

# CERTIFICATION TEST REPORT

**Report Number.** : 4790976580-E2V2

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

**Model** : SC-51E, SCG25

**FCC ID** : A3LSMS921JPN

**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 22 SUBPART H

**Date Of Issue:**  
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**Prepared by:**  
UL KOREA LTD.  
26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

Suwon Test Site: UL KOREA LTD. Suwon Laboratory  
218 Maeyeong-ro, Yeongtong-gu,  
Suwon-si, Gyeonggi-do, 16675, Korea  
TEL: (031) 337-9902  
FAX: (031) 213-5433

Revision History

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## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS .....</b>	<b>4</b>
<b>2. TEST METHODOLOGY .....</b>	<b>5</b>
<b>3. FACILITIES AND ACCREDITATION .....</b>	<b>5</b>
<b>4. CALIBRATION AND UNCERTAINTY .....</b>	<b>6</b>
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i> .....	6
4.2. <i>SAMPLE CALCULATION</i> .....	6
4.3. <i>MEASUREMENT UNCERTAINTY</i> .....	6
4.4. <i>DECISION RULE</i> .....	6
<b>5. EQUIPMENT UNDER TEST .....</b>	<b>7</b>
5.1. <i>DESCRIPTION OF EUT</i> .....	7
5.2. <i>MAXIMUM OUTPUT POWER</i> .....	7
5.3. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i> .....	10
5.4. <i>WORST-CASE ORIENTATION</i> .....	10
5.5. <i>DESCRIPTION OF TEST SETUP</i> .....	13
<b>6. TEST AND MEASUREMENT EQUIPMENT .....</b>	<b>15</b>
<b>7. SUMMARY TABLE .....</b>	<b>16</b>
<b>8. CONDUCTED RESULTS.....</b>	<b>17</b>
8.1. <i>CONDUCTED OUTPUT POWER</i> .....	17
8.1.1. <i>CONDUCTED AVERAGE OUTPUT POWER</i> .....	18
8.2. <i>PEAK TO AVERAGE RATIO</i> .....	29
8.2.1. <i>CONDUCTED PEAK TO AVERAGE RESULTS</i> .....	30
8.3. <i>OCCUPIED BANDWIDTH</i> .....	33
8.3.1. <i>OCCUPIED BANDWIDTH RESULTS</i> .....	35
8.4. <i>BAND EDGE EMISSIONS</i> .....	38
8.4.1. <i>BAND EDGE RESULTS</i> .....	40
8.5. <i>CONDUCTED SPURIOUS EMISSIONS</i> .....	49
8.5.1. <i>OUT OF BAND EMISSIONS RESULTS</i> .....	50
8.6. <i>FREQUENCY STABILITY</i> .....	54
8.6.1. <i>FREQUENCY STABILITY RESULTS</i> .....	55
<b>9. RADIATED RESULTS.....</b>	<b>57</b>
9.1. <i>RADIATED POWER (ERP)</i> .....	57
9.1.1. <i>ERP RESULTS</i> .....	58
9.2. <i>RADIATED SPURIOUS EMISSION</i> .....	60
9.2.1. <i>SPURIOUS RADIATION RESULTS</i> .....	61

# 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:** SC-51E, SCG25

**SERIAL NUMBER:** R3CWB0FGXJP, R3CWB0FGWHA (CONDUCTED);  
R3CWB0FGVYP, R3CWB0FGX1A, R3CWB0FGWVN, R3CWB0FGVLK,  
R3CWB0FGW7E (RADIATED);

**DATE TESTED:** 2023-12-12 - 2024-01-19;

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H	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:



Seokhwan Hong  
Suwon Lab Engineer  
UL KOREA LTD.

Tested By:



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 22.
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 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:

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

(Path loss = Signal generator output – PSA reading with substitution antenna)

### 4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.80 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
		SCG25
SC-51E	Hardware	Same as SC-51E
	Software	Different UI

The model SC-51E 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 ERP output powers as follows:

#### GSM

FCC Part 22							
Band	ANT	Frequency Range [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
GSM 850	A	824.20 ~ 848.80	GPRS	<b>31.97</b>	<b>1573.98</b>	<b>26.24</b>	420.73
			EGPRS	26.94	494.31	22.12	162.93
FCC Part 22							
Band	ANT	Frequency Range [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
GSM 850	E	824.20 ~ 848.80	GPRS	<b>32.63</b>	<b>1832.31</b>	<b>29.05</b>	803.53
			EGPRS	27.51	563.64	27.13	516.42

#### WCDMA

FCC Part 22							
Band	ANT	Frequency Range [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5	A	826.40 ~ 846.60	Rel. 99	<b>23.70</b>	<b>234.42</b>	<b>19.92</b>	98.17
			HSDPA	22.70	186.21	19.09	81.10
FCC Part 22							
Band	ANT	Frequency Range [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5	E	826.40 ~ 846.60	Rel. 99	<b>24.41</b>	<b>276.06</b>	<b>20.37</b>	108.89
			HSDPA	23.39	218.27	19.97	99.31

**LTE Band 5**

FCC Part 22								
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
					Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5	A	829.00 ~ 844.00	10	QPSK	24.05	254.10	19.89	97.50
				16QAM	23.40	218.78	18.84	76.56
				64QAM	22.30	169.82		
		826.50 ~ 846.50	5	QPSK	24.06	254.68	19.89	97.50
				16QAM	23.40	218.78	18.83	76.38
				64QAM	22.28	169.04		
		825.50 ~ 847.50	3	QPSK	23.98	250.03	18.75	74.99
				16QAM	23.42	219.79	18.88	77.27
				64QAM	22.29	169.43		
		824.70 ~ 848.30	1.4	QPSK	24.03	252.93	18.74	74.82
				16QAM	23.41	219.28	18.76	75.16
				64QAM	22.32	170.61		
FCC Part 22								
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
					Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5	E	829.00 ~ 844.00	10	QPSK	24.74	297.85	21.09	128.53
				16QAM	23.99	250.61	20.25	105.93
				64QAM	22.97	198.15		
		826.50 ~ 846.50	5	QPSK	24.37	273.53	20.69	117.22
				16QAM	23.74	236.59	19.81	95.72
				64QAM	22.58	181.13		
		825.50 ~ 847.50	3	QPSK	24.30	269.15	19.94	98.63
				16QAM	23.68	233.35	20.09	102.09
				64QAM	22.63	183.23		
		824.70 ~ 848.30	1.4	QPSK	24.28	267.92	19.91	97.95
				16QAM	23.68	233.35	20.09	102.09
				64QAM	22.60	181.97		



**NR Band n5**

FCC Part 22									
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Mode	Conducted		Radiated	
						Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
n5	A	834.00 - 839.00	20	DFT-s OFDM	$\pi/2$ BPSK	23.93	247.17	<b>18.28</b>	<b>67.30</b>
					QPSK	23.92	246.60		
					16QAM	22.77	189.23	17.83	60.67
					64QAM	21.56	143.22		
					256QAM	18.75	74.99		
		831.50 - 841.50	15	DFT-s OFDM	$\pi/2$ BPSK	23.96	248.89	18.15	65.31
					QPSK	23.94	247.74		
					16QAM	22.79	190.11	17.78	59.98
					64QAM	21.61	144.88		
					256QAM	18.92	77.98		
		829.00 - 844.00	10	DFT-s OFDM	$\pi/2$ BPSK	24.01	251.77	18.20	66.07
					QPSK	23.99	250.61		
					16QAM	22.84	192.31	17.74	59.43
					64QAM	21.54	142.56		
					256QAM	18.82	76.21		
		826.50 - 846.50	5	DFT-s OFDM	$\pi/2$ BPSK	<b>24.06</b>	<b>254.68</b>	18.24	66.68
					QPSK	24.05	254.10		
					16QAM	22.91	195.43	17.77	59.84
					64QAM	21.59	144.21		
					256QAM	18.92	77.98		
		CP-OFDM	QPSK	22.64	183.65				
FCC Part 22									
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Mode	Conducted		Radiated	
						Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
n5	E	834.00 - 839.00	20	DFT-s OFDM	$\pi/2$ BPSK	24.64	291.07	19.68	92.90
					QPSK	24.59	287.74		
					16QAM	23.49	223.36	19.04	80.17
					64QAM	22.24	167.49		
					256QAM	19.48	88.72		
		831.50 - 841.50	15	DFT-s OFDM	$\pi/2$ BPSK	24.62	289.73	19.63	91.83
					QPSK	24.58	287.08		
					16QAM	23.52	224.91	18.91	77.80
					64QAM	22.22	166.72		
					256QAM	19.51	89.33		
		829.00 - 844.00	10	DFT-s OFDM	$\pi/2$ BPSK	24.67	293.09	19.73	93.97
					QPSK	24.68	293.76		
					16QAM	23.54	225.94	18.85	76.74
					64QAM	22.23	167.11		
					256QAM	19.46	88.31		
		826.50 - 846.50	5	DFT-s OFDM	$\pi/2$ BPSK	<b>24.75</b>	<b>298.54</b>	<b>19.78</b>	<b>95.06</b>
					QPSK	<b>24.75</b>	<b>298.54</b>		
					16QAM	23.67	232.81	18.84	76.56
					64QAM	22.24	167.49		
					256QAM	19.57	90.57		
		CP-OFDM	QPSK	23.22	209.89				

### 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)	ANT	Peak Gain (dBi)
GSM850 / WCDMA Band 5 / LTE Band 5 / NR Band n5 824 - 849 MHz	A	-5.1
	E	-7.1

### 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 5 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 modulations. It was found QPSK and 16QAM results were worst case.

This device supports AsDiv Mode and Tx Device hopping Mode. Output Power measurements were measured and reported. So the test case is below.

LTE Band	ASDiv
LTE B5	Antenna Switching

Test Item	Test case antenna & port
Conducted output power	All
RF port test	Worst case
ERP	All
Radiated Spurious Emissions	All

For 5G NR n5 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  $\pi/2$  BPSK and 16QAM results were worst case.

This device supports NSA and SA Mode and ASDiv Mode. Output Power measurements were measured on entire Mode and worst case is reported.  
 worst case is SA Mode and ASDiv Mode. So the test case is as below.

NR Band	NSA	SA	ASDiv
n5	LTE B2, B66	Standard alone	Antenna Switching

Test Item	Test case antenna & port
Conducted output power	All
RF port test	Worst case
ERP	All
Radiated Spurious Emissions	All

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

Band	Main ANT	Tune up Limit (dBm)	Sub ANT	Tune up Limit (dBm)
GSM 850	A	33.0	<u>E</u>	<u>33.0</u>
WCDMA B5	A	25.0	<u>E</u>	<u>25.0</u>
LTE B5	A	25.0	<u>E</u>	<u>25.0</u>
NR n5	A	25.0	<u>E</u>	<u>25.0</u>

● Conducted Spurious Emission

Highest conducted output power setting for each bands					
LTE Band	ANT	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
5	A	826.50	5	1	0
		836.50		1	0
		846.50		1	0
NR Band	ANT	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
5	A	826.50	5	1	1
		836.50		1	1
		846.50		1	23

● Radiated Spurious Emission

Highest ERP setting for each bands					
LTE Band	ANT	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
5	A	829.00	10	1	0
		836.50		1	0
		844.00		1	0
5	E	829.00	10	1	25
		836.50		1	0
		844.00		1	0
NR Band	ANT	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
5	A	826.50	5	1	1
		836.50		1	1
		846.50		1	23
5	E	826.50	5	1	23
		836.50		1	1
		846.50		1	23

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

Band	ANT	ERP			RSE		
		X	Y	Z	X	Y	Z
GSM 850	A	-	-	O	-	-	O
WCDMA B5	A	-	-	O	-	-	O
LTE B5	A	-	-	O	-	O	-
NR n5	A	-	-	O	-	-	O

Note : For the 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	R37W61WENTASEA	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02117A	N/A

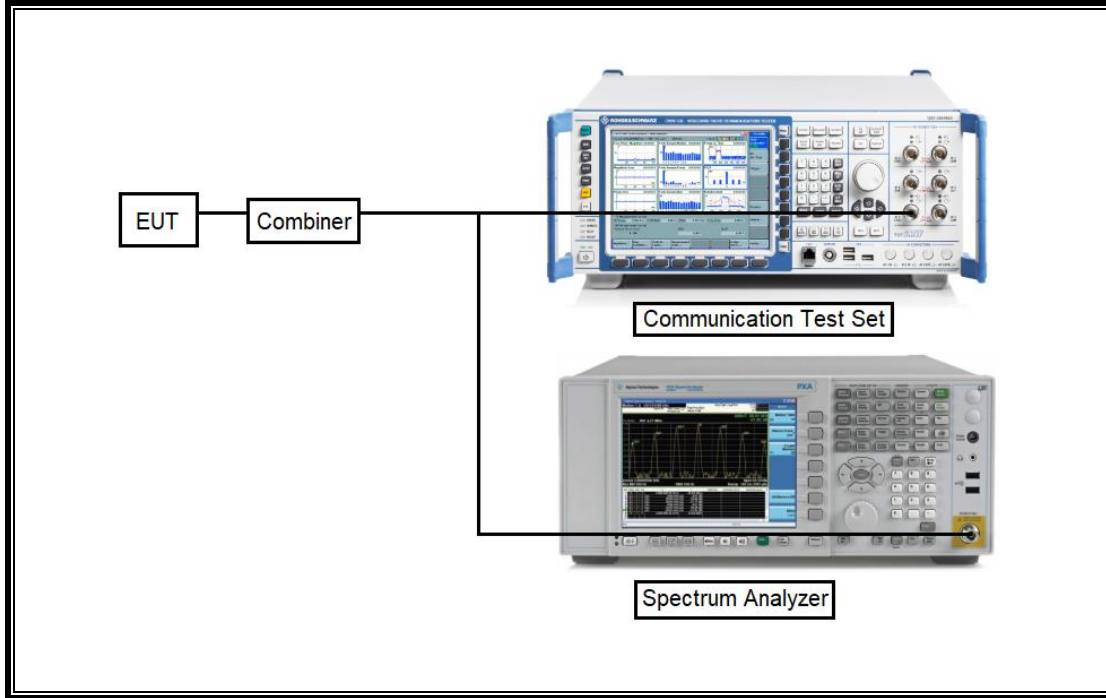
### I/O CABLE

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

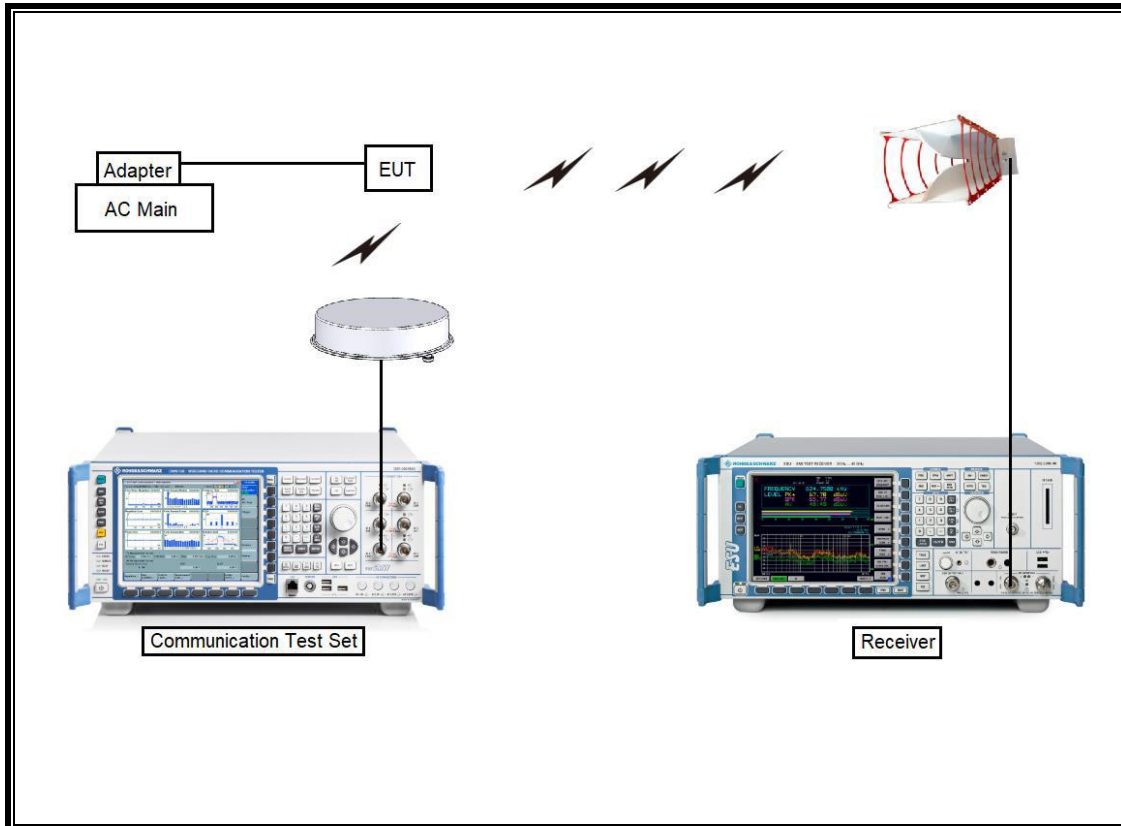
### TEST SETUP

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	CMW500	169797	2024-07-23
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	MY57143717	2024-07-24
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	2025-01-02
Power Splitter	MINI-CIRCUITS	WA1534	UL004	2025-01-02
UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY57510655	2025-01-03
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 Results
2.1046	Conducted Output Power	N/A	Conducted	Pass
2.1049	Occupied Bandwidth (99%)	N/A		Pass
22.917(a)	Conducted Band Edge / Conducted Spurious Emission	-13 dBm		Pass
22.355	Frequency Stability	2.5 ppm		Pass
22.913(a)(5)	Effective Radiated Power	38.5 dBm	Radiated	Pass
22.917(a)	Radiated Spurious Emission	-13 dBm		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	Maximum Average Power (dBm)			
			Measured		Tune-up Limit	
			Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM (Voice)	CS1	1	31.84	22.81	33.0	24.0
			31.97	22.94		
			31.91	22.88		
GPRS (GMSK)	CS1	1	31.84	22.81	33.0	24.0
			31.90	22.87		
			31.80	22.77		
		2	30.60	24.58	32.5	26.5
			30.64	24.62		
			30.63	24.61		
		3	28.87	24.61	30.5	26.2
			28.80	24.54		
			28.78	24.52		
		4	27.00	23.99	28.5	25.5
			27.09	24.08		
			27.09	24.08		
EGPRS (8PSK)	MCS5	1	26.43	17.40	28.0	19.0
			26.93	17.90		
			26.94	17.91		
		2	24.76	18.74	26.0	20.0
			25.62	19.60		
			25.51	19.49		
		3	23.87	19.61	25.5	21.2
			24.74	20.48		
			24.64	20.38		
		4	23.44	20.43	25.5	22.5
			24.31	21.30		
			24.22	21.21		

