

CERTIFICATION TEST REPORT

Report Number. : 4790976555-E3V2

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

Model : SM-S921B/DS, SM-S921B

FCC ID : A3LSMS921B

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

Test Standard(s) : FCC 47 CFR PART 24 SUBPART E

Date Of Issue:
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Revision History

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V2	2023-10-23	Updated to address TCB's question	Yeonhee Lim

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

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

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

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

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

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 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 47 CFR Part 2.
2. FCC 47 CFR Part 24.
3. ANSI TIA-603-E, 2016
4. ANSI C63.26, 2015
5. KDB 971168 D01 Power Meas License Digital Systems v03r01
6. KDB 971168 D02 Misc Rev Approv License Devices v02r02
7. KDB 412172 D01 Determining ERP and EIRP v01r01

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro	
<input checked="" type="checkbox"/>	Chamber 1(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 2(3m semi-anechoic chamber)
<input type="checkbox"/>	Chamber 3(3m semi-anechoic chamber)
<input 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 Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC and WPT. This test report addresses the WWAN operational mode.

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

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

5.2. MAXIMUM OUTPUT POWER

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

GSM

FCC Part 24						
Band	Frequency Range [MHz]	Modulation	Conducted		Radiated	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
GSM1900_ANT A	1850.20 ~ 1909.80	GPRS	29.04	801.68	29.92	980.85
		EGPRS	25.44	349.95	26.92	491.59

WCDMA

FCC Part 24						
Band	Frequency Range [MHz]	Modulation	Conducted		Radiated	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 2_ANT A	1852.40 ~ 1907.60	Rel. 99	22.57	180.72	24.02	252.53
		HSDPA	21.52	141.91	22.97	198.30

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_ANT E	1860.00 ~ 1900.00	20	QPSK	22.56	180.30	19.90	97.61
			16QAM	21.80	151.36	18.96	78.62
			64QAM	20.91	123.31		
			256QAM	19.93	98.40		
	1857.50 ~ 1902.50	15	QPSK	22.55	179.89	20.11	102.47
			16QAM	21.95	156.68	18.97	78.84
			64QAM	20.85	121.62		
			256QAM	19.83	96.16		
	1855.00 ~ 1905.00	10	QPSK	22.55	179.89	19.87	97.06
			16QAM	21.90	154.88	19.08	80.92
			64QAM	20.97	125.03		
			256QAM	19.90	97.72		
	1852.50 ~ 1907.50	5	QPSK	22.59	181.55	19.73	94.02
			16QAM	21.95	156.68	19.32	85.55
			64QAM	20.82	120.78		
			256QAM	19.84	96.38		
	1851.50 ~ 1908.5	3	QPSK	22.69	185.78	19.71	93.57
			16QAM	22.00	158.49	18.64	73.14
			64QAM	20.56	113.76		
			256QAM	19.77	94.84		
	1850.70 ~ 1909.3	1.4	QPSK	22.61	182.39	19.79	95.20
			16QAM	21.74	149.28	18.94	78.43
			64QAM	21.00	125.89		
			256QAM	19.78	95.06		

LTE Band 25

FCC Part 24							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 25_ANT A	1860.00 - 1905.00	20	QPSK	22.51	178.24	21.98	157.74
			16QAM	21.70	147.91	21.10	128.81
			64QAM	20.78	119.67		
			256QAM	19.70	93.33		
	1857.50 - 1907.50	15	QPSK	22.39	173.38	21.80	151.47
			16QAM	21.44	139.32	20.72	117.92
			64QAM	20.51	112.46		
			256QAM	19.30	85.11		
	1855.00 - 1910.00	10	QPSK	22.30	169.82	22.09	161.97
			16QAM	21.47	140.28	21.06	127.77
			64QAM	20.40	109.65		
			256QAM	19.45	88.10		
	1852.50 - 1912.50	5	QPSK	22.37	172.58	22.20	166.13
			16QAM	21.58	143.88	21.42	138.82
			64QAM	20.39	109.40		
			256QAM	19.31	85.31		
	1851.50 - 1913.50	3	QPSK	22.28	169.04	22.26	168.09
			16QAM	21.45	139.64	21.27	133.83
			64QAM	20.58	114.29		
			256QAM	19.25	84.14		
	1850.70 - 1914.30	1.4	QPSK	22.32	170.61	22.11	162.57
			16QAM	21.32	135.52	21.05	127.36
			64QAM	20.44	110.66		
			256QAM	19.28	84.72		

NR Band n25

FCC Part 24								
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Mode	Conducted		Radiated	
					Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
n25_ANT A	1860.00 ~ 1905.00	20	DFT-s OFDM	$\pi/2$ BPSK	23.03	200.91		
				QPSK	23.04	201.37	23.16	207.15
				16QAM	22.01	158.85	22.21	166.45
				64QAM	20.47	111.43		
				256QAM	18.50	70.79		
	CP-OFDM	QPSK	21.54	142.56				
	1857.50 ~ 1907.50	15	DFT-s OFDM	$\pi/2$ BPSK	22.97	198.15		
				QPSK	22.97	198.15	23.03	200.70
				16QAM	21.95	156.68	21.88	154.01
				64QAM	20.55	113.50		
				256QAM	18.54	71.45		
	CP-OFDM	QPSK	21.45	139.64				
	1855.00 ~ 1910.00	10	DFT-s OFDM	$\pi/2$ BPSK	23.01	199.99		
				QPSK	22.96	197.70	23.01	200.19
				16QAM	21.88	154.17	21.81	151.86
				64QAM	20.37	108.89		
				256QAM	18.43	69.66		
	CP-OFDM	QPSK	21.42	138.68				
	1852.50 ~ 1912.50	5	DFT-s OFDM	$\pi/2$ BPSK	22.99	199.07		
				QPSK	22.90	194.98	23.19	208.29
16QAM				21.89	154.53	22.27	168.53	
64QAM				20.43	110.41			
256QAM				18.48	70.47			
CP-OFDM	QPSK	21.46	139.96					
FCC Part 24								
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Mode	Conducted		Radiated	
					Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
n25_ANT F	1860.00 ~ 1905.00	20	DFT-s OFDM	$\pi/2$ BPSK	22.84	192.31		
				QPSK	22.94	196.79	21.29	134.66
				16QAM	21.84	152.76	20.28	106.71
				64QAM	20.30	107.15		
				256QAM	18.36	68.55		
	CP-OFDM	QPSK	21.30	134.90				
	1857.50 ~ 1907.50	15	DFT-s OFDM	$\pi/2$ BPSK	22.79	190.11		
				QPSK	22.79	190.11	21.21	132.24
				16QAM	21.78	150.66	20.27	106.51
				64QAM	20.25	105.93		
				256QAM	18.22	66.37		
	CP-OFDM	QPSK	21.34	136.14				
	1855.00 ~ 1910.00	10	DFT-s OFDM	$\pi/2$ BPSK	22.84	192.31		
				QPSK	22.85	192.75	21.20	131.68
				16QAM	21.84	152.76	20.20	104.59
				64QAM	20.37	108.89		
				256QAM	18.35	68.39		
	CP-OFDM	QPSK	21.30	134.90				
	1852.50 ~ 1912.50	5	DFT-s OFDM	$\pi/2$ BPSK	22.74	187.93		
				QPSK	22.72	187.07	21.16	130.49
16QAM				21.78	150.66	20.21	104.85	
64QAM				20.35	108.39			
256QAM				18.23	66.53			
CP-OFDM	QPSK	21.16	130.62					

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, 25 / NR Band n2, 25 1850 - 1915 MHz	-4.3 (ANT A)
	-4.2 (ANT F)

5.4. WORST-CASE ORIENTATION

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

- GSM GPRS/EGPRS
- UMTS REL 99/HSDPA

For LTE Bands the worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on QPSK, 16QAM, 64QAM and 256QAM modulations. It was found QPSK and 16QAM results were worst case.

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

This device supports both NSA and SA Mode. Output power measurements were measured on NSA/SA/PS(Path Switching) Mode.

This device supports PS (Path Switching) Mode. So the test case is as below.

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

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

Band	Main antenna	Tune-up Limit (dBm)	Sub antenna	Tune-up Limit (dBm)
GSM 1900	<u>A</u>	<u>31.0</u>		
WCDMA B2	<u>A</u>	<u>23.0</u>		
LTE B2	A	23.5	<u>F</u>	<u>23.5</u>
LTE B25	<u>A</u>	<u>23.5</u>		
NR n25	<u>A</u>	<u>24.5</u>	F	24.0

LTE Band 2 (ANT A)

LTE Band 2 (Frequency range: 1850-1910 MHz) is covered by LTE Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

NR Band 2 (ANT A) (ANT F)

NR Band 2 (Frequency range: 1850-1910 MHz) is covered by NR Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

● Conducted Spurious Emission (ANT A)

Highest conducted power setting for each bands				
LTE Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
25	1860.0	20	1	49
	1882.5		1	0
	1905.0		1	0
NR Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
25	1860.0	20	1	52
	1882.5		1	104
	1905.0		1	52

● Radiated Spurious Emission (ANT A)

Highest EIRP setting for each bands				
LTE Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
25	1851.5	3	1	14
	1882.5		1	8
	1913.5		1	8
NR Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
25	1852.5	5	1	23
	1882.5		1	1
	1912.5		1	1

● Radiated Spurious Emission (ANT F)

Highest EIRP setting for each bands				
LTE Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
2	1857.5	15	1	0
	1880.0		1	37
	1902.5		1	37
Highest EIRP setting for each bands				
NR Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
25	1860.0	20	1	53
	1882.5		1	53
	1905.0		1	53

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

NR Band	LTE Band
25 (ANT A)	<u>12</u> , 13
25 (ANT F)	<u>12</u> , 13

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	ANT	ERP			RSE		
		X	Y	Z	X	Y	Z
GSM 1900	A	O	-	-	-	-	O
WCDMA B2	A	O	-	-	O	-	-
LTE B2	F	-	O	-	-	O	-
LTE B25	A	O	-	-	-	-	O
NR n25	A	O	-	-	O	-	-
	F	-	-	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	R37T53J8459SEA	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02111A	N/A

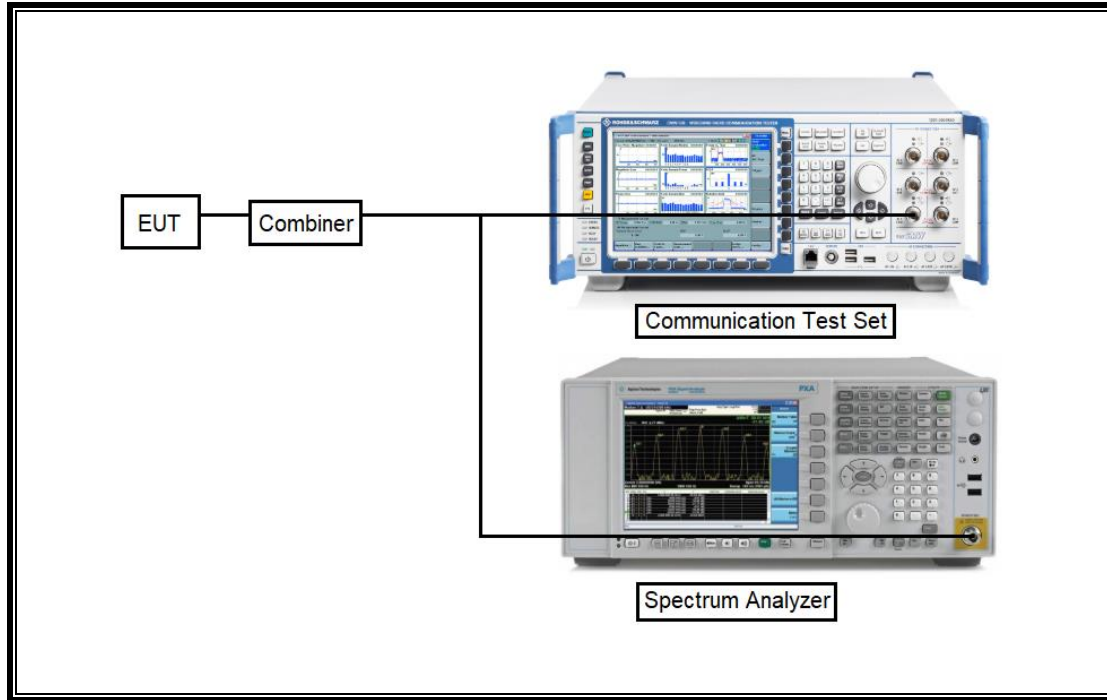
I/O CABLE

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

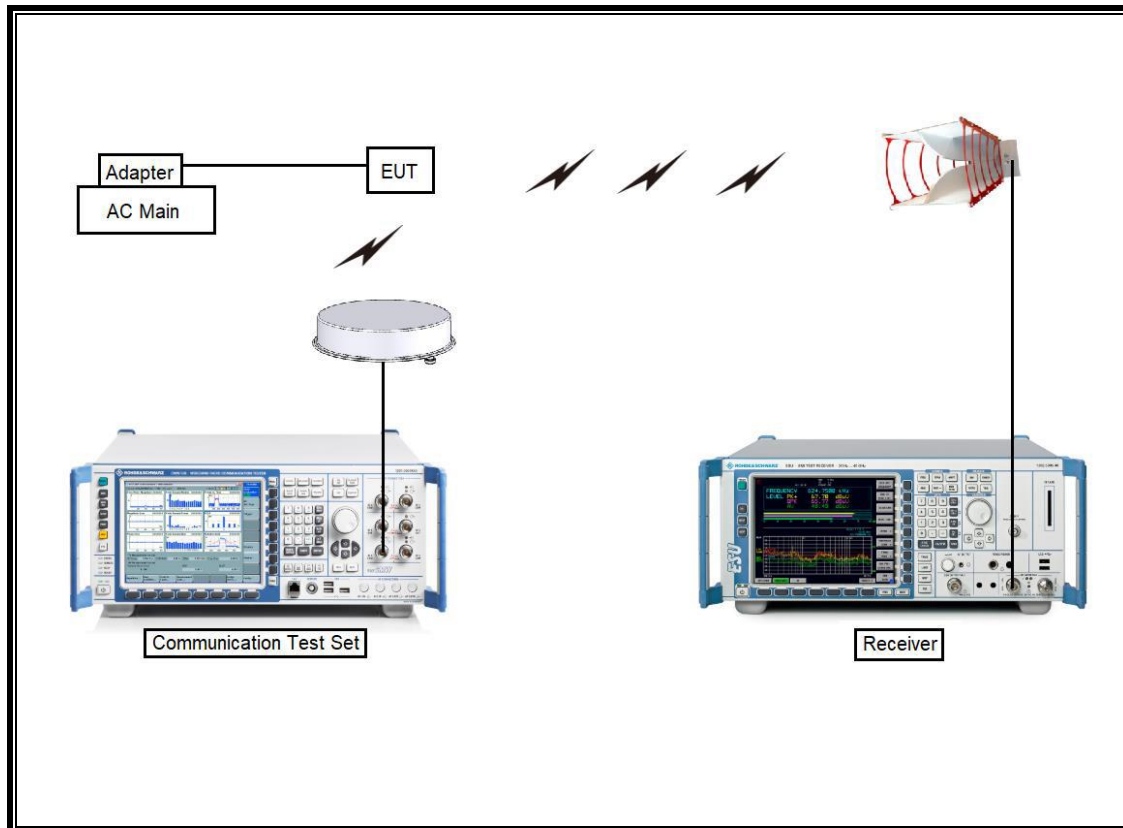
TEST SETUP

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

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. TEST AND MEASUREMENT EQUIPMENT

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

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

7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
2.1049	Occupied Band width (99%)	N/A	Conducted	Pass
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 either CMW500 Test Set or E7515B Test set and configured to operate at maximum power.

