



CERTIFICATION TEST REPORT

Report Number. : 4789739083-E2V2

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

Model : SM-M625F/DS, SM-E625F/DS

FCC ID : A3LSMM625F

EUT Description : GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC

Test Standard(s) : FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E
FCC CFR47 PART 27 SUBPART H,L,M
FCC CFR47 PART 90 SUBPART S

Date Of Issue:
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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	01/06/21	Initial issue	Sungeun Lee
V2	01/11/21	Updated to address TCB's question	Sungeun Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC
MODEL NUMBER: SM-M625F/DS, SM-E625F/DS
SERIAL NUMBER: ce160881d0207e49 (CONDUCTED);
R38NB04CMGF (RADIATED)
DATE TESTED: NOV 30, 2020 – JAN 05, 2021;

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H, 24E, 27H, L, M and 90S	Pass

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:



Junwhan Lee
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:



Sungeun Lee
Suwon Lab Engineer
UL Korea, Ltd.

2. TEST METHODOLOGY

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

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 22.
3. FCC CFR 47 Part 24.
4. FCC CFR 47 Part 27.
5. FCC CFR 47 Part 90.
6. ANSI TIA-603-E, 2016
7. ANSI C63.26, 2015
8. KDB 971168 D01 Power Meas License Digital Systems v03r01

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
<input checked="" type="checkbox"/>	Chamber 2
<input type="checkbox"/>	Chamber 3

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:

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

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

(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
Radiated Disturbance, 9 kHz to 30 MHz	1.72 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.26 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.90 dB
Radiated Disturbance, Above 18 GHz	5.49 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 1, Clause 4.4.2 in IEC Guide 115:2007.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

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

This report covers the Samsung models SM-M625F/DS and SM-E625F/DS.
 These models are identical in hardware except SM-E625F/DS has other Software name.
 With some pre-scan, model SM-M625F/DS was set for final test.

5.2. MAXIMUM OUTPUT POWER

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

Note : Conducted output power results were excerpted from RF exposure test report (4789739083-S1 FCC Report SAR).

GSM

FCC Part 22/24						
Band	Frequency Range [MHz]	Modulation	Conducted		Radiated	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
GSM850	824~849	GPRS	33.08	2032.02	30.52	1127.20
		EGPRS	26.20	416.87	24.29	268.53
GSM1900	1850~1910	GPRS	30.92	1235.99	31.24	1330.45
		EGPRS	26.33	429.20	28.19	659.17

WCDMA

FCC Part 22/24						
Band	Frequency Range [MHz]	Modulation	Conducted		Radiated	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5	824~849	Rel. 99	24.73	297.31	21.22	132.43
		HSDPA	23.35	216.48	21.36	136.77
Band 4	1710~1755	Rel. 99	24.06	254.47	23.22	209.89
		HSDPA	24.16	260.62	23.20	208.93
Band 2	1850~1910	Rel. 99	24.23	264.93	24.97	314.05
		HSDPA	24.10	257.04	24.96	313.33

LTE Band 2

FCC Part 24							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 2	1850 ~ 1910	20	QPSK	24.48	280.67	26.16	413.05
			16QAM	23.68	233.22	25.09	322.85
		15	QPSK	24.60	288.08	26.31	427.56
			16QAM	23.88	244.28	24.86	306.20
		10	QPSK	24.44	277.83	25.32	340.41
			16QAM	23.54	225.71	24.90	309.03
		5	QPSK	24.51	282.56	25.27	336.51
			16QAM	23.87	243.71	24.28	267.92
		3	QPSK	24.58	286.86	25.41	347.54
			16QAM	24.00	251.07	24.26	266.69
		1.4	QPSK	24.09	256.46	25.66	368.13
			16QAM	23.39	218.06	24.52	283.14

LTE Band 12

FCC Part 27							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 12	699 ~ 716	10	QPSK	24.56	285.55	19.71	93.54
			16QAM	23.75	236.87	18.42	69.50
		5	QPSK	24.55	285.40	19.63	91.83
			16QAM	23.68	233.58	18.37	68.71
		3	QPSK	24.89	308.04	19.68	92.90
			16QAM	24.04	253.50	18.32	67.92
		1.4	QPSK	24.58	286.79	19.50	89.13
			16QAM	23.73	236.32	18.25	66.83

LTE Band 26 (Part 90)

FCC Part 90							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 26	814 ~ 824	15	QPSK	24.86	306.38	18.63	72.95
			16QAM	24.00	251.06	17.43	55.34
		10	QPSK	24.68	293.50	18.53	71.29
			16QAM	23.85	242.51	16.86	48.53
		5	QPSK	24.64	291.21	18.72	74.47
			16QAM	23.98	249.86	17.81	60.39
		3	QPSK	24.89	308.52	18.77	75.34
			16QAM	23.75	237.34	17.85	60.95
		1.4	QPSK	24.68	293.82	18.80	75.86
			16QAM	23.82	240.96	17.58	57.28

LTE Band 26 (Part 22)

FCC Part 22							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 26	824 ~ 849	15	QPSK	24.75	298.67	21.95	156.68
			16QAM	24.12	258.22	20.97	125.03
		10	QPSK	24.63	290.32	21.96	157.04
			16QAM	24.02	252.13	20.95	124.45
		5	QPSK	24.80	301.70	22.62	182.81
			16QAM	23.88	244.56	21.62	145.21
		3	QPSK	24.79	300.99	22.67	184.93
			16QAM	23.89	245.04	21.46	139.96
		1.4	QPSK	24.70	295.24	22.65	184.08
			16QAM	23.89	244.95	21.53	142.23

LTE Band 41

FCC Part 27							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 41	2496 ~ 2690	20	QPSK	22.11	162.55	23.34	215.77
			16QAM	21.74	149.23	22.73	187.50
		15	QPSK	22.10	162.01	22.50	177.83
			16QAM	21.77	150.30	22.02	159.22
		10	QPSK	22.07	161.07	23.12	205.12
			16QAM	21.75	149.75	22.50	177.83
		5	QPSK	22.11	162.61	22.95	197.24
			16QAM	21.59	144.14	22.77	189.23

LTE Band 66

FCC Part 27							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 66	1710 ~ 1780	20	QPSK	24.74	298.03	24.28	267.92
			16QAM	23.90	245.68	22.80	190.55
		15	QPSK	24.53	283.66	25.32	340.41
			16QAM	23.76	237.59	23.58	228.03
		10	QPSK	24.58	287.03	25.02	317.69
			16QAM	23.73	235.98	23.89	244.91
		5	QPSK	24.54	284.60	24.40	275.42
			16QAM	23.84	242.36	23.54	225.94
		3	QPSK	24.76	299.20	24.81	302.69
			16QAM	23.90	245.63	24.04	253.51
		1.4	QPSK	24.20	263.20	24.57	286.42
			16QAM	23.42	219.72	23.30	213.80

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

Frequency (MHz)	Peak Gain (dBi)
GSM 1900 / WCDMA Band 2/ LTE Band 2 1850 ~ 1910 MHz	-1.62
LTE Band 4 / LTE Band 66 1710 ~ 1780 MHz	-4.81
GSM 850 / WCDMA Band 5 / LTE Band 5 / LTE Band 26 814 ~ 849 MHz	-5.30
LTE Band 12 / LTE Band 17 699 ~ 716 MHz	-11.25
LTE Band 41 2496 ~ 2690 MHz	0.40

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 all 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 modulations However, the out of band emissions and spurious radiation were only performed on bandwidth and RB offset(with RB size 1) with the highest conducted power in QPSK.

Highest power setting for each bands				
LTE Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
2	1857.5	15	1	0
	1880.0		1	0
	1902.5		1	37
12	700.5	3	1	8
	707.5		1	0
	714.5		1	8
26 (Part 90)	815.5	3	1	8
	822.5		1	14
26 (Part 22)	826.5	5	1	12
	831.5		1	24
	846.5		1	12
41 (PC2)	2498.5	5	1	0
	2593.0		1	0
	2687.5		1	0
66	1711.5	3	1	8
	1745.0		1	0
	1778.5		1	8

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

Band	ERP/EIRP			RSE		
	X	Y	Z	X	Y	Z
GSM850	-	-	O	O	-	-
GSM1900	O	-	-	-	O	-
WCDMA B5	-	-	O	-	-	O
WCDMA B4	O	-	-	O	-	-
WCDMA B2	-	O	-	-	O	-
LTE B2	O	-	-	O	-	-
LTE B12	-	-	O	-	-	O
LTE B26	-	-	O	-	-	O
LTE B41	-	O	-	-	-	O
LTE B66	O	-	-	O	-	-

Note : For ERP/EIRP testing, the EUT didn't attached with travel adapter. But radiated spurious 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	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37MAVSOLC7DK3	N/A
Data Cable	SAMSUNG	EP-DA705BBE	N/A	N/A
Earphone	SAMSUNG	EHS61ASFBE	N/A	N/A

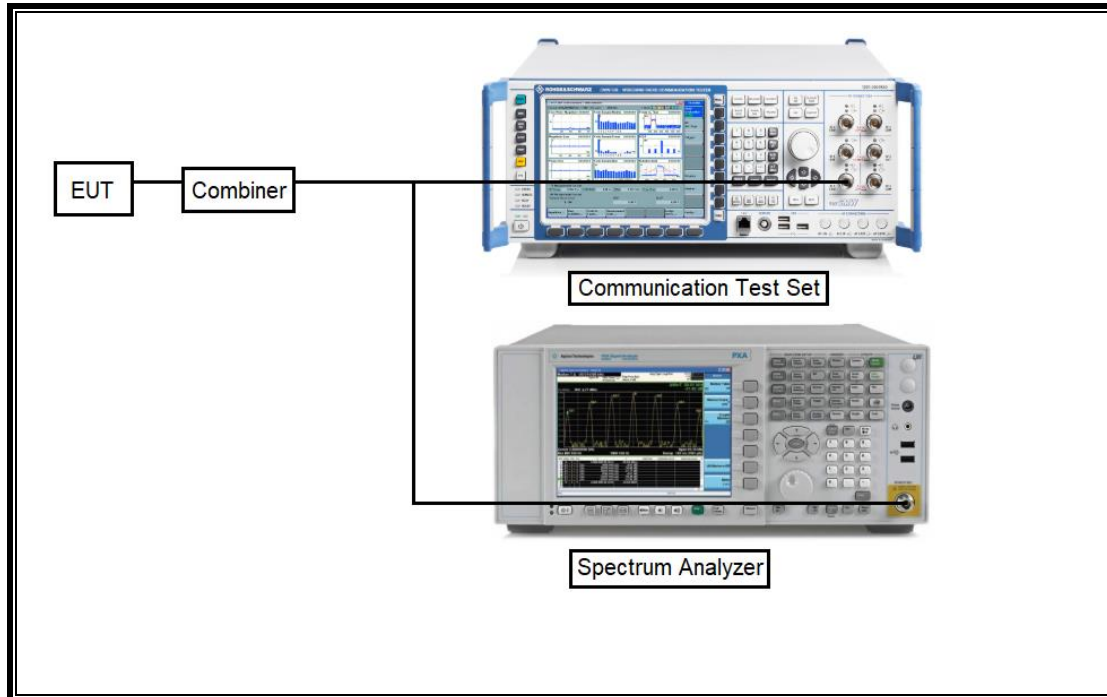
I/O CABLE

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
2	Audio	2	Mini-Jack	Unshielded	1.2 m	N/A

