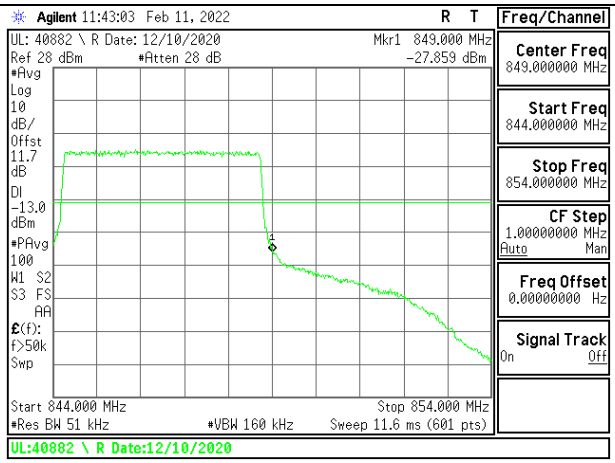

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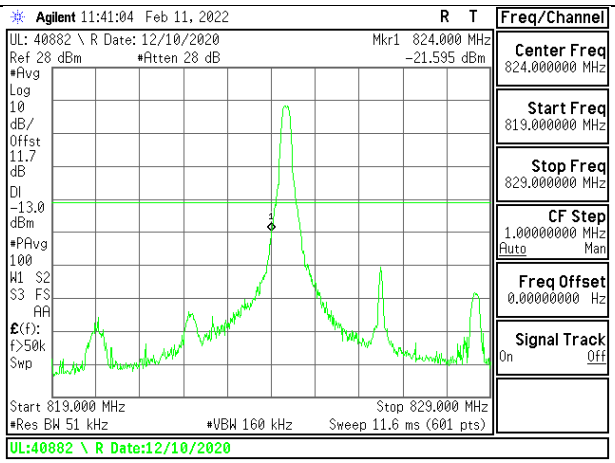

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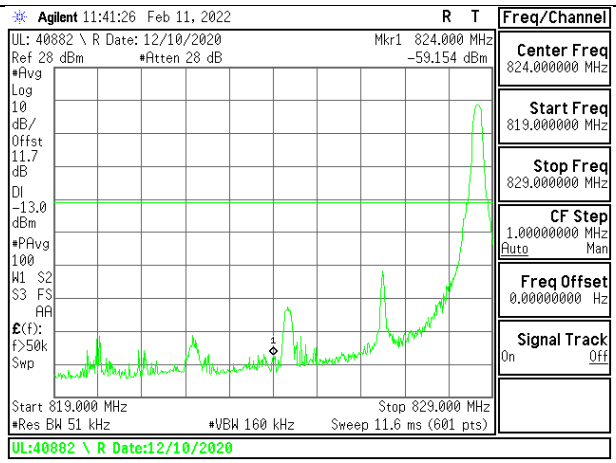
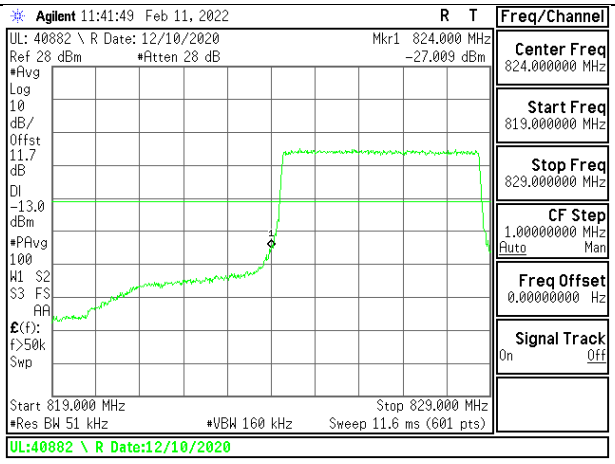
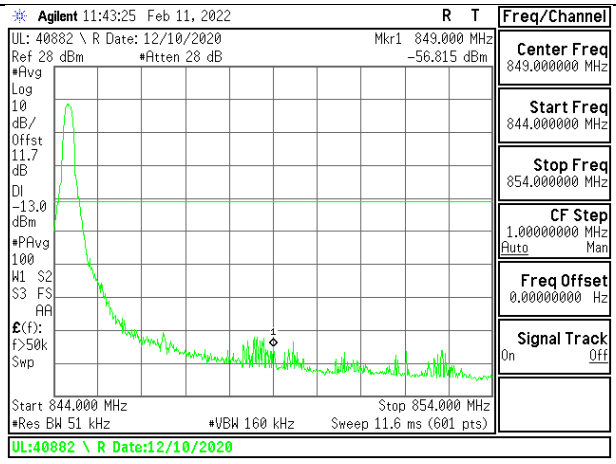