NOTE

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

RESULTS

See the following pages.

8.1.1. CONDUCTED AVERAGE OUTPUT POWER

GSM (ANT A)

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM (Voice)	CS1	1	512	1850.2	28.77	19.74	31.0	22.0
			661	1880.0	28.73	19.70		
			810	1909.8	29.12	20.09		
GPRS (GMSK)	CS1	1	512	1850.2	28.78	19.75	31.0	22.0
			661	1880.0	28.67	19.64		
			810	1909.8	29.04	20.01		
		2	512	1850.2	26.40	20.38	28.5	22.5
			661	1880.0	26.14	20.12		
			810	1909.8	26.14	20.12		
		3	512	1850.2	24.62	20.36	26.5	22.2
			661	1880.0	24.32	20.06		
			810	1909.8	24.48	20.22		
		4	512	1850.2	22.69	19.68	24.5	21.5
			661	1880.0	22.19	19.18		
			810	1909.8	22.29	19.28		
EGPRS (8PSK)	MCS5	1	512	1850.2	25.01	15.98	26.5	17.5
			661	1880.0	25.10	16.07		
			810	1909.8	25.44	16.41		
		2	512	1850.2	23.10	17.08	24.5	18.5
			661	1880.0	23.09	17.07		
			810	1909.8	23.34	17.32		
		3	512	1850.2	21.77	17.51	23.0	18.7
			661	1880.0	21.73	17.47		
			810	1909.8	21.90	17.64		
		4	512	1850.2	20.26	17.25	21.0	18.0
			661	1880.0	19.93	16.92		
			810	1909.8	20.10	17.09		

WCDMA B2 (ANT A)

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	22.57	N/A	23.0
		9400	1880.0	22.37		
		9538	1907.6	22.57		
HSDPA	Subtest 1	9262	1852.4	21.52	0	22.0
		9400	1880.0	21.33		
		9538	1907.6	21.49		
	Subtest 2	9262	1852.4	20.53	0	22.0
		9400	1880.0	20.32		
		9538	1907.6	20.46		
	Subtest 3	9262	1852.4	20.56	0.5	21.5
		9400	1880.0	20.34		
		9538	1907.6	20.46		
	Subtest 4	9262	1852.4	19.61	0.5	21.5
		9400	1880.0	19.37		
		9538	1907.6	19.56		
HSUPA	Subtest 1	9262	1852.4	20.50	0	22.0
		9400	1880.0	20.27		
		9538	1907.6	20.39		
	Subtest 2	9262	1852.4	18.49	2	20.0
		9400	1880.0	18.25		
		9538	1907.6	18.39		
	Subtest 3	9262	1852.4	19.52	1	21.0
		9400	1880.0	19.27		
		9538	1907.6	19.45		
	Subtest 4	9262	1852.4	18.46	2	20.0
		9400	1880.0	18.21		
		9538	1907.6	18.36		
	Subtest 5	9262	1852.4	21.66	0	22.0
		9400	1880.0	21.37		
		9538	1907.6	21.48		
DC-HSDPA	Subtest 1	9262	1852.4	21.44	0	22.0
		9400	1880.0	21.43		
		9538	1907.6	21.51		
	Subtest 2	9262	1852.4	20.48	0	22.0
		9400	1880.0	20.40		
		9538	1907.6	20.49		
	Subtest 3	9262	1852.4	19.56	0.5	21.5
		9400	1880.0	19.47		
		9538	1907.6	19.58		
	Subtest 4	9262	1852.4	19.54	0.5	21.5
		9400	1880.0	19.48		
		9538	1907.6	19.57		

LTE Band 2 (ANT F)

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	22.36	22.34	22.49	0.0	23.5
		1	49	22.53	22.00	22.56	0.0	23.5
		1	99	22.26	22.33	22.42	0.0	23.5
		50	0	21.31	21.35	21.47	1.0	22.5
		50	24	21.28	21.37	21.46	1.0	22.5
		50	50	21.27	21.39	21.44	1.0	22.5
	100	0	21.30	21.36	21.45	1.0	22.5	
	16QAM	1	0	21.43	21.42	21.80	1.0	22.5
		1	49	21.51	21.34	21.77	1.0	22.5
		1	99	21.39	21.45	21.72	1.0	22.5
		50	0	20.31	20.38	20.49	2.0	21.5
		50	24	20.29	20.41	20.46	2.0	21.5
		50	50	20.27	20.41	20.46	2.0	21.5
	64QAM	100	0	20.31	20.43	20.49	2.0	21.5
		1	0	20.68	20.72	20.79	2.0	21.5
		1	49	20.64	20.91	20.69	2.0	21.5
		1	99	20.58	20.76	20.58	2.0	21.5
		50	0	19.39	19.54	19.68	3.0	20.5
		50	24	19.39	19.56	19.67	3.0	20.5
	256QAM	50	50	19.40	19.55	19.66	3.0	20.5
		100	0	19.35	19.52	19.64	3.0	20.5
		1	0	19.45	19.75	19.71	3.0	20.5
		1	49	19.62	19.65	19.93	3.0	20.5
		1	99	19.37	19.76	19.66	3.0	20.5
50		0	17.39	17.46	17.61	5.0	18.5	
15 MHz	QPSK	50	24	17.36	17.47	17.58	5.0	18.5
		50	50	17.35	17.50	17.63	5.0	18.5
		100	0	17.36	17.48	17.62	5.0	18.5
		1	0	22.47	22.34	22.48	0.0	23.5
		1	37	22.37	22.45	22.55	0.0	23.5
		1	74	22.38	22.38	22.44	0.0	23.5
	16QAM	36	0	21.45	21.38	21.47	1.0	22.5
		36	20	21.43	21.41	21.47	1.0	22.5
		36	39	21.43	21.40	21.47	1.0	22.5
		75	0	21.43	21.43	21.48	1.0	22.5
		1	0	21.66	21.70	21.85	1.0	22.5
		1	37	21.70	21.75	21.95	1.0	22.5
	64QAM	1	74	21.59	21.67	21.83	1.0	22.5
		36	0	20.45	20.41	20.51	2.0	21.5
		36	20	20.45	20.44	20.53	2.0	21.5
		36	39	20.45	20.42	20.51	2.0	21.5
		75	0	20.47	20.43	20.51	2.0	21.5
		1	0	20.84	20.52	20.71	2.0	21.5
	256QAM	1	37	20.85	20.17	20.79	2.0	21.5
		1	74	20.74	20.57	20.62	2.0	21.5
		36	0	19.63	19.48	19.65	3.0	20.5
		36	20	19.62	19.49	19.66	3.0	20.5
		36	39	19.60	19.48	19.69	3.0	20.5
		75	0	19.56	19.52	19.61	3.0	20.5
15 MHz	256QAM	1	0	19.83	19.53	19.54	3.0	20.5
		1	37	19.80	19.65	19.55	3.0	20.5
		1	74	19.77	19.55	19.51	3.0	20.5
		36	0	17.57	17.46	17.56	5.0	18.5
		36	20	17.59	17.48	17.55	5.0	18.5
		36	39	17.56	17.48	17.57	5.0	18.5
75	0	17.56	17.50	17.57	5.0	18.5		

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	22.42	22.40	22.51	0.0	23.5
		1	25	22.55	22.43	22.37	0.0	23.5
		1	49	22.41	22.41	22.49	0.0	23.5
		25	0	21.45	21.37	21.48	1.0	22.5
		25	12	21.46	21.41	21.49	1.0	22.5
		25	25	21.43	21.38	21.49	1.0	22.5
	16QAM	50	0	21.45	21.40	21.47	1.0	22.5
		1	0	21.67	21.74	21.90	1.0	22.5
		1	25	21.72	21.85	21.73	1.0	22.5
		1	49	21.56	21.79	21.83	1.0	22.5
		25	0	20.49	20.43	20.59	2.0	21.5
		25	12	20.51	20.43	20.59	2.0	21.5
	64QAM	25	25	20.49	20.45	20.59	2.0	21.5
		50	0	20.50	20.44	20.51	2.0	21.5
		1	0	20.69	20.60	20.77	2.0	21.5
		1	25	20.69	20.70	20.97	2.0	21.5
		1	49	20.71	20.62	20.64	2.0	21.5
		25	0	19.56	19.47	19.66	3.0	20.5
	256QAM	25	12	19.59	19.49	19.67	3.0	20.5
		25	25	19.57	19.51	19.65	3.0	20.5
		50	0	19.59	19.53	19.64	3.0	20.5
		1	0	19.46	19.70	19.73	3.0	20.5
		1	25	19.58	19.90	19.73	3.0	20.5
		1	49	19.38	19.73	19.64	3.0	20.5
		25	0	17.55	17.50	17.63	5.0	18.5
25		12	17.59	17.52	17.66	5.0	18.5	
25		25	17.55	17.51	17.63	5.0	18.5	
50		0	17.56	17.48	17.60	5.0	18.5	

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	22.55	22.38	22.53	0.0	23.5
		1	12	22.59	22.33	22.56	0.0	23.5
		1	24	22.56	22.40	22.51	0.0	23.5
		12	0	21.54	21.41	21.53	1.0	22.5
		12	7	21.55	21.42	21.56	1.0	22.5
		12	13	21.54	21.42	21.52	1.0	22.5
	16QAM	25	0	21.53	21.42	21.54	1.0	22.5
		1	0	21.82	21.81	21.80	1.0	22.5
		1	12	21.85	21.83	21.95	1.0	22.5
		1	24	21.78	21.80	21.82	1.0	22.5
		12	0	20.55	20.48	20.59	2.0	21.5
		12	7	20.54	20.49	20.59	2.0	21.5
	64QAM	12	13	20.58	20.48	20.58	2.0	21.5
		25	0	20.57	20.44	20.56	2.0	21.5
		1	0	20.75	20.50	20.82	2.0	21.5
		1	12	20.69	20.64	20.67	2.0	21.5
		1	24	20.69	20.54	20.78	2.0	21.5
		12	0	19.56	19.49	19.67	3.0	20.5
	256QAM	12	7	19.57	19.52	19.69	3.0	20.5
		12	13	19.54	19.52	19.69	3.0	20.5
		25	0	19.60	19.48	19.68	3.0	20.5
		1	0	19.75	19.44	19.77	3.0	20.5
		1	12	19.84	19.31	19.83	3.0	20.5
		1	24	19.70	19.47	19.76	3.0	20.5
		12	0	17.56	17.47	17.65	5.0	18.5
12		7	17.57	17.47	17.63	5.0	18.5	
12		13	17.54	17.46	17.63	5.0	18.5	
25		0	17.53	17.47	17.66	5.0	18.5	

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	22.49	22.31	22.59	0.0	23.5
		1	8	22.36	22.41	22.69	0.0	23.5
		1	14	22.53	22.28	22.59	0.0	23.5
		8	0	21.45	21.36	21.50	1.0	22.5
		8	4	21.46	21.37	21.51	1.0	22.5
		8	7	21.44	21.36	21.53	1.0	22.5
	16QAM	15	0	21.43	21.38	21.49	1.0	22.5
		1	0	21.50	21.75	21.90	1.0	22.5
		1	8	21.57	21.76	22.00	1.0	22.5
		1	14	21.45	21.83	21.84	1.0	22.5
		8	0	20.52	20.43	20.60	2.0	21.5
		8	4	20.53	20.41	20.58	2.0	21.5
	64QAM	8	7	20.50	20.43	20.56	2.0	21.5
		15	0	20.48	20.41	20.54	2.0	21.5
		1	0	20.56	20.47	20.55	2.0	21.5
		1	8	20.52	20.55	20.44	2.0	21.5
		1	14	20.44	20.51	20.42	2.0	21.5
		8	0	19.60	19.50	19.59	3.0	20.5
	256QAM	8	4	19.58	19.46	19.58	3.0	20.5
		8	7	19.59	19.49	19.55	3.0	20.5
		15	0	19.59	19.44	19.66	3.0	20.5
		1	0	19.52	19.73	19.73	3.0	20.5
		1	8	19.55	19.71	19.77	3.0	20.5
		1	14	19.55	19.68	19.70	3.0	20.5
1.4 MHz	QPSK	8	0	17.61	17.49	17.62	5.0	18.5
		8	4	17.59	17.55	17.64	5.0	18.5
		8	7	17.65	17.51	17.65	5.0	18.5
		15	0	17.61	17.51	17.69	5.0	18.5
		1	0	22.61	22.45	22.58	0.0	23.5
		1	3	22.61	22.11	22.54	0.0	23.5
	16QAM	1	5	22.55	22.42	22.51	0.0	23.5
		3	0	22.49	22.43	22.48	0.0	23.5
		3	1	22.46	22.31	22.40	0.0	23.5
		3	3	22.44	22.22	22.41	0.0	23.5
		6	0	21.48	21.36	21.42	1.0	22.5
		1	0	21.46	21.63	21.59	1.0	22.5
	64QAM	1	3	21.43	21.66	21.74	1.0	22.5
		1	5	21.51	21.68	21.64	1.0	22.5
		3	0	21.58	21.48	21.68	1.0	22.5
		3	1	21.51	21.48	21.52	1.0	22.5
		3	3	21.61	21.42	21.52	1.0	22.5
		6	0	20.60	20.31	20.53	2.0	21.5
	256QAM	1	0	20.35	20.46	20.94	2.0	21.5
		1	3	20.59	20.40	21.00	2.0	21.5
		1	5	20.39	20.37	20.86	2.0	21.5
		3	0	20.57	20.61	20.78	2.0	21.5
		3	1	20.58	20.55	20.64	2.0	21.5
		3	3	20.51	20.45	20.68	2.0	21.5
QPSK	6	0	19.55	19.56	19.64	3.0	20.5	
	1	0	19.71	19.35	19.60	3.0	20.5	
	1	3	19.78	19.59	19.71	3.0	20.5	
	1	5	19.66	19.35	19.57	3.0	20.5	
	3	0	19.57	19.45	19.65	3.0	20.5	
	3	1	19.49	19.39	19.62	3.0	20.5	
16QAM	3	3	19.44	19.40	19.52	3.0	20.5	
	6	0	17.42	17.55	17.66	5.0	18.5	

