

CERTIFICATION TEST REPORT

Report Number. : 4790841155-E3V2

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

Model : SM-X516B

FCC ID : A3LSMX516B

EUT Description : GSM/WCDMA/LTE 5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac/ax,
Digitizer.

Test Standard(s) : FCC CFR47 PART 24 SUBPART E

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2023-07-14	Initial issue	Yeonhee Lim
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA/LTE 5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac/ax, and Digitizer.
MODEL NUMBER: SM-X516B
SERIAL NUMBER: R32W400Y96X (CONDUCTED);
R32W400Y96X, R32W400Y96Y, R32W400Y96Z (RADIATED);
DATE TESTED: 2023-06-11 - 2023-06-29;


APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 24E	Complies

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

Note: The results documented in this report apply only to the tested sample, under the conditions and Modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL KOREA LTD. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL KOREA LTD. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL KOREA LTD. By:

Tested By:



Seokhwan Hong
Suwon Lab Engineer
UL KOREA LTD.

Yeonhee Lim
Suwon Lab Engineer
UL KOREA LTD.

2. TEST METHODOLOGY

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

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 24.
3. ANSI TIA-603-E, 2016
4. ANSI C63.26, 2015
5. 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(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 2(3m semi-anechoic chamber)
<input type="checkbox"/>	Chamber 3(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 4(3m Full-anechoic chamber)
<input type="checkbox"/>	Chamber 5(3m Full-anechoic chamber)

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

4.4. DECISION RULE

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

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

5.2. MAXIMUM OUTPUT POWER

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

GSM

FCC Part 24						
Band	Frequency Range [MHz]	Modulation	Conducted		Radiated	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
GSM1900	1850 ~ 1910	GPRS	29.34	859.01	31.96	1570.36
		EGPRS	25.79	379.31	28.87	770.90

WCDMA

FCC Part 24						
Band	Frequency Range [MHz]	Modulation	Conducted		Radiated	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 2	1850 ~ 1910	Rel. 99	23.81	240.44	25.33	341.19
		HSDPA	23.41	219.28	25.10	323.59

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	1860.0 ~ 1900.0	20	QPSK	24.47	279.90	26.09	406.44
			16QAM	23.72	235.50	25.51	355.63
			64QAM	22.80	190.55		
			256QAM	19.88	97.27		
	1857.5 ~ 1902.5	15	QPSK	24.37	273.53	25.82	381.94
			16QAM	24.08	255.86	25.39	345.94
			64QAM	23.37	217.27		
			256QAM	20.30	107.15		
	1855.0 ~ 1905.0	10	QPSK	24.75	298.54	26.39	435.51
			16QAM	24.12	258.23	26.09	406.44
			64QAM	23.22	209.89		
			256QAM	20.32	107.65		
	1852.5 ~ 1907.5	5	QPSK	24.53	283.79	25.48	353.18
			16QAM	24.03	252.93	25.33	341.19
			64QAM	23.34	215.77		
			256QAM	20.46	111.17		
	1851.5 ~ 1908.5	3	QPSK	24.82	303.39	24.92	310.46
			16QAM	24.28	267.92	24.77	299.92
			64QAM	23.26	211.84		
			256QAM	20.39	109.40		
	1850.7 ~ 1909.3	1.4	QPSK	24.39	274.79	25.43	349.14
			16QAM	23.74	236.59	24.84	304.79
			64QAM	23.24	210.86		
			256QAM	20.31	107.40		

LTE Band 2 (Sub2 Antenna)

FCC Part 24							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 2	1860.0 ~ 1900.0	20	QPSK	23.72	235.50		
			16QAM	22.85	192.75		
			64QAM	21.76	149.97		
			256QAM	18.92	77.98		
	1857.5 ~ 1902.5	15	QPSK	23.77	238.23		
			16QAM	22.97	198.15		
			64QAM	21.80	151.36		
			256QAM	18.98	79.07		
	1855.0 ~ 1905.0	10	QPSK	23.86	243.22		
			16QAM	22.91	195.43		
			64QAM	21.65	146.22		
			256QAM	18.85	76.74		
	1852.5 ~ 1907.5	5	QPSK	23.82	240.99		
			16QAM	22.90	194.98		
			64QAM	21.85	153.11		
			256QAM	18.92	77.98		
	1851.5 ~ 1908.5	3	QPSK	23.95	248.31	20.86	121.90
			16QAM	22.98	198.61	20.04	100.93
			64QAM	21.71	148.25		
			256QAM	18.98	79.07		
	1850.7 ~ 1909.3	1.4	QPSK	23.93	247.17		
			16QAM	23.00	199.53		
			64QAM	21.91	155.24		
			256QAM	18.98	79.07		

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

Frequency (MHz)	Peak Gain (dBi)
GSM1900 / WCDMA Band 2 / LTE Band 2 1850 – 1910 MHz	-1.1
LTE Band 2 (Sub2 Antenna) 1850 – 1910 MHz	-4.2

5.4. WORST-CASE ORIENTATION

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

- GSM GPRS/EGPRS
- UMTS REL 99/HSDPA

For LTE Band 2 the worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on QPSK, 16QAM, 64QAM and 256QAM modulations. However, the out of band emissions and spurious radiation were only performed on bandwidth and RB offset(with RB size 1) with the highest power in QPSK.

For the sub2 antenna, LTE Band 2 operates on the sub2 antenna in the anchor combination(ENDC) of 5G NR n66.

- Conducted Spurious Emission

Highest conducted power setting for each bands				
LTE Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
2	1851.5	3	1	0
	1880.0		1	0
	1908.5		1	0
2 (Sub2 Antenna)	1851.5	3	1	8
	1880.0		1	8
	1908.5		1	14

- Radiated Spurious Emission

Highest EIRP setting for each bands				
LTE Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
2	1855.0	10	1	49
	1880.0		1	0
	1905.0		1	0
2 (Sub2 Antenna)	1851.5	3	1	8
	1880.0		1	8
	1908.5		1	14

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	EIRP			RSE		
	X	Y	Z	X	Y	Z
GSM 1900	O	-	-	-	O	-
WCDMA B2	O	-	-	O	-	-
LTE B2	O	-	-	O	-	-
LTE B2 (Sub2 Antenna)	O	-	-	-	-	O

Note : For 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	Manufacture	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37M9KML7D2DK3	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02115A	N/A

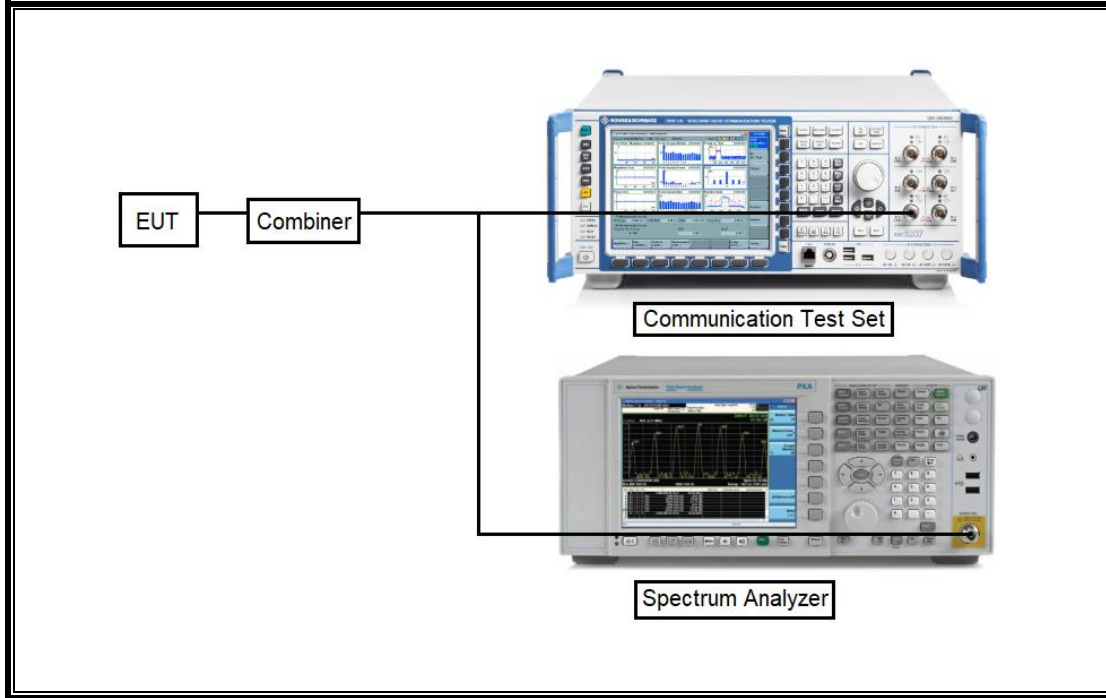
I/O CABLE

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

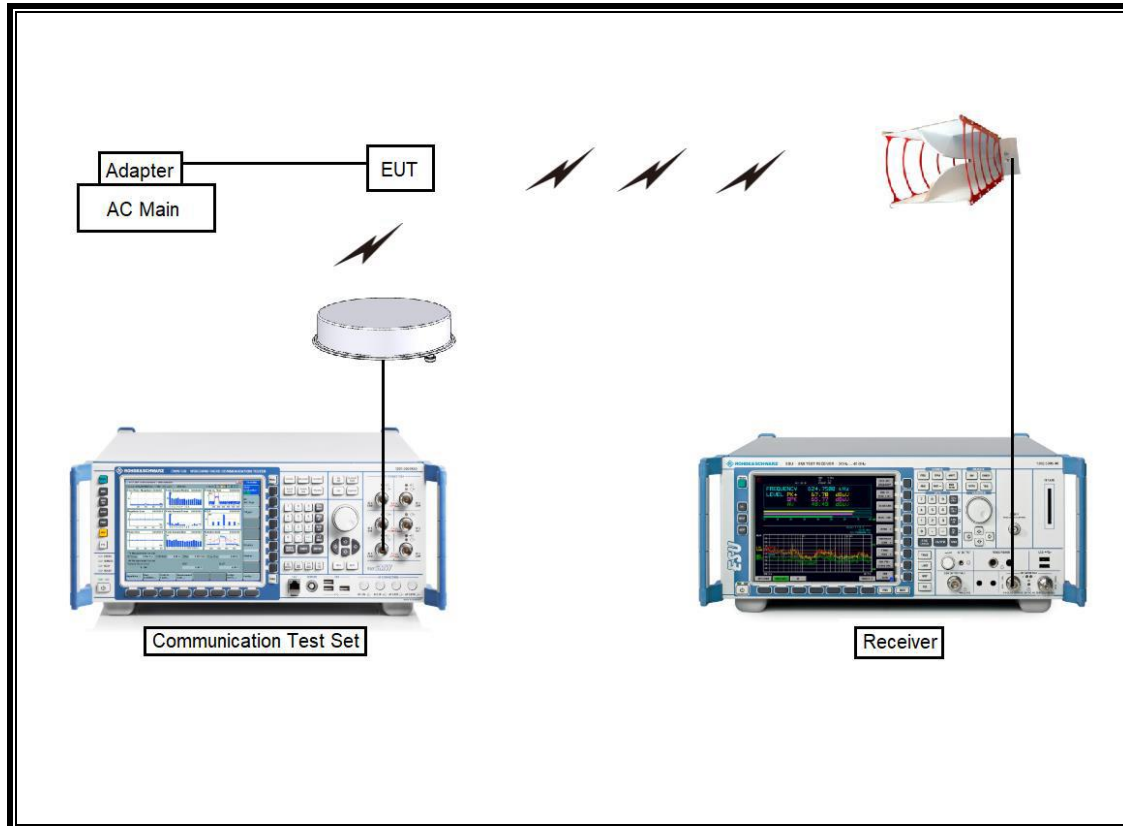
TEST SETUP

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

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	Manufacturer	Model	S/N	Cal Due
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121D DB4	00164753	2025-01-17
Directional Antenna	Cobham	FPA3-0.8-6.0R/1329	110367-0003	N/A
Directional Antenna	Cobham	FPA3-0.8-6.0R/1329	80108-0004	N/A
Antenna, Horn, 40 GHz	ETS	3116C	00168645	2023-10-13
Preamplifier	ETS	3115-PA	00167475	2023-08-04
Preamplifier	ETS	3116C-PA	00168841	2023-08-04
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2024-08-15
Antenna, Horn, 18 GHz	ETS	3115	00161451	2024-08-21
Antenna, Horn, 18 GHz	ETS	3117	00168717	2024-08-21
Communications Test Set	R&S	CMM500	169796	2024-01-05
DC Power Supply	Agilent / HP	E3640A	MY54226395	2023-08-02
Preamplifier, 1000 MHz	Sonoma	310N	341282	2023-08-02
Preamplifier, 1000 MHz	Sonoma	310N	351741	2023-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2023-08-01
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2023-08-01
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2023-08-03
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2023-08-01
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2023-08-02
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2023-07-29
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G005	2023-08-01
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G006	2023-08-01
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	010	2023-08-01
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	011	2023-08-01
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G001	2023-08-01
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G002	2023-08-01
Attenuator	PASTERNAK	PE7087-10	A009	2023-08-03
Attenuator	PASTERNAK	PE7087-10	A001	2023-08-03
Attenuator	PASTERNAK	PE7087-10	A008	2023-08-03
Attenuator	PASTERNAK	PE7004-10	2	2023-08-01
Attenuator	PASTERNAK	PE7395-10	A011	2023-08-03
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2023-10-06
Temperature Chamber	ESPEC	SH-642	93001109	2023-08-01
Power Splitter	MINI-CIRCUITS	WA1534	UL003	2024-01-09
Power Splitter	MINI-CIRCUITS	WA1534	UL004	2024-01-09
UL Software				
Description	Manufacturer	Model	Version	
Antenna port test software	UL	CLT	Ver 3.4	
Radiated software	UL	UL EMC	Ver 9.5	
Antenna port test software (5G NR FR1)	UL	UL iM	Ver 1.06	

7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
2.1049	Occupied Band width (99%)	N/A	Conducted	Pass
24.238(a)	Band Edge / Conducted Spurious Emission	-13dBm		Pass
2.1046	Conducted output power	N/A		Pass
24.235	Frequency Stability	2.5PPM		Pass
24.232(c)	Equivalent Isotropic Radiated Power	33dBm	Radiated	Pass
24.238(a)	Radiated Spurious Emission	-13dBm		Pass

8. CONDUCTED RESULTS

8.1. CONDUCTED OUTPUT POWER

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v03r01;

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

RESULTS

See the following pages.

