



FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E
FCC CFR47 PART 27 SUBPART F
FCC CFR47 PART 27 SUBPART L
FCC CFR47 PART 27 SUBPART M

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER : SM-G9287

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Revision History

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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, ANT+ and NFC
MODEL NUMBER: SM-G9287
SERIAL NUMBER: R38G50YKSZV (RADIATED); R38G609VZZD (CONDUCTED)
DATE TESTED: JUN 21 - JUL 11, 2015

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H, 24E, 27F, 27L and 27M	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.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-C, FCC CFR 47 Part 22, FCC CFR Part 24, FCC CFR Part 27 and FCC CFR Part 90.

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, 443-823, 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	
☐	Chamber 1
☒	Chamber 2

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <http://www.iasonline.org/PDF/TL/TL-637.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:

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

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

(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	2.32 dB
Radiated Disturbance, Below 1GHz	4.14 dB
Radiated Disturbance, Above 1 GHz	5.97 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, ANT+ and NFC.

5.2. MAXIMUM OUTPUT POWER (LTE)

The transmitter has a maximum peak conducted and radiated ERP / EIRP output powers as follows:

LTE Band 41

Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 41	2496 ~ 2690	20	QPSK	23.12	205.12	21.35	136.46
			16QAM	22.42	174.58	20.56	113.76
		15	QPSK	23.03	200.91	21.35	136.46
			16QAM	21.94	156.31	20.51	112.46
		10	QPSK	23.13	205.59	21.74	149.28
			16QAM	21.98	157.76	20.64	115.88
		5	QPSK	23.26	211.84	21.51	141.58
			16QAM	22.28	169.04	20.38	109.41

LTE Band 25

Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 25	1850 ~ 1915	20	QPSK	22.46	176.20	20.54	113.24
			16QAM	21.50	141.25	19.54	89.95
		15	QPSK	22.34	171.40	20.34	108.14
			16QAM	21.37	137.09	19.32	85.51
		10	QPSK	22.46	176.20	20.45	110.92
			16QAM	21.50	141.25	19.44	87.90
		5	QPSK	22.48	177.01	20.52	112.72
			16QAM	21.50	141.25	19.47	88.51
		3	QPSK	22.50	177.83	20.46	111.17
			16QAM	21.42	138.68	19.47	88.51
		1.4	QPSK	22.18	165.20	20.28	106.66
			16QAM	21.23	132.74	19.14	82.04

LTE Band 17

Due to frequency range and same output power setting, test was carried in LTE Band 12 to cover both LTE Band 12 and LTE Band 17.

LTE Band 12

Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 12	699 ~ 716	10	QPSK	23.25	211.35	15.49	35.40
			16QAM	22.49	177.42	14.41	27.61
		5	QPSK	23.30	213.80	15.99	39.72
			16QAM	22.50	177.83	15.02	31.77
		3	QPSK	23.25	211.35	16.13	41.02
			16QAM	22.34	171.40	15.13	32.58
		1.4	QPSK	23.20	208.93	16.05	40.27
			16QAM	22.50	177.83	15.05	13.99

LTE Band 4

Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 4	1710 ~ 1755	20	QPSK	22.35	171.79	21.20	131.83
			16QAM	21.29	134.59	20.19	104.47
		15	QPSK	22.27	168.66	21.42	138.68
			16QAM	21.18	131.22	20.42	110.15
		10	QPSK	22.34	171.40	21.06	127.64
			16QAM	21.30	134.90	20.04	100.93
		5	QPSK	22.29	169.43	21.14	130.02
			16QAM	21.26	133.66	20.16	103.75
		3	QPSK	22.30	169.82	21.14	130.02
			16QAM	21.28	134.28	20.22	105.20
		1.4	QPSK	22.33	171.00	19.25	84.14
			16QAM	21.46	139.96	18.19	65.92

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

Frequency (MHz)	Peak Gain (dBi)
LTE Band 41 2496 ~ 2690 MHz	-1.69
LTE Band 25 1850 ~ 1915 MHz	-1.96
LTE Band 12 / Band 17 699 ~ 716 MHz	-3.05
LTE Band 4 1710 ~ 1755 MHz	-1.98

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA20UWE	R37FBRA0BL1DK3	N/A
Data Cable	SAMSUNG	EP-DG925UWE	N/A	N/A
Earphone	SAMSUNG	EO-EG920BW	N/A	N/A

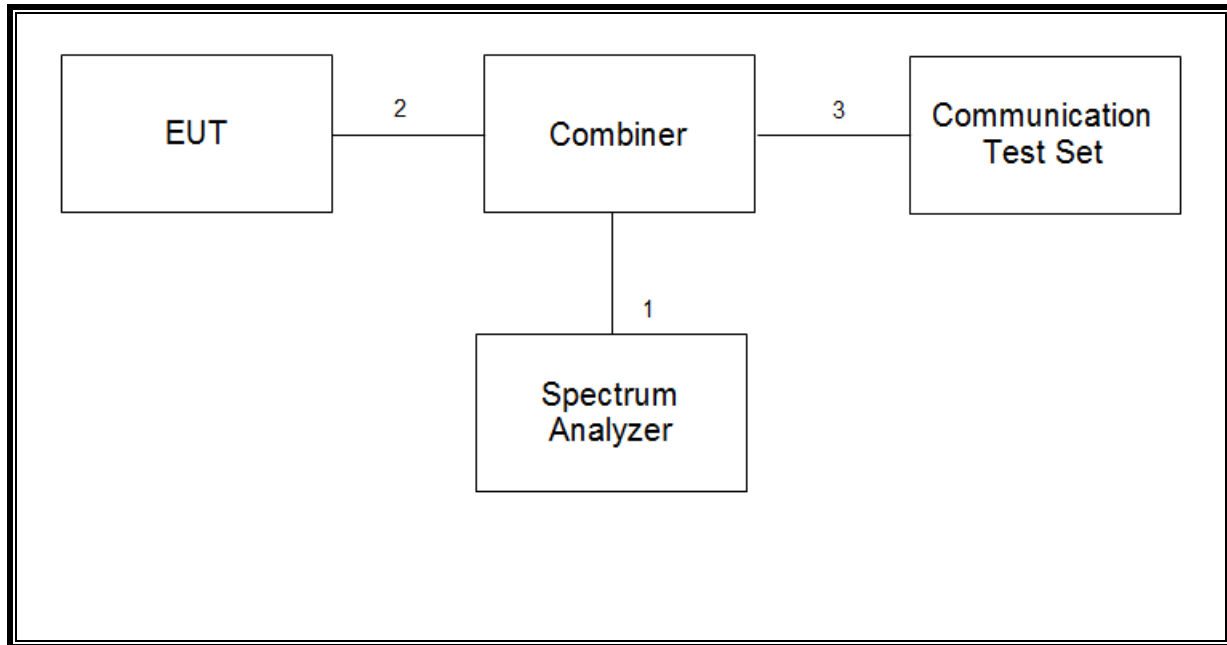
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	0.8m	N/A
2	Audio	1	Mini-Jack	Unshielded	1.0m	N/A

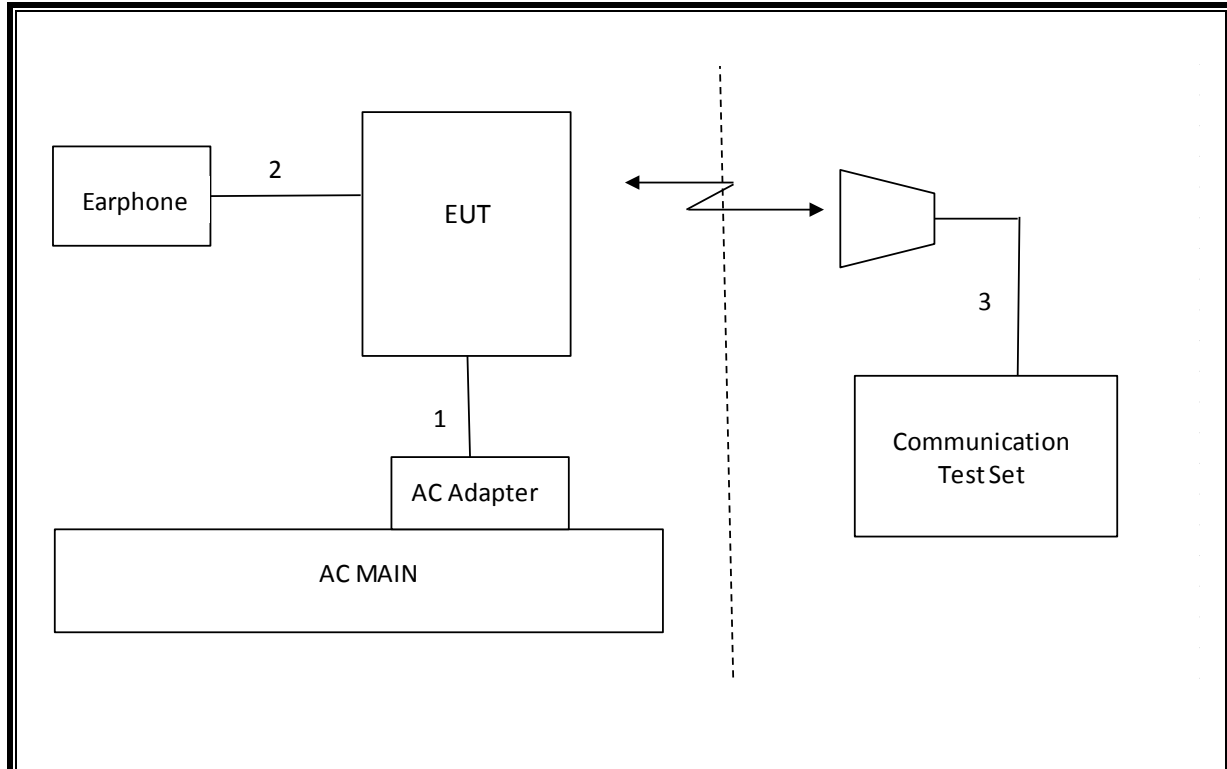
TEST SETUP

The EUT is continuously communicated to 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	07-29-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	950	11-17-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	04-25-16
Antenna, Horn, 18 GHz	ETS	3115	00167211	09-20-15
Antenna, Horn, 18 GHz	ETS	3115	00161451	05-17-16
Antenna, Horn, 18 GHz	ETS	3117	00168724	06-17-16
Antenna, Horn, 18 GHz	ETS	3117	00168717	06-17-16
Antenna, Horn, 40 GHz	ETS	3116C	00166255	09-23-15
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	09-29-15
Preamplifier, 1000 MHz	Sonoma	310N	341282	11-17-15
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	11-18-15
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	09-23-15
Communications Test Set	R&S	CMW500	150312	08-13-15
Average Power Sensor	R&S	NRZ-Z91	102681	11-17-15
Average Power Sensor	Agilent / HP	U2000	MY54270007	09-23-15
EMI Test Receive, 40 GHz	R&S	ESU40	100439	11-17-15
EMI Test Receive, 3 GHz	R&S	ESR3	101832	11-17-15
Attenuator / Switch driver	HP	11713A	3748A04272	N/A
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	009	11-17-15
High Pass Filter 5GHz	Micro-Tronics	HPS17542	009	11-17-15
High Pass Filter 6GHz	Micro-Tronics	HPM17543	010	11-17-15
Combiner	WEINSCHTEL	1575	2153	11-17-15
Temperature Chamber	ESPEC	SH-642	93001109	11-13-15
DC Power Supply	Agilent / HP	E3640A	MY54226395	09-23-15