LTE Band 25 (ANT A)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				26140	26365	26590		
				1860 MHz	1882.5 MHz	1905 MHz		
20 MHz	QPSK	1	0	22.07	22.15	22.32	0.0	23.5
		1	49	22.07	22.21	22.51	0.0	23.5
		1	99	22.00	22.04	22.16	0.0	23.5
		50	0	21.10	21.19	21.28	1.0	22.5
		50	24	21.08	21.17	21.23	1.0	22.5
		50	50	21.06	21.14	21.23	1.0	22.5
	100	0	21.08	21.16	21.26	1.0	22.5	
	16QAM	1	0	21.30	21.29	21.66	1.0	22.5
		1	49	21.18	21.11	21.70	1.0	22.5
		1	99	21.24	21.22	21.49	1.0	22.5
		50	0	20.12	20.21	20.27	2.0	21.5
		50	24	20.07	20.19	20.24	2.0	21.5
		50	50	20.12	20.20	20.24	2.0	21.5
	100	0	20.14	20.24	20.27	2.0	21.5	
	64QAM	1	0	20.58	20.78	20.35	2.0	21.5
		1	49	20.71	20.73	20.16	2.0	21.5
		1	99	20.59	20.65	20.20	2.0	21.5
		50	0	19.22	19.28	19.40	3.0	20.5
		50	24	19.20	19.26	19.36	3.0	20.5
		50	50	19.20	19.23	19.33	3.0	20.5
	100	0	19.19	19.20	19.33	3.0	20.5	
	256QAM	1	0	19.51	19.56	19.51	3.0	20.5
		1	49	19.36	19.70	19.67	3.0	20.5
		1	99	19.47	19.43	19.40	3.0	20.5
		50	0	17.16	17.27	17.34	5.0	18.5
		50	24	17.14	17.24	17.30	5.0	18.5
		50	50	17.12	17.20	17.28	5.0	18.5
	100	0	17.12	17.23	17.29	5.0	18.5	
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				26115	26365	26615		
				1857.5 MHz	1882.5 MHz	1907.5 MHz		
15 MHz	QPSK	1	0	22.15	22.24	22.30	0.0	23.5
		1	37	22.06	22.34	22.39	0.0	23.5
		1	74	22.08	22.20	22.19	0.0	23.5
		36	0	21.15	21.25	21.24	1.0	22.5
		36	20	21.17	21.23	21.24	1.0	22.5
		36	39	21.17	21.21	21.23	1.0	22.5
	75	0	21.18	21.23	21.25	1.0	22.5	
	16QAM	1	0	21.27	21.39	21.34	1.0	22.5
		1	37	21.39	21.44	21.39	1.0	22.5
		1	74	21.27	21.33	21.30	1.0	22.5
		36	0	20.15	20.31	20.31	2.0	21.5
		36	20	20.15	20.27	20.32	2.0	21.5
		36	39	20.17	20.27	20.30	2.0	21.5
	75	0	20.15	20.27	20.30	2.0	21.5	
	64QAM	1	0	20.25	20.17	20.51	2.0	21.5
		1	37	20.25	20.09	20.49	2.0	21.5
		1	74	20.25	20.09	20.40	2.0	21.5
		36	0	19.04	19.17	19.17	3.0	20.5
		36	20	19.00	19.15	19.14	3.0	20.5
		36	39	18.98	19.13	19.10	3.0	20.5
	75	0	19.06	19.08	19.10	3.0	20.5	
	256QAM	1	0	19.21	19.17	19.30	3.0	20.5
		1	37	19.20	19.04	19.00	3.0	20.5
		1	74	19.14	19.05	19.22	3.0	20.5
		36	0	17.03	17.11	17.16	5.0	18.5
		36	20	17.01	17.08	17.12	5.0	18.5
		36	39	16.99	17.06	17.08	5.0	18.5
	75	0	17.00	17.04	17.11	5.0	18.5	

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				26090	26365	26640		
				1855 MHz	1882.5 MHz	1910 MHz		
10 MHz	QPSK	1	0	22.20	22.30	22.21	0.0	23.5
		1	25	22.23	22.23	22.09	0.0	23.5
		1	49	22.20	22.20	22.17	0.0	23.5
		25	0	21.23	21.25	21.20	1.0	22.5
		25	12	21.23	21.23	21.19	1.0	22.5
		25	25	21.19	21.21	21.18	1.0	22.5
	16QAM	50	0	21.23	21.25	21.21	1.0	22.5
		1	0	21.41	21.47	21.30	1.0	22.5
		1	25	21.28	21.37	21.27	1.0	22.5
		1	49	21.32	21.44	21.15	1.0	22.5
		25	0	20.32	20.33	20.25	2.0	21.5
		25	12	20.30	20.31	20.24	2.0	21.5
	64QAM	25	25	20.32	20.28	20.24	2.0	21.5
		50	0	20.32	20.28	20.22	2.0	21.5
		1	0	19.98	20.40	20.08	2.0	21.5
		1	25	19.85	20.33	20.12	2.0	21.5
		1	49	19.99	20.39	19.98	2.0	21.5
		25	0	19.17	19.13	19.13	3.0	20.5
	256QAM	25	12	19.17	19.12	19.10	3.0	20.5
		25	25	19.14	19.10	19.09	3.0	20.5
		50	0	19.12	19.12	19.09	3.0	20.5
		1	0	19.33	19.39	19.13	3.0	20.5
		1	25	19.45	19.45	19.00	3.0	20.5
		1	49	19.29	19.31	19.06	3.0	20.5
	5 MHz	QPSK	25	0	17.14	17.13	17.18	5.0
25			12	17.12	17.10	17.15	5.0	18.5
25			25	17.10	17.08	17.14	5.0	18.5
50			0	17.07	17.08	17.08	5.0	18.5
1			0	22.29	22.16	22.20	0.0	23.5
16QAM		1	12	22.37	22.23	22.28	0.0	23.5
		1	24	22.31	22.17	22.19	0.0	23.5
		12	0	21.34	21.20	21.25	1.0	22.5
		12	7	21.35	21.21	21.26	1.0	22.5
		12	13	21.32	21.21	21.24	1.0	22.5
	25	0	21.34	21.23	21.26	1.0	22.5	
	1	0	21.53	21.49	21.32	1.0	22.5	
	1	12	21.58	21.47	21.44	1.0	22.5	
	1	24	21.47	21.42	21.31	1.0	22.5	
	12	0	20.33	20.28	20.23	2.0	21.5	
	12	7	20.31	20.28	20.26	2.0	21.5	
	12	13	20.28	20.25	20.25	2.0	21.5	
	25	0	20.37	20.25	20.26	2.0	21.5	
	64QAM	1	0	20.33	20.16	20.37	2.0	21.5
		1	12	20.37	20.17	20.26	2.0	21.5
1		24	20.39	20.18	20.32	2.0	21.5	
12		0	19.11	19.14	19.01	3.0	20.5	
12		7	19.12	19.11	19.01	3.0	20.5	
256QAM	12	13	19.08	19.11	19.02	3.0	20.5	
	25	0	19.13	19.10	19.08	3.0	20.5	
	1	0	19.07	18.93	19.31	3.0	20.5	
	1	12	18.98	18.84	19.29	3.0	20.5	
	1	24	19.07	18.88	19.29	3.0	20.5	
	12	0	17.18	17.14	17.09	5.0	18.5	
	12	7	17.18	17.13	17.10	5.0	18.5	
12	13	17.14	17.12	17.06	5.0	18.5		
25	0	17.13	17.08	17.02	5.0	18.5		

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				26055	26365	26675		
				1851.5 MHz	1882.5 MHz	1913.5 MHz		
3 MHz	QPSK	1	0	22.23	22.14	22.16	0.0	23.5
		1	8	22.10	22.24	22.28	0.0	23.5
		1	14	22.26	22.05	22.16	0.0	23.5
		8	0	21.19	21.17	21.07	1.0	22.5
		8	4	21.17	21.20	21.09	1.0	22.5
		8	7	21.17	21.16	21.14	1.0	22.5
	16QAM	15	0	21.16	21.19	21.11	1.0	22.5
		1	0	21.11	21.35	21.23	1.0	22.5
		1	8	21.24	21.45	21.33	1.0	22.5
		1	14	21.07	21.36	21.13	1.0	22.5
		8	0	20.25	20.40	20.20	2.0	21.5
		8	4	20.24	20.38	20.16	2.0	21.5
	64QAM	8	7	20.26	20.38	20.17	2.0	21.5
		15	0	20.19	20.29	20.16	2.0	21.5
		1	0	20.05	19.93	20.50	2.0	21.5
		1	8	19.98	19.99	20.58	2.0	21.5
		1	14	19.99	20.00	20.56	2.0	21.5
		8	0	19.20	19.08	19.17	3.0	20.5
	256QAM	8	4	19.17	19.09	19.12	3.0	20.5
		8	7	19.15	19.13	19.14	3.0	20.5
		15	0	19.18	19.14	19.01	3.0	20.5
		1	0	19.19	19.10	19.25	3.0	20.5
		1	8	19.23	19.15	19.13	3.0	20.5
		1	14	19.22	19.08	19.22	3.0	20.5
1.4 MHz	QPSK	8	0	17.16	17.07	17.09	5.0	18.5
		8	4	17.18	17.06	17.10	5.0	18.5
		8	7	17.16	17.09	17.09	5.0	18.5
		15	0	17.22	17.13	17.09	5.0	18.5
		1	0	22.32	22.24	22.15	0.0	23.5
		1	3	22.15	22.22	22.18	0.0	23.5
	16QAM	1	5	22.24	22.18	22.10	0.0	23.5
		3	0	22.27	22.26	22.14	0.0	23.5
		3	1	22.20	22.18	22.05	0.0	23.5
		3	3	22.17	22.11	21.96	0.0	23.5
		6	0	21.13	21.17	21.02	1.0	22.5
		1	0	21.16	21.18	21.21	1.0	22.5
	64QAM	1	3	21.31	21.26	21.31	1.0	22.5
		1	5	21.22	21.24	21.25	1.0	22.5
		3	0	21.32	21.29	21.11	1.0	22.5
		3	1	21.25	21.23	21.06	1.0	22.5
		3	3	21.26	21.25	20.98	1.0	22.5
		6	0	20.22	20.23	20.08	2.0	21.5
	256QAM	1	0	20.44	19.88	19.97	2.0	21.5
		1	3	20.38	20.16	19.67	2.0	21.5
		1	5	20.41	19.93	19.92	2.0	21.5
		3	0	20.18	19.99	20.26	2.0	21.5
		3	1	20.17	19.95	20.14	2.0	21.5
		3	3	20.16	19.86	20.16	2.0	21.5
QPSK	6	0	19.08	19.01	19.04	3.0	20.5	
	1	0	19.00	18.87	19.08	3.0	20.5	
	1	3	19.28	18.94	19.15	3.0	20.5	
	1	5	18.99	18.84	19.10	3.0	20.5	
	3	0	19.04	19.10	18.97	3.0	20.5	
	3	1	18.94	19.04	18.91	3.0	20.5	
16QAM	3	3	18.87	18.97	18.83	3.0	20.5	
	6	0	17.09	16.98	16.95	5.0	18.5	

NR Band n25 (ANT A)

					Maximum Average Power (dBm)				
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					372000	376500	381000		
					1860.00 MHz	1882.50 MHz	1905.00 MHz		
20 MHz	DFT-s-OFDM	π/2 BPSK	1	1	22.85	22.85	22.99	0.0	24.5
			1	52	22.94	22.82	23.03	0.0	24.5
			1	104	22.88	22.84	22.98	0.0	24.5
			50	0	21.85	21.83	21.97	0.5	24.0
			50	28	22.86	22.81	22.98	0.0	24.5
			50	56	21.84	21.84	22.00	0.5	24.0
		100	0	21.83	21.80	21.98	0.5	24.0	
		QPSK	1	1	22.83	22.81	22.94	0.0	24.5
			1	52	22.92	22.82	23.04	0.0	24.5
			1	104	22.85	22.83	22.95	0.0	24.5
			50	0	21.84	21.84	21.97	1.0	23.5
			50	28	22.83	22.79	22.99	0.0	24.5
			50	56	21.83	21.82	22.02	1.0	23.5
		16QAM	100	0	21.83	21.78	22.00	1.0	23.5
			1	1	21.74	21.86	22.01	1.0	23.5
			1	52	21.78	21.84	22.14	1.0	23.5
	64QAM	1	104	21.75	21.86	22.01	1.0	23.5	
1		1	20.30	20.40	20.47	2.5	22.0		
256QAM	1	1	18.47	18.29	18.50	4.5	20.0		
CP-OFDM	QPSK	1	1	21.37	21.36	21.54	1.5	23.0	
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					371500	376500	381500		
					1857.50 MHz	1882.50 MHz	1907.50 MHz		
15 MHz	DFT-s-OFDM	π/2 BPSK	1	1	22.89	22.85	22.94	0.0	24.5
			1	39	22.78	22.71	22.88	0.0	24.5
			1	77	22.86	22.82	22.95	0.0	24.5
			36	0	21.87	21.80	21.96	0.5	24.0
			36	21	22.87	22.78	22.97	0.0	24.5
			36	43	21.87	21.77	21.96	0.5	24.0
		75	0	21.86	21.79	21.97	0.5	24.0	
		QPSK	1	1	22.84	22.81	22.93	0.0	24.5
			1	39	22.73	22.69	22.88	0.0	24.5
			1	77	22.80	22.81	22.92	0.0	24.5
			36	0	21.88	21.80	21.94	1.0	23.5
			36	21	22.88	22.80	22.97	0.0	24.5
			36	43	21.87	21.78	21.97	1.0	23.5
		75	0	21.87	21.79	21.95	1.0	23.5	
		16QAM	1	1	21.95	21.80	21.90	1.0	23.5
			1	39	21.82	21.69	21.90	1.0	23.5
	1		77	21.86	21.80	21.91	1.0	23.5	
64QAM	1	1	20.19	20.20	20.55	2.5	22.0		
256QAM	1	1	18.42	18.39	18.54	4.5	20.0		
CP-OFDM	QPSK	1	1	21.45	21.35	21.38	1.5	23.0	

BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					371000	376500	382000		
					1855.00 MHz	1882.50 MHz	1910.00 MHz		
10 MHz	DFT-s-OFDM	$\pi/2$ BPSK	1	1	22.92	22.81	22.93	0.0	24.5
			1	25	22.99	22.81	23.01	0.0	24.5
			1	50	22.86	22.78	22.91	0.0	24.5
			25	0	21.89	21.81	21.94	0.5	24.0
			25	13	22.89	22.78	22.95	0.0	24.5
			25	27	21.87	21.81	21.92	0.5	24.0
		QPSK	50	0	21.90	21.79	21.96	0.5	24.0
			1	1	22.93	22.81	22.87	0.0	24.5
			1	25	22.93	22.86	22.96	0.0	24.5
			1	50	22.87	22.80	22.86	0.0	24.5
			25	0	21.89	21.81	21.94	1.0	23.5
			25	13	22.90	22.79	22.94	0.0	24.5
		16QAM	25	27	21.89	21.79	21.91	1.0	23.5
			50	0	21.91	21.79	21.94	1.0	23.5
1	1		21.83	21.80	21.88	1.0	23.5		
64QAM	1	25	21.86	21.88	22.03	1.0	23.5		
	1	50	21.78	21.83	21.86	1.0	23.5		
256QAM	1	1	20.37	20.35	20.31	2.5	22.0		
1	1	18.35	18.37	18.43	4.5	20.0			
CP-OFDM	QPSK	1	1	21.40	21.37	21.42	1.5	23.0	
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					370500	376500	382500		
					1852.50 MHz	1882.50 MHz	1912.50 MHz		
5 MHz	DFT-s-OFDM	$\pi/2$ BPSK	1	1	22.96	22.81	22.94	0.0	24.5
			1	12	22.77	22.71	22.82	0.0	24.5
			1	23	22.78	22.80	22.90	0.0	24.5
			12	0	21.69	21.79	21.90	0.5	24.0
			12	6	22.99	22.79	22.89	0.0	24.5
			12	13	21.98	21.79	21.87	0.5	24.0
			25	0	21.85	21.80	21.88	0.5	24.0
		QPSK	1	1	22.84	22.80	22.89	0.0	24.5
			1	12	22.73	22.71	22.79	0.0	24.5
			1	23	22.85	22.79	22.84	0.0	24.5
			12	0	21.84	21.79	21.91	1.0	23.5
			12	6	22.84	22.80	22.90	0.0	24.5
			12	13	21.83	21.78	21.91	1.0	23.5
		16QAM	25	0	21.83	21.79	21.88	1.0	23.5
			1	1	21.85	21.80	21.89	1.0	23.5
			1	12	21.75	21.71	21.77	1.0	23.5
		64QAM	1	23	21.83	21.82	21.83	1.0	23.5
			1	1	20.43	20.31	20.37	2.5	22.0
256QAM	1	1	18.37	18.36	18.48	4.5	20.0		
CP-OFDM	QPSK	1	1	21.33	21.33	21.46	1.5	23.0	

NR Band n25 (ANT F)

					Maximum Average Power (dBm)				
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					372000	376500	381000		
					1860.00 MHz	1882.50 MHz	1905.00 MHz		
20 MHz	DFT-s-OFDM	π/2 BPSK	1	1	22.66	22.66	22.76	0.0	24.0
			1	52	22.81	22.63	22.84	0.0	24.0
			1	104	22.65	22.65	22.76	0.0	24.0
			50	0	21.64	21.61	21.75	0.5	23.5
			50	28	22.66	22.60	22.78	0.0	24.0
			50	56	21.66	21.65	21.81	0.5	23.5
		100	0	21.67	21.61	21.77	0.5	23.5	
		QPSK	1	1	22.61	22.62	22.73	0.0	24.0
			1	52	22.67	22.67	22.94	0.0	24.0
			1	104	22.60	22.66	22.70	0.0	24.0
			50	0	21.64	21.60	21.74	1.0	23.0
			50	28	22.65	22.62	22.79	0.0	24.0
			50	56	21.67	21.63	21.81	1.0	23.0
		100	0	21.66	21.60	21.77	1.0	23.0	
		16QAM	1	1	21.71	21.60	21.84	1.0	23.0
			1	52	21.84	21.66	21.93	1.0	23.0
			1	104	21.70	21.63	21.81	1.0	23.0
		64QAM	1	1	20.25	20.12	20.30	2.5	21.5
256QAM	1	1	18.08	18.17	18.36	4.5	19.5		
CP-OFDM	QPSK	1	1	21.20	21.18	21.30	1.5	22.5	
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					371500	376500	381500		
					1857.50 MHz	1882.50 MHz	1907.50 MHz		
15 MHz	DFT-s-OFDM	π/2 BPSK	1	1	22.70	22.62	22.74	0.0	24.0
			1	39	22.61	22.50	22.73	0.0	24.0
			1	77	22.68	22.63	22.71	0.0	24.0
			36	0	21.69	21.59	21.72	0.5	23.5
			36	21	22.68	22.60	22.79	0.0	24.0
			36	43	21.69	21.62	21.75	0.5	23.5
		75	0	21.69	21.61	21.78	0.5	23.5	
		QPSK	1	1	22.65	22.65	22.70	0.0	24.0
			1	39	22.56	22.53	22.67	0.0	24.0
			1	77	22.66	22.66	22.68	0.0	24.0
			36	0	21.69	21.61	21.73	1.0	23.0
			36	21	22.70	22.61	22.79	0.0	24.0
			36	43	21.69	21.63	21.75	1.0	23.0
		75	0	21.68	21.61	21.79	1.0	23.0	
		16QAM	1	1	21.62	21.78	21.65	1.0	23.0
			1	39	21.59	21.68	21.67	1.0	23.0
			1	77	21.61	21.78	21.67	1.0	23.0
		64QAM	1	1	20.20	20.24	20.25	2.5	21.5
256QAM	1	1	18.22	18.09	18.22	4.5	19.5		
CP-OFDM	QPSK	1	1	21.17	21.18	21.34	1.5	22.5	

BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					371000	376500	382000		
					1855.00 MHz	1882.50 MHz	1910.00 MHz		
10 MHz	DFT-s-OFDM	$\pi/2$ BPSK	1	1	22.73	22.64	22.75	0.0	24.0
			1	25	22.78	22.66	22.84	0.0	24.0
			1	50	22.69	22.67	22.72	0.0	24.0
			25	0	21.71	21.64	21.80	0.5	23.5
			25	13	22.70	22.64	22.78	0.0	24.0
			25	27	21.72	21.62	21.73	0.5	23.5
			50	0	21.71	21.63	21.79	0.5	23.5
		QPSK	1	1	22.77	22.60	22.77	0.0	24.0
			1	25	22.77	22.65	22.85	0.0	24.0
			1	50	22.72	22.60	22.70	0.0	24.0
			25	0	21.70	21.62	21.78	1.0	23.0
			25	13	22.72	22.63	22.77	0.0	24.0
			25	27	21.71	21.63	21.73	1.0	23.0
		16QAM	50	0	21.71	21.63	21.78	1.0	23.0
			1	1	21.78	21.68	21.84	1.0	23.0
			1	25	21.84	21.68	21.98	1.0	23.0
		64QAM	1	50	21.82	21.65	21.78	1.0	23.0
1	1		20.11	20.12	20.37	2.5	21.5		
256QAM	1	1	18.25	18.26	18.35	4.5	19.5		
CP-OFDM	QPSK	1	1	21.29	21.19	21.30	1.5	22.5	
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					370500	376500	382500		
					1852.50 MHz	1882.50 MHz	1912.50 MHz		
5 MHz	DFT-s-OFDM	$\pi/2$ BPSK	1	1	22.67	22.62	22.74	0.0	24.0
			1	12	22.54	22.52	22.60	0.0	24.0
			1	23	22.63	22.61	22.65	0.0	24.0
			12	0	21.66	21.62	21.69	0.5	23.5
			12	6	22.65	22.61	22.68	0.0	24.0
			12	13	21.63	21.60	21.67	0.5	23.5
			25	0	21.65	21.63	21.69	0.5	23.5
		QPSK	1	1	22.70	22.61	22.72	0.0	24.0
			1	12	22.60	22.53	22.59	0.0	24.0
			1	23	22.65	22.62	22.65	0.0	24.0
			12	0	21.63	21.60	21.66	1.0	23.0
			12	6	22.64	22.61	22.69	0.0	24.0
			12	13	21.62	21.61	21.65	1.0	23.0
		16QAM	25	0	21.65	21.60	21.67	1.0	23.0
			1	1	21.58	21.71	21.78	1.0	23.0
			1	12	21.47	21.59	21.69	1.0	23.0
		64QAM	1	23	21.53	21.69	21.73	1.0	23.0
1	1		20.25	20.14	20.35	2.5	21.5		
256QAM	1	1	18.21	18.14	18.23	4.5	19.5		
CP-OFDM	QPSK	1	1	21.11	21.16	21.12	1.5	22.5	

8.2. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v03r01;

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

Test Spec

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

NOTE

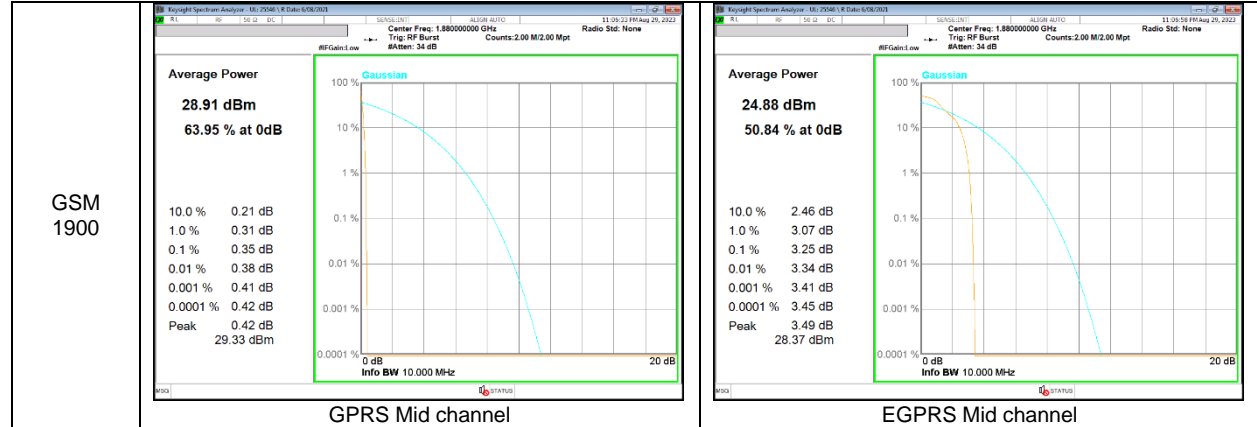
5G NR: All Waveforms (CP-OFDM vs DFT-s_OFDM) and modulations ($\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All Modes of operation were investigated and the worst case configuration results are reported in this section.

RESULTS

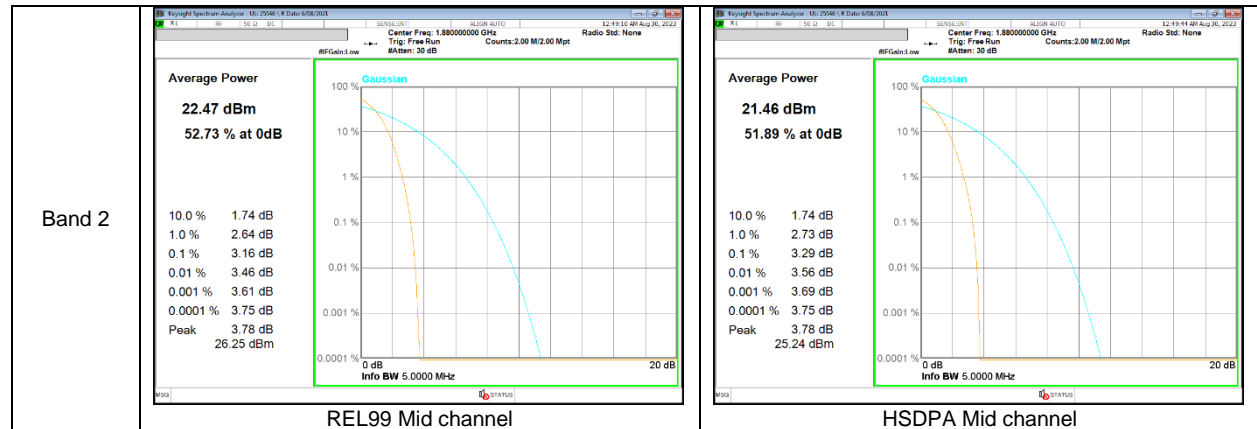
See the following pages.