8.1.1. CONDUCTED AVERAGE OUTPUT POWER

GSM

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pw r	Frame Pw r	Burst Pw r	Frame Pw r
GSM (Voice)	CS1	1	512	1850.2	29.33	20.30	30.5	21.5
			661	1880.0	29.22	20.19		
			810	1909.8	29.14	20.11		
GPRS (GMSK)	CS1	1	512	1850.2	29.34	20.31	30.5	21.5
			661	1880.0	29.31	20.28		
			810	1909.8	29.02	19.99		
		2	512	1850.2	27.29	21.27	28.0	22.0
			661	1880.0	27.30	21.28		
			810	1909.8	27.00	20.98		
		3	512	1850.2	26.37	22.11	27.0	22.7
			661	1880.0	26.19	21.93		
			810	1909.8	25.90	21.64		
		4	512	1850.2	25.19	22.18	26.0	23.0
			661	1880.0	25.02	22.01		
			810	1909.8	24.95	21.94		
EGPRS (8PSK)	MCS5	1	512	1850.2	25.79	16.76	27.0	18.0
			661	1880.0	25.68	16.65		
			810	1909.8	25.59	16.56		
		2	512	1850.2	23.42	17.40	24.5	18.5
			661	1880.0	23.46	17.44		
			810	1909.8	23.47	17.45		
		3	512	1850.2	21.95	17.69	23.0	18.7
			661	1880.0	22.01	17.75		
			810	1909.8	22.03	17.77		
		4	512	1850.2	20.65	17.64	21.5	18.5
			661	1880.0	20.53	17.52		
			810	1909.8	20.49	17.48		

WCDMA Band 2

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	9262	1852.40	23.81	N/A	24.5
		9400	1880.00	23.63		
		9538	1907.60	23.64		
HSDPA	Subtest 1	9262	1852.40	23.41	0	24.0
		9400	1880.00	23.41		
		9538	1907.60	23.21		
	Subtest 2	9262	1852.40	22.99	0	24.0
		9400	1880.00	22.94		
		9538	1907.60	22.78		
	Subtest 3	9262	1852.40	22.48	0.5	23.5
		9400	1880.00	22.44		
		9538	1907.60	22.25		
	Subtest 4	9262	1852.40	21.96	0.5	23.5
		9400	1880.00	21.91		
		9538	1907.60	21.73		
HSUPA	Subtest 1	9262	1852.40	22.44	0	24.0
		9400	1880.00	22.30		
		9538	1907.60	22.09		
	Subtest 2	9262	1852.40	19.90	2	22.0
		9400	1880.00	19.77		
		9538	1907.60	19.58		
	Subtest 3	9262	1852.40	22.44	1	23.0
		9400	1880.00	22.34		
		9538	1907.60	22.11		
	Subtest 4	9262	1852.40	20.34	2	22.0
		9400	1880.00	20.21		
		9538	1907.60	20.00		
	Subtest 5	9262	1852.40	23.59	0	24.0
		9400	1880.00	23.47		
		9538	1907.60	23.29		
DC-HSDPA	Subtest 1	9262	1852.40	23.44	0	24.0
		9400	1880.00	23.41		
		9538	1907.60	23.25		
	Subtest 2	9262	1852.40	23.00	0	24.0
		9400	1880.00	22.97		
		9538	1907.60	22.78		
	Subtest 3	9262	1852.40	22.52	0.5	23.5
		9400	1880.00	22.46		
		9538	1907.60	22.27		
	Subtest 4	9262	1852.40	21.96	0.5	23.5
		9400	1880.00	21.93		
		9538	1907.60	21.71		

LTE Band 2

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					
				Measured Pwr (dBm)			MPR	Tune-up Limit	
				18700	18900	19100			
				1860 MHz	1880 MHz	1900 MHz			
20 MHz	QPSK	1	0	23.81	24.16	24.22	0.0	25.0	
		1	49	24.19	24.37	24.10	0.0	25.0	
		1	99	24.47	24.06	23.56	0.0	25.0	
		50	0	23.41	23.34	23.45	0.5	24.5	
		50	24	23.48	23.31	23.43	0.5	24.5	
		50	50	23.47	23.29	23.34	0.5	24.5	
	100	0	23.47	23.31	23.44	0.5	24.5		
	16QAM	1	0	23.26	23.31	23.68	0.5	24.5	
		1	49	23.64	23.33	23.72	0.5	24.5	
		1	99	23.58	23.21	23.26	0.5	24.5	
		50	0	22.41	22.27	22.43	1.5	23.5	
		50	24	22.39	22.24	22.41	1.5	23.5	
		50	50	22.39	22.22	22.38	1.5	23.5	
	100	0	22.40	22.24	22.42	1.5	23.5		
	64QAM	1	0	22.56	22.29	22.31	1.5	23.5	
		1	49	22.80	22.38	22.49	1.5	23.5	
		1	99	22.66	22.32	22.33	1.5	23.5	
		50	0	21.57	21.28	21.33	2.5	22.5	
		50	24	21.57	21.26	21.31	2.5	22.5	
		50	50	21.55	21.22	21.27	2.5	22.5	
	100	0	21.54	21.20	21.28	2.5	22.5		
	256QAM	1	0	19.83	19.34	19.56	4.5	20.5	
		1	49	19.88	19.21	19.52	4.5	20.5	
		1	99	19.79	19.26	19.46	4.5	20.5	
		50	0	19.50	19.16	19.25	4.5	20.5	
		50	24	19.48	19.13	19.22	4.5	20.5	
		50	50	19.46	19.11	19.20	4.5	20.5	
	100	0	19.47	19.11	19.22	4.5	20.5		
	BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					18675	18900	19125		
1857.5 MHz					1880 MHz	1902.5 MHz			
18675					18900	19125			
15 MHz	QPSK	1	0	23.04	23.95	23.38	0.0	25.0	
		1	37	23.64	24.37	23.50	0.0	25.0	
		1	74	23.45	23.79	23.04	0.0	25.0	
		36	0	22.86	23.62	23.04	0.5	24.5	
		36	20	23.15	23.79	23.12	0.5	24.5	
		36	39	23.20	23.73	23.02	0.5	24.5	
	75	0	23.05	23.68	23.02	0.5	24.5		
	16QAM	1	0	22.69	23.61	23.04	0.5	24.5	
		1	37	23.36	24.08	23.31	0.5	24.5	
		1	74	23.23	23.62	22.90	0.5	24.5	
		36	0	22.37	22.96	22.53	1.5	23.5	
		36	20	22.67	22.93	22.63	1.5	23.5	
		36	39	22.73	22.89	22.55	1.5	23.5	
	75	0	22.56	22.94	22.56	1.5	23.5		
	64QAM	1	0	23.02	22.91	23.25	1.5	23.5	
		1	37	22.64	22.93	23.37	1.5	23.5	
		1	74	23.05	22.83	23.12	1.5	23.5	
		36	0	21.98	21.83	22.27	2.5	22.5	
		36	20	21.96	21.80	22.26	2.5	22.5	
		36	39	21.94	21.77	22.24	2.5	22.5	
	75	0	22.01	21.77	22.20	2.5	22.5		
	256QAM	1	0	20.20	19.98	20.00	4.5	20.5	
		1	37	20.30	20.06	20.06	4.5	20.5	
		1	74	20.12	19.91	19.89	4.5	20.5	
		36	0	19.94	19.77	20.14	4.5	20.5	
		36	20	19.93	19.74	20.10	4.5	20.5	
		36	39	19.89	19.69	20.09	4.5	20.5	
	75	0	19.92	19.73	20.13	4.5	20.5		

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18650	18900	19150		
				1855 MHz	1880 MHz	1905 MHz		
10 MHz	QPSK	1	0	23.70	24.75	24.06	0.0	25.0
		1	25	23.99	24.75	23.90	0.0	25.0
		1	49	24.05	24.66	23.77	0.0	25.0
		25	0	23.33	23.86	23.39	0.5	24.5
		25	12	23.54	23.82	23.44	0.5	24.5
		25	25	23.66	23.82	23.45	0.5	24.5
	16QAM	50	0	23.54	23.81	23.45	0.5	24.5
		1	0	23.36	24.11	23.89	0.5	24.5
		1	25	23.71	24.12	23.91	0.5	24.5
		1	49	23.81	24.10	23.80	0.5	24.5
		25	0	22.85	22.78	22.93	1.5	23.5
		25	12	22.94	22.75	23.00	1.5	23.5
	64QAM	25	25	22.93	22.73	23.02	1.5	23.5
		50	0	22.92	22.69	23.01	1.5	23.5
		1	0	23.00	22.96	23.19	1.5	23.5
		1	25	23.22	23.05	22.98	1.5	23.5
		1	49	22.95	22.97	23.22	1.5	23.5
		25	0	21.96	21.72	22.20	2.5	22.5
	256QAM	25	12	21.92	21.69	22.18	2.5	22.5
		25	25	21.93	21.68	22.15	2.5	22.5
		50	0	21.91	21.68	22.19	2.5	22.5
		1	0	19.99	20.05	20.21	4.5	20.5
		1	25	20.03	20.23	20.32	4.5	20.5
		1	49	19.94	19.99	20.10	4.5	20.5
5 MHz	QPSK	25	0	19.95	19.75	20.22	4.5	20.5
		25	12	19.92	19.70	20.18	4.5	20.5
		25	25	19.91	19.72	20.16	4.5	20.5
		50	0	19.87	19.68	20.13	4.5	20.5
		1	0	23.95	24.53	23.59	0.0	25.0
		1	12	23.92	24.44	23.54	0.0	25.0
5 MHz	QPSK	1	24	23.90	24.35	23.43	0.0	25.0
		12	0	23.25	23.88	23.10	0.5	24.5
		12	7	23.32	23.92	23.15	0.5	24.5
		12	13	23.37	23.91	23.16	0.5	24.5
		25	0	23.32	23.91	23.16	0.5	24.5
		1	0	23.24	24.03	23.29	0.5	24.5
	16QAM	1	12	23.37	23.99	23.37	0.5	24.5
		1	24	23.45	24.01	23.29	0.5	24.5
		12	0	22.67	22.92	22.60	1.5	23.5
		12	7	22.77	22.92	22.67	1.5	23.5
		12	13	22.84	22.88	22.68	1.5	23.5
		25	0	22.77	22.82	22.68	1.5	23.5
	64QAM	1	0	22.92	23.02	23.29	1.5	23.5
		1	12	23.12	22.99	23.34	1.5	23.5
		1	24	22.98	22.97	23.18	1.5	23.5
		12	0	21.90	21.64	22.25	2.5	22.5
		12	7	21.89	21.63	22.22	2.5	22.5
		12	13	21.87	21.61	22.22	2.5	22.5
256QAM	25	0	21.87	21.66	22.21	2.5	22.5	
	1	0	19.96	19.94	20.33	4.5	20.5	
	1	12	19.79	20.05	20.46	4.5	20.5	
	1	24	19.92	19.88	20.25	4.5	20.5	
	12	0	19.90	19.71	20.21	4.5	20.5	
	12	7	19.90	19.68	20.21	4.5	20.5	
5 MHz	256QAM	12	13	19.87	19.67	20.18	4.5	20.5
		25	0	19.89	19.62	20.19	4.5	20.5
		1	0	19.96	19.94	20.33	4.5	20.5

