



# TEST REPORT

**Report Number. :** 13094578-E1V1

**Applicant :** Samsung Electronics Co., Ltd.  
129 Samsung-Ro, Yeongtong-Gu,  
Suwon-Si, Gyeonggi-Do, 16677, Korea

**Model :** SM-N770F and SM-N770F/DS

**FCC ID :** A3LSMN770F

**EUT Description :** GSM/WCDMA/LTE Phablet with BT, DTS/UNII a/b/g/n/ac, NFC, ANT+ and WPT

**Test Standard(s) :** FCC CFR47 PART 22 SUBPART H  
FCC CFR47 PART 24 SUBPART E  
FCC CFR47 PART 27 SUBPART F, H, L, and M  
FCC CFR47 PART 15 SUBPART B

**Date Of Issue:**  
NOVEMBER 26, 2019

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	11/19/2019	Initial Review	Dan Corona
V2	11/26/2019	Updated Section 1, 2, 5, 8, and 9	Dan Corona

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# 1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	SM-N770F AND SM-N770F/DS
FCC ID	A3LSMN770F
EUT Description	GSM/WCDMA/LTE Phablet with BT, DTS/UNII a/b/g/n/ac, NFC, ANT+ and WPT
Serial Number	R38M90838FF, R38M908391A CONDUCTED, R38MA039RJA RADIATED
Date Tested	OCTOBER 29, 2019 to NOVEMBER 19, 2019
Applicable Standards	FCC CFR 47 PART 22H, 24E, 27F,H,L, and M
Test Results	Complies

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

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

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

Approved & Released For UL Verification Services Inc. By:  	Reviewed By:  
Dan Corona Operations Leader Consumer Technology Division UL Verification Services Inc.	Steven Tran Project Engineer Consumer Technology Division UL Verification Services Inc.

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.26:2015, ANSI C63.4:2014, TIA-603-E, FCC CFR 47 Part 2, Part 22, Part 24, Part 27, FCC KDB 971168 D01 v3r1, and KDB 412172 D01 Determining ERP and EIRP v01r01.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, 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	47658 Kato Rd
<input type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D	<input checked="" type="checkbox"/> Chamber I
<input type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E	<input checked="" type="checkbox"/> Chamber J
<input type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F	<input type="checkbox"/> Chamber K
	<input type="checkbox"/> Chamber G	<input type="checkbox"/> Chamber L
	<input type="checkbox"/> Chamber H	<input type="checkbox"/> Chamber M

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code: 2324A.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

## 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

#### RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\text{Field Strength (dBuV/m)} = \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Preamp Gain (dB)}$$
$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

#### MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\text{Final Voltage (dBuV)} = \text{Measured Voltage (dBuV)} + \text{Cable Loss (dB)} + \text{Limiter Factor (dB)} + \text{LISN Insertion Loss.}$$
$$36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$$

### 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	3.64 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 Phablet with BT, DTS/UNII a/b/g/n/ac, NFC, ANT+ and WPT. The model SM-N770F was used for final testing and is representative of the test results in this report.

### 5.2. MAXIMUM OUTPUT POWER

#### ERP/EIRP LIMIT

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

#### EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015 Sub-Clause 5.2.7/ TIA-603-E Clause 2.2.17

KDB 971168 D01 Section 5.8

KDB 412172 D01

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

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

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

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

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

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

The transmitter has a maximum average radiated ERP / EIRP output powers as follows:

**GSM MODES**

<b>Part 22 850MHz</b>					
Frequency range (MHz)	Modulation	Radiated ERP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
824.2-848.8	GPRS	27.46	0.5572	246.30	246KGXW
	EGPRS	22.93	0.1963	247.70	248KG7W
<b>Part 24 1900MHz</b>					
Frequency range (MHz)	Modulation	Radiated EIRP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
1850.2-1909.8	GPRS	26.76	0.4742	243.00	243KGXW
	EGPRS	24.97	0.3141	228.60	229KG7W

**WCDMA MODES**

<b>Part 22 Band 5</b>					
Frequency range (MHz)	Modulation	Radiated ERP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
826.4-846.6	REL 99	18.34	0.0682	4150	4M15F9W
	HSDPA	17.22	0.0527	4160	4M16F9W
<b>Part 24 Band 2</b>					
Frequency range (MHz)	Modulation	Radiated EIRP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
1852.4-1907.6	REL 99	21.36	0.1368	4160	4M16F9W
	HSDPA	20.31	0.1074	4170	4M17F9W
<b>Part 27 Band 4</b>					
Frequency range (MHz)	Modulation	Radiated EIRP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
1712.4-1752.6	REL 99	20.76	0.1191	4170	4M17F9W
	HSDPA	19.79	0.0953	4160	4M16F9W

**LTE BAND 2**

Part 24							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated EIRP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
1.4	QPSK	1850.7	1909.3	21.75	0.1496	1090	1M09G7W
	16QAM			20.97	0.1250	1080	1M08D7W
3.0	QPSK	1851.5	1908.5	22.75	0.1884	2680	2M68G7W
	16QAM			22.00	0.1585	2700	2M70D7W
5.0	QPSK	1852.5	1907.5	22.04	0.1600	4510	4M51G7W
	16QAM			21.38	0.1374	4520	4M52D7W
10.0	QPSK	1855.0	1905.0	22.16	0.1644	8970	8M97G7W
	16QAM			21.36	0.1368	8980	8M98D7W
15.0	QPSK	1857.5	1902.5	22.41	0.1742	13400	13M4G7W
	16QAM			21.77	0.1503	13420	13M4D7W
20.0	QPSK	1860.0	1900.0	22.79	0.1901	17930	17M9G7W
	16QAM			21.90	0.1549	17900	17M9D7W

**LTE BAND 4**

Part 27							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated EIRP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
1.4	QPSK	1710.7	1754.3	20.47	0.1114	1090	1M09G7W
	16QAM			19.94	0.0986	1080	1M08D7W
3.0	QPSK	1711.5	1753.5	20.73	0.1183	2690	2M69G7W
	16QAM			20.01	0.1002	2690	2M69D7W
5.0	QPSK	1712.5	1752.5	20.54	0.1132	4510	4M51G7W
	16QAM			19.83	0.0962	4510	4M51D7W
10.0	QPSK	1715.0	1750.0	20.51	0.1125	8970	8M97G7W
	16QAM			19.65	0.0923	8970	8M97D7W
15.0	QPSK	1717.5	1747.5	19.68	0.0929	13400	13M4G7W
	16QAM			19.17	0.0826	13420	13M4D7W
20.0	QPSK	1720.0	1745.0	20.25	0.1059	17890	17M9G7W
	16QAM			19.54	0.0899	17900	17M9D7W

**LTE BAND 5**

Part 22H							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated ERP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
1.4	QPSK	824.7	848.3	19.22	0.0836	1090	1M09G7W
	16QAM			18.24	0.0667	1090	1M09D7W
3.0	QPSK	825.5	847.5	19.05	0.0804	2700	2M70G7W
	16QAM			18.14	0.0652	2690	2M69D7W
5.0	QPSK	826.5	846.5	19.03	0.0800	4500	4M50G7W
	16QAM			18.25	0.0668	4510	4M51D7W
10.0	QPSK	829.0	844.0	18.92	0.0780	8970	8M97G7W
	16QAM			18.06	0.0640	8940	8M94D7W

**LTE BAND 12**

Part 27							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated ERP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
1.4	QPSK	699.7	715.3	17.90	0.0617	1090	1M09G7W
	16QAM			17.02	0.0504	1090	1M09D7W
3.0	QPSK	700.5	714.5	18.25	0.0668	2700	2M70G7W
	16QAM			17.42	0.0552	2710	2M71D7W
5.0	QPSK	701.5	713.5	18.07	0.0641	4520	4M52G7W
	16QAM			17.23	0.0528	4510	4M51D7W
10.0	QPSK	704.0	711.0	17.87	0.0612	8990	8M99G7W
	16QAM			16.92	0.0492	8990	8M99D7W

**LTE BAND 13**

Part 27							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated ERP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
5.0	QPSK	779.5	784.5	15.99	0.0397	4510	4M51G7W
	16QAM			15.14	0.0327	4510	4M51D7W
10.0	QPSK	782.0	782.0	16.02	0.0400	8960	8M96G7W
	16QAM			15.10	0.0324	8970	8M97D7W

**LTE BAND 41 (FCC)**

Part 27							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated EIRP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
5.0	QPSK	2498.5	2687.5	21.86	0.1535	4510	4M51G7W
	16QAM			21.23	0.1327	4520	4M52D7W
10.0	QPSK	2501.0	2685.0	21.91	0.1552	8980	8M98G7W
	16QAM			21.28	0.1343	8980	8M98D7W
15.0	QPSK	2503.5	2682.5	21.97	0.1574	13450	13M5G7W
	16QAM			21.46	0.1400	13440	13M4D7W
20.0	QPSK	2506.0	2680.0	21.54	0.1426	17960	18M0G7W
	16QAM			21.05	0.1274	17990	18M0D7W

**LTE BAND 66**

Part 27							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated ERP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
1.4	QPSK	1710.7	1779.3	19.95	0.0989	1090	1M09G7W
	16QAM			19.24	0.0839	1090	1M09D7W
3.0	QPSK	1711.5	1778.5	20.09	0.1021	2690	2M69G7W
	16QAM			19.32	0.0855	2690	2M69D7W
5.0	QPSK	1712.5	1777.5	19.90	0.0977	4520	4M52G7W
	16QAM			19.32	0.0855	4510	4M51D7W
10.0	QPSK	1715.0	1775.0	20.17	0.1040	8980	8M98G7W
	16QAM			19.45	0.0881	9000	9M00D7W
15.0	QPSK	1717.5	1772.5	20.36	0.1086	13440	13M4G7W
	16QAM			19.60	0.0912	13390	13M4D7W
20.0	QPSK	1720.0	1770.0	20.63	0.1156	17930	17M9G7W
	16QAM			19.94	0.0986	17880	17M9D7W

### 5.3. SOFTWARE AND FIRMWARE

The test utility software used during testing was N770F.001.

### 5.4. MAXIMUM ANTENNA GAIN

Please see table below:

LTE Bands	Antenna Gain (dBi)
GSM850, 824-849MHz	-4.97
GSM1900, 1850-1910MHz	-3.84
WCDMA Band 2, 1850-1910 MHz	-3.84
WCDMA Band 4, 1710-1755 MHz	-2.64
WCDMA Band 5, 824-849 MHz	-4.97
LTE BAND 2, 1850 - 1910 MHz	-3.84
LTE BAND 4, 1710 - 1755 MHz	-2.64
LTE BAND 5, 824-849 MHz	-4.97
LTE BAND 12, 699 - 716 MHz	-4.24
LTE BAND 13, 777 - 787 MHz	-6.82
LTE BAND 17, 704 - 716 MHz	-4.24
LTE BAND 41 (FCC), 2496 - 2690 MHz	-3.62
LTE BAND 66, 1710 - 1780 MHz	-2.64

## 5.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports LTE Bands of:

Band 2, Band 4, Band 5, Band 12, Band 13, Band 17, Band 41 and Band 66.

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. 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. It was determined that X-Axis for 2500, 800 and 700MHz. And Y-Axis for 1900 and 1700MHz with AC/DC Adapter and headset was worst-case orientation.

All radios that can be transmitted simultaneously have been evaluated for radiated for all possible combinations of transmission and found to be in compliance.

Radiated spurious emissions were investigated below 30MHz, 30MHz-1GHz, and above 1GHz. There were no emissions found below 30MHz and 30MHz-1GHz.

LTE Band 17 (704 - 716 MHz, 5/10 MHz bandwidth) is covered by LTE Band 12 (699 - 716 MHz) because it is a subset of LTE band 12 and they have same output power and channel bandwidth.

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

### **For check the Part15B receiver mode (Appendix A):**

For GSM850/ LTE B12 / LTE B13, the spurious emissions was investigated in three orthogonal orientations X, Y and Z. It was determined that X orientation was worst-case orientation.

In addition, LTE Band 17 (Frequency range: 734-746 MHz) is covered by LTE Band 12 (Frequency range: 729-746 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	EP-TA800	R37M3531XX1SE3	N/A
Earphone	Samsung	N/A	N/A	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	N/A
2	Antenna Port	1	EUT	Shielded	0.1m	N/A
3	RF In/Out	1	Communication Test Set	Shielded	1m	N/A

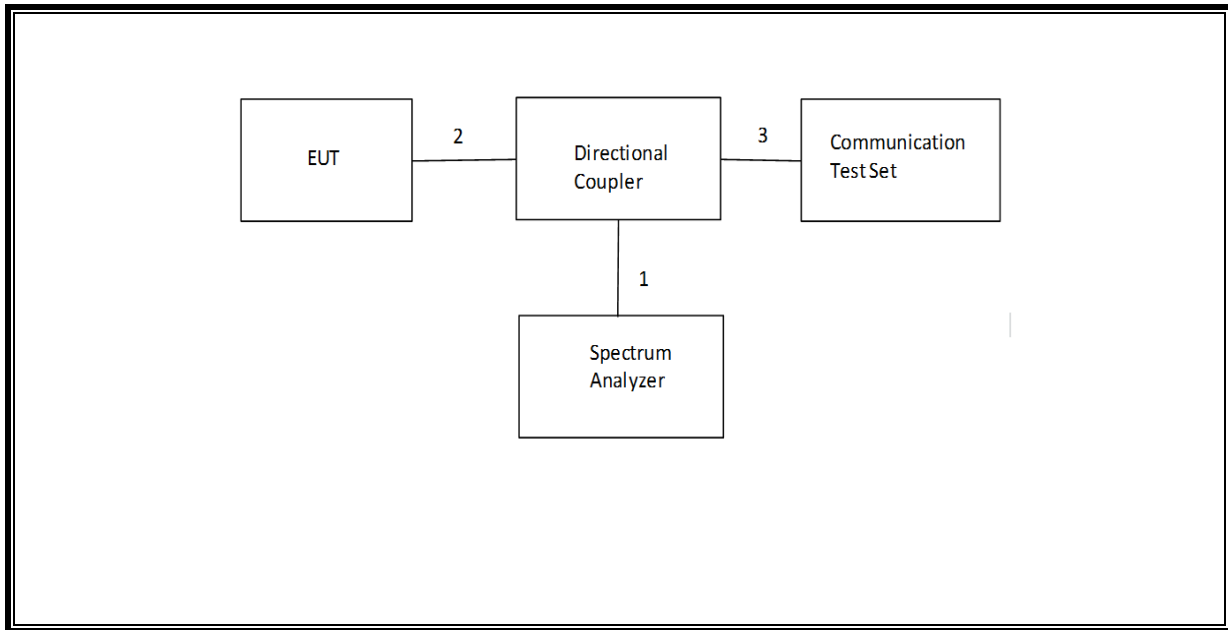
### I/O CABLES (RF Radiated Test)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	AC Adapter	Un-shielded	1.2	No
2	Earphone	1	USB	Un-shielded	1	No
3	RF In/out	1	Communication Test Set	Un-shielded	2	No

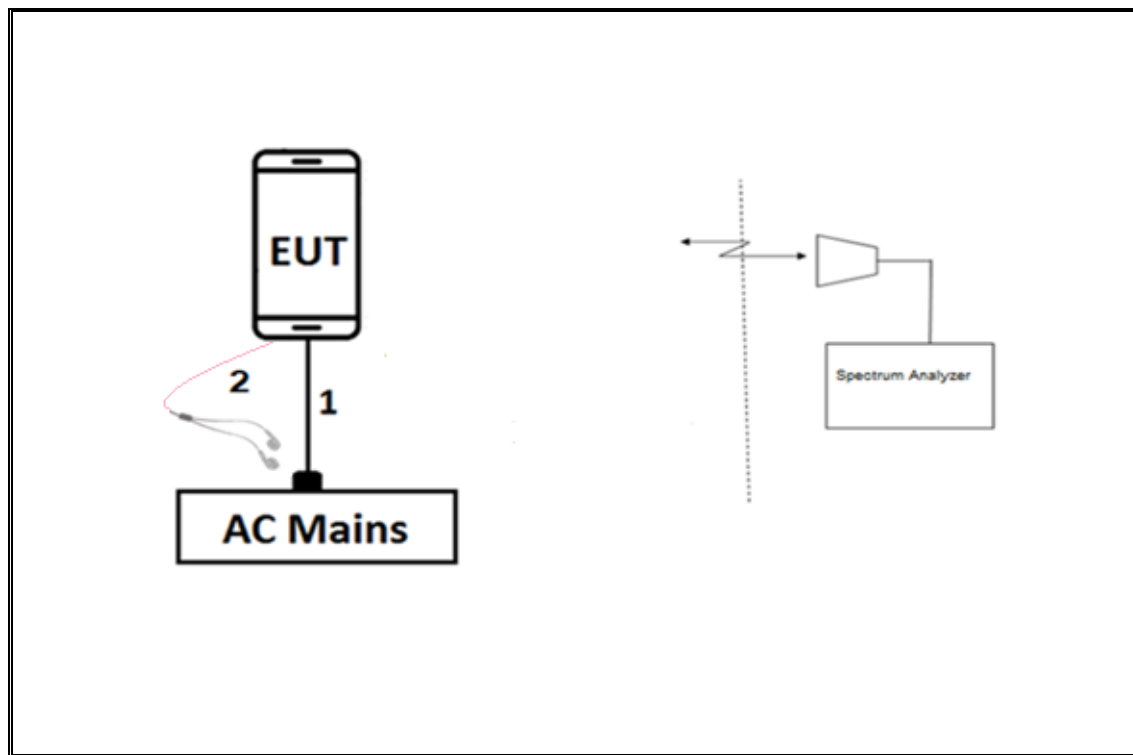
### TEST SETUP

The EUT is continuously communicated to the call box during the tests

**CONDUCTED TEST SETUP DIAGRAM**



**RADIATED TEST SETUP DIAGRAM**



## 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	12/31/19	12/31/18
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM50114	T1852	07/20/20	08/20/19
Highpass Filter, 4GHz	Micro-Tronics	HPM13351	T1240	05/22/20	06/22/19
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T344	05/07/20	05/07/19
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T862	06/05/20	06/05/19
Ant., Horn 18 - 26.5 GHz	ARA	MWH-1826/B	T448	03/26/20	03/26/19
Hybrid Antenna	SunAR rf motion	JB3	T899	08/23/20	08/23/19
Hybrid Antenna	SunAR rf motion	JB3	PRE0184971	11/13/19	11/13/18
RF Amplifier	MITEQ	AFS42-00101800-25-S-42	171460	08/24/20	08/24/19
RF Amplifier	AMPLICAL	AMP1G18-35	T1571	05/28/20	05/28/19
Pre-Amp 1-26.5 GHz	Agilent	8449B	T404	03/23/20	03/23/19
RF Amplifier 9KHz – 1GHz	SONOMA INSTR	310	PRE0180175	05/29/20	05/29/19
RF Amplifier 9KHz – 1GHz	SONOMA INSTR	310	PRE0180174	06/01/20	06/01/19
Directional Coupler	KRYTAR	T922	PRE0078321	07/05/20	07/05/19
Wideband Communication Test Set, Call Box	R&S	CMW500	T979	02/20/20	02/20/19
Wideband Communication Test Set, Call Box	R&S	CMW500	T1871	02/18/20	02/18/19
Wideband Communication Test Set, Call Box	R&S	CMW500	T959	02/16/20	02/16/19
Chamber, Environmental	Thermotron	SE-600-10-10	T80	05/07/20	11/07/19
Spectrum Analyzer	Agilent (Keysight) Technologies	E4440A	T200	01/28/20	01/28/19
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179367	05/16/20	05/16/19
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179376	02/14/20	02/14/19
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T908	01/23/20	01/23/19
DC power supply, 8 V @ 3 A or 15 V @ 2 A	Agilent / HP	E3610A	None	CNR	CNR
DC power supply 15V	Sorensen	XT15-4	T465	CNR	CNR
Power Meter	Keysight	N1911A	T1269	01/31/20	01/31/19
Power Sensor	Keysight	N1921A	T1227	02/05/20	02/05/19
UL AUTOMATION SOFTWARE					
CLT Software	UL	UL RF	Ver 7.6, November 11, 2017		
Power Measurement Software	UL	UL RF	Ver 2.7, 2019		
Radiated test software	UL	UL RF	Ver 9.5 June 15, 2019		

### NOTES:

\*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

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

### 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 <b>Signal Off</b> 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 <b>Signal On</b> to turn on the signal and change settings

**RESULT**

**7.1.1. GSM850**

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**GPRS (GMSK) - Coding Scheme: CS1**

Band	Ch No.	Freq. (MHz)	Power			
			1 slot	2 slots	3 slots	4 slots
850.0	128	824.2	32.4	30.3	28.8	27.7
	190	836.6	32.3	29.8	28.6	27.6
	251	848.8	32.4	29.9	28.8	27.4

**EGPRS (8PSK) - Coding Scheme: MCS5**

Band	Ch No.	Freq. (MHz)	Power			
			1 slot	2 slots	3 slots	4 slots
850.0	128	824.2	27.1	25.1	23.9	22.8
	190	836.6	26.9	24.8	23.7	22.4
	251	848.8	27.0	24.9	23.7	22.4

**7.1.2. GSM1900**

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**GPRS (GMSK) - Coding Scheme: CS1**

Band	Ch No.	Freq. (MHz)	Power			
			1 slot	2 slots	3 slots	4 slots
1900.0	512	1850.2	29.2	26.9	24.1	23.3
	661	1880.0	29.4	27.0	24.1	23.3
	810	1909.8	29.7	27.1	24.2	23.4

**EGPRS (8PSK) - Coding Scheme: MCS5**

Band	Ch No.	Freq. (MHz)	Power			
			1 slot	2 slots	3 slots	4 slots
1900.0	512	1850.2	26.0	23.7	22.0	20.3
	661	1880.0	26.0	23.6	22.0	20.2
	810	1909.8	26.1	24.0	22.1	20.2

## 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  $\geq$  RBW  $\geq$  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
	$\beta_c/\beta_d$	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			
	Bc	2/15	12/15	15/15	15/15
	Bd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	$\beta_c/\beta_d$	2/15	12/15	15/8	15/4
	Bhs	4/15	24/15	30/15	30/15
MPR (dB)	0	0	0.5	0.5	
HSDPA Specific Settings	D <sub>ACK</sub>	8			
	D <sub>NAK</sub>	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
Ahs= $\beta_{hs}/\beta_c$	30/15				

**HSPA (HSDPA & HSUPA)**

The following 5 Sub-tests were completed according to Release 9 procedures in section 5.2 of 3GPP TS34.121. 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
	$\beta_c$	11/15	6/15	15/15	2/15	15/15
	$\beta_d$	15/15	15/15	9/15	15/15	0
	$\beta_{ec}$	209/225	12/15	30/15	2/15	5/15
	$\beta_c/\beta_d$	11/15	6/15	15/9	2/15	-
	$\beta_{hs}$	22/15	12/15	30/15	4/15	5/15
$\beta_{ed}$	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				
	A <sub>hs</sub> = $\beta_{hs}/\beta_c$	30/15				
HSUPA Specific Settings	E-DPDCCH	6	8	8	5	0
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	12
	ETFCl (from 34.121 Table C.11.1.3)	75	67	92	71	67
	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	

**DUAL CARRIER HSDPA (DC-HSDPA (REL 8, CAT 24))**

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

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

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload ( $N_{INF}$ )	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

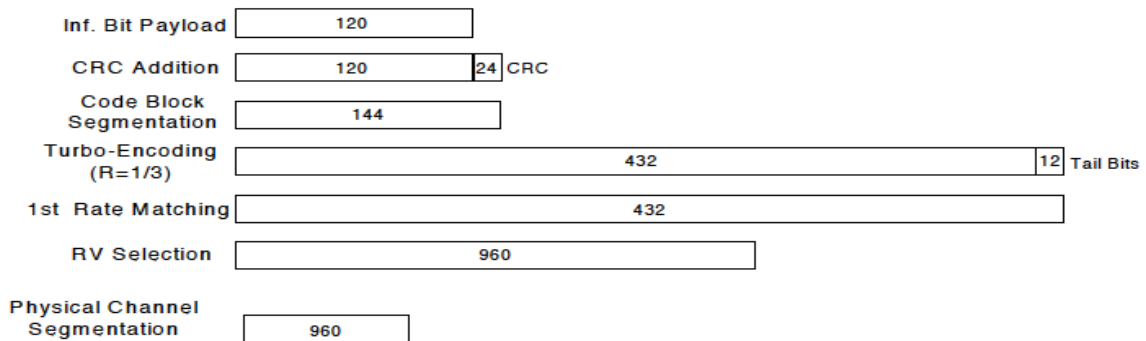


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 8 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

Mode	HSDPA	HSDPA	HSDPA	HSDPA
Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode			
	Test Mode 1			
	Rel99 RMC			
	12.2kbps RMC			
	HSDPA FRC			
	H-Set 1			
	Power Control Algorithm			
	Algorithm2			
	$\beta_c$	2/15	11/15	15/15
$\beta_d$	15/15	15/15	8/15	4/15
$\beta_d$ (SF)	64			
$\beta_c/\beta_d$	2/15	12/15	15/8	15/4
$\beta_{hs}$	4/15	24/15	30/15	30/15
MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK			
	8			
	DNAK			
	8			
	DCQI			
	8			
	Ack-Nack Repetition factor			
3				
CQI Feedback				
4ms				
CQI Repetition Factor				
2				
Ahs = $\beta_{hs} / \beta_c$				
30/15				

**HSPA+**

The following 1 Sub-test was completed according to Release 9 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

**Table C.11.1.4:  $\beta$  values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM**

Sub-test	$\beta_c$ (Note3)	$\beta_d$	$\beta_{HS}$ (Note1)	$\beta_{ec}$	$\beta_{ed}$ (2xSF2) (Note 4)	$\beta_{ed}$ (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	$\beta_{ed1}$ : 30/15 $\beta_{ed2}$ : 30/15	$\beta_{ed3}$ : 24/15 $\beta_{ed4}$ : 24/15	3.5	2.5	14	105	105
Note 1: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 30/15$ 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 $\beta_c$ is set to 1 and $\beta_d = 0$ by default. Note 4: $\beta_{ed}$ 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 BAND5