8.2.1. CONDUCTED PEAK TO AVERAGE RESULT

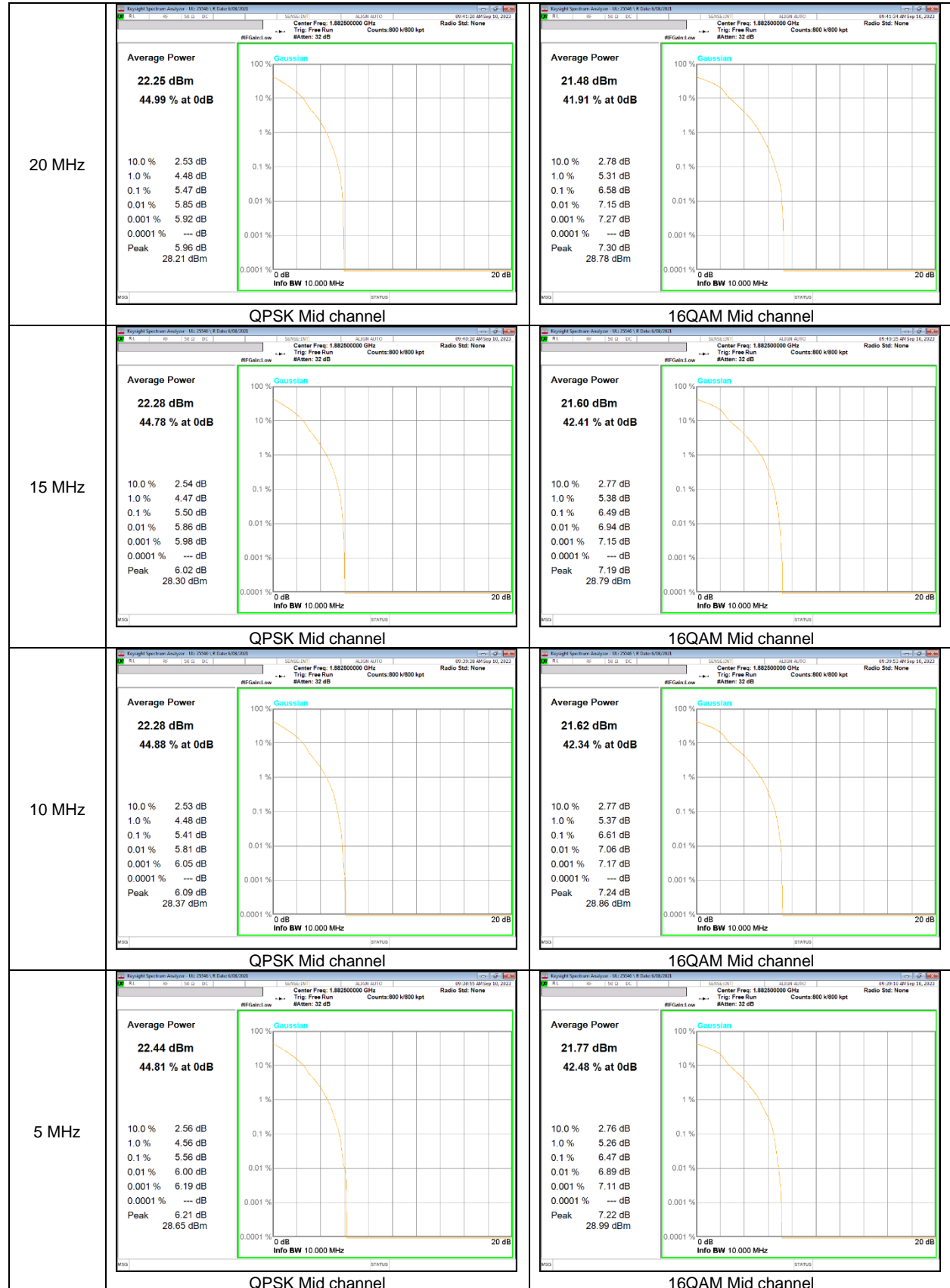
GSM

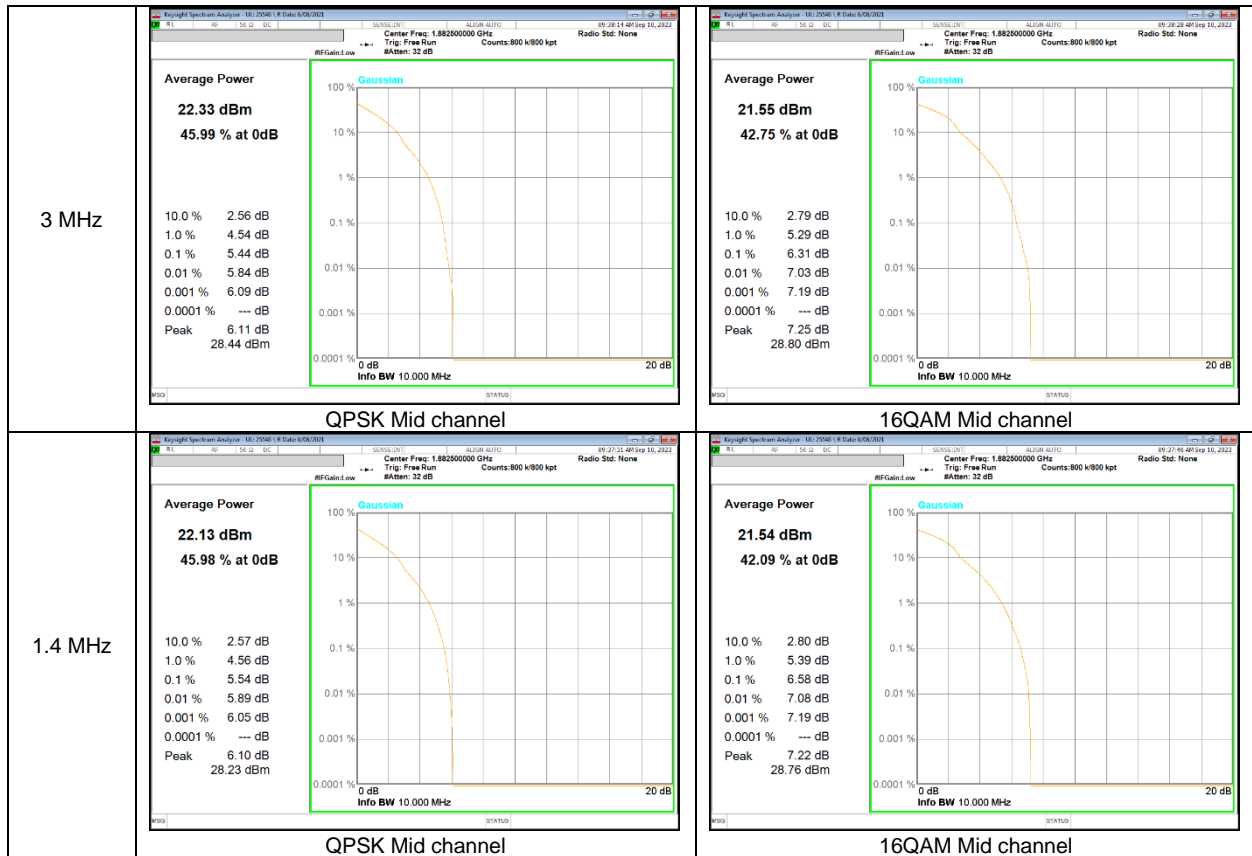


WCDMA

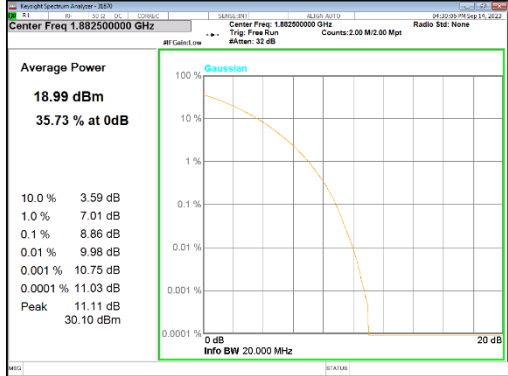
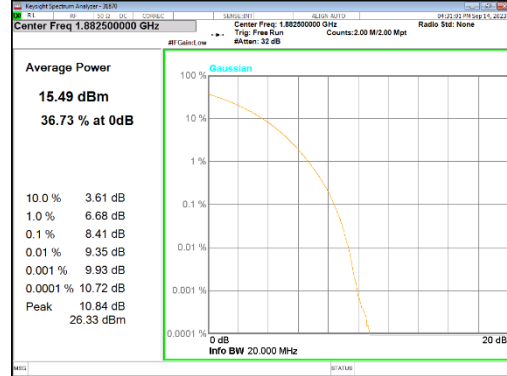
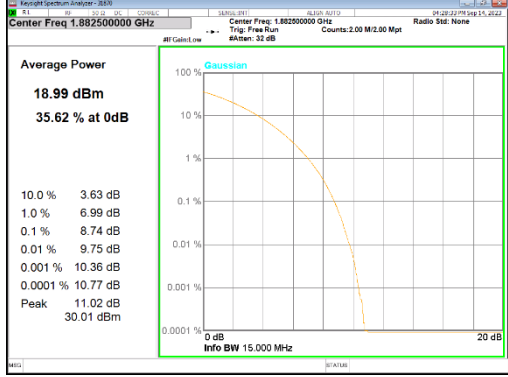
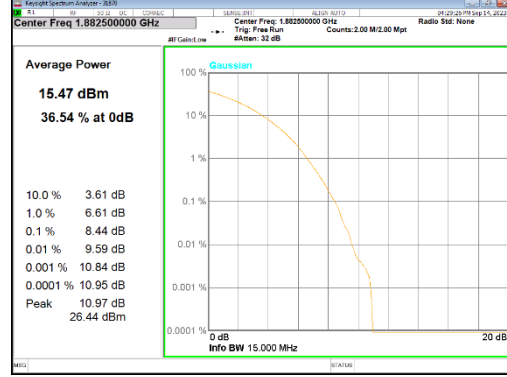
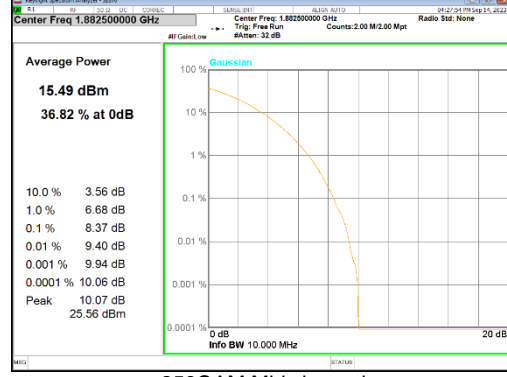
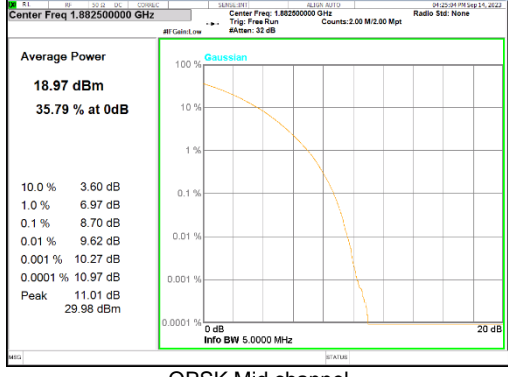
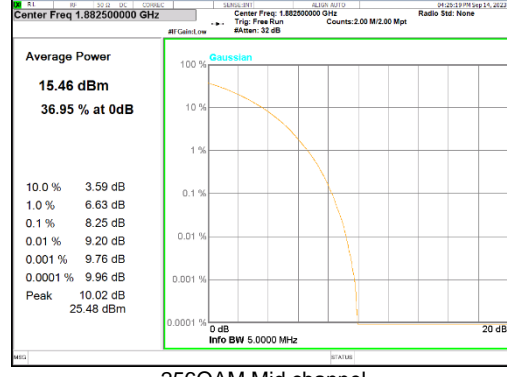


LTE Band 25





NR Band n25 CP-OFDM

<p>20 MHz</p>	 <p>Average Power 18.99 dBm 35.73 % at 0dB</p> <p>10.0 % 3.59 dB 1.0 % 7.01 dB 0.1 % 8.86 dB 0.01 % 9.98 dB 0.001 % 10.75 dB 0.0001 % 11.03 dB Peak 11.11 dB 30.10 dBm</p> <p>QPSK Mid channel</p>	 <p>Average Power 15.49 dBm 36.73 % at 0dB</p> <p>10.0 % 3.61 dB 1.0 % 6.68 dB 0.1 % 8.41 dB 0.01 % 9.35 dB 0.001 % 9.93 dB 0.0001 % 10.72 dB Peak 10.84 dB 26.33 dBm</p> <p>256QAM Mid channel</p>
<p>15 MHz</p>	 <p>Average Power 18.99 dBm 35.62 % at 0dB</p> <p>10.0 % 3.63 dB 1.0 % 6.99 dB 0.1 % 8.74 dB 0.01 % 9.75 dB 0.001 % 10.36 dB 0.0001 % 10.77 dB Peak 11.02 dB 30.01 dBm</p> <p>QPSK Mid channel</p>	 <p>Average Power 15.47 dBm 36.54 % at 0dB</p> <p>10.0 % 3.61 dB 1.0 % 6.61 dB 0.1 % 8.44 dB 0.01 % 9.59 dB 0.001 % 10.84 dB 0.0001 % 10.95 dB Peak 10.97 dB 26.44 dBm</p> <p>256QAM Mid channel</p>
<p>10 MHz</p>	 <p>Average Power 18.96 dBm 35.87 % at 0dB</p> <p>10.0 % 3.60 dB 1.0 % 6.93 dB 0.1 % 8.66 dB 0.01 % 9.61 dB 0.001 % 10.28 dB 0.0001 % 10.74 dB Peak 10.91 dB 29.87 dBm</p> <p>QPSK Mid channel</p>	 <p>Average Power 15.49 dBm 36.82 % at 0dB</p> <p>10.0 % 3.56 dB 1.0 % 6.68 dB 0.1 % 8.37 dB 0.01 % 9.40 dB 0.001 % 9.94 dB 0.0001 % 10.06 dB Peak 10.07 dB 25.56 dBm</p> <p>256QAM Mid channel</p>
<p>5 MHz</p>	 <p>Average Power 18.97 dBm 35.79 % at 0dB</p> <p>10.0 % 3.60 dB 1.0 % 6.97 dB 0.1 % 8.70 dB 0.01 % 9.62 dB 0.001 % 10.27 dB 0.0001 % 10.97 dB Peak 11.01 dB 29.98 dBm</p> <p>QPSK Mid channel</p>	 <p>Average Power 15.46 dBm 36.95 % at 0dB</p> <p>10.0 % 3.59 dB 1.0 % 6.63 dB 0.1 % 8.25 dB 0.01 % 9.20 dB 0.001 % 9.76 dB 0.0001 % 9.96 dB Peak 10.02 dB 25.48 dBm</p> <p>256QAM Mid channel</p>

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	242.41	316.30
	EGPRS		242.58	316.40

- WCDMA

Band	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
B2	Rel.99	1880.0	4.148	4.724
	HSDPA		4.169	4.710