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18615	18900	19185		
				1851.5 MHz	1880 MHz	1908.5 MHz		
3 MHz	QPSK	1	0	23.90	24.82	24.00	0.0	25.0
		1	8	23.90	24.71	23.90	0.0	25.0
		1	14	23.90	24.65	23.79	0.0	25.0
		8	0	23.37	24.04	23.41	0.5	24.5
		8	4	23.44	24.02	23.46	0.5	24.5
		8	7	23.47	23.99	23.46	0.5	24.5
	16QAM	15	0	23.48	23.93	23.48	0.5	24.5
		1	0	23.47	24.15	23.75	0.5	24.5
		1	8	23.53	24.28	23.77	0.5	24.5
		1	14	23.56	24.20	23.69	0.5	24.5
		8	0	22.93	22.99	22.92	1.5	23.5
		8	4	22.99	22.93	22.97	1.5	23.5
	64QAM	8	7	23.03	22.92	22.99	1.5	23.5
		15	0	23.03	22.84	23.00	1.5	23.5
		1	0	23.01	22.65	23.26	1.5	23.5
		1	8	23.07	22.80	23.24	1.5	23.5
		1	14	22.97	22.73	23.11	1.5	23.5
		8	0	21.99	21.75	22.34	2.5	22.5
	256QAM	8	4	21.96	21.66	22.33	2.5	22.5
		8	7	21.92	21.69	22.32	2.5	22.5
		15	0	21.89	21.61	22.30	2.5	22.5
		1	0	20.00	19.95	20.34	4.5	20.5
		1	8	20.10	19.92	20.39	4.5	20.5
		1	14	19.99	19.82	20.32	4.5	20.5
1.4 MHz	QPSK	8	0	19.90	19.70	20.31	4.5	20.5
		8	4	19.92	19.75	20.27	4.5	20.5
		8	7	19.96	19.72	20.29	4.5	20.5
		15	0	19.98	19.67	20.29	4.5	20.5
		1	0	23.65	24.39	23.62	0.0	25.0
		1	3	23.58	24.28	23.48	0.0	25.0
	16QAM	1	5	23.57	24.27	23.45	0.0	25.0
		3	0	23.47	24.18	23.41	0.0	25.0
		3	1	23.45	24.18	23.40	0.0	25.0
		3	3	23.44	24.18	23.38	0.0	25.0
		6	0	22.97	23.66	22.94	1.0	24.0
		1	0	23.39	23.70	23.15	1.0	24.0
	64QAM	1	3	23.42	23.70	23.14	1.0	24.0
		1	5	23.45	23.74	23.16	1.0	24.0
		3	0	23.00	23.70	23.11	1.0	24.0
		3	1	23.02	23.73	23.13	1.0	24.0
		3	3	23.03	23.73	23.13	1.0	24.0
		6	0	22.42	22.85	22.58	1.5	23.5
	256QAM	1	0	22.82	22.68	23.09	1.5	23.5
		1	3	22.93	22.37	23.24	1.5	23.5
		1	5	22.85	22.65	23.16	1.5	23.5
		3	0	22.92	22.61	23.15	1.5	23.5
		3	1	22.82	22.65	23.13	1.5	23.5
		3	3	22.83	22.56	23.11	1.5	23.5
QPSK	6	0	21.95	21.68	22.38	1.5	23.5	
	1	0	19.84	19.75	20.31	4.5	20.5	
	1	3	20.05	19.82	20.25	4.5	20.5	
	1	5	19.78	19.73	20.27	4.5	20.5	
	3	0	19.86	19.55	20.29	4.5	20.5	
	3	1	19.78	19.47	20.24	4.5	20.5	
16QAM	3	3	19.71	19.42	20.19	4.5	20.5	
	6	0	19.81	19.56	20.18	4.5	20.5	
	1	0	23.65	24.39	23.62	0.0	25.0	
	1	3	23.58	24.28	23.48	0.0	25.0	
	1	5	23.57	24.27	23.45	0.0	25.0	
	3	0	23.47	24.18	23.41	0.0	25.0	
64QAM	3	1	23.45	24.18	23.40	0.0	25.0	
	3	3	23.44	24.18	23.38	0.0	25.0	
	6	0	22.97	23.66	22.94	1.0	24.0	
	1	0	23.39	23.70	23.15	1.0	24.0	
	1	3	23.42	23.70	23.14	1.0	24.0	
	1	5	23.45	23.74	23.16	1.0	24.0	
256QAM	3	0	23.00	23.70	23.11	1.0	24.0	
	3	1	23.02	23.73	23.13	1.0	24.0	
	3	3	23.03	23.73	23.13	1.0	24.0	
	6	0	22.42	22.85	22.58	1.5	23.5	
	1	0	22.82	22.68	23.09	1.5	23.5	
	1	3	22.93	22.37	23.24	1.5	23.5	
QPSK	1	5	22.85	22.65	23.16	1.5	23.5	
	3	0	22.92	22.61	23.15	1.5	23.5	
	3	1	22.82	22.65	23.13	1.5	23.5	
	3	3	22.83	22.56	23.11	1.5	23.5	
	6	0	21.95	21.68	22.38	1.5	23.5	
	1	0	19.84	19.75	20.31	4.5	20.5	
16QAM	1	3	20.05	19.82	20.25	4.5	20.5	
	1	5	19.78	19.73	20.27	4.5	20.5	
	3	0	19.86	19.55	20.29	4.5	20.5	
	3	1	19.78	19.47	20.24	4.5	20.5	
	3	3	19.71	19.42	20.19	4.5	20.5	
	6	0	19.81	19.56	20.18	4.5	20.5	

LTE Band 2 (Sub2 Antenna)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				18700	18900	19100		
				1860 MHz	1880 MHz	1900 MHz		
20 MHz	QPSK	1	0	23.38	23.11	23.02	0.0	24.0
		1	49	23.30	23.26	23.20	0.0	24.0
		1	99	23.72	23.23	22.72	0.0	24.0
		50	0	22.50	22.28	22.02	1.0	23.0
		50	24	22.60	22.33	21.95	1.0	23.0
		50	50	22.66	22.33	21.83	1.0	23.0
	100	0	22.59	22.30	21.90	1.0	23.0	
	16QAM	1	0	22.47	22.36	22.25	1.0	23.0
		1	49	22.64	22.41	22.31	1.0	23.0
		1	99	22.85	22.46	21.89	1.0	23.0
		50	0	21.53	21.30	21.04	2.0	22.0
		50	24	21.62	21.33	20.97	2.0	22.0
		50	50	21.70	21.35	20.87	2.0	22.0
	100	0	21.62	21.32	20.97	2.0	22.0	
	64QAM	1	0	21.45	21.37	21.28	2.0	22.0
		1	49	21.68	21.65	21.31	2.0	22.0
		1	99	21.76	21.55	20.94	2.0	22.0
		50	0	20.52	20.31	20.08	3.0	21.0
		50	24	20.62	20.36	20.01	3.0	21.0
		50	50	20.69	20.38	19.91	3.0	21.0
	100	0	20.58	20.32	19.95	3.0	21.0	
	256QAM	1	0	18.54	18.32	18.35	5.0	19.0
		1	49	18.92	18.46	18.51	5.0	19.0
		1	99	18.89	18.45	18.08	5.0	19.0
		50	0	18.47	18.25	18.06	5.0	19.0
		50	24	18.56	18.30	18.00	5.0	19.0
		50	50	18.64	18.32	17.90	5.0	19.0
	100	0	18.57	18.26	17.95	5.0	19.0	
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18675	18900	19125		
				1857.5 MHz	1880 MHz	1902.5 MHz		
				15 MHz	QPSK	1	0	23.55
1	37	23.56	23.37			22.98	0.0	24.0
1	74	23.77	23.32			22.76	0.0	24.0
36	0	22.63	22.25			21.97	1.0	23.0
36	20	22.69	22.28			21.91	1.0	23.0
36	39	22.76	22.30			21.85	1.0	23.0
75	0	22.70	22.29		21.91	1.0	23.0	
16QAM	1	0	22.71		22.48	22.05	1.0	23.0
	1	37	22.93		22.65	21.98	1.0	23.0
	1	74	22.97		22.55	21.80	1.0	23.0
	36	0	21.63		21.25	21.05	2.0	22.0
	36	20	21.70		21.29	20.96	2.0	22.0
	36	39	21.74		21.32	20.89	2.0	22.0
75	0	21.66	21.32		20.96	2.0	22.0	
64QAM	1	0	21.36		21.64	21.04	2.0	22.0
	1	37	21.49		21.80	20.97	2.0	22.0
	1	74	21.67		21.71	20.74	2.0	22.0
	36	0	20.58		20.26	20.03	3.0	21.0
	36	20	20.65		20.30	19.99	3.0	21.0
	36	39	20.70		20.32	19.89	3.0	21.0
75	0	20.69	20.28		19.91	3.0	21.0	
256QAM	1	0	18.72		18.62	17.98	5.0	19.0
	1	37	18.91		18.55	17.85	5.0	19.0
	1	74	18.98		18.71	17.75	5.0	19.0
	36	0	18.57		18.26	17.96	5.0	19.0
	36	20	18.62		18.31	17.89	5.0	19.0
	36	39	18.69		18.29	17.81	5.0	19.0
75	0	18.65	18.28		17.88	5.0	19.0	

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18650	18900	19150		
				1855 MHz	1880 MHz	1905 MHz		
10 MHz	QPSK	1	0	23.64	23.23	22.97	0.0	24.0
		1	25	23.86	23.39	22.71	0.0	24.0
		1	49	23.84	23.29	22.85	0.0	24.0
		25	0	22.73	22.27	21.96	1.0	23.0
		25	12	22.78	22.29	21.91	1.0	23.0
		25	25	22.79	22.29	21.87	1.0	23.0
		50	0	22.79	22.30	21.94	1.0	23.0
	16QAM	1	0	22.90	22.40	22.22	1.0	23.0
		1	25	22.91	22.56	22.15	1.0	23.0
		1	49	22.73	22.48	21.96	1.0	23.0
		25	0	21.78	21.30	21.04	2.0	22.0
		25	12	21.82	21.32	20.98	2.0	22.0
		25	25	21.85	21.32	20.92	2.0	22.0
		50	0	21.82	21.33	20.97	2.0	22.0
	64QAM	1	0	21.46	21.51	21.00	2.0	22.0
		1	25	21.65	21.59	20.73	2.0	22.0
		1	49	21.56	21.64	20.85	2.0	22.0
		25	0	20.80	20.31	20.08	3.0	21.0
		25	12	20.82	20.31	20.02	3.0	21.0
		25	25	20.87	20.34	19.96	3.0	21.0
		50	0	20.80	20.33	20.00	3.0	21.0
	256QAM	1	0	18.67	18.55	17.98	5.0	19.0
		1	25	18.85	18.79	18.13	5.0	19.0
		1	49	18.82	18.58	17.81	5.0	19.0
		25	0	18.80	18.30	18.02	5.0	19.0
		25	12	18.81	18.29	17.97	5.0	19.0
		25	25	18.85	18.31	17.91	5.0	19.0
		50	0	18.76	18.30	17.96	5.0	19.0
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18625	18900	19175		
				1852.5 MHz	1880 MHz	1907.5 MHz		
5 MHz	QPSK	1	0	23.68	23.16	22.85	0.0	24.0
		1	12	23.81	23.32	22.80	0.0	24.0
		1	24	23.82	23.24	22.83	0.0	24.0
		12	0	22.81	22.22	21.88	1.0	23.0
		12	7	22.83	22.26	21.89	1.0	23.0
		12	13	22.85	22.23	21.85	1.0	23.0
		25	0	22.83	22.25	21.89	1.0	23.0
	16QAM	1	0	22.90	22.25	21.99	1.0	23.0
		1	12	22.64	22.31	21.95	1.0	23.0
		1	24	22.78	22.26	21.89	1.0	23.0
		12	0	21.82	21.24	20.89	2.0	22.0
		12	7	21.82	21.24	20.89	2.0	22.0
		12	13	21.85	21.24	20.85	2.0	22.0
		25	0	21.88	21.29	20.85	2.0	22.0
	64QAM	1	0	21.73	21.47	21.33	2.0	22.0
		1	12	21.78	21.60	21.27	2.0	22.0
		1	24	21.85	21.57	21.20	2.0	22.0
		12	0	20.90	20.23	19.86	3.0	21.0
		12	7	20.91	20.25	19.85	3.0	21.0
		12	13	20.92	20.21	19.85	3.0	21.0
		25	0	20.85	20.26	19.92	3.0	21.0
	256QAM	1	0	18.81	18.40	18.02	5.0	19.0
		1	12	18.91	18.33	18.08	5.0	19.0
		1	24	18.92	18.43	17.98	5.0	19.0
		12	0	18.86	18.26	17.98	5.0	19.0
		12	7	18.89	18.28	17.97	5.0	19.0
		12	13	18.89	18.25	17.93	5.0	19.0
		25	0	18.87	18.30	17.88	5.0	19.0