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Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Average	
						(dBm)	
W-CDMA Band 5 (850MHz)	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	24.3	
			4183	836.6	N/A	24.0	
			4233	846.6	N/A	24.0	
	HSDPA	Subtest 1	4132	826.4	0	23.4	
			4183	836.6	0	23.1	
			4233	846.6	0	23.0	
		Subtest 2	4132	826.4	0.0	22.4	
			4183	836.6	0.0	22.1	
			4233	846.6	0.0	22.0	
		Subtest 3	4132	826.4	0.5	22.4	
			4183	836.6	0.5	22.1	
			4233	846.6	0.5	21.9	
		Subtest 4	4132	826.4	0.5	21.4	
			4183	836.6	0.5	21.0	
			4233	846.6	0.5	21.0	
		HSUPA	Subtest 1	4132	826.4	0.0	21.3
				4183	836.6	0.0	21.0
				4233	846.6	0.0	20.9
	Subtest 2		4132	826.4	2.0	19.2	
			4183	836.6	2.0	18.9	
			4233	846.6	2.0	18.8	
	Subtest 3		4132	826.4	1.0	22.0	
			4183	836.6	1.0	21.9	
			4233	846.6	1.0	21.9	
	Subtest 4		4132	826.4	2.0	19.3	
			4183	836.6	2.0	18.9	
			4233	846.6	2.0	18.9	
	Subtest 5		4132	826.4	0.0	22.5	
			4183	836.6	0.0	22.7	
			4233	846.6	0.0	23.0	
	DC-HSDPA	Subtest 1	4132	826.4	0.0	23.4	
			4183	836.6	0.0	23.1	
			4233	846.6	0.0	23.0	
		Subtest 2	4132	826.4	0.0	22.4	
			4183	836.6	0.0	22.1	
			4233	846.6	0.0	22.0	
		Subtest 3	4132	826.4	0.5	21.3	
			4183	836.6	0.5	21.0	
			4233	846.6	0.5	21.0	
		Subtest 4	4132	826.4	0.5	21.4	
			4183	836.6	0.5	21.0	
			4233	846.6	0.5	21.0	

7.2.2. WCDMA BAND2

<b>ID:</b>	38206	<b>Date:</b>	10/29/19
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Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Average	
						(dBm)	
W-CDMA Band 2 (1900MHz)	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	24.6	
			9400	1880.0	N/A	24.6	
			9538	1907.6	N/A	24.6	
	HSDPA	Subtest 1	9262	1852.4	0	23.5	
			9400	1880.0	0	23.4	
			9538	1907.6	0	23.6	
		Subtest 2	9262	1852.4	0	22.5	
			9400	1880.0	0	22.4	
			9538	1907.6	0	22.6	
		Subtest 3	9262	1852.4	0.5	22.5	
			9400	1880.0	0.5	22.5	
			9538	1907.6	0.5	22.5	
		Subtest 4	9262	1852.4	0.5	21.6	
			9400	1880.0	0.5	21.5	
			9538	1907.6	0.5	21.6	
		HSUPA	Subtest 1	9262	1852.4	0	21.4
				9400	1880.0	0	21.4
				9538	1907.6	0	21.5
	Subtest 2		9262	1852.4	2	19.3	
			9400	1880.0	2	19.3	
			9538	1907.6	2	19.4	
	Subtest 3		9262	1852.4	1	22.3	
			9400	1880.0	1	22.3	
			9538	1907.6	1	22.5	
	Subtest 4		9262	1852.4	2	19.2	
			9400	1880.0	2	19.3	
			9538	1907.6	2	19.4	
	Subtest 5		9262	1852.4	0	22.4	
			9400	1880.0	0	22.4	
			9538	1907.6	0	22.5	
	DC-HSDPA	Subtest 1	9262	1852.4	0	23.5	
			9400	1880.0	0	23.4	
			9538	1907.6	0	23.6	
		Subtest 2	9262	1852.4	0	22.5	
			9400	1880.0	0	22.4	
			9538	1907.6	0	22.6	
		Subtest 3	9262	1852.4	0.5	21.7	
			9400	1880.0	0.5	21.5	
			9538	1907.6	0.5	21.6	
		Subtest 4	9262	1852.4	0.5	21.6	
			9400	1880.0	0.5	21.5	
			9538	1907.6	0.5	21.6	

7.2.3. WCDMA BAND4

<b>ID:</b>	38206	<b>Date:</b>	10/29/19
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Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Average	
						(dBm)	
W-CDMA Band 4 (1900MHz)	Rel 99	RMC, 12.2 kbps	1312	1712.4	N/A	24.7	
			1413	1732.6	N/A	24.8	
			1513	1752.6	N/A	25.0	
	HSDPA	Subtest 1	1312	1712.4	0	23.7	
			1413	1732.6	0	23.8	
			1513	1752.6	0	24.0	
		Subtest 2	1312	1712.4	0	22.7	
			1413	1732.6	0	22.7	
			1513	1752.6	0	23.0	
		Subtest 3	1312	1712.4	0.5	22.7	
			1413	1732.6	0.5	22.7	
			1513	1752.6	0.5	23.0	
		Subtest 4	1312	1712.4	0.5	21.8	
			1413	1732.6	0.5	21.8	
			1513	1752.6	0.5	22.1	
		HSUPA	Subtest 1	1312	1712.4	0	21.7
				1413	1732.6	0	21.7
				1513	1752.6	0	22.0
	Subtest 2		1312	1712.4	2	19.6	
			1413	1732.6	2	19.6	
			1513	1752.6	2	19.9	
	Subtest 3		1312	1712.4	1	22.5	
			1413	1732.6	1	22.5	
			1513	1752.6	1	22.5	
	Subtest 4		1312	1712.4	2	19.6	
			1413	1732.6	2	19.6	
			1513	1752.6	2	19.9	
	Subtest 5		1312	1712.4	0	22.6	
			1413	1732.6	0	22.7	
			1513	1752.6	0	23.0	
	DC-HSDPA	Subtest 1	1312	1712.4	0	23.7	
			1413	1732.6	0	23.9	
			1513	1752.6	0	24.0	
		Subtest 2	1312	1712.4	0	22.7	
			1413	1732.6	0	22.7	
			1513	1752.6	0	23.0	
		Subtest 3	1312	1712.4	0.5	21.7	
			1413	1732.6	0.5	21.9	
			1513	1752.6	0.5	22.0	
		Subtest 4	1312	1712.4	0.5	21.8	
			1413	1732.6	0.5	21.8	
			1513	1752.6	0.5	22.1	

### 7.3. LTE

#### CONDUCTED OUTPUT POWER MEASUREMENT PROCEDURE

All LTE bands conducted average power is obtained from the CMW500 telecommunication test set. The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

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

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

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS\_01".3

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

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks ( $N_{RB}$ )	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 <sup>1</sup>	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
...					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

**RESULTS**

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

**7.3.1. LTE 2**

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**OUTPUT POWER FOR LTE BAND 2 (1.4 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				18607 1850.7 MHz	18900 1880.0 MHz	19193 1909.3 MHz
1.4	QPSK	1	0	25.5	25.0	24.8
		1	2	25.5	24.9	24.8
		1	5	25.4	24.9	24.7
		3	0	25.4	24.8	24.7
		3	1	25.4	24.8	24.7
		3	2	25.4	24.8	24.7
	16QAM	6	0	24.5	23.9	23.8
		1	0	24.5	24.0	23.8
		1	2	24.4	24.0	24.0
		1	5	24.5	23.9	23.8
		3	0	24.3	23.9	23.7
		3	1	24.4	23.9	23.7
	64QAM	3	2	24.4	23.8	23.7
		6	0	23.5	23.0	22.7
		1	0	23.2	23.1	22.9
		1	2	23.3	23.2	22.8
		1	5	23.5	22.9	22.6
		3	0	23.4	22.9	22.7
		3	1	23.4	22.9	22.7
		3	2	23.4	22.9	22.7
		6	0	22.5	21.9	21.8

**OUTPUT POWER FOR LTE BAND 2 (3.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				18615 1851.5 MHz	18900 1880.0 MHz	19185 1908.5 MHz
3.0	QPSK	1	0	25.4	24.9	25.1
		1	7	25.5	24.9	25.2
		1	14	25.5	24.8	25.1
		8	0	24.4	23.9	24.1
		8	4	24.5	23.9	24.1
		8	7	24.5	23.9	24.1
	16QAM	15	0	24.4	23.9	24.0
		1	0	24.5	24.1	24.1
		1	7	24.5	24.1	24.0
		1	14	24.5	24.1	24.1
		8	0	23.4	22.9	23.1
		8	4	23.4	22.9	23.1
	64QAM	8	7	23.4	22.9	23.1
		15	0	23.4	22.9	23.0
		1	0	23.5	23.0	23.2
		1	7	23.5	23.1	23.1
		1	14	23.4	23.1	23.2
		8	0	22.4	21.9	22.0
		8	4	22.4	21.9	22.0
		8	7	22.4	21.9	22.0
		15	0	22.5	21.8	22.0

**OUTPUT POWER FOR LTE BAND 2 (5.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				18625	18900	19175
				1852.5 MHz	1880.0 MHz	1907.5 MHz
5.0	QPSK	1	0	25.3	24.8	24.9
		1	12	25.5	24.8	25.0
		1	24	25.5	24.9	25.1
		12	0	24.4	23.9	24.1
		12	6	24.4	23.9	24.0
		12	11	24.4	23.8	24.0
		25	0	24.4	23.9	24.0
	16QAM	1	0	24.5	24.0	24.4
		1	12	24.5	24.1	24.4
		1	24	24.5	24.1	24.3
		12	0	23.4	22.8	23.1
		12	6	23.4	22.9	23.0
		12	11	23.4	22.9	23.0
		25	0	23.4	22.8	23.0
	64QAM	1	0	23.3	23.0	23.3
		1	12	23.3	23.0	23.3
		1	24	23.4	23.1	23.2
		12	0	22.4	21.8	22.1
		12	6	22.3	21.8	22.0
		12	11	22.4	21.8	22.0
25		0	22.4	21.8	22.0	

**OUTPUT POWER FOR LTE BAND 2 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				18650	18900	19150
				1855.0 MHz	1880.0 MHz	1905.0 MHz
10.0	QPSK	1	0	25.3	24.8	24.9
		1	24	25.4	24.9	25.0
		1	49	25.5	24.8	25.1
		25	0	24.3	23.8	23.9
		25	12	24.3	23.8	24.0
		25	24	24.3	23.8	24.0
		50	0	24.3	23.9	24.0
	16QAM	1	0	24.5	23.9	23.9
		1	24	24.5	24.0	24.1
		1	49	24.5	23.9	24.1
		25	0	23.3	22.8	23.0
		25	12	23.3	22.9	23.0
		25	24	23.3	22.9	23.0
		50	0	23.3	22.9	23.0
	64QAM	1	0	23.5	23.0	23.1
		1	24	23.5	23.1	23.2
		1	49	23.5	23.1	23.3
		25	0	22.3	21.8	21.9
		25	12	22.3	21.9	22.0
		25	24	22.3	21.8	22.0
50		0	22.3	21.8	22.0	

**OUTPUT POWER FOR LTE BAND 2 (15.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				18675	18900	19125
				1857.5 MHz	1880.0 MHz	1902.5 MHz
15.0	QPSK	1	0	25.2	24.7	24.8
		1	37	<b>25.4</b>	24.8	24.8
		1	74	25.2	24.8	24.9
		36	0	24.4	23.9	24.0
		36	16	24.5	23.9	24.0
		36	35	24.5	23.9	24.0
		75	0	24.5	24.0	24.1
	16QAM	1	0	24.3	24.0	23.9
		1	37	24.4	24.1	24.0
		1	74	<b>24.4</b>	24.0	24.0
		36	0	23.3	22.9	23.0
		36	16	23.4	22.9	23.0
		36	35	23.3	22.8	23.0
		75	0	23.4	22.9	23.0
	64QAM	1	0	23.3	22.9	23.0
		1	37	<b>23.3</b>	23.0	23.2
		1	74	23.3	22.9	23.2
		36	0	22.3	21.8	21.9
		36	16	22.3	21.9	21.9
		36	35	22.3	21.8	21.9
		75	0	22.4	21.8	22.0

**OUTPUT POWER FOR LTE BAND 2 (20.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				18700	18900	19100
				1860.0 MHz	1880.0 MHz	1900.0 MHz
20.0	QPSK	1	0	24.9	24.7	24.8
		1	49	25.1	24.7	24.7
		1	99	<b>25.2</b>	24.8	24.7
		50	0	24.0	23.6	23.6
		50	24	24.1	23.7	23.7
		50	49	24.1	23.7	23.7
		100	0	24.1	23.7	23.8
	16QAM	1	0	24.2	23.7	23.7
		1	49	24.3	23.9	23.8
		1	99	<b>24.4</b>	23.8	23.9
		50	0	23.0	22.6	22.6
		50	24	23.1	22.7	22.7
		50	49	23.1	22.7	22.7
		100	0	23.2	22.7	22.8
	64QAM	1	0	23.1	22.7	22.7
		1	49	23.2	22.9	22.8
		1	99	<b>23.2</b>	22.2	22.9
		50	0	22.1	21.6	21.6
		50	24	22.2	21.7	21.7
		50	49	22.1	21.7	21.7
		100	0	22.2	21.8	21.8

**7.3.2. LTE 4**

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**OUTPUT POWER FOR LTE BAND 4 (1.4 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				19957 1710.7 MHz	20175 1732.5 MHz	20393 1754.3 MHz
1.4	QPSK	1	0	24.1	24.1	24.4
		1	2	24.1	24.0	24.3
		1	5	24.0	24.0	24.3
		3	0	23.9	23.9	24.3
		3	1	23.9	23.9	24.3
		3	2	24.0	24.0	24.2
	16QAM	6	0	23.0	23.0	23.3
		1	0	23.2	23.3	23.5
		1	2	23.2	23.2	23.4
		1	5	23.1	23.2	23.4
		3	0	22.9	22.9	23.4
		3	1	22.9	23.0	23.4
	64QAM	3	2	23.0	23.0	23.3
		6	0	22.1	21.9	22.4
		1	0	22.3	22.2	22.4
		1	2	22.3	22.1	22.3
		1	5	22.2	22.0	22.4
		3	0	22.2	22.0	22.3
		3	1	22.2	22.0	22.3
		3	2	22.2	21.9	22.3
		6	0	21.0	21.1	21.3

**OUTPUT POWER FOR LTE BAND 4 (3.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				19965 1711.5 MHz	20175 1732.5 MHz	20385 1753.5 MHz
3.0	QPSK	1	0	24.0	24.0	24.3
		1	7	24.0	23.9	24.3
		1	14	24.0	23.9	24.3
		8	0	23.0	23.0	23.3
		8	4	23.0	23.0	23.2
		8	7	22.9	23.0	23.2
	16QAM	15	0	23.0	22.9	23.2
		1	0	23.1	23.3	23.5
		1	7	23.0	23.1	23.6
		1	14	23.1	23.1	23.6
		8	0	22.0	22.0	22.3
		8	4	22.0	22.0	22.3
	64QAM	8	7	22.0	22.0	22.3
		15	0	21.9	22.0	22.3
		1	0	22.1	22.2	22.4
		1	7	22.0	22.2	22.5
		1	14	22.0	22.2	22.5
		8	0	20.9	21.0	21.3
		8	4	20.9	21.0	21.3
		8	7	20.9	20.9	21.3
		15	0	21.0	21.0	21.3

**OUTPUT POWER FOR LTE BAND 4 (5.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				19975	20175	20375
				1712.5 MHz	1732.5 MHz	1752.5 MHz
5.0	QPSK	1	0	23.8	23.9	24.1
		1	12	23.8	23.9	24.2
		1	24	23.9	24.0	24.2
		12	0	22.9	23.0	23.3
		12	6	22.9	23.0	23.2
		12	11	22.9	22.9	23.2
		25	0	22.9	23.0	23.2
	16QAM	1	0	23.1	23.2	23.5
		1	12	23.1	23.2	23.5
		1	24	23.2	23.2	23.6
		12	0	22.0	22.0	22.4
		12	6	21.9	22.0	22.3
		12	11	21.9	22.0	22.3
		25	0	21.9	22.0	22.3
	64QAM	1	0	22.1	22.0	22.3
		1	12	22.2	22.1	22.3
		1	24	22.2	22.1	22.3
		12	0	20.9	21.0	21.2
		12	6	20.9	21.0	21.2
		12	11	20.9	21.0	21.2
25		0	20.9	21.0	21.2	

**OUTPUT POWER FOR LTE BAND 4 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				20000	20175	20350
				1715.0 MHz	1732.5 MHz	1750.0 MHz
10.0	QPSK	1	0	23.8	23.9	24.0
		1	24	23.9	24.0	24.1
		1	49	23.9	23.9	24.1
		25	0	22.9	22.9	23.1
		25	12	22.9	23.0	23.2
		25	24	22.9	23.0	23.1
		50	0	23.0	23.0	23.2
	16QAM	1	0	22.9	23.3	23.4
		1	24	23.1	23.3	23.5
		1	49	23.1	23.2	23.5
		25	0	21.9	22.0	22.1
		25	12	22.0	22.0	22.2
		25	24	22.0	22.0	22.2
		50	0	22.0	22.0	22.2
	64QAM	1	0	22.1	22.2	22.3
		1	24	22.2	22.3	22.4
		1	49	22.1	22.3	22.5
		25	0	20.9	20.9	21.1
		25	12	21.0	21.0	21.2
		25	24	21.0	21.0	21.1
50		0	21.0	21.0	21.2	

**OUTPUT POWER FOR LTE BAND 4 (15.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				20025	20175	20325
				1717.5 MHz	1732.5 MHz	1747.5 MHz
15.0	QPSK	1	0	23.8	23.9	24.0
		1	37	23.9	24.0	24.1
		1	74	23.8	24.0	24.1
		36	0	22.9	23.1	23.3
		36	16	23.0	23.1	23.3
		36	35	22.9	23.0	23.2
		75	0	23.0	23.1	23.3
	16QAM	1	0	22.9	23.2	23.2
		1	37	23.1	23.2	23.4
		1	74	23.1	23.2	23.4
		36	0	21.9	22.0	22.2
		36	16	22.0	22.0	22.2
		36	35	21.9	22.0	22.2
		75	0	22.0	22.1	22.3
	64QAM	1	0	21.9	22.0	22.3
		1	37	22.1	22.0	22.5
		1	74	22.0	22.0	22.4
		36	0	20.9	21.0	21.3
		36	16	20.9	21.0	21.3
		36	35	20.9	21.0	21.3
		75	0	21.0	21.0	21.3

**OUTPUT POWER FOR LTE BAND 4 (20.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				20050	20175	20300
				1720.0 MHz	1732.5 MHz	1745.0 MHz
20.0	QPSK	1	0	23.7	23.8	24.0
		1	49	23.9	24.0	24.2
		1	99	23.8	23.9	24.1
		50	0	22.8	22.9	23.1
		50	24	22.9	23.0	23.2
		50	49	22.9	22.9	23.2
		100	0	22.9	23.0	23.2
	16QAM	1	0	23.0	23.1	23.1
		1	49	23.2	23.2	23.3
		1	99	23.1	23.1	23.3
		50	0	21.8	21.9	22.1
		50	24	21.9	22.0	22.2
		50	49	21.8	21.9	22.2
		100	0	21.9	22.0	22.2
	64QAM	1	0	22.1	22.1	22.2
		1	49	22.3	22.2	22.3
		1	99	22.2	22.2	22.3
		50	0	20.8	20.9	21.1
		50	24	20.9	21.0	21.2
		50	49	20.9	21.0	21.2
		100	0	20.9	21.0	21.2

**7.3.3. LTE 5**

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**OUTPUT POWER FOR LTE BAND 5 (1.4 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				20407 824.7 MHz	20525 836.5 MHz	20643 848.3 MHz
1.4	QPSK	1	0	25.2	24.9	24.7
		1	2	25.1	24.9	24.7
		1	5	25.1	24.8	24.7
		3	0	25.0	24.8	24.5
		3	1	25.0	24.8	24.6
		3	2	25.0	24.8	24.6
	16QAM	6	0	24.1	23.9	23.8
		1	0	24.5	24.1	24.0
		1	2	24.4	23.9	23.9
		1	5	24.4	23.9	23.9
		3	0	24.0	23.9	23.5
		3	1	24.0	23.9	23.5
	64QAM	3	2	24.1	23.8	23.6
		6	0	23.1	22.9	22.7
		1	0	23.0	23.5	22.9
		1	2	22.8	22.6	22.8
		1	5	23.2	22.8	22.9
		3	0	23.0	22.7	22.6
		3	1	23.0	22.8	22.6
		3	2	23.0	22.8	22.6
		6	0	22.1	21.9	21.7

**OUTPUT POWER FOR LTE BAND 5 (3.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				20415 825.5 MHz	20525 836.5 MHz	20635 847.5 MHz
3.0	QPSK	1	0	25.2	24.9	24.6
		1	7	25.2	24.8	24.7
		1	14	25.1	24.8	24.7
		8	0	24.1	23.8	23.7
		8	4	24.1	23.8	23.7
		8	7	24.1	23.8	23.7
	16QAM	15	0	24.1	23.8	23.6
		1	0	24.4	24.0	23.9
		1	7	24.4	24.0	23.9
		1	14	24.3	23.9	23.9
		8	0	23.1	22.8	22.6
		8	4	23.1	22.8	22.6
	64QAM	8	7	23.1	22.8	22.6
		15	0	23.1	22.8	22.6
		1	0	23.2	22.8	22.9
		1	7	23.3	22.8	22.9
		1	14	23.1	22.8	22.9
		8	0	22.1	21.8	21.6
		8	4	22.1	21.8	21.6
		8	7	22.1	21.8	21.6
		15	0	22.0	21.8	21.6



7.3.4. LTE 12

<b>ID:</b>	38515	<b>Date:</b>	10/29/19
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**OUTPUT POWER FOR LTE BAND 12 (1.4 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power			
				Conducted Average (dBm)			
				23017 699.7 MHz	23095 707.5 MHz	23173 715.3 MHz	
1.4	QPSK	1	0	23.7	23.7	23.6	
		1	2	<b>23.7</b>	23.6	23.6	
		1	5	23.7	23.7	23.6	
		3	0	23.7	23.5	23.5	
		3	1	23.7	23.5	23.5	
		3	2	23.6	23.6	23.5	
	16QAM	6	0	22.7	22.6	22.6	
		1	0	22.9	<b>23.0</b>	22.8	
		1	2	22.8	22.9	22.7	
		1	5	22.8	22.8	22.8	
		3	0	22.7	22.6	22.6	
		3	1	22.7	22.6	22.6	
	64QAM	3	2	22.7	22.7	22.5	
		6	0	21.8	21.6	21.7	
		1	0	21.7	21.7	22.0	
		1	2	21.8	21.7	<b>22.2</b>	
		1	5	21.7	21.5	21.7	
		3	0	21.8	21.6	21.6	
			3	1	21.8	21.6	21.6
			3	2	21.8	21.6	21.5
			6	0	20.9	20.7	20.6

**OUTPUT POWER FOR LTE BAND 12 (3.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power			
				Conducted Average (dBm)			
				23025 700.5 MHz	23095 707.5 MHz	23165 714.5 MHz	
3.0	QPSK	1	0	23.7	23.8	23.8	
		1	7	23.8	<b>23.9</b>	23.8	
		1	14	23.8	23.9	23.8	
		8	0	22.8	22.8	22.8	
		8	4	22.9	22.8	22.7	
		8	7	22.9	22.8	22.7	
	16QAM	15	0	22.8	22.8	22.7	
		1	0	23.1	23.0	22.9	
		1	7	<b>23.2</b>	23.1	22.9	
		1	14	23.1	23.2	22.9	
		8	0	21.8	21.8	21.8	
		8	4	21.8	21.8	21.7	
	64QAM	8	7	21.8	21.9	21.8	
		15	0	21.9	21.9	21.7	
		1	0	<b>22.1</b>	22.1	21.6	
		1	7	22.0	21.9	21.7	
		1	14	21.9	22.0	21.8	
		8	0	21.0	20.6	20.6	
			8	4	21.0	20.5	20.6
			8	7	21.0	20.5	20.6
			15	0	20.9	20.5	20.5

**OUTPUT POWER FOR LTE BAND 12 (5.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				23035 701.5 MHz	23095 707.5 MHz	23155 713.5 MHz
5.0	QPSK	1	0	23.8	23.6	23.7
		1	12	<b>24.0</b>	23.8	23.9
		1	24	23.9	23.8	23.9
		12	0	22.8	22.8	22.8
		12	6	22.8	22.8	22.8
		12	11	22.8	22.8	22.8
	16QAM	25	0	22.8	22.8	22.8
		1	0	23.2	23.0	23.1
		1	12	<b>23.3</b>	23.0	23.1
		1	24	23.2	23.0	23.0
		12	0	21.8	21.8	21.8
		12	6	21.9	21.8	21.8
	64QAM	12	11	21.8	21.7	21.8
		25	0	21.8	21.7	21.8
		1	0	21.9	21.9	22.0
		1	12	22.0	22.1	22.1
		1	24	<b>22.2</b>	22.1	22.1
		12	0	21.0	20.9	20.9
		12	6	21.0	20.8	20.8
		12	11	21.0	20.8	20.8
25	0	20.9	20.7	20.8		

**OUTPUT POWER FOR LTE BAND 12 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				23060 704.0 MHz	23095 707.5 MHz	23130 711.0 MHz
10.0	QPSK	1	0	23.8	23.7	23.8
		1	24	23.9	23.8	<b>24.0</b>
		1	49	23.9	23.9	23.9
		25	0	22.8	22.8	22.9
		25	12	22.9	22.9	22.9
		25	24	22.9	22.8	22.9
	16QAM	50	0	22.9	22.9	22.9
		1	0	22.8	22.9	22.9
		1	24	23.0	23.0	23.0
		1	49	23.0	<b>23.0</b>	23.0
		25	0	21.8	21.8	21.8
		25	12	21.8	21.9	21.9
	64QAM	25	24	21.8	21.8	21.9
		50	0	21.8	21.9	21.9
		1	0	21.9	21.9	22.0
		1	24	22.0	22.0	22.1
		1	49	22.0	22.0	<b>22.2</b>
		25	0	20.8	20.9	20.8
		25	12	20.8	20.9	20.9
		25	24	20.8	20.9	20.8
50	0	20.9	20.9	20.8		