**GSM (ANT E)**

Mode	Coding Scheme	Time Slots	Maximum Average Power (dBm)					
			Measured		Tune-up Limit			
			Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr		
GSM (Voice)	CS1	1	32.24	23.21	33.0	24.0		
			32.49	23.46				
			32.42	23.39				
GPRS (GMSK)	CS1	1	32.38	23.35	33.0	24.0		
			32.63	23.60				
			32.26	23.23				
		2	31.07	25.05	32.5	26.5		
			31.24	25.22				
			31.19	25.17				
		3	29.32	25.06	30.5	26.2		
			29.31	25.05				
			29.30	25.04				
		4	27.60	24.59	28.5	25.5		
			27.66	24.65				
			27.64	24.63				
		EGPRS (8PSK)	MCS5	1	26.88	17.85	28.0	19.0
					27.51	18.48		
					27.49	18.46		
2	25.21			19.19	26.0	20.0		
	25.98			19.96				
	25.78			19.76				
3	24.32			20.06	25.5	21.2		
	25.20			20.94				
	25.28			21.02				
4	23.90			20.89	25.5	22.5		
	24.76			21.75				
	24.85			21.84				

**WCDMA (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)	4132	826.4	23.65	N/A	25.0
		4183	836.6	23.64		
		4233	846.6	23.70		
HSDPA	Subtest 1	4132	826.4	22.65	0	24.0
		4183	836.6	22.67		
		4233	846.6	22.70		
	Subtest 2	4132	826.4	22.65	0	24.0
		4183	836.6	22.66		
		4233	846.6	22.68		
	Subtest 3	4132	826.4	22.15	0.5	23.5
		4183	836.6	22.14		
		4233	846.6	22.17		
	Subtest 4	4132	826.4	22.15	0.5	23.5
		4183	836.6	22.12		
		4233	846.6	22.19		
HSUPA	Subtest 1	4132	826.4	21.51	0	24.0
		4183	836.6	21.64		
		4233	846.6	21.66		
	Subtest 2	4132	826.4	19.91	2	22.0
		4183	836.6	20.77		
		4233	846.6	19.85		
	Subtest 3	4132	826.4	21.62	1	23.0
		4183	836.6	21.11		
		4233	846.6	21.25		
	Subtest 4	4132	826.4	21.74	2	22.0
		4183	836.6	21.66		
		4233	846.6	21.70		
	Subtest 5	4132	826.4	22.60	0	24.0
		4183	836.6	22.67		
		4233	846.6	22.63		

**WCDMA (ANT E)**

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	4132	826.4	24.38	N/A	25.0
		4183	836.6	24.34		
		4233	846.6	24.41		
HSDPA	Subtest 1	4132	826.4	23.34	0	24.0
		4183	836.6	23.35		
		4233	846.6	23.39		
	Subtest 2	4132	826.4	23.36	0	24.0
		4183	836.6	23.35		
		4233	846.6	23.36		
	Subtest 3	4132	826.4	22.84	0.5	23.5
		4183	836.6	22.76		
		4233	846.6	22.91		
	Subtest 4	4132	826.4	22.84	0.5	23.5
		4183	836.6	22.78		
		4233	846.6	22.89		
HSUPA	Subtest 1	4132	826.4	21.91	0	24.0
		4183	836.6	21.87		
		4233	846.6	21.56		
	Subtest 2	4132	826.4	21.86	2	22.0
		4183	836.6	21.80		
		4233	846.6	21.50		
	Subtest 3	4132	826.4	21.76	1	23.0
		4183	836.6	22.44		
		4233	846.6	21.80		
	Subtest 4	4132	826.4	21.24	2	22.0
		4183	836.6	21.31		
		4233	846.6	21.30		
	Subtest 5	4132	826.4	23.23	0	24.0
		4183	836.6	23.34		
		4233	846.6	23.33		

**LTE Band 5 (ANT A)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				20450	20525	20600		
				829 MHz	836.5 MHz	844 MHz		
10 MHz	QPSK	1	0	24.03	24.05	24.00	0.0	25.0
		1	25	23.98	24.01	23.75	0.0	25.0
		1	49	23.96	23.87	23.22	0.0	25.0
		25	0	22.90	22.97	22.91	1.0	24.0
		25	12	23.06	22.97	22.96	1.0	24.0
		25	25	23.00	22.95	22.93	1.0	24.0
	16QAM	50	0	22.91	22.93	22.72	1.0	24.0
		1	0	23.21	23.40	23.31	1.0	24.0
		1	25	23.21	23.33	23.13	1.0	24.0
		1	49	23.14	23.19	22.57	1.0	24.0
		25	0	21.96	22.00	22.00	2.0	23.0
		25	12	22.05	21.99	22.00	2.0	23.0
	64QAM	25	25	22.00	21.99	22.03	2.0	23.0
		50	0	22.04	21.95	21.89	2.0	23.0
		1	0	22.30	22.18	22.30	2.0	23.0
		1	25	22.28	22.24	22.17	2.0	23.0
		1	49	22.17	22.13	21.55	2.0	23.0
		25	0	21.02	21.01	20.96	3.0	22.0
5 MHz	QPSK	25	12	21.10	21.00	20.98	3.0	22.0
		25	25	21.05	21.05	21.03	3.0	22.0
		50	0	21.09	20.98	21.00	3.0	22.0
		1	0	24.06	24.05	23.74	0.0	25.0
		1	12	23.98	24.00	23.56	0.0	25.0
		1	24	24.00	23.98	23.26	0.0	25.0
	16QAM	12	0	22.67	22.99	22.94	1.0	24.0
		12	7	22.88	22.95	22.97	1.0	24.0
		12	13	22.97	22.99	23.03	1.0	24.0
		25	0	22.66	22.93	22.95	1.0	24.0
		1	0	23.40	23.39	23.15	1.0	24.0
		1	12	23.38	23.36	23.00	1.0	24.0
64QAM	1	24	23.40	23.33	22.71	1.0	24.0	
	12	0	21.83	22.04	21.98	2.0	23.0	
	12	7	22.02	22.01	22.02	2.0	23.0	
	12	13	22.06	22.04	22.05	2.0	23.0	
	25	0	21.87	21.94	21.93	2.0	23.0	
	1	0	22.26	22.28	22.26	2.0	23.0	
64QAM	1	12	22.28	22.25	22.15	2.0	23.0	
	1	24	22.28	22.19	21.81	2.0	23.0	
	12	0	20.73	20.94	21.04	3.0	22.0	
	12	7	21.11	20.90	21.05	3.0	22.0	
	12	13	21.05	20.94	21.09	3.0	22.0	
	25	0	21.09	20.99	20.98	3.0	22.0	

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20415	20525	20635		
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	23.93	23.93	23.75	0.0	25.0
		1	8	23.98	23.94	23.58	0.0	25.0
		1	14	23.90	23.87	23.31	0.0	25.0
		8	0	22.72	22.94	22.93	1.0	24.0
		8	4	22.82	22.92	23.04	1.0	24.0
		8	7	22.84	22.99	23.03	1.0	24.0
	16QAM	15	0	22.68	22.93	23.04	1.0	24.0
		1	0	23.24	23.42	23.03	1.0	24.0
		1	8	23.35	23.39	22.92	1.0	24.0
		1	14	23.22	23.31	22.64	1.0	24.0
		8	0	21.79	22.01	22.01	2.0	23.0
		8	4	21.90	22.00	22.07	2.0	23.0
	64QAM	8	7	21.97	22.05	22.10	2.0	23.0
		15	0	21.86	21.98	22.04	2.0	23.0
		1	0	22.26	22.16	21.90	2.0	23.0
		1	8	22.29	22.23	21.78	2.0	23.0
		1	14	22.21	22.15	21.50	2.0	23.0
		8	0	20.72	20.99	20.96	3.0	22.0
1.4 MHz	QPSK	8	4	21.04	21.00	21.05	3.0	22.0
		8	7	21.10	21.03	21.06	3.0	22.0
		15	0	21.07	20.99	21.09	3.0	22.0
		1	0	23.96	23.88	23.60	0.0	25.0
		1	3	24.01	23.88	23.53	0.0	25.0
		1	5	24.03	23.93	23.41	0.0	25.0
	16QAM	3	0	23.50	23.87	23.94	0.0	25.0
		3	1	23.47	23.86	23.89	0.0	25.0
		3	3	23.57	23.86	23.89	0.0	25.0
		6	0	22.64	22.83	22.93	1.0	24.0
		1	0	23.40	23.28	22.77	1.0	24.0
		1	3	23.31	23.30	22.75	1.0	24.0
	64QAM	1	5	23.41	23.29	22.67	1.0	24.0
		3	0	22.66	23.07	23.09	1.0	24.0
		3	1	22.74	23.03	23.08	1.0	24.0
		3	3	22.80	23.06	23.05	1.0	24.0
		6	0	21.80	21.92	22.08	2.0	23.0
		1	0	22.29	22.28	21.69	2.0	23.0
1.4 MHz	64QAM	1	3	22.32	22.26	21.64	2.0	23.0
		1	5	22.28	22.31	21.50	2.0	23.0
		3	0	21.88	22.09	22.14	2.0	23.0
		3	1	21.91	22.09	22.09	2.0	23.0
		3	3	21.92	22.08	22.14	2.0	23.0
		6	0	20.97	21.01	20.97	3.0	22.0

**LTE Band 5 (ANT E)**

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				20450	20525	20600		
				829 MHz	836.5 MHz	844 MHz		
10 MHz	QPSK	1	0	24.62	24.74	24.68	0.0	25.0
		1	25	24.72	24.70	24.51	0.0	25.0
		1	49	24.62	24.62	24.05	0.0	25.0
		25	0	23.65	23.66	23.60	1.0	24.0
		25	12	23.72	23.67	23.63	1.0	24.0
		25	25	23.68	23.60	23.67	1.0	24.0
	16QAM	50	0	23.69	23.59	23.37	1.0	24.0
		1	0	23.95	23.98	23.93	1.0	24.0
		1	25	23.93	23.99	23.72	1.0	24.0
		1	49	23.93	23.90	23.21	1.0	24.0
		25	0	22.68	22.65	22.65	2.0	23.0
		25	12	22.74	22.65	22.66	2.0	23.0
	64QAM	25	25	22.67	22.65	22.70	2.0	23.0
		50	0	22.72	22.63	22.57	2.0	23.0
		1	0	22.97	22.97	22.85	2.0	23.0
		1	25	22.93	22.95	22.68	2.0	23.0
		1	49	22.91	22.87	22.19	2.0	23.0
		25	0	21.64	21.68	21.66	3.0	22.0
5 MHz	QPSK	25	12	21.66	21.69	21.68	3.0	22.0
		25	25	21.69	21.69	21.72	3.0	22.0
		50	0	21.66	21.63	21.65	3.0	22.0
		1	0	24.37	24.34	23.80	0.0	25.0
		1	12	24.30	24.30	23.64	0.0	25.0
		1	24	24.31	24.30	23.49	0.0	25.0
	16QAM	12	0	23.08	23.27	23.30	1.0	24.0
		12	7	23.32	23.27	23.31	1.0	24.0
		12	13	23.34	23.30	23.36	1.0	24.0
		25	0	23.08	23.19	23.27	1.0	24.0
		1	0	23.66	23.74	23.25	1.0	24.0
		1	12	23.68	23.63	23.00	1.0	24.0
	64QAM	1	24	23.69	23.62	22.89	1.0	24.0
		12	0	22.14	22.33	22.36	2.0	23.0
		12	7	22.38	22.29	22.36	2.0	23.0
		12	13	22.36	22.33	22.41	2.0	23.0
		25	0	22.27	22.32	22.30	2.0	23.0
		1	0	22.54	22.56	22.33	2.0	23.0
QPSK	1	12	22.54	22.58	22.15	2.0	23.0	
	1	24	22.49	22.49	21.96	2.0	23.0	
	12	0	21.18	21.36	21.21	3.0	22.0	
	12	7	21.43	21.34	21.19	3.0	22.0	
	12	13	21.40	21.36	21.24	3.0	22.0	
	25	0	21.39	21.26	21.31	3.0	22.0	



BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20415	20525	20635		
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	24.24	24.27	23.70	0.0	25.0
		1	8	24.30	24.28	23.60	0.0	25.0
		1	14	24.30	24.20	23.43	0.0	25.0
		8	0	23.00	23.26	23.28	1.0	24.0
		8	4	23.12	23.25	23.34	1.0	24.0
		8	7	23.23	23.32	23.34	1.0	24.0
	16QAM	15	0	23.03	23.24	23.33	1.0	24.0
		1	0	23.53	23.68	23.00	1.0	24.0
		1	8	23.66	23.68	22.93	1.0	24.0
		1	14	23.59	23.66	22.77	1.0	24.0
		8	0	22.05	22.33	22.33	2.0	23.0
		8	4	22.27	22.34	22.41	2.0	23.0
	64QAM	8	7	22.34	22.38	22.41	2.0	23.0
		15	0	22.23	22.28	22.40	2.0	23.0
		1	0	22.58	22.51	21.93	2.0	23.0
		1	8	22.63	22.54	21.94	2.0	23.0
		1	14	22.55	22.50	21.74	2.0	23.0
		8	0	21.18	21.30	21.33	3.0	22.0
1.4 MHz	QPSK	8	4	21.30	21.28	21.42	3.0	22.0
		8	7	21.35	21.35	21.41	3.0	22.0
		15	0	21.38	21.29	21.38	3.0	22.0
		1	0	24.23	24.23	23.50	0.0	25.0
		1	3	24.22	24.21	23.47	0.0	25.0
		1	5	24.26	24.25	23.39	0.0	25.0
	16QAM	3	0	23.66	24.16	24.28	0.0	25.0
		3	1	23.75	24.18	24.25	0.0	25.0
		3	3	23.88	24.19	24.23	0.0	25.0
		6	0	22.81	23.15	23.29	1.0	24.0
		1	0	23.49	23.59	22.66	1.0	24.0
		1	3	23.45	23.68	22.70	1.0	24.0
	64QAM	1	5	23.52	23.62	22.57	1.0	24.0
		3	0	22.88	23.38	23.42	1.0	24.0
		3	1	22.98	23.41	23.44	1.0	24.0
		3	3	23.05	23.35	23.36	1.0	24.0
		6	0	21.98	22.22	22.39	2.0	23.0
		1	0	22.55	22.41	21.94	2.0	23.0
16QAM	1	3	22.60	22.42	21.95	2.0	23.0	
	1	5	22.56	22.40	21.87	2.0	23.0	
	3	0	22.13	22.35	22.37	2.0	23.0	
	3	1	22.18	22.35	22.36	2.0	23.0	
	3	3	22.24	22.35	22.38	2.0	23.0	
	6	0	21.17	21.27	21.43	3.0	22.0	

**NR Band n5 (ANT A)**

BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
					Measured Pwr (dBm)			MPR	Tune-up Limit
					166800	167300	167800		
					834.00 MHz	836.50 MHz	839.00 MHz		
20 MHz	DFT-s-OFDM	π/2 BPSK	1	1	23.88	23.93	23.86	0.0	25.0
			1	52	23.84	23.85	23.89	0.0	25.0
			1	104	23.73	23.75	23.74	0.0	25.0
			50	0	22.87	22.84	22.88	0.5	24.5
			50	28	23.86	23.83	23.87	0.0	25.0
			50	56	22.86	22.86	22.76	0.5	24.5
		100	0	22.89	22.89	22.95	0.5	24.5	
		QPSK	1	1	23.89	<b>23.92</b>	23.90	0.0	25.0
			1	52	23.83	23.85	23.89	0.0	25.0
			1	104	23.76	23.73	23.77	0.0	25.0
			50	0	22.86	22.93	22.94	1.0	24.0
			50	28	23.86	<b>23.87</b>	23.83	0.0	25.0
			50	56	22.90	22.85	22.81	1.0	24.0
		100	0	22.87	22.86	22.91	1.0	24.0	
		16QAM	1	1	22.71	22.75	22.70	1.0	24.0
			1	52	22.77	22.71	22.71	1.0	24.0
			1	104	22.56	22.56	22.61	1.0	24.0
		64QAM	1	1	21.51	21.56	21.46	2.5	22.5
256QAM	1	1	18.74	18.74	18.75	4.5	20.5		
CP-OFDM	QPSK	1	1	22.48	22.49	22.40	1.5	23.5	
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					166300	167300	168300		
					831.50 MHz	836.50 MHz	841.50 MHz		
					15 MHz	DFT-s-OFDM	π/2 BPSK	1	1
1	39	23.78	23.82	23.74				0.0	25.0
1	77	23.88	23.82	23.86				0.0	25.0
36	0	22.90	22.93	22.92				0.5	24.5
36	21	23.81	23.83	23.79				0.0	25.0
36	43	22.85	22.83	22.77				0.5	24.5
75	0	22.90	22.87	22.87			0.5	24.5	
QPSK	1	1	23.91	<b>23.94</b>			23.88	0.0	25.0
	1	39	23.86	23.82			23.78	0.0	25.0
	1	77	23.91	23.82			23.84	0.0	25.0
	36	0	22.92	22.93			22.83	1.0	24.0
	36	21	23.81	<b>23.87</b>			23.84	0.0	25.0
	36	43	22.83	22.90			22.81	1.0	24.0
75	0	22.80	22.84	22.85			1.0	24.0	
16QAM	1	1	22.63	22.79			22.79	1.0	24.0
	1	39	22.75	22.78			22.56	1.0	24.0
	1	77	22.72	22.67			22.59	1.0	24.0
64QAM	1	1	21.54	21.61			21.50	2.5	22.5
256QAM	1	1	18.82	18.92	18.83	4.5	20.5		
CP-OFDM	QPSK	1	1	22.49	22.55	22.47	1.5	23.5	
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					165800	167300	168800		
					829.00 MHz	836.50 MHz	844.00 MHz		
					10 MHz	DFT-s-OFDM	π/2 BPSK	1	1
1	25	24.01	23.86	23.74				0.0	25.0
1	50	23.89	23.78	23.81				0.0	25.0
25	0	22.90	22.91	22.84				0.5	24.5
25	13	23.90	23.83	23.72				0.0	25.0
25	27	22.92	22.84	22.81				0.5	24.5
50	0	22.96	22.89	22.79			0.5	24.5	
QPSK	1	1	23.92	<b>23.99</b>			23.75	0.0	25.0
	1	25	23.89	23.86			23.75	0.0	25.0
	1	50	23.96	23.76			23.83	0.0	25.0
	25	0	22.96	22.95			22.82	1.0	24.0
	25	13	<b>23.92</b>	23.81			23.73	0.0	25.0
	25	27	22.98	22.81			22.76	1.0	24.0
50	0	23.00	22.88	22.81			1.0	24.0	
16QAM	1	1	22.74	22.84			22.58	1.0	24.0
	1	25	22.70	22.70			22.55	1.0	24.0
	1	50	22.81	22.56			22.66	1.0	24.0
64QAM	1	1	21.54	21.53			21.37	2.5	22.5
256QAM	1	1	18.75	18.82	18.58	4.5	20.5		
CP-OFDM	QPSK	1	1	22.47	22.50	22.31	1.5	23.5	

BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					165300	167300	169300		
					826.50 MHz	836.50 MHz	846.50 MHz		
5 MHz	DFT-s-OFDM	π/2 BPSK	1	1	24.01	23.97	23.89	0.0	25.0
			1	12	23.91	23.83	23.83	0.0	25.0
			1	23	24.06	23.82	23.97	0.0	25.0
			12	0	22.96	22.87	22.72	0.5	24.5
			12	6	23.84	23.81	23.71	0.0	25.0
			12	13	22.97	22.76	22.82	0.5	24.5
		25	0	22.93	22.86	22.78	0.5	24.5	
		QPSK	1	1	24.05	24.03	23.92	0.0	25.0
			1	12	23.93	23.88	23.78	0.0	25.0
			1	23	24.04	23.78	23.95	0.0	25.0
			12	0	22.87	22.84	22.77	1.0	24.0
			12	6	23.83	23.79	23.74	0.0	25.0
			12	13	22.94	22.76	22.84	1.0	24.0
		16QAM	1	1	22.80	22.87	22.64	1.0	24.0
			1	12	22.77	22.68	22.56	1.0	24.0
	1		23	22.91	22.68	22.75	1.0	24.0	
	64QAM	1	1	21.59	21.56	21.49	2.5	22.5	
	256QAM	1	1	18.92	18.86	18.78	4.5	20.5	
	CP-OFDM	QPSK	1	1	22.64	22.51	22.40	1.5	23.5

**NR Band n5 (ANT E)**

BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
					166800	167300	167800		
					834.00 MHz	836.50 MHz	839.00 MHz		
20 MHz	DFT-s-OFDM	π/2 BPSK	1	1	24.60	24.64	24.63	0.0	25.0
			1	52	24.41	24.49	24.46	0.0	25.0
			1	104	24.37	24.42	24.40	0.0	25.0
			50	0	23.52	23.51	23.53	0.5	24.5
			50	28	24.49	24.56	24.50	0.0	25.0
			50	56	23.48	23.52	23.54	0.5	24.5
		100	0	23.49	23.54	23.54	0.5	24.5	
		QPSK	1	1	24.52	<b>24.59</b>	24.55	0.0	25.0
			1	52	24.46	24.54	24.51	0.0	25.0
			1	104	24.42	24.47	24.46	0.0	25.0
			50	0	23.47	23.55	23.53	1.0	24.0
			50	28	24.52	<b>24.53</b>	24.50	0.0	25.0
			50	56	23.53	23.58	23.52	1.0	24.0
		100	0	23.47	23.59	23.52	1.0	24.0	
		16QAM	1	1	23.38	23.49	23.44	1.0	24.0
	1		52	23.32	23.34	23.34	1.0	24.0	
	1		104	23.31	23.30	23.32	1.0	24.0	
	64QAM	1	1	22.13	22.20	22.24	2.5	22.5	
	256QAM	1	1	19.38	19.46	19.48	4.5	20.5	
	CP-OFDM	QPSK	1	1	23.09	23.16	23.11	1.5	23.5
	15 MHz	DFT-s-OFDM	π/2 BPSK	1	1	24.62	24.58	24.55	0.0
1				39	24.48	24.47	24.54	0.0	25.0
1				77	24.54	24.53	24.55	0.0	25.0
36				0	23.61	23.57	23.60	0.5	24.5
36				21	24.53	24.50	24.51	0.0	25.0
36				43	23.56	23.57	23.59	0.5	24.5
75			0	23.56	23.50	23.53	0.5	24.5	
QPSK			1	1	24.57	24.53	<b>24.58</b>	0.0	25.0
			1	39	24.53	24.46	24.49	0.0	25.0
			1	77	24.51	24.54	24.55	0.0	25.0
			36	0	23.62	23.62	23.59	1.0	24.0
			36	21	<b>24.53</b>	24.50	24.47	0.0	25.0
			36	43	23.53	23.56	23.57	1.0	24.0
75			0	23.54	23.48	23.50	1.0	24.0	
16QAM			1	1	23.40	23.52	23.41	1.0	24.0
		1	39	23.39	23.30	23.34	1.0	24.0	
		1	77	23.34	23.43	23.39	1.0	24.0	
64QAM		1	1	22.17	22.15	22.22	2.5	22.5	
256QAM		1	1	19.47	19.47	19.51	4.5	20.5	
CP-OFDM		QPSK	1	1	23.10	23.18	23.14	1.5	23.5

BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					165900	167300	168800		
					829.00 MHz	836.50 MHz	844.00 MHz		
10 MHz	DFT-s-OFDM	π/2 BPSK	1	1	24.55	24.58	24.53	0.0	25.0
			1	25	24.67	24.62	24.48	0.0	25.0
			1	50	24.56	24.54	24.53	0.0	25.0
			25	0	23.66	23.60	23.50	0.5	24.5
			25	13	24.55	24.46	24.38	0.0	25.0
			25	27	23.64	23.61	23.49	0.5	24.5
		QPSK	1	1	24.61	24.64	24.57	0.0	25.0
			1	25	<b>24.68</b>	24.57	24.49	0.0	25.0
			1	50	24.59	24.53	24.51	0.0	25.0
			25	0	23.54	23.58	23.49	1.0	24.0
			25	13	<b>24.49</b>	24.44	24.41	0.0	25.0
			25	27	23.56	23.61	23.45	1.0	24.0
		16QAM	1	1	23.45	23.50	23.37	1.0	24.0
			1	25	23.54	23.37	23.27	1.0	24.0
		64QAM	1	1	22.14	22.23	22.13	2.5	22.5
			1	1	19.43	19.46	19.43	4.5	20.5
256QAM	1	1	19.43	19.46	19.43	4.5	20.5		
	1	1	23.12	23.15	23.06	1.5	23.5		
5 MHz	DFT-s-OFDM	π/2 BPSK	1	1	24.69	24.65	24.59	0.0	25.0
			1	12	24.67	24.61	24.50	0.0	25.0
			1	23	24.75	24.68	24.69	0.0	25.0
			12	0	23.65	23.50	23.45	0.5	24.5
			12	6	24.53	24.50	24.40	0.0	25.0
			12	13	23.58	23.52	23.51	0.5	24.5
		QPSK	1	1	24.70	24.69	24.62	0.0	25.0
			1	12	24.69	24.59	24.47	0.0	25.0
			1	23	24.75	24.59	24.68	0.0	25.0
			12	0	23.54	23.53	23.48	1.0	24.0
			12	6	24.49	24.49	24.46	0.0	25.0
			12	13	23.65	23.58	23.55	1.0	24.0
		16QAM	1	1	23.57	23.49	23.40	1.0	24.0
			1	12	23.49	23.31	23.30	1.0	24.0
		64QAM	1	1	22.21	22.24	22.16	2.5	22.5
			1	1	19.57	19.53	19.46	4.5	20.5
256QAM	1	1	19.57	19.53	19.46	4.5	20.5		
	1	1	23.22	23.19	23.13	1.5	23.5		
5 MHz	CP-OFDM	QPSK	1	1	23.22	23.19	23.13	1.5	23.5

## 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

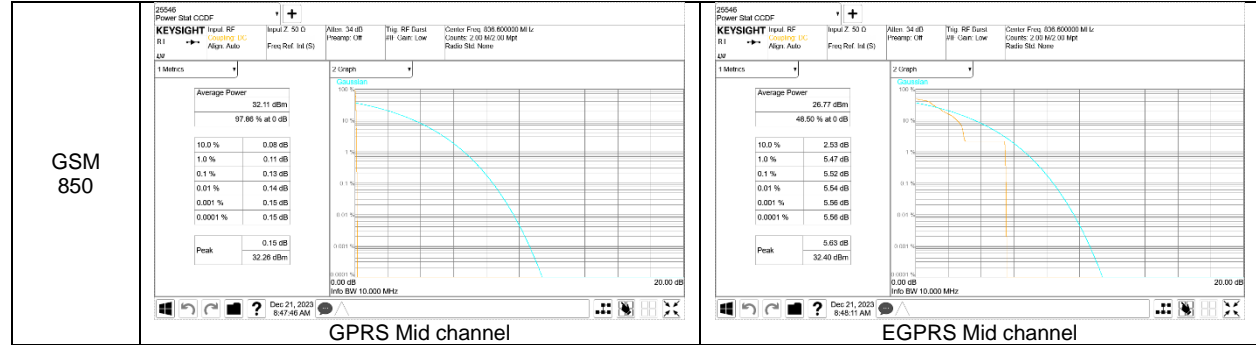
5G NR: All Waveforms (CP-OFDM vs DFT-s\_OFDM) and modulations ( $\pi/2$  BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

### RESULTS

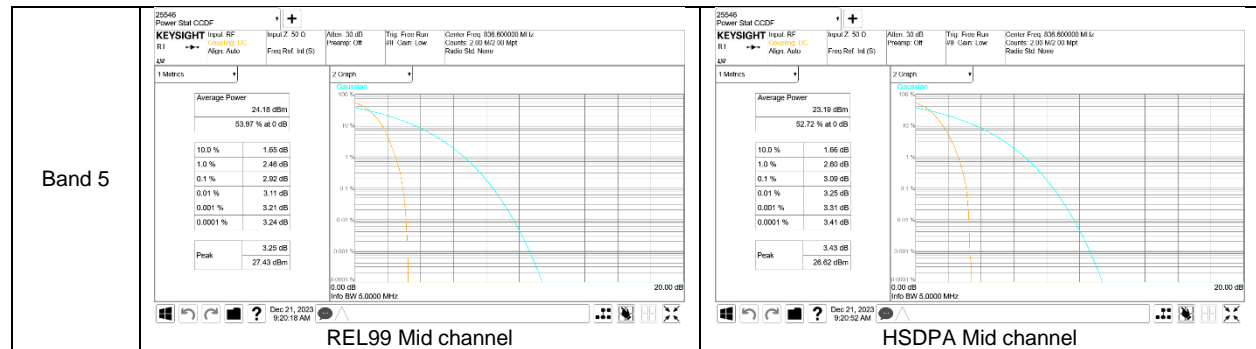
See the following pages.

### 8.2.1. CONDUCTED PEAK TO AVERAGE RESULTS

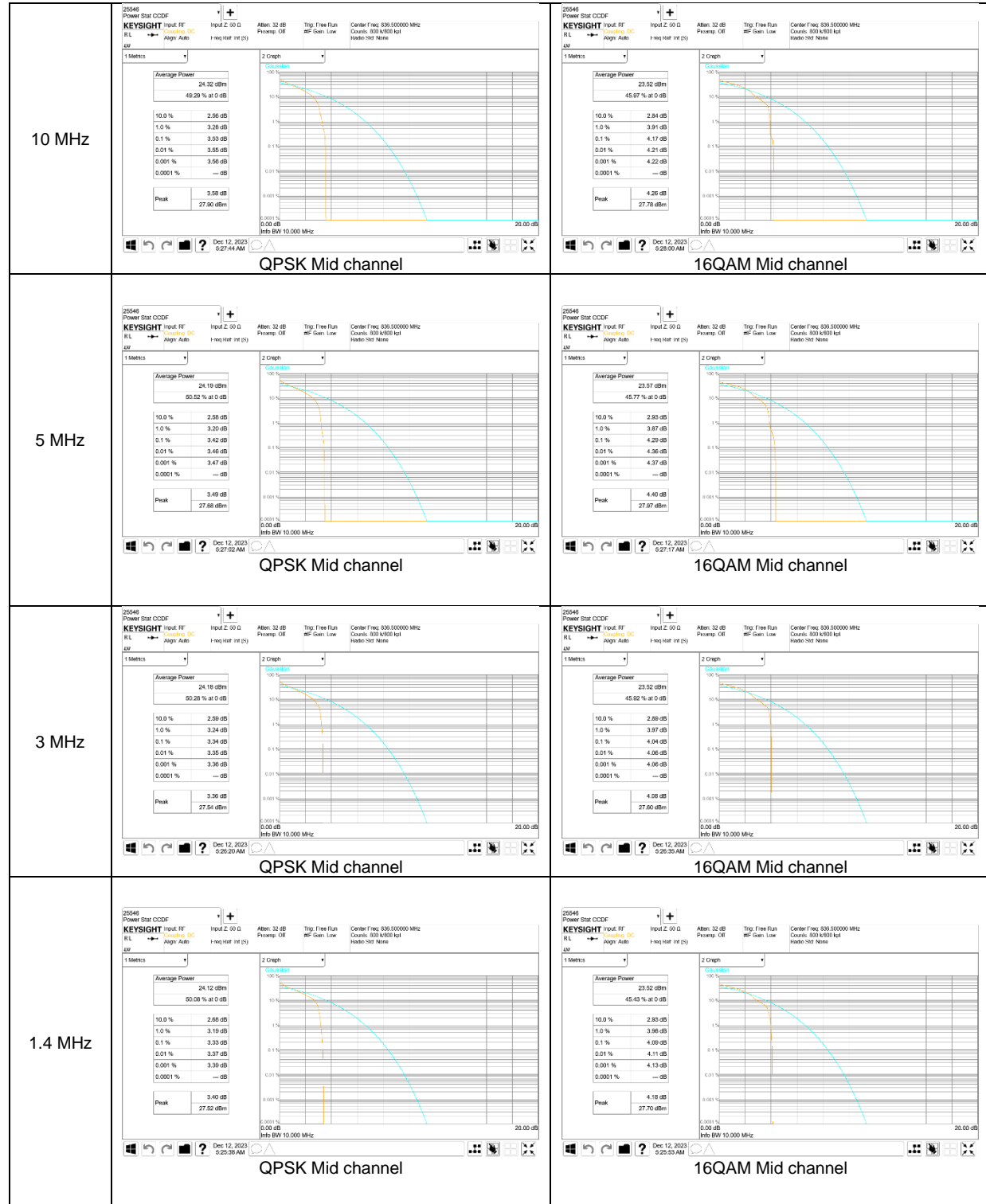
#### GSM



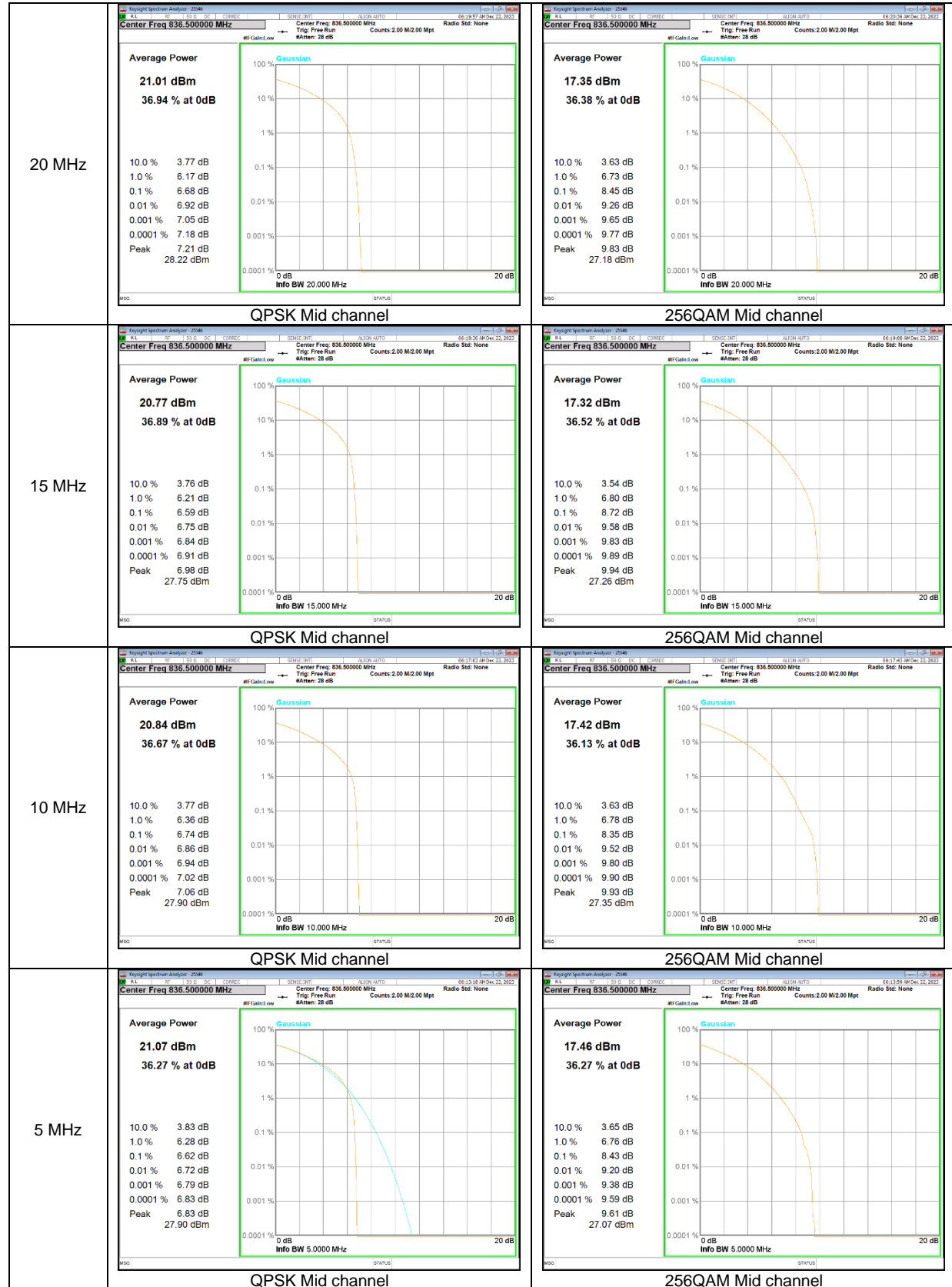
#### WCDMA



**LTE Band 5**



**NR Band n5 CP-OFDM**





### **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)
850	GPRS	836.6	249.21	318.1
	EGPRS		239.02	303.3

**- WCDMA**

Band	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
B5	Rel.99	836.6	4.142	4.698
	HSDPA		4.157	4.698