7. Summary Table

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result	Note
2.1049	Occupied Band width (99%)	N/A	Conducted	Pass	17.920 MHz
22.917(a) 24.238(a) 27.53(g)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-16.458 dBm
27.53(m)		-25dBm		Pass	-30.69 dBm
2.1046	Conducted output power	N/A		Pass	23.30 dBm
27.53(m)	Emission Mask			Pass	-15.53 dBm
22.355 24.235 27.54	Frequency Stability	2.5PPM		Pass	0.013 PPM
27.50(c)(10)	Effective Radiated Power	34.77 dBm		Pass	16.13 dBm
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power	33dBm		Pass	21.74 dBm
27.50(d)(4)		30dBm		Pass	21.42 dBm
22.917(a) 24.238(a) 27.53(g)	Radiated Spurious Emission	-13dBm		Pass	-55.9 dBm
27.53(m)		-25dBm		Pass	-60.5 dBm

FCC Rule Part	Frequency Range [MHz]	Output Power [W]	Frequency Tolerance	Emission Designator	Emission Bandwidth [MHz]	Communication Type
LTE Band 25						
24E	1860.0 - 1905.0	0.113	2.5 ppm	17M9G7D	20	QPSK
24E	1860.0 - 1905.0	0.090	2.5 ppm	17M9D7W	20	16QAM
LTE Band 4						
27L	1720.0 - 1745.0	0.132	2.5 ppm	17M9G7D	20	QPSK
27L	1720.0 - 1745.0	0.104	2.5 ppm	17M9D7W	20	16QAM
27L	1717.5 - 1747.5	0.139	2.5 ppm	13M5G7D	15	QPSK
27L	1717.5 - 1747.5	0.110	2.5 ppm	13M4D7W	15	16QAM
LTE Band 12 / Band 17						
27H	704.0 - 711.0	0.035	2.5 ppm	8M99G7D	10	QPSK
27H	704.0 - 711.0	0.028	2.5 ppm	8M99D7W	10	16QAM
27H	700.5 - 714.5	0.041	2.5 ppm	2M70G7D	3	QPSK
27H	700.5 - 714.5	0.033	2.5 ppm	2M70D7W	3	16QAM
LTE Band 41						
27M	2506.0 - 2680.0	0.136	2.5 ppm	17M9G7D	20	QPSK
27M	2506.0 - 2680.0	0.114	2.5 ppm	17M9D7W	20	16QAM
27M	2501.0 - 2685.0	0.149	2.5 ppm	8M99G7D	10	QPSK
27M	2501.0 - 2685.0	0.116	2.5 ppm	8M98D7W	10	16QAM

8. RF POWER OUTPUT VERIFICATION

8.1. LTE OUTPUT VERIFICATION

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

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

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

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

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of "NS_01".

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

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

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

8.1.1. LTE OUTPUT POWER RESULT

LTE Band 41 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						39750	40620	41490
						2506 MHz	2593 MHz	2680 MHz
LTE Band 41	20	QPSK	1	0	0	23.12	22.86	22.91
			1	49	0	23.07	22.79	23.06
			1	99	0	23.05	22.94	22.93
			50	0	1	21.91	21.72	21.93
			50	24	1	21.99	21.74	21.91
			50	50	1	21.81	21.66	21.91
			100	0	1	21.85	21.73	22.00
		16QAM	1	0	1	22.36	21.94	22.25
			1	49	1	22.42	21.87	22.15
			1	99	1	22.12	21.74	22.08
			50	0	2	20.88	20.71	20.91
			50	24	2	20.82	20.69	20.88
			50	50	2	20.82	20.65	20.92
			100	0	2	20.82	20.72	20.93
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						39725	40620	41515
						2503.5 MHz	2593 MHz	2682.5 MHz
LTE Band 41	15	QPSK	1	0	0	23.00	22.83	22.92
			1	37	0	23.03	22.87	21.81
			1	74	0	22.90	22.80	22.96
			36	0	1	21.94	21.73	21.87
			36	20	1	21.93	21.75	21.78
			36	39	1	21.92	21.63	21.78
			75	0	1	21.91	21.65	21.88
		16QAM	1	0	1	21.69	21.94	21.55
			1	37	1	21.52	21.70	21.62
			1	74	1	21.56	21.50	21.79
			36	0	2	20.90	20.67	20.84
			36	20	2	20.90	20.78	20.77
			36	39	2	20.91	20.58	20.75
			75	0	2	20.88	20.64	20.85
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						39700	40620	41540
						2501 MHz	2593 MHz	2685 MHz
LTE Band 41	10	QPSK	1	0	0	23.09	22.90	22.82
			1	25	0	23.09	22.82	22.86
			1	49	0	23.13	22.88	22.91
			25	0	1	21.93	21.77	21.85
			25	12	1	22.01	21.79	21.79
			25	25	1	21.93	21.72	21.82
		16QAM	50	0	1	21.93	21.74	21.88
			1	0	1	21.98	21.83	21.98
			1	25	1	21.93	21.80	21.79
			1	49	1	21.90	21.85	21.90
			25	0	2	20.93	20.74	20.87
			25	12	2	21.01	20.77	20.88
			25	25	2	20.94	20.69	20.83
			50	0	2	20.91	20.76	20.78
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						39675	40620	41565
						2498.5 MHz	2593 MHz	2687.5 MHz
LTE Band 41	5	QPSK	1	0	0	23.26	22.83	22.87
			1	12	0	23.07	22.83	22.82
			1	24	0	23.19	22.75	22.95
			12	0	1	21.97	21.67	21.80
			12	7	1	21.98	21.69	21.76
			12	13	1	22.02	21.64	21.74
		16QAM	25	0	1	21.95	21.65	21.81
			1	0	1	22.04	22.05	22.18
			1	12	1	21.94	21.91	22.15
			1	24	1	21.86	22.00	22.28
			12	0	2	20.78	20.65	20.75
			12	7	2	20.80	20.66	20.66
			12	13	2	20.86	20.64	20.74
			25	0	2	20.91	20.64	20.80

LTE Band 25 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						26140	26365	26590
						1860 MHz	1882.5 MHz	1905 MHz
LTE Band 25	20	QPSK	1	0	0	22.46	22.15	21.75
			1	49	0	22.39	22.24	21.75
			1	99	0	22.40	22.23	21.86
			50	0	1	21.13	20.92	20.62
			50	24	1	21.22	20.88	20.58
			50	50	1	21.12	20.90	20.57
			100	0	1	21.09	20.86	20.59
		16QAM	1	0	1	21.50	20.92	20.83
			1	49	1	21.43	20.92	20.73
			1	99	1	21.41	20.94	20.74
			50	0	2	20.13	19.88	19.56
			50	24	2	20.11	19.84	19.52
			50	50	2	20.03	19.85	19.53
			100	0	2	20.11	19.78	19.54
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						26115	26365	26615
						1857.5 MHz	1882.5 MHz	1907.5 MHz
LTE Band 25	15	QPSK	1	0	0	22.34	22.02	21.72
			1	37	0	22.28	21.98	21.78
			1	74	0	22.27	21.92	21.86
			36	0	1	21.17	20.90	20.65
			36	20	1	21.17	20.86	20.56
			36	39	1	21.22	20.85	20.64
			75	0	1	21.11	20.78	20.63
		16QAM	1	0	1	21.07	21.01	20.71
			1	37	1	21.37	21.04	20.67
			1	74	1	21.15	21.00	20.62
			36	0	2	20.14	19.88	19.60
			36	20	2	20.13	19.80	19.50
			36	39	2	20.20	19.83	19.51
			75	0	2	20.05	19.78	19.57
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						26090	26365	26640
						1855 MHz	1882.5 MHz	1910 MHz
LTE Band 25	10	QPSK	1	0	0	22.41	21.95	21.77
			1	25	0	22.42	21.95	21.72
			1	49	0	22.46	21.98	21.82
			25	0	1	21.17	20.80	20.70
			25	12	1	21.25	20.80	20.57
			25	25	1	21.29	20.84	20.56
			50	0	1	21.19	20.82	20.67
		16QAM	1	0	1	21.10	21.08	21.19
			1	25	1	21.42	21.19	20.78
			1	49	1	21.50	21.10	20.89
			25	0	2	20.32	19.95	20.00
			25	12	2	20.50	20.02	19.67
			25	25	2	20.50	20.05	19.54
			50	0	2	20.39	19.93	19.54

LTE Band 25 Measured Results(continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						26065	26365	26665
						1852.5 MHz	1882.5 MHz	1912.5 MHz
LTE Band 25	5	QPSK	1	0	0	22.48	22.09	21.60
			1	12	0	22.32	22.10	21.50
			1	24	0	22.36	22.20	21.61
			12	0	1	21.20	20.79	20.57
			12	7	1	21.32	20.78	20.47
			12	13	1	21.30	20.86	20.51
			25	0	1	21.17	20.80	20.53
		16QAM	1	0	1	21.49	21.18	20.85
			1	12	1	21.47	21.10	20.41
			1	24	1	21.50	21.16	20.45
			12	0	2	20.18	19.70	19.42
			12	7	2	20.18	19.69	19.27
			12	13	2	20.17	19.77	19.31
			25	0	2	20.14	19.67	19.33
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						26055	26365	26675
						1851.5 MHz	1882.5 MHz	1913.5 MHz
LTE Band 25	3	QPSK	1	0	0	22.50	21.94	21.79
			1	8	0	22.49	21.90	21.65
			1	14	0	22.50	22.05	21.83
			8	0	1	21.24	20.76	20.53
			8	4	1	21.31	20.72	20.49
			8	7	1	21.25	20.76	20.47
			15	0	1	21.21	20.80	20.52
		16QAM	1	0	1	21.30	21.13	20.83
			1	8	1	21.26	21.09	20.81
			1	14	1	21.42	21.14	20.95
			8	0	2	20.11	19.63	19.40
			8	4	2	20.16	19.61	19.35
			8	7	2	20.09	19.62	19.33
			15	0	2	20.14	19.62	19.39
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						26047	26365	26683
						1850.7 MHz	1882.5 MHz	1914.3 MHz
LTE Band 25	1.4	QPSK	1	0	0	22.05	22.05	21.81
			1	3	0	22.12	22.18	21.81
			1	5	0	22.07	22.14	21.86
			3	0	0	21.85	21.87	21.62
			3	1	0	21.88	21.90	21.64
			3	3	0	21.90	21.92	21.65
			6	0	1	21.50	21.50	21.50
		16QAM	1	0	1	21.23	21.20	20.96
			1	3	1	21.18	21.22	20.89
			1	5	1	21.15	21.17	20.91
			3	0	1	20.50	20.63	20.42
			3	1	1	20.55	20.68	20.44
			3	3	1	20.56	20.70	20.53
			6	0	2	20.50	20.50	20.50

LTE Band 17

Due to frequency range and same output power setting, test was carried in LTE Band 12 to cover both LTE Band 12 and LTE Band 17.