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18615	18900	19185		
				1851.5 MHz	1880 MHz	1908.5 MHz		
3 MHz	QPSK	1	0	23.83	23.33	22.96	0.0	24.0
		1	8	23.95	23.42	22.72	0.0	24.0
		1	14	23.86	23.37	22.97	0.0	24.0
		8	0	22.90	22.24	21.87	1.0	23.0
		8	4	22.92	22.24	21.89	1.0	23.0
		8	7	22.88	22.32	21.85	1.0	23.0
	15	0	22.92	22.26	21.89	1.0	23.0	
	16QAM	1	0	22.98	22.57	21.89	1.0	23.0
		1	8	22.91	22.65	21.95	1.0	23.0
		1	14	22.95	22.50	21.79	1.0	23.0
		8	0	21.97	21.28	20.92	2.0	22.0
		8	4	21.99	21.25	20.91	2.0	22.0
		8	7	22.00	21.27	20.88	2.0	22.0
	15	0	21.92	21.35	20.83	2.0	22.0	
	64QAM	1	0	21.63	21.62	20.89	2.0	22.0
		1	8	21.52	21.70	20.97	2.0	22.0
		1	14	21.60	21.71	20.90	2.0	22.0
		8	0	20.90	20.38	19.88	3.0	21.0
		8	4	20.89	20.34	19.92	3.0	21.0
		8	7	20.90	20.37	19.93	3.0	21.0
	15	0	20.87	20.25	19.98	3.0	21.0	
	256QAM	1	0	18.86	18.61	17.87	5.0	19.0
		1	8	18.92	18.47	17.91	5.0	19.0
		1	14	18.90	18.60	17.83	5.0	19.0
8		0	18.87	18.31	17.96	5.0	19.0	
8		4	18.91	18.30	17.93	5.0	19.0	
8		7	18.92	18.29	17.93	5.0	19.0	
15	0	18.98	18.30	17.99	5.0	19.0		
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18607	18900	19193		
				1850.7 MHz	1880 MHz	1909.3 MHz		
1.4 MHz	QPSK	1	0	23.90	23.27	22.91	0.0	24.0
		1	3	23.91	23.26	22.59	0.0	24.0
		1	5	23.93	23.26	22.92	0.0	24.0
		3	0	23.92	23.32	22.96	0.0	24.0
		3	1	23.85	23.21	22.86	0.0	24.0
		3	3	23.85	23.20	22.80	0.0	24.0
	6	0	22.85	22.25	21.84	1.0	23.0	
	16QAM	1	0	22.87	22.26	21.96	1.0	23.0
		1	3	23.00	22.40	22.05	1.0	23.0
		1	5	22.96	22.33	21.99	1.0	23.0
		3	0	22.95	22.40	21.82	1.0	23.0
		3	1	22.96	22.35	21.81	1.0	23.0
		3	3	22.93	22.34	21.76	1.0	23.0
	6	0	21.93	21.24	20.86	2.0	22.0	
	64QAM	1	0	21.63	21.41	20.91	2.0	22.0
		1	3	21.91	21.39	20.68	2.0	22.0
		1	5	21.73	21.36	20.82	2.0	22.0
		3	0	21.80	21.40	21.17	2.0	22.0
		3	1	21.75	21.35	21.02	2.0	22.0
		3	3	21.69	21.30	21.04	2.0	22.0
	6	0	20.86	20.26	19.95	3.0	21.0	
	256QAM	1	0	18.87	18.27	17.90	5.0	19.0
		1	3	18.98	18.52	18.08	5.0	19.0
		1	5	18.87	18.29	17.92	5.0	19.0
3		0	18.98	18.34	17.70	5.0	19.0	
3		1	18.95	18.25	17.70	5.0	19.0	
3		3	18.83	18.15	17.64	5.0	19.0	
6	0	18.79	18.30	17.88	5.0	19.0		

8.2. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v03r01;

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

Test Spec

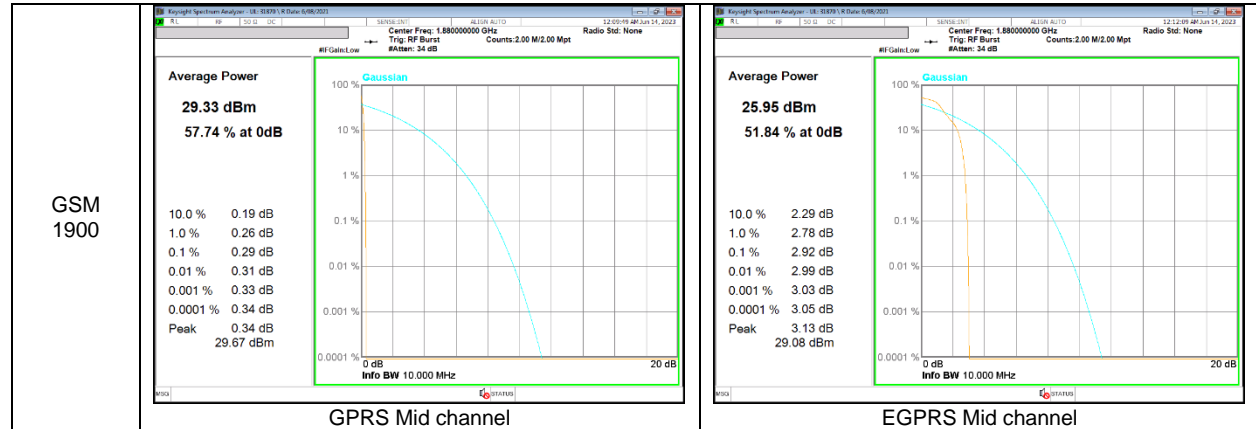
In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

RESULTS

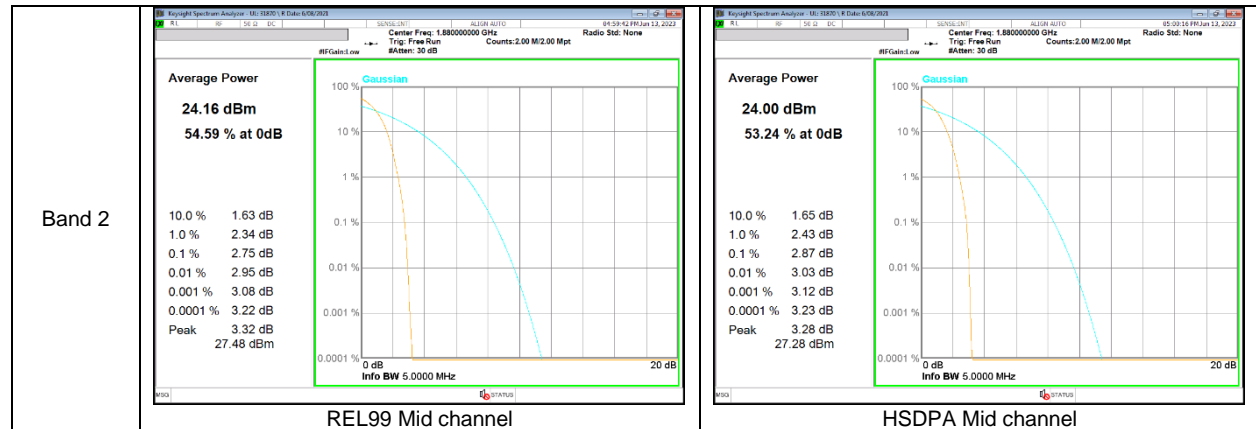
See the following pages.

