

# CERTIFICATION TEST REPORT

**Report Number.** : 4790976555-E2V2

**Applicant** : SAMSUNG ELECTRONICS CO., LTD.  
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,  
GYEONGGI-DO, 16677, KOREA

**Model** : SM-S921B/DS, SM-S921B

**FCC ID** : A3LSMS921B

**EUT Description** : GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax,  
NFC and WPT

**Test Standard(s)** : FCC 47 CFR PART 22 SUBPART H  
FCC 47 CFR PART 90 SUBPART S

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**Prepared by:**  
UL KOREA LTD.  
26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

Suwon Test Site: UL KOREA LTD. Suwon Laboratory  
218 Maeyeong-ro, Yeongtong-gu,  
Suwon-si, Gyeonggi-do, 16675, Korea  
TEL: (031) 337-9902  
FAX: (031) 213-5433

Revision History

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.

**EUT DESCRIPTION:** GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC and WPT.

**MODEL NUMBER:** SM-S921B/DS, SM-S921B

**SERIAL NUMBER:** R3CW80FKPKN, R3CW80FKP6R, R3CW80FKPWJ, R3CW80R6LQF, R3CW80FKPZP, R3CW90D5NAJ (CONDUCTED); R3CW80R6JZL, R3CW80R6KLB, R3CW80R6M1V, R3CW80R6L9H R3CW80R6LNE (RADIATED);

**DATE TESTED:** 2023-08-25 - 2023-10-18;

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H and 90S	Complies

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

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL KOREA LTD. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL KOREA LTD. 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 IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For  
UL KOREA LTD. By:

Tested By:



Seokhwan Hong  
Suwon Lab Engineer  
UL KOREA LTD.

Yeonhee Lim  
Suwon Lab Engineer  
UL KOREA LTD.

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC 47 CFR Part 2.
2. FCC 47 CFR Part 22.
3. FCC 47 CFR Part 90.
4. ANSI TIA-603-E, 2016
5. ANSI C63.26, 2015
6. KDB 971168 D01 Power Meas License Digital Systems v03r01
7. KDB 971168 D02 Misc Rev Approv License Devices v02r02
8. 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 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 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.

218 Maeyeong-ro	
<input checked="" type="checkbox"/>	Chamber 1(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 2(3m semi-anechoic chamber)
<input type="checkbox"/>	Chamber 3(3m semi-anechoic chamber)
<input type="checkbox"/>	Chamber 4(3m Full-anechoic chamber)
<input type="checkbox"/>	Chamber 5(3m Full-anechoic chamber)

UL KOREA LTD. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

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

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\text{ERP} = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss (between the SG and substitution antenna)}$$

(Path loss = Signal generator output – PSA reading with substitution antenna)

### 4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.80 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.92 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.06 dB
Radiated Disturbance, 18 GHz to 40 GHz	6.02 dB

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

### 4.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedure 2, Clause 4.4.3 in IEC Guide 115:2021.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC and WPT. This test report addresses the WWAN operational mode.

Representative model	Difference	Derivative model
		SM-S921B
SM-S921B/DS	Hardware	Different Sim Card tray
	Software	Same

The model SM-S921B/DS was used for final testing and is representative of the test results in this report.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum average radiated ERP output powers as follows:  
 Radiated samples were set to a higher power than conducted resulting in radiated ERP greater than conducted measurements.

#### GSM

FCC Part 22						
Band	Frequency Range [MHz]	Modulation	Conducted		Radiated	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
GSM850_ANT A	824.20 ~ 848.80	GPRS	<b>32.04</b>	<b>1599.56</b>	<b>30.13</b>	1031.54
		EGPRS	26.25	421.70	24.42	277.00
FCC Part 22						
Band	Frequency Range [MHz]	Modulation	Conducted		Radiated	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
GSM850_ANT E	824.20 ~ 848.80	GPRS	<b>32.55</b>	<b>1798.87</b>	<b>28.20</b>	661.43
		EGPRS	26.28	424.62	24.07	255.48

#### WCDMA

FCC Part 22						
Band	Frequency Range [MHz]	Modulation	Conducted		Radiated	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5_ANT A	826.40 ~ 846.60	Rel. 99	<b>24.02</b>	<b>252.35</b>	<b>20.95</b>	<b>124.49</b>
		HSDPA	21.93	155.96	18.34	68.26
FCC Part 22						
Band	Frequency Range [MHz]	Modulation	Conducted		Radiated	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5_ANT E	826.40 ~ 846.60	Rel. 99	<b>23.21</b>	<b>209.41</b>	<b>19.54</b>	<b>89.98</b>
		HSDPA	22.21	166.34	18.99	79.27

**LTE Band 5**

FCC Part 22							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5_ANT A	829.00 - 844.00	10	QPSK	23.73	236.05	<b>20.47</b>	<b>111.32</b>
			16QAM	22.99	199.07	19.47	88.42
			64QAM	22.24	167.49		
			256QAM	21.20	131.83		
	826.50 - 846.50	5	QPSK	23.72	235.50	20.43	110.30
			16QAM	22.86	193.20	19.34	85.81
			64QAM	22.00	158.49		
			256QAM	20.98	125.31		
	825.50 - 847.50	3	QPSK	23.69	233.88	20.08	101.76
			16QAM	22.92	195.88	19.05	80.27
			64QAM	21.92	155.60		
			256QAM	21.12	129.42		
	824.70 - 848.30	1.4	QPSK	<b>23.82</b>	<b>240.99</b>	20.11	102.46
			16QAM	22.85	192.75	18.94	78.26
			64QAM	22.14	163.68		
			256QAM	20.91	123.31		
FCC Part 22							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5_ANT E	829.00 - 844.00	10	QPSK	23.78	238.78	<b>20.33</b>	<b>107.79</b>
			16QAM	22.09	161.81	18.67	73.55
			64QAM	21.06	127.64		
			256QAM	19.19	82.99		
	826.50 - 846.50	5	QPSK	23.77	238.23	20.23	105.33
			16QAM	22.22	166.72	18.25	66.77
			64QAM	21.37	137.09		
			256QAM	19.08	80.91		
	825.50 - 847.50	3	QPSK	23.75	237.14	20.10	102.23
			16QAM	22.08	161.44	17.98	62.74
			64QAM	21.02	126.47		
			256QAM	18.91	77.80		
	824.70 - 848.30	1.4	QPSK	<b>23.80</b>	<b>239.88</b>	20.16	103.65
			16QAM	22.08	161.44	18.05	63.76
			64QAM	21.23	132.74		
			256QAM	19.05	80.35		



**LTE Band 26 (Part90)**

FCC Part 90							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 26_ANT A	821.50	15	QPSK	<b>23.70</b>	<b>234.42</b>	18.40	69.25
			16QAM	22.89	194.54	17.32	54.00
			64QAM	21.91	155.24		
			256QAM	20.85	121.62		
	819.00	10	QPSK	23.63	230.67	17.83	60.67
			16QAM	22.90	194.98	16.76	47.42
			64QAM	22.11	162.55		
			256QAM	20.85	121.62		
	816.50 ~ 821.50	5	QPSK	23.56	226.99	18.38	68.93
			16QAM	22.94	196.79	17.24	53.02
			64QAM	21.86	153.46		
			256QAM	20.85	121.62		
	815.50 ~ 822.50	3	QPSK	23.67	232.81	18.45	70.06
			16QAM	22.93	196.34	17.29	53.61
			64QAM	22.00	158.49		
			256QAM	20.81	120.50		
	814.70 ~ 823.30	1.4	QPSK	<b>23.70</b>	<b>234.42</b>	<b>18.49</b>	<b>70.55</b>
			16QAM	22.95	197.24	17.49	56.04
			64QAM	21.80	151.36		
			256QAM	20.85	121.62		

FCC Part 90							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 26_ANT E	821.50	15	QPSK	<b>23.18</b>	<b>207.97</b>	<b>19.33</b>	<b>85.79</b>
			16QAM	22.12	162.93	18.81	76.11
			64QAM	21.00	125.89		
			256QAM	18.53	71.29		
	819.00	10	QPSK	23.09	203.70	19.05	80.44
			16QAM	21.85	153.11	18.36	68.63
			64QAM	20.80	120.23		
			256QAM	18.34	68.23		
	816.50 ~ 821.50	5	QPSK	23.13	205.59	19.15	82.26
			16QAM	21.98	157.76	18.78	75.44
			64QAM	20.87	122.18		
			256QAM	18.27	67.14		
	815.50 ~ 822.50	3	QPSK	23.15	206.54	19.15	82.28
			16QAM	21.78	150.66	18.77	75.39
			64QAM	20.75	118.85		
			256QAM	18.41	69.34		
	814.70 ~ 823.30	1.4	QPSK	23.15	206.54	19.20	83.16
			16QAM	21.85	153.11	18.88	77.27
			64QAM	20.92	123.59		
			256QAM	18.22	66.37		

**LTE Band 26 (Straddle)**

Straddle							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated (ANT A+B)	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 26_ANT A	824.00	15	QPSK	23.65	231.74	18.59	72.32
			16QAM	22.63	183.23	17.62	57.84
			64QAM	21.80	151.36		
			256QAM	20.75	118.85		
		10	QPSK	<b>23.82</b>	<b>240.99</b>	18.42	69.54
			16QAM	23.02	200.45	17.51	56.40
			64QAM	22.02	159.22		
			256QAM	20.96	124.74		
		5	QPSK	23.69	233.88	18.37	68.75
			16QAM	23.18	207.97	17.37	54.61
			64QAM	21.95	156.68		
			256QAM	20.45	110.92		
		3	QPSK	23.69	233.88	18.53	71.32
			16QAM	22.97	198.15	17.48	56.01
			64QAM	22.20	165.96		
			256QAM	20.99	125.60		
		1.4	QPSK	23.71	234.96	<b>18.67</b>	<b>73.66</b>
			16QAM	22.77	189.23	17.57	57.18
			64QAM	22.05	160.32		
			256QAM	20.69	117.22		
Straddle							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated (ANT A+B)	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 26_ANT E	824.00	15	QPSK	23.15	206.54	19.03	79.98
			16QAM	21.94	156.31	18.05	63.83
			64QAM	20.92	123.59		
			256QAM	18.54	71.45		
		10	QPSK	23.15	206.54	19.05	80.35
			16QAM	21.85	153.11	18.04	63.68
			64QAM	20.99	125.60		
			256QAM	18.52	71.12		
		5	QPSK	<b>23.20</b>	<b>208.93</b>	18.94	78.34
			16QAM	21.84	152.76	17.90	61.66
			64QAM	20.84	121.34		
			256QAM	18.40	69.18		
		3	QPSK	23.05	201.84	18.75	74.99
			16QAM	21.85	153.11	17.82	60.53
			64QAM	20.75	118.85		
			256QAM	18.25	66.83		
		1.4	QPSK	23.10	204.17	<b>19.09</b>	<b>81.10</b>
			16QAM	22.02	159.22	18.10	64.57
			64QAM	21.02	126.47		
			256QAM	18.22	66.37		

**LTE Band 26 (Part22)**

FCC Part 22							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 26_ANT A	831.50 - 841.50	15	QPSK	23.84	242.10	19.87	96.95
			16QAM	23.09	203.70	18.91	77.73
			64QAM	22.04	159.96		
			256QAM	20.95	124.45		
	829.00 - 844.00	10	QPSK	23.85	242.66	19.67	92.70
			16QAM	23.15	206.54	18.55	71.63
			64QAM	22.14	163.68		
			256QAM	21.27	133.97		
	826.50 - 846.50	5	QPSK	23.73	236.05	19.57	90.57
			16QAM	23.08	203.24	18.53	71.30
			64QAM	22.43	174.98		
			256QAM	21.19	131.52		
	825.50 - 847.50	3	QPSK	23.76	237.68	19.75	94.39
			16QAM	23.06	202.30	18.57	71.93
			64QAM	22.18	165.20		
			256QAM	21.16	130.62		
	824.70 - 848.30	1.4	QPSK	<b>23.88</b>	<b>244.34</b>	<b>19.89</b>	<b>97.52</b>
			16QAM	23.28	212.81	18.61	72.62
			64QAM	22.36	172.19		
			256QAM	20.94	124.17		
FCC Part 22							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 26_ANT E	831.50 - 841.50	15	QPSK	23.24	210.86	19.19	82.95
			16QAM	22.08	161.44	18.72	74.55
			64QAM	21.35	136.46		
			256QAM	18.91	77.80		
	829.00 - 844.00	10	QPSK	23.30	213.80	19.02	79.74
			16QAM	22.14	163.68	18.89	77.41
			64QAM	21.14	130.02		
			256QAM	18.67	73.62		
	826.50 - 846.50	5	QPSK	23.18	207.97	19.18	82.78
			16QAM	22.09	161.81	18.69	74.02
			64QAM	21.29	134.59		
			256QAM	18.61	72.61		
	825.50 - 847.50	3	QPSK	23.17	207.49	19.21	83.30
			16QAM	22.05	160.32	18.71	74.23
			64QAM	21.14	130.02		
			256QAM	18.68	73.79		
	824.70 - 848.30	1.4	QPSK	<b>23.33</b>	<b>215.28</b>	<b>19.21</b>	<b>83.38</b>
			16QAM	21.94	156.31	18.96	78.72
			64QAM	21.14	130.02		
			256QAM	18.42	69.50		

**NR Band n5**

FCC Part 22								
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Mode	Conducted		Radiated	
					Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
n5_ANT A	834.00 - 839.00	20	DFT-s OFDM	$\pi/2$ BPSK	23.79	239.33		
				QPSK	23.76	237.68	<b>20.28</b>	<b>106.64</b>
				16QAM	22.73	187.50	19.36	86.28
				64QAM	21.27	133.97		
			256QAM	19.25	84.14			
	CP-OFDM	QPSK	22.22	166.72				
	831.50 - 841.50	15	DFT-s OFDM	$\pi/2$ BPSK	<b>23.80</b>	<b>239.88</b>		
				QPSK	23.77	238.23	20.17	104.01
				16QAM	22.78	189.67	19.18	82.81
				64QAM	21.27	133.97		
			256QAM	19.27	84.53			
	CP-OFDM	QPSK	22.29	169.43				
	829.00 - 844.00	10	DFT-s OFDM	$\pi/2$ BPSK	23.77	238.23		
				QPSK	23.79	239.33	20.19	104.37
				16QAM	22.77	189.23	19.10	81.20
				64QAM	21.21	132.13		
			256QAM	19.29	84.92			
	CP-OFDM	QPSK	22.21	166.34				
	826.50 - 846.50	5	DFT-s OFDM	$\pi/2$ BPSK	23.79	239.33		
				QPSK	23.78	238.78	20.24	105.69
16QAM				22.67	184.93	19.34	85.91	
64QAM				21.30	134.90			
256QAM			19.30	85.11				
CP-OFDM	QPSK	22.23	167.11					
FCC Part 22								
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Mode	Conducted		Radiated	
					Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
n5_ANT E	834.00 - 839.00	20	DFT-s OFDM	$\pi/2$ BPSK	23.84	242.10		
				QPSK	23.87	243.78	19.00	79.50
				16QAM	22.92	195.88	18.73	74.70
				64QAM	21.51	141.58		
			256QAM	19.39	86.90			
	CP-OFDM	QPSK	22.43	174.98				
	831.50 - 841.50	15	DFT-s OFDM	$\pi/2$ BPSK	23.85	242.66		
				QPSK	23.85	242.66	19.22	83.46
				16QAM	22.90	194.98	18.84	76.47
				64QAM	21.53	142.23		
			256QAM	19.38	86.70			
	CP-OFDM	QPSK	22.38	172.98				
	829.00 - 844.00	10	DFT-s OFDM	$\pi/2$ BPSK	<b>23.98</b>	<b>250.03</b>		
				QPSK	23.96	248.89	<b>19.28</b>	<b>84.78</b>
				16QAM	22.89	194.54	18.33	68.12
				64QAM	21.42	138.68		
			256QAM	19.43	87.70			
	CP-OFDM	QPSK	22.39	173.38				
	826.50 - 846.50	5	DFT-s OFDM	$\pi/2$ BPSK	23.86	243.22		
				QPSK	23.86	243.22	18.76	75.13
16QAM				22.87	193.64	17.93	62.06	
64QAM				21.42	138.68			
256QAM			19.46	88.31				
CP-OFDM	QPSK	22.40	173.78					

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a internal antenna for the supported bands with a maximum peak gain as follow:

Frequency (MHz)	Peak Gain (dBd)
GSM850 / WCDMA Band 5 / LTE Band 5, 26 / NR Band n5 814 - 849 MHz	-7.0 (ANT A) -7.0 (ANT E)

### 5.4. WORST-CASE ORIENTATION

Following modes should be considered as worst-case scenario for all other measurements.