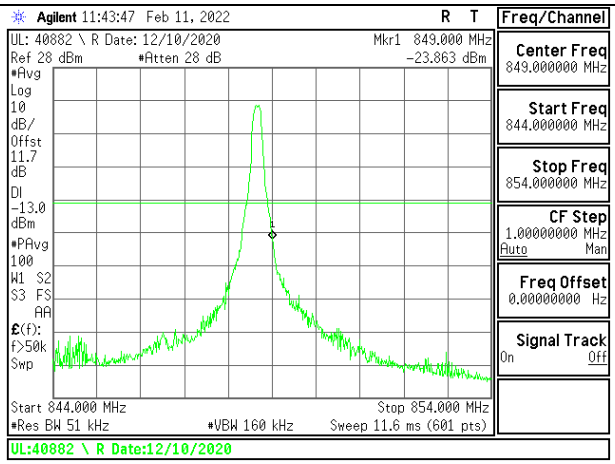
LTE5 5MHz 16QAM LOW Ch RB1-24



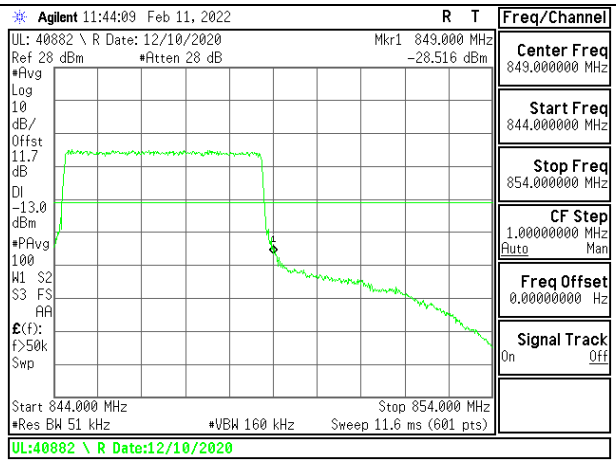
LTE5 5MHz 16QAM LOW Ch RB25-0



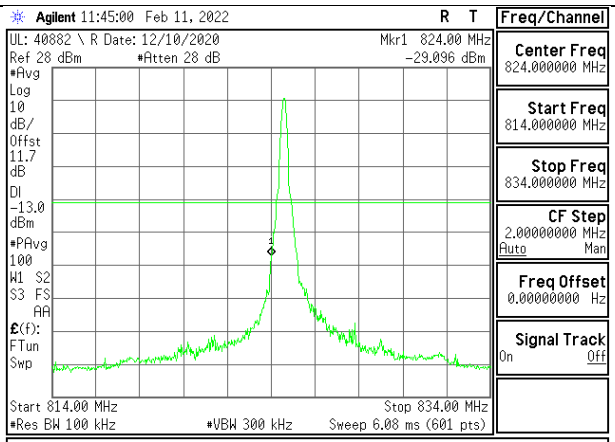
LTE5 5MHz 16QAM HIGH Ch RB1-0



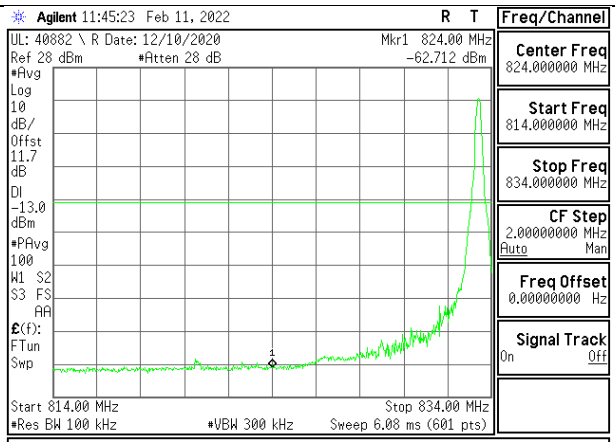
LTE5 5MHz 16QAM HIGH Ch RB1-24



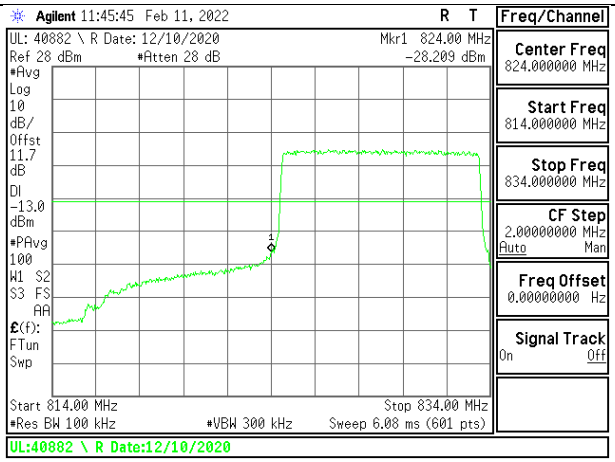
LTE5 5MHz 16QAM HIGH Ch RB25-0



LTE5 10MHz QPSK LOW Ch RB1-0



LTE5 10MHz QPSK LOW Ch RB1-49



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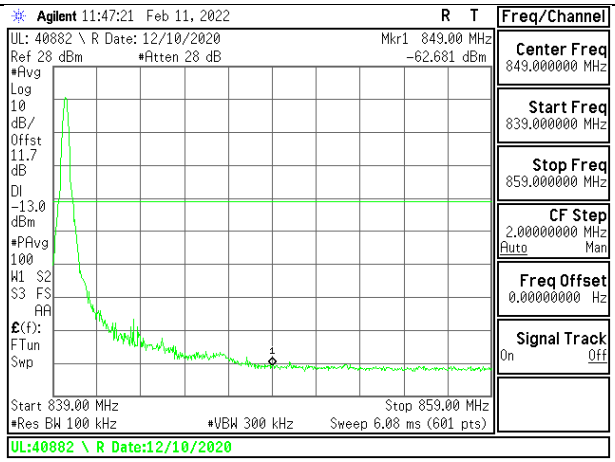

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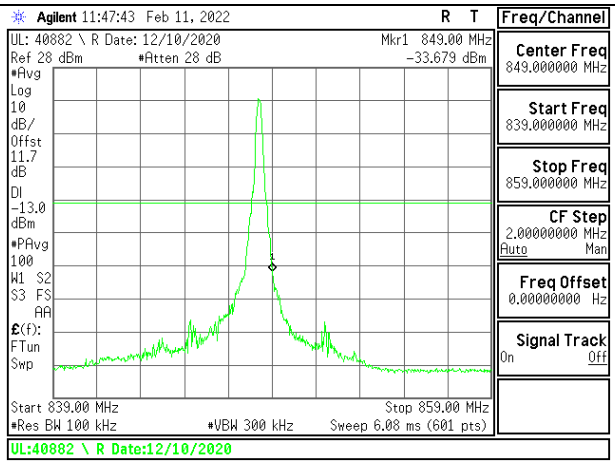

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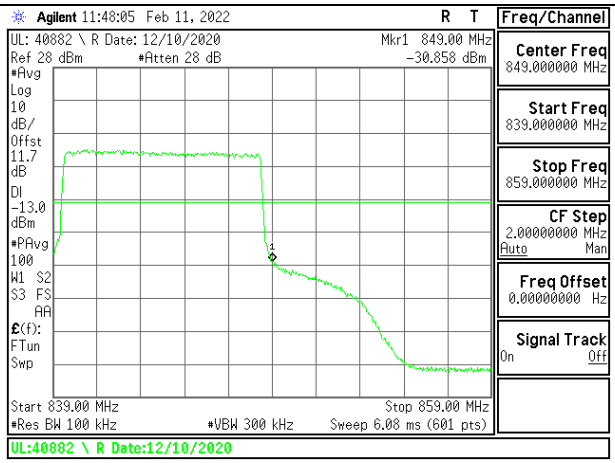

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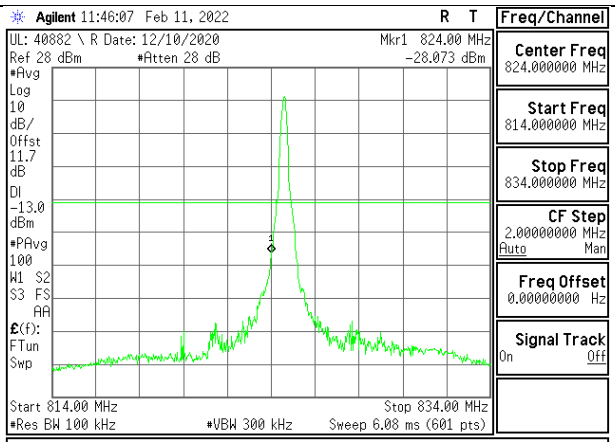

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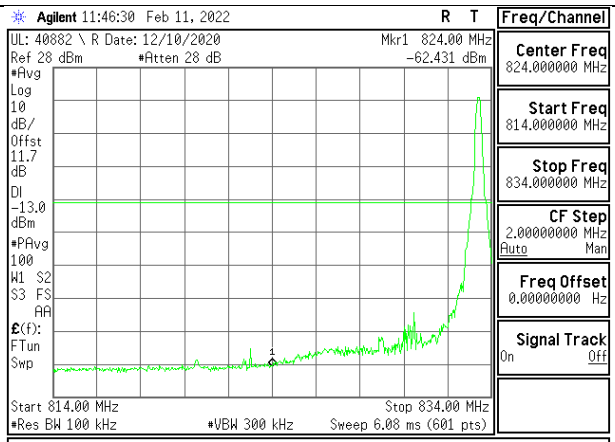