8.2.1. CONDUCTED PEAK TO AVERAGE RESULT

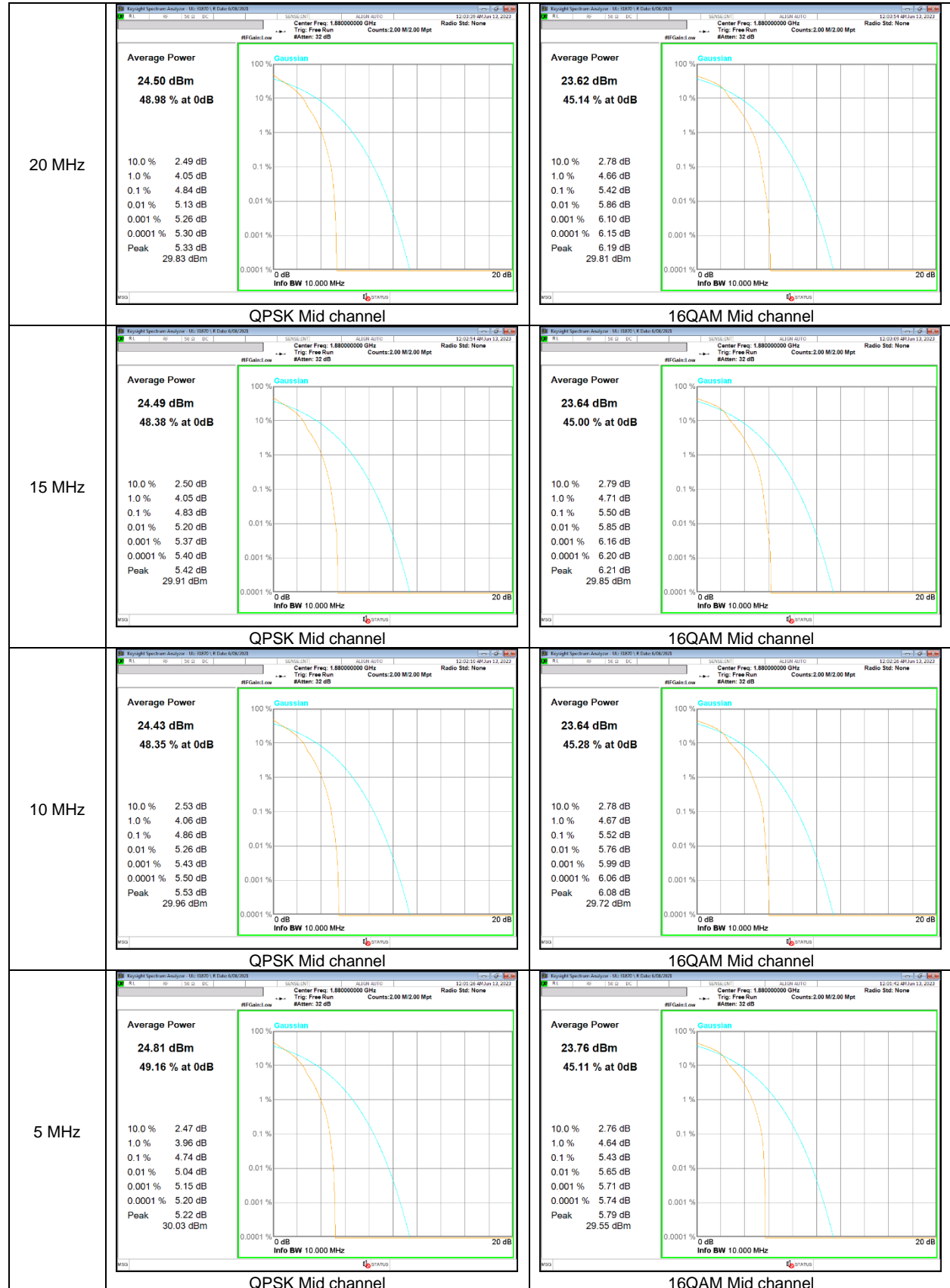
GSM

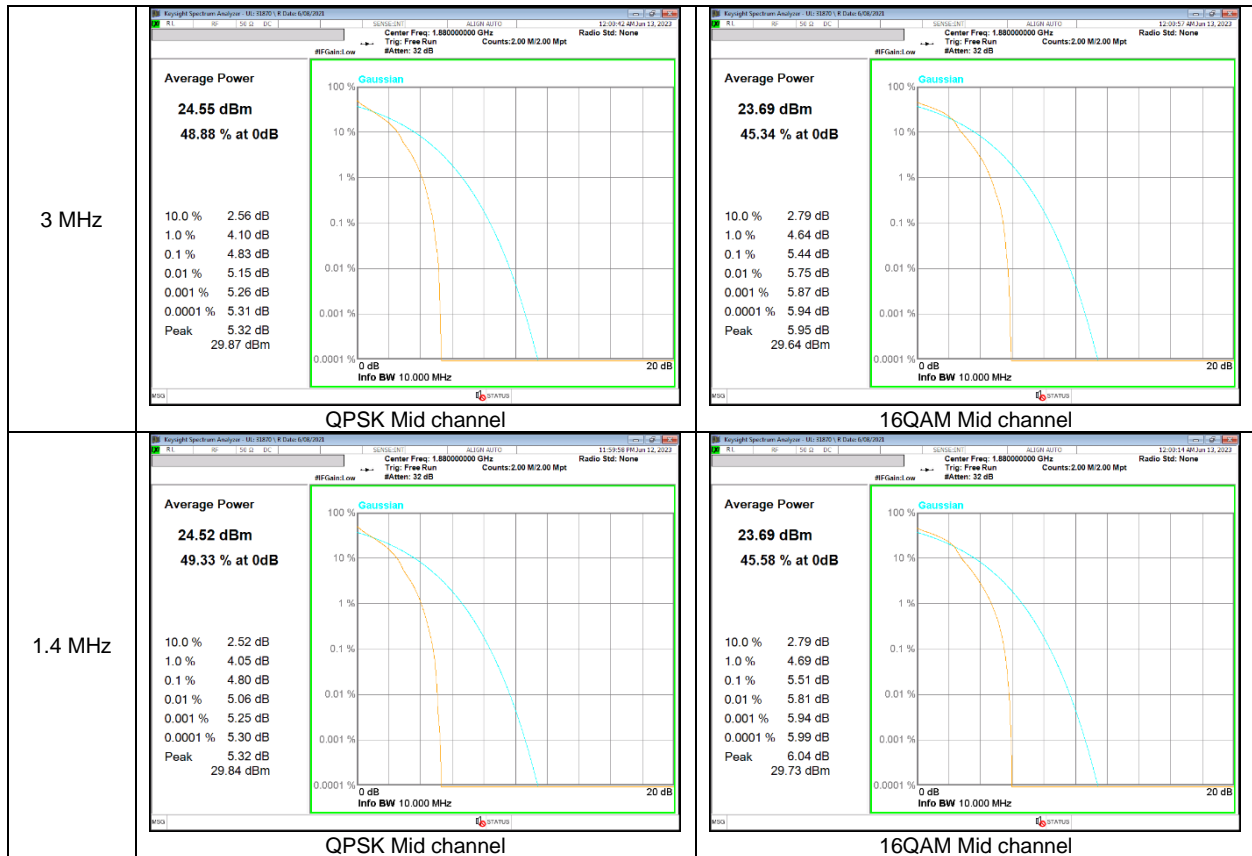


WCDMA

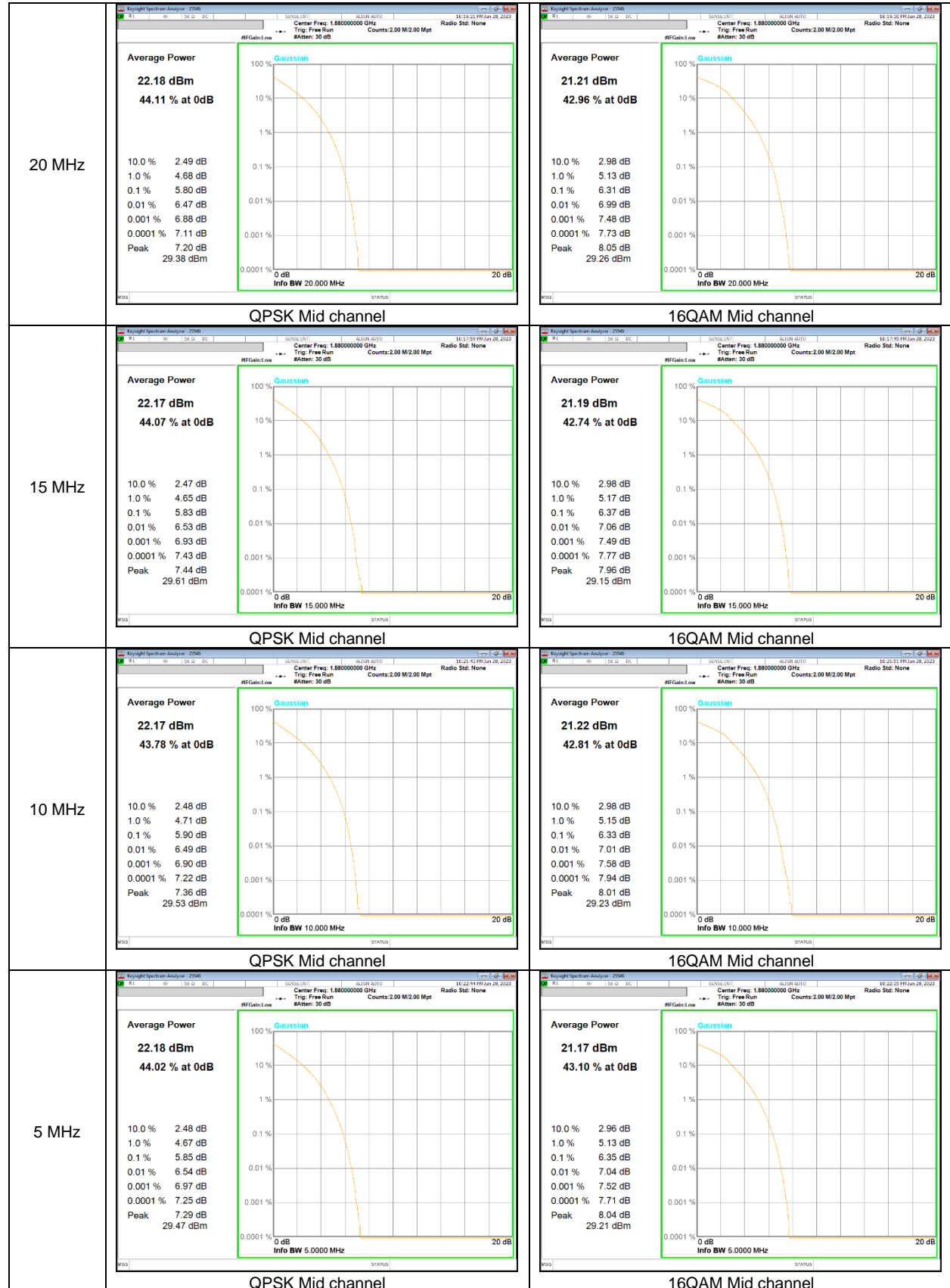


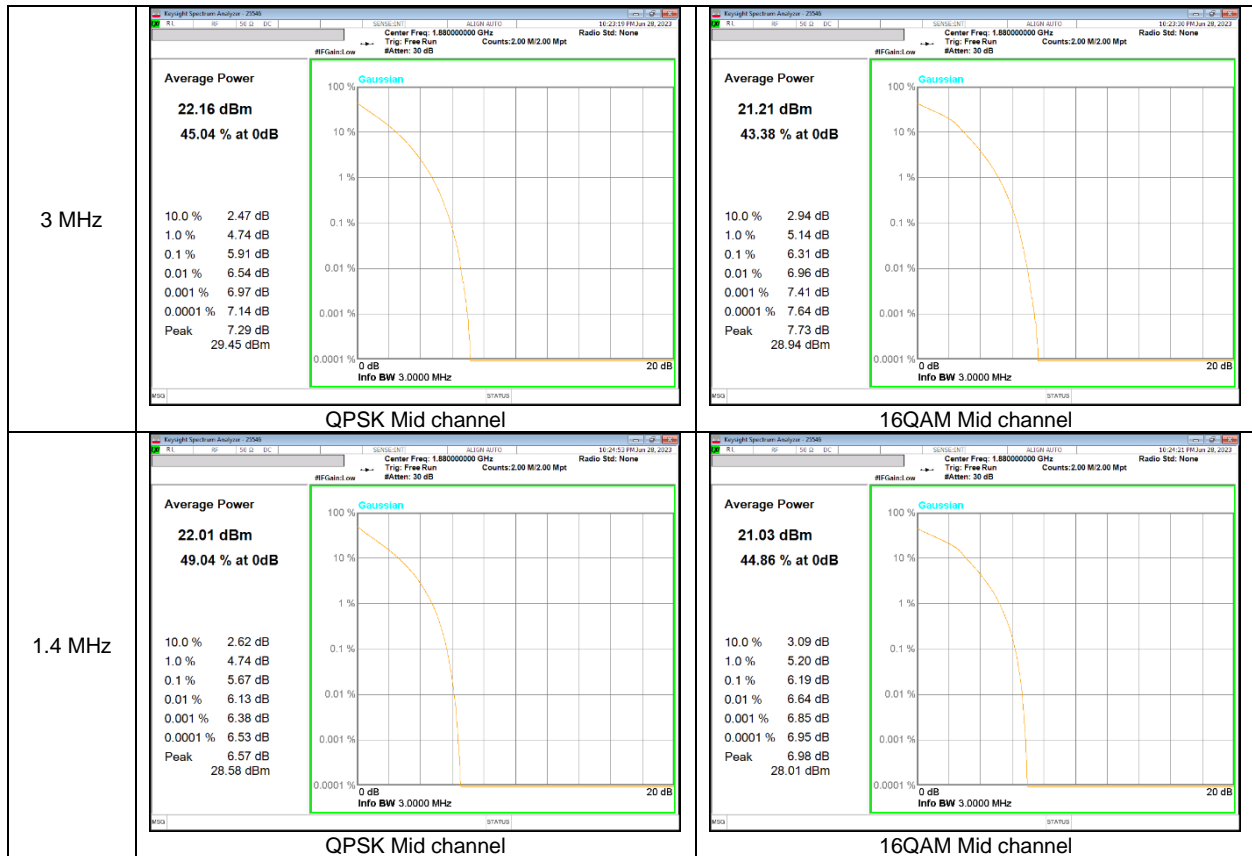
LTE Band 2





LTE Band 2 (Sub2 Antenna)





8.3. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

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

(KDB 971168 D01 Power Meas License Digital Systems v03r01)

RESULTS

See the following pages.

- GSM

Band	Modulation	f [MHz]	99% BW (kHz)	-26dB BW (kHz)
1900	GPRS	1880.0	244.810	310.600
	EGPRS		248.200	321.800

- WCDMA

Band	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
B2	Rel.99	1880.0	4.176	4.736
	HSDPA		4.184	4.742

- LTE Band 2

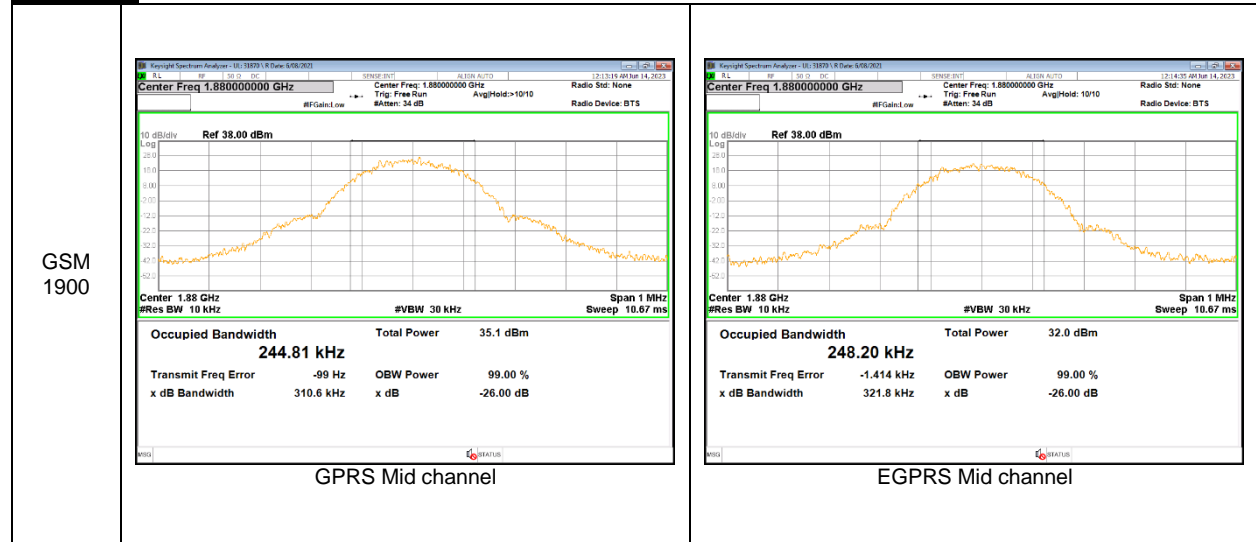
Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B2	20M	QPSK	1880.0	17.938	19.880
		16QAM		17.900	19.720
	15M	QPSK		13.449	15.140
		16QAM		13.399	15.050
	10M	QPSK		8.985	10.340
		16QAM		8.984	10.450
	5M	QPSK		4.500	5.294
		16QAM		4.493	5.197
	3M	QPSK		2.702	3.088
		16QAM		2.700	3.103
	1.4M	QPSK		1.092	1.289
		16QAM		1.090	1.313

