CERTIFICATION TEST REPORT

Report Number. : 12132731-E1V3

Applicant	:	SONY MOBILE COMMUNICATIONS, INC. 4-12-3 HIGASHI-SHINAGAWA, SHINAGAWA -KU, TOKYO, 140-0002, JAPAN
FCC ID	:	PY7-68553C
EUT Description	:	GSM/WCDMA/LTE PHONE WITH BT, DTS/UNII A/B/G/N/AC & NFC
Test Standard(s)	:	FCC CFR47 PART 22H, 24E, and 27

Date Of Issue:
MAY 04, 2018

Prepared by:
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NVLAP TESTING
NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	04/20/18	Initial Issue	
V2	05/02/18	Updated Section 2 & 8.1(Added 64QAM OBW data)	Kiya Kedida
V3	05/04/18	Updated Section 8.4	Kiya Kedida

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	SONY MOBILE COMMUNICATIONS, INC. 4-12-3 HIGASHI-SHINAGAWA, SHINAGAWA -KU, TOKYO, 140-0002, JAPAN
FCC ID	PY7-68553C
EUT Description	GSM/WCDMA/LTE PHONE WITH BT, DTS/UNII A/B/G/N/AC & NFC
Serial Number	CB512FH68Q, CB512FH68K, CB512FHBUK, CB512FHBVJ, CB512FHBVT
Date Tested	MARCH 22, 2018 to APRIL 11, 2018
Applicable Standards	FCC CFR47 PART 22H, 24E, and 27
Test Results	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released For
UL Verification Services Inc. By:

Dan Coronia
Operations Leader
UL Verification Services Inc.

Reviewed By:

Kiya Kedida
Project Engineer
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.26:2015, TIA-603-E, FCC CFR 47 Part 2, Part 22, Part 24, Part 27, FCC KDB 971168 D01 v03r01.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☒ Chamber A (ISED:2324B-1)	☐ Chamber D (ISED:22541-1)
☒ Chamber B (ISED:2324B-2)	☐ Chamber E (ISED:22541-2)
☒ Chamber C (ISED:2324B-3)	☐ Chamber F (ISED:22541-3)
	☐ Chamber G (ISED:22541-4)
	☐ Chamber H (ISED:22541-5)

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac & NFC.

5.2. MAXIMUM OUTPUT POWER

ERP/EIRP LIMIT

FCC: §2.1046, §22.913, §24.232, §27.50

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015/ TIA-603-E Clause 2.2.17
KDB 971168 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.2

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)	ERP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	GPRS	32.80	-4.00	26.65	462.38	38.5	-11.80
	EGPRS	27.10	-4.00	20.95	124.45	38.5	-17.50

Part 24 1900MHz

Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
1850-1910	GPRS	29.30	-2.80	26.50	446.68	33.0	-6.50
	EGPRS	25.60	-2.80	22.80	190.55	33.0	-10.20

WCDMA MODES

Part 22 Band 5

Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	ERP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	REL 99	24.30	-4.00	18.15	65.31	38.5	-20.30
	HSDPA	23.30	-4.00	17.15	51.88	38.5	-21.30

LTE BAND 4

Part 27	
EIRP Limit (dBm)	30.00
Antenna Gain (dBi)	-1.20

Bandwidth (MHz)	Frequency Range (MHz)	Modulation	Conducted Average (dBm)	EIRP Average		Margin (dB)
				dBm	mW	
1.4	1710-1755	QPSK	21.38	20.18	104.23	-9.82
		16QAM	21.16	19.96	99.08	-10.04
		64QAM	21.19	19.99	99.77	-10.01
3.0		QPSK	21.37	20.17	103.99	-9.83
		16QAM	21.30	20.10	102.33	-9.90
		64QAM	21.13	19.93	98.40	-10.07
5.0		QPSK	21.45	20.25	105.93	-9.75
		16QAM	21.32	20.12	102.80	-9.88
		64QAM	21.17	19.97	99.31	-10.03
10.0		QPSK	21.40	20.20	104.71	-9.80
		16QAM	21.31	20.11	102.57	-9.89
		64QAM	21.19	19.99	99.77	-10.01
15.0		QPSK	21.40	20.20	104.71	-9.80
		16QAM	21.36	20.16	103.75	-9.84
		64QAM	21.34	20.14	103.28	-9.86
20.0		QPSK	21.50	**20.30**	**107.15**	-9.70
		16QAM	21.41	**20.21**	**104.95**	-9.79
		64QAM	21.36	**20.16**	**103.75**	-9.84

LTE BAND 5

Part 22	
ERP Limit (dBm)	38.45
Antenna Gain (dBi)	-4.00

Bandwidth (MHz)	Frequency Range (MHz)	Modulation	Conducted Average (dBm)	ERP Average		Margin (dB)
				dBm	mW	
1.4	824-849	QPSK	24.52	18.37	68.71	-20.08
		16QAM	23.91	17.76	59.70	-20.69
		64QAM	22.47	**16.32**	**42.85**	-22.13
3.0		QPSK	24.51	18.36	68.55	-20.09
		16QAM	23.87	17.72	59.16	-20.73
		64QAM	22.31	16.16	41.30	-22.29
5.0		QPSK	24.57	**18.42**	**69.50**	-20.03
		16QAM	24.00	**17.85**	**60.95**	-20.60
		64QAM	22.36	16.21	41.78	-22.24
10.0		QPSK	24.54	18.39	69.02	-20.06
		16QAM	23.97	17.82	60.53	-20.63
		64QAM	22.34	16.19	41.59	-22.26

LTE BAND 7

Part 27	
EIRP Limit (dBm)	33.00
Antenna Gain (dBi)	-6.80

Bandwidth (MHz)	Frequency Range (MHz)	Modulation	Conducted Average (dBm)	EIRP Average		Margin (dB)
				dBm	mW	
5.0	2500-2570	QPSK	22.25	15.45	35.08	-17.55
		16QAM	22.15	15.35	34.28	-17.65
		64QAM	22.06	15.26	33.57	-17.74
10.0		QPSK	22.29	15.49	35.40	-17.51
		16QAM	22.18	15.38	34.51	-17.62
		64QAM	22.17	15.37	34.43	-17.63
15.0		QPSK	22.33	**15.53**	**35.73**	-17.47
		16QAM	22.30	**15.50**	**35.48**	-17.50
		64QAM	22.28	**15.48**	**35.32**	-17.52
20.0		QPSK	22.30	15.50	35.48	-17.50
		16QAM	22.28	15.48	35.32	-17.52
		64QAM	22.20	15.40	34.67	-17.60

LTE BAND 12

Part 27	
ERP Limit (dBm)	34.77
Antenna Gain (dBi)	-10.10

Bandwidth (MHz)	Frequency Range (MHz)	Modulation	Conducted Average (dBm)	ERP Average		Margin (dB)
				dBm	mW	
1.4	699-716	QPSK	24.67	12.42	17.46	-22.35
		16QAM	23.63	11.38	13.74	-23.39
		64QAM	22.52	10.27	10.64	-24.50
3.0		QPSK	24.63	12.38	17.30	-22.39
		16QAM	23.78	11.53	14.22	-23.24
		64QAM	22.69	**10.44**	**11.07**	-24.33
5.0		QPSK	24.72	**12.47**	**17.66**	-22.30
		16QAM	24.00	**11.75**	**14.96**	-23.02
		64QAM	22.69	**10.44**	**11.07**	-24.33
10.0		QPSK	24.61	12.36	17.22	-22.41
		16QAM	23.99	11.74	14.93	-23.03
		64QAM	22.47	10.22	10.52	-24.55

LTE BAND 13

Part 27	
ERP Limit (dBm)	34.77
Antenna Gain (dBi)	-5.40

Bandwidth (MHz)	Frequency Range (MHz)	Modulation	Conducted Average (dBm)	ERP Average		Margin (dB)
				dBm	mW	
5.0	777-787	QPSK	24.49	**16.94**	**49.43**	-17.83
		16QAM	24.00	**16.45**	**44.16**	-18.32
		64QAM	22.15	14.60	28.84	-20.17
10.0		QPSK	24.38	16.83	48.19	-17.94
		16QAM	23.38	15.83	38.28	-18.94
		64QAM	22.17	**14.62**	**28.97**	-20.15

LTE BAND 41

Part 27	
EIRP Limit (dBm)	33.00
Antenna Gain (dBi)	-6.80

Bandwidth (MHz)	Frequency Range (MHz)	Modulation	Conducted Average (dBm)	EIRP Average		Margin (dB)
				dBm	mW	
5.0	2496-2690	QPSK	22.24	15.44	34.99	-17.56
		16QAM	21.86	15.06	32.06	-17.94
		64QAM	21.88	15.08	32.21	-17.92
10.0		QPSK	22.29	15.49	35.40	-17.51
		16QAM	22.12	15.32	34.04	-17.68
		64QAM	22.00	15.20	33.11	-17.80
15.0		QPSK	22.31	15.51	35.56	-17.49
		16QAM	21.93	15.13	32.58	-17.87
		64QAM	21.95	15.15	32.73	-17.85
20.0		QPSK	22.38	**15.58**	**36.14**	-17.42
		16QAM	22.34	**15.54**	**35.81**	-17.46
		64QAM	22.29	**15.49**	**35.40**	-17.51

5.3. MAXIMUM ANTENNA GAIN

Please see table below:

LTE Bands	Antenna Gain (dBi)
GSM850, 824-849MHz	-4.0
GSM1900, 1850-1910MHz	-2.8
WCDMA Band 5, 824-849 MHz	-4.0
LTE Band 4, 1710 – 1755 MHz	-1.2
LTE Band 5, 824 – 849 MHz	-4.0
LTE Band 7, 2500 – 2570 MHz	-6.8
LTE Band 12, 699 – 716 MHz	-10.1
LTE Band 13, 777 – 787 MHz	-5.4
LTE Band 17, 704 – 716 MHz	-10.1
LTE Band 41, 2496 – 2690 MHz	-6.8

5.4. 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.

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 and channel bandwidth.

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.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y, & Z, and it was determined that X-Axis with AC/DC Adapter and headset was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X-Axis with AC/DC Adapter and headset orientation.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
AC adapter	SONY	UCH12	VB17W46601037
Audio & Charging Cable	SONY	1312-8675.1B	YYWWSSPCXXXXXXC
DC Power Supply	Ametek	XT 15-4	T463
Earphone	SONY	MH410c	N/A

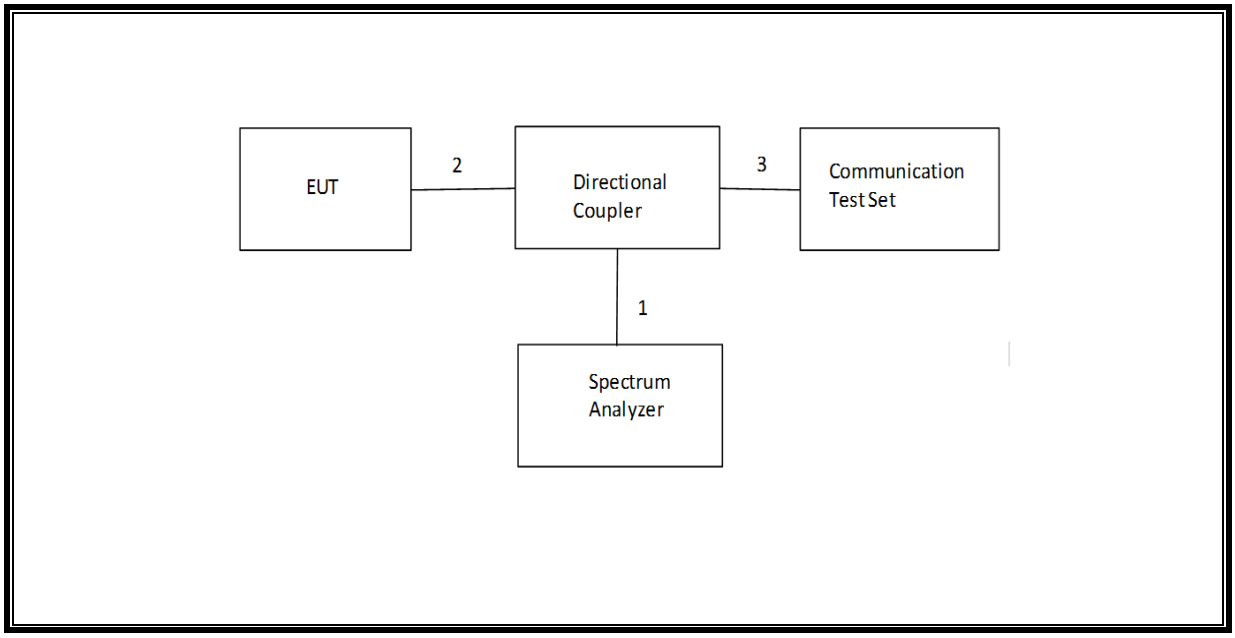
I/O CABLES (RF Conducted Test)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Shielded	None	NA
2	Antenna Port	1	EUT	Shielded	0.1m	NA
3	RF In/Out	1	Communication Test Set	Shielded	1m	NA

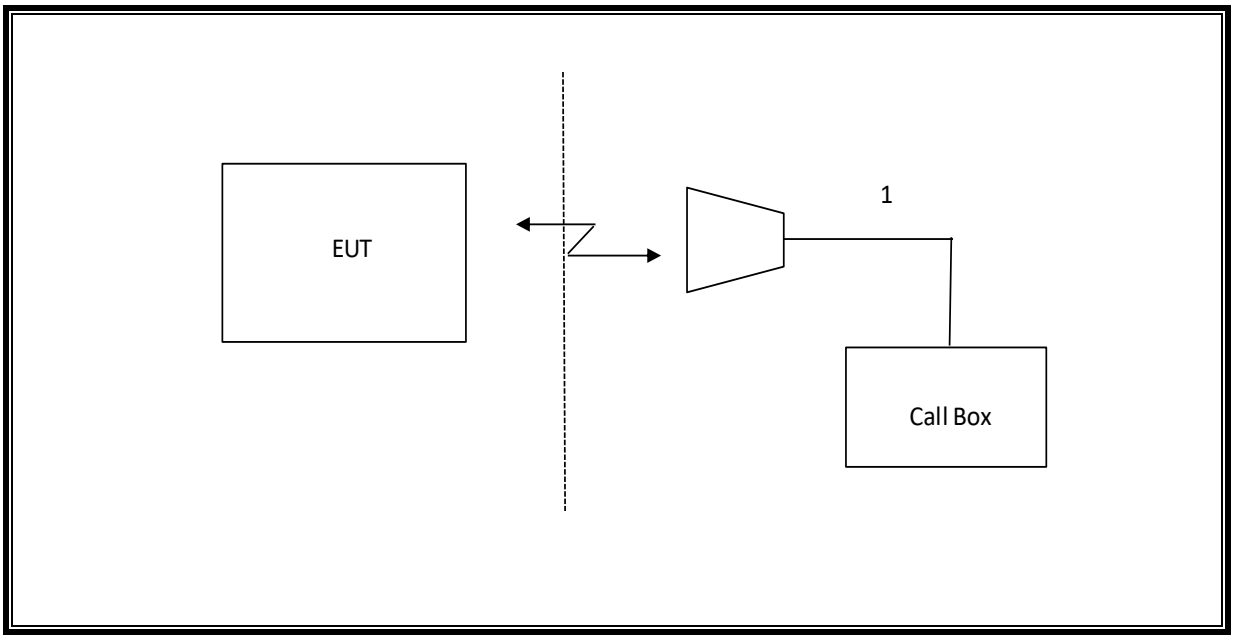
I/O CABLES (RF Radiated Test)

I/O Cable List						
Cable No	Port	# of identi	Connector Type	Cable Type	Cable Length	Remarks
1	USB	1	AC Adapter	Un-shielded	1.2m	No
2	Jack	1	Headset	Shielded	1m	No
3	USB/Headphone Jack	1	USB Type-C/Audio	Un-shielded	.2m	Audio & Charging Cable
4	RF In/out	1	Communication Test Set	Un-shielded	2m	No

CONDUCTED SETUP



RADIATED SETUP



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**	**Last Cal**
Highpass Filter, 2.7 GHz	Micro-Circuits	H2G518G6	T772	07/05/18	07/05/17
Highpass Filter, 1 GHz	Micro-Tronics	HPM18129	T889	02/21/19	02/21/18
Highpass Filter, 4GHz	Micro-Tronics	HPM13351	T1241	07/19/18	07/19/17
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T346	03/28/2019	03/28/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T862	06/09/2018	06/09/2017
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T120	06/26/2018	06/26/2017
RF Amplifier	MITEQ	AFS42-00101800-25-S-42	T493	12/16/2018	12/16/2017
RF Amplifier	MITEQ	AFS42-00101800-25-S-42	T1165	11/25/2018	11/25/2017
RF Amplifier	MITEQ	AFS42-00101800-25-S-42	T931	09/22/2018	09/22/2017
Directional Coupler	Mini-Circuits	ZUDC10-183+	T1136	06/18/18	06/18/17
Wideband Communication Test Set, Call Box	R&S	CMW500	T954	02/21/19	02/21/18
Chamber, Environmental	Thermotron	SE-600-10-10	T80	02/22/19	02/22/18
Spectrum Analyzer	Agilent (Keysight) Technologies	E4446A	T146	07/18/2018	07/18/2017
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1466	04/11/2018	04/11/2017
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T907	01/23/2019	01/23/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1210	07/17/2018	07/17/2017
DC power supply, 8 V @ 3 A or 15 V @ 2 A	Agilent / HP	E3610A	None	CNR	CNR

UL AUTOMATION SOFTWARE			
CLT Software	UL	UL RF	Ver 7.6, November 11, 2017
Power Measurement Software	UL	UL RF	Ver 2.2, June 2017

NOTES:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

7. RF OUTPUT POWER VERIFICATION

The below tables contain the highest of all configurations average conducted output powers as follows:

7.1. 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 4 (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

7.1.1. GSM GSM850

ID:	38515	Date:	3/27/18

GPRS (GMSK) - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Average (dBm)	
			1 slot	2 slots
850.0	128	824.2	**32.80**	30.80
	190	836.6	**32.80**	30.70
	251	848.8	32.70	30.60

EGPRS (8PSK) - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Average (dBm)	
			1 slot	2 slots
850.0	128	824.2	**27.10**	25.70
	190	836.6	27.00	25.80
	251	848.8	27.00	25.60

7.1.2. GSM 1900MHz

ID:	38515	Date:	3/27/18

GPRS (GMSK) - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Average (dBm)	
			1 slot	2 slots
1900.0	512	1850.2	29.10	27.10
	661	1880.0	29.20	27.30
	810	1909.8	**29.30**	27.20

EGPRS (8PSK) - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Average (dBm)	
			1 slot	2 slots
1900.0	512	1850.2	25.40	24.40
	661	1880.0	**25.60**	24.50
	810	1909.8	25.50	24.40

7.2. 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 section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	11/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs=βhs/βc	30/15			

HSPA (HSDPA & HSUPA) Setup Procedures used to establish the test signals

The following 5 Sub-tests were completed according to Release 6 procedures in table C, 11.1.3 of 3GPP TS34.121-1v13. A summary of these settings are illustrated below:

	Mode	HSPA				
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2 kbps RMC				
	HSDPA FRC	H-Set 1				
	HSUPA Test	HSPA				
	Power Control Algorithm	Algorithm 2				Algorithm 1
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	-
	βhs	22/15	12/15	30/15	4/15	5/15
	βed	1309/225	94/75	47/15	56/75	47/15
	CM (dB)	1	3	2	3	1
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	E-DPDCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E-TFCIs	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
	Reference E-TFCI PO	27	27	27	27	27
	Maximum Channelization Codes	2xSF2				SF4

HSPA+ REL 7

The following 1 Sub-test was completed according to Release 7 procedures in section 5.2 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	$\beta_{ed}1$: 30/15 $\beta_{ed}2$: 30/15	$\beta_{ed}3$: 24/15 $\beta_{ed}4$: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with $\beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
Note 3: DPDCH is not configured, therefore the β_c is set to 1 and 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

7.2.1. **WCDMA BAND 5**

ID:	38515	Date:	3/27/18

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Average (dBm)
W-CDMA Band 2 (1900MHz)	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	**24.30**
			4183	836.6	N/A	**24.30**
			4233	846.6	N/A	24.20
	HSDPA	Subtest 1	4132	826.4	0	**23.30**
			4183	836.6	0	**23.30**
			4233	846.6	0	23.10
		Subtest 2	4132	826.4	0	**23.30**
			4183	836.6	0	**23.30**
			4233	846.6	0	23.10
		Subtest 3	4132	826.4	0.5	22.80
			4183	836.6	0.5	22.80
			4233	846.6	0.5	22.70
		Subtest 4	4132	826.4	0.5	22.80
			4183	836.6	0.5	22.80
			4233	846.6	0.5	22.70
	HSPA (HSDPA & HSUPA)	Subtest 1	4132	826.4	0	**23.30**
			4183	836.6	0	**23.30**
			4233	846.6	0	23.20
		Subtest 2	4132	826.4	2	21.30
			4183	836.6	2	21.30
			4233	846.6	2	21.10
		Subtest 3	4132	826.4	1	22.30
			4183	836.6	1	22.30
			4233	846.6	1	22.20
		Subtest 4	4132	826.4	2	21.30
			4183	836.6	2	21.30
			4233	846.6	2	21.10
		Subtest 5	4132	826.4	0	**23.30**
			4183	836.6	0	**23.30**
			4233	846.6	0	23.20

7.3. LTE Band 4

ID:	38206	Date:	3/28/18

OUTPUT POWER FOR LTE BAND 4 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				19957	20175	20393
				1710.7 MHz	1732.5 MHz	1754.3 MHz
1.4	QPSK	1	0	21.21	21.20	21.31
		1	2	21.27	21.25	**21.38**
		1	5	21.22	21.19	21.30
		3	0	21.22	21.18	21.24
		3	1	21.28	21.22	21.31
		3	2	21.28	21.23	21.31
		6	0	21.22	21.11	21.26
	16QAM	1	0	20.83	21.07	20.89
		1	2	20.88	**21.16**	20.93
		1	5	20.80	21.07	20.85
		3	0	20.98	20.95	20.85
		3	1	21.04	21.00	20.91
		3	2	21.03	20.99	20.89
		6	0	20.95	20.66	20.99
	64QAM	1	0	21.08	20.89	20.82
		1	2	**21.19**	20.96	20.91
		1	5	21.05	20.90	20.79
		3	0	21.06	20.70	20.83
		3	1	21.12	20.75	20.90
		3	2	21.11	20.78	20.92
		6	0	20.68	20.82	21.00

OUTPUT POWER FOR LTE BAND 4 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				19965	20175	20385
				1711.5 MHz	1732.5 MHz	1753.5 MHz
3.0	QPSK	1	0	21.24	21.27	21.36
		1	7	21.31	**21.37**	21.32
		1	14	21.20	21.35	21.21
		8	0	21.25	21.26	21.23
		8	4	21.28	21.29	21.24
		8	7	21.26	21.34	21.26
		15	0	21.24	21.35	21.27
	16QAM	1	0	20.90	21.21	20.83
		1	7	20.94	21.28	20.74
		1	14	20.84	**21.30**	20.62
		8	0	20.88	20.89	20.94
		8	4	20.89	20.93	20.97
		8	7	20.88	21.03	20.96
		15	0	20.80	20.99	20.90
	64QAM	1	0	20.95	20.88	**21.13**
		1	7	21.00	20.98	21.11
		1	14	20.89	20.95	20.98
		8	0	20.70	20.81	20.78
		8	4	20.74	20.84	20.82
		8	7	20.73	20.92	20.81
		15	0	20.79	20.90	20.73

OUTPUT POWER FOR LTE BAND 4 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				19975	20175	20375
				1712.5 MHz	1732.5 MHz	1752.5 MHz
5.0	QPSK	1	0	21.26	21.42	21.39
		1	12	21.21	21.34	21.43
		1	24	21.20	**21.45**	21.34
		12	0	21.28	21.31	21.29
		12	6	21.27	21.39	21.39
		12	11	21.23	21.36	21.29
		25	0	21.29	21.42	21.30
	16QAM	1	0	21.27	21.05	21.05
		1	12	**21.32**	20.99	21.06
		1	24	21.31	21.11	20.91
		12	0	20.96	20.97	20.97
		12	6	20.98	21.07	21.06
		12	11	20.98	21.05	20.93
		25	0	20.91	21.01	20.90
	64QAM	1	0	21.05	21.15	20.78
		1	12	21.01	21.14	20.84
		1	24	21.05	**21.17**	20.74
		12	0	20.88	20.81	20.90
		12	6	20.89	20.91	20.97
		12	11	20.87	20.90	20.86
		25	0	20.86	20.92	20.82

OUTPUT POWER FOR LTE BAND 4 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20000	20175	20350
				1715.0 MHz	1732.5 MHz	1750.0 MHz
10.0	QPSK	1	0	21.27	**21.40**	21.31
		1	24	21.14	21.23	21.22
		1	49	21.27	21.34	21.24
		25	0	21.30	21.38	21.32
		25	12	21.25	21.39	21.29
		25	24	21.35	21.36	21.28
		50	0	21.38	21.35	21.28
	16QAM	1	0	20.91	**21.31**	20.87
		1	24	20.81	21.15	20.65
		1	49	20.89	21.27	20.62
		25	0	20.97	21.04	20.92
		25	12	20.93	20.98	20.92
		25	24	21.01	21.02	20.88
		50	0	21.00	20.99	20.89
	64QAM	1	0	21.03	21.10	**21.19**
		1	24	20.94	20.95	21.13
		1	49	21.07	21.04	21.12
		25	0	20.92	21.07	20.95
		25	12	20.93	21.07	20.95
		25	24	21.04	21.02	20.90
		50	0	20.99	21.03	20.93

OUTPUT POWER FOR LTE BAND 4 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20025	20175	20325
				1717.5 MHz	1732.5 MHz	1747.5 MHz
15.0	QPSK	1	0	**21.40**	21.39	21.30
		1	37	21.34	21.26	21.26
		1	74	21.30	21.33	21.24
		36	0	21.30	21.33	21.25
		36	16	21.32	21.36	21.31
		36	35	21.28	21.37	21.28
		75	0	21.35	21.34	21.32
	16QAM	1	0	**21.36**	21.33	20.84
		1	37	21.29	21.18	20.73
		1	74	21.29	21.29	20.66
		36	0	20.85	21.07	20.86
		36	16	20.90	21.02	20.91
		36	35	20.87	21.01	20.88
		75	0	20.93	20.99	20.93
	64QAM	1	0	21.30	21.12	21.26
		1	37	**21.34**	20.97	21.19
		1	74	21.32	21.03	21.15
		36	0	20.86	21.10	20.93
		36	16	20.98	21.07	20.96
		36	35	20.95	21.03	20.93
		75	0	21.00	21.02	20.95

OUTPUT POWER FOR LTE BAND 4 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20050	20175	20300
				1720.0 MHz	1732.5 MHz	1745.0 MHz
20.0	QPSK	1	0	21.33	**21.50**	21.46
		1	49	21.27	21.24	21.36
		1	99	21.36	21.35	21.35
		50	0	21.43	21.40	21.41
		50	24	21.36	21.47	21.35
		50	49	21.42	21.42	21.43
		100	0	21.36	21.44	21.38
	16QAM	1	0	21.38	**21.41**	21.39
		1	49	21.27	21.33	21.38
		1	99	21.41	21.36	21.36
		50	0	21.03	21.14	21.09
		50	24	20.99	21.09	21.00
		50	49	21.06	21.04	21.06
		100	0	20.96	21.08	20.99
	64QAM	1	0	21.12	21.36	**21.36**
		1	49	21.10	21.27	21.30
		1	99	21.20	21.33	21.25
		50	0	21.07	21.11	21.10
		50	24	21.02	21.07	21.05
		50	49	21.06	21.01	21.11
		100	0	21.01	21.01	21.00

7.4. LTE Band 5

ID:	38206	Date:	3/28/18

OUTPUT POWER FOR LTE BAND 5 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				20407	20525	20643
				824.7 MHz	836.5 MHz	848.3 MHz
1.4	QPSK	1	0	24.44	24.43	24.35
		1	2	24.38	24.38	24.41
		1	5	24.50	24.47	24.49
		3	0	24.47	**24.52**	24.51
		3	1	24.48	24.50	24.47
		3	2	24.49	24.48	24.50
		6	0	23.42	23.58	23.42
	16QAM	1	0	23.49	23.45	23.48
		1	2	23.41	23.45	23.47
		1	5	23.49	23.55	23.54
		3	0	23.89	23.90	**23.91**
		3	1	23.88	23.90	23.90
		3	2	23.89	23.89	23.90
		6	0	22.45	22.81	22.61
	64QAM	1	0	22.37	22.16	21.96
		1	2	**22.47**	22.23	22.04
		1	5	22.34	22.15	21.91
		3	0	22.34	21.93	22.01
		3	1	22.37	22.02	22.07
		3	2	22.36	22.04	22.08
		6	0	21.51	21.57	21.74

OUTPUT POWER FOR LTE BAND 5 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				20415	20525	20635
				825.5 MHz	836.5 MHz	847.5 MHz
3.0	QPSK	1	0	24.46	24.35	24.41
		1	7	24.51	**24.51**	24.46
		1	14	24.40	24.38	24.16
		8	0	23.44	23.46	23.39
		8	4	23.48	23.49	23.43
		8	7	23.48	23.50	23.44
		15	0	23.47	23.49	23.42
	16QAM	1	0	23.48	23.52	23.83
		1	7	23.52	23.65	**23.87**
		1	14	23.38	23.53	23.57
		8	0	22.65	22.58	22.56
		8	4	22.66	22.62	22.59
		8	7	22.66	22.63	22.57
		15	0	22.57	22.53	22.54
	64QAM	1	0	22.26	22.02	22.25
		1	7	22.31	22.22	**22.31**
		1	14	22.21	22.09	22.20
		8	0	21.54	21.57	21.55
		8	4	21.56	21.62	21.60
		8	7	21.52	21.61	21.58
		15	0	21.59	21.61	21.50

OUTPUT POWER FOR LTE BAND 5 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power Conducted Average (dBm)		
				20425	20525	20625
				826.5 MHz	836.5 MHz	846.5 MHz
5.0	QPSK	1	0	**24.57**	24.45	24.54
		1	12	24.52	24.45	24.46
		1	24	24.49	24.43	24.21
		12	0	23.50	23.53	23.45
		12	6	23.51	23.53	23.43
		12	11	23.45	23.52	23.45
		25	0	23.49	23.54	23.49
	16QAM	1	0	23.77	**24.00**	23.69
		1	12	23.69	**24.00**	23.62
		1	24	23.71	**24.00**	23.37
		12	0	22.70	22.76	22.61
		12	6	22.67	22.76	22.63
		12	11	22.64	22.74	22.62
		25	0	22.64	22.68	22.56
	64QAM	1	0	**22.36**	22.29	22.01
		1	12	22.27	22.34	21.91
		1	24	22.27	22.31	21.87
		12	0	21.67	21.58	21.60
		12	6	21.66	21.56	21.58
		12	11	21.62	21.54	21.57
		25	0	21.61	21.59	21.53

OUTPUT POWER FOR LTE BAND 5 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power Conducted Average (dBm)		
				20450	20525	20600
				829.0 MHz	836.5	844.0 MHz
10.0	QPSK	1	0	24.47	24.42	23.50
		1	24	**24.54**	24.47	24.47
		1	49	24.45	24.37	24.38
		25	0	23.60	23.59	23.59
		25	12	23.60	23.55	23.55
		25	24	23.52	23.50	23.49
		50	0	23.53	23.50	23.50
	16QAM	1	0	23.88	23.47	23.47
		1	24	**23.97**	23.45	23.44
		1	49	23.89	23.28	23.28
		25	0	22.73	22.68	22.69
		25	12	22.73	22.66	22.65
		25	24	22.67	22.57	22.57
		50	0	22.65	22.60	22.60
	64QAM	1	0	22.19	22.32	21.61
		1	24	22.22	**22.34**	22.34
		1	49	22.19	22.22	22.24
		25	0	21.74	21.71	21.72
		25	12	21.75	21.66	21.65
		25	24	21.68	21.61	21.61
		50	0	21.72	21.61	21.61

7.5. LTE BAND 7

ID:	38206	Date:	3/28/18

OUTPUT POWER FOR LTE BAND 7 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				20775	21100	21425
				2502.5 MHz	2535.0 MHz	2567.5 MHz
5.0	QPSK	1	0	22.02	22.23	**22.25**
		1	12	22.01	22.20	22.23
		1	24	22.01	22.17	22.21
		12	0	22.08	22.11	22.22
		12	6	22.08	22.13	22.24
		12	11	22.06	22.15	22.22
		25	0	22.09	22.15	22.23
	16QAM	1	0	**22.15**	21.87	21.90
		1	12	22.13	21.84	21.88
		1	24	22.06	21.82	21.87
		12	0	21.79	21.78	21.89
		12	6	21.80	21.80	21.91
		12	11	21.77	21.78	21.84
		25	0	21.71	21.74	21.78
	64QAM	1	0	21.92	**22.06**	21.76
		1	12	21.89	22.04	21.76
		1	24	21.90	21.96	21.71
		12	0	21.26	21.19	21.41
		12	6	21.29	21.25	21.42
		12	11	21.26	21.19	21.40
		25	0	21.22	21.25	21.36

OUTPUT POWER FOR LTE BAND 7 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				20800	21100	21400
				2505.0 MHz	2535.0 MHz	2565.0 MHz
10.0	QPSK	1	0	**22.29**	22.21	22.20
		1	24	22.19	22.12	22.12
		1	49	22.17	22.10	22.10
		25	0	22.19	22.17	22.17
		25	12	22.28	22.16	22.16
		25	24	22.24	22.15	22.13
		50	0	22.26	22.13	22.13
	16QAM	1	0	21.92	22.08	**22.18**
		1	24	21.76	22.02	22.03
		1	49	21.75	22.01	22.00
		25	0	21.95	21.75	21.77
		25	12	21.94	21.76	21.79
		25	24	21.91	21.75	21.75
		50	0	21.86	21.74	21.75
	64QAM	1	0	22.15	21.93	22.09
		1	24	22.05	21.90	**22.17**
		1	49	22.03	21.87	22.14
		25	0	21.50	21.40	21.38
		25	12	21.50	21.40	21.37
		25	24	21.47	21.38	21.44
		50	0	21.41	21.33	21.32

OUTPUT POWER FOR LTE BAND 7 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power Conducted Average (dBm)		
				20825	21100	21375
				2507.5 MHz	2535.0 MHz	2562.5 MHz
15.0	QPSK	1	0	**22.33**	22.25	22.25
		1	37	22.21	22.10	22.16
		1	74	22.30	22.03	22.19
		36	0	22.27	22.21	22.19
		36	16	22.24	22.19	22.14
		36	35	22.31	22.14	22.10
		75	0	22.33	22.12	22.14
	16QAM	1	0	**22.30**	21.69	22.22
		1	37	22.20	21.61	22.09
		1	74	22.14	21.56	22.15
		36	0	21.94	21.77	21.74
		36	16	21.90	21.77	21.73
		36	35	21.96	21.74	21.67
		75	0	21.99	21.74	21.72
	64QAM	1	0	**22.28**	21.97	22.19
		1	37	22.24	21.88	22.06
		1	74	22.24	21.83	22.10
		36	0	21.49	21.39	21.37
		36	16	21.43	21.37	21.36
		36	35	21.50	21.31	21.30
		75	0	21.56	21.35	21.34

OUTPUT POWER FOR LTE BAND 7 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power Conducted Average (dBm)		
				20850	21100	21350
				2510.0 MHz	2535.0 MHz	2560.0 MHz
20.0	QPSK	1	0	**22.30**	22.19	22.14
		1	49	22.04	22.10	22.10
		1	99	22.03	22.02	22.11
		50	0	22.18	22.23	22.12
		50	24	22.25	22.18	22.20
		50	49	22.17	22.15	22.13
		100	0	22.25	22.16	22.19
	16QAM	1	0	22.22	22.26	**22.28**
		1	49	22.05	22.13	22.22
		1	99	22.00	22.08	22.22
		50	0	21.81	21.84	21.75
		50	24	21.87	21.78	21.82
		50	49	21.75	21.75	21.75
		100	0	21.82	21.75	21.81
	64QAM	1	0	22.07	**22.20**	22.17
		1	49	21.99	22.17	22.11
		1	99	21.91	22.12	22.09
		50	0	21.45	21.27	21.41
		50	24	21.49	21.25	21.47
		50	49	21.39	21.02	21.30
		100	0	21.44	21.09	21.38

7.6. LTE BAND 12

ID:	38206	Date:	3/28/18

OUTPUT POWER FOR LTE BAND 12 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power Conducted Average (dBm)		
				23017	23095	23173
				699.7 MHz	707.5 MHz	715.3 MHz
1.4	QPSK	1	0	23.88	24.45	23.45
		1	2	24.00	**24.67**	24.66
		1	5	24.10	24.49	24.48
		3	0	23.88	24.38	24.38
		3	1	23.92	24.39	24.40
		3	2	24.02	24.40	24.43
		6	0	22.95	23.42	23.44
	16QAM	1	0	23.29	23.54	23.54
		1	2	23.41	**23.63**	23.61
		1	5	23.43	23.57	23.57
		3	0	23.16	23.52	23.51
		3	1	23.16	23.57	23.58
		3	2	23.19	23.53	23.53
		6	0	21.98	22.62	22.63
	64QAM	1	0	22.32	22.29	21.55
		1	2	22.34	22.38	**22.52**
		1	5	22.40	22.23	22.41
		3	0	22.12	22.30	22.38
		3	1	22.10	22.39	22.45
		3	2	22.04	22.41	22.43
		6	0	21.28	21.97	21.55

OUTPUT POWER FOR LTE BAND 12 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power Conducted Average (dBm)		
				23025	23095	23165
				700.5 MHz	707.5 MHz	714.5 MHz
3.0	QPSK	1	0	23.99	24.47	24.54
		1	7	24.22	**24.63**	24.58
		1	14	24.39	24.59	24.24
		8	0	23.08	23.52	23.55
		8	4	23.08	23.52	23.58
		8	7	23.26	23.54	23.55
		15	0	23.18	23.55	23.57
	16QAM	1	0	23.39	23.40	23.62
		1	7	23.74	23.56	23.66
		1	14	**23.78**	23.51	23.38
		8	0	22.26	22.71	22.66
		8	4	22.35	22.72	22.70
		8	7	22.42	22.76	22.70
		15	0	22.33	22.67	22.61
	64QAM	1	0	22.26	22.52	22.35
		1	7	22.61	**22.69**	22.40
		1	14	22.61	22.60	22.26
		8	0	21.31	21.81	21.60
		8	4	21.40	21.74	21.65
		8	7	21.43	21.82	21.65
		15	0	21.42	21.69	21.68

OUTPUT POWER FOR LTE BAND 12 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power Conducted Average (dBm)		
				23035	23095	23155
				701.5 MHz	707.5 MHz	713.5 MHz
5.0	QPSK	1	0	23.91	24.38	23.53
		1	12	24.37	24.60	24.63
		1	24	24.36	24.71	**24.72**
		12	0	23.14	23.44	23.44
		12	6	23.35	23.55	23.55
		12	11	23.43	23.59	23.60
		25	0	23.23	23.49	23.51
	16QAM	1	0	23.46	23.46	23.45
		1	12	**24.00**	23.71	23.68
		1	24	23.90	23.81	23.80
		12	0	22.37	22.62	22.63
		12	6	22.60	22.73	22.74
		12	11	22.67	22.77	22.77
		25	0	22.41	22.62	22.63
	64QAM	1	0	22.35	21.89	22.02
		1	12	22.61	21.94	22.07
		1	24	**22.69**	21.91	22.05
		12	0	21.23	21.59	21.35
		12	6	21.48	21.60	21.46
		12	11	21.54	21.57	21.45
		25	0	21.41	21.65	21.62

OUTPUT POWER FOR LTE BAND 12 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power Conducted Average (dBm)		
				23060	23095	23130
				704.0 MHz	707.5 MHz	711.0 MHz
10.0	QPSK	1	0	23.96	24.19	23.52
		1	24	24.41	24.31	24.31
		1	49	**24.61**	24.46	24.50
		25	0	23.21	23.35	23.37
		25	12	23.39	23.50	23.51
		25	24	23.45	23.67	23.67
		50	0	23.21	23.47	23.49
	16QAM	1	0	23.29	23.14	23.11
		1	24	23.88	23.26	23.25
		1	49	**23.99**	23.37	23.37
		25	0	22.38	22.48	22.50
		25	12	22.51	22.62	22.61
		25	24	22.54	22.74	22.75
		50	0	22.35	22.51	22.53
	64QAM	1	0	22.14	22.03	21.82
		1	24	22.38	22.18	21.84
		1	49	**22.47**	22.36	21.84
		25	0	21.49	21.59	21.66
		25	12	21.68	21.69	21.64
		25	24	21.66	21.85	21.68
		50	0	21.44	21.65	21.53

7.7. LTE BAND 13

ID:	38206	Date:	3/28/18

OUTPUT POWER FOR LTE BAND 13 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				23207	23230	23255
				779.5 MHz	782.0 MHz	784.5 MHz
5.0	QPSK	1	0	24.40	**24.49**	23.37
		1	12	24.35	24.42	24.42
		1	24	24.37	24.42	24.41
		12	0	23.42	23.39	23.40
		12	6	23.43	23.36	23.36
		12	11	23.42	23.36	23.35
		25	0	23.42	23.42	23.40
	16QAM	1	0	**24.00**	23.62	23.62
		1	12	23.96	23.58	23.56
		1	24	23.96	23.58	23.57
		12	0	22.64	22.58	22.57
		12	6	22.66	22.57	22.56
		12	11	22.64	22.52	22.51
		25	0	22.57	22.52	22.52
	64QAM	1	0	**22.15**	21.91	22.04
		1	12	22.11	21.86	22.07
		1	24	22.01	21.84	22.01
		12	0	21.55	21.55	21.50
		12	6	21.55	21.53	21.50
		12	11	21.52	21.50	21.50
		25	0	21.52	21.48	21.50

OUTPUT POWER FOR LTE BAND 13 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				N/A	23230	N/A
				N/A	782.0 MHz	N/A
10.0	QPSK	1	0		**24.38**	
		1	24		24.31	
		1	49		24.24	
		25	0		23.43	
		25	12		23.41	
		25	24		23.33	
		50	0		23.37	
	16QAM	1	0		**23.38**	
		1	24		23.33	
		1	49		23.24	
		25	0		22.51	
		25	12		22.53	
		25	24		22.47	
		50	0		22.45	
	64QAM	1	0		**22.17**	
		1	24		22.10	
		1	49		22.00	
		25	0		21.60	
		25	12		21.58	
		25	24		21.52	
		50	0		21.51	

7.8. LTE Band 41

ID:	38515	Date:	3/28/18

OUTPUT POWER FOR LTE BAND 41 (FCC) (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				39675	40620	41565
				2498.5 MHz	2593.0 MHz	2687.5 MHz
5.0	QPSK	1	0	22.00	22.22	22.22
		1	12	21.98	22.21	22.17
		1	24	21.95	22.15	22.16
		12	0	22.08	22.23	**22.24**
		12	6	22.10	**22.24**	22.23
		12	11	22.06	22.20	22.18
		25	0	22.10	22.22	22.19
	16QAM	1	0	21.53	21.72	21.86
		1	12	21.49	21.73	21.83
		1	24	21.49	21.71	21.78
		12	0	21.69	21.78	21.82
		12	6	21.69	21.80	**21.86**
		12	11	21.66	21.74	21.82
		25	0	21.69	21.79	21.79
	64QAM	1	0	21.42	21.15	**21.88**
		1	12	21.39	21.14	21.86
		1	24	21.34	21.10	21.78
		12	0	21.21	21.42	21.17
		12	6	21.22	21.43	21.20
		12	11	21.20	21.39	21.19
		25	0	21.26	21.26	21.17

OUTPUT POWER FOR LTE BAND 41 (FCC) (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				39700	40620	41540
				2501.0 MHz	2593.0 MHz	2685.0 MHz
10.0	QPSK	1	0	22.04	22.22	**22.29**
		1	24	22.07	22.17	22.15
		1	49	22.07	22.15	22.22
		25	0	22.14	22.25	22.24
		25	12	22.11	22.23	22.21
		25	24	22.11	22.20	22.17
		50	0	22.13	22.22	22.19
	16QAM	1	0	21.55	**22.12**	21.82
		1	24	21.55	21.86	21.69
		1	49	21.60	21.83	21.78
		25	0	21.71	21.81	21.81
		25	12	21.72	21.82	21.77
		25	24	21.68	21.80	21.74
		50	0	21.73	21.85	21.80
	64QAM	1	0	**22.00**	21.86	21.21
		1	24	21.99	21.80	21.25
		1	49	**22.00**	21.76	21.24
		25	0	21.31	21.28	21.26
		25	12	21.28	21.26	21.28
		25	24	21.26	21.20	21.23
		50	0	21.28	21.30	21.21

OUTPUT POWER FOR LTE BAND 41 (FCC) (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				39725	40620	41515
				2503.5 MHz	2593.0 MHz	2682.5 MHz
15.0	QPSK	1	0	22.07	**22.31**	22.30
		1	37	22.08	22.20	22.16
		1	74	21.99	22.10	22.15
		36	0	22.13	22.25	22.27
		36	16	22.09	22.19	22.23
		36	35	22.07	22.13	22.17
		75	0	22.08	22.21	22.21
	16QAM	1	0	21.63	**21.93**	21.85
		1	37	21.56	21.83	21.70
		1	74	21.57	21.74	21.72
		36	0	21.70	21.90	21.85
		36	16	21.66	21.83	21.79
		36	35	21.64	21.77	21.73
		75	0	21.69	21.81	21.80
	64QAM	1	0	21.78	21.45	**21.95**
		1	37	21.62	21.34	21.91
		1	74	21.61	21.26	21.89
		36	0	21.33	21.40	21.33
		36	16	21.29	21.38	21.29
		36	35	21.25	21.31	21.26
		75	0	21.25	21.32	21.23

OUTPUT POWER FOR LTE BAND 41 (FCC) (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				39750	40620	41490
				2506.0 MHz	2593.0 MHz	2680.0 MHz
20.0	QPSK	1	0	22.14	22.36	**22.38**
		1	49	22.09	22.17	22.19
		1	99	22.04	22.12	22.17
		50	0	22.17	22.27	22.32
		50	24	22.13	22.25	22.24
		50	49	22.06	22.16	22.14
		100	0	22.11	22.19	22.23
	16QAM	1	0	21.54	**22.34**	21.92
		1	49	21.45	21.85	21.70
		1	99	21.44	21.77	21.68
		50	0	21.77	21.90	21.84
		50	24	21.73	21.88	21.79
		50	49	21.65	21.78	21.67
		100	0	21.72	21.78	21.75
	64QAM	1	0	22.01	**22.29**	21.65
		1	49	21.80	22.12	21.59
		1	99	21.78	22.05	21.54
		50	0	21.44	21.40	21.33
		50	24	21.35	21.35	21.27
		50	49	21.30	21.31	21.23
		100	0	21.10	21.32	21.25

8. CONDUCTED TEST RESULTS

8.1. 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.