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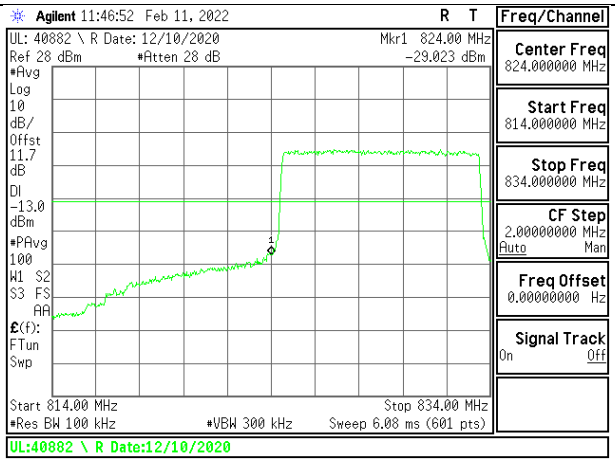

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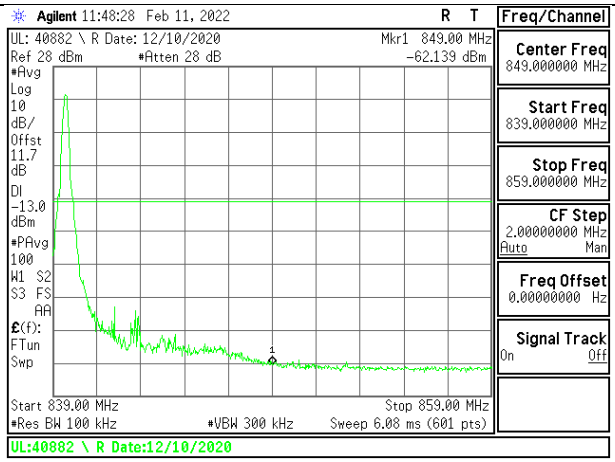
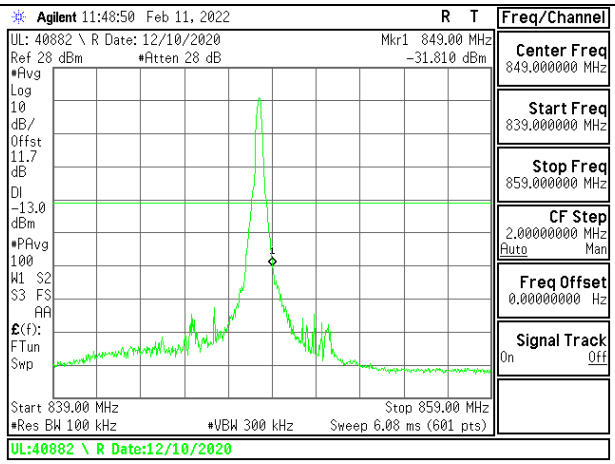
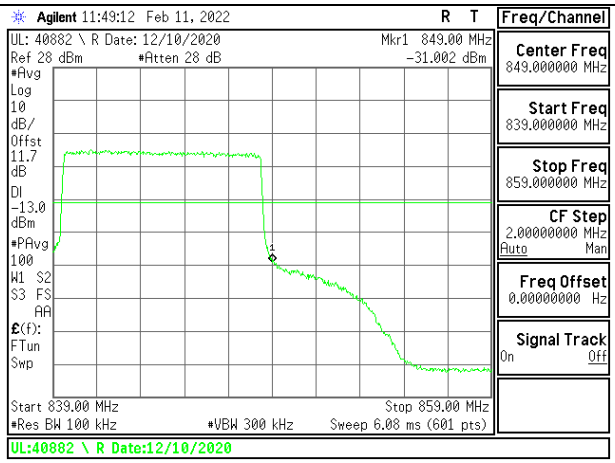


LTE5 10MHz 16QAM HIGH Ch RB1-0



LTE5 10MHz 16QAM HIGH Ch RB1-49

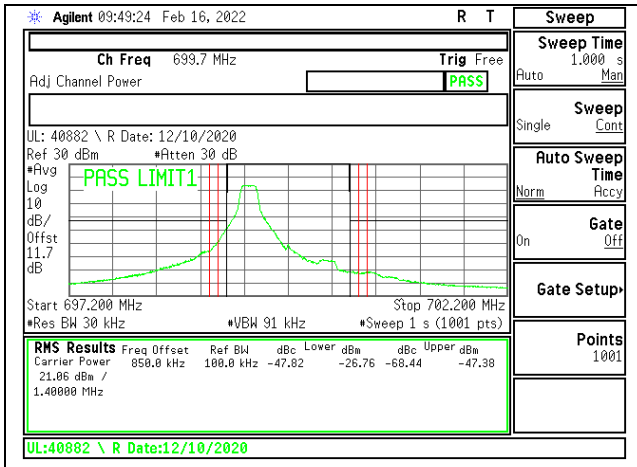


LTE5 10MHz 16QAM HIGH Ch RB50-0

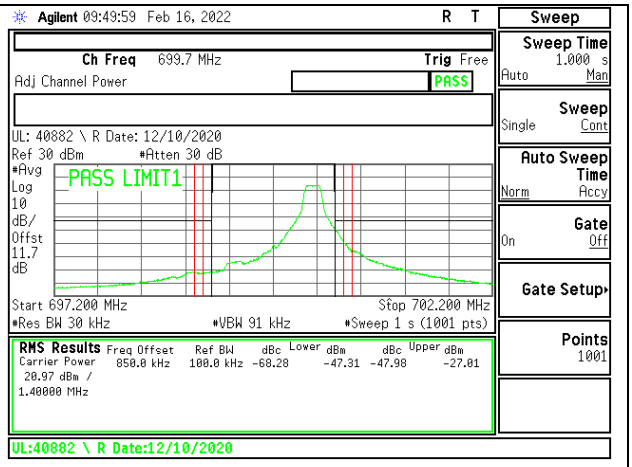
9.2.6.LTE12 ADJACENT CHANNEL POWER

LIMITS

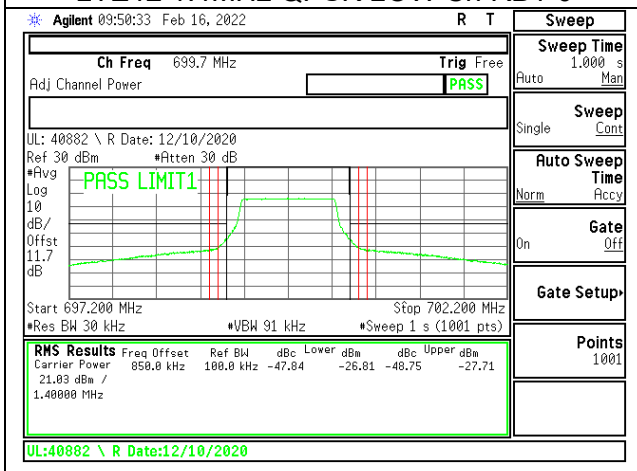
FCC: §27.53
(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance 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.