- LTE Band 2 (Sub2 Antenna)

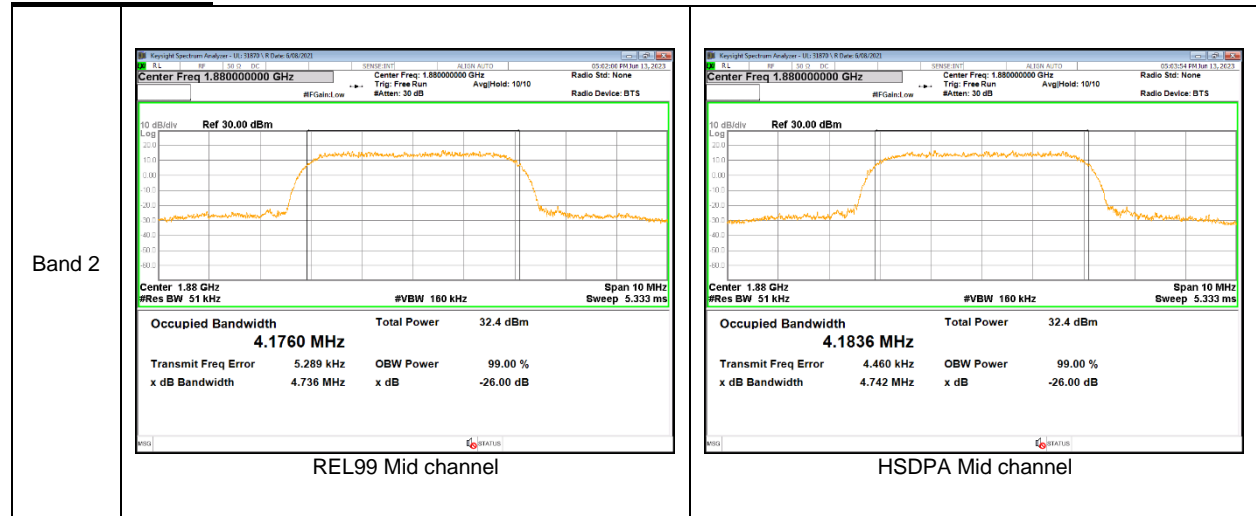
Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B2	20M	QPSK	1880.0	17.904	19.480
		16QAM		17.870	19.520
	15M	QPSK		13.418	14.950
		16QAM		13.426	15.180
	10M	QPSK		8.925	9.953
		16QAM		8.977	10.060
	5M	QPSK		4.497	5.221
		16QAM		4.486	5.219
	3M	QPSK		2.696	3.037
		16QAM		2.701	3.012
	1.4M	QPSK		1.081	1.291
		16QAM		1.092	1.291

8.3.1. OCCUPIED BANDWIDTH RESULTS

GSM 1900



WCDMA Band 2



LTE Band 2





LTE Band 2(Sub2 Antenna)





8.4. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §24.238

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

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

GSM

- a) Set the RBW = 1 - 5% of OBW(GSM1900 – 9.1KHz)
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = 1S ;
- e) Detector = RMS;
- f) Ensure that the number of measurement points $\geq 2 \times$ Span/RBW;
- g) Trace Mode = Average(100);
- h) Add duty cycle correction factor (9dB)

WCDMA/LTE

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

NOTE1

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

NOTE2

For Band-Edge extended:

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

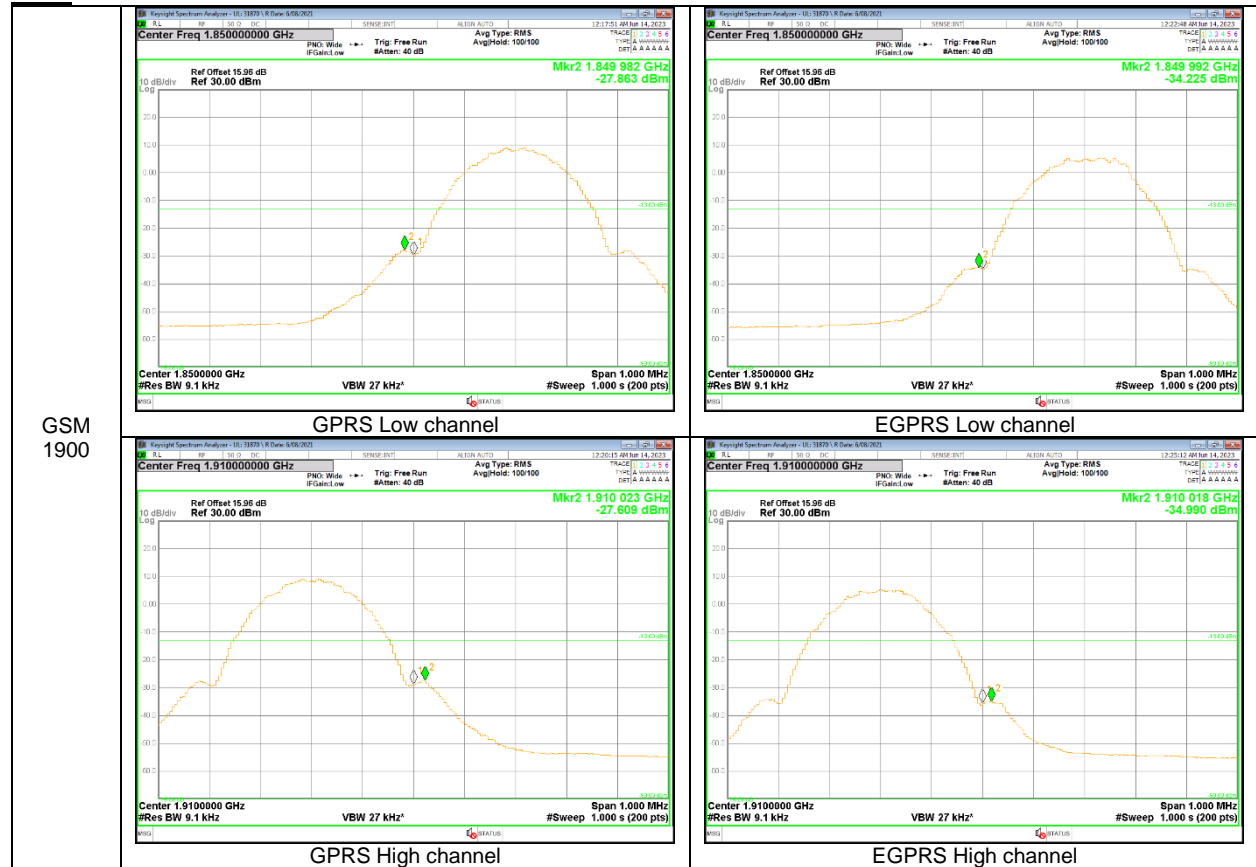
For the band edge value measured in [RB Used], even if [CF for emissions reference bandwidth 100kHz/1MHz] is applied, it is below -13dBm.

RESULTS

See the following pages.