LTE Band 12 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						23060	23095	23130
						704 MHz	707.5 MHz	711 MHz
LTE Band 12	10	QPSK	1	0	0	23.19	23.12	23.25
			1	25	0	23.06	23.04	23.18
			1	49	0	23.04	23.03	23.11
			25	0	1	21.88	21.89	21.98
			25	12	1	21.95	21.79	21.88
			25	25	1	21.95	21.82	21.78
		16QAM	50	0	1	21.84	21.83	21.93
			1	0	1	22.14	22.39	22.49
			1	25	1	22.06	22.43	22.33
			1	49	1	22.05	22.31	22.34
			25	0	2	20.93	20.80	20.88
			25	12	2	20.89	20.90	20.88
			25	25	2	20.87	20.81	20.81
			50	0	2	20.83	20.82	20.82
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						23035	23095	23155
						701.5 MHz	707.5 MHz	713.5 MHz
LTE Band 12	5	QPSK	1	0	0	23.24	23.24	23.04
			1	12	0	23.22	23.27	22.92
			1	24	0	23.14	23.30	22.91
			12	0	1	21.94	21.86	21.82
			12	7	1	21.88	21.82	21.72
			12	13	1	21.84	21.82	21.67
		16QAM	25	0	1	21.97	21.78	21.76
			1	0	1	22.50	22.20	22.02
			1	12	1	22.43	22.15	21.85
			1	24	1	22.50	22.19	22.03
			12	0	2	20.90	20.76	20.63
			12	7	2	20.76	20.70	20.60
			12	13	2	20.77	20.71	20.55
			25	0	2	20.87	20.78	20.64
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						23025	23095	23165
						700.5 MHz	707.5 MHz	714.5 MHz
LTE Band 12	3	QPSK	1	0	0	23.25	23.16	23.04
			1	8	0	23.14	23.16	22.92
			1	14	0	23.17	23.19	22.92
			8	0	1	21.94	21.88	21.79
			8	4	1	21.90	21.84	21.71
			8	7	1	21.83	21.84	21.67
		16QAM	15	0	1	21.92	21.81	21.66
			1	0	1	22.21	22.34	22.32
			1	8	1	22.03	22.29	22.31
			1	14	1	22.11	22.29	22.31
			8	0	2	20.96	20.66	20.66
			8	4	2	20.92	20.75	20.63
			8	7	2	20.86	20.73	20.58
			15	0	2	20.87	20.85	20.69
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						23017	23095	23173
						699.7 MHz	707.5 MHz	715.3 MHz
LTE Band 12	1.4	QPSK	1	0	0	23.16	23.15	23.04
			1	3	0	23.19	23.20	23.08
			1	5	0	23.19	23.20	23.17
			3	0	0	23.16	22.99	22.86
			3	1	0	23.17	22.97	22.94
			3	3	0	23.09	23.05	22.97
		16QAM	6	0	1	22.01	21.97	21.79
			1	0	1	22.40	22.32	22.50
			1	3	1	22.31	22.30	22.49
			1	5	1	22.33	22.28	22.50
			3	0	1	22.01	21.89	21.92
			3	1	1	21.96	21.78	21.88
			3	3	1	21.89	21.86	21.91
			6	0	2	20.88	20.78	20.72

LTE Band 4 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20050	20175	20300
						1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4	20	QPSK	1	0	0	22.25	22.13	22.00
			1	49	0	22.22	22.20	21.93
			1	99	0	22.35	22.15	22.11
			50	0	1	21.12	20.87	20.85
			50	24	1	21.14	20.91	20.77
			50	50	1	21.14	20.88	20.76
		16QAM	100	0	1	21.11	20.84	20.84
			1	0	1	21.28	21.09	21.09
			1	49	1	21.17	21.01	21.02
			1	99	1	21.29	21.05	21.13
			50	0	2	20.09	19.90	19.81
			50	24	2	20.08	19.86	19.72
			50	50	2	20.06	19.77	19.75
			100	0	2	20.05	19.79	19.84
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20025	20175	20325
						1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	22.25	22.04	22.02
			1	37	0	22.27	21.97	21.97
			1	74	0	22.25	21.94	22.10
			36	0	1	21.12	20.94	20.86
			36	20	1	21.15	20.90	20.80
			36	39	1	21.14	20.88	20.81
			75	0	1	21.10	20.82	20.77
		16QAM	1	0	1	21.14	21.11	20.80
			1	37	1	21.08	21.09	20.78
			1	74	1	21.18	21.00	20.84
			36	0	2	20.05	19.90	19.81
			36	20	2	20.12	19.89	19.77
			36	39	2	20.09	19.78	19.70
			75	0	2	20.05	19.72	19.79
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20000	20175	20350
						1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	22.24	22.07	22.11
			1	25	0	22.30	22.00	22.11
			1	49	0	22.34	22.00	22.25
			25	0	1	21.09	20.86	20.89
			25	12	1	21.19	20.89	20.98
			25	25	1	21.20	20.88	20.95
			50	0	1	21.15	20.88	20.94
		16QAM	1	0	1	21.30	21.19	21.19
			1	25	1	21.27	21.14	21.16
			1	49	1	21.27	21.07	21.26
			25	0	2	20.14	19.88	19.81
			25	12	2	20.12	19.93	19.88
			25	25	2	20.11	19.82	19.93
			50	0	2	20.05	19.77	19.80

LTE Band 4 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						19975	20175	20375
						1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	22.23	22.11	22.03
			1	12	0	22.24	22.15	22.04
			1	24	0	22.29	22.09	22.08
			12	0	1	21.02	20.89	20.85
			12	7	1	21.03	20.88	20.93
			12	13	1	21.06	20.80	20.90
			25	0	1	21.02	20.77	20.80
		16QAM	1	0	1	21.26	20.83	20.75
			1	12	1	21.22	20.85	20.87
			1	24	1	21.26	20.85	21.03
			12	0	2	19.89	19.74	19.72
			12	7	2	19.90	19.74	19.83
			12	13	2	19.92	19.71	19.78
			25	0	2	20.01	19.73	19.86
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						19965	20175	20385
						1711.5 MHz	1732.5 MHz	1753.5 MHz
LTE Band 4	3	QPSK	1	0	0	22.30	22.00	22.17
			1	8	0	22.25	21.97	22.11
			1	14	0	22.19	22.03	22.16
			8	0	1	21.06	20.83	20.83
			8	4	1	21.07	20.83	20.90
			8	7	1	21.08	20.82	20.92
			15	0	1	21.05	20.79	20.89
		16QAM	1	0	1	21.17	21.26	21.18
			1	8	1	21.10	21.12	21.20
			1	14	1	21.05	21.20	21.28
			8	0	2	19.97	19.76	19.69
			8	4	2	19.97	19.77	19.75
			8	7	2	19.98	19.65	19.76
			15	0	2	19.86	19.72	19.78
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						19957	20175	20393
						1710.7 MHz	1732.5 MHz	1754.3 MHz
LTE Band 4	1.4	QPSK	1	0	0	22.32	22.02	22.20
			1	3	0	22.27	22.04	22.15
			1	5	0	22.33	22.09	22.18
			3	0	0	22.19	21.96	21.93
			3	1	0	22.16	21.89	22.01
			3	3	0	22.19	21.87	22.03
			6	0	1	21.03	20.81	20.88
		16QAM	1	0	1	21.46	21.18	21.37
			1	3	1	21.33	21.11	21.32
			1	5	1	21.37	21.18	21.37
			3	0	1	20.87	20.77	20.81
			3	1	1	20.96	20.79	20.88
			3	3	1	20.92	20.70	20.96
			6	0	2	19.91	19.55	19.71

9. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v02r02;

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.

9.1. CONDUCTED PEAK TO AVERAGE RESULT

LTE

Band	BW [MHz]	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 41	20	40620	2593	QPSK	5.65	13.00
				16QAM	6.60	
	15			QPSK	5.27	
				16QAM	6.49	
	10			QPSK	5.46	
				16QAM	6.26	
	5			QPSK	5.36	
				16QAM	6.53	