- GSM GPRS/EGPRS
- UMTS REL 99/HSDPA

For LTE Bands 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, 64QAM and 256QAM modulations. It was found QPSK and 16QAM results were worst case.

For 5G NR the worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on  $\pi/2$  BPSK, QPSK, 16QAM, 64QAM and 256QAM modulations. It was found QPSK and 16QAM results were worst case.

This device supports AS (Antenna Switching) Mode. So the test case is as below.

Test Item	Test case antenna & port
Conducted output power	All
RF port test	Worst case
e.r.p	All
Radiated Spurious Emissions	All

As for the conducted test, 'Main ANT' is the same or higher than 'Sub ANT', so we tested with 'Main ANT'.

Band	Main antenna	Tune-up Limit (dBm)	Sub antenna	Tune-up Limit (dBm)
GSM 850	<u>A</u>	<u>33.0</u>	E	33.0
WCDMA B5	<u>A</u>	<u>25.0</u>	E	24.5
LTE B5	<u>A</u>	<u>25.0</u>	E	24.5
LTE B26	<u>A</u>	<u>24.5</u>	E	24.0
NR n5	<u>A</u>	<u>25.5</u>	E	25.0

For LTE anchor, the band with highest output power was chosen among the possible combinations with NR Bands.

NR Band	LTE Band
N5 (ANT A)	2, <u>66</u>
N5 (ANT E)	2, <u>66</u>

● Conducted Spurious Emission (ANT A)

Highest conducted output power setting for each bands				
LTE Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
26 (Part 90)	821.5	15	1	0
26 (Straddle)	824.0	10	1	0
26 (Part 22)	824.7	1.4	1	5
	831.5		1	3
	848.3		1	0
NR Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
5	834.0	20	1	52
	836.5		1	52
	839.0		1	1

● Radiated Spurious Emission (ANT A)

Highest conducted output power setting for each bands				
LTE Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
26 (Part 90)	814.7	1.4	1	0
	823.3		1	0
26 (Straddle)	824.0	1.4	1	3
26 (Part 22)	824.7	1.4	1	5
	831.5		1	3
	848.3		1	0
NR Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
5	834.0	20	1	53
	836.5		1	53
	839.0		1	1

● Radiated Spurious Emission (ANT E)

Highest conducted output power setting for each bands				
LTE Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
26 (Part 90)	821.5	15	1	0
26 (Straddle)	824.0	1.4	1	0
26 (Part 22)	824.7	1.4	1	0
	831.5		1	0
	848.3		1	0
NR Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
5	829.0	10	1	25
	836.5		1	49
	844.0		1	0

The fundamental and radiated spurious emission were investigated in three orthogonal orientations X, Y and Z and folded conditions it was determined that below orientation was worst-case orientation for each band.

Band	ANT	ERP			RSE		
		X	Y	Z	X	Y	Z
GSM 850	A	-	-	O	-	-	O
	E	-	-	O	-	-	O
WCDMA B5	A	-	-	O	-	-	O
	E	O	-	-	O	-	-
LTE B26	A	-	-	O	O	-	-
	E	-	-	O	O	-	-
NR n5	A	-	-	O	-	-	O
	E	-	-	O	-	O	-

Note : For radiated testing, the EUT attached with travel adapter for the worst case condition. The EUT is continuously communicated with the call box during the tests.

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacture	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37T53J8459SEA	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02111A	N/A

### I/O CABLE

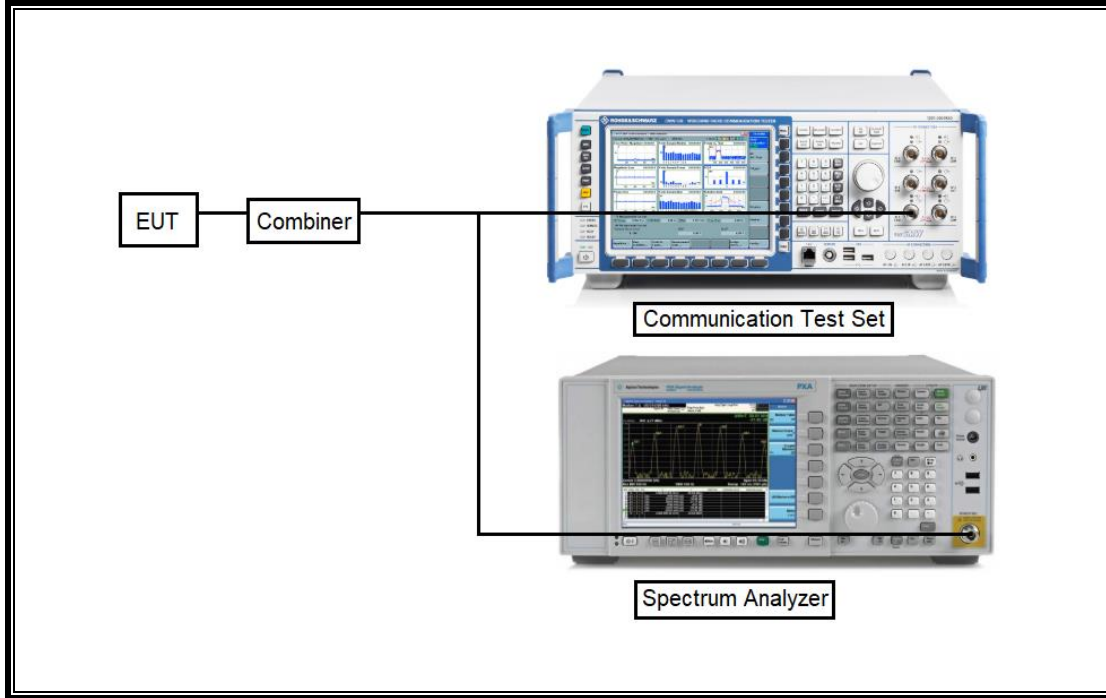
I/O Cable List						
Cable No.	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	C Type	Shielded	1.0 m	N/A

### TEST SETUP

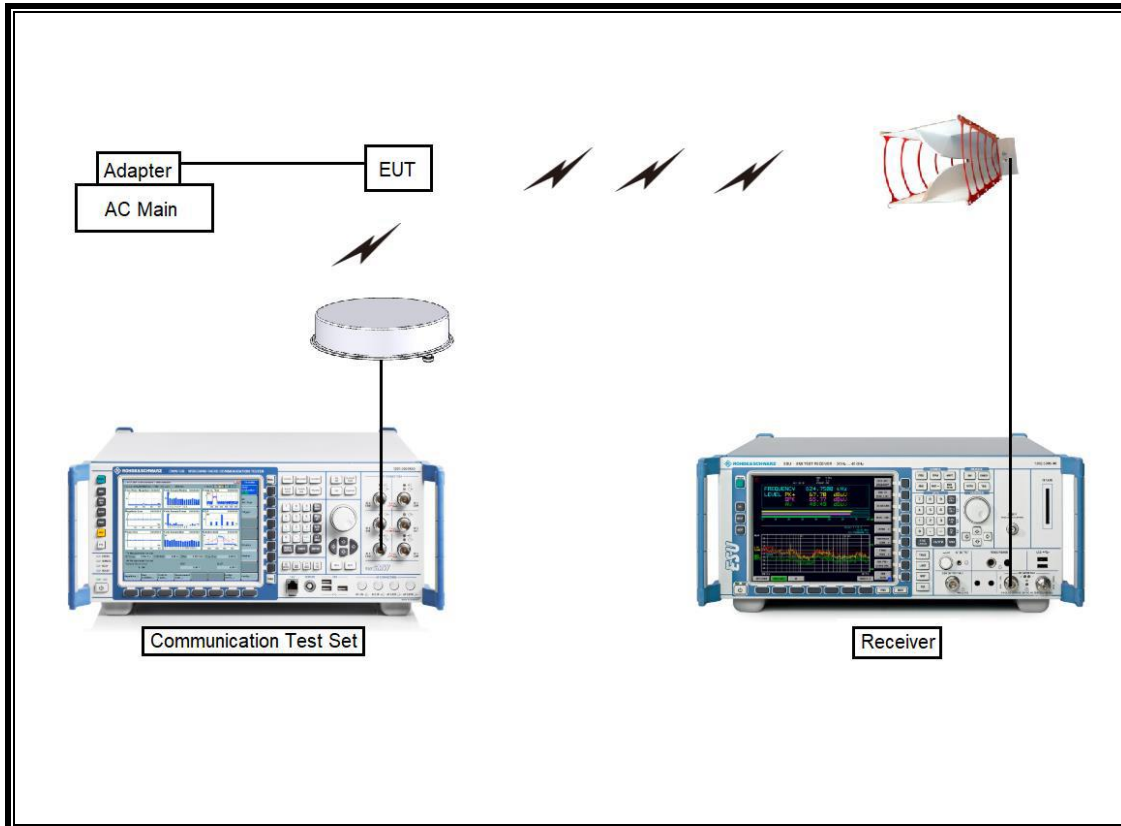
The EUT is continuously communicated with the call box during the tests.



**SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)**



**SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	Manufacturer	Model	S/N	Cal Due
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121D DB4	00164753	2025-01-17
Directional Antenna	Cobham	FPA3-0.8-6.0R/1329	110367-0003	N/A
Directional Antenna	Cobham	FPA3-0.8-6.0R/1329	80108-0004	N/A
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2024-08-02
Antenna, Horn, 40 GHz	ETS	3116C	00168645	2025-10-05
Preamplifier	ETS	3115-PA	00167475	2024-07-25
Preamplifier	ETS	3116C-PA	00168841	2024-07-25
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2024-08-15
Antenna, Horn, 18 GHz	ETS	3115	00167211	2024-08-04
Antenna, Horn, 18 GHz	ETS	3115	00161451	2024-08-21
Antenna, Horn, 18 GHz	ETS	3117	00168724	2024-08-04
Antenna, Horn, 18 GHz	ETS	3117	00168717	2024-08-21
Communications Test Set	R&S	CMV500	169796	2024-01-05
DC Power Supply	Agilent / HP	E3640A	MY54226395	2024-07-24
Preamplifier, 1000 MHz	Sonoma	310N	341282	2024-07-24
Preamplifier, 1000 MHz	Sonoma	310N	370599	2024-07-24
Preamplifier, 1000 MHz	Sonoma	310N	351741	2024-07-24
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2024-07-24
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2024-07-25
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2024-07-25
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2024-07-24
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030B	MY60070693	2024-01-09
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2024-07-23
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2024-07-24
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G005	2024-07-23
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G006	2024-07-23
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	010	2024-07-24
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	011	2024-07-24
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G001	2024-07-24
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G002	2024-07-24
Attenuator	PASTERNAK	PE7087-10	A009	2024-07-24
Attenuator	PASTERNAK	PE7087-10	A001	2024-07-24
Attenuator	PASTERNAK	PE7087-10	A008	2024-07-27
Attenuator	PASTERNAK	PE7004-10	2	2024-07-23
Attenuator	PASTERNAK	PE7395-10	A011	2024-07-25
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2025-09-06
Temperature Chamber	ESPEC	SH-642	93001109	2024-07-24
Power Splitter	MINI-CIRCUITS	WA1534	UL003	2024-01-09
Power Splitter	MINI-CIRCUITS	WA1534	UL004	2024-01-09
UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY57510655	2024-01-09
UL Software				
Description	Manufacturer	Model	Version	
Antenna port test software	UL	CLT	Ver 3.4	
Radiated software	UL	UL EMC	Ver 9.5	
Antenna port test software (5G NR FR1)	UL	UL iM	Ver 1.06	

## 7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
2.1049	Occupied Band width (99%)	N/A	Conducted	Pass
22.917(a)	Band Edge / Conducted Spurious Emission	-13dBm		Pass
90.691	Emission mask	Section 9.2.2		Pass
2.1046	Conducted output power	N/A		Pass
90.635(b)		50 dBm		Pass
22.355 90.213	Frequency Stability	2.5PPM		Pass
22.913(a)(5)	Effective Radiated Power	38.5dBm	Radiated	Pass
90.635(b)		34.77dBm		Pass
22.917(a) 90.691(a)	Radiated Spurious Emission	-13dBm		Pass

## 8. CONDUCTED RESULTS

### 8.1. CONDUCTED OUTPUT POWER

#### Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v03r01;

The transmitter output was connected to either CMW500 Test Set or E7515B Test set and configured to operate at maximum power.

#### NOTE

5G NR: All Waveforms (CP-OFDM vs DFT-s\_OFDM) and modulations ( $\pi/2$  BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

#### RESULTS

See the following pages.

### 8.1.1. CONDUCTED AVERAGE OUTPUT POWER

#### GSM (ANT A)

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM (Voice)	CS1	1	128	824.2	31.84	22.81	33.0	24.0
			190	836.6	31.91	22.88		
			251	848.8	32.04	23.01		
GPRS (GMSK)	CS1	1	128	824.2	31.82	22.79	33.0	24.0
			190	836.6	31.91	22.88		
			251	848.8	31.87	22.84		
		2	128	824.2	29.88	23.86	32.0	26.0
			190	836.6	31.99	25.97		
			251	848.8	30.38	24.36		
		3	128	824.2	28.70	24.44	29.5	25.2
			190	836.6	28.46	24.20		
			251	848.8	28.80	24.54		
		4	128	824.2	26.94	23.93	28.0	25.0
			190	836.6	27.10	24.09		
			251	848.8	27.20	24.19		
EGPRS (8PSK)	MCS5	1	128	824.2	26.15	17.12	28.5	19.5
			190	836.6	26.21	17.18		
			251	848.8	26.25	17.22		
		2	128	824.2	24.32	18.30	26.5	20.5
			190	836.6	26.19	20.17		
			251	848.8	24.35	18.33		
		3	128	824.2	23.09	18.83	25.0	20.7
			190	836.6	23.05	18.79		
			251	848.8	23.02	18.76		
		4	128	824.2	21.95	18.94	23.5	20.5
			190	836.6	23.08	20.07		
			251	848.8	21.34	18.33		

**GSM (ANT E)**

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM (Voice)	CS1	1	128	824.2	32.40	23.37	33.0	24.0
			190	836.6	32.21	23.18		
			251	848.8	32.09	22.50		
GPRS (GMSK)	CS1	1	128	824.2	32.55	26.53	33.0	24.0
			190	836.6	32.36	26.34		
			251	848.8	32.18	23.15		
		2	128	824.2	30.49	24.47	32.0	26.0
			190	836.6	30.24	24.22		
			251	848.8	30.04	24.02		
		3	128	824.2	29.08	24.82	29.5	25.2
			190	21.2	29.08	24.82		
			251	848.8	28.89	24.63		
		4	128	824.2	27.96	24.95	28.0	25.0
			190	836.6	27.93	24.92		
			251	848.8	27.70	24.69		
EGPRS (8PSK)	MCS5	1	128	824.2	26.28	17.25	27.5	18.5
			190	836.6	26.00	16.97		
			251	848.8	25.66	16.63		
		2	128	824.2	24.18	18.16	26.0	20.0
			190	836.6	24.01	17.99		
			251	848.8	23.50	17.48		
		3	128	824.2	23.11	18.85	24.5	20.2
			190	836.6	23.28	19.02		
			251	848.8	23.15	18.89		
		4	128	824.2	21.88	18.87	22.5	19.5
			190	836.6	21.50	18.49		
			251	848.8	20.96	17.95		

