



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

WWAN

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER : SM-W2018

FCC ID: A3LSMW2018

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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	11/15/17	Initial issue	Junwhan Lee
V2	11/27/17	Updated to address TCB's question	Junwhan Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

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

MODEL NUMBER: SM-W2018

SERIAL NUMBER: R38J906NY8B, R38J906NWJE (RADIATED);
R38J906NY6D (CONDUCTED)

DATE TESTED: SEP 27, 2017 - NOV 10, 2017

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H, 24E, 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.

Approved & Released For
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Tested By:



Junwhan 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. ANSI TIA-603-E, 2016
6. KDB 971168 D01 Power Meas License Digital Systems v03

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	
☐	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:

EIRP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna) + Substitution Antenna Factor (dBi)

ERP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – 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	3.86 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 CDMA/GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, ANT+ and NFC.

Test results of flip cover open configuration were more worst cases in comparison with test results of flip cover closed configuration. Therefore, all radiated tests were conducted on the condition of flip cover open configuration.

5.2. MAXIMUM OUTPUT POWER

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

Note : Conducted output power results were excerpted from RF exposure test report.(4788164548-S1V2 FCC Report SAR)

CDMA

FCC Part 22						
Band	Frequency Range	Modulation	Conducted		Radiated	
	[MHz]	Peak	Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
BC0	824~849	1xRTT	25.7	371.54	21.19	131.52
		EVDO REL. 0	25.5	354.81	21.15	130.32
		EVDO REV. A	25.4	346.74		

GSM

FCC Part 24						
Band	Frequency Range	Modulation	Conducted		Radiated	
	[MHz]	Peak	Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
GSM1900	1850~1910	GMSK	30.3	1071.52		
		GPRS	30.1	1023.29	31.30	1348.96
		EGPRS	25.7	371.54	28.48	704.69

WCDMA

FCC Part 22/24						
Band	Frequency Range	Modulation	Conducted		Radiated	
	[MHz]	Peak	Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5	824~849	REL99	23.3	213.80	19.32	85.51
		HSDPA	22.2	165.96	18.02	63.39
		HSUPA	22.2	165.96		
		DC-HSDPA	22.1	162.18		
Band 2	1850~1910	REL99	23.4	218.78	24.21	263.63
		HSDPA	22.1	162.18	23.23	210.38
		HSUPA	22.1	162.18		
		DC-HSDPA	22.1	162.18		

LTE Band 5

FCC Part 22							
Band	Frequency Range	BandWidth	Modulation	Conducted		Radiated	
	[MHz]	[MHz]	Peak	Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5	824 ~ 849	10	QPSK	24.0	251.19	18.13	65.01
			16QAM	23.4	218.78	17.10	51.29
			64QAM	22.2	165.96	16.50	44.67
		5	QPSK	24.1	257.04	17.59	57.41
			16QAM	23.5	223.87	16.59	45.60
			64QAM	22.4	173.78	15.32	34.04
		3	QPSK	24.1	257.04	18.76	75.16
			16QAM	23.3	213.80	17.83	60.67
			64QAM	22.2	165.96	16.07	40.46
		1.4	QPSK	24.0	251.19	16.18	41.50
			16QAM	23.2	208.93	15.28	33.73
			64QAM	22.3	169.82	12.82	19.14

LTE Band 4

FCC Part 27							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 4	1710 ~ 1755	20	QPSK	23.3	213.80	21.98	157.76
			16QAM	22.8	190.55	21.03	126.77
			64QAM	21.9	154.88	19.81	95.72
		15	QPSK	23.6	229.09	21.91	155.24
			16QAM	23.0	199.53	22.10	162.18
			64QAM	21.9	154.88	20.65	116.14
		10	QPSK	23.6	229.09	22.10	162.18
			16QAM	22.7	186.21	21.11	129.12
			64QAM	21.8	151.36	20.58	114.29
		5	QPSK	23.7	234.42	22.39	173.38
			16QAM	22.8	190.55	21.45	139.64
			64QAM	22.0	158.49	20.69	117.22
		3	QPSK	23.7	234.42	22.48	177.01
			16QAM	22.7	186.21	21.45	139.64
			64QAM	21.8	151.36	20.50	112.20
		1.4	QPSK	23.6	229.09	20.21	104.95
			16QAM	22.8	190.55	19.20	83.18
			64QAM	21.8	151.36	18.00	63.10

LTE Band 41

FCC Part 27							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 41	2496 - 2690	20	QPSK	24.5	281.84	22.46	176.20
			16QAM	23.5	223.87	21.87	153.82
			64QAM	22.5	177.83	20.48	111.69
		15	QPSK	24.4	275.42	22.64	183.65
			16QAM	23.4	218.78	21.80	151.36
			64QAM	22.5	177.83	22.00	158.49
		10	QPSK	24.4	275.42	22.75	188.36
			16QAM	23.4	218.78	21.92	155.60
			64QAM	22.4	173.78	21.20	131.83
		5	QPSK	24.4	275.42	23.17	207.49
			16QAM	23.4	218.78	21.63	145.55
			64QAM	22.5	177.83	21.30	134.90

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)
CDMA/WCDMA Band 5 / LTE Band 5 824 ~ 849 MHz	-2.88
GSM1900/WCDMA Band 2 1850 ~ 1910 MHz	1.59
LTE Band 4 1710 ~ 1755 MHz	0.81
LTE Band 41 2496 ~ 2680 MHz	1.07

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA12CBC	DW3J908CS/B- E	N/A
Data Cable	SAMSUNG	EP-DG950CBE	N/A	N/A

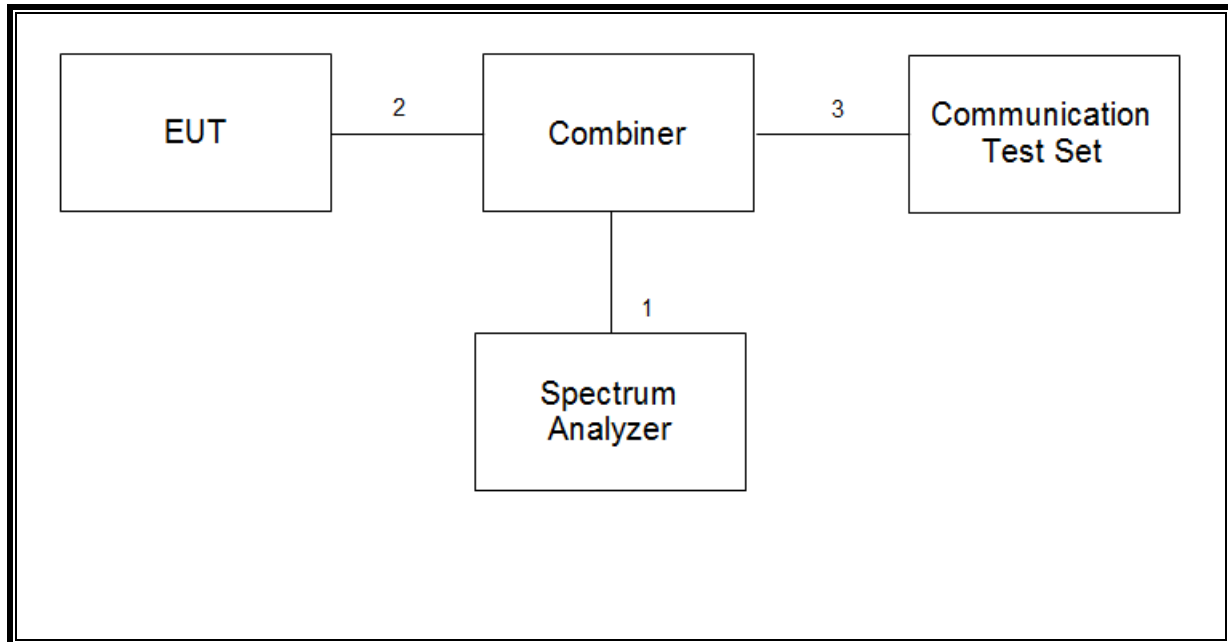
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	C-type	Shielded	1.2m	N/A