MODES TESTED
- GSM
- WCDMA
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 41

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)
850MHz	GPRS	190	836.6	244.1081	315.352
	EGPRS			234.5349	291.143
1900MHz	GPRS	661	1880.0	244.2858	314.791
	EGPRS			239.2110	316.492

WCDMA

Band	Modulation	Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
BAND 5	REL 99	9800	1880.0	4.1176	4.688
	HSDPA			4.1120	4.688

LTE BAND 4

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 4	1.4 MHz, QPSK	6/0	1732.5	1.0781	1.204
	1.4 MHz,16QAM			1.0857	1.230
	3 MHz, QPSK	15/0		2.6898	2.988
	3 MHz, 16QAM			2.6856	2.988
	5 MHz, QPSK	25/0		4.4893	4.884
	5 MHz, 16QAM			4.4905	4.871
	10 MHz, QPSK	50/0		8.9464	9.672
	10 MHz, 16QAM			8.9364	9.755
	15 MHz, QPSK	75/0		13.4083	14.441
	15 MHz, 16QAM			13.4281	14.671
	20 MHz, QPSK	100/0		17.8678	19.156
	20 MHz, 16QAM			17.8626	19.087
	20 MHz, 64QAM			17.8703	19.466

LTE BAND 5

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 5	1.4 MHz, QPSK	6/0	836.5	1.0818	1.220
	1.4 MHz, 16QAM			1.0828	1.233
	3 MHz, QPSK	15/0		2.6859	2.976
	3 MHz, 16QAM			2.6932	2.988
	5 MHz, QPSK	25/0		4.4964	4.892
	5 MHz, 16QAM			4.4853	4.916
	10 MHz, QPSK	50/0		8.9436	9.764
	10 MHz, 16QAM			8.9256	9.696
	10 MHz, 64QAM			8.9498	9.708

LTE BAND 7

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 7	5 MHz, QPSK	25/0	2535	4.4990	4.926
	5 MHz, 16QAM			4.4867	4.871
	10 MHz, QPSK	50/0		8.9724	9.764
	10 MHz, 16QAM			8.9274	9.628
	15 MHz, QPSK	75/0		13.4211	14.433
	15 MHz, 16QAM			13.3825	14.395
	20 MHz, QPSK	100/0		17.9072	19.124
	20 MHz, 16QAM			17.8311	19.191
	20 MHz, 64QAM			17.9019	19.432

LTE BAND 12

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 12	1.4 MHz, QPSK	6/0	707.5	1.0829	1.228
	1.4 MHz,16QAM			1.0859	1.218
	3 MHz, QPSK	15/0		2.6819	3.011
	3 MHz, 16QAM			2.6883	2.957
	5 MHz, QPSK	25/0		4.4957	4.917
	5 MHz, 16QAM			4.5042	4.916
	10 MHz, QPSK	50/0		8.9441	9.732
	10 MHz, 16QAM			8.9466	9.766
	10 MHz, 64QAM			8.9447	9.792

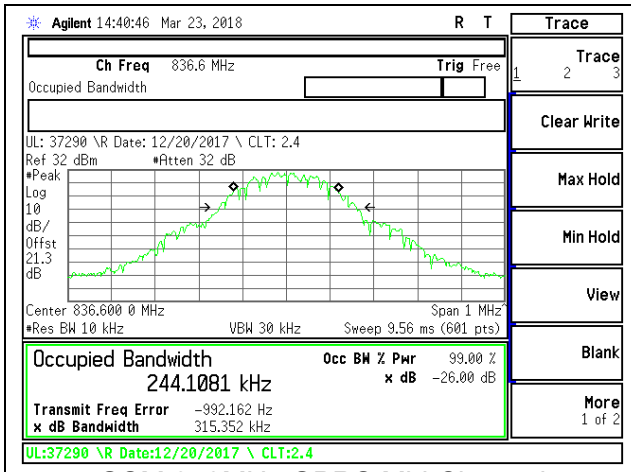
LTE BAND 13

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE Band 13	5 MHz, QPSK	25/0	782	4.5134	4.927
	5 MHz, 16QAM			4.4985	4.924
	10 MHz, QPSK	50/0		8.9302	9.742
	10 MHz, 16QAM			8.9534	9.703
	10 MHz, 64QAM			8.9506	9.801

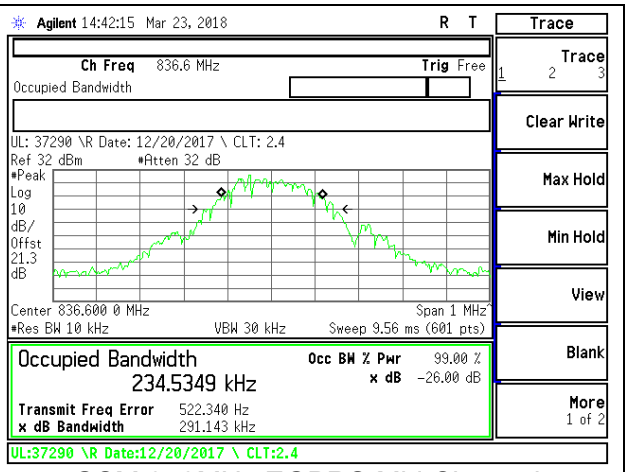
LTE BAND 41

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 41	5 MHz, QPSK	25/0	2593.0	4.4943	5.035
	5 MHz, 16QAM			4.4897	4.921
	10 MHz, QPSK	50/0		8.9510	9.659
	10 MHz, 16QAM			8.9326	9.677
	15 MHz, QPSK	75/0		13.3871	14.417
	15 MHz, 16QAM			13.3953	14.451
	20 MHz, QPSK	100/0		17.8087	19.025
	20 MHz, 16QAM			17.8787	19.180
	20 MHz, 64QAM			17.8748	19.158