**7.3.5. LTE 13**

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**OUTPUT POWER FOR LTE BAND 13 (5.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				23205 779.5 MHz	23230 782.0 MHz	23255 784.5 MHz
5.0	QPSK	1	0	23.0	23.1	22.9
		1	12	23.1	23.2	23.0
		1	24	23.1	<b>23.3</b>	23.0
		12	0	22.1	22.3	22.0
		12	6	22.1	22.3	22.0
		12	11	22.1	22.2	21.9
		25	0	22.1	22.2	22.0
	16QAM	1	0	22.1	22.4	22.1
		1	12	22.2	<b>22.5</b>	22.2
		1	24	22.3	22.4	22.3
		12	0	21.0	21.4	21.0
		12	6	21.1	21.3	20.9
		12	11	21.0	21.3	20.9
		25	0	21.0	21.2	20.9
	64QAM	1	0	20.1	21.1	20.4
		1	12	20.3	21.2	20.5
		1	24	20.3	<b>21.2</b>	20.4
		12	0	19.3	20.1	19.1
		12	6	19.3	20.1	19.1
		12	11	19.2	20.1	19.1
		25	0	19.2	20.0	19.1

**OUTPUT POWER FOR LTE BAND 13 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				N/A	23230 782.0 MHz	N/A
10.0	QPSK	1	0		23.0	
		1	24		23.2	
		1	49		<b>23.2</b>	
		25	0		22.1	
		25	12		22.2	
		25	24		22.2	
		50	0		22.3	
	16QAM	1	0		22.2	
		1	24		<b>22.4</b>	
		1	49		22.4	
		25	0		21.2	
		25	12		21.2	
		25	24		21.2	
		50	0		21.2	
	64QAM	1	0		21.3	
		1	24		<b>21.5</b>	
		1	49		21.5	
		25	0		20.2	
		25	12		20.3	
		25	24		20.3	
		50	0		20.2	

7.3.6. LTE 17

<b>ID:</b>	308205	<b>Date:</b>	10/30/19
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**OUTPUT POWER FOR LTE BAND 17 (5.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				23755 706.5 MHz	23790 710.0 MHz	23825 713.5 MHz
5.0	QPSK	1	0	23.5	23.6	23.4
		1	12	23.6	23.7	23.5
		1	24	23.6	<b>23.7</b>	23.5
		12	0	22.6	22.6	22.5
		12	6	22.6	22.6	22.5
		12	11	22.6	22.6	22.5
		25	0	22.6	22.6	22.5
	16QAM	1	0	22.7	23.0	22.8
		1	12	22.7	23.1	22.8
		1	24	22.8	<b>23.1</b>	22.8
		12	0	21.6	21.7	21.5
		12	6	21.6	21.6	21.5
		12	11	21.6	21.6	21.4
		25	0	21.6	21.6	21.5
	64QAM	1	0	21.6	21.7	21.8
		1	12	21.7	21.8	<b>21.8</b>
		1	24	21.7	21.8	21.7
		12	0	20.5	20.6	20.5
		12	6	20.5	20.6	20.5
		12	11	20.5	20.6	20.5
		25	0	20.5	20.5	20.4

**OUTPUT POWER FOR LTE BAND 17 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				23780 709.0 MHz	23790 710.0 MHz	23800 711.0 MHz
10.0	QPSK	1	0	23.5	23.5	23.5
		1	24	23.6	23.6	<b>23.6</b>
		1	49	23.6	23.6	23.6
		25	0	22.5	22.5	22.5
		25	12	22.6	22.6	22.6
		25	24	22.5	22.6	22.5
		50	0	22.5	22.6	22.6
	16QAM	1	0	22.5	22.6	22.8
		1	24	22.6	22.7	<b>23.0</b>
		1	49	22.5	22.6	22.9
		25	0	21.5	21.5	21.5
		25	12	21.5	21.6	21.6
		25	24	21.5	21.6	21.5
		50	0	21.5	21.5	21.5
	64QAM	1	0	21.5	21.7	21.7
		1	24	21.6	21.8	<b>21.8</b>
		1	49	21.5	21.8	21.8
		25	0	20.5	20.5	20.5
		25	12	20.5	20.6	20.5
		25	24	20.5	20.5	20.5
		50	0	20.5	20.5	20.5

**7.3.7. LTE 41 (FCC)**

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				39675	40620	41565
				2498.5 MHz	2593.0 MHz	2687.5 MHz
5.0	QPSK	1	0	22.9	23.4	22.8
		1	12	23.0	<b>23.5</b>	22.9
		1	24	22.9	23.4	22.8
		12	0	22.5	23.0	22.4
		12	6	22.5	22.9	22.4
		12	11	22.5	22.9	22.4
		25	0	22.5	22.9	22.4
	16QAM	1	0	22.3	22.9	22.2
		1	12	22.4	<b>23.0</b>	22.3
		1	24	22.3	23.0	22.3
		12	0	21.5	21.9	21.3
		12	6	21.5	21.9	21.3
		12	11	21.5	21.9	21.3
		25	0	21.5	21.9	21.4
	64QAM	1	0	20.9	21.4	20.8
		1	12	21.0	<b>21.5</b>	20.8
		1	24	20.9	21.5	20.8
		12	0	20.5	21.0	20.4
		12	6	20.5	20.9	20.3
		12	11	20.5	20.9	20.3
25		0	20.4	20.9	20.4	

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				39700	40620	41540
				2501.0 MHz	2593.0 MHz	2685.0 MHz
10.0	QPSK	1	0	22.9	23.4	22.8
		1	24	22.9	<b>23.5</b>	23.0
		1	49	22.9	23.5	22.9
		25	0	22.4	22.9	22.4
		25	12	22.5	23.0	22.4
		25	24	22.4	23.0	22.4
		50	0	22.5	23.0	22.4
	16QAM	1	0	22.5	22.9	22.3
		1	24	22.6	23.0	22.4
		1	49	22.6	<b>23.0</b>	22.3
		25	0	21.4	21.9	21.4
		25	12	21.4	22.0	21.4
		25	24	21.4	21.9	21.4
		50	0	21.5	22.0	21.4
	64QAM	1	0	20.8	21.5	20.7
		1	24	20.9	<b>21.6</b>	20.8
		1	49	20.9	21.6	20.8
		25	0	20.3	20.9	20.4
		25	12	20.4	21.0	20.4
		25	24	20.4	21.0	20.4
50		0	20.4	21.0	20.4	

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				39725	40620	41515
				2503.5 MHz	2593.0 MHz	2682.5 MHz
15.0	QPSK	1	0	22.7	23.4	22.8
		1	37	22.9	<b>23.6</b>	22.9
		1	74	22.8	23.6	22.8
		36	0	22.3	23.0	22.4
		36	16	22.4	23.0	22.4
		36	35	22.3	23.0	22.4
		75	0	22.4	23.1	22.5
	16QAM	1	0	22.5	23.1	22.0
		1	37	22.5	<b>23.3</b>	22.5
		1	74	22.1	23.0	22.0
		36	0	21.4	21.9	21.4
		36	16	21.4	22.0	21.4
		36	35	21.3	22.0	21.4
		75	0	21.3	22.0	21.5
	64QAM	1	0	20.6	21.5	20.6
		1	37	21.2	<b>21.7</b>	20.8
		1	74	20.7	21.6	20.7
		36	0	20.3	21.0	20.4
		36	16	20.3	21.0	20.4
		36	35	20.3	21.0	20.4
		75	0	20.3	21.0	20.4

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				39750	40620	41490
				2506.0 MHz	2593.0 MHz	2680.0 MHz
20.0	QPSK	1	0	23.1	23.4	23.3
		1	49	23.2	<b>23.6</b>	23.4
		1	99	23.3	23.5	23.5
		50	0	22.6	22.9	22.8
		50	24	22.7	23.0	22.9
		50	49	22.7	23.0	22.9
		100	0	22.8	23.1	23.0
	16QAM	1	0	22.3	22.9	22.8
		1	49	23.0	<b>23.3</b>	22.8
		1	99	22.5	23.1	22.9
		50	0	21.6	22.0	21.8
		50	24	21.7	22.0	21.9
		50	49	21.7	22.0	21.9
		100	0	21.8	22.1	22.0
	64QAM	1	0	21.1	21.6	<b>21.7</b>
		1	49	21.3	21.4	21.3
		1	99	21.4	21.6	21.4
		50	0	20.6	20.9	20.8
		50	24	20.7	21.0	20.9
		50	49	20.7	21.0	20.8
		100	0	20.7	21.1	20.9

**7.3.8. LTE 66**

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**OUTPUT POWER FOR LTE BAND 66 (1.4 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				131979 1710.7 MHz	132322 1745.0 MHz	132665 1779.3 MHz
1.4	QPSK	1	0	23.6	23.6	<b>23.8</b>
		1	2	23.6	23.6	23.7
		1	5	23.6	23.6	23.7
		3	0	23.5	23.5	23.7
		3	1	23.6	23.6	23.7
		3	2	23.5	23.5	23.7
	16QAM	6	0	22.6	22.5	22.7
		1	0	22.8	22.6	22.9
		1	2	22.7	22.6	<b>22.9</b>
		1	5	22.7	22.6	22.9
		3	0	22.6	22.7	22.7
		3	1	22.6	22.7	22.8
	64QAM	3	2	22.5	22.6	22.7
		6	0	21.7	21.7	21.8
		1	0	21.7	21.7	21.7
		1	2	21.6	21.6	21.7
		1	5	21.7	21.8	<b>21.8</b>
		3	0	21.5	21.6	21.8
		3	1	21.6	21.6	21.8
		3	2	21.6	21.6	21.8
		6	0	20.6	20.6	20.7

**OUTPUT POWER FOR LTE BAND 66 (3.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				131987 1711.5 MHz	132322 1745.0 MHz	132657 1778.5 MHz
3.0	QPSK	1	0	23.6	23.6	23.4
		1	7	23.6	23.6	23.5
		1	14	23.6	<b>23.6</b>	23.5
		8	0	22.6	22.6	22.4
		8	4	22.5	22.5	22.4
		8	7	22.6	22.5	22.4
	16QAM	15	0	22.6	22.6	22.4
		1	0	22.6	22.6	22.6
		1	7	22.6	<b>22.8</b>	22.6
		1	14	22.6	22.7	22.6
		8	0	21.6	21.6	21.5
		8	4	21.6	21.6	21.5
	64QAM	8	7	21.6	21.6	21.5
		15	0	21.6	21.6	21.5
		1	0	<b>22.0</b>	21.7	21.2
		1	7	21.9	21.9	21.5
		1	14	21.7	21.9	21.5
		8	0	20.6	20.6	20.5
		8	4	20.6	20.6	20.5
		8	7	20.6	20.6	20.5
		15	0	20.6	20.5	20.5

**OUTPUT POWER FOR LTE BAND 66 (5.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				131997 1712.5 MHz	132322 1745.0 MHz	132647 1777.5 MHz
5.0	QPSK	1	0	23.4	23.4	23.3
		1	12	23.5	23.5	23.4
		1	24	23.5	<b>23.6</b>	23.5
		12	0	22.5	22.6	22.5
		12	6	22.5	22.6	22.5
		12	11	22.5	22.6	22.5
		25	0	22.5	22.6	22.5
	16QAM	1	0	22.7	22.9	22.9
		1	12	22.8	<b>23.0</b>	22.9
		1	24	22.8	22.9	22.9
		12	0	21.6	21.6	21.5
		12	6	21.6	21.6	21.5
		12	11	21.6	21.6	21.5
		25	0	21.6	21.6	21.5
	64QAM	1	0	21.7	21.6	21.6
		1	12	21.8	21.7	21.7
		1	24	<b>21.9</b>	21.8	21.8
		12	0	20.6	20.6	20.5
		12	6	20.6	20.6	20.5
		12	11	20.6	20.6	20.5
25		0	20.6	20.6	20.5	

**OUTPUT POWER FOR LTE BAND 66 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				132022 1715.0 MHz	132322 1745.0 MHz	132622 1775.0 MHz
10.0	QPSK	1	0	23.4	23.4	23.3
		1	24	23.5	23.5	23.4
		1	49	23.5	<b>23.6</b>	23.5
		25	0	22.4	22.5	22.4
		25	12	22.5	22.6	22.5
		25	24	22.5	22.6	22.5
		50	0	22.6	22.6	22.5
	16QAM	1	0	22.6	22.5	22.5
		1	24	22.8	22.7	22.6
		1	49	<b>22.9</b>	22.7	22.7
		25	0	21.5	21.5	21.5
		25	12	21.6	21.6	21.5
		25	24	21.6	21.6	21.5
		50	0	21.6	21.6	21.6
	64QAM	1	0	21.7	21.7	21.6
		1	24	21.8	21.8	21.7
		1	49	<b>21.9</b>	21.9	21.7
		25	0	20.5	20.6	20.5
		25	12	20.6	20.7	20.6
		25	24	20.6	20.7	20.6
50		0	20.6	20.6	20.6	

**OUTPUT POWER FOR LTE BAND 66 (15.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				132047 1717.5 MHz	132322 1745.0 MHz	132597 1772.5 MHz
15.0	QPSK	1	0	23.2	23.4	23.4
		1	37	23.4	<b>23.6</b>	23.5
		1	74	23.4	23.6	23.5
		36	0	22.5	22.6	22.6
		36	16	22.5	22.6	22.6
		36	35	22.5	22.6	22.5
	75	0	22.5	22.7	22.6	
	16QAM	1	0	22.5	22.6	22.6
		1	37	22.7	22.7	22.7
		1	74	22.7	<b>22.8</b>	22.7
		36	0	21.5	21.5	21.5
		36	16	21.5	21.6	21.5
	64QAM	36	35	21.5	21.6	21.5
		75	0	21.5	21.7	21.6
		1	0	21.6	21.6	21.5
		1	37	21.8	21.8	21.7
		1	74	<b>21.8</b>	21.8	21.7
		36	0	20.4	20.5	20.5
36		16	20.4	20.6	20.5	
36	35	20.4	20.6	20.5		
75	0	20.5	20.7	20.6		

**OUTPUT POWER FOR LTE BAND 66 (20.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				132072 1720.0 MHz	132322 1745.0 MHz	132572 1770.0 MHz
20.0	QPSK	1	0	23.0	23.2	23.2
		1	49	23.1	23.3	23.4
		1	99	23.2	23.4	<b>23.4</b>
		50	0	22.1	22.2	22.3
		50	24	22.2	22.4	22.4
		50	49	22.2	22.4	22.4
	100	0	22.3	22.4	22.4	
	16QAM	1	0	22.3	22.3	22.4
		1	49	22.6	22.5	22.5
		1	99	22.6	22.6	<b>22.6</b>
		50	0	21.2	21.2	21.3
		50	24	21.3	21.4	21.4
	64QAM	50	49	21.3	21.4	21.4
		100	0	21.3	21.4	21.4
		1	0	21.3	21.3	21.4
		1	49	21.5	21.5	21.5
		1	99	21.6	<b>21.6</b>	21.6
		50	0	20.2	20.3	20.3
		50	24	20.3	20.4	20.4
		50	49	20.3	20.4	20.4
100		0	20.3	20.4	20.4	

## 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.

**RESULTS**

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

<b>ID:</b>	38206	<b>Date:</b>	10/29/19
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**GSM**

Band	Modulation	Channel	f(MHz)	99% BW (KHz)	-26dB BW (KHz)
GSM850	GPRS	190	836.6	246.3	315.2
	EGPRS			247.7	308.7
GSM1900	GPRS	661	1880.0	243.0	319.9
	EGPRS			228.6	301.7

**WCDMA**

Band	Modulation	Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
BAND5	REL 99	4408	836.6	4.15	4.72
	HSDPA			4.16	4.72
BAND2	REL 99	9800	1880.0	4.16	4.74
	HSDPA			4.17	4.75
BAND4	REL 99	1638	1732.6	4.17	4.72
	HSDPA			4.16	4.72

**LTE2**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 2	1.4 MHz, QPSK	6/0	1880.0	1.09	1.31
	1.4 MHz, 16QAM			1.08	1.3
	1.4 MHz, 64QAM			1.09	1.3
	3 MHz, QPSK	15/0		2.68	3.08
	3 MHz, 16QAM			2.7	3.07
	3 MHz, 64QAM			2.7	3.08
	5 MHz, QPSK	25/0		4.51	5.34
	5 MHz, 16QAM			4.52	5.17
	5 MHz, 64QAM			4.51	5.37
	10 MHz, QPSK	50/0		8.97	10.21
	10 MHz, 16QAM			8.98	10.3
	10 MHz, 64QAM			8.99	10.39
	15 MHz, QPSK	75/0		13.4	15.08
	15 MHz, 16QAM			13.42	14.89
	15 MHz, 64QAM			13.48	15.21
	20 MHz, QPSK	100/0		17.93	19.72
20 MHz, 16QAM	17.9		19.77		
20 MHz, 64QAM	17.96		19.92		

**LTE4**

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	1.09	1.3
	1.4 MHz, 16QAM			1.08	1.32
	1.4 MHz, 64QAM			1.09	1.3
	3 MHz, QPSK	15/0		2.69	3.12
	3 MHz, 16QAM			2.69	3.02
	3 MHz, 64QAM			2.68	3.06
	5 MHz, QPSK	25/0		4.51	5.18
	5 MHz, 16QAM			4.51	5.35
	5 MHz, 64QAM			4.51	5.28
	10 MHz, QPSK	50/0		8.97	10.11
	10 MHz, 16QAM			8.97	10.29
	10 MHz, 64QAM			8.99	10.43
	15 MHz, QPSK	75/0		13.4	14.93
	15 MHz, 16QAM			13.42	14.77
	15 MHz, 64QAM			13.46	15.23
	20 MHz, QPSK	100/0		17.89	19.76
20 MHz, 16QAM	17.9		19.67		
20 MHz, 64QAM	17.94		19.79		

**LTE5**

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	1.09	1.29
	1.4 MHz, 16QAM			1.09	1.32
	1.4 MHz, 64QAM			1.09	1.3
	3 MHz, QPSK	15/0		2.7	2.7
	3 MHz, 16QAM			2.69	2.69
	3 MHz, 64QAM			2.71	3.1
	5 MHz, QPSK	25/0		4.5	5.21
	5 MHz, 16QAM			4.51	5.35
	5 MHz, 64QAM			4.51	5.22
	10 MHz, QPSK	50/0		8.97	9.96
	10 MHz, 16QAM			8.94	10.12
	10 MHz, 64QAM			8.97	10.44

**LTE12**

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	1.09	1.28
	1.4 MHz, 16QAM			1.09	1.32
	1.4 MHz, 64QAM			1.09	1.3
	3 MHz, QPSK	15/0		2.7	3.1
	3 MHz, 16QAM			2.71	3.1
	3 MHz, 64QAM			2.71	3.09
	5 MHz, QPSK	25/0		4.52	5.34
	5 MHz, 16QAM			4.51	5.29
	5 MHz, 64QAM			4.51	5.22
	10 MHz, QPSK	50/0		8.99	10.25
	10 MHz, 16QAM			8.99	10.26
	10 MHz, 64QAM			8.99	10.44

**LTE13**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 13	5 MHz, QPSK	25/0	782.0	4.51	5.24
	5 MHz, 16QAM			4.51	5.25
	5 MHz, 64QAM			4.5	5.29
	10 MHz, QPSK	50/0		8.96	10.26
	10 MHz, 16QAM			8.97	10.19
	10 MHz, 64QAM			8.97	10.4

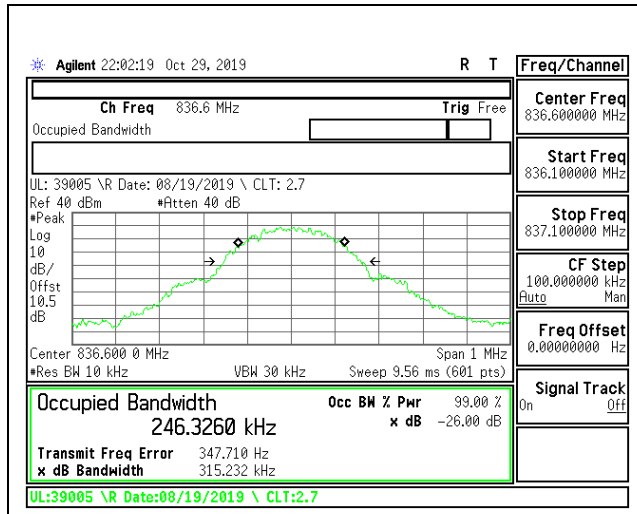
**LTE41 (FCC)**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 41	5 MHz, QPSK	25/0	2593.0	4.51	5.29
	5 MHz, 16QAM			4.52	5.25
	5 MHz, 64QAM			4.5	5.23
	10 MHz, QPSK	50/0		8.98	10.19
	10 MHz, 16QAM			8.98	10.28
	10 MHz, 64QAM			8.98	10.35
	15 MHz, QPSK	75/0		13.45	15.01
	15 MHz, 16QAM			13.44	15.05
	15 MHz, 64QAM			13.46	15.28
	20 MHz, QPSK	100/0		17.96	19.72
	20 MHz, 16QAM			17.99	19.95
	20 MHz, 64QAM			17.93	19.98

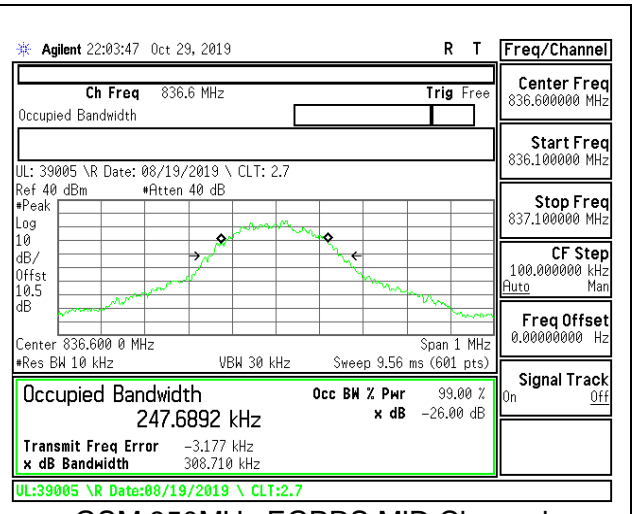
**LTE66**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 66	1.4 MHz, QPSK	6/0	1745.0	1.09	1.28
	1.4 MHz, 16QAM			1.09	1.29
	1.4 MHz, 64QAM			1.09	1.32
	3 MHz, QPSK	15/0		2.69	3.06
	3 MHz, 16QAM			2.69	3.01
	3 MHz, 64QAM			2.71	3.12
	5 MHz, QPSK	25/0		4.52	5.35
	5 MHz, 16QAM			4.51	5.24
	5 MHz, 64QAM			4.51	5.29
	10 MHz, QPSK	50/0		8.98	10.34
	10 MHz, 16QAM			9.00	10.33
	10 MHz, 64QAM			9.02	10.52
	15 MHz, QPSK	75/0		13.44	15.13
	15 MHz, 16QAM			13.39	14.84
	15 MHz, 64QAM			13.46	15.04
	20 MHz, QPSK	100/0		17.93	19.81
	20 MHz, 16QAM			17.88	19.47
	20 MHz, 64QAM			17.94	19.88