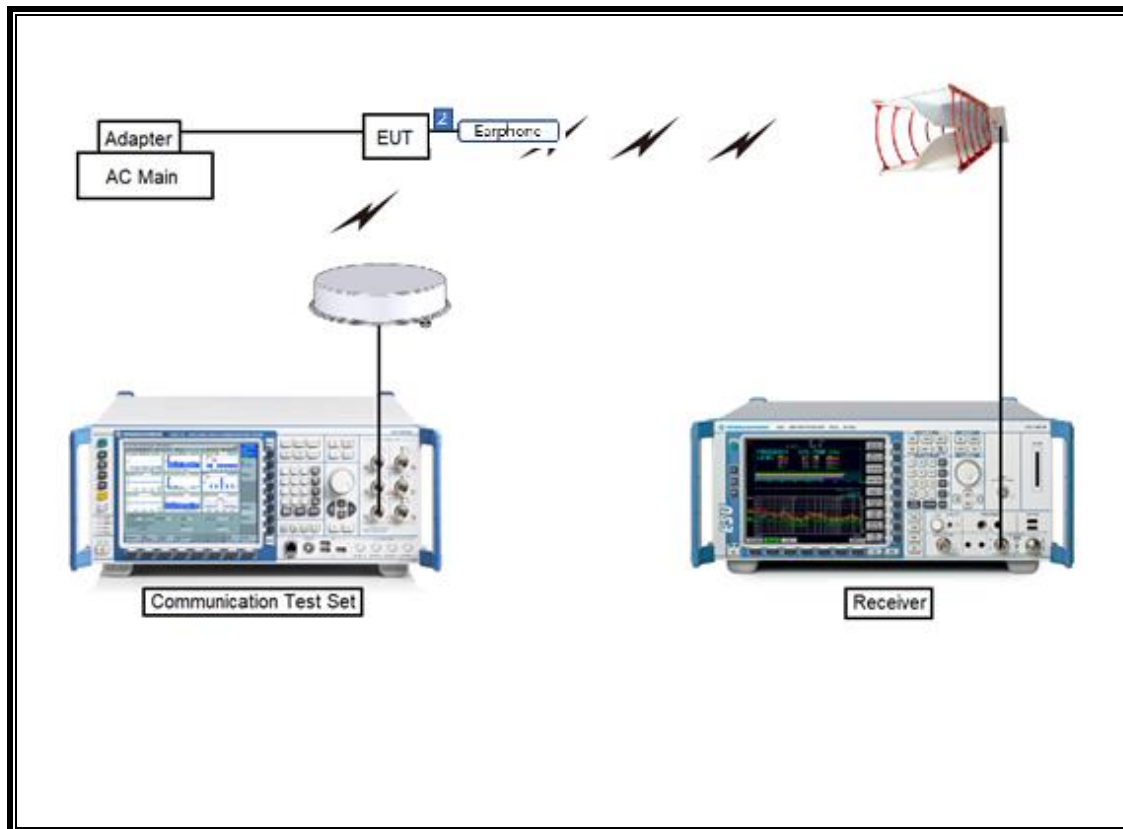
TEST SETUP

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	01-31-21
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	08-04-22
Preamplifier	ETS	3116C-PA	00168841	08-06-21
Antenna, Horn, 40 GHz	ETS	3116C	00168645	10-02-21
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	08-19-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-13-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	08-13-22
Antenna, Horn, 18 GHz	ETS	3115	00167211	07-27-22
Antenna, Horn, 18 GHz	ETS	3115	00161451	08-15-22
Antenna, Horn, 18 GHz	ETS	3117	00168724	07-27-22
Antenna, Horn, 18 GHz	ETS	3117	00168717	08-15-22
Communications Test Set	R&S	CMW500	115331	08-03-21
DC Power Supply	Agilent / HP	E3640A	MY54226395	08-05-21
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-03-21
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-06-21
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-04-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-03-21
Spectrum Analyzer	Keysight	N3090B	MY57143717	08-05-21
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-03-21
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-03-21
Directional Antenna	Cobham	FPA3-0.8-6.0R/1329	80108-0004	N/A
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G005	08-05-21
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G006	08-05-21
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	010	08-05-21
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	011	08-05-21
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G001	08-05-21
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G002	08-05-21
Attenuator	PASTERNAK	PE7087-10	A009	08-05-21
Attenuator	PASTERNAK	PE7087-10	A001	08-03-21
Attenuator	PASTERNAK	PE7087-10	A008	08-03-21
Attenuator	PASTERNAK	PE7004-10	2	08-04-21
Attenuator	PASTERNAK	PE7395-10	A011	08-05-21
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-02-21
Temperature Chamber	ESPEC	SH-642	93001109	08-04-21
Power Splitter	MINI-CIRCUITS	WA1534	UL001	02-05-21
Power Splitter	MINI-CIRCUITS	WA1534	UL002	02-05-21
UL Software				
Description	Manufacturer	Model	Version	
Antenna port test software	UL	CLT	Ver 2.5	

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) 24.238(a) 27.53(g),(h) 90.691	Band Edge / Conducted Spurious Emission	-13dBm		Pass
27.53(m)	Conducted Spurious Emission	-25 dBm		Pass
27.53(m) 90.691	Emission mask	Section 9.2.2		Pass
2.1046	Conducted output power	N/A		Pass
22.355 24.235 27.54 90.213	Frequency Stability	2.5PPM		Pass
22.913(a)(5)	Effective Radiated Power	38.5 dBm		Pass
90.635(b)		50 dBm	Pass	
27.50(c)(10) 27.50(b)(10)		34.77 dBm	Pass	
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power	33dBm	Radiated	Pass
27.50(d)(4)		30dBm		Pass
22.917(a) 24.238(a) 27.53(g),(h) 90.691	Radiated Spurious Emission	-13dBm		Pass
27.53 (m)		-25dBm		Pass

8. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v03r01;

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

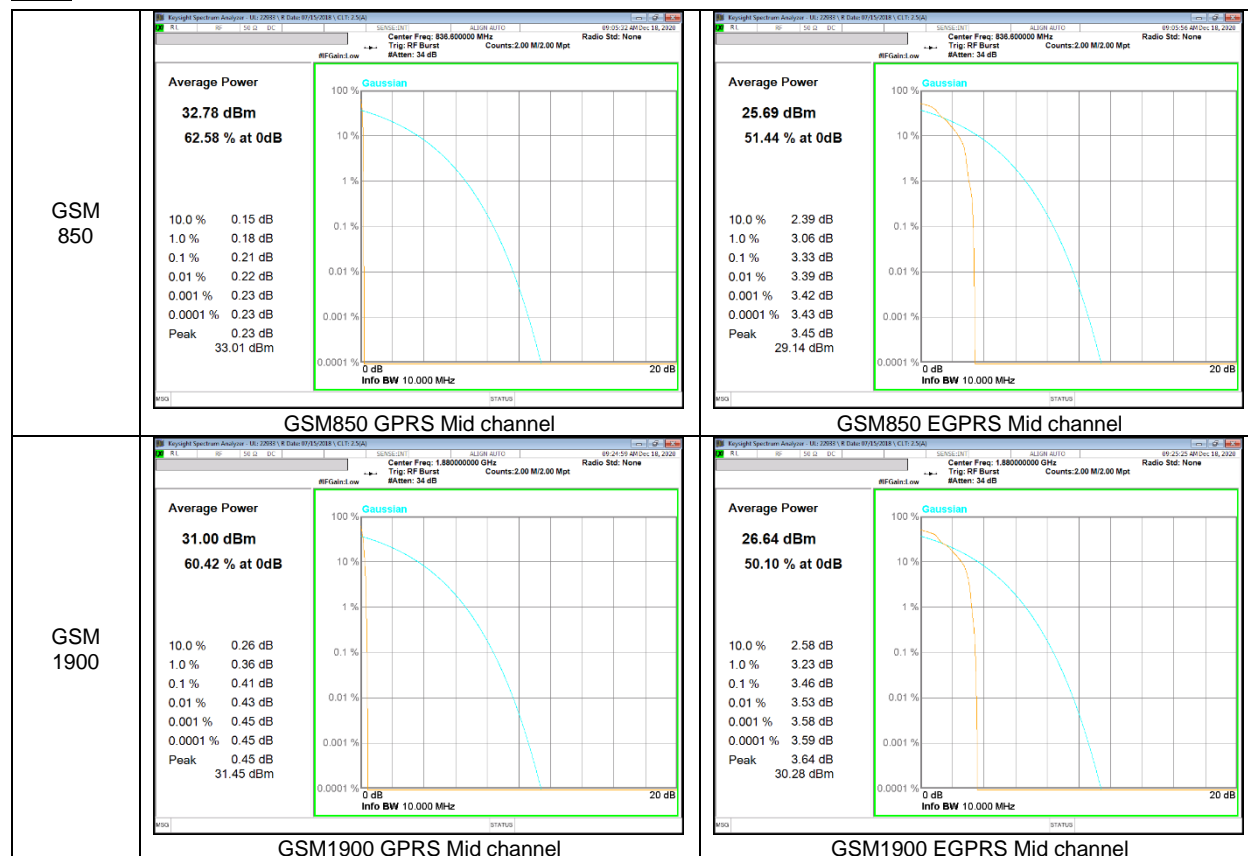
Test Spec

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.