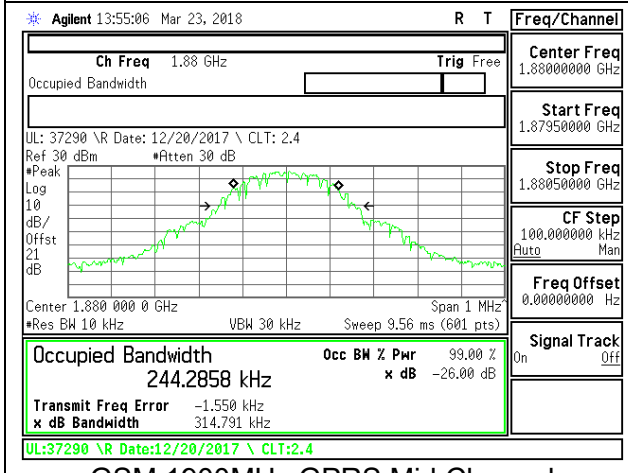
8.1.1. **GSM**



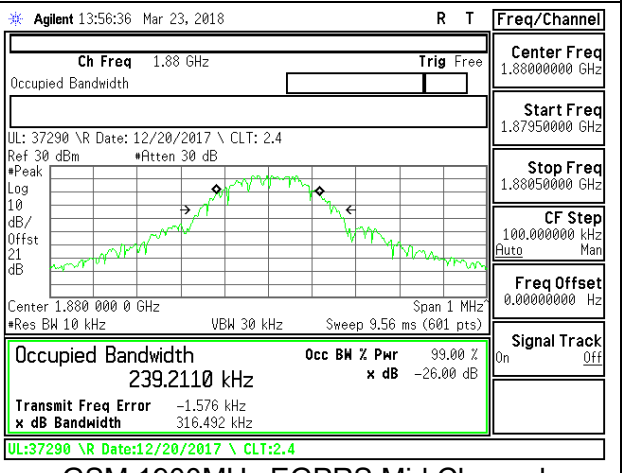
GSM 850MHz GPRS Mid Channel



GSM 850MHz EGPRS Mid Channel

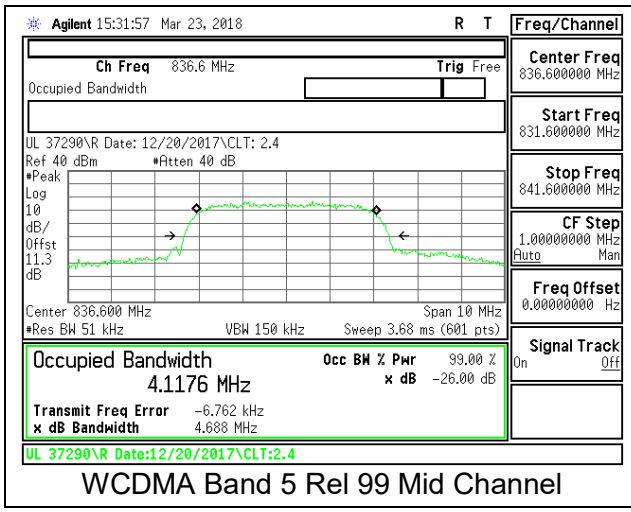


GSM 1900MHz GPRS Mid Channel

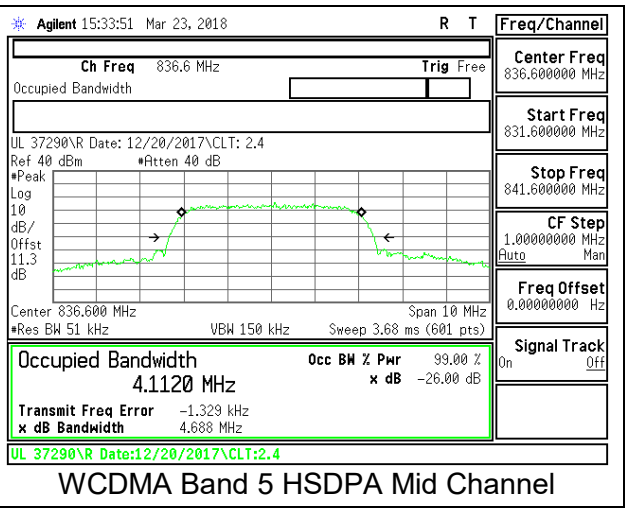


GSM 1900MHz EGPRS Mid Channel

8.1.2. **WCDMA**

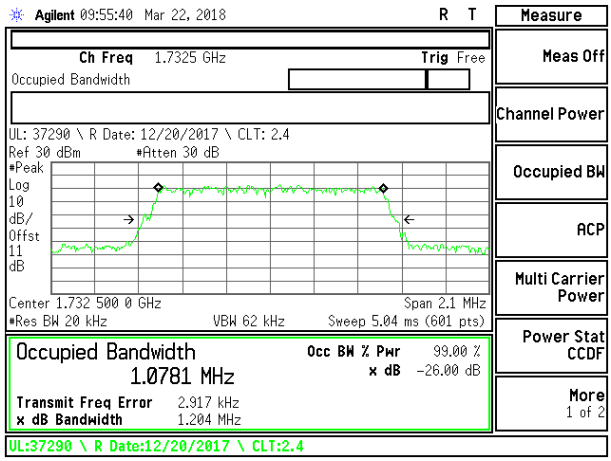


WCDMA Band 5 Rel 99 Mid Channel

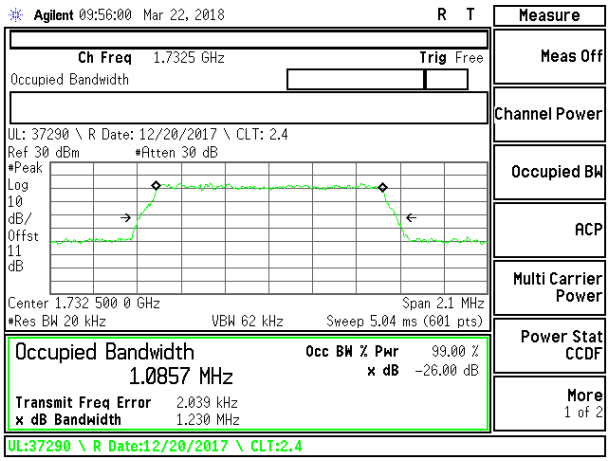


WCDMA Band 5 HSDPA Mid Channel

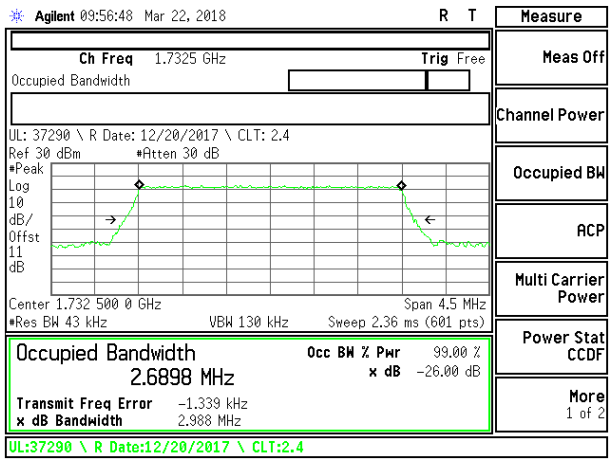
8.1.3. **LTE BAND 4**



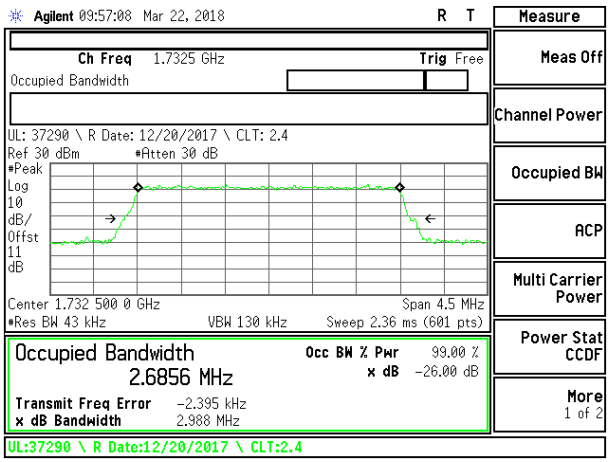
LTE B4 1.4MHz QPSK Mid Channel RB6-0



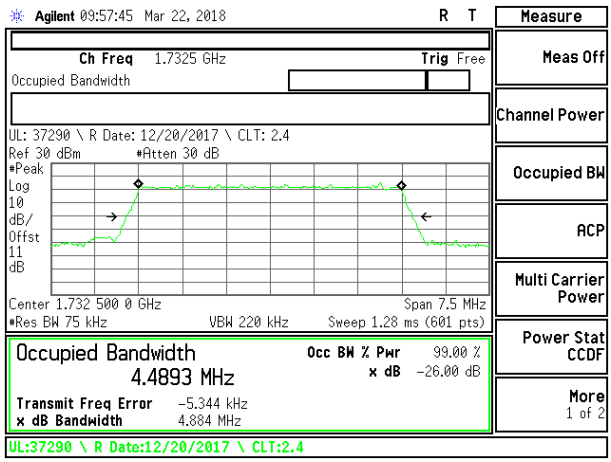
LTE B4 1.4MHz 16QAM Mid Channel RB6-0



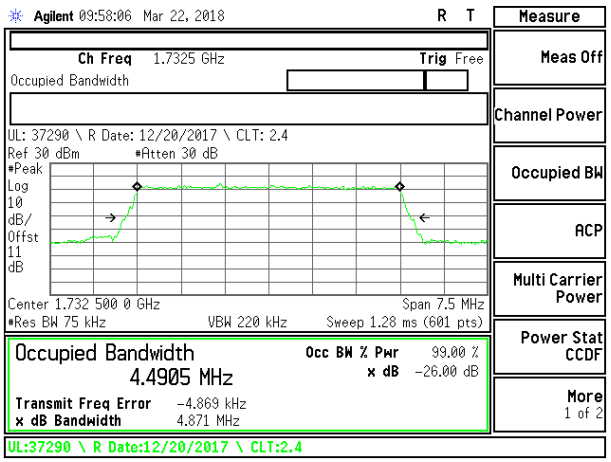
LTE B4 3MHz QPSK Mid Channel RB15-0



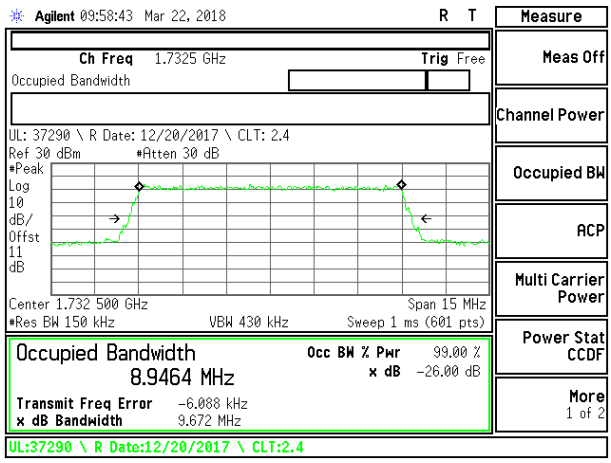
LTE B4 3MHz 16QAM Mid Channel RB15-0



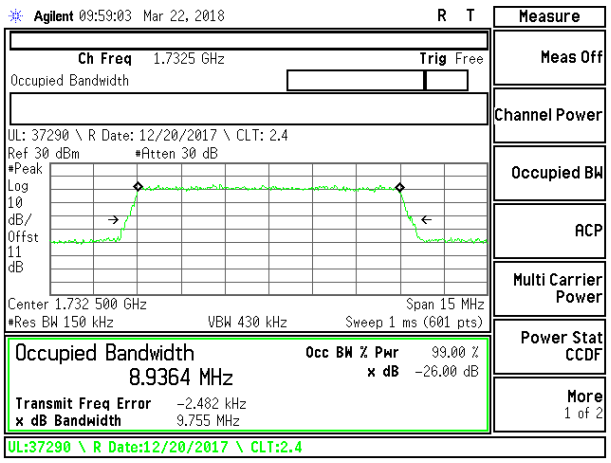
LTE B4 5MHz QPSK Mid Channel RB25-0



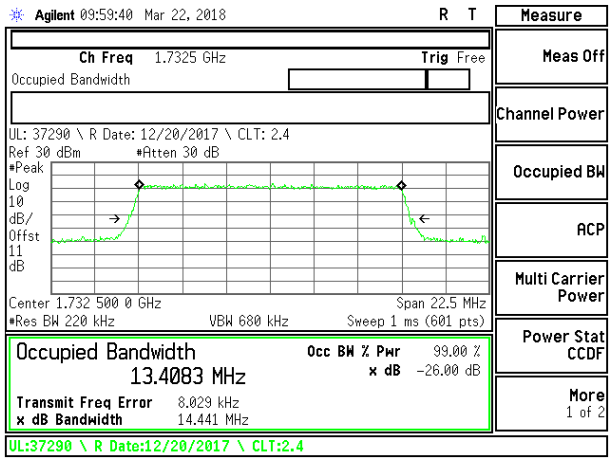
LTE B4 5MHz 16QAM Mid Channel RB25-0



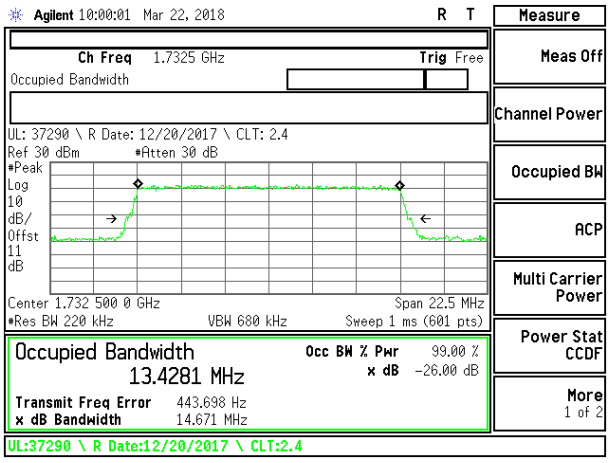
LTE B4 10MHz QPSK Mid Channel RB50-0



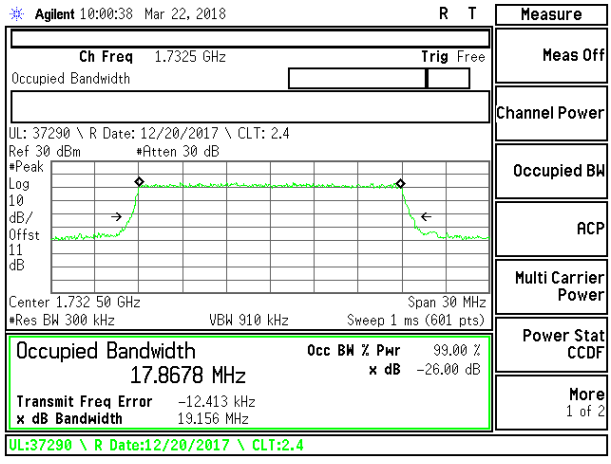
LTE B4 10MHz 16QAM Mid Channel RB50-0



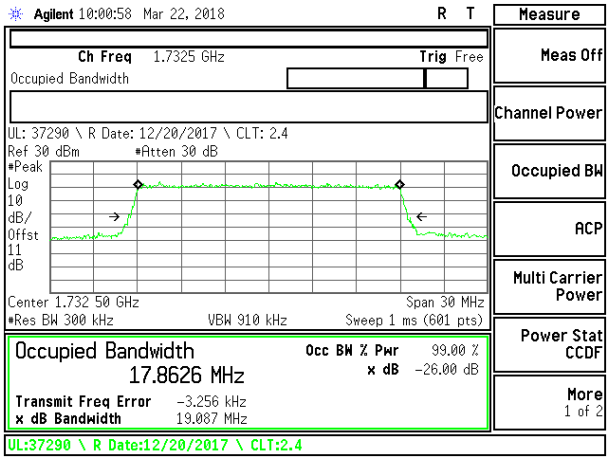
LTE B4 15MHz QPSK Mid Channel RB75-0



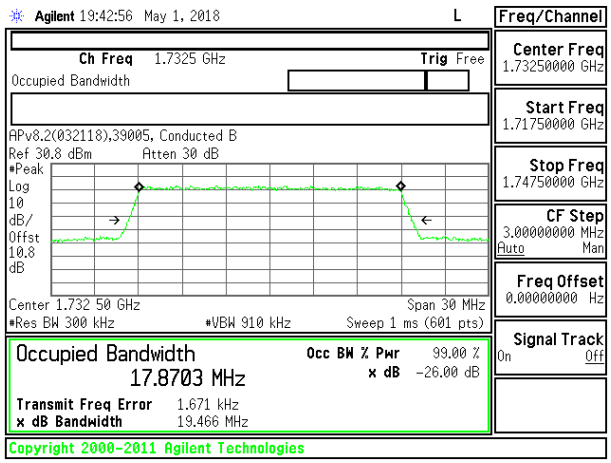
LTE B4 15MHz 16QAM Mid Channel RB75-0



LTE B4 20MHz QPSK Mid Channel RB100-0

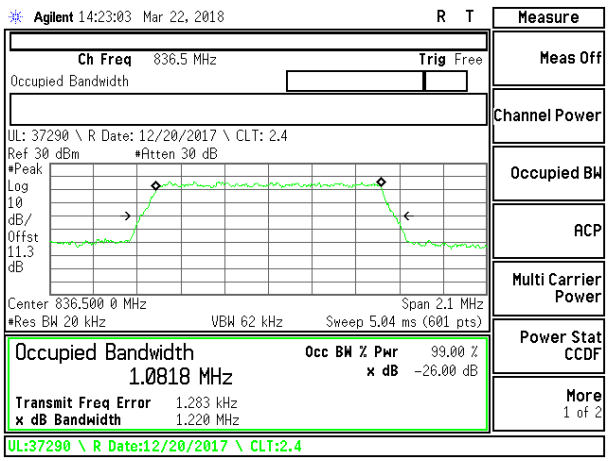


LTE B4 20MHz 16QAM Mid Channel RB100-0

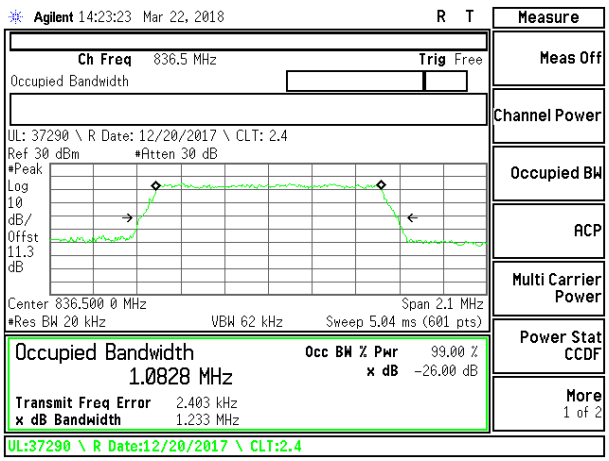


LTE B4 20MHz 64QAM Mid Channel RB100-0

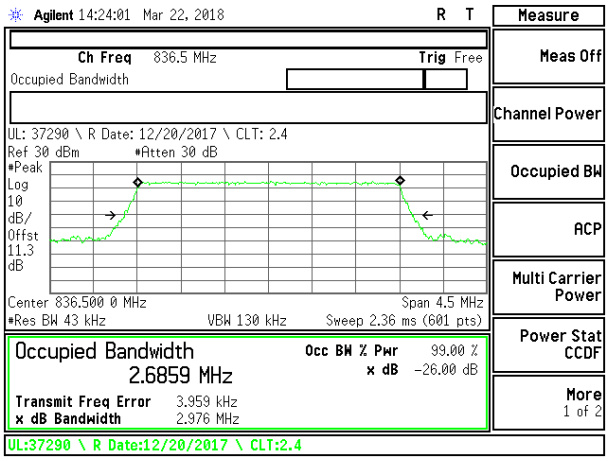
8.1.4. **LTE BAND 5**



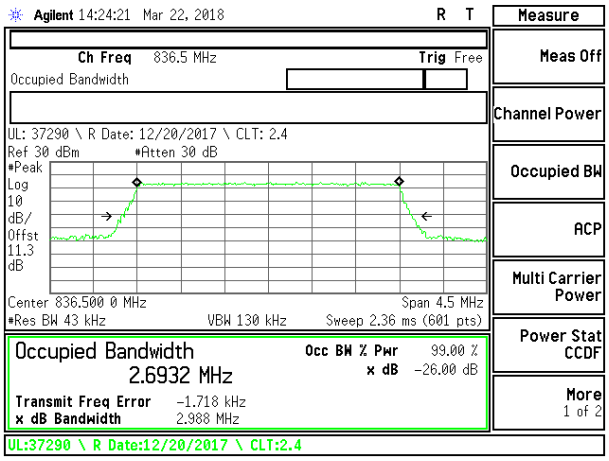
LTE B5 1.4MHz QPSK Mid Channel RB6-0



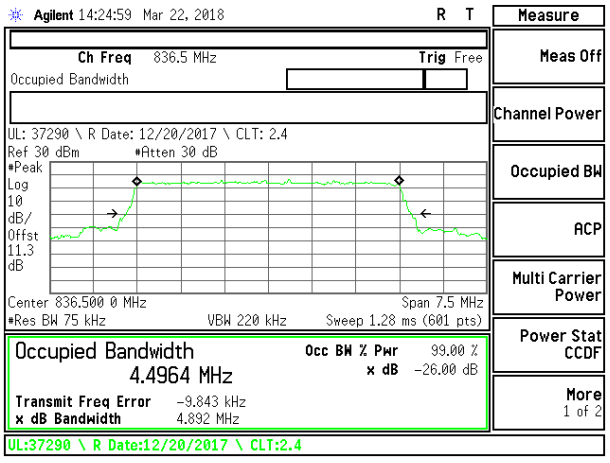
LTE B5 1.4MHz 16QAM Mid Channel RB6-0



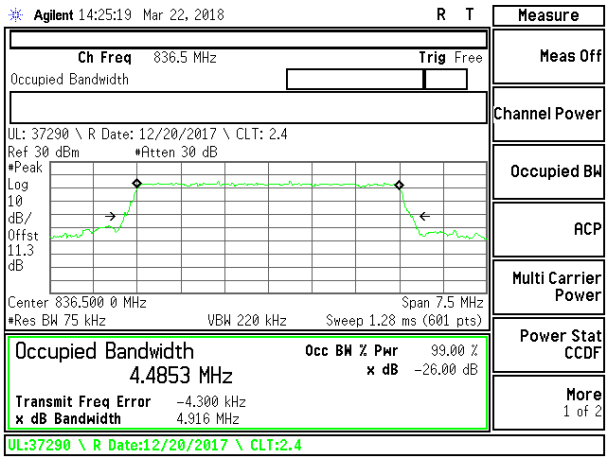
LTE B5 3MHz QPSK Mid Channel RB15-0



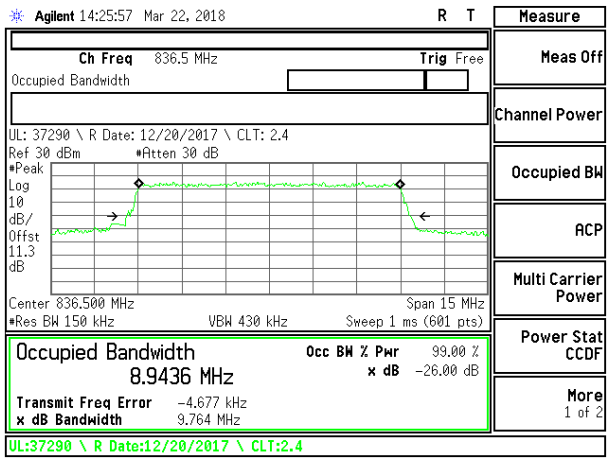
LTE B5 3MHz 16QAM Mid Channel RB15-0



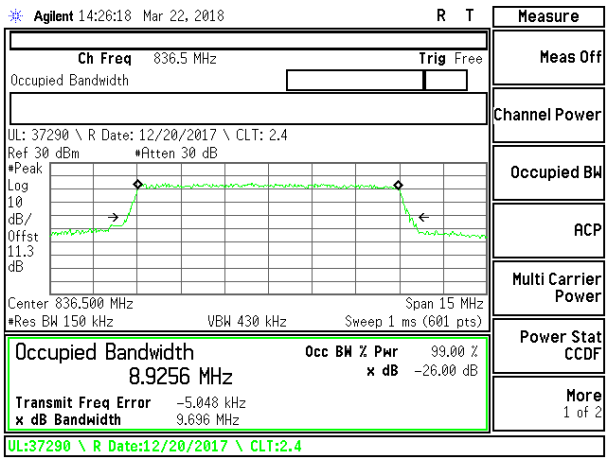
LTE B5 5MHz QPSK Mid Channel RB25-0



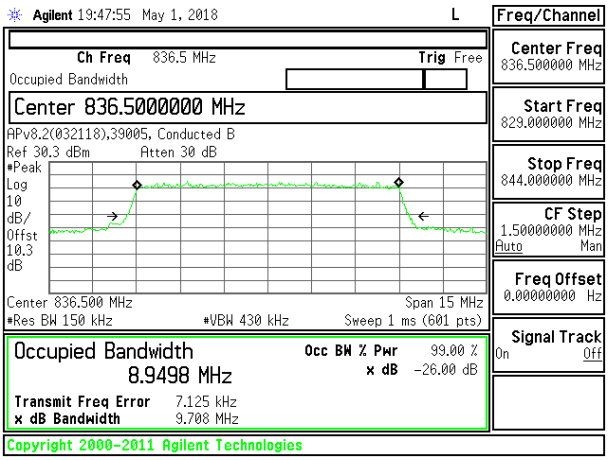
LTE B5 5MHz 16QAM Mid Channel RB25-0



LTE B5 10MHz QPSK Mid Channel RB50-0

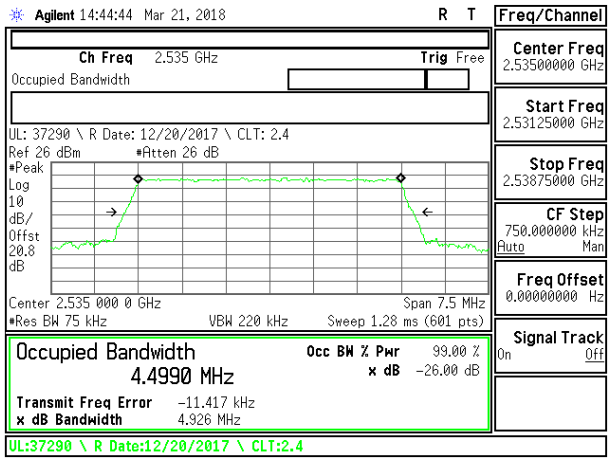


LTE B5 10MHz 16QAM Mid Channel RB50-0

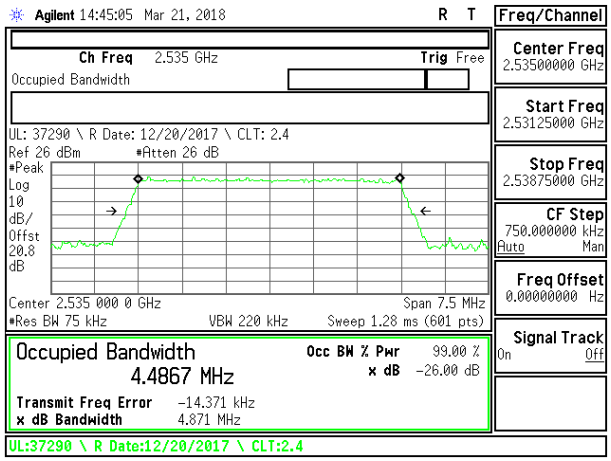


LTE B5 10MHz 64QAM Mid Channel RB50-0

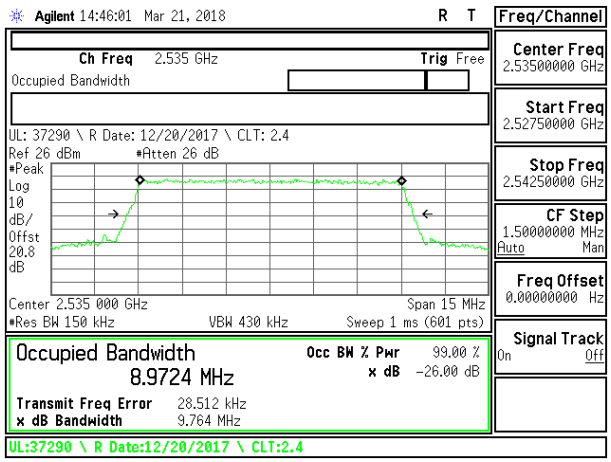
8.1.5. **LTE BAND 7**



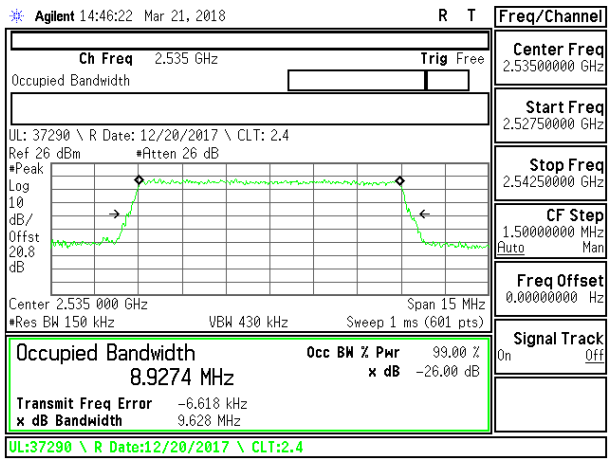
LTE B7 5MHz QPSK Mid Channel RB25-0



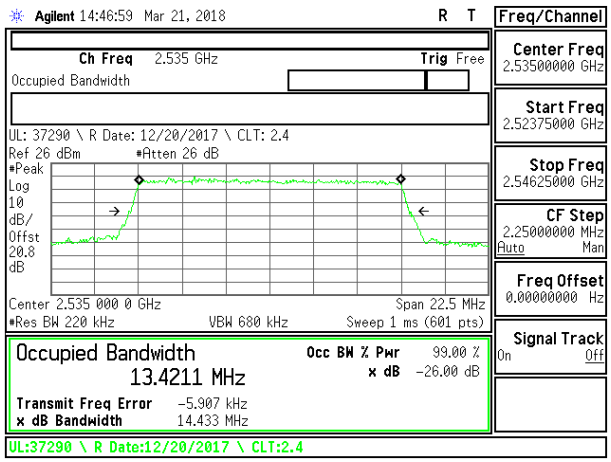
LTE B7 5MHz 16QAM Mid Channel RB25-0



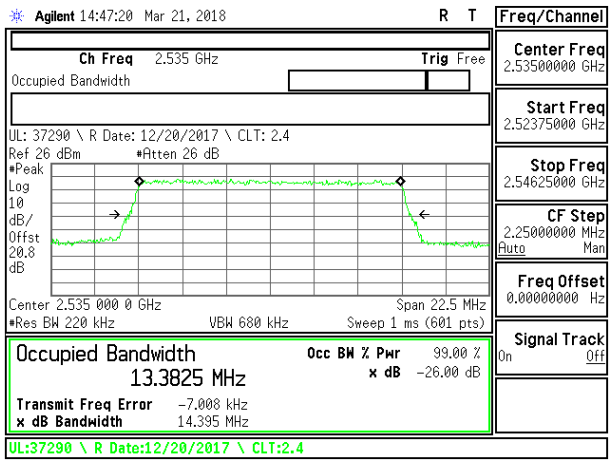
LTE B7 10MHz QPSK Mid Channel RB50-0



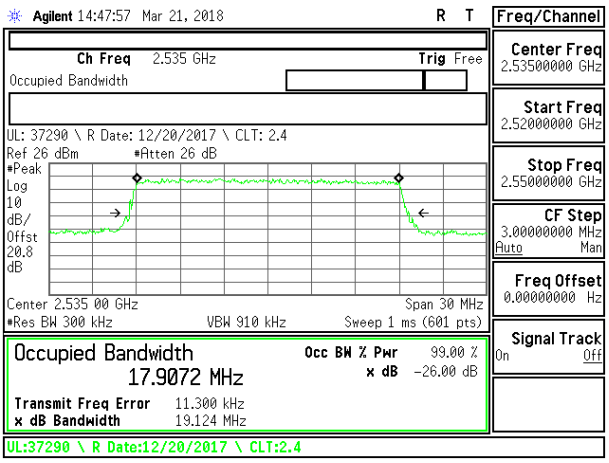
LTE B7 10MHz 16QAM Mid Channel RB50-0



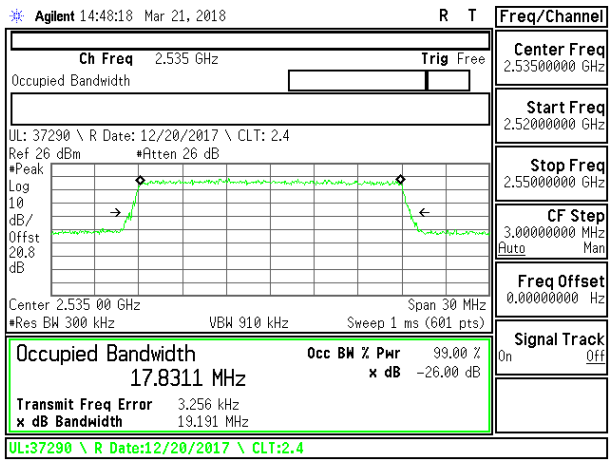
LTE B7 15MHz QPSK Mid Channel RB75-0



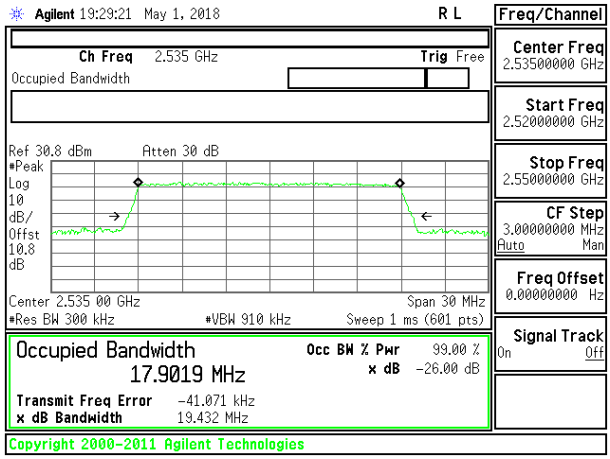
LTE B7 15MHz 16QAM Mid Channel RB75-0



LTE B7 20MHz QPSK Mid Channel RB100-0

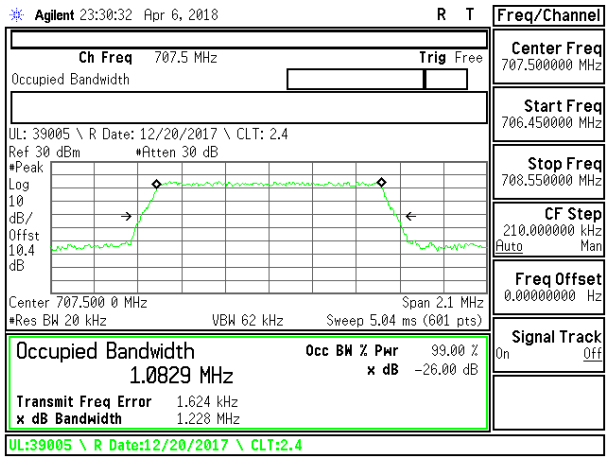


LTE B7 20MHz 16QAM Mid Channel RB100-0

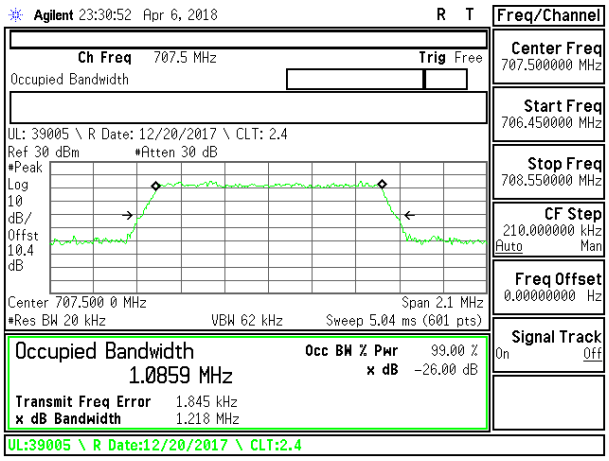


LTE B7 20MHz 64QAM Mid Channel RB100-0

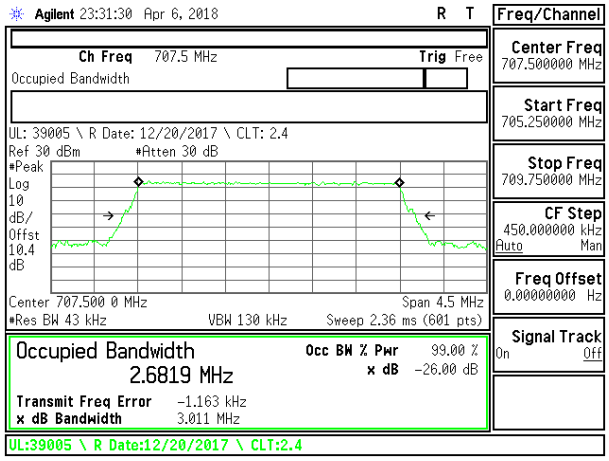
8.1.6. **LTE BAND 12**



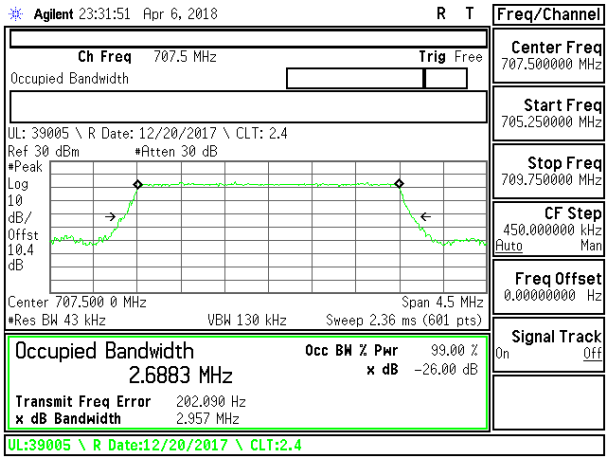
LTE B12 1.4MHz QPSK Mid Channel RB25-0



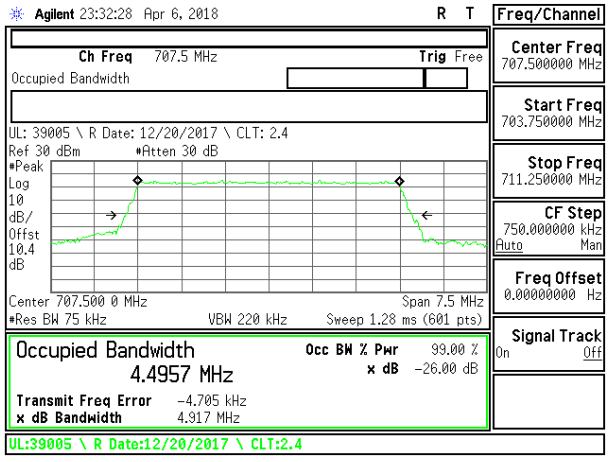
LTE B12 1.4MHz 16QAM Mid Channel RB25-0



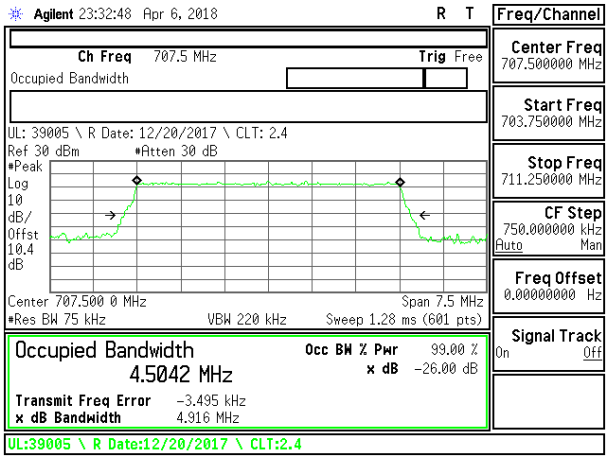
LTE B12 3MHz QPSK Mid Channel RB25-0



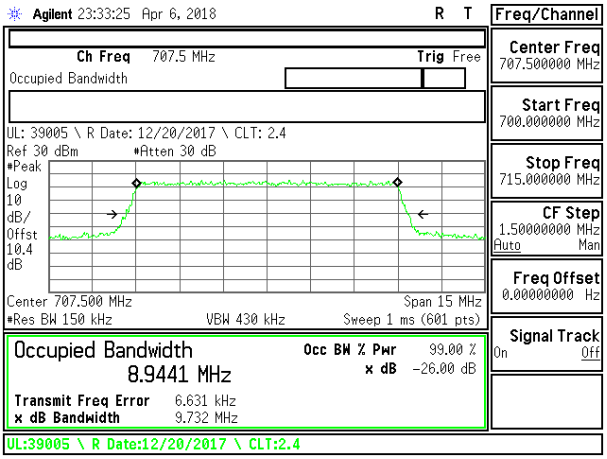
LTE B12 3MHz 16QAM Mid Channel RB25-0



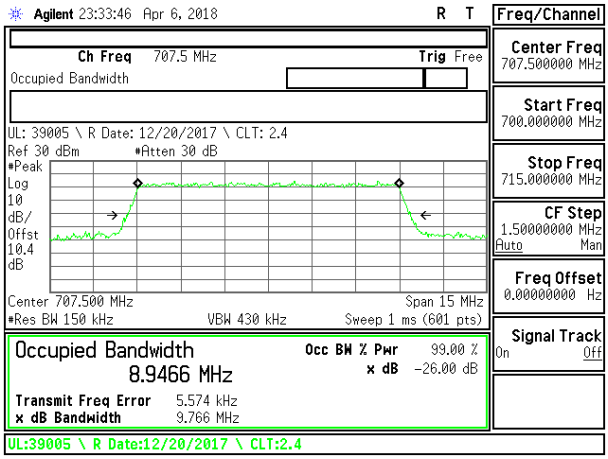
LTE B12 5MHz QPSK Mid Channel RB50-0



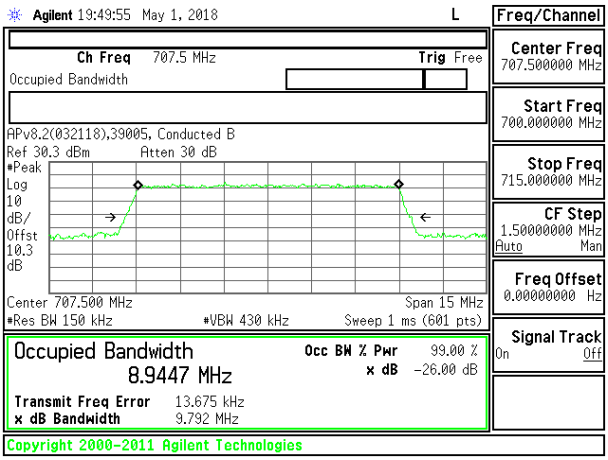
LTE B12 5MHz 16QAM Mid Channel RB50-0



LTE B12 10MHz QPSK Mid Channel RB50-0

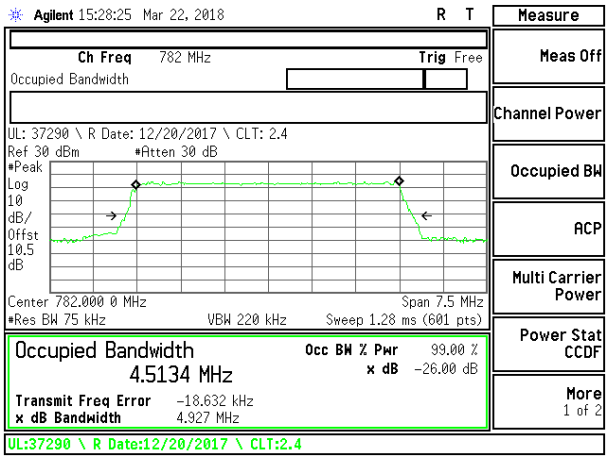


LTE B12 10MHz 16QAM Mid Channel RB50-0

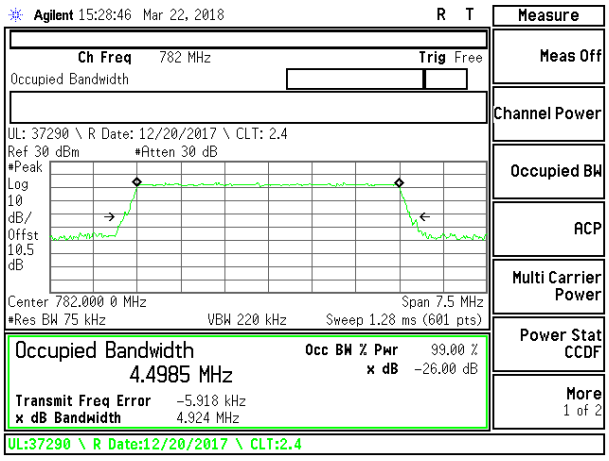


LTE B12 10MHz 64QAM Mid Channel RB50-0

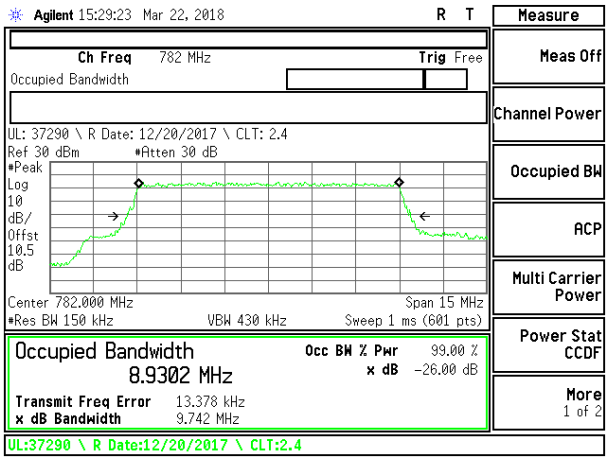
8.1.7. **LTE BAND 13**



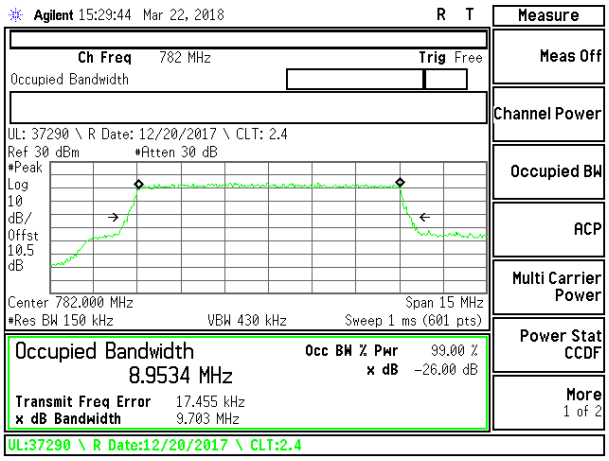
LTE B13 5MHz QPSK Mid Channel RB25-0



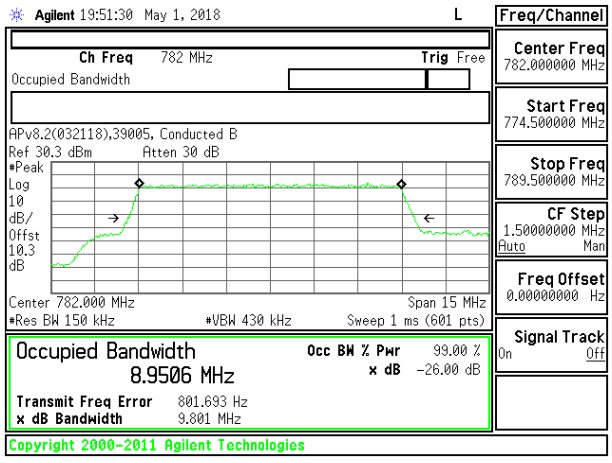
LTE B13 5MHz 16QAM Mid Channel RB25-0



LTE B13 10MHz QPSK Mid Channel RB50-0

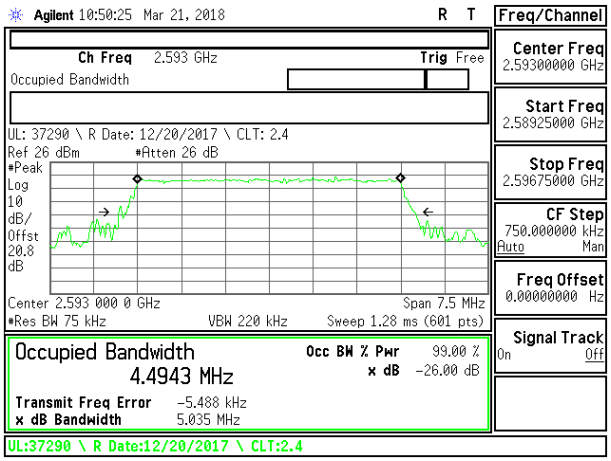


LTE B13 10MHz 16QAM Mid Channel RB50-0

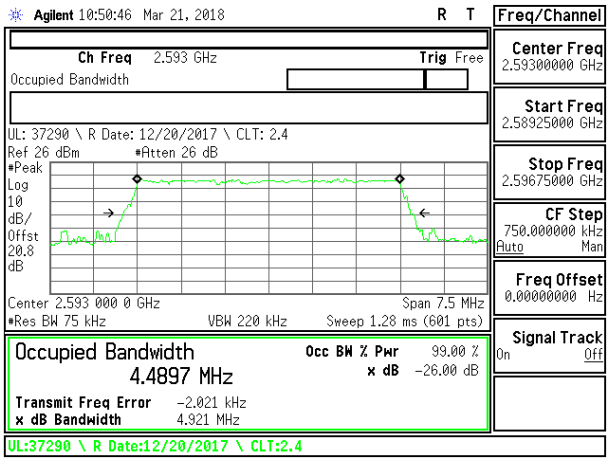


LTE B13 10MHz 64QAM Mid Channel RB50-0

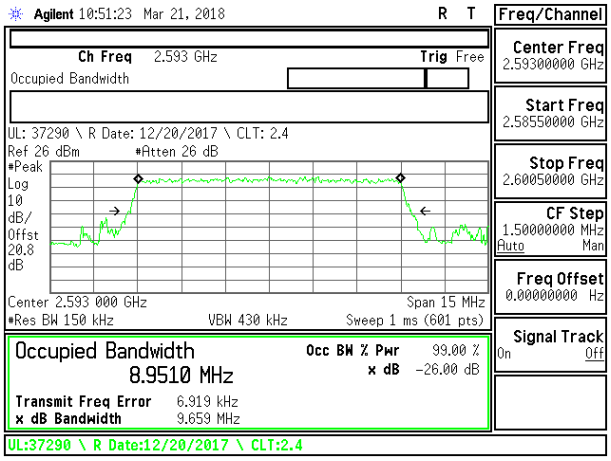
8.1.8. **LTE BAND 41**



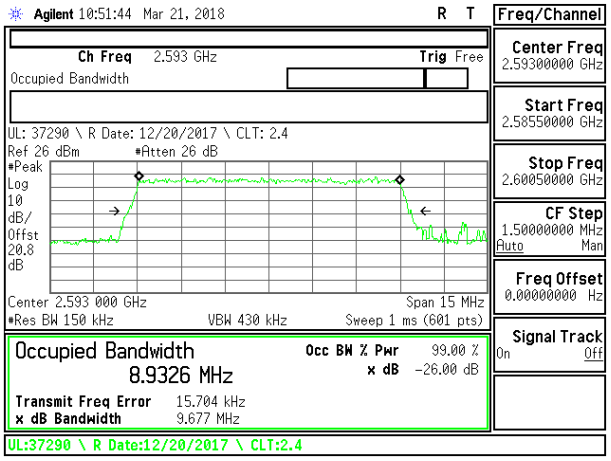
LTE B41 5MHz QPSK Mid Channel RB25-0



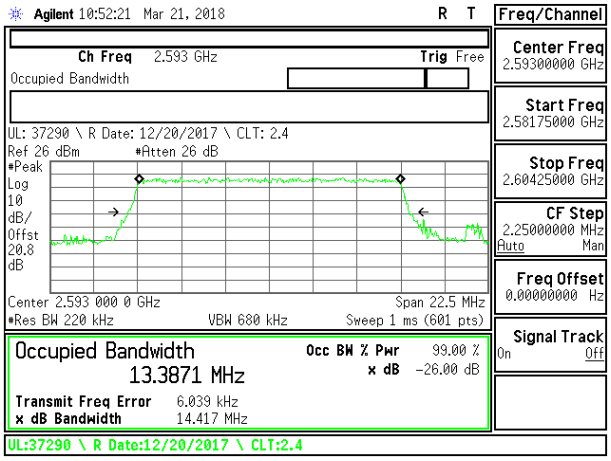
LTE B41 5MHz 16QAM Mid Channel RB25-0



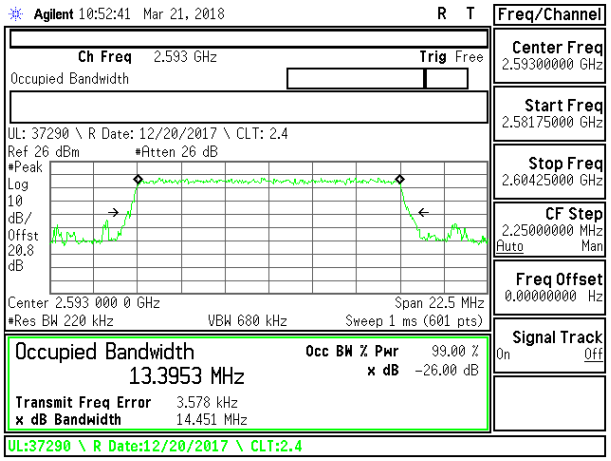
LTE B41 10MHz QPSK Mid Channel RB50-0



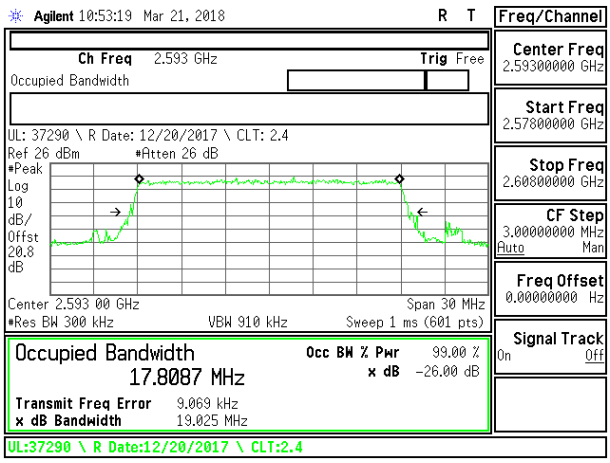
LTE B41 10MHz 16QAM Mid Channel RB50-0



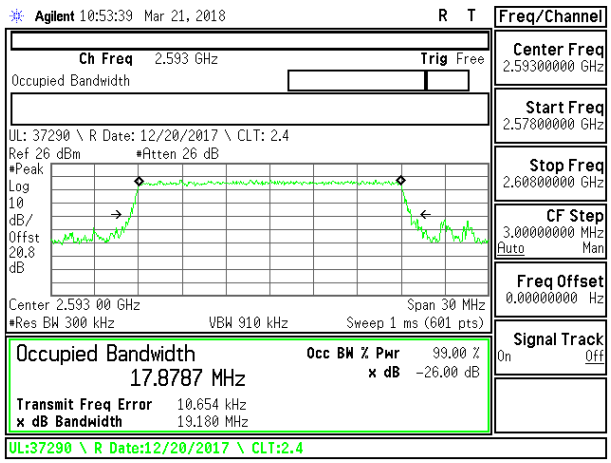
LTE B41 15MHz QPSK Mid Channel RB75-0



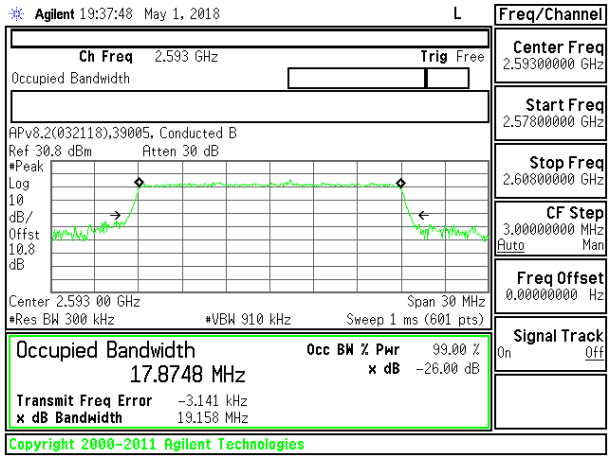
LTE B41 15MHz 16QAM Mid Channel RB75-0



LTE B41 20MHz QPSK Mid Channel RB100-0



LTE B41 20MHz 16QAM Mid Channel RB100-0



LTE B41 20MHz 64QAM Mid Channel RB100-0

8.2. BAND EDGE AND EMISSION MASK

RULE PART(S)
FCC: §2.1051, §22.917, §24.238, §27.53
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.

FCC: §27.53 (Band 13)
(c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

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

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

(f) Emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals. (-70 dBW/MHz = -40dBm/MHz).

FCC: §27.53 (Band 12, 17)
(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.

FCC: §27.53 (Band 7, 41)
(m)(4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

TEST PROCEDURE

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

For each band edge measurement:

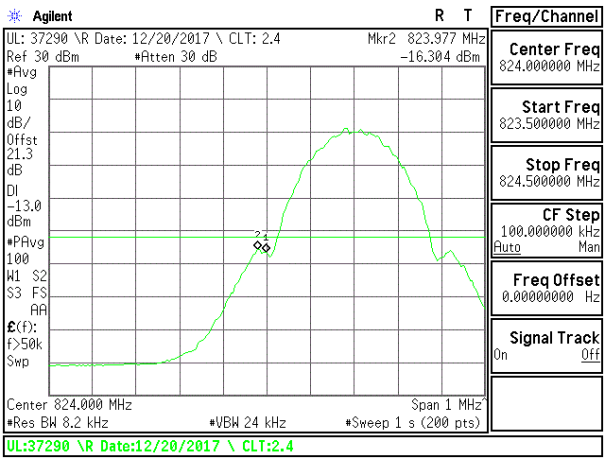
- Set the spectrum analyzer span to include the block edge frequency.
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

MODES TESTED

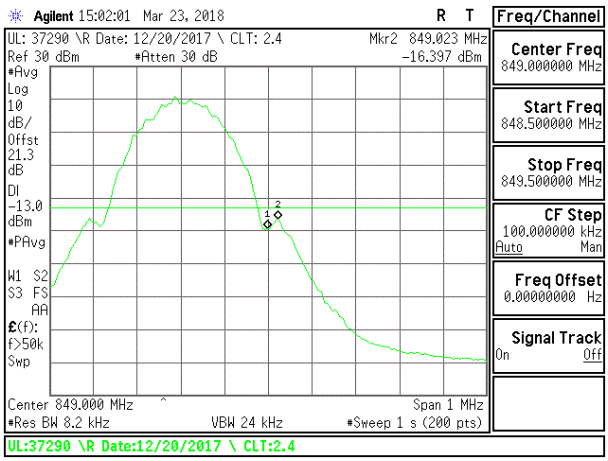
- GSM
- WCDMA
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 41