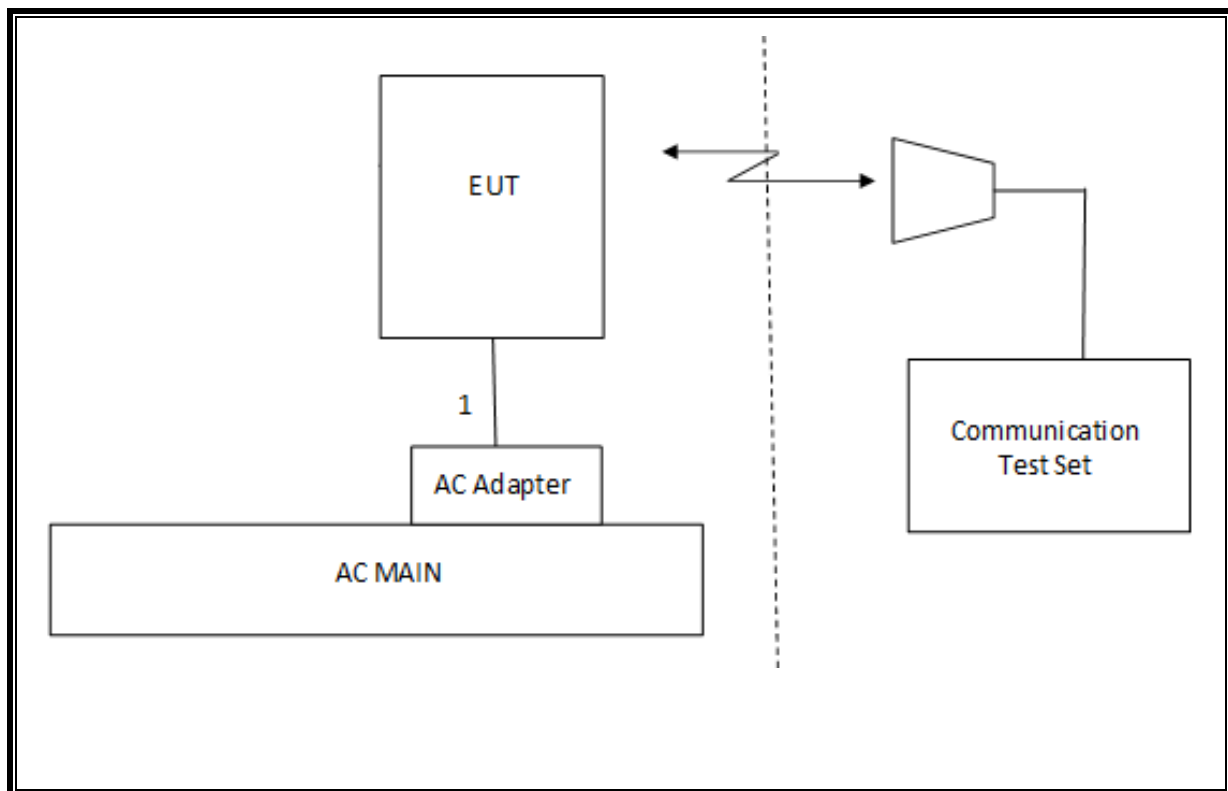
TEST SETUP

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:

Description	Manufacturer	Model	S/N	Cal Due
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121D DB4	00164753	06-30-19
Antenna, Horn, 40 GHz	ETS	3116C	00166155	11-30-17
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	12-15-17
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	04-14-19
Antenna, Horn, 18 GHz	ETS	3115	00167211	10-14-18
Antenna, Horn, 18 GHz	ETS	3115	00161451	03-10-19
Antenna, Horn, 18 GHz	ETS	3117	00168724	05-31-19
Antenna, Horn, 18 GHz	ETS	3117	00168717	05-31-19
Combiner	WEINSCHTEL	1575	2152	08-08-18
Communications Test Set	R&S	CMW500	150312	08-07-18
Communications Test Set	R&S	CMW500	115331	08-07-18
DC Power Supply	Agilent / HP	E3640A	MY54226395	08-07-18
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-09-18
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-07-18
Preamplifier	ETS	3115-PA	00167475	08-09-18
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-08-18
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-08-18
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-08-18
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-08-18
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G005	08-09-18
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G006	08-08-18
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	010	08-09-18
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	011	08-08-18
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G001	08-09-18
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G002	08-08-18
Attenuator	PASTERNAK	PE7087-10	A009	08-08-18
Temperature Chamber	ESPEC	SH-642	93001109	08-08-18
UL Software				
Description	Manufacturer	Model	Version	
Antenna port test software	UL	CLT	Ver 2.2	

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	17.9152 MHz
22.917(a) 24.238(a) 27.53(g)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-14.73 dBm
27.53(m)	Conducted Spurious Emission	-25 dBm		Pass	-30.17 dBm
27.53(m)	Emission mask	Section 9.2.2		Pass	Pass
2.1046	Conducted output power	N/A		Pass	Refer to RF exposure test report
22.355 24.235 27.54	Frequency Stability	2.5PPM		Pass	-0.003 PPM
22.913(a)(2)	Effective Radiated Power	38.5 dBm	Radiated	Pass	21.19 dBm
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power	33dBm		Pass	31.3 dBm
27.50(d)(4)		30dBm		Pass	22.48 dBm
22.917(a) 24.238(a) 27.53(h)	Radiated Spurious Emission	-13dBm		Pass	-39.6 dBm
27.53 (m)	Radiated Spurious Emission	-25dBm		Pass	-40.8 dBm

FCC Rule Part	Frequency Range [MHz]	Output Power [W]	Frequency Tolerance	Emission Designator	Emission Bandwidth [MHz]	Communication Type
GSM						
24E	1850.2 - 1909.8	1.349	2.5 ppm	249KGXW		GSM1900
24E	1850.2 - 1909.8	0.705	2.5 ppm	247KG7W		EDGE1900
CDMA						
22H	824.7 - 848.31	0.132	2.5 ppm	1M28F9W		BC0
WCDMA						
22H	826.4 - 846.6	0.086	2.5 ppm	4M13F9W		WCDMA B5
24E	1852.4 - 1907.6	0.264	2.5 ppm	4M14F9W		WCDMA B2
LTE Band 4						
27L	1720.0 - 1745.0	0.158	2.5 ppm	17M9G7W	20	QPSK
27L	1720.0 - 1745.0	0.127	2.5 ppm	17M9D7W	20	16QAM
27L	1717.5 - 1747.5	0.162	2.5 ppm	13M4D7W	15	16QAM
27L	1711.5 - 1753.5	0.177	2.5 ppm	2M70G7W	3	QPSK
LTE Band 5						
22H	829.0 - 844.0	0.065	2.5 ppm	8M95G7W	10	QPSK
22H	829.0 - 844.0	0.051	2.5 ppm	8M98D7W	10	16QAM
22H	825.5 - 847.5	0.075	2.5 ppm	2M69G7W	3	QPSK
22H	825.5 - 847.5	0.061	2.5 ppm	2M69D7W	3	16QAM
LTE Band 41						
27M	2506.0 - 2680.0	0.176	2.5 ppm	17M9G7W	20	QPSK
27M	2506.0 - 2680.0	0.154	2.5 ppm	17M9D7W	20	16QAM
27M	2503.5 - 2682.5	0.158	2.5 ppm	13M4D7W	15	64QAM
27M	2498.5 - 2687.5	0.207	2.5 ppm	4M50G7W	5	QPSK

8. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v03;

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.

8.1. CONDUCTED PEAK TO AVERAGE RESULT

WCDMA

Band	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 5	4183	836.6	REL99	3.06	13.00
			HSDPA	3.12	
Band 2	9400	1880.0	REL99	2.98	
			HSDPA	3.10	

CDMA

Band	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
BC0	384	836.52	1xRTT	3.37	13.00
			EVDO Rel.0	3.62	

GSM

Band	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
GSM1900	661	1880.0	GPRS	0.41	13.00
			EGPRS	3.41	

LTE Band 5/4

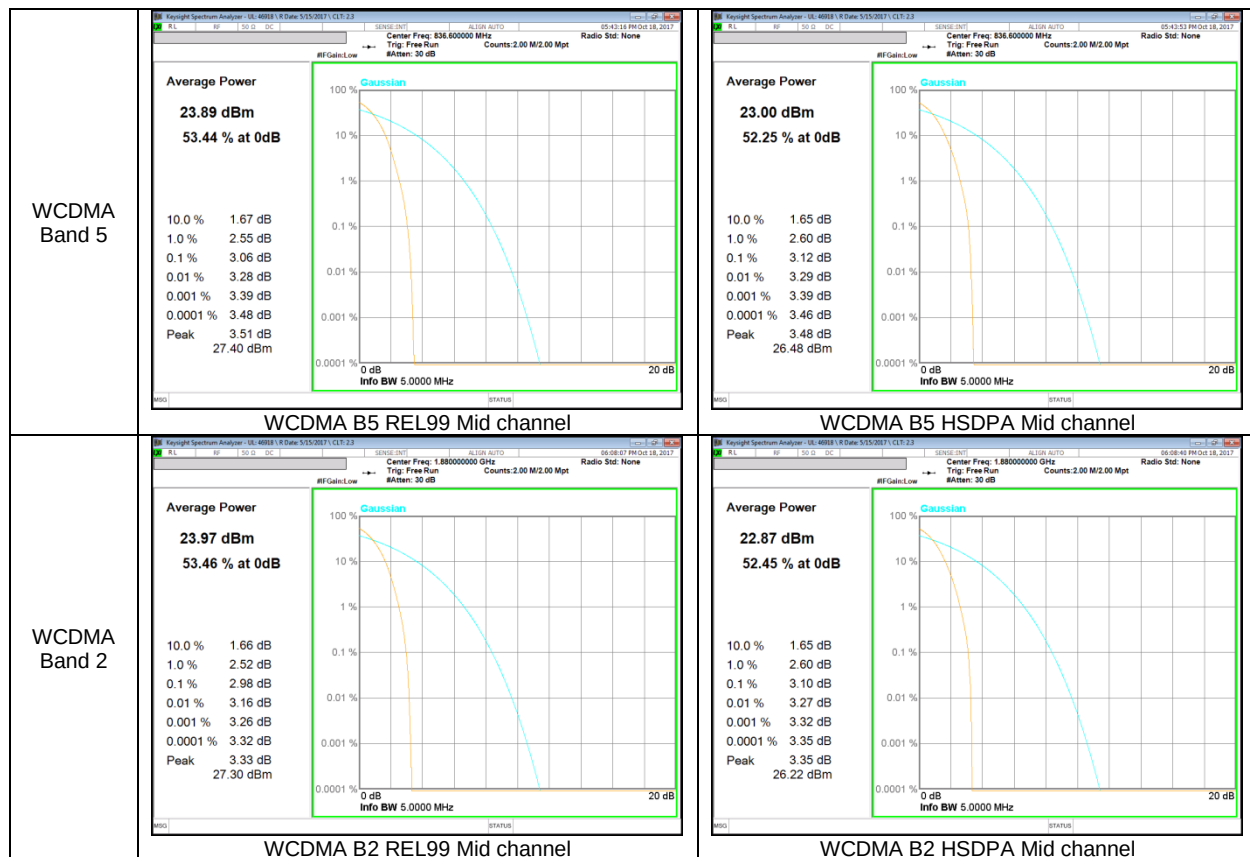
Band	BW [MHz]	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 5	10	20525	836.5	QPSK	4.42	13.00
				16QAM	5.17	
				64QAM	6.18	
	5			QPSK	4.47	
				16QAM	5.16	
				64QAM	6.19	
	3			QPSK	4.38	
				16QAM	5.20	
				64QAM	6.16	
	1.4			QPSK	4.47	
				16QAM	5.34	
				64QAM	6.37	
Band 4	20	20174	1732.5	QPSK	4.38	
				16QAM	5.05	
				64QAM	6.20	
	15			QPSK	4.39	
				16QAM	5.14	
				64QAM	6.09	
	10			QPSK	4.41	
				16QAM	5.14	
				64QAM	6.12	
	5			QPSK	4.44	
				16QAM	5.10	
				64QAM	6.12	
	3			QPSK	4.39	
				16QAM	5.17	
				64QAM	6.11	
	1.4			QPSK	4.43	
				16QAM	5.26	
				64QAM	6.32	