**WCDMA B5 (ANT A)**

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	4132	826.4	23.98	N/A	25.0
		4183	836.6	23.91		
		4233	846.6	24.02		
HSDPA	Subtest 1	4132	826.4	21.89	0	22.0
		4183	836.6	21.83		
		4233	846.6	21.93		
	Subtest 2	4132	826.4	20.90	0	22.0
		4183	836.6	20.83		
		4233	846.6	20.91		
	Subtest 3	4132	826.4	20.88	0.5	21.5
		4183	836.6	20.83		
		4233	846.6	20.94		
	Subtest 4	4132	826.4	19.94	0.5	21.5
		4183	836.6	19.90		
		4233	846.6	19.94		
HSUPA	Subtest 1	4132	826.4	21.07	0	23.0
		4183	836.6	20.98		
		4233	846.6	21.09		
	Subtest 2	4132	826.4	19.03	2	21.0
		4183	836.6	18.95		
		4233	846.6	19.06		
	Subtest 3	4132	826.4	20.15	1	22.0
		4183	836.6	20.04		
		4233	846.6	20.12		
	Subtest 4	4132	826.4	19.09	2	21.0
		4183	836.6	18.99		
		4233	846.6	19.10		
	Subtest 5	4132	826.4	22.19	0	23.0
		4183	836.6	22.08		
		4233	846.6	22.14		
DC-HSDPA	Subtest 1	4132	826.4	22.11	0	23.0
		4183	836.6	22.38		
		4233	846.6	22.28		
	Subtest 2	4132	826.4	21.20	0	23.0
		4183	836.6	21.37		
		4233	846.6	21.28		
	Subtest 3	4132	826.4	20.28	0.5	22.5
		4183	836.6	20.42		
		4233	846.6	20.28		
	Subtest 4	4132	826.4	20.21	0.5	22.5
		4183	836.6	20.37		
		4233	846.6	20.24		

**WCDMA B5 (ANT E)**

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	4132	826.4	23.13	N/A	24.5
		4183	836.6	23.09		
		4233	846.6	23.21		
HSDPA	Subtest 1	4132	826.4	22.19	0	22.5
		4183	836.6	22.13		
		4233	846.6	22.21		
	Subtest 2	4132	826.4	21.70	0	22.5
		4183	836.6	21.63		
		4233	846.6	21.72		
	Subtest 3	4132	826.4	21.10	0.5	22.0
		4183	836.6	21.04		
		4233	846.6	21.24		
	Subtest 4	4132	826.4	20.67	0.5	22.0
		4183	836.6	20.58		
		4233	846.6	20.60		
HSUPA	Subtest 1	4132	826.4	21.13	0	22.5
		4183	836.6	22.11		
		4233	846.6	22.16		
	Subtest 2	4132	826.4	19.15	2	20.5
		4183	836.6	19.04		
		4233	846.6	19.11		
	Subtest 3	4132	826.4	20.11	1	21.5
		4183	836.6	20.00		
		4233	846.6	20.09		
	Subtest 4	4132	826.4	19.15	2	20.5
		4183	836.6	19.05		
		4233	846.6	19.11		
	Subtest 5	4132	826.4	22.19	0	22.5
		4183	836.6	22.09		
		4233	846.6	22.15		
DC-HSDPA	Subtest 1	4132	826.4	22.15	0	22.5
		4183	836.6	22.28		
		4233	846.6	22.10		
	Subtest 2	4132	826.4	21.67	0	22.5
		4183	836.6	21.83		
		4233	846.6	21.73		
	Subtest 3	4132	826.4	20.10	0.5	22.0
		4183	836.6	20.25		
		4233	846.6	20.18		
	Subtest 4	4132	826.4	20.66	0.5	22.0
		4183	836.6	20.76		
		4233	846.6	20.67		



**LTE Band 5 (ANT A)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					
				Measured Pwr (dBm)			MPR	Tune-up Limit	
				20450	20525	20600			
				829 MHz	836.5 MHz	844 MHz			
10 MHz	QPSK	1	0	23.68	<b>23.73</b>	23.64	0.0	25.0	
		1	25	23.69	23.59	23.64	0.0	25.0	
		1	49	23.71	23.72	23.63	0.0	25.0	
		25	0	22.70	<b>22.79</b>	22.71	1.0	24.0	
		25	12	22.75	22.76	22.67	1.0	24.0	
		25	25	22.73	22.75	22.65	1.0	24.0	
	16QAM	50	0	22.76	22.78	22.68	1.0	24.0	
		1	0	22.91	22.88	22.99	1.0	24.0	
		1	25	22.97	22.72	22.93	1.0	24.0	
		1	49	22.73	22.77	22.90	1.0	24.0	
		25	0	21.80	21.84	21.74	1.0	24.0	
		25	12	21.77	21.79	21.70	1.0	24.0	
	64QAM	25	25	21.76	21.78	21.68	1.0	24.0	
		50	0	21.79	21.77	21.68	1.0	24.0	
		1	0	22.16	22.21	22.07	1.0	24.0	
		1	25	22.11	22.24	22.11	1.0	24.0	
		1	49	22.09	22.20	21.96	1.0	24.0	
		25	0	20.94	20.84	20.89	2.0	23.0	
	256QAM	25	12	20.92	20.81	20.85	2.0	23.0	
		25	25	20.88	20.80	20.84	2.0	23.0	
		50	0	20.90	20.81	20.83	2.0	23.0	
		1	0	20.79	21.14	21.12	2.0	23.0	
		1	25	20.79	21.10	21.20	2.0	23.0	
		1	49	20.71	21.01	20.98	2.0	23.0	
	5 MHz	QPSK	25	0	18.99	18.89	18.91	5.0	20.0
			25	12	18.98	18.84	18.95	5.0	20.0
			25	25	18.94	18.81	18.91	5.0	20.0
			50	0	18.91	18.79	18.88	5.0	20.0
1			0	23.70	23.63	23.51	0.0	25.0	
1			12	23.72	23.51	23.52	0.0	25.0	
16QAM		1	24	23.65	23.62	23.49	0.0	25.0	
		12	0	22.68	22.69	22.52	1.0	24.0	
		12	7	22.64	22.69	22.52	1.0	24.0	
		12	13	22.63	22.67	22.46	1.0	24.0	
		25	0	22.65	22.67	22.52	1.0	24.0	
		1	0	22.86	22.85	22.74	1.0	24.0	
64QAM		1	12	22.74	22.66	22.67	1.0	24.0	
		1	24	22.78	22.76	22.71	1.0	24.0	
		12	0	21.64	21.72	21.53	2.0	23.0	
		12	7	21.63	21.72	21.54	2.0	23.0	
		12	13	21.61	21.70	21.54	2.0	23.0	
		25	0	21.64	21.68	21.57	2.0	23.0	
256QAM		1	0	21.98	21.90	22.00	2.0	23.0	
		1	12	21.92	21.75	21.79	2.0	23.0	
		1	24	21.95	21.86	21.76	2.0	23.0	
		12	0	20.70	20.86	20.65	3.0	22.0	
		12	7	20.68	20.85	20.65	3.0	22.0	
		12	13	20.64	20.84	20.64	3.0	22.0	
256QAM		25	0	20.72	20.80	20.70	3.0	22.0	
		1	0	20.79	20.81	20.98	3.0	22.0	
		1	12	20.58	20.85	20.87	3.0	22.0	
		1	24	20.75	20.82	20.98	3.0	22.0	
	12	0	18.75	18.87	18.81	5.0	20.0		
	12	7	18.77	18.89	18.84	5.0	20.0		
256QAM	12	13	18.78	18.92	18.81	5.0	20.0		
	25	0	18.80	18.92	18.74	5.0	20.0		

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20415	20525	20635		
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	23.69	23.67	23.62	0.0	25.0
		1	8	23.36	23.59	23.55	0.0	25.0
		1	14	23.66	23.61	23.60	0.0	25.0
		8	0	22.59	22.68	22.52	1.0	24.0
		8	4	22.57	22.70	22.55	1.0	24.0
		8	7	22.61	22.68	22.59	1.0	24.0
	16QAM	15	0	22.62	22.72	22.54	1.0	24.0
		1	0	22.73	22.90	22.70	1.0	24.0
		1	8	22.68	22.80	22.70	1.0	24.0
		1	14	22.66	22.92	22.60	1.0	24.0
		8	0	21.69	21.83	21.58	2.0	23.0
		8	4	21.65	21.82	21.54	2.0	23.0
	64QAM	8	7	21.68	21.83	21.57	2.0	23.0
		15	0	21.60	21.76	21.59	2.0	23.0
		1	0	21.92	21.87	21.64	2.0	23.0
		1	8	21.84	21.73	21.56	2.0	23.0
		1	14	21.92	21.73	21.60	2.0	23.0
		8	0	20.83	20.86	20.73	2.0	23.0
	256QAM	8	4	20.80	20.82	20.74	2.0	23.0
		8	7	20.83	20.86	20.80	2.0	23.0
		15	0	20.66	20.83	20.73	2.0	23.0
		1	0	21.11	20.85	20.93	2.0	23.0
		1	8	20.98	20.73	20.85	2.0	23.0
		1	14	21.12	20.83	20.85	2.0	23.0
1.4 MHz	QPSK	8	0	18.82	18.82	18.77	5.0	20.0
		8	4	18.80	18.88	18.76	5.0	20.0
		8	7	18.82	18.86	18.79	5.0	20.0
		15	0	18.84	18.98	18.85	5.0	20.0
		1	0	23.67	23.82	23.62	0.0	25.0
		1	3	23.76	23.63	23.60	0.0	25.0
	16QAM	1	5	23.69	23.78	23.58	0.0	25.0
		3	0	23.76	23.76	23.52	0.0	25.0
		3	1	23.69	23.76	23.49	0.0	25.0
		3	3	23.61	23.61	23.51	0.0	25.0
		6	0	22.65	22.75	22.47	1.0	24.0
		1	0	22.63	22.78	22.53	1.0	24.0
	64QAM	1	3	22.74	22.79	22.51	1.0	24.0
		1	5	22.63	22.85	22.56	1.0	24.0
		3	0	22.72	22.76	22.63	1.0	24.0
		3	1	22.65	22.78	22.56	1.0	24.0
		3	3	22.68	22.66	22.54	1.0	24.0
		6	0	21.56	21.85	21.57	1.0	24.0
	256QAM	1	0	21.57	22.14	21.70	1.0	24.0
		1	3	21.51	21.92	21.84	1.0	24.0
		1	5	21.56	22.03	21.67	1.0	24.0
		3	0	21.87	21.83	21.58	1.0	24.0
		3	1	21.80	21.78	21.55	1.0	24.0
		3	3	21.83	21.72	21.51	1.0	24.0
QPSK	6	0	20.74	20.81	20.57	2.0	23.0	
	1	0	20.73	20.91	20.69	2.0	23.0	
	1	3	20.79	20.81	20.55	2.0	23.0	
	1	5	20.73	20.74	20.62	2.0	23.0	
	3	0	20.54	20.89	20.61	2.0	23.0	
	3	1	20.50	20.80	20.65	2.0	23.0	
16QAM	3	3	20.54	20.71	20.57	2.0	23.0	
	6	0	18.70	18.79	18.57	5.0	20.0	

**LTE Band 5 (ANT E)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					
				Measured Pwr (dBm)			MPR	Tune-up Limit	
				20450	20525	20600			
				829 MHz	836.5 MHz	844 MHz			
10 MHz	QPSK	1	0	23.69	<b>23.78</b>	23.67	0.0	24.5	
		1	25	23.67	23.74	23.48	0.0	24.5	
		1	49	23.61	23.64	23.56	0.0	24.5	
		25	0	<b>21.71</b>	<b>21.71</b>	21.63	1.0	23.5	
		25	12	21.66	21.68	21.60	1.0	23.5	
		25	25	21.62	21.65	21.58	1.0	23.5	
	16QAM	50	0	21.67	21.68	21.61	1.0	23.5	
		1	0	22.03	22.05	22.02	1.0	23.5	
		1	25	22.05	22.09	21.89	1.0	23.5	
		1	49	21.86	22.01	21.86	1.0	23.5	
		25	0	20.74	20.80	20.68	2.0	22.5	
		25	12	20.70	20.55	20.66	2.0	22.5	
	64QAM	25	25	20.68	20.75	20.65	2.0	22.5	
		50	0	20.70	20.69	20.63	2.0	22.5	
		1	0	21.04	20.97	20.89	2.0	22.5	
		1	25	21.06	20.92	20.77	2.0	22.5	
		1	49	20.91	20.88	20.67	2.0	22.5	
		25	0	19.80	19.88	19.78	3.0	21.5	
	256QAM	25	12	19.81	20.00	19.76	3.0	21.5	
		25	25	19.77	19.86	19.73	3.0	21.5	
		50	0	19.80	19.87	19.76	3.0	21.5	
		1	0	19.19	18.90	18.73	4.0	20.5	
		1	25	19.14	18.90	18.60	4.0	20.5	
		1	49	19.05	18.85	18.60	4.0	20.5	
	5 MHz	QPSK	25	0	18.89	18.93	18.88	4.0	20.5
			25	12	18.86	18.91	18.86	4.0	20.5
			25	25	18.82	18.86	18.80	4.0	20.5
			50	0	18.86	18.87	18.78	4.0	20.5
1			0	23.76	23.69	23.55	0.0	24.5	
1			12	23.77	23.56	23.54	0.0	24.5	
16QAM		1	24	23.71	23.64	23.51	0.0	24.5	
		12	0	21.76	21.69	21.56	1.0	23.5	
		12	7	21.75	21.72	21.57	1.0	23.5	
		12	13	21.72	21.70	21.56	1.0	23.5	
		25	0	21.76	21.73	21.59	1.0	23.5	
		1	0	22.06	22.22	21.91	1.0	23.5	
64QAM		1	12	21.96	21.93	21.87	1.0	23.5	
		1	24	21.97	22.11	21.90	1.0	23.5	
		12	0	20.82	20.80	20.57	2.0	22.5	
		12	7	20.81	20.79	20.58	2.0	22.5	
		12	13	20.79	20.78	20.56	2.0	22.5	
		25	0	20.76	20.74	20.61	2.0	22.5	
256QAM		1	0	21.37	21.00	20.89	2.0	22.5	
		1	12	21.26	21.00	20.75	2.0	22.5	
		1	24	21.24	20.95	20.80	2.0	22.5	
		12	0	19.80	19.79	19.65	3.0	21.5	
		12	7	19.82	19.78	19.67	3.0	21.5	
		12	13	19.79	19.79	19.65	3.0	21.5	
QPSK		25	0	19.83	19.83	19.70	3.0	21.5	
		1	0	19.08	18.66	18.69	4.0	20.5	
		1	12	19.03	18.63	18.47	4.0	20.5	
		1	24	19.05	18.66	18.61	4.0	20.5	
	12	0	18.92	18.92	18.77	4.0	20.5		
	12	7	18.92	18.90	18.77	4.0	20.5		
16QAM	12	13	18.87	18.90	18.75	4.0	20.5		
	25	0	18.81	18.89	18.78	4.0	20.5		