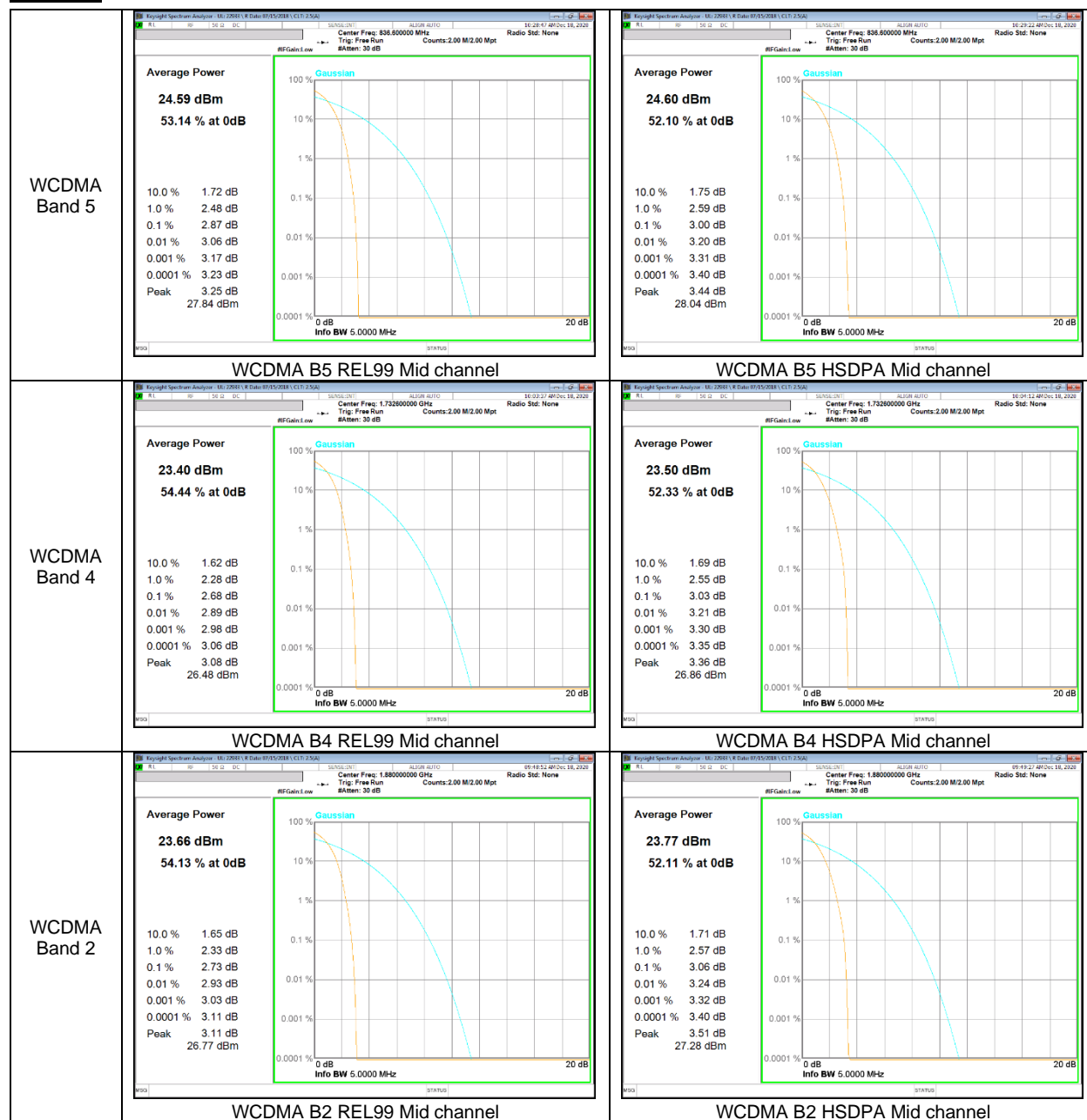
RESULTS

8.1. CONDUCTED PEAK TO AVERAGE RESULT

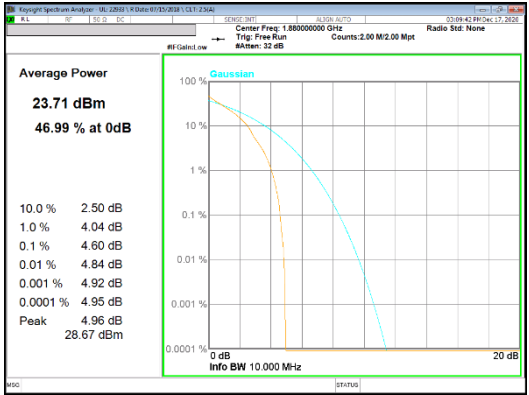
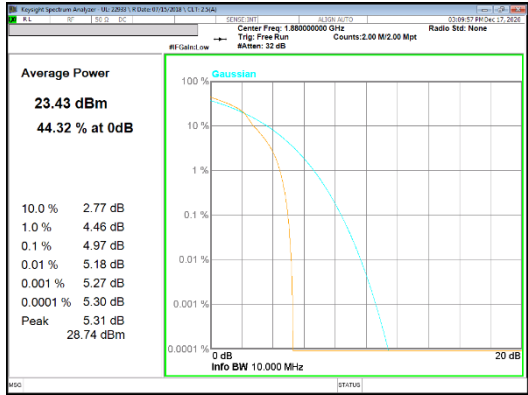
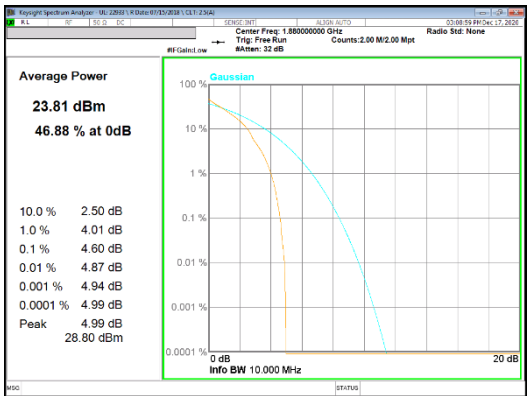
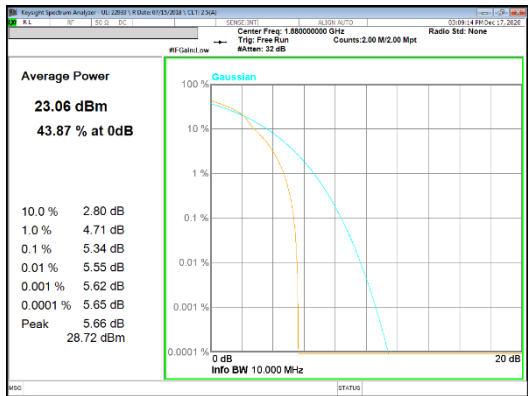
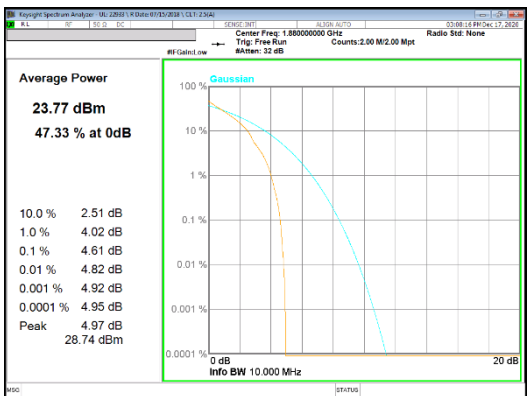
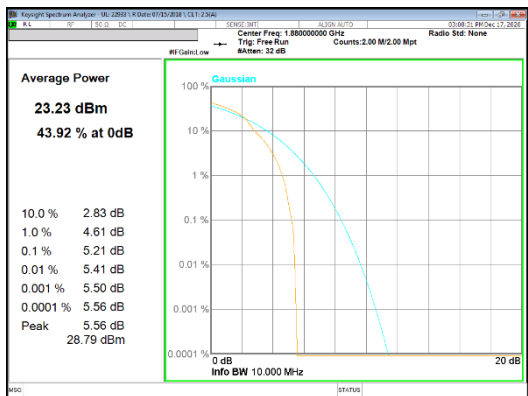
GSM