RESULTS

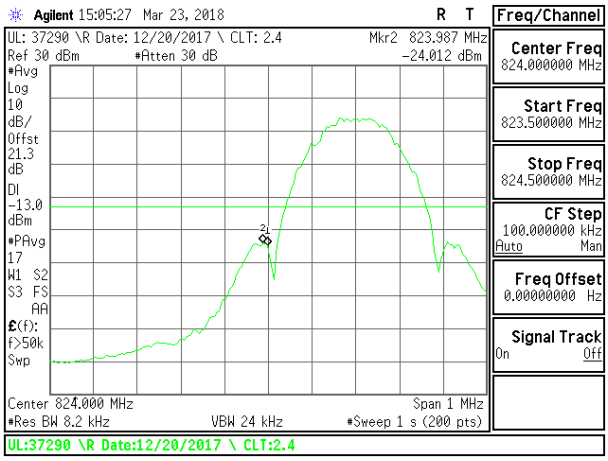
8.2.1. **GSM 850MHz**



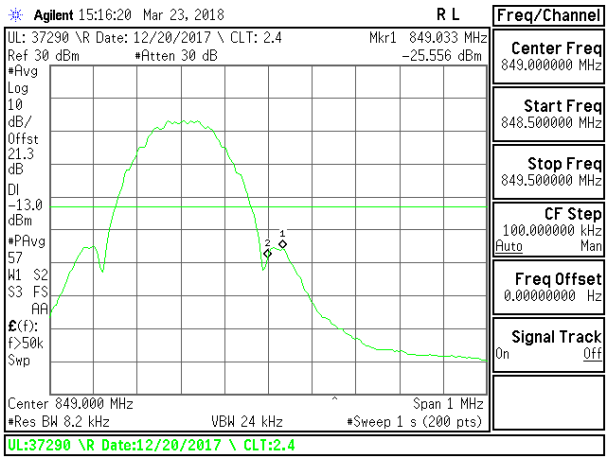
GSM 850MHz GPRS Low Channel



GSM 850MHz GPRS High Channel

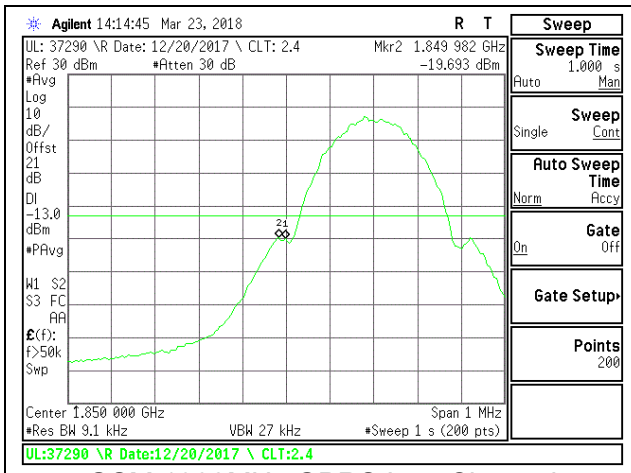


GSM 850MHz EGPRS Low Channel

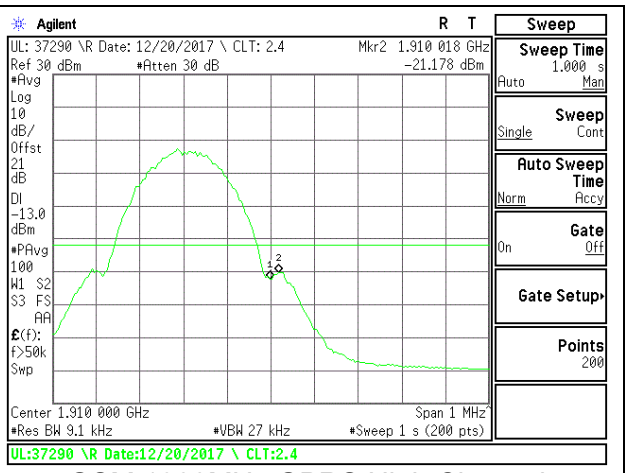


GSM 850MHz EGPRS High Channel

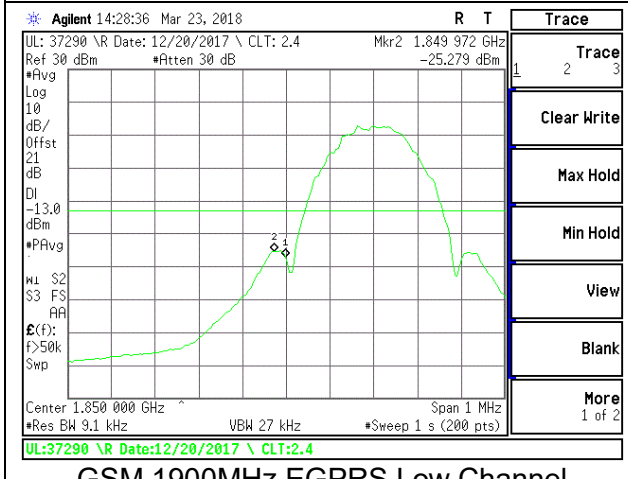
8.2.2. **GSM 1900MHz**



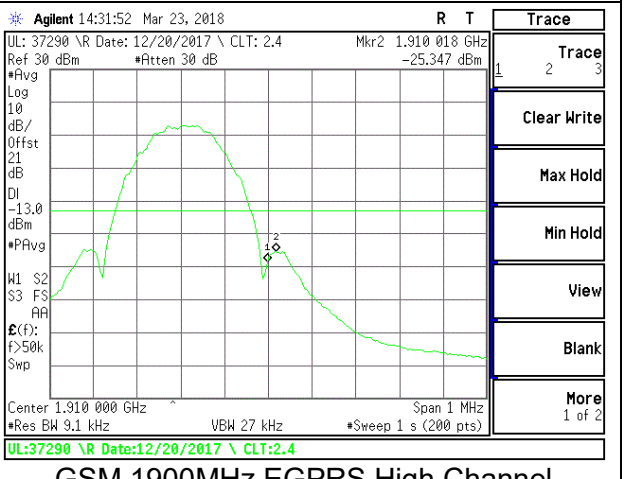
GSM 1900MHz GPRS Low Channel



GSM 1900MHz GPRS High Channel

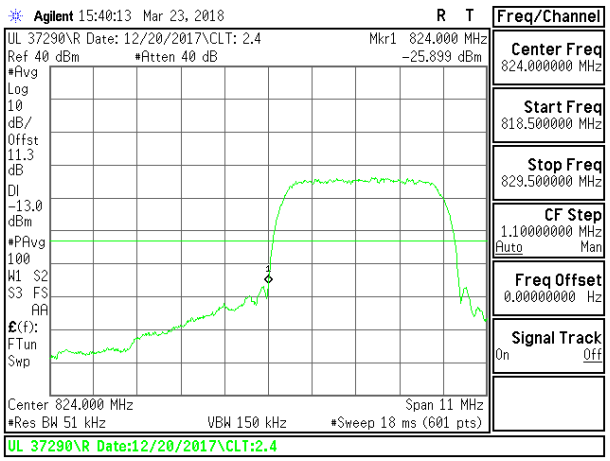


GSM 1900MHz EGPRS Low Channel

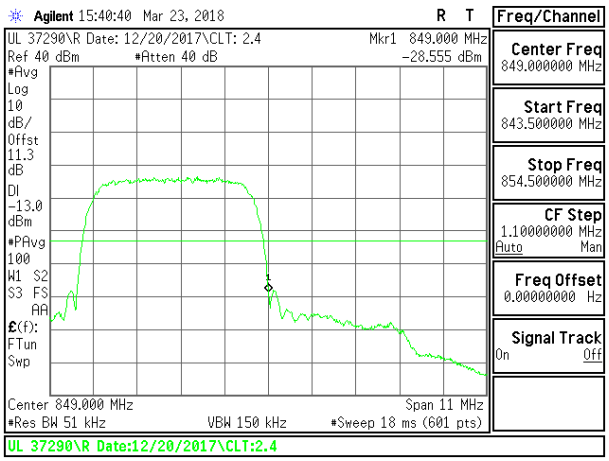


GSM 1900MHz EGPRS High Channel

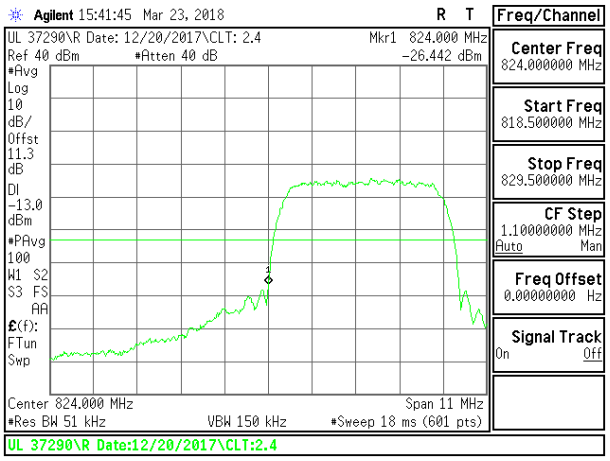
8.2.3. **WCDMA BAND 5**



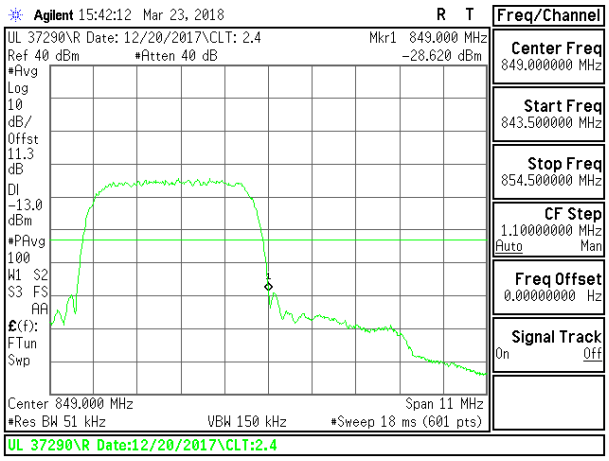
WCDMA Band 5 Rel 99 Low Channel



WCDMA Band 5 Rel 99 High Channel

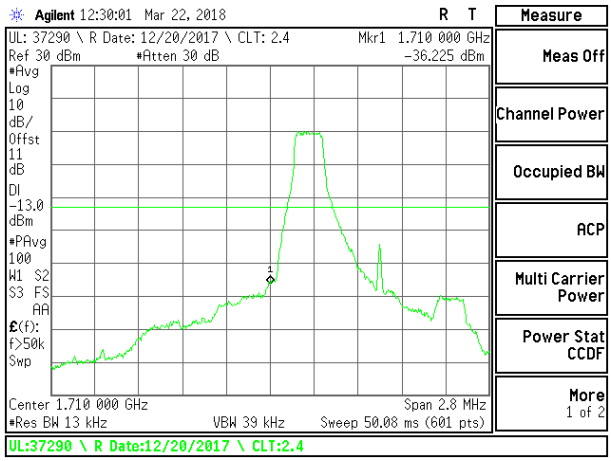


WCDMA Band 5 HSDPA Low Channel

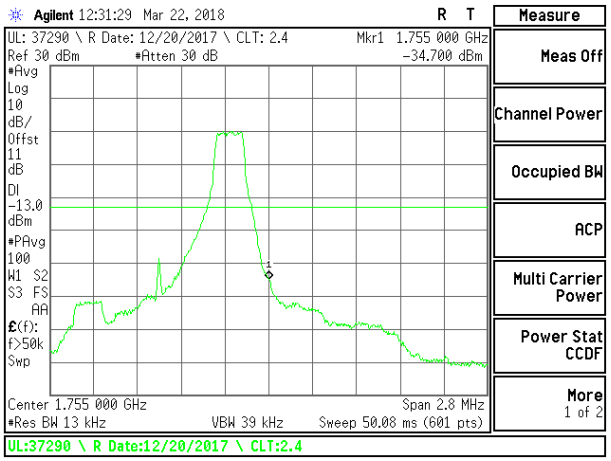


WCDMA Band 5 HSDPA High Channel

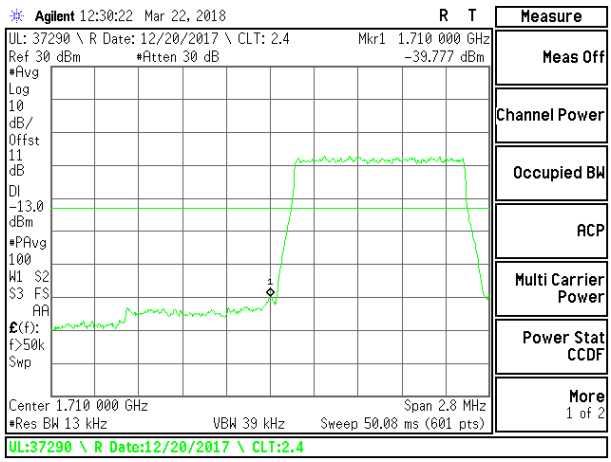
8.2.4. **LTE BAND 4 BANDEDGE**



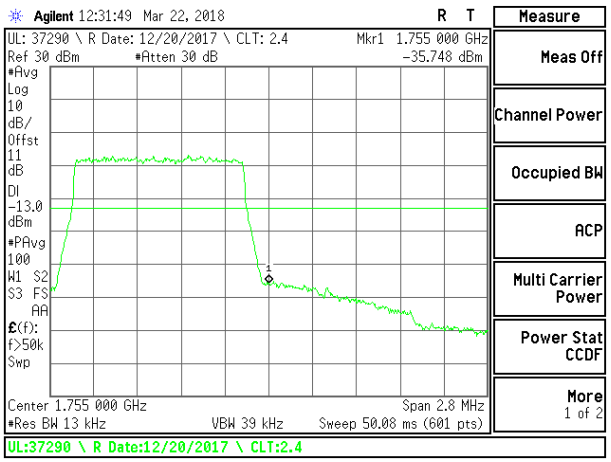
LTE B4 1.4MHz QPSK Low Channel RB1-0



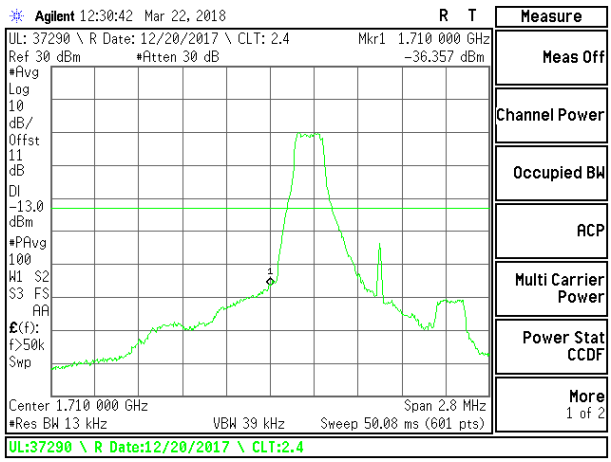
LTE B4 1.4MHz QPSK High Channel RB1-5



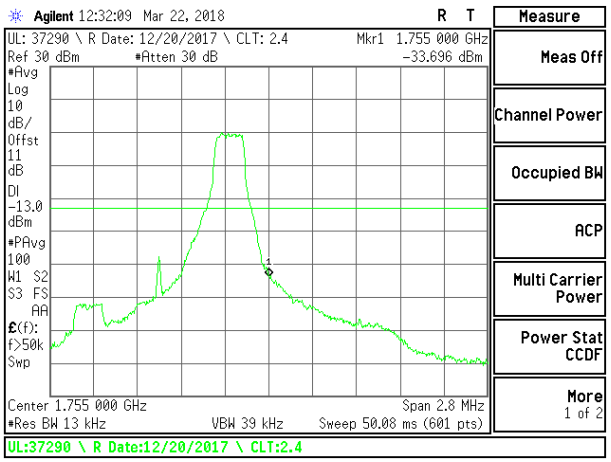
LTE B4 1.4MHz QPSK Low Channel RB6-0



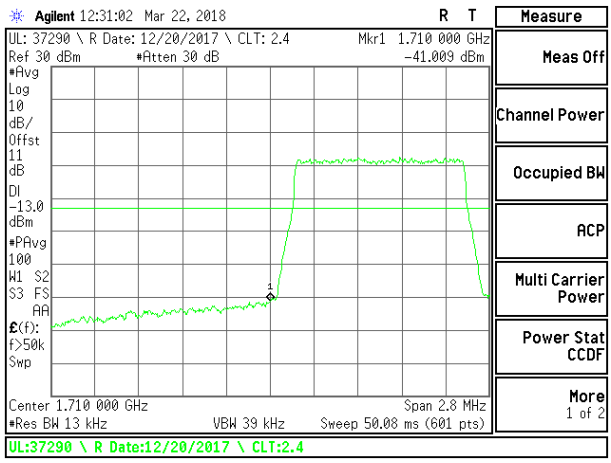
LTE B4 1.4MHz QPSK High Channel RB6-0



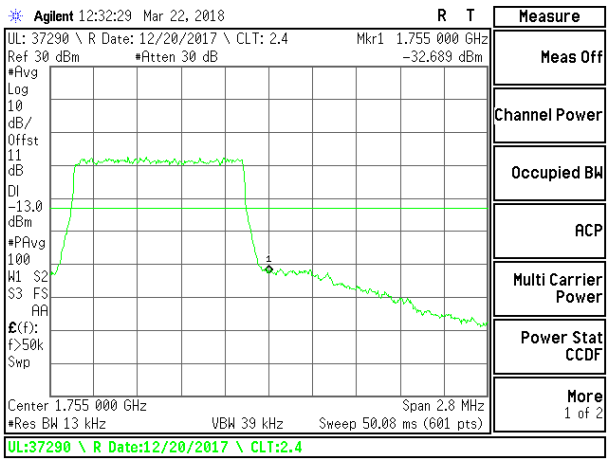
LTE B4 1.4MHz 16QAM Low Channel RB1-0



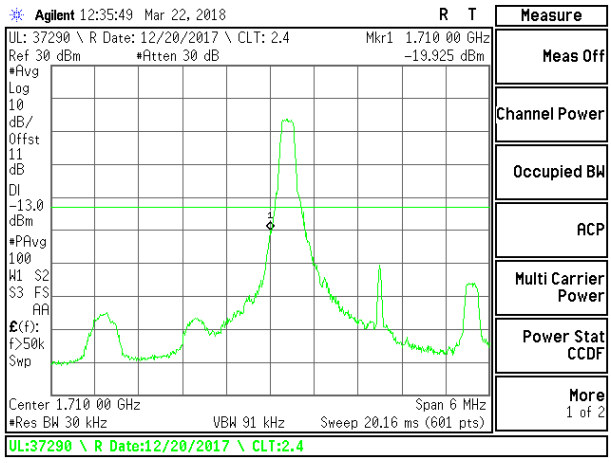
LTE B4 1.4MHz 16QAM High Channel RB1-5



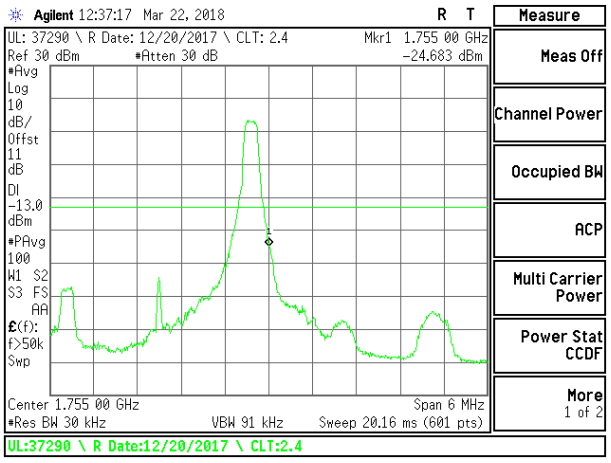
LTE B4 1.4MHz 16QAM Low Channel RB6-0



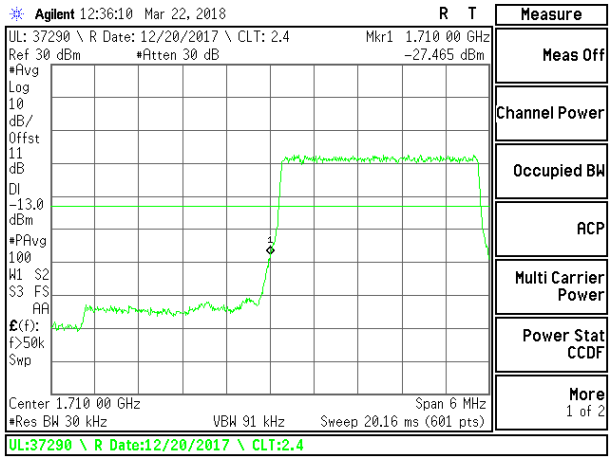
LTE B4 1.4MHz 16QAM High Channel RB6-0



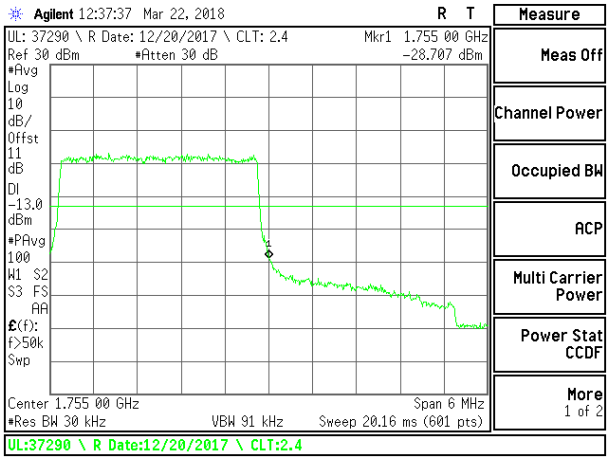
LTE B4 3MHz QPSK Low Channel RB1-0



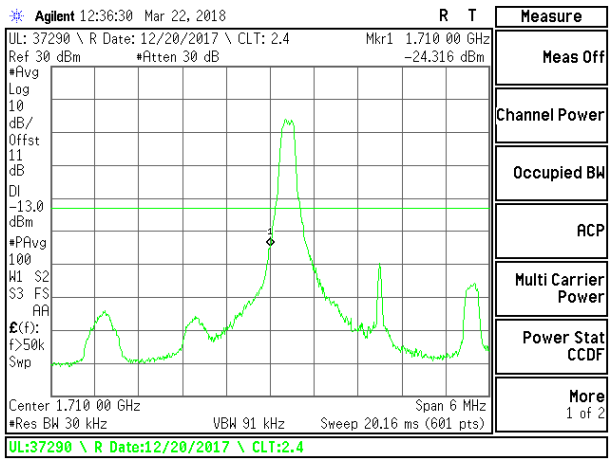
LTE B4 3MHz QPSK High Channel RB1-14



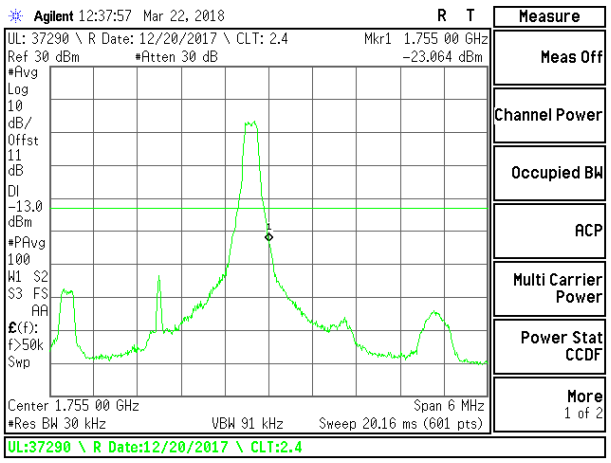
LTE B4 3MHz QPSK Low Channel RB15-0



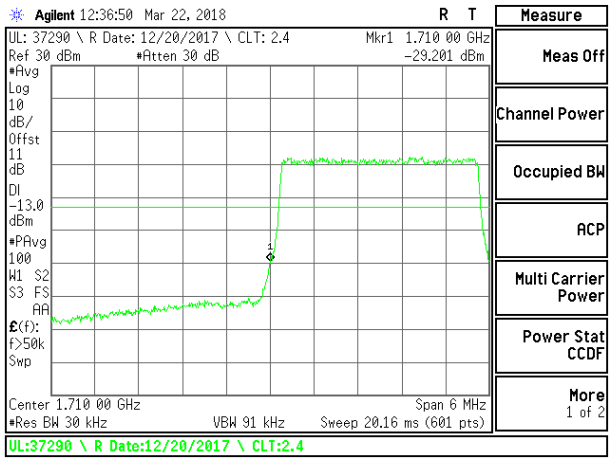
LTE B4 3MHz QPSK High Channel RB15-0



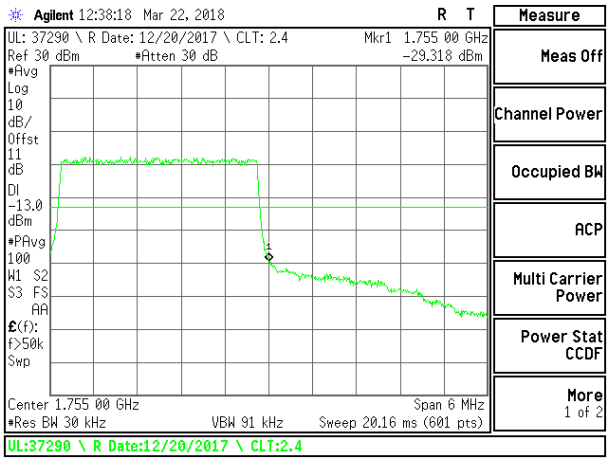
LTE B4 3MHz 16QAM Low Channel RB1-0



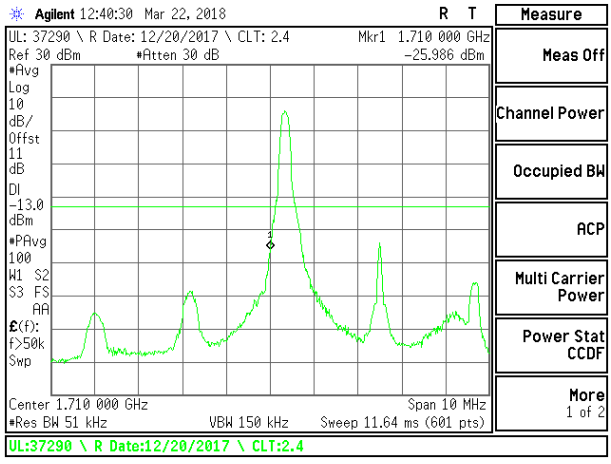
LTE B4 3MHz 16QAM High Channel RB1-14



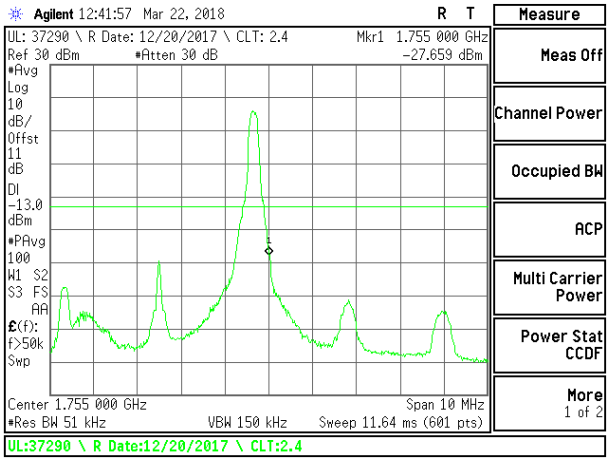
LTE B4 3MHz 16QAM Low Channel RB15-0



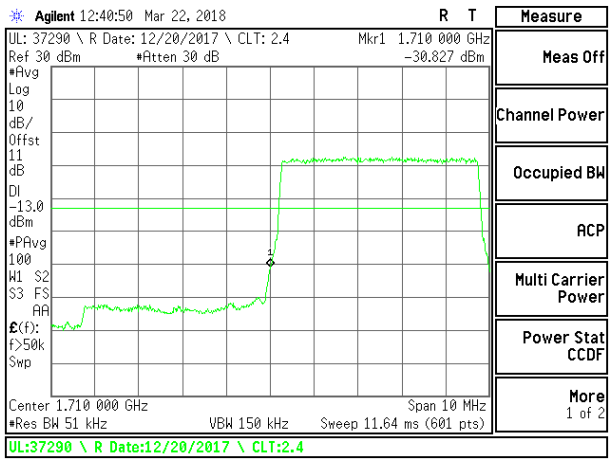
LTE B4 3MHz 16QAM High Channel RB15-0



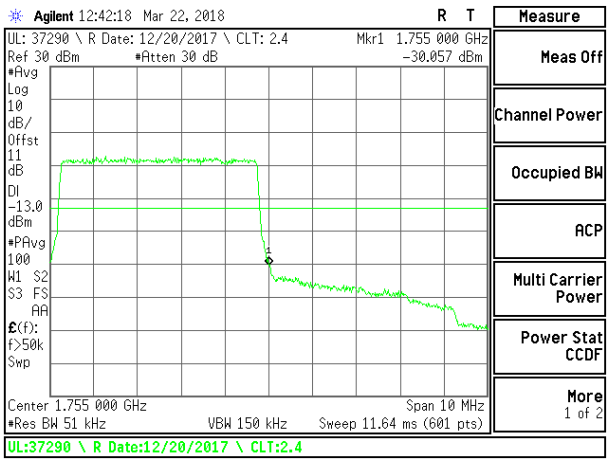
LTE B4 5MHz QPSK Low Channel RB1-0



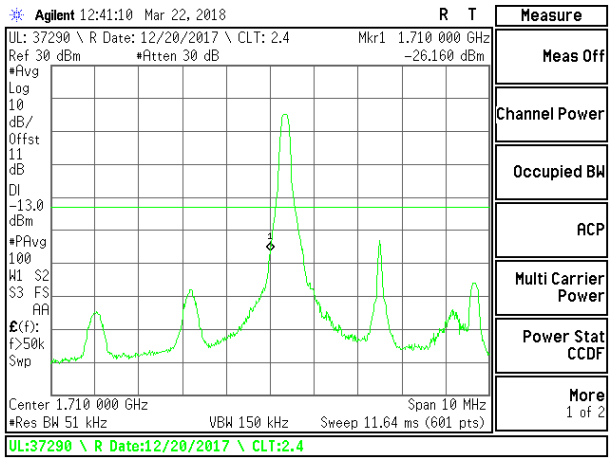
LTE B4 5MHz QPSK High Channel RB1-24



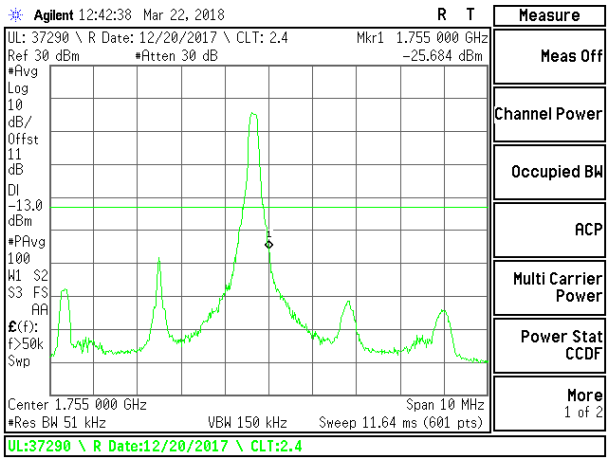
LTE B4 5MHz QPSK Low Channel RB25-0



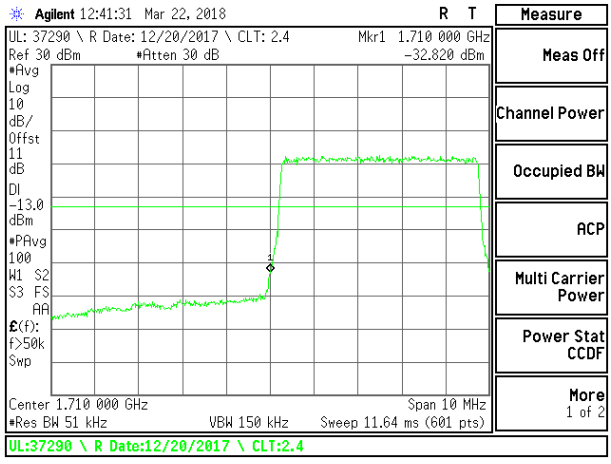
LTE B4 5MHz QPSK High Channel RB25-0



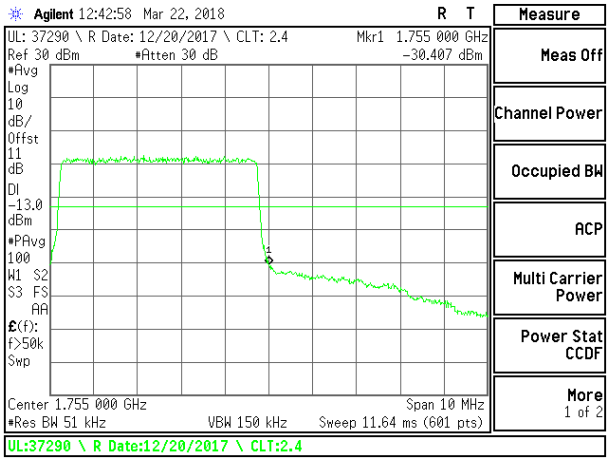
LTE B4 5MHz 16QAM Low Channel RB1-0



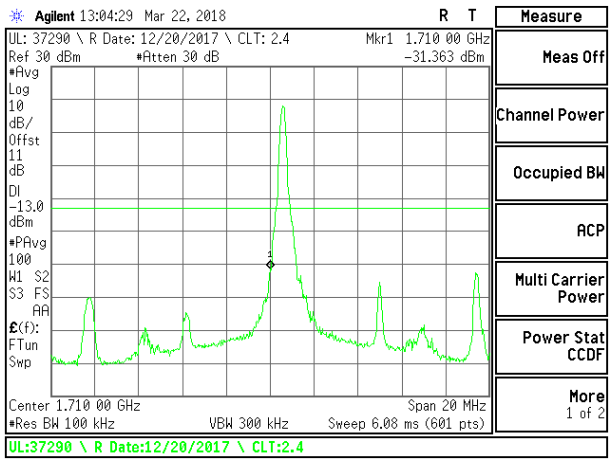
LTE B4 5MHz 16QAM High Channel RB1-24



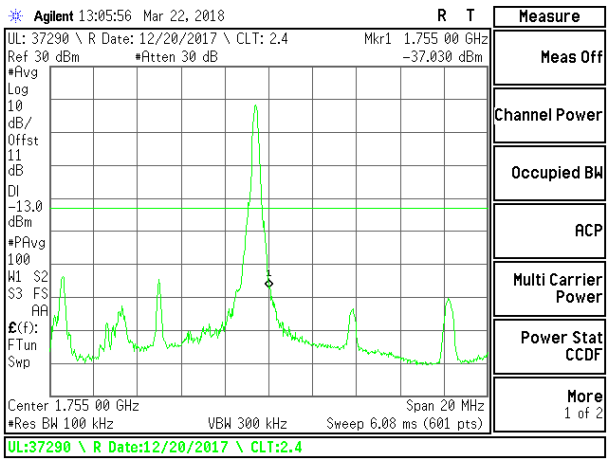
LTE B4 5MHz 16QAM Low Channel RB25-0



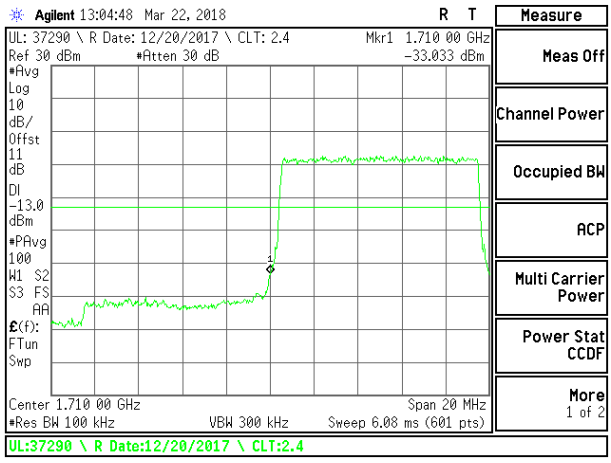
LTE B4 5MHz 16QAM High Channel RB25-0



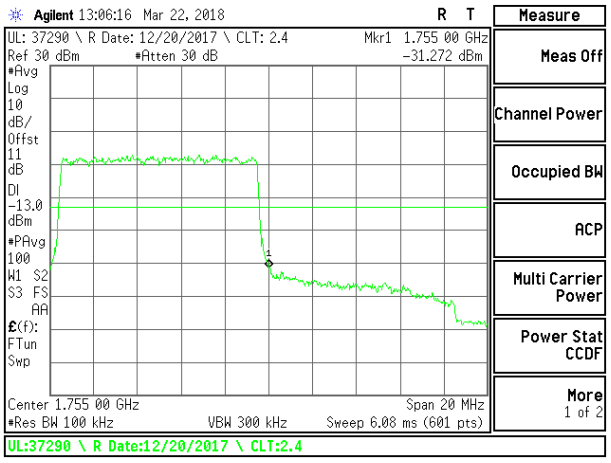
LTE B4 10MHz QPSK Low Channel RB1-0



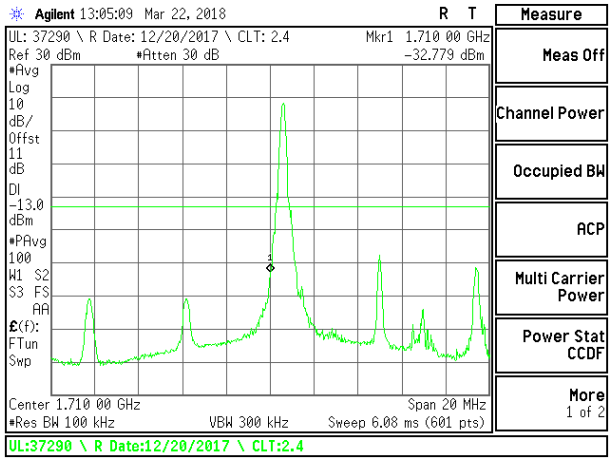
LTE B4 10MHz QPSK High Channel RB1-49



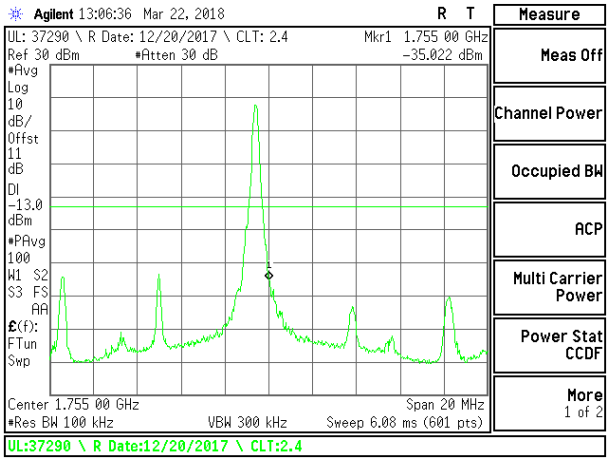
LTE B4 10MHz QPSK Low Channel RB50-0



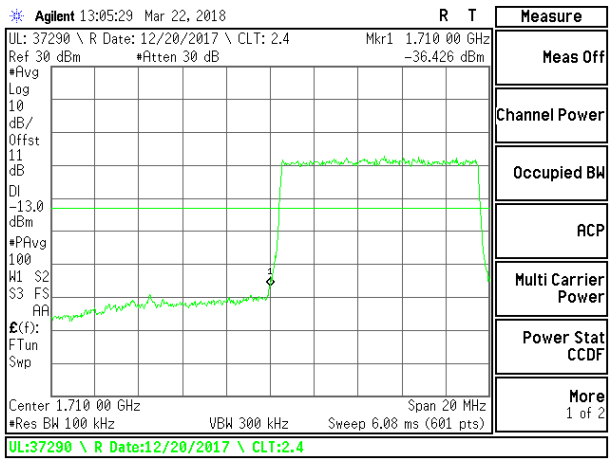
LTE B4 10MHz QPSK High Channel RB50-0



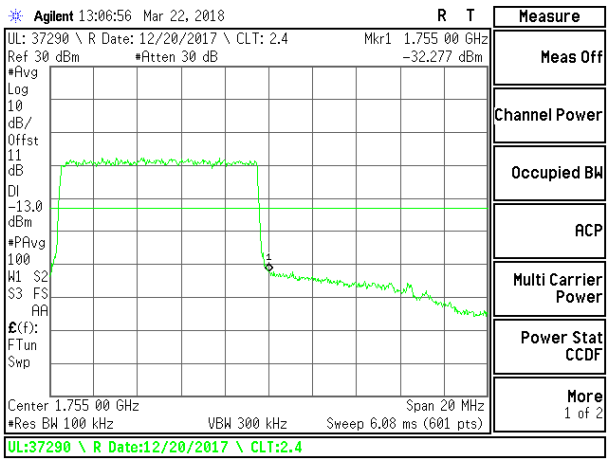
LTE B4 10MHz 16QAM Low Channel RB1-0



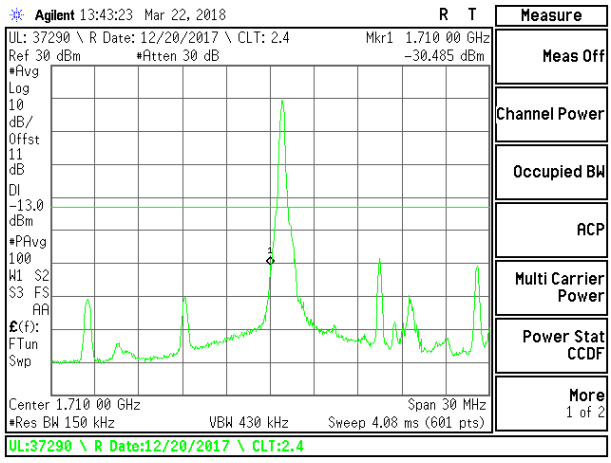
LTE B4 10MHz 16QAM High Channel RB1-49



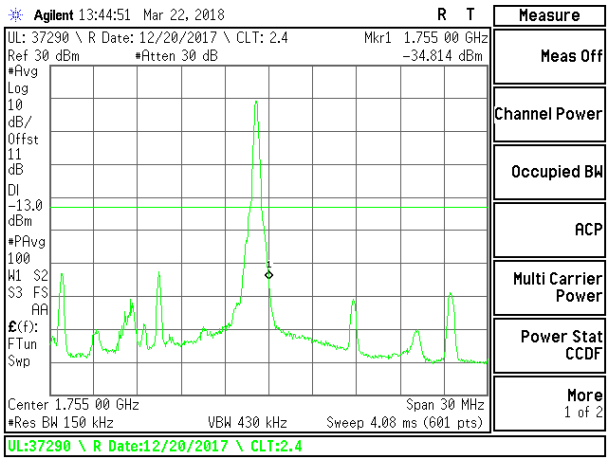
LTE B4 10MHz 16QAM Low Channel RB50-0



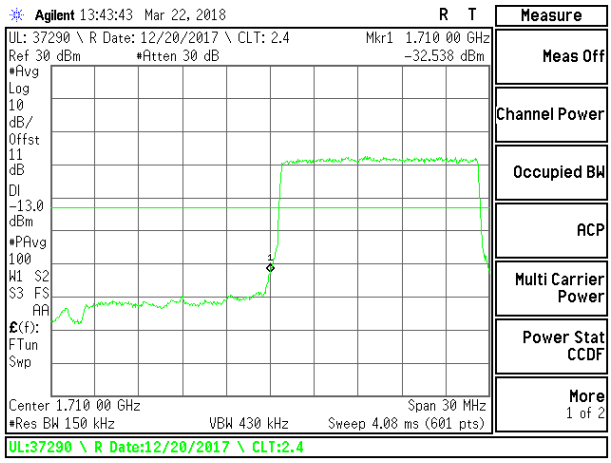
LTE B4 10MHz 16QAM High Channel RB50-0



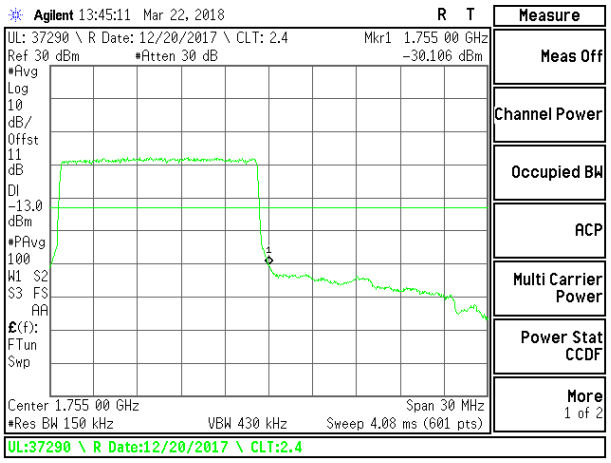
LTE B4 15MHz QPSK Low Channel RB1-0



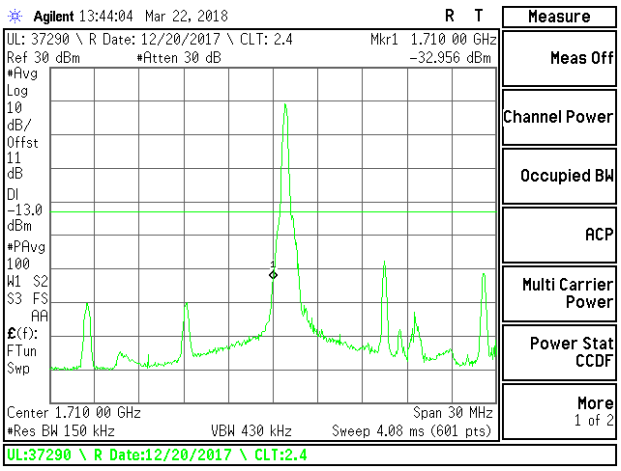
LTE B4 15MHz QPSK High Channel RB1-74



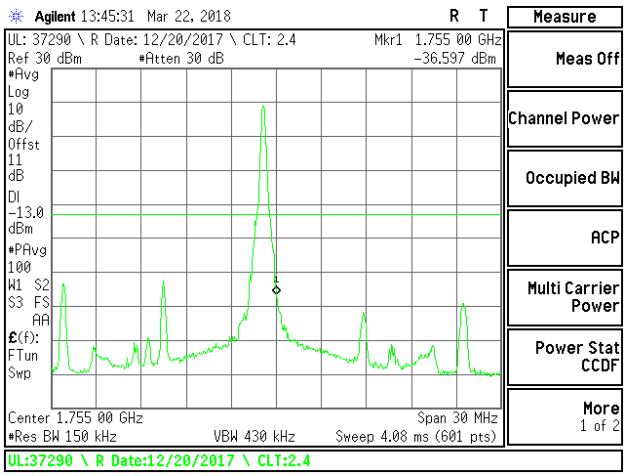
LTE B4 15MHz QPSK Low Channel RB75-0



LTE B4 15MHz QPSK High Channel RB75-0



LTE B4 15MHz 16QAM Low Channel RB1-0



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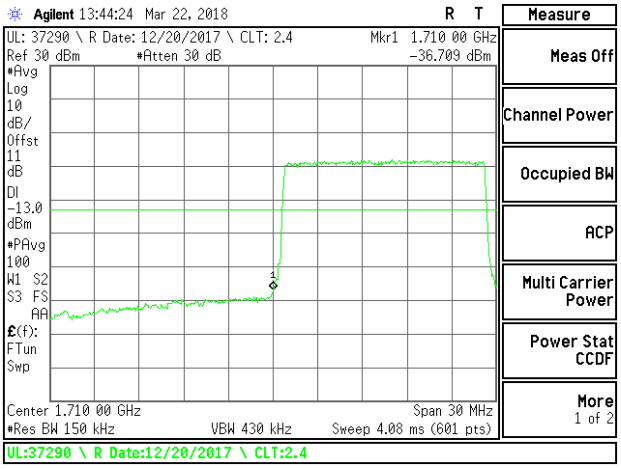

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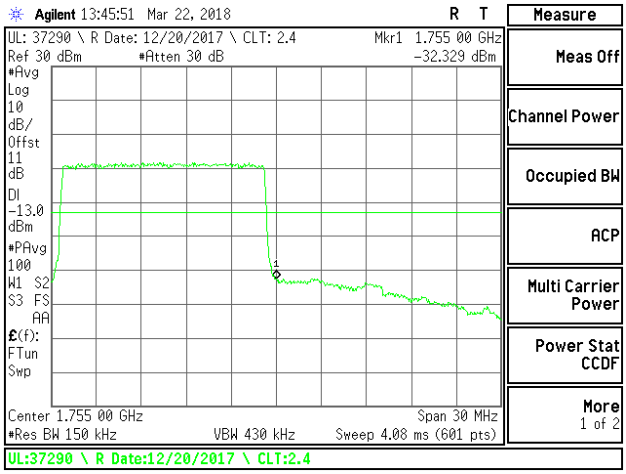

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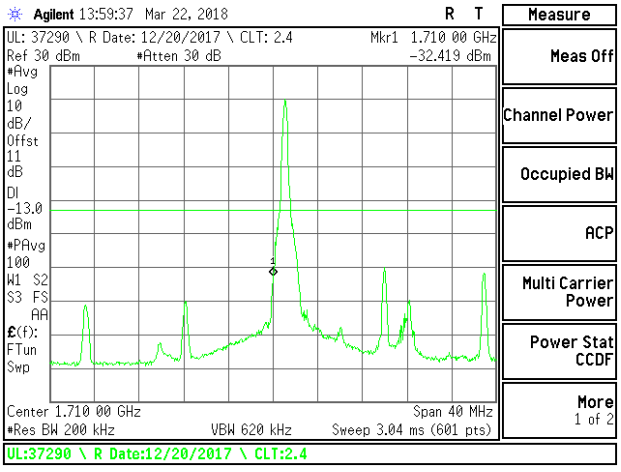
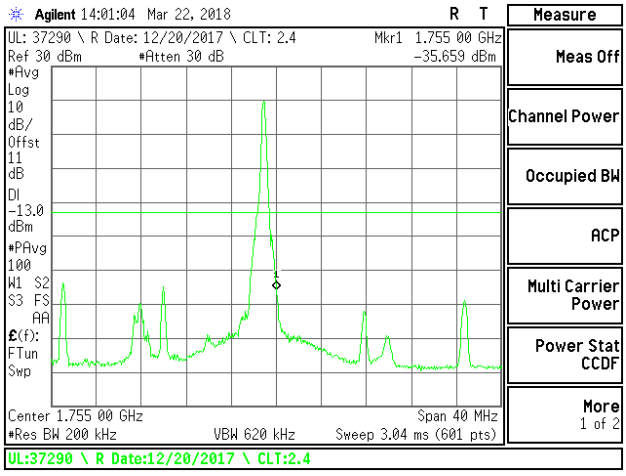
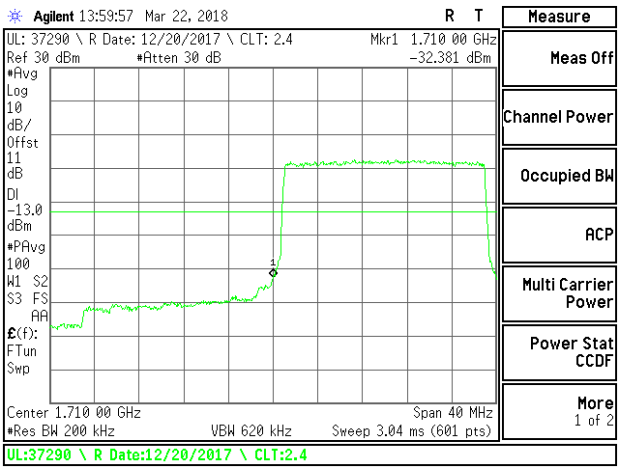