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20415	20525	20635		
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	23.74	23.69	23.66	0.0	24.5
		1	8	23.53	23.57	23.58	0.0	24.5
		1	14	23.75	23.61	23.61	0.0	24.5
		8	0	21.74	21.69	21.56	1.0	23.5
		8	4	21.71	21.69	21.57	1.0	23.5
		8	7	21.73	21.70	21.60	1.0	23.5
	16QAM	15	0	21.71	21.70	21.54	1.0	23.5
		1	0	21.86	22.06	21.95	1.0	23.5
		1	8	21.83	22.02	21.93	1.0	23.5
		1	14	21.74	22.08	21.88	1.0	23.5
		8	0	20.79	20.76	20.65	2.0	22.5
		8	4	20.83	20.75	20.59	2.0	22.5
	64QAM	8	7	20.79	20.73	20.58	2.0	22.5
		15	0	20.74	20.70	20.58	2.0	22.5
		1	0	21.01	20.99	20.88	2.0	22.5
		1	8	20.95	20.90	20.77	2.0	22.5
		1	14	21.02	20.80	20.81	2.0	22.5
		8	0	19.78	19.82	19.63	3.0	21.5
	256QAM	8	4	19.81	19.86	19.65	3.0	21.5
		8	7	19.84	19.87	19.67	3.0	21.5
		15	0	19.91	19.83	19.65	3.0	21.5
		1	0	18.88	18.77	18.91	4.0	20.5
		1	8	18.82	18.70	18.79	4.0	20.5
		1	14	18.84	18.77	18.90	4.0	20.5
1.4 MHz	QPSK	8	0	18.89	18.87	18.82	4.0	20.5
		8	4	18.84	18.87	18.76	4.0	20.5
		8	7	18.89	18.80	18.78	4.0	20.5
		15	0	18.87	18.90	18.80	4.0	20.5
		1	0	23.69	23.80	23.66	0.0	24.5
		1	3	23.79	23.51	23.56	0.0	24.5
	16QAM	1	5	23.69	23.76	23.61	0.0	24.5
		3	0	23.77	23.72	23.53	0.0	24.5
		3	1	23.73	23.76	23.49	0.0	24.5
		3	3	23.66	23.61	23.50	0.0	24.5
		6	0	21.71	21.79	21.51	1.0	23.5
		1	0	21.92	22.01	21.68	1.0	23.5
	64QAM	1	3	21.91	22.07	21.88	1.0	23.5
		1	5	21.96	22.08	21.72	1.0	23.5
		3	0	21.82	21.78	21.78	1.0	23.5
		3	1	21.69	21.84	21.65	1.0	23.5
		3	3	21.77	21.74	21.64	1.0	23.5
		6	0	20.88	20.71	20.63	2.0	22.5
	256QAM	1	0	20.97	21.19	20.77	2.0	22.5
		1	3	21.14	21.23	20.74	2.0	22.5
		1	5	21.03	21.07	20.66	2.0	22.5
		3	0	20.79	21.00	20.66	2.0	22.5
		3	1	20.71	20.97	20.67	2.0	22.5
		3	3	20.69	20.89	20.61	2.0	22.5
QPSK	6	0	19.83	19.86	19.77	3.0	21.5	
	1	0	18.78	18.87	18.75	4.0	20.5	
	1	3	18.79	19.05	18.74	4.0	20.5	
	1	5	18.72	18.83	18.76	4.0	20.5	
	3	0	18.83	18.87	18.59	4.0	20.5	
	3	1	18.81	18.81	18.59	4.0	20.5	
16QAM	3	3	18.77	18.72	18.61	4.0	20.5	
	6	0	18.80	18.84	18.66	4.0	20.5	

**LTE Band 26 (ANT A)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)							MPR	Tune-up Limit
				Measured Pwr (dBm)								
				26765 821.50 MHz	26790 824.00 MHz	26865 831.50 MHz	26915 836.50 MHz	26965 841.50 MHz				
15 MHz	QPSK	1	0	23.70		23.65	23.68	23.84	23.70	0.0	24.5	
		1	37	23.42		23.34	23.38	23.52	23.57	0.0	24.5	
		1	74	23.56		23.33	23.47	23.70	23.54	0.0	24.5	
		36	0	22.72		22.54	22.67	22.84	22.70	1.0	23.5	
		36	20	22.68		22.45	22.61	22.81	22.66	1.0	23.5	
		36	39	22.63		22.47	22.61	22.76	22.65	1.0	23.5	
	16QAM	75	0	22.66		22.49	22.61	22.81	22.68	1.0	23.5	
		1	0	22.89		22.63	22.92	23.09	23.07	1.0	23.5	
		1	37	22.78		22.49	22.77	22.81	22.99	1.0	23.5	
		1	74	22.76		22.48	22.75	22.91	22.84	1.0	23.5	
		36	0	21.66		21.52	21.58	21.80	21.74	2.0	22.5	
		36	20	21.64		21.42	21.53	21.77	21.69	2.0	22.5	
	64QAM	36	39	21.61		21.43	21.53	21.73	21.66	2.0	22.5	
		75	0	21.65		21.45	21.52	21.77	21.65	2.0	22.5	
		1	0	21.91		21.80	22.02	22.04	21.92	2.0	22.5	
		1	37	21.76		21.40	21.98	21.80	21.66	2.0	22.5	
		1	74	21.79		21.68	21.83	21.88	21.81	2.0	22.5	
		36	0	20.77		20.57	20.72	20.86	20.74	3.0	21.5	
	256QAM	36	20	20.73		20.48	20.65	20.81	20.69	3.0	21.5	
		36	39	20.71		20.46	20.59	20.78	20.66	3.0	21.5	
75		0	20.67		20.48	20.65	20.75	20.72	3.0	21.5		
1		0	20.85		20.75	20.84	20.95	20.84	3.0	21.5		
1		37	20.56		20.60	20.58	20.74	20.71	3.0	21.5		
1		74	20.71		20.64	20.74	20.79	20.65	3.0	21.5		
10 MHz	QPSK	36	0	18.72		18.53	18.63	18.80	18.70	5.0	19.5	
		36	20	18.69		18.52	18.70	18.75	18.62	5.0	19.5	
		36	39	18.63		18.54	18.65	18.69	18.57	5.0	19.5	
		75	0	18.66		18.59	18.69	18.74	18.66	5.0	19.5	
		1	0	23.63		23.82	23.62	23.84	23.69	0.0	24.5	
		1	25	23.63		23.76	23.64	23.85	23.49	0.0	24.5	
	16QAM	1	49	23.55		23.66	23.56	23.72	23.64	0.0	24.5	
		25	0	22.65		22.74	22.55	22.80	22.70	1.0	23.5	
		25	12	22.64		22.72	22.53	22.77	22.66	1.0	23.5	
		25	25	22.57		22.69	22.47	22.74	22.63	1.0	23.5	
		50	0	22.60		22.73	22.55	22.78	22.67	1.0	23.5	
		1	0	22.87		22.97	22.77	23.14	23.08	1.0	23.5	
	64QAM	1	25	22.90		23.02	22.83	23.15	23.03	1.0	23.5	
		1	49	22.74		22.92	22.61	23.05	22.93	1.0	23.5	
25		0	21.65		21.75	21.52	21.86	21.75	2.0	22.5		
25		12	21.63		21.72	21.60	21.87	21.72	2.0	22.5		
25		25	21.60		21.71	21.54	21.83	21.73	2.0	22.5		
50		0	21.65		21.69	21.52	21.81	21.69	2.0	22.5		
256QAM	1	0	22.07		22.02	21.94	22.12	22.14	2.0	22.5		
	1	25	22.11		21.92	21.81	22.13	22.12	2.0	22.5		
	1	49	21.98		21.94	21.78	22.02	21.94	2.0	22.5		
	25	0	20.77		20.79	20.69	20.97	20.87	3.0	21.5		
	25	12	20.77		20.76	20.66	20.93	20.83	3.0	21.5		
	25	25	20.73		20.75	20.62	20.90	20.81	3.0	21.5		
256QAM	50	0	20.74		20.73	20.63	20.90	20.82	3.0	21.5		
	1	0	20.73		20.96	20.77	21.16	21.02	3.0	21.5		
	1	25	20.85		20.95	20.75	21.27	20.99	3.0	21.5		
	1	49	20.65		20.91	20.69	21.06	20.91	3.0	21.5		
	25	0	18.79		18.86	18.73	19.01	18.93	5.0	19.5		
	25	12	18.82		18.86	18.69	19.00	18.96	5.0	19.5		
256QAM	25	25	18.80		18.85	18.72	18.96	18.94	5.0	19.5		
	50	0	18.80		18.84	18.73	18.95	18.90	5.0	19.5		

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)						MPR	Tune-up Limit
				26715	26765	26790	26815	26865	27015		
				816.50 MHz	821.5 MHz	824.00 MHz	826.50 MHz	831.50 MHz	846.50 MHz		
5 MHz	QPSK	1	0	23.52	23.56	23.69	23.64	23.73	23.70	0.0	24.5
		1	12	23.38	23.54	23.57	23.55	23.72	23.71	0.0	24.5
		1	24	23.53	23.49	23.67	23.64	23.70	23.68	0.0	24.5
		12	0	22.57	22.54	22.68	22.66	22.77	22.67	1.0	23.5
		12	7	22.57	22.55	22.66	22.69	22.76	22.67	1.0	23.5
		12	13	22.57	22.51	22.69	22.64	22.74	22.63	1.0	23.5
	16QAM	25	0	22.58	22.51	22.69	22.67	22.79	22.66	1.0	23.5
		1	0	22.94	22.93	23.18	23.03	23.03	23.08	1.0	23.5
		1	12	22.75	22.85	23.07	22.86	23.01	22.98	1.0	23.5
		1	24	22.87	22.94	23.07	23.02	23.04	22.96	1.0	23.5
		12	0	21.63	21.53	21.69	21.71	21.85	21.71	2.0	22.5
		12	7	21.63	21.48	21.75	21.78	21.83	21.72	2.0	22.5
	64QAM	12	13	21.60	21.45	21.70	21.73	21.81	21.71	2.0	22.5
		25	0	21.63	21.50	21.71	21.70	21.79	21.70	2.0	22.5
		1	0	21.86	21.66	21.95	21.95	22.43	21.99	2.0	22.5
		1	12	21.86	21.64	21.95	22.03	22.27	21.95	2.0	22.5
		1	24	21.82	21.79	21.91	22.02	22.31	21.96	2.0	22.5
		12	0	20.72	20.59	20.70	20.76	20.91	20.85	3.0	21.5
	256QAM	12	7	20.70	20.54	20.66	20.74	20.92	20.85	3.0	21.5
		12	13	20.70	20.59	20.65	20.75	20.90	20.81	3.0	21.5
		25	0	20.71	20.58	20.71	20.70	20.87	20.83	3.0	21.5
		1	0	20.85	20.43	20.45	20.67	21.19	20.92	3.0	21.5
		1	12	20.83	20.43	20.27	20.78	21.17	20.65	3.0	21.5
		1	24	20.81	20.31	20.45	20.65	21.18	20.85	3.0	21.5
	3 MHz	QPSK	12	0	18.75	18.55	18.76	18.75	18.98	18.86	5.0
12			7	18.77	18.56	18.78	18.79	18.95	18.88	5.0	19.5
12			13	18.76	18.66	18.74	18.79	18.91	18.83	5.0	19.5
25			0	18.76	18.65	18.82	18.79	18.91	18.90	5.0	19.5
1			0	23.63	23.53	23.69	23.66	23.71	23.76	0.0	24.5
1			8	23.48	23.47	23.67	23.50	23.64	23.72	0.0	24.5
16QAM		1	14	23.67	23.46	23.57	23.59	23.66	23.75	0.0	24.5
		8	0	22.62	22.51	22.63	22.53	22.77	22.70	1.0	23.5
		8	4	22.57	22.52	22.66	22.48	22.78	22.70	1.0	23.5
		8	7	22.56	22.55	22.69	22.55	22.75	22.72	1.0	23.5
		15	0	22.60	22.57	22.66	22.48	22.77	22.67	1.0	23.5
		1	0	22.66	22.93	22.93	22.93	23.04	23.04	1.0	23.5
	1	8	22.64	22.88	22.97	22.86	23.04	22.99	1.0	23.5	
	1	14	22.58	22.93	22.94	22.91	23.06	22.95	1.0	23.5	
	8	0	21.62	21.62	21.73	21.55	21.89	21.74	2.0	22.5	
	8	4	21.69	21.56	21.74	21.49	21.91	21.70	2.0	22.5	
64QAM	8	7	21.63	21.57	21.69	21.49	21.95	21.69	2.0	22.5	
	15	0	21.62	21.58	21.67	21.49	21.88	21.73	2.0	22.5	
	1	0	21.94	21.88	22.20	22.04	22.18	21.90	2.0	22.5	
	1	8	21.83	21.98	21.88	21.68	22.10	21.83	2.0	22.5	
	1	14	21.98	22.00	22.04	21.91	22.18	21.75	2.0	22.5	
	8	0	20.71	20.70	20.78	20.52	21.01	20.87	3.0	21.5	
256QAM	8	4	20.71	20.63	20.75	20.60	20.96	20.88	3.0	21.5	
	8	7	20.70	20.59	20.71	20.60	20.98	20.88	3.0	21.5	
	15	0	20.75	20.60	20.73	20.52	20.86	20.77	3.0	21.5	
	1	0	20.81	20.76	20.99	20.60	21.16	20.89	3.0	21.5	
	1	8	20.79	20.56	20.75	20.63	21.04	20.89	3.0	21.5	
	1	14	20.77	20.78	20.96	20.75	21.14	20.87	3.0	21.5	
	8	0	18.79	18.79	18.94	18.60	19.00	18.85	5.0	19.5	
8	4	18.71	18.76	18.95	18.64	18.98	18.83	5.0	19.5		
8	7	18.74	18.79	18.93	18.67	18.96	18.75	5.0	19.5		
15	0	18.80	18.75	18.85	18.64	18.92	18.85	5.0	19.5		

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)						MPR	Tune-up Limit
				26697	26783	26790	26797	26865	27033		
				814.70 MHz	823.3 MHz	824.00 MHz	824.7 MHz	831.50 MHz	848.30 MHz		
1.4 MHz	QPSK	1	0	23.70	23.67	23.71	23.75	23.84	23.76	0.0	24.5
		1	3	23.52	23.54	23.69	23.66	23.88	23.64	0.0	24.5
		1	5	23.65	23.58	23.65	23.79	23.82	23.74	0.0	24.5
		3	0	23.64	23.58	23.64	23.82	23.82	23.68	0.0	24.5
		3	1	23.59	23.51	23.62	23.85	23.86	23.66	0.0	24.5
		3	3	23.55	23.49	23.60	23.69	23.75	23.60	0.0	24.5
	16QAM	6	0	22.56	22.52	22.60	22.82	22.80	22.70	1.0	23.5
		1	0	22.74	22.72	22.70	23.25	22.99	22.93	1.0	23.5
		1	3	22.95	22.72	22.59	23.28	22.82	22.98	1.0	23.5
		1	5	22.80	22.77	22.71	23.28	23.01	22.97	1.0	23.5
		3	0	22.78	22.72	22.71	22.87	22.89	22.65	1.0	23.5
		3	1	22.63	22.54	22.60	22.92	22.76	22.74	1.0	23.5
	64QAM	3	3	22.65	22.59	22.77	22.88	22.84	22.68	1.0	23.5
		6	0	21.66	21.57	21.71	21.89	21.93	21.70	2.0	22.5
		1	0	21.71	21.48	21.97	22.23	22.13	22.09	2.0	22.5
		1	3	21.80	21.77	22.05	22.36	22.14	22.11	2.0	22.5
		1	5	21.78	21.63	21.86	22.29	22.07	22.02	2.0	22.5
		3	0	21.74	21.69	21.80	21.86	22.08	21.86	2.0	22.5
	256QAM	3	1	21.73	21.62	21.77	21.90	22.08	21.80	2.0	22.5
		3	3	21.60	21.58	21.73	22.00	22.02	21.81	2.0	22.5
		6	0	20.74	20.63	20.63	20.85	20.87	20.84	3.0	21.5
		1	0	20.80	20.55	20.49	20.68	20.84	20.87	3.0	21.5
		1	3	20.85	20.46	20.69	20.93	20.87	20.94	3.0	21.5
		1	5	20.75	20.46	20.45	20.71	20.86	20.85	3.0	21.5
		3	0	20.75	20.76	20.62	20.83	20.87	20.85	3.0	21.5
		3	1	20.72	20.70	20.52	20.74	20.86	20.78	3.0	21.5
		3	3	20.65	20.52	20.40	20.68	20.82	20.74	3.0	21.5
		6	0	18.61	18.54	18.68	18.88	18.84	18.88	5.0	19.5