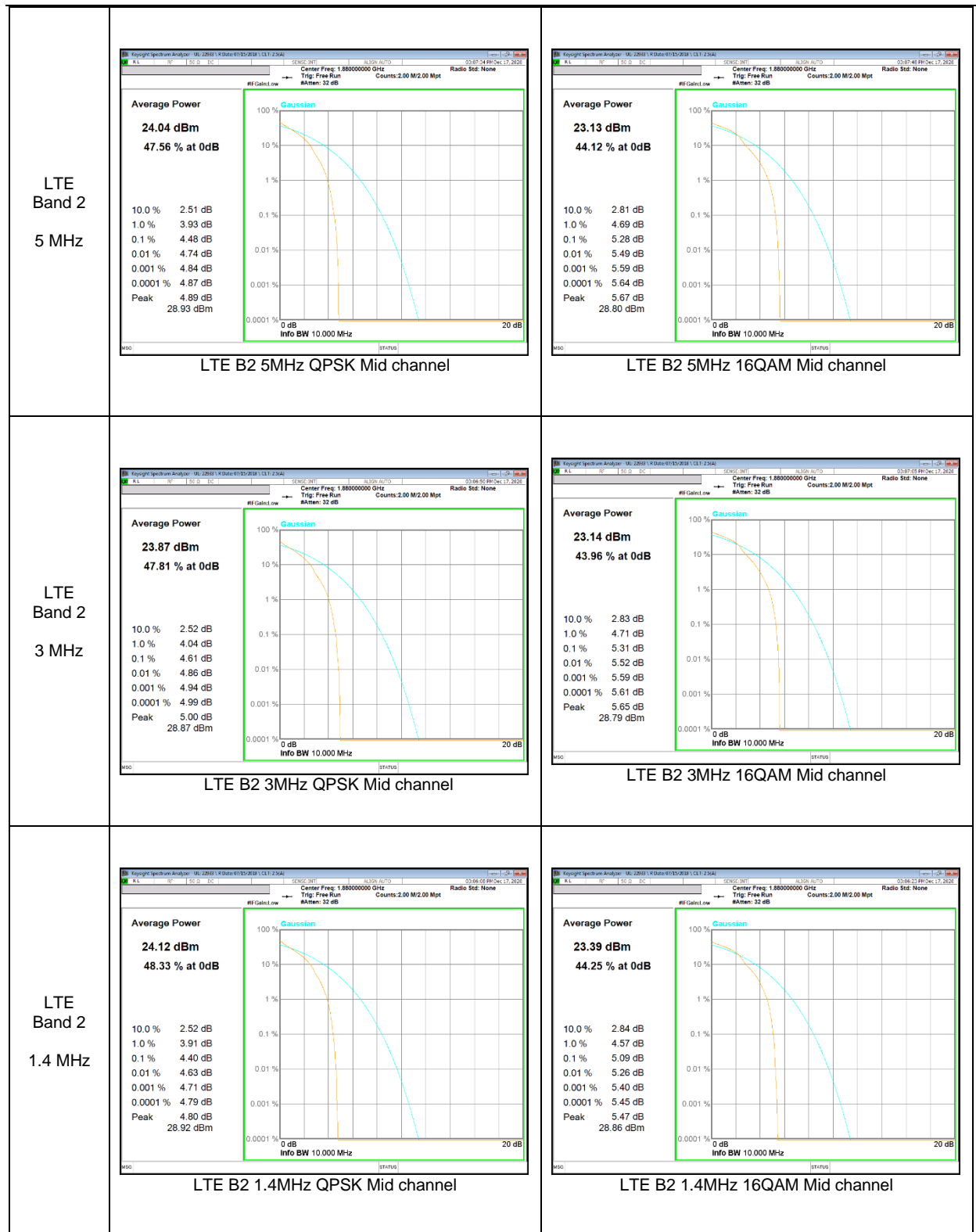


WCDMA



LTE Band 2

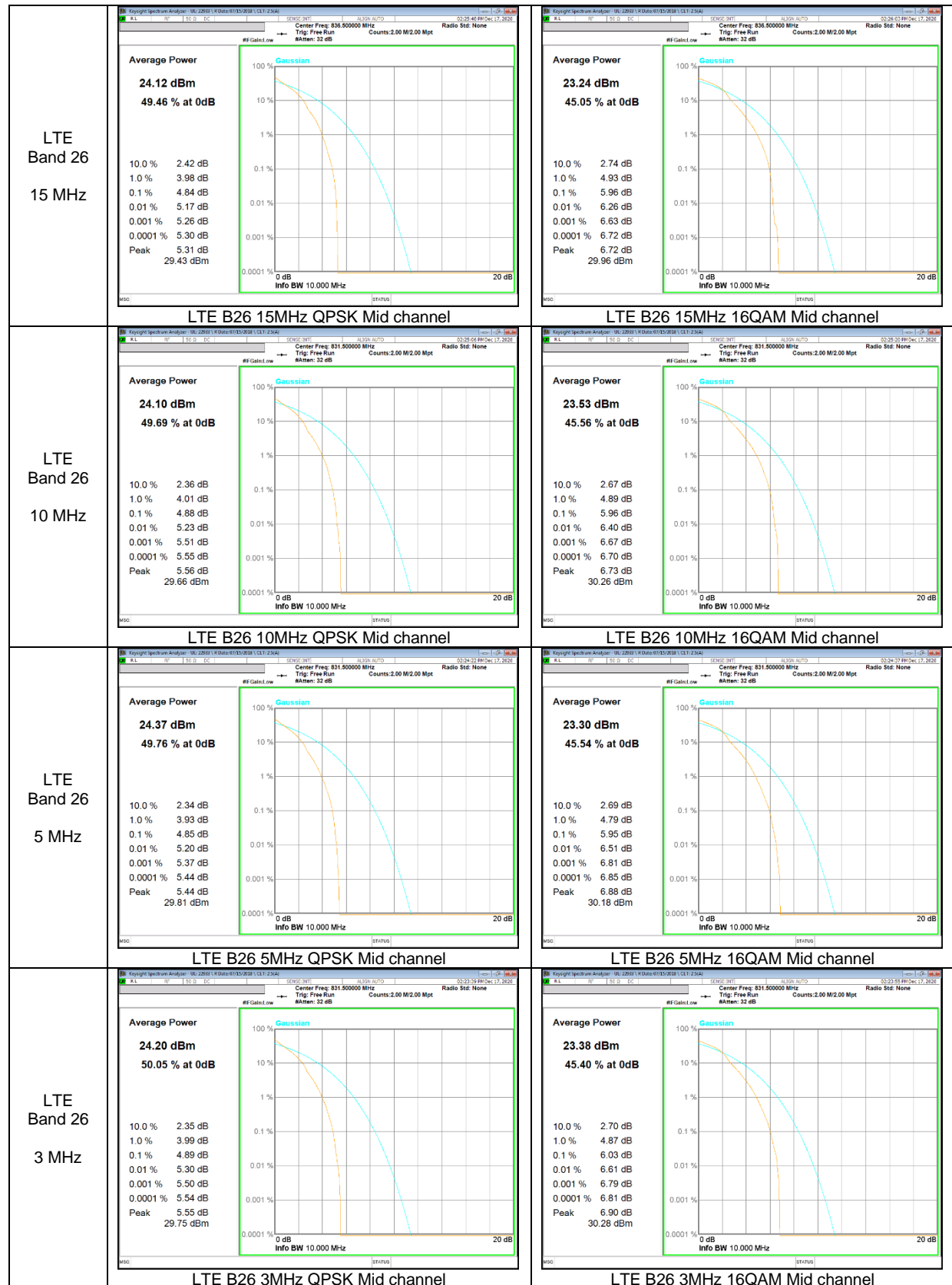
<p>LTE Band 2 20 MHz</p>	 <p>Average Power 23.71 dBm 46.99 % at 0dB</p> <p>10.0 % 2.50 dB 1.0 % 4.04 dB 0.1 % 4.60 dB 0.01 % 4.84 dB 0.001 % 4.92 dB 0.0001 % 4.95 dB Peak 4.96 dB 28.67 dBm</p> <p>LTE B2 20MHz QPSK Mid channel</p>	 <p>Average Power 23.43 dBm 44.32 % at 0dB</p> <p>10.0 % 2.77 dB 1.0 % 4.46 dB 0.1 % 4.97 dB 0.01 % 5.18 dB 0.001 % 5.27 dB 0.0001 % 5.30 dB Peak 5.31 dB 28.74 dBm</p> <p>LTE B2 20MHz 16QAM Mid channel</p>
<p>LTE Band 2 15 MHz</p>	 <p>Average Power 23.81 dBm 46.88 % at 0dB</p> <p>10.0 % 2.50 dB 1.0 % 4.01 dB 0.1 % 4.60 dB 0.01 % 4.87 dB 0.001 % 4.94 dB 0.0001 % 4.99 dB Peak 4.99 dB 28.80 dBm</p> <p>LTE B2 15MHz QPSK Mid channel</p>	 <p>Average Power 23.06 dBm 43.87 % at 0dB</p> <p>10.0 % 2.80 dB 1.0 % 4.71 dB 0.1 % 5.34 dB 0.01 % 5.55 dB 0.001 % 5.62 dB 0.0001 % 5.65 dB Peak 5.66 dB 28.72 dBm</p> <p>LTE B2 15MHz 16QAM Mid channel</p>
<p>LTE Band 2 10 MHz</p>	 <p>Average Power 23.77 dBm 47.33 % at 0dB</p> <p>10.0 % 2.51 dB 1.0 % 4.02 dB 0.1 % 4.61 dB 0.01 % 4.82 dB 0.001 % 4.92 dB 0.0001 % 4.95 dB Peak 4.97 dB 28.74 dBm</p> <p>LTE B2 10MHz QPSK Mid channel</p>	 <p>Average Power 23.23 dBm 43.92 % at 0dB</p> <p>10.0 % 2.83 dB 1.0 % 4.61 dB 0.1 % 5.21 dB 0.01 % 5.41 dB 0.001 % 5.50 dB 0.0001 % 5.56 dB Peak 5.56 dB 28.79 dBm</p> <p>LTE B2 10MHz 16QAM Mid channel</p>