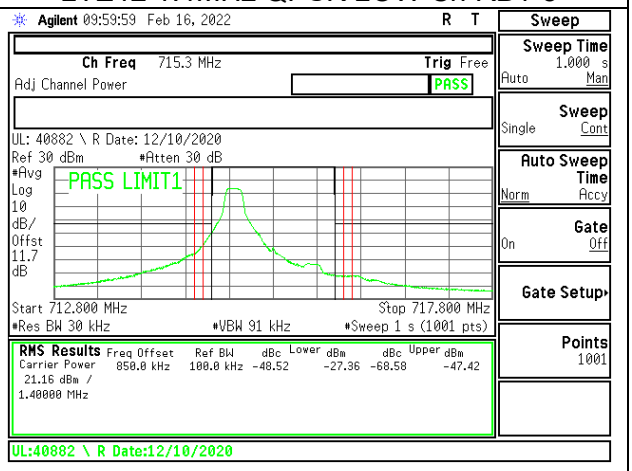
LTE12 1.4MHz QPSK LOW Ch RB1-0



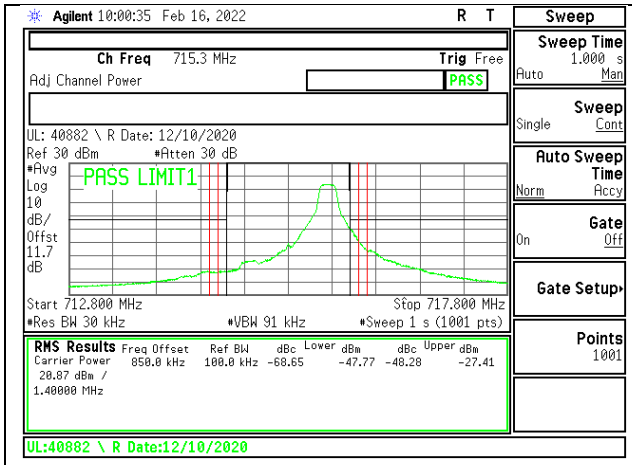
LTE12 1.4MHz QPSK LOW Ch RB1-5



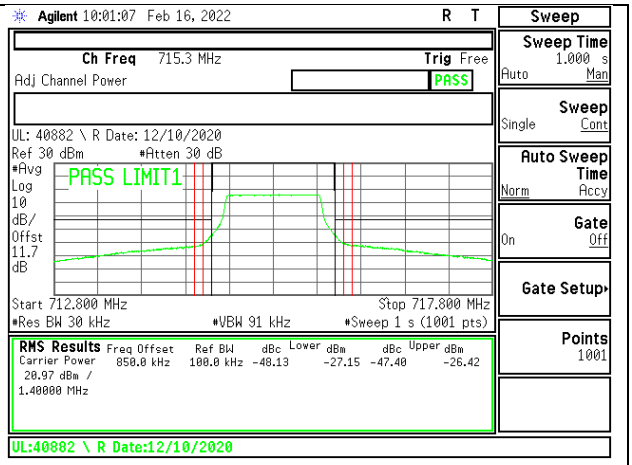
LTE12 1.4MHz QPSK LOW Ch RB6-0



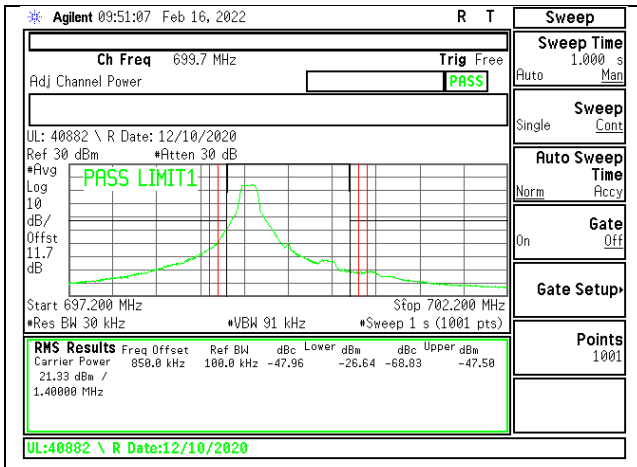
LTE12 1.4MHz QPSK HIGH Ch RB1-0



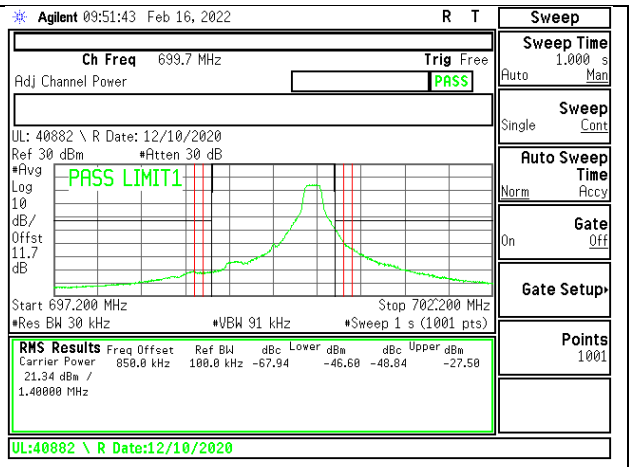
LTE12 1.4MHz QPSK HIGH Ch RB1-5



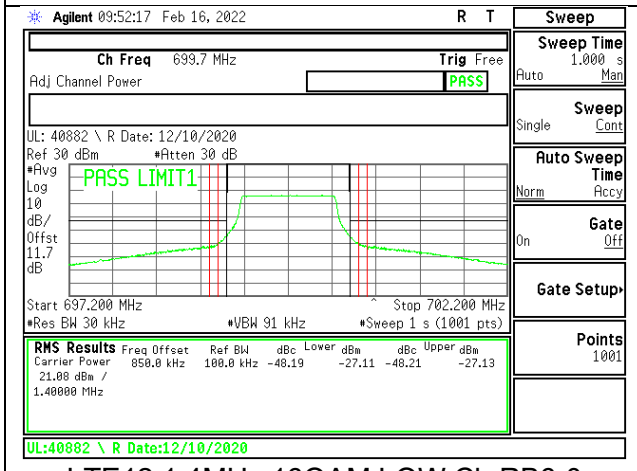
LTE12 1.4MHz QPSK HIGH Ch RB6-0



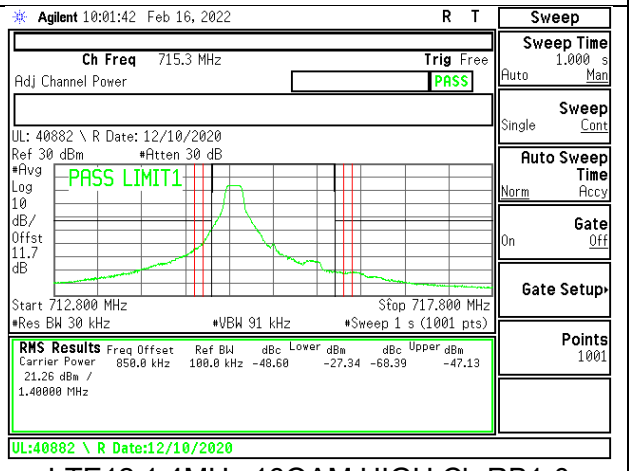
LTE12 1.4MHz 16QAM LOW Ch RB1-0