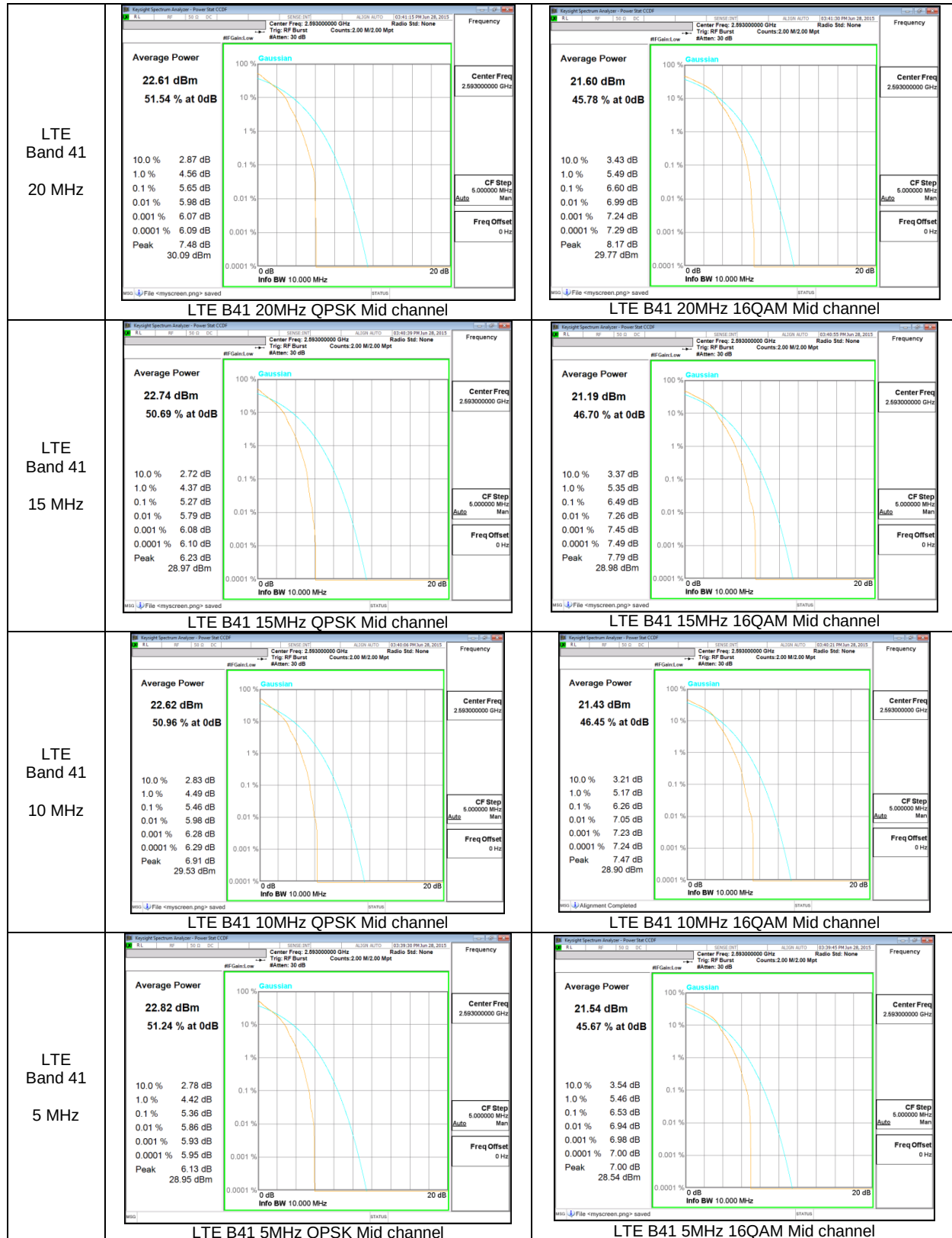
Band	BW [MHz]	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 25	20	26365	1882.5	QPSK	4.94	13.00
				16QAM	6.02	
	15			QPSK	4.98	
				16QAM	6.20	
	10			QPSK	5.39	
				16QAM	6.15	
	5			QPSK	5.71	
				16QAM	6.15	
	3			QPSK	5.75	
				16QAM	6.13	
1.4	QPSK	5.50				
	16QAM	6.08				
Band 12	10	23095	707.5	QPSK	5.33	
				16QAM	5.97	
	5			QPSK	5.72	
				16QAM	5.91	
	3			QPSK	5.69	
				16QAM	6.03	
	1.4			QPSK	5.57	
				16QAM	5.98	
Band 4	20	20715	1732.5	QPSK	5.06	
				16QAM	5.71	
	15			QPSK	4.87	
				16QAM	5.73	
	10			QPSK	5.53	
				16QAM	5.63	
	5			QPSK	5.63	
				16QAM	5.46	
	3			QPSK	5.66	
				16QAM	5.69	
	1.4			QPSK	5.62	
				16QAM	5.61	

LTE Band 17

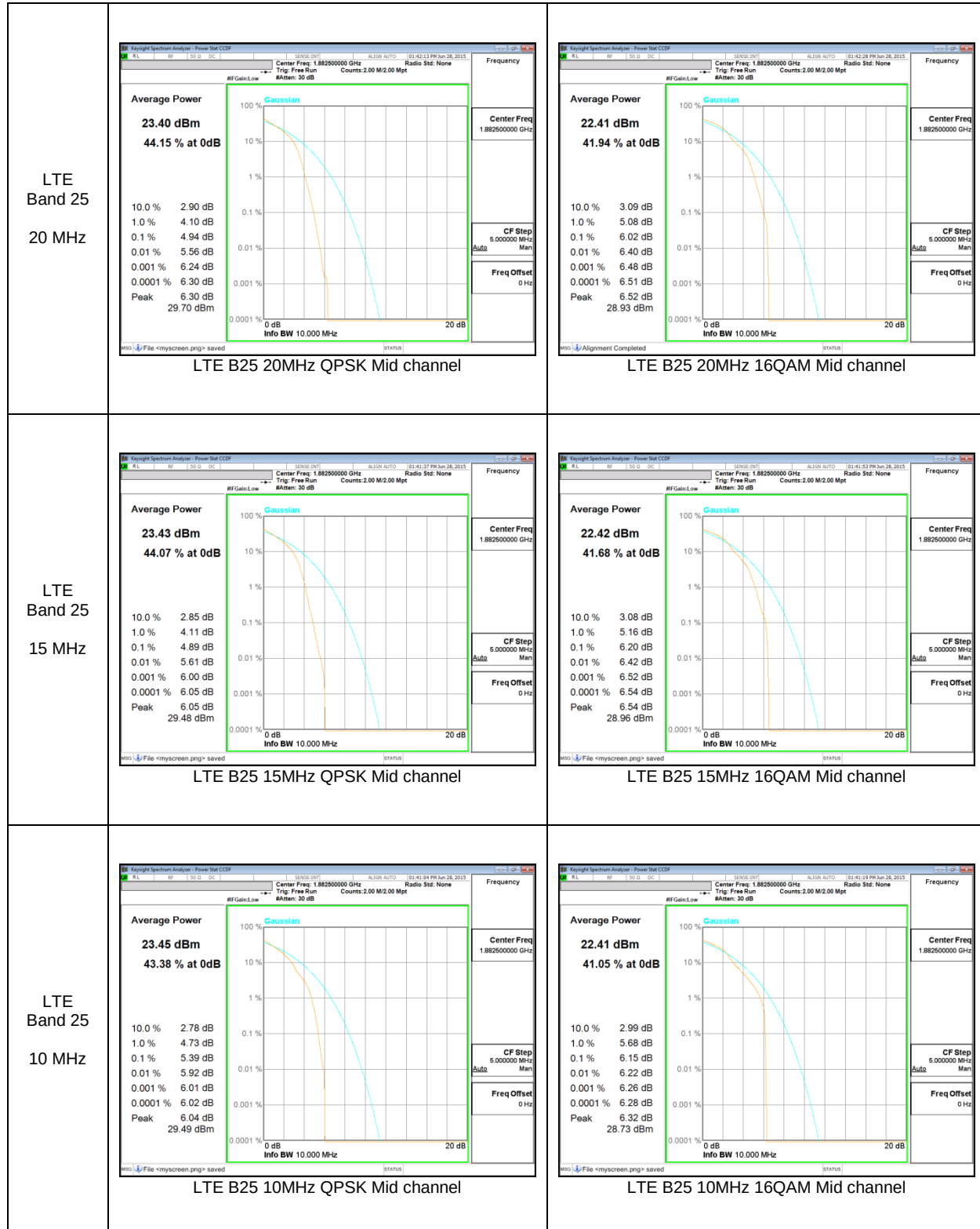
Due to frequency range and same output power setting, test was carried in LTE Band 12 to cover both LTE Band 12 and LTE Band 17.

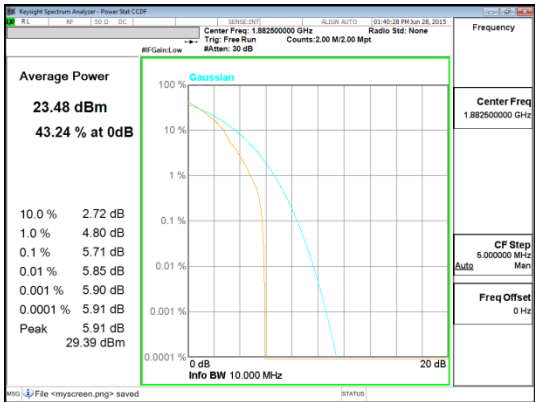
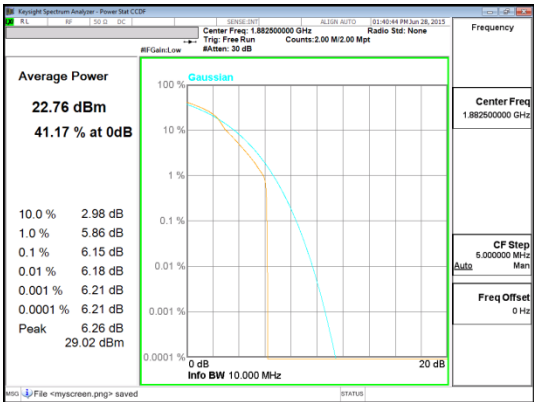
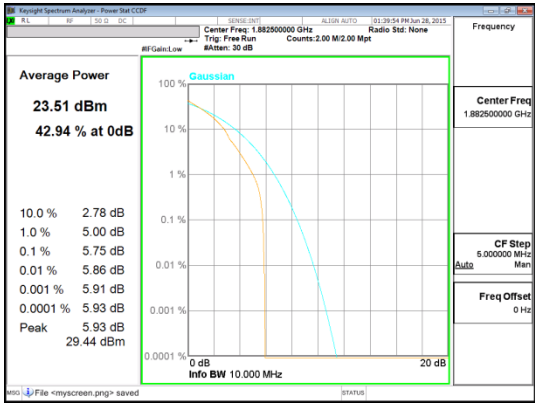
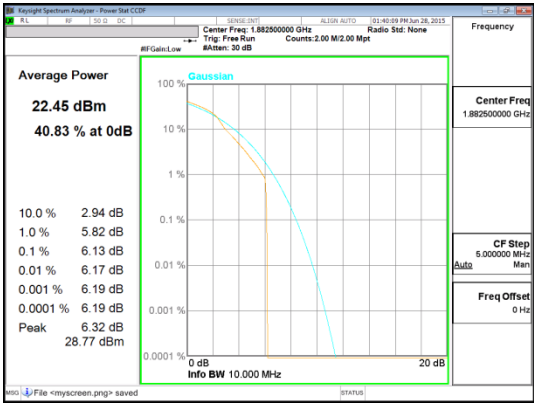
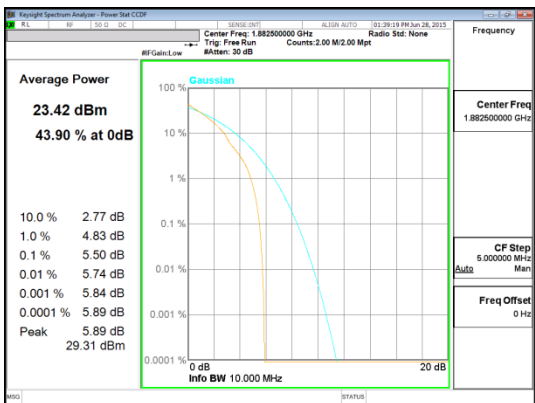
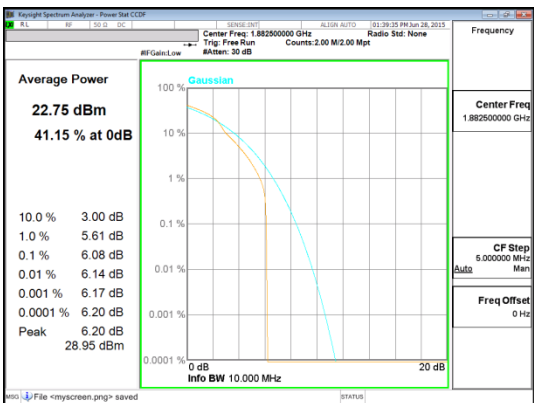
9.2. CONDUCTED PEAK TO AVERAGE PLOTS