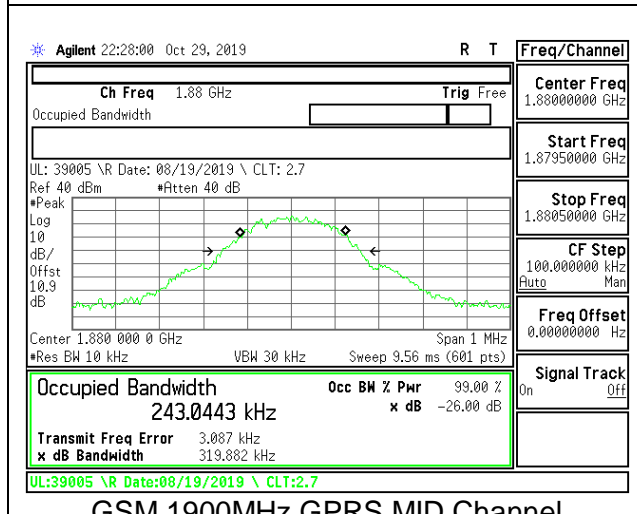
8.1.1 GSM



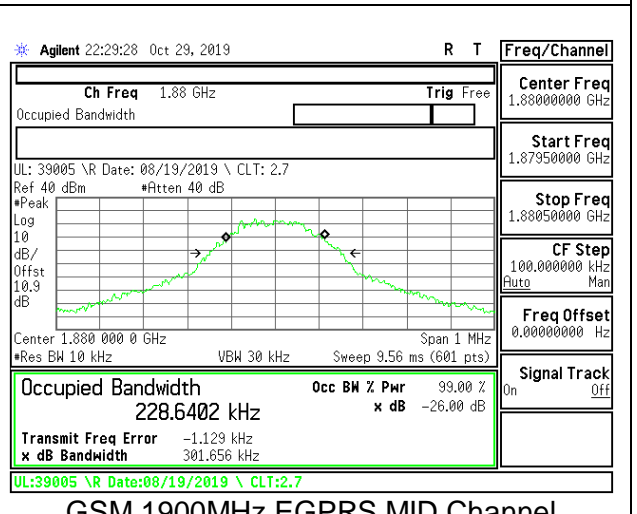
GSM 850MHz GPRS MID Channel



GSM 850MHz EGPRS MID Channel

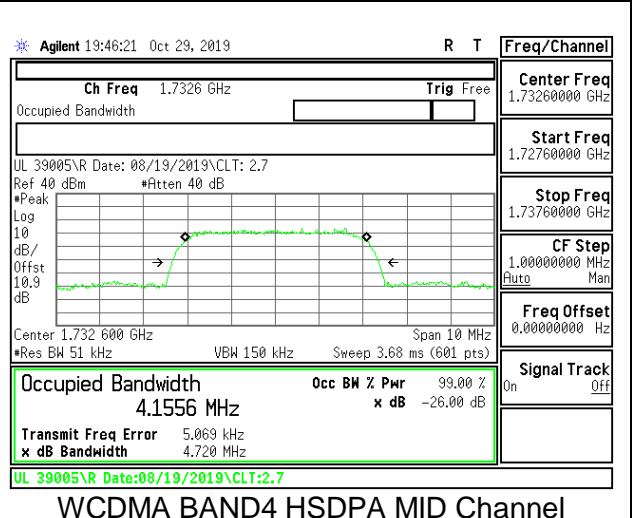
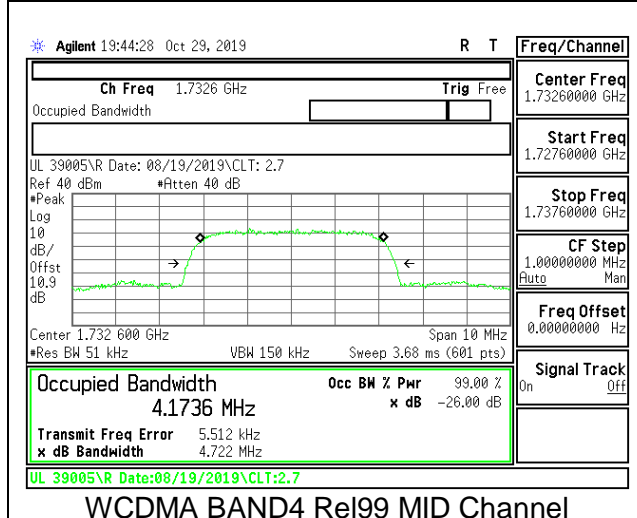
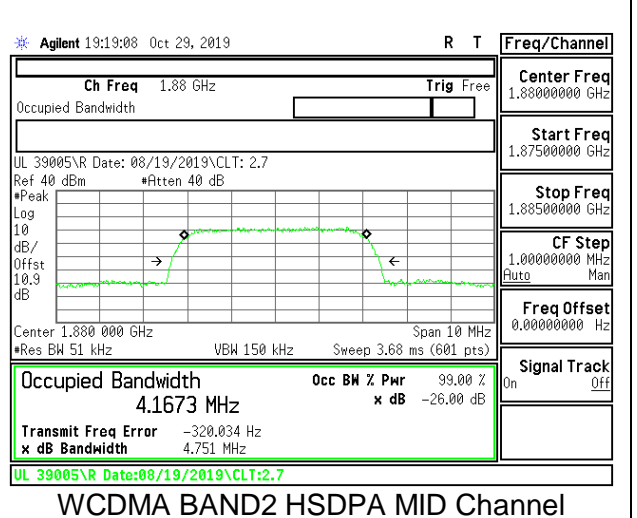
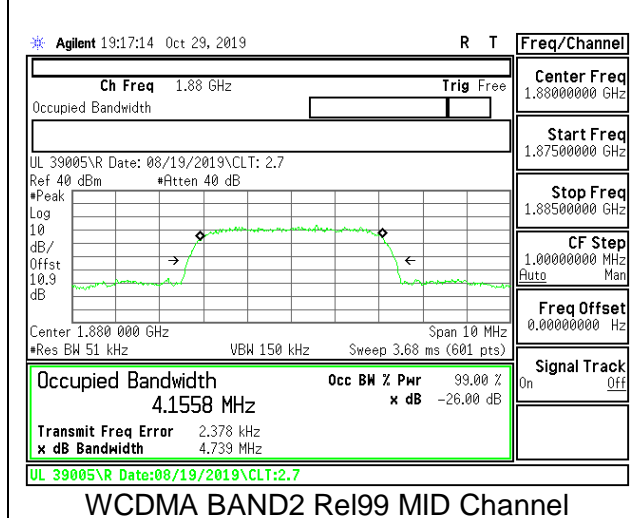
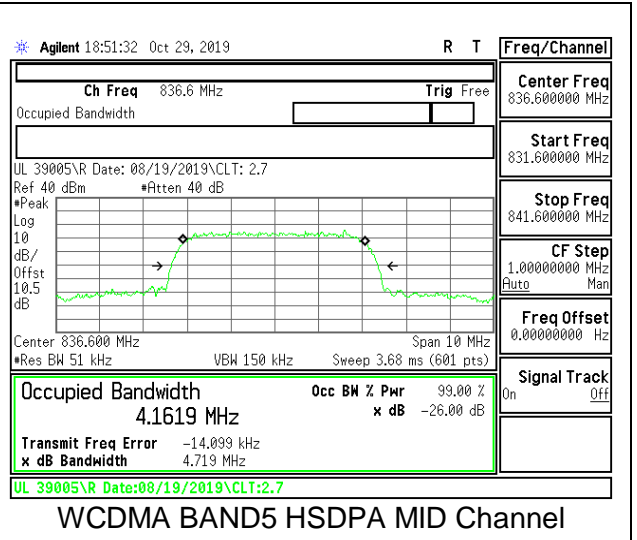
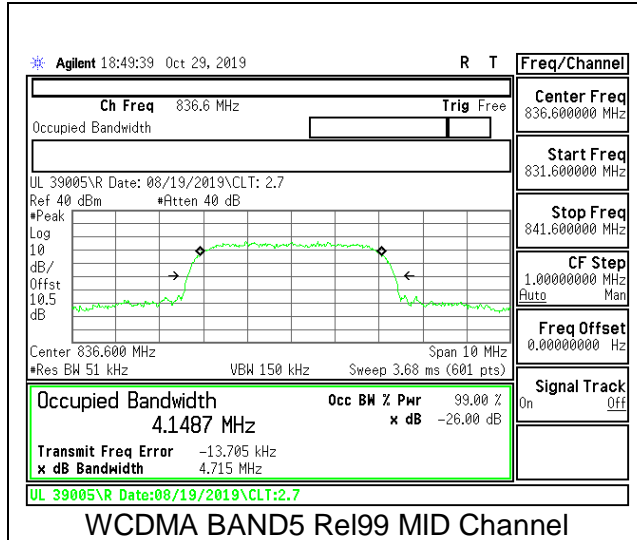


GSM 1900MHz GPRS MID Channel

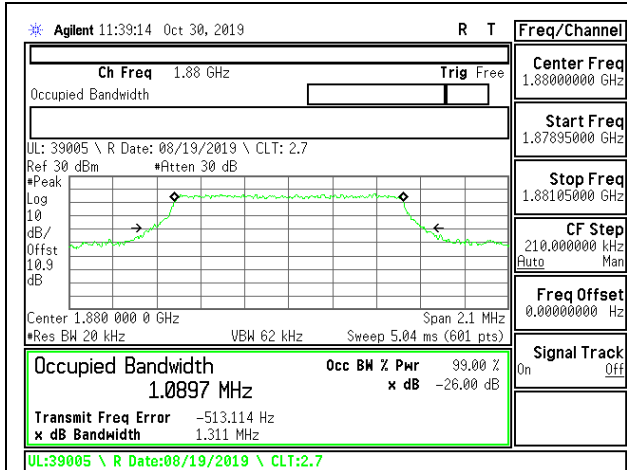


GSM 1900MHz EGPRS MID Channel

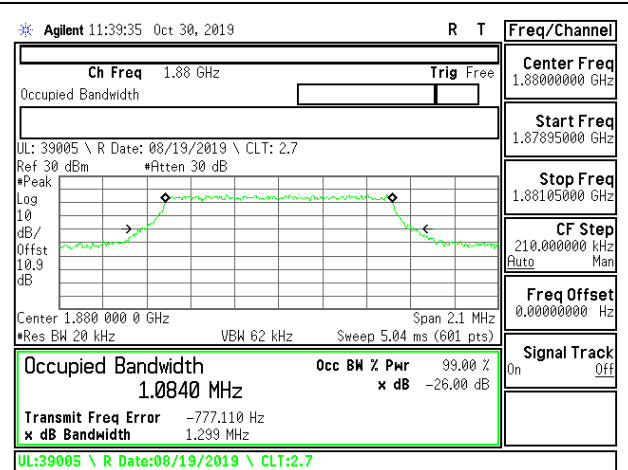
8.1.2. WCDMA



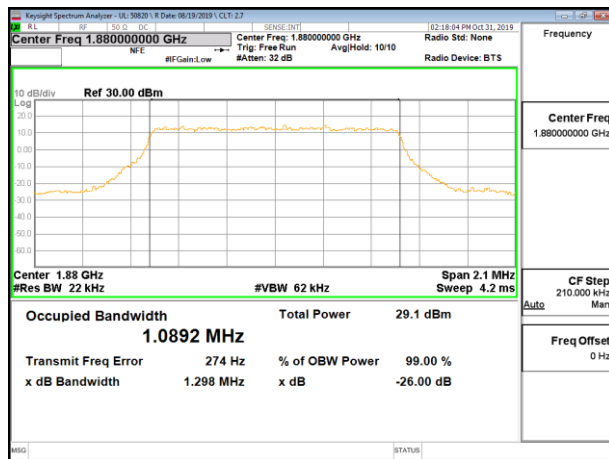
8.1.3. LTE BAND 2



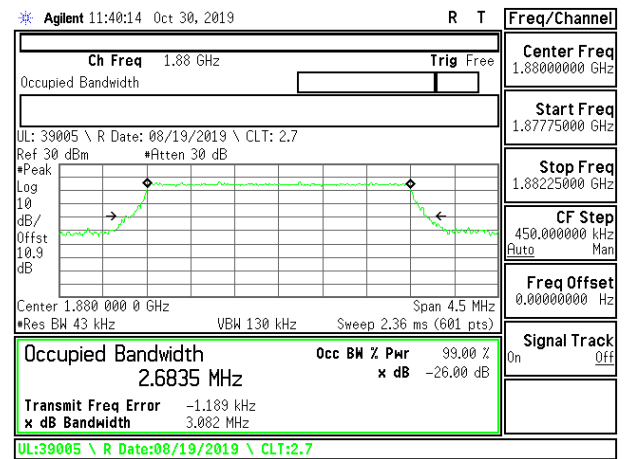
LTE B2 1.4MHz QPSK Mid Channel RB6-0



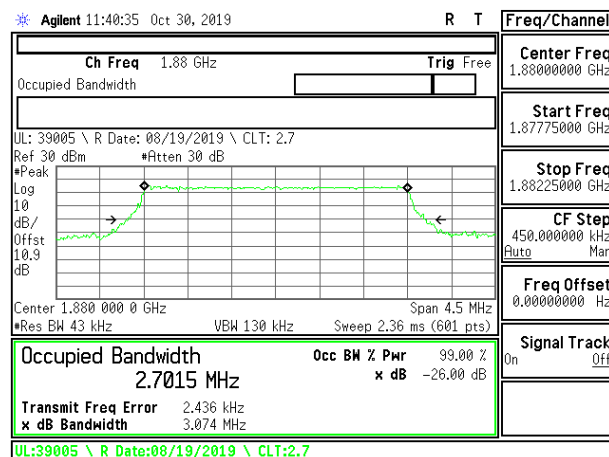
LTE B2 1.4MHz 16QAM Mid Channel RB6-0



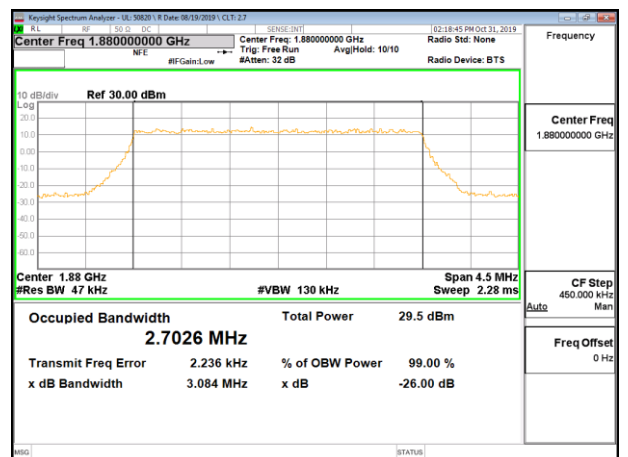
LTE B2 1.4MHz 64QAM Mid Channel RB6-0



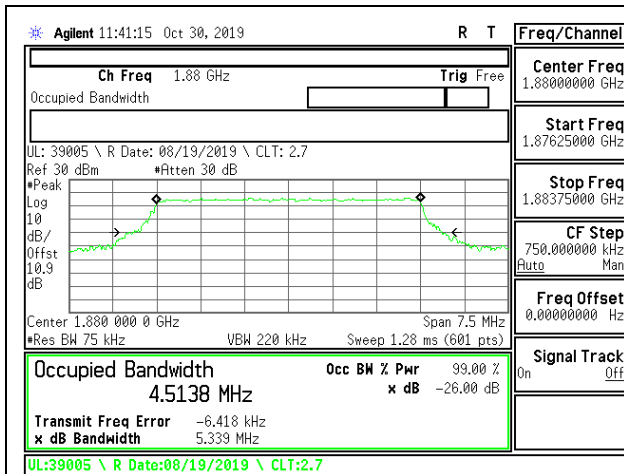
LTE B2 3MHz QPSK Mid Channel RB15-0



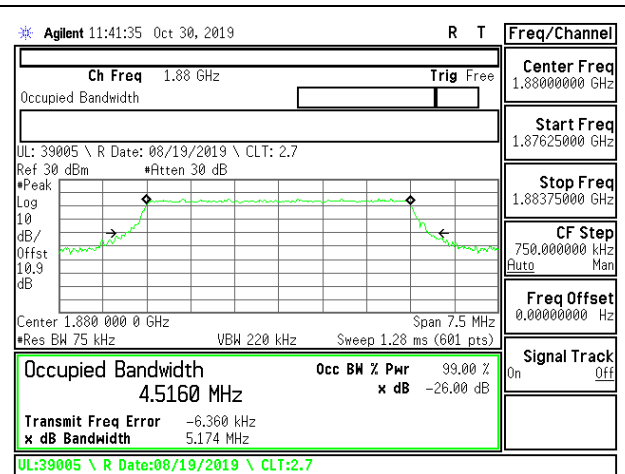
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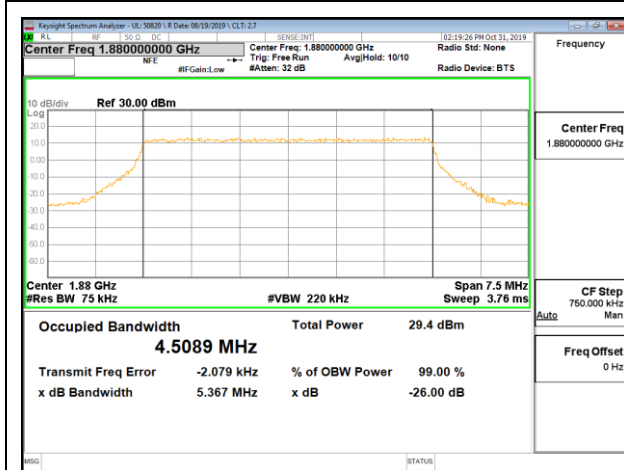
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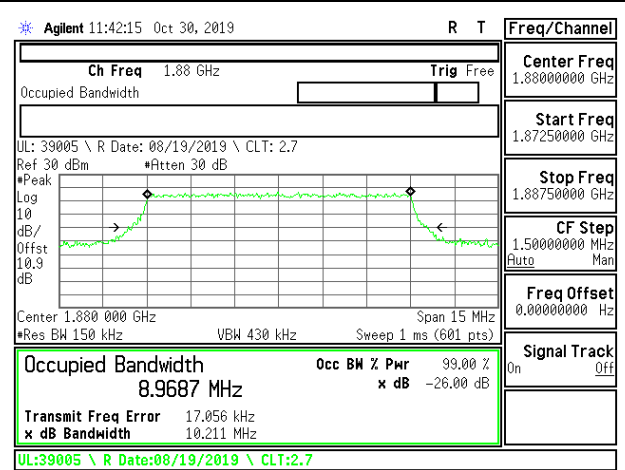
LTE B2 5MHz QPSK Mid Channel RB25-0



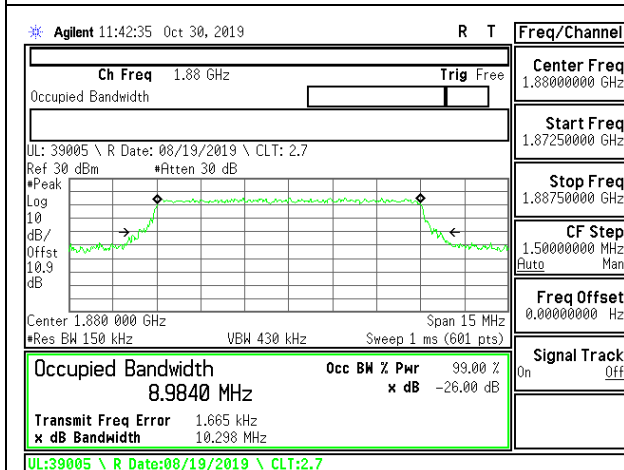
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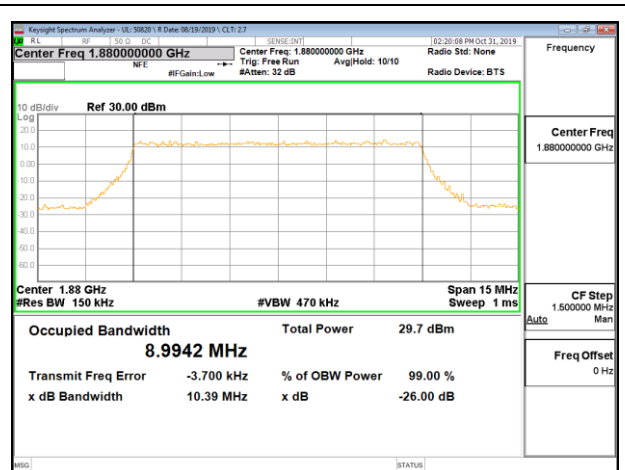
LTE B2 5MHz 64QAM Mid Channel RB25-0