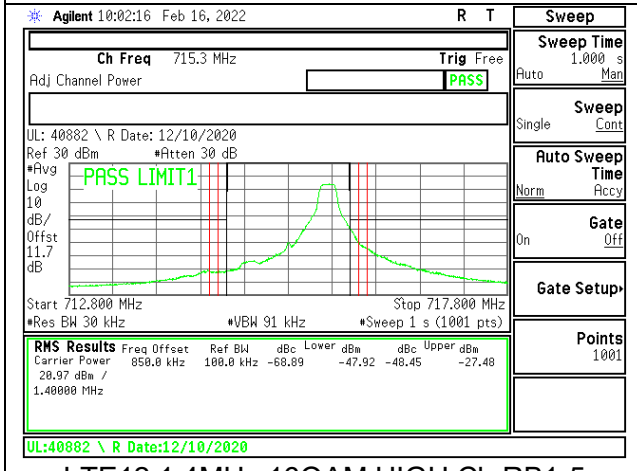
LTE12 1.4MHz 16QAM LOW Ch RB1-5



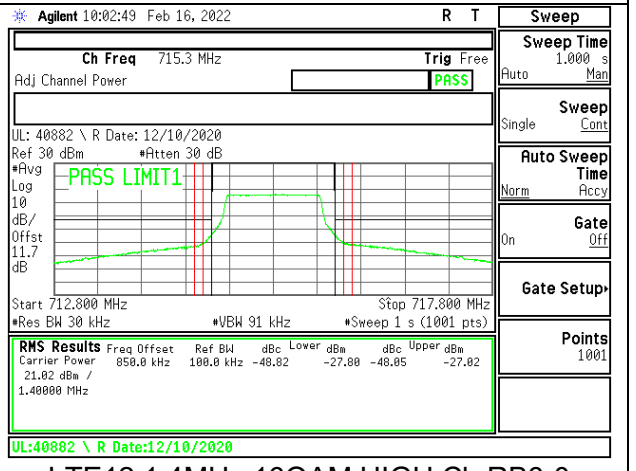
LTE12 1.4MHz 16QAM LOW Ch RB6-0



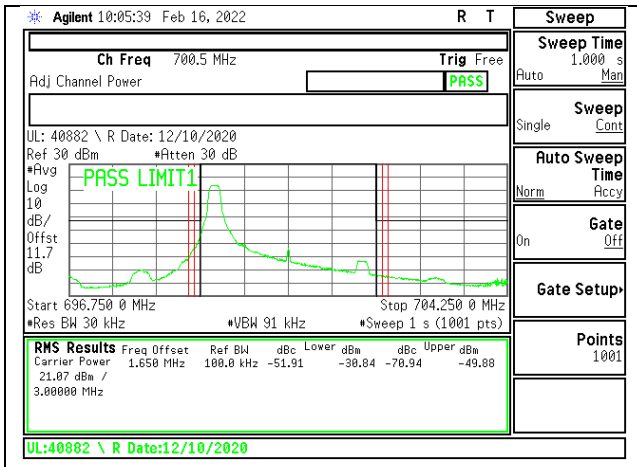
LTE12 1.4MHz 16QAM HIGH Ch RB1-0



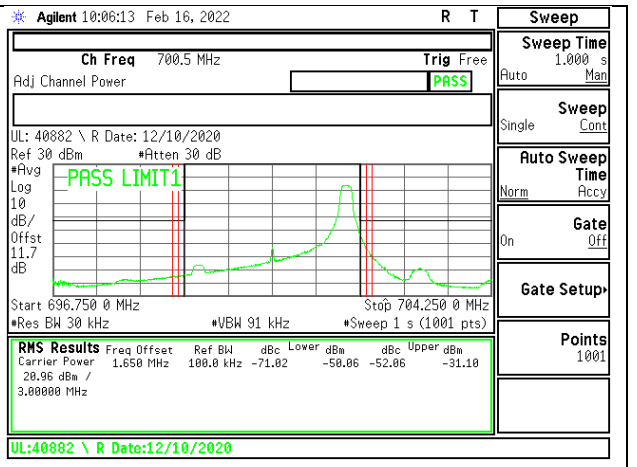
LTE12 1.4MHz 16QAM HIGH Ch RB1-5



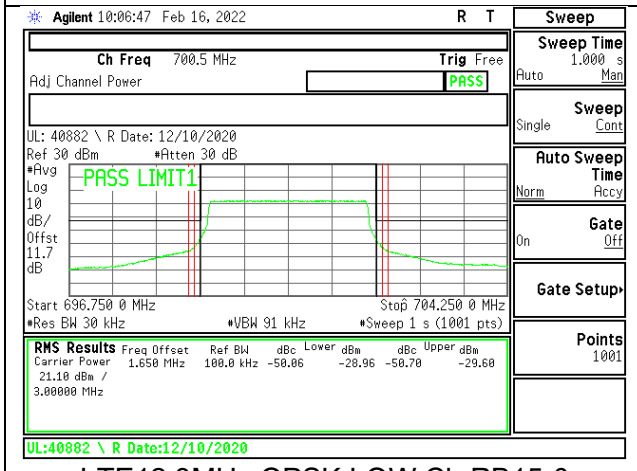
LTE12 1.4MHz 16QAM HIGH Ch RB6-0



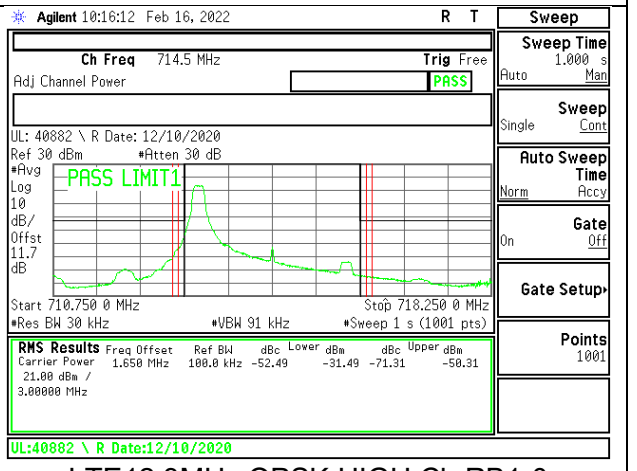
LTE12 3MHz QPSK LOW Ch RB1-0



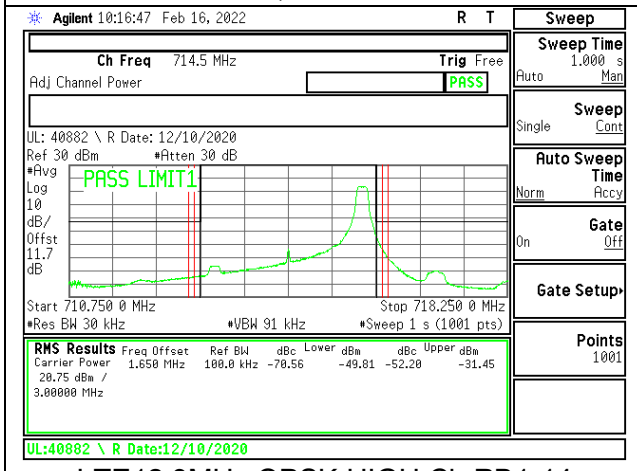