**- LTE Band 5**

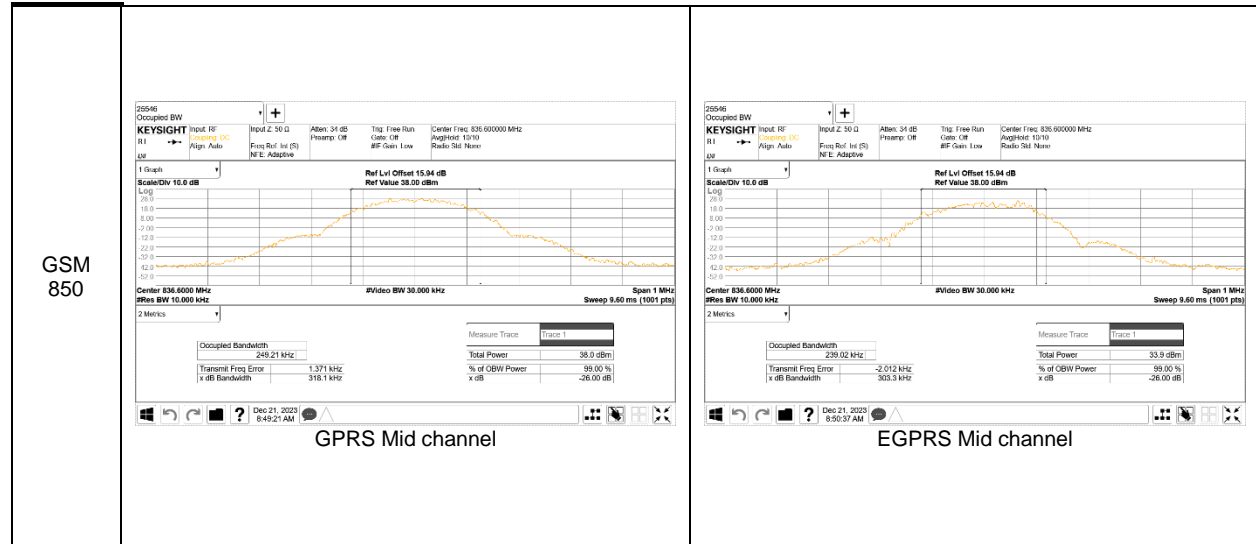
Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B5	10M	QPSK	836.5	8.985	10.030
		16QAM		8.980	9.911
	5M	QPSK		4.498	5.075
		16QAM		4.499	5.093
	3M	QPSK		2.701	3.084
		16QAM		2.698	3.066
	1.4M	QPSK		1.092	1.364
		16QAM		1.091	1.393

**- NR Band n5**

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
NR n5	20M	QPSK	836.5	17.884	18.95
		16QAM		17.871	18.72
	15M	QPSK		13.446	14.25
		16QAM		13.393	14.30
	10M	QPSK		8.970	9.700
		16QAM		8.946	9.863
	5M	QPSK		4.500	5.048
		16QAM		4.462	4.685

### 8.3.1. OCCUPIED BANDWIDTH RESULTS

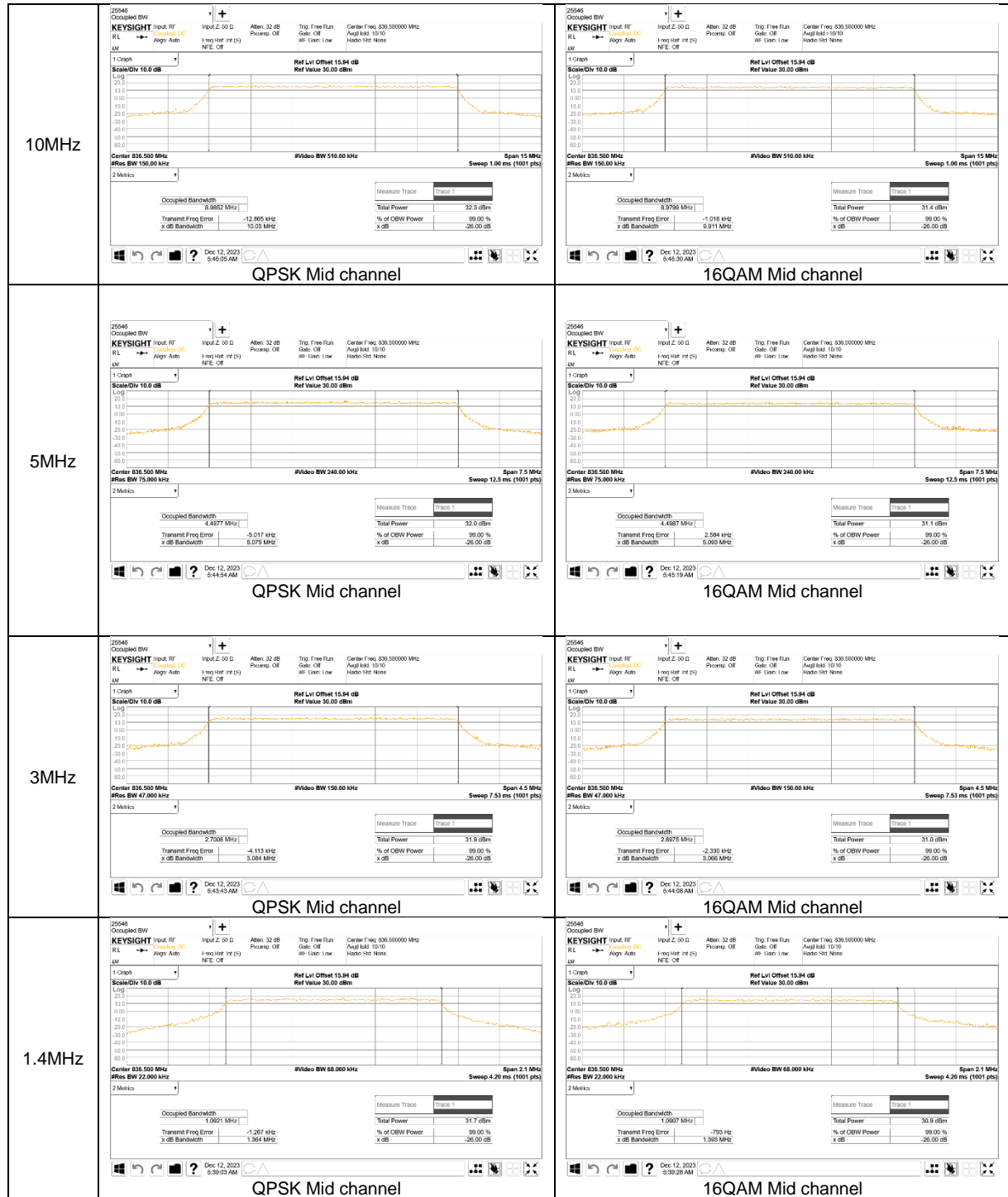
#### GSM 850



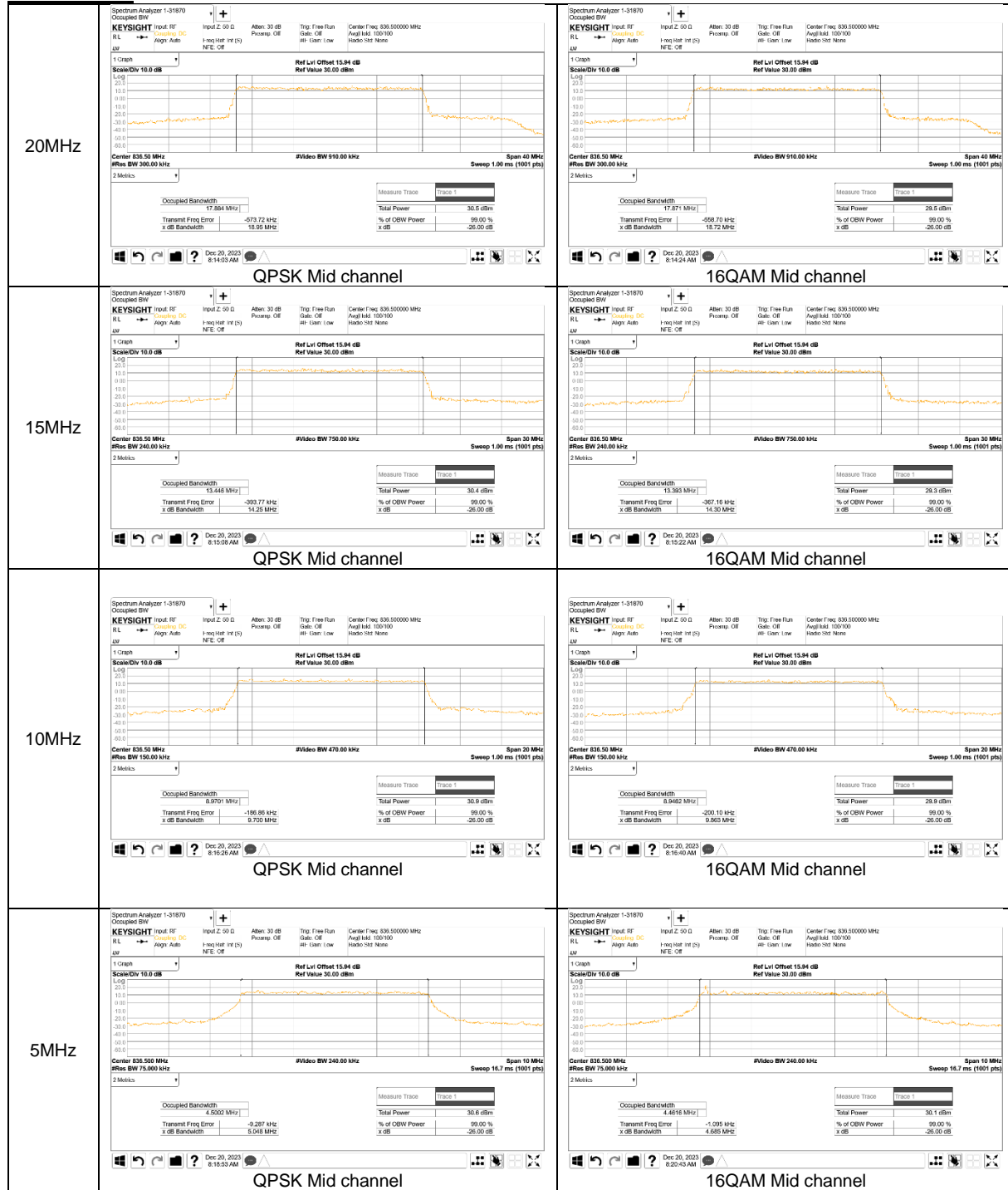
#### WCDMA Band 5



**LTE Band 5**



NR Band n5



## 8.4. BAND EDGE EMISSIONS

### RULE PART(S)

FCC: §22.359, §22.917

### 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(GSM850 – 8.2KHz)
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 1.5$  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  $\geq 1.5$  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**

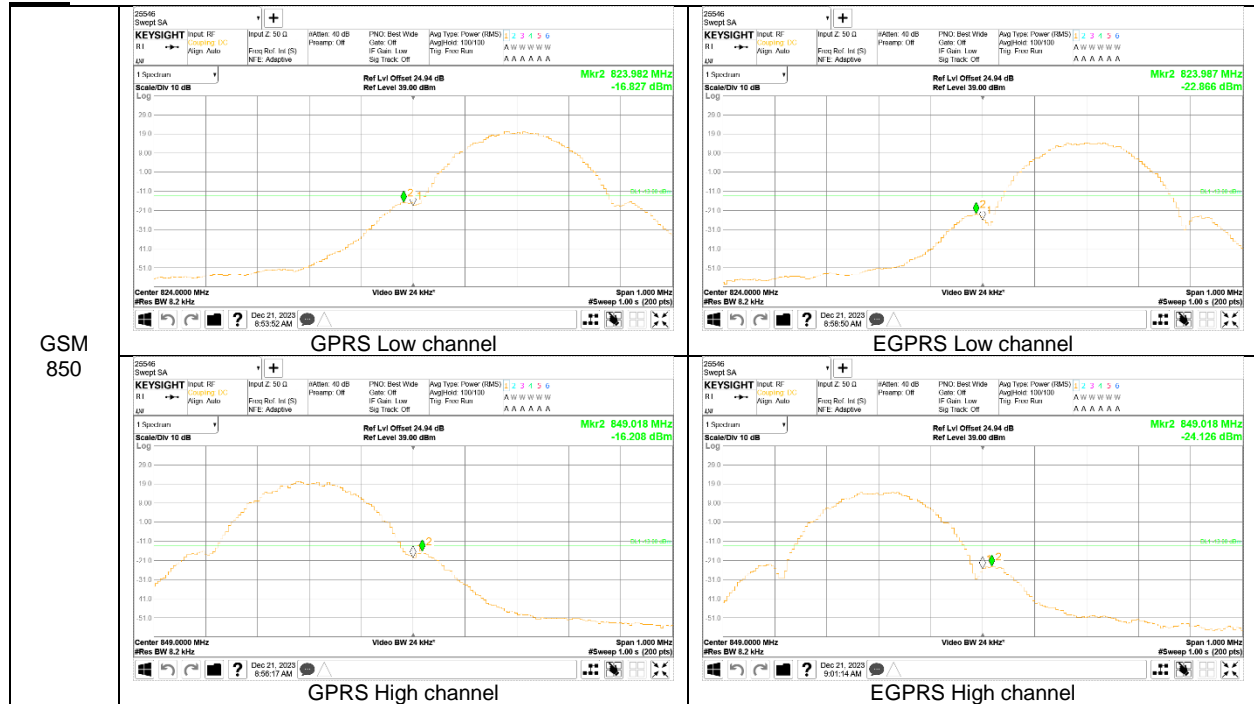
5G NR: All Waveforms (CP-OFDM vs DFT-s\_OFDM) and modulations ( $\pi/2$  BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

**RESULTS**

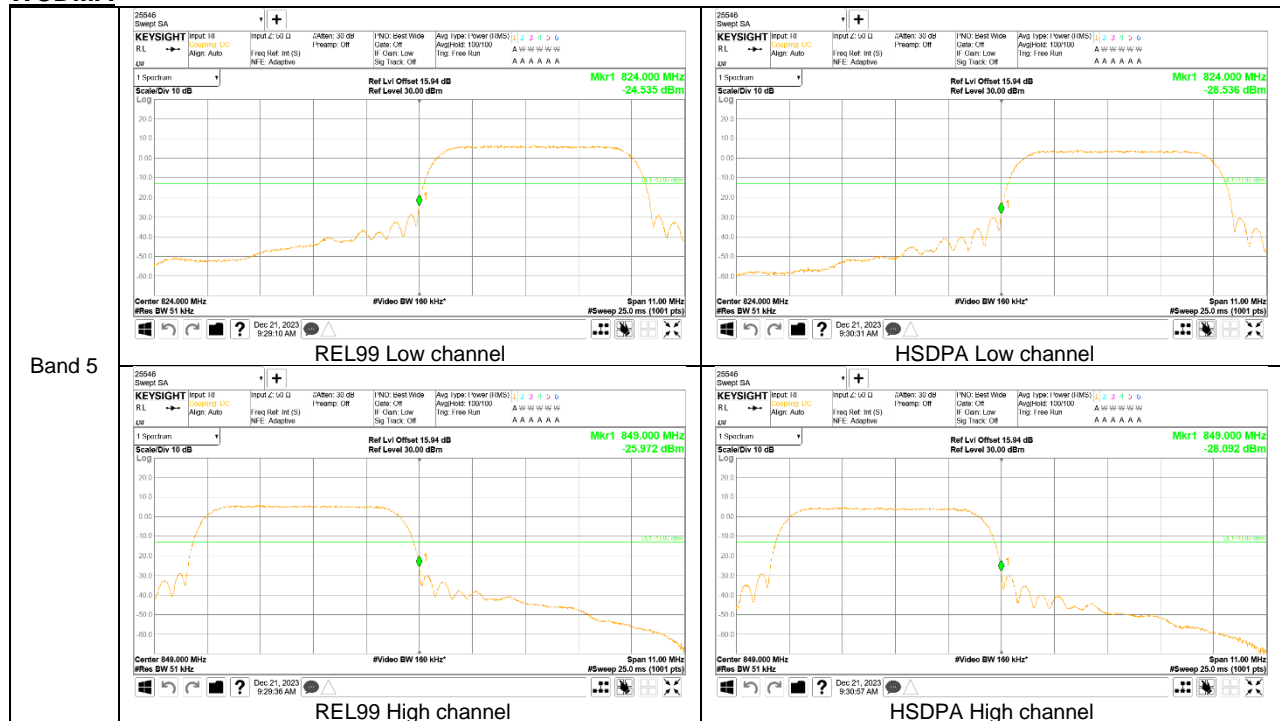
See the following pages.