**LTE Band 26 (ANT E)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)							MPR	Tune-up Limit
				Measured Pwr (dBm)								
				26765	26790	26865	26915	26965				
15 MHz	QPSK	1	0	23.18	23.15	23.24	23.24	23.23	0.0	24.0		
		1	37	23.07	22.88	22.83	22.98	23.10	0.0	24.0		
		1	74	23.00	22.92	22.97	23.08	23.07	0.0	24.0		
		36	0	21.64	21.58	21.64	21.76	21.66	1.0	23.0		
		36	20	21.60	21.54	21.64	21.74	21.65	1.0	23.0		
		36	39	21.59	21.51	21.58	21.70	21.62	1.0	23.0		
	16QAM	75	0	21.62	21.55	21.62	21.74	21.65	1.0	23.0		
		1	0	22.12	21.94	21.95	21.95	22.08	1.0	23.0		
		1	37	21.99	21.71	21.70	21.80	21.98	1.0	23.0		
		1	74	22.01	21.57	21.67	21.80	21.87	1.0	23.0		
		36	0	20.71	20.57	20.61	20.72	20.68	2.0	22.0		
		36	20	20.67	20.54	20.53	20.72	20.63	2.0	22.0		
	64QAM	36	39	20.62	20.42	20.46	20.69	20.63	2.0	22.0		
		75	0	20.64	20.48	20.62	20.73	20.65	2.0	22.0		
		1	0	21.00	20.92	21.14	21.35	21.19	2.0	22.0		
		1	37	20.90	20.68	20.94	21.27	21.08	2.0	22.0		
		1	74	20.83	20.68	20.84	21.20	20.98	2.0	22.0		
		36	0	19.79	19.60	19.71	19.95	19.78	3.0	21.0		
	256QAM	36	20	19.76	19.63	19.68	19.92	19.75	3.0	21.0		
		36	39	19.77	19.57	19.63	19.89	19.74	3.0	21.0		
75		0	19.80	19.68	19.62	19.90	19.80	3.0	21.0			
1		0	18.53	18.54	18.69	18.91	18.64	5.0	19.0			
1		37	18.49	18.39	18.52	18.82	18.58	5.0	19.0			
1		74	18.39	18.33	18.40	18.76	18.50	5.0	19.0			
10 MHz	QPSK	36	0	18.28	18.18	18.21	18.42	18.35	5.0	19.0		
		36	20	18.26	18.15	18.18	18.35	18.31	5.0	19.0		
		36	39	18.21	18.06	18.08	18.33	18.28	5.0	19.0		
		75	0	18.27	18.11	18.20	18.37	18.29	5.0	19.0		
		1	0	23.09	23.15	23.22	23.26	23.16	0.0	24.0		
		1	25	23.07	23.12	23.16	23.30	22.95	0.0	24.0		
	16QAM	1	49	23.02	23.04	23.03	23.12	23.05	0.0	24.0		
		25	0	21.57	21.61	21.67	21.74	21.64	1.0	23.0		
		25	12	21.54	21.58	21.64	21.74	21.60	1.0	23.0		
		25	25	21.52	21.49	21.57	21.70	21.57	1.0	23.0		
50		0	21.56	21.56	21.65	21.73	21.61	1.0	23.0			
1		0	21.79	21.83	22.03	22.04	22.14	1.0	23.0			
1		25	21.85	21.85	22.04	22.13	22.06	1.0	23.0			
1		49	21.65	21.64	21.94	21.99	22.00	1.0	23.0			
25		0	20.64	20.57	20.72	20.80	20.68	2.0	22.0			
25		12	20.65	20.57	20.65	20.80	20.65	2.0	22.0			
64QAM	25	25	20.61	20.51	20.62	20.77	20.62	2.0	22.0			
	50	0	20.57	20.55	20.59	20.73	20.63	2.0	22.0			
	1	0	20.80	20.96	20.78	21.12	20.81	2.0	22.0			
	1	25	20.69	20.99	20.92	21.14	20.76	2.0	22.0			
	1	49	20.63	20.89	20.77	21.02	20.73	2.0	22.0			
	25	0	19.79	19.66	19.67	19.92	19.83	3.0	21.0			
256QAM	25	12	19.77	19.60	19.70	19.91	19.83	3.0	21.0			
	25	25	19.79	19.56	19.68	19.88	19.78	3.0	21.0			
	50	0	19.77	19.59	19.65	19.85	19.82	3.0	21.0			
	1	0	18.26	18.52	18.56	18.67	18.40	5.0	19.0			
	1	25	18.26	18.44	18.48	18.54	18.30	5.0	19.0			
	1	49	18.19	18.32	18.37	18.55	18.34	5.0	19.0			
10 MHz	256QAM	25	0	18.34	18.23	18.28	18.44	18.35	5.0	19.0		
		25	12	18.30	18.16	18.22	18.41	18.31	5.0	19.0		
		25	25	18.27	18.10	18.17	18.38	18.28	5.0	19.0		
		50	0	18.23	18.09	18.18	18.37	18.26	5.0	19.0		



BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)						MPR	Tune-up Limit
				26715	26765	26790	26815	26865	27015		
				816.50 MHz	821.5 MHz	824.00 MHz	826.50 MHz	831.50 MHz	846.50 MHz		
5 MHz	QPSK	1	0	23.00	23.12	23.15	23.10	23.16	23.10	0.0	24.0
		1	12	22.77	23.13	23.20	23.18	23.14	23.09	0.0	24.0
		1	24	22.97	23.11	23.14	23.08	23.13	23.07	0.0	24.0
		12	0	21.50	21.70	21.70	21.71	21.71	21.59	1.0	23.0
		12	7	21.52	21.69	21.66	21.69	21.70	21.59	1.0	23.0
		12	13	21.48	21.69	21.67	21.67	21.68	21.56	1.0	23.0
	16QAM	25	0	21.51	21.71	21.67	21.70	21.72	21.59	1.0	23.0
		1	0	21.98	21.86	21.84	22.09	21.98	22.03	1.0	23.0
		1	12	21.80	21.91	21.82	21.96	21.95	21.96	1.0	23.0
		1	24	21.88	21.81	21.79	22.00	22.00	21.95	1.0	23.0
		12	0	20.64	20.76	20.68	20.84	20.79	20.67	2.0	22.0
		12	7	20.64	20.68	20.67	20.75	20.77	20.65	2.0	22.0
	64QAM	12	13	20.63	20.74	20.63	20.80	20.76	20.62	2.0	22.0
		25	0	20.56	20.70	20.66	20.73	20.70	20.57	2.0	22.0
		1	0	20.87	20.76	20.84	20.96	21.07	21.29	2.0	22.0
		1	12	20.81	20.78	20.72	20.82	20.89	21.15	2.0	22.0
		1	24	20.84	20.76	20.77	20.89	21.01	21.12	2.0	22.0
		12	0	19.74	19.66	19.68	19.72	19.85	19.70	3.0	21.0
	256QAM	12	7	19.72	19.68	19.68	19.70	19.87	19.72	3.0	21.0
		12	13	19.72	19.66	19.61	19.66	19.85	19.70	3.0	21.0
		25	0	19.69	19.63	19.65	19.70	19.88	19.83	3.0	21.0
		1	0	18.12	18.20	18.40	18.38	18.25	18.61	5.0	19.0
		1	12	18.05	18.06	17.92	18.11	18.00	18.51	5.0	19.0
		1	24	18.12	18.21	18.10	18.32	18.18	18.57	5.0	19.0
	3 MHz	QPSK	12	0	18.27	18.21	18.17	18.26	18.39	18.33	5.0
12			7	18.26	18.24	18.17	18.22	18.39	18.33	5.0	19.0
12			13	18.25	18.15	18.13	18.17	18.35	18.28	5.0	19.0
25			0	18.24	18.17	18.19	18.21	18.37	18.27	5.0	19.0
1			0	23.11	23.15	23.05	23.16	23.17	23.15	0.0	24.0
1			8	22.80	22.80	22.99	22.99	23.13	23.09	0.0	24.0
16QAM		1	14	23.10	23.08	22.95	23.08	23.10	23.12	0.0	24.0
		8	0	21.53	21.58	21.54	21.71	21.74	21.57	1.0	23.0
		8	4	21.54	21.51	21.56	21.67	21.67	21.58	1.0	23.0
		8	7	21.52	21.53	21.50	21.69	21.70	21.63	1.0	23.0
		15	0	21.54	21.58	21.54	21.75	21.71	21.56	1.0	23.0
		1	0	21.68	21.67	21.85	21.93	22.05	21.93	1.0	23.0
		1	8	21.65	21.78	21.82	22.00	22.03	21.88	1.0	23.0
		1	14	21.60	21.63	21.83	21.96	22.05	21.86	1.0	23.0
		8	0	20.59	20.61	20.60	20.84	20.84	20.67	2.0	22.0
		8	4	20.62	20.59	20.58	20.88	20.78	20.64	2.0	22.0
64QAM		8	7	20.61	20.52	20.55	20.85	20.80	20.61	2.0	22.0
		15	0	20.48	20.51	20.50	20.76	20.78	20.61	2.0	22.0
		1	0	20.72	20.75	20.57	20.53	21.14	20.77	2.0	22.0
		1	8	20.65	20.56	20.75	20.90	20.98	20.66	2.0	22.0
		1	14	20.56	20.55	20.71	20.72	21.12	20.75	2.0	22.0
		8	0	19.65	19.59	19.67	19.68	19.84	19.75	3.0	21.0
256QAM		8	4	19.63	19.63	19.62	19.57	19.90	19.72	3.0	21.0
		8	7	19.64	19.70	19.59	19.65	19.85	19.75	3.0	21.0
		15	0	19.71	19.61	19.60	19.65	19.79	19.78	3.0	21.0
	1	0	18.22	18.34	18.25	18.29	18.68	18.32	5.0	19.0	
	1	8	18.15	18.33	18.13	18.16	18.51	18.30	5.0	19.0	
	1	14	18.21	18.41	18.17	18.23	18.66	18.28	5.0	19.0	
	8	0	18.19	18.28	18.24	18.16	18.43	18.36	5.0	19.0	
	8	4	18.23	18.20	18.18	18.23	18.36	18.30	5.0	19.0	
	8	7	18.15	18.22	18.12	18.09	18.39	18.37	5.0	19.0	
15	0	18.25	18.19	18.15	18.18	18.40	18.34	5.0	19.0		

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)						MPR	Tune-up Limit
				26697	26783	26790	26797	26865	27033		
				814.70 MHz	823.3 MHz	824.00 MHz	824.7 MHz	831.50 MHz	848.30 MHz		
1.4 MHz	QPSK	1	0	23.1	23.1	23.1	23.13	23.33	23.19	0.0	24.0
		1	3	23.1	23.0	22.8	22.92	23.31	22.95	0.0	24.0
		1	5	23.2	23.0	23.0	23.06	23.30	23.14	0.0	24.0
		3	0	23.1	23.1	23.0	23.09	23.29	23.11	0.0	24.0
		3	1	23.0	23.0	23.0	23.07	23.20	23.06	0.0	24.0
		3	3	23.0	22.9	23.0	22.96	23.18	22.93	0.0	24.0
	16QAM	6	0	21.5	21.5	21.6	21.58	21.75	21.58	1.0	23.0
		1	0	21.7	21.8	21.9	21.79	21.91	21.81	1.0	23.0
		1	3	21.9	21.5	22.0	21.74	21.79	21.87	1.0	23.0
		1	5	21.8	21.8	22.0	21.87	21.94	21.85	1.0	23.0
		3	0	21.8	21.6	21.6	21.70	21.92	21.63	1.0	23.0
		3	1	21.6	21.6	21.6	21.63	21.79	21.66	1.0	23.0
	64QAM	3	3	21.6	21.6	21.5	21.57	21.83	21.59	1.0	23.0
		6	0	20.7	20.6	20.5	20.56	20.88	20.58	2.0	22.0
		1	0	20.9	20.7	20.8	20.87	20.92	20.77	2.0	22.0
		1	3	20.9	20.8	21.0	21.14	20.92	20.84	2.0	22.0
		1	5	20.8	20.6	20.7	20.88	20.88	20.78	2.0	22.0
		3	0	20.8	20.4	20.4	20.44	20.89	20.68	2.0	22.0
	256QAM	3	1	20.8	20.4	20.3	20.45	20.90	20.64	2.0	22.0
		3	3	20.8	20.4	20.2	20.46	20.81	20.56	2.0	22.0
		6	0	19.7	19.6	19.5	19.61	20.04	19.58	3.0	21.0
		1	0	18.1	18.0	18.2	18.22	18.42	18.33	5.0	19.0
		1	3	18.2	18.0	18.1	18.22	18.41	18.34	5.0	19.0
		1	5	18.1	17.9	18.2	18.15	18.40	18.31	5.0	19.0
	256QAM	3	0	18.2	18.2	18.2	18.25	18.22	18.36	5.0	19.0
		3	1	18.1	18.1	18.2	18.16	18.15	18.29	5.0	19.0
		3	3	18.0	18.1	18.1	18.08	18.10	18.23	5.0	19.0
		6	0	18.1	18.1	18.0	18.08	18.26	18.21	5.0	19.0

**NR Band n5 (ANT A)**

					Maximum Average Power (dBm)				
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					166800	167300	167800		
					834.00 MHz	836.50 MHz	839.00 MHz		
20 MHz	DFT-s-OFDM	π/2 BPSK	1	1	23.69	23.76	23.77	0.0	25.5
			1	52	23.69	23.76	23.67	0.0	25.5
			1	104	23.68	23.72	23.70	0.0	25.5
			50	0	22.74	22.81	22.80	0.5	25.0
			50	28	23.78	23.79	23.75	0.0	25.5
			50	56	22.74	22.74	22.71	0.5	25.0
		100	0	22.78	22.80	22.78	0.5	25.0	
		QPSK	1	1	23.64	23.71	23.74	0.0	25.5
			1	52	23.71	<b>23.75</b>	23.72	0.0	25.5
			1	104	23.64	23.73	23.62	0.0	25.5
			50	0	22.73	22.67	22.71	1.0	24.5
			50	28	23.71	<b>23.76</b>	23.75	0.0	25.5
			50	56	22.72	22.74	22.72	1.0	24.5
		16QAM	100	0	22.78	22.80	22.78	1.0	24.5
			1	1	22.67	22.73	22.71	1.0	24.5
			1	52	22.71	22.68	22.71	1.0	24.5
		64QAM	1	104	22.66	22.73	22.70	1.0	24.5
			1	1	21.23	21.27	21.20	2.5	23.0
	256QAM	1	1	19.20	19.25	19.13	4.5	21.0	
CP-OFDM	QPSK	1	1	22.22	22.21	22.21	1.5	24.0	
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					166300	167300	168300		
					831.50 MHz	836.50 MHz	841.50 MHz		
15 MHz	DFT-s-OFDM	π/2 BPSK	1	1	23.69	23.75	23.61	0.0	25.5
			1	39	23.67	23.69	23.68	0.0	25.5
			1	77	23.69	23.70	23.67	0.0	25.5
			36	0	22.72	22.82	22.74	0.5	25.0
			36	21	23.77	23.80	23.71	0.0	25.5
			36	43	22.78	22.77	22.72	0.5	25.0
		75	0	22.78	22.80	22.77	0.5	25.0	
		QPSK	1	1	23.69	23.61	23.77	0.0	25.5
			1	39	23.65	23.68	23.38	0.0	25.5
			1	77	23.69	23.59	23.67	0.0	25.5
			36	0	22.72	22.75	22.77	1.0	24.5
			36	21	23.76	23.80	23.79	0.0	25.5
			36	43	22.77	22.75	22.73	1.0	24.5
		75	0	22.76	22.78	22.55	1.0	24.5	
		16QAM	1	1	22.75	22.73	22.78	1.0	24.5
			1	39	22.71	22.69	22.69	1.0	24.5
			1	77	22.73	22.68	22.72	1.0	24.5
		64QAM	1	1	21.23	21.27	21.20	2.5	23.0
	256QAM	1	1	19.16	19.27	19.26	4.5	21.0	
	CP-OFDM	QPSK	1	1	22.20	22.29	22.11	1.5	24.0

BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					165800	167300	168800		
					829.00 MHz	836.50 MHz	844.00 MHz		
10 MHz	DFT-s-OFDM	π/2 BPSK	1	1	23.69	23.59	23.61	0.0	25.5
			1	25	23.71	23.73	23.72	0.0	25.5
			1	50	23.71	23.76	23.70	0.0	25.5
			25	0	22.74	22.81	22.71	0.5	25.0
			25	13	23.75	23.71	23.77	0.0	25.5
			25	27	22.78	22.78	22.71	0.5	25.0
		QPSK	50	0	22.76	22.79	22.74	0.5	25.0
			1	1	23.69	23.76	23.71	0.0	25.5
			1	25	23.71	23.74	23.76	0.0	25.5
			1	50	23.77	23.74	23.71	0.0	25.5
			25	0	22.73	22.71	22.48	1.0	24.5
			25	13	23.73	23.79	23.63	0.0	25.5
		16QAM	25	27	22.78	22.77	22.75	1.0	24.5
			50	0	22.75	22.72	22.71	1.0	24.5
			1	1	22.77	22.70	22.69	1.0	24.5
64QAM	1	25	22.78	22.64	22.79	1.0	24.5		
	1	50	22.71	22.73	22.75	1.0	24.5		
256QAM	1	1	21.21	21.19	21.21	2.5	23.0		
1	1	19.29	19.20	19.23	4.5	21.0			
CP-OFDM	QPSK	1	1	22.21	22.17	22.14	1.5	24.0	
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					165300	167300	169300		
					826.50 MHz	836.50 MHz	846.50 MHz		
5 MHz	DFT-s-OFDM	π/2 BPSK	1	1	23.73	23.72	23.69	0.0	25.5
			1	12	23.66	23.70	23.61	0.0	25.5
			1	23	23.76	23.78	23.71	0.0	25.5
			12	0	22.73	22.80	22.68	0.5	25.0
			12	6	23.73	23.79	23.69	0.0	25.5
			12	13	22.74	22.79	22.61	0.5	25.0
		QPSK	25	0	22.74	22.80	22.58	0.5	25.0
			1	1	23.75	23.78	23.68	0.0	25.5
			1	12	23.67	23.68	23.61	0.0	25.5
			1	23	23.75	23.76	23.71	0.0	25.5
			12	0	22.74	22.80	22.71	1.0	24.5
			12	6	23.74	23.75	23.71	0.0	25.5
		16QAM	12	13	22.76	22.79	22.67	1.0	24.5
			25	0	22.74	22.71	22.67	1.0	24.5
			1	1	22.63	22.65	22.67	1.0	24.5
		64QAM	1	12	22.56	22.51	22.47	1.0	24.5
			1	23	22.63	22.61	22.71	1.0	24.5
		256QAM	1	1	21.30	21.27	21.21	2.5	23.0
1	1	19.30	19.21	19.24	4.5	21.0			
CP-OFDM	QPSK	1	1	22.23	22.21	22.20	1.5	24.0	

**NR Band n5 (ANT E)**

					Maximum Average Power (dBm)				
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					166800	167300	167800		
					834.00 MHz	836.50 MHz	839.00 MHz		
20 MHz	DFT-s-OFDM	π/2 BPSK	1	1	23.82	23.84	23.82	0.0	25.0
			1	52	23.83	23.84	23.69	0.0	25.0
			1	104	23.56	23.55	23.54	0.0	25.0
			50	0	22.78	22.81	22.73	0.5	24.5
			50	28	23.72	23.72	23.67	0.0	25.0
			50	56	22.64	22.66	22.61	0.5	24.5
		100	0	22.72	22.72	22.70	0.5	24.5	
		QPSK	1	1	23.85	23.84	23.81	0.0	25.0
			1	52	23.76	<b>23.87</b>	23.70	0.0	25.0
			1	104	23.55	23.56	23.54	0.0	25.0
			50	0	22.80	22.79	22.76	1.0	24.0
			50	28	23.71	<b>23.72</b>	23.67	0.0	25.0
			50	56	22.65	22.64	22.61	1.0	24.0
		100	0	22.73	22.72	22.70	1.0	24.0	
		16QAM	1	1	22.92	22.85	22.82	1.0	24.0
			1	52	22.94	22.76	22.75	1.0	24.0
			1	104	22.65	22.56	22.54	1.0	24.0
		64QAM	1	1	21.51	21.36	21.33	2.5	22.5
1	1		19.36	19.37	19.39	4.5	20.5		
CP-OFDM	QPSK	1	1	22.39	22.43	22.27	1.5	23.5	
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					166300	167300	168300		
					831.50 MHz	836.50 MHz	841.50 MHz		
15 MHz	DFT-s-OFDM	π/2 BPSK	1	1	23.85	23.83	23.73	0.0	25.0
			1	39	23.66	23.64	23.51	0.0	25.0
			1	77	23.63	23.60	23.52	0.0	25.0
			36	0	22.82	22.79	22.69	0.5	24.5
			36	21	23.76	23.72	23.64	0.0	25.0
			36	43	22.72	22.68	22.58	0.5	24.5
		75	0	22.79	22.73	22.65	0.5	24.5	
		QPSK	1	1	23.84	23.85	23.73	0.0	25.0
			1	39	23.67	23.63	23.52	0.0	25.0
			1	77	23.66	23.60	23.52	0.0	25.0
			36	0	22.84	22.78	22.70	1.0	24.0
			36	21	23.76	23.71	23.62	0.0	25.0
			36	43	22.71	22.67	22.59	1.0	24.0
		75	0	22.79	22.73	22.64	1.0	24.0	
		16QAM	1	1	22.86	22.90	22.82	1.0	24.0
			1	39	22.65	22.70	22.61	1.0	24.0
			1	77	22.65	22.67	22.61	1.0	24.0
		64QAM	1	1	21.53	21.38	21.27	2.5	22.5
1	1		19.37	19.38	19.29	4.5	20.5		
CP-OFDM	QPSK	1	1	22.38	22.32	22.28	1.5	23.5	

BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					165800	167300	168800		
					829.00 MHz	836.50 MHz	844.00 MHz		
10 MHz	DFT-s-OFDM	π/2 BPSK	1	1	23.87	23.80	23.64	0.0	25.0
			1	25	23.98	23.76	23.64	0.0	25.0
			1	50	23.73	23.63	23.49	0.0	25.0
			25	0	22.86	22.77	22.65	0.5	24.5
			25	13	23.82	23.71	23.58	0.0	25.0
			25	27	22.79	22.70	22.57	0.5	24.5
		QPSK	50	0	22.82	22.74	22.59	0.5	24.5
			1	1	23.86	23.78	23.61	0.0	25.0
			1	25	23.96	23.75	23.64	0.0	25.0
			1	50	23.73	23.63	23.53	0.0	25.0
			25	0	22.85	22.77	22.62	1.0	24.0
			25	13	23.80	23.72	23.58	0.0	25.0
		16QAM	25	27	22.79	22.70	22.56	1.0	24.0
			50	0	22.83	22.75	22.59	1.0	24.0
			1	1	22.89	22.77	22.58	1.0	24.0
64QAM	1	25	22.94	22.79	22.62	1.0	24.0		
	1	50	22.78	22.64	22.54	1.0	24.0		
256QAM	1	1	21.42	21.36	21.25	2.5	22.5		
CP-OFDM	QPSK	1	1	19.43	19.39	19.22	4.5	20.5	
CP-OFDM	QPSK	1	1	22.39	22.28	22.21	1.5	23.5	
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					165300	167300	169300		
					826.50 MHz	836.50 MHz	846.50 MHz		
5 MHz	DFT-s-OFDM	π/2 BPSK	1	1	23.86	23.79	23.61	0.0	25.0
			1	12	23.75	23.65	23.50	0.0	25.0
			1	23	23.82	23.73	23.55	0.0	25.0
			12	0	22.89	22.74	22.61	0.5	24.5
			12	6	23.86	23.74	23.58	0.0	25.0
			12	13	22.86	22.72	22.59	0.5	24.5
		QPSK	25	0	22.88	22.75	22.60	0.5	24.5
			1	1	23.86	23.80	23.61	0.0	25.0
			1	12	23.76	23.65	23.50	0.0	25.0
			1	23	23.82	23.70	23.54	0.0	25.0
			12	0	22.89	22.75	22.61	1.0	24.0
			12	6	23.86	23.73	23.58	0.0	25.0
		16QAM	12	13	22.87	22.71	22.59	1.0	24.0
			25	0	22.88	22.74	22.60	1.0	24.0
			1	1	22.87	22.85	22.62	1.0	24.0
		64QAM	1	12	22.76	22.73	22.54	1.0	24.0
			1	23	22.84	22.79	22.61	1.0	24.0
		256QAM	1	1	21.42	21.40	21.16	2.5	22.5
CP-OFDM	QPSK	1	1	19.46	19.32	19.18	4.5	20.5	
CP-OFDM	QPSK	1	1	22.40	22.29	22.07	1.5	23.5	

## 8.2. PEAK TO AVERAGE RATIO

### Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v03r01;

The transmitter output was connected to either CMW500 Test Set or E7515B Test set and configured to operate at maximum power. The PAR were measured on the Spectrum Analyzer.

### Test Spec

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

### NOTE

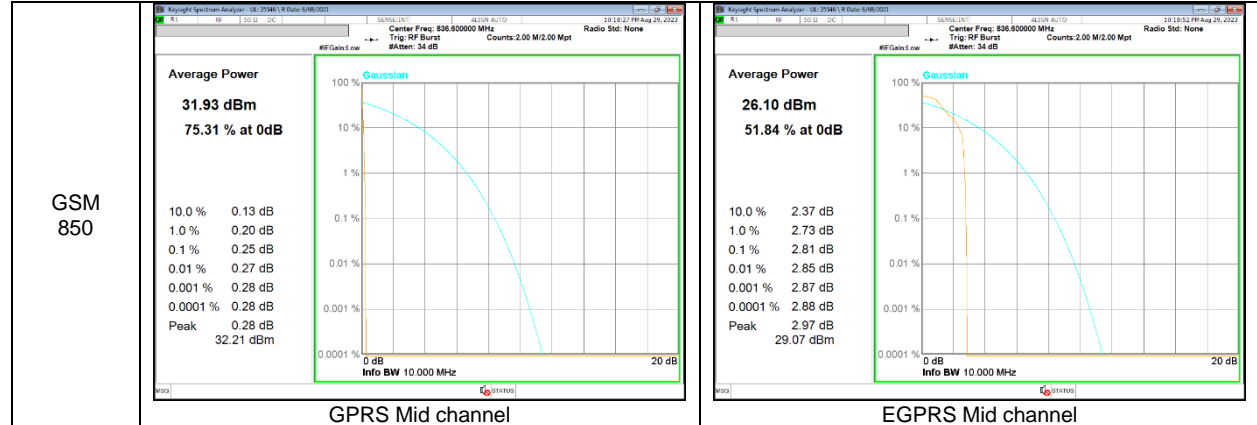
5G NR: All Waveforms (CP-OFDM vs DFT-s\_OFDM) and modulations ( $\pi/2$  BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

### RESULTS

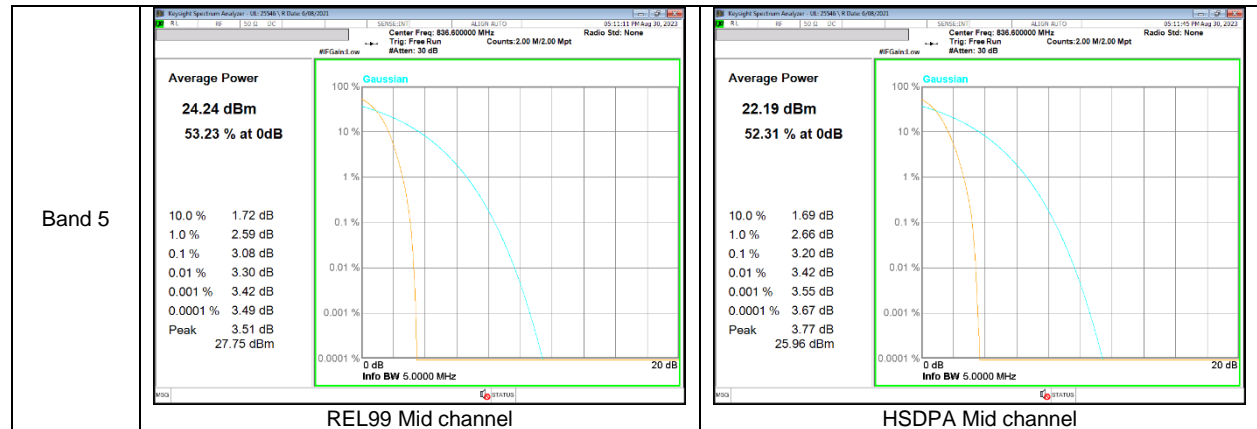
See the following pages.