LTE Band 41

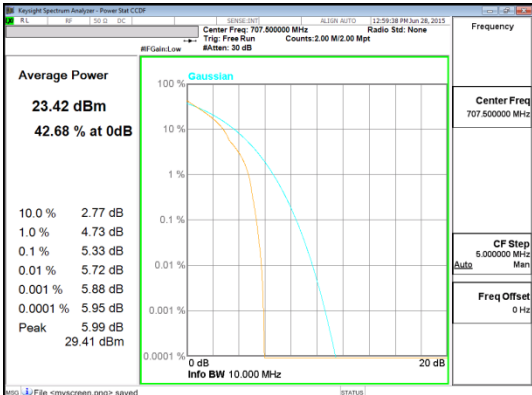
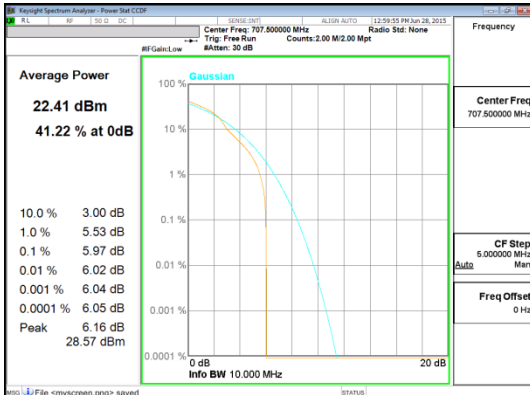
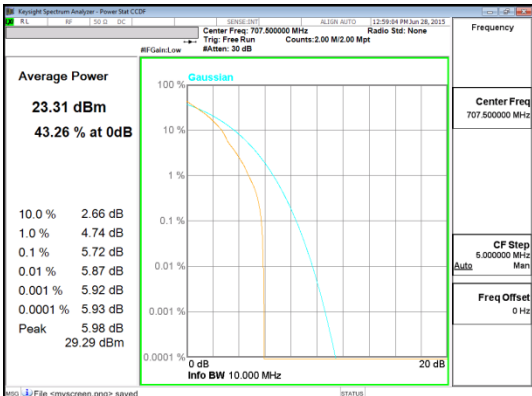
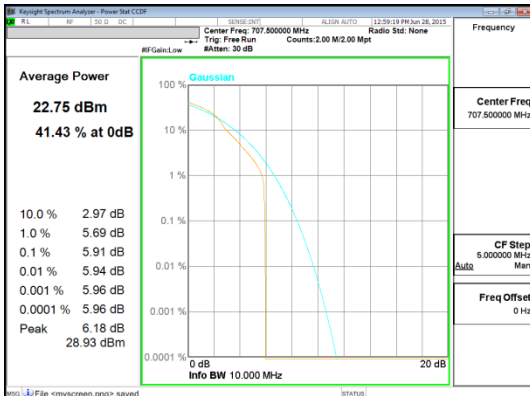
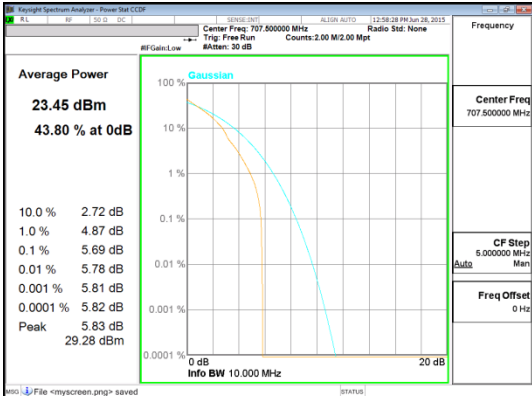
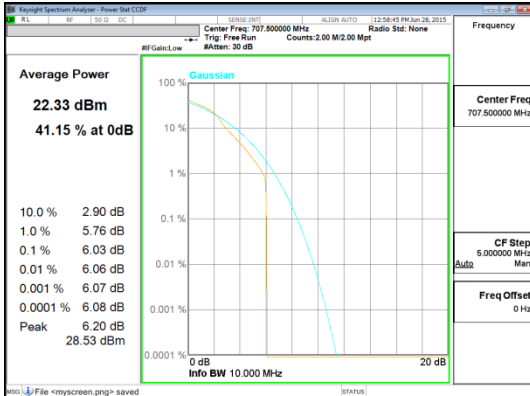


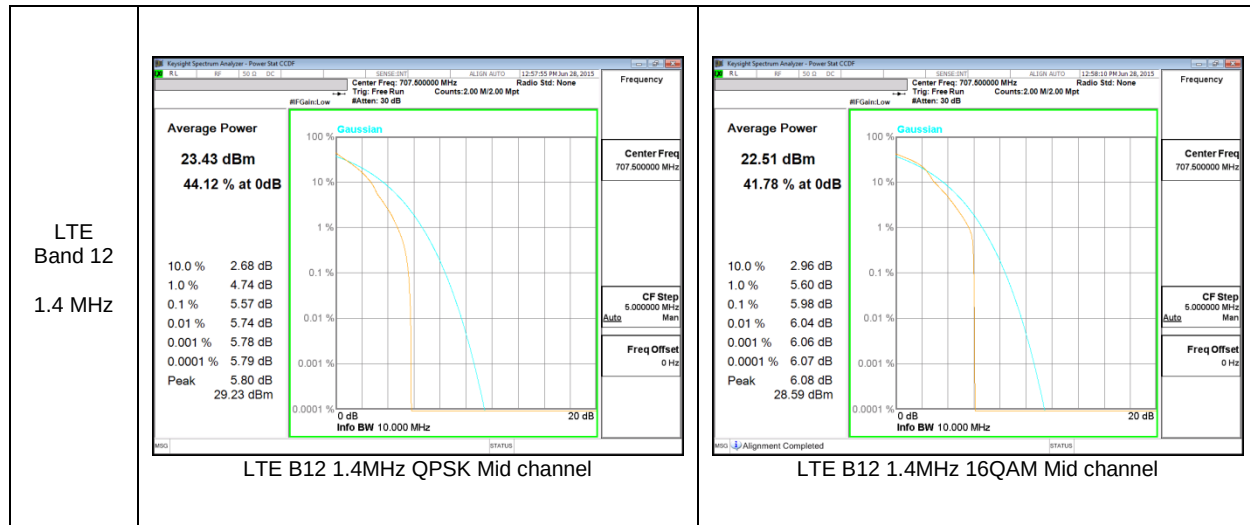
LTE Band 25



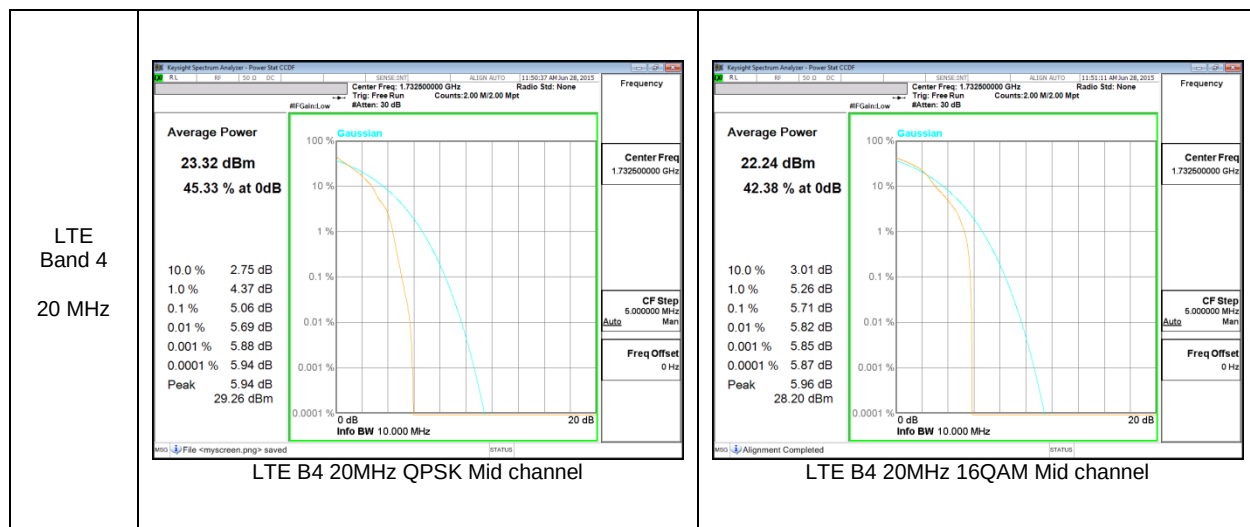
LTE Band 25 5 MHz	 LTE B25 5MHz QPSK Mid channel	 LTE B25 5MHz 16QAM Mid channel
LTE Band 25 3 MHz	 LTE B25 3MHz QPSK Mid channel	 LTE B25 3MHz 16QAM Mid channel
LTE Band 25 1.4 MHz	 LTE B25 1.4MHz QPSK Mid channel	 LTE B25 1.4MHz 16QAM Mid channel