### 8.4.1. BAND EDGE RESULTS

#### GSM

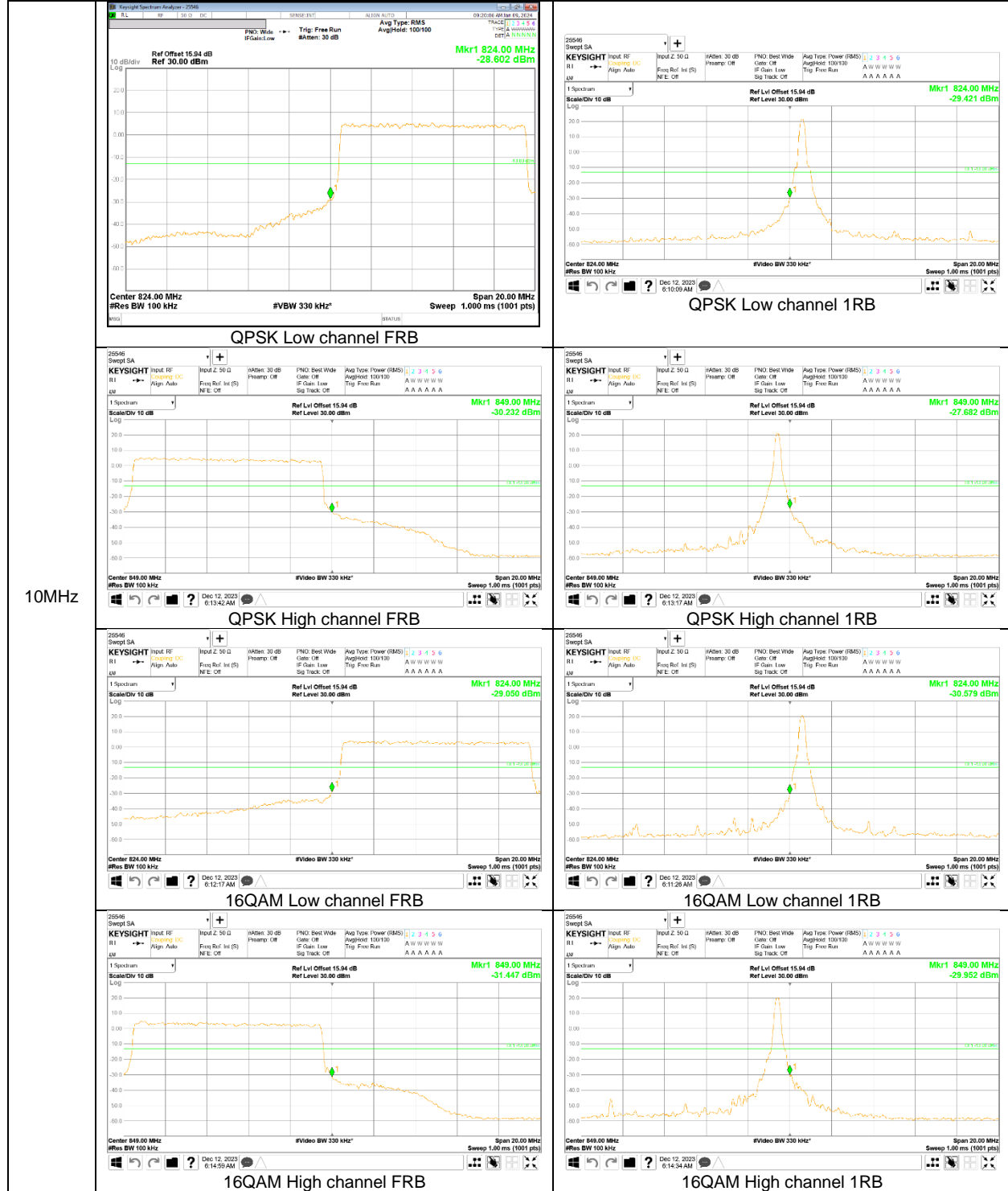


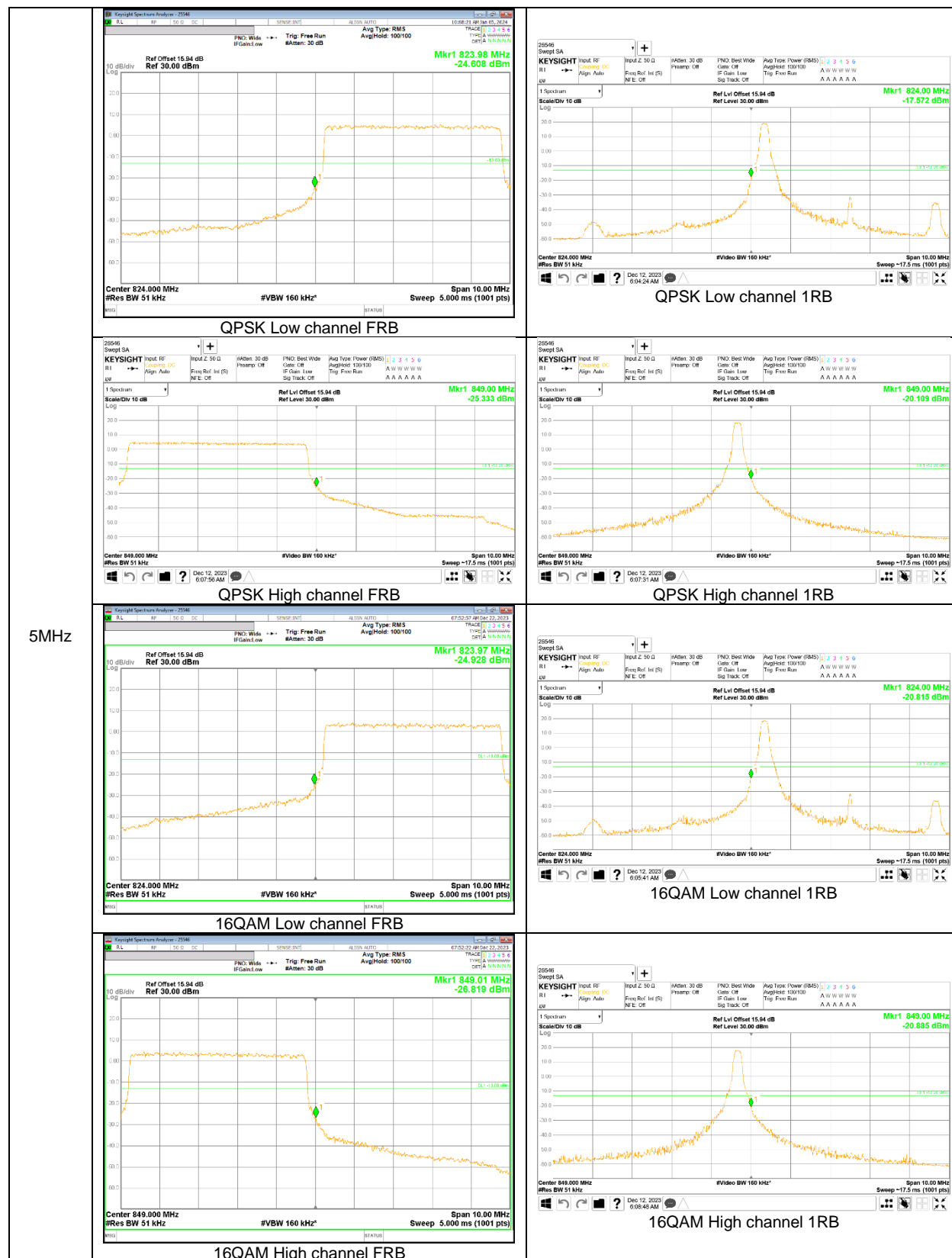
#### WCDMA



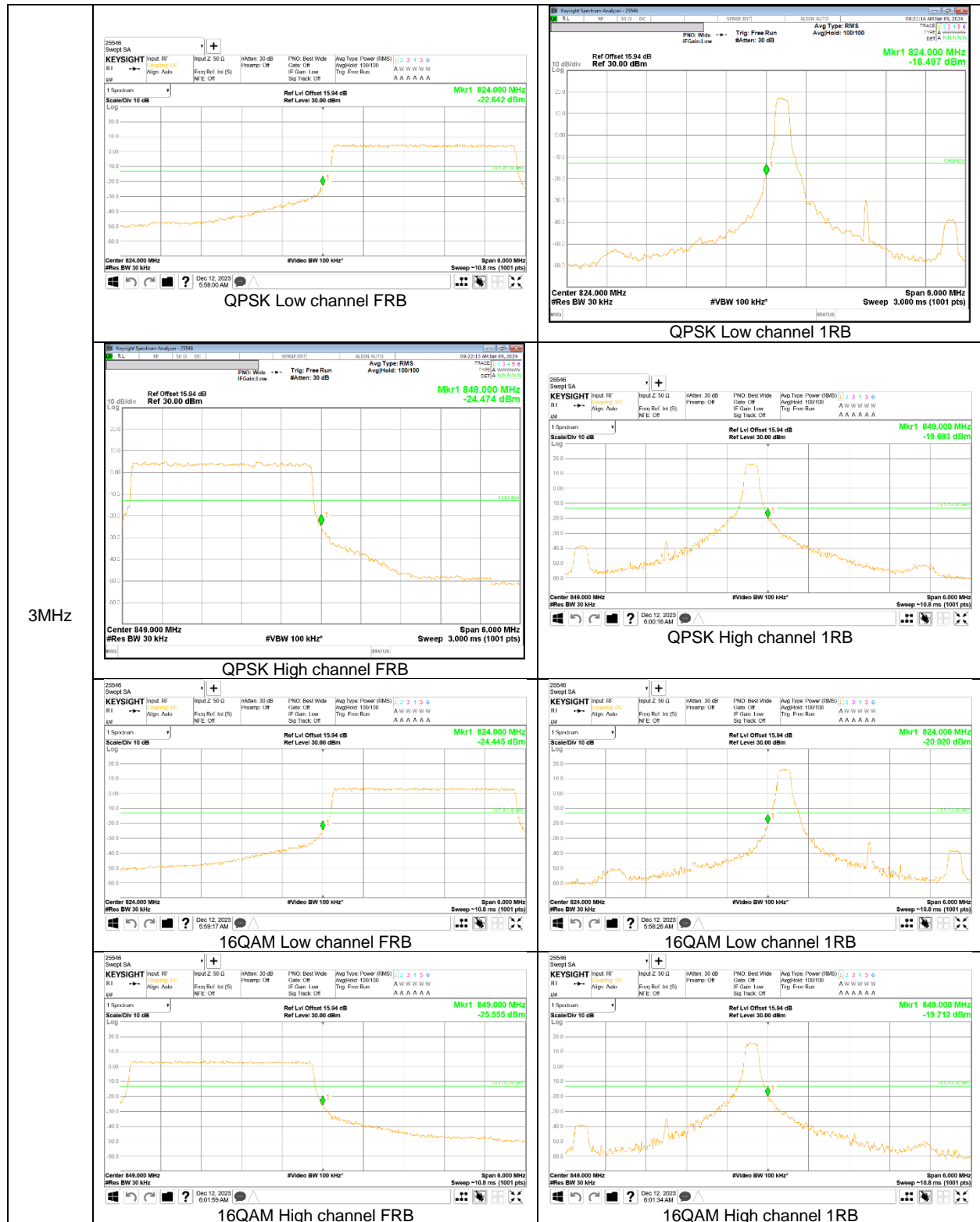


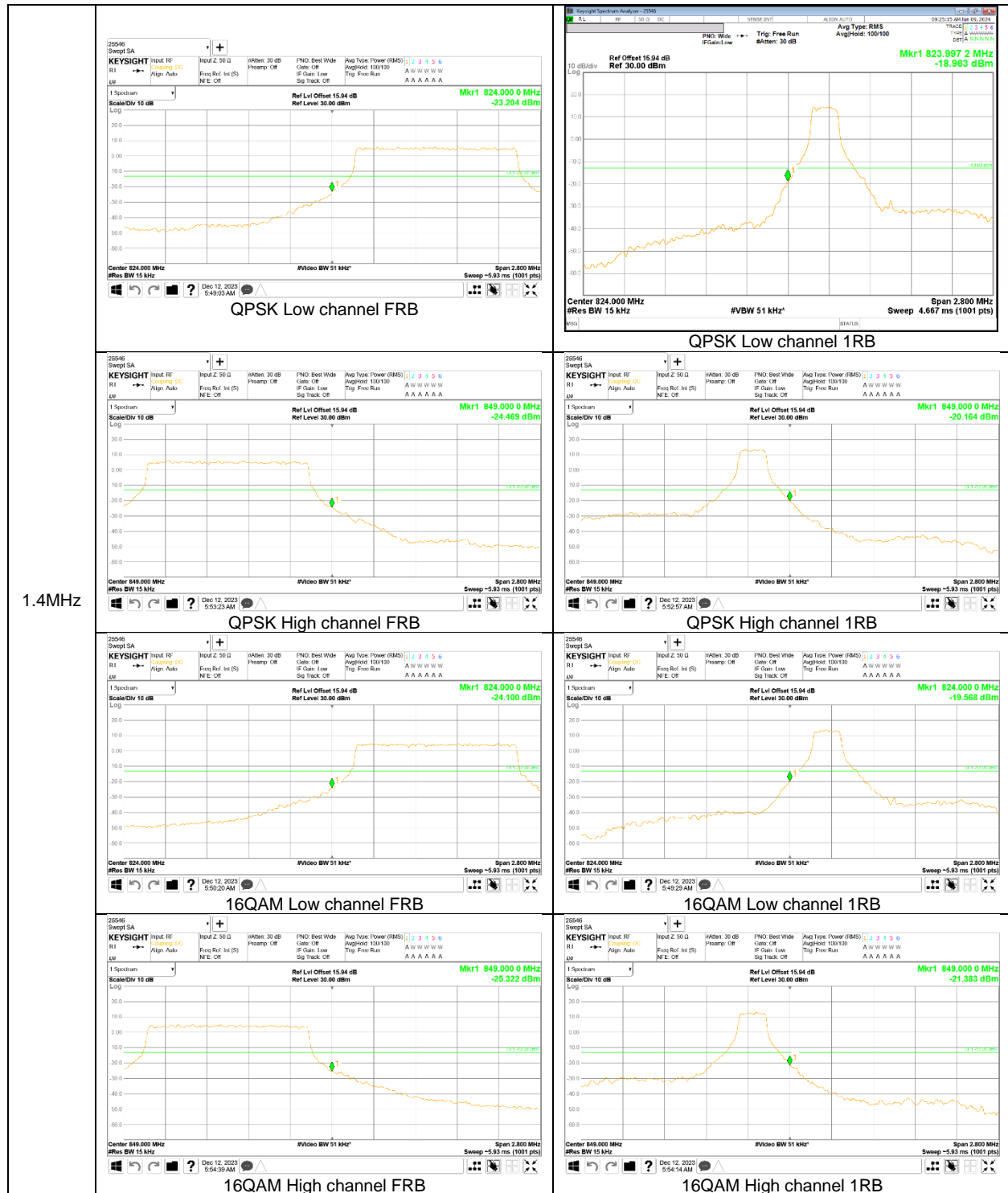
LTE Band 5



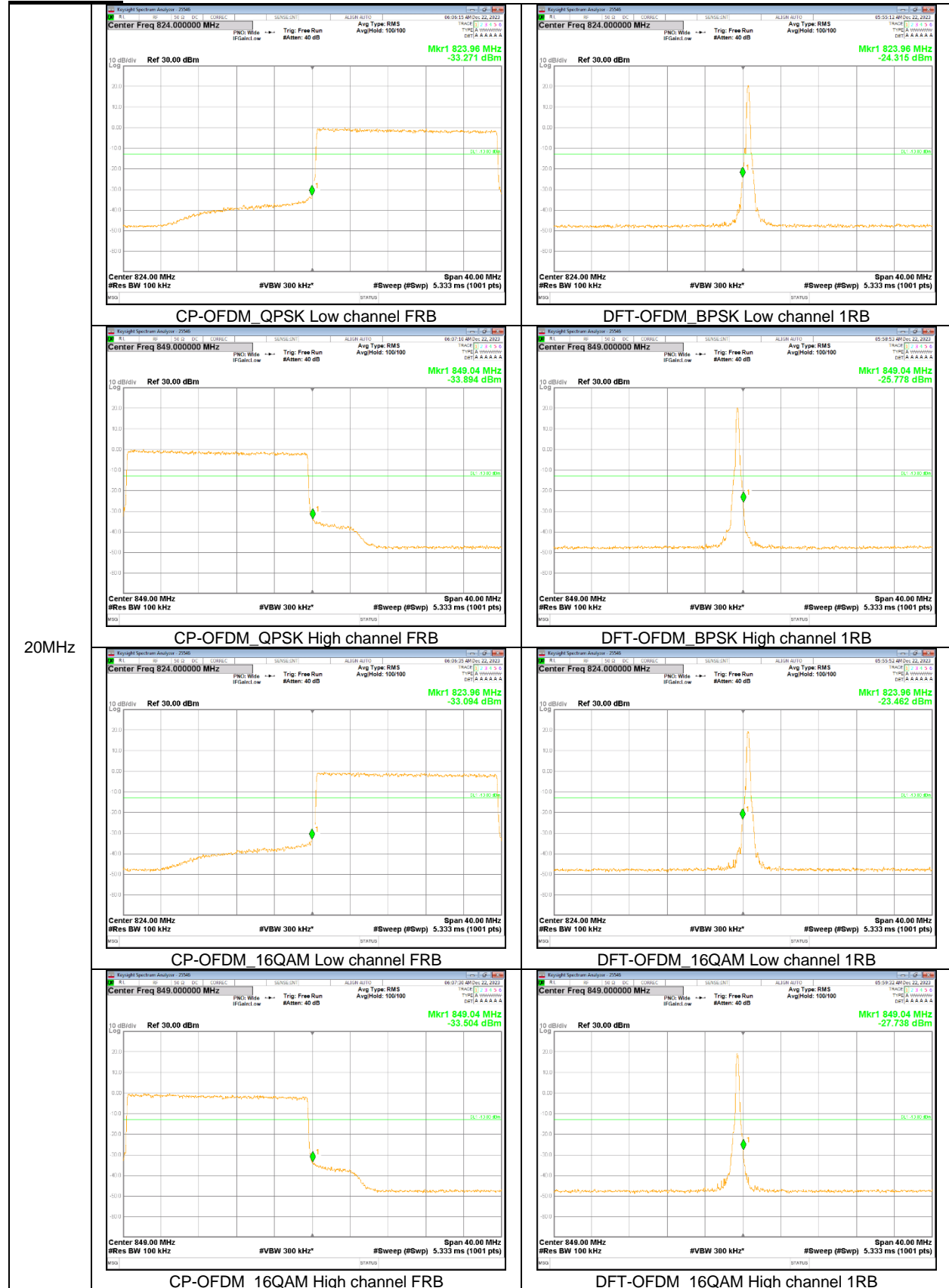


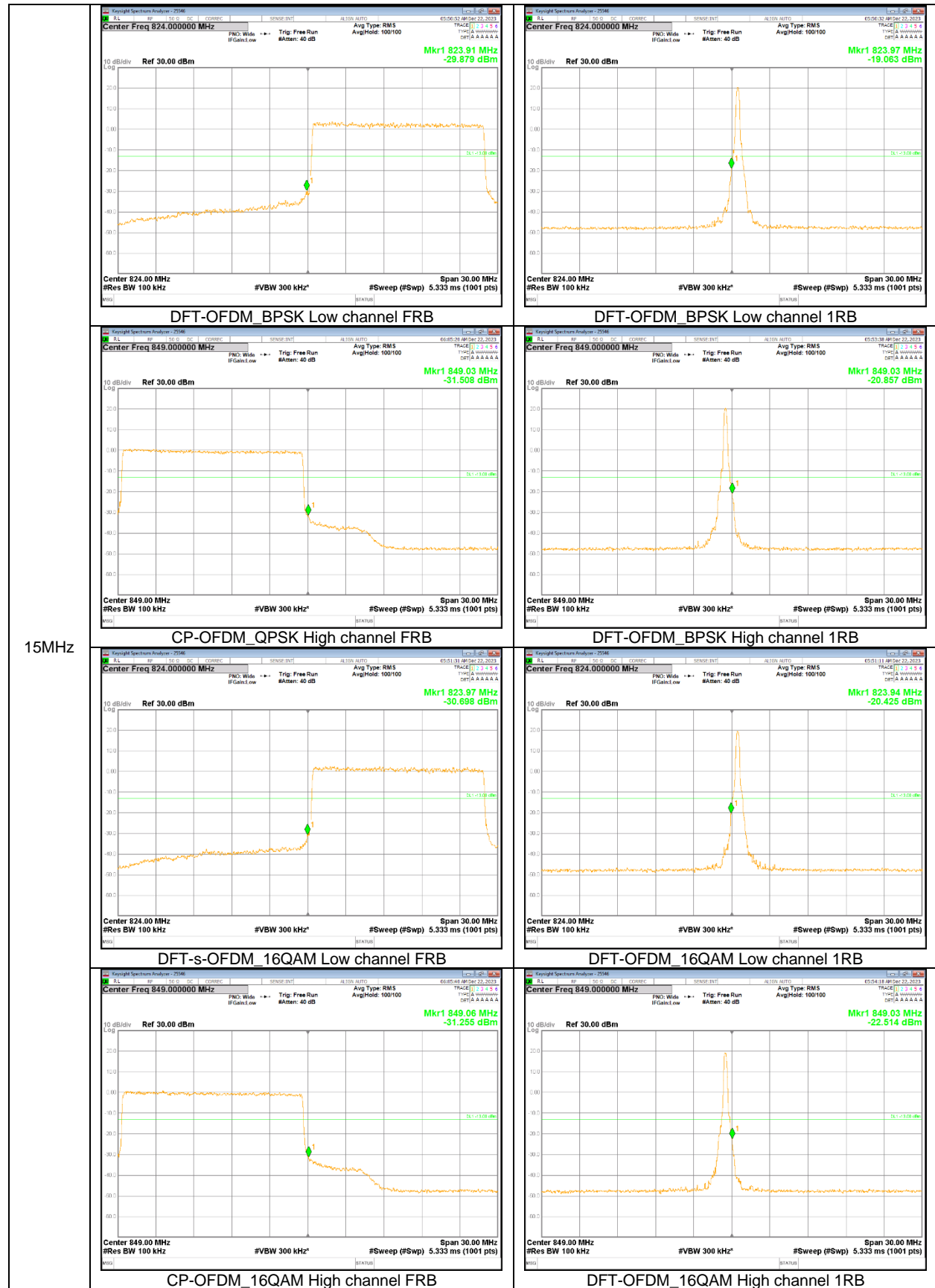
5MHz



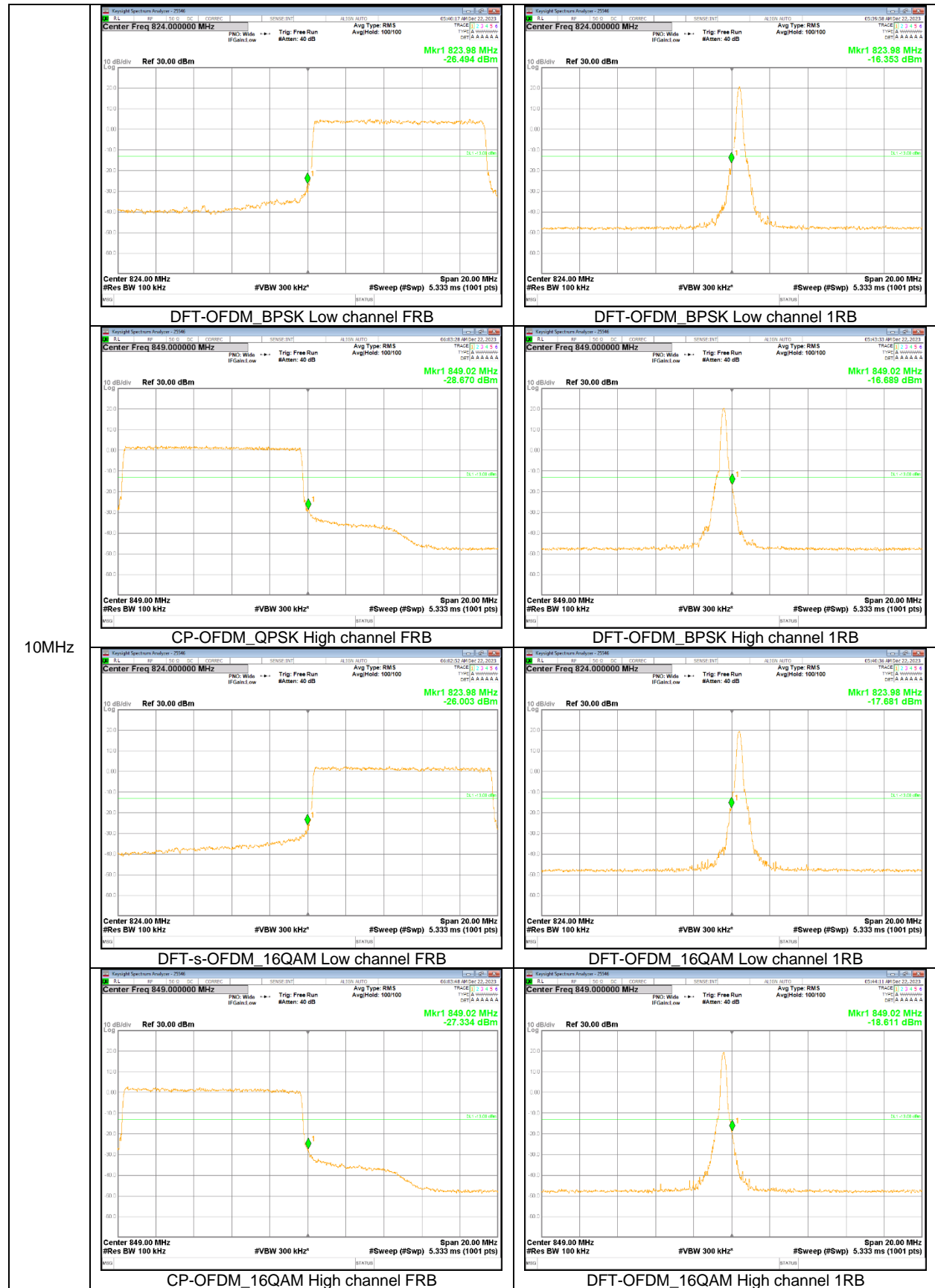


NR Band n5



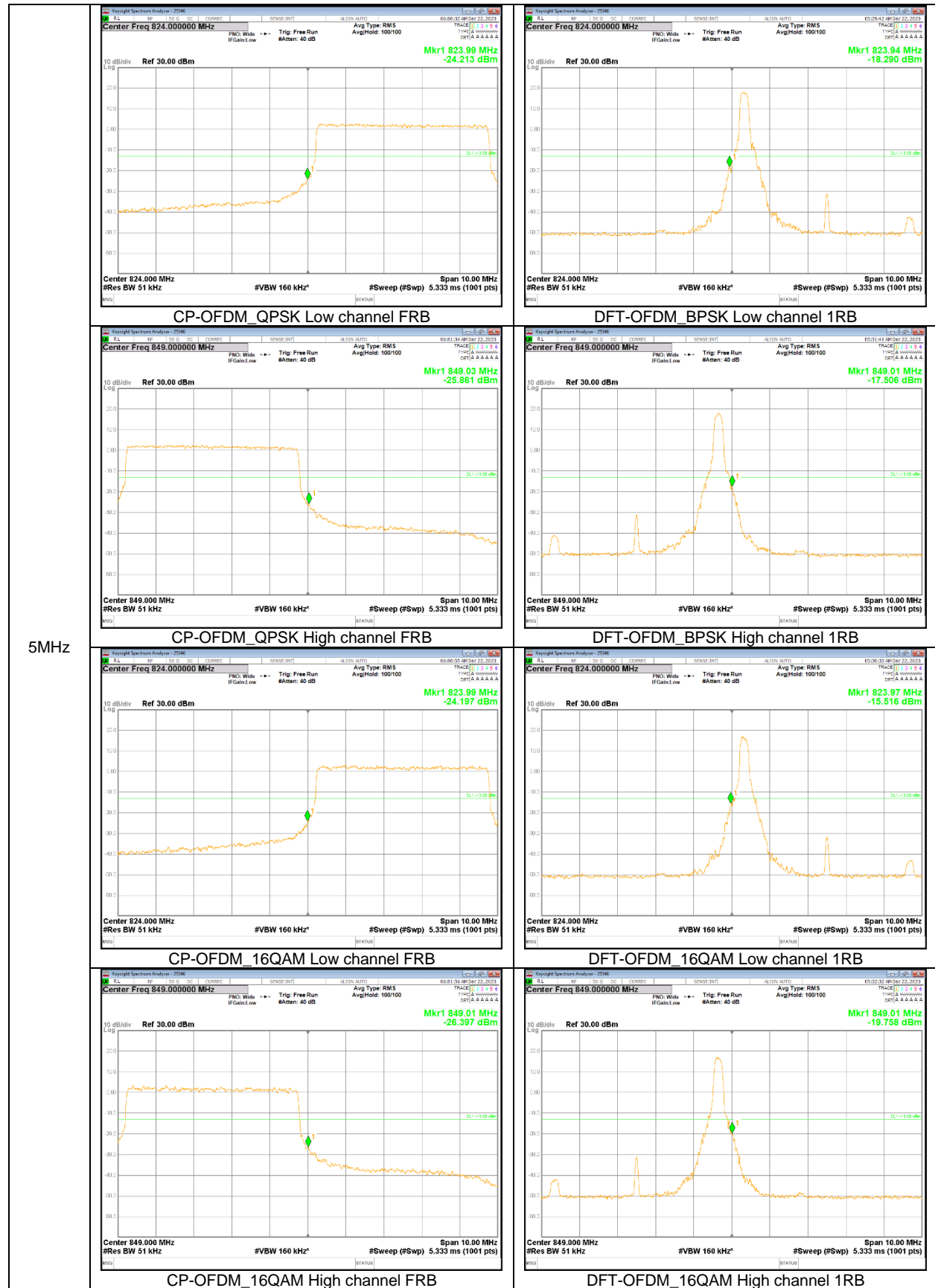


15MHz



10MHz







## 8.5. CONDUCTED SPURIOUS EMISSIONS

### RULE PART(S)

FCC: §2.1051, §22.901, §22.917

### 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 RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

- a) Set the RBW = 100 kHz for emission below 1 GHz.  
(Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 1.5$  times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points = Max (40001);
- g) Trace mode = average(WCDMA, LTE, 5G NR), Max hold(GSM);

### NOTE1

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.