### 8.2.1. CONDUCTED PEAK TO AVERAGE RESULT

#### GSM



#### WCDMA

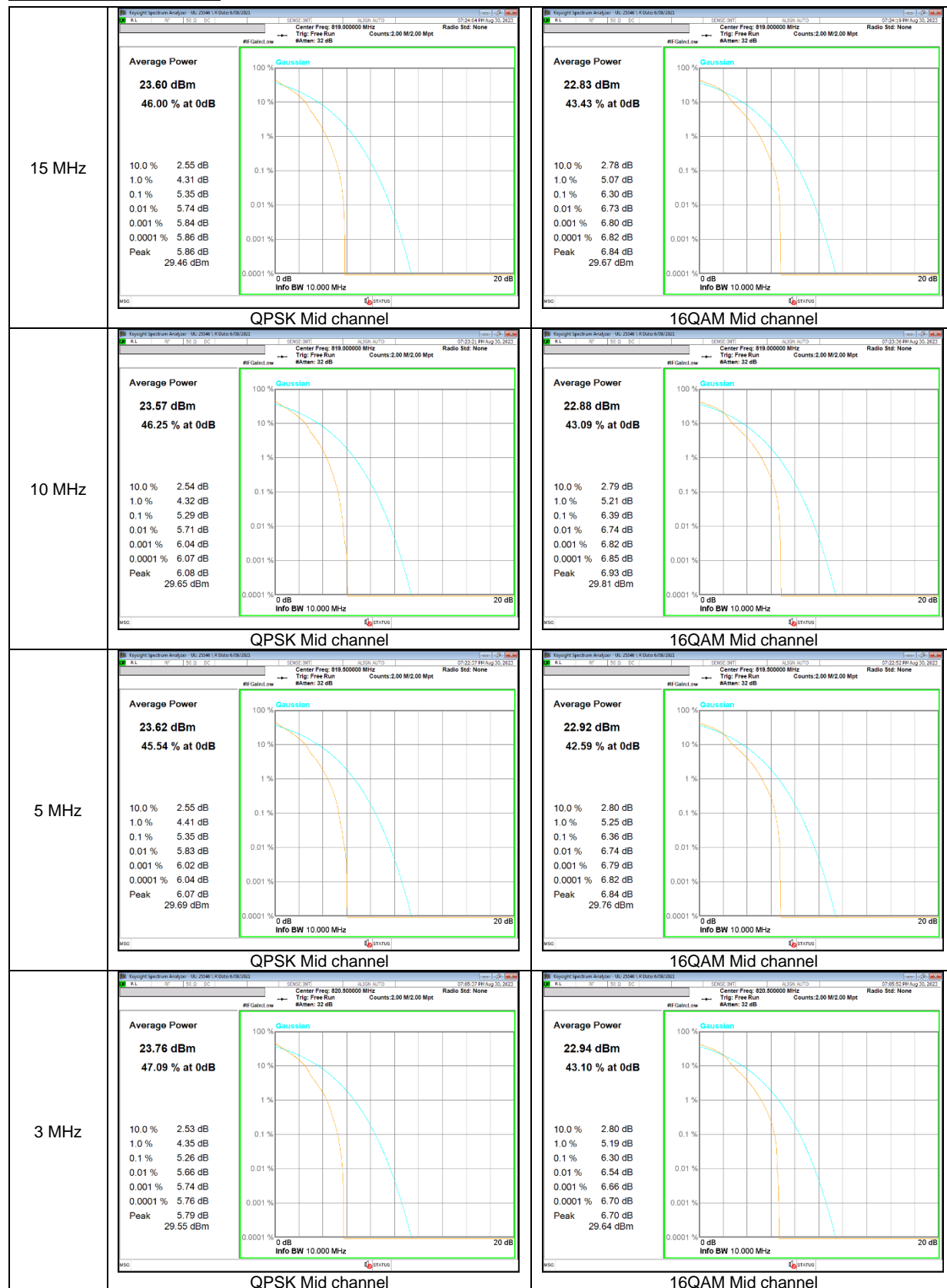


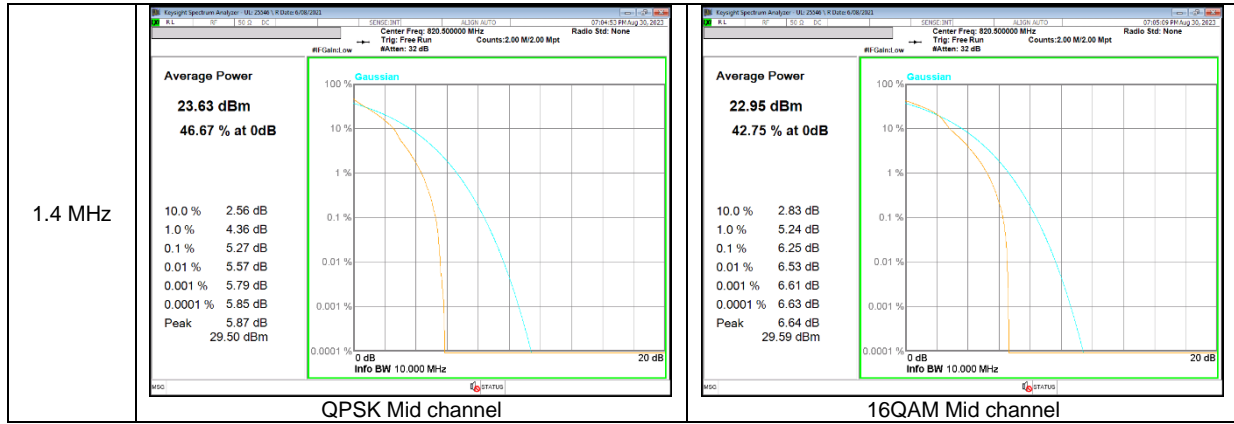


**LTE Band 5**



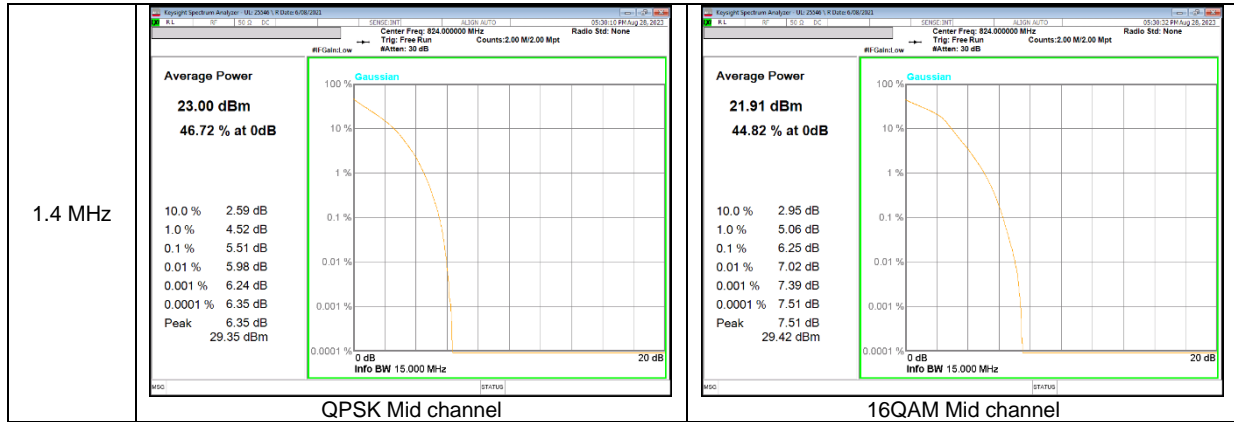
**LTE Band 26 (Part 90)**





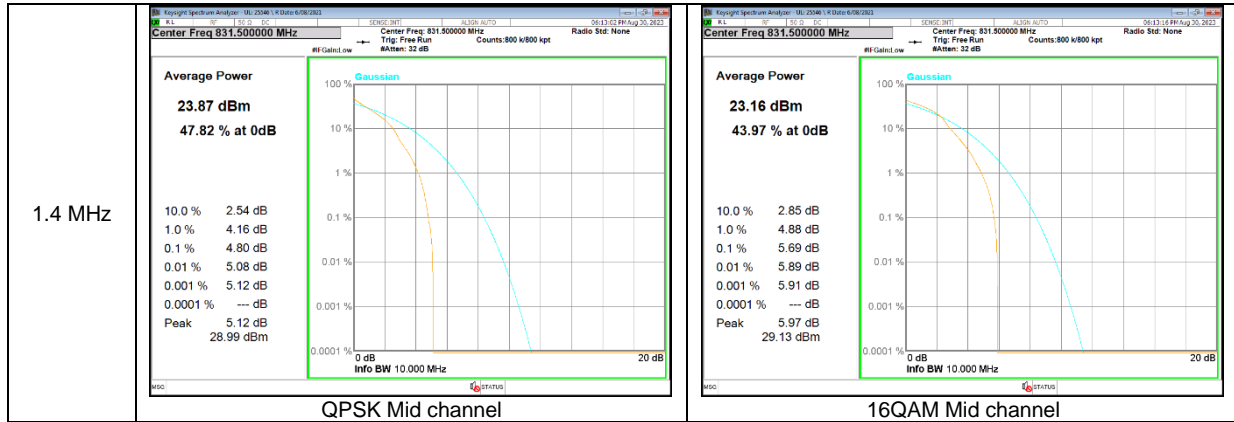
**LTE Band 26 (Straddle)**



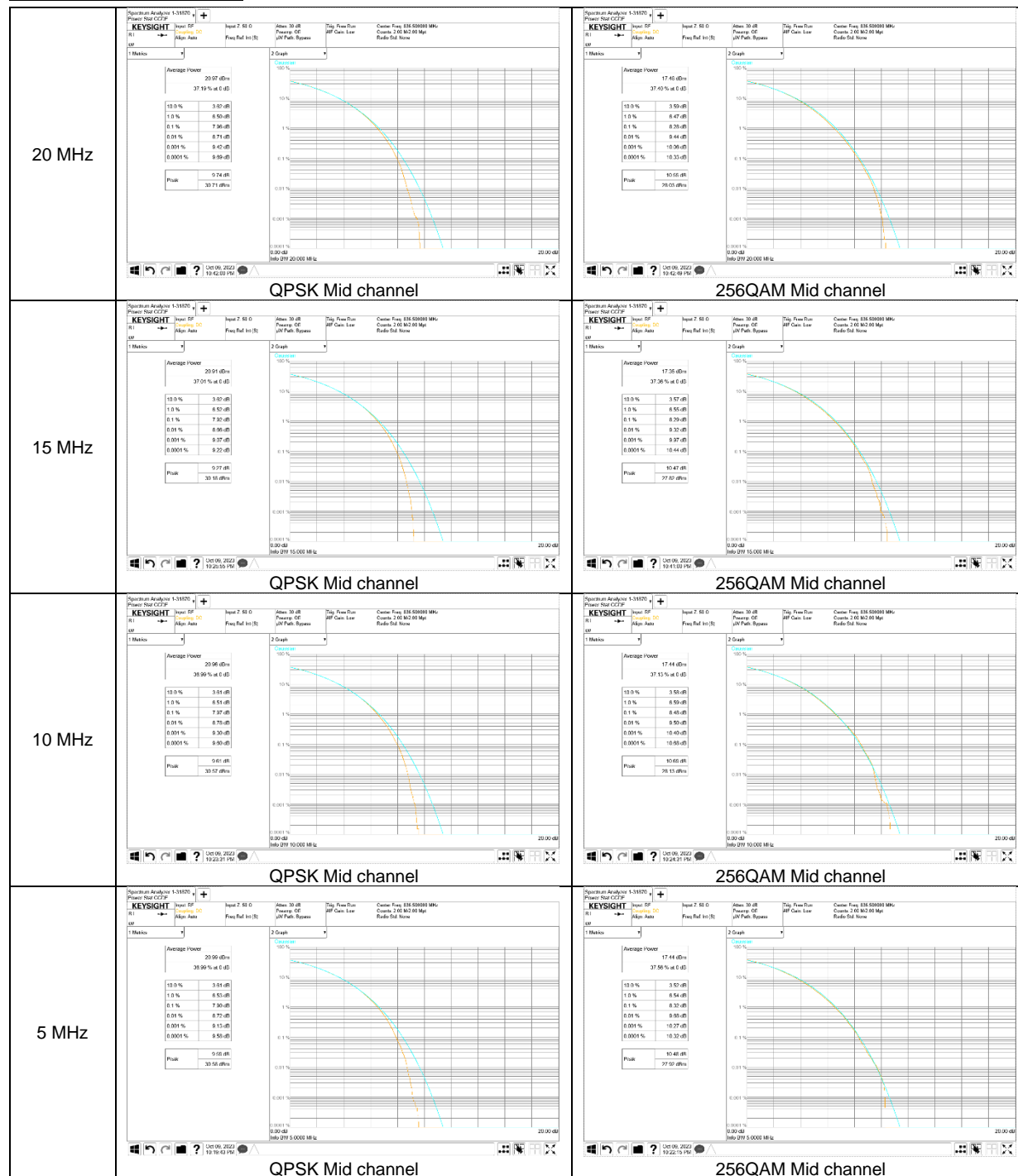


**LTE Band 26 (Part 22)**





**NR Band n5 CP-OFDM**





### **8.3. 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 middle channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v03r01)

#### **RESULTS**

See the following pages.

**- GSM**

Band	Modulation	f [MHz]	99% BW (kHz)	-26dB BW (kHz)
850	GPRS	836.6	249.35	316.5
	EGPRS		251.06	321.6

**- WCDMA**

Band	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
B5	Rel.99	836.6	4.163	4.708
	HSDPA		4.165	4.716

**- LTE Band 5**

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B5	10M	QPSK	836.5	8.997	10.360
		16QAM		9.001	10.230
	5M	QPSK	836.5	4.508	5.259
		16QAM		4.494	5.196
	3M	QPSK	836.5	2.706	3.104
		16QAM		2.703	3.067
	1.4M	QPSK	836.5	1.086	1.285
		16QAM		1.085	1.308

**- LTE Band 26 (Part 90)**

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B26	15M	QPSK	819.0	13.458	15.470
		16QAM		13.437	15.110
	10M	QPSK	819.0	8.983	10.310
		16QAM		8.978	10.430
	5M	QPSK	819.5	4.499	5.273
		16QAM		4.505	5.157
	3M	QPSK	820.5	2.712	3.114
		16QAM		2.703	3.088
	1.4M	QPSK	820.5	1.095	1.315
		16QAM		1.089	1.310

**- LTE Band 26 (Straddle)**

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B26	15M	QPSK	824.0	13.444	15.050
		16QAM		13.421	14.820
	10M	QPSK		9.004	10.190
		16QAM		8.994	10.030
	5M	QPSK		4.502	5.219
		16QAM		4.492	5.193
	3M	QPSK		2.699	3.039
		16QAM		2.703	3.054
	1.4M	QPSK		1.083	1.287
		16QAM		1.084	1.291

**- LTE Band 26 (Part 22)**

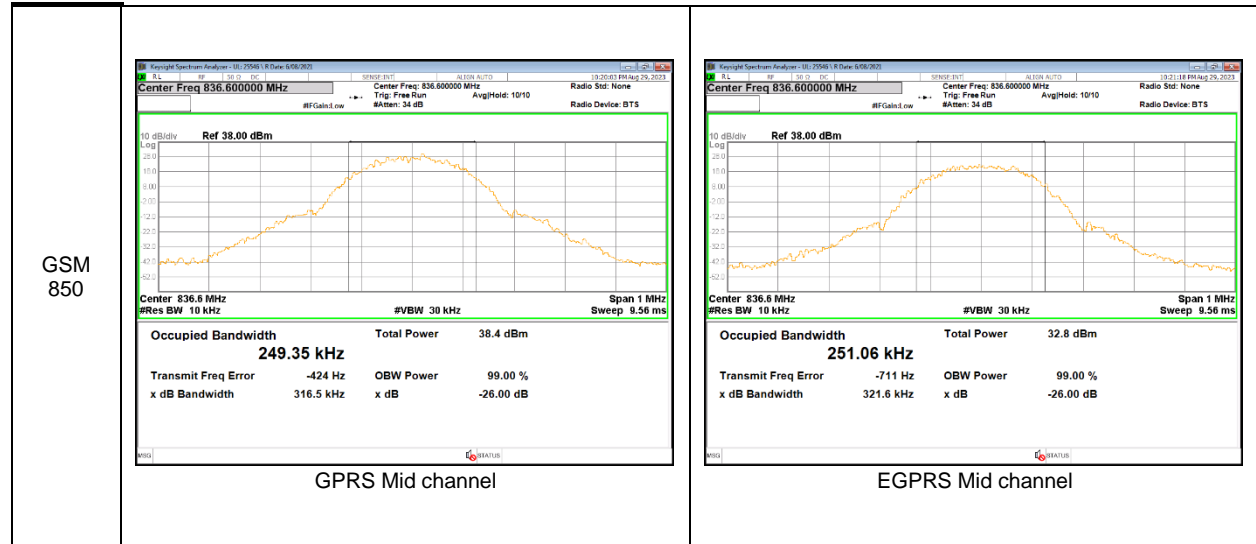
Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B26	15M	QPSK	836.5	13.445	15.080
		16QAM		13.464	15.220
	10M	QPSK	831.5	8.987	10.440
		16QAM		8.993	10.220
	5M	QPSK	831.5	4.504	5.316
		16QAM		4.511	5.249
	3M	QPSK	831.5	2.713	3.111
		16QAM		2.709	3.083
	1.4M	QPSK	831.5	1.086	1.257
		16QAM		1.090	1.329

**- NR Band n5 CP-OFDM**

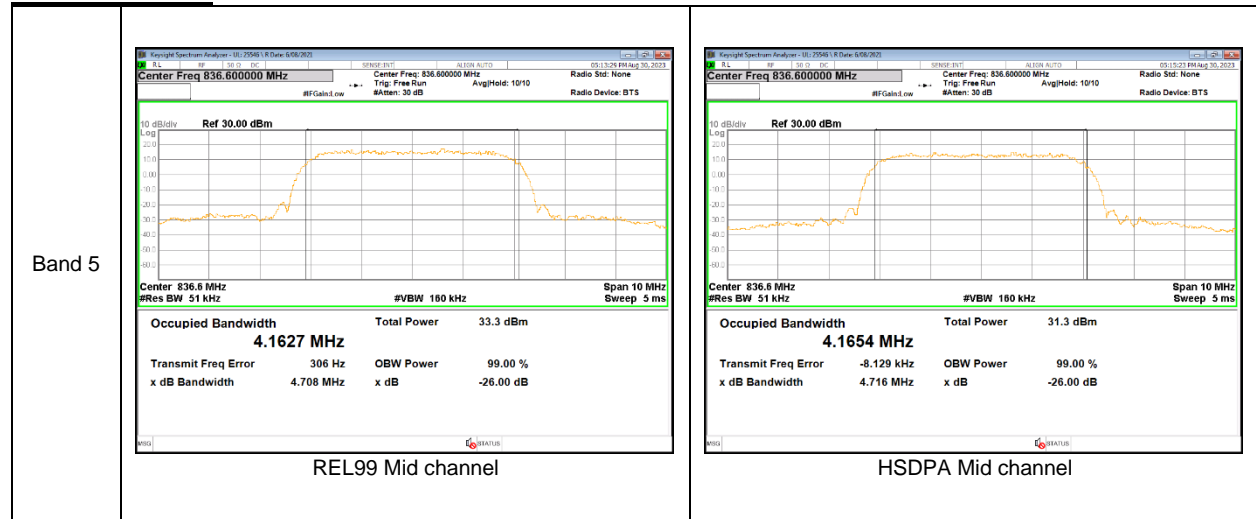
Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
NR n5	20M	QPSK	836.5	18.891	20.390
		16QAM		18.946	20.290
	15M	QPSK	836.5	14.101	14.840
		16QAM		14.149	14.990
	10M	QPSK	836.5	9.280	10.200
		16QAM		9.343	10.400
	5M	QPSK	836.5	4.485	5.180
		16QAM		4.493	5.195