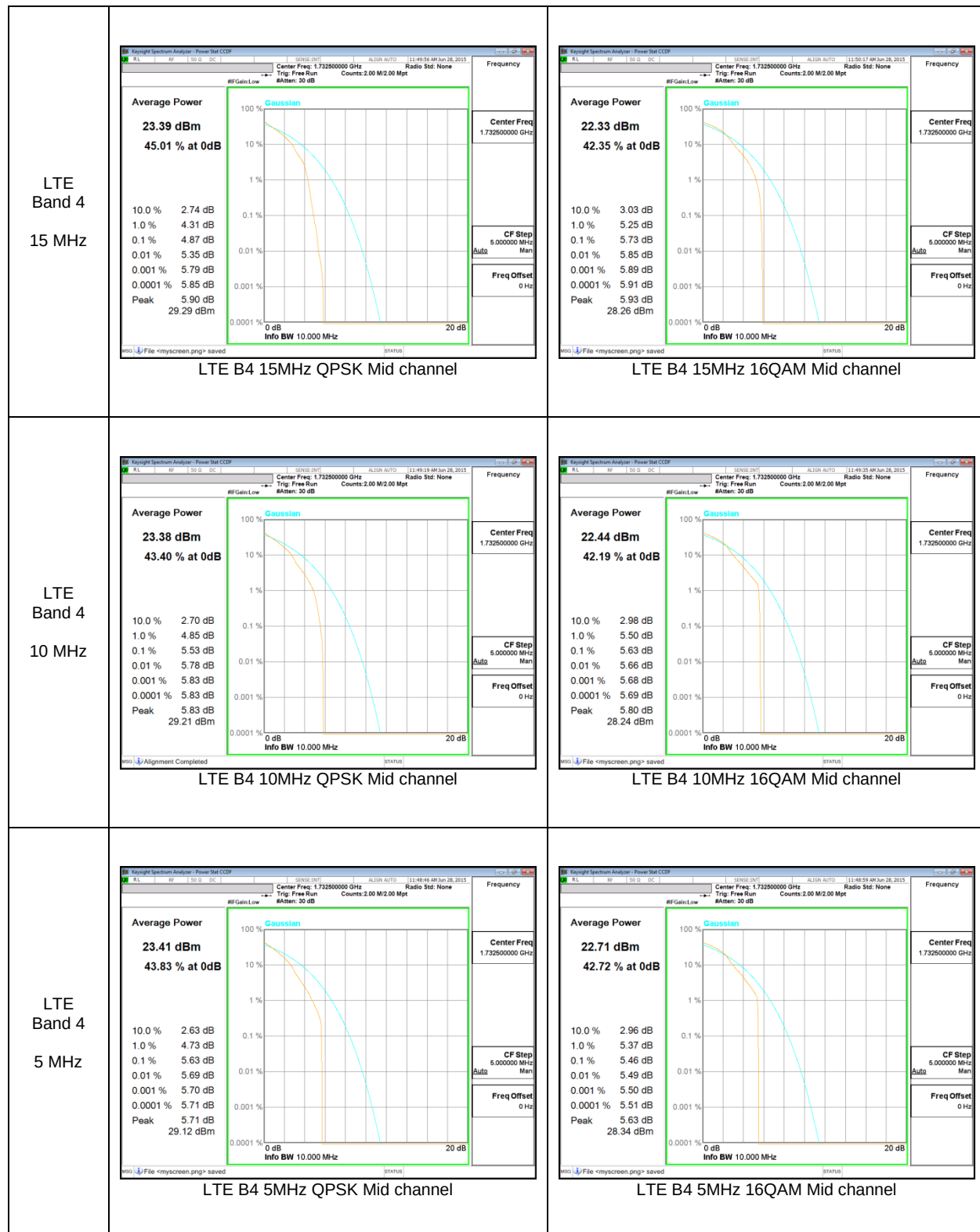
LTE Band 12

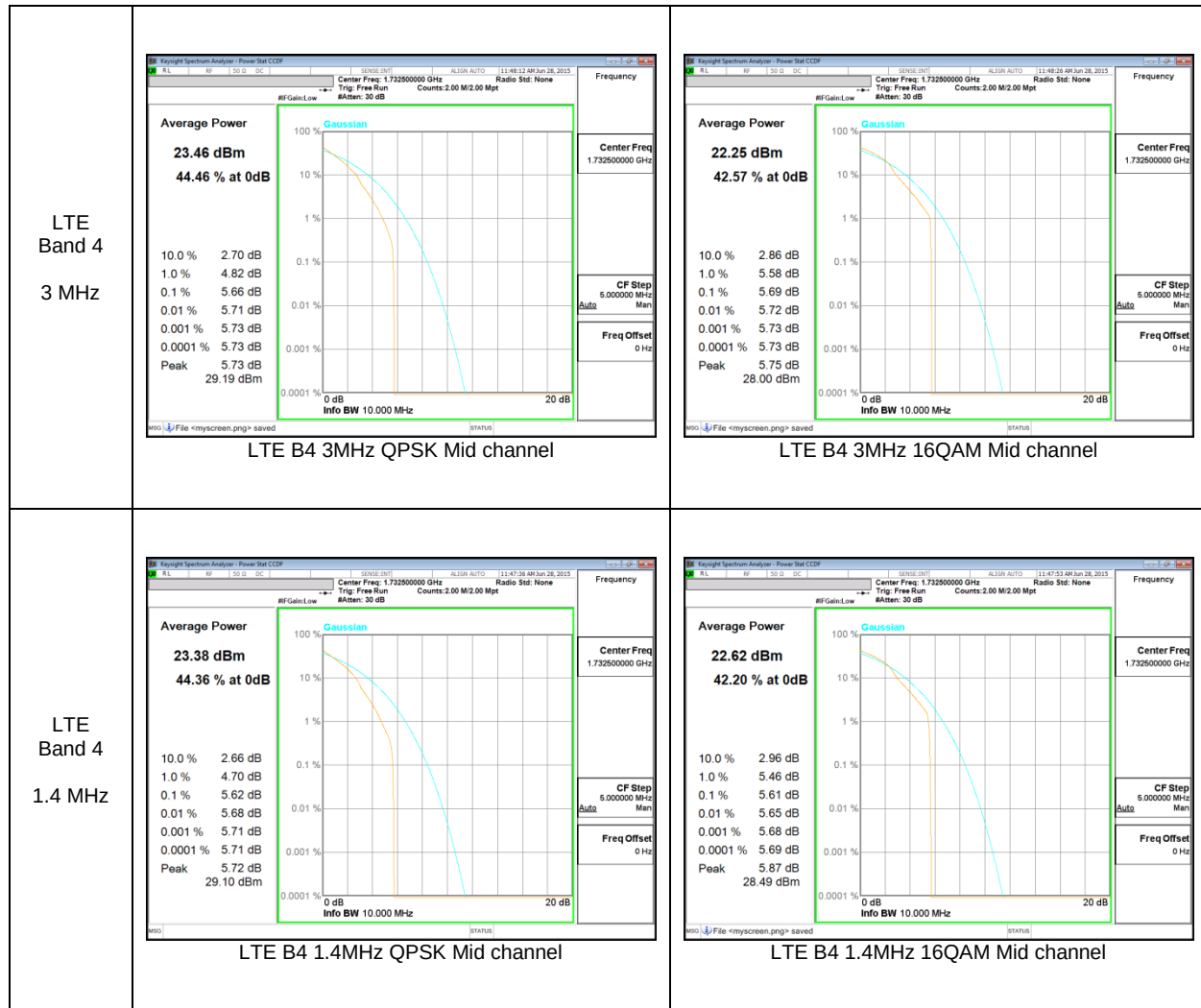
LTE Band 12 10 MHz	 Average Power 23.42 dBm 42.68 % at 0dB 10.0 % 2.77 dB 1.0 % 4.73 dB 0.1 % 5.33 dB 0.01 % 5.72 dB 0.001 % 5.88 dB 0.0001 % 5.95 dB Peak 5.99 dB 29.41 dBm Center Freq 707.500000 MHz Trig: Free Run Counts: 2.00 M/2.00 Mpt Radio Std: None #F Gain: Low #F BW: 10.000 MHz Info BW: 10.000 MHz CF Step 5.000000 MHz Auto Man Freq Offset 0 Hz LTE B12 10MHz QPSK Mid channel	 Average Power 22.41 dBm 41.22 % at 0dB 10.0 % 3.00 dB 1.0 % 5.53 dB 0.1 % 5.97 dB 0.01 % 6.02 dB 0.001 % 6.04 dB 0.0001 % 6.05 dB Peak 6.16 dB 28.57 dBm Center Freq 707.500000 MHz Trig: Free Run Counts: 2.00 M/2.00 Mpt Radio Std: None #F Gain: Low #F BW: 10.000 MHz Info BW: 10.000 MHz CF Step 5.000000 MHz Auto Man Freq Offset 0 Hz LTE B12 10MHz 16QAM Mid channel
LTE Band 12 5 MHz	 Average Power 23.31 dBm 43.26 % at 0dB 10.0 % 2.66 dB 1.0 % 4.74 dB 0.1 % 5.72 dB 0.01 % 5.87 dB 0.001 % 5.92 dB 0.0001 % 5.93 dB Peak 5.98 dB 29.29 dBm Center Freq 707.500000 MHz Trig: Free Run Counts: 2.00 M/2.00 Mpt Radio Std: None #F Gain: Low #F BW: 10.000 MHz Info BW: 10.000 MHz CF Step 5.000000 MHz Auto Man Freq Offset 0 Hz LTE B12 5MHz QPSK Mid channel	 Average Power 22.75 dBm 41.43 % at 0dB 10.0 % 2.97 dB 1.0 % 5.69 dB 0.1 % 5.91 dB 0.01 % 5.94 dB 0.001 % 5.96 dB 0.0001 % 5.96 dB Peak 6.18 dB 28.93 dBm Center Freq 707.500000 MHz Trig: Free Run Counts: 2.00 M/2.00 Mpt Radio Std: None #F Gain: Low #F BW: 10.000 MHz Info BW: 10.000 MHz CF Step 5.000000 MHz Auto Man Freq Offset 0 Hz LTE B12 5MHz 16QAM Mid channel
LTE Band 12 3 MHz	 Average Power 23.45 dBm 43.80 % at 0dB 10.0 % 2.72 dB 1.0 % 4.87 dB 0.1 % 5.69 dB 0.01 % 5.78 dB 0.001 % 5.81 dB 0.0001 % 5.82 dB Peak 5.83 dB 29.28 dBm Center Freq 707.500000 MHz Trig: Free Run Counts: 2.00 M/2.00 Mpt Radio Std: None #F Gain: Low #F BW: 10.000 MHz Info BW: 10.000 MHz CF Step 5.000000 MHz Auto Man Freq Offset 0 Hz LTE B12 3MHz QPSK Mid channel	 Average Power 22.33 dBm 41.15 % at 0dB 10.0 % 2.90 dB 1.0 % 5.76 dB 0.1 % 6.03 dB 0.01 % 6.06 dB 0.001 % 6.07 dB 0.0001 % 6.08 dB Peak 6.20 dB 28.53 dBm Center Freq 707.500000 MHz Trig: Free Run Counts: 2.00 M/2.00 Mpt Radio Std: None #F Gain: Low #F BW: 10.000 MHz Info BW: 10.000 MHz CF Step 5.000000 MHz Auto Man Freq Offset 0 Hz LTE B12 3MHz 16QAM Mid channel