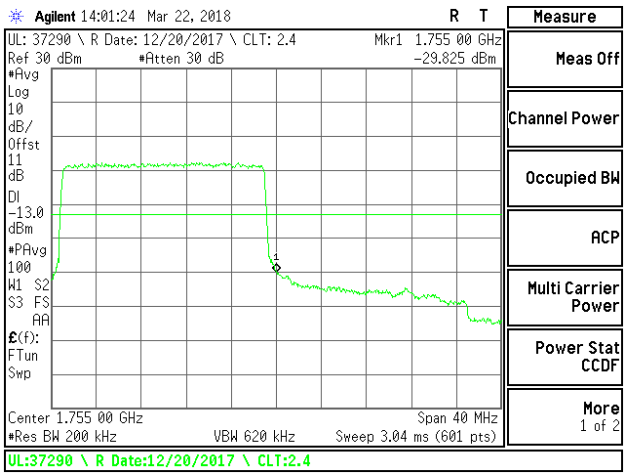
LTE B4 20MHz QPSK Low Channel RB1-0



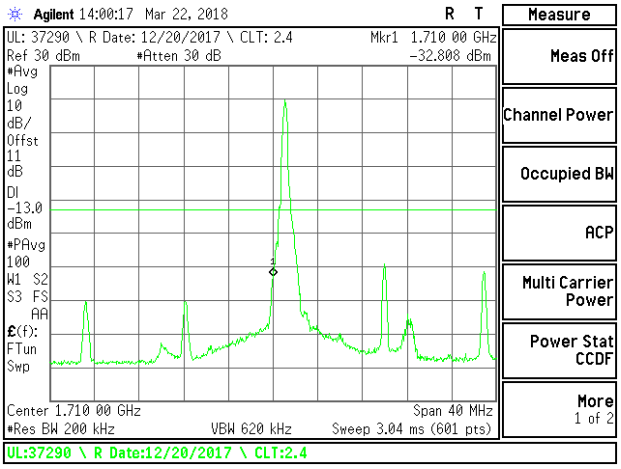
LTE B4 20MHz QPSK High Channel RB1-99



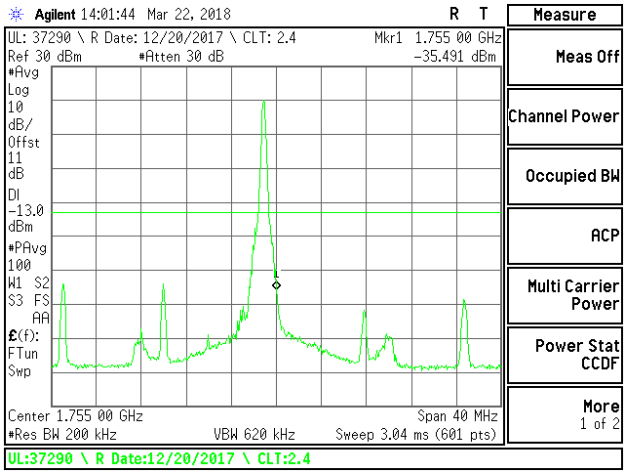
LTE B4 20MHz QPSK Low Channel RB100-0



LTE B4 20MHz QPSK High Channel RB100-0



LTE B4 20MHz 16QAM Low Channel RB1-0



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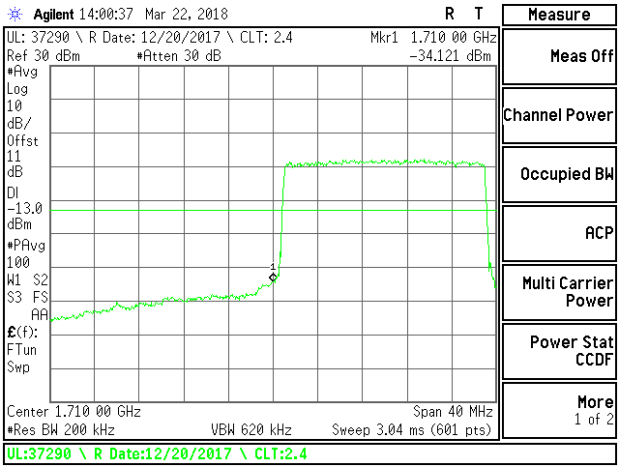
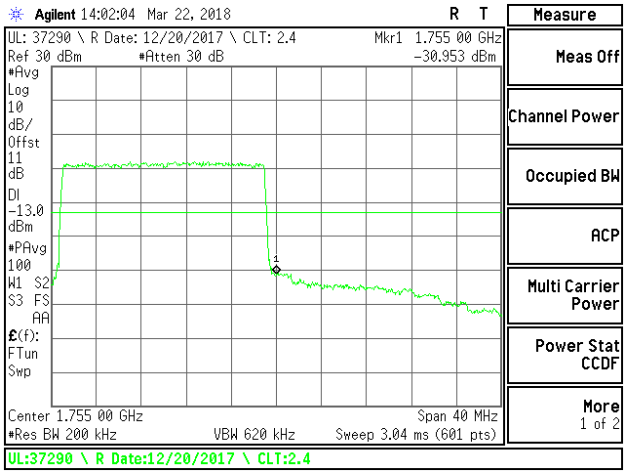
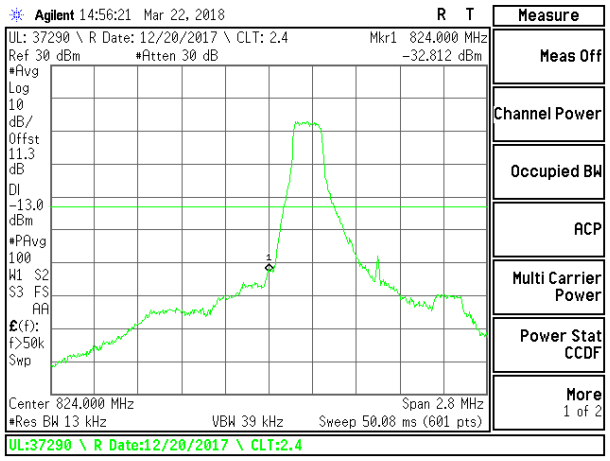


LTE B4 20MHz 16QAM Low Channel RB100-0

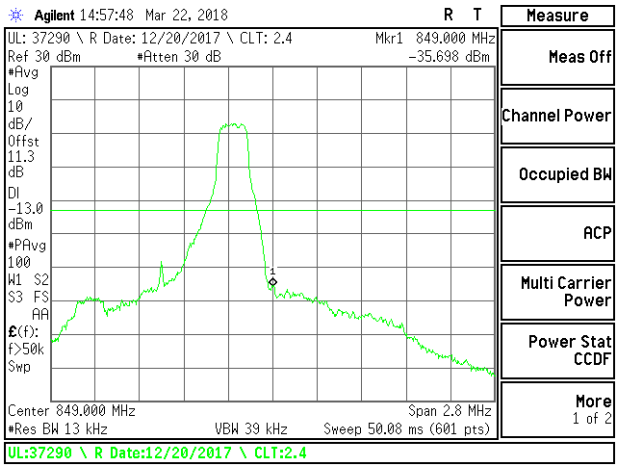


LTE B4 20MHz 16QAM High Channel RB100-0

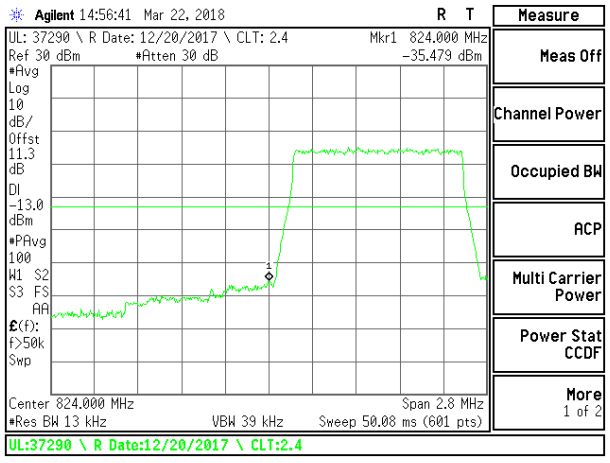
8.2.5. **LTE BAND 5 BANDEDGE**



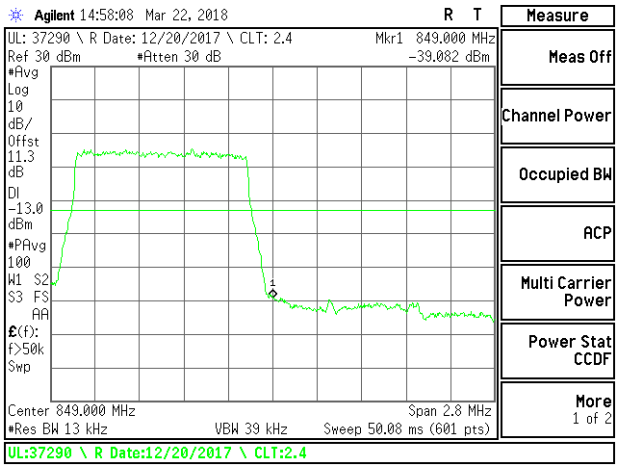
LTE B5 1.4MHz QPSK Low Channel RB1-0



LTE B5 1.4MHz QPSK High Channel RB1-5



LTE B5 1.4MHz QPSK Low Channel RB6-0



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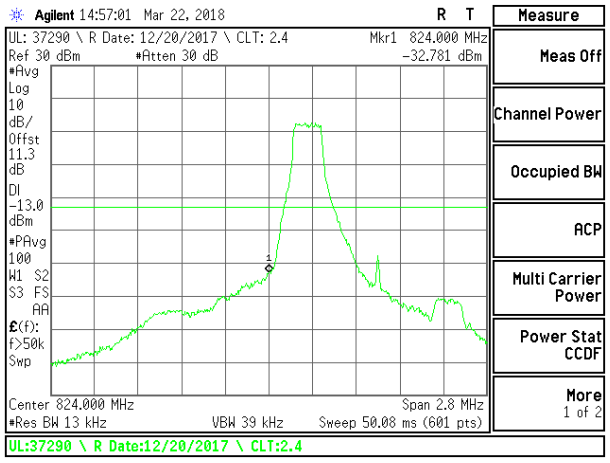
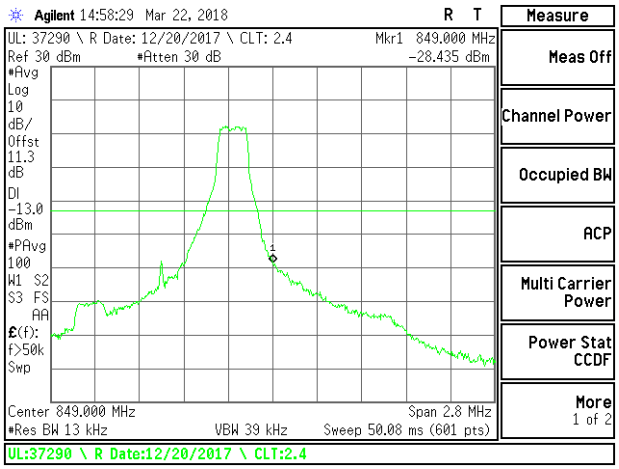
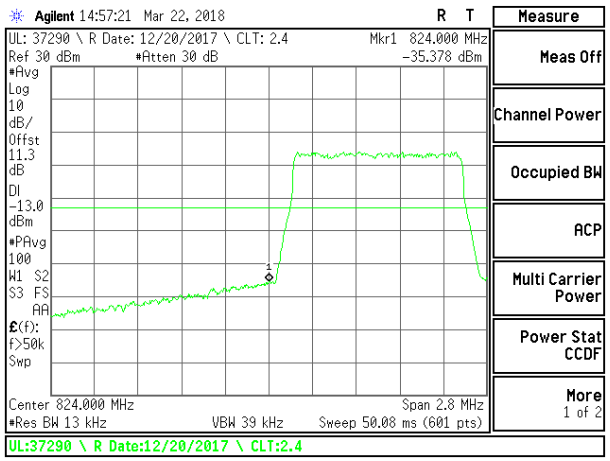


LTE B5 1.4MHz 16QAM Low Channel RB1-0



LTE B5 1.4MHz 16QAM High Channel RB1-5



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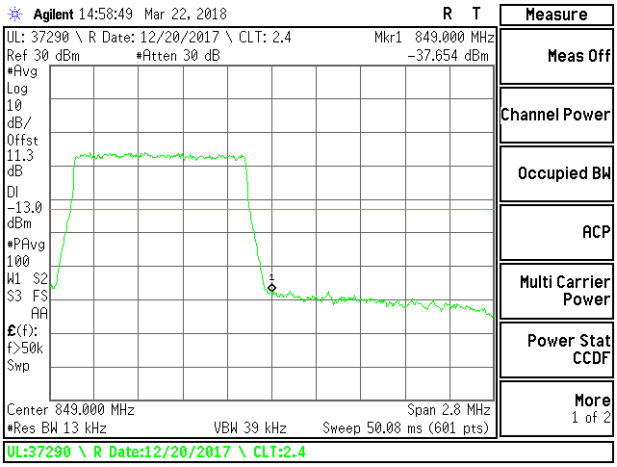
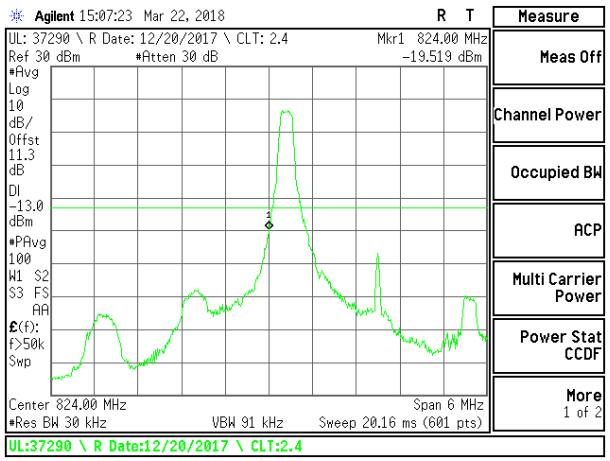
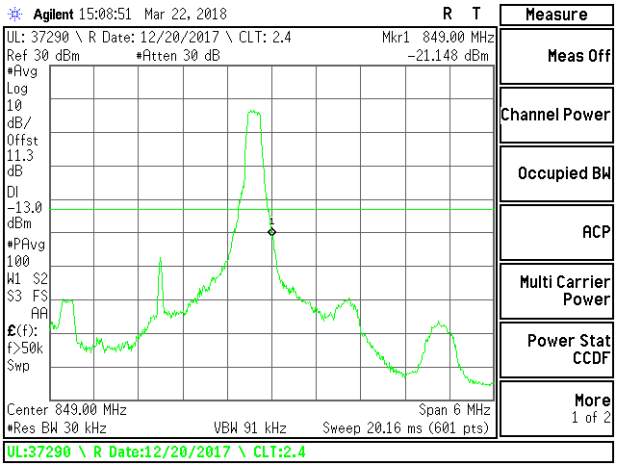


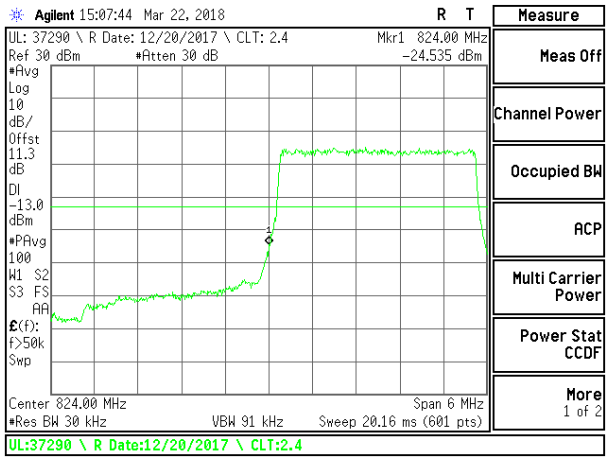
LTE B5 1.4MHz 16QAM High Channel RB6-0



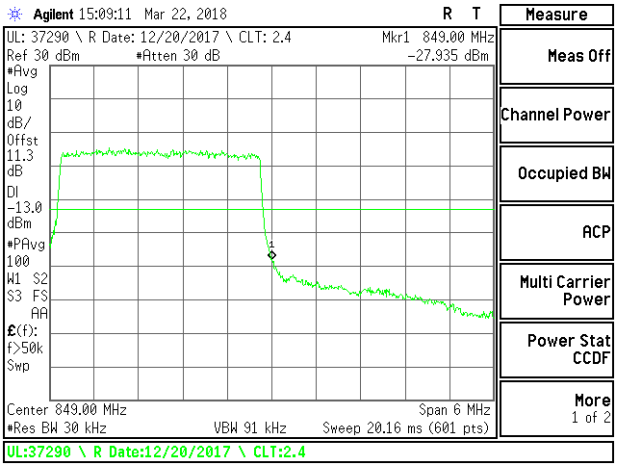
LTE B5 3MHz QPSK Low Channel RB1-0



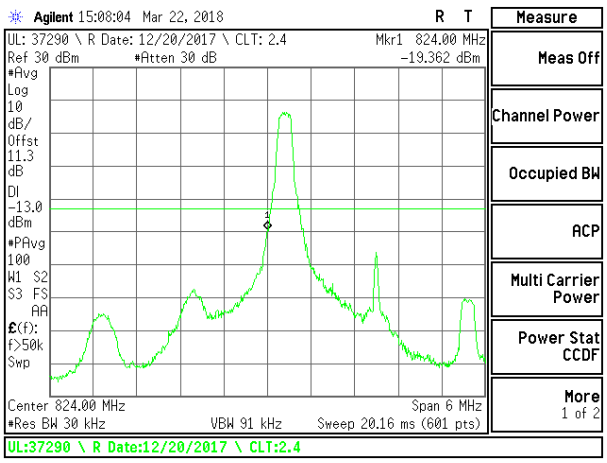
LTE B5 3MHz QPSK High Channel RB1-14



LTE B5 3MHz QPSK Low Channel RB15-0



LTE B5 3MHz QPSK High Channel RB15-0



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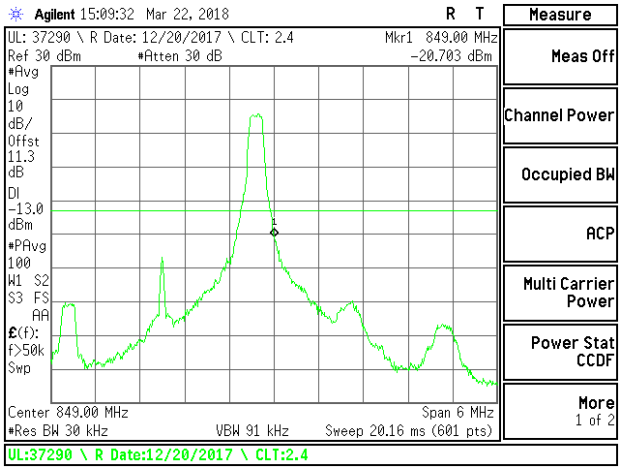

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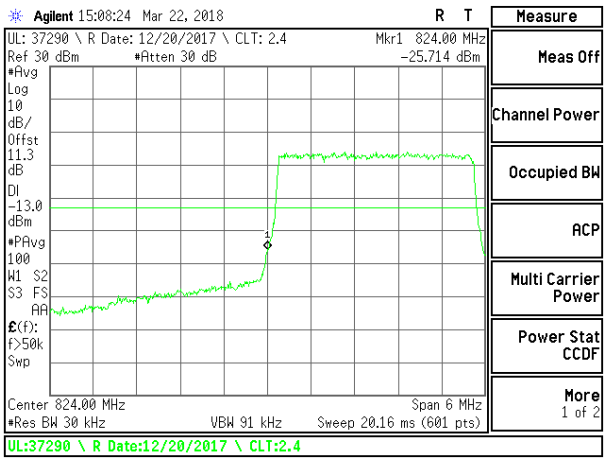

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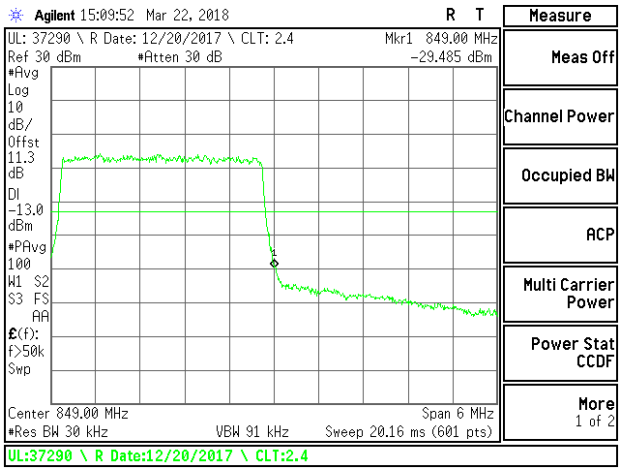
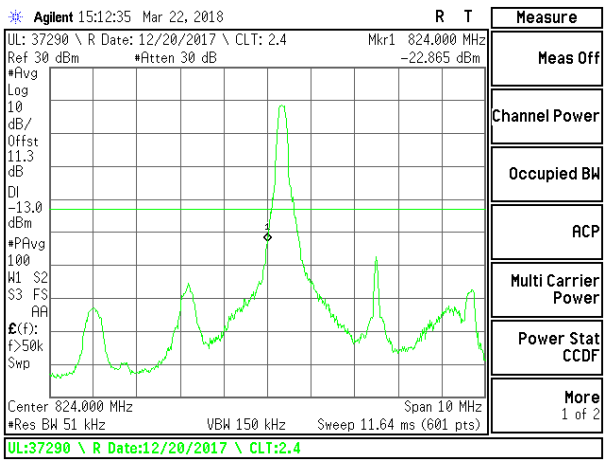
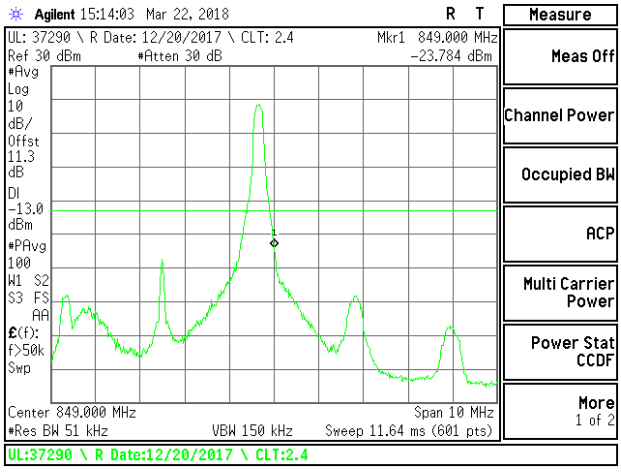


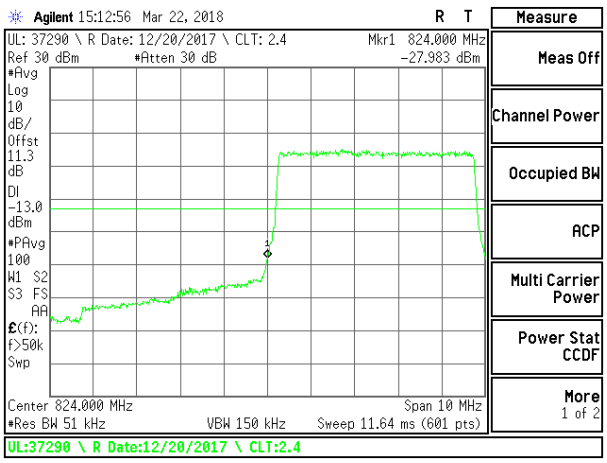
LTE B5 3MHz 16QAM High Channel RB15-0



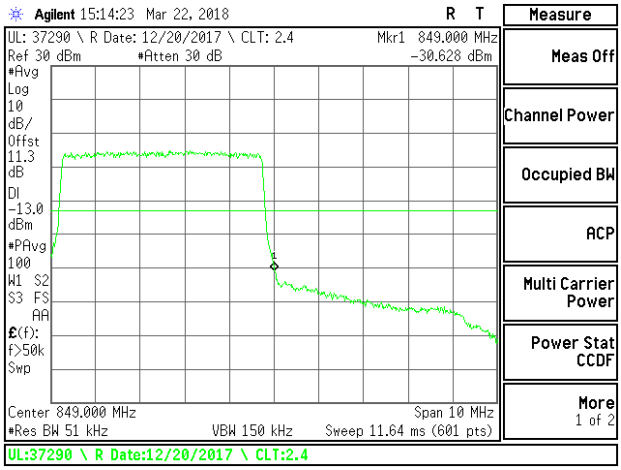
LTE B5 5MHz QPSK Low Channel RB1-0



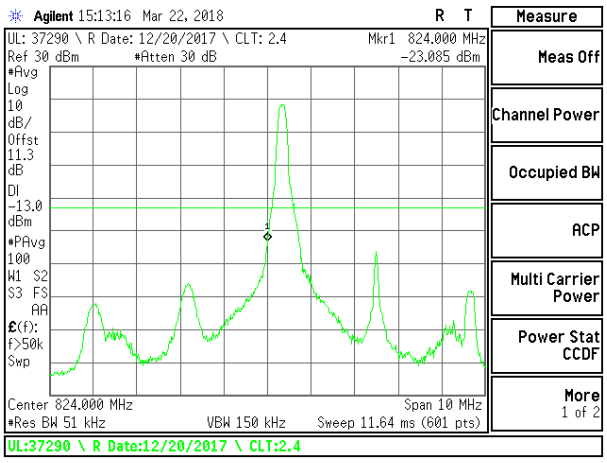
LTE B5 5MHz QPSK High Channel RB1-24



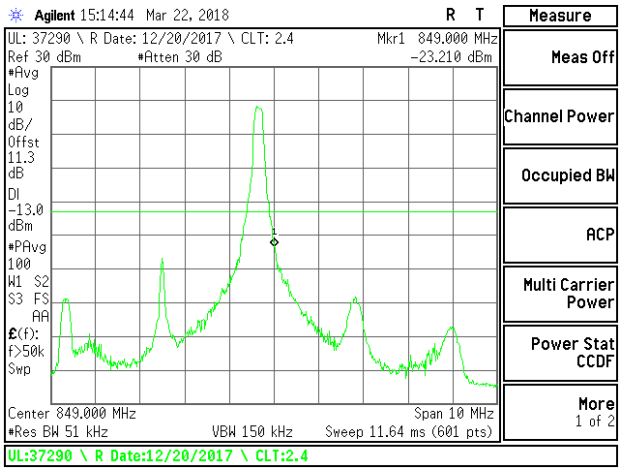
LTE B5 5MHz QPSK Low Channel RB25-0



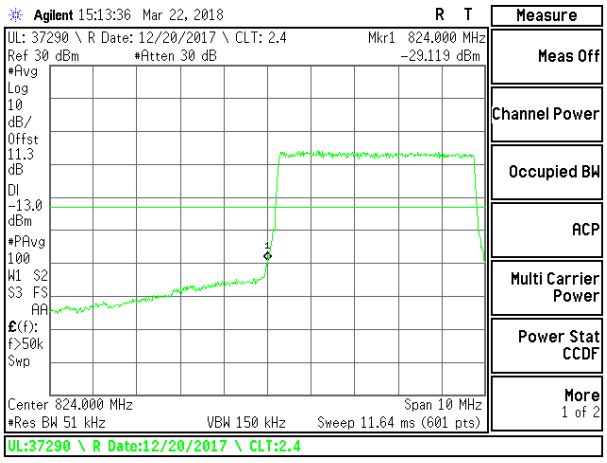
LTE B5 5MHz QPSK High Channel RB25-0



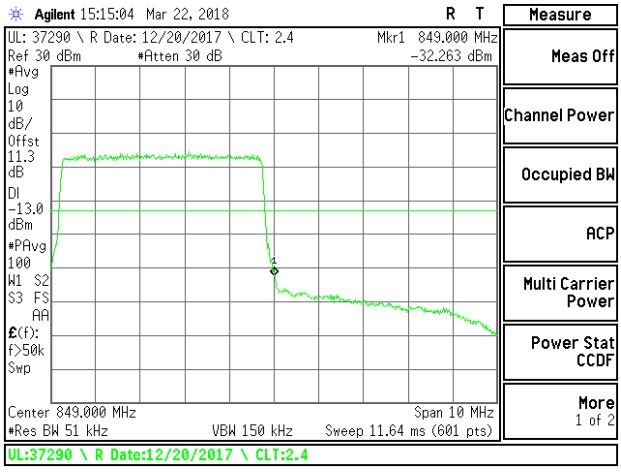
LTE B5 5MHz 16QAM Low Channel RB1-0



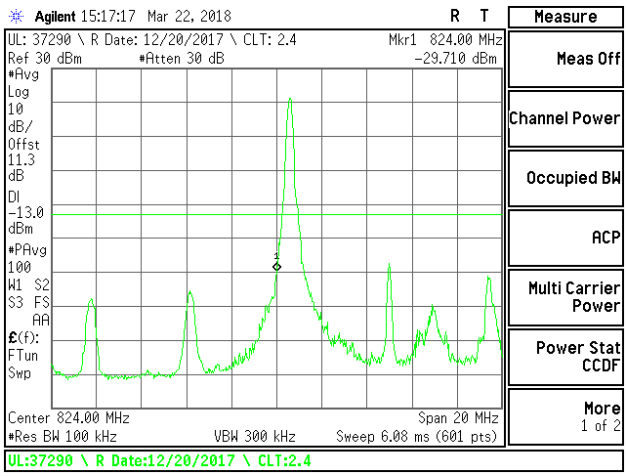
LTE B5 5MHz 16QAM High Channel RB1-24



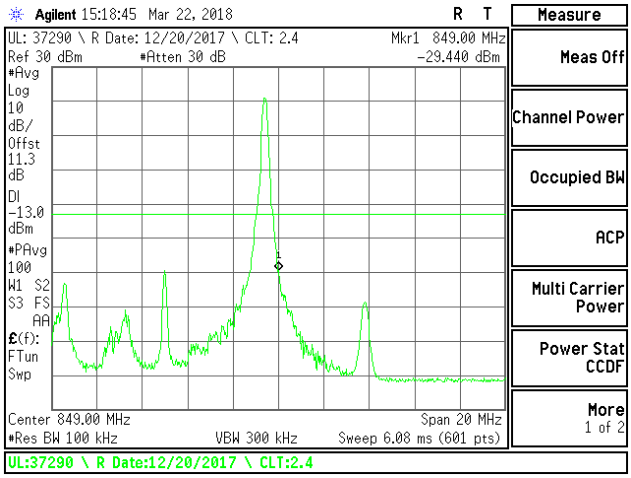
LTE B5 5MHz 16QAM Low Channel RB25-0



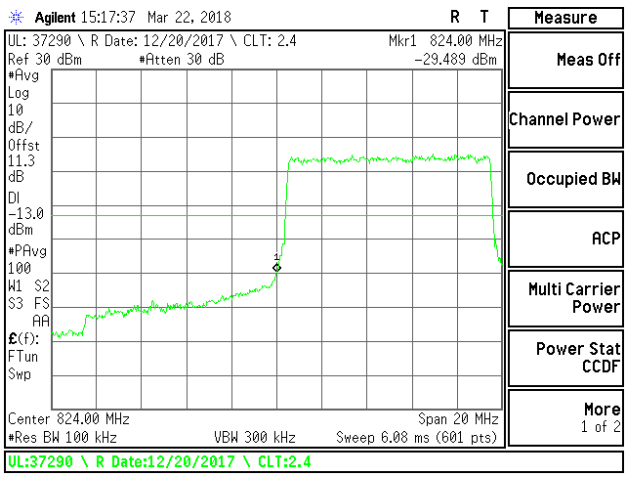
LTE B5 5MHz 16QAM High Channel RB25-0



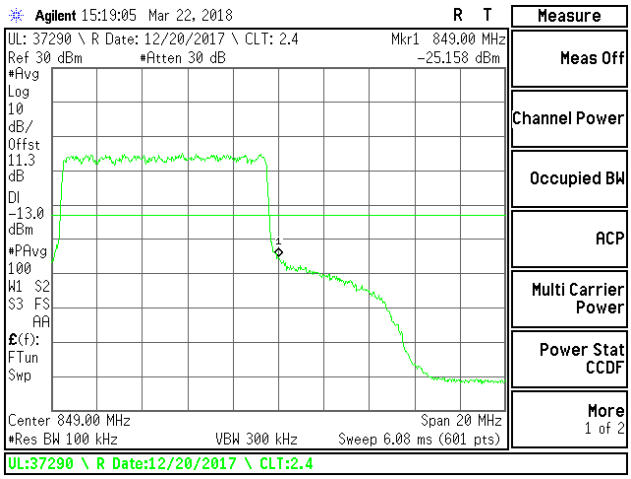
LTE B5 10MHz QPSK Low Channel RB1-0



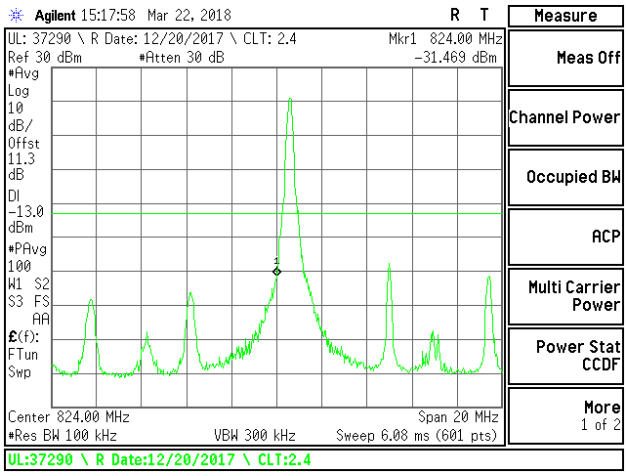
LTE B5 10MHz QPSK High Channel RB1-49



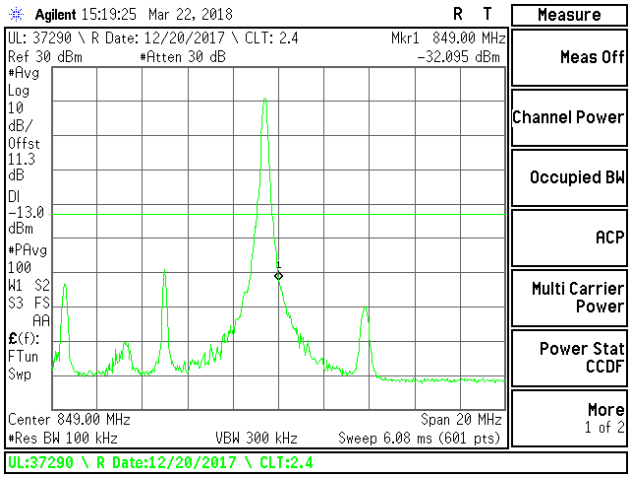
LTE B5 10MHz QPSK Low Channel RB50-0



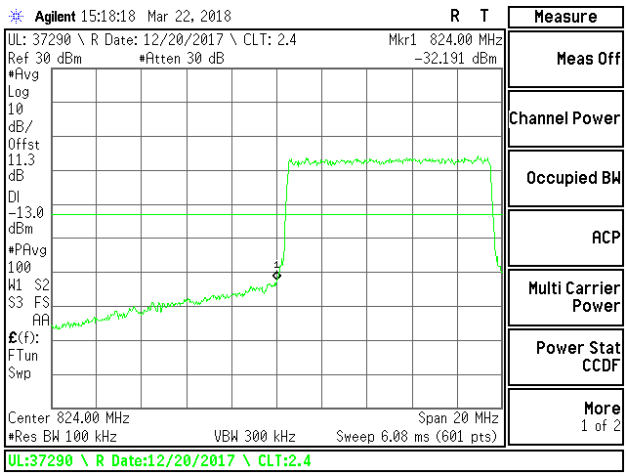
LTE B5 10MHz QPSK High Channel RB50-0



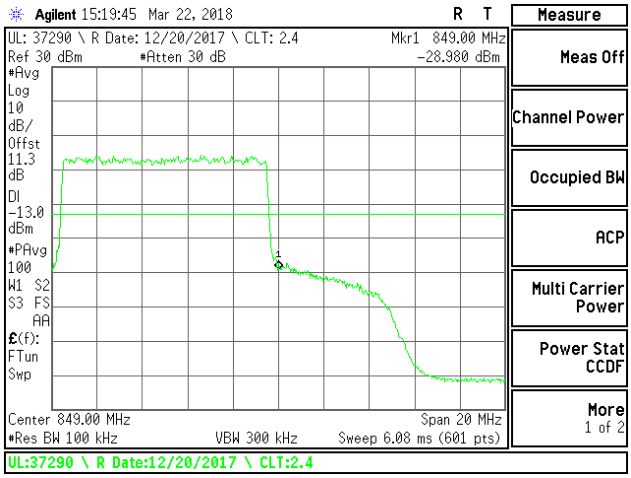
LTE B5 10MHz 16QAM Low Channel RB1-0



LTE B5 10MHz 16QAM High Channel RB1-49

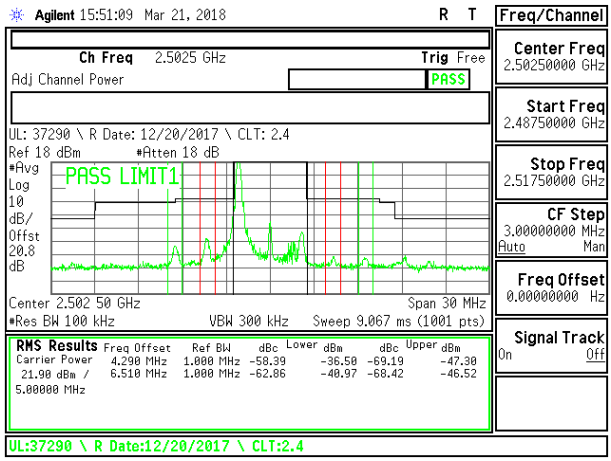


LTE B5 10MHz 16QAM Low Channel RB50-0

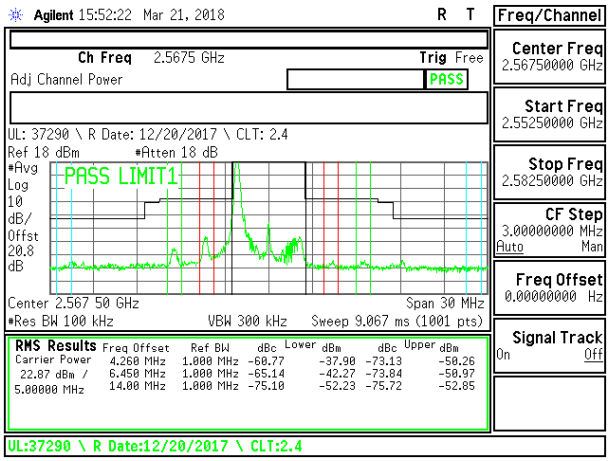


LTE B5 10MHz 16QAM High Channel RB50-0

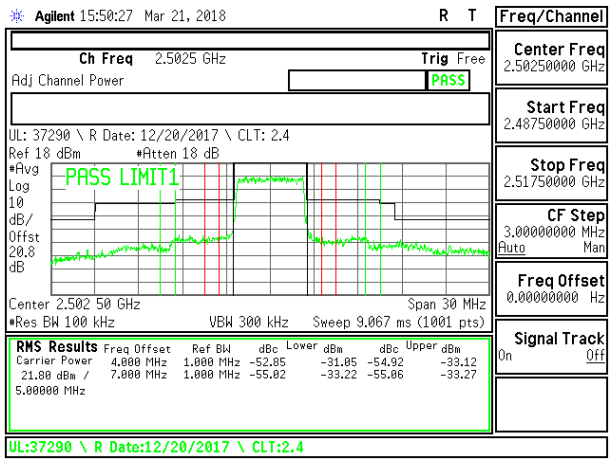
8.2.6. LTE BAND 7 ADJACENT CHANNEL POWER



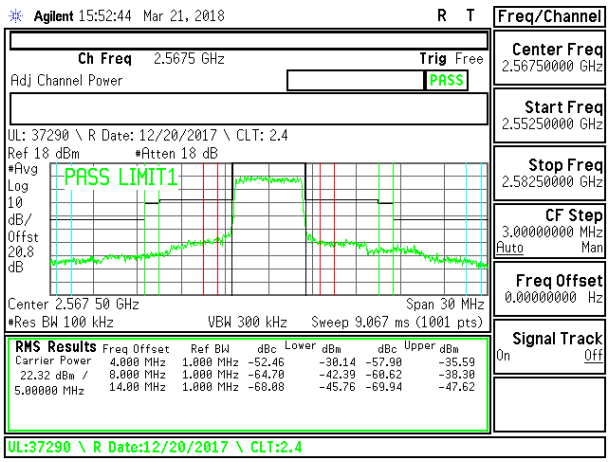
LTE B7 5MHz QPSK Low Channel RB1-0



LTE B7 5MHz QPSK High Channel RB1-24



LTE B7 5MHz QPSK Low Channel RB25-0



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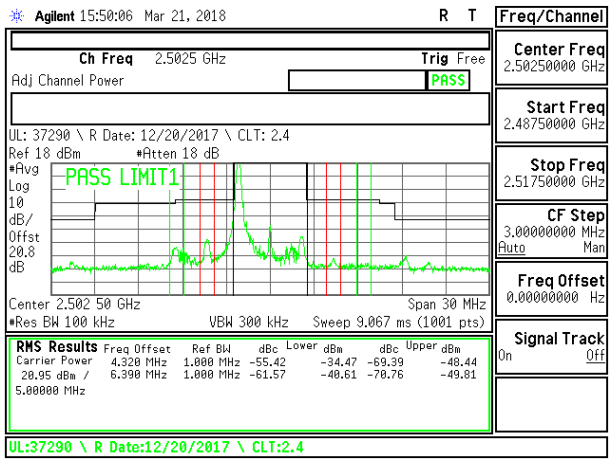
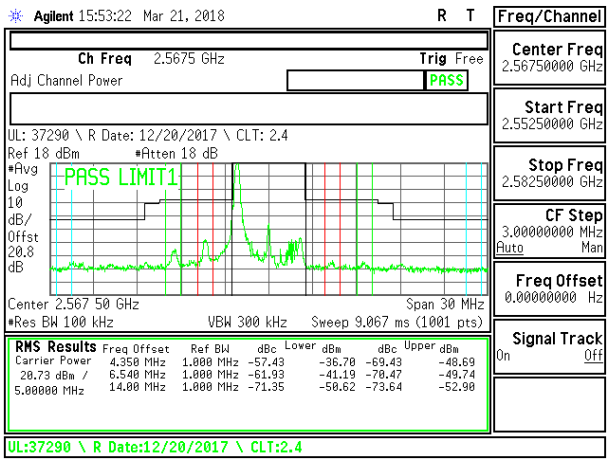
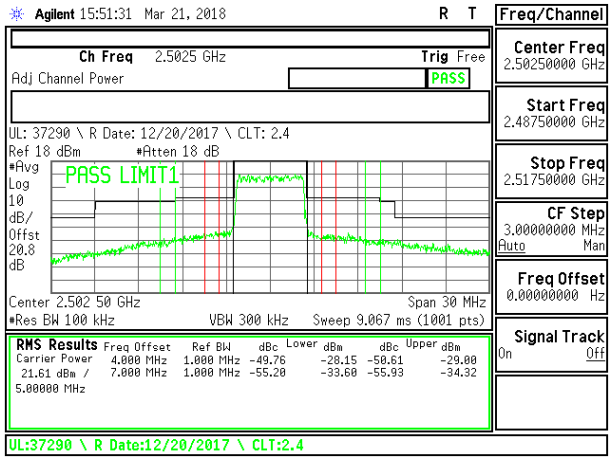