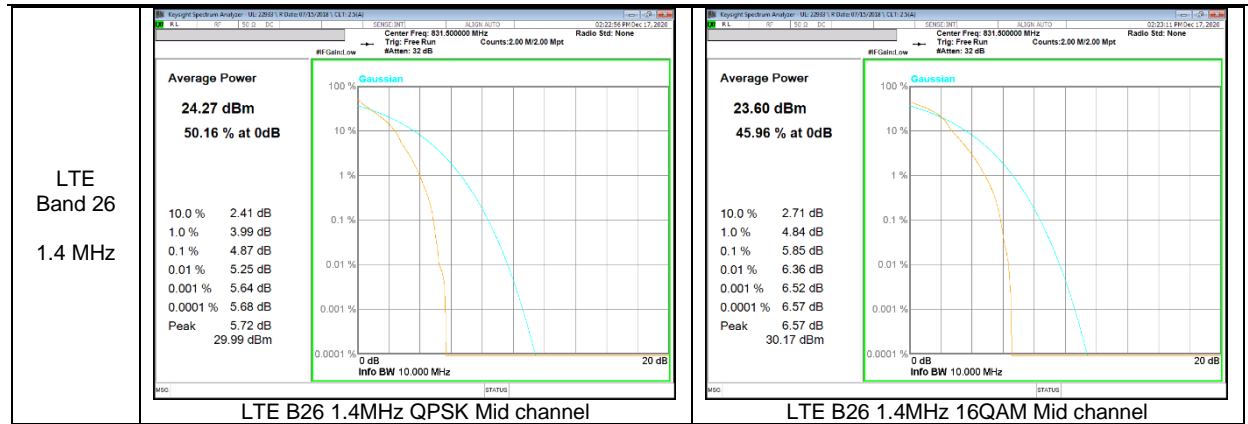


LTE Band 12

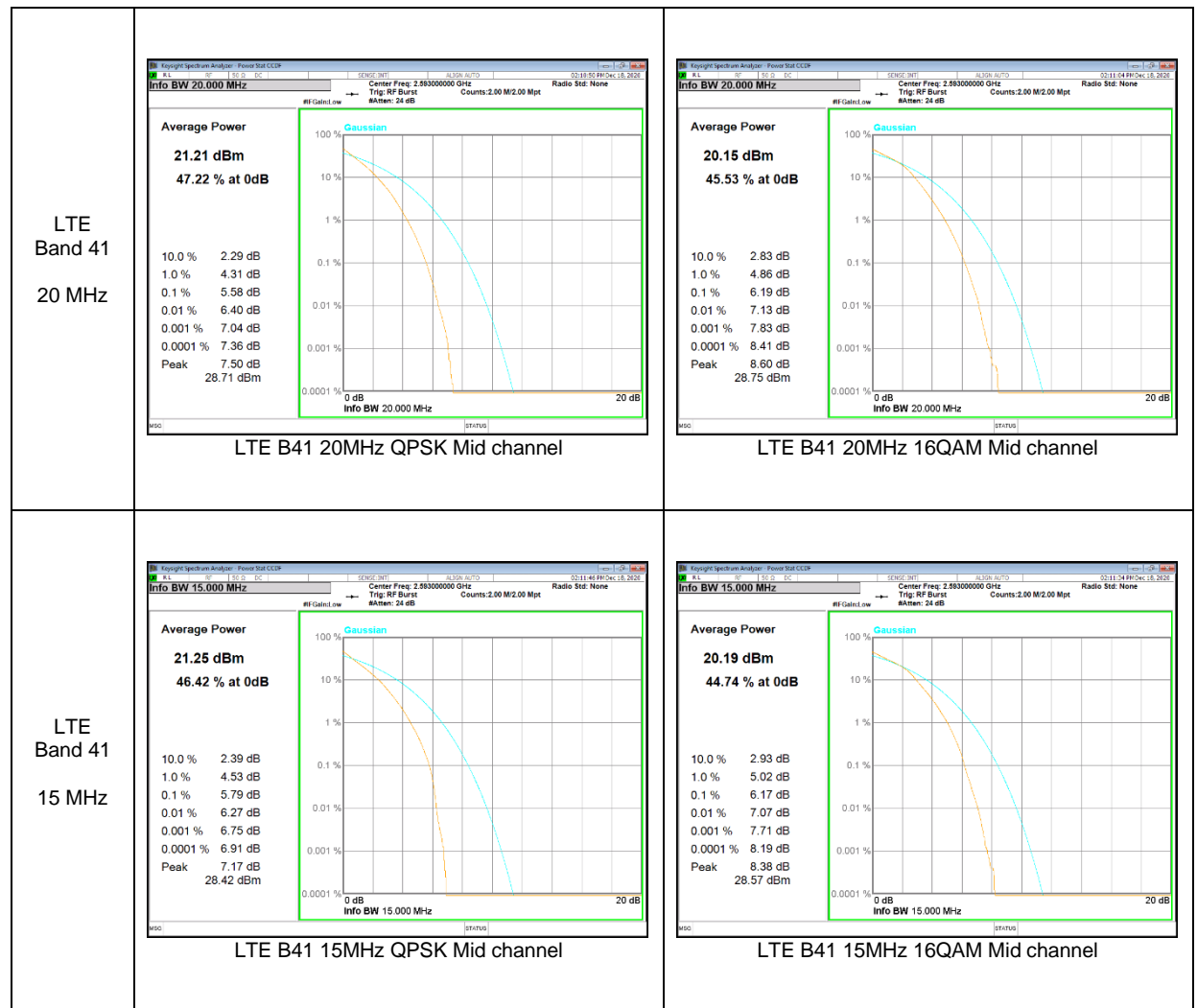


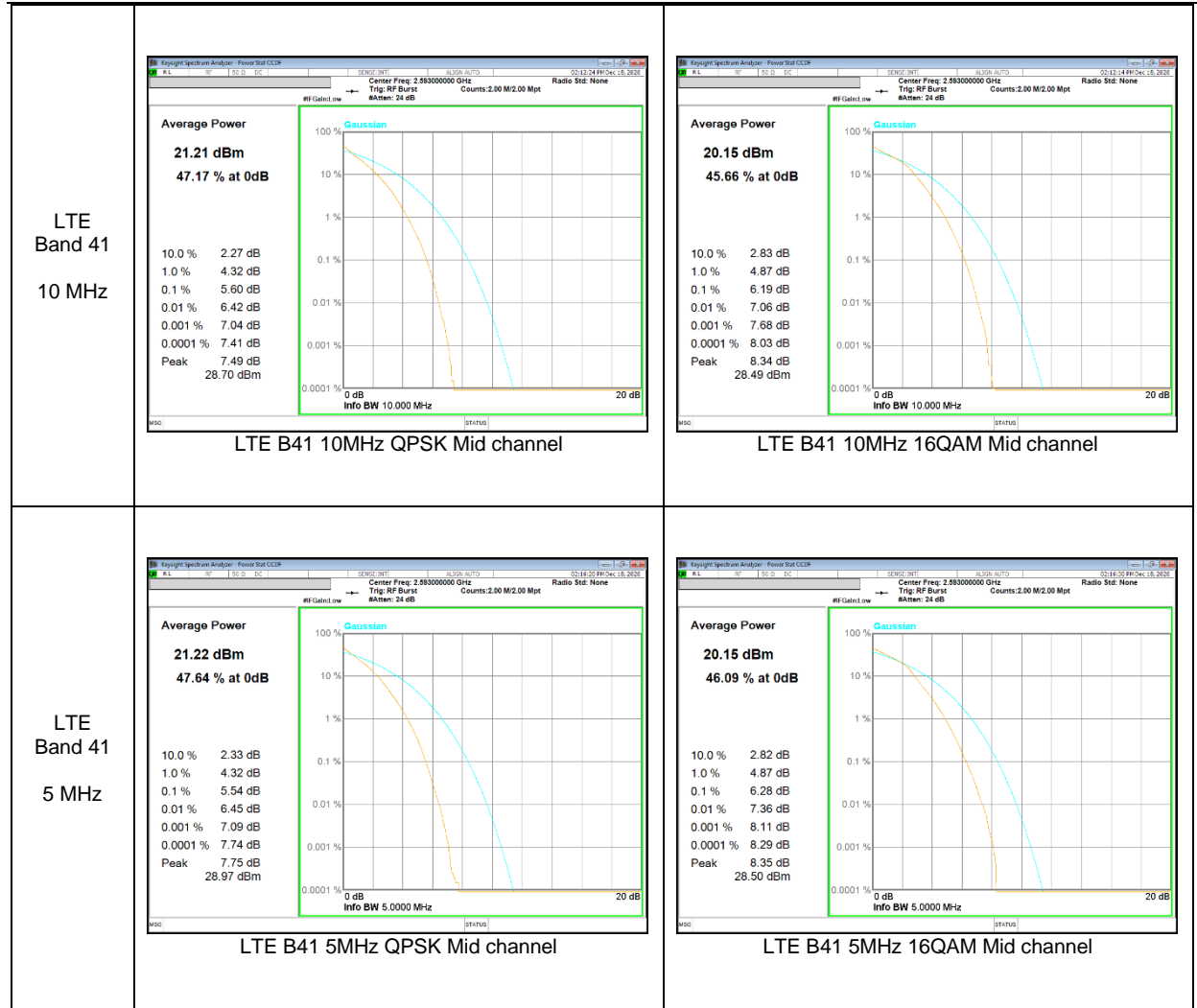
LTE Band 26



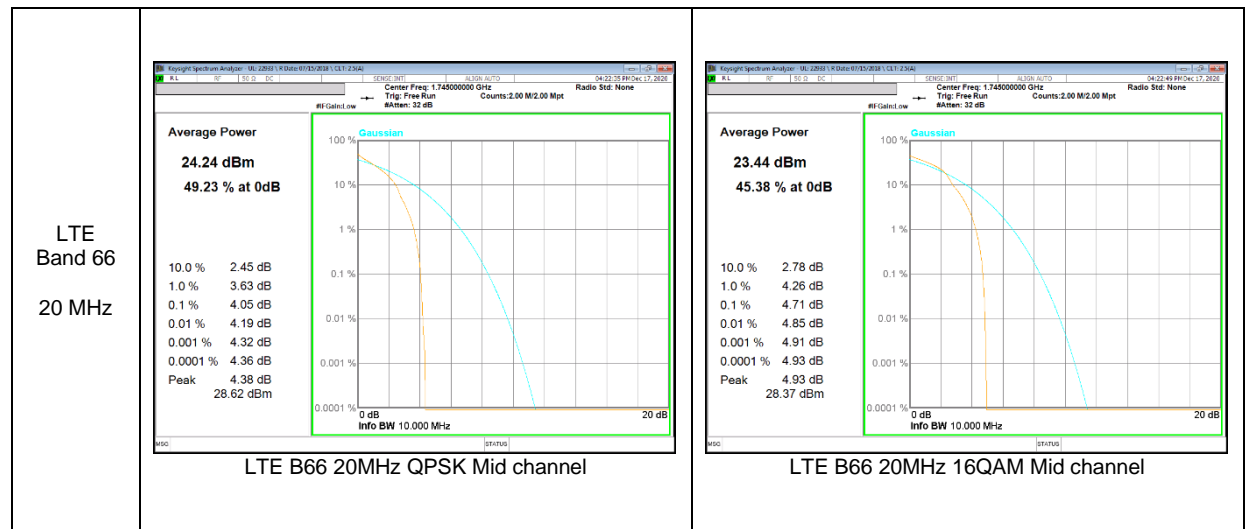


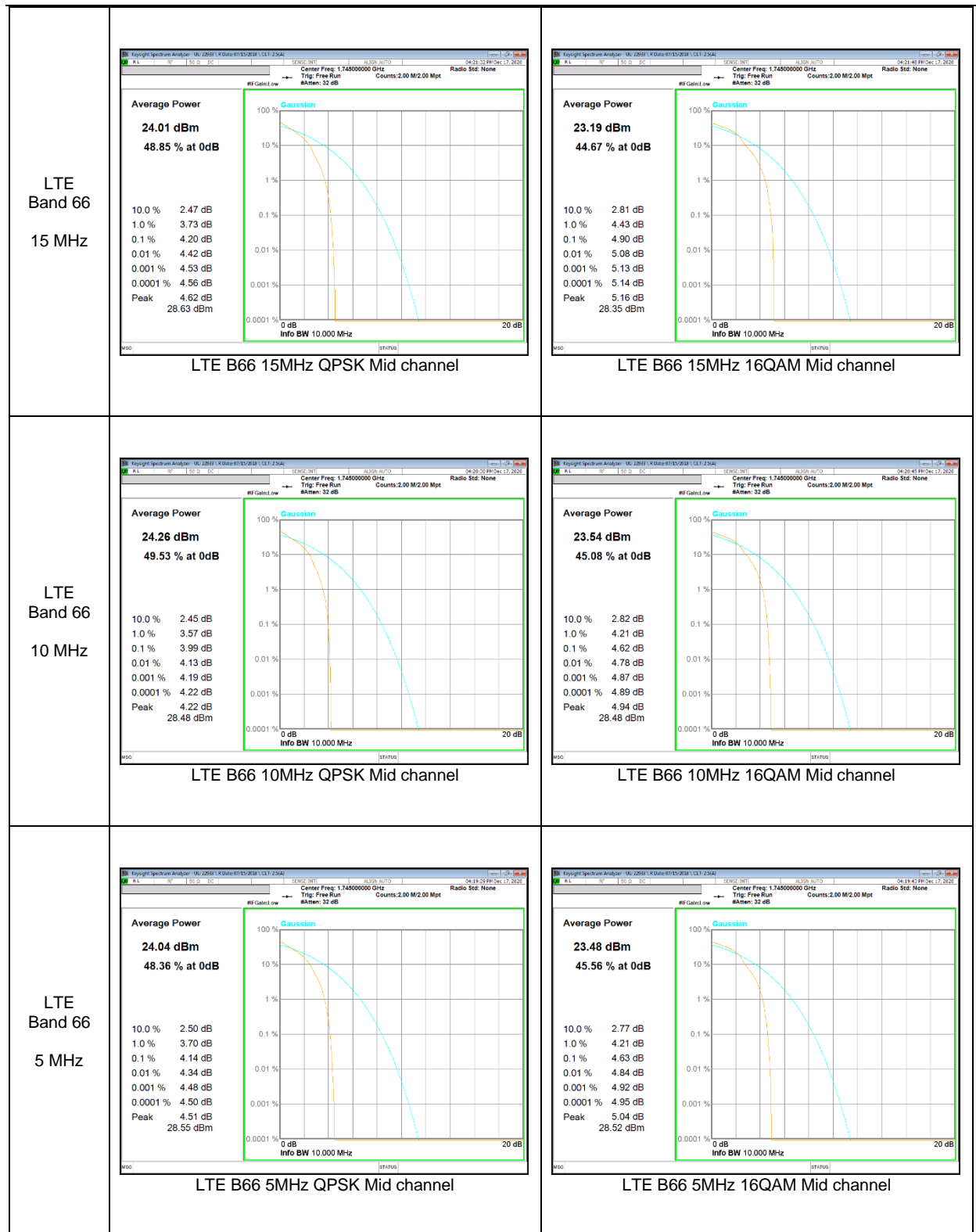
LTE Band 41

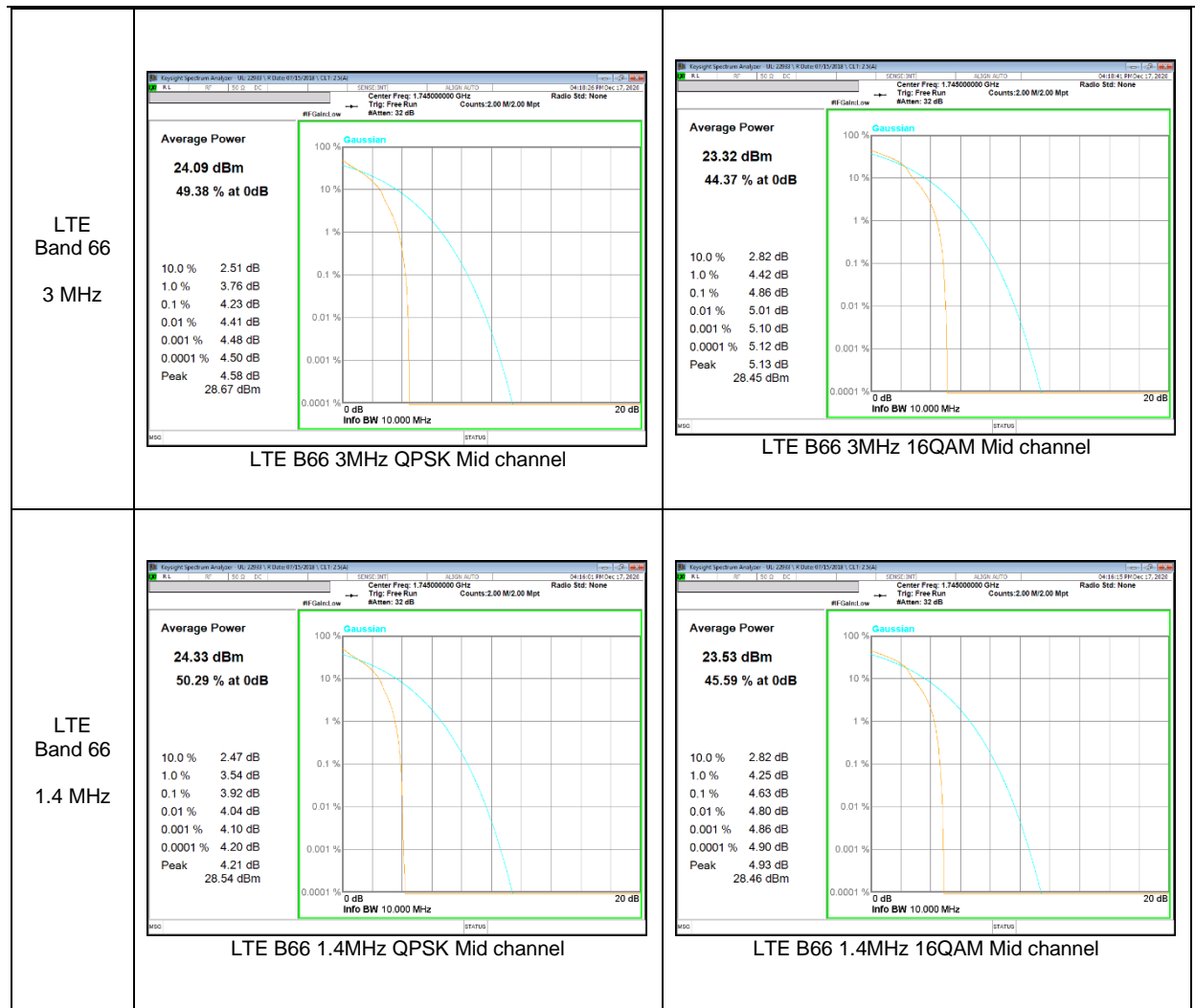




LTE Band 66







LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

9. LIMITS AND CONDUCTED RESULTS

9.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

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

(KDB 971168 D01 Power Meas License Digital Systems v03r01)

RESULTS

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

- GSM

Band	Modulation	Channel	f [MHz]	99% BW (kHz)	-26dB BW (kHz)
GSM850	GPRS	190	836.6	237.09	295.80
	EGPRS			241.22	303.90
GSM1900	GPRS	661	1880.0	237.70	307.50
	EGPRS			242.12	304.20

- WCDMA

Band	Modulation	Channel	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
WCDMAB5	Rel. 99	4183	836.6	4.174	4.718
	HSDPA			4.164	4.723
WCDMAB4	Rel. 99	1412	1732.4	4.172	4.750
	HSDPA			4.186	4.694
WCDMAB2	Rel. 99	9400	1880.0	4.178	4.744
	HSDPA			4.179	4.701

- LTE B2

Band	BW	Modulation	Channel	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B2	20M	QPSK	18900	1880.0	17.927	19.920
		16QAM			17.952	19.950
	15M	QPSK	18900	1880.0	13.409	15.090
		16QAM			13.408	15.100
	10M	QPSK	18900	1880.0	8.991	10.140
		16QAM			8.971	10.220
	5M	QPSK	18900	1880.0	4.500	5.254
		16QAM			4.505	5.346
	3M	QPSK	18900	1880.0	2.698	3.110
		16QAM			2.703	3.134
	1.4M	QPSK	18900	1880.0	1.092	1.298
		16QAM			1.088	1.303