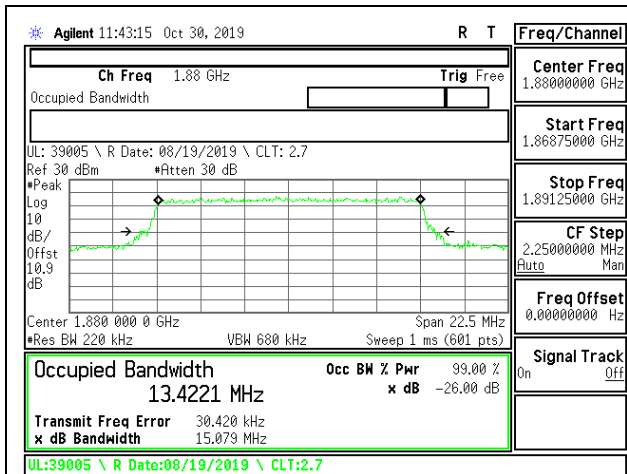
LTE B2 10MHz QPSK Mid Channel RB50-0



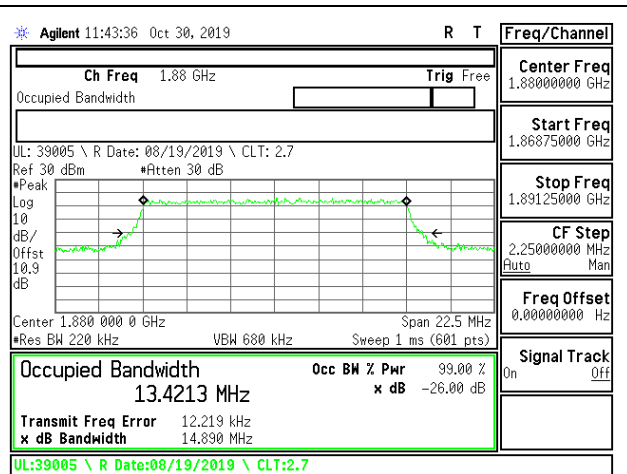
LTE B2 10MHz 16QAM Mid Channel RB50-0



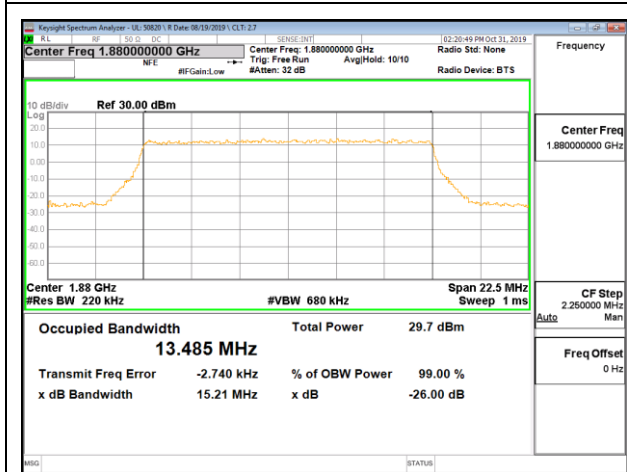
LTE B2 10MHz 64QAM Mid Channel RB50-0



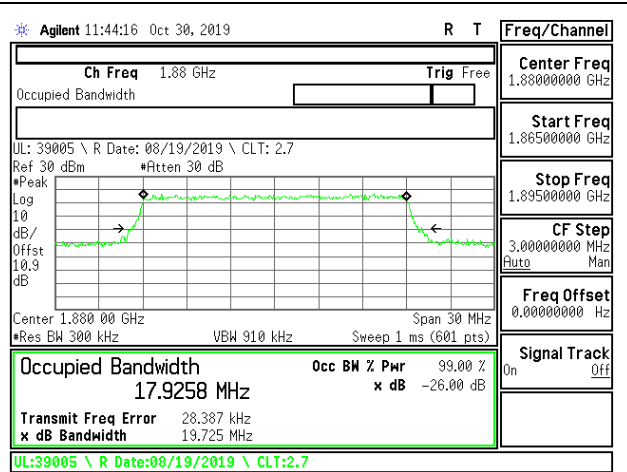
LTE B2 15MHz QPSK Mid Channel RB75-0



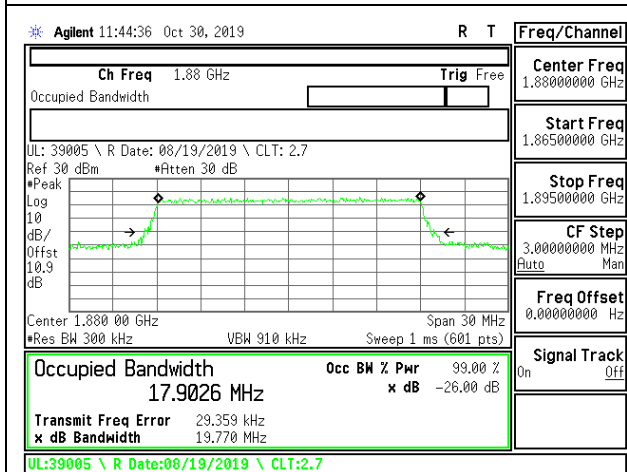
LTE B2 15MHz 16QAM Mid Channel RB75-0



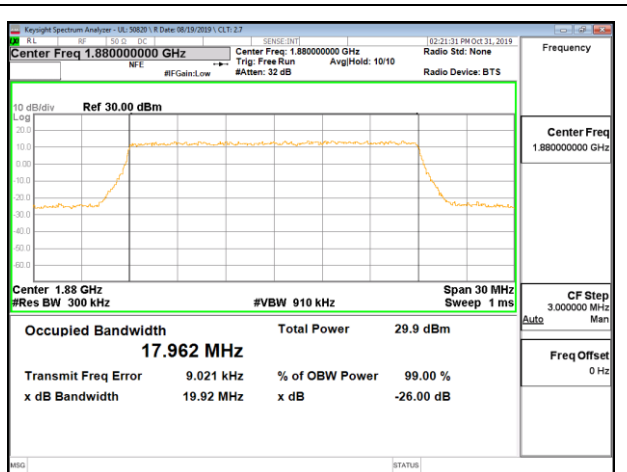
LTE B2 15MHz 64QAM Mid Channel RB75-0



LTE B2 20MHz QPSK Mid Channel RB100-0

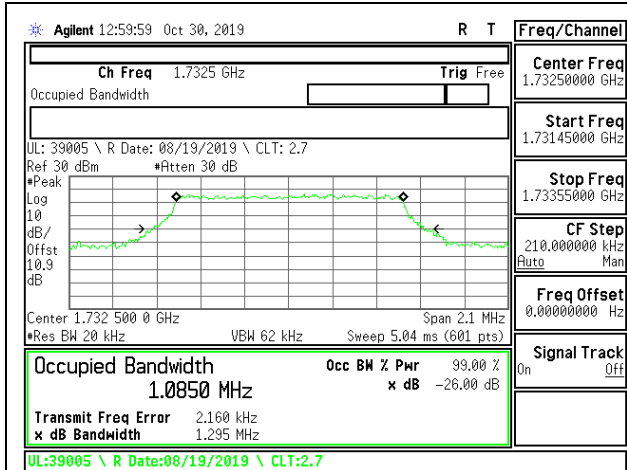


LTE B2 20MHz 16QAM Mid Channel RB100-0

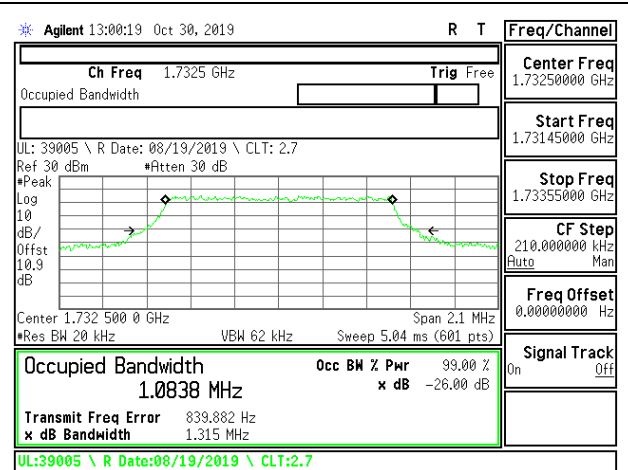


LTE B2 20MHz 64QAM Mid Channel RB100-0

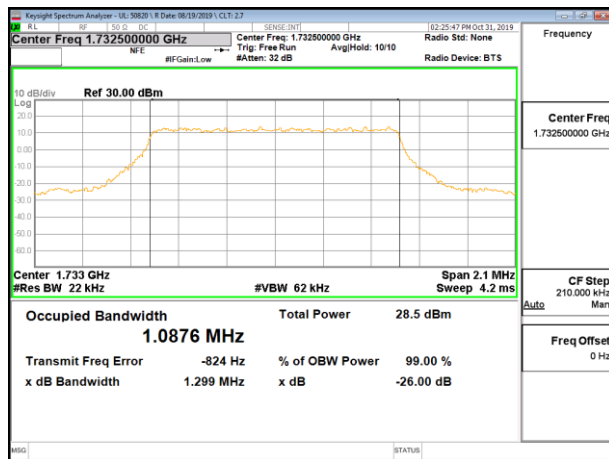
8.1.4. LTE BAND 4



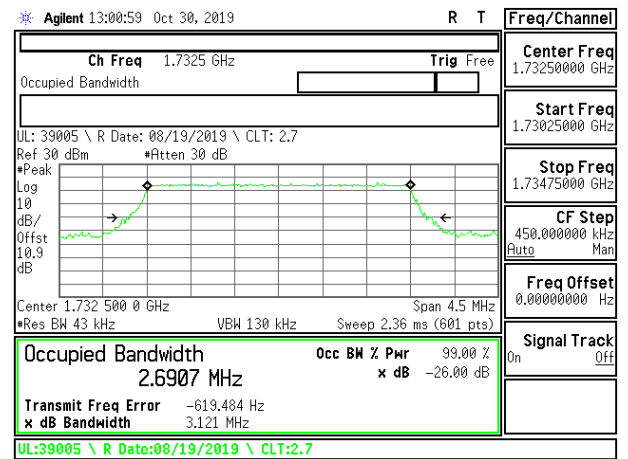
LTE B4 1.4MHz QPSK Mid Channel RB6-0



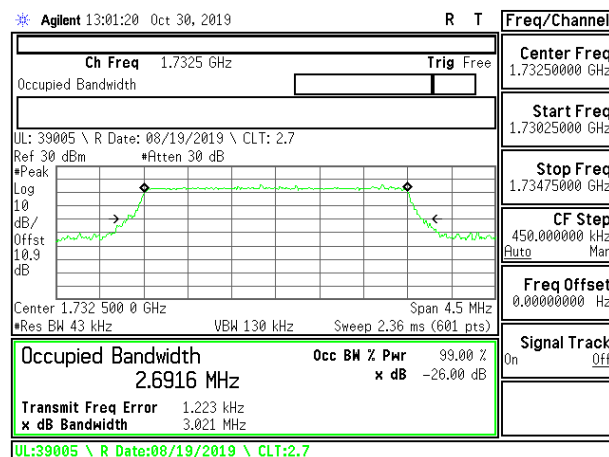
LTE B4 1.4MHz 16QAM Mid Channel RB6-0



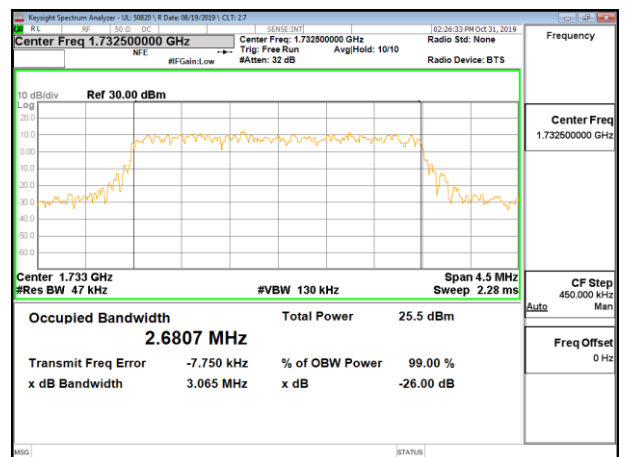
LTE B4 1.4MHz 64QAM Mid Channel RB6-0



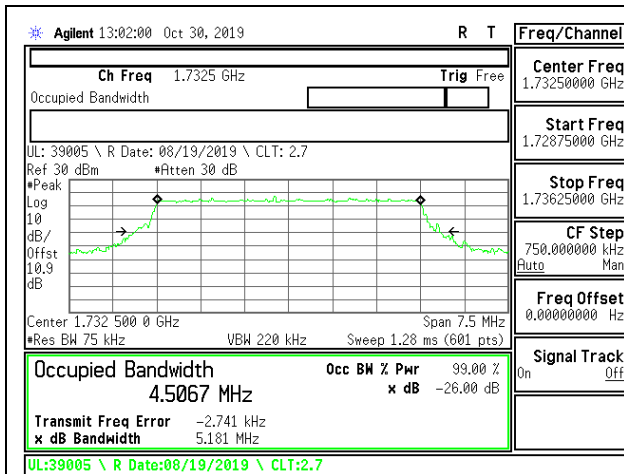
LTE B4 3MHz QPSK Mid Channel RB15-0



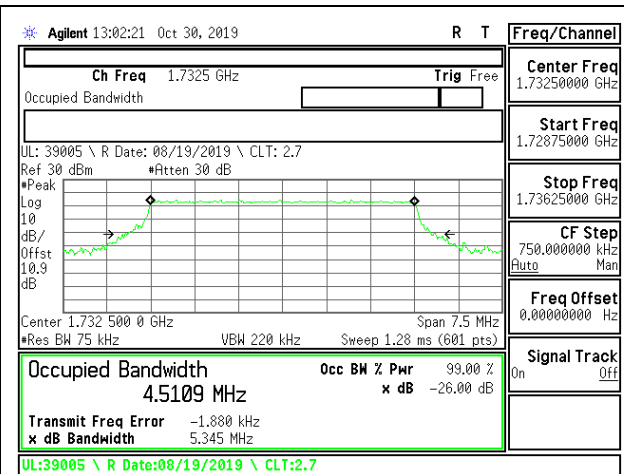
LTE B4 3MHz 16QAM Mid Channel RB15-0



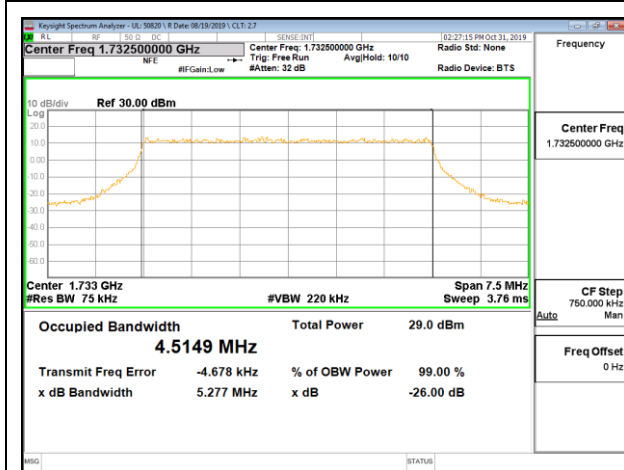
LTE B4 3MHz 64QAM Mid Channel RB15-0



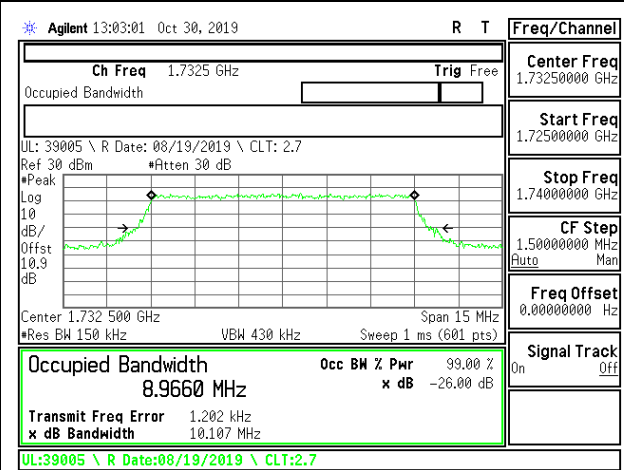
LTE B4 5MHz QPSK Mid Channel RB25-0



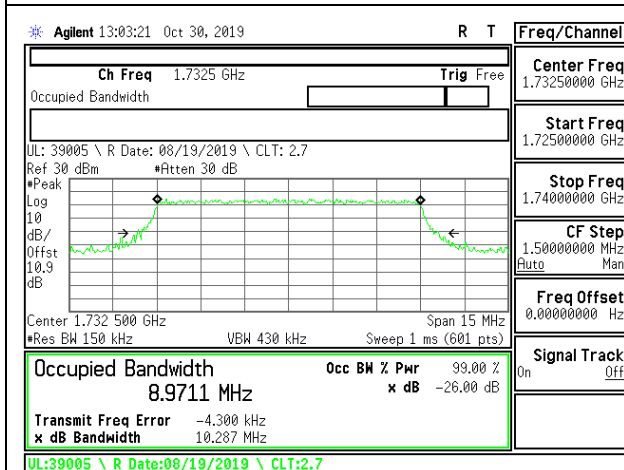
LTE B4 5MHz 16QAM Mid Channel RB25-0



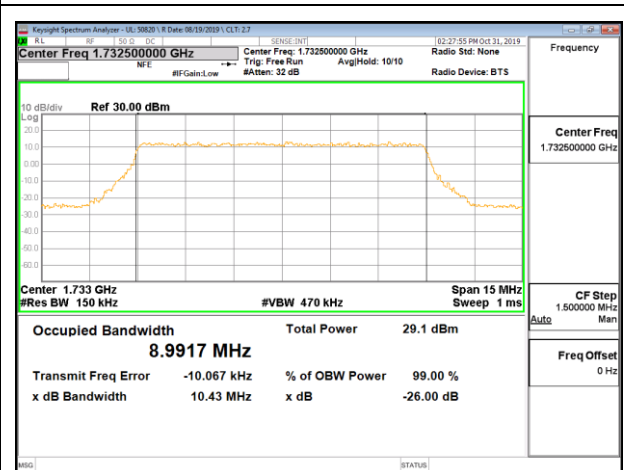
LTE B4 5MHz 64QAM Mid Channel RB25-0



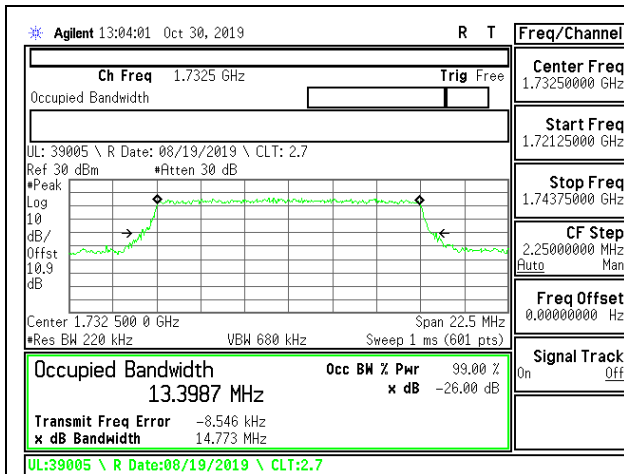
LTE B4 10MHz QPSK Mid Channel RB50-0



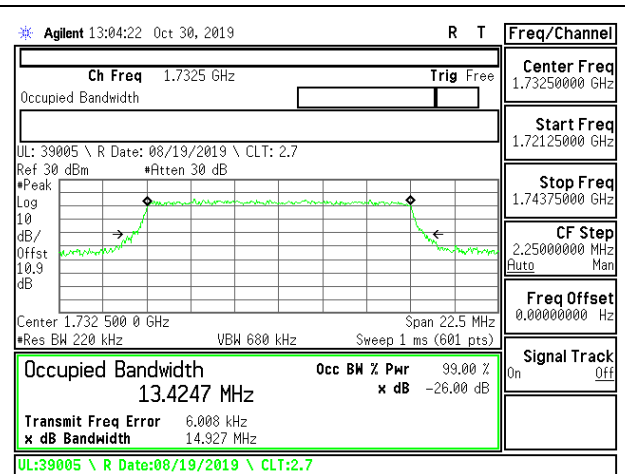
LTE B4 10MHz 16QAM Mid Channel RB50-0



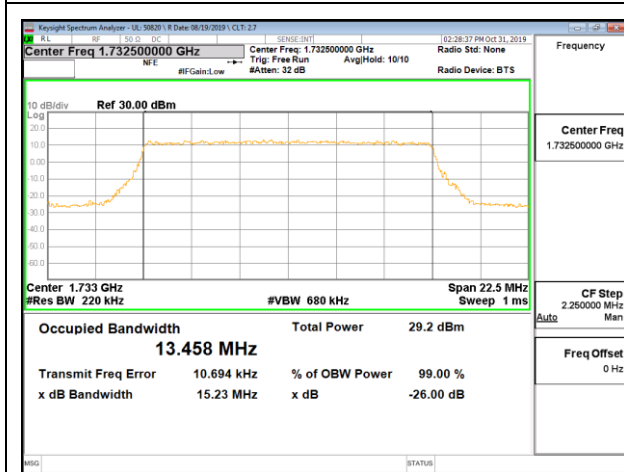
LTE B4 10MHz 64QAM Mid Channel RB50-0



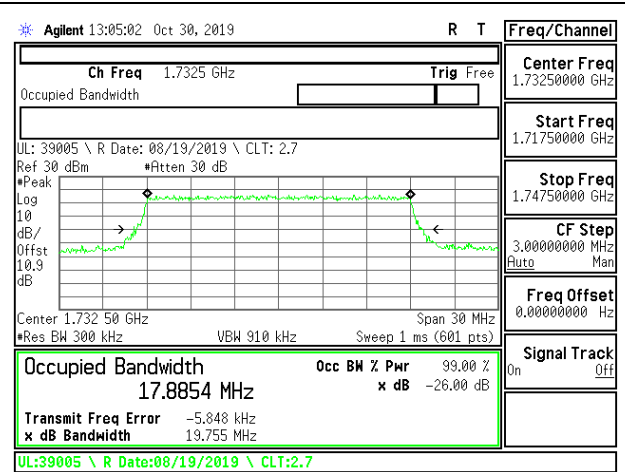
LTE B4 15MHz QPSK Mid Channel RB75-0



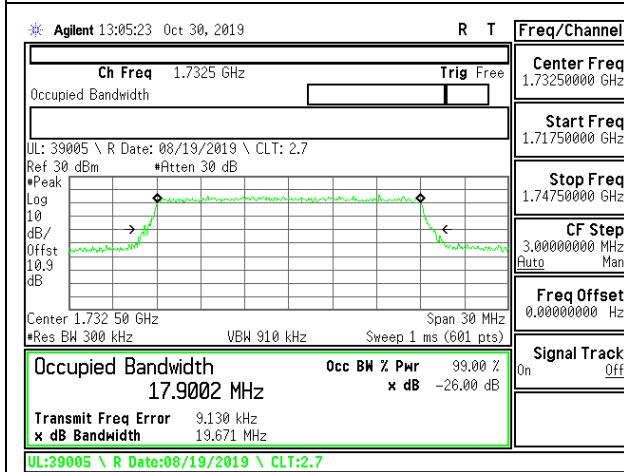
LTE B4 15MHz 16QAM Mid Channel RB75-0



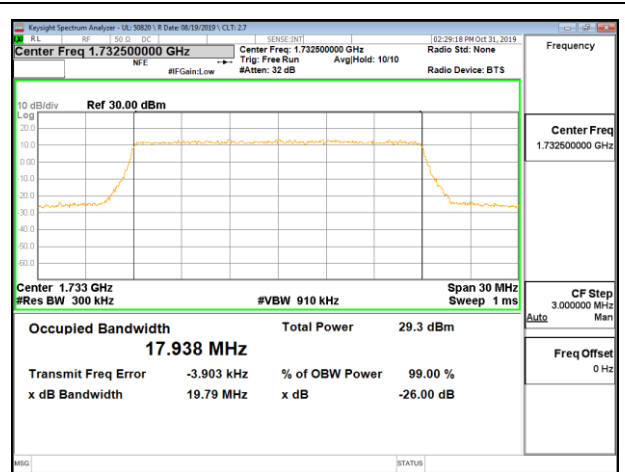
LTE B4 15MHz 64QAM Mid Channel RB75-0



LTE B4 20MHz QPSK Mid Channel RB100-0

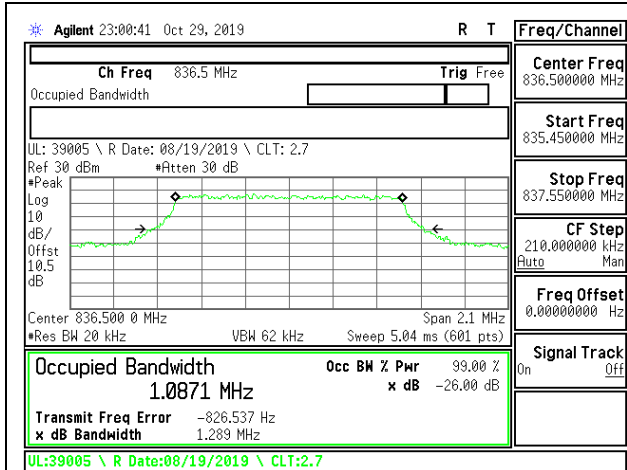


LTE B4 20MHz 16QAM Mid Channel RB100-0

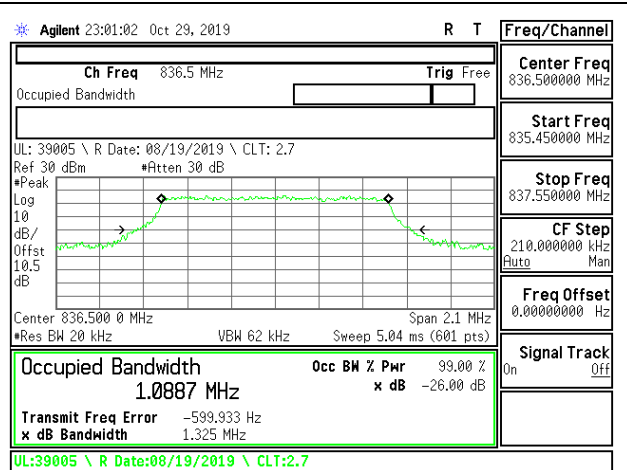


LTE B4 20MHz 64QAM Mid Channel RB100-0

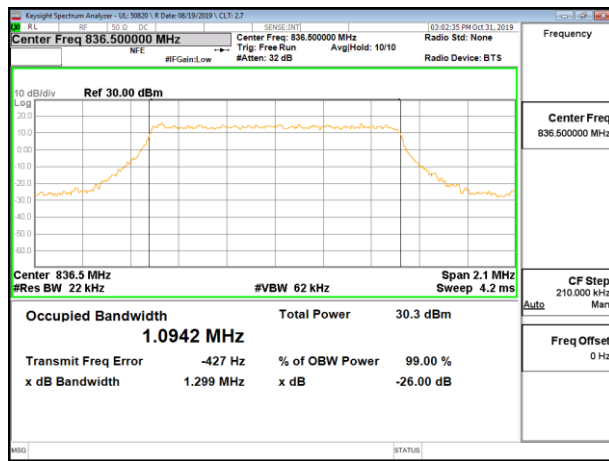
8.1.5. LTE BAND 5



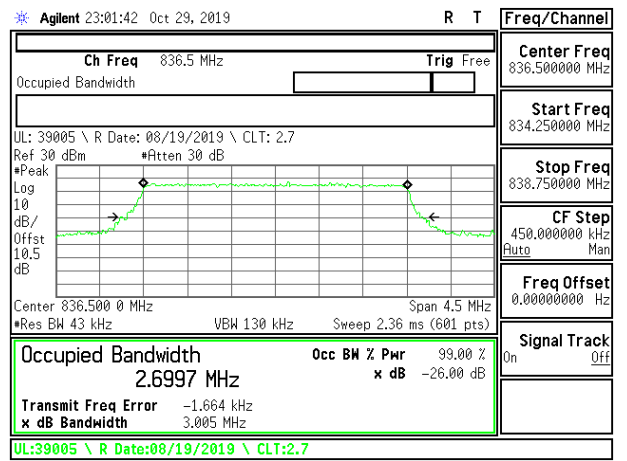
LTE B5 1.4MHz QPSK Mid Channel RB6-0



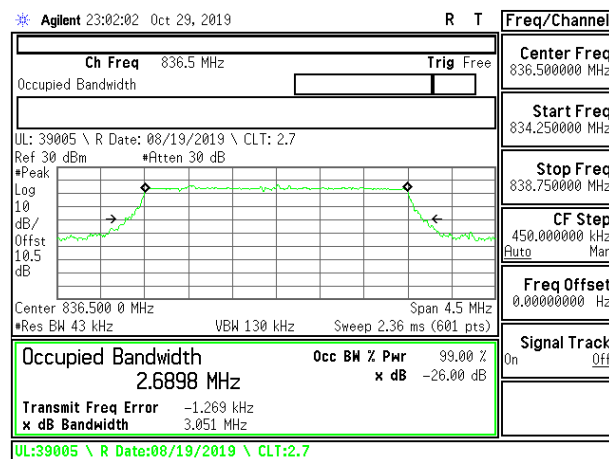
LTE B5 1.4MHz 16QAM Mid Channel RB6-0



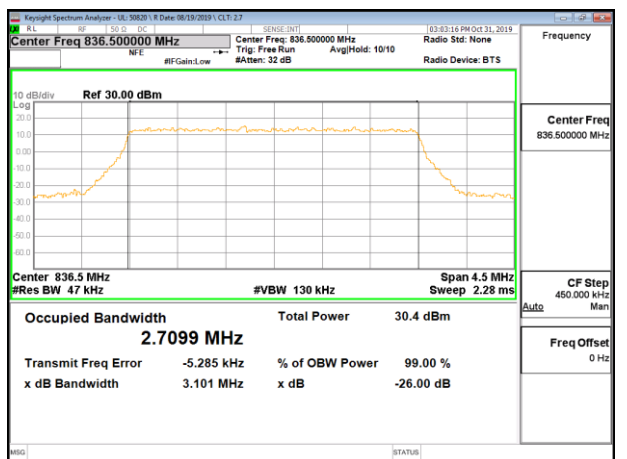
LTE B5 1.4MHz 64QAM Mid Channel RB6-0



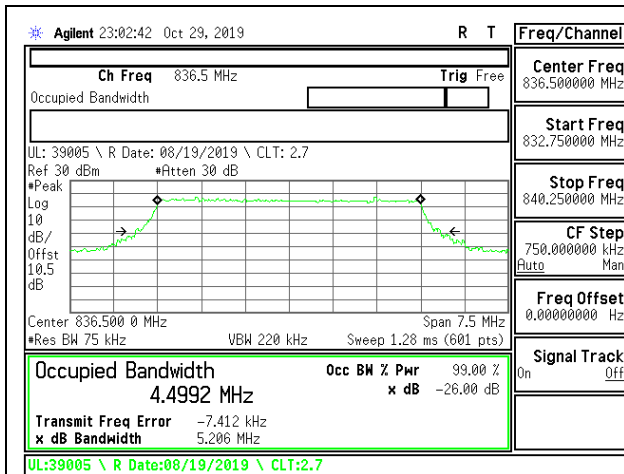
LTE B5 3MHz QPSK Mid Channel RB15-0



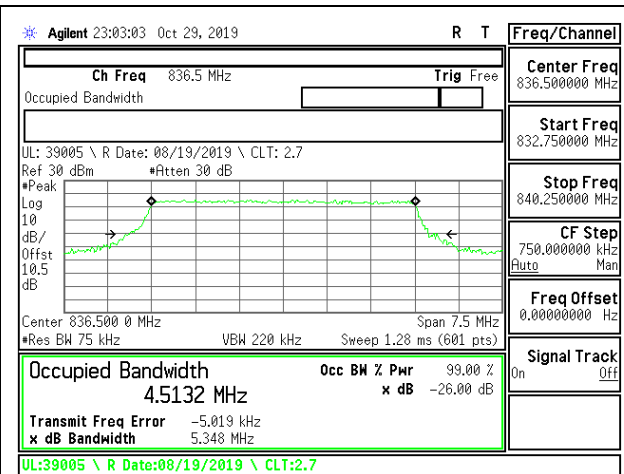
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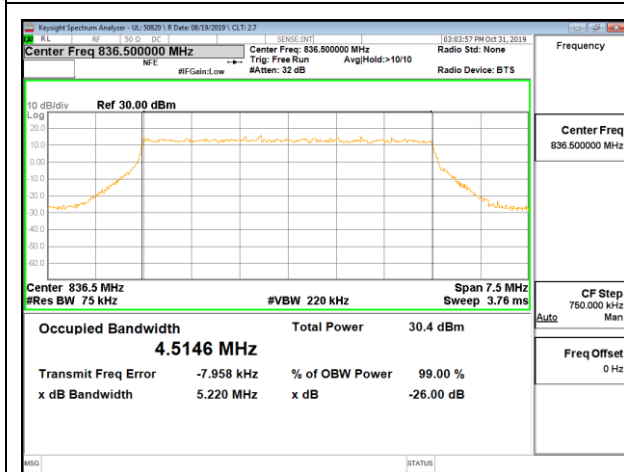
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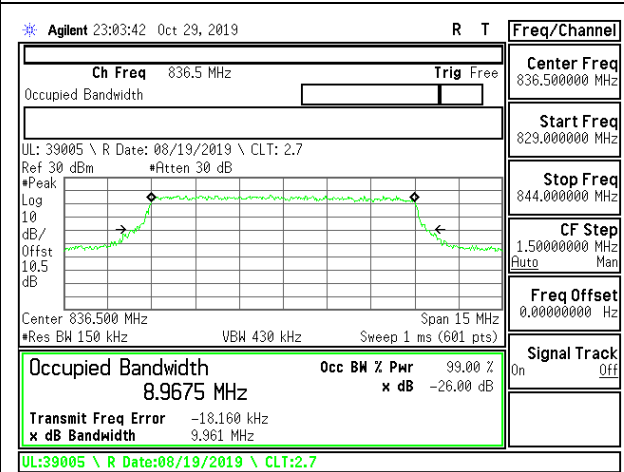
LTE B5 5MHz QPSK Mid Channel RB25-0