LTE Band41

Band	BW [MHz]	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 41	20	40620	2593	QPSK	3.94	13.00
				16QAM	4.90	
				64QAM	6.60	
	15			QPSK	3.87	
				16QAM	5.19	
				64QAM	6.20	
	10			QPSK	3.79	
				16QAM	5.21	
				64QAM	6.32	
	5			QPSK	3.80	
				16QAM	5.03	
				64QAM	6.10	

8.2. CONDUCTED PEAK TO AVERAGE PLOTS

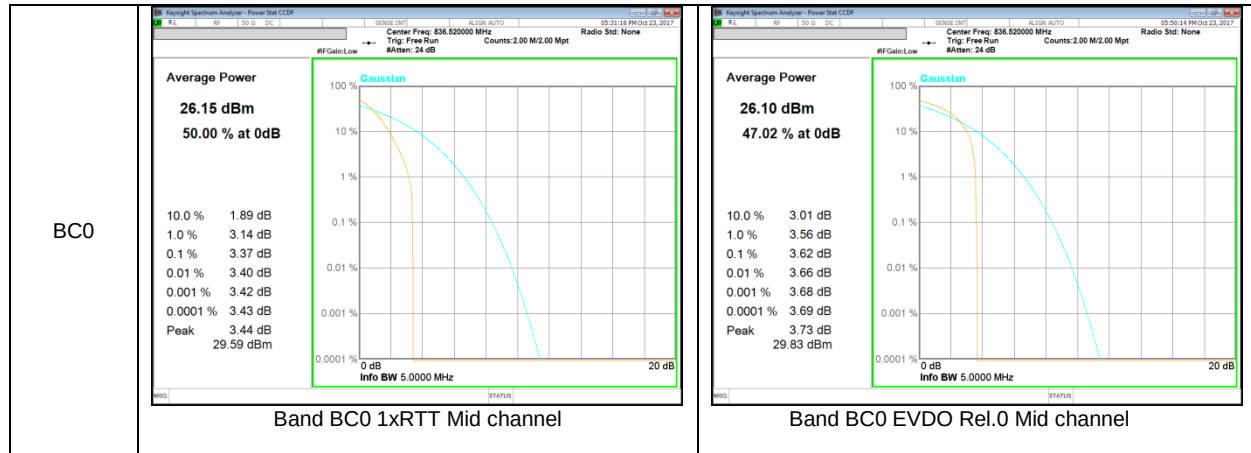
WCDMA



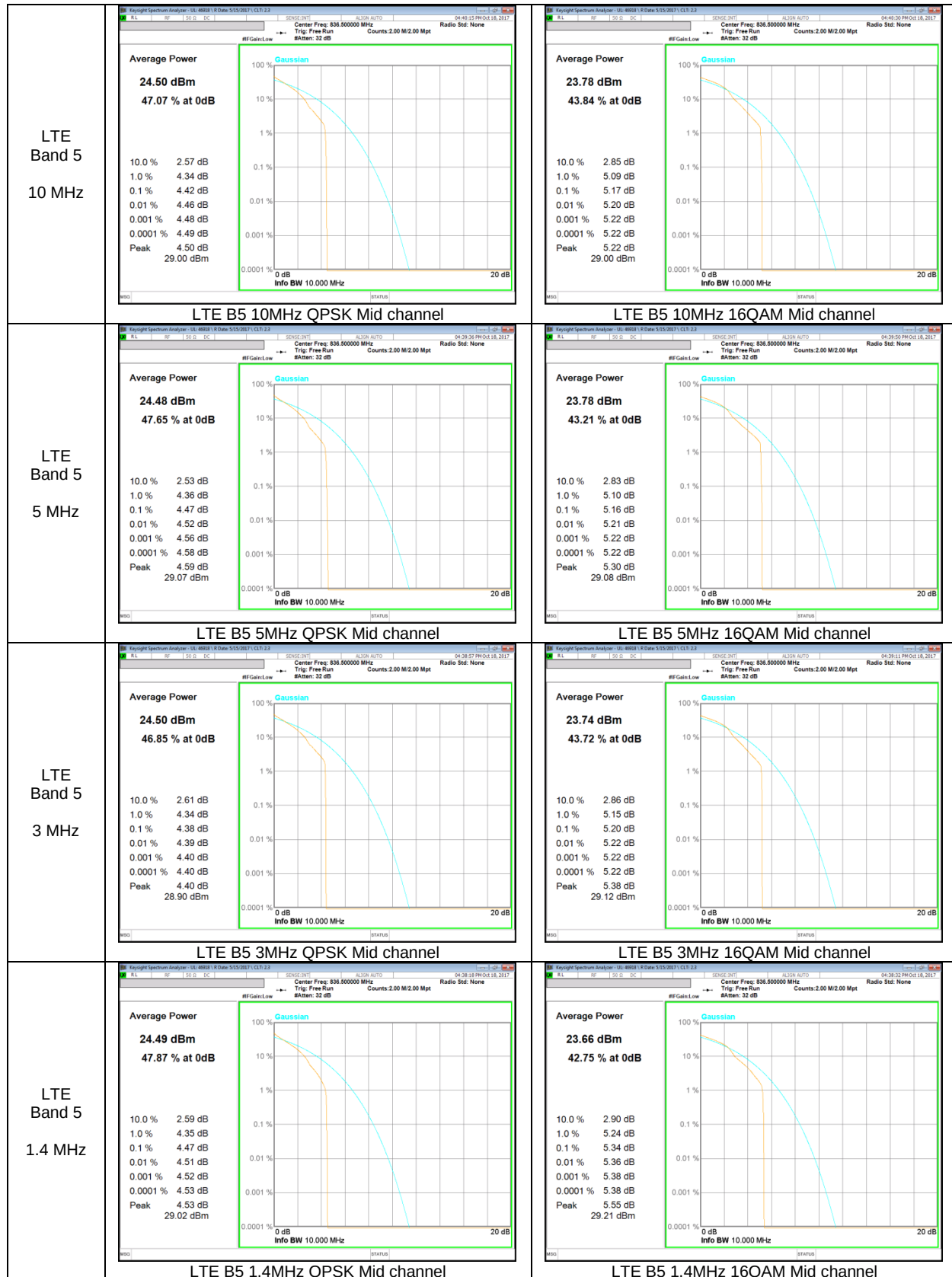