- LTE Band 25

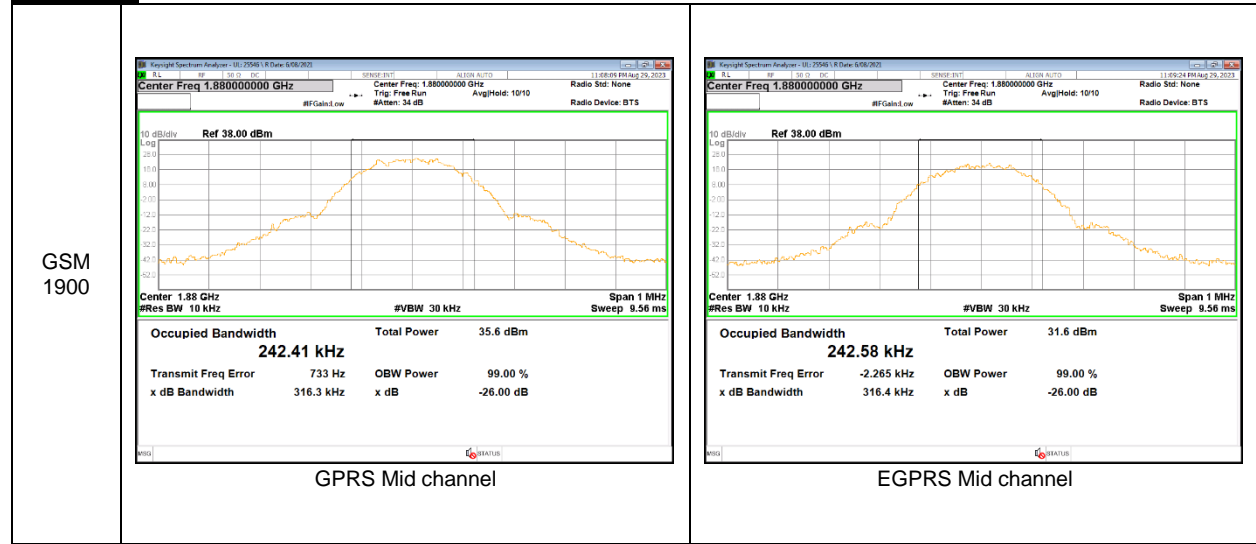
Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B25	20M	QPSK	1882.5	17.886	19.540
		16QAM		17.888	19.860
	15M	QPSK		13.459	14.970
		16QAM		13.412	15.130
	10M	QPSK		8.994	10.590
		16QAM		8.894	10.410
	5M	QPSK		4.513	5.223
		16QAM		4.511	5.242
	3M	QPSK		2.700	3.007
		16QAM		2.706	3.123
	1.4M	QPSK		1.088	1.299
		16QAM		1.085	1.279

- NR Band n25 CP-OFDM

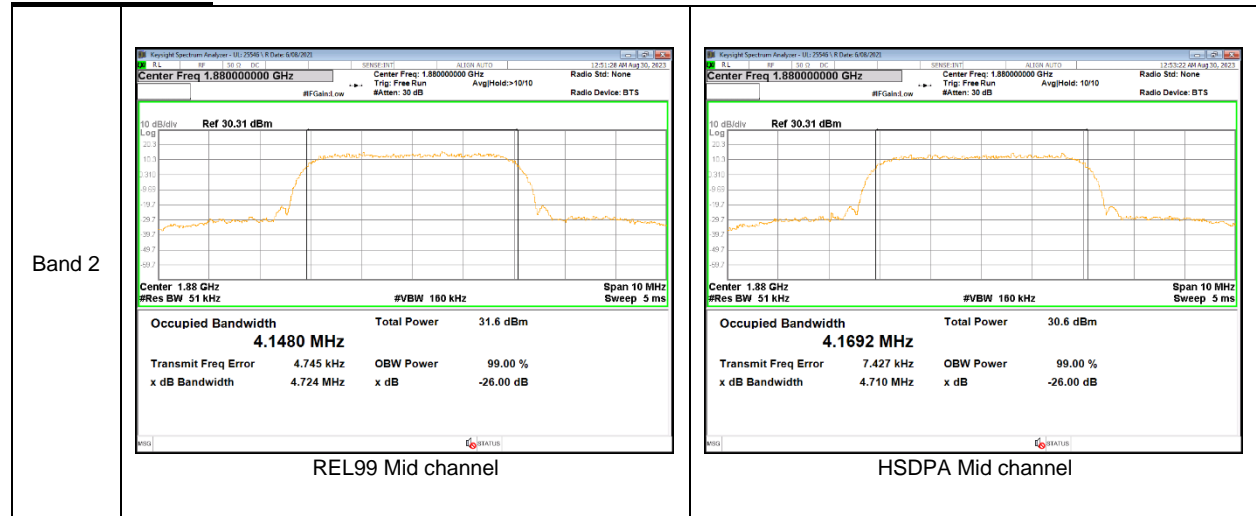
Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
NR n25	20M	QPSK	1882.5	18.896	20.100
		16QAM		18.927	20.400
	15M	QPSK		14.117	14.980
		16QAM		14.134	15.020
	10M	QPSK		9.308	10.170
		16QAM		9.314	10.270
	5M	QPSK		4.500	5.207
		16QAM		4.482	5.070

8.3.1. OCCUPIED BANDWIDTH RESULTS

GSM 1900



WCDMA Band 2



LTE Band 25





NR Band n25 CP-OFDM



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 either CMW500 Test Set or E7515B Test set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

GSM

- a) Set the RBW = 1 - 5% of OBW(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/5G NR

- a) Set the RBW = 1 - 1.5 % of OBW(Typically limited to a minimum RBW of 1% of the OBW)
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 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.

NOTE3

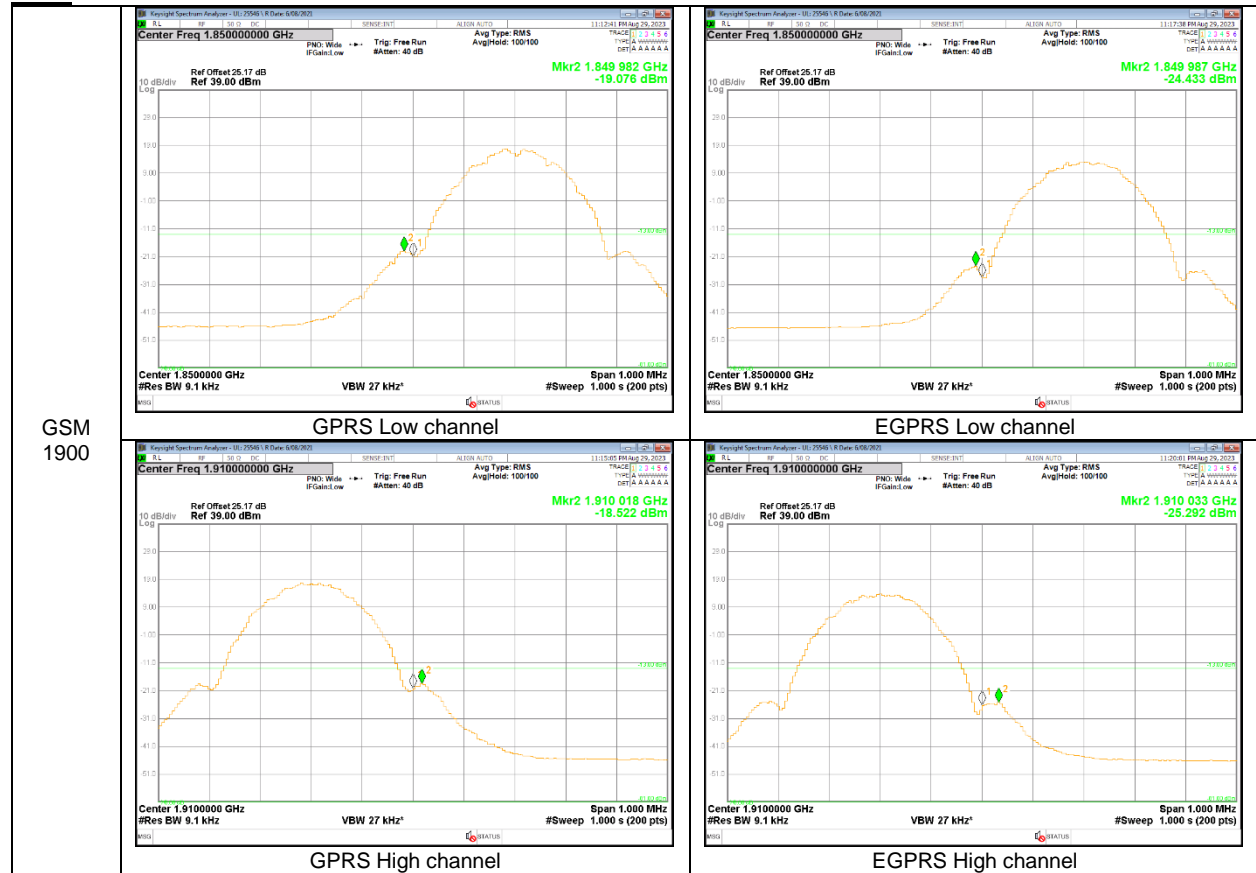
5G NR: All Waveforms (CP-OFDM vs DFT-s_OFDM) and modulations ($\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All Modes of operation were investigated and the worst case configuration results are reported in this section.

RESULTS

See the following pages.