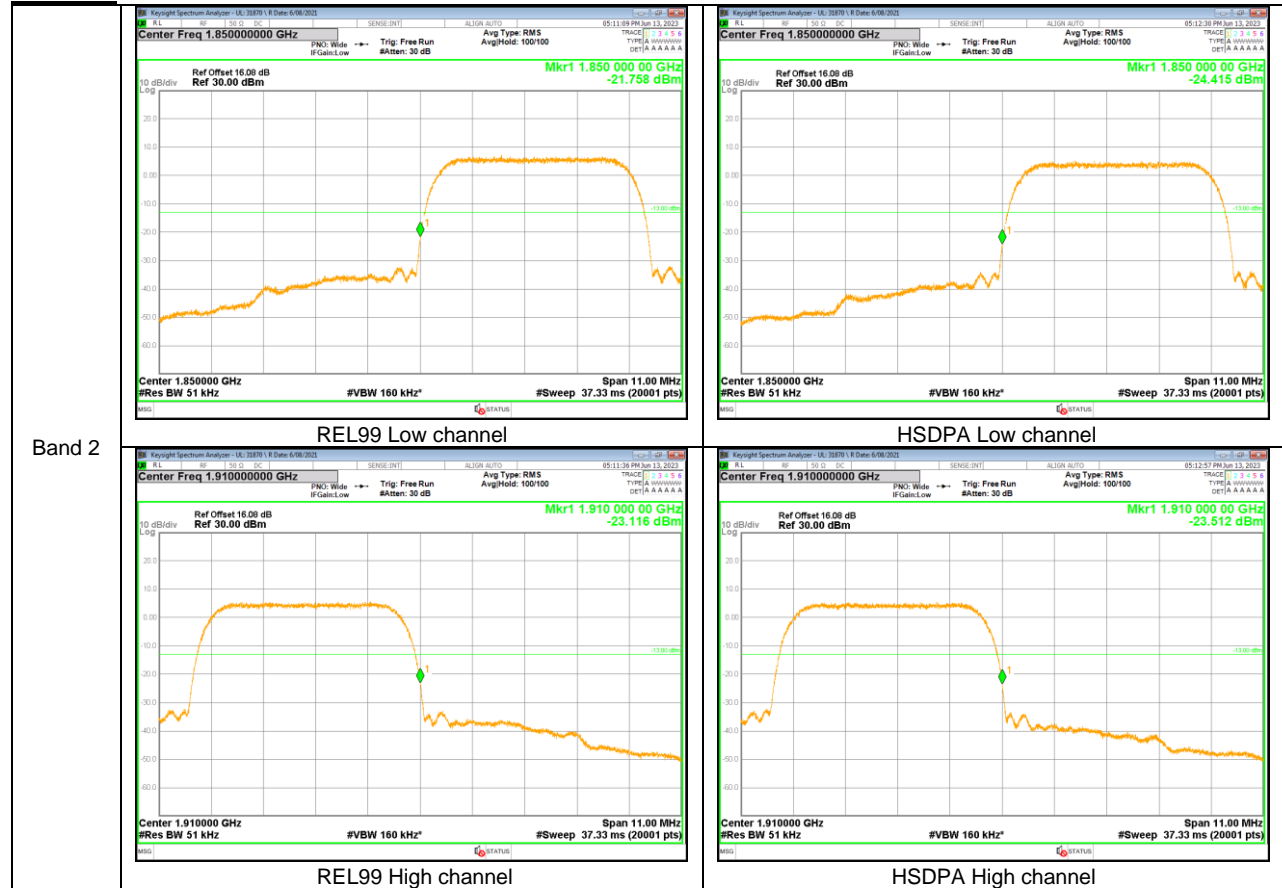
8.4.1. BAND EDGE RESULT

GSM



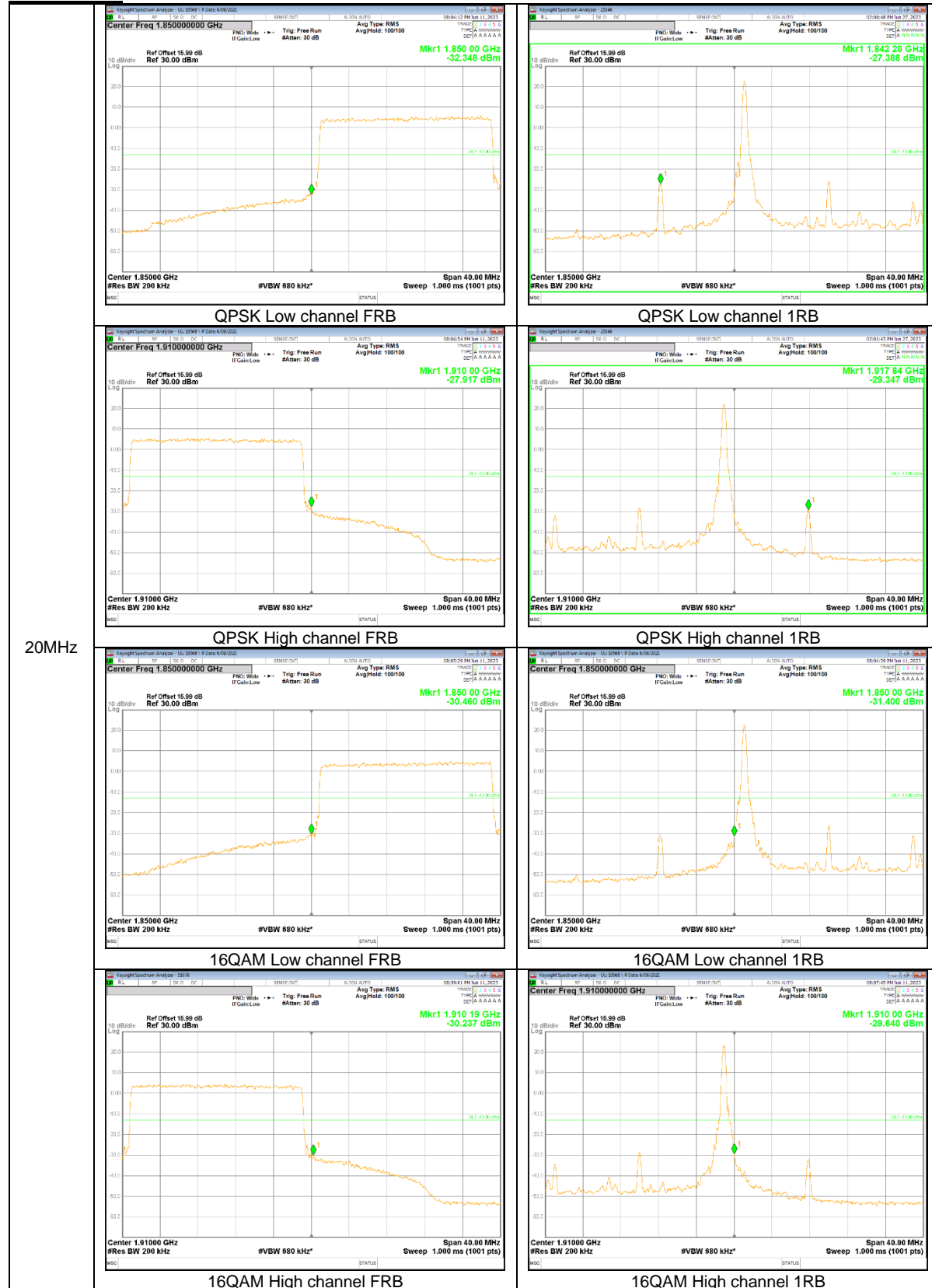
GSM
1900

WCDMA

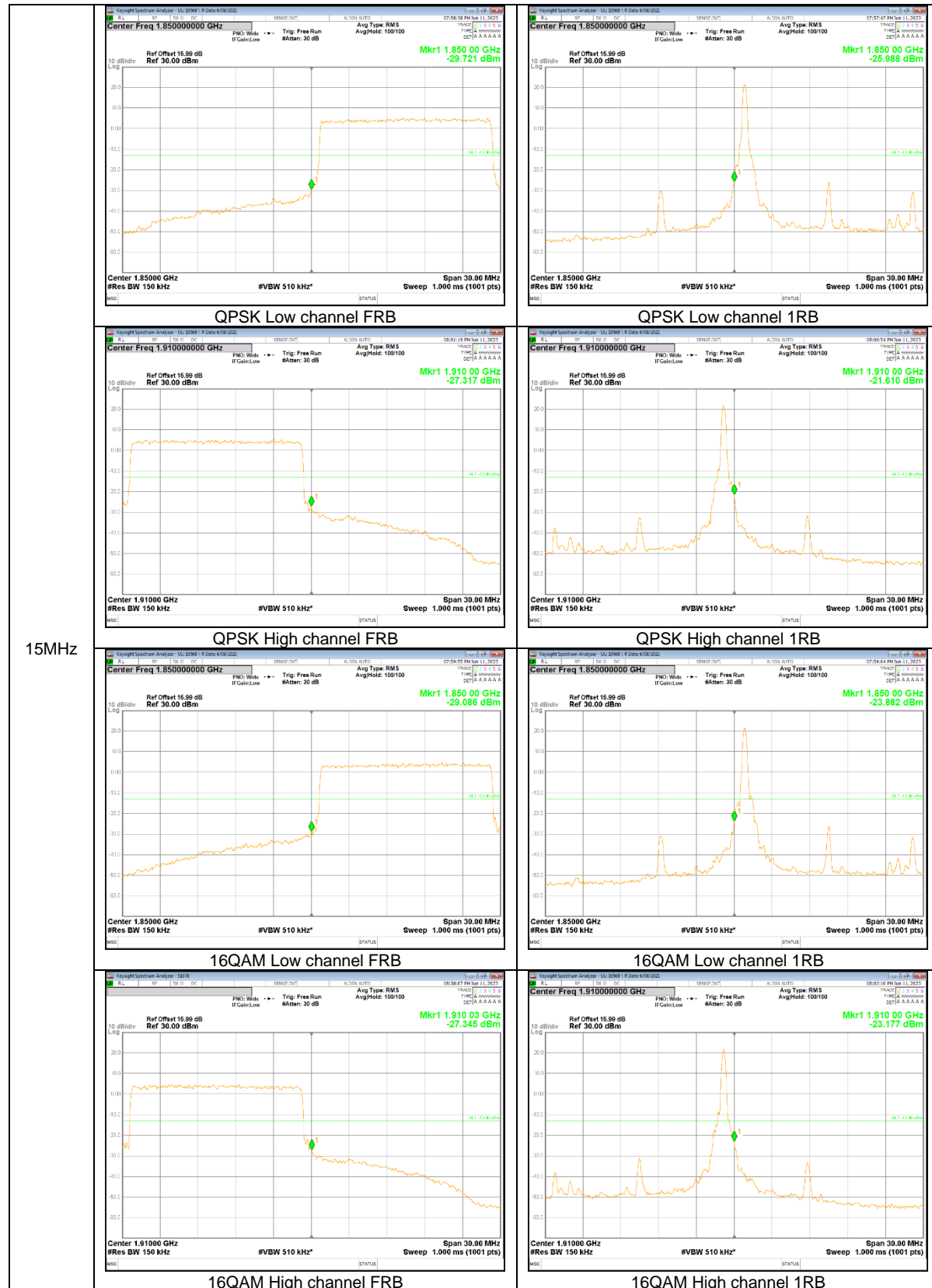


Band 2

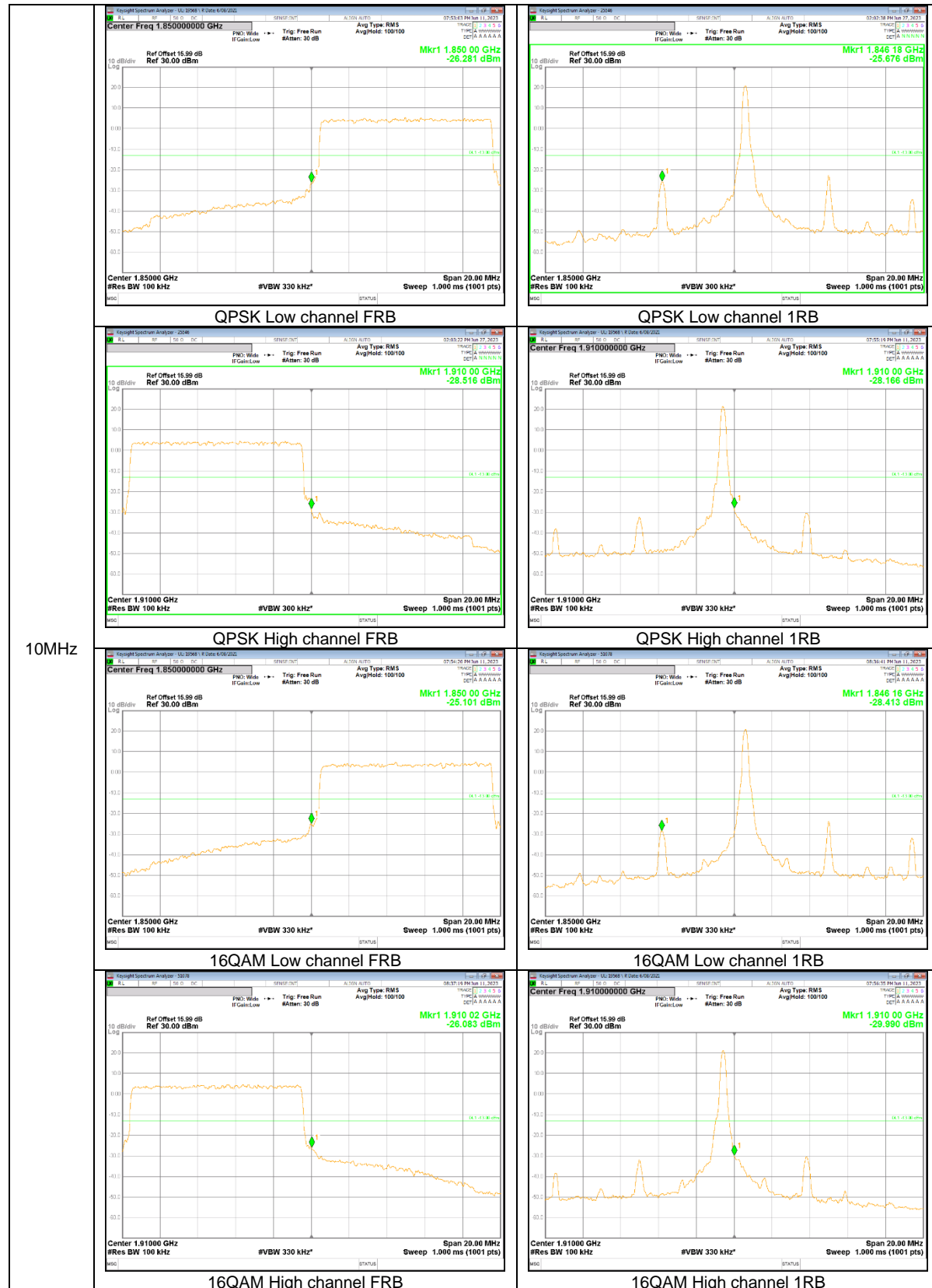
LTE Band 2