GSM

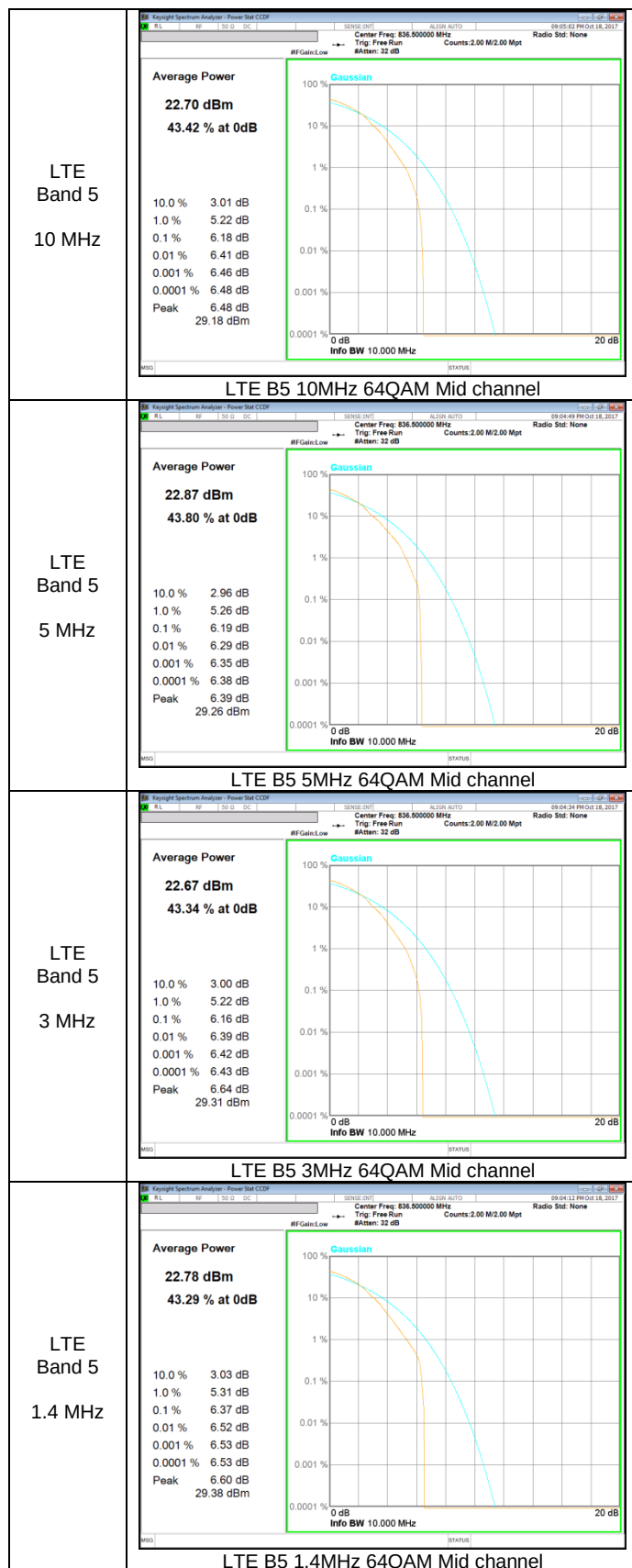


CDMA

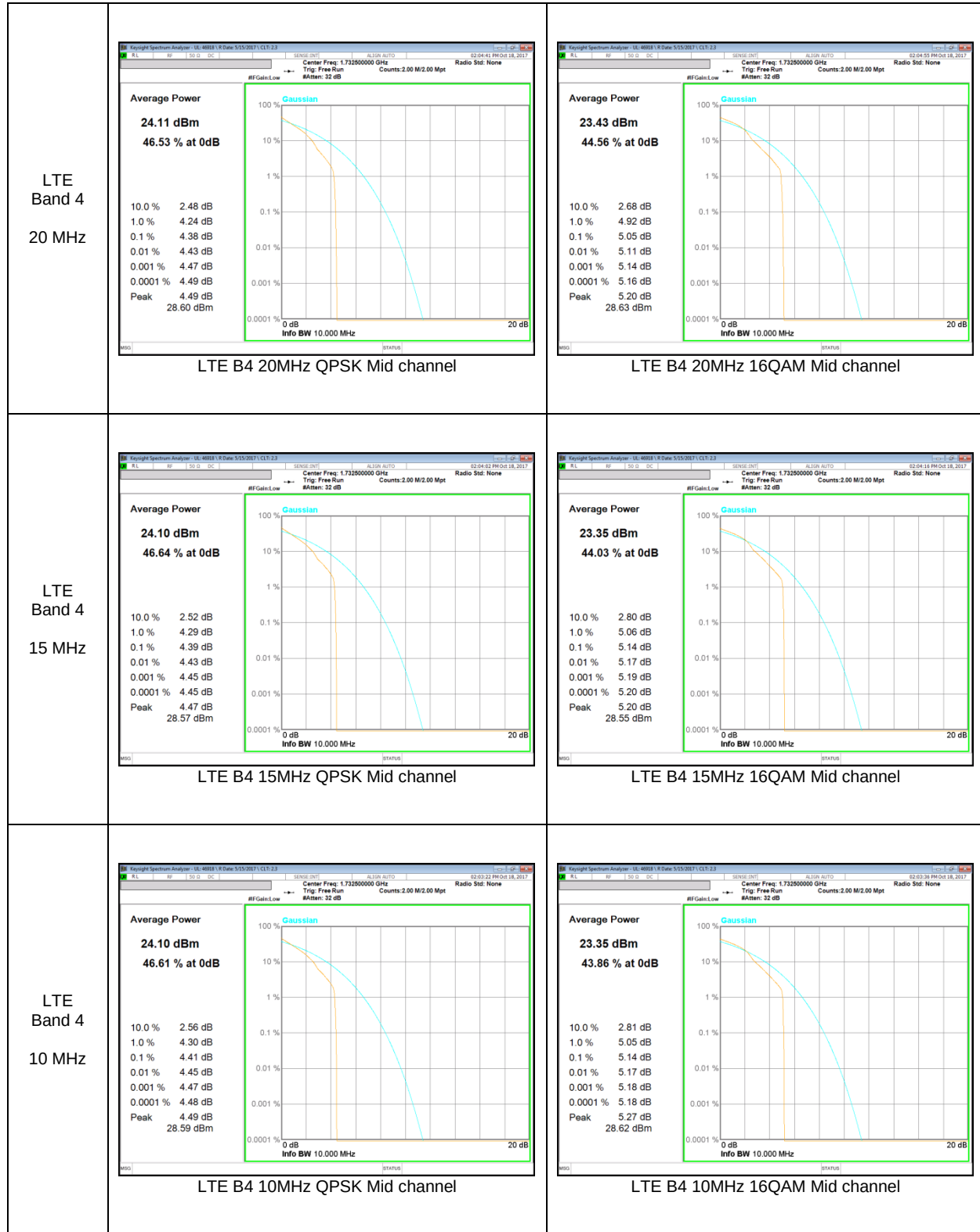


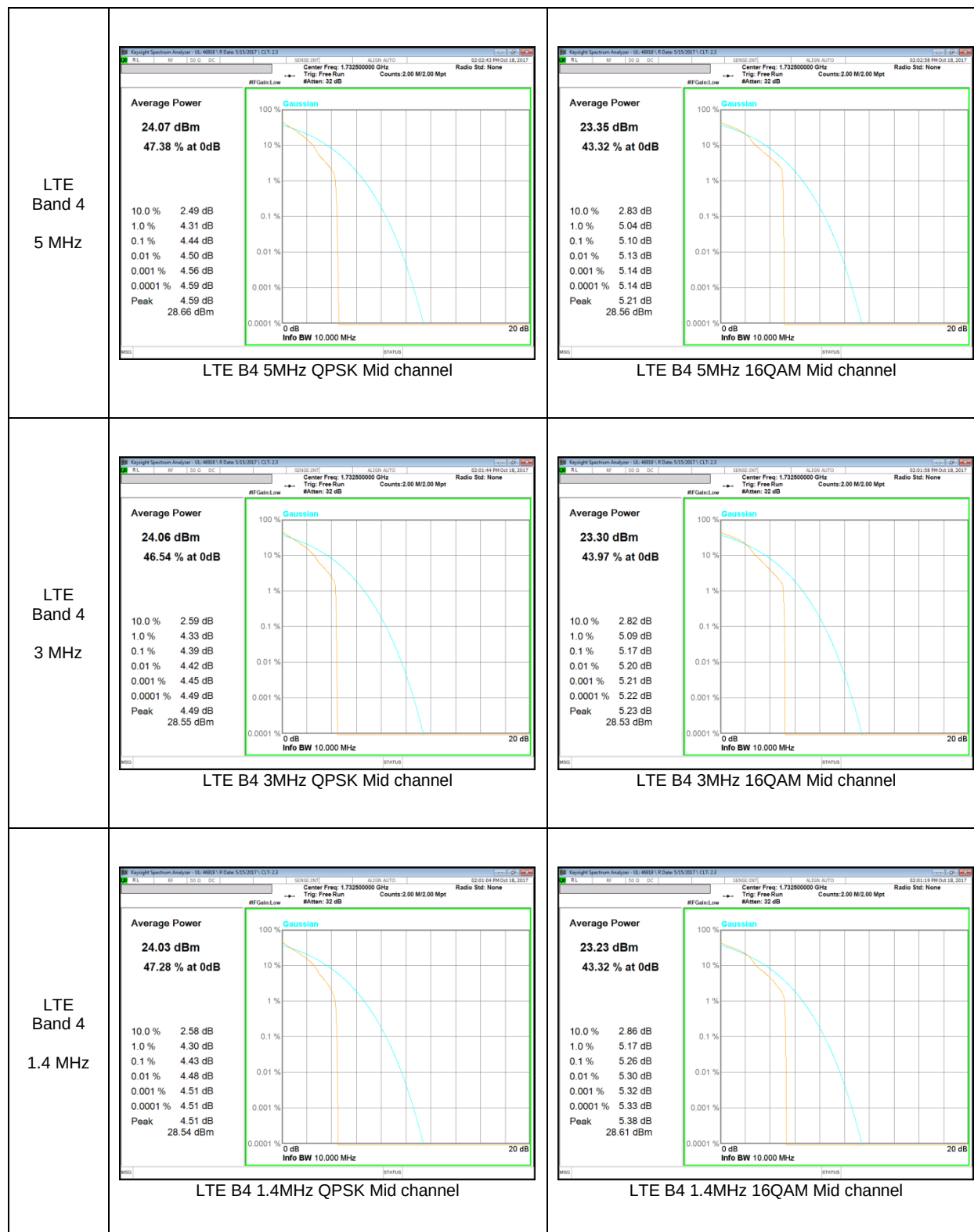
LTE Band 5

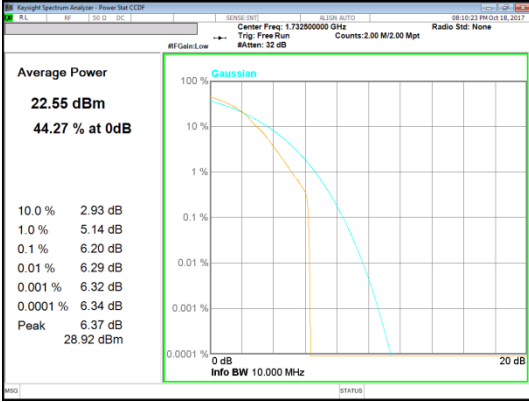
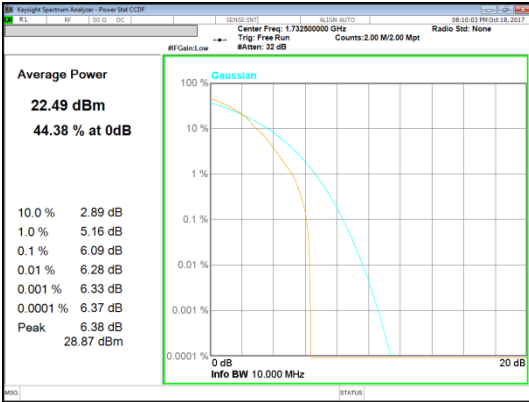
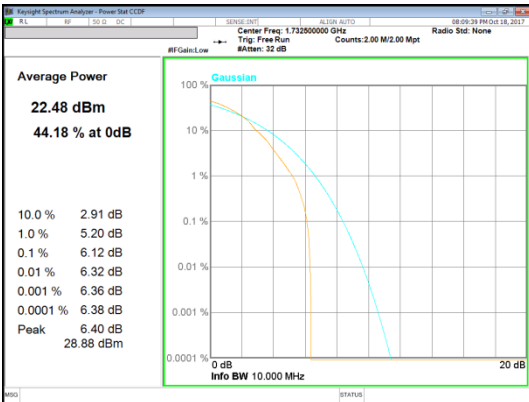


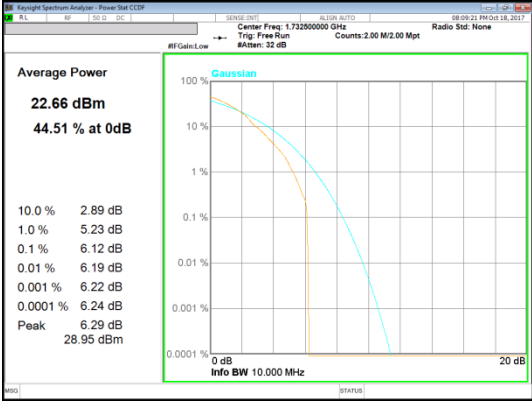
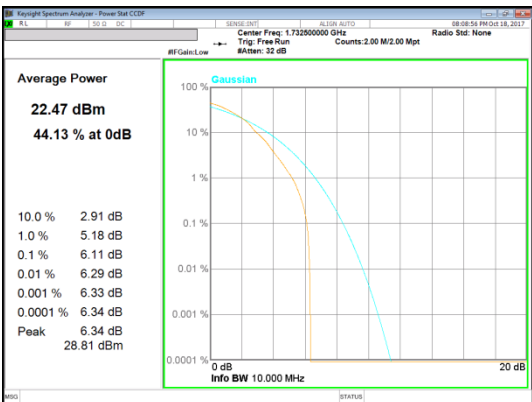
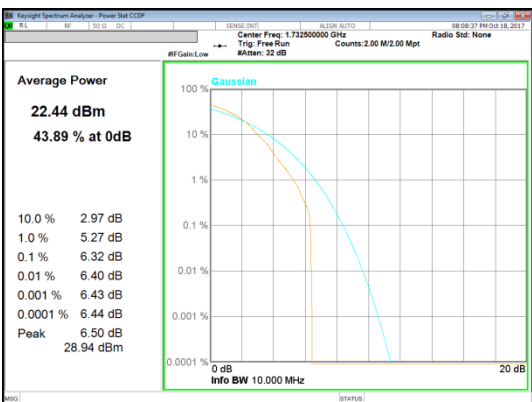