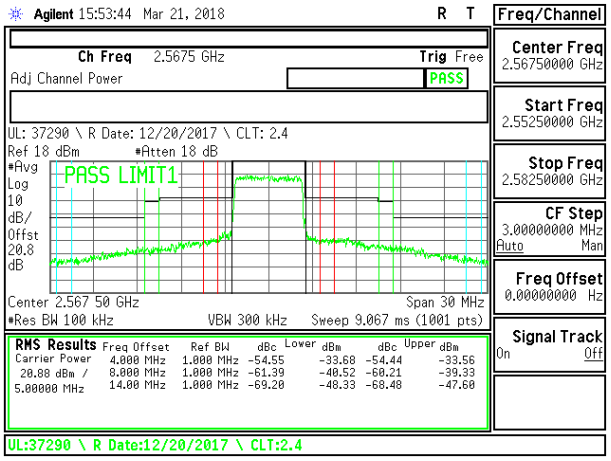
LTE B7 5MHz 16QAM Low Channel RB1-0



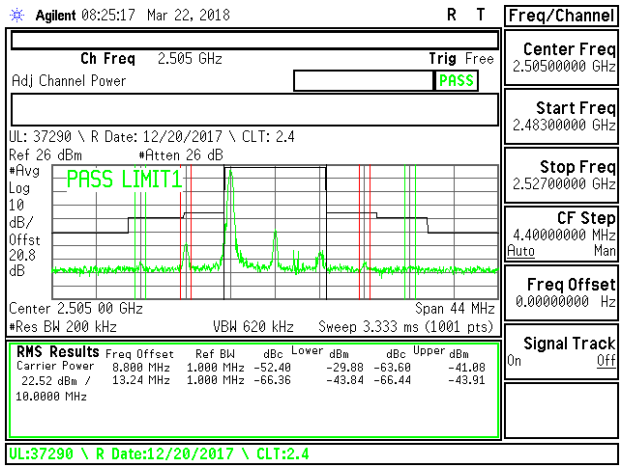
LTE B7 5MHz 16QAM High Channel RB1-24



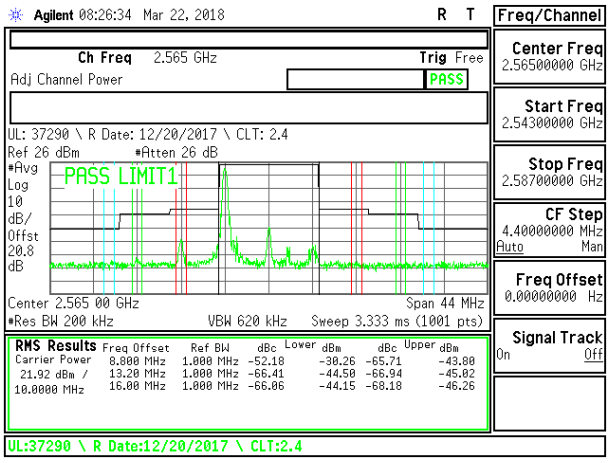
LTE B7 5MHz 16QAM Low Channel RB25-0



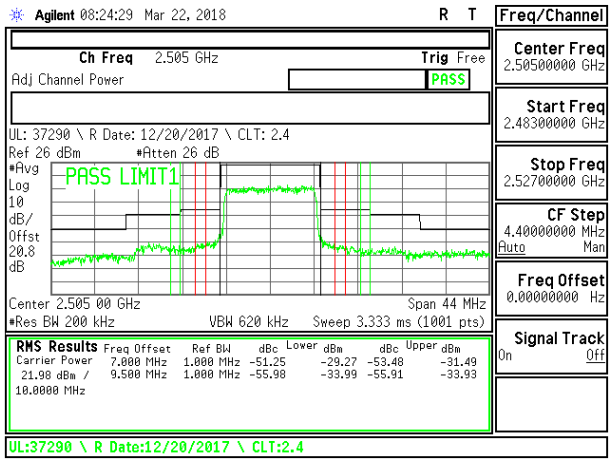
LTE B7 5MHz 16QAM High Channel RB25-0



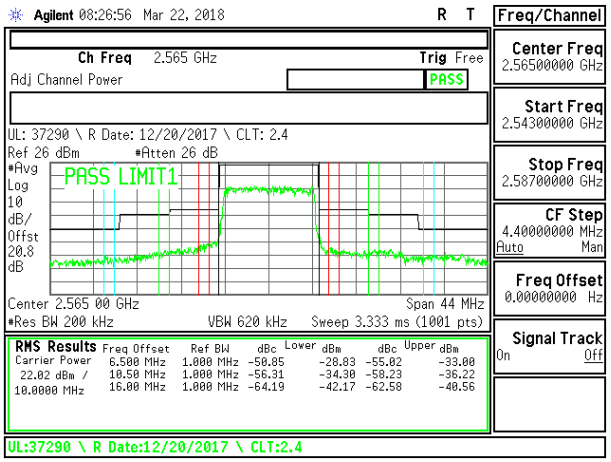
LTE B7 10MHz QPSK Low Channel RB1-0



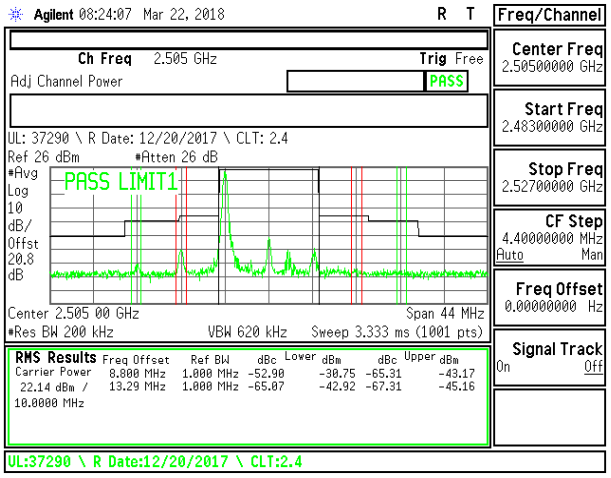
LTE B7 10MHz QPSK High Channel RB1-49



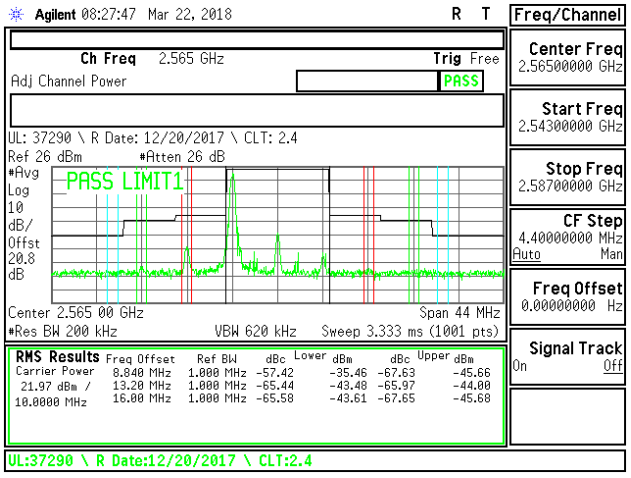
LTE B7 10MHz QPSK Low Channel RB50-0



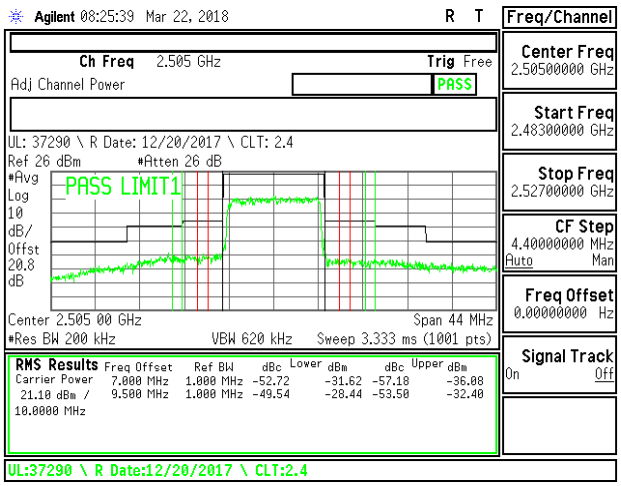
LTE B7 10MHz QPSK High Channel RB50-0



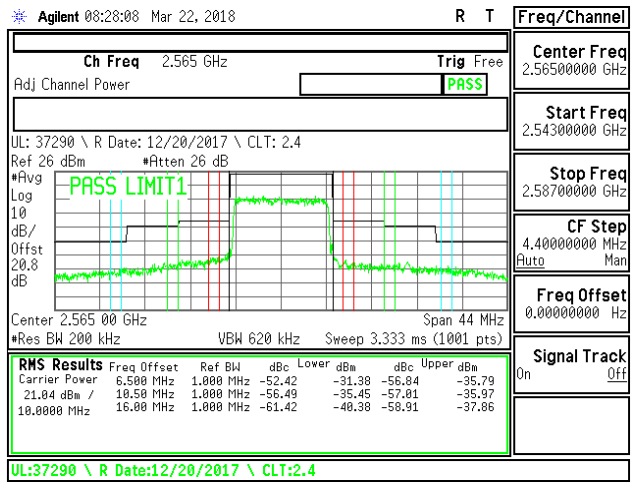
LTE B7 10MHz 16QAM Low Channel RB1-0



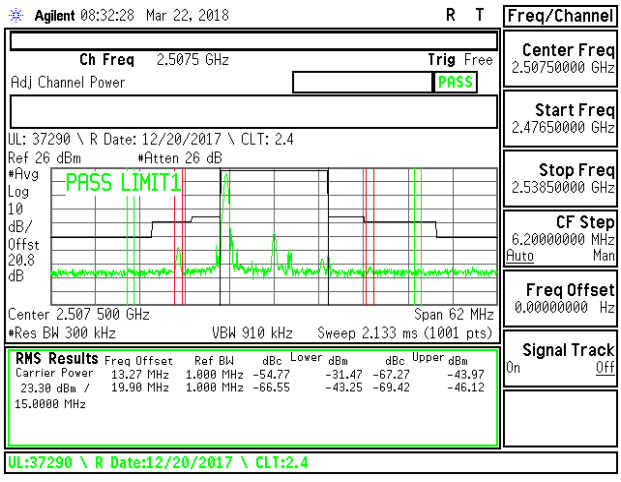
LTE B7 10MHz 16QAM High Channel RB1-49



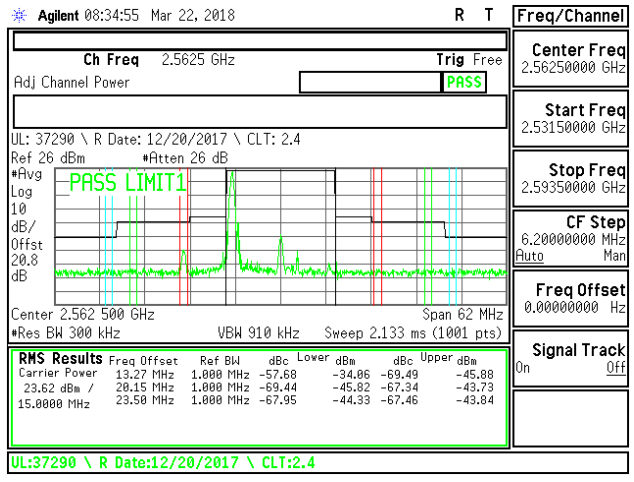
LTE B7 10MHz 16QAM Low Channel RB50-0



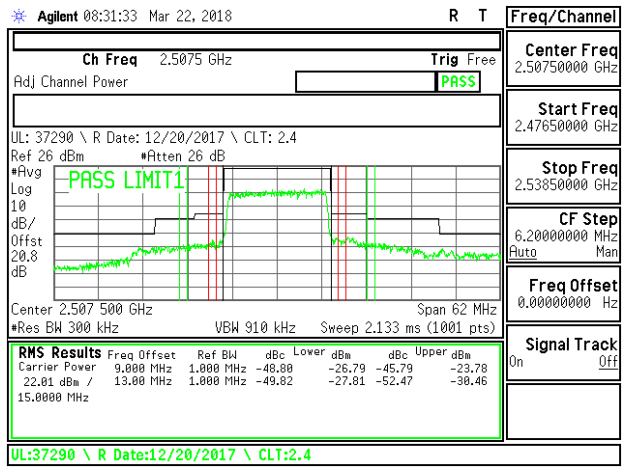
LTE B7 10MHz 16QAM High Channel RB50-0



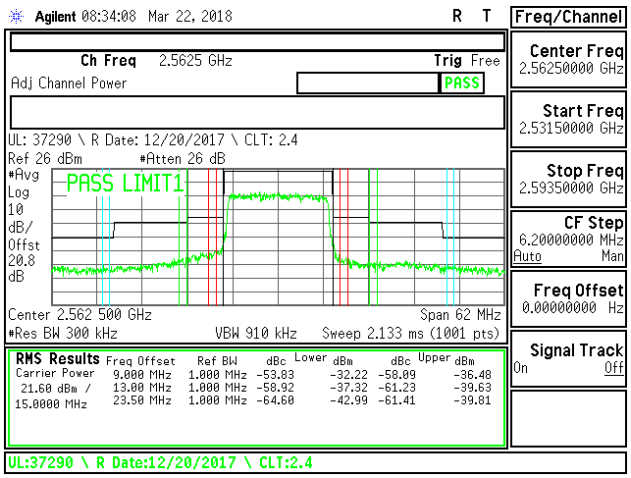
LTE B7 15MHz QPSK Low Channel RB1-0



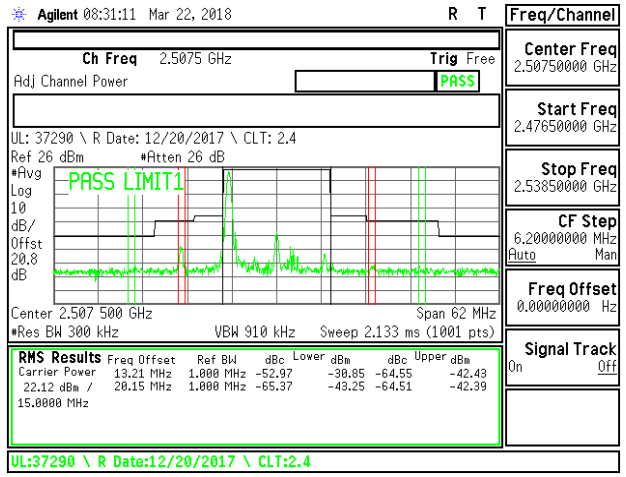
LTE B7 15MHz QPSK High Channel RB1-74



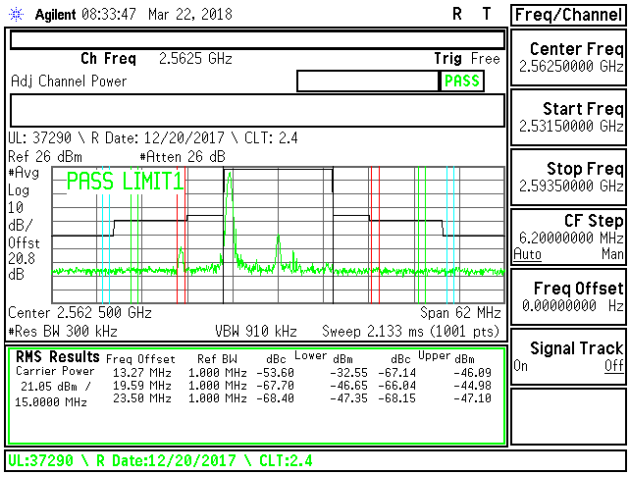
LTE B7 15MHz QPSK Low Channel RB75-0



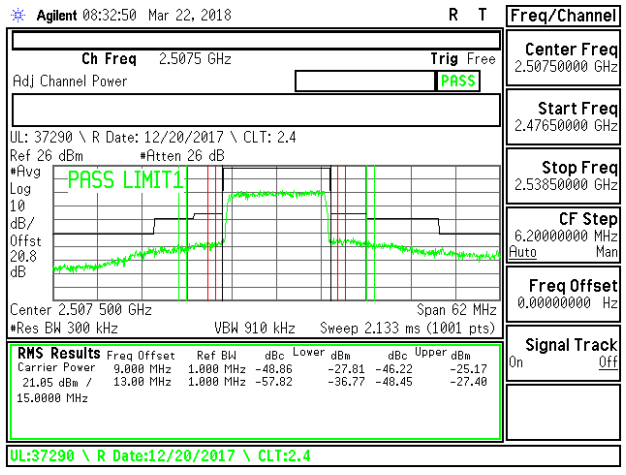
LTE B7 15MHz QPSK High Channel RB75-0



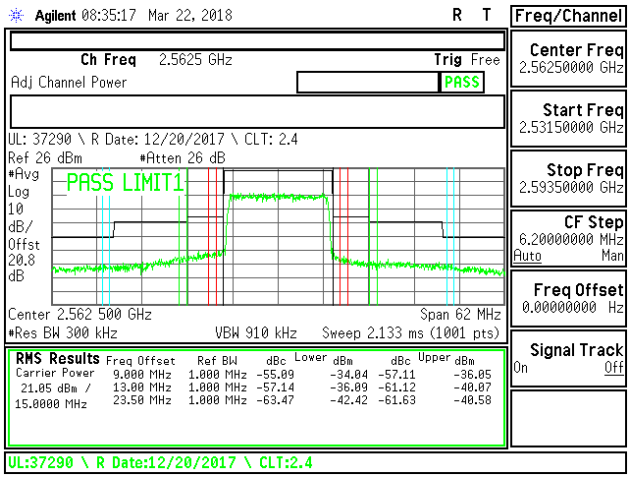
LTE B7 15MHz 16QAM Low Channel RB1-0



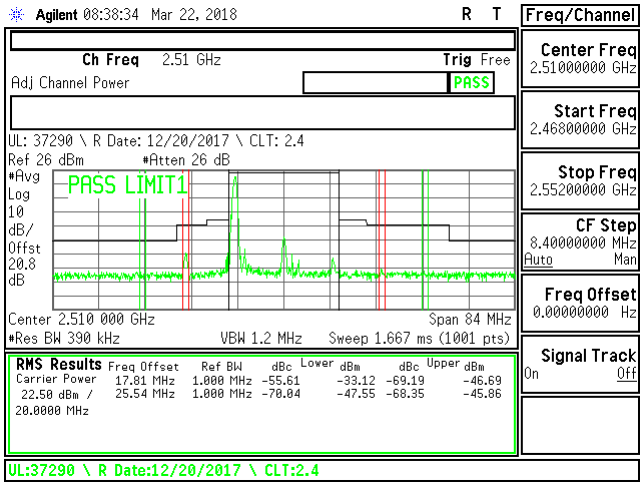
LTE B7 15MHz 16QAM High Channel RB1-74



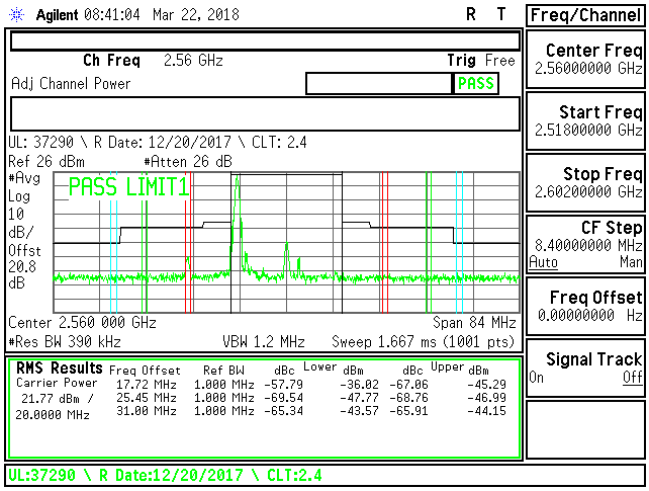
LTE B7 15MHz 16QAM Low Channel RB75-0



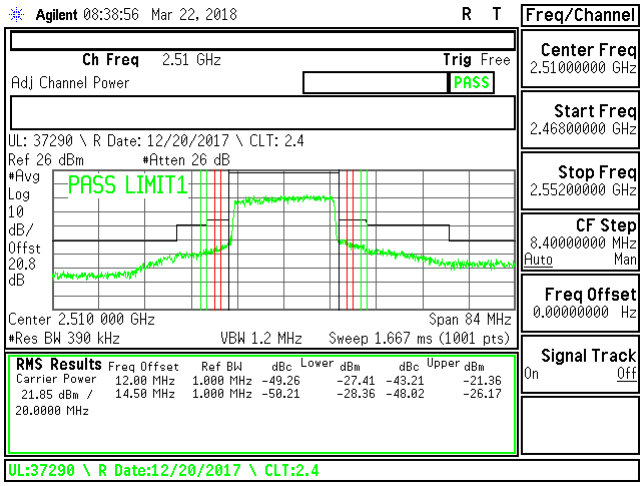
LTE B7 15MHz 16QAM High Channel RB75-0



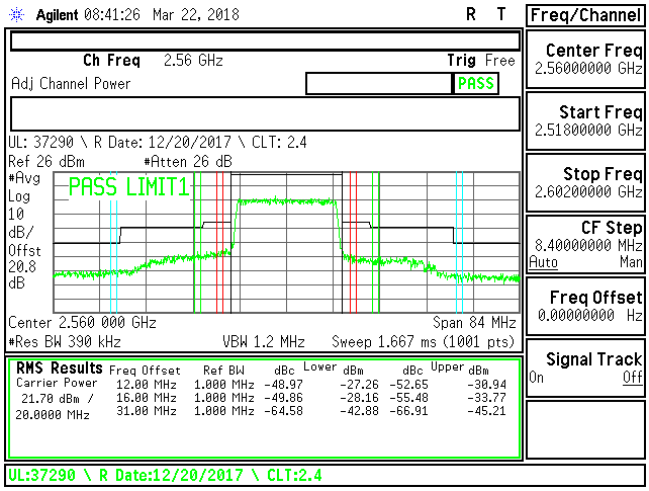
LTE B7 20MHz QPSK Low Channel RB1-0



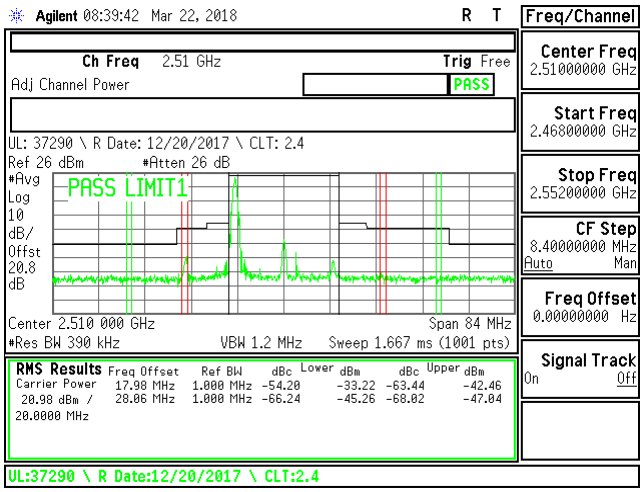
LTE B7 20MHz QPSK High Channel RB1-99



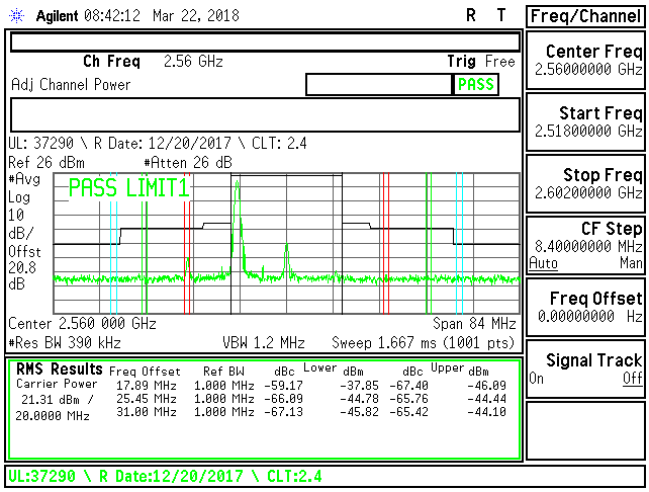
LTE B7 20MHz QPSK Low Channel RB100-0



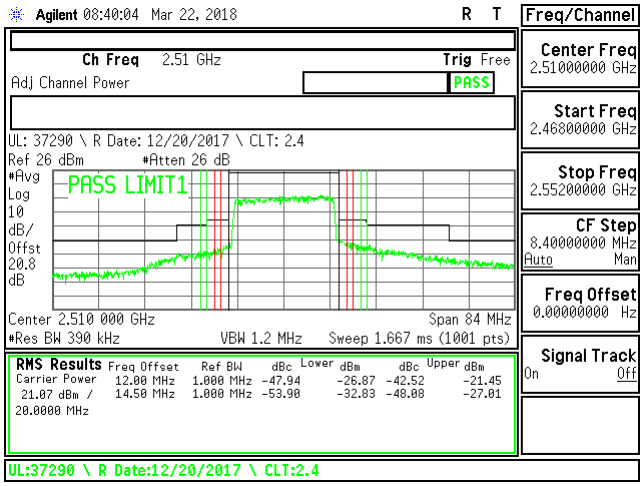
LTE B7 20MHz QPSK High Channel RB100-0



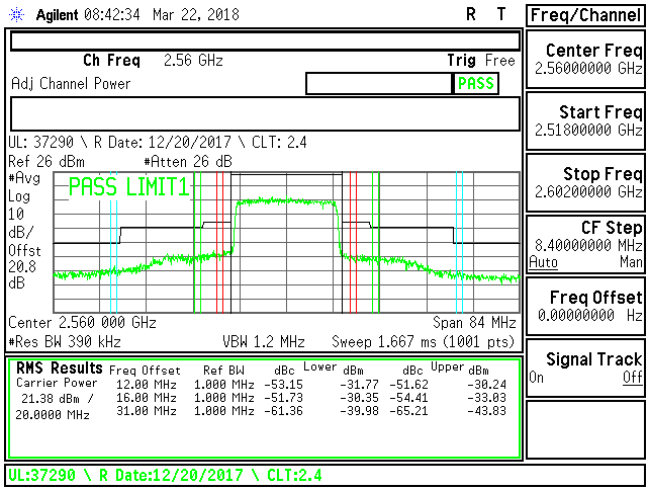
LTE B7 20MHz 16QAM Low Channel RB1-0



LTE B7 20MHz 16QAM High Channel RB1-99

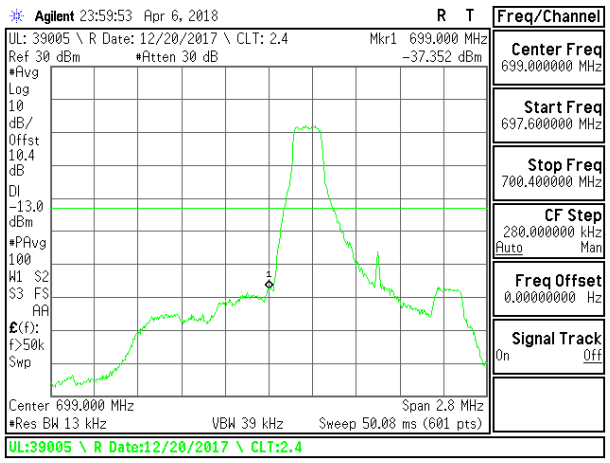


LTE B7 20MHz 16QAM Low Channel RB100-0

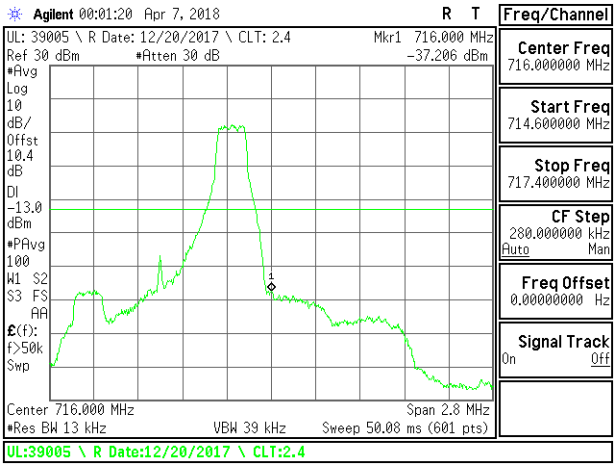


LTE B7 20MHz 16QAM High Channel RB100-0

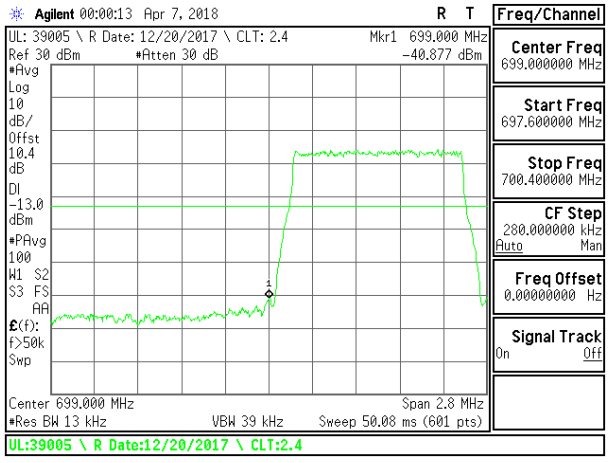
8.2.7. **LTE BAND 12 BANDEDGE**



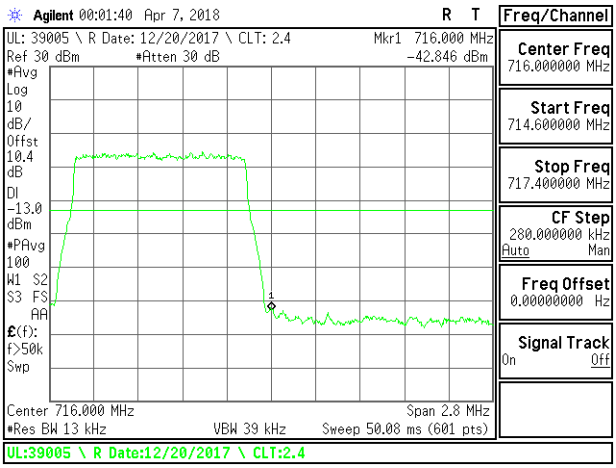
LTE B12 1.4MHz QPSK Low Channel RB1-0



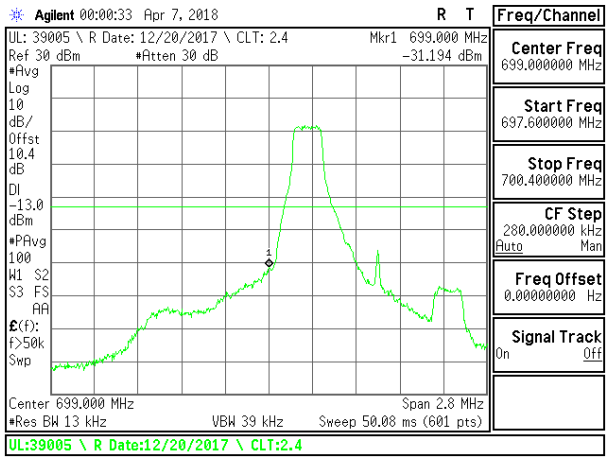
LTE B12 1.4MHz QPSK High Channel RB1-5



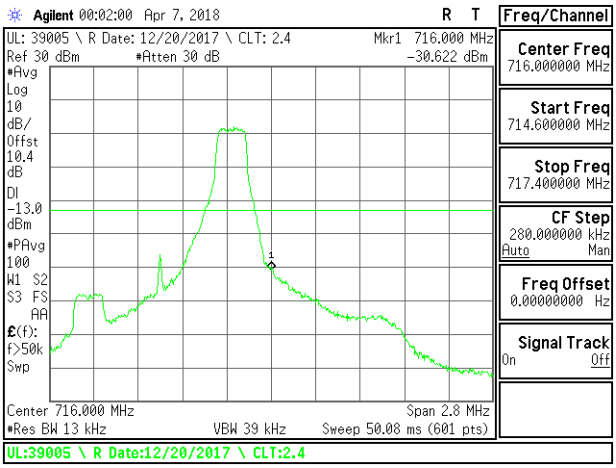
LTE B12 1.4MHz QPSK Low Channel RB6-0



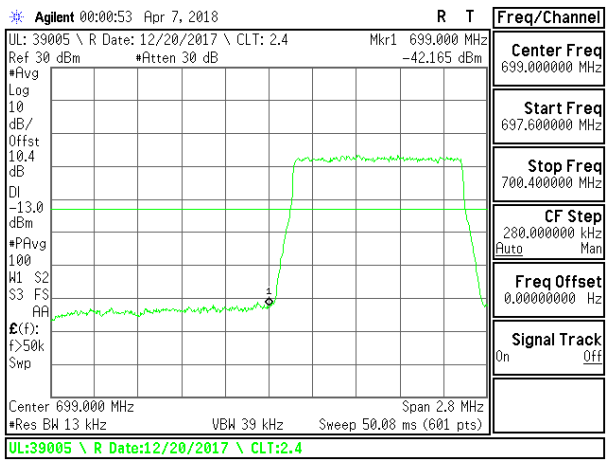
LTE B12 1.4MHz QPSK High Channel RB6-0



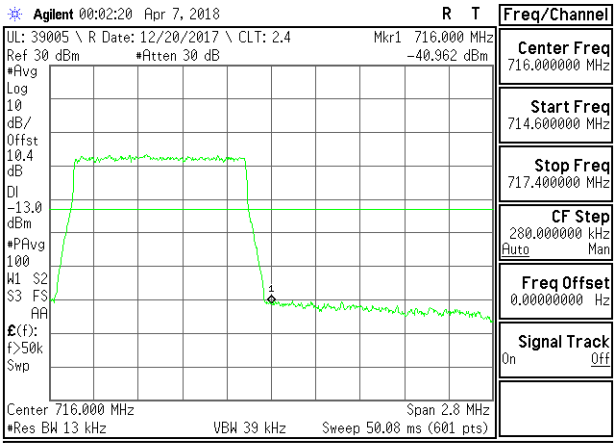
LTE B12 1.4MHz 16QAM Low Channel RB1-0



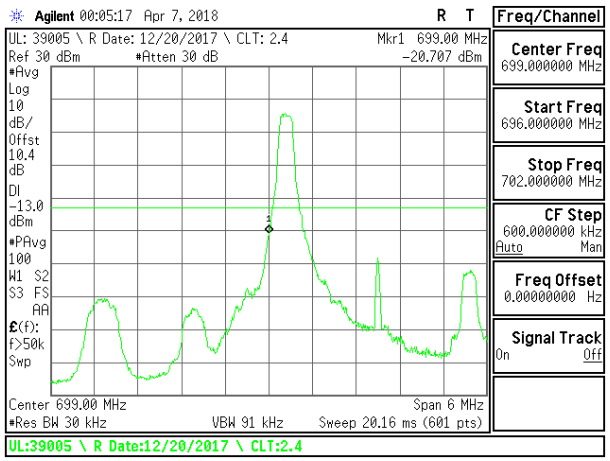
LTE B12 1.4MHz 16QAM High Channel RB1-5



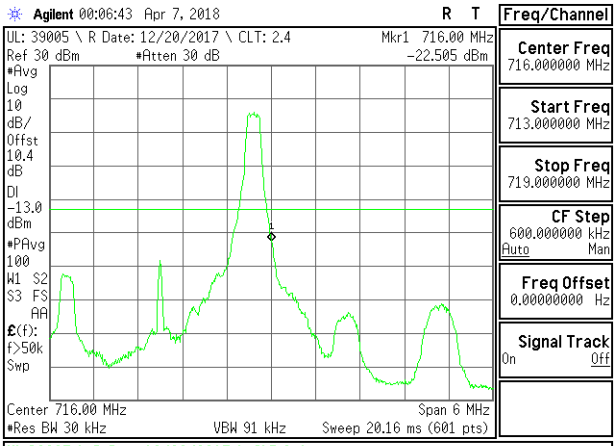
LTE B12 1.4MHz 16QAM Low Channel RB6-0



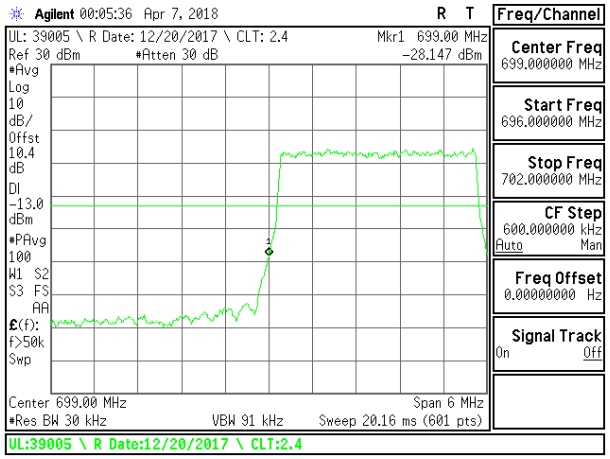
LTE B12 1.4MHz 16QAM High Channel RB6-0



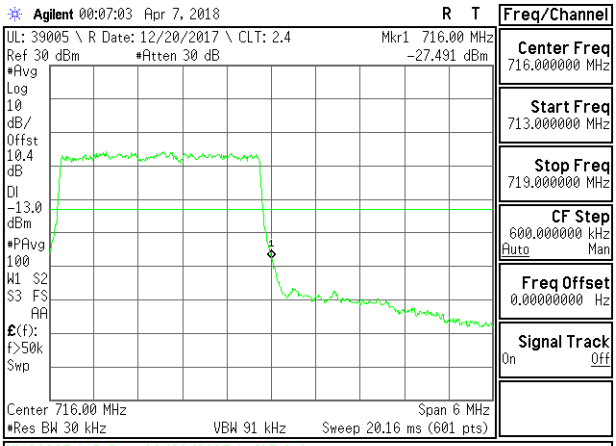
LTE B12 3MHz QPSK Low Channel RB1-0



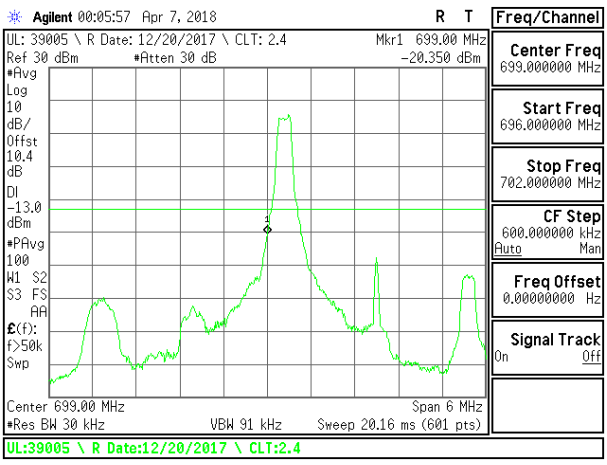
LTE B12 3MHz QPSK High Channel RB1-14