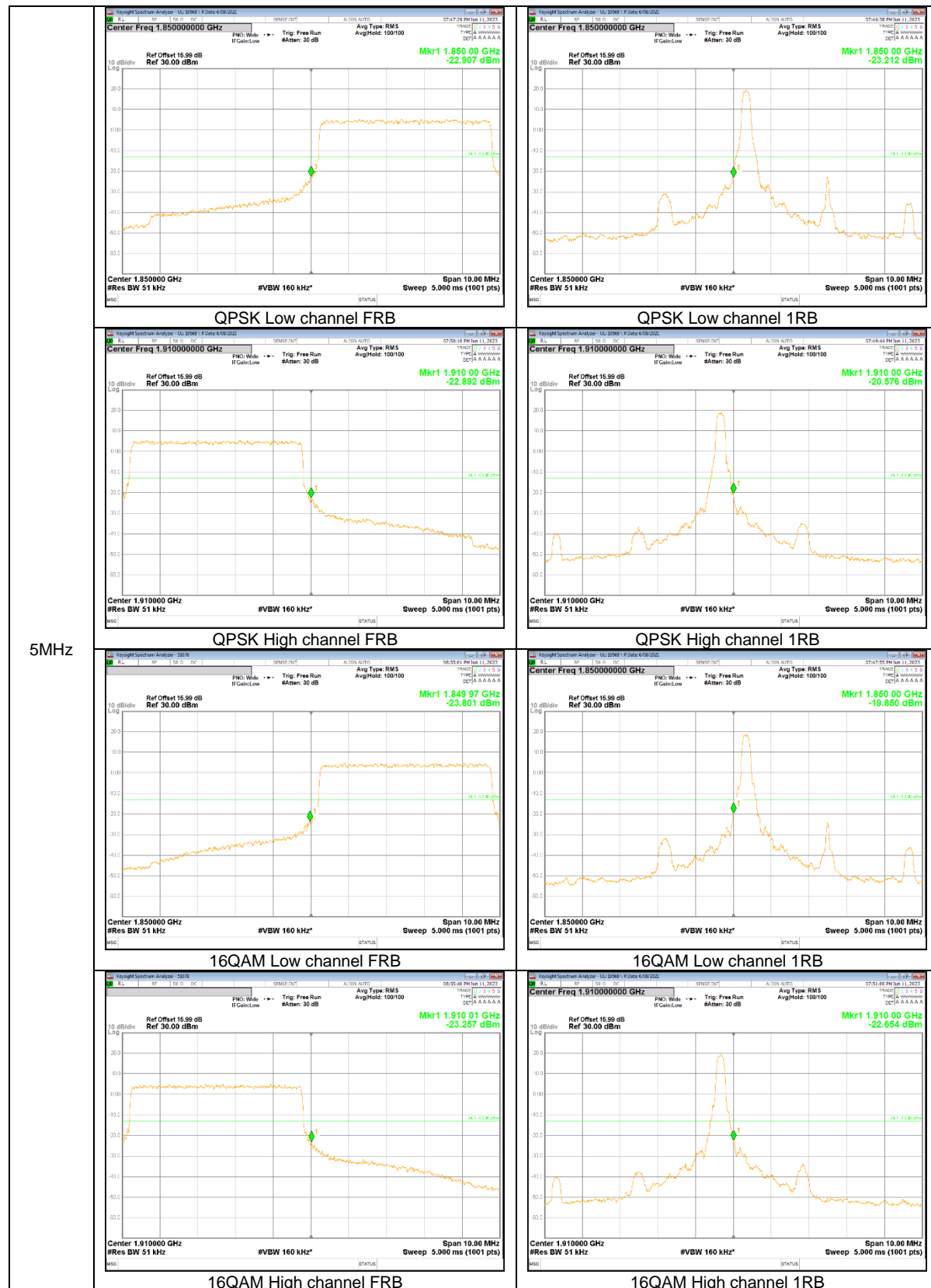
20MHz

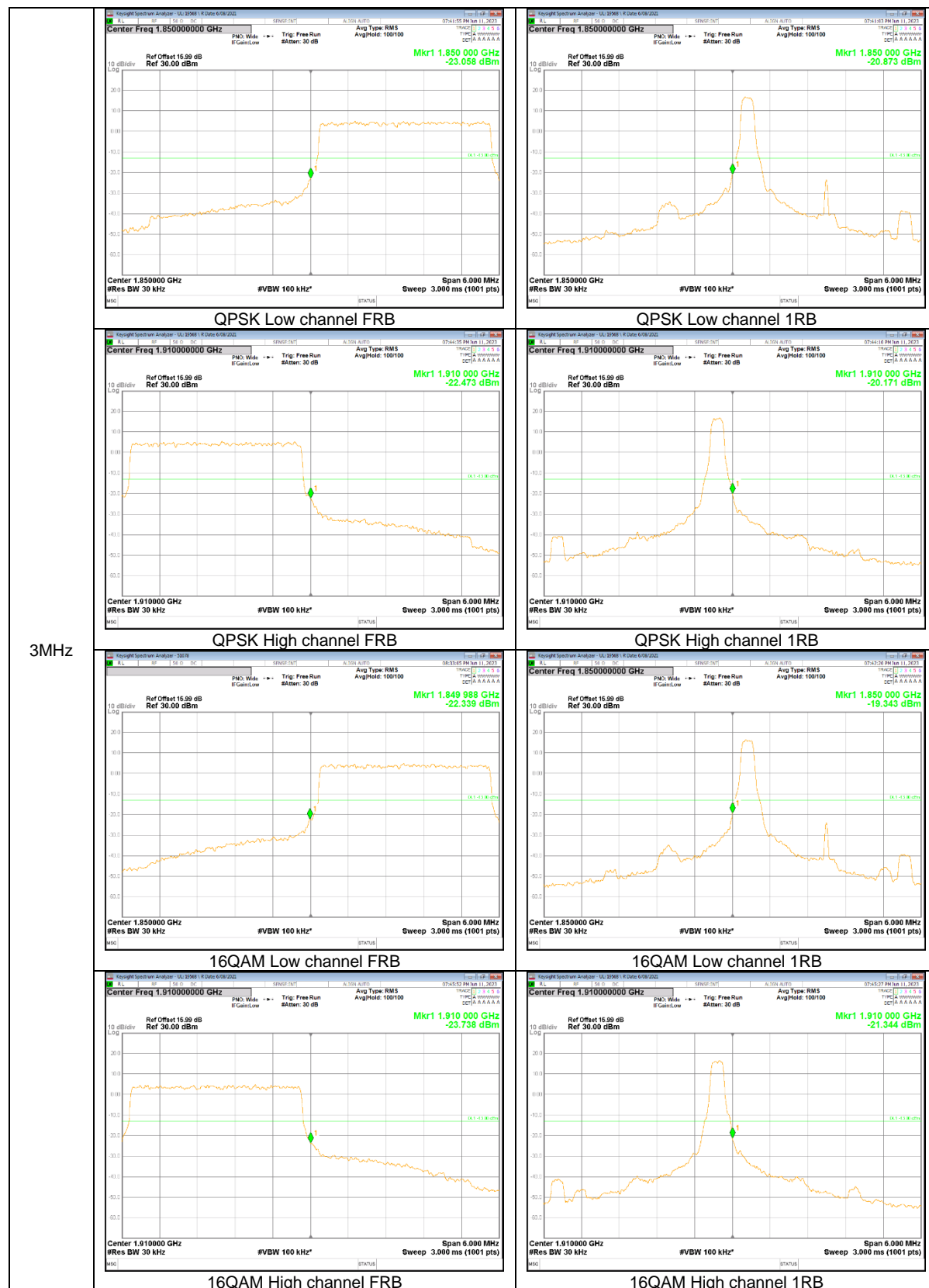


15MHz

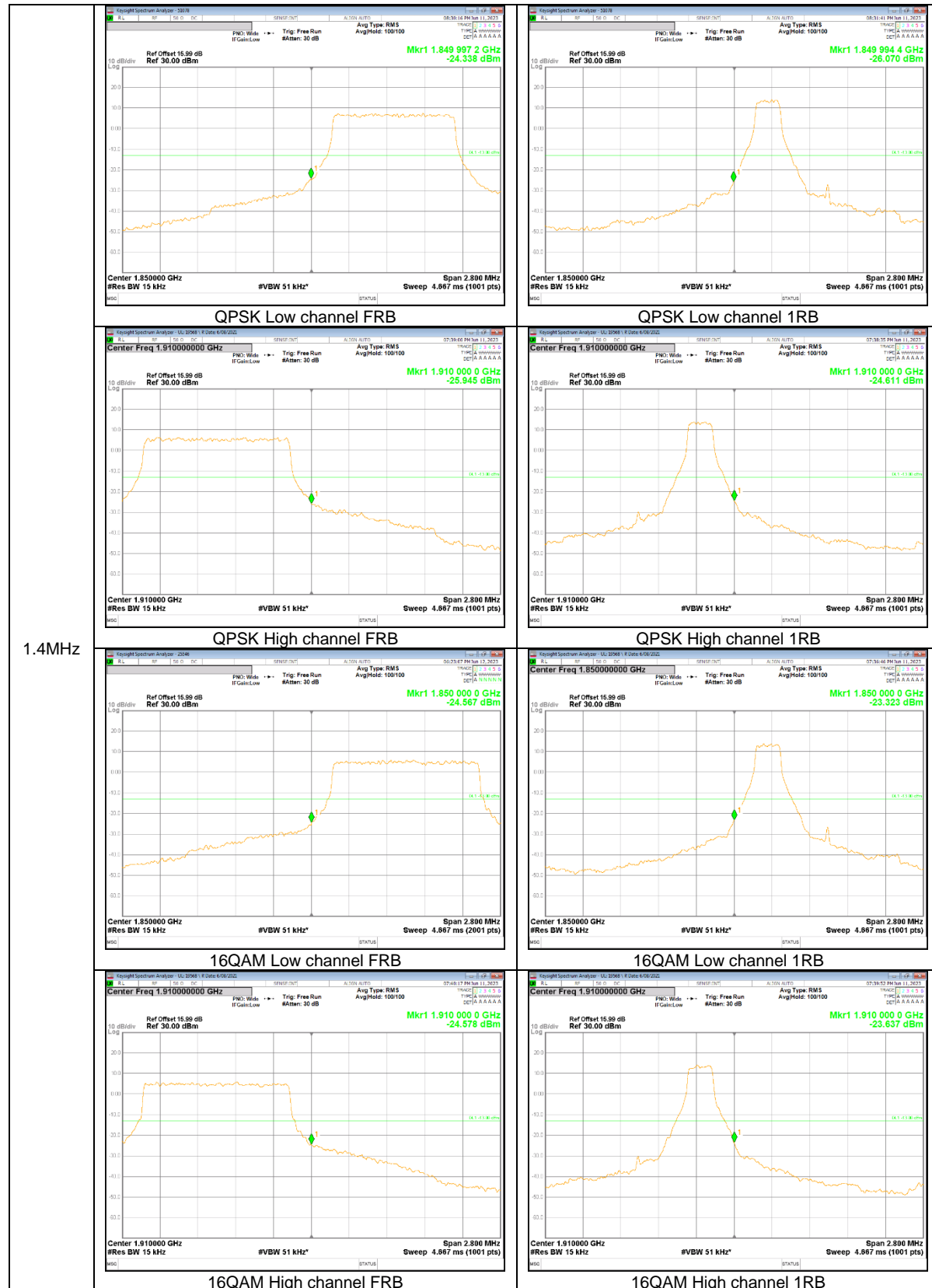


10MHz



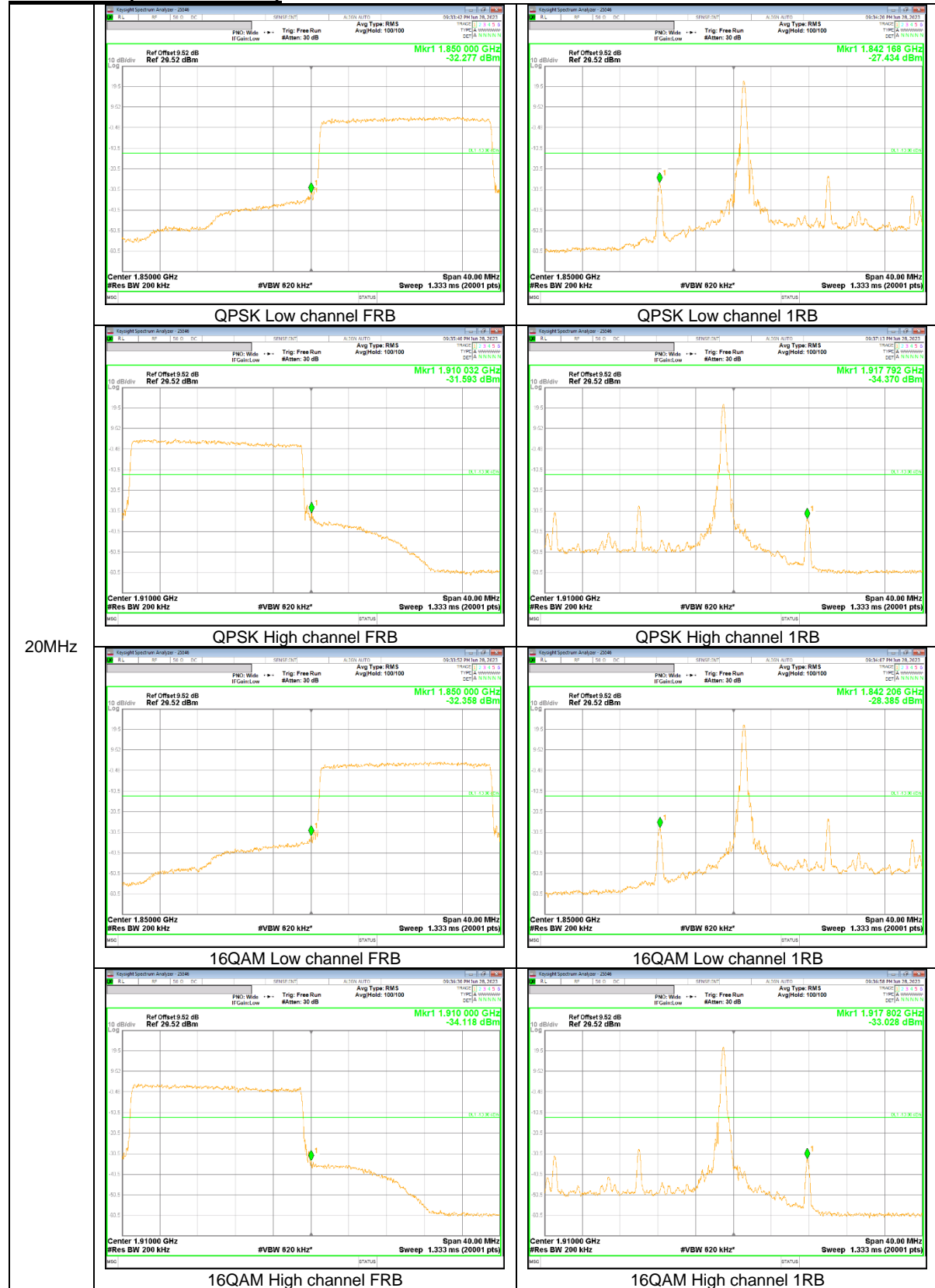


3MHz



1.4MHz

LTE Band 2 (Sub2 Antenna)



20MHz