LTE Band 4

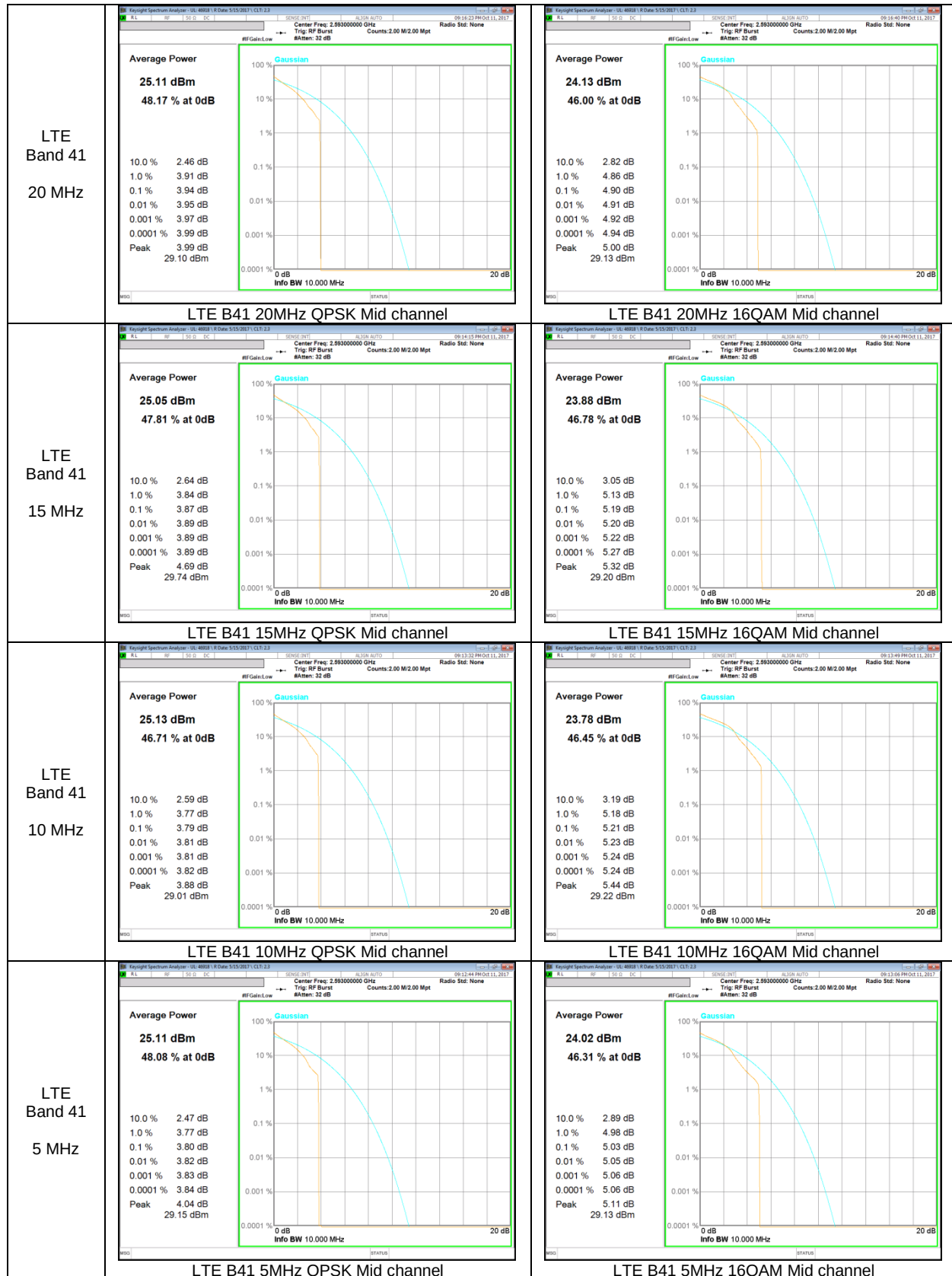


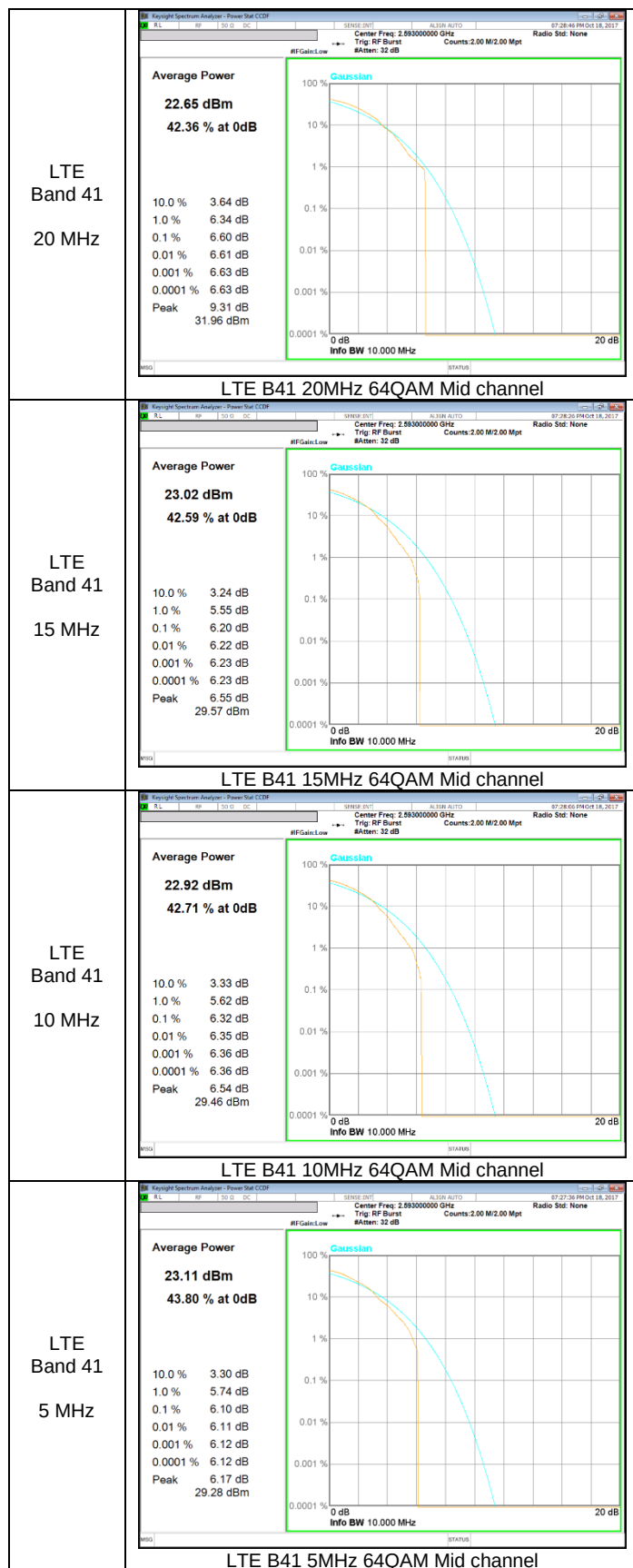


LTE Band 4 20 MHz	 Average Power 22.55 dBm 44.27 % at 0dB <table border="1"> <tr><td>10.0 %</td><td>2.93 dB</td></tr> <tr><td>1.0 %</td><td>5.14 dB</td></tr> <tr><td>0.1 %</td><td>6.20 dB</td></tr> <tr><td>0.01 %</td><td>6.29 dB</td></tr> <tr><td>0.001 %</td><td>6.32 dB</td></tr> <tr><td>0.0001 %</td><td>6.34 dB</td></tr> <tr><td>Peak</td><td>6.37 dB</td></tr> <tr><td></td><td>28.92 dBm</td></tr> </table> Info BW 10.000 MHz LTE B4 20MHz 64QAM Mid channel	10.0 %	2.93 dB	1.0 %	5.14 dB	0.1 %	6.20 dB	0.01 %	6.29 dB	0.001 %	6.32 dB	0.0001 %	6.34 dB	Peak	6.37 dB		28.92 dBm
10.0 %	2.93 dB																
1.0 %	5.14 dB																
0.1 %	6.20 dB																
0.01 %	6.29 dB																
0.001 %	6.32 dB																
0.0001 %	6.34 dB																
Peak	6.37 dB																
	28.92 dBm																
LTE Band 4 15 MHz	 Average Power 22.49 dBm 44.38 % at 0dB <table border="1"> <tr><td>10.0 %</td><td>2.89 dB</td></tr> <tr><td>1.0 %</td><td>5.16 dB</td></tr> <tr><td>0.1 %</td><td>6.09 dB</td></tr> <tr><td>0.01 %</td><td>6.28 dB</td></tr> <tr><td>0.001 %</td><td>6.33 dB</td></tr> <tr><td>0.0001 %</td><td>6.37 dB</td></tr> <tr><td>Peak</td><td>6.38 dB</td></tr> <tr><td></td><td>28.87 dBm</td></tr> </table> Info BW 10.000 MHz LTE B4 15MHz 64QAM Mid channel	10.0 %	2.89 dB	1.0 %	5.16 dB	0.1 %	6.09 dB	0.01 %	6.28 dB	0.001 %	6.33 dB	0.0001 %	6.37 dB	Peak	6.38 dB		28.87 dBm
10.0 %	2.89 dB																
1.0 %	5.16 dB																
0.1 %	6.09 dB																
0.01 %	6.28 dB																
0.001 %	6.33 dB																
0.0001 %	6.37 dB																
Peak	6.38 dB																
	28.87 dBm																
LTE Band 4 10 MHz	 Average Power 22.48 dBm 44.18 % at 0dB <table border="1"> <tr><td>10.0 %</td><td>2.91 dB</td></tr> <tr><td>1.0 %</td><td>5.20 dB</td></tr> <tr><td>0.1 %</td><td>6.12 dB</td></tr> <tr><td>0.01 %</td><td>6.32 dB</td></tr> <tr><td>0.001 %</td><td>6.36 dB</td></tr> <tr><td>0.0001 %</td><td>6.38 dB</td></tr> <tr><td>Peak</td><td>6.40 dB</td></tr> <tr><td></td><td>28.88 dBm</td></tr> </table> Info BW 10.000 MHz LTE B4 10MHz 64QAM Mid channel	10.0 %	2.91 dB	1.0 %	5.20 dB	0.1 %	6.12 dB	0.01 %	6.32 dB	0.001 %	6.36 dB	0.0001 %	6.38 dB	Peak	6.40 dB		28.88 dBm
10.0 %	2.91 dB																
1.0 %	5.20 dB																
0.1 %	6.12 dB																
0.01 %	6.32 dB																
0.001 %	6.36 dB																
0.0001 %	6.38 dB																
Peak	6.40 dB																