- LTE B12

Band	BW	Modulation	Channel	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B12	10M	QPSK	23095	707.5	8.978	10.350
		16QAM			8.983	10.260
	5M	QPSK	23095	707.5	4.498	5.356
		16QAM			4.500	5.227
	3M	QPSK	23095	707.5	2.697	3.048
		16QAM			2.701	3.075
	1.4M	QPSK	23095	707.5	1.085	1.317
		16QAM			1.087	1.313

- LTE B26 (Part90)

Band	BW	Modulation	Channel	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B26 (Part90)	15M	QPSK	26765	821.5	13.431	15.040
		16QAM			13.409	15.030
	10M	QPSK	26740	819.0	8.977	10.240
		16QAM			8.968	10.370
	5M	QPSK	23205	816.5	4.501	5.294
		16QAM			4.994	5.143
	3M	QPSK	26705	815.5	2.693	3.050
		16QAM			2.696	3.078
	1.4M	QPSK	26697	814.7	1.087	1.292
		16QAM			1.091	1.327

- LTE B26 (Part22)

Band	BW	Modulation	Channel	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B26 (Part22)	15M	QPSK	26915	836.5	13.386	14.820
		16QAM			13.389	14.950
	10M	QPSK	26865	831.5	8.984	10.320
		16QAM			8.969	10.140
	5M	QPSK	26865	831.5	4.498	5.296
		16QAM			4.500	5.351
	3M	QPSK	26865	831.5	2.694	3.030
		16QAM			2.696	3.054
	1.4M	QPSK	26865	831.5	1.086	1.301
		16QAM			1.084	1.324

- LTE B41

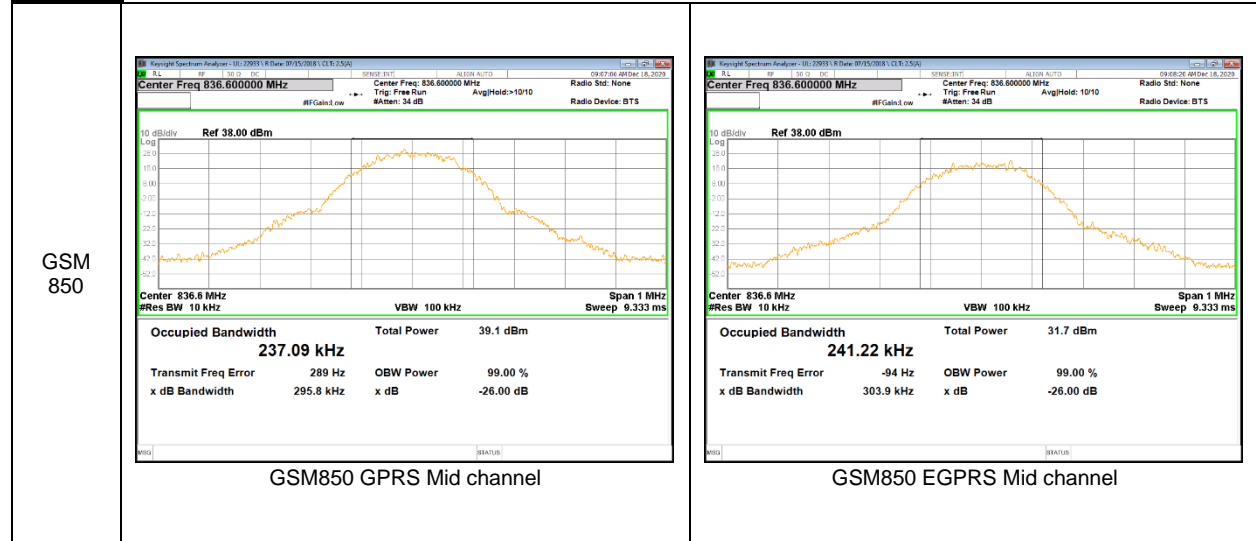
Band	BW	Modulation	Channel	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B41	20M	QPSK	40620	2593.0	17.882	19.770
		16QAM			17.889	19.670
	15M	QPSK	40620	2593.0	13.412	15.240
		16QAM			13.411	15.080
	10M	QPSK	40620	2593.0	8.964	10.280
		16QAM			8.961	10.190
	5M	QPSK	40620	2593.0	4.487	5.251
		16QAM			4.511	5.285

- LTE B66

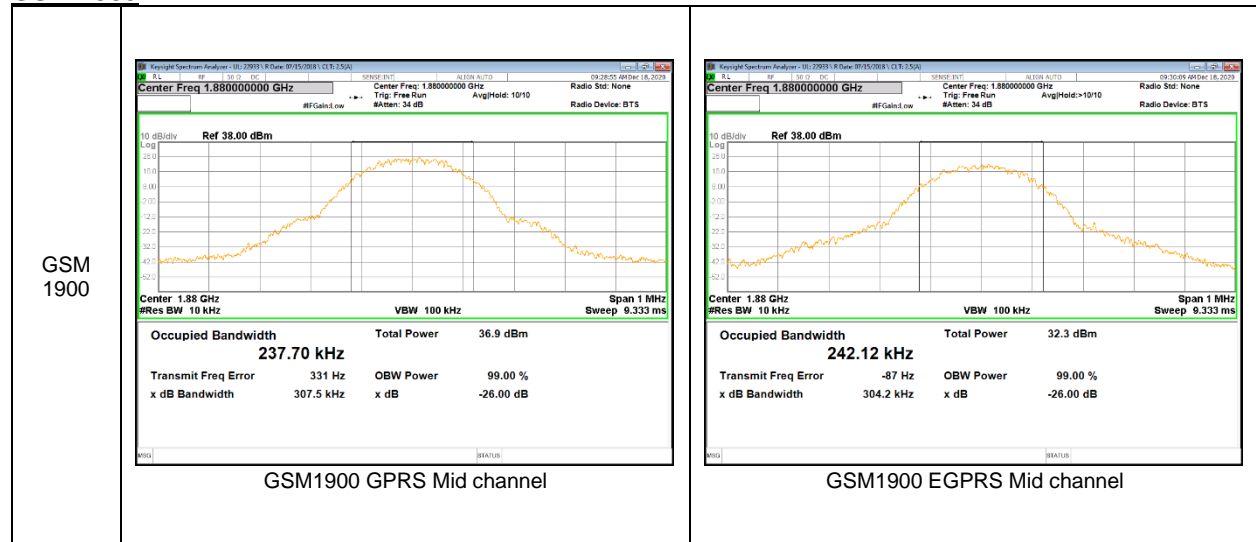
Band	BW	Modulation	Channel	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B66	20M	QPSK	132322	1745.0	17.946	19.890
		16QAM			17.937	19.740
	15M	QPSK	132322	1745.0	13.462	15.310
		16QAM			13.458	15.060
	10M	QPSK	132322	1745.0	8.959	10.290
		16QAM			8.969	10.270
	5M	QPSK	132322	1745.0	4.504	5.244
		16QAM			4.510	5.300
	3M	QPSK	132322	1745.0	2.697	3.088
		16QAM			2.704	3.106
	1.4M	QPSK	132322	1745.0	1.086	1.308
		16QAM			1.088	1.339