### 8.3.1. OCCUPIED BANDWIDTH RESULTS

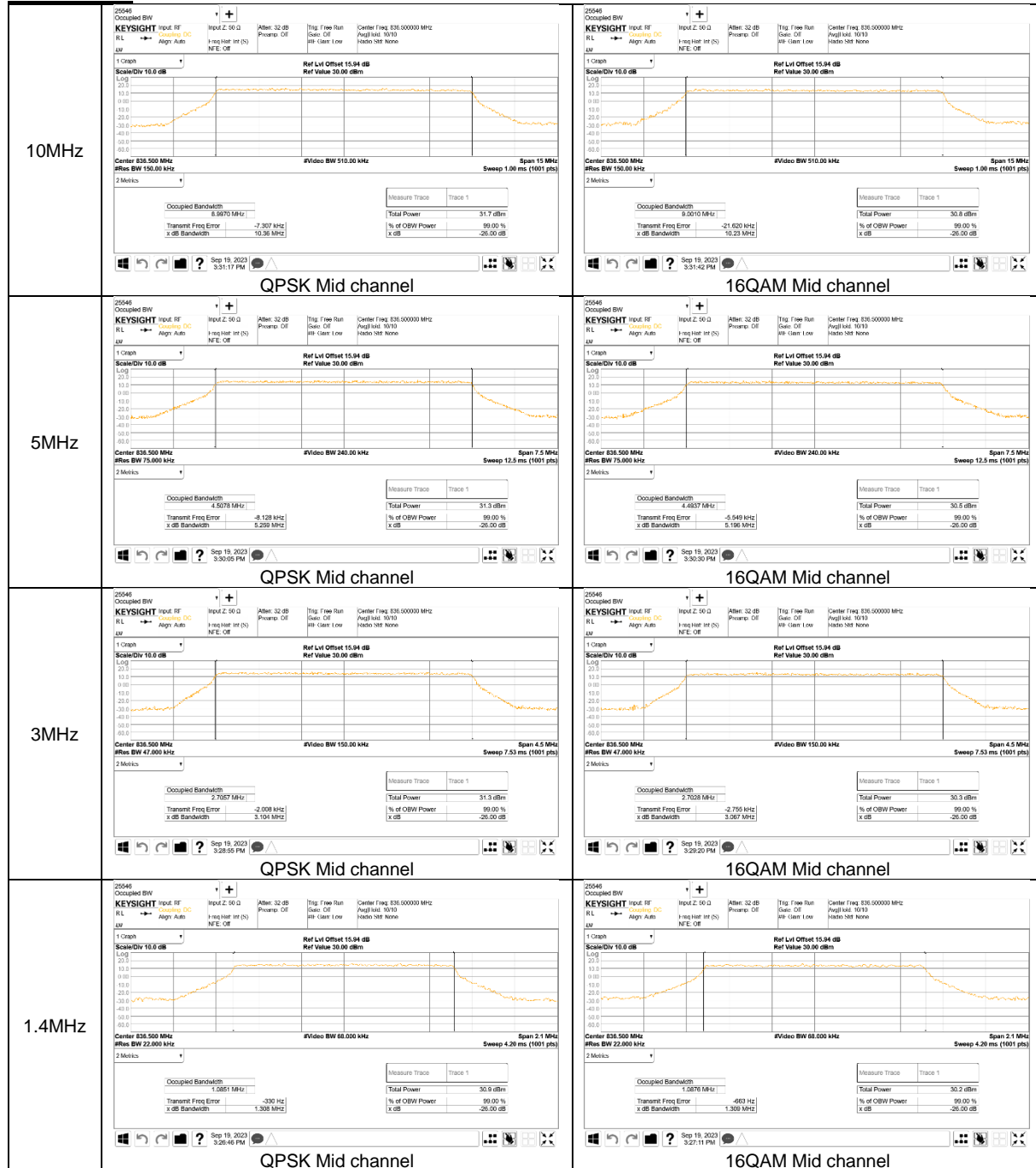
#### GSM 850



#### WCDMA Band 5

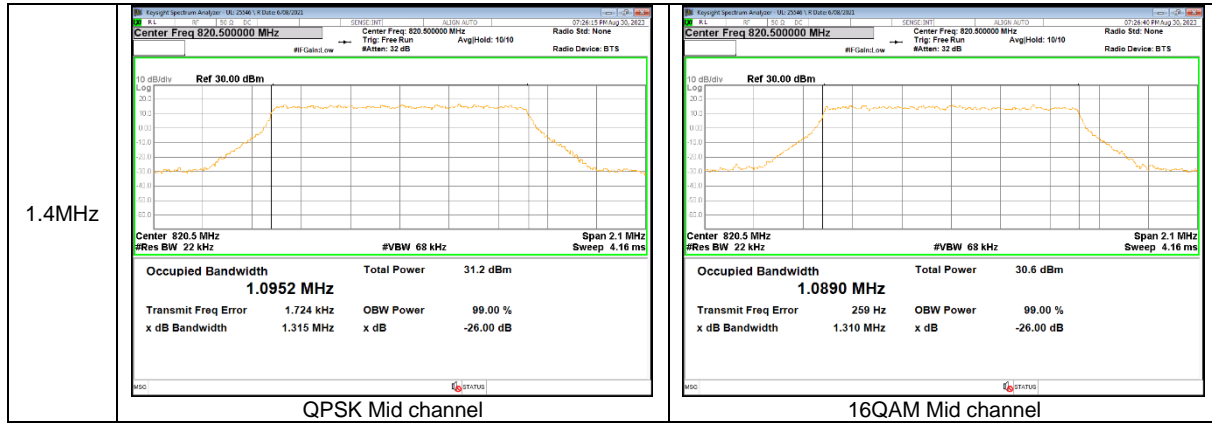


**LTE Band 5**



**LTE Band 26 (Part 90)**

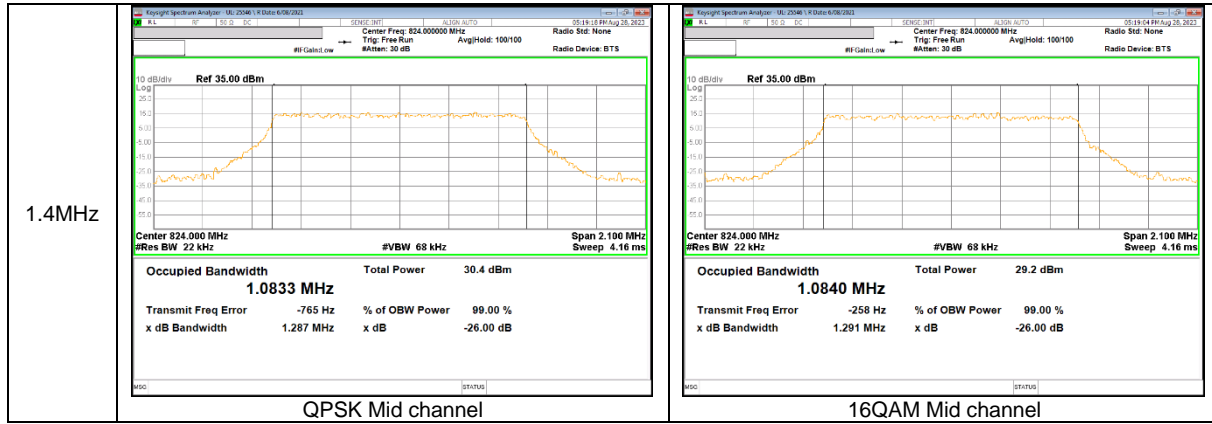




**LTE Band 26 (Straddle)**

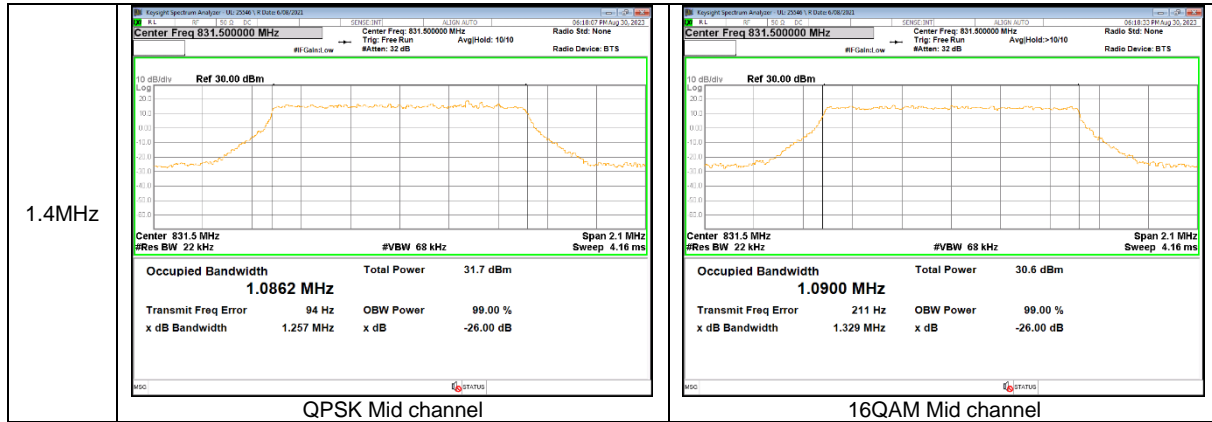






**LTE Band 26 (Part 22)**





**NR Band n5 CP-OFDM**



## 8.4. BAND EDGE EMISSIONS

### RULE PART(S)

FCC: §22.359, §22.917 and 90.691

### LIMITS

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.

Part 90.691:

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

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

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

## **TEST PROCEDURE**

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

The transmitter output was connected to either CMW500 Test Set or E7515B 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.

### **GSM**

- a) Set the RBW = 1 - 5% of OBW(GSM850 – 8.2kHz)
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 1.5$  times the OBW;
- d) Sweep time = 1s ;
- e) Detector = RMS;
- f) Ensure that the number of measurement points  $\geq 2 \times$  Span/RBW;
- g) Trace mode = Average(100);
- h) Add duty cycle correction factor (9dB)

### **WCDMA/LTE/5G NR**

- a) Set the RBW = 1 - 1.5 % of OBW(Typically limited to a minimum RBW of 1% of the OBW)
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 1.5$  times the OBW;
- d) Sweep time = Auto;
- e) Detector = RMS;
- f) Ensure that the number of measurement points  $\geq 2 \times$  Span/RBW;
- g) Trace mode = Average (100);

**NOTE1**

Note that the spurious emissions outside of the channel include narrowband signals. These signals are all below the -13dBm / -25dBm limits. Although the measurement bandwidth is less than the reference bandwidth of 1MHz no addtional correction is applied as ANSI C63.26 section 4.2.3 only requires the correction to be applied when the OBW of the emission being measured is wider than the measurement bandwidth (Where the OBW of the signal under measurement is less than the RBW of the measuring instrument, no bandwidth correction or integration will be required.) Plots for low and high channels show the level of the emission measured with the reduced bandwidth and the level of the same emission measured using the integration method over the 1MHz reference bandwidth are very close, indicating the emissions are narrowband.

**NOTE2**

For Band-Edge extended:

CH BW (MHz)	RB Used (kHz)	CF for emissions more than 100kHz	CF for emissions more than 1MHz
1.4	15	+8.2 dB	+18.2 dB
3	30	+5.2 dB	+15.2 dB
5	51	+2.9 dB	+12.9 dB
10	100	N/A	+10.0 dB
15	150	N/A	+8.2 dB
20	200	N/A	+7.0 dB

For the band edge value measured in [RB Used], even if [CF for emissions reference bandwidth 100kHz/1MHz] is applied, it is below -13dBm.

**NOTE3**

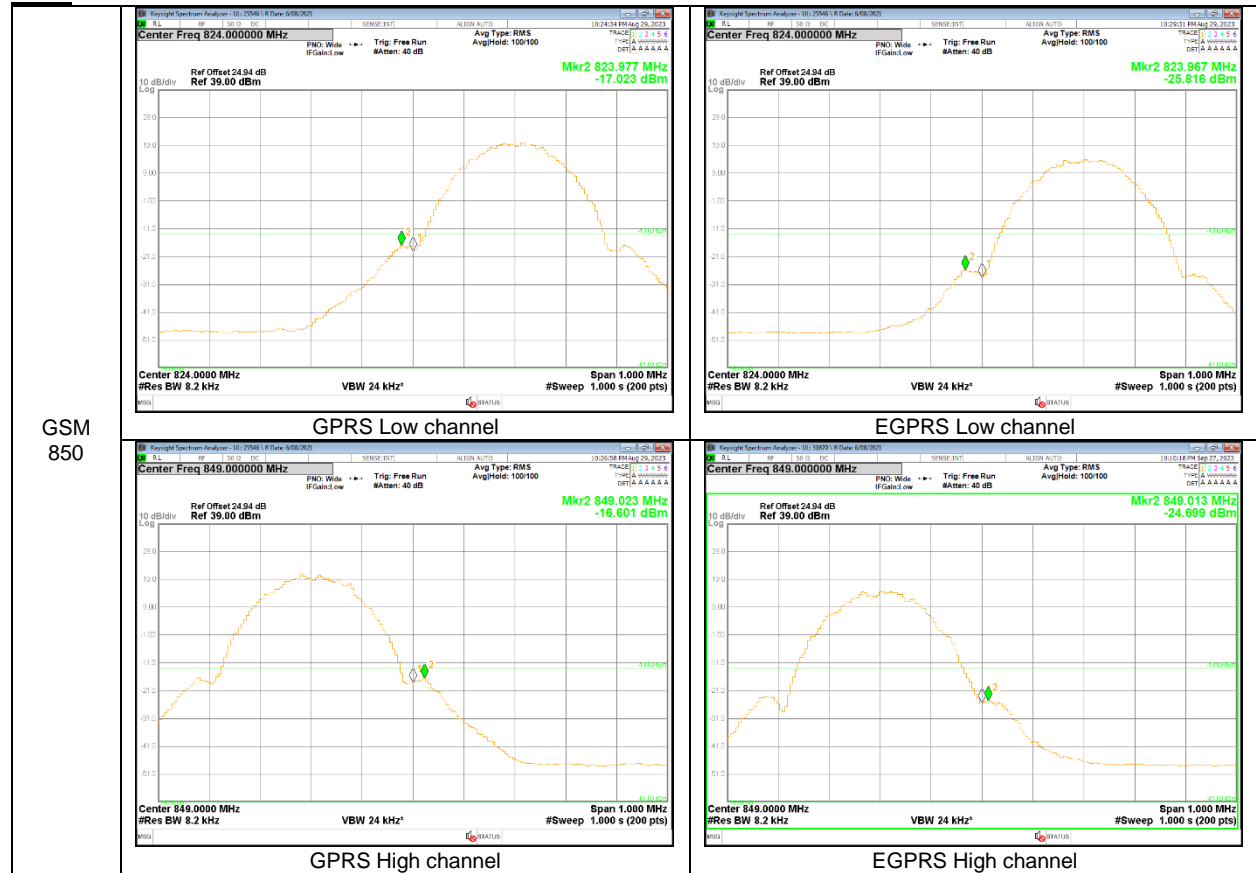
5G NR: All Waveforms (CP-OFDM vs DFT-s\_OFDM) and modulations ( $\pi/2$  BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

**RESULTS**

See the following pages.

### 8.4.1. BAND EDGE RESULT

GSM





WCDMA