	28.88 dBm																

LTE Band 4 5 MHz	 Average Power 22.66 dBm 44.51 % at 0dB <table border="1"> <tr><td>10.0 %</td><td>2.89 dB</td></tr> <tr><td>1.0 %</td><td>5.23 dB</td></tr> <tr><td>0.1 %</td><td>6.12 dB</td></tr> <tr><td>0.01 %</td><td>6.19 dB</td></tr> <tr><td>0.001 %</td><td>6.22 dB</td></tr> <tr><td>0.0001 %</td><td>6.24 dB</td></tr> <tr><td>Peak</td><td>6.29 dB</td></tr> <tr><td>Peak</td><td>28.95 dBm</td></tr> </table> Info BW 10.000 MHz LTE B4 5MHz 64QAM Mid channel	10.0 %	2.89 dB	1.0 %	5.23 dB	0.1 %	6.12 dB	0.01 %	6.19 dB	0.001 %	6.22 dB	0.0001 %	6.24 dB	Peak	6.29 dB	Peak	28.95 dBm
10.0 %	2.89 dB																
1.0 %	5.23 dB																
0.1 %	6.12 dB																
0.01 %	6.19 dB																
0.001 %	6.22 dB																
0.0001 %	6.24 dB																
Peak	6.29 dB																
Peak	28.95 dBm																
LTE Band 4 3 MHz	 Average Power 22.47 dBm 44.13 % at 0dB <table border="1"> <tr><td>10.0 %</td><td>2.91 dB</td></tr> <tr><td>1.0 %</td><td>5.18 dB</td></tr> <tr><td>0.1 %</td><td>6.11 dB</td></tr> <tr><td>0.01 %</td><td>6.29 dB</td></tr> <tr><td>0.001 %</td><td>6.33 dB</td></tr> <tr><td>0.0001 %</td><td>6.34 dB</td></tr> <tr><td>Peak</td><td>6.34 dB</td></tr> <tr><td>Peak</td><td>28.81 dBm</td></tr> </table> Info BW 10.000 MHz LTE B4 3MHz 64QAM Mid channel	10.0 %	2.91 dB	1.0 %	5.18 dB	0.1 %	6.11 dB	0.01 %	6.29 dB	0.001 %	6.33 dB	0.0001 %	6.34 dB	Peak	6.34 dB	Peak	28.81 dBm
10.0 %	2.91 dB																
1.0 %	5.18 dB																
0.1 %	6.11 dB																
0.01 %	6.29 dB																
0.001 %	6.33 dB																
0.0001 %	6.34 dB																
Peak	6.34 dB																
Peak	28.81 dBm																
LTE Band 4 1.4 MHz	 Average Power 22.44 dBm 43.89 % at 0dB <table border="1"> <tr><td>10.0 %</td><td>2.97 dB</td></tr> <tr><td>1.0 %</td><td>5.27 dB</td></tr> <tr><td>0.1 %</td><td>6.32 dB</td></tr> <tr><td>0.01 %</td><td>6.40 dB</td></tr> <tr><td>0.001 %</td><td>6.43 dB</td></tr> <tr><td>0.0001 %</td><td>6.44 dB</td></tr> <tr><td>Peak</td><td>6.50 dB</td></tr> <tr><td>Peak</td><td>28.94 dBm</td></tr> </table> Info BW 10.000 MHz LTE B4 1.4MHz 64QAM Mid channel	10.0 %	2.97 dB	1.0 %	5.27 dB	0.1 %	6.32 dB	0.01 %	6.40 dB	0.001 %	6.43 dB	0.0001 %	6.44 dB	Peak	6.50 dB	Peak	28.94 dBm
10.0 %	2.97 dB																
1.0 %	5.27 dB																
0.1 %	6.32 dB																
0.01 %	6.40 dB																
0.001 %	6.43 dB																
0.0001 %	6.44 dB																
Peak	6.50 dB																
Peak	28.94 dBm																