9.1.1. OCCUPIED BANDWIDTH RESULTS

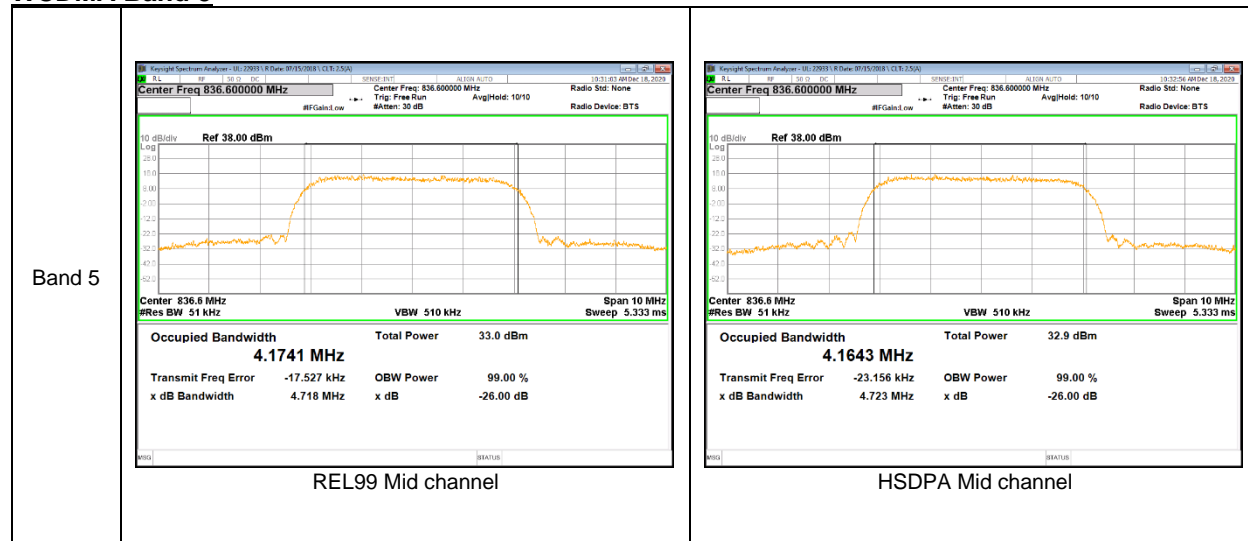
GSM 850



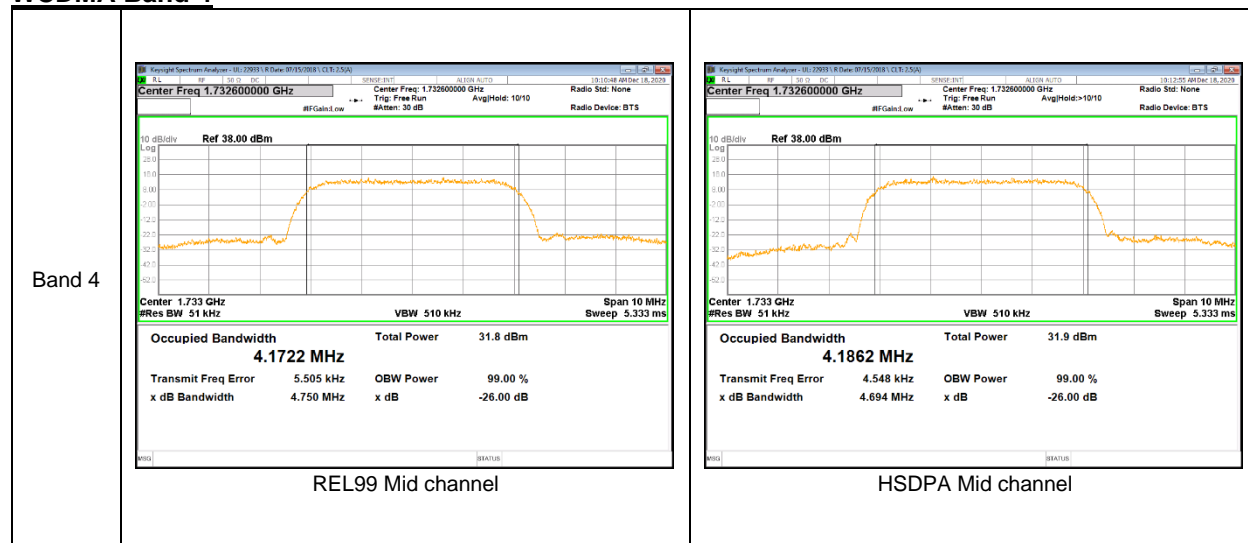
GSM 1900



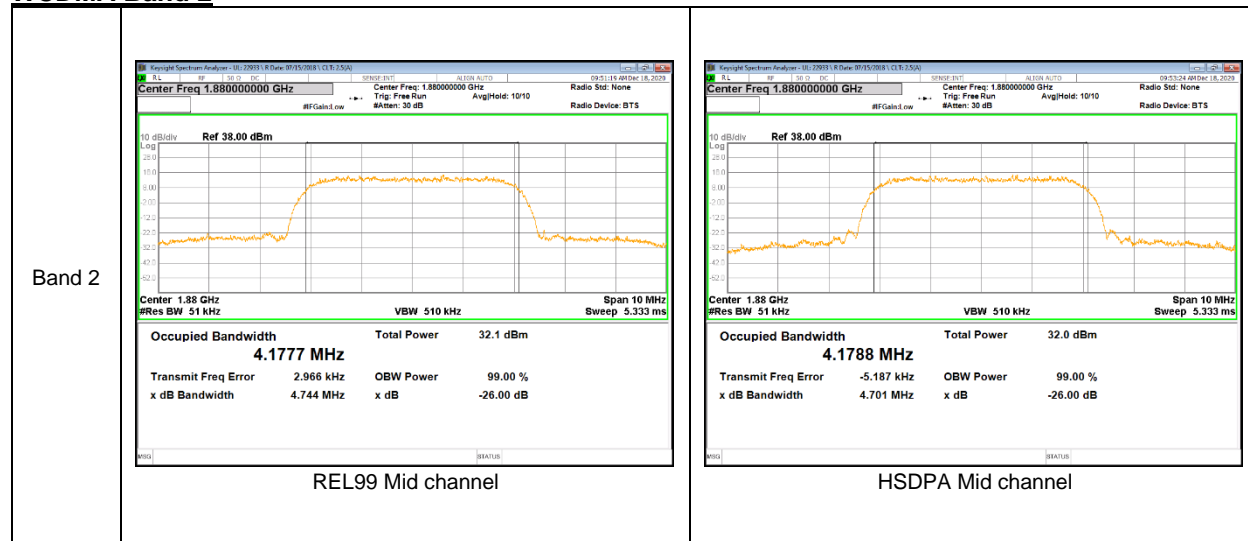
WCDMA Band 5



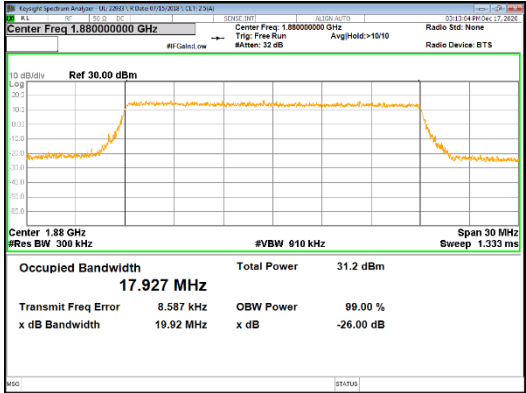
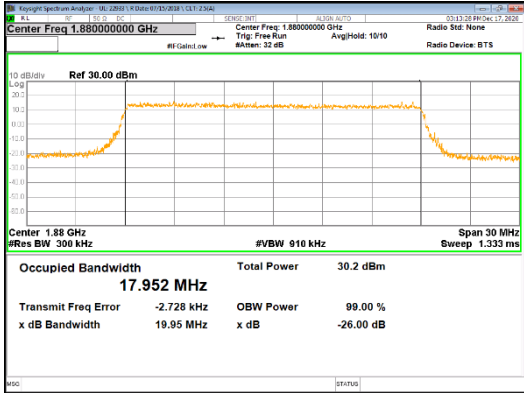
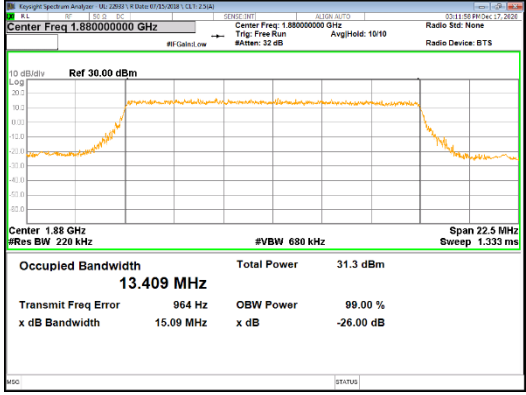
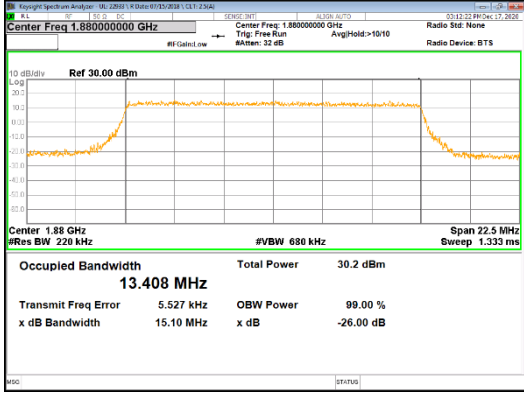
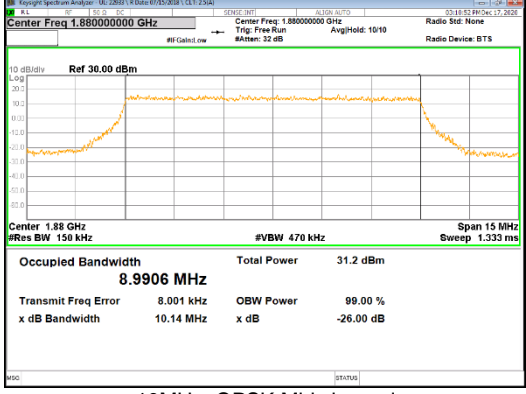
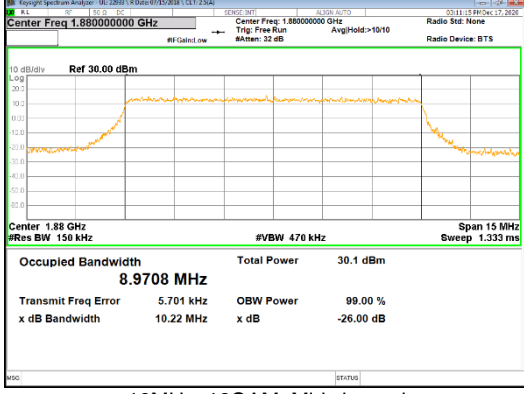
WCDMA Band 4

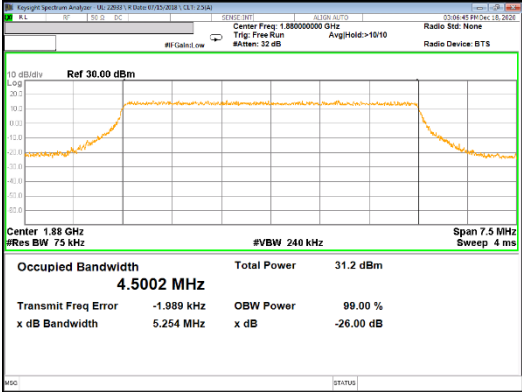
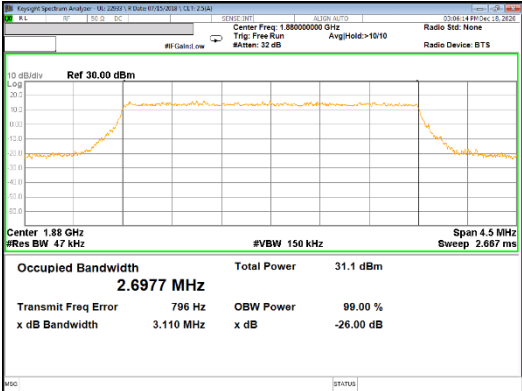
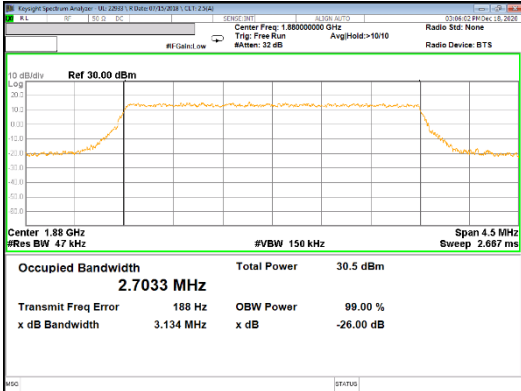
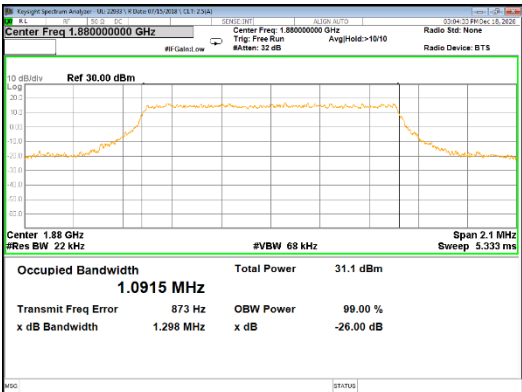