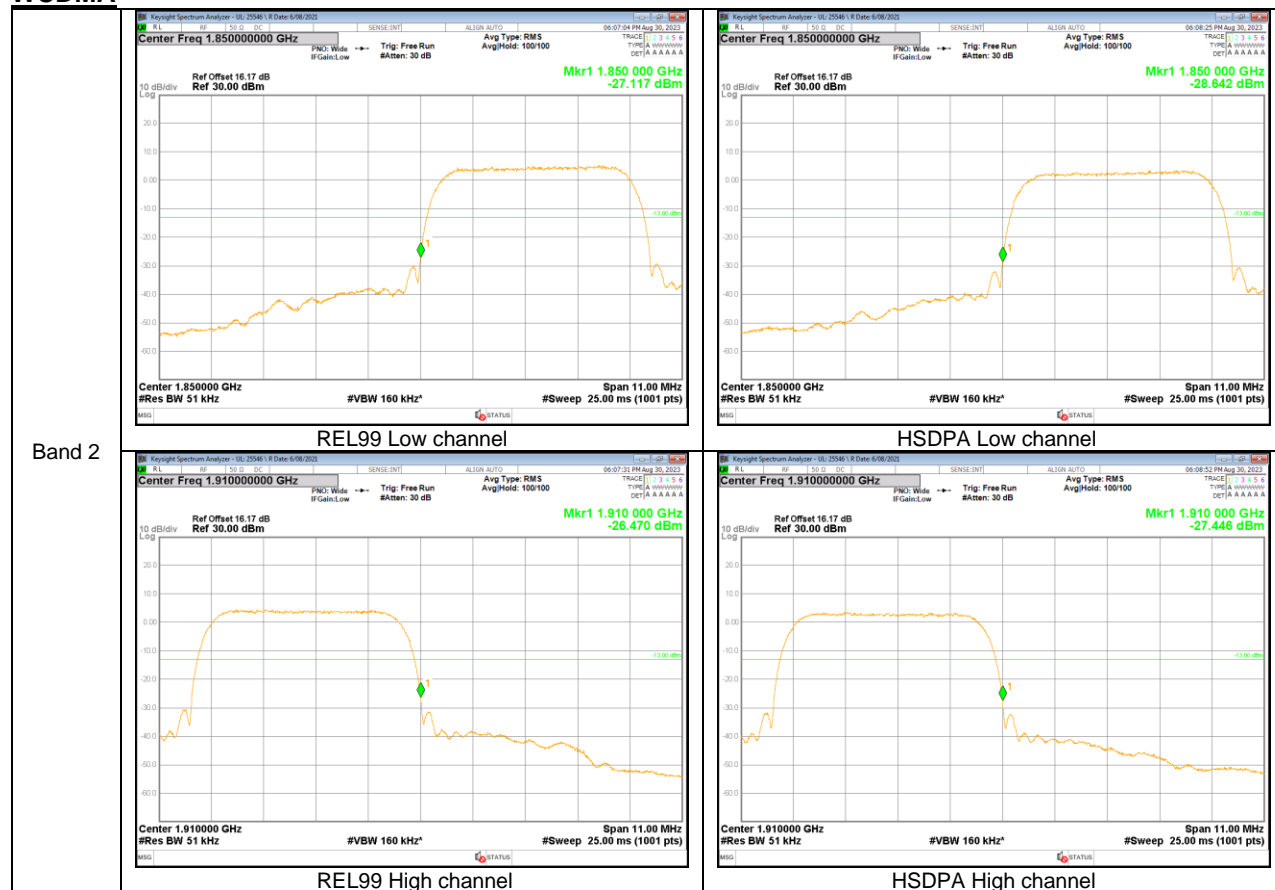
8.4.1. BAND EDGE RESULT

GSM

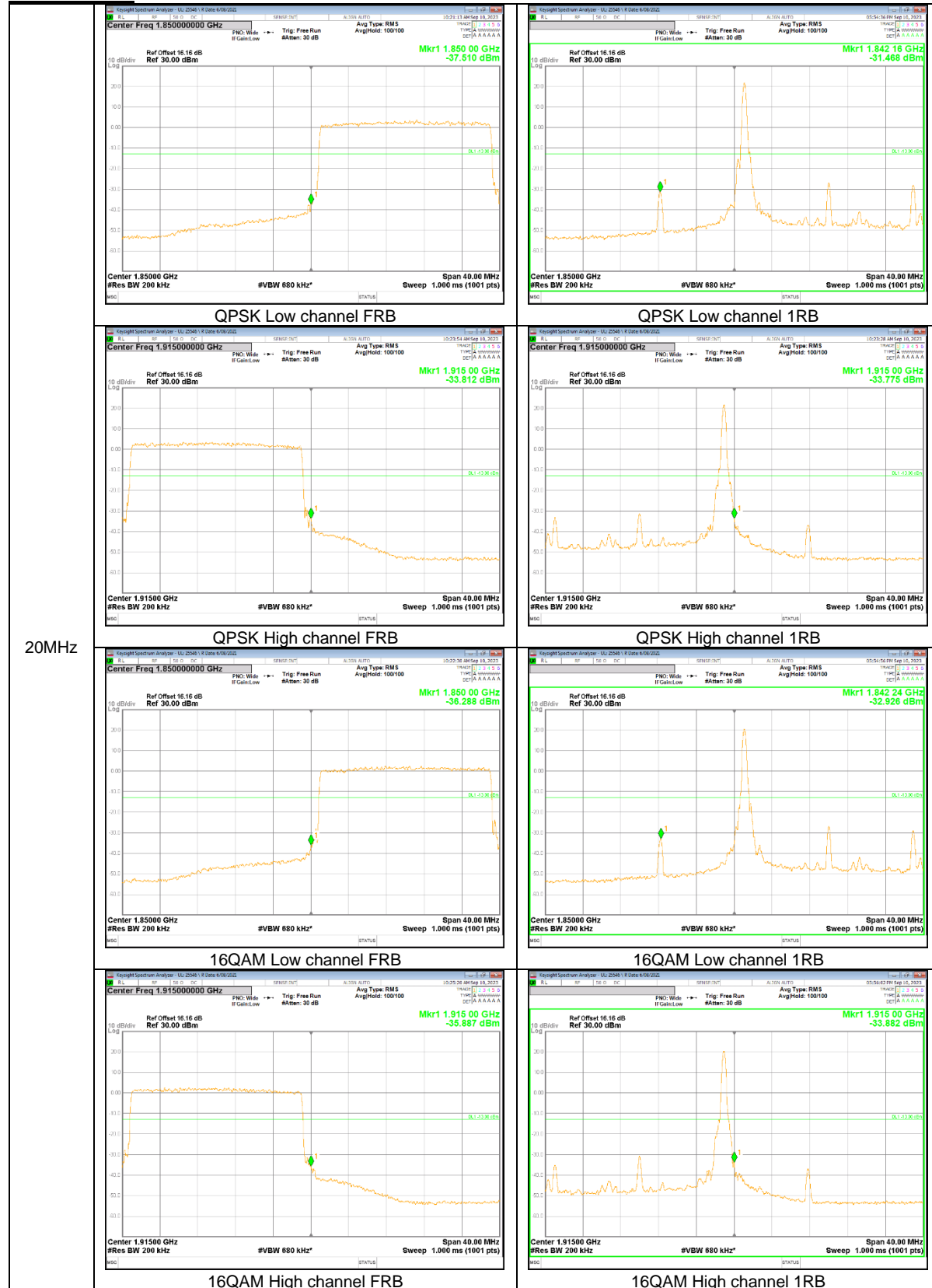


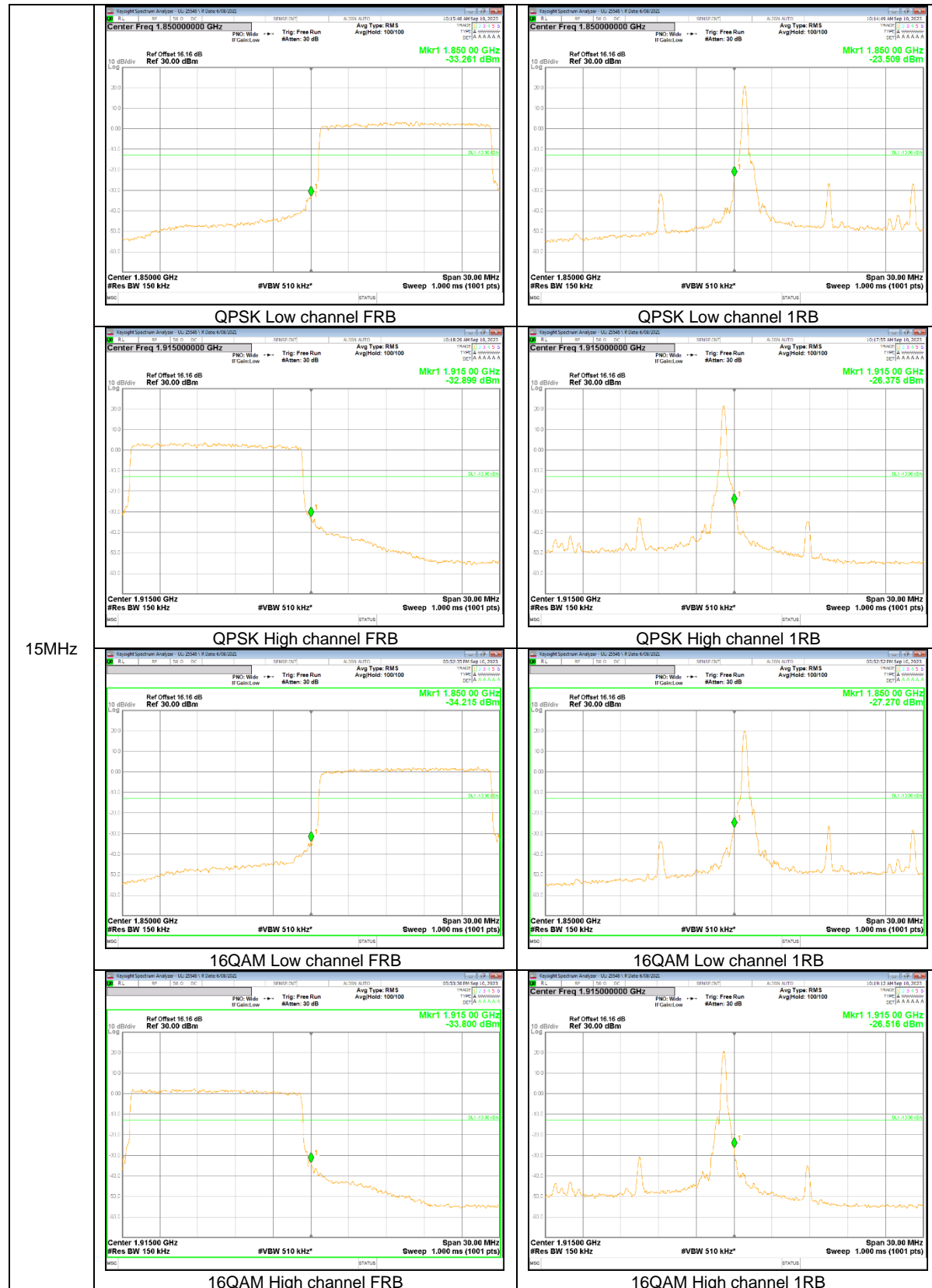
GSM
1900

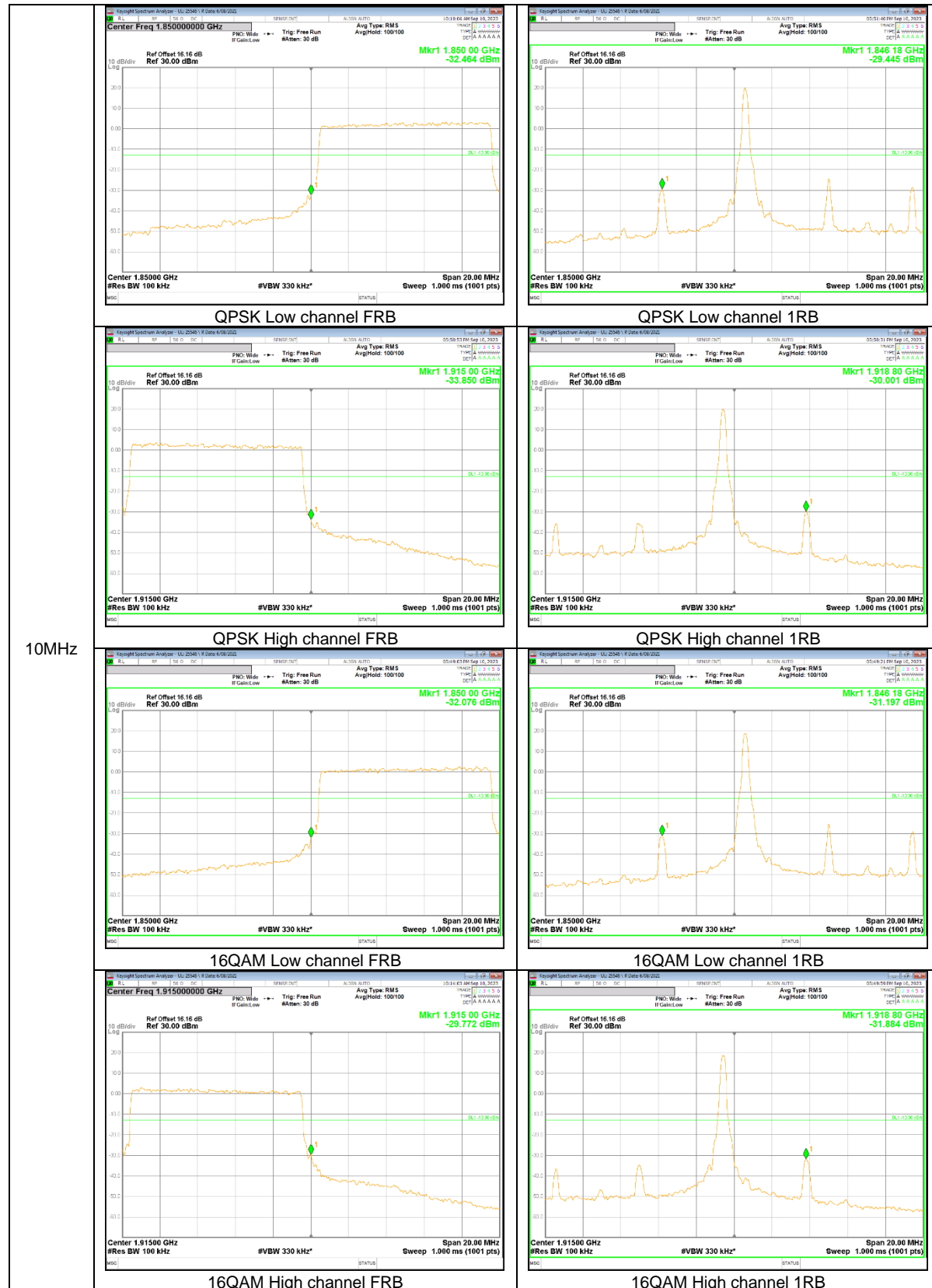
WCDMA



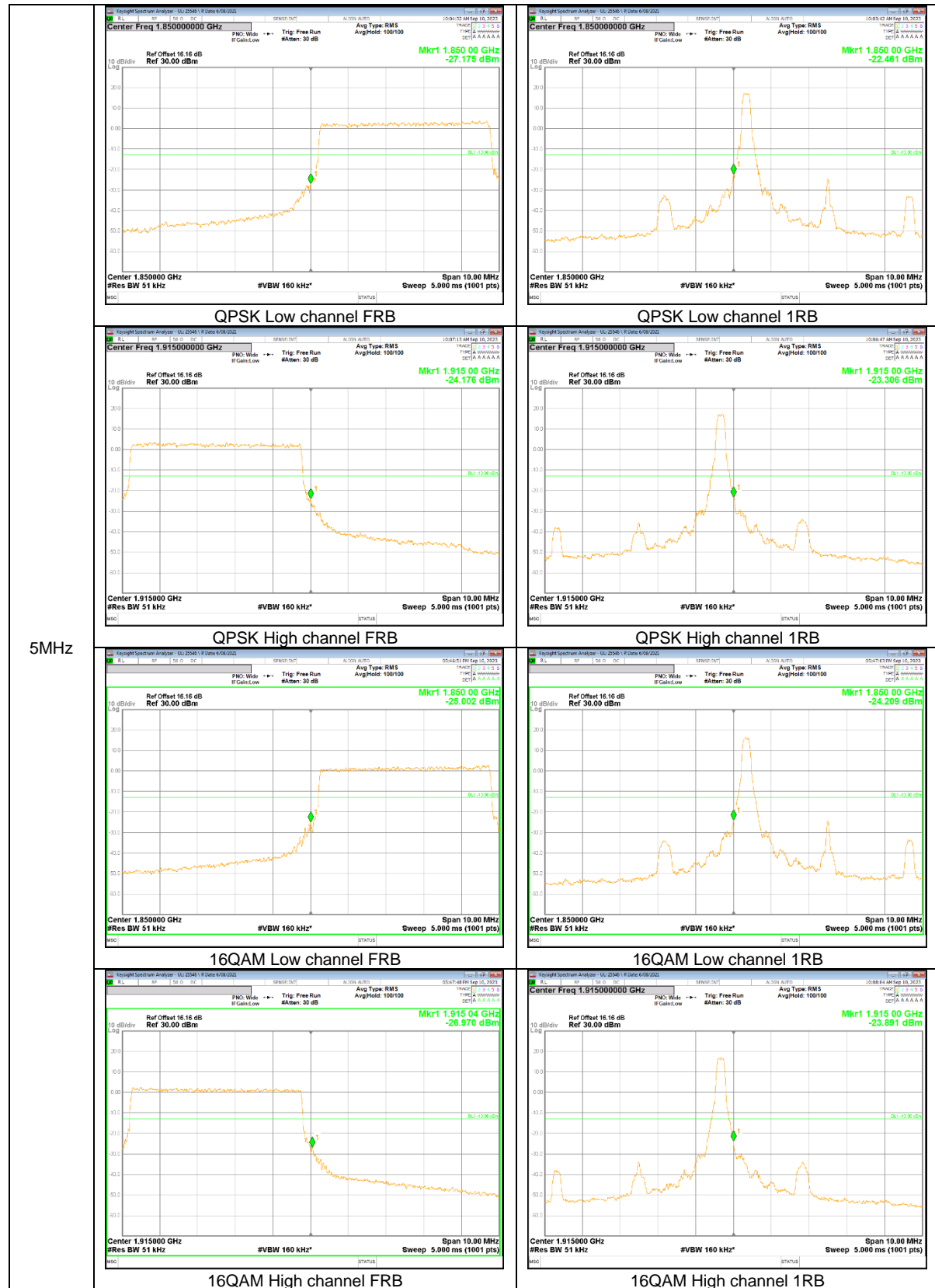