LTE Band 41





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

(KDB 971168 D01 Power Meas License Digital Systems v03)

9.1.1. OCCUPIED BANDWIDTH RESULTS

CDMA

Band	Mode	Channel	f [MHz]	99% BW [MHz]	26dB BW [MHz]
BC0	1xRTT	1013	824.70	1.2675	1.422
		384	836.52	1.2712	1.425
		777	848.31	1.2743	1.420
	EVDO Rel.0	1013	824.70	1.2710	1.428
		384	836.52	1.2752	1.424
		777	848.31	1.2679	1.421

GSM

Band	Mode	Channel	f [MHz]	99% BW [KHz]	26dB BW [KHz]
GSM1900	GPRS	512	1850.2	243.40	309.3
		661	1880.0	249.19	313.1
		810	1909.8	243.21	303.8
	EGPRS	512	1850.2	236.18	308.2
		661	1880.0	246.56	303.9
		810	1909.8	241.88	305.1

WCDMA

Band	Mode	Channel	f [MHz]	99% BW [MHz]	26dB BW [MHz]
Band 5	REL99	4132	826.4	4.1158	4.654
		4183	836.6	4.1190	4.673
		4233	846.6	4.1206	4.683
	HSDPA	4132	826.4	4.1316	4.670
		4183	836.6	4.1292	4.694
		4233	846.6	4.1145	4.653
Band 2	REL99	9262	1852.4	4.1243	4.671
		9400	1880.0	4.1301	4.683
		9538	1907.6	4.1202	4.678
	HSDPA	9262	1852.4	4.1215	4.660
		9400	1880.0	4.1358	4.668
		9538	1907.6	4.1295	4.668

LTE Band 5

Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 5	10	20450	829.0	QPSK	8.9442	9.787
				16QAM	8.9616	9.724
				64QAM	8.9462	9.635
		20524	836.5	QPSK	8.9418	9.767
				16QAM	8.9509	9.670
				64QAM	8.9366	9.719
		20599	844.0	QPSK	8.9503	9.830
				16QAM	8.9789	9.665
				64QAM	8.9399	9.711
	5	20425	826.5	QPSK	4.5009	4.941
				16QAM	4.4932	4.943
				64QAM	4.4767	4.896
		20524	836.5	QPSK	4.4841	4.914
				16QAM	4.4820	4.896
				64QAM	4.4818	4.911
		20624	846.5	QPSK	4.4965	4.894
				16QAM	4.4782	4.881
				64QAM	4.4785	4.887
	3	20415	825.5	QPSK	2.6926	2.973
				16QAM	2.6924	2.989
				64QAM	2.6933	2.953
		20524	836.5	QPSK	2.6931	2.962
				16QAM	2.6936	2.963
				64QAM	2.6844	2.964
		20634	847.5	QPSK	2.6936	2.967
				16QAM	2.6906	3.000
				64QAM	2.6944	2.977
	1.4	20407	824.7	QPSK	1.0923	1.233
				16QAM	1.0816	1.225
				64QAM	1.0801	1.222
		20524	836.5	QPSK	1.0805	1.227
				16QAM	1.0830	1.229
				64QAM	1.0806	1.214
		20624	848.3	QPSK	1.0852	1.225
				16QAM	1.0904	1.238
				64QAM	1.0875	1.233

LTE Band 4

Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 4	20	20050	1720.0	QPSK	17.882	19.26
				16QAM	17.838	19.31
				64QAM	17.833	19.23
		20174	1732.5	QPSK	17.884	19.23
				16QAM	17.879	19.35
				64QAM	17.876	19.26
		20299	1745.0	QPSK	17.876	19.27
				16QAM	17.890	19.39
				64QAM	17.889	19.17
	15	20025	1717.5	QPSK	13.414	14.52
				16QAM	13.410	14.45
				64QAM	13.391	14.49
		20174	1732.5	QPSK	13.438	14.40
				16QAM	13.420	14.57
				64QAM	13.442	14.53
		20324	1747.5	QPSK	13.401	14.56
				16QAM	13.432	14.41
				64QAM	13.427	14.48
	10	20000	1715.0	QPSK	8.9443	9.769
				16QAM	8.9589	9.731
				64QAM	8.9479	9.664
		20174	1732.5	QPSK	8.9649	9.698
				16QAM	8.9391	9.775
				64QAM	8.9455	9.675
		20349	1750.0	QPSK	8.9786	9.682
				16QAM	8.9717	9.732
				64QAM	8.9593	9.676
	5	19975	1712.5	QPSK	4.5066	4.949
				16QAM	4.4866	4.931
				64QAM	4.4756	4.922
		20174	1732.5	QPSK	4.4818	4.901
				16QAM	4.4836	4.922
				64QAM	4.4826	4.914
		20374	1752.5	QPSK	4.4933	4.914
				16QAM	4.4783	4.902
				64QAM	4.4833	4.889

LTE Band 4

Band 4	3	19965	1711.5	QPSK	2.6902	2.976
				16QAM	2.6932	2.985
				64QAM	2.6959	2.973
		20174	1732.5	QPSK	2.6940	2.984
				16QAM	2.6899	2.979
				64QAM	2.6903	2.957
		20384	1753.5	QPSK	2.6950	2.965
				16QAM	2.6891	2.986
				64QAM	2.6948	2.980
	1.4	19957	1710.7	QPSK	1.0838	1.227
				16QAM	1.0907	1.238
				64QAM	1.0811	1.221
		20174	1732.5	QPSK	1.0921	1.229
				16QAM	1.0805	1.231
				64QAM	1.0834	1.226
		20392	1754.3	QPSK	1.0804	1.227
				16QAM	1.0821	1.229
				64QAM	1.0920	1.238

LTE Band 41

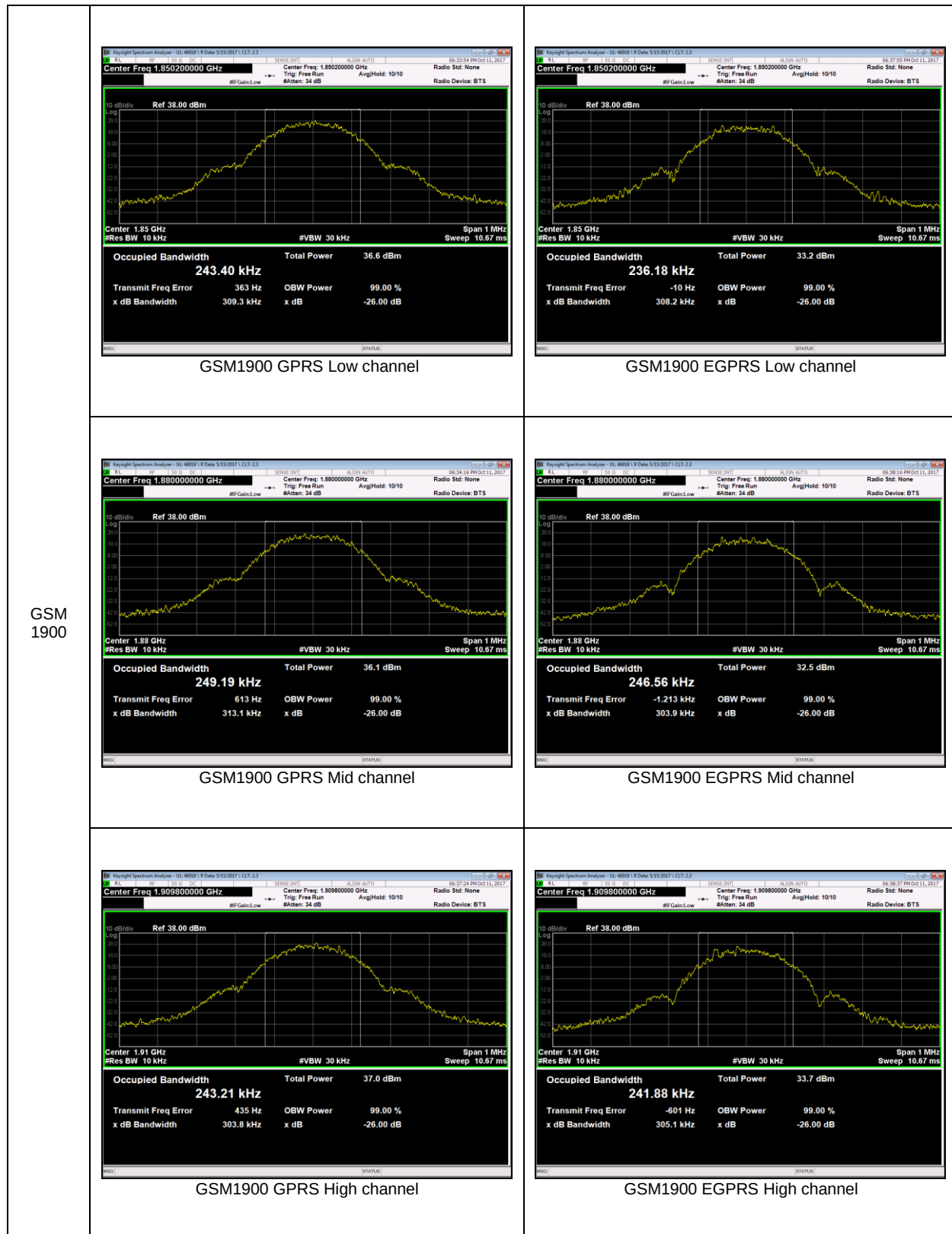
Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 41	20	35970	2506.0	QPSK	17.878	19.21
				16QAM	17.854	19.29
				64QAM	17.854	19.04
		40620	2593.0	QPSK	17.839	19.14
				16QAM	17.877	19.06
				64QAM	17.860	19.13
		41490	2680.0	QPSK	17.844	19.19
				16QAM	17.879	19.14
				64QAM	17.868	19.32
	15	39725	2503.5	QPSK	13.408	14.44
				16QAM	13.408	14.39
				64QAM	13.391	14.41
		40620	2593.0	QPSK	13.398	14.44
				16QAM	13.432	14.53
				64QAM	13.402	14.34
		41515	2682.5	QPSK	13.413	14.52
				16QAM	13.400	14.49
				64QAM	13.387	14.45
	10	39700	2501.0	QPSK	8.9425	9.745
				16QAM	8.9623	9.744
				64QAM	8.9396	9.700
		40620	2593.0	QPSK	8.9369	9.750
				16QAM	8.9568	9.664
				64QAM	8.9200	9.595
		41540	2685.0	QPSK	8.9589	9.658
				16QAM	8.9778	9.700
				64QAM	8.9425	9.669
	5	39675	2498.5	QPSK	4.4853	5.172
				16QAM	4.4880	4.933
				64QAM	4.4748	4.871
		40620	2593.0	QPSK	4.4798	4.921
				16QAM	4.4837	4.917
				64QAM	4.4645	4.859
		41565	2687.5	QPSK	4.4957	4.965
				16QAM	4.4749	4.889
				64QAM	4.4670	4.894