WCDMA Band 2

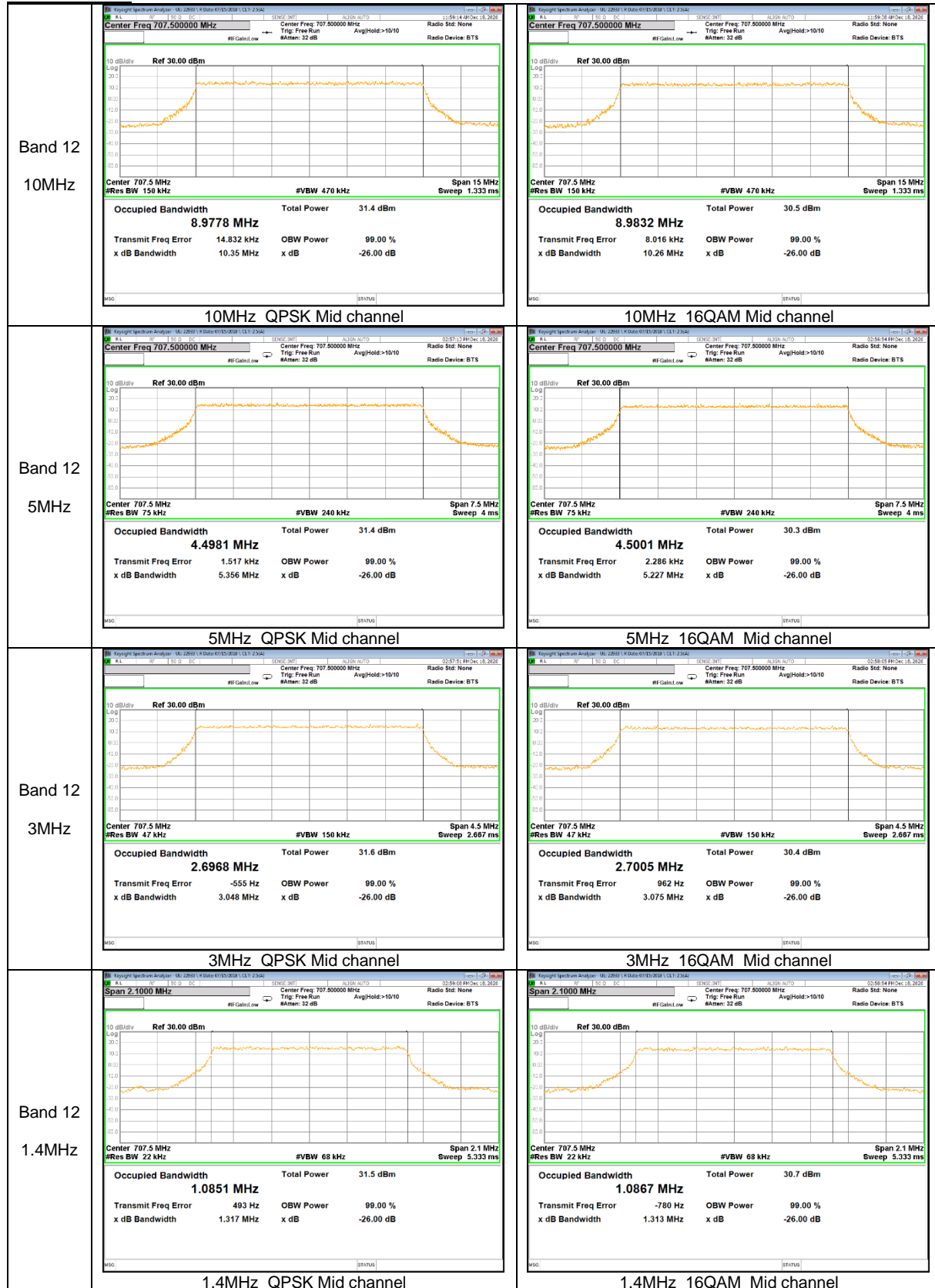


LTE Band 2

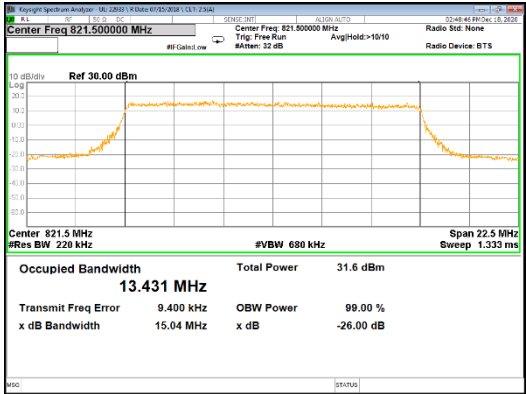
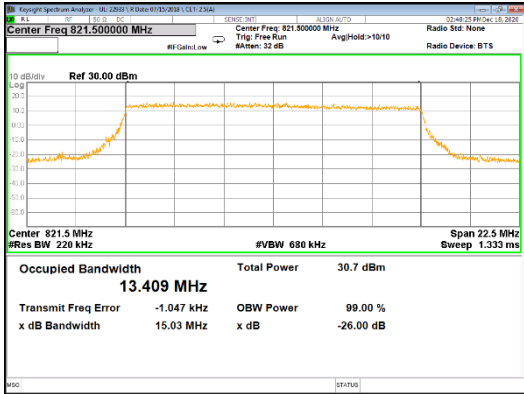
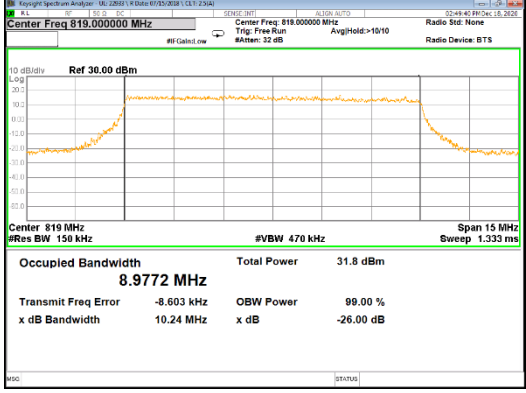
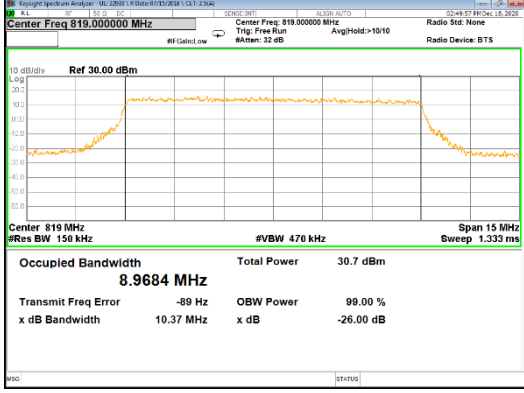
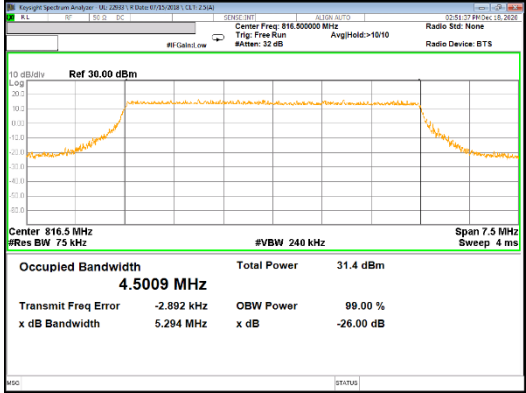
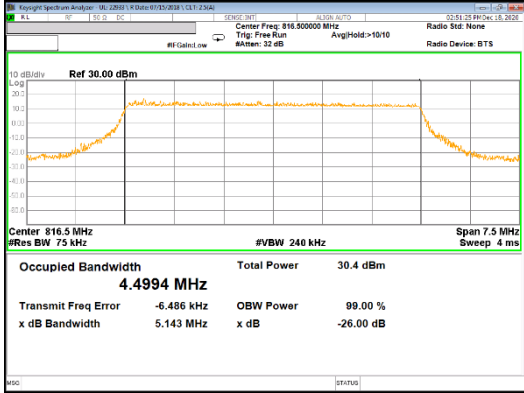
<p>Band 2 20MHz</p>	 <p>20MHz QPSK Mid channel</p>	 <p>20MHz 16QAM Mid channel</p>
<p>Band 2 15MHz</p>	 <p>15MHz QPSK Mid channel</p>	 <p>15MHz 16QAM Mid channel</p>
<p>Band 2 10MHz</p>	 <p>10MHz QPSK Mid channel</p>	 <p>10MHz 16QAM Mid channel</p>

<p>Band 2 5MHz</p>	 <p>5MHz QPSK Mid channel</p>	 <p>5MHz 16QAM Mid channel</p>
<p>Band 2 3MHz</p>	 <p>3MHz QPSK Mid channel</p>	 <p>3MHz 16QAM Mid channel</p>
<p>Band 2 1.4MHz</p>	 <p>1.4MHz QPSK Mid channel</p>	 <p>1.4MHz 16QAM Mid channel</p>

LTE Band 12

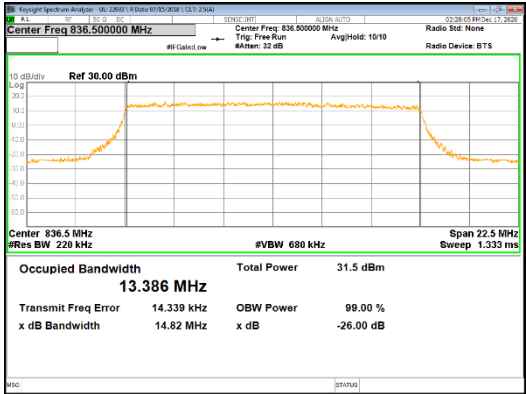
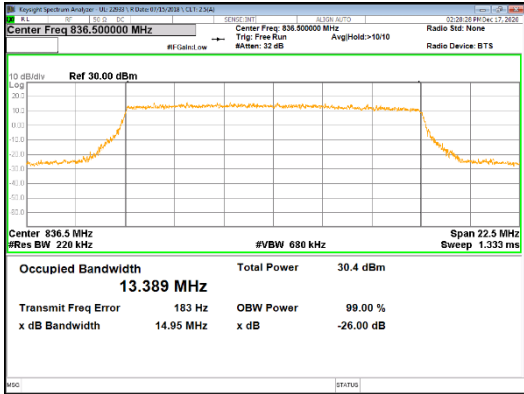
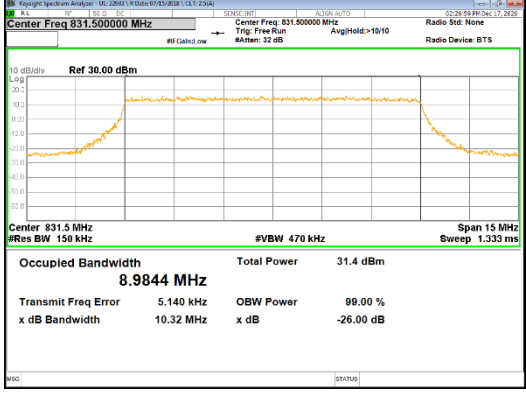
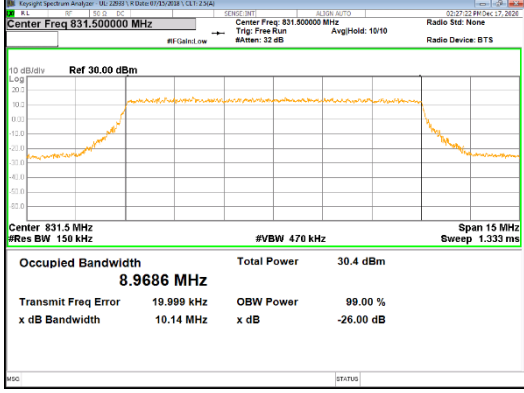
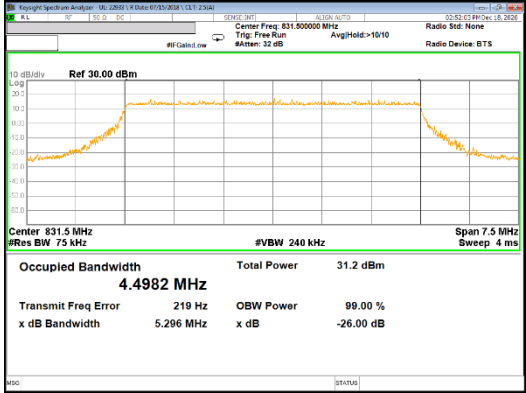
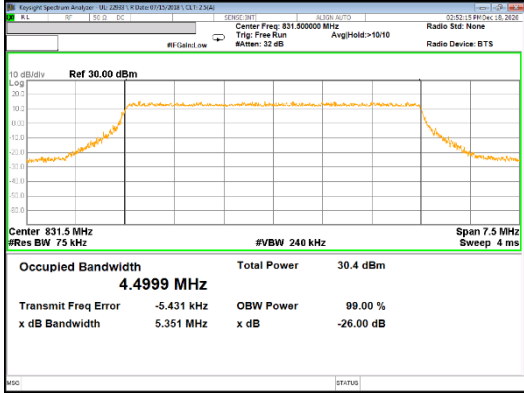


LTE Band 26 (Part90)

<p>Band 26 15MHz</p>	 <p>15MHz QPSK Mid channel</p>	 <p>15MHz 16QAM Mid channel</p>
<p>Band 26 10MHz</p>	 <p>10MHz QPSK Mid channel</p>	 <p>10MHz 16QAM Mid channel</p>
<p>Band 26 5MHz</p>	 <p>5MHz QPSK Mid channel</p>	 <p>5MHz 16QAM Mid channel</p>

<p>Band 26 3MHz</p>	 <p style="text-align: center;">3MHz QPSK Mid channel</p>	 <p style="text-align: center;">3MHz 16QAM Mid channel</p>
<p>Band 26 1.4MHz</p>	 <p style="text-align: center;">1.4MHz QPSK Mid channel</p>	 <p style="text-align: center;">1.4MHz 16QAM Mid channel</p>

LTE Band 26 (Part22)

<p>Band 26 15MHz</p>	 <p>15MHz QPSK Mid channel</p>	 <p>15MHz 16QAM Mid channel</p>
<p>Band 26 10MHz</p>	 <p>10MHz QPSK Mid channel</p>	 <p>10MHz 16QAM Mid channel</p>
<p>Band 26 5MHz</p>	 <p>5MHz QPSK Mid channel</p>	 <p>5MHz 16QAM Mid channel</p>