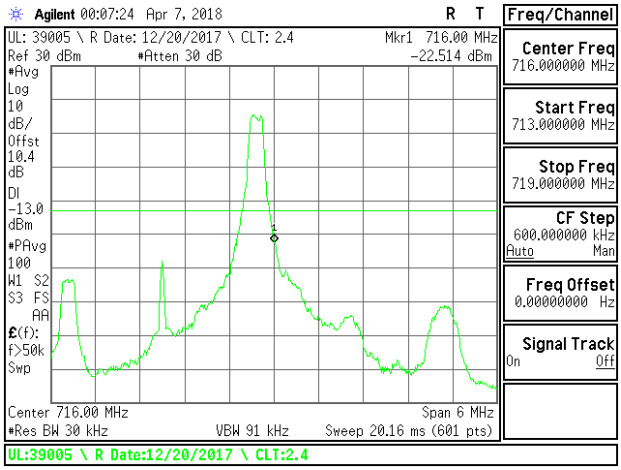
LTE B12 3MHz QPSK Low Channel RB15-0



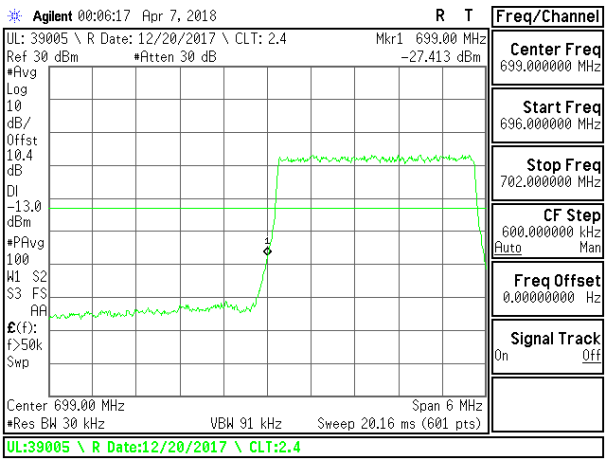
LTE B12 3MHz QPSK High Channel RB15-0



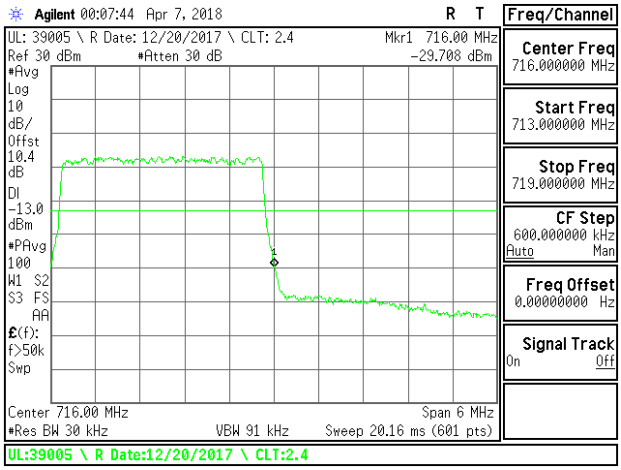
LTE B12 3MHz 16QAM Low Channel RB1-0



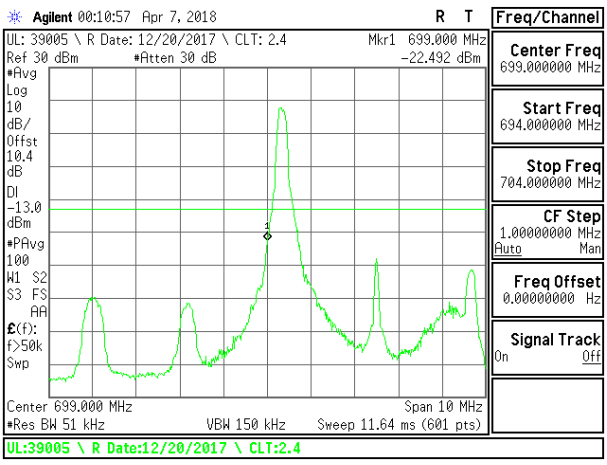
LTE B12 3MHz 16QAM High Channel RB1-14



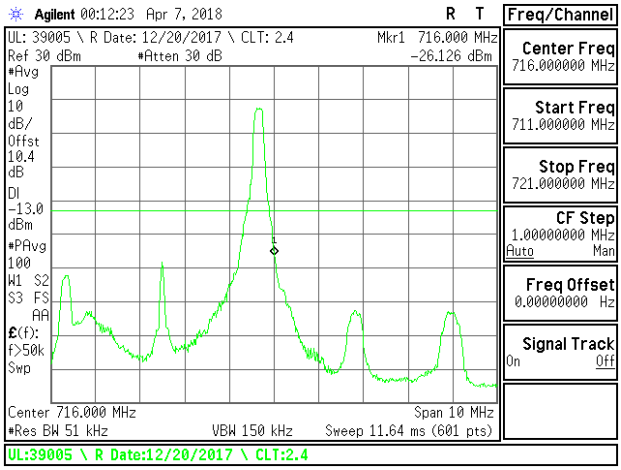
LTE B12 3MHz 16QAM Low Channel RB15-0



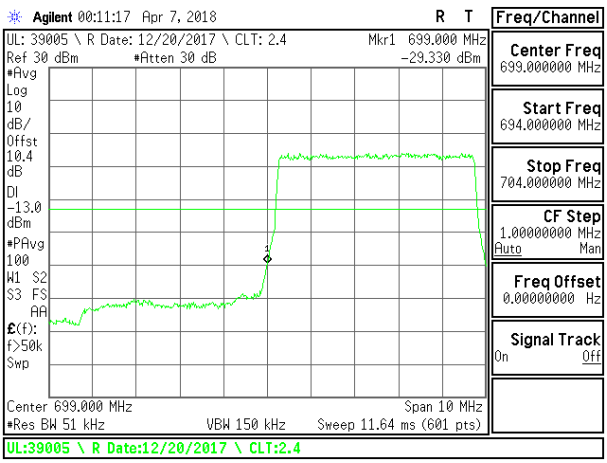
LTE B12 3MHz 16QAM High Channel RB15-0



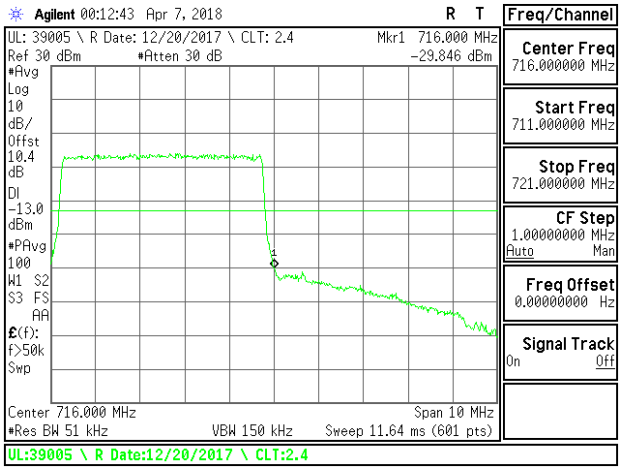
LTE B12 5MHz QPSK Low Channel RB1-0



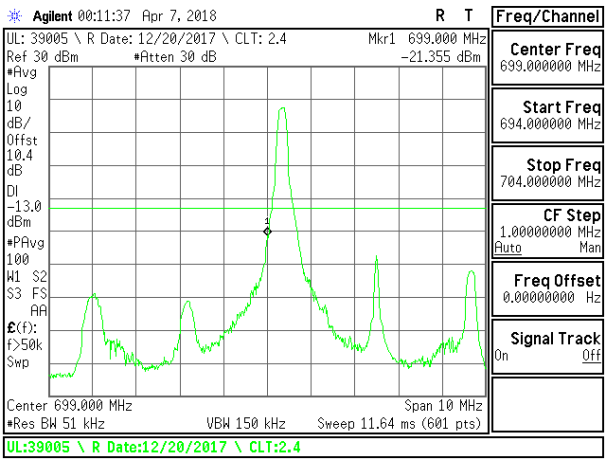
LTE B12 5MHz QPSK High Channel RB1-24



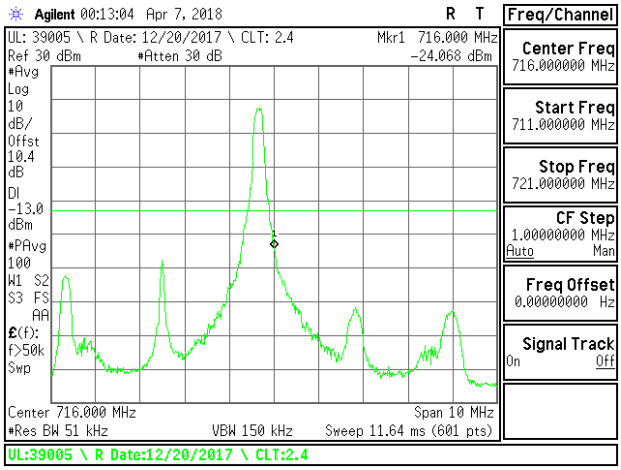
LTE B12 5MHz QPSK Low Channel RB25-0



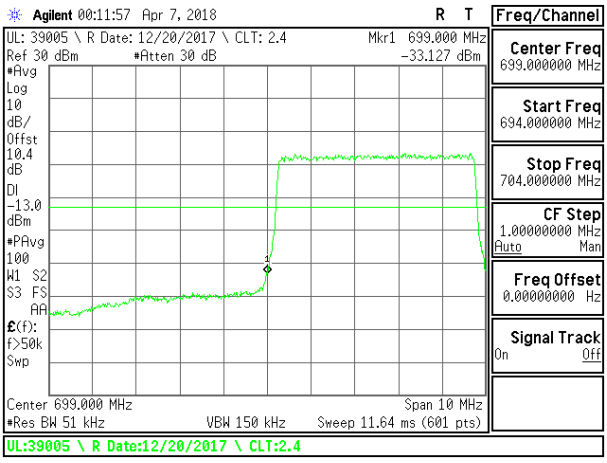
LTE B12 5MHz QPSK High Channel RB25-0



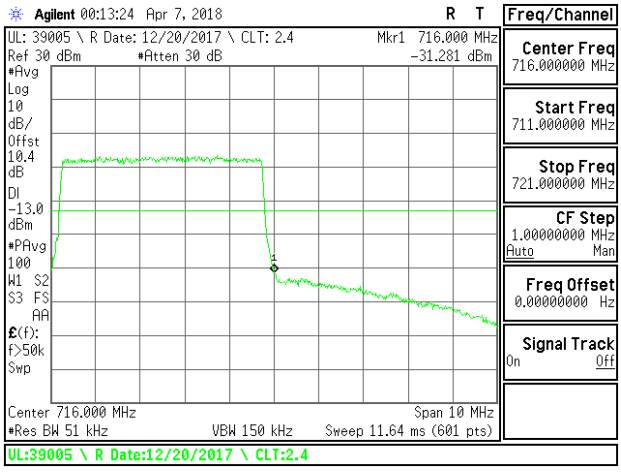
LTE B12 5MHz 16QAM Low Channel RB1-0



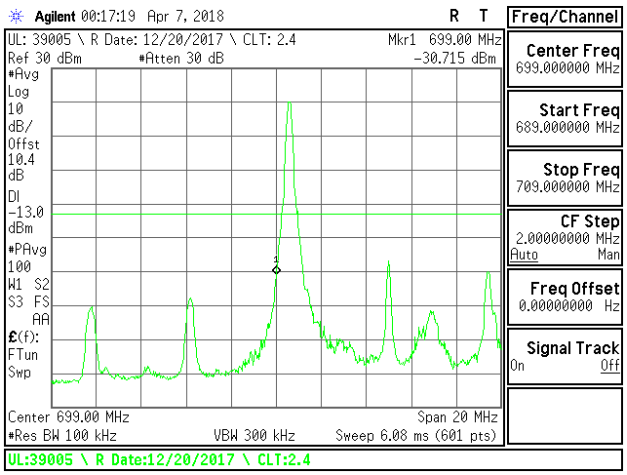
LTE B12 5MHz 16QAM High Channel RB1-24



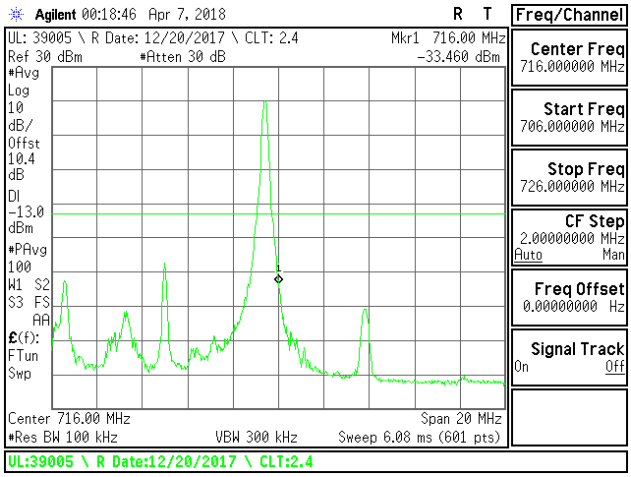
LTE B12 5MHz 16QAM Low Channel RB25-0



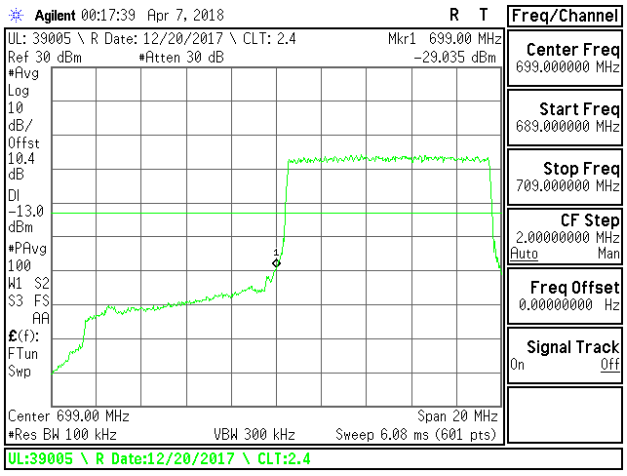
LTE B12 5MHz 16QAM High Channel RB25-0



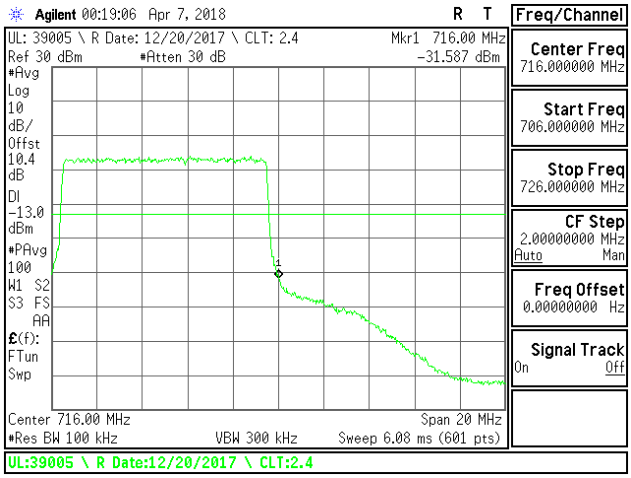
LTE B12 10MHz QPSK Low Channel RB1-0



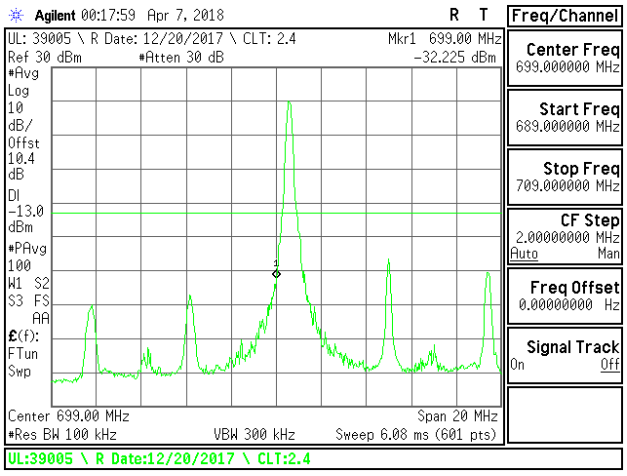
LTE B12 10MHz QPSK High Channel RB1-49



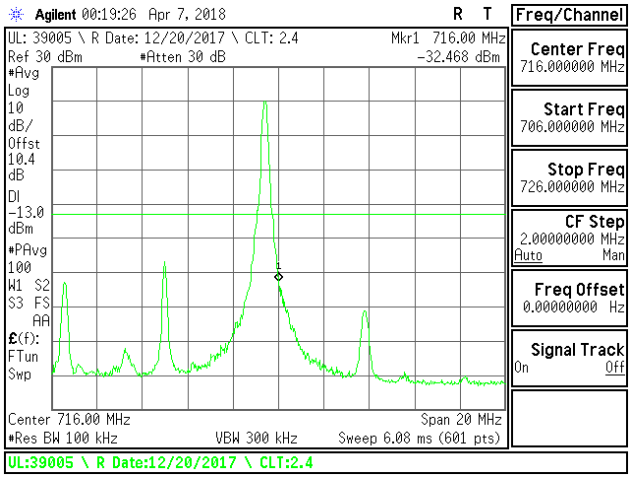
LTE B12 10MHz QPSK Low Channel RB50-0



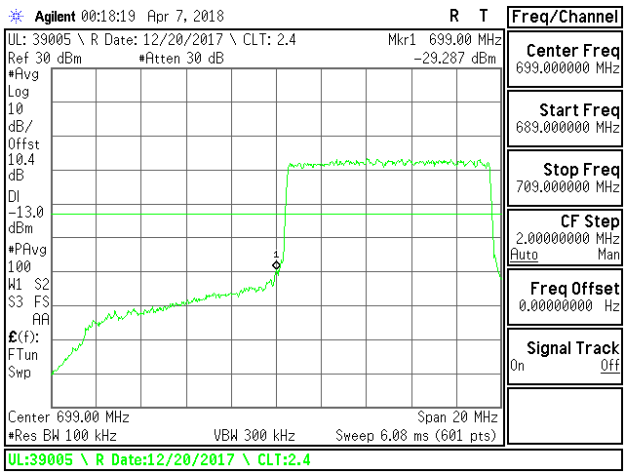
LTE B12 10MHz QPSK High Channel RB50-0



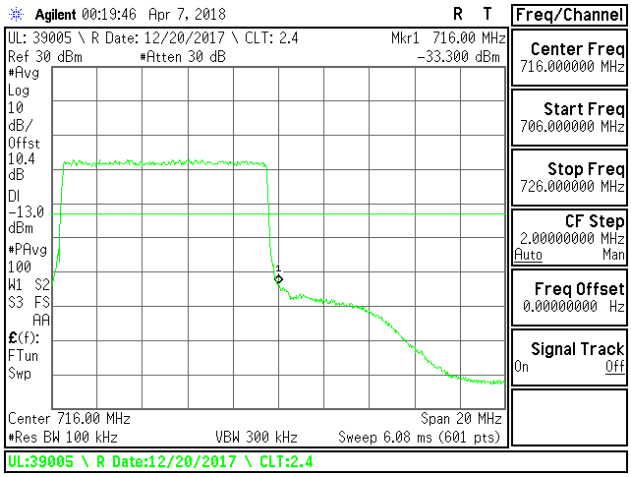
LTE B12 10MHz 16QAM Low Channel RB1-0



LTE B12 10MHz 16QAM High Channel RB1-49

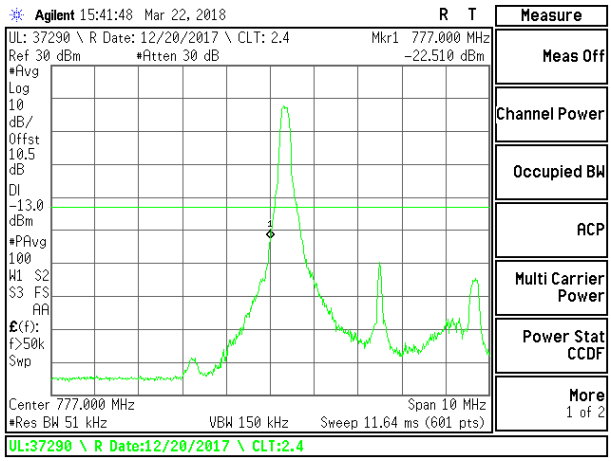


LTE B12 10MHz 16QAM Low Channel RB50-0

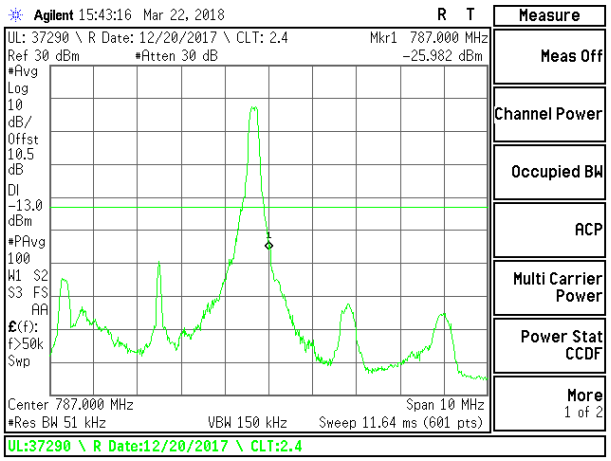


LTE B12 10MHz 16QAM High Channel RB50-0

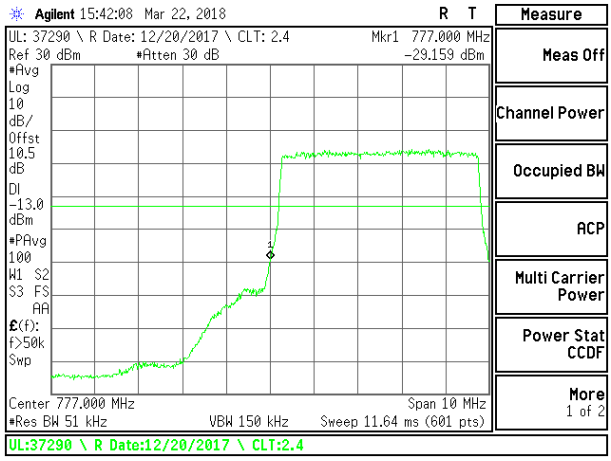
8.2.8. **LTE BAND 13**



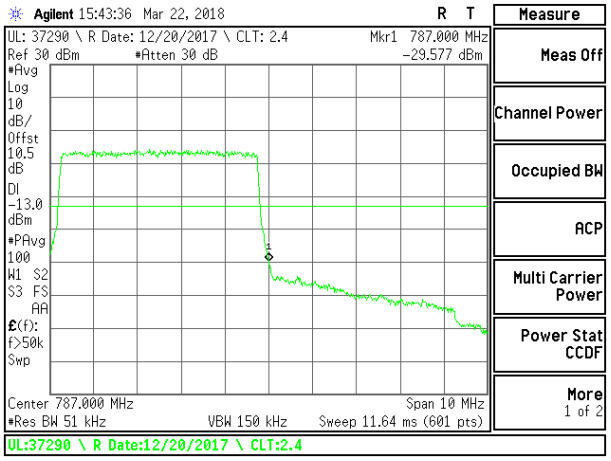
LTE B13 5MHz QPSK Low Channel RB1-0



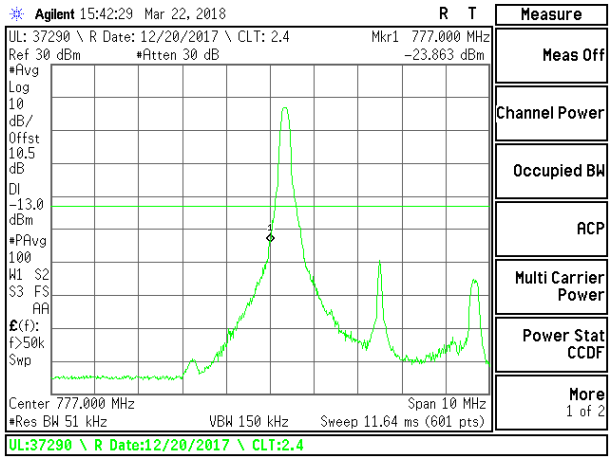
LTE B13 5MHz QPSK High Channel RB1-24



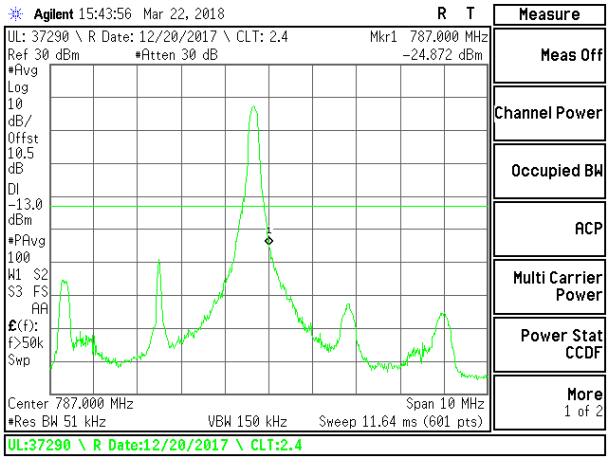
LTE B13 5MHz QPSK Low Channel RB25-0



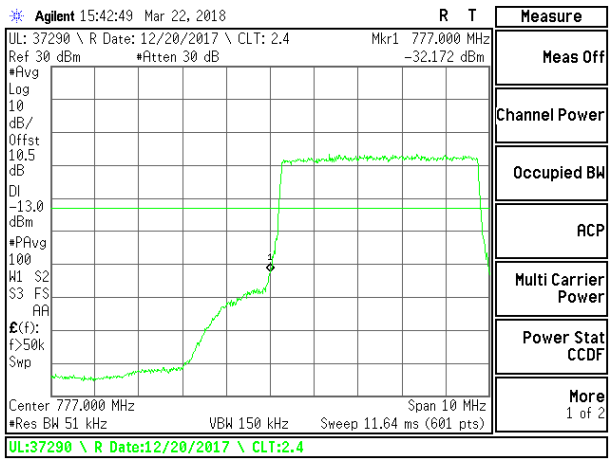
LTE B13 5MHz QPSK High Channel RB25-0



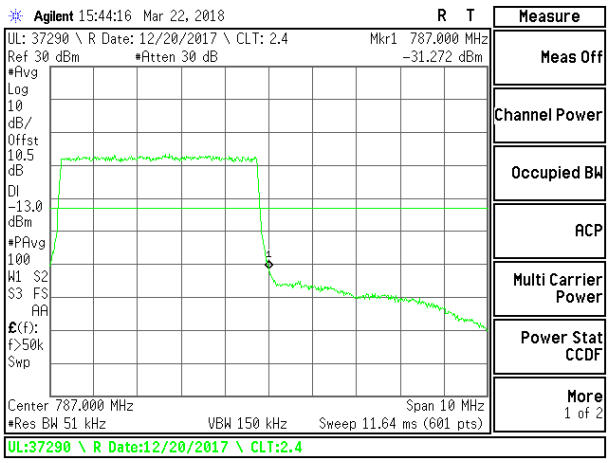
LTE B13 5MHz 16QAM Low Channel RB1-0



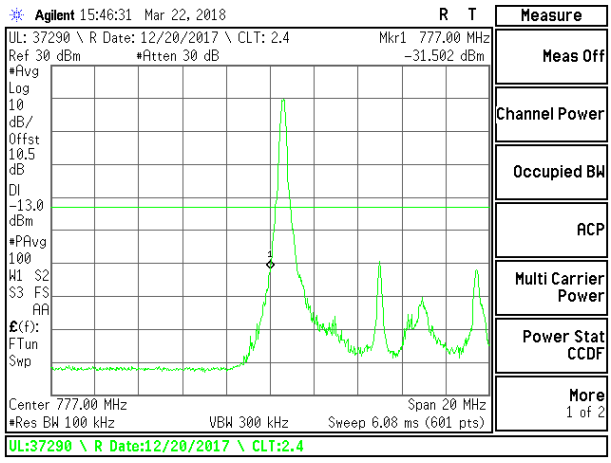
LTE B13 5MHz 16QAM High Channel RB1-24



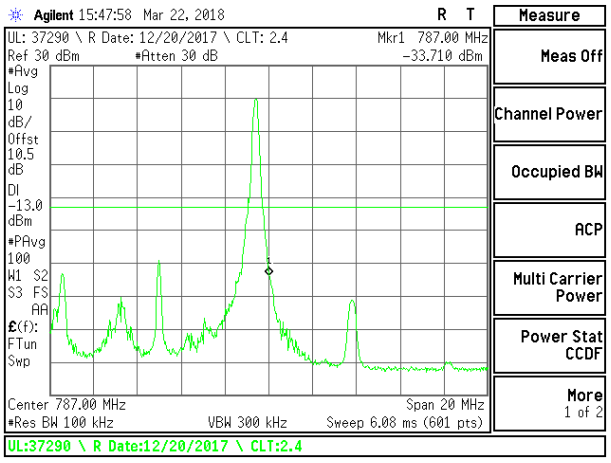
LTE B13 5MHz 16QAM Low Channel RB25-0



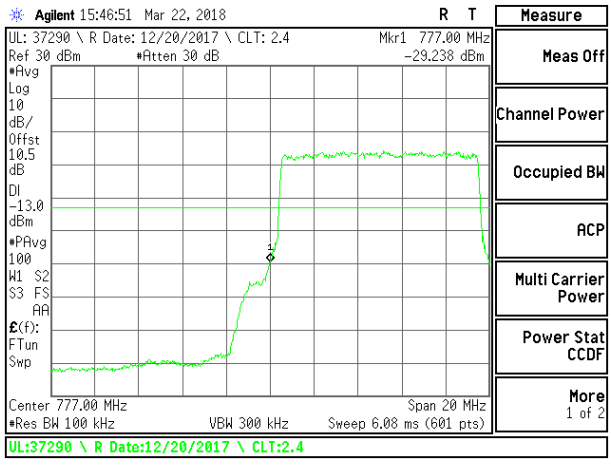
LTE B13 5MHz 16QAM High Channel RB25-0



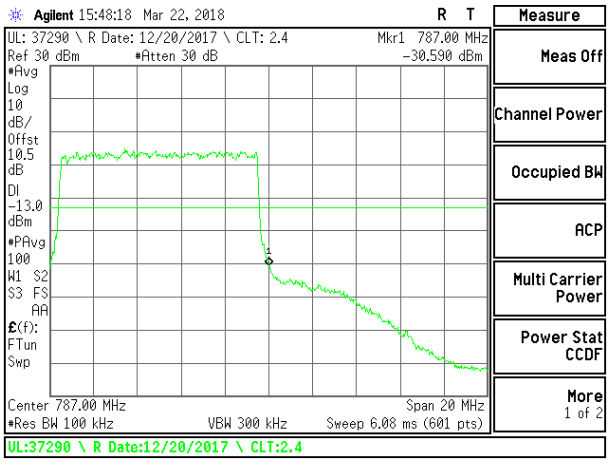
LTE B13 10MHz QPSK Low Channel RB1-0



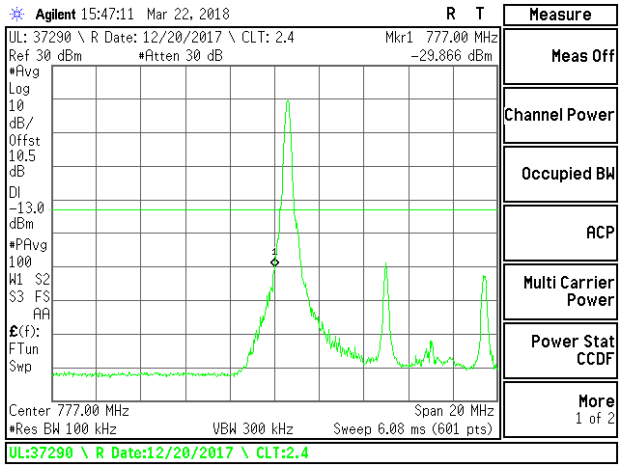
LTE B13 10MHz QPSK High Channel RB1-49



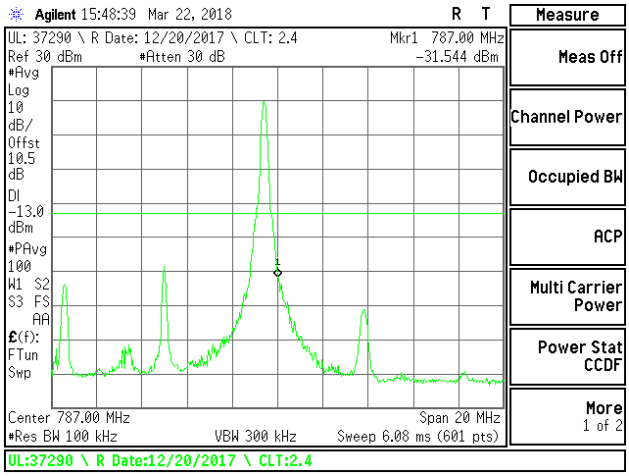
LTE B13 10MHz QPSK Low Channel RB50-0



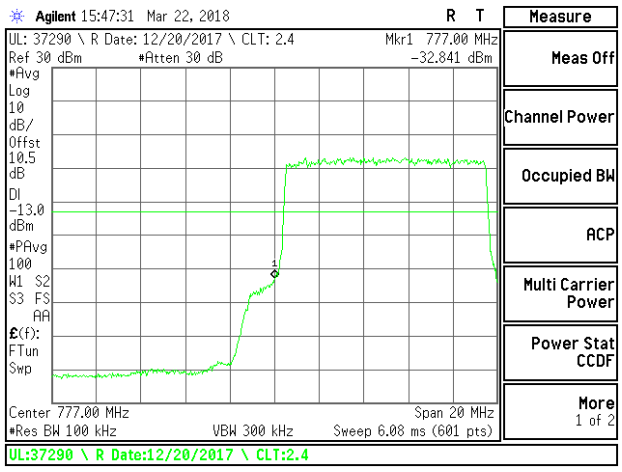
LTE B13 10MHz QPSK High Channel RB50-0



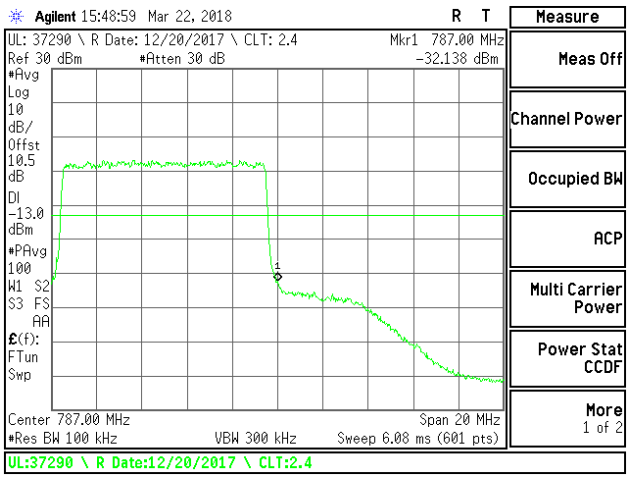
LTE B13 10MHz 16QAM Low Channel RB1-0



LTE B13 10MHz 16QAM High Channel RB1-49

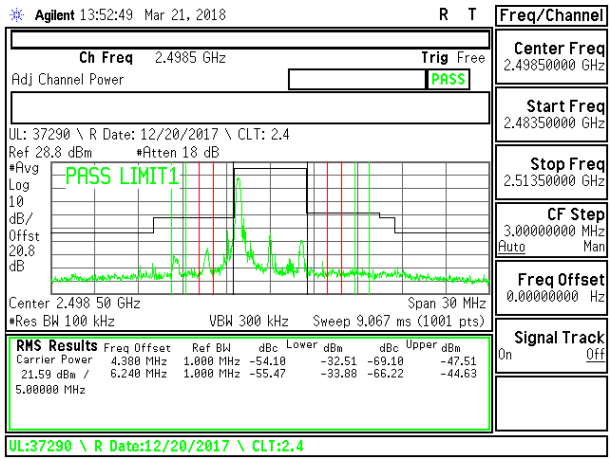


LTE B13 10MHz 16QAM Low Channel RB50-0

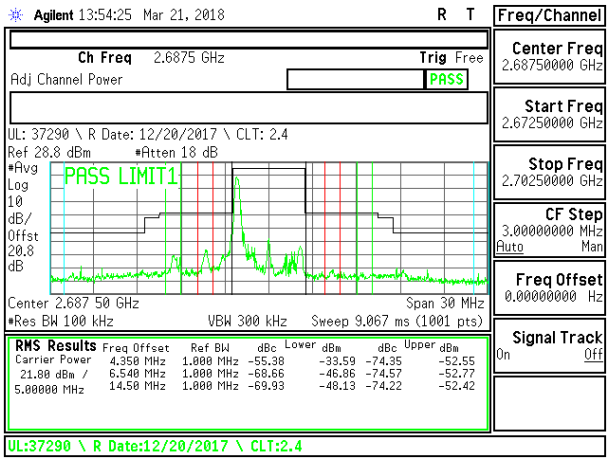


LTE B13 10MHz 16QAM High Channel RB50-0

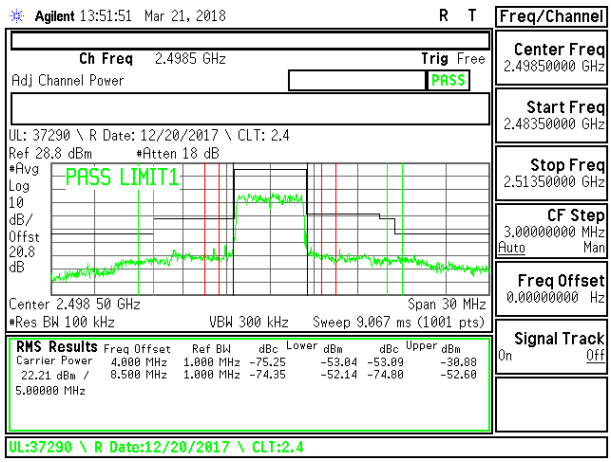
8.2.9. LTE BAND 41 ADJACENT CHANNEL POWER