LTE12 3MHz QPSK LOW Ch RB1-14



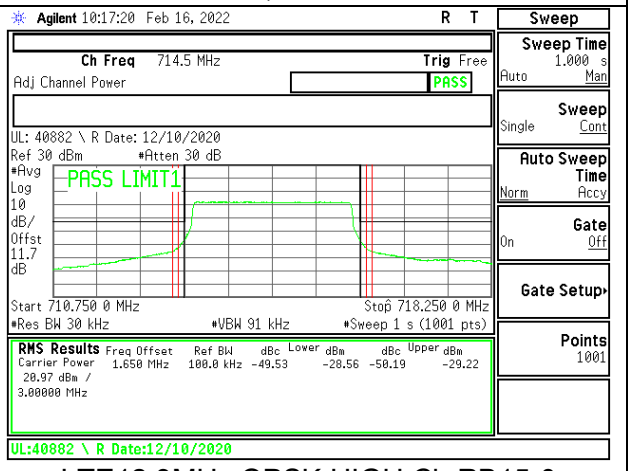
LTE12 3MHz QPSK LOW Ch RB15-0



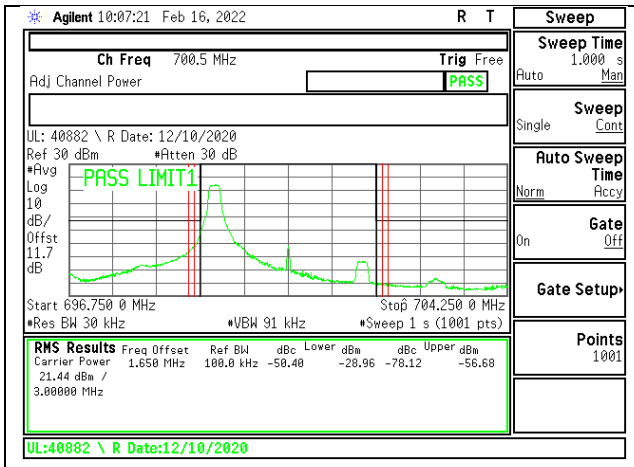
LTE12 3MHz QPSK HIGH Ch RB1-0



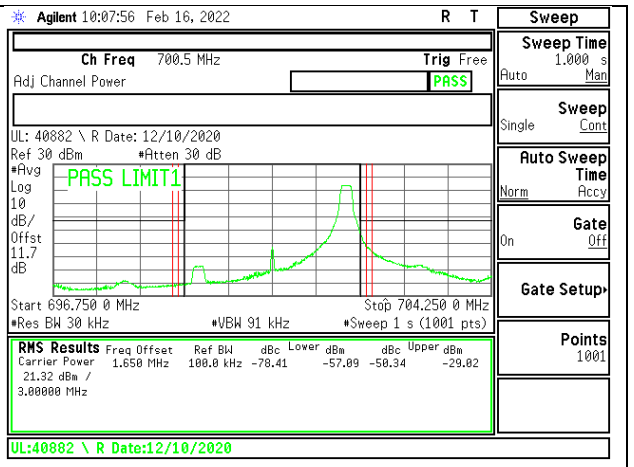
LTE12 3MHz QPSK HIGH Ch RB1-14



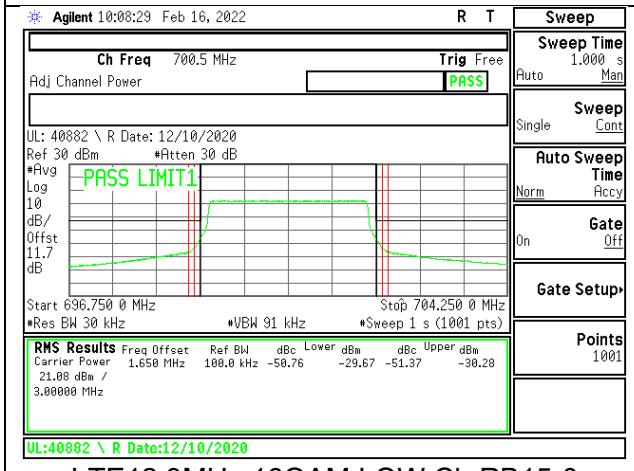
LTE12 3MHz QPSK HIGH Ch RB15-0



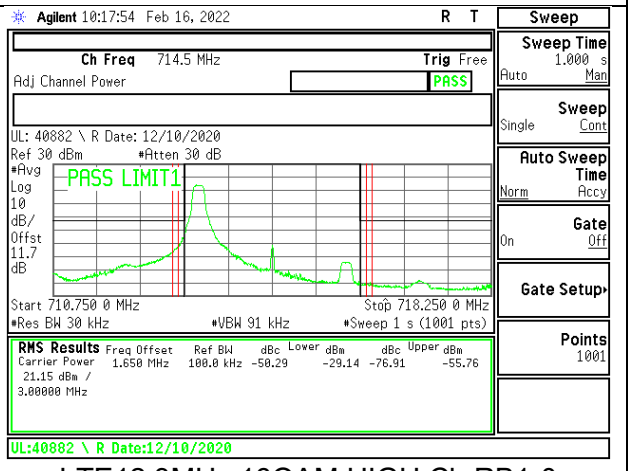
LTE12 3MHz 16QAM LOW Ch RB1-0



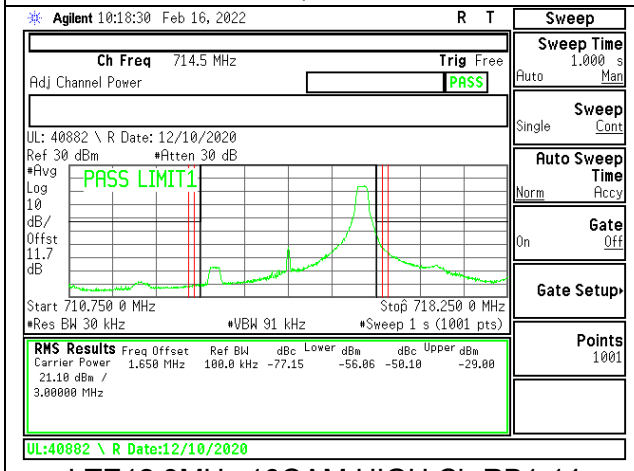
LTE12 3MHz 16QAM LOW Ch RB1-14



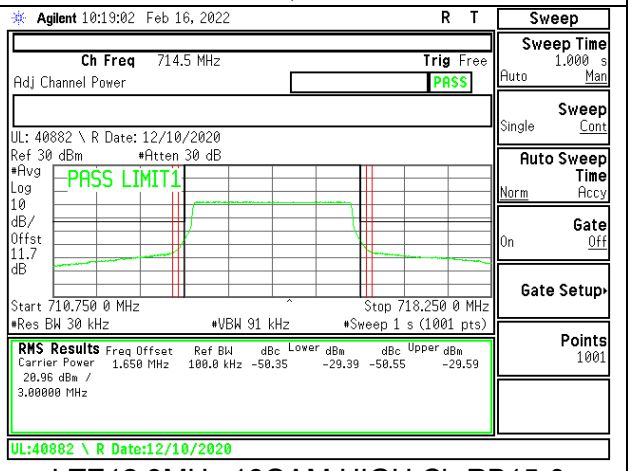