### NOTE2

Please refer to section 5.4 for bandwidth and RB setting about LTE, 5G NR bands.

### RESULTS

See the following pages.

### 8.5.1. OUT OF BAND EMISSIONS RESULTS

#### GSM 850

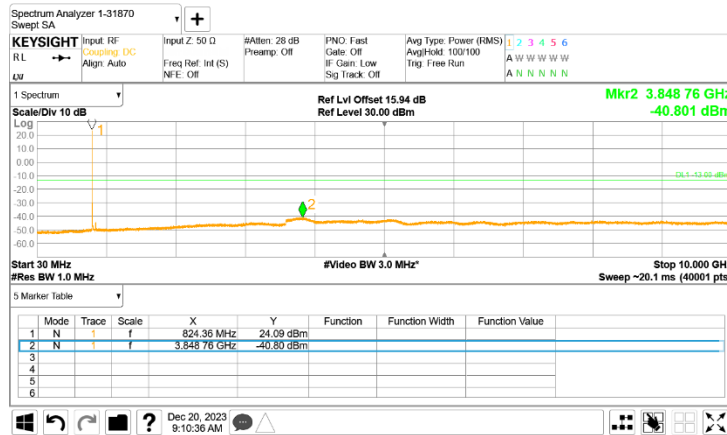


**WCDMA Band 5**

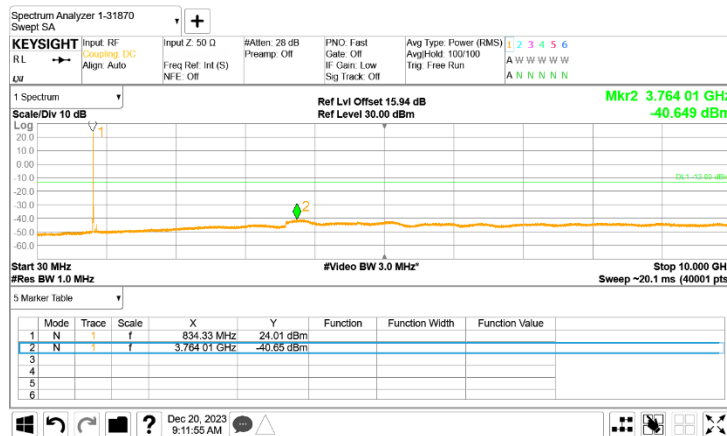


**LTE Band 5**

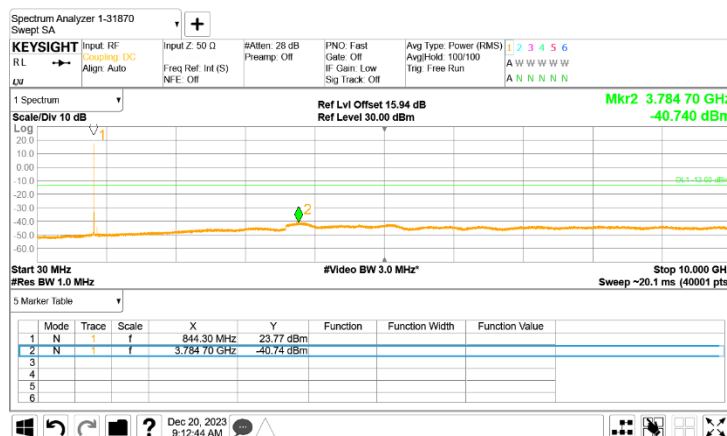
**5MHz QPSK**



Low channel



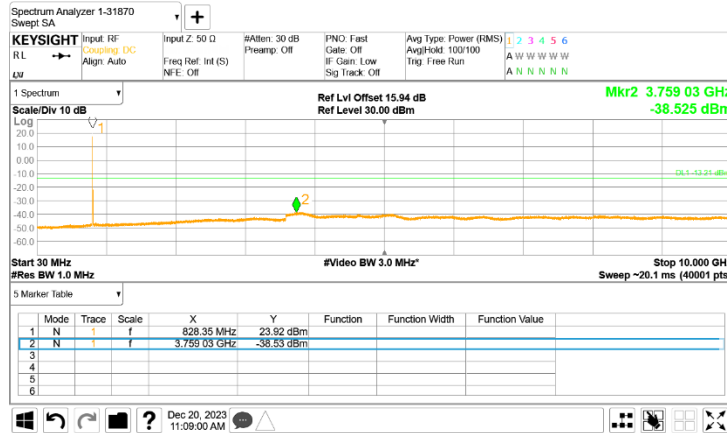
Mid channel



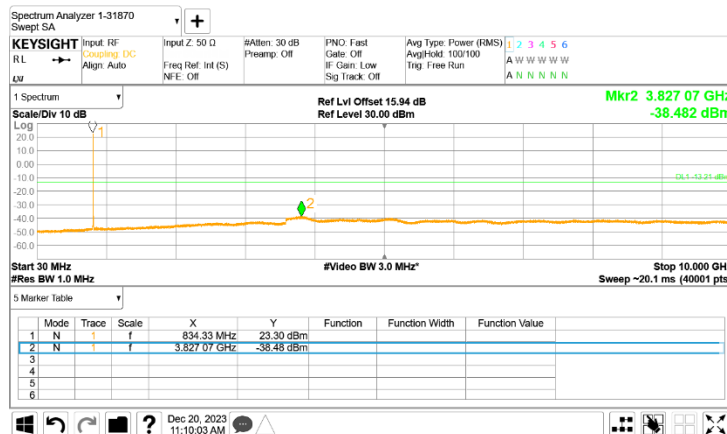
High channel

**NR Band n5**

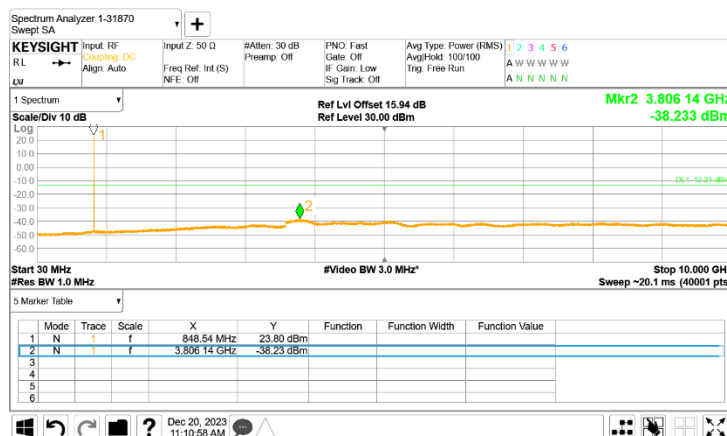
5MHz BPSK\_DFT-s\_OFDM



Low channel



Mid channel



High channel

## 8.6. FREQUENCY STABILITY

### RULE PART(S)

FCC: §2.1055, §22.355

### LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations.

### TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

### NOTE

Test were performed each lowest or highest frequency on the modulation condition of more wide bandwidth.(Please refer to section 9.1.1 OBW results)

### RESULTS

See the following pages.