LTE Band 4







10. LIMITS AND CONDUCTED RESULTS

10.1. 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 low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v02r02)

10.1.1. OCCUPIED BANDWIDTH RESULTS

LTE Band 41

Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 41	20	35970	2506.0	QPSK	17.868	19.63
				16QAM	17.865	20.29
		40620	2593.0	QPSK	17.877	19.83
				16QAM	17.870	19.60
		41490	2680.0	QPSK	17.855	20.33
				16QAM	17.894	19.85
	15	39725	2503.5	QPSK	13.423	15.13
				16QAM	13.455	14.98
		40620	2593.0	QPSK	13.444	15.26
				16QAM	13.426	15.27
		41515	2682.5	QPSK	13.425	15.79
				16QAM	13.413	15.13
	10	39700	2501.0	QPSK	8.9425	10.14
				16QAM	8.9815	10.02
		40620	2593.0	QPSK	8.9652	10.23
				16QAM	8.9603	10.01
		41540	2685.0	QPSK	8.9895	10.10
				16QAM	8.9568	10.15
	5	39675	2498.5	QPSK	4.4916	5.223
				16QAM	4.4991	5.246
		40620	2593.0	QPSK	4.4902	5.316
				16QAM	4.5009	5.300
		41565	2687.5	QPSK	4.5085	5.718
				16QAM	4.5145	5.657

LTE Band 25

Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 25	20	26140	1860.0	QPSK	17.909	19.72
				16QAM	17.893	19.72
		26365	1882.5	QPSK	17.897	19.70
				16QAM	17.875	19.76
		26590	1905.0	QPSK	17.903	19.56
				16QAM	17.911	19.74
	15	26115	1857.5	QPSK	13.437	15.21
				16QAM	13.427	15.16
		26365	1882.5	QPSK	13.448	15.35
				16QAM	13.433	15.01
		26615	1907.5	QPSK	13.446	15.19
				16QAM	13.438	15.03
	10	26090	1855.0	QPSK	8.9657	10.41
				16QAM	8.9475	10.27
		26365	1882.5	QPSK	8.9657	10.14
				16QAM	8.9808	10.16
		26640	1910.0	QPSK	8.9589	10.13
				16QAM	8.9492	10.26
	5	26065	1852.5	QPSK	4.5015	5.252
				16QAM	4.5121	5.271
		26365	1882.5	QPSK	4.5026	5.322
				16QAM	4.5038	5.293
		26665	1912.5	QPSK	4.4966	5.315
				16QAM	4.5003	5.186
	3	26055	1851.5	QPSK	2.6885	2.983
				16QAM	2.6913	2.952
		26365	1882.5	QPSK	2.6953	2.981
				16QAM	2.6941	2.994
		26675	1913.5	QPSK	2.6973	2.984
				16QAM	2.6891	3.000
	1.4	26047	1850.7	QPSK	1.0833	1.228
				16QAM	1.0906	1.238
		26365	1882.5	QPSK	1.0847	1.225
				16QAM	1.0815	1.230
		26683	1914.3	QPSK	1.0837	1.233
				16QAM	1.0910	1.237

LTE Band 17

Due to frequency range and same output power setting, test was carried in LTE Band 12 to cover both LTE Band 12 and LTE Band 17.

LTE Band 12

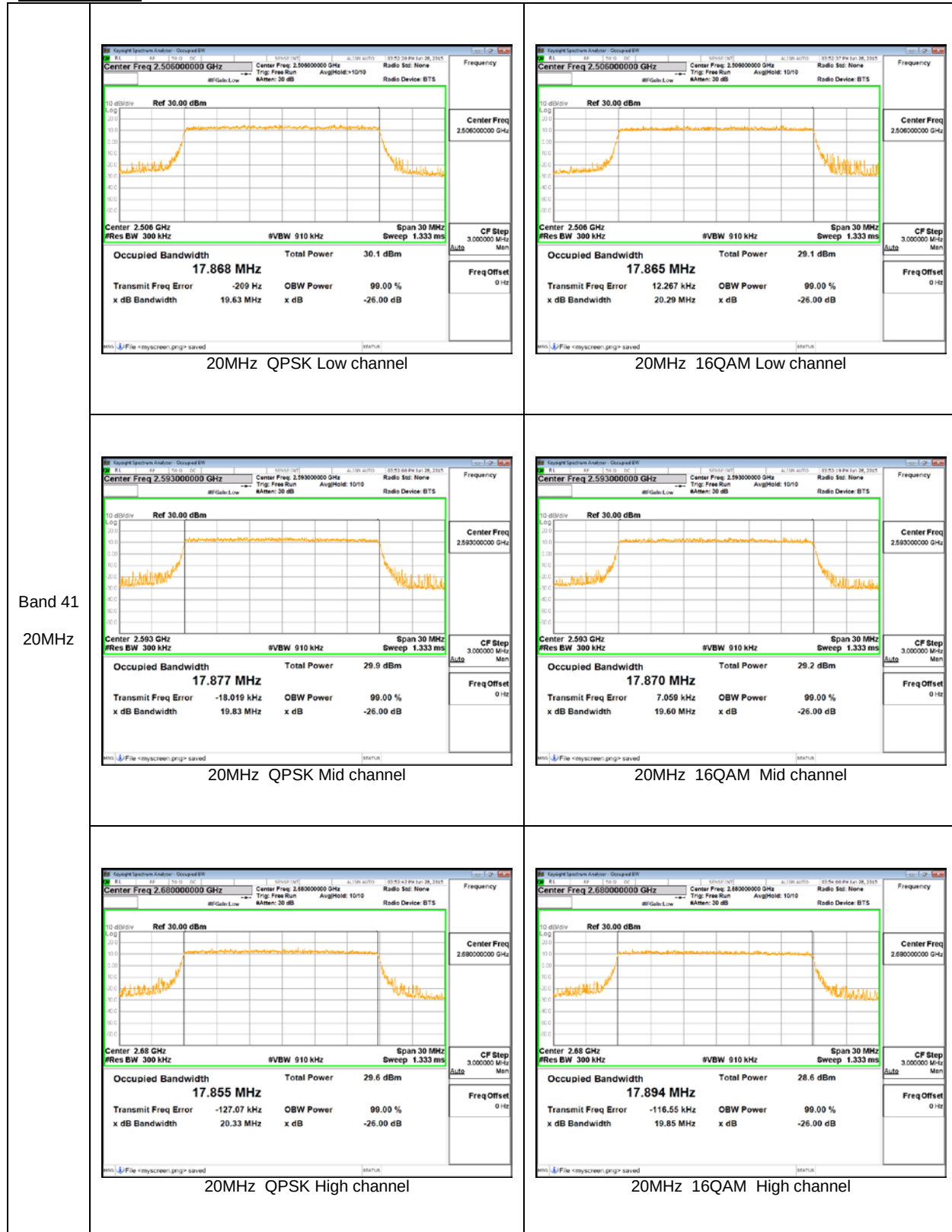
Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 12	10	23060	704.0	QPSK	8.9868	10.36
				16QAM	8.9931	10.31
		23095	707.5	QPSK	8.9717	10.17
				16QAM	8.9550	10.09
		23130	711.0	QPSK	8.9456	10.13
				16QAM	8.9530	10.14
	5	23035	701.5	QPSK	4.4934	5.252
				16QAM	4.5031	5.177
		23095	707.5	QPSK	4.5045	5.216
				16QAM	4.4961	5.264
		23155	713.5	QPSK	4.4986	5.190
				16QAM	4.5017	5.296
	3	23025	700.5	QPSK	2.6926	3.038
				16QAM	2.6891	3.055
		23095	707.5	QPSK	2.6977	3.110
				16QAM	2.6999	3.030
		23165	714.5	QPSK	2.6998	3.040
				16QAM	2.7013	3.040
	1.4	23017	699.7	QPSK	1.0910	1.361
				16QAM	1.0869	1.275
		23095	707.5	QPSK	1.0945	1.376
				16QAM	1.0879	1.362
		23173	715.3	QPSK	1.0889	1.365
				16QAM	1.0919	1.410