LTE12 3MHz 16QAM LOW Ch RB15-0



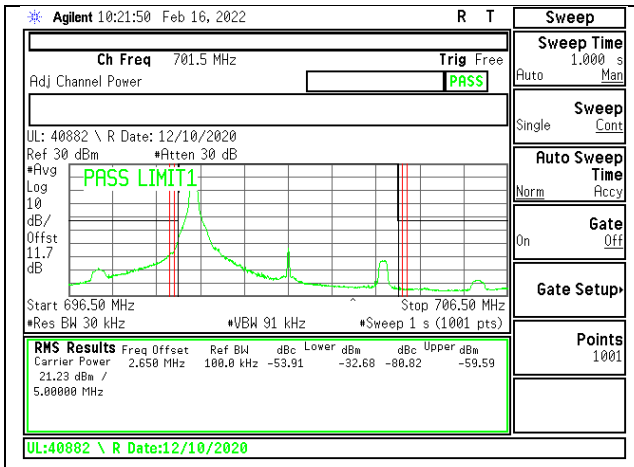
LTE12 3MHz 16QAM HIGH Ch RB1-0



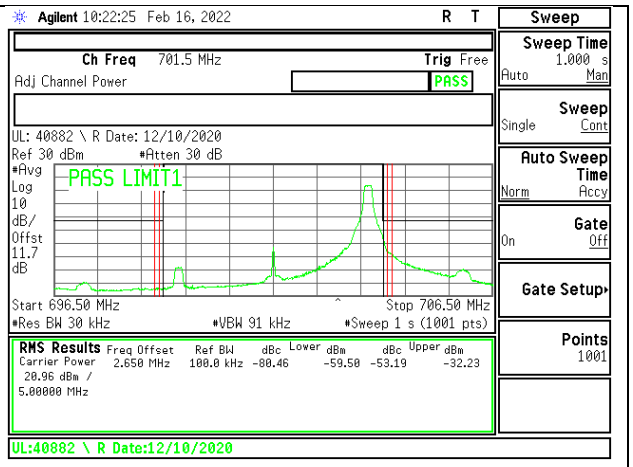
LTE12 3MHz 16QAM HIGH Ch RB1-14



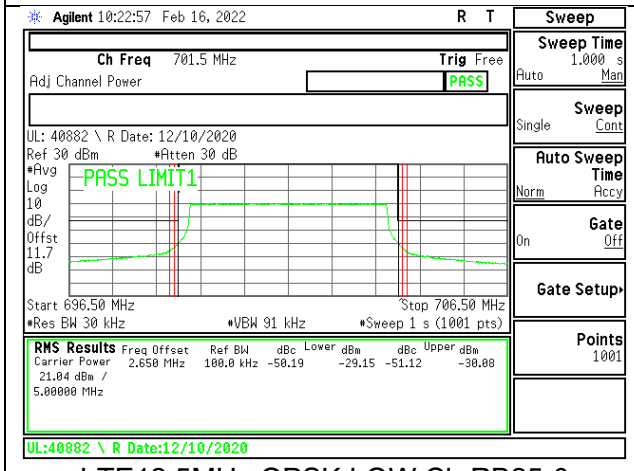
LTE12 3MHz 16QAM HIGH Ch RB15-0



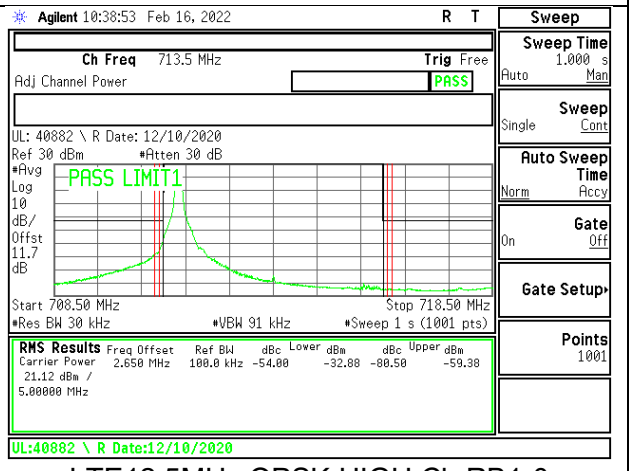
LTE12 5MHz QPSK LOW Ch RB1-0



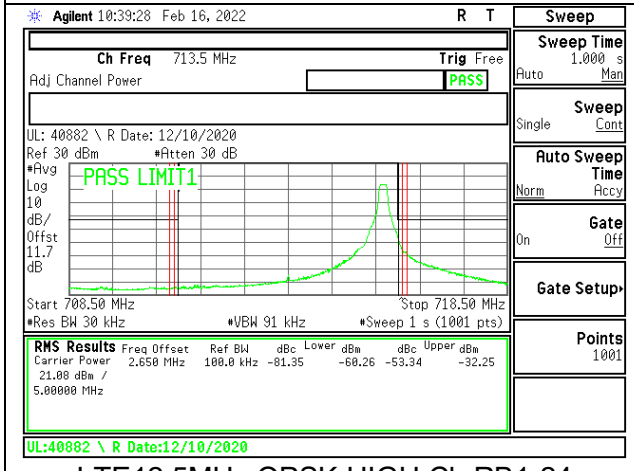
LTE12 5MHz QPSK LOW Ch RB1-24



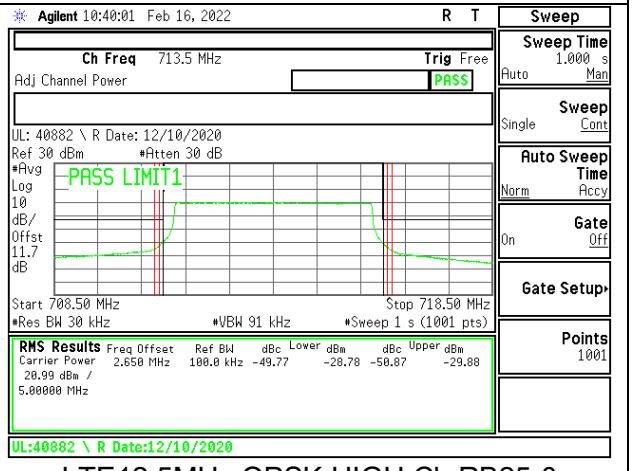
LTE12 5MHz QPSK LOW Ch RB25-0



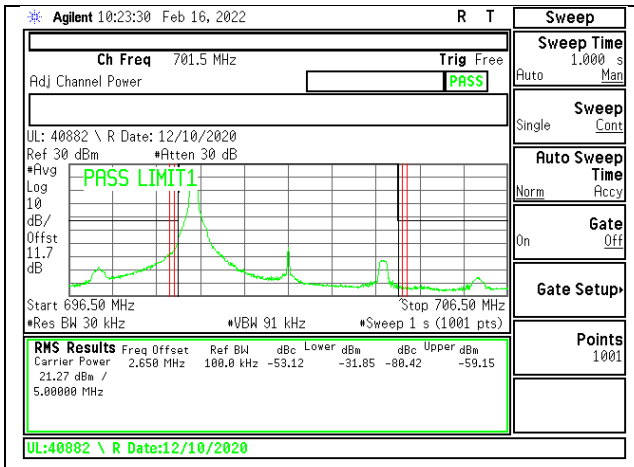