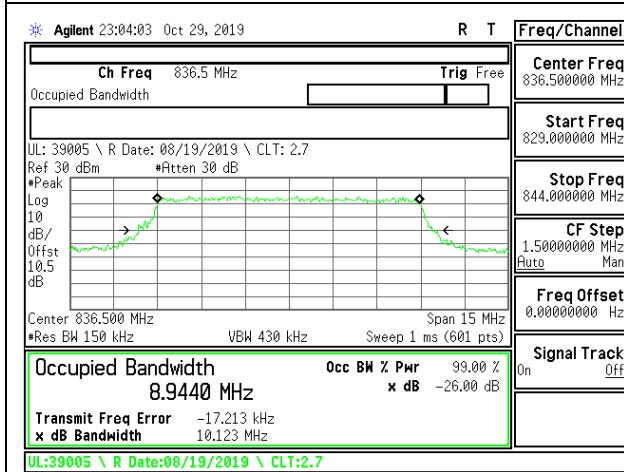
LTE B5 5MHz 16QAM Mid Channel RB25-0



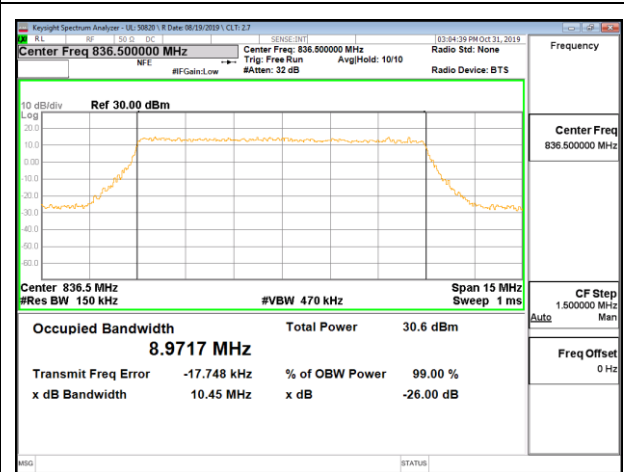
LTE B5 5MHz 64QAM Mid Channel RB25-0



LTE B5 10MHz QPSK Mid Channel RB50-0

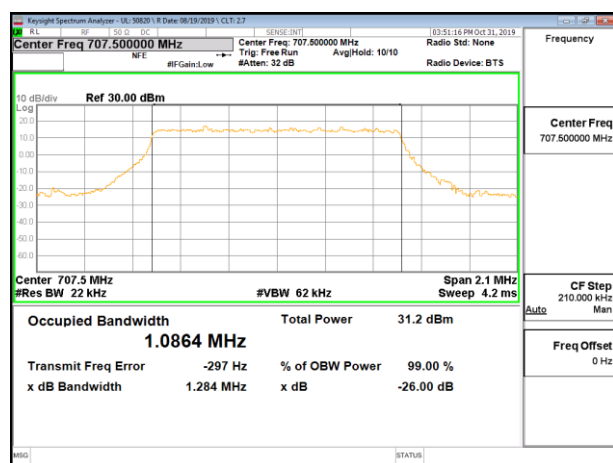


LTE B5 10MHz 16QAM Mid Channel RB50-0

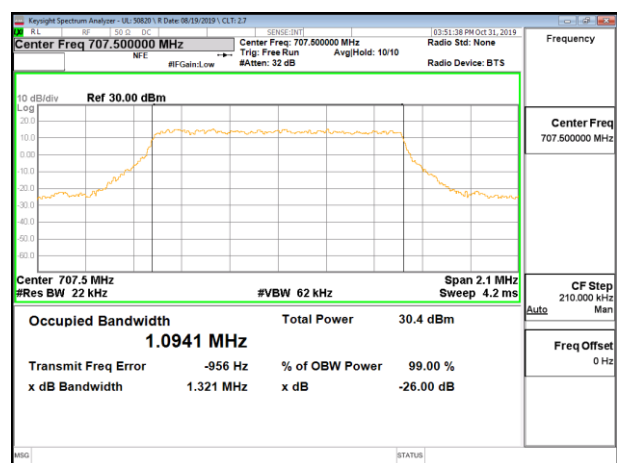


LTE B5 10MHz 64QAM Mid Channel RB50-0

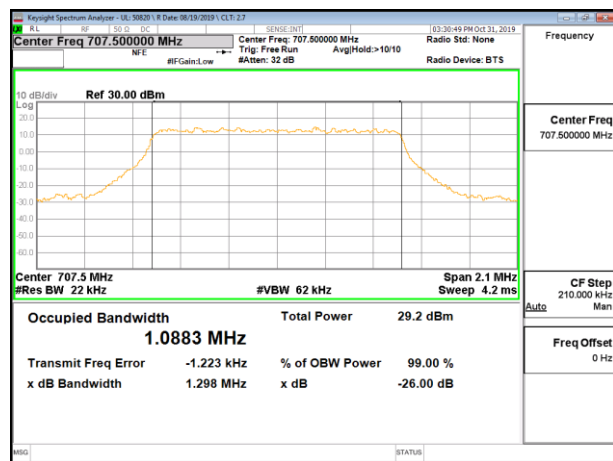
8.1.6. LTE BAND 12



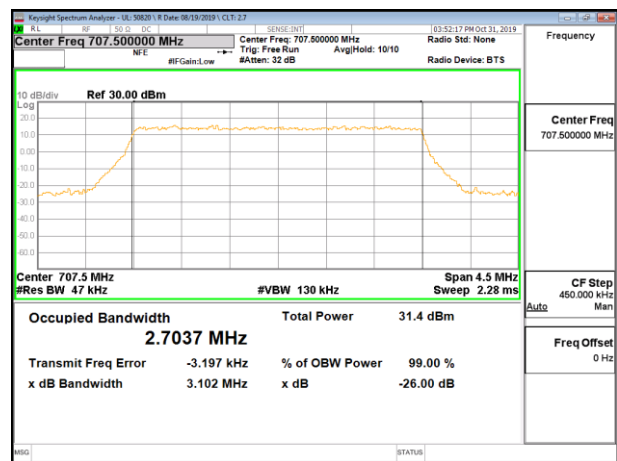
LTE B12 1.4MHz QPSK Mid Channel RB6-0



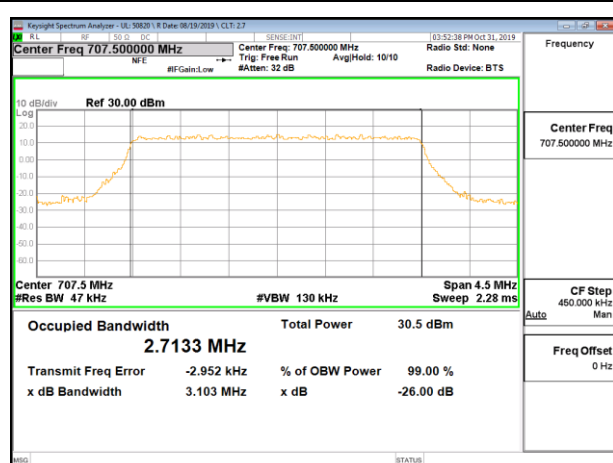
LTE B12 1.4MHz 16QAM Mid Channel RB6-0



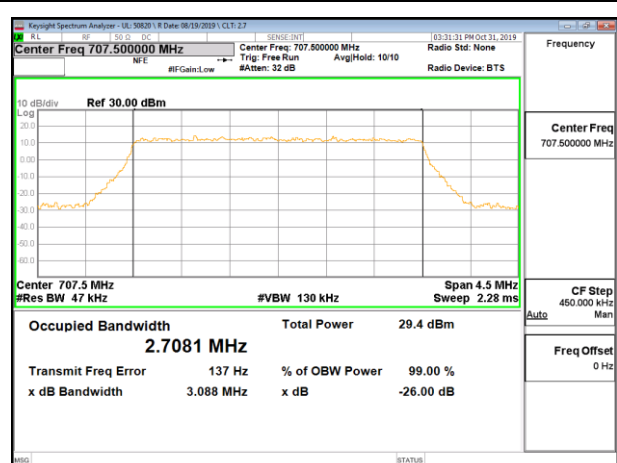
LTE B12 1.4MHz 64QAM Mid Channel RB6-0



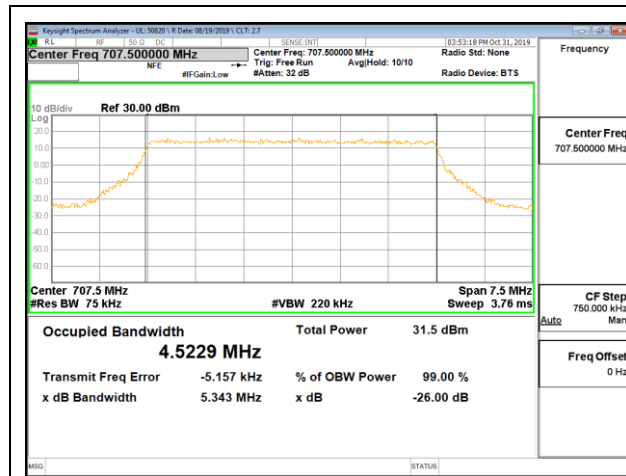
LTE B12 3MHz QPSK Mid Channel RB15-0



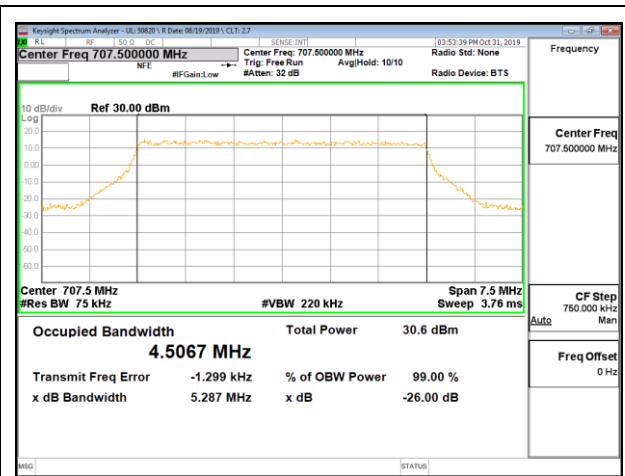
LTE B12 3MHz 16QAM Mid Channel RB15-0



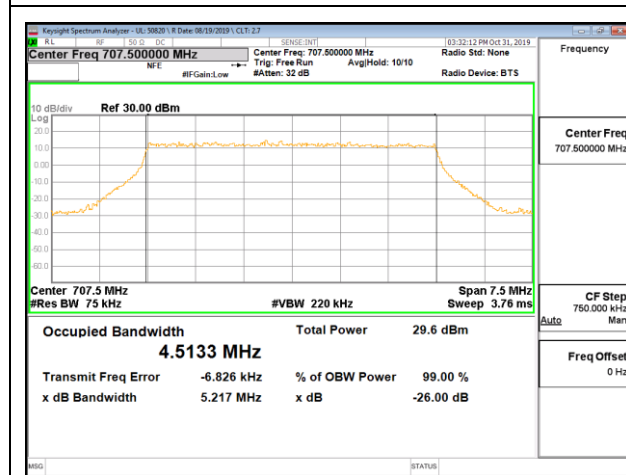
LTE B12 3MHz 64QAM Mid Channel RB15-0



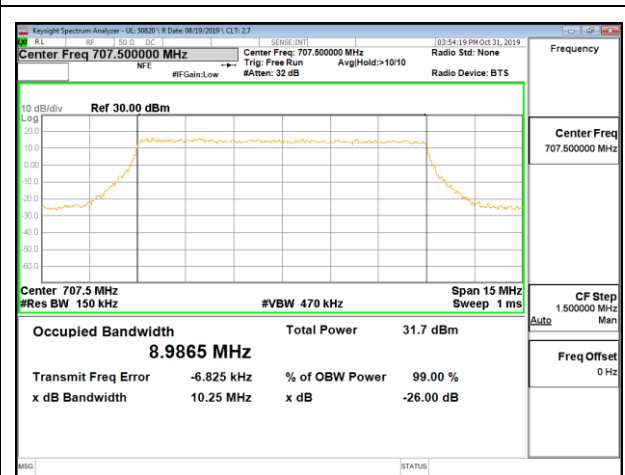
LTE B12 5MHz QPSK Mid Channel RB25-0



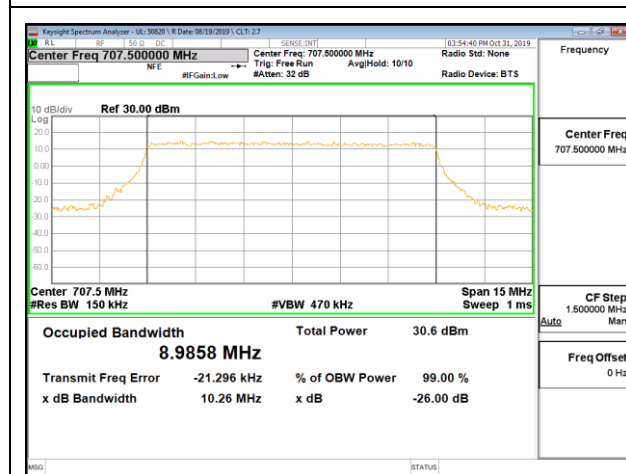
LTE B12 5MHz 16QAM Mid Channel RB25-0



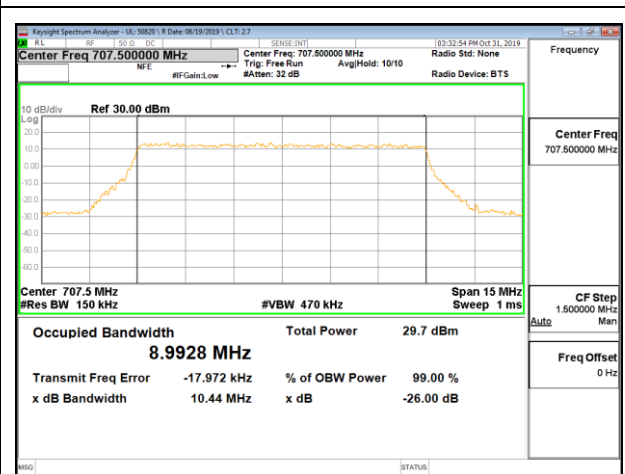
LTE B12 5MHz 64QAM Mid Channel RB25-0



LTE B12 10MHz QPSK Mid Channel RB50-0

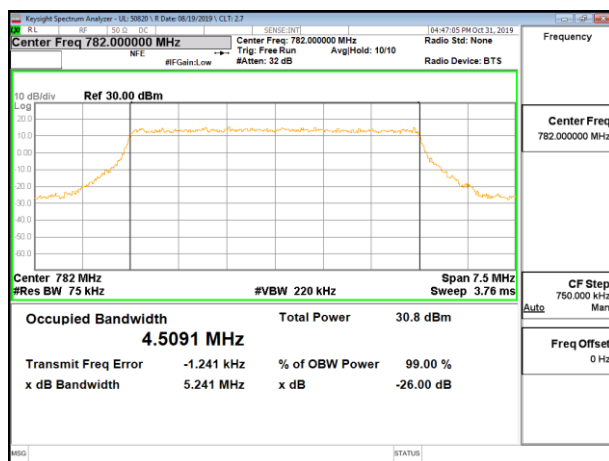


LTE B12 10MHz 16QAM Mid Channel RB50-0

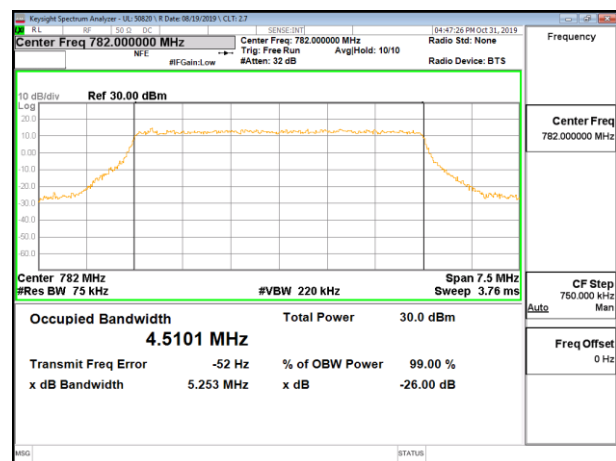


LTE B12 10MHz 64QAM Mid Channel RB50-0

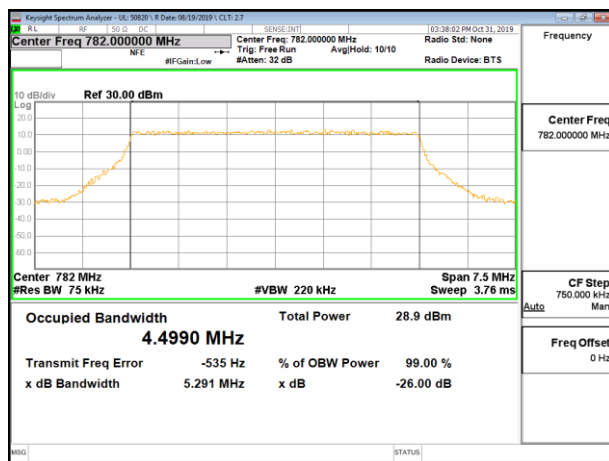
8.1.7. LTE BAND 13



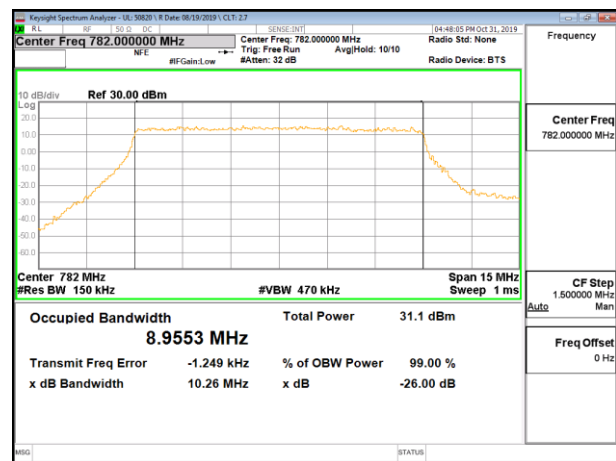
LTE B13 5MHz QPSK Mid Channel RB25-0



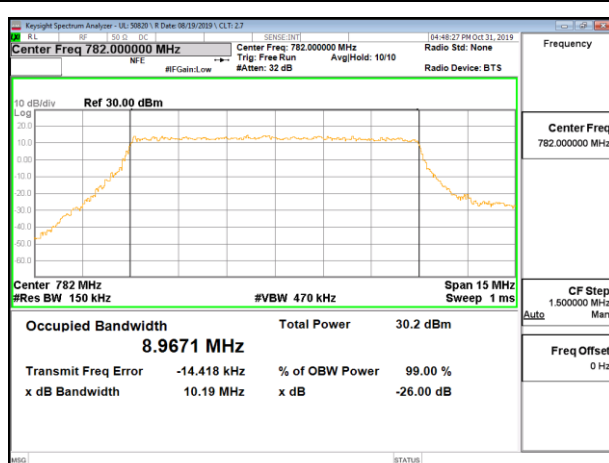
LTE B13 5MHz 16QAM Mid Channel RB25-0



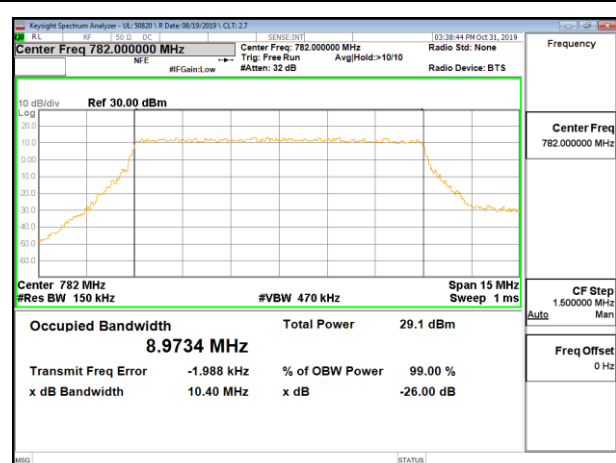
LTE B13 5MHz 64QAM Mid Channel RB25-0



LTE B13 10MHz QPSK Mid Channel RB50-0

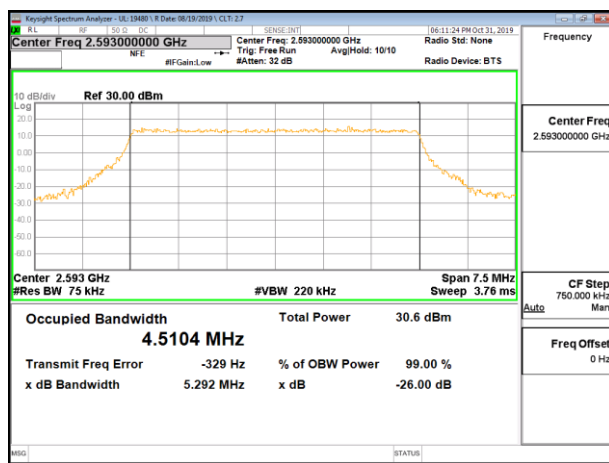


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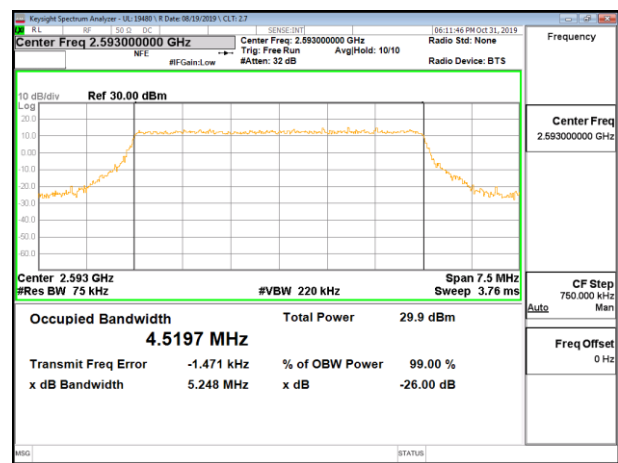


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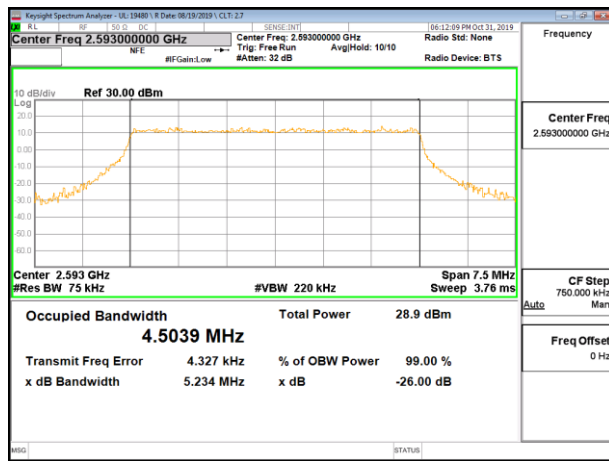
8.1.8. LTE BAND 41 (FCC)



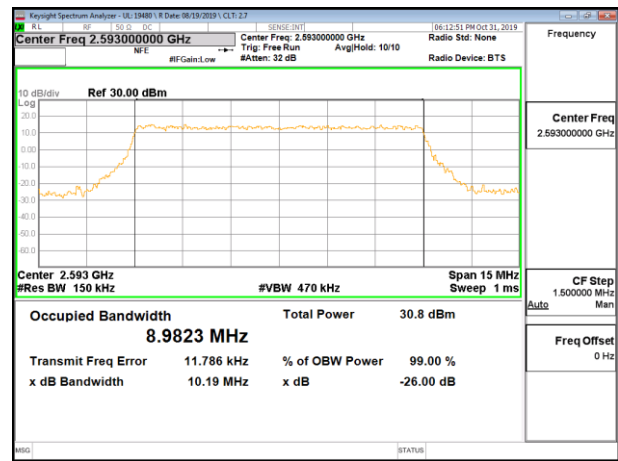
LTE B41 5MHz QPSK Mid Channel RB25-0



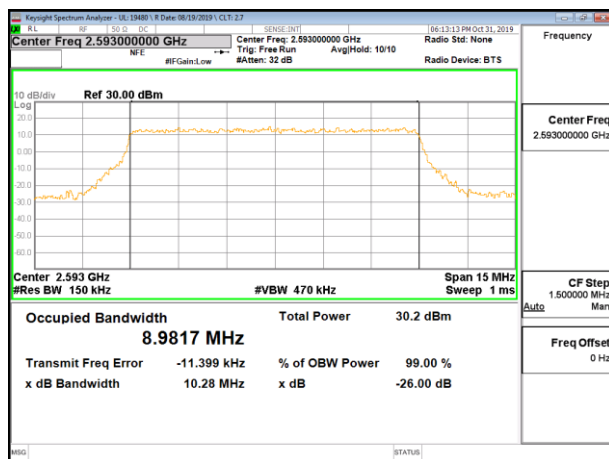
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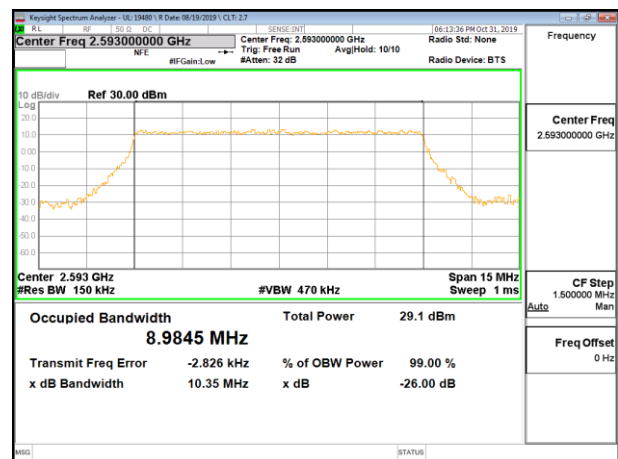
LTE B41 5MHz 64QAM Mid Channel RB25-0