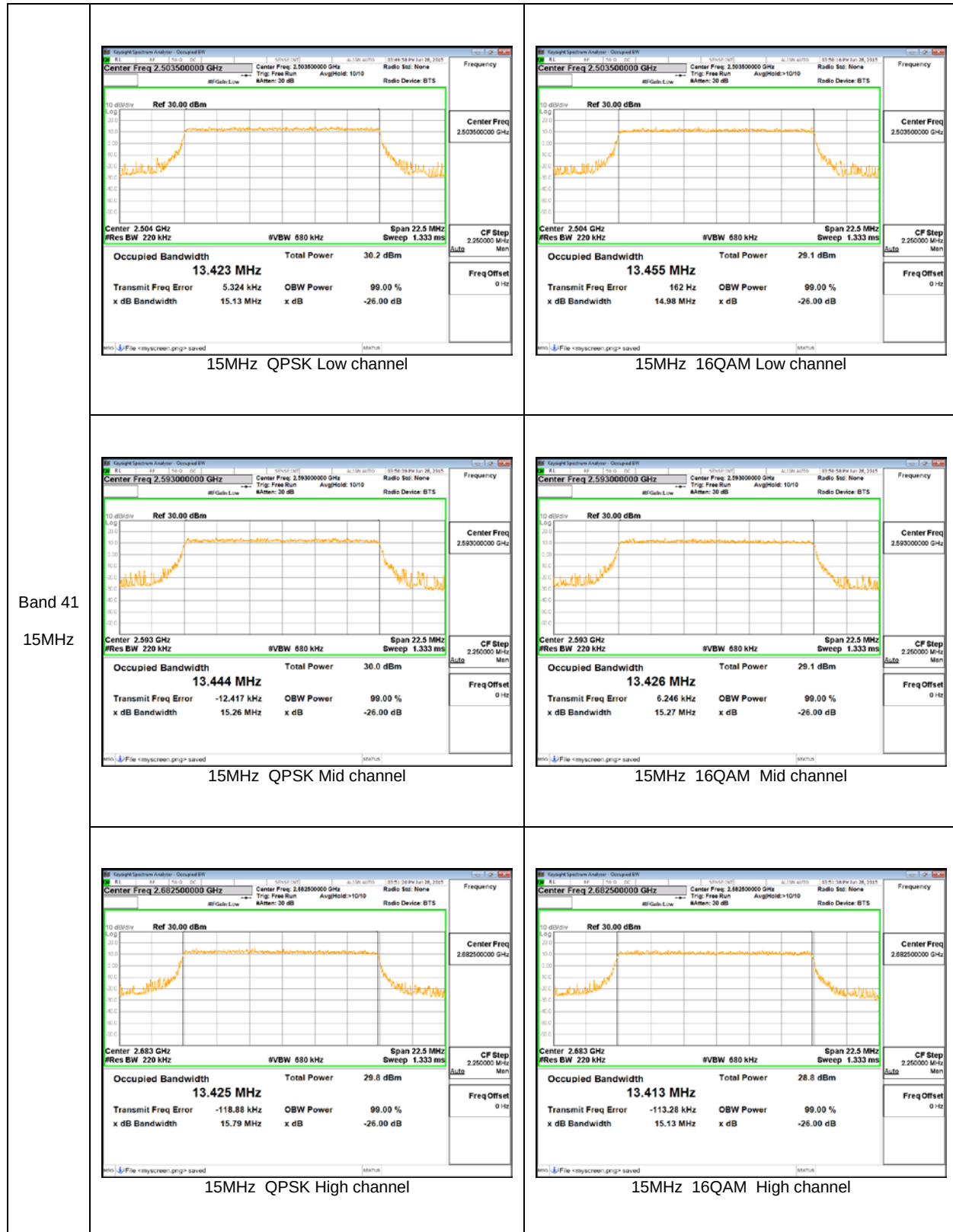
LTE Band 4

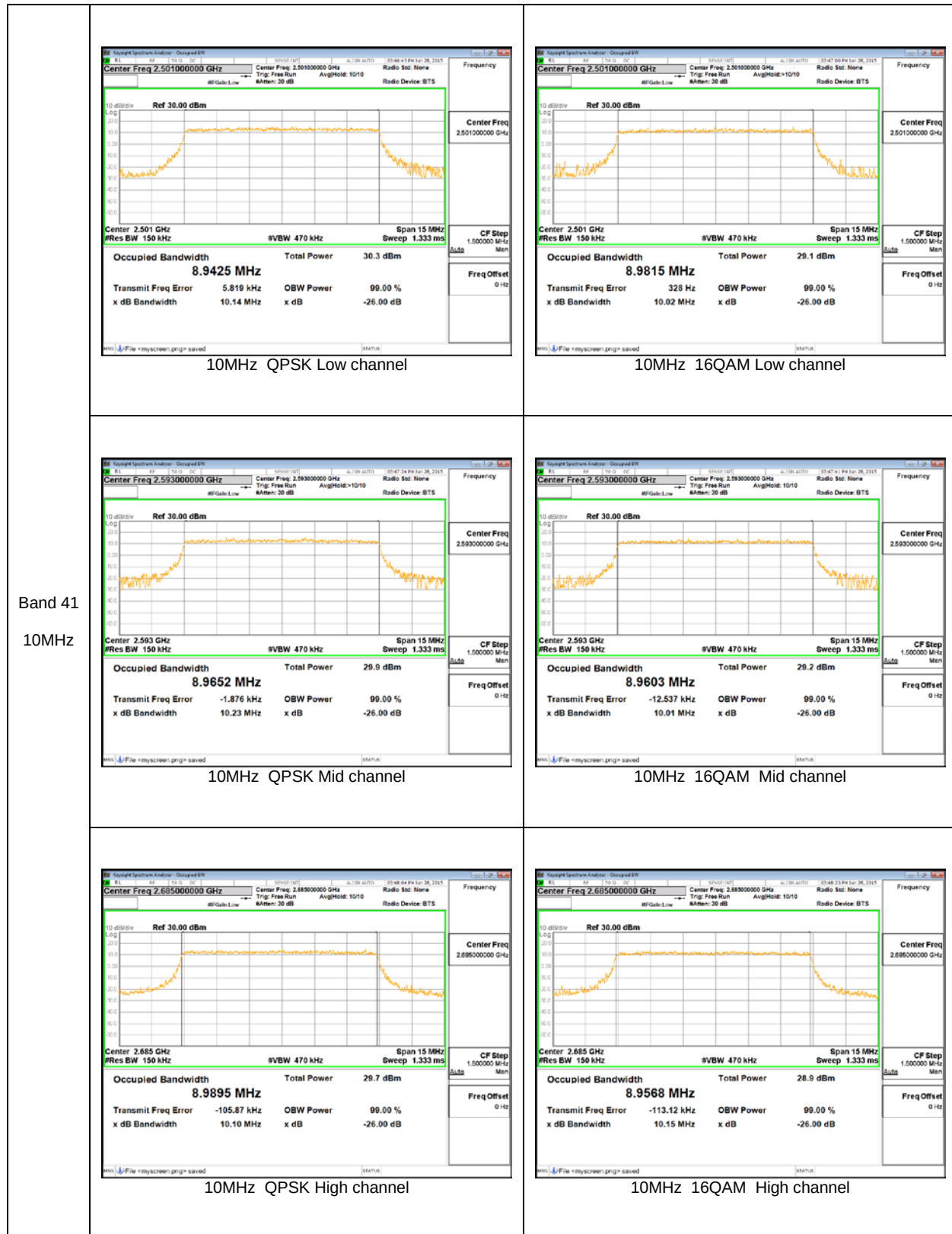
Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 4	20	20050	1720.0	QPSK	17.906	19.76
				16QAM	17.920	19.96
		20174	1732.5	QPSK	17.858	19.88
				16QAM	17.878	19.72
		20299	1745.0	QPSK	17.891	19.74
				16QAM	17.916	19.81
	15	20025	1717.5	QPSK	13.436	15.25
				16QAM	13.430	15.22
		20174	1732.5	QPSK	13.431	15.12
				16QAM	13.426	14.97
		20324	1747.5	QPSK	13.451	15.43
				16QAM	13.416	15.03
	10	20000	1715.0	QPSK	8.9815	10.24
				16QAM	8.9683	10.19
		20174	1732.5	QPSK	8.9833	10.00
				16QAM	8.9859	10.33
		20349	1750.0	QPSK	8.9636	10.25
				16QAM	9.0069	10.25
	5	19975	1712.5	QPSK	4.5017	5.249
				16QAM	4.5017	5.317
		20174	1732.5	QPSK	4.5024	5.286
				16QAM	4.5015	5.274
		20374	1752.5	QPSK	4.5062	5.278
				16QAM	4.5051	5.255
	3	19965	1711.5	QPSK	2.6956	3.057
				16QAM	2.6976	3.074
		20174	1732.5	QPSK	2.7020	3.081
				16QAM	2.6975	3.100
		20384	1753.5	QPSK	2.7022	3.074
				16QAM	2.7005	3.056
	1.4	19957	1710.7	QPSK	1.0922	1.384
				16QAM	1.0946	1.377
		20174	1732.5	QPSK	1.0899	1.388
				16QAM	1.0960	1.363
		20392	1754.3	QPSK	1.0913	1.378
				16QAM	1.0973	1.383

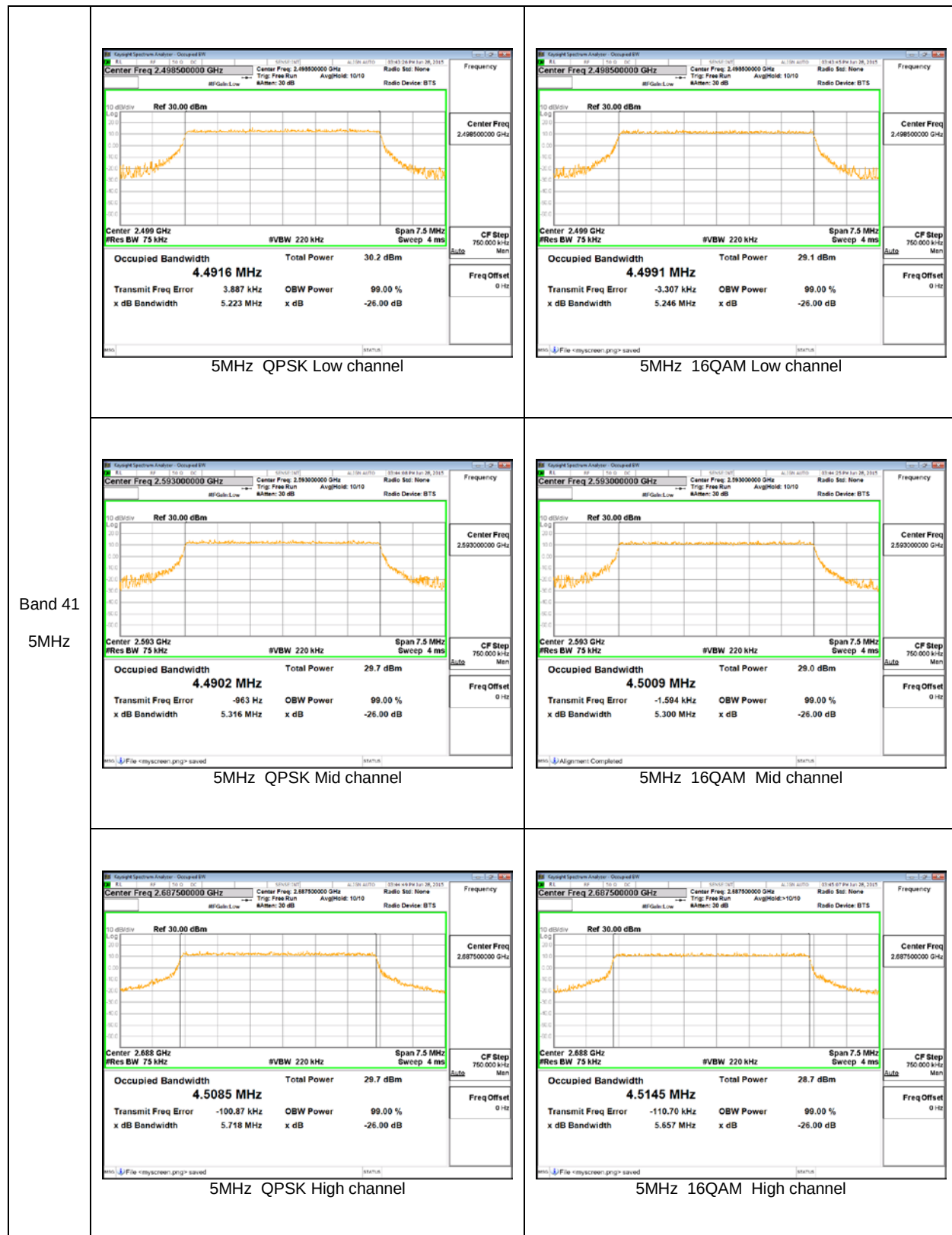
10.1.2. OCCUPIED BANDWIDTH PLOTS

LTE Band 41









LTE Band 25