LTE12 5MHz QPSK HIGH Ch RB1-0



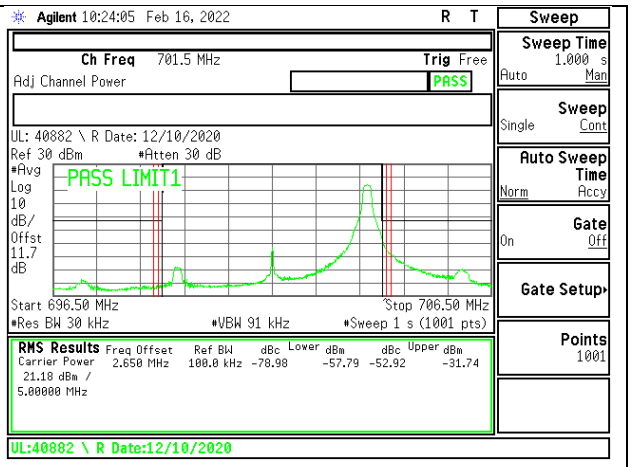
LTE12 5MHz QPSK HIGH Ch RB1-24



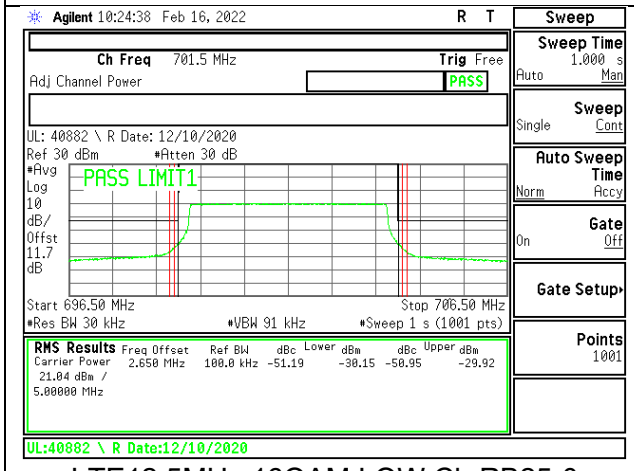
LTE12 5MHz QPSK HIGH Ch RB25-0



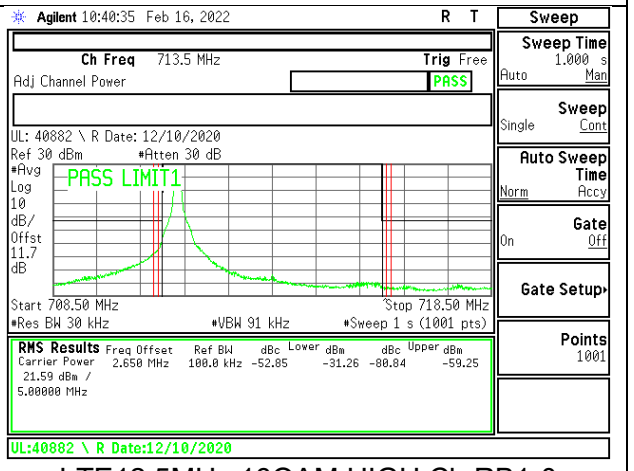
LTE12 5MHz 16QAM LOW Ch RB1-0



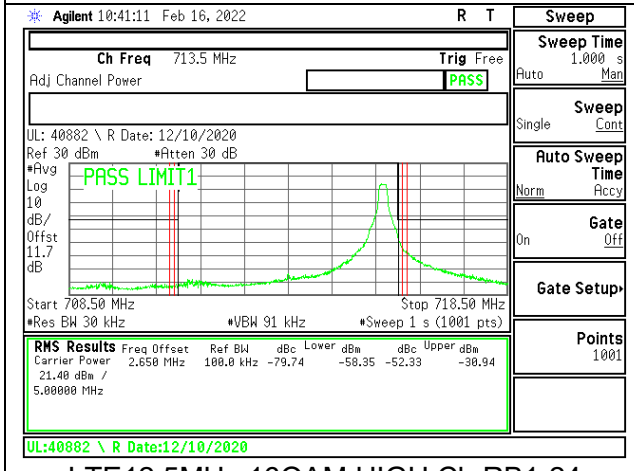
LTE12 5MHz 16QAM LOW Ch RB1-24



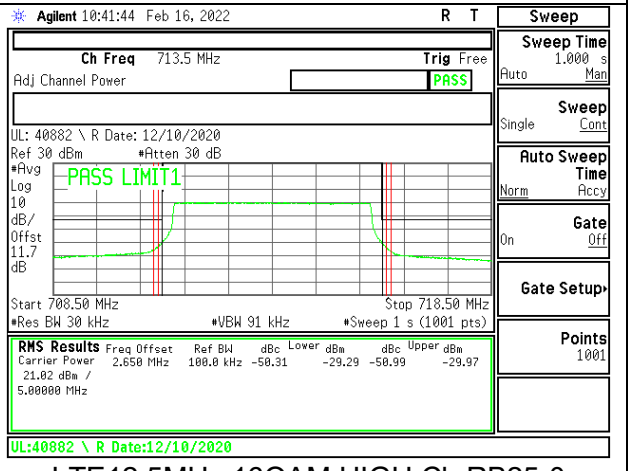
LTE12 5MHz 16QAM LOW Ch RB25-0



LTE12 5MHz 16QAM HIGH Ch RB1-0



LTE12 5MHz 16QAM HIGH Ch RB1-24



LTE12 5MHz 16QAM HIGH Ch RB25-0