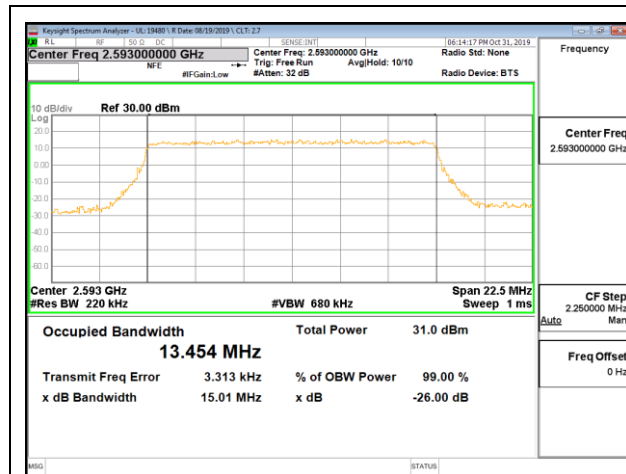
LTE B41 10MHz QPSK Mid Channel RB50-0



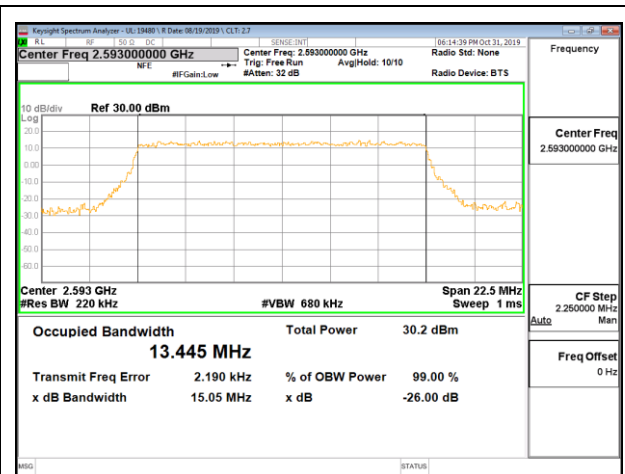
LTE B41 10MHz 16QAM Mid Channel RB50-0



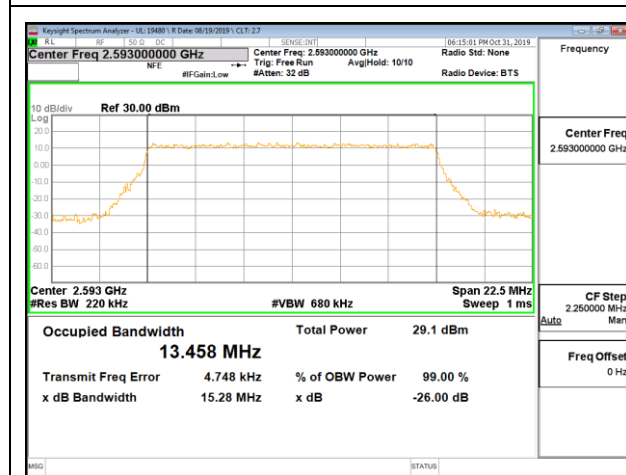
LTE B41 10MHz 64QAM Mid Channel RB50-0



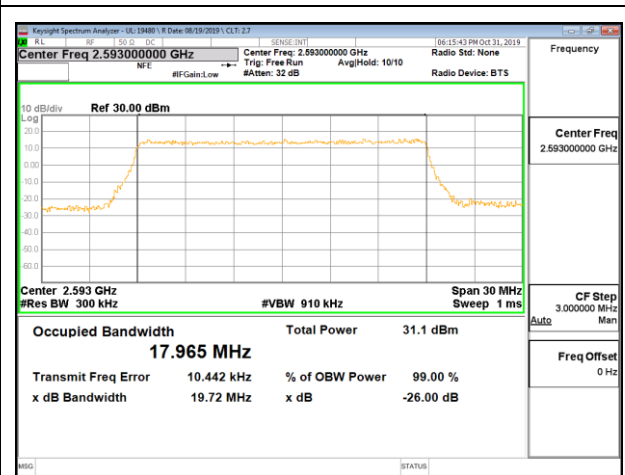
LTE B41 15MHz QPSK Mid Channel RB75-0



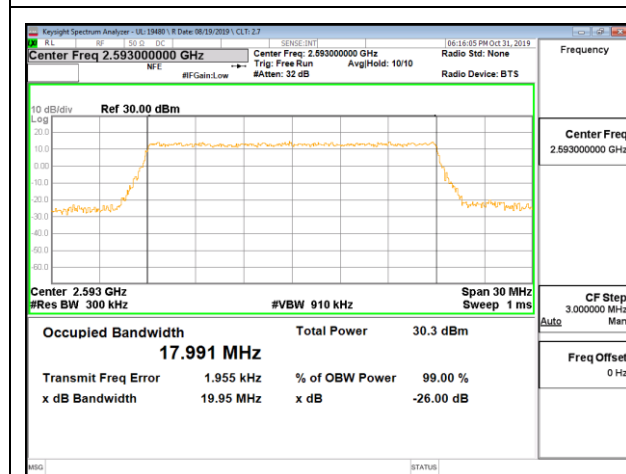
LTE B41 15MHz 16QAM Mid Channel RB75-0



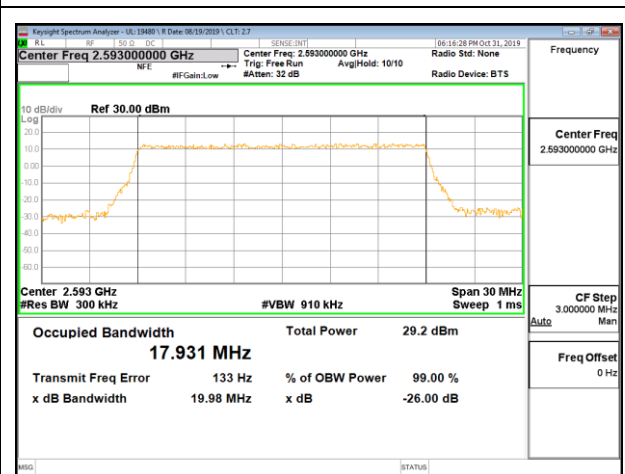
LTE B41 15MHz 64QAM Mid Channel RB75-0



LTE B41 20MHz QPSK Mid Channel RB100-0

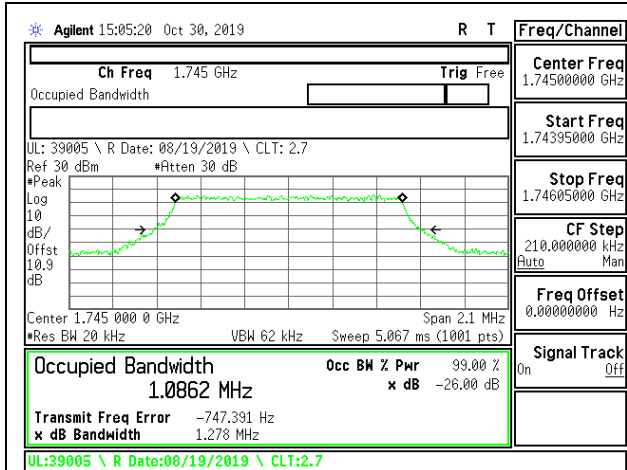


LTE B41 20MHz 16QAM Mid Channel RB100-0

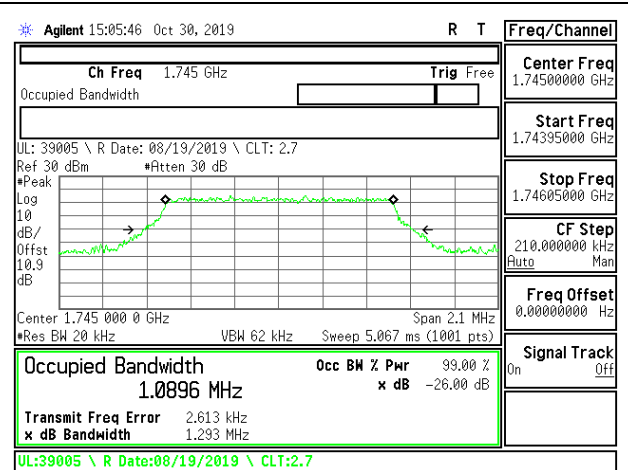


LTE B41 20MHz 64QAM Mid Channel RB100-0

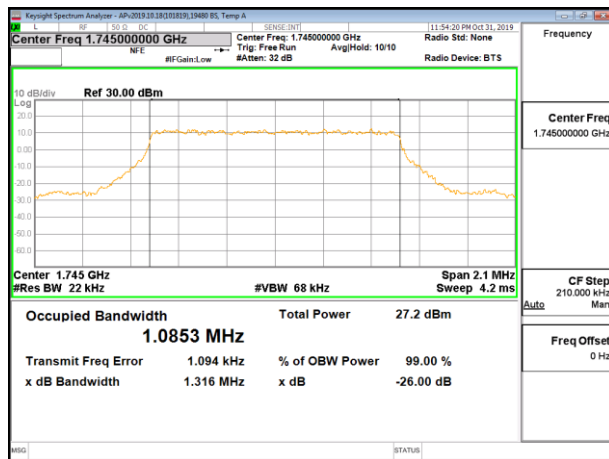
8.1.9. LTE BAND 66



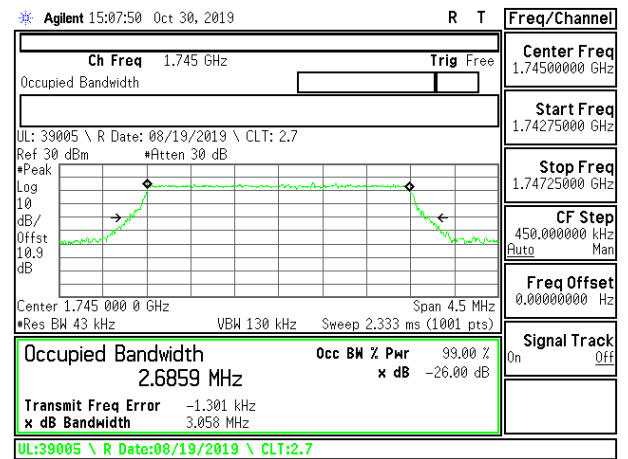
LTE B66 1.4MHz QPSK Mid Channel RB6-0



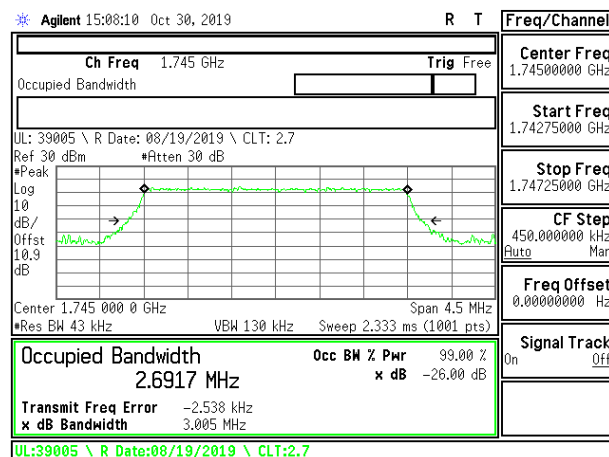
LTE B66 1.4MHz 16QAM Mid Channel RB6-0



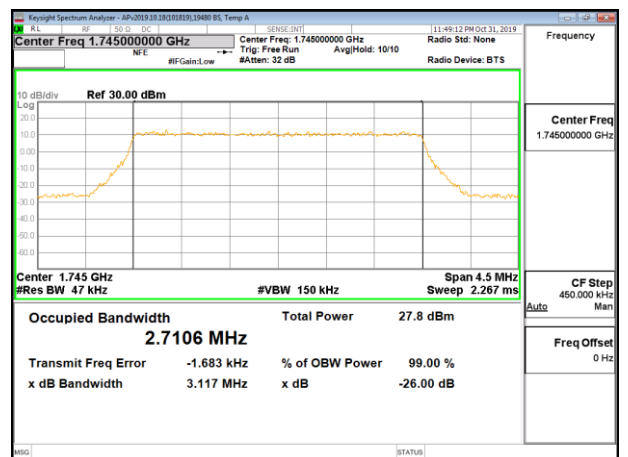
LTE B66 1.4MHz 64QAM Mid Channel RB6-0



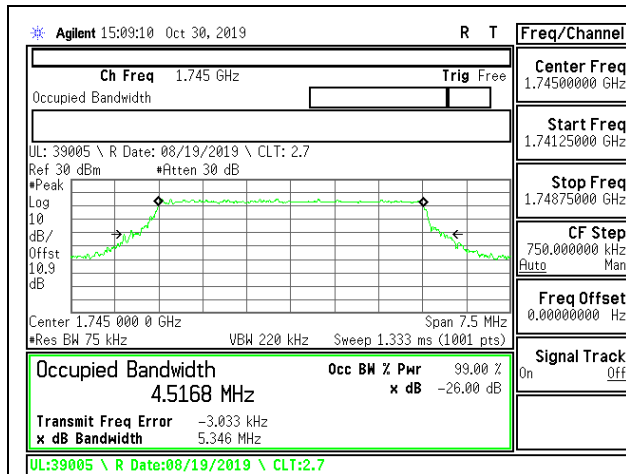
LTE B66 3MHz QPSK Mid Channel RB15-0



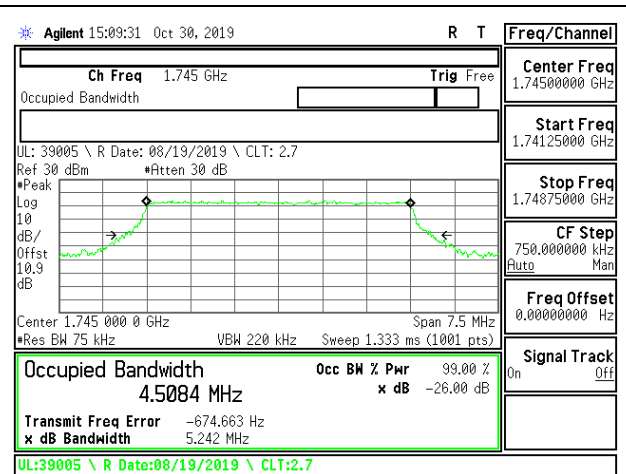
LTE B66 3MHz 16QAM Mid Channel RB15-0



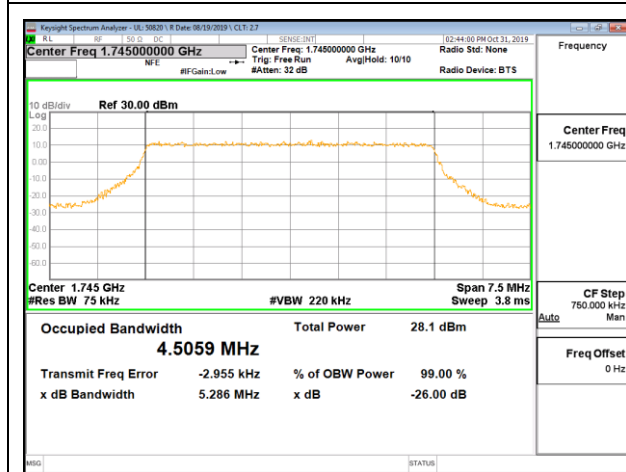
LTE B66 3MHz 64QAM Mid Channel RB15-0



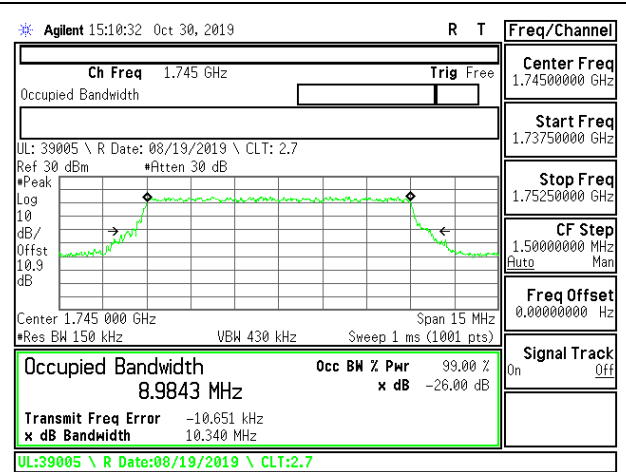
LTE B66 5MHz QPSK Mid Channel RB25-0



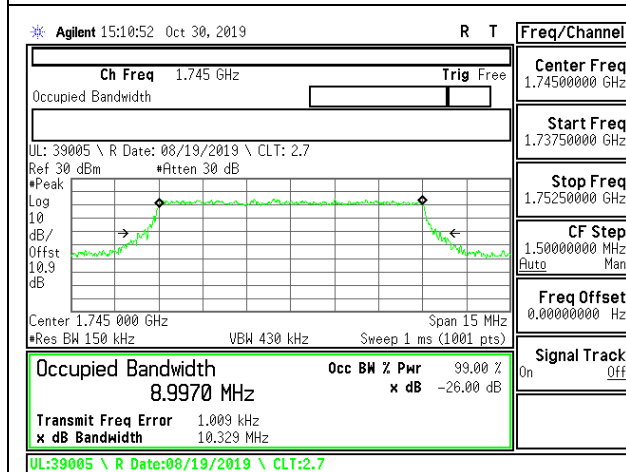
LTE B66 5MHz 16QAM Mid Channel RB25-0



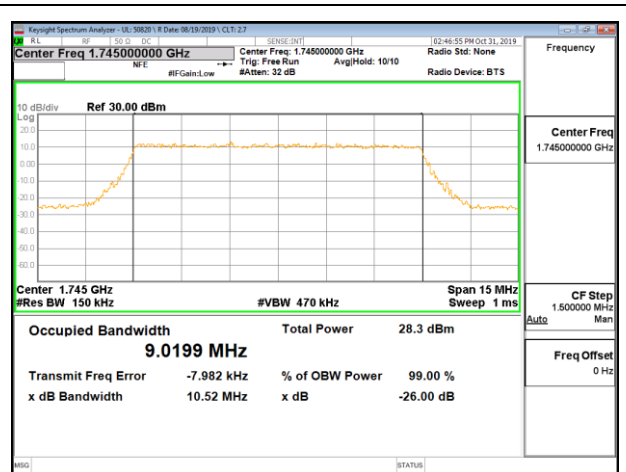
LTE B66 5MHz 64QAM Mid Channel RB25-0



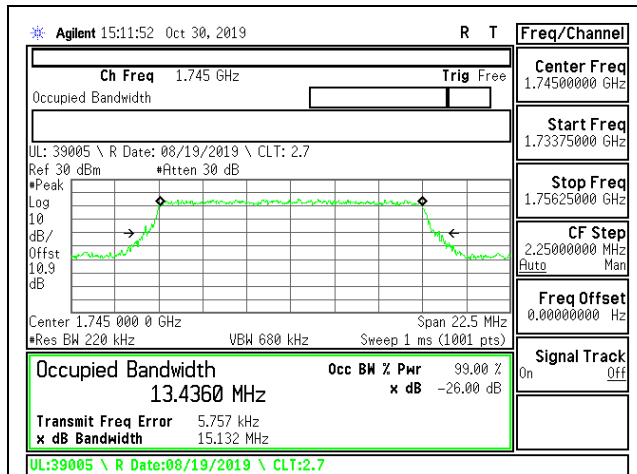
LTE B66 10MHz QPSK Mid Channel RB50-0



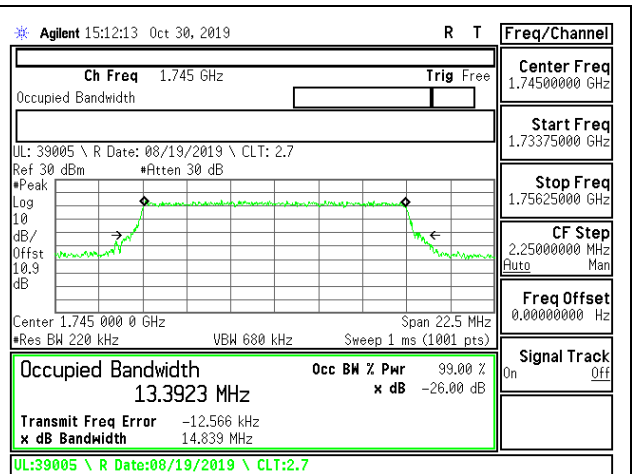
LTE B66 10MHz 16QAM Mid Channel RB50-0



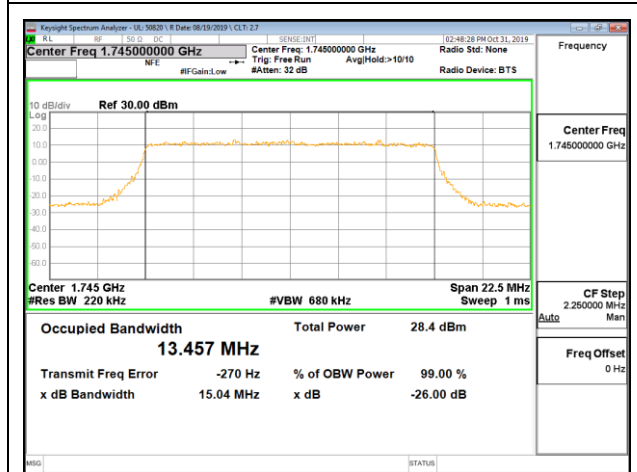
LTE B66 10MHz 64QAM Mid Channel RB50-0



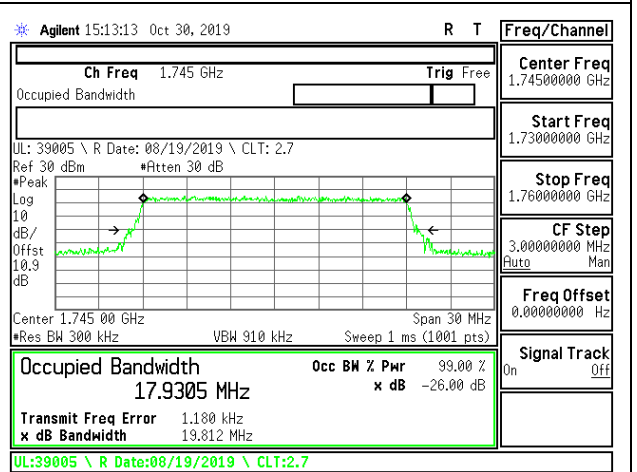
LTE B66 15MHz QPSK Mid Channel RB75-0



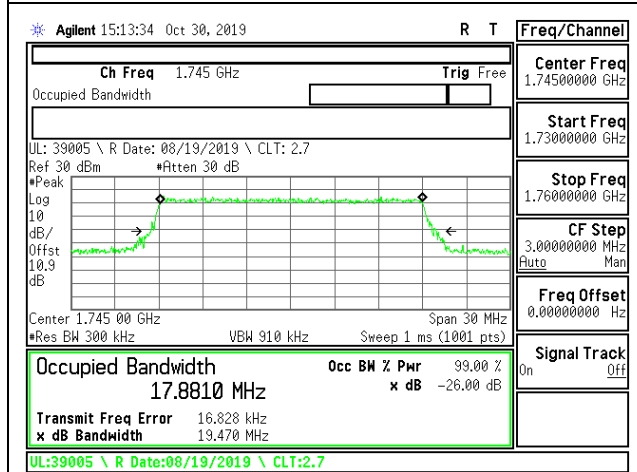
LTE B66 15MHz 16QAM Mid Channel RB75-0



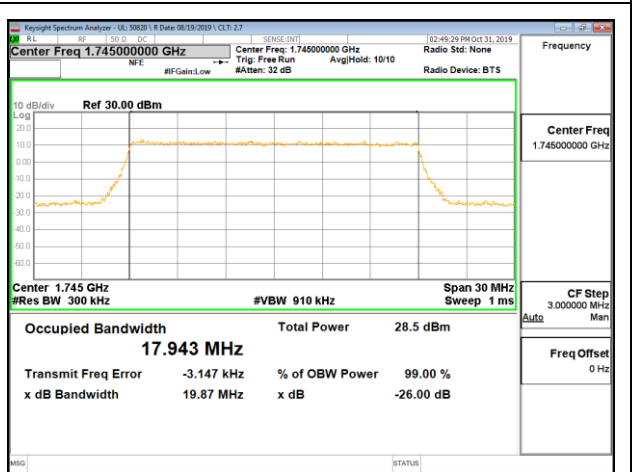
LTE B66 15MHz 64QAM Mid Channel RB75-0



LTE B66 20MHz QPSK Mid Channel RB100-0



LTE B66 20MHz 16QAM Mid Channel RB100-0



LTE B66 20MHz 64QAM Mid Channel RB100-0

## 8.2. BAND EDGE AND EMISSION MASK

### RULE PART(S)

FCC: §2.1051, §22.917, §24.238, and §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 =  $-40$  dBm/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 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 than  $43 + 10 \log (P)$  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.