LTE Band 25



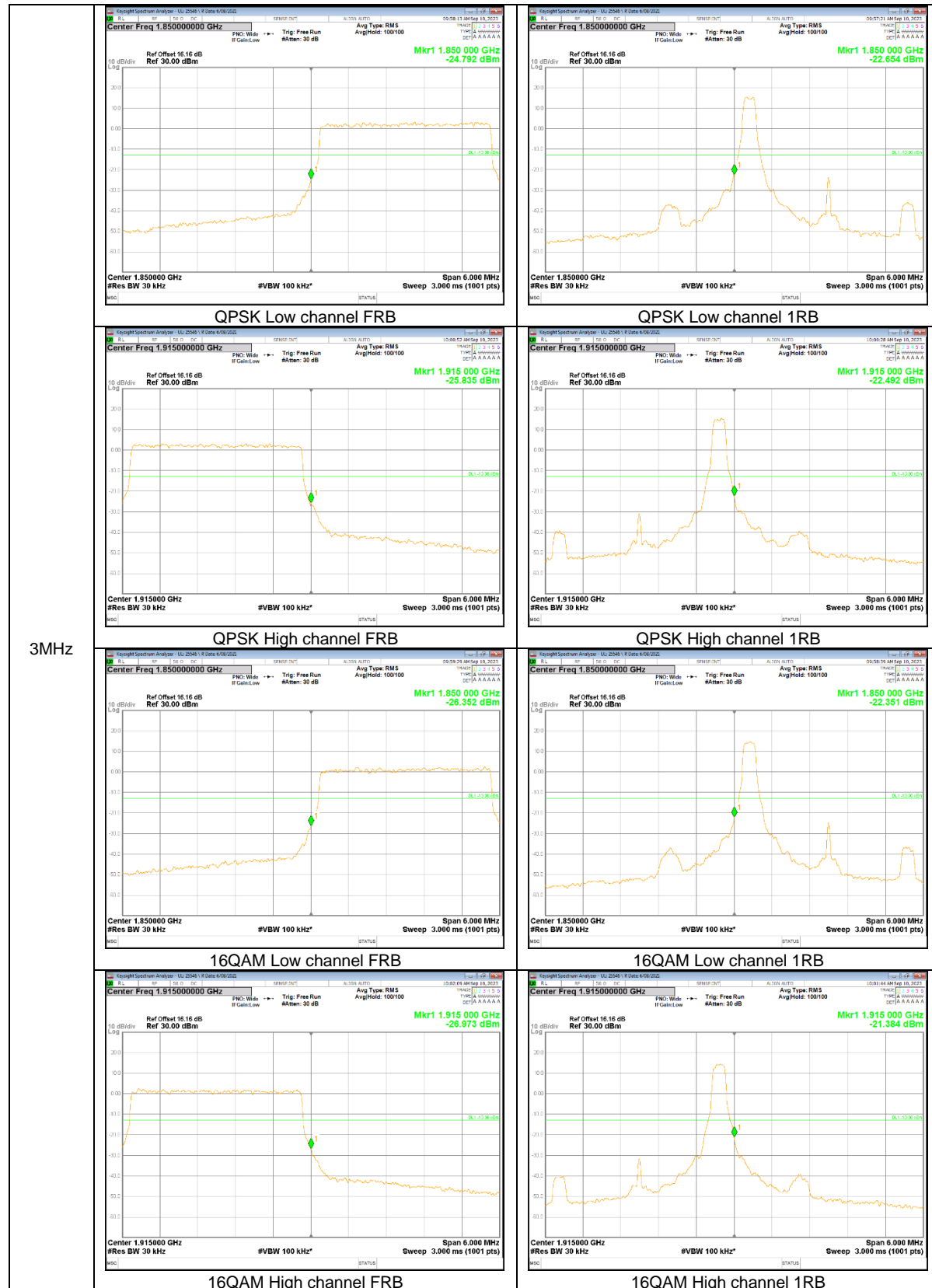




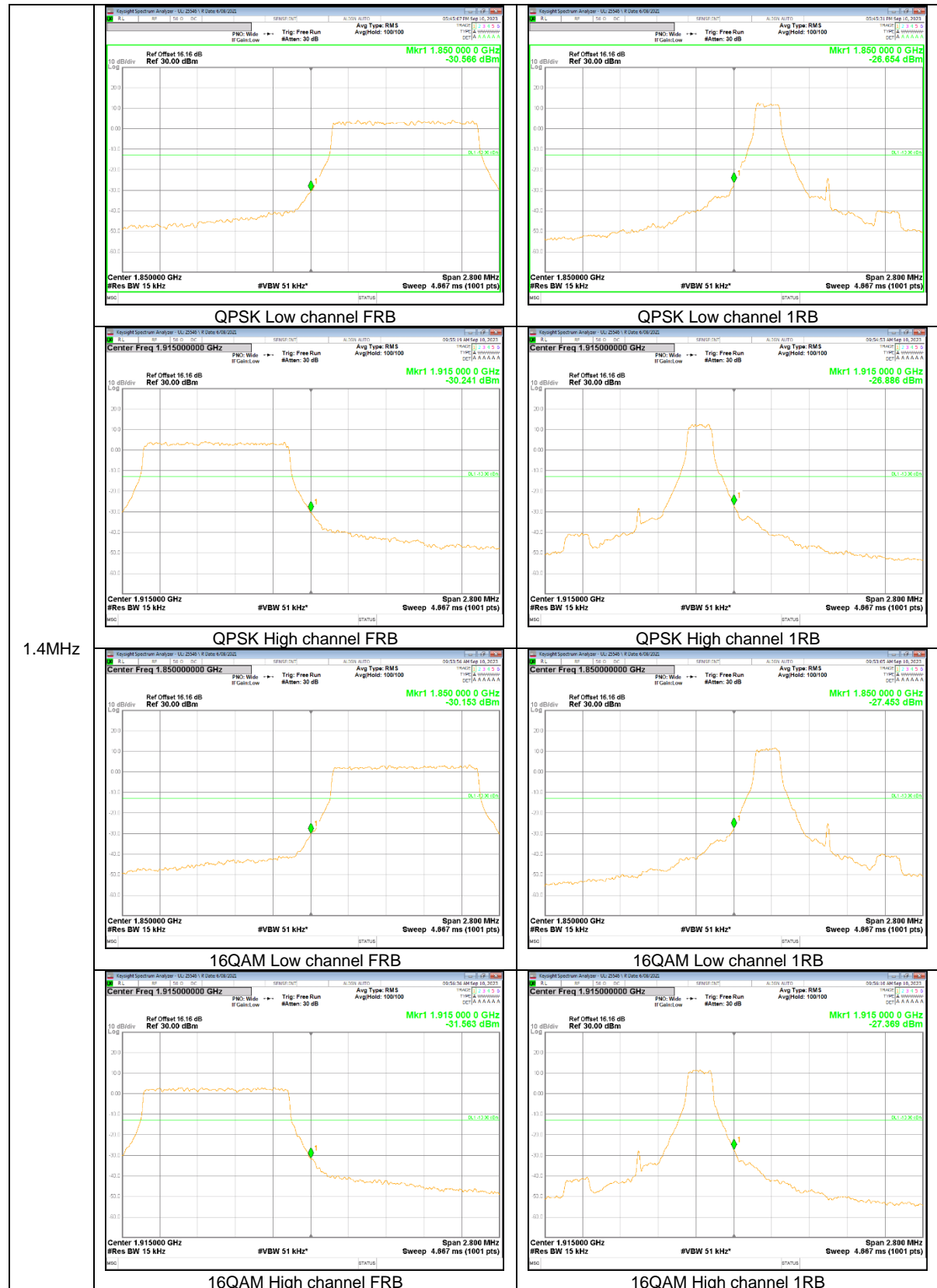
10MHz



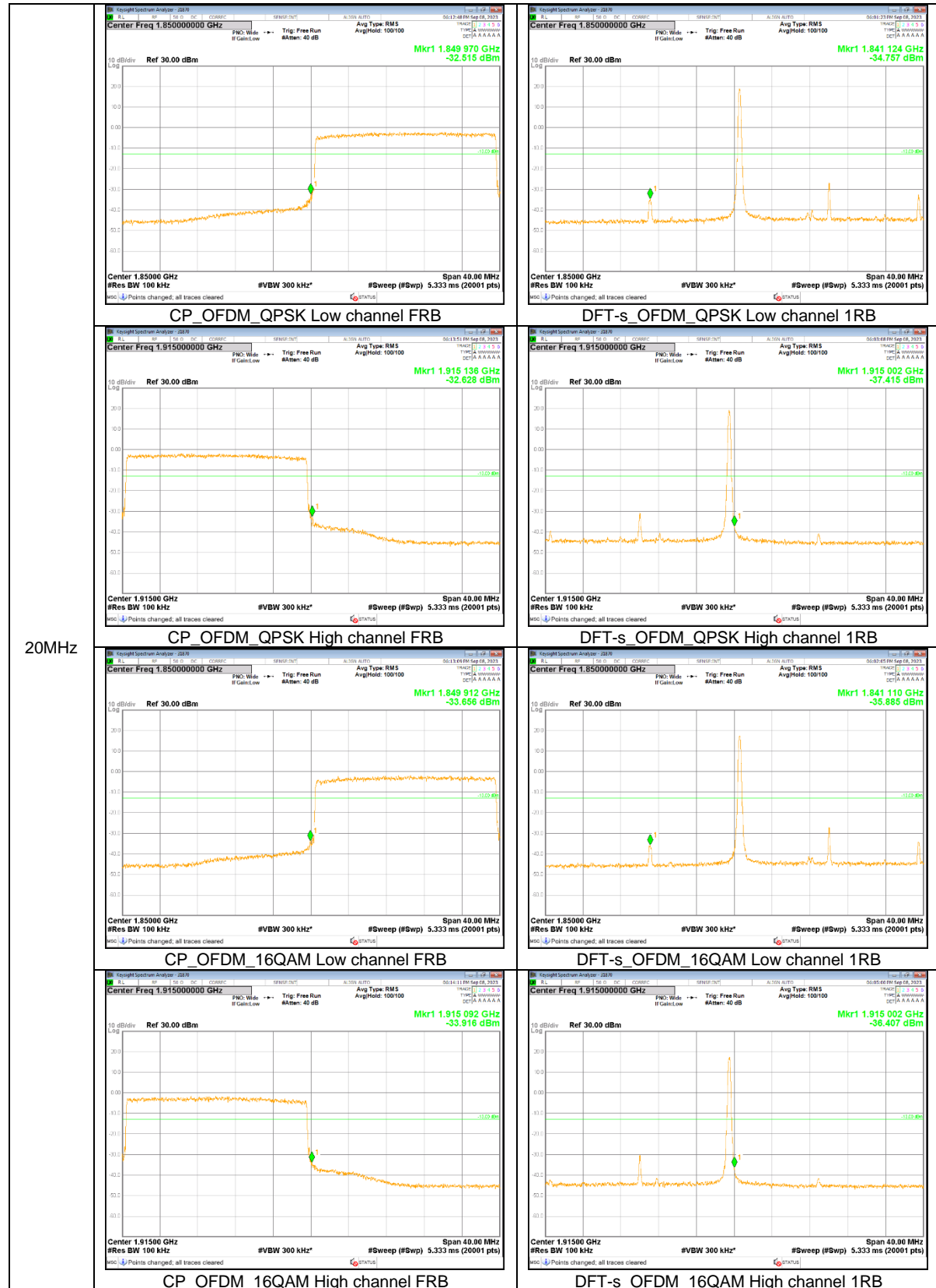
5MHz

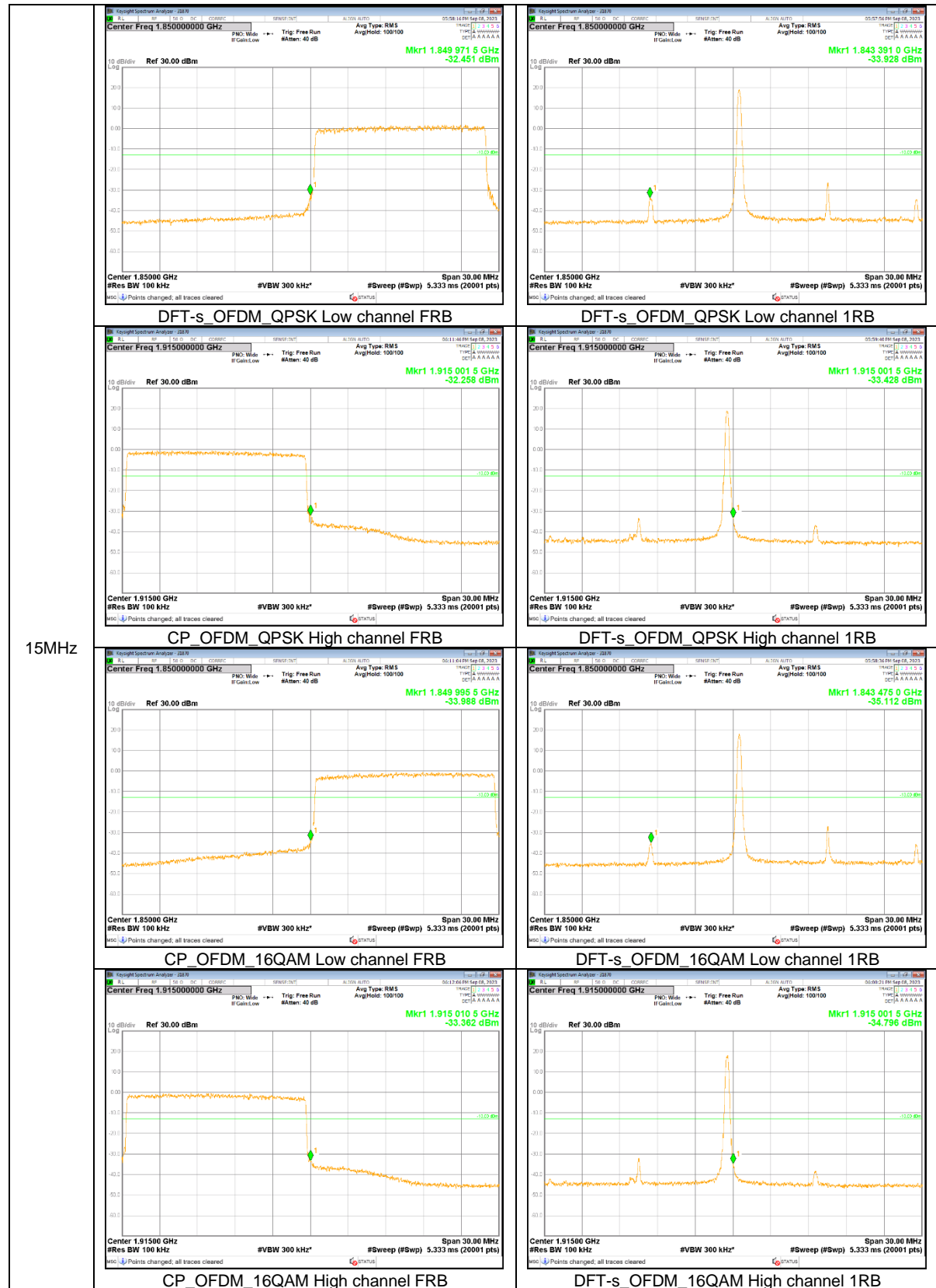


3MHz



NR Band n25





15MHz