9.1.2. OCCUPIED BANDWIDTH PLOTS

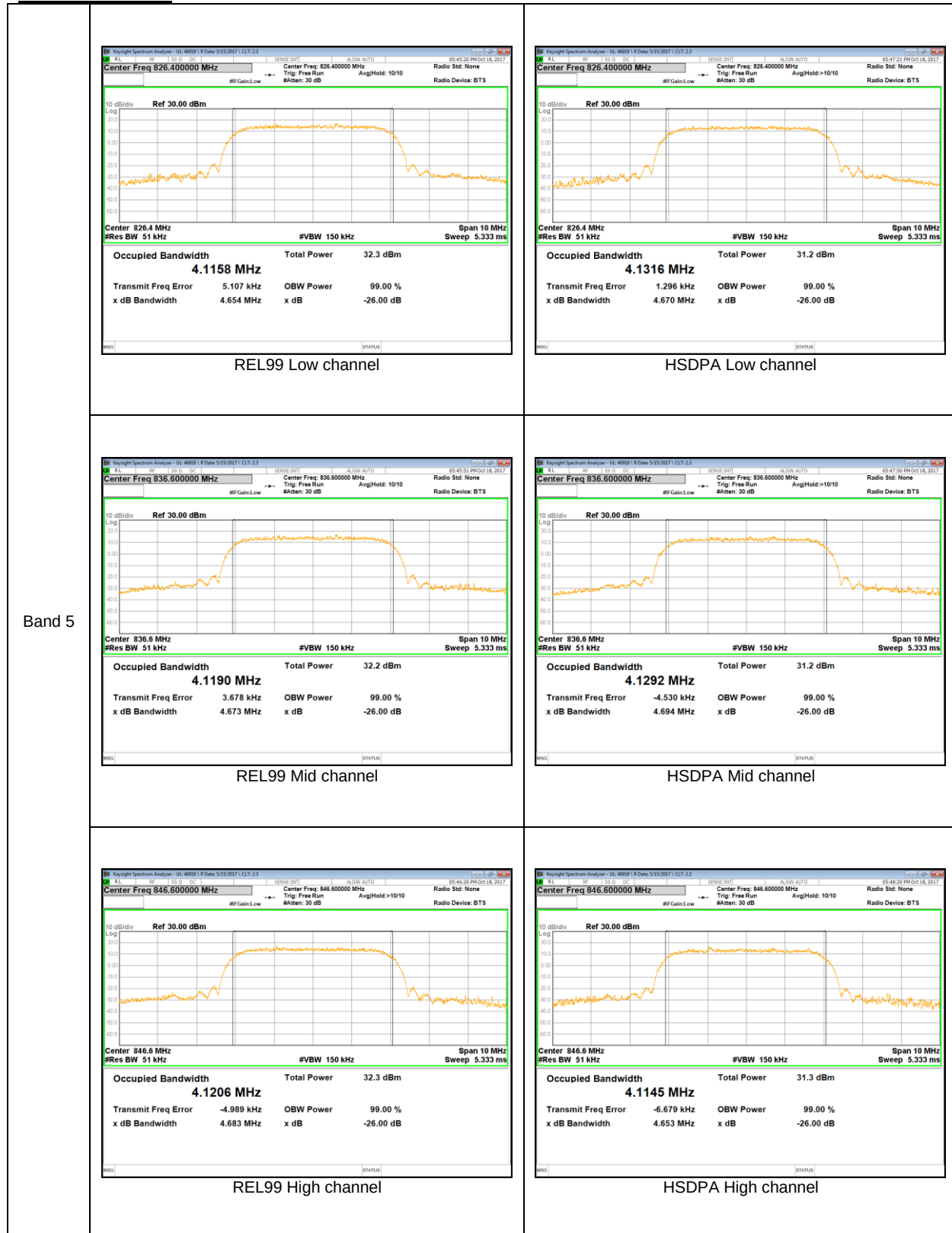
CDMA



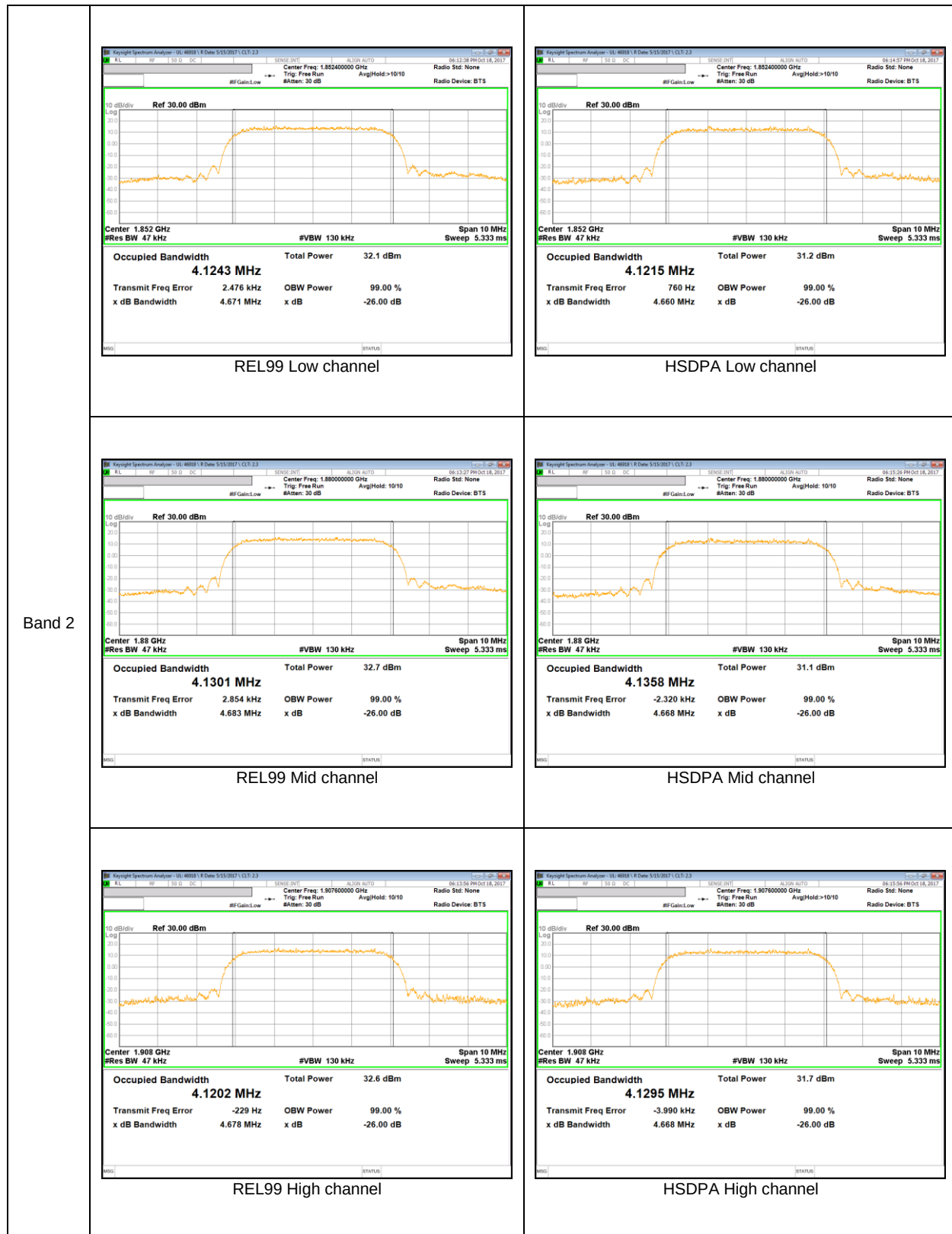
GSM 1900



WCDMA Band 5



WCDMA Band 2



LTE Band 5