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### **TEST PROCEDURE**

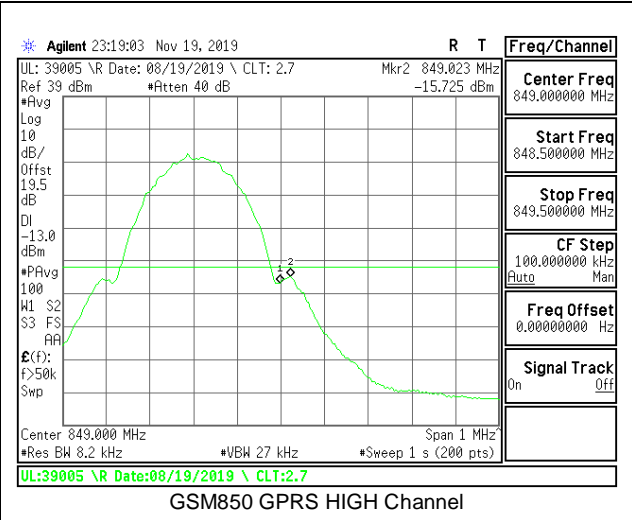
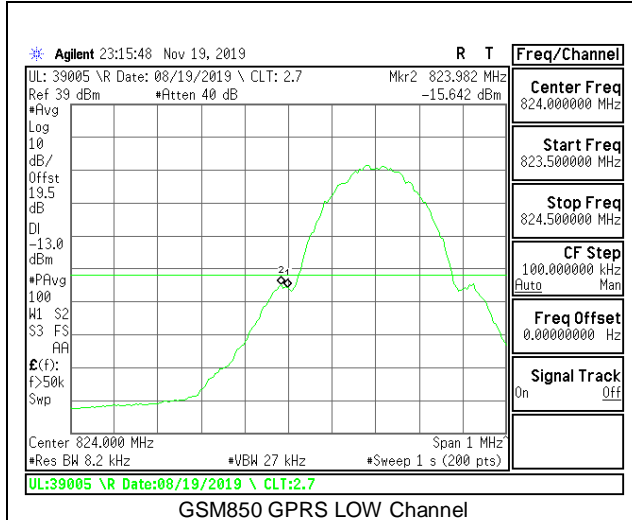
The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

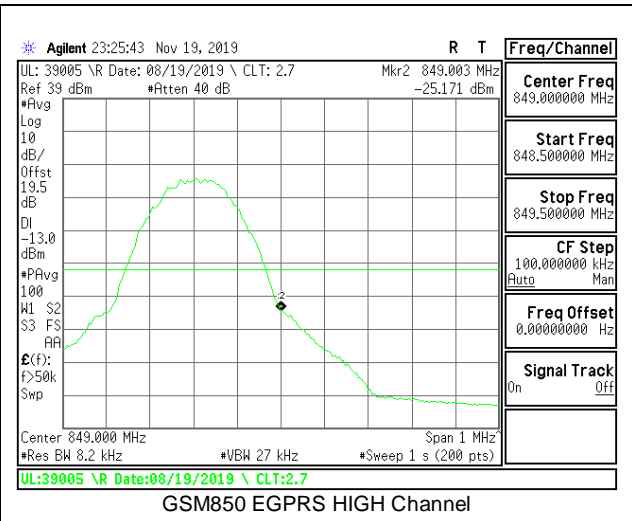
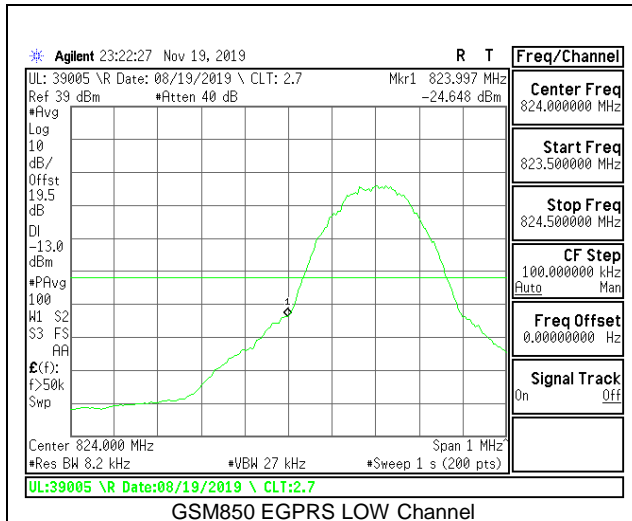
- Set the spectrum analyzer span to include the block edge frequency.
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

### **RESULTS**

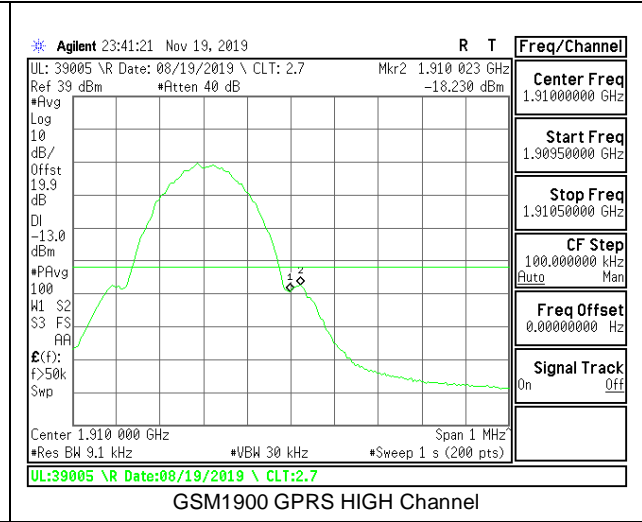
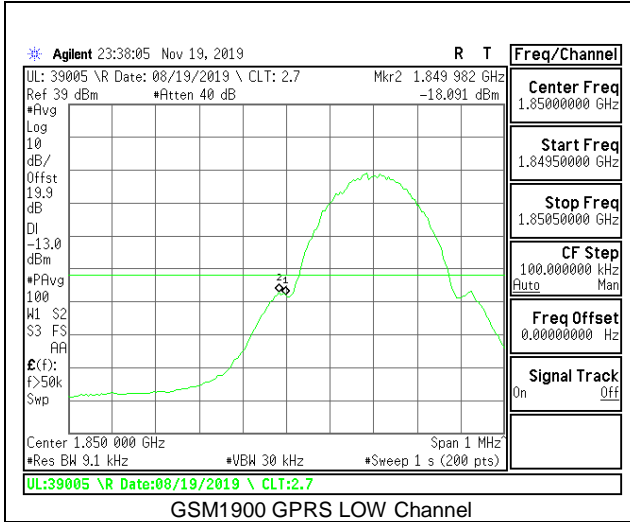
8.2.1. GSM GSM850  
 GPRS



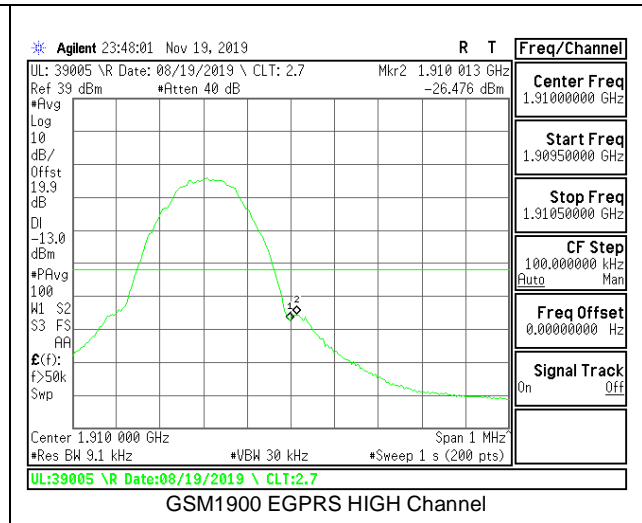
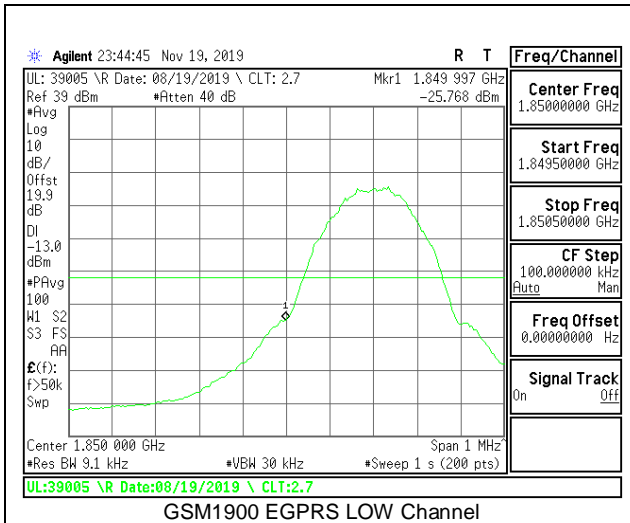
EGPRS



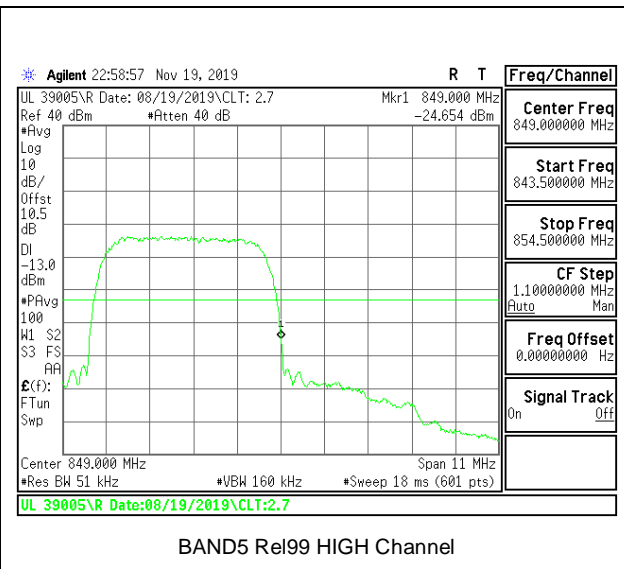
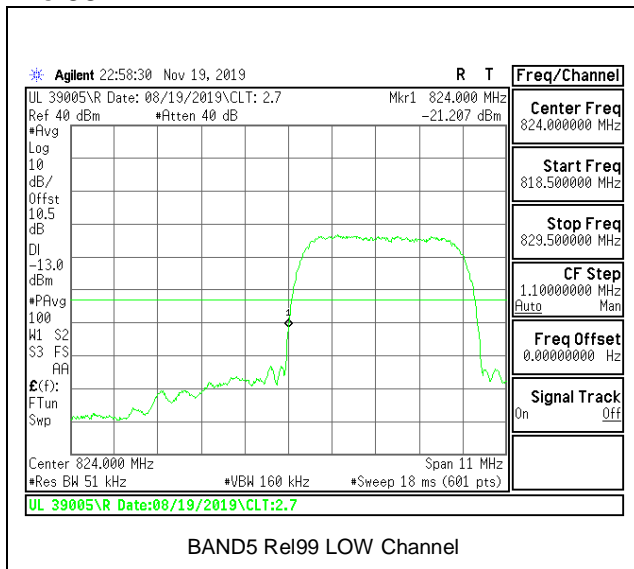
8.2.2. GSM GSM1900  
 GPRS



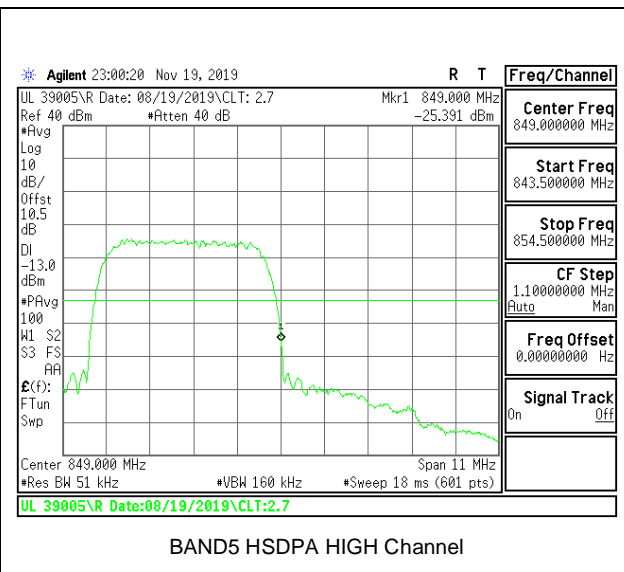
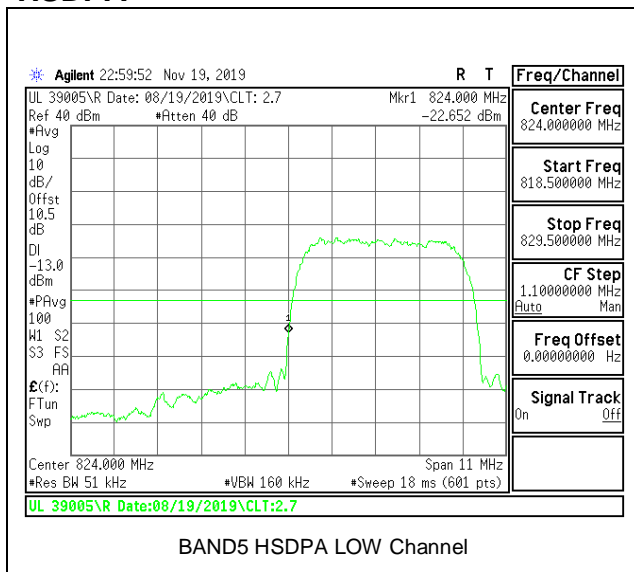
EGPRS



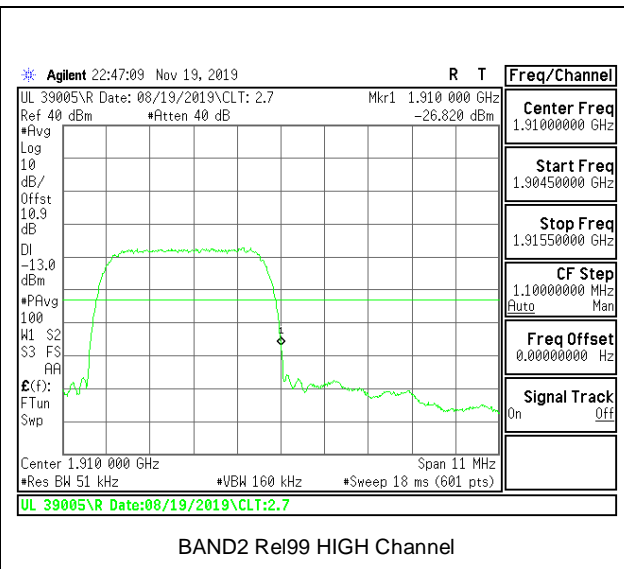
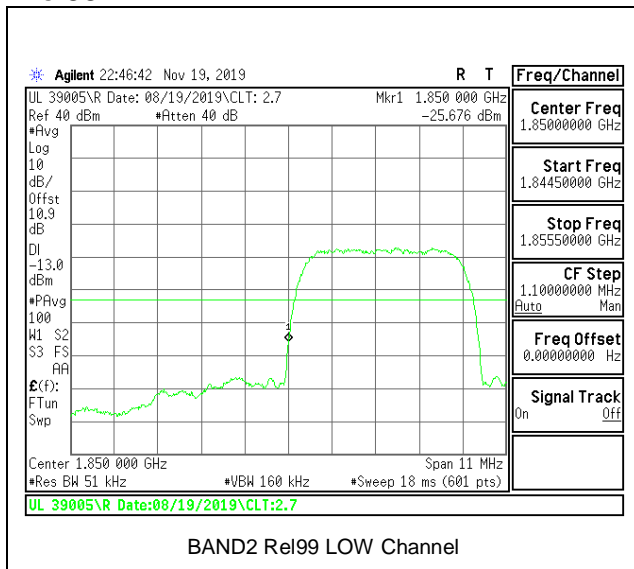
### 8.2.3. WCDMA BAND5 Rel99



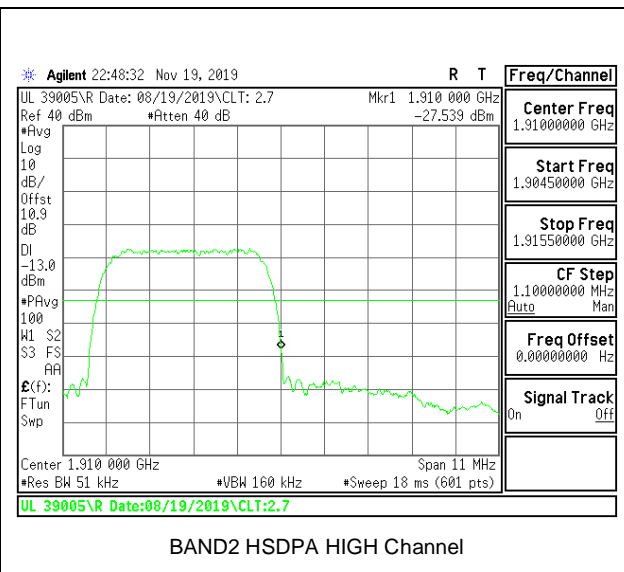
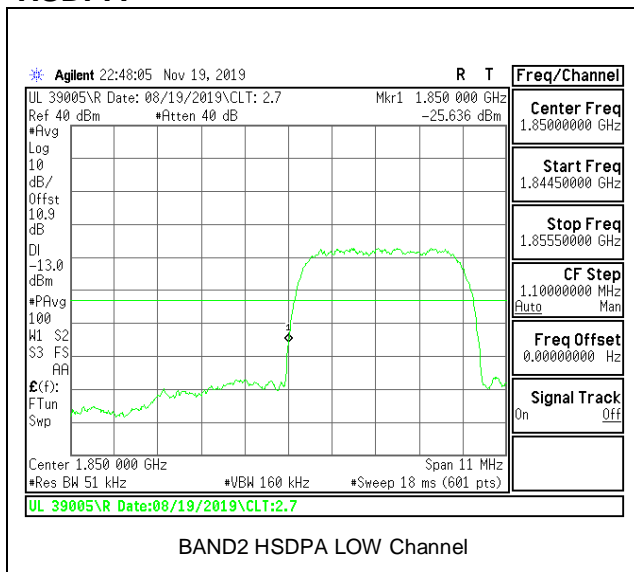
### HSDPA



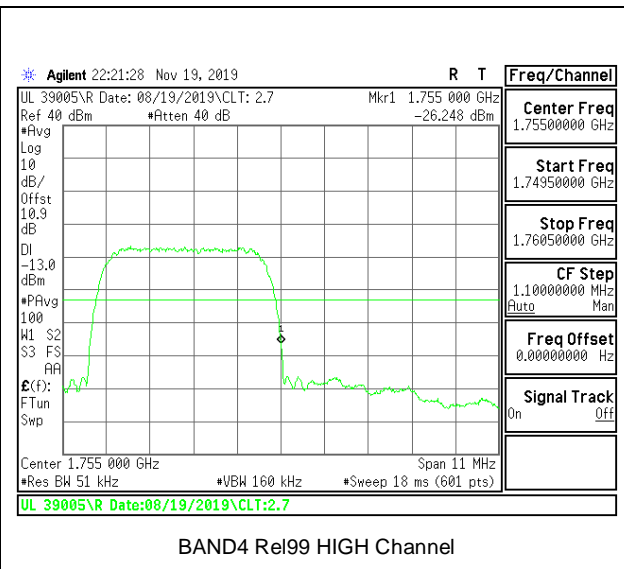
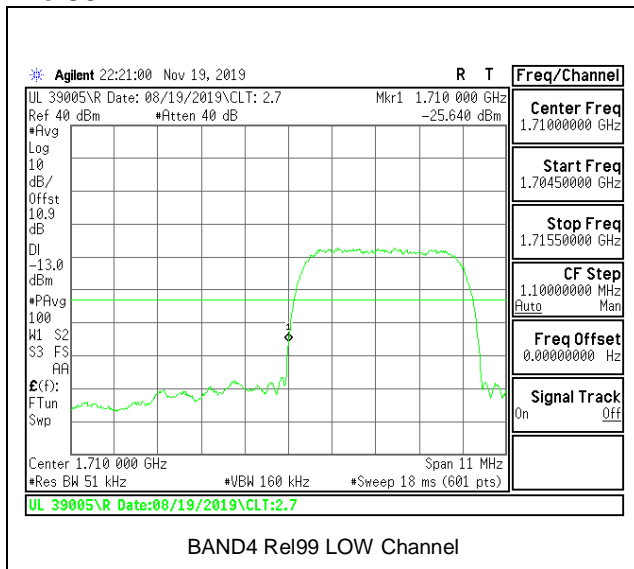
8.2.4. WCDMA BAND2  
 Rel99



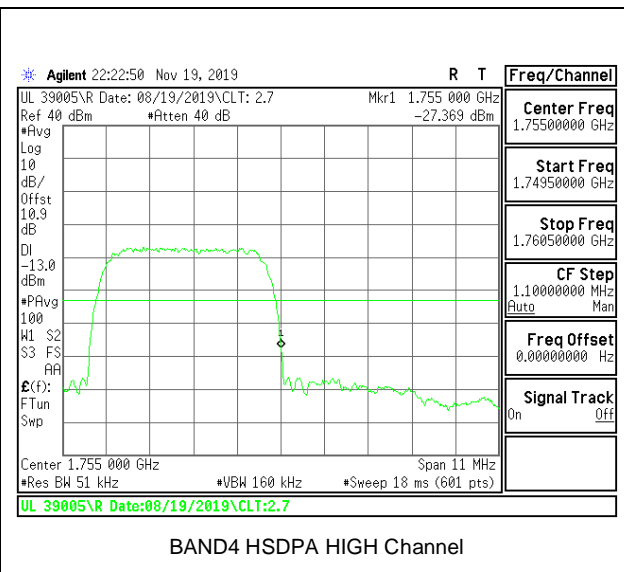
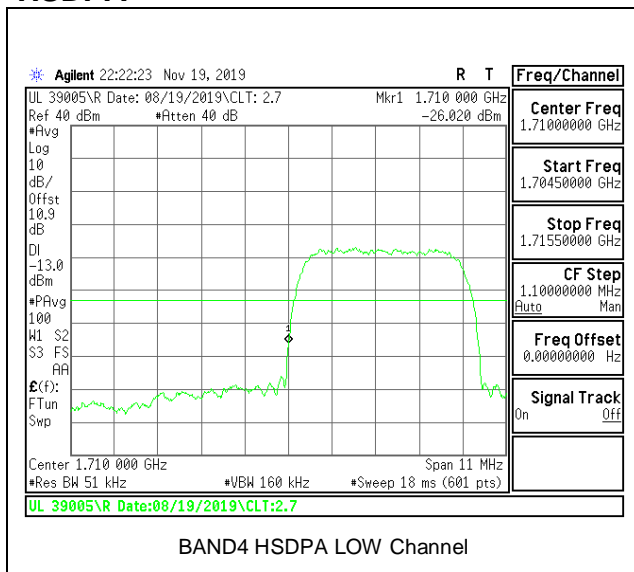
HSDPA



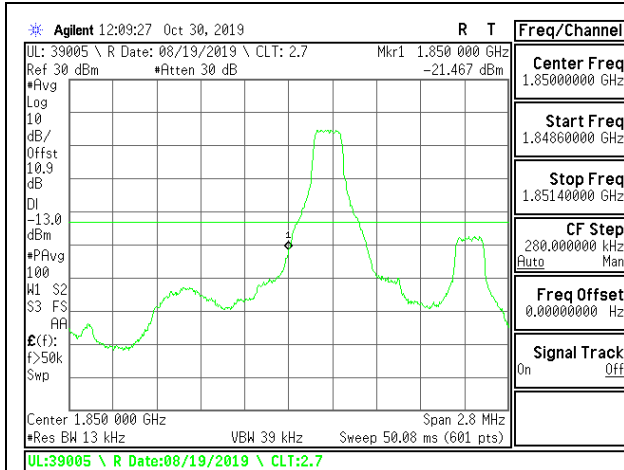
### 8.2.5. WCDMA BAND4 Rel99



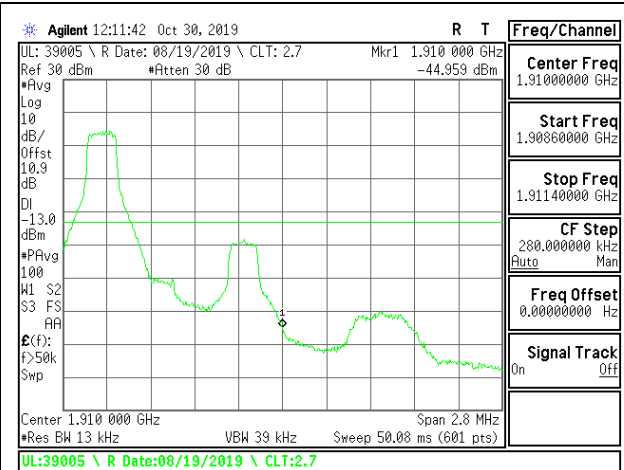
### HSDPA



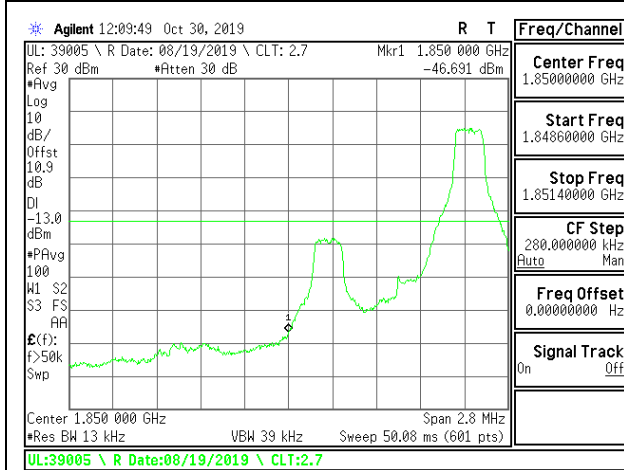
8.2.6. LTE BAND 2 BANDEDGE



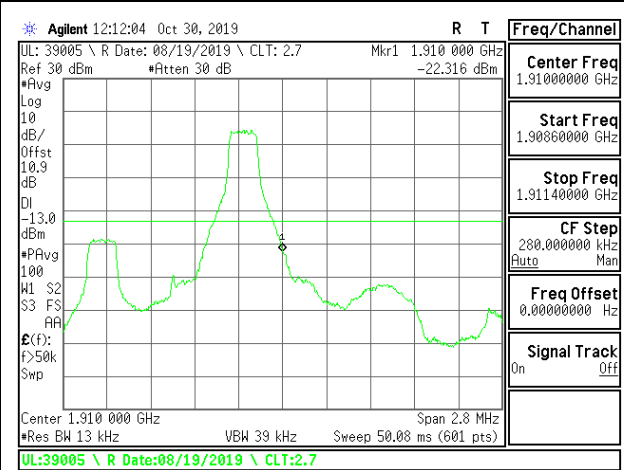
LTE B2 1.4MHz QPSK Low Channel RB1-0



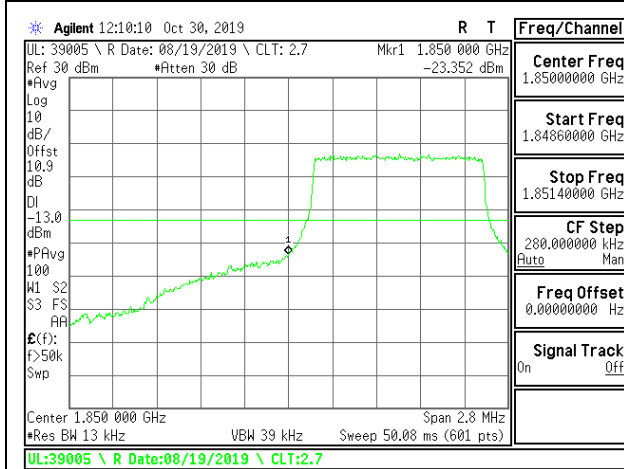
LTE B2 1.4MHz QPSK High Channel RB1-0



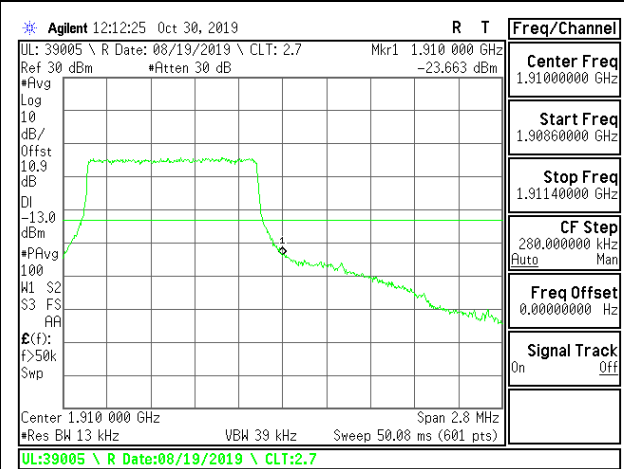
LTE B2 1.4MHz QPSK Low Channel RB1-5



LTE B2 1.4MHz QPSK High Channel RB1-5



LTE B2 1.4MHz QPSK Low Channel RB6-0



LTE B2 1.4MHz QPSK High Channel RB6-0