### 8.6.1. FREQUENCY STABILITY RESULTS

#### GSM 850, Channel 128/251, Frequency 824.2/848.8 MHz

Test Date	2023-12-18
Test Engineer	25546

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20°C						
Limit: +- 2.5 ppm =	Low Channel	2060.500	Hz	High Channel	2122.000	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	50	824.20000535	-0.004	848.80000432	-0.003	2.5
3.88	40	824.20000341	-0.002	848.80000414	-0.003	2.5
3.88	30	824.20000432	-0.003	848.80000320	-0.002	2.5
<b>3.88</b>	<b>20</b>	<b>824.20000214</b>	<b>0.000</b>	<b>848.80000164</b>	<b>0.000</b>	<b>2.5</b>
3.88	10	824.20000162	0.001	848.80000113	0.001	2.5
3.88	0	824.20000334	-0.001	848.80000247	-0.001	2.5
3.88	-10	824.20000426	-0.003	848.80000362	-0.002	2.5
3.88	-20	824.20000560	-0.004	848.80000164	0.000	2.5
3.88	-30	824.20000648	-0.005	848.80000547	-0.005	2.5

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20°C						
Limit: +- 2.5 ppm =	Low Channel	2060.500	Hz	High Channel	2122.000	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
<b>3.88</b>	<b>20</b>	<b>824.20000214</b>	<b>0</b>	<b>848.80000164</b>	<b>0</b>	<b>2.5</b>
4.50	20	824.20000531	-0.004	848.80000365	-0.002	2.5
3.70	20	824.20000216	0.000	848.80000167	0.000	2.5

#### WCDMA Band 5

Test Date	2023-12-19
Test Engineer	25546

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C						
Limit: +- 2.5 ppm =	Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	50	826.40000632	0.002	846.60000341	0.001	2.5
3.88	40	826.40000495	0.004	846.60000264	0.002	2.5
3.88	30	826.40000514	0.003	846.60000337	0.001	2.5
<b>3.88</b>	<b>20</b>	<b>826.40000795</b>	<b>0.000</b>	<b>846.60000436</b>	<b>0.000</b>	<b>2.5</b>
3.88	10	826.40000348	0.005	846.60000834	-0.005	2.5
3.88	0	826.40000269	0.006	846.60000365	0.001	2.5
3.88	-10	826.40000648	0.002	846.60000324	0.001	2.5
3.88	-20	826.40000762	0.000	846.60000435	0.000	2.5
3.88	-30	826.40000841	-0.001	846.60000765	-0.004	2.5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C						
Limit: +- 2.5 ppm =	Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
<b>3.88</b>	<b>20</b>	<b>826.40000795</b>	<b>0</b>	<b>846.60000436</b>	<b>0</b>	<b>2.5</b>
4.50	20	826.40000241	0.007	846.60000532	-0.001	2.5
3.70	20	826.40000378	0.005	846.60000435	0.000	2.5

**LTE Band 5**

Test Date	2023-12-20
Test Engineer	25546

Reference Frequency : Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2061.750	Hz	High Channel	2120.750	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.88	50	824.70000614	-0.006	848.30000314	-0.001	2.5	
3.88	40	824.70000513	-0.005	848.30000269	0.000	2.5	
3.88	30	824.70000326	-0.003	848.30000334	-0.001	2.5	
<b>3.88</b>	<b>20</b>	<b>824.70000115</b>	<b>0.000</b>	<b>848.30000269</b>	<b>0.000</b>	<b>2.5</b>	
3.88	10	824.70000247	-0.002	848.30000347	-0.001	2.5	
3.88	0	824.70000345	-0.003	848.30000469	-0.002	2.5	
3.88	-10	824.70000214	-0.001	848.30000169	0.001	2.5	
3.88	-20	824.70000369	-0.003	848.30000241	0.000	2.5	
3.88	-30	824.70000435	-0.004	848.30000332	-0.001	2.5	

Reference Frequency : Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2061.750	Hz	High Channel	2120.750	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
<b>3.88</b>	<b>20</b>	<b>824.70000115</b>	<b>0</b>	<b>848.30000269</b>	<b>0</b>	<b>2.5</b>	
4.50	20	824.70000126	0.000	848.30000247	0.000	2.5	
3.70	20	824.70000547	-0.005	848.30000364	-0.001	2.5	

**NR Band n5**

Test Date	2023-12-22
Test Engineer	25546

Reference Frequency : Low Channel 826.5 MHz / High Channel 846.5 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2066.250	Hz	High Channel	2116.250	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.88	50	826.50000331	-0.001	846.50000136	0.002	2.5	
3.88	40	826.50000264	-0.001	846.50000360	-0.001	2.5	
3.88	30	826.50000165	0.001	846.50000247	0.001	2.5	
<b>3.88</b>	<b>20</b>	<b>826.50000220</b>	<b>0.000</b>	<b>846.50000314</b>	<b>0.000</b>	<b>2.5</b>	
3.88	10	826.50000111	0.001	846.50000169	0.002	2.5	
3.88	0	826.50000206	0.000	846.50000236	0.001	2.5	
3.88	-10	826.50000246	0.000	846.50000222	0.001	2.5	
3.88	-20	826.50000214	0.000	846.50000298	0.000	2.5	
3.88	-30	826.50000236	0.000	846.50000217	0.001	2.5	

Reference Frequency : Low Channel 826.5 MHz / High Channel 846.5 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2066.250	Hz	High Channel	2116.250	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
<b>3.88</b>	<b>20</b>	<b>826.50000220</b>	<b>0</b>	<b>846.50000314</b>	<b>0</b>	<b>2.5</b>	
4.50	20	826.50000220	0.000	846.50000164	0.002	2.5	
3.70	20	826.50000169	0.001	846.50000276	0.000	2.5	



## 9. RADIATED RESULTS

### 9.1. RADIATED POWER (ERP)

#### RULE PART(S)

FCC: §2.1046, §22.913,

#### LIMITS

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

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

#### TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.17; ESU40 setting reference to 971168 D01 v03r01

For radiated output power measurement with a ESU40:

- a) Set the RBW  $\geq$  OBW;
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 2 \times$  RBW;
- d) Sweep time = auto couple or 1 second;
- e) Detector = rms;
- f) Ensure that the number of measurement points  $\geq$  span/RBW;
- g) Trace mode = max hold(GSM, WCDMA), average(LTE, 5G NR);

#### TEST RESULTS

See the following pages.

### 9.1.1. ERP RESULTS

#### GSM (ANT A)

Band	Mode	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)
GSM 850	GPRS	824.20	29.95	V	3.01	-1.03	25.91	389.94	38.50	-12.59
		836.60	30.23	V	3.03	-0.97	26.24	420.73	38.50	-12.26
		848.80	29.41	V	3.05	-0.91	25.45	350.75	38.50	-13.05
	EGPRS	824.20	25.23	V	3.01	-1.03	21.19	131.52	38.50	-17.31
		836.60	26.11	V	3.03	-0.97	22.12	162.93	38.50	-16.38
		848.80	24.54	V	3.05	-0.91	20.58	114.29	38.50	-17.92

#### GSM (ANT E)

Band	Mode	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)
GSM 850	GPRS	824.20	32.30	V	3.01	-1.03	28.26	669.88	38.50	-10.24
		836.60	33.01	V	3.03	-0.97	29.02	797.99	38.50	-9.48
		848.80	33.01	V	3.05	-0.91	29.05	803.53	38.50	-9.45
	EGPRS	824.20	29.91	V	3.01	-1.03	25.87	386.37	38.50	-12.63
		836.60	31.12	V	3.03	-0.97	27.13	516.42	38.50	-11.37
		848.80	30.01	V	3.05	-0.91	26.05	402.72	38.50	-12.45

#### WCDMA (ANT A)

Band	Mode	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)
Band 5	REL99	826.40	23.16	V	3.01	-1.02	19.13	81.85	38.50	-19.37
		836.60	23.91	V	3.03	-0.97	19.92	98.17	38.50	-18.58
		846.60	23.69	V	3.05	-0.92	19.72	93.76	38.50	-18.78
	HSDPA	826.40	21.64	V	3.01	-1.02	17.61	57.68	38.50	-20.89
		836.60	23.08	V	3.03	-0.97	19.09	81.10	38.50	-19.41
		846.60	23.05	V	3.05	-0.92	19.08	80.91	38.50	-19.42

#### WCDMA (ANT E)

Band	Mode	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)
Band 5	REL99	826.40	24.09	V	3.01	-1.02	20.06	101.39	38.50	-18.44
		836.60	24.36	V	3.03	-0.97	20.37	108.89	38.50	-18.13
		846.60	23.59	V	3.05	-0.92	19.62	91.62	38.50	-18.88
	HSDPA	826.40	22.85	V	3.01	-1.02	18.82	76.21	38.50	-19.68
		836.60	23.96	V	3.03	-0.97	19.97	99.31	38.50	-18.53
		846.60	23.47	V	3.05	-0.92	19.50	89.13	38.50	-19.00

#### LTE Band 5 (ANT A)

BW (MHz)	Modulation	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)	RB
10	QPSK	829.00	23.37	V	3.02	-1.01	19.34	85.90	38.50	-19.16	1/0
		836.50	23.89	V	3.03	-0.97	19.89	97.50	38.50	-18.61	1/0
		844.00	23.66	V	3.04	-0.93	19.69	93.11	38.50	-18.81	1/0
	16-QAM	829.00	22.33	V	3.02	-1.01	18.30	67.61	38.50	-20.20	1/0
		836.50	22.84	V	3.03	-0.97	18.84	76.56	38.50	-19.66	1/0
		844.00	22.68	V	3.04	-0.93	18.71	74.30	38.50	-19.79	1/0
5	QPSK	826.50	23.07	V	3.01	-1.02	19.04	80.17	38.50	-19.46	1/0
		836.50	23.89	V	3.03	-0.97	19.89	97.50	38.50	-18.61	1/0
		846.50	23.35	V	3.05	-0.92	19.38	86.70	38.50	-19.12	1/0
	16-QAM	826.50	22.19	V	3.01	-1.02	18.16	65.46	38.50	-20.34	1/0
		836.50	22.83	V	3.03	-0.97	18.83	76.38	38.50	-19.67	1/0
		846.50	22.47	V	3.05	-0.92	18.50	70.79	38.50	-20.00	1/0
3	QPSK	825.50	21.98	V	3.01	-1.02	17.94	62.23	38.50	-20.56	1/8
		836.50	22.75	V	3.03	-0.97	18.75	74.99	38.50	-19.75	1/8
		847.50	22.39	V	3.05	-0.91	18.43	69.66	38.50	-20.07	1/0
	16-QAM	825.50	22.17	V	3.01	-1.02	18.13	65.01	38.50	-20.37	1/8
		836.50	22.88	V	3.03	-0.97	18.88	77.27	38.50	-19.62	1/0
		847.50	22.36	V	3.05	-0.91	18.40	69.18	38.50	-20.10	1/0
1.4	QPSK	824.70	21.94	V	3.01	-1.03	17.90	61.66	38.50	-20.60	1/5
		836.50	22.74	V	3.03	-0.97	18.74	74.82	38.50	-19.76	1/5
		848.30	22.59	V	3.05	-0.91	18.63	72.95	38.50	-19.87	1/0
	16-QAM	824.70	22.14	V	3.01	-1.03	18.10	64.57	38.50	-20.40	1/5
		836.50	22.76	V	3.03	-0.97	18.76	75.16	38.50	-19.74	1/3
		848.30	22.44	V	3.05	-0.91	18.48	70.47	38.50	-20.02	1/0

**LTE Band 5 (ANT E)**

BW (MHz)	Modulation	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)	RB
10	QPSK	829.00	24.60	V	3.02	-1.01	20.57	114.02	38.50	-17.93	1/25
		836.50	25.09	V	3.03	-0.97	21.09	128.53	38.50	-17.41	1/0
		844.00	25.01	V	3.04	-0.93	21.04	127.06	38.50	-17.46	1/0
	16-QAM	829.00	23.35	V	3.02	-1.01	19.32	85.51	38.50	-19.18	1/0
		836.50	24.06	V	3.03	-0.97	20.06	101.39	38.50	-18.44	1/25
		844.00	24.22	V	3.04	-0.93	20.25	105.93	38.50	-18.25	1/0
5	QPSK	826.50	23.92	V	3.01	-1.02	19.89	97.50	38.50	-18.61	1/24
		836.50	24.69	V	3.03	-0.97	20.69	117.22	38.50	-17.81	1/0
		846.50	24.08	V	3.05	-0.92	20.11	102.57	38.50	-18.39	1/0
	16-QAM	826.50	22.76	V	3.01	-1.02	18.73	74.64	38.50	-19.77	1/0
		836.50	23.81	V	3.03	-0.97	19.81	95.72	38.50	-18.69	1/0
		846.50	23.49	V	3.05	-0.92	19.52	89.54	38.50	-18.98	1/0
3	QPSK	825.50	23.15	V	3.01	-1.02	19.11	81.47	38.50	-19.39	1/8
		836.50	23.94	V	3.03	-0.97	19.94	98.63	38.50	-18.56	1/8
		847.50	23.20	V	3.05	-0.91	19.24	83.95	38.50	-19.26	1/0
	16-QAM	825.50	23.28	V	3.01	-1.02	19.24	83.95	38.50	-19.26	1/8
		836.50	24.09	V	3.03	-0.97	20.09	102.09	38.50	-18.41	1/8
		847.50	23.25	V	3.05	-0.91	19.29	84.92	38.50	-19.21	1/0
1.4	QPSK	824.70	23.02	V	3.01	-1.03	18.98	79.07	38.50	-19.52	1/5
		836.50	23.91	V	3.03	-0.97	19.91	97.95	38.50	-18.59	1/5
		848.30	23.77	V	3.05	-0.91	19.81	95.72	38.50	-18.69	1/0
	16-QAM	824.70	23.05	V	3.01	-1.03	19.01	79.62	38.50	-19.49	1/5
		836.50	24.09	V	3.03	-0.97	20.09	102.09	38.50	-18.41	1/3
		848.30	23.71	V	3.05	-0.91	19.75	84.41	38.50	-18.75	1/3

**NR Band n5 (DFT-OFDM) (ANT A)**

BW (MHz)	Modulation	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)	RB
20	BPSK	834.00	22.29	V	3.03	-0.98	18.28	67.30	38.50	-20.22	1/1
		836.50	22.13	V	3.03	-0.97	18.13	65.01	38.50	-20.37	1/1
		839.00	22.22	V	3.03	-0.96	18.23	66.53	38.50	-20.27	1/104
	16-QAM	834.00	21.84	V	3.03	-0.98	17.83	60.67	38.50	-20.67	1/53
		836.50	21.65	V	3.03	-0.97	17.65	58.21	38.50	-20.85	1/1
		839.00	21.77	V	3.03	-0.96	17.78	59.98	38.50	-20.72	1/53
15	BPSK	831.50	22.17	V	3.02	-0.99	18.15	65.31	38.50	-20.35	1/1
		836.50	22.15	V	3.03	-0.97	18.15	65.31	38.50	-20.35	1/1
		841.50	22.11	V	3.04	-0.94	18.13	65.01	38.50	-20.37	1/1
	16-QAM	831.50	21.68	V	3.02	-0.99	17.66	58.34	38.50	-20.84	1/40
		836.50	21.69	V	3.03	-0.97	17.69	58.75	38.50	-20.81	1/1
		841.50	21.76	V	3.04	-0.94	17.78	59.98	38.50	-20.72	1/1
10	BPSK	829.00	21.90	V	3.02	-1.01	17.87	61.24	38.50	-20.63	1/26
		836.50	22.20	V	3.03	-0.97	18.20	66.07	38.50	-20.30	1/1
		844.00	21.98	V	3.04	-0.93	18.01	63.24	38.50	-20.49	1/1
	16-QAM	829.00	21.42	V	3.02	-1.01	17.39	54.83	38.50	-21.11	1/50
		836.50	21.74	V	3.03	-0.97	17.74	59.43	38.50	-20.76	1/1
		844.00	21.55	V	3.04	-0.93	17.58	57.28	38.50	-20.92	1/50
5	BPSK	826.50	21.66	V	3.01	-1.02	17.63	57.94	38.50	-20.87	1/23
		836.50	22.24	V	3.03	-0.97	18.24	66.68	38.50	-20.26	1/1
		846.50	22.05	V	3.05	-0.92	18.08	64.27	38.50	-20.42	1/23
	16-QAM	826.50	21.19	V	3.01	-1.02	17.16	52.00	38.50	-21.34	1/23
		836.50	21.77	V	3.03	-0.97	17.77	59.84	38.50	-20.73	1/1
		846.50	21.59	V	3.05	-0.92	17.62	57.81	38.50	-20.88	1/23

**NR Band n5 (DFT-OFDM) (ANT E)**

BW (MHz)	Modulation	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)	RB
20	BPSK	834.00	23.64	V	3.03	-0.98	19.63	91.83	38.50	-18.87	1/1
		836.50	23.68	V	3.03	-0.97	19.68	92.90	38.50	-18.82	1/1
		839.00	23.41	V	3.03	-0.96	19.42	87.50	38.50	-19.08	1/1
	16-QAM	834.00	23.05	V	3.03	-0.98	19.04	80.17	38.50	-19.46	1/1
		836.50	22.84	V	3.03	-0.97	18.84	76.56	38.50	-19.66	1/1
		839.00	22.96	V	3.03	-0.96	18.97	78.89	38.50	-19.53	1/1
15	BPSK	831.50	23.55	V	3.02	-0.99	19.53	89.74	38.50	-18.97	1/1
		836.50	23.63	V	3.03	-0.97	19.63	91.83	38.50	-18.87	1/1
		841.50	23.35	V	3.04	-0.94	19.37	86.50	38.50	-19.13	1/1
	16-QAM	831.50	22.93	V	3.02	-0.99	18.91	77.80	38.50	-19.59	1/1
		836.50	22.87	V	3.03	-0.97	18.87	77.09	38.50	-19.63	1/1
		841.50	22.84	V	3.04	-0.94	18.86	76.91	38.50	-19.64	1/1
10	BPSK	829.00	23.34	V	3.02	-1.01	19.31	85.31	38.50	-19.19	1/26
		836.50	23.73	V	3.03	-0.97	19.73	93.97	38.50	-18.77	1/26
		844.00	23.26	V	3.04	-0.93	19.29	84.92	38.50	-19.21	1/1
	16-QAM	829.00	22.75	V	3.02	-1.01	18.72	74.47	38.50	-19.78	1/26
		836.50	22.85	V	3.03	-0.97	18.85	76.74	38.50	-19.65	1/1
		844.00	22.77	V	3.04	-0.93	18.80	75.86	38.50	-19.70	1/50
5	BPSK	826.50	23.08	V	3.01	-1.02	19.05	80.35	38.50	-19.45	1/23
		836.50	23.78	V	3.03	-0.97	19.78	95.06	38.50	-18.72	1/23
		846.50	23.32	V	3.05	-0.92	19.35	86.10	38.50	-19.15	1/23
	16-QAM	826.50	22.55	V	3.01	-1.02	18.52	71.12	38.50	-19.98	1/23
		836.50	22.84	V	3.03	-0.97	18.84	76.56	38.50	-19.66	1/1
		846.50	22.79	V	3.05	-0.92	18.82	76.21	38.50	-19.68	1/23

## 9.2. RADIATED SPURIOUS EMISSION

### RULE PART(S)

FCC: §2.1053, §22.917

### LIMIT

Part 22.917(a)

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

ANSI / TIA / EIA 603 E Clause 2.2.12; ESU40 setting reference to 971168 D01 v03r01

For peak power measurement with a ESU40:

- a) Set the RBW = 100 kHz for emission below 1 GHz.
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 1.5$  times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points  $\geq$  span/RBW;
- g) Trace mode = average(WCDMA, LTE, 5G NR), Maxhold(GSM);

### NOTE1

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.

### NOTE2

Please refer to section 5.4 for bandwidth and RB setting about LTE, 5G NR bands.

### RESULTS

See the following pages.