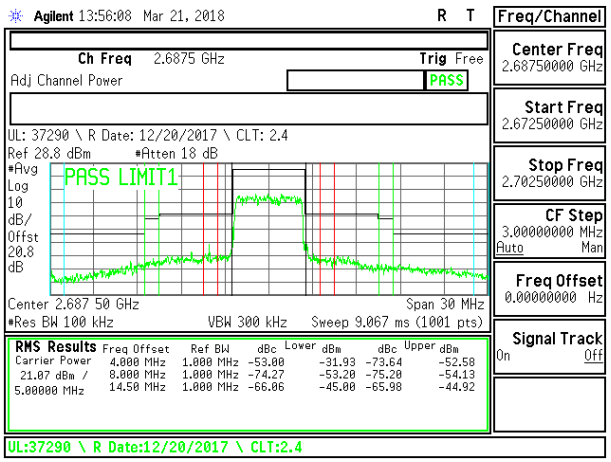
LTE B41 5MHz QPSK Low Channel RB1-0



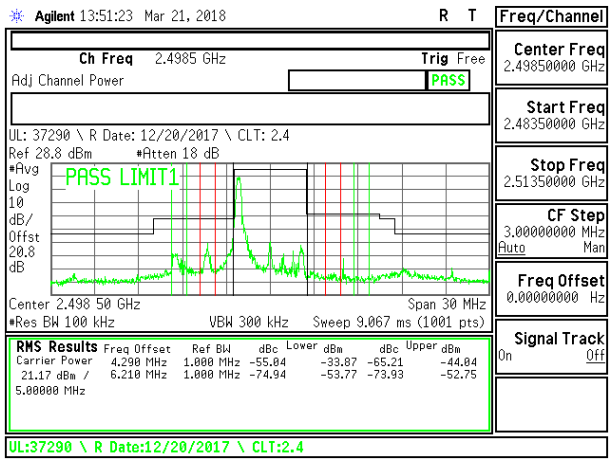
LTE B41 5MHz QPSK High Channel RB1-24



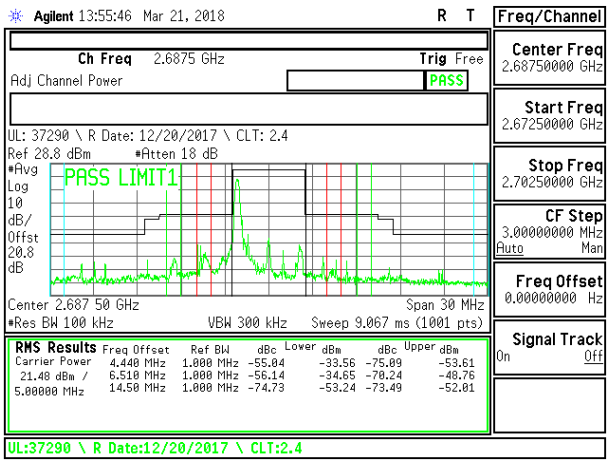
LTE B41 5MHz QPSK Low Channel RB25-0



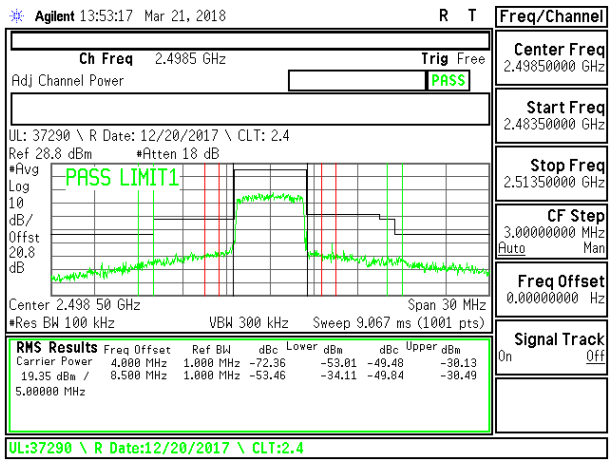
LTE B41 5MHz QPSK High Channel RB25-0



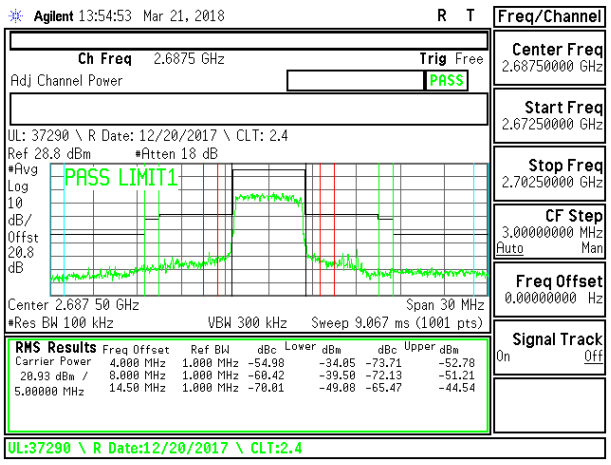
LTE B41 5MHz 16QAM Low Channel RB1-0



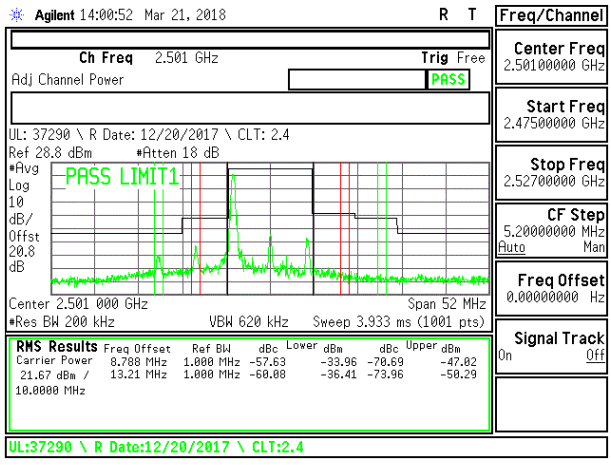
LTE B41 5MHz 16QAM High Channel RB1-24



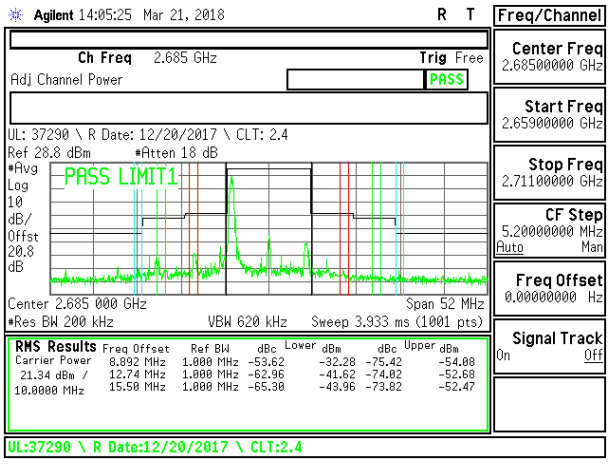
LTE B41 5MHz 16QAM Low Channel RB25-0



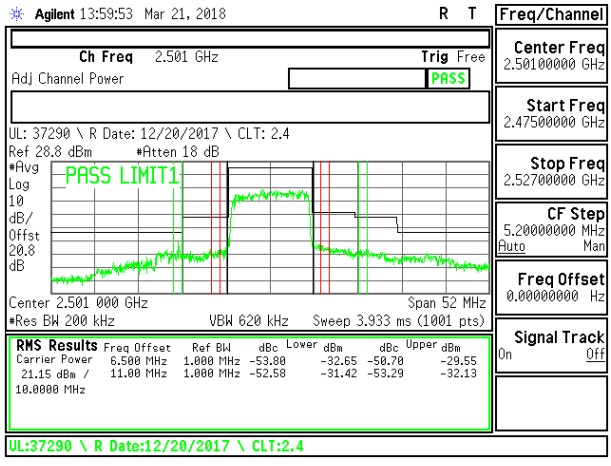
LTE B41 5MHz 16QAM High Channel RB25-0



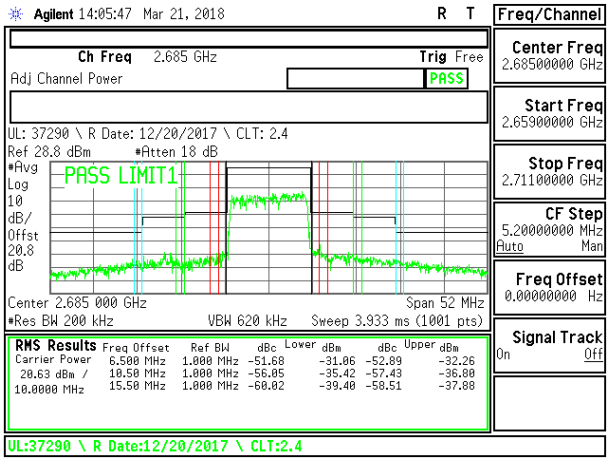
LTE B41 10MHz QPSK Low Channel RB1-0



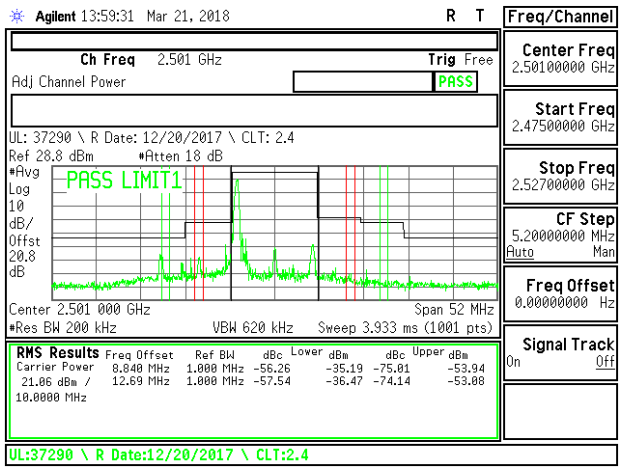
LTE B41 10MHz QPSK High Channel RB1-49



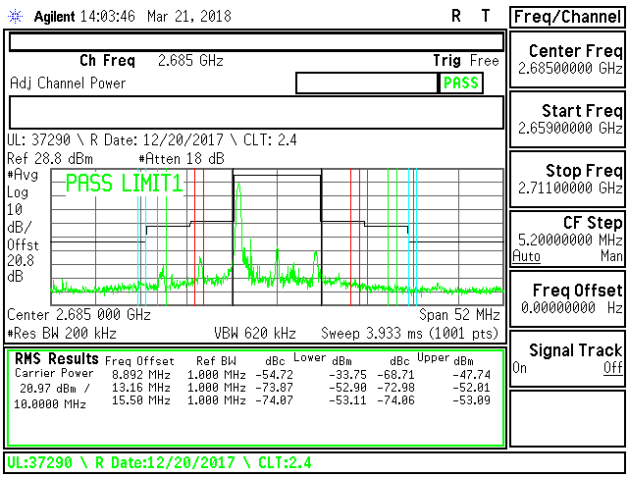
LTE B41 10MHz QPSK Low Channel RB50-0



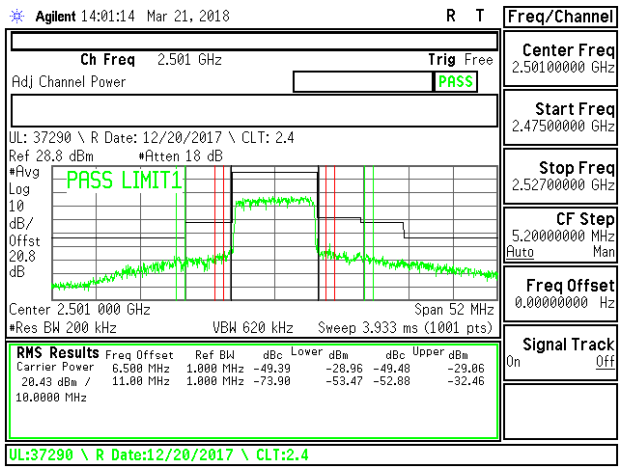
LTE B41 10MHz QPSK High Channel RB50-0



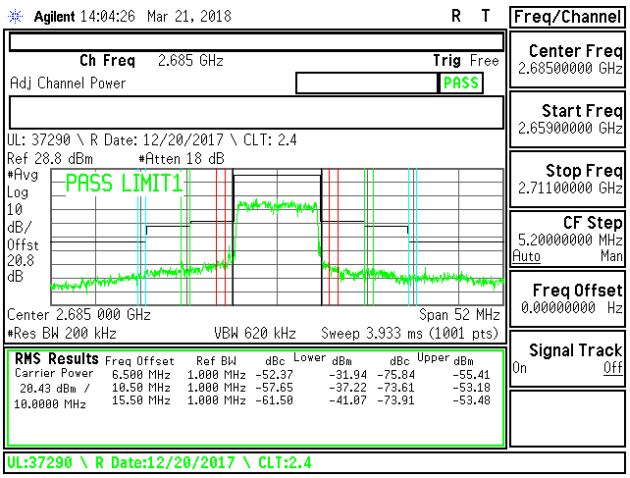
LTE B41 10MHz 16QAM Low Channel RB1-0



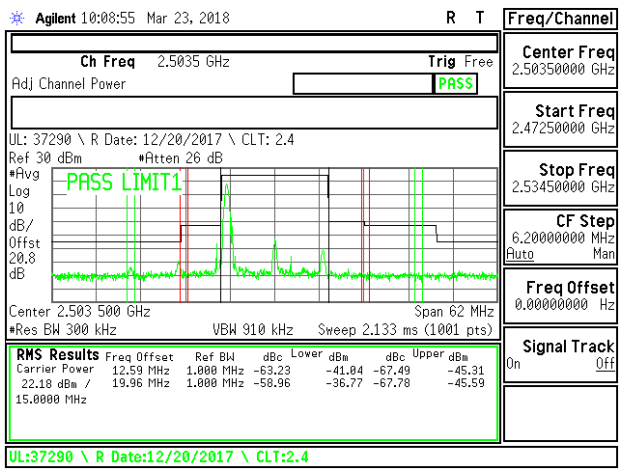
LTE B41 10MHz 16QAM High Channel RB1-49



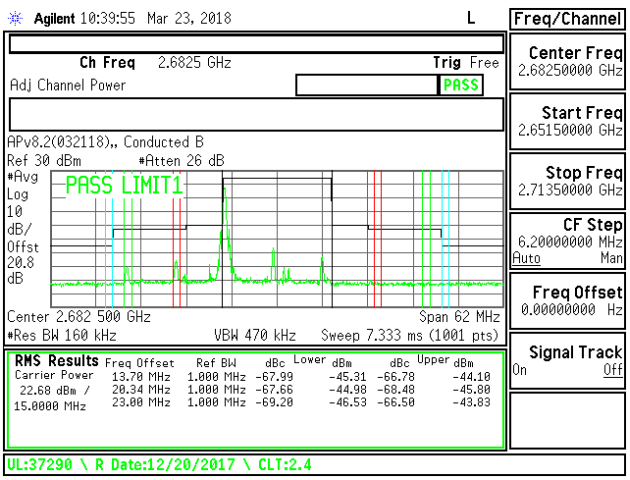
LTE B41 10MHz 16QAM Low Channel RB50-0



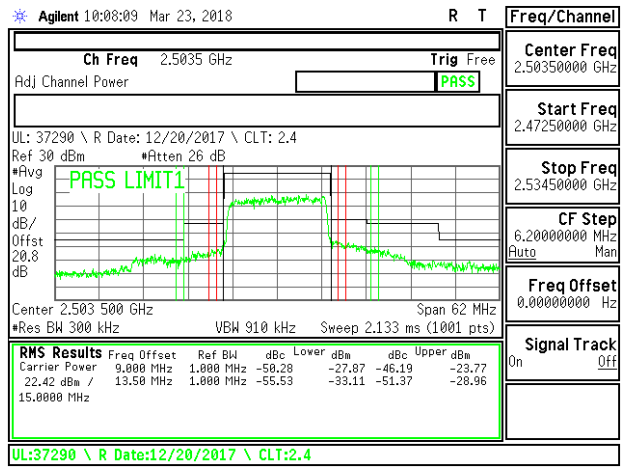
LTE B41 10MHz 16QAM High Channel RB50-0



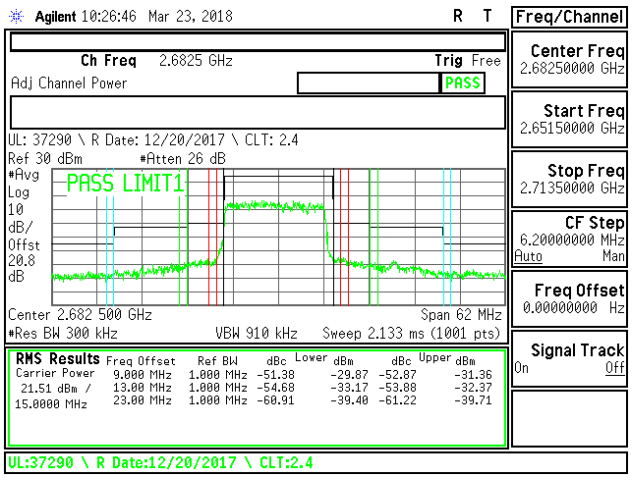
LTE B41 15MHz QPSK Low Channel RB1-0



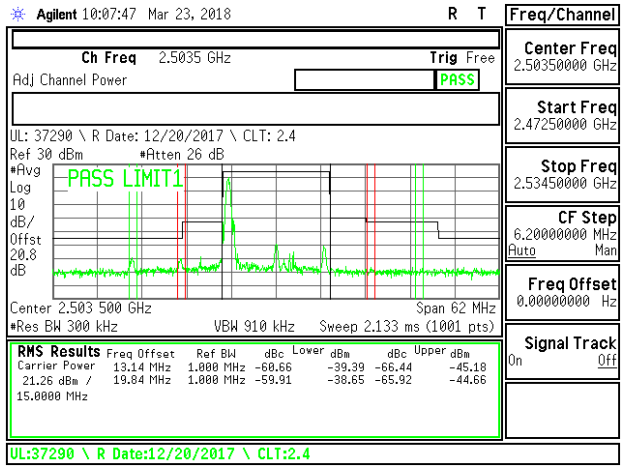
LTE B41 15MHz QPSK High Channel RB1-74



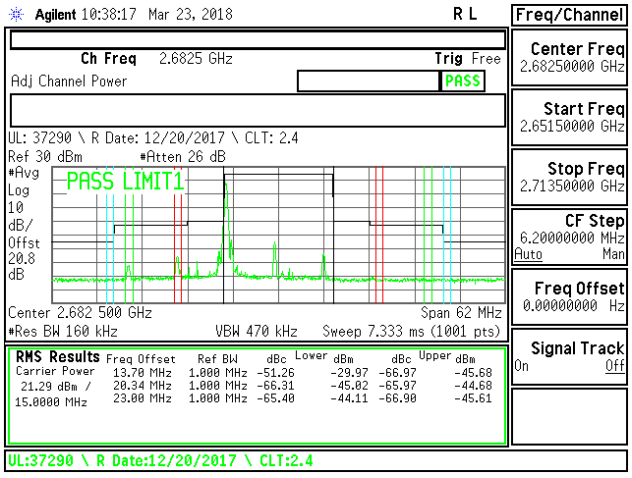
LTE B41 15MHz QPSK Low Channel RB75-0



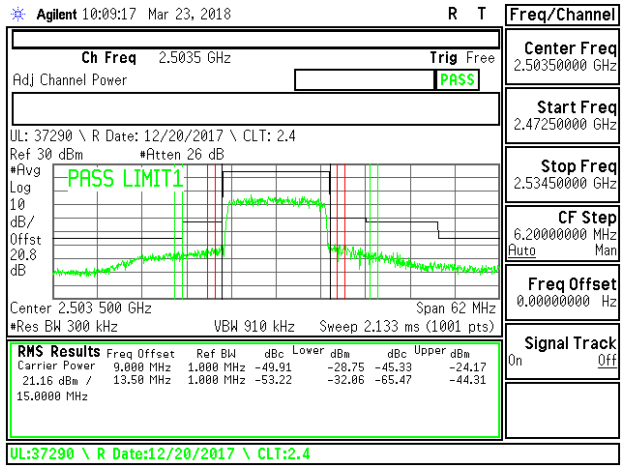
LTE B41 15MHz QPSK High Channel RB75-0



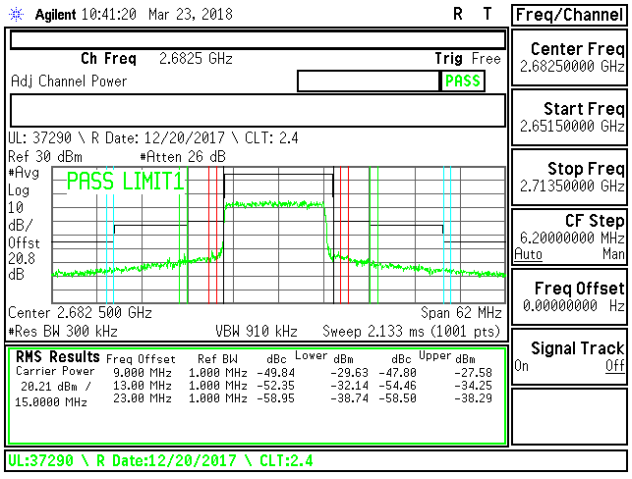
LTE B41 15MHz 16QAM Low Channel RB1-0



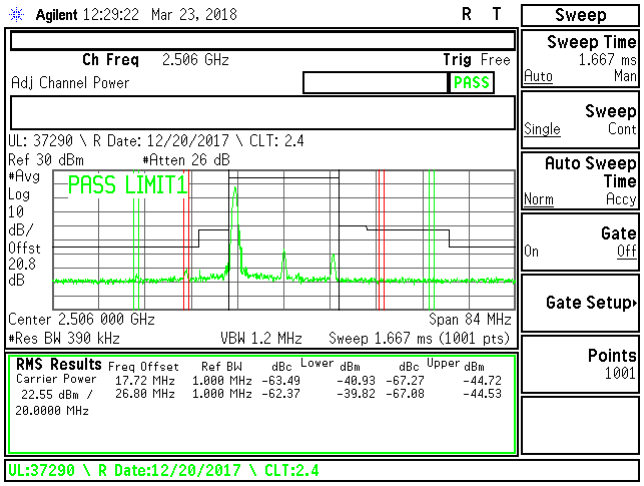
LTE B41 15MHz 16QAM High Channel RB1-74



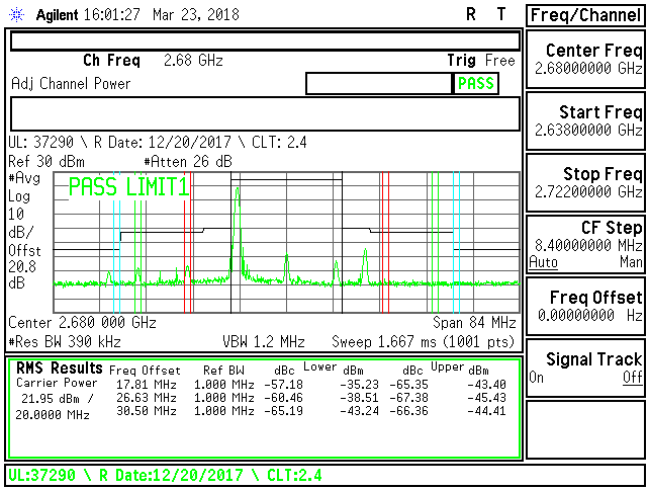
LTE B41 15MHz 16QAM Low Channel RB75-0



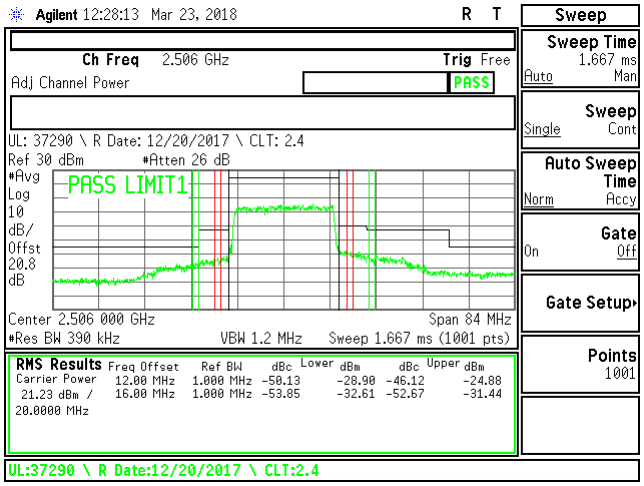
LTE B41 15MHz 16QAM High Channel RB75-0



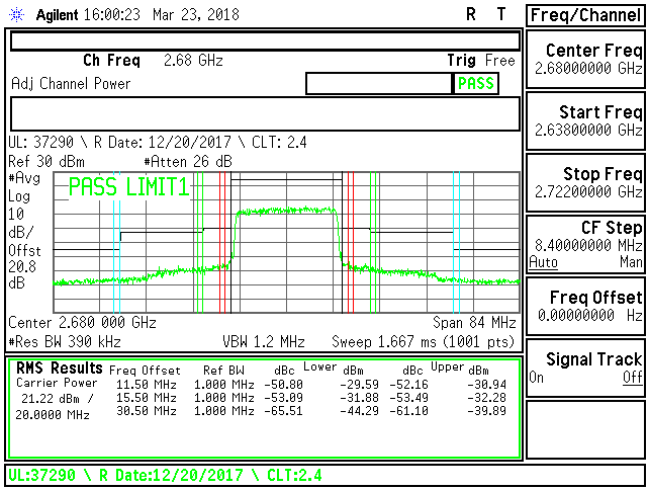
LTE B41 20MHz QPSK Low Channel RB1-0



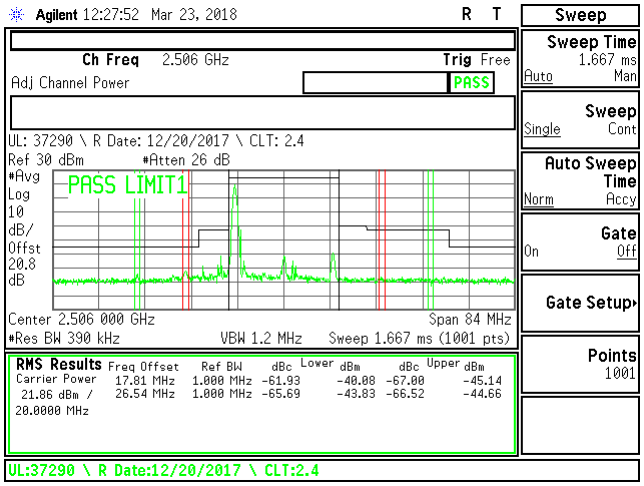
LTE B41 20MHz QPSK High Channel RB1-99



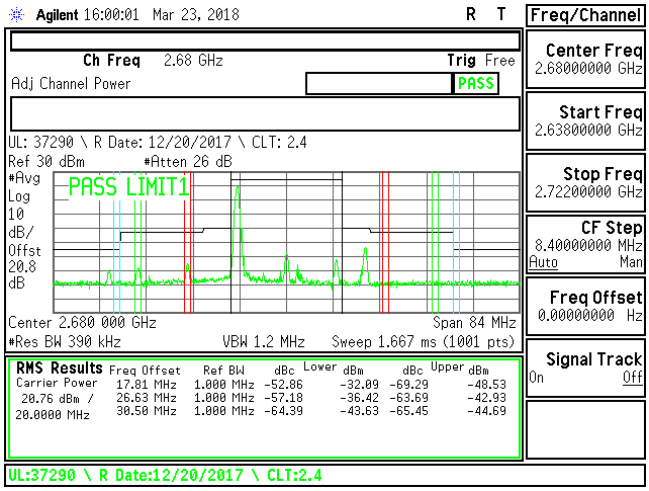
LTE B41 20MHz QPSK Low Channel RB100-0



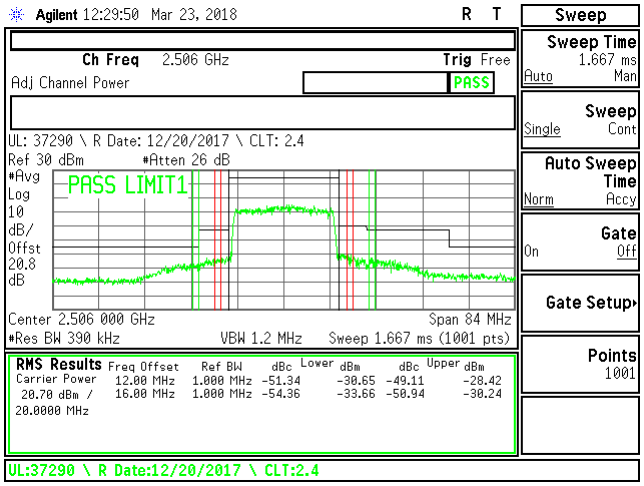
LTE B41 20MHz QPSK High Channel RB100-0



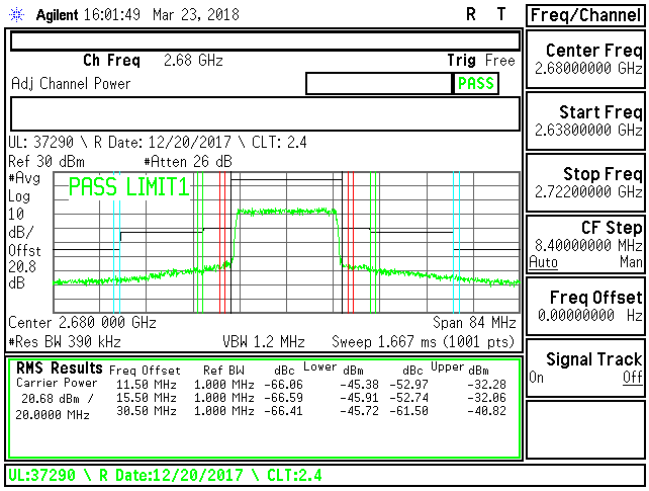
LTE B41 20MHz 16QAM Low Channel RB1-0



LTE B41 20MHz 16QAM High Channel RB1-99



LTE B41 20MHz 16QAM Low Channel RB100-0



LTE B41 20MHz 16QAM High Channel RB100-0

8.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53

LIMITS

FCC: §22.917, §24.238, §27.53 (c), (g), (h),
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.

FCC: §27.53 (m) (Band 7, 41)
The minimum permissible attenuation level of any spurious emissions is 55 + 10 log (P) dB where transmitting power (P) in Watts.

TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz. (NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

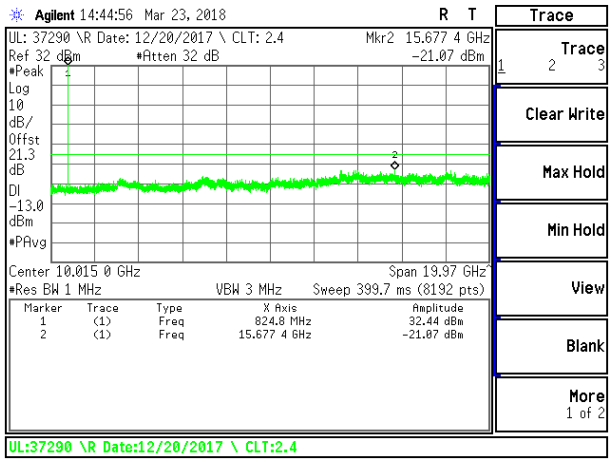
MODES TESTED

- GSM
- WCDMA
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 41
-

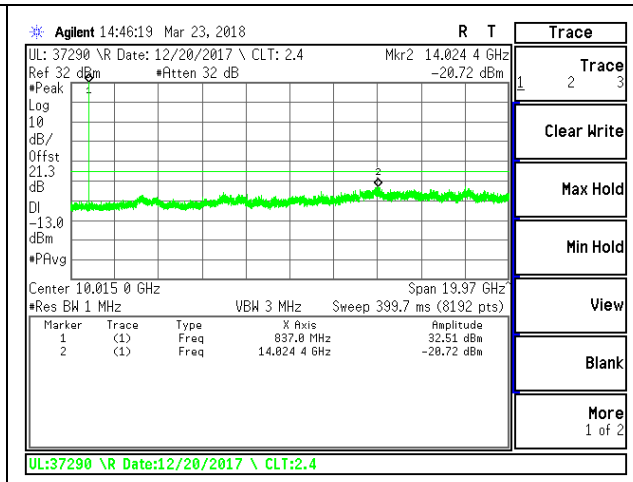
RESULTS

8.3.1. **GSM GSM850**

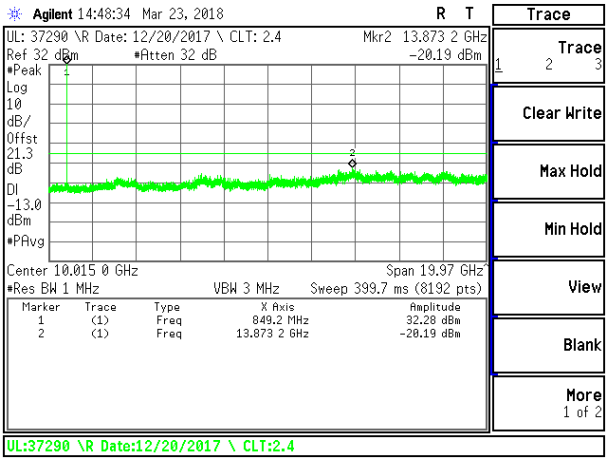
GPRS



GSM850 GPRS LOW Channel

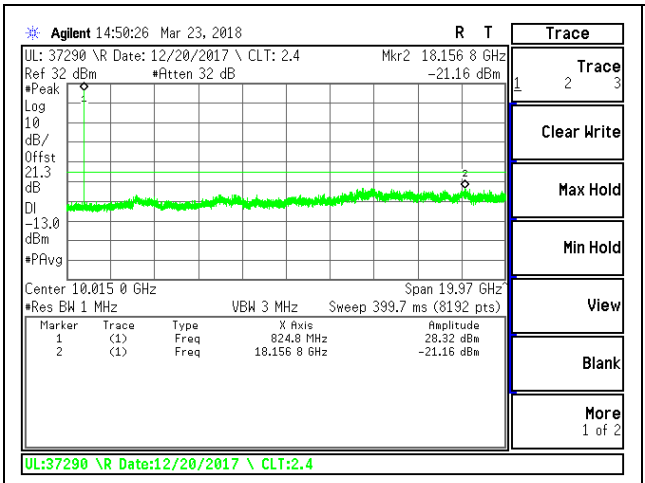


GSM850 GPRS MID Channel

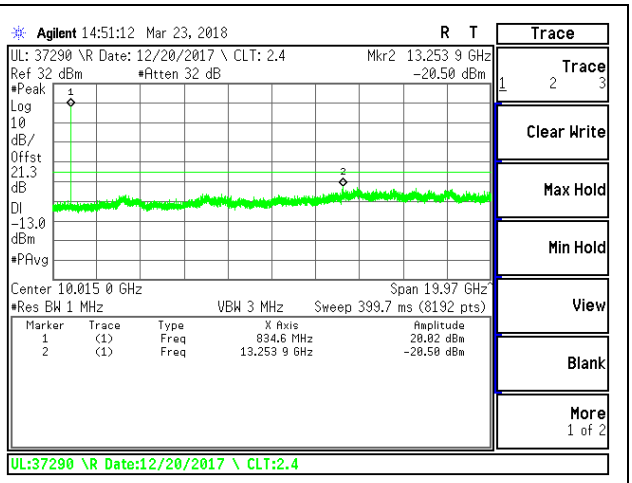


GSM850 GPRS HIGH Channel

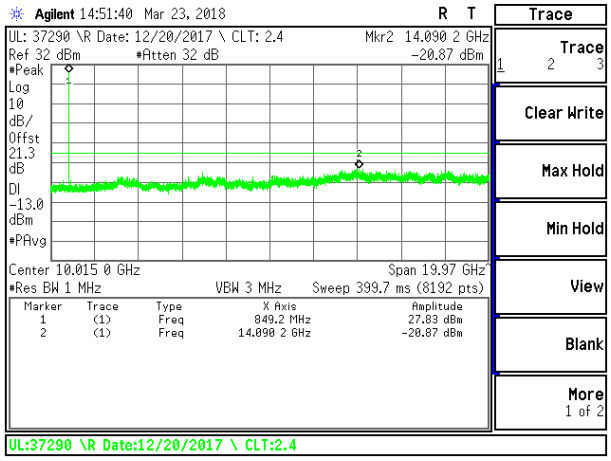
EGPRS



GSM850 EGPRS LOW Channel



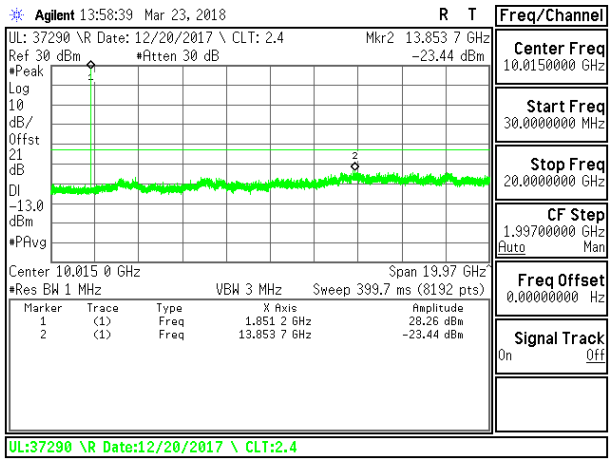
GSM850 EGPRS MID Channel



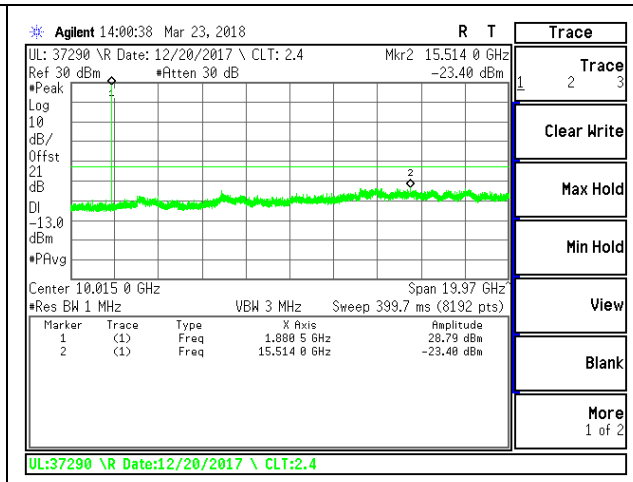
GSM850 EGPRS HIGH Channel

8.3.2. **GSM GSM1900**

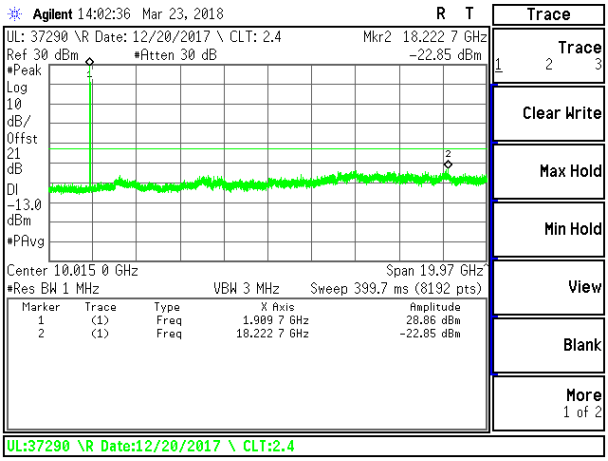
GPRS



GSM1900 GPRS LOW Channel

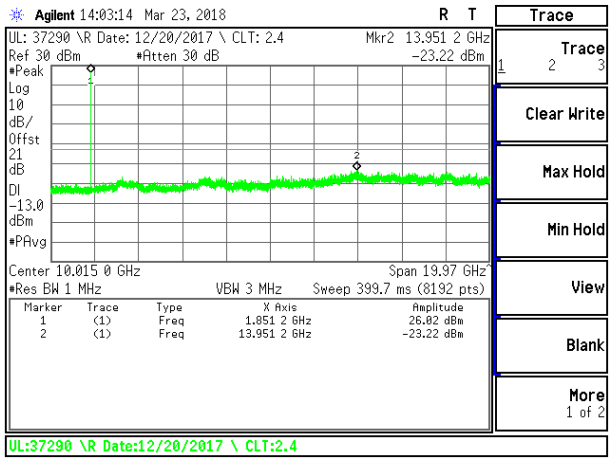


GSM1900 GPRS MID Channel

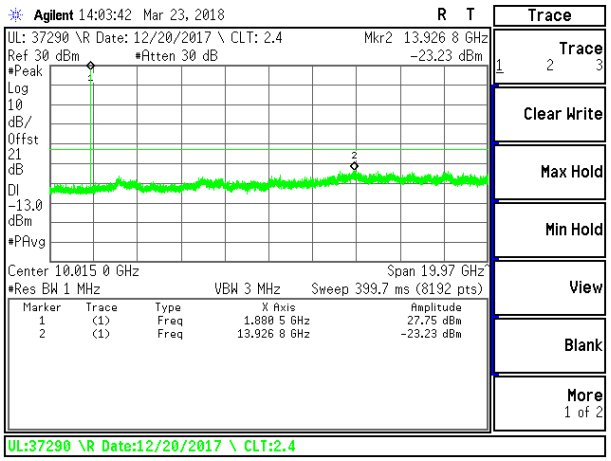


GSM1900 GPRS HIGH Channel

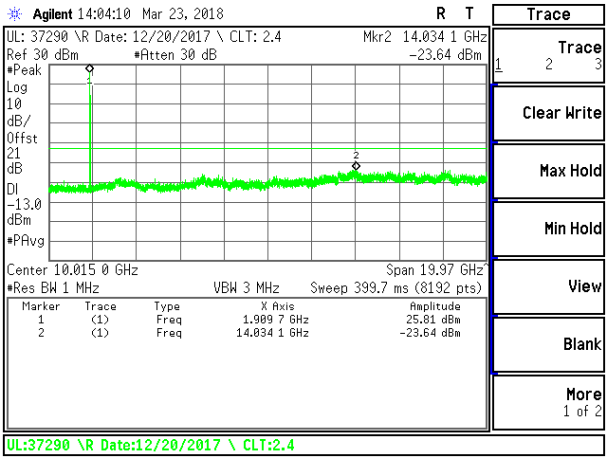
EGPRS



GSM1900 EGPRS LOW Channel



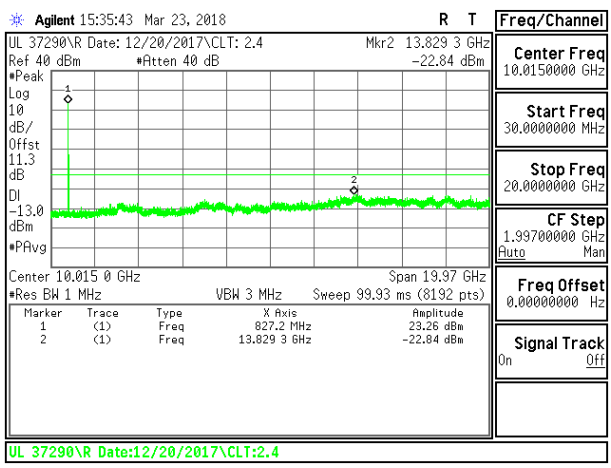
GSM1900 EGPRS MID Channel



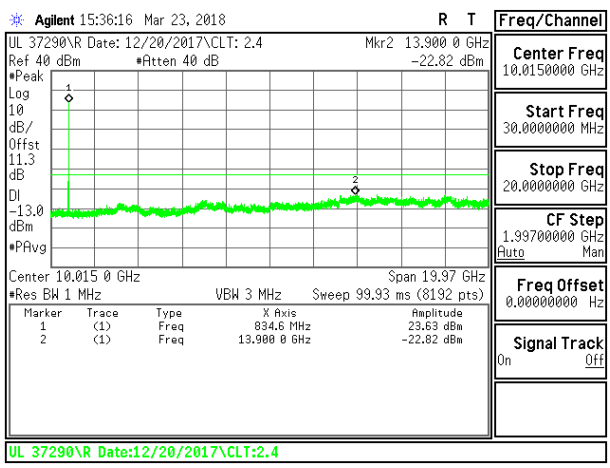
GSM1900 EGPRS HIGH Channel

8.3.3. **WCDMA BAND 5**

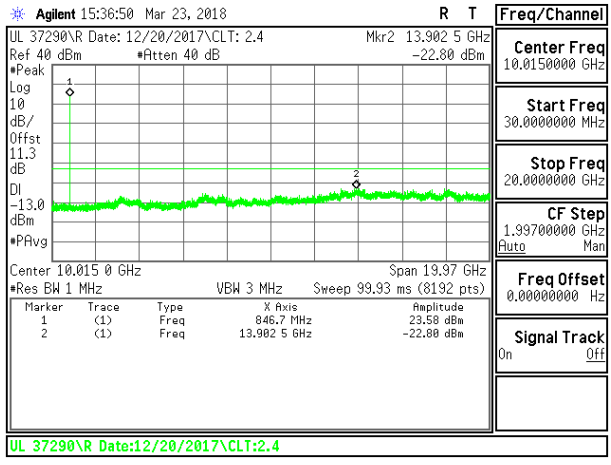
Rel99



BAND 5 Rel99 LOW Channel



BAND 5 Rel99 MID Channel



BAND 5 Rel99 HIGH Channel