### 9.2.1. SPURIOUS RADIATION RESULTS

#### GSM850

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement							
		Company: Samsung Project #: 4790976580 Date: 2023-12-14 Test Engineer: 27089 Configuration: EUT / AC Adapter, Z-Position Location: Chamber 2 Mode: GPRS 850 MHz Harmonics Test Votage: AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
GPRS									
ANT A									
Low Ch, 824.2MHz									
1648.40	-9.4	V	3.0	40.8	1.0	-49.3	-13.0	-36.3	
2472.60	-6.3	V	3.0	41.4	1.0	-46.8	-13.0	-33.8	
3296.80	-4.0	V	3.0	42.2	1.0	-45.2	-13.0	-32.2	
1648.40	-9.9	H	3.0	40.8	1.0	-49.7	-13.0	-36.7	
2472.60	-6.1	H	3.0	41.4	1.0	-46.5	-13.0	-33.5	
3296.80	-3.0	H	3.0	42.2	1.0	-44.2	-13.0	-31.2	
Mid Ch, 836.6MHz									
1673.20	-9.4	V	3.0	40.8	1.0	-49.2	-13.0	-36.2	
2509.80	-6.3	V	3.0	41.5	1.0	-46.8	-13.0	-33.8	
3346.40	-3.8	V	3.0	42.2	1.0	-45.0	-13.0	-32.0	
1673.20	-10.3	H	3.0	40.8	1.0	-50.1	-13.0	-37.1	
2509.80	-5.7	H	3.0	41.5	1.0	-46.2	-13.0	-33.2	
3346.40	-3.1	H	3.0	42.2	1.0	-44.3	-13.0	-31.3	
High Ch, 848.8MHz									
1697.60	-9.1	V	3.0	40.8	1.0	-48.9	-13.0	-35.9	
2546.40	-6.0	V	3.0	41.5	1.0	-46.5	-13.0	-33.5	
3395.20	-3.4	V	3.0	42.2	1.0	-44.6	-13.0	-31.6	
1697.60	-10.0	H	3.0	40.8	1.0	-49.8	-13.0	-36.8	
2546.40	-5.5	H	3.0	41.5	1.0	-46.1	-13.0	-33.1	
3395.20	-2.9	H	3.0	42.2	1.0	-44.1	-13.0	-31.1	

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4790976580							
<b>Date:</b>		2023-12-14							
<b>Test Engineer:</b>		28775							
<b>Configuration:</b>		EUT / AC Adapter, X-Position							
<b>Location:</b>		Chamber 1							
<b>Mode:</b>		GPRS 850 MHz Harmonics							
<b>Test Voltage:</b>		AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, 824.2MHz</b>									
1648.40	-5.6	V	3.0	43.3	1.0	-47.9	-13.0	-34.9	
2472.60	-8.8	V	3.0	43.6	1.0	-51.3	-13.0	-38.3	
3296.80	-5.6	V	3.0	43.9	1.0	-48.5	-13.0	-35.5	
4121.00	-5.5	V	3.0	44.3	1.0	-48.8	-13.0	-35.8	
4945.20	-4.6	V	3.0	44.7	1.0	-48.3	-13.0	-35.3	
1648.40	-4.4	H	3.0	43.3	1.0	-46.7	-13.0	-33.7	
2472.60	-6.5	H	3.0	43.6	1.0	-49.1	-13.0	-36.1	
3296.80	-3.2	H	3.0	43.9	1.0	-46.1	-13.0	-33.1	
4121.00	-5.2	H	3.0	44.3	1.0	-48.5	-13.0	-35.5	
4945.20	-4.4	H	3.0	44.7	1.0	-48.1	-13.0	-35.1	
<b>Mid Ch, 836.6MHz</b>									
1673.20	-5.6	V	3.0	43.3	1.0	-47.9	-13.0	-34.9	
2509.80	-6.1	V	3.0	43.6	1.0	-48.7	-13.0	-35.7	
3346.40	-4.3	V	3.0	43.9	1.0	-47.3	-13.0	-34.3	
4183.00	-5.4	V	3.0	44.3	1.0	-48.7	-13.0	-35.7	
5019.60	-4.1	V	3.0	44.8	1.0	-47.8	-13.0	-34.8	
1673.20	-4.7	H	3.0	43.3	1.0	-47.0	-13.0	-34.0	
2509.80	-6.3	H	3.0	43.6	1.0	-48.8	-13.0	-35.8	
3346.40	-3.6	H	3.0	43.9	1.0	-46.6	-13.0	-33.6	
4183.00	-5.1	H	3.0	44.3	1.0	-48.5	-13.0	-35.5	
5019.60	-4.2	H	3.0	44.8	1.0	-48.0	-13.0	-35.0	
<b>High Ch, 848.8MHz</b>									
1697.60	-4.6	V	3.0	43.3	1.0	-46.9	-13.0	-33.9	
2546.40	-7.1	V	3.0	43.6	1.0	-49.7	-13.0	-36.7	
3395.20	-4.2	V	3.0	44.0	1.0	-47.2	-13.0	-34.2	
4244.00	-5.1	V	3.0	44.4	1.0	-48.5	-13.0	-35.5	
5092.80	-4.3	V	3.0	44.8	1.0	-48.1	-13.0	-35.1	
1697.60	-1.9	H	3.0	43.3	1.0	-44.2	-13.0	-31.2	
2546.40	-6.2	H	3.0	43.6	1.0	-48.8	-13.0	-35.8	
3395.20	-3.1	H	3.0	44.0	1.0	-46.1	-13.0	-33.1	
4244.00	-5.1	H	3.0	44.4	1.0	-48.5	-13.0	-35.5	
5092.80	-4.3	H	3.0	44.8	1.0	-48.1	-13.0	-35.1	

GPRS  
ANT E

**WCDMA Band 5**

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
REL99 ANT A	Company:	Samsung									
	Project #:	4790976580									
	Date:	2023-12-14									
	Test Engineer:	27089									
	Configuration:	EUT / AC Adapter, Z-Position									
	Location:	Chamber 2									
	Mode:	Rel99 Band 5 Harmonics									
	Test Voltage:	AC 120 V, 60 Hz									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch, 826.4MHz										
	1652.80	-14.9	V	3.0	40.8	1.0	-54.7	-13.0	-41.7		
	2479.20	-12.0	V	3.0	41.4	1.0	-52.4	-13.0	-39.4		
	3305.60	-9.4	V	3.0	42.2	1.0	-50.6	-13.0	-37.6		
	1652.80	-16.0	H	3.0	40.8	1.0	-55.8	-13.0	-42.8		
	2479.20	-11.9	H	3.0	41.4	1.0	-52.3	-13.0	-39.3		
	3305.60	-8.8	H	3.0	42.2	1.0	-50.0	-13.0	-37.0		
	Mid Ch, 836.6MHz										
	1673.20	-15.0	V	3.0	40.8	1.0	-54.8	-13.0	-41.8		
	2509.80	-12.0	V	3.0	41.5	1.0	-52.4	-13.0	-39.4		
	3346.40	-9.0	V	3.0	42.2	1.0	-50.2	-13.0	-37.2		
	1673.20	-15.9	H	3.0	40.8	1.0	-55.7	-13.0	-42.7		
	2509.80	-11.7	H	3.0	41.5	1.0	-52.2	-13.0	-39.2		
	3346.40	-8.7	H	3.0	42.2	1.0	-49.9	-13.0	-36.9		
	High Ch, 846.6MHz										
	1693.20	-14.9	V	3.0	40.8	1.0	-54.7	-13.0	-41.7		
2539.80	-11.7	V	3.0	41.5	1.0	-52.3	-13.0	-39.3			
3386.40	-8.9	V	3.0	42.2	1.0	-50.1	-13.0	-37.1			
1693.20	-15.8	H	3.0	40.8	1.0	-55.6	-13.0	-42.6			
2539.80	-11.5	H	3.0	41.5	1.0	-52.0	-13.0	-39.0			
3386.40	-8.5	H	3.0	42.2	1.0	-49.7	-13.0	-36.7			
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
REL99 ANT E	Company:	Samsung									
	Project #:	4790976580									
	Date:	2023-12-14									
	Test Engineer:	27089									
	Configuration:	EUT / AC Adapter, Z-Position									
	Location:	Chamber 2									
	Mode:	Rel99 Band 5 Harmonics									
	Test Voltage:	AC 120 V, 60 Hz									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch, 826.4MHz										
	1652.80	-15.0	V	3.0	40.8	1.0	-54.8	-13.0	-41.8		
	2479.20	-11.6	V	3.0	41.4	1.0	-52.0	-13.0	-39.0		
	3305.60	-9.3	V	3.0	42.2	1.0	-50.5	-13.0	-37.5		
	1652.80	-16.0	H	3.0	40.8	1.0	-55.8	-13.0	-42.8		
	2479.20	-11.5	H	3.0	41.4	1.0	-51.9	-13.0	-38.9		
	3305.60	-8.8	H	3.0	42.2	1.0	-50.0	-13.0	-37.0		
	Mid Ch, 836.6MHz										
	1673.20	-14.9	V	3.0	40.8	1.0	-54.7	-13.0	-41.7		
	2509.80	-11.6	V	3.0	41.5	1.0	-52.1	-13.0	-39.1		
	3346.40	-9.1	V	3.0	42.2	1.0	-50.3	-13.0	-37.3		
	1673.20	-15.8	H	3.0	40.8	1.0	-55.7	-13.0	-42.7		
	2509.80	-11.4	H	3.0	41.5	1.0	-51.9	-13.0	-38.9		
	3346.40	-8.6	H	3.0	42.2	1.0	-49.8	-13.0	-36.8		
	High Ch, 846.6MHz										
	1693.20	-14.8	V	3.0	40.8	1.0	-54.6	-13.0	-41.6		
2539.80	-11.4	V	3.0	41.5	1.0	-52.0	-13.0	-39.0			
3386.40	-8.9	V	3.0	42.2	1.0	-50.1	-13.0	-37.1			
1693.20	-15.8	H	3.0	40.8	1.0	-55.6	-13.0	-42.6			
2539.80	-11.2	H	3.0	41.5	1.0	-51.8	-13.0	-38.8			
3386.40	-8.4	H	3.0	42.2	1.0	-49.6	-13.0	-36.6			

**LTE Band 5**

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
		Company: Samsung Project #: 4790976580 Date: 2023-12-15 Test Engineer: 28775 Configuration: EUT / AC Adapter, Y-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Harmonics, 10MHz Bandwidth Test Voltage: AC 120 V, 60 Hz									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
10 MHz	QPSK	Low Ch, 829MHz									
		1658.00	-14.7	V	3.0	43.3	1.0	-57.0	-13.0	-44.0	
		2487.00	-11.6	V	3.0	43.6	1.0	-54.2	-13.0	-41.2	
		3316.00	-9.4	V	3.0	43.9	1.0	-52.3	-13.0	-39.3	
		1658.00	-15.7	H	3.0	43.3	1.0	-58.0	-13.0	-45.0	
		2487.00	-12.0	H	3.0	43.6	1.0	-54.6	-13.0	-41.6	
		3316.00	-9.2	H	3.0	43.9	1.0	-52.1	-13.0	-39.1	
		Mid Ch, 836.5MHz									
		1673.00	-11.9	V	3.0	43.3	1.0	-54.2	-13.0	-41.2	
		2509.50	-11.6	V	3.0	43.6	1.0	-54.2	-13.0	-41.2	
		3346.00	-9.3	V	3.0	43.9	1.0	-52.2	-13.0	-39.2	
		1673.00	-13.7	H	3.0	43.3	1.0	-56.0	-13.0	-43.0	
		2509.50	-11.5	H	3.0	43.6	1.0	-54.1	-13.0	-41.1	
		3346.00	-9.1	H	3.0	43.9	1.0	-52.1	-13.0	-39.1	
		High Ch, 844MHz									
		1688.00	-14.8	V	3.0	43.3	1.0	-57.2	-13.0	-44.2	
		2532.00	-11.7	V	3.0	43.6	1.0	-54.3	-13.0	-41.3	
		3376.00	-9.1	V	3.0	44.0	1.0	-52.1	-13.0	-39.1	
		1688.00	-15.5	H	3.0	43.3	1.0	-57.8	-13.0	-44.8	
		2532.00	-11.7	H	3.0	43.6	1.0	-54.3	-13.0	-41.3	
		3376.00	-8.9	H	3.0	44.0	1.0	-51.8	-13.0	-38.8	
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
		Company: Samsung Project #: 4790976580 Date: 2023-12-18 Test Engineer: 28183 Configuration: EUT / AC Adapter, Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Harmonics, 10MHz Bandwidth Test Voltage: AC 120 V, 60 Hz									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
10 MHz	QPSK	Low Ch, 829MHz									
		1658.00	-14.7	V	3.0	43.3	1.0	-57.0	-13.0	-44.0	
		2487.00	-8.1	V	3.0	43.6	1.0	-50.7	-13.0	-37.7	
		3316.00	-9.2	V	3.0	43.9	1.0	-52.2	-13.0	-39.2	
		1658.00	-15.4	H	3.0	43.3	1.0	-57.7	-13.0	-44.7	
		2487.00	-8.5	H	3.0	43.6	1.0	-51.1	-13.0	-38.1	
		3316.00	-9.1	H	3.0	43.9	1.0	-52.0	-13.0	-39.0	
		Mid Ch, 836.5MHz									
		1673.00	-14.2	V	3.0	43.3	1.0	-56.5	-13.0	-43.5	
		2509.50	-6.3	V	3.0	43.6	1.0	-48.8	-13.0	-35.8	
		3346.00	-9.1	V	3.0	43.9	1.0	-52.0	-13.0	-39.0	
		1673.00	-15.9	H	3.0	43.3	1.0	-58.3	-13.0	-45.3	
		2509.50	-6.4	H	3.0	43.6	1.0	-49.0	-13.0	-36.0	
		3346.00	-8.8	H	3.0	43.9	1.0	-51.7	-13.0	-38.7	
		High Ch, 844MHz									
		1688.00	-14.4	V	3.0	43.3	1.0	-56.8	-13.0	-43.8	
		2532.00	-9.3	V	3.0	43.6	1.0	-51.9	-13.0	-38.9	
		3376.00	-8.8	V	3.0	44.0	1.0	-51.8	-13.0	-38.8	
		1688.00	-15.8	H	3.0	43.3	1.0	-58.1	-13.0	-45.1	
		2532.00	-8.6	H	3.0	43.6	1.0	-51.2	-13.0	-38.2	
		3376.00	-8.5	H	3.0	44.0	1.0	-51.5	-13.0	-38.5	



**NR Band n5**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
		<b>Company:</b>	Samsung						
		<b>Project #:</b>	4790976580						
		<b>Date:</b>	2023-12-17						
		<b>Test Engineer:</b>	27089						
		<b>Configuration:</b>	EUT / AC Adapter, Z-Position						
		<b>Location:</b>	Chamber 2						
		<b>Mode:</b>	5G NR_BPSK NR n5 Harmonics, 5MHz Bandwidth						
		<b>Test Votage:</b>	AC 120 V, 60 Hz						
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
5 MHz									
DFT-OFDM									
BPSK									
ANT A									
Low Ch, 826.5MHz									
1653.00	-15.0	V	3.0	40.8	1.0	-54.8	-13.0	-41.8	
2479.50	-11.9	V	3.0	41.4	1.0	-52.3	-13.0	-39.3	
3306.00	-9.3	V	3.0	42.2	1.0	-50.5	-13.0	-37.5	
1653.00	-15.9	H	3.0	40.8	1.0	-55.7	-13.0	-42.7	
2479.50	-11.8	H	3.0	41.4	1.0	-52.2	-13.0	-39.2	
3306.00	-8.8	H	3.0	42.2	1.0	-50.0	-13.0	-37.0	
Mid Ch, 836.5MHz									
1673.00	-14.9	V	3.0	40.8	1.0	-54.7	-13.0	-41.7	
2509.50	-11.8	V	3.0	41.5	1.0	-52.3	-13.0	-39.3	
3346.00	-9.0	V	3.0	42.2	1.0	-50.2	-13.0	-37.2	
1673.00	-15.8	H	3.0	40.8	1.0	-55.6	-13.0	-42.6	
2509.50	-11.7	H	3.0	41.5	1.0	-52.2	-13.0	-39.2	
3346.00	-8.6	H	3.0	42.2	1.0	-49.8	-13.0	-36.8	
High Ch, 846.5MHz									
1693.00	-14.8	V	3.0	40.8	1.0	-54.6	-13.0	-41.6	
2539.50	-11.7	V	3.0	41.5	1.0	-52.2	-13.0	-39.2	
3386.00	-8.7	V	3.0	42.2	1.0	-49.9	-13.0	-36.9	
1693.00	-15.8	H	3.0	40.8	1.0	-55.6	-13.0	-42.6	
2539.50	-11.6	H	3.0	41.5	1.0	-52.1	-13.0	-39.1	
3386.00	-8.4	H	3.0	42.2	1.0	-49.6	-13.0	-36.6	

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement													
		<b>Company:</b>	Samsung										
		<b>Project #:</b>	4790976580										
		<b>Date:</b>	2023-12-18										
		<b>Test Engineer:</b>	28775										
		<b>Configuration:</b>	EUT / AC Adapter, X-Position										
		<b>Location:</b>	Chamber 2										
		<b>Mode:</b>	5G NR_BPSK NR n5 Harmonics, 5MHz Bandwidth										
		<b>Test Voltage:</b>	AC 120 V, 60 Hz										
5 MHz	DFT-OFDM	BPSK	ANT E	f	SG reading	Ant. Pol.	Distance	Preamp	Filter	EIRP	Limit	Delta	Notes
				MHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
<b>Low Ch, 826.5MHz</b>													
				1653.00	-14.2	V	3.0	40.8	1.0	-54.1	-13.0	-41.1	
				2479.50	-11.8	V	3.0	41.4	1.0	-52.2	-13.0	-39.2	
				3306.00	-9.3	V	3.0	42.2	1.0	-50.5	-13.0	-37.5	
				1653.00	-15.4	H	3.0	40.8	1.0	-55.2	-13.0	-42.2	
				2479.50	-11.8	H	3.0	41.4	1.0	-52.3	-13.0	-39.3	
				3306.00	-8.8	H	3.0	42.2	1.0	-50.0	-13.0	-37.0	
<b>Mid Ch, 836.5MHz</b>													
				1673.00	-14.7	V	3.0	40.8	1.0	-54.5	-13.0	-41.5	
				2509.50	-11.8	V	3.0	41.5	1.0	-52.2	-13.0	-39.2	
				3346.00	-9.0	V	3.0	42.2	1.0	-50.2	-13.0	-37.2	
				1673.00	-15.6	H	3.0	40.8	1.0	-55.4	-13.0	-42.4	
				2509.50	-11.6	H	3.0	41.5	1.0	-52.0	-13.0	-39.0	
				3346.00	-8.6	H	3.0	42.2	1.0	-49.8	-13.0	-36.8	
<b>High Ch, 846.5MHz</b>													
				1693.00	-14.8	V	3.0	40.8	1.0	-54.6	-13.0	-41.6	
				2539.50	-11.7	V	3.0	41.5	1.0	-52.2	-13.0	-39.2	
				3386.00	-8.8	V	3.0	42.2	1.0	-50.0	-13.0	-37.0	
				1693.00	-15.7	H	3.0	40.8	1.0	-55.5	-13.0	-42.5	
				2539.50	-11.5	H	3.0	41.5	1.0	-52.0	-13.0	-39.0	
				3386.00	-8.4	H	3.0	42.2	1.0	-49.6	-13.0	-36.6	

## END OF REPORT